

A NEW CONTINUOUS GPS NETWORK TO MONITOR DEFORMATIONS IN THE IBERIAN PENINSULA (TOPO-IBERIA PROJECT)

J. Gallastegui (1), J.M. González-Cortina (1), J. Garate (2), J. Martin Davila (2), G. Khazaradze (3), A.J.Gil (4), A.M. Ruiz (4), I. Jimenez-Munt (5), C. Ayala (6), J. Tellez (7), G. Rodríguez Caderot (7), P. Ayarza (8) y F. Álvarez Lobato (8).

(1) Geology Department, University of Oviedo. c/ Jesús Arias de Velasco s/n 33005, Oviedo, Spain, jorge@geol.uniovi.es. (2) San Fernando Naval Observatory, Cadiz, Spain. (3) University of Barcelona, Spain. (4) University of Jaén, Spain. (5) Institute of Earth Sciences Jaume Almera (CSIC), Barcelona, Spain. (6) Geological and Mining Institute of Spain (IGME), Madrid. (7) Complutense University of Madrid, Spain. (8) University of Salamanca, Spain.

Topo-Iberia is a Spanish Research Council funded project that shares interests with Topo-Europe project. Topo-Iberia will expand for five years (2006-11) and the objective is to understand the interactions in the Iberian Peninsula (SW Europe) between deep, shallow and atmospheric processes, through a multidisciplinary approach linking geology, geophysics and geodesy. In order to achieve the observational goals of the project, three main working groups have been setup: seismic, magneto-telluric and geodetic.

The efforts undertaken by the latter group are presented in this work. The first task of the GPS geodetic working group was to design the new Continuous GPS network that is going to be deployed in the study area, trying to complement other GPS networks which are already operating under the supervision of different institutions. Since not all of these stations meet the strict requirements of high precision geodesy, we have conducted a preliminary survey to identify the stations that are stable enough to be included as a complement to the new Topo-Iberia GPS network, without degrading its quality. This way the new network avoids the duplication of the existing CGPS sites. The next step was to identify the appropriate places to locate the new GPS facilities. The sites must fulfill requirements such as having a clean horizon, with no obstacles that obscure the visibility, and the presence of solid rock at or near the surface for stable foundations. Different teams performed various field surveys to choose the appropriate places for building the monuments. After an exhaustive review of the UNAVCO recommendations, we have decided to build concrete pillars as monuments, since their stability meet our requirements satisfactorily and provide relative ease in the construction. In addition, each monument design is adapted to the particular conditions of the location.

Taking the EarthScope's Plate Boundary Observatory (PBO) component facilities as a model, autonomous systems were designed including GPS and antenna receiver, an ancillary material such as solar panels or batteries. The deployment of the network equipment started in early 2008 and all stations are due to be operational by June 2008. The network includes twenty-eight stations: 24 installed in different regions of Spain and 4 located in strategically chosen places in northern Morocco to complete the overview of the present-day kinematics (vertical and horizontal movements) in the Iberian Peninsula and southern neighboring areas including the Atlas chain.