

EM data processing tools in Matlab

M. Becken¹, H. Marzouk¹, J. Plett¹, H. Treppke¹, A. Thiede¹, P. Kotowski¹

¹University of Münster, Institute of Geophysics, michael.becken@uni-muenster.de

SUMMARY

As part of the master's program in geophysics, we teach modules on theoretical magnetotellurics (MT) and on inversion theory, including solution estimates to regression problems such as in MT data processing, and to ill-posed problems such as in MT inversion. Practicals associated with these courses include the acquisition of MT data in a field course, processing of the acquired data and inversion. In this contribution, we present the time series processing tools that we develop in an ongoing effort and that we use both in teaching and in research projects. The software is written in Matlab using object-oriented programming and is designed to process MT data as well as controlled source EM (CSEM) data, including stationary recordings on the ground (MT, CSEM) and mobile airborne recordings (AFMAG, semi-airborne EM). The design objective was to facilitate easy and automated data access to various data formats holding electric and magnetic field recordings, current recordings and readings from inertial measurement units, and fully automated processing with optional data access at all processing stages. Diagnostic plots can be generated and aim at supporting decisions on parameter selection. This allows the user to perform quick-look processing in the field or to get set started, and detailed analyses to obtain an in-depth understanding of EM field recordings. The processing comes along with a html manual, which we try to keep up to date as time allows. We ultimately hope that these tools allow the user to concentrate on the actual data rather than on formatting issues or other tedious and time-consuming tasks.

Keywords: time series processing, magnetotellurics, controlled source EM, airborne EM
