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**GEOLOGICAL SURVEY OF CANADA
OPEN FILE 8095**

Guide to Authors

Compiled by

A.J. Weatherston, O.E. Inglis, J. Gray, D. Busby, and B. Couture

2016

Canada



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ACKNOWLEDGMENTS

This *Guide to Authors* has evolved over many years from the earliest versions by H.M.A. Rice and P. Harker in the 1960s, and by R.G. Blackadar, H. Dumych, and P.J. Griffin in the 1970s. As techniques in both the acquisition of geological information and in publishing changed and evolved, the Guide did also, moving from 1998's printed Open File 3600 to an online version in the early 2000s, with new material, suggestions and critical review by (in alphabetical order) E.M. Cameron, J. Caron, F.W. Chandler, M.-F. Dufour, H. Dumych, S.R. Elliot Meadows, P.J. Griffin, G. Labelle, O.E. Inglis, J. Kingsley, J.M. MacGillivray, A.D. McCracken, D.C. McGregor, W.C. Morgan, G.S. Nowlan, N.C. Ollerenshaw, T. Poulton, L. Reynolds, and A.J. Weatherston.

This latest incarnation of the Guide is a downloadable and printable version that builds on all those that have come before. It was updated and augmented with new material by a group led by J. Gray, consisting of (in alphabetical order) D. Busby, P. Champagne, B. Couture, O.E. Inglis, and A.J. Weatherston.

INTRODUCTION

The Geological Survey of Canada (GSC) and Geomatics Canada (GC) produce information to promote the sustainable and balanced use of geological resources for business and industry. They release many of the results of scientific research programs in the form of publications and maps. As do most institutions involved in scholarly publishing, ESS requires that submissions by authors comply with its own set of precise specifications. To assist authors, a Guide to Authors was prepared more than 20 years ago, and several revised editions have been released since then.

The main purpose for such a guide is to provide authors with examples of the style in use at the GSC and GC. To this end, we have adopted a style of presentation and standards for our publications that have become the hallmark of GSC/GC publications and that contribute to the high esteem in which these publications are generally held.

The Guide to Authors is divided into four main parts:

- Descriptions of publication types
- The critical review process
- Reference material helpful for writing reports
- Nuts and bolts of style: grammar, punctuation, reference style, and alphabetical list of spelling and usage.

ABOUT BULLETINS

This series generally comprises final results from ESS science projects (outputs) or comprehensive final reports on subjects such as the geology of specific geographic areas or the study of climate change in an area of Canada.

Bulletins deal with topics like the following, and are of either broad regional or local interest: systematic bedrock or surficial mapping, geophysics, geochemistry, structural geology, economic geology, carbon sequestration, climate change, etc. Accompanying data are released in the Open File series.

A bulletin is either a monograph (a report on a single subject or a group of related subjects, usually written by one author) or a compendium (a collection of articles on a subject or group of related subjects by different authors).

Each Bulletin is critically reviewed by two specialists and is scientifically edited. The series is geared towards specialists (mining industry, land-use planning, geoscience students) rather than the general public.

Consult the [Submission guidelines](#) for more information.

Bulletins are available for free download through [GEOSCAN](#).

ABOUT CANADIAN GEOSCIENCE MAPS

Each product in this series includes a complex, multicoloured map, georeferenced interpretation, and selected data from a science project in any part of the Earth Sciences Sector, e.g. GSC, CCMEQ, etc.

Canadian Geoscience Maps can consist of preliminary versions and/or a final version. The preliminary versions are produced to expedite the release of information, and to act as a repository for relevant supporting data that are referred to in published reports. Final versions can incorporate geophysical, geochemical, or dating results from samples collected in the field.

Preliminary versions are critically reviewed by one specialist, and the final version is critically reviewed by two specialists. In addition, the final version is scientifically edited.

The series is geared towards specialists (mining industry, land-use planning, geoscience students) rather than the general public.

Consult the [Submission guidelines](#) for more information.

Canadian Geoscience Maps are available for free download through [GEOSCAN](#). The GIS data are included, as well as an image of the map in .pdf format.

ABOUT CURRENT RESEARCH

This series contains short reports that are comparable in scope and subject matter to those appearing in scientific journals and other serials. Oversized items cannot be included in Current Research articles.

Each article is critically reviewed by one specialist and undergoes a scientific edit. The series is geared towards specialists (mining industry, land-use planners, geoscience students) rather than the general public.

Consult the [Submission guidelines](#) for more information.

Current Research articles are available for free download through [GEOSCAN](#).

ABOUT INFORMATION PRODUCTS

The ESS General Information Product series is a vehicle for publishing or reposting stand-alone articles that do not fit into any of the other publication series. A separate, parallel series (CGDI Information Product) was started to accommodate similar products coming from the Canadian Geoscience Data Infrastructure program.

Information Products are critically reviewed by one specialist. The series is geared towards specialists (mining industry, land-use planners, geoscience students) rather than the general public.

Information Products are available for free download through [GEOSCAN](#).

ABOUT OPEN FILES

This series is produced to expedite the release of information by making unedited manuscript material available to the public in advance of formal publication, and to act as a repository for relevant supporting data that are referred to in published reports.

Open Files can consist of reports, posters, data sets, or any combination thereof. They may contain voluminous data sets resulting from multiparameter geophysical and geochemical surveys, consultants' reports, or preliminary, unvetted field and laboratory results.

Open Files are critically reviewed by one specialist. The series is geared towards specialists (mining industry, land-use planners, geoscience students) rather than the general public.

Consult the [Open File instructions](#) for more information.

Open Files are available for free download through [GEOSCAN](#).

ABOUT POPULAR GEOSCIENCE

These are popular guides or posters designed to help the general public have a better understanding of the geosciences and how they are important for Canada. Examples of products in this series are Geoscape and Climate Change posters, the *Rocks and Minerals for the Collector* series, and field guides.

Popular Geoscience publications are critically reviewed by two specialists and are scientifically edited. The series is geared towards the general public.

In December 2006, Popular Geoscience replaced the Miscellaneous Report series.

Consult the [Submission guidelines](#) for more information.

Popular Geoscience publications are available for free download through [GEOSCAN](#). Some posters may be available as offset-printed paper copies.

ABOUT SCIENTIFIC PRESENTATIONS

This series comprises summary versions of scientific results from ESS science projects (outputs), such as PowerPoint presentations or posters for a conference. PowerPoint presentations must be self-explanatory, and must include presenter's notes or voice-over technology. Digital files for the series will be made available as .pdf or .ppt files, or other format to be accepted on a case-by-case basis.

Scientific Presentations are not edited by Scientific and Technical Publishing Services (STPS); however, they must be critically reviewed by one specialist. The series is geared towards specialists (mining industry, land-use planners, geoscience students) rather than the general public.

Stand-alone abstracts are not accepted as part of this series.

Templates for both [posters](#) and [PowerPoint presentations](#) are available and must be used for Scientific Presentations submitted to STPS for publication. The PowerPoint template utilizes the required NRCan Family Look and consists of two slides that must appear at the beginning of Power Point presentations. The .cdr poster template consists of banners across the upper and lower margins of the poster for the title, author names, Federal Identity Program logos, etc., and is available in three sizes.

Consult the [Submission guidelines](#) for more information.

Scientific Presentations are available for free download through [GEOSCAN](#).

ABOUT TECHNICAL NOTES

This series is a vehicle for publishing methods and techniques developed by ESS scientists as program outputs and by laboratory staff in support of programs. Oversized items cannot be included in Technical Note articles.

Technical Notes are critically reviewed by one specialist and undergo a scientific edit. The series is geared towards specialists (mining industry, land-use planners, geoscience students) rather than the general public.

Consult the [Submission guidelines](#) for more information.

Technical Notes are available for free download through [GEOSCAN](#).

ABOUT EXTERNAL PUBLICATIONS

Contributions by ESS scientists to outside journals or publishing houses are termed *External Publications*. They are not ESS, GSC, or CCRS publications, and are not processed by Scientific and Technical Publishing Services (STPS). However, in order to be traceable in GEOSCAN, External Publications must be entered into the ESS Publishing Process Integration system (PPI).

What do I need to do?

Open [PPI](#) (Internet Explorer only) and click **Add** as you would for any new publication. You will be given the option of three forms. Click on **PUB3020 External Publication Permission to Publish**. Fill out the form with the necessary information and click **Save**. You do not need to enter a contribution number. The NRCan Library will assign one and send you an email confirming that a number has been issued and entered on the form. See [Obtaining and using a contribution number for an external publication](#).

What next?

Follow the submission instructions supplied by your external publisher. Your contribution must conform to the style guide of the publisher, not that of STPS.

Remember to fill out Pub3007 (Crown copyright reserve form) and forward it to the publisher along with your contribution. See [About copyright](#).

ABOUT THE CRITICAL REVIEW PROCESS

Critical review plays an essential role in maintaining the quality of ESS publications, and must be documented in the ESS Publishing Process Integration system (PPI). As a scientist, you must expect to be assigned publications for critical review as a normal part of your duties, and that your publications will be subject to critical review.

What should be reviewed?

All publications must be critically reviewed, but the number of reviewers required depends on the type of publication.

Current Research, Technical Note, Scientific Presentation, Canadian Geoscience Maps (preliminary versions) and Open Files: One Critical Reviewer's form must be completed, saved, and approved by your Publication Supervisor in PPI

Bulletin, Popular Geoscience, Canadian Geoscience Maps (final versions): Two Critical Reviewer's forms must be completed, saved, and approved by your Publication Supervisor in PPI.

Data: Two Critical Reviewer's forms must be completed, saved, and approved by your Publication Supervisor in PPI. The first is a scientific critical review; the second a technical critical review. The technical review pertains to the overall usability of the tools employed to provide the information (e.g. database interface) and should be done by someone who is knowledgeable about the data and the tools used in the data delivery.

Note

After the critical review has been completed, and the Critical Reviewer's form has been approved by your Publication Supervisor in PPI, you will be notified by email to go into PPI and complete the author's portion of the form.

Who should critically review my work?

A Critical Reviewer should be familiar with your area of study, and must be impartial. In the case of technical critical reviews, the reviewer must understand the data and the tools used to deliver it. If the required expertise is not available in-house, you may recommend an outside Critical Reviewer.

Note

If you wish to use an outside Critical Reviewer, he or she will need access to PPI. To obtain this, send a request to: [PPI Administrator](#).

If, on your Permission to Publish form in PPI, you suggest Critical Reviewers for your publication, they must be approved by your Publication Supervisor. If you do not suggest anyone, it is your Publication Supervisor's responsibility to designate reviewers.

When should my publication be reviewed?

Do not submit your publication for review until it is complete. Formal critical review doesn't take the place of peer discussion, which may generate new ideas and new material.

In the case of maps, critical review usually takes place after preliminary cartographic work is done.

For more information:

[Critically reviewing manuscripts](#)

[Critically reviewing maps](#)

CRITICALLY REVIEWING MANUSCRIPTS

Critical review plays an essential role in maintaining the quality of ESS publications. As a scientist, you must expect to be assigned manuscripts for critical review as a normal part of your duties, and that your manuscripts be subject to critical review.

Note

Critical reviewers must fill out a Critical Reviewer's Appraisal Form (PUB3012) in the ESS Publication Process Integration system ([PPI](#)) (Internet Explorer only).

Here are the steps you need to follow in order to critically review another scientist's manuscript:

1. Make sure your experience allows you to accurately assess all aspects of the report.
 - Are there sections that should be reviewed by someone else?
2. Assess whether or not the manuscript is worthy of formal publication.
 - Does it contain any significant advances in knowledge, or is it composed of confirmatory data?
 - Does it meet the objectives of the project?
3. Check the organization of the manuscript.
 - Does it meet its purpose in the shortest, clearest manner?
4. Look at the title.
 - Is it appropriate?
5. Read the abstract and assess whether or not it is informative and representative of the paper. It should not be a summary. See [About abstracts](#)
6. Read the introduction and assess whether or not it provides adequate background for the reader.
7. Look at the figures and tables.
 - Could they be better designed?
 - Are they all necessary or could some be combined?
 - Could some text messages be better conveyed through an illustration?
8. Check the text and illustrations for errors of fact, interpretation, or calculation.
9. Make sure the author has cited only the pertinent literature.
10. Ensure that, if the author has made use of material already presented in another publication, it has been adequately referenced.
 - Could any parts of the report be considered dual publication?
 - Has full credit been given to other authors?
11. Check that geographic or geological names referred to in the text appear on one or more of the maps and illustrations.
12. Consider the length of the report.
 - Is it padded?
 - Should parts be deleted or condensed?
 - Alternatively, should some parts be expanded in order to convey the message?

Note

A critical reviewer is not a ghost writer, and authors must not expect their reports to be rewritten.

13. Check that the scientific terminology meets accepted standards.
 - Are measurements expressed in SI units wherever possible?
14. Fill out the Critical Reviewer's Appraisal Form (PUB 3012) in [PPI](#) (Internet Explorer only).
 - Return the critically reviewed manuscript to the author.

You have completed your critical review obligations for this manuscript.

CRITICALLY REVIEWING MAPS

Critical review plays an essential role in maintaining the quality of ESS formal publications. As a scientist, you must expect to be assigned maps for critical review as a normal part of your duties, and that your maps be subject to critical review.

Note

Critical reviewers must fill out a Critical Reviewer's Appraisal Form (PUB3012) in the ESS Publication Process Integration system ([PPI](#)) (Internet Explorer only).

Here are the steps you need to follow in order to critically review another scientist's map:

1. Make sure your experience allows you to accurately assess all aspects of the map. Should the map be reviewed by someone else?
2. Check the scale of the map considering detail. Is it appropriate? Frequently used maps scales are 1:50 000, 1:100 000, 1:125 000, 1:250 000, and 1:500 000 (for a compilation).
3. Ensure that the proper projection has been used.
4. Read the abstract and assess whether or not it is informative and representative of the map. *See [About abstracts](#).*
5. Make sure the legend values exist on the map (no extra data) and that no values are missing (exist on map but not in legend). Ensure the legend items have the proper indentation (parent-child relationship).
6. Check for impossible geology or geometrically unlikely interpretations/anomalies. Examine the geological interpretation overall.
7. Check that stratigraphic symbols are accurate. Are faults accurately portrayed as thrust or normal? Errors could be the result of data entry error, symbolization error, or interpretation error.
8. Check cross-sections against mapping along the line of section.
9. Fill out the Critical Reviewer's Appraisal Form (PUB 3012), including a brief evaluation of the map, in [PPI](#) (Internet Explorer only).
10. Return the critically reviewed map to the author.

You have completed your critical review obligations for this map.

ABOUT AUTHORSHIP

The following provides information about how you should cite your name as an ESS author, and guidelines for dealing with the different types of authoring situations you may encounter when producing a publication.

Consistency of use

Be consistent in the use of your surname and initials throughout your career. Changes in surname or initials can be confusing to fellow scientists, librarians, and bibliographers, as a literature search or Google search will not identify all of your work. Note that in ESS publications, authors are identified solely by surname and initials in references and recommended citations, and only initials and surnames appear on the cover and title pages, unless ambiguity would result (e.g. two authors with the same surname and initials).

Joint authorship

In a co-authored publication list the primary author first. List the remaining authors in decreasing order based on the importance of their contribution. If authors have made equally significant contributions to the publication, list them in alphabetical order.

Volume editor

In a multi-author Bulletin, a volume editor is responsible for

- collecting the papers for the volume
- ensuring all papers are critically reviewed
- working with STPS
- acting as liaison between STPS's scientific editors and the authors
- getting the papers and illustrations from the contributors to STPS
- distributing the edited copies to the authors
- ensuring that the authors' answers to the scientific editors' queries get back to STPS

Compiler

A compiler is considered responsible for collecting the information for a work, but his or her input of new scientific material is minimal. The role is seen mostly in the production of geoscience maps, although it would be an appropriate term for a primary scientific contact who does not take on the tasks inherent in the volume editor role (*see above*).

Supporting contributor

Scientific and technical staff may contribute data such as age determinations, rock or mineral analyses, fossil identification, paleomagnetic information, petrography, etc. to publications. Where possible, these data should be grouped together in tabular form or as an appendix, preferably as a separate item at the end of the report, under the name of the contributor, so that if necessary, the results can be cited in other publications. Where this is not possible, and where such contributions are scattered throughout the text,

then there should be proper acknowledgment in each case, for example, 'These rocks were studied by J.M. Jones of the Geological Survey of Canada, who reported as follows...'. Tables of analytical or other data should clearly state the name of the laboratory where the work was done, with the analyst's name (if applicable), the method used, and with laboratory identification numbers.

Acknowledge contributions as such in the title of your publication, for example:

Lower Ordovician strata of Cold Creek, Ontario

A.P. Hodges, I.H. Maraposa, and R.J. Smith

(with contributions by S.R. Johnston and S.S. Williams)

For more information

If you need more information regarding your specific authorship situation, please contact the [Head, STPS](#).

ABOUT ALTERNATE CONTACT INFORMATION

Scientific and Technical Publishing Services (STPS) must have the contact information (name, email address, telephone number) for a person who can review your publication proofs in the event you are away or out in the field when they are ready for the author check.

This information should be entered in the appropriate fields on the Permission-to-Publish form in the ESS Publishing Process Integration system ([PPI](#)) (Internet Explorer only).

ABOUT ABSTRACTS

Abstracts must be submitted with Bulletins (both monograph and compendium), Current Research articles, Technical Notes, Popular Geoscience reports, and Canadian Geoscience Maps.

What are they?

Abstracts should state the purpose, nature, and scope of the publication, along with a summary of any significant results. If your publication reports on experimental work, list quantitative conclusions. Do not include figures, tables, illustrations, or reference citations in your abstract. Do not repeat the title.

How long should they be?

- Bulletin (monograph): 250 words or fewer
- Bulletin (compendium): 150 words or fewer per article
- Current Research (short – less than 5000 words): 150 words or fewer
- Current Research (long – 5000 -10 000 words): 250 words or fewer
- Technical Note: 250 words or fewer
- Popular Geoscience (report): 250 words or fewer
- Canadian Geoscience Map: 150 words or fewer

Longer abstracts will be returned to the author to be shortened.

What about translation?

Abstracts are translated into the other official language, and the translation is published in the report. Scientific and Technical Publishing Services will co-ordinate that service. If you are able to submit an abstract in both official languages you may do so, but remember that online automatic translations are not acceptable.

ABOUT SUMMARIES

Summaries are meant to improve access to the published output of ESS scientific programs in both official languages.

When is a summary required?

A summary is required Bulletins (both monograph and compendium) and for Popular Geoscience guidebooks. Bulletins released in both official languages, such as reports of general interest, broad economic impact, or those dealing with Canada-wide topics, do not require a summary.

What is it?

A summary is essentially a précis of your Bulletin or Popular Geoscience guidebook, but does not include figures, tables, illustrations, or reference citations.

How long should it be?

A summary should be 3 to 5% of the total word count of the manuscript, but no fewer than 1.5 double-spaced, single-column pages.

What about translation?

Summaries are translated into the other official language, and the translation is published in the Bulletin or Popular Geoscience. Scientific and Technical Publishing Services (STPS) will co-ordinate that service. If you are able to submit a summary in both official languages you may do so, but remember that online automatic translations are not acceptable.

Where can I see an example?

Check any recently published ESS Bulletin for an example.

TABLE TITLES, FIGURE CAPTIONS, AND SHORT FIGURE CAPTIONS

A table title briefly describe the contents of a table. A figure caption is a detailed description of the contents of a figure. Shorter, simplified versions of figure captions appear in the table of contents of Bulletins and Popular Geoscience reports.

Table titles

A table title is placed at the top of the table.

Table 6. Isotopic analysis of samples selected for radiometric dating, Dubawnt Lake area.

Place descriptions of error ranges, reference citations, explanations of abbreviations, etc. as notes below the table.

Figure captions

Make sure the caption adequately describes the figure contents.

Ensure that abbreviations and/or symbols appear on a legend **within** the figure and **not** in the figure caption.

If the figure or photograph consists of several parts (a, b, c, etc.), use an introductory phrase to explain the purpose of the figure as a whole; this introductory phrase can become your short caption.

Figure 53. Feldspar- and leucite-bearing rocks of the Christopher Island Formation: **a)** unit PBCvf lava with sanidine, clinopyroxene, olivine, and phlogopite; **b)** sanidine porphyry dyke. *See* Figure 6 for photograph locations.

Figure 17. Spinel prism plots: **a)** and **b)** oxidized prism, **c)** and **d)** reduced prism.

Short captions list

Short captions, simplified versions of the figure captions, are required for the table of contents of Bulletins or Popular Geoscience reports — they should be no more than one line in length.

Do not include reference citations or references to other figures or tables in the short captions.

This long caption:

Figure 53. Feldspar- and leucite-bearing rocks of the Christopher Island Formation: a) unit PBCvf lava with sanidine, clinopyroxene, olivine, and phlogopite; b) sanidine porphyry dyke. See Figure 6 for photograph locations.

becomes this short caption:

Figure 53. Feldspar- and leucite-bearing rocks of the Christopher Island Formation.

CREATING YOUR COLUMNAR SECTION

A columnar section is a graphic representation of a measured vertical sequence of rocks (type section, reference section, etc.). Include columnar sections in the text of your report only if they are of reasonable length. Otherwise, you can add them as an appendix, or, if very long, release them as an Open File and reference them in your report.

When creating your columnar section

1. Describe the section from the top down.
2. Identify the original system of measurement.
3. Use the following template to describe each unit or bed:

Rock type: composition or mineralogy, grain or crystal size(s); fresh colour and weathered colour; bedding characteristics; other structures; fossil content; basal contact; general or additional comments.

(The above is also a template for font style (bold) and punctuation.)
4. When discussing sequences of events reflected by sections, describe the sequence in terms of older to younger.
5. List identified fossils by name along with the registered GSC locality number as part of the description of the bed in which they were found.

ABOUT COPYRIGHT

This section gives a short overview, in Q&A form, of copyright issues facing ESS authors.

Why do we worry about copyright?

Copyright laws protect the original producer, writer, and/or publisher of material from the unauthorized reproduction of that material. Unauthorized reproduction of material from scientific reports is no different than that of music, novels, and movies, and is subject to prosecution. It is imperative, therefore, to obtain copyright permission from the copyright holder to use, in an ESS publication, any previously published figure, photograph, or other text material — **and this is your responsibility.**

How do I know if I need to ask for copyright permission?

All photos, figures, tables, or pieces of text longer than 50 words that are not original should be checked to see if copyright permission is necessary. Redrafting a figure or making minor modifications to one **does not** relieve you from having to obtain copyright clearance.

Check the colophon page of the journal or publication containing the original material to see if written permission must be obtained to reproduce a figure or photograph. For example, the *Canadian Journal of Earth Sciences* grants permission to reproduce figures, etc. provided the source is acknowledged, but recommends that the consent of the original author be obtained.

Permission is not required for material already published by Natural Resources Canada or other federal government departments.

How do I obtain copyright permission?

[Text](#) has been prepared to assist you in obtaining copyright clearance. You can copy and paste it into an email, or print it and then fax or mail it to the copyright holder.

Instructions on [how to obtain copyright permission](#) have been created for you.

Once you have secured the proper permission in writing (an email is acceptable), include a copy with your manuscript when you submit it to STPS for editing and production. Any costs incurred securing this permission (royalties, licensing fees, etc.) are solely your responsibility, or the responsibility of your division/program.

How do I indicate in my paper that a figure has been reproduced from another publication?

Include the appropriate credit in the figure caption. When illustrations are reproduced from other publications, the appropriate credit will vary according to whether changes were made to the figure or not, as the following examples show:

(Froese, 1995, Fig. 3) indicates no change in information

(*after* Froese, 1995, Fig. 3) indicates possible redrafting, but no change in information

(*modified from* Froese, 1995, Fig. 3) indicates change in information

I am publishing externally, and the journal wants me to sign over copyright to them. What should I do?

You **do not** have the authority to sign over copyright to an outside publisher for work done as an employee of the Government of Canada. Any work that you do in the course of your employment remains copyrighted to the Crown.

If you are publishing externally, you need to fill out Pub3007 (Crown copyright reserve form) and forward it to the publisher along with your manuscript.

OBTAINING COPYRIGHT PERMISSION

If you use material already published by another author (e.g. reproduce a figure), you must obtain copyright permission to do so. This protects your organization from possible litigation. Redrafting a figure or making minor modifications does not relieve you from having to obtain copyright clearance.

You must complete the Copyright Request Sign-off form (PUB3006) in the ESS Publication Process Integration system ([PPI](#)) (Internet Explorer only) whether or not you have included figures, photos, or tables that require copyright permission in your publication.

More information can be found in [About copyright](#). Follow these steps to obtain your copyright permission:

1. Check all previously published figures, photos, tables, and quoted text appearing in your publication and decide which need copyright permission.
2. Check with the journal or publication in which the material was previously published to see what is required in order to reproduce it.
3. If written permission is required, copy and paste the following text into a document and send via email, fax, or mail to the copyright owner.

To whom it may concern:

I am preparing [insert series name and title] for the Geological Survey of Canada, dealing with [insert subject] . I would like permission to include the material, as outlined on the attached form, in this and any future revisions and/or editions thereof; the work and copyright holder will be cited in the customary manner.

This permission will in no way restrict re-publication of your material by you or others authorized by you. If it is not within your power to grant these rights, please let me know whom I should contact.

I am looking forward to hearing a positive reply to this request.

Yours truly,

4. When permission is received, make sure you've included the appropriate credit in your figure caption, table note, etc. and added the reference to the publication the material came from in the References list.
5. Complete the copyright sign-off form (PUB3006) in PPI to indicate either that you've obtained copyright permission for any previously published material, or that no material in your publication needs copyright permission.
6. Include copies of all required permissions with your manuscript when you submit it to Scientific and Technical Publishing Services (STPS) for publication.

If you have questions about obtaining copyright permission, or whether your situation warrants it, contact the [Head, STPS](#).

Note

Any costs associated with securing permission (royalties, licensing fees etc.) are solely your responsibility or the responsibility of your division/program.

CATALOGUING YOUR PHOTOS

Photos (including photomicrographs) appearing in your publication must either be catalogued using the ESS Publication Process Integration system (PPI), or attributed to the photographer and/or organization where they originated.

Note

Photos in the Scientific Presentation series do not require cataloguing; however, sources for all photos must be indicated either under the photo or as a separate list.

You will need individual digital files at a minimum resolution of 300 dpi for each photo.

Complete and save form PUB 3014 to capture information for each photo in your publication.

See [Do my photos need cataloguing?](#) to decide which photos need cataloguing.

1. Log into PPI.
2. Click the title of the publication for which you are cataloguing photographs.
3. Click PUB 3014. This form is repeatable and will be available for each of your photos.
4. Fill in all the fields on the form, and click Save. The grey box at the top is for Photo Library use only.
5. Repeat steps 3 and 4 for each photo.
6. Contact the [Photo Collection Co-ordinator](#) to obtain details on how to transfer your digital files.
7. The Photo Collection Co-ordinator will catalogue the photos, log into PPI, and add the catalogue numbers to the corresponding form (PUB 3014).
8. You will be notified when the cataloguing is complete.
9. Log into PPI, access the cataloguing forms (PUB 3014) and copy the catalogue number for each photo from the grey box at the top into your figure captions.

DO MY PHOTOS NEED CATALOGUING?

The following guidelines will help you decide whether your photographs need cataloguing.

Note

Photos do not need to be catalogued for external publications, Scientific Presentations, or Open Files.

You, Dr. Smith, are writing a bulletin with Dr. Jones and Dr. Brown.

- You are an ESS scientist. As one of the authors of the bulletin, and an ESS scientist, you must catalogue your photographs.
- Jones is not an ESS scientist, but since it is an ESS bulletin, his photographs must be catalogued.
- Brown is not a ESS employee now, but at the time the research was done he was under contract. His photographs need cataloguing for two reasons:
 - most importantly, he is a joint author of an ESS bulletin, but as well
 - all research results and material paid for by ESS funds are the property of ESS. Copyright of the material is retained by the Queen.

For photos that have been catalogued, include *Photograph by*, and the author's name, followed by the catalogue number, in each caption.

Figure 35. Flaggy beds of Thelon Formation: pebbly lithic and quartz arenite, above the basal conglomerate. Photograph by J.M. Smith. 2002-839

If you, Jones, and Brown use photographs from the following colleagues in your bulletin, these rules apply:

- Dr. Green is not one of the authors of this bulletin, but is now and was in the past an ESS employee. Her photograph must be catalogued. Include *Photograph by* in the caption.
- Dr. Pink is not one of the authors of this bulletin, and is not now ESS employee, but took the photograph while being paid by the ESS. It is ESS property and must be catalogued. Include *Photograph by* in the caption.
- Dr. Black is not one of the authors of this bulletin, and was never an ESS employee. Dr. Black's photograph doesn't need cataloguing. You need written permission to use it, and this permission must be included when you submit your manuscript. Include *Photograph courtesy of* in the caption.
- Dr. White is not one of the authors of this bulletin, but while doing his Ph.D., he took a picture you now want to use. He is presently an ESS employee. If he wasn't working for the ESS at the time of his Ph.D. thesis, that photograph is his. You need written permission to use it, and this permission must be included when you submit your manuscript. Include *Photograph courtesy of* in the caption.
- Dr. Rose works for another federal government department. Her photograph doesn't need cataloguing, but you must indicate its source (photographer's name and affiliation) by including *Photograph courtesy of* in the caption. Also, if the department or agency has a catalogue numbering system, the photograph's number should be included in the caption to help your readers in obtaining a copy if needed.

- Drs. Teal, Purple, and Tan work for a provincial government, another agency, and a journal, respectively. Their photographs do not need to be catalogued, but you need written permission to use them, and this permission must be included when you submit your manuscript. Include Photograph courtesy of along with the source (photographer's name and affiliation) in the caption.

For credits *Photograph by*, *Photograph Courtesy of* etc., use only initials and surname — no titles (Dr., Mr., etc.).

Note

Photomicrographs **must be** catalogued.

If you need more information, please contact the [Head, STPS](#).

HOW DO I WRITE A PHOTO CATALOGUE NUMBER?

ESS photo catalogue numbers consist of a year, followed by a hyphen and a number:

2009-123

Do not add affiliation initials.

Proper use in a figure caption would be:

Figure 35. Flaggy beds of Thelon Formation: pebbly lithic and quartz arenite, above the basal conglomerate. Photograph by J.M. Smith. 2002-839

A period follows the photographer's name; there is no period after the number.

For a photo on a poster (with no caption) use the same format, arranged either vertically or horizontally alongside the photo, whichever works best for the layout.

More information can be found at

[Do my photos need cataloguing?](#)

[Cataloguing your photos](#)

Note

Airphotos require the NAPL designation before the number. Also, catalogue numbers for older photos sometimes contain affiliation initials; use these numbers as they originally appeared—do not delete the initials.

TRANSLATION OF GEOGRAPHIC NAMES

In a bilingual country like Canada, questions arise regarding the official use of toponyms, or geographic names, and their translation. The names on our official, federal government maps have been authorized through the Geographical Names Board of Canada.

General rules

Do not translate geographic names shown on maps. Spell them according to their official form shown on the [Geonames Web site](#). Names of pan-Canadian or historical significance (listed below) have both official English and French spellings. On the other hand, certain names are spelled exactly the same in both English and French, for example, one will write *Montréal, Quebec* on an English map, and *Montréal, Québec* on the French version, or, *St. John's, Newfoundland* in English, and *St. John's, Terre-Neuve* in French. Note that *Quebec* (the province — a name of pan-Canadian significance) is written in English without the accent, whereas *Québec* (the city) keeps the accent.

Do not translate the names of populated places (cities, towns, etc.). Write them according to their official spellings (as for maps).

When writing the names of physical features, translate the generic, but never the specific term. The generic terms, such as lake, river, valley, mountain, island, pond, bay, point, and hill describe the nature of the entity. The specific term is the particular name applied to the location or geographic feature, for example Saguenay (River), St. Elias (Mountain), Wager (Bay). In an English text, for example, the names of the following geographic features and locations are written as follows:

Lake Saint-Jean (for lac Saint-Jean)
Lake Trois Rivières (for lac Trois Rivières)
Saint-Jovite
Sarrazin Beach (for plage Sarrazin)
Trois-Rivières

Names of pan-Canadian significance

Abitibi, Lake / lac Abitibi
Anticosti Island / île d'Anticosti
Appalachian Mountains / les Appalaches
Arctic Ocean / océan Arctique
Athabasca, Lake / lac Athabasca
Athabasca River / rivière Athabasca
Atlantic Ocean / océan Atlantique
Baffin Bay / baie de Baffin
Baffin Island / île de Baffin
Beaufort Sea / mer de Beaufort

Belle Isle, Strait of / détroit de Belle Isle
British Columbia / Colombie-Britannique
Cabot Strait / détroit de Cabot
Cape Breton Island / île du Cap-Breton
Chaleur Bay / baie des Chaleurs
Champlain, Lake / lac Champlain
Churchill River, Man. / rivière Churchill (Man.)
Churchill River, Nfld. / fleuve Churchill (T.-N.)
Coast Mountains / chaîne Côtière
Columbia River / fleuve Columbia
Davis Strait / détroit de Davis
Ellesmere Island / île d'Ellesmere
Erie, Lake / lac érié
Fraser River / fleuve Fraser
Fundy, Bay of / baie de Fundy
Georgian Bay / baie Georgienne
Great Bear Lake / Grand lac de l'Ours
Great Slave Lake / Grand lac des Esclaves
Haida Gwaii / Haida Gwaii
Hudson Bay / baie d'Hudson
Hudson Strait / détroit d'Hudson
Huron, Lake / lac Huron
James Bay / baie James
Labrador Sea / mer du Labrador
Laurentian Mountains / les Laurentides
Mackenzie River / fleuve Mackenzie
Manitoba, Lake / lac Manitoba
Michigan, Lake / lac Michigan (not in Canada)
Nelson River / fleuve Nelson
New Brunswick / Nouveau-Brunswick
Newfoundland / Terre-Neuve

Niagara Falls / chutes Niagara
Nipigon, Lake / lac Nipigon
Nipissing, Lake / lac Nipissing
North Saskatchewan River / rivière Saskatchewan
Nord Northumberland Strait / détroit de Northumberland
Northwest Territories / Territoires du Nord-Ouest
Nova Scotia / Nouvelle-Écosse
Ontario, Lake / lac Ontario
Ottawa River / rivière des Outaouais
Pacific Ocean / océan Pacifique
Peace River / rivière de la Paix
Prince Edward Island / île-du-Prince-Édouard
Quebec / Québec (province)
Queen Elizabeth Islands / îles de la Reine-Élisabeth
Rainy Lake / lac à la Pluie
Rainy River / rivière à la Pluie
Red River / rivière Rouge
Restigouche River / rivière Ristigouche
Rocky Mountains / montagnes Rocheuses
Sable Island / île de Sable
Saguenay River / rivière Saguenay
St. Clair, Lake / lac Sainte-Claire
Saint John River / rivière Saint-Jean
St. Lawrence, Gulf of / golfe du Saint-Laurent
St. Lawrence River / fleuve Saint-Laurent
Saskatchewan River / rivière Saskatchewan
South Saskatchewan River / rivière Saskatchewan
Sud Superior, Lake / lac Supérieur
Timiskaming, Lake / lac Témiscamingue
Ungava Bay / baie d'Ungava
Vancouver Island / île de Vancouver

Winnipeg, Lake / lac Winnipeg

Winnipegosis, Lake / lac Winnipegosis

Winnipeg River / rivière Winnipeg

Woods, Lake of the / lac des Bois

Yukon River / fleuve Yukon

ABOUT TRADEMARKS

Proprietary product names that appear in ESS publications need to be used and spelled correctly, and accompanied by the appropriate trademark symbols where applicable. The text below, adapted from the Corel Web site (©2009 Corel Corporation), gives general information about trademarks and their use.

What is a trademark?

Trademarks include words, logos, designs, symbols or slogans used to distinguish one's goods or services from those of others. A trademark may be registered or unregistered. A registered trademark is a trademark that has been registered at the relevant trademark office (Canada and the United States have separate trademark offices). An unregistered trademark is, not surprisingly, a trademark that has not been registered. In Canada and the United States, trademarks are entitled to legal protection whether they are registered or not. Registration, however, provides trademark owners with certain advantages in enforcing their rights to those trademarks.

Why protect trademarks?

When used properly, a trademark identifies one's goods or services as being distinct from those of others. Used improperly, however, a trademark can become diluted or fall into generic use, losing its protected status. For example, words such as *escalator* and *zipper* were once trademarks that became generic because they were not properly protected by their owners.

Guidelines for using trademarks

1. Use the appropriate ® or ™ symbol.

A trademark that has been registered with a trademark office in the applicable jurisdiction is noted with a ®. A trademark that has not been registered with a trademark office is noted with a ™. You can find out which to use by checking the Web site of the trademark owner.

2. Use the appropriate ® and ™ symbol at the first reference

Once you have marked the first appearance of a trademark, you do not need to mark subsequent appearances of the trademark in the work. Avoid using trademarks in headings and titles. It is not necessary to include ® or ™ symbols in tables of contents or indexes.

3. Use trademarks as proper adjectives.

Trademarks are adjectives used to describe specific things. Therefore, you must use them as an adjective with a generic noun at the first use of the trademark in any document.

The samples were analyzed using an FEI™ Inspect™ scanning electron microscope.

4. Trade name vs. trademark

The name of a company when used to refer to the company's software or instrument or product is a trademark and its use is governed by the general guidelines set out in this section. However, when a company name is used in text only to refer to the company or its subsidiaries, it is being used as the company's trade name, not as a trademark and is not subject to general trademark usage rules.

This geological software is compatible with Microsoft's products.

The software will only run on Microsoft Vista®.

5. Do not use a trademark in the possessive.

Incorrect: CorelDRAW®'s vector illustration capabilities...

Correct: The vector illustration capabilities of CorelDRAW®...

6. Do not use a trademark in the plural.

Incorrect: This will work with any of the Adobe® Acrobats.

Correct: This will work with any version of Adobe® Acrobat®.

7. Do not include a trademark in a hyphenated phrase.

Incorrect: Corel® WordPerfect®-compatible macros...

Correct: Macros compatible with Corel® WordPerfect®...

8. Do not use a trademark as a verb.

Incorrect: You can Winzip your files...

Correct: Use Winzip® to compress your files...

9. Do not shorten, abbreviate or create acronyms from trademarks.

Incorrect: Using the Schlumberger Plot software...

Correct: Using the Schlumberger GeoPlot™ software...

10. Capitalize trademarks as they appear in the trademark owner's list of trademarks.

Incorrect: Esri™ Arcinfo™

Correct: ESRI™ ArcInfo™

NATIONAL TOPOGRAPHIC SYSTEM (NTS)

The National Topographic System (NTS) provides general-purpose 1:50 000 and 1:250 000 scale topographic map coverage of Canada. These maps sheets are often used as base maps for geological maps.

A 1:250 000 scale NTS map covers the same area of land as sixteen 1:50 000 scale maps.

Write the NTS number with a hyphen separating the number and the letter:

14-M

104-O/1, 7, 8

31-I/12

92-G/3, 4, 5

CAPITALIZATION

Basic rules of capitalization are given below. Examples of capitalization are listed in alphabetical order throughout the section entitled [Spelling and usage](#).

First word of a sentence

Begin every sentence with a capital letter.

In lists, if the complete thought can be stated briefly, it is unnecessary to capitalize the first word of each list entry:

Every year GSC summer students receive

1. firearms training,
2. first aid instruction, and
3. general instruction on safety in the field.

If the list entries cannot be stated briefly, introduce each with a capital letter and end it with a period.

Capitalize the first word of a direct quotation that is a complete sentence. (See [Quotation marks](#).)

Capitalize the first word of a complete sentence in parentheses, when it stands alone. (See [Parentheses](#).)

Proper nouns

Capitalize all proper nouns. Proper nouns include these categories:

- names of persons and places (countries, regions, counties, cities, and other political and geographical divisions) and the names substituted for them
- names of the months and days, languages, races, geological and historical periods and events, and documents
- names of organizations and the distinguishing names substituted for them:
the Parliament of Canada, Parliament; House of Commons, the houses; the Earth Sciences Sector, the Sector
- names of institutions, churches, schools, libraries, buildings, hotels, clubs, corporations, ships, etc.
- official titles of persons when used without their personal names:
the Prime Minister, the Assistant Deputy Minister, the Chief Scientist

Common nouns

Common nouns automatically become proper nouns and are capitalized in these cases:

- when they refer specially to events, institutions, or similar objects
- decade, geology, *but* Decade of North American Geology

- when they become an essential part of the proper name: a group comprises formations, *but* Ramah Group
- when common nouns such as north and west are used to name a specific region or its inhabitants:
the North, Westerners

Stratigraphic names

A good general rule is not to capitalize unless specific convention warrants it. The modifying names of informal members, units, beds, etc. should be capitalized if, either 1) the modifying name is already a proper noun, such as Banff member, or, 2) there is a logical and arguable reason for doing so (clarity or emphasis). To conform with the [North American Stratigraphic Code](#), the rank of the unit term at the end of a specific name is not capitalized unless the unit is formal. Thus Calcareous member, Sandstone member, and Lower member are informal.

