Utilizing the electrical conductivity distribution to unravel the hydrothermal system beneath Mt.Hasan composite volcano and its vicinity, southwest Cappodocia, Turkey

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The electrical conductivity structure in the vicinity of Mt.Hasan composite volcano at Central Anatolia, Turkey was imaged by means of wide-band magnetotellurics data collected at 38 sounding locations and three-dimensional numerical modeling. The primary aim in this study was to decipher the major elements that drive a hydrothermal system beneath study area in detail. Therefore, following the dimensionality analyses performed by plotting induction arrows and phase tensor ellipses, the electromagnetic impedance data were numerically modeled in the data-space for imaging (i) the shallow and (ii) the deep electric structure with different frequency tables. While the former approach, provided information on the the thickness of a surficial (surface-to-2 km) and widespread welded ignimbrite layer, the latter approach, revealed the geometry of the deeper two layers beneath the ignimbrites that make up the clay cap. These layers that are found on the top of one another are interpreted as smectite (<10 Ohmm) and smectite-illite mixed (<10-15 Ohmm) layers. And finally beneath the smectite and smectite-illite layers, there is a cone-shaped anomaly (10 –60 Ohmm) that may have been serving as a reservoir for different vents in the area.

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