

# SCI 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 3D constraints, also called SCI (Spatial Constrained Inversion) in Aarhus Workbench

Example files can be downloaded at our wiki page. [www.aarhusgeosoftware.dk](http://www.aarhusgeosoftware.dk)

### Version information

This manual is written for Aarhus Workbench 6.x

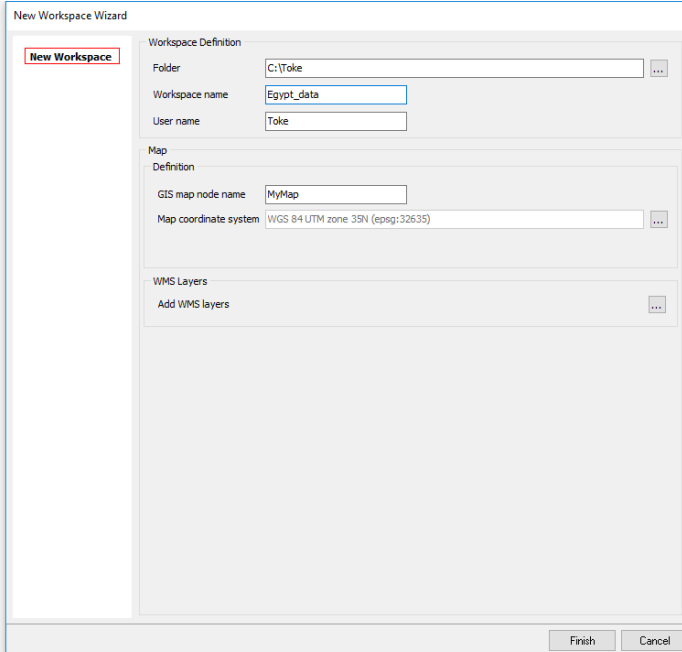
### Reference

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



New Workspace Wizard

**New Workspace**

Workspace Definition

Folder: C:\Tolke ...

Workspace name: Egypt\_data

User name: Tolke

Map Definition

GIS map node name: MyMap

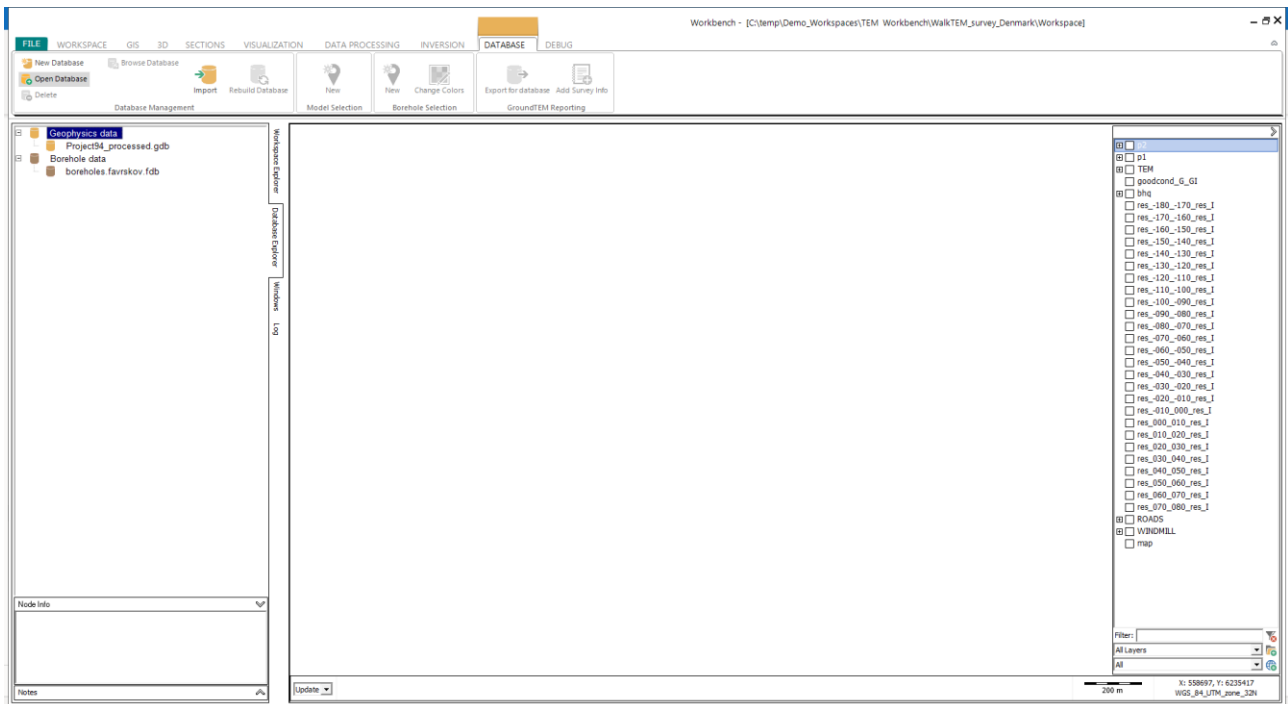
Map coordinate system: WGS 84 UTM zone 35N (epsg:32635) ...