Terms such as unit A, member B, etc. are obviously informal.

State clearly at the start of your report what formal and informal stratigraphic nomenclature is being used. Also state if new stratigraphic units are being named, defined, and described in accordance with the North American Stratigraphic Code.

Proper adjectives

Use capitals for proper adjectives because they are derived from proper names:

Tyndall limestone, Douglas fir

When this association is more common, the adjective no longer takes a capital:

portland cement, leda clay

Quotations

Use a capital letter for the opening word of a quoted sentence or sentences, but not of quoted phrases:

John said, "They have gone."

Their report mentioned only "height, width, and breadth".

Titles of books

Capitalize every important word in literary titles. Prepositions, articles, and conjunctions do not take capitals unless one of them is the initial word in the title:

Glossary of Geology

Paleozoic Limestones of Ontario: a Review

Note

Exceptions occur in [References](#). Link to [types of references](#).

Hyphenated compounds

A proper noun or adjective in a hyphenated compound retains the capital:

mid-Paleozoic

trans-Arctic *but* transatlantic

Abbreviations

See [Abbreviations](#) for details.

Biological classification

The scientific name of a phylum, class, order, family, or genus is capitalized, but the name of a species or subspecies, or a common name, is not:

the phylum Arthropoda

the class Trilobita

the species *Olenellus thompsoni*

but arthropod

trilobite

See [Paleontology](#) for details of paleontological terminology.

Parts of a book or report

Capitalize words followed by a number or letter to indicate the parts of a book or report when they are used in text references. Note that they are capitalized in the singular and plural, and also in parentheses — with the exception of figures in paleontological plates:

Chapter 2

Table 10

Figures 5 to 7

(Fig. 4) (Fig. 5–7) (Fig. 2, 3)

Plates 2 and 3

(Pl. 2) (Pl. 2, 3)

Plate 1, figure 6a

(Pl. 1, fig. 4, 6a)

International System of Units (SI)

See [International System of Units](#) for details of SI (metric) symbols that are capitalized.

Note

Celsius is capitalized when written out; the symbol for litre is ‘L’.

Other guidelines

Capital letters are used for

- awards (the Badge of the Order of Canada)
- degrees (Doctor of Philosophy)
- official documents (The Report of the Mackenzie Valley Pipeline Inquiry by Mr. Justice Thomas R. Berger)
- cultural periods (the Bronze Age)
- chemical symbols and elements (H_2SO_4 , ^{14}C , Au)
- computer language (BASIC, FORTRAN)
- single letters used as words (X-ray)
- the titles of magazines and newspapers (The Northern Miner)

Note

Do not capitalize physical laws, theorems, principles, or constants except for attached proper names:
special theory of relativity, Boyle's law, the third law of thermodynamics, Avogadro's number

ITALICS

The following are some examples of the use of italics in ESS publications:

1. for emphasis, or to indicate the correct use of a word, phrase, or sentence: The word *greywacke* has a number of different definitions.
2. for certain Latin terms and foreign words and phrases that are not yet established in the English language:

idem

fait accompli

sensu stricto

sensu lato

Many Latin terms (such as *versus*, *ibid*, *in situ*) are now accepted as fully English forms, and are not italicized. Abbreviations for Latin terms (such as *ca.*, *cf.*, *etc.*, *e.g.*, *et al.*, *op. cit.*, *viz*, *vs.*) are never italicized.

3. the Latin word *sic* meaning *thus*, *so* is used to inform the reader that an unlikely quotation is, in fact, correctly quoted, and also to indicate that an error in a quotation is not to be attributed to the author(s). The word *sic* is written in square brackets: [*sic*] immediately after the error:

The northwestern Canadian shield [*sic*]

4. the titles of publications (books, periodicals, plays, newspapers, studies, etc.) in the text, but not in the References list:

Although most geologists have heard of Beringer's *Lithographiae Wirceburgensis*, few have read the book.

5. the names of ships:

the submersible

Pisces IV

CSS Baffin

CFAV Sackville

6. letters, words, and sentences referred to as such:

the letter *s*

the words (nouns) *abstract* and *concrete*

the sentence should be rewritten: *The fault strikes northeast*

7. taxonomic names of genera and species in botany, zoology, and paleontology:

Betula glandulosa

Homo sapiens

Hildoceras bifrons

See [About paleontology](#).

8. Italic type is used to indicate that a figure or table has been reproduced from another publication, and also to show that the illustration has been altered:

after indicates that the figure or table is reproduced as it was shown in a previous publication.

modified from indicates that changes or redrafting have been made to the original figure or table.

In both cases reference must be made to the original source of publication:

modified from Smith (1993).

9. Italic type is used in the text when making reference to figures, tables, plates, maps, or a reference for a chapter in a book or compendium:

The fault strikes northward (*see* Fig. 6).

... (*see* Regional Geology)

... (*see also* Sample collection)

Ritchie, J.C., 1989. History of the boreal forest in Canada; *in* Chapter 7 of Quaternary Geology of Canada and Greenland, (ed.) R.J. Fulton; Geological Survey of Canada, Geology of Canada, no. 1, p. 508–512 (*also* Geological Society of America, The geology of North America, v. K-1, p. 508–512).

NUMERICAL EXPRESSIONS

The following rules cover most situations where you must choose between expressing a number in words or in numerals.

Less than ten

Write out numbers less than ten unless they represent measurements:

five sections

5 ft.

5 m

Beginning sentences

Write out numbers and the word *number* where they occur at the beginning of a sentence, as well as any related numbers that follow closely:

Three thousand line-kilometres must be flown this summer.

Number 6 should not be included in the total; number 5 was the last in the series (*not* No. 6 or no. 5).

Twenty-five of the three hundred samples were contaminated. (Or, 'Of the 300 samples collected, 25 were contaminated'.)

Mixing numerals and words

Do not mix numerals and numbers expressed as words in the same phrase:

nine out of ten samples

not

nine out of 10 samples

Multiple numerical expressions

Where one numerical expression follows another, write out the smaller number to avoid ambiguity, unless it accompanies a unit:

300 six-inch core samples

ten 43-cent stamps

but

one hundred twenty 1 g samples

Million, billion, and similar terms

Write out the word *million* and similar terms, unless the number represents a metric or imperial measurement, or is in a table:

\$25 million

4.1 million people

but

2 000 000 t of ore

1 000 000 km²

Numbers less than one million

Use numerals for any number less than one million (and more than 10):

250 000

Spaces in long numbers

To make long numbers easier to read, insert a space between three-digit groups:

15 000

250 267

1 350 000

Do not use a space with a four-digit number:

1500

except in tables, in order to preserve the alignment of columns.

Specific numbers

Use numerals for specific numbers:

GSC locality 3

Bulletin 582

p. 99–146

Indefinite expressions

Write out indefinite expressions:

the mid-nineties

on a scale of millimetres to centimetres hundreds of metres

Repeating in numerals

When a number is written out, do not repeat it in numerals.

Measures and quantities

Use numerals for measures and quantities:

2.1 m

7 km traverse

250°C

To express a tolerance:

$30 \pm 2^\circ\text{C}$

To express an error range:

$65 \pm 3 \text{ Ma}$

$65 +2/-1 \text{ Ma}$

Fractions

Write out fractions standing alone:

one half of the sample was lost

Do not hyphenate fractions used as nouns:

four fifths of the sample was sand and one fifth was silt.

Do not follow a fraction that is expressing a unit of measurement by *a* or *of an*:

one-half inch *not* one half of an inch, or $\frac{1}{2}$ of an inch

Do not use fractions with SI units:

the long axis is 0.25 cm *not* $\frac{1}{4}$ cm

Hyphenate fractions used as modifiers and that are written in full, except where the numerator or denominator already contains a hyphen:

one-third share

twenty-nine fiftieths calcium (29/50 is preferable)

Fractions with numerators and denominators greater than ninety-nine should be written as numbers rather than words, except at the beginning of a sentence.

Decimals

Always write decimals as numerals. Place a zero before the decimal point for numbers less than one:

2.75 cm

0.12 m

Time

Use numerals to express clock time but write out duration of time or time of day unless emphasizing an exact time:

10:00 p.m.

We generally worked twelve-hour days in the field to take advantage of the light.

The helicopter left base camp about four o'clock.

The scheduled flight time was 3:40 p.m.

Calendar dates

Use numerals for the year and day in calendar dates, but write out the month in full:

21 March 2003

March 21, 2003

Note

In forms and tables, ESS style is to use the ISO all-numeric date standards. Write dates in Arabic numerals in the order: year-month-day. The year consists of four digits, the month two digits, and the day two digits. Use hyphens between year and month and between month and day. Thus write the 8th of July, 2008 as 2008-07-08.

Ranges

To express a range, use *to* in the text and an en dash (–) in parentheses:

1 to 2 m

(140–150 m)

5 to 50%

(5–10%)

Hyphenating numbers

Hyphenate in these cases:

1. compound numbers from twenty-one (twenty-first) to ninety-nine (ninety-ninth):

Twenty-two trenches were cut through the overburden.

2. an adjectival compound in which one component is a cardinal number (one, two, three, etc.) and the other a noun or adjective:

three-dimensional image

three-year-old maps

3. ordinal numbers (first, second, third, etc.) when they precede the word they modify:

twenty-first-century technology

first-order lamellae

Do not hyphenate the following:

1. before a symbol that is not a letter:
 - a 100°C thermometer
 - 27% salinity
2. between a cardinal numeral and a unit of measure:
 - 25 m section
 - 10 km traverse
 - 100 m cliff
3. between the numeral and unit in a compound adjectival expressions:
 - a 100 m high cliff *not* a 100-m high cliff
 - the 200 ft. level (*not* the 200-ft. level)
4. between a unit of measure and the following adjective in a compound modifier:
 - 25 m thick section *not* 25 m-thick section *not* 25-m-thick section
 - 100 m high cliff *not* 100 m-high cliff *not* 100-m-high cliff

GRAMMAR

The following notes are not comprehensive; they are meant to draw your attention to some of the basic rules and common pitfalls.

Sentences

To avoid confusion, place the related parts of a sentence as closely together as possible.

The writer and G.H. Turner began a detailed regional study of the Upper Cretaceous rocks of the area in 2002, when the Blackstone section was first studied in detail.

not

The writer began a detailed regional study of the Upper Cretaceous rocks of the area along with G.H. Turner in 2002, when the Blackstone section was first studied in detail.

Jargon and contrived or redundant words

Jargon is obscure (specialized technical or scientific vocabulary) and often pretentious language that effectively clouds what you want to say. Avoid it.

Also, contrived words, such as *operationalize*, have no place in scientific writing.

The following sentences illustrate the use of redundant words and the advantage gained by eliminating them or replacing them with something more succinct.

All of the wells in this township are in the glacial drift, and the majority of them are less than 10 m with only a few deeper ones.

can be rewritten more simply as

The wells in this township are in glacial drift, and most of them are less than 10 m deep.

The following words can become pretentious or irritating if they are used too often (shown with alternatives in parentheses):

ascertain (determine, establish)

cartoon (schematic, diagram)

constrain (control, restrict, define, limit)

essentially (generally, commonly, practically)

generate (produce)

irregardless (regardless, irrespective)

Note

No matter how commonly used, *irregardless* is not a legitimate word.

ongoing (continuing, current)

portion (part)

show (demonstrate, illustrate, suggest, indicate, imply) ubiquitous (widely distributed)

comprises (composed of, consists of)

Note

Use *comprise* correctly. Not many people do: The committee comprises 14 members *not* The committee is comprised of 14 members. *Comprised* should never be followed by *of*.

utilize (use)

Parallel structures

Parallel structure results in economy of words and clearer meaning. It is especially useful for making detailed descriptions and comparisons more readable. For example, if the different minerals in a rock are always described with their features (such as modal abundance, grain size, and habit) in the same order, readers can assimilate the information more easily. As well, when two rocks are compared by presenting their features in parallel groups (say of three), readers will not have to switch back and forth as much between the two descriptions. It may even be helpful to construct successive paragraphs in parallel.

Awkward: Augite in large phenocrysts and small grains of olivine are common in the lava.

Parallel: Large augite phenocrysts and small olivine grains are common in the lava.

For items in lists, give parallel information in parallel forms:

Poor: The rock contains abundant quartz, some biotite, and garnet.

Parallel: The rock contains abundant quartz, some biotite, and rare garnet.

Poor: Two dykes can be seen: one, 5 m wide, composed of granophyre and pegmatite, is exposed at the top of the mountain; the other is gabbro.

Better: Two dykes can be seen: one, 5 m wide, composed of granophyre and pegmatite, is exposed at the top of the mountain; the other, 2 m wide, consisting of gabbro, outcrops in the cirque to the north.

Nouns

Proper nouns

A proper noun names a particular object, person, or place, or group of objects, persons, or places. It always begins with a capital letter.

Common nouns

Common nouns used as an essential part of a name are capitalized: Shuswap Lake.

When using the common, or generic noun in the plural, it is not usually capitalized: Shuswap and Okanagan lakes; lakes Huron and Ontario; Pekisko and Shunda formations. See [Capitalization](#) for details.

Collective nouns

Collective nouns such as board, committee, majority, number, and series take either a singular or plural verb or pronoun depending upon the context in which they are used. Use the plural when the action is taken by the individual members, and the singular when the group acts or thinks as a whole:

The review board have discussed all aspects of the thesis and have not yet agreed on the new information presented there.

The committee approved the motion unanimously and directed its subcommittee to take immediate action.

Group, series

The [North American Stratigraphic Code](#) uses these words in the singular, but they can be singular or plural depending on context:

A series of varves was deposited (but, if two or more different series are involved: two series of varves were compared.)

Majority

Although the complexes were mapped in detail, the majority have not been accurately dated.

Number

A large number of wells were drilled (but the number of solutions was limited). See [Verbs](#) for more examples.

Pronouns

Pronouns take the place of nouns. Use them freely rather than the noun unnecessarily. Too often the word *such* is added to the repeated noun to stress the particular reference:

The duck-billed dinosaurs developed a complex social unit and strongly defended it (not defended strongly such a unit, or even this unit).

Avoid beginning sentences with the words *there*, *this*, or *it* if confusion may result:

The Rockland Formation may be easily distinguished from the Chaumont in the field. The Rockland (not *It*) is bright red-brown.

Former and latter

To avoid repetition, the terms *former* and *latter* can be used instead of a pair of names, nouns, or groups. Use these terms sparingly. They often confuse and irritate readers, who must look back to be sure of the reference. Short sentences may be clearer if the noun is repeated. If three or more persons or objects are referred to, use the words *first* and *last*.

Pronouns taking singular verbs

There can be a problem deciding if some indefinite pronouns take a singular or a plural verb.

None

Singular when it means *no one*, *not one*, *no person*, *no thing*, but plural when it means *no persons*, *no things*, *not any*

None of us was hurt (not one of us). None were hurt (not any).

Either, neither, each, and everyone

Neither of the members warrants formation status.

Everyone wants their work published quickly.

The words *any* and *none* replace *either* and *neither* when the reference is to more than two.

Relative pronouns *that* and *which*

These relative pronouns are commonly misused. Use *that* when introducing an essential fact, without which the antecedent is incomplete or undefined. The essential fact is a restrictive adjective clause (a restrictive adjective clause is one that defines, identifies, or restricts the noun it modifies). Note that a restrictive adjective clause has no commas on either side of it.

The fossils are in the part of the section that was measured.

or

The temperatures and pressures of reactions that produce these assemblages can be no more than 2.8 kbar.

or

This is the sample that Jack collected.

Use *which* when introducing a new fact about the antecedent as a nonrestrictive adjective clause (a nonrestrictive adjective clause is one that supplies information about the noun that it modifies, but supplementary information, not essential to the identification of the noun to which it refers):

The process, which is of recent invention, extracts both the gold and the silver.

or

The outcrop, which is on the left bank of the river, consists of sandstone, siltstone, and shale.

Which neither restricts nor defines, but comments on, or expands, the meaning of the preceding phrase, usually by adding a new thought. Note that a nonrestrictive adjective clause is enclosed within commas.

The choice of *that* or *which* sometimes changes the meaning of a sentence. In “I am returning the reports, which I have read”, the borrower implies that he or she has read them all. If the borrower says: “I am returning the reports that I have read,” it means that the borrower is returning only those reports that he or she has read. Make sure that your choice of *that* or *which* conveys the meaning intended.

That and *who*

Use *that* rather than *who* when the preceding phrase is general in its implication and does not refer specifically to a person or persons:

The staff that work in the Publications Section....

The technician who works in the Publications Section....

The phrases *and which*, *and who*

Phrases such as *and which*, *and who*, or *and whose* require a preceding relative pronoun to justify the *and*:

This district, which is the largest and which contains the principal mine, is in the western part of the country.

The statement also applies when the conjunction *but* is used.

Where a restrictive clause is followed by an *and which* clause, both clauses take *which*: The district, which is the largest, and which contains the principal mine....

not

The district that is the largest, and which....

Relative pronouns *who* and *whom*

There are exceptions, but none, however, to the following rule: *who* is always used as subject; *whom* as object. In the following two examples the reasoning behind the choice of *who* or *whom* is shown in parentheses:

They are hiring people *who* they know are not qualified. (Who are not qualified? They are not qualified – subject.)

They are hiring people *whom* they know. (Who do they know? They know them – object.)

Whom is used after every preposition, because prepositions take the objective case; for example, *to whom*, *from whom*. *Whom* is used after *than*; (never use *than who*).

Possessive pronouns

Use the possessive forms *my*, *your*, *his*, *her*, *our*, *your* (pl.), *their*, and *whose*, when the present participle form of a verb is used as a noun; that is, words ending in *ing*:

Count on my doing all in my power (*not* Count on me).

This will not affect his going (*not* him going).

Verbs

Verbs may be transitive, denoting action, or intransitive, describing a state of being. The verb *to be* is a typical intransitive verb because it reflects back on its subject. It is also one of the important auxiliary verbs. It combines with almost all verbs, both transitive and intransitive, in their present and past participle forms. It is in dealing with the verb *to be* that most difficulties arise. A study of this verb and the verb *to have*, which also acts as an auxiliary, is recommended to all who are interested in good grammar.

Agreement in number

Verbs always agree in number with their subjects:

The collection is unique.

The collection of brachiopods from these areas is unique.

A singular verb is necessary when the subject is singular and the complement plural:

The only problem was the thrust faults.

but

The thrust faults were the only problem.

The word *what* takes a singular verb even if its complement is plural:

What we need is more samples.

Words joined to the subject by *with*, *together with*, *including*, *as well as*, and similar connectives do not affect the number of the verb:

The helicopter, together with two light planes, was loaded and waiting.

but

The helicopter and two light planes were loaded and waiting.

If the word *number* is used collectively, the verb is singular:

The number of field assistants is larger this year than last.

If individual units are referred to, the word *number* takes the plural verb:

A number of the field assistants are taking summer courses.

More information is available in the section on [Collective nouns](#).

Tense

There are many tenses with numerous applications, and only a few general recommendations are made here:

- Describe rocks in the present tense:
The sill occupies an unconformity, and its roof rocks are highly altered.
- Describe events of geological history in the past tense:
The magma intruded the unconformity, forming a sill, and shortly after, a hydrothermal system developed in its roof rocks.
- Describe experimental activities and phenomena in the past tense; they presumably are complete by the time of writing:
We heated the charge to 1500°C at 20 kbar, and the mineral assemblage partly melted.
- Discuss experimental results in both past and present tenses, as appropriate to the conditions and observations:
The experiments showed that the mineral assemblage is stable under these conditions.
- Describe specific conclusions in the past tense to emphasize that they represent special conditions, in contrast to general conclusions, principles, or truths, which should be described in the present tense:
The Hawaiian hotspot evidently stayed fixed, even though oceans are spreading and continents are drifting.
- Refer to other authors in the past tense; they may since have changed their minds—or even died:
Darwin (1859) argued for evolution of the species by survival of the fittest.
But, when reference is made to their work by its title, then because the document still exists, discuss its contents in the present tense:
The *Origin of Species* contains other examples.

Verbals

In English, there are three verb forms, which, in addition to their verb-like functions, perform the work of another part of speech at the same time. These verb forms are the participle, the gerund, and the infinitive.

Participles

An English verb has two participles: the present participle always ending in -ing, as in *finishing*, and the past participle, which ends in -d, -ed, -n, -en, or -t, as in *finished*. A participle is a verb form that can act as an adjective:

The fossils were evidence of a flourishing fauna in the area during the Eocene.

His reports from the field were discouraging.

Folded rocks appear to the west of the fault.

Dangling participles

A common error is to begin a sentence with a participle, so that it becomes unattached from its correct noun or implies a wrong noun, as in the following examples:

Shattered into fragments, the student picked up the calcite shard.

Traversing across the fold belt, the rocks become increasingly gneissic.

Going westward, the craton becomes part of a mobile belt.

Make sure that phrases are related to a proper subject in the main clause. This can be done by examining the participles (present participles end in -ing; past participles end in -d or -ed) and asking: Who or what is -ing or -ed? If the answer is not logical, then rewrite the entire sentence.

Avoid leaving out the subject. Some amusing illustrations:

Having eaten our lunch, the boat sailed for Quebec

At the age of three, my grandmother died.

However, these are no more absurd than the following:

Approaching the contact, the phenocrysts decrease in size.

On crossing the ridge, the quartz veins appeared at closer intervals.

Gerunds

A gerund is a verbal noun: mining, geochemical prospecting. When used as a subject or object, the gerund should be used with a noun or pronoun in the possessive:

The company's drilling in the area delineated the gold deposit.

This rule is most often ignored when words are inserted between the preposition and the gerund:

The seismic-equipment operators were removed from the site because of their provincial licences being revoked.

This trap can be avoided by rewriting the sentence:

The seismic-equipment operators were removed from the site because their provincial licences had been revoked.

Infinitives

This verbal form may be used as a noun, an adjective, or an adverb. It is usually preceded by the word to, which in this case is not a preposition, but the sign of the infinitive:

to traverse

to sample

Split infinitives

An adverb or an adverbial phrase placed between the to and the verb of an infinitive is called a split infinitive. Split infinitives can sometimes be unpleasant to the ear but have become commonly used

(“to boldly go”), and are not incorrect, grammatically speaking. At times, it is better for emphasis to split an infinitive when it would be awkward to put the adverb before or after the infinitive. Let your ear be your guide.

Active and passive voice

Use the active voice wherever possible. It makes for better and clearer writing. Make the initiator of the action, not the object acted upon, the subject of the sentence:

Miller (1996) investigated [active voice] the gold potential of the Old Woman greenstone belt.

not

The gold potential of the Old Woman greenstone belt was investigated [passive voice] by Miller (1996).

Do not change from the active to the passive voice, or vice versa, within a sentence or within a paragraph. The sentence: *The writer spent the last two field seasons in the area, and it is expected that he will return next year* should be written: *The writer spent the last two field seasons in the area, and expects to return next year.*

It is sometimes easy to lose sight of the logical subject of a sentence. Do not begin a sentence with a clause containing an active verb and then introduce a new subject that leads to the use of a passive verb:

These vugs carry no gold and do not affect the tenor of the vein.

not

These vugs carry no gold and the tenor of the vein has not been affected by them.

The workings were closed and could not be examined.

not

The workings were closed and examination of them could not be made.

This series is made up largely of shale, but includes some sandstone and limestone.

not

This series is made up largely of shale though some sandstone and limestone are included.

Avoid using *it* as a subject, such as:

It should be noted that....

You can use the passive voice for certain routine statements:

Samples were collected from several localities.

is just as acceptable as

We collected samples from several localities.

If the state of the bedrock is the point of significant interest in a report, then it is more acceptable to write:

The bedrock was covered by talus. than

Talus covered the bedrock.

The best advice is: prefer the active voice, but do not eliminate the passive voice. The passive voice is used where it is intended to stress the thing done rather than the doer, or when the doer is unknown:

My hammer was broken stresses the breakage, whereas *The assistant broke my hammer* stresses the action of the assistant.

Adverbs

Place adverbs so that there is no doubt which word or words they modify. Adverbs are usually placed immediately before or after verbs, and before adjectives and other adverbs that they modify.

Take special care with the adverbs *only*, *merely*, *just*, *almost*, *ever*, *hardly*, *scarcely*, and *nearly*. Depending on the meaning write:

Only visiting scientists may remove *Dynamosaurus* bones from the area.

or

Visiting scientists may remove only *Dynamosaurus* bones from the area.

Resist the temptation to use *very* too frequently.

Use *quite* only in its proper sense of *completely*.

Keep related words and phrases together. Some writers misplace adverbs and adverbial phrases, especially the adverbs *only*, *principally*, *mainly*, *chiefly*, *alone*, *also*, and *too*. Note the following sentences:

Their presence can be determined only by tests.

not

Their presence can only be determined by tests.

The sediments were derived principally from quartzite.

not

The sediments were principally derived from quartzite.

Adjectives

A sentence with only one or two adjectives or qualifying adverbs may be stronger than one overflowing with them:

This sentence is boring.

not

This sentence is exceedingly long winded and very boring.

The laboratory staff worked efficiently.

not

The laboratory staff did its utmost, and worked extremely well and very efficiently.

Do not combine an abstract noun with an adjective when an adjective alone would do:

The grains are rounded.

not

The grains are of a rounded shape.

Some adjectives are absolute and should not be modified by a comparative adverb — although *almost* and *nearly* are sometimes applicable. These words include: *absolute, basic, empty, entire, essential, fatal, final, fundamental, necessary, perfect, primary, pure, right, round, square, supreme, ubiquitous, unanimous, unique, universal, and wrong.*

Conjunctions

When *that* is used as a conjunction, do not use it again after an interjected clause, however long the sentence may be:

The Director knew that, however great the travel difficulties to be overcome, that his assistant would be there. (Omit the second *that*.)

Use *while* only in its true sense of time:

He continued the traverse while I collected samples.

Otherwise, use *and* or *although* instead of *while*, such as in the following sentence:

At the conference the terrain scientist gave a talk on sampling procedures and (not *while*) the geophysicist spoke on new instrumentation.

Although (not *while*) we found no evidence of fossils in the field, laboratory analysis revealed an abundant fauna.

Do not use *also* as a conjunction after *and*.

The word *like* can be used as a conjunction in constructions such as: He ran like a rabbit, but do not use it in the sense of *as* or *as if*:

The field assistants worked as if they were possessed.

not

The field assistants worked like they were possessed.

Prepositions

Preposition means ‘pre-position’, and in grammar this part of speech is intended to be placed before its object. A preposition can, however, end a sentence when the spontaneity of the sentence would be lost by inverting the preposition:

He is the greatest stratigrapher I have ever heard of.

not

He is the greatest stratigrapher of whom I have ever heard.

Between and among

Distinguish between *between* and *among*. The first refers to two persons or things; the second to more than two:

Divide rations between A and B.

but

Divide rations among A, B, and C.

However, *between* is still used where the more than two items are considered severally divided, and also in cases where every relationship is a well defined two-way relationship:

We found coal between the beds of shale.

An agreement was forged between Alberta, Saskatchewan, Manitoba, and the Northwest Territories.

With and and

With is frequently misused, especially for *and*:

The vein has a northeast strike and a vertical dip.

not

The vein has a northeast strike with a vertical dip.

The rocks are indurated, tilted, and slightly folded.

not

The rocks are indurated and tilted, with some slight folding.

Do not use *with* when you mean *but*:

The rocks are mostly grey slate, but include some greywacke.

not

The rocks are mostly grey slate with some greywacke.

Do not use *with* when you should use a verb:

The rock is even grained, finely laminated, and well bedded, and exhibits clearly defined jointing.

not

The rock is even grained, finely laminated, and well bedded, with clearly defined jointing.

Prepositions in a series

Do not omit the preposition where a different preposition is required in a series:

He had a knowledge of, and a keen interest in, geology.

Or in expressions of time:

The earthquake occurred on Thursday, 18 June 1987.

Compound prepositions

Use the conjunction *because* rather than the compound preposition *inasmuch as*. Another compound, *as to*, can be left out of most sentences without changing the meaning. Avoid such hybrids as *herewith*, *thereof*, *thereon*, or *thereunder*.

Appropriate prepositions with nouns, verbs, adjectives, and adverbs

Usage has resulted in certain nouns, verbs, adjectives, and adverbs being followed by particular prepositions. Some of the more common are listed below.

accord with (but, of one's own accord)

account for

acquiesce in, acquiesce to something
adhere to
adverse to
agree on terms
agree to a proposal
agree with a person
aim at, aim to do something
alien to
averse to (not averse from)
aware of
begin by doing something
begin from a point
begin with an act
benefits of the benefactor
benefits to the beneficiary
capable of
capacity for circumstances (in the)
compare with (to note points of resemblance and difference)
compare to (only when used in the sense 'to liken to')
concur with a person
conditions (under the)
conform to (adapt one's self to)
conform with (in harmony with)
consist in (definition: Memory consists in a present imagination of past incidents.)
consist of (material: The meal consisted of fish.)
consistent with
content one's self with
content others by
contrast (When contrast is used as a verb, it is followed by *with*. Either *to* or *with* may be used when the word *contrast* is used as a noun.)
conversant with correspond to (resemble)
correspond with (communicate)
demand for a thing

demand a thing from, or of, a person
derive from
differ, different, from (not than, to)
differ with a person in opinion
disagree with a person
embark in a mining venture (but embark on a journey)
endowed with
evidence of (something)
evidence for (a theory)
find a fault in a person or thing
find fault with a person
free from
indifferent to
infected with disease, bad qualities
infested with insects, vermin
initiative in (to take) (on one's own initiative)
insight into
invest in a business
join in a project
join with some person or thing
labour at a task
labour for a person, for an end
labour in a good cause
labour under a disadvantage
look after a business
look at a thing
look for a missing article
look into a matter
look over an account
moment (on the spur of the)
moment's notice (at a)
order of (in the)
parallel with or to

perpendicular to
point at a thing
point to a fact
point with an object
prefer one to the other
prefer to do one thing rather than another
preference for
prevent from doing something
proceed to an act not previously started
proceed with an act already started
prohibit from doing something
provide against ill luck
provide for an emergency
provide one's self with something
pursuant to (in pursuance of)
range from X to Y (not range between)
ready to do something
ready with a reply
reckon with a person, a contingency
reference to (preceded by *with*, not *in*)
regard for a person (with regard to a subject)
regard for one's own interest
relief to suffering (to bring)
relieve one from a duty
responsibility for (an act or situation)
responsibility of deciding, of a position
responsibility to a person for an action
result from an event
result in a failure
result of an investigation
right of doing
right to do
satisfied of a fact

satisfied with a thing
secure against attack
secure from harm
secure in a position
tamper with
tinker at gemmology
tinker with an engine
unconscious of
variance on certain topics (at)
variance with a person (at)
versed in
view of circumstances (in)
view to a purpose (with a)
wary of a danger

PUNCTUATION

Punctuation makes the relationships between the various parts of a sentence clear. The following sections are a guide to logical punctuation.

Period

The period is the first, most important punctuation mark.

Use the period in these instances:

1. at the end of a sentence that is neither a question nor an exclamation:

The formation is only 30 m thick at this locality.

Take out your map.

2. after an abbreviation or in some acronyms (*see* [Abbreviations](#), and [A General List of Abbreviations](#)):

Fig.

ca.

a.s.l.

The period that marks an abbreviation is never omitted before a mark of sentence punctuation, except when the abbreviation comes at the end of a sentence. In that situation, the period marking the abbreviation also serves as the period marking the end of the sentence:

The firm of Allan and Co., of which I am a partner, has its head office in Ottawa.

I was made a partner in the firm of Allan and Co.

3. to mark the end of an independent sentence placed inside parentheses.

(The material in parentheses starts with a capital letter and ends with a period, as in this example.)

If, however, a sentence contains material in parentheses, then the period falls outside the parentheses

(as illustrated here).

4. inside quotation marks when the end of the sentence quoted coincides with the end of the main sentence:

The excursion guide said, “This unconformity is marked by a regolith, not a shear zone.”

Do not use the period in these instances:

1. after titles or headings:

Stratigraphy of the Upshot River valley

2. after column headings in tables:

Total organic carbon (%)

3. after dates or signatures:

10 October 2008

Allen J. Moore

4. after SI symbols:

The pillows are up to 1.5 m in exposed long axis on a subhorizontal surface.

All the major events took place within about 15 Ma in that region.

5. after individual letters in some acronyms and initialisms (see [A General List of Abbreviations](#)):

REE

LOI

DNAG

6. when abbreviating the names of most organizations

GSC

USSGS

GAC

Ellipsis (pl., ellipses)

The period is used in series, to mark an ellipsis: i.e. something left out of a sentence.

If the ellipsis comes in the middle of the sentence, three dots are used; if it comes at the end of a sentence, four (a period, with no space between it and the preceding word, followed by three dots):

An iceberg is a massive piece of floating or stranded ice detached from the front of a glacier into a body of water.

An iceberg is a massive piece of...ice detached from the front of a glacier into a body of water.

An iceberg is a massive piece of floating or stranded ice....

Colon

The colon ranks in value between a period and a semicolon: it indicates a pause, or degree of separation, longer than that marked by a semicolon, but shorter than a period.

It marks the end of the first of two very closely related clauses.

The first word following a colon is not capitalized unless it is a proper noun or the first word in a quoted sentence.

Use the colon in these instances:

1. between two clauses that present contrasting ideas, or between independent clauses when the second clause amplifies or interprets the first:

We did not find shale: we found sandstone.

The anticline is asymmetrical and faulted: its development was related to compression beneath the McConnell Thrust.

2. to introduce a formal statement, or a statement that explains, proves, or enlarges on one that precedes it. In this case, the colon acts as a substitute for a word like *for*, *viz.*, or a phrase like *that is to say*:

The purpose of this paper is twofold: to explode the myth of the Cannon Embayment, and to reconstruct the depositional environment of the Triassic Fodder Formation.

3. to introduce a formal quotation:

The party chief looked at his crew and said: “We’re stuck here until the fog lifts, I’m afraid.”

4. before a final clause that summarizes preceding matter:

Before establishing a formal geological unit one must describe the unit, define its boundaries, dimensions, shape, age, and other regional aspects, and attempt to establish its correlation with other units and its genesis: in other words, a very thorough examination of the unit must be made.

5. to introduce a series of particulars, such as a list or an enumeration:

In 50 m of section, we found the following materials: fine-grained sandstone, siltstone, shale, fossiliferous limestone, and chert.

Sandstone: calcareous; fine-grained; medium greenish grey, light-brown-weathering; thin-bedded, crosslaminated.

The following structures are found in the Foothills: 1) thrust faults, 2) culminations, and 3) triangle zones.

However, not all lists need to be introduced by a colon.

Do not place a colon between a preposition and its object:

Stratigraphic information about the Fraser River delta is important for understanding the processes that have shaped the delta (Luternauer et al., 1994), allowing possible aquifers and aquitards to be identified (Ricketts, 1998), and providing the basis for geotechnical assessments of earthquake hazards (Harris et al., 1995).

not

Stratigraphic information about the Fraser River delta is important for: understanding the processes that have shaped the delta (Luternauer et al., 1994), allowing possible aquifers and aquitards to be identified (Ricketts, 1998), and providing the basis for geotechnical assessments of earthquake hazards (Harris et al., 1995).

Do not place a colon between a verb and its object or object complement.

From structurally lowest to highest, the four volcanic and plutonic units are 1) Skinner Cove Formation, 2) Old Man Cove Formation, 3) Little Port Complex, and 4) Bay of Islands Complex.

not

From structurally lowest to highest, the four volcanic and plutonic units are: 1) Skinner Cove Formation, 2) Old Man Cove Formation, 3) Little Port Complex, and 4) Bay of Islands Complex.

Use a colon where the introductory clause is an independent clause.

The seismic–reflection profiles (Fig. 5) indicate that the sedimentary sequence beneath the southern Fraser River delta comprises four main units: Holocene topset (unit 1) and foreset (unit 2) deposits, underlying Pleistocene sediments (unit 3), and Tertiary bedrock (unit 4).

not

The seismic–reflection profiles (Fig. 5) indicate that the sedimentary sequence beneath the southern Fraser River delta comprises: Holocene topset (unit 1) and foreset (unit 2) deposits, underlying Pleistocene sediments unit 3), and Tertiary bedrock (unit 4).

Note

The example above is incorrect because the colon is placed between a verb and its objects.

Mineralization in the area consists of the following: massive sulphides and barite in the Macumber limestone (Magnet Cove deposit), barite-siderite without associated sulphides in the Macumber limestone, and hematite-limonite in the Horton sandstone.

not

Mineralization in the area consists of: massive sulphides and barite in the Macumber limestone (Magnet Cove deposit), barite-siderite without associated sulphides in the Macumber limestone, and hematite-limonite in the Horton sandstone.

Note

The example above is incorrect because the colon is placed between a preposition and its objects.

Semicolon

The semicolon comes third in the descending order of punctuation: period, colon, semicolon, comma. It indicates a pause or degree of separation less than a colon, but more than a comma.

Use the semicolon in these instances:

1. to separate clauses that are too closely related in meaning to be written separately:
Phyllitic slate, phyllite, and fine-grained, argillaceous sandstone are the dominant rock types; they are penetratively cleaved and weather greenish grey and brown.
2. to separate closely related clauses in a compound sentence where the connecting conjunction is omitted:
In the northern part of the section there are many graptolitic beds; in the southern part there are none.
3. to separate principal clauses in a long sentence from phrases or subordinate clauses marked off by commas:
The succession is composed of the Carnival Formation, a quartz sandstone unit; the Greentree Formation, a marine shale; and the Blackbird Formation, a second, less extensive sandstone unit.
4. between the clauses of a compound sentence when there is a contrast of ideas:
In GSC publications, we refer to a fine-grained sandstone, not a fine sandstone; a coarse-grained granite, not a coarse granite.
5. before a conjunctive adverb (*therefore, however, moreover, indeed, in fact, that is, for example, consequently, and furthermore*) when it connects independent clauses:
Corrections can be made for variations in topography along a survey line during data processing; however, surface conditions and the depth to the water table are likely to vary with the topography.

A semicolon is not used before a conjunctive adverb if it is being used in a transitional sense (i.e. not joining independent clauses):

Uranium-lead dating, however, suggests that the volcanic rocks in this succession are not significantly younger than the Coldbrook Group (Bevier et al., 1994).

Therefore, although great uncertainties remain, predictions of climate change suggest that the Palliser Triangle region will be warmer, and likely drier, in the future.

Semicolons following quotations and parentheses should be placed outside the closing quotation mark and parenthesis.

Comma

The comma is perhaps the most widely used punctuation mark.

Use the comma in these instances:

1. to mark off an introductory adverbial phrase or clause from the rest of the sentence, but not if the phrase or clause is short and the omission is not misleading:

When deposition finally ceased, at least 2000 m of sediments had accumulated.

At present the equipment needed for monitoring the earthquakes is not available to our scientists.

2. to separate or enclose a *nonrestrictive* (or *commenting*) relative clause. A *restrictive* (or *defining*) relative clause is never set off by commas. The distinction appears difficult, but really is not. A restrictive (defining) clause contains some information that is essential to the meaning of the sentence; a nonrestrictive (commenting) clause contains additional information:

Restrictive clause: The man who discovered the fossil beds was not a geologist.

Nonrestrictive clause: The man, who was not a geologist, discovered the fossil beds while on holiday. ('Who was not a geologist' is a nonrestrictive [commenting] clause that contains no essential information and is set off by commas.)

Note how the presence or absence of commas can affect meaning:

The geologists who knew about slope instability detoured around the talus. (some of the geologists)

The geologists, who knew about slope instability, detoured around the talus. (all the geologists)

The samples that were in the helicopter were lost. (only the samples in the helicopter)

The samples, which were in the helicopter, were lost. (all the samples)

In the second set of examples above, the example of a nonrestrictive clause is introduced by the relative pronoun *which*. A restrictive clause is introduced by the relative pronoun *that*, a nonrestrictive clause cannot be introduced by the relative pronoun *that*. See also [Pronouns](#) in [Grammar](#).

3. between independent clauses when they are linked by the co-ordinating conjunctions *and*, *for*, *but*, *or*, *nor*, *yet*, *so*:

The fossils were not identified in the field, for nobody there knew anything about them.

But if the clauses are long and already contain commas, a semicolon is used to separate them (see [Semicolon](#)).

4. to separate words and phrases in a series, particularly when they have the same construction:
The formation comprises beds of sandstone, siltstone, shale, and argillaceous sandstone. Separate the last and second last items in a series by placing a comma before the *and*.

