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Program

- Short presentation of AGS and our software packages
- Short walkthrough of the ERT and IP method
- Short introduction to inversion theory
- Introduction to options and file formats in Res2DInv
- Live demo of Res2DInv
- Introduction to Res3DInv
- Live demo of Res3DInv
- A few examples from Aarhus Workbench Essentials
- Further reading
- (Very) short break and questions

Aarhus Geosoftware – Who are we?



- Aarhus Geosoftware is based in Aarhus, Denmark
- Commercial spin-off from the geophysical community at the Geoscience Department at Aarhus University
- Customers worldwide
- 9 employees – 5 software developers & 4 geophysicists

A screenshot of the Aarhus GeoSoftware website. The header features the company logo 'AGS' with a teal globe icon followed by the text 'Aarhus GeoSoftware'. Below the header is a navigation bar with links for 'HOME', 'AARHUS WORKBENCH', 'SPIA', and 'DOWNLOAD'. The main content area has a dark grey background. On the left, there is a large, bold title 'Software solutions for EM and electrical data'. To the right of the title are three vertical panels, each showing a different type of geophysical survey data visualization, such as resistivity or magnetic field measurements. Below the title, there is descriptive text: 'Leading provider of processing and inversion software for EM and electrical surveys. Specializing in Airborne TEM and HEM, groundbased TEM, ERT/IP and GCM.'

AGS Aarhus GeoSoftware

HOME AARHUS WORKBENCH SPIA DOWNLOAD

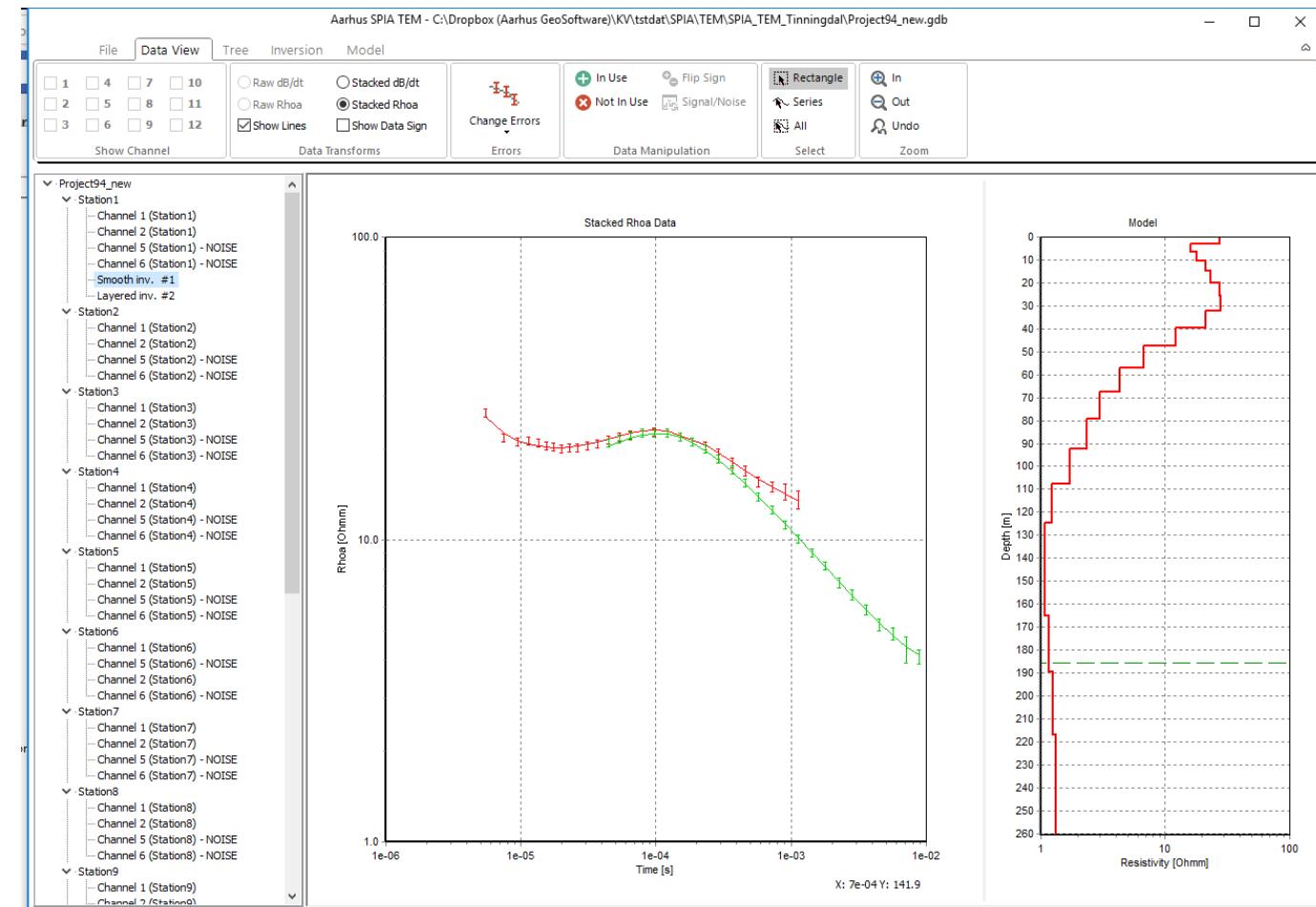
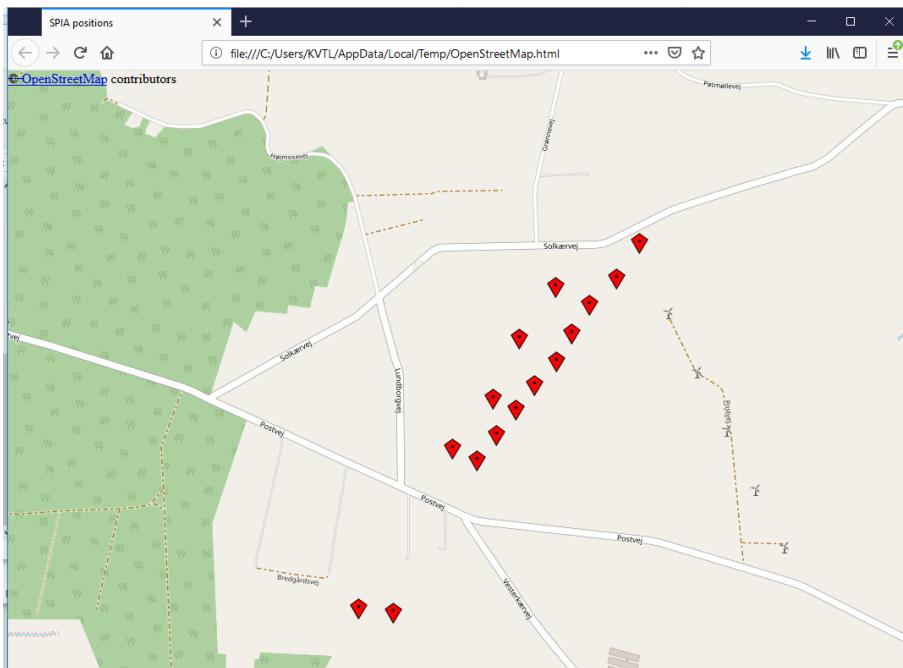
**Software solutions for
EM and electrical data**

Leading provider of processing and inversion software for EM and electrical surveys. Specializing in Airborne TEM and HEM, groundbased TEM, ERT/IP and GCM.

Software for processing and inversion of E&EM data

SPIA

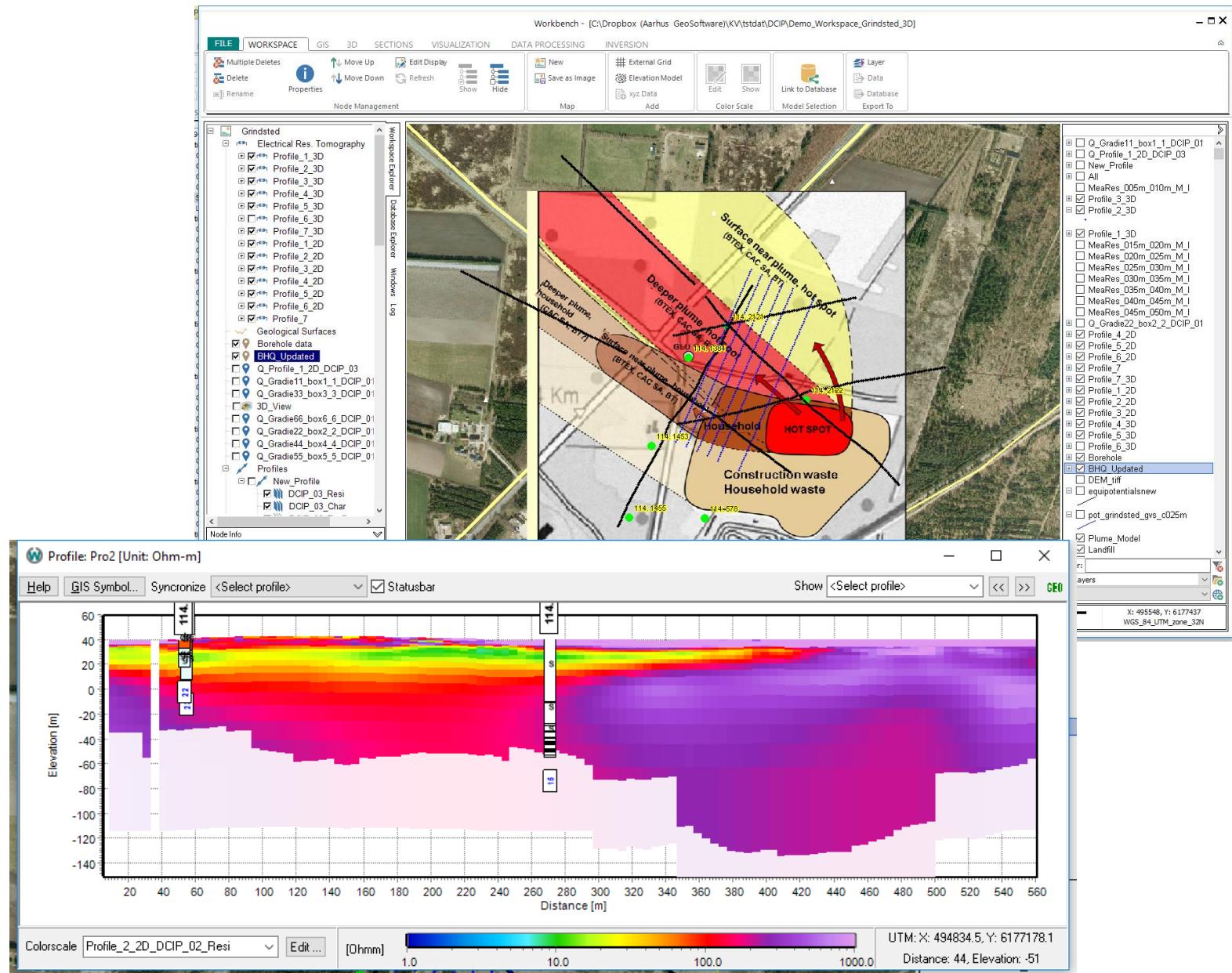
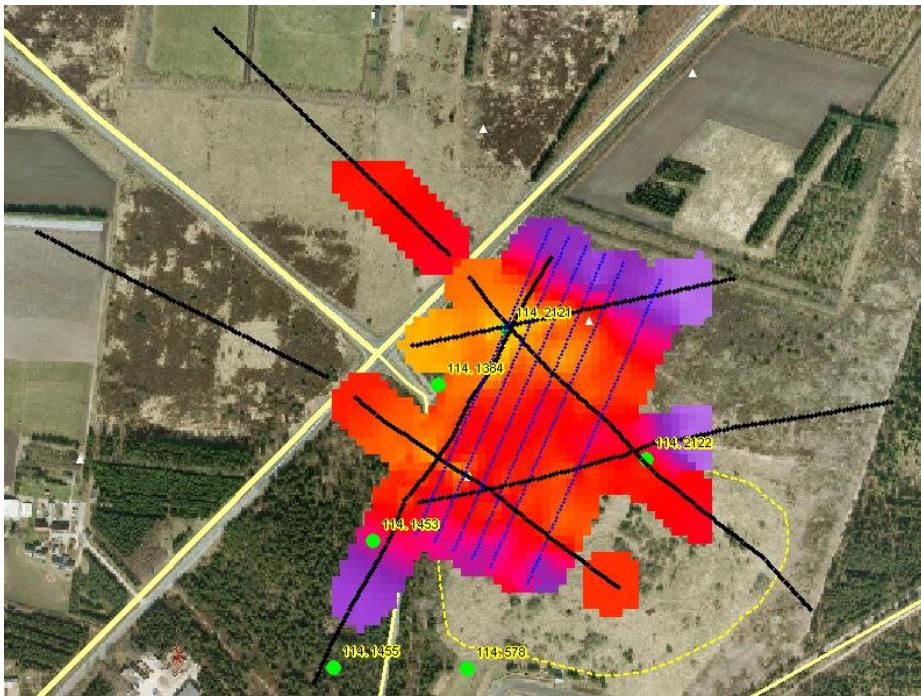
- Processing (removal of bad or noisy data points) for single site TEM and VES soundings
- 1D inversion for smooth and layered models
- Simple presentation of inversion results
- Map display of sounding positions



