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CANADIAN GEOSCIENCE MAP 96

GEOLOGY

CARCAJOU CANYON (SOUTHEAST)

Northwest Territories



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Cover Illustration

View looking east at dolostone of the Franklin Mountain Formation on the Keele River at the northern termination of the Redstone Range, Northwest Territories. Light orange-weathering dolostone of the middle member is offset by two south-side-up faults. Photograph by K.M. Fallas. 2013-239

ABSTRACT

The southeast quadrant of Carcajou Canyon map area (NTS 96-D) lies within the mountainous Canyon Ranges of the eastern Mackenzie Mountains, Northwest Territories. Outcrop is widespread on the higher ridges in the western portion of the map, but decreases to the northeast as ridges become lower and more vegetated toward the Mackenzie Plain. Rock types include siliciclastic, carbonate, and evaporite strata ranging from Neoproterozoic to Paleocene. Proterozoic and Paleozoic strata have been deformed by northwest- to southeast-trending folds and contractional faults associated with Cordilleran deformation. A set of approximately north-trending minor extensional faults are preserved within Proterozoic and Cambrian strata, and were

locally reactivated by Cordilleran deformation. Cryogenian igneous activity resulted in the emplacement of gabbroic dykes into strata of the Mackenzie Mountains Supergroup. Two major unconformities represent significant gaps in the local geological record, one between Proterozoic (Cryogenian) and Cambrian strata, and another between Devonian and Cretaceous strata.

RÉSUMÉ

Le quadrant sud-est de la région cartographique de Carcajou Canyon (SNRC 96-D) se situe dans la région montagneuse des chaînons Canyon de la partie est des monts Mackenzie (Territoires du Nord-Ouest). Les affleurements sont répandues sur les hautes crêtes de la partie ouest de la carte, mais deviennent plus rares vers le nord-est où les crêtes deviennent moins accentuées et davantage couvertes de végétation en se dirigeant vers la plaine du Mackenzie. La lithologie comprend des strates silicoclastiques, carbonatées et évaporitiques dont les âges s'échelonnent du Néoprotérozoïque au Paléocène. Les strates du Protérozoïque et du Paléozoïque ont été déformés par le jeu de failles de contraction et de plis de direction nord-ouest à sud-est associés à la déformation cordillérienne. Un ensemble de failles mineures d'extension de direction approximativement nord ont été conservées dans les strates du Protérozoïque et du Cambrien et celles-ci ont été réactivées par endroits lors de la déformation cordillérienne. Une activité magmatique au Cryogénien s'est traduite par la mise en place de dykes gabbroïques dans les strates du Supergroupe de Mackenzie Mountains. Deux discordances majeures témoignent de lacunes importantes dans la géologie locale, l'une se situant entre les strates du Protérozoïque (Cryogénien) et du Cambrien, l'autre entre les strates du Dévonien et du Crétacé.

ABOUT THE MAP

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Stratigraphic sections measured by L. Gal (Northwest Territories Geoscience Office), R. Acker (University of Calgary), E.C. Turner (Laurentian University), M. Pope (Texas A&M University), and S. Leslie (James Madison University), 2009–2011, R.W. Macqueen, W.S. MacKenzie, and J.L. Usher, 1969, D.W. Morrow, 1977, and D.K. Norris, 1983

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Joint initiative of the Geological Survey of Canada and the Northwest Territories Geoscience Office, conducted under the auspices of the Mackenzie Delta and Corridor Project as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) Program.

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Map projection Universal Transverse Mercator, zone 9.
North America Datum 1983

Base map at the scale of 1:50 000 from Natural Resources Canada,
with modifications.
Elevations are in metres above mean sea level

Some geographic names on this map are not official.

Mean magnetic declination 2014, 22°27'E, decreasing 29' annually. Readings vary from 22°36'E in the NW corner of the map to 22°18'E in the SE corner of the map.

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ABOUT THE GEOLOGY

Descriptive Notes

The authors have updated and revised map unit terminology from the Operation Norman map (Aitken et al., 1974). In general, terminology for Cambrian units is that of

Dixon and Stasiuk (1998) with modifications by Fallas and MacNaughton (2012), Silurian and Devonian usage follows that of Morrow (1991), and Cretaceous formation names are those of Dixon (1999). Neoproterozoic to Ordovician units have recently undergone revision to their terminology, as outlined below.

