Geophysical Research Abstracts
Vol. 18, EGU2016-12777, 2016
EGU General Assembly 2016

The "SABEIS" Project: Warning systems based on earthquake and tsunamis-induced ionospheric effects.

Marta Rodriguez-Bouza (1), Francisco Sánchez-Dulcet (1), Miguel Herraiz (1), Gracia Rodríguez-Caderot (1), David Altadill (2), Estefania Blanch (2), and Miguel Angel Santoyo (3)

(1) Universidad Complutense de Madrid, Ciencias Físicas, Fisica de la Tierra, Astronomia y Astrofisica I, Madrid, Spain (mrodriguezbouza@ucm.es), (2) Observatori de l'Ebre, (OE), CSIC - Universitat Ramon Llull, Roquetes, Spain, (3) Instituto de Geofísica Universidad Nacional Autónoma de Mexico, Unidad Michoacán, Morelia, Michoacán, México

The study of a possible lithosphere–atmosphere–ionosphere coupling (LAI) is mainly focused on the analysis and comprehension of atmospheric and ionospheric anomalies caused by extreme lithospheric events. In this context, earthquakes are considered as possible sources of atmosphere–ionosphere anomalies.
The goal of the two-year long project SABEIS (Sistemas de Alerta Basados en Efectos de terremotos y tsunamis en la IonoSfera) granted by the Spanish Ministry of Economy and Competitiveness, is to analyze the disturbances caused by earthquakes and tsunamis and their possible contribution to warning systems. These topics are receiving increased attention in the scientific community and their correct understanding can meaningfully contribute to the protection of people and economic assets in areas subject to seismic threat.
The project is based on the analysis of Total Electron Content (TEC) obtained from signals of Global Navigation Satellite Systems (GNSS) and anomalies of the ionospheric F2 layer observed in ionograms. This methodology was partially applied in a previous study of the Mw6.1 earthquake in Greece occurred on January 26, 2014. In that case two TEC disturbances were detected the days prior the earthquake. The first one, four days before, was registered by the majority of the stations analyzed over Europe and after studying its temporal variation, was considered unrelated to the earthquake. The second one occurred the day before the earthquake. This anomaly appeared only at stations close to the epicenter and their temporal proximity to the earthquake point to a possible connection with the earthquake preparation process.
In the SABEIS project possible anomalies caused by earthquakes in Mexico and Peru with magnitude ranging from 5.5 to 8.2, will be studied. If the results confirm the influence of seismic events on the ionosphere, the possibility of incorporating this type of analysis in a seismic alert network for the Gulf of Cadiz (southern Iberian Peninsula) will be studied in the last stage of the project.