AGS Aarhus GeoSoftware

LCI inversion of SPIA TEM data in Aarhus Workbench

1. INTRODUCTION

This manual contains a detailed description of how to open TEM data from SPIA and make an 1D inversion with 2D constraints, also called LCI (Spatial Constrained Inversion) in Aarhus Workbench

Example files can be downloaded at our wiki page. www.aarhusgeosoftware.dk

Version information

This manual is written for Aarhus Workbench 6.x

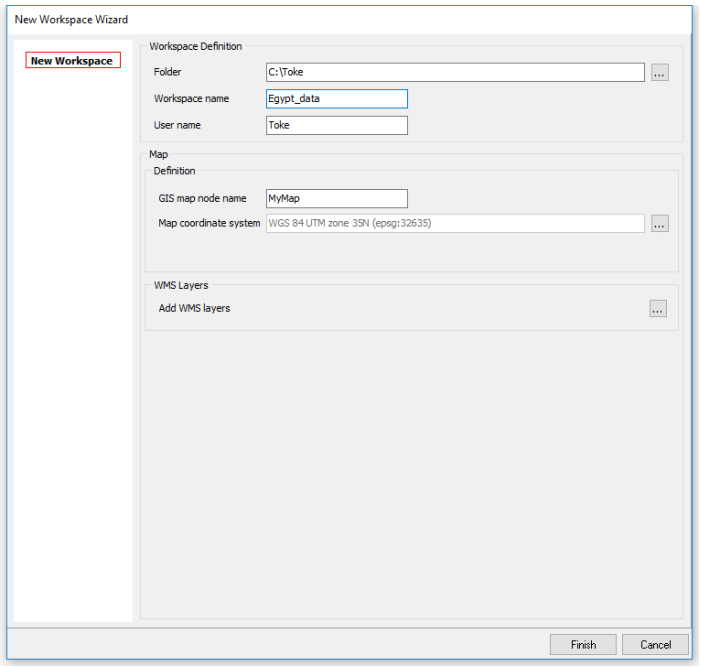
Reference

Aarhus Workbench is not freeware, but a trial version or a Viewer version is available by contacting Aarhus GeoSoftware at info@aarhusgeosoftware.dk.

