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RELATIVE AND ABSOLUTE TIMING OF GOLD MINERALIZATION ALONG THE MELIADINE TREND, NUNAVUT, CANADA: EVIDENCE FOR PALEOPROTEROZOIC GOLD HOSTED IN AN ARCHEAN GREENSTONE BELT

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Abstract

The Meliadine area of the Neoproterozoic Rankin Inlet greenstone belt is located on the western shore of Hudson Bay, Canada, and is host to several important orogenic or mesothermal gold deposits. Supracrustal rocks comprise alternating southeast-striking panels of mafic volcanic and clastic sedimentary rocks, both of which are host to banded iron formation. The dominant structural element is the Pyke “Break,” a several-kilometer-wide, high-strain zone characterized by multiple foliations and regionally important shear zones. Gold mineralization is spatially associated with these shear zones. The maximum age of mineralization is constrained by the observation that auriferous veins crosscut ca. 2450 Ma mafic dikes, and a minimum age is constrained by undeformed, postore lamprophyre dikes emplaced at ca. 1830 Ma. Highly concordant SHRIMP-determined ages on hydrothermal monazite indicate auriferous veining occurred at ca. 1850 Ma. These relative and absolute timing constraints suggest gold was concentrated in Neoproterozoic supracrustal rocks during Paleoproterozoic tectonothermal activity that was widespread in the western Churchill province at ca. 1850 Ma. These observations do not preclude the presence of Archean gold occurrences in the Rankin Inlet greenstone belt, but no “early” deformed ores can be linked to auriferous veins introduced at ca. 1850 Ma, suggesting remobilization from earlier formed deposits was not a factor in concentrating gold at Meliadine.

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