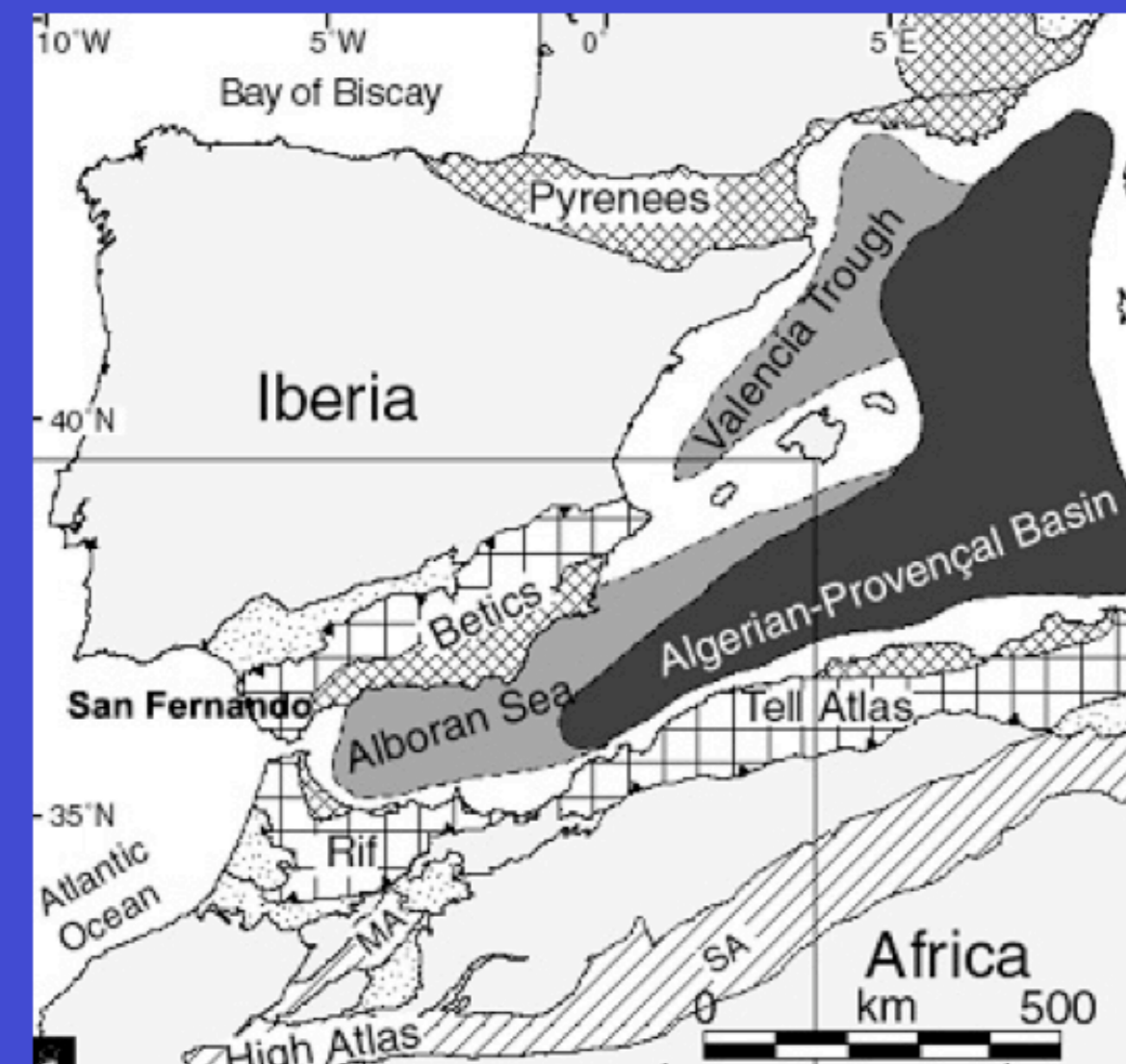


Topo-Iberia Project: GPS planned contribution

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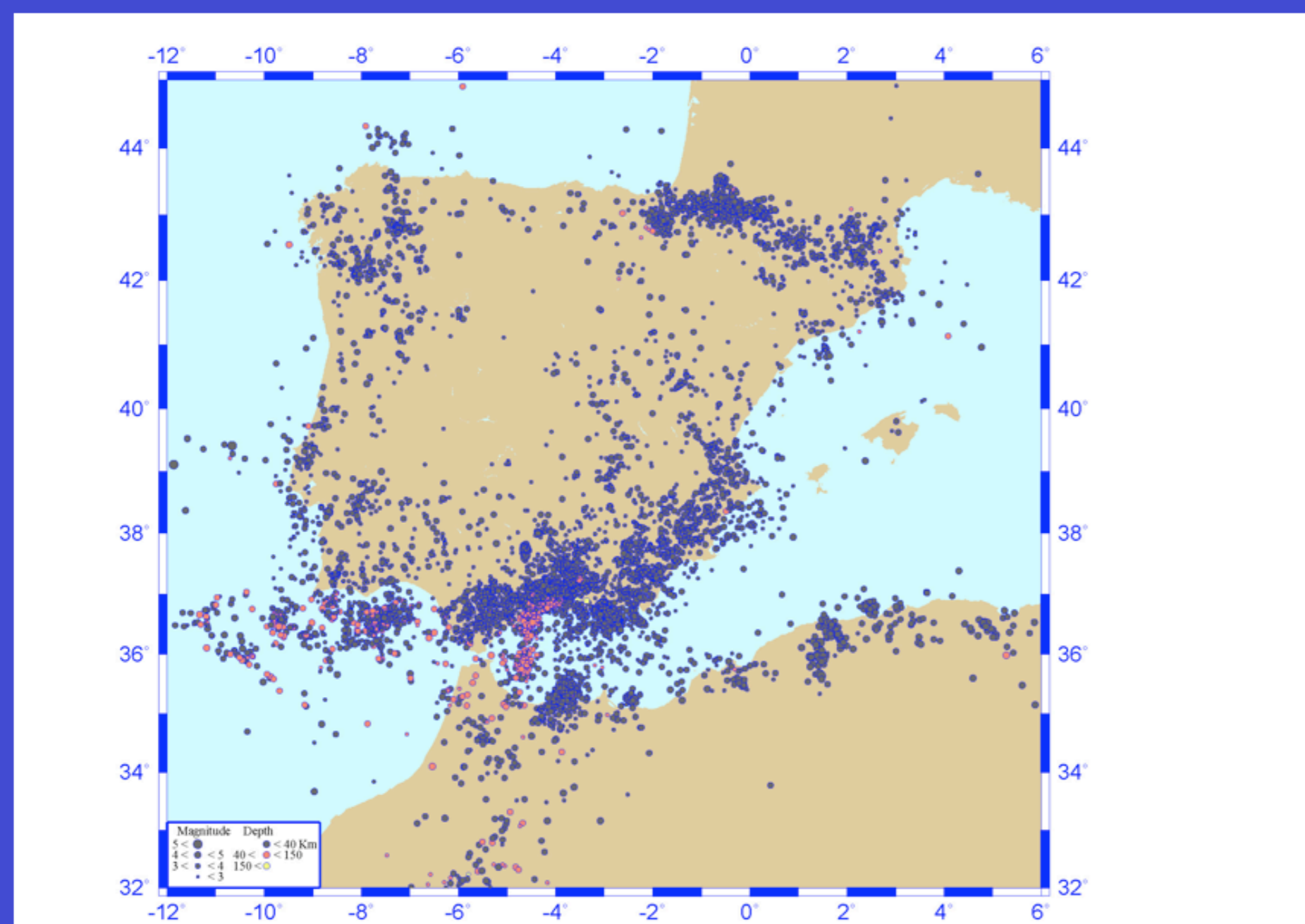


From Rosenbaum, G., et al. 2002. Reconstruction of the tectonic evolution of the western Mediterranean since the Oligocene. *Journal of the Virtual Explorer*, 8, 107-130

Topo-Iberia is a multidimensional program, with interrelated and interactive components and integration of results to establish a topography and evolution model of our natural environment. Actions to be developed can be catalogued depending on the domains or type of activity as methodological, regional or thematic.

