



Post-orogenic exhumation history of a Variscan mid-crustal basement in Galicia (NW Spain)

Rene Grobe (1), Joaquina Alvarez-Marrón (2), Ulrich A. Glasmacher (1), Finlay Stuart (3), and A. Castañeda-Zarauz (1)

(1) Institute of Earth Sciences, Research Group Thermochronology and Archaeometry, University of Heidelberg, Germany (rene.grobe@geow.uni-heidelberg.de, ulrich.a.glasmacher@geow.uni-heidelberg.de), (2) Instituto de Ciencias de la Tierra Jaume Almera, CSIC, Barcelona, Spain (jalvarez@ija.csic.es), (3) Isotope Geosciences Unit, SUERC, East Kilbride, United Kingdom (F.Stuart@suerc.gla.ac.uk)

The present study aims to quantify the complex post-orogenic history of cooling, denudation, and long-term landscape evolution of a mid-crustal section of Variscan basement in Galicia (NW Spain). We use apatite fission-track and apatite (U-Th)/He thermochronological techniques combined with time-temperature (t-T) path modelling using the software code HeFTy©. The topography is characterized by an extensive, low relief area at ~500 m elevation in central Galicia, and a WNW-ESE ridge that reaches up to 1000 m to the North.

The area experienced two major tectonic events since the end of the Variscan orogeny in the Late Palaeozoic: 1) continental break-up and Mesozoic rifting leading to the opening of the Atlantic Ocean and the Bay of Biscay, and 2) limited convergence between Iberia and Eurasia since Middle Eocene times. Apatite fission-track ages range from 68.1 ± 5.0 Ma to 174.5 ± 7.7 Ma and apatite (U-Th)/He ages range from 73.6 ± 5.4 to 147.1 ± 16.6 Ma. Age-elevation plots and t-T path modelling suggest a tectonothermal evolution with faster exhumation associated to faulting during Mesozoic rifting. In particular, two major fault systems trending WNW-ESE and NNE-SSW, the As Pontes and the Lugo faults respectively separate areas with the fastest exhumation around 115 Ma from areas with overall slow exhumation since 200-150 Ma. A landscape of subdued topography in central Galicia was acquired prior to Eocene convergence. The higher elevation areas along the northern ridge formed since Middle Eocene times due to fault reactivation and minor exhumation occurred along the fault escarpment.