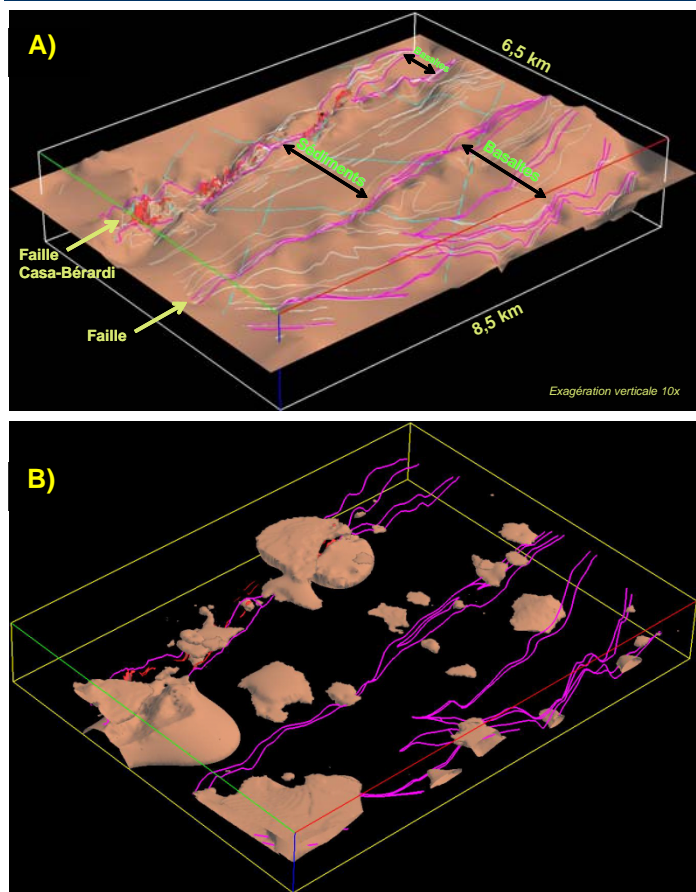


## Project 2002-5: 3D modelling of the Quaternary deposits in the Casa-Bérardi mine area - Implications for exploration

Quaternary stratigraphy and glacial dispersion are relatively poorly known in northwestern Abitibi because of glacial lake sediment thickness and the scarcity of stratigraphic sections. More specifically, gold anomalies in the till covering the Casa-Bérardi mines are historically documented as being erratic. They are interpreted either as a secondary geochemical enrichment or as glacial remobilisation. 3D modelling of the stratigraphy and the Au and As anomalies in the till as well as in the glaciofluvial deposits was carried out over the gold deposit. The objective of the project is to gain a better understanding of the geometry of geochemical anomalies and the ice dynamics in the area to improve exploration strategies.

The database used contains 1659 reverse circulation drill sites covering an area of 50 km E-W by 10 km N-S. In addition, 1948 diamond drill holes were integrated to generate the bedrock topography. An 8.5 km E-W by 6.5 km N-S block was chosen for carrying out the modelling above the mineralised zones. Seven Quaternary lithostratigraphic units were identified from the base to the top: old till, Lower Matheson Till, Missinaibi sediments, Upper Matheson Till, Ojibway sediments, Cochrane Till and humus.

3D analysis of the data shows that topographic lows along the basement correspond to the mineralised zones and to regional faults. The topographic highs correspond to volcanics and to iron formations. The Quaternary stratigraphy is homogeneous and laterally continuous. The geometry of the Au and As anomalies is homogeneous with polyphased glacial dispersion established for the region. In the deep depressions, the anomalies in the old till explain the presence of the West Zone mineralised lenses. The Main and East Zones are explained by the step-like anomalies in the Matheson Till. Glacial dispersion above these two zones is mostly controlled by basement topography down-ice; a rocky spur to the south of the Casa-Bérardi Fault limits the Au and As anomalies to a narrow band oriented E-W. The anomalies reappear at the top of the Upper Matheson Till to the southeast.



3D model of Quaternary deposits – Casa-Bérardi mine area: A) Bedrock topography and geology; B) Gold distribution in the till (includes 1000 ppb Au).

The hypothesis of glacial remobilisation is favoured. The 3D visualisation has generated new exploration targets. This is a key tool for the interpretation of regional geochemical dispersion.

### Summary: Project 2002-5

<p><b>Objectives</b></p>	<ul style="list-style-type: none"> <li>• To use a 3D visualisation tool to understand better the Quaternary stratigraphy, to determine the geometry of the Au and As anomalies, and to understand better glacial dynamics and glacial dispersion.</li> <li>• To generate exploration targets.</li> </ul>
<p><b>Results</b></p>	<ul style="list-style-type: none"> <li>• Creation of a 3D model of Quaternary deposits.</li> <li>• Topographic lows in the basement correspond to mineralised zones and to regional faults; topographic highs correspond to volcanic rocks.</li> <li>• The Quaternary stratigraphy is relatively simple and continuous from one survey or section to another.</li> <li>• The geometry of the Au and As anomalies appear to be consistent with the regional polyphase glacial dispersion. The supergene enrichment hypothesis seems to be excluded.</li> <li>• Generation of new exploration targets.</li> </ul>
<p><b>Tools and Innovations</b></p>	<ul style="list-style-type: none"> <li>• 3D model = an unparalleled tool for visualisation and understanding;</li> <li>• 3D model = a tool for interpreting regional geochemical dispersion.</li> </ul>
<p><b>Special Collaboration</b></p>	<ul style="list-style-type: none"> <li>• Francine Fallara, URSTM-UQAT</li> <li>• Gervais Perron and Chrissy Williston, Mira Géoscience</li> </ul>