



Natural Resources  
Canada

Ressources naturelles  
Canada

**CANADIAN GEOSCIENCE MAP 30**  
**GEOLOGY**  
**TECTONIC ASSEMBLAGE**  
**MAP OF ALEXANDRA FIORD**

central Ellesmere and eastern Axel  
Heiberg islands, Nunavut



**Map Information  
Document**

**Preliminary**

**Geological Survey of Canada  
Canadian Geoscience Maps**

**2015**

**Canada** 

## **PUBLICATION**



### **Map Number**

Natural Resources Canada, Geological Survey of Canada  
Canadian Geoscience Map 30 (Preliminary)

### **Title**

Geology, Tectonic assemblage map of Alexandra Fiord,  
central Ellesmere and eastern Axel Heiberg islands, Nunavut

### **Scale**

1:500 000

### **Catalogue Information**

Catalogue No. M183-1/30-2013E-PDF  
ISBN 978-1-100-22346-9  
doi:10.4095/292827

### **Copyright**

© Her Majesty the Queen in Right of Canada, as represented  
by the Minister of Natural Resources Canada, 2015

### **Recommended Citation**

Harrison, J.C., Gilbert, C., Lynds, T., Ford, A., Thorsteinsson, R., Frisch, T.,  
de Freitas, T.A., and Kerr, J.W., 2015. Geology, Tectonic assemblage map of Alexandra  
Fiord, central Ellesmere and eastern Axel Heiberg islands, Nunavut; Geological Survey  
of Canada, Canadian Geoscience Map 30 (preliminary), scale 1:500 000.  
doi:10.4095/292827

## **ABSTRACT**

This map and the related geodatabase illustrate the bedrock geology of central Ellesmere Island and eastern Axel Heiberg Island. Major features of the area include high-grade Paleoproterozoic metasedimentary and granitoid rocks of the Inglefield Orogen, unconformable lower Paleozoic shelf (and some deep-water strata) of the Central Ellesmere fold belt, the foreland clastic wedge of the Ellesmerian Orogen, unconformable Upper Paleozoic and Mesozoic strata of the Sverdrup Basin, and diverse Paleogene clastic rocks derived from the Eurekan Orogen. The Silurian and Devonian interval includes the depositional record of Bache Uplift.

## RÉSUMÉ

Cette carte et la géodatabase qui s'y rapporte documentent la géologie du substratum rocheux dans le centre de l'île d'Ellesmere et l'est de l'île Axel Heiberg. Les principales entités géologiques de la région comprennent des roches métasédimentaires et des roches granitoïdes paléoprotérozoïques à degré élevé de métamorphisme de l'orogène d'Inglefield, des strates discordantes de la plate-forme continentale (et quelques strates d'eau profonde) du Paléozoïque inférieur de la zone de plissement de Central Ellesmere, le prisme de roches clastiques d'avant-pays de l'orogène ellesmérien, des strates discordantes du Paléozoïque supérieur et du Mésozoïque du bassin de Sverdrup, et diverses roches clastiques du Paléogène dérivées de l'orogène eurékien. L'intervalle du Silurien et du Dévonien témoigne de l'histoire sédimentaire du soulèvement de Bache.

## ABOUT THE MAP

### General Information

Authors: J.C. Harrison, C. Gilbert, T. Lynds, A. Ford, R. Thorsteinsson, T. Frisch, T.A. de Freitas, and J.W. Kerr

Geological compilation by J.C. Harrison

Source map geology (senior authors) by R. Thorsteinsson, T. Frisch, J.C. Harrison, T.A. de Freitas, and J.W. Kerr

GIS development by C. Gilbert and T. Lynds

Spatial data capture by Gismo Solutions Ltd. (Edmonton)

Cartography by M.J. Baldock

Critical review by L. Currie

Initiative of the Geological Survey of Canada, conducted under the auspices of the Tri-Territorial Project as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program.

Map projection Lambert Conformal Conic, standard parallels 79°30'N and 77°30'N. North American Datum 1983

Base map at the scale of 1:250 000 from Natural Resources Canada, with modifications.

Proximity to the North Magnetic Pole causes the magnetic compass to be erratic in this area.

Mean magnetic declination 2015, 52°11'W decreasing 71.2' annually.

Readings vary from 44°02'W in the SW corner to 53°03'W in the NE corner of the map.

