Petrological and geochemical characterization of the Nuvulialuk mafic-ultramafic Suite, Southeastern Churchill Province, Québec

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The Nuvulialuk mafic-ultramafic Suite is located near the boundary between the Core Zone and the Torngat Orogen, in the Southeastern Churchill Province (NTS sheets 24H10 and 24H15). This suite consists of several kilometre-scale intrusions oriented N-S that were emplaced along the Blumath deformation zone. It is composed of metamorphosed mafic and ultramafic rocks that intrude the Paleoproterozoic Lake Harbour Group, a clastic sedimentary sequence dominated by paragneisses, quartzites or an alternation of these two lithologies. Some paragneiss horizons at the base of the sequence contain disseminated sulphides (3-15%). The mafic-ultramafic intrusions are the result of increased magmatic activity within a continental intraplate setting associated with mantle plumes. This is an interesting setting from an economic standpoint for the formation of Ni-Cu and platinum group element (PGE) mineralization. Mapping and systematic sampling of these intrusions was carried out during the summer of 2014, with ~150 observation points. Subsequently, fifty samples were selected for petrographic and lithogeochemical analyses. Our observations indicate that the Nuvulialuk mafic-ultramafic suite is dominated by two rock groups consisting of peridotitic facies and mafic facies (pyroxenites and gabbros). Ultramafic rocks exhibit various textures ranging from olivine cumulates (with crystals ≤ 5 cm) to olivine and pyroxene mesocumulates (with crystals ≤ 2-3 cm and ≤ 30 cm, respectively), whereas mafic rocks are mostly massive. Deformation is variable, resulting in some very weakly deformed facies to locally mylonitic zones. Foliations exhibit two preferential orientations: i) NE-SW (~N30ºE) and ii) WNW-ESE (~N310ºE), with variable dips ranging from 50º to 90º. Folds trending ~ N180ºE and ~N275ºE with shallow dips (5-25º) were also observed. Based on preliminary results for eight samples collected in 2013 by the *Ministère de l'Énergie et des Ressources naturelles*, four groups were established: i) wehrlite with Pd = 17 ppb and Pt = 11 ppb, ii) pyroxenite with Pd = 12 ppb and Pt = 8 ppb (average grades), iii) amphibolite with Pd = 6 ppb and Pt = 3 ppb, and iv) gabbro with Pd < 0.5 ppb and Pt = 2.5 ppb. Upcoming work will aim to characterize the petrography, mineral chemistry, and geochemistry of these rocks to assess the economic potential of the intrusions and determine their emplacement setting.