Recent stratigraphic work in the Mackenzie Mountains has formalized the Mackenzie Mountains Supergroup and revised its formation-level nomenclature. Within the Katherine Group, the Eduni, Tawu, Grafe River, Etagogchile, and Shattered Range formations of Long and Turner (2012) correspond to the lower part of the Katherine Group as shown on the GSC maps for Carcajou Canyon (Aitken et al., 1974), and to the K1 to K5 divisions of Aitken et al. (1978) and Long et al. (2008). Delineation of these new formations depends on the ability to recognize the recessive Tawu and Etagogchile formations. These formations are seldom exposed in the mapping area and so the five lower formations of the Katherine Group were grouped during mapping. The McClure and Abraham Plains formations correspond to the upper Katherine Group on the Carcajou Canyon map (Aitken et al., 1974), and to the K6 and K7 divisions of Aitken et al. (1978) and Long et al. (2008).

The Little Dal Group previously was mapped in this region as two units: H5, and Little Dal Formation (Aitken et al. 1974). Regionally, those two units were reorganized into seven informal units of formation scale by Aitken (1981). In the present mapping area, Aitken's terminology can be applied as follows: the lower part of H5 corresponds to the 'Mudcracked formation'; the upper part of H5 and the Little Dal Formation correspond to the 'Basinal Assemblage'. Most recently, Turner and Long (2012) have formalized the internal stratigraphy of the Little Dal Group. Their nomenclature applies as follows to the present study area: the Mudcracked formation is now the Dodo Creek Formation; the Basinal Assemblage is now the Stone Knife Formation, consisting of four informal members (1, 2, 3, and 4). In the present series of maps the Dodo Creek Formation and the lower Stone Knife Formation (equivalent to its member 1) have been combined due to similarity of weathering profile and colour. Our middle Stone Knife Formation corresponds to the lower part of member 2 (typically a bright red shale in this area), and the upper Stone Knife Formation encompasses the upper part of member 2 (carbonate-dominated).

Previous work by the Geological Survey of Canada in southeast Carcajou Canyon map area (Aitken and Cook, 1974) subdivided the Cambro-Ordovician Franklin Mountain Formation into four informal units. In ascending order they are: Basal red beds, Cyclic member, Rhythmic member, and Cherty member (Norford and Macqueen, 1975). The present work separates the basal red beds from the Franklin Mountain Formation and applies the term Nainlin Formation to this shale- and sandstone-dominated unit (MacNaughton and Fallas, in press). Field relationships suggest the Nainlin Formation is laterally equivalent to the evaporitic Saline River Formation. For the remaining carbonate-dominated members of the Franklin Mountain Formation, the older unit names correspond, in ascending order, to informal lower, middle, and upper members. These also correspond to the units 1, 2, and 3 of the Franklin Mountain Formation described by Turner (2011).

Although the Devonian Hare Indian and Canol formations (Aitken and Cook, 1974) can be distinguished in some well exposed sections, at the map scale these recessive, shale-dominated units are combined and the name Horn River Group is applied.

The names Summit Creek Fault, Rouge Mountain anticline, and Redstone anticline have been introduced to facilitate future discussion of these structural features. The names Canyon Fault, Gambill Fault, Summit anticline, Moose Prairie syncline, Foran anticline, and Foran syncline, have been incorporated from the older Carcajou Canyon map (Aitken et al., 1974). The name Moose Prairie anticline has been extended from the Dahadinni River map area (Douglas, 1974) through southwest Fort Norman (Fallas and MacLean, 2013).

