DESCRIPTIVE NOTES

INTRODUCTION

Ellef Ringnes Island is between the centre of the Sverdrup Basin, a Paleozoic to early Cenozoic sedimentary basin that spans the Queen Elizabeth Islands, Nunavut and NWT. The bedrock of the island consists of Jurassic and Cretaceous clastic rocks that are penetrated by evaporite diapirs and intruded by mafic sills and dykes. The northeastmost end of the island is covered by a veneer of Neogene sediments of the Arctic Coastal Plain. Bedrock exposures are sparse, but the island is well-mapped because of approximately 17 major gas and/or oil fields in the Sverdrup Basin, with 8 of these fields occurring on or immediately offshore of Ellef Ringnes Island.

Objectives of new bedrock mapping on Ellef Ringnes Island are to develop a more robust geological framework for integration of surface and subsurface datasets, to provide a new, digital, seamless bedrock map for the Geological Survey of Canada's Canadian Geoscience Map series. These goals are accomplished by application of modern stratigraphic nomenclature, more detailed mapping than previous work, and analysis of structures and collected rock samples. Seven weeks of fieldwork during the summers of 2011 and 2012 were followed by compilation to produce this preliminary map. Previous work includes that of Thorsteinsson (1963), Fortier et al. (1963), Thorsteinsson and Tozer (1970), Balkwill (1983), the geology of King Christian Island is from Balkwill and Roy (1977). Primary differences from Stott's map (1968) are application of current stratigraphic terminology, and an increase in detail of contacts and structures. Supporting photographs are in Evenchick and Hayward (2012), and subsequent papers will focus on refining contacts, exploring the nature of igneous rocks, further identification and analysis of faults and folds, and inclusion of digital datasets.

COMPILATION METHODS

Bedrock contacts were refined based on analysis of several remote datasets because for field season is short (see Stott, 1968). In addition, surface exposures are poor as a result of frost-heaving, creep, erosion of unconsolidated sand units, and because the bedrock is commonly covered by a thin layer of eroded bedrock mixed with clay. Fortunately, the bedrock geology is displayed well at a large scale owing to the lack of vegetation, the paucity of surficial deposits, and the fact that the Arctic Ocean has not been transgressed since the last glaciation, so there are no lakes of Wisconsinan aging sites. Data used in the compilation dates to orthophoto features from Stott (aerial photo lineaments, geo-referenced and ortho-rectified aerial photographs), field and airphoto notes of previous workers (D.F. Stott, H.R. Balkwill, and K. J. Roy), more than 12,000 geo-tagged photos taken during the author's fieldwork, Landsat 7 imagery (GeoCover, 2000, Edition 2, Mosaic, Global Land Survey, 2005), ASTER imagery (L1A, Band, parachronistic, C.A. Brent, unpublished) and multispectral (S.F. Mazzi, unpublished) ortho-image composites from released images (useful for features >30m), Geo-referenced airphotos (provided additional bias in many areas (useful for features <10m), QuickBird scenes (useful for features <10m), Google Earth imagery (useful for features <10m), Bing Maps imagery (useful for features <10m), Landsat 8 imagery (L1T, Band, unpublished, useful for features <30m) for parts of the southeast island (provide spectrachron detail of bedding traces, structures, and stratigraphy, Landsat band combinations and image enhancements (J. Harris, unpublished) were used after the most reliable bedrock contacts were established, ASTER GDEM (v2) hillshades (used to correlate well with the bedrock geology but do not have adequate spatial resolution to improve significantly on the previous work (Stott, 1968).

The level of detail in the data described above, and the ability to integrate datasets in a GIS, have enabled compilation and interpretation of bedrock contacts at a much more detailed level than Stott (1968) could achieve. Nevertheless, the map is a reconnaissance compilation of surface geology to interpretation of subsurface data. The useful scale of this compilation ranges from 1:30,000 to 1:100,000. The useful scale for most of the southern three-quarters of the island is 1:50,000 or better (excluding surficial deposits).

GENERAL GEOLOGY

Sverdrup Basin deposition began in Carboniferous, and shelf carbonates and basinal shales were dominant until mid-Permian. Notably, a thick Carboniferous to Permian evaporite sequence was deposited throughout much of the basin. Sedimentation was almost continuous from Permian to Paleogene by four major transgressive-regressive cycles of siliciclastic deposition, resulting in a maximum preserved thickness of 13 km. The middle two of these cycles form the bulk of bedrock on Ellef Ringnes Island. There are several different associations of folds and faults, which are related to the different lithostratigraphic units involved in deformation. For more details, see Stott (1968), Balkwill (1983), Fortier et al. (1963), Gould and McMillan (1964), Stott (1968), Hopkins and Balkwill (1973), Balkwill (1974), and Balkwill and Hopkins (1976).