Software for processing and inversion of E&EM data

Aarhus Workbench

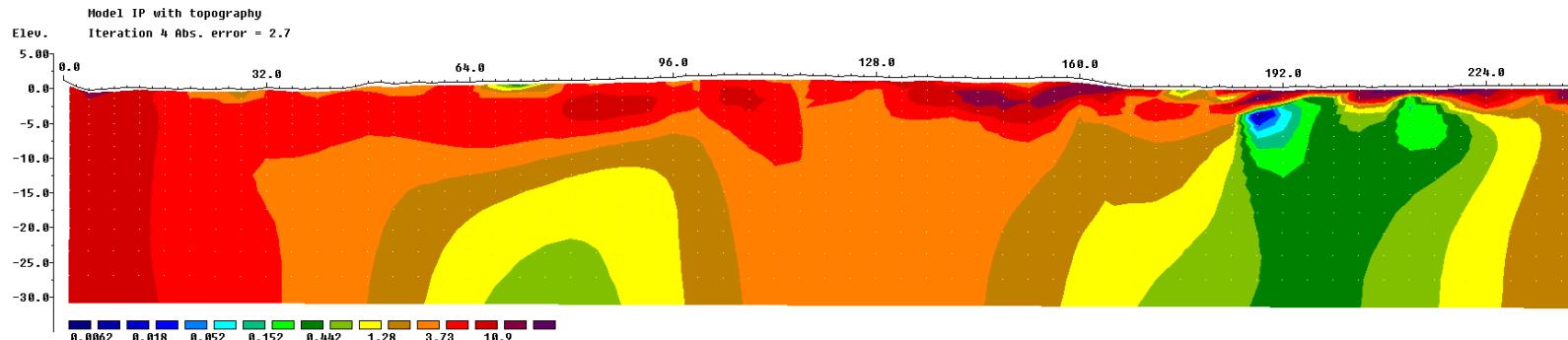
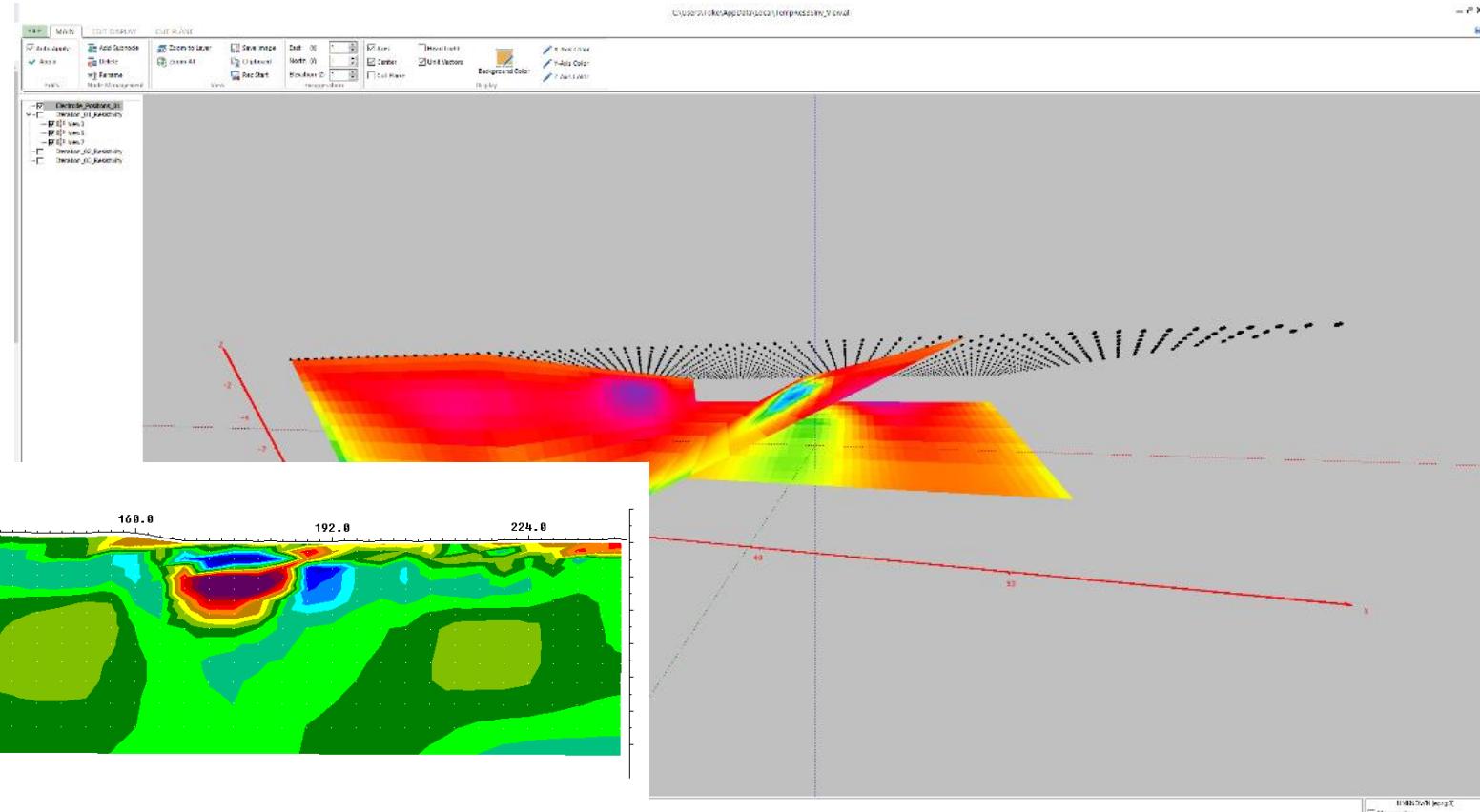
- Data management, processing, inversion, interpretation, GIS, visualization and presentation in one program
- Handles ERT/IP, TEM, GCM, Airborne TEM and HEM data



Software for processing and inversion of E&EM data

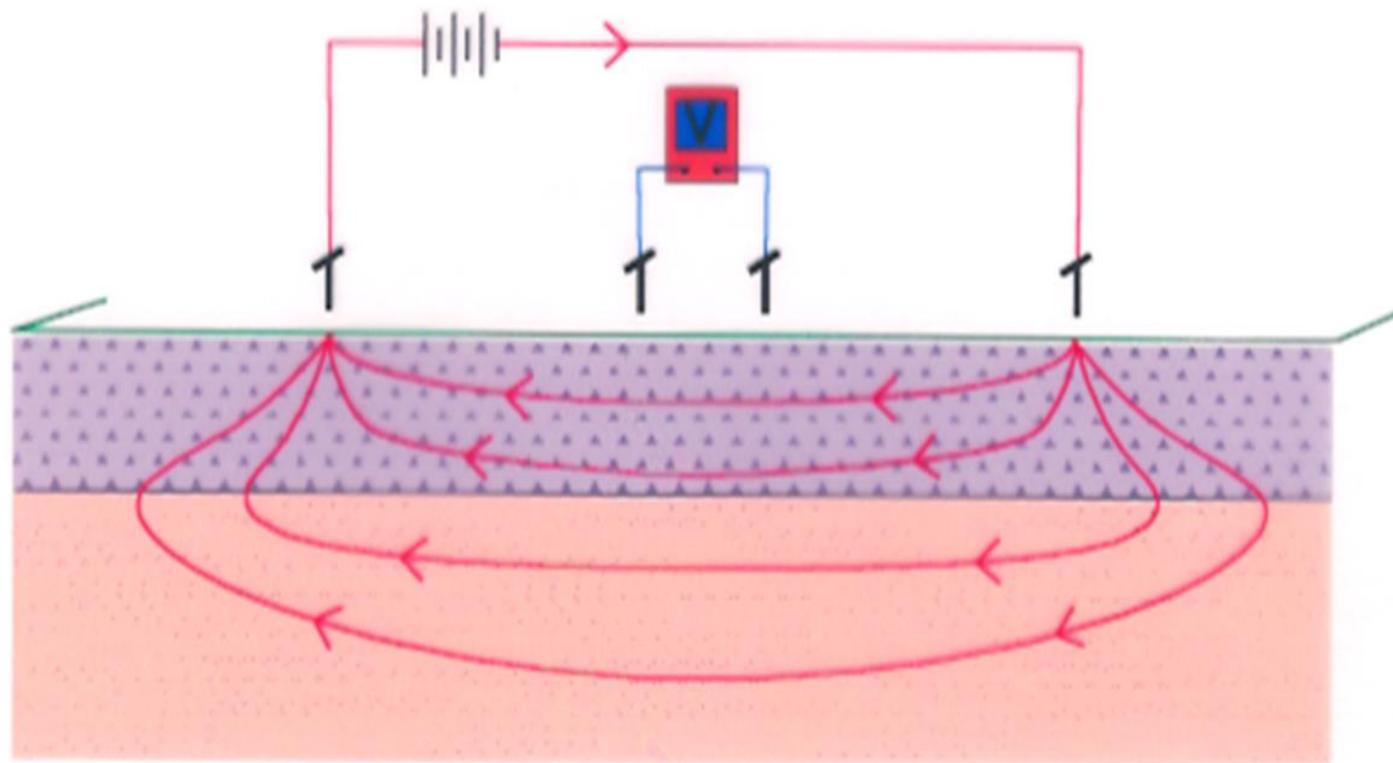
Res2DInv and Res3DInv

- Processing, inversion and visualization of ERT and IP data
- 2D and 3D inversion for all configurations with many advanced options



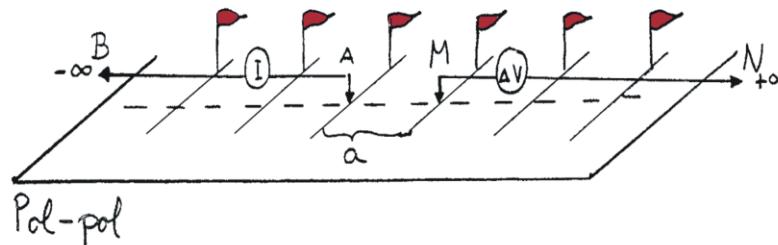
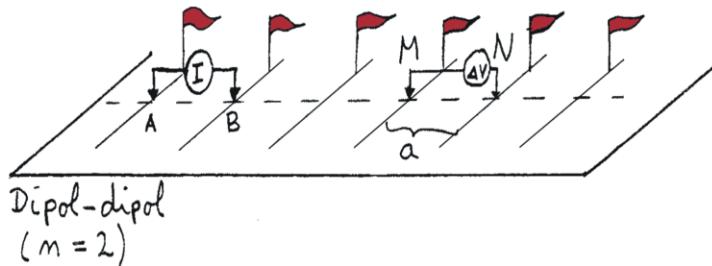
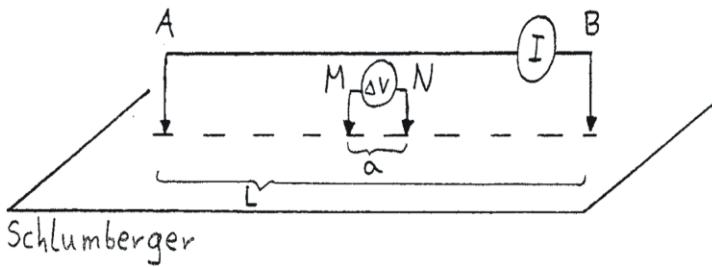
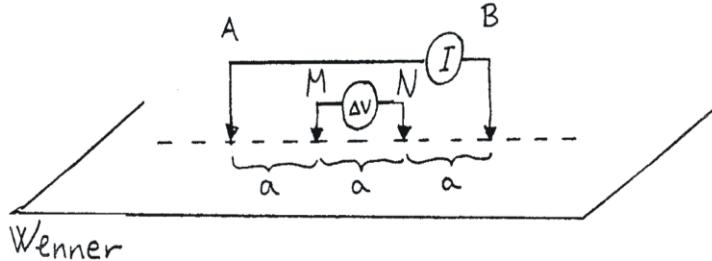
The resistivity and induced polarization method

