Geophysical Research Abstracts
Vol. 19, EGU2017-9483-2, 2017
EGU General Assembly 2017

Magnetotelluric Imaging of Hasandağ-Karacadağ Monogenetic Cluster, Central Anatolia, Turkey

Göksu Uslular (1), Sabri Bülent Tank (2), Sinan Özaydın (2), Mustafa Karaş (2,3), Gonca Gençalioğlu-Kuşcu (1), and Eric Sandvol (4)

(1) Muğla Sıtkı Koçman University, Department of Geological Engineering, Turkey (goksuuslular@mu.edu.tr), (2) Boğaziçi University, Kandilli Observatory and Earthquake Research Institute, Department of Geophysics, Turkey, (3) İstanbul Technical University, Department of Geophysical Engineering, Turkey, (4) University of Missouri, Columbia, USA

Hasandağ stratovolcano is one of the most devastating volcanic edifices in the Central Anatolia, Turkey. The volcano has been studied for decades but there is still no consensus on its origin. To provide new insight on Hasandağ, there is also a need for geophysical explorations (e.g. seismology, magnetotelluric-MT) within the region. As a part of collaborative multidisciplinary project (CD-CAT: Continental Dynamics/Central Anatolian Tectonics) funded by NSF, we conducted 25 MT (360 Hz - 0.0002 Hz) measurements to reveal the electrical conductivity structure of the volcanic region between Hasandağ and Karacadağ stratovolcanoes. By means of two- and three-dimensional numerical modelling attempts based on several state-of-the-art algorithms, the MT data were utilized to create SW-NE trending profiles that visualize to a depth of 50-km of the subsurface structure. Prior to two-dimensional modelling, dimensionality analyses (i.e. geo-electric strike angle determination following Groom and Bailey decomposition for single-site and multi-site cases, phase tensors and induction vectors) were performed. Preliminary findings lead us to suggest that (i) there is a highly conductive body from 20 km to 40 km depth beneath the monogenetic field (i.e. Eğrikuyu) between Hasandağ and Karacadağ. This may correspond to the possible depth at which widespread mildly-alkaline basalts are formed due to the decompression melting of heterogeneous mantle (mixing of mostly subduction-modified lithospheric and partially upwelling asthenospheric). (ii) Relatively low conductive body at shallow depth possibly due to the presence of buried ignimbrite. (iii) One of the maar with a deep source (diatreme-like) may still store hot fluids that result from highly conductive body, and here would be a suitable prospect area for geothermal exploration. (iv) low to high conductivity boundary underneath the Tuz Gölü fault appear as a barrier for fluid flow.