Magnetotelluric investigations in the way umpu geothermal prospect area, Lampung Province, Indonesia

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Abstrak

The Geological Research Center’s (GRC) or Pusat Sumber Daya Geologi (PSDG) previous research estimated that the Way Umpu 1 Hot Springs in the Way Umpu geothermal prospect area reflects a reservoir temperature of 160°C–195°C. From geological observations, the main fault structure in that area is the Way Umpu Fault, which has a strike direction of NE–SW and the area is dominated by volcanic rocks. Many joints are also found along the fault line. The Way Umpu-1 Hot Springs is controlled by these geologic structures. The previous research and field observations lead us to carry out continuing research in this area, which is aimed at determining its resistivity structure to a depth of 4 km. For this purpose, we carried out field measurements using Audio magnetotelluric (AMT) and Magnetotelluric (MT) methods. The work presented in this paper is the result of 1-D and 2-D inversion modeling from 8 MT soundings. We compared inversion models using the 1-D Bostick transformation scheme, 1-D Occam model, and 2-D Nonlinear Conjugate Gradient (NLCG) algorithms. The study results reveal the existence of a strike as indicated from the geological data and a low resistivity zone at a shallow surface to a depth of 2 km that is most probably associated with partial melting and intrusion at a greater depth.