Otherwise, the items will be construed as being joined in some way.

Beds of siltstone, sandstone and shale

are different from

beds of siltstone, sandstone, and (beds of) shale.

Grey, red, and green mudstone

indicates three discrete colours, but

grey, red and green mudstone

indicates two: a grey, and a mixed or mottled red and green.

If an adjective is closely related to the noun, it should not be set off by a comma:

The lower part of the section contains significant amounts of gritty feldspathic sandstone.

(Avoid usage that defines a colour as *coarse*, by adding the comma to *coarse, pink feldspar*.)

5. to mark off *appositional* material—that is, a noun or noun phrase that follows another directly and explains or describes it. If the appositional material is a restrictive (or defining) phrase, commas are not required:

The unit at the base of the mountain, the sandstone member, is 300 m thick.

6. to set off parenthetical words and phrases from other parts of the sentence, when parentheses or brackets are not used for this purpose. In such instances commas are used in pairs, just as parentheses would be:

The scarcity of blue and green algae, as previously noted by Schlink and Schlime (1979), suggests that sedimentation took place under marine conditions.

Note

There is no comma before parentheses: any punctuation that is required comes after the parentheses.

7. to separate adverbs and adverbial phrases that modify a whole clause:

For the third time, the field party set off, only to be hampered by bad weather.

8. to indicate the omission of a word that is, or words that are, common to two parts of a sentence (i.e. to indicate an ellipsis):

The rocks of this area were studied by Greener (1950), Max and Scheel (1981), and Kemper (1985).

In 2007 more than 500 wells were drilled; in 2008, 76; and in 2009, so far, only 32.

9. between the day of the month and the year (in the sequence month-day-year), but not between the month and the year:

June 19, 2009

June 2009

19 June 2009

Use a comma between the day and the date or between the place and the date:

Friday, 4 May 2009

Ottawa, 4 May 2009

Saturday, May 4, 2010

Ottawa, May 4, 2010

10. between titles and degrees used with names:

J.L. Jones, M.A., Ph.D.

11. to separate two words or numbers that might otherwise be misunderstood:

In July 1999, 36 geologists went into the field.

In 2000, 500 wells were drilled.

12. to separate co-ordinating (modifying the same noun/verb) adjectives and adverbs:

It was a small, weathered, lichen-covered outcrop.

The geologist climbed slowly, carefully, and safely.

Commas are not used if the modifiers are not co-ordinating (i.e. the word order cannot be switched without affecting the meaning):

It was a pink granitic rock.

13. to separate a series of independent clauses, including the final clause (i.e. the comma precedes the conjunction):

The outcrops are extensive, they are severely fractured, and show little evidence of bedding.

14. to set off a nonrestrictive dependent clause following the main clause, but not a restrictive clause:

Pebbles of volcanic rock are scattered throughout the conglomerate, but it is difficult to explain their origin.

It would have been possible to date the pebbles if I had collected more samples.

But, if a dependent clause precedes the main clause it should be followed by a comma regardless of whether it is restrictive or nonrestrictive:

If the thrust faults developed before the normal faults, retrothrusting (normal movement on an existing thrust plane) may have occurred.

15. to set off a quotation that does not form part of a phrase or clause in the sentence:

According to Douglas (1957, p. 92), "...the easternmost syncline...is isoclinally folded..." in the Mount Head map area.

Do not use the comma in these instances:

1. before a parenthesis (or a bracket);

2. between the parts of a compound predicate (two or more verbs with the same subject):

He had collected the fossils carefully and was annoyed to find that the more fragile ones were broken.

The pegmatite veins are widespread in this area and show traces of gold.

Hyphen

The hyphen (-) looks like a short dash, but the hyphen and the dash are very different: the hyphen unites, the dash separates.

In general, the hyphen is used between a word and a prefix, suffix, or other word-element, to prevent ambiguity of meaning or awkward-looking combinations of letters.

Nouns

Use the hyphen in these instances:

1. nouns of equal value (or when used as adjectives):

basin-and-range
salt-and-pepper sandstone
silver-gold anomaly
cusp-ripple strike-slip
fault lead-zinc
vein shale-arenite
vein-dyke
stoss-and-lee topography

2. nouns written as two words, where they have a modifier:

dispersed mineral-matter
but
mineral matter
fixed entropy-ratio
but
entropy ratio
red colour-filter
but
colour filter

3. noun-plus-adjective compounds:

mineral-rich section
the section is mineral-rich lichen-free rock
the rock was lichen-free

Do not use the hyphen in these instances:

a compound noun that has become a single specialized word:

aircraft
fieldwork

mudflow

seashore

but if such a noun has a modifier that modifies only the first part, the compound is separated:

cut-glass ware

sulphurous-mud flow

inland-sea shore

Adjectives

For clarity, use the hyphen in these instances:

1. compound adjectives when they precede the noun they modify:

coarse-grained granite

ice-marginal channel large-scale feature

high-energy environment

ice-contact deposit

thin-bedded limestone

Mid-Atlantic Ridge

shallow-marine environment

2. combination colour terms placed before or after the noun:

blue-green amphibole

the amphibole is blue-green

orange-red shear zone

the shear zone is orange-red

Compounds with the suffix *-ish* are hyphenated only when they precede the noun:

bluish-green amphibole

but

the amphibole is bluish green

Adjectives indicating a specific shade, such as *light*, *pale*, *bright*, and *dark* are not hyphenated if they are placed before or after the noun:

light grey gneiss

the gneiss is light grey

pale yellow zone

the zone is pale yellow

3. compound adjectives made up of a noun, adjective, or adverb and a present participle whether used before or after the noun:
 - gold-bearing deposit
 - deposit was gold-bearing
 - north-trending fault
 - the dyke is north-trending

but if the compound is preceded by an adjective modifying the first word in the compound, use two hyphens:

 - north-northwest-trending striae
 - mid-oceanic-ridge basalt
 - light-green-weathering rocks
4. compound adjectives made up of a noun or adverb and a past participle when they precede the noun they modify:
 - contact-metamorphosed
 - sediment intrusion-hosted deposits
 - ice-rafted material
 - shear-zone-hosted deposits
5. compound adjectives when the adverb of the combination could be misread as the modifier of the noun:
 - more-open creek bottoms
 - shows much-improved growth
6. compound adjectives ending in an adverb of direction or place (*in, out, up, down, etc.*) when they precede the noun:
 - melt-out till
 - fining-upward cycles
 - rip-up clasts
 - trickle-down theory
7. compound adjectives made up of a preposition and a noun:
 - in-house program
 - per-day basis
8. where the meaning would not be clear without hyphens:
 - elongated-clast fabric measurement
 - stony, matrix-supported, subglacial till
 - high sea-level beach
 - subaqueous, sediment-flow deposit

9. compound adjectives that follow the noun in map legends:
quartzite: white, thin-bedded, fine-grained, ripple-marked

Do not use the hyphen in these instances:

1. compound adjectives that follow the noun modified (exceptions, *see* points [2](#), [3](#), and [9](#), above):
The granite is coarse grained.
The amphibole is bluish green.
The sediments are contact metamorphosed
2. adjectives used in the name of an institution or place:
grand jury room
school board members
3. compound adjectives made up of adjective and noun when both are capitalized:
Safety First rules
Merit Award survey
4. compound adjectives used in foreign expressions:
in situ mining methods
en échelon folding
5. if the adverb in a compound adjective cannot be misread as an adjective modifying the noun (the use of hyphens with adverbs ending in *ly* and with the adverb *well* are the most common errors):
highly shattered rock
carefully prepared samples
well developed feature
glacially eroded landscape
thinly bedded limestone (prefer thin-bedded limestone)
northerly trending faults
6. if the compound adjective is preceded by an adverb modifying the first word of the compound:
a reasonably tall growing tree
but
a tall-growing tree
7. a two-word unit modifier, the first element of which is a comparative or superlative:
best preserved specimen
highest priced coal
better drained soil
larger sized grains

8. chemical terms used as adjectives:

calcium carbonate minerals

hydrogen sulphide solution

Phrases

Use the hyphen in these instances:

1. when the prefix is joined to a proper noun, unless usage demands otherwise:

mid-Cretaceous

pre-Wisconsinan mid-1980s

trans-Arctic

but

subarctic, transatlantic, transpacific

expressions beginning with the prefixes *ex* (meaning 'former'), *self*, *quasi*, and *all*, where used to form adjectives or nouns, and those beginning with *quasi* used to form adjectives:

all-inclusive

ex-student

But do not hyphenate when *self* is the base word to which a suffix is added:

selfish, selfless, selfsame

Do not use the hyphen in these instances:

compounds with *after*, *ante*, *anti*, *bi*, *co*, *counter*, *de*, *down*, *extra*, *infra*, *inter*, *intra*, *iso*, *macro*, *micro*, *multi*, *non*, *over*, *photo*, *poly*, *post*, *pre*, *pro*, *pseudo*, *re*, *retro*, *semi*, *stereo*, *sub*, *super*, *trans*, *tri*, *ultra*, *un*, *under*, *uni*, and *up*, except where clarity demands otherwise:

macrofossil

semianthracite

microclimate

bilateral

subsurface

multicoloured

noncalcareous

downsection

downthrow

preglacial

upvalley

but use a hyphen where two identical consonants occur together, where the appearance of the word is confusing without the hyphen, or where the word written without a hyphen has another meaning:

co-operation post-tectonic

co-ordinate re-cover

de-icing
semi-indurated
down-ice (adj.)
multi-element

Suffixes

Use the hyphen in these instances:

words ending in *wide*, depending on usage and the degree of familiarity of the word:

Canada-wide
industry-wide
but nationwide, worldwide

Do not use the hyphen in these instances:

compounds composed of nouns ending in *like*:

businesslike
childlike

but hyphenate occasional compounds:

drumlin-like

and root words ending in double l:

bell-like

Do not combine adjectives with *like* as in *globularlike*. Write either *globule-like* or *globular*.

Suspended compounds

Use the hyphen in these instances:

when a component common to successive compound adjectives is omitted:

medium- to coarse-grained granite
thin- to thick-bedded limestone
upward- and eastward-younging rocks

Compass points

Compass points consisting of two directions are written as one word:

northwest
southeast

Hyphenate after the first point when there are three points:

north-northwest
south-southeast
north-northwest-trending

Single letters, figures, and symbols

Hyphenate between a letter, figure, or sign, and the word it modifies:

X-ray

S-wave

3-D

\$-mark

Z-fold

Element ratios

Hyphenate element ratios unless they involve isotopes:

U-Pb ratio

K-Ar age

but

²⁰⁷Pb/²⁰⁶Pb

⁴⁰Ar/³⁹Ar

Dash

There are two kinds of dashes: the *en dash*, which is longer than a [hyphen](#) and the *em dash*, which is twice as long as an en dash:

en dash—no space on either side

em dash — space on either side

En dash

Use the en dash in these instances:

1. to join inclusive numbers or series inside parentheses in the text, in a reference in the references list, or in a table:
 - p. 9–15
 - W.E. Logan
(1798–1875)
 - 10–15°C
 - January–June
 - but*
 - 8 to -20°C
2. in compound expressions joining place names:
 - the Great Lakes–St. Lawrence Lowlands
 - the Laurentide–Greenland ice sheets

3. in joining a one-word noun to a two-word noun in a compound adjective:

a granodiorite–quartz monzonite phase

a lagoon–coastal swamp environment

Em dash

Use the em dash in these instances:

1. as the equivalent of, or as a substitute for, parentheses. A pair of dashes sets off material in parenthesis more directly and decisively than a pair of commas:

The Gantry Formation — the name is the subject of much controversy — is found at only one locality in the map area.

2. to mark the insertion of material that explains, amplifies, complements, or corrects:

The outcrop consists of limestone, gneiss, and salt — an unlikely combination that has been juxtaposed by faulting.

3. to gather up the subject of a sentence when it is a very long one:

Rich stores of minerals, good agricultural land, forests stretching over millions of acres, coastal waters teeming with fish, and energetic and enterprising people — all these assure Canada a bright future.

Do not use the em dash immediately after a colon, semicolon, or comma.

Question mark

Use the question mark in these instances:

1. at the end of any sentence that is a direct question:

Where is the contact between the two formations?

2. after every direct question of a series that makes up a single sentence:

When trying to identify any hand sample, we must ask ourselves these questions: what is the grain size? the texture? the colour? the mineralogy? the rock type?

3. enclosed in parentheses, to express a doubt about the correctness of a statement:

The quartzite of the Ludding Formation is overlain by fine-grained sandstone of the (?) Packs Formation.

Note

(?) is a query expressing doubt.

? is a punctuation mark, placed at the end of a question.

Position the (?) carefully in order to define exactly what is questionable:

(?) Lower Devonian (questions the entire statement)

(?)Lower Devonian (questions only *Lower*) (?) Silurian–Devonian (questions both ages)

(?)Silurian–Devonian (questions only *Silurian*) Silurian–(?)Devonian (questions only *Devonian*)

(?)[Upper Bathonian]–Callorian (questions only *Upper Bathonian*)

4. to indicate missing digits:

The research was carried out over several years (1929–193?)

Do not use the question mark after indirect questions:

The geologist asked the students which formation the samples came from.

Quotation marks

The exact words of a speaker or writer are indicated by the use of quotation marks or by a variation in type or indentation.

For quotations of less than 50 words or five lines, use quotation marks. For quotations greater than 50 words, offset the quoted text, set in smaller type, and do not use quotation marks.

Whichever method is used, you must reproduce in every detail the spelling, punctuation, and other characteristics of the original, even to the extent of reproducing errors, though attention may be called to such mistakes by writing sic (Latin meaning ‘thus so’) in square brackets thus: [sic] immediately after the error.

Use quotation marks in these instances:

1. to enclose direct quotations. Do not use with indirect quotations:

Dennison (2005) described the units as follows: “...the volcanoclastic sequence is diluted by at least 34 m of gabbroic to dioritic intrusions of transitional magmatic affinity.”

Ross et al. (2007) described two volcanoclastic units, the D’Alembert tuff and the Stadacona unit, and inferred that they were deposited mostly by water-supported density currents, following submarine explosive eruptions of plagioclase-phyric magmas.

2. Double quotation marks are used for the main quotation, single ones for inside quotations, and double ones for a third quotation within the matter between single quotation marks. Quoted matter rarely goes beyond the third set of quotation marks:

Walters (1994, p. 12) stated, “The outcrop reported by Kingsley as Green Formation and by Smith as ‘probably “upper” Markum’ is actually neither of those.”

3. Use single quotation marks to enclose technical terms. If the term or word is repeated after the first use, the quotation marks are not required.

The parameter Ω is often referred to as the clumping index (Chen, 1996) or ‘nonrandomness factor’ (Kucharik et al., 1999).

4. You may use single quotation marks to indicate an informal name or part of a name for a unit, zone, member, or formation:

This section of the ‘upper’ Banff Formation is over 500 m thick.

The ‘lower member’ consists of sandstone with minor shale.

In this paper, these strata represent the ‘Cadoceras’ zone.

5. Enclose matter following the terms *entitled*, *marked*, *specified*, *as*, *endorsed*, *signed*, *indicated as*, *mentioned as*, *termed*, *the word*, *the name*, and *the term* in single quotation marks:

The word ‘greywacke’ has had a number of different definitions. The use of the name ‘Turtle Formation’ is a matter of some dispute.

Using quotation marks with other punctuation marks

1. Place commas and periods within the enclosing quotation marks, whether or not they are part of the quoted material:

Dennison (2005) described the units as follows: "...the volcanoclastic sequence is diluted by at least 34 m of gabbroic to dioritic intrusions of transitional magmatic affinity."
2. The question mark and exclamation mark remain true to the original text by appearing within the quotation marks:

...Jefferson's main questions being, "Could these be marker horizons? Alternatively, could the upper units be deformed pillows?"
3. Separate a quotation from the rest of the text by commas, unless the meaning requires other punctuation (*see* examples above).

Parentheses

Use parentheses (round brackets) in these instances:

1. to set off words of explanation or comment, or an afterthought:

Access to the area is by plane (the landing strips are not always usable), helicopter, or pack horse.

The study by Hopkins (1949) is the best one completed to date.

A complete sentence that stands alone in parentheses starts with a capital letter and ends with a period:

The speaker gave a synopsis of the stratigraphy of the six new formal members. (Detailed measured sections are given in Appendix 5.)
2. to set off letters or numbers designating items in a series, either at the beginning of a paragraph or within a paragraph:

The objectives of this study are 1) to provide vitrinite reflectance profiles, 2) to provide time-temperature histories, and 3) to assess conditions of bitumen reflectance evolution.
3. For the use of parentheses in systematic paleontology, *see* [Paleontology](#).

Brackets

Use square brackets, often simply called brackets, in these instances:

1. to enclose material inserted into the text by an editor or a critical reviewer, not the author, or, in quoted text, material inserted by the author quoting the text:

The Harvey Formation [referred to as the Landing Formation, below] can be recognized at three localities in the area.

Jespeth (1909) described the section as, "...a thick deposit of greywacke and flysh [sic] stretching down the mountainside."
2. to enclose the translation of a title

3. to enclose a second set of parenthetical material inside material already enclosed by parentheses:
(More controversial views were published recently [*see* Smith (2008) for an in-depth review of K-Ar dating in the area].)

If the secondary material is minor, such as an initial or number, it may be enclosed in a second set of parentheses instead or brackets:

(*see* Smith's (1967) description of the breccia)

Apostrophe

Use the apostrophe in these instances:

to indicate the omission of letters:

can't (cannot)

doesn't (does not)

Be careful to distinguish between *it's* as a contraction of *it is*, and *its*, the possessive pronoun. The first takes the apostrophe; the second does not.

Do not use the apostrophe with dates such as the *1980s* or plural abbreviations such as *PGEs*.

Oblique

Use the oblique to separate alternatives in these instances:

1. and/or

2. fractions:

3/4

3. element ratios:

²³⁸U/²⁴⁸Pb

4. NTS area designations:

31-M/6

5. strike and dip measurements:

125°/30°

6. isotopic ages:

2658 +9/-8 Ma

ABBREVIATIONS

This section describes the use of abbreviations in ESS publications.

General rules

Use abbreviations in parenthetical and bracketed expressions, tables, figures, footnotes, and references. In running text, if the abbreviation of a term is new or may not be recognized, write it in full the first time, with the abbreviated form in parentheses immediately following. Thereafter the abbreviated form may be used by itself.

In general, it's best to avoid abbreviations in running text, although a few, such as i.e., e.g., viz., AD, BC, BP, and Ma, are commonly used and are permissible.

Do not use abbreviations at the beginning of a sentence or at the beginning of a section title.

Loss-on-ignition data were also collected for these samples.

not

LOI data were also collected for these samples.

Do not use abbreviations in legends, tables of contents, or indexes.

Several word constructions resemble abbreviations. These include contractions (e.g. can't), which are abbreviations that end with the last letter of the word abbreviated, and clipped forms of words (e.g. phone). Other constructions are acronyms, initialisms, and scientific terms (weights and measures [metric and imperial symbols] and chemical symbols).

Questions? [A General List of Abbreviations](#), which includes other constructions, has been prepared to help you. Consult [International System of Units](#) (SI), popularly know as the metric system, for SI and other approved symbols.

Periods

When an abbreviation that takes a period comes at the end of the sentence, do not add another period; one performs both functions.

Do not use periods with the following:

- chemical symbols and mathematical abbreviations: H₂O, cos, log, Ca, Fe
- SI symbols: L, m, km, Ma
- abbreviations for points of the compass: NNW (an exception is for an address: 32 Street N.W.)
- acronyms and initialisms: NATO, UNESCO, GSC, CIMM, *but* U.S.A., N.W.T.
- these Latin words (which are not abbreviations):
 - via
 - et
 - finis

par

pro

Plurals

Form the plurals of most abbreviations by adding an *s*, but not an apostrophe:

Dr.

Drs.

In ESS publications, however, some abbreviations remain the same in the plural as in the singular:

p. (page, pages)

v. (volume, volumes)

Fig. (Figure, Figures)

pt. (part, parts)

Pl. (Plate, Plates)

no. (number, numbers)

Note that symbols for metric units do not take an *s* in the plural:

1 m, 10 m

1 L, 18 L

1 kg, 3 kg

1 mm, 50 mm

Capital letters and hyphens

An abbreviation is capitalized or hyphenated only if the unabbreviated word is capitalized or hyphenated:

Ontario: Ont.

foot-pound: ft.-lb.

Geographic names

Do not abbreviate the words County, Township, Fort, Mount, North, Point, Island, Port, and Saint when they are part of a proper name, unless the abbreviated form is used in the official name (official spellings can be found at the [Geographic Names of Canada](#) website).

Port Radium

Fort McMurray

Saint John River valley

Saint John, N.B.

but

St. John's, N.L.

The following are the official abbreviations for the names of provinces and territories of Canada. Use them in figures and tables if space is limited, but spell them out in running text.

| | |
|---------------------------|--------|
| Alberta | Alta. |
| British Columbia | B.C. |
| Manitoba | Man. |
| New Brunswick | N.B. |
| Newfoundland and Labrador | N.L. |
| Northwest Territories | N.W.T. |
| Nova Scotia | N.S. |
| Nunavut | Nun. |
| Ontario | Ont. |
| Prince Edward Island | P.E.I. |
| Quebec | Que. |
| Saskatchewan | Sask. |
| Yukon | Y.T. |

Latitude, longitude, and compass directions

Use the abbreviated forms where the co-ordinates are given. The abbreviations for latitude and longitude are not capitalized:

lat. 42°15'30"N, long. 59°17'45"W

lat. 42°15'00"N, long. 59°00'00"W

Do not abbreviate latitude and longitude where the term is used without a numeral or in running text:

What is the latitude of section 3?

Abbreviate compass directions as follows:

N, S, E, W

NE, SW, NNW, ESE

Always write out compass directions in running text.

The base camp was located north of the bay.

The fault trends east-southeast.

In designating lands covered by Canada Lands Surveys, abbreviations of the following type may be used in the order shown:

NE sec., twp. 22, rge. 7, W 3rd mer.

l.s. 16, sec. 29, twp. 22, rge. 7, W 5th mer.

Edith Township, Edith Twp. (on figures)

Acronyms and initialisms

An acronym is a pronounceable word formed from the first letters of a series of words:

DNAG

NAFTA MORB

An initialism is formed from the first letters of a series of words and may not be pronounceable:

GSA

CIMM

GSC

Acronyms and initialisms also serve to identify commonly used terms:

platinum-group elements: PGEs

rare-earth element: REE

Use upper case letters for acronyms and initialisms, even if some of the component words are not normally capitalized. Omit periods and spaces.

Use the legal titles of corporate names. Do not abbreviate words such as Company, Corporation, Association, and Limited unless they appear in that form in the corporate name. Do not use an ampersand (&) unless it is part of the official name.

On first use of an organization or program name, put the abbreviation in parentheses immediately following the spelled-out name. You can use the abbreviation as a substitute for the name throughout the text.

See also [A General List of Abbreviations](#)

Initialisms for geological features

Authors sometimes attempt to shorten their papers by using initialisms for such elements as formation names: Grand River Formation (GRF); faults: Windy River Fault: (WRF); and unit names: Chilcotin Group basalts: (CGb). This becomes cumbersome when there are many of these initialisms in a paper and the reader may become confused.

Spell names in full so that readers do not have to refer back to the first use of the name. Where there are repeated references to the same rock unit or feature, you may rely on *the formation* or *the fault* where this usage is clear. Continue to use legend unit designators on maps.

Months and days

Always spell out the names of months in running text. They may be abbreviated in tables and figures. Note: May, June, and July are not abbreviated:

Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Always spell out the names of days in running text. They may be abbreviated in tables and figures:

Sun. Mon. Tues. Wed. Thurs. Fri. Sat.

Parts of the text

When referring to specific (followed by a number) parts of a text, such as volume, chapter, etc., or to figures, tables and plates, do not abbreviate the word except when it appears in parentheses. These words take an initial capital letter:

Part 4

Table 10

but The locality is situated between two rivers (Fig. 2).

Note

In paleontological plates, *figure* does not take an initial capital letter:

Plate 1, figures 1 to 3, or (Pl. 1, fig. 1–3)

Write smaller divisions (paragraph, line, page) in full in running text, but do not capitalize them except in headings:

The exact location is page 247, line 13

More information on when and when not to capitalize can be found in [Capitalization](#).

Do not abbreviate the word *Figure* in a legend or caption:

Figure 2. Hoodoos on the west bank of the Milk River.

In reference lists, tables, and figures in a plate, words referring to parts of a publication should be abbreviated as follows:

| | |
|-----------|-------|
| article | art. |
| book | bk. |
| chapter | chap. |
| figure | fig. |
| section | sec. |
| volume | v. |
| page | p. |
| paragraph | par. |
| plate | Pl. |
| part | at. |
| number | no. |

A GENERAL LIST OF ABBREVIATIONS

Although the plural of most abbreviations is formed by adding an *s*, in many cases the same abbreviation serves for both the singular and plural forms of a word. This list includes some acronyms, initialisms, and scientific terms. Approved [SI symbols](#) appear in their own section. Abbreviations of Latin terms used in paleontology are listed in the sections entitled [About Paleontology](#) and [Latin terms and abbreviations](#).

| Abbreviation | Description |
|---------------------|--|
| A | |
| a | year(s) |
| AD | (<i>anno Domini</i>) in the year of our Lord; AD should always be placed before the numerals, e.g. AD 1066 |
| adj. | adjective |
| adv. | adverb |
| AFM | alkalis-iron-magnesium |
| a.m. | (<i>ante meridiem</i>) before noon |
| art. | article |
| a.s.l. | above sea level |
| assoc. | associate, association |
| ATV | all-terrain vehicle |
| av. | average |
| B | |
| B.A. | Bachelor of Arts |
| BC | before Christ; BC should always be placed after the numerals, e.g. |
| 500 BC | |
| BCE | Before the Common Era, Before the Current Era, Before the Christian Era. A secular alternative to BC/AD (Before Christ/Anno Domini). The numbering of years using Common Era notation is identical to the numbering used with Before Christ/Anno Domini (BC/AD) notation; neither uses a year zero. Common Era is also known as Current Era and Christian Era; all three expressions are abbreviated as CE. (Christian Era is, however, also abbreviated AD, for Anno Domini.) Dates before the year 1 CE are indicated by the usage of BCE, short for Before the Common Era, Before the Christian Era, or Before the Current Era. |
| bldg. | building |
| BP | before present (specifically before 1950); BP should always be placed after the numerals, e.g. 11 000 BP |
| B.Sc. | Bachelor of Science |

C

| | |
|----------|--|
| C | Celsius, carbon |
| ca. | <i>circa</i> (about) (used for dates only, not for measurements) |
| CAI | Colour Alteration Index |
| can./CDN | Canada, Canadian |
| cap. | capital letter (pl. caps.) |
| c.c. | carbon copy |
| cf. | <i>confer</i> (compare) |
| chap. | chapter(s) |
| cm | centimetre |
| c/o | care of |
| col. | column(s) |
| cont. | continued |
| cos | cosine |
| crm | certified reference material |
| cu. | cubic, e.g. <i>cu. yd.</i> |
| c.v. | <i>curriculum vitae</i> (summary of a career résumé) |

D

| | |
|-------|----------------------------------|
| ddh | diamond-drill hole |
| del. | delete |
| dept. | department |
| dia. | diameter |
| DNAG | Decade of North American Geology |
| doz. | dozen |
| Dr. | Doctor, Drive |
| D.Sc. | Doctor of Science |

E

| | |
|--------|---|
| ed. | editor(s), edited |
| e.g. | <i>exempli gratia</i> (for example) |
| Eh | standard oxidation-reduction potential |
| EM | electromagnetic |
| et al. | <i>et alii, et aliae</i> (and others) (in citation of references) |
| etc. | <i>et cetera</i> (and the rest, and so forth, and the remaining things) |

| | |
|------------------|---|
| et seq. | <i>et sequens</i> (and the following) |
| ext. | extension, extinct, external |
| F | |
| f./F. | fault/Fault |
| Fig./fig. | figure(s) |
| Fm | Formation |
| ft. | foot (feet) |
| G | |
| f | gram(s) |
| G | giga, 10 ⁹ the SI symbol for a billion |
| Ga | thousand million (i.e. 10 ⁹) years; Ga should always be placed after the numerals, e.g. 2.5 Ga; Ga should always be placed after the numerals, e.g. 500 Ga. Note that the GSC uses the symbol Ga (thousand millions of years ago or before present) to indicate an age or date, and also to indicate a time interval or age difference. |
| gal. | gallon(s) |
| GB | gigabyte(s) |
| GCMS | gas chromatography mass spectrometry |
| geol. | geology, geologist, geological |
| Gp | Group |
| GSC | Geological Survey of Canada |
| GSC loc. | Geological Survey of Canada locality, e.g. <i>GSC loc. C-25304</i> |
| H | |
| g | hour(s) |
| ha | hectare |
| hp | horsepower |
| HREE | heavy rare-earth element (pl. HREEs) |
| ht. | height |
| Hwy | Highway |
| I | |
| I. | Island(s), Isle(s) |
| ibid. | <i>ibidem</i> (in the same place) (Note: do not use for references, except when pages, figures, tables, etc. have been cited above in a reference, and you wish to refer to the same page or figure.) |

| | |
|---------------------|--|
| ICP-AES | inductively coupled plasma atomic-emission spectrometry |
| ICP-MS | inductively coupled plasma mass spectrometry |
| id. | <i>idem</i> (the same, as mentioned before) |
| ID-TIMS | isotope dilution – thermal-ionization mass spectrometry |
| i.e. | <i>id est</i> (that is) (not followed by a comma) |
| in. | inch (inches) |
| inst. | institute(s), instant |
| int. | international, interior |
| ISBN | International Standard Book Number |
| ital. | italic |
| J | |
| Jr. | Junior |
| K | |
| k | kilo, 10 ³ ; the SI symbol for a thousand |
| ka | thousands of years before the present; ka should always be placed after the numerals, e.g. 500 ka. Note that the GSC uses the symbol ka (thousands of years ago or before present) to indicate an age or date, and also to indicate a time interval or age difference. |
| K-Ar | potassium-argon |
| kbar | kilobar |
| kPa | kilopascal |
| KB | kelly bushing |
| KB | kilobyte(s) |
| KE | kinetic energy |
| km | kilometre(s) |
| km/h | kilometres per hour |
| L | |
| Abbreviation | Description |
| L | litre(s) (The symbol L for litre(s) is used to distinguish this symbol from the numeral 1.) |
| L. | Lower |
| Lab. | Labrador |
| LA-ICP-MS | laser-ablation inductively coupled plasma mass spectrometry |
| lat. | latitude |

| | |
|------------------|---|
| lb. | pound(s) |
| l.c. | lower case |
| LILE | large-ion lithophile elements |
| loc. cit. | <i>loco citato</i> (in the place cited) (requires a publication and page reference) |
| log | logarithm |
| LOI | loss on ignition |
| long. | longitude |
| LREE | light rare-earth element (pl. LREEs) |
| l.s. | legal survey |
| M | |
| m | metre(s) |
| M | mega, 10 ⁶ ; the SI symbol for a million |
| Ma | million years; Ma should always be placed after the numerals, e.g. 500 Ma. Note that the GSC uses the symbol Ma (millions of years ago or before present) to indicate an age or date, and also to indicate a time interval or age difference. The GSC does not use the abbreviation m.y. |
| M.A. | Master of Arts |
| max. | maximum |
| Mb | Member |
| MB | megabyte(s) |
| mer. | meridian |
| min. | minute(s) |
| misc. | miscellaneous |
| mm | millimetre |
| mo. | month(s) |
| mol % | molecular per cent |
| MORB | mid-ocean-ridge basalt |
| m.p. | melting point |
| m/s | metres per second |
| M.Sc. | Master of Science |
| MSWD | mean square of weighted deviates |
| Mt. | Mount (pl. Mts.) |
| Mtn. | Mountain (pl. Mtns.) |
| mV | millivolt |
| mW | milliwatt |
| MW | megawatt |

N

| | |
|-------------|--|
| n. | noun |
| n.a. | not applicable, not available |
| NB | <i>nota bene</i> (note well) |
| n.d. | no date given, no data, not determined |
| no. | number(s) |
| NTS | National Topographic System |

O

| | |
|-----------------|---|
| OD | ordnance datum |
| op. cit. | <i>opere citato</i> (in the work, article cited) (no page reference). Use for general reference to articles by authors cited earlier in the same paragraph or page. Do not use (ibid.) as a substitute for (op. cit.) |
| org. | organization |

P

| | |
|--------------------|--|
| p. | page(s) |
| Pen. | Peninsula |
| pers. comm. | personal communication (give date: C.R. Barnes, pers. comm., 2007) |
| PGE | platinum-group element (pl. PGEs) |
| pH | measure of hydrogen ion concentration; acidity or alkalinity |
| Ph.D. | Doctor of Philosophy |
| Pl. | Plate(s) |
| pl. | plural |
| p.m. | <i>post meridiem</i> (after noon) |
| ppb | parts per billion (i.e. 10 ⁹) |
| ppm | parts per million (i.e. 10 ⁶) |
| prep. | preposition |
| Prov. | Province |
| Pt. | Point, Port |
| pt. | part(s), point |
| pub. | publication, publish, published |

Q

| | |
|-------------|---|
| q.e. | <i>quod est</i> (which is) |
| QED | <i>quod erat demonstrandum</i> (which was to be demonstrated) |

| | |
|------------------------|---|
| QFM | quartz-feldspar-mafic |
| quad. | quadrant |
| q.v. | <i>quod vide</i> (which see; refers to singular) |
| R | |
| R. | River |
| Rb-Sr | rubidium-strontium |
| R&D | research and development |
| Re | Reynolds number |
| re | with regard to. This preposition is a contraction of the Latin <i>in re</i> , meaning 'in the matter of'. |
| rec. | record |
| REE | rare-earth element (pl. REEs) |
| ref. | reference |
| rel. | relative |
| repr. | reprint |
| rept. | report |
| rge. | range |
| R_{max} | mean maximum reflectance |
| R_o | reflectance in oil |
| ROM | read-only memory |
| rom. | roman type |
| r.p.m. | revolutions per minute |
| RR | railroad, rural route |
| Rwy. | railway |
| S | |
| s | second(s) |
| l.a. | <i>sine anno</i> (without date) |
| SD | standard deviation |
| sec | secant |
| sec. | section(s) |
| SEM | scanning electron microscope |
| Sg | specific gravity |
| Sg. | Supergroup |
| SHRIMP | Sensitive High-Resolution Ion Micro Probe |

| | |
|-------------------|--|
| SI | Système international d'unités (International System of Units) |
| SIMS | secondary-ion mass spectrometry |
| sing. | singular |
| s.l. | <i>sensu lato</i> (in the broad sense) |
| sp. | species, specimen(s) (pl. spp.) |
| sq. | square, e.g. <i>sq. in.</i> , <i>sq. ft.</i> , <i>sq. yd.</i> |
| Sr. | senior |
| s.s. | <i>sensu stricto</i> (in the strict narrow sense) |
| St. | Street, Saint |
| suppl. | supplement |
| syn. | synonym, synonymous |
| syst. | system |
| T | |
| T | temperature |
| a | metric ton = tonne |
| TAI | Thermal Alteration Index |
| tan | tangent |
| TD | total depth in a well |
| TIMS | thermal-ionization mass spectrometry |
| tr. | translation |
| twp., Twp. | township, Township |
| U | |
| U. | Upper |
| U-Pb | uranium-lead |
| U.S.A. | United States of America |
| USGS | United States Geological Survey |
| UTM | Universal Transverse Mercator |
| UV | ultraviolet |
| V | |
| v. | volume(s) |
| var. | variety |
| vb. | verb |
| viz. | <i>videlicet</i> (namely, to wit, it is permitted to see) |

| | |
|--------------|---------------------------------------|
| vol % | volume per cent (used only in tables) |
| vs. | versus (against) |
| v.v. | vice versa |
| W | |
| wt % | weight per cent (used only in tables) |
| X | |
| XRD | X-ray diffraction |
| XRF | X-ray fluorescence |
| Y | |
| yd. | yard(s) |

INTERNATIONAL SYSTEM OF UNITS

The International System of Units (Système international d'unités, abbreviated SI in all languages), used in Canada and in most European countries, is popularly called the metric system. This system of weights, measures, and physical quantities is decimal throughout.

Kinds of SI units

SI units are of three types: base, supplementary, and derived. There are seven base units, one for each physical quantity, and two supplementary units ([Table 1](#)). Derived units are obtained by multiplying and dividing base and supplementary units. Several of these derived units have been given special names and symbols ([Table 2](#)), and can be expressed in terms of other units and base units ([Table 3](#)).

Prefixes, symbols, conversion factors, etc.

[Table 4](#) gives examples of SI prefixes and symbols. Several conversion factors are listed in ([Table 5](#)). Some units continue to be used with SI ([Table 6](#)), whereas other units should not be used ([Table 7](#)).

General rules

Follow these rules when writing unit symbols, names, and numbers:

- Write symbols in upright roman type.
- Do not add 's' to indicate more than one: symbols remain unaltered in the plural.
- Write symbols without a period.
- When the symbol for a unit comprises letters, leave a full space between the number and symbol (45 kg), except when the first character of a symbol is not a letter (32°C).
- Always use symbols for SI units; don't write out unit names except to express an approximation, such as 'several metres west'. Do not mix written unit names and symbols.
- In North America, a period or dot is used as the decimal marker, and should be positioned in line with the base of the numerals. Outside of North America and in French text, the comma is used instead of the period.
- Break numbers with many digits into readable blocks of three digits each, starting from the right and left of the decimal point, e.g. 1 000 000. Do not leave a space in a four-digit number (e.g. 1000) except for uniformity where four-digit numbers occur in tables along with larger numbers.
- When a decimal fraction is used, always place a zero to the left of the decimal marker (0.78 g).

Multiplication and division of units

The product of two or more units in symbolic form is indicated by a dot that occurs above the base of the line of text. The dot may be placed at the base of the line of text if the software used to generate the text cannot accommodate special symbols. For example, N·m (newton metre) and N.m are both acceptable; however, be careful, as N·m means newton metre, but mN means millinewton; m.s⁻¹ means metre per second, but ms⁻¹ means reciprocal millisecond.

Table 1. SI units with their names and symbols

| Physical quantity | Unit name | Unit symbol |
|---------------------------|-----------|-------------|
| length | metre | m |
| mass | kilogram | kg |
| time | second | s |
| electric current | ampere | A |
| thermodynamic temperature | kelvin | K |
| amount of substance | mole | mol |
| luminous intensity | candela | cd |
| plane angle | radian | rad |
| solid angle | steradian | sr |

Table 2. SI derived units with special names and symbols

| Physical quantity | Unit name | Symbol | Definition of SI unit | Equivalent forms of SI unit |
|---------------------------------------|--------------------------------|----------|---|-----------------------------|
| energy work | joule | J | $m^2 \cdot kg \cdot s^{-2}$ | $N \cdot m$ |
| force | newton | N | $m \cdot kg \cdot s^{-2}$ | $J \cdot m^{-1}$ |
| pressure stress | pascal | Pa | $m^{-1} \cdot kg \cdot s^{-2}$ | $N \cdot m^{-2}$ |
| power | watt | W | $m^2 \cdot kg \cdot s^{-3}$ | $J \cdot s^{-1}$ |
| electric charge | coulomb | C | $s \cdot A$ | $s \cdot A$ |
| electric potential difference | volt | V | $m^2 \cdot kg \cdot s^{-3} \cdot A^{-1}$ | $W \cdot A^{-1}$ |
| electric resistance | ohm | Ω | $m^2 \cdot kg \cdot s^{-3} \cdot A^{-2}$ | $V \cdot A^{-1}$ |
| electric conductance | siemens | S | $m^2 \cdot kg^{-1} \cdot s^3 \cdot A^2$ | $A \cdot V^{-1}$ |
| electric capacitance | farad | F | $m^{-2} \cdot kg^{-1} \cdot s^4 \cdot A^2$ | $C \cdot V^{-1}$ |
| magnetic flux | weber | Wb | $m^2 \cdot kg \cdot s^{-2} \cdot A^{-1}$ | $V \cdot s$ |
| magnetic flux density | tesla | T | $kg \cdot s^{-2} \cdot A^{-1}$ | $Wb \cdot m^{-2}$ |
| inductance | henry | H | $m^2 \cdot kg \cdot s^{-2} \cdot A^{-2}$ | $Wb \cdot A^{-1}$ |
| luminous flux | lumen | lm | $m^2 \cdot m^{-2} \cdot cd = cd$ | $cd \cdot sr$ |
| illuminance | lux | lx | $m^2 \cdot m^{-4} \cdot cd = m^{-2} \cdot cd$ | $lm \cdot m^{-2}$ |
| frequency | hertz | Hz | s^{-1} | s^{-1} |
| activity of radionuclides | becquerel (replaces currie) | Bq | s^{-1} | s^{-1} |
| absorbed dose (of ionizing radiation) | gray (replaces red) | Gy | $m^2 \cdot s^{-2}$ | $J \cdot kg^{-1}$ |

To express a compound formed by division, an oblique, a horizontal line, or a negative power with a dot to indicate multiplication may be used e.g. m/s, m·s⁻¹

Do not repeat the oblique in the same expression for the same unit. For example, m/s², but not m/s/s.