STRATIGRAPHY

Rocks of the Sverdrup Basin on Ellef Ringnes Island are Carboniferous evaporite and minor carbonate of the Otto Fiord and Nansen(?) formations (respectively). All occurrences but one are within seven evaporite diapiric structural/stratigraphic complexes. The diapirs are largely anhydrite, gypsum, and salerite, but include up to 30% surface exposure of mafic intrusive and carbonate rocks. Small and large masses of dolomite and limestone are present within the diapirs, and are commonly brecciated and cut by veins of calcite and gypsum. Most of the diapirs are flanked by belts of carbonate and carbonate breccia along the margins of the diapirs. Evaporite diapirs outcrop the highest and most rugged topography on the island, suggesting relatively young uplift. Whether this included movement of the diapirs relative to host rocks, and/or diapiric relative movement, is unknown. The diapirs are commonly associated with faults, folds, and mafic sills. The largest evaporite diapir, Schei Dome, is distant from a diapir is 10-15 km east-northeast of the evaporite at Heiskie Dome. Two overlapping lenses of gypsum and carbonate (CCed, each 4 to 6 km thick, are concordant with bedding in the Christopher Fm. Three bodies 200 to 500 m farther southeast are ruby-weathering magnetite-rich diabase (Jurassic?) sills. Other diapirs are at Isachsen, Cape Allison (A. Springer, K. Dewing, and R. Sharp, pers.comm., 2010-2011). The lenses may be sills of evaporite and the other bodies may be diapirs.

Jurassic and Cretaceous clastic rocks occur over most of the island. In this compilation we apply the terminology of Balkwill et al. (1977). Lower Jurassic Kingmi Fm is assigned to the Ringnes Formation, and Middle Jurassic Bjarmian is assigned to the Bjarmian Formation, modified to fine. Pre-different stratigraphic levels are exposed as a result of two fault orientations which impose successively higher dip/plunge to the east and south. Lower Jurassic King Christian Fm is as defined by Embry (1982). Lower to Middle Jurassic Jameson Bay Fm and Middle Jurassic Bjarmian Fm are as defined by Embry (1982). Upper Jurassic Awingak Fm is as defined by Embry (1982). Lower Cretaceous Jameson Bay and Sandy Point Formations (combined) is McConnell Island Fm, the sandstone at the top is Sandy Point Fm. The Middle Jurassic McConnell Island Fm is as described by Embry (1984), and here divided into three informal members - a lower shale and sandstone, a middle carbonate breccia, and an upper shale. Lower Cretaceous Isachsen Fm is as defined by Balkwill (1983). Upper Cretaceous Kanguk Fm is as defined by Balkwill (1983). The dominantly shale unit includes local coarse-grained sandstone (informal, KCSs). Distinction between shales of the Jameson Bay, McConnell Island, Ringnes, and Deer Bay formations is difficult where ground observations are sparse and the units are lithologically similar and have similar weathering.

The Lower Cretaceous Isachsen Fm is subdivided into the Paterson Island, Rondon, and Walker Island members by mapping marine shale of the Rondon Mb between the two sandstone-dominated units. All units are as described by Embry (1983), with the addition of a local unit of coarse-grained, pebbly sandstone at the base of the Paterson Island Mb. This sandstone is well-developed on Cape Allison, but is not shown to be in the Walker Island Mb, but Rondon Mb and the Paterson Island Mb may be present close to the basal contact. The contact between Deer Bay and Isachsen formations is gradational, placed where sandstone becomes dominant going up-section. East and west of Heiskie Dome, the Deer Bay Fm is 100-150 m thick, but it is only 50 m thick to the south. The base of the Isachsen Fm because the sills occur near the formational contact and large flows of sill debris cover slopes immediately beneath the sills.

