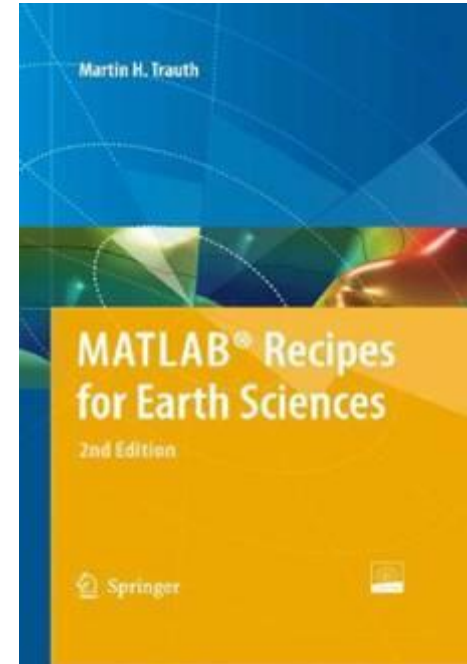Workshop from the 11th – 13th of April (NHM Vienna)

MATLAB – Recipies for Earth Science
by Martin H. Trauth (University of Podsdam)
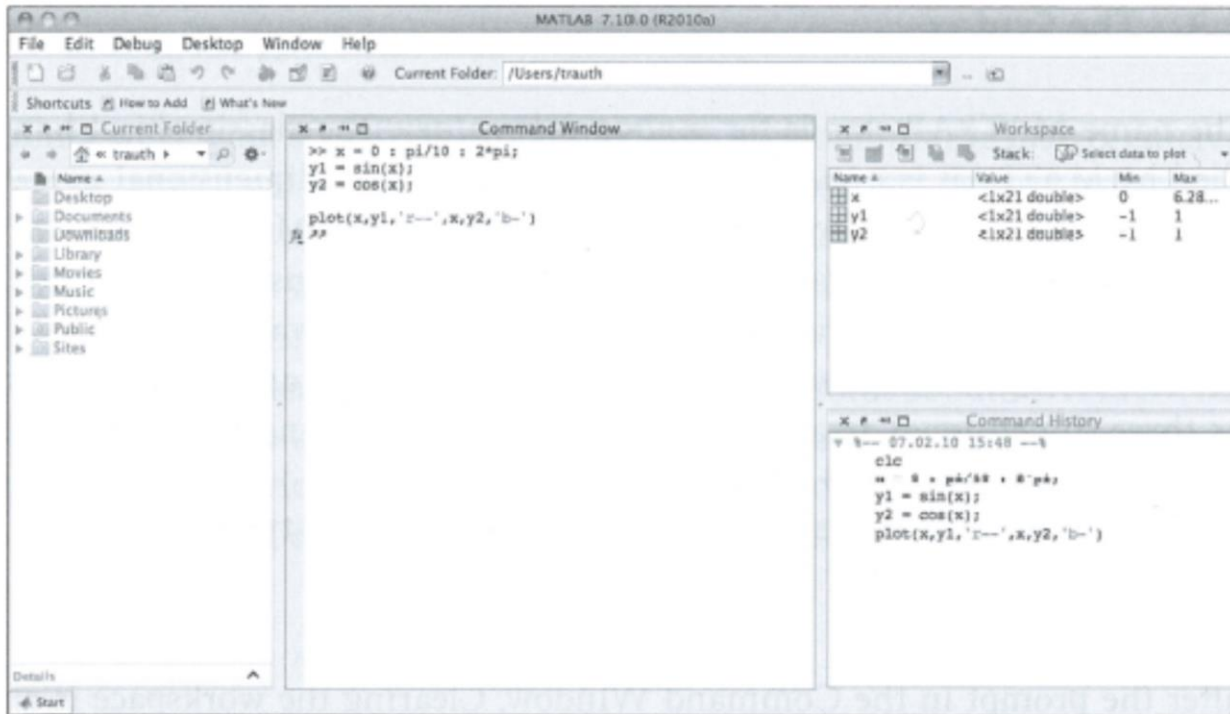
- Outline of the workshop
  - introduction into MATLAB
  - univariant/bivariante statistics
  - timeseries analysis, signal processing,
    image processing

- What's this for?
  - to imporve our statistical analysis of high-res data by testing a new and commonly used program amoung Earth scientists
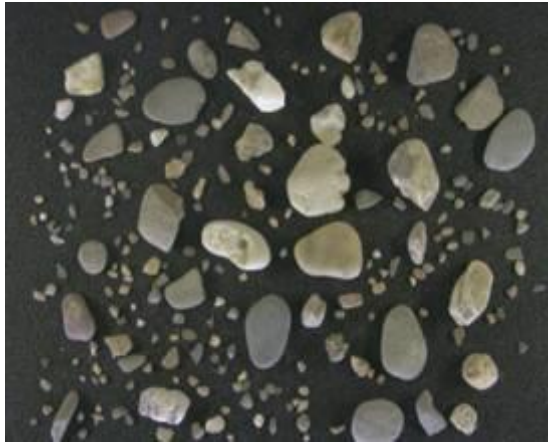 - to detect and illustrate cyclicities

