NGU Report 2010.047

Resistivity modelling for clay layer characterisation, possibilities and limitations

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REPORT

Report no.: 2010.047		Grading: Open

Title:
Resistivity modelling for clay layer characterisation, possibilities and limitations

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County:	Commune:
Map-sheet name (M=1:250.000)	Map-sheet no. and -name (M=1:50.000)
Deposit name and grid-reference:	Number of pages: 319 Price (NOK): 1500,-

Fieldwork carried out:	Date of report: 23.12.2010	Project no.: 323800 REMA	Person responsible: Guri V. Ganerød

Summary:

Quick clay plays an important role in Norway due to the occurrence of several landslides that caused severe damage. Hence, it is of high importance to understand the properties of quick clay and locate it in the subsurface.

In this report, 2D resistivity modelling was done in order to study the possibilities and limitations of mapping quick clay and other material. Models of different horizontal layers, dipping interfaces and lenses were analysed. The following configurations were used for the modelling: Dipole-dipole, Gradient, Pole-dipole and Wenner. The forward modelling was done with RES2DMOD whereas the inversion was performed with RES2DINV. The protocol files that were used for the forward modelling simulate the measuring procedure in the field with an ABEM Lund system which is based on a layout of 4 cables with total 81 electrode positions. Smooth and robust inversion was carried out for all the models in order to compare the different responses. Additionally, vertical/horizontal filter values of 1 and 0.5 were tested and the effect on the inversion models analysed. Results from some models are presented with two colour scales to enhance different conditions.

In general, the smooth inversion is better for detecting quick clay in a low resistivity environment. However, if bedrock is present with higher and sharper contrasts, robust inversion can improve the mapping of bedrock. Mostly a vertical/horizontal filter of 0.5 showed slightly better results, since a lot of models tend to have horizontal formations and therefore a filter value of 0.5 aligns the structures more along the horizontal axis.

Keywords: Geophysics (Geofysikk)	Quick clay (Kvikkleire)	Modelling (Modellering)
Resistivity (Resistivitet)	Syntethic models (Syntetiske modeller)	
		Scientific report (Fagrapport)

CONTENT

1. INTRODUCTION

Quick clay is an important issue in Norway because it has lead to several landslides which caused severe damage. It is very important to examine the properties of quick clay and find ways to locate it in the subsurface. With identifying quick clay, possible landslides can be recognised in advance and reasonable precautions can be taken. During the glaciation and deglaciation in Norway large amounts of clay and other sediments were deposited in the sea. The retreat of glaciers resulted in an isostatic uplift and marine clay was raised above sea level. Consequently, the marine clay was exposed to fresh groundwater and therefore leaching of salt. If the salt is washed out, the structure of the clay may be instable and additional pressure causing remoulding of the clay (e.g. earthquakes, erosion, human impact) can result in a collapse of the structure. The clay liquefies and destructive landslides can occur. Norway is very prone to these landslides and it is therefore particularly important to be able to locate possible quick-clay areas.

Promising results to map quick clay in the subsurface were achieved with the direct current resistivity method (Solberg, et al. 2008). It is a good tool to distinguish between possible quick clay and non quick clay due to different resistivity values of quick clay and clay with high pore-water salt content. Unleached marine clay is assumed to have a resistivity of 1-10 Ωm, whereas possible quick clay is more resistive since the salt has been washed out, and shows resistivity values of 10-100 Ωm (Solberg et al. in press).

2D resistivity modelling is done in this work to examine the possibilities and limitations of imaging various types of clay and other geological material in the subsurface. Quick clay is represented as either 30 Ωm, 50 Ωm or 80 Ωm, whereas unleached clay corresponds to 1 Ωm or 5 Ωm. Models of horizontal layers, dipping layers and lenses are created and the responses analysed. Different electrode configurations can be used for mapping the subsurface, and each one of them has its own advantages and drawbacks. In this work, results from Dipole-dipole, Gradient, Pole-dipole and Wenner electrode configurations were studied.

It is of high importance to choose the right array for a survey, since they can all have fairly different responses depending on the feature present in the subsurface. To save labour costs in the field, it is a good alternative to create synthetic data, do the inversion and analyse the results. In this way, it is possible to become more confident in choosing the optimal array in different geological situations, and to learn more about the possibilities and the limitations connected to the 2D resistivity method.

The forward modelling was done using the program RES2DMOD version 3.01.63 (Loke 2002) for creating synthetic data. To simulate measured data, 5 % random noise was added and these data were subsequently inverted using RES2DINV version 3.56 (Loke 2008). The electrode spacing was chosen to be 5 m and the length of the 2D line was 400 m. For the inversion the standard least-squares constraint was used which minimises the square of the difference between the measured and calculated apparent resistivity. Additionally, robust inversion was performed in order to study the different responses from smooth and robust inversions. The robust inversion code tends to give sharp interface between different regions, and the resistivity within each region is almost constant (Loke 2008). The effect of choosing different values for the vertical/horizontal filter was also examined. The vertical/horizontal filter values were chosen to be 1 and 0.5, where 0.5 emphases the horizontal structures.

2. ELECTRODE CONFIGURATIONS

The responses from Dipole-dipole, Gradient, Pole-dipole and Wenner electrode configurations were examined. The different configurations can be seen in Figure 3.1. A current is applied and the potential difference between two electrodes can be measured. The altered electrode positions give rise to different current flow and hence lead to different responses. To get information about deeper regions, the distance between the electrodes is increased to force the current to flow deeper.

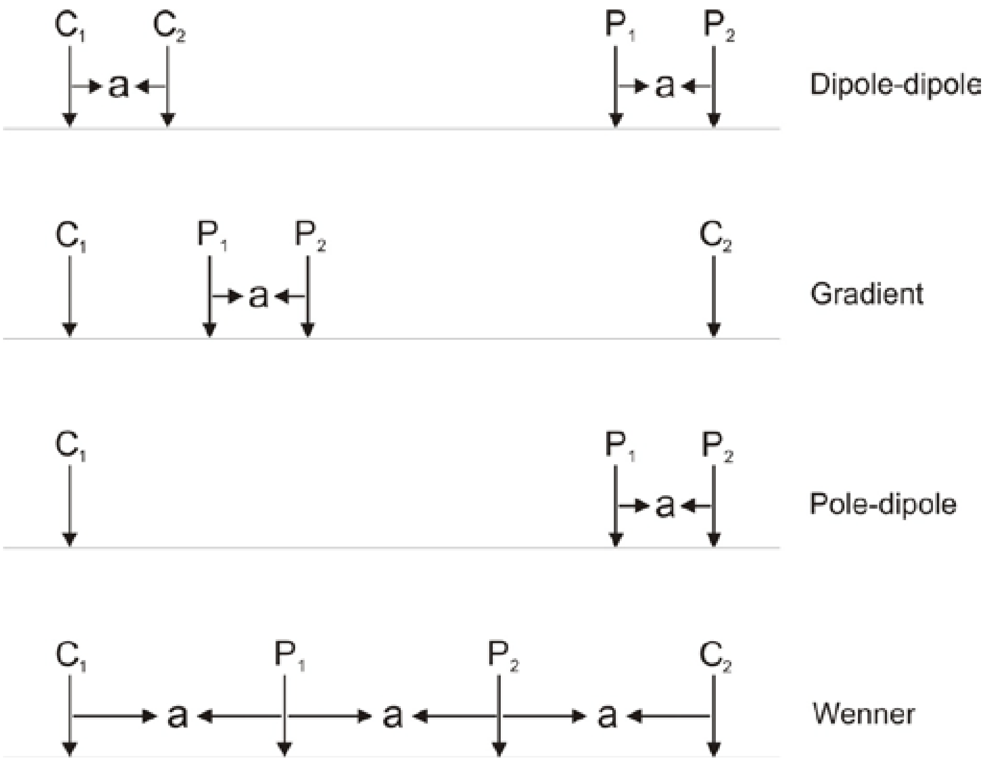

Figure 3.1.: The electrode configurations used in the modelling. C is a current electrode and P a potential electrode (M. Loke 2002).

Every single electrode configuration has its own advantages and disadvantages (Reynolds 1997). The different way of measuring leads to dissimilar responses depending also on the feature present in the subsurface.

Dipole-dipole performs depth sounding in the way that the distance “a” normally is kept constant whereas the distance between the pairs of potential electrodes and current electrodes is increased. As the distance enlarges, the current is forced to flow deeper and hence reveals more information about lower regions. To increase data quality, also the distance "a" has to be increased.

For the Gradient configuration, the potential electrodes are moved along the line between the current electrodes with a constant separation. To get information about the deeper subsurface, the distance between the current electrodes is increased.

The Pole-dipole configuration, which uses one “far away” current electrode, has a fixed distance between the potential electrodes. The depth sounding is carried out in that the distance between the current electrode and the potential electrodes is gradually increased.

Wenner shows a constant distance between all the electrodes. For a higher penetration depth the distance “a” has to be increased progressively. As a result, the current and the potential electrodes have to be changed for each measurement.

Data about each electrode configuration are shown in table 1.

Table 1: Technical data and names of protocol files for the forward modelling (provided by Thorleif Dahlin).

Electrode configuration	No. of data points	No. of data lines in pseudosection	Name of protocol files for the modelling
Dipole-dipole	1417	12	DipoleDipole4LS_5m
Gradient	1416	11	Grad4XLS8plus_5m
Pole-dipole	1968	18	POLDIP4LSplus_5m
Wenner	445	13	Wenner_XLS_5m

The modelling was done with the same electrode configurations as used in the field measurements. Herewith, overestimation of the possibilities with the method can be avoided. The modelling simulates the measuring procedure used with an ABEM Lund System (Dahlin 1993) which is based on a layout of 4 cables with total 81 electrode positions. To cover an extended 2D line, the first cable can be moved to the end and lateral profiling can be achieved. The measuring procedure can be seen in Figure 2.1. Lateral information in two dimensions is achieved letting the soundings described above roll along the cable spread (Figure 2.2).

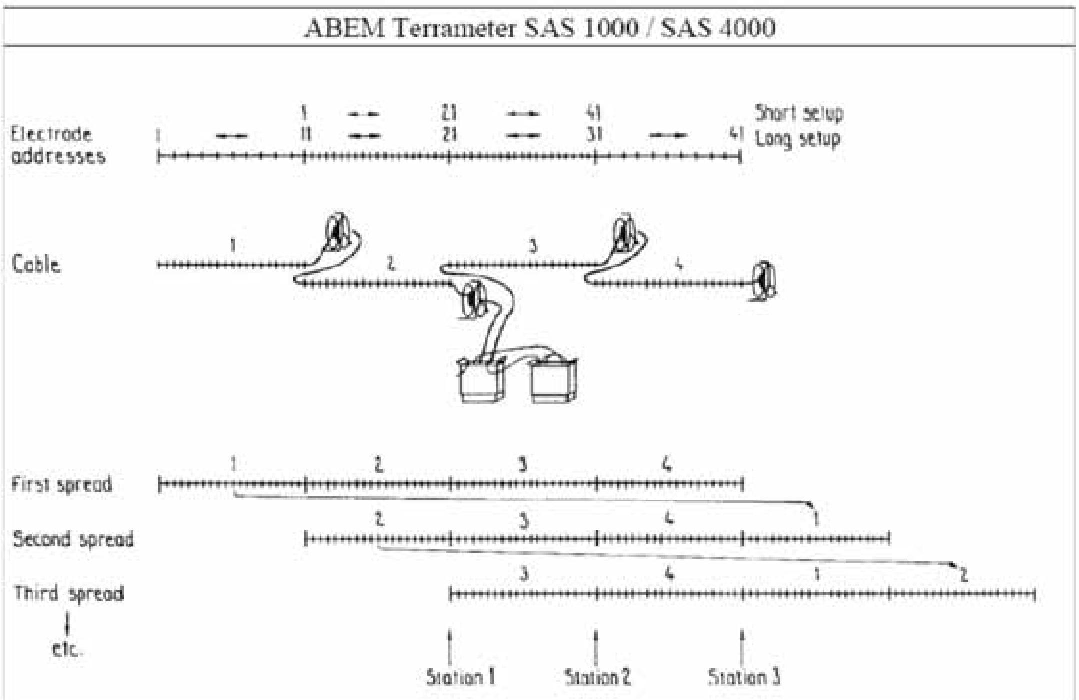

Figure 2.1: Measuring procedure in the field using 4 cables in a spread (From Dahlin 1993).

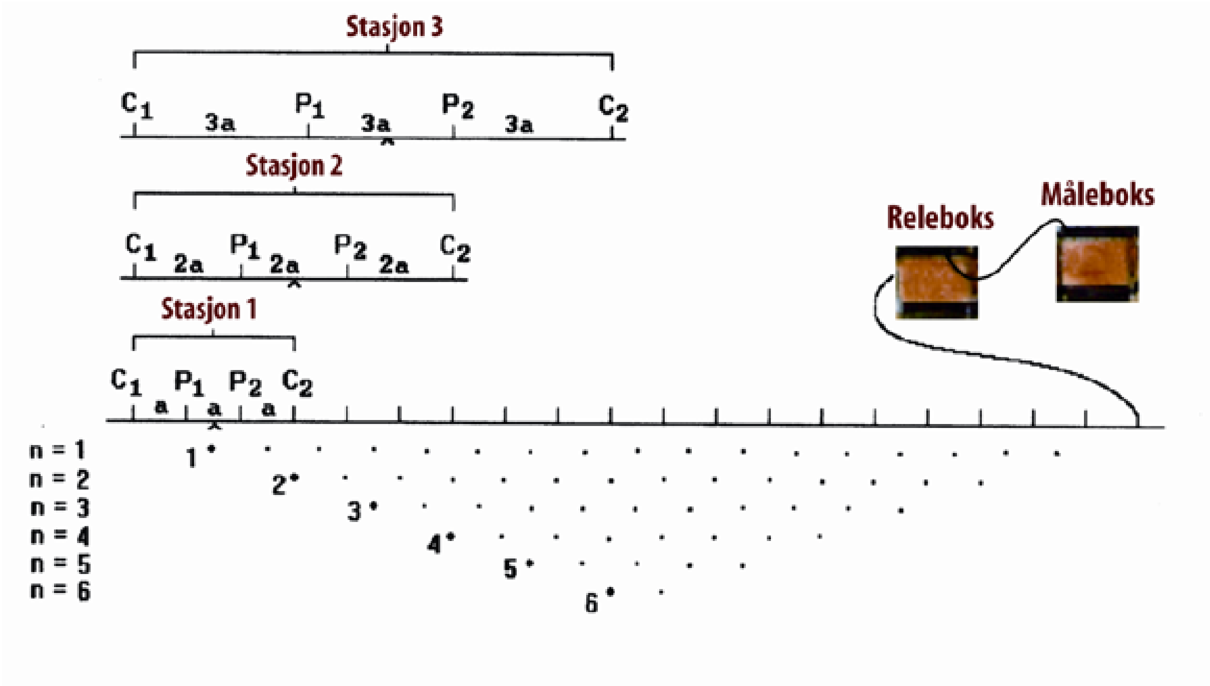

Figure 2.2: Roll along principle with the Wenner electrode configuration (After Barker 1992).

3. MODELLING RESULTS

Table 2 shows the resistivity values used in the models, and what material they may represent.

Table 2: Resistivity values used in the models, and what material they may represent.

Resistivity value	Material
1 Ωm 5 Ωm	Unleached marine clay
30 Ωm 50 Ωm 80 Ωm	Leached clay, possible quick
100 Ωm 150 Ωm	Dry crust clay
200 Ωm	Dry clay, clay-slide deposits
300 Ωm 500 Ωm 800 Ωm	Coarse material (sand and/or gravel)
5000 Ωm	Bedrock

3.1 Horizontal layers

Model description

Several models with horizontal layers of different resistivities were created. The aim was to check if horizontal layers of quick clay and non quick clay can be distinguished. The possible quick clay is represented as 30 Ωm or 80 Ωm and the unleached clay as 1 Ωm or 5 Ωm. For most of the models a top layer of 100-150 Ωm was added, since one often encounters such a layer in the field due to weathering and drying-out processes. Layers of 300 Ωm, 500 Ωm or 800 Ωm may represent coarse material like sand and/or gravel.

Modelling Results

It is possible to differentiate between possible quick clay and unleached clay if the layers have a certain thickness, such as about 10-15 m (Figures 3.1.13 – 3.1.20, 3.1.33 – 3.1.40). The thickness and resistivity values are very accurate in this case. However, if the layers decrease in thickness, they cannot be resolved in great detail, which means that the true thickness and resistivity values cannot be recovered (Figures 3.1.1 – 3.1.12, 3.1.21 – 3.1.32).

If there are alternated beddings present in the subsurface, it is hard to see the alternation in the inversion model. Mostly, only the first two layers can be detected (Figures 3.1.69 – 3.1.92). In the case where 1 m thick alternating layers are present, the inversion models display an intermediate resistivity and no alternating layers (Figures 3.1.93 – 3.1.100).

The different configurations are quite equally qualified for mapping horizontal quick clay and non quick clay layers. In some cases Pole-dipole seems to show the less accurate results (Figures, 3.1.33 – 3.1.40, 3.1.69 – 3.1.92).

Generally, robust inversion produces less accurate models than smooth inversion, especially when the layers are thin. Additionally, if there are many layers present, the robust inversion tends to overlook an intermediate layer (Figures 3.1.49 – 3.1.52, principle of suppression, Raynolds 1997). The worse resolution with robust inversion is probably the effect of low resistivity contrast. In cases where bedrock of 5000 Ωm is present in the subsurface, the robust inversion shows better results to map this interface than smooth inversion since the contrast is high.

A vertical filter of 0.5 slightly improves the image capability, since the horizontal layers get more compressed along the horizontal axis and the interfaces experience less curvature.

Summary

The difference between possible quick clay and unleached clay is very accurate if the layers have a thickness of about 10-15 m. As the thickness decreases, the resolution gets worse and the true resistivity values cannot be recovered. Alternated beddings are difficult to display and only the top few layers or an intermediate resistivity is displayed. Generally, all configurations are suitable for mapping horizontal clay layers, apart from Pole-dipole that shows in some cases a worse response. Smooth inversion with horizontal filter of 0.5 resulted in the most accurate inversion models.

3.2 Dipping interfaces

Model description

Inversion models with dipping interfaces and different contrasts were produced and analysed. Mostly three different resistivities are present in the model and it is examined whether the true resistivity can be recovered and the interfaces displayed.

Possible quick clay is represented as 30 Ωm or 50 Ωm and unleached clay as 1 Ωm or 5 Ωm. For most of the models a top layer of 100-150 Ωm was added to simulate field conditions.

Modelling results

Above bedrock of 5000 Ωm, two different contrasts are mapped, such as 30 Ωm, 300 Ωm and 50 Ωm, 800 Ωm. If the dipping interface extends to the surface, the three different resistivities and the right interface in between can be mapped highly accurate (Figures 3.2.1 – 3.2.24). However, if the dipping interface does not continue to the surface, it is not possible to image the 300 Ωm layer (Figures 3.2.25 – 3.2.32). This effect can also be seen for 50 Ωm and 800 Ωm (Figures 3.2.41 – 3.2.48). Additionally, it is already troublesome to distinguish between 800 Ωm and 5000 Ωm, even though the dipping interface continues to the top (Figures 3.2.33 – 3.2.40). This might be the effect of the smaller contrast between 800 Ωm and 5000 Ωm.
Resistivity of 30 Ωm, 5 Ωm and 1 Ωm can be distinguished; however, the shape of the interface between 1 Ωm and the close-by resistivity is not straight but rather curved (Figures 3.2.49 – 3.2.52).

There was not an outstanding difference of the image capability for the different arrays.
For dipping interfaces, robust inversion yields worse results than smooth inversion, since the robust inversion shows rather a staircase-shaped interface instead of a continuous dipping interface. However, for the imaging of the bedrock interface, the robust inversion shows better results. Also a vertical/horizontal filter of 0.5 increases the resolution of the bedrock, since the interface can be mapped more to its true horizontal structure.

Summary

Interfaces between 30 Ωm, 300 Ωm and 5000 Ωm can be mapped quite accurately if the interface continues to the surface. If the interface does not continue, or the contrasts get smaller, the image capability decreases and the true resistivity cannot be resolved. The resolution of the different configurations is very similar. Best results were achieved with smooth inversion, where the dip can be mapped very accurately. A V/H filter of 0.5 increased the accuracy of the bedrock interface.

3.3 Lenses

Model description

In the field one can encounter lenses with a certain resistivity. The aim of this part is therefore to create lenses with different resistivities and contrasts and analyse how well they can be imaged with the direct current resistivity method. It is often the question how big such a lens has to be in order to be seen. Additionally, the depth of the lens plays an important role regarding the resolution. Hence, different sizes and different locations are used to examine the ability of imaging lenses in the subsurface.

Modelling results

A large quick clay lens (30 Ωm) in a surrounding of unleached clay (1 Ωm) can be mapped quite accurately regarding the resistivity and the position. Since the lens is quite big, it is hard to image the lower interface of the lens (Figures 3.3.1 – 3.3.4). For a lens of 1Ωm in quick clay surrounding (30 Ωm), it is easier to map the bottom of the interface (Figures 3.3.5 – 3.3.8).

Lenses with various contrasts and two different sizes were imaged which can be seen in Figures 3.3.13 – 3.3.44. A size of 90 m x 24 m in a depth of ~25 m can be mapped highly accurate regarding shape and resistivity. Even a lens with the size of 30 m x 12 m in a depth of ~15 m can be displayed quite exactly.

Smaller lenses with resistivity of 200 Ωm, 800 Ωm and 5000 Ωm were tested in a surrounding of 50 Ωm in about 20 m depth (Figures 3.3.45 – 3.3.68). The lens with dimensions of 20 m x 10 m can be seen, however, the size cannot be determined very exactly from the inversion models. Additionally, the different resistivities (200 Ωm, 800 Ωm, 5000 Ωm) give all similar results and hence cannot be distinguished. A lens of 15 m x 6 m in a depth of ~20 m can hardly be detected. For the models with a 10 m thick 200 Ωm layer at the top, the location of the lens gets even more troublesome (Figures 3.3.69 – 3.3.92).

The robust inversion generally shows worse results, partly due to the square shaped lenses instead of round lenses. Additionally it is assumed that the change in resistivity is rather gradual, so the robust inversion results in too sharp interfaces. Mostly the V/H filter value 0.5 yields better results due to the rather flat shape of the lenses.

Summary

Lenses can be mapped quite accurately in case they have a certain size. If the size is smaller than 20 m x 10 m and the depth greater than 20 m, it is troublesome to recover the true shape and resistivity of the lens. Normally, robust inversion shows worse results, since the resistivities are expected to have a gradual change with no sharp interfaces. A V/H filer of 0.5 shows slightly a better result, since in most of the models have rather flat-shaped lenses.

3.4 Special models

Model description

Models with dipping interfaces between resistivities of 50 Ωm and 5000 Ωm are created, partly with additional clay lenses of 5 Ωm. For some models, a resistivity of 800 Ωm is added above 5000 Ωm in order to check if this layer can be distinguished from bedrock.

Modelling results

The bedrock of 5000 Ωm can be mapped highly accurate if the dip is moderate and runs along the whole profile (Figures 3.4.1 – 3.4.8). The clay lens is mapped fairly precise as well and has no influence on the image capability of the bedrock, probably since the location is on the side (Figures 3.4.9 – 3.4.16).

A larger dip is analysed in the next models. Due to the steeper angle, the bedrock is present only on the side of the profile (3.4.17 – 3.4.24). Pole-dipole can image the bedrock in the best way, since there are more data points available on the edge of the profile. For the models where an additional 800 Ωm layer is added above the bedrock, it is hard to differ between 5000 Ωm and 800 Ωm in the inversion models (Figures 3.4.33 – 3.4.40). The interface between these two resistivities is gradual and the difference between models 3.4.17 – 3.4.24 and 3.4.33 – 3.4.40 is only minor.

The robust inversion shows better results for mapping the interface of 5000 Ωm bedrock, since the contrast is quite high. In cases where 800 Ωm is added, robust inversion is slightly worse. Additionally it doesn't image the dip in the proper shape, since it rather results in a staircase-shaped interface. Between the filter values of 1 and 0.5 it is hardly any difference recognisable, so they are equally appropriate.

Summary

Dipping bedrock of 5000 Ωm can be imaged quite accurately if situated below 50 Ωm. However, if an additional layer of 800 Ωm is added above bedrock, it is troublesome to see the interface between 5000 Ωm and 800 Ωm. Therefore, it is not possible to assess if there is only a 5000 Ωm layer present or an additional 800 Ωm. Robust inversion shows better results for mapping the 5000 Ωm interface. However, if 800 Ωm is present, it shows rather worse results, since the resistivity increase is not sharp enough (principle of suppression, Reynold 1997) . The filter values of 1 and 0.5 depict fairly equal results.

4. CONCLUSIONS

2D resistivity imaging is a very effective tool for detecting possible quick clay structures in the subsurface. The ability to map quick clay with electrical resistivity depends on contrast, size and depth of the features, and this can be assessed using forward modelling followed by inversion.

Horizontal layers of quick clay can be imaged highly accurate if they have a thickness of about 10-15 m. As the thickness decreases, the resolution gets worse and the resistivity value is hard to estimate in a confident way.

Dipping and horizontal interfaces between 30 Ωm, 300 Ωm and 5000 Ωm can be mapped quite accurately if the interface continues to the surface. If the interface does not reach the surface or the contrasts get smaller, the image capability decreases and the true resistivity cannot be resolved.

Lenses can be mapped quite accurately unless they reach a limited size. If the dimensions are smaller than 20 m x 10 m and the depth greater than 20 m, it is troublesome to recover the true shape and resistivity of the lens.

Dipping bedrock of 5000 Ωm can be imaged quite accurately if situated below 50 Ωm. However, if an additional layer of 800 Ωm is added above bedrock, it is troublesome to detect the interface between 5000 Ωm and 800 Ωm.

Generally smooth inversion shows better results, since between quick clay and unleached clay a rather gradual change in resistivity is assumed. Additionally it is better for recovering the true shape of a dipping layer and round lenses. However, in some cases, robust inversion shows better results for mapping the 5000 Ωm interface, due to a larger contrast.

Between the vertical/horizontal filter values, there is only a minimal difference noticeable in the inversion models. In most of the cases, the filter value of 0.5 increases the resolution slightly, since most of the models have rather horizontal than vertical structures.

5. REFERENCES

Dahlin, T. 1993: On the Automation of 2D Resistivity Surveying for Engineering and Environmental Applications. Dr. Thesis. Department of Engineering Geology, Lund Institute of Technology, Lund University. ISBN 91-628-1032-4.

Barker, R. 1992: A simple algorithm for electrical imaging of the subsurface. First Break Vol. 10,No.2, pp 53-62.

Loke, M.H. 2002: RES2DMOD Geoelectrical Imaging 2D & 3D. Instruction Manual. http://www.geoelectrical.com.

Loke, M.H. 2008: RES2INV ver 3.56. Geoelectrical Imaging 2D & 3D. Instruction manual. http://www.geoelectrical.com.

Reynolds, J.M. 1997: An Introduction to Applied and Environmental Geophysics. Wiley & Sons.

Solberg, I.L., Hansen, L., Rønning, J.S., Haugen, E.D., Dalsegg, E. & Tønnesen, J.F. (in press): Combined geophysical and geotechnical approach for ground investigations and hazard zonation in a quick-clay area, Mid-Norway. Accepted for publication in Bulletin of Engineering Geology and the Environment.

Solberg, I.L., J.S. Rønning, E. Dalsegg, L. Hansen, K. Rokoengen, og R. Sandven 2008: Resistivity measurements as a tool for outlining quick-clay extent and valley-fill stratigraphy: a feasability study from buvika, central norway. Canadian Geotechnical Journal 45:210-255.

APPENDIX A - Modeling results. Horizontal layers

Figures 3.1.1 – 3.1.12:	Horizontal layers; 5 m, 2 m and 1 m (30 Ωm) in a depth of 14 m surrounded by 1 Ωm.
Figures 3.1.13 - 3.1.16:	Top layer (3m) of 100 Ωm overlaying horizontal layers of 30 Ωm and 1 Ωm.
Figures 3.1.17 – 3.1.20:	Horizontal layers of 300 Ωm, 30 Ωm and 1 Ωm.
Figures 3.1.21 – 3.1.32:	Horizontal 5 layers; 5 m, 2 m and 1 m thick zone of 300 Ωm in a depth of 10 m.
Figures 3.1.33 – 3.1.40:	Horizontal 3 layers; 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 5000 Ωm. Two different colour scales.
Figures 3.1.41 – 3.1.48:	Horizontal 4 layers; Top layer (150 Ωm) over horizontal layers of 30 Ωm, 300 Ωm and 5000 Ωm. Two different colour scales.
Figures 3.1.49 – 3.1.56:	Horizontal 5 layers; 3 m top layer (150 Ωm) over horizontal layers of 30 Ωm, 5 Ωm, 30 Ωm and 5000 Ωm. Two different colour scales.
Figures 3.1.57 – 3.1.60:	Horizontal 3 layers; 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm and 800 Ωm.
Figures 3.1.61 – 3.1.64:	Horizontal 3 layers; 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm and 5 Ωm.
Figures 3.1.65 – 3.1.68:	Horizontal 5 layers; 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm, 40 Ωm, 15 Ωm and 5 Ωm.
Figures 3.1.69 – 3.1.72:	Horizontal 8 layers; 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 1 Ωm as the bottom layer.
Figures 3.1.73 – 3.1.80:	Horizontal 8 layers; 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 5000 Ωm as the bottom layer. Two different colour scales.
Figures 3.1.81 – 3.1.84:	Horizontal 6 layers; 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 1 Ωm as the bottom layer.
Figures 3.1.85 – 3.1,92:	Horizontal 6 layers; 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 5000 Ωm as the bottom layer. Two different colour scales.
Figures 3.1.93- 3.1.96:	Horizontal 6 layers; 3 m top layer (150 Ωm) and 1 m thick horizontal layers of 500 Ωm and 50 Ωm between 30 Ωm.
Figures 3.1.97 – 3.1.100:	Horizontal layers; 3 m top layer (150 Ωm) and 1 m thick horizontal layers of 500 Ωm and 5 Ωm between 30 Ωm.

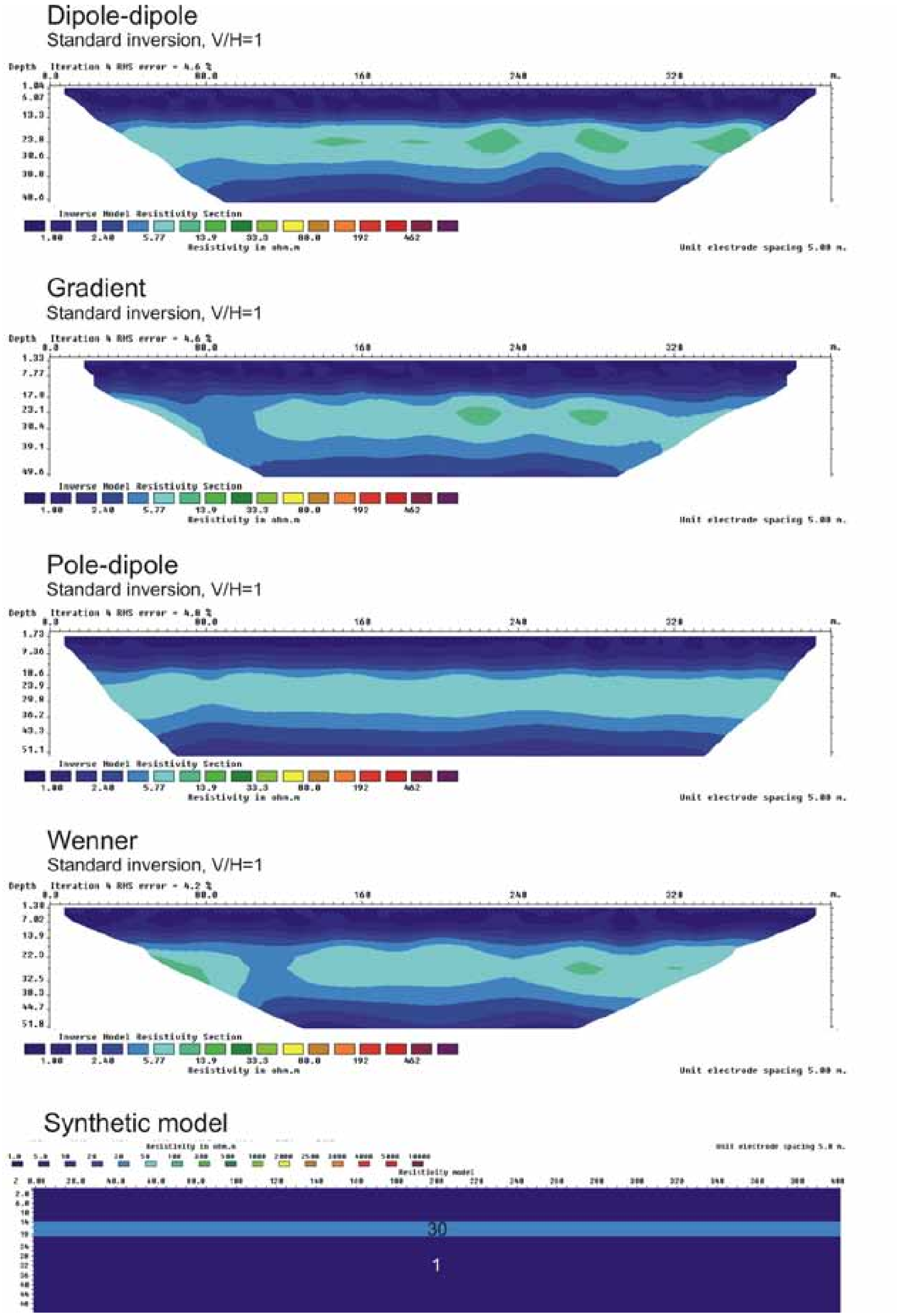

Figure 3.1.1: 5 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm. Standard inversion, VH=1

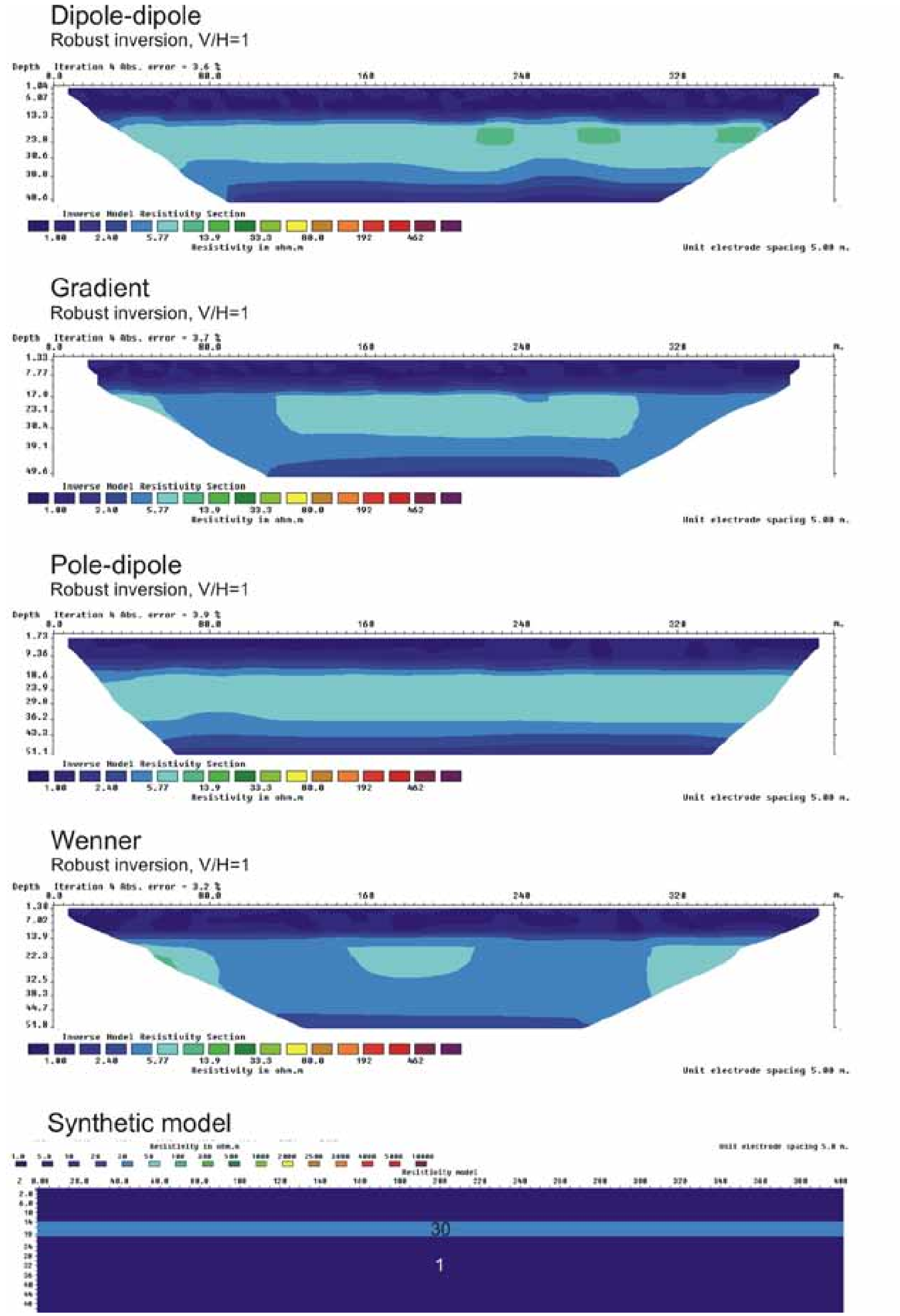

Figure 3.1.2: 5 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm.
Robust inversion, VH=1

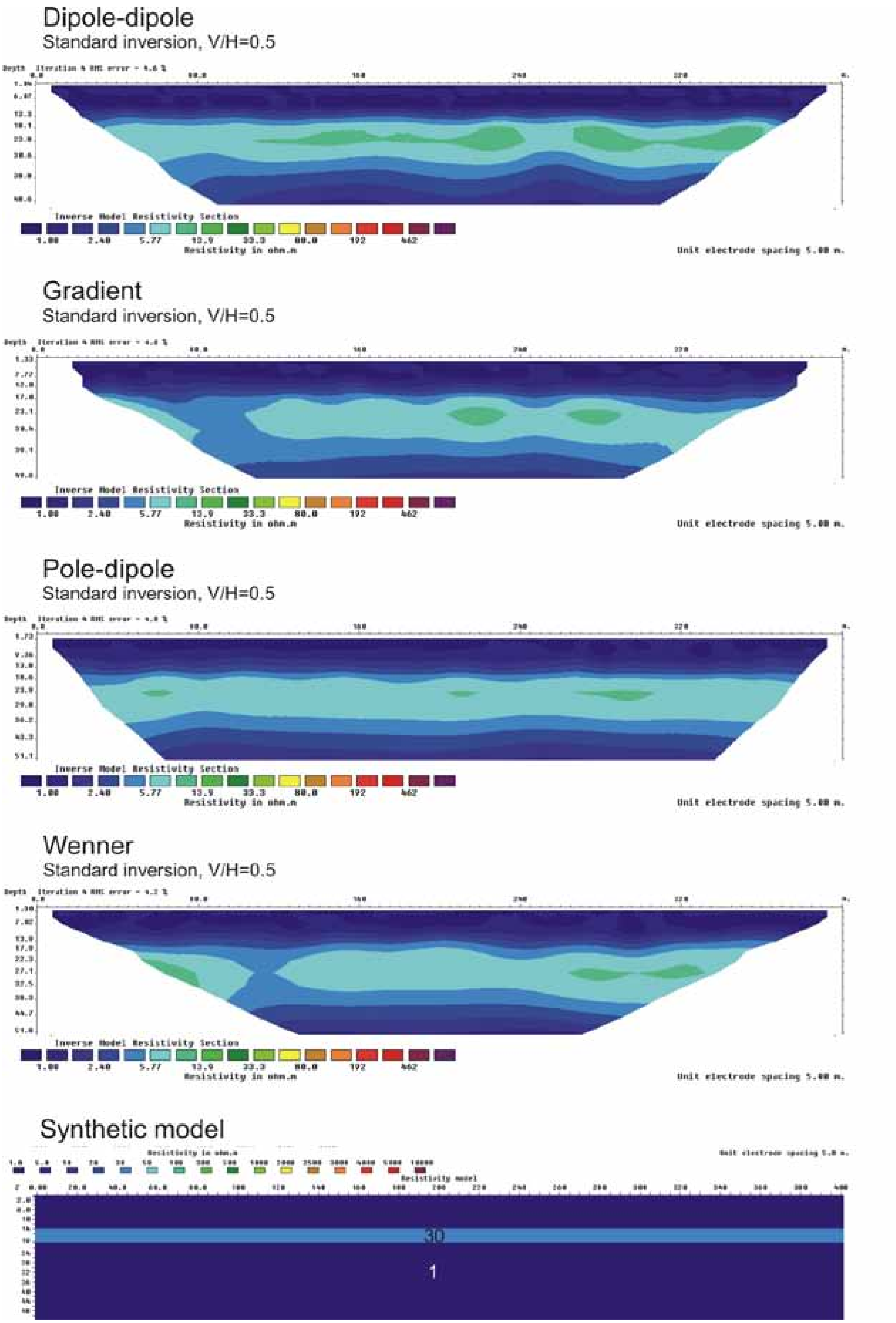

Figure 3.1.3: 5 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm. Standard inversion, VH=0.5

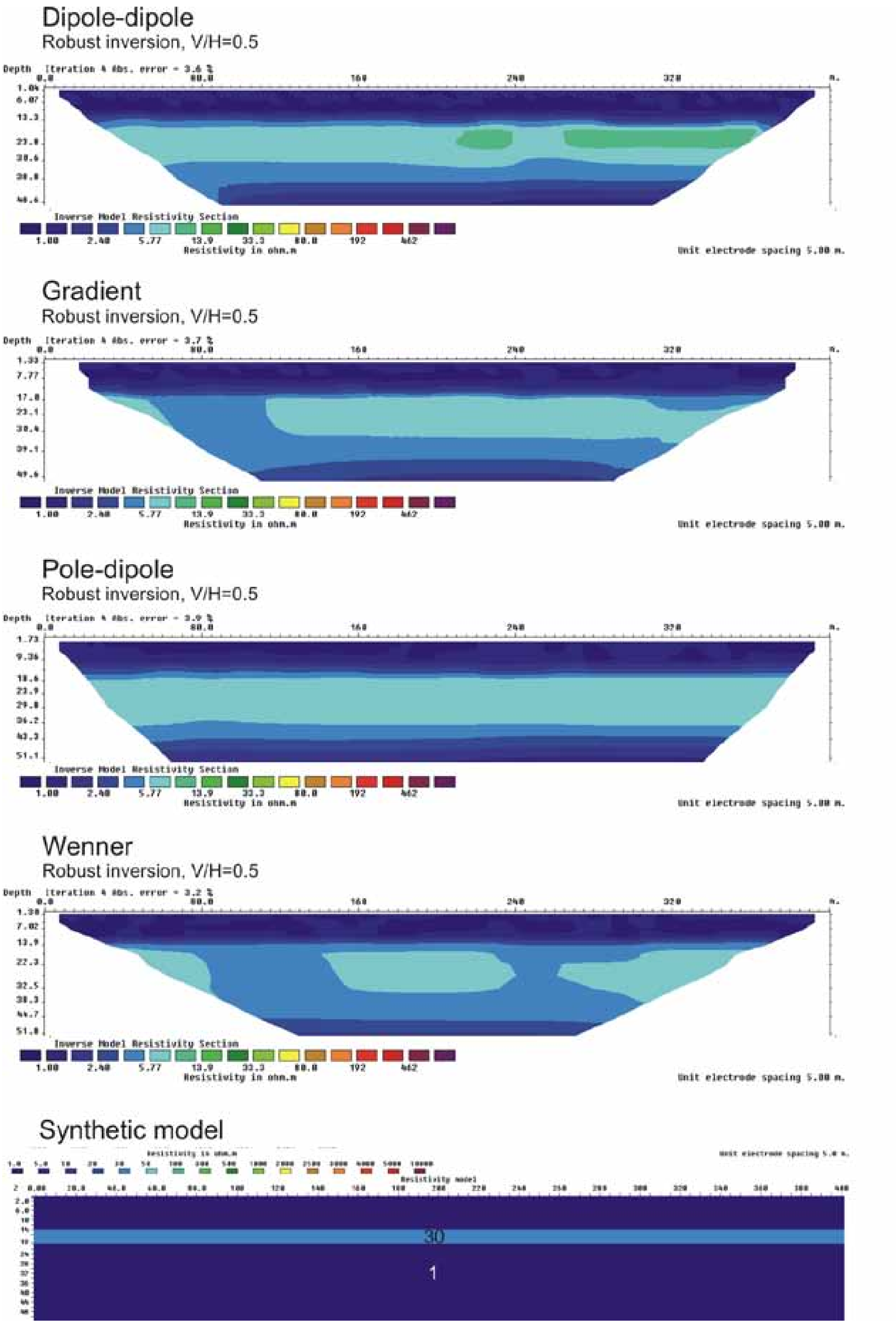

Figure 3.1.4: 5 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm.
Robust inversion, VH=0.5

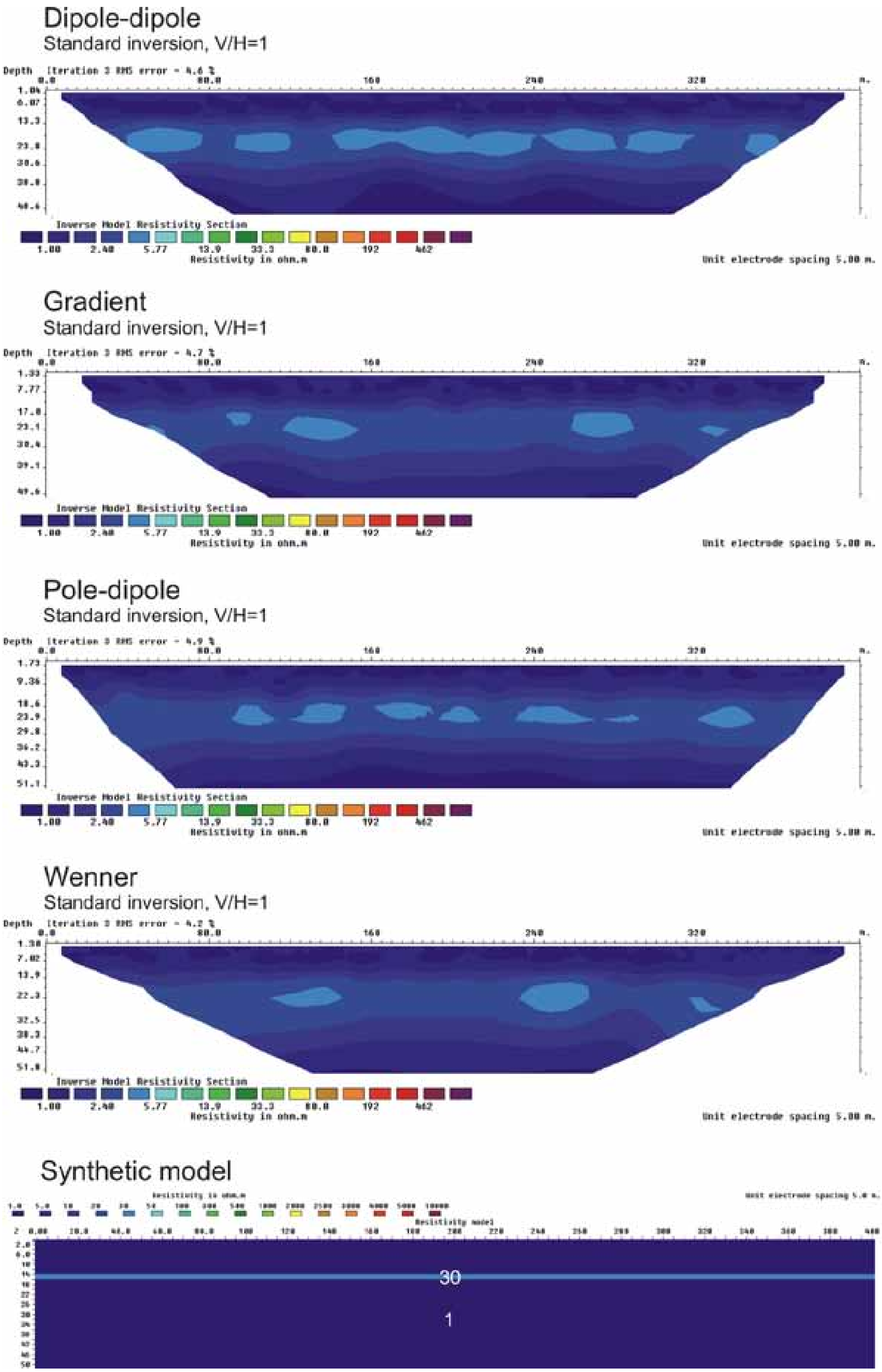

Figure 3.1.5: 2 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm.
Standard inversion, V/H=1

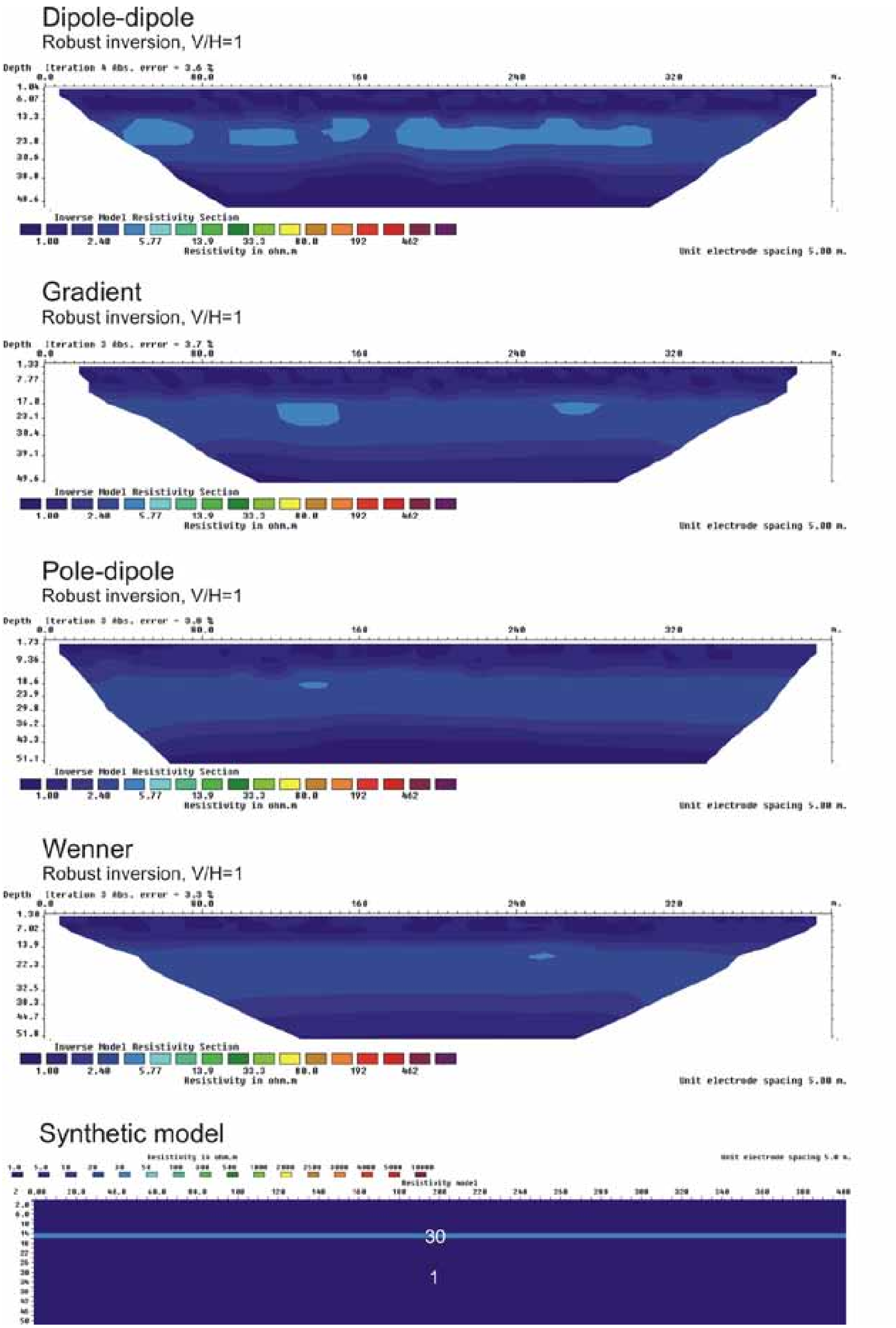

Figure 3.1.6: 2 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm. Robust inversion, V/H=1

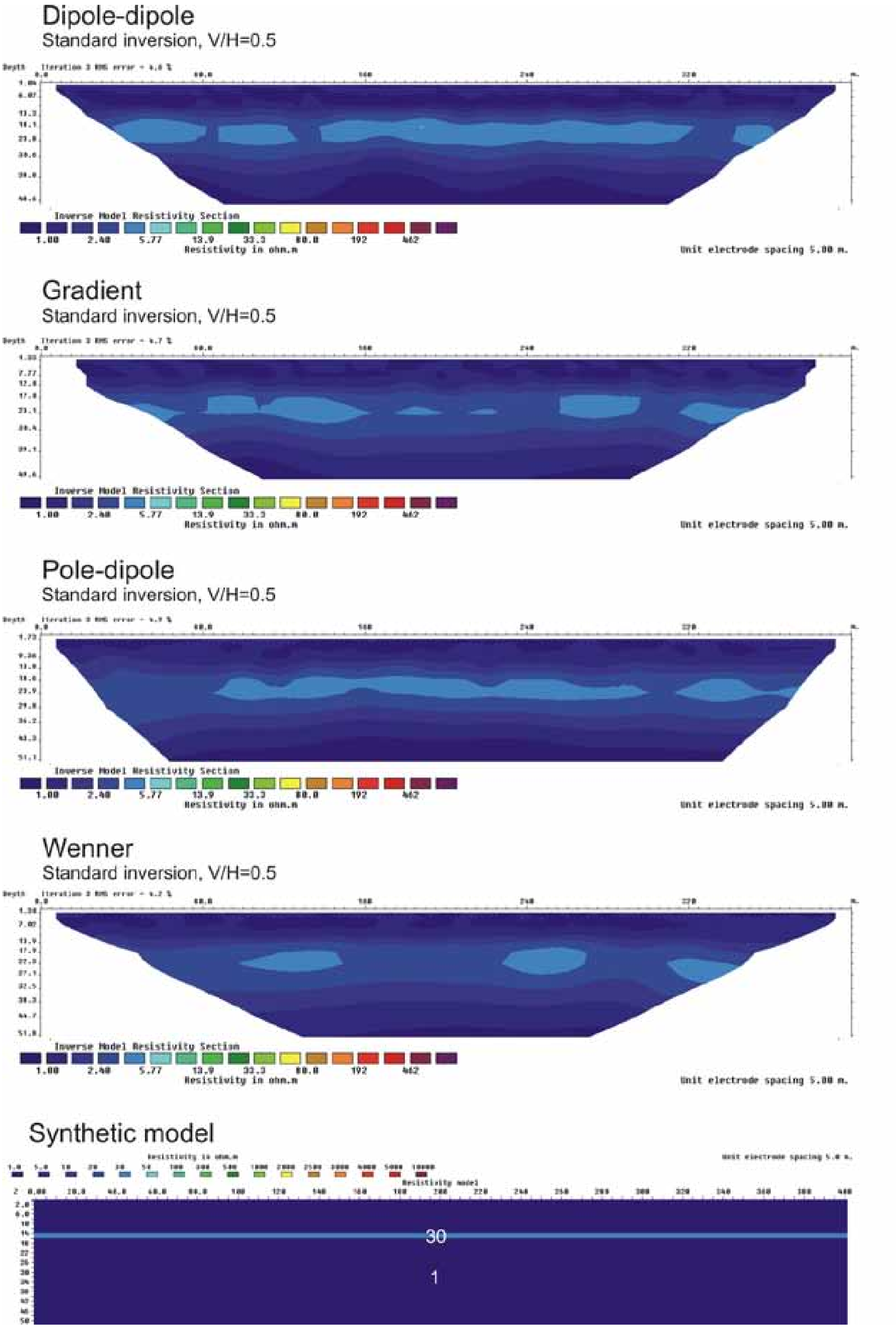

Figure 3.1.7: 2 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm.
Standard inversion, V/H=0.5

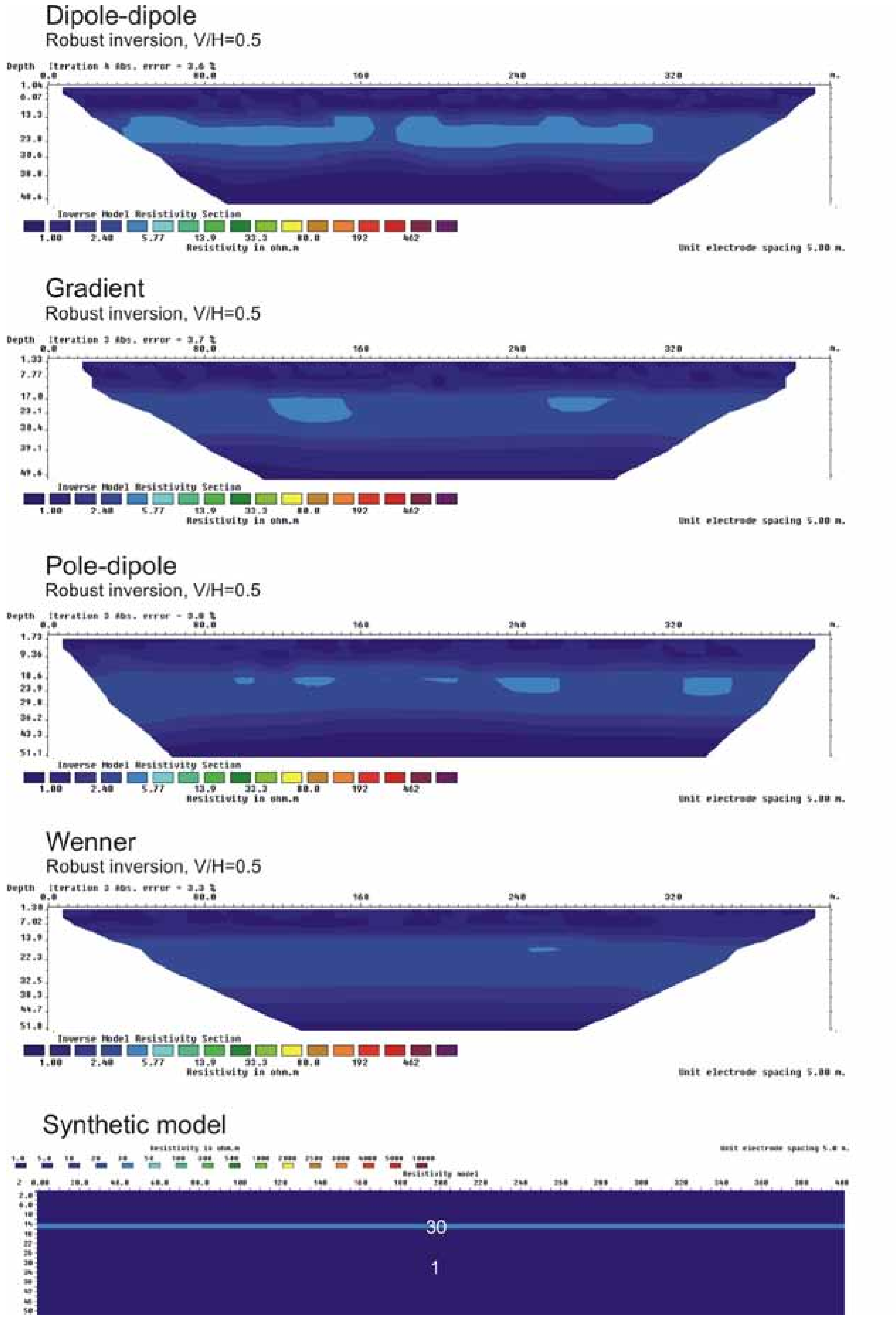

**Figure 3.1.8: 2 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm.
Robust inversion, V/H=0.5**

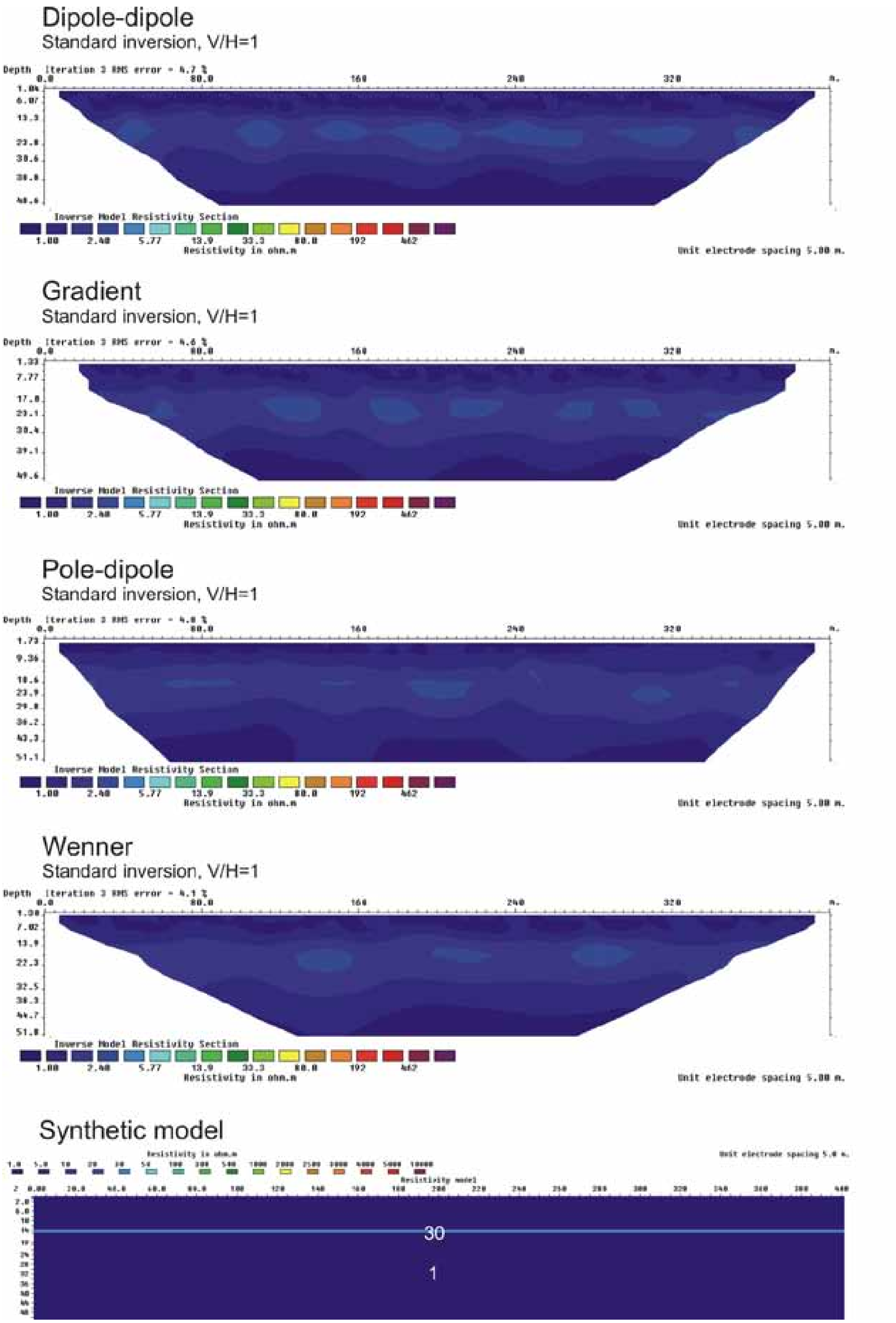

**Figure 3.1.9: 1 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm.
Standard inversion, V/H=1**

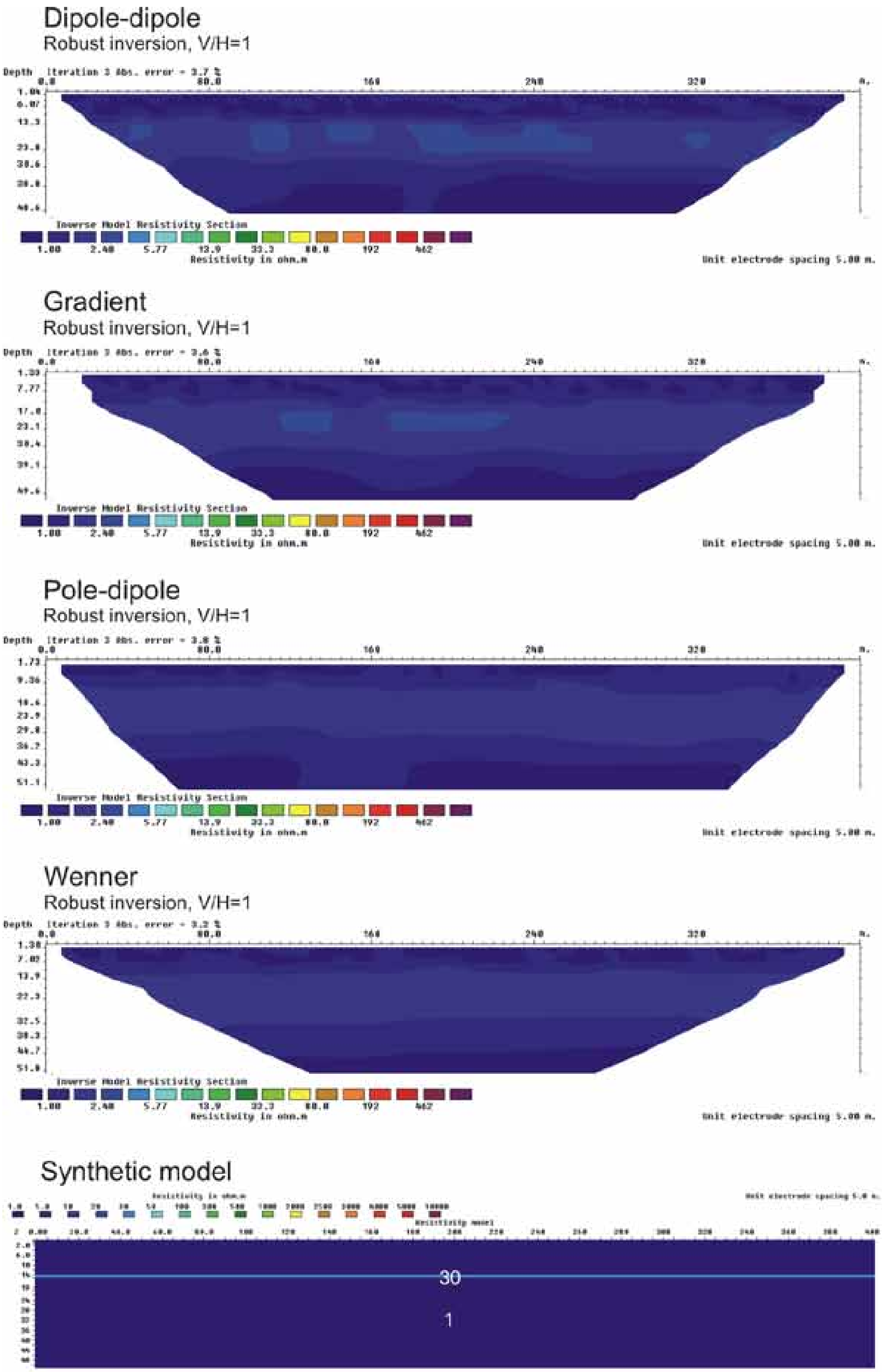

Figure 3.1.10: 1 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm. Robust inversion, V/H=1

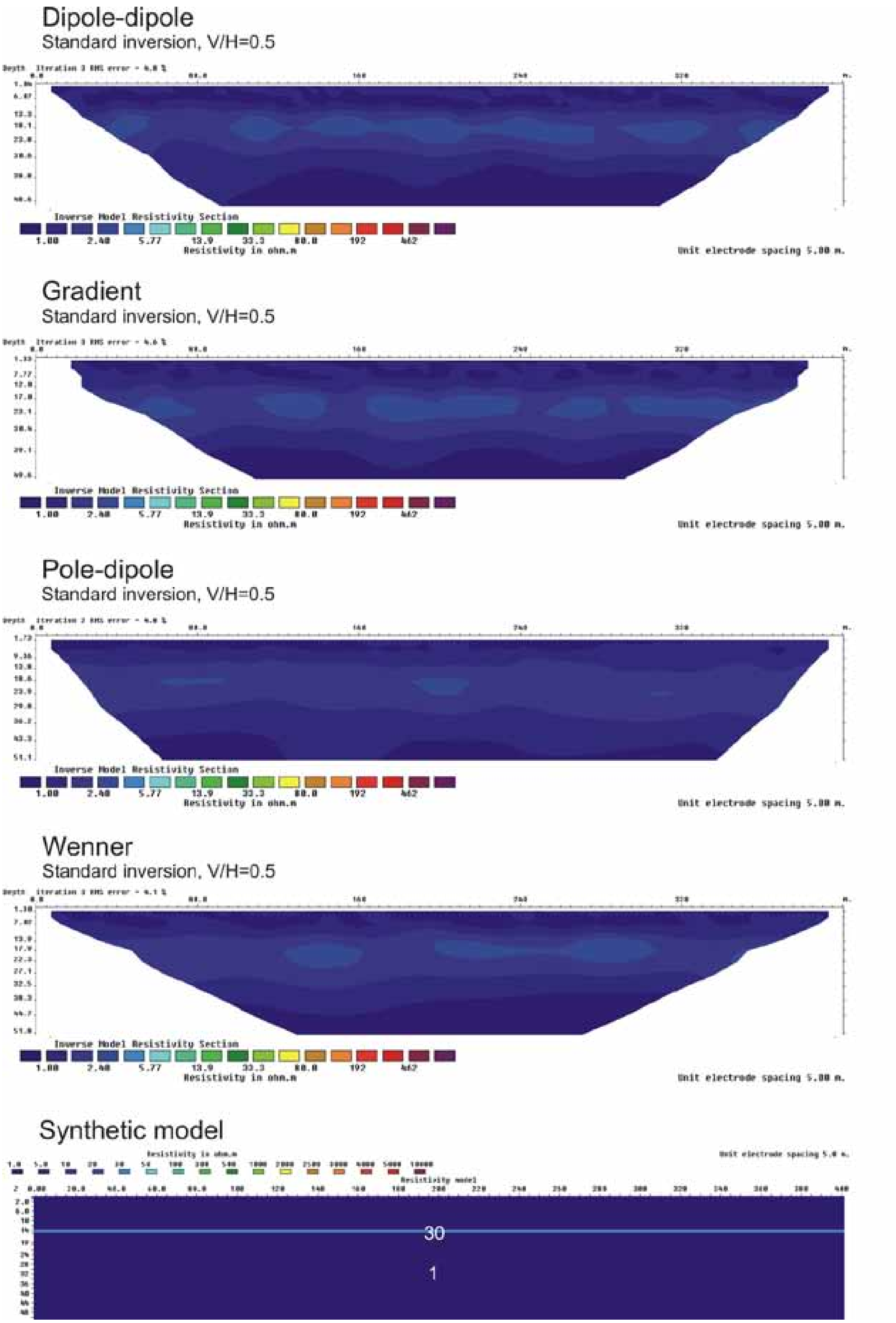

Figure 3.1.11: 1 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm. Standard inversion, V/H=0.5

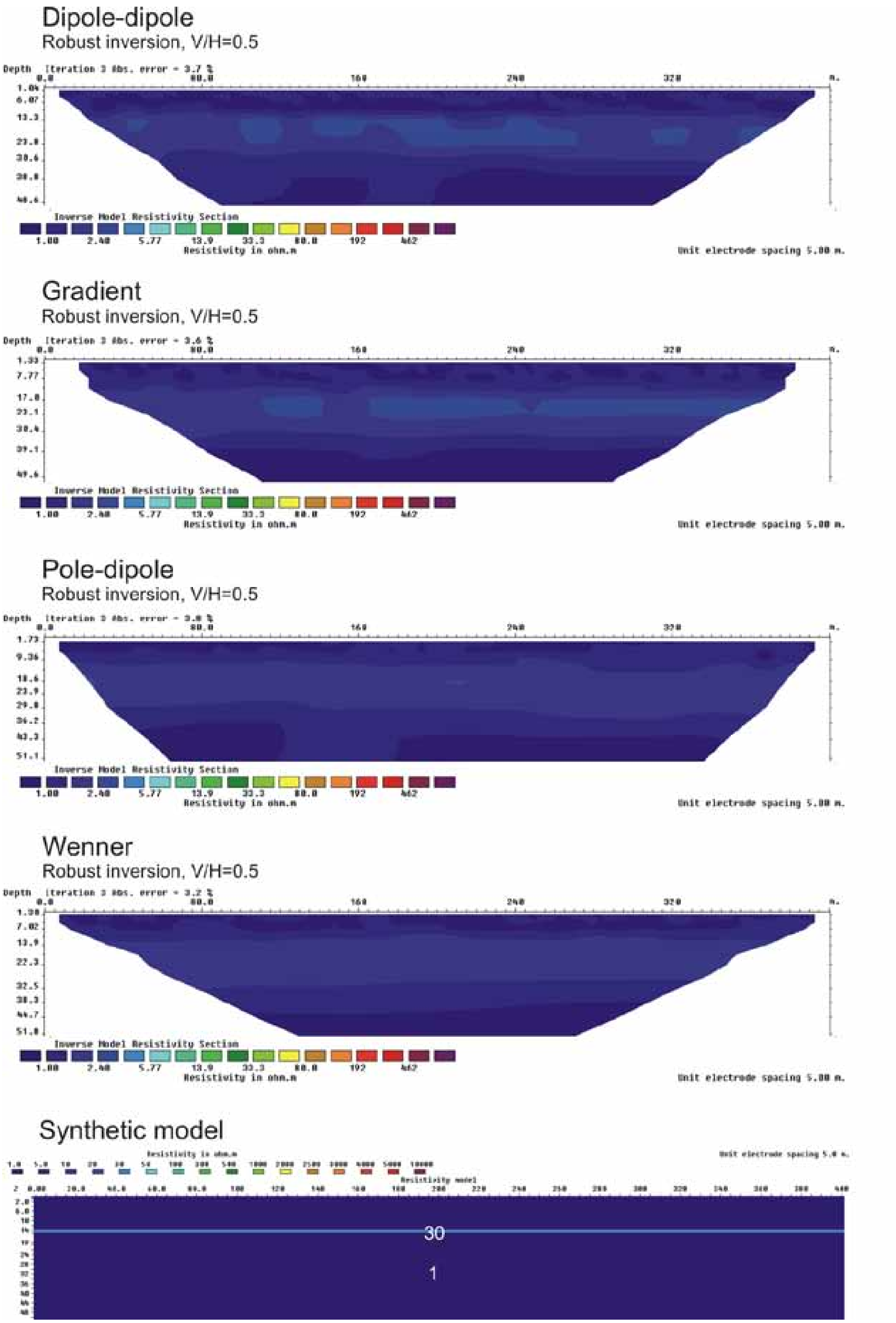

Figure 3.1.12: 1 m zone (30 Ωm) in a depth of 14 m surrounded by 1 Ωm. Robust inversion, V/H=0.5

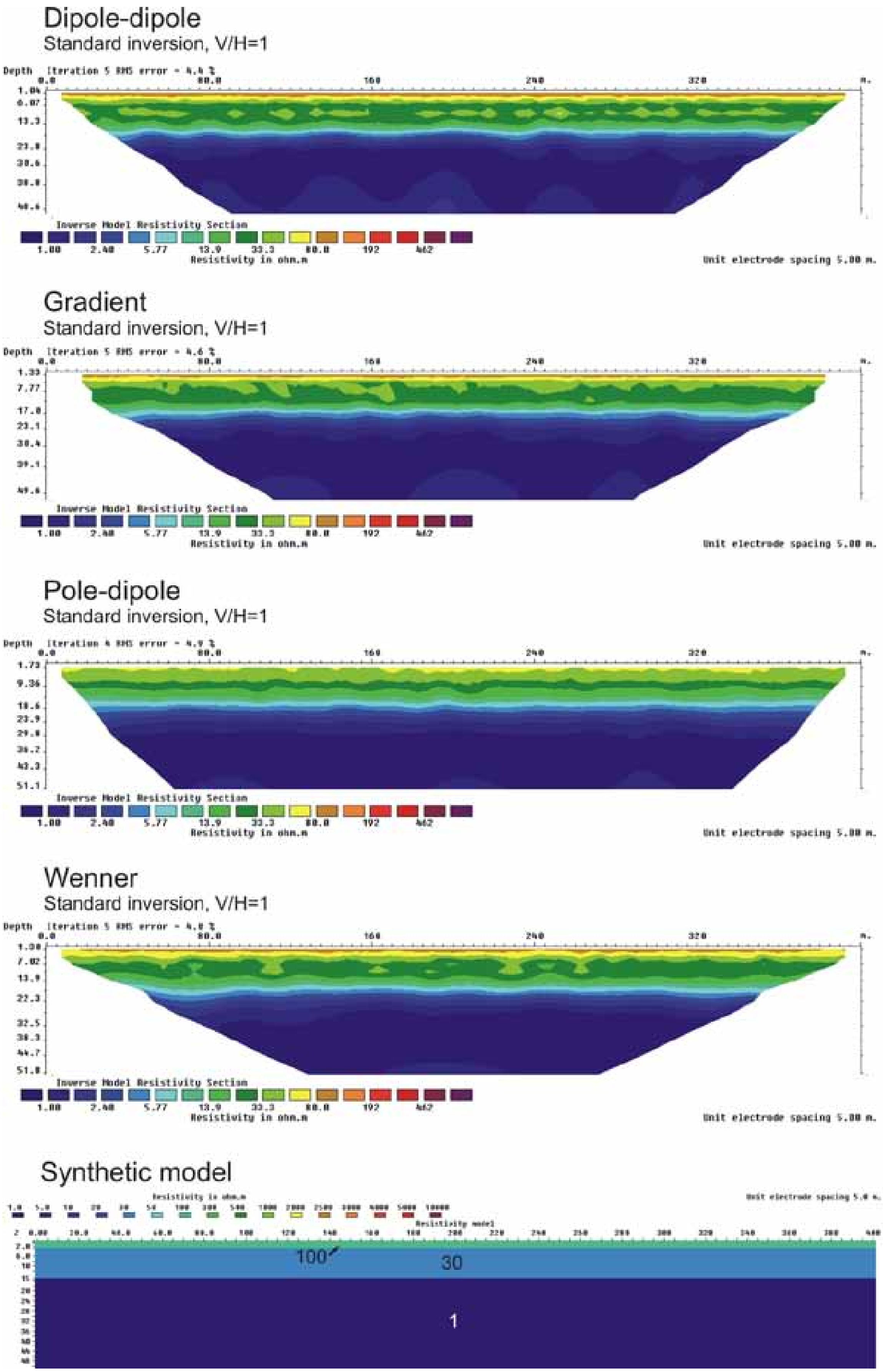

Figure 3.1.13: 3m top layer of 100 Ωm with horizontal layers of 30 Ωm and 1 Ωm. Standard inversion, V/H=1

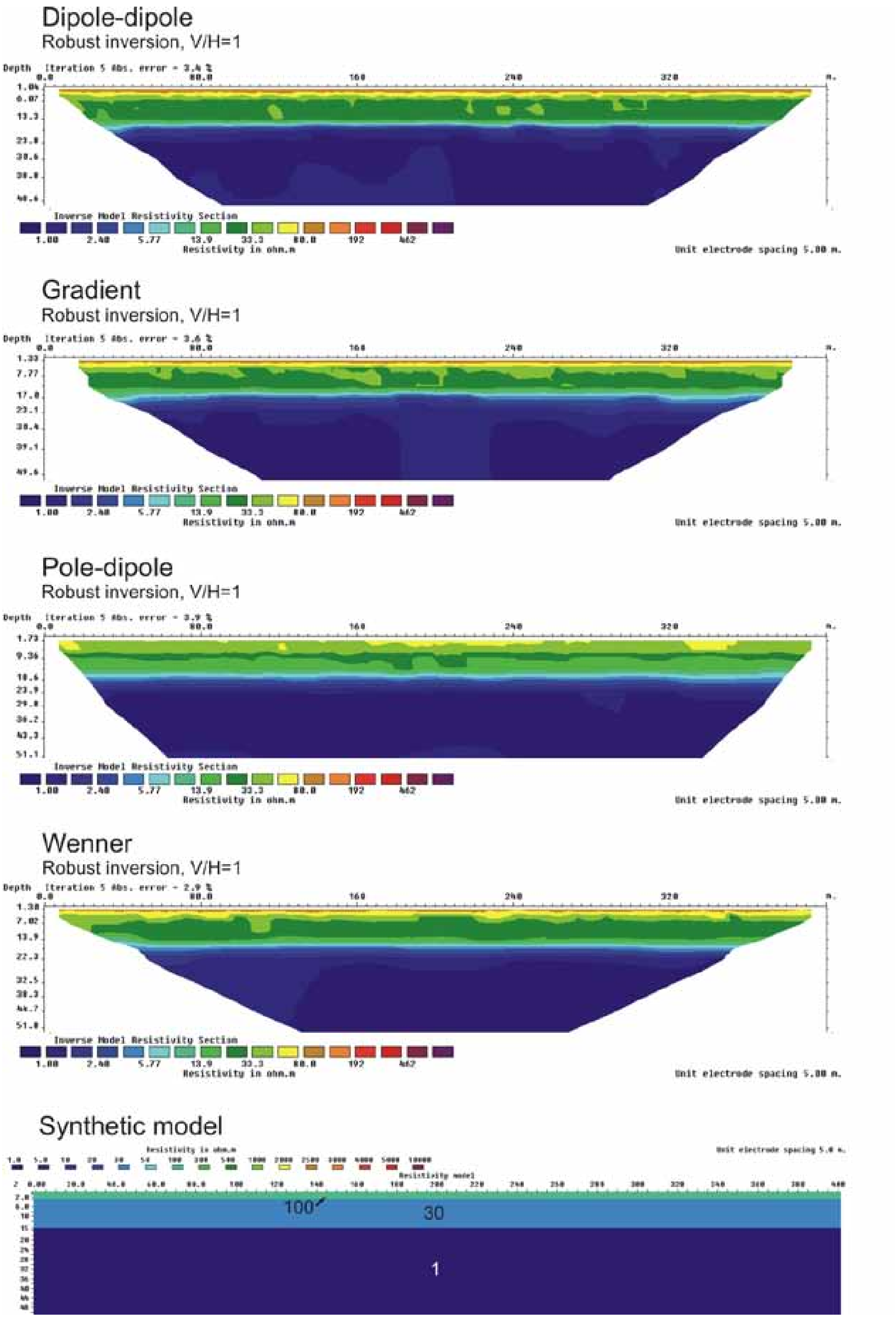

Figure 3.1.14: 3m top layer of 100 Ωm with horizontal layers of 30 Ωm and 1 Ωm. Robust inversion, V/H=1

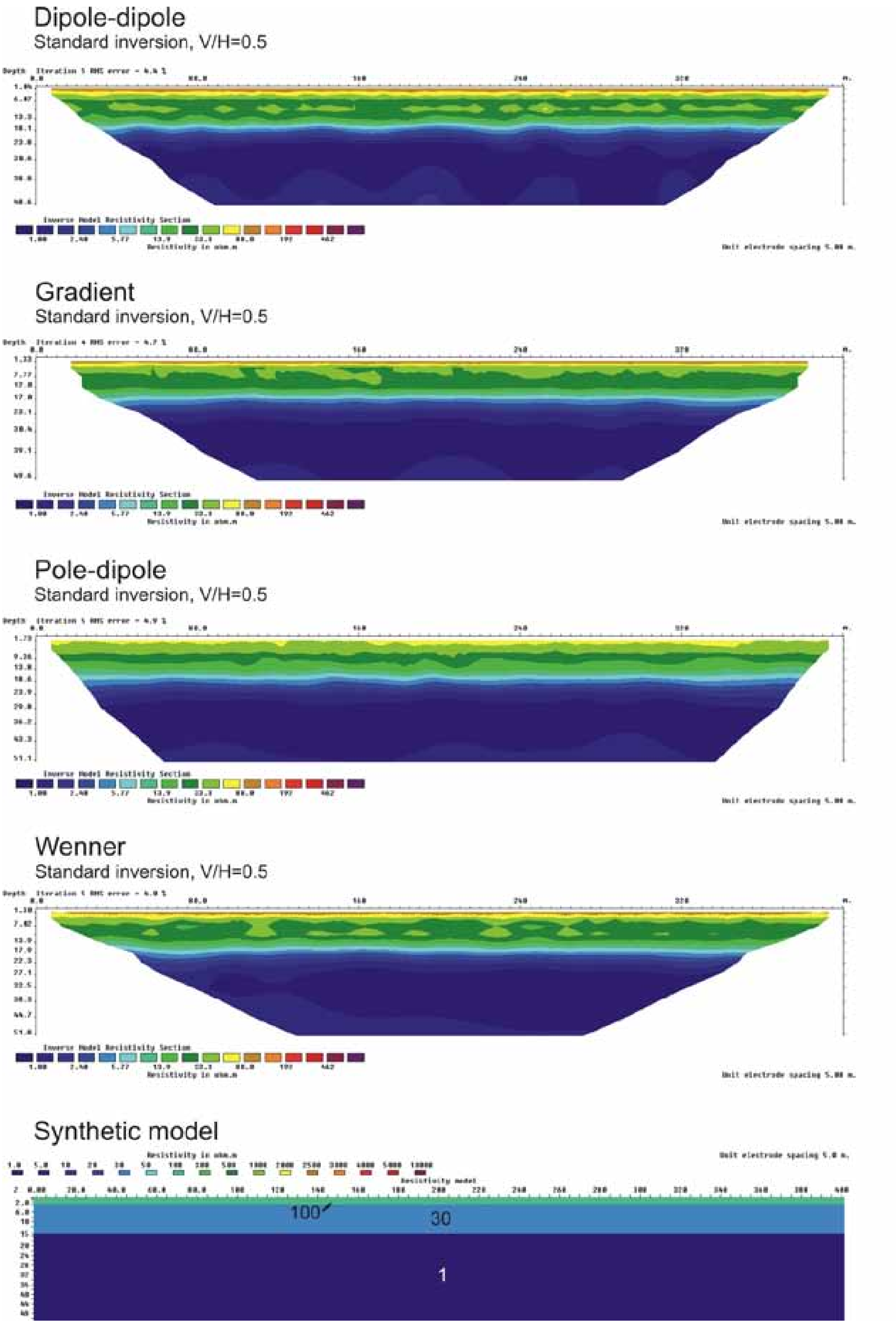

Figure 3.1.15: 3m top layer of 100 Ωm with horizontal layers of 30 Ωm and 1 Ωm. Standard inversion, V/H=0.5

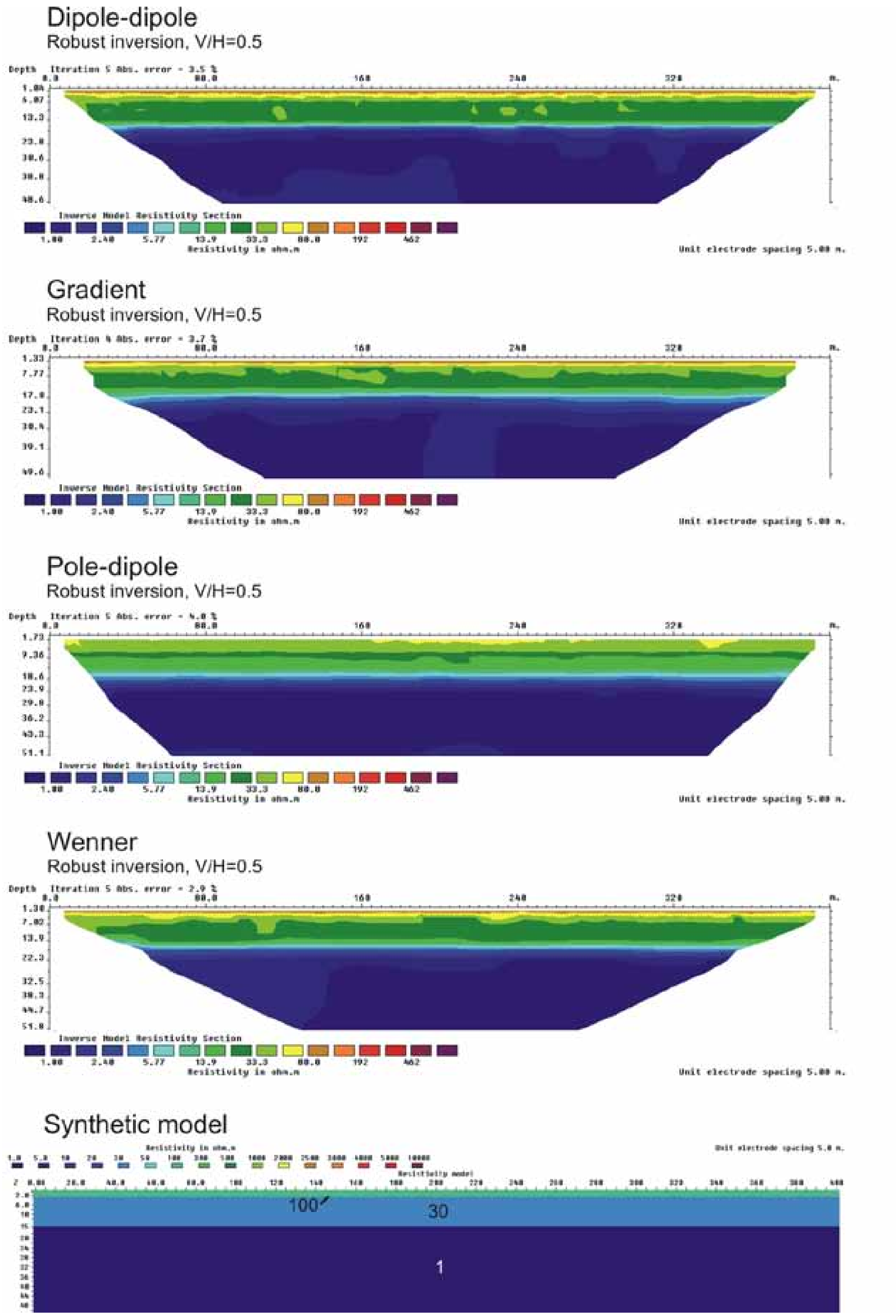

Figure 3.1.16: 3m top layer of 100 Ωm with horizontal layers of 30 Ωm and 1 Ωm. Robust inversion, V/H=0.5

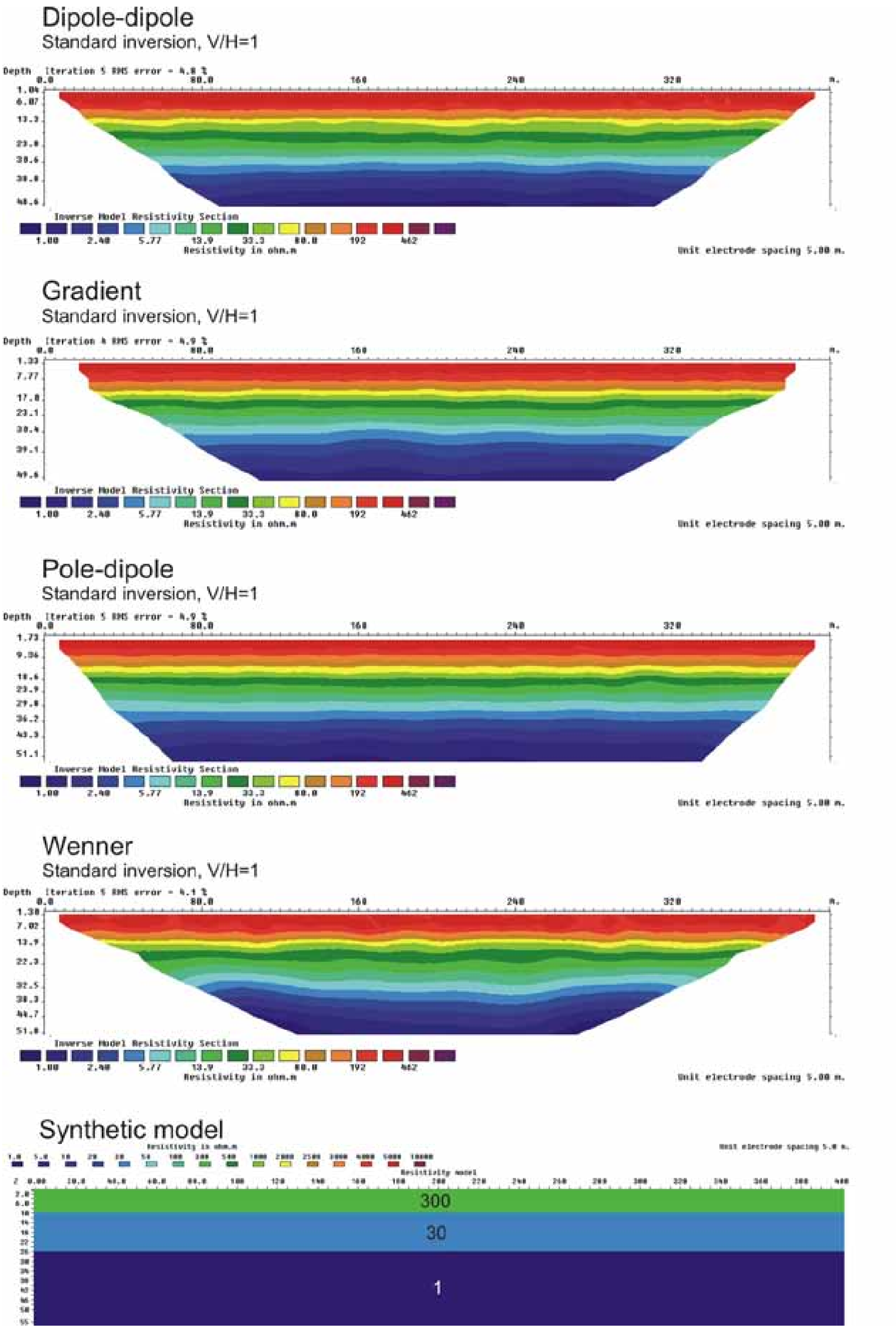

Figure 3.1.17: Horizontal layers of 300 Ωm, 30 Ωm and 1 Ωm.
Standard inversion, V/H=1

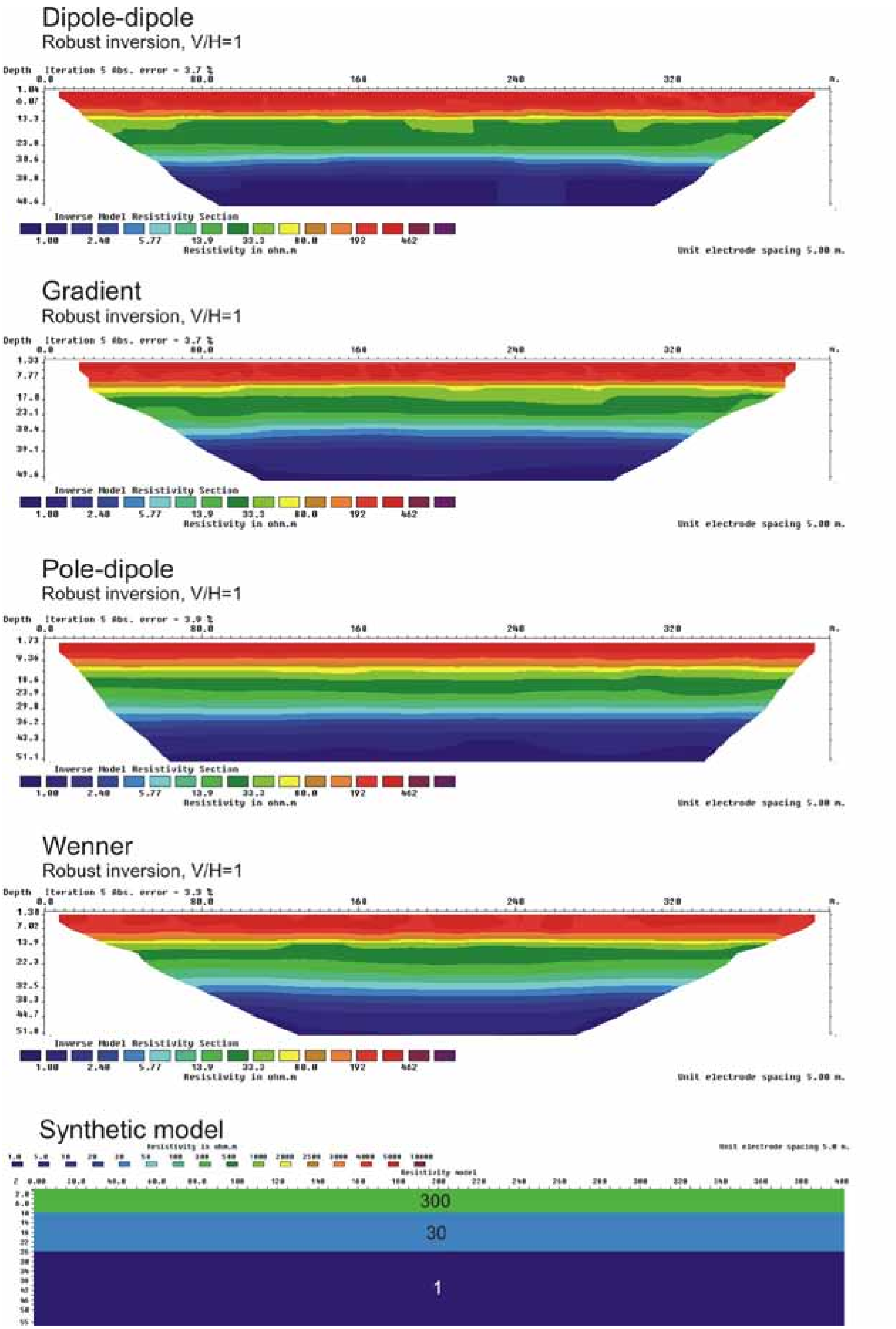

Figure 3.1.18: Horizontal layers of 300 Ωm, 30 Ωm and 1 Ωm.
Robust inversion, V/H=1

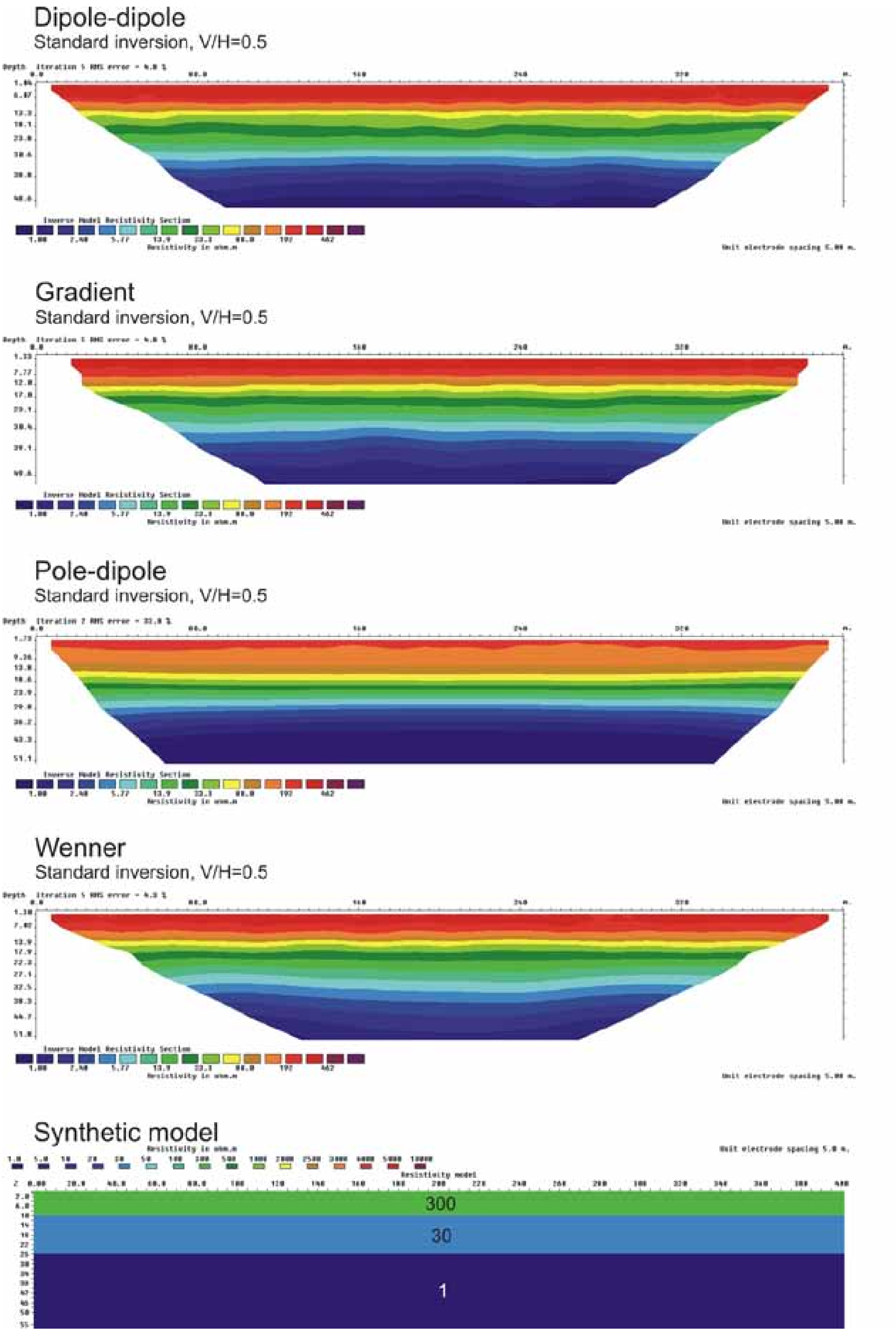

Figure 3.1.19: Horizontal layers of 300 Ωm, 30 Ωm and 1 Ωm.
Standard inversion, V/H=0.5

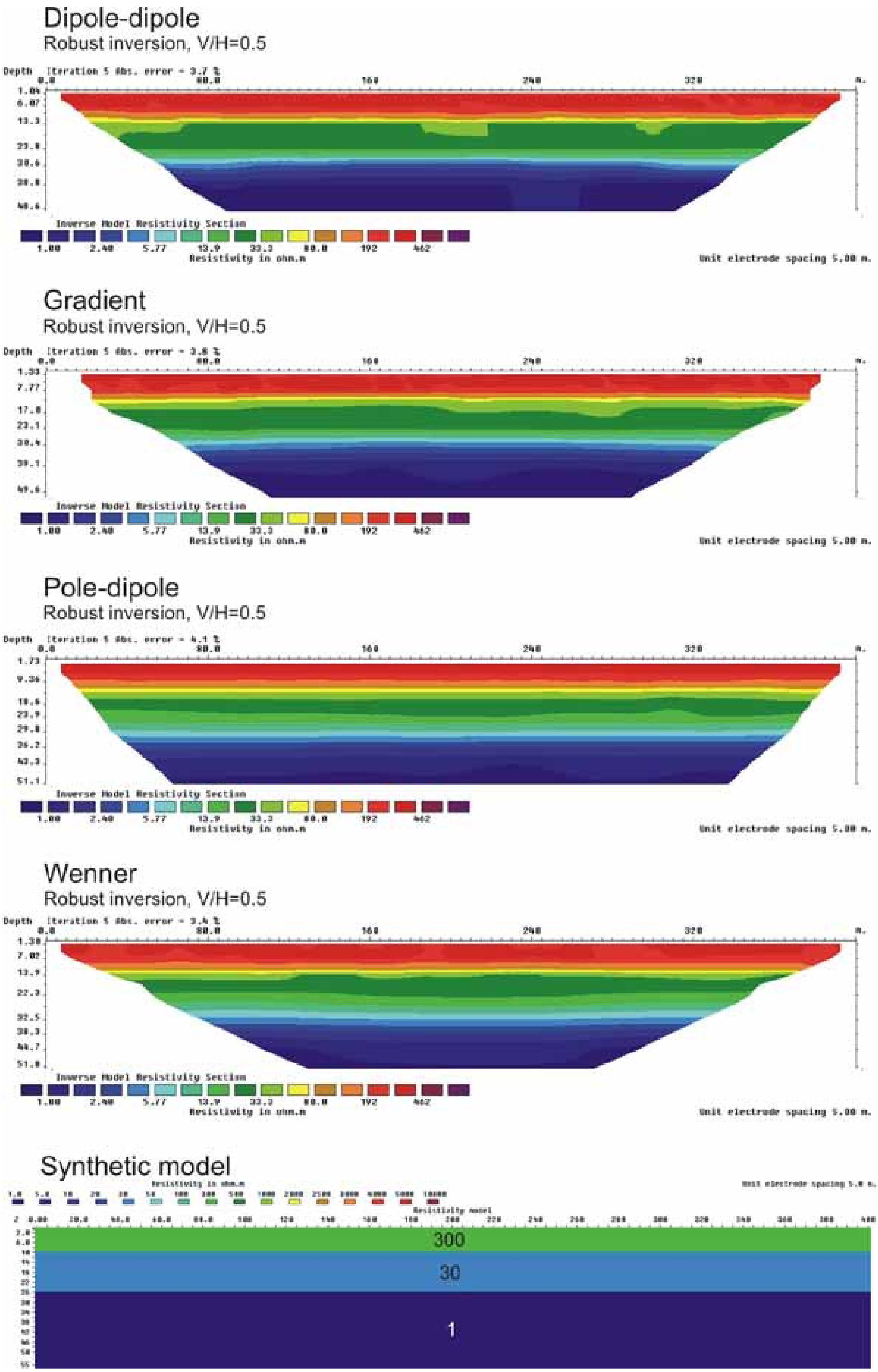

Figure 3.1.20: Horizontal layers of 300 Ωm, 30 Ωm and 1 Ωm.
Robust inversion, V/H=0.5

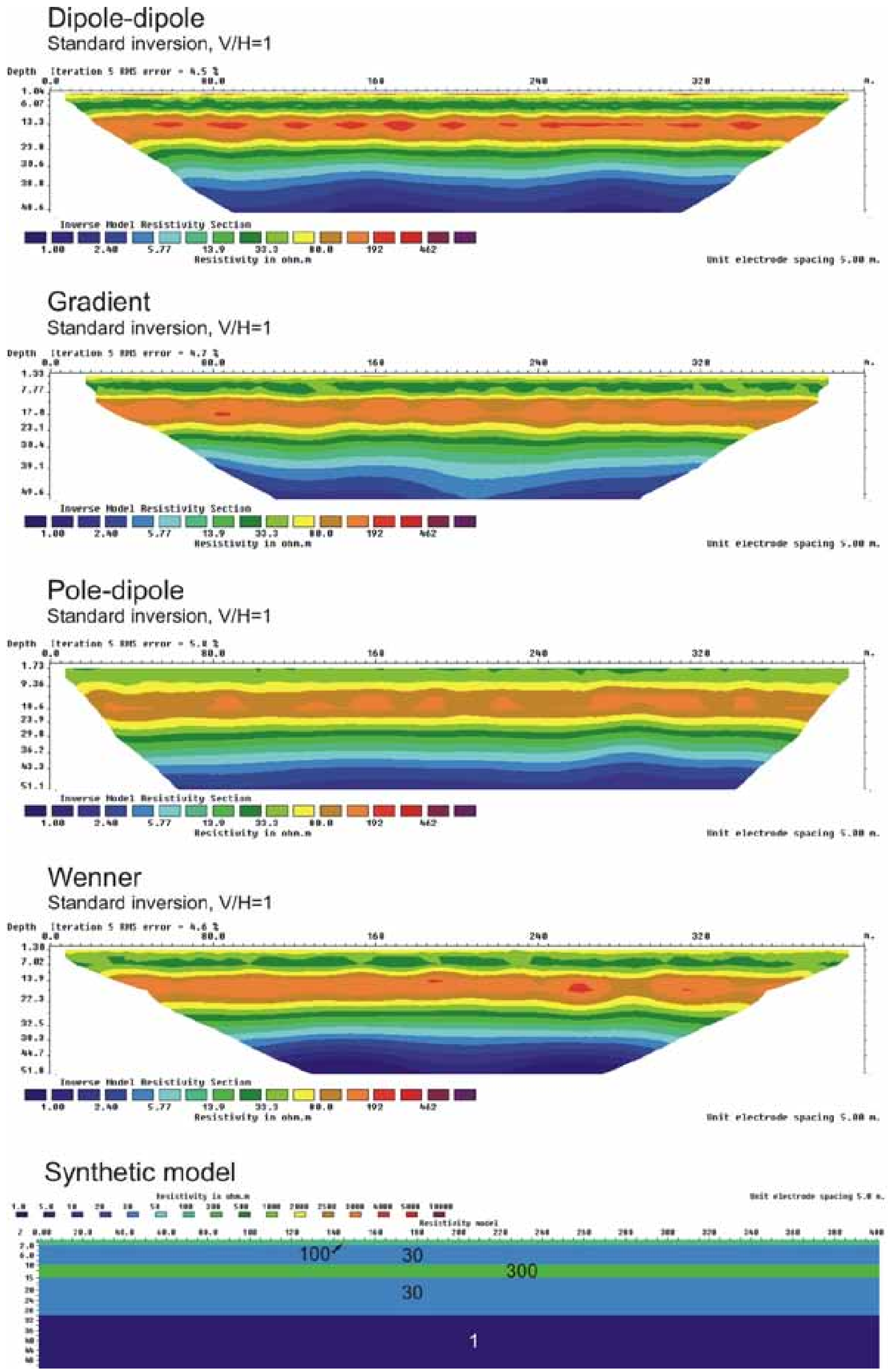

Figure 3.1.21: 5 m thick zone of 300 Ωm in a depth of 10 m.
Standard inversion, V/H=1

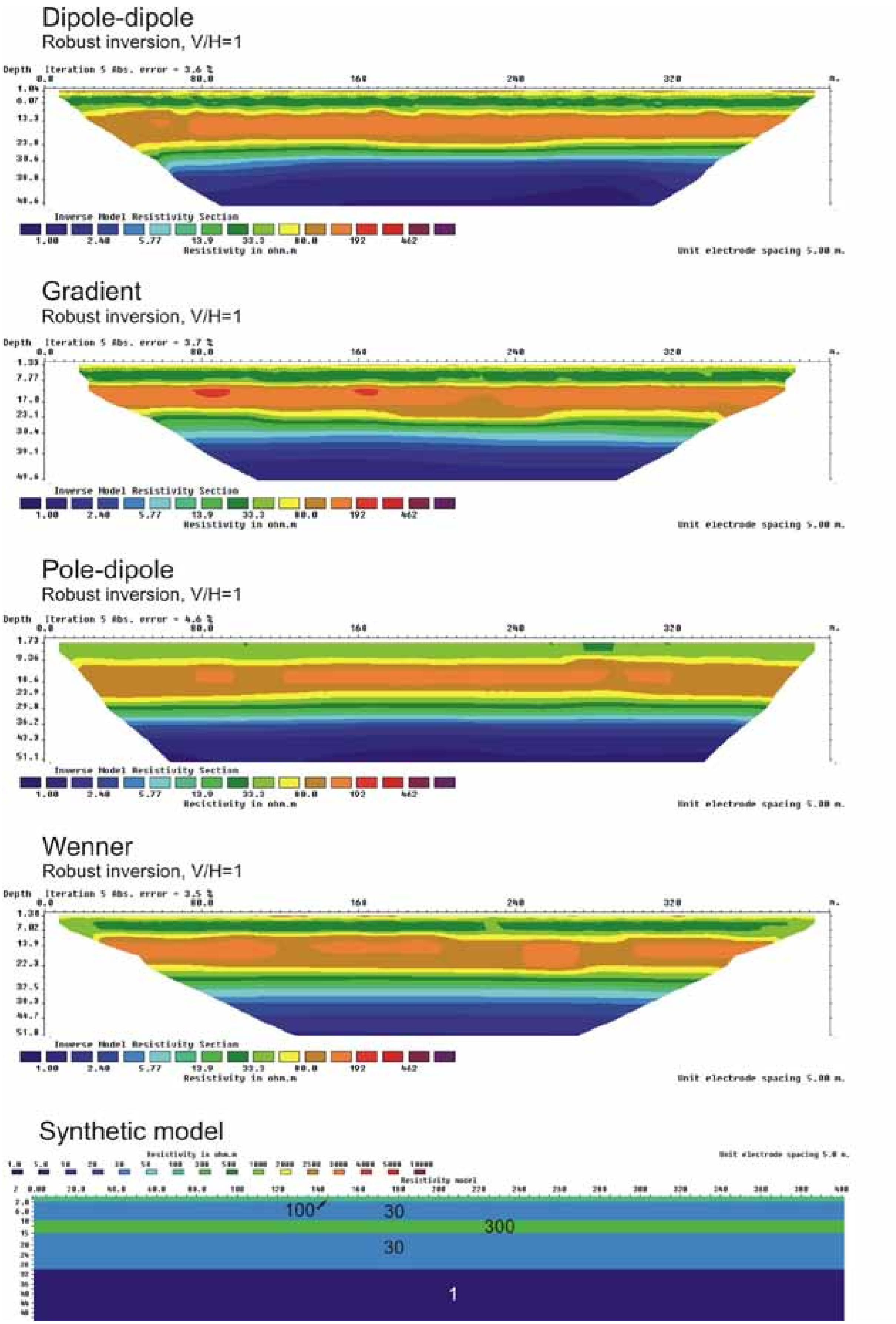

Figure 3.1.22: 5 m thick zone of 300 Ωm in a depth of 10 m.
Robust inversion, V/H=1

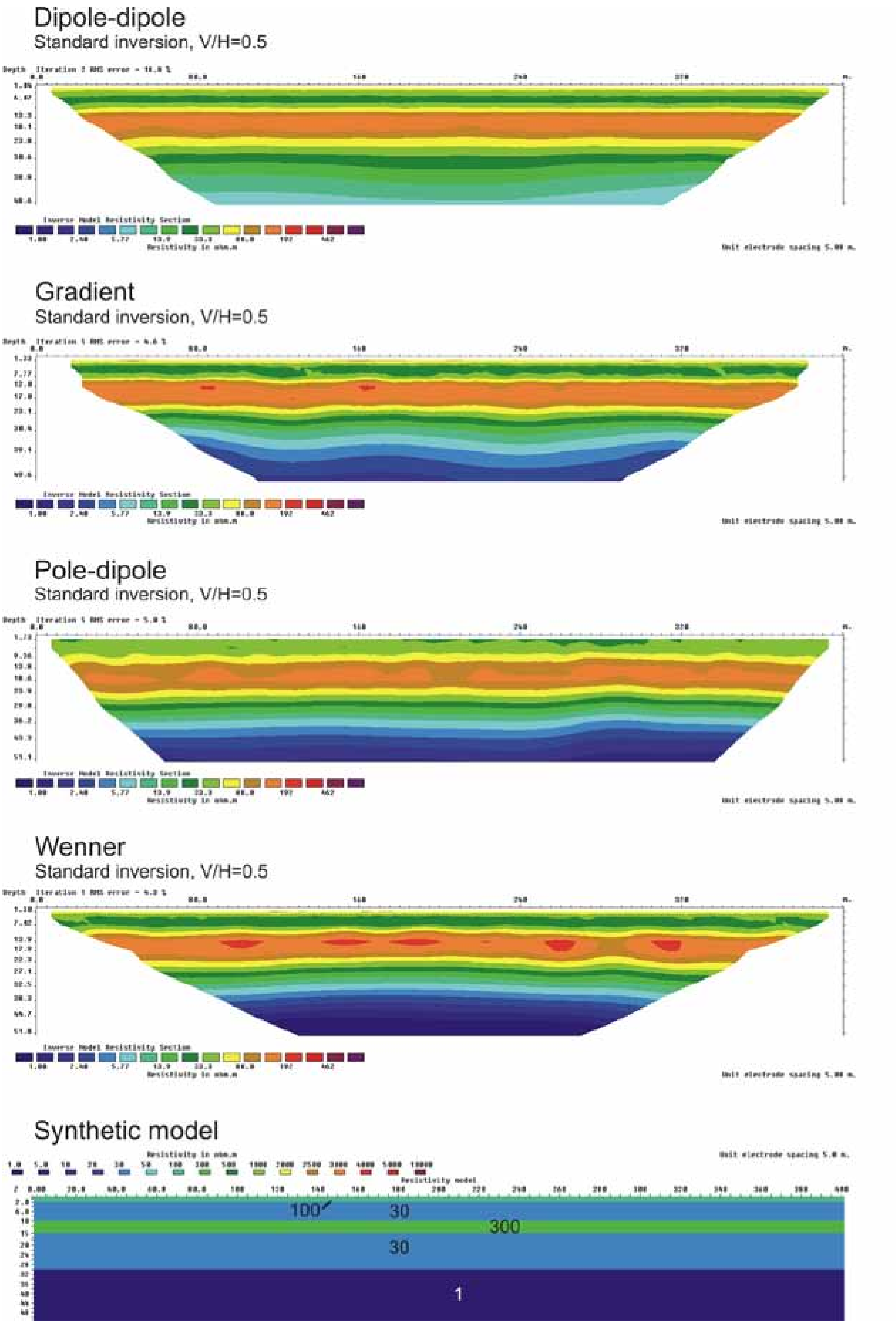

Figure 3.1.23: 5 m thick zone of 300 Ωm in a depth of 10 m. Standard inversion, V/H=0.5

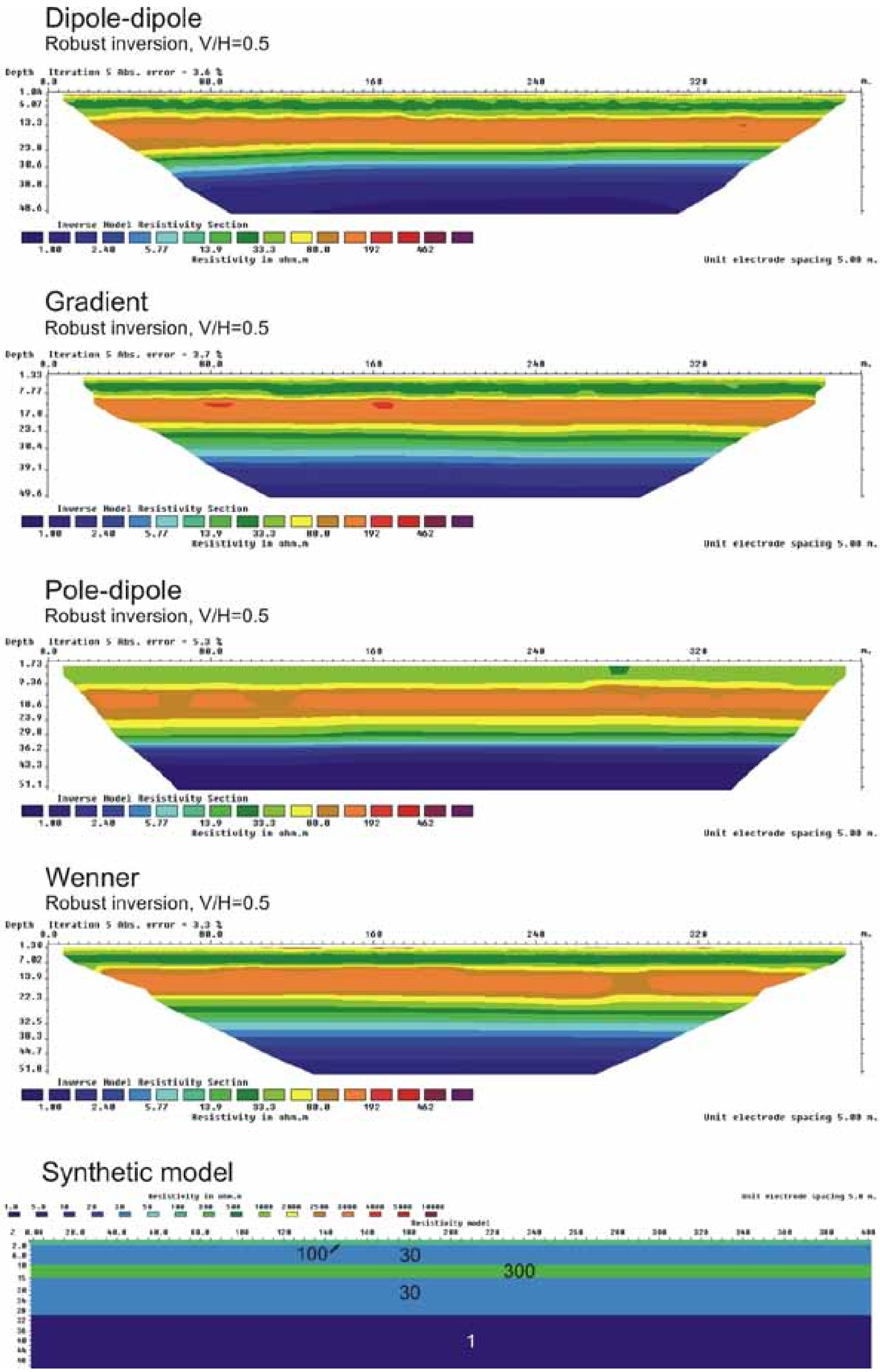

Figure 3.1.24: 5 m thick zone of 300 Ωm in a depth of 10 m.
Robust inversion, V/H=0.5

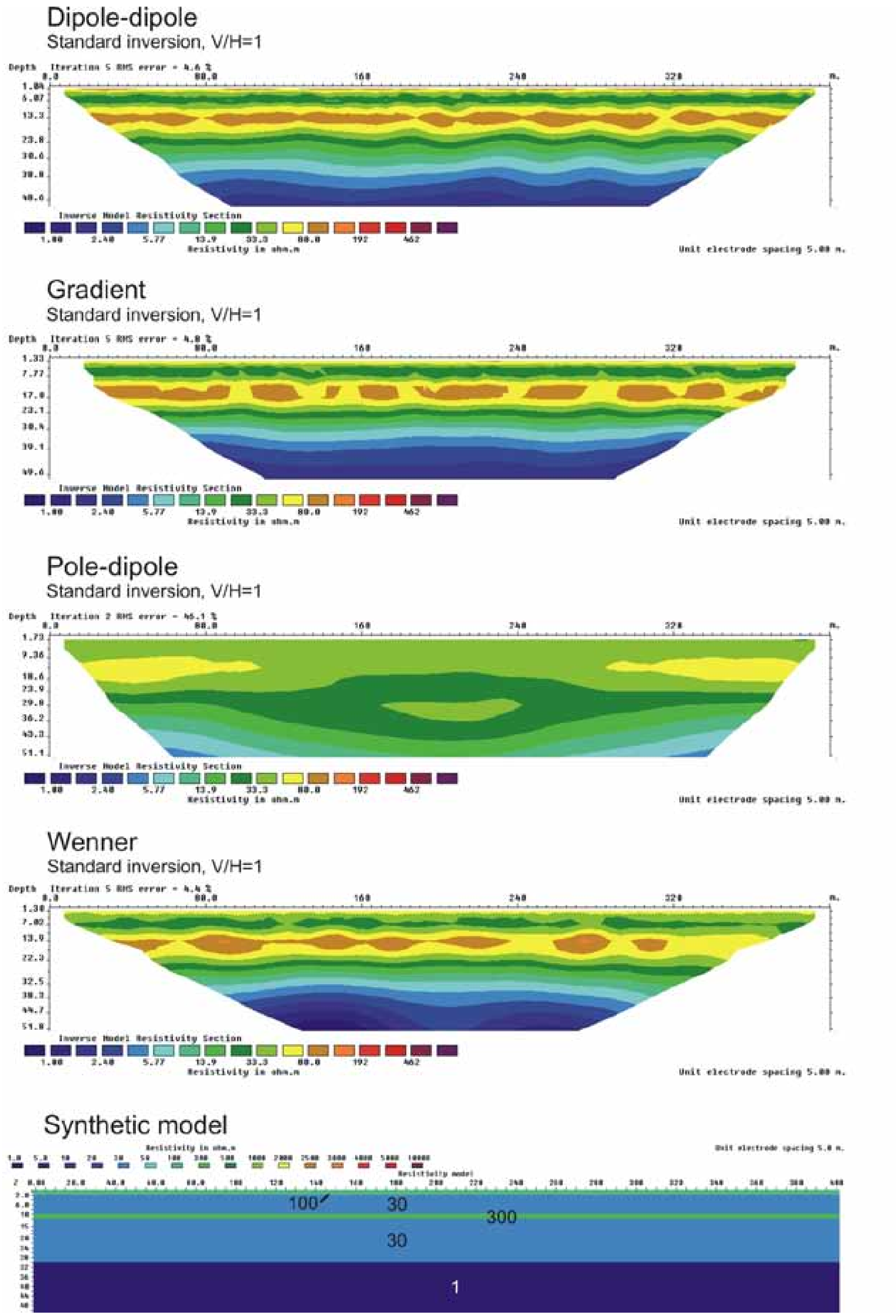

Figure 3.1.25: 2 m thick zone of 300 Ωm in a depth of 10 m.
Standard inversion, V/H=1

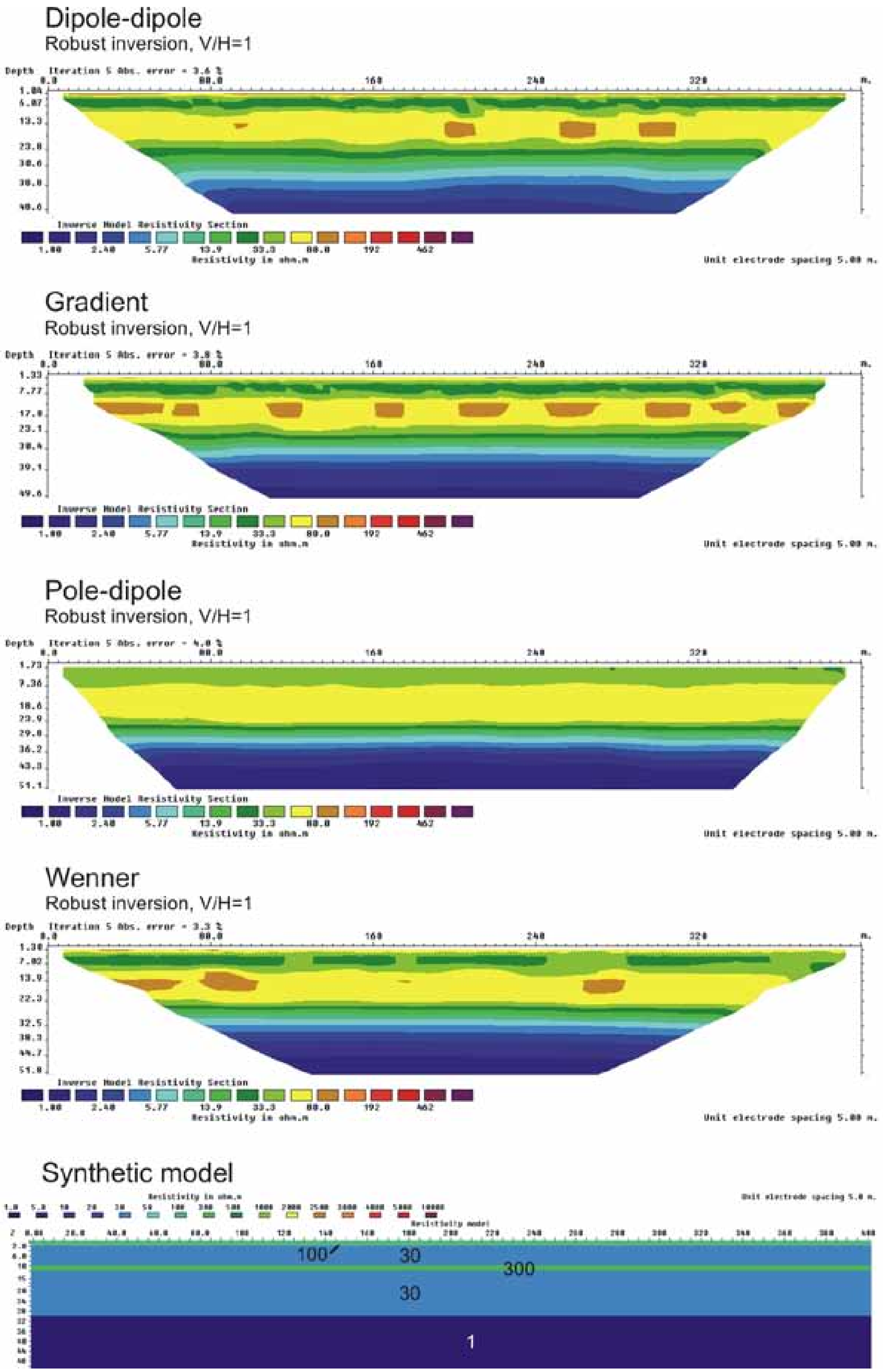

Figure 3.1.26: 2 m thick zone of 300 Ωm in a depth of 10 m.
Robust inversion, V/H=1

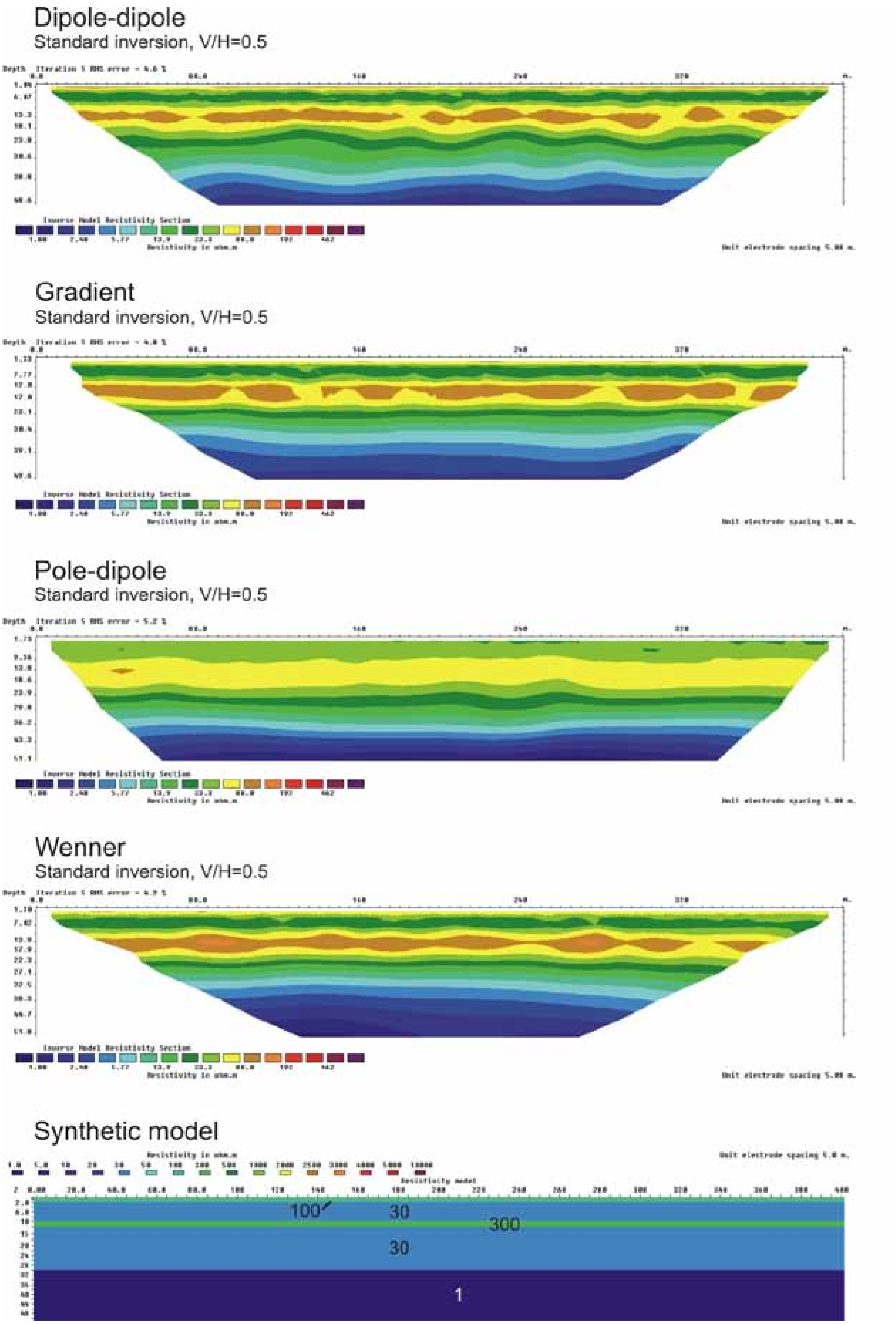

Figure 3.1.27: 2 m thick zone of 300 Ωm in a depth of 10 m.
Standard inversion, V/H=0.5

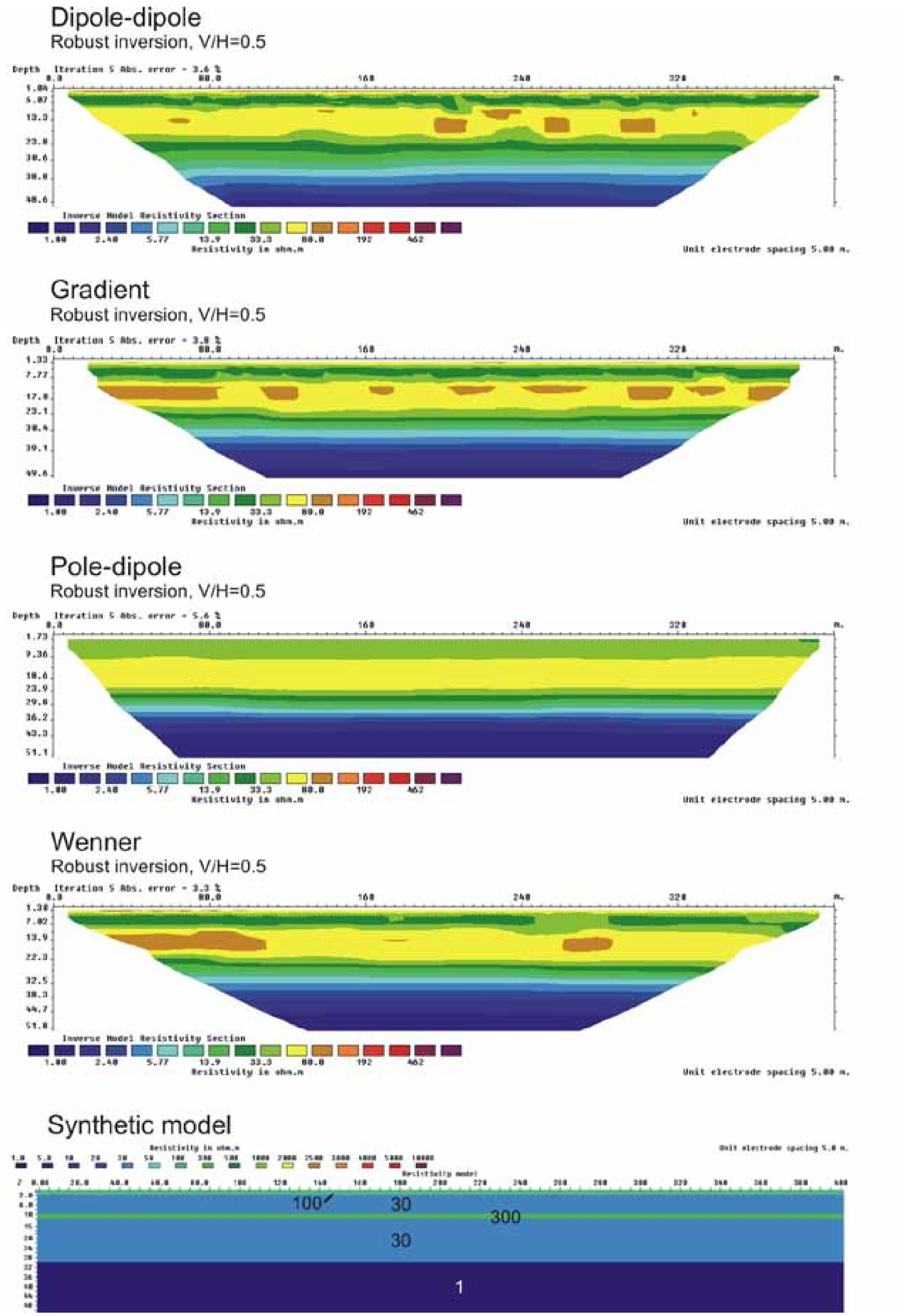

Figure 3.1.28: 2 m thick zone of 300 Ωm in a depth of 10 m.
Robust inversion, V/H=0.5

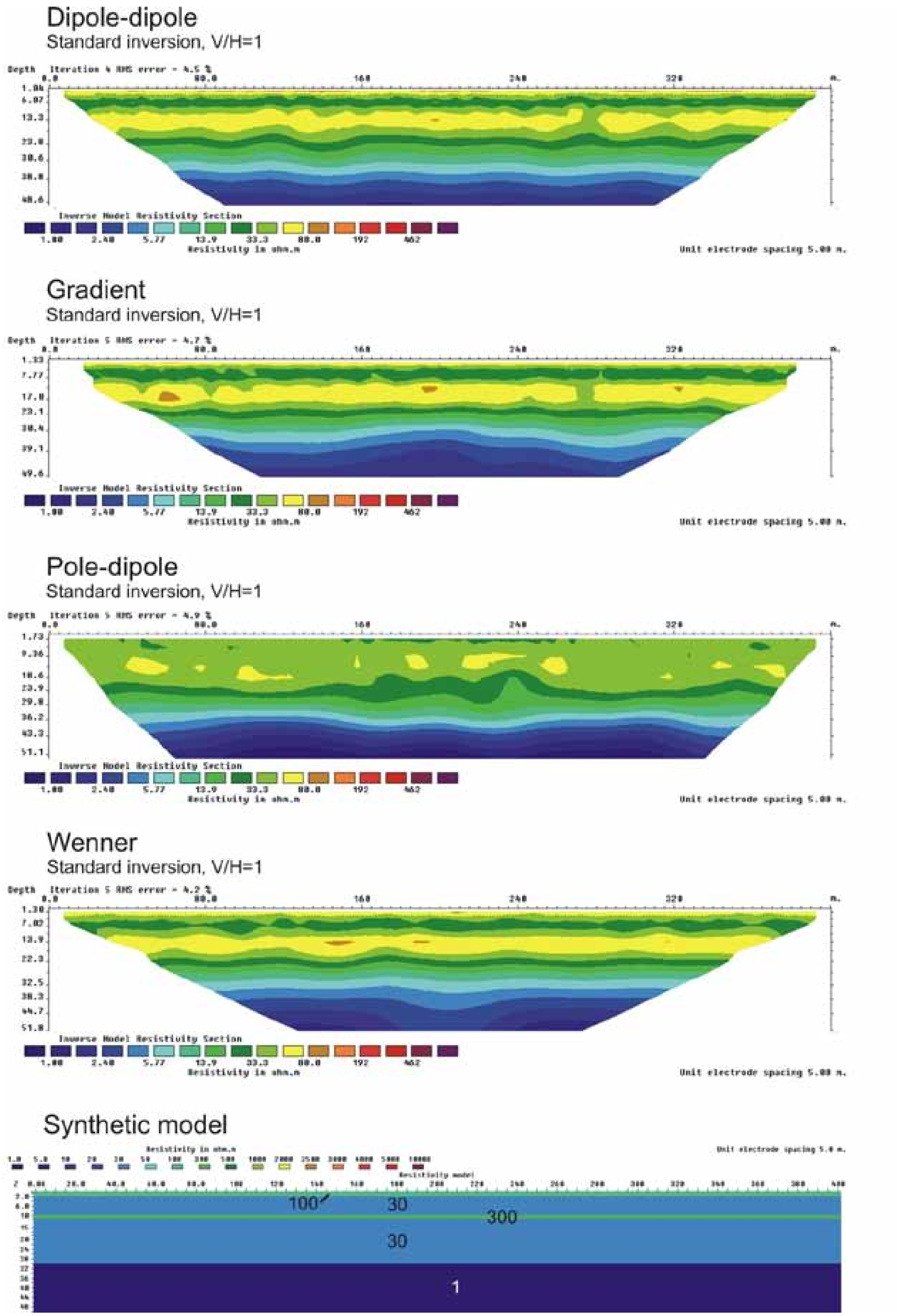

Figure 3.1.29: 1 m thick zone of 300 Ωm in a depth of 10 m.
Standard inversion, V/H=1

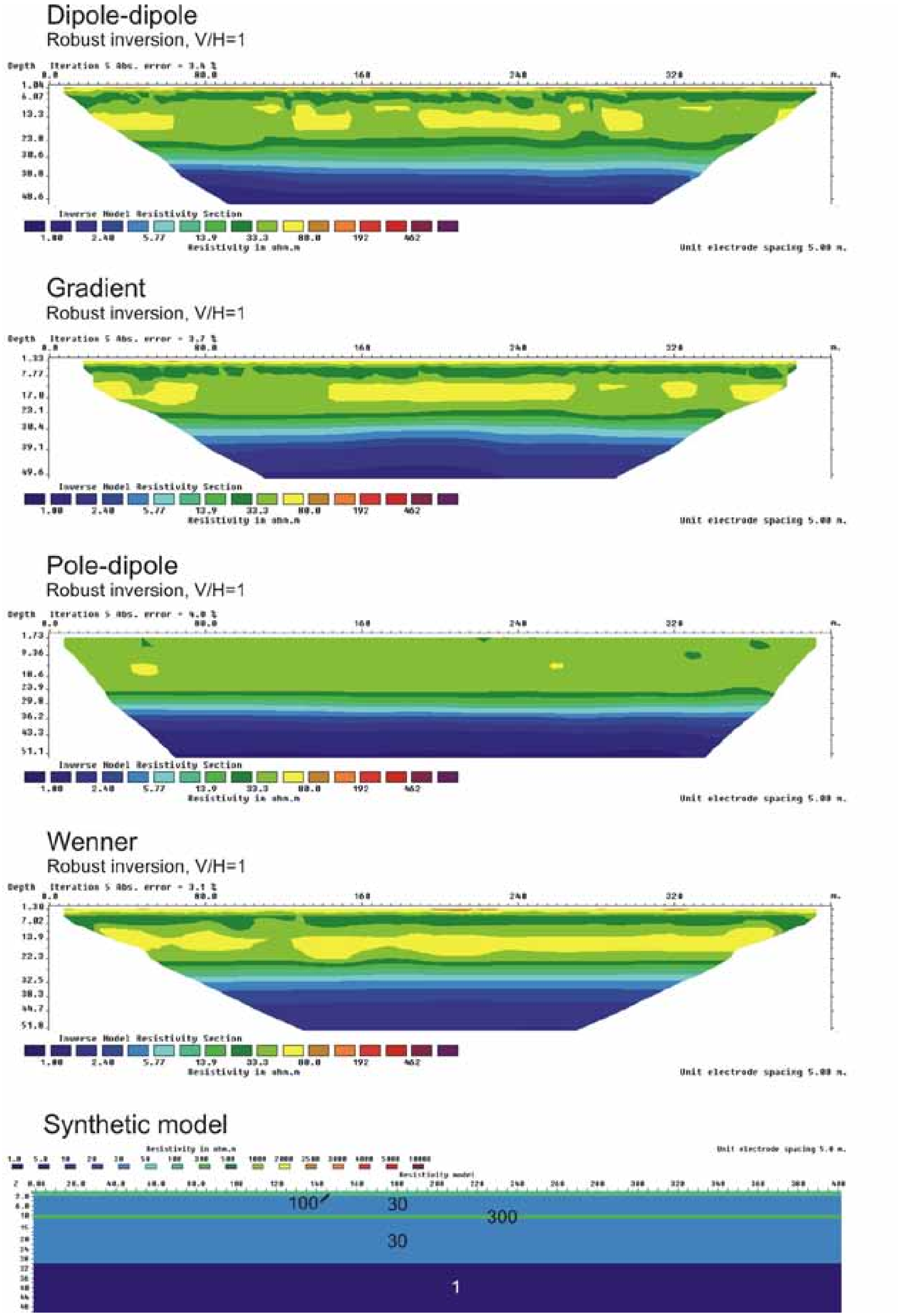

Figure 3.1.30: 1 m thick zone of 300 Ωm in a depth of 10 m.
Robust inversion, V/H=1

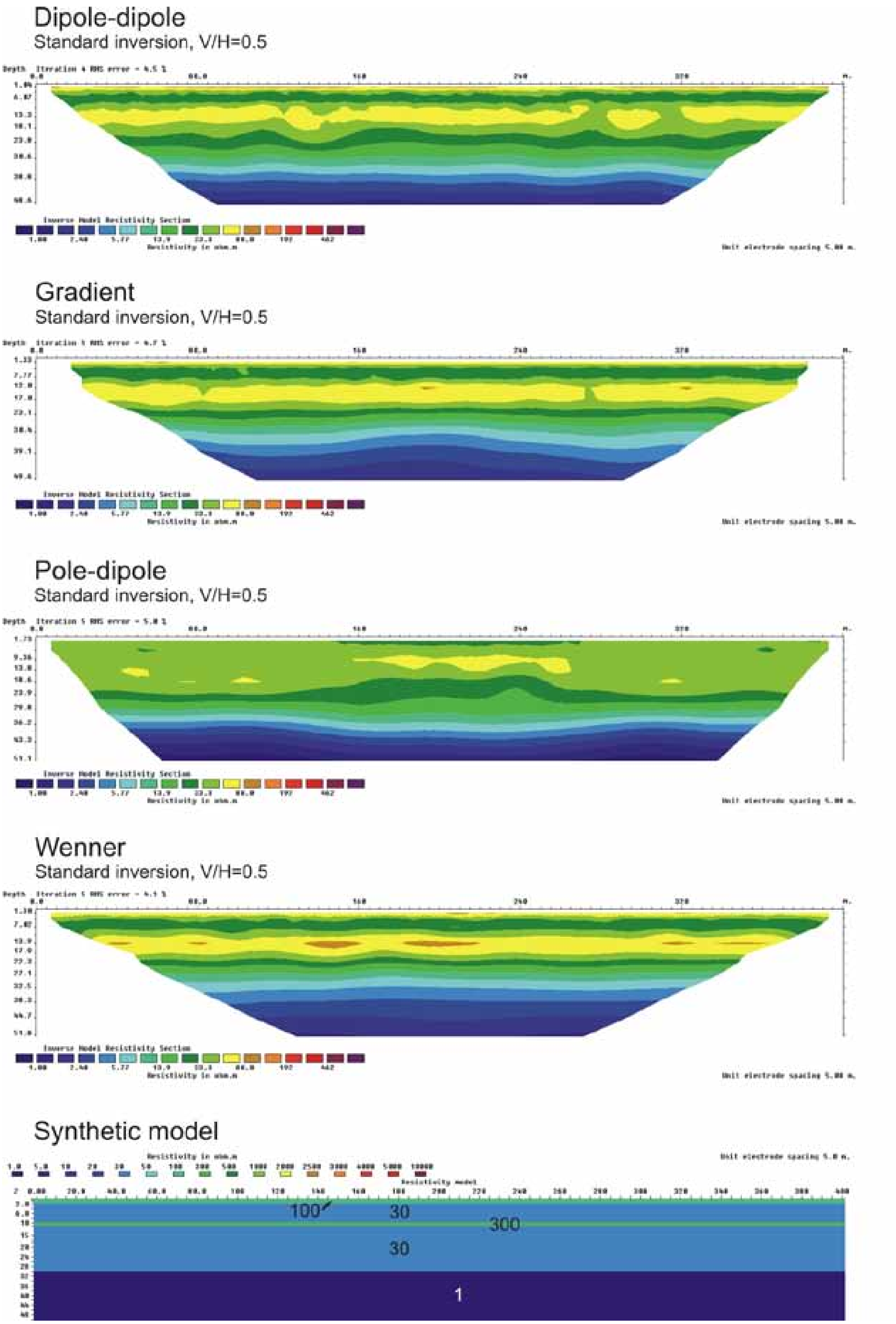

Figure 3.1.31: 1 m thick zone of 300 Ωm in a depth of 10 m.
Standard inversion, V/H=0.5

