

Report 'Detailed and high-resolution records'

report by Andrea Kern

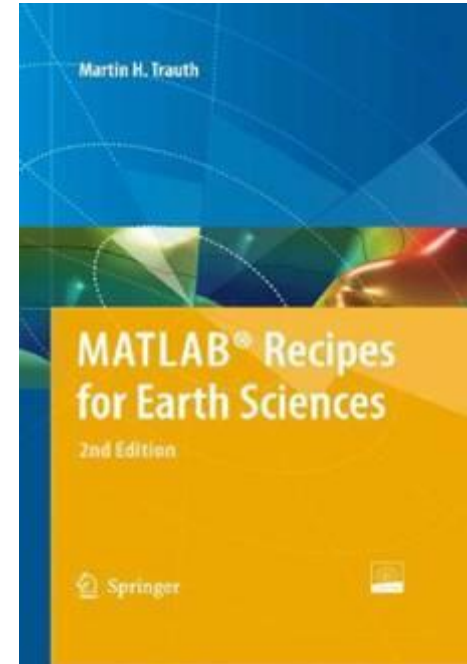


Workshop from the 11th – 13th of April (NHM Vienna)

MATLAB – Recipes for Earth Science

by Martin H. Trauth (University of Potsdam)

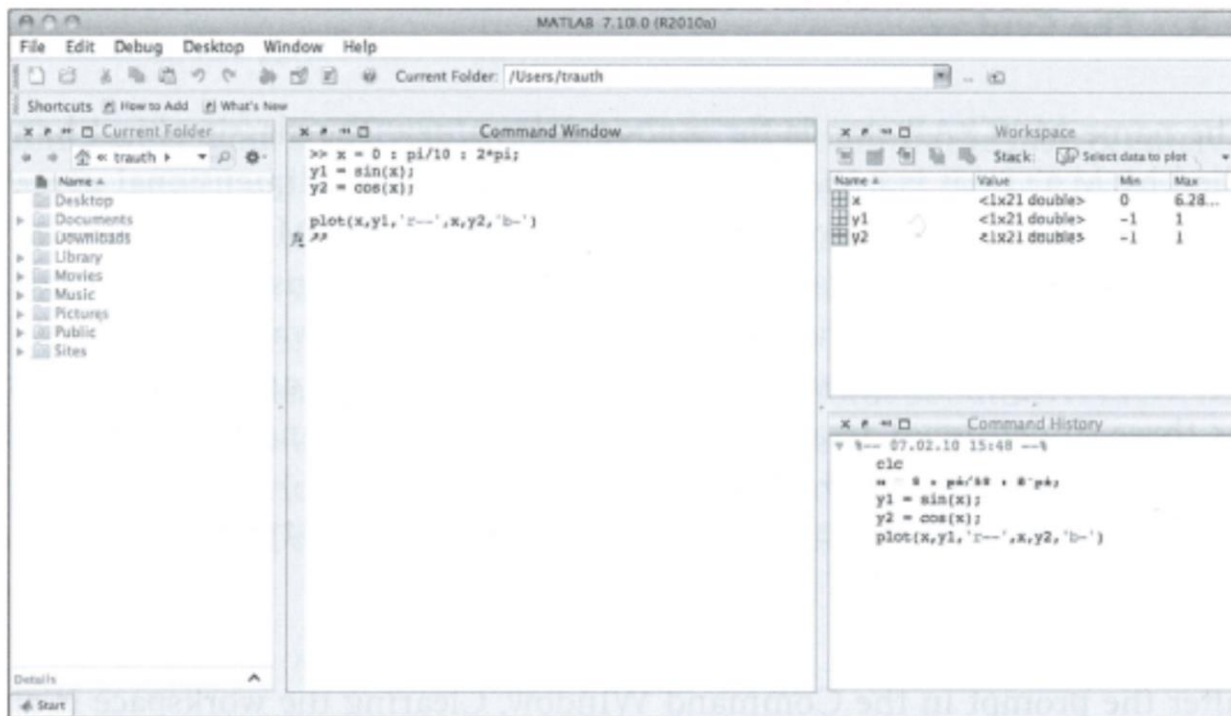
- Outline of the workshop
 - introduction into MATLAB
 - univariant/bivariate statistics
 - timeseries analysis, signal processing, image processing
- What's this for?
 - to improve our statistical analysis of high-res data by testing a new and commonly used program among Earth scientists
 - to detect and illustrate cyclicities