- 4 Electrodes – 2 for current injection – 2 for measurement!
- Current electrodes: AB or C1 and C2
- Potential electrodes: MN or P1 and P2



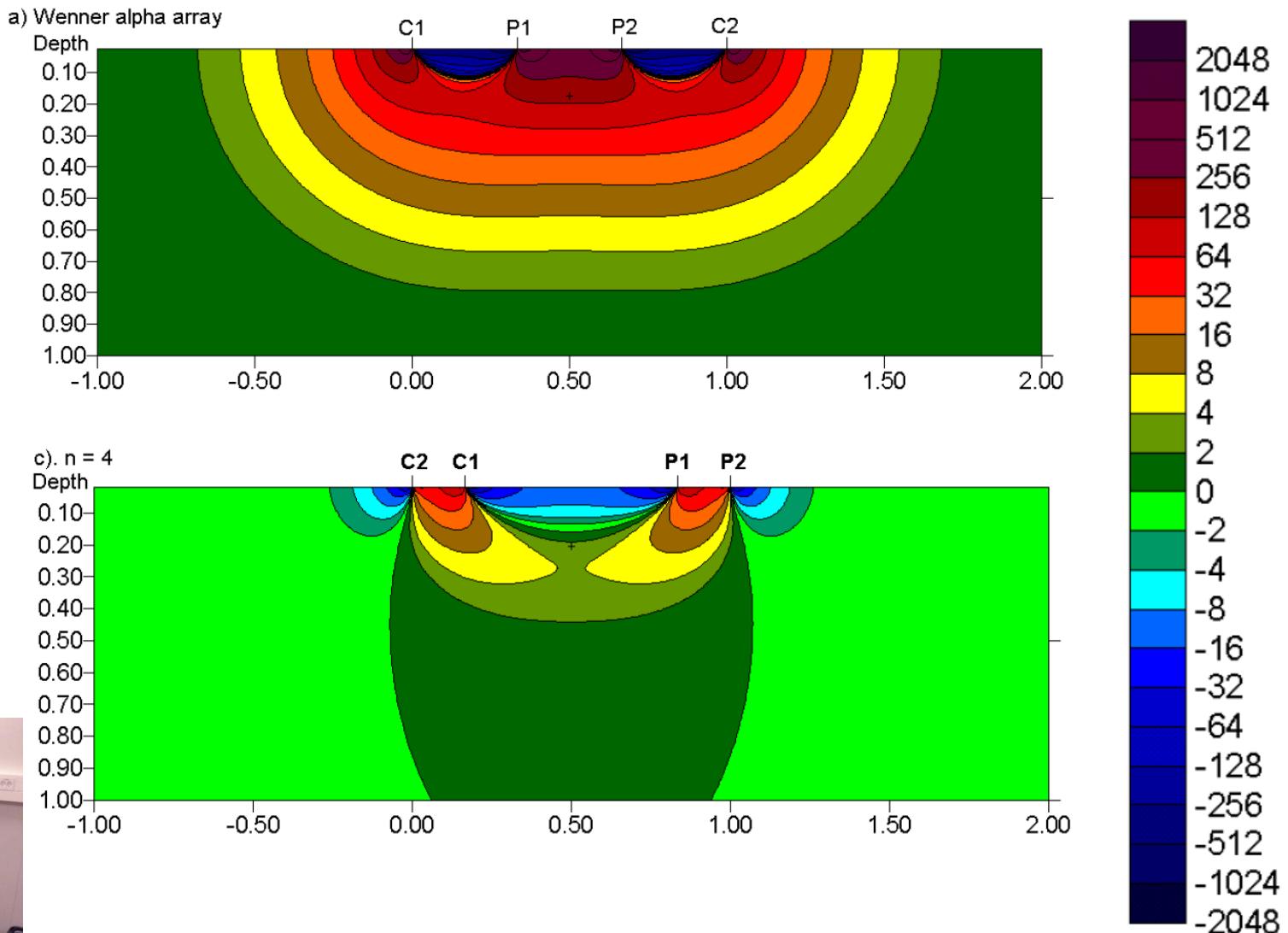
The resistivity and induced polarization method

- 4 Electrodes – 2 for current injection – 2 for measurement



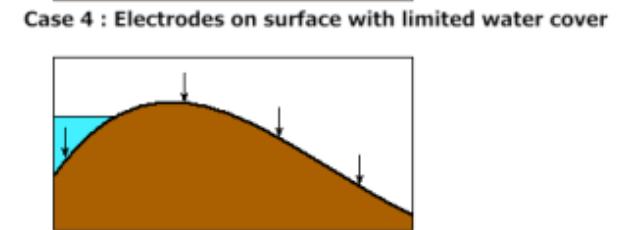
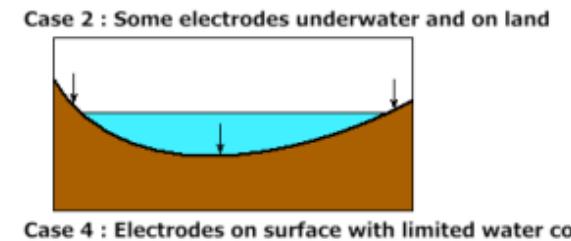
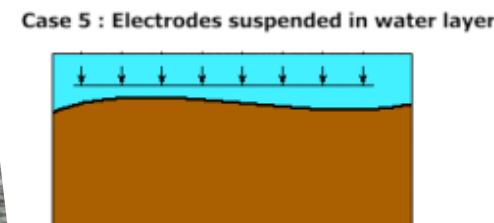
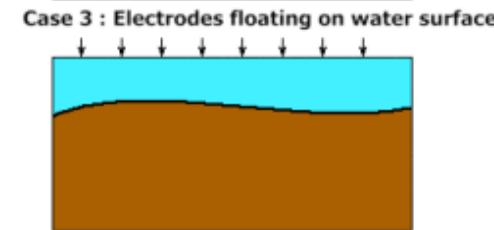
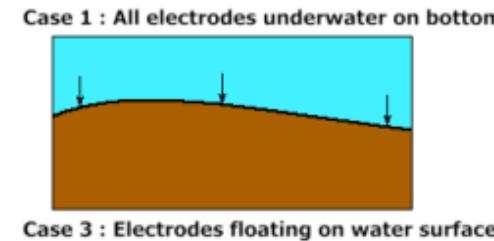
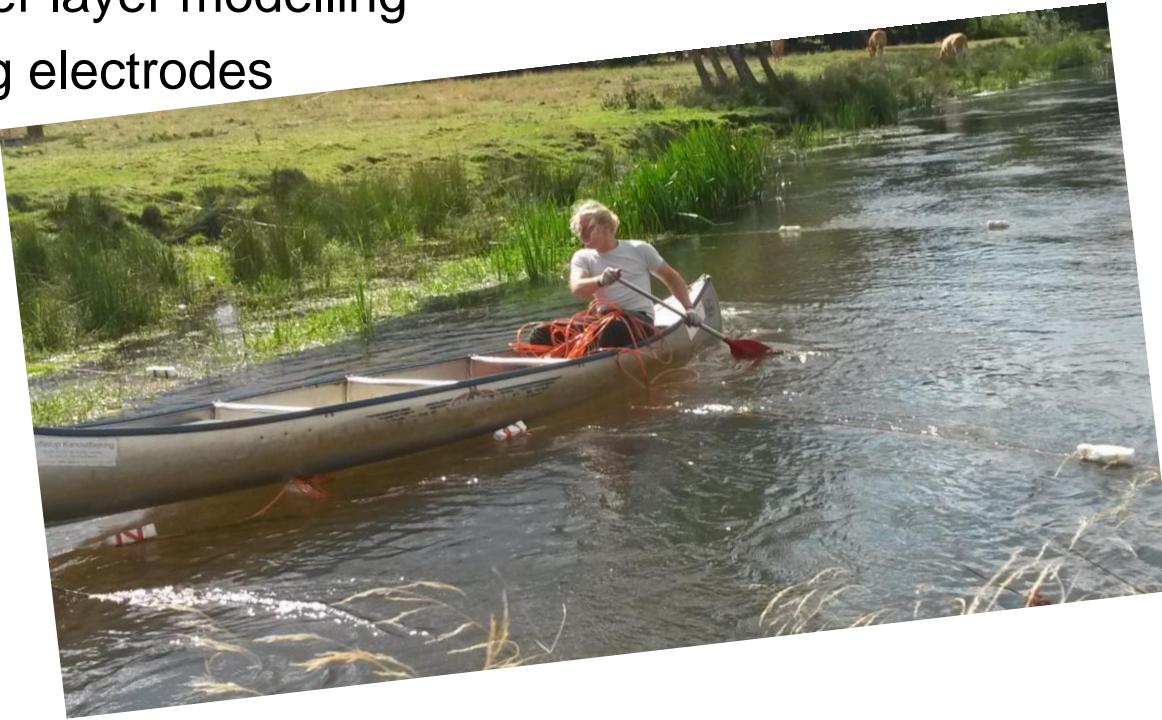
The resistivity and induced polarization method

- Sensitivity
- Acquisition speed
- Equipment
- Ease (price) of fieldwork



The resistivity and induced polarization method

- 4 Electrodes – 2 for current injection – 2 for measurement
- Nearly all imaginable electrode configurations are supported
- Cross borehole
- Combination of surface and borehole electrodes
- Electrodes in water
- Combination of land and water electrodes
- Water layer modelling
- Long electrodes



The resistivity and induced polarization method

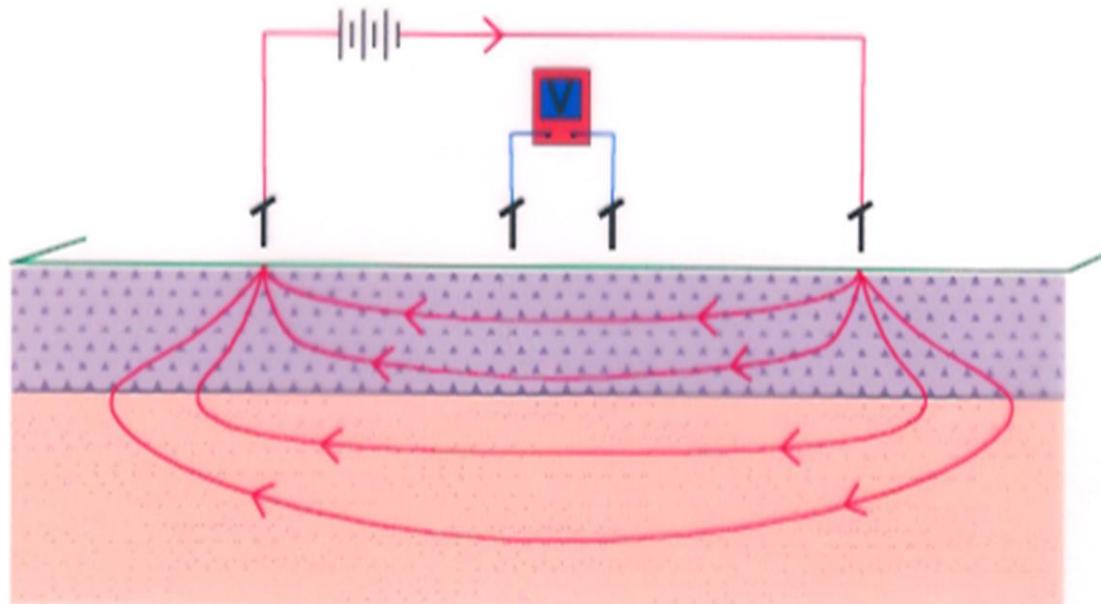
What do we measure, DC:

Resistance:

$$R = \frac{\Delta V_{MN}}{I_{AB}}$$

Apparent resistivity:

$$\rho_a = k \frac{\Delta V_{MN}}{I_{AB}}, \quad k = \frac{2\pi}{\left(\frac{1}{AM} - \frac{1}{BM}\right) - \left(\frac{1}{AN} - \frac{1}{BN}\right)}$$



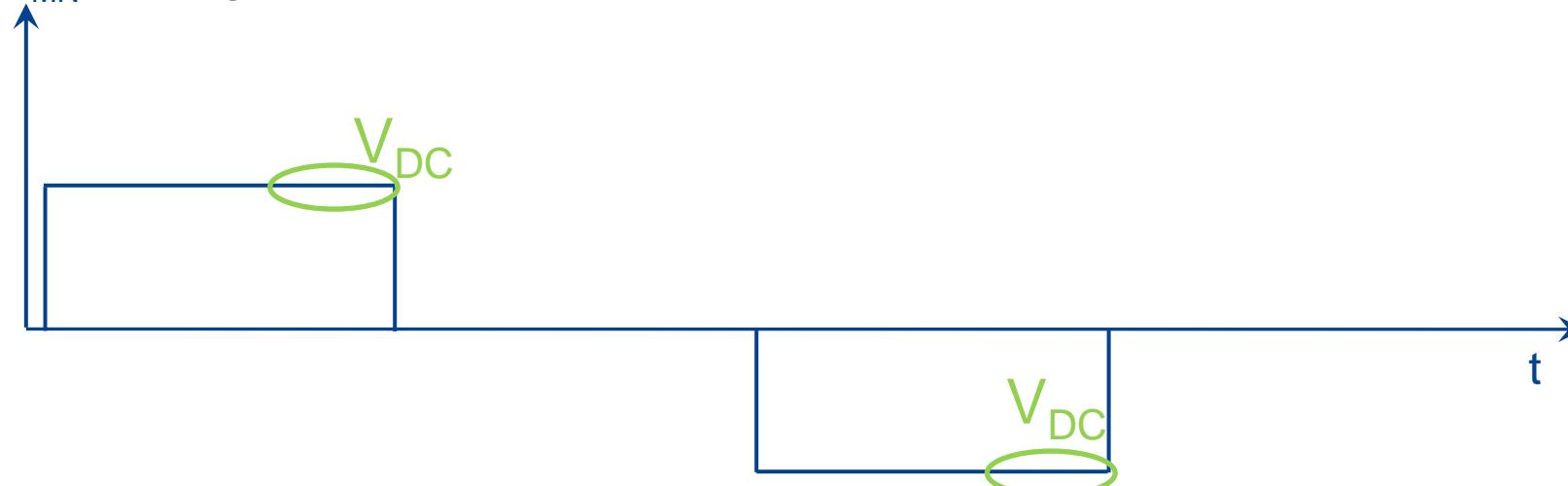
The resistivity and induced polarization method

What do we measure, IP: Example with NO IP effect

I_{AB} – Transmitted current



V_{MN} - Voltage at receiver electrodes



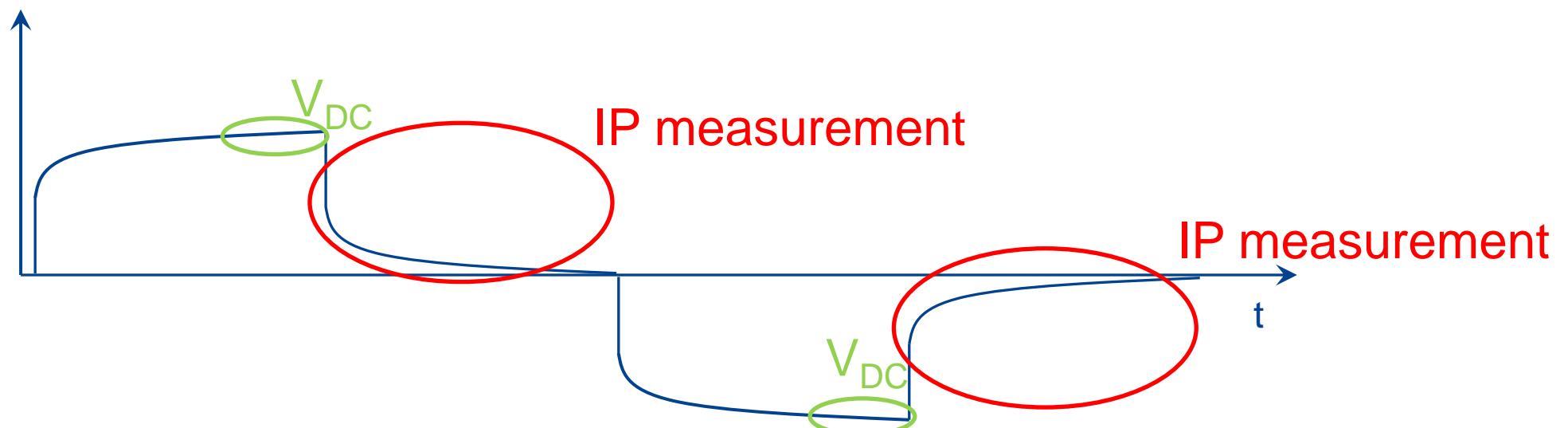
The resistivity and induced polarization method

What do we measure, IP: Example WITH IP effect

I_{AB} – Transmitted current



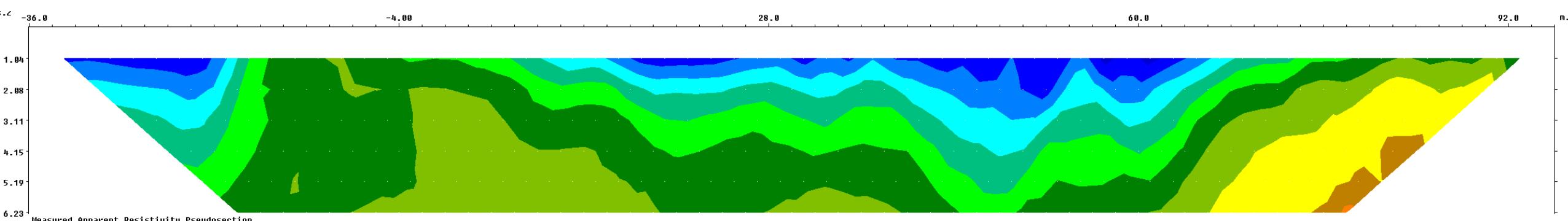
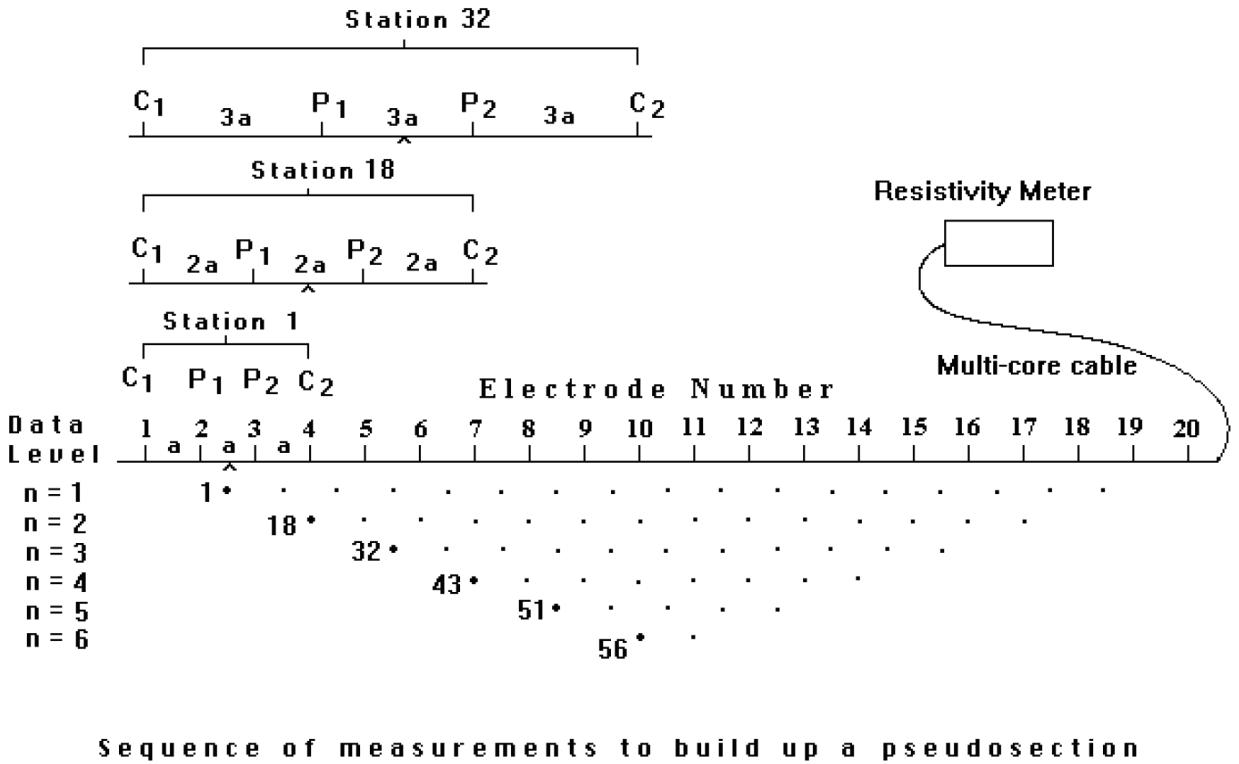
V_{MN} - Voltage at receiver electrodes



Brief inversion theory

What do we have?

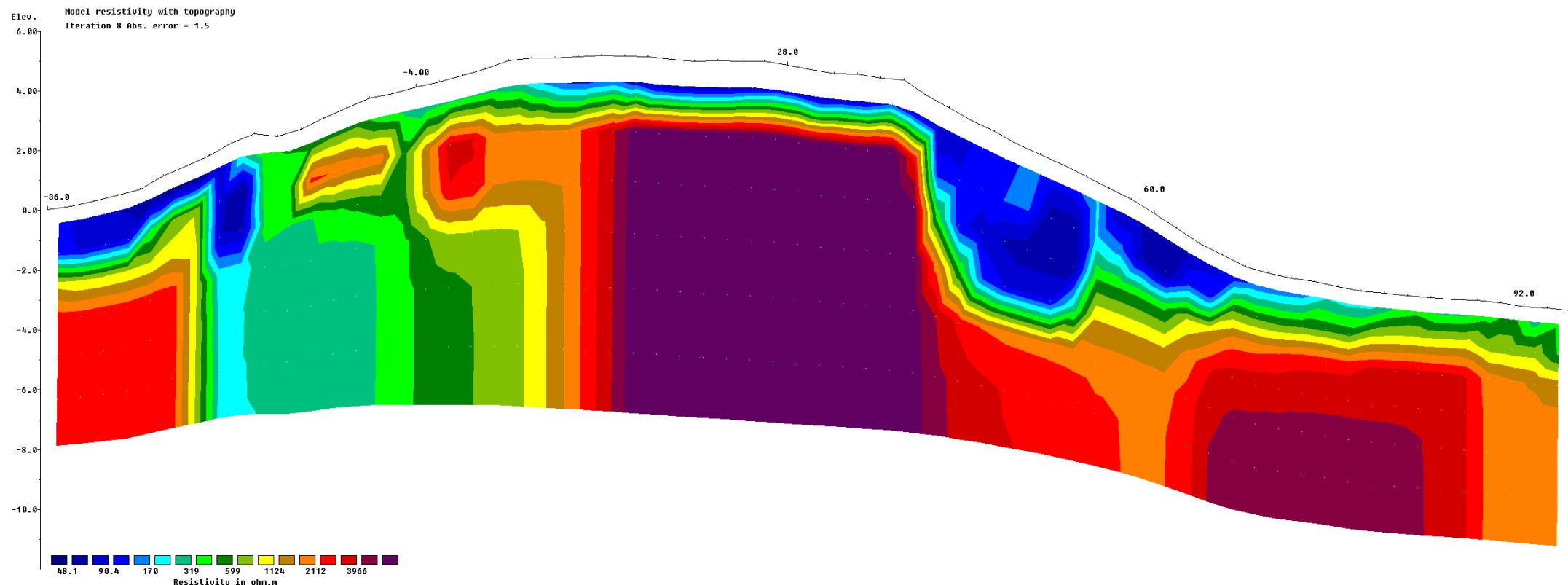
A series of measurements of resistivity
(and possibly induced polarization)