The Christopher Fm has gradational contacts with the Isachsen Fm and is subdivided into the Invincible Point and Mastrigaat Point members, based on the presence of a thick, coarse-grained, pebbly sandstone at the base of the Mastrigaat Point Mb. The Invincible Point Mb is dominated with semi-lithic arenite. The volcanogenic succession overlies black shales with mafic-weathering sandstone, and is dominated by lithic arenite, and underlies the dominantly shale MacDougall Point Mb. The volcanogenic succession includes: ahalic volcaniclastic sandstone, commonly with abundant plagioclase, and rare to common lithic fragments, and rare to common, 1-5 m thick, lenses of pebbly sandstone, and rare to abundant, commonly < 1 m thick, lenses a prominent clay that serves as an important structural marker across the central island. An isolated pillow of coarse-massive volcaniclastic rock with pillow breccia (KCSP) occurs near the top of the MacDougall Point Mb at Cape Caton.

The Hassel Fm is as described by Embry (1983), and is subdivided into the Cape Allison, Cape Alfsen, and Cape Vera members, in addition at a locally, megapelite marine shale (KHu), and two isolated exposures of coarse volcaniclastic rock (KHv). The latter occur near the base of the Hassel Fm at Cape Caton and south of Heiskie Dome. At Cape Caton the unit is pillow breccia with a diabase sill 1 to 3 m thick at the base. The pillows are commonly 1 m in diameter, and the breccia is clast-supported with a sandy matrix. At Heiskie Dome, the unit is a lithic lithic arenite, gently dipping, and topographic relief is low. The result is that the across-strike zone of uncertainty may be up to 200 m. The Upper Cretaceous Kanguk Fm is separated into informal upper and lower members following Balkwill and Hopkins (1976). The Expedition Fm, defined by Roksandic (1978), is recognized in the subsurface of the southeast island, but is not differentiated from the lower member of the Kanguk Fm.

New work has recognized volcanogenic components in the Isachsen, Christopher, and Hassel formations, some at stratigraphic levels not previously reported. They expand southwestward the region of known Cretaceous volcanic occurrences in the Queen Elizabeth Islands (Evenchick et al., 2010, 2012).

Mafic intrusive rocks are widespread in the northern third of the island. Most of the intrusions are sills, dykes trend north and north-northwest. They are assigned to the Queen Elizabeth Intrusions following Buchan and Ernst (2004) based on dyke orientation. Sills commonly occur near the contact of the Christopher Formation and the overlying Hassel Formation. At Cape Caton, two vesicular sills up to 10 m thick occur as high as the Christopher-Hassel contact, with one before the contact and one within it.

Three light coloured oval alteration zones (unit JKDBx) of uncertain age occur in the Deer Bay Fm northwest of Loader Fiord. They define a trend of north-northwest-trending fault. One of the oval alteration zones was identified by Stott (unpublished field notes). A second was recognized as a similar feature in SPOT imagery (T. Brent, pers. comm., 2010), and the third was identified in the compilation.

STRUCTURES

Folds

The distribution of map units on Ellef Ringnes Island is controlled at the largest scale by the general southwest dip from the northeast limit of the exposed section to the southwest limit of the island. This is part of the limb of a broad, north-northwest-trending, gently east-dipping syncline. Superimposed on this regional dip are large-scale, northwest-trending, open folds and warps, commonly with wavelengths >5 km, and interfaces angles generally <150°. These folds affect all Cretaceous and older stratigraphic units and are assumed to have formed during Eurekan deformation. Some of the folds are cored by diapirs, and others are not. The diapirs, which are Carboniferous evaporite, response to loading by evaporite diapirs resulted in the most significant local structural relief. Within 1 km of the flanks of the diapirs beds/strata/rocks in dip (steeply) from < 10°, typical of most of the island, to steep or overturned at the faulted boundaries of the evaporites.

Faults

The outer contacts of evaporite diapirs are interpreted to be faulted, but uncontroversial cases cannot be ruled out. Other steep faults occur in four associations. These spatially associated with the evaporite diapirs have wide variation in strike. The remaining three groups each has consistent orientation and are spatially distinct. The faults are all high-angle, and most are steeply dipping.

