Kimberlite indicator mineral sampling, western Labrador

Newfoundland Labrador
Natural Resources

The Archean cratons of western Labrador are potential targets for diamond-bearing kimberlites and lamproites. In 2012, the Geological Survey conducted a reconnaissance regional-scale field program as an initial appraisal of the area. The main objective was to collect sand and gravel samples from esker deposits, to be analyzed for kimberlite indicator mineral (KIM) grains as a means of identifying potential areas for diamond exploration.

Shoestring-shaped esker west of Menihek Lakes. Samples were collected at 5 km intervals along this ~ 20 km esker.

Eskers and Kimberlite Exploration

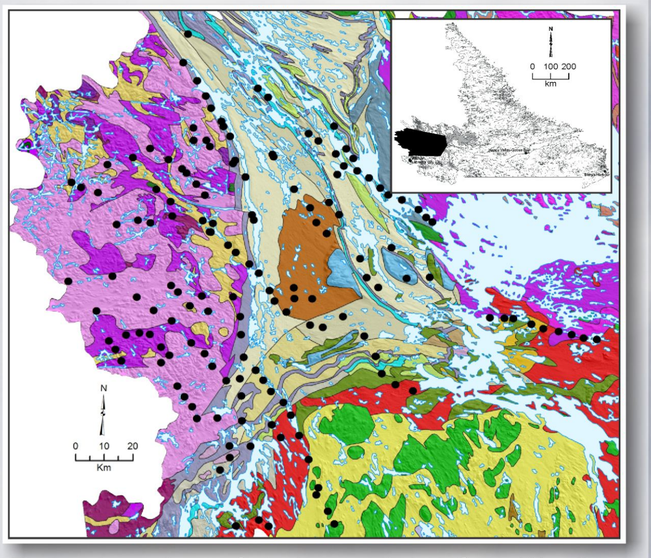
These eskers are part of a large tree-shaped esker network northwest of Menihek Lakes.

Most of western Labrador is blanketed by thick glacial sediments that obscure potential diamond-bearing intrusions. Initial exploration in glaciated terrain requires the analysis of surficial sediment samples (in this program, eskers) for indicator minerals from eroded kimberlite and lamproite. Eskers, sinuous ridges of glaciofluvial sand and gravel, are abundant in western Labrador and elsewhere in the Precambrian Shield.

Bedrock Geology

The main focus area was on the Archean Ashuanipi Metamorphic Complex of the Superior Province which comprises intrusive and high-grade (granulite facies) metamorphic rocks.

The study area also occupies the Proterozoic Churchill Province which includes the Labrador Trough and comprises sedimentary and volcanic rocks in its western part and mafic volcanic and intrusive rocks in its eastern part. East of the trough, the Churchill Province comprises gneissic and granitic intrusive rocks. To the south is the metamorphic gneissic Grenville Province, which includes the metamorphic equivalents of the trough and gabbroic intrusive rocks.



Bedrock geology of study area (taken from Wardle *et al.*, 1997). Sample locations are shown by black dots.

Sampling and Analysis

156 medium- to very coarse-sand samples (~10-15kg) were collected and sieved on site and stored in heavy plastic sample bags. Sample sites were designated prior to and during the field program based on the mapped distribution of eskers, particularly the regional map of Klassen *et al.* (1992).

The large sharp-crested esker ridge above is part of an extensive esker network overlying the Ashuanipi Complex.

Sample processing is being carried out by Overburden Drilling Management and includes sieving, heavy-mineral separation, and magnetic separation. The resulting non- to weakly- magnetic heavy mineral concentrates are examined by microscope in order to identify potential KIM grains.

Samples were sieved to < 4 mm in the field.

Sample collecting east of Esker.

Selected mineral grains will be analyzed for major and minor elements by scanning electron microprobe. Counting, measuring and classification of gold grains and platinum-group minerals will also be conducted.

Data is expected to be released in Spring 2013

References

Klassen, R.A., Paradis, S., Bolduc, A.M., and Thomas, R.D., 1992. Glacial landforms and deposits, Labrador, Newfoundland and eastern Quebec. Geological Survey of Canada, ``A`` Series Map, 1814A.

Wardle, R.J., Gower, C.F., Ryan, B., Nunn, G.A.G., James, D.T., and Kerr, A., 1997. Geological Map of Labrador; 1:1 million scale. Government of Newfoundland and Labrador, Department of Mines and Energy, Geological Survey, Map 97-07.