ERTLAB STUDIO

TUTORIAL # 1

QUICK 2D ERT PROFILE INVERSION PROCESS

www.geostudiastier.com

v.1.0

CASE 1

2D FLAT PROFILE

and

2D PROFILE WITH ELECTRODE TOPOGRAPHY INCLUDED INTO THE .BIN FILE

ERTLab *Studio*

QUICK INVERSION PROCESS

1) IMPORT FIELD DATA (Syscal .bin file)

2) MESH AND MODEL GENERATION

3) RUN THE INVERSION

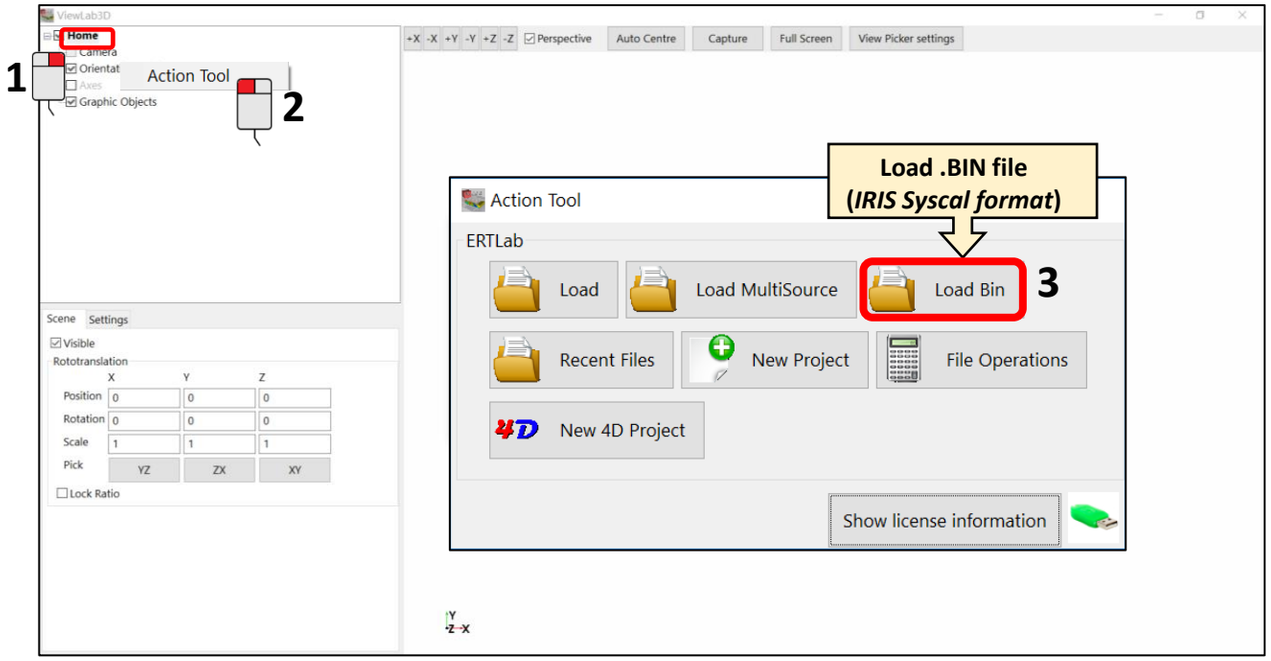
4) DISPLAY OF INVERTED MODEL

N° 3 SIMPLE FULLY AUTOMATED PASSES TO GET AN INVERTED 2D SECTION

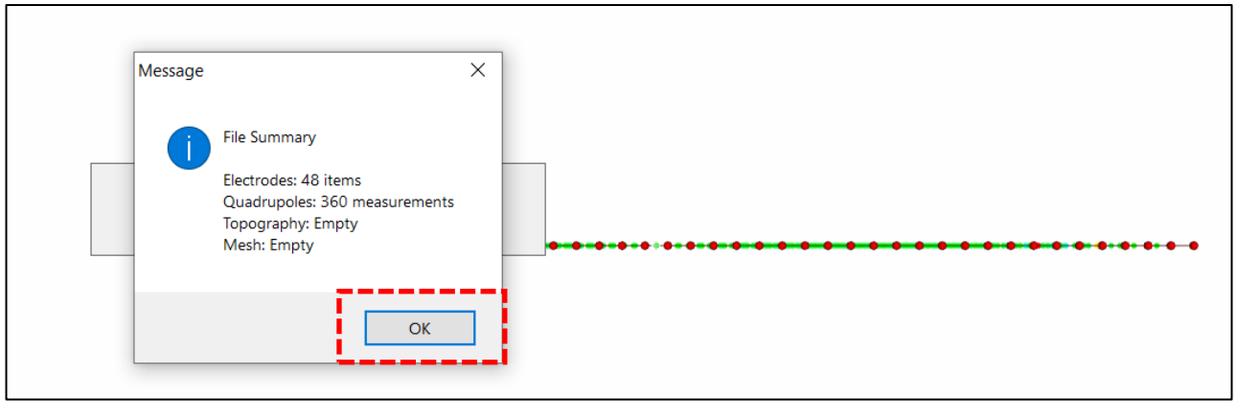
2D FLAT PROFILE

STEP 1: IMPORT FIELD .BIN file

1. Launch ERTLab Studio;
2. Left mouse Click on “Home” on the main tree on the left;
3. Right mouse click → Action tool→ and press on the LOAD BIN button in order to select a Syscal .bin 2D field data:

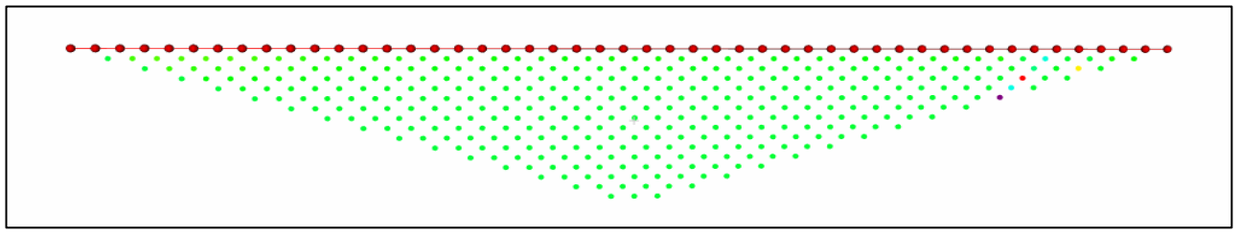


4. A File summary message will appear:
5. Press OK button



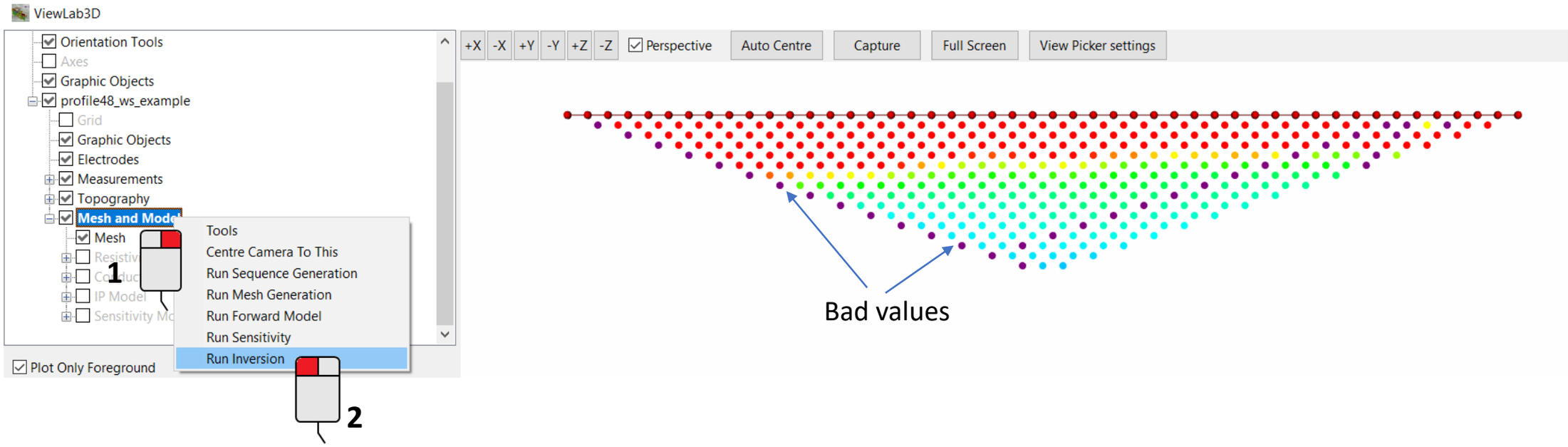
6. Press “–Y” button on top of the window to get the proper view