Steep faults associated with evaporite diapirs affect Cretaceous strata bounding the diapirs, as well as the diapir boundaries. They occur in patterns radial to the diapirs, commonly at strikes of 30° to 60° to the local diapir boundary. Groups of faults have opposing strike angles to the diapir, and have been interpreted as normal faults, and as reverse. Three large-scale relationships suggest that many of the faults formed during deposition of Cretaceous units, and have been dated during diapiric movement, resulting in apparent strike-slip offset of opposing senses. One example of this type of fault pattern is on the southwest flank of Dumbella Dome (Inset 3 on Evenchick and Embry, 2012). There, a fault with a strike of 030° and a dip of 80° southeast juxtaposes Cretaceous strata that are 1 km apart in the hanging wall, but the difference in thickness of the Macdougall Point Mb within and outside the graben indicates that most of this displacement occurred during deposition of the upper member of the Christopher Fm. Similar relationships are present around Isachsen Dome, but there the Invincible Point varies in thickness, and the Mastrigaat Point Mb is absent in the hanging wall of the faults. Faults with opposing strike are present around Schei Dome, but there the radial pattern has a northeast preferred orientation. In addition, a group of faults and associated folds southeast of the evaporite exposure are radial to an area of no surface exposure of evaporite. These faults are probably associated with a dome of evaporite in the shallow subsurface, as there is a local gravity high and the faults are similar to those at Schei Dome.

Steep north-northeast-trending faults are common in the northern half of the island. In many cases their apparent offset, typically < 1 km, can be determined from local markers. Map relationships locally permit interpretation of sense of displacement; these cases are commonly dip-slip, with the east side relatively downthrown. Stratigraphic offset is up to 1 km, but it is not clear if this is the total offset. In at least one, and almost all cases, A small proportion have been interpreted as normal faults, and fewer as reverse. Three larger scale relationships suggest that many of the north-northeast-trending faults are extensional. They are spatially associated and parallel with dykes (and related sills), and with the boundaries of the evaporite diapirs. The dykes are Eocene (Buchan and Ernst, 2004), and the diapirs are Carboniferous. The dykes and sills are spatially associated with these faults. Finally, groups of faults have opposing apparent offset and lack of stratigraphic along the fault patterns that combined suggest that they are extensional faults. One fault at Steinbert Peninsula with exposed fault surface and slickenlines is a normal fault with a dip of 60° east. The fault at Cape Caton is a normal fault with a dip of 70° east, and the fault at Heiskie Dome is consistent with the suite of faults. In some cases the faults are parallel with and beside the faults. In the normal fault example at Steinbert Peninsula, folds along trend of the fault accommodated the same displacement as the fault.

Steep east-west-trending faults are common in the southern half of Deer Bay. They accommodated south-side-down displacement, but whether they accommodated crustal contraction or extension is uncertain because the slip directions are discussed. Faults south of Hoodoo Dome trend northeast, and offset Hassel Fm and immediately bounding strata. Small folds are parallel with these faults.

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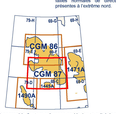
Abstract

Ellef Ringnes Island lies in the western Queen Elizabeth Islands, Nunavut, Canada (parts of NTS 89-C, -D, -E, -F, -G and 79-O, -B, -H). The bedrock consists mainly of Jurassic and Cretaceous siliciclastic rocks of the Sverdrup Basin, and a thin veneer of Neogene sediments in the far north, adjacent to the Arctic Ocean. Carboniferous evaporite and carbonate rocks are disrupted by several evaporite diapirs, and folded by northwest-trending folds associated with Eurekan (Paleogene) deformation. The majority of sills are concentrated close to the contact between Deer Bay and Hassel formations (late Albian), but range up-section as high as the lower Hassel Formation (late Albian). In the central and southern island, steeply dipping extensional faults occur in patterns radial to the evaporite domes. In the northern half of the island, faults are steep north-northeast-trending and west-northwest, with the addition of east trending normal faults in the far north.

Résumé

L'île Ellef Ringnes est située dans le secteur ouest des îles de la Reine-Élisabeth, au Nunavut (parties des feuillets 89-C, -D, -E, -F, -G et 79-O, -B, -H de SNRC). Le substratum y est composé de roches siliciclastiques de roches sédimentaires du bassin de Sverdrup, datant du Jurassique au Crétacé le plus récent, et d'un mince voile de sédiments néogènes dans la partie la plus septentrionale, jouxtant l'océan Arctique. Les strates sont recouvertes par des roches-couches et des dykes mafiques du Crétacé, perturbées par plusieurs diapirs d'évaporitoïques, et plissées selon un axe de direction nord-ouest associé à la déformation éocène eurékienne (Paléogène). La majorité des roches-couches sont concentrés près du contact entre les formations de Deer Bay et d'Isachsen (Albanginien tardif), mais ils peuvent être présents plus haut dans la succession stratigraphique, jusqu'à la formation inférieure de Hassel (Albanien tardif). Dans le sud et le centre de l'île, des failles de distension à fort pendage sont disposées en des motifs radiaux par rapport aux dômes d'évaporites. Dans la moitié nord de l'île, des failles à pendage prononcé, ainsi que les jdis mineurs qui leur sont associés, ont une direction nord-nord-est; des failles normales de direction est sont également présentes à l'extrême nord.



