“Chisel”-ing Away: Laurentian University Graduate Research Projects at Snow Lake, Manitoba

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Abstract

The Paleoproterozoic Flin Flon Belt is host to 28 significant volcanogenic massive sulphide (VMS) deposits. The Snow Lake arc assemblage is located at the eastern extent of the belt and has undergone peak regional metamorphism at middle almandine-amphibolite facies. It is divided into the Anderson, Chisel, and Snow Creek sequences, with VMS deposits occurring in the Anderson and Chisel sequences. Three graduate projects are in progress in order to provide a new understanding of the VMS metallogeny and assembly of the Snow Lake assemblage with a focus on the Chisel sequence: 1) The Volcanic and Deformation History, Geodynamic Setting and Metallogenesis of the Upper Chisel Succession (Engelbert, Gibson, Lafrance, DeWolfe, Tinkham); 2) Reaction History and Cu-Pb-Ag-Au-Zn Mobility at the Lalor deposit (Lam, Tinkham, Gibson); and 3) Volcanic Reconstruction of the Powderhouse Dacite (Friesen, Gibson, DeWolfe). The objective of project 1 is to reconstruct the tectonic, petrogenetic, and volcanic evolution of the Upper Chisel sequence and its VMS deposits. The contact between the Upper and Lower Chisel sequences is important as it represents the productive VMS horizon in the Chisel sequence but the nature of this contact is relatively unknown. Project 2 aims to characterize Cu-Pb-Ag-Au-Zn mineralization at the Lalor deposit and unravel the metamorphic reaction history to determine if metals were remobilized within the deposit. Lalor is the largest deposit in the Lower Chisel sequence and is different from the other deposits as it is Au-rich, deep, and contains an extensive footwall alteration system. The purpose of project 3 is to investigate the petrogenesis, origin, structure, and emplacement mechanisms for the Powderhouse dacite unit. The Powderhouse dacite is important because it is the immediate stratigraphic footwall unit to all VMS deposits at the Upper-Lower Chisel sequence contact and represents the volcanic environment prior to VMS formation.