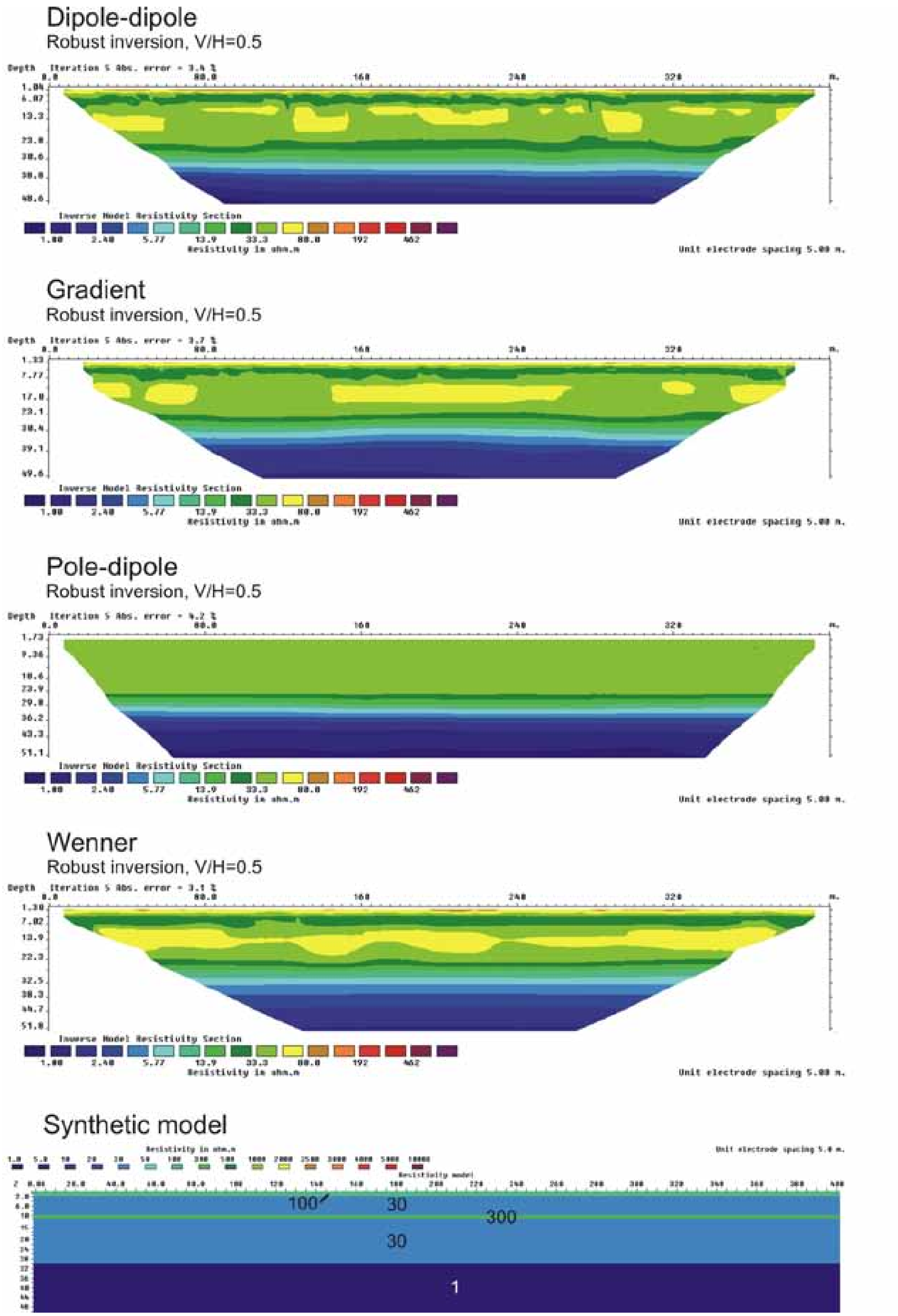

Figure 3.1.32: 1 m thick zone of 300 Ωm in a depth of 10 m.
Robust inversion, V/H=0.5

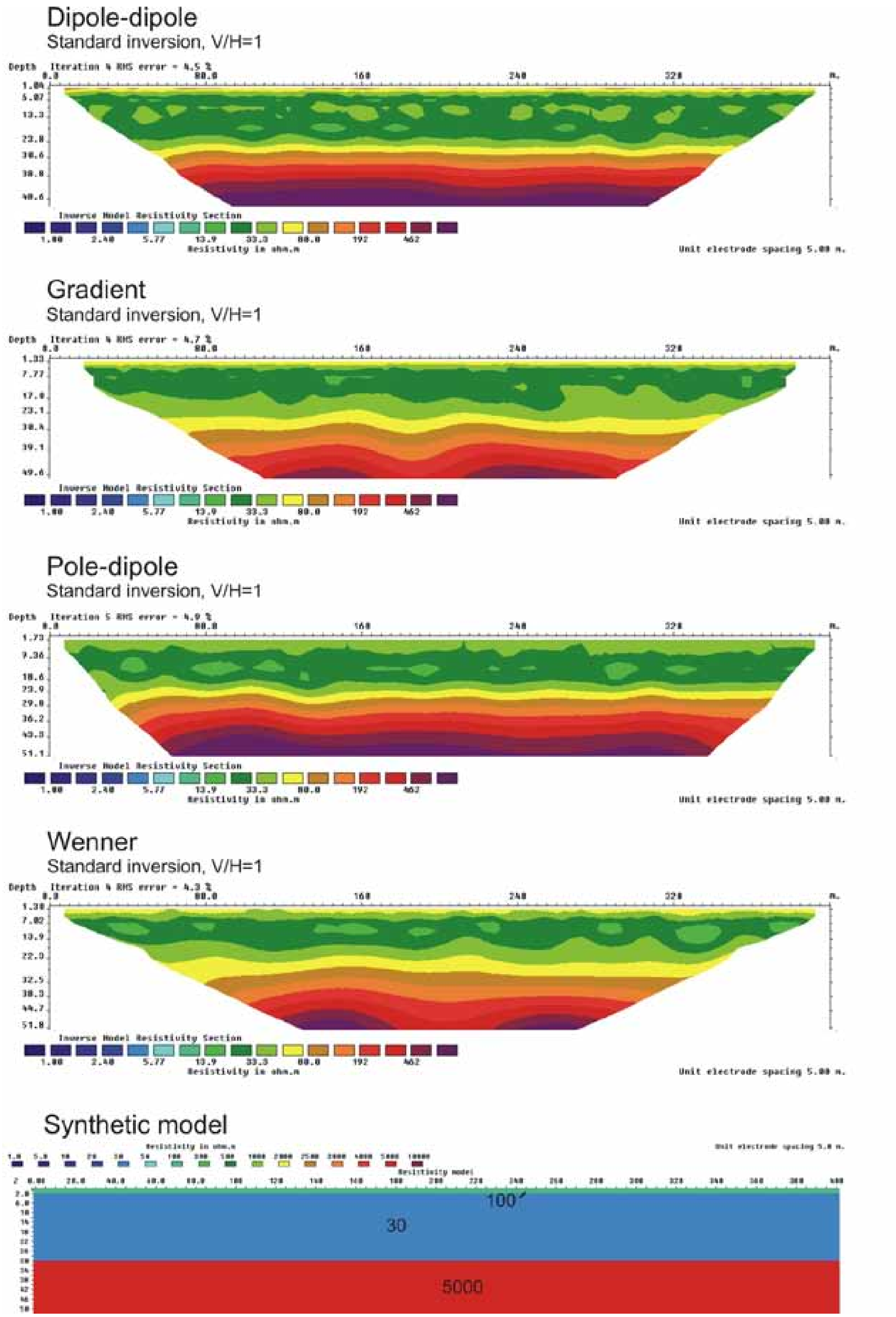

Figure 3.1.33: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 5000 Ωm. Standard inversion, V/H=1

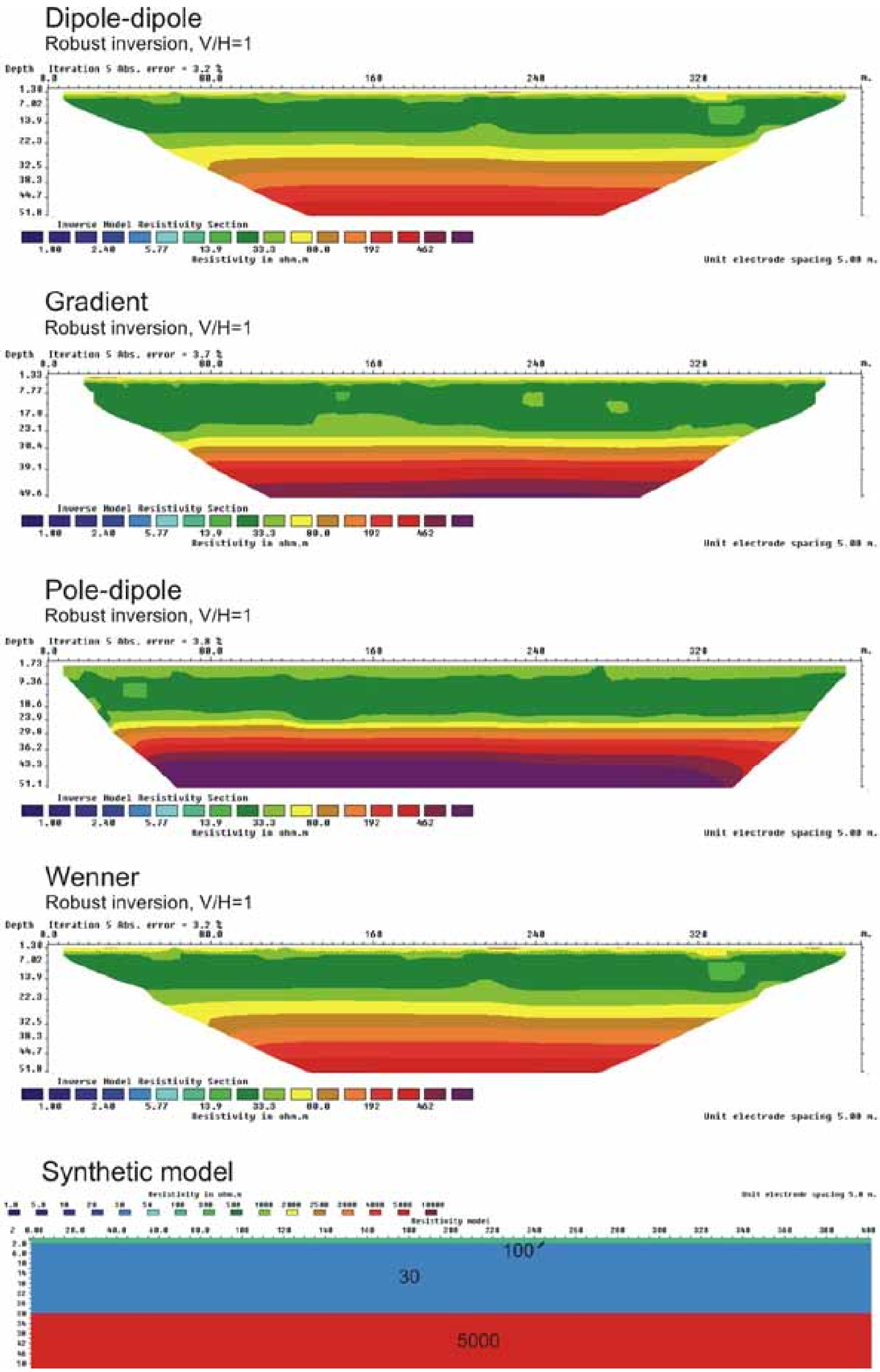

Figure 3.1.34: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 5000 Ωm. Robust inversion, V/H=1

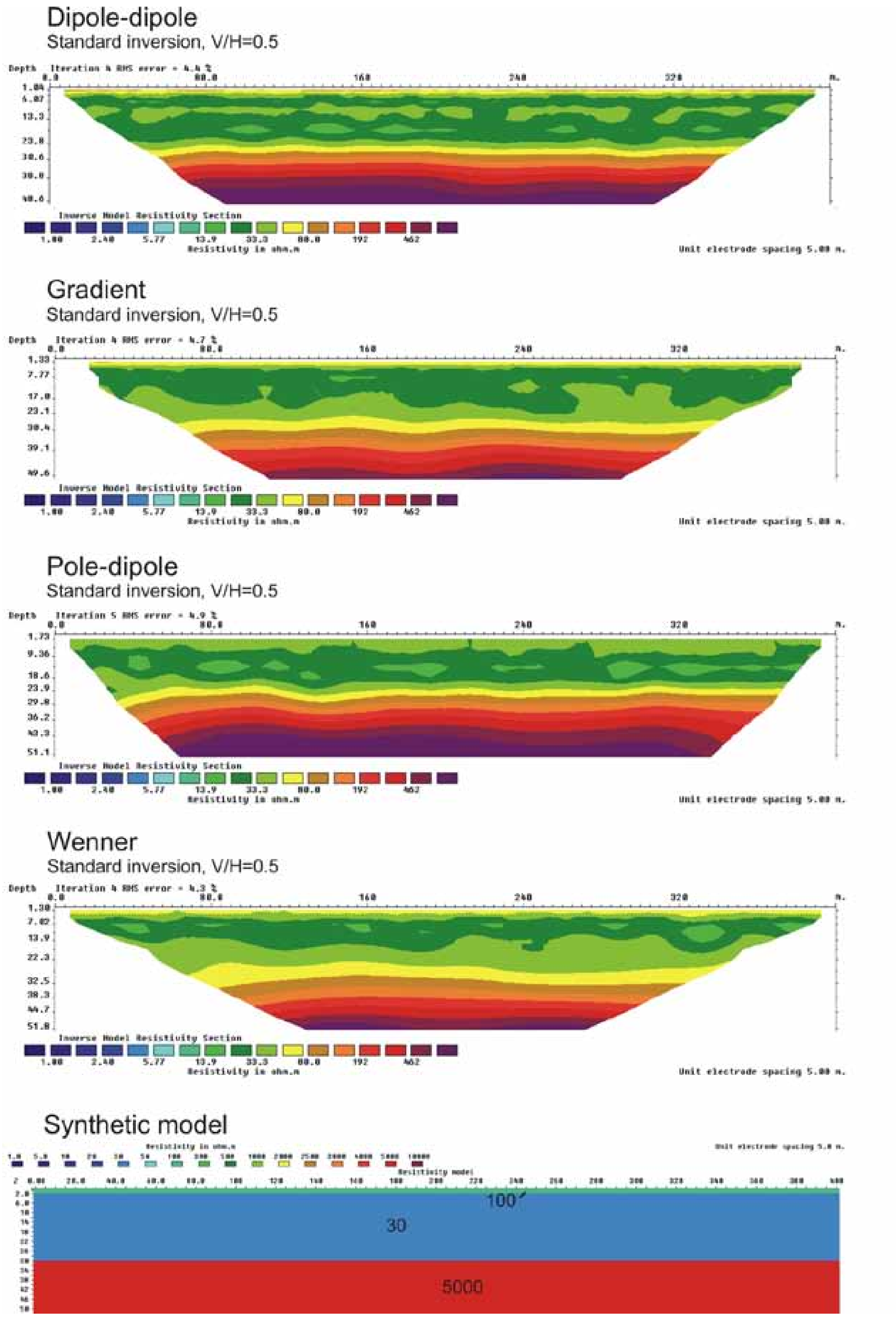

Figure 3.1.35: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 5000 Ωm. Standard inversion, V/H=0.5

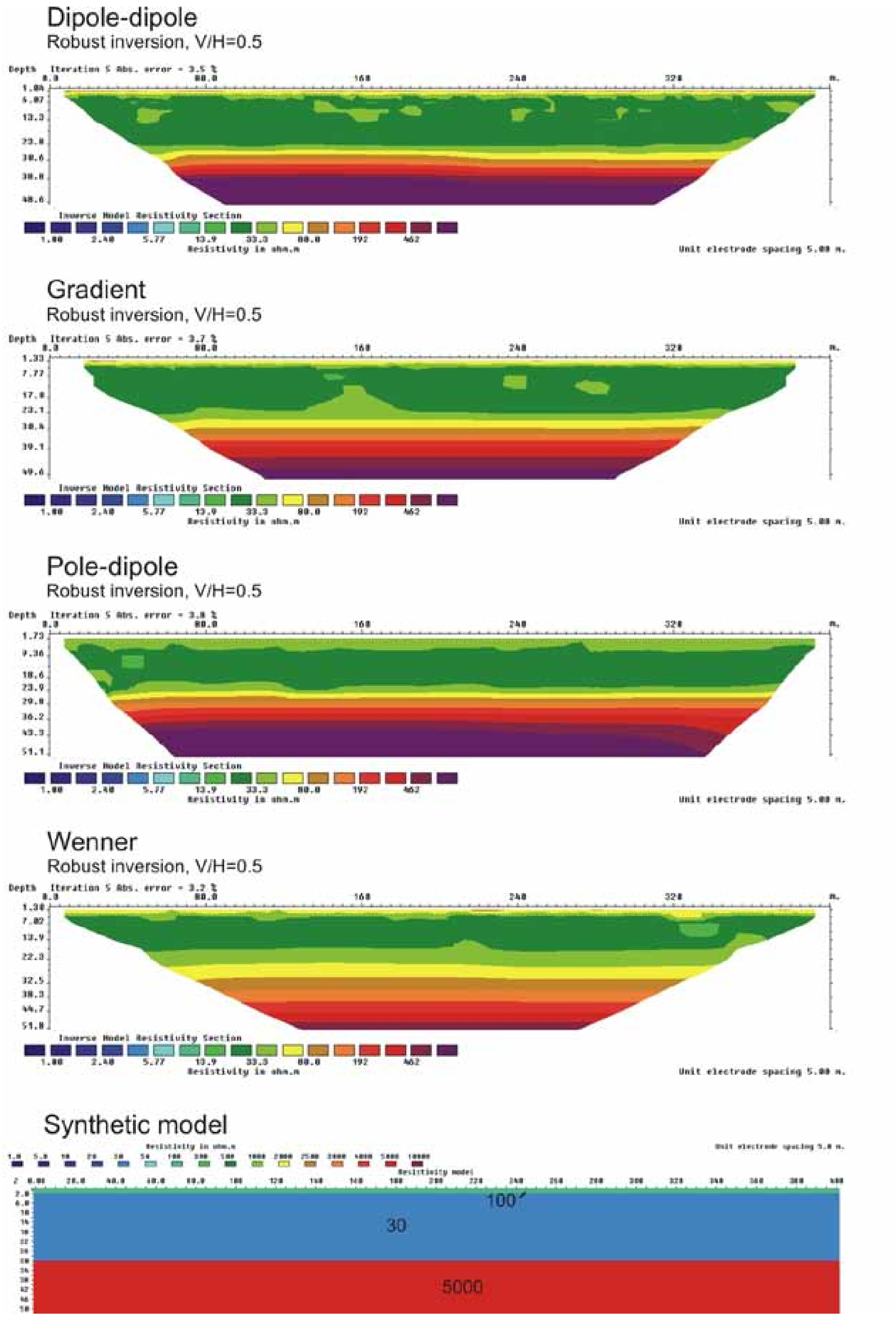

Figure 3.1.36: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 5000 Ωm. Robust inversion, V/H=0.5

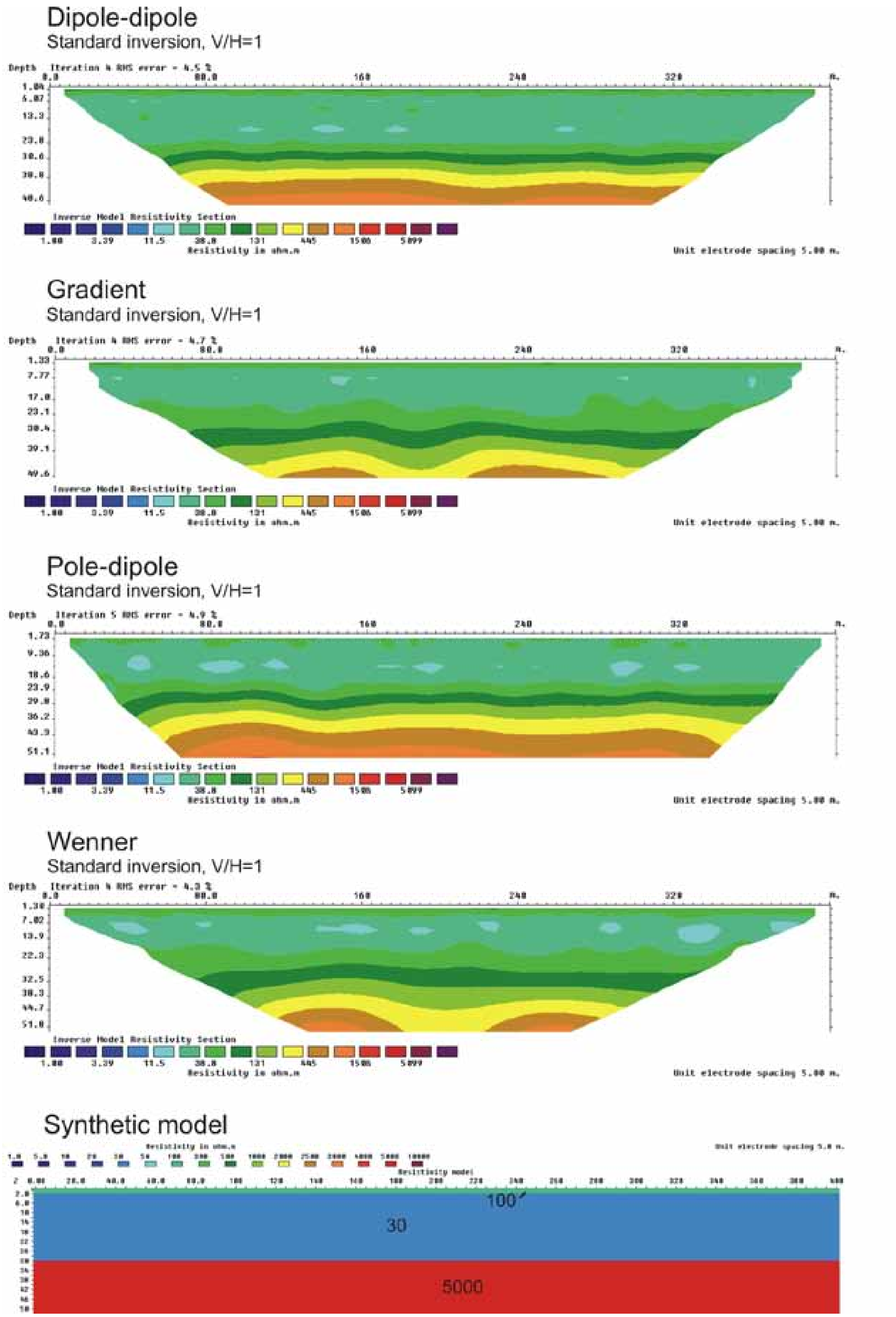

Figure 3.1.37: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 5000 Ωm. Standard inversion, V/H=1

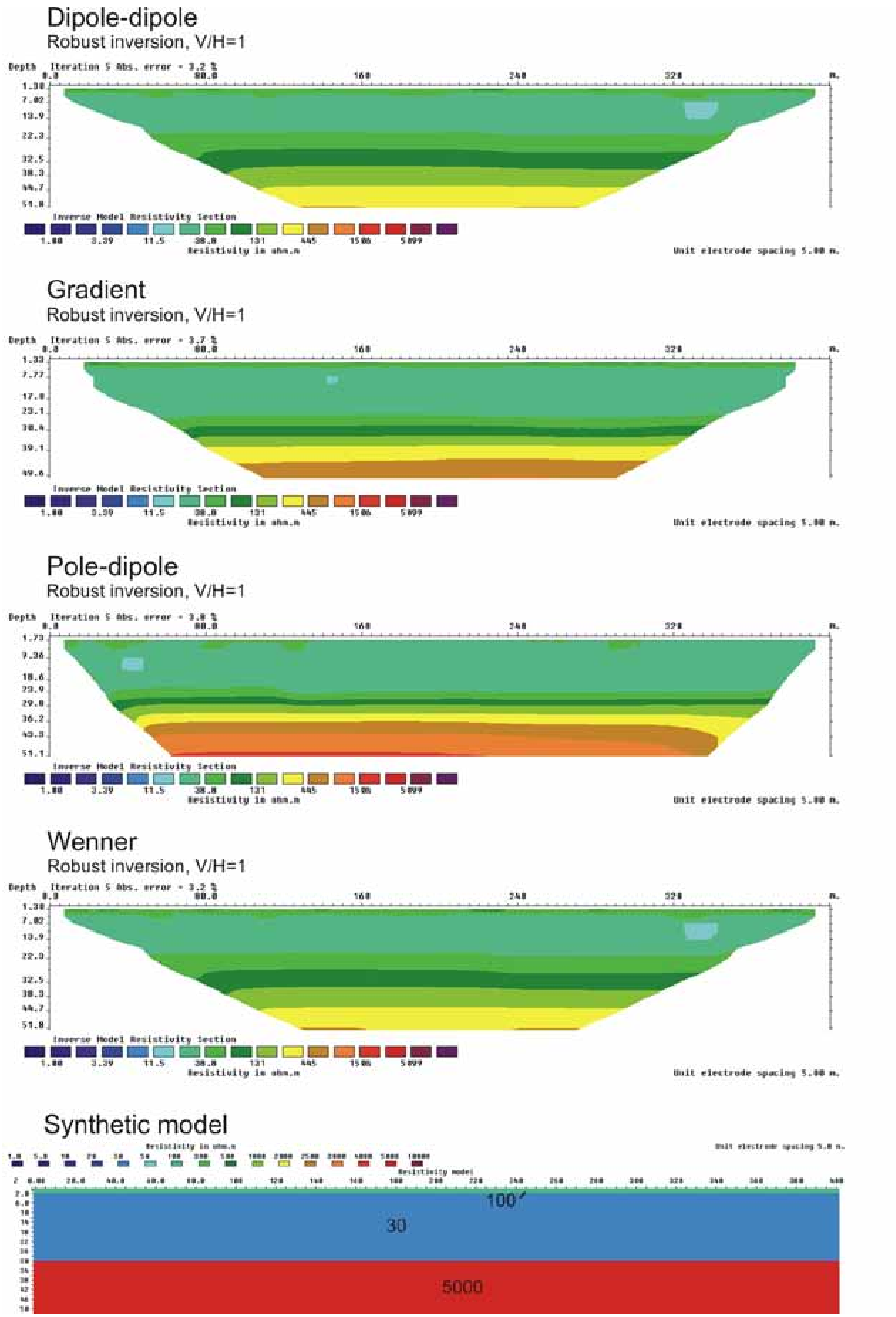

Figure 3.1.38: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 5000 Ωm. Robust inversion, V/H=1

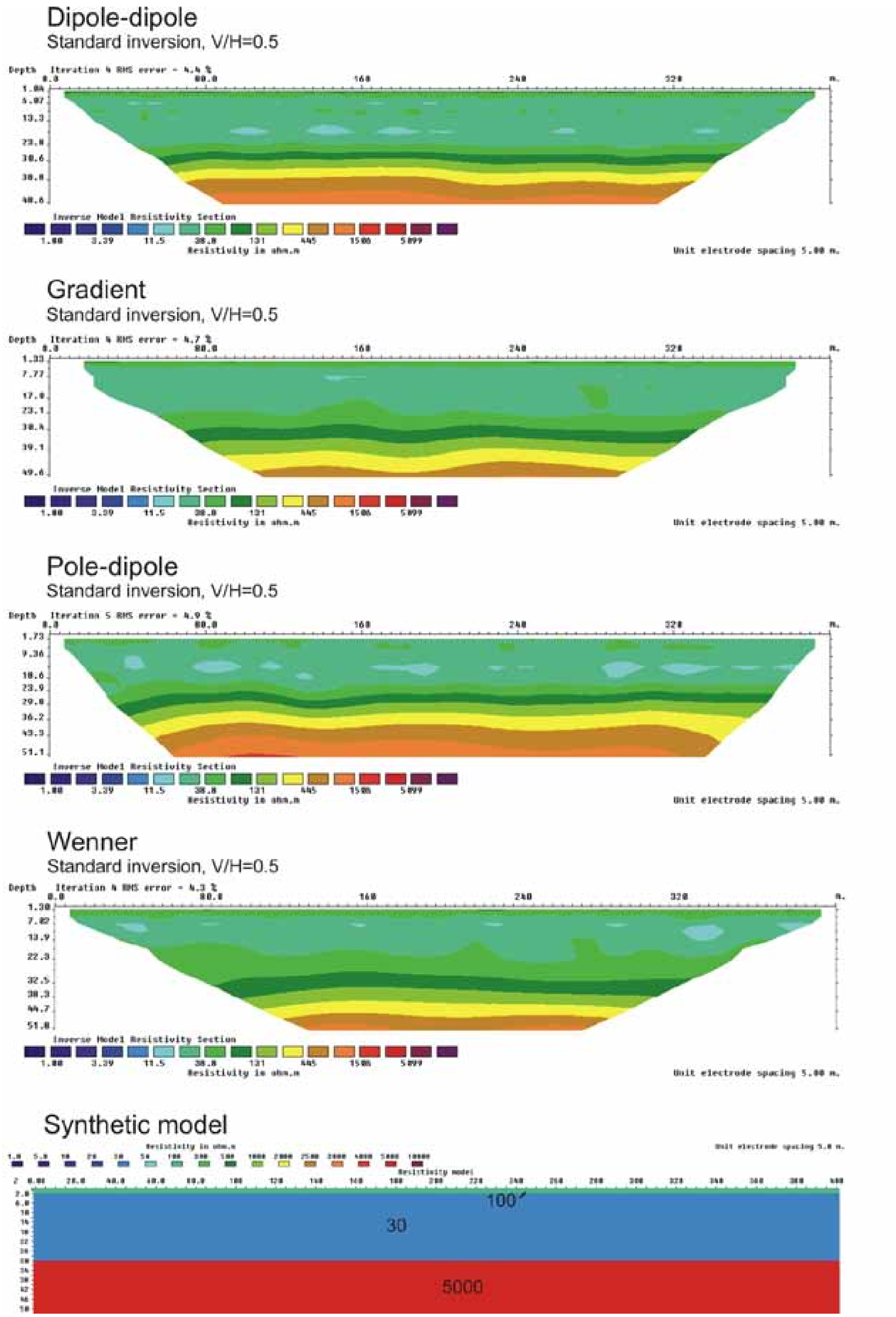

Figure 3.1.39: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 5000 Ωm. Standard inversion, V/H=0.5

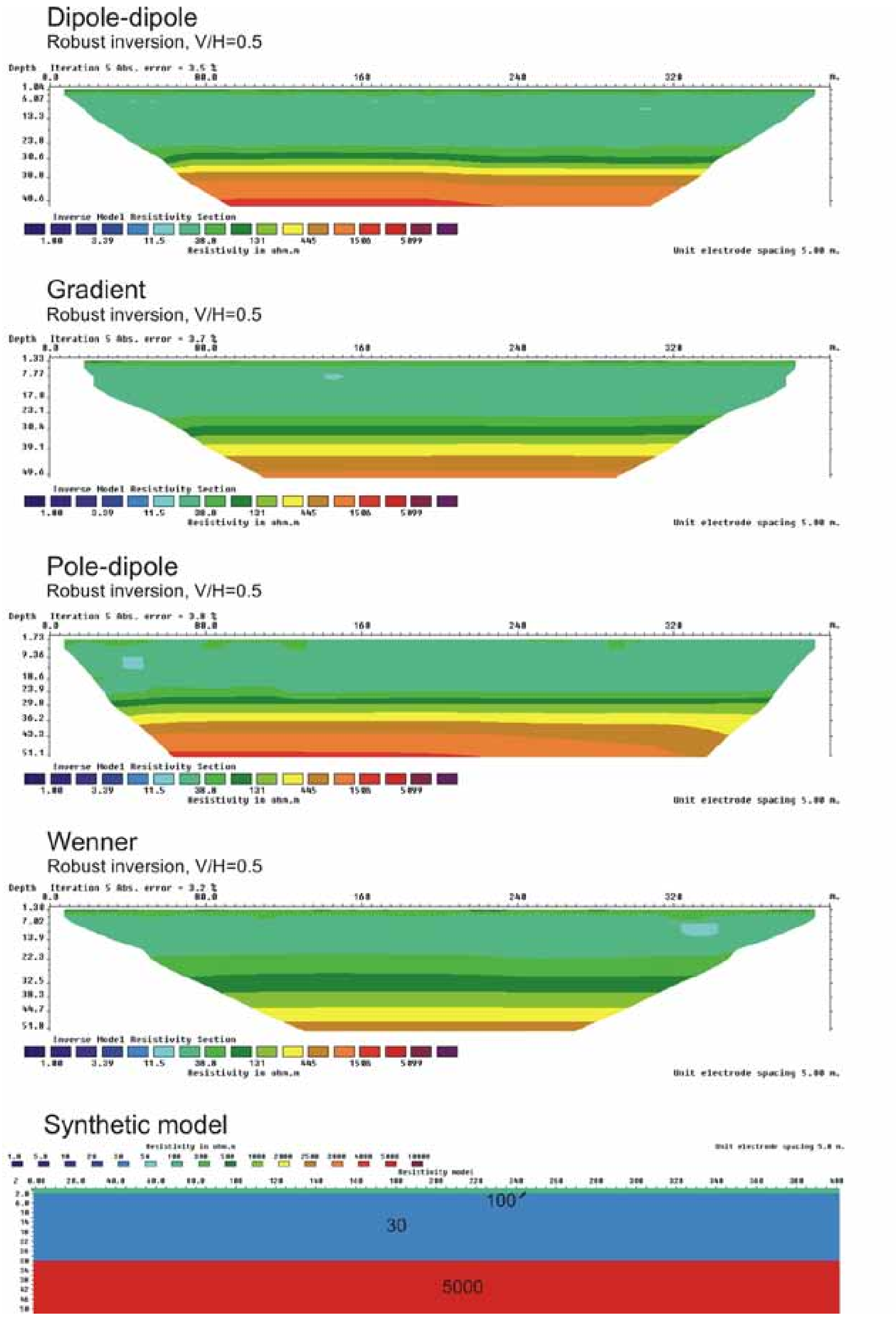

Figure 3.1.40: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 5000 Ωm. Robust inversion, V/H=0.5

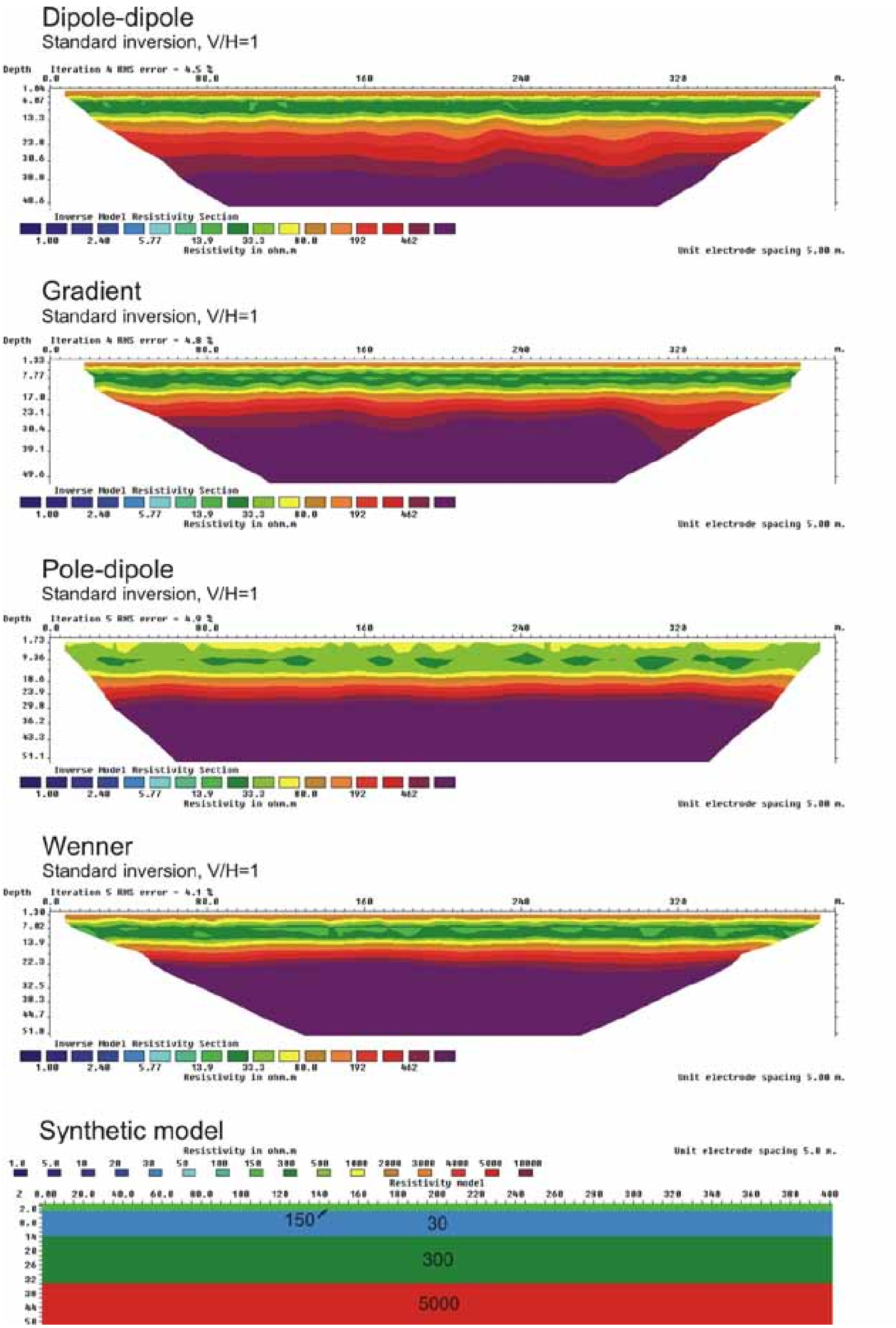

Figure 3.1.41: 3m top layer (150 Ωm) over horizontal layers of 30 Ωm, 300 Ωm and 5000 Ωm. Standard inversion, V/H=1

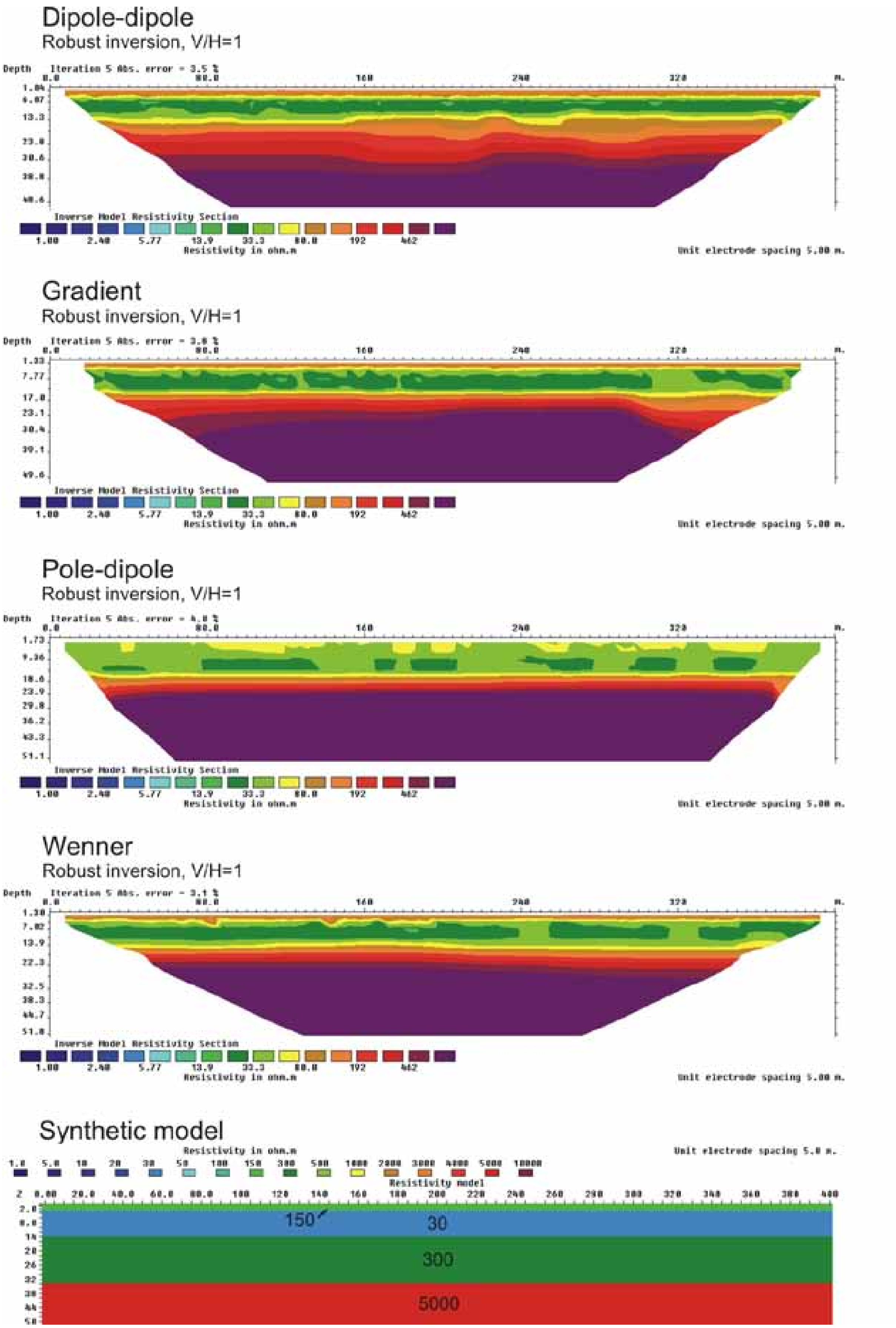

Figure 3.1.42: 3m top layer (150 Ωm) over horizontal layers of 30 Ωm, 300 Ωm and 5000 Ωm. Robust inversion, V/H=1

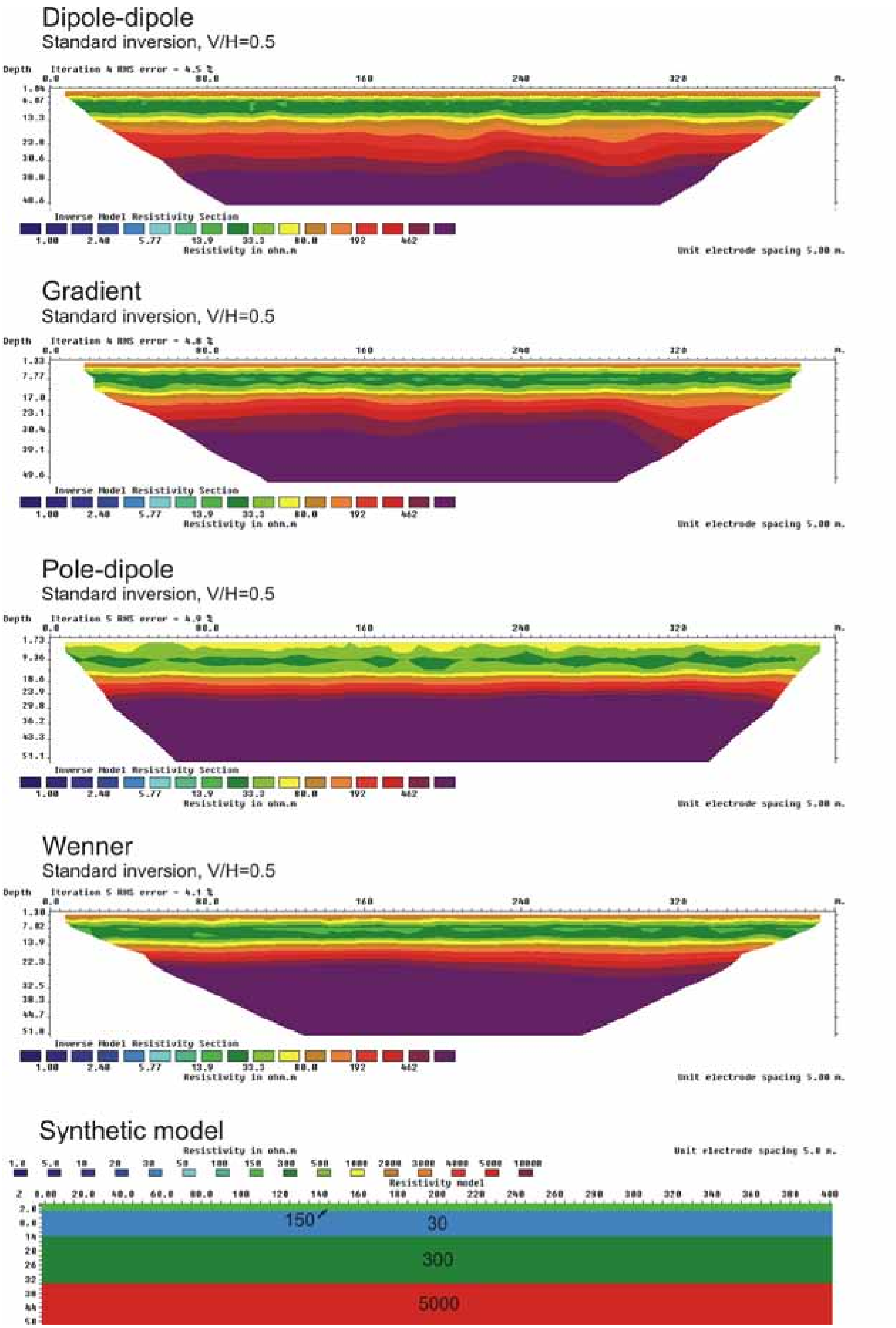

Figure 3.1.43: 3m top layer (150 Ωm) over horizontal layers of 30 Ωm, 300 Ωm and 5000 Ωm. Standard inversion, V/H=0.5

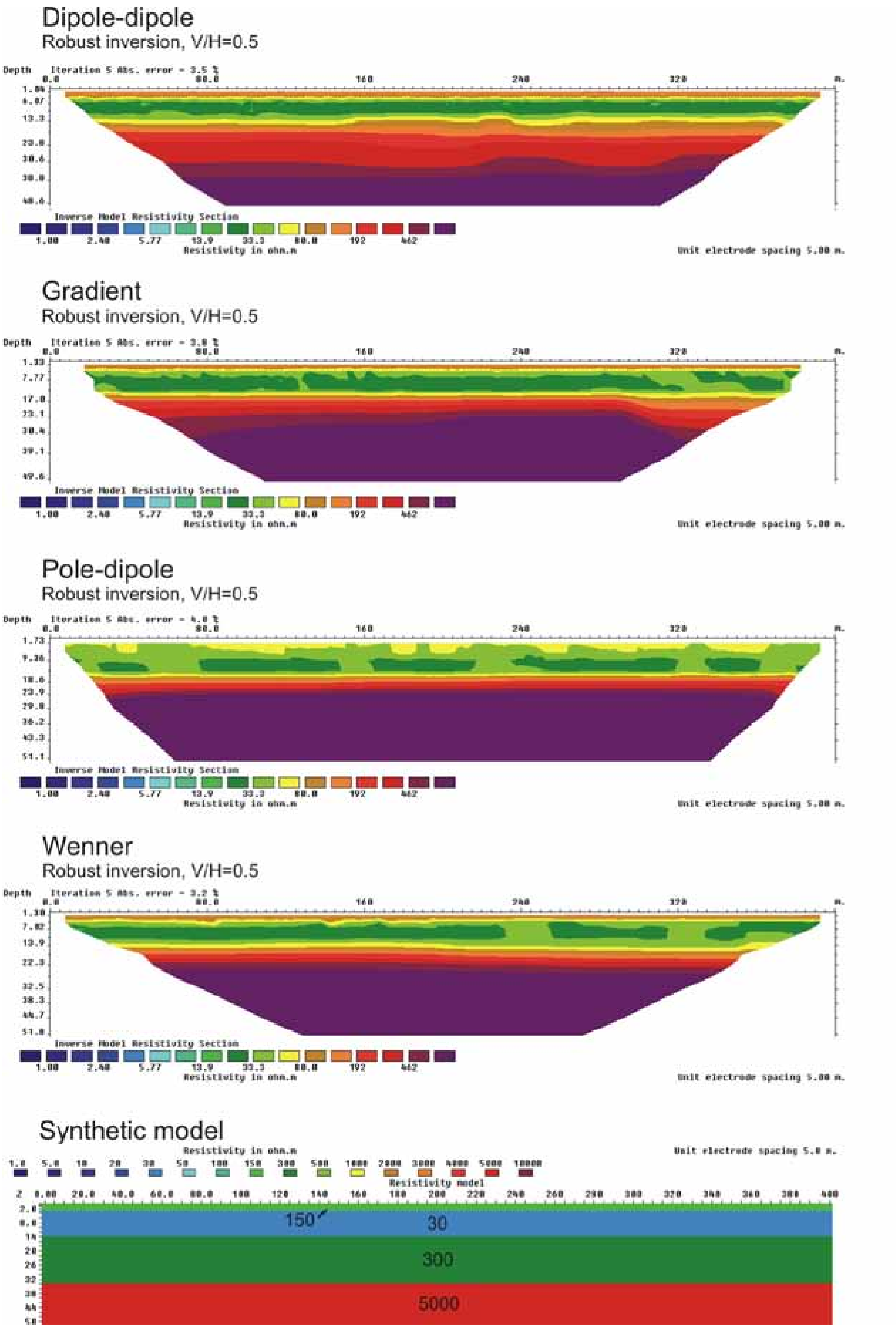

Figure 3.1.44: 3m top layer (150 Ωm) over horizontal layers of 30 Ωm, 300 Ωm and 5000 Ωm. Robust inversion, V/H=0.5

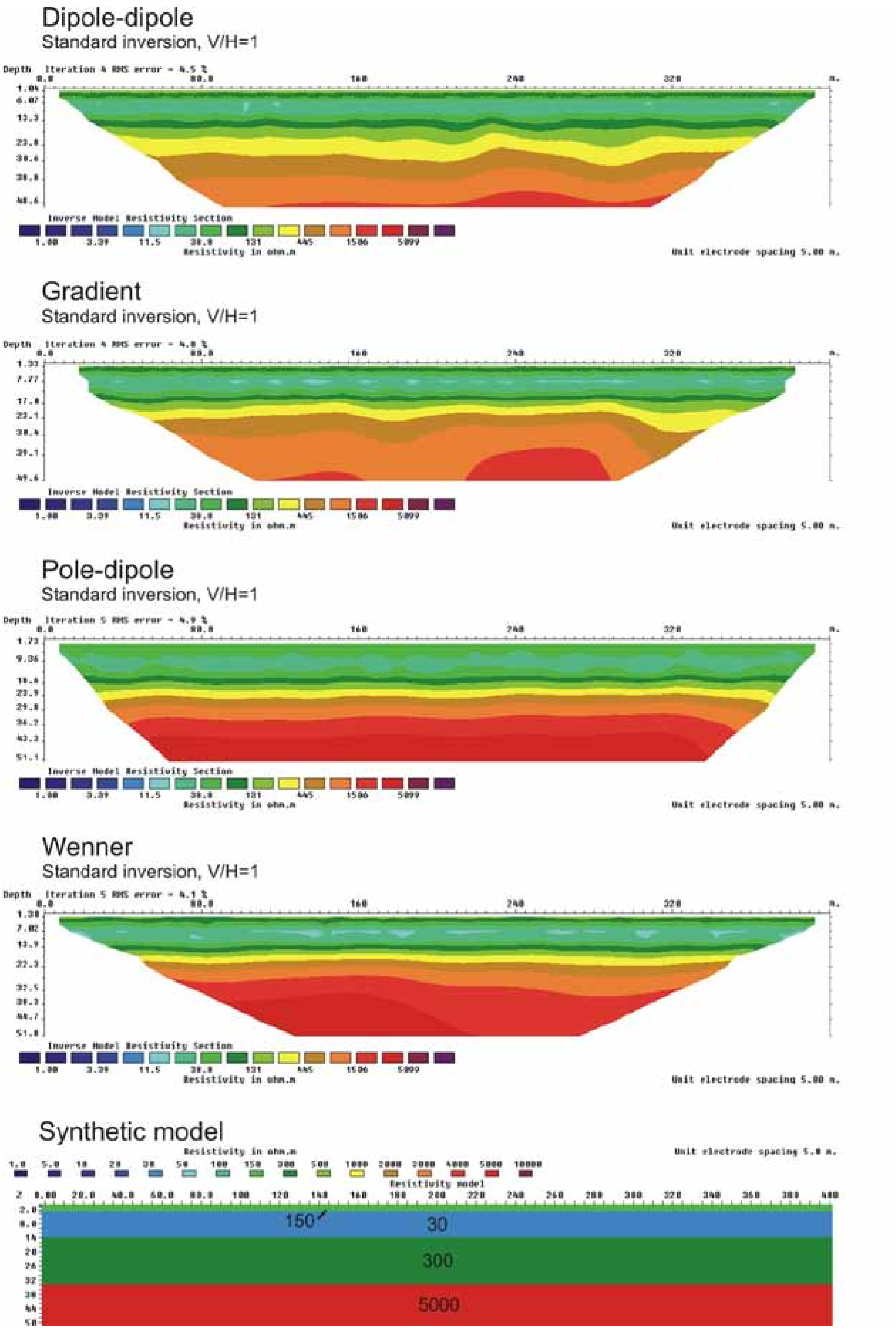

Figure 3.1.45: 3m top layer (150 Ωm) over horizontal layers of 30 Ωm, 300 Ωm and 5000 Ωm. Standard inversion, V/H=1

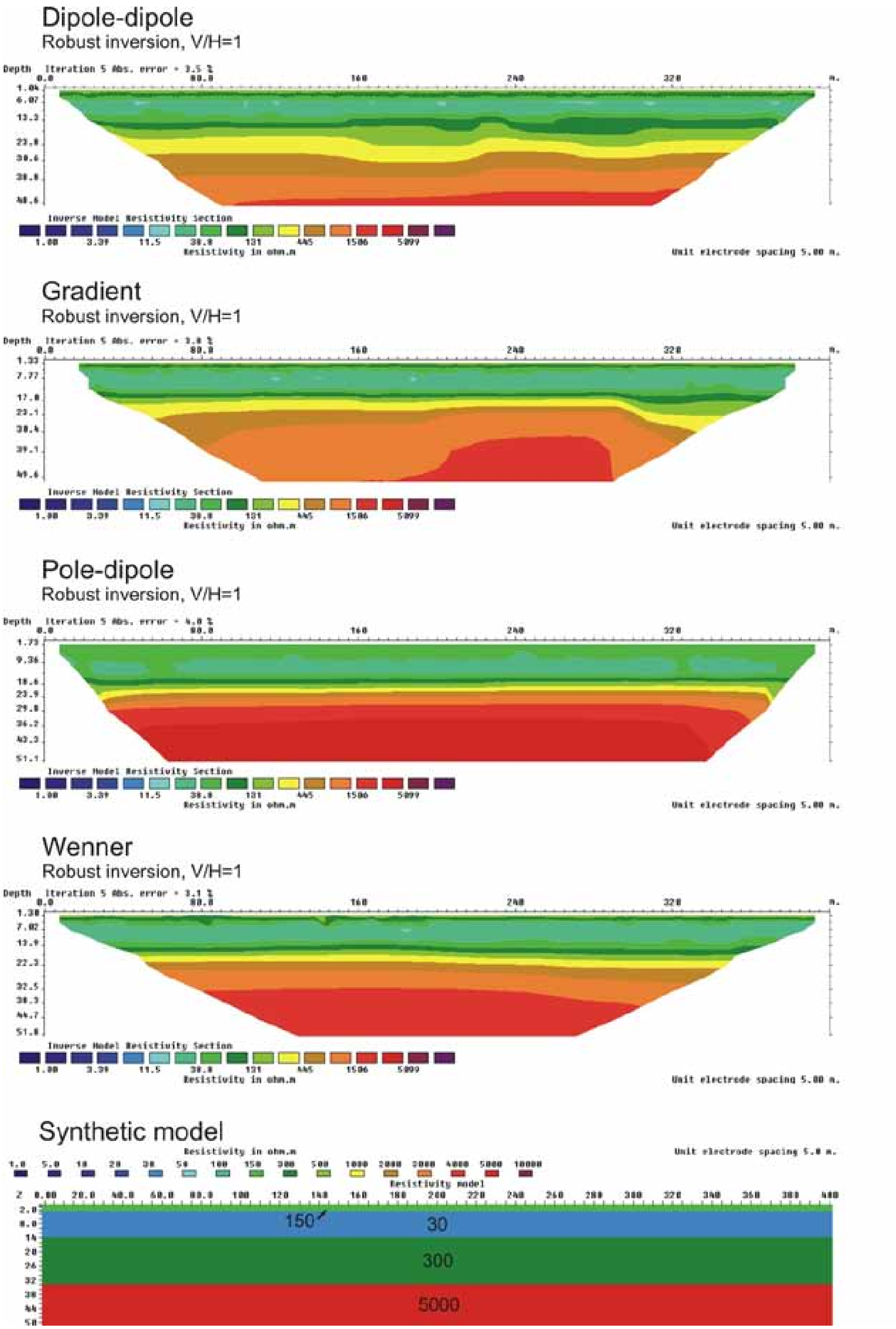

Figure 3.1.46 3m top layer (150 Ωm) over horizontal layers of 30 Ωm, 300 Ωm and 5000 Ωm. Robust inversion, V/H=1

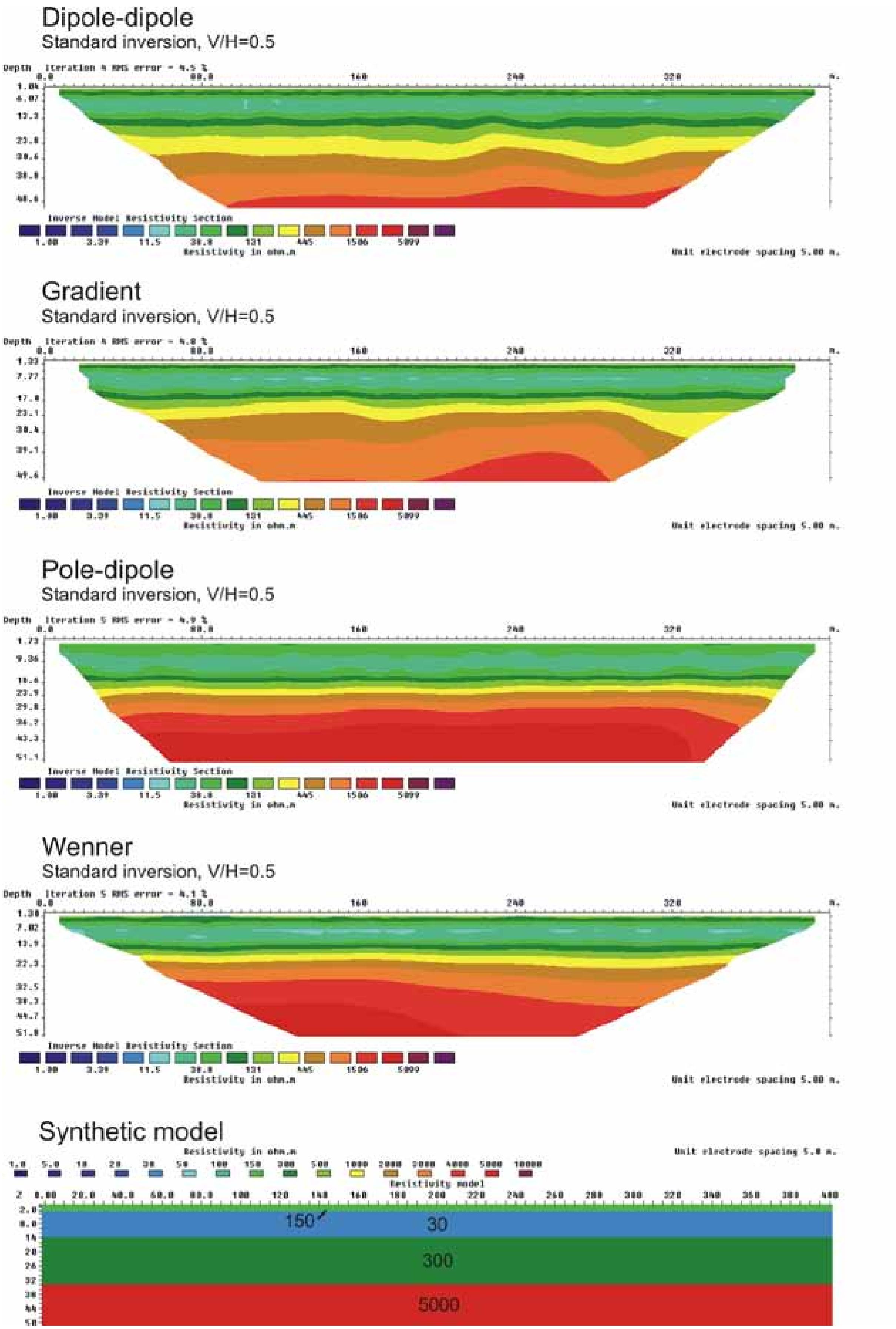

Figure 3.1.47: 3m top layer (150 Ωm) over horizontal layers of 30 Ωm, 300 Ωm and 5000 Ωm. Standard inversion, V/H=0.5

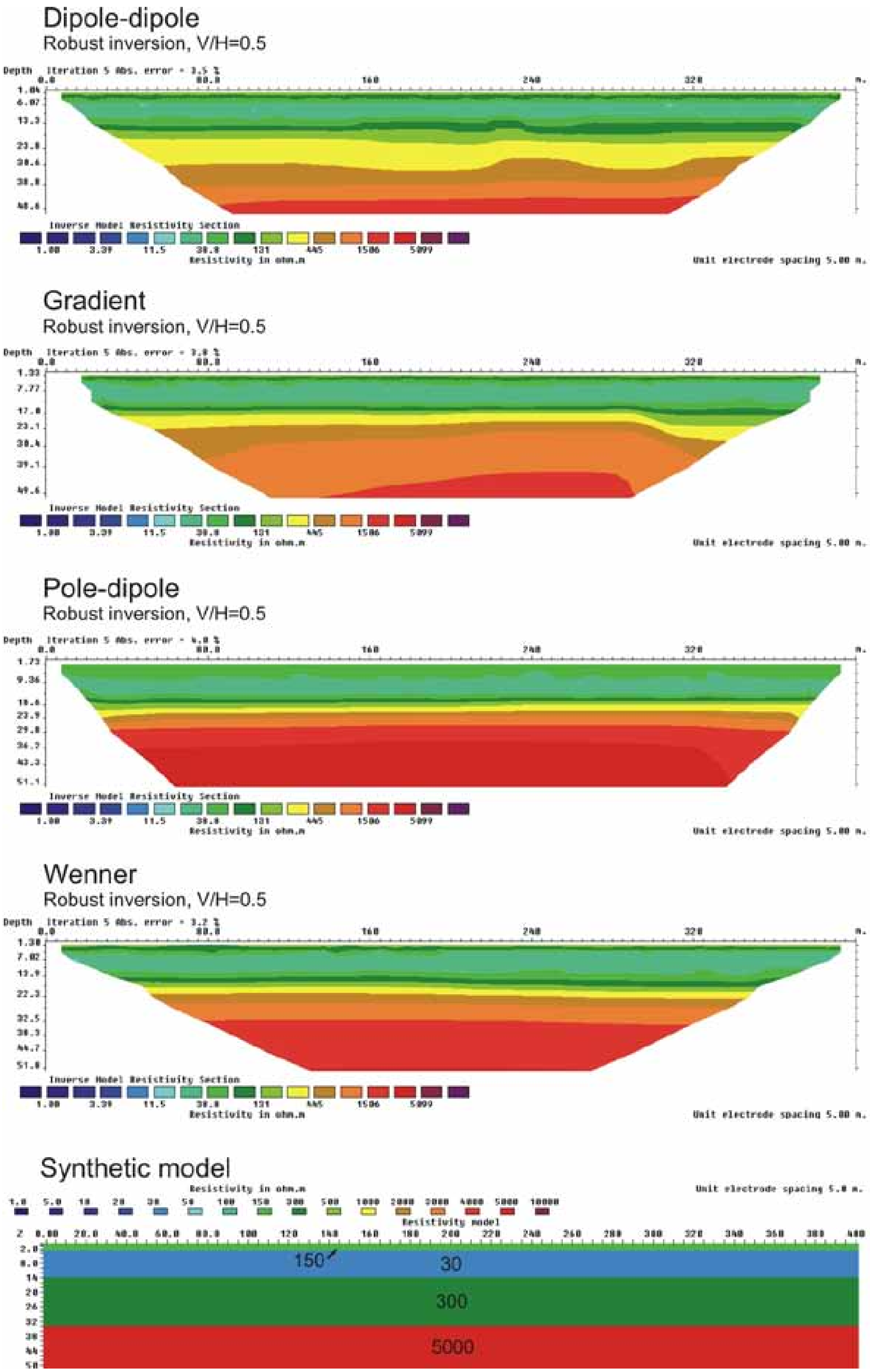

Figure 3.1.48: 3m top layer (150 Ωm) over horizontal layers of 30 Ωm, 300 Ωm and 5000 Ωm. Robust inversion, V/H=0.5

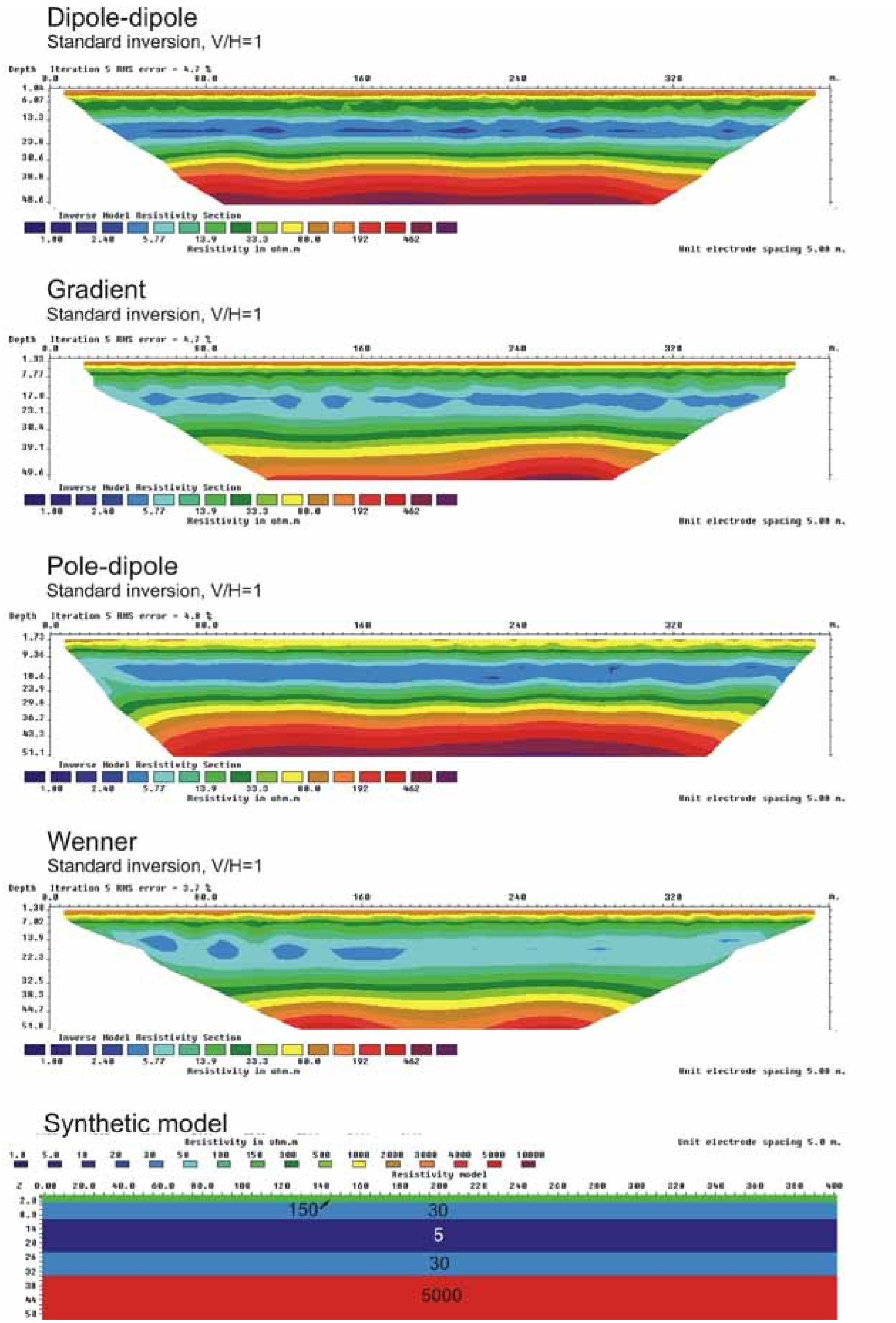

Figure 3.1.49: 3 m top layer (150 Ωm) over horizontal layers of 30 Ωm, 5 Ωm, 30 Ωm and 5000 Ωm. Standard inversion, V/H=1

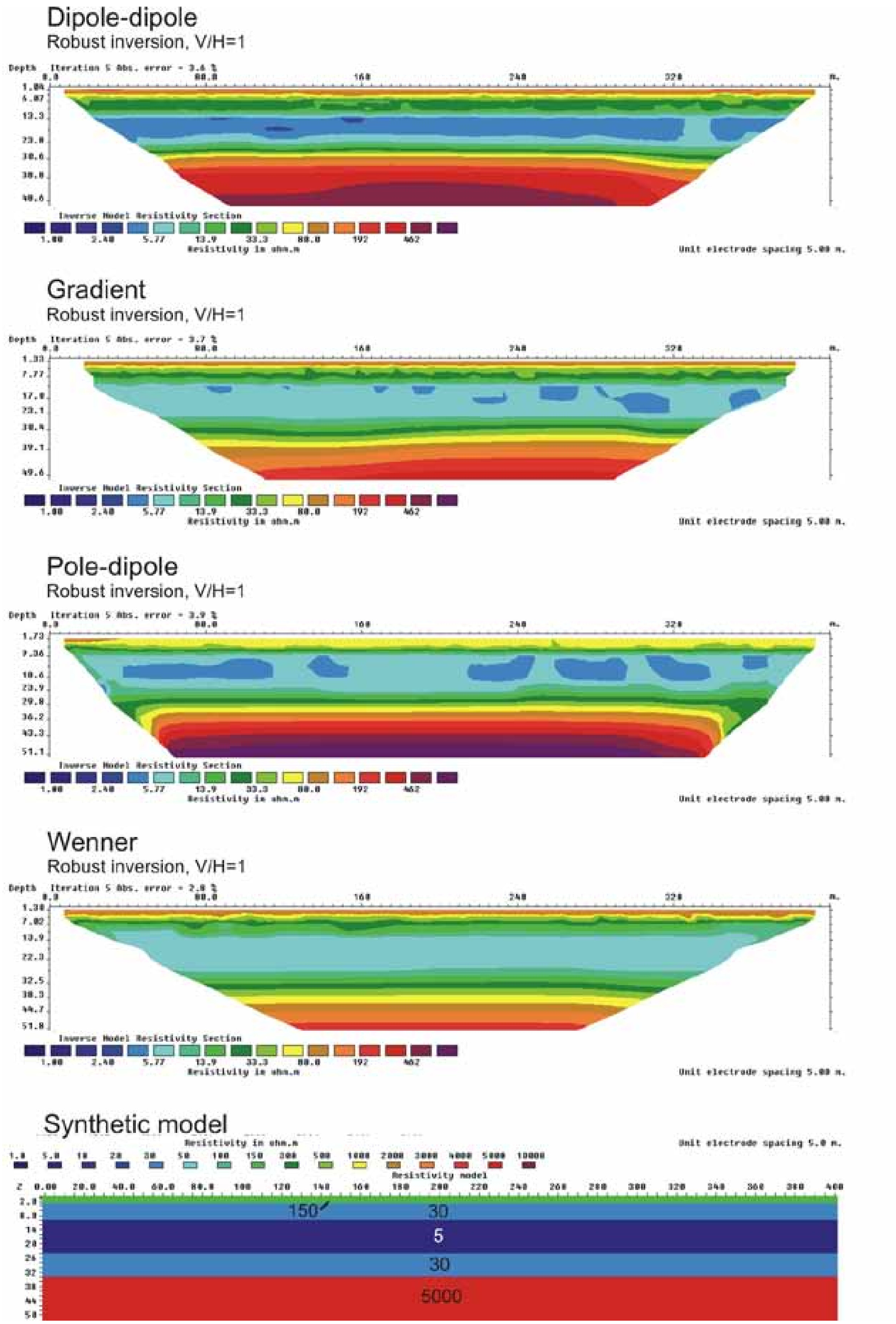

Figure 3.1.50: 3 m top layer (150 Ωm) over horizontal layers of 30 Ωm, 5 Ωm, 30 Ωm and 5000 Ωm. Robust inversion, V/H=1

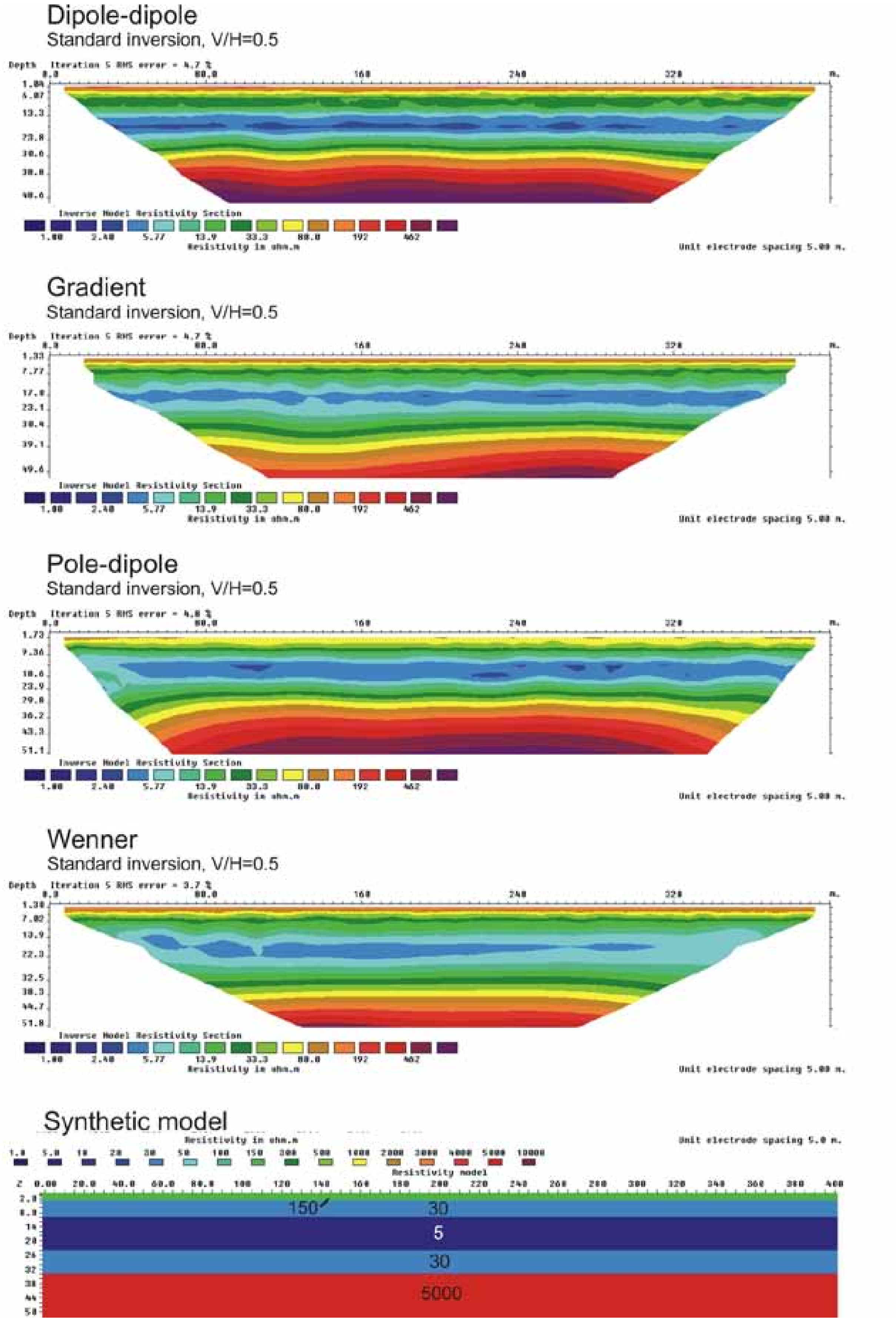

Figure 3.1.51: 3 m top layer (150 Ωm) over horizontal layers of 30 Ωm, 5 Ωm, 30 Ωm and 5000 Ωm. Standard inversion, V/H=0.5

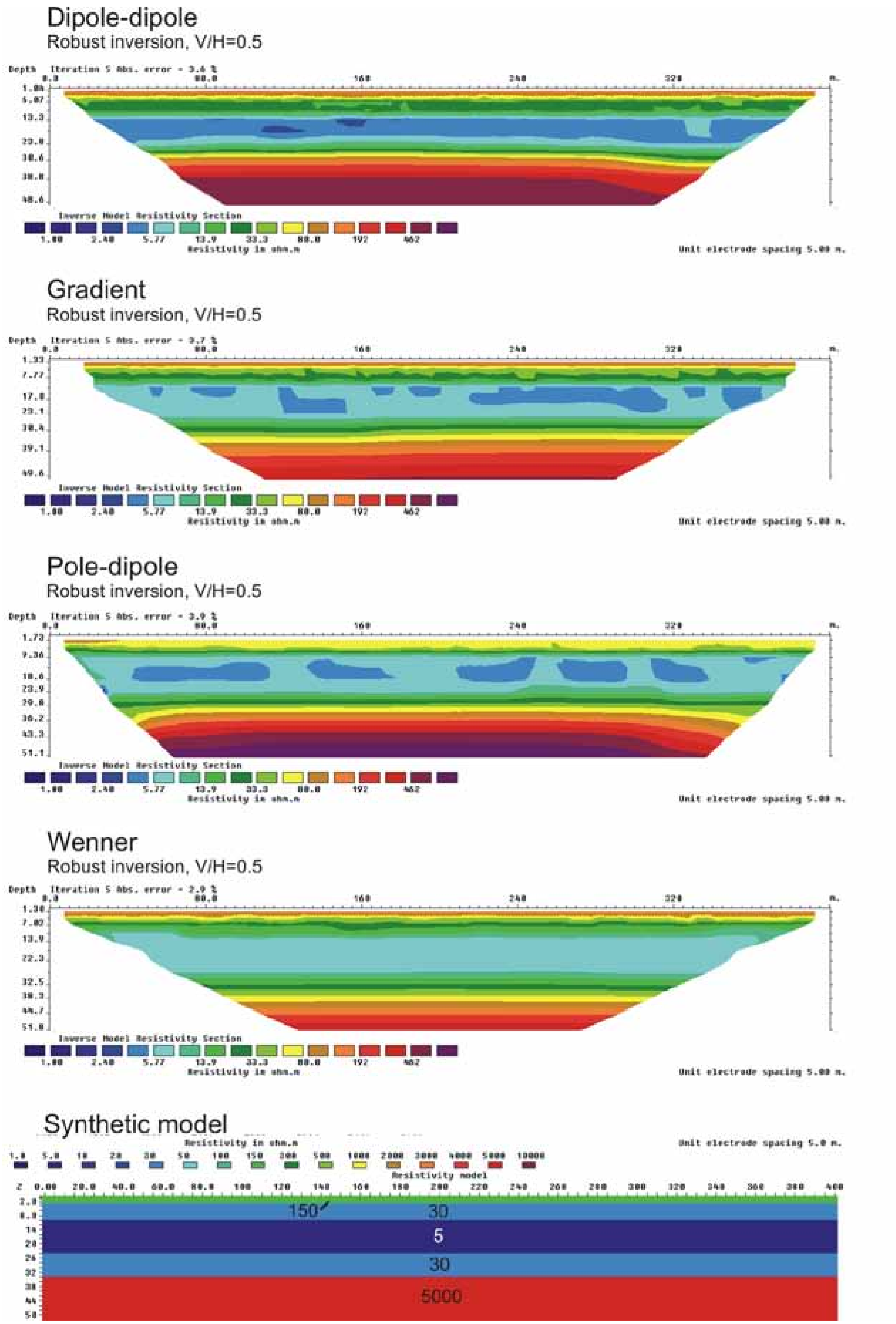

Figure 3.1.52: 3 m top layer (150 Ωm) over horizontal layers of 30 Ωm, 5 Ωm, 30 Ωm and 5000 Ωm. Robust inversion, V/H=0.5

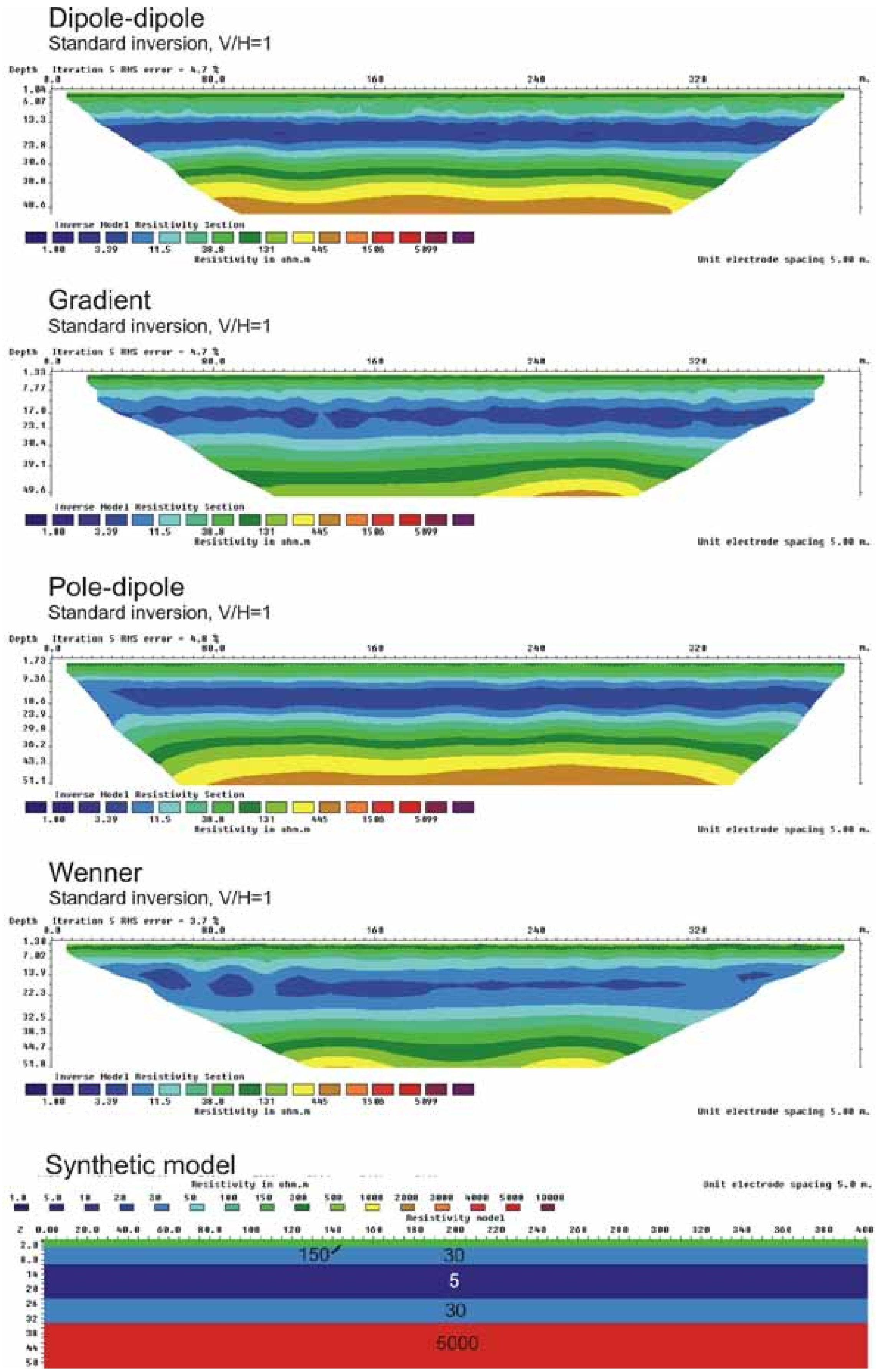

Figure 3.1.53: 3 m top layer (150 Ωm) over horizontal layers of 30 Ωm, 5 Ωm, 30 Ωm and 5000 Ωm. Standard inversion, V/H=1

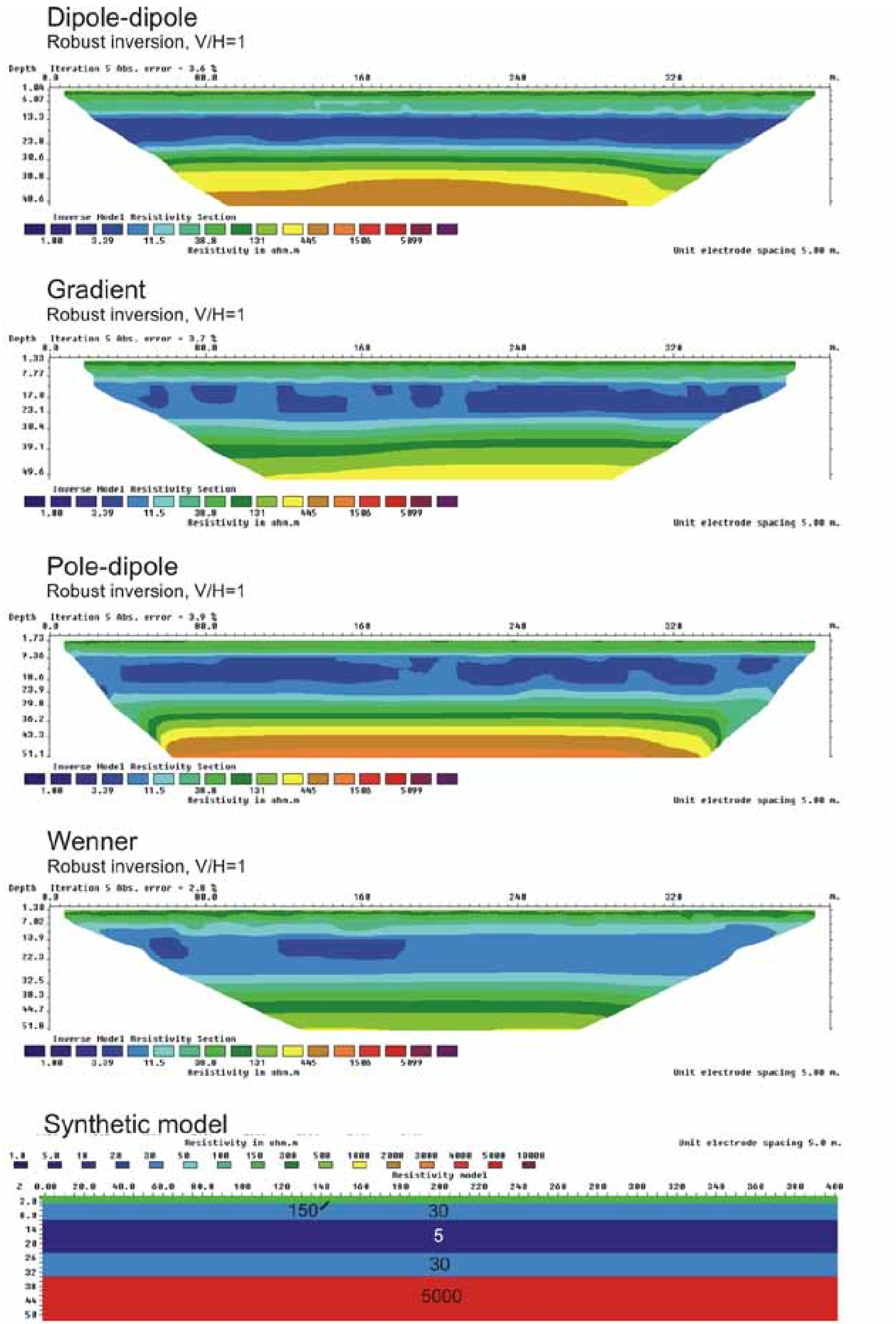

Figure 3.1.54: 3 m top layer (150 Ωm) over horizontal layers of 30 Ωm, 5 Ωm, 30 Ωm and 5000 Ωm. Robust inversion, V/H=1

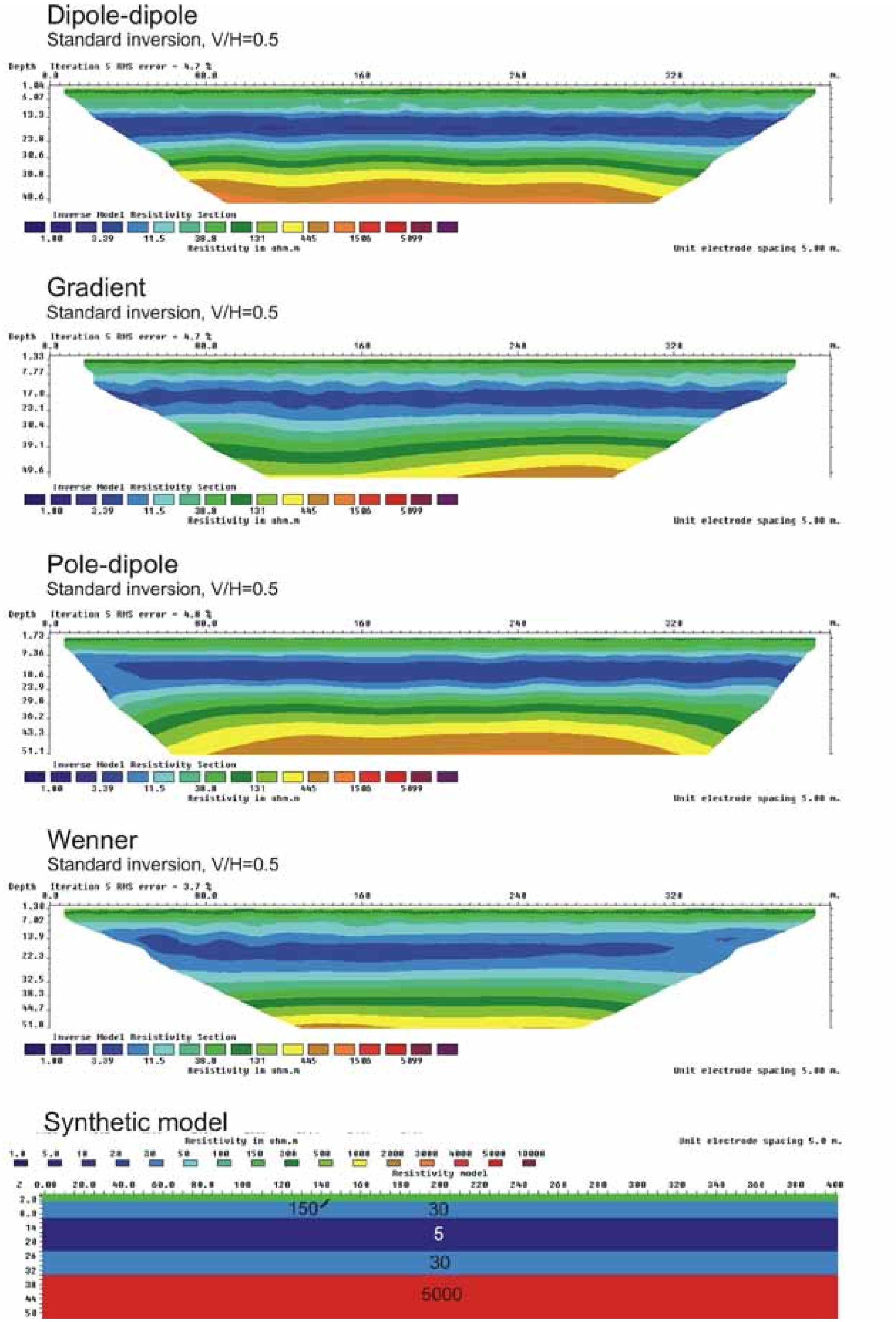

Figure 3.1.55: 3 m top layer (150 Ωm) over horizontal layers of 30 Ωm, 5 Ωm, 30 Ωm and 5000 Ωm. Standard inversion, V/H=0.5

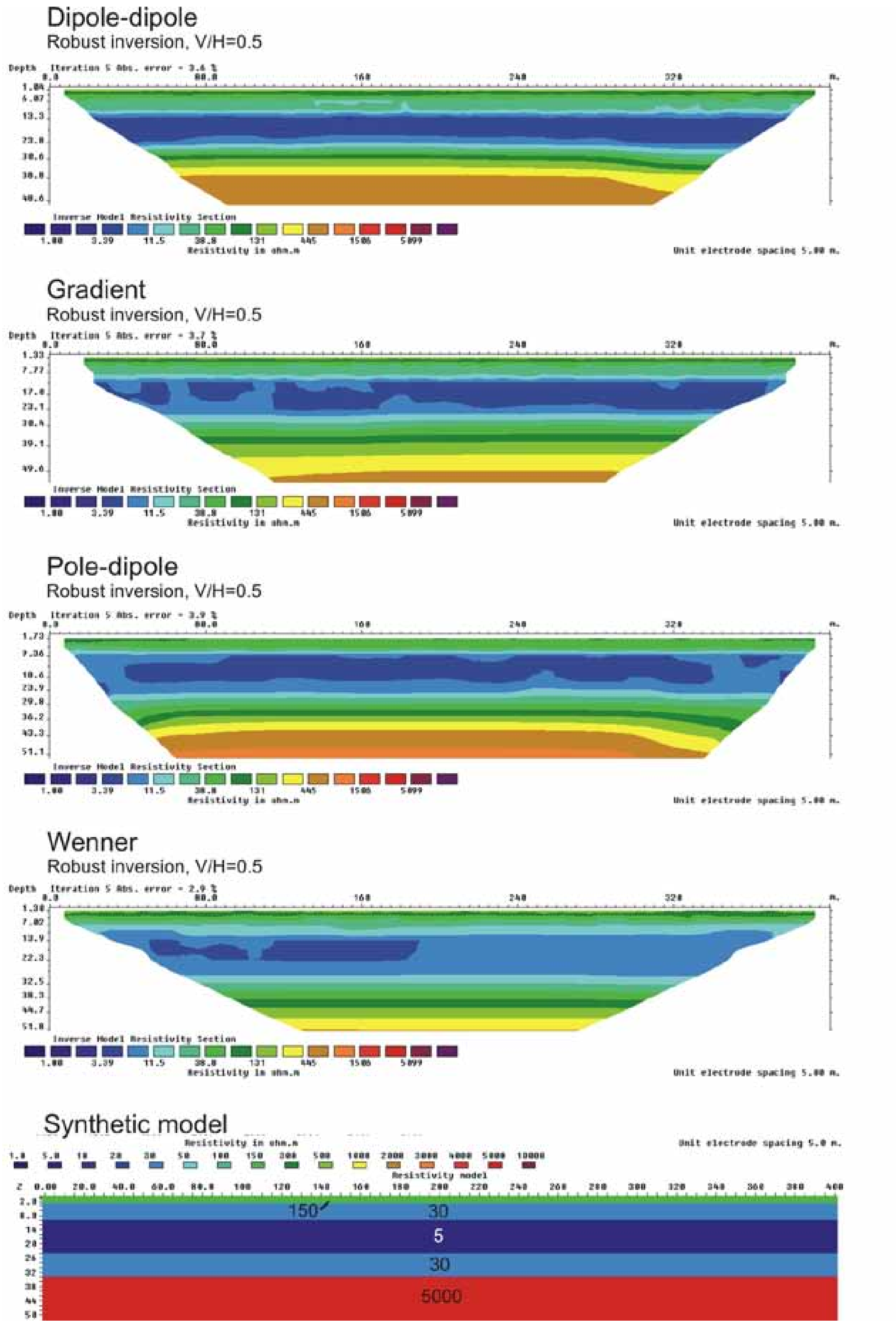

Figure 3.1.56: 3 m top layer (150 Ωm) over horizontal layers of 30 Ωm, 5 Ωm, 30 Ωm and 5000 Ωm. Robust inversion, V/H=0.5

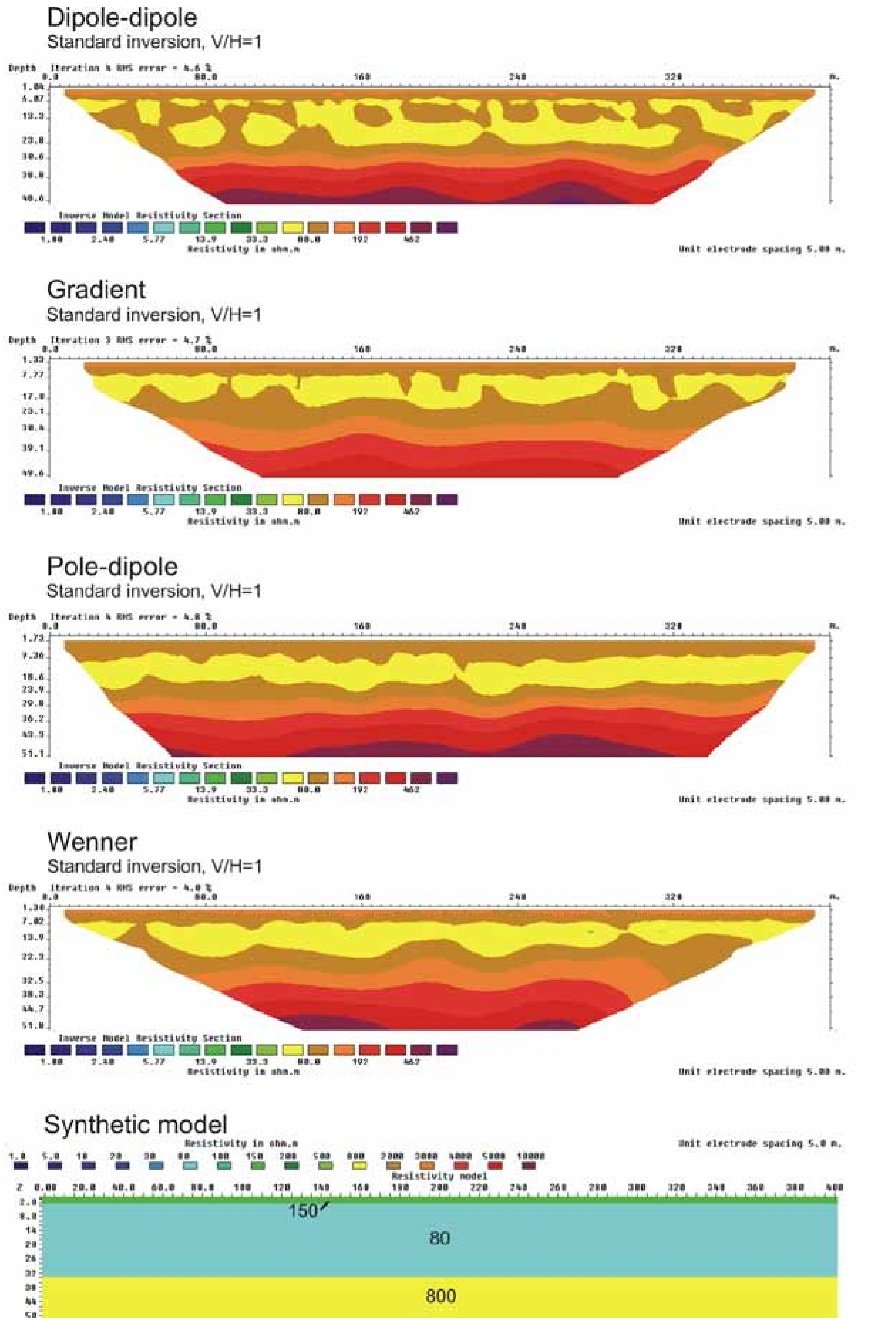

Figure 3.1.57: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm and 800 Ωm. Standard inversion, V/H=1

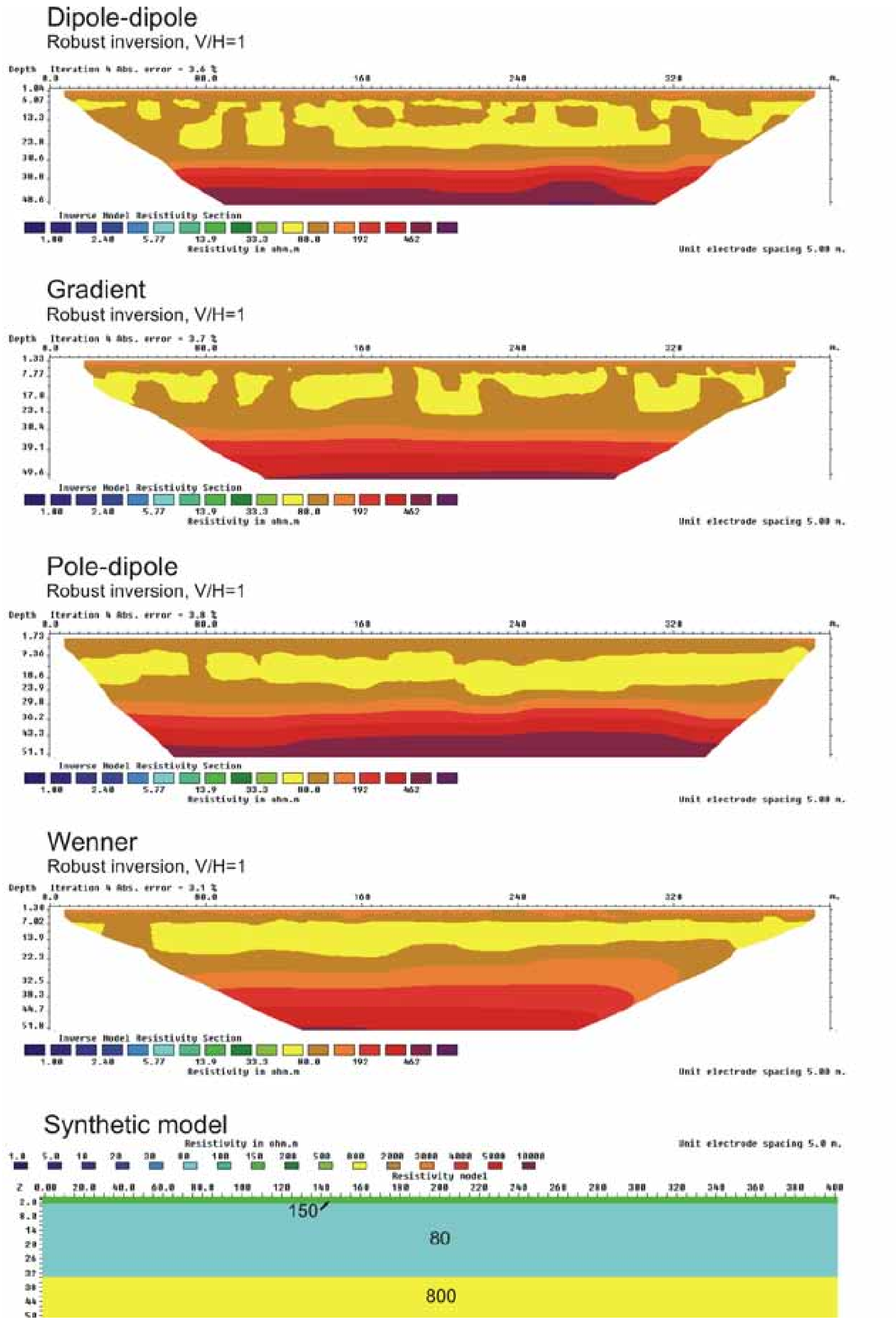

Figure 3.1.58: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm and 800 Ωm. Robust inversion, V/H=1

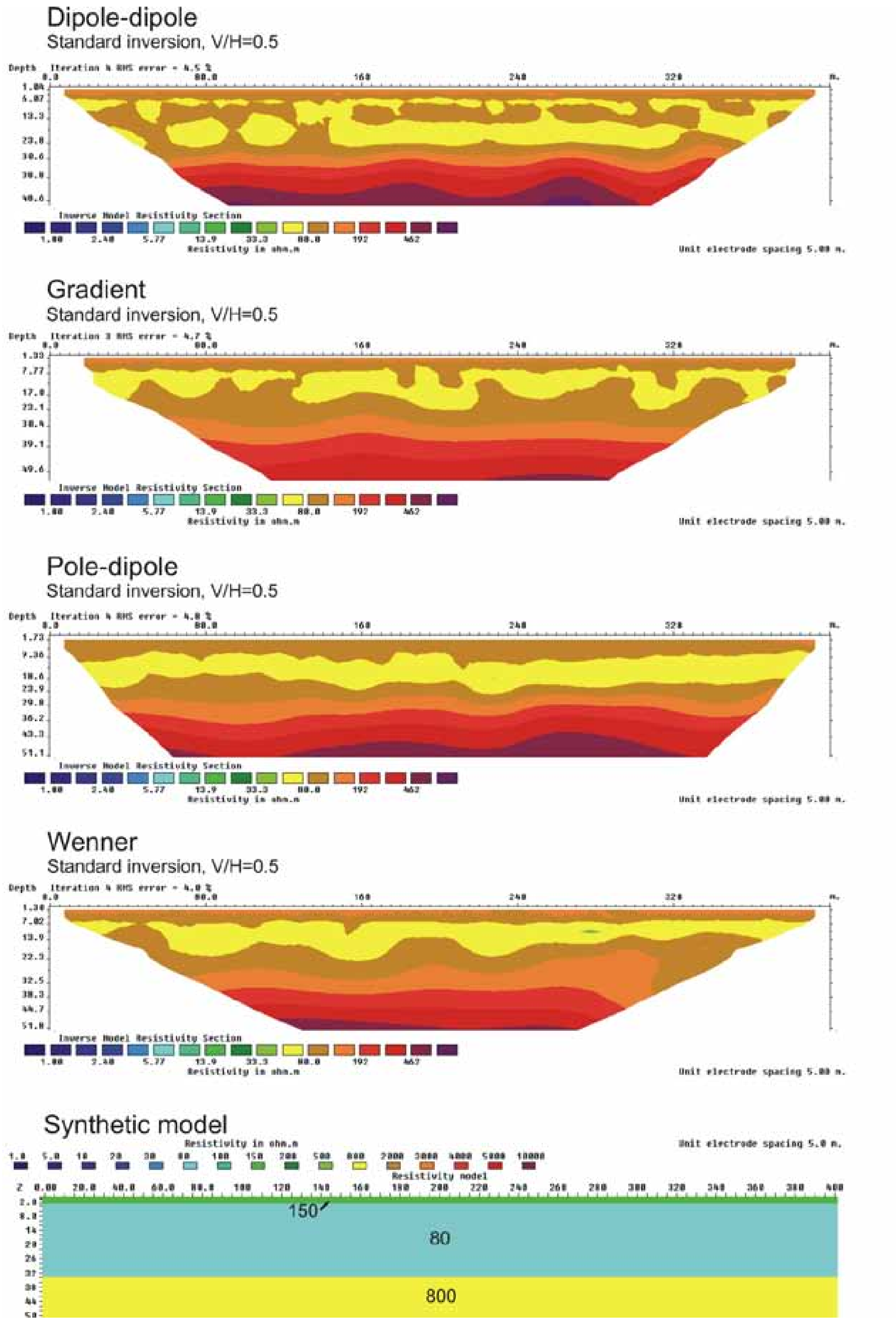

Figure 3.1.59: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm and 800 Ωm. Standard inversion, V/H=0.5

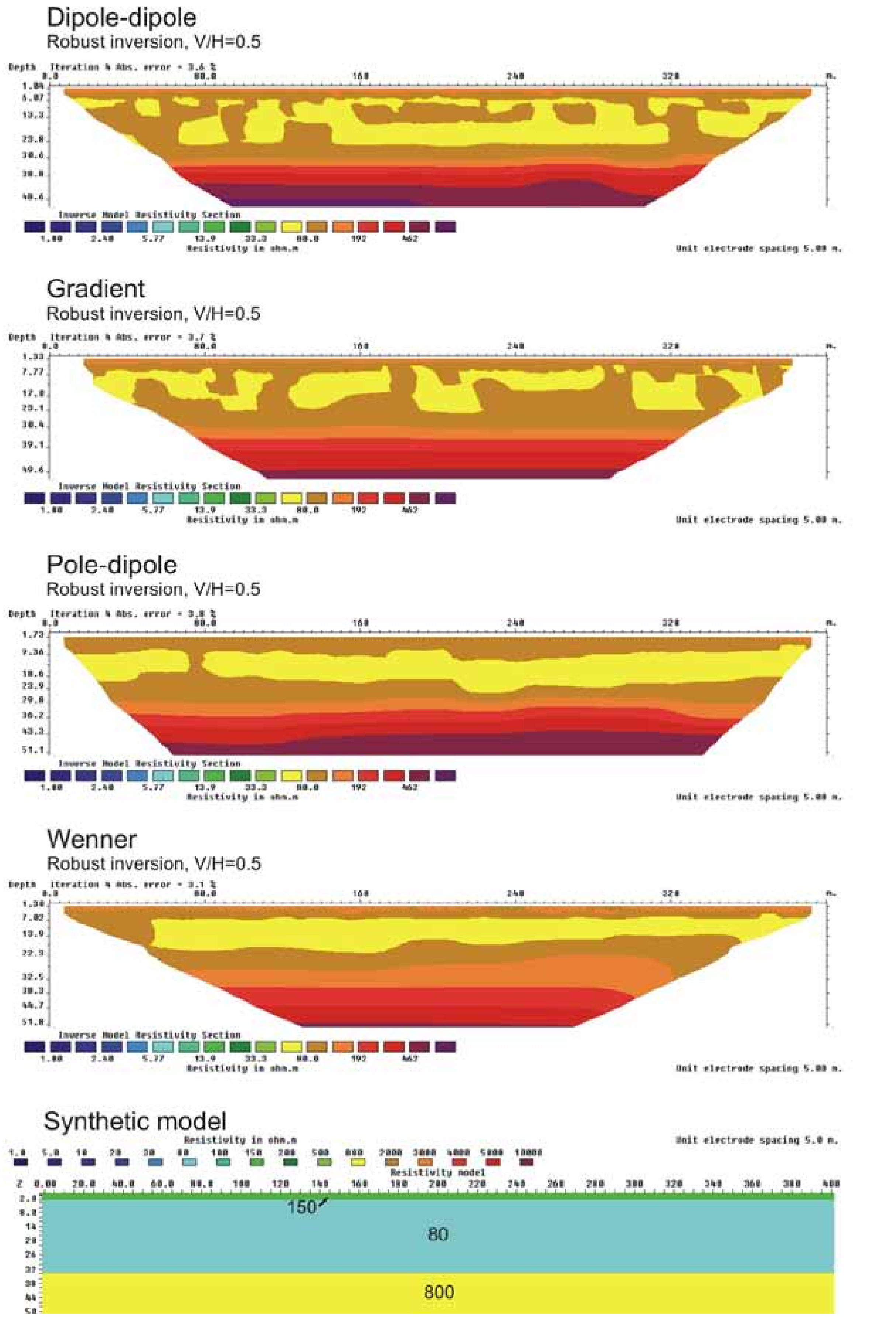

Figure 3.1.60: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm and 800 Ωm. Robust inversion, V/H=0.5

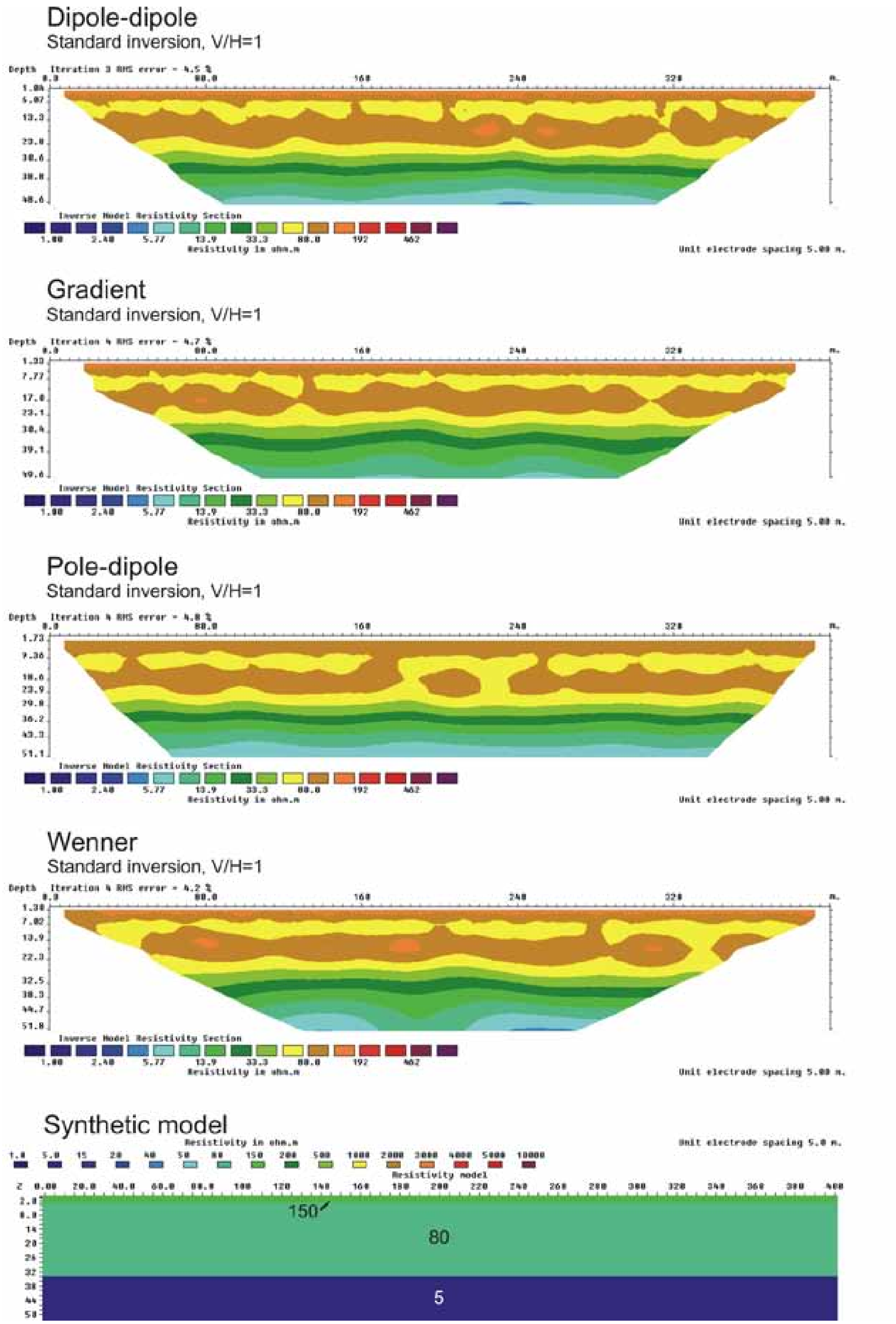

Figure 3.1.61: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm and 5 Ωm. Standard inversion, V/H=1

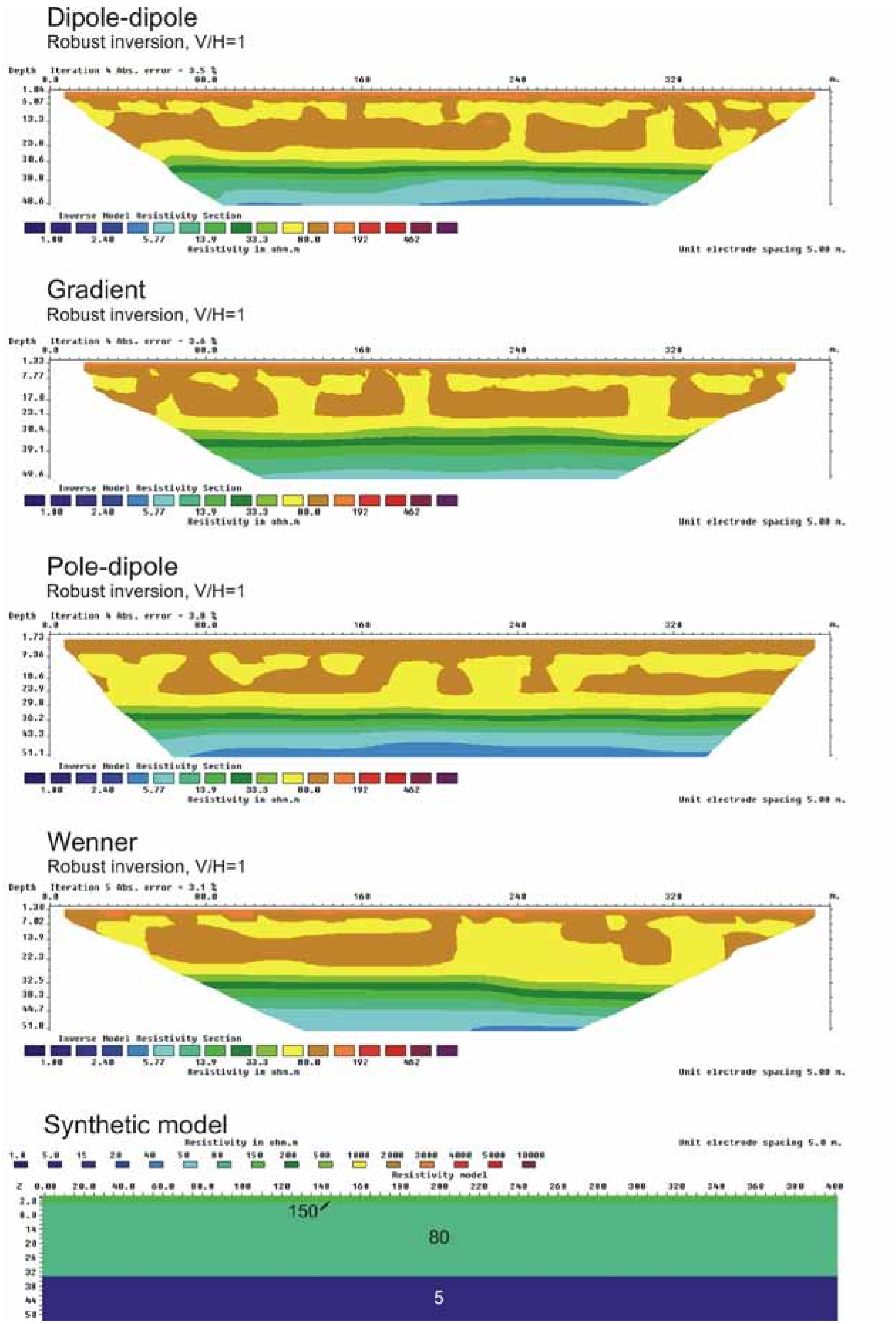

Figure 3.1.62: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm and 5 Ωm. Robust inversion, V/H=1

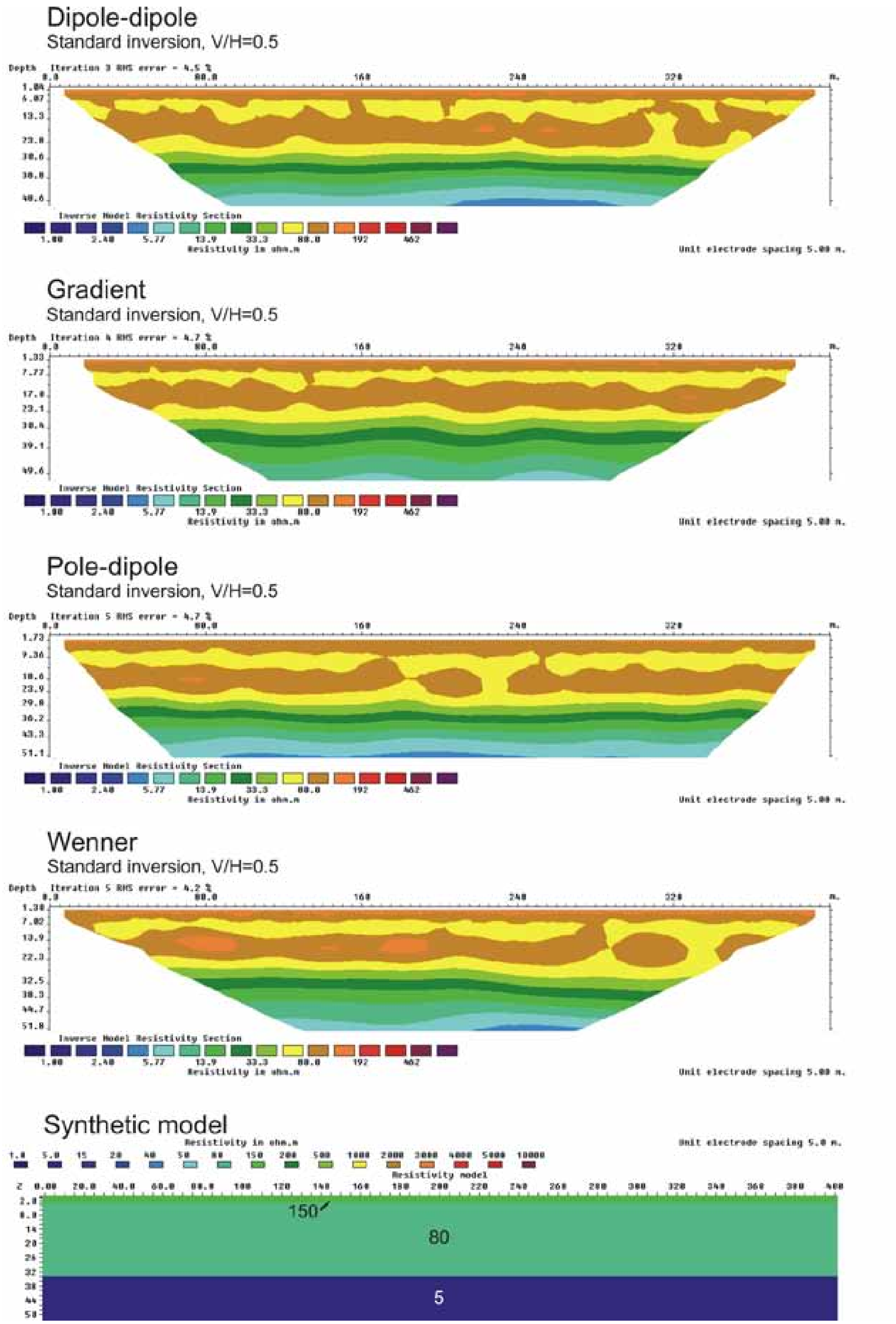

Figure 3.1.63: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm and 5 Ωm. Standard inversion, V/H=0.5

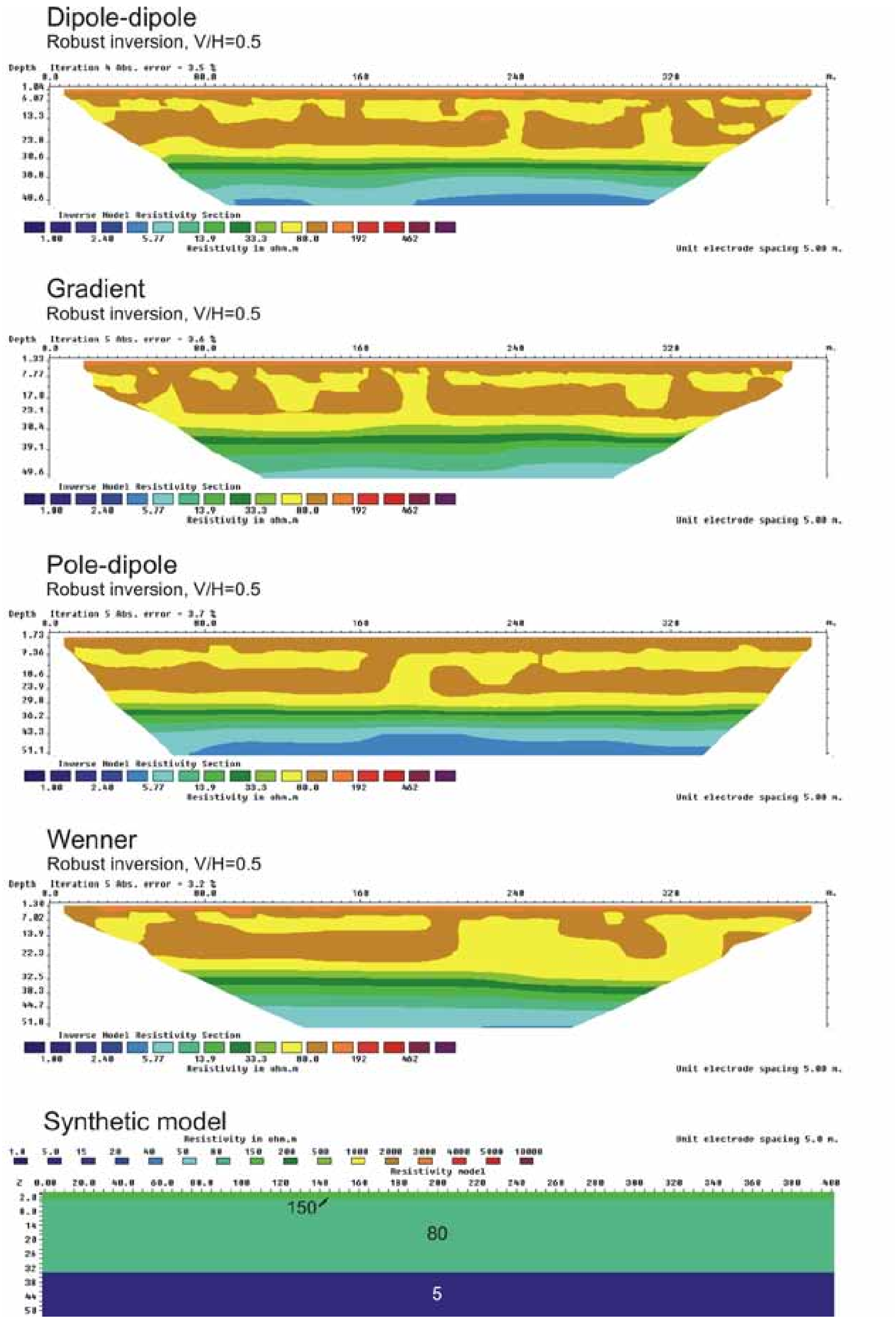

Figure 3.1.64: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm and 5 Ωm. Robust inversion, V/H=0.5

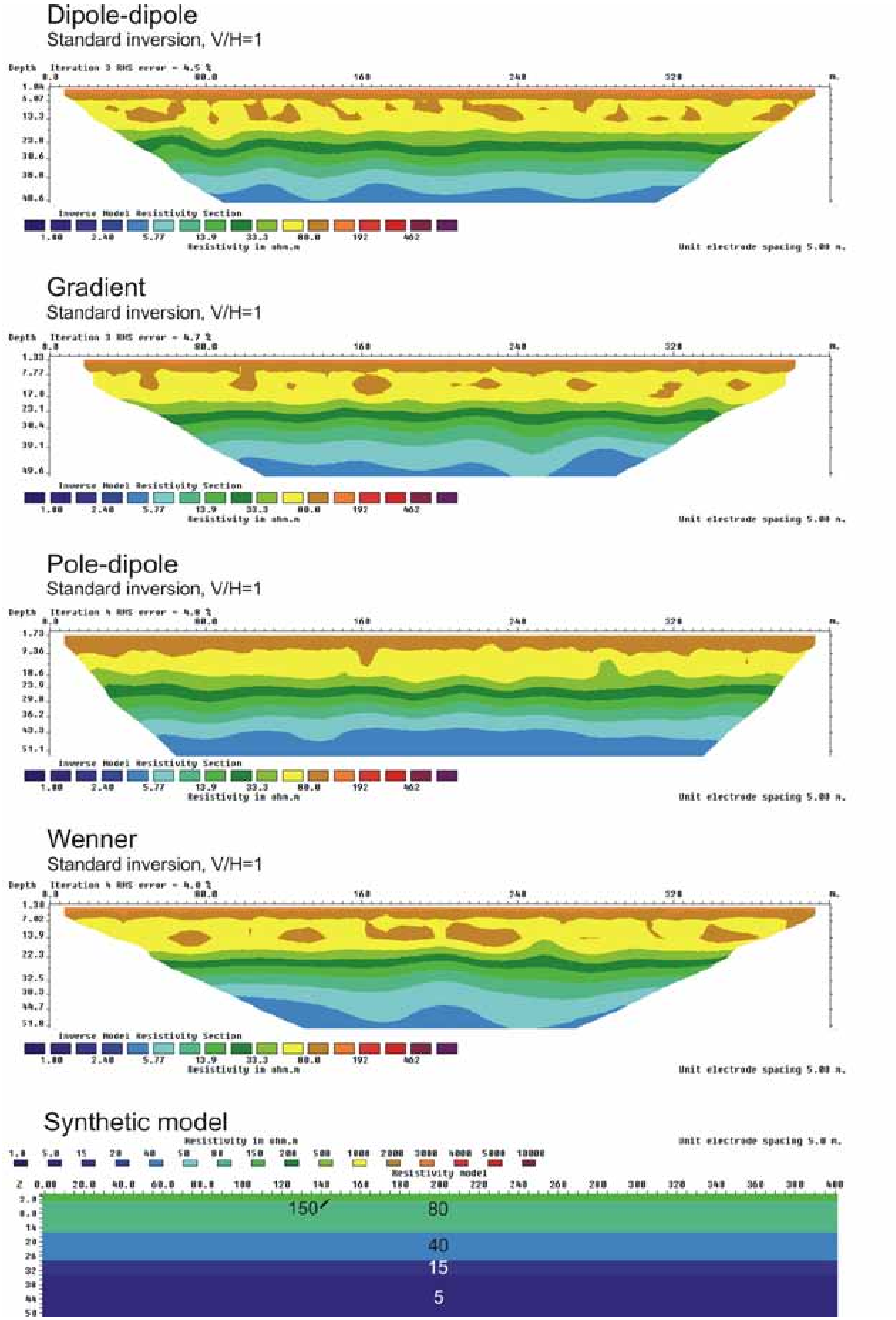

Figure 3.1.65: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm, 40 Ωm, 15 Ωm and 5 Ωm. Standard inversion, V/H=1

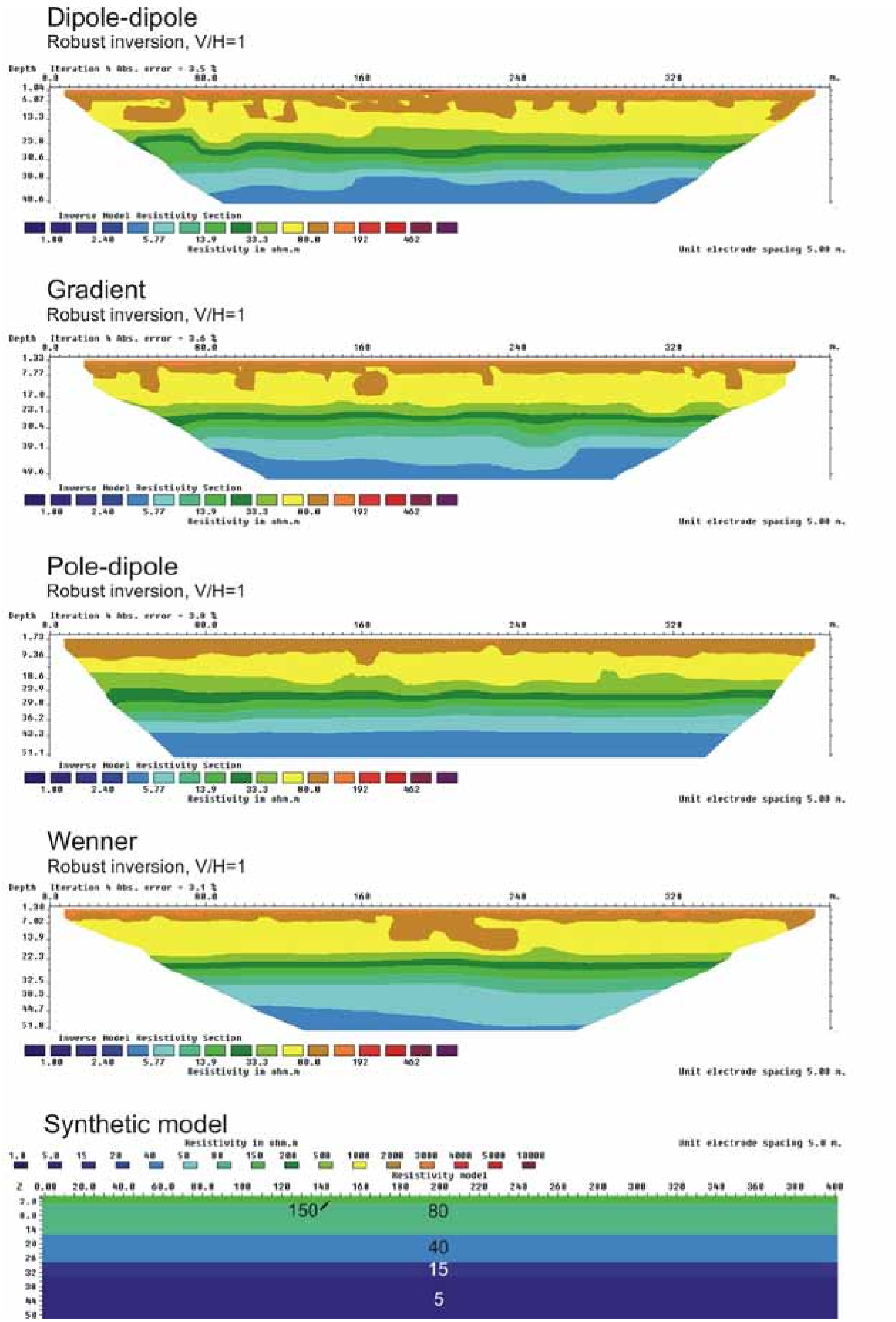

Figure 3.1.66: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm, 40 Ωm, 15 Ωm and 5 Ωm. Robust inversion, V/H=1

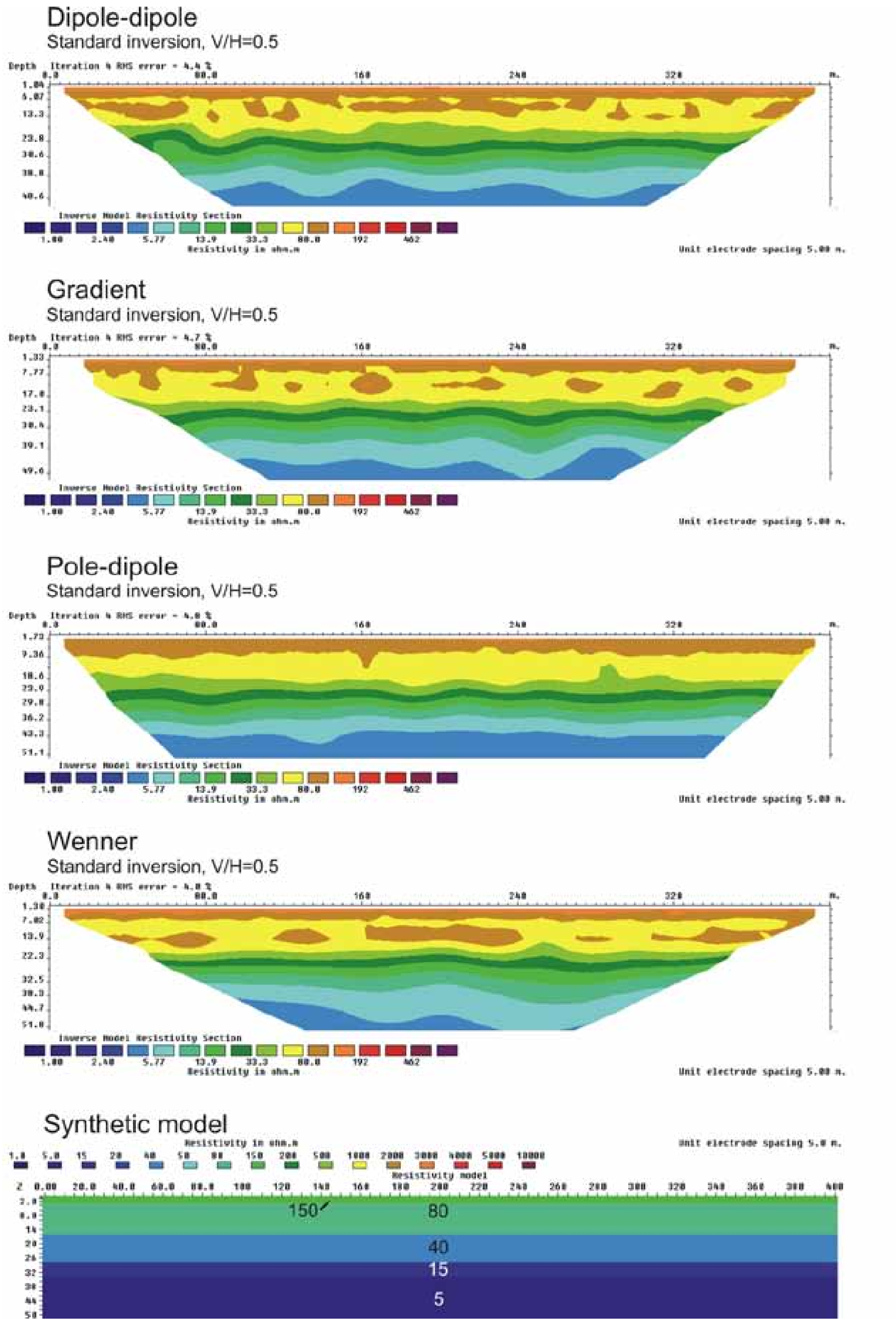

Figure 3.1.67: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm, 40 Ωm, 15 Ωm and 5 Ωm. Standard inversion, V/H=0.5

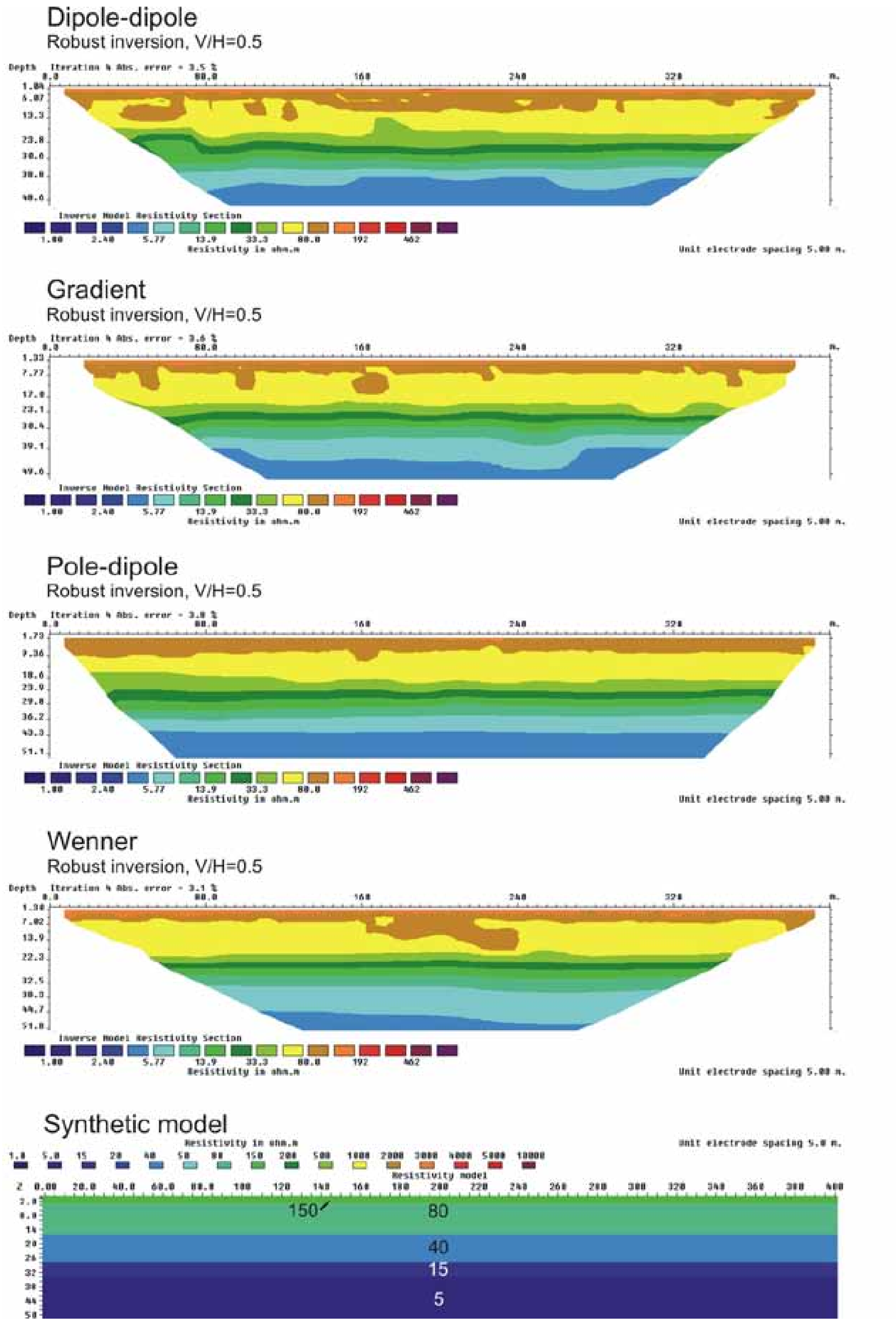

Figure 3.1.68: 3 m top layer (150 Ωm) over horizontal layers of 80 Ωm, 40 Ωm, 15 Ωm and 5 Ωm. Standard inversion, V/H=0.5

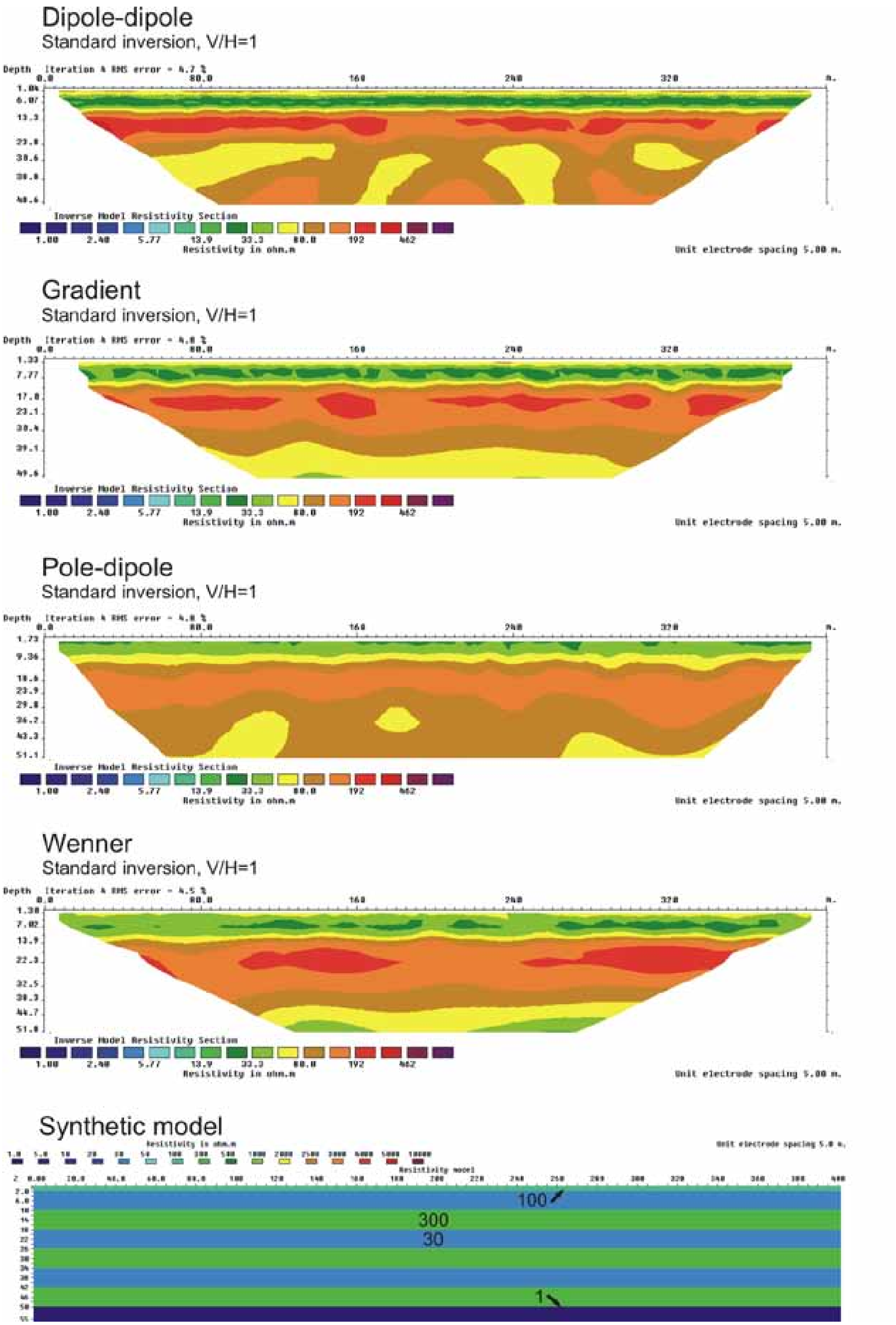

Figure 3.1.69: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 1 Ωm as the bottom layer.
Standard inversion, V/H=1

