

Department of Geology

Doctoral Research Proposal Defence



Saint Mary's
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SCIENCE

Melt inclusions associated with Archean volcanogenic massive sulphide deposits: constraints on the pre-eruptive metal and volatile content of magmas

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via Zoom

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Abstract

The role of magmas in sourcing specific metals (e.g. Cu, Pb, Zn, Au) in seafloor hydrothermal ore-forming systems has been a long-standing debate. This novel study focuses on elucidating the role of magmas in metal and volatile upgrading in Archean volcanogenic massive sulfide (VMS) deposits in the Abitibi Greenstone Belt (Ontario-Quebec) through the study of melt inclusions hosted in zircon. The key objectives of this study are: (i) Establish that melt inclusions methodologies currently used to study typically younger magmatic-hydrothermal ore systems can be applied to Archean VMS systems; (ii) Examine the spatiotemporal variations of metal tenors of volcanic rocks from metal-fertile and metal-barren stratigraphic units in the Abitibi Greenstone Belt; (iii) Determine the chemical conditions of melt inclusions to understand how metals are supplied to VMS deposits; and (iv) Understand the chemical evolution of melt inclusions which can provide insight into the tectono-magmatic history of VMS deposits in the Abitibi Greenstone belt. This research will address a knowledge gap that may result in a significant improvement in our understanding of the processes responsible for VMS endowment and ultimately provide new criteria of value to global VMS exploration.