This map is not to be used for navigational purposes.

Title photograph: Paleoproterozoic basement gneisses, Makinson Inlet, southeastern Ellesmere Island. Photograph by J.C. Harrison. 2013-066

The Geological Survey of Canada welcomes corrections or additional information from users.

Data may include additional observations not portrayed on this map.  
See documentation accompanying the data.

This publication is available for free download through  
GEOSCAN (<http://geoscan.nrcan.gc.ca/>).

Preliminary publications in this series have not been scientifically edited.

### **Map Viewing Files**

The published map is distributed as a Portable Document File (PDF), and may contain a subset of the overall geological data for legibility reasons at the publication scale.

### **Cartographic Representations Used on Map**

This map utilizes ESRI Cartographic Representations in order to customize the display of standard GSC symbols for visual clarity on the PDF of the map only. The digital data still contains the original symbol from the standard GSC symbol set. The following legend features have Cartographic Representations applied:

Fault: approximate, showing downthrown side

Fault: assumed, showing downthrown side

Thrust fault: approximate, teeth indicate upthrust side

Thrust fault: assumed, teeth indicate upthrust side

Diabase dyke

Diabase dyke (solid circle indicates downthrown side of fault intruded by dyke)

# ABOUT THE GEOLOGY

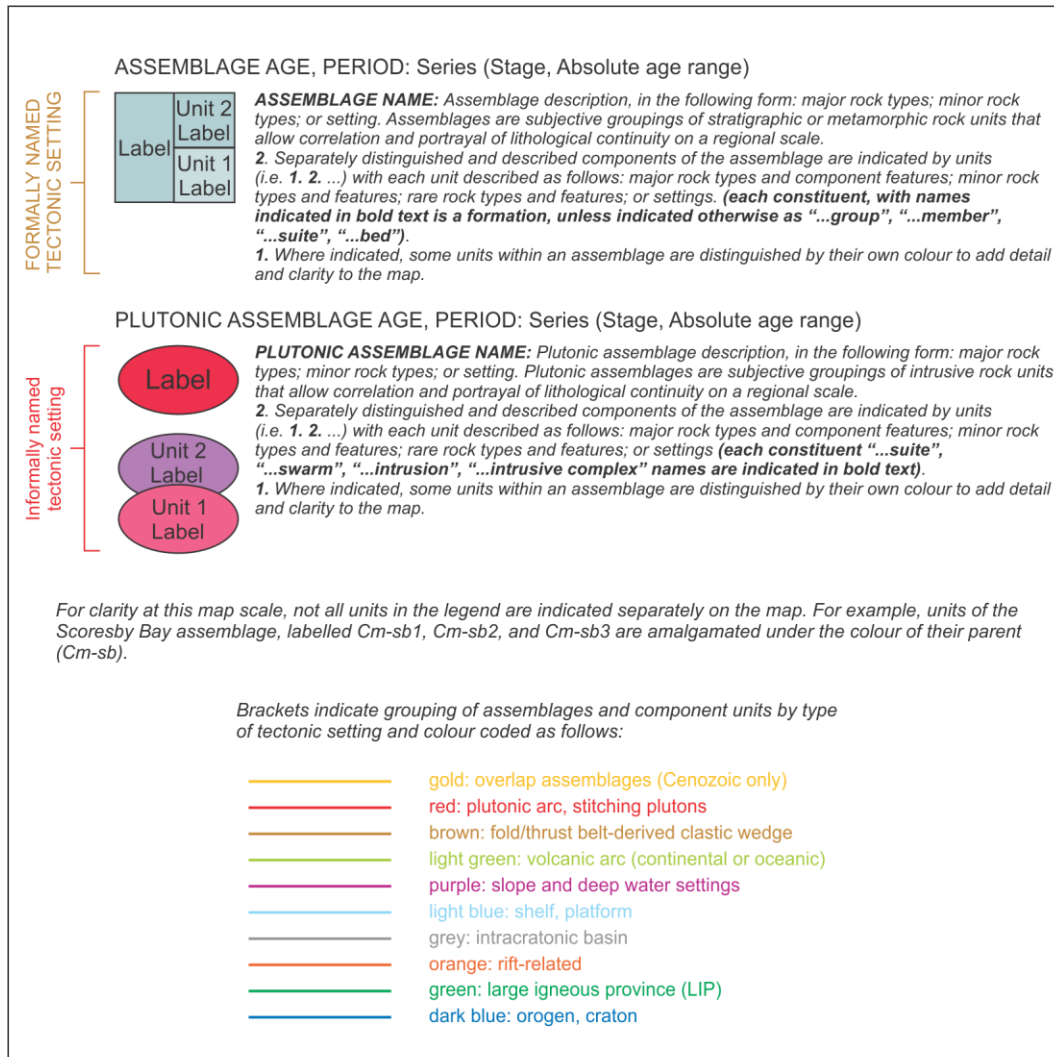


Figure 1. Explanation of map unit features.

