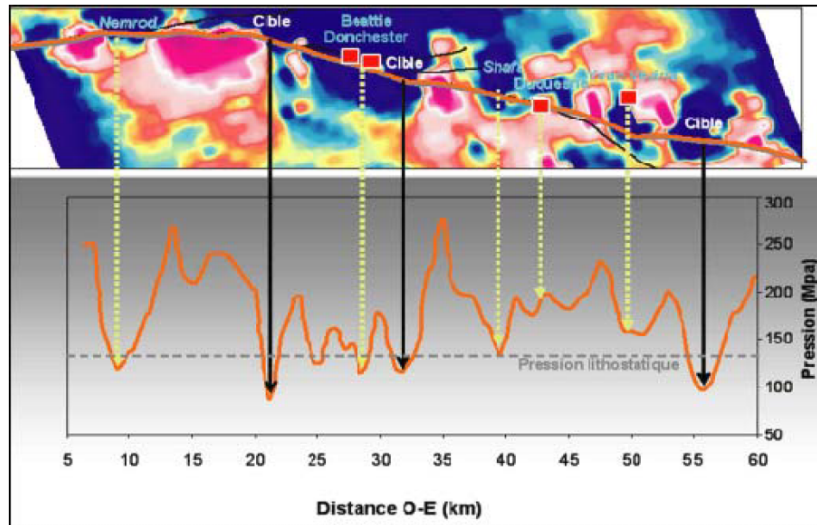


Project 2003-03: Modeling of paleostresses and paleopressures and prediction of mineralised gold areas along the Porcupine-Destor Fault

The tectonic paleopressures on the Quebec portion of the Porcupine - Destor - Manneville Fault (PDMF) were reconstituted using UDEC, a geomechanical modeling software. Regional scale modeling is centered on the PDMF and covers the area between the Quebec-Ontario border to the west and the village of Destor to the east. From the results obtained on this model using UDEC, it is possible to establish a spatial correlation between specific areas of pressure and known gold mineralisation. The Beattie and Donchester mines are located in the center of a vast area of low pressure (100-170 MPa) measuring about 10 x 13 km. The Yvan Vezina mine and most deposits with values above 10 g / t Au are located in areas equivalent to lithostatic pressure (130 MPa) and where the pressure gradient is high. The Duquesne mine is located at the tip of a kilometre-scale high pressure area (200 MPa) of and surrounded by a crescent-shaped area of low pressure extending over several kilometers. The distribution of gold values along the PDMF show that the grades higher than 1 g Au/t are located in area of lower pressure than the 1 g g Au/t values.



Longitudinal along PDMF showing changes in mean pressure $(\sigma_1 + \sigma_2)/2$ and the position of mines and deposits (in italics). Several exploration targets can be deduced.

Normative CO₂ and H₂O values were calculated using Normat software and are compared in plan and longitudinal sections with the calculated pressures from the regional model. The CO₂ values greater than 5% show a good spatial correlation with areas of low pressure. This relationship establishes a direct link between tectonic pressure and carbonate-type hydrothermal alteration. The normative H₂O indicates the presence of hydrated and metamorphic minerals. Areas of high pressure have a normative H₂O content of ± 3%, while in areas of low pressure the values are ± 1%. This relationship is explained by the fact that metamorphic minerals are more abundant and/or have been preserved from carbonate alteration in areas of high pressure.

By relying on paleopressure signatures similar to those identified around the Beattie mine, the Donchester mine and several gold deposits, the favourable areas for exploration along the PDMF have been identified.

Summary: Project 2003-3

Objectives	<ul style="list-style-type: none"> To establish favourable sites for gold mineralisation along the PDMF.
Results	<ul style="list-style-type: none"> Modelling the formation of the Duparquet pull-apart basin. Modelling the influence of fault curvature. Correspondence between mineralisation and low-pressure zones. Delineation of new areas with high potential.
Tools and Innovations	<ul style="list-style-type: none"> Modelling of paleopressures related to hydrothermal activity for establishing gold prospectivity of a crustal fault segment.
Special Collaboration	<ul style="list-style-type: none"> Silvain Rafini, UQAM.