Where the names of units are used, indicate multiplication by a space:

pascal second

and division by the word *per*:

kilograms per square metre

Table 3. Examples of some SI derived units and derived symbols

| Physical quantity | SI unit | Symbol |
|-------------------------|-----------------------|-------------------|
| mass | gram | g |
| length | kilometre | km |
| length | centimetre | cm |
| length | millimetre | mm |
| length | micrometre | µm |
| area | square metre | m ² |
| area | hectare | ha |
| volume | cubic metre | m ³ |
| volume | cubic centimetre | cm ³ |
| magnetic field strength | ampere per metre | A·m ⁻¹ |
| pressure | kilopascal | kPa |
| time | thousand years | ka |
| time | million years | Ma |
| time | 10 ⁹ years | Ga |
| grade of ore | grams per tonne | g·t ⁻¹ |

Table 4. SI prefixes and symbols

| Multiple | Prefix | Symbol | Multiple | Prefix | Symbol |
|-------------------|--------|--------|------------------|--------|--------|
| 10 ⁻¹ | deci | d | 10 | deca | da |
| 10 ⁻² | centi | c | 10 ² | hecto | h |
| 10 ⁻³ | milli | m | 10 ³ | kilo | k |
| 10 ⁻⁶ | micro | µ | 10 ⁶ | mega | M |
| 10 ⁻⁹ | nano | n | 10 ⁹ | giga | G |
| 10 ⁻¹² | pico | p | 10 ¹² | tera | T |
| 10 ⁻¹⁵ | femto | f | 10 ¹⁵ | peta | P |
| 10 ⁻¹⁸ | atto | a | 10 ¹⁸ | exa | E |

Table 5. Conversion factors for some common units.

| Unit name | Conversion factor |
|---|------------------------------|
| 1 inch | = 2.54 cm |
| 1 foot | = 0.304 8 m |
| 1 mile | = 1.609 344 km |
| 1 mile (international nautical) | = 1.852 km |
| 1 square inch | = 645.16 mm ² |
| 1 square foot | = 929.030 4 cm ² |
| 1 square mile | = 2.589 988 km ² |
| 1 acre | = 0.404 685 6 ha |
| 1 cubic inch | = 16.387 064 cm ³ |
| 1 cubic foot | = 28.316 85 dm ³ |
| 1 ounce (avoirdupois) | = 28.349 523 g |
| 1 ounce (troy) | = 31.103 476 8 g |
| 1 pound | = 0.453 592 37 kg |
| 1 fluid ounce | = 28.4 mL |
| 1 ton (short, 2000 lb) | = 0.907 184 74 Mg |
| 1 ton (long, 2240 lb) | = 1.016 046 908 8 Mg |
| 1 tonne | = 1.102 311 short tons |
| 1 tonne | = 0.984 206 5 long tons |
| 1 kilobar | = 10 ⁵ kPa |
| 1 atmosphere | = 101.3 kPa |
| Fahrenheit temperature | = 1.8 °C + 32 |
| Celsius temperature | = 0.555 (°F-32) |
| 1 centimetre | = 0.393 700 7 inches |
| 1 metre | = 3.280 839 8 feet |
| If the values were not recorded originally in SI units, the equivalent should be given in parentheses (e.g. the section was 421 ft. (128 m) thick). | |

Table 6. Some units that continue to be used in SI.

| Physical quantity | Unit name | Symbol | Definition of unit |
|---|----------------|--------|---------------------------|
| time | minute | min | 60 s |
| time | hour | h | 60 min = 3600 s |
| time | day | d | 24 h = 86 400 s |
| time | year | a | – |
| angle | degree | ° | ($\pi/180$) rad |
| angle | minute | ' | ($\pi/10\ 800$) rad |
| angle | second | " | ($\pi/648\ 000$) rad |
| volume | litre* | L | 1 dm ³ |
| temperature | degree Celsius | °C | 1 K |
| mass | tonne | t | 10 ³ kg = 1 Mg |
| *The 'L' is used in North America, both alone and with a prefix | | | |

Table 7. Some units that should not be used with SI.

| Physical quantity | Unit name | Symbol | Definition of unit |
|-------------------------|-----------|--------|--|
| length | ångström | Å | 10 ⁻¹⁰ m = 10 ⁻¹ nm |
| length | micron | μ | 10 ⁻⁶ m |
| force | dyne | dyn | 10 ⁻⁵ N |
| pressure | torr | Torr | (101 325/760) Pa |
| pressure | bar | bar | 10 ⁵ Pa |
| energy | calorie | cal | 4.1868 J |
| energy | erg | erg | 10 ⁻⁷ J |
| dynamic viscosity | poise | P | 10 ⁻¹ Pa·s |
| kinematic viscosity | stokes | St | 10 ⁻⁴ m ² ·s ⁻¹ |
| conductance | mho | mho | 1 S |
| magnetic field strength | oersted | Oe | $\frac{1000}{4\pi}$ A·m ⁻¹ |
| magnetic flux | maxwell | Mx | 0.01 μWb |
| magnetic flux density | gauss | Gs, G | 10 ⁻⁴ T |
| magnetic induction | gamma | γ | 10 ⁻⁹ T |

ABOUT PALEONTOLOGY

In ESS publications, there are two ways of documenting the occurrence of fossils in an area: by informal lists of fossil names, and by formal, systematic descriptions or taxonomic remarks. Information about these two formats is found below, along with recommendations for paleontological publishing in ESS.

Additional information can be found in the [Paleontological Glossary](#) and [Latin Terms and Abbreviations](#) sections.

Informal lists

GSC paleontologists or outside consultants may provide lists of fossil names and scientific interpretations, usually in the form of unpublished [paleontological reports](#), that you can include in your reports. If you do include them, you should do the following:

- identify in the text the paleontologist who identified the fossils, because that person is responsible for the accuracy of the lists, as well as any opinions on age and correlation that might be derived from the fossil identifications;
- give the paleontologist a chance to check and update the list before you submit your manuscript to your Publication Supervisor;
- include as a preamble to your report the [qualifying statement](#) indicating how the information should be used;
- cite the GSC locality numbers of the fossil occurrences in the text;
- have the Chief Paleontologist check the accuracy and completeness of the curatorial data.

If the paleontologist's contribution is substantial, include it as an appendix under his or her authorship.

Systematic descriptions

Systematic descriptions of genera and species should conform to accepted international standards and should include, preferably in the following order, these items:

1. name of taxon, including authorship (date not necessary if in [synonymy](#));
2. plate and figure, and text-figure numbers;
3. [synonymy](#);
4. derivation of name (if a new taxon);
5. if it is a new genus, designation of a type species (zoological), or a type (botanical);
6. if it is a new species, the explicit designation of a holotype and any other type specimens used in the description of the species. This should immediately follow the diagnosis or description according to recommendations of the [International Code of Botanical Nomenclature](#) (ICBN).
7. diagnosis (for a new taxon) or description. The [International Code of Zoological Nomenclature](#) (ICZN) recommends a diagnosis for a new taxon. Under the ICBN a new taxon may be accompanied by a description or diagnosis. If possible, use telegraph style (omitting verbs, articles, complex sentences) in systematic descriptions. This saves a considerable amount of space, and results in succinct descriptions.

8. discussion or remarks, to include the means by which a new taxon is differentiated from similar, previously named taxa;
9. material: to include [GSC type specimen numbers and GSC curation numbers](#). For example, 'Hypotype GSC 65111 from GSC Curation No. C-60126'.
10. Illustration: at least one illustration showing the essential characters of the taxon, or a reference to a previously published illustration.
11. According to the ICBN, the name of a new taxon must be accompanied by a description or diagnosis, designation of holotype, and indication of repository. In addition, from 1996 the name of a new fossil plant taxon must be accompanied by a description or diagnosis in English or Latin (Art. 36.3). If this information is not included, the name will be invalid.

Synonymy

A synonymy is appropriate and necessary for many systematic descriptions. An adequate synonymy, published with the description of new material, is one of the bases for the author's concept of the taxon. It should contain citations verified by the author from original publications. Synonyms may be listed by publication date or by taxon name. There are some differences between zoological and botanical nomenclature and so examples are given for both sciences. Synonyms may be preceded by qualifier abbreviations. Zoological synonyms may be preceded by Richter notations that should be explained in the text (e.g. vp* in the following examples). The following forms of synonymy are recommended for use in ESS publications:

| | | |
|------|------|--|
| | 1895 | <i>Lytoceras</i> (<i>Gaudryceras</i>) <i>politissimum</i> KOSSMAT, p. 128, Pl. 15, fig. 7a–c. |
| cf. | 1909 | <i>Lytoceras</i> (<i>Gaudryceras</i>) <i>politissimum</i> Kossmat. KILIAN and REBOUL, p. 14, Pl. 1, fig. 7, 8. |
| aff. | 1979 | <i>Anagaudryceras politissimum</i> (Kossmat). KENNEDY and KLINGER, p. 154, Pl. 5, fig. 3, Pl. 7, fig. 2A–D, F. |
| vp* | 1985 | <i>Anagaudryceras politissimum</i> (Kossmat). MATSUMOTO, p. 23, Pl. 3, fig. 1–6, Pl. 5, fig. 5–8. |

or:

?*Astropentagnathus irregularis* MOSTLER, 1967, p. 298–300, Pl. 1, fig. 4.

Astropentagnathus irregularis Mostler. OVER and CHATTERTON, 1987, p. 10, Pl. 2, fig. 2, 3; cf. MÄNNIK and VIIRA, 1990, Pl. 17, fig. 24.

vp* *Hadrognathus irregularis* (Mostler). SCHÖNLAUB, 1971, p. 42, 43, Pl. 1, fig. 4, 11.

Either of the styles of zoological synonymy given above may contain annotations in parentheses

e element

Oistodus nevadensis ETHINGTON and SCHUMACHER, 1969, p. 467, 468, Pl. 68, fig. 1-4, Fig. 5C (part.).

multi-element

Ansella nevadensis (Ethington and Schumacher). FÅHRÆUS and HUNTER, 1985, p. 1175, 1176, Pl. 1, fig. 7, 10 (= e, b elements), Pl. 2, fig. 11a,b, 13a,b, 14 (= b, e, c elements), Fig. 2a-c (= e, c, b elements; includes synonymy); vp* BERGSTRÖM, 1990, p. 25, Pl. 1, fig. 11-14.

non *Belodella* sp. STOUGE in STOUGE and BOYCE, 1983, Pl. 6, fig. 2-8 (fig. 2, 3 = c, f elements of *A. sinuosa*; fig. 4-8 = c, a, e, f, b elements of *A. jemtlandica*).

The botanical style immediately below lists the synonyms by publication date:

1932 *Sporonites bireticulatus* IBRAHIM in POTONIÉ et al., p. 447, Pl. 14, fig. 1. 1933 *Reticulatisporites bireticulatus* IBRAHIM, p. 35, Pl. 1, fig. 1. 1934

Reticulata-sporites bireticulatus (Ibrahim) LOOSE, Pl. 7, fig. 28.

1955 *Reticulatisporites mediareticulatus* auct. non Ibrahim. KNOX, p. 323, Pl. 18, fig. 253.

1967 *Dictyotriletes bireticulatus* (Ibrahim) Potonié & Kremp, 1955, emend. SMITH & BUTTERWORTH, p. 194, 195, Pl. 11, fig. 14, 15.

Note that in this botanical example, a period is not placed between ‘(Ibrahim)’ and ‘LOOSE’ in the 1934 citation because this represents a recombination of Ibrahim’s species by Loose. If it were simply a citation of the Ibrahim species by Loose, a period would follow the former author’s name. This example also illustrates the use of abbreviations (discussed elsewhere), and the importance of citing the taxonomic name verbatim (e.g. including hyphens).

Under the ICBN, a misidentification should be followed by the words ‘auct. non’ and then the name(s) of the original author(s) and full bibliographic reference of the misapplied name. If the misidentified taxon is a synonym, its citation should be included within the synonymy:

1955 *Vallatisporites ciliaris* (auct. non Luber) SULLIVAN, p. 370, Pl. 59, fig. 14, 15, Fig. 3.

or:

1963 *Klukisporites pseudoreticulatus* auct. non Couper: SAAD, p. 121, Pl. 34, fig. 31.

If it was formerly mistakenly regarded as a synonym, or could be regarded erroneously as such because of its misapplied name, its citation should not be included in the synonymy, but listed after it, preceded by ‘non’:

non 1955 *Vallatisporites ciliaris* (auct. non Luber) SULLIVAN, p. 370, Pl. 59, fig. 14, 15, Fig. 3.

Taxonomic remarks

Systematic treatment may not be needed for some taxa. A taxon may be illustrated but not included in the systematic descriptions because no new or significant information is available. Conversely, a taxon may be discussed in the text but not illustrated, in which case it may be appropriate to include the discussion within a section titled ‘Taxonomic remarks’ or ‘Taxonomic summaries’, with only a minimum of information provided, for example name and authorship of the taxon; Plate and figure, and text-figure numbers; and GSC type specimen numbers (e.g. GSC Bulletin 417, p. 46-47).

Digital publication

The ICZN rules governing availability of animal names require publication changed in 2012. The website states

“The amendment establishes an Official Register of Zoological Nomenclature (with ZooBank as its online version), allows electronic publication after 2011 under certain conditions, and disallows publication on optical discs after 2012. The requirements for electronic publications are that the work be registered in ZooBank before it is published, that the work itself state the date of publication and contain evidence that registration has occurred, and that the ZooBank registration state both the name of an electronic archive intended to preserve the work and the ISSN or ISBN associated with the work. Registration of new scientific names and nomenclatural acts is not required.’

Full information can be found at the [International Commission on Zoological Nomenclature](#) website.

Formal and informal scientific names

Italicize generic, trivial (species), and subtrivial (subspecies) names in the text, figures, and tables. This also applies to the adjectival use of names to denote biostratigraphic or chronostratigraphic units (e.g. *Calvustrigis rutherfordi* Zone).

When the names of such taxa are used as part of formal lithostratigraphic or paleogeographic terms, use italics.

Bakevellia Sea

Carbonicola Bed

Names of suprageneric taxa are not italicized but are written with a capital initial letter. If the names are used informally as English nouns or adjectives, they should not be capitalized:

Chonetidae, Ammonoidea, Mollusca, Arthropoda, Ostracoda, Foraminifera, chonetids, ammonites, molluscs, arthropod burrows, ostracodes, foraminifers.

The genus *Spirifer* is in the family Spiriferidae, which includes the true spirifers.

Informal reference to the following suprageneric categories can be indicated by the appropriate termination:

| | | |
|--------------|-------------|---------------|
| Order: | Pentamerida | pentamerid(s) |
| Superfamily: | Atrypacea | atrypcean(s) |
| Family: | Atrypidae | atrypid(s) |
| Subfamily: | Atrypinae | atrypin(s) |

Formal scientific names of fossils should conform to the rules and recommendations of the relevant code — the ICZN or the ICBN — which are based on the binomial Linnean system, first used by the Swedish naturalist Carl von Linné (Carolus Linnaeus) in 1758. In this system, each species name is a binomial, a combination of two latinized names: 1) the generic, or genus name; and 2) the trivial, or species name, which always follows the generic name. Authors of new names should familiarize themselves with the appropriate code.

If a trivial or subtrivial name is an adjective and not used as a substantive, it must agree in gender with the genus name. It may therefore be necessary to change the endings of adjectival trivial or subtrivial names when a species is reassigned to another genus. For example, if *Peneckiella salternensis* were transferred to the genus *Phacellophyllum*, it would become *Phacellophyllum salternense*.

Abbreviations of scientific names

You may abbreviate a generic name to the initial letter followed by a period, for the second and subsequent citations in a single context, but only under conditions that leave no ambiguity. However, at the beginning of a sentence, which should never begin with an abbreviation, write the genus name in full (e.g. ‘*Baculites compressus* is elongate’).

Place the name of a subdivision of a genus in parentheses following the generic name, e.g. *Scaphites* (*Hoploscaphites*) *constrictus*. You may write subsequent citations as *S. (H.) constrictus*. You can use this form in both zoological and botanical citations. However, according to the ICBN, in normal citation the subdivisional name consists of the generic name and a subdivisional epithet connected by a term, as for example *Costus* subg. *Metacostus*.

A trivial name follows the generic name and begins with a lower case letter. Abbreviate it only when it is followed by a subtrivial name (see below). It is not recommended that the trivial name alone be used in citations of biostratigraphic units (e.g. *compressus* Zone). Instead, use *Baculites compressus* Zone, or *B. compressus* Zone.

A subtrivial name always follows the species name, and its first letter, like that of the trivial name, is always lower case. In zoological citations you may write it as *Coelospira exilicosta orbita* or as *C. e. orbita* for subsequent citations. In botanical citations, the subspecies (or other infraspecific) name is connected to the species name by a term denoting its rank. For example: *Stachys palustris* subsp. *pilosa*.

Author citation

In taxonomic studies, the name(s) of the author(s) and the date of publication for each genus or taxon of lower rank should be cited at least once in the text, preferably at first mention of the taxon, and may be omitted subsequently, provided no confusion is caused. According to the ICZN, the name(s) of the author(s) should not be abbreviated except, optionally, where the author(s) are known by the abbreviated name (e.g. ‘L.’ for ‘Linnaeus’). This topic is

discussed under ICBN recommendations (not Articles). Author abbreviation in GSC reports is not encouraged.

The author’s name should follow the name of the taxon without any intervening mark of punctuation. There should be a comma between the author’s name and the date.

For example:

Orthis umbella Barrande, 1848; *Cubiceps gracilis* (Lowe, 1843).

In these examples, the dates are parts of the species names and thus do not constitute publication citations.

When a zoological species has been transferred from the original genus to another genus, the author’s name (and where necessary, date of publication) is in parentheses.

For example:

Paltodus recurvatus Rhodes is now *Panderodus recurvatus* (Rhodes).

New combinations under the ICBN must contain the name(s) of the original author(s) in parentheses, followed by the name(s) of the combining author(s) and date of publication.

For example:

Baltisphaeridium bimarginatum (Timofeev) Downie & Sarjeant, 1965.

The ICBN recommends that the names of two joint authors of a taxon be joined by ‘et’ or an ampersand (&) instead of ‘and’. Where there are more than two joint authors, the citation should consist of the first author, followed by ‘et al.’, with no punctuation between the author’s name and ‘et al.’. Where an author has described a botanical or zoological taxon in a work by another author, ‘in’ should be used:

Grandispora longa Chi & Hills or *Grandispora longa* Chi et Hills

Retusotriletes phillipsii Clendening et al.

Spirifer albertensis Warren in Allan et al.

Comments on, or additions to, determinations should not be italicized, but should be in square brackets:

Opoa adamsi [juv.]

Cherurus [sic] *insignis* (i.e. error in the spelling of *Cheirurus*)

Nucula chassyana d’Orbigny [Cottreau, 1925, Pl. 40, fig. 1, 2 only]

New genus, new species

The first time a new genus is cited in both the abstract and the text, follow it by ‘gen. nov.’, or ‘gen. n.’, or ‘n. gen.’, in roman type (e.g. *Jasperella* gen. nov.). Similarly, the first time a new species is cited in both the abstract and the text, follow it by ‘sp. nov.’, or ‘sp. n.’, or ‘n. sp.’ (e.g. *Acanthoscapha brevicristata* n. sp.). If the species cited belongs to a new genus, follow the citation by ‘gen. et sp. nov.’, or ‘gen. et sp. n.’ or ‘n. gen. et sp.’. References to new taxa in the plate and figure captions should also include these abbreviations. Ensure that the abbreviations chosen are consistent throughout the manuscript. Under ICZN regulations, a new name published after 1999 must be explicitly indicated as being new (e.g. sp. nov. or n. sp., etc.), the repository identified, and the name-bearing type (either a holotype or a syntype series) must be explicitly designated.

Open nomenclature

You can indicate varying degrees of confidence in the identification of fossils by using qualifiers. In order to provide some degree of uniformity, use the following examples:

Leptaena sp. aff. *L. rhomboidalis* (Wilckens) — closely related to *L. rhomboidalis* but probably a new species.

Leptaena sp. cf. *L. rhomboidalis* (Wilckens) — similar to *L. rhomboidalis* and possibly conspecific with it.

Leptaena ‘*concava*’ Hall, *Leptaena* ‘*rhomboidalis*’ (Wilckens) — quoted names are used in an obsolete or probably incorrect sense.

Leptaena concava Hall sensu lato — in the broad, or general, sense of *L. concava* (in this form, do not italicize ‘sensu lato’, and ‘sensu stricto’).

Leptaena concava sensu Hall — in the sense of, or as interpreted by, Hall.

When the question mark is used in any of the following ways, do not italicize it:

Leptaena? *concava* Hall — identification at the generic level in doubt, but species identification believed to be correct.

Leptaena concava? or *Leptaena concava* Hall? — identification at the species level in doubt, but generic identification believed to be correct.

?*Leptaena concava* Hall — whole identification doubtful.

?*Leptaena* sp. cf. *L. rhomboidalis* — whole identification doubtful.

(Qualifiers between the generic and specific names are not regulated by the ICBN or ICZN, so usages differ amongst authors. For example, *Leptaena* sp. cf. *L. rhomboidalis* ('a species of *Leptaena* compared to *Leptaena rhomboidalis*') may also be written *Leptaena* cf. *L. rhomboidalis* ['a species (implied) of *Leptaena* compared to *Leptaena rhomboidalis*'].) Note that terms used to qualify taxonomic determinations are not in italics.

Documentation in publications and reports

Apart from the internationally recommended formal requirements of systematic paleontology, it is essential to fully document all fossil collections that are referred to in a geological report. Requirements include the following:

1. all available geological information, including name of stratigraphic unit, geological age, stratigraphic position given as height above a known datum or recognizable contact, and, where appropriate, other information such as name of biozone;
2. adequate, geographic locality information, including locality data, [GSC curation number](#), section number or name, latitude and longitude (and/or UTM co-ordinates), and a narrative description of the locality;
3. for fossils taken from boreholes, depth information, the accepted name of the borehole, and a locality description;
4. a statement to indicate that all GSC types are catalogued in the National Type Collection of Invertebrate and Plant Fossils at the Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario K1A 0E8 (this statement normally appears on the introductory page to the plates or as an introduction to the section on systematic paleontology);
5. in palynological contributions, the make and registration number of the microscope used, and for each specimen cited, the slide number and England Finder co-ordinates;
6. in plate captions, the taxon name and authorship (date optional), figure numbers, and magnification. Indicate the kind of type specimen (e.g. holotype), or that the illustrated specimen is a 'figured specimen'; the type number, preceded by 'GSC'; and a statement regarding the view or orientation (e.g. upper, ventral). Where this information applies to all or most figures on a plate, it can be placed in a statement at the beginning of the caption (e.g. 'All specimens are paratypes, except holotype specimen in figure 19');
7. in plate captions, detailed locality and geological data for the illustrated fossils (see 1 and 2 above), or, alternatively, reference to a locality appendix or register. Having all necessary information conveniently listed in either a plate caption or locality appendix will assist in the curation of the specimens in the National Type Collection of Invertebrate and Plant Fossils;

8. if appropriate, reference to image production methods (e.g. 'Scanning electron micrographs', 'All specimens at 10 tilt', 'All figures are unretouched photographs').

Notes for format of publications

In the table of contents of each paleontological publication, list all the genera in the systematics section in the order in which they appear.

Full page groups of photographs or photomicrographs are called 'Plates'; subordinate or individual illustrations within plates are called 'figures'. Where practical, group figures and figure numbers in sequence according to the taxonomic order in the systematic descriptions. Assign figure numbers in a logical sequence, and apply them to an overlay rather than directly on the plate.

All other illustrations smaller than page size in paleontological texts are called 'Figures'. Refer to them as 'Figures', with a capital *F*, to distinguish them from the 'figures' (lower-case *f*) in the 'Plates'.

When in simple tabular form, distribution or occurrence charts should be called 'Tables'.

Imprint date

To some authors, the date of issue of a publication is more important than the claimed date of publication (imprint date). Paleontologists are especially concerned about the differences between these two dates, because in naming new species, they are governed by Article 21 of the *International Code of Zoological Nomenclature*. This Article states that if the imprint date is known to be incorrect, then the earliest day on which the publication was available is to be adopted as the date of publication.

In the following example from the *Canadian Journal of Earth Sciences*, the imprint date of the volume number is December 1988, but the journal published the actual issue the following April and gave the issue date as being 01 March 1989. Thus the two new species described by Lenz, and the citation, are dated 1989, not 1988:

Lenz, A.C., 1989. Upper Llandovery and Wenlock graptolites from Prairie Creek, southern Mackenzie Mountains, Northwest Territories; *Canadian Journal of Earth Sciences*, v. 25, no. 4, p. 1955–1971 (imprint date 1988).

ABOUT PALEONTOLOGICAL REPORTS

Paleontological reports (in many cases previously cited as ‘fossil reports’) are numbered, unpublished reports by GSC paleontologists and outside consultants that identify and/or discuss fossils submitted by collectors.

The paleontological report numbering system includes author initials, year, and commonly, abbreviations for geological ages (e.g. Paleontological Report No. J2-1991-TTP, or Paleontological Report No. 002-GSN-1991). To assist in the cataloguing of the reports, their titles should be as detailed as possible, including number of fossil collections, geological age, geographic provenance (e.g. geographic name, province, or territory), complete NTS number, year of collection or (re)submission, and name and institutional affinity of the person requesting the report. Where practical, fossil group and stratigraphic unit are useful additions to the title:

Report on 6 Silurian conodont samples from the Allen Bay Formation, Ellesmere Island, District of Franklin, Northwest Territories, collected by T. de Freitas (University of Ottawa) in 1989 (NTS 49 D/10, 49 D/16, 49 F/8)

Immediately following the title of the Paleontological Report include the following preamble, or qualifying statement:

All references to age determinations and paleontological data must quote the authorship of the report, and the unique GSC Curation Number of the fossil collection. If the report is cited in publication, it should be included in the References Cited section as:

“Report on Early Cretaceous fossils from the Harrison Lake region of south-central British Columbia (NTS 92G); Geological Survey of Canada, Paleontological Report JWH-2009-01, 2 p.”

Reference to, or reproduction of, paleontological data and age determinations in publications must be approved by the author of the Paleontological Report prior to manuscript submission.

Substantial use of paleontological and age data in publications should be reflected in the publications’ authorship.

In order that curators of GSC collections may update the records to show that a paleontological report was generated for the localities cited, it is useful (especially in lengthy reports) to list the [GSC curation numbers](#) on the first page.

ABOUT CURATION NUMBERS

Several independent series of numbers exist for paleontological collections, and it is essential that they be used carefully and consistently to avoid confusion.

Some numbers are designated by prefixes. Specimens catalogued in the National Type Collection of Invertebrate and Plant Fossils contain a prefix including the nature of the type specimen followed by the abbreviation 'GSC' — e.g. 'Hypotype GSC 65111'. Numbers for type specimens can be supplied by the [Curator](#) of the National Type Collection.

GSC curation numbers (formerly called locality numbers) generally refer interchangeably to collecting localities and to the samples that derive from those localities, and are preceded by 'GSC Curation Number' or 'GSC Curation No.'. As a general rule, numbers with a 'C-' prefix indicate samples curated by GSC Calgary, 'D-' for those in Dartmouth, and 'O-' for those curated recently in Ottawa, from O-102540 onward.

Samples previously curated in Ottawa without prefixes retain their original numbers and will never be larger than GSC Curation No. 102539. Numbers for collections and locality data can be supplied by the curator at each regional office. The discontinued numbers in the old plant locality series are designated by the prefix 'GSC plant locality'. Do not include the one or more '0's (zeros) prior to the digits that were introduced in order to satisfy digital data requirements in the early stages of development of a computerized curation system.

There is great risk of confusion with these different numbering systems. Please consider that clarity for the reader is paramount, even if a slightly longer explanation is needed to ensure that clarity. The numbers published should be those that appear on the specimen itself and in existing available catalogues, unpublished notes, and publications, in order to prevent confusion by future scientists and to provide a unique and consistent number throughout the historical treatment of the specimens and the localities.

Publication of illustrations or designation of individual specimens requires that they be placed into a valid type specimen repository, and it is an expectation that Canadian specimens will be placed into a Canadian repository. The National Type Collection of Invertebrate and Plant Fossils is most appropriate for specimens treated in ESS publications. Under International Code of Zoological Nomenclature regulations, a repository must be named for any new taxa.

PALEONTOLOGICAL GLOSSARY

The following terms are commonly used in GSC paleontological publications.

| | |
|-------------------------|--|
| allotype | A specimen of the opposite sex to the holotype, designated from among paratypes (not regulated by ICBN or ICZN) |
| binomen | or binomial name. The combination of two names, the first the generic and the second the species or trivial, that constitute the scientific name of a species (pl. binomina) |
| CAI | Colour Alteration Index (conodonts); plural, Colour Alteration Index values (i.e. not indices) |
| description | A statement of the attributes of a specimen or taxon |
| diagnosis | A statement of those attributes of a specimen or taxon that separate it from others |
| emendation | <ol style="list-style-type: none">1. (ICZN) any intentional change in the original spelling of an available name2. (ICBN) an alteration of the diagnostic characters or circumscription of a taxon, without the exclusion of the type |
| epitype | (ICBN) a specimen selected as an interpretive type when the type material is demonstrably ambiguous |
| extant | Of a taxon: having living representatives |
| extinct | Of a taxon: having no living representatives |
| figured specimen | <ol style="list-style-type: none">1. (Zoological) an illustrated specimen that has been assigned with some degree of uncertainty to a formal species, e.g. <i>Atrypa</i> sp., <i>A. reticularis</i>? <i>A. sp. cf. A. reticularis</i> (therefore, there are no type specimens)2. (Botanical) any illustrated specimen that is not a type specimen |
| holotype | <ol style="list-style-type: none">1. (ICZN) the single specimen that was designated by the author as the name-bearer of a species or subspecies when it was established, or the single specimen on which the taxon was based when no type was specified2. (ICBN) the one specimen or illustration used by, or designated by, the author of a species or infraspecific taxon as the nomenclatural type homonyms Names that have the same spelling, but that refer to two or more different taxa; 'senior homonym' and 'junior homonym' apply, respectively, to the first, and all later published homonyms |
| hypotype | a subsequently described, listed, or figured specimen of a taxon, other than the holotype or paratypes |
| invalid | A name that is not acceptable (valid) under the codes |
| isotype | (ICBN) a duplicate of the holotype (i.e. part of a single gathering made by a collector at one time) |
| lectotype | <ol style="list-style-type: none">1. (ICZN) a syntype that is designated as the single name-bearing type specimen after the establishment of a species or subspecies |

| | |
|--------------------------|--|
| | 2. (ICBN) a specimen or illustration selected from the original material to be the nomenclatural type when the holotype is missing or was not designated at the time of publication |
| name-bearing type | The type genus, type species, holotype, or other type specimen(s), or type slide, that determines the application of a particular name |
| neotype | <ol style="list-style-type: none"> 1. (ICZN) a specimen subsequently designated as the name-bearing type of a species or subspecies for which, it is believed, there no longer exists a holotype, lectotype, syntype(s), or prior neotype (i.e. type lost or destroyed) 2. (ICBN) a specimen or illustration designated as the name-bearing type as long as all of the material on which the taxon is based is missing |
| paralectotype | (ICZN) each specimen of a former syntype series that remains after the lectotype has been designated |
| paratype | <ol style="list-style-type: none"> 1. (ICZN) a specimen of the type series as originally designated, apart from the holotype 2. (ICBN) a specimen or illustration cited at the time of original publication, that is neither the holotype nor isotype, nor one of the syntypes |
| plesiotype | A specimen used in the redescription of an existing species |
| rank | The level at which a taxon lies in the zoological or botanical hierarchy (e.g. all families are at the same rank, which lies between subfamily and superfamily) |
| synonym | One of two or more scientific names applied to the same taxon; ‘senior synonym’ and ‘junior synonym’ apply, respectively, to the first, and all later published synonyms |
| syntype | <ol style="list-style-type: none"> 1. (ICZN) a specimen of a type series from which neither a holotype nor a lectotype has been designated 2. (ICBN) any one of two or more specimens cited by the author when no holotype was designated |
| TAI | Thermal Alteration Index (palynomorphs, etc.); plural (for each kind of palynomorphs, e.g. spores), Thermal Alteration Index values (i.e. not indices) |
| taxon | A taxonomic group of any rank (pl. taxa) |
| topotype | A term, not regulated by the ICBN or ICZN, for a specimen that was found at the type locality of species or subspecies to which it is thought to belong, whether or not the specimen belongs to the type series |
| trinomen | or trinomial name The combination of three names, the first two being the binomen, the third being the scientific name of the infraspecific taxon, e.g. subspecies (pl. trinomina) |
| type | A term used on its own, denoting a kind of type specimen |
| type genus | (ICZN) the genus that is the name-bearing type of a family-group taxon |
| type horizon | The stratigraphic horizon from which the name-bearing type of a taxon was collected |

| | |
|----------------------|--|
| type locality | The geographic and stratigraphic place where the name-bearing type of a species or subspecies was collected |
| type series | The series of specimens that either constitutes the name-bearing type (syn-types) of a taxon, or from which the name-bearing type may be designated |
| type species | (ICZN) the species that is the name-bearing type of a genus or subgenus. (In contrast, according to the ICBN the type of a genus or subgenus is a specimen.) |
| type specimen | (ICZN) used generally for any specimen of the type series |

LATIN TERMS AND ABBREVIATIONS

The following Latin terms and their abbreviations are commonly used in GSC paleontological publications.

| Abbreviation | Latin term | Definition |
|------------------|---------------------------------------|--|
| aff. | <i>affinis</i> | having affinity with but not identical with |
| auct. | <i>auctorum</i> | of authors |
| auct. non | <i>auctorum non</i> | (botanical) not of authors — to follow the citation of a misidentified taxon |
| cf. | <i>confer</i> | compare |
| comb. nov. | <i>combinatio nova</i> | new combination |
| emend. | <i>emendavit</i> | emended, altered, corrected |
| | <i>emendatus, -a, -um</i> | emended |
| et al. | <i>et alii</i> | and others |
| ex aff | <i>ex affinis</i> | of affinity |
| excl.var. | <i>exclusa varietate</i> | by the excluded variety |
| | <i>exclusis varietatibus</i> | by the excluded varieties |
| ex gr. | <i>ex grege</i> | from the herd, of the group |
| ex par. | <i>ex parte</i> | on one side |
| f. | <i>forma</i> | form (a morphological term); a rank of infra-specific taxa (ICBN) |
| gen. et sp. nov. | <i>genus (novum) et species novum</i> | new genus and new species |
| gen. nov. | <i>genus novum</i> | new genus (<i>see also</i> n. gen.) |
| ibid. | <i>ibidem</i> | in the same place (i.e. page or figure reference to a journal or volume) |
| indet. | <i>indeterminatus, -a, -um</i> | cannot be, or has not been, determined |
| in litt. | <i>in litteris</i> | in letters, correspondence (written comm. may also be used) |
| | <i>incertae sedis</i> | of a taxon; of uncertain position |
| | <i>lapsus calami</i> | an error made through carelessness in writing (“slip of the reed”) |
| loc. cit. | <i>loco citato</i> | in the place cited (publication and page). Contrast “op. cit.”, in which publication alone is cited |
| | <i>mihi</i> | belonging to me (as a new species) |
| nob. | <i>nobis</i> | to us (as a new species) |
| nom. cons. | <i>nomen conservandum</i> | a name to be or should be preserved |
| | <i>nomen conservatum</i> | a preserved name |
| nom. dub. | <i>nomen dubium</i> | (ICZN) a name representing a taxon for which the original diagnosis or type material is inadequate to permit its subsequent recognition (pl. <i>nomina dubia</i>) |
| nom. nov. | <i>nomen novum</i> | new name (pl. <i>nomina nova</i>) |

| Abbreviation | Latin term | Definition |
|----------------|--------------------------------|--|
| nom. nud. | <i>nomen nudum</i> | a name without a designation (i.e. without indication, description, or definition, therefore invalid; pl. nomina nuda) |
| | <i>non.</i> | not |
| n. comb. | | new combination |
| n. gen. | | new genus (<i>see also</i> gen. nov.) |
| n. sp. | | new species (<i>see also</i> sp. nov.) |
| op. cit. | <i>opere citato</i> | in the work, article cited (no page reference) |
| part. | <i>partim</i> | in part |
| | <i>pars</i> | a part of the whole |
| q.v. | <i>quod vide</i> | which see |
| s.f. | <i>sensu forma</i> | in the form (taxonomy) |
| s.l. | <i>sensu lato</i> | in the broad sense |
| s.s. | <i>sensu stricto</i> | in the strict (narrow) sense |
| | <i>sic</i> | thus (to indicate an exact transcription, including errors) |
| sp. | <i>species</i> | species (singular) |
| spp. | <i>species</i> | species (plural) |
| ssp. | | subspecies (<i>see also</i> subsp.) |
| sp. indet. | <i>species indeterminata</i> | species indeterminate (cannot be, or has not been determined) |
| sp. nov. | <i>species nova</i> | new species (<i>see also</i> n. sp.) |
| subgen., subg. | | subgenus |
| subsp. | | subspecies (<i>see also</i> ssp.) |
| sup. | <i>supra</i> | above |
| supra cit. | <i>supra citato</i> | cited above |
| | <i>typus; typicus, -a, -um</i> | typical or type species of a genus |
| v. | <i>vida</i> | indicates the author has viewed the type material (pl. <i>vidimus</i>) |
| var. | <i>varietas</i> | variety (as for subdivision of a species): a rank of infraspecific taxa (ICBN) |

CITING REFERENCES IN THE TEXT

The following section will provide you with rules and examples for citing references in the text of ESS publications.

Format of citations

Scientific and Technical Publication Services (STPS) uses the author-date system to cite references, as in the following examples:

(Jackson, 2001)

Holden (2006, in press) [Note that there are two different references here: 2006 and in press]

...as discussed by Dixon (2007a, b, c, d, 2008b, c). (McKinley, 2008; Geological Survey of Canada, 2009) (Jamieson et al., 2000)

Placement of citations

If possible, place the reference citations at a suitable break in a sentence, or at the end of a sentence:

Although the Livingstone Range lies within the Rocky Mountain Foothills (Mathews, 2001), its structure and stratigraphy are typical of the Rocky Mountains.

Orthoquartzite was mapped north of Dubawnt Lake during Operation Thelon (Wright, 1967).

The age of the tholeiitic volcanic rocks was fixed near 1.75 Ga by Bainbridge et al. (2006).

In the text, list a series of reference citations in chronological order:

Earlier workers (Smith, 1927; Graham, 1943, 1958; Jones, 1953; Zaak, 1957, 1990; Andrews, 1991) mapped the Broad Lake area.

Do not cite references in ESS publication abstracts or summaries.

Matching citations and references list entries

The accuracy of the references list in your report or map is your responsibility. Make sure that all references cited in the text, figure captions, and table footnotes are in the references list, are correct and complete, and that there are no other references in that list.

Citing unpublished material and personal communications

All references cited in the references list must be accessible to the public. If the reference is, for example, an unpublished company report or government document that is generally not accessible, cite it, listing the author or company, within the body of the text, but do not include it in the references list.

Levels of Cu and Mo were elevated in the samples (R.K. Smith, unpub. rept., 2006).

Similarly, cite personal communications as such in the text, but do not include them in the references list.

Specifically, all the U-Pb dates for volcanic rocks between the Larder Lake–Cadillac fault and the Horne mine fall in the 2702 to 2700 Ma range (V. McNicoll, pers. comm., 2008).

Theses are the exception to this; if they are cited in the text they should be listed in the references list.

If you cite additional, unpublished information **of your own** in the text, you can refer to it as ‘work in progress’:

Samples from outcrops outside the study area show overlapping Ti/Zr (or Zr/TiO₂) ratios and SiO₂ values (Bell and Jenkins, work in progress, 2009).

If you cite the unpublished work of others in the text, include initials along with the surnames:

Rim analyses for the three grains are more consistent, ranging between 2420 ± 4 and 2411 ± 8 Ma (R.G. Anderson and D.K. Foxe, unpub. U-Pb data, 2008).

We do not use *in prep* in GSC or GC publications: use *work in progress* or *unpub. rept.* instead. Do not include these citations in the references list. Once a manuscript is accepted for publication, you can cite it in the text and references list as *in press*, but without a year of publication:

The area is characterized by a strong, northeast-trending structural fabric, shown clearly in the first vertical derivative of aeromagnetic data (Smith, in press).

