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Vienna University of Technology

# Transient Electro Magnetics – Processing

Practical exercise – UE 128.080

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1. Raw data visualization
  - Which data is influenced by anthropogenic objects?
2. Processing
  - Which data points are reliable?
  - ZondTEM software
3. Inversion
  - ZondTEM software
4. Results
  - Report until: 13th of July 2018
  - E-Mail to [adrian.flores-orozco@geo.tuwien.ac.at](mailto:adrian.flores-orozco@geo.tuwien.ac.at)
  - Question also to: [lukas.aigner@tuwien.ac.at](mailto:lukas.aigner@tuwien.ac.at)

# Data and site information

- Single loop configuration (12.5m loop & 25m loop)
- 0.75mm<sup>2</sup> diameter; copper cable
- 1A or 4A; different Stacks and Time values

- Matzleinsdorf:  
Data Visualization
- Rosalia:  
Data processing and  
Inversion



# Raw data visualization

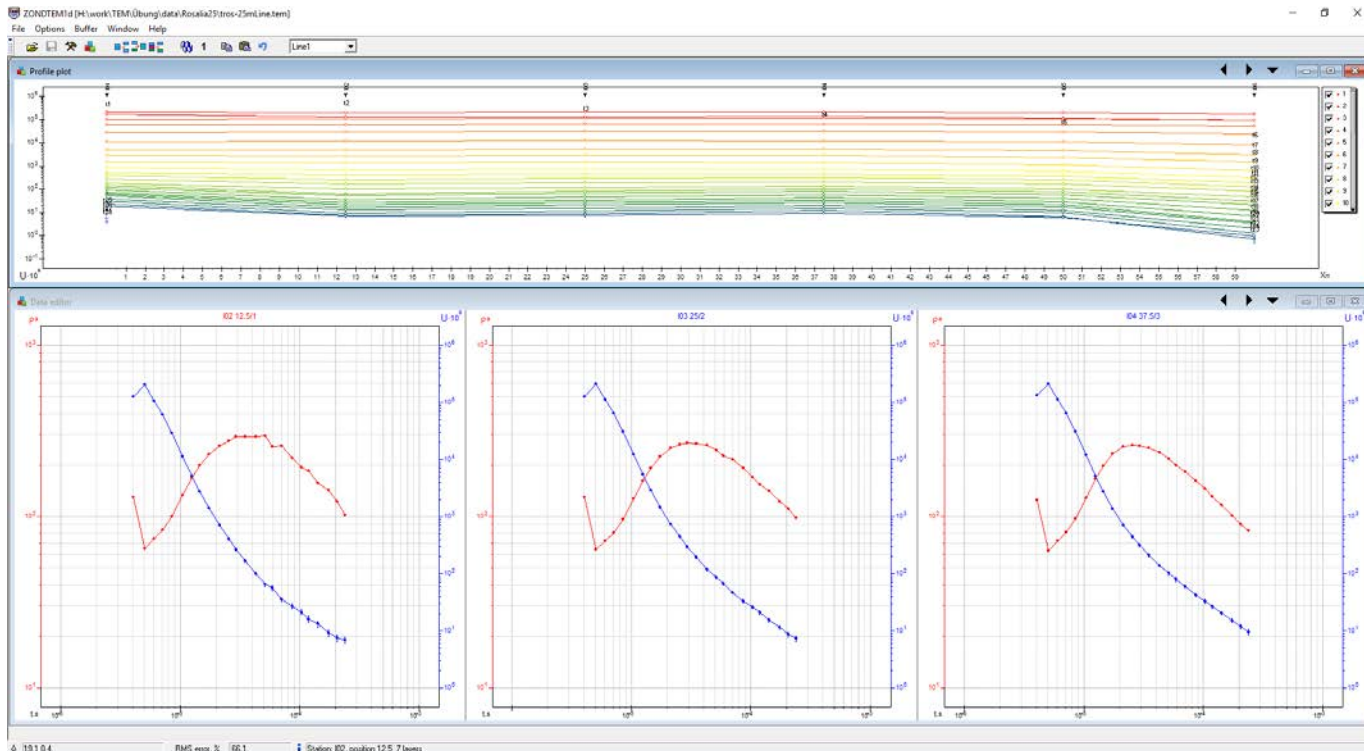
- Necessary to assess overall data quality
- Check for anthropogenic influences
- 2 possibilities:
 