Cordilleran deformation in this map area has generated folds and contractional faults along variable trends. The western portion is dominated by a major culmination exposing Neoproterozoic Tsezotene Formation and Katherine Group in the core, at the convergence of the Canyon Fault, Foran anticline, and Tawu anticline (Aitken et al., 1974). Pre-Cordilleran extensional faults, cutting Neoproterozoic and Cambrian strata, are exposed in the core of the culmination, and may be locally reactivated by Cordilleran deformation. This culmination generally coincides with the crest of the Mackenzie Arch (see Fig. 1). On the southeast flank of the culmination are a series of south-plunging anticlines and synclines that continue into the Wrigley Lake map area (Gabrielse et al., 1973). Younger Cambrian to Paleocene strata are exposed in the northeast portion of the map, where the Mackenzie Mountains descend into the Mackenzie Plain. Structurally, the Gambill Fault dominates this region, associated with structural trends that deviate from the dominant northwest-southeast Cordilleran trend where the fault turns from a northwest-trending thrust fault into a northeast-trending reverse fault. Surface exposures also indicate that the level of detachment for the Cordilleran structures moves from deep in the Mackenzie Mountains Supergroup up into the Saline River Formation in the vicinity of the Gambill Fault.

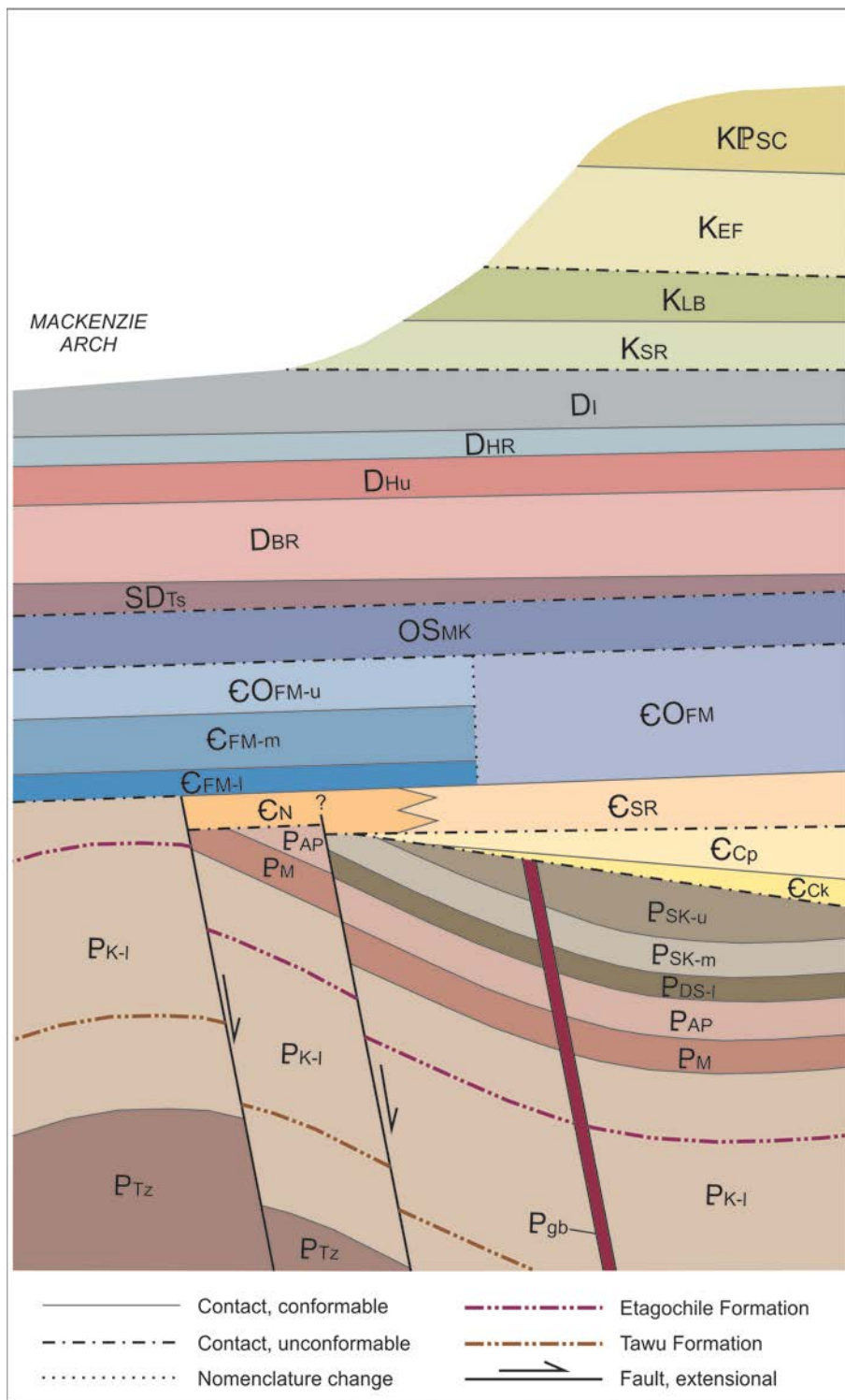


Figure 1. Schematic stratigraphic relationship diagram for southeast Carcajou Canyon map area (NTS 96-D/SE). Although normal faulting is known to affect the lower boundary of the Nainlin Formation–Saline River Formation succession, the question mark at the top end of some faults reflects uncertainty about where faulting terminates within the succession.

Acknowledgments

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References

- Acker, R., 2013. Sedimentology and stratigraphy of the Upper Devonian Imperial Formation, Mackenzie Valley, Northwest Territories, Canada; M.Sc. thesis, University of Calgary, Calgary, Alberta, 115 p.
- Aitken, J.D., 1981. Stratigraphy and sedimentology of the upper Proterozoic Little Dal Group, Mackenzie Mountains, Northwest Territories; In *Proterozoic Basins of Canada*; (ed.) F.H.A. Campbell; Geological Survey of Canada, Paper 81-10, p. 47-71. doi:10.4095/109385