## References

- Dawes, P.R., 1997. The Proterozoic Thule Supergroup, Greenland and Canada: history, lithostratigraphy and development; Geological Survey of Greenland Bulletin 174, 150 p.
- Dawes, P.R., 2006. Explanatory notes to the Geological map of Greenland, 1:500 000, Thule, Sheet 5; Geological Survey of Denmark and Greenland Map Series 2, 97 p.
- de Freitas, T.A. and Mayr, U., 2007. Geology, Sawyer Bay, Ellesmere Island, Nunavut; Geological Survey of Canada, Map 2103A, scale 1:125 000. doi:10.4095/223620
- de Freitas, T.A., Harrison, J.C., and Mayr, U., 1997. Sequence stratigraphic correlation chart of the lower Paleozoic Franklinian succession, Canadian Arctic Islands and parts of north Greenland; Geological Survey of Canada, Open File 3410. doi:10.4095/208912

de Freitas, T.A., Mayr, U., Harrison, J.C., Piepjohn, K., and Tessensohn, F., 2007. Geology, Dobbin Bay, Ellesmere Island, Nunavut; Geological Survey of Canada, Map 2101A, scale 1:125 000. doi:10.4095/223548

Dewing, K. and Nowlan, G.S., 2004. Correlation chart of Cambrian and Ordovician stratigraphy, Arctic Islands, Nunavut, Canada; Geological Survey of Canada, Open File 1837. doi:10.4095/214889

Dewing, K., Mayr, U., Harrison, J.C., and de Freitas, T.A., 2008. Upper Neoproterozoic to Lower Devonian stratigraphy of northeast Ellesmere Island, in Geology of northeast Ellesmere Island adjacent to Kane Basin and Kennedy Channel, Nunavut; (ed.) Mayr, U.; Geological Survey of Canada, Bulletin no. 592; p. 31–108; 1 CD-ROM. doi:10.4095/226135

Embry, A.F., 1983. Stratigraphic subdivision of the Heiberg Formation, eastern and central Sverdrup Basin, Arctic Islands; in Current research, part B; Geological Survey of Canada, Paper no. 83-1B; p. 205–213. doi:10.4095/109286

Embry, A.F., 1984a. The Wilkie Point group [Lower-Upper Jurassic], Sverdrup Basin, Arctic Islands; in Current research: part B; Geological Survey of Canada; Geological Survey of Canada, Paper no. 84-1B; p. 299–308. doi:10.4095/119557

Embry, A.F., 1984b. The Schei Point and Blaa Mountain groups [middle-upper Triassic], Sverdrup Basin, Canadian Arctic Archipelago in Current research, part B; Geological Survey of Canada, Paper no. 84-1B; p. 327–336. doi:10.4095/119557

Embry, A.F., 1984c. Stratigraphic subdivision of the Roche Point, Hoyle Bay and Barrow formations [Schei Point group], western Sverdrup Basin, Arctic Islands; Current research, part B; Geological Survey of Canada, Paper no. 84-1B; p. 275–283. doi:10.4095/119557

Embry, A.F., 1985. Stratigraphic subdivision of the Isachsen and Christopher formations [Lower Cretaceous], Arctic Islands; in Current research, part B; Geological Survey of Canada, Paper no. 85-1B; p. 239–246. doi:10.4095/120220

Embry, A.F., 1991a. Chapter 10: Middle-Upper Devonian Clastic Wedge of the Arctic Islands; in Geology of the Inuitian Orogen and Arctic Platform of Canada and Greenland; (ed.) H.P.Trettin; Geological Survey of Canada, Geology of Canada Series no. 3; p. 263–279. doi:10.4095/133959

