Dear referee,

thank you for reviewing our manuscript. We have considered your helpful remarks and included the necessary additional information in the manuscript:

1. Introduction: The introduction is well described but some cited papers are not indicated in the final bibliography. Moreover, I suggest to add some deep DC application with nostandard instruments (transmitter and receiver physically separated) with a single and multichannel system. In example, there are papers where a deep DC instrument with single channel was used: Rizzo E... (2004), Colella A… (2004), Tamburriello G… (2008). Moreover, there are some more recent with deep DC multichannel use: Santilano A… (2015), Balasco M… (2008)

Response: Thank you very much for this suggestions to literature that we have not been aware of. We extended the introduction and parts of the processing with references to these works.

New text: "Furthermore, an Italian group used deep electrical resistivity tomography (DERT) to successively image several deep geological structures (e.g. Santilano et al., 2015 for an overview). Colella et al. (2004) images the Agri sediment basin on profiles of up to 6.5 km length. Rizzo et al. (2004) compare these results with small-scaled ERT. Tamburiello et al. (2008) revealed geothermally relevant fluid-affected structures. Balacso et al. (2011) give insight into tectonic structures in the area of the disastrous L'Aquila earthquake."

Additionally we cited Balasco et al. (2011) as example for a data logger with a similar (but simpler) design.

We also cite Colella et al. (2004) for comparing time series and spectrum.

2. Datalogger: Line 90 to 92: I suggest to explain why only 3 channels are used.

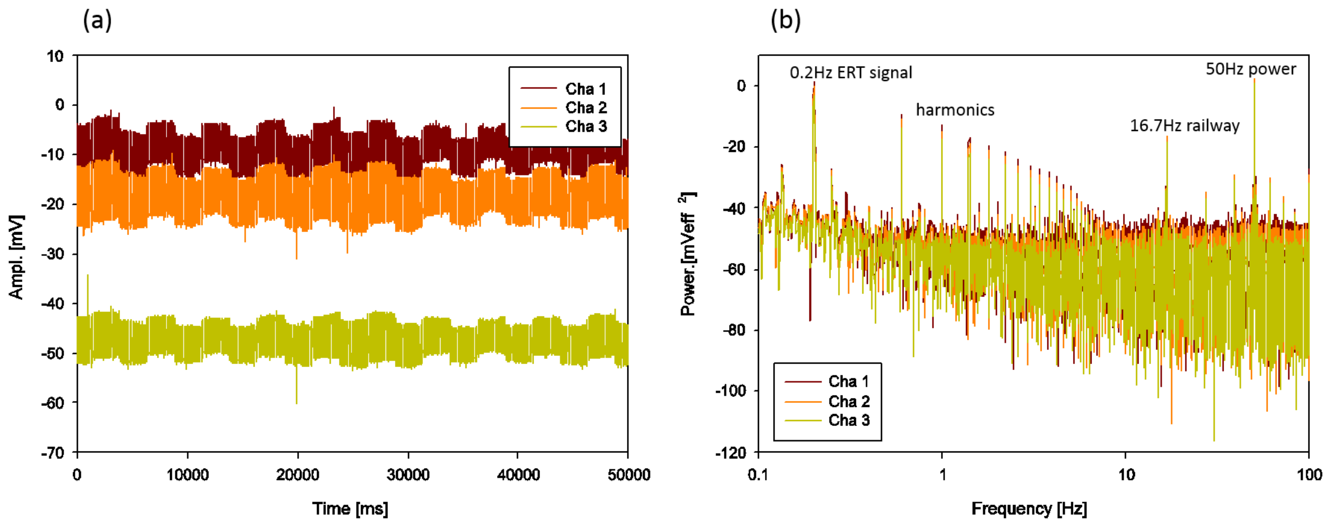
Response: We designed the datalogger using three channels to record data in all spatial directions generally. For the particular case of 2D setups, where adjacent dipoles in the same direction are measured, it is also a good trade-off between minimizing the length of wires to the electrodes and the number of dataloggers to be installed in the survey area.

3. Line 96: The GSM module is used only for the communication between the DL and the laptop as remote control…to download the acquired data the system uses a USB way. Why is it not possible to use a 3G module? I suggest to add one sentence to explain.

Response: There was no intention to download the big amount of data recorded over remote control. We just wanted to change parameters like gain and sample rate remotely and monitor small parts of the recorded time series to check the signal quality. Main aim was to minimize power consumption, which is significantly lower for the used GSM module compared to 3G- or 4G-modules.

4. Line 120: I suggest to add on the figure 4 the frequencies indicated: powerlines, railway, the signals 0.2hz and the harmonics.

Response: We added the description of lines in the frequency spectrum to the modified Figure 4:



Modified Figure 4: Exemplary voltage time series (a) from a square-wave current injection and frequency spectrum (b) as visible in the GUI monitoring software

5. Field case: Line 275-279: the authors wrote “Higher DD correspond to larger penetration depths but exhibit lower...”…the figure 14b show low S/N signals (blue color) in two zone (one shallow and one deep) with in the middle a better S/N signals zone. Therefore, the sentence needs some more details… it depends also for the electrical resistivity distribution. Low resistivity zone (i.e. clay) produce low S/N signals then relative high resistive layer (i.e. sandstone). I suggest to explain better this part.