7. The pseudo-section can be visualized:

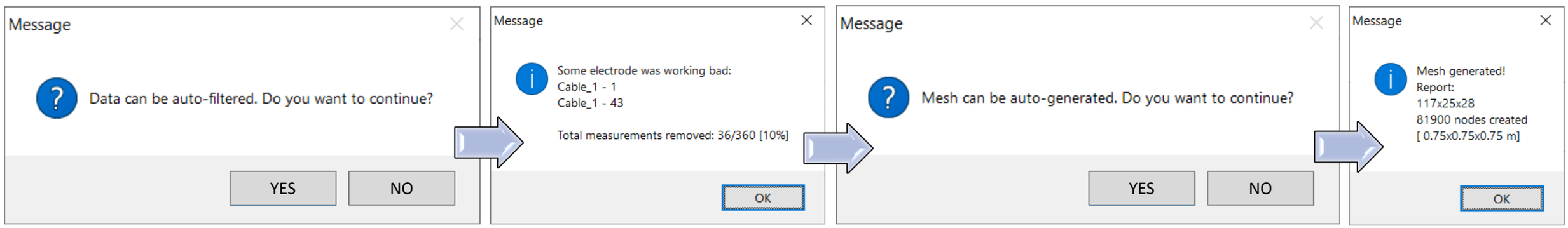


STEP 2: MESH GENERATION

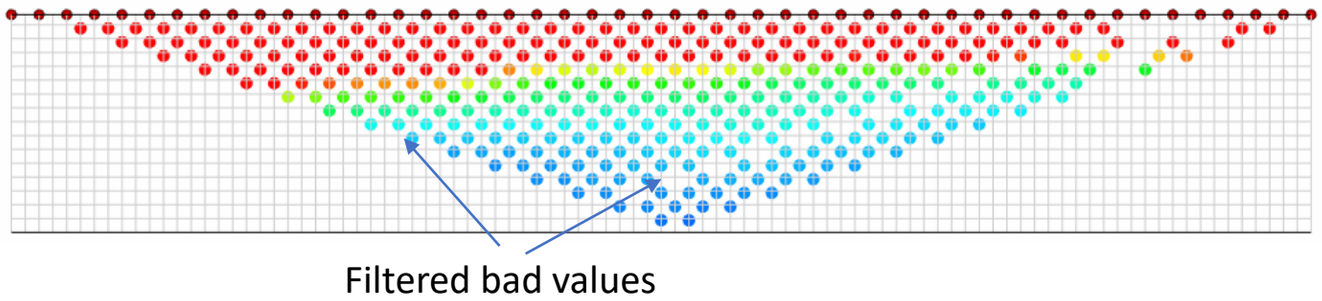
8. Launch the “Run Inversion” command by Right Mouse clicking on “Mesh and Model” and then Left Mouse Click on “Run Inversion”:



9. Answer “yes” to the following questions and take note of the related computational messages provided:

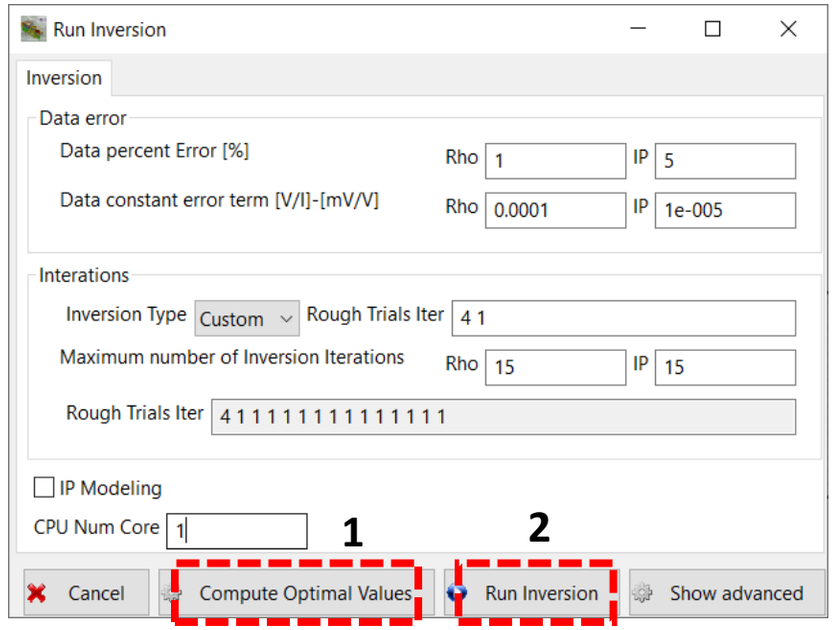


The data have been filtered (*additional manual filters are available*) and the mesh cre



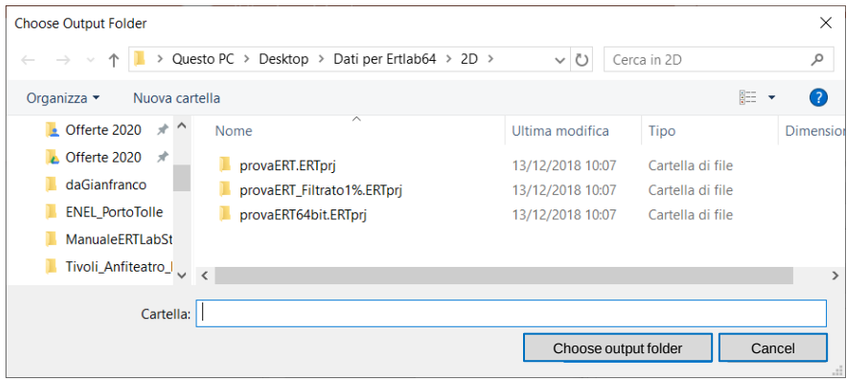
STEP 3: RUN INVERSION

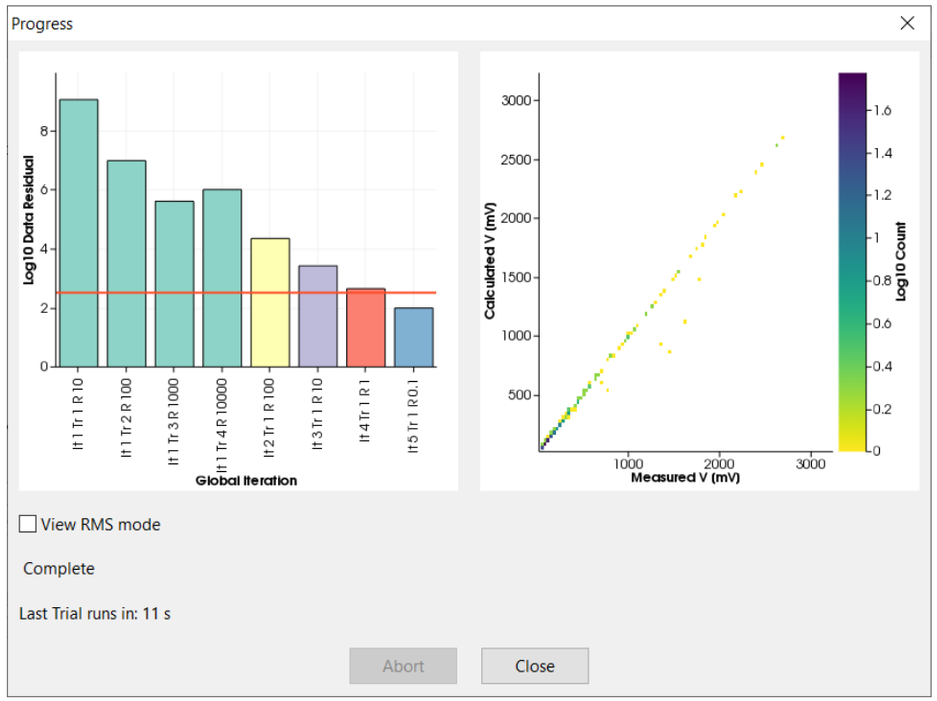
10. The following window will appear:

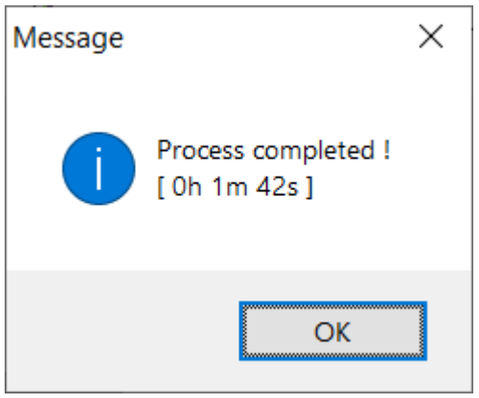


11. Press “Compute Optimal Values” button and then press “Run Inversion” to start the process *(You will be asked to choose the Output folder before the process automatically starts)*

