Geophysical Research Abstracts
Vol. 14, EGU2012-12969, 2012
EGU General Assembly 2012

Seimic Images and Wide-angle Velocity constrains of the structure and geodynamic origin of the Gibraltar Arc system: A geological interpretation of the Gulf of Cadiz imbricated wedge, the western and eastern Alboran basins, and the South-Balearic basin.

E Gracia (2), C. R. Ranero (1), I. Grevemeryer (3), T h e WestMed, TopoMed, and and Geomargen-1 cruise parties ()

(1) Barcelona Center for Subsurface Imaging, ICREA at CSIC, ICM-CSIC, Barcelona, Spain (cranero@icm.csic.es, +34-(0)93-2309555), (2) Barcelona Center for Subsurface Imaging, UTM-CSIC, Barcelona, Spain, (3) GEOMAR | Helmholtz Centre of Ocean Research, Kiel, Germany

The current geodynamics of the region between north Africa and the Iberian Peninsula are dominated by the collision between the Eurasian and African plates. The ongoing deformation is mainly driven by the NW–SE, slow 4-5 mm/yr convergence that is partitioned across numerous faults and diffused through a broad region with no clear plate boundary defined.
However, this region is characterized by the a series of geological structures that appear unrelated to the current dominant plate kinematics. The region is formed by the Gibraltar Arc system, an arcuate structure that is fronted by a large imbricated wedge of tectonically piled sediment slices in the Gulf of Cadiz, and a series of basins in the Mediterranean part of the region. The western, little deformed Alboran basin is located on the rear of the Gibraltar stacked units. The eastern Alboran basin is characterized by numerous volcanic ridges and is transitional to the South Balearic – North Algerian basin that displays a generally lower topography.
The different tectonic elements are floored by a poorly known crystalline basement and their age, evolution and geodynamic origin is still strongly debated. Part of the uncertainty arises from the lack of deep penetrating modern geophysical data in much of the region. In the last 5 years, 3 successive cruise in the region have produced an extensive coverage of the different tectonic elements collection a series of wide angle seismic profiles in 2006 during the WestMed cruise with German R/V Meteor and two multichannel seismic reflection cruises with the R/V Sarmiento de Gamboa from mid September to late October (TopoMed-Gassis cruise) and late October to late November (Geomargen-1 cruise) 2011.
In this contribution we present the new images of the tectonic structures and sedimentary basin and the wide-angle seismic velocity models across key regions of the system. We also present an interpretation of the entire system in the context of a geodynamic model of eastward Miocene subduction, currently inactive, that may explain the structures observed in the data from the 3 cruises.