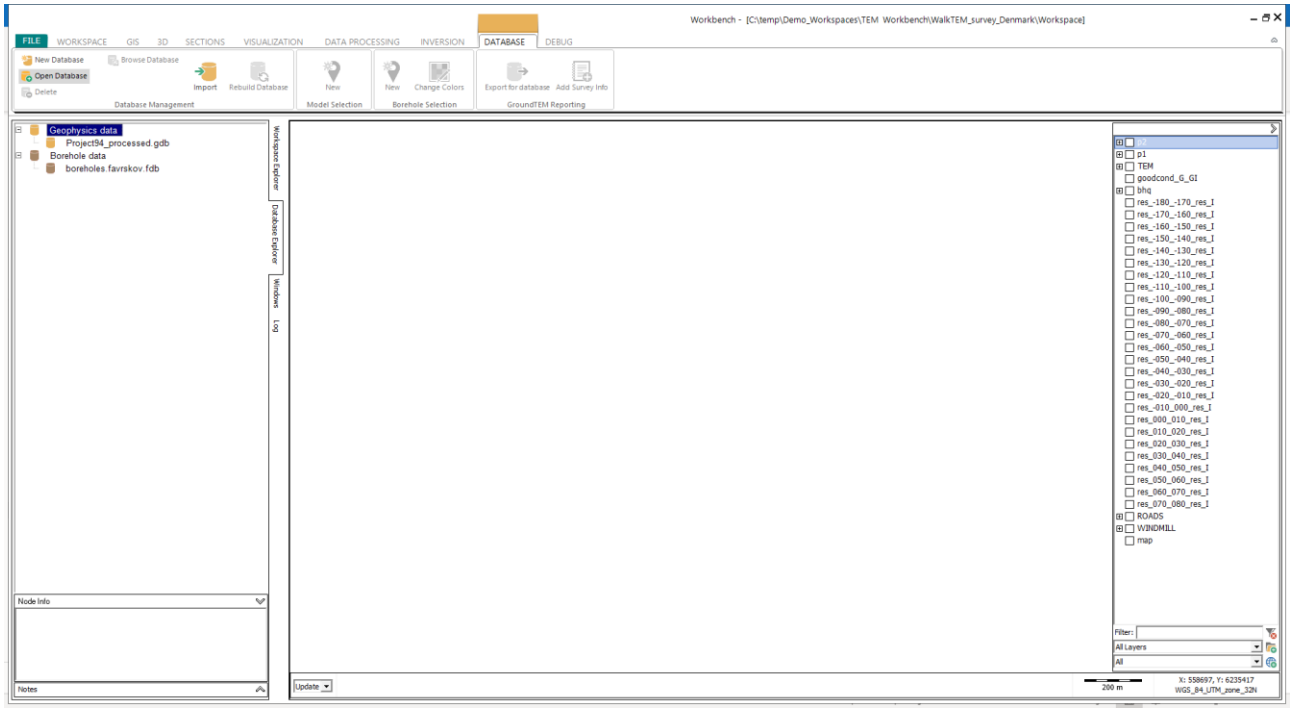
2. OPEN TEM DATA INTO AARHUS WORKBENCH

This section describes how create a new workspace in Aarhus Workbench and import TEM data from SPIA.

1. Open Aarhus Workbench and press New. Choose the folder for the workspace, give it a name and choose the coordinate system which should be the same as the coordinate system of the TEM data from SPIA.

