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Closing the Seismic Coverage on Western Iberia: Project WILAS

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The lithosphere of Iberia has been formed through a number of processes of continental collision and extension: in Lower Paleozoic, the collision of three tectonics blocks produced the Variscan Orogeny, the main event of formation of the lithosphere. The subsequent Mesozoic rifting and breakup of the Pangea had a profound effect on the continental crust of Western Iberia. Since the Miocene, the southern interaction between Africa and Iberia is characterized by a diffuse convergent margin that originates a vast area of deformation. The impact of this complex tectonic in the structure of the Lithosphere remains an incognito, especially in its western part. Which is the relation between surface topography, the observed tectonic units and the deep crustal/lithospheric structure?
Similar problems are currently being addressed by programs such US-EarthSCOPE or TOPO-EUROPE. The Iberian Peninsula is covered by two projects, concentrated in its southern collision margin (TOPO-MED) and the central cratonic Massif (TOPO-IBERIA). Within TOPO-IBERIA (Consolider-Ongenio CSD2006-00041), a roughly 50x50 km dense network of BB seismic stations is being deployed in Spain through 2007-2013, sequentially covering southern, central and northern Spain; however, W Iberia will be widely unsampled.
Project WILAS – "West Iberia Lithosphere and Astenosphere Structure" Ref. PTDC/CTE-GIX/097946/2008, is a 3 years project funded by Portugal Science & Technology Foundation (FCT) in which a temporary network of several BB stations is being deployed in Portugal. It is a joint effort of all Portuguese partners operating seismic BB/VBB stations, in close cooperation with international GFZ and ICJTA partners, and it aims to extend to the western border of Iberia the TOPO-IBERIA coverage, completing its coverage. A set of 20 BB stations, belonging to the GIPP-GFZ-Potsdam, will be temporarily deployed between 2010-2012, and together with new stations to being by the Portuguese and Spanish partners, will create a dense array of Broad-Band (30-60 s) and Very Broad-Band (120 s) seismic stations achieving for the first time a full coverage of the Iberian Peninsula.
Here we will present the project WILAS, the main purpose of which is to contribute to image the 3D structure beneath W Iberia. The knowledge of the Crust, Lithosphere and Astenosphere seismic structure must be dealt at different scales, involving different but complementary methods: Local-Earthquake Tomography for fine structure of seismogenic areas, ambient noise tomography for regional crustal structure, Receiver Functions for Lithospheric structure and Surface-wave tomography for large scale Listosphere-Astenosphere structure. Crustal and Mantle seismic anisotropy analysis, coupled with source analysis and correlation with current geodetic measurements will allow establishing a reference 3D anisotropy model of present and past processes.