



Early Mesozoic cooling from low temperature thermochronology in N Spain and N Africa

R. Grobe (1), J. Alvarez-Marrón (2), U. A. Glasmacher (1), and R. Menéndez-Duarte (3)

(1) Institute of Earth Sciences, University of Heidelberg, Germany (rgrobe@geos.uni-heidelberg.de), (2) Earth Sciences Institute (CSIC), University of Barcelona, Spain, (3) INDUROT, University of Oviedo, Spain

In the western prolongation of the Pyrenees, the substratum of the Cantabrian Mountains consists of an E-W crustal section of the Gondwana continental margin involved in the Variscan collision. In Mesozoic times, the region was modified by rifting and the opening of the Atlantic and the Bay of Biscay, while in Paleogene-Neogene times it was affected by the convergence of the Iberian Plate with the Eurasian Plate resulting in the present mountains.

Our thermochronological data and modelled time-temperature histories suggest an earlier, relative fast cooling period during Early Triassic to Early Jurassic. This cooling event coincides temporally with the process of rifting that caused Pangaea continental break-up and the opening of the North Atlantic. Other authors report similar cooling histories from Early Triassic to Middle Jurassic from other parts of the Iberian Peninsula (Juez-Larré, 2003; Barbero et al., 2005) as well as from the Moroccan Meseta, in N Africa (Ghorbal et al., 2008). Furthermore, the time span of this cooling event includes the period of main activity of the Central Atlantic Magmatic Province (CAMP) magmatism at around 200 Ma (Marzoli et al., 1999). Wilson (1997) postulates a relationship between this magmatic activity and upwelling of a large-scale mantle plume (super-plume) beneath the West African craton. Correlatives of this province have been identified as far as the southern Iberian Peninsula, Newfoundland, and possibly in Brittany, among other European areas (Pe-Piper et al., 1992; Jourdan et al., 2003). The current presentation aims to discuss possible African far-field effects on thermochronological data in the Cantabrian Mountains of NW Spain.

References:

Barbero, L.; Glasmacher, U. A.; Villaseca, C.; López García, J. A.; Martín-Romera, C. (2005). Long-term thermo-tectonic evolution of the Montes de Toledo area (Central Hercynian Belt, Spain): constraints from apatite fission-track analysis. *International Journal of Earth Sciences*, Volume 94, Issue 2, pp.193-203.

Ghorbal, B.; Bertotti, G.; Foeken, J.; Andriessen, P. (2008). Unexpected Jurassic to Neogene vertical movements in 'stable' parts of NW Africa revealed by low temperature geochronology. *Terra Nova*, Volume 20, Number 5, October 2008, pp. 355-363(9).

Jourdan, F.; Marzoli, A.; Bertrand, H.; Cosca, M.; Fontignie, D. (2003). The Northernmost CAMP: $^{40}\text{Ar}/^{39}\text{Ar}$ Age, petrology and Sr–Nd–Pb isotope geochemistry of the Kerforne Dike, Brittany, France. In: Hames, W.E., McHone, J.G., Renne, P.R., Ruppel, C. (Eds.), *The Central Atlantic Magmatic Province: Insights From Fragments of Pangea*. AGU, *Geophys. Mon.*, vol. 136, pp. 209–226.

Juez-Larré, J. (2003). Post Late Paleozoic tectonothermal evolution of the northeastern margin of Iberia, assessed by fission-track and (U-T)/He analysis: a case history from the Catalan Coastal Ranges. Ph.D. thesis, Free University of Amsterdam. 200 pp.

Marzoli, A.; Renne, P.R.; Piccirillo, E.M.; Ernesto, M.; Bellieni, G.; De Min, A. (1999). Extensive 200-million-year-old continental flood basalts of the Central Atlantic magmatic province. *Science* 284, 616-618.

Pe-Piper, G.; Jansa, L.F.; Lambert, R.St.-J. (1992). Early Mesozoic magmatism of the Eastern Canadian margin. In: Puffer, J.H., Ragland, P.C. (Eds.), Eastern North American Mesozoic magmatism. Geol. Soc. Am., Spec. Paper, vol. 268, pp. 13–36.

Wilson, M. (1997). Thermal evolution of the Central Atlantic passive margins: continental break-up above a Mesozoic super-plume. J. Geol. Soc. (Lond.) 154, 491-495.