National Topographic System reference and index to adjoining published Geological Survey of Canada maps

Cover illustration:
View north-northwest across steeply dipping sandstones of the Isachsen Formation (foreground and at right), to diapiric evaporite in the core of Hoodoo Dome (upper left). At right the Isachsen Formation wraps around the diapiric evaporite of the dome. Nunavut. Photograph by C.A. Evenchick, 2012-039

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CANADIAN GEOSCIENCE MAP 87
GEOLOGY
ELLEF RINGNES ISLAND SOUTH
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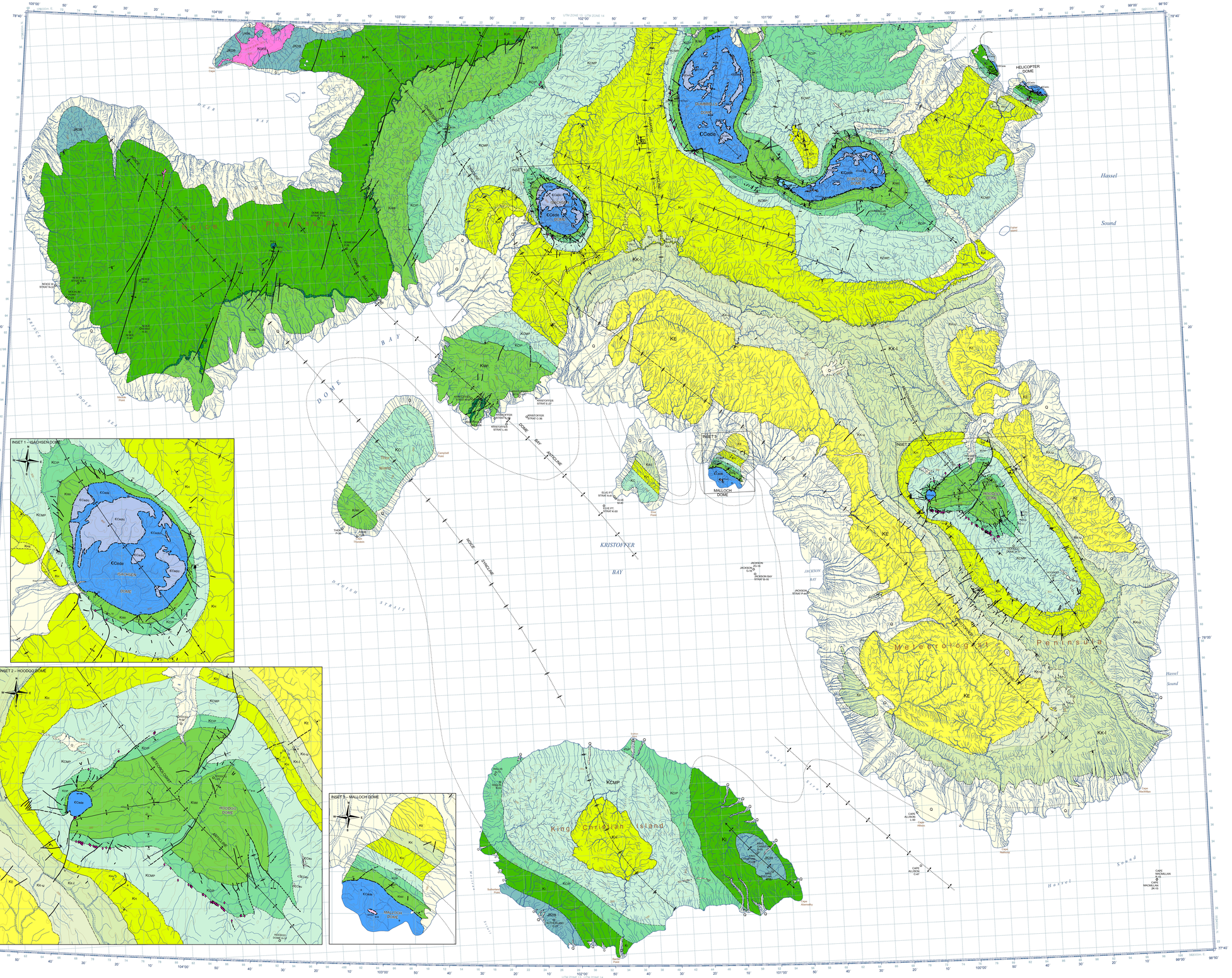

CENOZOIC

QUATERNARY

Q	Surficial deposits: sand, silt, clay, and gravel; undivided alluvium, colluvium, and marine deposits.