Citing quoted material

Reference to quoted material in the text must be accurate and should include an indication of the page or pages on which the quotation occurs in the original publication.

Citing Web material

Include electronic documents consulted online in the references list. Treat references to digital information as you would traditional, hard-copy references. In order for a reader to find the information being referenced, a lot of the same information is needed.

When citing Web references, include the name of the author or information provider, and the publication date, as is done for a book or journal reference.

(Ford and Johnston, 2006)

If a publication date is not apparent for the page in question, then designate the citation as *undated*.

(University of Delaware Mineralogical Museum, undated)

Email communication or Internet postings are less formal and more ephemeral, and should be handled as personal communications; i.e. do not include them in the references list.

REFERENCES LIST

This section follows the main body of the text in a report, or after the Notes section on a map. Each publication in this list must have been cited at least once in the text, appendices, figure captions, or table footnotes. Conversely, all publications cited in any part of the text, appendices, figure captions or table footnotes must have a reference in the references list.

Abbreviations in the references list

Write out names of journals, periodicals, and publishing agencies. Do not abbreviate the words *Memoir*, *Bulletin*, *Economic Geology Report*, *Paper*, etc. Terms such as *volume*, *page*, *number*, *series*, and *part* are abbreviated, but *s* is not added to the plural of the abbreviations:

| | |
|-----------|-------|
| volume | v. |
| number/s | no. |
| page/s | p. |
| chapter/s | chap. |
| series | ser. |
| part/s | pt. |

For references with editors, compilers, or co-ordinators, use the shortened form (ed.), (comp.), and (co-ord.) for both the singular and plural:

Dallimore, S.R., Uchida, T., and Collett, T.S. (ed.), 1999. Scientific results from JAPEX/JNOC/GSC Mallik 2L-38 gas hydrate research well, Mackenzie Delta, Northwest Territories, Canada; Geological Survey of Canada, Bulletin 544, 403 p.

Van Eysinga, F.W.B. (comp.), 1975. Geological time table; Elsevier, Amsterdam (chart, third edition).

References for publications in press

Include only material that has been published or that is in press in the references list. A paper is in press when it has been accepted for publication by a journal after critical review, or, at the Scientific and Technical Publishing Services (STPS), when it is received for editing. Use the term *in press* instead of a year of publication.

Aylsworth, J.M., Burgess, M.M., Desrochers, D.T., Duk-Rodkin, A., Robertson, T., and Traynor, J.A., in press. Surficial geology, subsurface materials, and thaw sensitivity of sediments; *in* The physical environment of the Mackenzie Valley, Northwest Territories: a base line for the assessment of environmental change, (ed.) L.D. Dyke and G.R. Brooks; Geological Survey of Canada, Bulletin 547.

Tulk, C.A., Ba, Y., Klug, D.D., McLaurin, G., and Ripmeester, J.A., in press. Evidence for phase separation during the crystallization of hyperquenched glassy clathrate hydrate-forming solutions; *Journal of Chemical Physics*.

Listing page numbers in references

When referencing an entire book, report, Bulletin, Open File, etc., indicate the total number of pages in the book, for instance 302 p. For a section of pages within a larger work, use p. 32–90, or p. 31, 32.

Author names

Use surnames in citations and initials and surnames in the references list. Write last name first, comma, then initials. Where there are more than two authors, insert a comma before the *and*.

Order in references list

Arrange the references in alphabetical order by author and then by year for each series of authors.

List single-author references before two-author references with the same first author, followed by references by three or more authors with the same first author.

List references with two authors alphabetically, first by the main author, and then by the second author.

List references with three or more authors alphabetically, first by the main author, then by year of publication.

Where several *et al.* references are used in the text and belong to the same year but have different author combinations, list them chronologically by first author in the references list, label the *a, b, c* in the references list, and identify them accordingly in the text as *et al., a, b, c*.

Where more than two authors are listed in a reference, place a comma before the *and*. Here is an example of a references list showing the correct order of references.

- Fulton, R.J., 1999. Surficial geology, Red Wine River, Labrador, Newfoundland; Geological Survey of Canada, Map 1621A, scale 1:500 000.
- Fulton, R.J., 2009. Surficial geology, Cartwright, Labrador, Newfoundland; Geological Survey of Canada, Map 1620A, scale 1:500 000.
- Fulton, R.J. and Hodgson, D.A., 1979. Wisconsin glacial retreat, southern Labrador; *in* Current Research, Part C; Geological Survey Canada, Paper 79-1C, p. 17–21.
- Fulton, R.J. and Smith, G.W., 2004. Late Pleistocene stratigraphy of south-central British Columbia; Canadian Journal of Earth Sciences, v. 15, p. 971–980.
- Fulton, R.J., Hodgson, D.A., and Minning, G.V., 1980a. Surficial materials, Rigolet, Newfoundland; Geological Survey of Canada, Map 26-1979, scale 1:250 000.
- Fulton, R.J., Davis, B.C., and Minning, G.V., 1980b. Surficial materials, Groswater Bay, Newfoundland; Geological Survey of Canada, Map 25-1979, scale 1:250 000.
- Fulton, R.J., Hodgson, D.A., and Minning, G.V., 1980c. Surficial materials, Lac Brûlé, Newfoundland-Quebec; Geological Survey of Canada, Map 1-1978, scale 1:250 000.
- Fulton, R.J., Hodgson, D.A., and Minning, G.V., 1981. Surficial materials, Ossokmanuan, Newfoundland; Geological Survey of Canada, Map 29-1979, scale 1:250 000.
- Fulton, R.J., Rebus, J., Clarke, S.A., and Thomas, R.D., 2004. Surficial materials, Kasheshibaw Lake, Newfoundland-Quebec; Geological Survey of Canada, Map 28-1979, scale 1:250 000.
- Fulton, R.J., McKnight, A.B., and Dresden, H.B., 2006. Surficial materials, Winokapau Lake, Newfoundland; Geological Survey of Canada, Map 21-1979, scale 1:250 000.

Surname prefixes

List names that start with *St* or *St-*, *Mac*, *Mc*, *de*, *van*, or *von* alphabetically:

- de Freitas, T.A. and Nowlan, G.S., 1998. A new, major Silurian reef tract and overview of regional Silurian reef development, Canadian Arctic and north Greenland; *Bulletin of Canadian Petroleum Geology*, vol. 46, no. 3, p. 327–349.
- Macnab, R., Verhoef, J., and Srivastava, S.P., 1990. A compilation of magnetic data from the Arctic and North Atlantic oceans; *in* *Current Research, Part D*; Geological Survey of Canada, Paper 90-1D, p. 1–9.
- McCracken, A.D., 1991. Middle Ordovician conodonts from the Cordilleran Road River Group, northern Yukon Territory, Canada; *in* *Ordovician to Triassic Conodont Paleontology of the Canadian Cordillera*, (ed.) M.J. Orchard and A.D. McCracken; Geological Survey of Canada, Bulletin 417, p. 41–63.
- Seguin, M.K., 1978. Paleomagnetism of Cambrian volcanics in the Quebec Appalachians; *Geomagnetism and Aeronomy*, v. 18, p. 218–224.
- St-Julien, P., Slivitsky, A., and Feininger, T., 1983. A deep structural profile across the Appalachians of southern Quebec; *Geological Society of America, Memoir* 158, p.103–112.
- St-Onge, D.A., 1969. Nivation landforms; Geological Survey of Canada, Paper 69-30, 12 p.
- van Breemen, O., Pehrsson, S., and Peterson, T.D., 2007. Reconnaissance U-Pb SHRIMP geochronology and Sm-Nd isotope analyses from the Tehery-Wager Bay gneiss domain, western Churchill Province, Nunavut; Geological Survey of Canada, *Current Research* 2007-F2, 15 p.
- Vanstone, P.J., 2009. Surficial geology of the Ruby Lake area; Ontario Geological Survey, Preliminary Map 5678, scale 1:20 000.

References using Jr.:

- Clague, J.J., Harper, J., Jr., Hebda, R.J., and Howes, D.E., 1982. Late Quaternary sea levels and crustal movements, coastal British Columbia; *Canadian Journal of Earth Sciences*, v. 19, no. 6, p. 597–618.
- Jackson, L.E., Jr. and Pawson, M., 1984. Alberta radiocarbon dates; Geological Survey of Canada, Paper 83-25, 27 p.

References for publications without authors, but with editors, compilers, or co-ordinators

Use the shortened form (ed.), (comp.), and (co-ord.) for both the singular and plural.

- Dallimore, S.R., Uchida, T., and Collett, T.S. (ed.), 1999. Scientific results from JAPEX/JNOC/GSC Mallik 2L-38 gas hydrate research well Mackenzie Delta, Northwest Territories, Canada; Geological Survey of Canada, Bulletin 544, 403 p.
- Van Eysinga, F.W.B. (comp.), 1975. *Geological time table*; Elsevier, Amsterdam (chart, third edition).
- Escher, A. and Watt, W.S. (ed.), 2006. *Geology of Greenland*; Grønlands Geologiske Undersøgelse, Copenhagen, 603 p.
- Orchard, M.J. and McCracken, A.D. (ed.), 1991. *Ordovician to Triassic conodont paleontology of the Canadian Cordillera*; Geological Survey of Canada, Bulletin 417, 335 p.

References for publications without authors, editors, compilers, or co-ordinators

In these cases, use the name of the agency responsible for the work.

Geological Survey of Canada, 1998. Aeromagnetic total field map, 77G/NW, Victoria Island, Northwest Territories, Geological Survey of Canada, Open File 3368, scale 1:100 000.

Note

The names of publishing organizations are written out in full both in the citation in the text and the entry in the references list.

References containing contributors

Sometimes manuscripts contain sections by scientists/workers who are not given authorship, but are considered contributors.

Gibson, D.W., 2002. Stratigraphy, sedimentology, coal geology and depositional environments of the Lower Cretaceous Gething Formation, northeastern British Columbia and west-central Alberta; Geological Survey of Canada, Bulletin 431, 127 p. (with contributions by J.H. Wall, J.A. Jeletzky, and D.J. McIntyre).

Language of reference

In the references list of a manuscript written in English, write the *connecting words* in the reference in English even if the title of the publication being referenced is French. Only the title remains in French. Use the word *and* not *et* both in the citation in the text (e.g. Dionne and Laverdière (2007)) and in the list of authors in the references list entry. Use the word *in* not *dans* in the references list entry.

Both upper and lower case letters in the title of a publication or article bear diacritical marks where appropriate.

Bouchard, M.A. and Martineau, G., 1984. Les aspects régionaux de la dispersion glaciaire, Chibougamau, Québec; *in* Chibougamau, stratigraphy and mineralization, (ed.) J. Guha and E.H. Chown; Canadian Institute of Mining and Metallurgy, Special Volume 34, p. 431–441.

In the references list, do not translate the names of journals or other publications unless the name of the publication or journal exists in both official languages:

Dionne, J.-C., 1974. The eastward transport of erratics in James Bay area, Québec; *Revue de géographie de Montréal*, v. 28, p. 453–457.

Dyke, A.S., Dredge, L.A., and Vincent, J.S., 2002. Configuration of the Laurentide Ice Sheet during the Late Wisconsin maximum; *Géographie physique et Quaternaire*, v. 36, p. 5–14.

Gross, G.A., 1993. Iron-formation metallogeny and facies relationships in stratafer sediments; *in* Proceedings of the Eighth Quadrennial International Association on the Genesis of Ore Deposits Symposium; E. Schweizerbart'sche Verlagsbuchhandlung (Nägele u. Obermiller), D-7000 Stuttgart 1, p. 541–550.

St-Onge, D.A. and Bruneau, H.C., 2004. Dépôts meubles du secteur aval de la rivière Coppermine, Territoires du Nord-Ouest; *in* Recherches en cours, partie B; Commission géologique du Canada, étude 82-1B, p. 51–55.

Von Damm, K.L., Edmond, J.M., Measures, C.I., and Grant, B., 1985. Chemistry of submarine hydrothermal solutions at Guaymas Basin, Gulf of California; *Geochimica et Cosmochimica Acta*, v. 49, p. 2221–2237.

Where its original language is not in the Roman alphabet, give the reference in translation, and note the original language:

Ma, G., Lee, H., and Xue, X., 1980. Isotopic ages of the Sinian in the east Yangtze gorges with a discussion on the Sinian geochronological scale of China; *Chinese Academy of Geological Sciences, Bulletin*, ser. 7, v. 1, p. 39–55 (in Chinese, English summary).

For references in cyrillic, translate the title and transliterate the journal reference:

Sorokina, N.L., 2009. New species of Upper Devonian spores from the Dniepr-Donets Basin; *Geologichnii Zhurnal*, v. 26, p. 49–63 (in Ukrainian).

TYPES OF REFERENCES

There are ten main types of references cited in ESS publications:

- Reports (e.g. Bulletin, Economic Geology Report, Paper, Miscellaneous Report, Memoir, Technical Note, Popular Geoscience, or other government report)
- Articles in a journal, periodical, or series
- Current Research articles
- Web references
- Books, symposium volumes, compendium volumes (e.g. some Bulletins), Current Research volume (prior to 2000), Geology of Canada volumes, or charts
- Articles in a book, symposium volume, compendium volume, (e.g. Geology of Canada volume)
- Abstracts
- Theses
- Maps
- Open Files

Reports (e.g. Bulletin, Economic Geology Report, Paper, Miscellaneous Report, Memoir, Technical Note, Popular Geoscience, or other government report(s)) (hard copy or online)

The following information is required:

- surnames and initials of all authors (or editors, compilers, or co-ordinators)
- year of publication
- title of book as it appears on the title page, with the first letter of first words and proper nouns capitalized (sentence style)
- name of publishing organization
- series name and number of the report (Bulletin, paper, etc.)
- total number of pages if in book form; number of sheets if it is a poster
- digital object identifier (doi) if the report was found online and has one

Examples:

Eisbacher, G.H. and Clague, J.J., 1984. Destructive mass movements in high mountains: hazard and management; Geological Survey of Canada, Paper 84-16, 230 p. doi:10.4095/120001

Gibson, D.W., 1992. Stratigraphy, sedimentology coal geology and depositional environments of the Lower Cretaceous Gething Formation, northeastern British Columbia and west-central Alberta; Geological Survey of Canada, Bulletin 431, 127 p. (with contributions by J.H. Wall, J.A. Jeletzky, and D.J. McIntyre) doi:10.4095/183877

Harris, D.C., 2006. The mineralogy and geochemistry of the Hemlo gold deposit, Ontario; Geological Survey of Canada, Economic Geology Report 38, 88 p.

Lambert, M.B., 2008. Cameron River and Beaulieu River volcanic belts of the Archean Yellowknife Supergroup, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Bulletin 382, 145 p. doi:10.4095/126481

Turner, R.J.W., Page, J., Klassen, M., Quo Vadis, H., and Jensen, A., 2000. Vancouver rocks; Geological Survey of Canada, Miscellaneous Report 68, 1 sheet. doi:10.4095/211534

Articles in a journal, periodical, or series (hard copy or online)

The following information is required:

- surnames and initials of all authors (or editors, compilers, or co-ordinators)
- year of publication
- title of the article as it appears in the journal, with the first letter of the first word and proper nouns capitalized (sentence style)
- the full name of the journal, periodical, and/or series, capitalized headline-style
- volume number
- issue number (if applicable)
- part number (if applicable)
- relevant page numbers
- digital object identifier (doi) if the report was found online and has one

Examples:

Conway, K.W., Krautter, M., Barrie, J.V., and Neuweiler, M., 2001. Hexactinellid sponge reefs on the Canadian continental shelf: a unique “living fossil”; *Geoscience Canada*, v. 28. no. 2, p. 71–78. (no doi for this article)

Hildebrand, R.S. and Whalen, J.B., 2014. Arc and slab-failure magmatism in Cordilleran batholiths II – the Cretaceous Peninsular Ranges Batholith of southern and Baja California; *Geoscience Canada*, v. 41, no. 4, p. 399-458. doi:10.12789/geocanj.2014.41.059.

Verbeek, N.H. and McGee, T.M., 1995. Characteristics of high-resolution marine reflection profiling sources; *Journal of Applied Geophysics*, v. 33, p. 251–269.

References for periodicals produced by geological societies

The publication series (Philosophical Transactions, Proceedings, Journal, etc.) produced by societies should follow the name of the society, for example, refer to *Philosophical Transactions of the Royal Society of London* is referred to as *Royal Society of London, Philosophical Transactions*.

Examples:

Hoffman, P., 1973. Evolution of an early Proterozoic continental margin: the Coronation geosyncline and associated aulacogens of the northwestern Canadian Shield; *Royal Society of London, Philosophical Transactions*, ser. A, v. 273, p. 547–581. doi: 10.1098/rsta.1973.0017

Similarly, to avoid confusion, refer to the *Journal of the Geological Society* as *Geological Society of London, Journal*:

Searl, A., 1991. Early Dinantian dolomites from East Fife: hydrothermal overprinting of early diagenetic fabrics?; *Geological Society of London, Journal*, v. 148, p. 737–747.

Current Research articles (hard copy or online)

Through the years, the annual product showing the year's field research has changed both in format and in the way it is referenced. Whereas now each article is a separate publication, previously they were released in collections at set times during the year. The reference format depends on the year of release.

Please use the examples below as models.

2000 to present:

Berman, R.G., Davis, W.J., Corrigan, D., and Nadeau, L., 2015. Insights into the tectonothermal history of Melville Peninsula, Nunavut, provided by in situ SHRIMP geochronology and thermobarometry; *Geological Survey of Canada, Current Research 2015-4*, 22 p. doi:10.4095/295852

Bellefleur, G., Duchesne, M.J., Hunter, J., Long, B.F., and Lavoie, D., 2006. Comparison and processing of single and multi-channel high-resolution seismic data for shallow stratigraphy mapping in the St. Lawrence Estuary; *Geological Survey of Canada, Current Research 2006-D2*, 10 p. doi:10.4095/223015

Kerr, D.E. and Wilson, P., 2000. Preliminary surficial geology studies and mineral exploration considerations in the Yellowknife area, Northwest Territories; *Geological Survey of Canada, Current Research 2000-C3*, 8 p.

Skulski, T., Sandeman, H., Sanborn-Barrie, M., MacHattie, T., Young, M., Carson, C., Berman, R., Brown, N., Rayner, D., Pangapko, D., Byrne, D., and Deyell, C., 2003a. Bedrock geology of the Ellice Hills map area and new constraints on the regional geology of the Committee Bay area, Nunavut; *Geological Survey of Canada, Current Research 2003-C22*, 11 p.

Note

In 2008, the letter was dropped from the series number:

Katsube, T.J. and Connell-Madore, S., 2008. Gas permeability versus texture relationship of sediment samples from a research well in the Beaufort-Mackenzie Basin, Northwest Territories; *Geological Survey of Canada, Current Research 2008-4*, 10 p. doi:10.4095/224806

1994 to 1999

(The letters F and G are reserved for the *Radiogenic Age and Isotopic Studies* and *Radiocarbon Dates* volumes, respectively):

Gordey, S.P. and Stevens, R.A., 1994. Tectonic framework of the Teslin region, southern Yukon Territory; *in Current Research 1994-A*; *Geological Survey of Canada*, p. 11–18.

Jackson, G.D. and Fahrig, W.F., 1994. Ages of diabase dyke intrusions, Cumberland Peninsula, Baffin Island, District of Franklin; *in Radiogenic age and isotopic studies, report 8*; *Geological Survey of Canada, Current Research 1994-F*, p. 23–28.

Note that Radiocarbon Dates is one long report, not a series of articles, and should be referenced like a report:

McNeely, R. and Atkinson, D.E., 1996. Geological Survey of Canada radiocarbon dates XXXII, Geological Survey of Canada, Current Research 1995-G, 92 p.

1978 to 1993

Campbell, R.B. and Dodds, C.J., 1978. Operation Saint Elias, Yukon Territory; *in* Current research, Part A; Geological Survey of Canada, Paper 78-1A, p. 35–41.

Currie, K.L., 1991. A note on the stratigraphy and significance of the Martinon Formation, Saint John, New Brunswick; *in* Current research, Part D; Geological Survey of Canada, Paper 91-1D, p. 9–13.

St-Onge, D.A. and Bruneau, H.C., 1982. Dépôts meubles du secteur aval de la rivière Coppermine, Territoires du Nord-Ouest; *in* Recherches en cours, partie B; Commission géologique du Canada, étude 82-1B.

Before 1973

Current Research was called *Report of Activities*, and referenced as follows:

Davies, J.L., Topp, G.C., and Annan, A.P., 1977. Measuring soil water content in situ using time-domain reflectometry techniques; *in* Report of activities, Part B; Geological Survey of Canada, Paper 77-1B, p. 33–36.

Web references

Treat references to digital information as you would references to traditional hard-copy books, journals, maps, etc., if possible. The main difference is the addition of the date the Web page was accessed by the author. In order for a reader to find the information being referenced, the following information is needed:

- name of author (or information provider)
- date of document creation or publishing
- document title, with the first letter of first words and proper nouns capitalized (sentence style)
- name of publisher or hosting organization (Web page owner)
- URL (in angle brackets)
- citation number (if applicable)
- the date accessed by the author
- the doi (digital object identifier) (if applicable)

Examples of Web document references

Burchi, S. and Mechlem, K., 2005. Groundwater in international law, compilation of treaties and other legal instruments; United Nations Educational, Scientific and Cultural Organization. <www.un.org/waterforlifedecade/pdf/groundwaterFao86.pdf> [accessed September 14, 2015]

Council of Canadian Academics, 2011. Energy from gas hydrates; Council of Canadian Academics. <<http://www.scienceadvice.ca/en/assessments/completed/gas-hydrates.aspx>> [accessed August 20, 2015]

Here is an example for a page that is updated frequently (version date is given at the bottom of the Web page):

United States Geological Survey, 2006. Latest earthquakes — last 7 days; United States Geological Survey, <<http://eqwebback.wr.usgs.gov/index.php>> [accessed January 31, 2006]

Here is an example of an undated page reference (no publication date apparent for the page): University of Delaware Mineralogical Museum, undated.

Kurnakovite; University of Delaware Mineralogical Museum, <http://www.museums.udel.edu/mineral/mineral_site/collection/alphabetical/K/kurnakovite.html> [accessed January 4, 2006].

Books, symposium volumes, compendium volumes (e.g. some Bulletins), Current Research volume (prior to 2000), Geology of Canada volumes, or charts (hard copy or online)

The following information is required:

- surnames and initials of authors (or editors, compilers, or co-ordinators)
- year of publication
- title of book as it appears on the title page, with the first letter of first words and proper nouns capitalized (sentence style)
- name of publishing organization
- city and province/state (if from U.S.A. or Canada), or country (if outside North America) of publication (for books)
- name and number of the report (series), if applicable
- total number of pages in the book
- digital object identifier (doi) if the publication was found online and has one

Examples:

Aitken, M.J., 1998. An introduction to optical dating; Oxford University Press, Oxford, United Kingdom, 267 p.

Domenico, P.A. and Schwartz, F.W., 1990. Physical and chemical hydrogeology; John Wiley and Sons, Inc., New York, New York, 790 p.

Jackson, J.A. (ed.), 1997. Glossary of geology; American Geological Institute, Alexandria, Virginia, 769 p. (fourth edition).

Reineck, H.-E. and Singh, I.B., 1975. Depositional sedimentary environments with reference to terrigenous clastics; Springer-Verlag, New York, New York, 439 p. (corrected reprint of the first edition).

Articles or chapters in a book, symposium volume, compendium volume, (e.g. Geology of Canada volume) (hard copy or online)

The following information is required:

- surnames and initials of authors (or editors, compilers or , co-ordinators)
- year of publication

- title of article or chapter, with the first letter of first words and proper nouns capitalized (sentence style)
- title of book as it appears on the title page, with the first letter of first words and proper nouns capitalized (sentence style)
- name of publishing organization
- city and province/state (if from U.S.A. or Canada), or country (if outside North America) of publication (for books)
- name and number of the report (series), if required
- total number of pages in the book
- digital object identifier (doi) if the publication was found online and has one. NOTE: if the article in the compendium or the chapter in the book does not have an individual doi, but the book/volume as a whole has a doi, use that doi in the article/chapter reference.

All editors or compilers should be listed within a reference, even if there are many. Use the shortened form (ed.), (co-ord.), and (comp.) before the names of any editors, co-ordinators, or compilers:

Dawes, P.R., 1976. Precambrian to Tertiary of northern Greenland; *in* *Geology of Greenland*, (ed.) A. Escher and W.S. Watt; Grønlands Geologiske Undersøgelse, p. 248–303.

Jamieson, R.A., Tallman, P.C., Plint, H.E., and Connors, K.A., 1990. Regional geological setting of pre-Carboniferous mineral deposits in the western Cape Breton Highlands, Nova Scotia; *in* *Mineral deposit studies in Nova Scotia, volume 1*, (ed.) A.L. Sangster; Geological Survey of Canada, Paper 90-8, p. 77–99. doi:10.4095/129030

Ritchie, J.C., 1989. History of the boreal forest in Canada; *in* *Chapter 7 of Quaternary Geology of Canada and Greenland*, (ed.) R.J. Fulton; Geological Survey of Canada, *Geology of Canada*, no. 1, p. 508–512 (also Geological Society of America, *The geology of North America*, v. K-1, p. 508–512). doi:10.4095/127905

St-Onge, D.A. and Bruneau, H.C., 1982. Dépôts meubles du secteur aval de la rivière Coppermine, Territoires du Nord-Ouest; *in* *Recherches en cours, partie B*; Commission géologique du Canada, Étude 82-1B, p. 51–55. doi:10.4095/119299

Trettin, H.P., 1991. Tectonic Framework; Chapter 4 *in* *Geology of the Innuitian Orogen and Arctic Platform of Canada and Greenland*, (ed.) H.P. Trettin; Geological Survey of Canada, *Geology of Canada*, no. 3, p. 59–66 (also Geological Society of America, *The geology of North America*, v. E). doi:10.4095/133959

Abstracts

For references that are abstracts only, write (*abstract*) following the page numbers when the reference is not in a volume of abstracts.

Kenyon, N.H., 1999. Sand ribbons; Geological Society of London, *Proceedings*, no. 1650, p. 159 (abstract).

Contrast it with these examples, where it is obvious that the publication being referenced is an abstract as it is in an abstracts volume.

Gandhi, S.S. and Mortensen, J.K., 1992. 1.87-1.86 Ga old felsic volcano-plutonic activity in southern Great Bear magmatic zone; Geological Association of Canada-Mineralogical Association of Canada, Abstracts, v. 17, p. A37.

Gordon, T.M., 2007. Algebraic methods in the study of natural mineral assemblages; Geological Society of America, Abstracts with programs, v. 6, no. 7, p. 761–762.

Theses

Theses (dissertations) are not published material, but are publicly available and therefore included in references lists. Give the university name, city, and province or state for universities in Canada and the U.S.A. For other countries, give the university name, city, and country. The word *unpublished* is unnecessary:

Herd, R.K., 1972. The petrology of the sapphirine-bearing and associated rocks of the Fiskenaesset complex, West Greenland; Ph.D. thesis, University of London, London, England, 2 v., 608 p.

King, J.E., 2006. Low-pressure regional metamorphism and progressive deformation in the eastern Point Lake area, Slave Province, Northwest Territories; Ph.D. thesis, Queen's University, Kingston, Ontario, 187 p.

Maps

When referencing maps, include the scale. No commas should appear in the numbers (e.g. scale 1:100 000 *not* scale 1:1,000,000):

Harrison, J.C., Lynds, T., Ford, A., Trettin, H.P., Thorsteinsson, R., and Mayr, U., 2015. Geology, tectonic assemblage map of the Nansen Sound area, northern Axel Heiberg and western Ellesmere islands, Nunavut; Geological Survey of Canada, Canadian Geoscience Map 26 (preliminary edition), scale 1:500 000. doi:10.4095/292821

Geological Survey of Canada, 1993. Principal mineral areas of Canada; Geological Survey of Canada, Map 900A (forty-third edition), scale 1:7 603 200.

Rickard, M.J., 1991. Geology, Cowansville-Sutton-Mansonville, Quebec; Geological Survey of Canada, Map 1750A, scale 1:50 000. doi:10.4095/132459

Veillette, J.J. and Thibaudeau, P., 2007. Géologie des formations en surface et histoire glaciaire, Rivière Wawagasic, Québec; Commission géologique du Canada, Carte 2765, scale 1:100 000.

Open Files

References to Open Files should indicate the number of pages of text, the map scale, or the media type as appropriate:

Brooks, G.R., 2016. A varve record of Lake Ojibway glaciolacustrine deposits from Lac Dasserat, northwestern Quebec, Canada; Geological Survey of Canada, Open File 8089, 1 .zip file. doi:10.4095/299013

Dyke, A.S. and Hooper, M.J.G., 2000. Till geochemistry, Borden and Brodeur peninsulas of northern Baffin Island and Devon Island; Geological Survey of Canada, Open File 3907, 15 p.

Sader, J.A., Leybourne, M.I., McClenaghan, M.B., and Hamilton, S.M., 2003. Geochemistry of groundwater from Jurassic kimberlites in the Kirkland Lake and Lake Timiskaming kimberlite fields, northeastern Ontario; Geological Survey of Canada, Open File 4515, 1 CD-ROM.

SPELLING

Frequently misspelled words

accommodate
arctic
precede
gauge
rarefy
consensus
desiccate
separate
liquefy
supersede
unparalleled
naphtha

Words with *ei* and *ie*

The jingle *i before e except after c or when sounded as a as in neighbour and weigh* covers the rule.
Exceptions:

foreign
height
seize
leisure
neither
weird

Words ending in *sede*, *cede*, and *ceed*

Supersede is the only word ending in *sede*. *Exceed*, *proceed*, and *succeed* are the only common verbs ending in *ceed*.

Words ending in *able* and *ible*

There is no basic rule for the *able* and *ible* endings, but if there is a corresponding word ending in *ation*, the ending is usually *able*; if ending in *sion* or *tion*, the ending is more often *ible*.

| | |
|----------|-----------|
| duration | durable |
| division | divisible |

Final consonants doubled before a suffix

In words of one syllable ending in a consonant preceded by a vowel, double the final consonant.

| | |
|-----|---------|
| bed | bedded |
| dip | dipper |
| fit | fitted |
| sit | sitting |

Exception: Do not double the consonant before a suffix beginning with a consonant.

| | |
|-----|---------|
| fit | fitful |
| sad | sadness |

In words of more than one syllable ending in a consonant preceded by a vowel, double the final consonant if the accent is on the last syllable and the suffix begins with a vowel.

| | |
|--------|------------|
| occur | occurrence |
| regret | regretted |

Exceptions:

| | |
|-------|-----------|
| avoid | avoidable |
| refer | referable |

Final consonants not doubled before a suffix

In words ending in a consonant preceded by a vowel and not accented on the last syllable, do not double the final consonant before a suffix beginning with a.

| | |
|---------|-----------|
| abandon | abandoned |
| benefit | benefited |

Exceptions: certain words with equally accented syllables.

| | |
|-------|-----------|
| model | modelling |
| label | labelling |

For words ending in a consonant preceded by a vowel, do not double the final consonant before a suffix beginning with a vowel if the accent is shifted to a preceding syllable.

| | |
|--------|------------|
| confer | conference |
| prefer | preference |
| refer | reference |

For words ending in a consonant preceded by more than one vowel, do not double the final consonant before a suffix.

| | |
|-------|----------|
| breed | breeding |
| cheap | cheapest |

Words ending in two or more consonants usually remain unchanged when a suffix is added.

| | |
|------|---------|
| call | called |
| cost | costing |

Combinations with *all*

Drop the final *l* when using *all* as a prefix.

| | |
|--------------|------------|
| all together | altogether |
|--------------|------------|

Words ending in *e*

In words ending in a silent *e*, drop the *e* before a suffix beginning with a vowel.

| | |
|--------|-----------|
| age | aging |
| debate | debatable |
| subdue | subduing |

Exceptions:

- noticeable
- toeing
- courageous
- mileage
- dyeing
- singeing

Words ending in a silent *e* generally retain the *e* before a suffix beginning with a consonant.

| | |
|----------|--------------|
| complete | completeness |
| waste | wasteful |

Exceptions:

- acknowledgment
- judgment
- argument
- wholly

Words ending in *c*

For words ending in *c* with the sound of *k*, add *k* before *i*, *y*, or *e*.

| | |
|--------|------------|
| picnic | picnicking |
| panic | panicky |

Verbs ending in *ie*

For verbs ending in *ie*, change *ie* to *y* before *ing*.

| | |
|-----|-------|
| die | dying |
| lie | lying |

Words ending in *n*

When the suffix *ness* is added to a word ending in *n*, the original *n* is retained.

| | |
|--------|------------|
| clean | cleanness |
| green | greenness |
| sudden | suddenness |

SPELLING AND USAGE: A

a axis, a horizon

abandon, abandoned

about, approximately

Usually *about* can take the place of *approximately*. If there is a difference it is that *approximately* suggests a more careful calculation. Do not use *around* when you mean *about*.

abridgment

absorption, adsorption

Absorption means assimilation (e.g. of liquids in solids, or gases in liquids). *Adsorption* means the adherence of gas molecules etc. to the surface of solids.

abstract, concrete

Try to use concrete rather than abstract terms in writing. Words implying geological processes, such as *mineralization*, *chloritization*, *granitization*, *shearing*, *faulting*, etc., are abstract. Faulting cannot *strike northeasterly*, though the fault, or faults, or fault zone may.

Another abstract term commonly misused in a concrete sense is *values*. *Value* is an attribute, not a substance. An ore does not *carry high gold values*, though it may contain much of that valuable metal. Nor does a miner *encounter good values* in an ore, but may encounter valuable minerals, or minerals that carry valuable metals. Also, *values are not lost* in sinking, but the orebody may be lost.

abyssal

accede

accessories

see [intrusives](#)

accessory

as in *an accessory mineral*

accommodate,

accommodation

accumulate,

accumulation

accuracy, precision

Accuracy is a measure of how closely a fact or value approaches the absolute or true value. Precision is a measure of the fineness of a value. Thus, 1.0103 is more precise than 1.01 but it may not be more accurate.

achieve

Achieve implies successful effort and not the mere completion of something. You may *achieve* a merit increase but you get a statutory raise.

acknowledgment

not acknowledgement

active layer

active voice

see [Active and passive voice](#)

addendum (pl. addenda)

adsorption

see [absorption](#)

advice (n.), advise (vb.)

| | |
|---------------------------------------|---|
| aegirine | |
| aeolian | not recommended spelling, <i>see</i> eolian |
| aerial, areal | Aerial means <i>from the air</i> (e.g. aerial photograph, airphoto), whereas <i>areal</i> relates to area. |
| aerobic, anaerobic | Aerobic (oxidizing) means <i>living, active, or occurring only in the presence of oxygen</i> . Anaerobic (reducing) means <i>living, active, or occurring in the absence of free oxygen</i> . |
| affect, effect | As a noun, <i>affect</i> signifies an emotion or feeling, whereas <i>effect</i> denotes a result or consequence. In scientific papers, the noun form is almost always <i>effect</i> . As a verb, <i>affect</i> means to act upon or to have an influence, whereas <i>effect</i> means to cause, produce, accomplish, or to bring about a change: The granite <i>affected</i> the position of the fault, and the fault <i>effected</i> a detour around the granite. |
| AFM diagram | A triangular diagram used to indicate the composition of pelitic schist and gneiss by plotting the molecular quantities of three components: A (Al ₂ O ₃), F (FeO), and M (MgO). |
| after | <i>see</i> Italics |
| aftershock, foreshock | Major earthquakes are commonly preceded and followed by many less intense earthquakes. These <i>foreshocks</i> and <i>aftershocks</i> decrease in frequency and magnitude with time, and whereas <i>foreshocks</i> may precede a main shock by an interval ranging from seconds to weeks, <i>aftershocks</i> can occur many days or months after the main shock. <i>See also</i> forecast, prediction ; intensity, magnitude . |
| age, aging | |
| agendum (pl. agenda) | |
| aggravate | <i>Aggravate</i> means to increase or intensify, or make worse (not to annoy). |
| airborne (not airborn) | as in <i>an airborne magnetometer</i> |
| aircraft | |
| air-fall (n. and adj.) | |
| airphoto, aerial photograph | |
| alga (pl. algae) | |
| alignment | |
| alkali feldspar (no hyphen) | <i>see</i> aerial |
| alkalis | not alkalies |
| all (not all of) all-inclusive | |
| allochthonous | |
| all ready, already | <i>All ready</i> is an adjectival phrase, as in: When the helicopter arrived at the base camp, they were <i>all ready</i> . <i>Already</i> is an adverb, meaning <i>by this time</i> . |
| all-terrain vehicle (ATV) | |

| | |
|---------------------------------------|---|
| all together, altogether | Use <i>all together</i> when referring to several people, things, or ideas that have been brought together: the caribou stood <i>all together</i> in the small clearing. <i>Altogether</i> means <i>on the whole, entirely, in all</i> : not <i>altogether</i> pleased with the assistant. |
| allude, elude | <i>Allude</i> means to refer indirectly (to); <i>elude</i> means to escape from. |
| allusion, illusion | An <i>allusion</i> is an indirect reference; an <i>illusion</i> is an unreal image or false impression. |
| alluvial fan | |
| alternate(ly), alternative(ly) | <i>Alternate</i> means by turns; <i>alternative</i> means in a way that offers a choice (between two things): The stratigraphic sequence consists of alternating mafic and felsic layers. Alternatively, the pluton could be synorogenic. |
| although | see though |
| altitude, elevation | The terms <i>altitude</i> and <i>elevation</i> are essentially synonymous, and mean height above sea level; however, specifically, <i>altitudes</i> are the approximate heights of geographic features (or aircraft), whereas <i>elevations</i> denote exact heights, as indicated by bench marks. |
| aluminosilicate | |
| amid, amidst | Although both forms are correct, the shorter is commonly preferred. |
| among, amongst | Although both forms are correct, the shorter is commonly preferred. |
| among, between | <i>Among</i> is generally used when more than two persons or things are involved; <i>between</i> is normally used for two: <i>between</i> five and nine (<i>not</i> between five to nine). See Prepositions |
| amount, number | <i>Amount</i> means total (masses or bulks). <i>Number</i> (noun) refers to collective units (things that can be counted one by one): the amount of faulting; the number of specimens. |
| ampersand (&) | Use an ampersand when it forms part of an official corporate name (Jones & Sons). In paleontological papers governed by the International Code of Botanical Nomenclature, the names of two joint authors of a taxon are joined by an ampersand. Do not use the ampersand in any other connection in text or when citing references. |
| amygdale | <i>not</i> amygdule |
| anaerobic | see aerobic |
| analogous | <i>not</i> analagous |
| analogue | |
| analysis | pl. analyses |
| analyze | <i>not</i> analyse, see -ise,-ize . |
| anastomosing | |
| and/or | You can use this construction in scientific texts. It indicates that all of the possibilities linked by <i>and/or</i> may be applicable: The pelite contains kyanite, garnet, <i>and/or</i> sillimanite |
| ångstrom (Å) | 1Å= 0.1 nm. In ESS publications, use the SI unit 0.1 nm in the place of ångstrom. |

| | |
|---|--|
| anomalous | |
| antecede | |
| anthropomorphism | Avoid <i>anthropomorphism</i> , or the ascription of human attributes or personality to inanimate objects in scientific writing. Rocks do not <i>suffer</i> deformation or metamorphism, regions do not <i>experience</i> glaciation or uplift, minerals do not <i>call for</i> or <i>argue for</i> an explanation, and special sessions do not <i>invite</i> papers. |
| anticipate | <i>Anticipate</i> means to forestall by prior action, to foresee, or to expect. |
| anticlimax | |
| anticusp | |
| anyone, any one, everyone, every one | <i>Anyone</i> (everyone, no one, someone) is the correct form when the meaning is anybody, everybody, etc. <i>Any one</i> (every one, no one, some one) is the correct form when things and not persons are meant |
| apparent, evident, obvious | <i>Obvious</i> means easily seen, in the sense of discovered. <i>Evident</i> denotes the existence of visible signs, all pointing to one conclusion. <i>Apparent</i> goes one step beyond evident and implies visible signs and some reasoning, as in: Although faulting was <i>evident</i> from the aerial photographs, its true extent was not <i>apparent</i> until the outcrops had been studied. |
| appear | <i>Appear</i> suggests that which is visible. A person <i>appears</i> to be young, but <i>seems</i> to be intelligent. |
| appendix | pl. appendices, capitalized as in <i>Appendix A</i> . |
| appreciate | <i>Appreciate</i> means to place value on. Use it with a noun as object: I <i>appreciate</i> your kindness. |
| apprise | |
| approximately | see about |
| apt, liable, likely | <i>Apt</i> means having a tendency to do or feel something, because of the subject's character: <i>apt to take offence</i> . <i>Liable</i> expresses probability that the subject will suffer something undesirable; <i>likely</i> expresses simple probability. |
| aquifer | |
| arabic numerals | <i>not</i> Arabic numerals |
| arc | capitalized as in <i>Great Bear Arc</i> . |
| arch | capitalized as in <i>Boothia Arch</i> . |
| Archean (not Archaean) | |
| archeology | |
| arctic | Canadian Arctic, Arctic Islands, Arctic Archipelago, the Arctic; <i>but</i> arctic Canada and an arctic environment, compare boreal |
| area | as in <i>the Rouyn-Bell River area</i> |
| areal | see aerial |
| areally | |

arguable, argument

armour

around

Around means on every side, enveloping (not *about*).

artifact

not artefact

as

see [like](#)

as far as

Distinguish between: *as far as Vancouver*, which implies a fact, and *so far as is known*, which implies doubt.

ascendant (n.)

ascendent (adj.)

ash flow (n.),

but ash-flow (adj.)

assume, presume

Problems occur where both verbs are used to mean *to suppose*, or *to take for granted*. When you *assume*, you are expressing a theory, or even a hypothesis. When you *presume*, you are expressing your belief or opinion.

asymmetry, asymmetrical

Atlantic provinces

atmospheric

aulacogen

aurora borealis

autochthonous

auxiliary

avoid, avoidable

avulsion

axial plane (n.)

but axial-plane cleavage (adj.)

azimuth

Azimuth is the horizontal angle, measured clockwise, from due north, and is recorded numerically as three digits with a degree symbol

the fault trends 015°; *not* the fault trends N15°E

See also [direction](#); [strike and dip](#).

