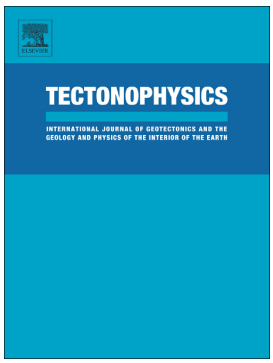

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Regional two-dimensional magnetotelluric profile in West Bohemia / Vogtland reveals deep conductive channel into the earthquake swarm region

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Abstract

The West Bohemia / Vogtland region, characterized by the intersection of the Eger (Ohře) Rift and the Mariánské Lázně fault, is a geodinamically active area exhibiting repeated occurrence of earthquake swarms, massive CO2 emanations and mid Pleistocene volcanism. The Eger Rift is the only known intra-continental region in Europe where such deep seated, active lithospheric processes currently take place. We present an image of electrical resistivity obtained from two-dimensional inversion of magnetotelluric (MT) data acquired along a regional profile crossing the Eger Rift. At the near surface, the Cheb basin and the aquifer feeding the mofette fields of Bublák and Hartoušov have been imaged as part of a region of very low resistivity. The most striking resistivity feature, however, is a deep reaching conductive channel which extends from the surface into the lower crust spatially correlated with the hypocentres of the seismic events of the Nový Kostel Focal Zone. This channel has been interpreted as imaging a pathway from a possible mid-crustal fluid reservoir to the surface. The resistivity model reinforces the relation between the fluid circulation along deep-reaching faults and the generation of the earthquakes. Additionally, a further conductive channel has been revealed to the south of the profile. This other feature could be associated to fossil hydrothermal alteration related to Mýtinaa and/or Neualbenreuth Maar structures or alternatively could be the signature of a structure associated to the suture between the Saxo-Thuringian and Teplá-Barrandian zones, whose surface expression is located only a few kilometres away.

Keywords: Magnetotellurics; West Bohemia; Vogtland; Earthquake swarm; Conductive channel; Fluids

1 Introduction

The region of West Bohemia / Vogtland at the border between Germany and the Czech Republic, including the Cenozoic Eger (Ohře) Rift (ER), is the western part of the Bohemian