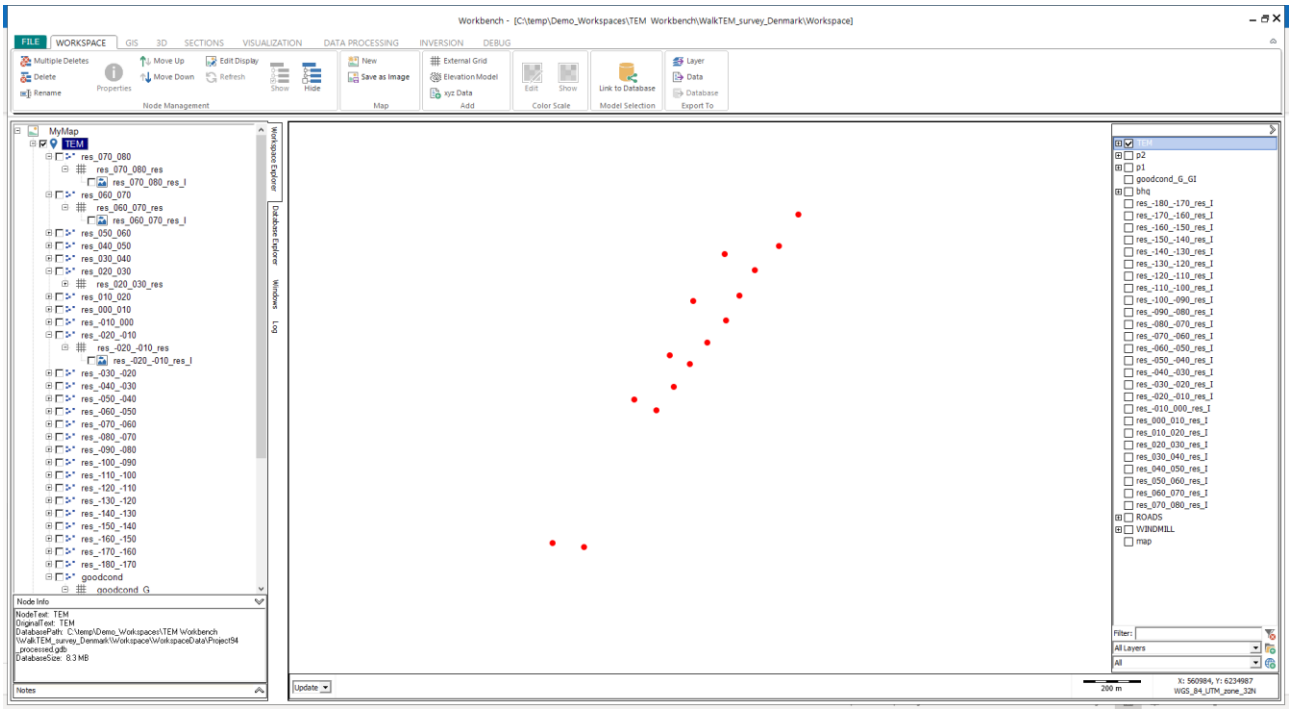


2. Press Finish and you will come the main Workbench window. Now you want to open the database that holds the TEM data. Highlight the “Geophysical data” database in the Workspace manager tree to the left. Go to the DATABASE tab and click “Open Database”.



Choose the gdb file from SPIA and Workbench ask if you want to make a local copy. Click yes and the gdb will be copied into the Workbench workspace folder. Now the data is in imported to the database.

3. Now we want to add the data to the GIS map. Go to DATA PROCESSING tab and click Create New Data. A window will open where databases can be chosen, click OK. A new window will open with a list of datasets in the database. For now, there is only one, so click OK again. Give the processing node a name.
   Now go to the Workspace Explorer tab in the workspace manager to the left, click the +-sign on the map node and check the box of the processing node. The data points are now added to the GIS.

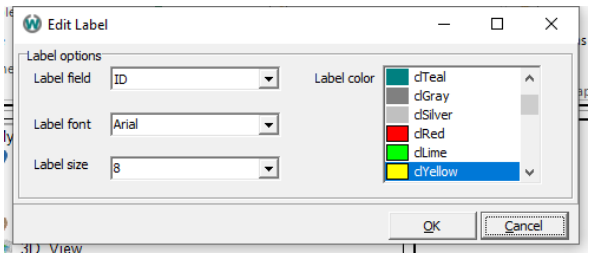


Edit Display of soundings

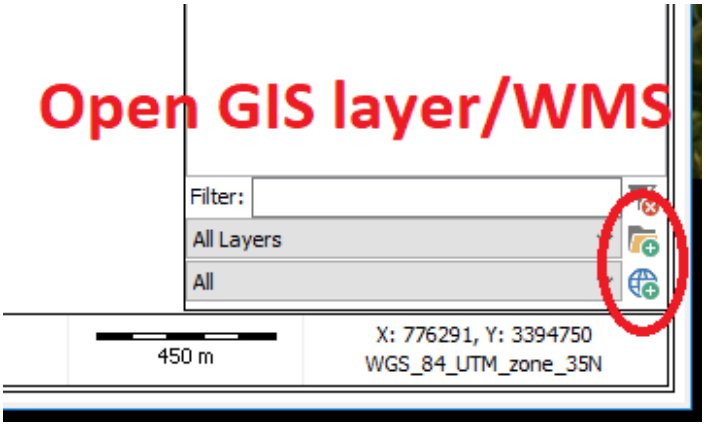
You can edit the size and color of the sounding positions on the GIS map by selecting the TEM data node and go to the WORKSPACE tab and click “Edit Display”.

Add sounding names

To setup the LCI inversion, you need to display the sounding names on the GIS interface. On the GIS layer manger (right tree), right-click on the TEM data node and click “Edit label”. In the Label Field dropdown, select STATION_NA and click ok. (You might need to click the TEM data node off and on again on the GIS layer manger tree to the right for the labels to display).

