

SURFICIAL ACTIVITIES LABRADOR 2016

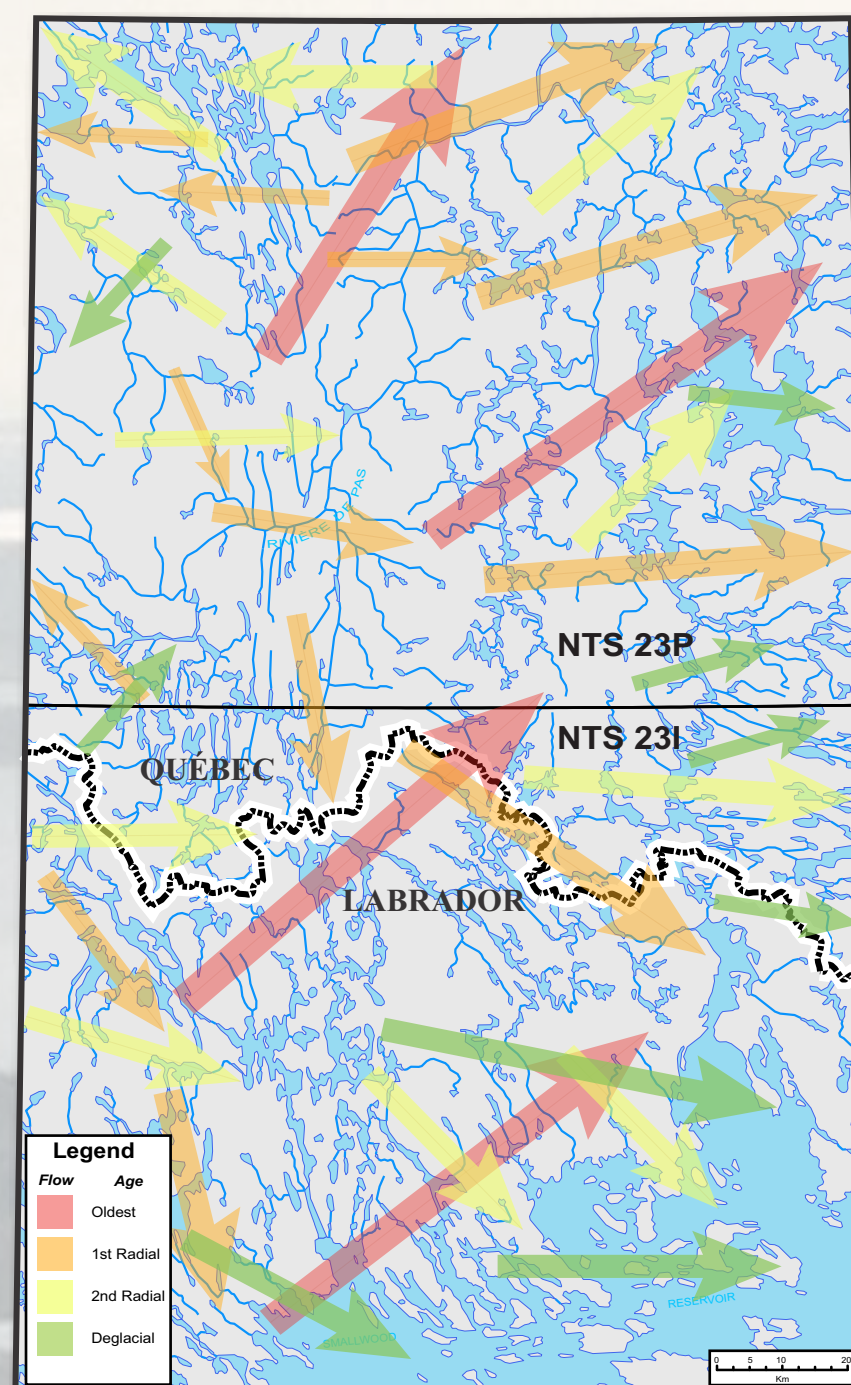
GEM2 HUDSON-UNGAVA CORE ZONE

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During the summer of 2016, the Geological Survey participated in the Geological Survey of Canada's GEM2 Hudson-Ungava Core Zone project in western Labrador. The aim is to understand ice-flow patterns of the Labrador ice centre, characterize glacial landscapes and to determine glacial dispersal, sediment transport and deposition north of the Smallwood Reservoir. The survey represented the third and final year of work in this project involving ice-flow chronology (cosmic nuclide analysis), relative exposure history of glaciolacustrine sediments (optical stimulated luminescence-OSL dating), and

indicator-mineral studies, as well as traditional surficial mapping and sampling. Fieldwork focused on glacial mapping and sampling of the southwestern portion of the Woods Lake 1:250 000 NTS map areas 231/03, 231/04, 231/05, 231/06, 231/11 and 231/12. The choice of sample sites was based on proximity to previously documented mineralization and ice-flow indicators, and in areas where till was abundant. Sites were accessed by helicopter as there is no road access in the area. Till samples were taken at 54 sites, and multi-element analytical results are expected to be released in 2017.

GLACIAL FLOW HISTORY- LABRADOR ICE CAP



GSC Open File 8148

Investigation of glacial-flow indicators (striae, rat tails, grooves), from several sites measured between 2014 and 2016, shows a complex subglacial regime with ice movement initially to the northeast, and radial flow out from the Labrador ice centre and subsequent deglacial flow to the east. The photographs show rat tails crosscut by striae (A) and a conglomerate outcrop with large wrap-around striations and rat tails (B). The map on the right is a composite of glacial flow observations collected between 2014 and 2016.