1. Signal voltage	$E(t)$	$[V/A]$
2. Apparent Resistivity	$\rho_a$	$[Ohm\ m]$
- Time range:  $4 - 1000\ \mu s$
- Signal range:  $10^{-1} - 10^{-7}\ V/A$

- ZondTEM software

<http://zond-geo.com/english/zondsoftware/electromagnetic-sounding/zondtem1d/>

- Which points are part of the reliable signal?
- Mainly qualitative
- Expectation is a smooth decaying curve



## Goal:

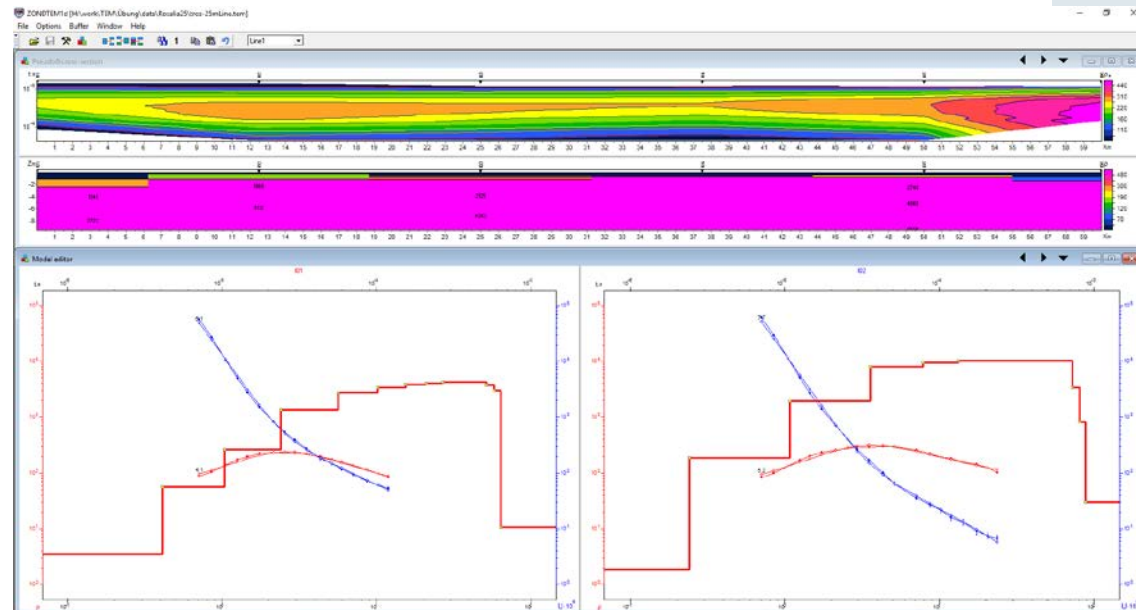
- Find a model which is able to reproduce the observed data  
→ Simplest model fitting the data in appropriate way

- Inversion algorithm:

→ n-Iterations, after each: calculated data is compared to observed data.

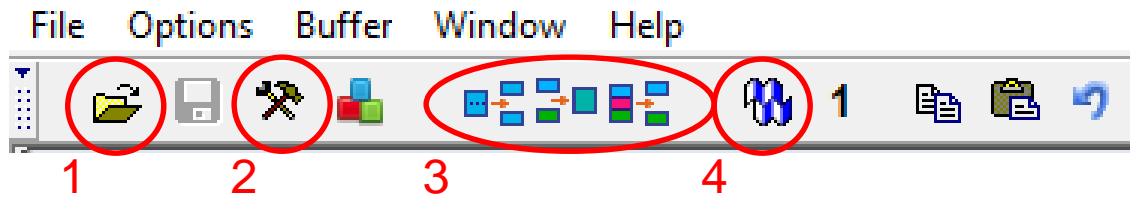
- Parameters:

