

Base Metal Skarns and Au Occurrences in the Southern Gaspé Appalachians: Distal Products of a Faulted and Displaced Magmatic-Hydrothermal System along the Grand Pabos-Restigouche Fault System

MICHEL MALO,

INRS-Géoressources, Centre géoscientifique de Québec, C.P. 7500, Sainte-Foy, Québec, Canada G1V 4C7

ROBERT MORITZ,

Section des Sciences de la Terre, Université de Genève, 13 rue des Maraîchers, 1211 Genève 4, Switzerland

BENOÎT DUBE,

Commission géologique du Canada, Centre géoscientifique de Québec, C.P. 7500, Sainte-Foy, Québec, Canada G1V 4C7

ANDRÉ CHAGNON, FRANÇOIS ROY, AND CHANTAL PELCHAT

INRS-Géoressources, Centre géoscientifique de Québec, C.P. 7500, Sainte-Foy, Québec, Canada G1V 4C7

Abstract

In the southern Gaspé Appalachians, base metal and Au occurrences are spatially associated with the Acadian dextral strike-slip Grand Pabos and Restigouche faults. Mineralization occurs as veins, replacement zones, and disseminations along the main structures and subsidiary faults with orientations compatible with the dextral strikeslip kinematics along the main faults.

Limestone of the Upper Ordovician-Lower Silurian White Head Formation hosts numerous base metal skarns and Au occurrences that are surrounded by halos of argillaceous alteration. The Reboul prospect is a type example of base metal skarns and consists of three types of mineralization: (1) early strata-bound disseminated Cu-Zn-Ag associated with marble-hornfels and skarn, (2) northeast- and northwesttrending (Cu-Zn-Pb-Ag-(Au) and Ag-Cu-Zn-Pb-(Au-Sb)) veins, parallel and perpendicular to the regional folding, and (3) late Ag-Au-Zn-Pb mineralized zones in quartz breccia veins parallel to the Grand Pabos fault. Crosscutting relationships, fluid inclusion microthermometry, mineralogy of the three types of mineralization, and alteration patterns were used to define the timing of mineralizing processes which are (1) prograde metamorphism, (2) metasomatism and hydrothermal alteration with hightemperature skarn formation and Cu-Zn-Ag mineralization, (3) retrograde alteration with Cu-Zn-Pb-Ag-(Au) and Ag-Cu-Zn-Pb-(Au-Sb) veins, and (4) late Au precipitation at low temperature. The Saint-André-de-Restigouche prospect is the best example of Au mineralization spatially associated with a base metal skarn in the area. It consists of Au-Sb-As extensional veins and stockwork hosted by limestones.

Felsic dikes associated with base metal skarns and a magmatic-hydrothermal breccia at the Reboul prospect are evidence for magmatic activity coincident with the mineralizing events. Argillaceous alteration, high-temperature and high-salinity fluid inclusions, and the Pb isotope compositions of galena are compatible with a model linking the skarns and Au occurrence to Early to Middle Devonian magmatic activity at depth along the Grand Pabos and Restigouche faults. A palinspastic pre-Acadian strikeslip reconstruction of the southern Gaspé Appalachians shows that all mineral occurrences hosted by the White Head Formation belong to the same mineralized area that might represent distal components of a magmatic-hydrothermal system at depth.