- Aitken, J.D. and Cook, D.G., 1974. Carcajou Canyon map-area, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Paper 74-13, 28 p.
- Aitken, J.D., Cook, D.G., Balkwill, H.R., and Yorath, C.J., 1974. Geology, Carcajou Canyon, District of Mackenzie; Geological Survey of Canada, Map 1390A, scale 1:250 000. doi:10.4095/109026
- Aitken, J.D., Long, D.G.F., and Semikhatov, M.A., 1978. Progress in Helikian stratigraphy, Mackenzie Mountains; In *Current Research, Part A*; Geological Survey of Canada, Paper 78-1A, 481–484.
- Aitken, J.D., Macqueen, R.W., and Usher, J.L., 1973. Reconnaissance studies of Proterozoic and Cambrian stratigraphy, lower Mackenzie River area, District of Mackenzie; Geological Survey of Canada, Paper 73-9, 178 p.
- Dixon, J., 1999. Mesozoic-Cenozoic stratigraphy of the northern Interior Plains and plateaux, Northwest Territories; Geological Survey of Canada, Bulletin 536, 56 p.
- Dixon, J. and Stasiuk, L.D., 1998. Stratigraphy and hydrocarbon potential of Cambrian strata, northern Interior Plains, Northwest Territories; *Bulletin of Canadian Petroleum Geology*, v. 46, no. 3, p. 445–470.
- Douglas, R.J.W., 1974. Geology, Dahadinni River, District of Mackenzie; Geological Survey of Canada, Map 1374A, scale 1:250 000. doi:10.4095/109153

Duk-Rodkin, A. and Hughes, O.L., 2002. Surficial geology, Carcajou Canyon, Northwest Territories; Geological Survey of Canada, Map 1988A, scale 1:250 000. doi:10.4095/213616

Fallas, K.M. and MacLean, B.C., 2013. Geology, Fort Norman (southwest), Northwest Territories; Geological Survey of Canada, Canadian Geoscience Map 93, scale 1:100 000. doi:10.4095/292285

Fallas, K.M. and MacNaughton, R.B., 2012. Distribution of Cambrian formations in the eastern Mackenzie Mountains, Northwest Territories; Geological Survey of Canada, Current Research 2012-12, 12 p. doi:10.4095/289498

Gabrielse, H., Roddick, J.A., and Blusson, S.L., 1973. Geology, Wrigley Lake area, District of Mackenzie; Geological Survey of Canada, Map 1315A, scale 1:250 000. doi:10.4095/107939

Gal, L.P., MacNaughton, R.B., and Fallas, K.M., 2010. Little Bear River Measured Section: Upper Cambrian to Middle Devonian Stratigraphy, Little Bear River, Northwest Territories, Canada, NTS 096 D/07; Northwest Territories Geoscience Office, NWT Open Report 2010-006, 18p.

