Instituto Dom Luiz – University of Lisbon and the Center of Geophysics of the University of Coimbra invite applications for one Post-Doctoral research position. The post-doctoral researcher will be integrated in project QuakeLoc-PT.

**Job description:** Post-doctoral fellow

Start date: January 2015

Grant duration: 12 months

Deadline for application: The search will continue until a successful applicant is found.

Project PI: Susana Custodio (susanacustodio@campus.ul.pt)

**Required skills**

Academic degree: PhD in seismology/geophysics

Other required skills: Solid background in computation, physics and mathematics.

**Application**

Send a detailed CV, copy of academic diplomas, and recommendation letters to susanacustodio@campus.ul.pt.

**Research Group**


**The project – QuakeLocPT**

QuakeLoc-PT aims at relocating earthquakes along the Eurasia-Nubia plate boundary offshore Portugal, as well as earthquakes in mainland Portugal, using the large volume of seismic data accumulated over the last decades. A variety of methods will be used and developed, from simple travel time methods to forefront waveform algorithms.

The seismicity of Portugal has been repeatedly classified as diffuse, a characteristic that is generally associated to the regional tectonic setting (see figure below). Portugal lies next to the boundary between the Eurasian and African plates, in a region of transition from convergence in the Mediterranean to strike-slip in the Atlantic. The oblique convergence occurs at a modest rate of ∼4–5 mm/yr. Rather than being accommodated along one linear, well-defined plate boundary, the tectonic deformation is distributed along a broad belt that includes poorly-known seismogenic structures in Iberia, Morocco and offshore. Despite the low rates of deformation, throughout history Portugal has been affected by some of the largest earthquakes in Europe, both onshore and offshore. Examples are the M8.75 great Lisbon
earthquake of 1755, the 1858 M7.1 Setúbal earthquake, the 1909 M6 Benavente earthquake, or the 1969 M7.8 earthquake located offshore southwest Iberia. The epicenters of small to moderate magnitude earthquakes map onto diffuse clouds according to current catalogs. Offshore, many of the well-located earthquakes occur at depths of 40 – 70 km. These earthquakes are not related to a Benioff subduction zone, and have been explained as earthquakes that occur on old, cold lithosphere that has a brittle behavior down to depths larger than usual. The study of seismogenic structures in Portugal is particularly challenging due to the low rates of seismic activity and to the offshore location of most earthquakes.

Is the Portuguese seismicity in fact diffuse or just poorly located? Recent studies show that catalog hypocenters are often grossly mislocated. We will re-locate the Portuguese seismicity by applying state-of-the-art techniques to the large volume of data accumulated during the last decades. Forefront algorithms will be used and developed taking into account the regional specificities: large azimuthal gap offshore, heterogeneous crustal structure, longevity of the seismic networks, moderate-depth seismicity, low rates of seismic activity, etc. Precise earthquake locations will allow improved:

1. Knowledge of the active seismogenic structures (faults), which in turn will allow a better assessment of seismic and tsunami hazard.
2. Understanding of earthquake generation mechanisms at moderate depths (40 – 70 km).
4. Knowledge of the Earth structure bellow mainland Portugal and adjacent offshore.
5. Understanding of the plate boundary between Eurasia and Nubia.

Catalog epicenters of earthquakes recorded by the short-period network (1961 – present, gray dots), and by the broadband (BB) network (2007 – present, orange dots). Also shown are the earthquakes with magnitude larger than 3.5 recorded by the BB network (red dots). Blue triangles show the location of permanent BB stations and white triangles mark the location of temporary BB stations (projects NEAREST, TOPOIBERIA, and WILAS).