12. Follow the inversion process till the end (Process completed) and close the inversion window.

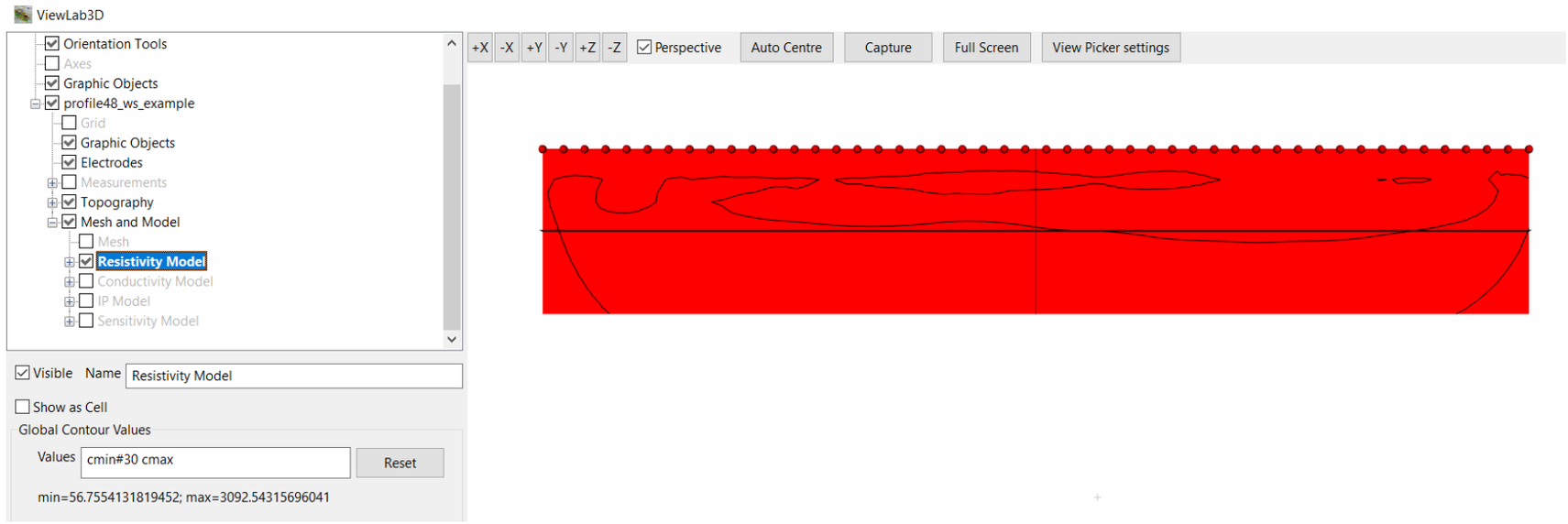




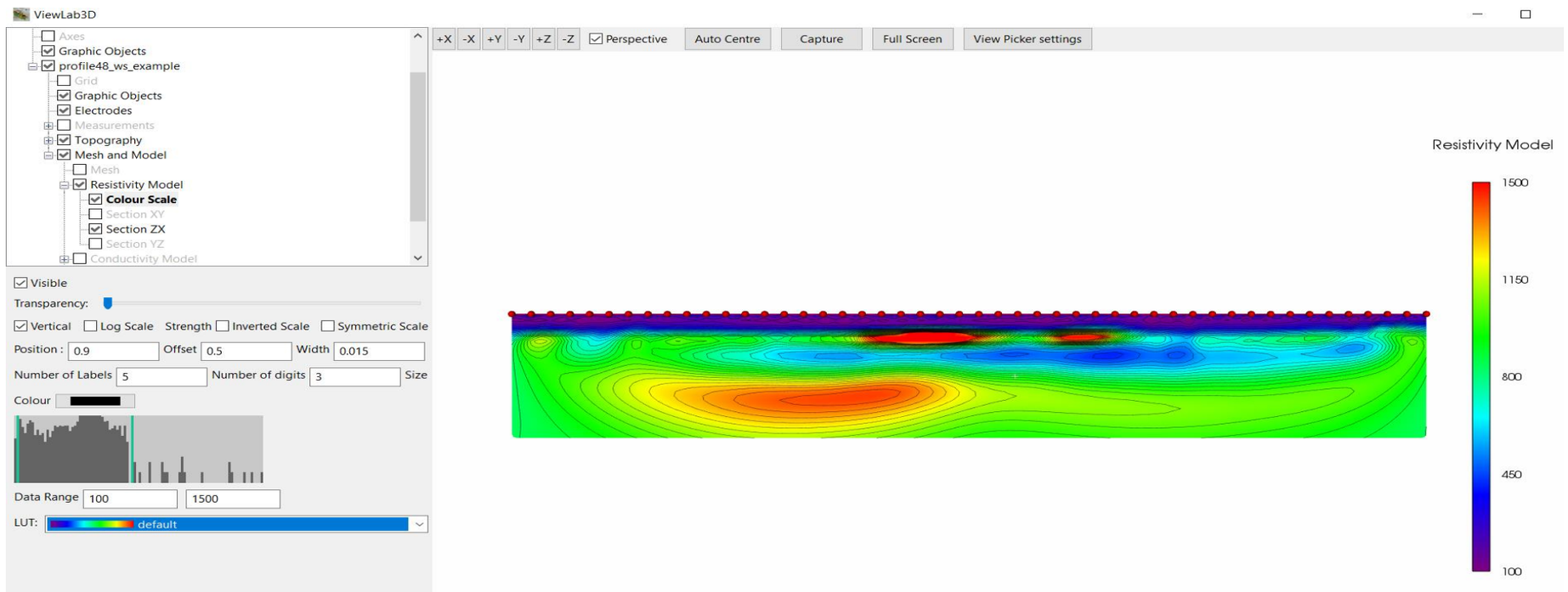


DISPLAY OF INVERTED MODEL

13. Display the inverted model by checking the “Resistivity model” on the main tree, uncheck “mesh” and “Measurements”, then expand the “Resistivity model” menu by click on “+”:

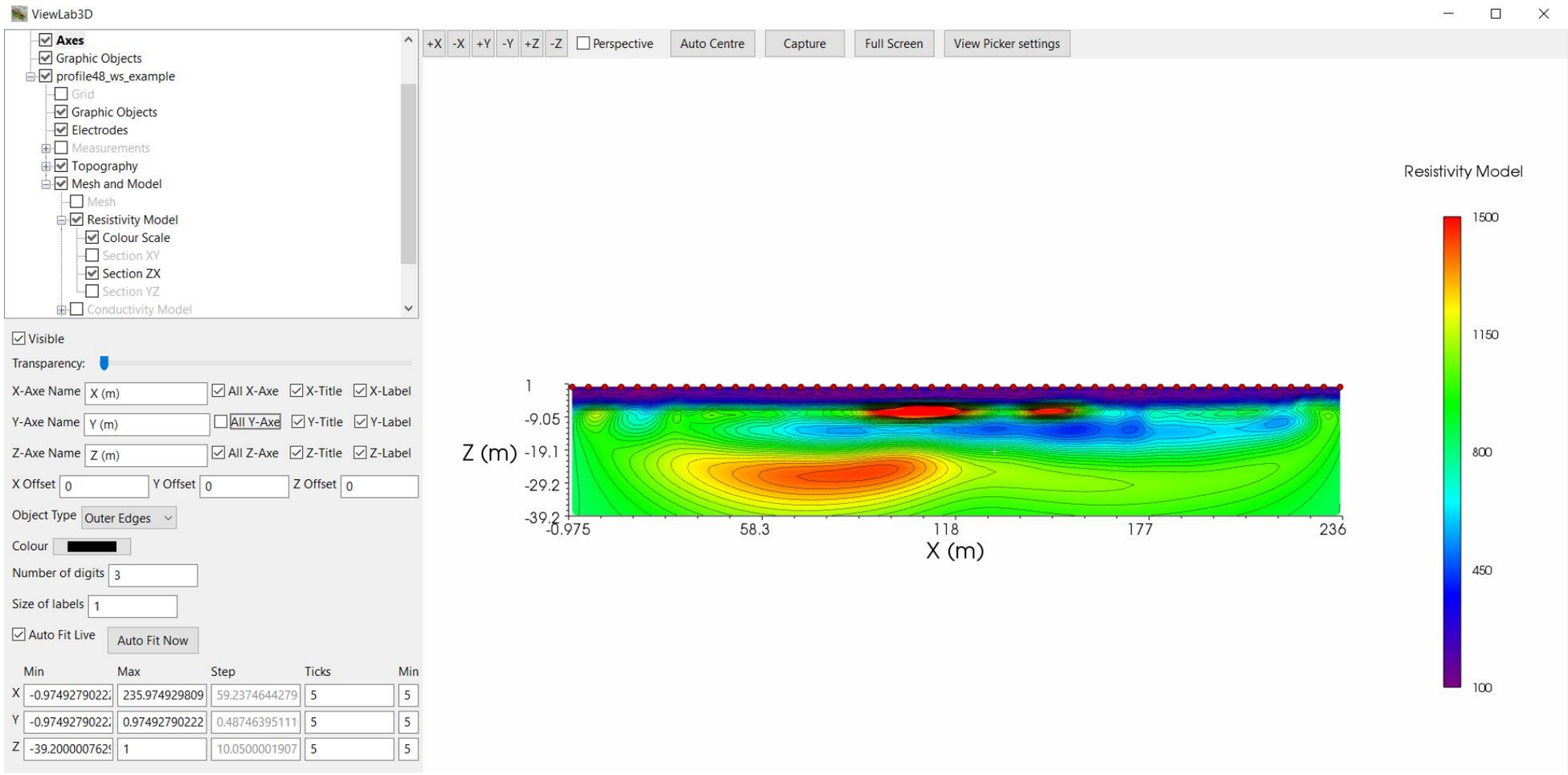


14. Uncheck the XY and YZ sections, check the “Color scale”, setup a proper resistivity Data Range (*min* and *max*) and choose a color scale (recommended: “ERTLab Viewer) with or without Log Scale.

