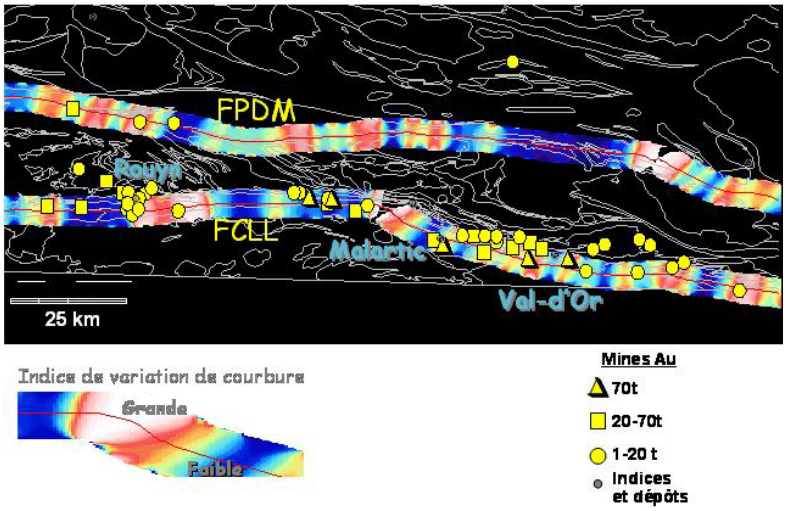
Project 2004-6: Spatial distribution of gold deposits in Archean volcanic belts

Project **2004-6** on the subject of spatial distribution of gold deposits in Archean volcanic belts was a preliminary study to determine if the distribution of deposits in a greenstone belt has a specific and predictable organisation.

Comparative spatial analyses were carried out for the Yilgarn Province in Australia, Zimbabwe Province in Africa and the Superior Province in Canada in an attempt to identify trends applicable on the territory of Quebec.



Relationship between the position of gold mines and variations in fault curvatures.

Analysis of average distances between similarly sized gold deposits in the Yilgarn, Zimbabwe and Superior Provinces, as well as in the Abitibi Subprovince, shows a random relationship (that is to say, there is no predictable distance). The analysis of the spatial location of the deposits with respect to the curvature of the main Cadillac and Destor-Porcupine Faults shows us that large deposits (>100 t Au) are located near faults with intermediate curvature gradients (between 3 and 6 degrees). On the other hand, there is a positive relationship between the position of gold deposits and a metal parameter representing the sum of known mineralisations (Ag, Cu, Mo, Ni, Zn). Finally, a spatial relationship test between gold deposits and the presence of ultramafic rocks allows us to conclude that even if no relationship seems to emerge for the Zimbabwe and Yilgarn Cratons, this relationship appears to be more positive in the Abitibi Subprovince.

Summary: Project 2004-6	
Objectives	• To assess the spatial distribution of Archean gold deposits. • To test the hypothesis of an ordered spatial organization.
Results	• Geometric analysis on a scale of volcanic belts of the distance between deposits in the Zimbabwe, Yilgarn Craton and Superior Cratons, and detailed analysis of the Abitibi indicate random and therefore unpredictable relationships. • Analysis of the relationship with major faults in the Abitibi Subprovince shows an association between the curvature of the faults and the presence of large gold deposits. • The spatial relationship with ultramafic rocks is inconclusive in the Zimbabwe and Yilgarn Cratons, but seems positive in the Abitibi Subprovince.
Tools and Innovations	• Comparative analysis of the spatial relationship of gold mineralisation in several Archean cratons.