

Mobilized Chromite and Hybridized Ultramafic Rocks in the Black Label Breccia Zone of the Black Thor Intrusive Complex, McFaulds Lake Greenstone Belt, Ontario

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Abstract

The 2.7 Ga Black Thor Intrusive Complex (BTIC) is located in the James Bay Lowlands of northern Ontario and is composed primarily of dunite, ilherzolite, websterite, olivine websterite and chromitite (Black Thor and Black Label horizons) with melaleuco gabbro and anorthositic gabbro. After emplacement and crystallization but before complete solidification of the BTIC, a Late Pyroxenite transgressed the dunites and ilherzolite of the lower ultramafic series and lower parts of the middle ultramafic series, including the Black Label chromitite horizon, producing a wide range of breccias and hybrid lithologies. The Late Pyroxenite is composed largely of light grey, unaltered, generally medium-grained, heteradcumulate websterite with pods of light blue, unaltered, coarse- to very coarse-grained, mesocumulate feldspathic orthopyroxenite. Both lithologies are cross-cut by thin (<2 cm) blue altered pyroxenite veins, probably representing expulsion of a late magmatic melt phase. Along the margins and sporadically distributed into the core of the Late Pyroxenite is the heterolithic Black Label Breccia Zone (BLBZ), which contains 1-30 cm (rarely >50 cm) clasts of dunite, chromitite, and ilherzolite within a matrix of hybrid olivine websterite or ilherzolite. BLBZ lithologies are heterogeneous and interfinger on a decimeter to meter scale. The form and contacts of the clasts vary from amoeboidal to subangular, and sharp to embayed depending on clast lithology and proximity to the central portion of the BTIC. The matrices of the ol-cpx-opx-chr hybrid rocks show evidence of olivine resorption, and crystallization of interstitial oikocrystic clinopyroxene. Current work is focused on the mineral chemistry and petrology of the hybrid rocks to establish the P-T conditions during brecciation/hybridization and on mapping out the lithological and textural variations within the BLBZ to establish the mechanism(s) of emplacement.