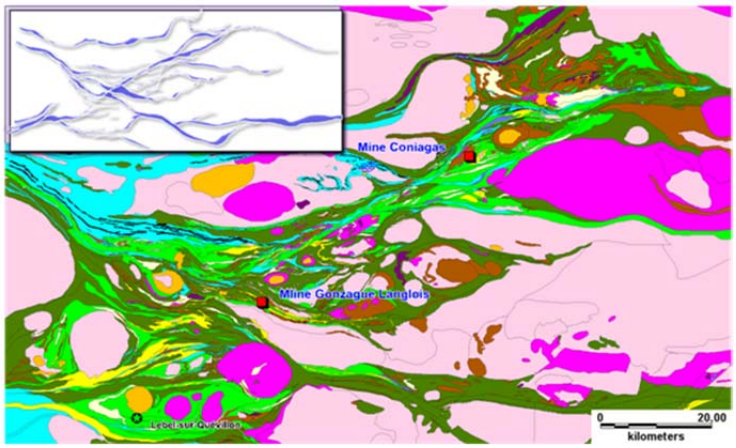
CONSOREM
Consortium de recherche en exploration minérale

2010-03: The Lebel-sur-Quévillon / Lac Short (Abitibi) metallogenic corridor revisited

The area of Lebel-sur-Quévillon, located in the centre of the Abitibi Subprovince, has several special geological features that make it favourable for several types of mineralisation environments. First, the area is located in a NE-oriented segment of greenstones. It is a point where several major structures meet, such as the Cameron Fault, the Casa Berardi Fault and the Lamarck-Wedding Fault. It includes rhyolites fertile for VMS mineralisation and it contains a wide variety of intrusions from synvolcanic tonalites to late alkaline intrusions.



New geological and structural interpretation of the Lebel-sur-Quévillon – Lac Short corridor for orogenic gold and volcanogenic massive sulphides

Following the discovery of the Grevet deposit in the late 1980s (the present day Gonzague-Langlois Mine: 1.9 Mt Zn produced and in reserves/resources), several companies began exploring in the Lebel-sur-Quévillon area. The results from several of these companies, especially present day members of CONSOREM, were never made public. One of the objectives of project 2010-03 was to integrate on searchable layers and to make uniform a large amount of geological and geophysical data stored in outdated digital formats (for example .dxf) and dispersed in different projects or catalogued by township. By integrating this new information with SIGÉOM and recent Megatem surveys from Xstrata, a new high-resolution mapping model is presented for this region of high-potential. Outcrops / drill core, and information obtained from them, as well as the deformation of geophysical conductors and S0 and S1 traces helped to define better known deformation corridors and to identify about ten new ones. The Lamarck-Wedding corridor was refined and now reaches between 2 and 4 km in width and crosses the entire area in an orientation that is atypical in Abitibi, NE-SW.

Targets were generated for volcanogenic massive sulphide (VMS) and orogenic gold mineralisation at different scales. For VMS exploration, arguments based on geochemical affinity and the fertility of volcanic and intrusive rocks, geophysical signatures, volcanic assemblage and textures, as well as the paleovolcanic reconstruction helped propose extensions to the fertile volcanic sequence of the Gonzague-Langlois Mine, especially to the west and to the south and SW of the differentiated synvolcanic Mountain Pluton. Once favourable volcanic domains were defined, several target zones were identified by comparing the position of the isolated Megatem conductors with mass gains and losses of certain elements known to be mobile and proximal to volcanogenic hydrothermal systems, as well as to the geochemical fertility of rhyolites (project 2004-02). The area between Gonzague-Langlois and Coniagas Mines also seems fertile, but has not been worked a lot. Intrusions previously interpreted as syntectonic show similar magnetic signatures to synvolcanic plutons. Felsic volcanics are present in the region, but their geochemical fertility is little known. Paleovolcanic reconstruction led to proposing two cycles of volcanic basin openings: the first around 2718 Ma with one or several volcanic basins of transitional affinity and the Gonzague-Langlois massive sulphides, and the second possibly around 2722 Ma with at least two basins with calc-alkaline affinity, oriented NE-SW parallel to the Lamarck-Wedding

fault, and correlated with the Géant Dormant volcanogenic gold mineralisation. This fault would have had significant control very early in the volcanic history of the area.

The new deformation corridors explain known gold mineralisations, but a relationship with a regional structure was not proposed. The area occupied by these corridors is therefore a prime target for orogenic gold deposits. Based on outcrop and drill core descriptions, 6 new syenites (≥1 km^2) and about twenty small syenitic bodies (<1 km^2) were identified regionally. Most of the syenites are spatially associated with deformation corridors. Hydrothermal alteration around the syntectonic intrusions and along faults was characterised using a new mineral data normalisation method on 250 m x 250 m cells. Several alteration zones around the syenites and/or along the deformation corridors without known mineralisation and with local EM anomalies are suggested as exploration targets.

Project 2010-03: Summary	
Objectives	• To integrate a large amount of information to refine the geological model of the area. • To recognise environments similar to the mineralised Gonzague-Langlois volcanic sequence. • To determine the nature and chronology of the Lamarck-Wedding Fault compared to other deformation corridors and to identify new deformation corridors.
Results	• 54 exploration targets at different scales for VMS and gold. • Other environments favourable for VMS were identified around Gonzague-Langlois. • New altered and mineralised deformation corridors. • A first paleovolcanic reconstruction proposed for the area.
Innovations	• Integration of unpublished and public data for the development of a new geological framework and new exploration models. • Multidisciplinary approach that identified volcanic domains fertile in VMS and deformation corridors fertile in orogenic gold.