A Stratigraphic Framework for the Zn-Pb Ba VMS Deposit, NW BC, Canada, Using New U-Pb Age Dates and Lithogeochemistry; Implications for Mineral Systems in the Golden Triangle

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The BA Zn-Pb VMS system is located in the southern half of the well-endowed Stikine Terrane of Northwest British Columbia, Canada. It is hosted in the Jurassic (ca. 201-168 Ma) Hazelton Group; a bimodal island arc assemblage comprising submarine to subaerial coherent and volcano-sedimentary rock units that define multiple paleo-volcanic centers across a 150-km area. Several VMS deposits are hosted throughout the Hazelton Group stratigraphy including the silver-rich Dolly Varden deposit at the base and the gold-rich Eskay Creek deposit at the top. The Zn-Pb BA deposit is geographically between these two significant mineral deposits that lie 130 km apart in BC's Golden Triangle. However, the age and lithological provenance of the host stratigraphy remains ambiguous.

The volcanic facies at BA are assigned to both the Lower and Upper Hazelton Group using primarily textural classification with no proximal geochemical/geochronological constraints over the 25 Ma interval. Several unconformities have been mapped at BA and further complicate unraveling the stratigraphy in the study area and contextualizing its paleo-depositional setting within the Hazelton Group. In addition, the mineralization style at BA differs from the above precious metal-rich deposits, composed largely of the base metals Zn and Pb, which could be due to its location within the Hazelton Group.

Detailed field relationships and drill core logging are combined with new whole-rock major and trace element lithogeochemistry, shortwave infrared spectroscopy, and zircon U-Pb dates from key stratigraphic positions such as unconformities, mineralized horizons, and intrusive units. These results will establish the geological framework of the BA mineralizing system in both temporal and regional stratigraphic context in relation to the Dolly Varden and Eskay Creek VMS deposits.