Long, D.G.F., Rainbird, R.H., Turner, E.C., and MacNaughton, R.B., 2008. Early Neoproterozoic strata (Sequence B) of mainland northern Canada and Victoria and Banks islands: a contribution to the Geological Atlas of the Northern Canadian Mainland Sedimentary Basin. Geological Survey of Canada, Open File 5700, 27 p., 1 CD-ROM. doi:10.4095/226070

Long, D.G.F. and Turner, E.C., 2012. Formal definition of the Neoproterozoic Mackenzie Mountains Supergroup (NWT), and formal stratigraphic nomenclature for terrigenous clastic units of the Katherine Group; Geological Survey of Canada, Open File 7113, 118 p. doi:10.4095/29216

MacNaughton, R.B. and Fallas, K.M., in press. Nainlin Formation, a new Middle Cambrian map unit from the Mackenzie Mountains, Northwest Territories; Bulletin of Canadian Petroleum Geology.

MacNaughton, R.B., Pratt, B.R., and Fallas, K.M., 2013. Observations on Cambrian stratigraphy in the eastern Mackenzie Mountains, Northwest Territories; Geological Survey of Canada, Current Research 2013-10, 7 p. doi:10.4095/292423

Macqueen, R.W., 1970. Lower Paleozoic stratigraphy and sedimentology; eastern Mackenzie Mountains, northern Franklin Mountains (96 C, D, E, F; 106 G, H); Geological Survey of Canada, Paper 70-1A, p. 225–230.

Morrow, D.W., 1991. The Silurian-Devonian sequence in the northern part of the Mackenzie Shelf, Northwest Territories; Geological Survey of Canada, Bulletin 413, 121 p.

Norford, B.S. and Macqueen, R.W., 1975. Lower Paleozoic Franklin Mountain and Mount Kindle formations, District of Mackenzie: their type sections and regional development; Geological Survey of Canada, Paper 74-34, 37 p.

Pope, M.C. and Leslie, S.A., 2013; Late Ordovician-Early Silurian Mount Kindle Formation lithostratigraphy, Franklin Mountains and eastern Mackenzie Mountains, Northwest Territories: new data from measured sections; Geological Survey of Canada, Current Research 2013-8, 14 p. doi:10.4095/292389

Sweet, A.R., Ricketts, B.D., Cameron, A.R., and Norris, D.K., 1989. An integrated analysis of the Brackett coal basin, Northwest Territories; In, Current Research, Part G; Frontier Geoscience Program, Arctic Canada; Geological Survey of Canada, Paper 89-1G, p. 85–99.

Turner, E.C., 2011. A lithostratigraphic transect through the Cambro-Ordovician Franklin Mountain Formation in NTS 96D (Carcajou Canyon) and 96E (Norman Wells), Northwest Territories; Geological Survey of Canada, Open File 6994, 28 p. doi:10.4095/289612

Turner, E.C. and Long, D.G.F., 2012. Formal definition of the Neoproterozoic Mackenzie Mountains Supergroup (NWT), and formal stratigraphic nomenclature for its carbonate and evaporate formations; Geological Survey of Canada, Open File 7112, 57 p. doi:10.4095/292167

Yorath, C.J. and Cook, D.G., 1981. Cretaceous and Tertiary stratigraphy and paleogeography, northern Interior Plain, District of Mackenzie; Geological Survey of Canada, Memoir 398, 76 p.

Geological Survey of Canada Paleontological Reports (available from GSC Calgary):

Fritz, W.H., 1969; Report on one collection of Upper Cambrian trilobites from the lower portion of Ronning Formation, lower Keele River, NWT; collected by R.W. Macqueen, 1969 (NTS: 96D); Geological Survey of Canada, Paleontological Report C-13-1969-WHF, 1 p.