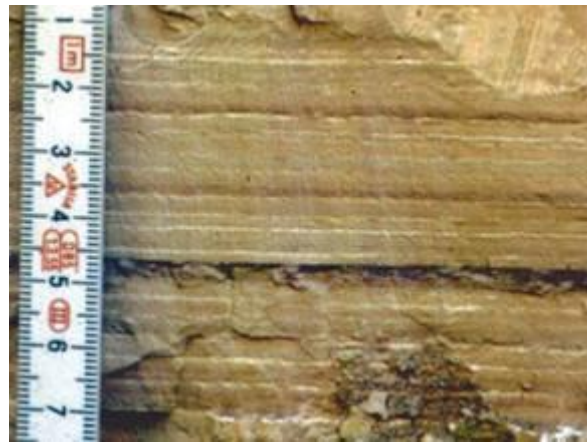# Report `Detailed and high-resolution records´

- MATLAB (MATrix LABoratory) by The MathWorks

- default desktop layout -> requires the usage of program lanugages

Grain size analysis

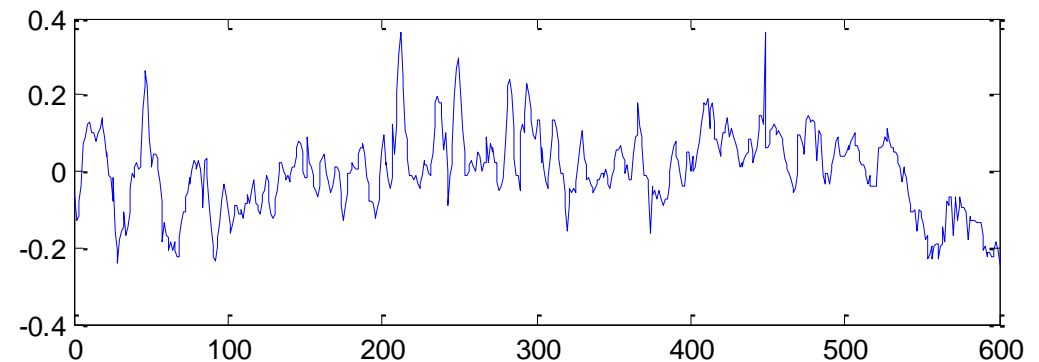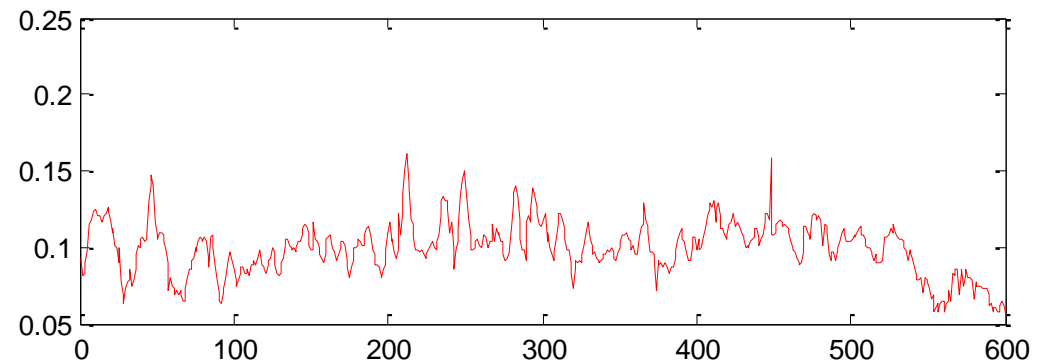Varve counting (colors)

Exporting surface information

- Basic statistics (mean, smoothing, etc.)
- Clusters
- Power spectra (detect repetitive signals)
- Wavelet analysis
- Removing of noise
- Using of different filters

NECLIME

- %%
- gamma=load('gamma.txt');
- plot(gamma(:,2),gamma(:,1));
- x=gamma(:,2);
- %%remove trend
- xdtr = detrend(x);
- plot(xdtr);
- %
- %%smooth//mean
- span = 3;
- window = x(span,1)/span;
- smoothed_x = convn(x,window,'same');
- %
- h=plot(smoothed_x,'r-');
- %
- %both curves
- %subplot(2,1,1), plot(smoothed_x,'r');
- %subplot(2,1,2), plot(xdtr);

Script for removing trend + create a 3-point mean

NECLIME

- MATLAB offers many possibilites

- One script for many statistical processes

- Re-use and modifying this script is easy and fast

- Mathematically argue and present what processes were performed

- Need kowledge of program language

- Time consuming initial training

- expensive

NECLIME

Other useful stats programs

- AnalySeries program (Mac only)
  standard program for filtering

- C2
  similar to Tilia (up to 75 samples)

  → free download
    http://www.ncdc.noaa.gov/paleo/softlib/softlib.html
    (NOAA Paleoclimatology)

- PAST (Paleontological Statistics)
  http://folk.uio.no/ohammer/past/