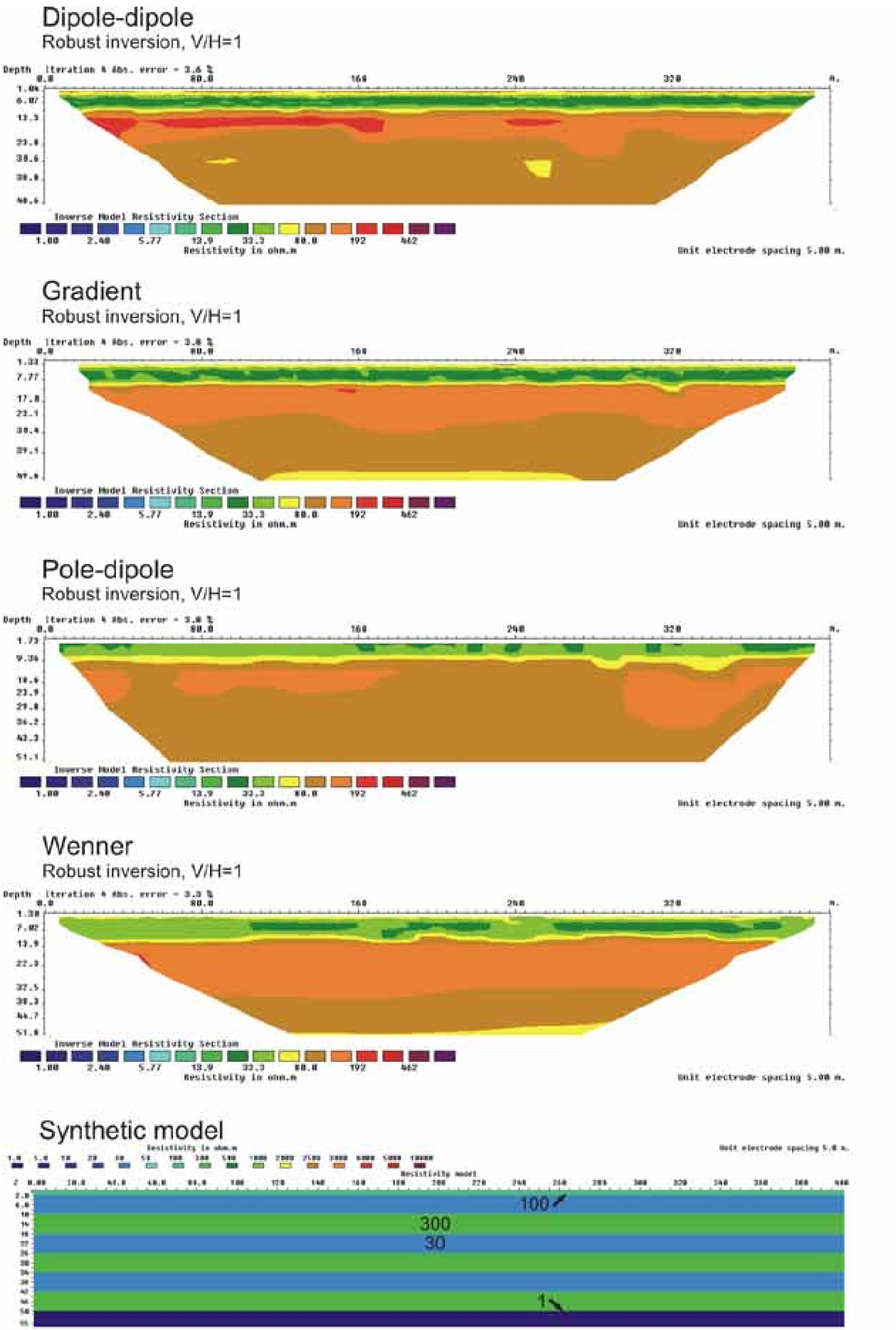

Figure 3.1.70: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 1 Ωm as the bottom layer.
Robust inversion, V/H=1

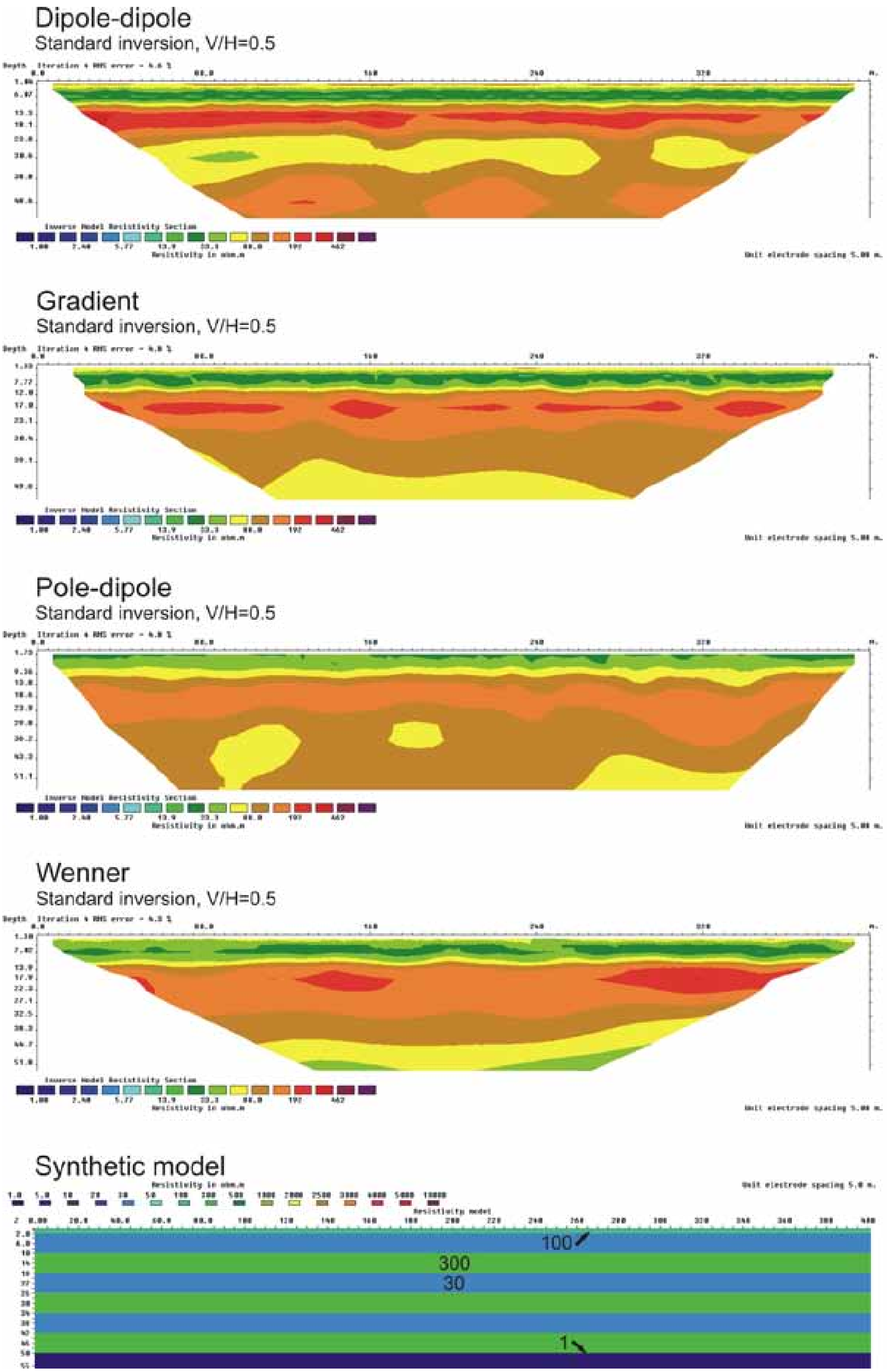

Figure 3.1.71: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 1 Ωm as the bottom layer.
Standard inversion, V/H=0.5

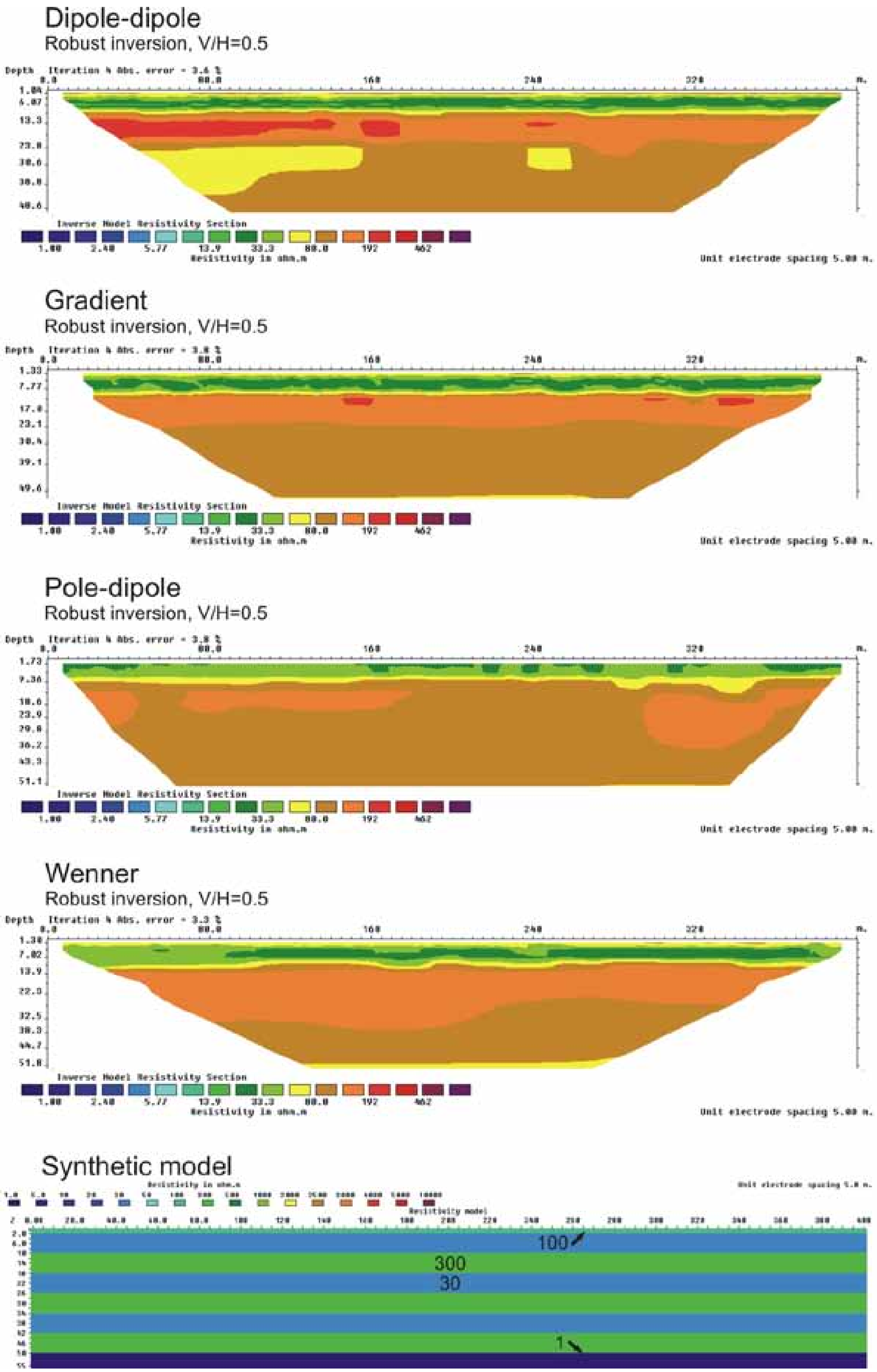

Figure 3.1.72: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 1 Ωm as the bottom layer.
Robust inversion, V/H=0.5

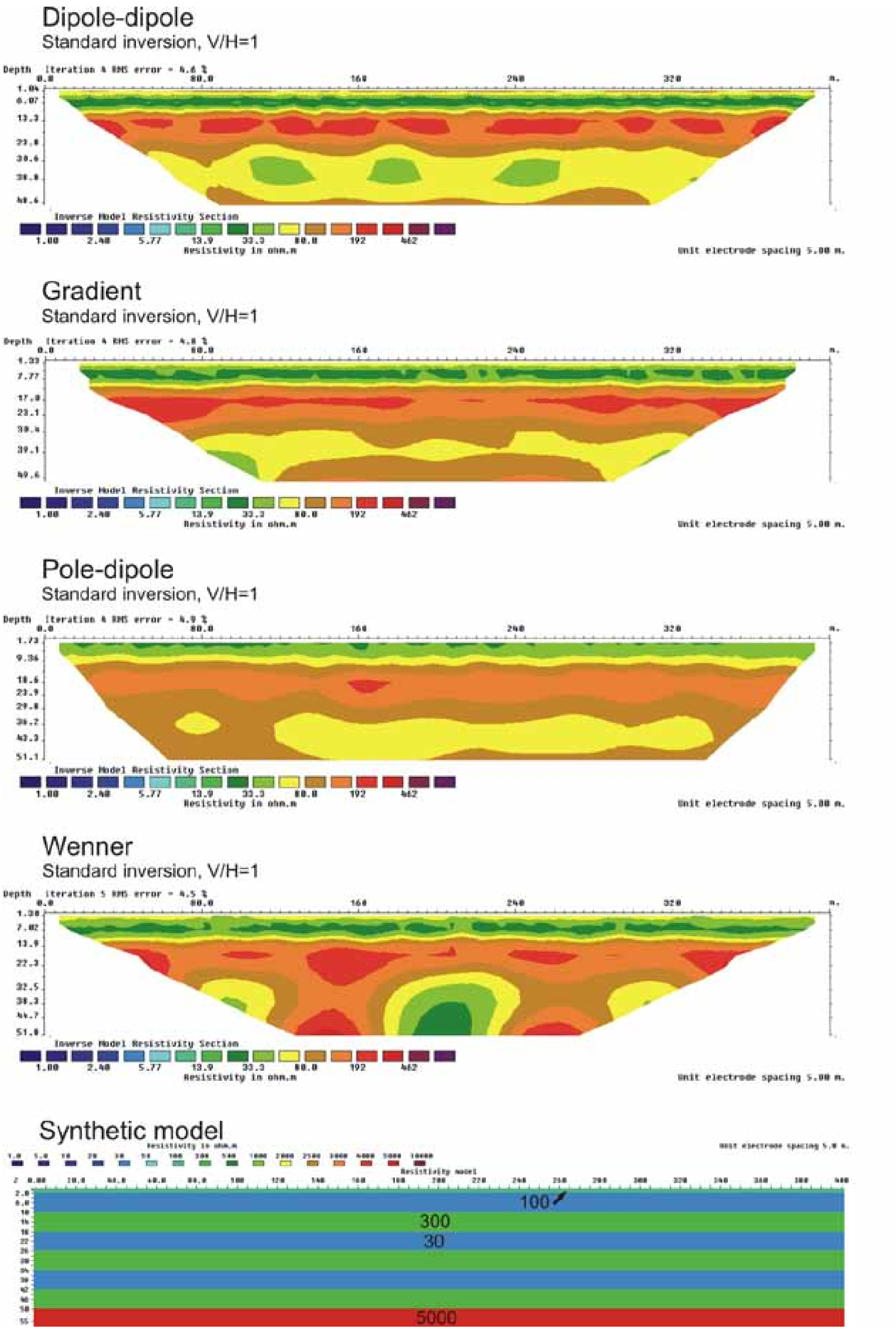

Figure 3.1.73: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 5000 Ωm as the bottom layer.
Standard inversion, V/H=1

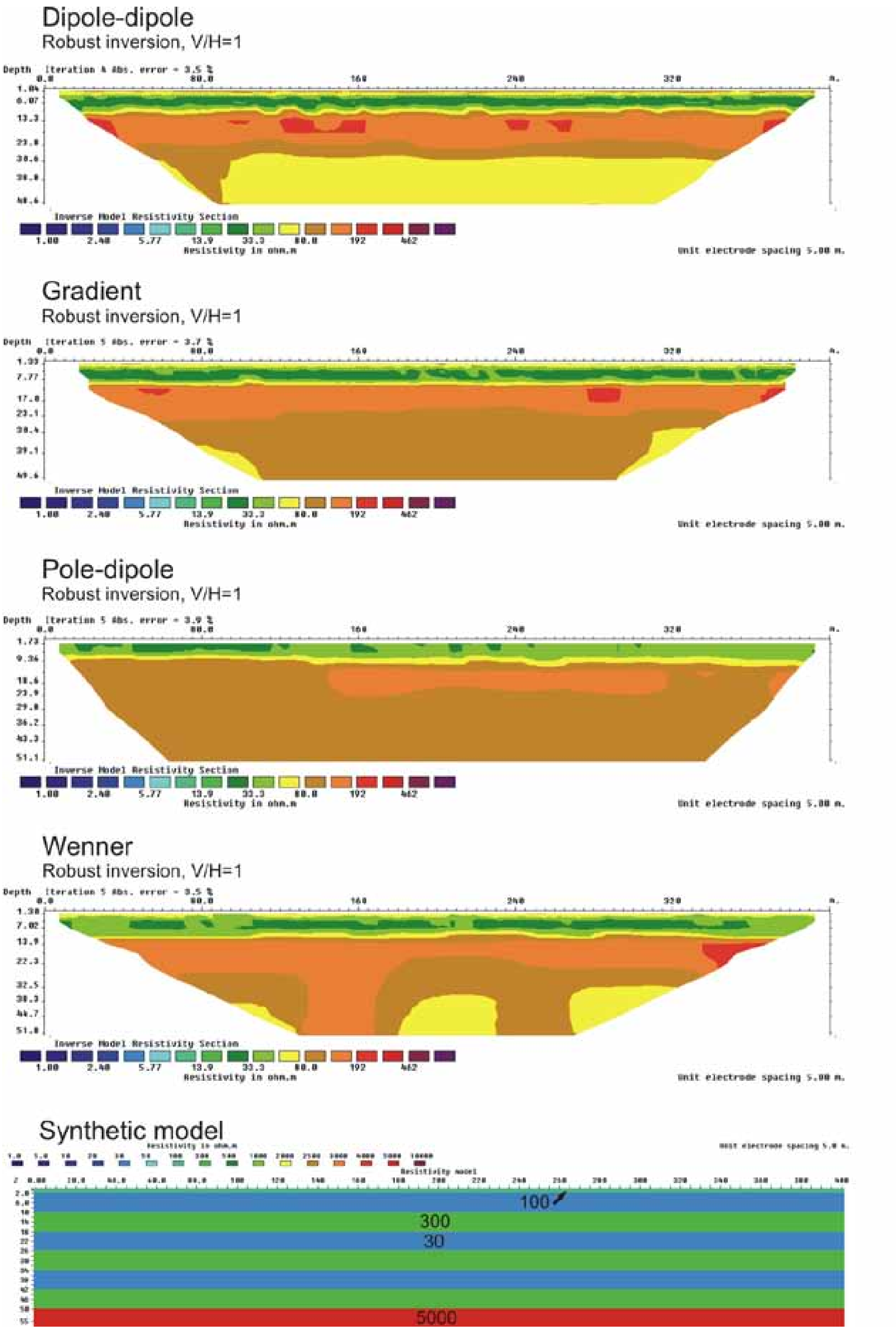

Figure 3.1.74: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 5000 Ωm as the bottom layer.
Robust inversion, V/H=1

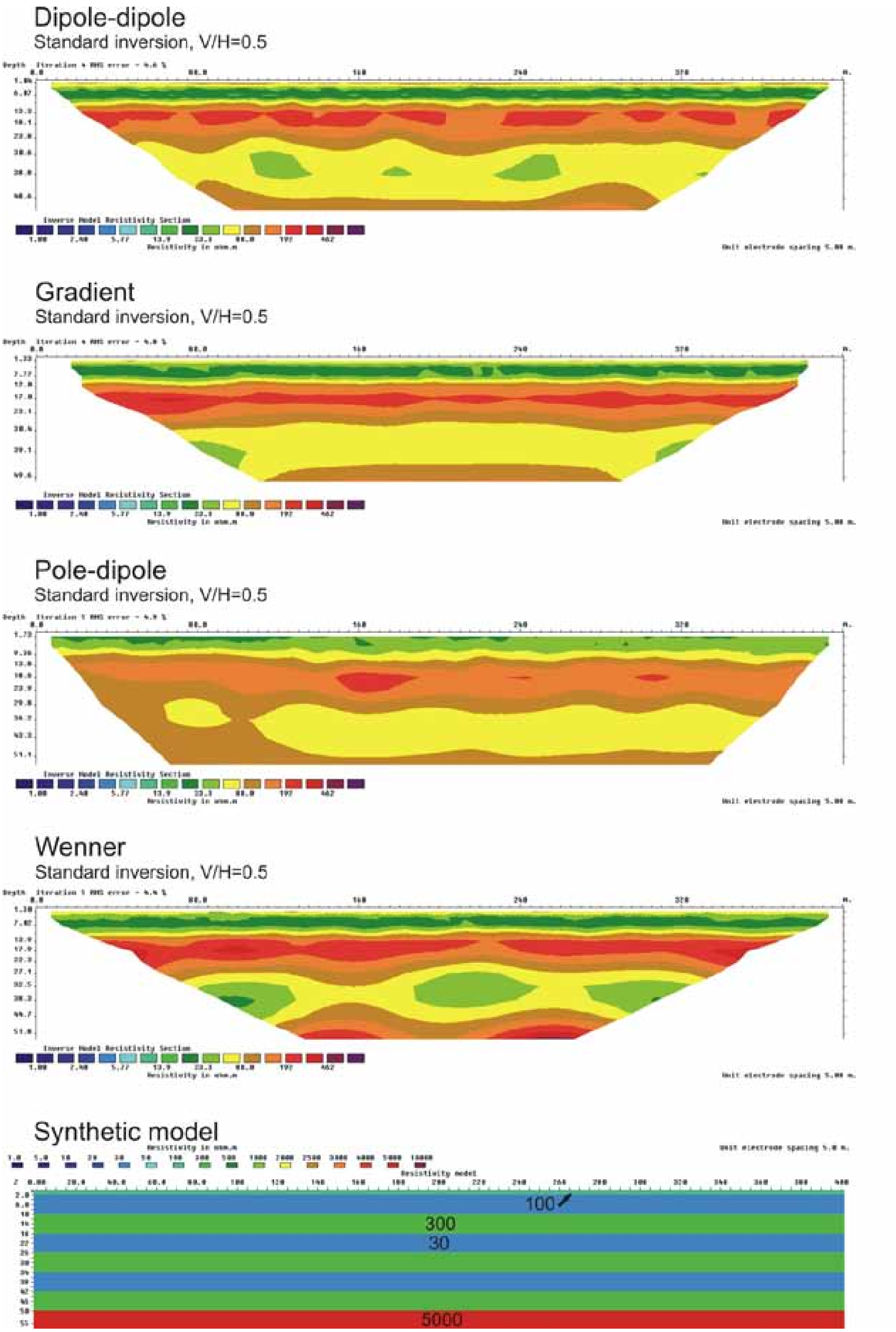

Figure 3.1.75: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 5000 Ωm as the bottom layer.
Standard inversion, V/H=0.5

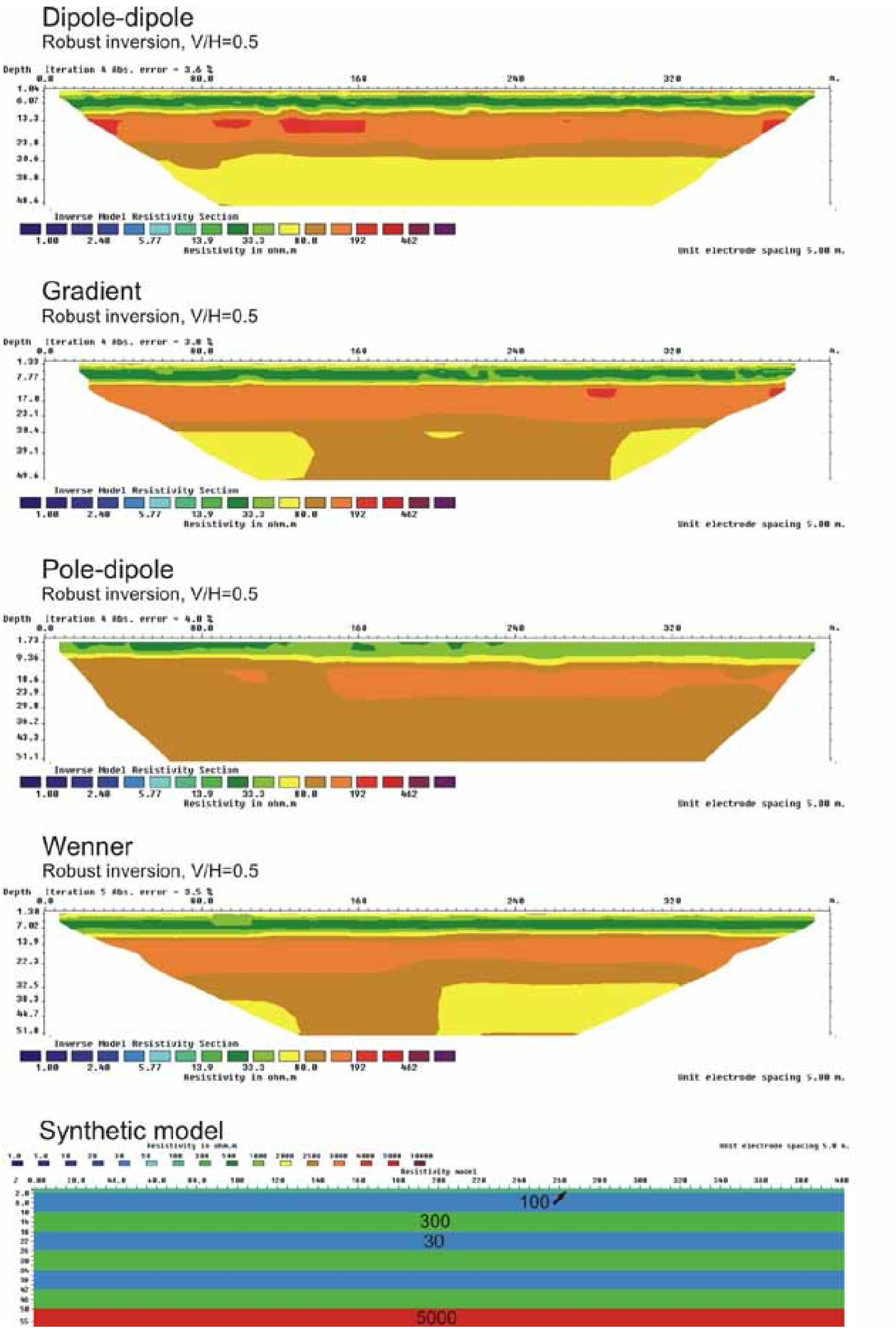

Figure 3.1.76: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 5000 Ωm as the bottom layer.
Robust inversion, V/H=0.5

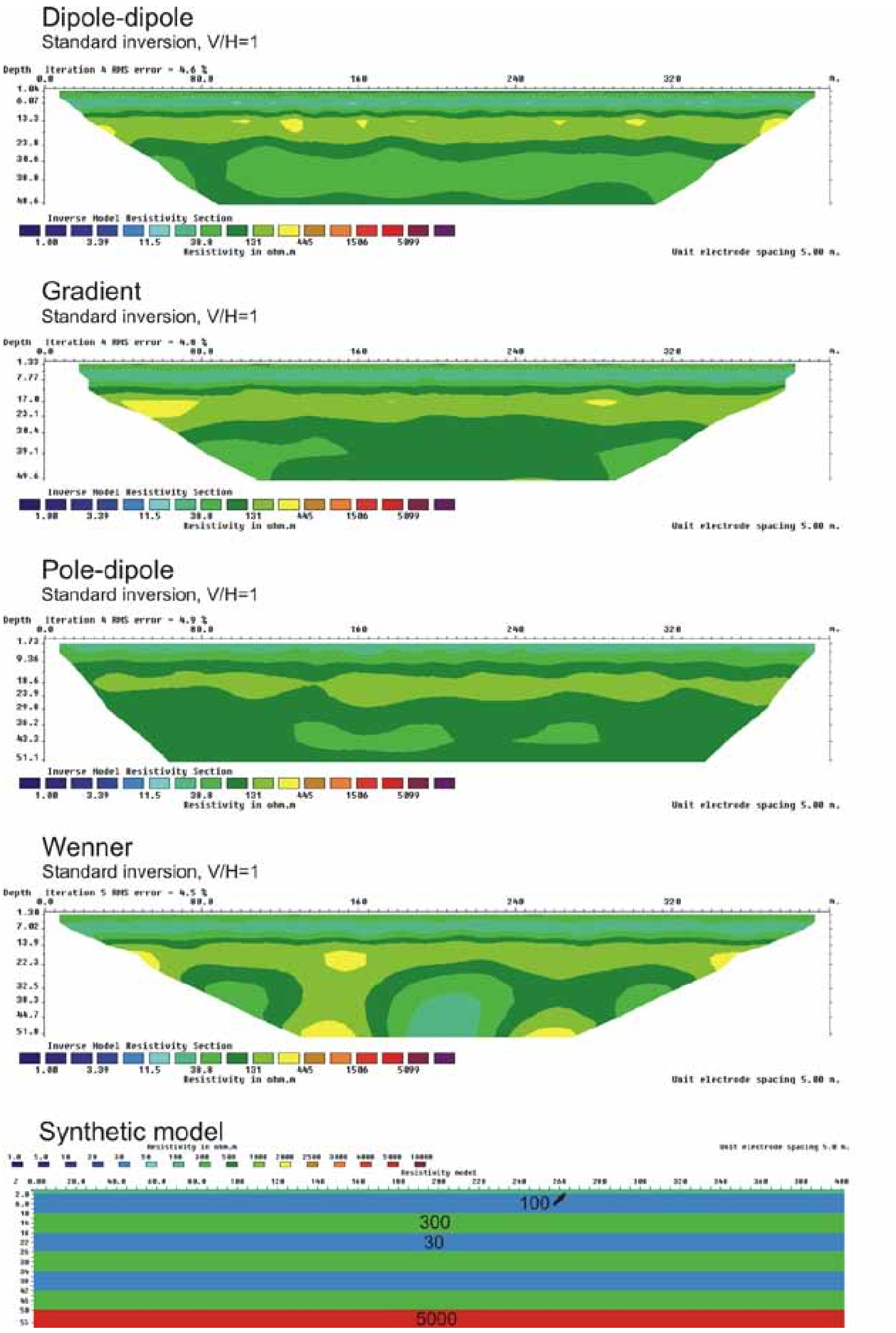

Figure 3.1.77: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 5000 Ωm as the bottom layer.
Standard inversion, V/H=1

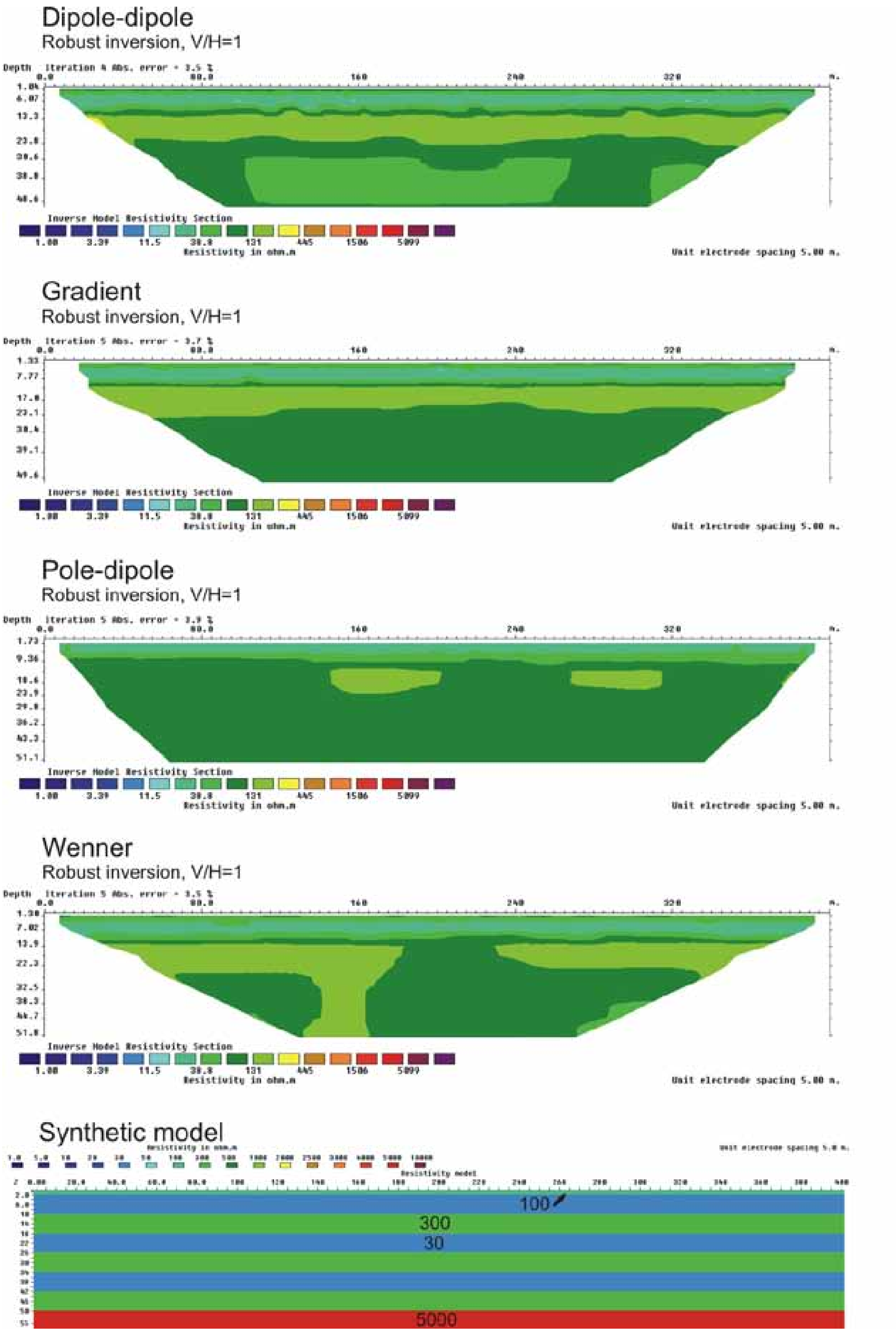

Figure 3.1.78: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 5000 Ωm as the bottom layer.
Robust inversion, V/H=1

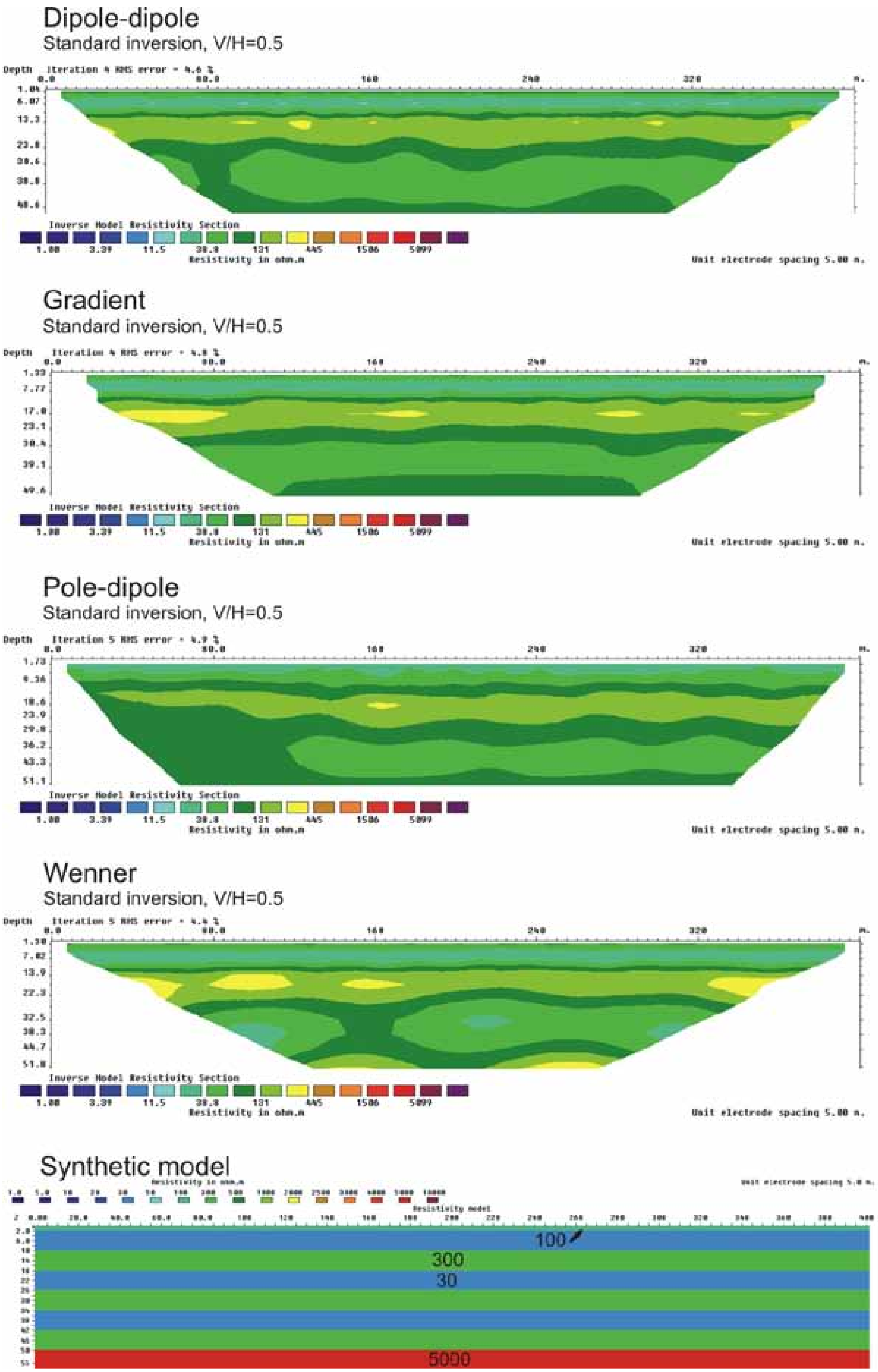

Figure 3.1.79: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 5000 Ωm as the bottom layer.
Standard inversion, V/H=0.5

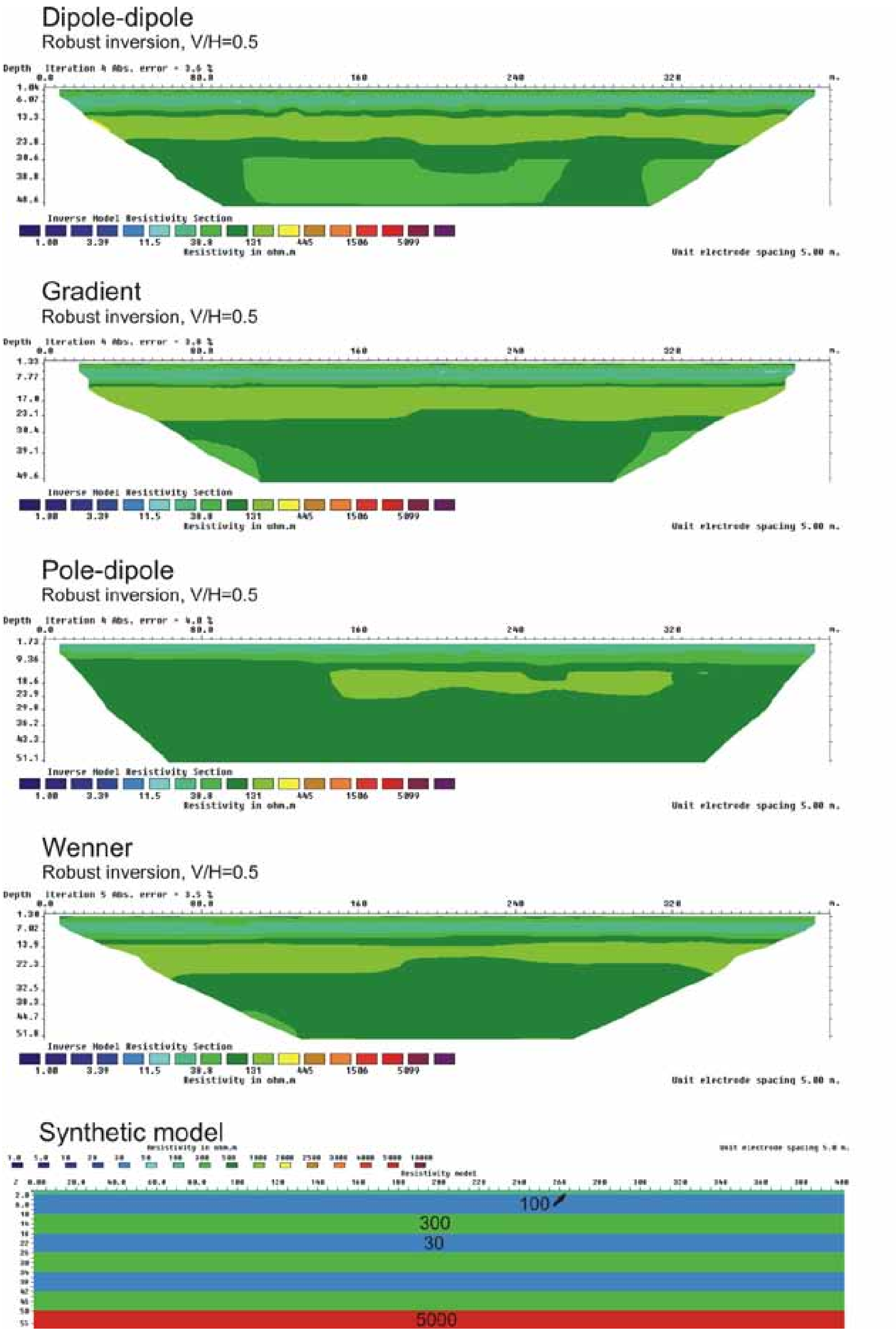

Figure 3.1.80: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 8 m. 5000 Ωm as the bottom layer.
Robust inversion, V/H=0.5

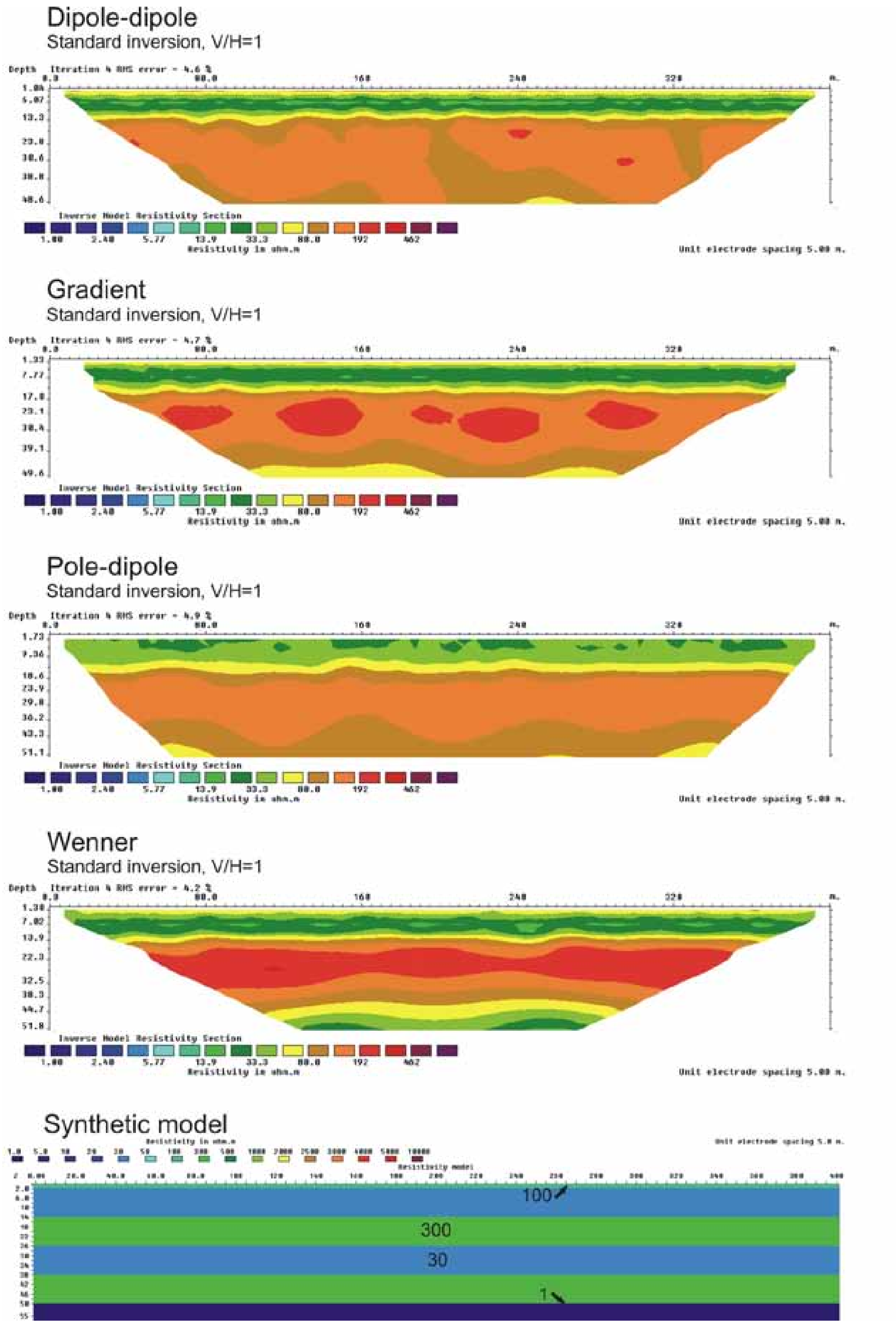

Figure 3.1.81: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 1 Ωm as the bottom layer.
Standard inversion, V/H=1

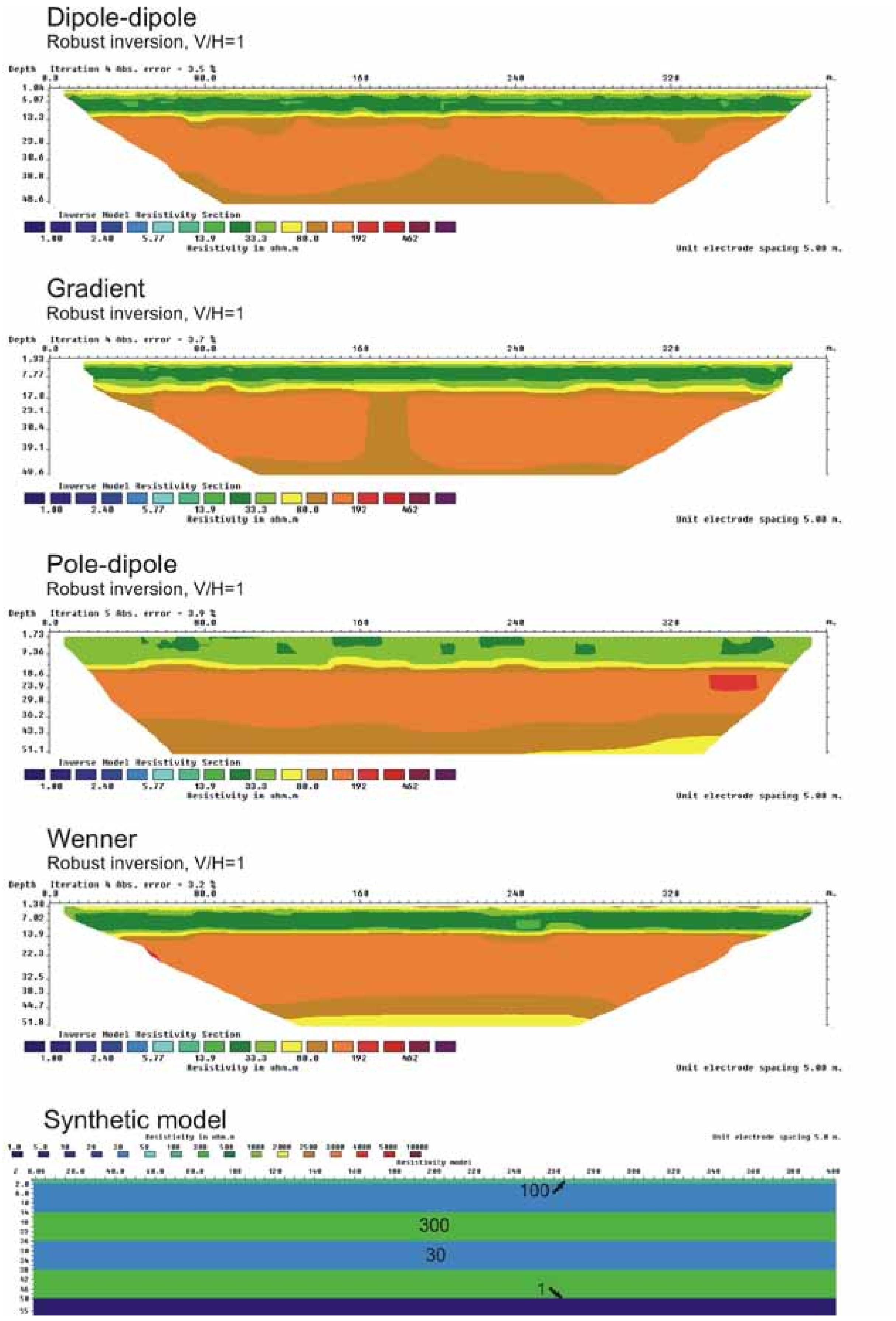

Figure 3.1.82: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 1 Ωm as the bottom layer.
Robust inversion, V/H=1

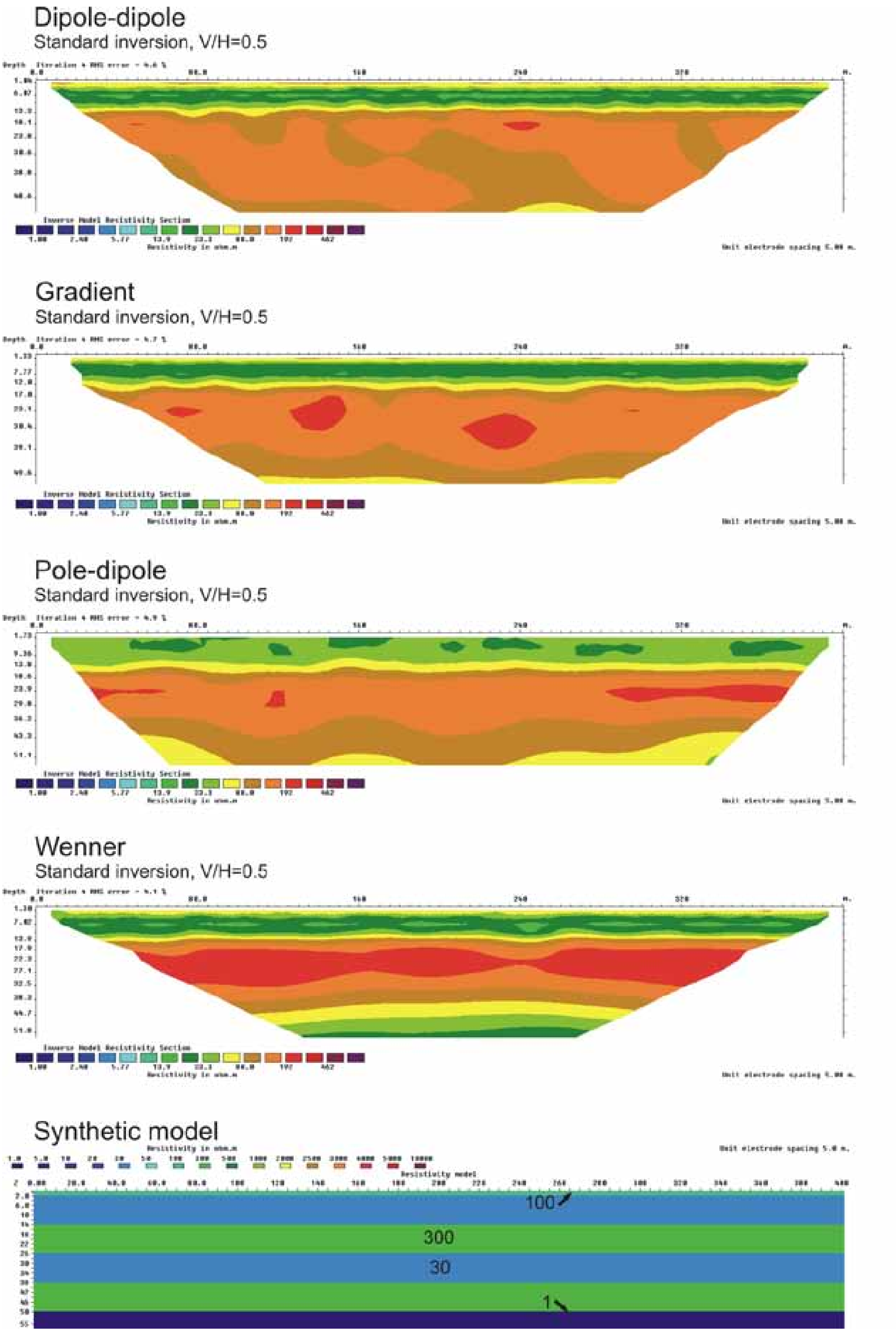

Figure 3.1.83: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 1 Ωm as the bottom layer.
Standard inversion, V/H=0.5

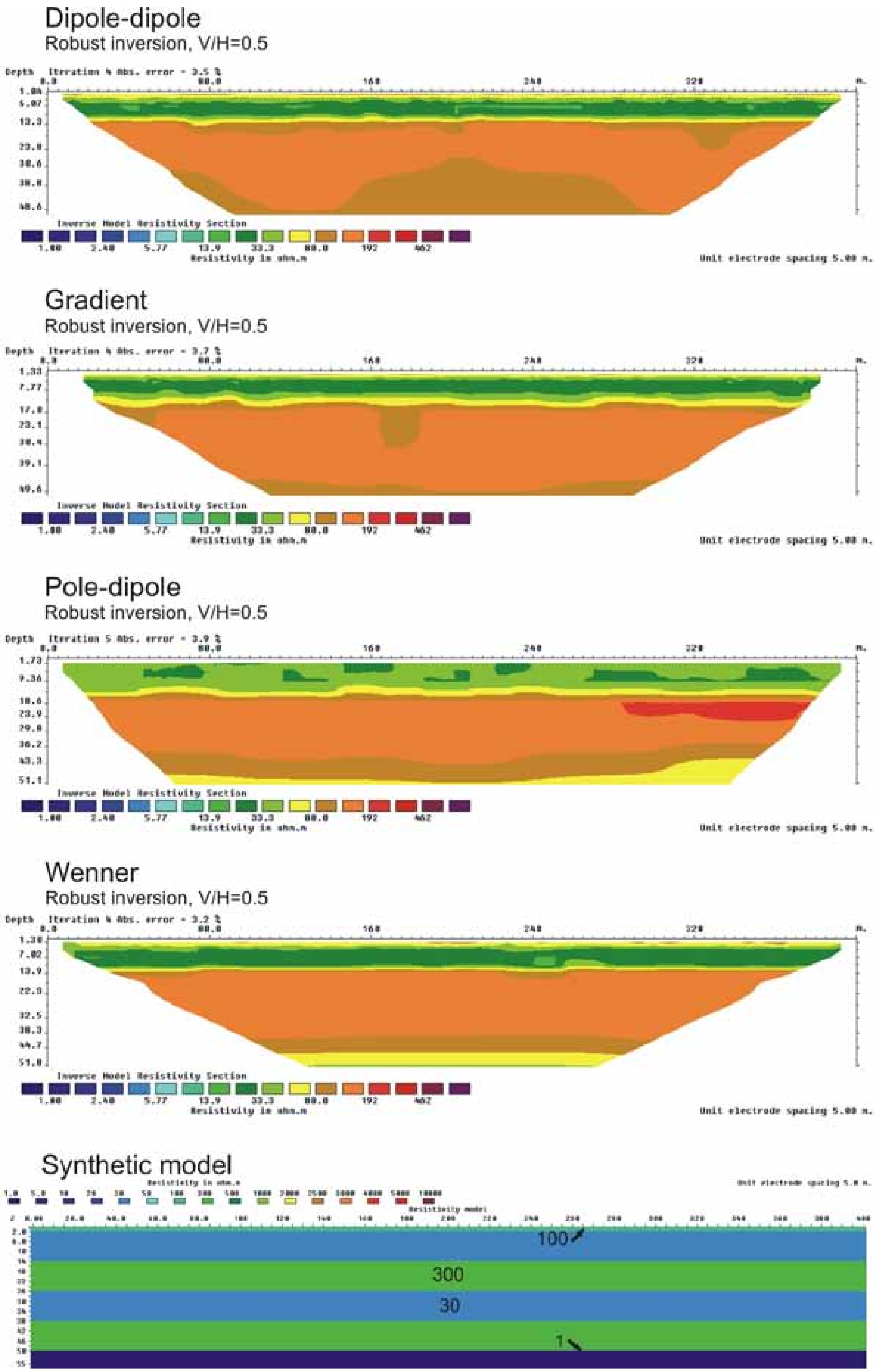

**Figure 3.1.84: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 1 Ωm as the bottom layer.
Robust inversion, V/H=0.5**

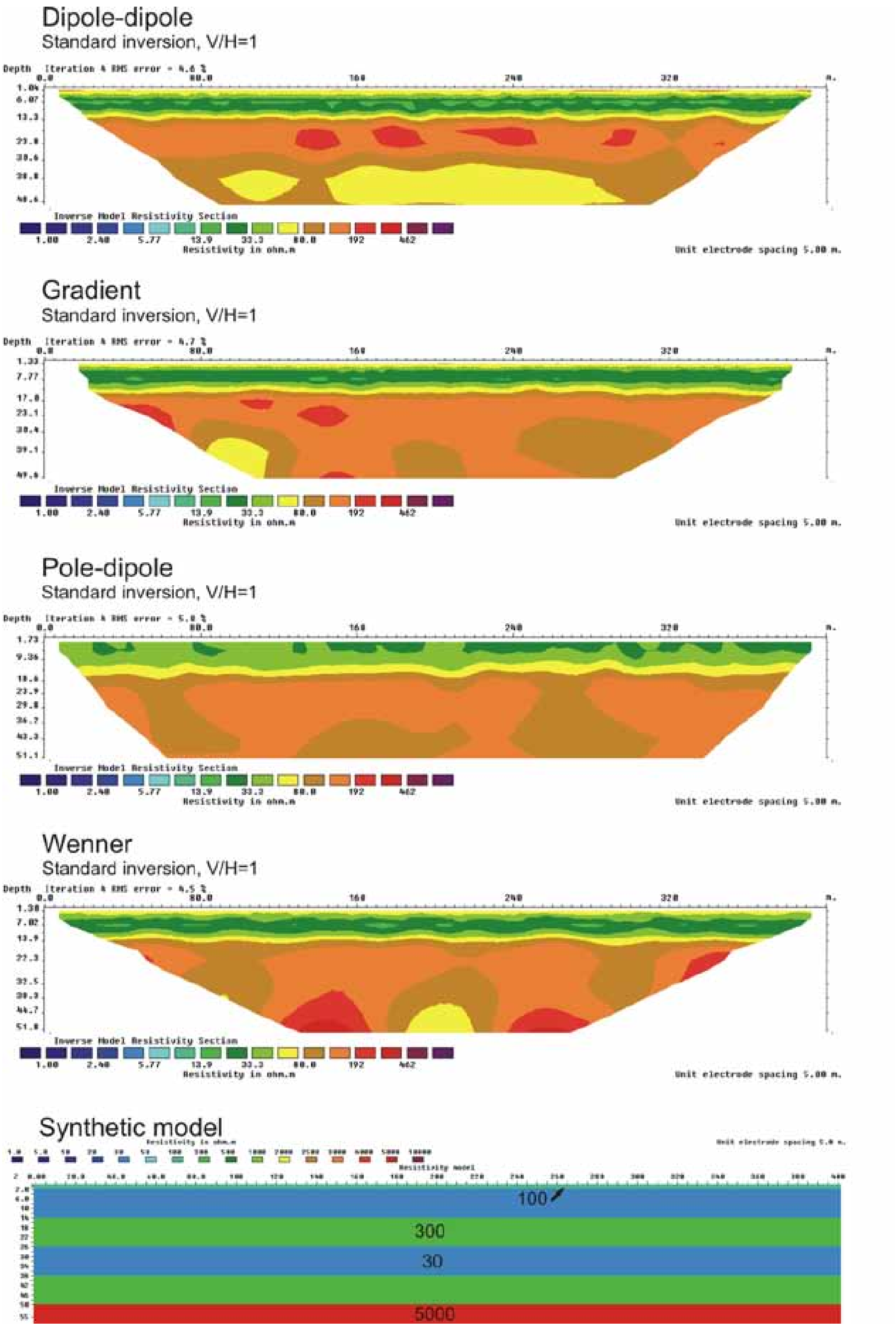

Figure 3.1.85: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 5000 Ωm as the bottom layer.
Standard inversion, V/H=1

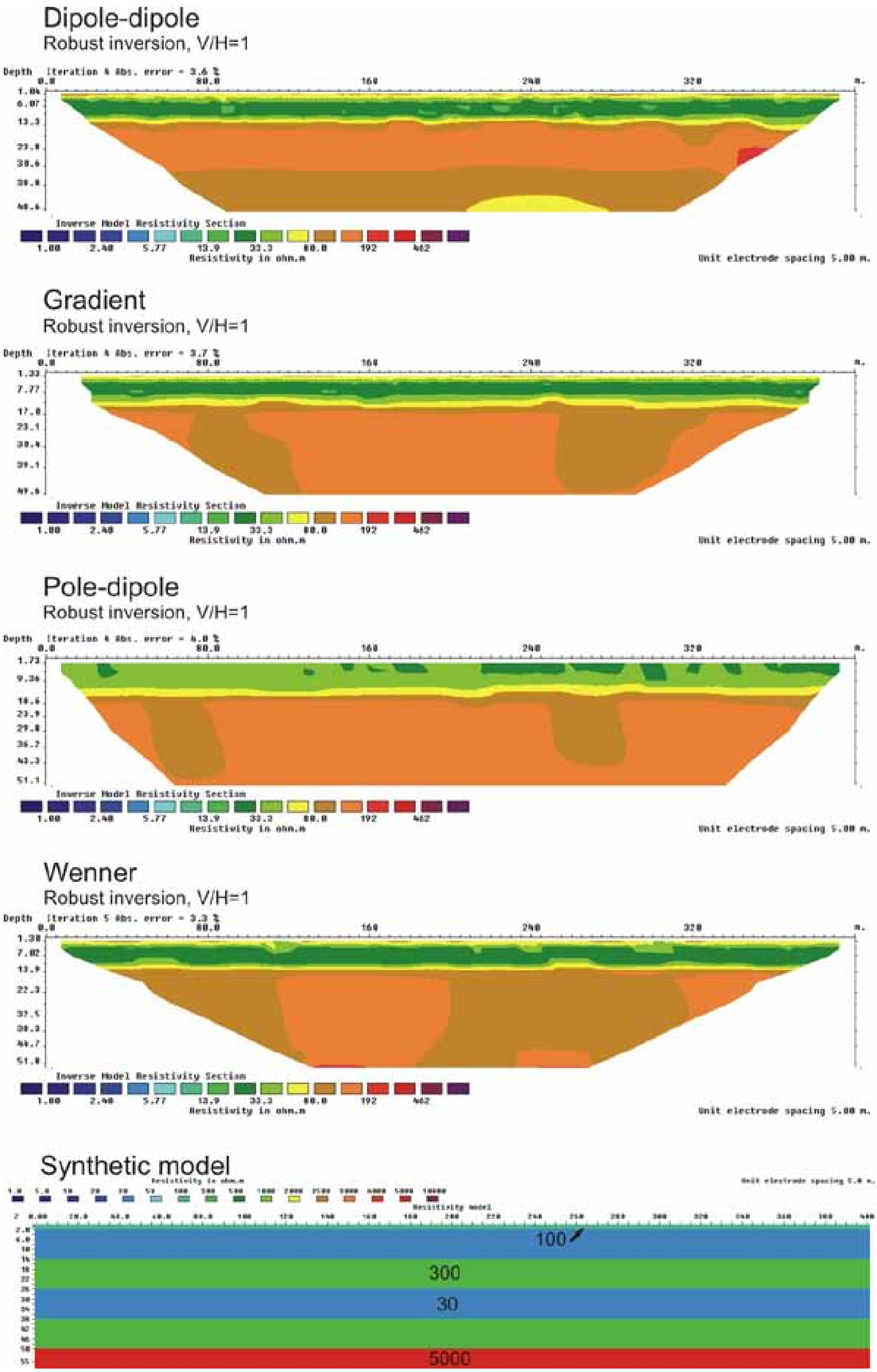

Figure 3.1.86: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 5000 Ωm as the bottom layer.
Robust inversion, V/H=1

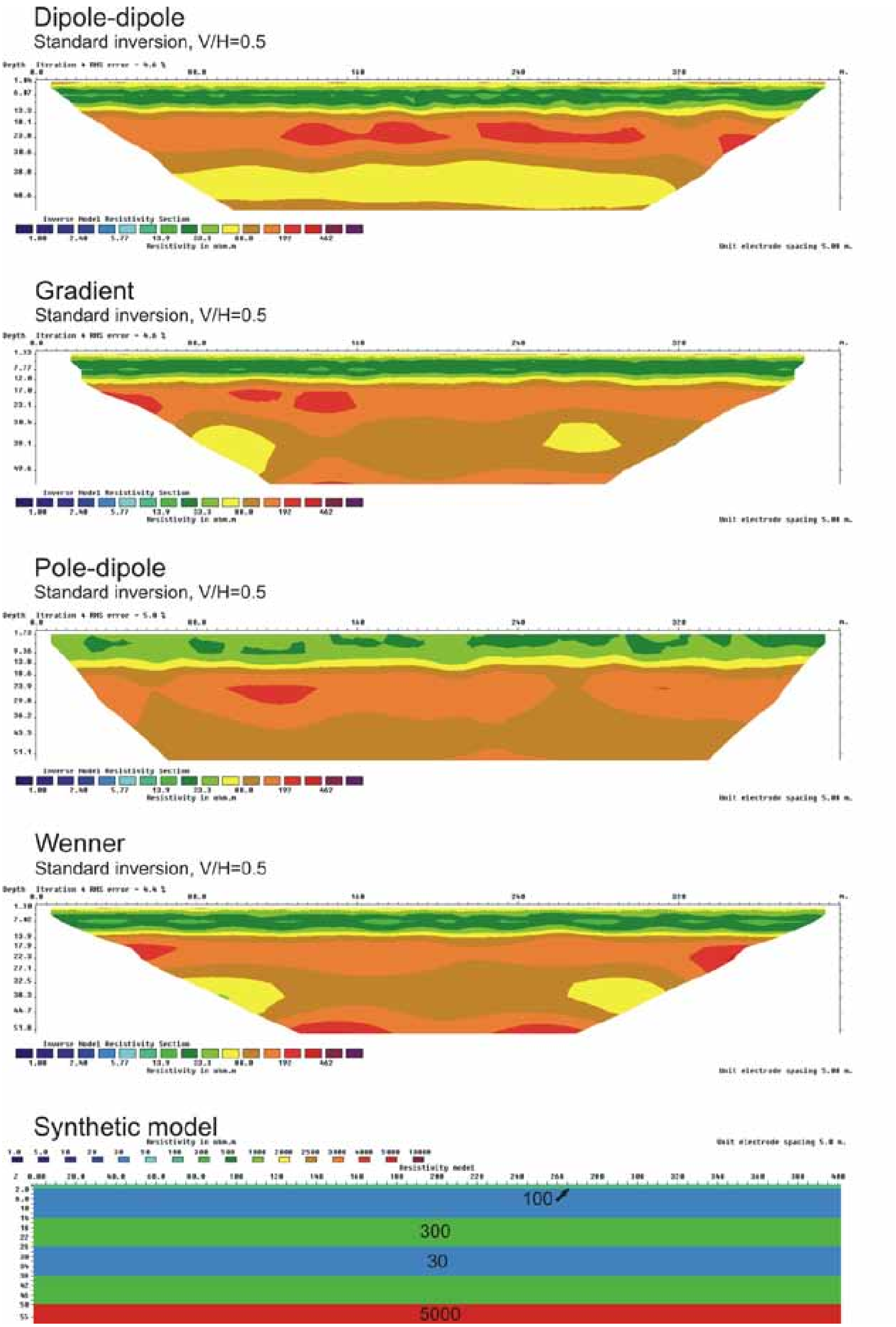

Figure 3.1.87: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 5000 Ωm as the bottom layer.
Standard inversion, V/H=0.5

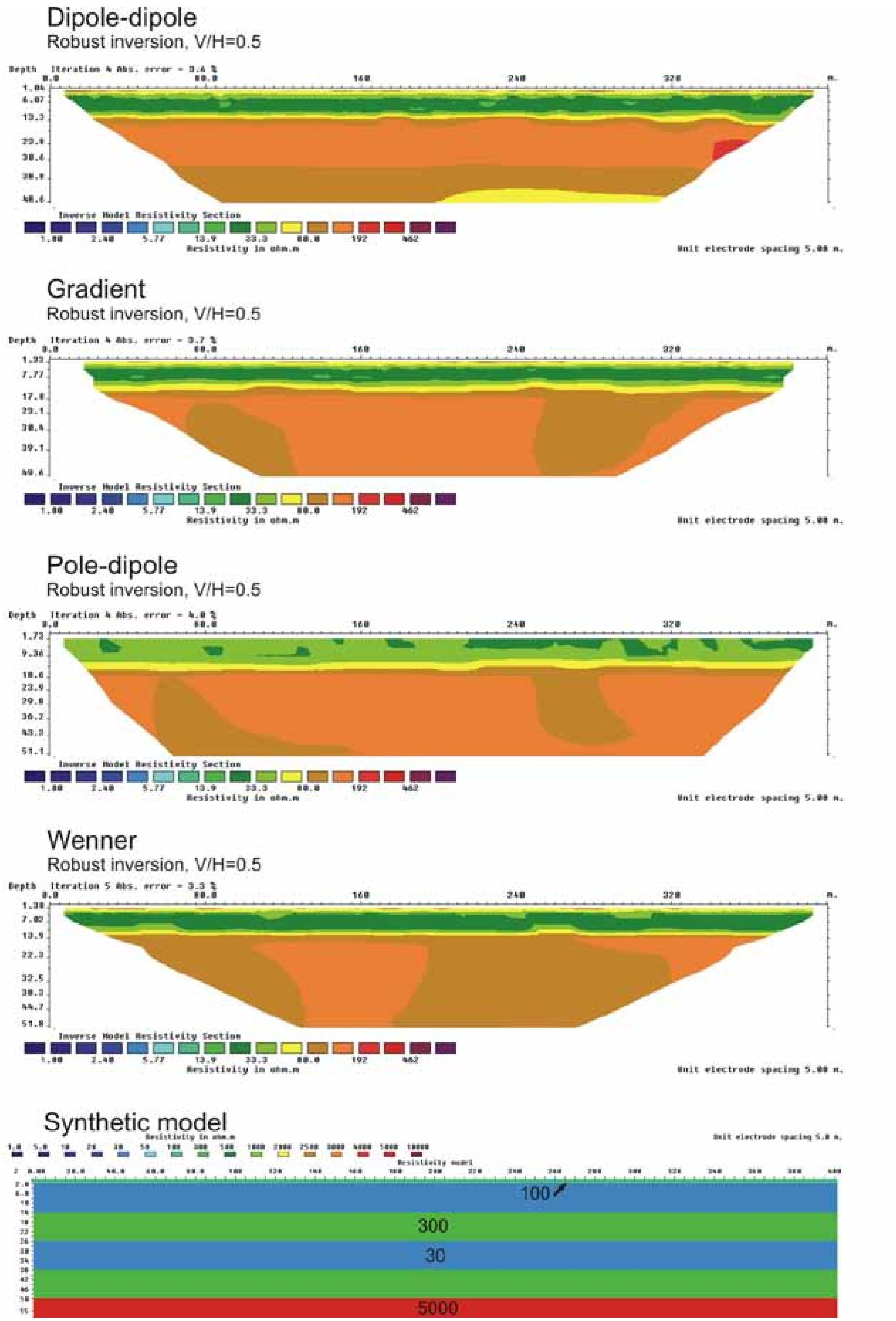

Figure 3.1.88: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 5000 Ωm as the bottom layer.
Robust inversion, V/H=0.5

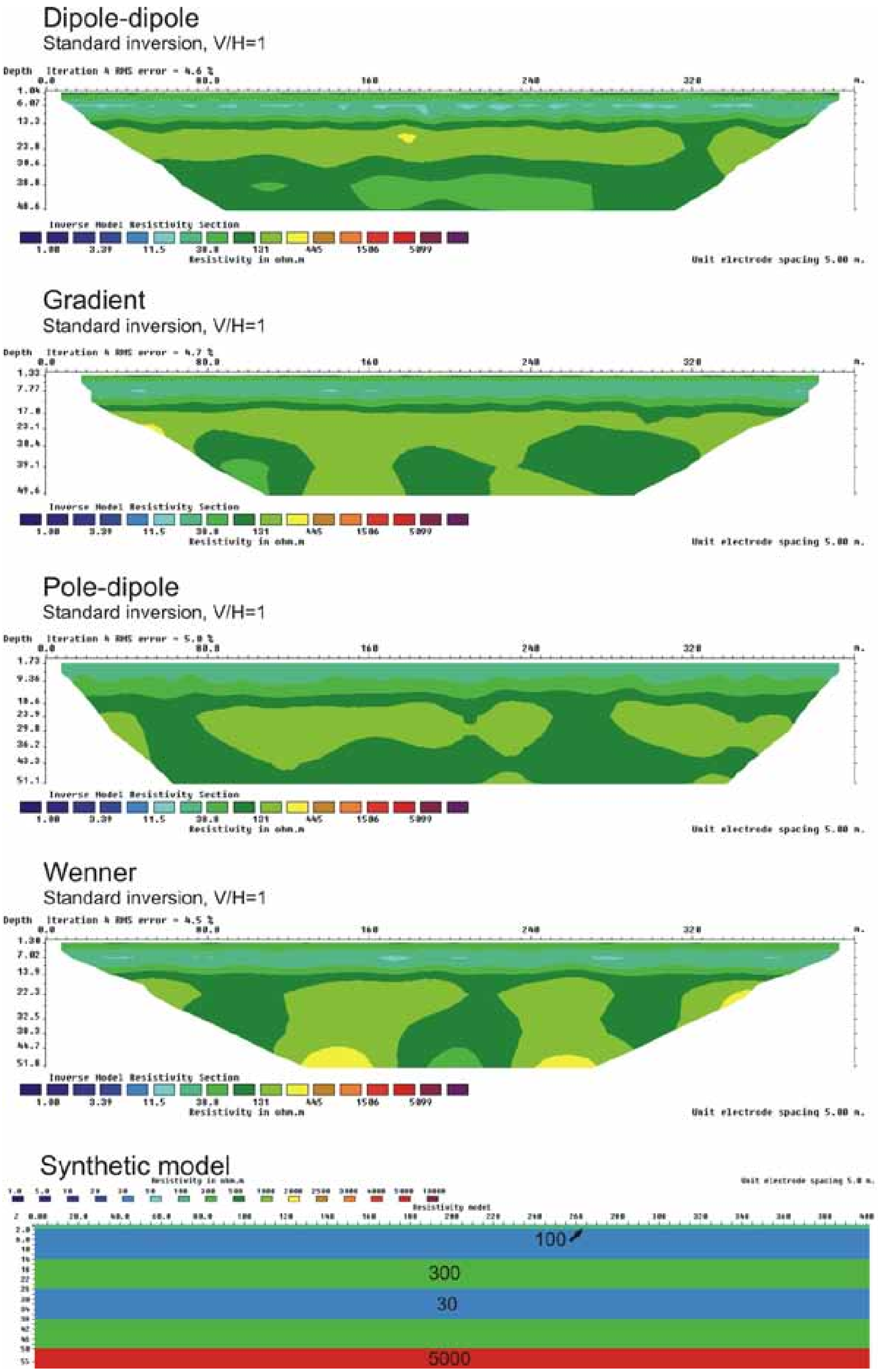

Figure 3.1.89: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 5000 Ωm as the bottom layer.
Standard inversion, V/H=1

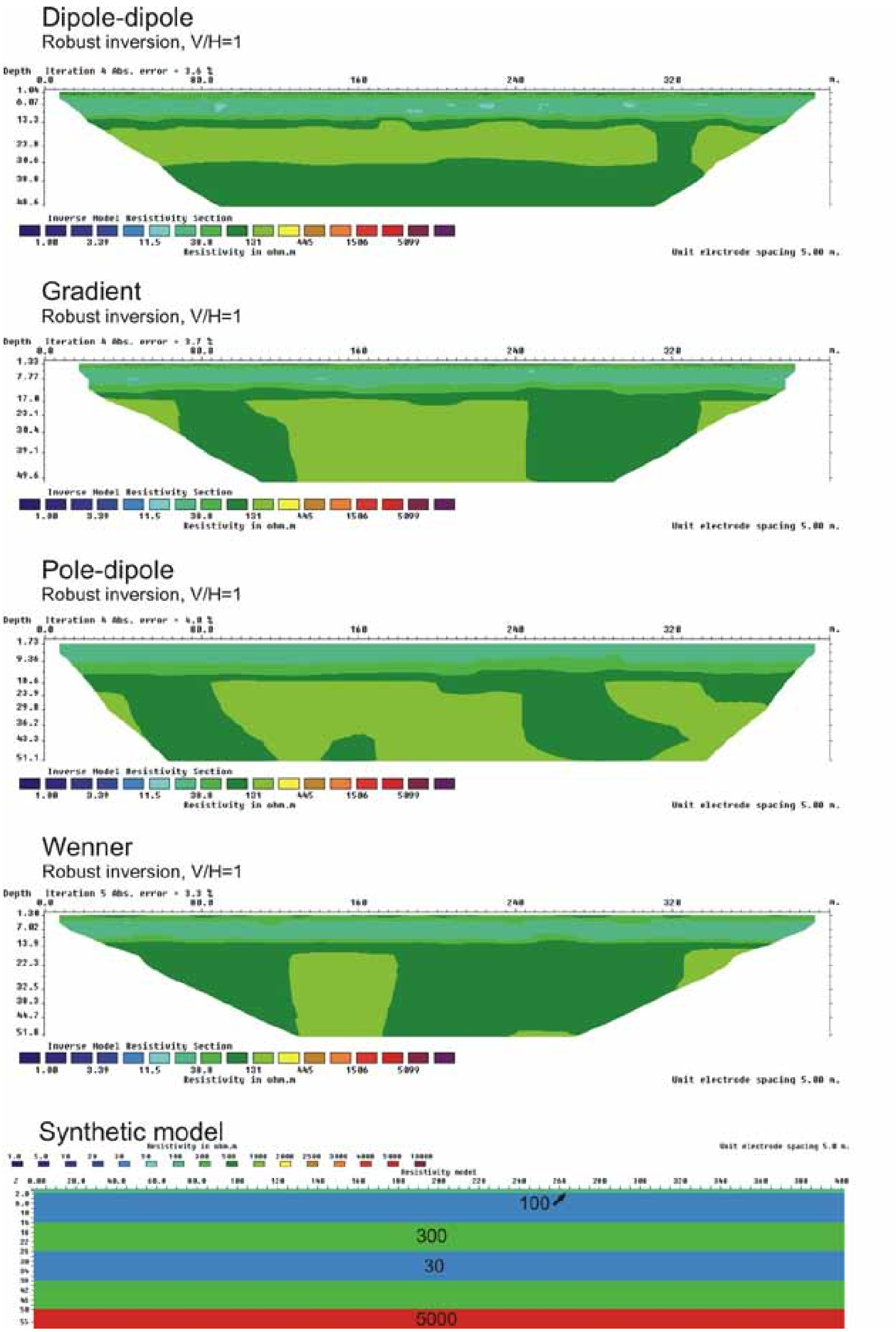

Figure 3.1.90: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 5000 Ωm as the bottom layer.
Robust inversion, V/H=1

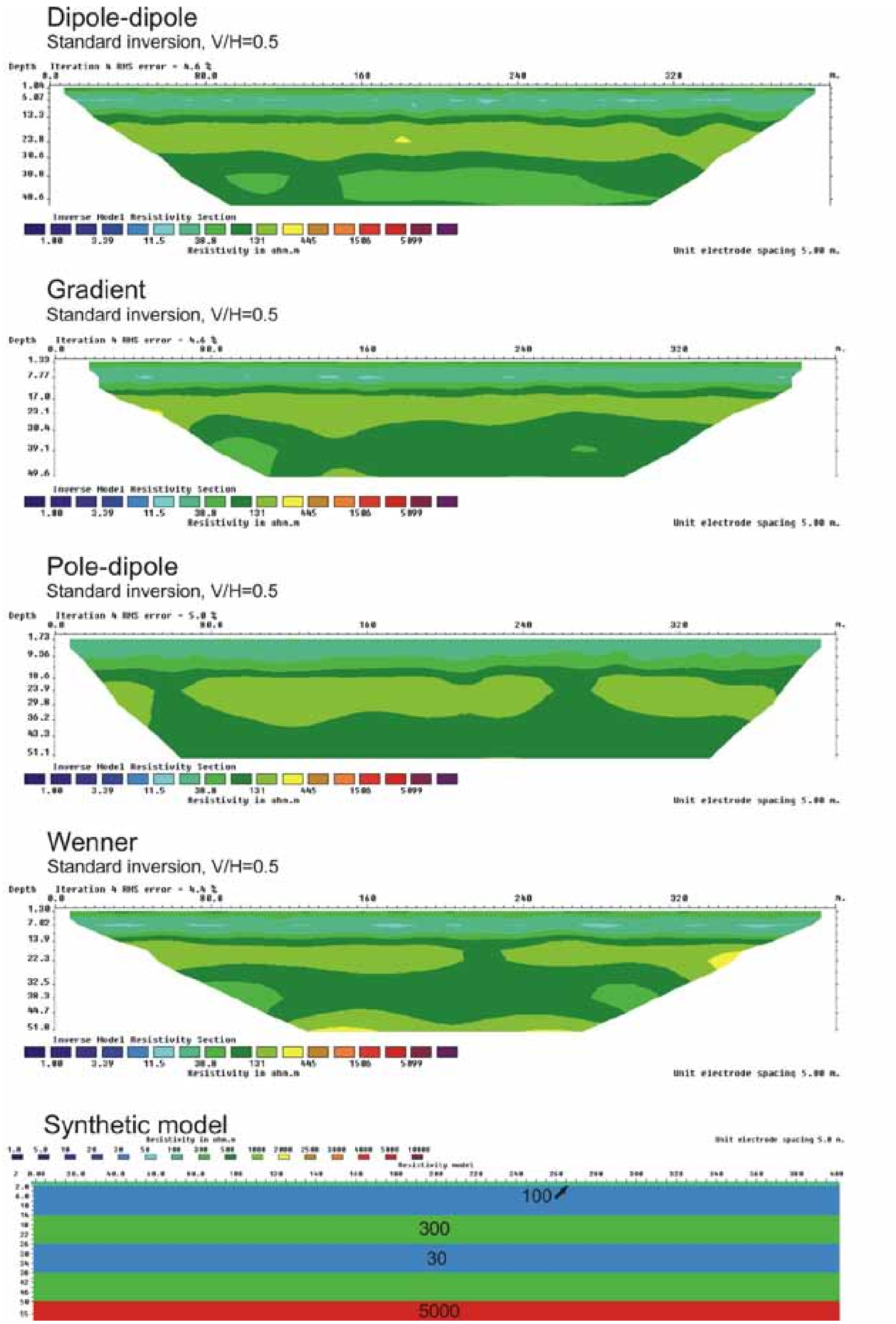

Figure 3.1.91: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 5000 Ωm as the bottom layer.
Standard inversion, V/H=0.5

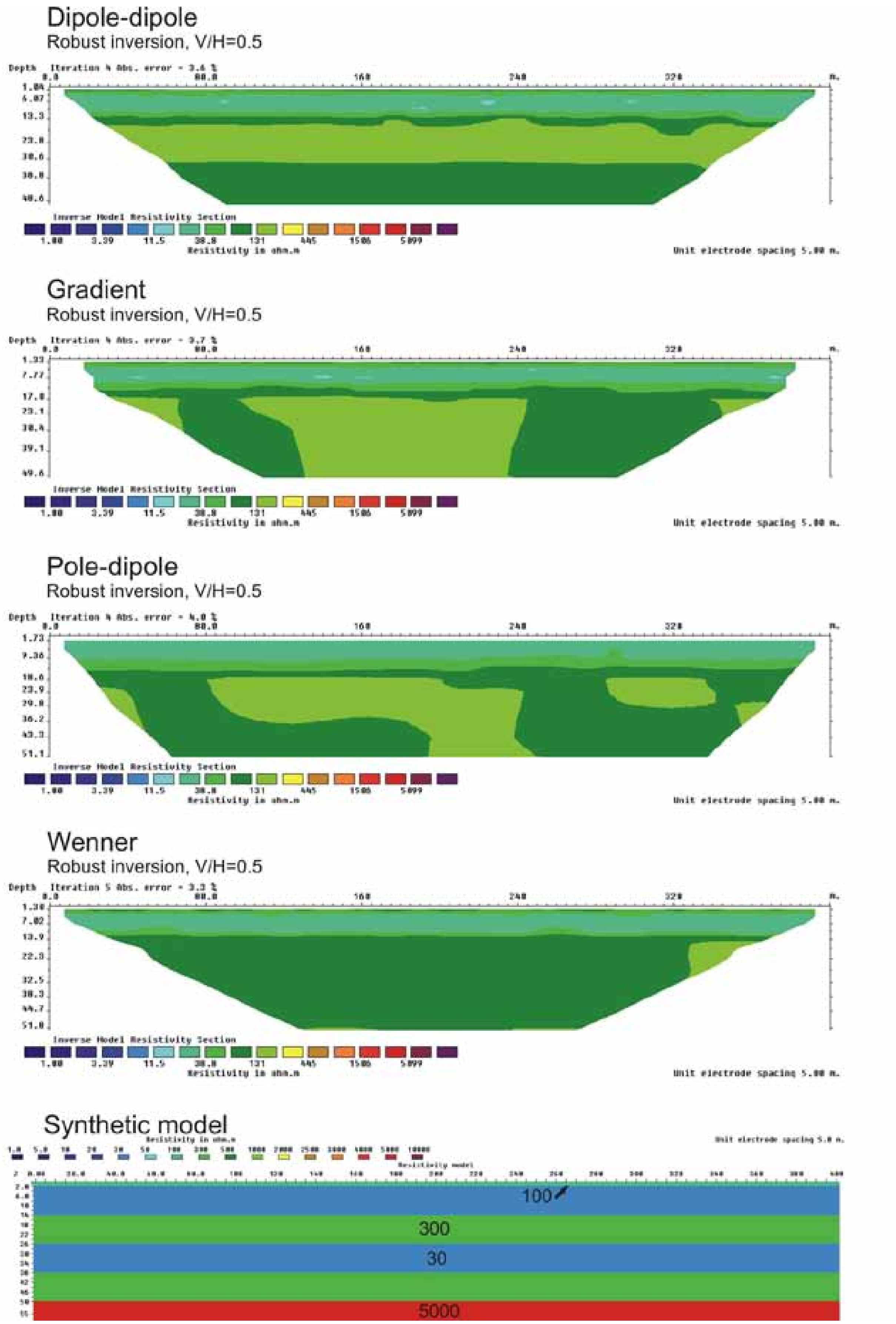

Figure 3.1.92: 2 m top layer (100 Ωm) over horizontal layers of 30 Ωm and 300 Ωm with a thickness of 12 m. 5000 Ωm as the bottom layer.
Robust inversion, V/H=0.5

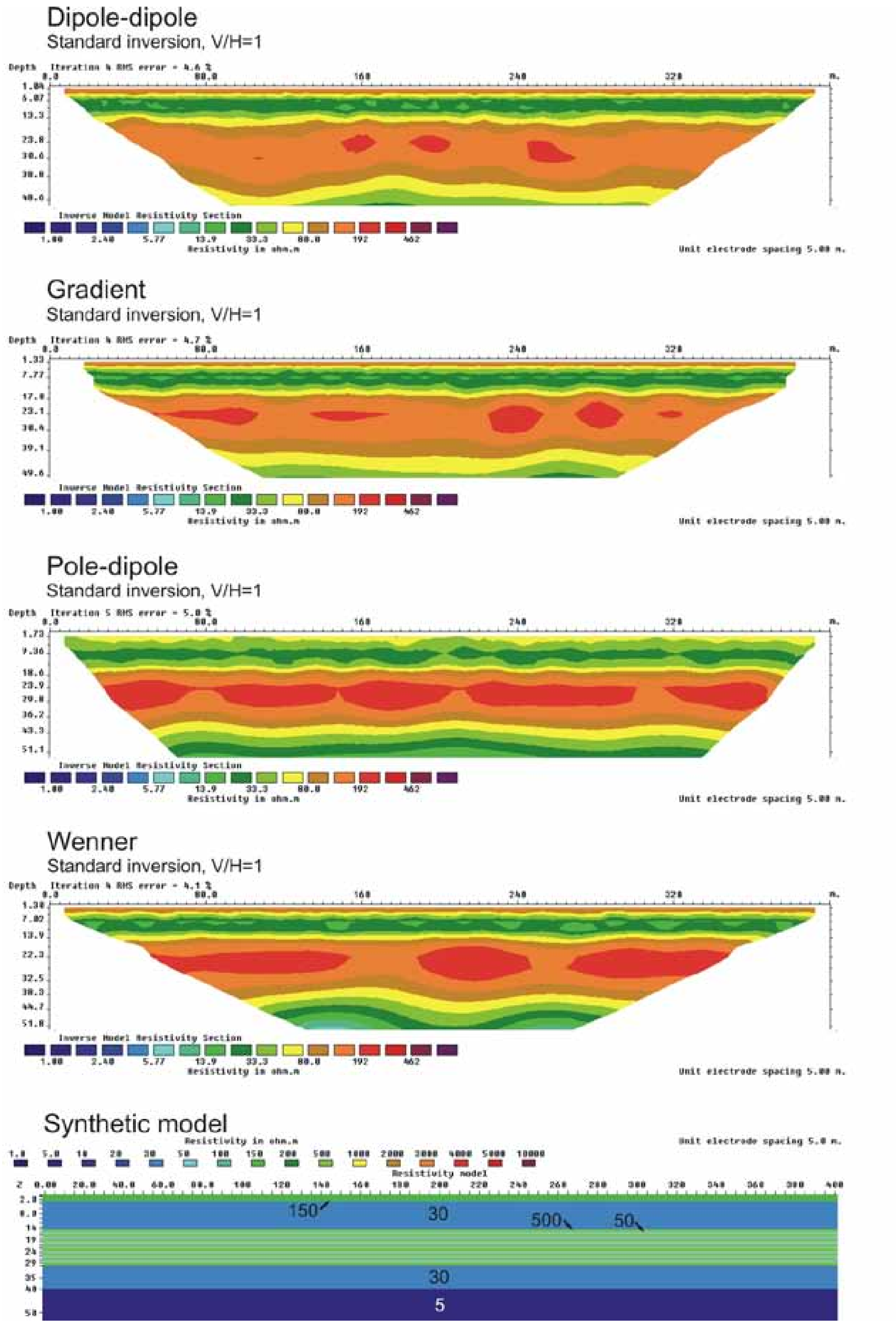

Figure 3.1.93: 3 m top layer (150 Ωm) and 1 m thick horizontal layers of 500 Ωm and 50 Ωm between 30 Ωm.
Standard inversion, V/H=1

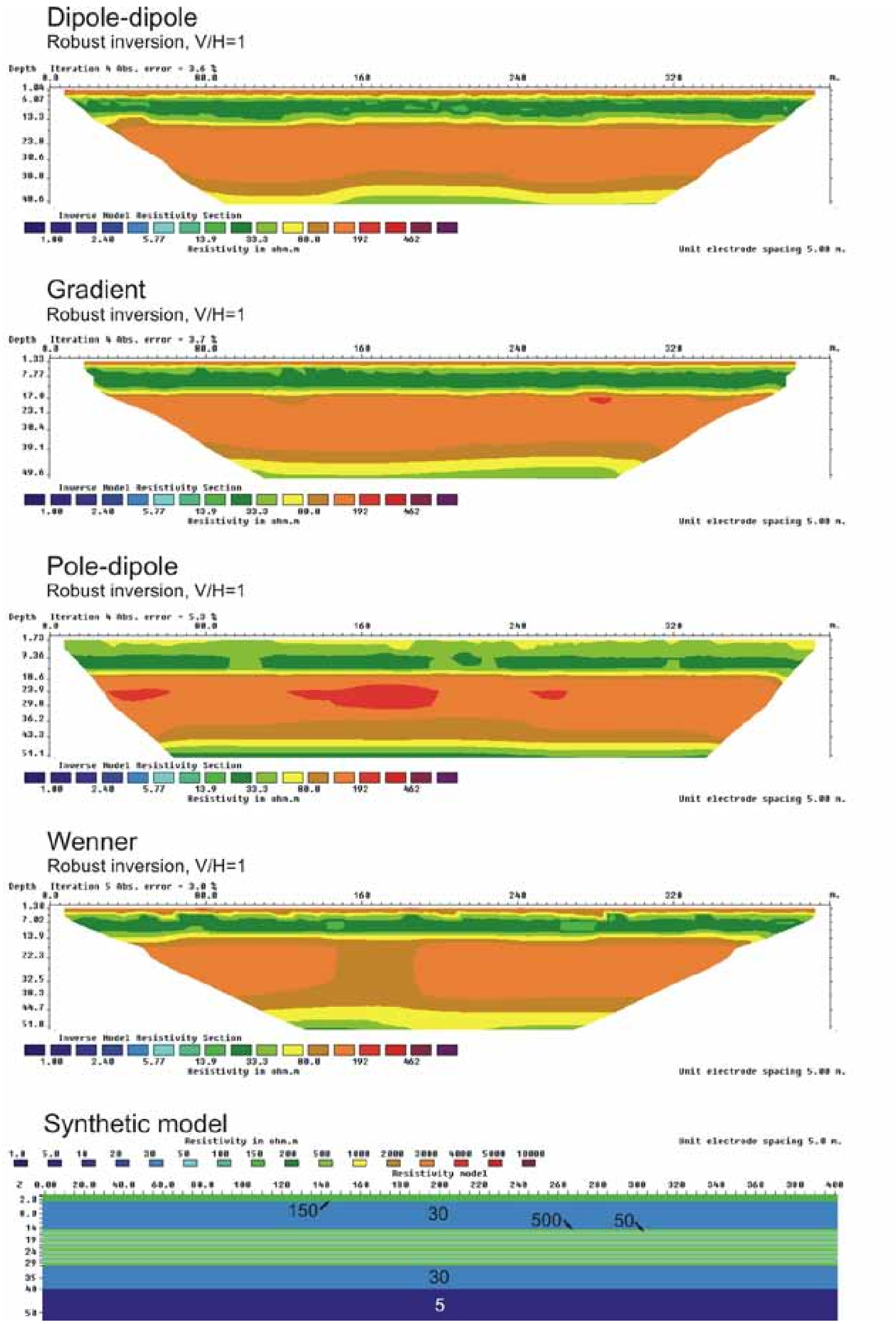

Figure 3.1.94: 3 m top layer (150 Ωm) and 1 m thick horizontal layers of 500 Ωm and 50 Ωm between 30 Ωm.
Robust inversion, V/H=1

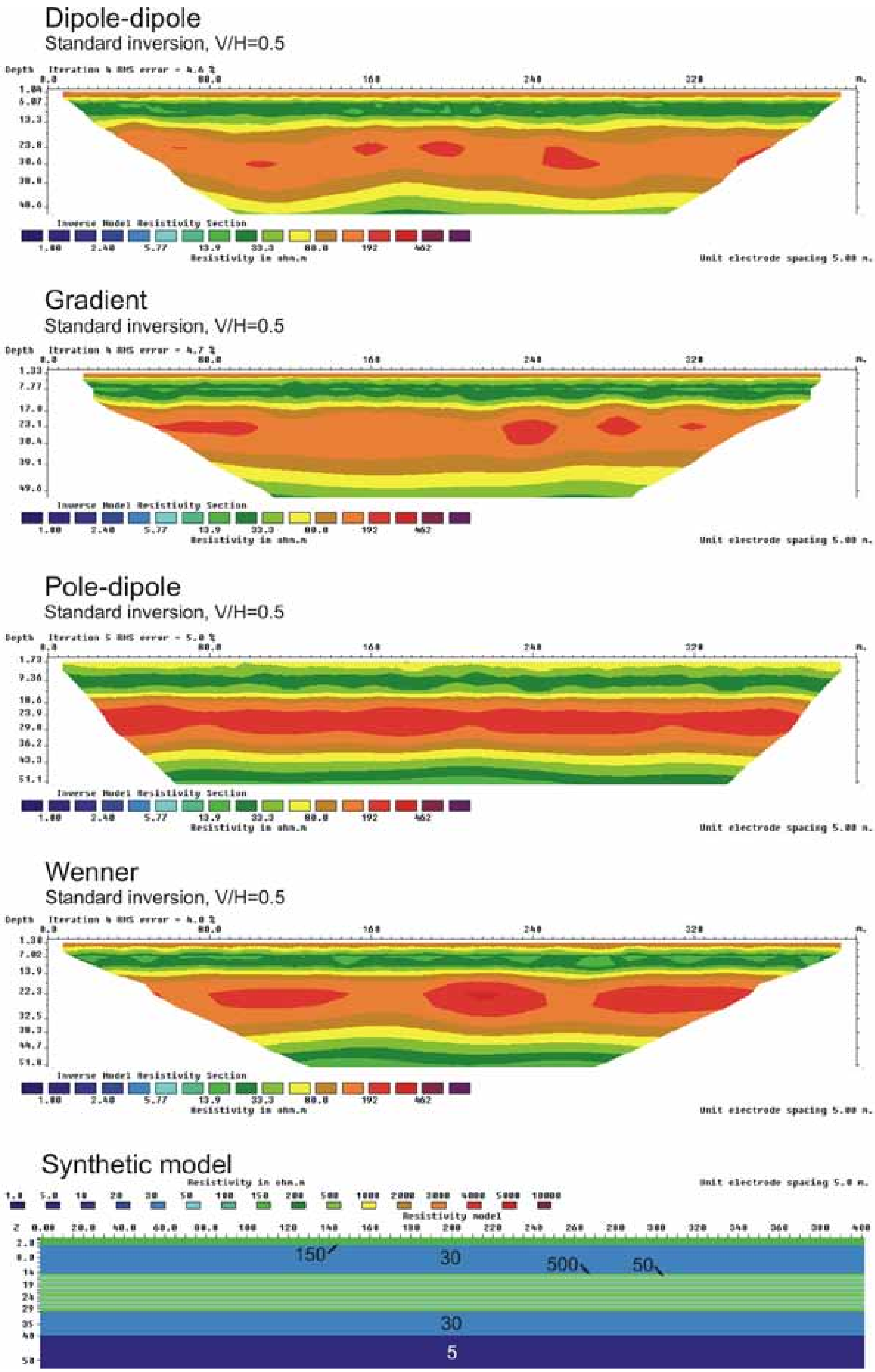

Figure 3.1.95: 3 m top layer (150 Ωm) and 1 m thick horizontal layers of 500 Ωm and 50 Ωm between 30 Ωm. Standard inversion, V/H=0.5

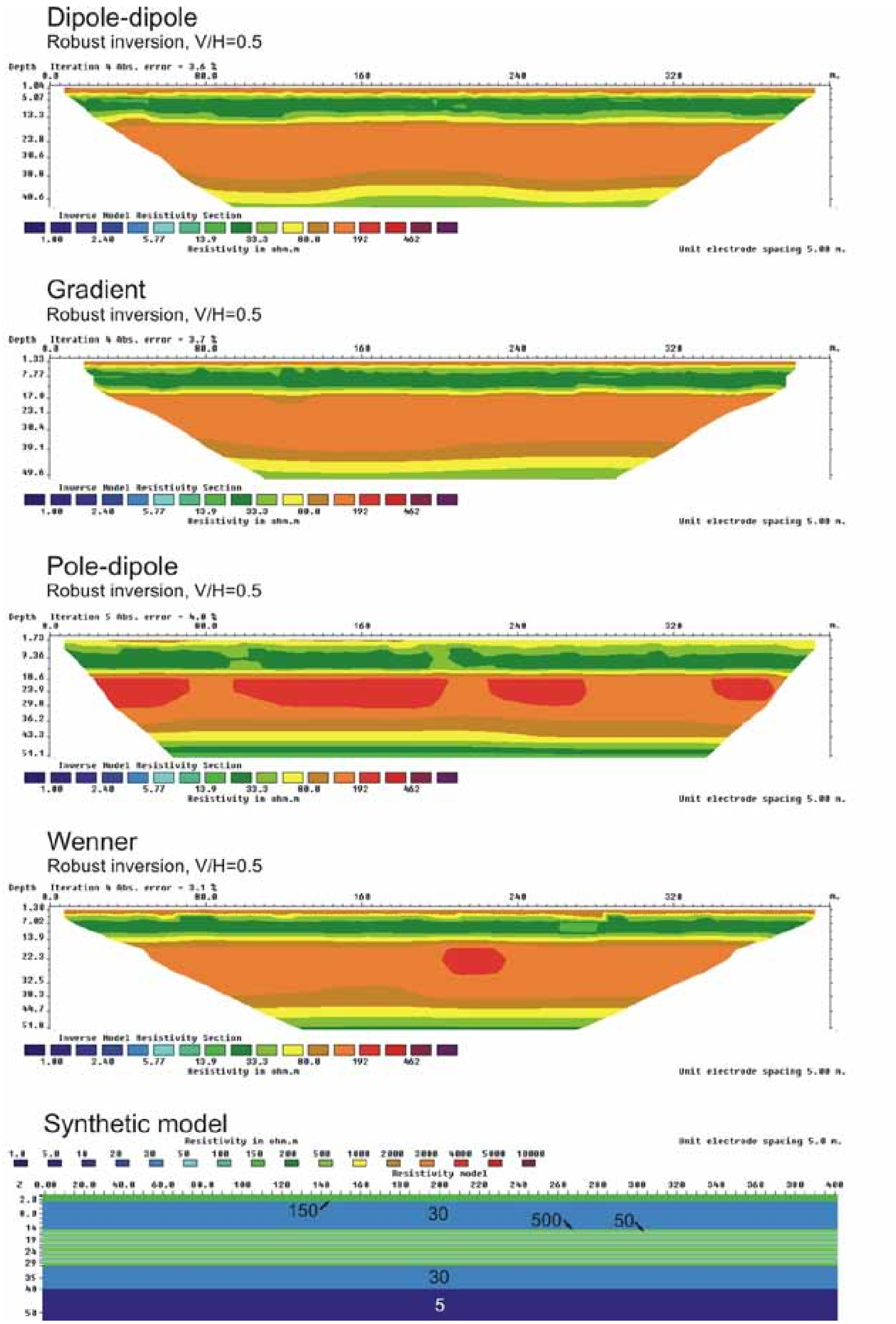

Figure 3.1.96: 3 m top layer (150 Ωm) and 1 m thick horizontal layers of 500 Ωm and 50 Ωm between 30 Ωm. Robust inversion, V/H=0.5

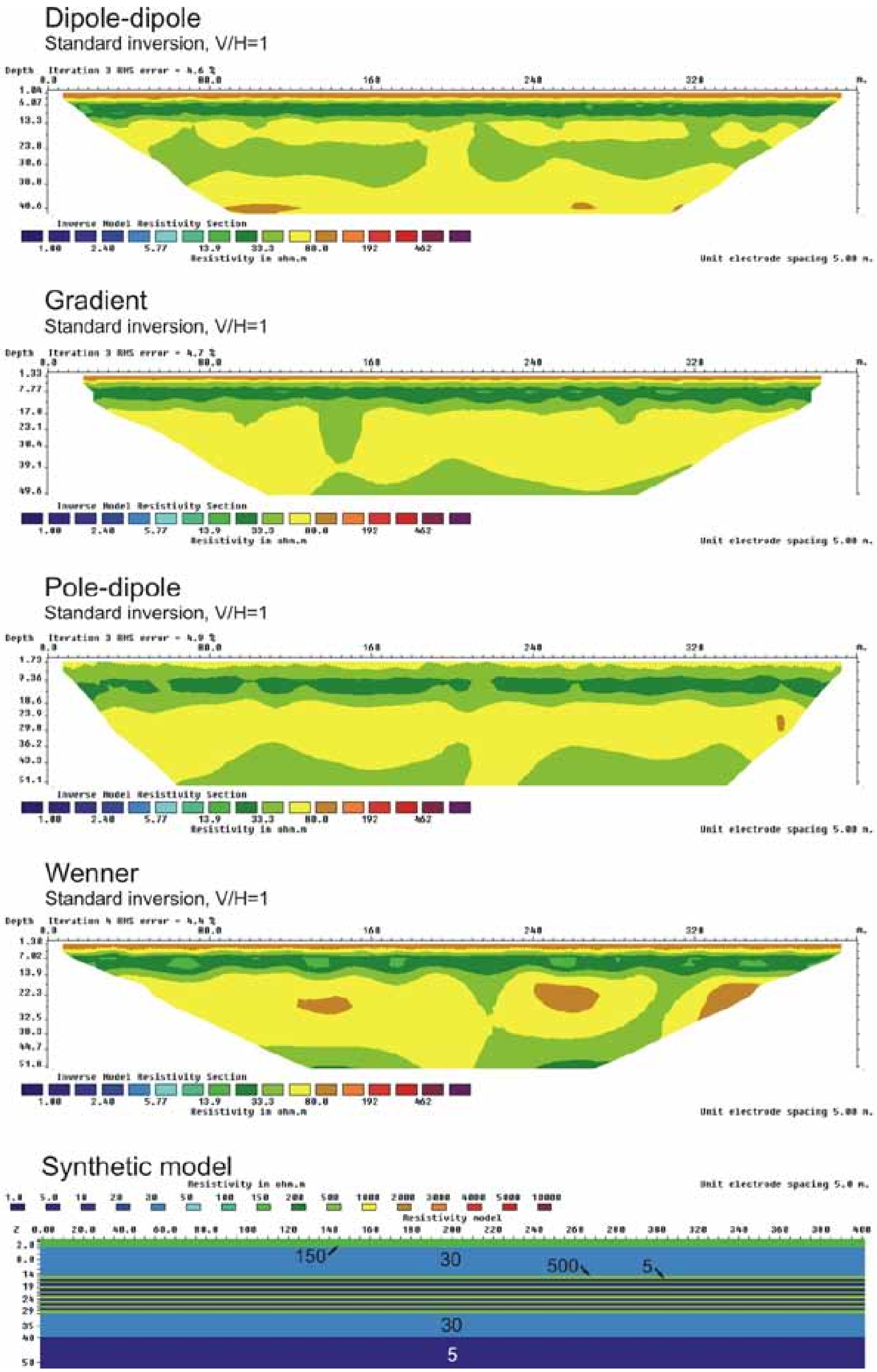

Figure 3.1.97: 3 m top layer (150 Ωm) and 1 m thick horizontal layers of 500 Ωm and 5 Ωm between 30 Ωm. Standard inversion, V/H=1

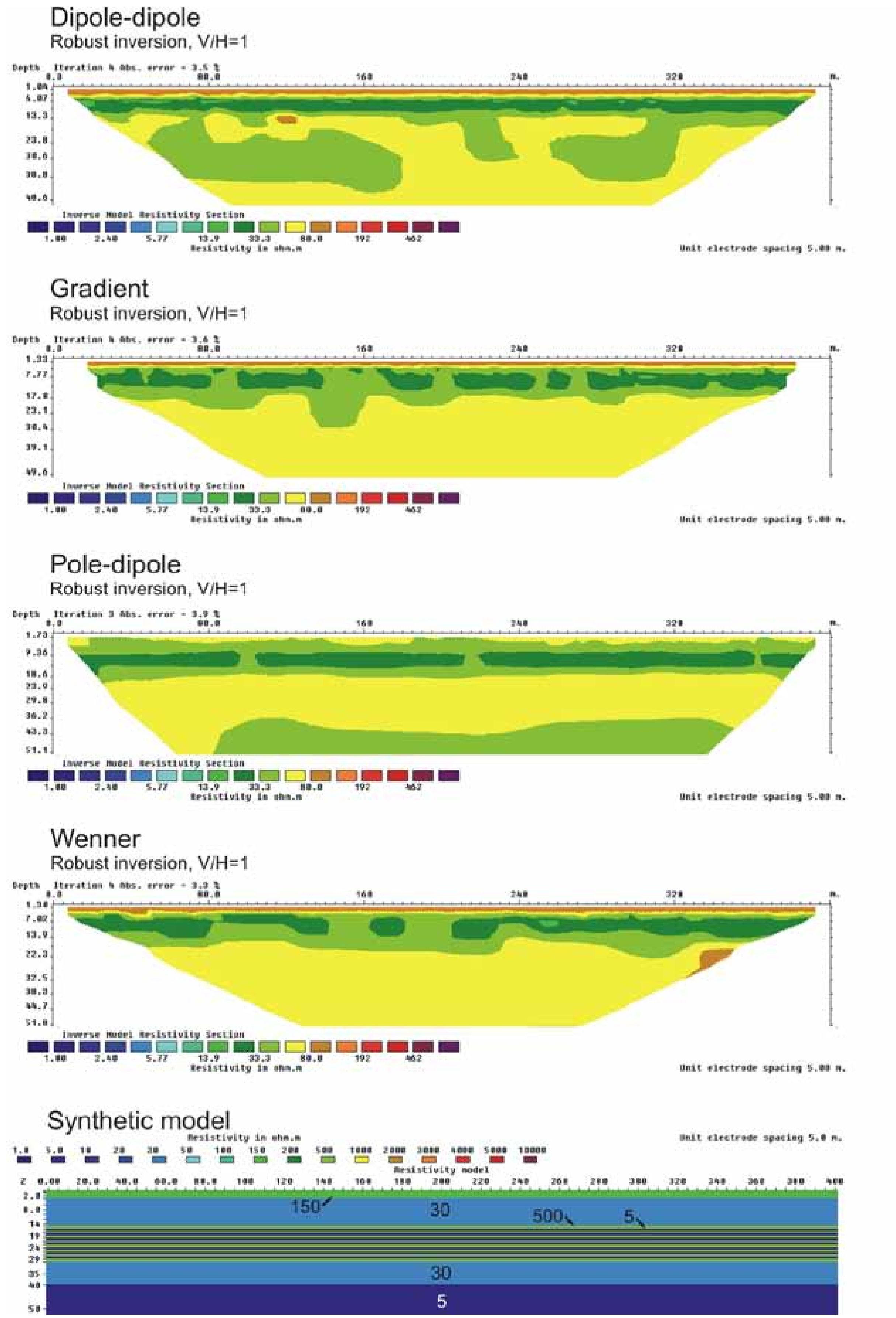

Figure 3.1.98: 3 m top layer (150 Ωm) and 1 m thick horizontal layers of 500 Ωm and 5 Ωm between 30 Ωm. Robust inversion, V/H=1

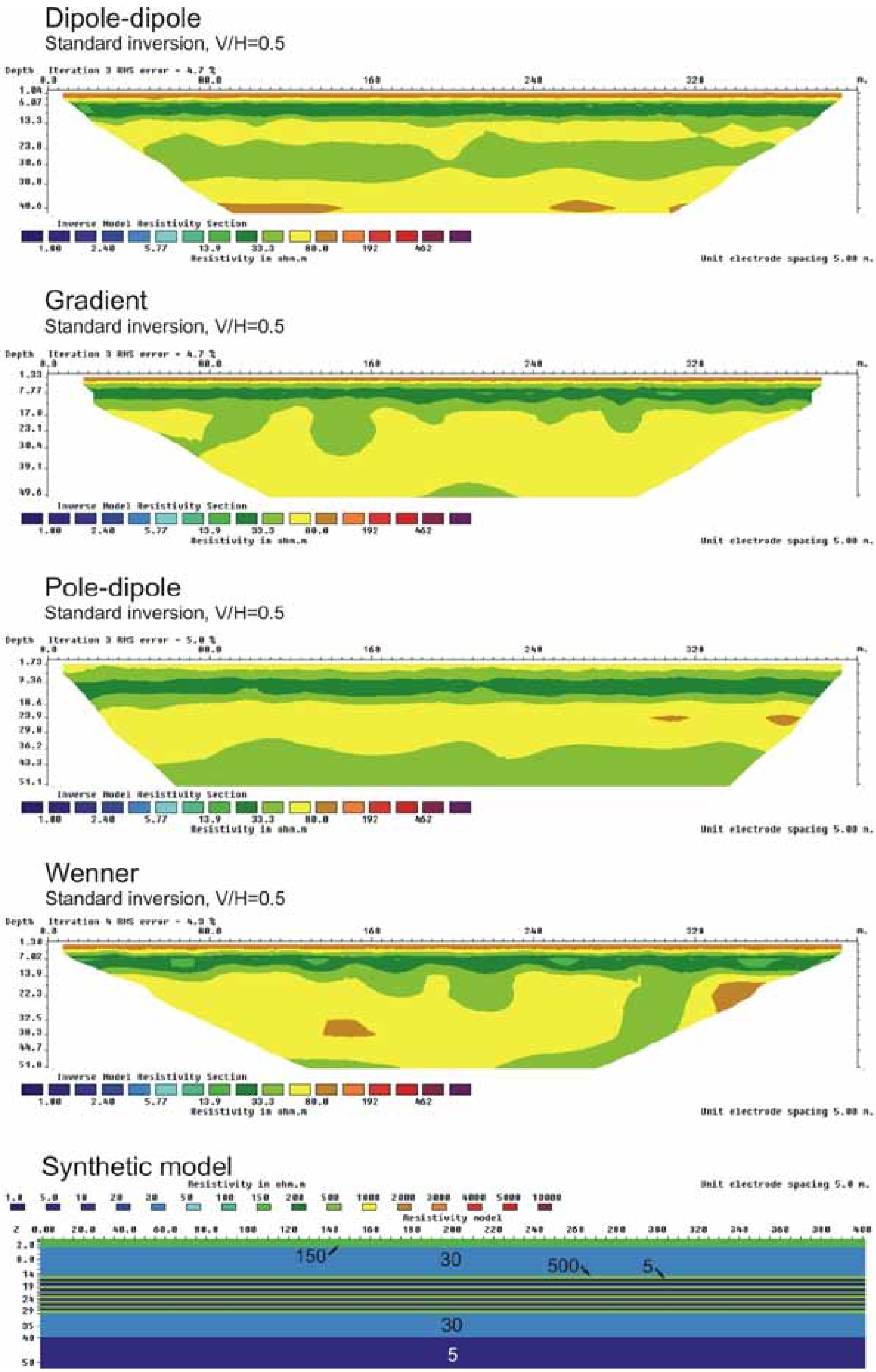

Figure 3.1.99: 3 m top layer (150 Ωm) and 1 m thick horizontal layers of 500 Ωm and 5 Ωm between 30 Ωm. Standard inversion, V/H=0.5

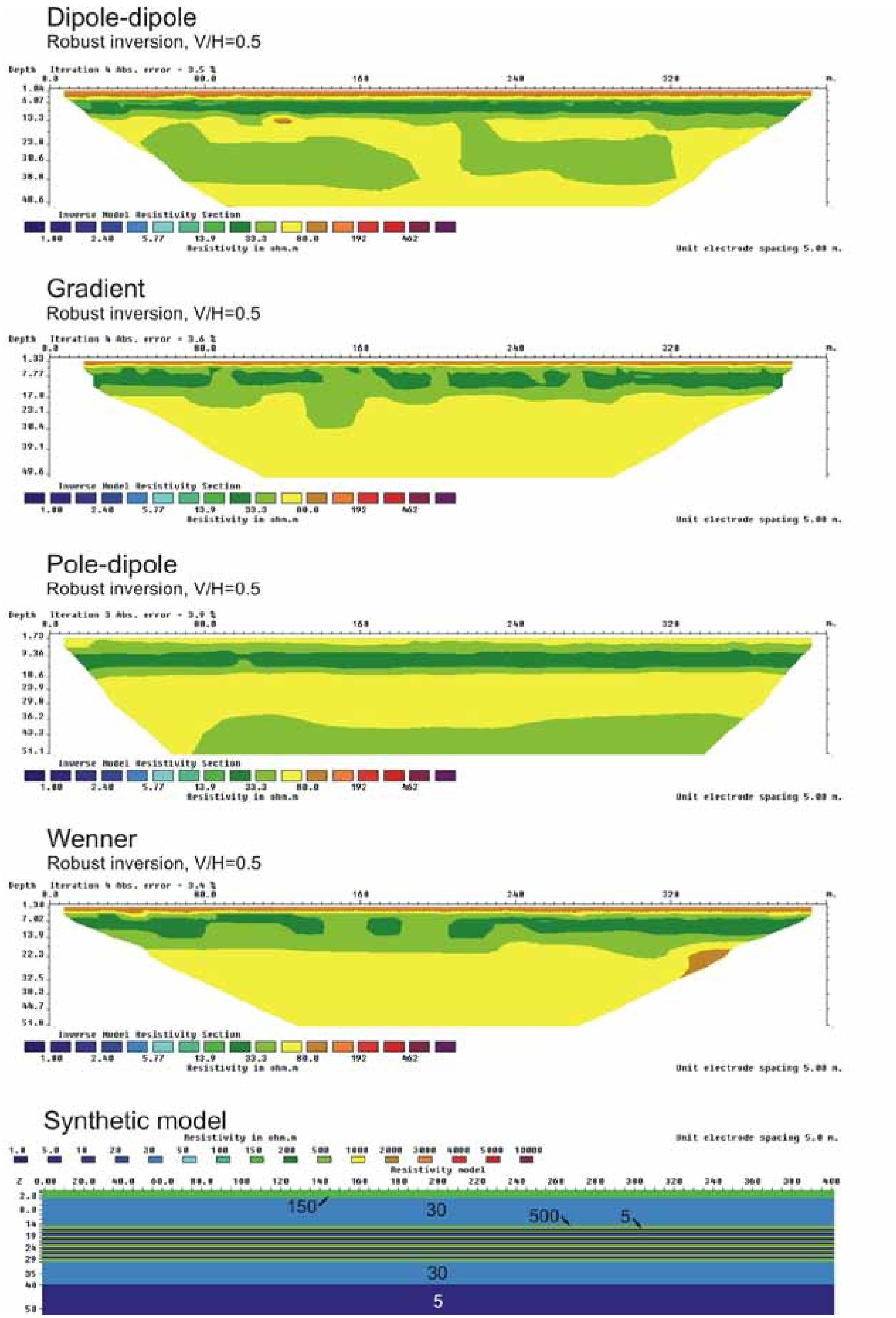

Figure 3.1.100: 3 m top layer (150 Ωm) and 1 m thick horizontal layers of 500 Ωm and 5 Ωm between 30Ωm. Robust inversion, V/H=0.5

APPENDIX B - Modeling results. Dipping interfaces

Figures 3.2.1 -:3.2.24:	Shallow, intermediate and steeply dipping interface between resistivities of 300 Ωm and 30 Ωm above bedrock of 5000 Ωm below. Two different colour scales.
Figures 3.2.25 – 3.2.32:	2 m top layer (100Ωm) over a horizontal and dipping interface between 30 Ωm and 300 Ωm. Bedrock of 5000 Ωm below. Two different colour scales.
Figures 3.2.33 – 3.2.40:	3 m top layer (150 Ωm) over a dipping interface between resistivities of 800 Ωm and 50 Ωm. Bedrock of 5000 Ωm below. Two different colour scales.
Figures 3.2.41 – 3.2.48:	3 m top layer (150 Ωm) over a horizontal and dipping interface between 50 Ωm and 800 Ωm. Bedrock of 5000 Ωm below. Two different colour scales.
Figures 3.2.49 - 3.2.52:	3 m top layer (150 Ωm) over a dipping interface between resistivities of 30 Ωm and 5 Ωm. Clay of 1 Ωm below.
Figures 3.2.53 – 3.2.56:	Dipping interfaces between 1 Ωm, 30 Ωm and 1 Ωm.

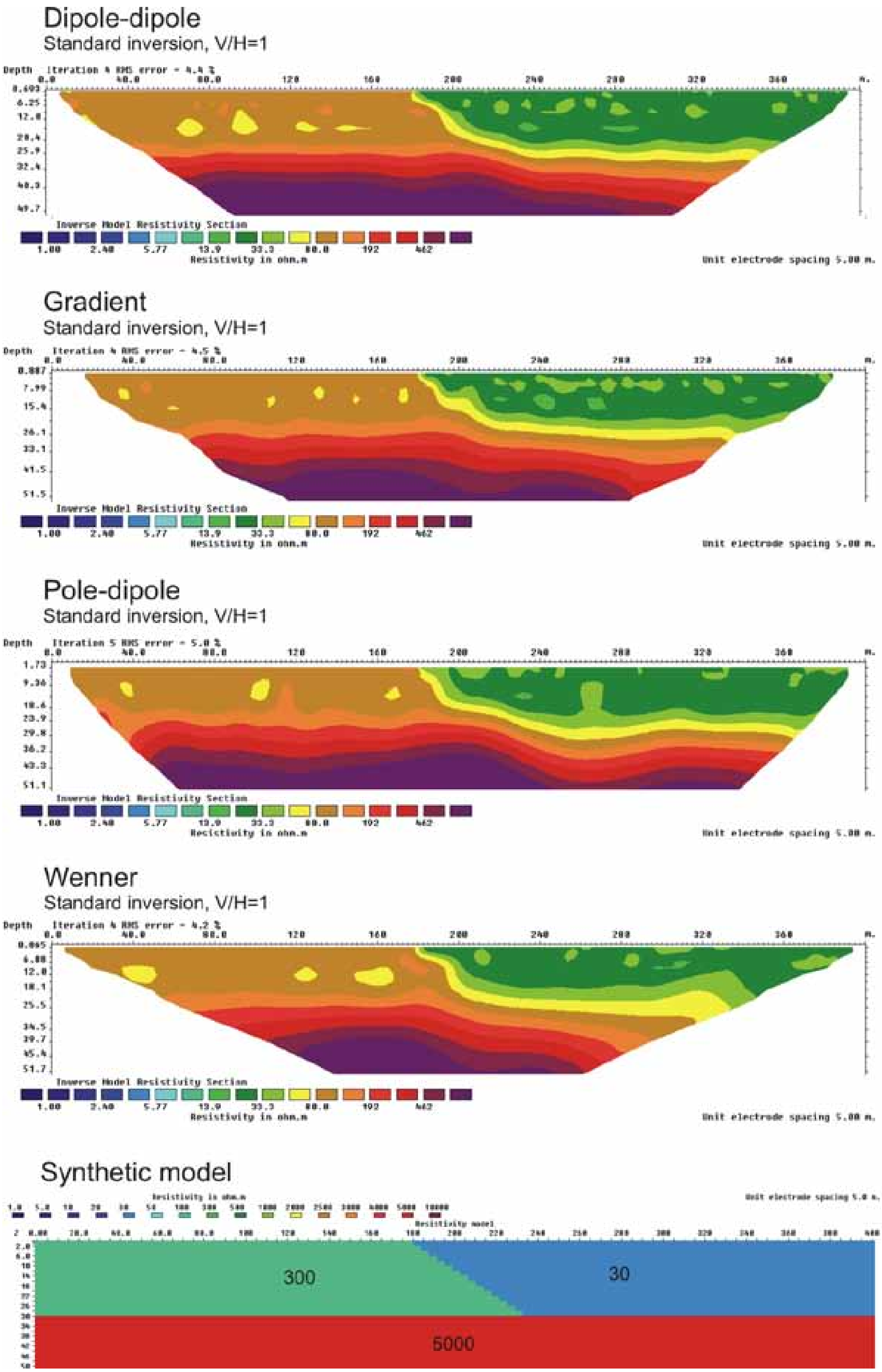

Figure 3.2.1: Shallow dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=1

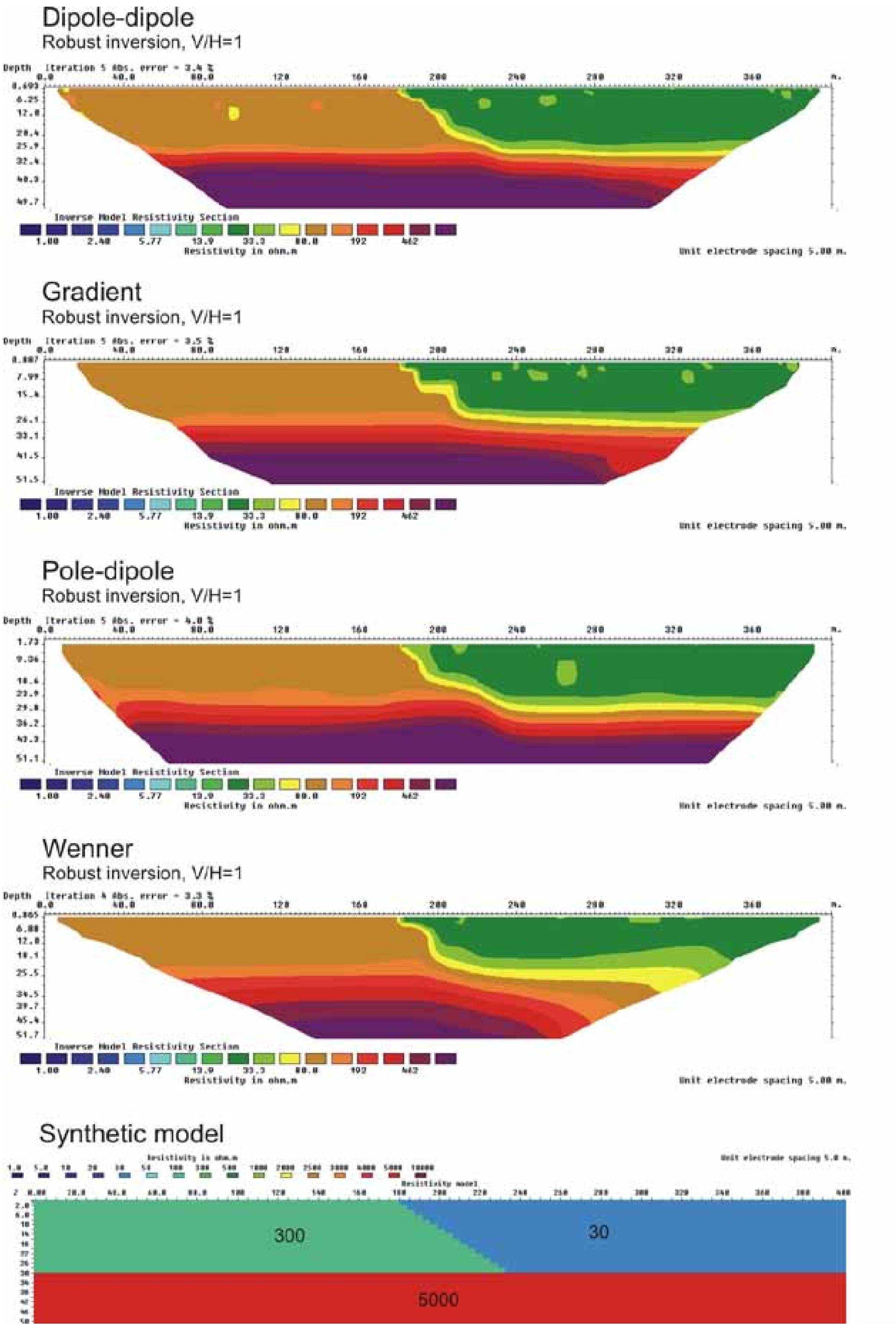

Figure 3.2.2: Shallow dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=1

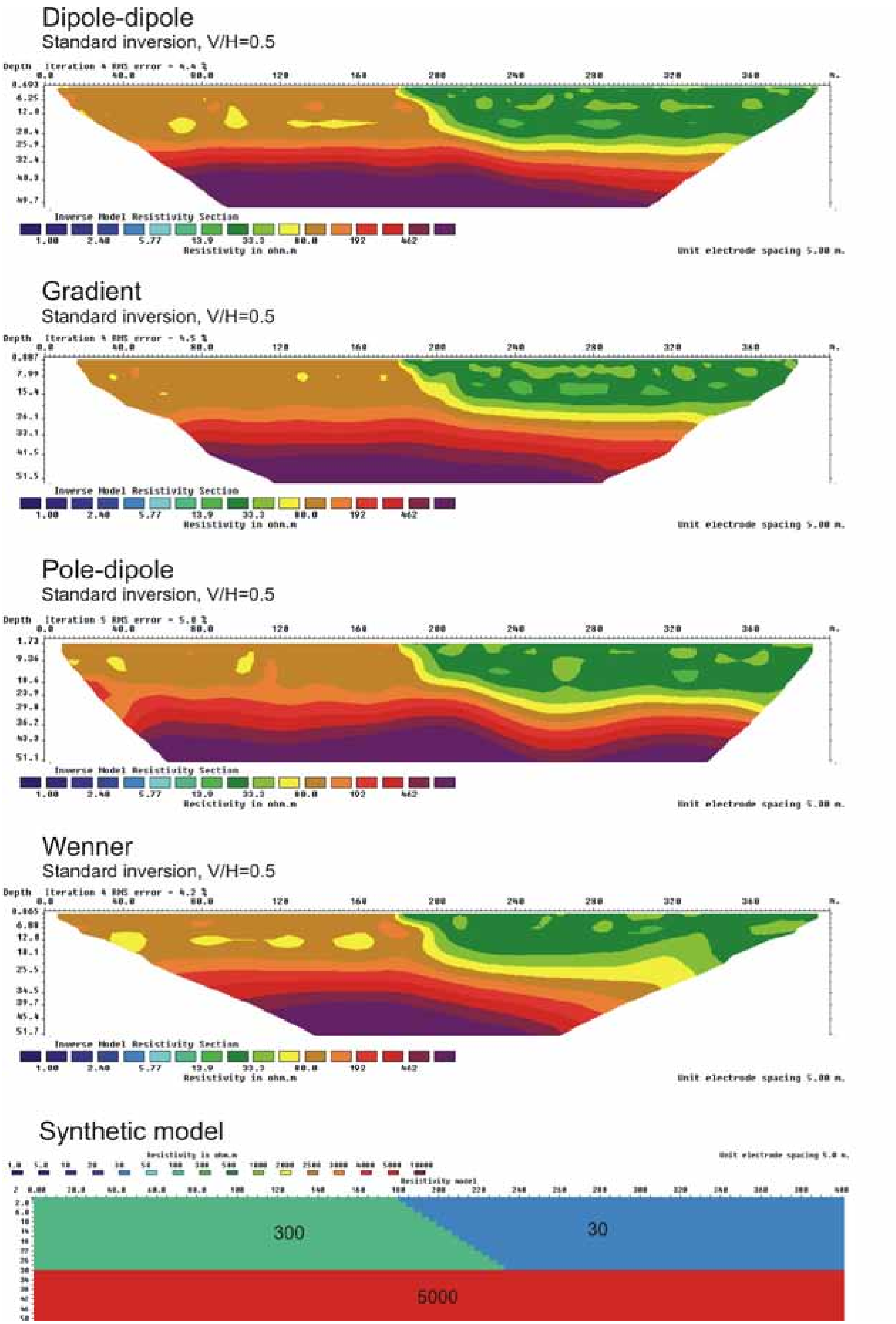

Figure 3.2.3: Shallow dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=0.5

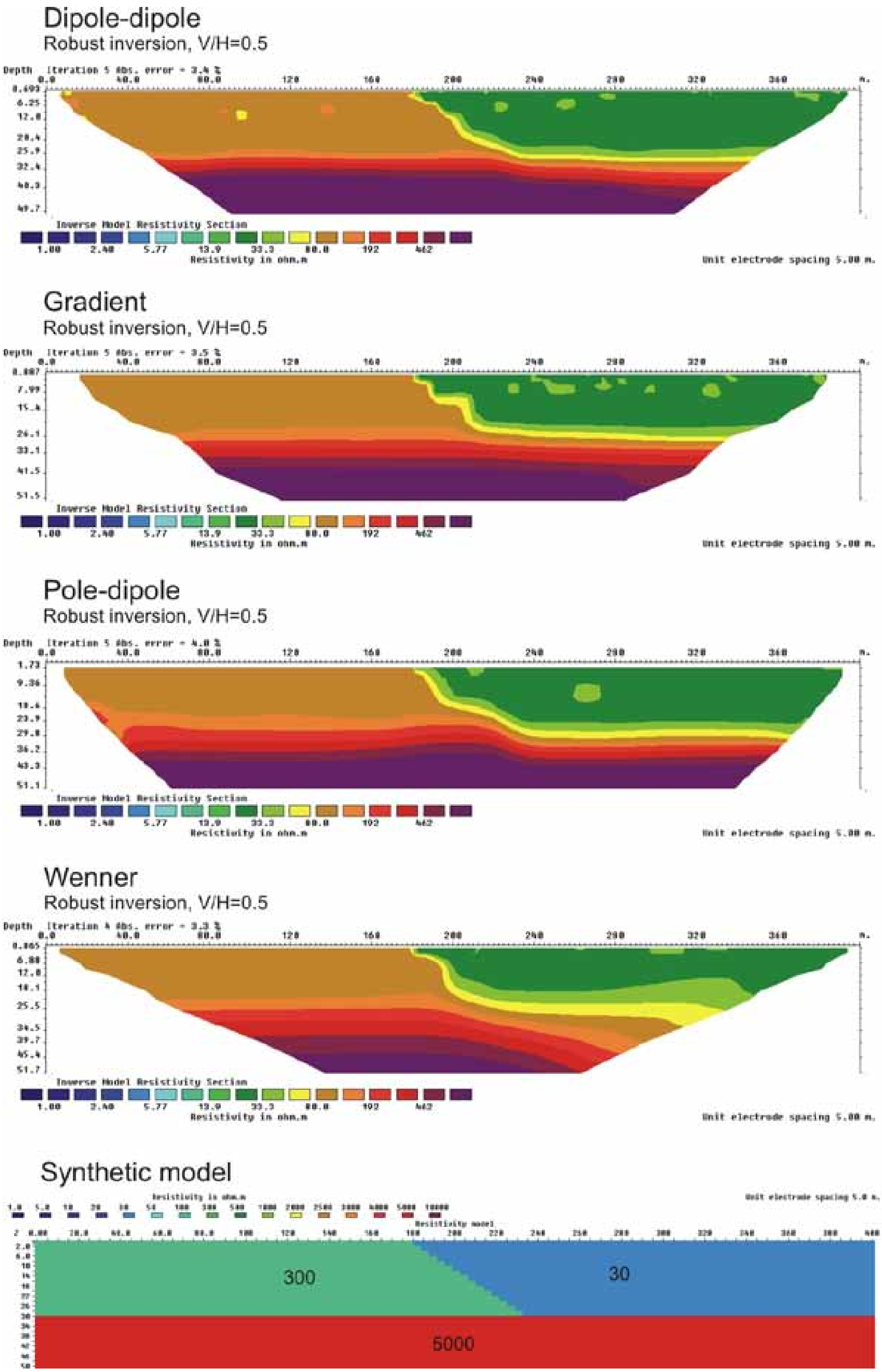

Figure 3.2.4: Shallow dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=0.5

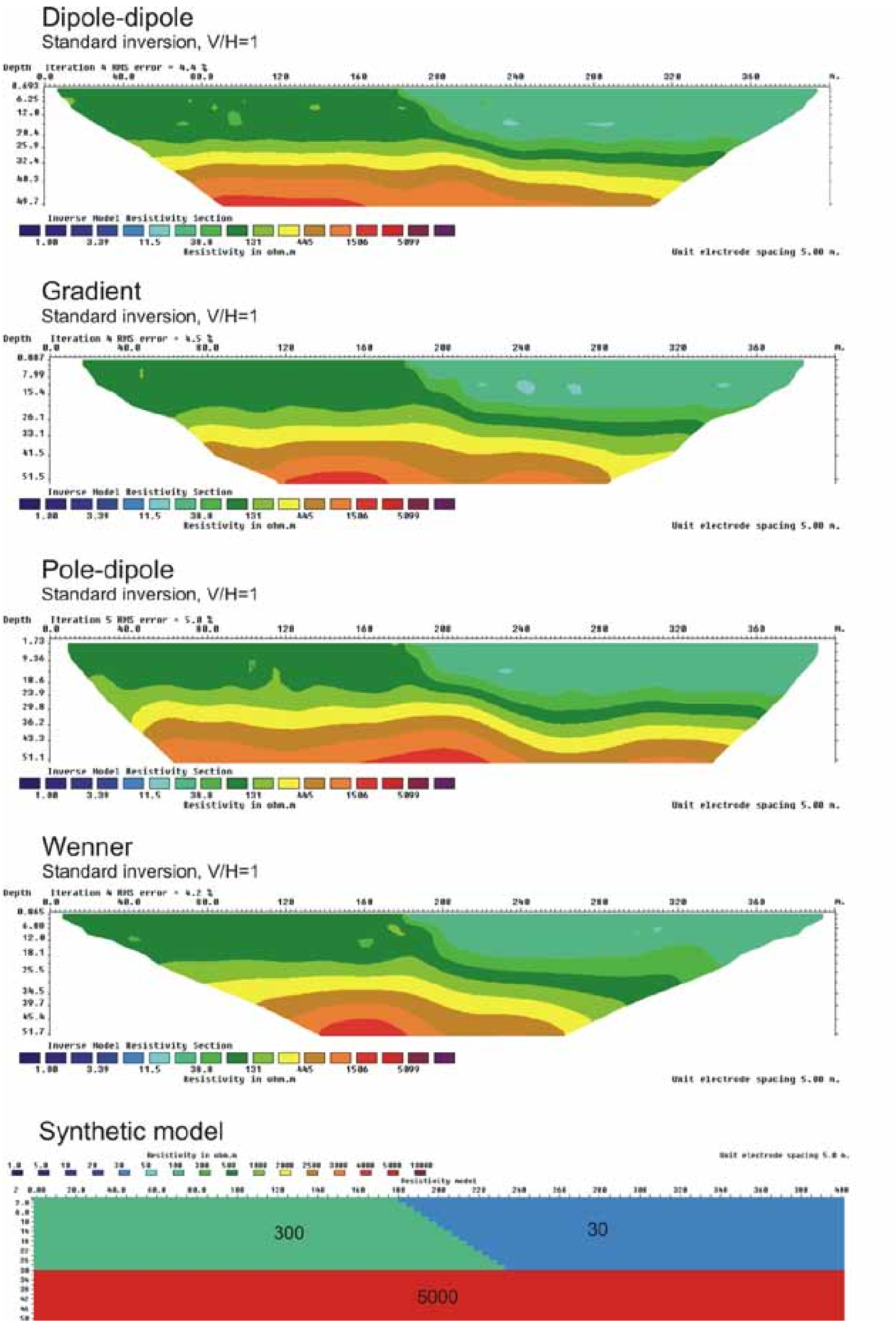

Figure 3.2.5: Shallow dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=1

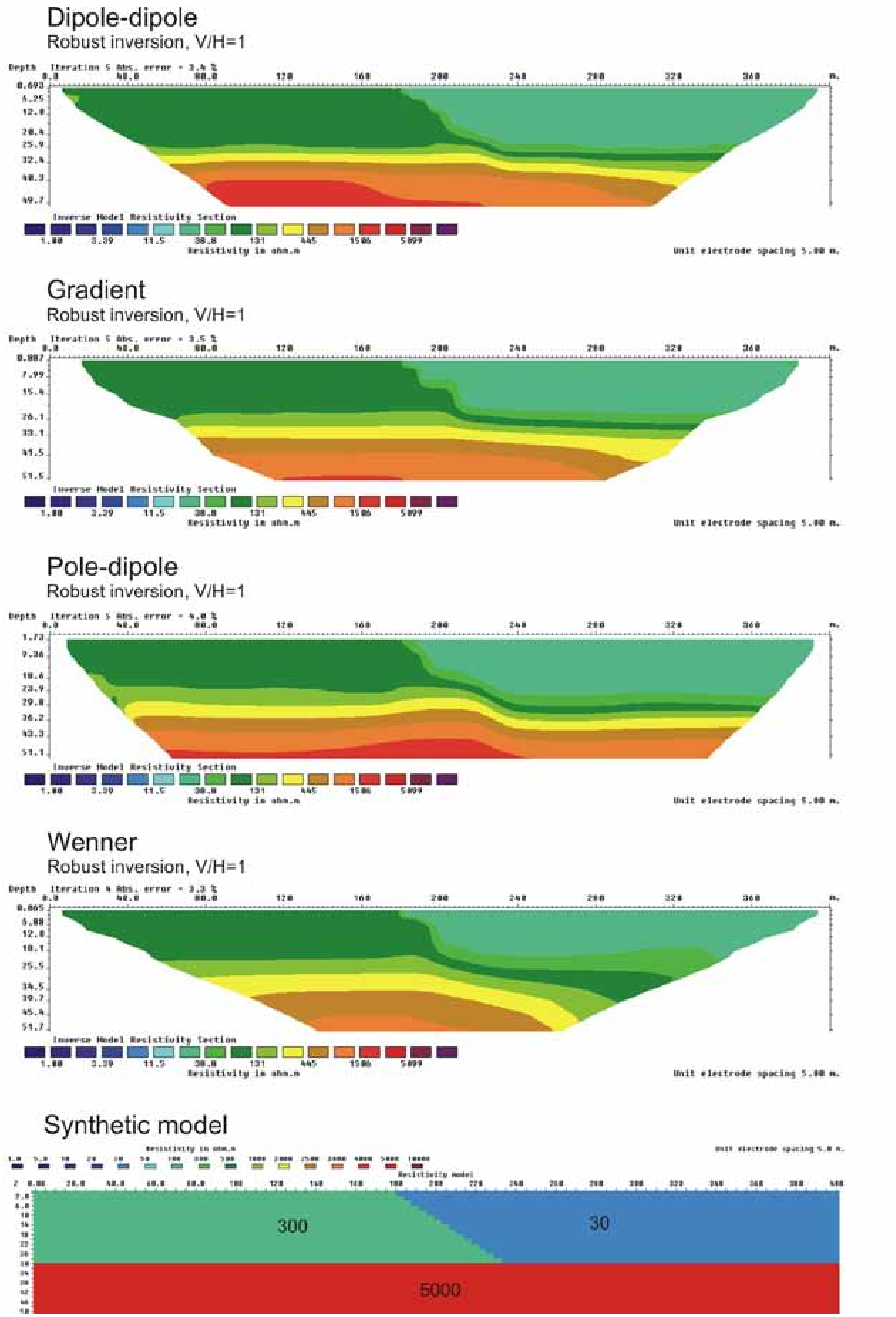

Figure 3.2.6: Shallow dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=1

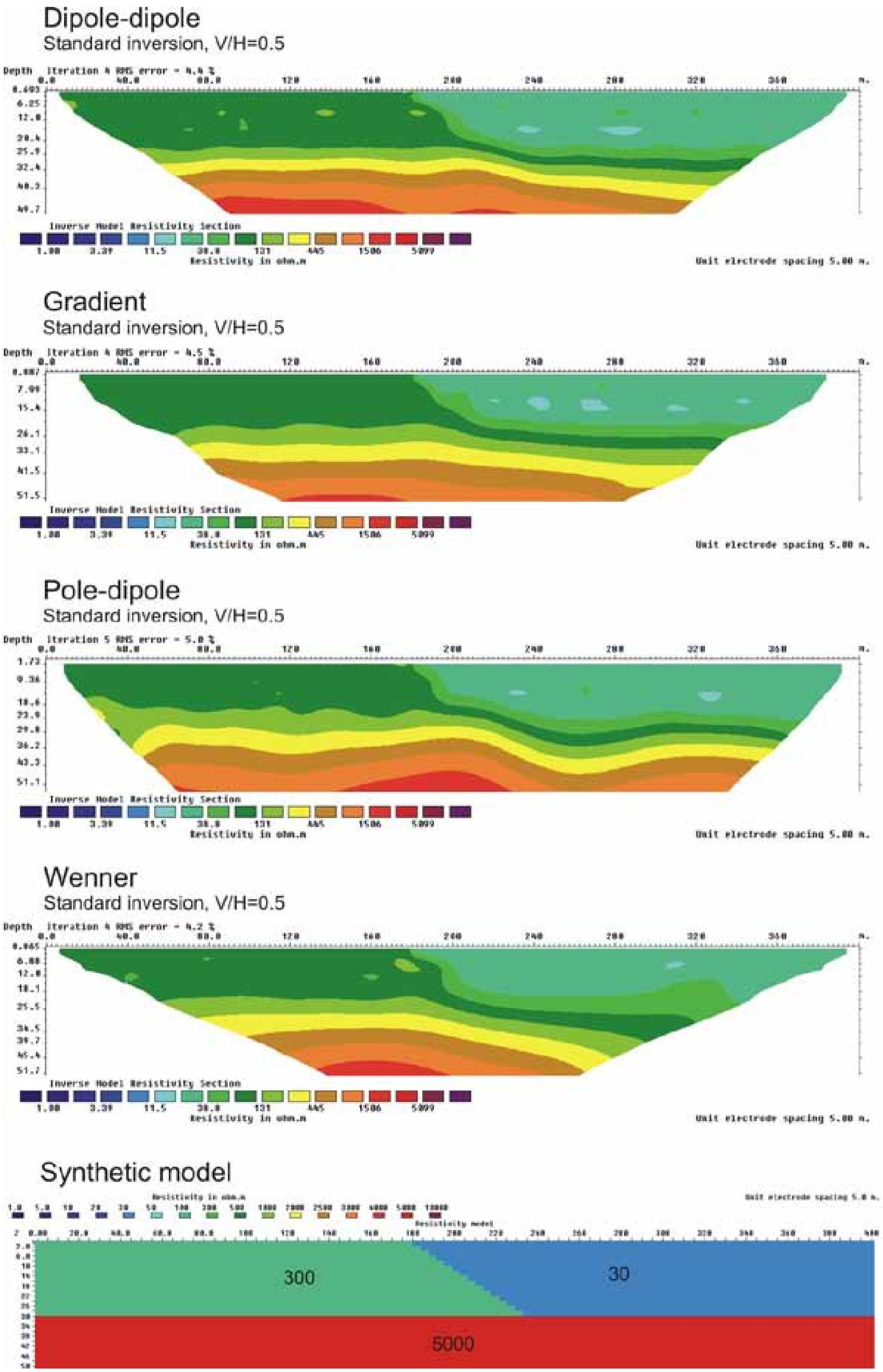

Figure 3.2.7: Shallow dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=0.5

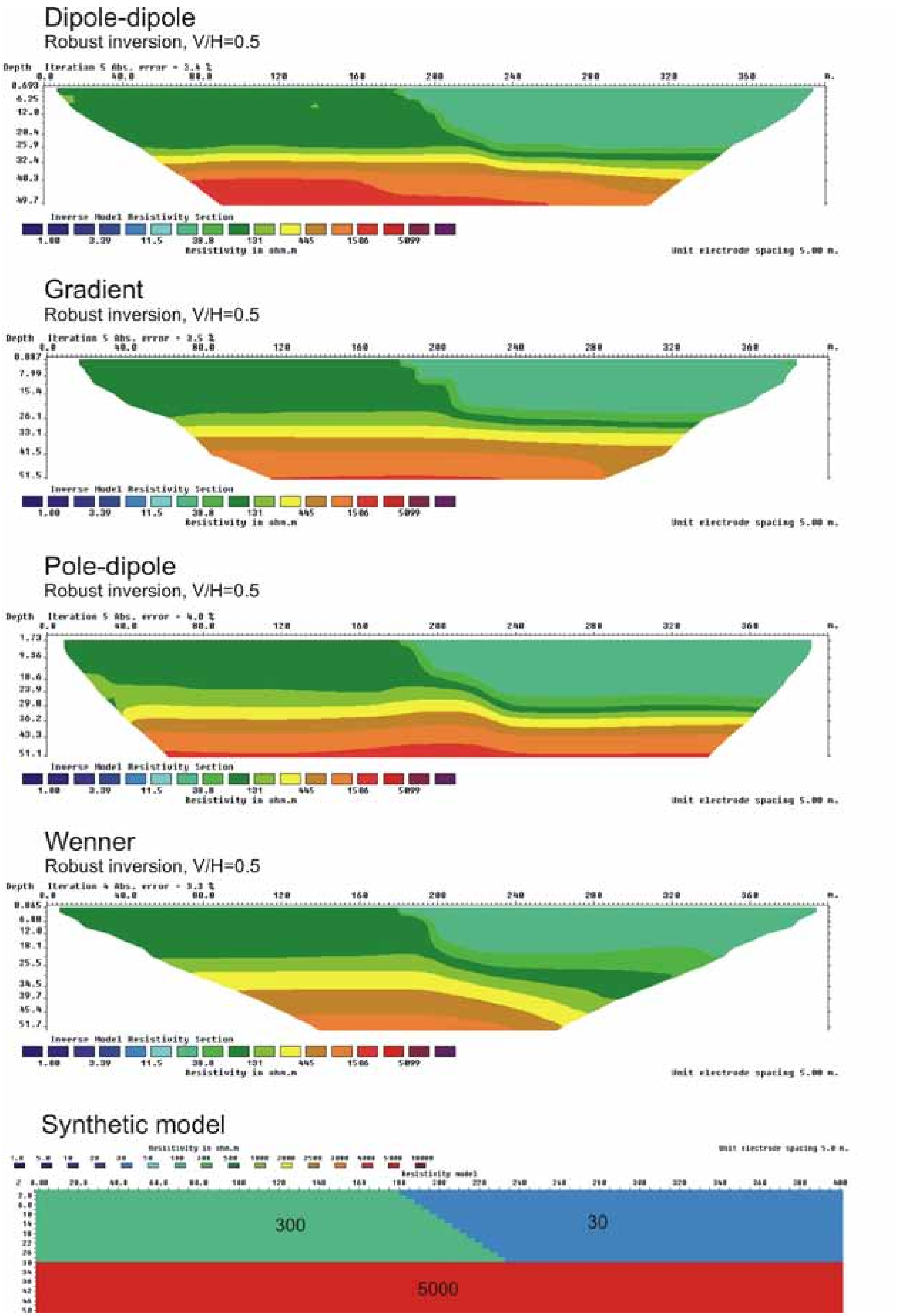

Figure 3.2.8: Shallow dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=0.5

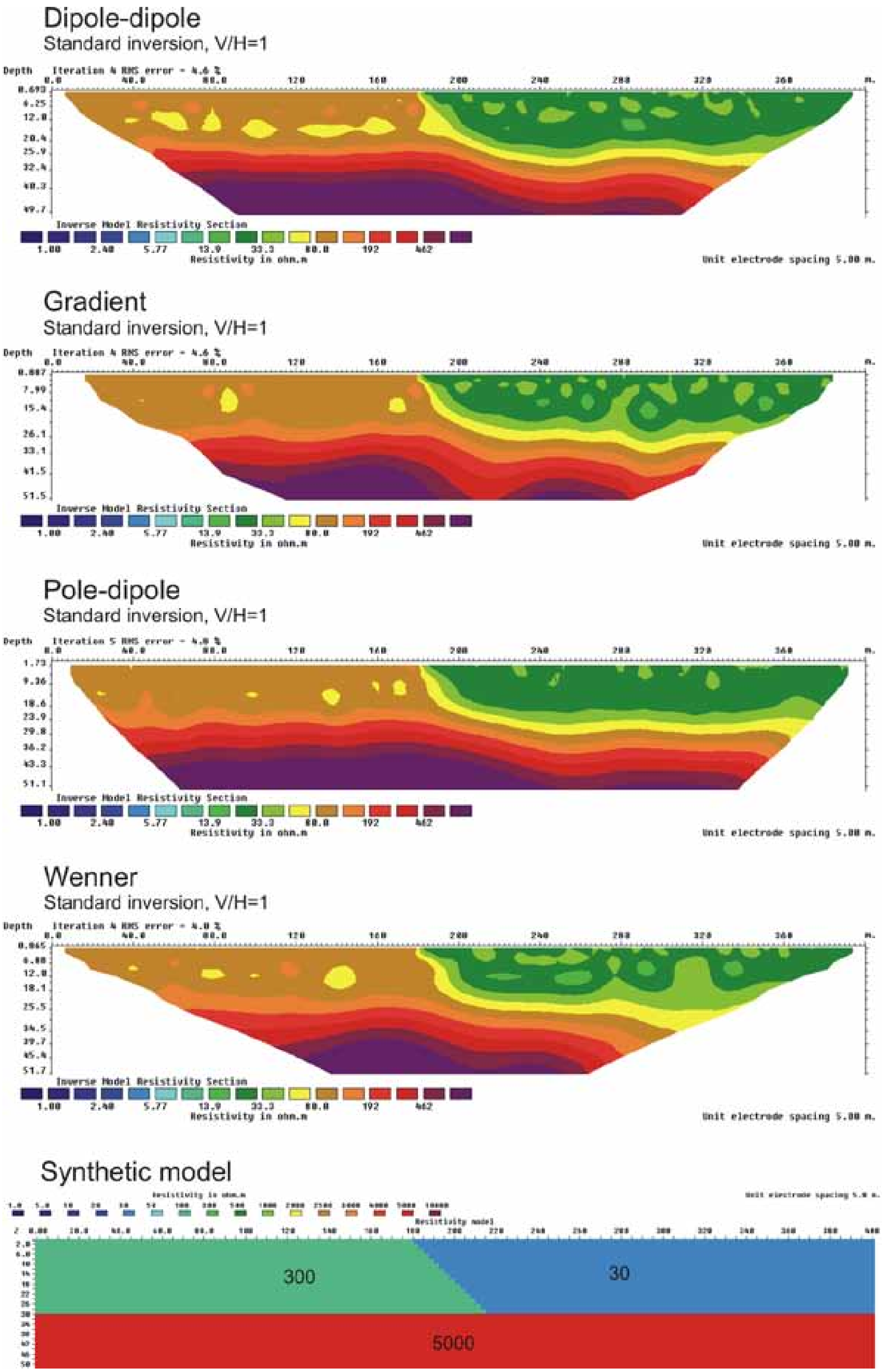

Figure 3.2.9: Moderately dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=1

