IBERGIC project: characterizing geomagnetically induced currents in Spain

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The IBERGIC project aims at adressing the characterization of geomagnetically induced currents (GIC) in the Iberian Peninsula by means of a multidisciplinary approach, from the characterization of magnetospheric and ionospheric sources to the creation of a lithospheric geoelectrical model of the Iberian Peninsula.
GIC are produced in long terrestrial conductors as a result of geomagnetic storms, and may affect pipelines, railways and power supply, the critical infrastructure from which society has become more dependent. The main challenge of the project is to analyze and characterize the magnetosphere-ionosphere-earth electromagnetic coupling and to improve the accuracy of the vulnerability map of the Spanish high voltage power transmission network in front of the GIC. To do this, i) we will characterize the external sources (from the sun to the Earth's space environment) that generate the greatest GIC; ii) a 3D lithospheric-scale geoelectric model of the Iberian Peninsula will be determined to predict how the subsurface resistivity and network topology affect the GIC; and iii) GIC intensities at critical locations will be obtained in a non-invasive manner, i. e., without interfering with the operations of the network or power plants.
In this presentation we will focus on how to obtain an initial 3D electrical resistivity model at lithospheric scale of the Iberian Peninsula with the magnetotelluric data and models already available from different institutions and companies. Moreover, we will compare the GIC modelling results using a local impedance tensor (Torta et al., 2017) with the new regional 3D electrical resistivity model.
Torta, J. M., A. Marcuello, J. Campanyà, S. Marsal, P. Queralt, and J. Ledo (2017), Improving the modeling of geomagnetically induced currents in Spain, Space Weather, 15, doi:10.1002/2017SW001628.