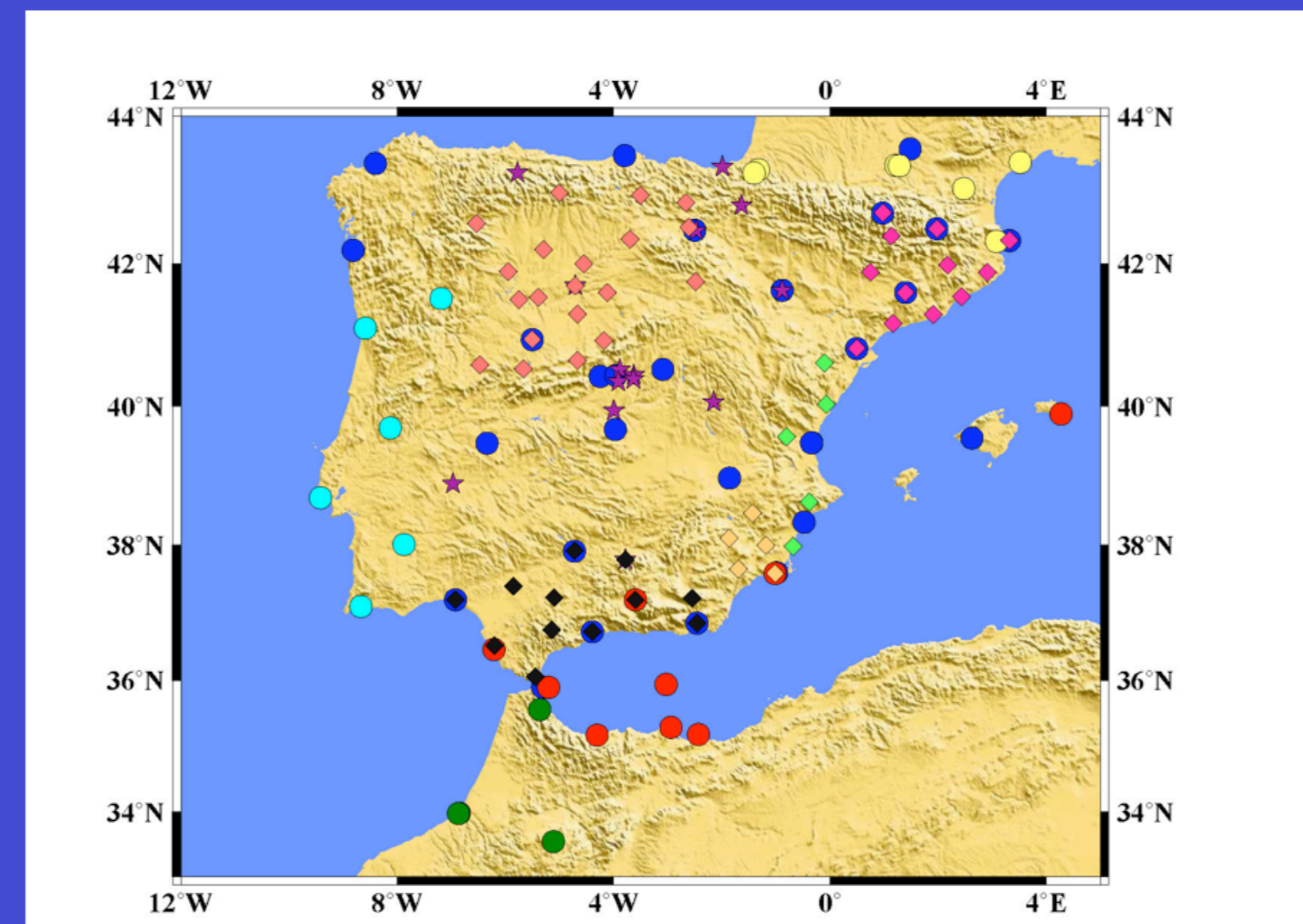
Methodological actions include experimental studies making use of seismic techniques, deformation measurements by GPS, magnetotellurics, gravimetric, magnetism and paleomagnetism and satellite imaging. A very important aim is to get new data with unprecedented resolution and coverage (multi-instrumental pool IberArray), that complement the existing data sets, allowing an integrated analysis with needed resolution. New methods and analytical and interpretation techniques as well as new analogical and evolution numerical models will be developed.