SPELLING AND USAGE: B

| | |
|--|---|
| back reef (n.) | <i>but</i> back-reef (adj.) back-reef environment |
| backscattered-electron imaging (BSE imaging) | |
| backshore, backslope, backwash, backwater | |
| badlands | |
| ball-and-pillow (adj.) | as in <i>ball-and-pillow structures</i> |
| bankfull discharge | |
| basal | Never use <i>basal</i> as part of an informal name that has other modifiers. See also early, late ; early, lower ; lower, upper ; middle . |
| base camp, base level, base line, base map, base metal (n.) | <i>but</i> as adjectives: base-camp activities, base-level studies, base-metal deposit, etc. |
| based on, on the basis of | <i>Based on</i> is a past-tense participial phrase, so it is adjectival: The decision was based on sound reasoning. <i>On the basis of</i> is an adverbial phrase: On the basis of this tiny fossil collection, Smith proposed a new phylum. |
| basin | capitalized as in <i>Michigan Basin</i> |
| basin-and-range (adj.) | as in <i>basin-and-range province</i> . |
| basis (pl. bases) | |
| b axis, b direction, b horizon | |
| bay head, bay ice (n.) | <i>but</i> bay-mouth bar, bay-ice studies (adj.) |
| because of | see due to |
| bed, bedding, bedding plane (n.) | <i>but</i> bedding-plane fault (adj.) |
| bed load (n.) | <i>but</i> bed-load (adj.); bed-load material |
| bedrock | |
| begin, commence | Use <i>begin</i> rather than <i>commence</i> except where discussing legal matters. |
| behaviour (not behavior) | |
| believe, consider, feel | These verbs attract criticism when used incorrectly. <i>Believe</i> means having faith or trust in, and is commonly applied to the acceptance of a theology or deity. <i>Consider</i> means to regard as, or think of a being as, and is also used in the sense of believe, conclude, decide, and judge, which are all synonyms. <i>Feel</i> connotes sensation or emotion. |
| bell-like, bell-shaped distribution | |

| | |
|--|---|
| below, under | <i>Below</i> is concerned with relative position, whereas <i>under</i> implies superposition or subjection. |
| bench mark | |
| benefit, benefited, benefiting | |
| Bernoulli effect | |
| Berriasian | |
| beside, besides | Both of these words are used as prepositions. <i>Beside</i> means at the side of; <i>besides</i> means in addition to. |
| best preserved specimen | |
| better drained soil | |
| between | see among |
| bevelled | |
| biannual, biennial | <i>Biannual</i> means every half year, twice a year, semiannual. <i>Biennial</i> means lasting two years or happening every second year. It is applied to a plant that springs from seed one year, and flowers and dies the next (cf. annuals, biennials, and perennials). <i>Biweekly</i> and <i>bimonthly</i> can mean either once in two weeks/months or twice a week/month. Use <i>twice-weekly</i> , <i>every two months</i> , <i>half-yearly</i> , <i>every two years</i> , etc. to be clear. <i>Bicentennial</i> , however, means every two hundred years. |
| bilateral | |
| billion | In North American usage, this word signifies a thousand million (10^9); in most other countries it signifies a million million (10^{12}). Because of this ambiguity do not use the terms <i>billion</i> , <i>trillion</i> , or <i>quadrillion</i> . To avoid all ambiguity, use phrases such as <i>thousand million</i> or express the term in figures, such as 10^{12} . See also quadrillion ; trillion . |
| bio- | Most words with this prefix are unhyphenated (e.g. bioclast, bioclastic, biocoenosis, biodegradable, bioerosion, and biofacies). |
| biological (not biologic) | |
| bioturbation mottling, bioturbated mottling | <i>Bioturbation mottling</i> means mottling resulting from bioturbation. Do not use <i>bioturbated mottling</i> in this sense, as it refers to an existing mottling that has been modified by bioturbation. |
| bird's-eye | |
| Blackriveran (not Blackriverian) | |
| block | capitalized as in <i>Peace River Block</i> |
| block fault | |
| blowout | |
| borderland | |
| boreal (adj.) | <i>Boreal</i> means pertaining to, or located in, northern regions; northern: boreal region. But, in paleontological usage: Boreal Realm, Boreal Bathonian, Boreal Upper Bathonian, etc.; compare arctic . |
| borehole | |

| | |
|---------------------------------------|--|
| botanic | |
| both | Follow <i>both</i> by <i>and</i> , (not <i>as well as</i>). |
| bottomset | |
| boudin, boudinage | |
| Bouguer anomaly | |
| box fold | |
| BP | This means <i>before present</i> (specifically 1950) and is used for radiocarbon ages. BP should always be placed after the numerals: an age of $13\ 660 \pm 370$ BP (WAT-951); dated $22\ 260 \pm 1000$ BP; (WAT-95, Smith and Jones, 1989). It is not necessary to add ago or years to the age. |
| braided river (n.) | <i>but</i> a sandy, braided-river system (adj.) |
| braidplain | |
| break of slope, break in slope | |
| breakup (n.) | <i>but</i> break up (vb.), break-up (adj.) as in break-up season |
| breakwater | |
| broad, wide | These words have similar meanings, as is shown by the fact that they have the same opposite: narrow. Wide refers to the distance that separates the limits, and <i>broad</i> to the extent or size of something in a direction measured across. Backs, shoulders, and expanses can be broad, but mouths and rivers are wide. |
| BSE imaging | abbreviation for backscattered-electron imaging |
| B-tectonite | |
| buildup (n.) | <i>but</i> build up (vb.) For example: Carbonate buildups build up gradually. |
| built-up area burned over | |
| but | <i>But</i> can be used as the first word in a sentence such as: But for the weather, the field crew might have made it on time. |
| by | 20 by 60 m (in text), 20 x 60 m (in parentheses, tables, etc.) |
| bypass, byproduct | |

SPELLING AND USAGE: C

| | |
|---|---|
| CAI | See Colour Alteration Index . |
| calc | Most words with the prefix <i>calc</i> , meaning <i>lime-</i> or <i>calcareous</i> , are hyphenated: calc-alkali, calc-alkalic, calc-dolomite, calc-flinta, calcs-chist, calc-silicate, and calc-tufa. The exception is calcarenite. |
| calcilutite | |
| calcium carbonate powder | |
| caldera | |
| Cambrian System | <i>but</i> Cambrian time |
| cannot | |
| Cape Breton Highlands | |
| caprock | |
| carbonated | see carbonized |
| carbonates | Do not use <i>carbonates</i> when you mean <i>carbonate rocks</i> . See also intrusives. |
| carbonatized | see carbonized |
| carbonized, carbonated, carbonatized | It has become customary in our reports to distinguish between these terms. <i>Carbonized</i> means changed to carbon; <i>carbonated</i> , charged with carbonic acid; and <i>carbonatized</i> , replaced by carbonate mineral(s). |
| cardinal numerals, ordinal numerals | The numbers <i>one, two, three</i> , etc., as opposed to the ordinal numerals, <i>first, second, third</i> , etc. |
| Caribbean | |
| cataclastic | |
| catalyze | |
| catastrophic | |
| cauldron | |
| cave in (vb.) | <i>but</i> cave-in (n.) |
| cede | |
| Celsius | |
| centi | The prefix <i>centi</i> (symbol c) indicates the multiple 10^{-2} |
| centimetre | <i>not</i> centimeter. See metre |
| centre, centre point, central, centring | <i>not</i> center |
| centred on | <i>not</i> centred around |
| cf., see, see also | The abbreviation of the Latin <i>confer</i> , meaning <i>compare</i> or <i>to be compared to</i> is <i>cf.</i> See refers to somewhere else for information; for example, ‘the strata are highly contorted (<i>see</i> Harris and Baltimore, Fig. 6)’ <i>See also</i> refers to additional information. The abbreviation cf. is set in vertical (roman) type; <i>see</i> and <i>see also</i> are italicized. |

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|---|---|
| changeable | |
| channel, channelling, channelled | <i>not</i> channeling, channeled |
| channel flow | <i>but</i> channel-fill, channel-mouth bar |
| characteristic, distinctive, typical | The <i>characteristic</i> quality of something is the quality that distinguishes and identifies that thing. <i>Distinctive</i> denotes an individuality that sets something apart from its type or group. <i>Typical</i> , which is the opposite of individual, denotes that the thing or person in question has the characteristics peculiar to the type, class, species, or group to which it belongs. |
| characterize | |
| chemical symbols | <p>When the text deals with analytical work, or reports analytical measurements, indicate chemical elements by their symbols:</p> <p style="padding-left: 40px;">The Cu, Pb, and Zn values were statistically analyzed.</p> <p style="padding-left: 40px;">Current estimated reserves are 1 000 000 t grading 9% Zn.</p> <p>Write out element names when they occur in other contexts in the text:</p> <p style="padding-left: 40px;">The fault was active after gold emplacement.</p> <p>Use symbols in figures, tables, and equations.</p> <p>Rewrite sentences so that they do not begin with a chemical symbol:</p> <p style="padding-left: 40px;">Gold, silver, and mercury <i>not</i> Au, Ag, and Hg</p> <p>Write isotopes with the mass number as a left superscript to the symbol:</p> <p style="padding-left: 40px;">¹⁴C, ¹⁸O, ⁴⁰Ar/³⁹Ar <i>but</i> K-Ar ag, U-Pb ratio</p> <p>Use symbols for chemical compounds:</p> <p style="padding-left: 40px;">LiBO₂ <i>not</i> lithium metaborate</p> <p style="padding-left: 40px;">H₂SO₄ <i>not</i> sulphuric acid</p> <p style="padding-left: 40px;">Four analyses indicate 5% to 10% MnO and 10% to 28% FeO.</p> <p>Write valences as follows:</p> <p style="padding-left: 40px;">Fe⁺³ <i>not</i> Fe⁺⁺⁺</p> |
| china clay | |
| chronological | <i>not</i> chronologic |
| chronostratigraphic units | Position within chronostratigraphic units (system, series, stage, etc.) is best indicated by basal, lower, lowest, middle, upper, and uppermost. <i>See also</i> geochronological units |
| Cincinnatian | |
| circum-Pacific | |
| circumstances | <i>Under the circumstances</i> and <i>in the circumstances</i> are both acceptable. |
| cirque | |

claim *Claim* as a noun in not capitalized: claims A 61239 to A 61244; Nancy claim. Other similar terms are deposit, property, prospect, mine, and showing.

clastics Do not use *clastics* when you mean *clastic rocks*. See also [intrusives](#), [volcanics](#), [metamorphics](#).

clay belt, clay boil (n.) *but* clay-rich, clay-sized (adj.) particles

clean, cleanness

cliff-forming (adj.)

cliffline

co- Many compound words with the prefix *co-* are written as one word. A hyphen is used when two similar vowels occur together, or when the appearance of the word is confusing without the hyphen:

coaxial, coexist, coproduct, co-author, co-operate, co-ordinate, and co-worker

coal

| | |
|----------------|--|
| anthracite | high volatile bituminous coal (hvb) |
| semianthracite | medium volatile bituminous coal (mvb) |
| semibituminous | low volatile bituminous coal (lvb) |
| subbituminous | high volatile A bituminous coal (hvAb) |
| | high volatile B bituminous coal (hvBb) |
| | high volatile C bituminous coal (hvCb) |
| | subbituminous A coal (subA) |
| | subbituminous B coal (subB) |
| | subbituminous C coal (subC) |
| | lignite A (ligA) |
| | lignite B (ligB) |

coal-bearing (adj.)

coalfield

but the Peace River Coalfield

coal measures

coalspar

coarse grained

Use a hyphen with compound adjectives before a noun, but not after it:

A coarse-grained granite *but* The granite is coarse grained

Coarse grained is used when referring to a crystalline rock; use *coarse* when referring to unconsolidated sediments. See [coarse sand](#).

coarsening-upward sequences

not upward-coarsening sequences

coarse sand, coarse gravel

but coarse-grained sandstone

coast

Pacific coast, coastal plain, coastlands, coastline, Coast Mountains

coeval

coldspring, hot spring

| | |
|---|---|
| collaborate | |
| collinear | <i>not</i> co-linear or colinear |
| colour, coloured | <i>not</i> color, <i>but</i> coloration, colorimeter |
| Colour Alteration Index (CAI) | There are Colour Alteration and Thermal Alteration indices, but do not use Colour Alteration Indices when referring to a series of values or measurements: write these as Colour Alteration Index values, or CAI values. |
| colour filter | <i>but</i> red colour-filter |
| colours | Hyphenate combination colour terms that are placed before or after the noun: a blue-green mineral; the mineral is blue-green orange-red shear zones; the shear zones are orange-red Compounds with the suffix -ish are hyphenated only when they precede the noun: bluish-green amphibole <i>but</i> the amphibole is bluish green Adjectives indicating a specific shade, such as light, pale, bright, dark are not hyphenated whether they are placed before or after the noun: light grey gneiss; the gneiss is light grey sky blue kyanite pale yellow zone; the zone is pale yellow olive green shale |
| commence | <i>see</i> begin |
| commit, commitment, committal, committed | |
| comparatively, relatively | Do not use these words unless the degree of comparison or relativity is clearly stated. These words are commonly used as substitutes for <i>fairly</i> and <i>somewhat</i> . Use <i>relatively</i> only when a comparison is made. <i>Extremely</i> should be used only in the sense of <i>to the utmost degree</i> . |
| compare to, compare with | These two expressions are distinct and different but are very often misused. If one rock specimen is <i>compared to</i> another, the object is to indicate their similarity; but, if one is <i>compared with</i> another, both their differences and similarities are considered. Any poet could be <i>compared with</i> Shakespeare, but few could be <i>compared to</i> him. |
| compass points | <i>see</i> direction |
| competition, competitive | |
| complement, compliment | <i>Complement</i> as noun, verb, and adjective (<i>complementary</i>) relates to the quantity or amount that completes. <i>Compliment</i> as noun, verb, and adjective (<i>complimentary</i>) relates to praise, flattery, and something obtained free. |
| complete, completeness | |

| | |
|---|--|
| compose | <i>Compose</i> means make up, constitute, or form, and is most frequently used in the passive: be composed of <i>see also</i> comprise |
| comprise | The word <i>comprise</i> means consists of. A formation is not <i>comprised of</i> sandstone and shale; it <i>comprises</i> , or <i>consists of</i> , or is <i>composed of</i> sandstone and shale. A whole comprises two halves, but two halves constitute (not comprise) a whole. <i>Comprise</i> implies inclusion of all parts of a whole as opposed to <i>include</i> , which implies that there may be other parts not mentioned: The sandstone <i>comprises</i> quartz, feldspar, chert, and calcite. <i>but</i> The sandstone <i>includes</i> quartz and feldspar in its mineral composition. Never use <i>of</i> after <i>comprised</i> . |
| computerize | |
| concede | |
| concrete | <i>see</i> abstract |
| cone-in-cone | |
| confer, conference | |
| conform to | <i>not</i> conform with |
| conodont | |
| consensus | <i>Consensus</i> means shared opinion, or unanimity of opinion. <i>Consensus of opinion</i> is redundant. |
| consider | <i>see</i> believe |
| consistent, consistency | |
| conspicuous | <i>not</i> conspecific |
| contact-metamorphosed sedimentary rocks (adj.) | |
| continual, continuous | <i>Continual</i> means repeated, or going on at regular intervals; <i>continuous</i> means unbroken, or going on without pause. |
| contrast with, contrast to | When contrast is used as a verb, it is followed by <i>with</i> . Either <i>to</i> or <i>with</i> may be used when contrast is used as a noun. |
| corehole | |
| Coriolis effect | |
| corollary | |
| corrasion, corrosion | <i>Corrasion</i> refers to mechanical erosion of rocks and soil by the sediment load in air, water, or ice. <i>Corrosion</i> refers to erosion by chemical processes. |

| | |
|------------------------------------|--|
| correlate | Use <i>correlate</i> to demonstrate the equivalence of two or more geological phenomena in different areas, even though they may be different in lithology. A limestone formation in British Columbia may, for example, be correlated with a sandstone formation in Alberta. Do not use the term to apply to separate bodies of the same formation or group, nor to what are mapped tentatively as parts of the same lithological units. Correlations may be based on lithological, paleontological, chronological, or other physical evidence. <i>Correlate with</i> is the correct expression; <i>correlate to</i> is incorrect. |
| correspondence | |
| corroborate | |
| counsel, counselled | |
| county | capitalized as in <i>Pictou County</i> |
| crag-and-tail (n. and adj.) | |
| craton | capitalized as in <i>Slave Craton, North American Craton</i> |
| creek | capitalized as in <i>Lost Creek</i> |
| crevasse splay | |
| crisis (pl. crises) | |
| criterion (pl. criteria) | |
| cross- | Some compound words starting with <i>cross</i> are one word: crossbed, crossbedded, crossbedding, crosscut, crosscutting, crosshatched, crosshatching, crosslaminae, crosslaminated, crosslamination; some are hyphenated: cross-section, cross-stratification; and some are two words: cross fault, cross fold. |
| crystallize, | |
| crystallization | |
| crystallographic | |
| cryptocrystalline | |
| cryptozoon | |
| cumulate, cumulus | In petrological jargon, <i>cumulate</i> is a name for igneous rocks of a particular kind, and its uses are essentially parallel to those of rock. Thus, we can have cumulate layers or rock layers, but <i>cumulate rock</i> is redundant. <i>Cumulus</i> is defined as the corresponding adjective, so we have cumulus minerals and postcumulus processes, but <i>cumulate mineral</i> and <i>postcumulate processes</i> are inappropriate. |
| cuspl-ripple | |
| cut-and-fill (n. and adj.) | |
| cutbank | |
| cutoff (n.), | <i>but</i> cut off (vb.) |
| cuttings samples | <i>not</i> cutting samples |

SPELLING AND USAGE: D

damsite

dangling participle

Avoid the common error of opening a sentence with a participle, thus misrelating phrases, so that the participle becomes unattached from its correct noun or implies a wrong noun, as in the following examples:

Shattered into fragments, the student picked up the calcite crystal.

Traversing across the fold belt, the rocks become increasingly gneissic.

see also [participles](#)

**dark coloured,
dark weathering**

Avoid using these meaningless descriptive terms by describing the actual colour of the rock, weathering, etc.

database

but data set

datable

not dateable

data set

but database

date line

dates

Instead of such expressions as *last year* or *next year*, specify the exact year.

datum (pl. data)

The word *data* is a Latin plural: data are (*not* data is), and, these data (*not* this data). Unless you are talking about a reference level, the singular, *datum*, is seldom used; you can usually rewrite using the word *information*.

debate, debatable

debris flow (n.)

but debris-flow deposits (adj.)

deca

The prefix *deca* (symbol da) indicates the multiple 10^1 .

deci

The prefix *deci* (symbol d) indicates the multiple 10^{-1}

decimate

Decimate means to reduce *by* one tenth, not *to* one tenth (originally, to take out one tenth); hence, *to decimate by twenty per cent* is incorrect. *Decimate* also now means to destroy a large proportion of.

décollement

deep-sea sediments

deep water (n.)

but deep-water sediments (adj.)

defective, deficient

Defective (from defect) is appropriate if something is lacking in quality. *Deficient* (from deficit) refers to inadequate quantities.

definite, definitely

Do not use these words unless you are sure that you cannot express your meaning properly without them. They mean *exact(ly)*, *precise(ly)*, *distinct(ly)*, *certain(ly)*.

definite article

see [the](#)

This word goes a step further than *definite* and introduces a concept of finality. A *definite* offer may state precise terms, but a *definitive* offer presents final terms. A *definitive* report is the last word on a subject.

De Geer moraines

| | |
|---|--|
| degree symbol (°) | 32°C (no space, not 32 °C, or 32° C) 30 ± 2°C minus 10°C or -10°C -10°C to -30°C (<i>not</i> -10–30°C) 10° (of arc) an angle of 45° latitude 49°21'18"N, longitude 72°13'14"W |
| de-icing | <i>not</i> deicing |
| delta fan, delta front, delta plain (n.) | <i>but</i> delta-front deposits, delta-plain deposits (adj.) |
| dependable | |
| dependant (n.) | Do not omit the word <i>on</i> or <i>upon</i> after <i>depend</i> and <i>dependent</i> . |
| dependent (adj.) | |
| depleted | <i>see</i> enriched |
| depocentre | |
| deposit (or detritus) feeder structure (ichnology) | <i>not</i> deposit feeding structure — deposits do not feed |
| deprecate, depreciate | <i>Deprecate</i> means to express disapproval of. <i>Depreciate</i> means to diminish in value. |
| descendant(n.), descendent (adj.) | |
| dessicate, dessication, desiccator | |
| desirable | |
| develop | Do not use <i>develop</i> in the sense of <i>a gradual process</i> . It is not a synonym for arise, come, happen, occur, take place, etc. It is correctly applied in <i>developing a mine</i> , but a <i>prospect</i> is <i>explored</i> . Other words or expressions, such as uncover, unfold, bring to light, disclose, increase, produce, expand, evolve, make, contrive, construct, build, establish, compose, achieve, enlarge, and extend, can be substituted for greater clarity and less monotony. |
| devise | |
| diamond-drill hole | <i>but</i> drillhole |
| differ | When used in the sense of being different, <i>differ</i> is followed by <i>from</i> . When used in the sense of having a difference of opinion, it may be followed by <i>with</i> or <i>from</i> . |
| different | Use <i>different from</i> (never <i>different than</i> or <i>different to</i>). |
| dilemma | This word is not a synonym for difficulty. A <i>dilemma</i> is a situation or predicament involving a choice between two, equally balanced, and usually equally unattractive, solutions or courses of action. |
| dip, dipping | <i>See</i> direction ; strike and dip |

**dip slip, dip slope (n.)
direction**

but dip-slip fault (adj.)

Write compass points consisting of two directions as one word:

northwest, southeast

Where there are three points, hyphenate after the first point:

north-northwest, south-southwest

Note

north-trending, north-northwest-trending, west-central

North (or south, east, west, northeast, north-northeast, etc.) is preferred where a definite directional designation is intended, as in north bank, north side, west corner, east boundary, south-flowing, or north dip. *Northward* or *northerly* are more appropriate where the direction is less precise, as in northward-trending, northerly dipping.

Northward (westward, etc.) is preferred to *northerly*, as the latter can mean both *from* the north and *to* the north.

Bearings should be given by azimuth. Write *the fault strikes 135°* (not the fault strikes north 45° west, or N55°W). Similarly, write that *glacial striae trend 140°* (not south 40° east, or S40°E). Avoid bearings such as north-south, northwest-southeast, or east-west in such statements as *the folds trend north-south*; it is sufficient to note that the folds trend north (*not* N). Unless stated to be magnetic, all bearings are assumed to be true.

In texts on structural geology, compass directions can be abbreviated; for example, N, NE, NNE, and strike 084°, dip 25° NW (or 084°/25°NE). Do not abbreviate north (south, etc.) in expressions such as *the north side of the lake*, or in expressions such as *north-trending fault*, *southwest-plunging strata*.

Use northern, etc. where the general northern end of the zone is intended: southern Alberta, western Virginia, *but* West Virginia and Western Canada (formal names).

See also [azimuth](#); [strike and dip](#).

directly

As an adverb, directly means instantly or immediately, not a conjunction equivalent to *as soon as*.

discrete, discreet

Discrete means individually distinct, a separate entity. *Discreet* means prudent or tactful.

dissect

disseminate

dissociate

not disassociate

distinctive

see [characteristic](#)

district

not capitalized as in *Cariboo district*

divisible, division

dolomite, dolostone

Dolomite is the mineral. Either *dolostone* or *dolomite* may be used for the rock.

| | |
|---|--|
| domain | capitalized where formal, as in <i>Britt Domain</i> , <i>Parry Sound Domain</i> |
| dome | capitalized as in <i>Ozark Dome</i> |
| down | Most compound words starting with <i>down</i> are one word: downdip, downdropped, downfaulted, downsection, downslope, downstream, downthrown, downwarped, downwelling <i>but</i> down-ice (adj.) downward, <i>not</i> downwards |
| drag fold | |
| drift-covered area | <i>but</i> the area is drift covered |
| driftwood | |
| drill bit, drill core | |
| drillhole | <i>but</i> diamond-drill hole |
| drumlin-like | |
| due to, owing to, because of | <i>Due to</i> has become a compound preposition, essentially synonymous with <i>owing to</i> : Due to (owing to) the high chert content, the limestone is of limited use. Both of these complex prepositions mean <i>because of</i> , or <i>caused by</i> . Do not add <i>the fact that</i> to either phrase. |
| dwelling structure (ichnology) | |
| dyke | <i>not</i> dike |

SPELLING AND USAGE: E

| | |
|--|--|
| earlier, later | <p><i>Earlier</i> and <i>later</i> (also <i>older</i> and <i>younger</i>) are commonly misused in geological reports and maps. <i>Earlier</i> and <i>later</i> are time terms: Late Cretaceous or earlier. <i>Older</i> and <i>younger</i> refer to rocks and rock formations: Blackstone River Group or older strata.</p> |
| early, late | <p>These are time terms applied to geochronological units (period, epoch, age, etc.) and should be used for age or intervals of time only; the terms <i>lower</i> and <i>upper</i> are used for stratigraphic intervals.</p> <p>Use <i>early</i> and <i>late</i> for informal, loosely defined divisions: early Paleozoic, late Paleozoic, early in the Devonian, late Cretaceous deformation.</p> <p>Use <i>Early</i> and <i>Late</i> for formal, clearly defined divisions: Early Cambrian, Late Devonian. <i>See also</i> basal; early, lower; late, upper; lower, upper; middle.</p> |
| early, lower | <p>A stratigraphic unit may be referred to in either physical (rock) or temporal (time) terms, depending on the context, and regardless of whether or not the word <i>age</i> is used. <i>Early</i> and <i>Lower</i>, for example (also <i>Late</i> and <i>Upper</i>), are not interchangeable, because they have different meanings: <i>Lower</i> refers to relative physical position in a stratigraphic section. <i>Early</i> refers to relative temporal attribution in a continuum of age. <i>See also</i> basal; early, late; late, upper; lower, upper; middle.</p> |
| Early Precambrian | Archean, <i>but</i> early Precambrian is indefinite |
| Earth (planet) | |
| earth (material) | |
| earthflow | |
| earthquake | <i>see</i> aftershock, foreshock ; forecast, prediction ; intensity, magnitude |
| east-central | |
| easterly, eastward | <i>see</i> westerly |
| Eastern Canada, Eastern Townships | |
| east-northeast | |
| ebb tide | |
| echogram, echo sounder | |
| effect | <i>see</i> affect |
| e.g. | <p>Abbreviation of the Latin <i>exempli gratia</i>, meaning <i>for example</i>. This abbreviation introduces an example or examples of what precedes: sedimentary rock types, e.g. siltstone, sandstone, and limestone.</p> <p>Note that a comma is generally written before e.g. but not afterward. Where e.g. is written out (<i>for example</i>), it is usually followed by a comma, and may be preceded by a comma, a dash, a period, or a bracket.</p> |

If you use e.g. at the beginning of a list, do not use etc. at the end of it. Avoid using e.g. at the beginning of a sentence. Do not use e.g. in place of i.e. (i.e. restates and specifies, whereas e.g. just exemplifies).

The abbreviation e.g. is preferably confined to parenthetical references, and is set in vertical (roman) type. *See also* [i.e.](#), [viz.](#)

eighteenth century

not Eighteenth Century

eldest

see [oldest](#)

electron microprobe

not electron probe or probe

elevation

see [altitude](#)

elongated-clast fabric measurement

elude

see [allude](#)

embedded

not imbedded

emphasis

Emphasis can be changed by rearranging the order of words in a sentence. For example, in the following sentence the emphasis is on discovery:

The discovery of gold in the Klondike was made in 1896.

If you wish to emphasize gold, the sentence should read:

Gold was discovered in the Klondike in 1896.

To emphasize the Klondike, the sentence should read:

The Klondike gold discoveries were made in 1896.

To stress the date:

In 1896, gold was discovered in the Klondike.

enclose

encounter

This verb is commonly misused for *observe*. One *encounters* a grizzly bear, but *observes* a deformation pattern.

encrustation

not incrustation

endorse

This word should not be used in the sense of corroborate, subscribe to, or be in agreement with. It means confirm or ratify.

en échelon

enriched, depleted

Avoid these words when you mean richer, poorer, higher, or lower. Enrichment and depletion are processes, and so if you wish to use *enriched* or *depleted*, ask yourself what process is implied. If you use the words, be sure to say what is enriched or depleted, that it is something that can be enriched or depleted, and that you identify the standard of comparison:

After ten years of production, the Zn deposit was depleted by 50%.

en route

not enrout

| | |
|---|---|
| entail | <i>Entail</i> means to impose upon, to involve, or to require as a necessary condition (e.g. in terms of labour or expense). This verb is frequently used where no verb is necessary, or where the words <i>need, cause, impose, necessitate, or involve</i> should be substituted. <i>See also involve.</i> |
| entropy ratio | <i>but</i> fixed entropy-ratio |
| eolian | <i>not</i> aeolian |
| epeirogeny | |
| epicentre | |
| equally as | <i>As</i> should be omitted. <i>Not</i> equally as good, <i>but</i> equally good. |
| erosional, erosive | Do not confuse erosional with erosive — the two words are not interchangeable. <i>Erosional</i> describes the state or origin of something as the result of erosion. <i>Erosive</i> means having the function or property of eroding. Surfaces and contacts can be erosional, but cannot be erosive. Currents and streams are erosive. |
| erratum (pl. errata) | |
| error ranges | <i>see plus, plus/minus</i> |
| essentially | <i>Essentially</i> means necessarily or indispensably. In scientific writing, it should not be used as a substitute for <i>principally, chiefly, mainly, virtually, in effect, most of, or almost</i> : <p style="padding-left: 40px;">The formation consists mainly of limestone, or Most of the formation is limestone, <i>not</i> The formation is essentially limestone.</p> |
| et al. | Abbreviation of the Latin <i>et alii</i> (or <i>et aliae</i> , the feminine form) meaning <i>and others</i> or <i>and other people</i> . The abbreviation <i>et al.</i> is set in vertical (roman) type. When the list is of nonhuman items, the appropriate term is <i>etc.</i> If <i>et al.</i> follows a list of two or more items, then it is preceded by a comma. Do not use <i>et al.</i> at the end of a list that begins with <i>e.g., such as, or for example</i> . Never write <i>and et al.</i> <i>See also etc.</i> |
| etc. | Abbreviation of the Latin <i>et cetera</i> , meaning <i>and the remaining things</i> . The abbreviation <i>etc.</i> is preceded by a comma if it follows a list of two or more items: <i>A typical metasedimentary sequence of quartzite, marble, pelite, etc.</i> If there is only one item, however, the comma is usually omitted. Since <i>etc.</i> means <i>and the rest</i> , it is redundant to write <i>and etc.</i> Do not use <i>etc.</i> at the end of a list if the list begins with <i>e.g., for example, or such as</i> . The abbreviation <i>etc.</i> is preferably confined to parenthetical references, and is set in vertical (roman) type. <i>See also et al.</i> |
| eustasy | |
| even, evenness | |
| everyone, every one | <i>see anyone</i> |
| evidence of (something), evidence for (a theory) | |
| evident | <i>see apparent</i> |

exaggerate, exaggeration

exceed

except that

As a conjunction introducing a clause, *except that* is better replaced by *unless*, or *if not*.

excerpt

existence, existent

extend

Consider the merits of *give*, *accord*, or *offer* as alternatives when expressing thanks to your associates.

extraglacial

SPELLING AND USAGE: F

| | |
|--|---|
| fact | Avoid using such meaningless phrases as <i>in fact</i> , <i>as a matter of fact</i> , <i>the fact is</i> , and <i>actually</i> . |
| factor | A factor is something that contributes to an effect, but too commonly it is used instead of <i>circumstance</i> , <i>component</i> , <i>consideration</i> , <i>constituent</i> , <i>element</i> , <i>event</i> , and <i>fact</i> . |
| fall line | |
| fallout (n., adj.) | <i>but</i> fall out (vb.) |
| far-reaching, far-reaching events | |
| farther, further | Use <i>farther</i> when implying distance, as in <i>farther from the base</i> ; but use <i>further</i> when implying something additional, as with <i>this requires further research</i> . |
| fast ice | |
| fault | capitalized as in San Andreas Fault. |
| fault-block mountain | |
| favour | |
| feasible | |
| fecal | <i>not</i> faecal |
| feeding structure (ichnology) | <i>see</i> deposit feeder structure |
| feel | <i>see</i> believe |
| feet | Written as 5 ft. or five feet. The SI equivalent should be stated in parentheses. |
| feldspar, feldspar porphyry | <i>but</i> feldspar-phyric |
| felsenmeer | |
| felsic, mafic | When describing rocks, the terms felsic and mafic are used. Salic and femic are used for discussing norms. <i>See also</i> salic , femic . |
| femic | <i>See also</i> felsic , mafic |
| ferromagnesian | |
| fetid | |
| few, a few | <i>Few</i> emphasizes the fact that the number is small. <i>A few</i> emphasizes the fact that there is more than one. |
| fewer, less, lesser | The word <i>less</i> should not be misused for <i>fewer</i> . <i>Less</i> takes a singular noun: <i>there is less choice</i> ; <i>fewer</i> takes a plural noun: <i>there are fewer choices</i> . <i>Fewer</i> is used when referring to number (i.e. countable items): <i>There were fewer phenocrysts in the porphyry on the southern edge of the exposure. Do not add number to fewer by writing fewer number or fewer in number.</i> |

Less or *lesser* are used when referring to relative quantity, amount, mass, bulk, or size: The porphyry has a lesser content of phenocrysts near its southern margin.

fibre

not fiber

**field geology, field map,
field season, field trip**

but fieldwork

figure

The word *Figure* is capitalized when written out in the text (in singular and plural) and when abbreviated in parentheses:

Figure 1

Figures 1 and 2

Figures 5 to 20

Figure 1a, b

(Fig. 1)

(Fig. 1, 2)

(Fig. 5–20)

(Fig. 1a, b)

(Fig. 17a, b, 18)

Note that a semicolon is used to separate references to different items in parentheses:

(Fig. 1; Smith, 1994) – indicates two references: one to Figure 1 (of this report), and one to Smith, 1994.

(Fig. 1 in Smith, 1994) – indicates one reference: to Figure 1 found in Smith, 1994.

Full page groups of black and white photographs or photomicrographs, in other than paleontological reports, are called *Figures*. Individual illustrations in these Figures are identified by letters. *See also* [plate](#)

fine grained

see [coarse grained](#)

**fining-upward cycles,
fining-upward sequences**

not upward-fining sequences, or fining-up sequences

fjords

not fjords

first, firstly

Although both are correct, first, second, third is preferred. Be consistent.

first-order (adj.)

fit, fitted

but fitful

fix

Fix means to make firm or to place definitely. Avoid using *fix* to mean arrange, prepare, or repair.

flatland

but flat-lying

flight line

floodplain, floodwater

flowslide, flowtill

| | |
|--|--|
| fluorescent, fluorescence | The light is <i>fluorescent</i> ; the property of the mineral or substance is <i>fluorescence</i> . |
| fluorite | |
| fluviodeltaic, fluviglacial, fluviolacustrine | |
| focus (pl. focuses) | |
| focused | <i>not</i> focussed |
| -fold | Numerical compounds with <i>fold</i> are written as one word: twofold, sixtyfold, a thousandfold, <i>but</i> 24-fold. |
| fold belt (n.), fold-belt (adj.) | <i>not</i> foldbelt |
| follow-up (n., adj.), follow up (vb.) | |
| following | Do not use <i>following</i> as a preposition substituting for <i>after</i> or <i>as a result of</i> , but only as a participle, when it agrees with a noun or pronoun: <p style="margin-left: 40px;">Such success, following the careful preparations, was to be expected.</p> |
| foothills | Capitalize as in the <i>Alberta Foothills</i> , the <i>Rocky Mountain Foothills</i> , and the <i>Foothills</i> (when referring to either of the previous two and the term has been previously established). Note also the <i>Foothills Belt</i> . |
| footnote | |
| footwall (n., adj.) | <i>but</i> hanging wall (n.) and hanging-wall (adj.) |
| for, of | John Smith is manager <i>of</i> a mine <i>for</i> a company. |
| foraminifers, Foraminifera | The word <i>Foraminifera</i> is a taxonomic term and should not be used in a sentence where the writer means fossils belonging to the order Foraminifera. Write: <p style="margin-left: 40px;">rocks contain foraminifers (or brachiopods, conodonts, etc.)</p> <p><i>not</i></p> <p style="margin-left: 40px;">rocks contain Foraminifera (or Brachiopoda, Conodonta, etc.)</p> <p>It is also correct to use <i>foraminiferal limestone</i>, <i>foraminiferal ooze</i>, and <i>foraminiferal test</i>.</p> |
| forecast, prediction | Although in most dictionaries, <i>forecast</i> and <i>predict</i> are regarded as synonymous, there is a distinction between the terms when applied to geophysical phenomena. <i>Forecast</i> is a description of the ambient conditions over some period of time in the future over some region. <i>Prediction</i> is the indication of a particular event at a particular time and place. Whereas weather conditions and magnetic storms are <i>forecast</i> , earthquakes are <i>predicted</i> . The past tense and past participle are <i>forecast</i> , <i>not forecasted</i> . See also aftershock , foreshock ; intensity , magnitude . |
| foredeep, foreland, foreset, foreslope | |

| | |
|--|--|
| foregoing, forgoing | <i>Foregoing</i> refers to something that has gone before (preceding). <i>Forgoing</i> means abstaining from something. |
| foreign | |
| fore reef | |
| foreshock | see aftershock |
| foreword, forward | Whereas a <i>foreword</i> is similar to a preface, <i>forward</i> means ahead. |
| format, formatting | |
| formation | Warspite Formation; Nullataktok Formation; <i>but</i> Warspite and Nullataktok formations. |
| former, latter | Try to avoid overusing <i>former</i> and <i>latter</i> , for in many cases it is clearer to simply repeat the actual nouns. <i>Latter</i> should not be used for the final item or person in a list. Where three or more items are under consideration, do not use <i>the former</i> or <i>the latter</i> . The words <i>the first</i> and <i>the last</i> are then appropriate. See former and latter in Grammar. |
| formula (pl. formulas) | |
| Forty-ninth Parallel, 49th Parallel | Capitalized if the International Boundary, not otherwise: fifty-first parallel, 51st parallel. |
| fossilize | |
| fourfold, fourscore | |
| fractions | see Numerical expressions |
| Fraser River delta | |
| freeze-and-thaw (adj.) | |
| freeze-up (n.), freeze up (vb.) | |
| frequently | see time terms |
| fresh water (n.) | <i>but</i> freshwater (adj.). A <i>freshwater</i> lake consists of <i>fresh water</i> . |
| frontispiece | |
| frost heave, frost table | |
| fulfil, fulfilment | |
| fulgurite | The burrow-like trace or glassy tube formed by a lightning strike. |
| further | See farther |

SPELLING AND USAGE: G

| | |
|---|---|
| Ga | 10 ⁹ years, <i>see</i> Ma |
| gamma ray (n.) | <i>but</i> gamma-ray (adj.). A <i>gamma-ray</i> log is based on <i>gamma rays</i> . |
| gangué | |
| gas (pl. gases) | |
| Gaspésie | This is the correct term. Do not use <i>Gaspé</i> , or <i>Gaspé Peninsula</i> , or <i>Gaspésie Peninsula</i> . |
| gastropods | |
| gauge, gaugeable | |
| geochronological units | Position within geochronological units (period, epoch, age, etc.) is best indicated by early, middle, medial, late, and latest. |
| geographic | <i>not</i> geographical |
| geological | <i>not</i> geologic. Compare usage with <i>a logical idea</i> , <i>a logical person</i> , etc. Never a <i>logic idea</i> or a <i>logic person</i> . |
| geometry | This word is frequently misused, particularly in structural geology, but also in paleontology. Fossils, folds, and faults, etc. do not have a <i>geometry</i> . The words <i>form</i> , <i>style</i> , <i>profile</i> , <i>shape</i> , and <i>configuration</i> can be substituted in many instances. |
| geomorphological | <i>not</i> geomorphologic |
| giga | The prefix <i>giga</i> (symbol G) indicates the multiple 10 ⁹ . |
| glacial lake | <i>but</i> glacial Lake Iroquois |
| glacially eroded landscape | |
| glaciofluvial, glaciogenic, glaciolacustrine | <i>but</i> glacio-isostasy |
| globular, globule-like | <i>not</i> globularlike |
| gneiss | <i>see</i> rock names |
| gold-bearing deposit | |
| got | Avoid the use of <i>got</i> . Never use <i>gotten</i> . |
| graben (pl. grabens) | <i>not</i> capitalized |
| grain size | |
| gram | |
| Great Divide, Great Plains, the Plains (as a physiographic province) | |
| greater than (>), less than (<) | The signs stand for <i>is greater than</i> , or <i>are greater than (less than)</i> . Write out the expression in the text; use the signs in parentheses. dip less than 10°; steep dips (>70°) Use the signs in equations and tables; there is no space between the sign and the number. |
| grey | <i>not</i> gray |

greywacke

**groundmass, groundwater,
groundwork**

ground ice (n.)

but ground-ice feature (adj.)

group

Windsor Group, Canso Group, *but* Windsor and Canso groups

guidebook

gully (pl. gullies), gullying

SPELLING AND USAGE: H

| | |
|--|--|
| half life, half width, one half | <i>not</i> a half |
| halfway | |
| halo (pl. haloes) | |
| hanging participle | <i>see</i> dangling participle |
| hanging wall (n.), | <i>but</i> footwall (n. and adj.) |
| hanging-wall (adj.) | |
| harbour | |
| hardground, hardpan, | |
| hardwood | |
| hardly | <i>Hardly</i> is used only in the sense of <i>scarcely</i> . |
| hard copy | |
| hard rock | A colloquial term meaning igneous or metamorphic rock; hard-rock geology (adj.) |
| Hawaiian-type eruption | |
| headland | |
| hecto | The prefix <i>hecto</i> (symbol h) indicates the multiple 10 ² . |
| height | |
| hemispheric | |
| herringbone crossbedding | |
| hiatus (pl. hiatuses) | |
| high | Compound adjectives made with high are hyphenated when they come before the noun they modify: high-angle fault, high-energy environment, high-grade metamorphism, <i>but</i> the metamorphism is high grade. |
| highlight(s) | Reserve this word to refer to a moment or detail of vivid interest. |
| highly shattered rock | |
| high sea-level beach | |
| highstand, highwall | |
| high volatile coal | <i>see</i> coal |
| high water (n.) | <i>but</i> high-water mark (adj.) |
| highway | <i>but</i> Alaska Highway, Trans-Canada Highway, Mackenzie Highway, Highway 417 |
| hillside, hilltop | |
| hinge line | |
| histogram | |
| historic, historical | <i>Historic</i> is used in the broad sense of notable or important or well known in history. The word <i>historical</i> is used to describe events or things from the past. |

a *historic* earthquake (an earthquake notable for its magnitude, or the damage it caused)

historical records (records from the past)

historical earthquakes (earthquakes that occurred in the past)

homeoblastic

**homogeneous,
homogeneity**

honour

hoodoo

horizon

A *horizon* is, theoretically, a plane, and the word should not be used in reference to features that have implied or measured thicknesses. Alternative words are zone, band, belt, bed, seam, parting, layer, unit, etc. Thus we have platy units, fossil zones, mineral belts, ironstone bands, concretionary bands, sandstone beds, seams of coal, and partings of shale, bentonite, etc. An exception is a soil horizon, which is a layer.

hotspring, coldspring

however

Avoid starting a sentence with *however* when the meaning is nevertheless.