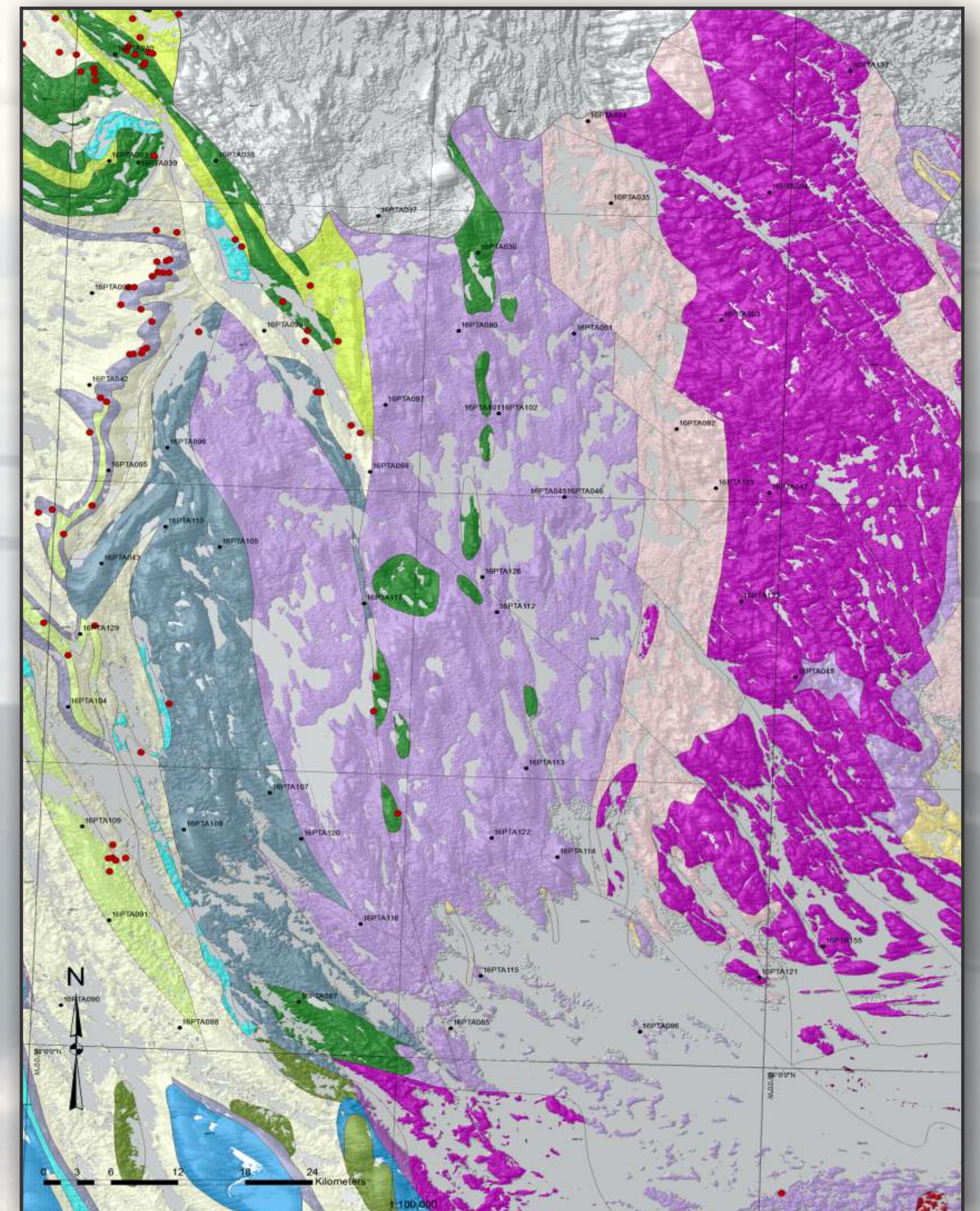
MELTWER, ESKERS AND GLACIAL LAKE LOW



Large volumes of meltwater carried sediment from the northwest, through channels in the till cover, to the area occupied by the present-day Smallwood Reservoir. Large eskers and esker complexes (left), channels and eroded moraines attest to the amount of meltwater involved. A large glacial lake (informally named 'Glacial Lake Low' after A.P. Low who recognized in 1896 that the final disintegration of the continental ice sheet occurred in this region) submerged the surrounding region up to 8 m above current reservoir levels. Evidence of Glacial Lake Low can be seen in glacial landforms such as littoral beach deposits, strandlines and wave-cut benches (right).

BEDROCK GEOLOGY AND GLACIAL LANDSCAPE-LABRADOR

The uplands in the northwest study area consist of bedrock (volcanics and metasediments of the Labrador Trough), interspersed with abundant glacial meltwater channels, and covered by a thin till veneer. Most of the known mineral occurrences are located here and are hosted by the Knob Lake Group. The central lowlands consist of wetlands, mostly underlain by metatonalite and gneiss, surrounding isolated till-covered hills underlain by later gabbro. Known mineral occurrences in this area are related to the gabbro. The east is underlain by granitic rocks, and is covered by a till veneer, while the south is dominated by spectacular glaciofluvial landforms and moraines that cover metasedimentary and intrusive rocks to the southwest, and metatonalites and gneiss to the southeast.



Geological map showing the southwestern Core Zone (NTS 231 west). The composition of till derived from diagnostic bedrock of contrasting composition should provide excellent elemental indicators of glacial dispersal patterns and aid in locating up-ice sources of indicator minerals and anomalous geochemistry. Red dots indicate documented mineralization.

FUTURE WORK



The opportunity to be part of a larger study of the Labrador ice centre was invaluable. Future publications of maps, geochemical results, relative age dates and data from all aspects of this project will provide a more thorough framework for future work in this area; to aid in understanding the environment in terms of future resource exploration, development and management.