

A complete workflow of open-source Python packages to work with Magnetotelluric data

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SUMMARY

Reading, processing, and archiving magnetotelluric (MT) time series and transfer function data can be an unnecessarily complicated experience. We introduce a group of open-source Python packages to help make working with MT data more findable, accessible, interoperable, and reusable (FAIR). MTH5 is an archivable and exchangeable HDF5 data container with standardized metadata for storing time series data, Fourier coefficients, and transfer functions. The MTH5 package contains readers for common data loggers and transfer function formats. MTH5 is the input format for Aurora, a transfer function processing code based on the Fortran code EMTF. Finally, MTPy-v2 is the main controlling software that processes (Aurora), analyzes, plots, models (using SimPEG) and builds input files for various modeling codes from transfer functions using MTH5 as the data container. This workflow has been successfully tested on the USArray data using the Gadi supercomputer hosted at the National Computational Infrastructure. All packages include documentation with example Jupyter notebooks and are installable through PyPi and Conda-forge.

Keywords: Time series, open-source software, transfer functions, Python

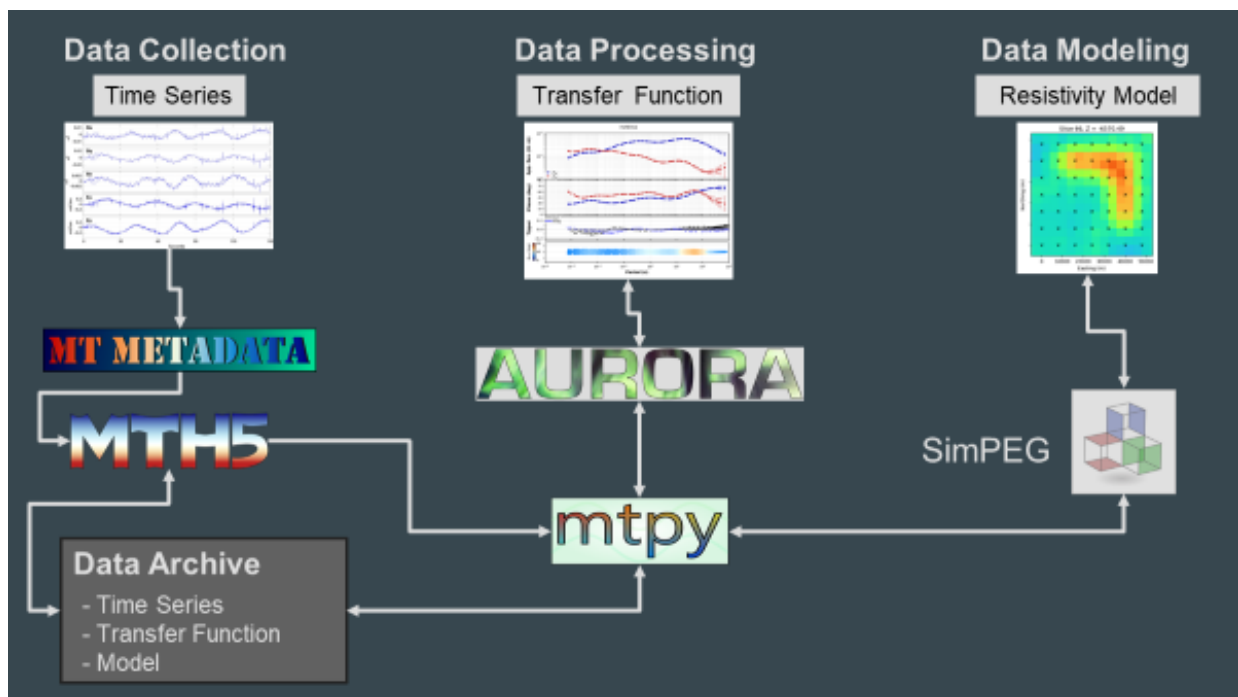


Figure 1. General workflow of open-source Python packages from time series to transfer functions to resistivity models to data archiving.

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