



A MATLAB GUI based algorithm for modelling Magnetotelluric data

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The magnetotelluric method is an electromagnetic survey technique that images the electrical resistivity distribution of layers in subsurface depths. Magnetotelluric method measures simultaneously total electromagnetic field components such as both time-varying magnetic field $B(t)$ and induced electric field $E(t)$. At the same time, forward modeling of magnetotelluric method is so beneficial for survey planning purpose, for comprehending the method, especially for students, and as part of an iteration process in inverting measured data. The MTINV program can be used to model and to interpret geophysical electromagnetic (EM) magnetotelluric (MT) measurements using a horizontally layered earth model. This program uses either the apparent resistivity and phase components of the MT data together or the apparent resistivity data alone. Parameter optimization, which is based on linearized inversion method, can be utilized in 1D interpretations. In this study, a new MATLAB GUI based algorithm has been written for the 1D-forward modeling of magnetotelluric response function for multiple layers to use in educational studies. The code also includes an automatic Gaussian noise option for a demanded ratio value. Numerous applications were carried out and presented for 2,3 and 4 layer models and obtained theoretical data were interpreted using MTINV, in order to evaluate the initial parameters and effect of noise.

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