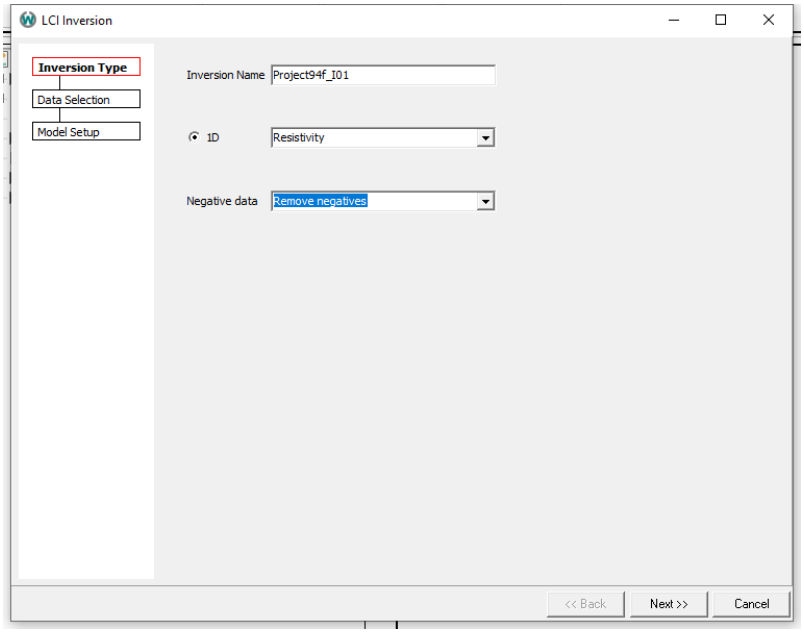


4. IF you want, you can add a background map, either by loading a local file or using a WMS server. Both can be accessed by the two bottom icons in the right GIS layer manager tree.

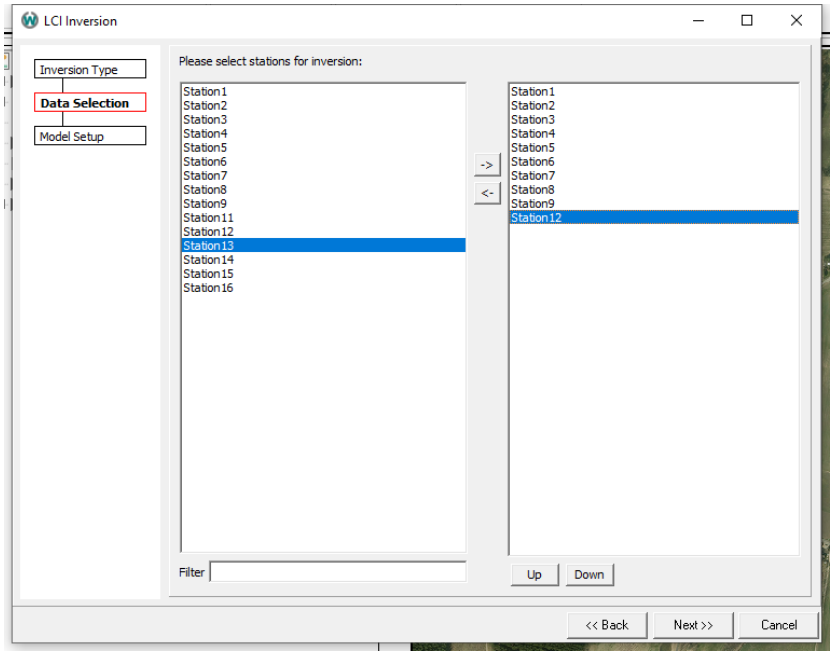


5. Now we want to setup and run the LCI inversion. Select the data node in the tree to the left and go to INVERSION tab and click LCI.

   In the first window, Give the inversion a name, choose resistivity and remove negatives (defaults).



6. In the next window select the soundings you want to use for the LCI inversion. As the LCI inversion constraints the data to its neighbors along a line, you will need to order the soundings as you want them aligned along the line. Use the sounding names on the GIS interface to put them in the correct order and click next.



7. This window lets you setup the starting model for the inversion. To go into details, you can read our inversion guide:

   http://wiki.hgg.au.dk/do/view/Workbench/GuideInversions

   - For now, choose a smooth model with 20 layers.
   - The reference distance should be set to the average distance between 2 soundings times 2. So, if the average distance of the TEM soundings is 20 m, the reference distance should be set to 40.
   - Leave constraints to default values
   - In the Inversion Settings tab, choose the number of CPUs wanted for the inversion. The more CPUs used, the faster the inversion.
   - Check the “Run inversion when done” box and click Finish.

   The inversion will now run. When the inversion is done, use our guides for profiles, resistivity slices, 3d viewer and model quality maps to visualize your inversion results as wanted.

   All the guides are found on our Workbench wiki page:

   http://wiki.hgg.au.dk/do/view/Workbench/WebHome