Gold mineralization in the Neoproterozoic Avalonian rocks of the Newfoundland Appalachians

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Much of the southeastern (Avalonian) margin of the Newfoundland Appalachians is cored by Neoproterozoic (760-540 Ma) volcano-plutonic arcs of peri-Gondwanan paleogeographic affinity. Similar successions extend southeastward along the eastern seaboard through maritime Canada and coastal New England, into the Carolinas and Georgia. Avalonian rocks host a variety of mineral occurrences, most notably gold. Extensive areas of argillic and advanced argillic alteration and associated epithermal-style gold mineralization accompanied the formation of volcano-plutonic arcs in at least two distinct episodes within the Newfoundland Avalon Zone (635-620 Ma and 590-560 Ma). Examples of high sulphidation (acid sulphate) and low sulphidation (adularia-sericite) systems are preserved. In several examples, the host rocks are calc-alkaline subaerial felsic volcanics and/or coeval intrusions. There is a spatial relationship of altered rocks with adjacent, overlying, marine siliciclastic rocks. The geological setting and the type and size of hydrothermal systems present in the Newfoundland Avalon Zone, coupled with the existence of similar styles of mineralization in gold deposits in Avalonian rocks of similar age in maritime Canada and the Carolina Slate Belt emphasizes the potential of Newfoundland's Avalonian rocks for epithermal and porphyry-style gold and copper-gold mineralization.