

Yukon Digital Bedrock Geology

February 2022 update

Release notes

In this update, the following enhancements were made to the Yukon Digital Bedrock Geology dataset:

1. New detailed maps were integrated into the GIS dataset for:
 - a Keno Hill district, NTS 105M/13-14 (Read et al., 2020)
 - b Porcupine River area, west of Old Crow, NTS 116N/6-7, 10 (Faehnrich et al., 2020)
 - c Rusty Spring area, NTS 116K/7-10 (Greig, 2000)
 - d Mount Raymond area, NTS 116I/8 (Lane, 2020)
2. The GIS data for the Frances Lake area (105H) and adjacent part of Watson Lake area (105A) were updated to reflect the latest interpretation of the regional stratigraphy by D. Moynihan for the region. The revised map for Frances Lake will be released with the final report for this area (in preparation). Reinterpretation of the Hyland Group stratigraphy established in France Lake was also applied to the western edge of the Coal River area (95D). These reinterpretations of the geology are in part guided by unpublished regional mapping by G. Jilson and colleagues for the Anvil Range Corp. in the early 1980s
3. Parts of the McQuesten area mapped by D. Murphy were revised to capture the published maps more accurately (Murphy et al., 1996; Murphy and Héon, 1996a,b)
4. The stratigraphy of the Road River Group in the Richardson Mountains was revised according to formal nomenclature published by Strauss et al. (2020)
5. Pennsylvanian-Permian plutons intruding Wrangellia and Alexander terranes in the Saint Elias Mountains of southwestern Yukon were previously assigned to the Icefield Ranges suite (ca. 308-285 Ma; Gordey and Makepeace, 2001; Colpron et al., 2016a,b). These plutons are now divided into two distinct suites following Beranek et al. (2014) – the Barnard Glacier (ca. 307-301 Ma) and Donjek Glacier (ca. 291-284 Ma) plutonic suites.
6. Mafic and ultramafic rocks in parts of western (115O, 116B-C; Dawson–Clinton Creek) and central Yukon (105F; Dunite Peak) were previously assigned to the Slide Mountain terrane (Anvil assemblage: Gordey and Makepeace, 1999; Slide Mountain assemblage: Colpron et al., 2016a). New data published by van Staal et al. (2018) and Parsons et al. (2019) provide the basis for separating these occurrences of mafic-ultramafic rocks from the Slide Mountain terrane *sensu stricto*. Oceanic rocks of the Slide Mountain terrane occur between the Yukon-Tanana terrane and rocks of the ancestral North American margin in southeastern Yukon and British Columbia. They range from Mississippian to early Permian (older than ca. 274 Ma gabbro bodies intruding them; e.g., Murphy et al., 2006). Rocks in the Dawson–Clinton Creek and Dunite Peak areas have distinct composition (arc vs. MORB in

Slide Mountain) and younger ages (ca. 268-264 Ma; van Staal et al., 2018; Parsons et al., 2019). They also occupy a distinct structural setting, sandwiched between rocks assigned to the Yukon-Tanana terrane. For these reasons, we have assigned these mafic-ultramafic complexes to the “Dawson-Clinton Creek assemblage” following Mortensen (1996) but provisionally assign those rocks to the Yukon-Tanana terrane rather than Slide Mountain. Ongoing work should provide more details on this reinterpretation of the geology.

7. The attribute structure for the bedrock geology polygon feature class and shapefile was modified. A new field was introduced (ASSEMBLAGE) to more readily identify the name of regional assemblages (which may reflect Group or Formation level source names). The REFERENCE and MI_COLOUR fields of previous versions have now been removed. The reference information is now tied to the line feature classes (faults and contacts) and information about the source maps compiled is given in a separate feature class – Bedrock Map Index.
8. The attribution of line feature classes (faults and contacts) is much improved from previous version of the bedrock geology GIS dataset. The scale of display for faults and contacts (SCALE field) and distinction between intrusive and stratigraphic contact types are now more accurate.
9. A companion paper that summarizes features of the Yukon Digital Bedrock Geology datasets is also available (Colpron, 2022)

We thank users who contributed comments and pointed out errors in the data since the last update. We welcome your feedback as we strive to continue improving the geoscience dataset for Yukon.

The updated GIS dataset can be downloaded from:

<https://data.geology.gov.yk.ca/Compilation/3>

As always, the Yukon Geological Survey welcomes any revisions or additional geological information known to the user.

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Recent publications relevant to this update:

Beranek, L.P., van Staal, C.R., McClelland, W.C., Joyce, N.L. and Israel, S., 2014. Late Paleozoic assembly of the Alexander-Wrangellia-Peninsular composite terrane, Canadian and Alaskan Cordillera. *Geological Society of America Bulletin*, vol. 126, p. 1531-1550.

Colpron, M., 2022. The Yukon digital bedrock geology compilation. *In: Yukon Exploration and Geology 2021*, K.E. MacFarlane (ed.), Yukon Geological Survey, p. 143-159.

