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Resolving the deep electrical resistivity structure at Central Pontides, Northern Turkey by three-dimensional magnetotelluric modeling

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Wide-band magnetotelluric (MT) (360 Hz – 1860 sec) data were acquired at 25 sites along a north – south aligned profile cutting across the Central Pontides, which are made up of highly metamorphosed formations and their tectonic boundaries including: a Lower Cretaceous-aged turbidite sequence, Central Pontides Metamorphic Supercomplex (CPMS), North Anatolian Fault Zone (NAFZ) and Izmir-Ankara-Erzincan Suture Zone (IAESZ). Dimensionality analyses over all observation points demonstrated high electrical anisotropy, which indicates complex geological and tectonic structures. This dimensional complexity and presence of the electrically conductive Black Sea augmented the requirement for a three-dimensional analysis. Inverse modeling routines, ModEM (Egbert and Kelbert, 2012) and WSINV3DMT (Siripunvaraporn et al., 2005) were utilized to reveal the geo-electrical implications over this unusually complicated region. Interpretations of the resultant models are summarized as follows: (i) Çangaldağ and Domuzdağ complexes appear as highly resistive bodies bounded by north dipping faults. (ii) Highly conductive Tosya Basin sediments overlain the ophiolitic materials as a thin cover located at the south of the NAFZ. (iii) North Anatolian Fault and some auxiliary faults within the system exhibit conductive-resistive interfaces that reach to lower crustal levels. (iv) IAESZ is a clear feature marked by the resistivity contrast between NAFZ-related sedimentary basins and Neo-Tethyan ophiolites.