Geophysical Research Abstracts,
Vol. 11, EGU2009-8621, 2009
EGU General Assembly 2009

Late Paleozoic basin evolution in the Western Pyrenees

V. Cantarelli (1), A. Casas-Sainz (2), S. Corrado (3), J. Gisbert-Aguilar (2), C. Invernizzi (1), and L. Aldega (3)

(1) Dipartimento di Scienze della Terra, Università di Camerino, Camerino, Italy (valentina.cantarelli@unicam.it) (chiara.invernizzi@unicam.it/+39 737402621), (2) Universidad de Zaragoza, Departamento de Ciencias de la Tierra, Zaragoza, Spain (acasas@unizar.es/+34 976761088) (gisbert@unizar.es/+34 976761106), (3) Dipartimento di Scienze Geologiche, Università di Roma Tre, Rome, Italy (corrado@uniroma3.it/+39 0657338201) (aldega@uniroma3.it)

Late-Variscan (Late Carboniferous-Early Triassic) evolution in the Axial Zone of the Pyrenees is characterised by continental, intra-mountainous basin formation. These basins are presently preserved in the hangingwall of the main thrusts responsible for the uplift of the Axial Zone (Gavarnie thrust in the western Pyrenees and Nogueres thrust system in the central Pyrenees). Sedimentary sequences filling the Late Variscan basins developed under a post-collisional, strike-slip regime, with thrust-top facies, and evolved toward an extensional setting during Permian times with fluvial and lacustrine facies accompanied by extensive pyroclastic deposition (Gisbert, 1984), still before the onset of widespread extensional sedimentation corresponding to the beginning (Early Triassic) of the Alpine cycle. The continental successions are preserved in basins organised along the E-W direction, parallel to the present-day outcrop of the Axial Zone of the Pyrenees, with limited extension and lengthening in the same direction. Although it is difficult to infer the actual position of the main faults limiting the Late-Variscan basins because of the Tertiary compressional deformation and basin inversion, the main faults limiting these basins are considered to have a WNW-ESE direction, with other oblique or near-perpendicular faults responsible for the occurrence of no-sedimentation areas along-strike of the Axial Zone.

Between the Variscan basement (mainly consisting of Devonian limestones and Carboniferous turbiditic Culm facies) and the Alpine sedimentary cover (Early Triassic continental deposits), the Stephanian-Autunian record is a fining-upward lacustrine, 1000-1500 m thick sedimentary succession constituted by dolomitic limestones, conglomerates, sandstones and siltstones. It is organized in four depositional units: Grey Unit (Stephanian B), Intermediate Unit (Stephanian B- Autunian), Lower Red Unit (Autunian) and Upper Red Unit (late Permian). The entire succession is limited at the bottom and top by first order unconformities all along the Pyrenean chain, and second order paraconformities can be identified within the lacustrine succession.

Although these units are traditionally considerated as purely sedimentary (Gisbert, 1981), metamorphic parageneses (greenschist facies) have been locally recognized in one of these basins (Aragón-Bearn basin) in the Lower Red Unit below the paraconformity that marks the beginning of the Upper Red Unit (Lago et al., 2004). This metamorphism has been interpreted as related to later intrusion of andesitic bodies, although its causes are still matter of debate.

In order to better constrain the origin and features of this metamorphism, we present results of fluid inclusions micro-thermometric studies on quartz and calcite veins and mineralogical XRD analyses of the <2 micron grain size fraction of the Aragón-Bearn basin sediments, performed on the Intermediate Unit, Lower Red Unit and Upper Red Unit. These data will be compared with the thermo-baric signature defined through classical petrography and coal petrography of the surrounding rocks of the Axial Zone and the Triassic deposits, and discussed in the light of the late Variscan and Early Alpine tectonic evolution of this sector of the Pyrenees.