NUMERICAL MODELLING OF CSAMT SOURCE EFFECTS FOR ELONGATED CONDUCTIVITY STRUCTURES

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CSAMT using electrical dipole source creates a lot of interpretational problems associated with conductivity inhomogeneities in the vicinity of the source and with the finite transmitter-receiver distance. These effects - non-plane effect (due to the closeness of the source) transmitter or source overprint effect (due to conductivity inhomogeneities beneath the source) and shadow effect (arising from inhomogeneities between the transmitter and sounding site) - are called source effects and they may significantly distort the EM components frequency sounding curves. For elongated conductivity structure the applied 2.5D finite difference forward modelling makes it possible to investigate these source effects separately and jointly as well. In this presentation these source effects are investigated in the function of source polarization, i.e. modelling was done both in broadside configuration (TE mode) and in collinear configuration (TM mode). In the course of investigation the most complicated model was a two-layer half-space model with two embedded elongated blocks and one of these blocks was beneath the source. This investigation covered the transition zone as well, for this reason instead of Cagniard apparent resistivity pseudosections impedance amplitude and impedance phase sections were applied to present source effects in both modes. Assuming elongated conductivity structures with surface HED source both the shadow and source overprint effect can be experienced in the two modes and these effects manifest themselves characteristically. For the investigated models greater source overprint effect was observed in TM mode than in TE mode to compare with the layered half-space EM responses.

source effects, TE and TM mode

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