

Collaboration between academia and the junior exploration sector during Ni-Cu-PGE exploration in Labrador

I. BLISS^{1*}, C. VAILLANCOURT¹, W.D. MAIER²

¹Northern Shield Resources, 150-160 Metcalfe St, Ottawa K2P 1P2, Canada (*correspondence: ibliss@northern-shield.com)

²School of Earth and Ocean Sciences, Cardiff University, UK

The Labrador trough is an early Proterozoic (2.17-1.87 Ga) volcanosedimentary belt formed in a rifted continental margin setting during break-up of the Kenorland supercontinent, from ~ 2.2 Ga to ~ 1.87Ga [1]. The large volume of mafic-ultramafic intrusions and basaltic lavas in the area suggests enhanced magmatic sulfide potential, but only relatively small Ni-Cu-PGE deposits have been found so far, possibly implying that larger deposits remain undiscovered. The interpretation of geochemical data and the application of modern ore forming models has led to the discovery of Ni-Cu-PGE sulfides at Northern Shield's Idefix and Huckleberry prospects. Drilling and surface sampling at Idefix proved the existence of reef type mineralization averaging 0.2-0.4 g/t PGE over 16-34 meters that can be traced for 7 km along strike (with peak grades of 16 g/t Pt+Pd). The presence of large (up to 3cm) Ni-Cu-PGE bearing sulphide globules observed in every drill hole points to the possible existence of nearby massive magmatic sulphides [2]. Preliminary analysis of these globules showed grades on the order of 2% Ni, 4% Cu and 20 g/t PGE, and SEM element maps provided information on location and grain size of platinum-group minerals that is important for assessing metal recovery.

Huckleberry is located 350 km SE of Idefix, and 100 km N of Schefferville, Quebec. Mineralisation has so far been traced along a strike length of 3 kilometers, with 70 samples collected in 2015 yielding an average of 1.10 % Cu, 0.21 % Ni and 0.87 g/t PGE+Au. The richest sample contains 10.6 wt% Cu and 16.9 ppm PGE+Au. The host rocks are gabbros with major and trace element concentrations similar to Idefix, suggesting a broadly similar magmatic lineage. The ore forming model comprises sill-like intrusion of sulfide-bearing magmas into semi-consolidated gabbroic sills, concentration of sulfides along the base of the intruding magma, and locally downward percolation of sulfides into the footwall cumulates.

[1] Wares & Skulski (1992). *EOS* **73**, 333. [2] Robertson et al. (2016) *J.Petrol.* **56**, 2445–2472.