Developing a Combined 3D Geochemical and Mineralogical Model of the Hope Brook Gold Deposit, Newfoundland

E.Cayer[1], D. Copeland[2], B. Pearson[2], B. Hylands[2], L. Lepage[1], N. Banerjee[1]
[1]Department of Earth Sciences, Western University, London, ON, Canada; [2]Coastal Gold Corp., Toronto, ON, Canada

Abstract

The Hope Brook gold deposit is a high sulphidation mesothermal to epithermal gold deposit located in southwestern Newfoundland in the Avalon Zone. The deposit was mined from 1987 to 1997 and produced a total of 752,163 ounces of gold from combined open pit and underground operations. Gold mineralization is hosted in silicified zones within the Late Proterozoic Whittle Hill Sandstone – Third Pond Tuff succession. This succession is developed upon the syn-volcanic quartz-feldspar-porphyry Roti Intrusive Suite, and strongly deformed by the Cinq Cerf Fault in the Silurian. It is enveloped by a zone of advanced argillic alteration about three kilometers long and 400 meters wide. Previous models of the deposit have been proposed but are for the most part solely based on mineralogy. This project will use X-ray diffraction and short-wave infrared spectroscopy data in conjunction with oxygen isotope analysis, X-ray fluorescence data, and ICP-OES and ICP-MS data to create a combined 3D mineralogical and geochemical model of the deposit using Leapfrog software. These data will be used to better identify alteration patterns that can be used as vectors towards higher grade gold mineralization. Currently, X-ray diffraction data and ICP-OES and ICP-MS data are being compiled to represent the mineralogy and geochemistry of each lithology type at Hope Brook. There are four main lithology types at Hope Brook: the Siliceous Alteration Zone, Pyrite Zone, Argillic Alteration Zone, and the Roti Felsic Intrusive Suite. Gold mineralization is hosted within the Siliceous Alteration Zone and bulk-rock oxygen isotope analysis of all units suggests that gold mineralization at Hope Brook was likely from a single fluid source. Evidence for this comes from the fact that all samples with high gold grades have oxygen isotope values that consistently fall within a narrow window.