

Variably metal endowed fault systems in the Larder Lake area

Ross Sherlock, Laurentian University, Sudbury, Canada

Research by the Metal Earth project includes a ~40 km geologic transect in the Larder Lake area of the southern Abitibi Subprovince. This transect crosses the Cadillac-Larder Lake break and the Lincoln-Nipissing shear zone. These two fault systems each represent crustal scale breaks, juxtaposing different geologic assemblages with variable gold mineralization.

The Lincoln-Nipissing shear zone juxtaposes the Skead (2701 \pm 3/-2 Ma) felsic-intermediate volcanic rocks against mafic and ultramafic volcanic rocks of the Larder Lake group (ca. 2710-2704 Ma) and clastic sedimentary rocks of the Hearst assemblage (< [CHECK ORIGINAL RE <] ca. 2700 Ma), marking a distinct change in the age and geometry of the volcano-sedimentary strata. Gold mineralization along the Lincoln-Nipissing shear zone is associated with Timiskaming-aged small volume intrusions which intrude the shear zone, and to a lesser extent with fuchsitic altered ultramafic rocks.

The Cadillac-Larder Lake break is a regionally significant fault system and in the Larder Lake area juxtaposes Timiskaming clastic sedimentary rocks (2677-2670 Ma) along with small volume alkali intrusions and their volcanic equivalents against ultramafic volcanic rocks of the Larder Lake group. Gold mineralization is mainly associated with fuchsitic altered ultramafic rocks and albite altered mafic volcanic rocks, and to a lesser extent with alkalic intrusions. Gold deposits in the area include the Kerr Addison deposit that previously produced 11Moz at an average grade of 9 g/t gold.

At both the Cadillac-Larder Lake break and the Lincoln-Nipissing shear zone, ultramafic rocks of the Larder Lake group (equivalent to the Piche in Quebec) are unconformably overlain by clastic rocks of the Timiskaming or Hearst assemblage, suggesting that the original geologic relationship was stratigraphic in nature and subsequently overprinted by deformation and alteration associated with the gold deposits.

Recent geological and geophysical surveys have indicated that the Cadillac-Larder Lake break is resolved using seismic methods to over 30 km depth and has a corresponding conductivity anomaly. In contrast the Lincoln-Nipissing shear zone, although sharing similar characteristics to the Cadillac-Larder Lake break, is poorly resolved in seismic and MT methods, perhaps correlating with the relative lack of metal endowment along the shear zone.

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Ross Sherlock, Kate Rubingh and the Metal Earth research team