Epithermal-style gold mineralization in the eastern Cobequid Highlands, Nova Scotia: towards a first model

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In the northeastern Cobequid Highlands, Nova Scotia, recent bedrock mapping, bulk rock geochemistry, and prospecting has identified a potential low-sulphidation epithermal Au system in Late Devonian to Early Carboniferous bimodal volcanic rocks. In this area of the Highlands, two distinct volcanic units are present, the Byers Brook Formation consisting of felsic and volcaniclastic rocks and the overlying Diamond Brook Formation comprised of vesicular basalts with minor felsic volcaniclastic rocks. To the southwest these formations overly the Hart Lake-Byers Lake granite, and to the north are unconformably overlain by Late Carboniferous sedimentary rocks of the Cumberland Basin. These magmatic events are synchronous with the onset of siliciclastic sedimentation in the Maritimes Basin and combined with the bimodal, within-plate characteristics of the volcanic package suggest emplacement in a continental-rift-type environment. Continental-rift, bimodal volcanic environments are known to host epithermal gold systems (e.g., Great Basin, Nevada) and the Warwick Mountain area located in the northwestern part of the Diamond Brook Formation shows the most potential for gold mineralization. Here two zones of intensely silicified and sulphidized basalt are present with the mineral assemblage of quartz + sericite + carbonate + pyrite ± chlorite ± epidote. Assays from the first narrower zone returned anomalous Au concentrations, up to ~660 ppb. Anomalous concentrations of As, Sb, Cd, and W were also detected. These trace elements are typical of the bimodal volcanic-hosted low-sulphidation deposits in Nevada. To date, there has been no detailed study conducted on this potential low-sulphidation Au system leaving many questions unanswered. This preliminary study aims to answer two questions: (1) What is the mineralogy and paragenesis of alteration and mineralization and (2) With what generation of pyrite (i.e., early vs. late) is gold mineralization associated? In order to address the above questions, petrographic microscopy and SEM-EDS will be conducted to determine the alteration and ore mineralogy and paragenesis, thereby aiding in determining the relative age of Au precipitation. This research will contribute new data to a poorly studied area and will help put constraints on the mineralization history and economic potential.[Poster]

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