



## **A crustal view on the pyrenean rift system: the Arzacq-Mauléon basins (W Pyrenees)**

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Conceptual models of formation of rifted margins suggest different rheologies for the lower crust, from strong and brittle to weak and ductile, with major implications for the thermal evolution and final rift architecture. Typically, the Cretaceous Pyrenean rift systems are considered to be formerly bordered by hot and ductile margins, now reactivated and incorporated into the Pyrenean orogen. Whereas the syn-rift thermal evolution of the sedimentary cover is actively studied, the syn-rift thermal and mechanical evolution of the basement remains poorly constrained.

In this contribution, we focus on the Labourd Massif, corresponding to the basement of the Mauléon basin (W Pyrenees). It is composed of the upper-crustal Artzamendi-Baygourra-Aldudes unit and middle to lower crustal Ursuya unit. In order to constrain P-T conditions and the composition of the different pre-rift crustal levels as well as their syn-rift history, structural observations are coupled to magmatic and metamorphic petrology. To the south, the Artzamendi-Baygourra-Aldudes unit is composed of Palaeozoic metasediments (Cambrian to Carboniferous). They record large-scale pervasive folding and thrusting during the Variscan orogeny and synchronous low-grade metamorphism to LP-amphibolite facies metamorphism (Bt-St-And assemblages in metapelites). These rocks are unconformably covered by unmetamorphosed Permian to Triassic clastic sediments. To the north, the Ursuya unit is made of Precambrian metasediments. They present a main foliation that moderately dips to the south with a well-defined E-W striking lineation with synchronous emplacement of gabbroic to dioritic magmas of Permian age. Granulite facies assemblages are developed regionally, as attested by syn-kinematic Sil-Grt-Crd assemblages in metasediments. Both units are separated by the Louhossoa lineament, an undated structure with apparent normal sense of shear formed at greenschist facies conditions. This structure is truncated by the North Mauléon Detachment, a brittle normal detachment fault exhuming basement rocks close to the sea floor between the mid-Albian to Cenomanian.

These initial results give insights on the Late Carboniferous to Cretaceous evolution of the North Pyrenean zone in the W Pyrenees. Several preliminary conclusions can be drawn for the syn-rift evolution of the basement:

- Whereas Late Carboniferous – Permian high temperature conditions are evidenced, the syn-rift thermal evolution of the lower crustal Ursuya unit remains unclear;
- Rift-related deformation in the lower crustal Ursuya unit itself seems to be low;
- The exhumation history and the role of the different structures is not yet totally understood.

The preliminary results show that the behavior of the lower crust during rifting in the Western Pyrenees remains ill-defined and asks for a better understanding of the pre-rift nature and architecture of the continental crust.