



A quantitative calibration of Raman Spectroscopy of Carbonaceous Materials (RSCM) geothermometer in the range 180-330° C.

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After an intensive onshore and offshore exploration of most of the plays located at moderate depths, petroleum exploration is now targeting more and more deep objectives where the temperature can exceed 150°C sometimes 200°C.

The aim of this study is to present a quantitative calibration of the Raman Spectroscopy of Carbonaceous Materials (RSCM) geothermometer in the range 180-330°C for organic bearing-rocks.

For this purpose, we have developed a new fitting procedure which has allowed us to define a new Raman parameter R3. This parameter is different of R1 and R2 used previously to characterize the thermal evolution of the Carbonaceous Materials (CM) and is correlated with temperature in the range 180-330°C.

Raman spectra measured and treated are obtained by analysing samples from different contexts (Helvetic nappes of Switzerland and Franciscan complex, central California). We focused our studies on two cross-sections: Glarus cross-section and Sur area cross-section in the selected areas.

The thermal history of these samples is well known thanks to the systematic combination of various techniques which are probably not perfectly reliable taken individually, but provides a robust estimate when they all converge. These methods are fluid inclusion thermometry, vitrinite reflectance, index mineralogy, illite crystallinity and low-T

thermochronology.

The study of these both cross-sections in various tectonic contexts is important to discuss the roles of the rock lithology, carbonaceous material precursor, deformation history and geological timing rate.

The CM was analysed under transparent minerals such as quartz or carbonates. We did not notice any influence of the lithology on structural evolution of CM with temperature increase.

RSCM geothermometer is a reliable method to constrain temperatures in the range 180-330°C. It constitutes a useful tool for a better estimate of the thermal history of petroleum basins.