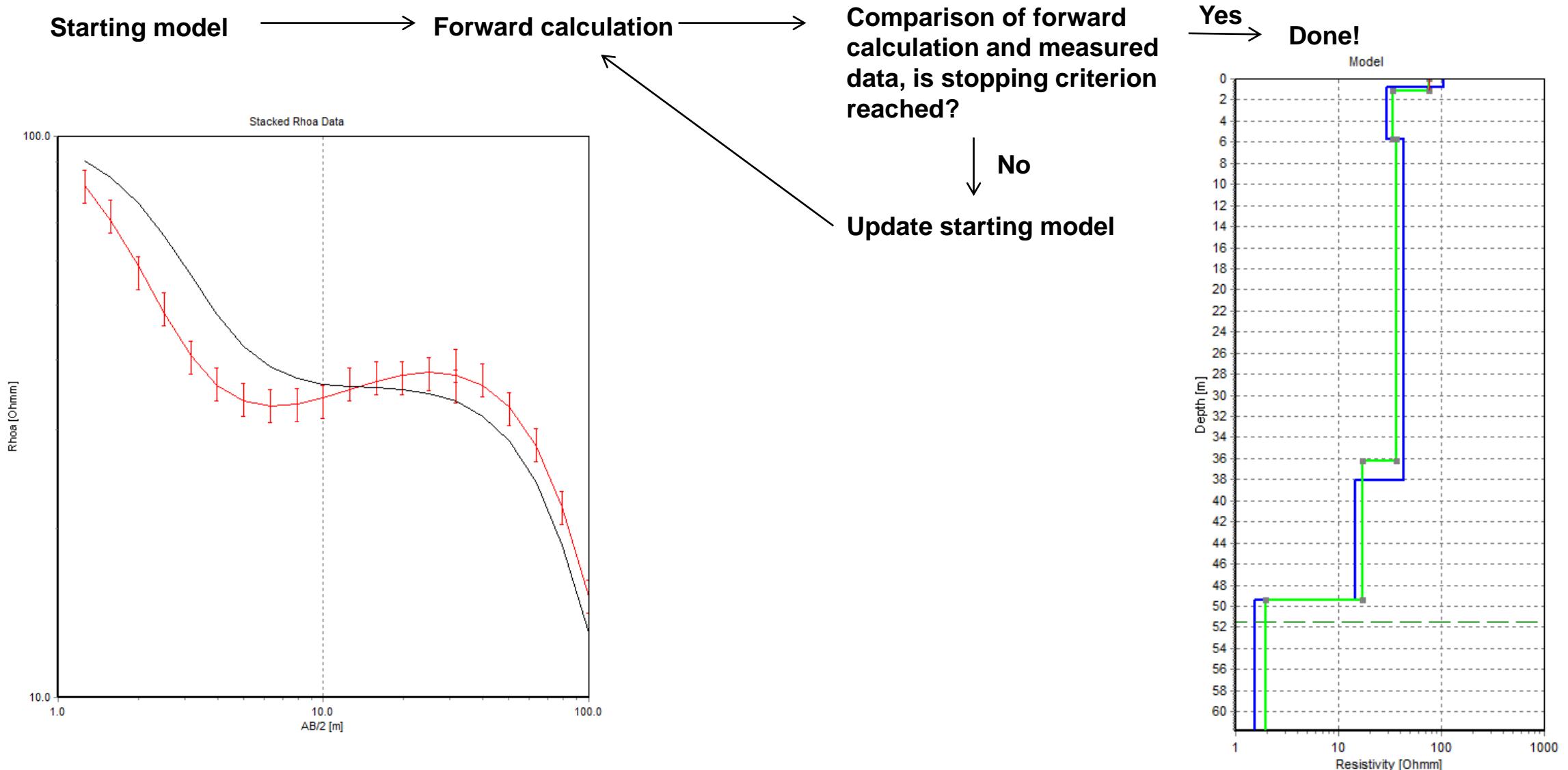
Brief inversion theory

What do we want?

A model of the resistivity (and chargeability) distribution of the subsurface:



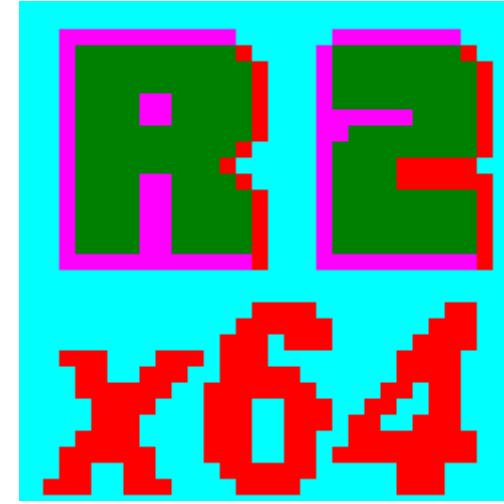
Brief inversion theory



Res2DInv and Res3DInv

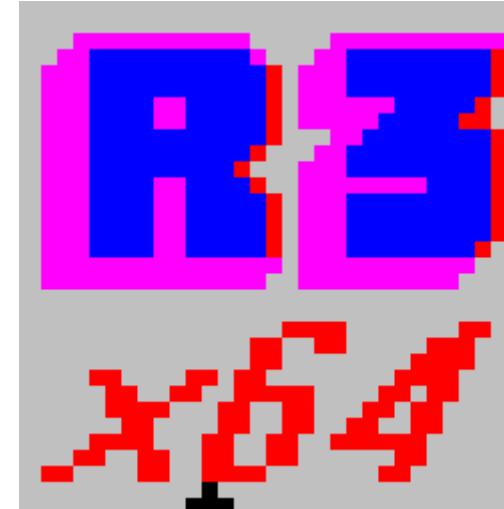
Input: .dat file

- measured data
 - a priori information
 - coordinates, topography
- .ivp file
- Inversion settings



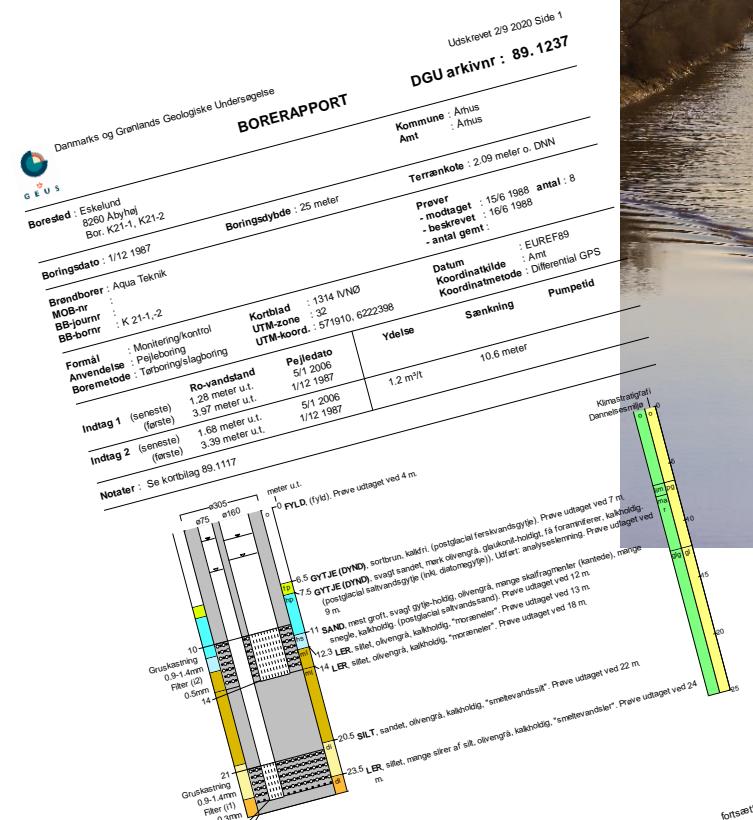
Output: .inv file

- Models and forward calculations from all iterations
- Inversion settings
- Data



Overview of options

- Fixed regions
- Water and streamed surveys
- Boreholes
- Topography modelling
- Global coordinates
- Fixed regions
- Known boundaries
- Induced polarization



The .dat file – simple example

Header lines

```
1 General array format example Comment/title line
2 1.0 Unit electrode distance
3 11 Array type (General array)
4 0 Array sub-type (unspecified)
5 Type of measurement (0=app. resistivity,1=resistance) Header
6 0 Measurement type indication
7 407 Number of data points
8 1 Format of x-coordinates (0 or 1 for true horizontal distances)
9 0 Flag for IP data
```