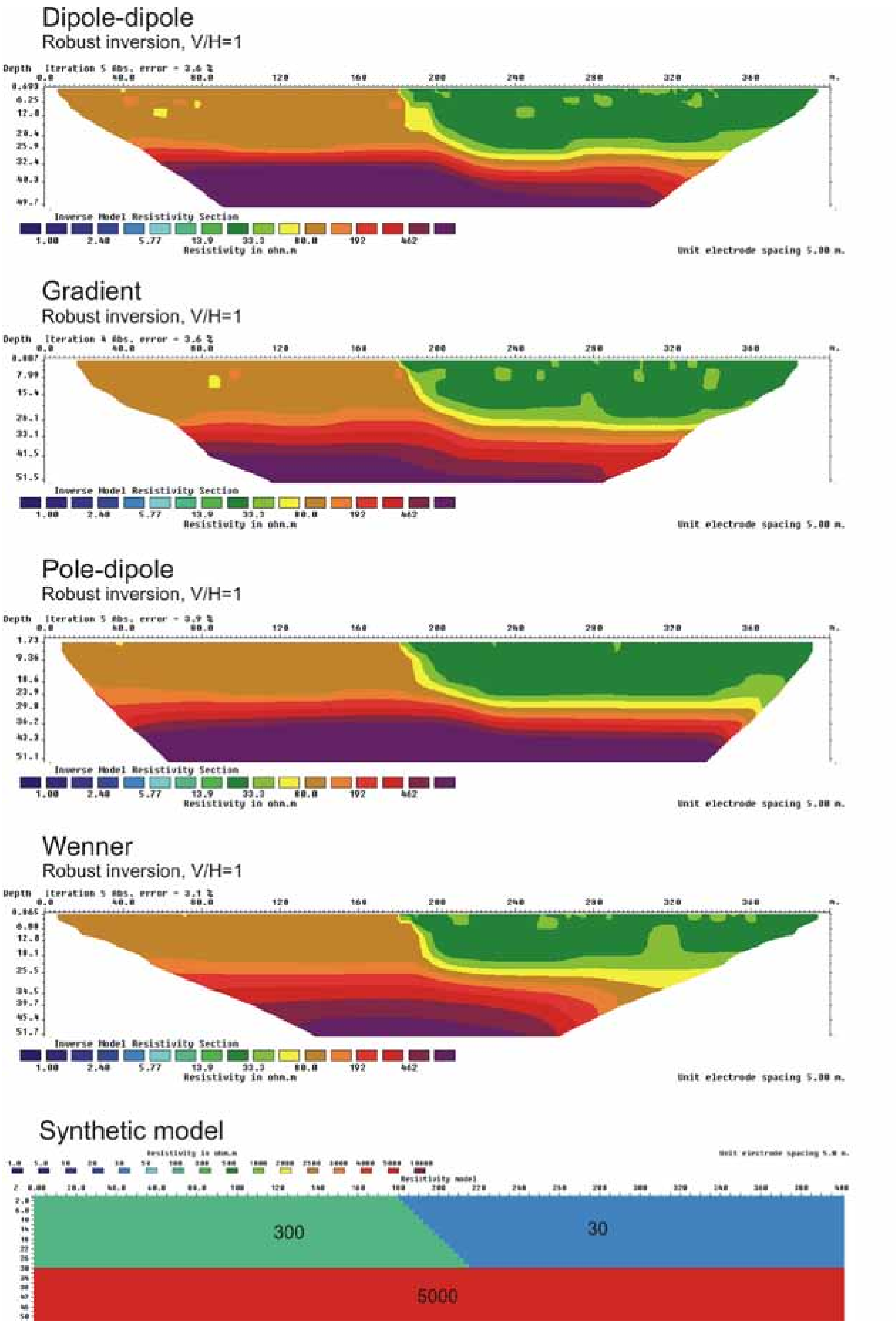

Figure 3.2.10: Moderately dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=1

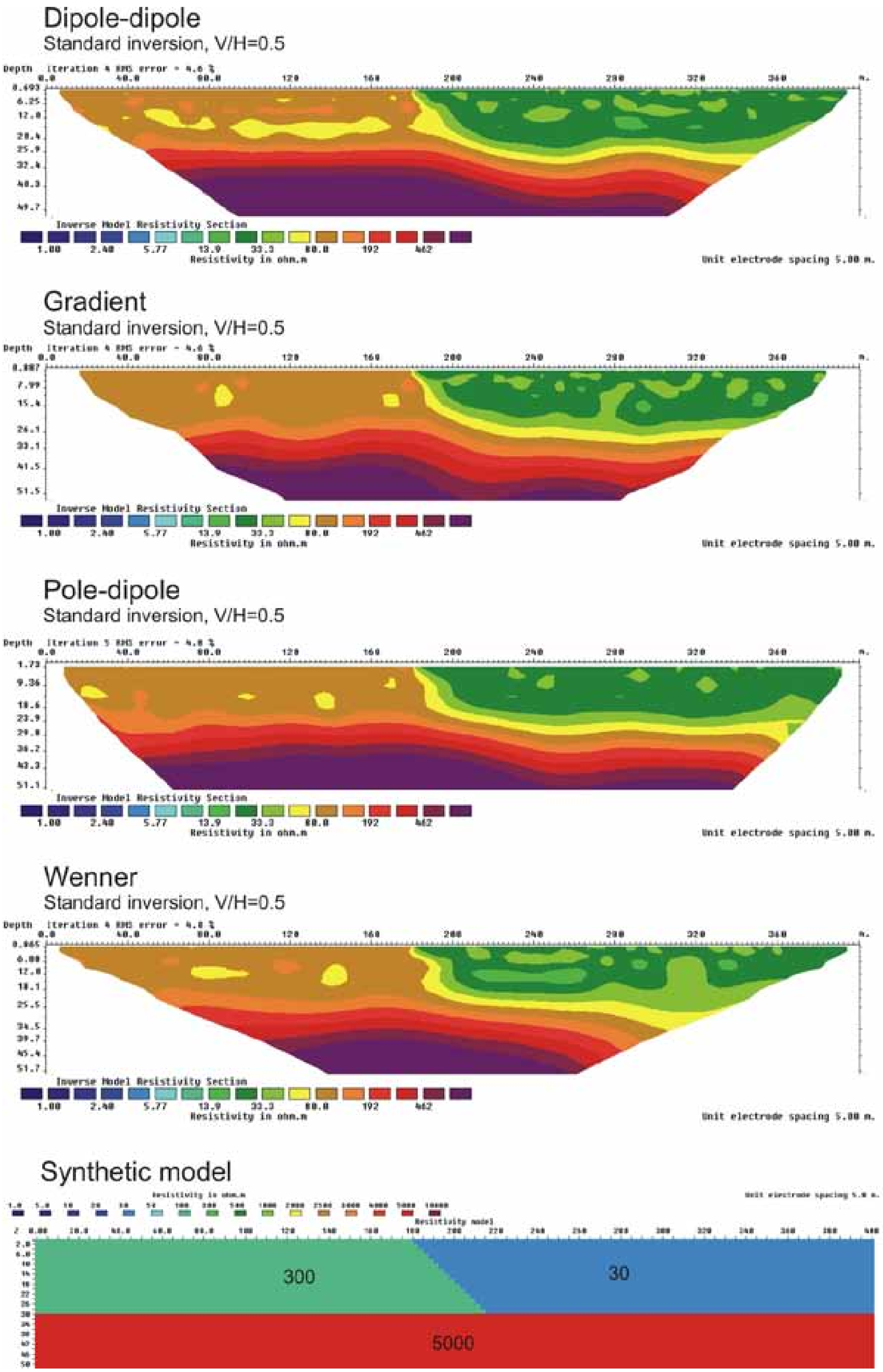

Figure 3.2.11: Moderately dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=0.5

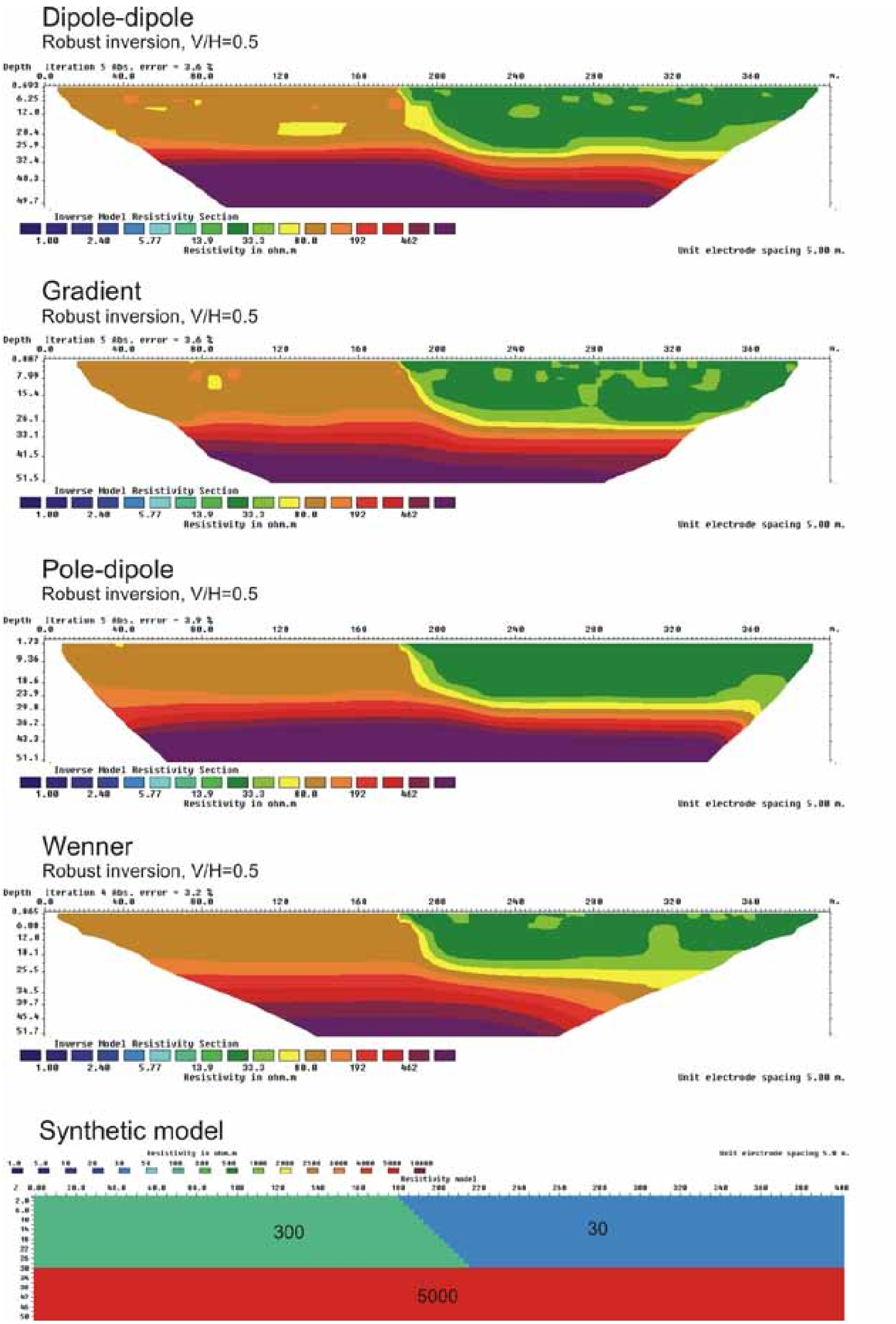

Figure 3.2.12: Moderately dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=0.5

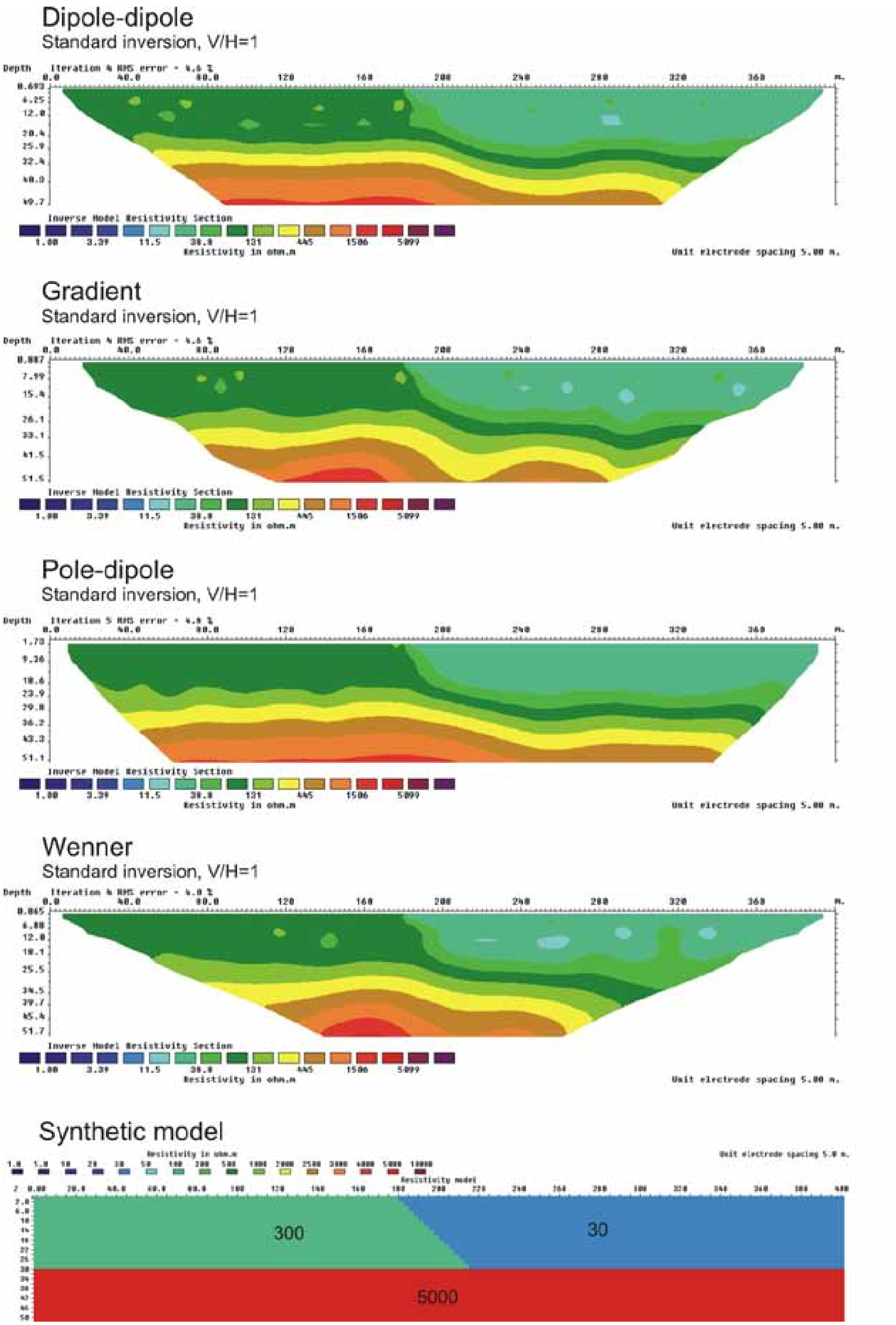

Figure 3.2.13: Moderately dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=1

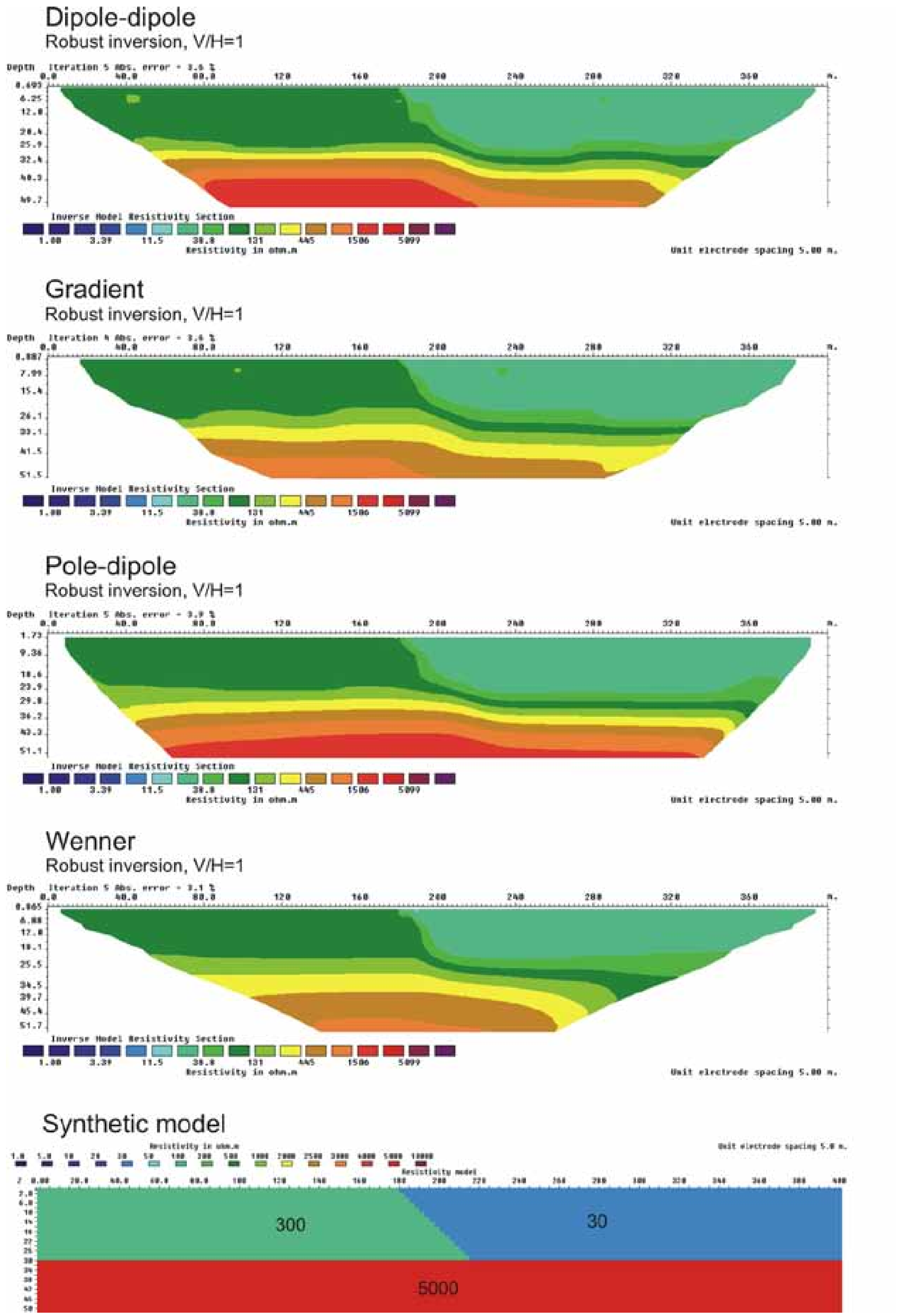

Figure 3.2.14: Moderately dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=1

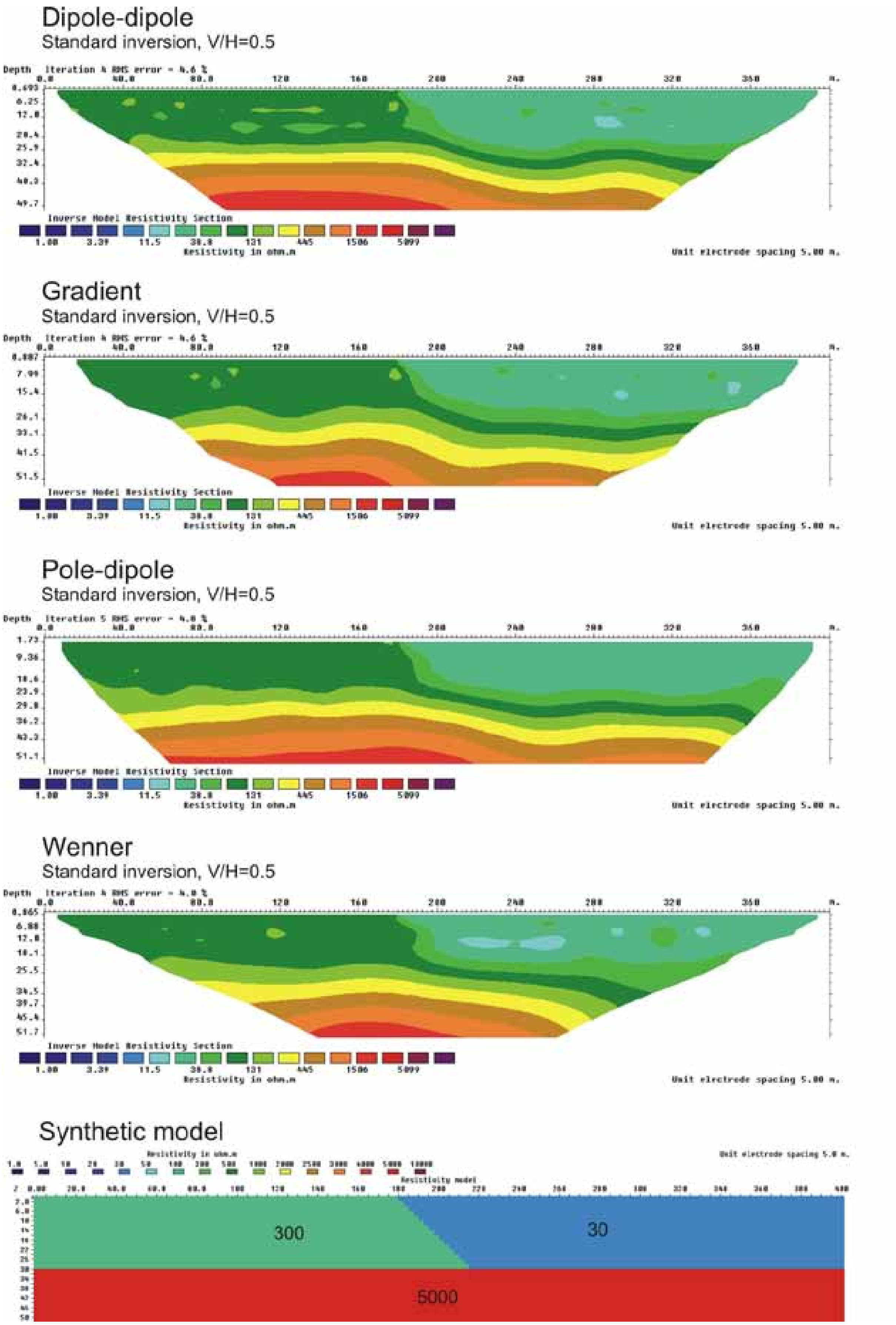

Figure 3.2.15: Moderately dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=0.5

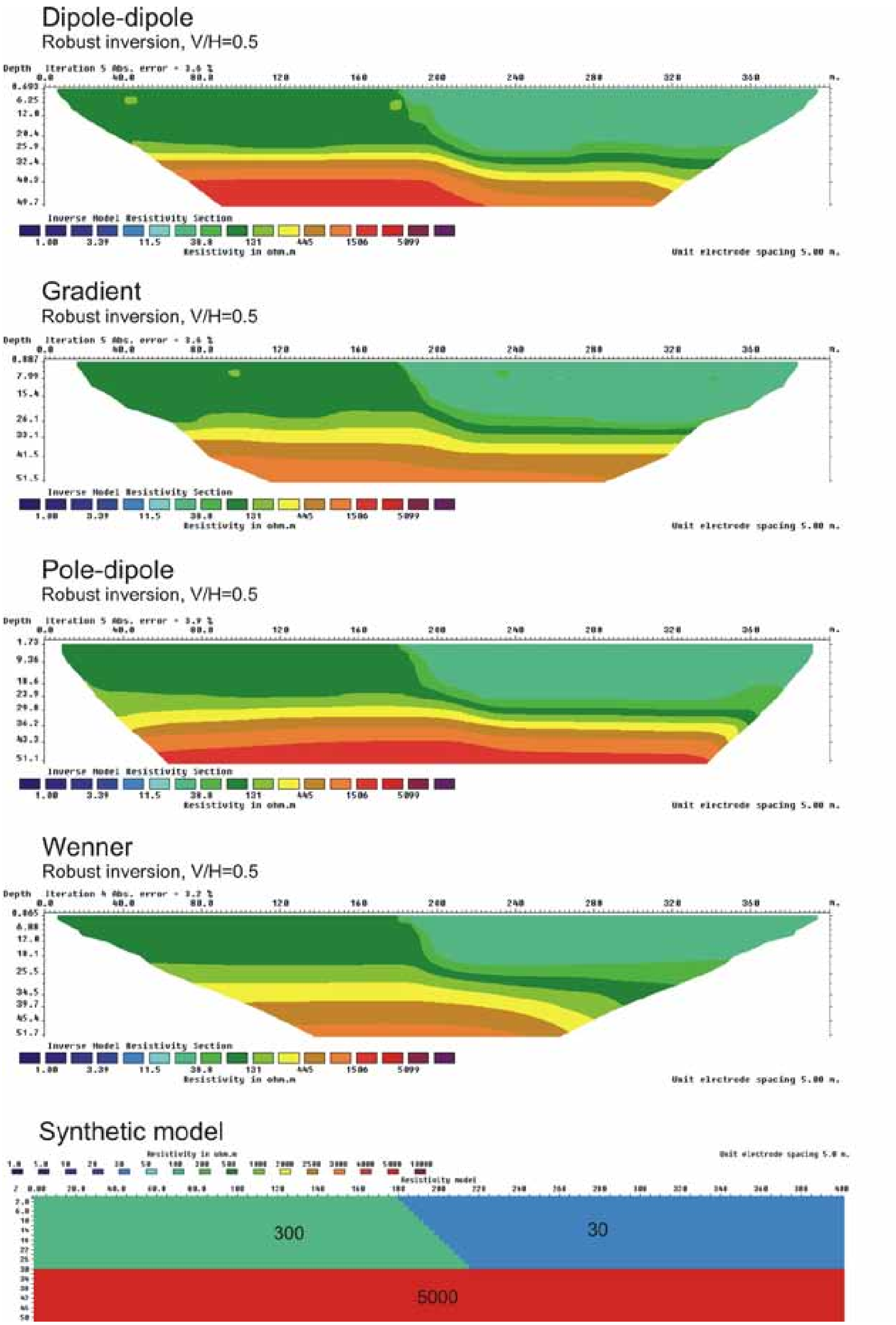

Figure 3.2.16: Moderately dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=0.5

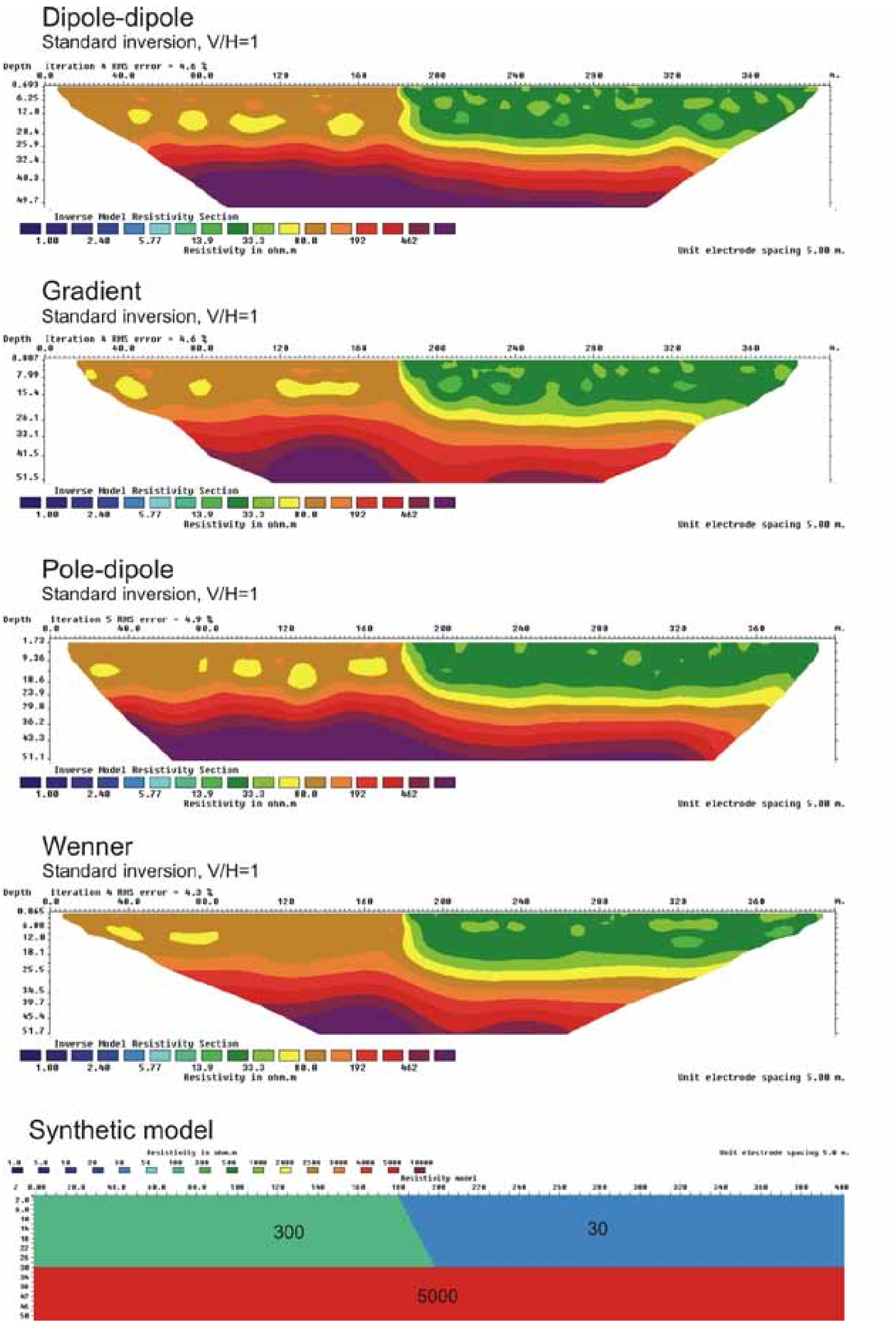

Figure 3.2.17: Steeply dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=1

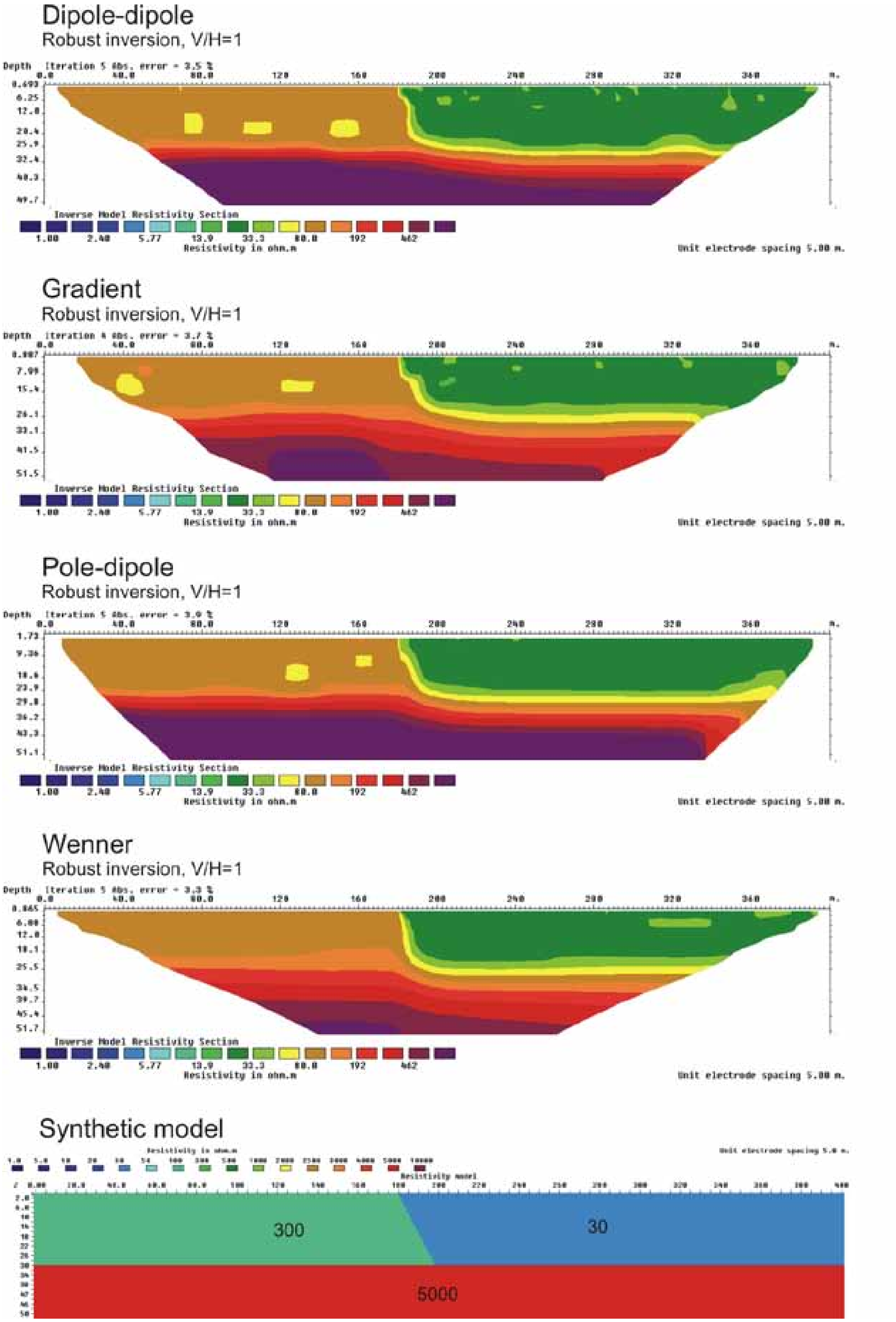

Figure 3.2.18: Steeply dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=1

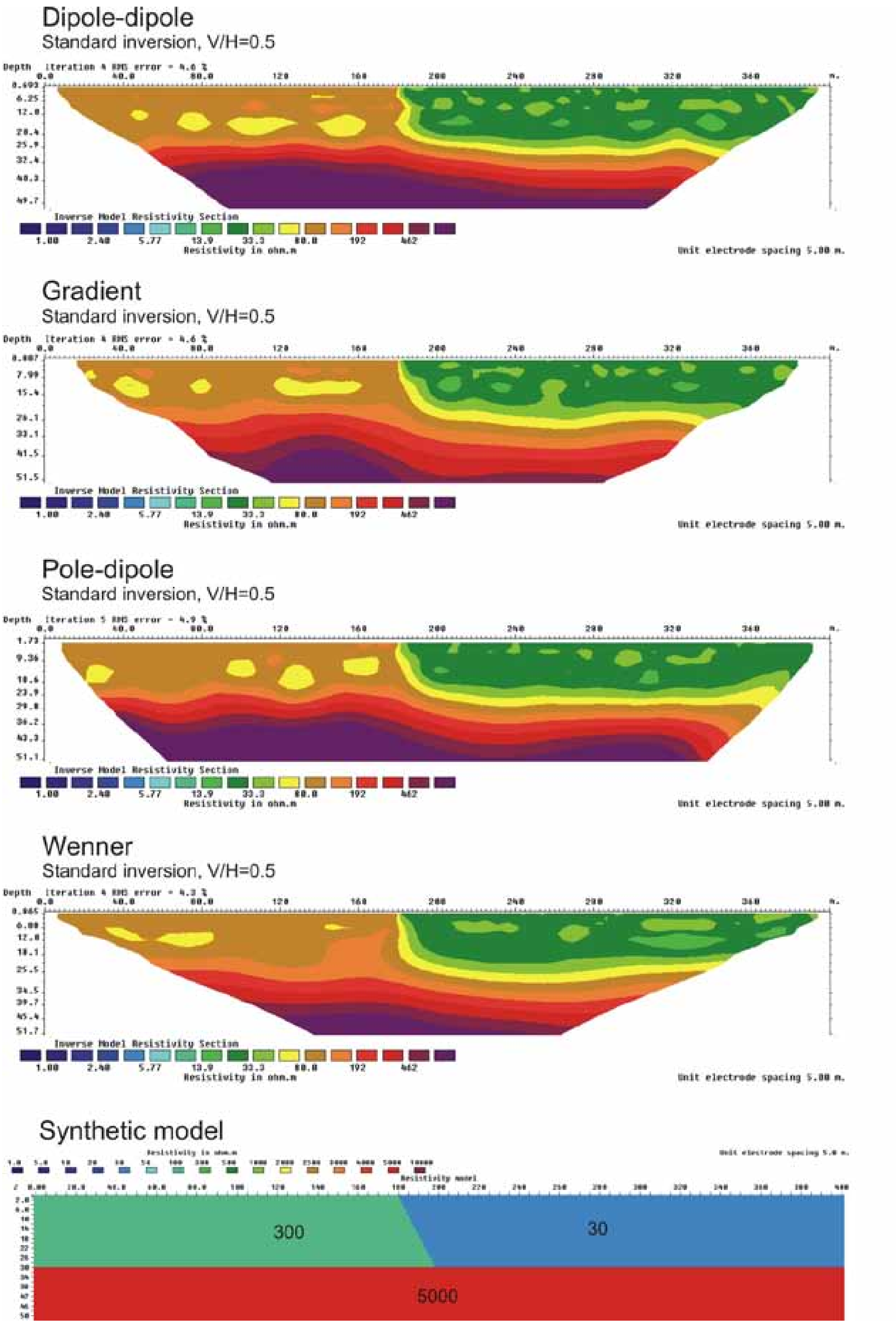

Figure 3.2.19: Steeply dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=0.5

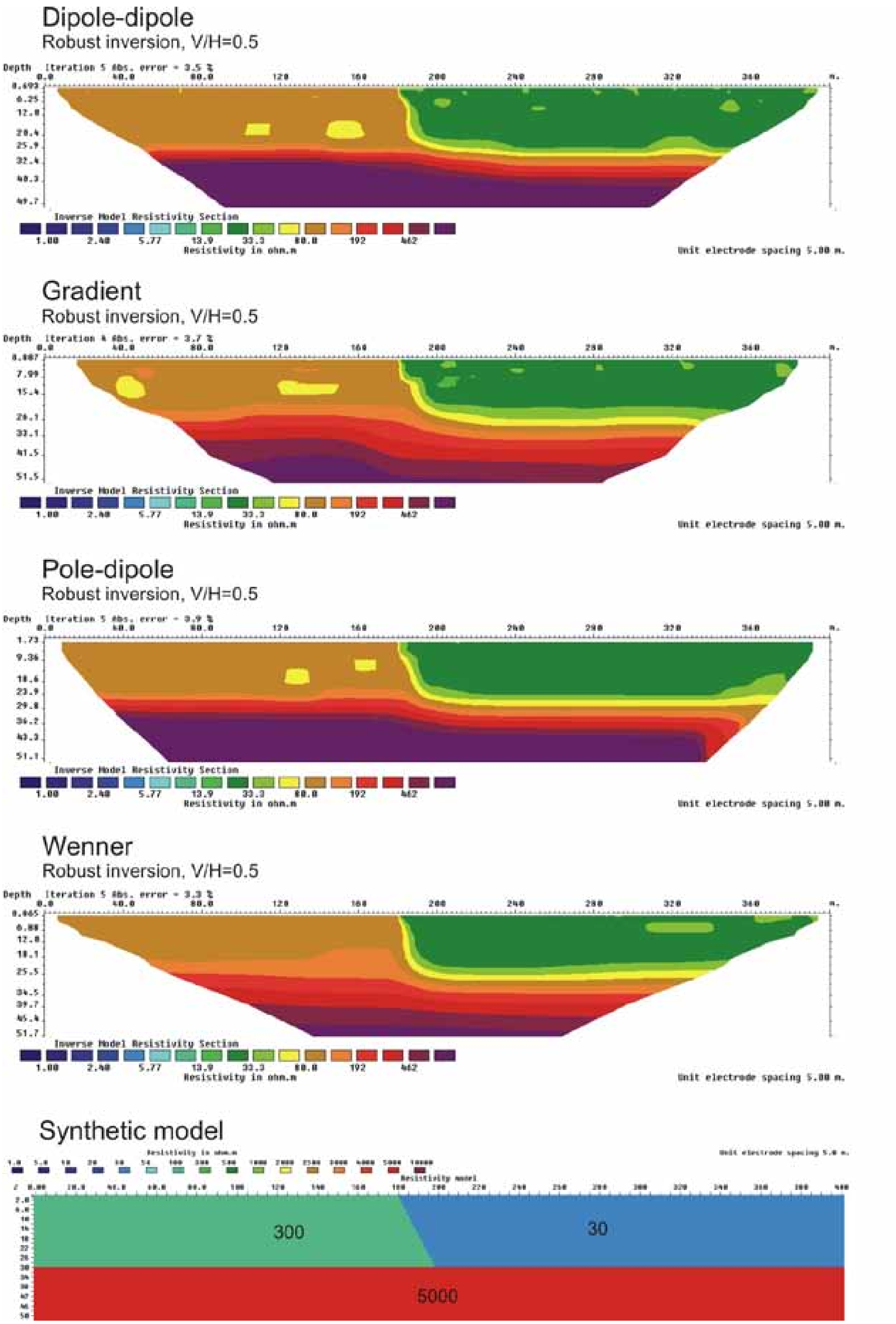

Figure 3.2.20: Steeply dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=0.5

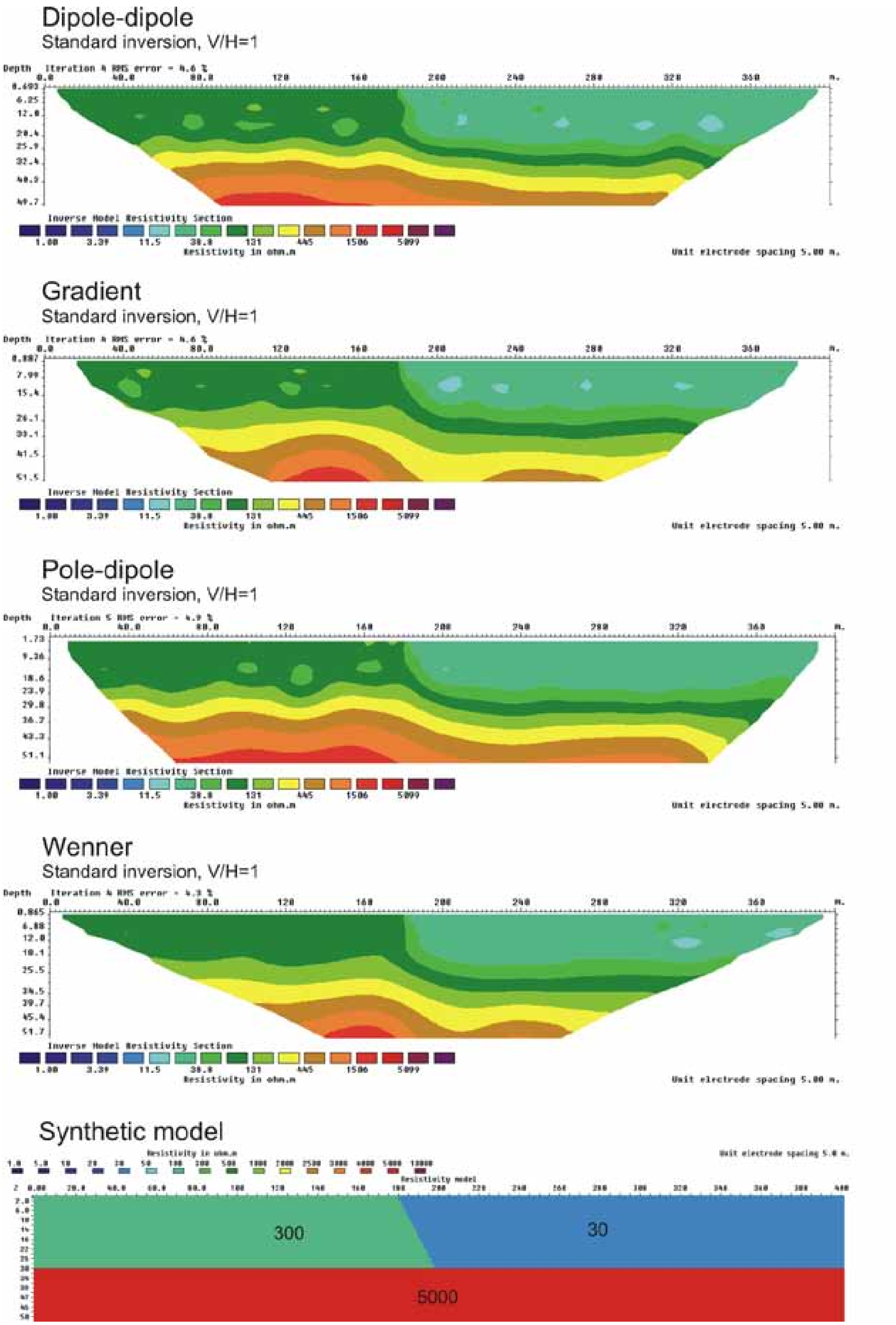

Figure 3.2.21: Steeply dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=1

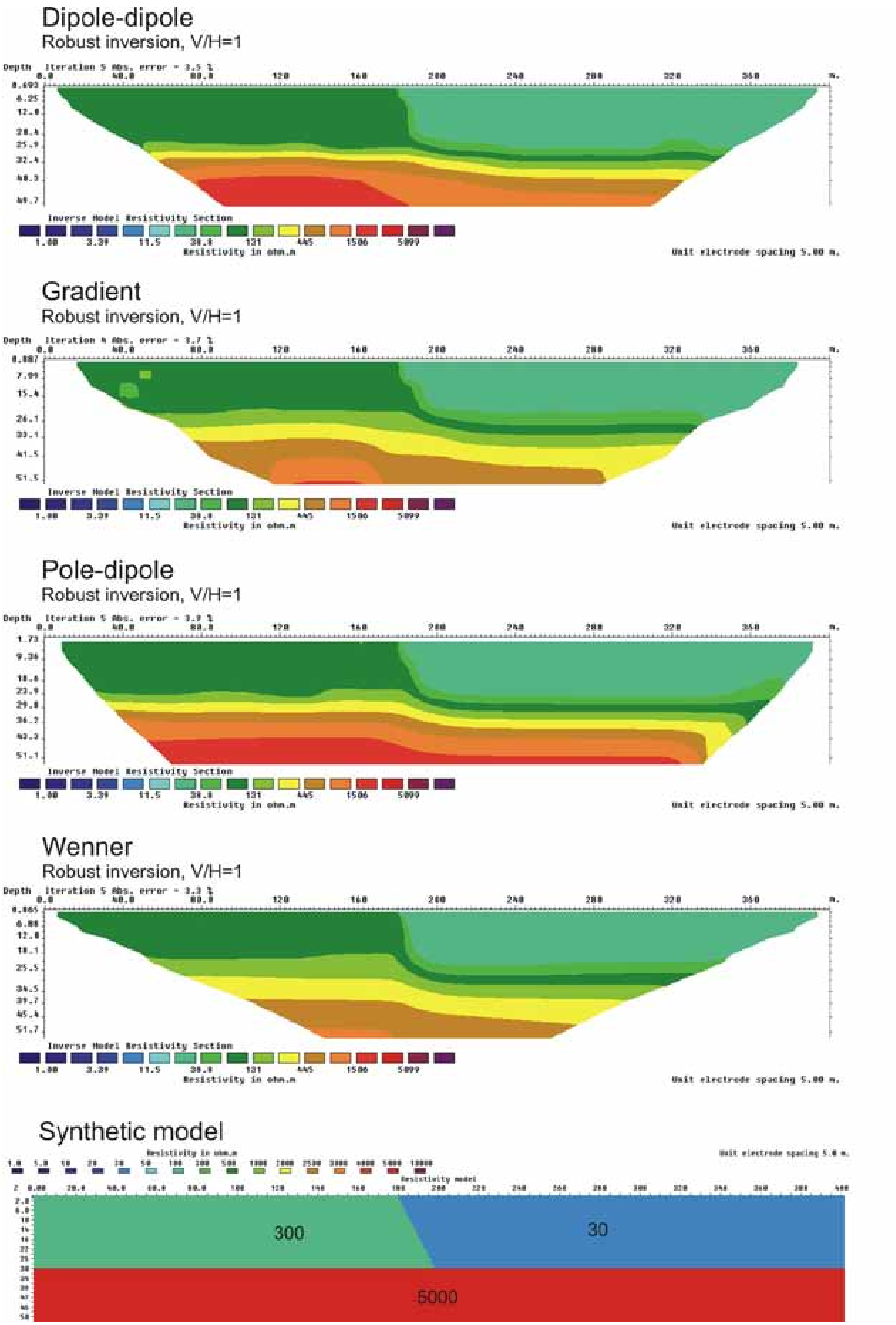

Figure 3.2.22: Steeply dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=1

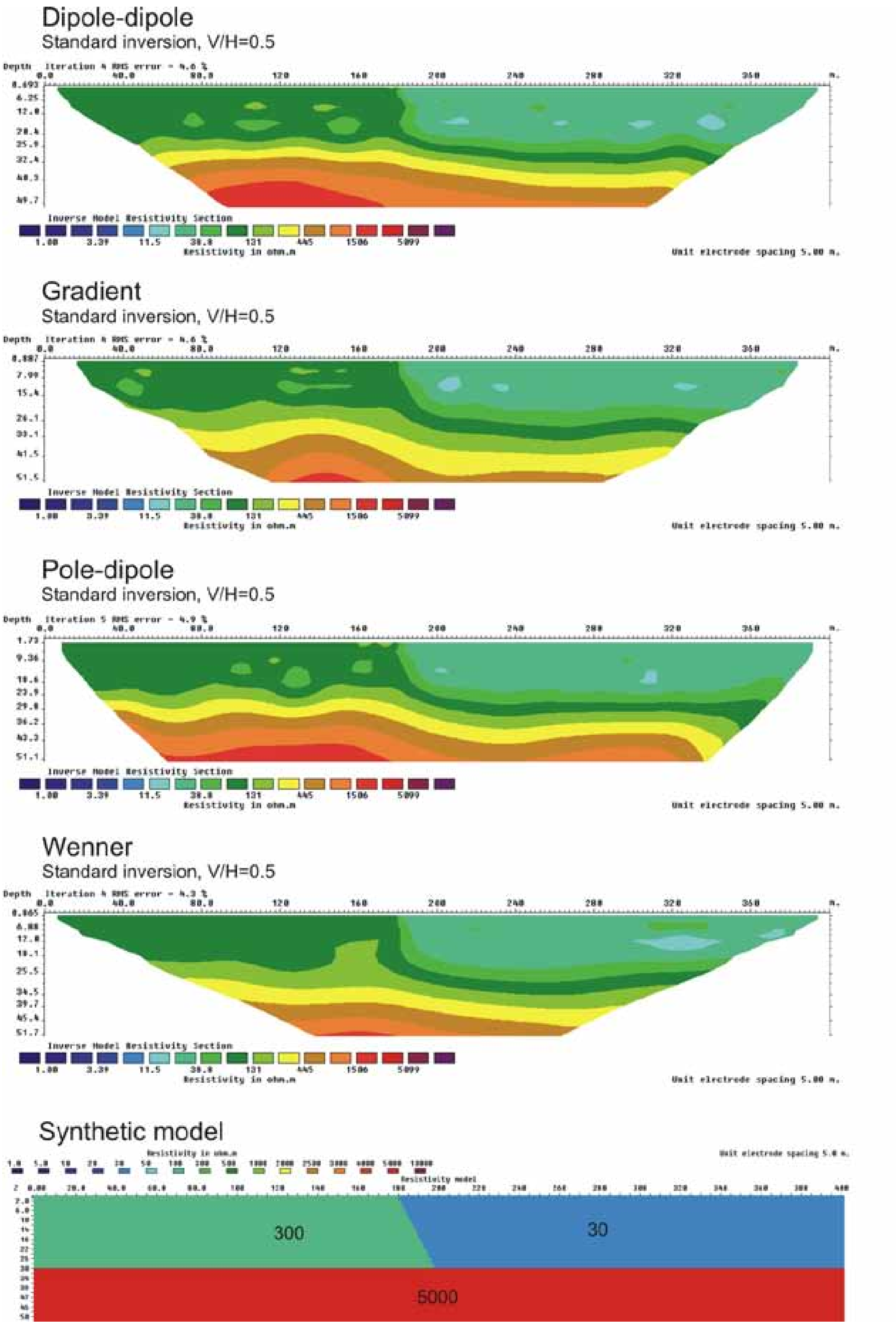

Figure 3.2.23: Steeply dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Standard inversion, V/H=0.5

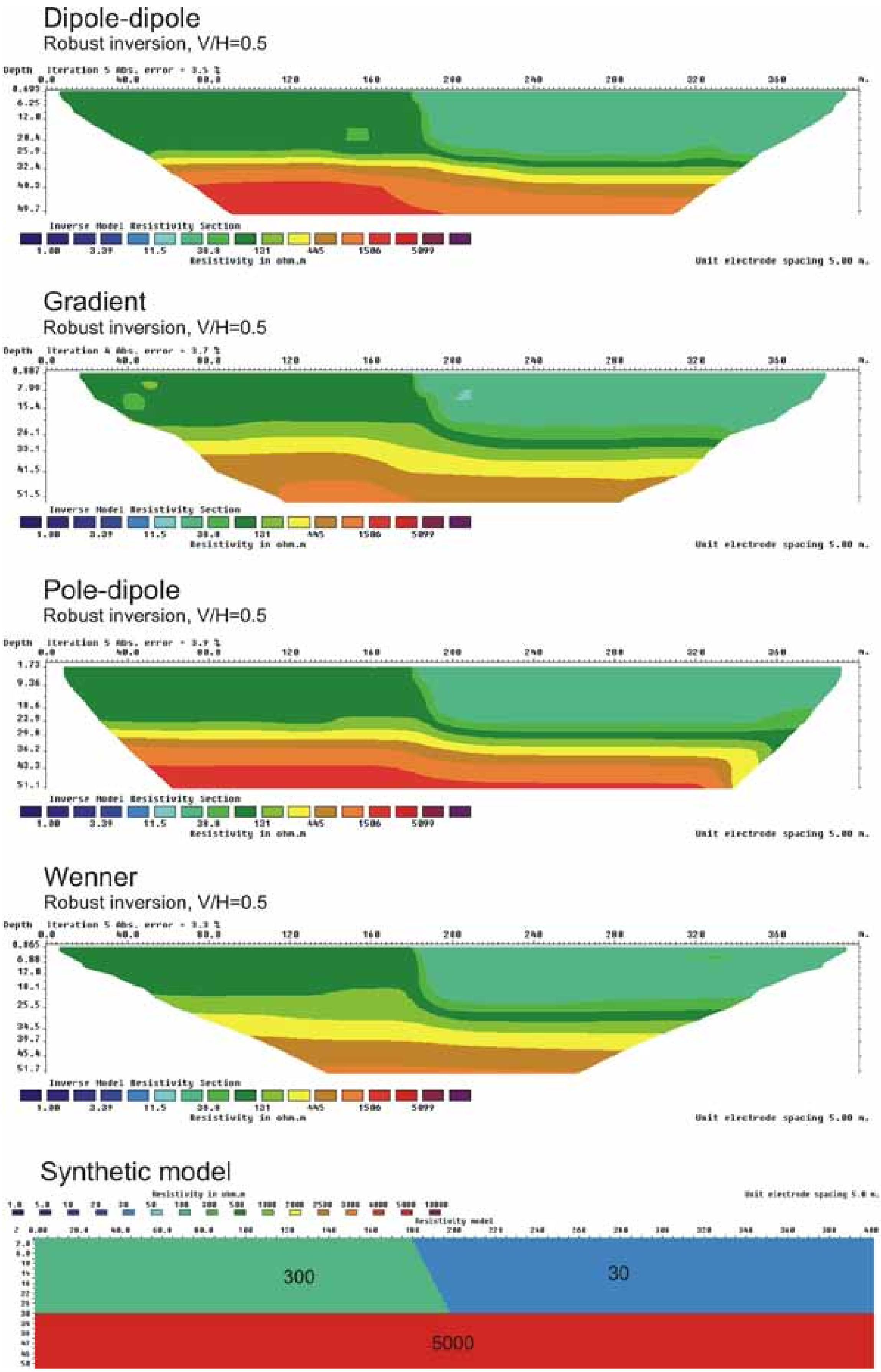

Figure 3.2.24: Steeply dipping interface between resistivities of 300 Ωm and 30 Ωm with bedrock of 5000 Ωm below. Robust inversion, V/H=0.5

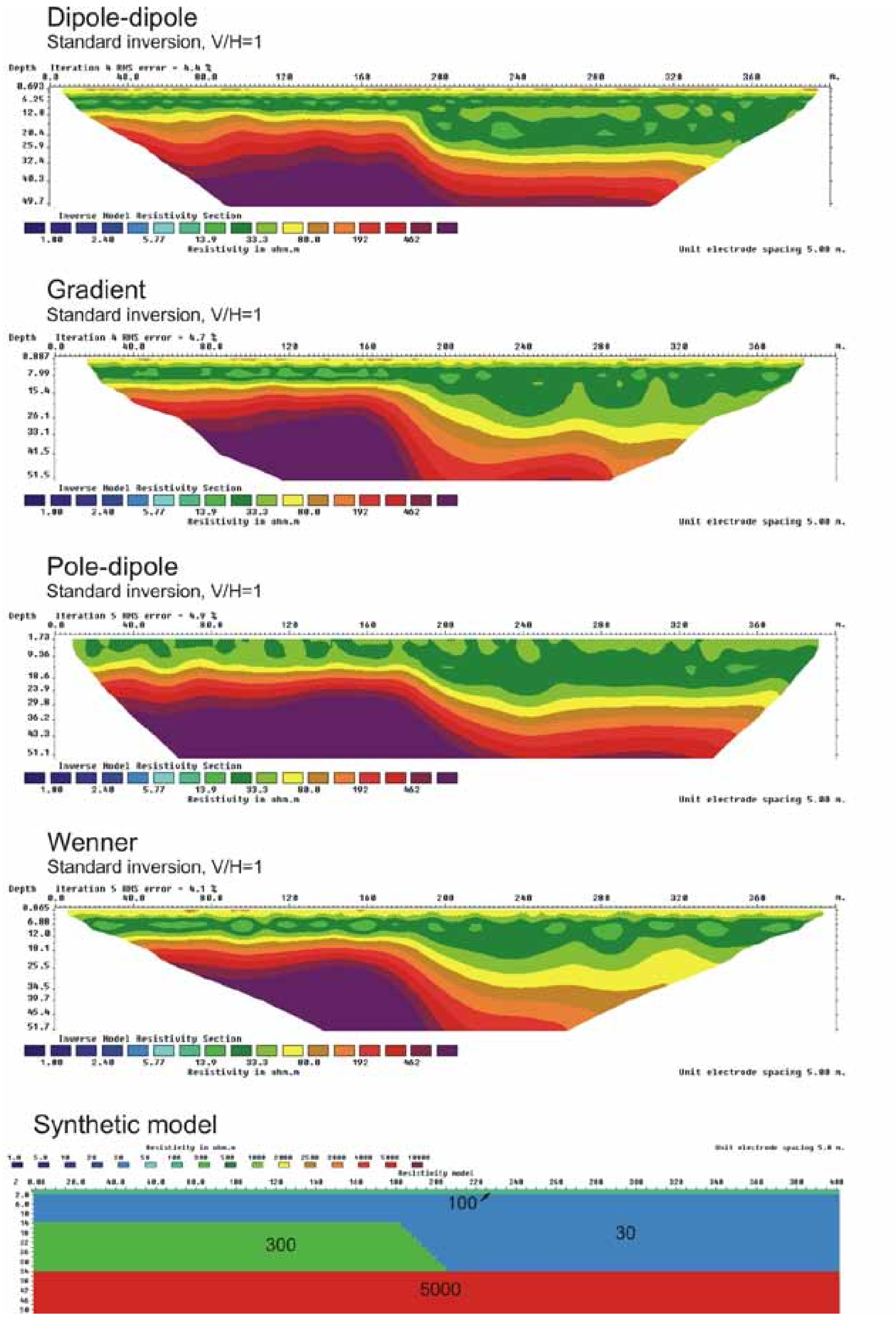

Figure 3.2.25: 2m top layer (100Ωm) over a horizontal and dipping interface between 30 Ωm and 300 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=1

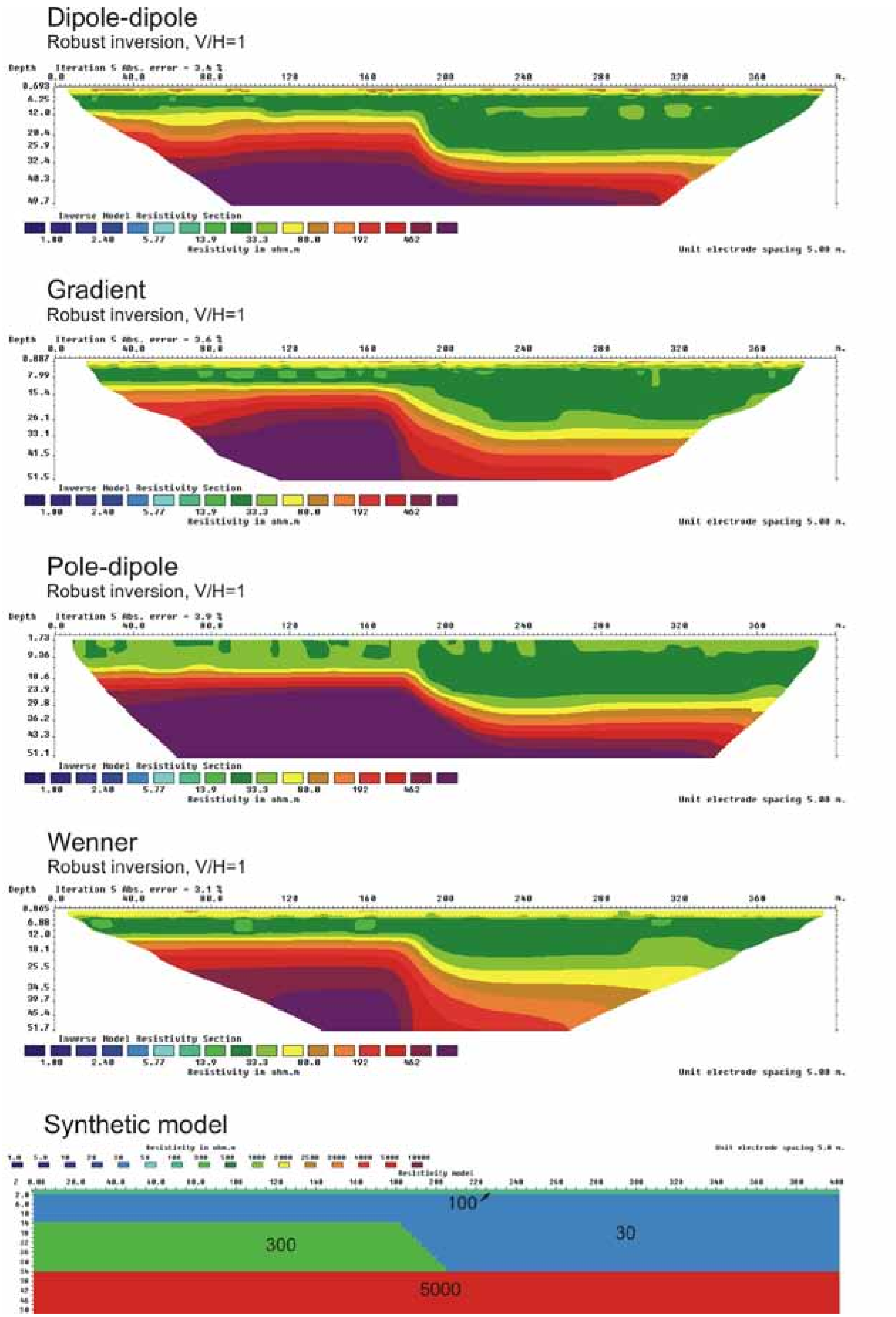

Figure 3.2.26: 2m top layer (100Ωm) over a horizontal and dipping interface between 30 Ωm and 300 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=1

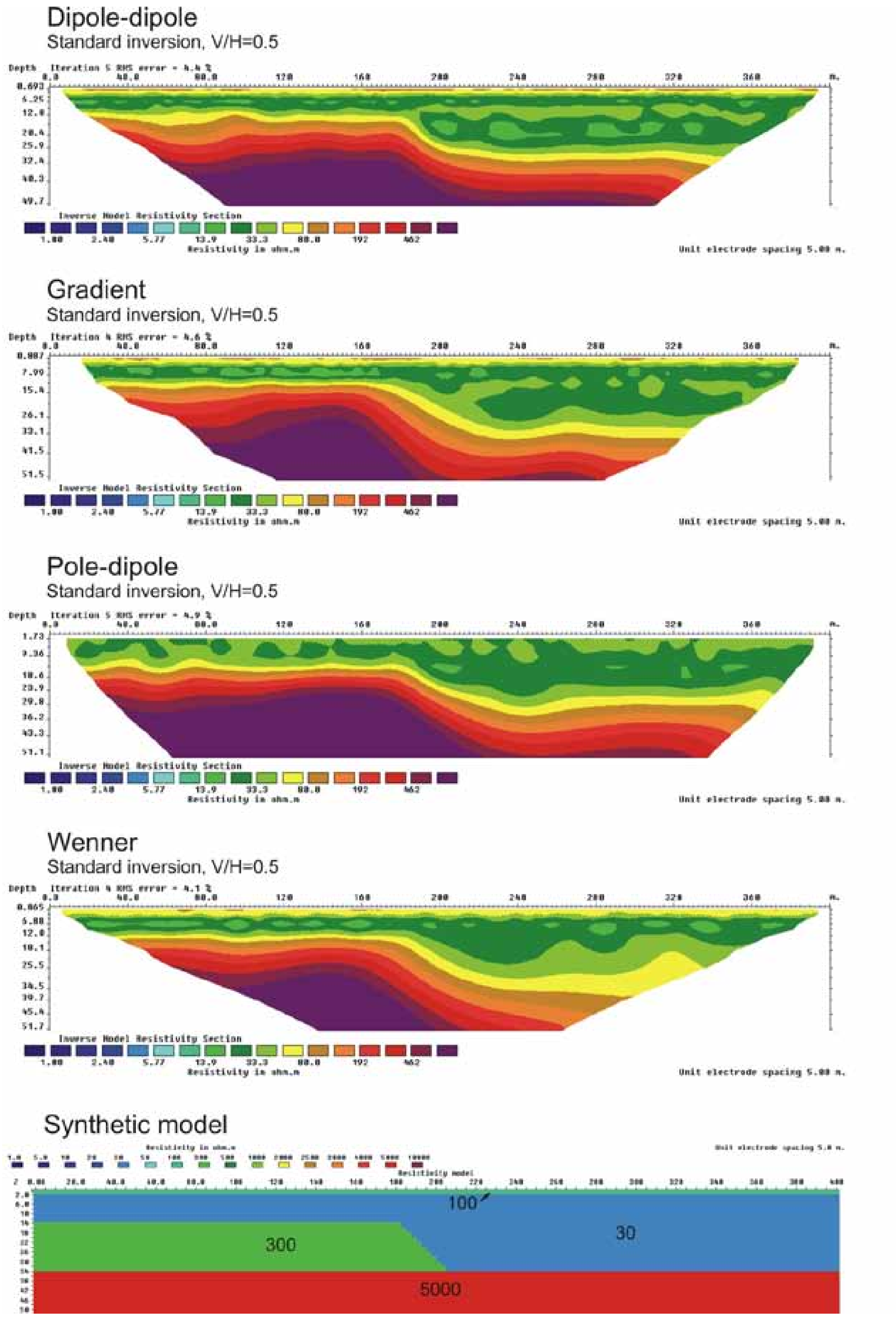

Figure 3.2.27: 2m top layer (100Ωm) over a horizontal and dipping interface between 30 Ωm and 300 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=0.5

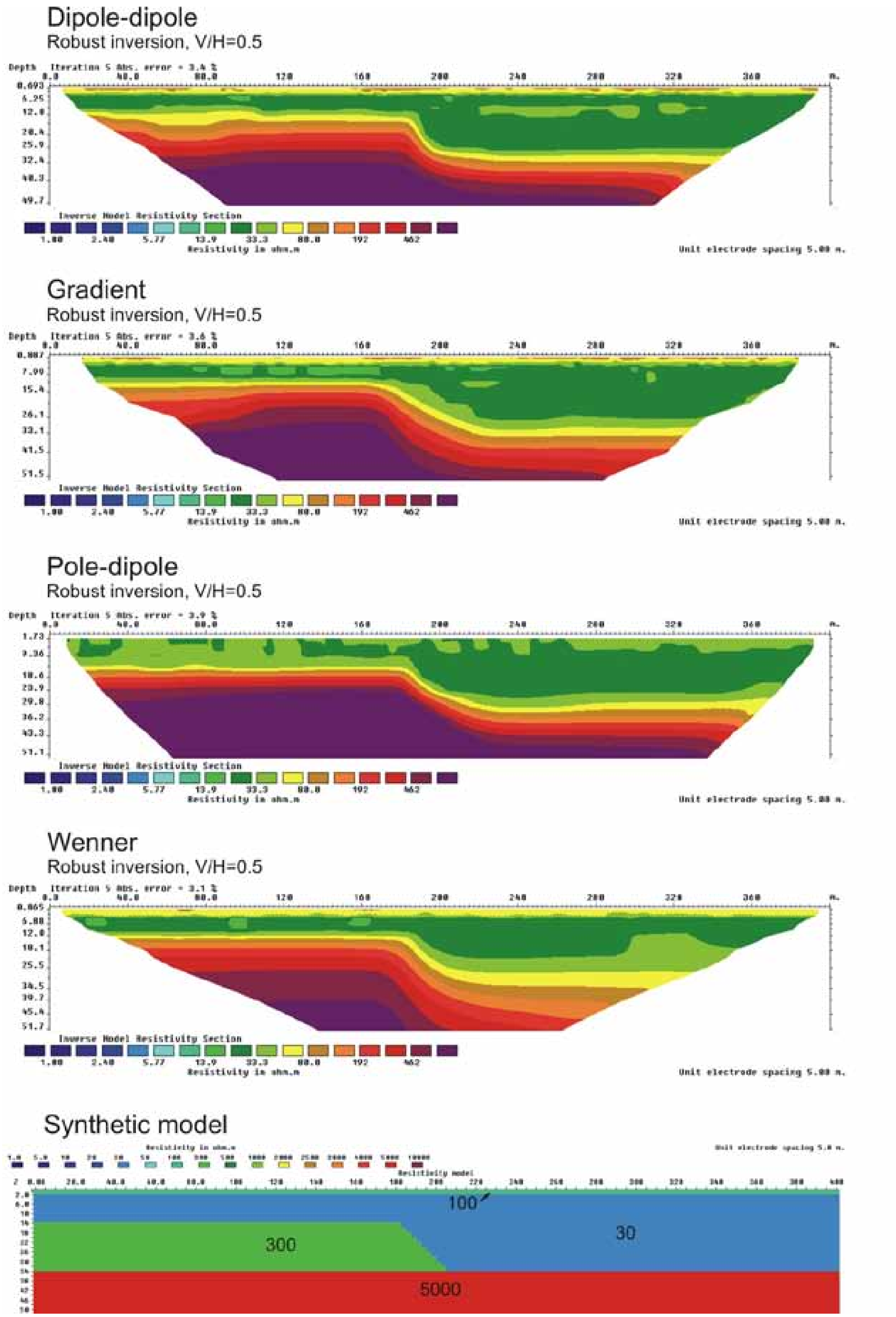

Figure 3.2.28: 2m top layer (100Ωm) over a horizontal and dipping interface between 30 Ωm and 300 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=0.5

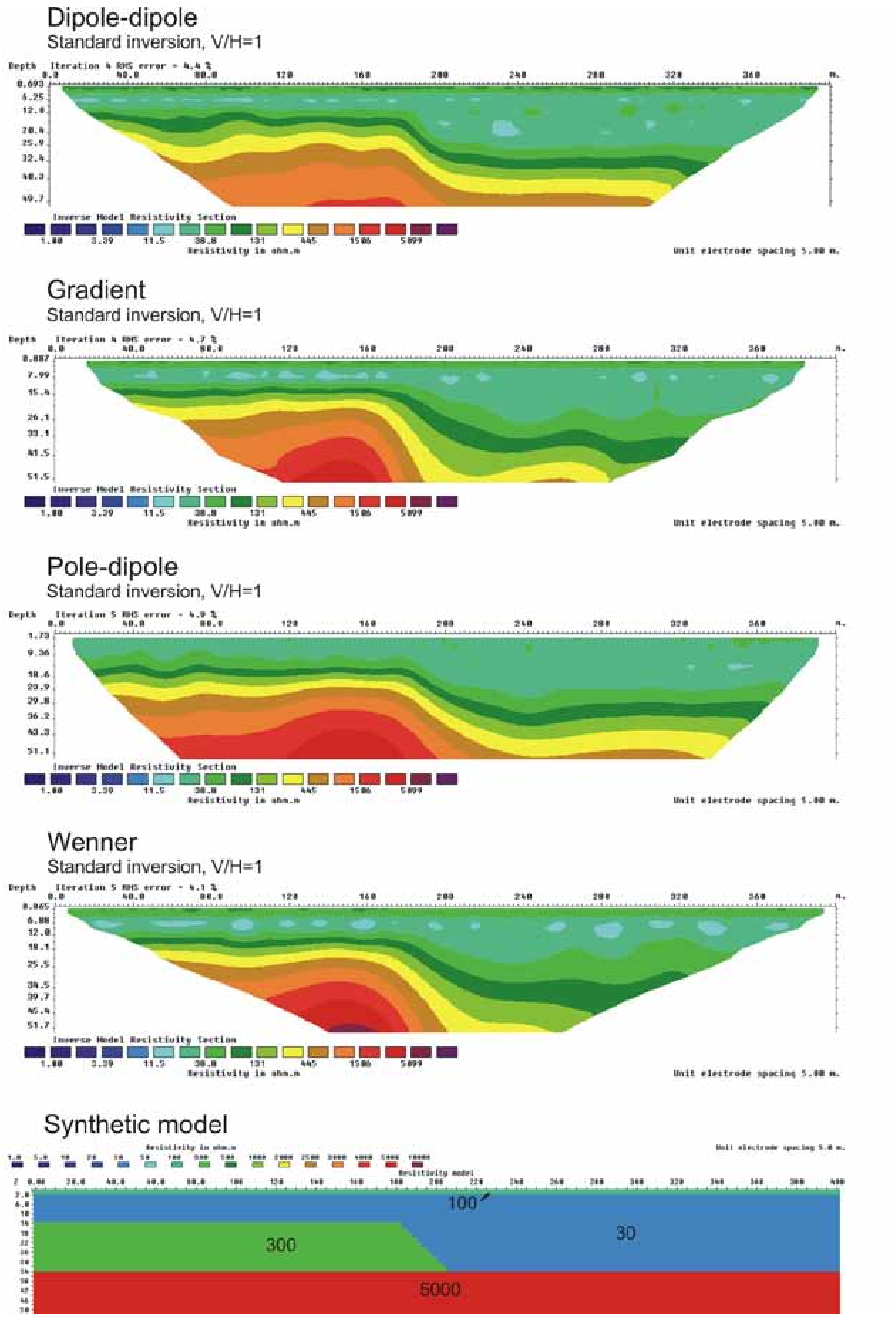

Figure 3.2.29: 2 m top layer (100Ωm) over a horizontal and dipping interface between 30 Ωm and 300 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=1

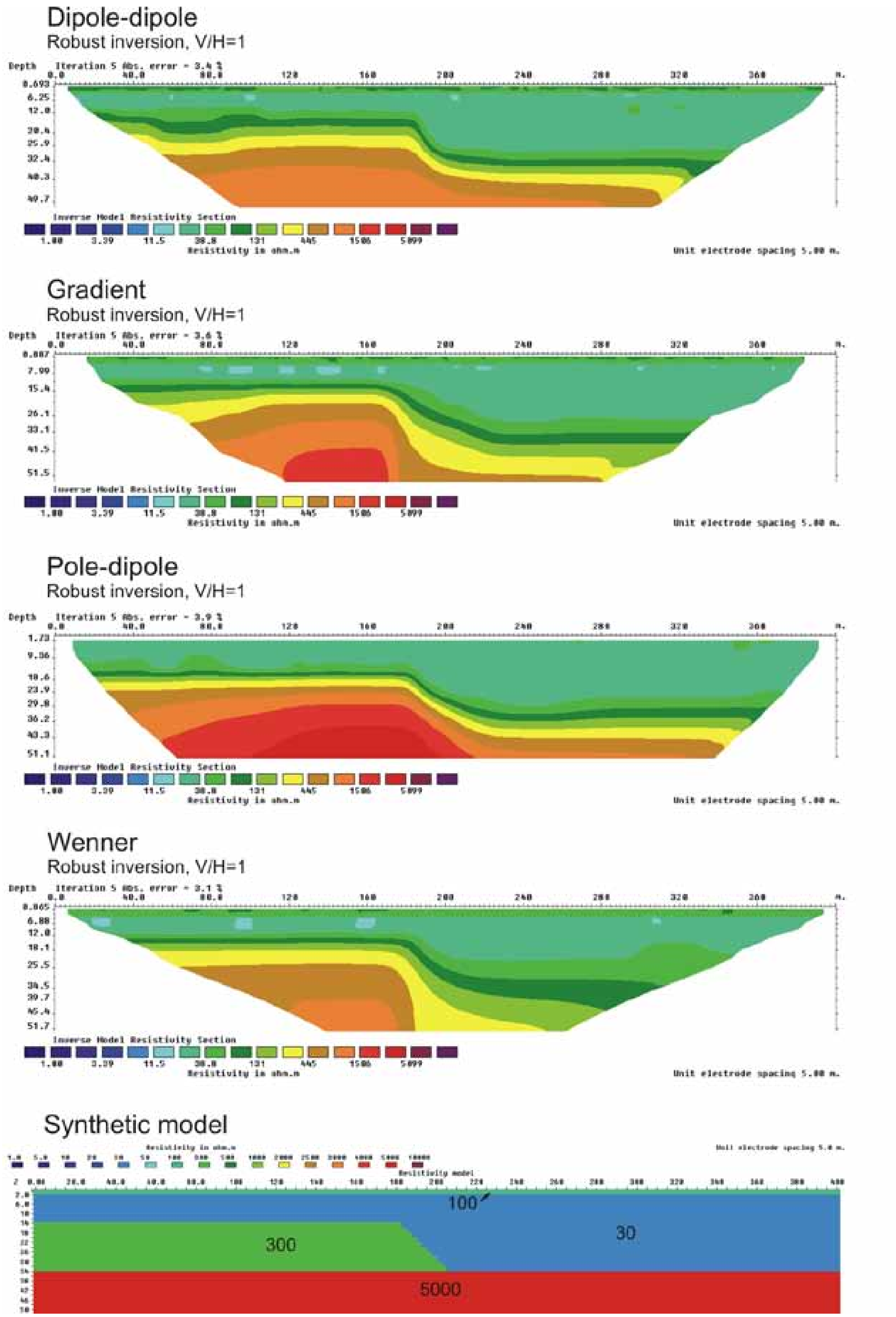

Figure 3.2.30: 2 m top layer (100Ωm) over a horizontal and dipping interface between 30 Ωm and 300 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=1

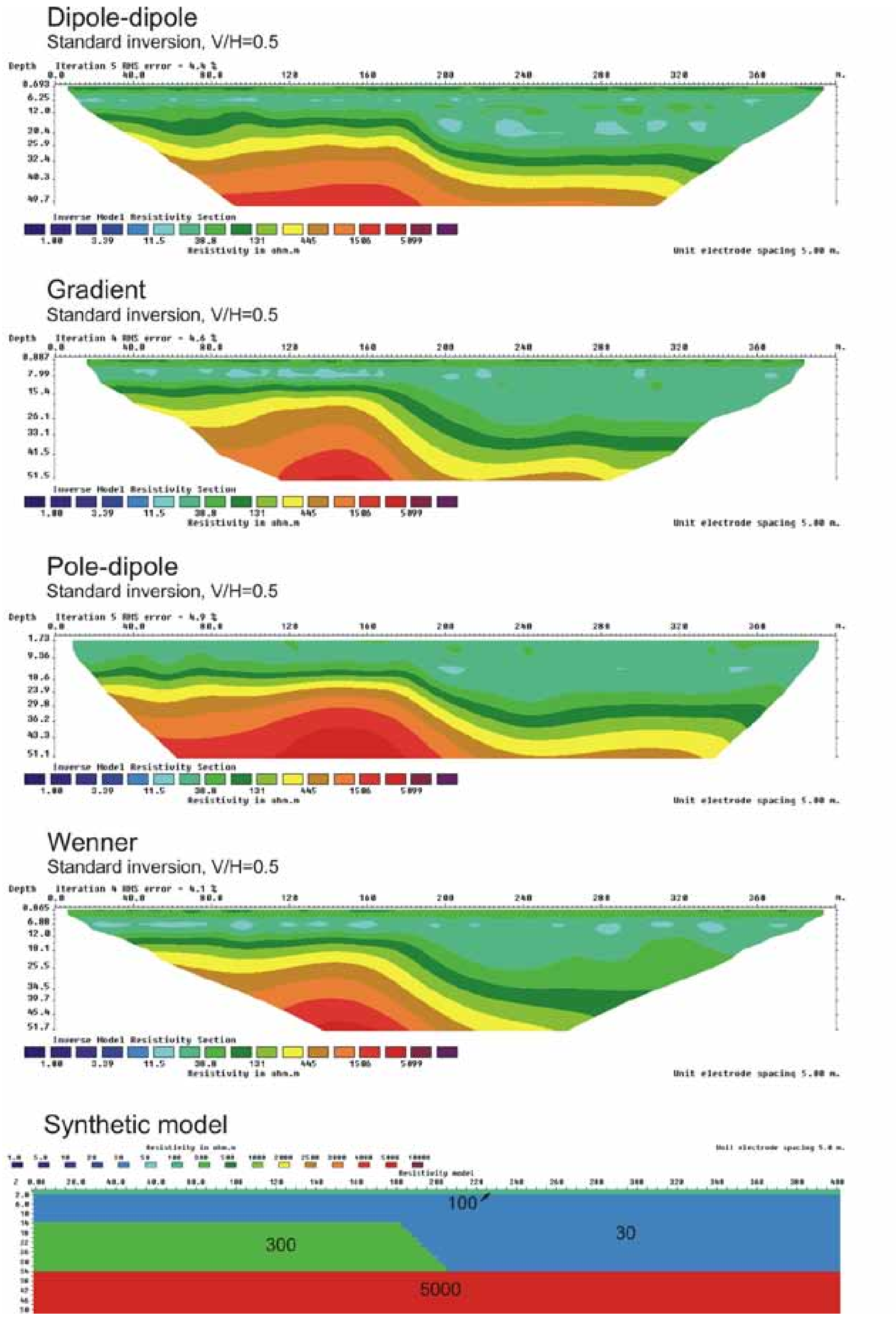

Figure 3.2.31: 2 m top layer (100Ωm) over a horizontal and dipping interface between 30 Ωm and 300 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=0.5

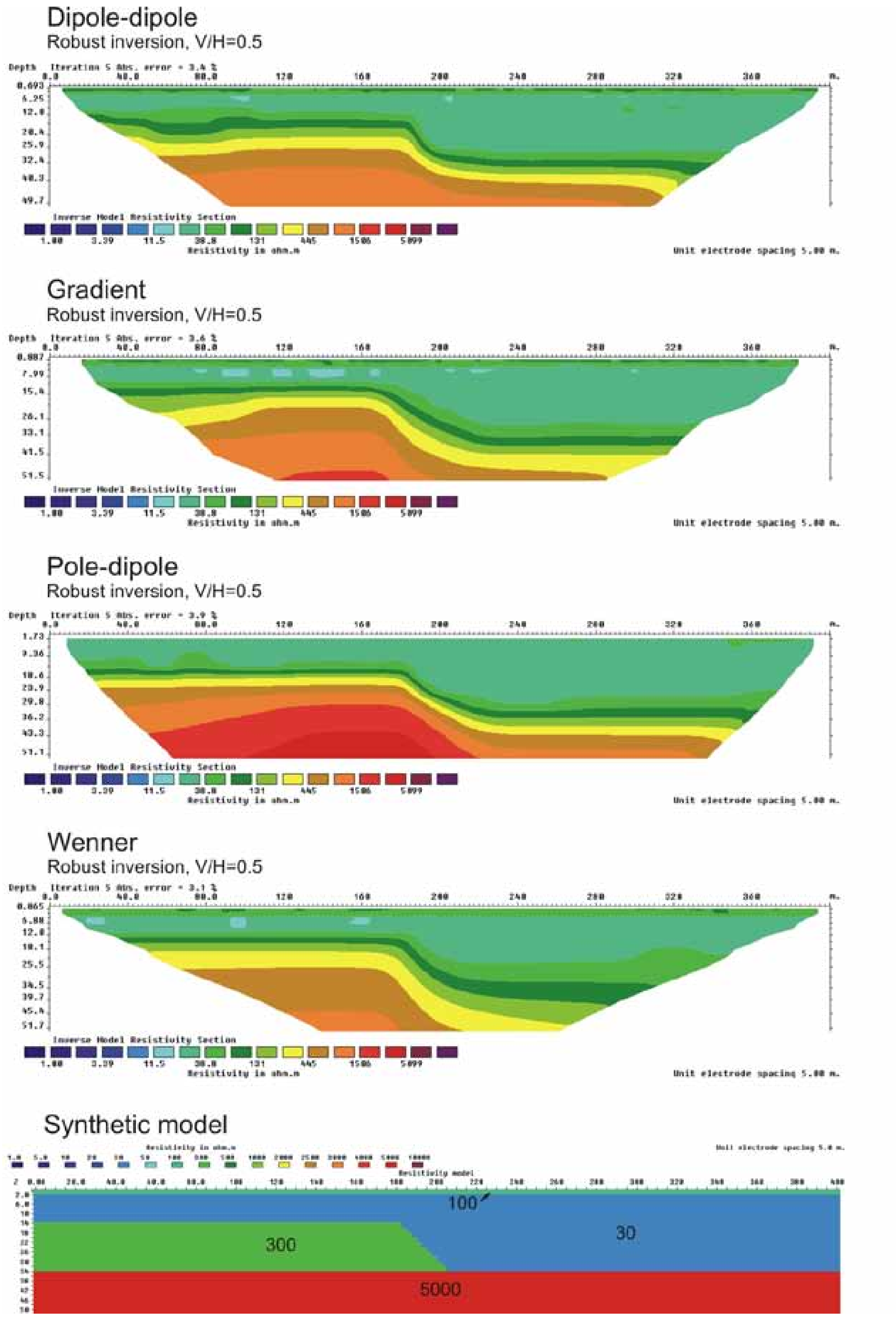

Figure 3.2.32: 2 m top layer (100Ωm) over a horizontal and dipping interface between 30 Ωm and 300 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=0.5

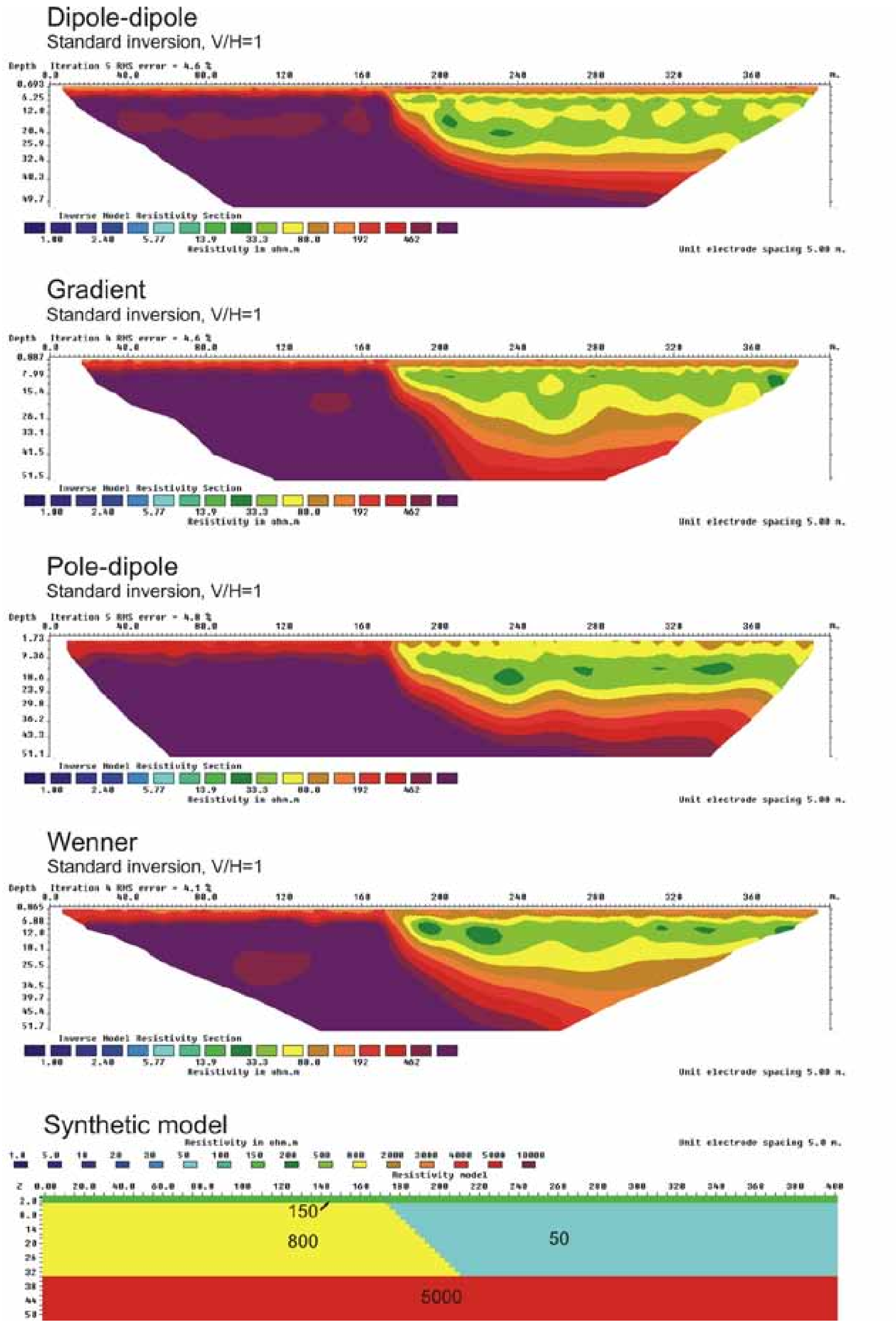

Figure 3.2.33: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 800 Ωm and 50 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=1

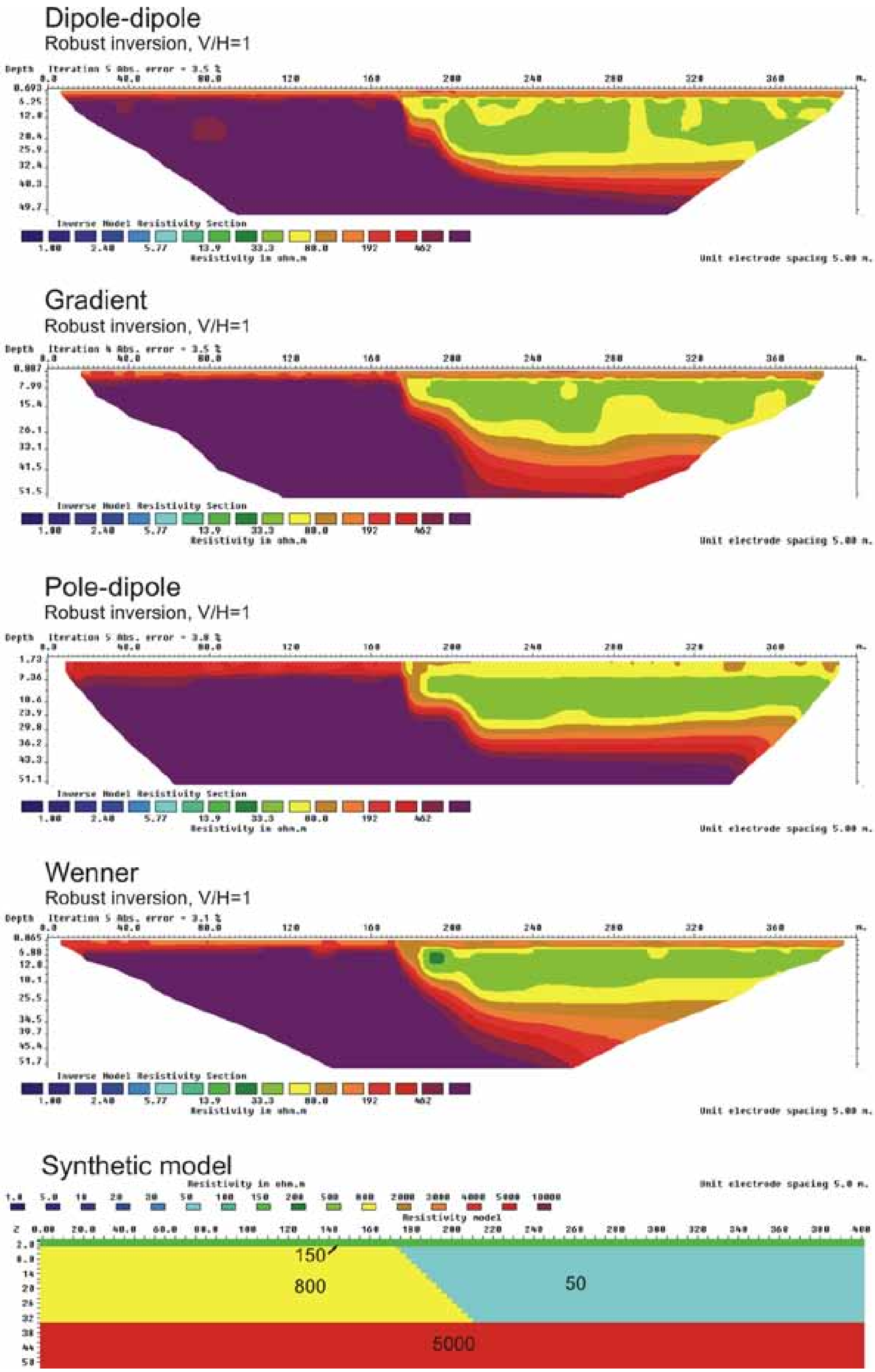

Figure 3.2.34: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 800 Ωm and 50 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=1

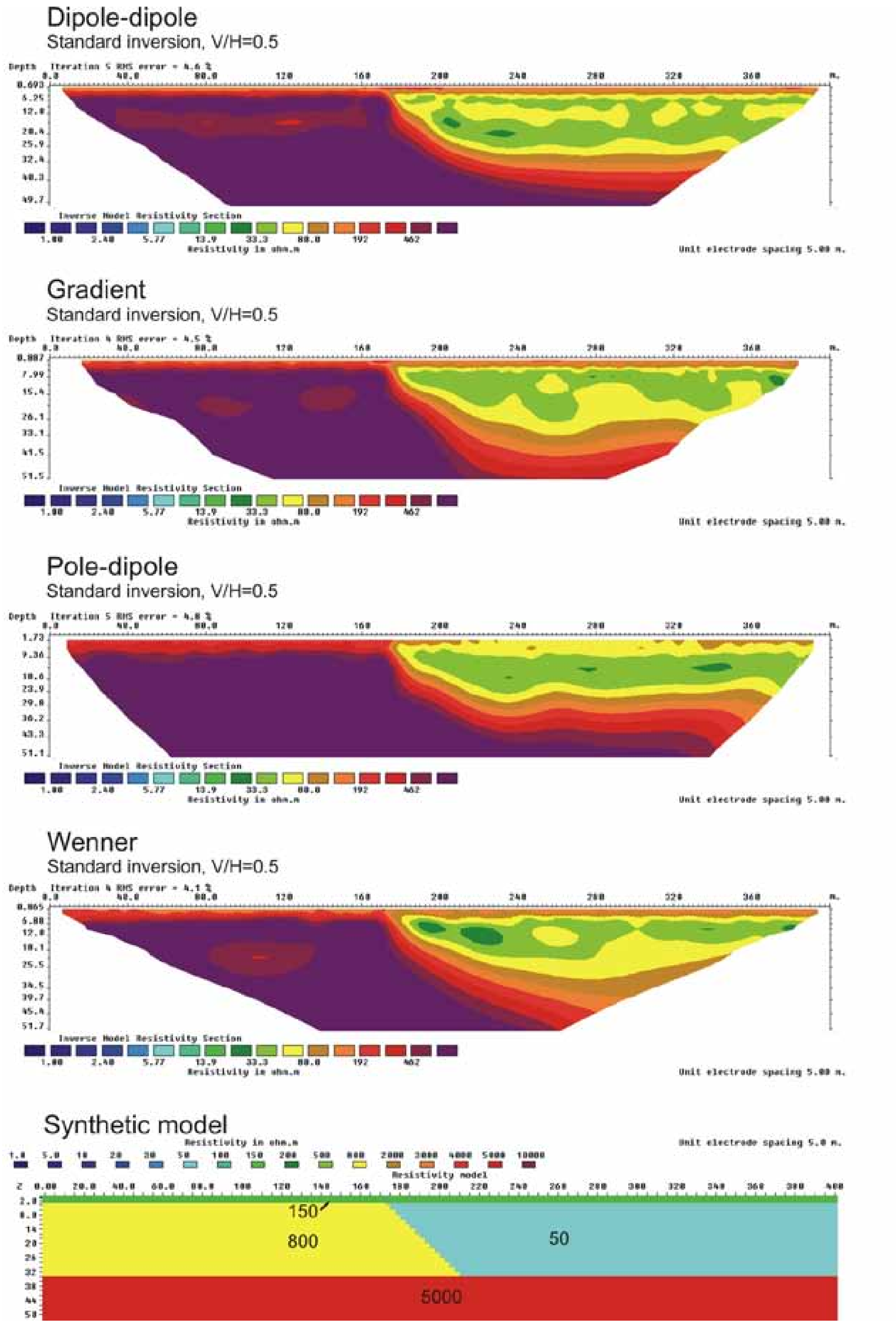

Figure 3.2.35: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 800 Ωm and 50 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=0.5

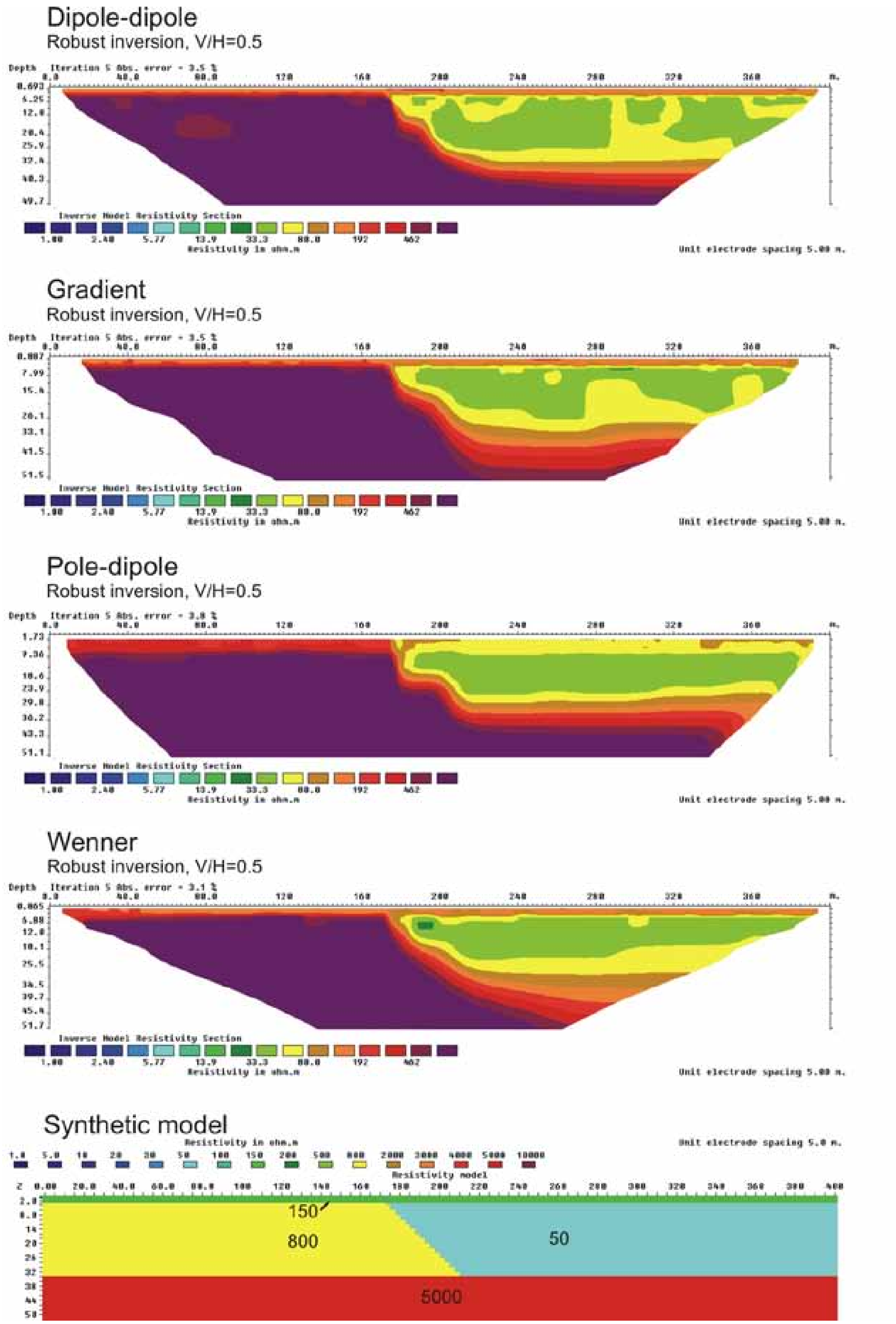

Figure 3.2.36: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 800 Ωm and 50 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=0.5

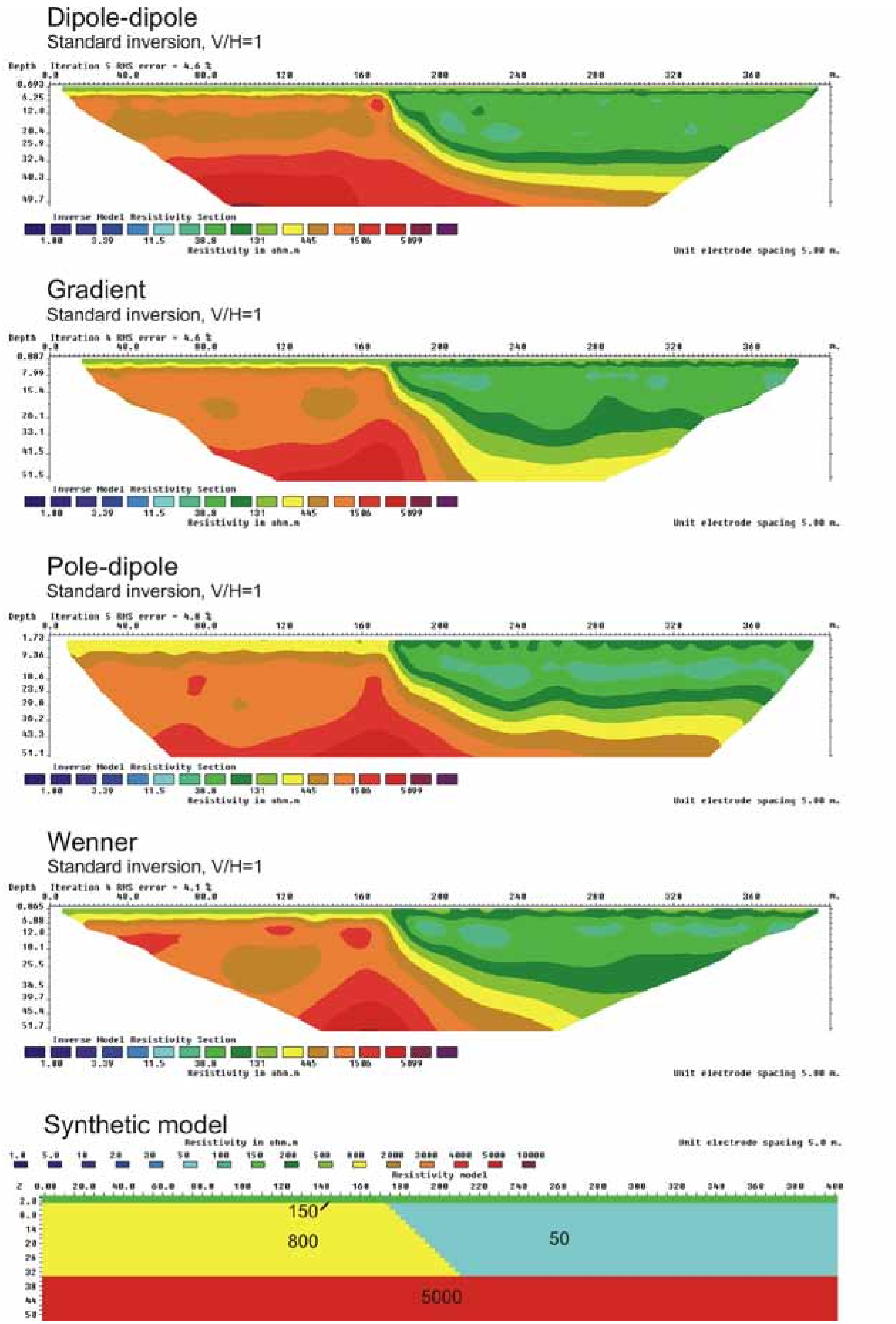

Figure 3.2.37: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 800 Ωm and 50 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=1

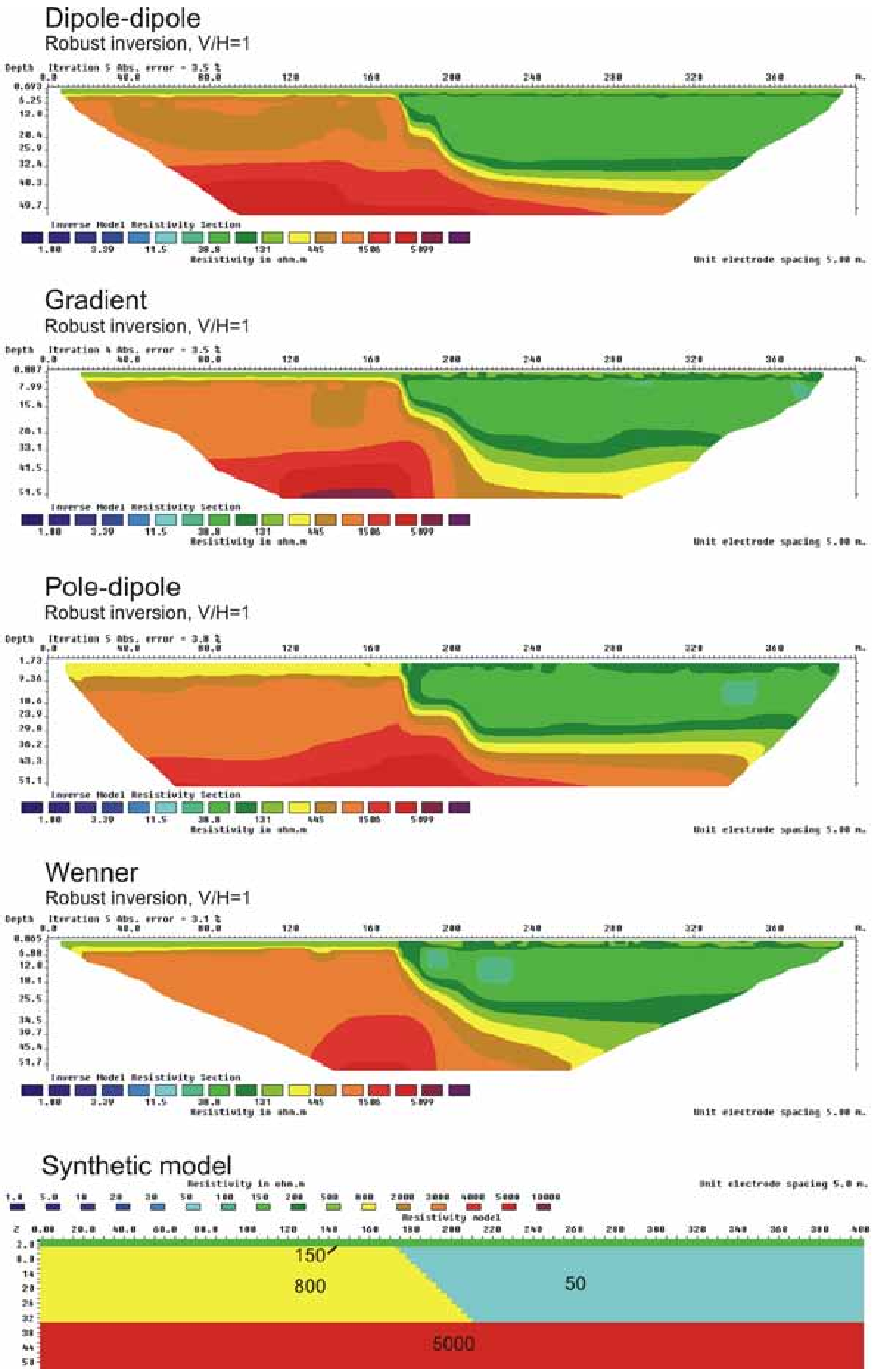

Figure 3.2.38: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 800 Ωm and 50 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=1

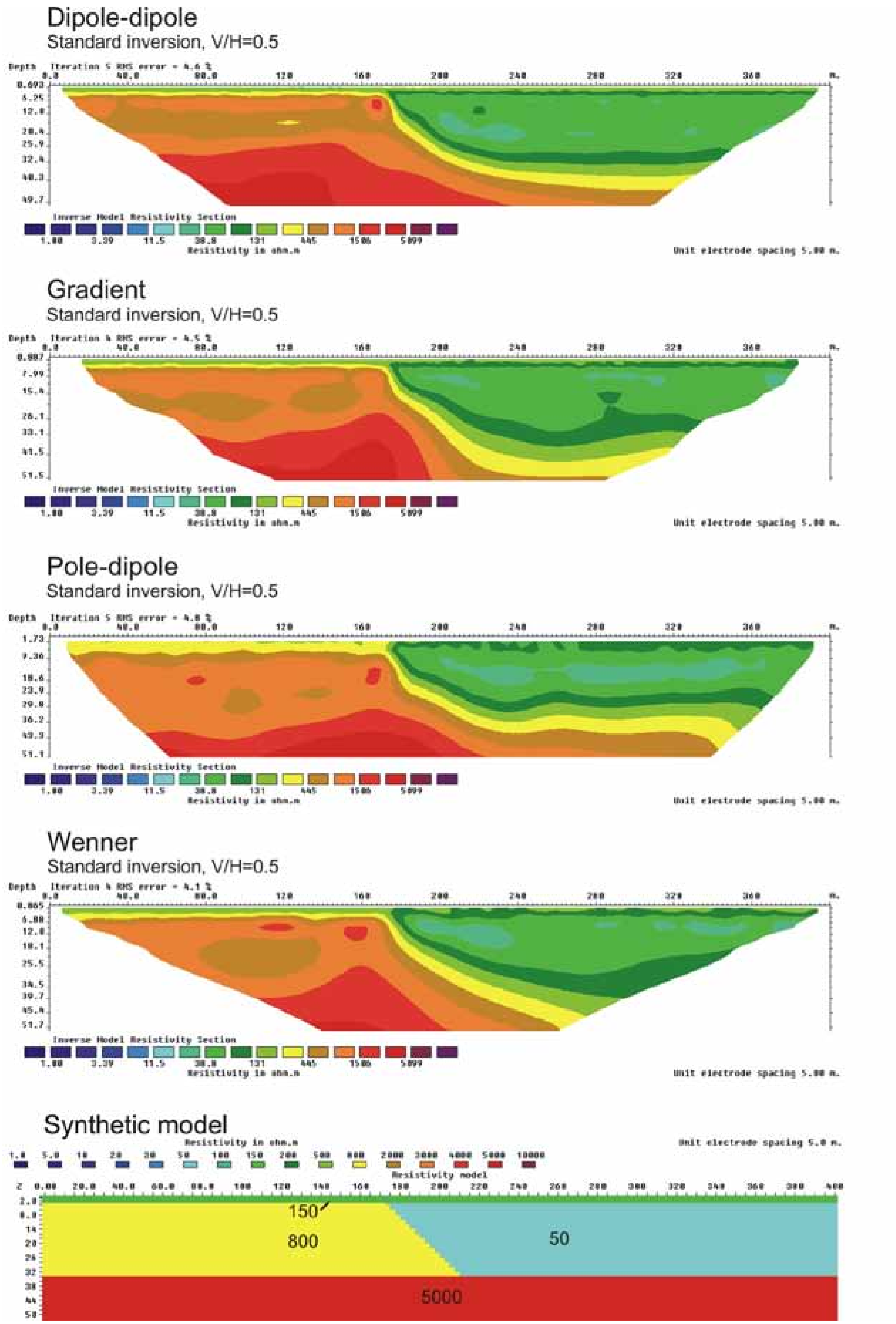

Figure 3.2.39: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 800 Ωm and 50 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=0.5

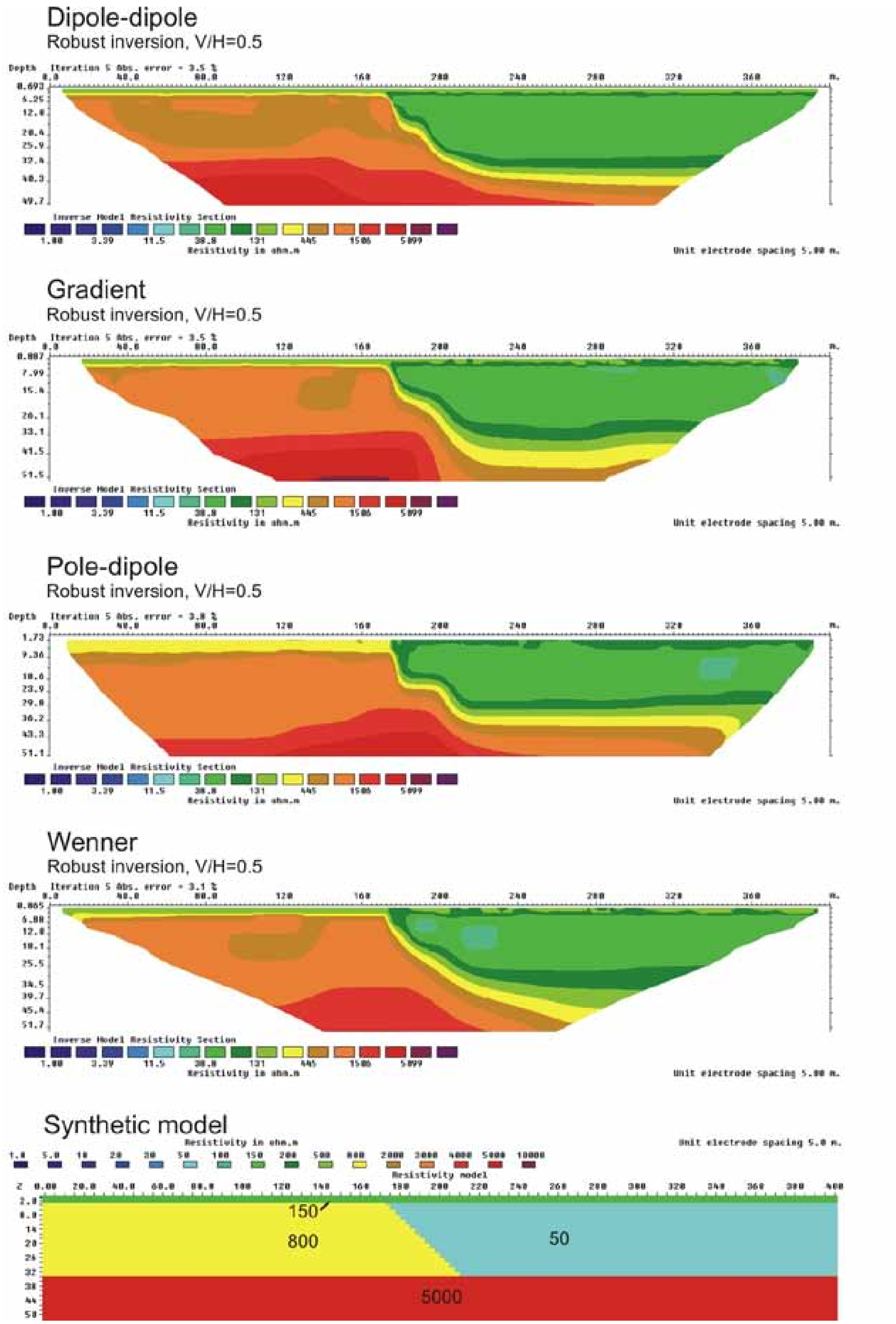

Figure 3.2.40: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 800 Ωm and 50 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=0.5

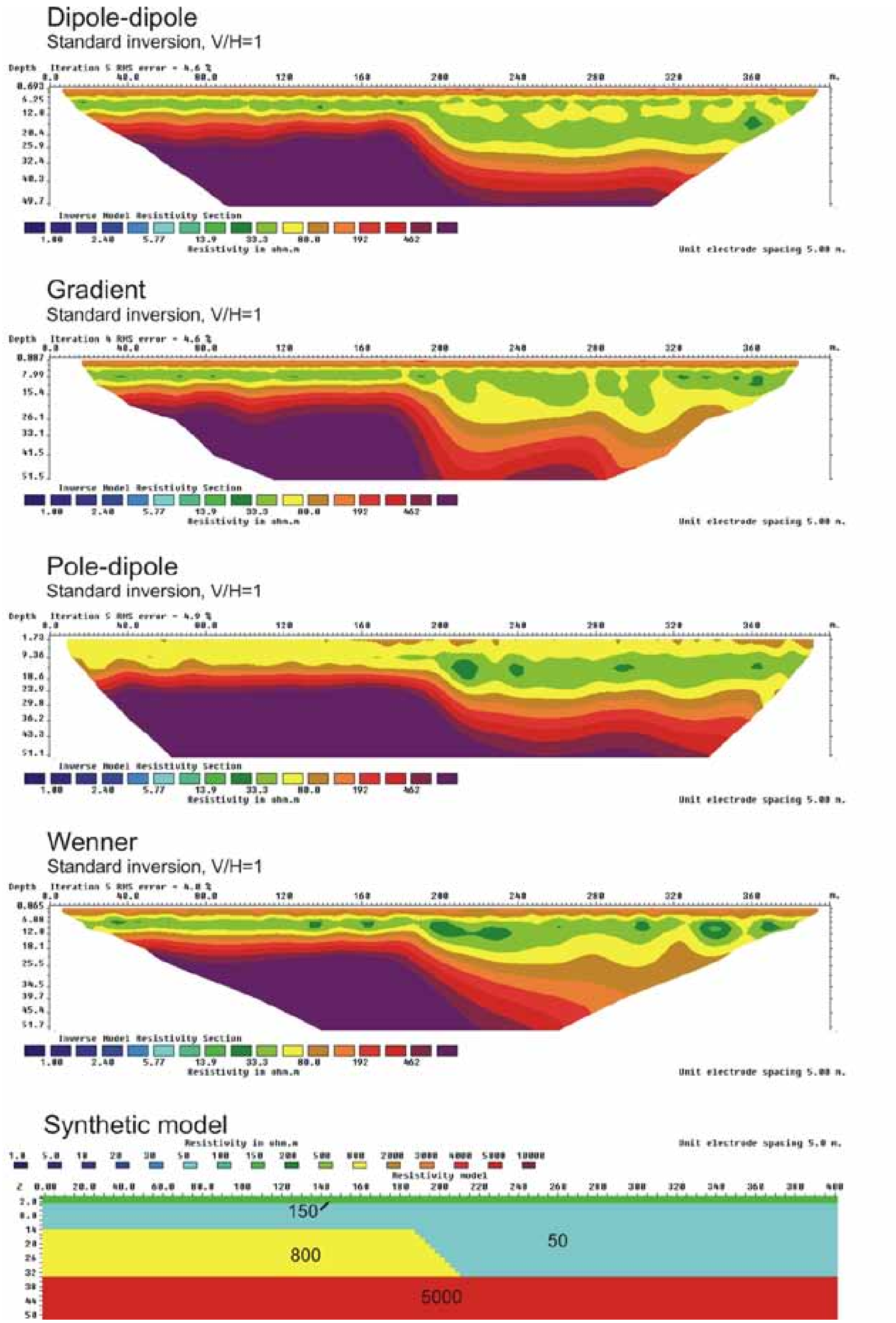

Figure 3.2.41: 3 m top layer (150 Ωm) over a horizontal and dipping interface between 50 Ωm and 800 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=1

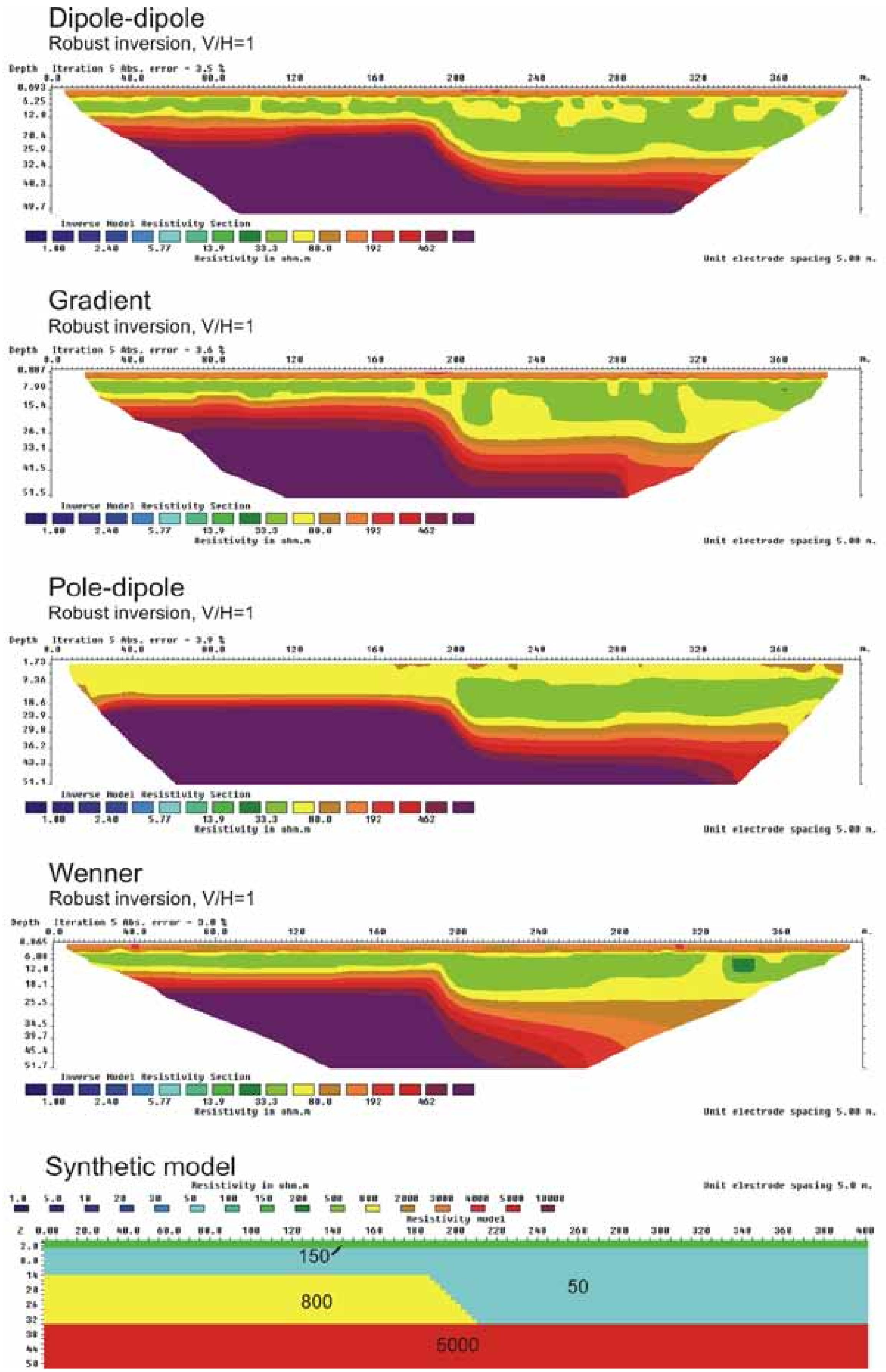

Figure 3.2.42: 3 m top layer (150 Ωm) over a horizontal and dipping interface between 50 Ωm and 800 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=1

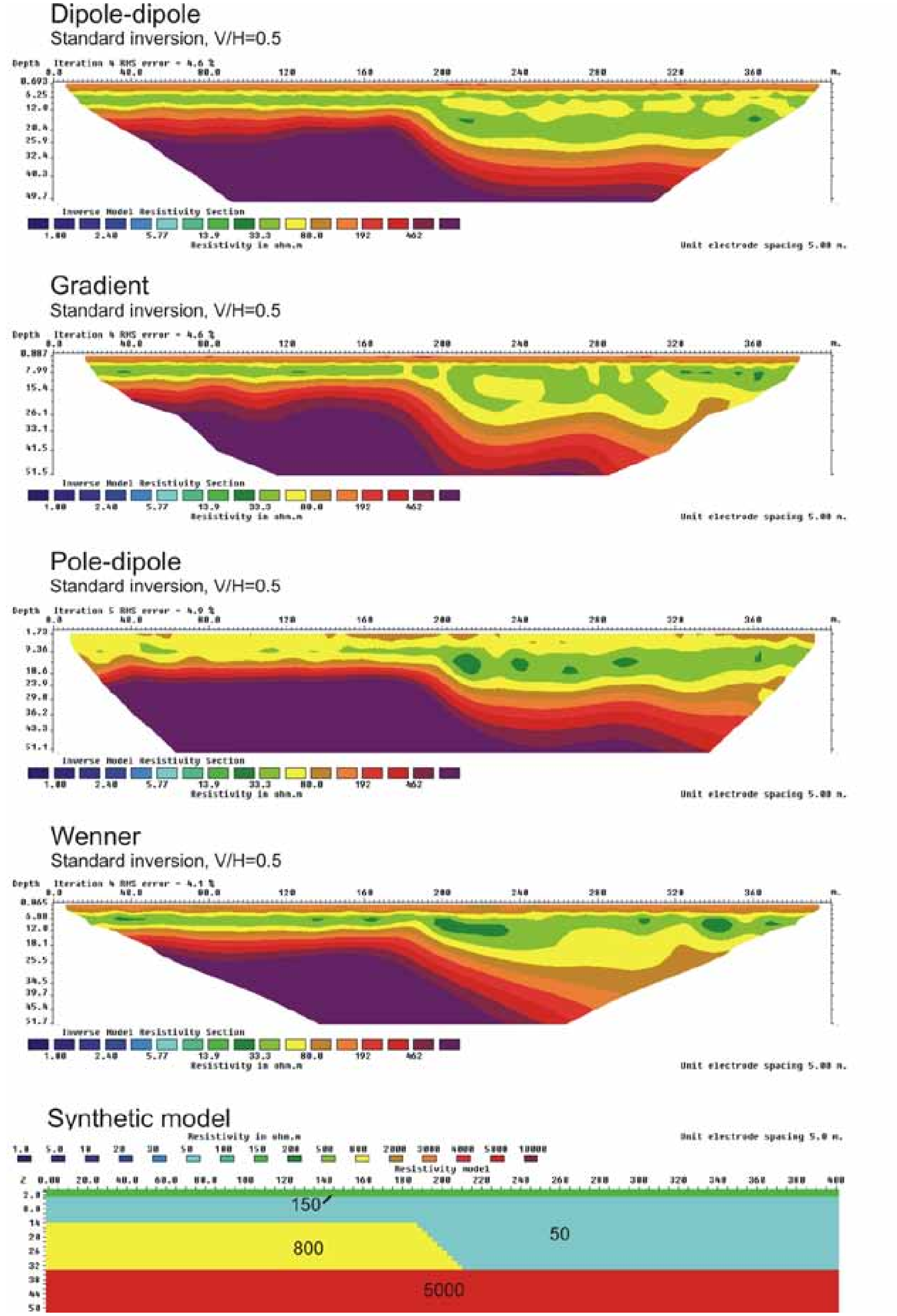

Figure 3.2.43: 3 m top layer (150 Ωm) over a horizontal and dipping interface between 50 Ωm and 800 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=0.5

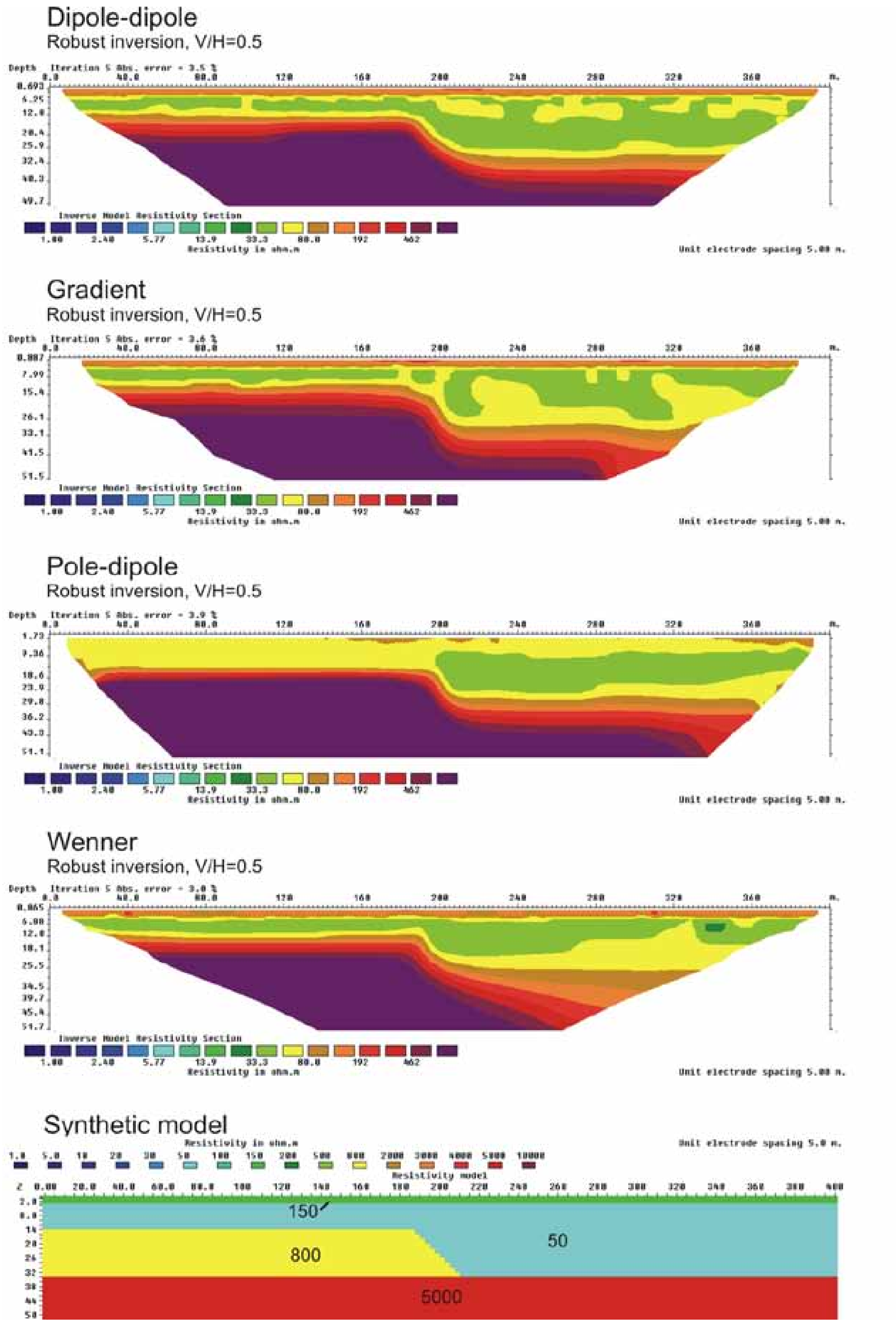

Figure 3.2.44: 3 m top layer (150 Ωm) over a horizontal and dipping interface between 50 Ωm and 800 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=0.5

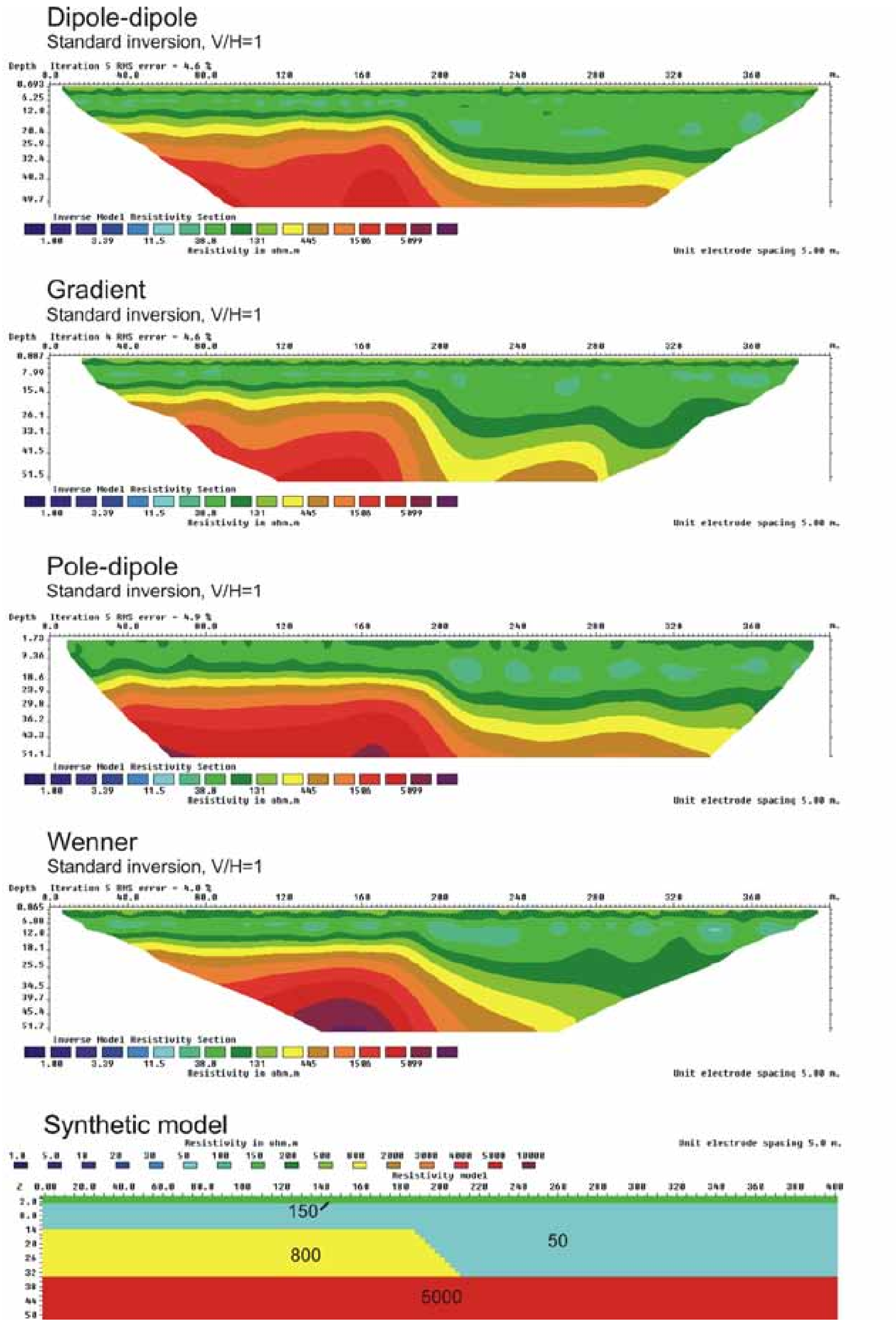

Figure 3.2.45: 3 m top layer (150 Ωm) over a horizontal and dipping interface between 50 Ωm and 800 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=1

