## TGI 4: Investigating structural and tectonic controls on Devonian intrusion related mineralisation on the Connaigre Peninsula, Newfoundland

N. Rogers<sup>1</sup>, G. Ruberti<sup>2</sup>, D.A. Kellett<sup>1</sup>, C.R. van Staal<sup>3</sup> and J. Hanchar<sup>2</sup>

Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario
Memorial University of Newfoundland, St John's, Newfoundland and Labrador
Geological Survey of Canada, Vancouver, British Columbia

**Abstract:** Targeted Geoscience Initiative 4 (TGI 4) is a 5 year Government of Canada program to help produce the next generation of innovative geoscience knowledge and analytical techniques that will result in more effective targeting of buried mineral deposits. The Geological Survey of Canada in collaboration with provincial and territorial surveys, industry and academia will conduct thematic, knowledge-driven projects based around ore systems. The thematic nature of TGI 4 means that individual projects are not defined by geographic region, but instead integrate data and knowledge from multiple sites across Canada, to optimise ore system categorisation.

Intrusion related (e.g., porphyry) deposits are the most important sources for Cu, Mo, W and Sn, along with Au, Ag, and PGEs. Porphyry deposits are large, low- to medium-grade deposits in which mineralisation is hosted within and immediately surrounding distinctive intrusive phases within larger intrusive complexes that commonly have a complex and prolonged emplacement history. The metallogenic contents of intrusion related deposits are diverse, reflecting a variety of tectonic settings.

The Connaigre Peninsula was selected to study the structural and tectonic controls on the formation of granitoid intrusion-related Sn-W-Mo mineralisation as it contains a variety of supracrustal units plus (apparently) barren and mineralised intrusives within a relatively constrained and accessible area. The main mineralised zones are related to the ca. 376 Ma Old Woman Stock and ca. 377 Ma phase of the Ackley Granite (Rencontre Lake facies of Tuach, 1987).

The detailed bedrock map of O'Brien (1992) has been simplified to highlight the main lithotectonic packages. Their distributions indicate three distinct tectonic blocks (herein Gander, Deadman's Bight and Wreck Cove blocks) that were amalgamated during the Devonian along major fault zones. The topographically prominent Hermitage Bay Fault has traditionally been considered to represent the Gander – Avalon boundary in this area. However, the recently obtained Silurian age for the Pass Island Granite indicates against this, as Avalonia (sensu lato) was on the passive margin at that time. In contrast to the Hermitage Bay Fault, the White Horse – East Bay fault zone, although major break, is obscured by younger sequences and so its exact position is unknown. It is interpreted to be positioned to the north-west of the Cambrian passive margin style sequences of the Young's Cove Group. In this model the White Horse – East Bay fault zone also separates the Upper Devonian Poole's Cove and Great Bay De L'Eau formations. As these formations: i) occupy approximately the same stratigraphic position; ii) are both red to buff coloured sandstone to boulder conglomeratic sequences; and iii) both appear to unconformably overlie the likely Lower Devonian Cinq Isles Formation, they are considered as a single map unit for this study.

Originally presented AMEBC Mineral Exploration Roundup 2015, Vancouver, BC, January 25-28, 2015.

Corresponding author: Neil Rogers (nrogers@nrcan.gc.ca)

Rogers, N., Ruberti, G., Kellett, D.A., van Staal, C.R., and Hanchar, J., 2015. TGI 4: Investigating structural and tectonic controls on Devonian intrusion related mineralisation on the Connaigre Peninsula, Newfoundland; *in* TGI 4 – Intrusion Related Mineralisation Project: New Vectors to Buried Porphyry-Style Mineralisation, (ed.) N. Rogers; Geological Survey of Canada, Open File 7843, p. 571-572.