Data lines

```
10 4 0.00 0.00 3.00 0.00 1.00 0.00 2.00 0.00 10.158
11 4 1.00 0.00 4.00 0.00 2.00 0.00 3.00 0.00 10.168
12 4 2.00 0.00 5.00 0.00 3.00 0.00 4.00 0.00 10.184
13 4 3.00 0.00 6.00 0.00 4.00 0.00 5.00 0.00 10.225
14 4 4.00 0.00 7.00 0.00 5.00 0.00 6.00 0.00 10.337
15 4 5.00 0.00 8.00 0.00 6.00 0.00 7.00 0.00 10.708
16 4 6.00 0.00 9.00 0.00 7.00 0.00 8.00 0.00 11.668
17 4 7.00 0.00 10.00 0.00 8.00 0.00 9.00 0.00 12.542
18 4 8.00 0.00 11.00 0.00 9.00 0.00 10.00 0.00 12.871
19 4 9.00 0.00 12.00 0.00 10.00 0.00 11.00 0.00 13.238
20 4 10.00 0.00 13.00 0.00 11.00 0.00 12.00 0.00 13.342
21 4 11.00 0.00 14.00 0.00 12.00 0.00 13.00 0.00 13.731
22 4 15.00 0.00 17.00 0.00 14.00 0.00 16.00 0.00 14.521
23 4 18.00 0.00 20.00 0.00 17.00 0.00 19.00 0.00 15.822
24 4 21.00 0.00 23.00 0.00 20.00 0.00 22.00 0.00 17.123
25 4 24.00 0.00 26.00 0.00 23.00 0.00 25.00 0.00 18.424
26 4 27.00 0.00 29.00 0.00 26.00 0.00 28.00 0.00 19.725
27 4 30.00 0.00 32.00 0.00 29.00 0.00 31.00 0.00 21.026
28 4 33.00 0.00 35.00 0.00 32.00 0.00 34.00 0.00 22.327
29 4 36.00 0.00 38.00 0.00 35.00 0.00 37.00 0.00 23.628
30 4 39.00 0.00 41.00 0.00 38.00 0.00 40.00 0.00 25.000
31 4 42.00 0.00 44.00 0.00 41.00 0.00 43.00 0.00 26.375
32 4 45.00 0.00 47.00 0.00 44.00 0.00 46.00 0.00 27.750
33 4 48.00 0.00 50.00 0.00 47.00 0.00 49.00 0.00 29.125
34 4 51.00 0.00 53.00 0.00 50.00 0.00 52.00 0.00 30.500
35 4 54.00 0.00 56.00 0.00 53.00 0.00 55.00 0.00 31.875
36 4 57.00 0.00 59.00 0.00 56.00 0.00 58.00 0.00 33.250
37 4 60.00 0.00 62.00 0.00 59.00 0.00 61.00 0.00 34.625
38 4 63.00 0.00 65.00 0.00 62.00 0.00 64.00 0.00 36.000
39 4 66.00 0.00 68.00 0.00 65.00 0.00 67.00 0.00 37.375
40 4 70.00 0.00 72.00 0.00 69.00 0.00 71.00 0.00 38.750
41 4 74.00 0.00 76.00 0.00 73.00 0.00 75.00 0.00 40.125
42 4 78.00 0.00 80.00 0.00 77.00 0.00 79.00 0.00 41.500
43 4 82.00 0.00 84.00 0.00 81.00 0.00 83.00 0.00 42.875
44 4 86.00 0.00 88.00 0.00 85.00 0.00 87.00 0.00 44.250
45 4 90.00 0.00 92.00 0.00 89.00 0.00 91.00 0.00 45.625
46 4 94.00 0.00 96.00 0.00 93.00 0.00 95.00 0.00 47.000
47 4 98.00 0.00 100.00 0.00 97.00 0.00 99.00 0.00 48.375
48 4 102.00 0.00 104.00 0.00 101.00 0.00 103.00 0.00 49.750
49 4 106.00 0.00 108.00 0.00 105.00 0.00 107.00 0.00 51.125
50 4 110.00 0.00 112.00 0.00 109.00 0.00 111.00 0.00 52.500
51 4 114.00 0.00 116.00 0.00 113.00 0.00 115.00 0.00 53.875
52 4 118.00 0.00 120.00 0.00 117.00 0.00 119.00 0.00 55.250
53 4 122.00 0.00 124.00 0.00 121.00 0.00 123.00 0.00 56.625
54 4 126.00 0.00 128.00 0.00 125.00 0.00 127.00 0.00 58.000
55 4 130.00 0.00 132.00 0.00 129.00 0.00 131.00 0.00 59.375
56 4 134.00 0.00 136.00 0.00 133.00 0.00 135.00 0.00 60.750
57 4 138.00 0.00 140.00 0.00 137.00 0.00 139.00 0.00 62.125
58 4 142.00 0.00 144.00 0.00 141.00 0.00 143.00 0.00 63.500
59 4 146.00 0.00 148.00 0.00 145.00 0.00 147.00 0.00 64.875
60 4 150.00 0.00 152.00 0.00 149.00 0.00 151.00 0.00 66.250
61 4 154.00 0.00 156.00 0.00 153.00 0.00 155.00 0.00 67.625
62 4 158.00 0.00 160.00 0.00 157.00 0.00 159.00 0.00 69.000
63 4 162.00 0.00 164.00 0.00 161.00 0.00 163.00 0.00 70.375
64 4 166.00 0.00 168.00 0.00 165.00 0.00 167.00 0.00 71.750
65 4 170.00 0.00 172.00 0.00 169.00 0.00 171.00 0.00 73.125
66 4 174.00 0.00 176.00 0.00 173.00 0.00 175.00 0.00 74.500
67 4 178.00 0.00 180.00 0.00 177.00 0.00 179.00 0.00 75.875
68 4 182.00 0.00 184.00 0.00 181.00 0.00 183.00 0.00 77.250
69 4 186.00 0.00 188.00 0.00 185.00 0.00 187.00 0.00 78.625
70 4 190.00 0.00 192.00 0.00 189.00 0.00 191.00 0.00 80.000
71 4 194.00 0.00 196.00 0.00 193.00 0.00 195.00 0.00 81.375
72 4 198.00 0.00 200.00 0.00 197.00 0.00 199.00 0.00 82.750
73 4 202.00 0.00 204.00 0.00 201.00 0.00 203.00 0.00 84.125
74 4 206.00 0.00 208.00 0.00 205.00 0.00 207.00 0.00 85.500
75 4 210.00 0.00 212.00 0.00 209.00 0.00 211.00 0.00 86.875
76 4 214.00 0.00 216.00 0.00 213.00 0.00 215.00 0.00 88.250
77 4 218.00 0.00 220.00 0.00 217.00 0.00 219.00 0.00 89.625
78 4 222.00 0.00 224.00 0.00 221.00 0.00 223.00 0.00 91.000
79 4 226.00 0.00 228.00 0.00 225.00 0.00 227.00 0.00 92.375
80 4 230.00 0.00 232.00 0.00 229.00 0.00 231.00 0.00 93.750
81 4 234.00 0.00 236.00 0.00 233.00 0.00 235.00 0.00 95.125
82 4 238.00 0.00 240.00 0.00 237.00 0.00 239.00 0.00 96.500
83 4 242.00 0.00 244.00 0.00 241.00 0.00 243.00 0.00 97.875
84 4 246.00 0.00 248.00 0.00 245.00 0.00 247.00 0.00 99.250
85 4 250.00 0.00 252.00 0.00 249.00 0.00 251.00 0.00 100.625
86 4 254.00 0.00 256.00 0.00 253.00 0.00 255.00 0.00 102.000
87 4 258.00 0.00 260.00 0.00 257.00 0.00 259.00 0.00 103.375
88 4 262.00 0.00 264.00 0.00 261.00 0.00 263.00 0.00 104.750
89 4 266.00 0.00 268.00 0.00 265.00 0.00 267.00 0.00 106.125
90 4 270.00 0.00 272.00 0.00 269.00 0.00 271.00 0.00 107.500
91 4 274.00 0.00 276.00 0.00 273.00 0.00 275.00 0.00 108.875
92 4 278.00 0.00 280.00 0.00 277.00 0.00 279.00 0.00 110.250
93 4 282.00 0.00 284.00 0.00 281.00 0.00 283.00 0.00 111.625
94 4 286.00 0.00 288.00 0.00 285.00 0.00 287.00 0.00 113.000
95 4 290.00 0.00 292.00 0.00 289.00 0.00 291.00 0.00 114.375
96 4 294.00 0.00 296.00 0.00 293.00 0.00 295.00 0.00 115.750
97 4 298.00 0.00 300.00 0.00 297.00 0.00 299.00 0.00 117.125
98 4 302.00 0.00 304.00 0.00 301.00 0.00 303.00 0.00 118.500
99 4 306.00 0.00 308.00 0.00 305.00 0.00 307.00 0.00 119.875
100 4 310.00 0.00 312.00 0.00 309.00 0.00 311.00 0.00 121.250
101 4 314.00 0.00 316.00 0.00 313.00 0.00 315.00 0.00 122.625
102 4 318.00 0.00 320.00 0.00 317.00 0.00 319.00 0.00 124.000
103 4 322.00 0.00 324.00 0.00 321.00 0.00 323.00 0.00 125.375
104 4 326.00 0.00 328.00 0.00 325.00 0.00 327.00 0.00 126.750
105 4 330.00 0.00 332.00 0.00 329.00 0.00 331.00 0.00 128.125
106 4 334.00 0.00 336.00 0.00 333.00 0.00 335.00 0.00 129.500
107 4 338.00 0.00 340.00 0.00 337.00 0.00 339.00 0.00 130.875
108 4 342.00 0.00 344.00 0.00 341.00 0.00 343.00 0.00 132.250
109 4 346.00 0.00 348.00 0.00 345.00 0.00 347.00 0.00 133.625
110 4 350.00 0.00 352.00 0.00 349.00 0.00 351.00 0.00 135.000
111 4 354.00 0.00 356.00 0.00 353.00 0.00 355.00 0.00 136.375
112 4 358.00 0.00 360.00 0.00 357.00 0.00 359.00 0.00 137.750
113 4 362.00 0.00 364.00 0.00 361.00 0.00 363.00 0.00 139.125
114 4 366.00 0.00 368.00 0.00 365.00 0.00 367.00 0.00 140.500
115 4 370.00 0.00 372.00 0.00 369.00 0.00 371.00 0.00 141.875
116 4 374.00 0.00 376.00 0.00 373.00 0.00 375.00 0.00 143.250
117 4 378.00 0.00 380.00 0.00 377.00 0.00 379.00 0.00 144.625
118 4 382.00 0.00 384.00 0.00 381.00 0.00 383.00 0.00 146.000
119 4 386.00 0.00 388.00 0.00 385.00 0.00 387.00 0.00 147.375
120 4 390.00 0.00 392.00 0.00 389.00 0.00 391.00 0.00 148.750
121 4 394.00 0.00 396.00 0.00 393.00 0.00 395.00 0.00 150.125
122 4 398.00 0.00 400.00 0.00 397.00 0.00 399.00 0.00 151.500
123 4 402.00 0.00 404.00 0.00 401.00 0.00 403.00 0.00 152.875
124 4 406.00 0.00 408.00 0.00 405.00 0.00 407.00 0.00 154.250
125 4 410.00 0.00 412.00 0.00 409.00 0.00 411.00 0.00 155.625
126 4 414.00 0.00 416.00 0.00 413.00 0.00 415.00 0.00 157.000
127 4 418.00 0.00 420.00 0.00 417.00 0.00 419.00 0.00 158.375
128 4 422.00 0.00 424.00 0.00 421.00 0.00 423.00 0.00 159.750
129 4 426.00 0.00 428.00 0.00 425.00 0.00 427.00 0.00 161.125
130 4 430.00 0.00 432.00 0.00 429.00 0.00 431.00 0.00 162.500
131 4 434.00 0.00 436.00 0.00 433.00 0.00 435.00 0.00 163.875
132 4 438.00 0.00 440.00 0.00 437.00 0.00 439.00 0.00 165.250
133 4 442.00 0.00 444.00 0.00 441.00 0.00 443.00 0.00 166.625
134 4 446.00 0.00 448.00 0.00 445.00 0.00 447.00 0.00 168.000
135 4 450.00 0.00 452.00 0.00 449.00 0.00 451.00 0.00 169.375
136 4 454.00 0.00 456.00 0.00 453.00 0.00 455.00 0.00 170.750
137 4 458.00 0.00 460.00 0.00 457.00 0.00 459.00 0.00 172.125
138 4 462.00 0.00 464.00 0.00 461.00 0.00 463.00 0.00 173.500
139 4 466.00 0.00 468.00 0.00 465.00 0.00 467.00 0.00 174.875
140 4 470.00 0.00 472.00 0.00 469.00 0.00 471.00 0.00 176.250
141 4 474.00 0.00 476.00 0.00 473.00 0.00 475.00 0.00 177.625
142 4 478.00 0.00 480.00 0.00 477.00 0.00 479.00 0.00 179.000
143 4 482.00 0.00 484.00 0.00 481.00 0.00 483.00 0.00 180.375
144 4 486.00 0.00 488.00 0.00 485.00 0.00 487.00 0.00 181.750
145 4 490.00 0.00 492.00 0.00 489.00 0.00 491.00 0.00 183.125
146 4 494.00 0.00 496.00 0.00 493.00 0.00 495.00 0.00 184.500
147 4 498.00 0.00 500.00 0.00 497.00 0.00 499.00 0.00 185.875
148 4 502.00 0.00 504.00 0.00 501.00 0.00 503.00 0.00 187.250
149 4 506.00 0.00 508.00 0.00 505.00 0.00 507.00 0.00 188.625
150 4 510.00 0.00 512.00 0.00 509.00 0.00 511.00 0.00 190.000
151 4 514.00 0.00 516.00 0.00 513.00 0.00 515.00 0.00 191.375
152 4 518.00 0.00 520.00 0.00 517.00 0.00 519.00 0.00 192.750
153 4 522.00 0.00 524.00 0.00 521.00 0.00 523.00 0.00 194.125
154 4 526.00 0.00 528.00 0.00 525.00 0.00 527.00 0.00 195.500
155 4 530.00 0.00 532.00 0.00 529.00 0.00 531.00 0.00 196.875
156 4 534.00 0.00 536.00 0.00 533.00 0.00 535.00 0.00 198.250
157 4 538.00 0.00 540.00 0.00 537.00 0.00 539.00 0.00 199.625
158 4 542.00 0.00 544.00 0.00 541.00 0.00 543.00 0.00 201.000
159 4 546.00 0.00 548.00 0.00 545.00 0.00 547.00 0.00 202.375
160 4 550.00 0.00 552.00 0.00 549.00 0.00 551.00 0.00 203.750
161 4 554.00 0.00 556.00 0.00 553.00 0.00 555.00 0.00 205.125
162 4 558.00 0.00 560.00 0.00 557.00 0.00 559.00 0.00 206.500
163 4 562.00 0.00 564.00 0.00 561.00 0.00 563.00 0.00 207.875
164 4 566.00 0.00 568.00 0.00 565.00 0.00 567.00 0.00 209.250
165 4 570.00 0.00 572.00 0.00 569.00 0.00 571.00 0.00 210.625
166 4 574.00 0.00 576.00 0.00 573.00 0.00 575.00 0.00 212.000
167 4 578.00 0.00 580.00 0.00 577.00 0.00 579.00 0.00 213.375
168 4 582.00 0.00 584.00 0.00 581.00 0.00 583.00 0.00 214.750
169 4 586.00 0.00 588.00 0.00 585.00 0.00 587.00 0.00 216.125
170 4 590.00 0.00 592.00 0.00 589.00 0.00 591.00 0.00 217.500
171 4 594.00 0.00 596.00 0.00 593.00 0.00 595.00 0.00 218.875
172 4 598.00 0.00 600.00 0.00 597.00 0.00 599.00 0.00 220.250
173 4 602.00 0.00 604.00 0.00 601.00 0.00 603.00 0.00 221.625
174 4 606.00 0.00 608.00 0.00 605.00 0.00 607.00 0.00 223.000
175 4 610.00 0.00 612.00 0.00 609.00 0.00 611.00 0.00 224.375
176 4 614.00 0.00 616.00 0.00 613.00 0.00 615.00 0.00 225.750
177 4 618.00 0.00 620.00 0.00 617.00 0.00 619.00 0.00 227.125
178 4 622.00 0.00 624.00 0.00 621.00 0.00 623.00 0.00 228.500
179 4 626.00 0.00 628.00 0.00 625.00 0.00 627.00 0.00 229.875
180 4 630.00 0.00 632.00 0.00 629.00 0.00 631.00 0.00 231.250
181 4 634.00 0.00 636.00 0.00 633.00 0.00 635.00 0.00 232.625
182 4 638.00 0.00 640.00 0.00 637.00 0.00 639.00 0.00 234.000
183 4 642.00 0.00 644.00 0.00 641.00 0.00 643.00 0.00 235.375
184 4 646.00 0.00 648.00 0.00 645.00 0.00 647.00 0.00 236.750
185 4 650.00 0.00 652.00 0.00 649.00 0.00 651.00 0.00 238.125
186 4 654.00 0.00 656.00 0.00 653.00 0.00 655.00 0.00 239.500
187 4 658.00 0.00 660.00 0.00 657.00 0.00 659.00 0.00 240.875
188 4 662.00 0.00 664.00 0.00 661.00 0.00 663.00 0.00 242.250
189 4 666.00 0.00 668.00 0.00 665.00 0.00 667.00
```