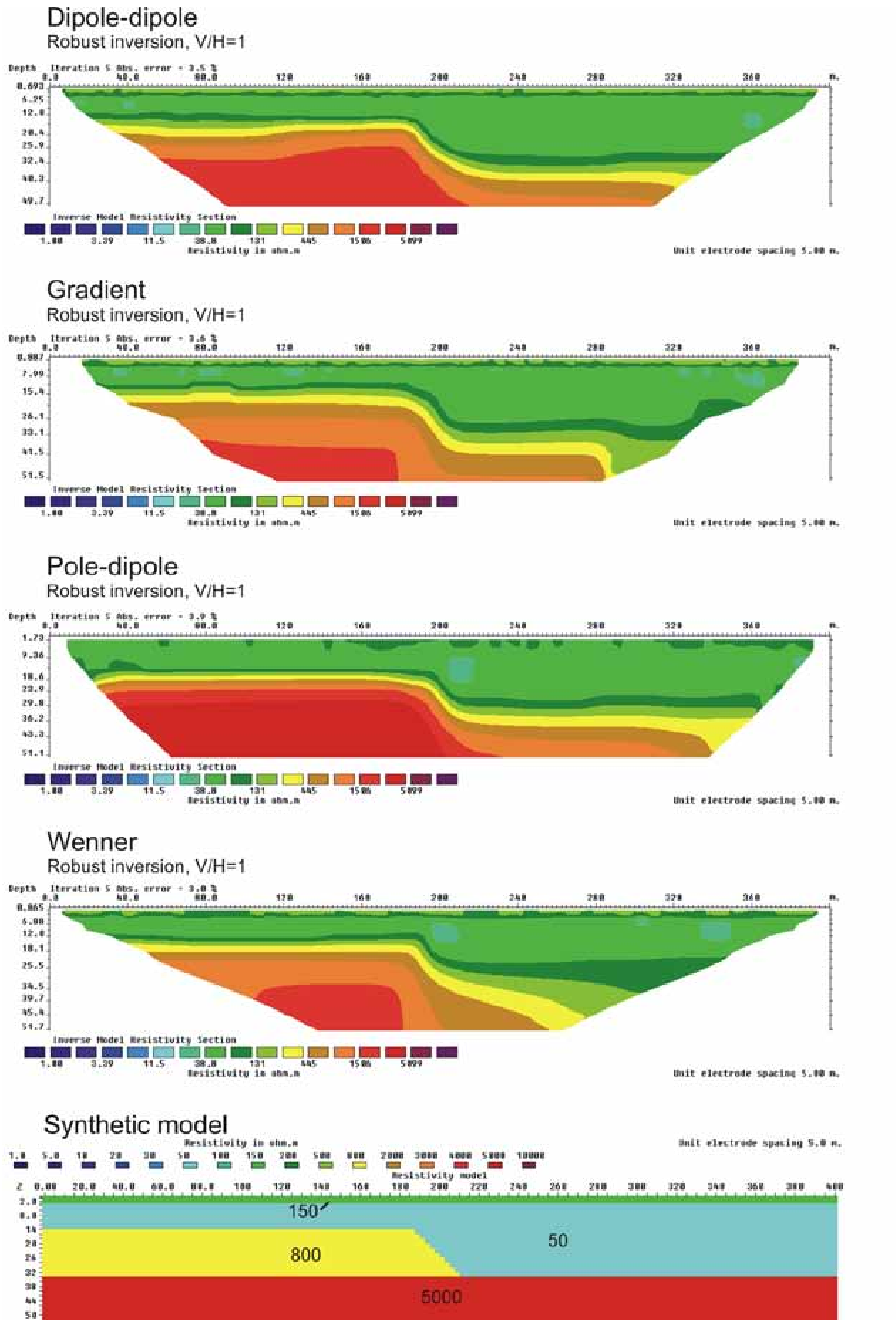

Figure 3.2.46: 3 m top layer (150 Ωm) over a horizontal and dipping interface between 50 Ωm and 800 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=1

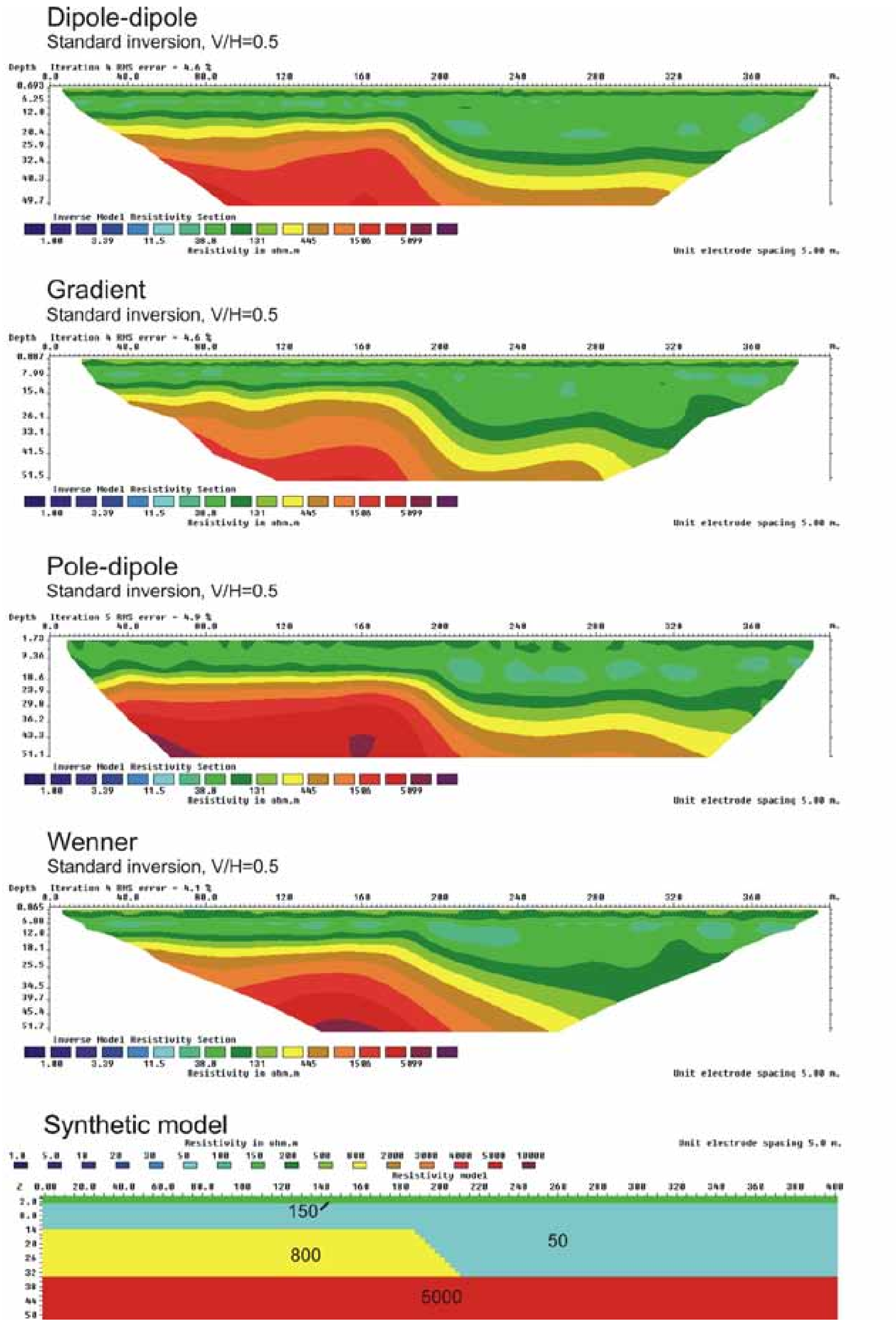

Figure 3.2.47: 3 m top layer (150 Ωm) over a horizontal and dipping interface between 50 Ωm and 800 Ωm. Bedrock of 5000 Ωm as the bottom layer. Standard inversion, V/H=0.5

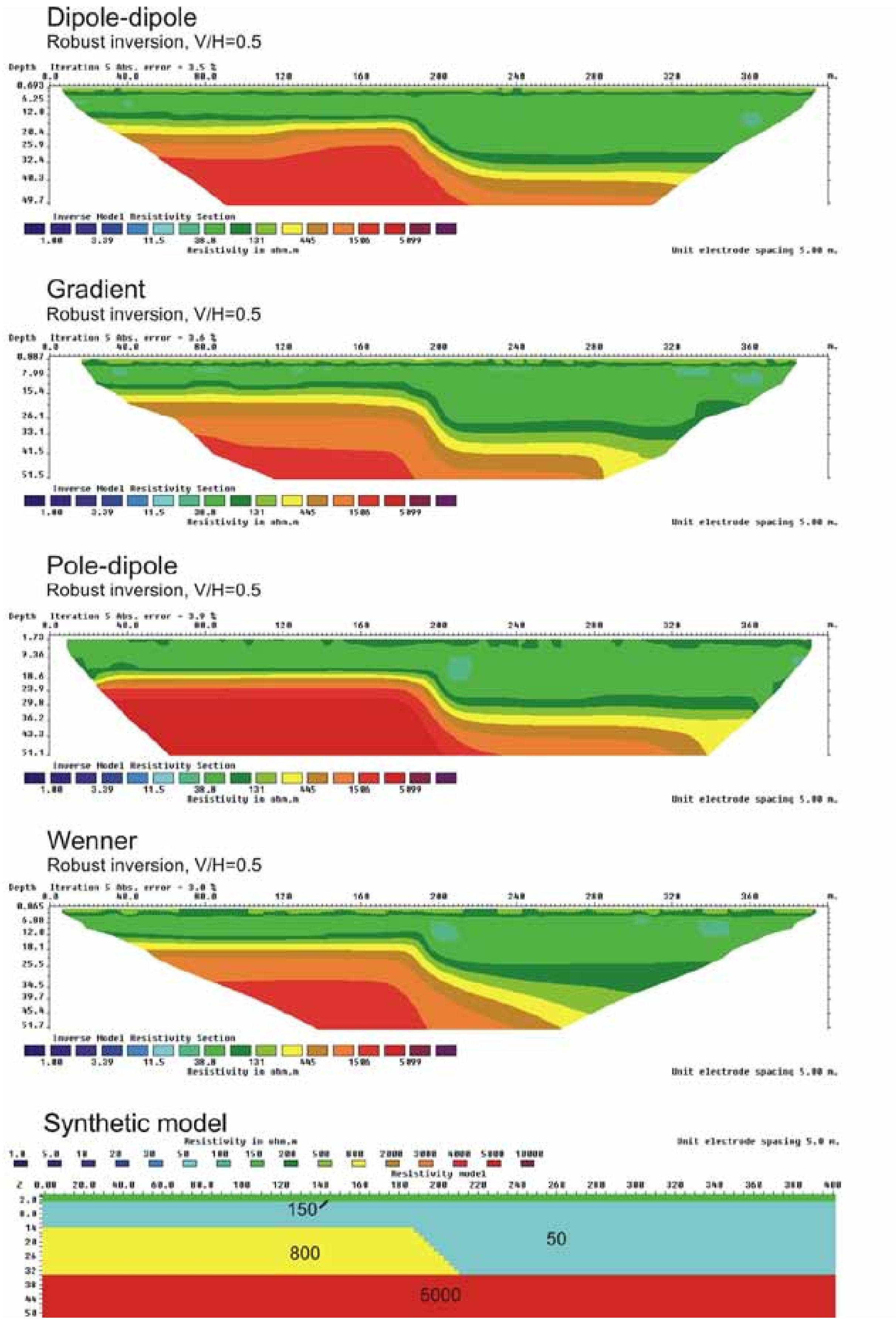

Figure 3.2.48: 3 m top layer (150 Ωm) over a horizontal and dipping interface between 50 Ωm and 800 Ωm. Bedrock of 5000 Ωm as the bottom layer. Robust inversion, V/H=0.5

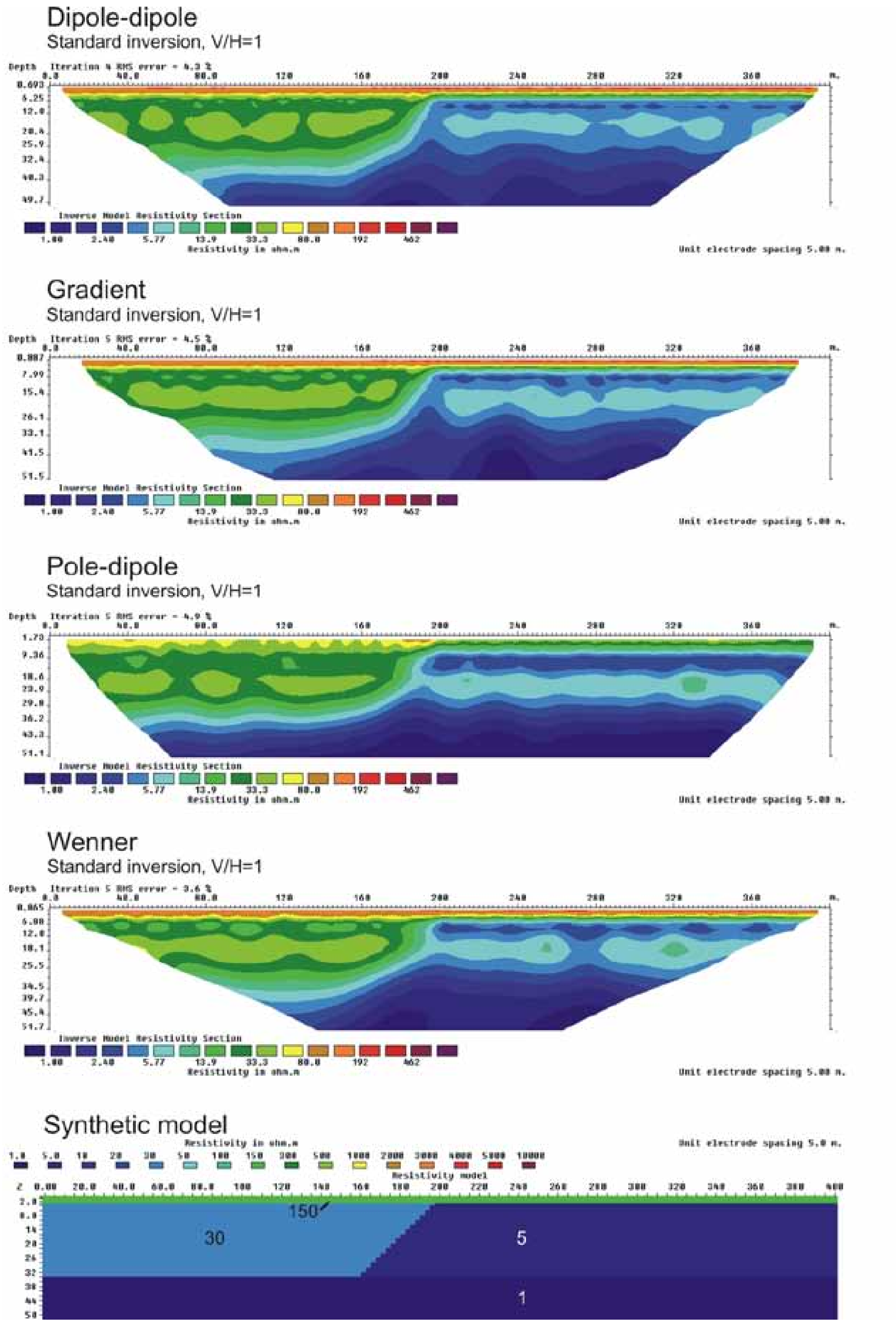

Figure 3.2.49: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 30 Ωm and 5 Ωm. 1 Ωm as the bottom layer. Standard inversion, V/H=1

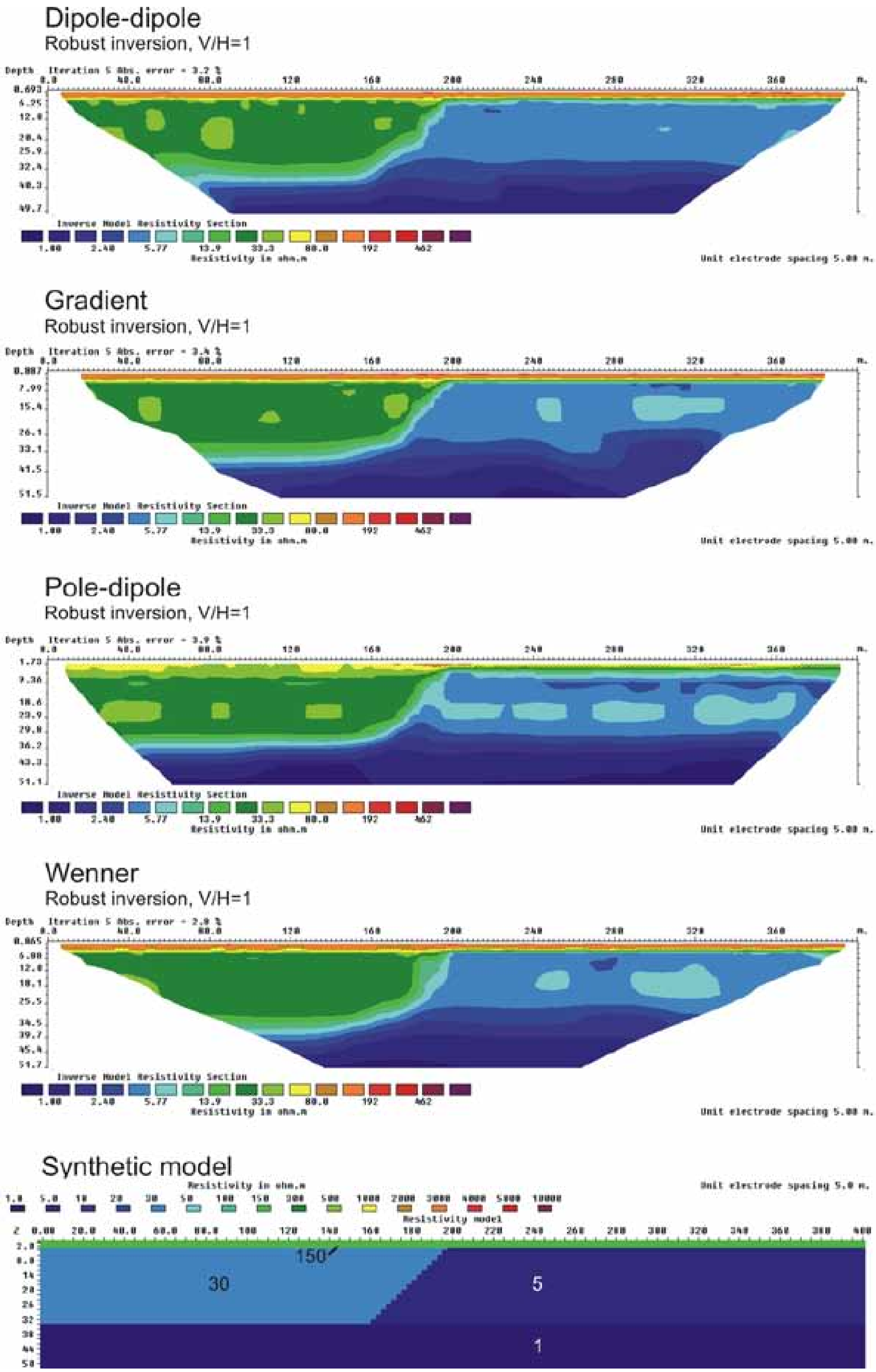

Figure 3.2.50: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 30 Ωm and 5 Ωm. 1 Ωm as the bottom layer. Robust inversion, V/H=1

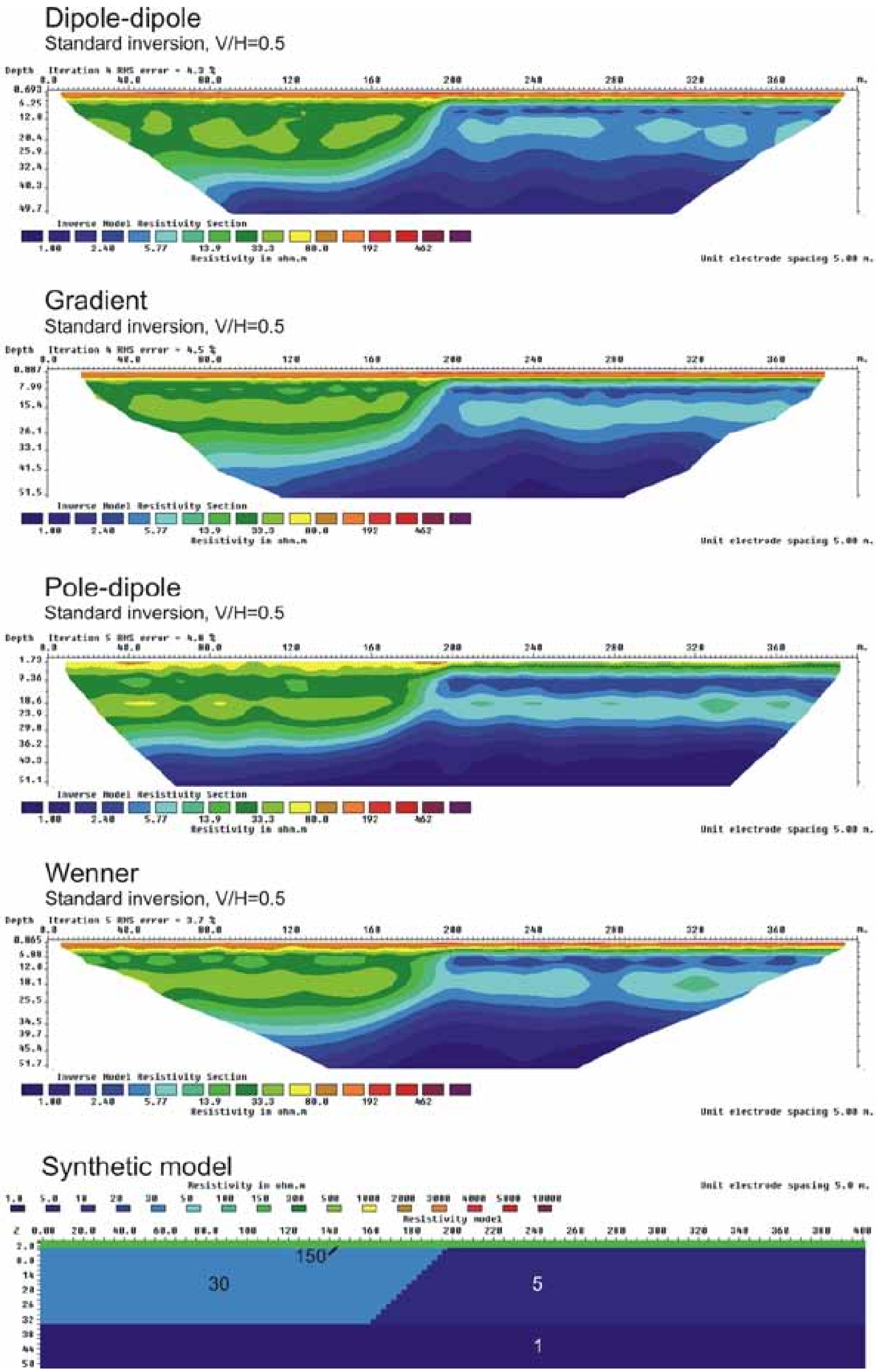

Figure 3.2.51: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 30 Ωm and 5 Ωm. 1 Ωm as the bottom layer. Standard inversion, V/H=0.5

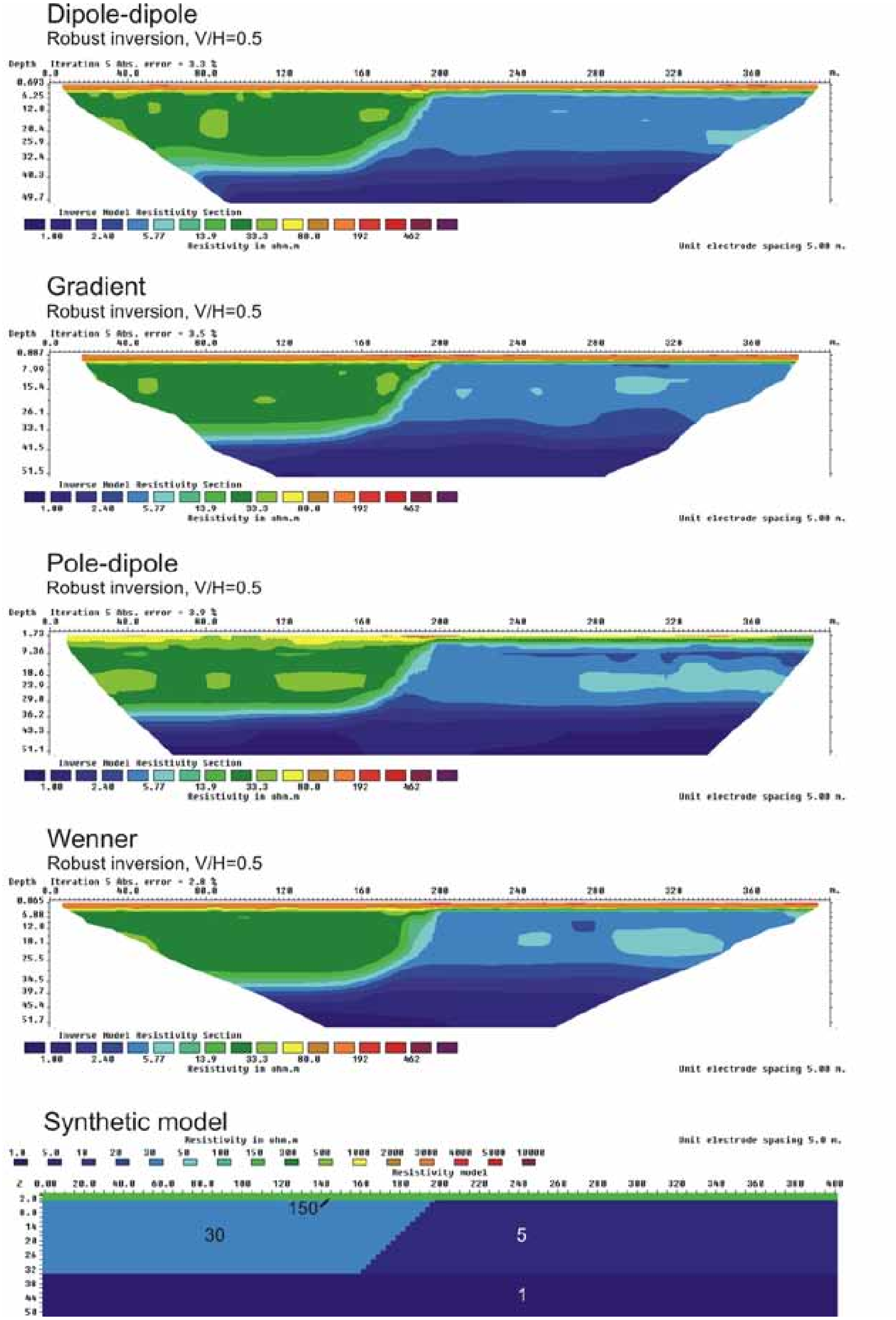

Figure 3.2.52: 3 m top layer (150 Ωm) over a dipping interface between resistivities of 30 Ωm and 5 Ωm. 1 Ωm as the bottom layer. Robust inversion, V/H=0.5

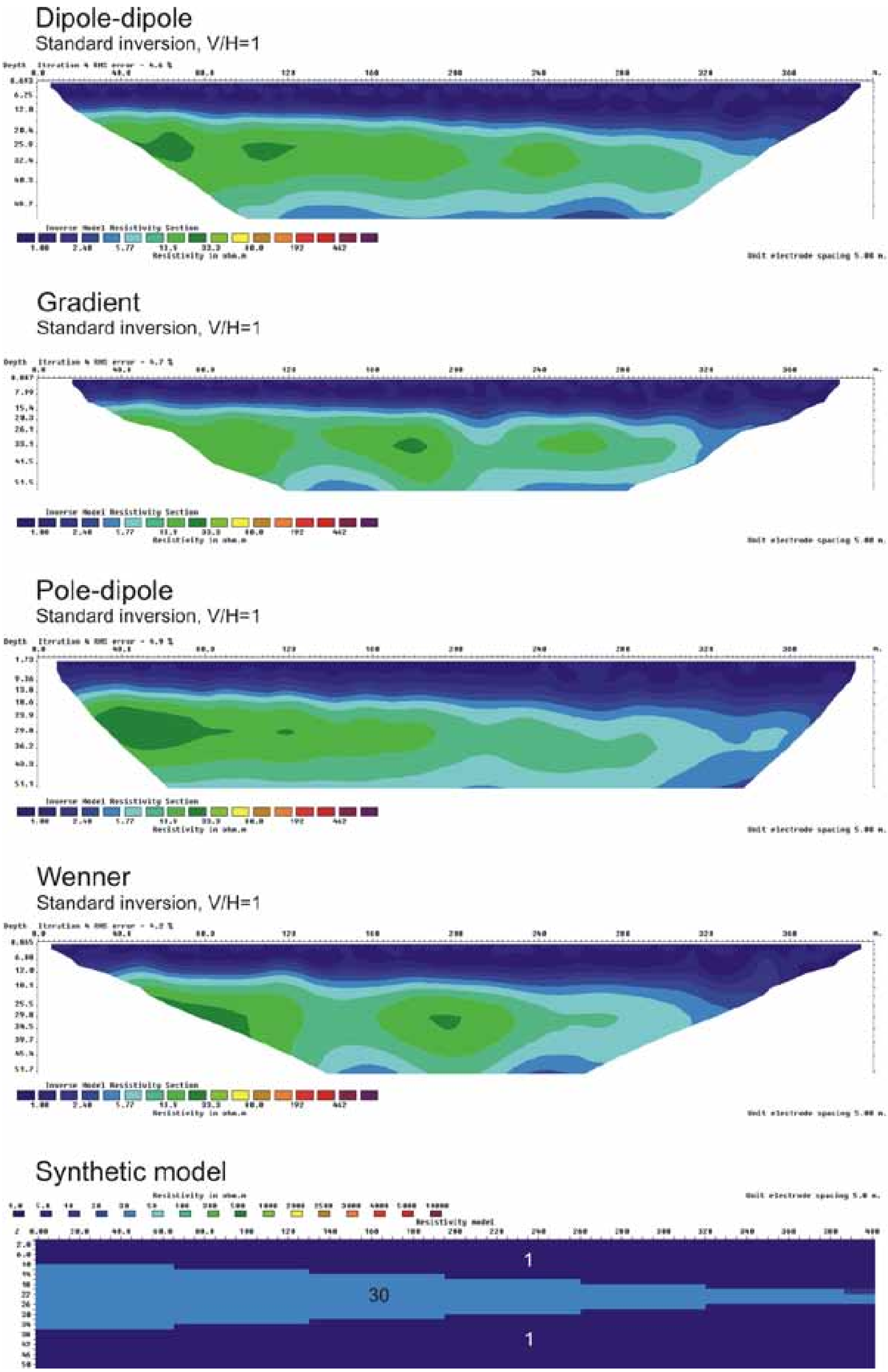

Figure 3.2.53: Dipping interfaces between 1 Ωm, 30 Ωm and 1 Ωm. Standard inversion, V/H=1

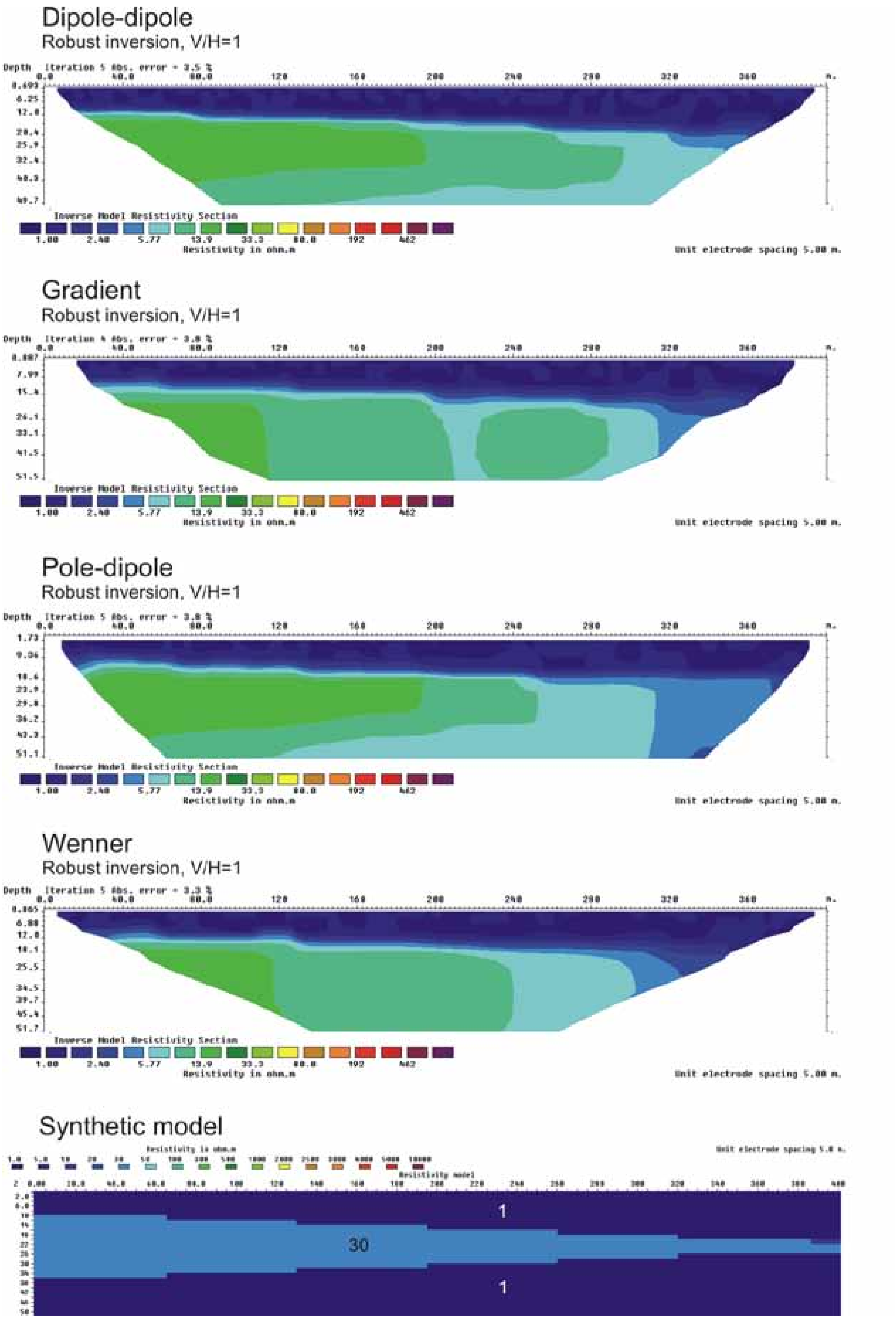

Figure 3.2.54: Dipping interfaces between 1 Ωm, 30 Ωm and 1 Ωm. Robust inversion, V/H=1

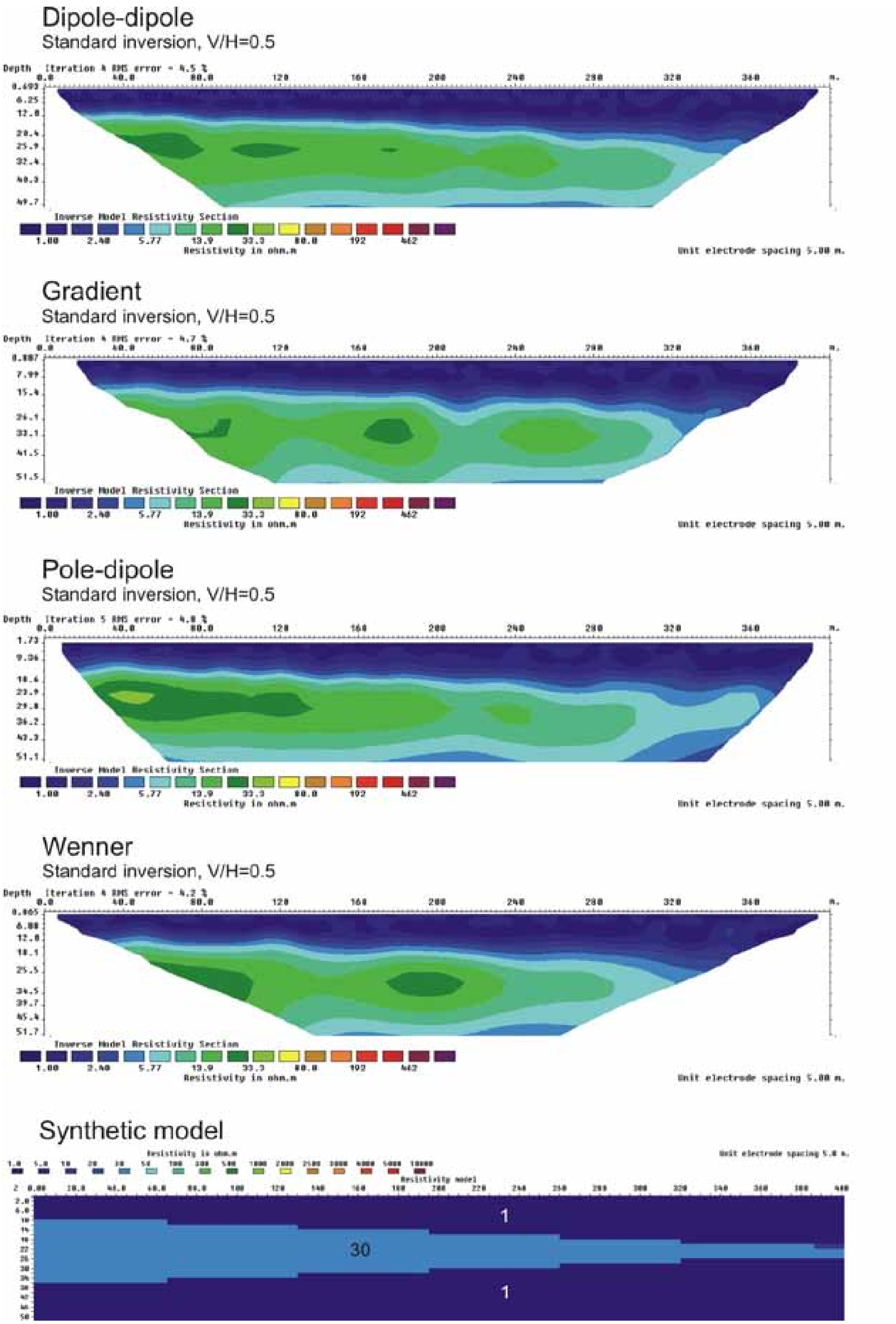

Figure 3.2.55: Dipping interfaces between 1 Ωm, 30 Ωm and 1 Ωm. Standard inversion, V/H=0.5

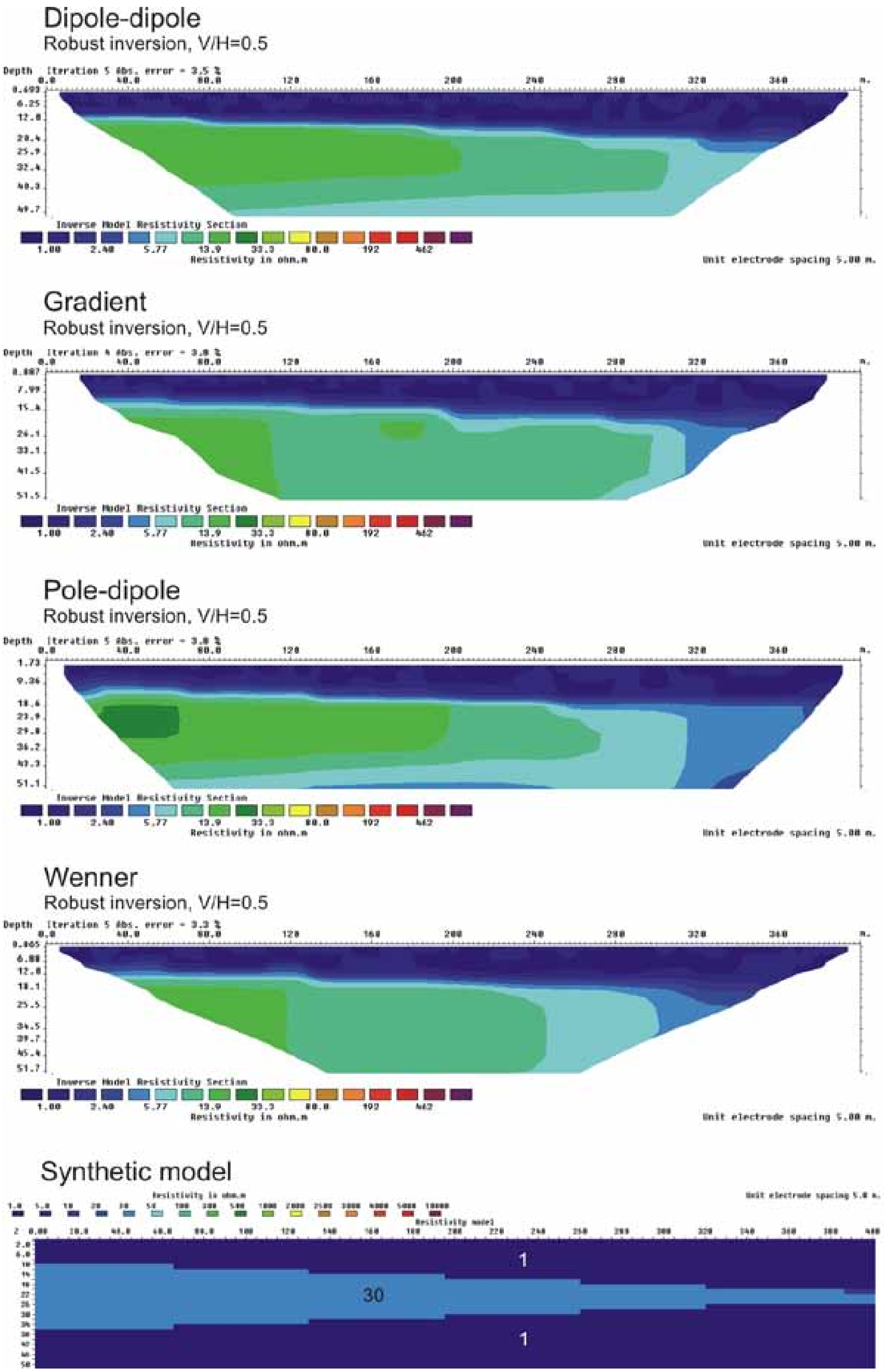

Figure 3.2.56: Dipping interfaces between 1 Ωm, 30 Ωm and 1 Ωm. Robust inversion, V/H=0.5

APPENDIX C - Modeling results. Lenses

Figures 3.3.1 – 3.3.4:	2 m top layer (100 Ωm) over 1 Ωm and a quick clay lens of 30 Ωm.
Figures 3.3.5 -3.3.8:	2 m top layer (100 Ωm) over 30 Ωm and a clay lens of 1 Ωm.
Figures 3.3.9 -3.3.12:	10 m of slide deposits (100 Ωm) over horizontal layers of 30 Ωm, 1 Ωm and a lens of 300 Ωm.
Figures 3.3.13 – 3.3.20:	2 m top layer (100 Ωm) over 1 Ωm and a lens of 300 Ωm with the size of 90 m x 24 m in a depth of ~25 m, and the size of 30 m x 12 m in a depth of ~15 m.
Figures 3.3.21 – 3.3.28:	2 m top layer (100 Ωm) over 30 Ωm and a lens of 300 Ωm with the size of 90 m x 24 m in a depth of ~25 m, and the size of 30 m x 12 m in a depth of ~15 m.
Figures 3.3.29 - 3.3.36:	2 m top layer (100 Ωm) over 30 Ωm and a lens of 1 Ωm with the size of 90 m x 24 m in a depth of ~25 m, and the size of 30 m x 12 m in a depth of ~15 m.
Figures 3.3.37 – 3.3.44:	2 m top layer (100 Ωm) over 1 Ωm and a lens of 30 Ωm with the size of 90 m x 24 m in a depth of ~25 m, and the size of 30 m x 12 m in a depth of ~15 m.
Figures 3.3.45 – 3.3.56:	3 m top layer (150 Ωm) over 50 Ωm with a lens of clay slide deposits of 200 Ωm, a lens of sand and gravel of 800 Ωm, and a rock of 5000 Ωm. The size of the lens is 20 m x 10 m.
Figures 3.3.57 – 3.3.68:	3 m top layer (150 Ωm) over 50 Ωm with a lens of clay slide deposits of 200 Ωm, a lens of sand and gravel of 800 Ωm, and a rock of 5000 Ωm. The size of the lens is 15 m x 6 m.
Figures 3.3.69 – 3.3.80:	3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lens of clay slide deposits of 200 Ωm, a lens of sand and gravel of 800 Ωm, and a rock of 5000 Ωm. The size of the lens is 20 m x 10 m.
Figures 3.3.81 – 3.3.92:	3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lens of clay slide deposits of 200 Ωm, a lens of sand and gravel of 800 Ωm, and a rock of 5000 Ωm. The size of the lens is 15 m x 6 m.

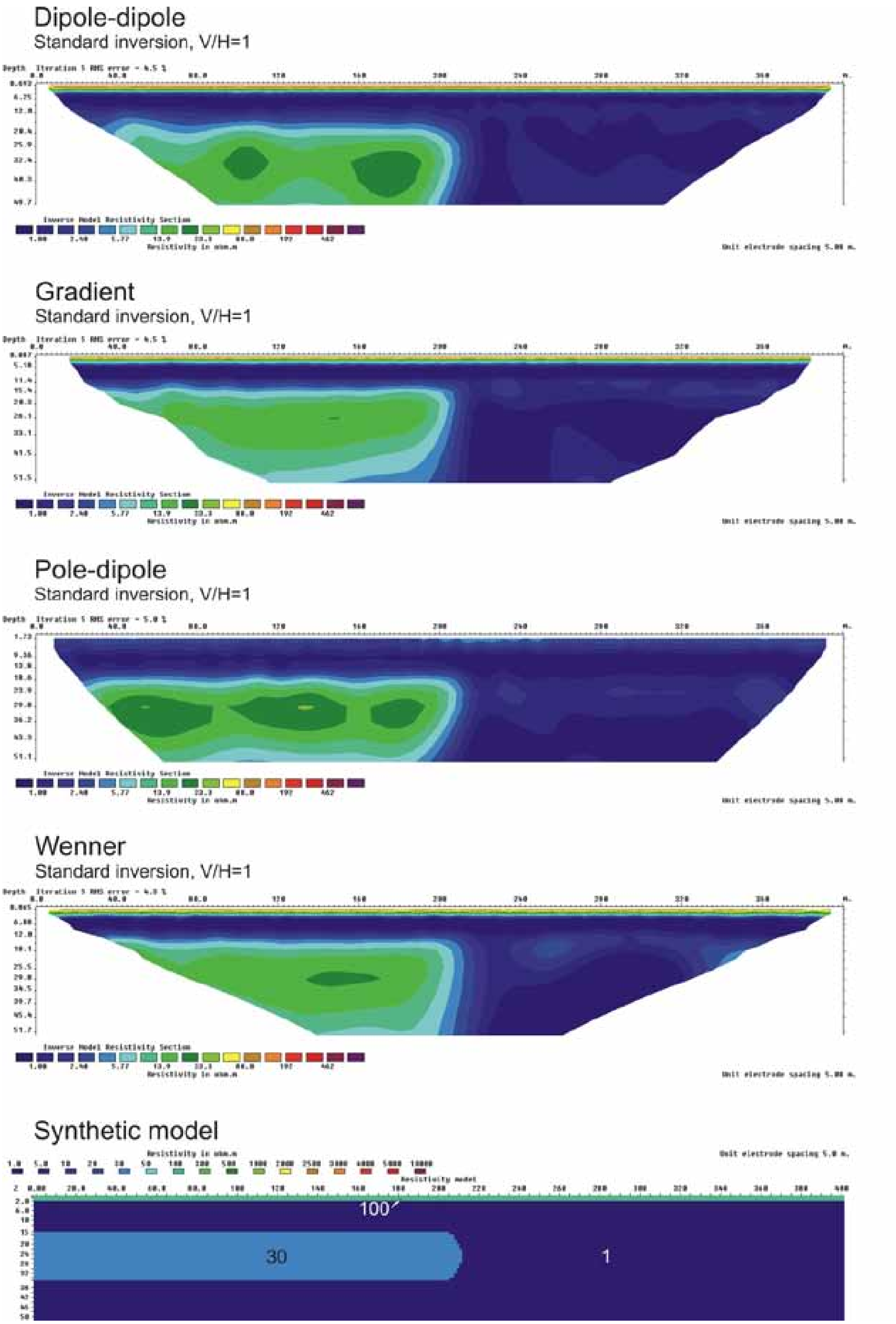

Figure 3.3.1: 2 m top layer (100 Ωm) over 1 Ωm and a quick clay lense of 30 Ωm. Standard inversion, V/H=1

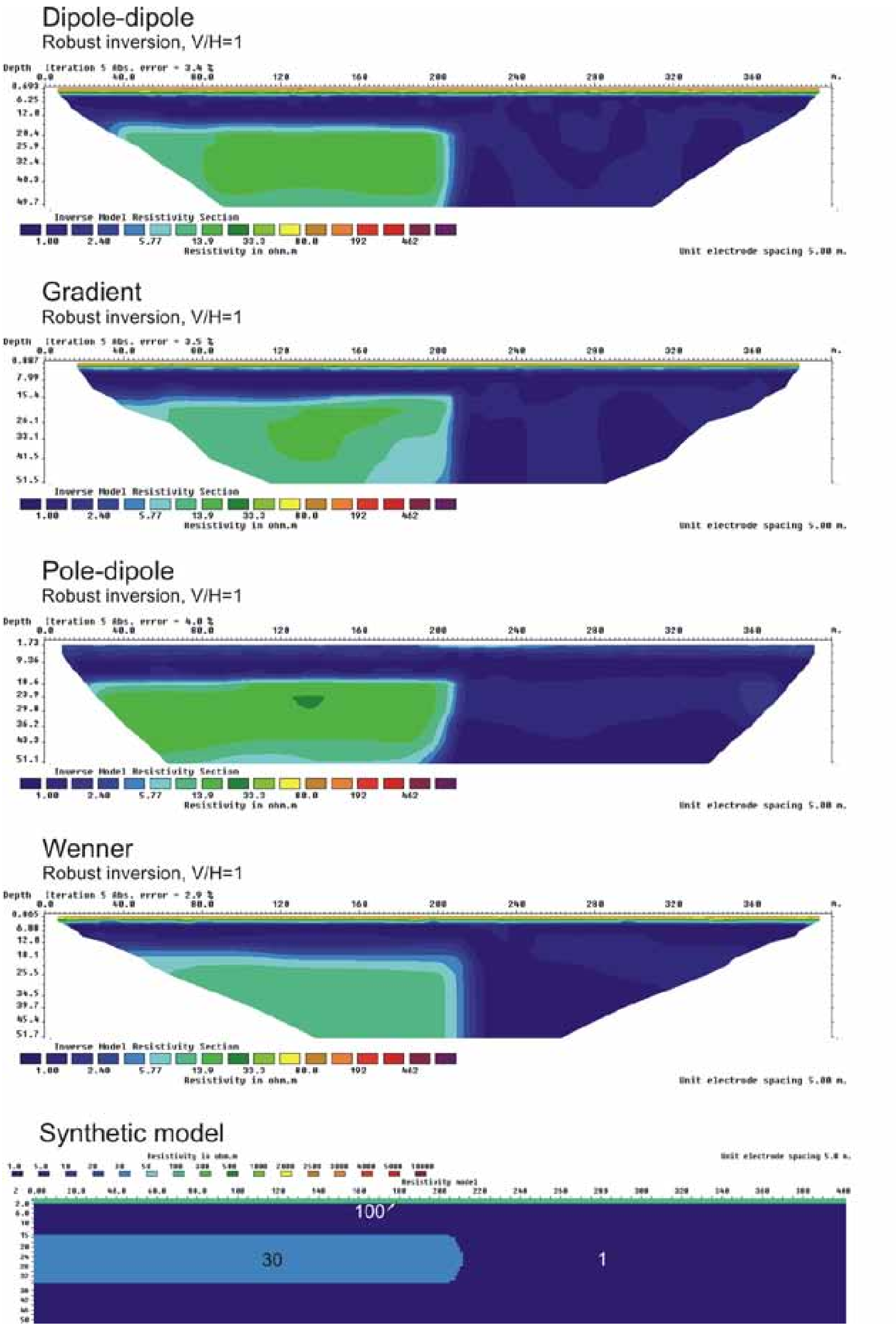

Figure 3.3.2: 2 m top layer (100 Ωm) over 1 Ωm and a quick clay lense of 30 Ωm. Robust inversion, V/H=1

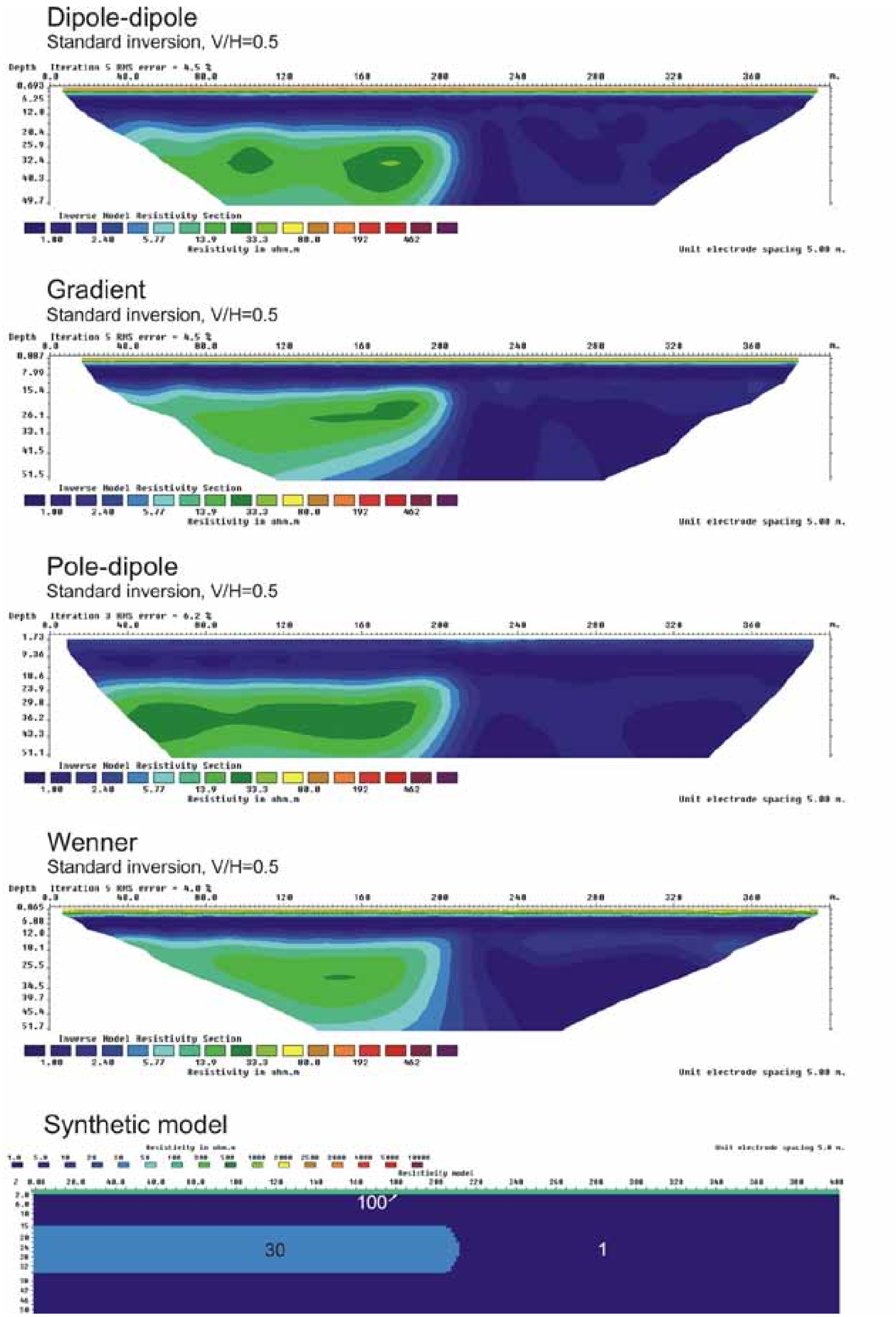

Figure 3.3.3: 2 m top layer (100 Ωm) over 1 Ωm and a quick clay lense of 30 Ωm. Standard inversion, V/H=0.5

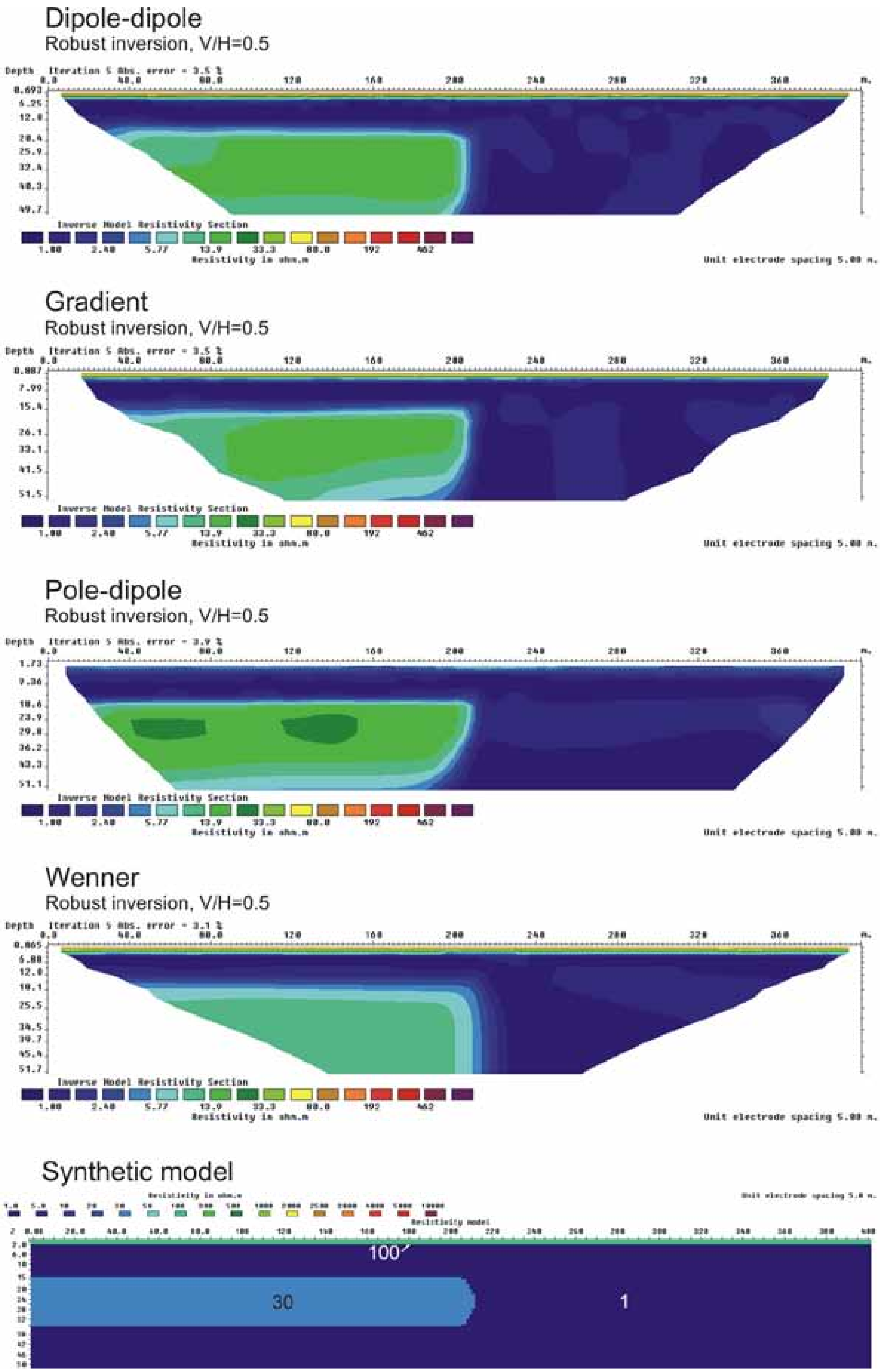

Figure 3.3.4: 2 m top layer (100 Ωm) over 1 Ωm and a quick clay lense of 30 Ωm. Robust inversion, V/H=0.5

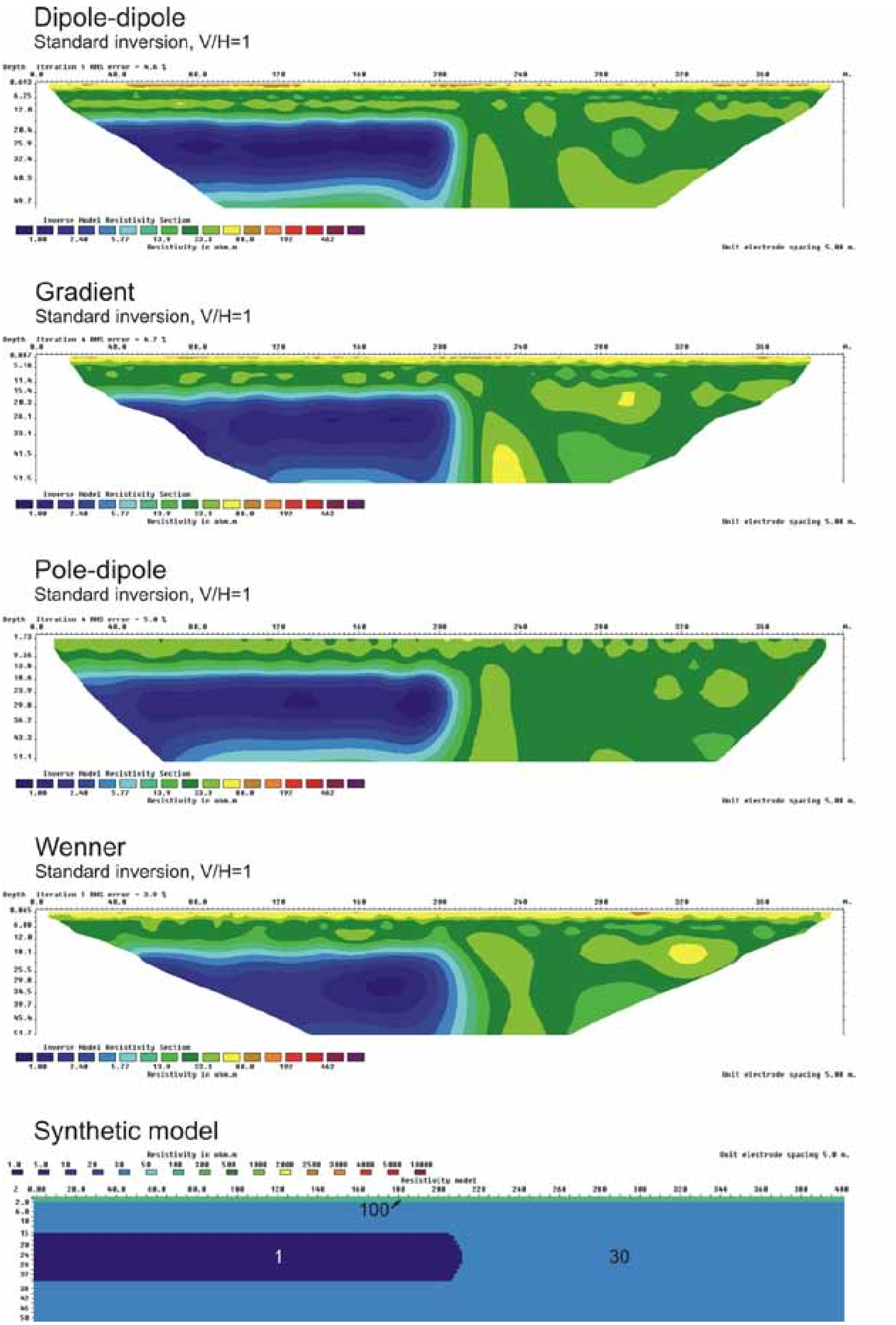

Figure 3.3.5: 2 m top layer (100 Ωm) over 30 Ωm and a clay lense of 1 Ωm. Standard inversion, V/H=1

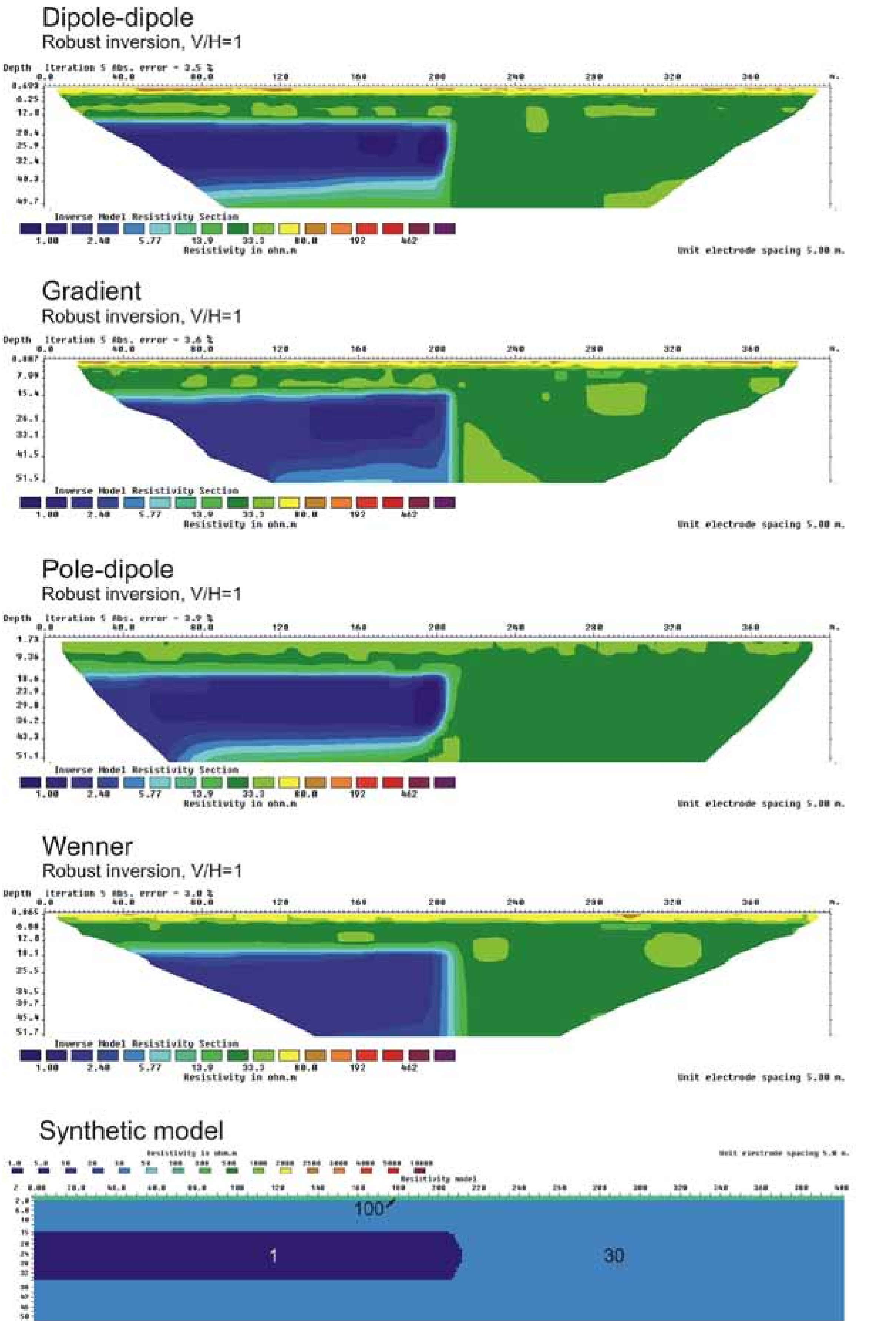

Figure 3.3.6: 2 m top layer (100 Ωm) over 30 Ωm and a clay lense of 1 Ωm. Robust inversion, V/H=1

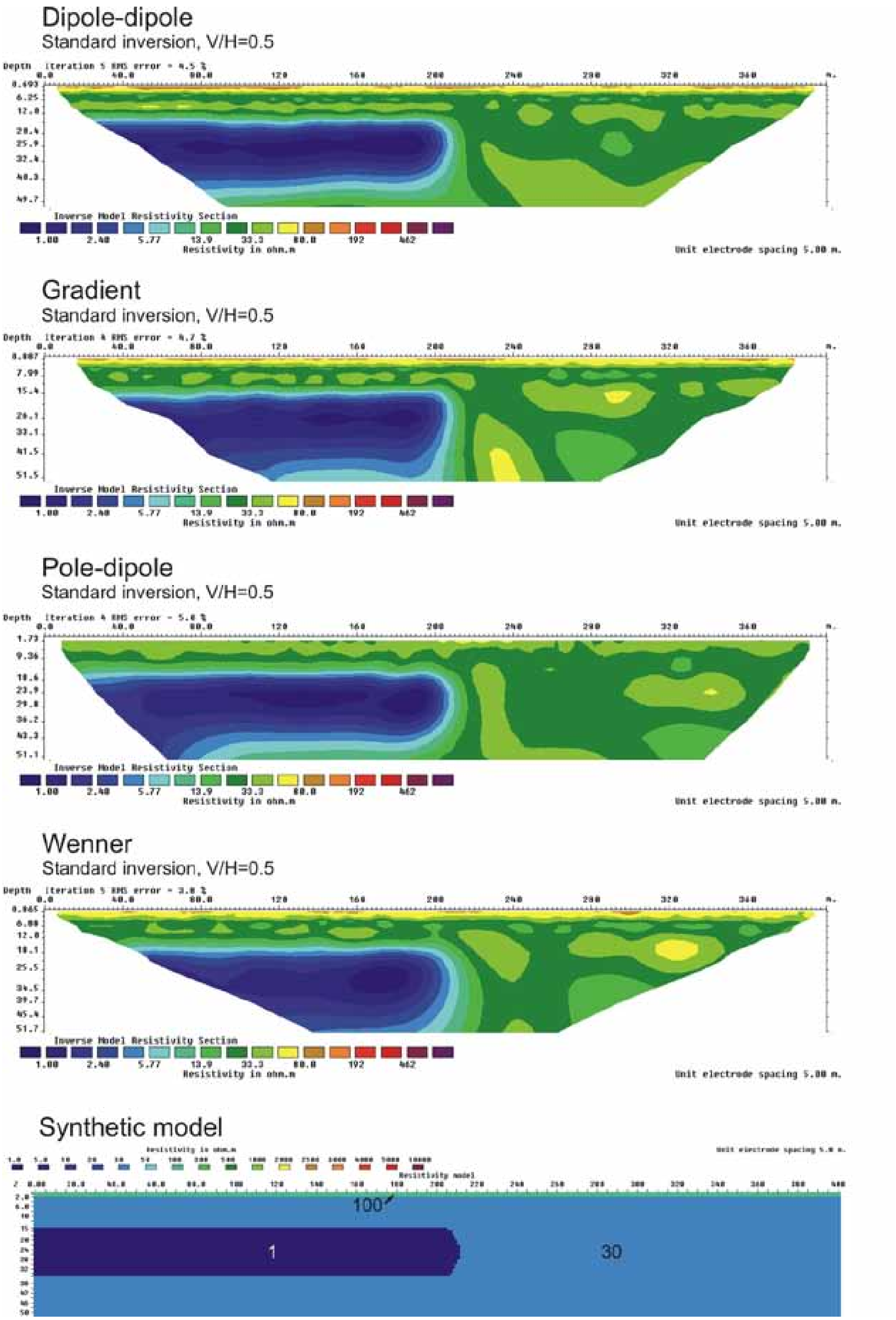

Figure 3.3.7: 2 m top layer (100 Ωm) over 30 Ωm and a clay lense of 1 Ωm. Standard inversion, V/H=0.5

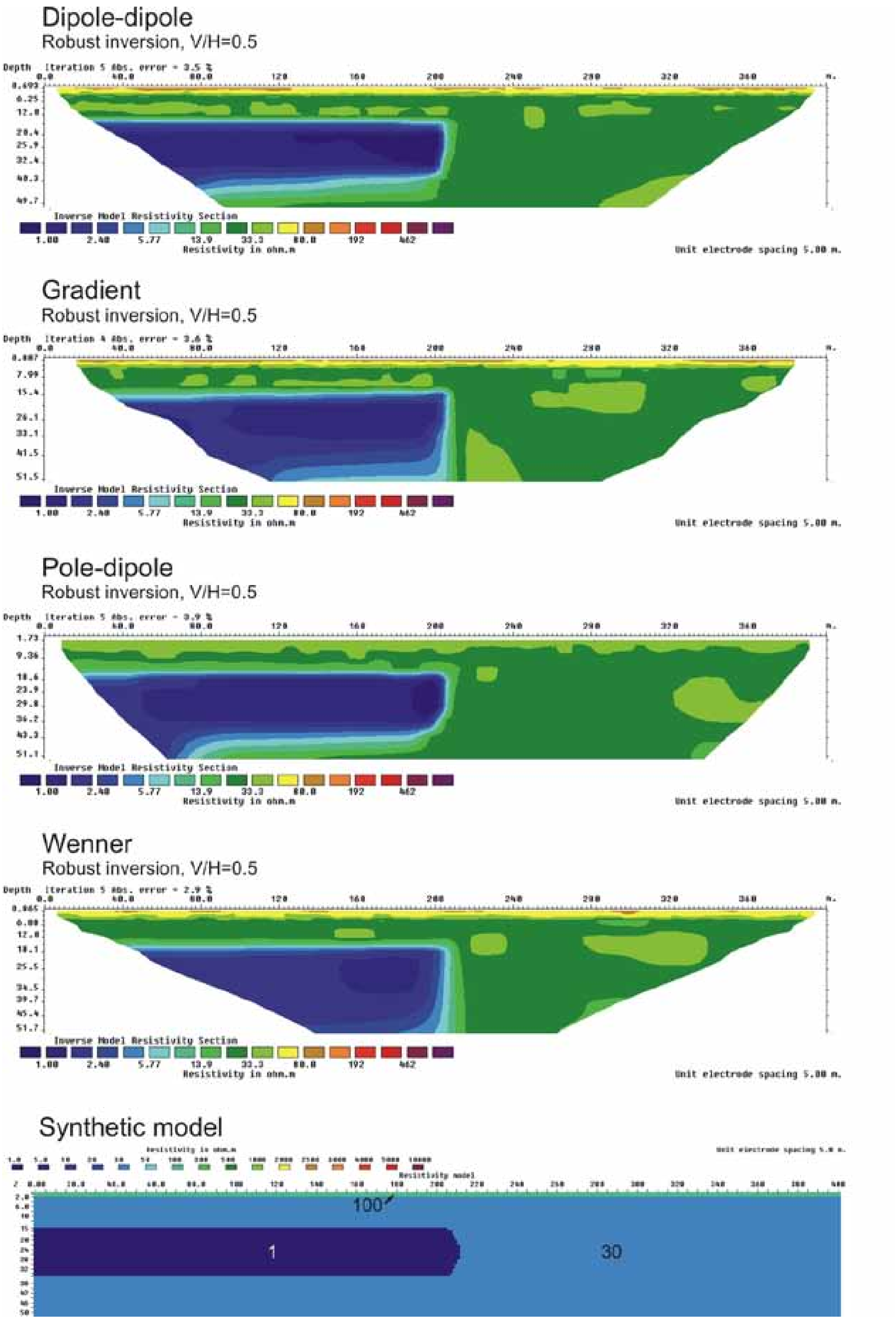

Figure 3.3.8: 2 m top layer (100 Ωm) over 30 Ωm and a clay lense of 1 Ωm. Robust inversion, V/H=0.5

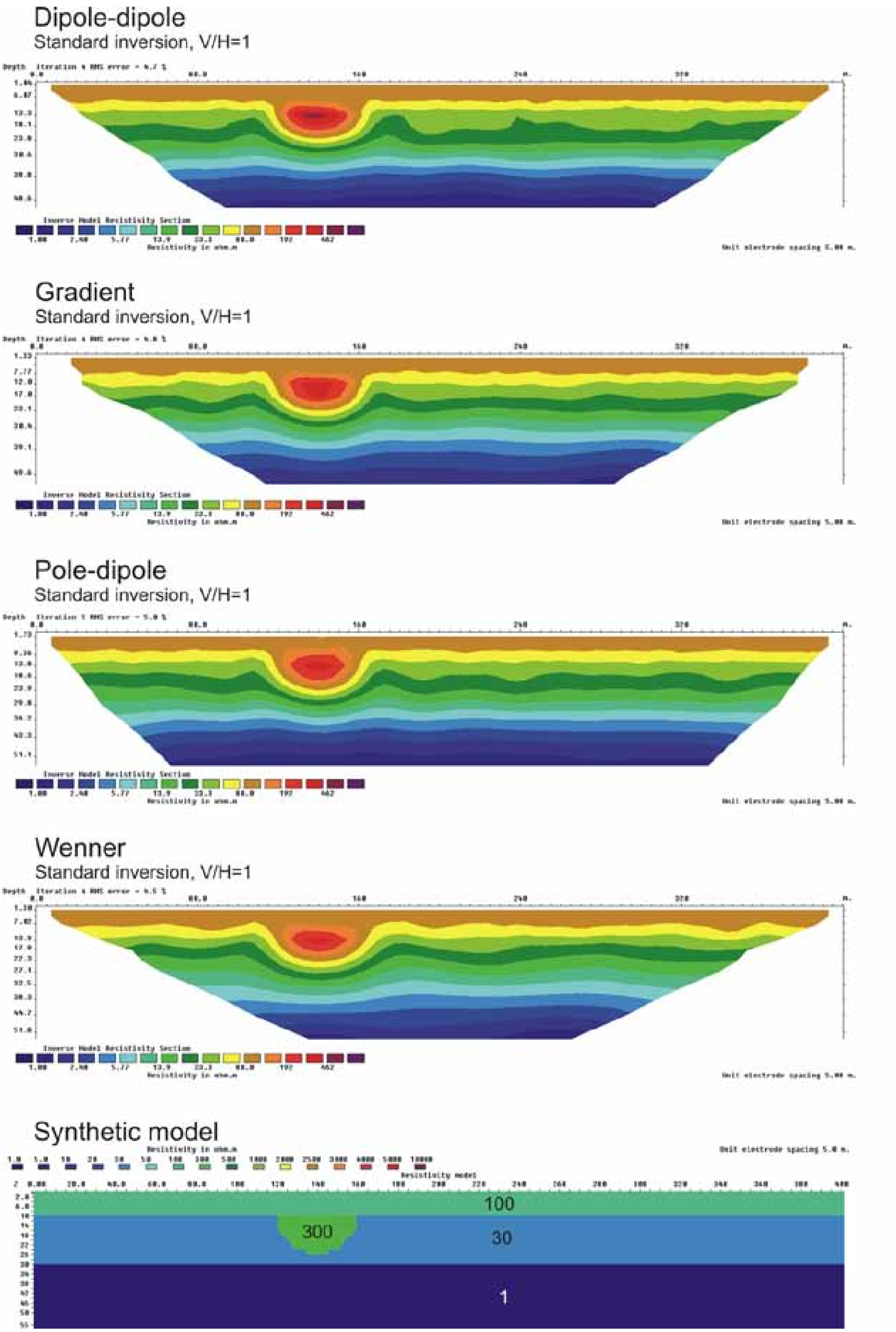

Figure 3.3.9: 10 m of slide deposits (100 Ωm) over horizontal layers of 30 Ωm, 1 Ωm and a lense of 300 Ωm. Standard inversion, V/H=1

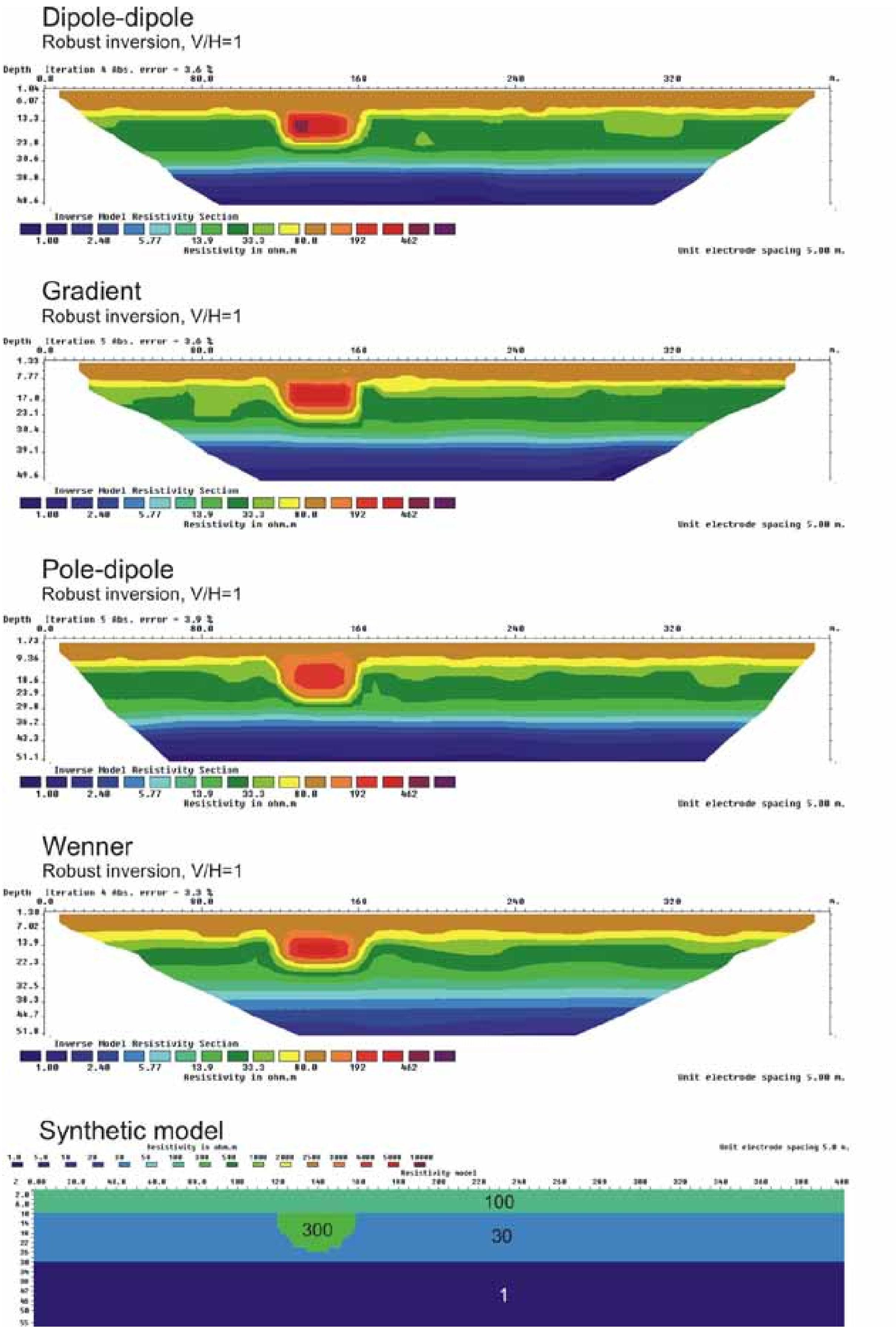

Figure 3.3.10: 10 m of slide deposits (100 Ωm) over horizontal layers of 30 Ωm, 1 Ωm and a lense of 300Ωm. Robust inversion, V/H=1

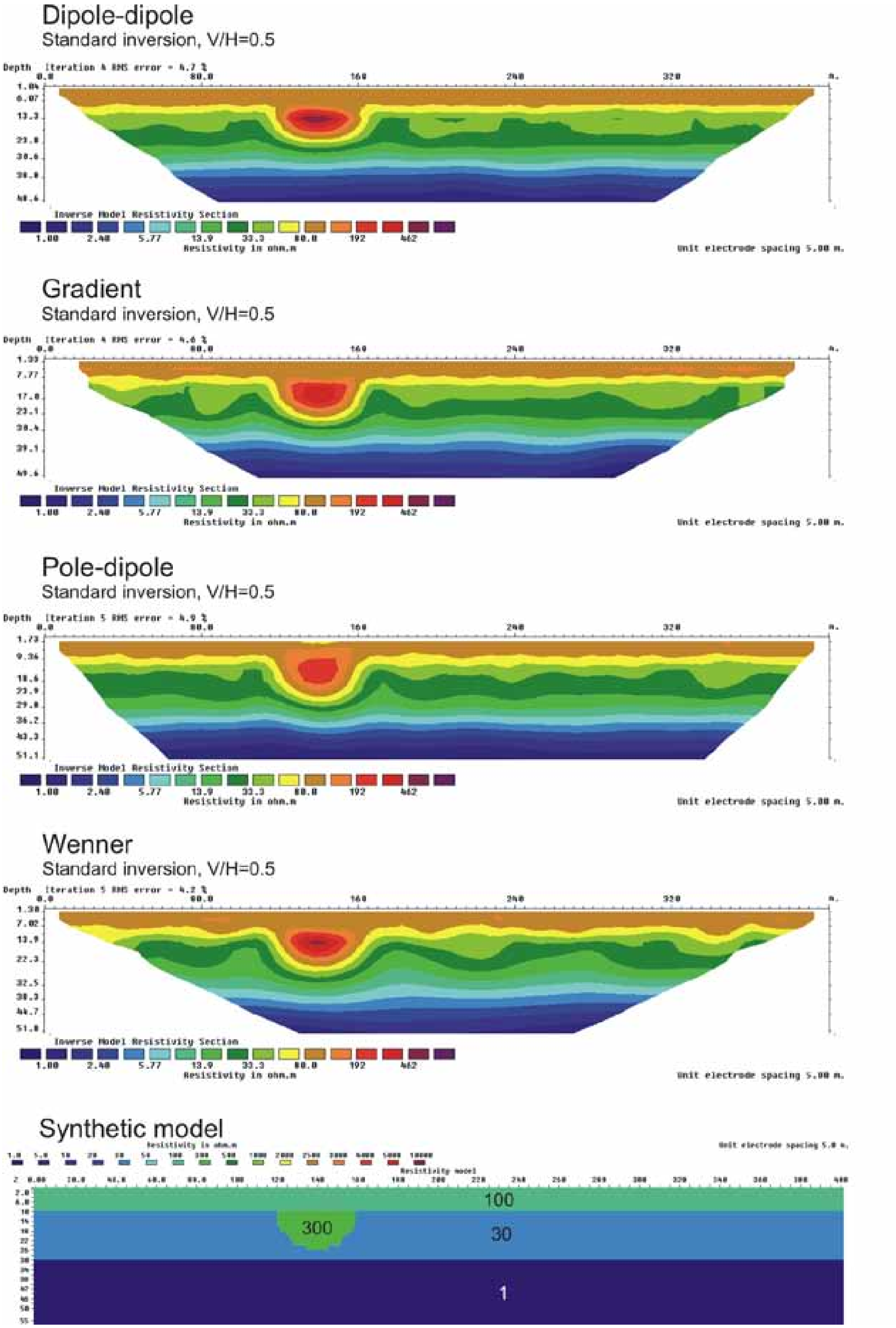

Figure 3.3.11: 10 m of slide deposits (100 Ωm) over horizontal layers of 30 Ωm, 1 Ωm and a lense of 300Ωm. Standard inversion, V/H=0.5

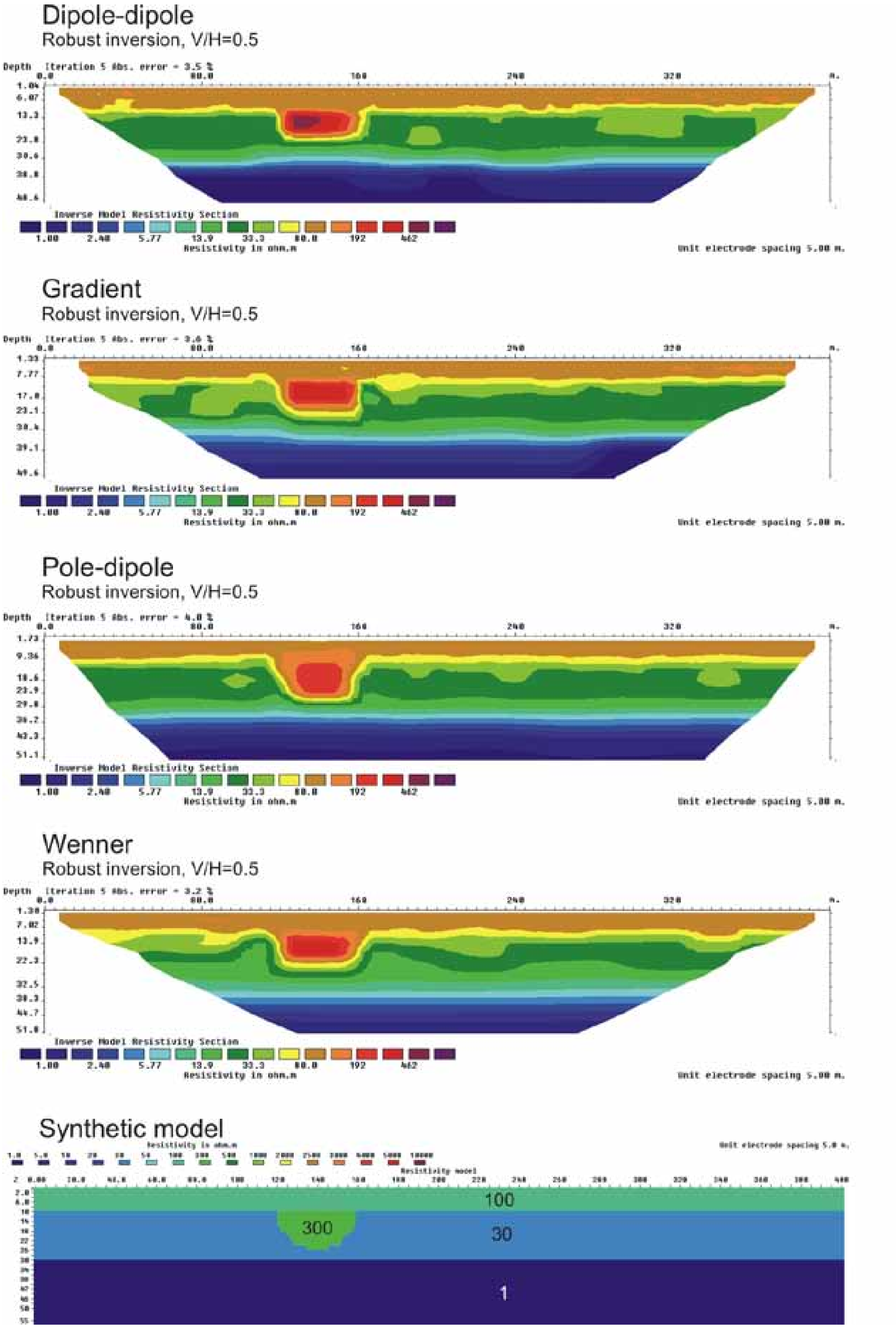

Figure 3.3.12: 10 m of slide deposits (100 Ωm) over horizontal layers of 30 Ωm, 1 Ωm and a lense of 300Ωm. Robust inversion, V/H=0.5

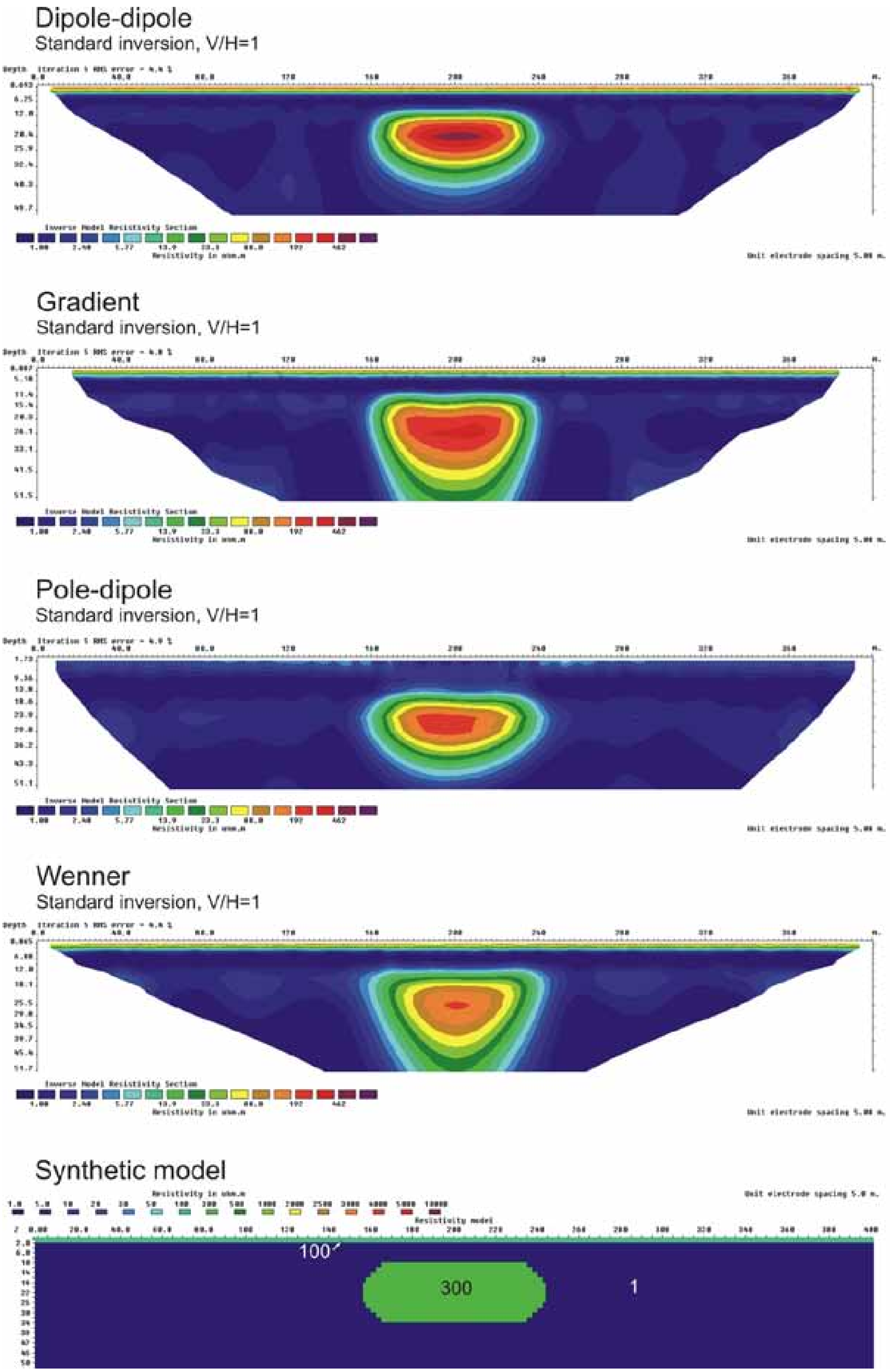

Figure 3.3.13: 2 m top layer (100 Ωm) over 1 Ωm and a lense (90 m x 24 m) of 300 Ωm in a depth of ~25 m. Standard inversion, V/H=1

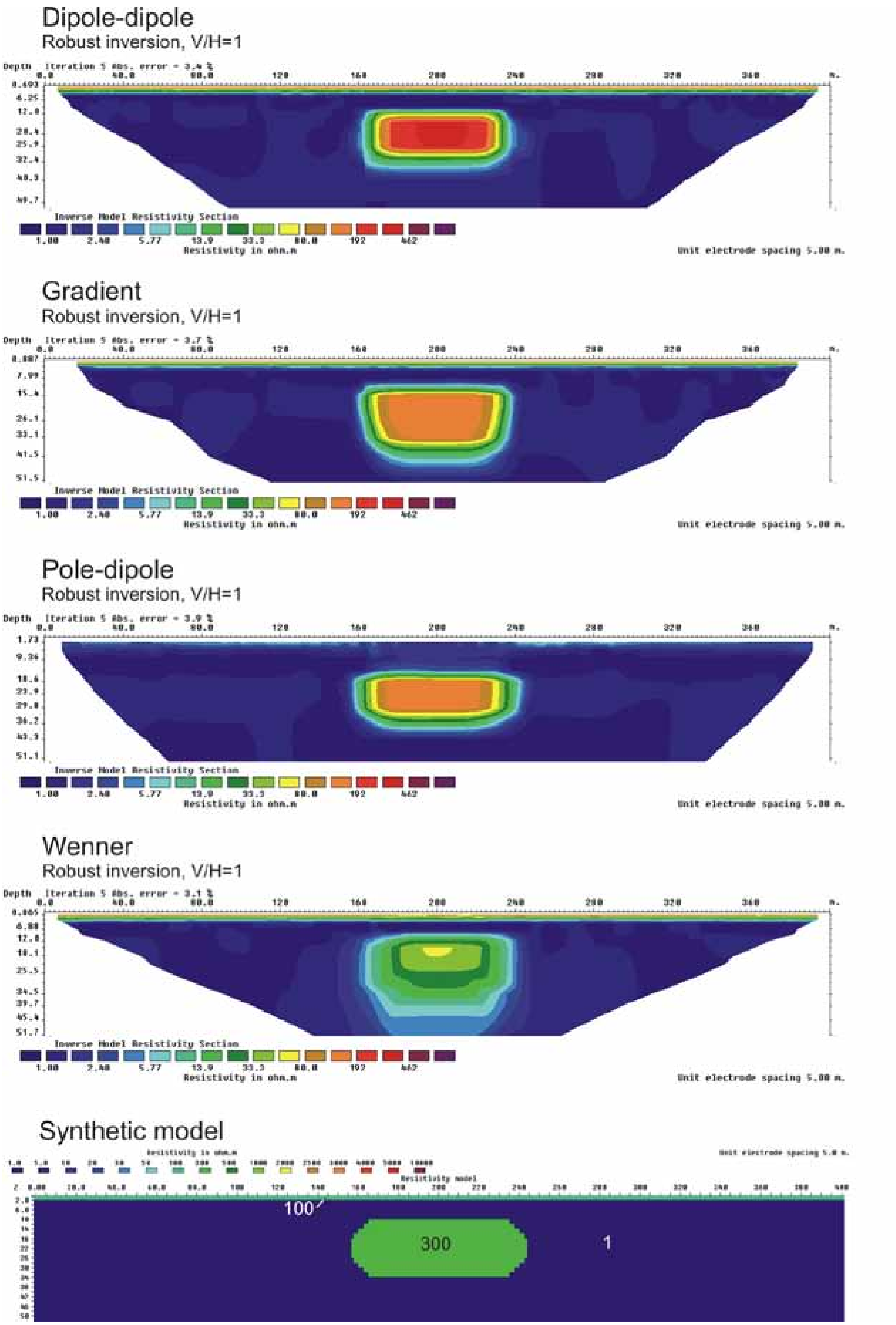

Figure 3.3.14: 2 m top layer (100 Ωm) over 1 Ωm and a lense (90 m x 24 m) of 300 Ωm in a depth of ~25 m. Robust inversion, V/H=1

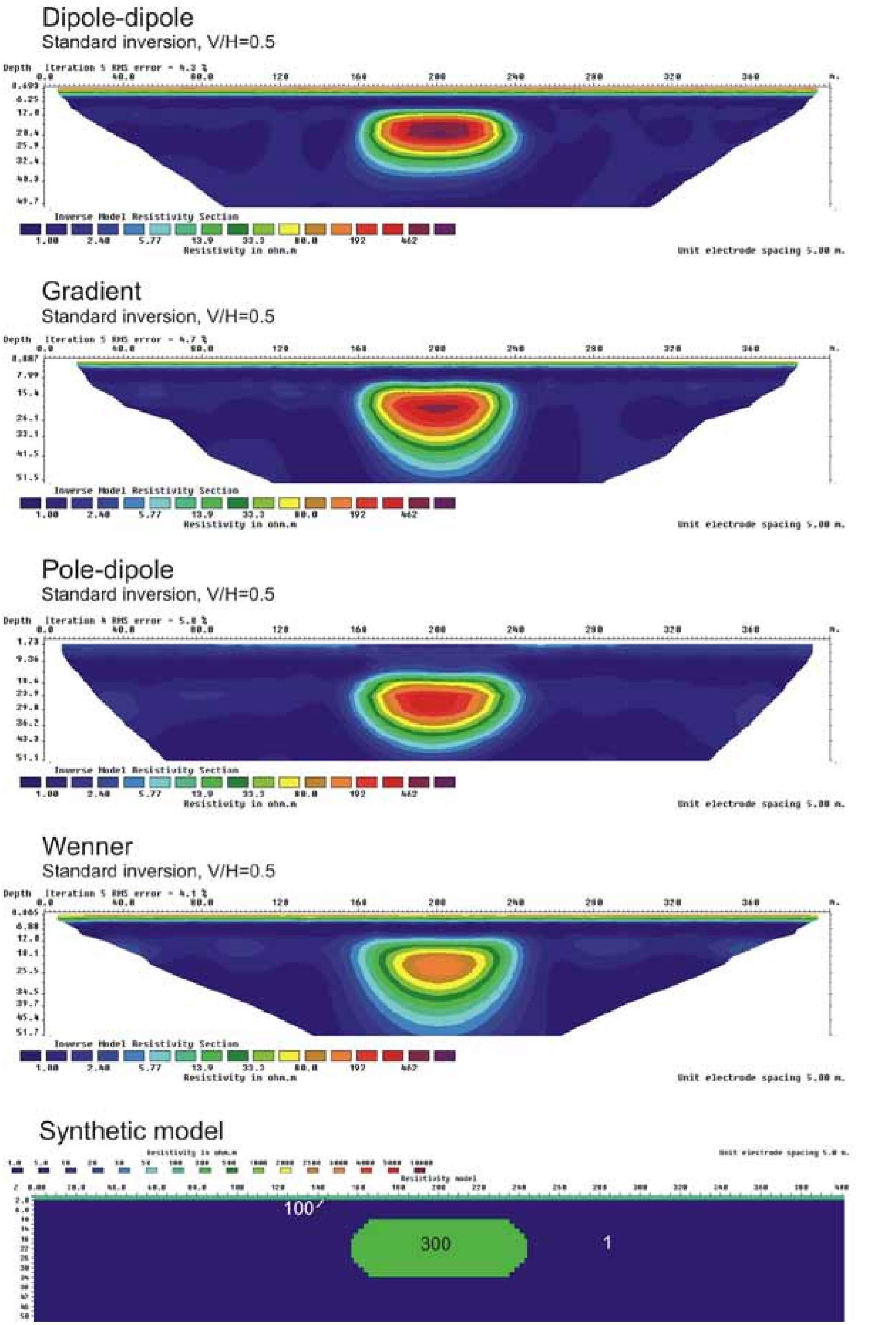

Figure 3.3.15: 2 m top layer (100 Ωm) over 1 Ωm and a lense (90 m x 24 m) of 300 Ωm in a depth of ~25 m. Standard inversion, V/H=0.5

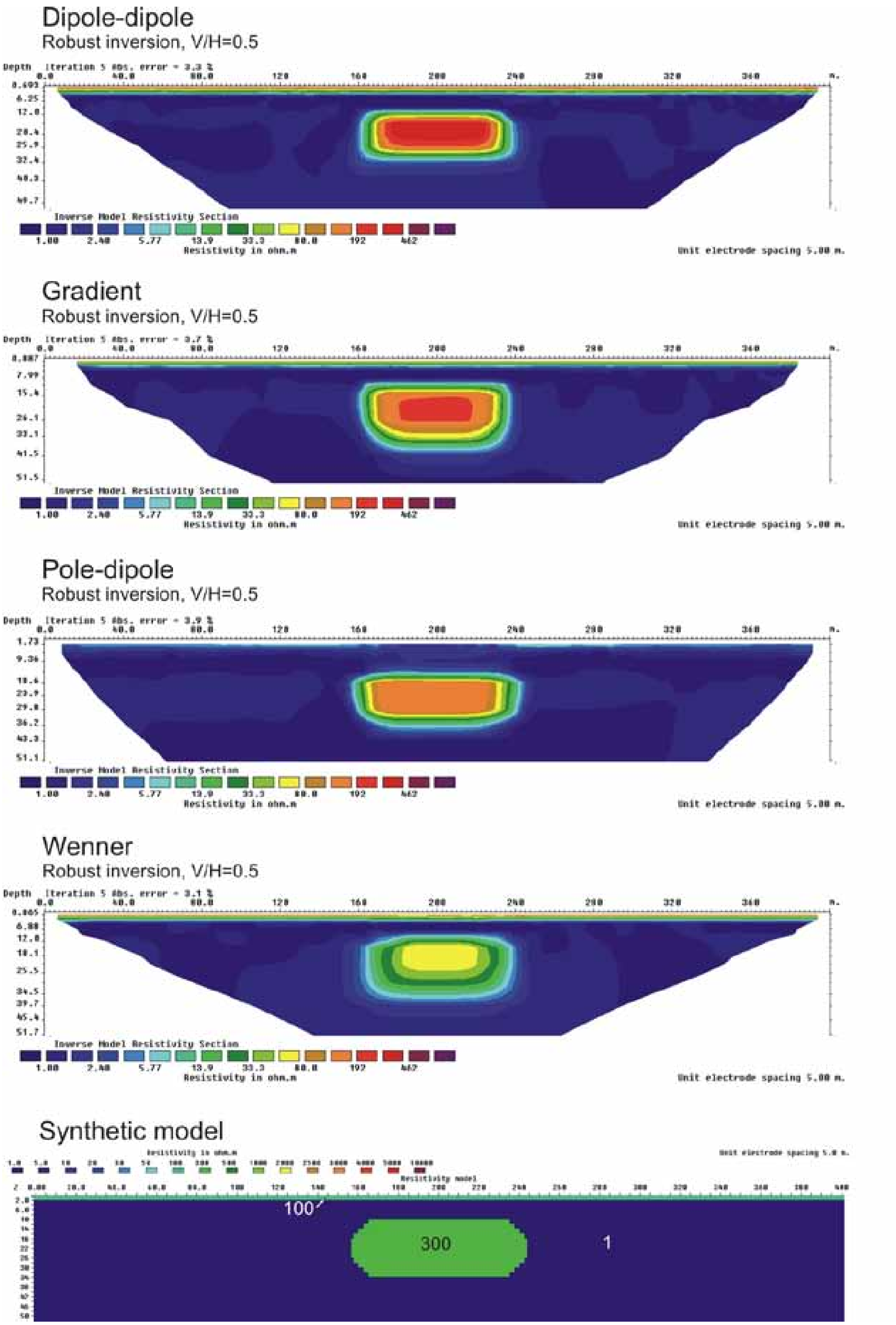

Figure 3.3.16: 2 m top layer (100 Ωm) over 1 Ωm and a lense (90 m x 24 m) of 300 Ωm in a depth of ~25 m. Robust inversion, V/H=0.5

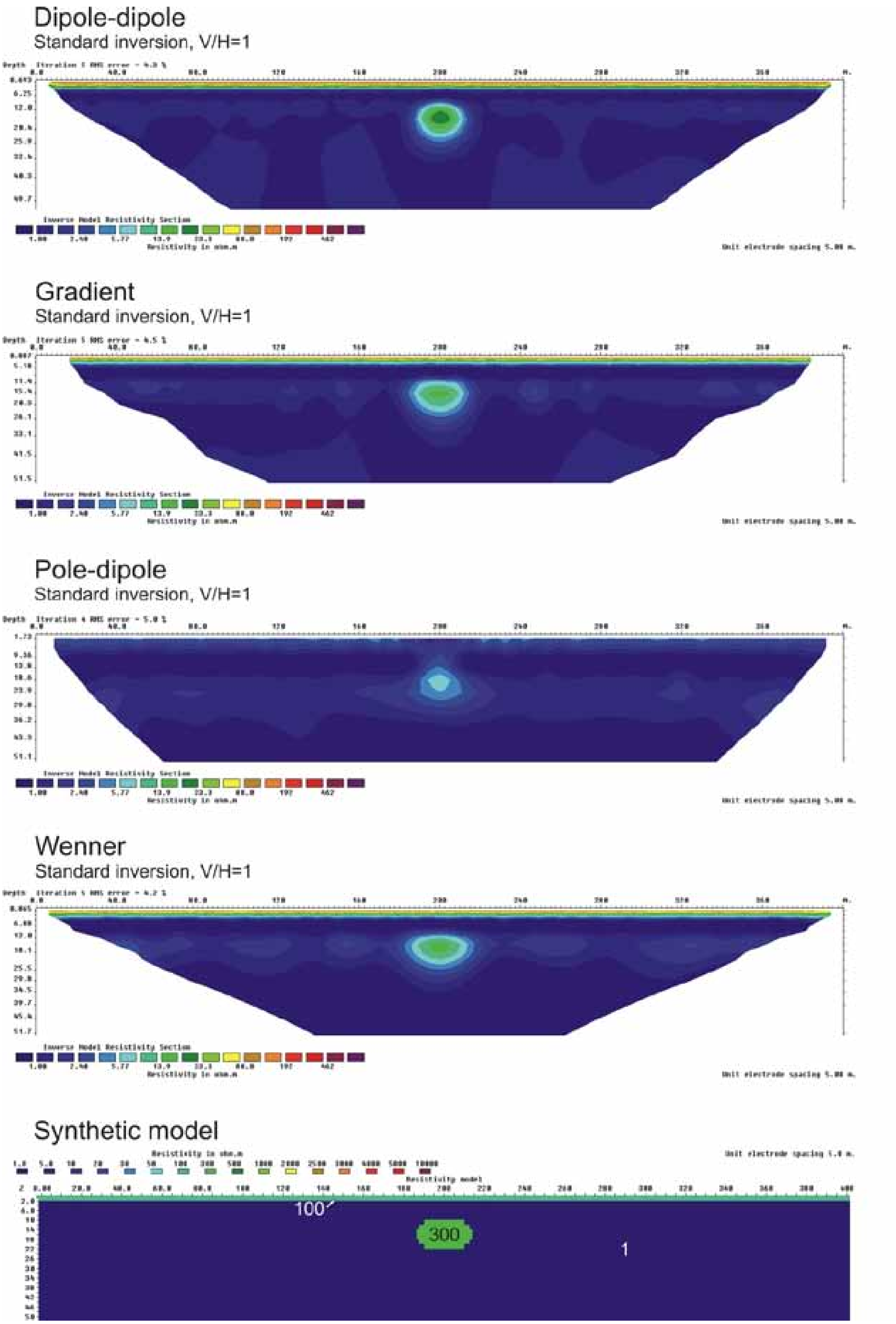

Figure 3.3.17: 2 m top layer (100 Ωm) over 1 Ωm and a lense (30 m x 12 m) of 300 Ωm in a depth of ~15 m. Standard inversion, V/H=1

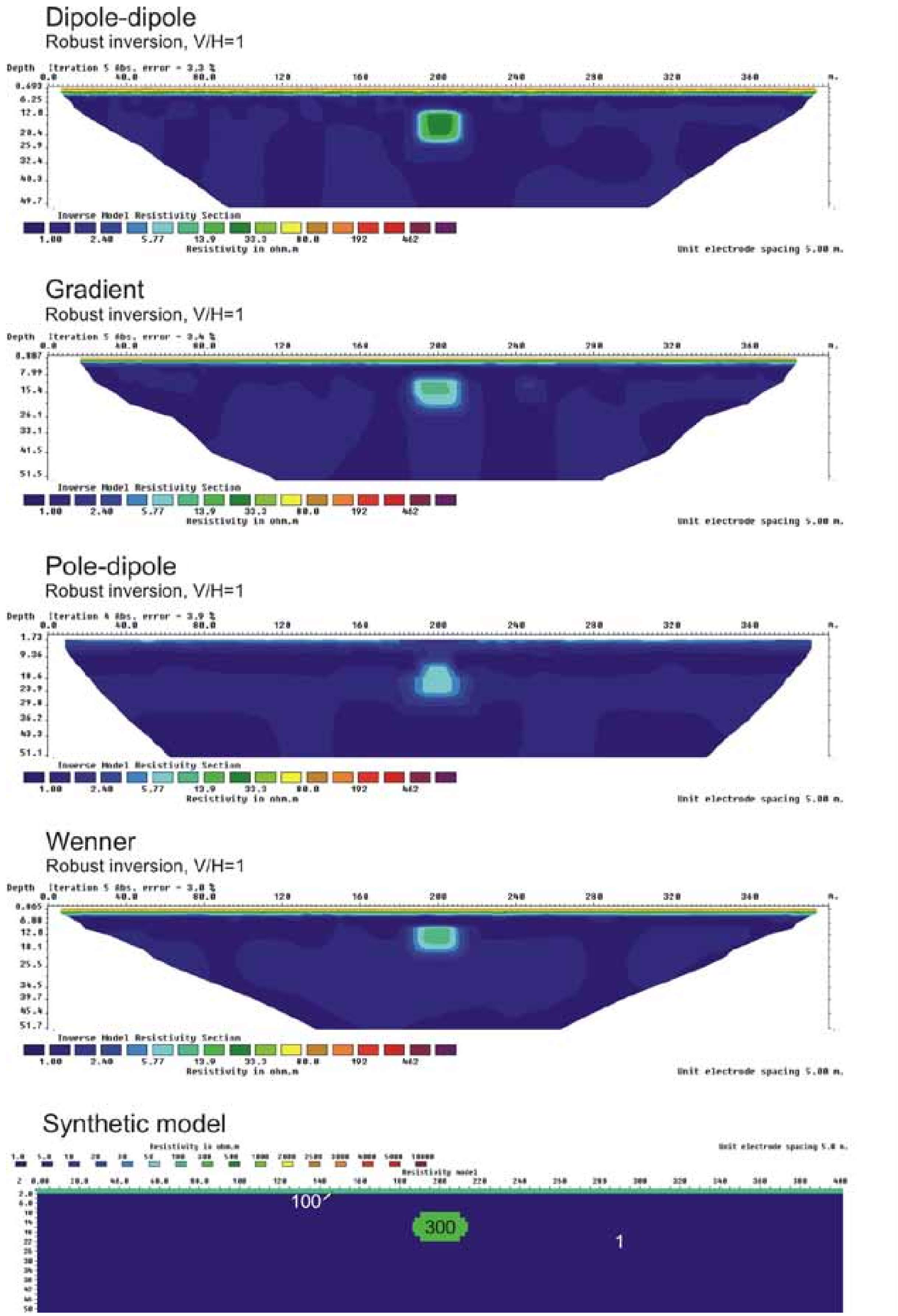

Figure 3.3.18: 2 m top layer (100 Ωm) over 1 Ωm and a lense (30 m x 12 m) of 300 Ωm in a depth of ~15 m. Robust inversion, V/H=1

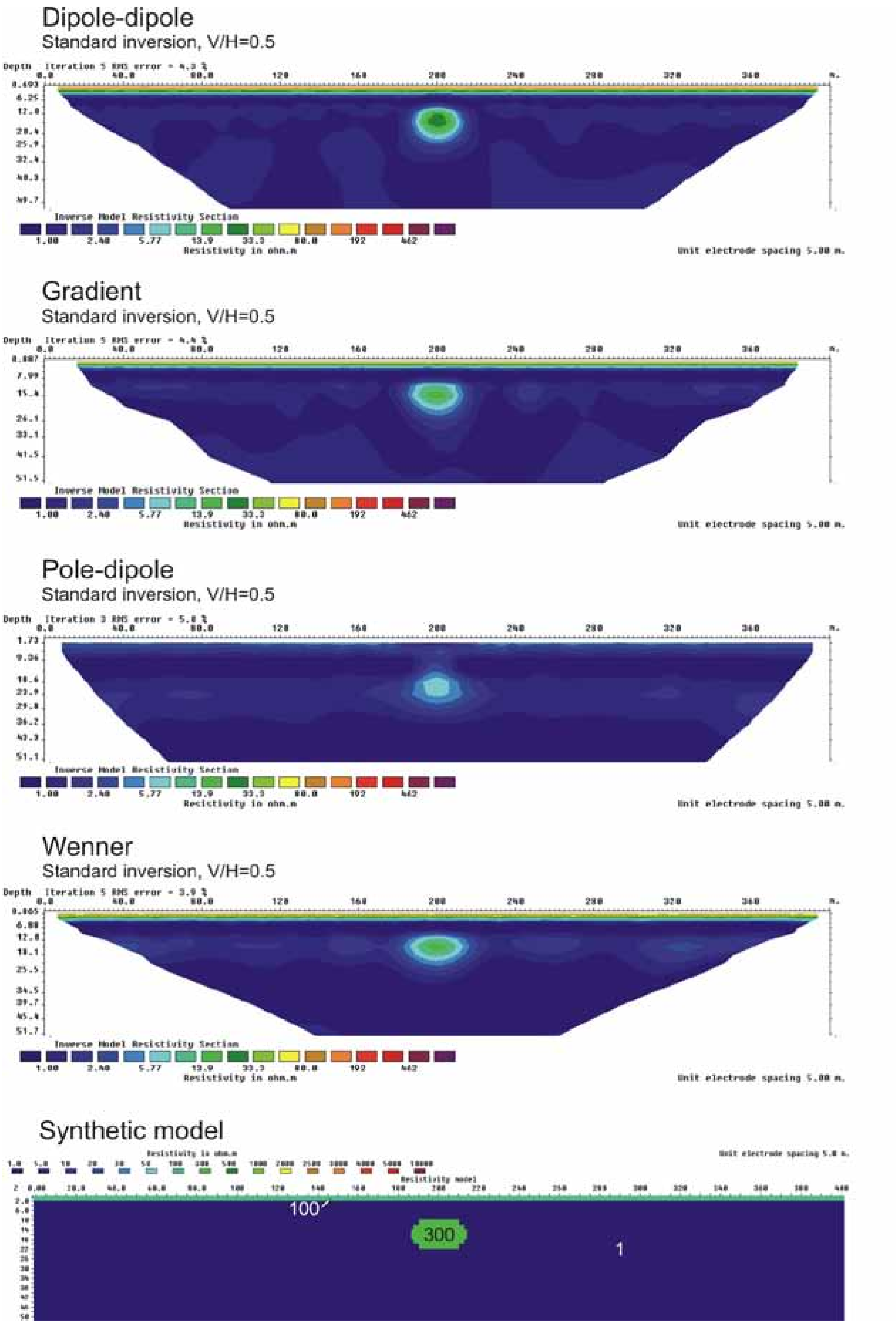

Figure 3.3.19: 2 m top layer (100 Ωm) over 1 Ωm and a lense (30 m x 12 m) of 300 Ωm in a depth of ~15 m. Standard inversion, V/H=0.5

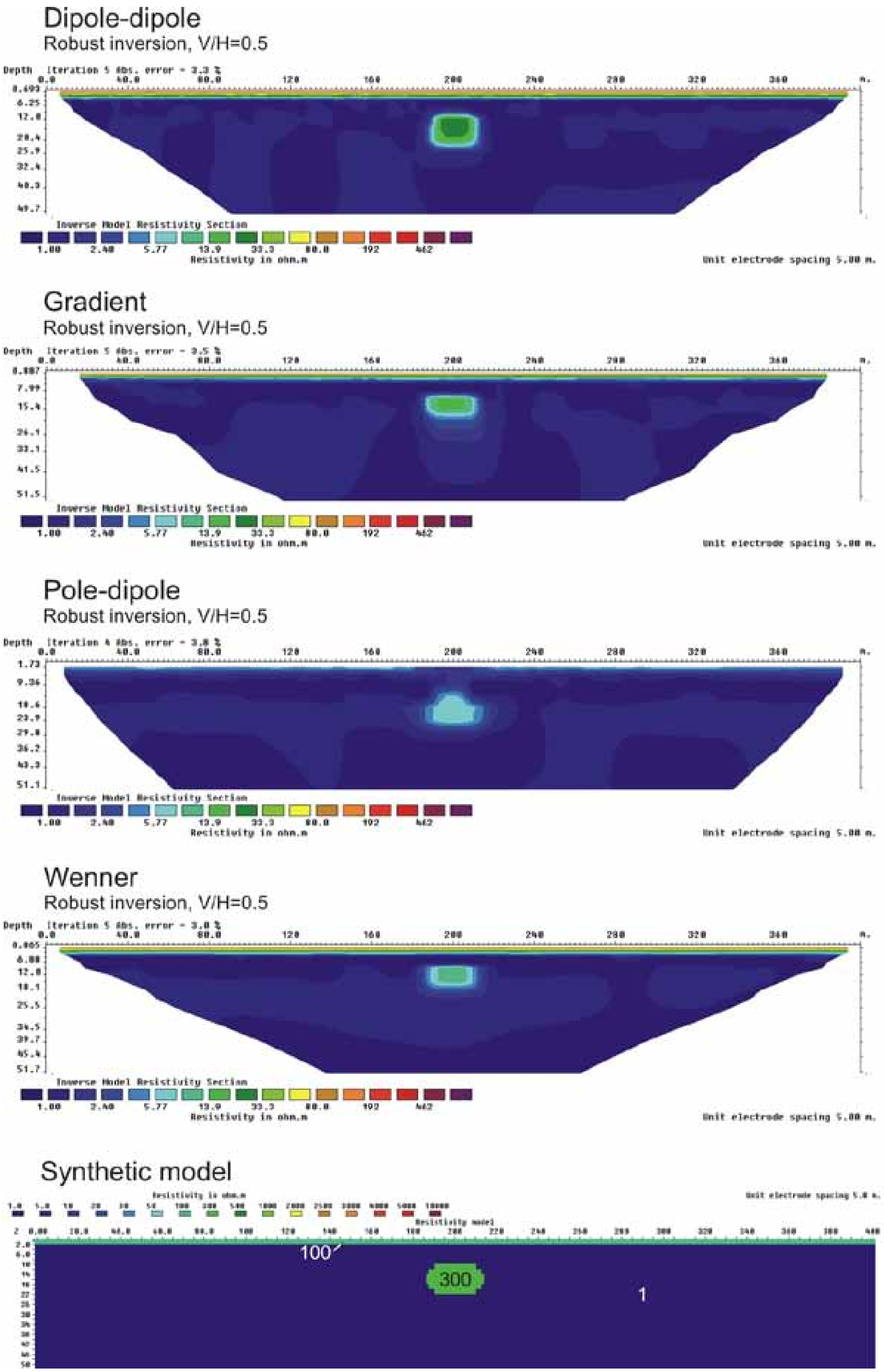

Figure 3.3.20: 2 m top layer (100 Ωm) over 1 Ωm and a lense (30 m x 12 m) of 300 Ωm in a depth of ~15 m. Robust inversion, V/H=0.5

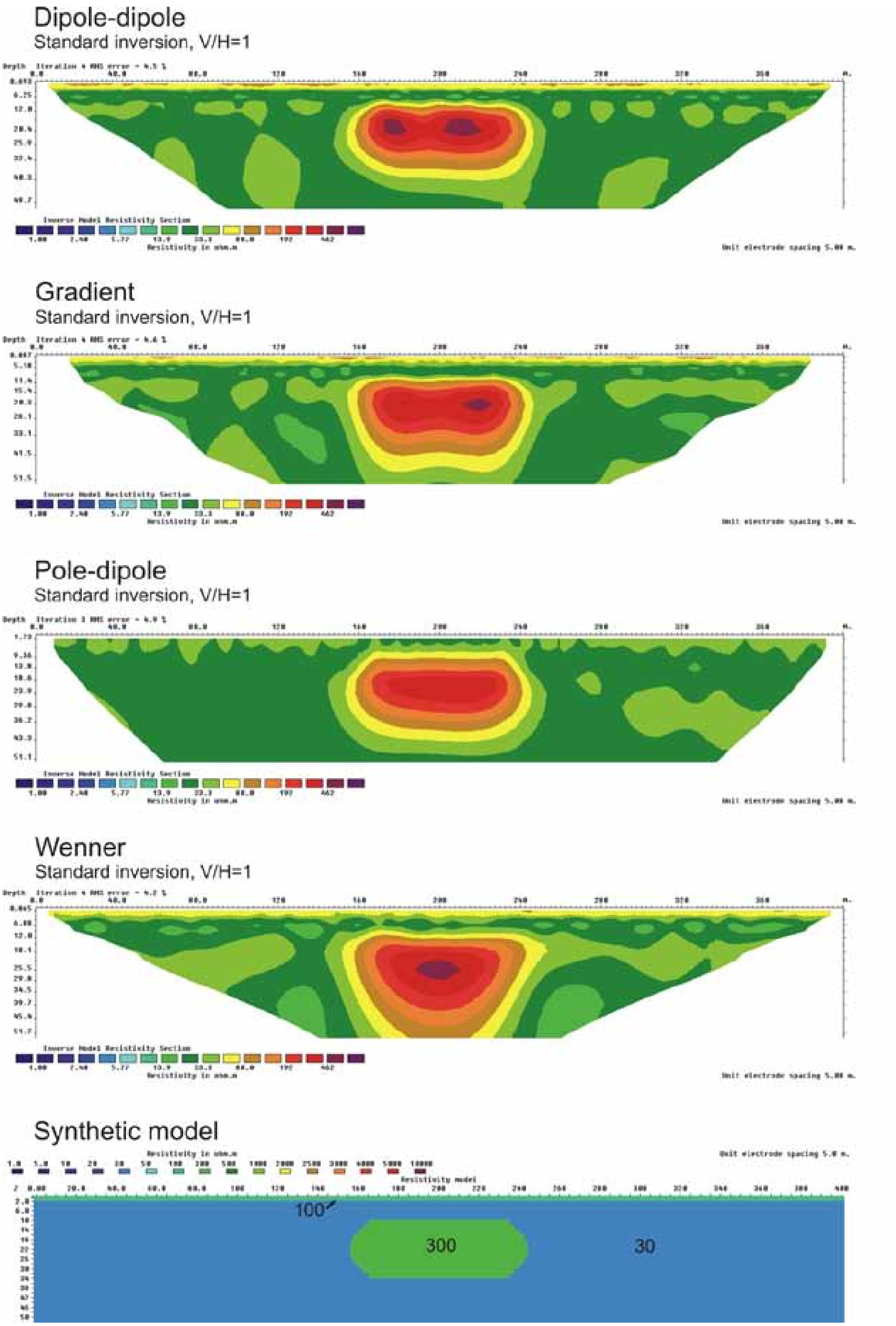

Figure 3.3.21: 2 m top layer (100 Ωm) over 30 Ωm and a lense (90 m x 24 m) of 300 Ωm in a depth of ~25 m. Standard inversion, V/H=1

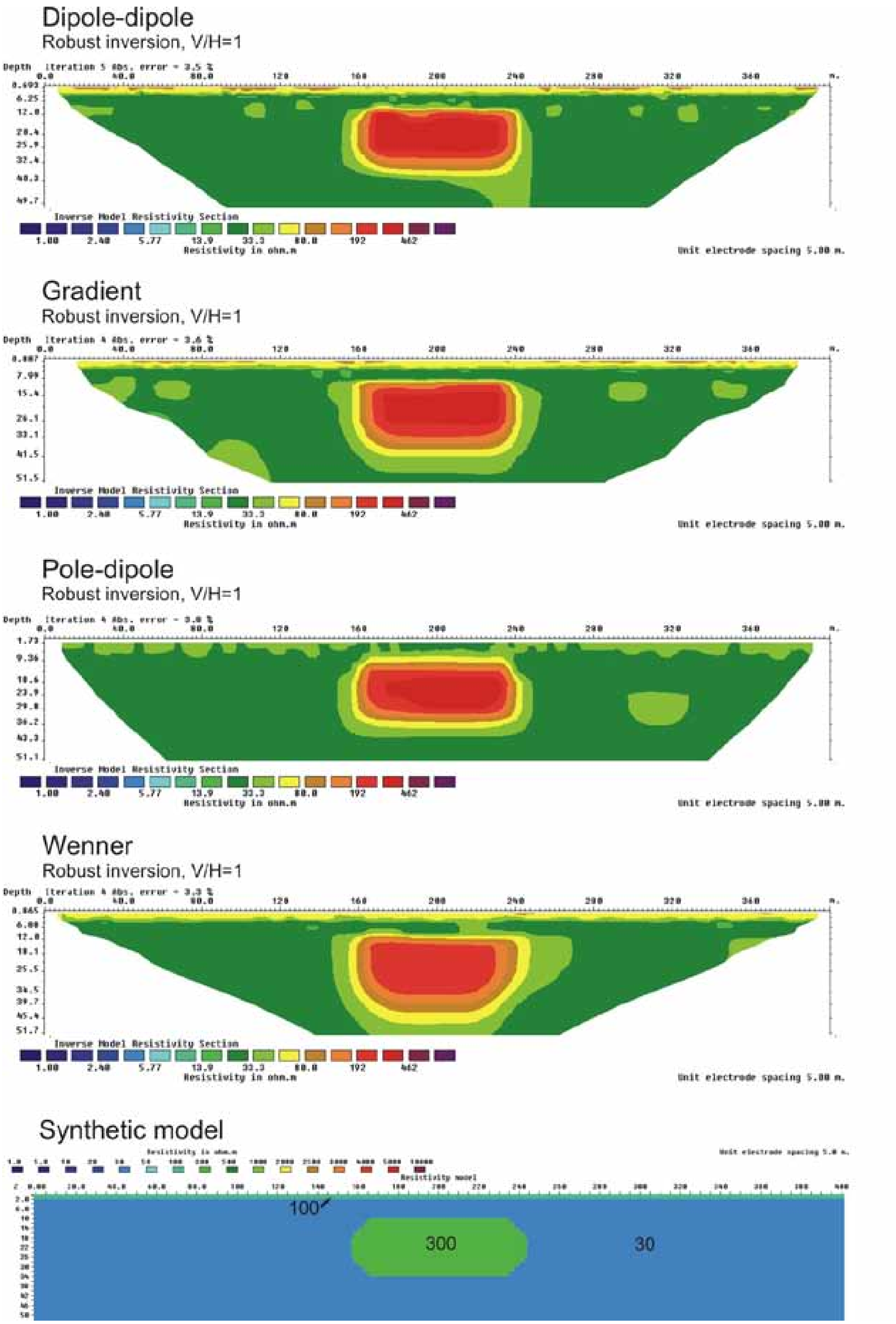

Figure 3.3.22: 2 m top layer (100 Ωm) over 30 Ωm and a lense (90 m x 24 m) of 300 Ωm in a depth of ~25 m. Robust inversion, V/H=1

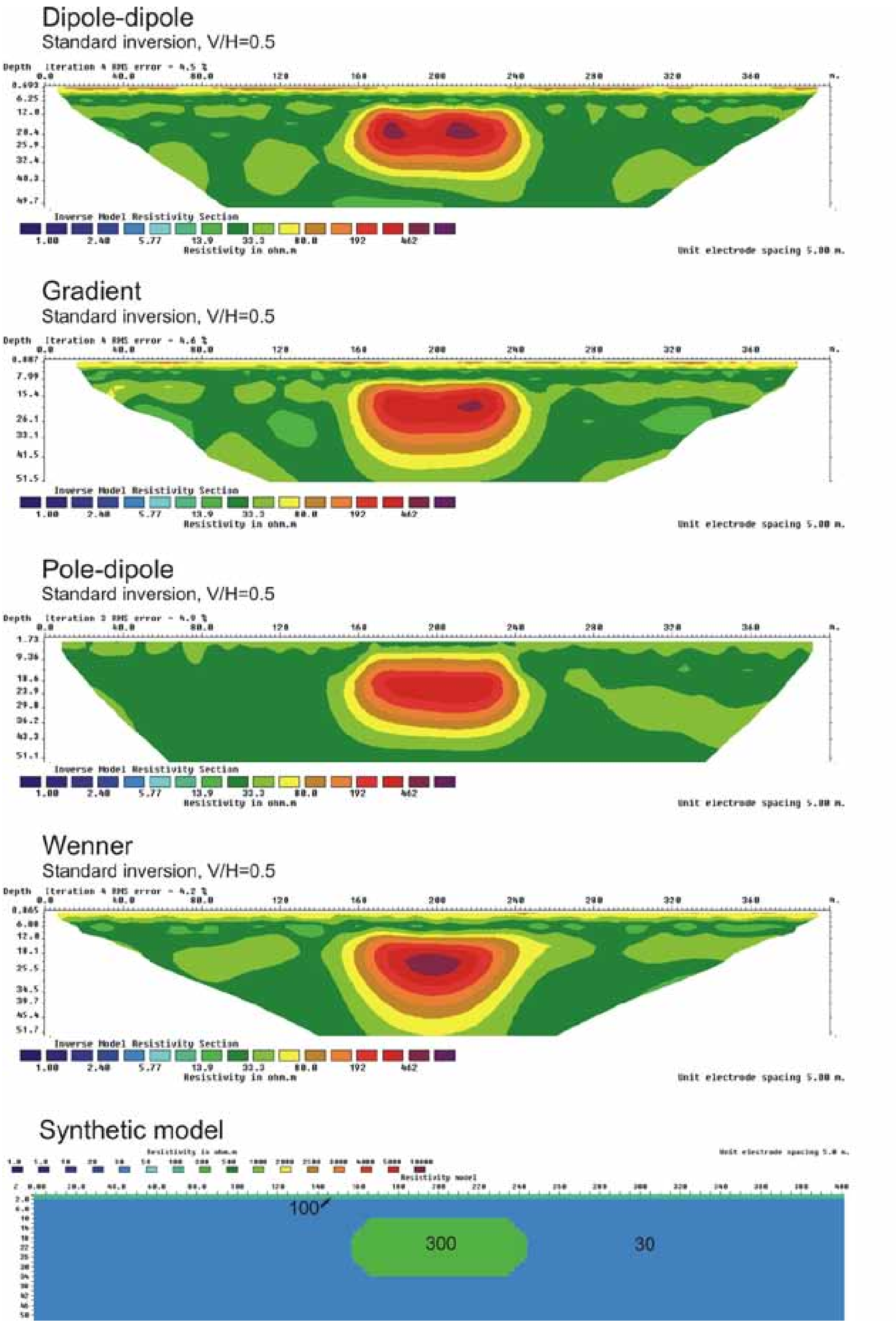

Figure 3.3.23: 2 m top layer (100 Ωm) over 30 Ωm and a lense (90 m x 24 m) of 300 Ωm in a depth of ~25 m. Standard inversion, V/H=0.5

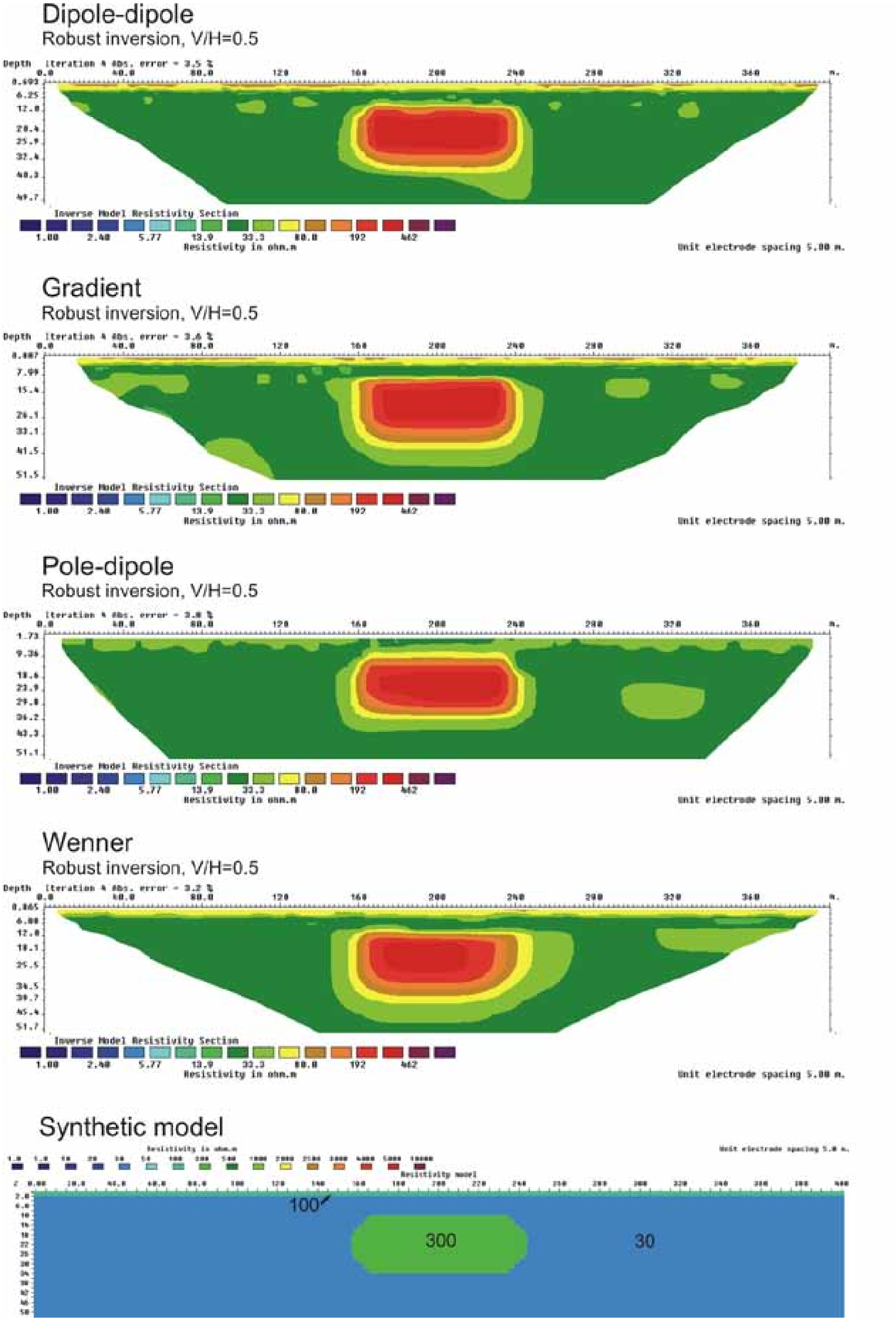

Figure 3.3.24: 2 m top layer (100 Ωm) over 30 Ωm and a lense (90 m x 24 m) of 300 Ωm in a depth of ~25 m. Robust inversion, V/H=0.5

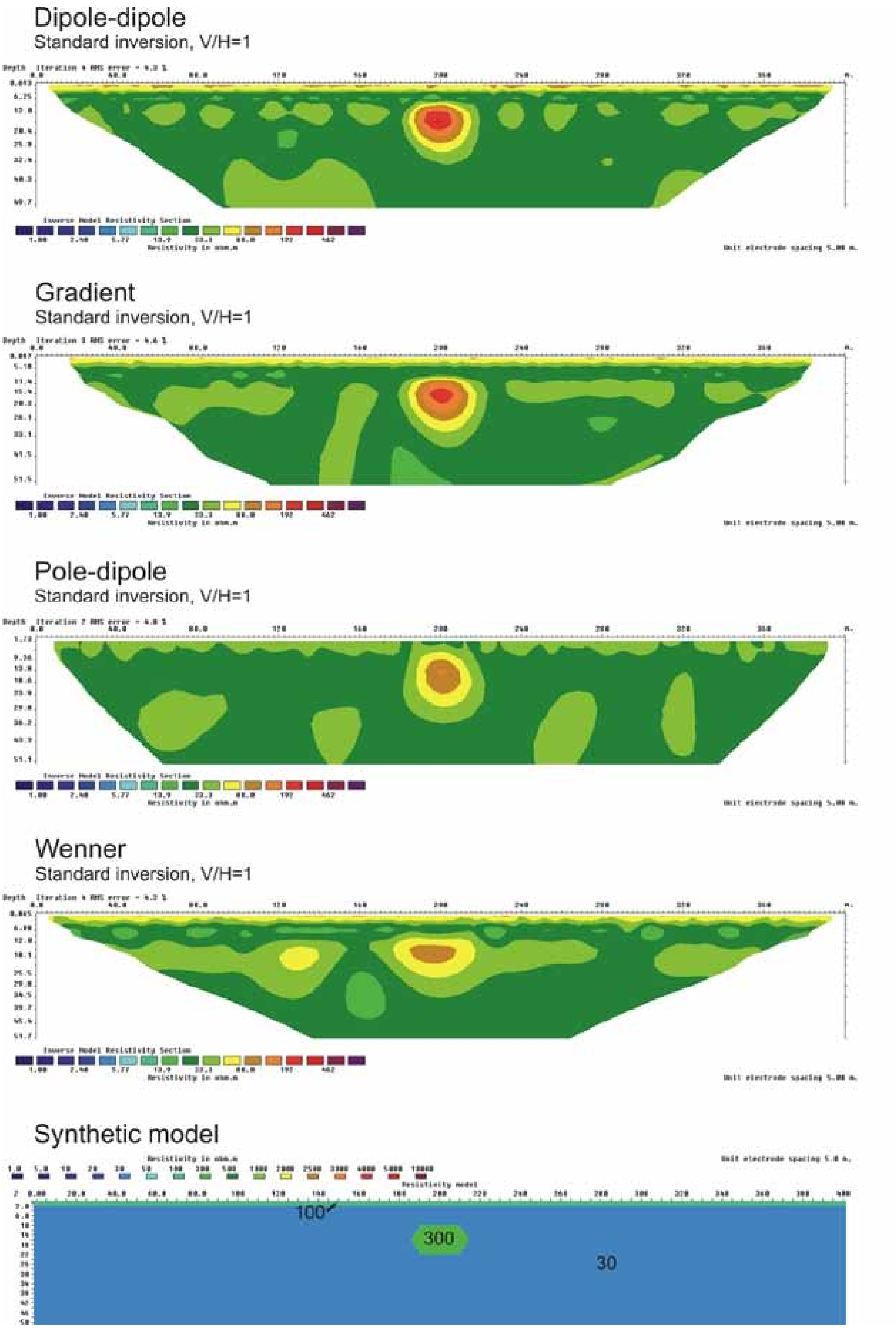

Figure 3.3.25: 2 m top layer (100 Ωm) over 30 Ωm and a lense (30 m x 12 m) of 300 Ωm in a depth of ~15 m. Standard inversion, V/H=1

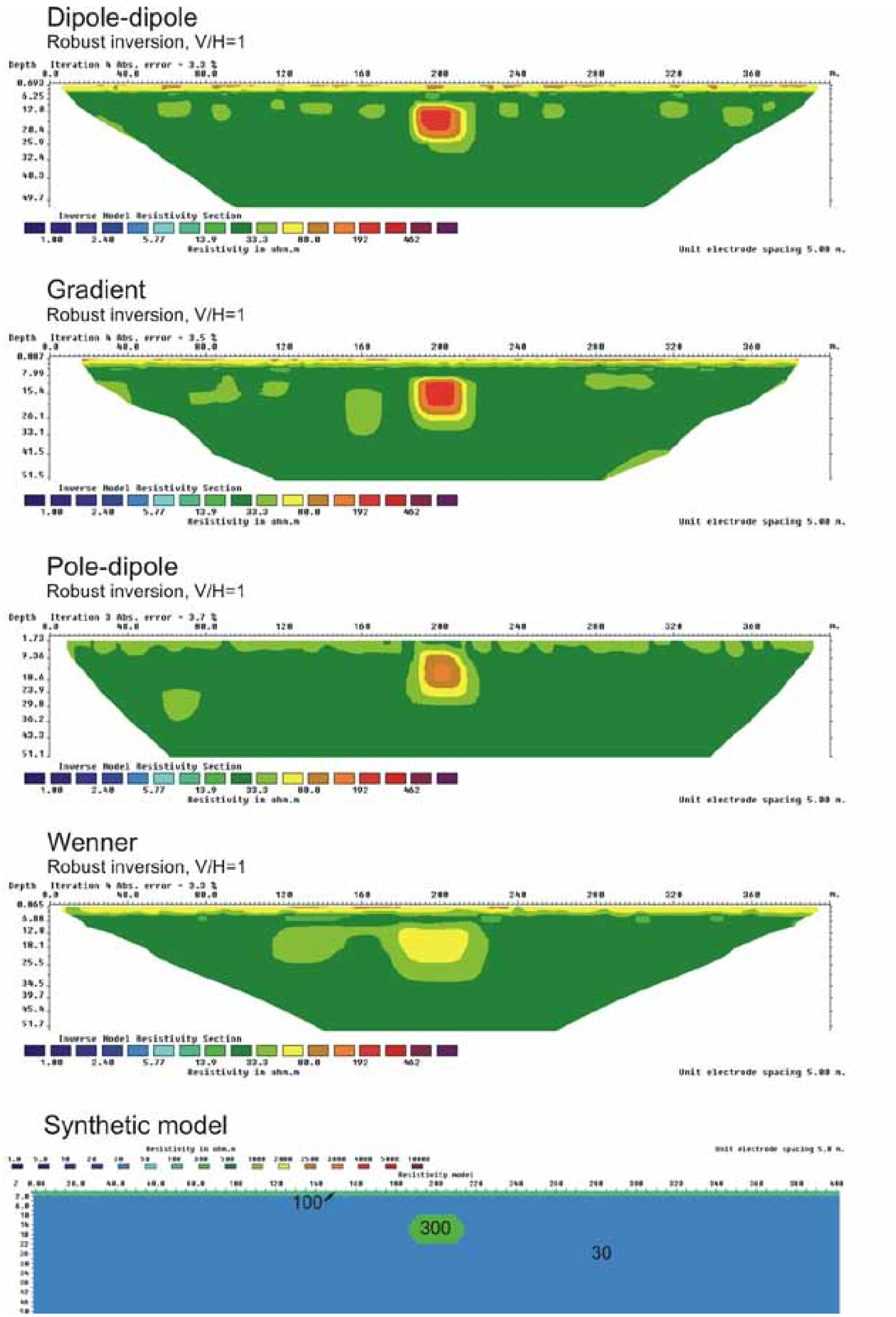

Figure 3.3.26: 2 m top layer (100 Ωm) over 30 Ωm and a lense (30 m x 12 m) of 300 Ωm in a depth of ~15 m. Robust inversion, V/H=1

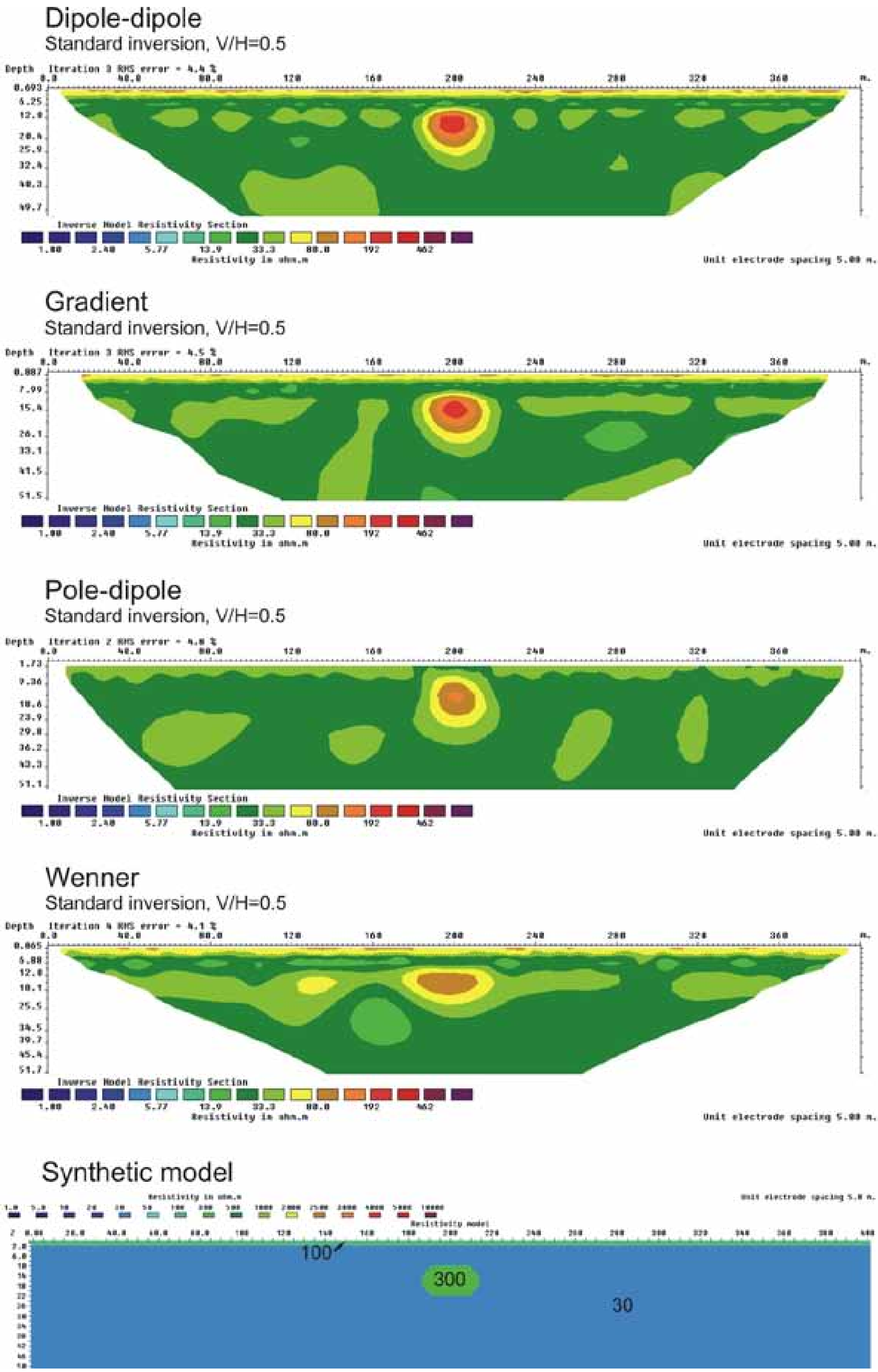

Figure 3.3.27: 2 m top layer (100 Ωm) over 30 Ωm and a lense (30 m x 12 m) of 300 Ωm in a depth of ~15 m. Standard inversion, V/H=0.5