- Number of layers
- Model depth
- Start model
- Type of inversion

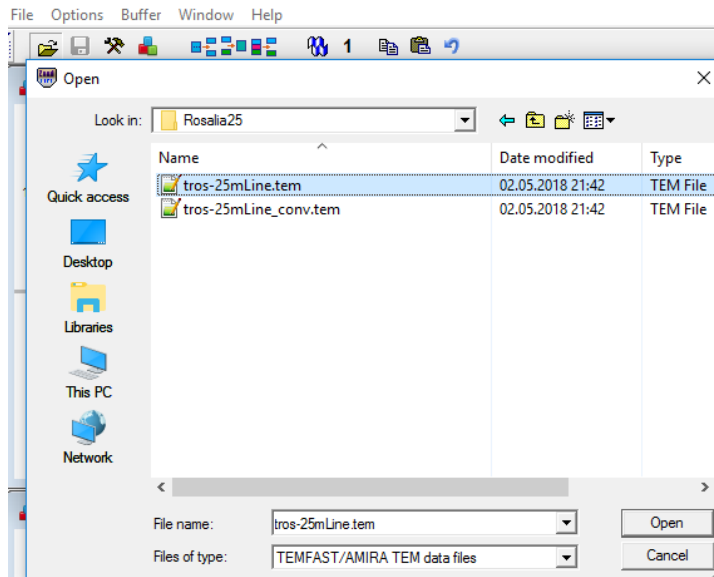


# Step-by-Step: ZondTEM - 1

- Overview control panels:



1. Open data file
2. Program setup
3. Layer modelling controls
4. Start Inversion (1 Inversion step – button on the right)

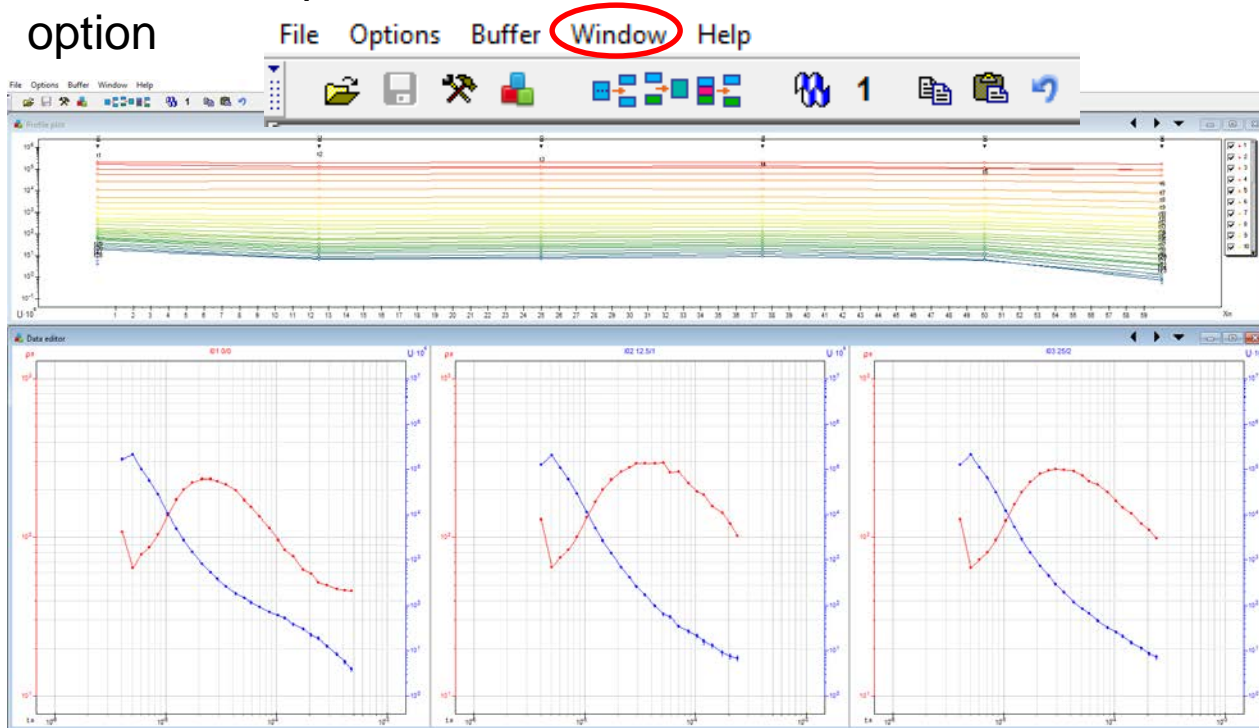


- Press „open data file“
- Select the desired data
- Make sure to use files of type: TEMFAST „\*.tem“