Regional actions will consist of studies of orogenic systems including foreland basins and continental margins in three areas: South, Centre and North. To the South: the Betic-Rif and Atlas Orogenics, and the marine domains in-between: Alboran Sea and Gulf of Cadiz (initiative Picasso). In the Centre: Central Plateau, Central System and Iberian system, including Catalanian Ranges and Eastern Basins. To the North: Pyrenean and Cantabrian Ranges, including Duero and Ebro Basins and Cantabrian and Galician Margins. Some studies should also include all three thematic areas, the entire Iberian Peninsula and depending on the aim of the study (lithospheric deformation, mantle characterization) surrounding areas such as North of Africa (in the case of the Alboran Basin) and/or South of France (in the case of the Pyrenees).



Earthquakes in Iberia and its surroundings

Thematic actions refer to studies of superficial processes and deep processes, at the lithosphere and mantle level, as well as environmental studies such as global change: interactions between tectonics, erosion-sedimentation and climate, natural resources and hazards. It should also be mentioned actions related to the tectonic interaction between erosion-sedimentation, climate, global change, natural resources and geological hazards. Another action includes the interaction of the crustal and lithospheric structure, heat flow, mineralogic composition. Finally, a third topic includes the development of a new generation of tools for analogic and numeric modelling which should constrain with higher precision the geological processes including a larger number of physical observables and conceptual elements.



Continuous GPS set of stations available at the moment

A growing number of Continuous GPS (CGPS) station has been installed since the mid's of the nineties all over the Iberian Peninsula Area. Some of them, marked with circles at the map, are dedicated to Geodesy. CGPS delivering their data files to EUREF or to IGS have the quality of their data ensured by the quality control checks at those institutions.

Furthermore, some additional sets of CGPS have been installed by regional government agencies, see diamonds at the figure: different colours for different regions. Even a private initiative increases the number of CGPS deployed: the Iberref network, marked with stars at the figure. However these facilities have been designed as user-services. Their quality standards should be carefully checked if they are going to be included in the further analysis. So, a first step in the project development will be to ensure that the whole data set passes standard quality controls.



Different networks, different monumentations,

One of the main problems when trying to integrate different CGPS from different institutions is to identify which of the antenna monuments are suitable to our goals. There should be taken into account which kind of basement is stable enough to ensure we are reaching the truth small displacements we expect to get. Unstabilities in the monumentations should mask real tectonic movements.

We are showing monumentations at some of the CGPS: Salamanca (IGNE included in EUREF network), but also from regional networks (Segovia and Peñafiel belonging to Castilla-Leon network, and Cartagena managed by the Murcia Region network). Concrete pillar, anchored at bedrock should be the most suitable monumentation for the new CGPS stations, as is shown in one of the ROA's CGPS stations in the left.



ABSTRACT

Topo-Iberia is a Spanish Research Council funded project, which aim is to understand interactions among deep, shallow and atmospheric processes, integrating geological, geophysical, geodetic and geo-technological researching activities. Knowledge of topographic changes and their causes are needed in order to assess natural hazards. It is also important to take them into account when evaluating the climatic change impact. The project will be focused in three main areas of interest, located in the Iberian Peninsula: Northern and Southern borders of the Iberian micro-plate, besides its central core.