NEOGENE

Tb	Beaufort Formation: sand, gravel, silt and clay; includes non-petrified logs and wood debris.

MESOZOIC

CRETACEOUS

UPPER CRETACEOUS

Late Campanian and Maastrichtian

KE	Expedition Formation: very fine- and fine-grained sandstone (and unconsolidated sand), shale, mudstone; minor coal and medium-grained sandstone.

Early Turonian to Late Campanian

Kk	Kanguk Formation (KKl+KKu) undivided
KKu	Upper member: dark brown and grey shaley siltstone and silty shale; bentonite.
KKl	Lower member: black and dark grey shale, bituminous shale; near the base block shale is laminated with yellow and grey clay (bentonite?).

LOWER CRETACEOUS

Late Albian to Cenomanian

KHu, KHv, KHv	Hassel Formation: quartz sandstone (also unconsolidated sand), minor siltstone, shale, clay, coal; includes a local tongue of marine shale (KHe), and minor volcanic rocks (KHv).
KC	Christopher Formation (KCIP–KDMP) undivided

Early Albian to Late Albian

KCMP, KDMP	Macdougall Point Member: clay, shale, shale, siltstone; fine- to medium-grained sandstone near the top increases in abundance upwards; includes a local volcanic member of pillow breccia and related rocks (KCMPv)

Late Aptian to Early Albian

KCIP	Invincible Point Member: shale, siltstone, very fine-grained sandstone, calcareous mudstone concretions/nodules; locally includes calcite seep mounds near the top; at the top is an association of black shale, green lithic arenite, and volcanic sandstone, limestone with magnetite- and/or pyrite-bearing evaporite with and without carbonate, sandstone and gypsum (CCed).

Late Valanginian to Late Aptian

Ki	Isachsen Formation (KKh–KKel) undivided

Late Barremian to Late Aptian

KWI	Walker Island Member: very fine- to coarse-grained quartz sandstone (and unconsolidated sand), carbonaceous siltstone, carbonaceous shale, minor quartz pebble conglomerate and coal.

Late Barremian

KR	Rondon Member: shale, siltstone, and very fine-grained sandstone.

Late Valanginian to Early Barremian

KPI, KPIP	Paterson Island Member: very fine- to coarse-grained quartz sandstone (and unconsolidated sand); well-quartz pebbly sandstone; carbonaceous shale, coal, and coal; includes minor volcanic and volcaniclastic member (KPIv).

JURASSIC AND CRETACEOUS

UPPER JURASSIC AND LOWER CRETACEOUS

Early Tithonian to Late Valanginian

JKDB, JKDBx, JKDBx	Deer Bay Formation: shale, siltstone; minor sandstone; includes local fine- to coarse-grained and pebbly sandstone member (JKDBs), and light coloured alteration zones (JKDBa).

JURASSIC

UPPER JURASSIC

Early Oxfordian to Kimmeridgian

Jfr	Ringnes Formation: dark grey to black shale, siltstone; includes large septarian concretions.

LOWER AND MIDDLE JURASSIC

Bajocian to Callovian

JMI	McConnell Island Formation (JMI-l – JMI-u) undivided

Callovian

JMI-u	Upper member: shale and siltstone.

Bathonian

JMI-m	Middle member: siltstone; green weathering sandstone, minor pebble conglomerate.

Bajocian

JMI-l	Lower member: shale, siltstone, fine- and medium-grained sandstone; medium to light grey weathering.

Pliensbachian to Aalenian

JJB-SP	Jameson Bay and Sandy Point formations, undivided: shale, siltstone, and minor very fine-grained sandstone; the Sandy Point Formation (fine- to medium-grained sandstone, siltstone, and shale) occurs at the top, where JJB-SP is in stratigraphic contact with overlying units.

