Geophysical Research Abstracts
Vol. 15, EGU2013-6703, 2013
EGU General Assembly 2013

Investigating and Imaging the Lithospheric Structure of the Westernmost Mediterranean Using S Receiver Functions

Meghan S. Miller and Amber Butcher
University of Southern California

The Alboran System was created during the Neogene at the western edge of the Alpine-Himalayan orogenic belt, as the result of convergence between the European and African plates. This system includes the Gibraltar Arc, Rif-Betic chain, Atlas Mountains, and Alboran Sea. The evolution from ocean subduction to continental collision, particularly in complex three-dimensional settings such as this, is poorly understood. Advances in this subject are likely to come from multidisciplinary projects, such as PICASSO (Program to Investigate Convective Alboran Sea System Overturn): a study of the Alboran Sea, Atlas Mountains, and Gibraltar arc. Several models have been suggested to explain the tectonics of this system including: continental lithospheric delamination and drips, slab breakoff, and subducting slab rollback.

Advances in defining the lithosphere – asthenosphere boundary (LAB) are crucial to understanding the geochemical and geodynamic evolution of the region. Seismic data from ∼85 broadband instruments deployed in Morocco and Spain as part of the PICASSO project are being utilized to constrain lithospheric structure beneath this part of the Western Mediterranean via identification of S-to-p conversions from S receiver functions. A previous study indicates that the lithospheric thinning beneath the Atlas High may be the result of mantle upwelling induced thermal erosion, while a more recent imaging study suggests that the LAB could be at depths >200 km, tens of kilometers thicker than previous models. Our preliminary results indicate LAB depths down to ∼100 - 110 km near the Straight of Gibraltar and as shallow as ∼65 – 80 km under the Atlas High. The primary purpose of this project is to advance our understanding of the structure and evolution of the lithosphere – asthenosphere boundary (LAB) of the Atlas Mountains and surrounding areas.