Fritz, W.H., 1969; Report on nine collections of late Lower and Middle Cambrian fossils from the Mackenzie Mountains, NWT; collected by J.L. Usher, Queen's University, Operation Norman, 1969 (NTS: 96D); Geological Survey of Canada, Paleontological Report C-19-1969-WHF, 2 p.

Fritz, W.H., 1969; Report on two Cambrian fossil collections from the NWT; collected by H.P. Balkwill for D.G. Cook, 1969 (NTS: 96D & 86D); Geological Survey of Canada, Paleontological Report C-24-1969-WHF, 1 p.

McCracken, A.D., 2013; Report on three Devonian conodont samples from the Bear Rock Formation and Tsetso Formation, Mackenzie Mountains, NWT collected by Karen Fallas (GSC Calgary) and submitted in 2012 under R.B. MacNaughton's Mackenzie Delta and Corridor: Mapping for Energy (MADACOR) Project in 2012; NTS 096D/02, 96D/03, 96D/10; Con. No. 1779; Geological Survey of Canada, Paleontological Report 1-ADM-2013, 4 p.

McNeil, D.H., 2010; Micropaleontology report on 6 outcrop samples from Devonian strata of the Franklin and Mackenzie Mountains, Northwest Territories (NTS 96D, E); Geological Survey of Canada, Paleontological Report DHM-2010-03, 4 p.

Norford, B.S., 1969; Report on six lots of fossils from western District of Mackenzie; collected by Dr. H.R. Balkwill, Operation Norman, 1969 (NTS 86D, 96D, 96H, 106H); Geological Survey of Canada, Paleontological Report O-S 11 BSN 1969, 2 p.

Norford, B.S., 1970. Report on 47 lots of fossils from the Mackenzie Mountains and the Franklin Mountains, northwest District of Mackenzie; collected by Drs. R.W. Macqueen and B.S. Norford, Operation Norman, 1969 (NTS 96D, 96F, 106G, 106H); Geological Survey of Canada, Paleontological Report C-S 1 BSN 1970, 9 p.

Nowlan, G.S., 2010; Report on four samples of Ordovician and Silurian strata from Little Bear River, Mackenzie Plain, Northwest Territories; collected by Leonard Gal (NWT Geoscience) and submitted for microfossil analysis by Thomas Hadlari (Geological Survey of Canada, Calgary); NTS 096D/07; Con # 1749; Geological Survey of Canada, Paleontological Report 006-GSN-2010, 6 p.

Pedder, A.E.H., 1969; Report on nine lots of Middle Devonian fossils from the District of Mackenzie collected by D.K. Norris, 1968 (NTS 96D, 106G,H); Geological Survey of Canada, Paleontological Report DKN 11 AEHP 1969, 3 p.

Pedder, A.E.H., 1969; Report on one lot of Devonian fossils collected by H.R. Balkwill on Operation Norman 1969 (NTS 96D/08); Geological Survey of Canada, Paleontological Report HRB 13 AEHP 1969, 1 p.

Pedder, A.E.H., 1970. Report on 158 lots of Devonian fossils collected by W.S. Mackenzie and A.E.H. Pedder on Operation Norman, 1968, 1969 (NTS 95C-E, L, M, and 106A, G-J, O); Geological Survey of Canada, Paleontological Report WSM 18 AEHP 70, 39 p.

Sweet, A.R., 1984; Applied research report on 45 samples from the Little Bear Formation and immediately contiguous strata Brackett Basin, Northwest Territories (NTS 96D, 96C) as requested by D.K. Norris; Geological Survey of Canada, Paleontological Report 8-ARS-1984, 26 p.

Utting, J., 2009; Palynological investigation of 11 outcrop samples from the Devonian and Cretaceous of the Mackenzie Corridor, N.W.T.; submitted by K. Fallas, Geological Survey of Canada (Calgary) (NTS 96D and 96E); Geological Survey of Canada, Paleontological Report JU-2009-07, 6 p.

