

Geochemical prospecting in the Carboniferous Maritimes Basin of eastern Canada

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Geochemical exploration in Canada is normally conducted in areas covered with thick sheets of glacial drift. Within the Maritimes Basin, traditional geochemical methods including those of soil, till, stream sediment -80 mesh, heavy minerals, lake sediments, and several vegetation media have been applied to locate many deposits outcropping at surface. Of those classical methods, vegetation is normally the most cost-effective sampling method to locate mineralization. However, where a significant bedrock cover masks buried mineralization, there is a distinct paucity of studies involving success in discovery. Several multi-media studies detail surface geochemical expression in the Maritimes Basin of Nova Scotia, including those at the Yava Pb and Jubilee Pb-Zn deposits; all show anomalous responses but to a varying degree of resolution depending on the sampling media applied. The Canfield Creek Cu-Ag deposit lies beneath 100 m of bedrock sedimentary rock and has no surface geochemical expression; it was found by wildcat drilling based on a geologist's hunch. In order to increase discovery rates in these covered situations, partial extraction soil technology is applied at several locations within the Maritimes Basin. This technology greatly enhances the resolution of the location of the Canfield Creek deposit not easily seen by other methods. Studies at the Jubilee Pb-Zn deposit at outcrop, along-strike, and under cover were able to locate the ore zone beneath 200 m of anhydrite. It is shown that buried deposits in the Maritimes Basin can be detected using partial extraction geochemistry, including but not limited to MMI, SGH, and Enzyme Leach, and that partial extraction geochemical methods are capable of detecting mineralization through at least 400 m of bedrock cover.