LOWER JURASSIC

Sinemurian to Pliensbachian

JKD	King Christian Formation: fine- and medium-grained quartz sandstone (and unconsolidated sand), siltstone, shale, minor coal.

CARBONIFEROUS TO CENOZOIC

DIAPIRIC EVAPORITE COMPLEX

Anyhitite, gypsum, salerite, mafic intrusive rock and carbonate rock; complexly deformed during protracted diapiric movement from Triassic or older, to possibly as recently as Cenozoic; protoliths are assumed to include Carboniferous Otto Fiord Formation (evaporite), Nansen Formation (carbonate), and Queen Elizabeth intrusions (mafic intrusive rock).

CCedu	Undivided anhydrite, gypsum, carbonate, carbonate breccia; diabase and gabbro; may include minor blocks of Jurassic to latest Cretaceous sedimentary rock.
CCede	Anhydrite and gypsum; may include minor (CCedz) and/or (CCed).
CCedz	Carbonate rock, carbonate breccia; occurs as rafts in the evaporite complex, and commonly as a belt rimming the evaporite complex; the latter includes breccia interpreted to be carbonate caprock formed during salt migration; may include minor (CCede and/or (CCed).
CCed	Diabase and gabbro; occurs as rafts within the evaporite complex; may include minor (CCedz and/or (CCede.
CCedc	Undivided diabase and gabbro, carbonate rock, carbonate breccia; may include minor (CCede.
CCedm	Small intrusions(?) of magnetite- and/or pyrite- bearing evaporite; some bodies include carbonate, sandstone, and gabbro.

INTRUSIVE ROCKS

CRETACEOUS

KQEd	Queen Elizabeth intrusions: diabase; rare gabbro; sills and rare dykes.

Contact (defined, approximate, inferred, concealed)

Fault, steeply dipping (defined, approximate, inferred, concealed)

Fault, normal, steeply dipping (defined, approximate, inferred)

Fault, thrust (defined)

Anticline (defined, approximate, concealed)

Anticline, asymmetrical (defined, shorter arrow on steeper limb)

Syncline (defined, approximate, concealed)

Syncline, overturned (defined)

Syncline, asymmetrical (defined, approximate, concealed, shorter arrow on steeper limb)

Station

Bedding, inclined (upright, top unknown)

Bedding, vertical

Bedding, overturned

Foliation, inclined

Fault plane and lineation

Well: gas, gas and oil, dry; status not available

Methane seep deposit

Magnetic declination varies from about -20 degrees to -40 degrees across the island. Application of IGRF-modelled site- and time-specific declination corrections has resulted in bedding orientations that are inconsistently parallel with bedding traces on aerial photographs and high resolution satellite images. For this reason bedding strikes were measured from the detailed images.

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Canadian Geoscience Maps
Cartes géoscientifiques du Canada

Canada

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Geology by C.A. Evenchick and A.F. Embry, based on ground and air observations 2010–2011 and compilation of previous work by D.F. Stott, 1968; H.R. Balkwill, 1974, field notes of D.F. Stott, 1967; H.R. Balkwill, 1973, and K.J. Roy, 1973. Also based in part on previous fieldwork and compilations by Fortier et al., 1963; H.R. Balkwill, Blackadar, and H.R. Greiner in Fortier et al., 1963; Stott, 1968,1969; Hopkins and Balkwill, 1973; Balkwill, 1974; Balkwill and Hopkins, 1976; and Balkwill and Roy, 1977.

Geological compilation and cartography by C.A. Evenchick, 2010–2012

Geomatics and cartography by R.B. Cocking

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CANADIAN GEOSCIENCE MAP 87
GEOLOGY
ELLEF RINGNES ISLAND SOUTH
Nunavut
1:125 000

2 0 2 4 6 8 10 km

Map projection Universal Transverse Mercator, zone 14. North American Datum 1983

Base map at the scale of 1:50,000 from Natural Resources Canada, National Topographic Database. Elevations in feet above mean sea level.

Some geographic names on this map are not official.

All geological field data were collected in UTM zone 14.

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

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

This publication, including digital data, is available for free download through GEOSCAN (http://geoscan.ess.nrcan.gc.ca/).

This map is not to be used for navigational purposes.

Preliminary publications in this series have not been scientifically edited.

CANADIAN GEOSCIENCE MAP 87
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Four trim marks around perimeter of map sheet. Trim map sheet first, then fold at folding marks.

Cover and additional panels are 17cm wide when folded.