Seismic sources at intermediate depth in the Alboran Sea

Elisa Buform¹, Lucía Lozano², Simone Cesca³, Juan Vicente Cantavella², Maurizio Mattesini¹, and Agustín Udias¹

¹Universidad Complutense, Fac. CC. Físicas, Geofísica y Meteorología, Madrid, Spain (ebuform@ucm.es)
²Instituto Geográfico Nacional, Madrid, Spain
³GFZ German Research Centre for Geosciences Potsdam (Germany)

The occurrence of moderate magnitude earthquakes in intermediate depth (40<h<150 km) is a characteristic of the seismicity of the Ibero-Magrebian region. The most important concentration of this activity is in the western part of the Alboran Sea, with the epicenters following an N-S direction. In order to improve the knowledge of the geometry of these seismogenic structures, we have carried out a study of the hypocenters distribution and focal mechanisms for earthquakes that occurred in the period 2000-2020 (M>4.0). For the hypocentral location, we have used a non-linear probabilistic approach (NonLinLoc algorithm) jointly with 3-D lithospheric velocity tomography models recently developed for the Alboran-Betic-Rif zone. Focal mechanisms have been obtained from moment tensor inversion of stations at regional distances (Kiwi tools). Maximum likelihood hypocentres confirm a near vertical N-S distribution in a depth range between 50 and 100 km. Focal mechanisms show a different stress pattern, changing from a vertical tension axis for earthquakes located off-shore and western of 4.5ºW to vertical pressure axis for earthquakes inland and at eastern of 4.5ºW.