The .dat file – IP data

```
1 General array with IP Comment/title line
2 1.0 Unit electrode distance
3 11 Array type
4 0 Array sub-type
5 Type of measurement (0=app. resistivity,1=resistance) Header
6 0 Measurement type indication
7 228 Number of data points
8 1 Format of x-coordinates (0 or 1 for true horizontal distances)
9 1 Flag for IP data
10 Chargeability Type of IP data
11 mV/V IP data unit
12 0.0,1.0 Delay, Integration time
13 4 1.00 0.00 0.00 0.00 2.00 0.00 3.00 0.00 13.301 12.5858
14 4 2.00 0.00 1.00 0.00 3.00 0.00 4.00 0.00 13.298 12.5886
15 4 3.00 0.00 2.00 0.00 4.00 0.00 5.00 0.00 13.297 12.5867
16 4 4.00 0.00 3.00 0.00 5.00 0.00 6.00 0.00 13.297 12.5917
17 4 5.00 0.00 4.00 0.00 6.00 0.00 7.00 0.00 13.297 12.5953
18 4 6.00 0.00 5.00 0.00 7.00 0.00 8.00 0.00 13.297 12.6043
19 4 7.00 0.00 6.00 0.00 8.00 0.00 9.00 0.00 13.299 12.6218
20 4 8.00 0.00 7.00 0.00 9.00 0.00 10.00 0.00 13.302 12.6501
21 4 9.00 0.00 8.00 0.00 10.00 0.00 11.00 0.00 13.307 12.6990
22 4 10.00 0.00 9.00 0.00 11.00 0.00 12.00 0.00 13.317 12.7835
23 4 11.00 0.00 10.00 0.00 12.00 0.00 13.00 0.00 13.336 12.9266
24 4 12.00 0.00 11.00 0.00 13.00 0.00 14.00 0.00 13.375 13.1871
25 4 13.00 0.00 12.00 0.00 14.00 0.00 15.00 0.00 13.458 13.7017
26 4 14.00 0.00 13.00 0.00 15.00 0.00 16.00 0.00 13.665 14.8151
27 4 15.00 0.00 14.00 0.00 16.00 0.00 17.00 0.00 14.107 16.9138
28 4 16.00 0.00 15.00 0.00 17.00 0.00 18.00 0.00 12.544 9.5202
29 4 17.00 0.00 16.00 0.00 18.00 0.00 19.00 0.00 10.183 -1.7850
30 4 18.00 0.00 17.00 0.00 19.00 0.00 20.00 0.00 9.640 -2.2646
31 4 19.00 0.00 18.00 0.00 20.00 0.00 21.00 0.00 9.881 -1.0075
32 4 20.00 0.00 19.00 0.00 21.00 0.00 22.00 0.00 10.011 -0.8956
33 4 21.00 0.00 20.00 0.00 22.00 0.00 23.00 0.00 10.181 -1.8721
34 4 22.00 0.00 21.00 0.00 23.00 0.00 24.00 0.00 10.565 -4.4820
35 4 23.00 0.00 22.00 0.00 24.00 0.00 25.00 0.00 10.887
```

IP data

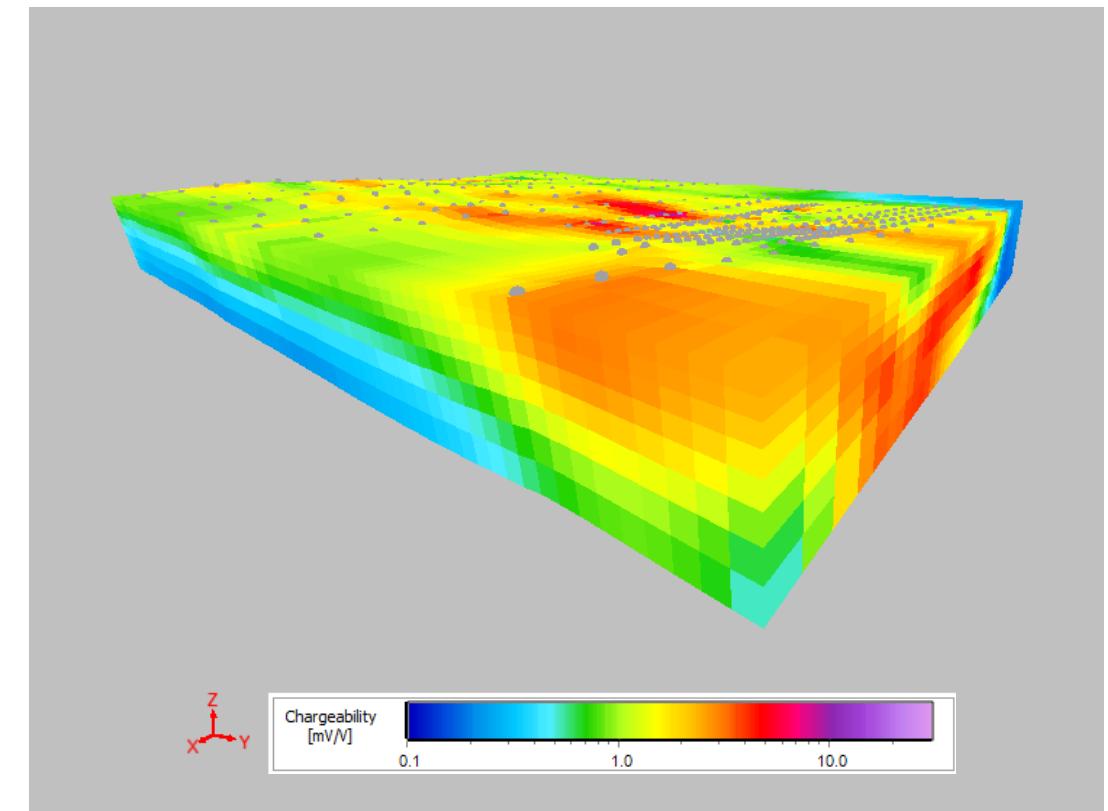
The .dat file – extra options

```
794 4      235.00    4.82     355.00    7.41     305.00    8.33     315.00    8.44     138.0700 } Last 4 data lines, or topography section
795 4      235.00    4.82     355.00    7.41     315.00    8.44     325.00    8.28     134.3600
796 4      235.00    4.82     355.00    7.41     325.00    8.28     335.00    8.00     138.9900
797 4      235.00    4.82     355.00    7.41     335.00    8.00     345.00    7.72     138.6200
798 0
799 Global Coordinates present } Header lines
800 Number of coordinate points
801 17 Number of corrdinate points
802 Local Longitude Latitude Header line
803 85.00   572088.12  6222426.57 X-coordinate along profile, Longitude/UTMX, Latitude/UTMY
804 90.00   572088.28  6222421.58
805 110.00  572088.91  6222401.60
806 115.00  572089.07  6222396.61
807 120.00  572089.23  6222391.62
808 125.00  572089.39  6222386.66
809 160.00  572090.50  6222351.66
810 165.00  572090.66  6222346.67
811 170.00  572090.82  6222341.68
812 175.00  572090.98  6222336.68
813 200.00  572091.77  6222311.72
814 205.00  572091.93  6222306.74
815 250.00  572093.36  6222261.85
816 255.00  572093.52  6222256.88
817 260.00  572093.67  6222251.91
818 325.00  572098.11  6222187.28
819 355.00  572100.26  6222157.44
820 0 End of file
```

Res2DInv live demo!