Colpron, M., Israel, S. and Friend, M., 2016b. Yukon plutonic suites. Yukon Geological Survey, Open File 2016-37, scale 1:750 000.

Colpron, M., Israel, S., Murphy, D.C., Pigage, L.C. and Moynihan, D., 2016a. Yukon Bedrock Geology Map. Yukon Geological Survey, Open File 2016-1, scale 1:1 000 000. 2 *sheets*.

Faehnrich, K., McClelland, W.C., Colpron, M., Nutt, C.L., Miller, R.S., Trembath, M. and Strauss, J.V., 2020. Pre-Mississippian stratigraphic architecture of the Porcupine Shear Zone, Yukon and Alaska, and significance in the evolution of northern Laurentia. *Lithosphere*, <https://doi.org/10.2113/2021/7866155>.

Gordey, S.P. and Makepeace, A.J., 2001. Bedrock geology, Yukon Territory. Geological Survey of Canada, Open File 3754, scale 1:1 000 000. *also: Yukon Geological Survey, Open File 2001-1*.

Greig, C.J., 2000. Geologic setting, genesis, and potential of the Rusty Springs Ag-Pb-Zn-Cu property, northern Yukon (NTS 116 K/8 and K/9). *In: Yukon Exploration and Geology 1999*, Emond, D.S. and Weston, L.W. (eds.), Exploration and Geological Sciences Division, Yukon Region, Indian and Northern Affairs Canada, p. 247-266.

Lane, L.S., 2020. Bedrock geology, Mount Raymond, Yukon, NTS 116-I/8; Geological Survey of Canada, Canadian Geoscience Map 71, scale 1:50 000.

Murphy, D.C., Héon, D. and Hunt, J.A., 1996. Geological map of Clear Creek area, western Selwyn Basin, Yukon. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Geoscience Map 1996-1, 1:50 000 scale.

Murphy, D.C. and Héon, D., 1996a. Geological map of Sprague Creek map area, western Selwyn Basin, Yukon, NTS 115P/15. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Geoscience Map 1996-2, scale 1:50 000.

Murphy, D.C. and Héon, D., 1996. Geological Map of Seattle Creek Area, Western Selwyn Basin, Yukon, NTS 115P/16. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Geoscience Map 1996-3, scale 1:50 000.

Murphy, D.C., Mortensen, J.K., Piercey, S.J., Orchard, M.J. and Gehrels, G.E., 2006. Mid-Paleozoic to early Mesozoic tectonostratigraphic evolution of Yukon-Tanana and Slide Mountain terranes and affiliated overlap assemblages, Finlayson Lake massive sulphide district, southeastern Yukon. *In: Paleozoic Evolution and Metallogeny of Pericratonic Terranes at the Ancient Pacific Margin of North America*, Canadian and Alaskan Cordillera, M. Colpron and J.L. Nelson (eds.), Geological Association of Canada, Special Paper 45, p. 75-105.

Parsons, A.J., Zagorevski, A., Ryan, J.J., McClelland, W.C., van Staal, C.R., Coleman, M.J. and Golding, M.L., 2019. Petrogenesis of the Dunite Peak ophiolite, south-central Yukon, and the distinction between upper-plate and lowerplate settings: A new hypothesis for the late Paleozoic–early Mesozoic tectonic evolution of the Northern Cordillera. *Geological Society of America Bulletin*, vol. 131, p. 274-298,

Read, P.B., McOnie, A. and Iles, S., 2020. Geology of the Keno Hill district, Yukon. Yukon Geological Survey, Open File 2020-42, scale 1:25 000 and 1:2 500. *2 sheets*.

Strauss, J.V., Fraser, T.A., Melchin, M.J., Allen, T.J., Malinowski, J., Feng, X., Taylor, J.F., Day, J., Gill, B.J. and Sperling, E.A., 2020. The Road River Group of northern Yukon, Canada: early Paleozoic deep-water sedimentation within the Great American Carbonate Bank. *Canadian Journal of Earth Sciences*, vol. 57, p. 1193-1219.

van Staal, C.R., Zagorevski, A., McClelland, W.C., Escayola, M.P., Ryan, J.J., Parsons, A.J. and Proenza, J., 2018. Age and setting of Permian Slide Mountain terrane ophiolitic ultramafic-mafic complexes in the Yukon: Implications for late Paleozoic-early Mesozoic tectonic models in the northern Canadian Cordillera. *Tectonophysics*, vol. 744, p. 458-483,

Projection information:

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Projection ALBERS
Datum NAD83
Zunits NO
Units METERS
Spheroid GRS1980
Xshift 0.0000000000
Yshift 0.0000000000
Parameters
61 40 0.000 /* 1st standard parallel
68 0 0.000 /* 2nd standard parallel
-132 30 0.000 /* central meridian
59 0 0.000 /* latitude of projection's origin
500000.00000 /* false easting (meters)
500000.00000 /* false northing (meters)
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