Geophysical Research Abstracts
Vol. 14, EGU2012-7719, 2012
EGU General Assembly 2012

Are the geoelectric structures of the Betics lithosphere anisotropic? Insights from a complete dimensionality analysis of magnetotelluric data

A. Martí, O. Rosell, P. Queralt, J. Ledo, A. Marcuello, and E. Roca

Institut Geomodels, Departament de Geodinàmica i Geofísica, Universitat de Barcelona, c/Martí i Franquès s/n, 08028 Barcelona, Spain

Magnetotelluric (MT) exploration in orogenic zones has provided valuable information on the sructures and processes that can be correlated with other geophysical observations. In the Betic Chain (SE Spain), an extensive broadband and long period MT dataset allowed the charaterization of the geoelectric structure of the lithosphere using 3D modelling, in agreement with the 3D character of the data. The model revealed the presence of a low conductivity zone at lithospheric mantle depths that was identified as asthenospheric intruding material related to the westwards roll-back of a lithospheric subduction. As an advancing step in the understanding of the Betics lithospheric structure we present the results of a new dimensionality analysis of the magnetotelluric data with the goal of identifying the possible presence of electrical anisotropy. In the last years, electrical anisotropy within the Earth has been included in geoelectric models and has been related to tectonic structures and geodynamic processes. However, given the amount of information contained in the magnetotelluric impedance tensor and induction arrows, it is not a routine task to uniquely identify the presence and nature of anisotropy, given that it can occur within different types of structures and at different scales. Thus, our analysis is based on a previous methodological work, which established the relationship between the dimensionality pattern obtained at different sites and periods and the possible presence of anisotropy. Additionally, we use the information contained in the induction arrows to constrain the results and compare them with other geophysical data.