# Step-by-Step: ZondTEM - 2

- Data editing:

From the dropdown menu under „window“ select the „editing style“ option

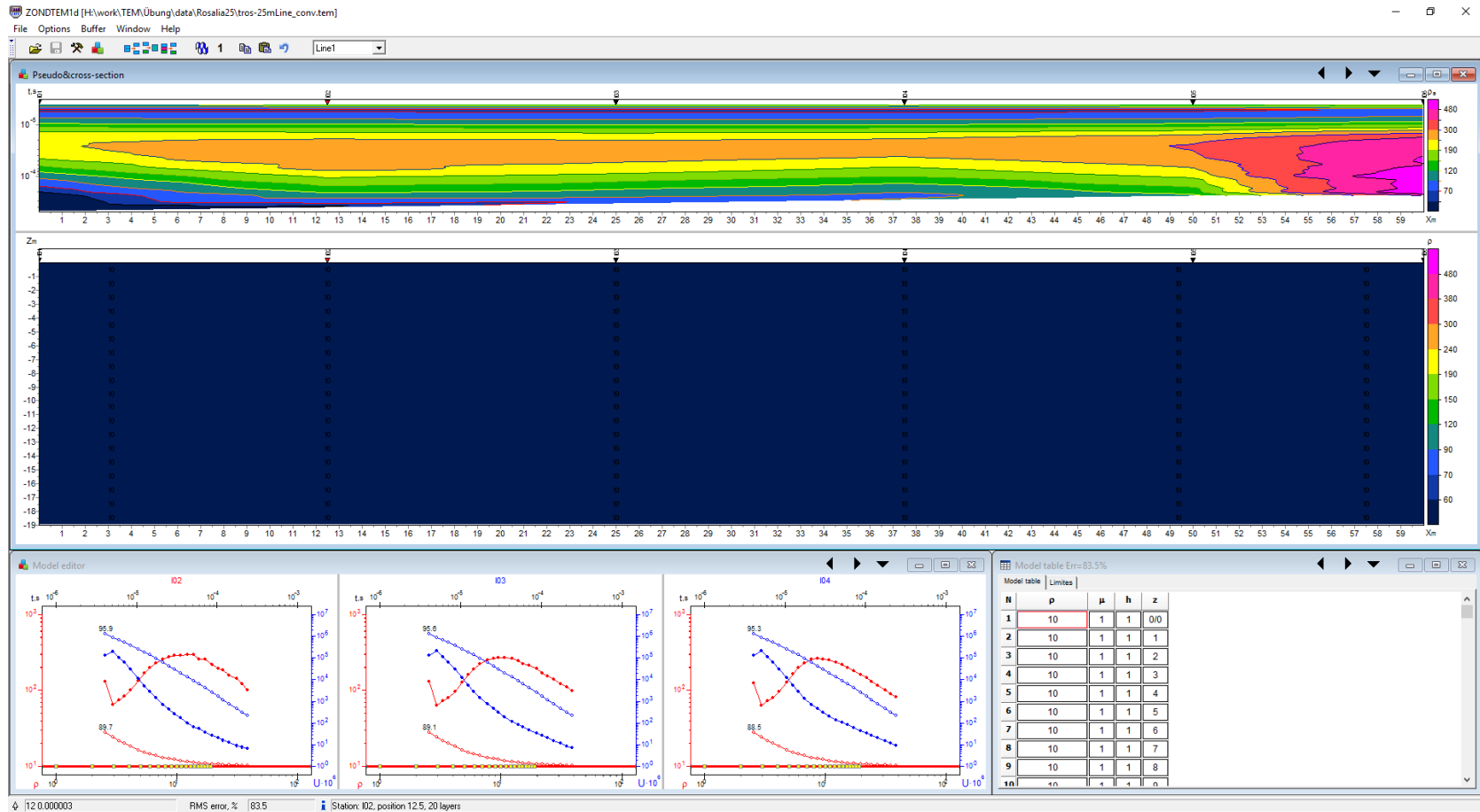


- You can visualize 1 to 3 soundings in the lower part
- Upper part shows  $\rho_a$  along the profile
- To remove points „right click“ onto a data curve and choose from the menu  
→ Switch to „interpretation style“, the same way you did select „editing style“