WMS Layers

Add WMS layers ...

Finish Cancel

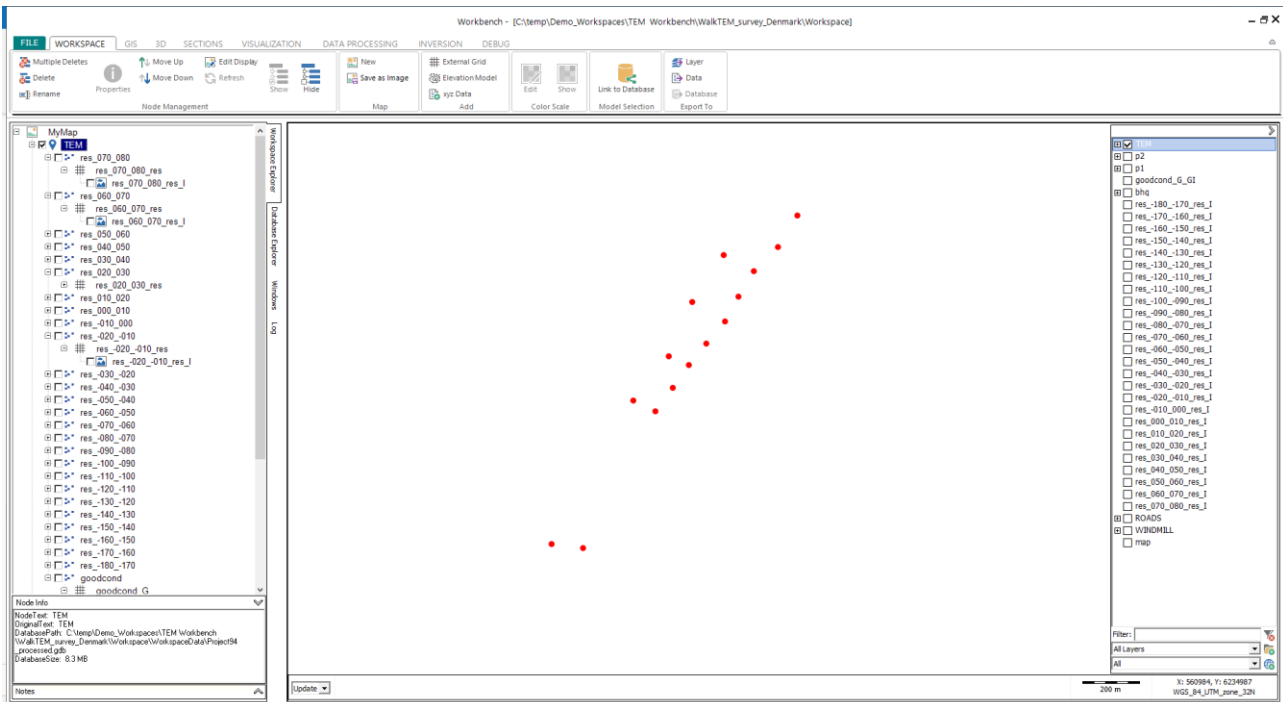
- Press Finish and you will come the main Workbench window. Now you want to open the database that holds the TEM data. Highlight the “Geophysical data” database in the Workspace manager tree to the left. Go to the DATABASE tab and click “Open Database”.



Choose the wanted 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 imported to the database.

- Now we want to add the data to the GIS. 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.