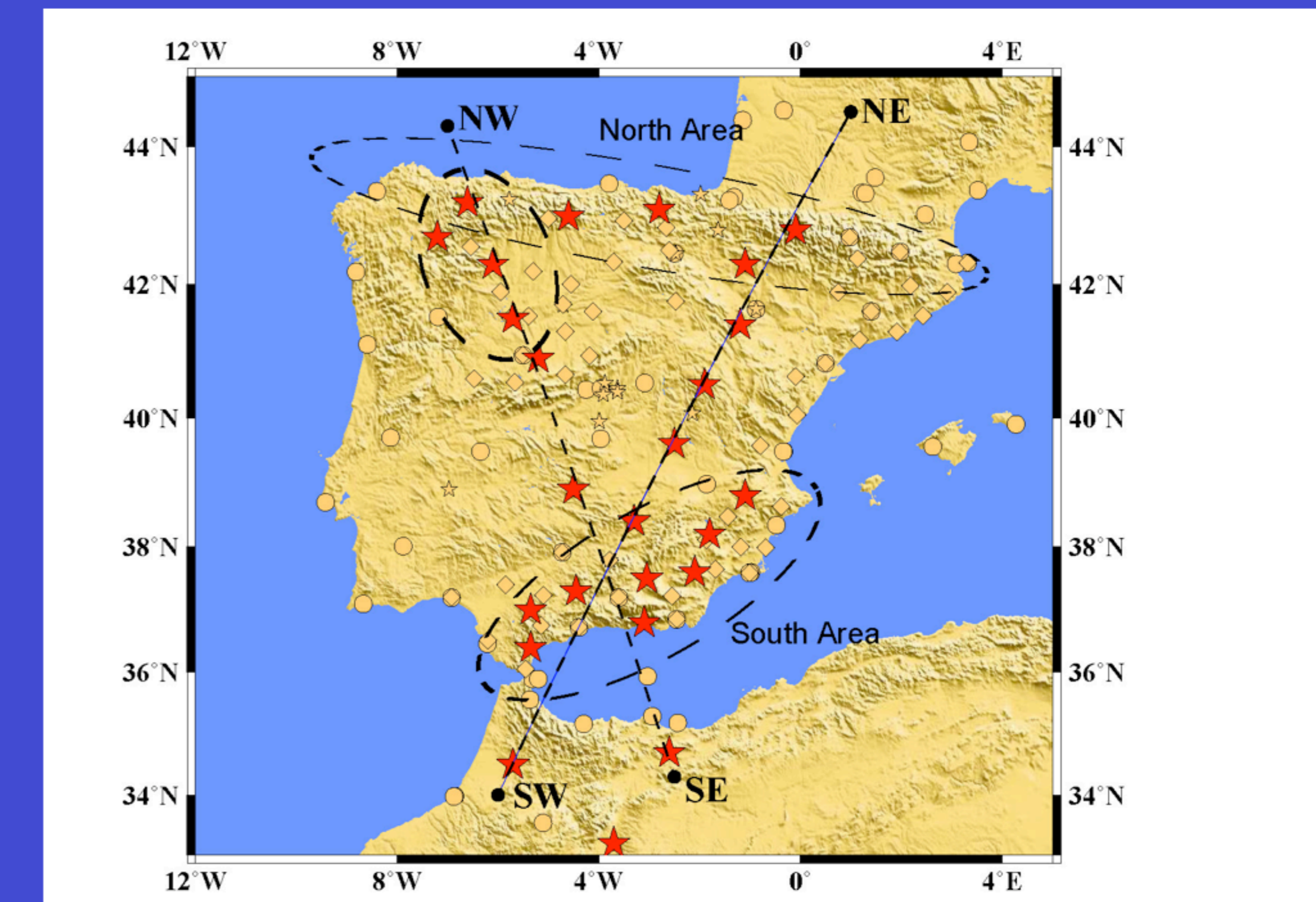
This paper will show the scheduled GPS contribution to the project. A new array of permanent station will be installed complementing the GPS networks already deployed by different institutions. After an initial period designing the network, purchasing new equipments, and deploying stations, it is intended to keep them a minimum of four years of continuous monitoring. A further analysis of the whole set of coordinates time series, should give a nice view of relative displacements, deformations and stresses all over the frame of our interest.



Map of Faults at the Iberian Peninsula, by Dept. of Geodynamics. UCM. Madrid.

In order to have a more complete overview of the present surface processes, a set of about 25 new CGPS will be deployed. Fault locations will be considered, and, when possible, pairs of stations will control active faults.

However, the main focus will be to fill some active areas. This is the case of the Betic System Area, which is the most tectonically active region. But it will not be the same at the Pyrenean range, because they already have a good coverage by the CGPS network deployed by the Catalanian Cartographic Institute. Due to this area is under a NNW-SSE to NW-SE compression regime, two station alignments (from NE to SW and from NW to SE) will be built, including some CGPS in Northern Africa.



Planned CGPS deployment, in the frame of TOPOIberia

A data base with files from existing CGPS with good quality data will be built. Data analysis of the whole set of new and existing CGPS will be performed at three different analysis centers: "Real Instituto y Observatorio de la Armada" (ROA), University of Barcelona (UB) and University of Jaen (UJA). Different approaches will be made by using different programs: GIPSY-OASIS II, Bernese and GAMIT.

We expect that after the scheduled five years of work, we will be able to reach a better understanding of the surface processes and their link to deep and environmental ones.

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