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Coordinate System

Projection: Universal Transverse Mercator
Units: metres
Zone: 9
Horizontal Datum: NAD83
Vertical Datum: mean sea level

Bounding Coordinates

Western longitude: 127°00'00" W
Eastern longitude: 126°00'00" W
Northern latitude: 64°30'00" N
Southern latitude: 64°00'00" N

Data Model Information

Surface bedrock data are organized into feature classes and themes consistent with logical groupings of geological features. All field observation point data are related through the Station_ID property of the Station theme. These feature attribute names and definitions are identical in the shapefiles and the XML files.

Consult PDFs in Data folder for complete description of the feature classes, feature attributes, and attribute domains.

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ACCORD DE LICENCE D'UTILISATION SANS RESTRICTION DE DONNÉES NUMÉRIQUES DE GÉOGRATIS

CE DOCUMENT constitue une entente légale entre vous (ci-après le " Détenteur de licence ") et SA MAJESTÉ LA REINE DU CHEF DU CANADA (ci-après le " Canada "), représentée par le Ministre des Ressources naturelles du Canada. **EN ATTEIGNANT, TÉLÉCHARGEANT, IMPRIMANT OU UTILISANT LES DONNÉES, L'INFORMATION OU LE MATÉRIEL FOURNIS OU ACCESSIBLES SELON CETTE ENTENTE, VOUS VOUS ENGAGEZ À RESPECTER LES MODALITÉS DE CET ACCORD. SI VOUS ÊTES EN DÉSACCORD AVEC CES MODALITÉS, VOUS DEVEZ IMMÉDIATEMENT ÉLIMINER TOUTE COPIE DE CES DONNÉES, INFORMATION, MATÉRIEL ET PRODUITS DÉRIVÉS.**

- I. **ATTENDU QUE** le Canada détient les droits de propriété sur les données (les " Données ") accessibles aux termes des modalités de cet Accord;
- II. **ATTENDU QUE** le Détenteur de licence désire obtenir certains droits sur les Données, sous réserve des modalités énoncées ci-après;
- III. **ATTENDU QUE** le Canada déclare avoir la pleine autorité pour accorder les droits demandés par le Détenteur de licence, sous réserve des modalités énoncées ci-après;
- IV. **ET ATTENDU QUE** les parties veulent en venir à une entente d'utilisation à partir de ce qui suit.
- V. **À CES CAUSES**, en considérant les conventions contenues dans cet Accord, les parties conviennent de ce qui suit :

1.0 DÉFINITIONS

1. Données du Canada signifie toute Donnée dont le Canada détient le droit de propriété.
2. Données signifie toute donnée numérique, métadonnée ou documentation visée par les modalités de cet Accord.
3. Produits dérivés signifie tout produit, système, sous-système, appareil, composant, matériel ou logiciel qui comprend ou utilise toute partie des Données.
4. Droits de propriété intellectuelle signifie tout droit de propriété intellectuelle reconnu par la loi, y compris tout droit de propriété intellectuelle protégé par une législation telle que celle qui régit, sans être limitée à, les droits d'auteur et les brevets.

2.0 CESSION D'UNE LICENCE

1. 2.1 Sous réserve des modalités du présent Accord, le Canada octroie au Détenteur de licence une licence non exclusive, sans frais ni redevances exigibles, et le droit d'exercer tous les Droits de propriété intellectuelle sur les Données. Ceci comprend le droit d'utiliser, incorporer, accorder des licences d'utilisation (avec droit subséquent d'accorder des licences d'utilisation), modifier, améliorer, développer et distribuer les Données; et de fabriquer ou distribuer des Produits dérivés.
2. Les Droits de propriété intellectuelle découlant de toute modification, amélioration, développement ou traduction des Données, ou de la fabrication de Produits dérivés, effectués par ou pour le Détenteur de licence seront détenus par le Détenteur de licence ou tout substitut identifié par le Détenteur de licence.

3.0 PROTECTION ET IDENTIFICATION DE LA SOURCE

1. L'utilisation des Données ne constitue en aucune façon une reconnaissance par le Canada d'un Produit dérivé. Le Détenteur doit identifier la source de données, de la façon suivante, lorsque toute partie des Données est redistribuée ou comprise dans un Produit dérivé :
© Le ministère des Ressources naturelles Canada. Tous droits réservés.