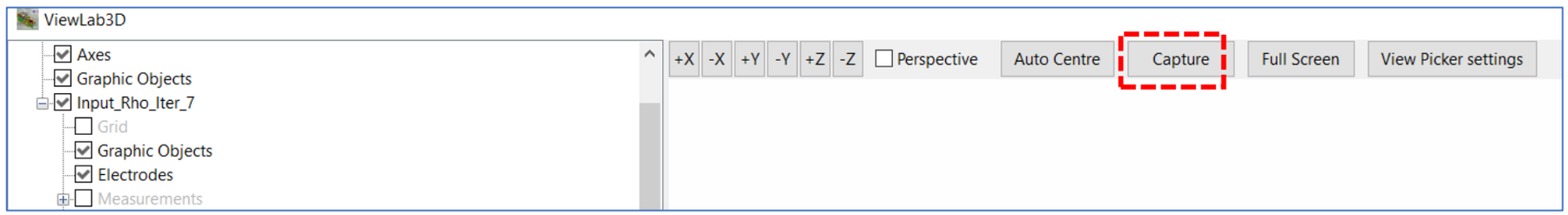


DISPLAY OF INVERTED MODEL

15. Check the “Axis” node on the main tree and check the Auto Fit Live option in order to fit the axes to the section and uncheck the ”Perspective” option on top of the window:



16. Save the visualized section pressing on “Capture” button on top of the window.



CASE 2

2D ERT PROFILE WITH EXTERNAL ELECTRODE TOPOGRAPHY

ERTLab *Studio*

QUICK INVERSION PROCESS

1) IMPORT FIELD DATA (Syscal .bin file)

2) INSERT ELECTRODES TOPOGRAPHY

3) MESH AND MODEL GENERATION

4) RUN THE INVERSION

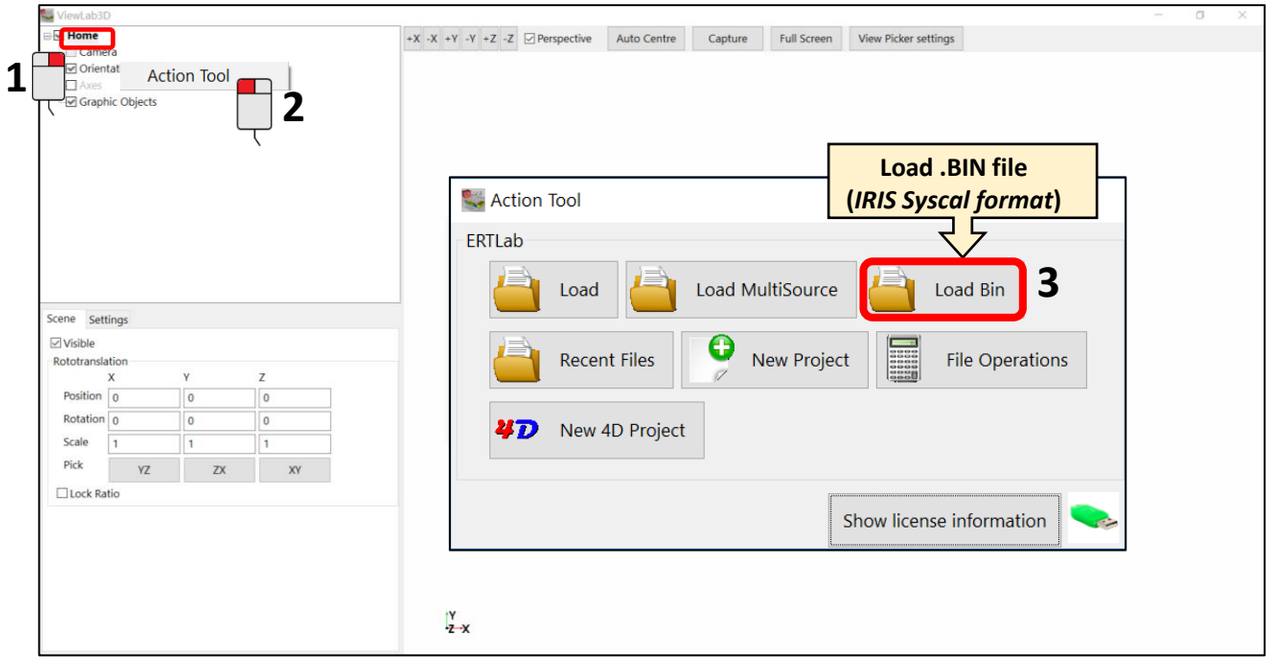
4) DISPLAY OF INVERTED MODEL

N° 4 SIMPLE FULLY AUTOMATED PASSES TO GET AN INVERTED 2D SECTION

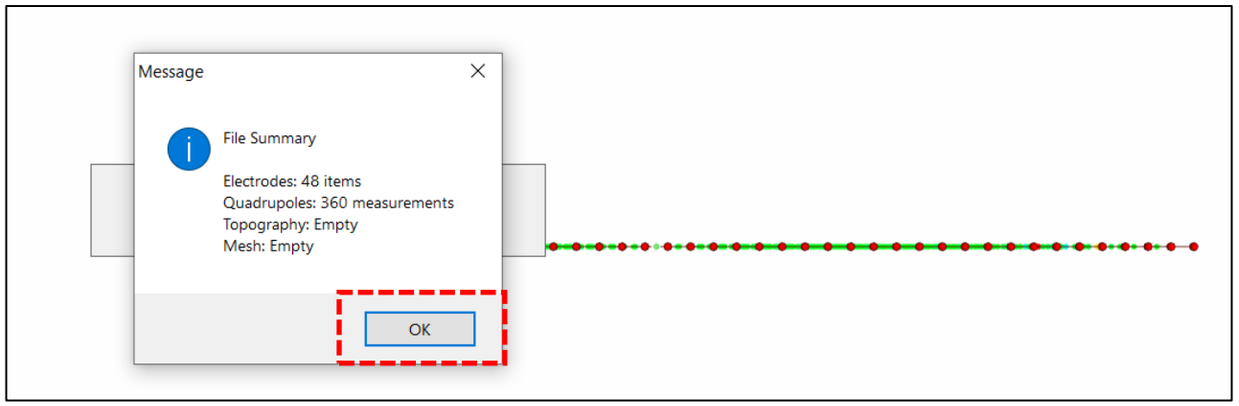
ERT PROFILE WITH ELECTODE TOPOGRAPHY

STEP 1: LOAD .BIN file

1. Launch ERTLab Studio;
2. Left mouse Click on “Home” on the main tree on the left;
3. Right mouse click → Action tool→ and press on the LOAD BIN button in order to select a Syscal .bin 2D field data:

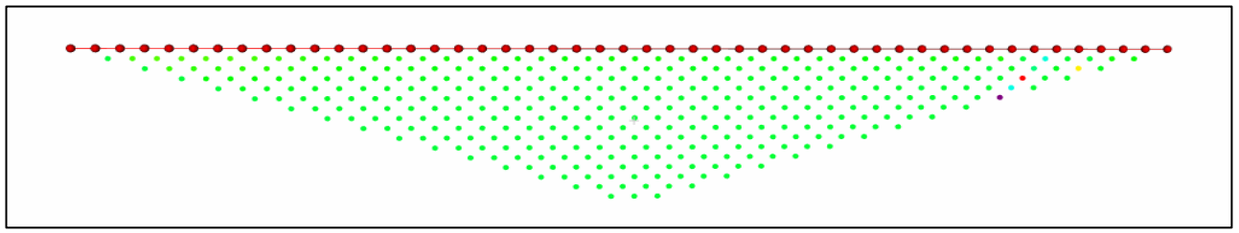


4. A File summary message will appear:
5. Press OK button



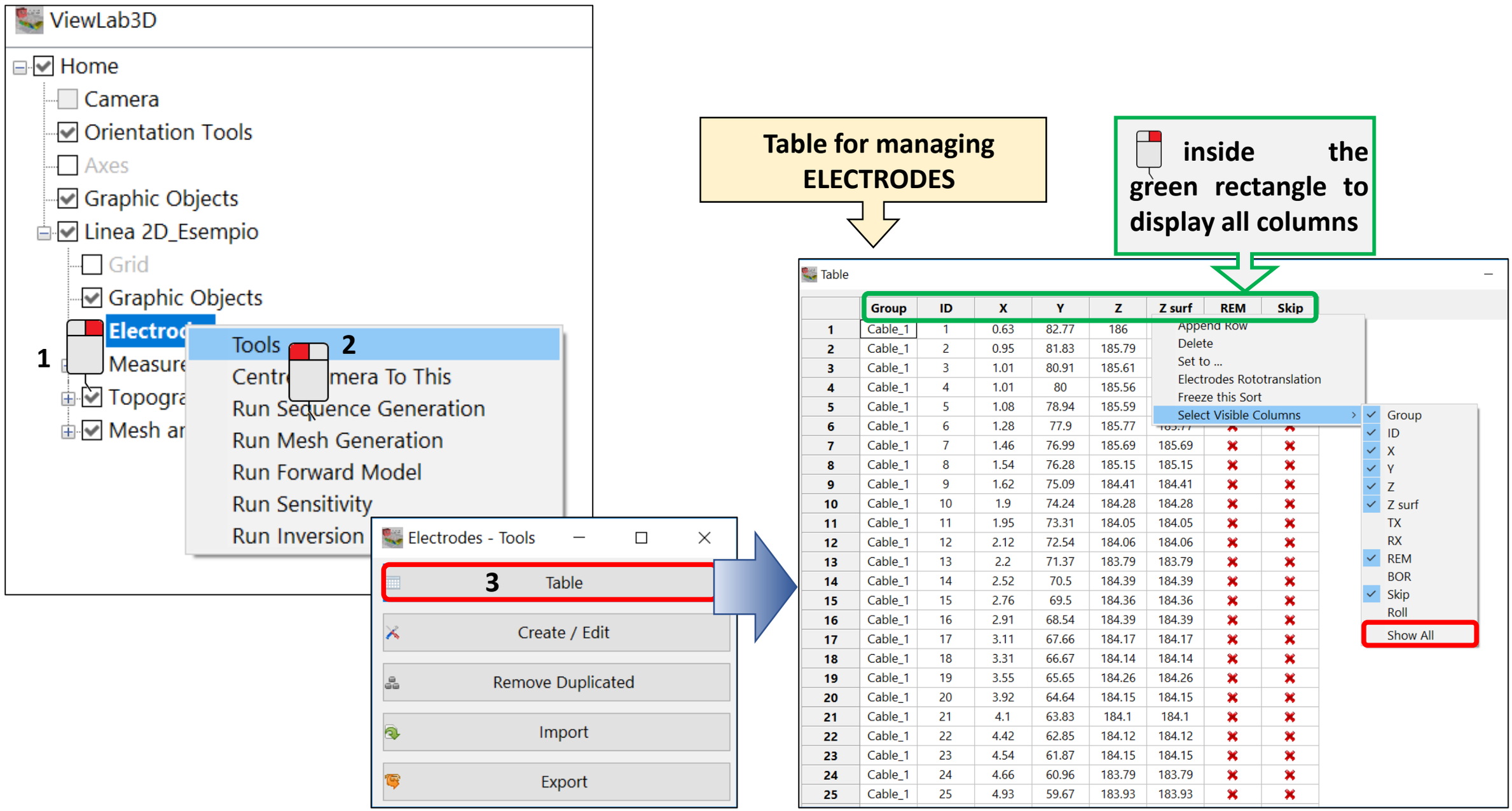
6. Press “–Y” button on top of the window to get the proper view

