

Tectonostratigraphic evolution of the North Pyrenean Fold and Thrust Belt and the Aquitaine foreland basin: constraint along a SSW-NNE cross-section (West Comminges –Mirande basins).

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The Pyrenees are the result of the convergence of the Iberian and the European plates. They are subdivided into two fold-and-thrust belts (north and south) separated by an axial zone. The orogenic load led to the formation of two flexural basins: the Ebro pro-foreland basin in the southern Pyrenees and the Aquitaine retro-foreland basin on the northern side. This study is part of the ANR PYRAMID project which aimed at having a better understanding of the evolution of a retro-wedge (fold belt and flexural basin). To do so, a study of the subsidence history, the stratigraphic and structural features of the Aquitaine basin has been carried out along a 129 km long SSW-NNE cross-section. It extends from the North Pyrenean Zone to the "Mole of Montauban", in the Aquitaine platform. Subsurface data (2D seismic profiles and wells) have been used to constraint the chrono-and lithostratigraphy, which helped to realize the subsidence analysis and construct a balanced cross-section.

This study revealed that the North Pyrenean retro-wedge evolved in two main tectonic regimes. A first extensional regime since Triassic times allowing the deposition of an important thickness of evaporites. These extensional phenomena continued until the Albo-Cenomanian times, which constitute the major phase of extension. During this period, there was the formation of the black flysch basin in the North-Pyrenean Zone. This basin contained volcanic deposits (tuffs) and breccias which show an important extensional phase. The compressional regime occurred during Late Cretaceous times marking the onset of the foreland basin. The sedimentation observed in the Aquitaine retro-foreland basin goes from Late Cretaceous times (Campano-Mastrichtian) until the Miocene times and records the growth phase of the mountain belt. The depocenters are characterized by a variation in thickness and a migration towards the north. The thrust front sealed by Miocene deposits is the result of the inversion of the Albo-Cenomanian depocenter border. The Keuper Group is made up of evaporites representing a decollement level and is strongly involved in the deformation. The study of the subsidence history of the basin reveals three main phases:

Coniacian to Maastrichtian (89–66 Ma): high subsidence rate corresponding to the onset of flexural subsidence related to the beginning of the Pyrenean orogenesis, accompanied by post-rift thermal subsidence; Beginning of Paleocene (66–59 Ma): very low or no subsidence rate, implying tectonic quiescence; From Thanetian to Oligocene-Miocene times (59–5 Ma): increasing subsidence rate corresponding to the resumption of orogenic flexural subsidence until Miocene. It is the generalization of the compressional regime.

The subsidence curves show an overall decrease and a slight migration of subsidence from south to north.

Keywords: North Pyrenean retro-wedge, Aquitaine retro-foreland basin, Basin inversion, Subsidence migration