



Electrical anisotropy: dimensionality imprints in magnetotelluric responses and effects in isotropic inversion.

Anna Martí (1), Pilar Queralt (1), Juanjo Ledo (1), and Colin Farquharson (2)

(1) GEOMODELS. Departament de Geodinàmica i Geofísica. Universitat de Barcelona, Spain., (2) Earth Sciences Department. Memorial University of Newfoundland, Canada

In this paper we investigate the imprints of anisotropic media responses in the dimensionality analysis using rotational invariants of the magnetotelluric tensor as well as the effects in isotropic inversion. Even if it is almost impossible from the observation of the responses and the dimensionality analysis alone to retrieve all the parameters that characterize anisotropy, the following observations in the dimensionality results make them distinguishable from those from isotropic media:

A) 2D cases even if the responses from different sites are the same, which are indicative of a 1D medium with an anisotropic layer. If the strike direction of 2D is well defined, it indicates the rotation angle around the z axis of the principal directions. Moreover, in the particular case of homogeneous anisotropic media, it has been observed a non-coincidence between the strike angles defined by 2D and 3D/2D. B) A succession, along increasingly periods, of 2D, 3D and 2D cases, with different strike directions, might indicate a 1D structure with 2 anisotropic layers with different properties. C) A similar succession, but with 2D, 3D and 3D/2D cases can be found in an anisotropic dyke with anisotropic surroundings of different properties, or in the case of an anisotropic block underlain by a differently anisotropic layer. In the later, invariants parameters indicate that the distortion is only characterized by the twist angle, although both twist and shear angles are different than zero.