7. The pseudo-section can be visualized:



STEP 2: INSERT ELECTRODE TOPOGRAPHY (1° method)

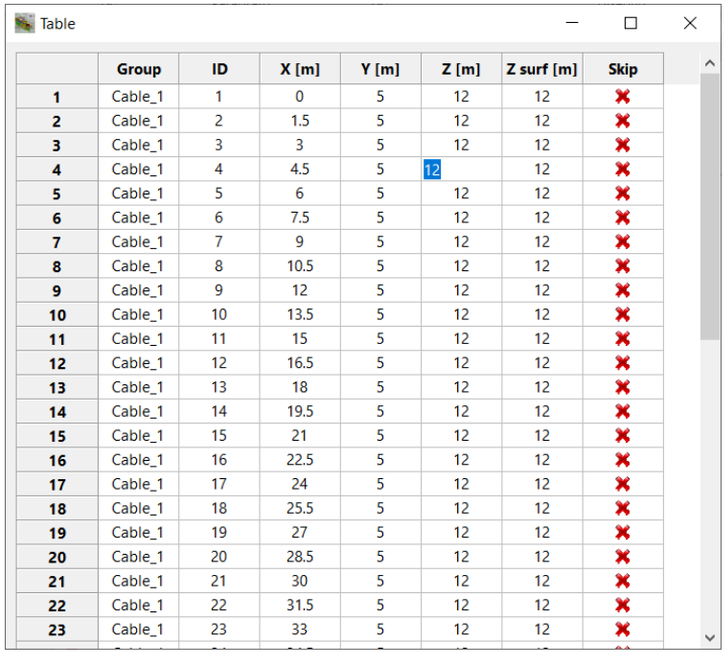
8. Access to the Table for managing the electrodes following this procedure:



	Group	ID	X	Y	Z	Z surf	REM	Skip
1	Cable_1	1	0.63	82.77	186			
2	Cable_1	2	0.95	81.83	185.79			
3	Cable_1	3	1.01	80.91	185.61			
4	Cable_1	4	1.01	80	185.56			
5	Cable_1	5	1.08	78.94	185.59			
6	Cable_1	6	1.28	77.9	185.77			
7	Cable_1	7	1.46	76.99	185.69	185.69	✖	✖
8	Cable_1	8	1.54	76.28	185.15	185.15	✖	✖
9	Cable_1	9	1.62	75.09	184.41	184.41	✖	✖
10	Cable_1	10	1.9	74.24	184.28	184.28	✖	✖
11	Cable_1	11	1.95	73.31	184.05	184.05	✖	✖
12	Cable_1	12	2.12	72.54	184.06	184.06	✖	✖
13	Cable_1	13	2.2	71.37	183.79	183.79	✖	✖
14	Cable_1	14	2.52	70.5	184.39	184.39	✖	✖
15	Cable_1	15	2.76	69.5	184.36	184.36	✖	✖
16	Cable_1	16	2.91	68.54	184.39	184.39	✖	✖
17	Cable_1	17	3.11	67.66	184.17	184.17	✖	✖
18	Cable_1	18	3.31	66.67	184.14	184.14	✖	✖
19	Cable_1	19	3.55	65.65	184.26	184.26	✖	✖
20	Cable_1	20	3.92	64.64	184.15	184.15	✖	✖
21	Cable_1	21	4.1	63.83	184.1	184.1	✖	✖
22	Cable_1	22	4.42	62.85	184.12	184.12	✖	✖
23	Cable_1	23	4.54	61.87	184.15	184.15	✖	✖
24	Cable_1	24	4.66	60.96	183.79	183.79	✖	✖
25	Cable_1	25	4.93	59.67	183.93	183.93	✖	✖

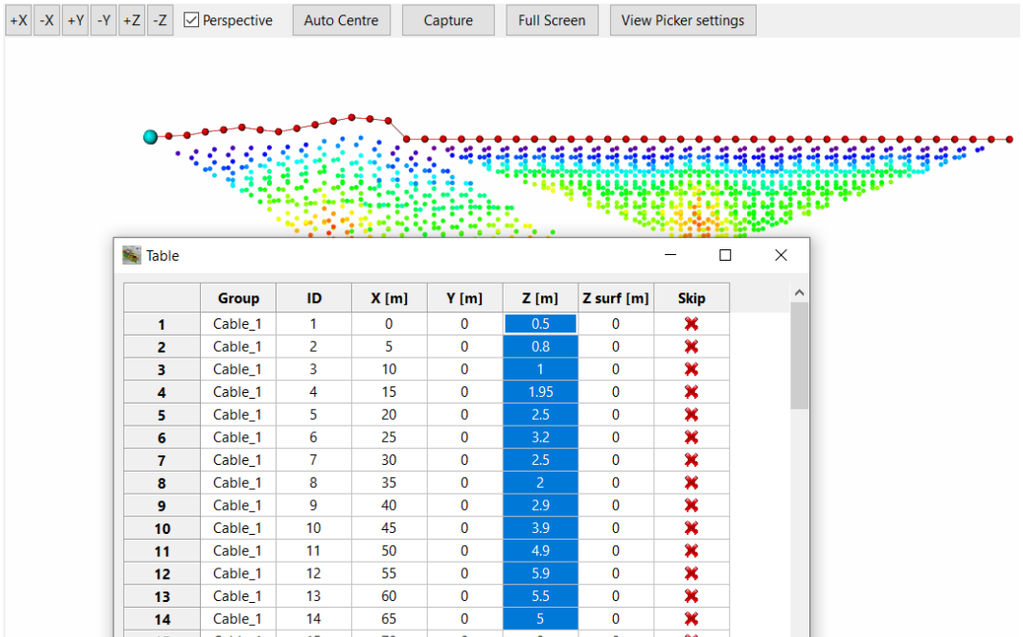
STEP 2: INSERT ELECTRODE TOPOGRAPHY (1° method)

9. Modify each Z value manually as necessary by clicking into the related cells and check for the update on the section:



Table

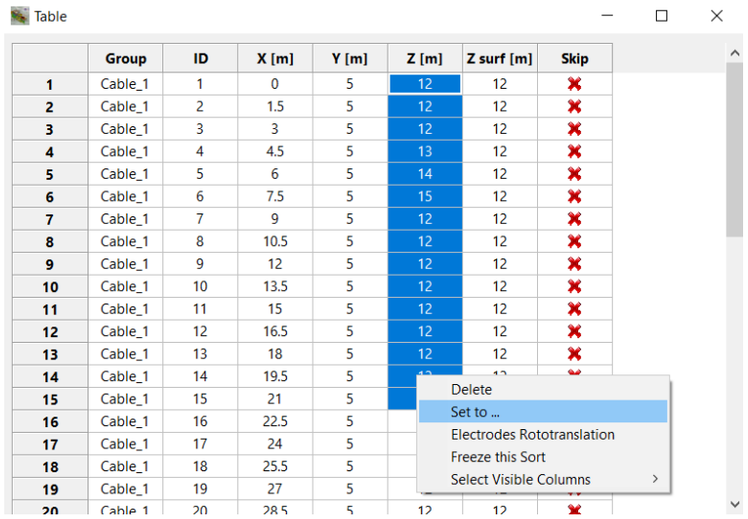
	Group	ID	X [m]	Y [m]	Z [m]	Z surf [m]	Skip
1	Cable_1	1	0	5	12	12	✖
2	Cable_1	2	1.5	5	12	12	✖
3	Cable_1	3	3	5	12	12	✖
4	Cable_1	4	4.5	5	12	12	✖
5	Cable_1	5	6	5	12	12	✖
6	Cable_1	6	7.5	5	12	12	✖
7	Cable_1	7	9	5	12	12	✖
8	Cable_1	8	10.5	5	12	12	✖
9	Cable_1	9	12	5	12	12	✖
10	Cable_1	10	13.5	5	12	12	✖
11	Cable_1	11	15	5	12	12	✖
12	Cable_1	12	16.5	5	12	12	✖
13	Cable_1	13	18	5	12	12	✖
14	Cable_1	14	19.5	5	12	12	✖
15	Cable_1	15	21	5	12	12	✖
16	Cable_1	16	22.5	5	12	12	✖
17	Cable_1	17	24	5	12	12	✖
18	Cable_1	18	25.5	5	12	12	✖
19	Cable_1	19	27	5	12	12	✖
20	Cable_1	20	28.5	5	12	12	✖
21	Cable_1	21	30	5	12	12	✖
22	Cable_1	22	31.5	5	12	12	✖
23	Cable_1	23	33	5	12	12	✖



