# Provenance studies of the deep-marine Ainsa basin, Spanish Pyrenees using combined U-Pb and fission track techniques

K. DAS GUPTA, A. CARTER , K.T. PICKERING AND A.J. HURFORD

Research School of Earth Sciences, University and Birkbeck College London, Gower Street, London WC1E 6BT, UK; k.dasgupta@ucl.ac.uk

The Paleogene collision of the Iberian and European plates created a compact two-sided orogen, with paired fold-and-thrust belts and foreland basins north and south of the Axial Zone in the Pyrenees. The Mid Eocene South Pyrenean foreland basin evolved with mainly non-marine / marginal marine environments in the eastern sectors, whilst further west, in the Ainsa and Jaca basins, there was an overall change from fluvio-deltaic to deep-marine systems. Maximum rates of tectonic subsidence in the foreland basin coincide with the deep-marine basin fill, during maximum rates of shortening and thrust front advance at ~41.5 Ma (Late Lutetian). In slightly younger stratigraphic sequences east of the Ainsa Basin, ca. 42-35 Ma, magneto-stratigraphic and structural work show phases of thrusting, duplex growth, and related deposition on a time scale of ~1.5-3 Ma

Within the South Pyrenean foreland basin, the Ainsa basin comprises ~10-12 million years of deposition of deep-water clastics with a cumulative thickness of ~4 km and contains about 15 deep-water sand bodies, typically 10s m thick but packaged essentially as 6 depositional complexes, each in the order of 100-200 m thick. The area around Ainsa village, Spain has excellent 3D outcrops in ~2-3 km of deep-marine basin / slope clastics above a late Cretaceous-earliest Tertiary foundered carbonate platform, and overlain by ~1 km of fluvio-deltaic and related systems. Synsedimentary tectonics expressed as active thrusting and folding of the basinal sediments have created many subtle unconformities and their correlative conformities within the basin fill. This study, using petrographic and thermo-chronometric techniques, aims to constrain and understand the evolution of the basinal sediments and its routing system. In addition to detailed petrographic modal analyses of the six complexes, one representative sample from each has been studied for detrital zircon geochronology combining U-Pb and fission track techniques. Results from this study, which is first of its kind in the Ainsa basin, will provide fundamental understanding of the sediment provenance of the basin and its source region discrimination, characterisation and thermotectonic aspects of hinterland evolution.