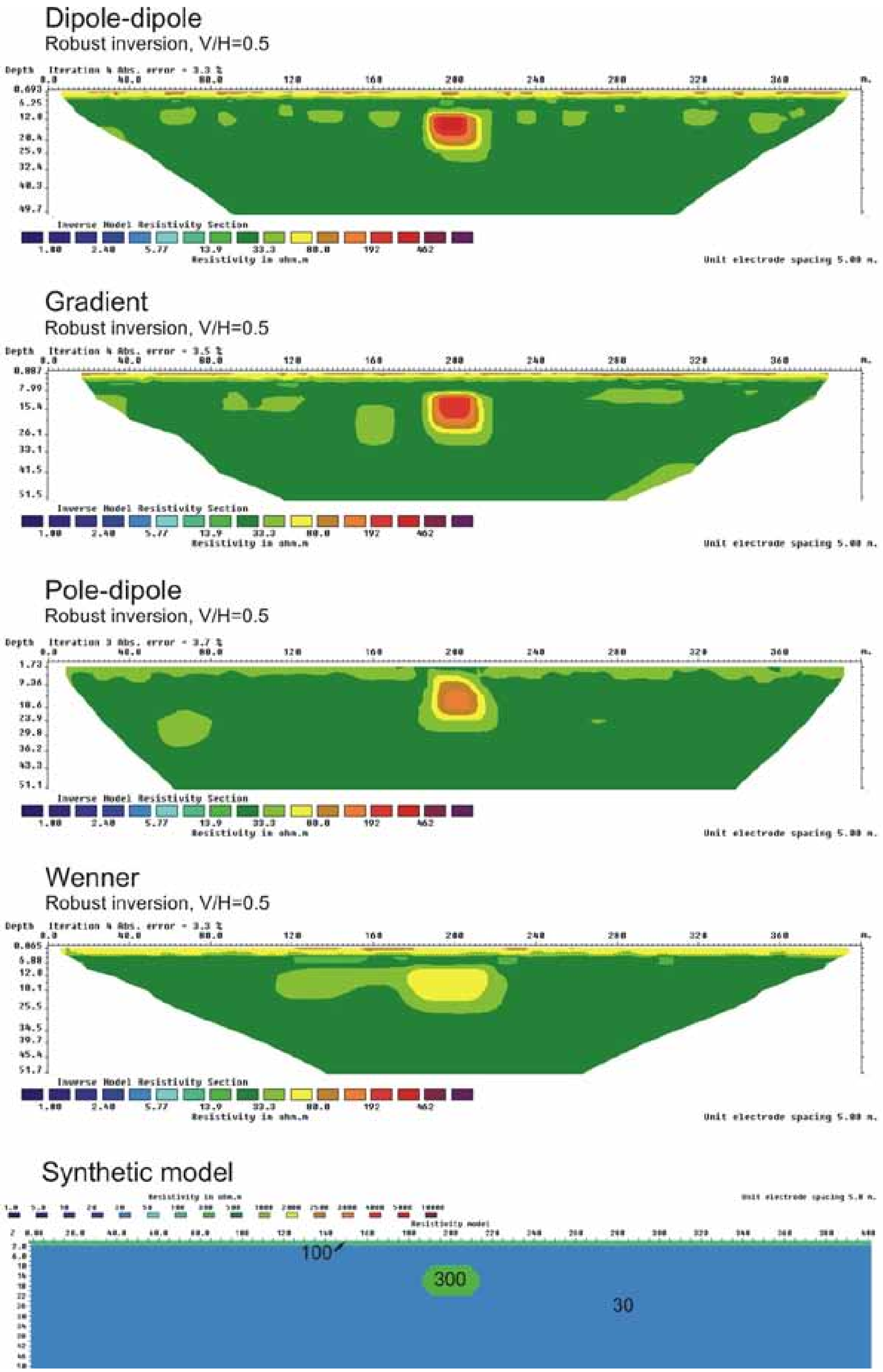

Figure 3.3.28: 2 m top layer (100 Ωm) over 30 Ωm and a lense (30 m x 12 m) of 300 Ωm in a depth of ~15 m. Robust inversion, V/H=0.5

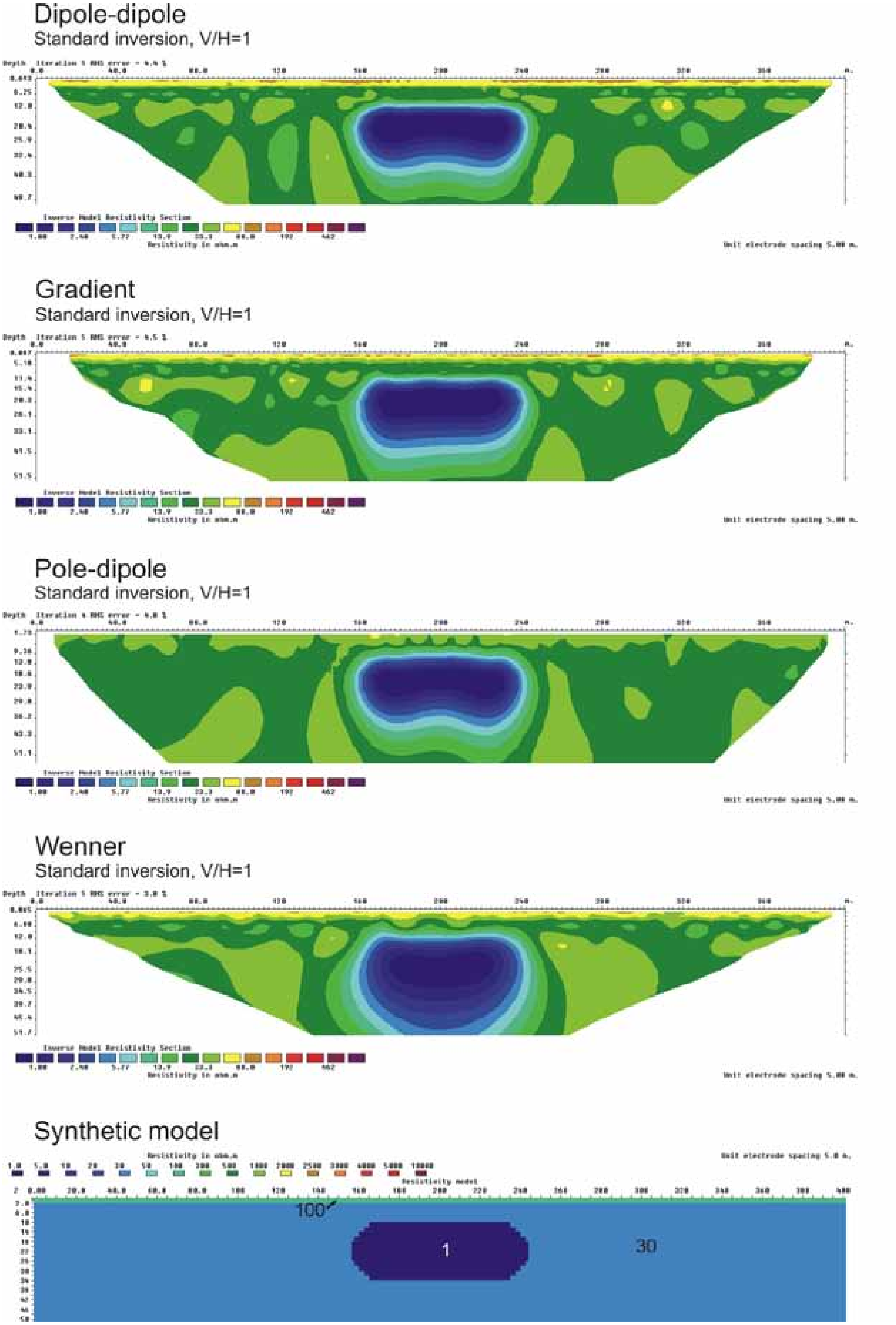

Figure 3.3.29: 2 m top layer (100 Ωm) over 30 Ωm and a lense (90 m x 24 m) of 1 Ωm in a depth of ~25 m. Standard inversion, V/H=1

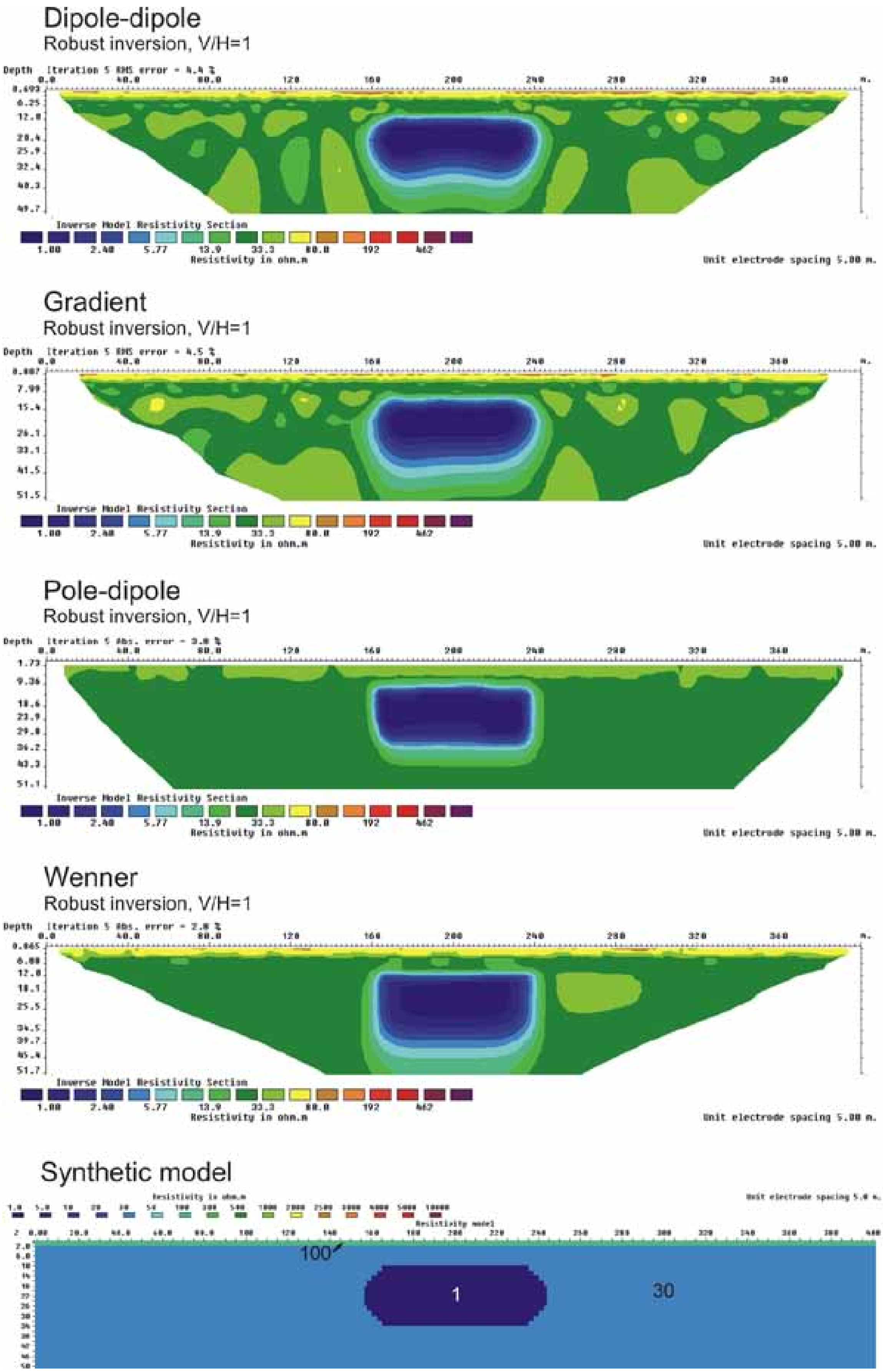

Figure 3.3.30: 2 m top layer (100 Ωm) over 30 Ωm and a lense (90 m x 24 m) of 1 Ωm in a depth of ~25 m. Robust inversion, V/H=1

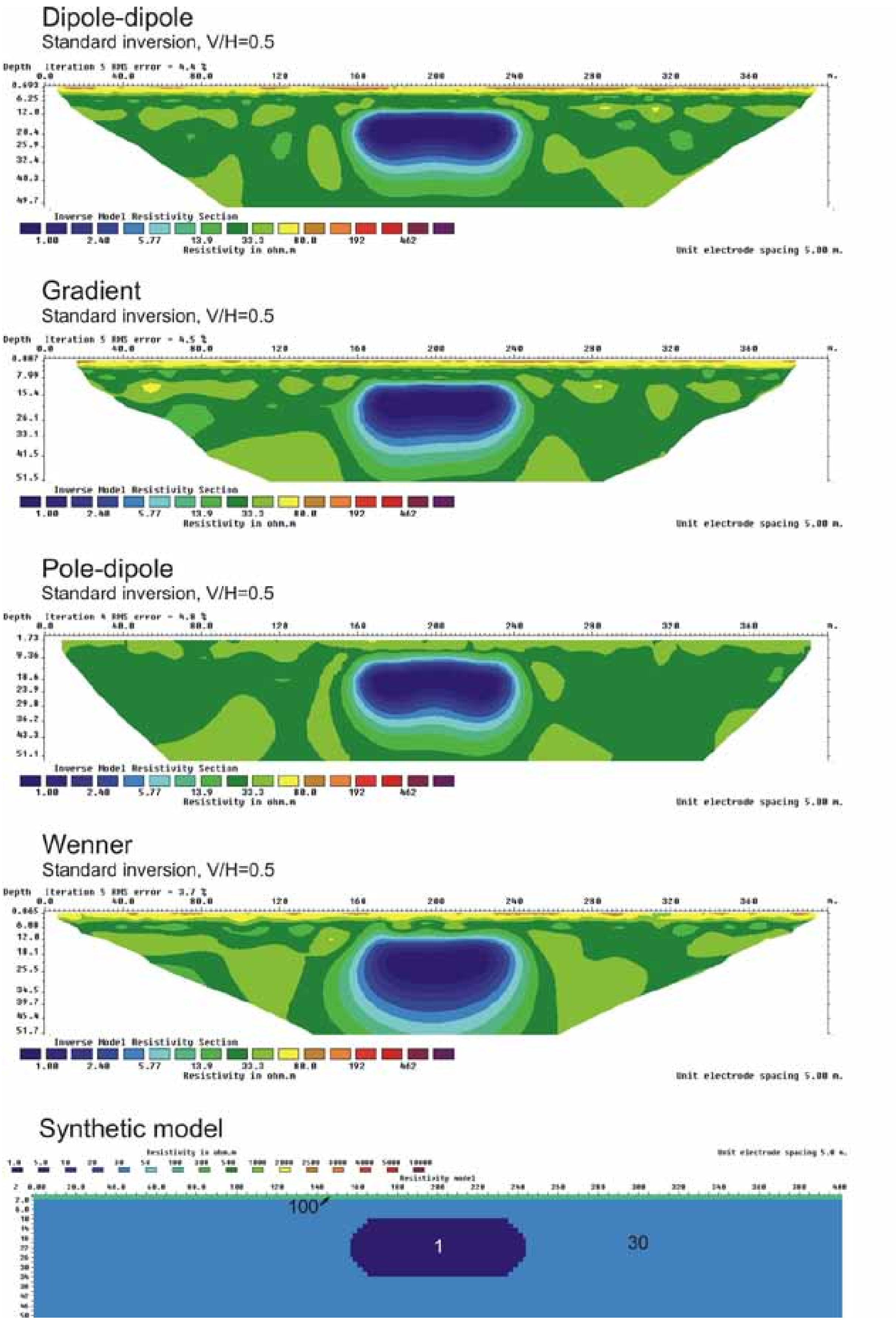

Figure 3.3.31: 2 m top layer (100 Ωm) over 30 Ωm and a lense (90 m x 24 m) of 1 Ωm in a depth of ~25 m. Standard inversion, V/H=0.5

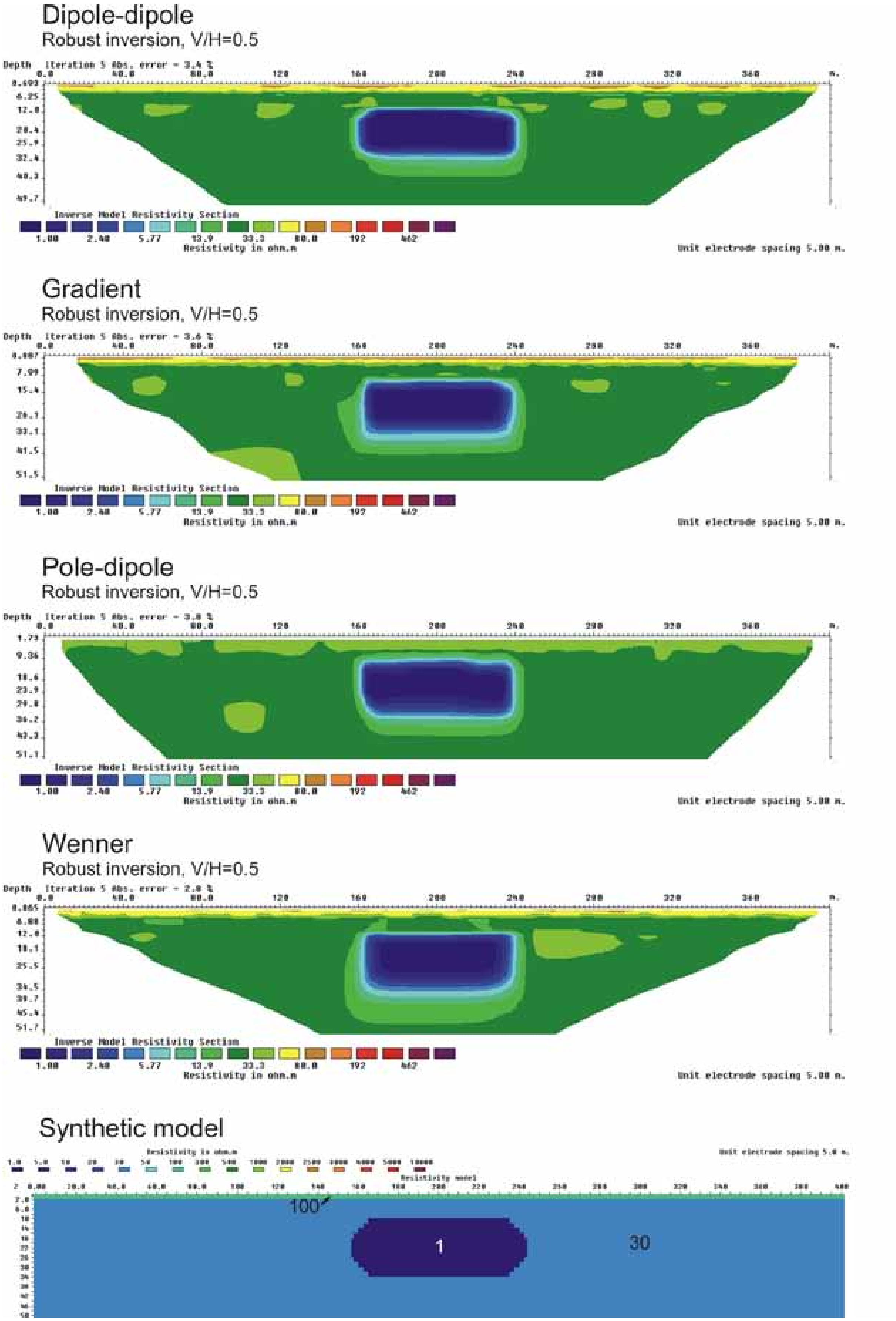

Figure 3.3.32: 2 m top layer (100 Ωm) over 30 Ωm and a lense (90 m x 24 m) of 1 Ωm in a depth of ~25 m. Robust inversion, V/H=0.5

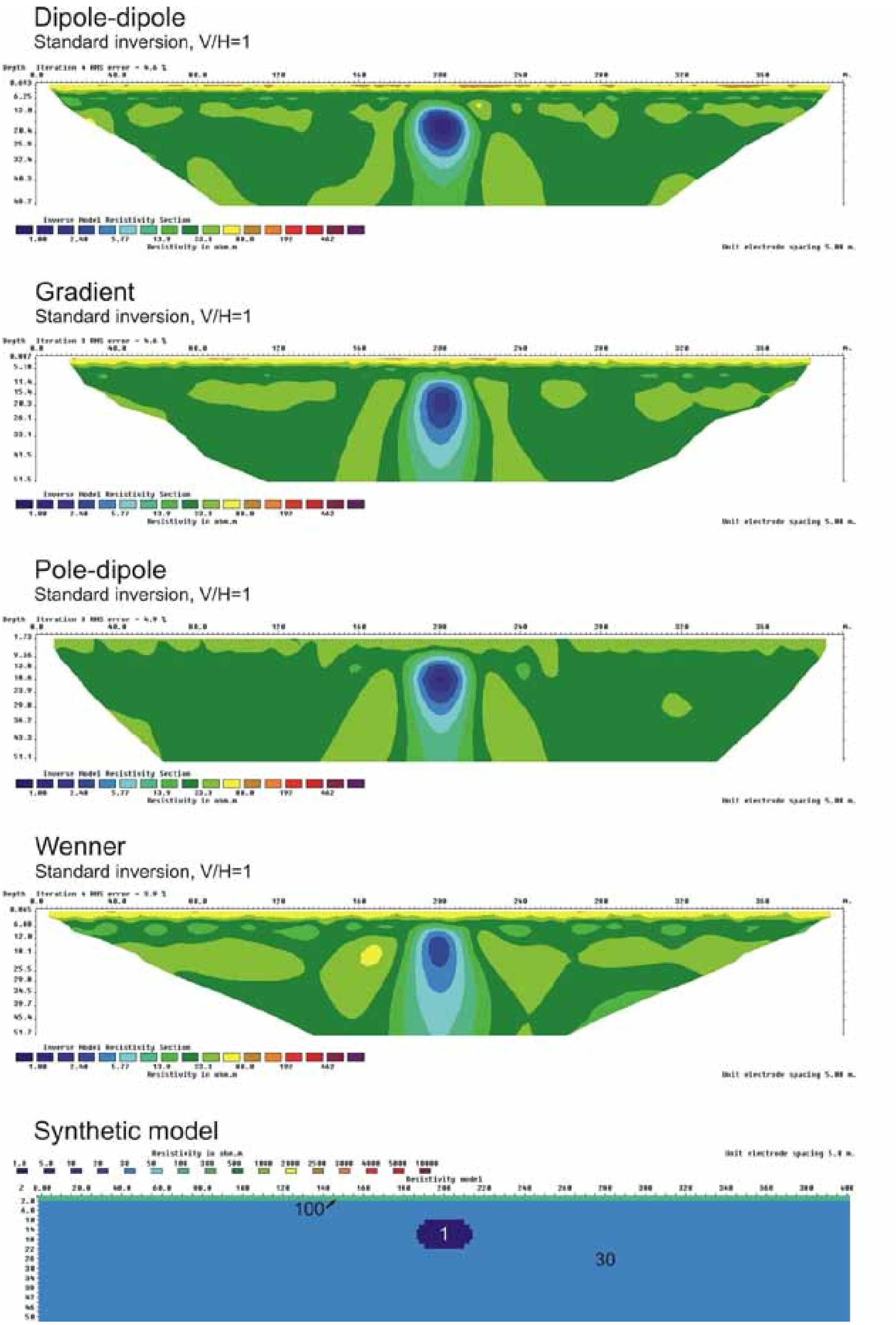

Figure 3.3.33: 2 m top layer (100 Ωm) over 30 Ωm and a lense (30 m x 12 m) of 1 Ωm in a depth of ~15 m. Standard inversion, V/H=1

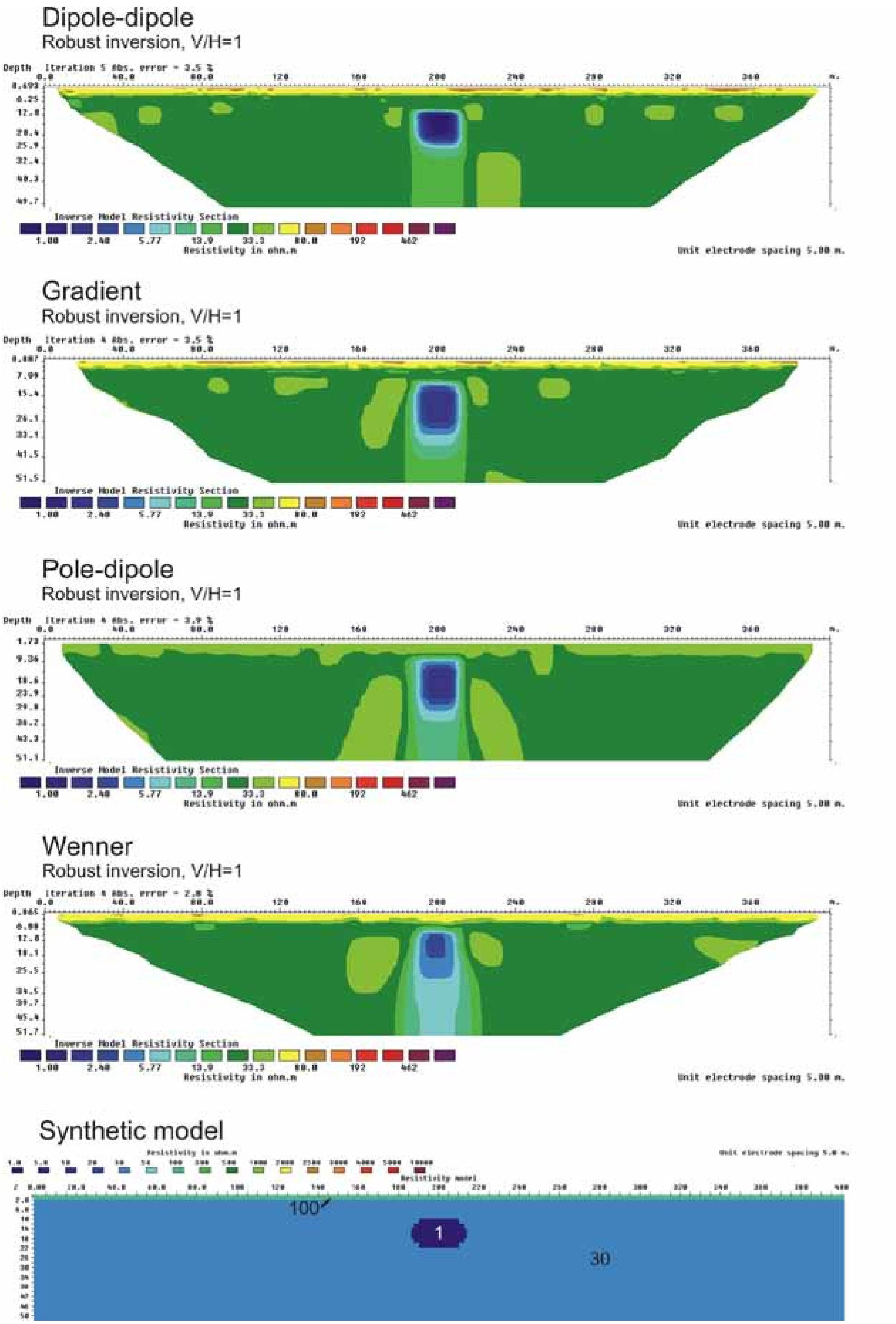

Figure 3.3.34: 2 m top layer (100 Ωm) over 30 Ωm and a lense (30 m x 12 m) of 1 Ωm in a depth of ~15 m. Robust inversion, V/H=1

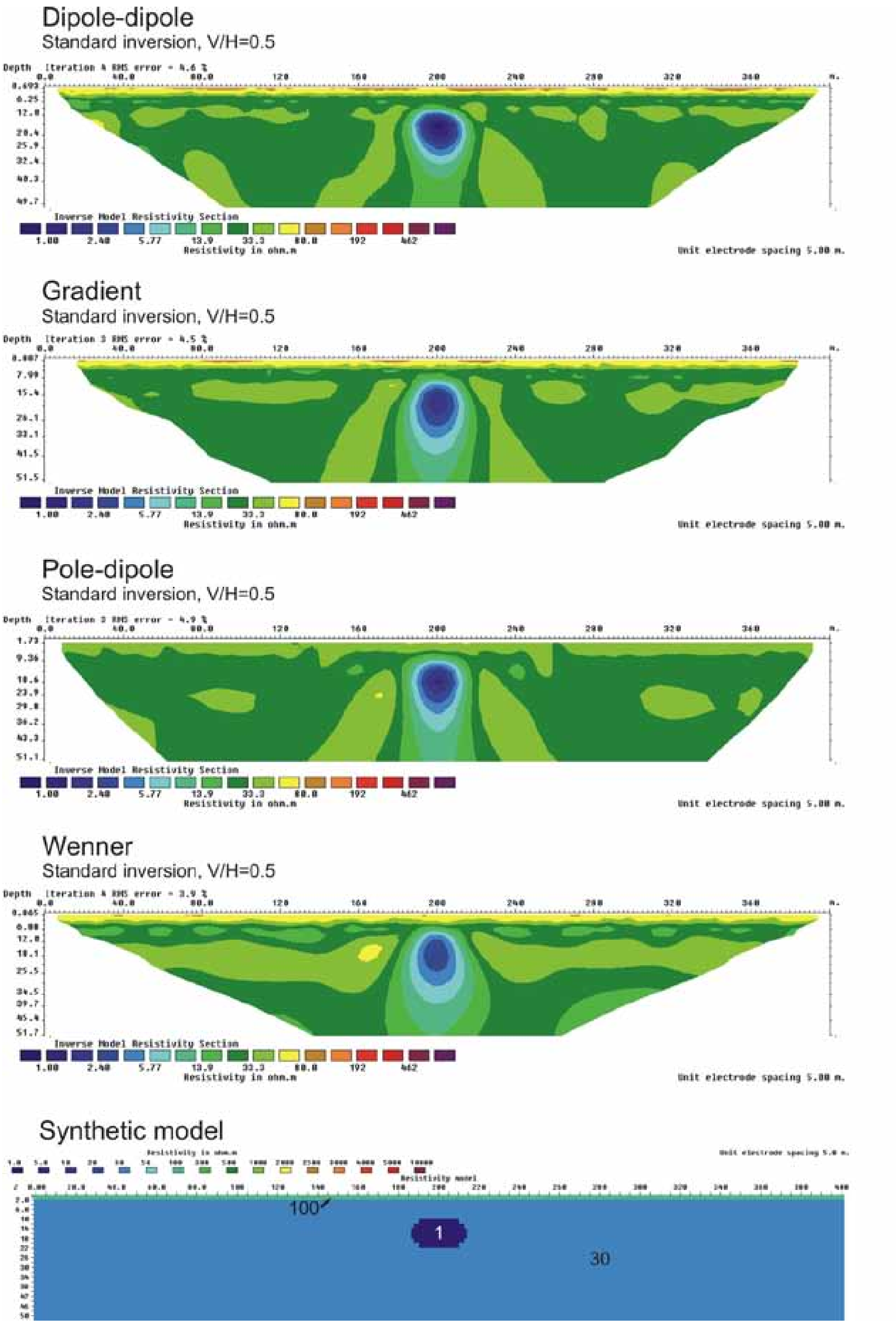

Figure 3.3.35: 2 m top layer (100 Ωm) over 30 Ωm and a lense (30 m x 12 m) of 1 Ωm in a depth of ~15 m. Standard inversion, V/H=0.5

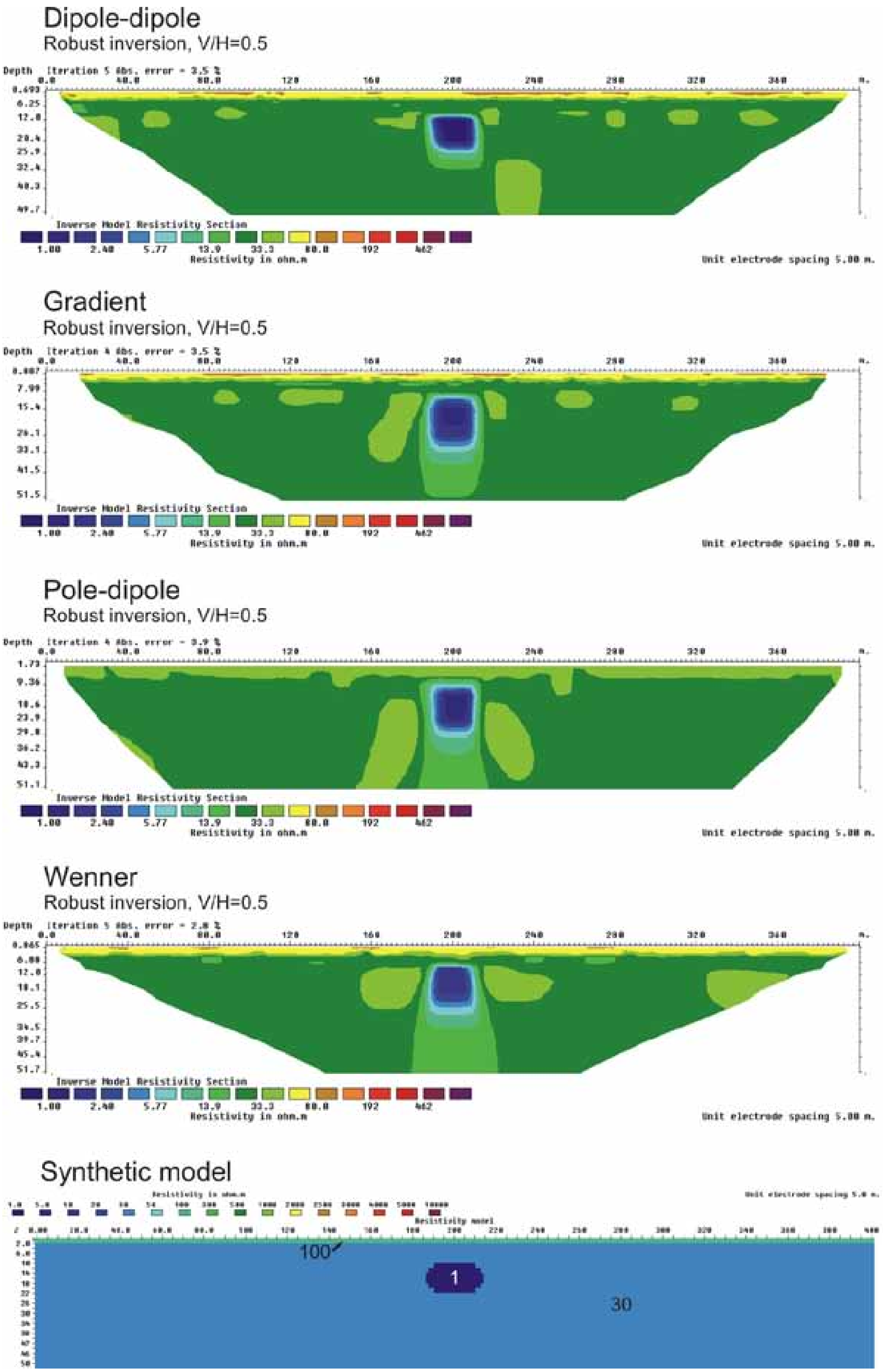

Figure 3.3.36: 2 m top layer (100 Ωm) over 30 Ωm and a lense (30 m x 12 m) of 1 Ωm in a depth of ~15 m. Robust inversion, V/H=0.5

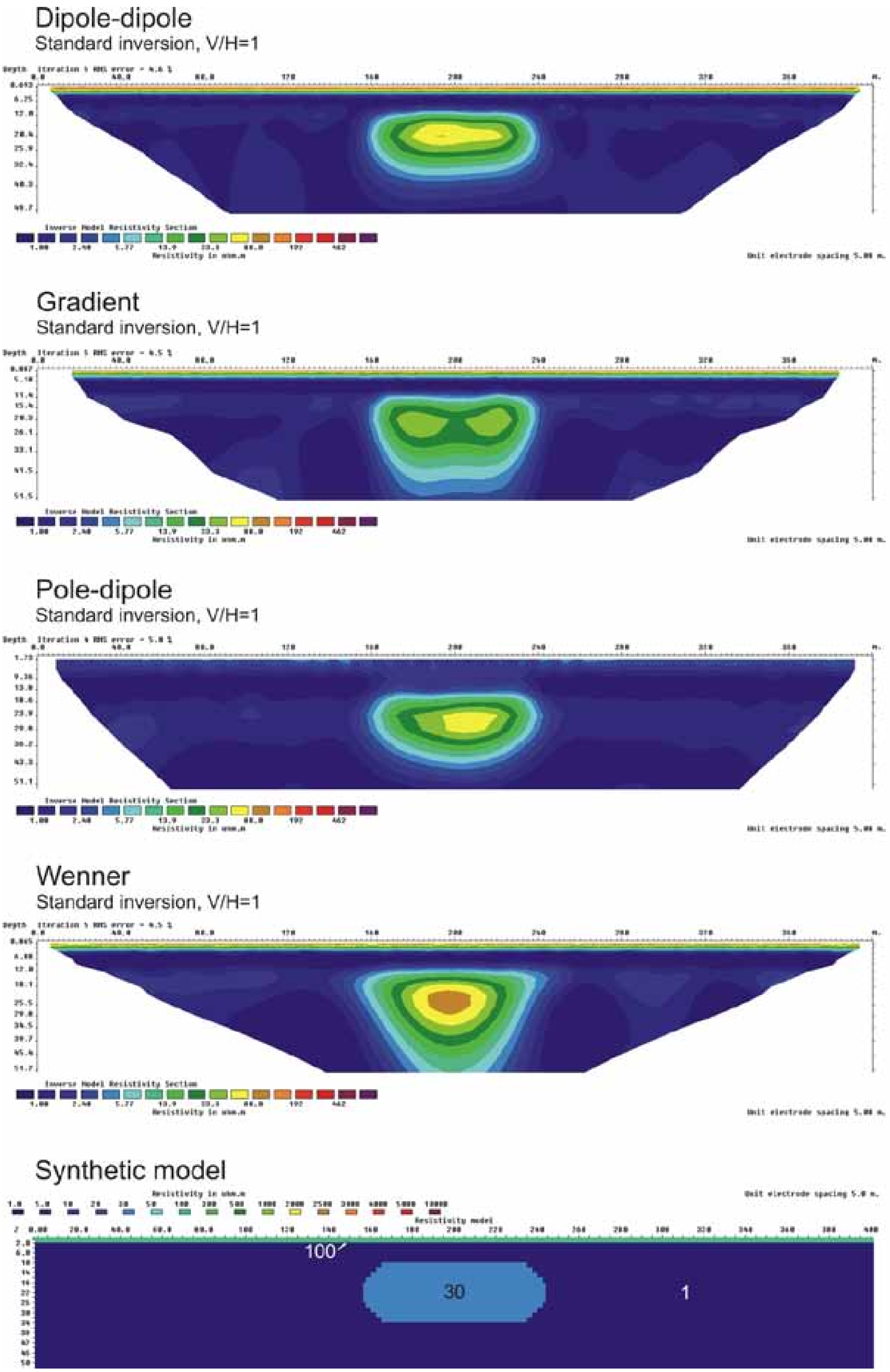

Figure 3.3.37: 2 m top layer (100 Ωm) over 1 Ωm and a lense (90 m x 24 m) of 30 Ωm in a depth of ~25 m. Standard inversion, V/H=1

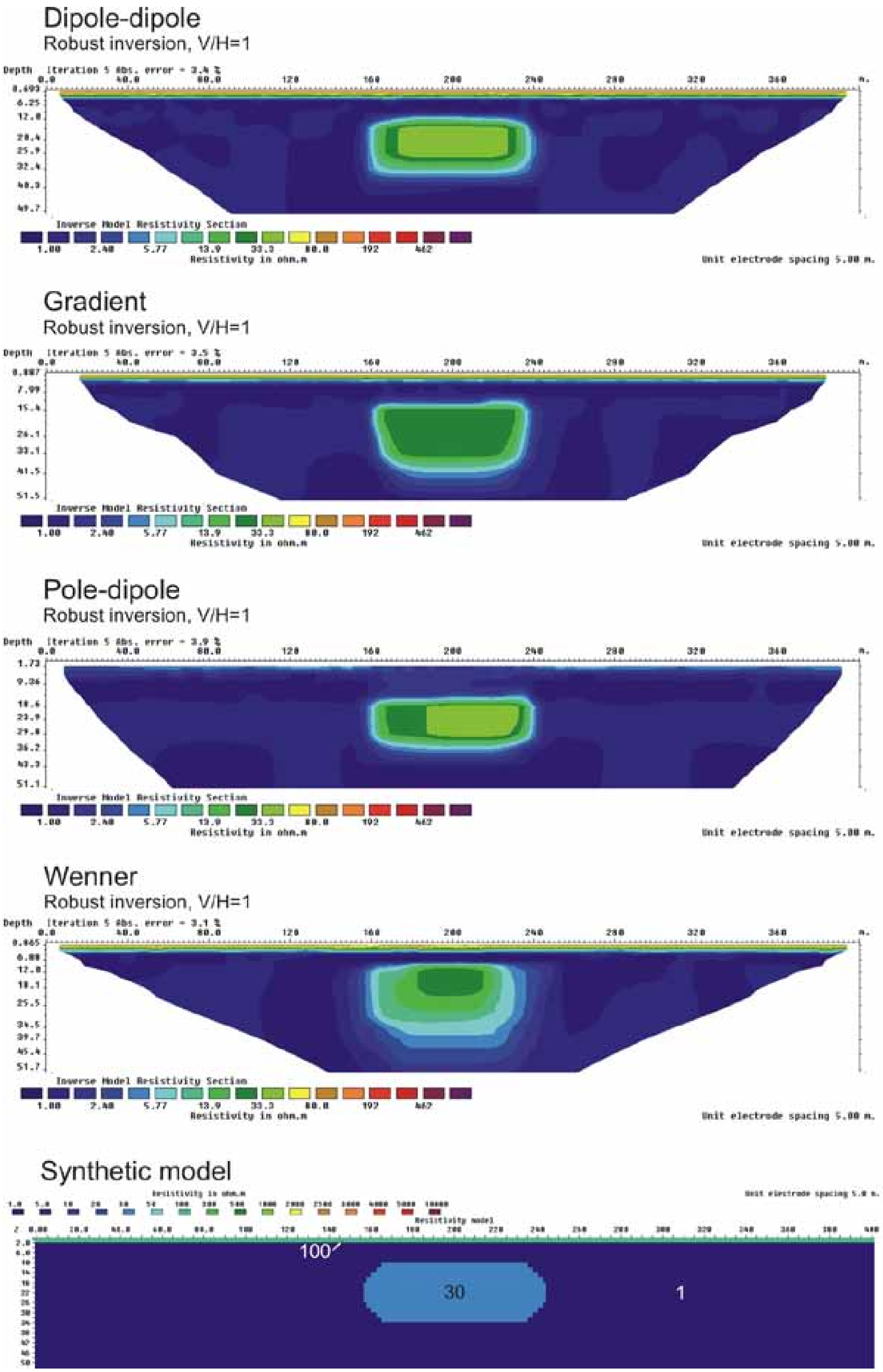

Figure 3.3.38: 2 m top layer (100 Ωm) over 1 Ωm and a lense (90 m x 24 m) of 30 Ωm in a depth of ~25 m. Robust inversion, V/H=1

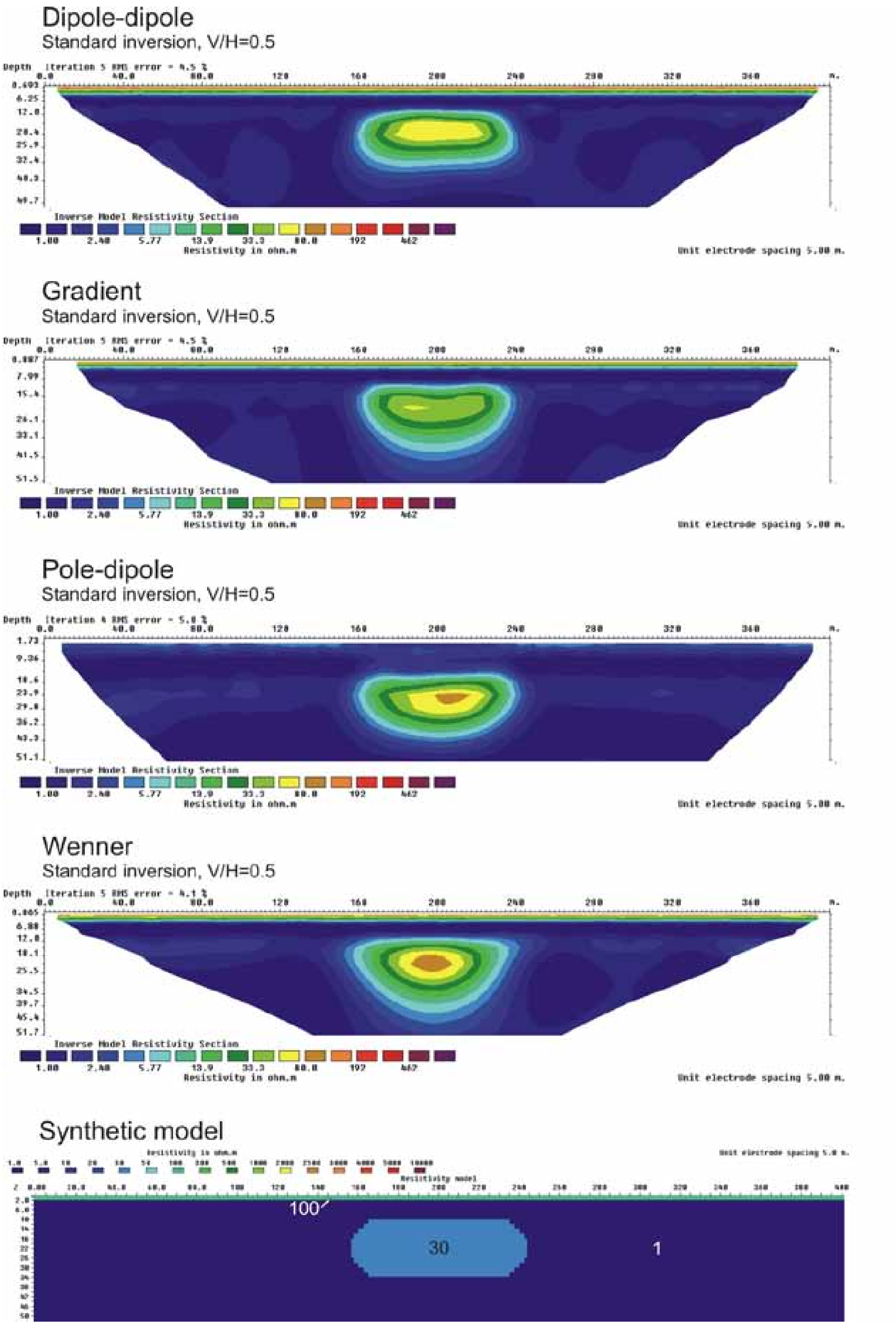

Figure 3.3.39: 2 m top layer (100 Ωm) over 1 Ωm and a lense (90 m x 24 m) of 30 Ωm in a depth of ~25 m. Standard inversion, V/H=0.5

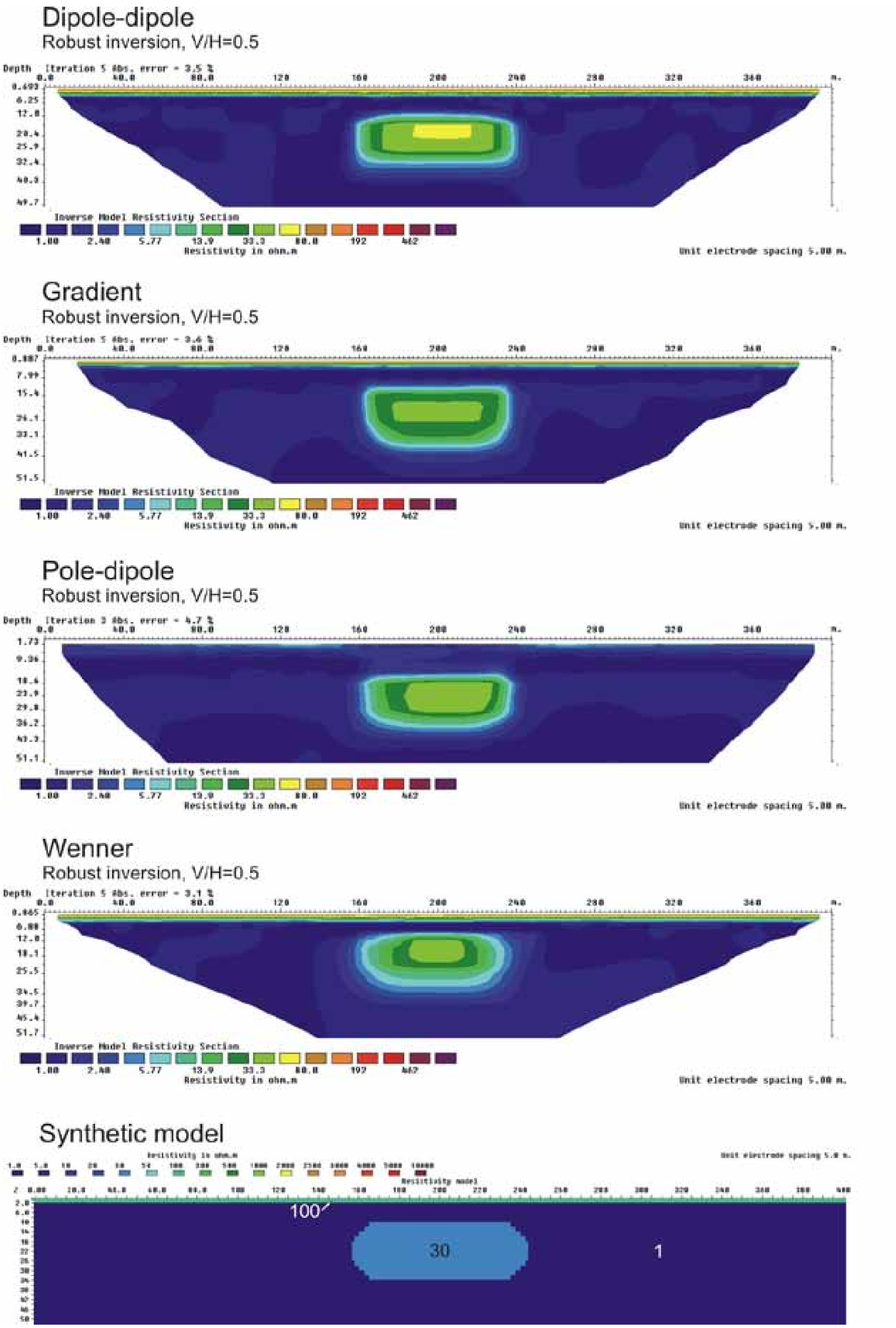

Figure 3.3.40: 2 m top layer (100 Ωm) over 1 Ωm and a lense (90 m x 24 m) of 30 Ωm in a depth of ~25 m. Robust inversion, V/H=0.5

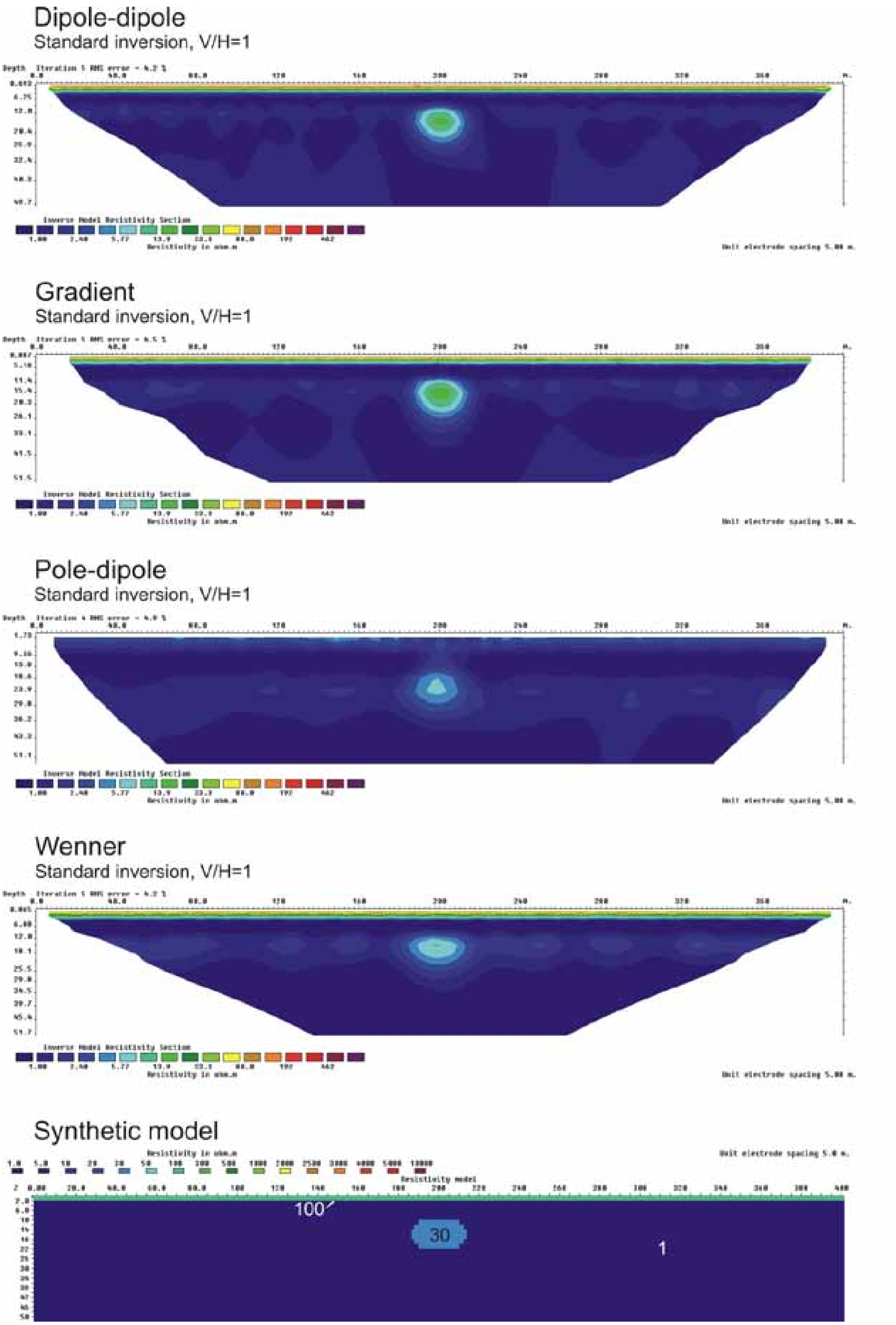

Figure 3.3.41: 2 m top layer (100 Ωm) over 1 Ωm and a lense (30 m x 12 m) of 30 Ωm in a depth of ~15 m. Standard inversion, V/H=1

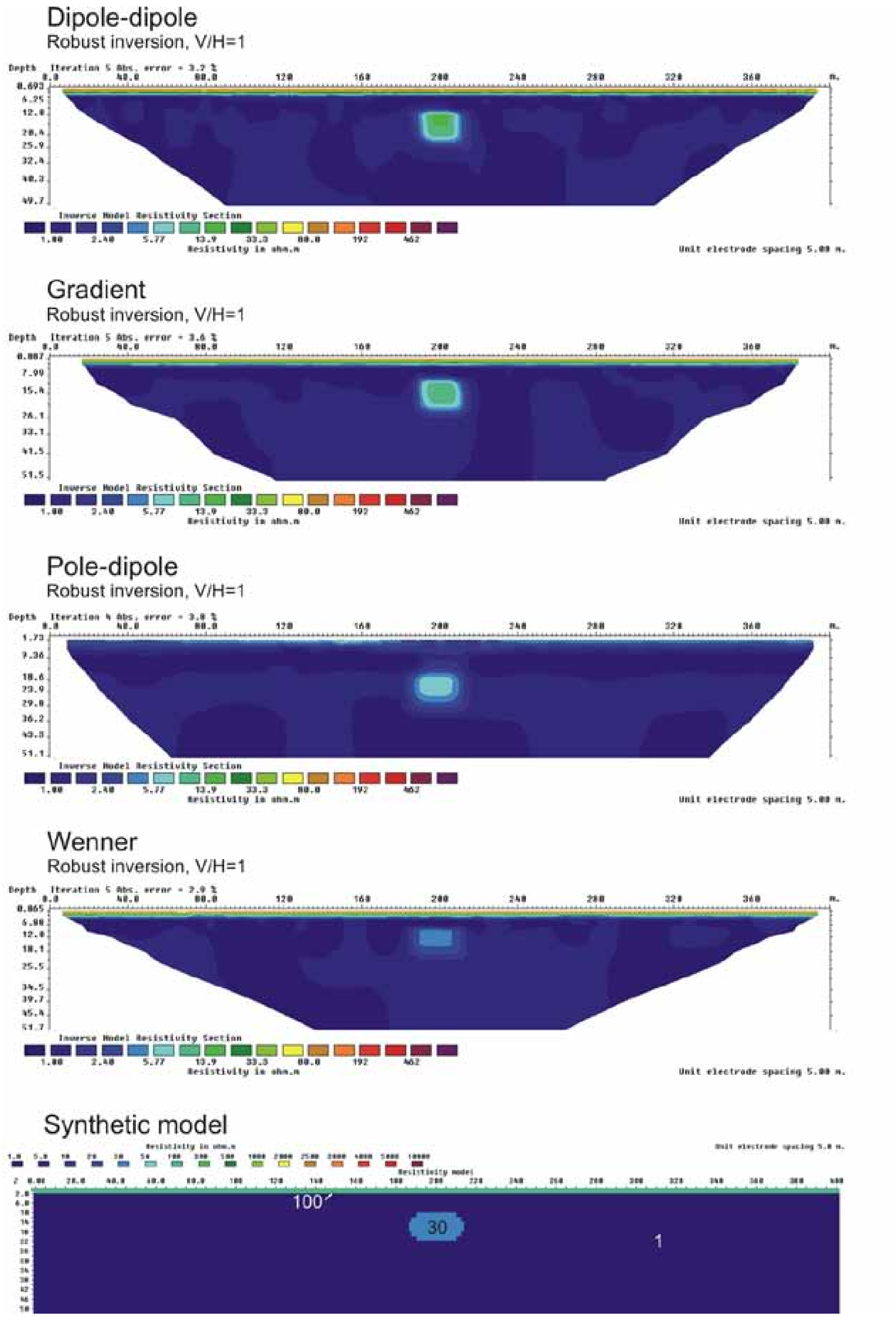

Figure 3.3.42: 2 m top layer (100 Ωm) over 1 Ωm and a lense (30 m x 12 m) of 30 Ωm in a depth of ~15 m. Robust inversion, V/H=1

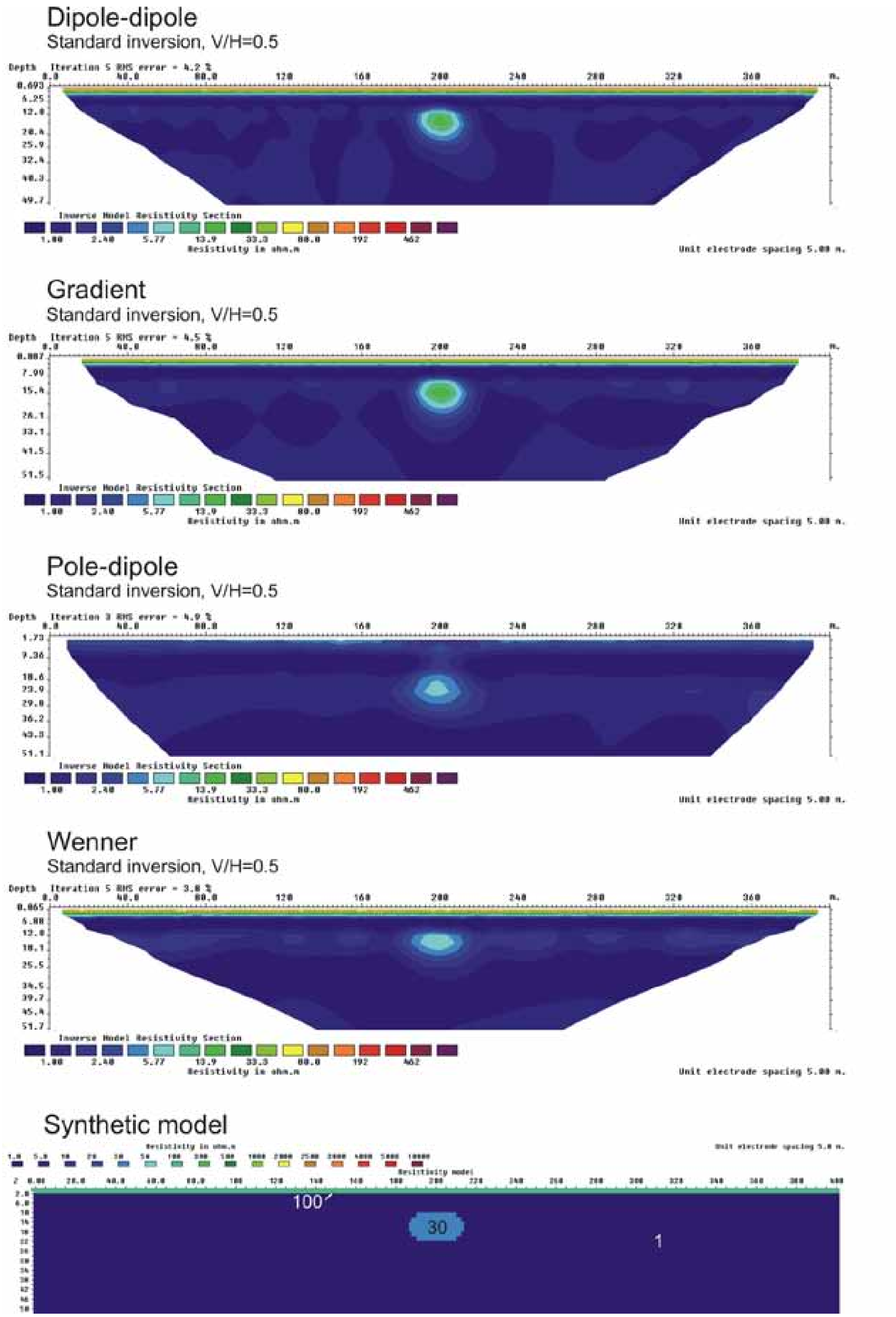

Figure 3.3.43: 2 m top layer (100 Ωm) over 1 Ωm and a lense (30 m x 12 m) of 30 Ωm in a depth of ~15 m. Standard inversion, V/H=0.5

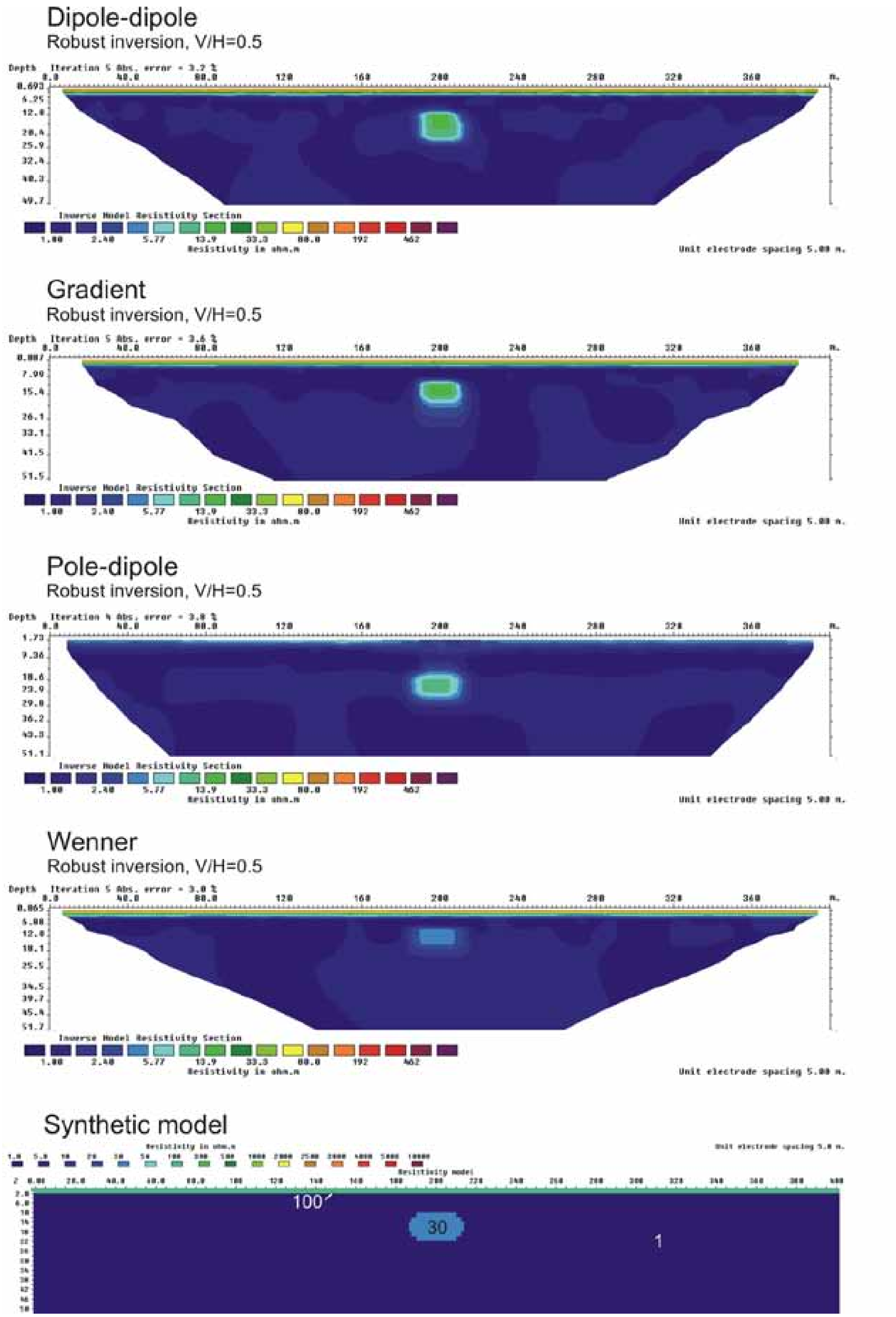

Figure 3.3.44: 2 m top layer (100 Ωm) over 1 Ωm and a lense (30 m x 12 m) of 30 Ωm in a depth of ~15 m. Robust inversion, V/H=0.5

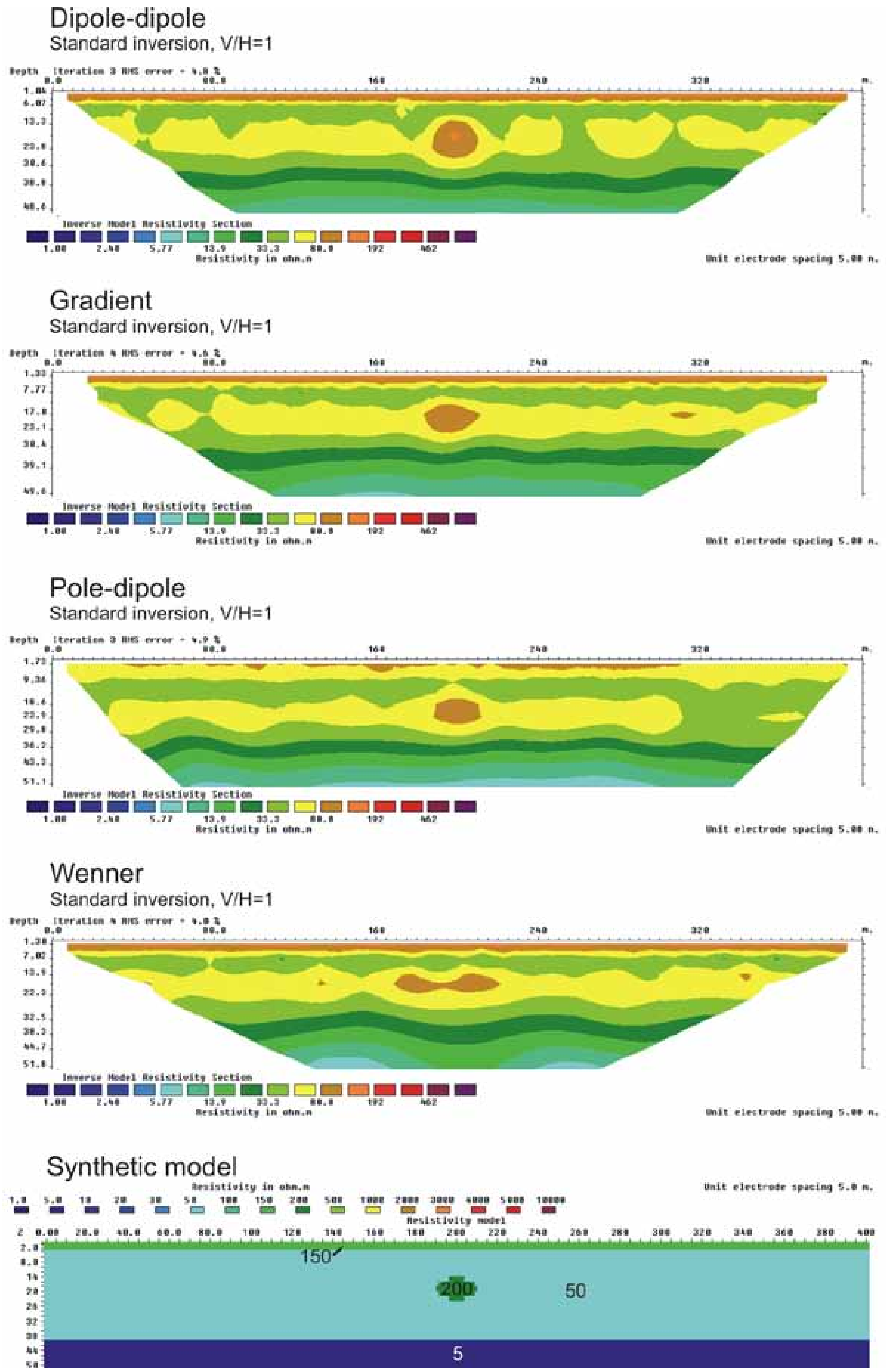

Figure 3.3.45: 3 m top layer (150 Ωm) over 50 Ωm with a lense of clay slide deposits of 200 Ωm (20 m x 10 m). Standard inversion, V/H=1

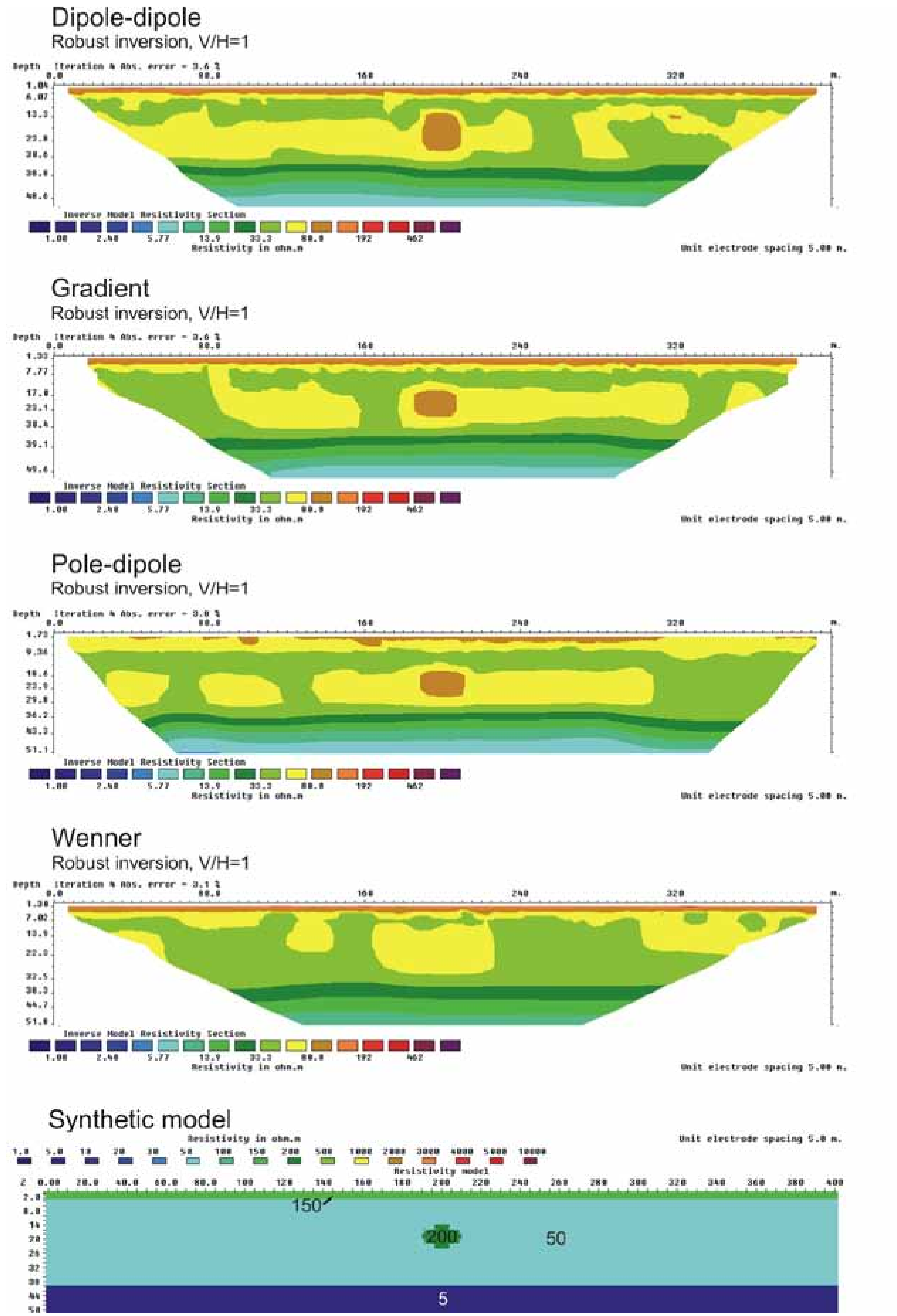

Figure 3.3.46: 3 m top layer (150 Ωm) over 50 Ωm with a lense of clay slide deposits of 200 Ωm (20 m x 10 m). Robust inversion, V/H=1

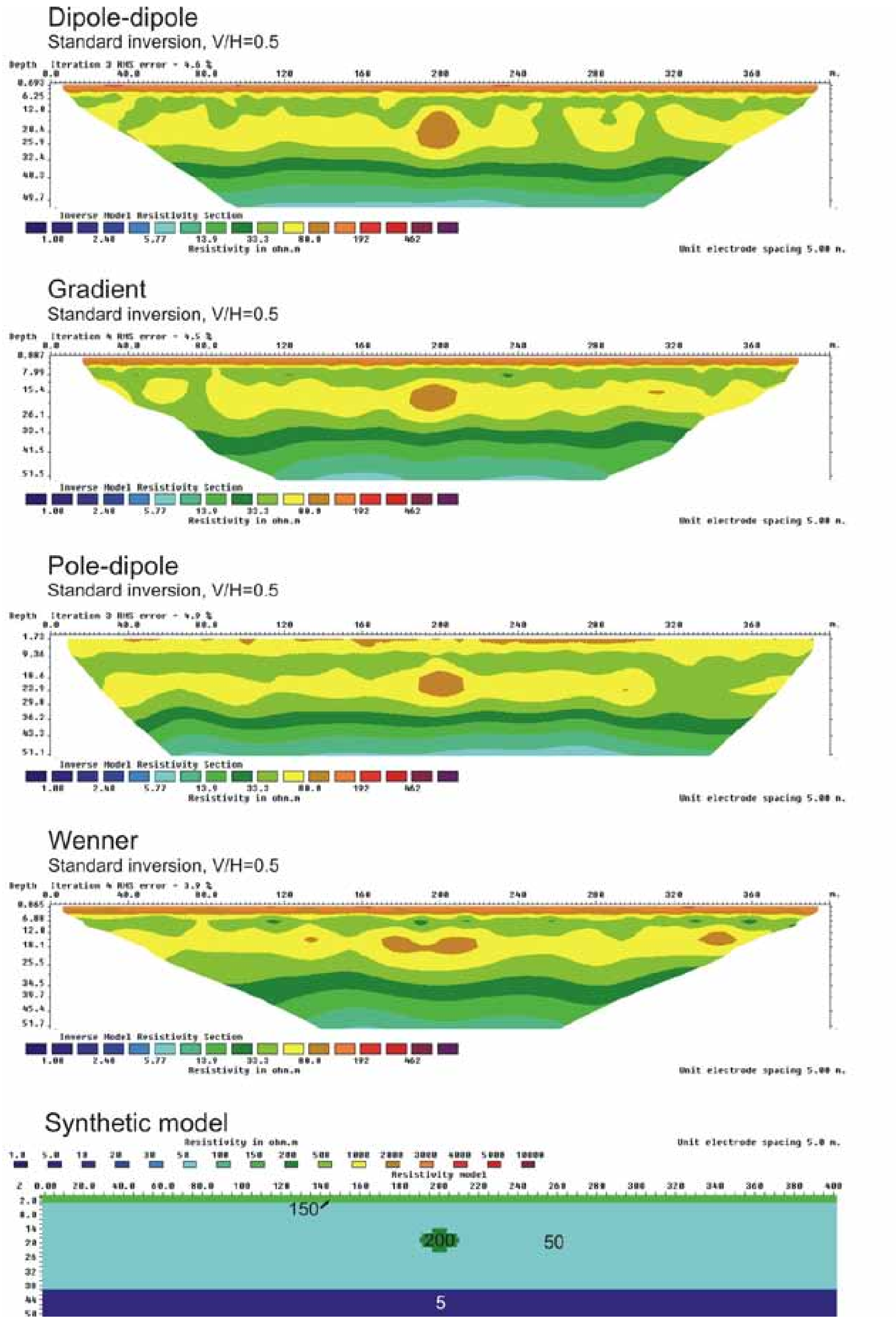

Figure 3.3.47: 3 m top layer (150 Ωm) over 50 Ωm with a lense of clay slide deposits of 200 Ωm (20 m x 10 m). Standard inversion, V/H=0.5

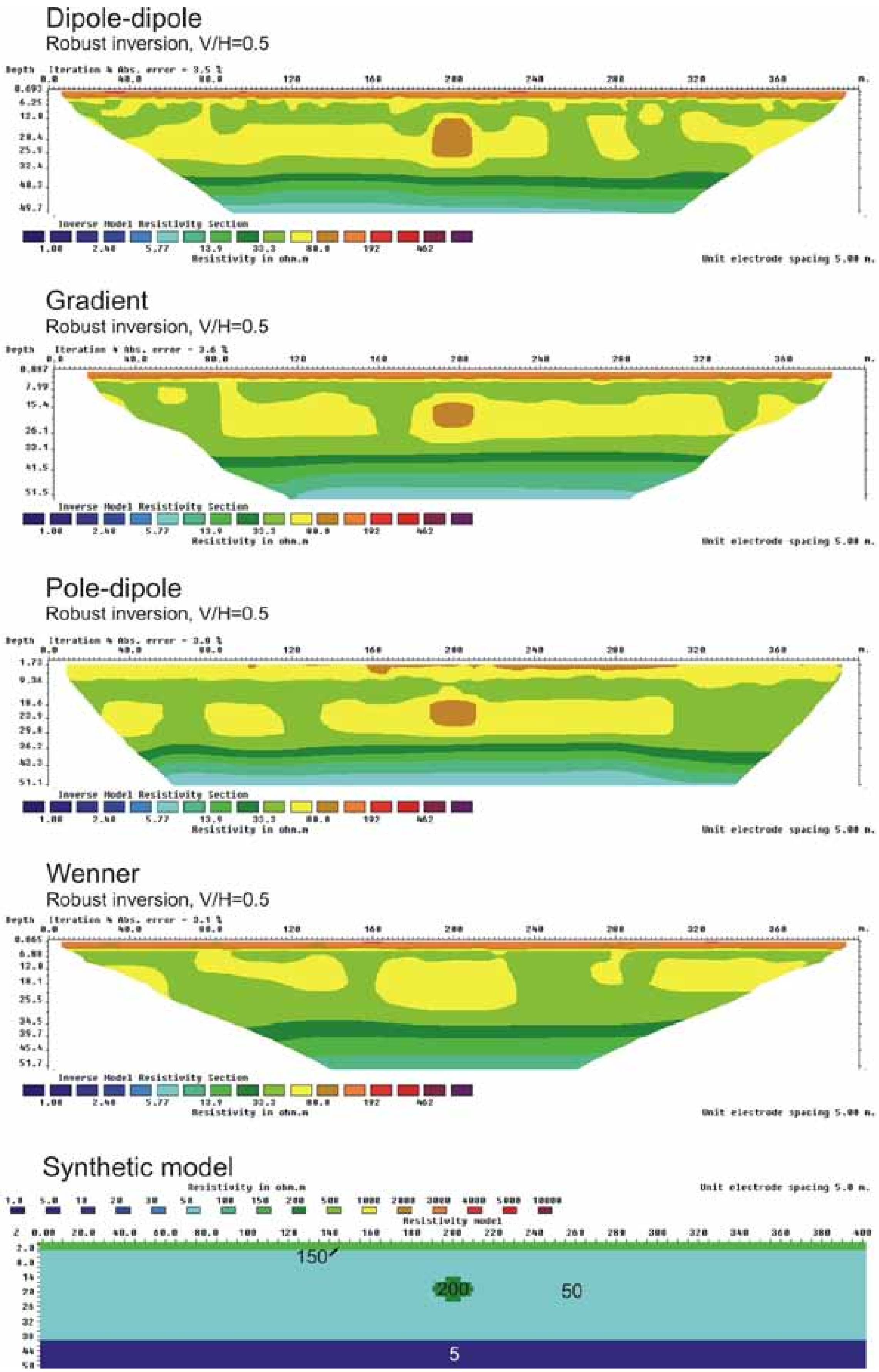

Figure 3.3.48: 3 m top layer (150 Ωm) over 50 Ωm with a lense of clay slide deposits of 200 Ωm (20 m x 10 m). Robust inversion, V/H=0.5

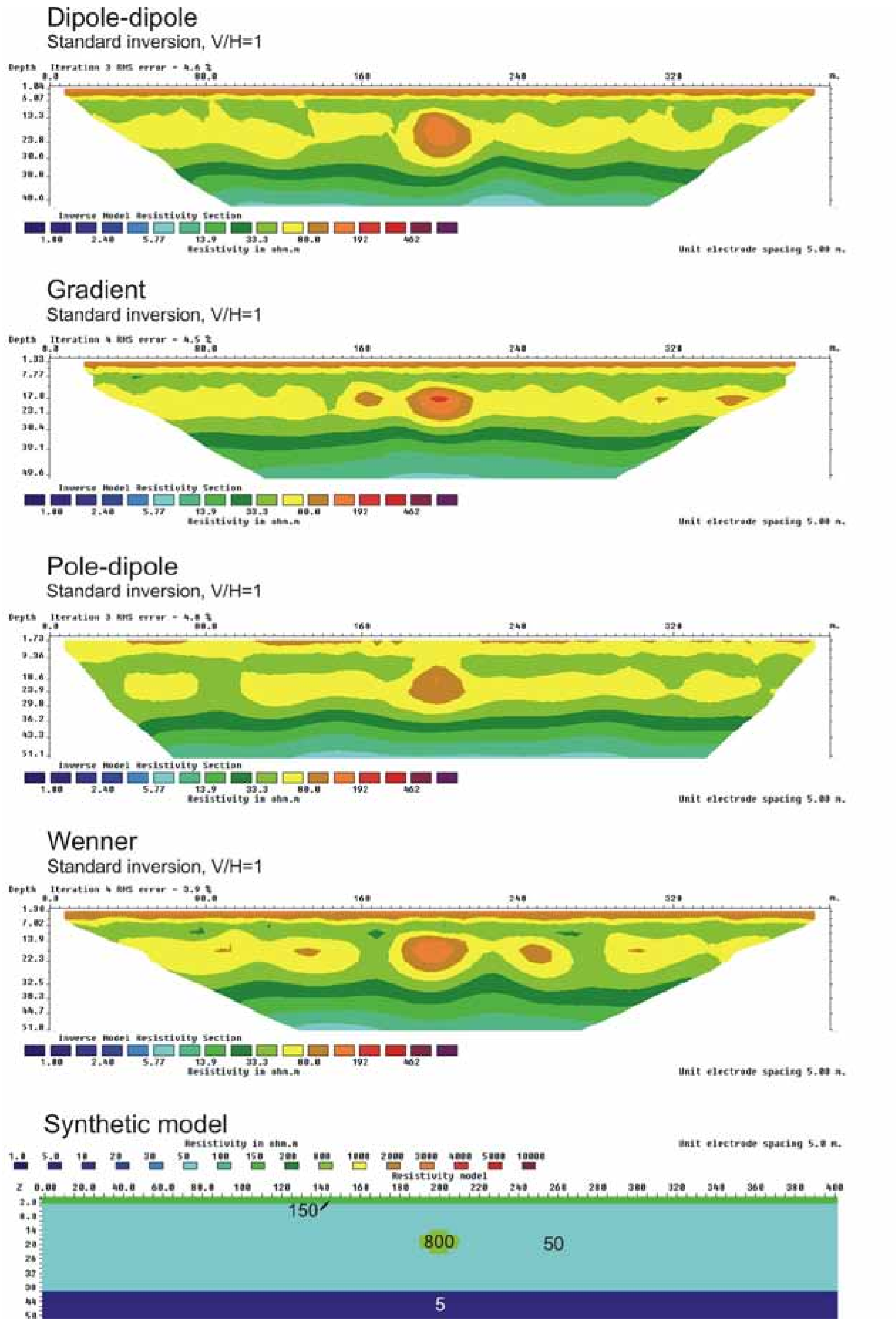

Figure 3.3.49: 3 m top layer (150 Ωm) over 50 Ωm with a lense of sand and gravel of 800 Ωm (20 m x 10 m). Standard inversion, V/H=1

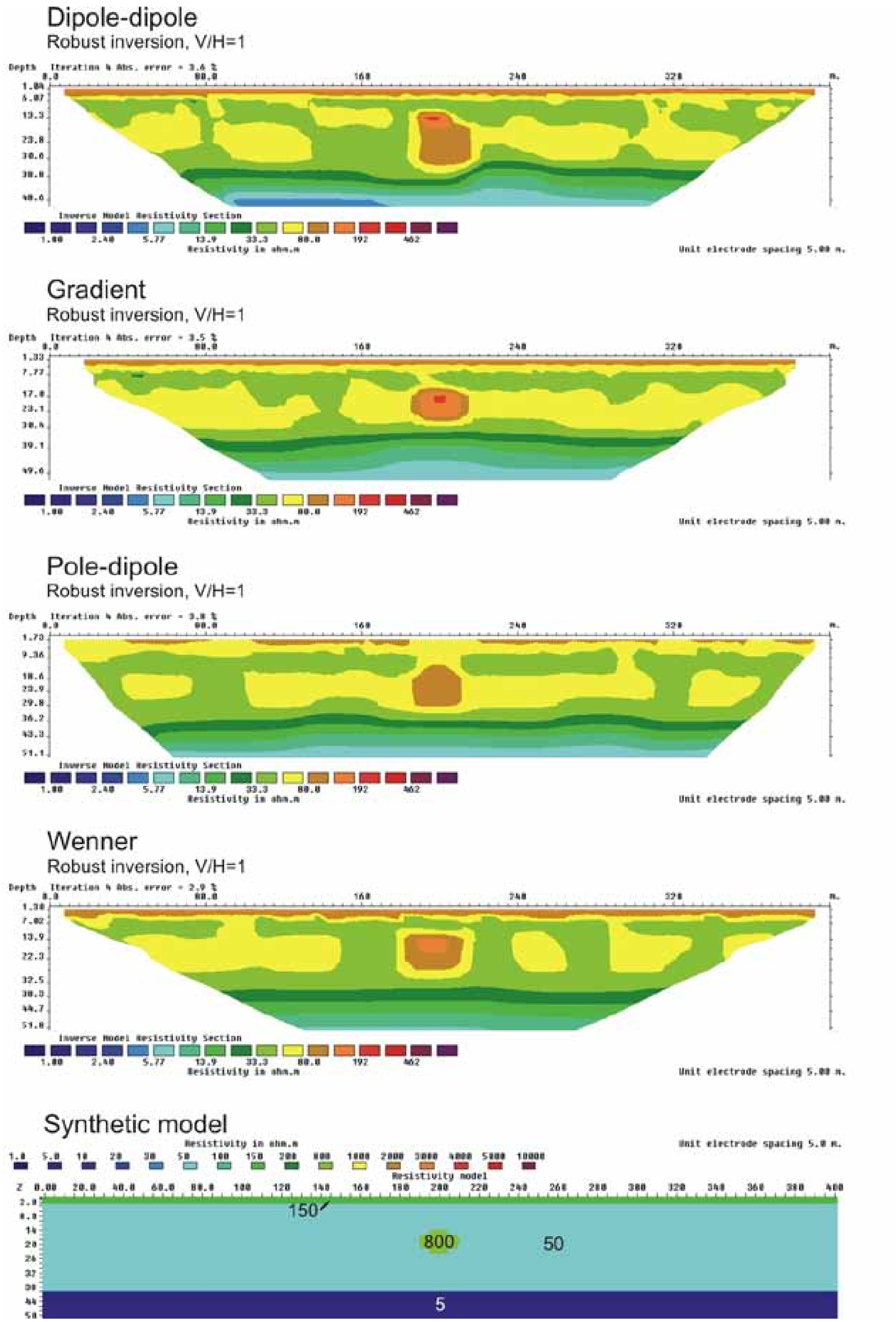

Figure 3.3.50: 3 m top layer (150 Ωm) over 50 Ωm with a lense of sand and gravel of 800 Ωm (20 m x 10 m). Robust inversion, V/H=1

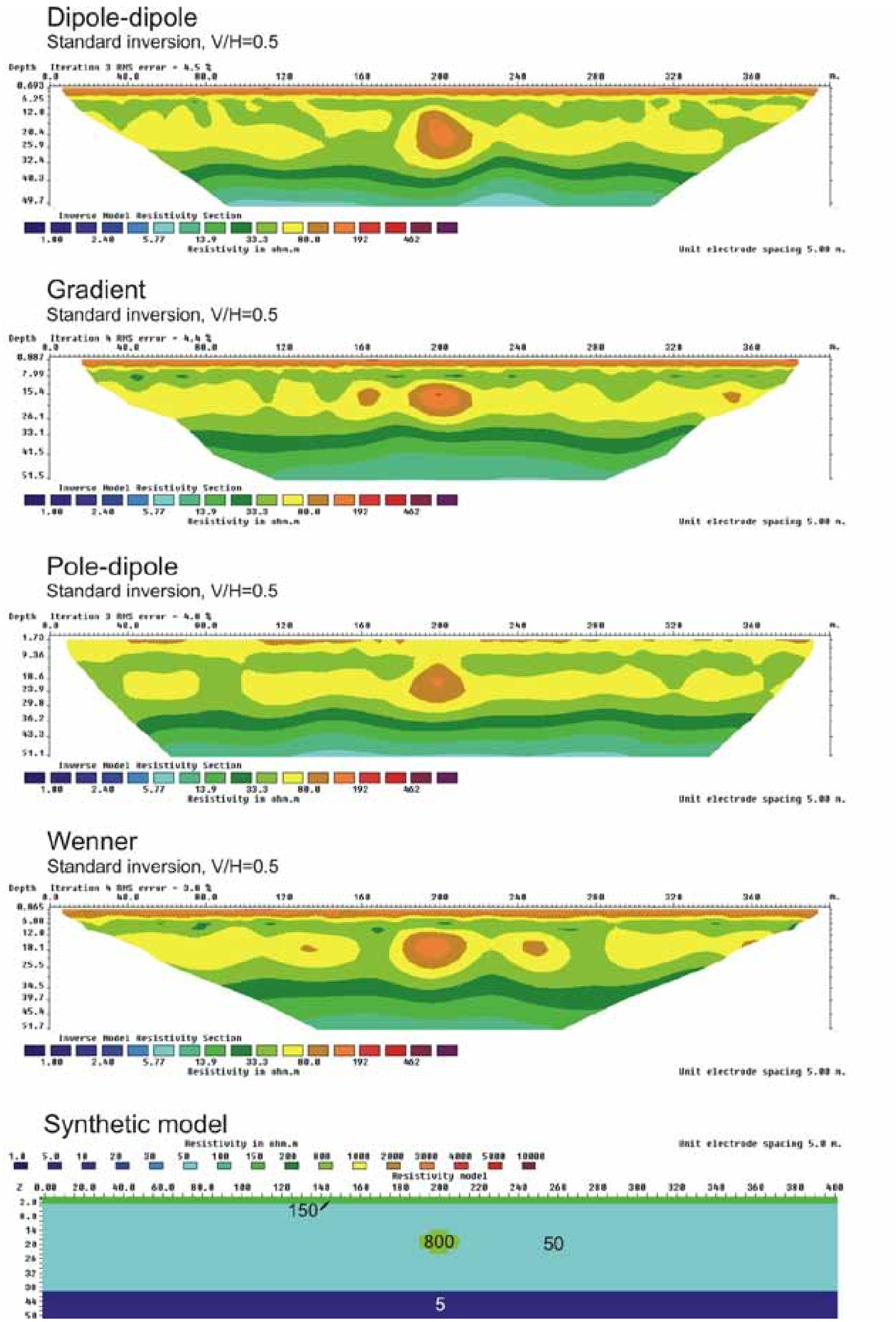

Figure 3.3.51: 3 m top layer (150 Ωm) over 50 Ωm with a lense of sand and gravel of 800 Ωm (20 m x 10 m). Standard inversion, V/H=0.5

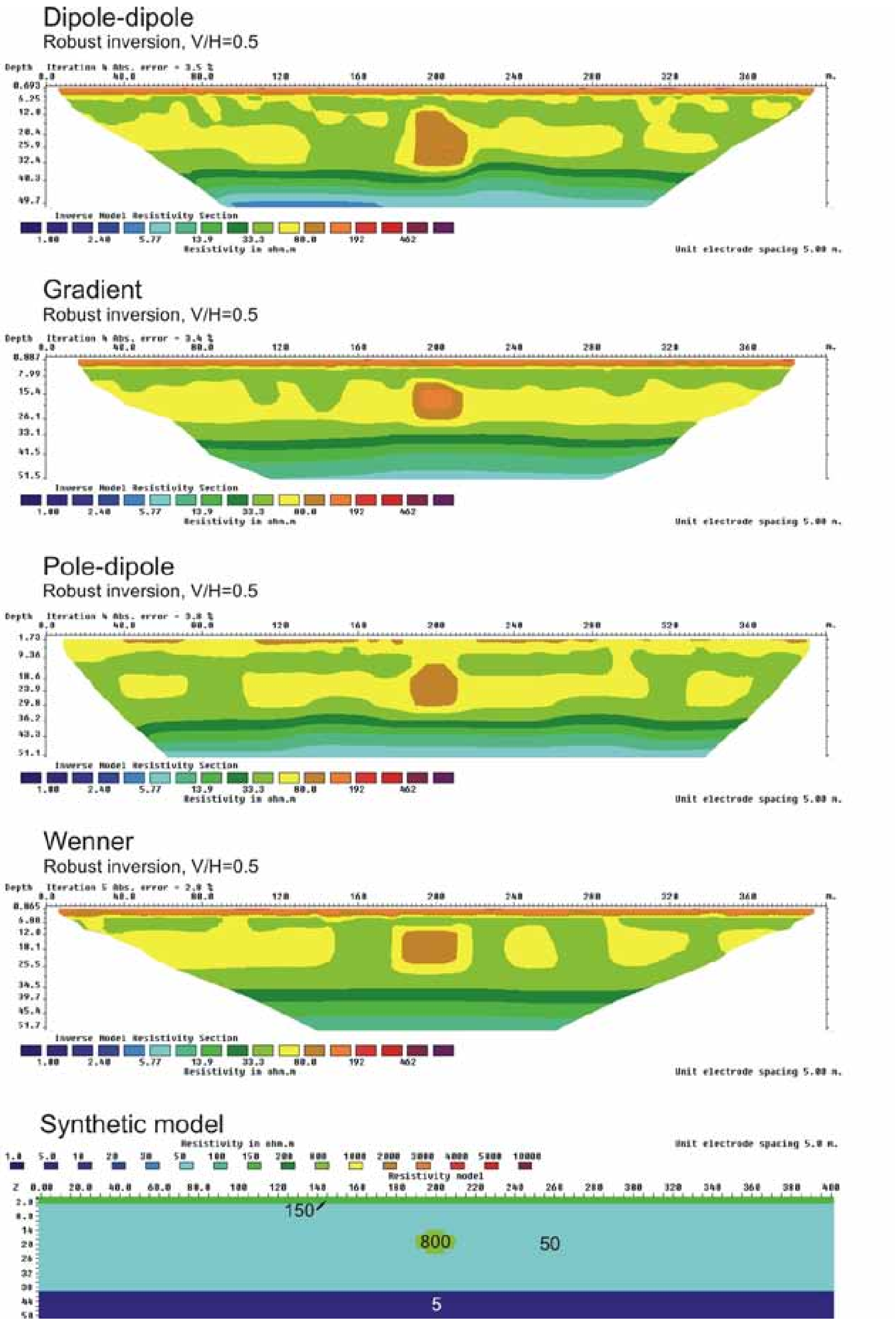

Figure 3.3.52: 3 m top layer (150 Ωm) over 50 Ωm with a lense of sand and gravel of 800 Ωm (20 m x 10 m). Robust inversion, V/H=0.5

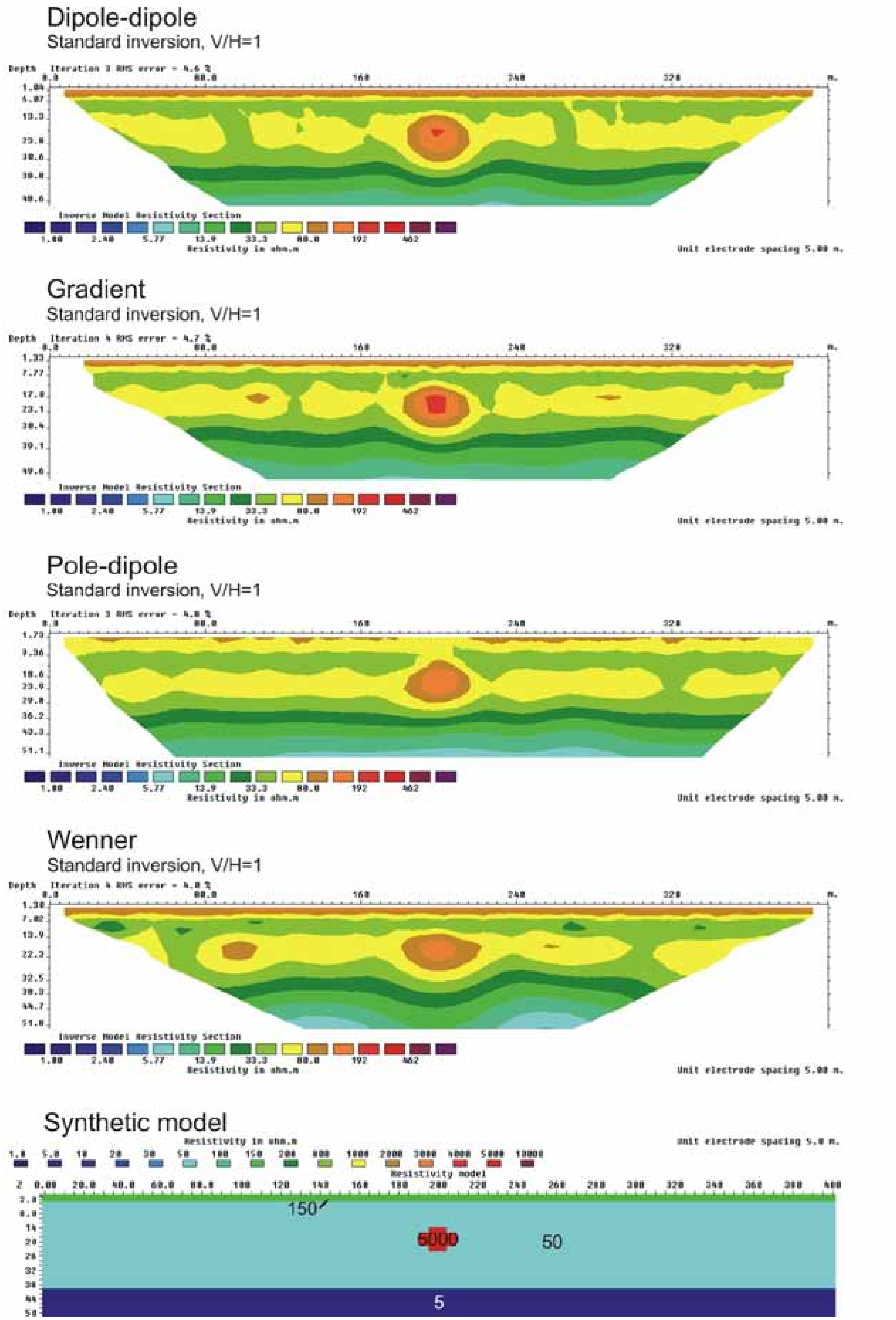

Figure 3.3.53: 3 m top layer (150 Ωm) over 50 Ωm with a rock of 5000 Ωm (20 m x 10 m). Standard inversion, V/H=1

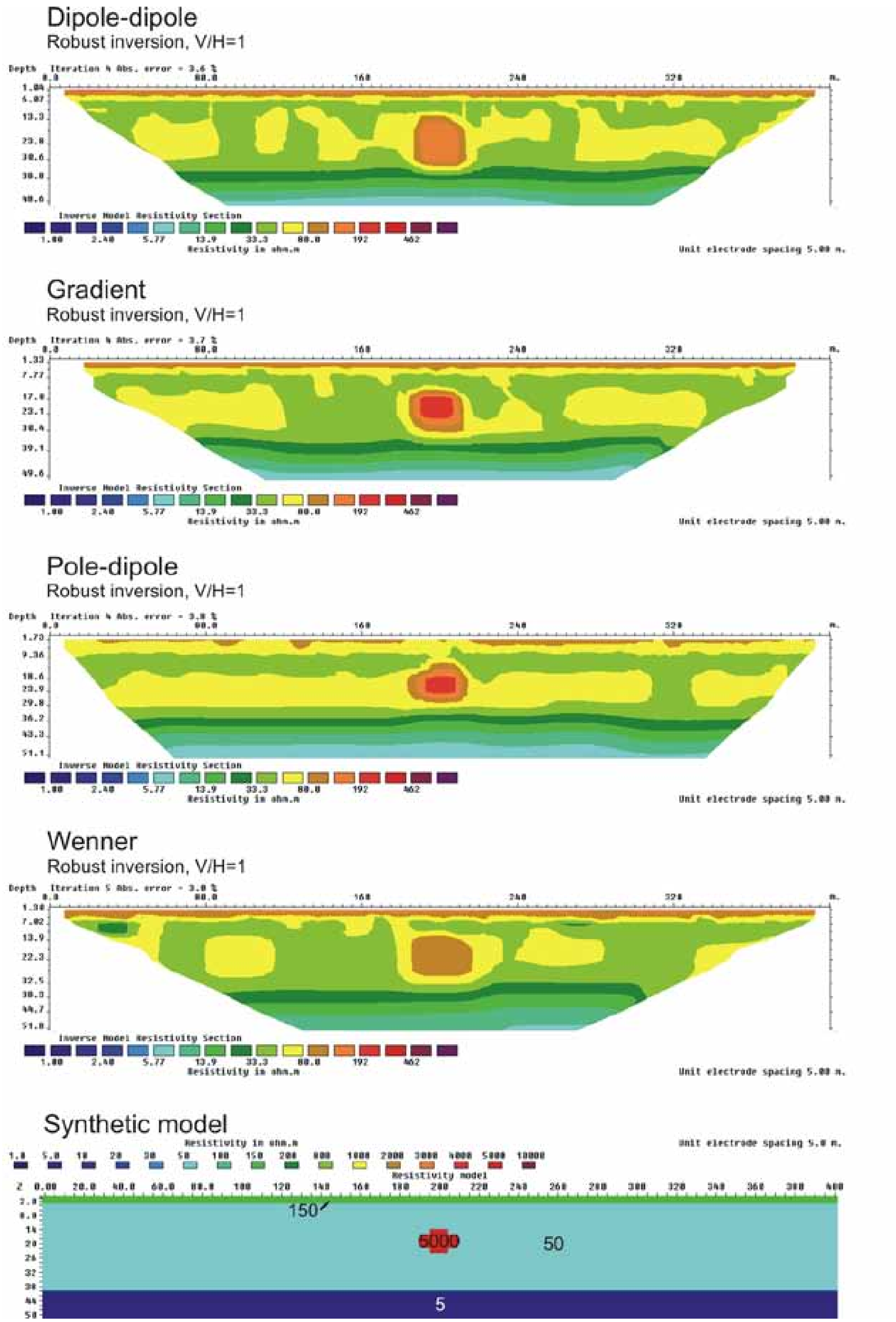

Figure 3.3.54: 3 m top layer (150 Ωm) over 50 Ωm with a rock of 5000 Ωm (20 m x 10 m). Robust inversion, V/H=1

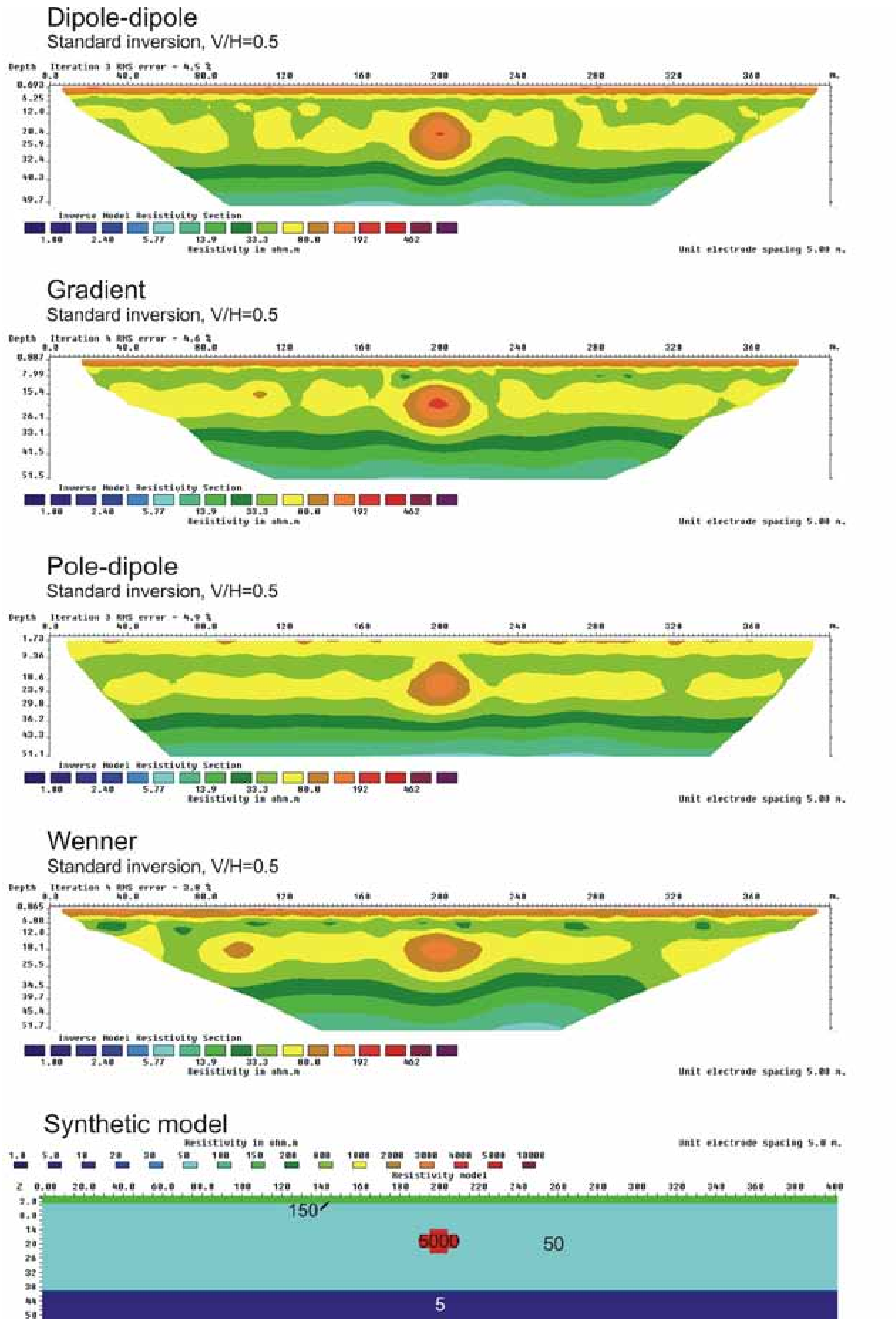

Figure 3.3.55: 3 m top layer (150 Ωm) over 50 Ωm with a rock of 5000 Ωm (20 m x 10 m). Standard inversion, V/H=0.5

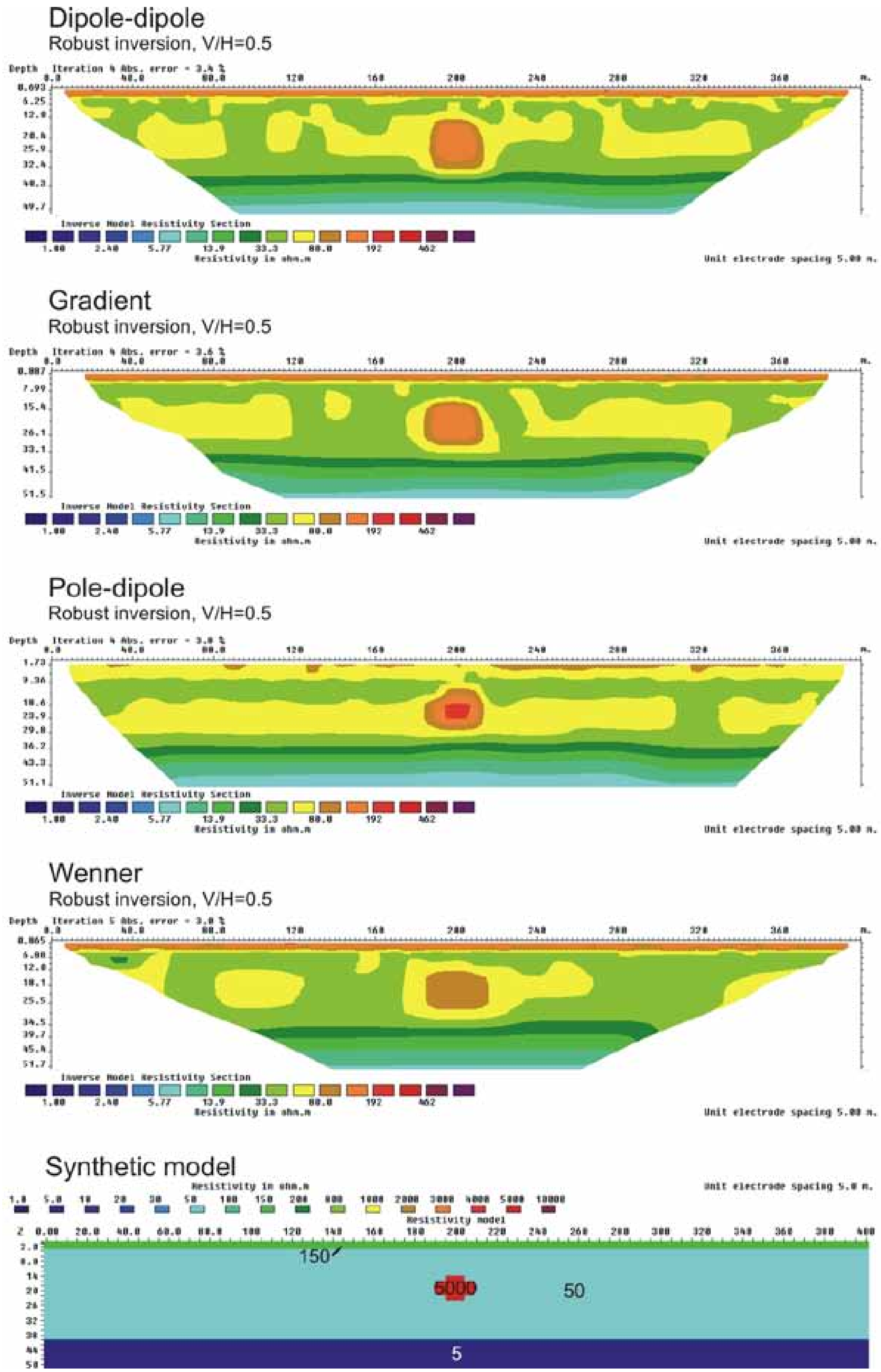

Figure 3.3.56: 3 m top layer (150 Ωm) over 50 Ωm with a rock of 5000 Ωm (20 m x 10 m). Robust inversion, V/H=0.5

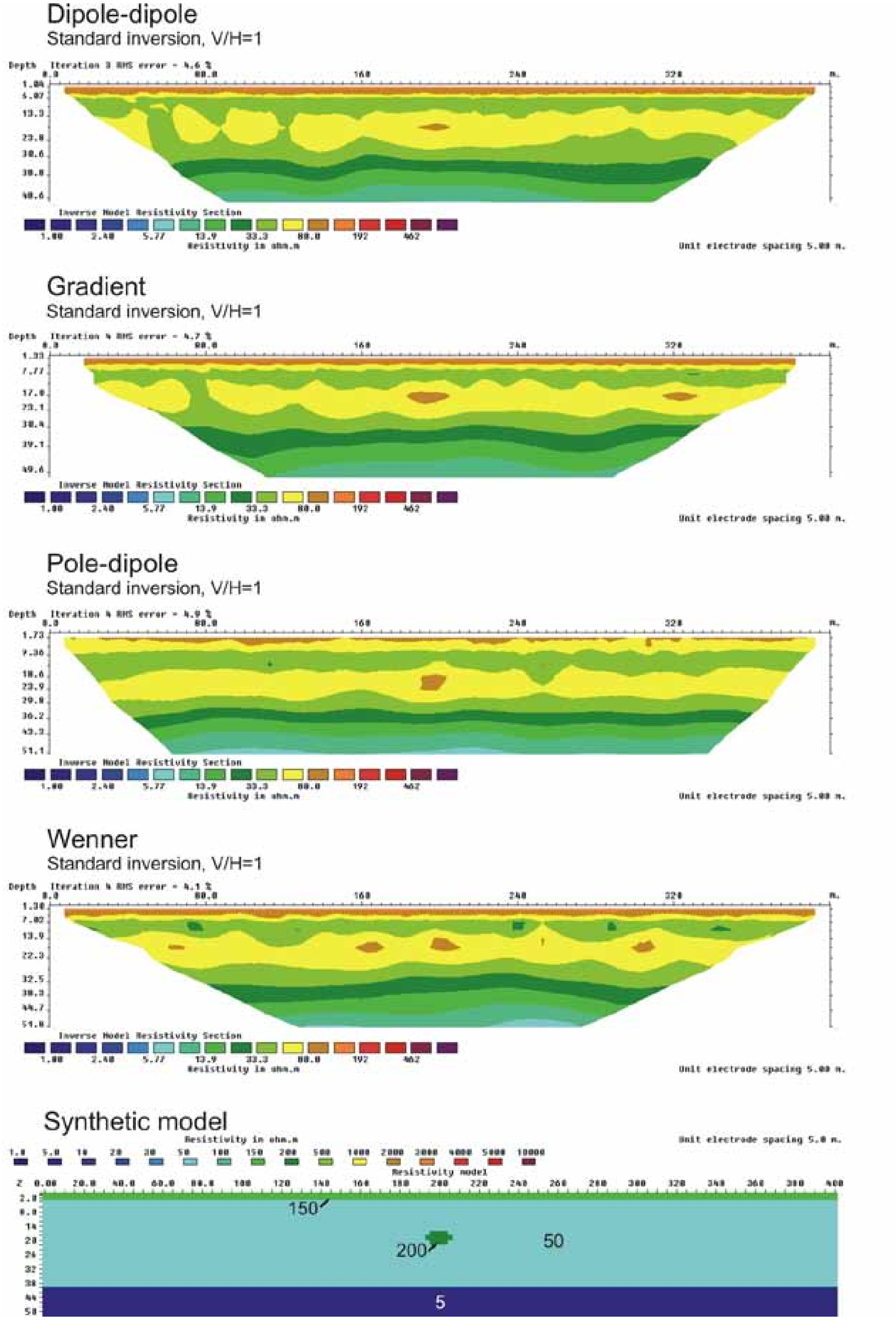

Figure 3.3.57: 3 m top layer (150 Ωm) over 50 Ωm with a lense of clay slide deposits of 200 Ωm (15 m x 6 m). Standard inversion, V/H=1

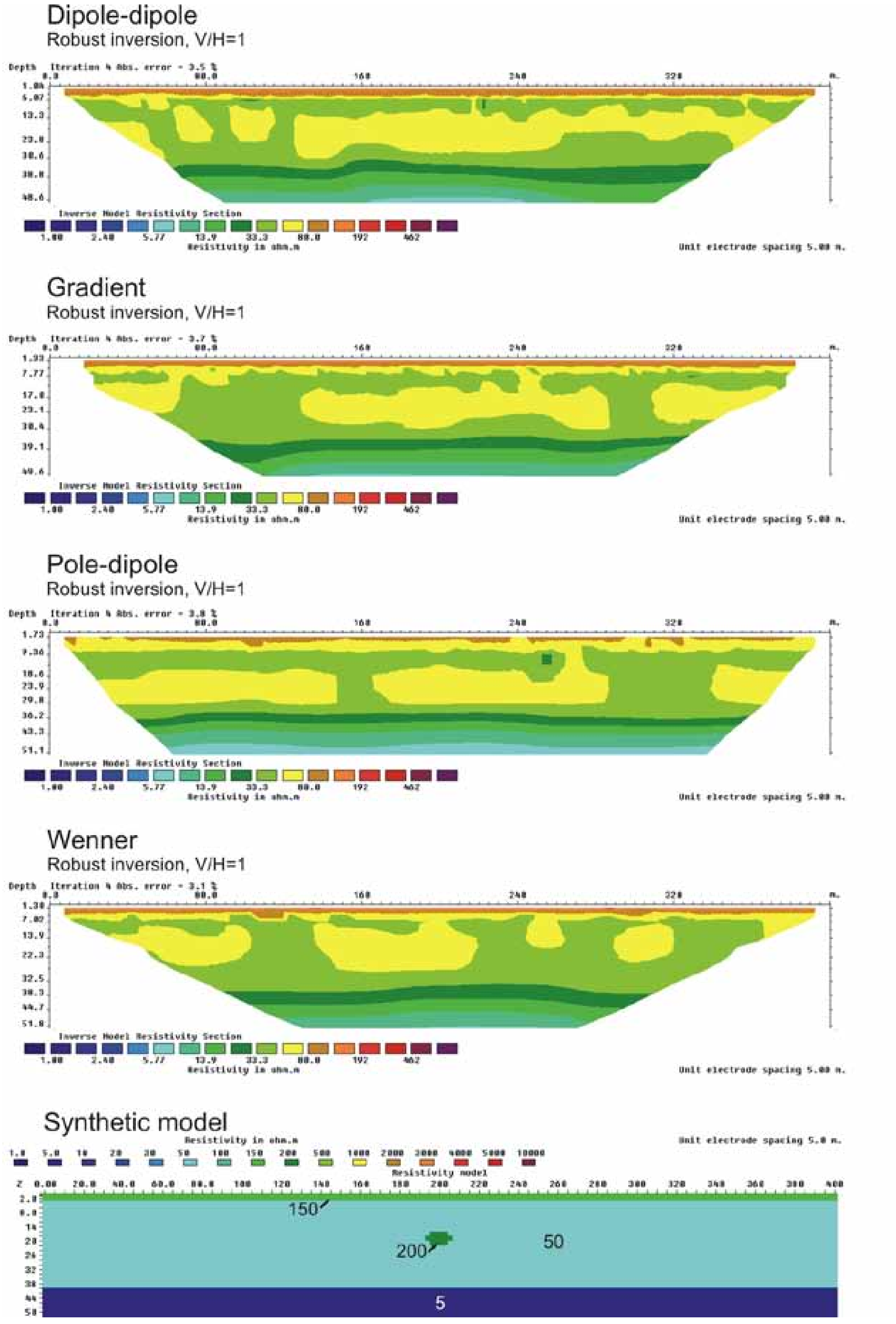

Figure 3.3.58: 3 m top layer (150 Ωm) over 50 Ωm with a lense of clay slide deposits of 200 Ωm (15 m x 6 m). Robust inversion, V/H=1

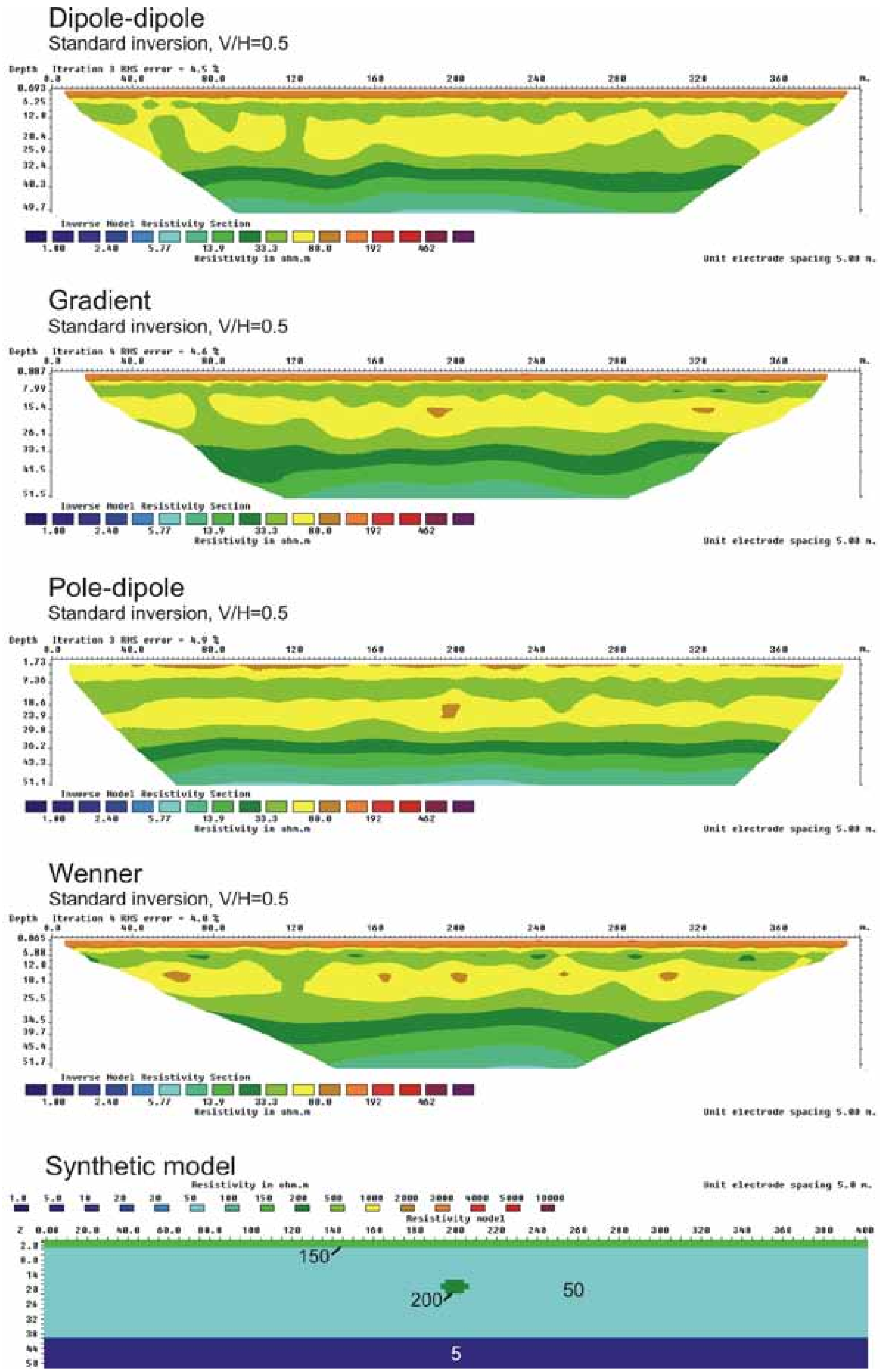

Figure 3.3.59: 3 m top layer (150 Ωm) over 50 Ωm with a lense of clay slide deposits of 200 Ωm (15 m x 6 m). Standard inversion, V/H=0.5

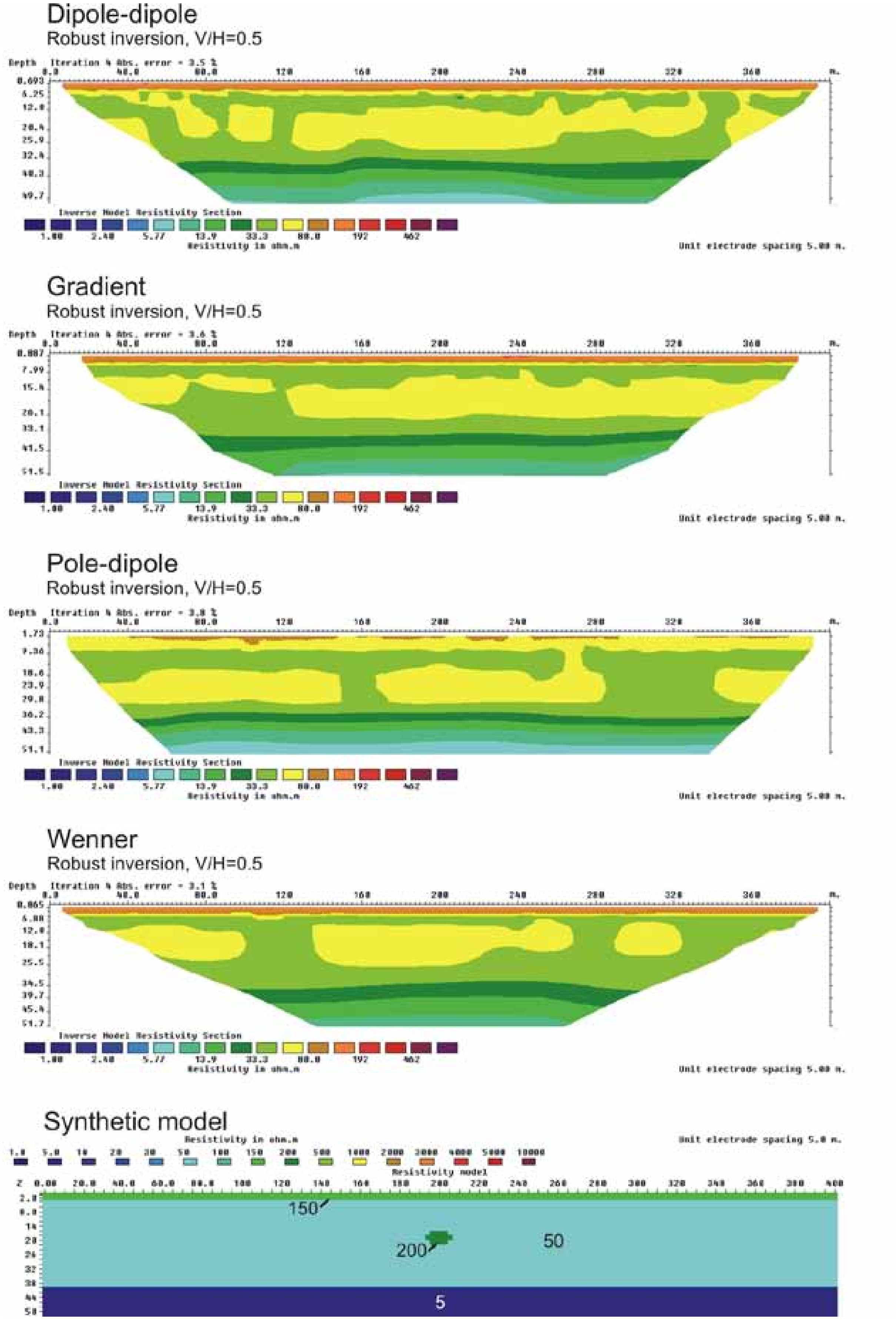

Figure 3.3.60: 3 m top layer (150 Ωm) over 50 Ωm with a lense of clay slide deposits of 200 Ωm (15 m x 6 m). Robust inversion, V/H=0.5

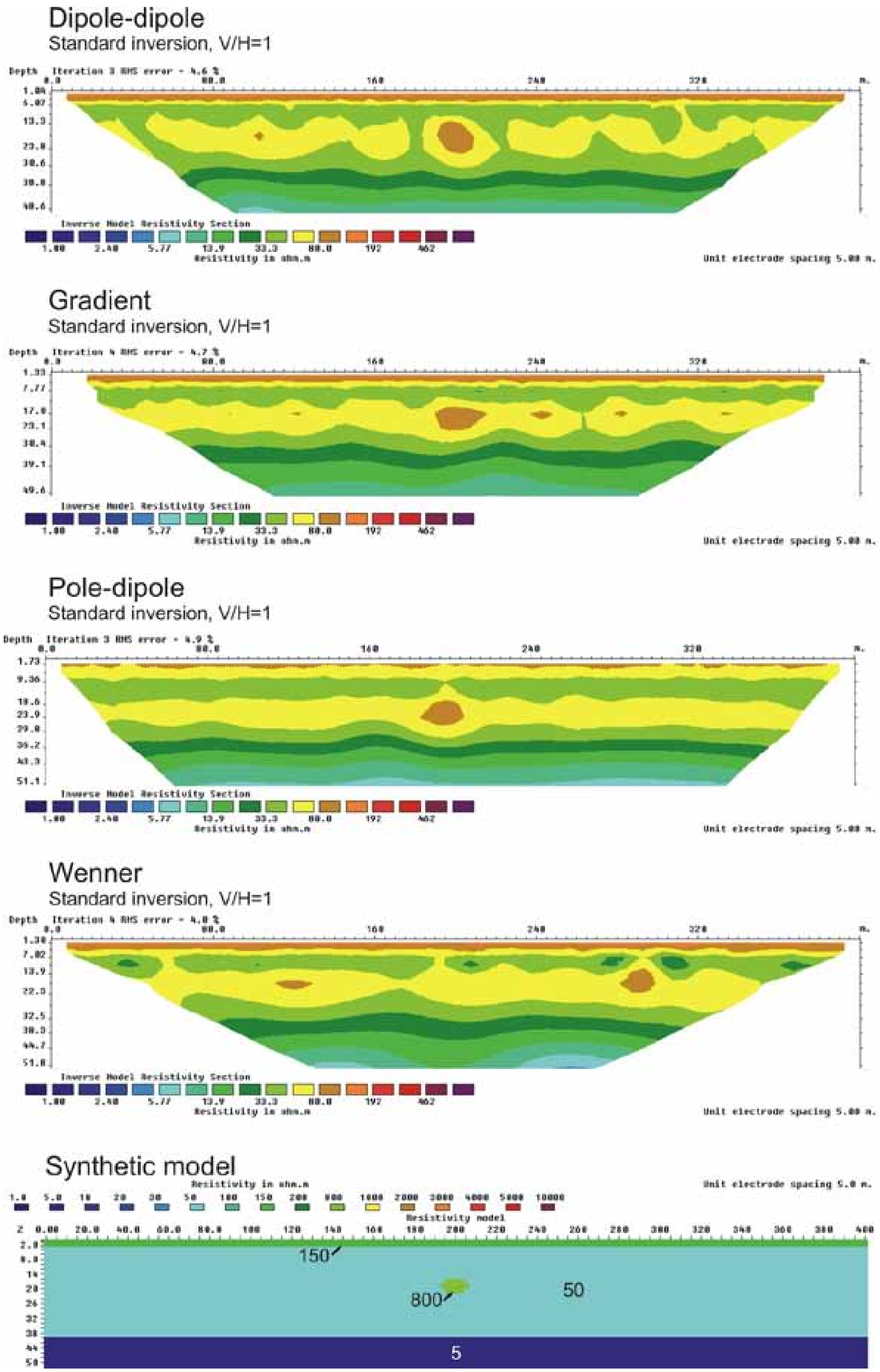

Figure 3.3.61: 3 m top layer (150 Ωm) over 50 Ωm with a lense of sand and gravel of 800 Ωm (15 m x 6 m). Standard inversion, V/H=1

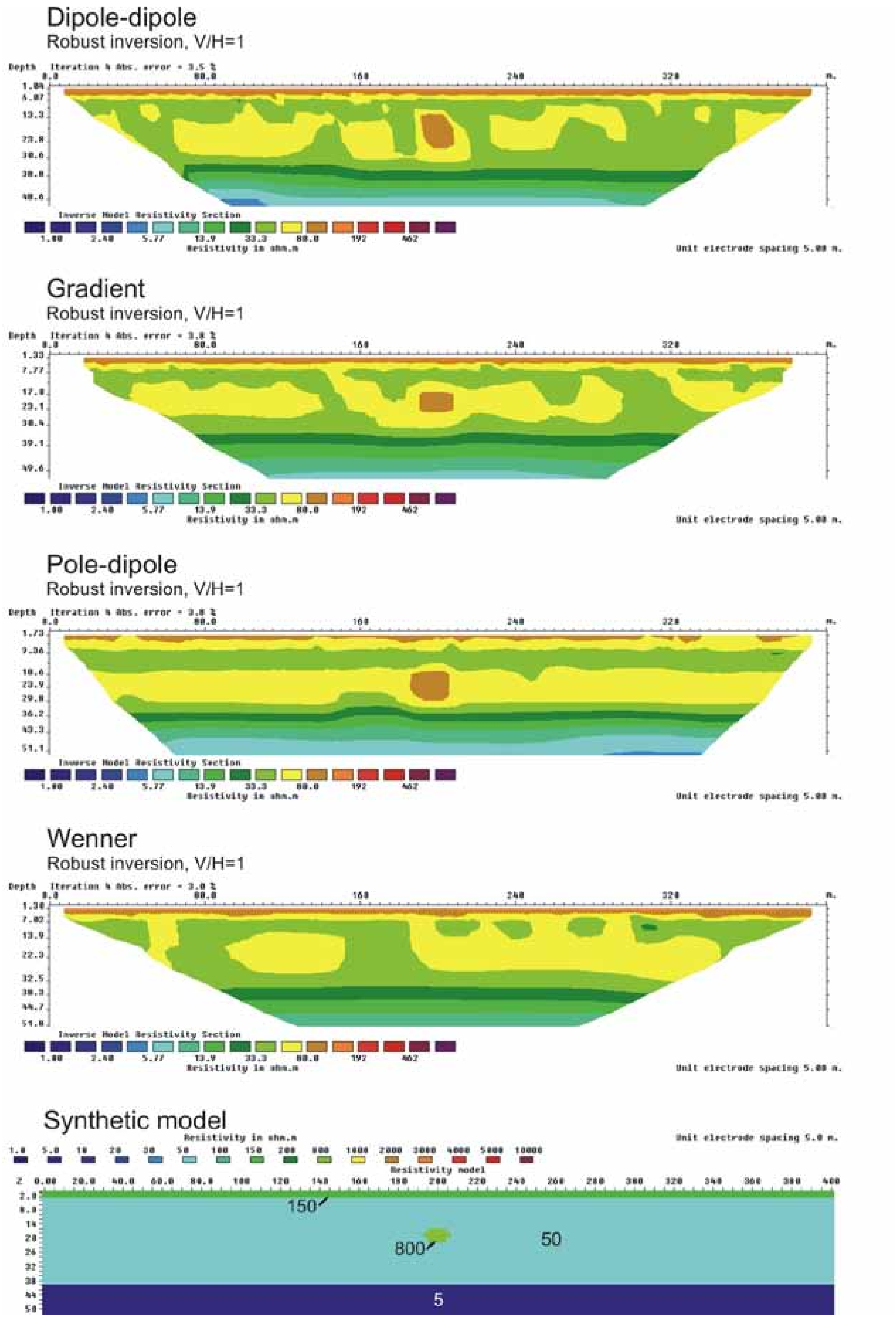

Figure 3.3.62: 3 m top layer (150 Ωm) over 50 Ωm with a lense of sand and gravel of 800 Ωm (15 m x 6 m). Robust inversion, V/H=1

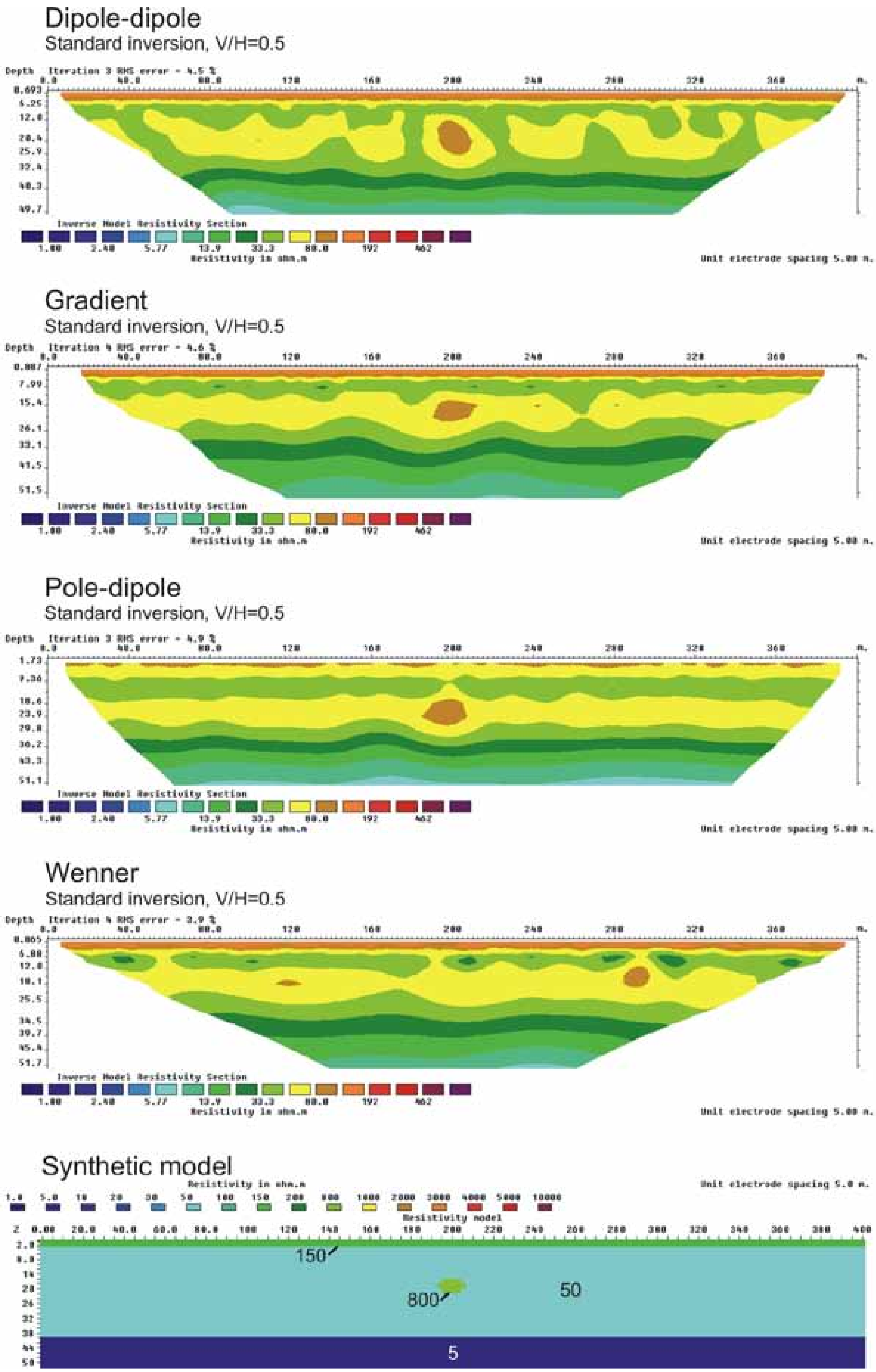

Figure 3.3.63: 3 m top layer (150 Ωm) over 50 Ωm with a lense of sand and gravel of 800 Ωm (15 m x 6 m). Standard inversion, V/H=0.5

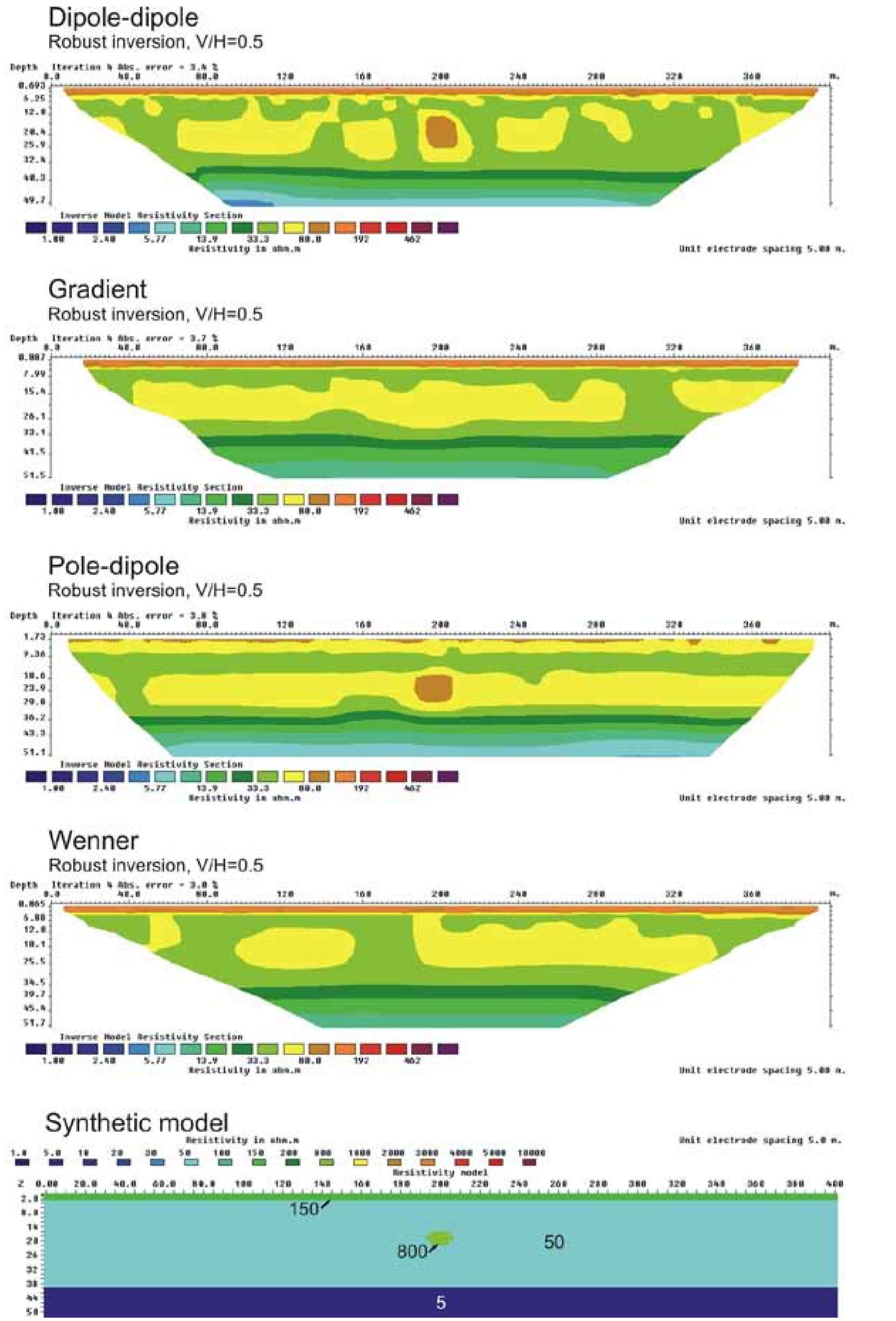

Figure 3.3.64: 3 m top layer (150 Ωm) over 50 Ωm with a lense of sand and gravel of 800 Ωm (15 m x 6 m). Robust inversion, V/H=0.5