Hudson Bay

but Hudson's Bay Company

humus

hydroelectric

hydrogen sulphide solution

hydrological

not hydrologic

hypabyssal

hypothesis (pl. hypotheses)

SPELLING AND USAGE: I

| | |
|---|--|
| I, we | First person pronouns are acceptable in ESS publications. |
| ibid. | Abbreviation of the Latin <i>ibidem</i> , meaning <i>in the same place</i> , and should not be confused with <i>op. cit.</i> (abbr. of Latin <i>opere citato</i>) meaning <i>in the work quoted</i> . Use <i>op. cit.</i> to indicate a repeat of the previous reference, and <i>ibid.</i> to identify a repeat of a specific reference to a page or figure. Both <i>ibid.</i> and <i>op. cit.</i> are set in vertical (roman) type. Do not overuse <i>ibid.</i> or <i>op. cit.</i> See Notes for format of publication in About Paleontology . |
| -ic, -ical | Words ending in <i>-spheric</i> do not take <i>-al</i> ; for example, atmospheric and hemispheric. The word spherical is an exception. Words ending in <i>-graphic</i> do not take <i>-al</i> (e.g. geographic, petrographic, topographic). Words ending in <i>-logic</i> do take <i>-al</i> (e.g. biological, geological, petrological, lithological, hydrological). |
| iceberg, icefall | |
| ice break-up season | |
| ice cap | |
| ice dam | |
| ice field | |
| ice flow | |
| ice front | |
| ice sheet | |
| ice-contact deposit | |
| ice-flow direction | |
| ice-marginal channel | |
| ichnocoenosis (an assemblage of trace fossils), ichnofossil, ichnology | |
| ichthyosaur, Ichthyosaurus | |
| ICP-AES | abbreviation for <i>inductively coupled plasma atomic emission</i> |
| spectrometry | |
| ICP-MS | abbreviation for <i>inductively coupled plasma mass spectrometry</i> |
| ideal | This word cannot be used in the comparative. <i>More ideal</i> is impossible. |
| identical | Correct constructions are: one is <i>identical with</i> (or <i>to</i>) the other; two (or more) people, things are <i>identical</i> . |
| identified as | <i>not</i> identified to be |
| ID-TIMS | abbreviation for <i>isotope dilution thermal ionization mass spectrometry</i> |

| | |
|---------------------------|--|
| i.e. | <p>Abbreviation of the Latin <i>id est</i>, meaning <i>that is</i>. The abbreviation gives a full explanation of what precedes: Examination of the MORB, i.e. the mid-ocean-ridge basalt...</p> <p>Note that a comma (sometimes a dash, semicolon, or bracket) is written directly before i.e. but that as a rule there is no need for a comma immediately afterwards.</p> <p>If you use i.e. at the beginning of a list, do not use etc. at the end of it. Avoid using i.e. at the beginning of a sentence.</p> <p>Do not use i.e. in the place of e.g. (i.e. restates and specifies, whereas e.g. just exemplifies).</p> <p>Where <i>that is</i> is written out, it is usually followed by a comma, and may be preceded by a comma, a dash, a period, or a bracket.</p> <p>The abbreviation i.e. is preferably confined to parenthetical references, and is set in vertical (roman) type. <i>See also</i> e.g.; viz.</p> |
| if, when | One of these words is usually sufficient. |
| illusion | <i>see</i> allusion |
| immanent, imminent | <i>Immanent</i> means inherent, <i>imminent</i> means about to occur. |
| immiscible | |
| impact | Use this word as a noun only: Climate change has had an impact on the geomorphology of the prairies. Use the verbs <i>affect</i> or <i>influence</i> instead of impact: climate change affected the environment, not climate change impacted the environment. |
| impassable | <i>not</i> impassable |
| Imperial system | <p>Unit abbreviations in the Imperial system of measures take periods. Do not add an <i>s</i> to form the plural. Area and volume are expressed by sq. and cu: 8 in., 100 sq. ft., 11.6 sq. in., 20 cu. yd.</p> <p>NOTE: When the Imperial system is used, state the SI (metric) equivalent in parentheses.</p> |
| imply, infer | <p>Do not confuse these words. They are not interchangeable. <i>Imply</i> means to hint at or suggest, whereas <i>infer</i> means to deduce or to draw a conclusion from:</p> <p style="padding-left: 40px;">The evidence implies the existence of a fault.</p> <p style="padding-left: 40px;">The geologists inferred the location of the contact from airphotos.</p> |
| important | Do not use words such as <i>important</i> and <i>significant</i> without explaining why the subject is important or significant. For example, a <i>significant find</i> may mean one thing to the author, but something quite different to the reader. An <i>important outcrop</i> is similarly vague. Many other words, such as long, extensive, and widespread convey more information than the word important, but also require explanation and a more scientific definition. The same applies to such words as interesting and reasonable. |
| inasmuch as | |

| | |
|---|--|
| incertae sedis | Latin, meaning <i>of uncertain place</i> . A term applied to a fossil or modern specimen whose classification is considered uncertain. |
| inch (pl. inches) | written as 5 in. or 5 inches; the SI equivalent should be stated in parentheses |
| incise | The word <i>incise</i> means to cut into, so <i>incised into</i> is redundant. |
| include | see comprise |
| independent | <i>not</i> independent |
| index (pl. indexes) | Use <i>indexes</i> with books, but <i>indices</i> for specialized usage (e.g. Miller indices, Colour Alteration indices) |
| individual | <i>Individual</i> is not equivalent to person. It refers to a single member of a group as opposed to the whole group. |
| infer | see imply |
| infinitive phrase | see dangling participle . |
| inform | <i>tell</i> is preferable. |
| information, informative | |
| infrared | |
| -ing endings | see participles |
| in-house program | |
| inside of | This is correct only when used adverbially to mean <i>in less than</i> (e.g. inside of a week). |
| in situ | This Latin phrase, meaning <i>in position</i> , is set in vertical (roman) type. |
| insofar as | <i>not</i> in so far as |
| install, installed, installation, instalment | |
| intense, intensive | <i>Intense</i> means existing in a high degree. <i>Intensive</i> means directed to a single point, or area, or subject. |
| intensity, magnitude | The <i>intensity</i> of an earthquake at a particular place depends not only on the earthquake magnitude, but on the distance from the earthquake epicentre, and also on the local geology. Earthquake <i>magnitude</i> is a measure of the strength of an earthquake determined by seismographic observations recorded on the Richter logarithmic scale. See also aftershock , foreshock ; forecast , prediction |
| inter-, intra- | The prefix <i>inter-</i> means between or among: interbed, interglacial, intermontane, inter-relationship. The prefix <i>intra-</i> means within or on the inside: intradepartmental, intraformational, intraglacial. |
| inter alia | Latin, meaning <i>among other things</i> . |
| interburden | A layer of sedimentary rock that separates two mineable coal beds. |
| intercede | |
| intermittent, sporadic | Whereas <i>intermittent</i> relates to time, <i>sporadic</i> relates to distribution. |

| | |
|---|--|
| internal sediment | Material that has been chemically precipitated or mechanically deposited as a sediment in vugs and other cavities or interstices. |
| International Boundary | |
| interpreted as | <i>not</i> interpreted to be. For example, the presence of mudcracks is <i>interpreted as</i> evidence of an arid paleoclimate. |
| interstice (n.), interstitial (adj.) | |
| in the order of | <i>not</i> of the order of, or on the order of |
| intra- intrusion-hosted deposits | see inter |
| intrusives | The words <i>intrusives</i> , <i>metamorphics</i> , <i>pyroclastics</i> , <i>volcanics</i> , <i>carbonates</i> , <i>clastics</i> , and <i>accessories</i> are not nouns and, when used in that sense, are geological jargon. Preferably, these words should be used only adjectivally: intrusions or intrusive rocks, accessory minerals, carbonate rocks, clastic rocks, siliciclastic rocks, etc. See also carbonates ; clastics ; minerals , mineral crystals , mineral grains ; rocks , rock bodies . Do not use <i>intrusive into</i> (this is using adjective and preposition to replace a verb); use <i>intrudes</i> or <i>intruding</i> . Because Inuit means <i>the people</i> , do not use <i>the</i> or <i>people</i> with Inuit. |
| Inuk (person, s.) Inuit, (people, pl., not Innuit), Inuktitut (language) | |
| involve | <i>Involve</i> originally meant wrap up, envelop, or enfold; recent usage is in the sense of include, contain, or imply. It is correct to say that rocks are <i>involved</i> in folding. See also entail . |
| iridescent (adj.), iridescence (n.) | |
| iron-formation | |
| irreconcilable | |
| irrelevant | |
| -ise, -ize | Most verbs ending with the sound <i>iz</i> derive from the original Latin ending <i>-izare</i> , based on the Ancient Greek verb suffix, <i>-izein</i> . For these verbs, the current North American usage, <i>-ize</i> , is more correct than the common British usage, <i>-ise</i> , which owes something to the French, <i>-iser</i> . Use <i>-ize</i> as the standard form for most words: carbonatize, characterize, crystallize, fossilize, and mineralize. Some verbs, however, should be spelled with <i>-ise</i> : advise, apprise, arise, comprise, compromise, devise, improvise, incise, revise, and surmise. |
| isostasy | |
| isotope | see chemical symbols |
| isotopic composition | <i>but</i> lead-isotope composition <i>not</i> lead isotopic composition |

| | |
|----------------------|---|
| it | When using <i>it</i> , or any other pronoun, make sure that the reader knows exactly what is being referred to, i.e. avoid overusing <i>it</i> . |
| italics | Italics, or italic type, should be used sparingly, as this type tends to overemphasize the words. See Italics |
| it is, it was | Avoid overusing <i>it is</i> and <i>it was</i> at the beginning of a sentence. |
| its, it's | Without the apostrophe, <i>its</i> is the possessive form of the pronoun <i>it</i> . Use of the apostrophe indicates that <i>it's</i> is a contraction of <i>it is</i> or <i>it has</i> . |
| I-wave | |
| -ize | see -ise |

SPELLING AND USAGE: J

jargon

Jargon refers to the specialized vocabularies used by members of various professional or social groups, such as geologists, physicians, lawyers, and computer experts. The technical terminology used is incomprehensible to lay people, but facilitates communication within specialized groups. Avoid needless jargon. The point of writing an article or report well is to communicate clearly, so before using jargon ask yourself three questions. Does it convey your meaning? Can it be replaced by a simpler word or expression? Are you using it to communicate, and if not, why not?

joint plane**judgment****juxtaposition**

Means the placing of things side by side or in a close spatial relationship, or the condition of being in this relationship.

SPELLING AND USAGE: K

| | |
|---|---|
| ka (10³ years) | This symbol denotes an absolute age and also an interval of time: about 6.6 ka; gave an age of 17 ka; dated from >24 to 11.4 ka. It is not necessary to add <i>ago</i> to the age, as in <i>25 ka ago</i> . |
| kame-and-kettle (adj.) | |
| kbar | see kilobar |
| kerogen | Use Roman numerals as in kerogen Type I, Type III |
| kettle hole | |
| K-feldspar | <i>not</i> K-spar |
| kieselguhr | synonym for diatomite |
| kilo | The prefix <i>kilo</i> (symbol k) indicates the multiple 10 ³ . |
| kilobar | Although this unit of pressure is not part of the SI, we continue to use it. Do not abbreviate bar (1 bar = 100 kPa). The symbol for kilobar is kbar (1 kbar = 105 kPa). |
| kilometre (<i>not</i> kilometer) | see metre |
| knowledgeable | |
| K-wave | |
| kPa | kilopascal |

SPELLING AND USAGE: L

label, labelling

labour

but laborious

LA-ICP-MS

Abbreviation for *laser ablation inductively coupled plasma mass spectrometry*

lake

Capitalized as in Great Slave Lake, Lake Erie, *but* lakes Huron and Ontario.

**lakebed, lakefront,
lakeshore, lakeside,**

but lake basin

lamina (pl. laminae)

Lamina is the layer, lamination is the structure. Do not use *lamination(s)* for *layer(s)*, use *lamina(e)*.

**landform, landmark,
landmass, landslide,
landlocked**

land ice

Landsat images

lapilli tuff

larger sized grains

large scale (n.)

but large-scale (adj.)

last, latest

Last means final, the end of a sequence. *Latest* means the most recent.

laser Raman spectroscopy

late

see [early](#)

late, upper

A stratigraphic unit may be referred to in either physical (rock) or temporal (time) terms, depending on the context, and regardless of whether or not the word *age* is used. *Late* and *Upper*, for example (also *Early* and *Lower*), are not interchangeable as they have different meanings: *Upper* refers to relative physical position in a stratigraphic section *Late* refers to the relative temporal attribution in a continuum of age *See also* [early, late](#); [early, lower](#); [lower, upper](#); [middle](#).

**Late Precambrian
(Proterozoic)**

but late Precambrian (indefinite)

later

see [earlier](#)

latitude

Write as: *latitude 64°28'30"N and longitude 115°21'42"W*, or (*lat. 64°28'30"N; long. 115°21'42"W*). Do not omit the words *latitude (lat.)*, *longitude (long.)*, or the compass direction.

latter

see [former](#)

Laurentide Ice Sheet

lead-zinc vein

| | |
|---|--|
| least | <i>Least</i> is the superlative of <i>little</i> ; <i>less</i> is the comparative form. It is incorrect to use <i>least</i> when referring to only two persons or things: <i>He is the less efficient of the two supervisors</i> , but <i>Of all the people in the company, he works the least</i> (or <i>he is the least efficient</i>). |
| lebensspur (pl. lebensspuren) | |
| leda clay | |
| left-lateral fault | |
| lens (pl. lenses) | |
| less, lesser | see fewer |
| less than (>) | see greater than |
| leuco-quartz diorite | but leucodiorite |
| levée | |
| levelled, levelling | not leveled, leveling |
| liable | see apt |
| liaison | |
| licence (n.), license (vb.) | |
| lie, lay | <p>It is easy to confuse the verbs <i>to lie</i> and <i>to lay</i> although they are quite distinct.</p> <p><i>To lie</i> (past tense: <i>lay</i>) means to recline, to be positioned on a flat surface, or to be moved into such a position, and is an intransitive verb taking no direct object:</p> <p>The boulder of Precambrian charnockite <i>lies</i> on the Ordovician limestone.</p> <p>The erratic <i>lay</i> undisturbed for thousands of years. It is not <i>lying</i> there now, as it has been moved to a university campus.</p> <p>It had <i>lain</i> on the outcrop since the Ice Age.</p> <p><i>To lay</i> (past tense: <i>laid</i>) means, to place in a recumbent position, to deposit, or to put, and is a transitive verb having a direct object:</p> <p>The farmer <i>lays</i> each stone in its most appropriate place in the dry stone dyke. He <i>laid</i> the entire dyke in two weeks. By <i>laying</i> each stone with care, the wall could last for generations. His ancestors <i>laid</i> a limestone dyke that is still perfect.</p> <p>Confusion arises because the past tense of <i>to lie</i> is <i>lay</i>.</p> |
| Liesegang rings | |
| light coloured, light weathering | Avoid using these meaningless descriptive terms by describing the colour of the rock, weathering, etc. |
| lignite A, lignite B | see coal |

| | |
|---------------------------------|---|
| like, as | Use <i>like</i> as a preposition, not as a conjunction with subordinate clauses. <i>As</i> may be used as a preposition and as a subordinating conjunction: At the fault contact, water acted <i>like</i> (or <i>as</i>) a lubricant. In the field he behaves <i>as</i> (<i>not</i> like) he does in the office. No interpretation can convince the geologist as much <i>as</i> the evidence of the rocks themselves. |
| likely, likelihood | <i>Likely</i> means probable. <i>Likely</i> does not imply any suggestion of habit or that the probability arises from the character of the subject. <i>See also</i> apt . |
| lime mudstone | <i>not</i> lime-mudstone |
| lime packstone | Note, however, <i>lime-packstone lithofacies</i> , <i>mixed-skeletal lime packstone</i> , and <i>mixed-skeletal lime-packstone lithofacies</i> |
| limited | Do not use <i>limited</i> as a substitute for few, small, meagre, inadequate, or scant. |
| limy | Containing calcite, lime, or limestone. |
| lineament, lineation | |
| liquefaction, liquefy | |
| literally | <i>Literally</i> means truly, accurately, actually, adhering to the facts; the opposite of figuratively. Do not confuse it with figuratively, virtually, or metaphorically. |
| lithological | <i>not</i> lithologic |
| lithology | In its original sense, <i>lithology</i> was essentially synonymous with <i>petrography</i> , but it is now used for the description of rocks in outcrop and hand specimen. Different rock types or units should be called <i>lithological units</i> , not lithologies. A rock such as limestone has a certain <i>lithology</i> , but limestone, shale, and sandstone are not lithologies. Lithologies are not present in a section or a map area, but rocks, rock types, strata, or lithological units are. |
| LITHOPROBE | |
| lithostratigraphic units | Position within <i>lithostratigraphic units</i> (group, formation, member, etc.) is indicated by <i>basal</i> , <i>lower</i> , <i>middle</i> , <i>upper</i> , <i>uppermost</i> . |
| lithotectonic | |
| lit-par-lit | |
| litre | Note that L is the correct SI symbol for <i>litre</i> |
| little | <i>see</i> least |
| littoral, littoral zone | The <i>littoral zone</i> is the part of a sea, lake, or river that extends from the high-water mark to shoreline areas that are permanently submerged. |
| loan | Use <i>loan</i> only as a noun; the verb is <i>lend</i> . |
| loaned | The better form is <i>lent</i> , past participle of <i>lend</i> . |
| loc. | For singular and plural GSC location numbers |
| locate | This word is commonly misused, as in the expressions: |

the company located the mill; he was located in Toronto

or

he located the ore shoot

Use other words, such as find, place, reside, situate. A millsite may be located (i.e. its position established), but the mill is built at a certain place. You may *locate* a claim, but you *find* the ore on it. In many instances, the word may be omitted, as in the sentence: The millsite is on (not located on) Spring Creek.

lodgment till

loess

longitude

see [latitude](#)

longshore

low energy, low water

but low-energy environment, low-water mark

lower, upper

These terms are applied to chronostratigraphic units (system, series, stage, etc.) to indicate stratigraphic position within the geological column; the terms *early* and *late* are used for age. They correspond to *early* and *late* as applied to the equivalent geochronological unit, for example: rocks of the Lower Cambrian System formed during the Early Cambrian Period. The current rule is to use *lower* and *upper* for informal, loosely defined divisions: lower Paleozoic, upper Paleozoic, lowermost Cambrian, lower Albian, upper Tertiary. Lower and Upper are used for formal, clearly defined divisions: Lower Cambrian, Upper Devonian, Lower Jurassic, Upper Cretaceous. See also [basal](#); [early](#), [late](#); [early](#), [lower](#); [late](#), [upper](#); [middle](#).

lowland

Capitalized as in *St. Lawrence Lowland*

low-lying

low-pressure conditions,

low-velocity zone

lowstand

low volatile coal

see [coal](#)

L-tectonite

lustre

not luster

L-wave

SPELLING AND USAGE: M

| | |
|----------------------------------|---|
| Ma | <p>(10⁶ years) <i>Ma</i> refers to the absolute age of rocks and also denotes a geological interval of time:</p> <p>The age of the basal Devonian rocks is approximately 409 Ma, and the Devonian Period lasted for about 46 Ma.</p> <p>The laboratory reported a whole-rock Rb-Sr isochron age of 325 ± 20 Ma.</p> <p>It is not necessary to add <i>ago</i> to the age, as in <i>510 Ma ago</i>. Do not use the abbreviation m.y. (or my) for millions of years.</p> |
| Maastrichtian | |
| Mackenzie Delta | <p>(Yukon and Northwest Territories), Mackenzie River valley (<i>Northwest Territories</i>), <i>Mackenzie Valley</i> (<i>British Columbia</i>)</p> |
| macroclimate, macrofossil | |
| mafic | <p>see felsic; see also salic, femic</p> |
| magnitude | <p>see intensity</p> |
| mainland | |
| major, majority | <p>Use these words when referring to numbers. Do not use them when referring to the greater part of a whole that is not numerical.</p> |
| many, much | <p>Do not use <i>much</i> when you mean <i>many</i>. <i>Much</i> takes a singular noun: <i>much quartz</i>. <i>Many</i> takes a plural noun: <i>many sills</i>. <i>Many</i> is used when referring to number (i.e. countable items):</p> <p>There were many zircons in the sample.</p> <p><i>Much</i> is used when referring to relative quantity, amount, mass, bulk, or size:</p> <p>Much of the kyanite in the sample is twinned.</p> <p>see fewer, less, lesser</p> |
| map area | <p>not map-area</p> |
| map sheet | <p>Do not confuse a <i>map sheet</i> with a <i>map area</i>: a <i>map</i>, <i>map sheet</i>, or <i>sheet</i> is a piece of paper.</p> |
| map legend | <p>Lithological descriptions in map legends and cross-sections can be given in sentences or in inverted sentences. Hyphenate unit modifiers when they follow the noun in inverted sentences:</p> <p>Quartzite, white, thin-bedded, ripple-marked, fine-grained</p> <p>see rock names</p> |
| map scale | <p>see scale</p> |
| map unit | <p>map unit CAb</p> |
| Maritime provinces | <p>Maritime provinces, the Maritimes</p> |
| massif | |
| massive | <p>Used to describe a rock or very thick bed of homogeneous material with no apparent stratification.</p> |

| | |
|---|---|
| massive-sulphide deposits | |
| matrix (pl. matrices) | |
| matrix-supported deposits | |
| meagre | <i>not</i> meager |
| medium (pl. media) | |
| medium grained | <i>see</i> coarse grained |
| medium volatile coal | <i>see</i> coal |
| mega | The prefix <i>mega</i> (symbol M) indicates the multiple 10 ⁶ . |
| megafauna, megathrust | |
| mélange | |
| melt-out till | |
| meltwaters | |
| member A | <i>not</i> Member A. Capitalized if formal, as in Franklin Member, but Franklin and Benjamin members. |
| memorandum (pl. memoranda) | |
| meridian | Capitalized if an international boundary, such as 141st Meridian; not otherwise: 142nd meridian. |
| Mesoarchean, Mesoproterozoic | |
| meta-andesite, meta-anthracite, meta-igneous | |
| metabasalt, metavolcanic | |
| metamorphics | <i>see</i> clastics ; intrusives ; volcanics , |
| meter (instrument) | Do not use for the SI unit of measurement (metre). |
| metre | <i>not</i> meter. Only the spelling <i>metre</i> is used for the SI unit in Canada. Write: Five metres or 5 m, <i>not</i> 5 metres or five m. Leave one space between the <i>m</i> and the numerical value, and do not use a period: 5 to 9 m 3–8 m (in parentheses, tables and appendices only, not in text) 25 m section 25 m thick section 100 m cliff 100 m high cliff Always write <i>30 m are</i> , <i>not</i> <i>30 m is</i> , even when referring to the upper or lower 30 m of a section: The top 20 m of the Cardium Formation are (or consist of) sandstone, <i>not</i> The top 20 m is (or consists of) sandstone. |

Other SI units, such as the millimetre (mm), centimetre (cm), and kilometre (km), are similar to the metre:

20 km traverse

micaceous

micro

The prefix *micro* (symbol μ) indicates the multiple 10^{-6}

**microclimate, microfauna,
microprocessor**

microlithotype

Means associations of macerals determined microscopically.

micrometre

μm *not* micron (μ). $1 \mu\text{m} = 1\mu$. The micron is *not* part of the SI.

micron

not used, see [micrometre](#)

**micro-organism,
micro-ornament**

mid-

Most words with the prefix *mid-* are hyphenated: mid-anterior, Mid-Atlantic Ridge, mid-continental, mid-Cretaceous, mid-length, mid-ocean-ridge basalt, mid-Paleozoic (*not* mid Paleozoic or Mid-Paleozoic), mid-valve, mid-nineteen eighties; *but* midpoint, midline, midway.

middle

This is a time term, between *early* and *late*, when applied to geochronological units, but is also a stratigraphic position term, between *lower* and *upper*, when applied to chronostratigraphic units. The initial letter of the term is in lowercase (*middle*) to indicate informal, loosely defined divisions (*middle Tertiary*), and is capitalized (*Middle*) to indicate formal, clearly defined divisions (*Middle Devonian*). See also [basal](#); [early, late](#); [early, lower](#); [late, upper](#); [lower, upper](#).

Midwest

The north-central states of the U.S.A.

mile, mileage

Mile is capitalized as in *Mile 105, Alaska Highway*.

milepost, milestone

millennium

milli

The prefix *milli* (symbol m) indicates the multiple 10^{-3}

millimetre

(*not* millimeter) see [metre](#)

millsite

mine

not capitalized even as part of a name: McWatters mine

mineable

mineralize

mineral matter

but dispersed mineral-matter

mineralogical

not mineralogic

mineralogy

Mineralogy is the study of minerals and should not be used when referring to mineral composition.

| | |
|---|--|
| minerals, mineral crystals, mineral grains | Do not write <i>olivines rimmed by pyroxene</i> , when you mean <i>olivine grains</i> (or <i>crystals</i>) <i>rimmed by pyroxene</i> . Do not write <i>opaques</i> when you mean <i>opaque minerals</i> . Reserve the plural forms of mineral names for their variants or species, e.g. pyroxenes might mean augite and hypersthene in one case, or orthopyroxene and pigeonite in another. See also intrusives ; rocks , rock bodies . |
| minimize | |
| mining division | Kamloops mining division. |
| minuscule | <i>Minuscule</i> means very small. |
| miogeocline, miogeosyncline | A <i>miogeocline</i> is a prograding wedge of shallow-water sediment along a passive continental margin. A <i>miogeosyncline</i> is the basin or geosyncline, of the type in which sedimentation is not associated with volcanism. |
| miscible | |
| Mississippian | |
| misspell | |
| model, modeller, modelling, modelled | |
| mollusc | <i>not</i> mollusk |
| more or less | This expression is overworked. Do not write that the beds are <i>more or less</i> vertical, or the situation is <i>more or less</i> unique. Nothing can be more than vertical or more than unique. <i>Almost</i> , <i>approximately</i> , or <i>virtually</i> , are more appropriate. |
| more than | see over |
| mould | <i>not</i> mold |
| mount | Capitalized as in <i>Mount Robson</i> . |
| mountainside | |
| mud | Most compound words starting with <i>mud</i> are one word: <i>mudball</i> , <i>mudbank</i> , <i>mudchip</i> , <i>mudclast</i> , <i>mudcrack</i> , <i>mudflow</i> , <i>mudlump</i> , <i>mudrock</i> , <i>mudslide</i> , <i>mudstone</i> , but <i>mud boil</i> , <i>mud drape</i> , <i>mud flat</i> , <i>mud mound</i> , and <i>sulphurous-mud flow</i> . |
| multi | Most words with the prefix <i>multi</i> are one word: multicoloured, multicyclic, multipurpose, multistage, multistoried, <i>but</i> multi-author, multi-element. |
| MVT deposit | Abbreviation for Mississippi Valley–type deposit |
| m.y. | <i>not</i> used, see Ma |
| myrmekite | |

SPELLING AND USAGE: N

nannoplankton

nano

The prefix *nano* (symbol n) indicates the multiple 10⁻⁹.

naphtha

National Topographic System (NTS)

NTS map areas are written in this form:

14-L

14-M/3

14-N/1, 2, 3

104-O/3 west half

neap tide

near

not near to

near, nearly

Near in the sense of *almost* is now usually expressed by *nearly*.

nearby, near by

Nearby is an adjective; near by is an adverb: he walked to the nearby cliff, the cliff was near by, or better still, the cliff was near.

nearshore

Nearshore is an adjective; near shore is an adverb: the nearshore sediments, the drilling platform was near shore.

negligible

neighbour, neighbouring

neither

Neoproterozoic, Neoproterozoic

next two

This is correct: avoid using *two next*.

nickel

nineteenth century

not Nineteenth Century

Nipissing

no.

The abbreviation for number(s). Leave a space between *no.* and the number. Do not use the # symbol for number(s). See also [number](#); [numerical expressions](#).

non

Most words beginning with the prefix *non* are one word: nonaligned, nonbedded, noncalcareous, nondeposition, nonglacial, nonpenetrative, nonrestrictive, nonmarine, *but* non-sequence,

non-Newtonian flow.

nonfossiliferous

The adjective *nonfossiliferous* means not containing fossils. The word *unfossiliferous* means the same thing. Both are correct, just be consistent in their usage.

| | |
|------------------------------|--|
| non sequitur | Latin, meaning <i>it does not follow</i> . In non sequiturs there is no causal connection between the pieces of information in a sentence: Born in Montreal on 20 April 1798, William Logan was knighted by Queen Victoria at Windsor Castle on 29 January 1856. The information should be given in separate sentences, or in clauses linked by <i>and</i> . |
| no one | see anyone |
| North American Plate | <i>not</i> North America Plate |
| northeast, northwest | <i>but</i> north-northeast, north-central, north-northwest-trending striae |
| North Pole | |
| north trending | <i>but</i> north-trending fault |
| northerly, northward | see westerly |
| notice, noticeable | |
| not to exceed | Except in specifications and similar work, use <i>not more than</i> . |
| number | <i>Number</i> takes a singular verb when preceded by <i>the</i> : the number of geologists has increased. When preceded by <i>a</i> or <i>any</i> , <i>number</i> takes a plural verb: a number of geophysicists have applied. See also amount ; no . |
| number of | A <i>number of</i> is inexact. Where possible, give the exact number. |
| numerals | Hyphenate compound numbers from twenty-one (twenty-first) to ninety-nine (ninety-ninth): twenty-two trenches were cut through the overburden. |
| numerical expressions | see Numerical expressions see also no ; number |
| Nunavut | <i>not</i> Nunavut Territory |

SPELLING AND USAGE: O

oblique-slip fault

observed

Encountered should not be substituted for *observed*. One *encounters* a grizzly bear, but *observes* a deformation pattern.

obtain

see [secure](#)

obvious

see [apparent](#)

occasion, occasionally

see [time terms](#)

occur

Occur is overused by many writers. A more precise meaning can be obtained by substituting words such as: *are present, are found, exist, live, stand, take place, and lie*.

occurred, occurrence

ocean-island basalt

odd

Compounds of a numeral with *odd* are hyphenated: sixty-odd.

odd-looking feature

odour, odoriferous

of

see [for](#)

off

Do not use *off of*, which is colloquial: use *off* alone. In many cases, including the following example, *from* should be used instead of *off* or *off of*: I borrowed the hammer *from* my assistant.

offlap, offset, offshore (adj.)

but off shore (adv.) *Offshore* drilling takes place *off shore*.

often

see [time terms](#)

oilfield,

but conventional oil field

oil sand(s),

but the Athabasca Oil Sands

oilwell

older

see [earlier](#), [later](#)

oldest, eldest

These are both superlatives of *old*; *oldest* being the more recent form. *Eldest* is now reserved for reference to the first-born in a family. So, also, are the comparatives *older* and *elder*.

omit, omitted

on, upon

Most authorities agree that these words are interchangeable and that the choice of one or the other depends upon convention, emphasis, or rhythm.

one

Do not use *one* as a first person pronoun. *One* should be used only as an impersonal pronoun: I (*not* One) must complete the program although I know that it is late in the season. Also, do not use the impersonal pronoun (*one*) and the personal pronoun (*I*) in the same sentence.

one half, one third,

but one-half (of something), or a one-third share

| | |
|--|--|
| one of the most | This construction is overworked; avoid it. But, if you do use this expression, do not make the mistake of using a singular verb in the relative clause that follows it. <i>One of the most difficult climbs that face the explorer</i> , illustrates the correct usage. |
| one of those who | Use a plural verb after <i>who</i> . |
| ongoing | |
| onshore (adj.), on shore (adv.) | <i>Onshore</i> wind moves the beach sand farther <i>on shore</i> . |
| on the basis of | see based on |
| op. cit. | Abbreviation of the Latin <i>opere citato</i> , meaning <i>in the work quoted</i> , and should not be confused with <i>ibid.</i> (<i>ibidem</i>) meaning <i>in the same place</i> . Use <i>op. cit.</i> to indicate a repeat of the previous reference, and <i>ibid.</i> to identify a repeat of a specific reference to a page or figure. Both <i>op. cit.</i> and <i>ibid.</i> are set in vertical (roman) type. The normal style of ESS referencing is more convenient for the reader than overuse of <i>ibid.</i> or <i>op. cit.</i> See Notes for format of publication in about Paleontology . |
| open pit (n.) | <i>but</i> open-pit mine(adj.) |
| open water | |
| oral, verbal | <i>Oral</i> means spoken, <i>by word of mouth</i> . <i>Verbal</i> means, <i>in words</i> , whether written or spoken. |
| ordinal numerals | see cardinal numerals |
| ordinarily | |
| orebody | |
| organize, organization | |
| orient, orientate | Both forms of this verb are acceptable and both give rise to the same noun, <i>orientation</i> . Things may be <i>oriented</i> or <i>orientated</i> . |
| orogen | Capitalized as in the Cordillera Orogen and Appalachian Orogen. |
| orogeny | Capitalized as in the Acadian Orogeny, Hercynian Orogeny, Laramide Orogeny, and Taconic Orogeny. |
| ostracode | <i>not</i> ostracod |
| outcrop (n. and vb.) | (<i>not</i> crop out). The limestone <i>outcrops</i> at the top of the ridge. The <i>outcrop</i> on the arête is rhyolite. |
| outflow, outgoing, outwash | |
| over, more than | <i>Over</i> can be used in the sense of <i>more than</i> or <i>greater than</i> . |
| overall | <i>Overall</i> is overused. Select one of many synonyms that are more exact: <i>absolute, aggregate, average, complete, comprehensive, entire, general, inclusive, net, overriding, supreme, total, and whole</i> . |
| overlain, underlain | (<i>not</i> overlaid or overlaid, underlaid or underlaid). The coal seam is <i>underlain</i> by fireclay and <i>overlain</i> by sandstone. |
| overlay (n.) | A transparent sheet bearing graphic or other data to be superimposed on another sheet. |

| | |
|-----------------------------|--|
| overlie (vb.) | To lie above or on (<i>not</i> overly). |
| override, overrun | |
| overthrust, overturn | |
| owing to | see due to |
| oxbow | |
| oxidized | <i>not</i> oxidised |

