MESS ObsPy/Python Practical

1 Python Introduction

Slides + interactive presentation

- Python data types
- manipulating these (esp. `str`, `list`, `dict`, `np.ndarray`)
- working with `IPython` (help, tab completion, history), running Python programs
- control flow (`if`/`for`/`while`/`continue`/`break`/`try`/...)
- (functions/classes just very briefly)
- importing standard modules (brief note on easy_install, http://pypi.python.org)
- short overview of available standard library modules (http://docs.python.org/library/)

15 minutes playing around

- just a few very simple manipulations on lists, dictionaries, arrays etc.

2 ObsPy Introduction

Slides + interactive presentation

- ObsPy data types (`UTCDateTime`, `Stats`, `Trace`, `Stream`)
- overview of online resources (API, ObsPy Tutorial, Ticket System, Mailing Lists)
- working with ObsPy data types
  - plotting data
  - using predefined methods of `Stream`
  - working on the data manually (e.g. doing an fft using numpy)

15 minutes playing around

- short, simple tasks like: `copy`, `filter`, `trim`, `select`, `simulate`, `write`

Slides + interactive presentation

- how to get data/metadata: `read`, `Client`, `Parser`

15 minutes playing around

- exercises with combined tasks:
  - getting data (local files, online)
  - check for available stations/networks on servers
  - get data for stations in a certain network
  - get metadata for these stations
  - write to file locally

5 minutes interactive solutions to exercises

3 Exercise

30 minutes

- fetch data of one station for given time span (some hours)
- use trigger routine to get P onset time
- simulate Wood Anderson seismometer
- trim to e.g. 20 sec after P onset
- determine peak-to-peak amplitude (simple min/max)
- calculate local magnitude
- if it works: do it automated in a loop over several stations and calculate network magnitude

5 minutes interactive solution to exercise

4 Additional Problems

for quick guys or if someone wants to play around some more later

- fetch big eq data, visualize normal modes
- load/fetch DHFO data, run a trigger over it, stack the signal according to the trigger onset times
- load data (24 hours), make probability density function of psd
- cross-correlation pick refinement
- waveform similarity analysis, clustering