Embry, A.F., 1991b. Chapter 14: Mesozoic History of the Arctic Islands; in, Geology of the Inuitian Orogen and Arctic Platform of Canada and Greenland; (ed.) H.P.Trettin; Geological Survey of Canada, Geology of Canada Series no. 3; p. 371–433. doi:10.4095/133959

Frisch, T., 1984a. Geology, Makinson Inlet, District of Franklin, Northwest Territories; Geological Survey of Canada, Map 1573A, scale 1:250 000. doi:10.4095/126421

Frisch, T., 1984b. Geology, Prince of Wales Mountains, District of Franklin, Northwest Territories; Geological Survey of Canada, Map 1572A, scale 1:250 000. doi:10.4095/126420

Frisch, T., 1988. Reconnaissance Geology of the Precambrian Shield of Ellesmere, Devon and Coburg islands, Canadian Arctic Archipelago; Geological Survey of Canada, Memoir 409; 102 p. doi:10.4095/126419

Harrison, J.C. and de Freitas, T.A., 2007. Geology, Agassiz Ice Cap, Ellesmere Island, Nunavut; Geological Survey of Canada, Map 2104A, 1 CD-ROM. doi:10.4095/223622

Harrison, J.C., Thorsteinsson, R., and de Freitas, T.A., 2009. Phanerozoic bedrock geology, Strathcona Fiord area, Ellesmere Island, Nunavut; Geological Survey of Canada, Map 2141A, scale 1:125 000. doi:10.4095/226428

Harrison, J.C., Mayr, U., McNeil, D.H., Sweet, A.R., McIntyre, D.J., Eberle, J.J., Harington, C.R., Chalmers, J.A., Dam, G., and Nøhr-Hansen, H., 1999. Correlation of Cenozoic sequences of the Canadian Arctic region and Greenland; implications for the tectonic history of northern North America; Bulletin of Canadian Petroleum Geology vol. 47, no. 3; p. 223–254.

Kerr, J.W., 1976. Stratigraphy of Central and eastern Ellesmere Island, Arctic Canada, Part III. Upper Ordovician (Richmondian), Silurian and Devonian; Geological Survey of Canada, Bulletin 260. doi:10.4095/103963

Kerr, J.W. and Thorsteinsson, R., 1972. Geology, Baumann Fiord, District of Franklin; Geological Survey of Canada, Map 1312A, scale 1:250 000. doi:10.4095/109134

Lee, C.C., Lehnert, O., and Nowlan, G.S., 2008. Sedimentology, stratigraphy, and clast biostratigraphy of Cretaceous and Tertiary strata, northeastern Ellesmere Island, Nunavut; in Geology of northeast Ellesmere Island adjacent to Kane Basin and Kennedy Channel, Nunavut; (ed.) U. Mayr; Geological Survey of Canada, Bulletin no. 592; p. 115–167, 1 CD-ROM. doi:10.4095/226135

Mayr, U. and Okulitch, A.V., 1994. Geology, Baad Fiord-Cardigan Strait, District of Franklin, Northwest Territories; Geological Survey of Canada, Map 1840A; 1 sheet. doi:10.4095/194487

Mayr, U., Packard, J.J., Goodbody, Q.H., Okulitch, A.V., Rice, R.J., Goodarzi, F., and Stewart, K.R., 1994. The Phanerozoic geology of southern Ellesmere and North Kent islands, Canadian Arctic Archipelago, (Craig Harbour, Baad Fiord, and eastern part of Cardigan Strait map areas, NTS 49A, 49B, and 59A); Geological Survey of Canada, Bulletin 470; 310 p. doi:10.4095/195161

Miall, A.D., 1986. The Eureka Sound Group (Upper Cretaceous – Oligocene), Canadian Arctic Islands; Bulletin of Canadian Petroleum Geology, vol. 34, no. 2, p. 240–270.