4.0 GARANTIE, EXCLUSION ET INDEMNISATION

1. Le Canada ne fait aucune représentation ou garantie, expresse ou tacite, découlant de la loi ou d'autres sources, en ce qui concerne entre autres l'exactitude, l'utilité, la nouveauté, la validité, l'étendue, l'intégralité ou l'actualité des Données et rejette expressément toute garantie implicite de qualité loyale et marchande ou l'à propos à une fin particulière des Données. Le Canada n'assure ni ne garantit la compatibilité du site qui contient les Données avec les versions antérieures, actuelles et futures de n'importe quel fureteur.
2. Le Canada ne peut être tenu responsable par le Détenteur de licence en ce qui a trait à toute réclamation, revendication ou action en justice, quelle qu'en soit la cause, concernant toute perte ou tout préjudice ou dommage ou frais, direct ou indirect, qui pourrait résulter de la possession ou de l'utilisation des Données par le Détenteur de licence.
3. Le Détenteur de licence tiendra le Canada et ses représentants, employés, agents et exécutants, indemnes et à couvert à l'égard de toute réclamation, revendication ou action en justice, quelle qu'en soit la cause, alléguant toute perte, tout frais, toute dépense, tout dommage ou toute blessure (y compris toute blessure mortelle) qui pourrait résulter de la possession ou de l'utilisation des Données par le Détenteur de licence.
4. Le Détenteur de licence devra accorder des licences d'utilisation à toute personne ou partie qui obtient les Données ou des Produits dérivés au moyen d'un accord de licence, et cet accord devra imposer à ces personnes ou parties les mêmes modalités que celles qui sont énoncées dans la section 4.0 de cet Accord.
5. L'obligation du Détenteur de licence d'indemniser le Canada selon cet Accord ne peut affecter ni empêcher le Canada d'exercer tout autre droit selon la loi.

5.0 DURÉE

1. Cet Accord entre en vigueur à partir de la date et de l'heure d'acceptation des modalités de l'Accord (Heure de l'Est) et restera en vigueur pour une période d'un (1) an, en vertu de la sous-section 5.2 et de la section 6.0 qui suivent.
2. À la fin du premier terme, cet Accord sera automatiquement renouvelé pour des termes successifs d'un (1) an, en vertu de la section 6.0 qui suit.

6.0 RÉSILIATION

1. 6.1 Nonobstant la section 5.0, cet Accord peut être résilié :
 - i. automatiquement et sans préavis, si le Détenteur de licence manque à ses engagements ou obligations selon cet Accord;
 - ii. par un préavis écrit de résiliation émis par le Détenteur de licence, en tout temps, et cette résiliation prendra effet trente (30) jours suivant la réception d'un tel préavis par le Canada; ou
 - iii. par consentement mutuel des parties.

2. Lors de la résiliation de cet Accord, pour quelque raison que ce soit, les obligations qui incombent au Détenteur de licence en vertu de la section 4.0 continueront de s'appliquer et les droits du Détenteur de licence en vertu de la section 2.0 cesseront immédiatement.
3. Lors de la résiliation de cet Accord, pour quelque raison que ce soit, le Détenteur de licence devra immédiatement effacer ou détruire toutes les Données obtenues en vertu de cet Accord, ou à l'intérieur d'un délai raisonnable lorsque les Données sont nécessaires pour terminer la livraison de Produits dérivés commandés avant la résiliation de cet Accord.

7.0 GÉNÉRAL

1. **Lois d'application**

Le présent Accord est régi et interprété en vertu des lois en vigueur dans la province de l'Ontario. Les parties acceptent de tomber sous la juridiction de la Cour supérieure de la Province de l'Ontario.

2. **Totalité de l'Accord**

Le présent Accord constitue l'intégralité de l'entente conclue entre les parties relativement à l'objet du présent Accord. Toute modification à cet Accord ne peut être que par écrit, doit porter la signature de chaque partie et exprimer clairement l'intention de modifier cet Accord.

3. **Solution des litiges**

Si un litige survient à propos de cet Accord, les parties tenteront de le résoudre par des négociations de bonne foi.