



Different sedimentological and thermal evolution of three north-pyrenean basins during their set-up

Roman Chelalou (1), Thierry Nalpas (1), Romain Bousquet (2), and Abdeltif Lahfid (3)

(1) Géosciences Rennes, Université Rennes 1, Rennes, France, (2) Institut für Geowissenschaften, Christian-Albrecht-Universität zur Kiel, Kiel, Germany, (3) Bureau de Recherche Géologique et Minière, Orléans, France

The Pyrenean belt is resulting in the inversion of several lower Cretaceous basins, separating the Iberia micro-plate from the Eurasia plate. The east-west oriented basins are well known for their high-temperature metamorphism synchronous of the last deposits during Aptian-Albian times.

For the first time, we present a combined sedimentological and thermal study of three north pyrenean basins (Boucheville, St Paul-de-Fenouillet and Bas-Agly). With the help of detailed stratigraphic logs of each basin, we propose restored cross-sections for the whole area. North-south sections across Boucheville and St Paul-de-Fenouillet basins show that these basins have large asymmetrical structure. The Boucheville basin is a large anticline bordered by two isoclinal syncline highly skewed, while the St Paul-de-Fenouillet one is a unique syncline.

Detailed sedimentological observations show common features for these basins: deposits of white limestones and breccias during the Jurassic time following by black sandstones with a calcareous matrix of lower Cretaceous age. On one hand, Jurassic limestones were deposited on a shelf environment and their thickness is homogeneous all over each basin. On the other hand, sandstones deposits seem to occur at greater depths during the Albian time and are displaying asymmetrical north-south variation of their thickness.

The quantification of the temperature overprint occurred in the basin was done using the graphitisation of the carbonaceous material, and was measured by RAMAN spectroscopy (Lahfid et al. 2010). Despite their similar deposits, the mapping of the temperature-peak inside the three basins show contrasted thermal evolution. Then we document a lower temperature overprint around 150-200°C in the northern basin (St Paul-de-Fenouillet) while the highest overprint up to 600°C has been reached in the southern basin (Boucheville) in which diopside - scapolite and also probably olivine are occurring.

These three north-pyrenean basin turn out to be good places where to study the evolution of passive margin analogue and also to be a good example where the sediments were metamorphosed during the basin set up.