# Step-by-Step: ZondTEM - 3

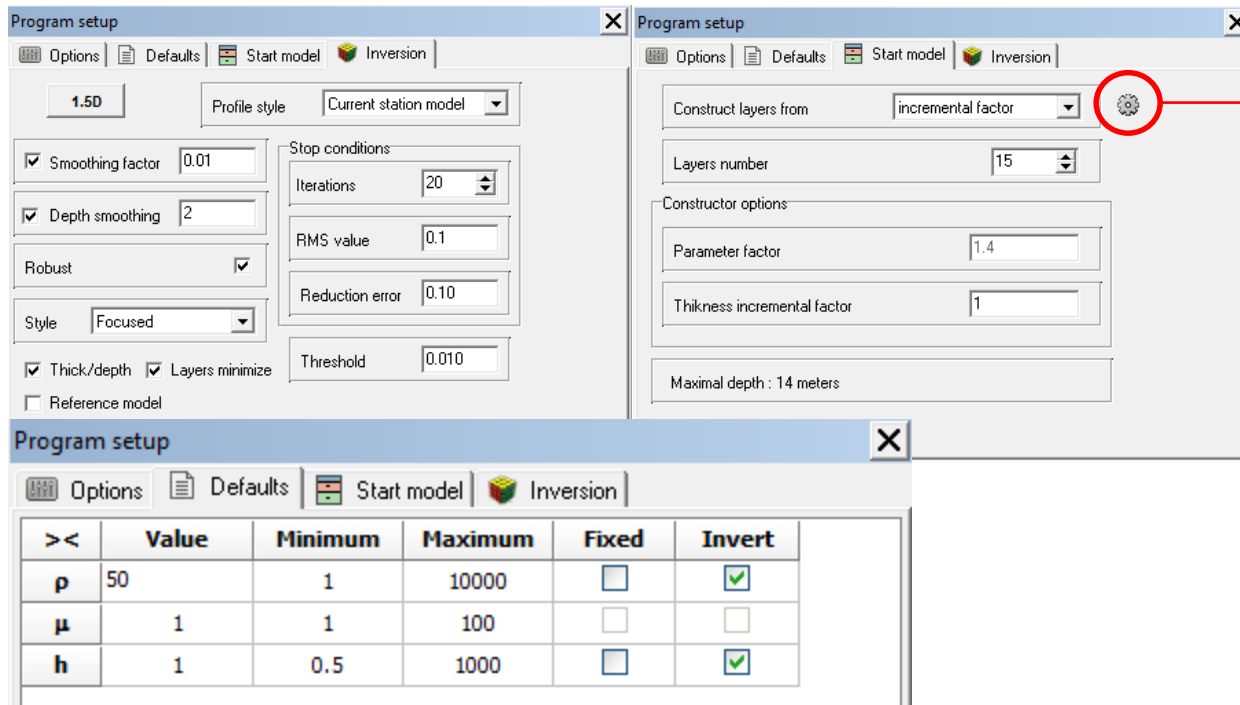
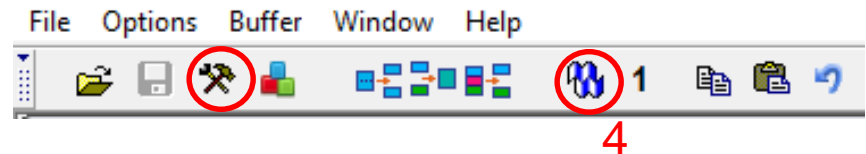
- „Interpretation style“:



- Additional view of the model along the section
- Model table to chekc the values of a single model

# Step-by-Step: ZondTEM - 4

- Inversion: go to „program setup“ → red circle below
1. Set number of layers
  2. Set initial value for resistivity
  3. Select type of inversion
  4. Start Inversion
  5. Check if calculated Signal fits to the measured data
  6. If not: reDo processing step and exclude/include points



After setting all values for the start model: Press this button in order to (Re)Construct the model

- Part 1: Raw data visualization:
  - Melk data „UE\_anthropInfluence.tem“
  - Python or Matlab
  - Subplot or multiple lines within one plot
  - Which data is influenced by anthropogenic structures?
- Part 2: Data Processing & Inversion:
  - Rosalia Data „tros-25mLine“
  - Which points to include in Inversion?
  - Inversion of the data