Res3DInv vs Res2DInv

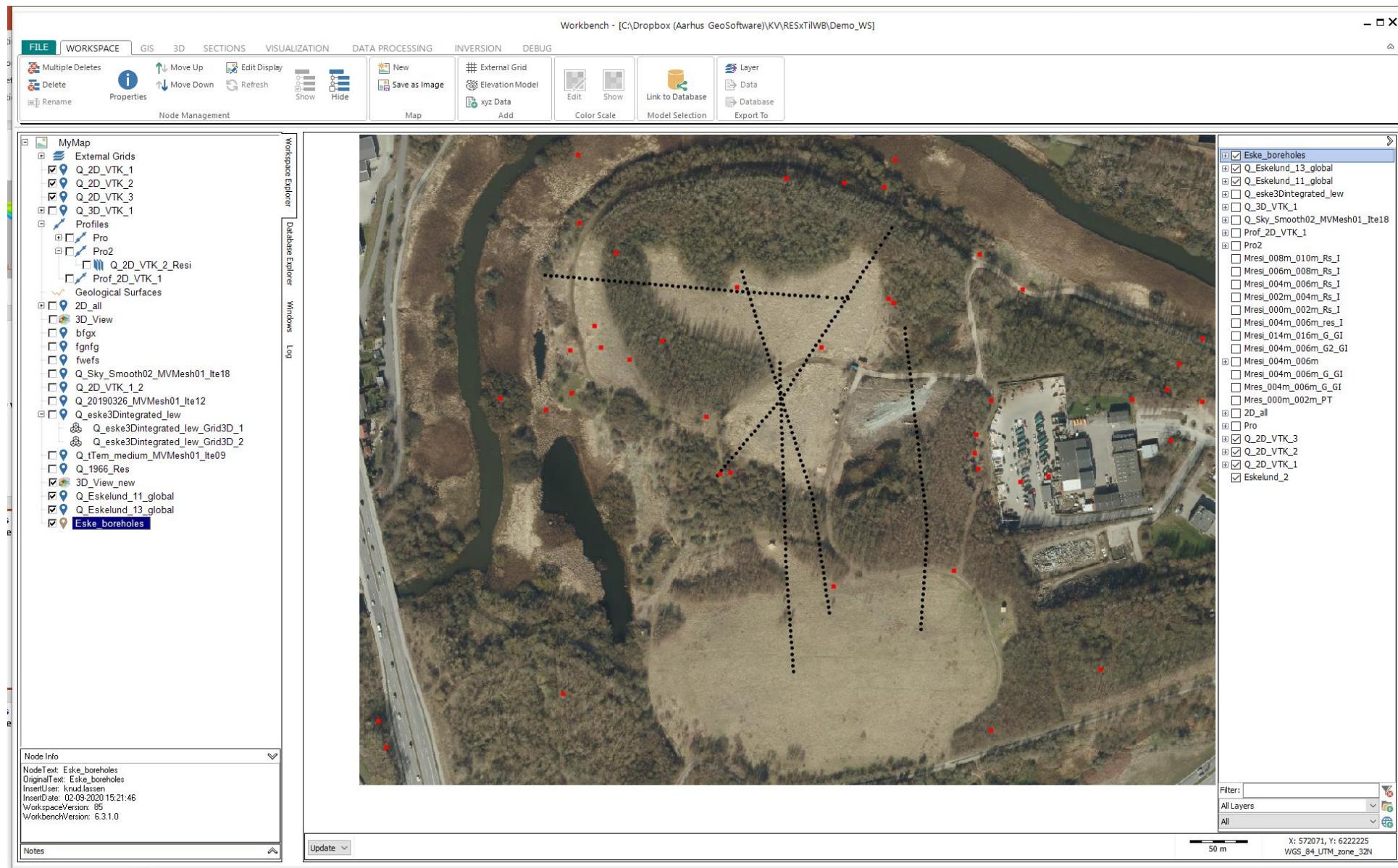
- More complex than Res2DInv because everything is 3D
- Inversion settings and running inversions very similar
- Much more computationally demanding
- Data format is simpler in some ways and more complex in others



Live demo of Res3DInv with 3D viewer!

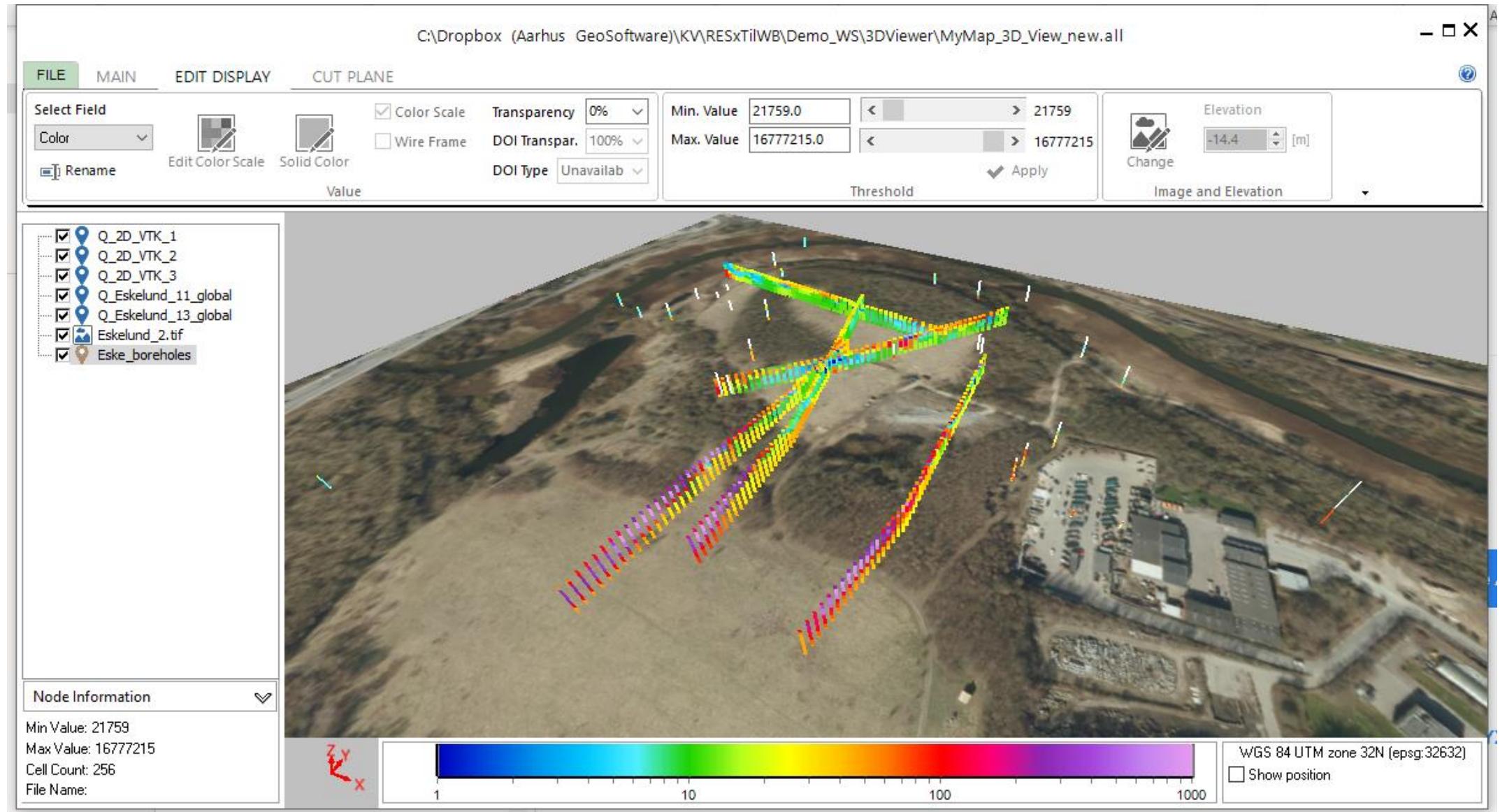
Extra option: Aarhus Workbench Essentials

Overview of all inversion results on GIS interface



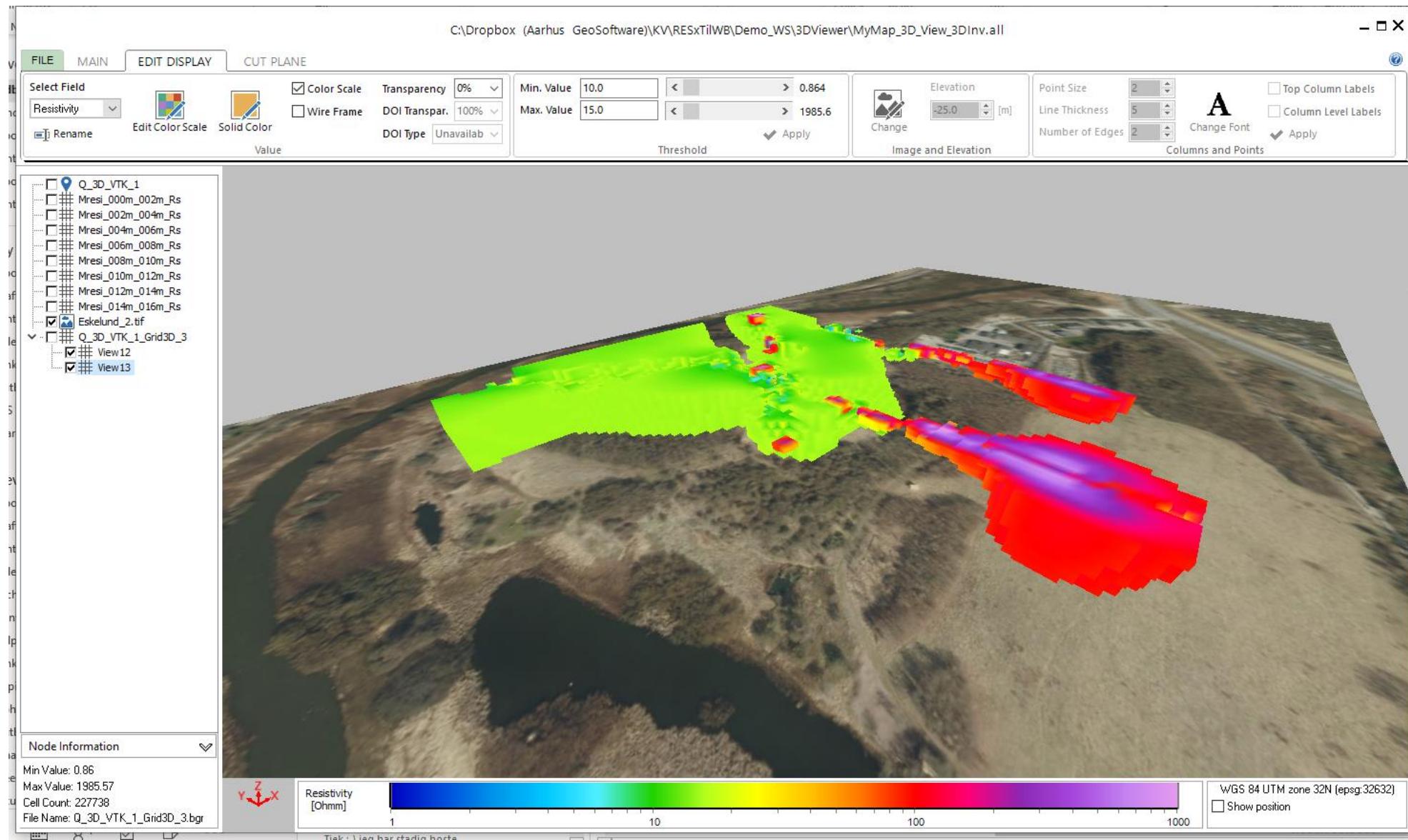
Extra option: Aarhus Workbench Essentials

Advanced 3D Views



Extra option: Aarhus Workbench Essentials

Advanced 3D Views



Extra option: Aarhus Workbench Essentials

Automatic generation of PDF reports

The screenshot displays the Aarhus Workbench Essentials Report Editor interface. At the top, there is a toolbar with various icons for file operations (Save, Load, Print, Page, All Pages, Preview), navigation (Previous, Next), and report editing (New, Copy, Delete, Increase, Decrease, Reset). Below the toolbar, the main area contains several sections:

- Profile Name:** Set to "Pro".
Axis Min/Max Mode: "As defined on profil".
X-Axis Scale 1: 20000.0, X Min: 0.00, Y Min: 0.00.
Vertical Exaggeration 1: 3.0, X Max: 0.00, Y Max: 0.00.
- Profile Name:** Set to "Pro2".
Axis Min/Max Mode: "As defined on profil".
X-Axis Scale 1: 20000.0, X Min: 0.00, Y Min: 0.00.
Vertical Exaggeration 1: 3.0, X Max: 0.00, Y Max: 0.00.
- Text:** Project Title: "Project Title".
- Text:** Cross Sections with 1D Modelbars: "Cross Sections with 1D Modelbars".
- Text:** Profile Location: "Profile Location".
- Workbench Map:** MyMap, Map Center (X,Y): 572071.6, 6222320.4, Rotation: 0.0, Map Scale: 1: 10 000, Map Layers: Show Axes, Show Grid.
- Text:** Profile Name: "Profile Name".
- Text:** Profile Name: "Profile Name".

To the right of the editor window, there is a larger panel displaying two cross-section plots. The top plot is labeled "Profile Name" and shows a vertical exaggeration of the terrain. The bottom plot is also labeled "Profile Name" and shows another view of the terrain. On the far right of this panel, there is a "Profile Locations" section with a small thumbnail image of a map.

Further reading

- Res2DInv and Res3DInv manuals <https://ags-cloud.dk/AGS/Geotomo%20Manuals/>
- Dr. M. H. Lokes electrical survey course notes http://www.agc-cloud.dk/Wiki/W_GeotomoNotes
- Workflow guides for Arhus Workbench http://www.agc-cloud.dk/Wiki/W_GeotomoGuides

Questions?