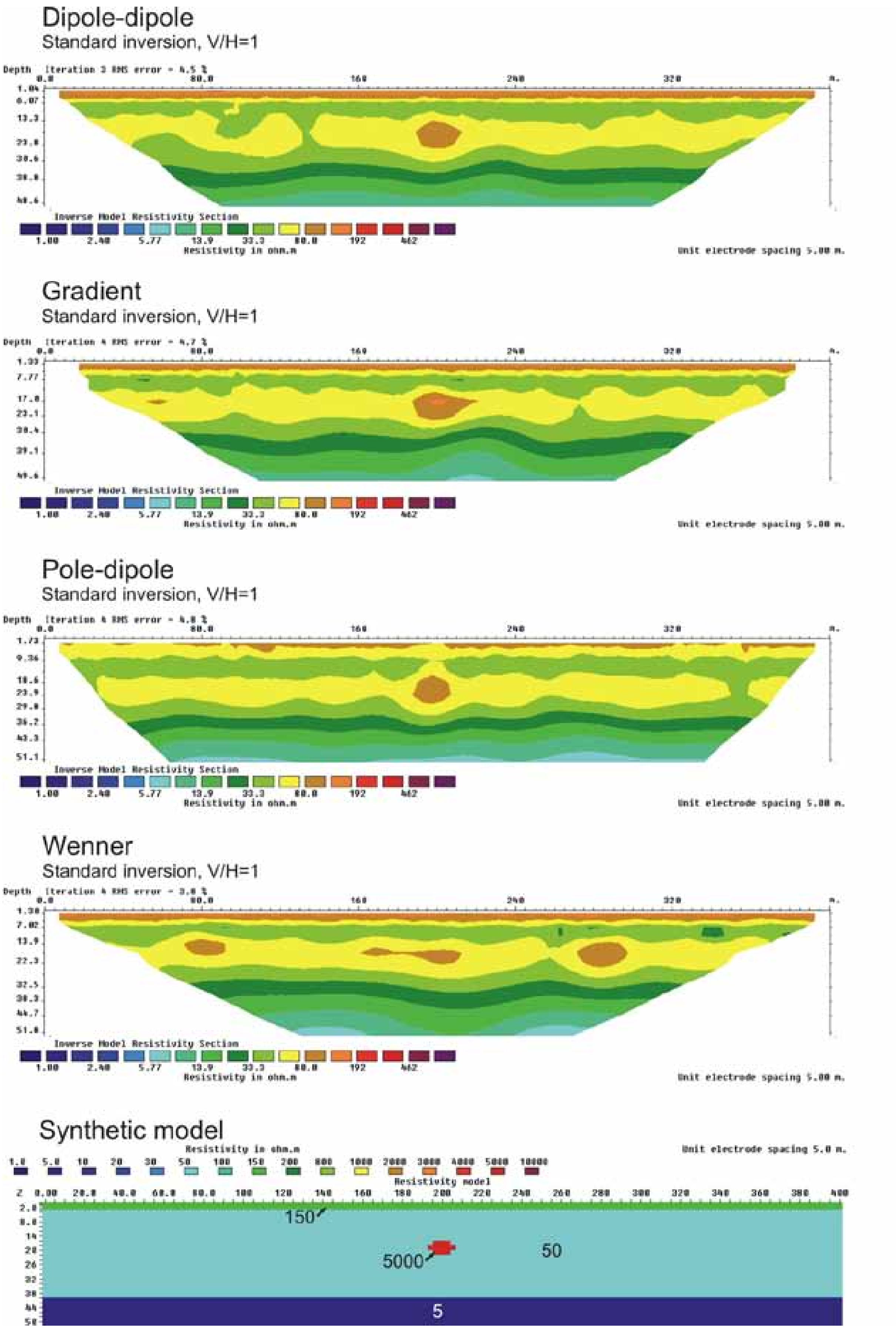

Figure 3.3.65: 3 m top layer (150 Ωm) over 50 Ωm with a rock of 5000 Ωm (15 m x 6 m). Standard inversion, V/H=1

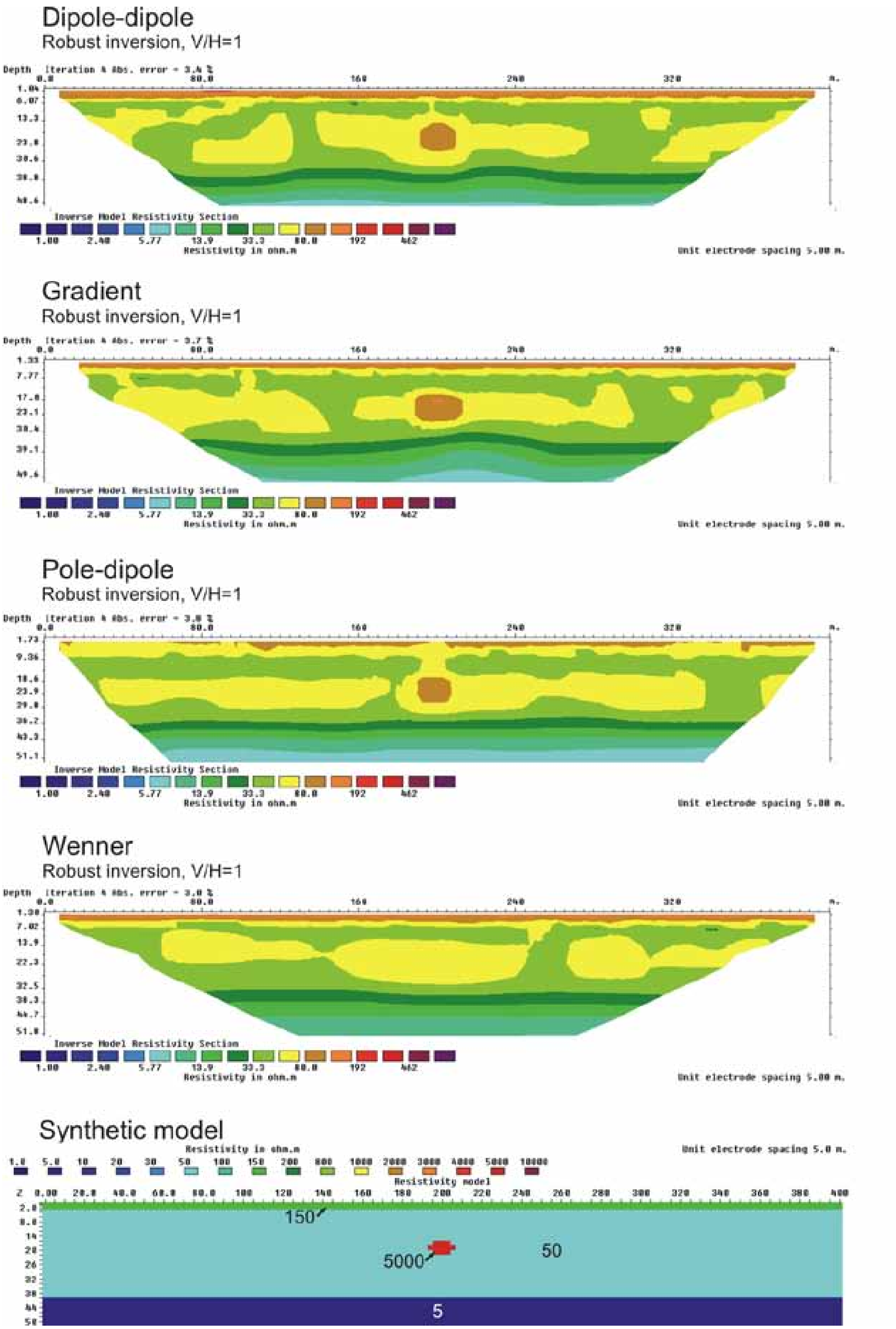

Figure 3.3.66: 3 m top layer (150 Ωm) over 50 Ωm with a rock of 5000 Ωm (15 m x 6 m). Robust inversion, V/H=1

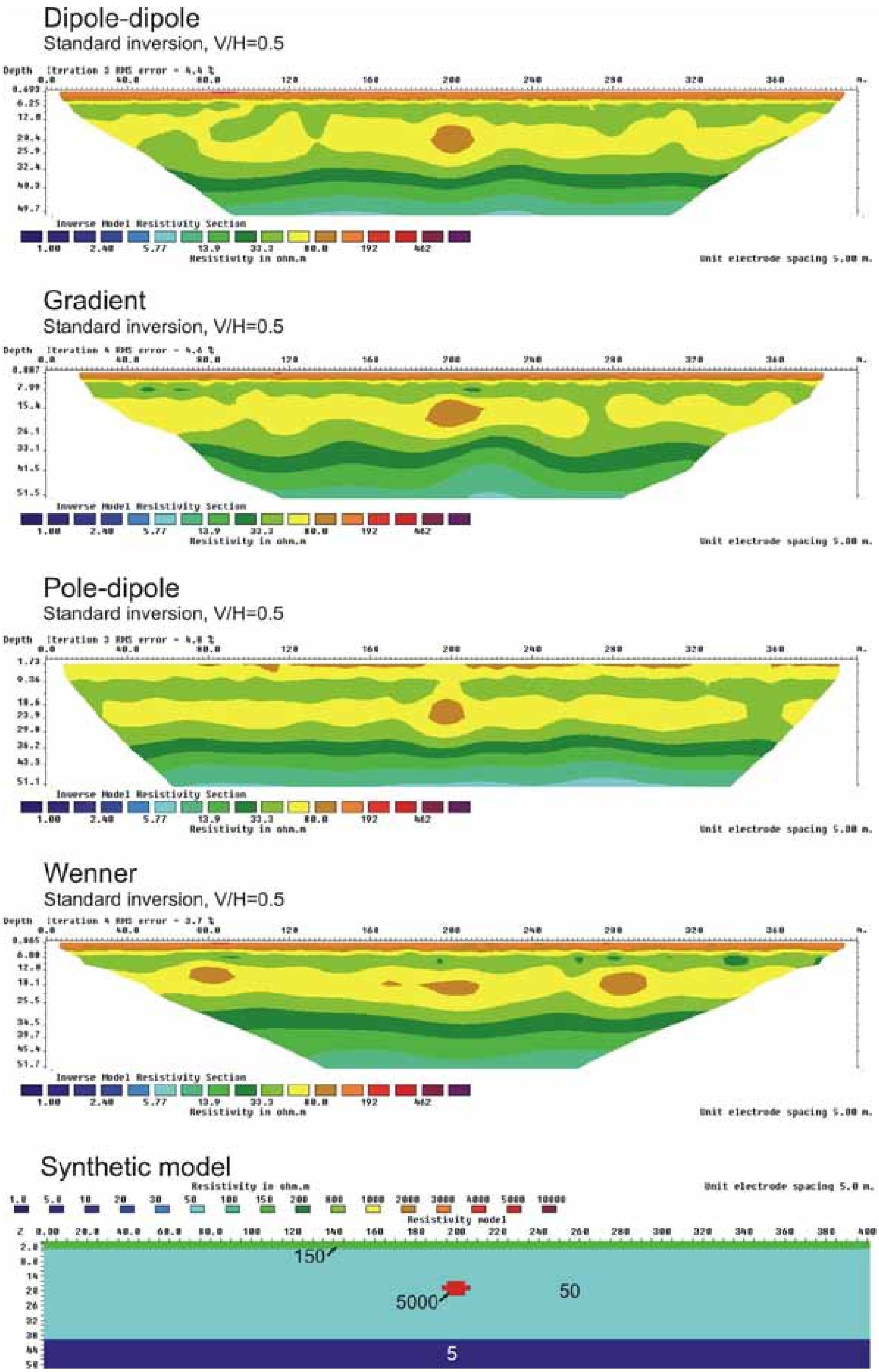

Figure 3.3.67: 3 m top layer (150 Ωm) over 50 Ωm with a rock of 5000 Ωm (15 m x 6 m). Standard inversion, V/H=0.5

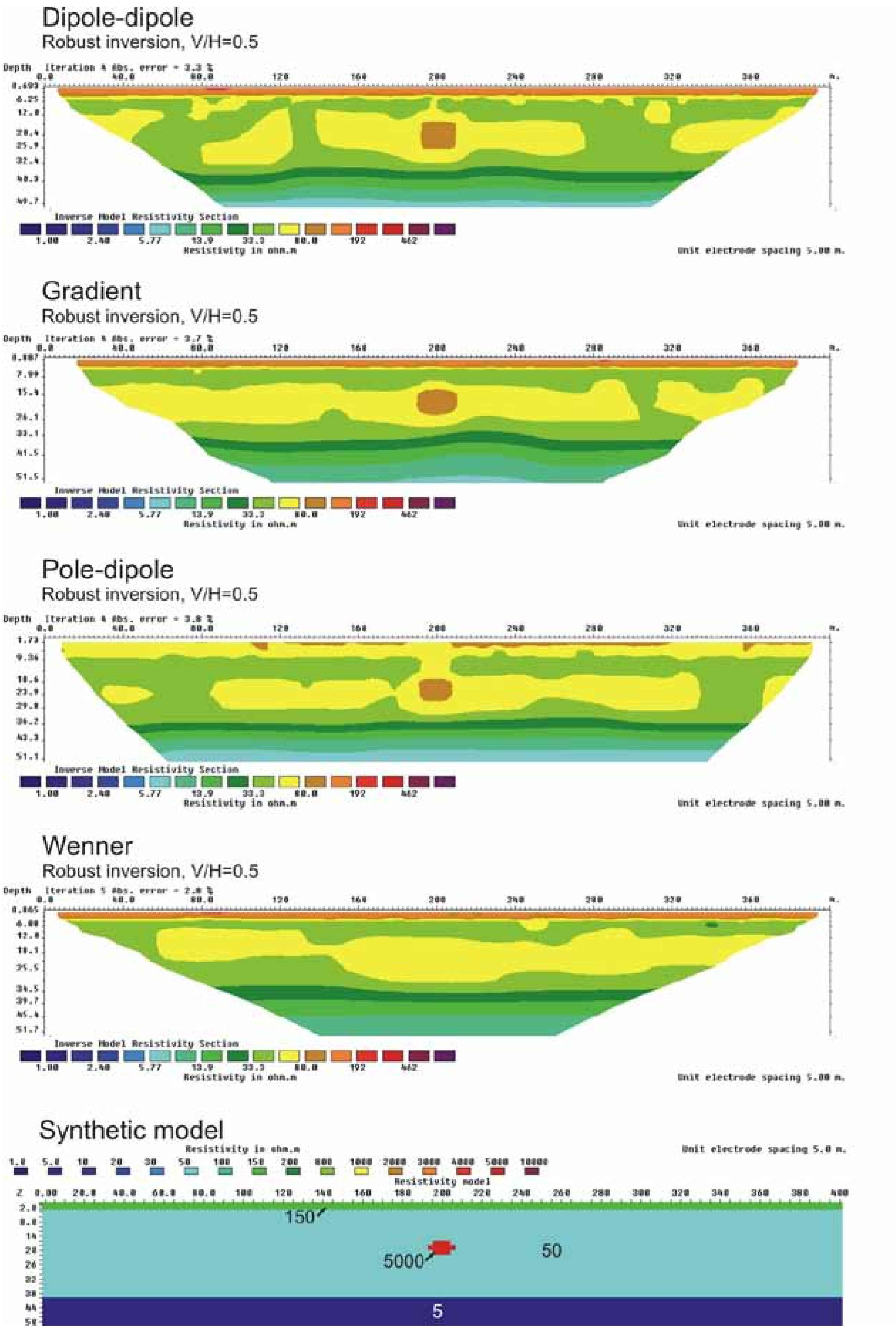

Figure 3.3.68: 3 m top layer (150 Ωm) over 50 Ωm with a rock of 5000 Ωm (15 m x 6 m). Robust inversion, V/H=0.5

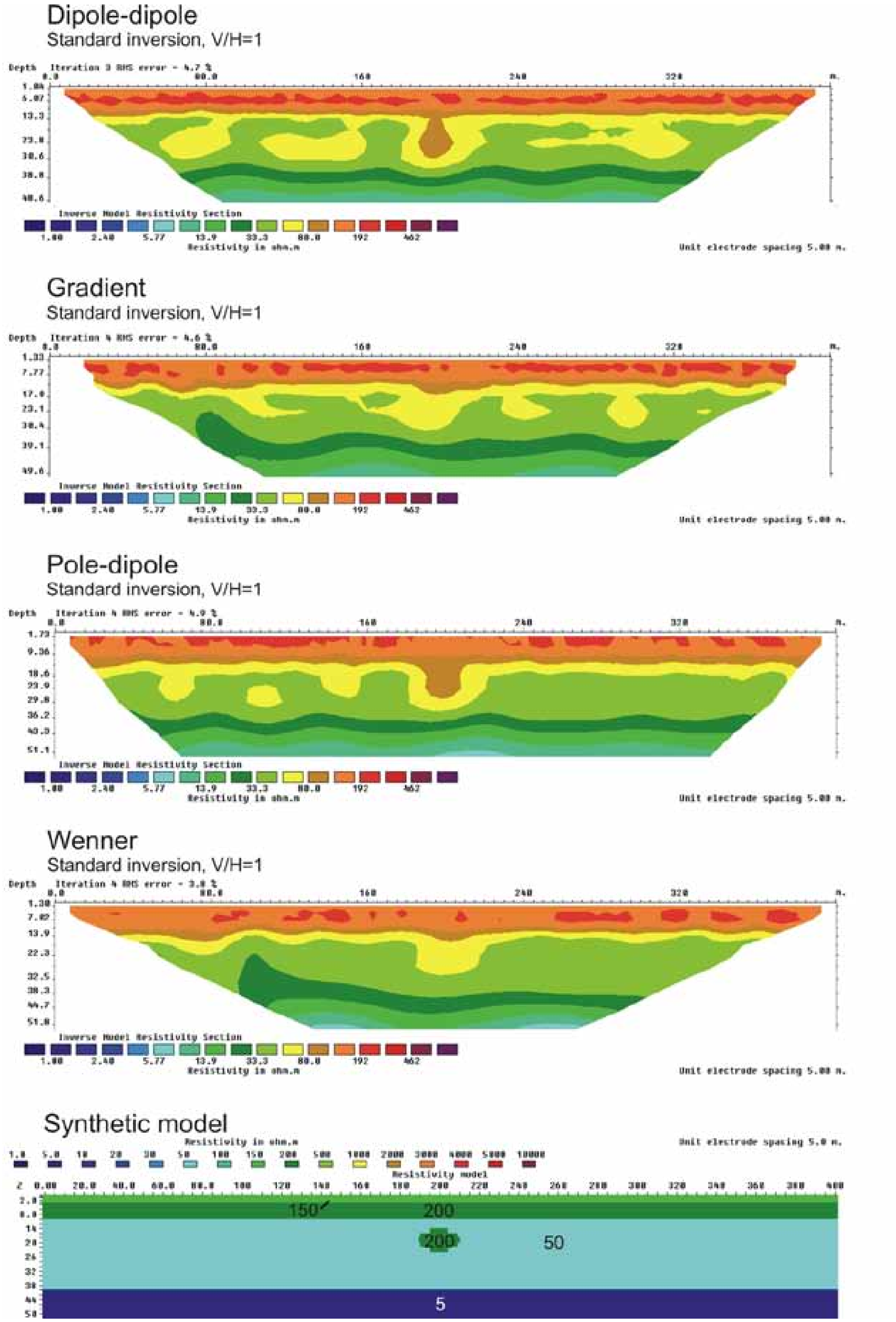

Figure 3.3.69: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of clay slide deposits of 200 Ωm (20 m x 10 m). Standard inversion, V/H=1

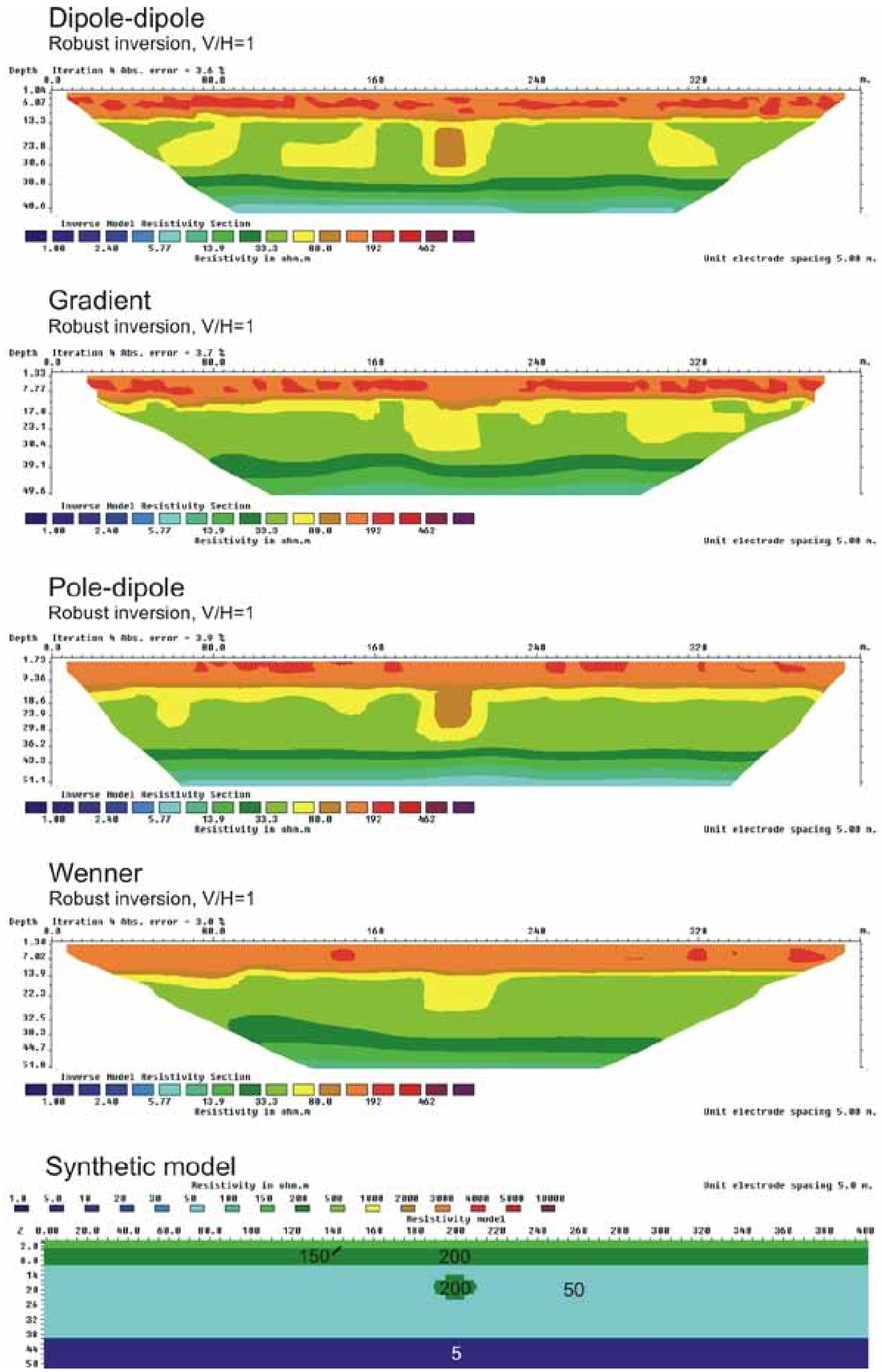

Figure 3.3.70: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of clay slide deposits of 200 Ωm (20 m x 10 m). Robust inversion, V/H=1

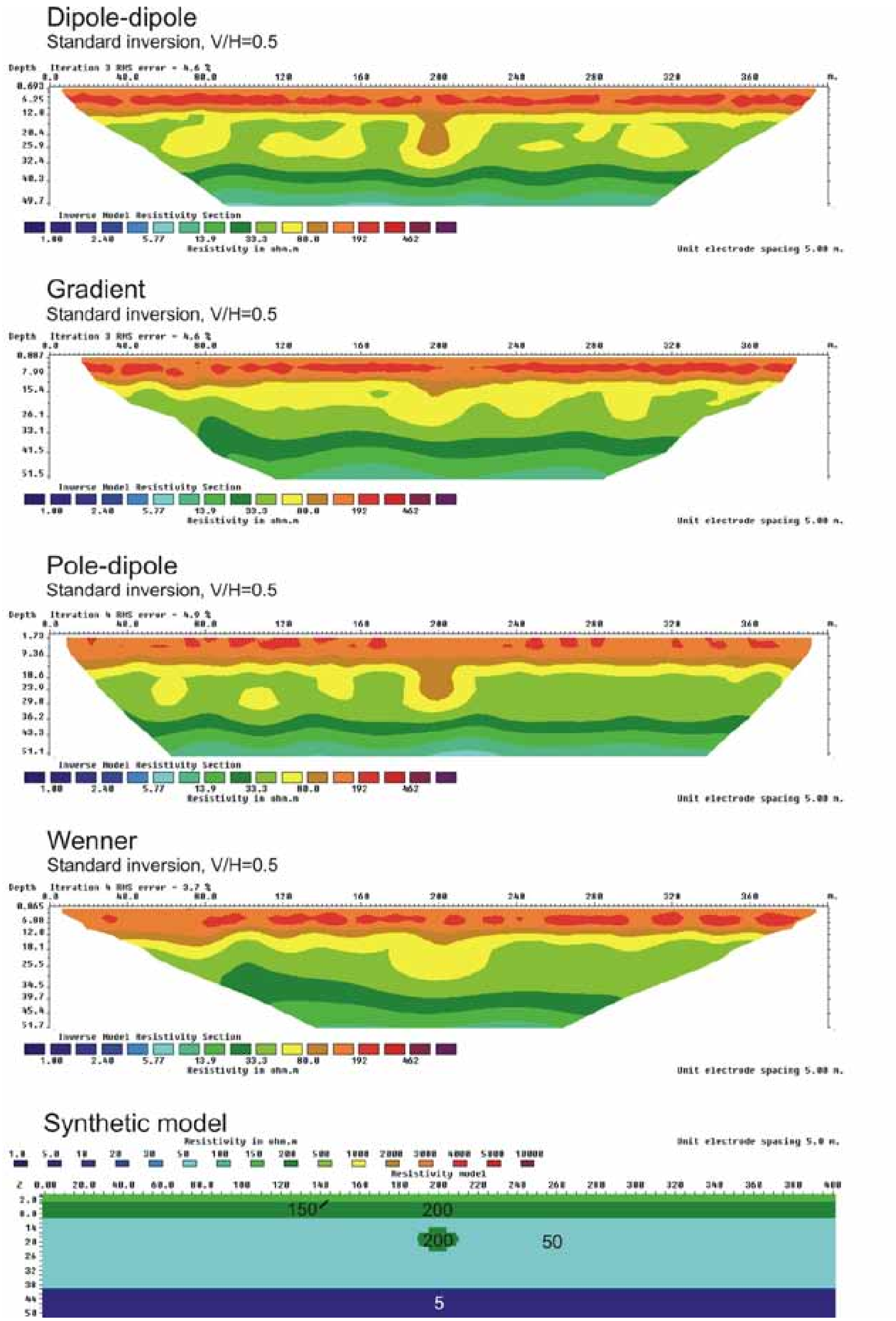

Figure 3.3.71: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of clay slide deposits of 200 Ωm (20 m x 10 m). Standard inversion, V/H=0.5

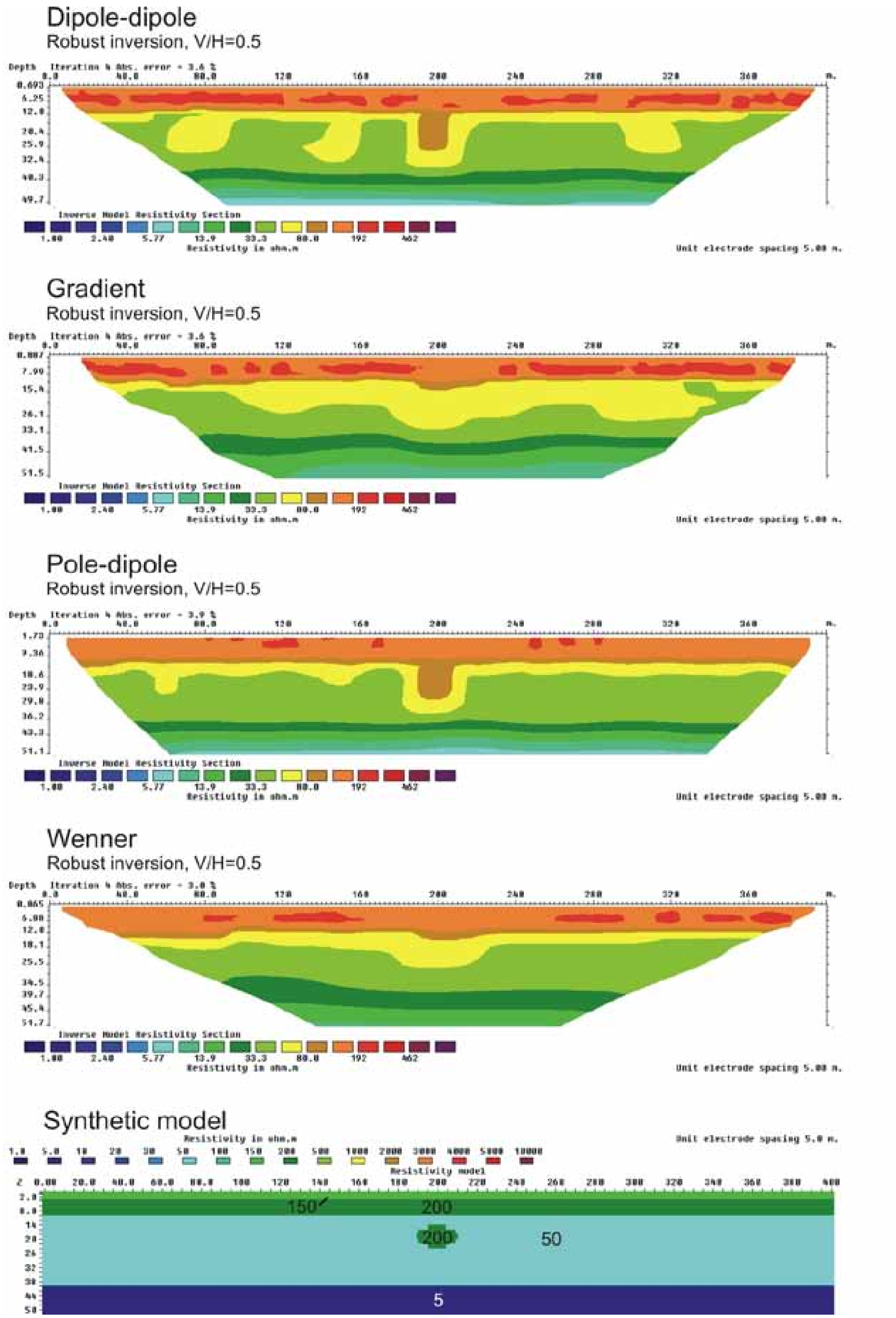

Figure 3.3.72: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of clay slide deposits of 200 Ωm (20 m x 10 m). Robust inversion, V/H=0.5

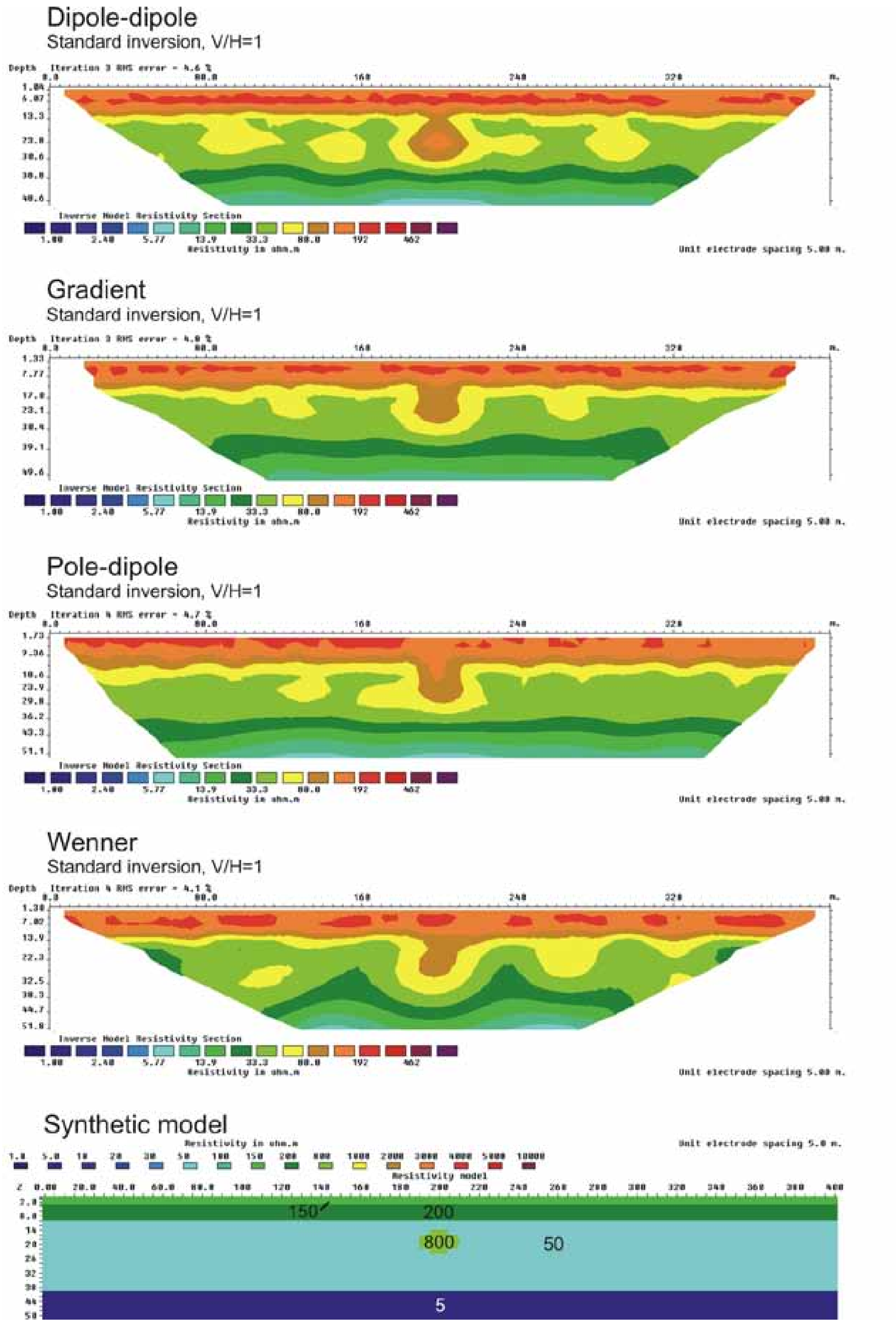

Figure 3.3.73: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of sand and gravel of 800 Ωm (20 m x 10 m). Standard inversion, V/H=1

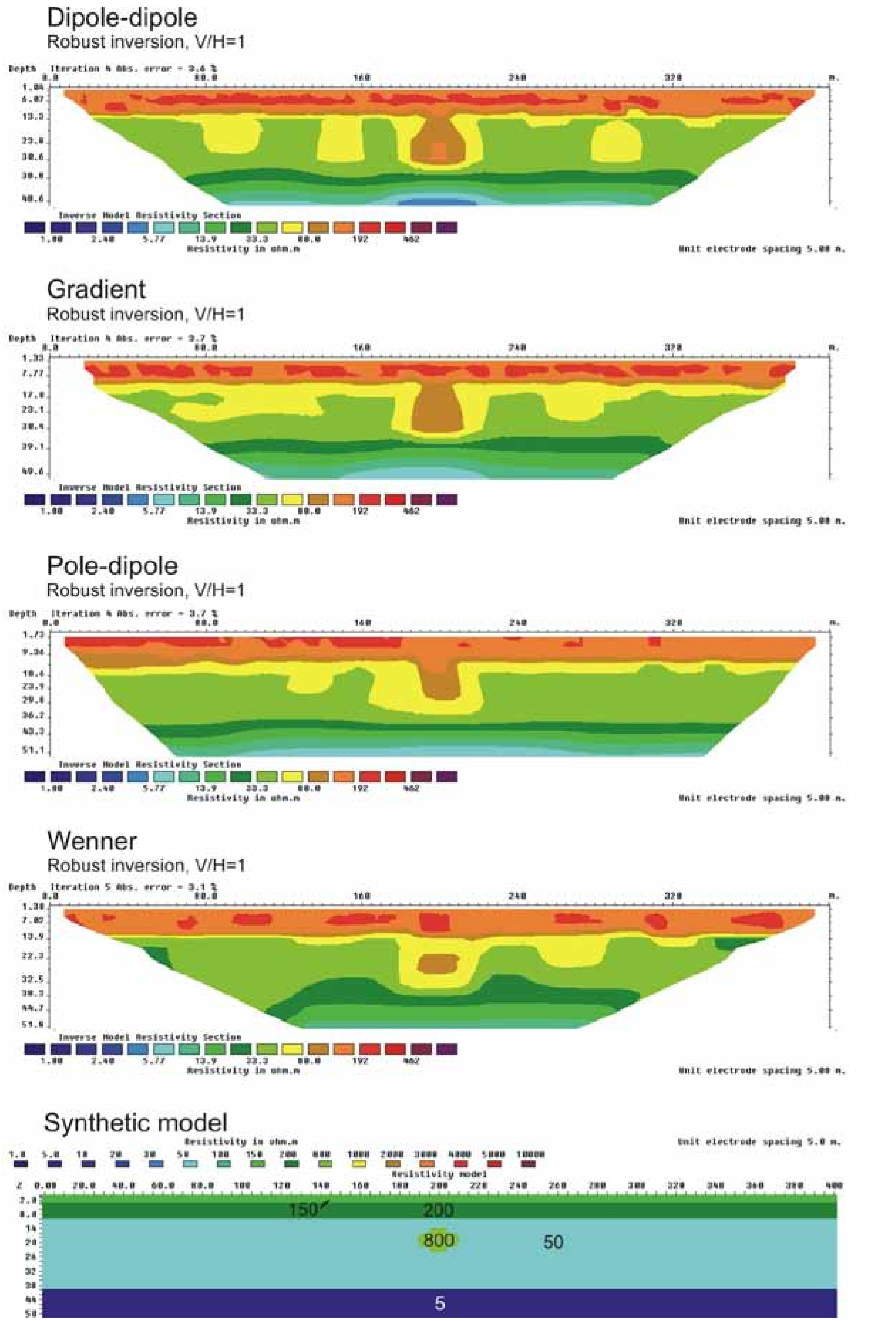

Figure 3.3.74: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of sand and gravel of 800 Ωm (20 m x 10 m). Robust inversion, V/H=1

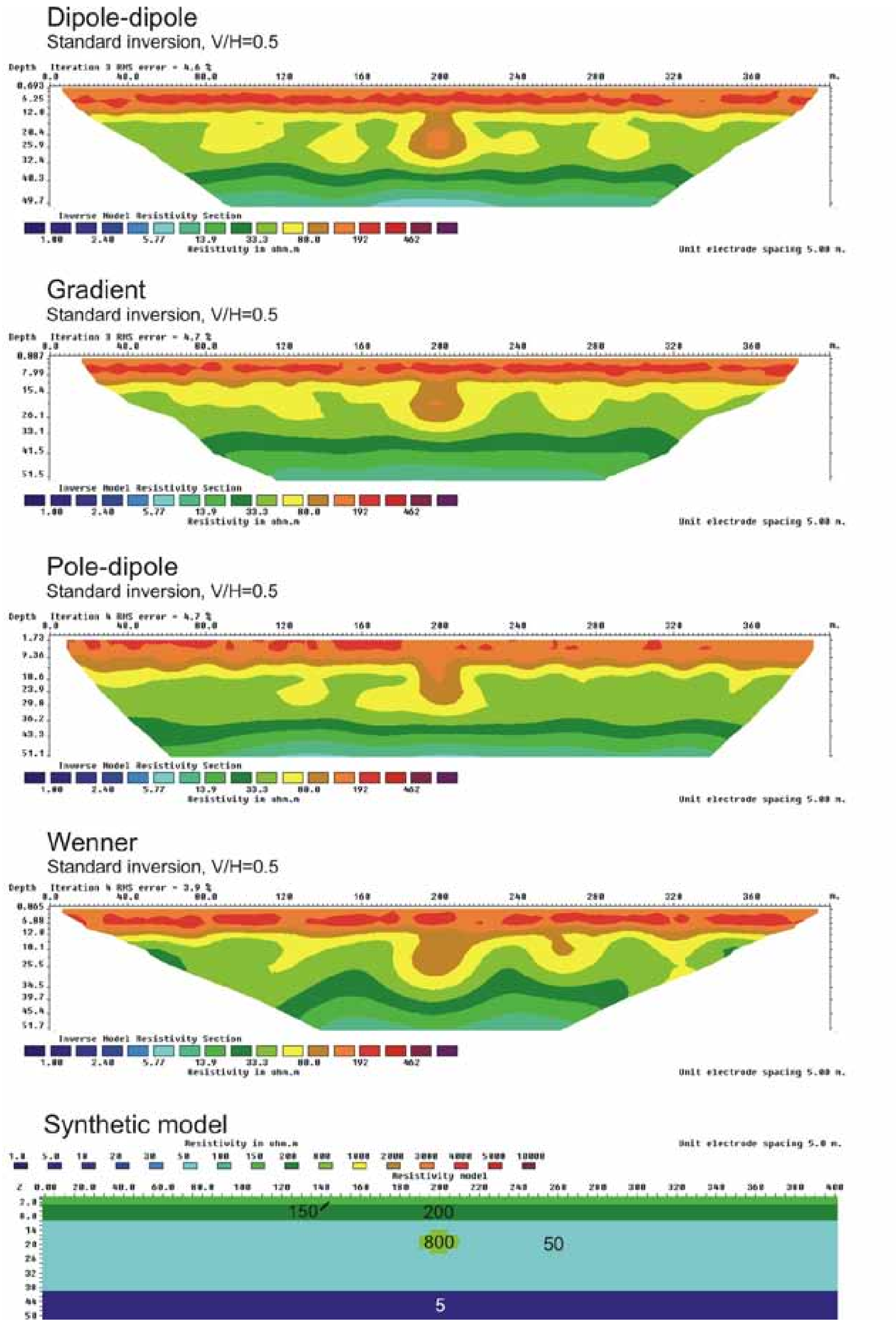

Figure 3.3.75: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of sand and gravel of 800 Ωm (20 m x 10 m). Standard inversion, V/H=0.5

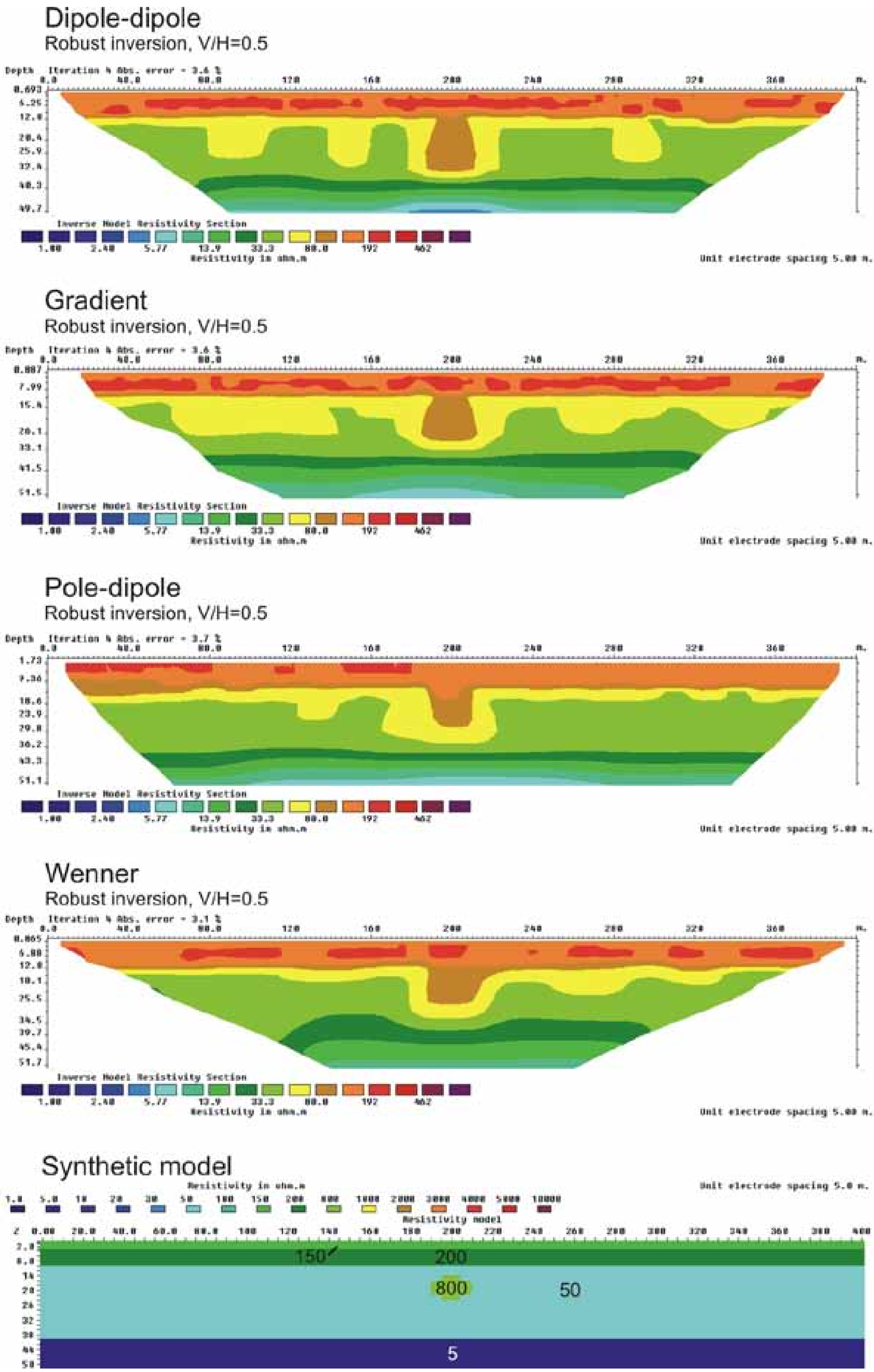

Figure 3.3.76: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of sand and gravel of 800 Ωm (20 m x 10 m). Robust inversion, V/H=0.5

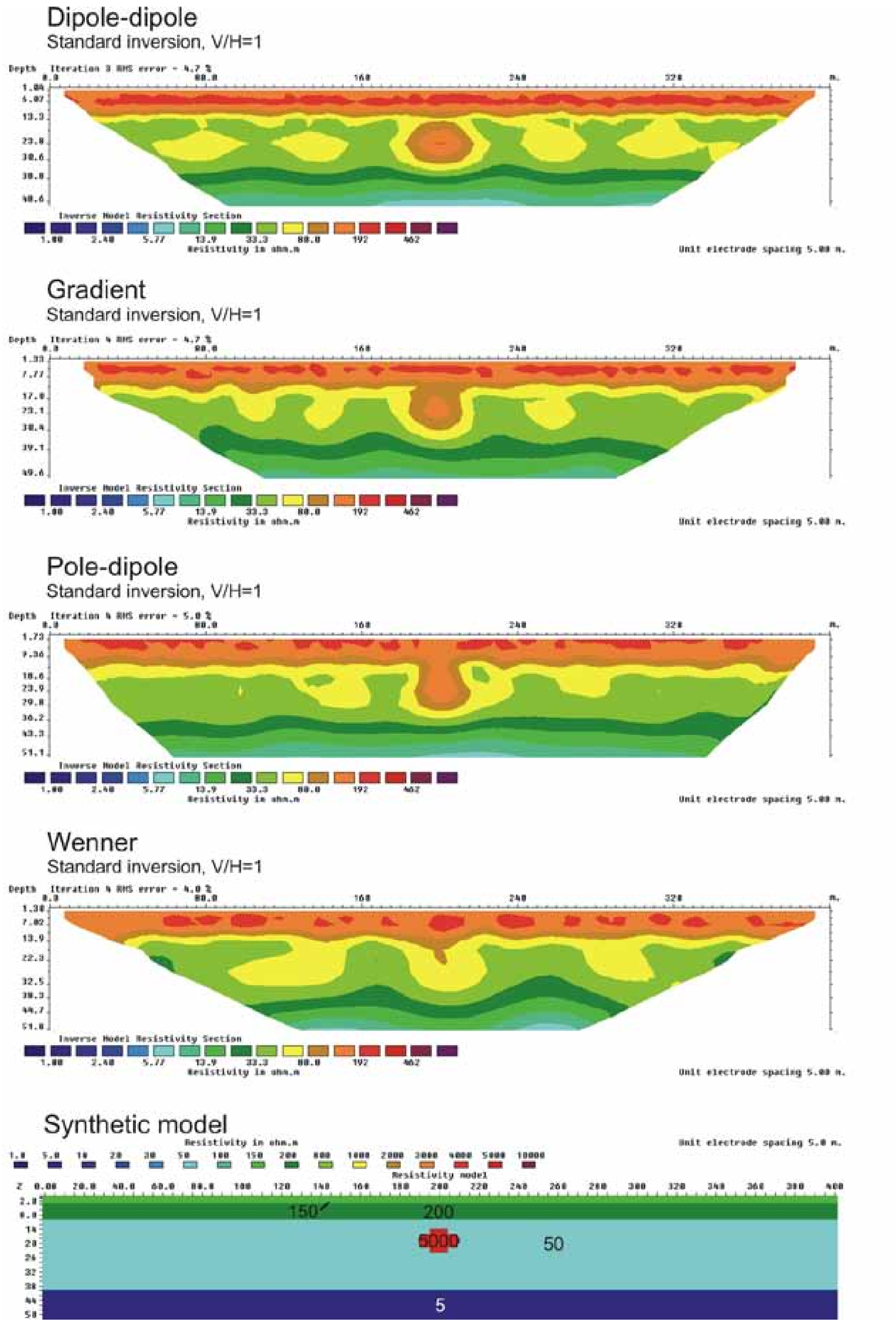

Figure 3.3.77: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a rock of 5000 Ωm (20 m x 10 m). Standard inversion, V/H=1

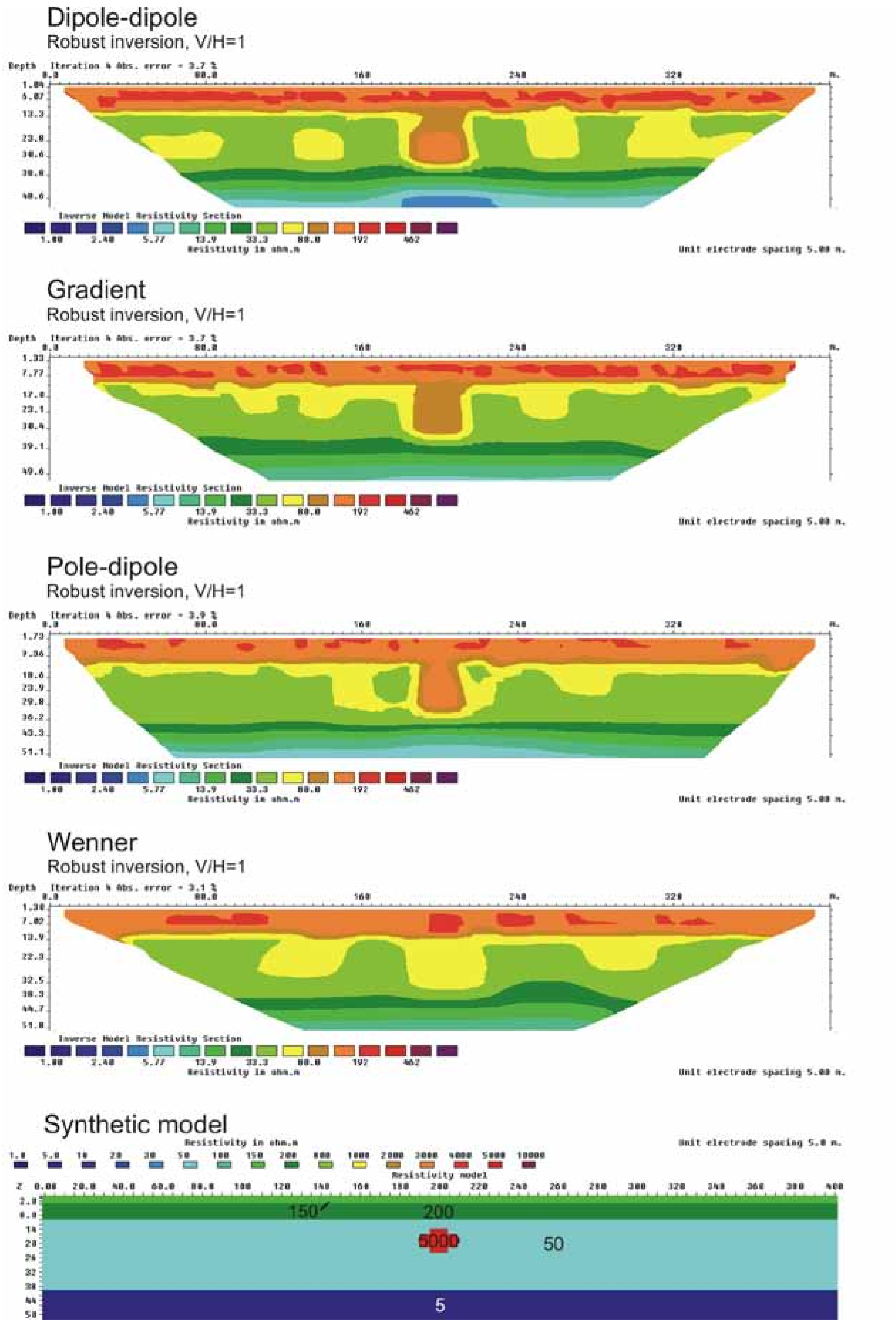

Figure 3.3.78: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a rock of 5000 Ωm (20 m x 10 m). Robust inversion, V/H=1

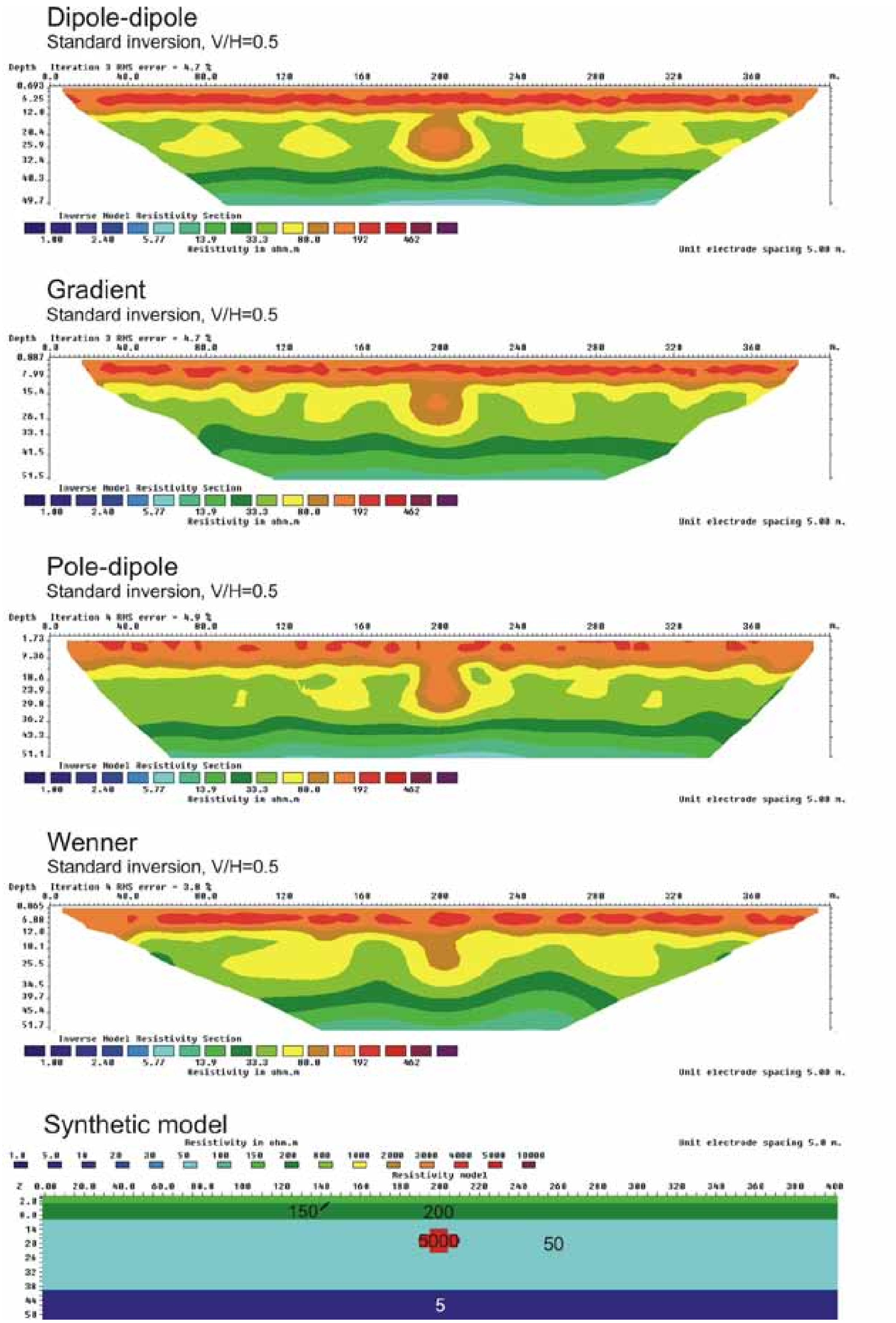

Figure 3.3.79: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a rock of 5000 Ωm (20 m x 10 m). Standard inversion, V/H=0.5

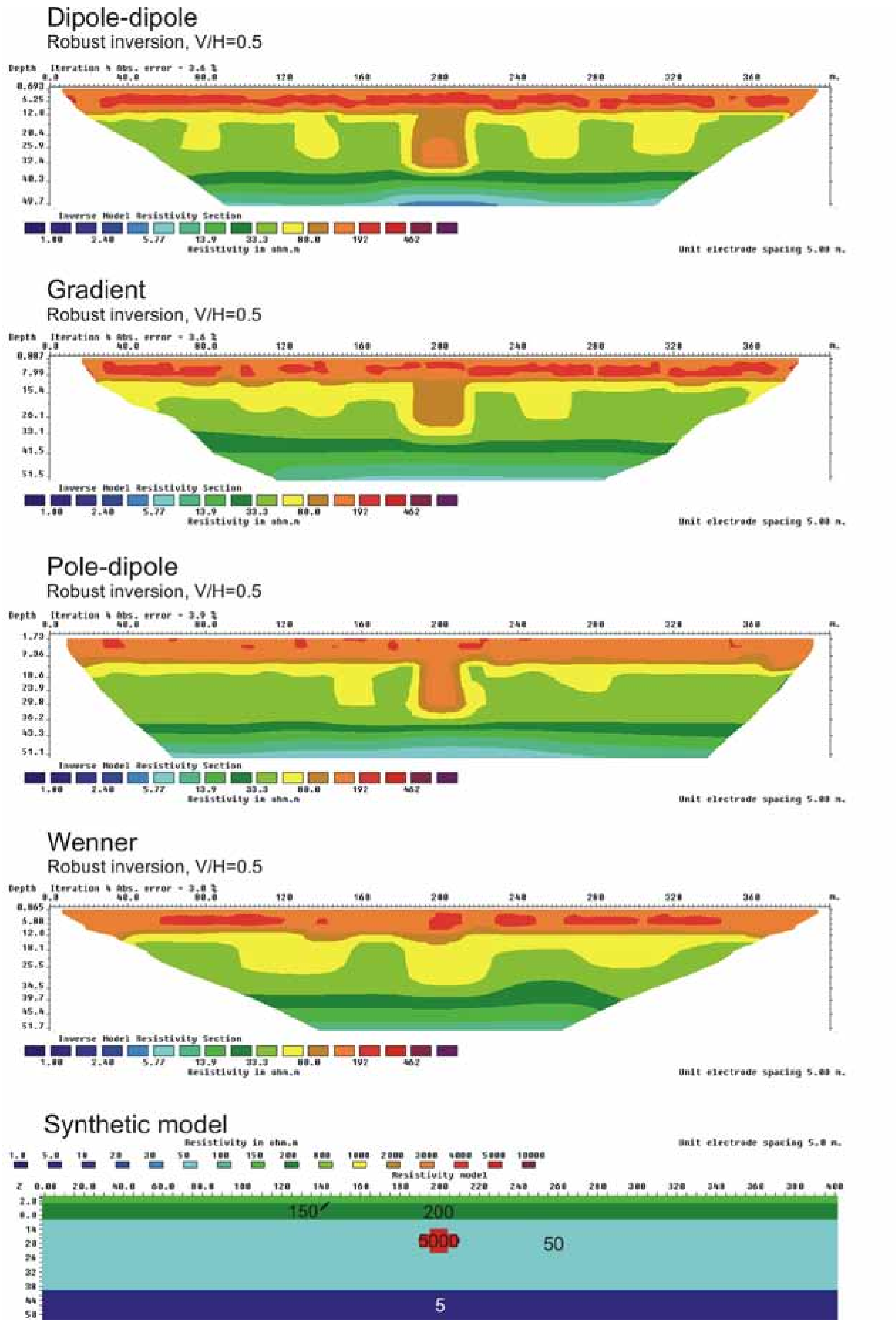

Figure 3.3.80: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a rock of 5000 Ωm (20 m x 10 m). Robust inversion, V/H=0.5

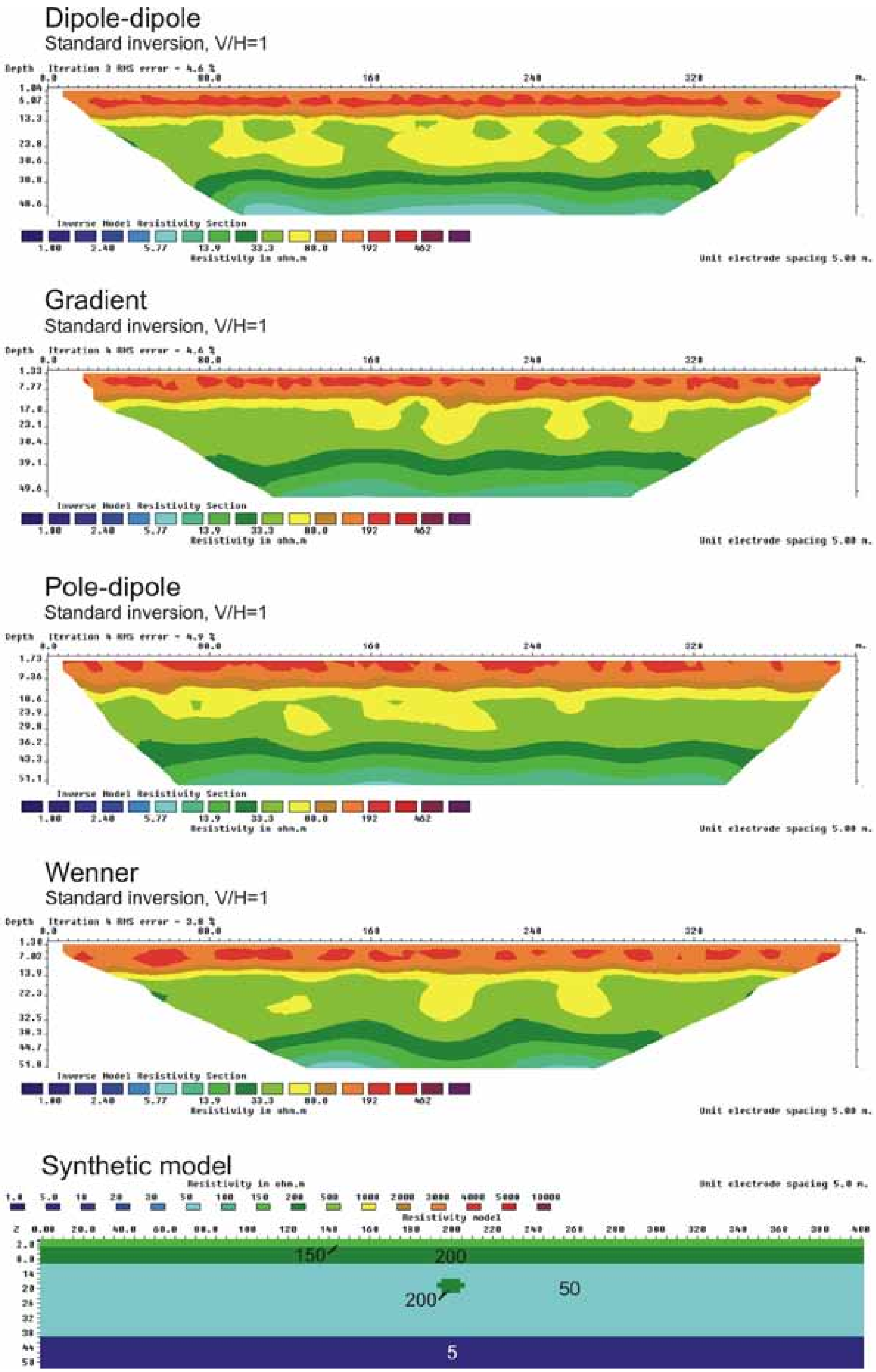

Figure 3.3.81: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of clay slide deposits of 200 Ωm (15 m x 6 m). Standard inversion, V/H=1

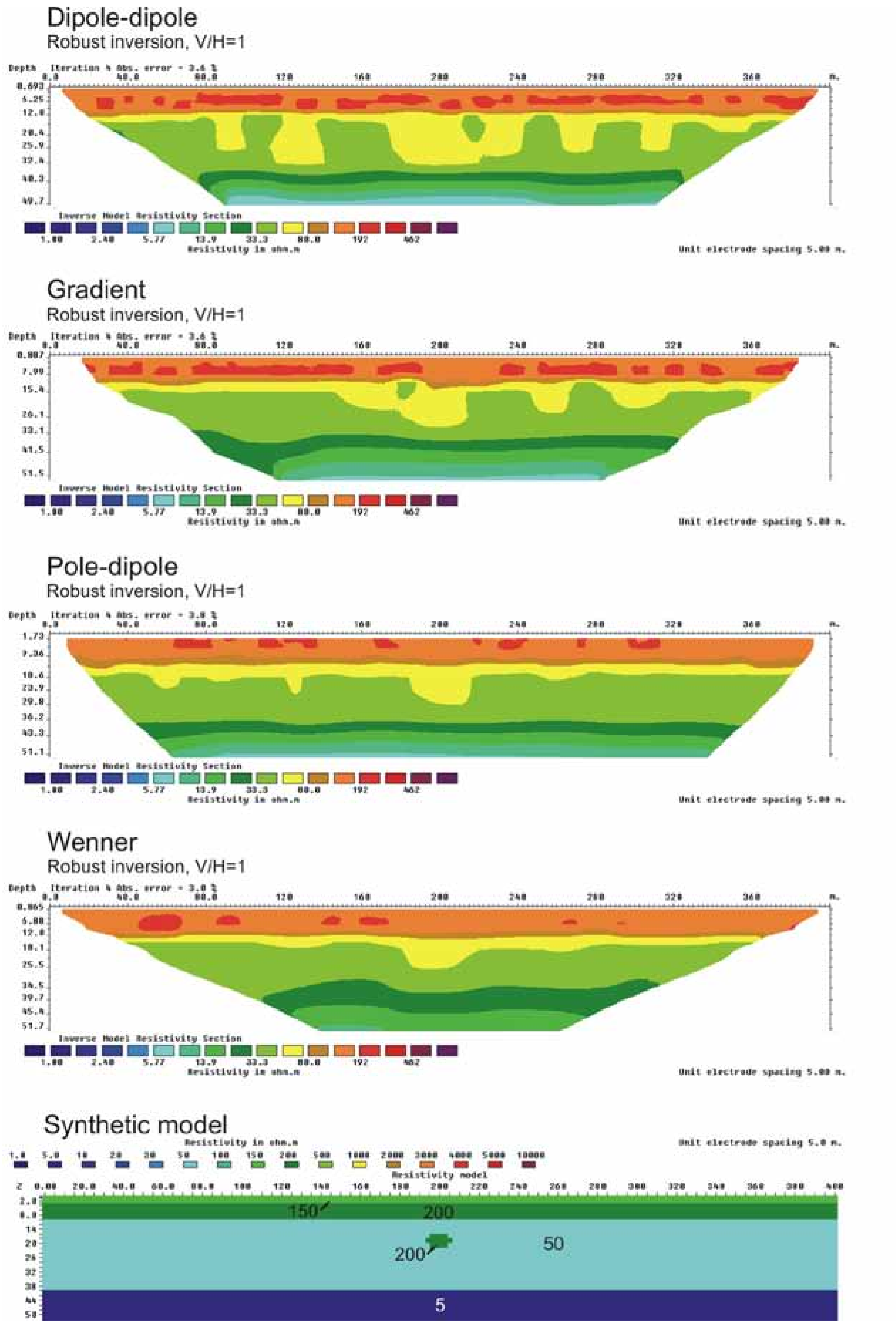

Figure 3.3.82: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of clay slide deposits of 200 Ωm (15 m x 6 m). Robust inversion, V/H=1.

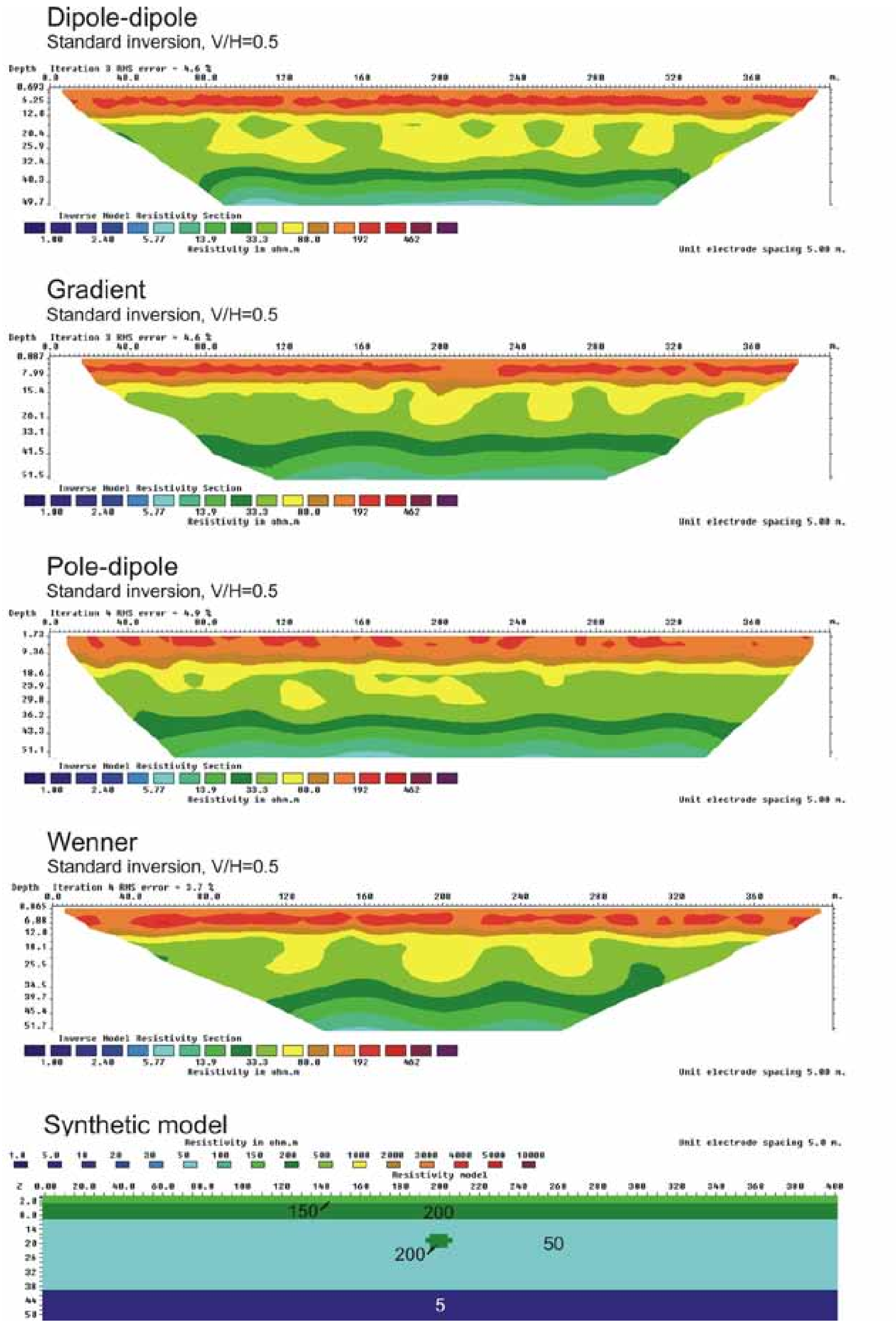

Figure 3.3.83: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of clay slide deposits of 200 Ωm (15 m x 6 m). Standard inversion, V/H=0.5

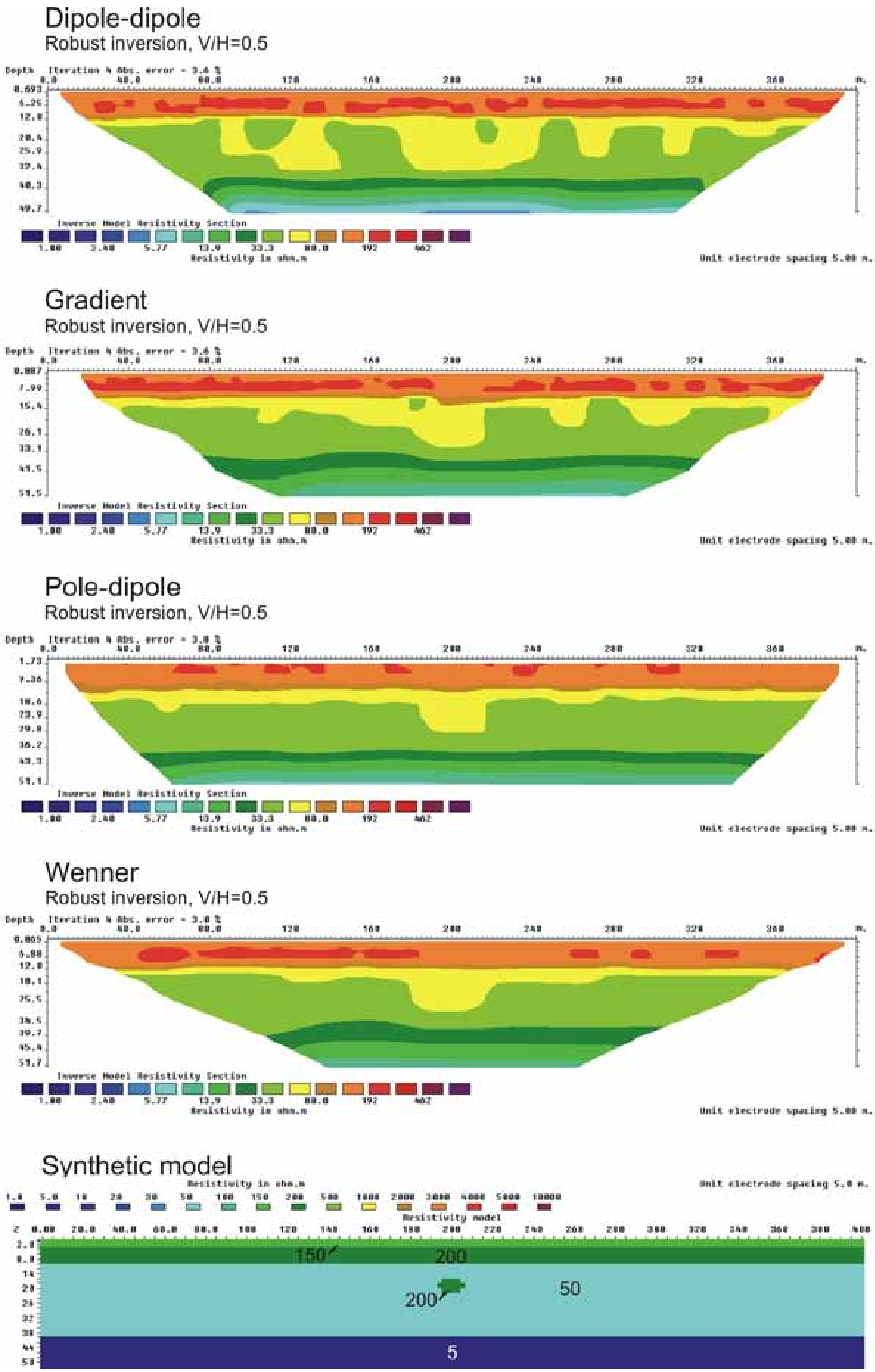

Figure 3.3.84: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of clay slide deposits of 200 Ωm (15 m x 6 m). Robust inversion, V/H=0.5

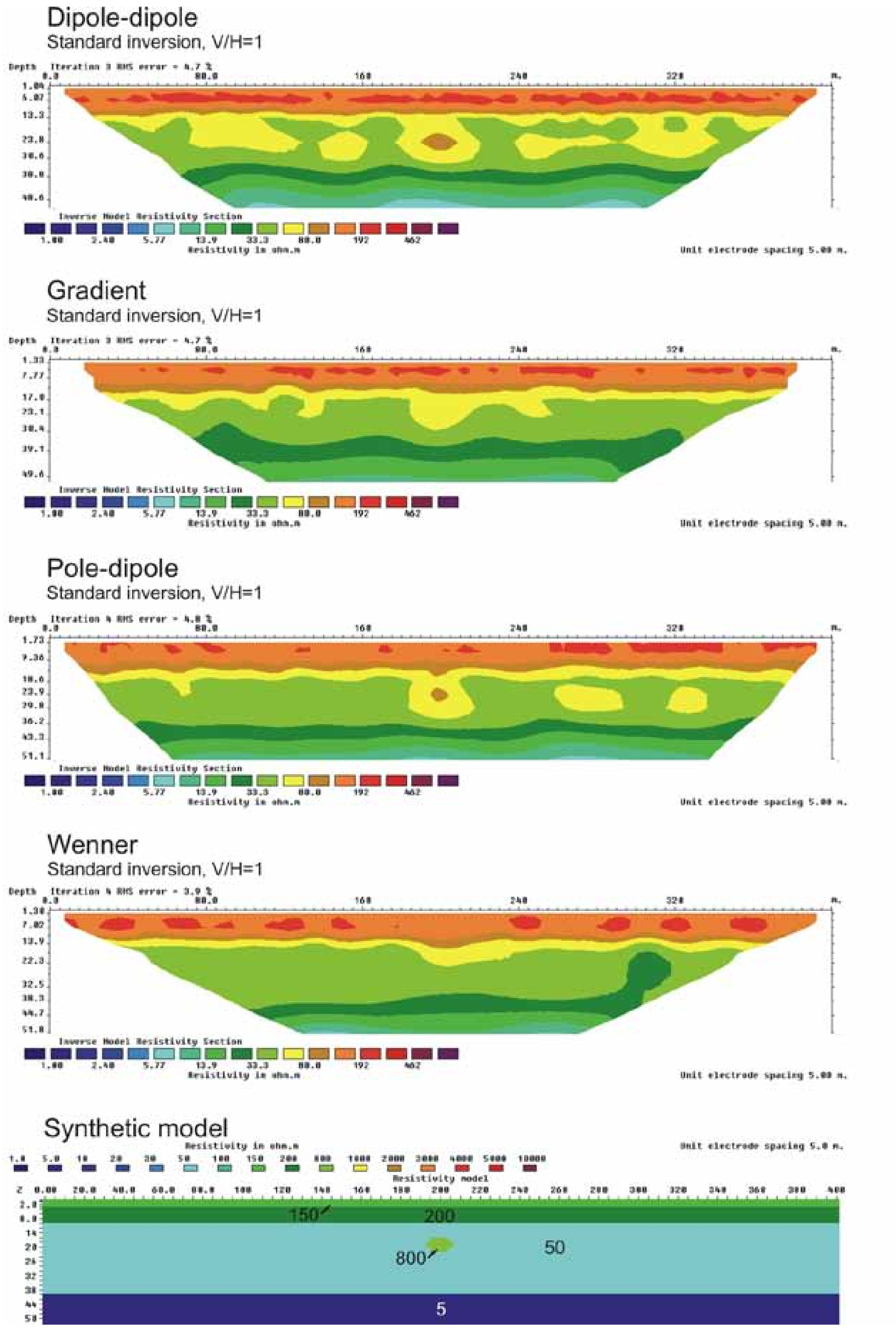

Figure 3.3.85: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of sand and gravel of 800 Ωm (15 m x 6 m). Standard inversion, V/H=1

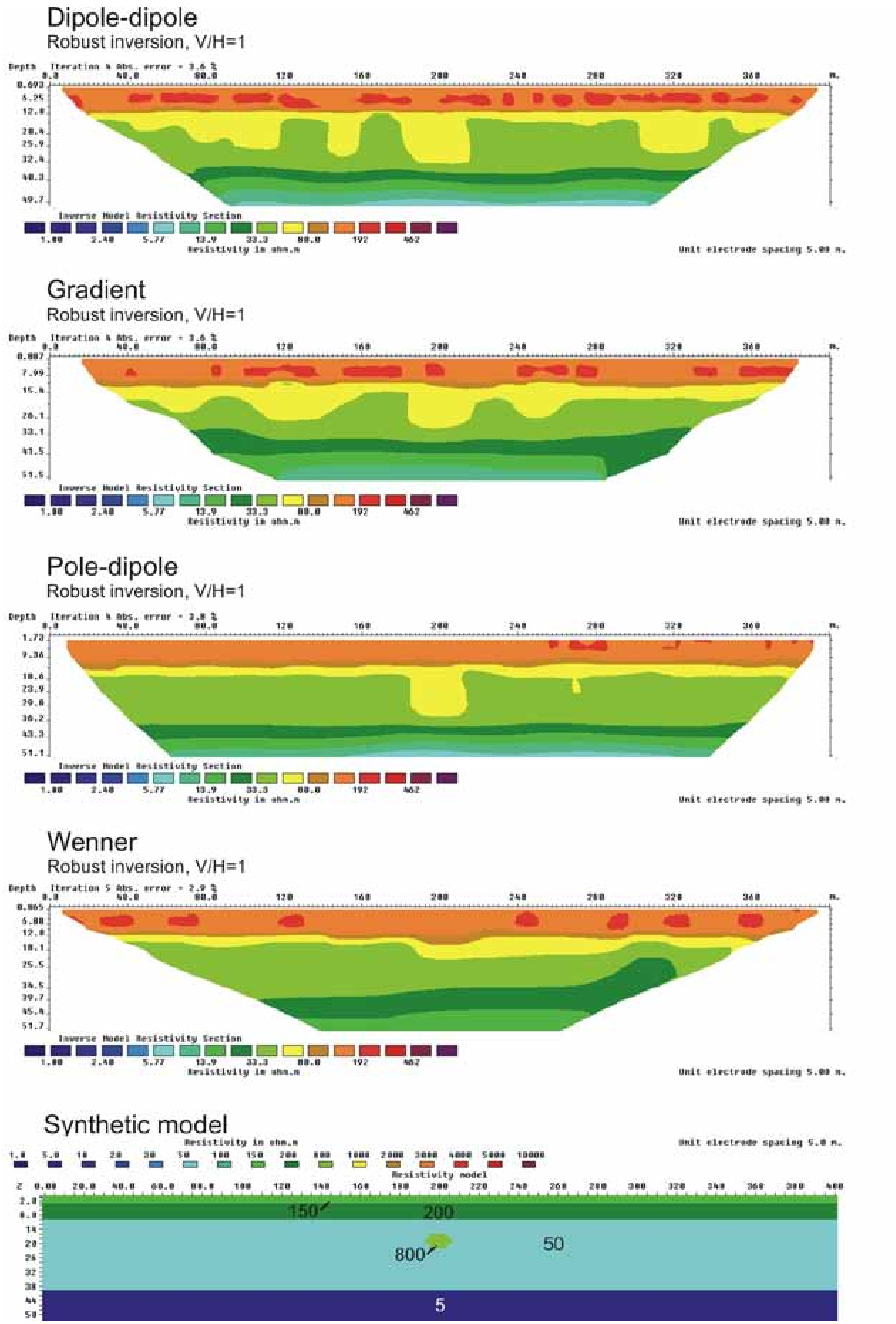

Figure 3.3.86: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of sand and gravel of 800 Ωm (15 m x 6 m). Robust inversion, V/H=1

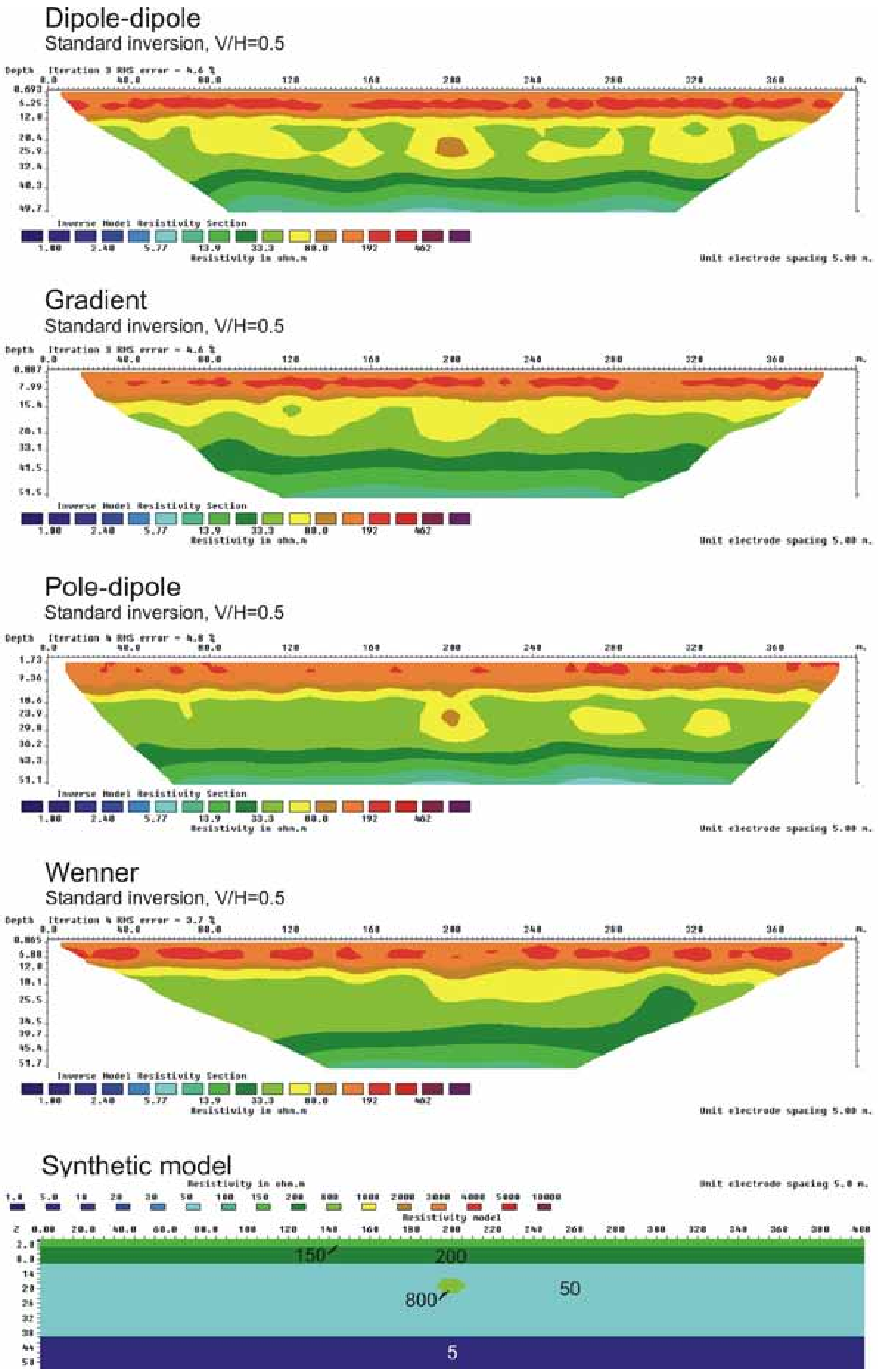

Figure 3.3.87: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of sand and gravel of 800 Ωm (15 m x 6 m). Standard inversion, V/H=0.5

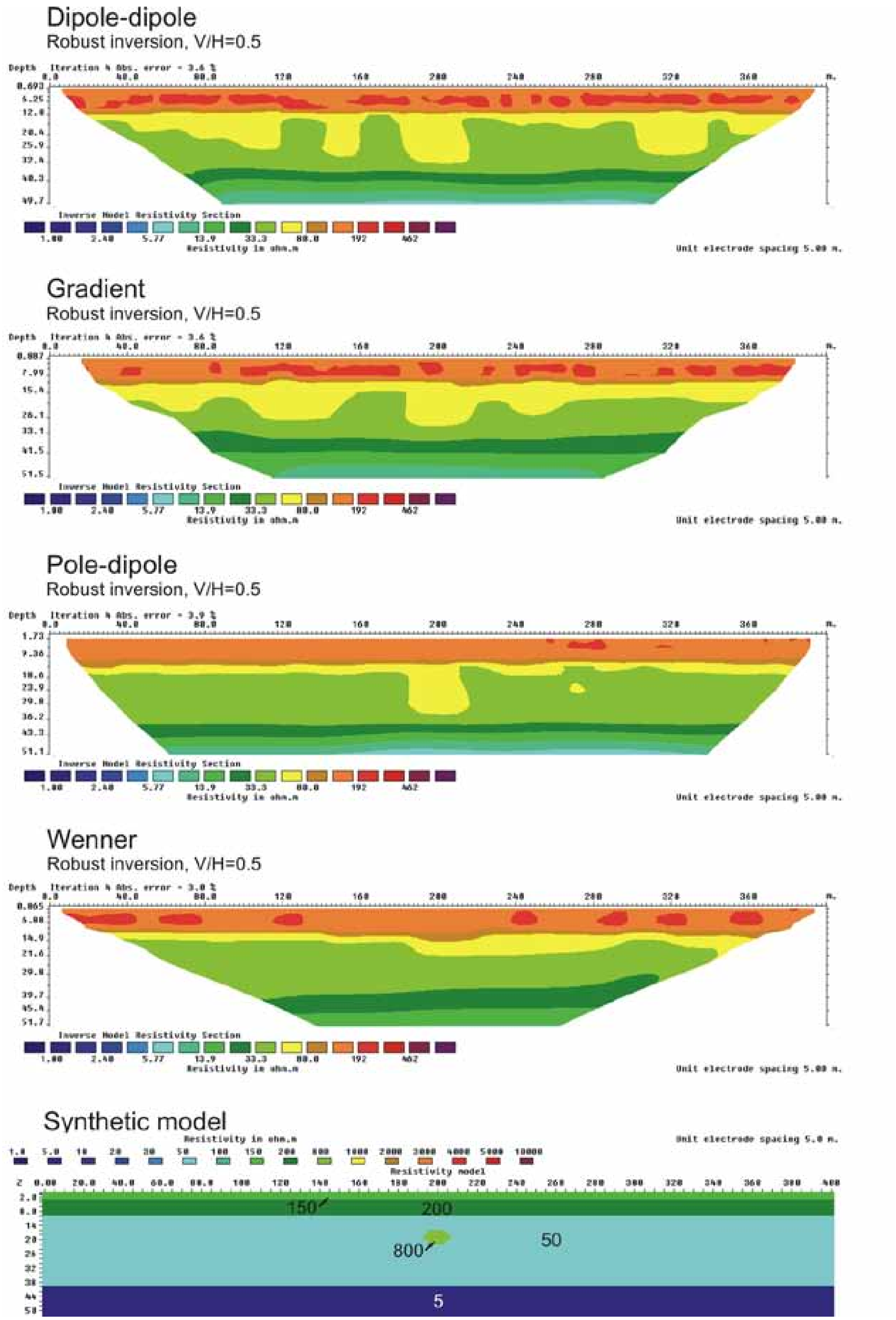

Figure 3.3.88: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a lense of sand and gravel of 800 Ωm (15 m x 6 m). Robust inversion, V/H=0.5

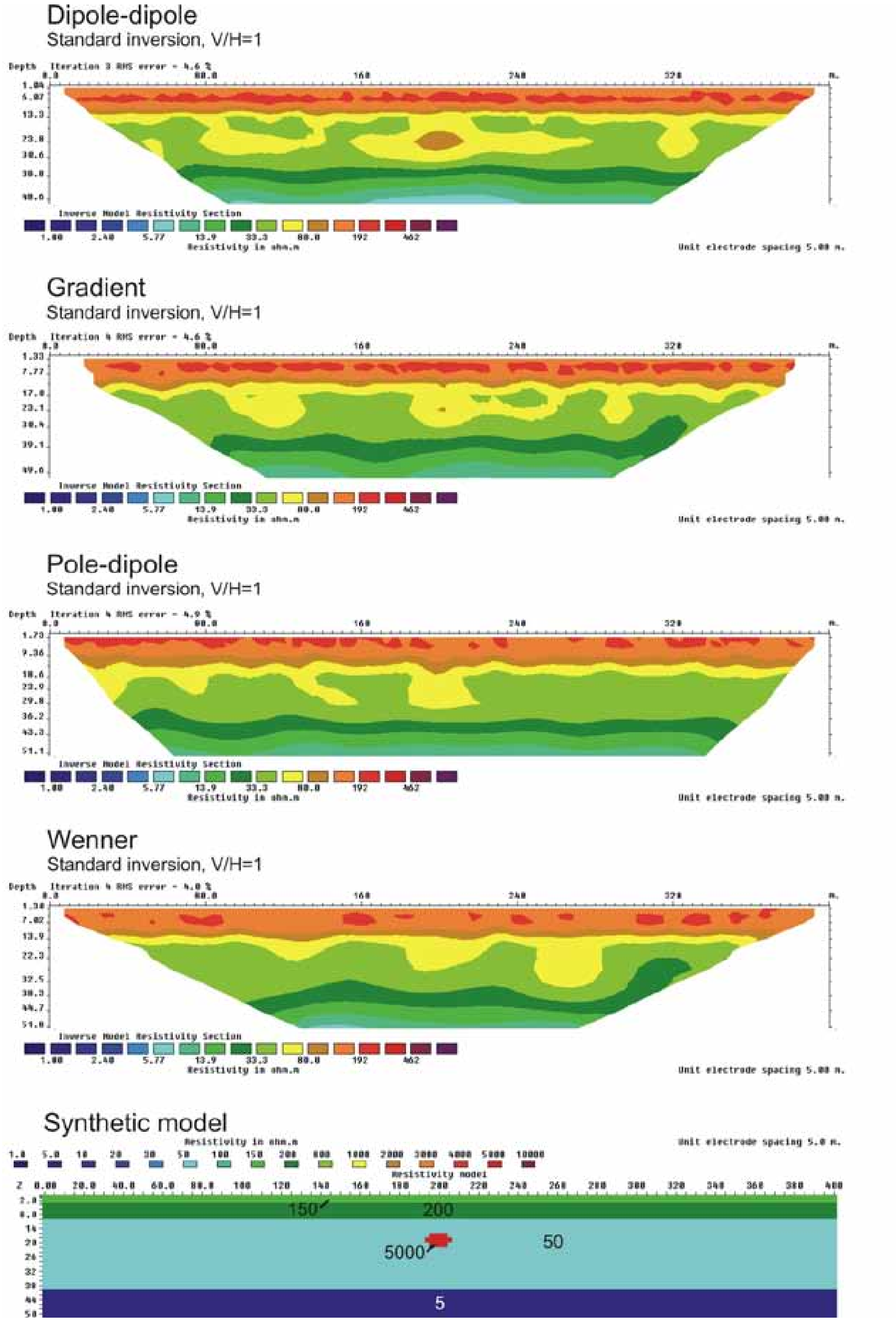

Figure 3.3.89: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a rock of 5000 Ωm (15 m x 6 m). Standard inversion, V/H=1

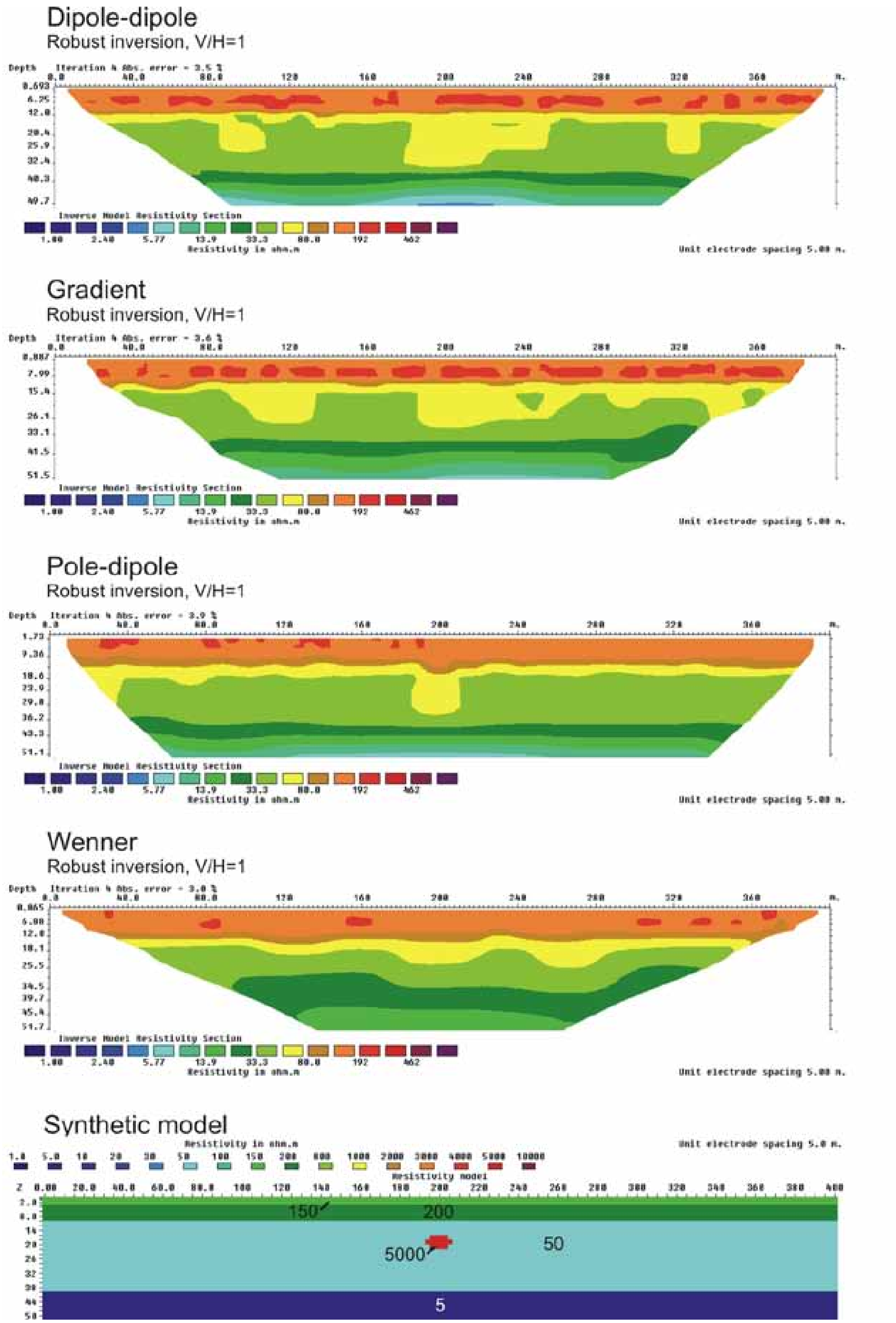

Figure 3.3.90: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a rock of 5000 Ωm (15 m x 6 m). Robust inversion, V/H=1

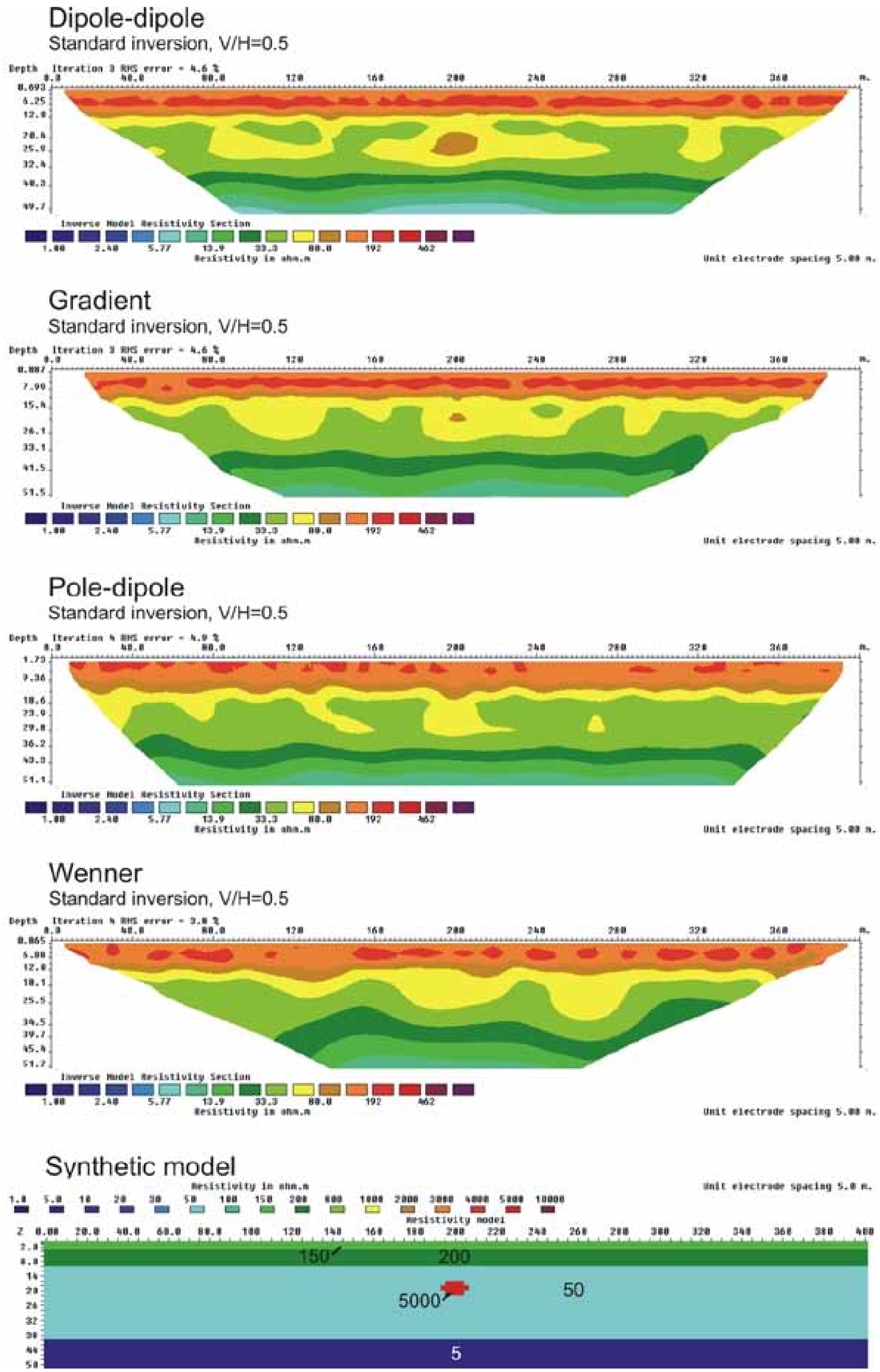

Figure 3.3.91: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a rock of 5000 Ωm (15 m x 6 m). Standard inversion, V/H=0.5

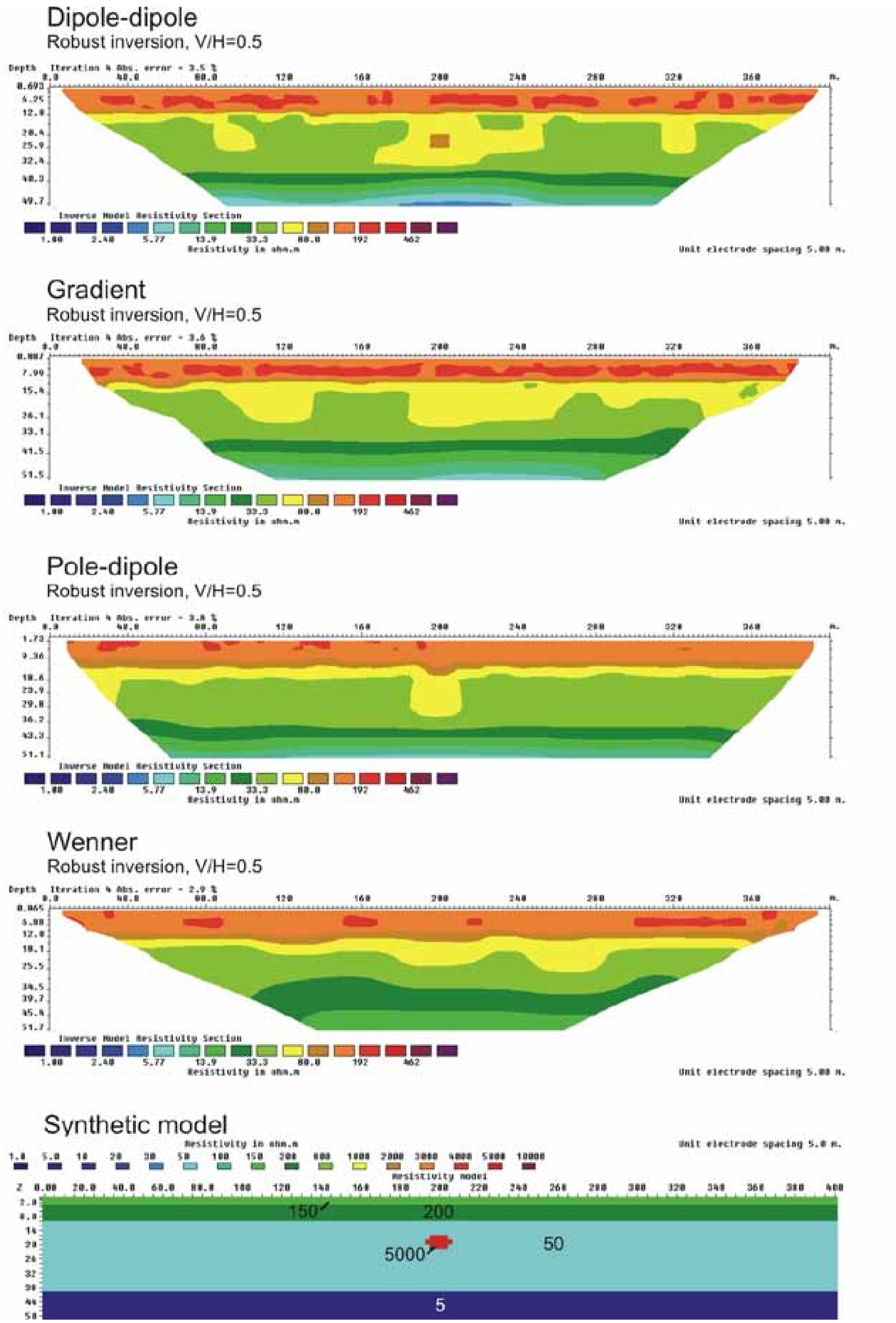

Figure 3.3.92: 3 m top layer (150 Ωm) over 200 Ωm and 50 Ωm with a rock of 5000 Ωm (15 m x 6 m). Robust inversion, V/H=0.5

APPENDIX D - Modeling results. Special models

Figure 3.4.1– 3.4.8:	3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface. Two different colour scales.
Figure 3.4.9 – 3.4.16:	3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface and a lens of 5 Ωm. Two different colour scales.
Figure 3.4.17 – 3.4.24:	3 m top layer (150 Ωm) over 50 Ωm and a dipping layer of 5000 Ωm. Two different colour scales.
Figure 3.4.25 – 3.4.32:	3 m top layer (150 Ωm) over 50 Ωm, a dipping layer of 5000 Ωm and a lens of 5 Ωm. Two different colour scales.
Figure 3.4.33 – 3.4.40:	3 m top layer (150 Ωm) over 50 Ωm and dipping layers of 800 Ωm and 5000 Ωm. Two different colour scales.
Figure 3.4.41 – 3.4.48:	3 m top layer (150 Ωm) over 50 Ωm, dipping layers of 800 Ωm and 5000 Ωm and a lens of 5 Ωm. Two different colour scales.

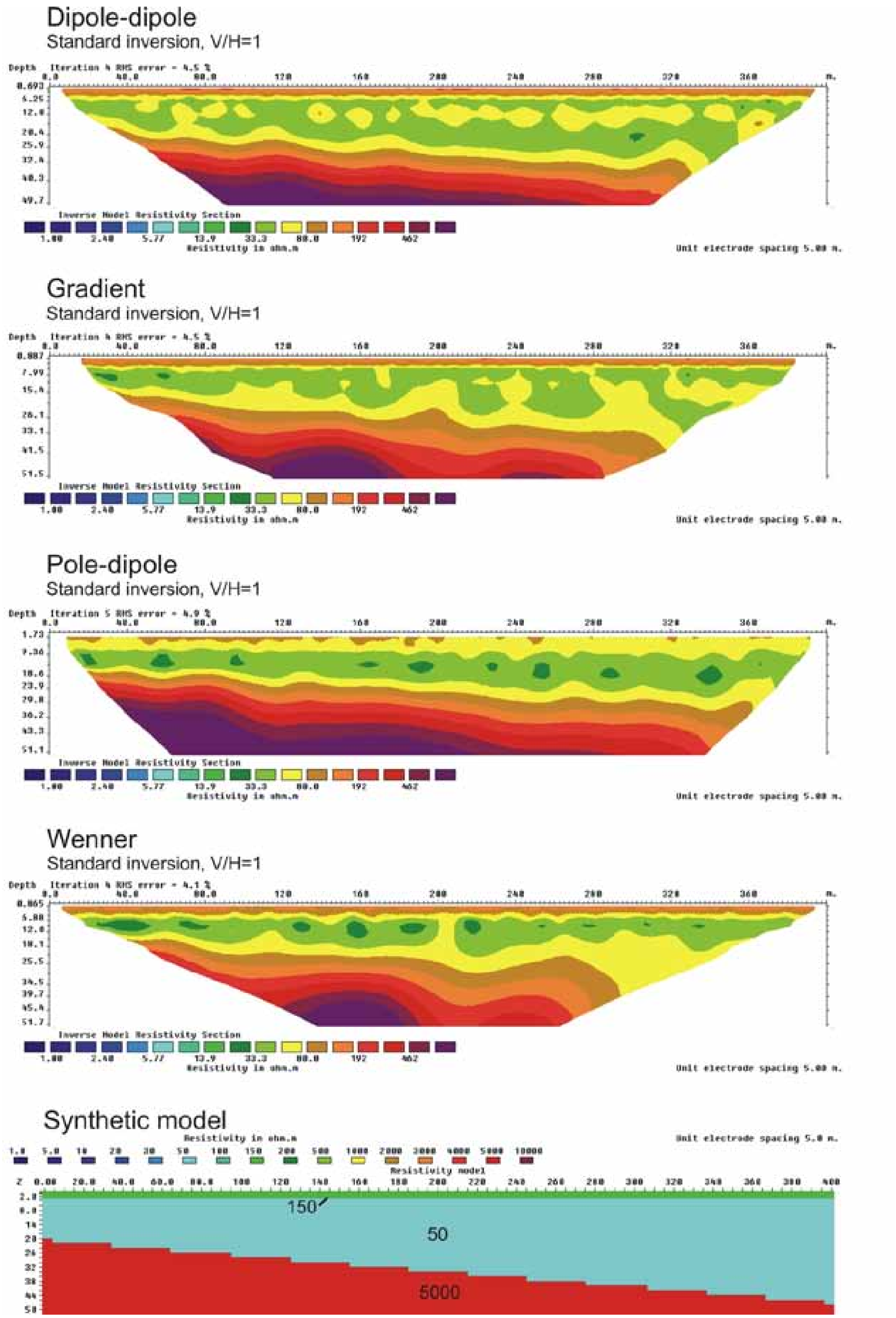

Figure 3.4.1: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface. Standard inversion, V/H=1

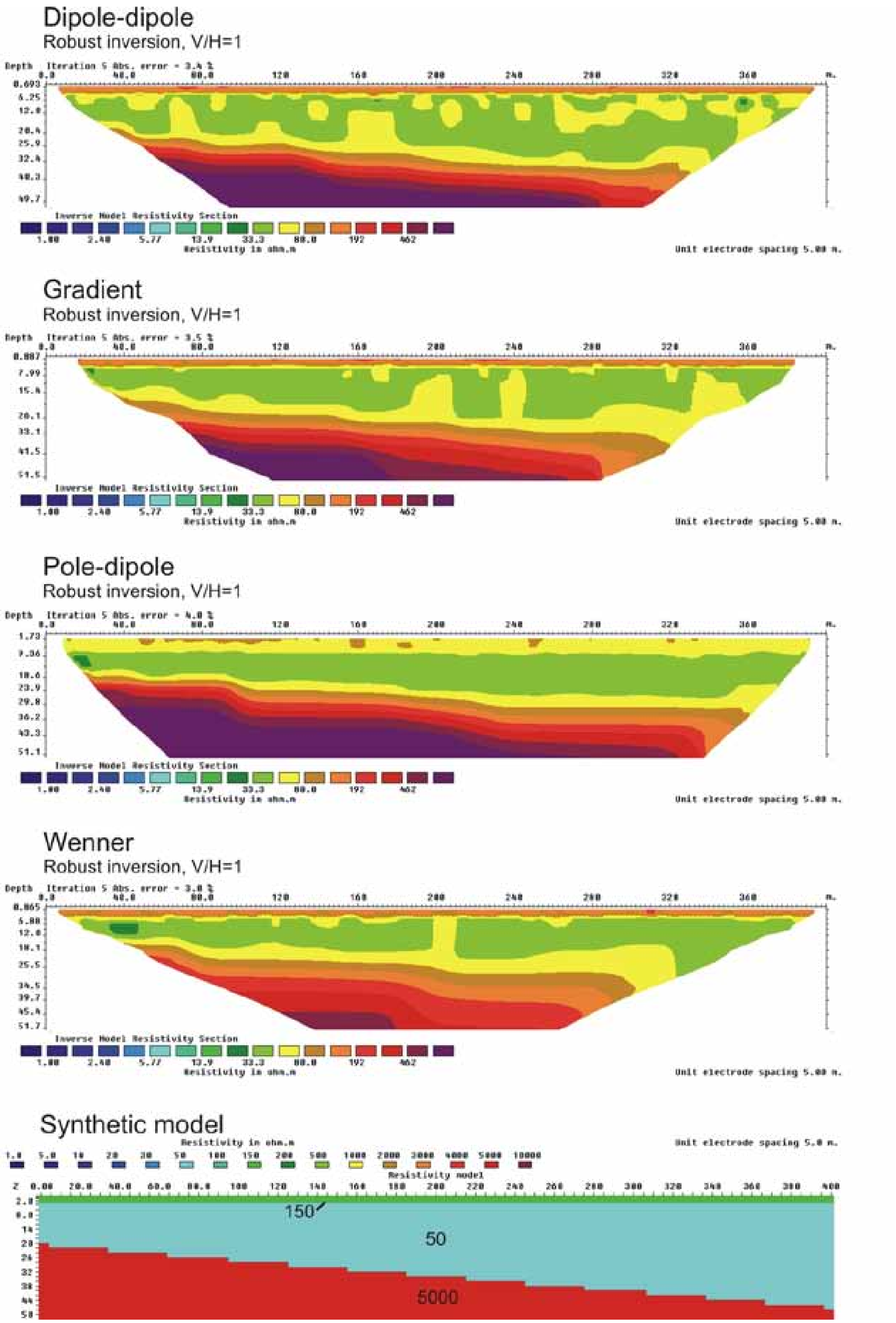

Figure 3.4.2: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface. Robust inversion, V/H=1

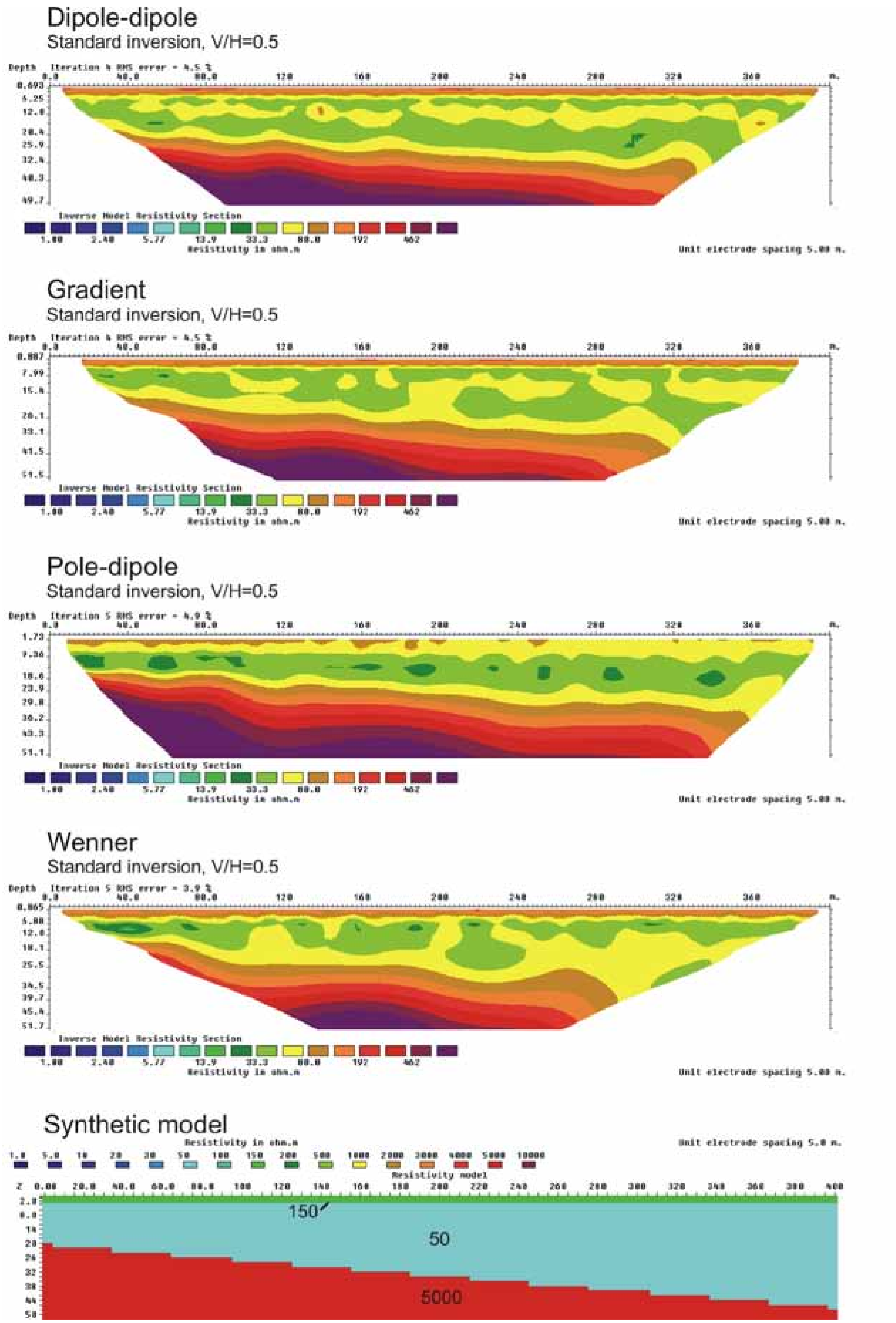

Figure 3.4.3: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface. Standard inversion, V/H=0.5

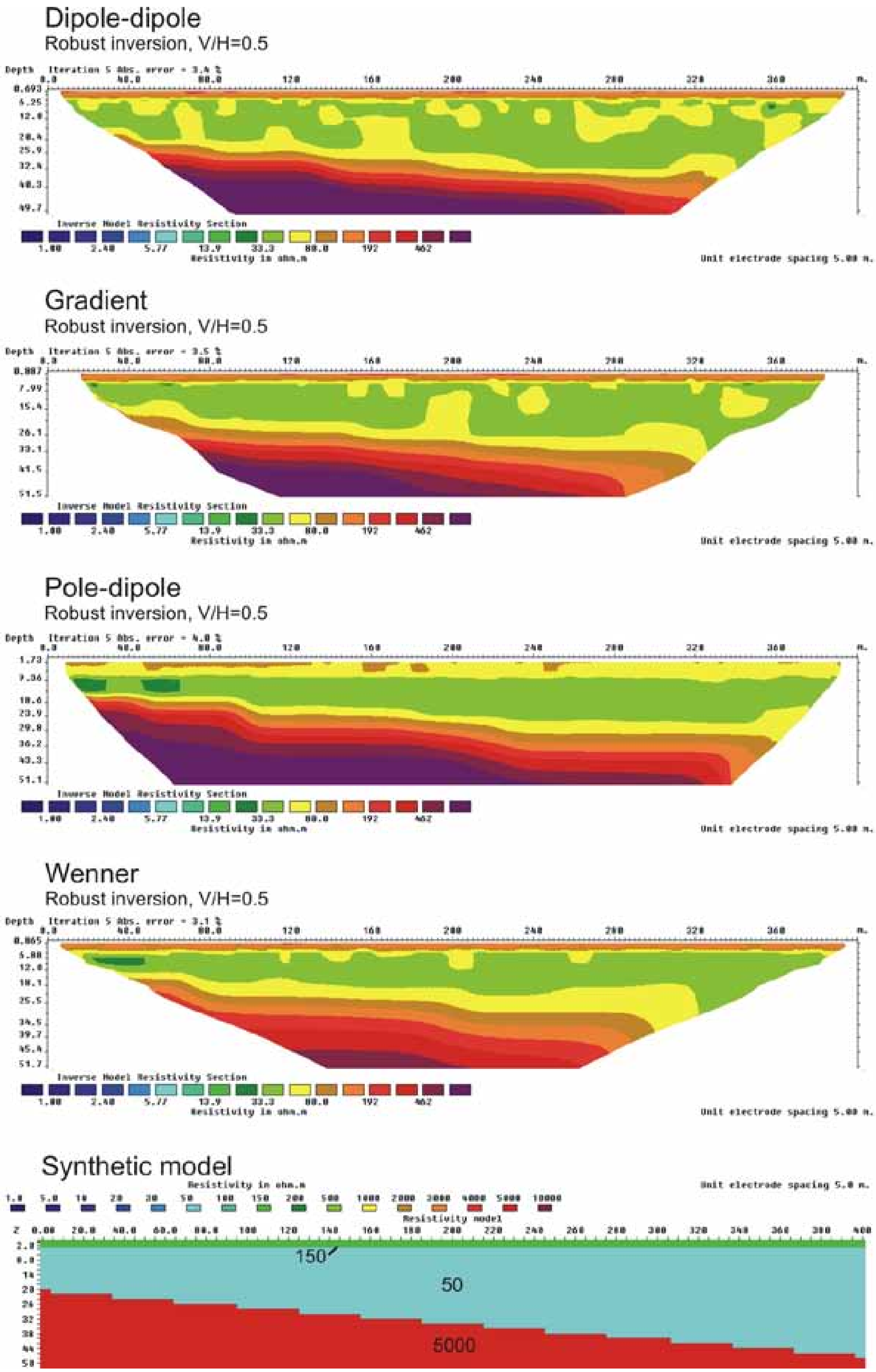

Figure 3.4.4: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface. Robust inversion, V/H=0.5

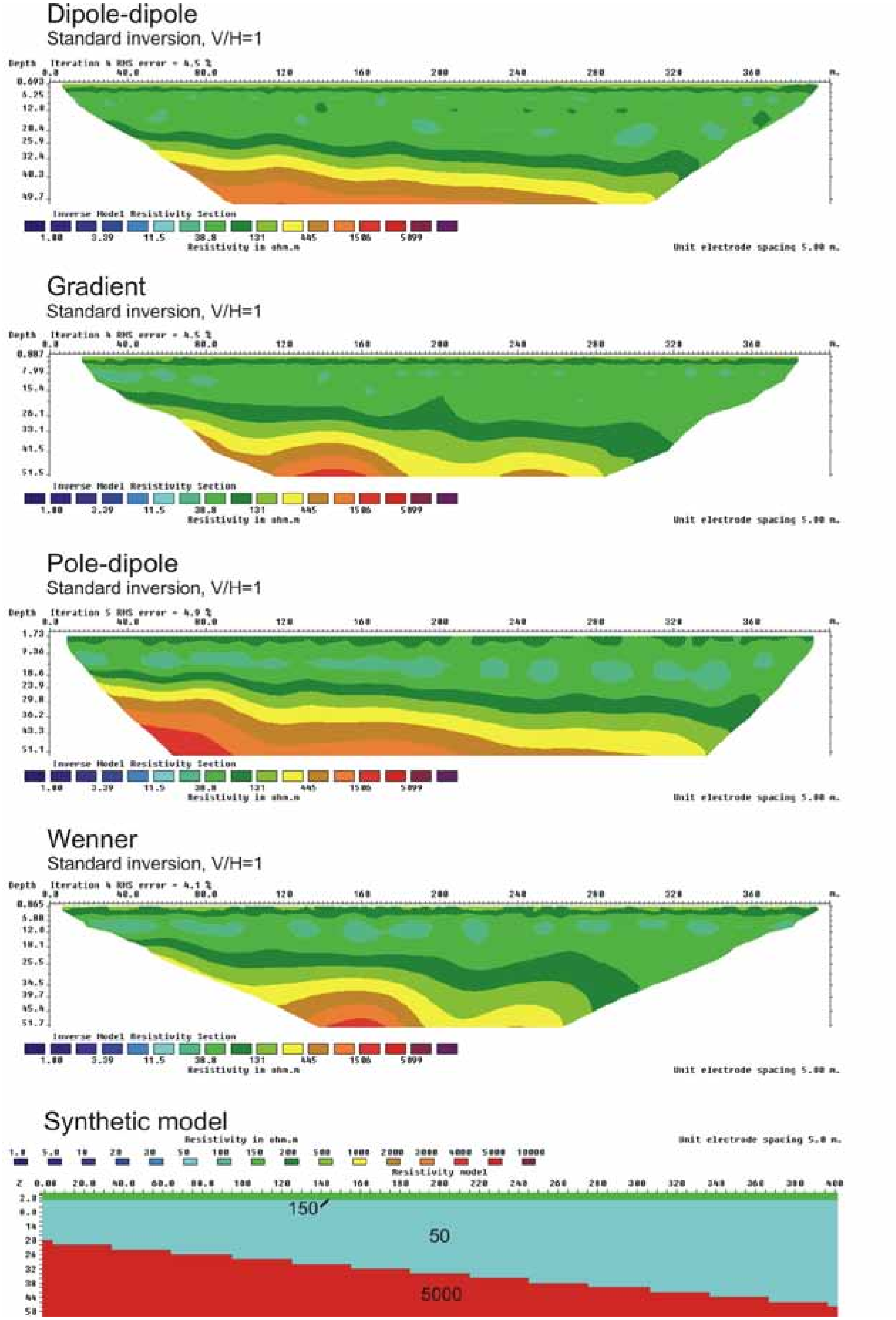

Figure 3.4.5: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface. Standard inversion, V/H=1

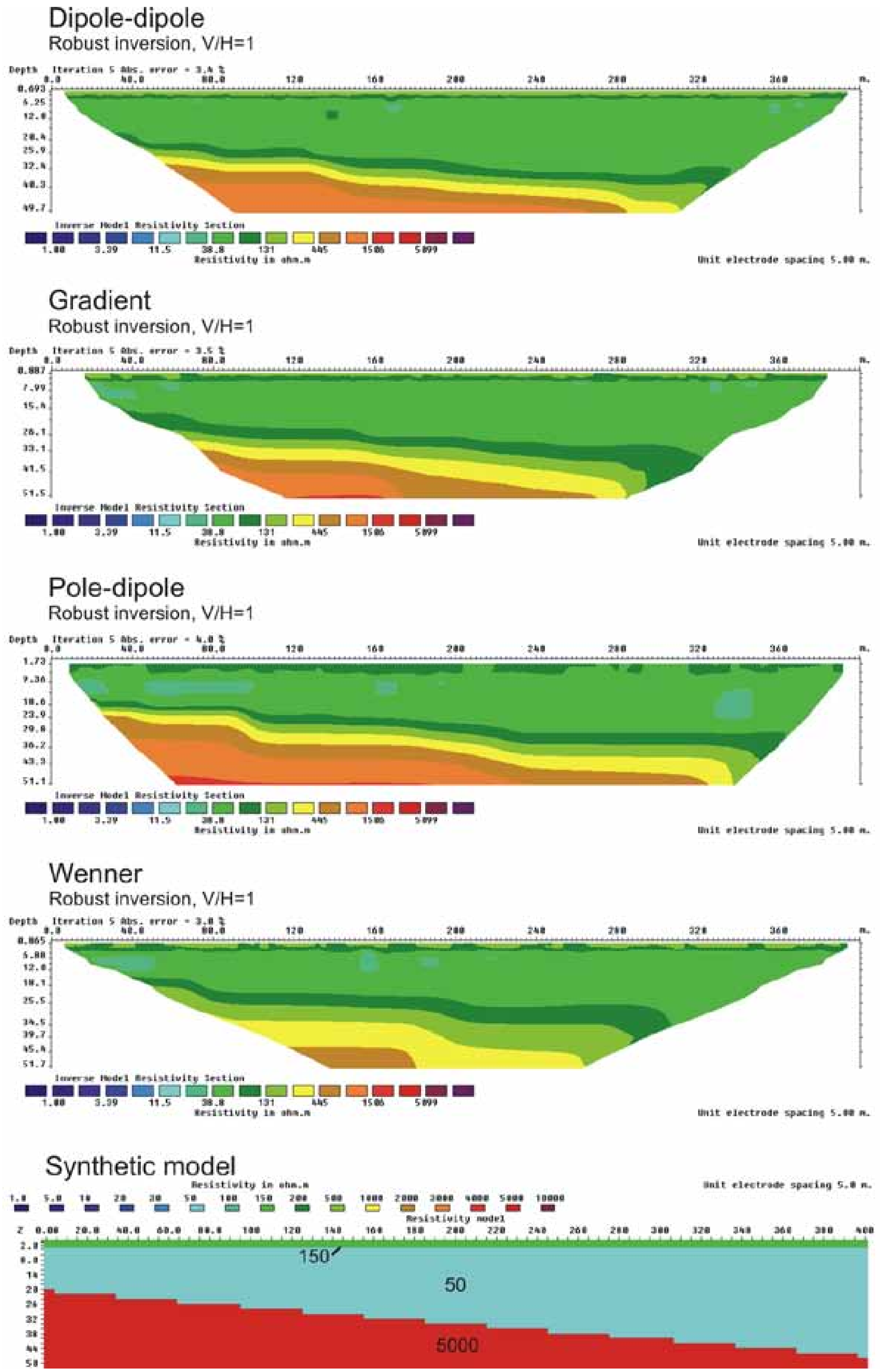

Figure 3.4.6: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface. Robust inversion, V/H=1

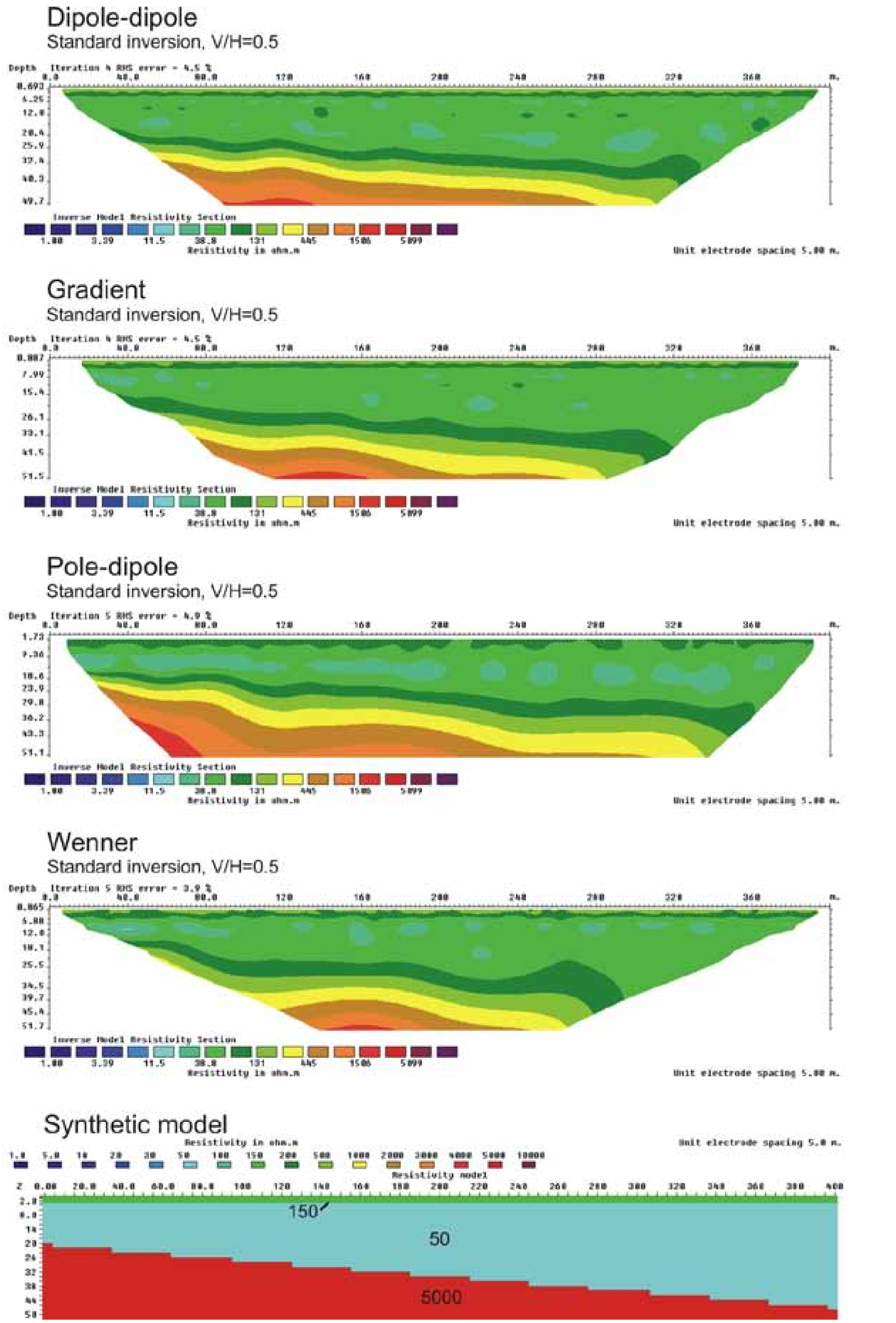

Figure 3.4.7: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface. Standard inversion, V/H=0.5

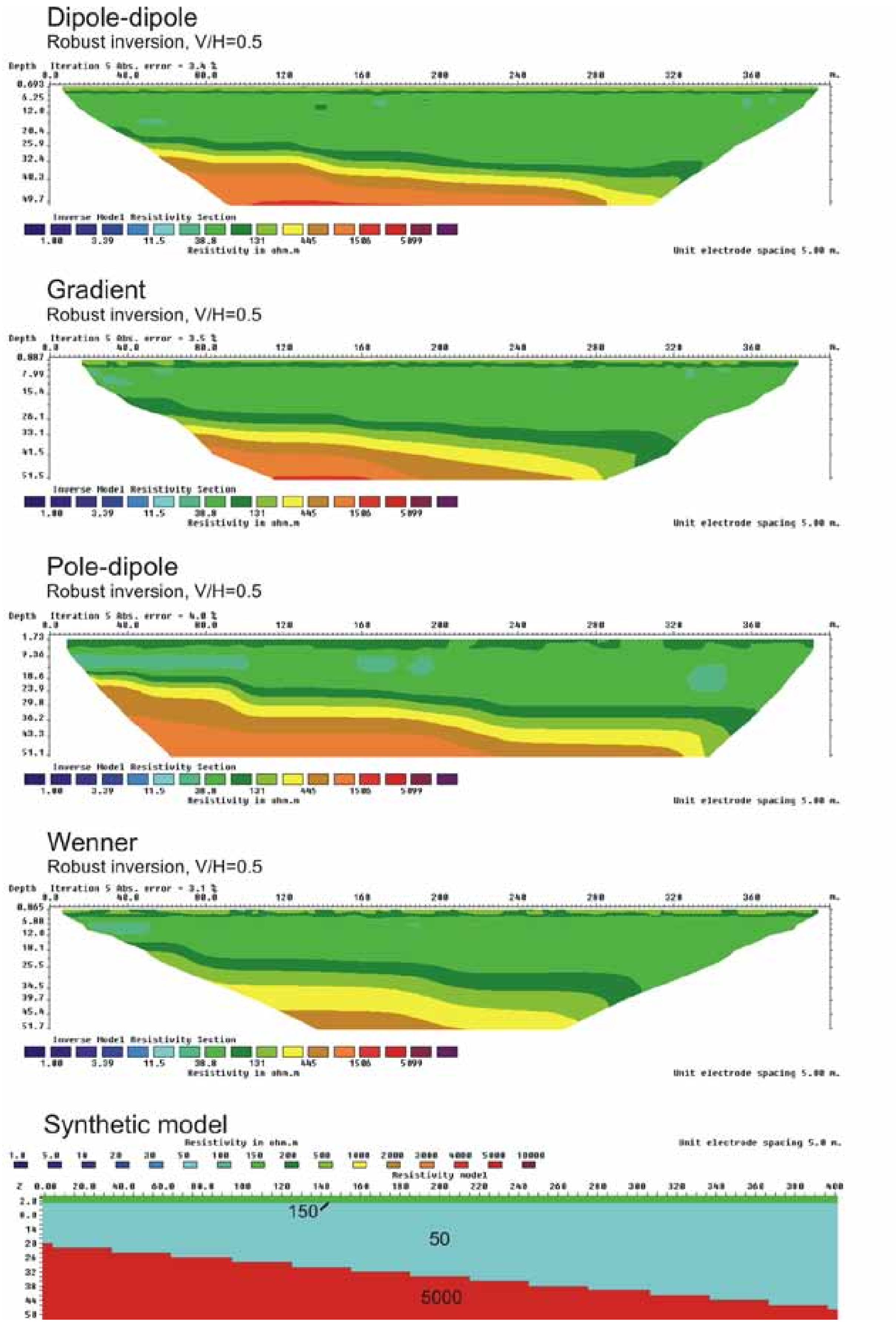

Figure 3.4.8: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface. Robust inversion, V/H=0.5

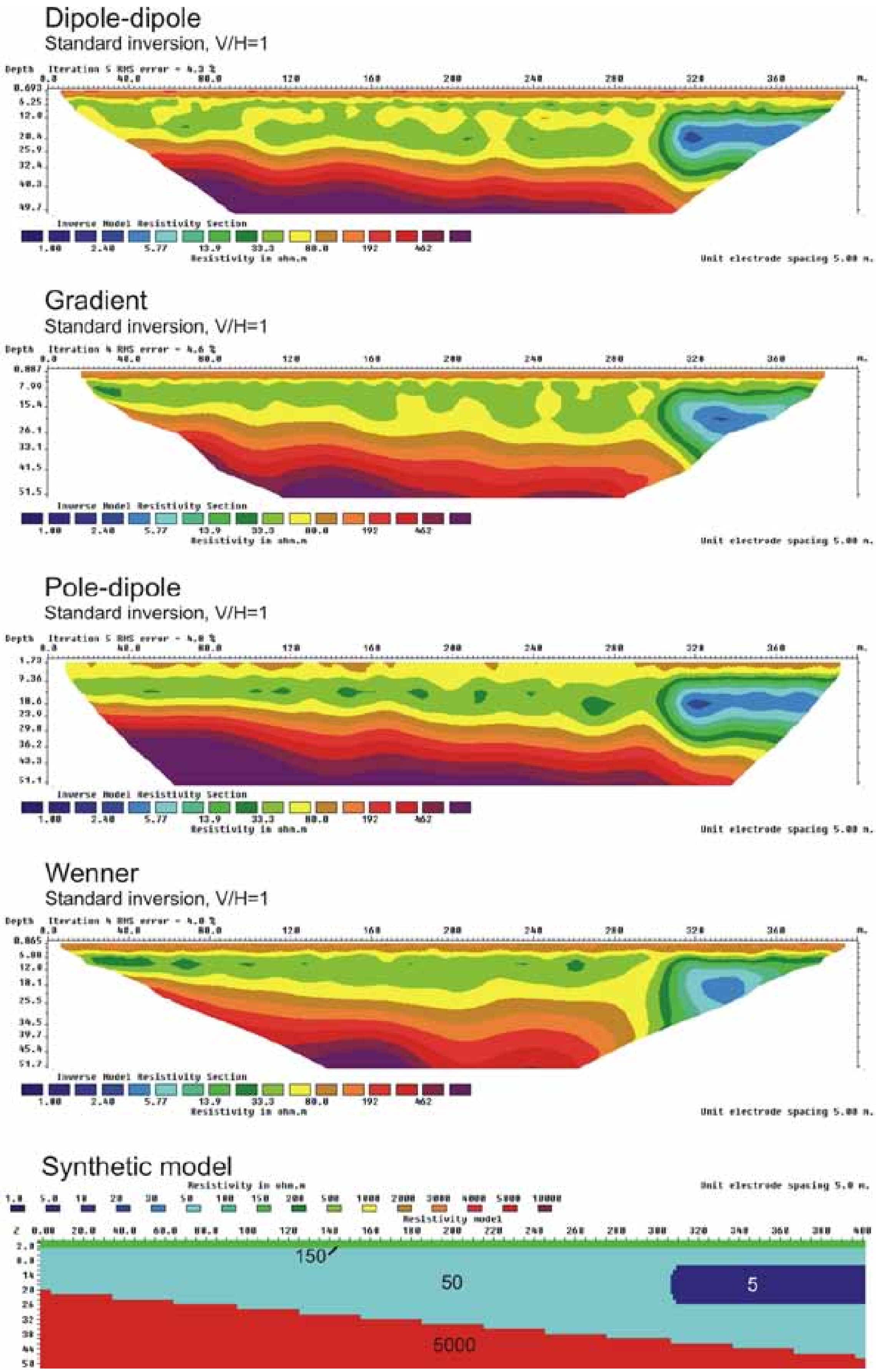

Figure 3.4.9: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface and a lense of 5 Ωm. Standard inversion, V/H=1

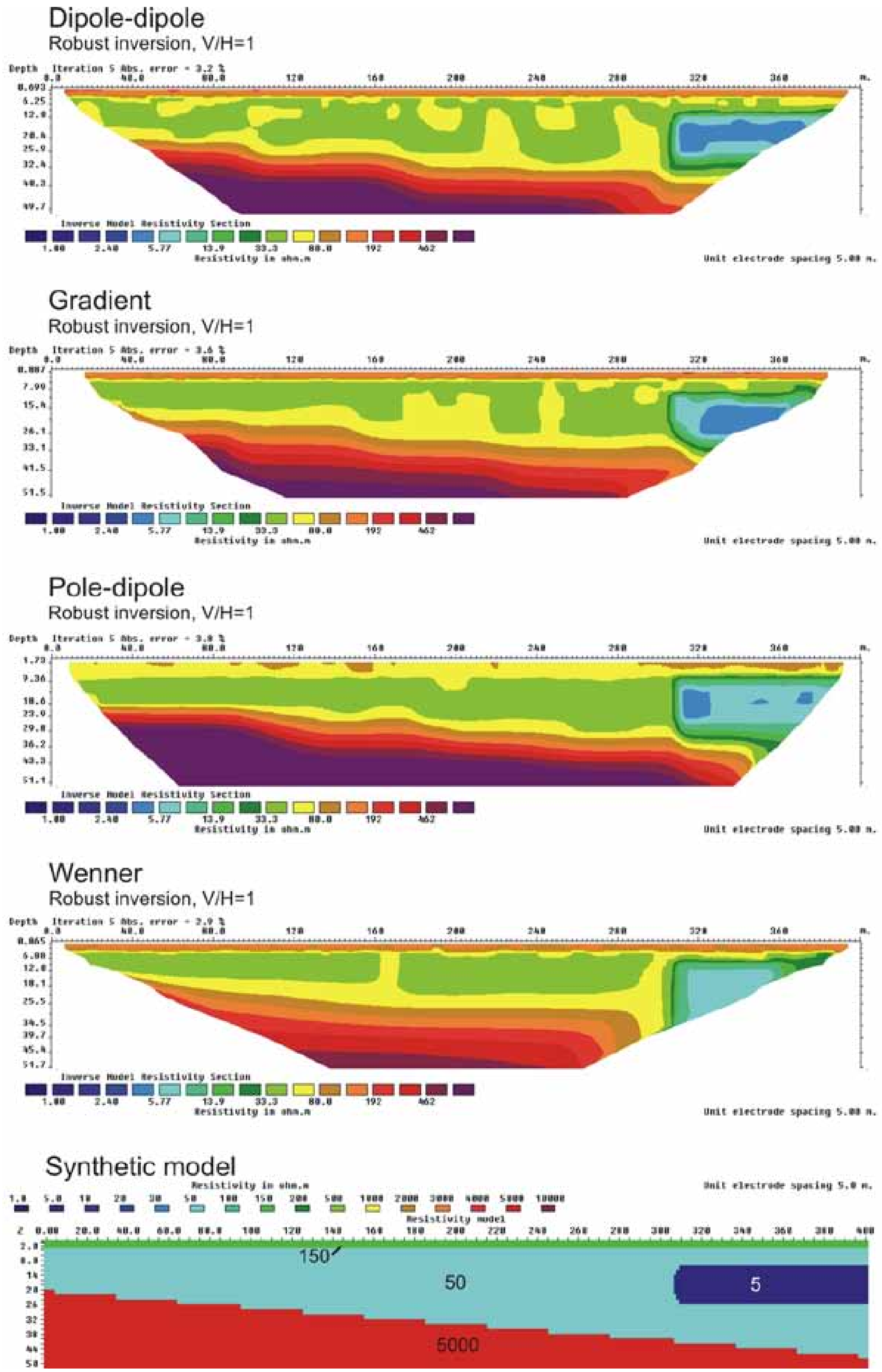

Figure 3.4.10: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface and a lense of 5 Ωm. Robust inversion, V/H=1

