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THERMAL ANOMALY ENGENDERED BY THE EMPLACEMENT OF AN Au-DEPOSIT: EXAMPLE FROM THE FRANCISCAN COMPLEX

The thermal history of the Lucia subterrane located within the Franciscan Complex (California, USA) has been previously proposed by Underwood et al. (1995). Based on both vitrinite reflectance (Rm) and illite cristallinity methods, these authors suggest that the Lucia subterrane is locally perturbed by a thermal anomaly (up to ~300ºC), probably caused by the emplacement of an Au-deposit: the Los Burros Gold deposit. Although both the thermal anomaly and the deposit seem spatially correlated, their relationship is still poorly constrained.

In order to better explain the anomalous temperatures recorded in the vicinity of the deposit and their possible link with mineralization processes, we first performed detailed geological and structural mapping within the Los Burros district coupled to a thermal study. The peak temperature reached by metasediments from the Lucia subterrane have been regionally investigated using Raman Spectroscopy of Carbonaceous Materials (RSCM) method. In addition, through a careful fluid-inclusion study of the deposit, the potential source and the temperature of the fluid responsible for the Los Burros Au-deposit emplacement are currently being investigated.

Our preliminary results confirm the previous temperatures and the presence of the thermal anomaly in the range 260-320ºC as inferred by Underwood et al (1995). In addition, our structural interpretation shows that the Los Burros deposit was emplaced during a late tectonic event marked by local reorientation of the regional tectonic features and the emplacement of meter-wide, quartz-calcite-sulfide extension veins. The temperatures determined by both methods (RSCM thermometry and fluid inclusion microthermometry) are consistent and support that the thermal anomaly is likely generated by the emplacement of the Los Burros Au-deposit during a local tectonic event.