SPELLING AND USAGE: P

| | |
|--|---|
| Pacific coast | |
| pack ice | |
| packstone | <i>not</i> packestone |
| paleo | Words with the prefix <i>paleo</i> (<i>not</i> <i>palaeo</i>) are rarely followed by a hyphen: <i>paleoatmosphere</i> , <i>paleoceanography</i> (<i>not</i> <i>paleo-oceanography</i>), <i>paleoclimate</i> , <i>paleoenvironment</i> , <i>paleontology</i> , <i>paleovalley</i> , <i>Paleoarchean</i> , <i>Paleoproterozoic</i> , <i>Paleozoic</i> , and <i>Paleocene</i> (Note <i>lower Paleozoic</i> but <i>Lower Paleocene</i>). |
| paleontological | <i>not</i> paleontologic |
| palimpsest | |
| palsa (pl. palsen) | |
| Pangaea | <i>not</i> Pangea |
| parabituminous | |
| paraffin | |
| paragneiss | <i>but</i> para-amphibolite |
| parallel, paralleled | |
| parallel lamination | |
| parallel structures, parallel constructions | Parallel structures commonly yield economy of words, clearer meaning, and pleasing effects. <i>See</i> parallel structures in Grammar . |
| paralyze | |
| parenthesis (pl. parentheses) | |
| partially, partly | <i>Partially</i> is commonly misused for <i>partly</i> , as in the sentences: The area is <i>partially</i> drift covered; The ore bin is <i>partially</i> filled; or, The granodiorite is <i>partially</i> altered. <i>Partially</i> implies partiality, and should never be used without first considering using <i>partly</i> . <i>Partially</i> can mean <i>incompletely</i> , but for <i>in part</i> , always use <i>partly</i> . |
| participles | The two verb participles in English are the present participle (which always ends in <i>-ing</i> ; e.g. <i>standing</i>) and the past participle (ending in <i>-d</i> , <i>-ed</i> , <i>-n</i> , <i>-en</i> , and <i>-t</i> ; e.g. <i>shattered</i>). <i>See also</i> dangling participle . |
| particular | Do not misuse this strong adjective. Use it for emphasis. The noun to which it is attached should be one that you need to single out and emphasize. |
| passive voice | <i>See</i> Active and passive voice in Grammar . |
| past, passed | <i>Past</i> can be used as a noun: Fossils are relics of the <i>past</i> , as an adjective: Fossils are used to interpret <i>past</i> events, or as a preposition: The avalanche roared <i>past</i> my tent in a matter of seconds. <i>Passed</i> is the verb form: I <i>passed</i> the hammer to my assistant. |
| patch reef | |
| pay zone | |

| | |
|--|--|
| peatlands, peat moss | |
| pebble conglomerate | <i>but</i> chert-pebble conglomerate |
| pelite | |
| pellet | |
| penecontemporaneous | The prefix <i>pene</i> means <i>almost, nearly, or all but</i> . |
| penep lain (n.), penep lained (vb.) | |
| penep lation | |
| Pennsylvanian | |
| per | This is a Latin preposition and should be confined to its own language (e.g. per cent). Say eight cents a mile (<i>not</i> eight cents per mile). Some expressions do, however, demand per, such as miles per gallon and kilometres per hour. |
| perbituminous | |
| per cent (from per centum) | (<i>not</i> percent). The per cent sign (%) can be used in the text where numbers are common, but otherwise use the term <i>per cent</i> . There is no space between the numeral and the per cent sign: 10% plagioclase, but there is a space between a word or abbreviation and the sign: weight %; wt %. |
| percentage | Instead of <i>a large percentage of</i> , use <i>many</i> ; instead of <i>a small percentage of</i> , use <i>few</i> . |
| perceptible | |
| Permo-Carboniferous | When both periods are considered as one unit. |
| persistent person | In grammar, pronouns belong to three persons and occur in the singular and plural. First person: <i>I</i> (singular), <i>we</i> (plural). Second person: <i>you</i> (singular and plural). Third person: <i>he, she, it</i> (singular), <i>they</i> (plural). In modern writing, scientists are encouraged to use the first person <i>I</i> and <i>we</i> . When there are two or more authors, use <i>we found</i> instead of <i>it was found</i> (passive voice) or <i>The authors found</i> (active voice, but verbose). Use <i>I</i> for a singular author, not the editorial <i>we</i> . Be consistent in your use of person. See also Active and passive voice in Grammar . |
| personal, personnel | <i>Personal</i> means <i>individual, private</i> , <i>personnel</i> means <i>staff</i> . |
| persuasive, pervasive | <i>Persuasive</i> means <i>able to persuade</i> . <i>Pervasive</i> means <i>spreading through, saturating</i> . |
| Petro-Canada | |
| petrographic | <i>not</i> petrographical |
| petrological | <i>not</i> petrologic |
| PGE | See platinum group . |

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| phase | A <i>phase</i> means a stage of transition or development (not an aspect). A mineral is a <i>phase</i> , so that <i>mineral phase</i> is redundant. An exception applies for broad discussions or comparisons, as in <i>mineral, melt, and gas phases</i> . At one time <i>phase</i> was widely used in petrology in reference to the compositional <i>units, variants, or facies</i> of igneous intrusions, presumably with the implication that these units represent different stages of differentiation. Nowadays, though, the word is deeply entrenched in the sense of <i>phase equilibria</i> , where a phase is a solid, liquid, or gas. It seems advisable, therefore, to avoid the older usage. |
| phenoclast, phenocryst | |
| phenomenon (pl. phenomena) | |
| phosphorus (n.), phosphorous (adj.) | |
| photomicrograph | (<i>not</i> microphotograph) |
| phylum (pl. phyla) | |
| -phyric | As a suffix -phyric is usually preceded by a hyphen: <i>feldspar-phyric, hornblende-feldspar-phyric, olivine-phyric, plagioclase-phyric, pyroxene-phyric, quartz-phyric</i> . |
| pico | The prefix <i>pico</i> (symbol p) indicates the multiple 10 ⁻¹² . |
| pilotaxitic | |
| pinch-out (n. and adj.), pinch out (vb.) | |
| pipeline | |
| planar crossbedding | |
| planetable | |
| plate | Refers to full page groups of photographs or photomicrographs in paleontological reports only. Subordinate or individual illustrations within a plate are called 'figures': <p style="margin-left: 40px;">Plate 1, figures 1 to 3 (Pl. 1, fig. 1–3)</p> All other illustrations of paleontological (less than page size) or other material are called <i>Figures</i> with a capital <i>F</i> to distinguish them from the <i>figures</i> with a lower case <i>f</i> in the plates. See also figure . |
| plateau (pl. plateaus) | |
| platy | <i>not</i> platey |
| platinum group | <i>but</i> platinum-group element (PGE), platinum-group elements (PGEs) |
| pleochroic | |
| Pliensbachian | |

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|--|---|
| plus, plus/minus (\pm) | <p>In mineral assemblages and metal-deposit descriptions, there are no spaces on either side of the + or \pm.</p> <p style="padding-left: 40px;">Sedimentary rocks adjacent to the pluton contain the assemblage cordierite +biotite+chlorite\pmmuscovite, whereas mafic volcanic rocks contain hornblende+biotite\pmchlorite.</p> <p style="padding-left: 40px;">The Broad River Group hosts both the Teahan and Lumsden Cu-Zn-Pb\pmAu\pmAg deposits, and other less well known sulphide occurrences.</p> <p>In stating error ranges in age determinations, a space is used on either side of the \pm.</p> <p style="padding-left: 40px;">The Broad River Group has been intruded by dioritic to granitic plutons with ages of ca. 615 +1/-2 Ma, 625 \pm 5 Ma, 616 \pm 3 Ma, and 623 \pm 2 Ma (Watters, 1993; Barr et al., 1994).</p> |
| plutonics | Do not use <i>plutonics</i> when plutonic rocks is meant. See also clastics ; intrusives ; volcanics , metamorphics . |
| poikilitic | |
| poikiloblast | |
| point bar (n.) | <i>but</i> point-bar deposit (adj.) |
| polarize | |
| Pole, the Pole, North Pole | |
| polychaete | |
| porphyroblast | |
| porphyry, porphyritic | |
| portion | <i>Portion</i> is commonly misused for <i>part</i> , as in <i>the northern portion of the area</i> . <i>Portion</i> refers to a <i>share</i> , as in <i>your portion of the profits</i> . |
| post | Most words with the prefix <i>post</i> , meaning <i>after</i> or <i>later</i> , are not hyphenated: postdate, postdepositional, postglacial, postmagmatic, postorogenic, postoperative, but post-Mississippian, post-tectonic, post-Tertiary, and post-Paleozoic. See also pre ; syn . |
| post office | The Red Lake post office. |
| potassium feldspar | <i>not</i> potash feldspar. See also K-feldspar . |
| pothole | |
| pneumatolysis | |
| pneumotectic | |
| practicable, practical | Practicable means <i>that which can be done, feasible</i> . Practical means <i>relating to or applicable in practice</i> , the opposite of theoretical. Other opposites are <i>impracticable</i> and <i>unpractical</i> or <i>impractical</i> . |
| practically | Do not use <i>practically</i> as a substitute for <i>almost</i> , <i>nearly</i> , or <i>virtually</i> . The section may be <i>almost complete</i> , but it is not <i>practically complete</i> . It is incorrect to write that a geologist <i>practically</i> proved the hypothesis, when in fact most of the hypothesis' terms remained unexplained. |
| practice (n.), practise (vb.) | |

| | |
|---|--|
| pre | Most words with the prefix <i>pre</i> , meaning ‘before’ or ‘previous in time’, are not hyphenated: Precambrian, precede, predate, predetermined, preglacial, premetamorphic, <i>but</i> pre-Devonian brachiopods, pre-empt, pre-existing, pre-Fraser Valley Glaciation, pre-Jurassic, and pre-Wisconsinan. <i>See also</i> post ; syn . |
| precede | <i>not</i> preced |
| precision | <i>see</i> accuracy |
| prediction | <i>see</i> forecast |
| prefer, preference | |
| preferable | <i>Preferable</i> should not be used with a comparative (<i>more preferable</i> is incorrect). |
| Preoccupy | |
| prerequisite | |
| presently | <i>Presently</i> once meant immediately. It currently has two meanings: after a short time, in a little while, before long, shortly, soon; and now, at present, currently. Writers should therefore ensure that when they use <i>presently</i> , their meaning is not ambiguous. |
| presume | <i>see</i> assume |
| preventive | <i>not</i> preventative |
| principal, principle | <i>Principal</i> , as a noun or as an adjective, always means <i>chief</i> . <i>Principle</i> is used only as a noun and means a rule, law, or moral value. |
| prior to (prep.) | <i>Before</i> is preferred. <i>Prior</i> as an adjective is correct. |
| proceed | |
| prodelta, proglacial, prograde | |
| program (not programme), programmer, programming | <i>Program</i> the preferred spelling, was the common form, even in Britain, until the nineteenth century. |
| prohibit from | doing, <i>but</i> forbid to do. |
| proportion | Use this word only to refer to statistics. Instead of <i>a proportion of</i> , use <i>some</i> ; instead of <i>a large proportion of</i> , use <i>many</i> . |
| proposition | <i>Proposition</i> means something put forward for discussion, or as the basis of argument; it should not be used as a synonym for <i>plan</i> or <i>project</i> . |
| proto-Atlantic Ocean | |
| proven | Accepted usage is only in the legal sense. As the participle of <i>prove</i> , the form <i>proved</i> should be employed. <i>Proven</i> may be correctly used as an adjective. |
| provenance | |
| provided that | Introduces a stipulation (on the condition that) and is preferable to <i>providing</i> . |
| province | Capitalized as in <i>Province of Quebec</i> , <i>Churchill Province</i> . |

psammite

pseudo

As a prefix *pseudo* is rarely followed by a hyphen: *pseudobreccia*, *pseudotachylyte*.

pseudomorph

Pseudomorphs of cassiterite after orthoclase. Avoid using *pseudomorph* as a verb.

P-wave

pyroclastics

see [intrusives](#)

SPELLING AND USAGE: Q

quadrillion

This word signifies 10^{15} in North America, but 10^{24} in most other countries. Because of this ambiguity, the term *quadrillion* should not be used. *See also* [billion](#); [trillion](#).

quantity

Avoid such expressions as *the majority of*, *a good deal of*, *a lot of*, and *a number of* where the words *most* or *much* will serve for the first three expressions, and one or other of *a few*, *several*, *many*, or *numerous* will convey a more definite meaning for the last.

quartz arenite, quartz diorite, quartz porphyry

quartzofeldspathic

quartz-rich (adj.)

Québec

not Quebec City

questionable

When using the question mark to imply that something is questionable or uncertain, the symbol should always be placed in parentheses (?) to distinguish this usage from its normal use as a punctuation mark. The position of the symbol is also very important, and the following conventions should be observed:

(?) Lower Devonian questions the entire statement.

(?) Lower Devonian questions only Lower.

(?) Silurian-Devonian questions both ages.

(?) Silurian-Devonian questions only the Silurian age.

Silurian-(?) Devonian questions only the Devonian age.

(?) [Upper Bathonian]-Callovian questions only Upper Bathonian.

questionnaire

quicksand

quite

Quite is now accepted as having two opposite meanings: *fairly*, *somewhat*, and *completely*, *totally*. In the statement: The pebbles are *quite* round, *quite round* can mean nearly round or absolutely spherical. To make the intended meaning clear, replace *quite* by *fairly* or *absolutely*.

SPELLING AND USAGE: R

RADARSAT

radio

As a prefix, *radio* is rarely followed by a hyphen: *radioactive*, *radiocarbon*, *radioecology*, *radioisotope*.

radiocarbon dates

Because of the need to distinguish between uncalibrated (¹⁴C) and calibrated (cal.) radiocarbon dates, and in the absence of a standard convention, the following formats should be used for expressing these dates:

Uncalibrated:

18 000 ± 600 ¹⁴C years BP

18 ka ¹⁴C BP

Calibrated:

18 000 ± 600 cal. years BP

18 ka cal. BP

rainfall, rainwater

but rain gauge

range

The word *range* implies a minimum as well as a maximum limit. It is imprecise to say that the beds *range* up to 3 m thick, although a minimum thickness close to zero would be understood, perhaps wrongly. It is more accurate to state that the beds *range* from 50 cm to 3 m in thickness. Do not say that the beds are *between* 50 cm and 3 m in thickness, as this could mean that all the beds are of one thickness and the reader must guess exactly how thick, within the minimum and maximum values given. Also, do not say that the beds *range between* 50 cm and 3 m in thickness; the word *between* constitutes a repetition of range and should be omitted. *Bedding thickness ranges from 50 cm to 3 m*, is the correct entry.

rare earth (n.)

but rare-earth element (REE), rare-earth elements (REEs) (adj.)

rarefy

ratio

In written text use slash or colon (e.g. Pb/Zn, water: gas ratio; water-to-gas ratio also accepted).

rationale, rationalize

re

Many compound words with the prefix *re* are written as one word. A hyphen is used when two similar vowels occur together, when the appearance of the word is confusing without the hyphen, or when the word written without a hyphen has another meaning. Several words occur both with and without a hyphen, and have different meanings and pronunciations. Examples are listed as entries below in alphabetical order.

reaction

This word implies an automatic rather than an intellectual response. Reserve its use for chemical, biological, and mechanical processes, and do not use it in place of opinion or impression.

readvance, reappraise, reassess, reassign

| | |
|---|--|
| recede | |
| recognize | |
| recollect, re-collect | <i>Recollect</i> means to remember; <i>re-collect</i> means to collect again. |
| reconcilable | |
| recount, re-count | <i>Recount</i> means to narrate; <i>re-count</i> means to count again. |
| recover, re-cover | <i>Recover</i> means to get (a thing) back; <i>re-cover</i> means to cover again. |
| recreation, re-creation | <i>Recreation</i> is a pleasant pastime; <i>re-creation</i> means creation anew. |
| recurrence | |
| redbeds | |
| reducible | |
| redundant words | see Jargon and contrived or redundant words in Grammar |
| REE | see rare earth |
| re-educate | |
| reef core, reef edge, reef front, reef rock, reef wall | |
| re-entrant | |
| re-establish | |
| refer, referable, reference | <i>but</i> referred |
| reform, re-form | To <i>reform</i> is to improve, to correct; <i>re-form</i> is to form anew. |
| re-fused rocks | |
| regardless | <i>not</i> irregardless |
| reinterpret | |
| relatively | see comparatively, relatively |
| relay, re-lay | <i>Relay</i> means to receive and pass on; <i>re-lay</i> means to lay again. |
| relic, relict | <i>Relic</i> and <i>relict</i> have come to be used differently from everyday English, where both tend to be used as nouns, and where <i>relict</i> is obsolete except in legal sense. Premetamorphic minerals or textural features are said to be <i>relics</i> (noun) or <i>relict</i> (adjective) textures. In paleontology, <i>relict</i> serves as both adjective and noun. |
| replace | see substitute, replace |
| reproduction, reproducible | |
| requisition (n. and vb.) | One <i>requisitions</i> something, or makes a requisition for it, but does not <i>requisition</i> for it. |
| reserve, resource | In simple terms <i>reserves</i> (of coal, oil, gas, etc.) are proven quantities, whereas <i>resources</i> are estimated quantities. |
| resign, re-sign | <i>Resign</i> means to relinquish; <i>re-sign</i> means to sign again. |
| resistance, resistant | |
| resort, resource | <i>Resort</i> means that to which one has recourse for aid: <i>as a last resort</i> . <i>Resource</i> is a reserve upon which one can draw when necessary. |
| resource | see reserve, resource ; resort, resource |

| | |
|---|---|
| respective, respectively | |
| responsible | Do not confuse <i>responsible</i> with <i>cause</i> . People are <i>responsible</i> for events, but things <i>cause</i> them. |
| résumé | |
| retrothrust | <i>Retrothrust</i> means a fault on which reverse or thrust movement has been followed by normal displacement. |
| reversible | |
| revise | |
| rhythm, rhythmite | |
| right angle (n.) | <i>but</i> right-angled triangle (adj.) |
| right-hand rule | <i>see</i> strike and dip |
| right-lateral fault | |
| rigour, rigorous | |
| ripple bedding, ripple crosslamination | |
| ripple mark | Use this for the structure in sediments or rocks (<i>ripple</i> is unacceptable: use <i>ripple mark</i>). |
| rip-up clasts | |
| river | Capitalized as in Fraser River, Fraser River valley, <i>but</i> Fraser and Mackenzie rivers. |
| river bed, river bottom, river valley | <i>but</i> riverbank |
| road | not capitalized unless official name |
| roadbed, roadcut, roadside, roadway | |
| roches moutonnées | |
| Rock-Eval | |
| rockburst | |
| rock names | When applying unit modifiers to the names of rocks, remember that like names (i.e. names of rocks, minerals, textures, and clastic aggregates) are connected by hyphens, whereas unlike names are not: <ul style="list-style-type: none"> quartz diorite quartz porphyry biotite granite porphyritic quartz monzonite ash-flow tuff quartz diorite dyke porphyroblastic kyanite-staurolite-garnet schist hornblende-biotite granite |

feldspar megacrystic biotite-garnet gneiss

see also [map legend](#)

**rocks, magmas, melts,
liquids**

In igneous petrology, the names of rocks (particularly of the volcanic types) are commonly also applied to the magmas from which they solidified, and confusion commonly results. For example, authors write about basalt *the rock* in one sentence, and basalt *the magma* in the next, without specifically identifying them or explaining that they have switched. Try, therefore, always to make the distinction by identifying the magma, as in *andesitic magma* or *kimberlite magma*. Other ever-recurring problems concern the distinctions between *magma*, *melt*, and *liquid*. By its traditional definition, magma is molten rock material, but it can also embody crystals, rock fragments, and gas bubbles. Thus, if the liquid is the part of interest, it should be specifically identified. It is properly called *melt* if the topic concerns the formation of the magma by melting processes, but if the topic pertains to crystallization, assimilation, or related processes occurring under cooling conditions, then *magmatic liquid* (or just *liquid*) is more appropriate.

rocks, rock bodies

Geologists frequently speak (for example) of kimberlites when they mean kimberlite dykes, pipes, or diapirs; of basalts when they mean basaltic lavas or flows; and of peridotites when they mean peridotite lenses or bodies. The plural form of a rock name ideally should be reserved for reference to its variants, e.g. basalts might refer to an association of alkaline and subalkaline basalts in one situation, or to an affiliation of tholeiitic and high-alumina basalts in another. See also [intrusives](#); [minerals](#), [mineral crystals](#), [mineral grains](#).

rock type, rock unit

but rockslide

Rocky Mountains

Capitalized as in *the Canadian Rockies*, *the Rockies* (colloquial), *Rocky Mountain Foothills*, *Rocky Mountain Trench*.

roman numerals

not Roman numerals

runoff R-wave

SPELLING AND USAGE: S

sabkha

saccharoidal

salic, femic

When discussing norms, the terms *salic* and *femic* are used. *Felsic* and *mafic* are used for describing rocks. See also [felsic](#), [mafic](#).

salt-and-pepper sandstone

saltpetre

salt water, (n.)

but saltwater lagoon (adj.)

same

This word should never be used as a pronoun, as in: rocks full of fossils, and students ready to collect *same*.

sandbag, sandbank, sandbar, sandshale, sandspit

but sand flat

saussurite, saussuritization

savannah

saw-cut

scale

This is the ratio between the linear distance on a map, figure, airphoto, etc. and the corresponding distance on the surface being mapped. The scale 1:50 000 indicates that one unit on the map represents 50 000 identical units on the ground. The scale is always given in this order: 1 inch to 4 miles (not 4 miles to 1 inch). Note the difference between a *small-scale map* and a *large-scale map*. In a *small scale map*, a large area is shown in a generalized form, say at 1:250 000 scale or smaller (e.g. 1:1 000 000). A *large-scale map* shows a small area in fine detail, say at 1:25 000 scale or larger (e.g. 1:5000).

scanning electron microscope (SEM)

Schlumberger

Schmidt net

scoriaceous

seabed, seabottom, seafloor, seamount, seashore, seawater

but sea fan, sea ice. Note that most *sea* words are written as one word: seafloor spreading, but inland-sea shore.

sea level (n.)

but sea-level (adj.): The *sea-level* curve indicates major changes in *sea level*.

secede

second-order (adj.)

section 21

not Section 21

secure, obtain

Secure means to get possession of (something desirable) as the result of effort; to make safe. *Obtain* means to acquire, get.

| | |
|---|--|
| sediment(s), sedimentary rock(s) | By default, these two terms have become synonymous to some extent. In good scientific writing, however, the terms should be differentiated as follows: The word <i>sediment(s)</i> should be reserved for unconsolidated material, such as sand, gravel, or clay, and may be used in reference to recent deposits or to paleoenvironments: Mississippian deltas consisted of a variety of <i>sediments</i> . <i>Sedimentary rocks</i> are ‘consolidated sediment’. |
| sediments. Sedimentary rocks | |
| sediment-flow deposit | |
| sedimentological | |
| <i>see, see also</i> | <i>see</i> cf. , see , see also |
| self-assured, self-control, self-possessed | <i>but</i> selfish, selfless, selfsame |
| seismic wave | |
| seize | |
| selvage | |
| SEM | Abbreviation for scanning electron microscope |
| semi | Most words with the prefix <i>semi</i> are one word: semiannual, semianthracite, semiarid, semibituminous, semicircular, semiconsolidated, semiopal, semipelite, semiquantitative, <i>but</i> semi-invalid. |
| <i>sensu lato, sensu stricto</i> | These Latin phrases are set in italic type except in naming fossils. <i>see</i> Open nomenclature in About paleontology |
| separate | |
| septum (pl. septa) | |
| sequence | A formal term now accepted for a depositional package of rocks rather than a lithostratigraphic package of rocks: <i>Iperk Sequence, Mackenzie Bay Sequence</i> . |
| severely | |
| S-fold | |
| shallow-marine environment | |
| shaly (not shaley); more shaly (not shalier) | |
| sharp | <i>Sharp</i> (not sharply) is the correct adverb to use in matters of time and direction: Turn sharp right at the conglomerate outcrop. Meet me at eight o’clock sharp. |
| shear-zone-hosted deposits | |
| sheetlike | |
| shoreline | <i>but</i> shore ice |

short-term project

shortwave

shothole

SHRIMP

sic

abbreviation for Sensitive High-Resolution Ion Micro Probe

This is a Latin word meaning thus, so. It is used to inform the reader that an unlikely quotation is in fact correctly worded, and also to indicate that an error in a quotation is not to be attributed to the author(s). Write *sic* in square brackets: [*sic*] immediately after the error, as in the following item in a References list:

Prest, V.K., 1990. Laurentide ice-flow patterns: a historial [*sic*] review, and implications of the dispersal of Belcher Island erratics; *Géographie physique et Quaternaire*, v. 44, no. 2, p. 113–136.

Do not italicize [*sic*] when used as a comment to determinations in paleontology, e.g. *cherurus* [*sic*], *insignis* (i.e. error in the spelling of *Cheirurus*)

**side-by-side (adj.),
side by side (adv.)**

sideroad

side-scan sonar

sidewall sampling

siliceous

siliciclastic, siliciclastics

see [intrusives](#)

sill-like

silver-gold anomaly

similar to

not similar as, *or* similar with

SIMS

abbreviation for secondary-ion mass spectrometry

slip-off slope

slack water

slipface

small scale (n.)

but small-scale folds (adj.)

**snowbank, snowdrift,
snowfall, snowfield,
snowline, snowpack,
snowmelt**

so far as

see [as far as](#)

**soft rock (n.),
soft-rock (adj.)**

colloquial term meaning sedimentary rock

someone

see [anyone](#)

| | |
|-------------------------------|--|
| somewhat | If a mineral is somewhat altered, it is altered, and <i>somewhat</i> is unnecessary; if some attempt is being made to indicate the degree of alteration, use more specific terms, such as: completely, largely, partly, or slightly. The use of percentages is even more scientific. In the same class as <i>somewhat</i> are several other words, including: about, considerable, perhaps, probably, very, and rather: The rock is hard (<i>not</i> rather hard); Walls are straight (<i>not</i> very straight); The lode is 4 m wide, or, ranges from 3 to 4 m wide (<i>not</i> is probably about 4 m wide); The value of the gold produced was more than two million dollars (<i>not</i> was considerable). |
| southeast, southwest | <i>but</i> south-southeast, south-central, south-southwest-trending striae |
| southerly, southward | <i>see</i> westerly , westward |
| south trending | <i>but</i> south-trending fault |
| space terms | <i>see</i> time terms |
| SP-curve | spontaneous potential curve |
| spatial | |
| specialize | |
| spectrum (pl. spectra) | |
| spherical | |
| sporadic, intermittent | Whereas <i>sporadic</i> relates to distribution, <i>intermittent</i> relates to time. |
| stage | capitalized as in <i>Cenomanian Stage</i> |
| stationary, stationery | <i>Stationary</i> means not moving; <i>stationery</i> means writing materials, paper. |
| S-tectonite | |
| stillstand, stillwater | |
| stockwork | |
| stony | <i>not</i> stoney |
| strandline | <i>but</i> strand plain |
| stratabound | |
| stratigraphic | from graphic; <i>not</i> stratigraphical |
| stratovolcano | |
| stratum (pl. strata) | |
| stream bed (n.) | <i>but</i> stream-bed markings (adj.) |
| stream cut (n.) | <i>but</i> stream-cut sediments (adj.) |
| street | capitalized as in Sparks Street, <i>but</i> Sparks and Rideau streets |
| stria (pl. striae) | |

| | |
|---|---|
| strike and dip | <i>Strike and dip</i> should be recorded numerically, with degree symbols, and with the dip direction given: 020°/15°E. If you are using the right-hand rule for strike and dip, then state this at the beginning of your report and record the strike as three digits: Dip directions are always to the right of the azimuth recorded, e.g. 090°/10° indicates a dip of 10° due south. Azimuths indicating the orientation of geological features should also be recorded numerically with a degree symbol: The dyke swarm strikes 085° (<i>not</i> N85°E) <i>See also</i> azimuth ; direction . |
| strike fault, strike-slip fault | A <i>strike fault</i> is parallel to the strike of the strata involved: on a <i>strike-slip fault</i> , movement is parallel to the strike of the fault. |
| stromatactoid | |
| stromatoporoid | |
| sub | Most words formed with the prefix <i>sub</i> are one word: <i>subaerial, subalkaline, subalpine, subaqueous, subangular, subarctic, subbasement, subbasin, subbituminous, subbottom, subclass, subcommittee, subcrop, subdelta, subfacies, subgenus, subglacial, subgroup, sublittoral, suborder, subparallel, subrounded, subsurface, subtropical, subunit</i> . |
| subbituminous coal | <i>see</i> coal |
| sub-ice | |
| subprovince | Capitalized as in <i>Abitibi Subprovince</i> . |
| substitute, replace | <i>Substitute</i> means to put a person or thing in place of another. <i>Replace</i> means to take the place of another. <i>Substituted by</i> is incorrect; the correct form is <i>replaced by</i> . |
| substrate | <i>Substrate</i> is the medium on which organisms grow or to which they are attached. Do not use <i>substrate</i> as a substitute for <i>substratum</i> . |
| substratum (pl. substrata) | The layer or bed underlying the stratum or interval under discussion, and the layer underlying the true soil. |
| subsurface | Do not use <i>subsurface</i> in conjunction with well, as in <i>subsurface well section</i> . The section is either a <i>subsurface section</i> or a <i>well section</i> . |
| subterranean | |
| succeed | |
| succession | |
| such a large, such a small, etc. | <i>So large a, so small a</i> is preferable. |
| sudden, suddenness | |
| sulphur, sulphide, sulphate, sulphuric | <i>not</i> sulfur, sulfide, sulfate, sulfuric |
| suncrack | |

**supercool, superfamily,
superglacial, supersede,
supervise**

**suprafan, supraglacial
surmise**

**surplus (pl. surpluses)
susceptible**

suspended compounds

Hyphenate when a component common to successive compound adjectives is omitted:

first- and second-class fares

thin- to thick-bedded limestone

syn- to late-tectonic granodiorite

swaley crossbedding

S-wave

symmetrical, symmetry

syn

Most words with the prefix *syn*, meaning together or at the same time, are not hyphenated: *syndepositional*, *synmetamorphic*, *synorogenic*, *synsedimentary*, and *syntectonic*. A hyphen is used, however, to represent the omitted part of a solid compound — that is a compound intended as one word rather than hyphenated: *pre- to synsedimentary*. See also [post](#); [pre](#).

syneresis

not synaeresis

SPELLING AND USAGE: T

tableland

achlyte

TAI

see [thermal alteration index](#)

technique

tectonostratigraphic,
tectonometamorphic

tendency

tends to

Tends to is incorrectly used in such expressions as: the vein *tends to* split or the fault *tends to* swing to the north. Either the vein splits or it does not, and, similarly, either the fault swings or it maintains its course. The expression is used correctly in the sentence: *dispositions tend to change with age.*

tense

see [Verbs](#) in [Grammar](#)

terrain, terrane

Terrain refers specifically to a topographic surface. *Terrane* refers to the general area or body of a type or grouping of rock, by age, formations, or lithology, especially metamorphic or structural groupings: *a gneissic terrane, a Precambrian terrane, Bancroft terrane, Elzevir terrane.*

terrigenous

testhole

tetrahedron
(pl. tetrahedra)

thalweg

that, which

These relative pronouns are commonly misused. See [Pronouns](#) in [Grammar](#).

that kind, this sort, those
kinds, these sorts

The correct expressions are: this (that) kind, this (that) sort; these (those) kinds, these (those) sorts.

the

The definite article *the* is generally unnecessary in association with the names of streams, valleys, or other physiographic or topographic features, such as: (the) *Mackenzie River*, (the) *Fraser River valley*, (the) *Porcupine Creek*, (the) *Sverdrup Basin*, though the ruling is not absolute and, in some instances, custom prefers the retention of the definite article, as in: *the Rocky Mountains, the Coast Range, the Great Lakes, the Great Plains, the Prairie provinces*. Use *the* in such expressions as: *the Mackenzie, the Liard River bridge, and the Bearpaw Formation.*

**Thermal Alteration Index
(TAI)**

Do not use *Thermal Alteration Indices* when referring to a series of values or measurements; write Thermal Alteration Index values, or TAI values.

thick, thickness

The expression *the beds are 2 to 3 m thick* is preferable to *the beds are 2 to 3 m in thickness*, but no choice is allowed in the expression: *the beds vary in thickness from 2 to 3 m.*

| | |
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| thick bedded, thin bedded | Use hyphens when the compound functions as an adjective before a noun, but not elsewhere: <i>A thick-bedded sandstone</i> , as opposed to <i>a 100 m thick, bedded sandstone</i> . The unit is <i>thin bedded</i> , chiefly composed of beds less than 10 cm thick. |
| thickening-upward cycles, thickening-upward sequences | <i>not</i> upward-thickening sequences, or thickening-up sequences |
| thin section | |
| third order (n.) | third-order folds (adj.) |
| tholeiite, tholeiitic | |
| though, although | Both forms are correct, though the shorter is commonly preferred. |
| three-dimensional, third dimension | |
| thrust fault | <i>but</i> McConnell Thrust, or McConnell Fault, and McConnell thrust fault |
| tidewater | |
| till | <i>see</i> until |
| timberline | |
| time comparisons | <i>see</i> earlier , later |
| time domain (n.) | <i>but</i> time-domain electromagnetic method (adj.) |
| time-stratigraphic (adj.) | |
| time terms | <p><i>Time terms</i>, chiefly adverbs, should not be used to denote abundance or distribution (space or place terms). The time terms listed here should be replaced by the corresponding space terms that are in parentheses: always (everywhere), frequently (commonly), never (nowhere), occasionally (locally, here and there), often (commonly, in many places), seldom (rarely), since (as, because), sometimes (in places), usually (commonly, most of), when (where), and while (although, whereas).</p> <p>Some examples are shown in such sentences as:</p> <p style="padding-left: 40px;">When (Where) the fault swings to the west.</p> <p style="padding-left: 40px;">Since (As) the shaft is caved, no examination can be made.</p> <p>They are correctly used in:</p> <p style="padding-left: 40px;">When the first assays were run, anomalous gold values were returned.</p> <p style="padding-left: 40px;">Since the Gulf War, oil prices have risen steadily.</p> <p>You may visit outcrops <i>frequently</i> (not commonly).</p> <p>Sandstones are <i>commonly</i> feldspathic (not often feldspathic).</p> <p>Beach deposits may show evidence of <i>occasional</i> (or <i>frequent</i>) storm influence, but the same deposits <i>rarely</i> (or <i>commonly</i>) contain storm-generated sediments.</p> <p>Note that <i>throughout</i> can be used for time and space.</p> |

| | |
|--|---|
| Timiskaming | A geographical area in Ontario, but <i>Témiscamingue</i> a geographical area in Quebec: <i>Timiskaming Group</i> , and <i>Lake Timiskaming</i> (Ontario), <i>lac Témiscamingue</i> (Quebec). See Names of pan-Canadian significance . |
| TIMS | Abbreviation for thermal-ionization mass spectrometry |
| titles | Do not use titles such as <i>Dr.</i> , <i>Mr.</i> , etc. |
| tonne | Use the SI symbol t. 1 tonne = 1.1 short tons. |
| topographic | <i>not</i> topographical |
| topsoil | |
| toward, towards | Either is acceptable. Be consistent. |
| township | Capitalized as in Fitzroy Township, and the Eastern Townships, <i>but</i> Tiny and Tay townships |
| traceable | |
| transatlantic, transcontinental | <i>but</i> trans-Arctic |
| transfer, transferable, transferred, transferring | |
| transpire | In its nontechnical sense, <i>transpire</i> means become known (<i>not</i> happen). |
| travel, travelled | |
| traveltime, two-way traveltime | |
| treatise, pl. treatises | |
| treeline | |
| trickle-down theory | |
| tricolpate, tricolporate | The adjective <i>tricolpate</i> refers to pollen with three colpae without pores. The adjective <i>tricolporate</i> refers to pollen with three colpae, each of which has a central pore. |
| trillion | Do not use the term <i>trillion</i> . This word signifies 10 ¹² in North America, but 10 ¹⁸ in most other countries. See also billion ; quadrillion . |
| trimline | |
| tsunami | |
| tuff breccia | |
| T-wave | |
| twentieth century | <i>not</i> Twentieth Century |
| twenty-first century | <i>not</i> Twenty-First Century |
| two-person tent | |
| type section | |
| Type III kerogen | |
| typical | see characteristic |

SPELLING AND USAGE: U

ultrabasic, ultramafic

Ultrabasic igneous (metamorphic) rocks have a low (<45%) silica content. *Ultramafic* igneous (metamorphic) rocks are composed chiefly of mafic minerals, e.g. monomineralic rocks of olivine or pyroxene.

Not all ultrabasic rocks are ultramafic. Anorthosite, composed of anorthite, admittedly a rare terrestrial rock, is ultrabasic ($\text{SiO}_2 < 45\%$) but not ultramafic. Pyroxenites are ultramafic, but are not ultrabasic because of their high SiO_2 content.

ultraviolet

under

see [below](#)

undercut, underestimate, underwater

underlain, underlie, underlying

see [overlain](#)

undulose extinction

Use *undulose extinction* not *undulatory extinction*.

undulous

Undulous means of an undulating nature.

unfossiliferous

see [nonfossiliferous](#)

unidirectional

unique

There are no degrees of uniqueness. It is incorrect to say *rather unique*, *somewhat unique*, *very unique*, *fairly unique*, etc. Many other adjectives are also absolute, and should not be modified by a comparative adverb — although *almost* and *nearly* are sometimes applicable. These words include *absolute*, *basic*, *empty*, *entire*, *essential*, *fatal*, *final*, *fundamental*, *necessary*, *perfect*, *primary*, *pure*, *right*, *round*, *square*, *supreme*, *ubiquitous*, *unanimous*, *universal*, and *wrong*.

see [Adjectives](#) in [Grammar](#)

unit A

not Unit A

Universal Transverse Mercator (UTM)

UTM co-ordinates are written in this form:

UTM 11U, 428800E, 5583400N

If the map sheet is given, e.g. 82-L/8, then it is not necessary to give the zone (11U).

unparalleled

until, till

These are variations of the same preposition or conjunction. Use *until*.

up

Most compound words starting with up are one word: updip, upsection, upslope, upstream, upvalley, *but* up-ice.

upon

see [on](#)

upper

see [late](#), [upper](#); [lower](#), [upper](#)

upward

Upward (not upwards) is the preferred spelling when *to or toward a higher position or plane* is the intended meaning, as in:

The conglomerate grades *upward* into sandstone and siltstone.

The chert content decreases *upward*.

usable**use, utilize**

There is little difference in meaning between these words, but *use* is preferable. *Utilize* conveys the meaning that good use was made of something not originally designed for the purpose, as in *For a bathtub they utilized an old 45 gallon drum*.

U-shaped

SPELLING AND USAGE: V

| | |
|--|--|
| valence | <i>see</i> chemical symbols |
| valley | Check capitalization with Geographical Names Board of Canada . |
| valley bottom, valley fill, valley floor | <i>but</i> valleyside |
| vapour | |
| variable, varied, varying, various | Do not misuse these words. A sandstone does not contain <i>variable</i> (or <i>varying</i>) amounts of chert — this usage implies that the sandstone has say 10% chert one day and 20% chert the next. The correct word to use in this context is <i>varied</i> or <i>various</i> . |
| variegated | |
| vein-dyke | |
| verbal | <i>see</i> oral |
| very | Nine times out of ten the word <i>very</i> can be omitted without loss, and, often, its use defeats its purpose. |
| via | means <i>by way of</i> |
| vigour, vigorous | |
| village | Capitalized as in Village of Carp. |
| viz. | Abbreviation of the Latin <i>videlicet</i> , meaning it is permitted to see or namely. The abbreviation <i>viz</i> is used when listing items just mentioned or hinted at. <i>See also</i> e.g. ; i.e. |
| volcaniclastic | |
| volcanics, metamorphics, clastics | These and similar words are not acceptable in geological writing. Use volcanic rocks, metamorphic rocks, clastic rocks, clastic material, etc. <i>See also</i> clastics ; intrusives . |
| volcano, volcanoes, volcanism | |
| volcanogenic massive-sulphide deposits | |
| volcano-sedimentary, volcano-sulphide, volcano-tectonic | |
| V-shaped | |

SPELLING AND USAGE: W

| | |
|--|---|
| wackestone | |
| wall rock (n.) | <i>but</i> wall-rock xenoliths (adj.) |
| -ward, -wards | Use <i>-ward</i> in words with these endings: facing northward, a northward trend. |
| washout (n.), wash out (vb.) | |
| watercourse, waterfall, waterline, waterlogged, watershed, waterway | |
| water gap, water level, water table, water well | |
| wave base, wave form | <i>but</i> wavelength |
| wave ripple mark | |
| wavy | <i>not</i> wavey |
| we | See I ; see also Active and passive voice in Grammar . |
| weather conditions | The word <i>conditions</i> is unnecessary. |
| Web, Web site, Web-based software | <i>but</i> webmaster, webcam |
| well bedded, well defined, well developed, well known, well rounded, well sorted (adj.). | Omit the hyphens in these compound adjectives: well defined hypothesis well developed feature well known author |
| Wenlock (Series/Epoch) | <i>not</i> Wenlockian |
| west-central, west-southwest | |
| westerly, westward (adj. and adv.) | Except for expressing wind direction, in which context it means <i>blowing from the west</i> , do not use <i>westerly</i> , as it can mean either from the west or toward the west; if you mean toward the west, use <i>westward</i> , which can have no other meaning. |
| Western Canada, | <i>but</i> western Ontario |
| when | see if , when |
| which | see Pronouns in Grammar |
| whichever | |
| while, whilst | Although both forms are correct, <i>while</i> is commonly preferred. |
| Whiterock (Series/Epoch), Whiterockian (Stage/Age) | |
| who, whom | <i>Who</i> is the subject of a verb; <i>whom</i> is the object of a verb: Who will be sent to the field camp? Whom will she choose as a field assistant? Tell me who was responsible. |

Tell me whom she selected.

whole, wholesome, wholly

whole-rock analysis

wide

Canada-wide, industry-wide, province-wide, *but* basinwide, nationwide, worldwide. *See also* [broad](#), [wide](#).

widespread

windblown, windfall

but wind gap

with

With is frequently misused, especially for *and*. *See also* [Prepositions in Grammar](#).

WWI, WWII

World War I, World War II

SPELLING AND USAGE: X

x axis

**xenoblast, xenocryst,
xenolith**

X-ray

SPELLING AND USAGE: Y

y axis

year

abbreviated as *a* in scientific texts

younger

see [earlier](#), [later](#)

Yukon

not Yukon Territory or the Yukon

SPELLING AND USAGE: Z

z axis

Z-fold

zinnwaldite