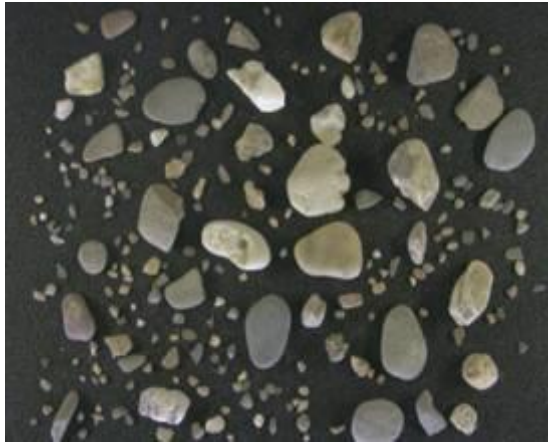


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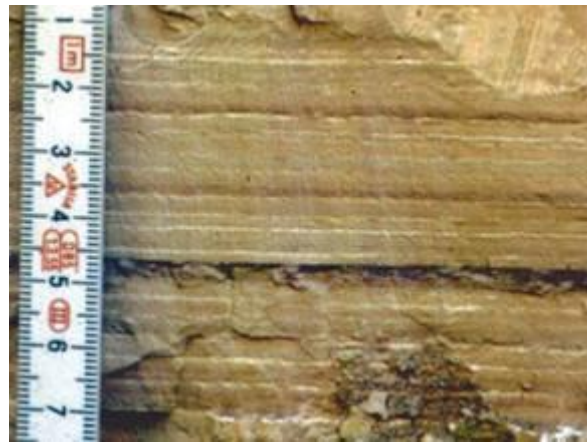


- MATLAB (MATrix LABoratory) by The MathWorks
- default desktop layout -> requires the usage of program languages





Grain size analysis



Varve counting (colors)



Exporting surface information

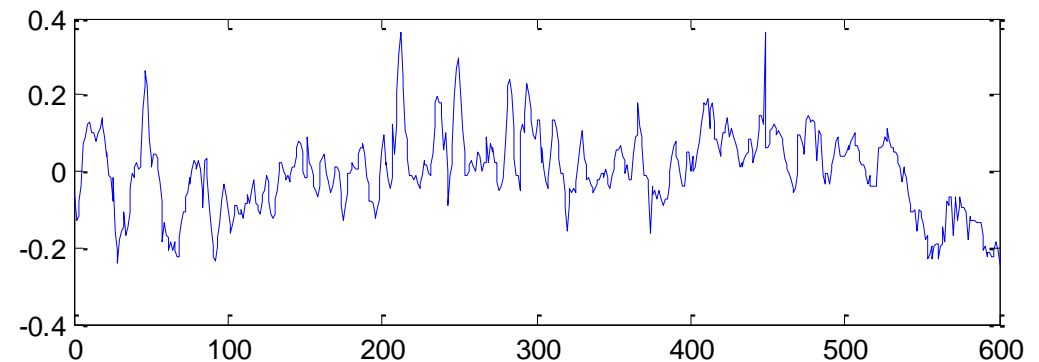
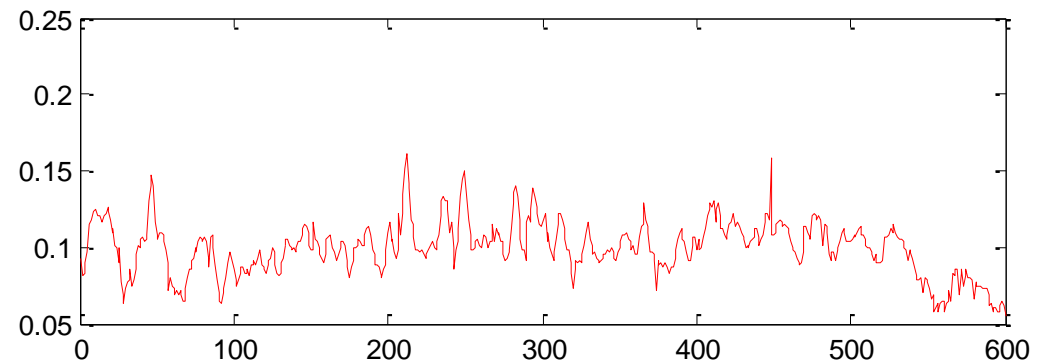
- Basic statistics (mean, smoothing, etc.)
- Clusters
- Power spectra (detect repetitive signals)
- Wavelet analysis
- Removing of noise
- Using of different filters

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- %%
- 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



- MATLAB offers many possibilities
- 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 knowledge of program language
- Time consuming initial training
- expensive

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/>