Geophysical Research Abstracts
Vol. 17, EGU2015-2292-2, 2015
EGU General Assembly 2015

Flexure of oceanic lithosphere along the north Algerian margin and tectonic implications

lamine hamai (1,2), carole Petit (2), abdeslem Abtout (1), abdekrim Yelles-chaouche (1), jacques Déverchère (3), and frauke Klingelhoefer (4)

(1) Centre de Recherches en Astronomie Astrophysique et Géophysique, CRAAG, Route de l'Observatoire, BP 63, Algiers, Algeria (lamine.hamai@yahoo.fr), (2) Geoazur, CNRS-UNS-IRD, 250 rue Albert Einstein, F-06560 Valbonne-Sophia Antipolis, France (carpetit@geoazur.unice.fr), (3) Domaines Oceaniques, Institut Européen de la Mer, CNRS-UBO, Technopôle Brest-Iroise, Place Nicolas Copernic, F-29280 Plouzané, France. (Jacques.Deverchere@univ-brest.fr), (4) Ifremer, Centre Bretagne, ZI de la pointe du Diable, CS 10070, F-29280 Plouzané, France. (frauke.klingelhoefer@ifremer.fr)

The Algerian margin resulting from a back-arc basin Algerian opening associated with a withdrawal from the Tethyan break. Recent geophysical data acquired in the Algerian basin (MARADJA campaigns, 2003, 2005 (Active Margin of "el DJAzair" and SPIRAL, 2009 (Deep Seismic and Regional Investigations in Algeria) have identified signs of active or recent compressive deformation in the basin.
New data from four wide-angle seismic profiles helped us image, for the first time, the deep structure of the Algerian margin and adjacent basins.We converted these velocity profiles into density models, then isostatic anomalies. This allowed us to image an isostatic imbalance (relative to a local isostasy model) scored at the margin toe. If we interpret this as the Moho depth variation over a depth of balance, then the Moho in oceanic part is too deep and Moho in continental part too shallow, on either side of a boundary located towards the margin toe. These abnormalities can be interpreted by a flexural mechanism in the presence of two lithospheres.
We use a finite element formulation to model the lithospheric flexure at the plate boundary. The profiles are discretized into two distinct plates for the continental and oceanic parts, which allow us to apply opposite flexures on both domains. The two plates can be separated by a transition zone of variable width where no flexure is computed. We have focused our study on the oceanic part because the continental domain is much less constrained owing to the lack of wide-angle data. The deflection of the plates oppositely to their point of junction are set to zero, and the amount of deflection computed from the equivalent Moho deflection is applied at both ends of each plate.
Preliminary interpretation of this modeling shows a flexural difference between central and lateral profiles, this is probably due to the difference in geometry margin segments and there evolution in the geodynamic and kinematic context.