Miall, A.D., 1991. Chapter 15: Late Cretaceous and Tertiary Basin Development and Sedimentation, Arctic Islands, in *Geology of the Innuitian Orogen and Arctic Platform of Canada and Greenland*; (ed.) H.P. Trettin; Geological Survey of Canada, *Geology of Canada Series no. 3*; p. 437–458. doi:10.4095/133959

Ricketts, B.D., 1994. Basin analysis, Eureka Sound Group, Axel Heiberg and Ellesmere islands, Canadian Arctic Archipelago; Geological Survey of Canada, *Memoir 439*; 126 p. doi:10.4095/194814

Thorsteinsson, R., 1971a. Geology, Eureka Sound North, District of Franklin; Geological Survey of Canada, *Map 1302A*, scale 1:250 000. doi:10.4095/109125

Thorsteinsson, R., 1971b. Geology, Greely Fiord West, District of Franklin; Geological Survey of Canada, *Map 1311A*, scale 1:250 000. doi:10.4095/109133

Thorsteinsson, R., 1971c. Geology, Strand Fiord, District of Franklin; Geological Survey of Canada, *Map 1301A*, scale 1:250 000. doi:10.4095/123319

Thorsteinsson, R., 1972a. Geology, Glacier Fiord, District of Franklin; Geological Survey of Canada, *Map 1304A*, scale 1:250 000. doi:10.4095/109127

Thorsteinsson, R., 1972b. Geology, Eureka Sound South, District of Franklin; Geological Survey of Canada, *Map 1300A*, scale 1:250 000. doi:10.4095/123320

Thorsteinsson, R., 1972c. Geology, Canon Fiord, District of Franklin; Geological Survey of Canada, *Map 1308A*, scale 1:250 000. doi:10.4095/108009

Thorsteinsson, R., 1974. Carboniferous and Permian stratigraphy of Axel Heiberg Island and western Ellesmere Island, Canadian Arctic Archipelago; Geological Survey of Canada, *Bulletin 224*; 115 p. doi:10.4095/103460

Thorsteinsson, R., Harrison, J.C., and de Freitas, T.A., 2009. Phanerozoic bedrock geology, Vandom Fiord area, Ellesmere Island, Nunavut; Geological Survey of Canada, *Map 2142A*, 1 CD-ROM. doi:10.4095/226426

Trettin, H.P., 1976. Reconnaissance of Lower Paleozoic Geology, Agassiz Ice Cap To Yelverton Bay, northern Ellesmere Island; *Report of Activities Part A*; Geological Survey of Canada, *Paper no. 76-1A*; p. 431–444. doi:10.4095/119844

Trettin, H.P., 1994. Pre-Carboniferous geology of the northern part of the Arctic Islands, Hazen Fold Belt and adjacent parts of central Ellesmere Fold Belt, Ellesmere Island; Geological Survey of Canada, *Bulletin 430*; 260 p. doi:10.4095/194326

Trettin, H.P., Mayr, U., Long, G.D.F., and Packard, J.J., 1991. Chapter 8: Cambrian To Early Devonian Basin Development, Sedimentation, and Volcanism, Arctic Islands; *Geology of the Innuitian Orogen and Arctic Platform of Canada and Greenland*; (ed.) H.P. Trettin; Geological Survey of Canada, *Geology of Canada Series no. 3*; p. 165–238. doi:10.4095/133959



## **Author Contact**

Questions, suggestions, and comments regarding the geological information contained in the data sets should be addressed to:

Christopher Harrison  
Geological Survey of Canada  
481 - 601 Booth Street  
Ottawa ON  
K1A 0E8  
Christopher.Harrison@NRCan-RNCan.gc.ca

## **Coordinate System**

Projection: Lambert Conformal Conic  
False Easting: 0.0°  
False Northing: 0.0°  
Central\_Meridian: -79.0  
Standard Parallel 1: 77.5  
Standard Parallel 2: 79.5  
Latitude Of Origin: 40.0°  
Units: metres  
Horizontal Datum: NAD83  
Vertical Datum: mean sea level

## **Bounding Coordinates**

Western longitude: 88°00'00"W  
Eastern longitude: 70°00'00"W  
Northern latitude: 80°00'00"N  
Southern latitude: 77°00'00"N

## **Data Model Information**

This Canadian Geoscience Map does not conform to the Bedrock Mapping Geodatabase Data Model v.3.1. Therefore, some of the feature classes and feature attributes require explanation. Consult "Explanation\_of\_attributes.rtf" in Data folder for complete description of the feature classes and feature attributes.

## **LICENCE AGREEMENT**

View the licence agreement at <http://data.gc.ca/eng/open-government-licence-canada>

## **ACCORD DE LICENCE**

Voir l'accord de licence à <http://donnees.gc.ca/fra/licence-du-gouvernement-ouvert-canada>