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**Geology and geochemistry of the Rattling Brook gold deposit, western Newfoundland: An assessment in the context of new exploration models**

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ANDREW KERR

*Geological Survey of Newfoundland and Labrador, Department of Natural Resources, PO Box 8700, St. John's, NL, A1B 4J6.*

The Rattling Brook gold deposit is a large, dispersed, low-grade system in which auriferous sulphides are disseminated or present in myriad tiny veinlets. Larger and more continuous quartz vein systems typical of most gold deposits are conspicuously absent. The dominant host rocks are altered Precambrian granites, but some of the best mineralization occurs in altered Precambrian metadiabase dykes and in Cambrian quartzite, limestone and phyllite. The mineralization must be post-Cambrian, but its timing is otherwise unconstrained, although a Silurian or younger age is implied by its undeformed character. The commonality of textures in mineralized rocks, and broadly similar alteration sequences, suggest that a single process deposited gold in all of these host rocks. Petrological and metallurgical studies indicate that free gold is very rare and imply that much of the gold is refractory, likely held within sulphides. The most likely candidates are gold-rich arsenopyrite or gold-rich arsenian pyrite, but the latter has yet to be firmly identified. Geochemical data indicate that there is very little associated Ag, and essentially no enrichment in Cu, Zn, Pb, Co, or Ni. There are strong Au-As-S correlations, and a diffuse Au-Ag correlation, but essentially no correlation between gold and the base metals. Auriferous samples are also commonly enriched in Te and W, and there is more diffuse enrichment in Sb. A few auriferous samples display marginal enrichment in Tl, but no obvious enrichment in Hg or Se is present. The geochemical characteristics and associations resemble those described from

sedimentary-rock-hosted micron (“Carlin-type”) gold deposits or generally similar noncarbonate-hosted disseminated-stockwork gold deposits. These conclusions are encouraging in the context of new exploration models for western Newfoundland. However, there remains a pressing need for more extensive and precise trace element geochemistry, and for more information on sulphide mineral assemblages and the precise habitat of the gold.