Geophysical Research Abstracts
Vol. 16, EGU2014-2915, 2014
EGU General Assembly 2014

Lithospheric Structure Along the Wide-Angle Seismic Reflection Transect of the Central Iberian Massif

SIDDIQUE AKHTAR EHSAN (1), RAMON CARBONELL (1), MARCEL CEMBROWSKI (1), DAVID MARTI (1), ALBA GIL (1), IGNACIO MARZAN (1), PUY AYARZA (2), DAVID MARTINEZ-POYATOS (3), JOSE FERNANDO SIMANCAS (3), and ANTONIO AZOR (3)

(1) Institute of Earth Sciences Jaume Almera (ICTJA-CSIC), Department of Structure and Dynamics of the Earth, Barcelona, Spain, (2) Department of Geology, University of Salamanca, 37008 Salamanca, Spain, (3) Department of Geodynamics, Faculty of Science, University of Granada, E-18071 Granada, Spain

The Iberian Massif is the largest outcrop of the Late Paleozoic Variscan Orogen in western Europe. In May 2012, a spatially dense high resolution wide-angle seismic reflection profile ALCUDIA was acquired across the Central Iberian Massif. The ALCUDIA wide-angle profile investigates lithospheric structure of the Central Iberian Zone and a suture zone (the Central Unit). The experiment consisted in a main SW-NE line of receivers, c. 300 km long, and a supplementary transect, c. 35 km long, that sampled the crust beneath the Central Iberian System. The acoustic energy generated by 5 shots, c. 70 km apart, was recorded by over 900 TEXANS (single component, digital recording stations) from the IRIS-PASSCAL Instrument Center. Each shot consisted in 1 TM of explosives fired in a single 55-65 m deep borehole. Approximately, 100 stations were deployed across the Central Iberian System in an effort to map the topography of the crust mantle boundary beneath this mountain range. This design generated enough energy to be able to identify Pn and even mantle reflections. The preliminary analysis of the shot gathers reveals that the recorded events features relatively low frequencies (4-30 Hz). The processing of the shot gathers resulted into high amplitude reflective events within the upper crust and strong PmP phases. From the southwest to northeast, the interpreted PmP arrivals are located at c. 11 s and c. 12 s (normal incidence traveltime) respectively. The ALCUDIA wide-angle profile provided a detailed P-wave velocity structural model and complemented the previously acquired normal incidence deep seismic profile ALCUDIA. The velocity model obtained by forward modelling constraints the composition of the crust and upper mantle. The upper crust is located at c. 13 km and the Moho is in the 32-36 km range, equates to normal incidence reflection profile ALCUDIA. Existing knowledge indicates that the mid-lower crust along the southern part of the CIZ is characterized by relatively high mafic compositions.