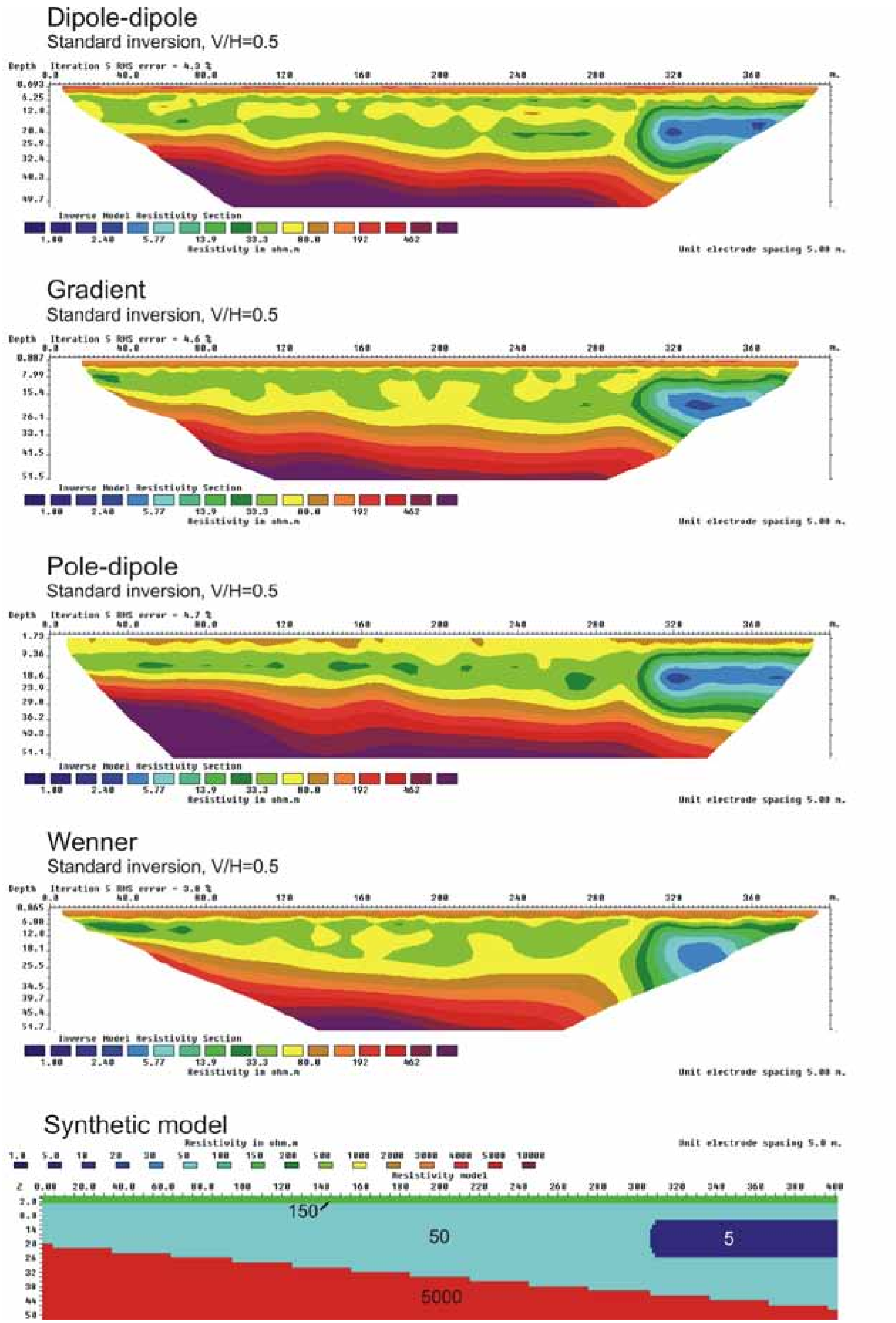

Figure 3.4.11: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface and a lense of 5 Ωm. Standard inversion, V/H=0.5

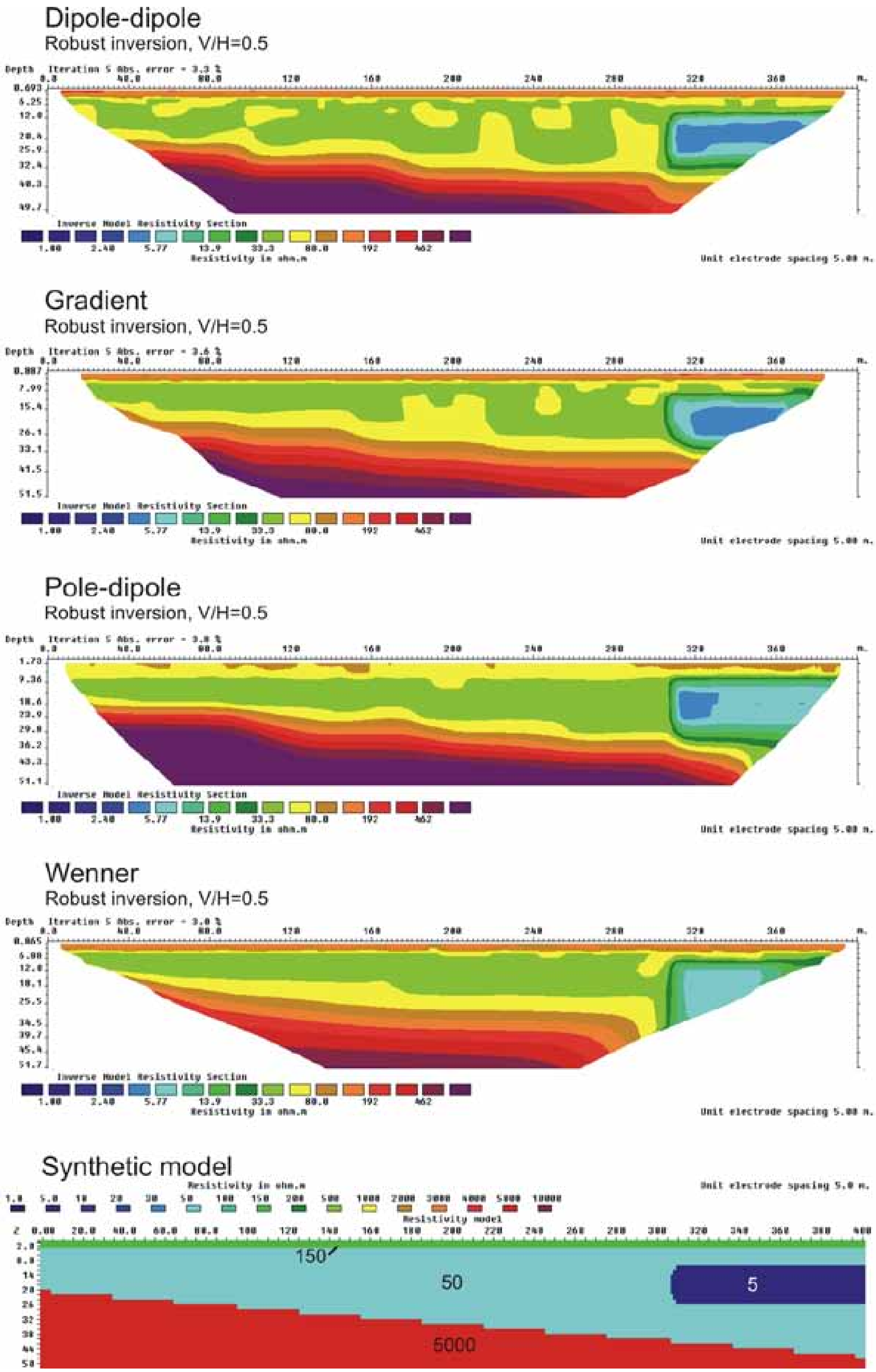

Figure 3.4.12: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface and a lense of 5 Ωm. Robust inversion, V/H=0.5

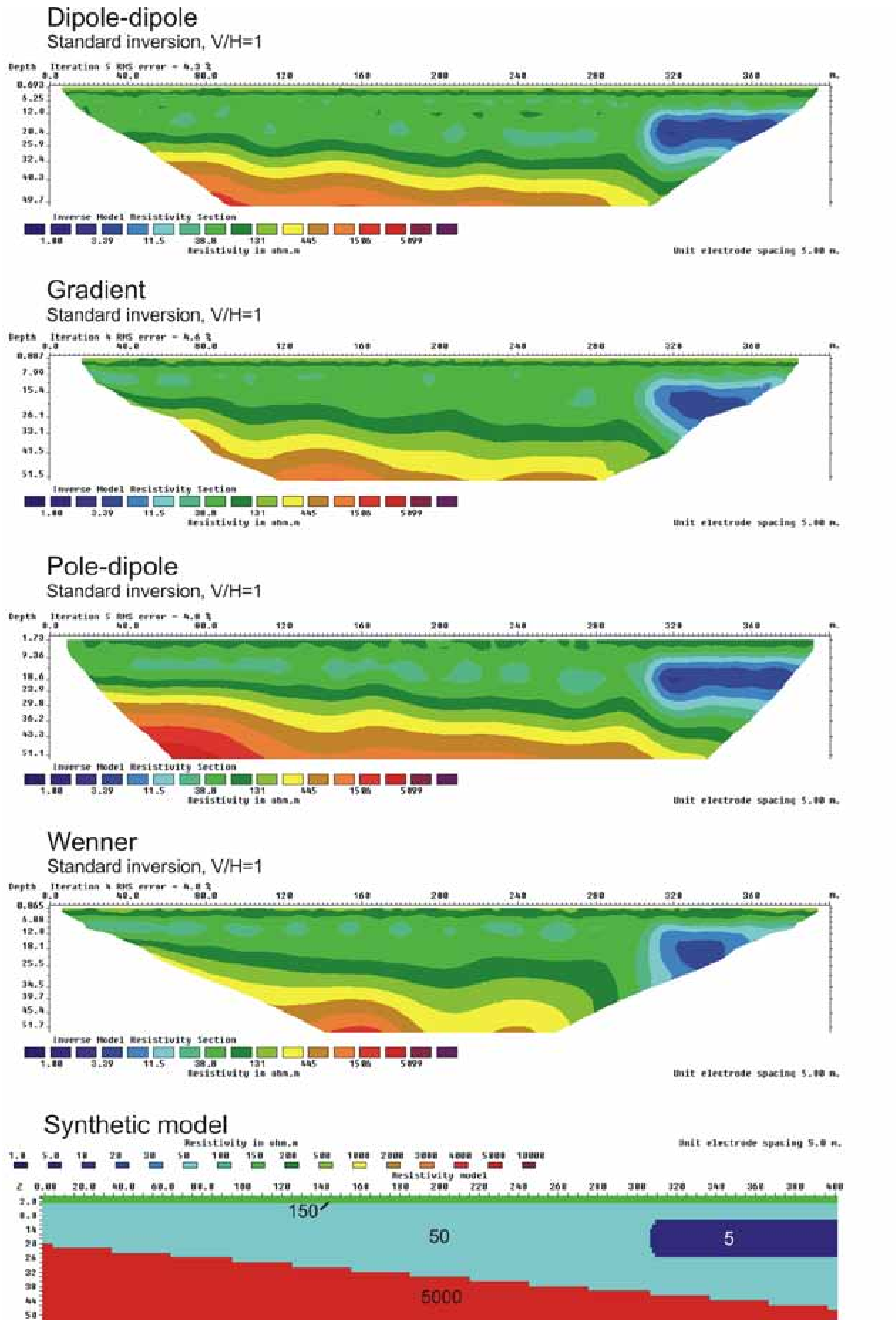

Figure 3.4.13: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface and a lense of 5 Ωm. Standard inversion, V/H=1

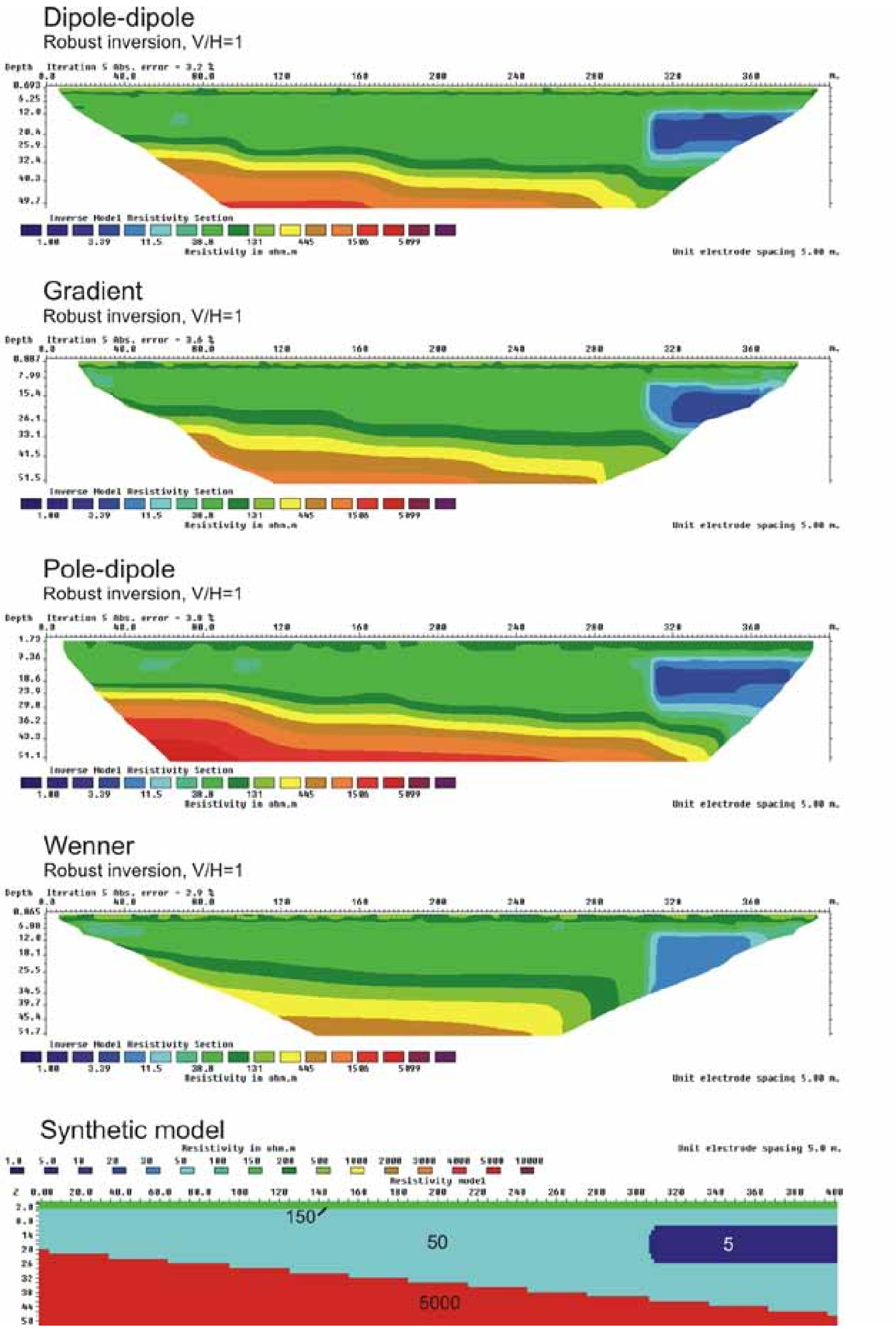

Figure 3.4.14: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface and a lense of 5 Ωm. Robust inversion, V/H=1

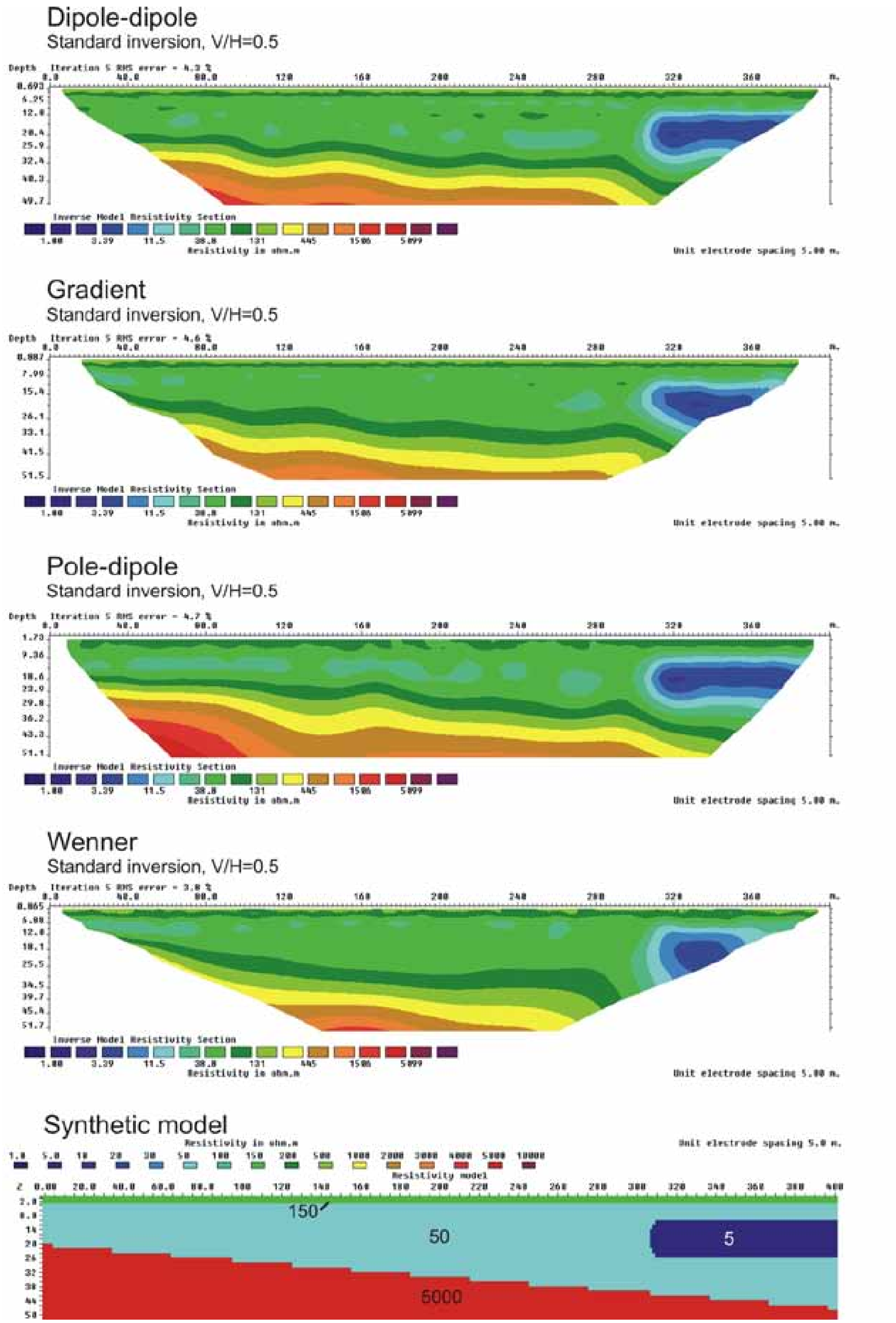

Figure 3.4.15: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface and a lense of 5 Ωm. Standard inversion, V/H=0.5

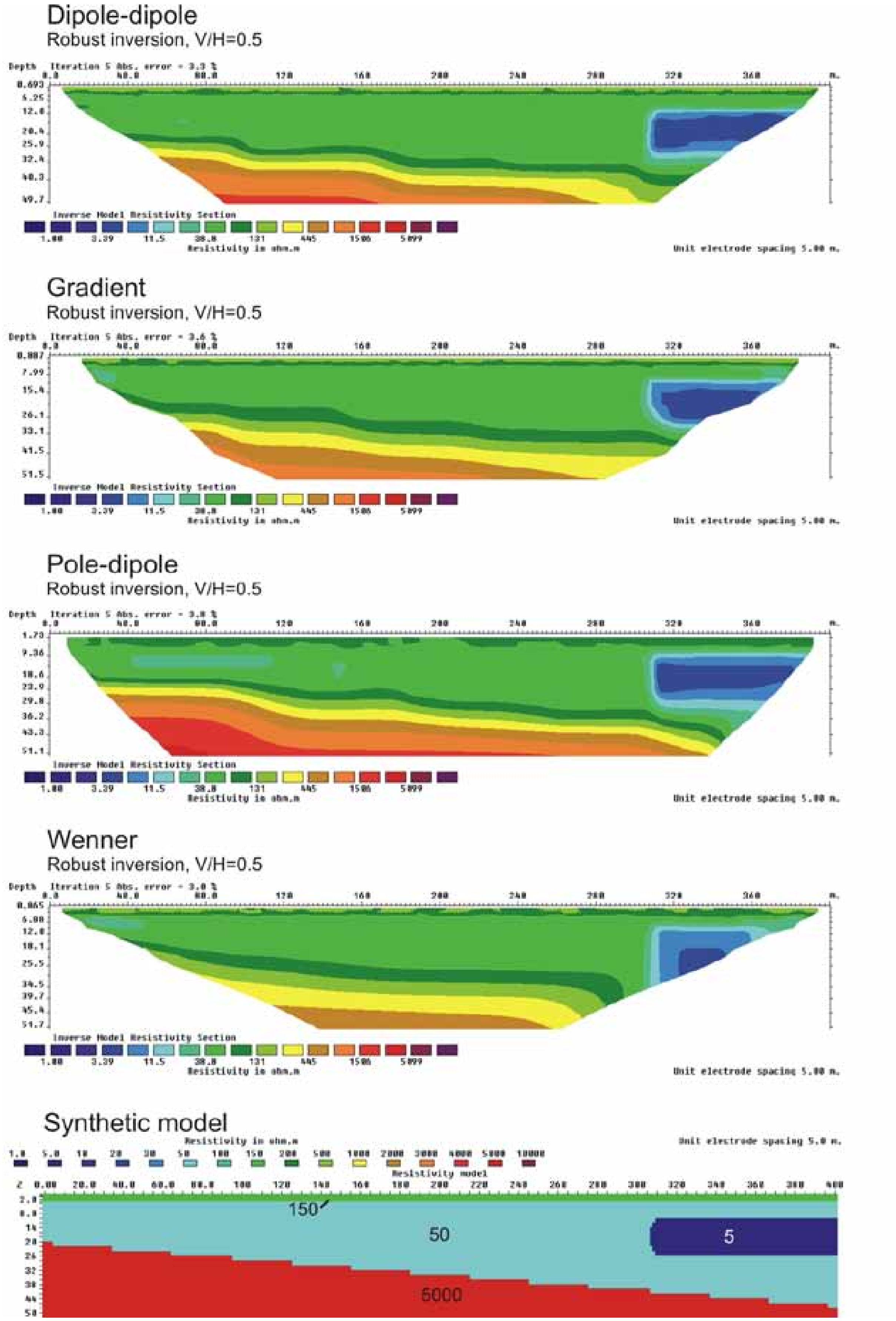

Figure 3.4.16: 3 m top layer (150 Ωm) over 50 Ωm and 5000 Ωm with a dipping interface and a lense of 5 Ωm. Robust inversion, V/H=0.5

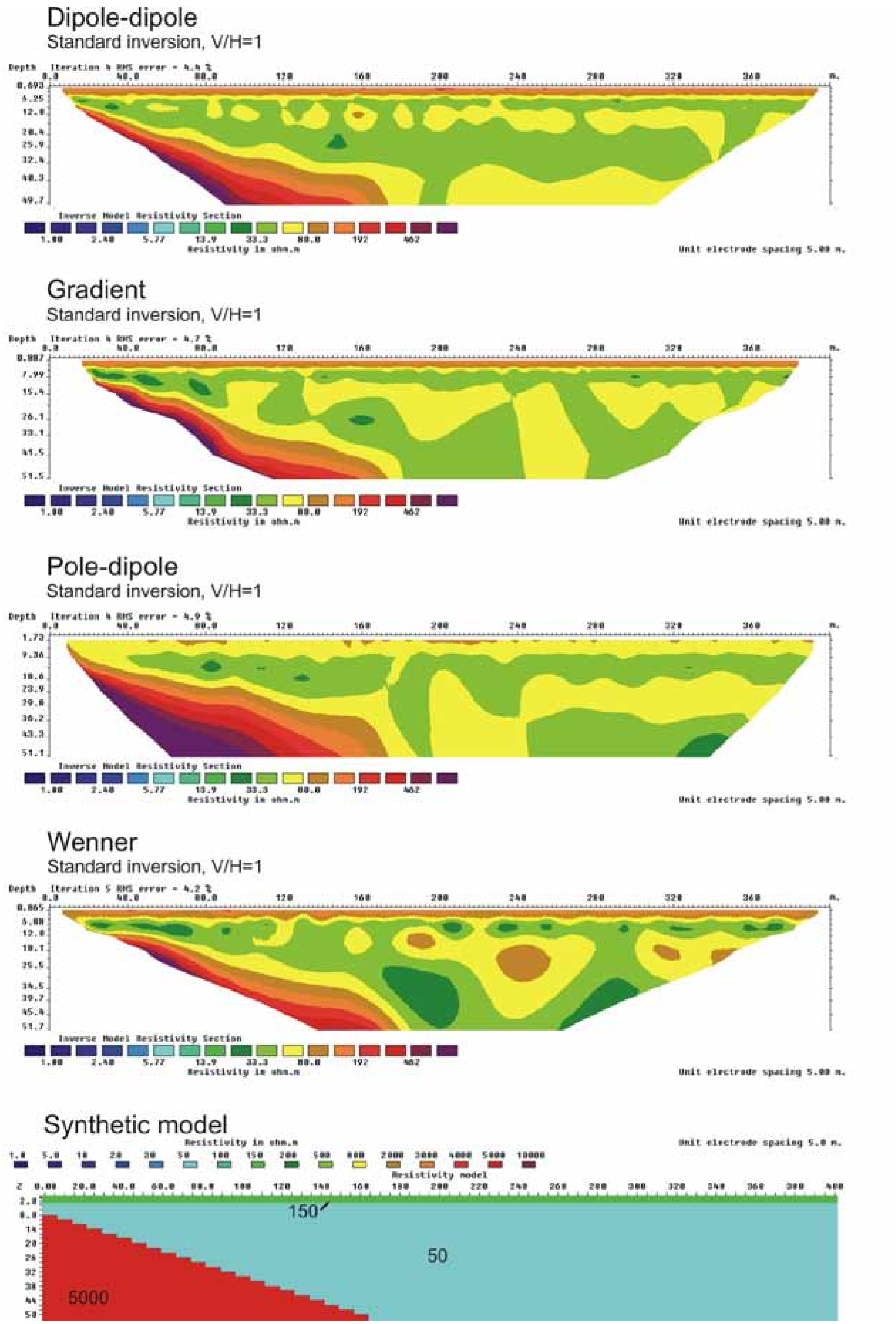

Figure 3.4.17: 3 m top layer (150 Ωm) over 50 Ωm and a dipping layer of 5000 Ωm. Standard inversion, V/H=1

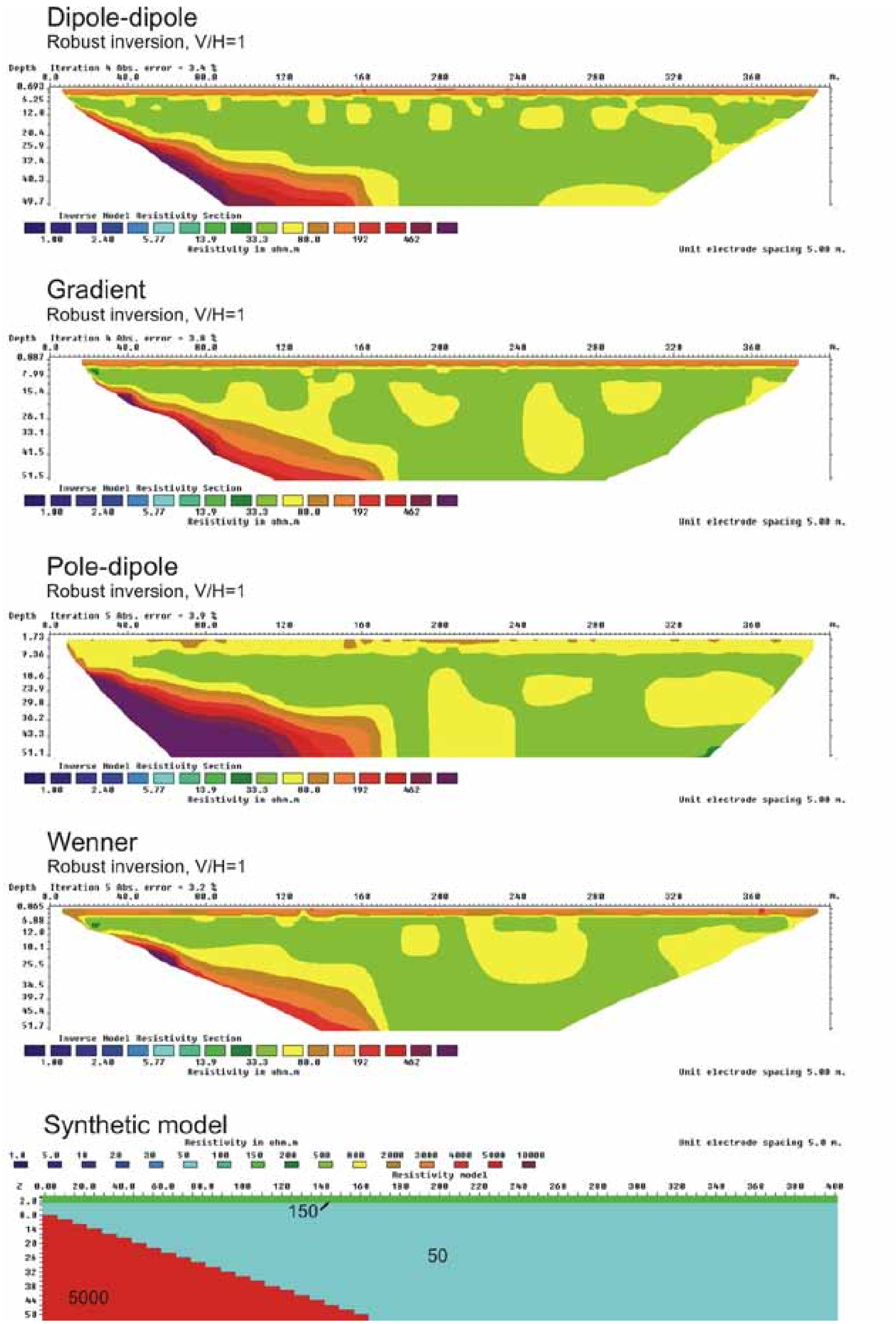

Figure 3.4.18: 3 m top layer (150 Ωm) over 50 Ωm and a dipping layer of 5000 Ωm. Robust inversion, V/H=1

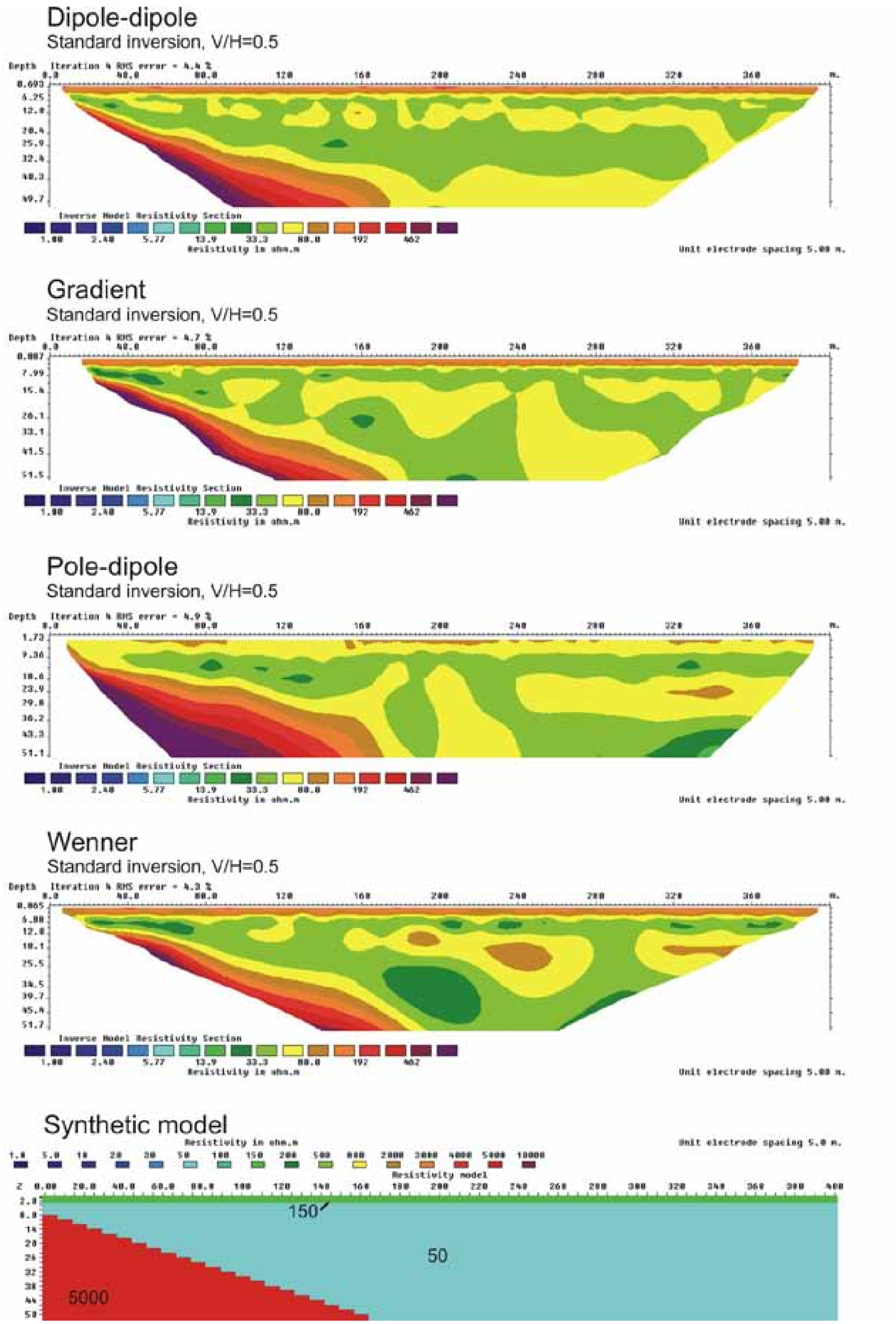

Figure 3.4.19: 3 m top layer (150 Ωm) over 50 Ωm and a dipping layer of 5000 Ωm. Standard inversion, V/H=0.5

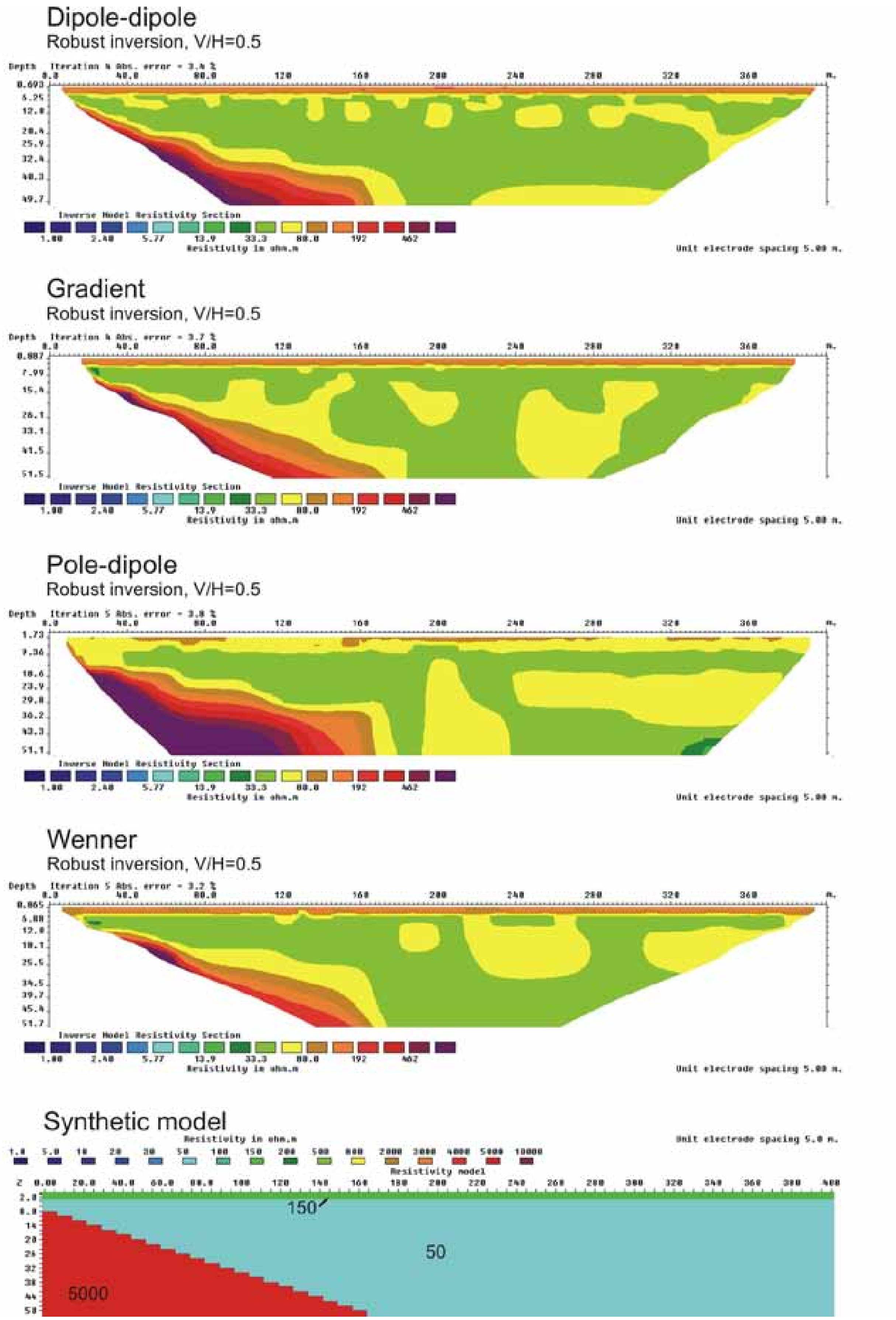

Figure 3.4.20: 3 m top layer (150 Ωm) over 50 Ωm and a dipping layer of 5000 Ωm. Robust inversion, V/H=0.5

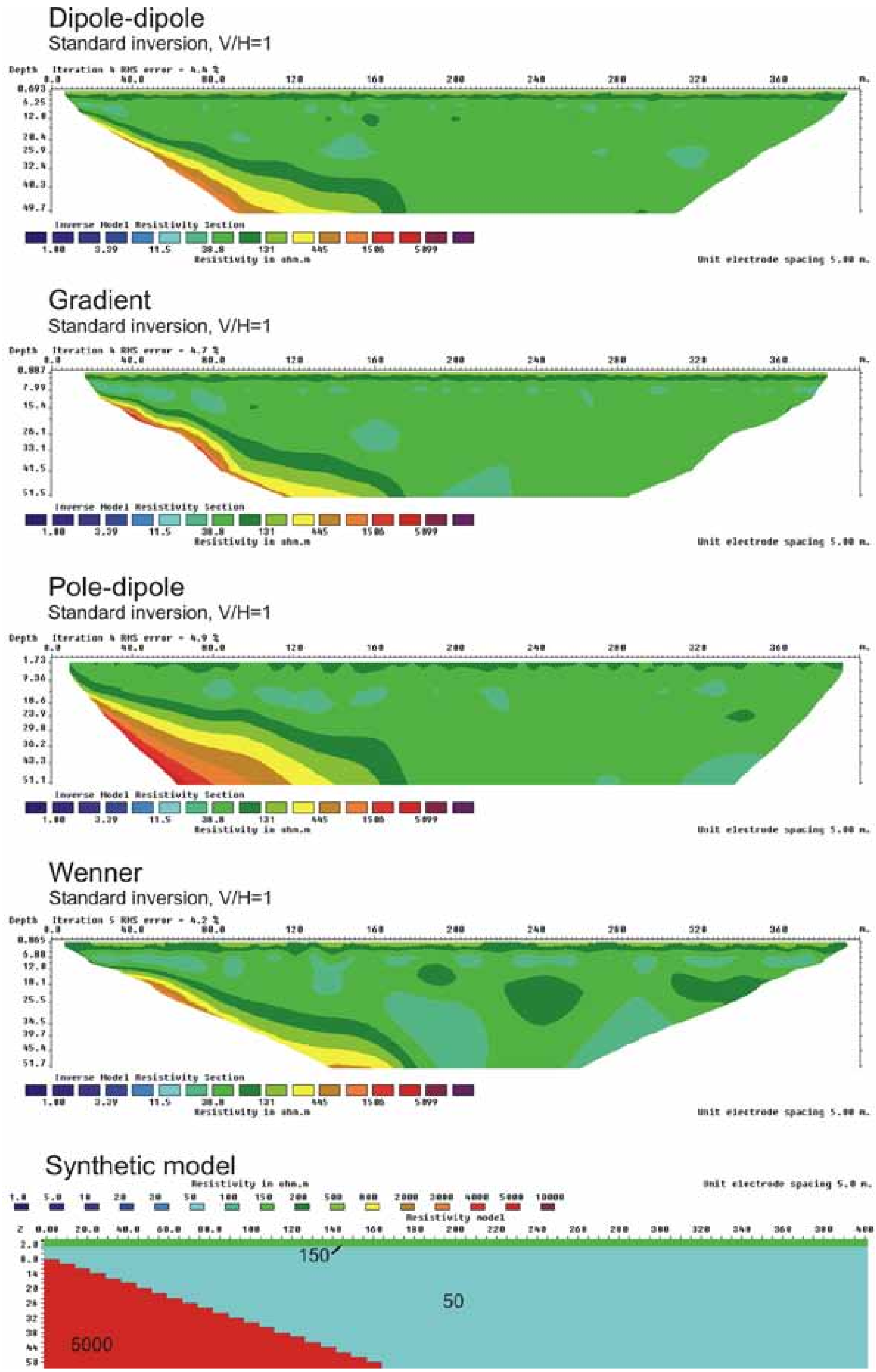

Figure 3.4.21: 3 m top layer (150 Ωm) over 50 Ωm and a dipping layer of 5000 Ωm. Standard inversion, V/H=1

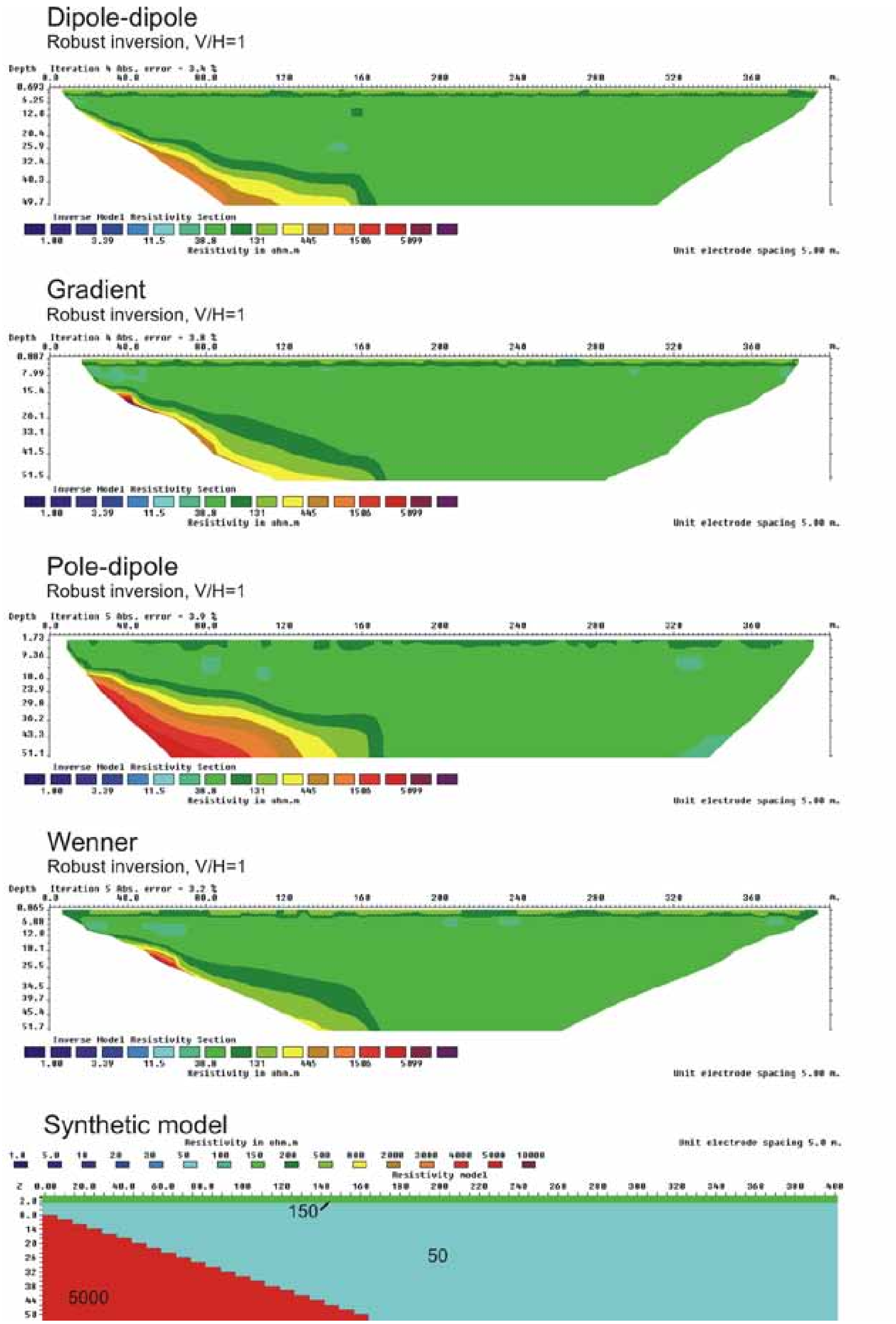

Figure 3.4.22: 3 m top layer (150 Ωm) over 50 Ωm and a dipping layer of 5000 Ωm. Robust inversion, V/H=1

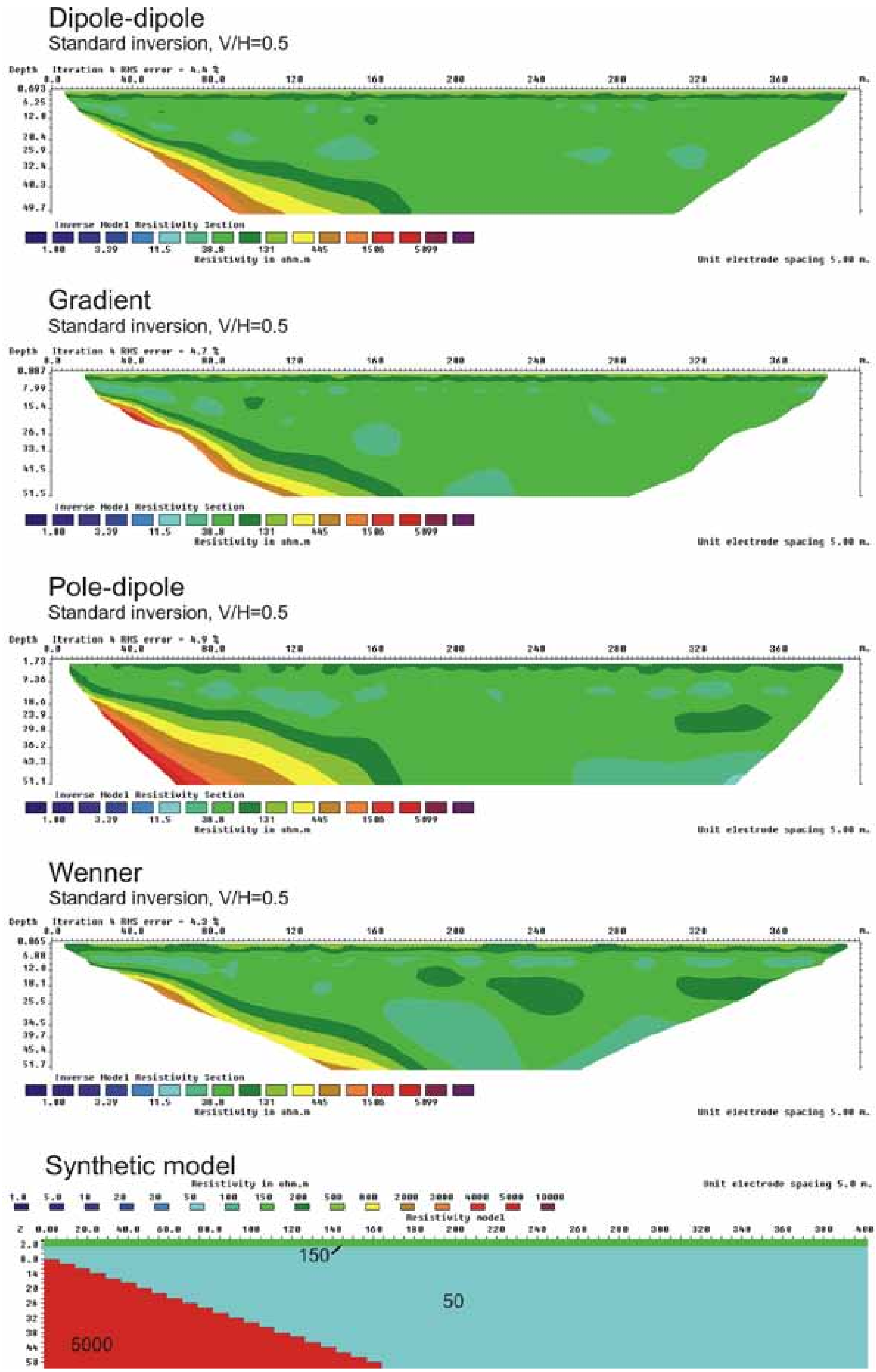

Figure 3.4.23: 3 m top layer (150 Ωm) over 50 Ωm and a dipping layer of 5000 Ωm. Standard inversion, V/H=0.5

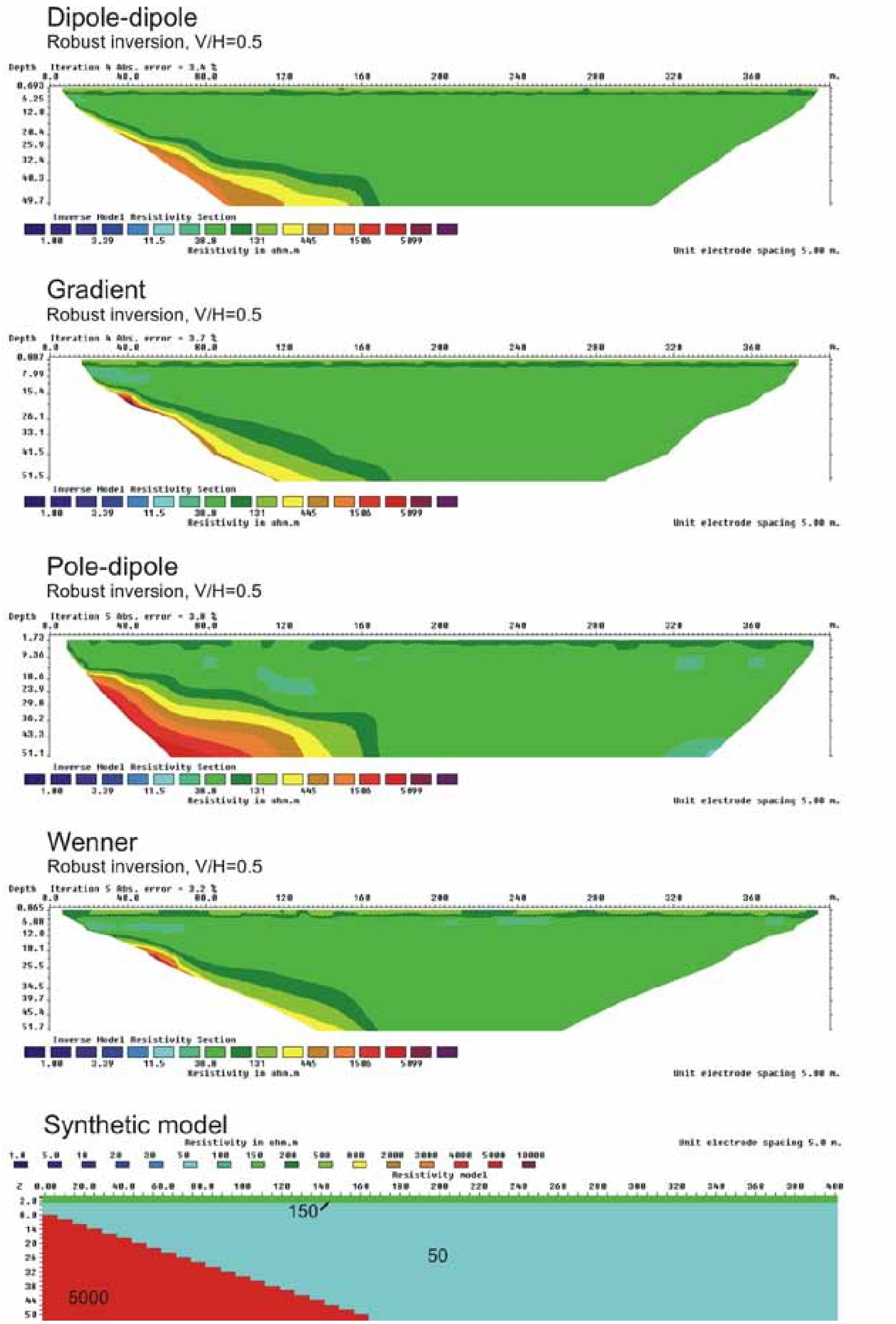

Figure 3.4.24: 3 m top layer (150 Ωm) over 50 Ωm and a dipping layer of 5000 Ωm. Robust inversion, V/H=0.5

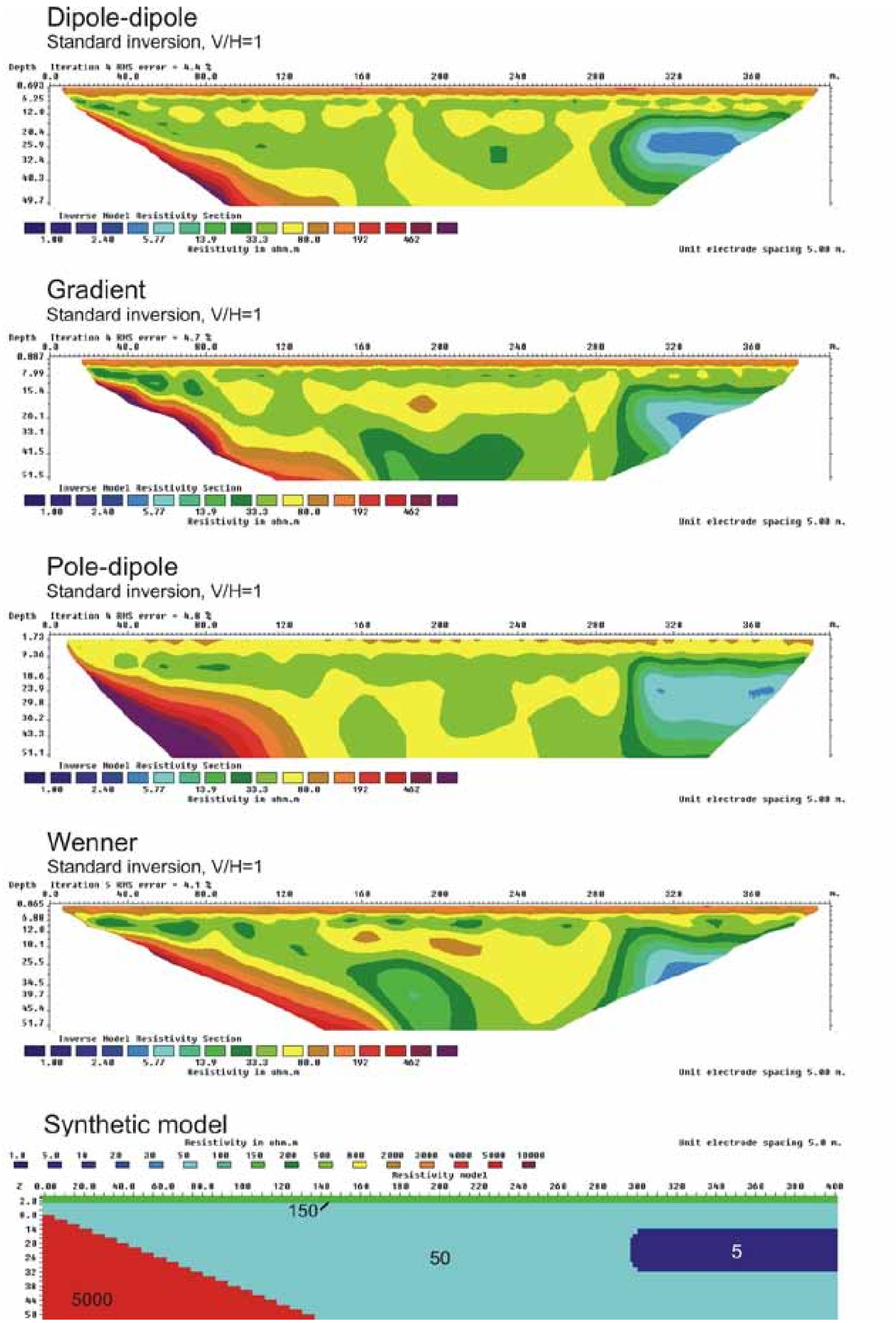

Figure 3.4.25: 3 m top layer (150 Ωm) over 50 Ωm, a dipping layer of 5000 Ωm and a lense of 5 Ωm. Standard inversion, V/H=1

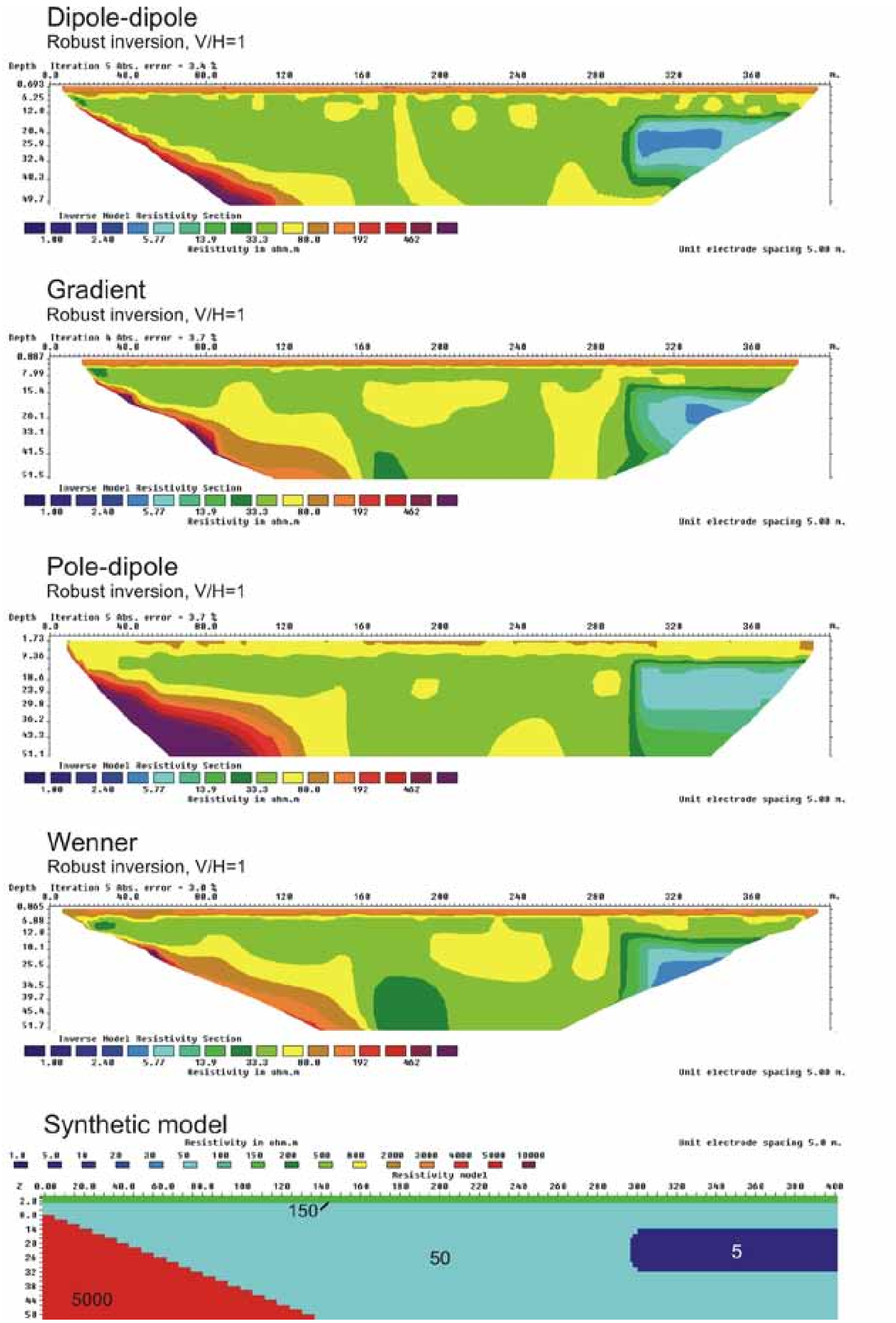

Figure 3.4.26: 3 m top layer (150 Ωm) over 50 Ωm, a dipping layer of 5000 Ωm and a lense of 5 Ωm. Robust inversion, V/H=1.

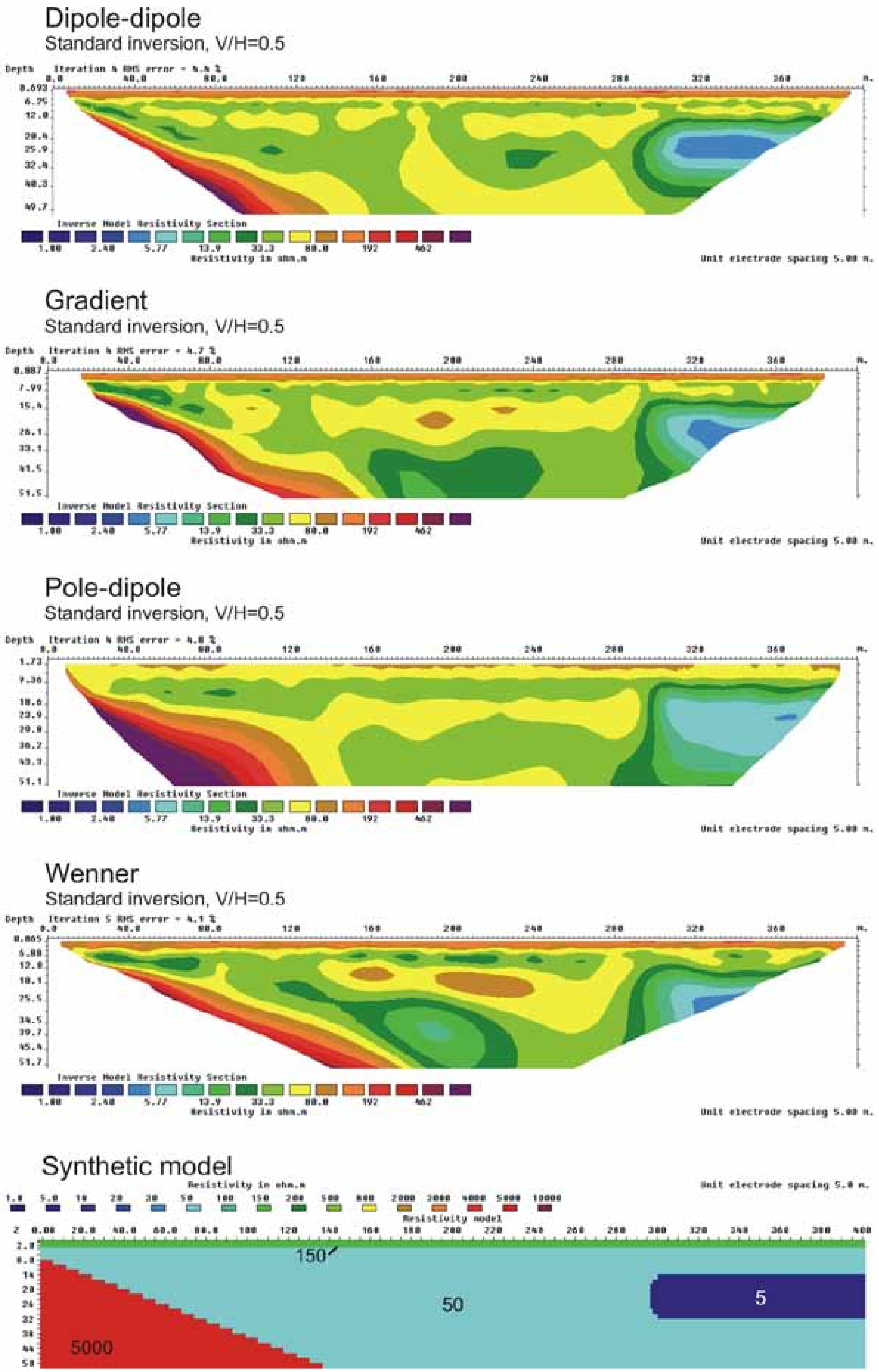

Figure 3.4.27: 3 m top layer (150 Ωm) over 50 Ωm, a dipping layer of 5000 Ωm and a lense of 5 Ωm. Standard inversion, V/H=0.5

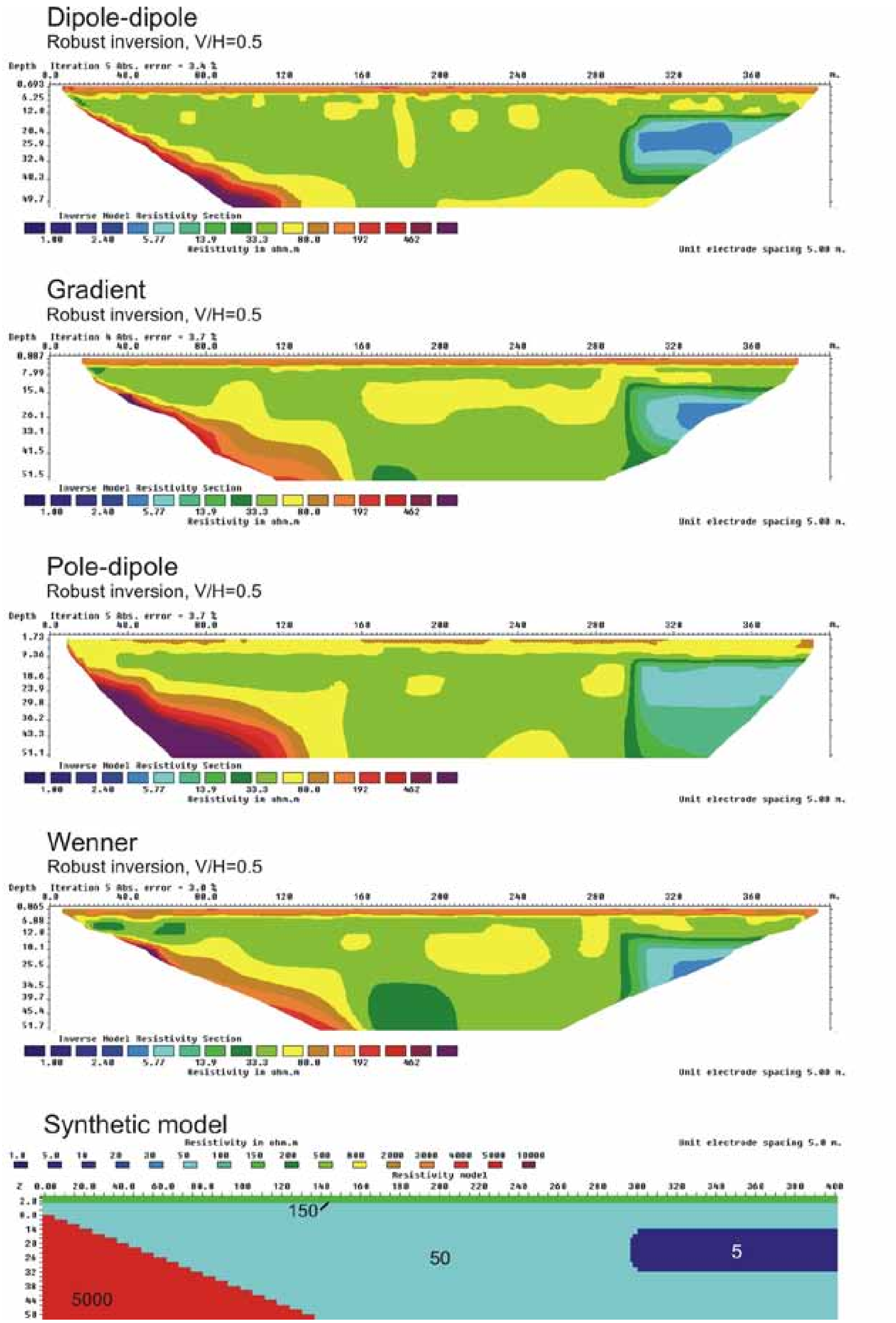

Figure 3.4.28: 3 m top layer (150 Ωm) over 50 Ωm, a dipping layer of 5000 Ωm and a lense of 5 Ωm. Robust inversion, V/H=0.5

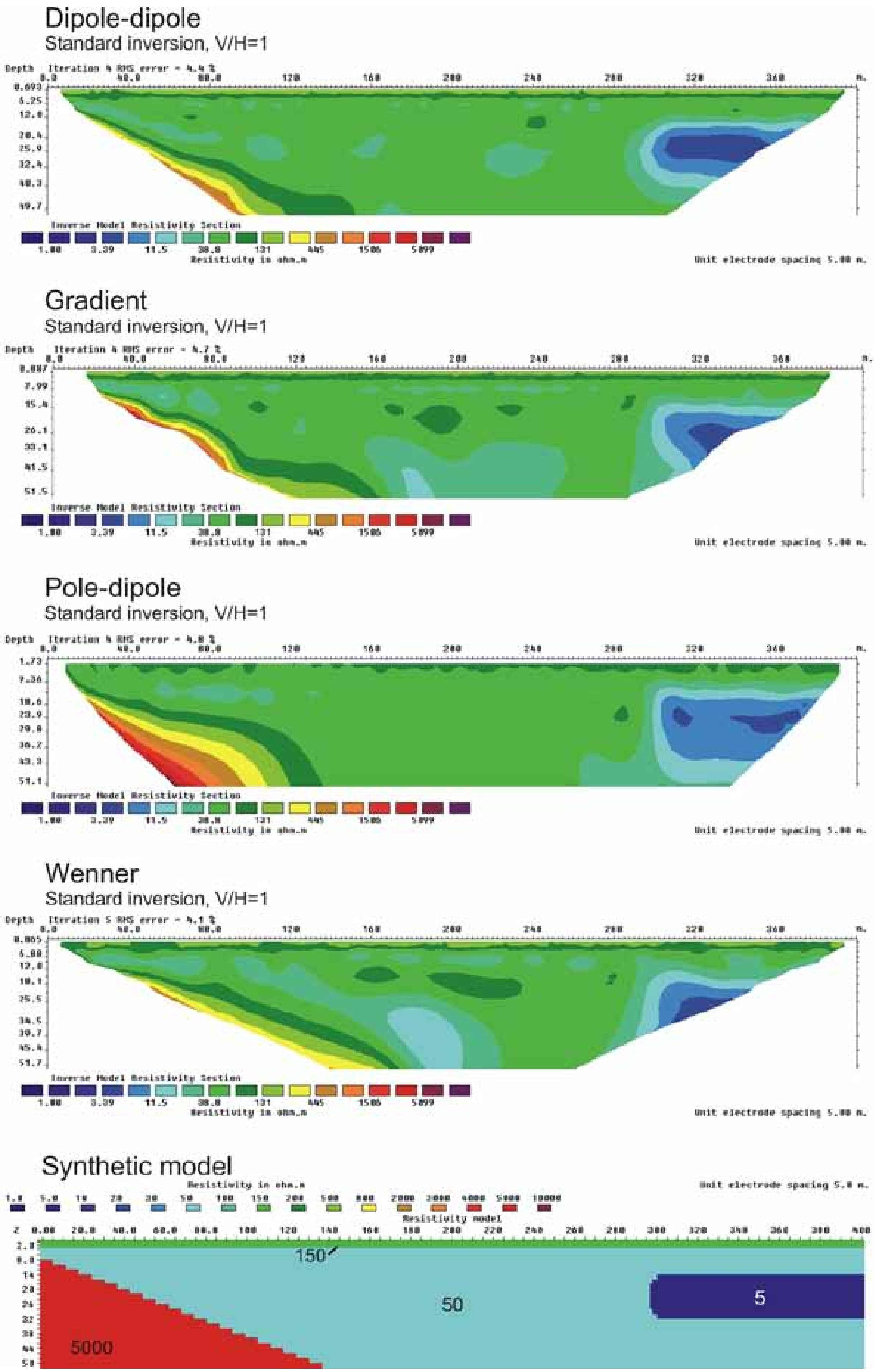

Figure 3.4.29: 3 m top layer (150 Ωm) over 50 Ωm, a dipping layer of 5000 Ωm and a lense of 5 Ωm. Standard inversion, V/H=1

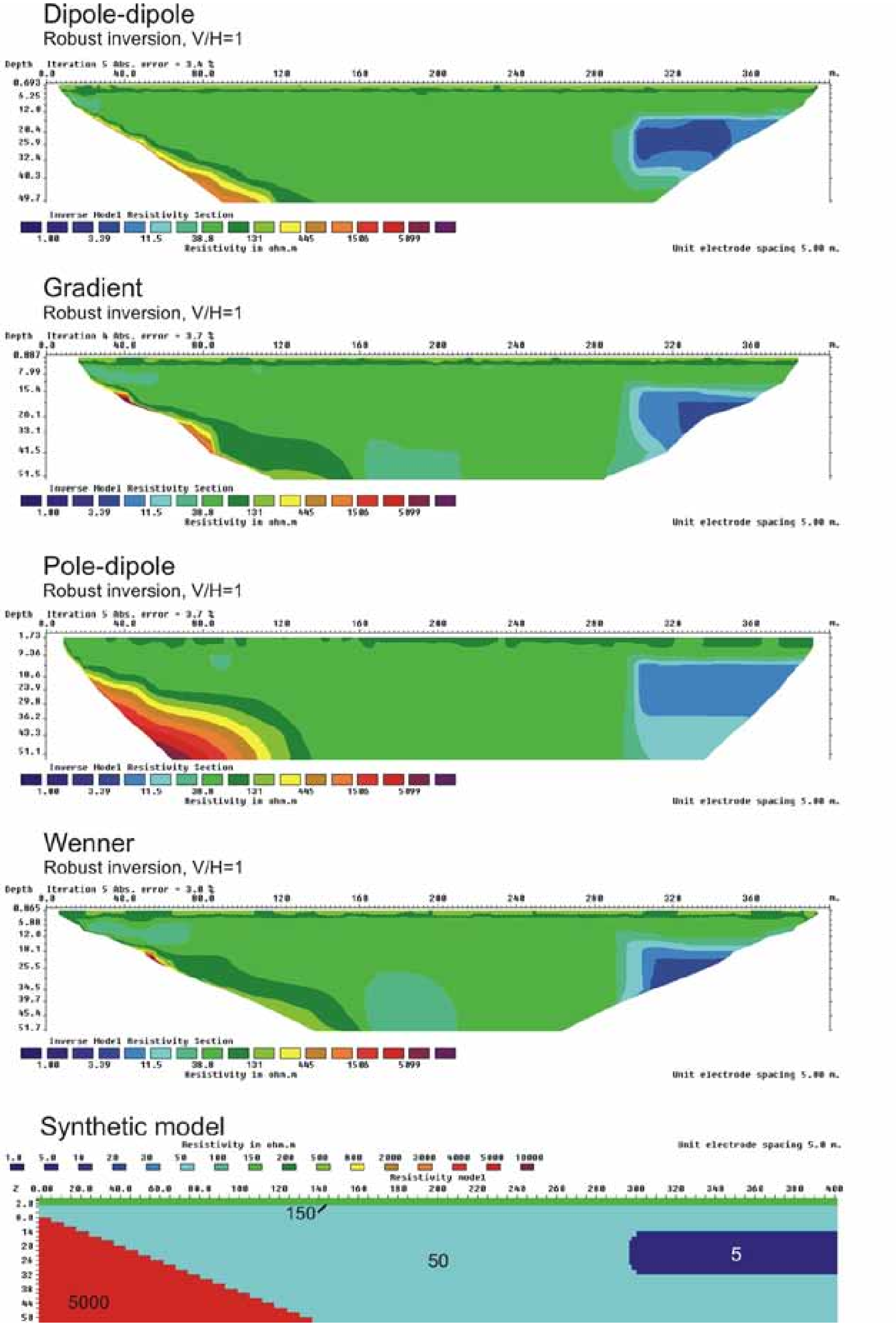

Figure 3.4.30: 3 m top layer (150 Ωm) over 50 Ωm, a dipping layer of 5000 Ωm and a lense of 5 Ωm. Robust inversion, V/H=1.

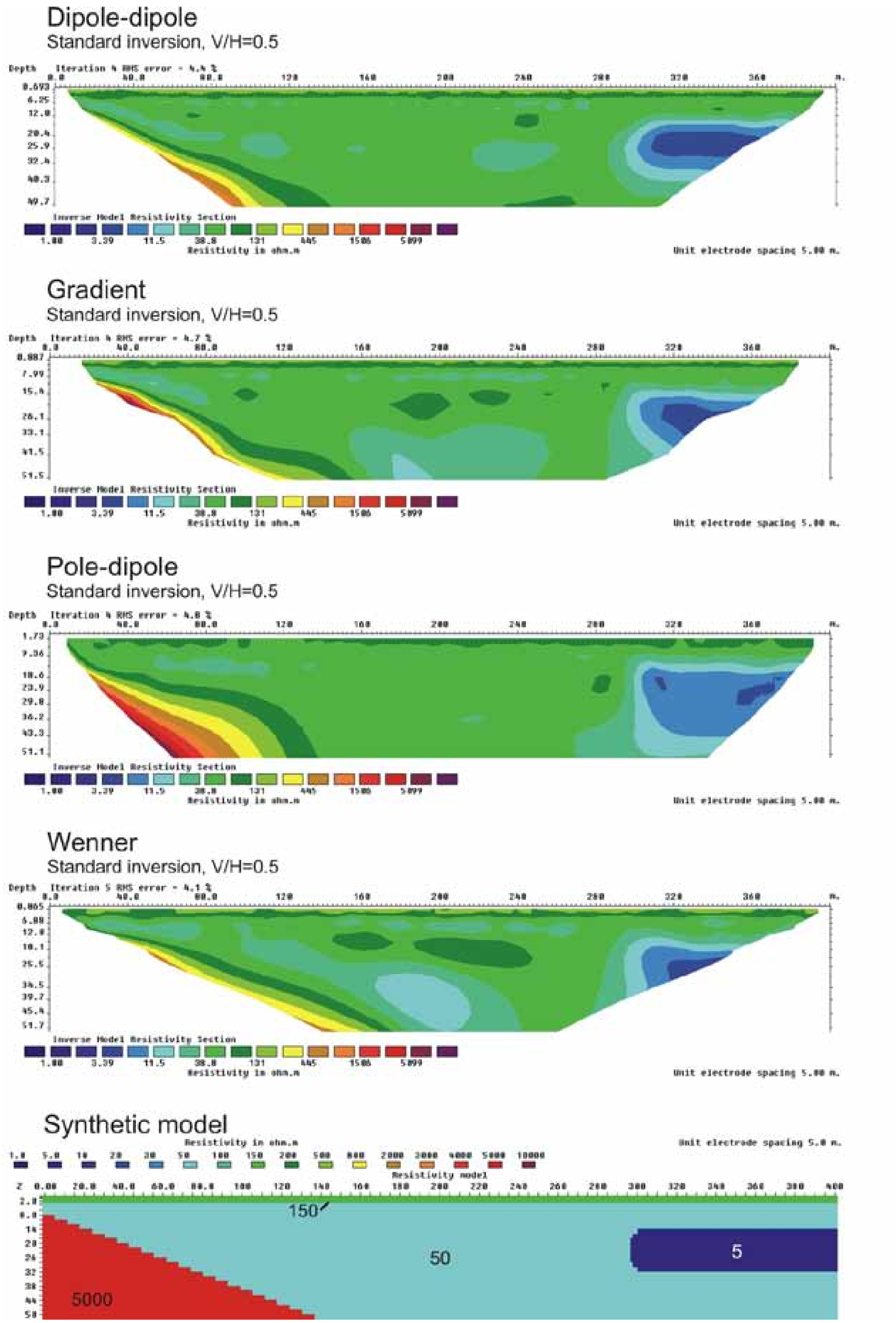

Figure 3.4.31: 3 m top layer (150 Ωm) over 50 Ωm, a dipping layer of 5000 Ωm and a lense of 5 Ωm. Standard inversion, V/H=0.5

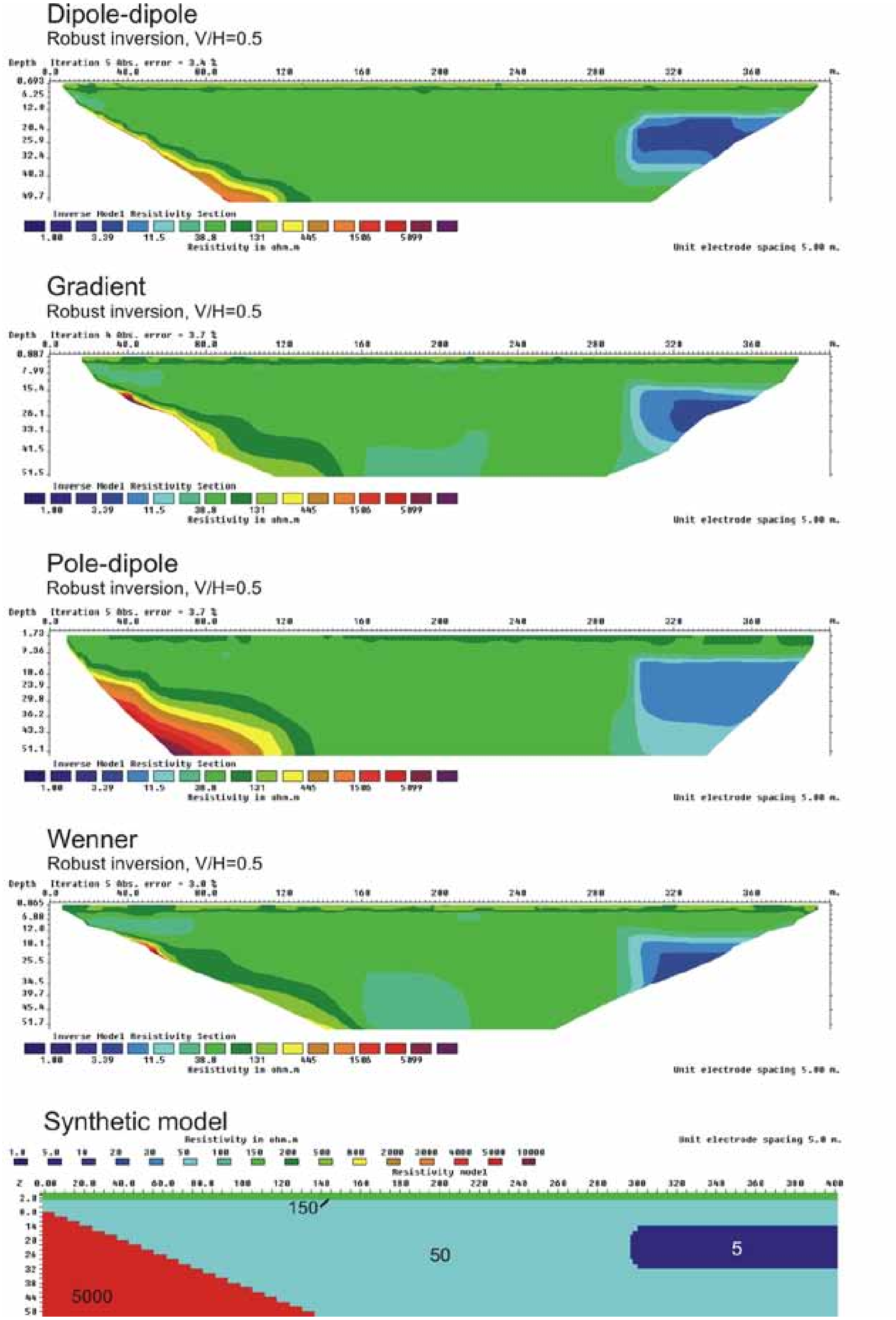

Figure 3.4.32: 3 m top layer (150 Ωm) over 50 Ωm, a dipping layer of 5000 Ωm and a lense of 5 Ωm. Robust inversion, V/H=0.5.

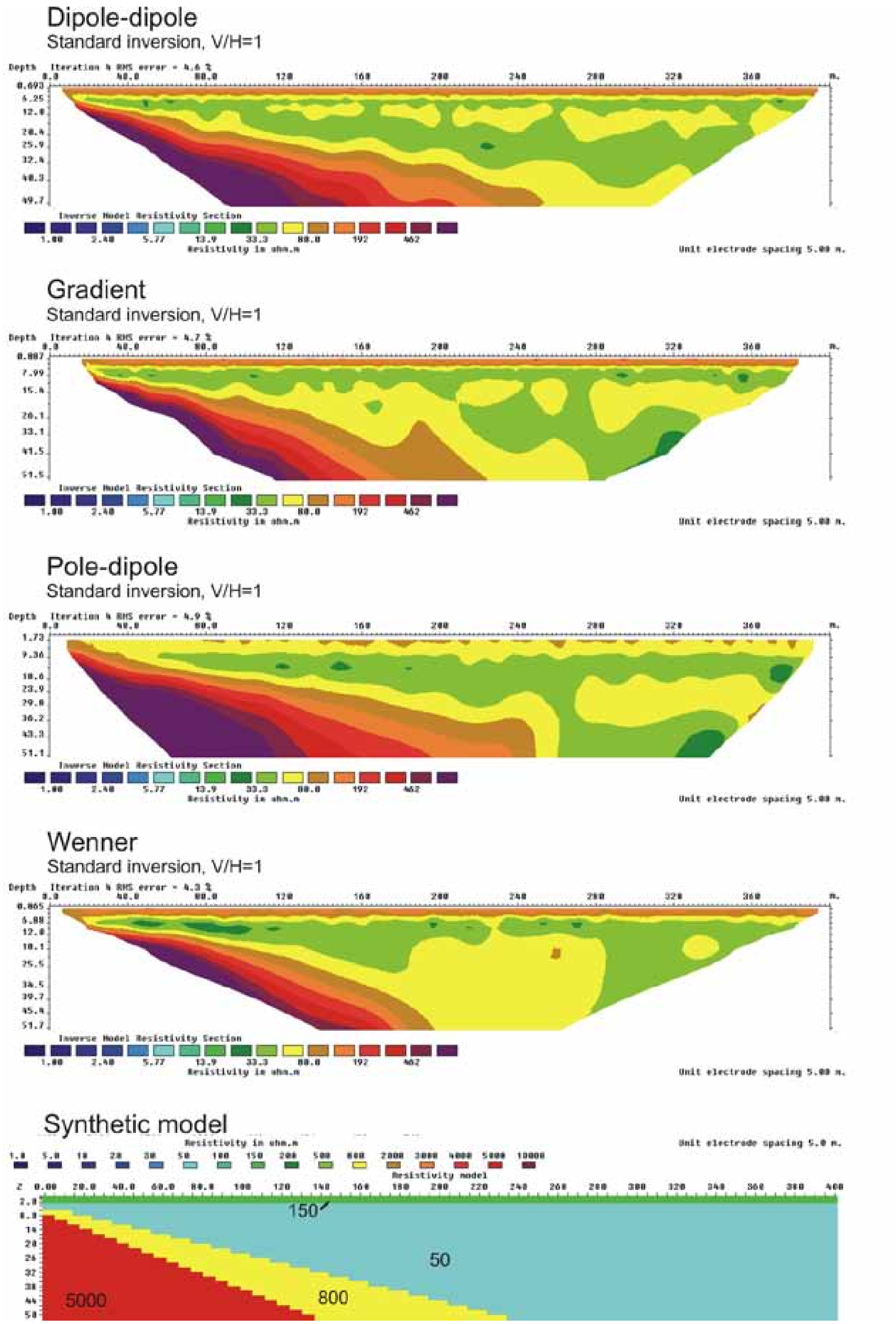

Figure 3.4.33: 3 m top layer (150 Ωm) over 50 Ωm and dipping layers of 800 Ωm and 5000 Ωm. Standard inversion, V/H=1.

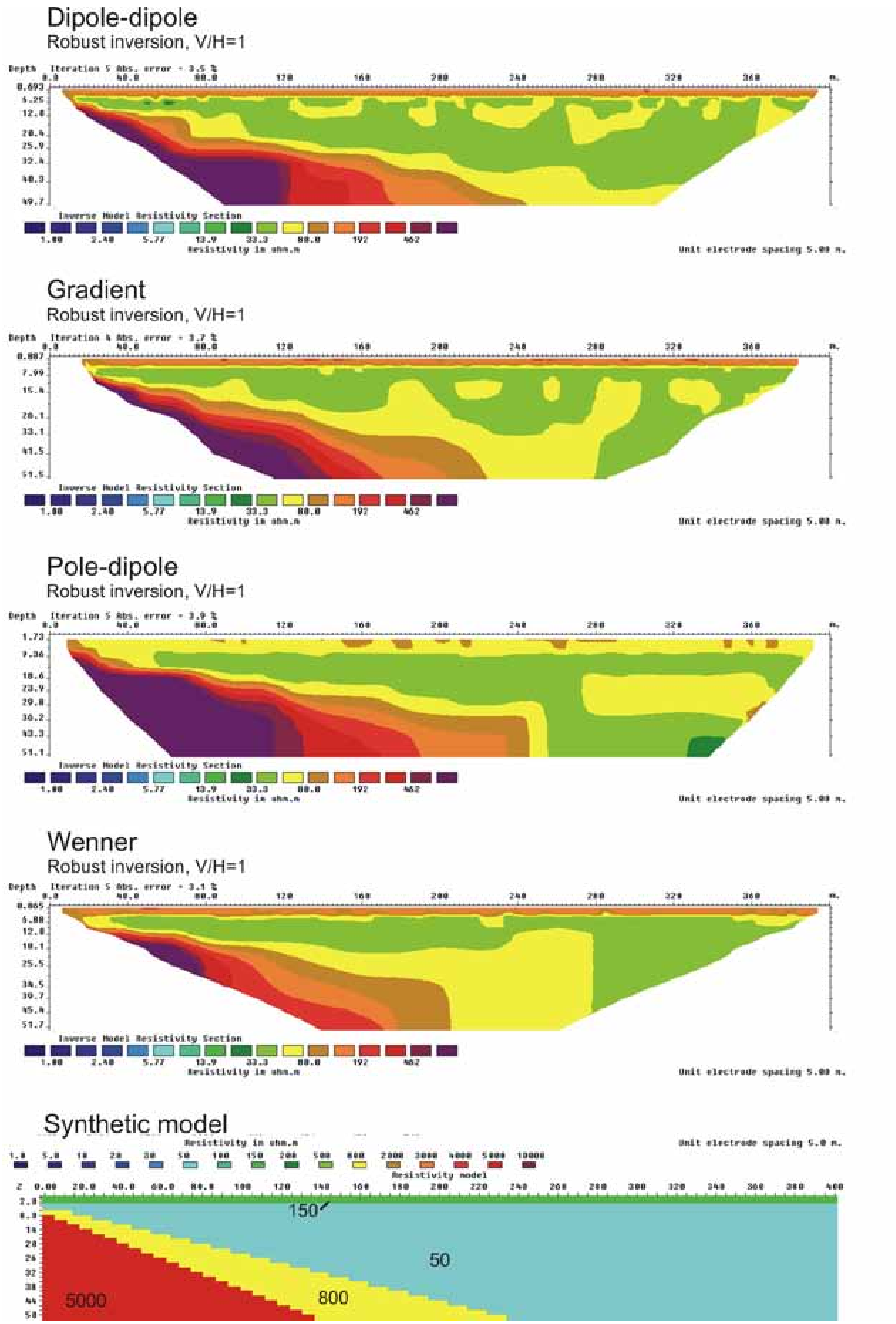

Figure 3.4.34: 3 m top layer (150 Ωm) over 50 Ωm and dipping layers of 800 Ωm and 5000 Ωm. Robust inversion, V/H=1.

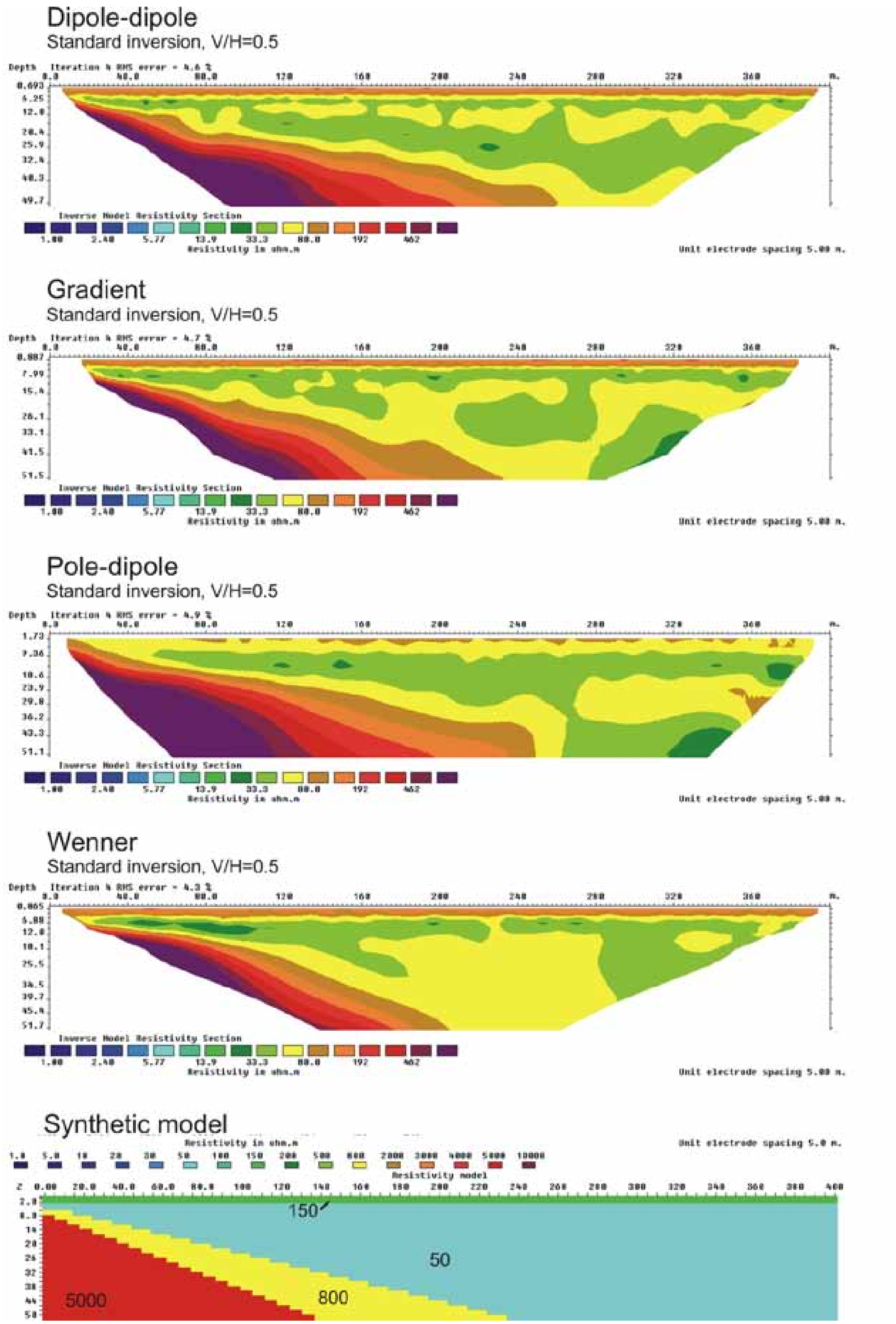

Figure 3.4.35: 3 m top layer (150 Ωm) over 50 Ωm and dipping layers of 800 Ωm and 5000 Ωm. Standard inversion, V/H=0.5.

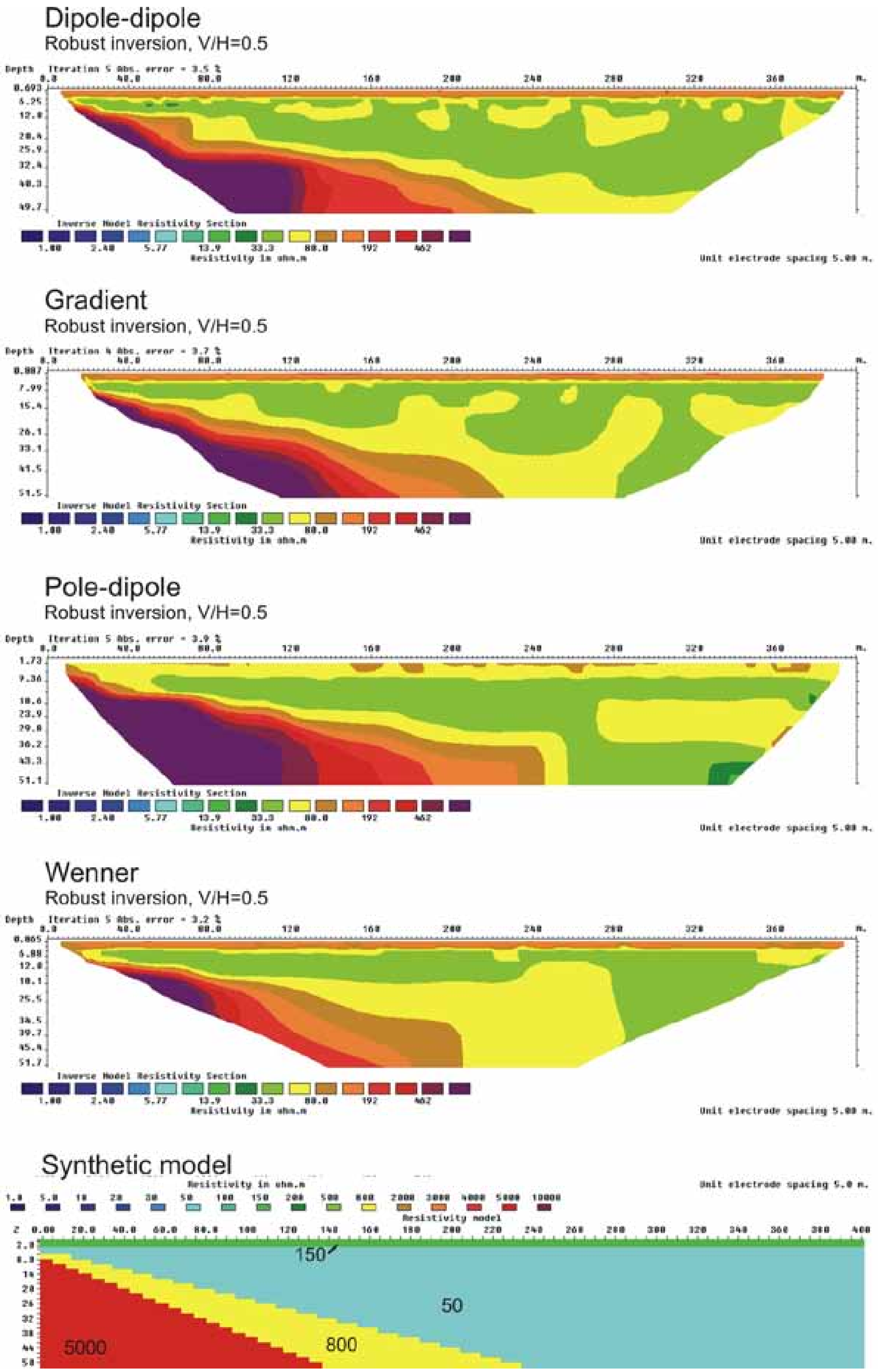

Figure 3.4.36: 3 m top layer (150 Ωm) over 50 Ωm and dipping layers of 800 Ωm and 5000 Ωm. Robust inversion, V/H=0.5.

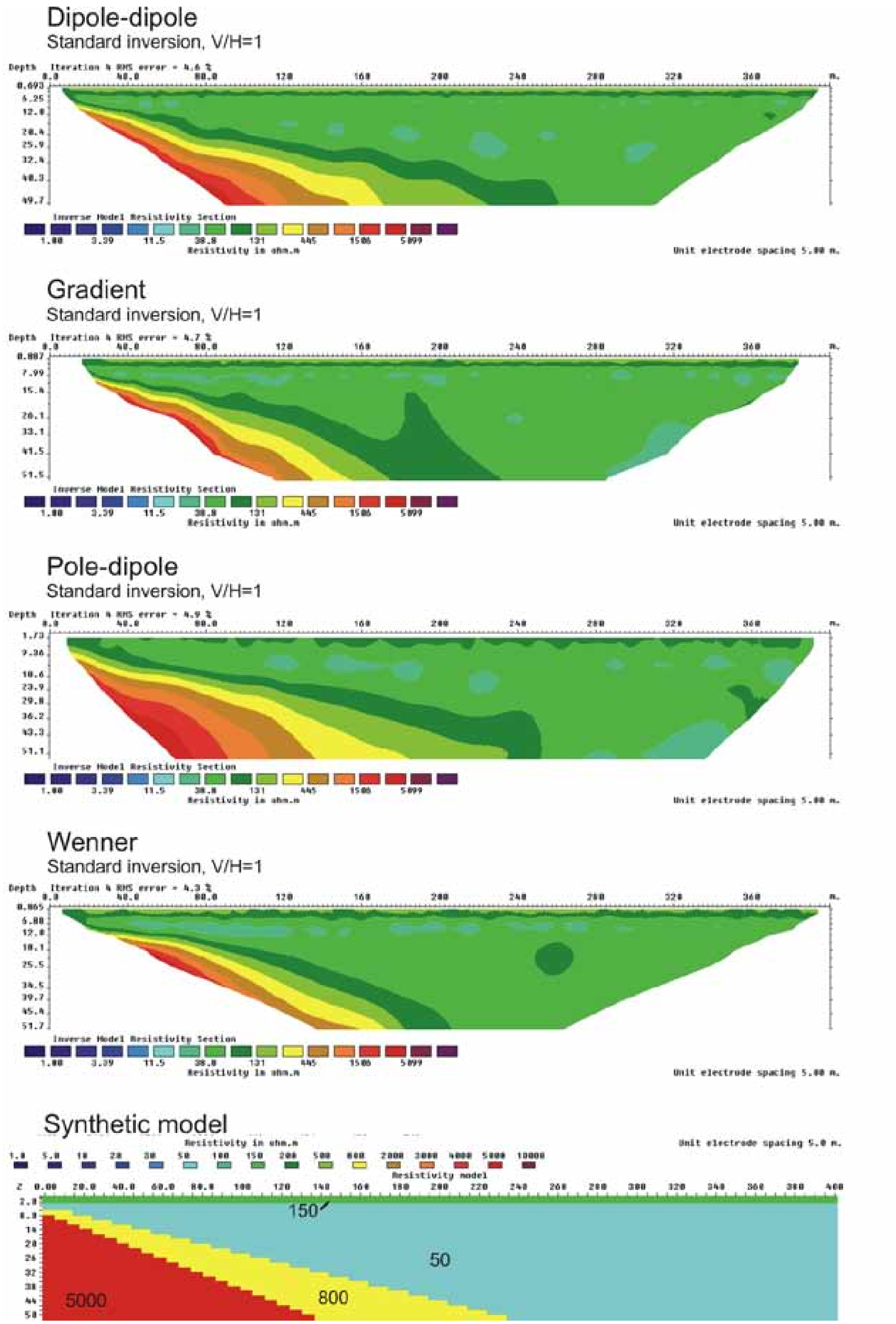

Figure 3.4.37: 3 m top layer (150 Ωm) over 50 Ωm and dipping layers of 800 Ωm and 5000 Ωm. Standard inversion, V/H=1.

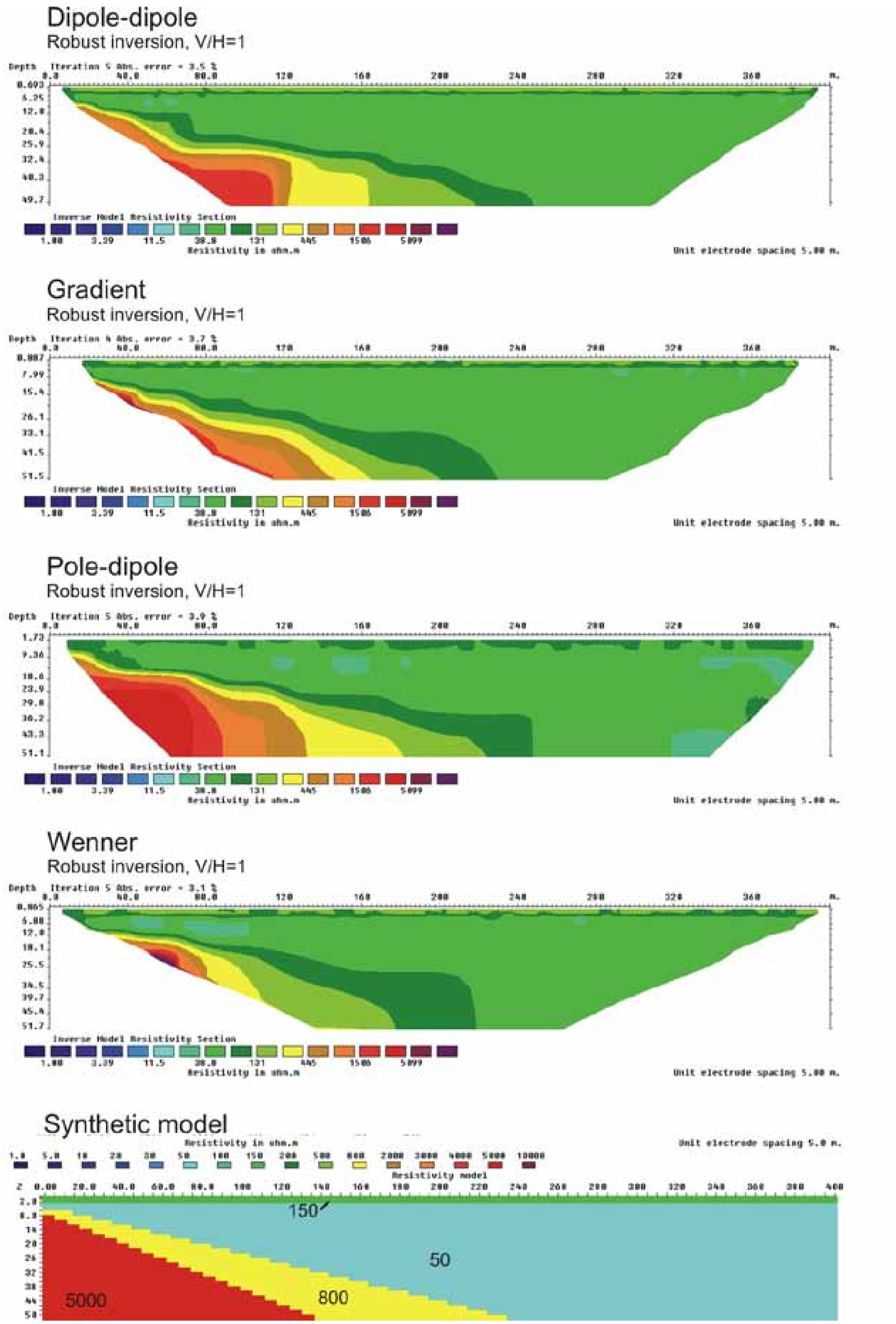

Figure 3.4.38: 3 m top layer (150 Ωm) over 50 Ωm and dipping layers of 800 Ωm and 5000 Ωm. Robust inversion, V/H=1.

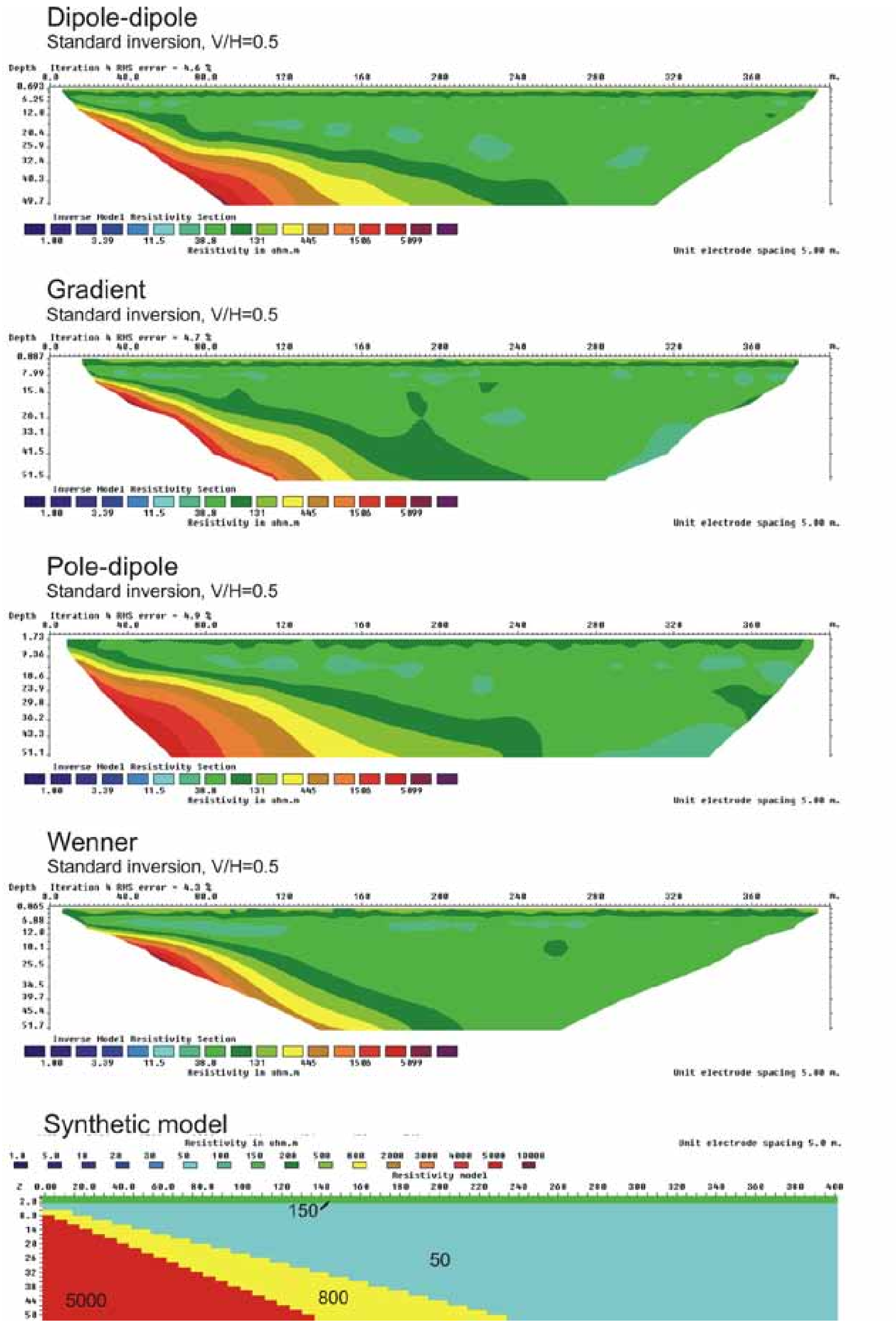

Figure 3.4.39: 3 m top layer (150 Ωm) over 50 Ωm and dipping layers of 800 Ωm and 5000 Ωm. Standard inversion, V/H=0.5.

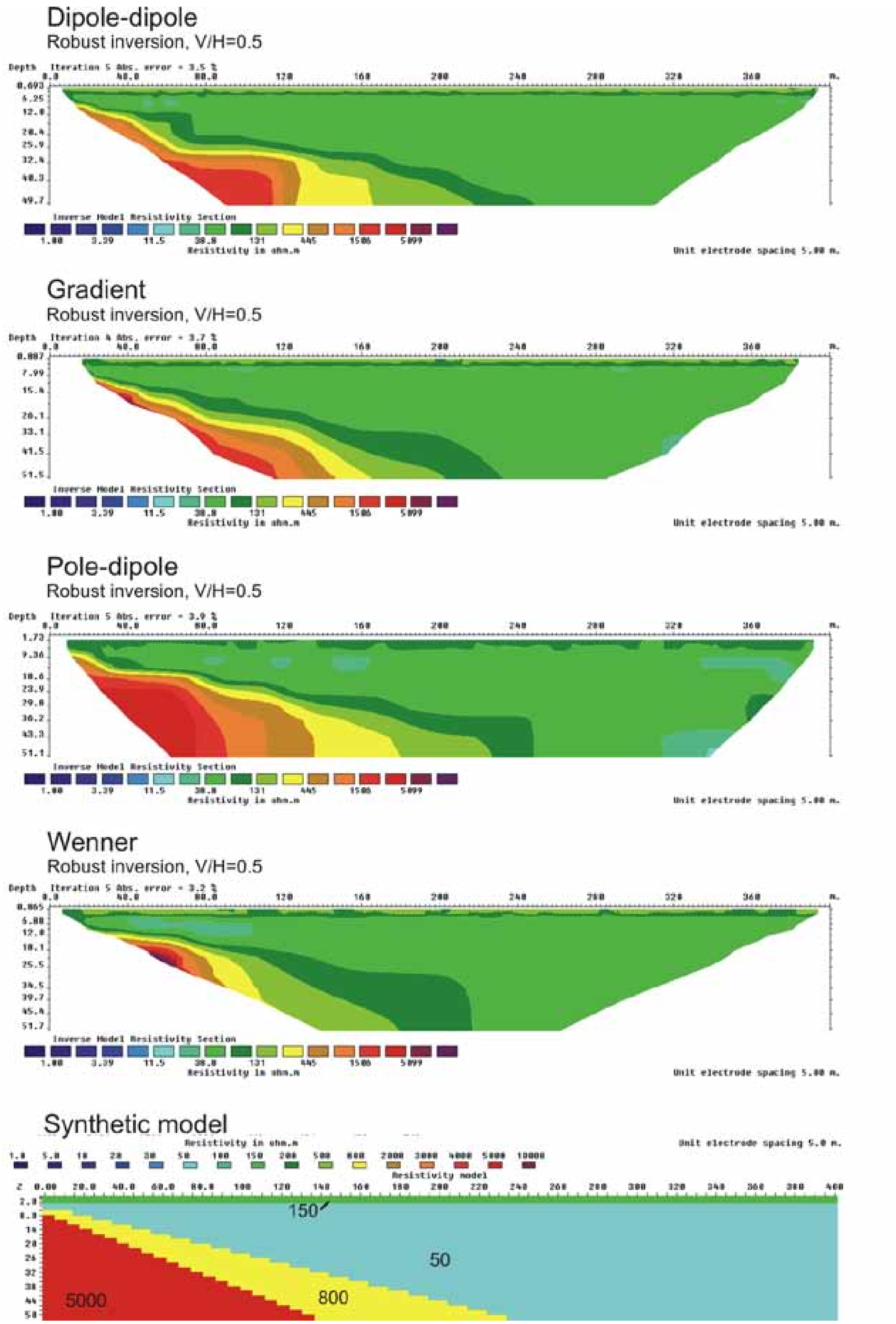

Figure 3.4.40: 3 m top layer (150 Ωm) over 50 Ωm and dipping layers of 800 Ωm and 5000 Ωm. Robust inversion, V/H=0.5.

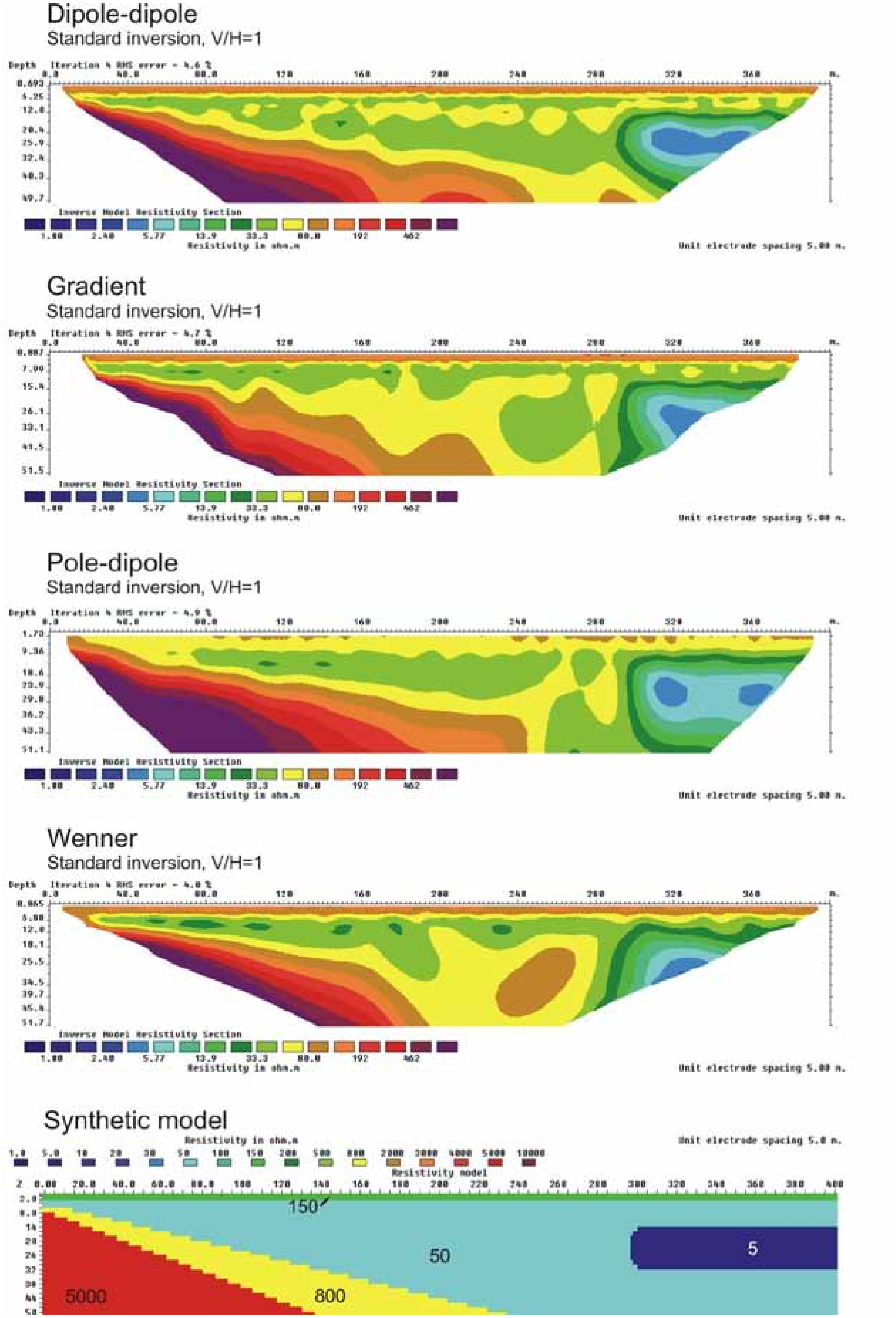

Figure 3.4.41: 3 m top layer (150 Ωm) over 50 Ωm, dipping layers of 800 Ωm and 5000 Ωm and a lense of 5 Ωm. Standard inversion, V/H=1.

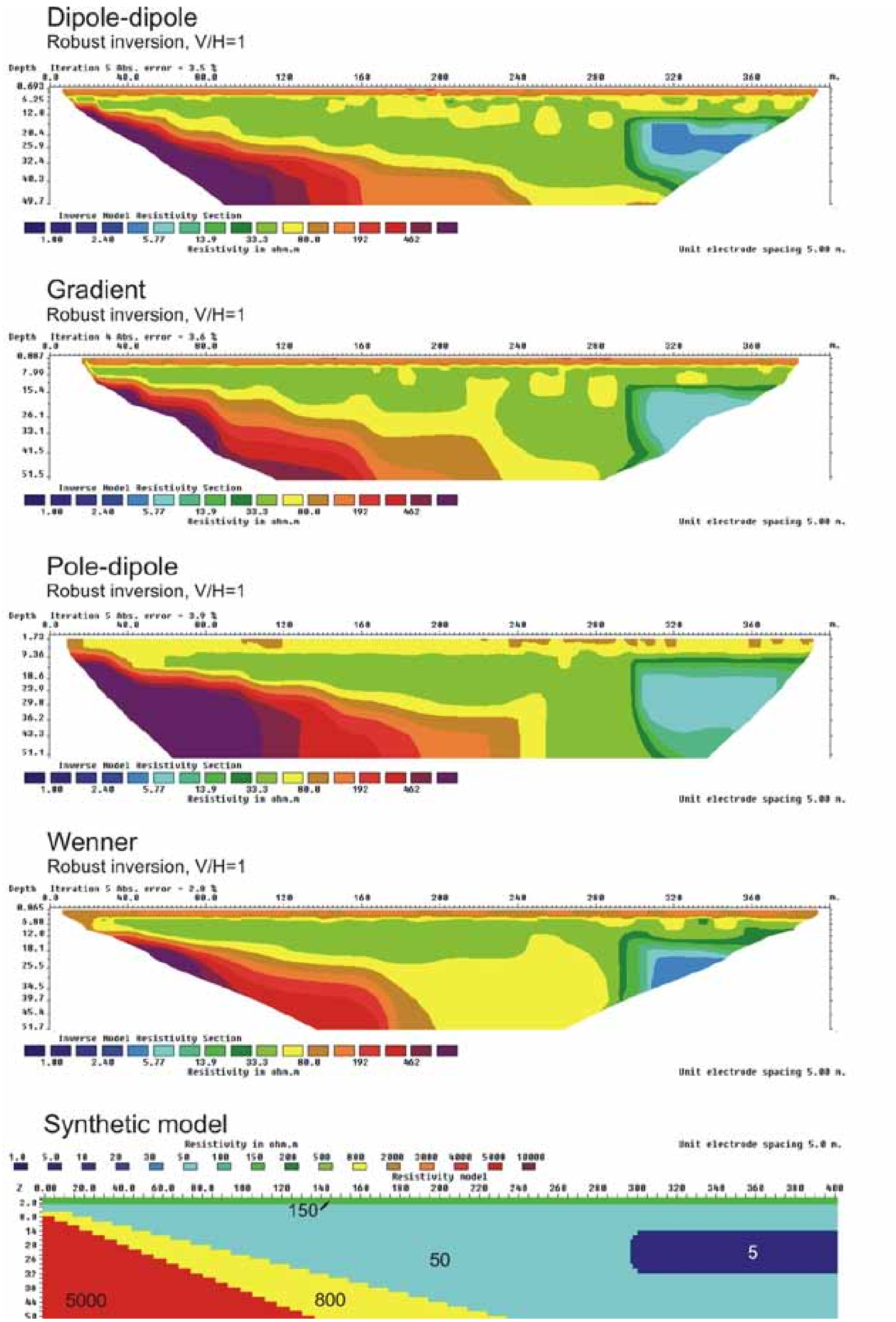

Figure 3.4.42: 3 m top layer (150 Ωm) over 50 Ωm, dipping layers of 800 Ωm and 5000 Ωm and a lense of 5 Ωm. Robust inversion, V/H=1.

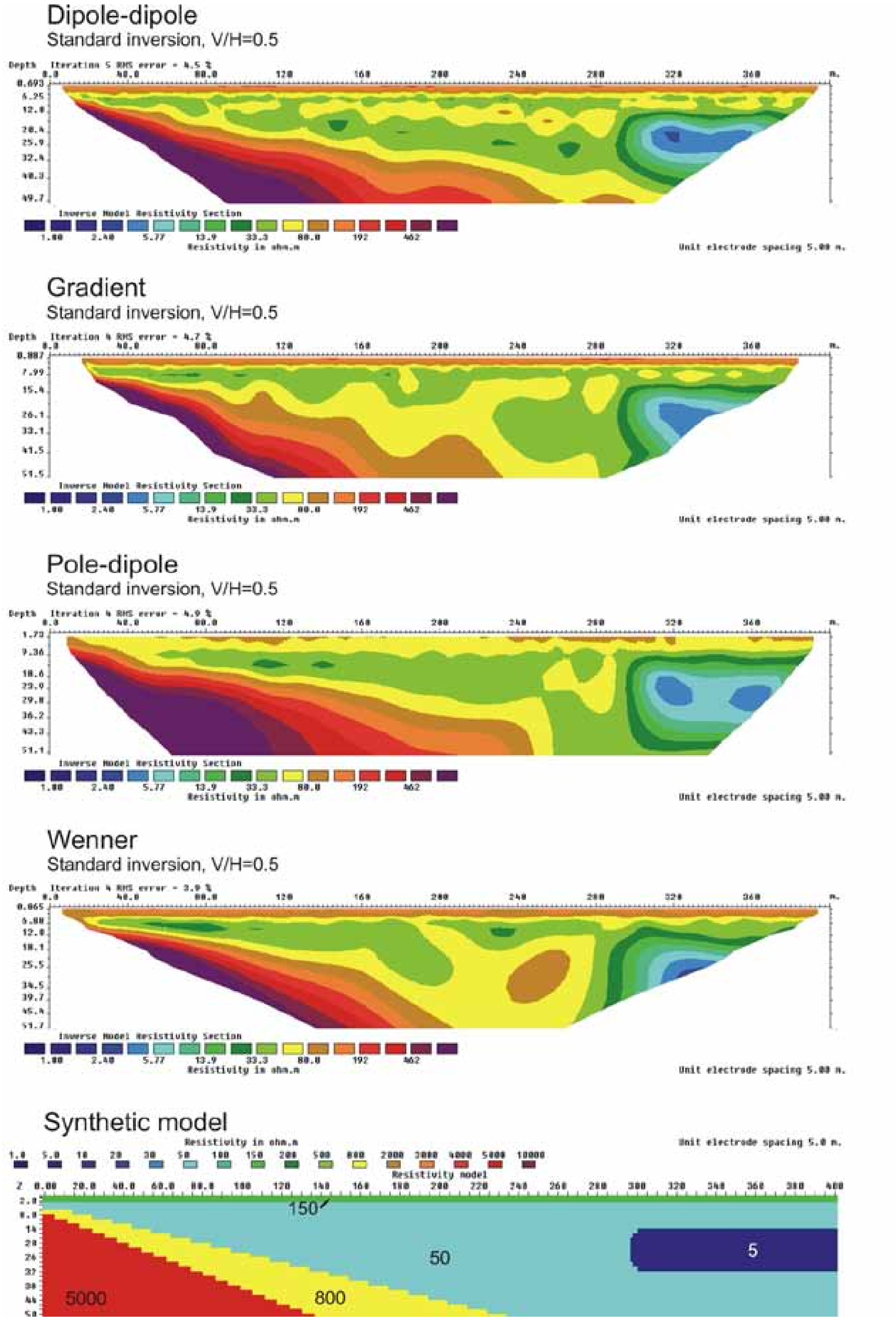

Figure 3.4.43: 3 m top layer (150 Ωm) over 50 Ωm, dipping layers of 800 Ωm and 5000 Ωm and a lense of 5 Ωm. Standard inversion, V/H=0.5.

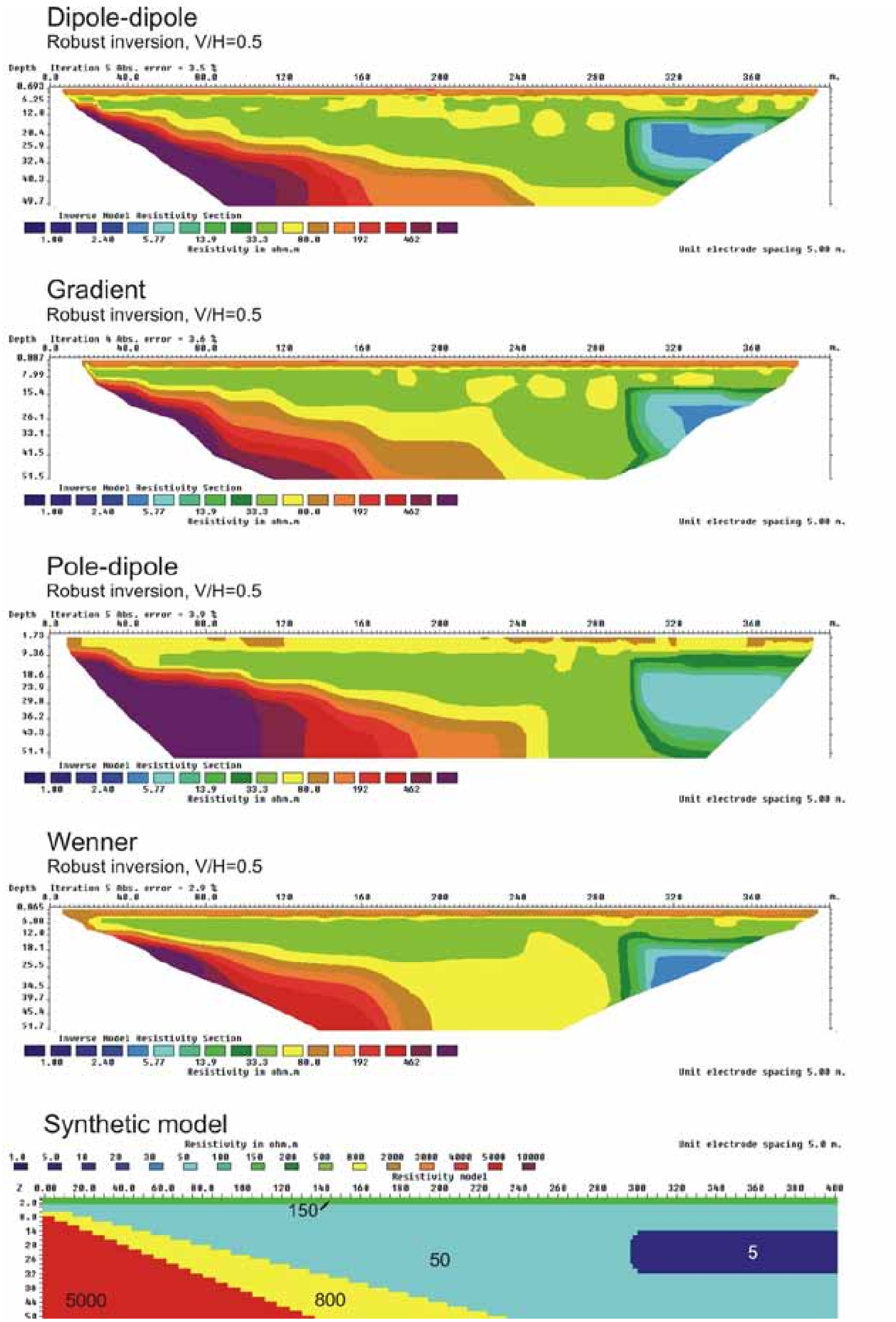

Figure 3.4.44: 3 m top layer (150 Ωm) over 50 Ωm, dipping layers of 800 Ωm and 5000 Ωm and a lense of 5 Ωm. Robust inversion, V/H=0.5.

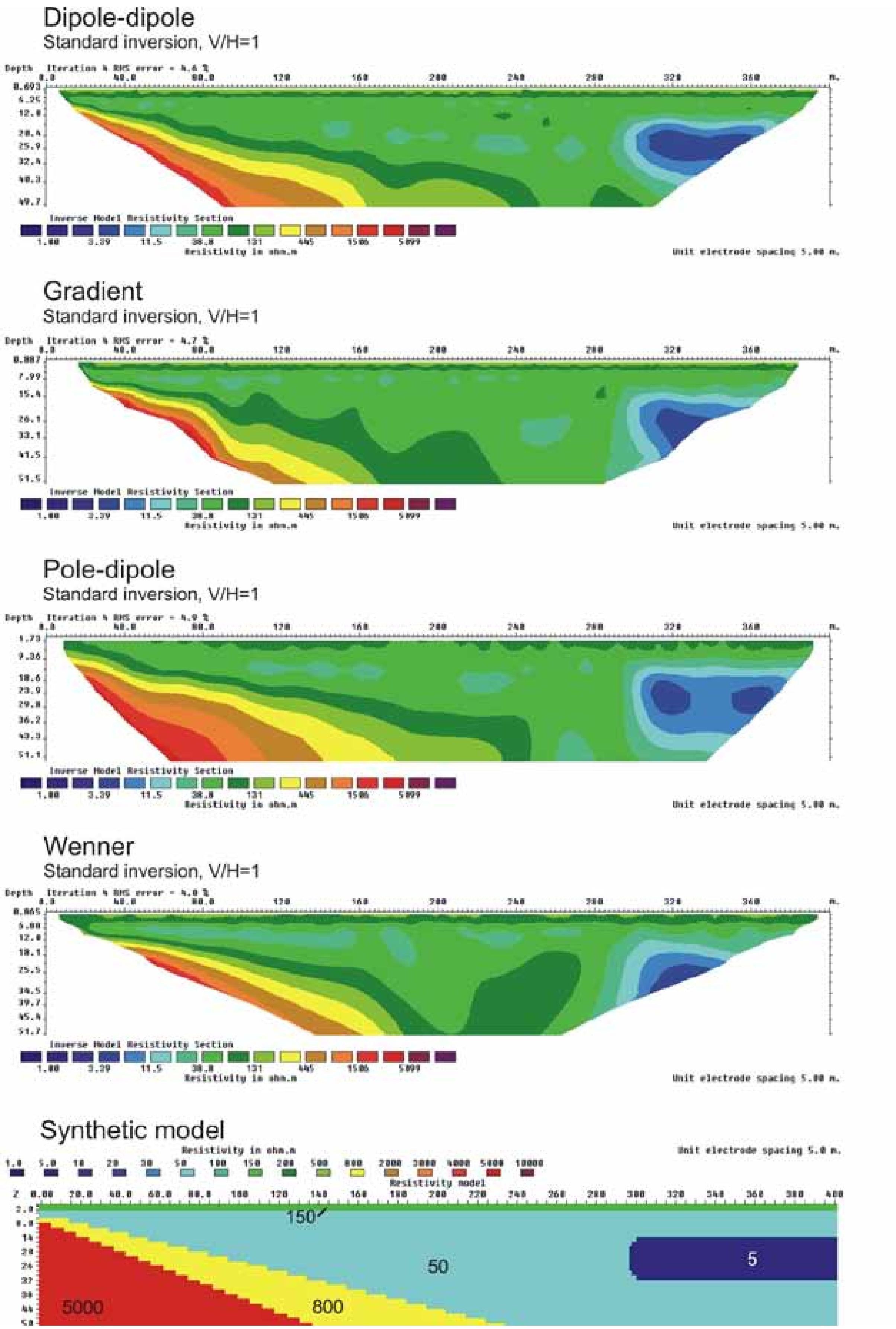

Figure 3.4.45: 3 m top layer (150 Ωm) over 50 Ωm, dipping layers of 800 Ωm and 5000 Ωm and a lense of 5 Ωm. Standard inversion, V/H=1.

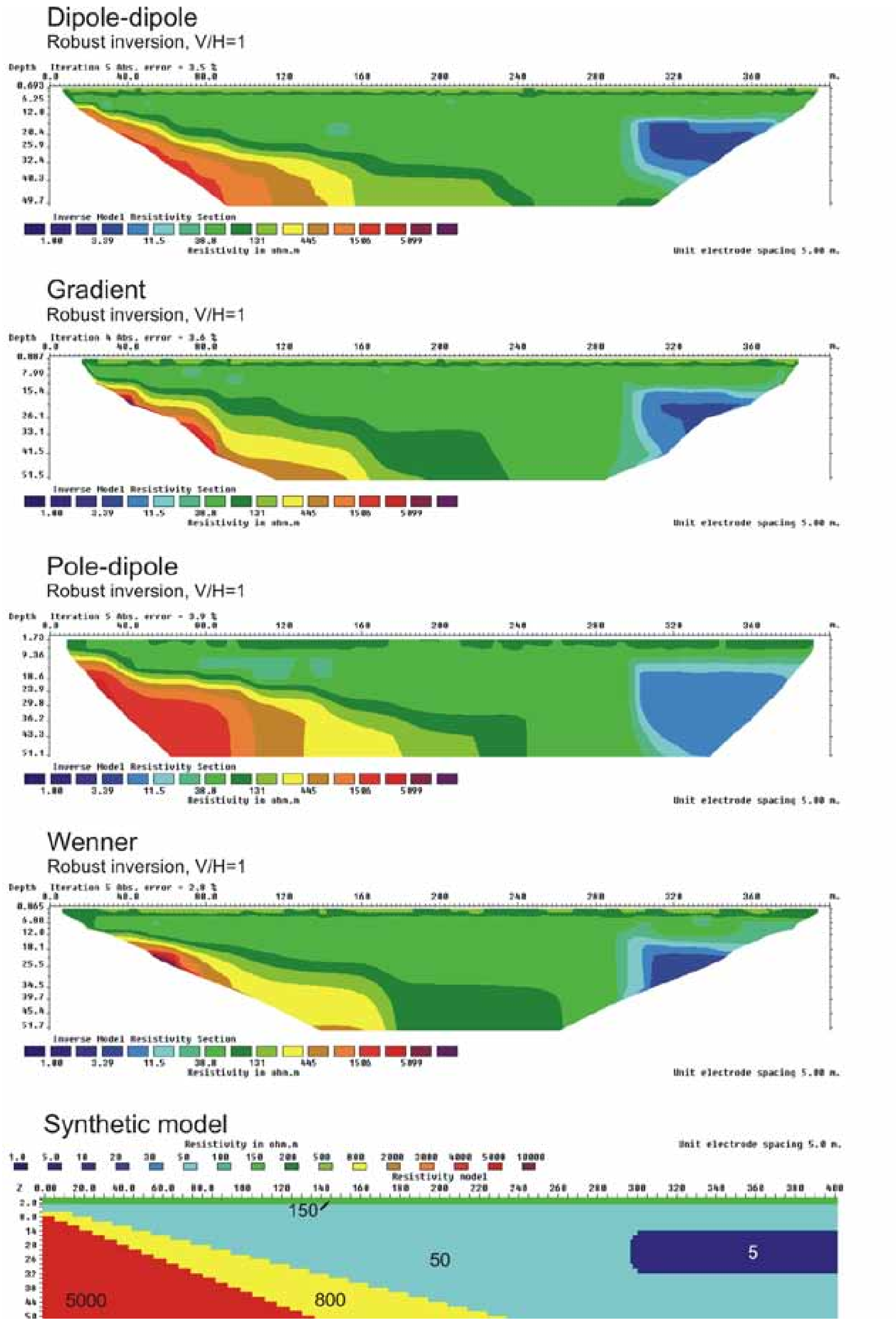

Figure 3.4.46: 3 m top layer (150 Ωm) over 50 Ωm, dipping layers of 800 Ωm and 5000 Ωm and a lense of 5 Ωm. Robust inversion, V/H=1.

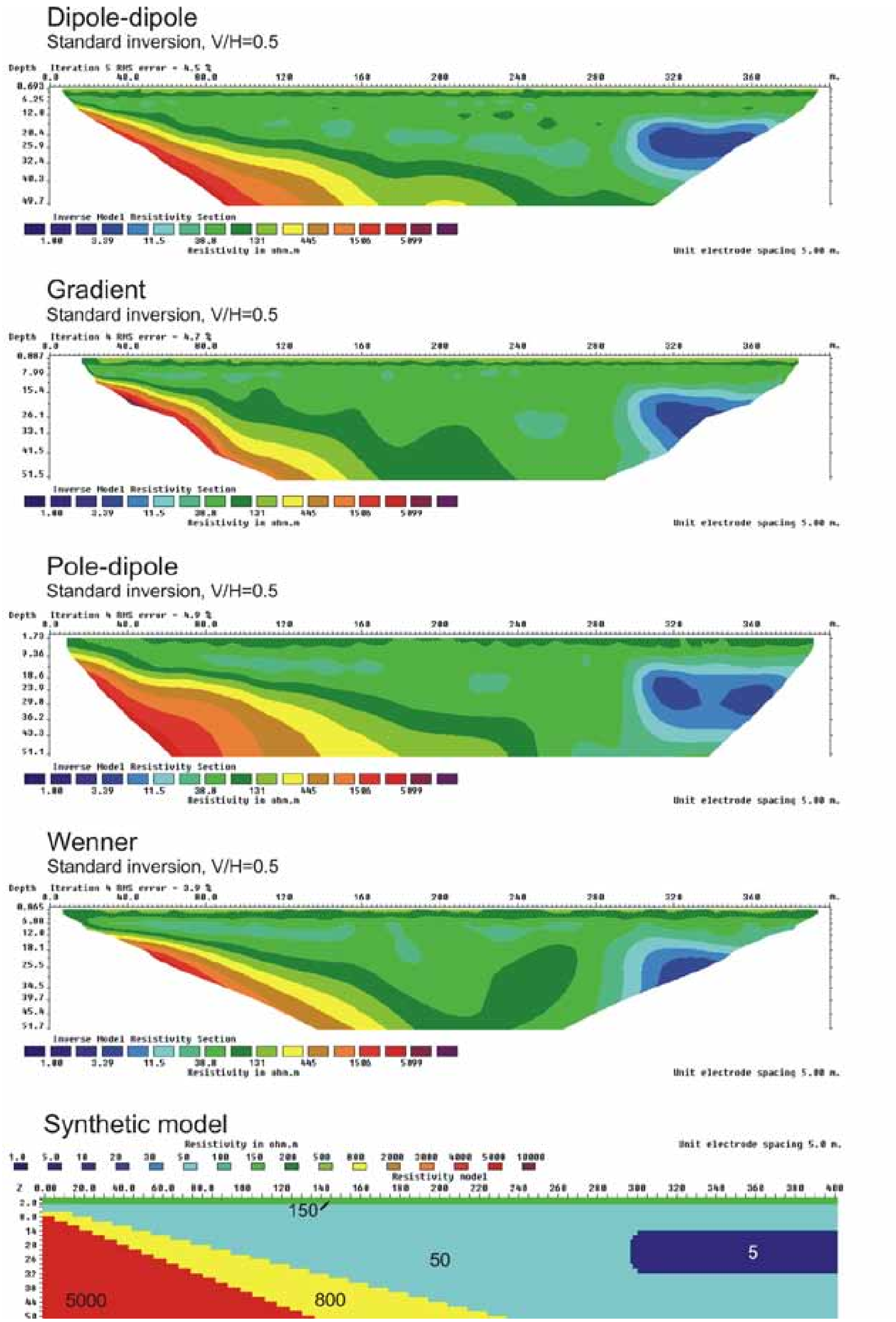

Figure 3.4.47: 3 m top layer (150 Ωm) over 50 Ωm, dipping layers of 800 Ωm and 5000 Ωm and a lense of 5 Ωm. Standard inversion, V/H=0.5.

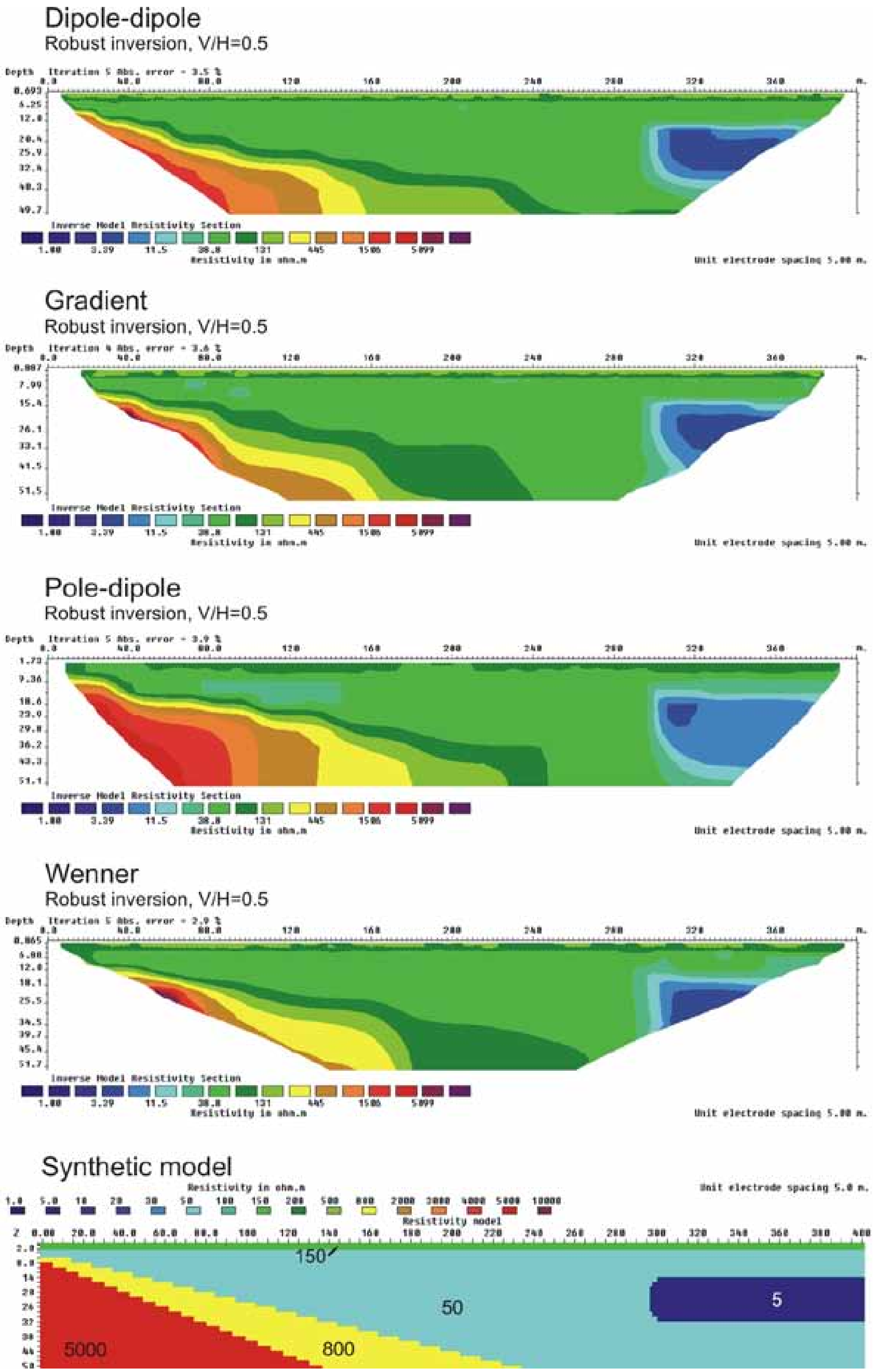

Figure 3.4.48: 3 m top layer (150 Ωm) over 50 Ωm, dipping layers of 800 Ωm and 5000 Ωm and a lense of 5 Ωm. Robust inversion, V/H=0.5.