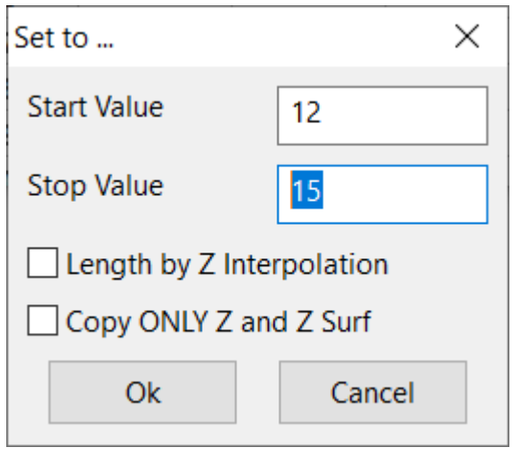
Table

	Group	ID	X [m]	Y [m]	Z [m]	Z surf [m]	Skip
1	Cable_1	1	0	0	0.5	0	✖
2	Cable_1	2	5	0	0.8	0	✖
3	Cable_1	3	10	0	1	0	✖
4	Cable_1	4	15	0	1.95	0	✖
5	Cable_1	5	20	0	2.5	0	✖
6	Cable_1	6	25	0	3.2	0	✖
7	Cable_1	7	30	0	2.5	0	✖
8	Cable_1	8	35	0	2	0	✖
9	Cable_1	9	40	0	2.9	0	✖
10	Cable_1	10	45	0	3.9	0	✖
11	Cable_1	11	50	0	4.9	0	✖
12	Cable_1	12	55	0	5.9	0	✖
13	Cable_1	13	60	0	5.5	0	✖
14	Cable_1	14	65	0	5	0	✖
15	Cable_1	15	70	0	0	0	✖

10. And/or use the automated interpolation function available selecting the electrode's range to be modified and entering the "Set to…" windows by Right Mouse clicking



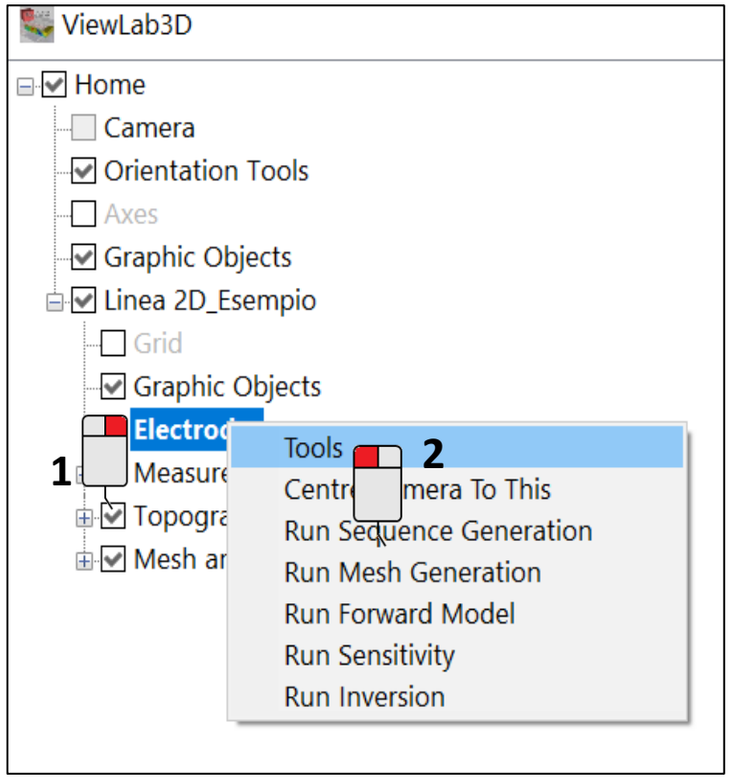
11. Type-in the Start and Stop Value for an automated interpolation over the selected range:

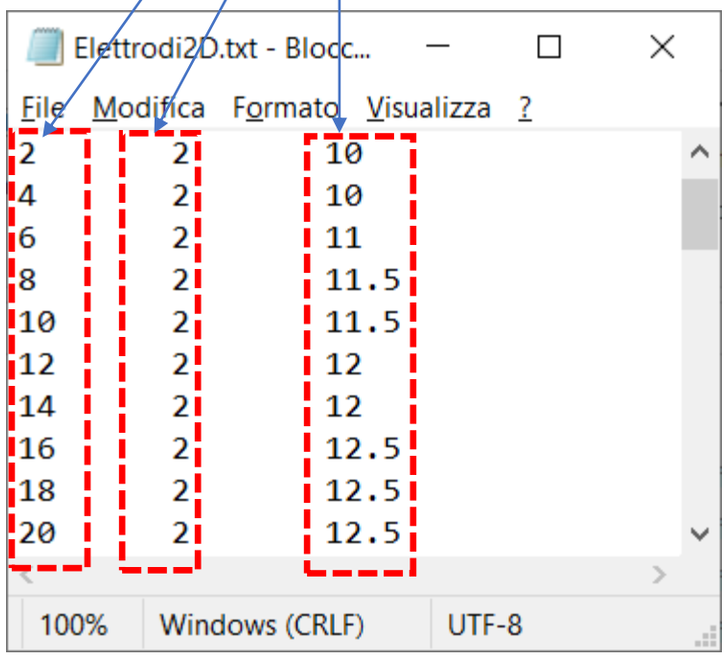


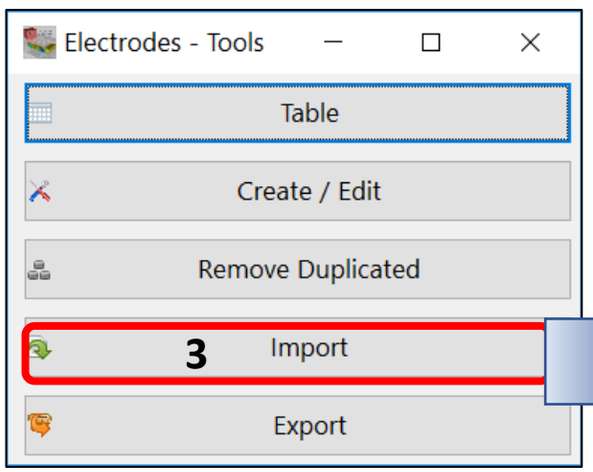
STEP 2: INSERT ELECTRODE TOPOGRAPHY (2° method)

<u>AS AN ALTERNATIVE,</u> it is possible to insert the real electrodes' coordinates importing a proper 3 columns .txt file containing the X, Y, Z in meters (can be easily generated by Excel or Wordpad):

The procedure is the following:

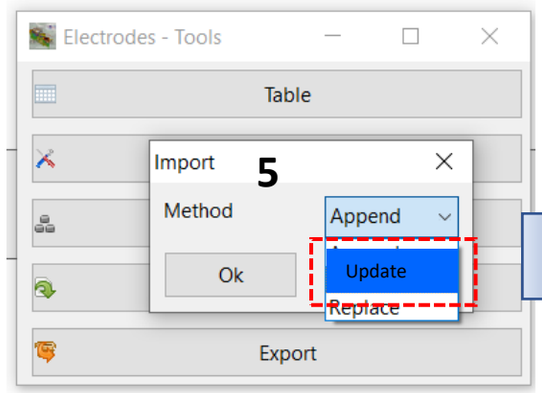


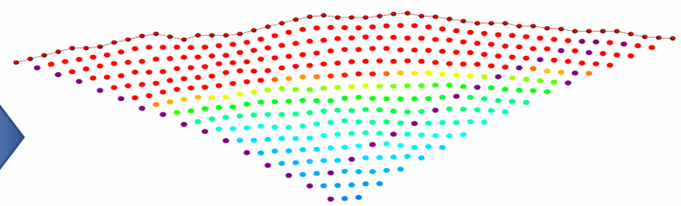




4

Selezionare il file .txt e scegliere l'opzione «update»





STEP 2: INSERT ELECTRODE TOPOGRAPHY (3° method)

AS AN ALTERNATIVE, it is possible easily uploading the electrodes coordinates setting up a proper TABLE OF CONVERSION:
It is a simple .txt file (can be generated by Excel or Wordpad) composed by n° 7 columns:

ELECTRODE NUMBER	SEQUENCE COORDINATES			REAL COORDINATES (absolute or relative)		
1	0	0	0	245.630	47263.770	86.000
2	2	0	0	245.950	47262.830	85.790
3	4	0	0	246.010	47261.910	85.610
4	6	0	0	246.010	47261.000	85.560
5	8	0	0	246.080	47259.940	85.590
6	10	0	0	246.280	47258.900	85.770
7	12	0	0	246.460	47257.990	85.690
8	14	0	0	246.540	47257.280	85.150
9	16	0	0	246.620	47256.090	84.410
10	18	0	0	246.900	47255.240	84.280
11	20	0	0	246.950	47254.310	84.050
12	22	0	0	247.120	47253.540	84.060
13	24	0	0	247.200	47252.370	83.790

ERTLab *Studio* **automatically** reads the conversion table when the .BIN file is load, provided that the two files have the **EXACT SAME NAME**:

Example

File .BIN name → **Line1 .BIN**
Associated Conversion Table name → **Line1.TXT**

In case of acquisition with REMOTE POLE it is possible to:

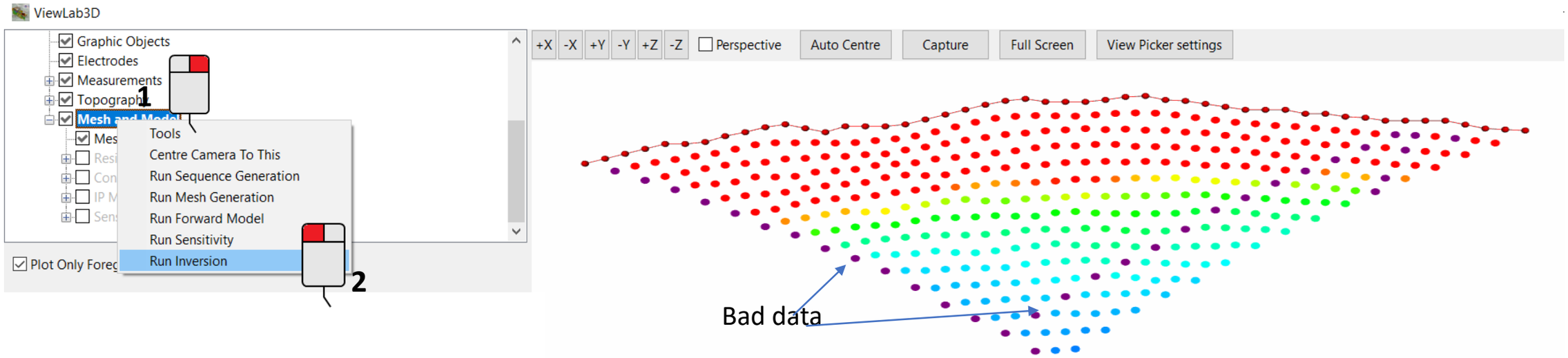
- Insert its coordinates at the end of the conversion table, with the special «flag» **-1** in the Electrode column; in this case, ERTLab *Studio* will automatically identify it as a remote pole:

70	138	0	0	66.090	47201.970	87.550
71	140	0	0	66.510	47201.200	87.870
72	142	0	0	66.740	47200.190	88.260
-1	9315	7181	178	15.660	47181.190	78.420

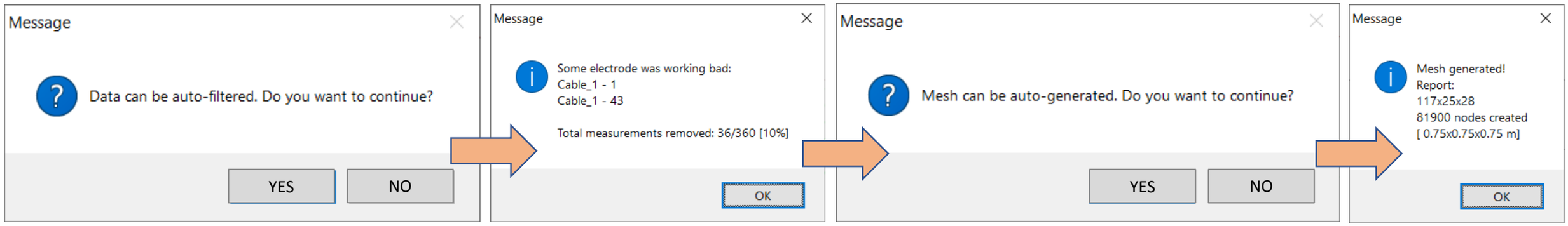
Random coordinates

STEP 3: MESH GENERATION

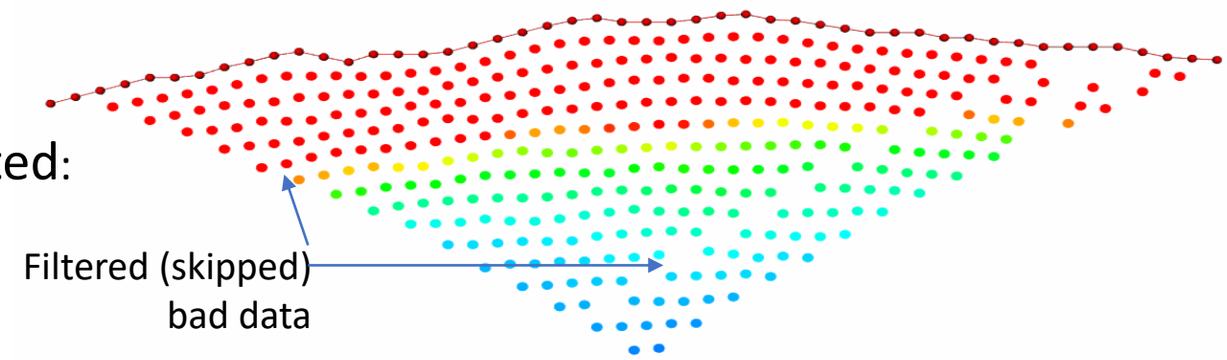
12. Launch the “Run Inversion” command by Right Mouse click on “Mesh and Model” and then Left Mouse Click on “Run Inversion”:



13. Answer “yes” to the following questions to apply the automatic filtering and take note of the related computational messages provided:

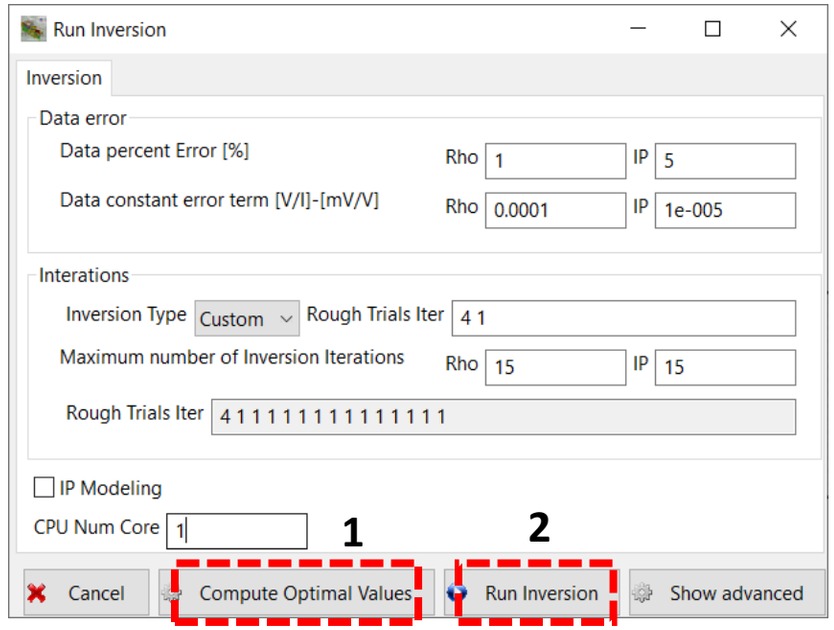


The data have been filtered (*additional manual filters are available*) and the mesh created:



STEP 4: RUN INVERSION

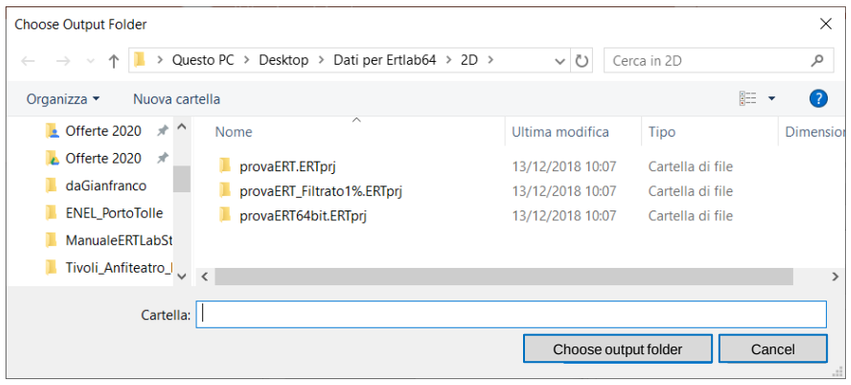
14. The following window will appear":

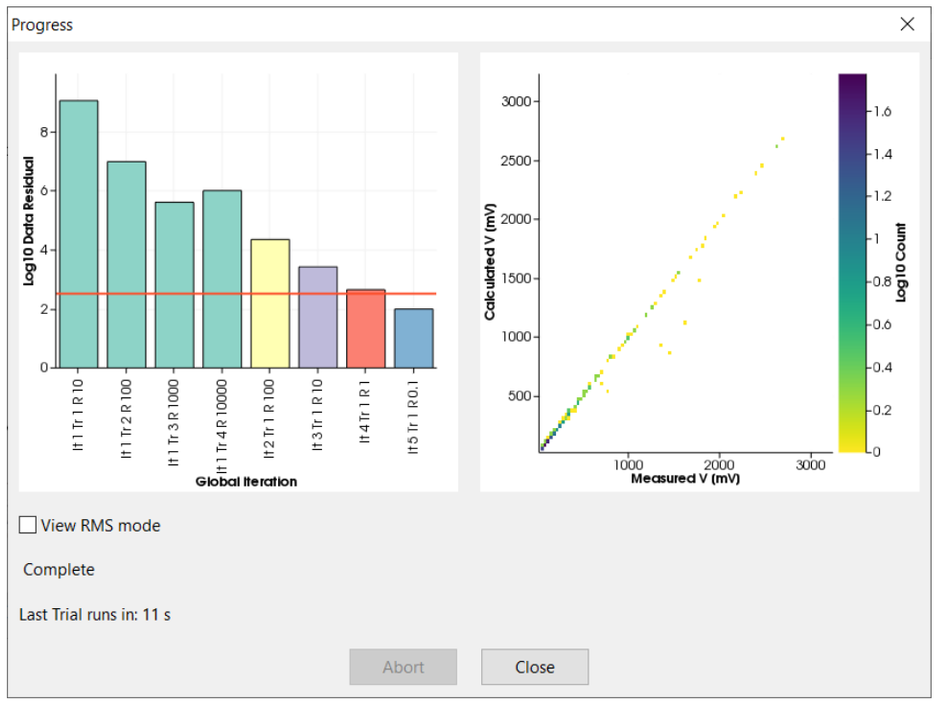


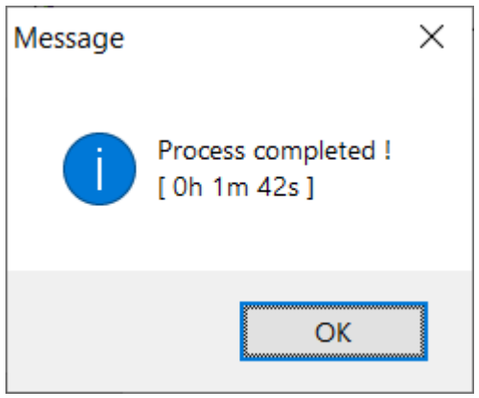
15. Press "Compute Optimal Values" button and then press "Run Inversion" to start the process:

(You will be asked to choose the Output folder before the process start automatically)

16. Follow the inversion process till the end (*Process completed*) and close the inversion window.

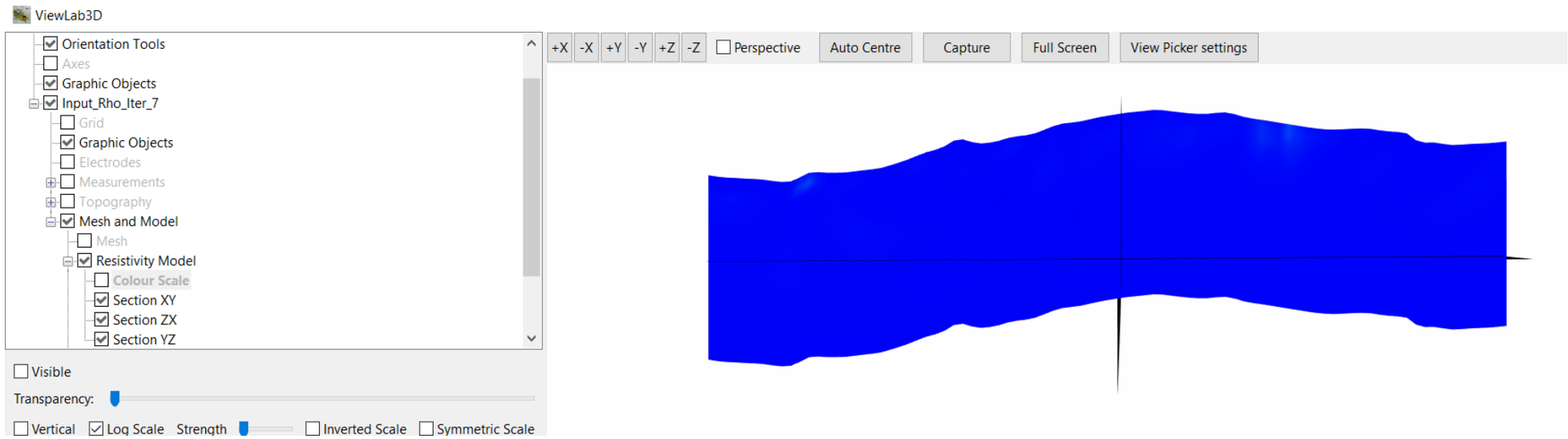




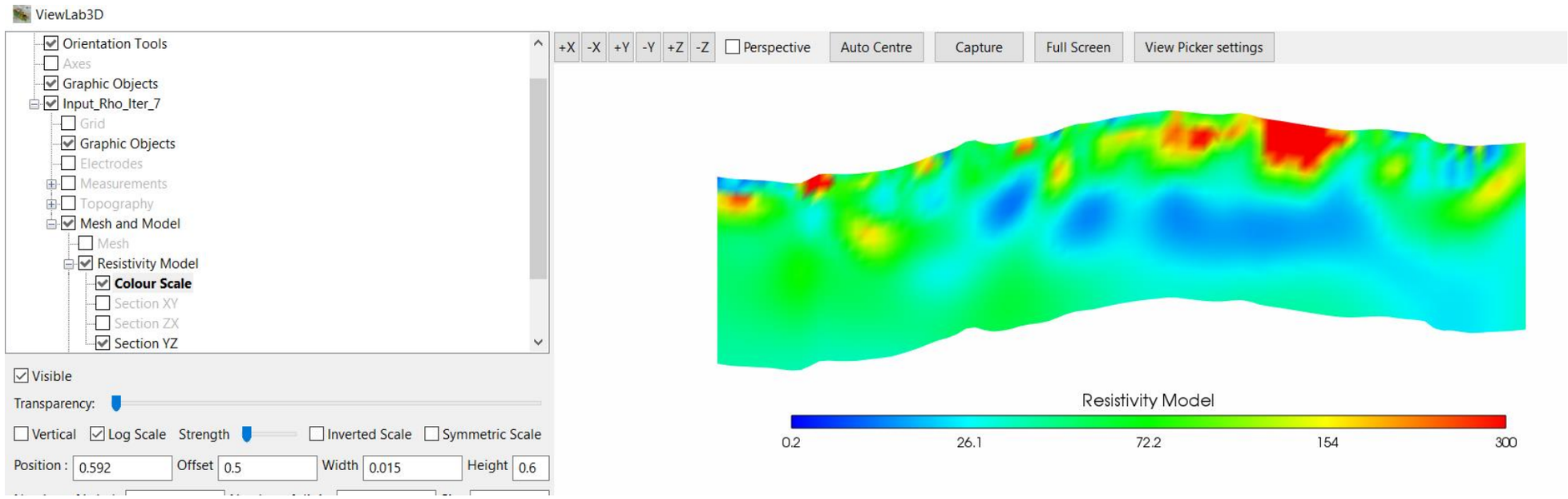


STEP 5 - DISPLAY OF INVERTED MODEL

17. Display the inverted model by checking the “Resistivity model” on the main tree, uncheck “Mesh”, “Measurements” and expand the “Resistivity model” menu by click on “+”:

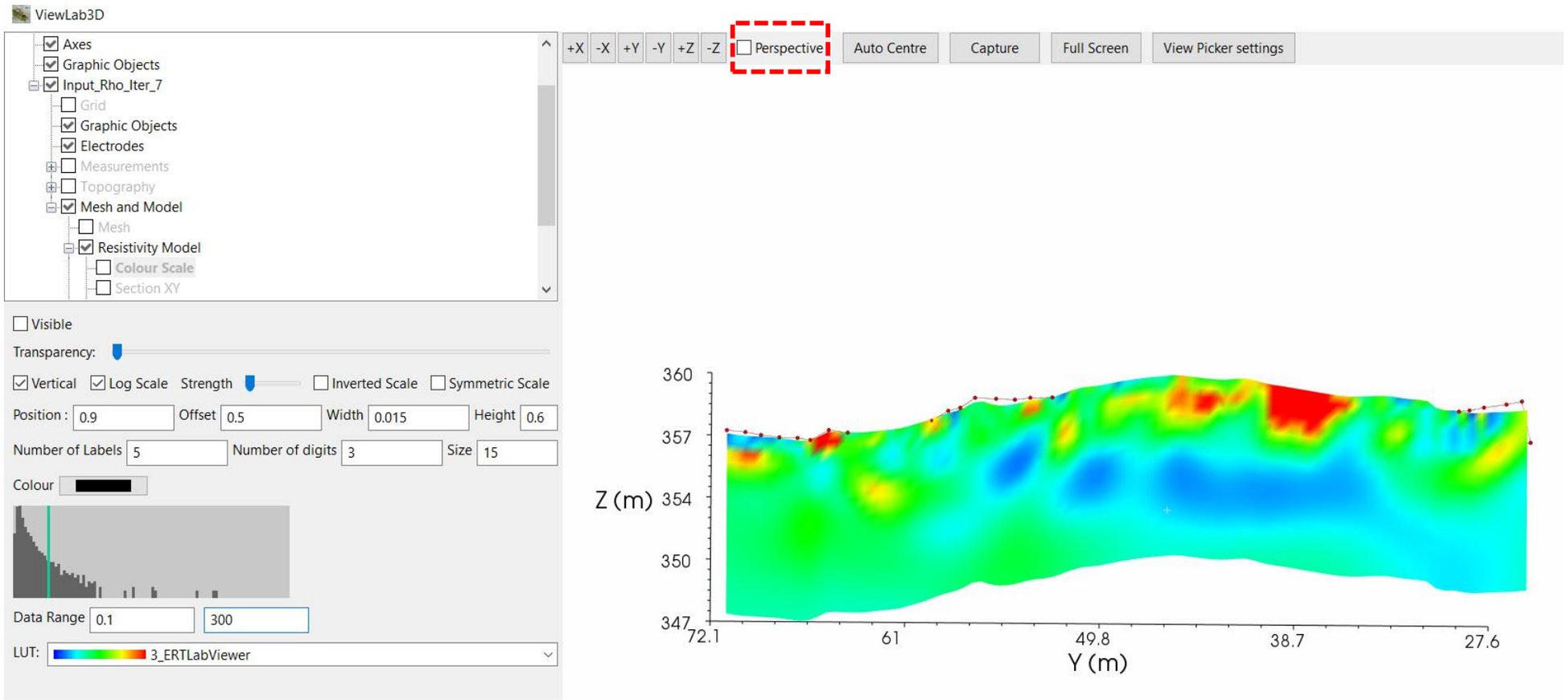


18. Uncheck the XY and YZ sections, check the “Color scale”, setup a proper resistivity Data Range (min-max) and choose a color scale (recommended: “ERTLab Viewer) with or without Log Scale:



STEP 5 - DISPLAY OF INVERTED MODEL

19. Check the “Axis” node on the main tree and check the Auto Fit Live option in order to fit the axes to the section and uncheck the “Perspective” option on top of the window:



20. Save the visualized section pressing on “Capture” button on top of the window.