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2013

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A Virtual Geological Field Trip Across Victoria Island, Northwest Territories

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2013

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doi:10.4095/292435

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

Recommended citation
Williamson, M.-C., Rainbird, R.H., Froome, J., and Brown, O., 2013. A virtual geological field trip across Victoria Island, Northwest Territories; Geological Survey of Canada, Open File 7361, 6 p. + poster. doi:10.4095/292435

Publications in this series have not been edited; they are released as submitted by the author.

INTRODUCTION

The poster contains information on the objectives, location, and contents of a geoscience outreach activity initiated in June 2012 by leaders of the GEM-Minerals Victoria Island Project[1]. The approach involved the production of a Google Earth© software interface that simulates a geological field trip by helicopter to key locations on Victoria Island, Northwest Territories. At each location, the physiography and geology are illustrated by a series of captioned photographs. The poster was presented at the Yellowknife Geoscience Forum in November, 2012 (Williamson et al., 2012b) as a means to collect feedback on the contents prior to the release of the Google Earth© fly-through Open File Report.

BACKGROUND INFORMATION

The Geo-Mapping for Minerals and Polar Continental Shelf Programs of Natural Resources Canada provided support for geological field work on Victoria Island in 2010 and 2011. The operations were extensive, and involved over 30 geologists and the community of Ulukhaktok each summer. In keeping with the stated objective of *acquiring new information on northern resource potential* [2], the Victoria Island project targeted the new geoscience knowledge required for base and precious metal exploration.

The objectives of the GEM-Victoria Island outreach activity were to: (1) introduce some aspects of the geoscience that could assist the community of Ulukhaktok on questions related to mineral exploration and resource development; (2) promote the GEM-Victoria Island project goals and showcase discoveries; (3) communicate the details on access, aircraft and other logistical support, field safety protocols, mapping tools, technology, etc, that are required to conduct geological field work in Canada's North; (4) increase public awareness about career opportunities in the Earth Sciences; and (5) promote networking amongst GEM-Minerals stakeholders in northern communities, industry, territorial governments, universities, and colleges. First and foremost, the deliverable was a tangible way to thank the residents of Ulukhaktok for their support of the field campaigns since 2009.

The GEM-Victoria Island Virtual Geological Field Trip consists of 18 stops along a route that zigzags through the entire area targeted for geological mapping. This poster highlights 8 of the stops to illustrate the diversity of activities carried out during the 2010 and 2011 field campaigns.

POSTER FIGURE CAPTIONS

Central Map

Figure 1. LANDSAT-7 mosaic of central Victoria Island showing the location of 18 stops along the Google-Earth© geological field trip. The mosaic was assembled for remote predictive geological mapping in advance of field work (Behnia et al., 2012).

Life in Camp

Figure 2. Aerial view of the GSC base camp at Minto North (2010).

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[1] http://www.nrcan.gc.ca/earth-sciences/about/current-program/geomapping/minerals/8061

[2] http://www.nrcan.gc.ca/earth-sciences/about/current-program/geomapping/7131

Figure 3. The base camp is where campers work hard, learn new skills, and relax.

Figure 4. Several geological field crews are deployed each day and returned safely back to base camp thanks to our dedicated helicopter pilots.

Figure 5. Fly camps such as this one typically involve 2 to 4 geologists and wildlife monitors working at one location for a few days.

Island Resources – Carving Stone Deposit

Figure 6. A deposit of gypsum was discovered by GSC geologist Rob Rainbird in 2005. The outcrop provides an accessible source of high-quality alabaster for stone carving.

Figure 7. Local artist Ross Klengenberg carves the stone in Ulukhaktok.

Figure 8. A beautiful sculpture made from the Victoria Island alabaster.

Figure 9. Local residents of the hamlet of Ulukhaktok worked hard to excavate the stones from a cliff-side quarry.

Figure 10. A closer look at the deposit reveals the delicate light purple to pale pink translucent colour of the rock. Sledge hammer for scale.

Island Resources – Copper, Natkusiak Formation

Figure 11. Panoramic view of the Natkusiak Formation. Lava flows (dark) of different thicknesses overlie sandstone beds (pale).

Figure 12. Luke Ootes (NWT Geoscience Office) at the site of a copper sheet in basaltic lava flows.

Figure 13. Weathering of the native copper sheets gives the metal a green tarnish known as ‘patina’.

Geology – Karst Caverns and Sandstone Cylinders

Figure 14. Paleocavern in sharp, irregular contact with hosting limestone (Mathieu et al., 2013). Sledge hammer for scale.

Figure 15. The concentric structures are cylinders in cross-section and are thought to have formed when water escaped upwards from underlying paleocaverns. Sledge hammer for scale.

Geology – Sill Gossan

Figure 16. Gossans are weathered, iron-rich soils that result from the alteration of sulphides. This gossan, located beneath a Franklin diabase sill, is a natural laboratory to study the formation of oxides in a permafrost environment (Williamson et al., 2012a). Shown here is Lisel Currie, research scientist at GSC Calgary.

Geology – Canyon, Kuujjua Formation

Figure 17. A Franklin diabase sill and the underlying Kuujjua sandstone beds are well-exposed at this locality.

Tunnunik Crater

Figure 18. Digital elevation model of the topography derived from 1:50 000 scale Canadian Digital Elevation data. The dashed line shows the location of the impact structure (Dewing et al., 2013).

Figure 19. Oblique aerial view of a canyon (looking southeastward) where steeply dipping strata were found. These layers of rock could have formed in the uplifted, central area of a complex crater.

Community Engagement

Figure 20. Reeney Oliktoak and Jean Bédard.

Figure 21. Agnes Kuptana, Mary Kudlak, Reeney Oliktoak and Jean Bédard, checking out the maps.

Figure 22. Susie Memogana and Jack Alanak at base camp.

Figure 23. Justine Okheena at work as a field assistant.

Figure 24. Jasmine Klengenberg and Gayle Ogina participate in a geological traverse.

Figure 25. Ashley Kagyut on board the helicopter.

Figure 26. Noah Akhiatak participates in a fly camp to collect rocks of the Natkusiak Formation.

Figure 27. From left to right: Noah Akhiatak, Isaac Inuktalik, Mathieu Beaudoin and Rob Rainbird.

Figure 28. Brian Kuptana and Patrick at Ulukhaktok airport.

ACKNOWLEDGEMENTS

Thank you to the residents of the hamlet of Ulukhaktok, Victoria Island; Luke Ootes of the NWT Geoscience Office; and the participants of the Victoria Island Project for contributing photographs and captions for the poster. We are grateful to Alain Leclair and John Percival for their encouragement during the soap talk and fly-through demonstration held at the Yellowknife Geoscience Forum in November, 2012. Special thanks to Mary Sanborn-Barrie, leader of the GEM-Cumberland project, who first applied the concept of a fly-through for community and public outreach. Odette Nehza and Beth Hillary assisted the authors in the production of the poster. Jeanne Percival provided a critical review that improved the original poster and report.

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