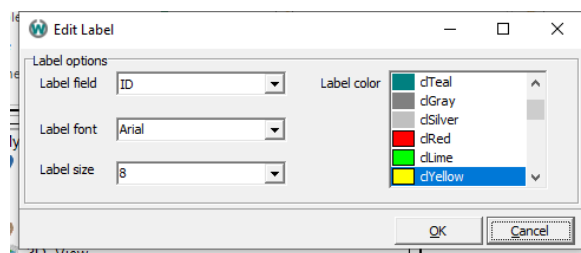


### Edit Display of soundings

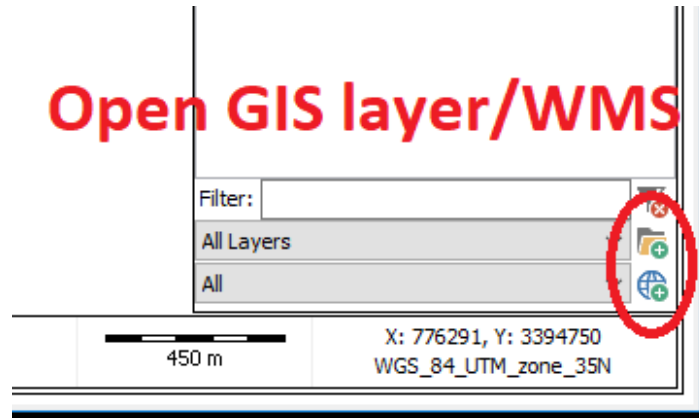
You can edit the size and color of the sounding positions on the GIS map by selecting the TEM data node and go to the WORKSPACE tab and click “Edit Display”.

### Add sounding names

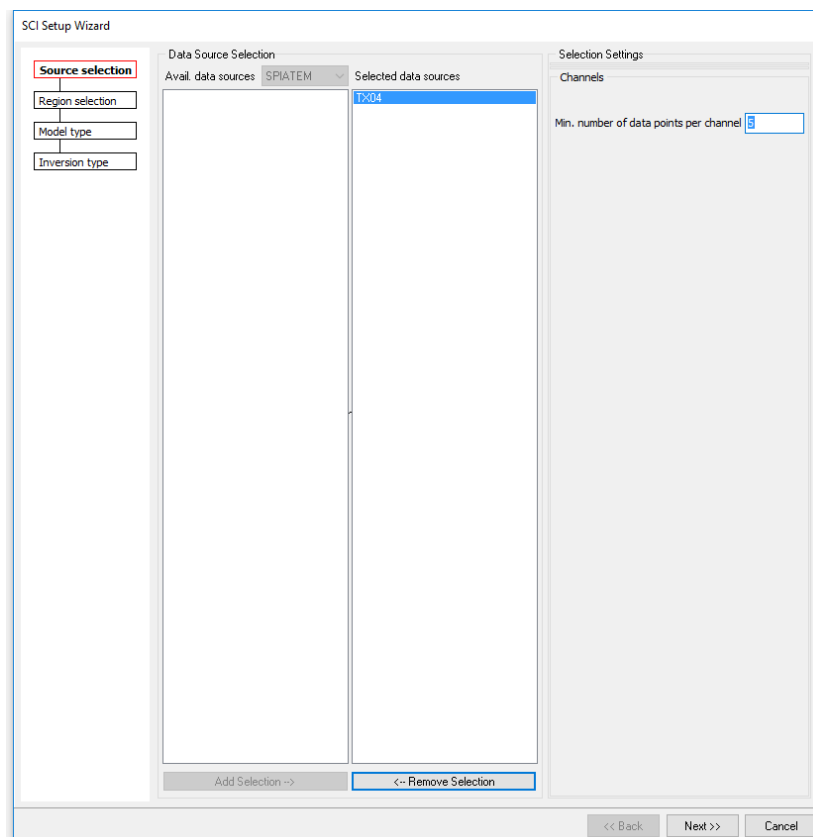
To setup the LCI inversion, you need to display the sounding names on the GIS interface. On the GIS layer manger (right tree), right-click on the TEM data node and click “Edit label”. In the Label Field dropdown, select STATION\_NA and click ok. (You might need to click the TEM data node and on again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



- 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.



- Now we want to setup and run the SCI inversion. Highlight the map node (Default name is MyMap) and go to INVERSION tab and click New Spatially Constrained.
- In the first window, choose SPIATEM from the dropdown, select the data set and click Add Selection.  
The Minimum number of data points per channel don't uses soundings with a number of data points below the selected. 7 data points is recommended as minimum. Click Next



7. In the next window it is possible to choose all data or a region. Choose All Data and click Next.
8. The next window let you choose if you want to setup the start model manually or from another SCI inversion. Choose Manual selection and click Next
9. 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>