



Structural evolution of the Axial Zone basement units, Pyrenees

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The Axial Zone of the Pyrenean belt is an antiformal stack of basement units. If the timing of exhumation of the central part of the Pyrenees along the ECORS is well constrained, the western Axial Zone shortening and kinematics are both less constrained. Moreover, the internal deformation of the basement units is poorly documented. As a consequence, the early shortening (before activation of the main thrusts, e.g., Gavarnie thrust) is rarely taken into account and shortening amounts are likely to be underestimated.

In this contribution, we present new structural, microstructural, thermo-chronologic (U-Th-Sm/He and ZFT) and thermometric (Chlorite and RSCM thermometry) data of the Bielsa and Gavarnie granitic basements, which compose the two main basement units. We constrain the Temperature-time path of these units from their maximum temperature around 250-300°C until their coeval, final exhumation at about 8-9 Ma. A new detailed cross-section of the Bielsa unit is presented with special emphasis on the brittle-ductile deformations associated to folding of the basement-cover interface. These deformations are accommodated within mylonites and cataclasites, whose deformation mechanisms are strongly influenced and controlled by the presence of hydrated phyllosilicates. These minerals, which formed by the breakdown of feldspars during (early) deformation allow for the transition from brittle to ductile deformation, hence they most likely control the distributed style of deformation within this low-temperature basement. These results have several implications both in terms of sequence of shortening and crustal strength during the Alpine collision in the Pyrenees.