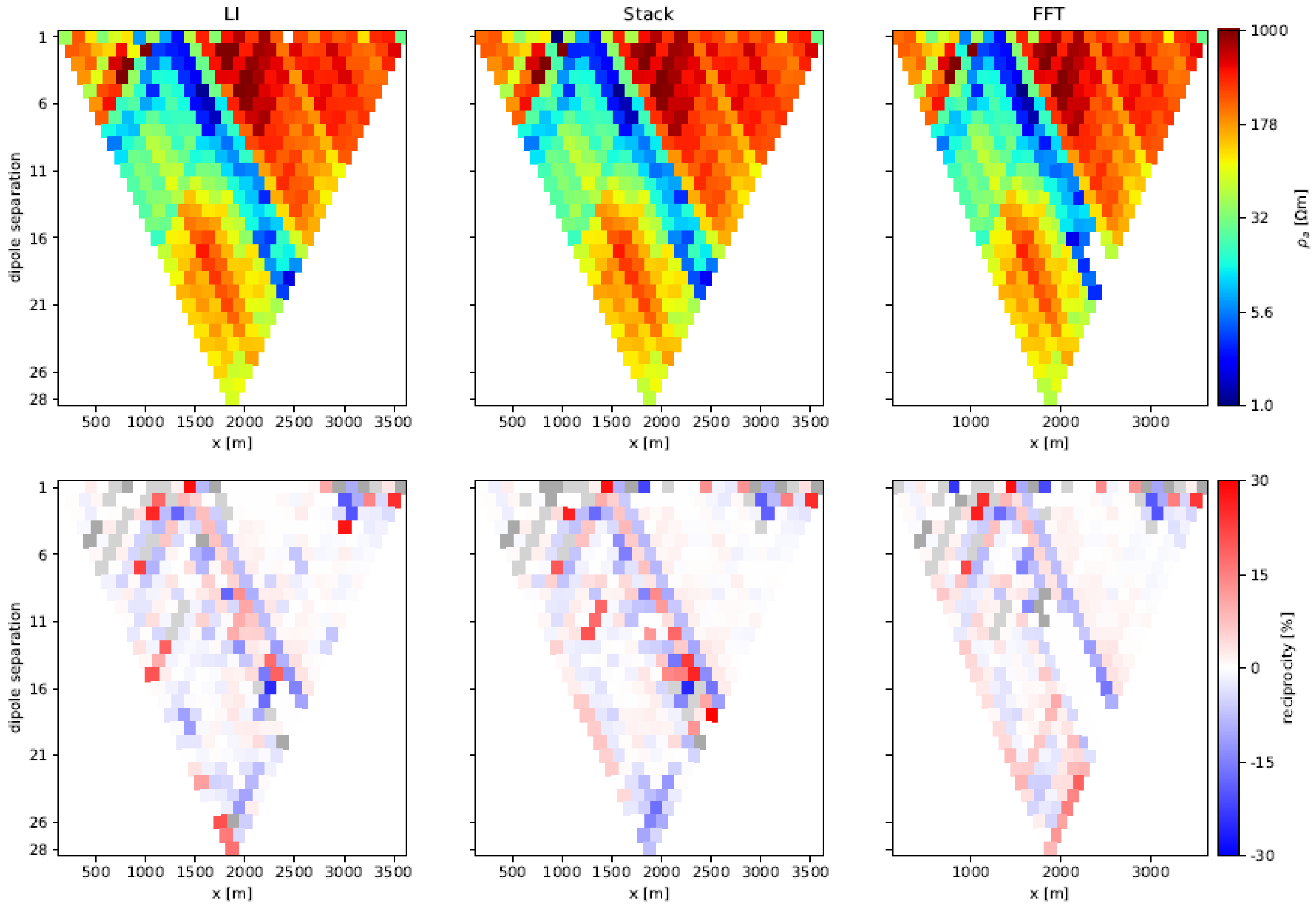
Response: We agree that particularly in this example resembling huge resistivity contrasts there is a large dependency on the measured voltage and extended the description accordingly.
Changed text: “Figure 14b shows the obtained S/N for forward-directed standard dipole-dipole data in a so-called pseudo-section, i.e. as a function of the array midpoint and the dipole separation factor DD (dipole distance by dipole length) that indicates penetration depth. Generally, the S/N decreases with the dipole separation from about 0..20 dB for the shallowest penetrating data down to -10..-30 dB for the deepest data. A comparison with the very heterogeneous apparent resistivity (Figure 15) shows that S/N is strongly correlated with the measured voltages which are low above conducting zones.”

6. References: I suggest to check the matching between the list of the references and the indication in the text.

Response: Thank you for pointing this out. We checked in both directions and did the following corrections: i) The paper of Roßberg (2007) describing the low-frequency data logger used before was in the list but not cited in the text, which we now do in the introduction and when describing the logger design. ii) The citation Schünemann et al. (2007) is now given in the reference list. iii) The years of Johnson et al. (2001) and de Marcellis et al. (2012) were wrong and are corrected now.

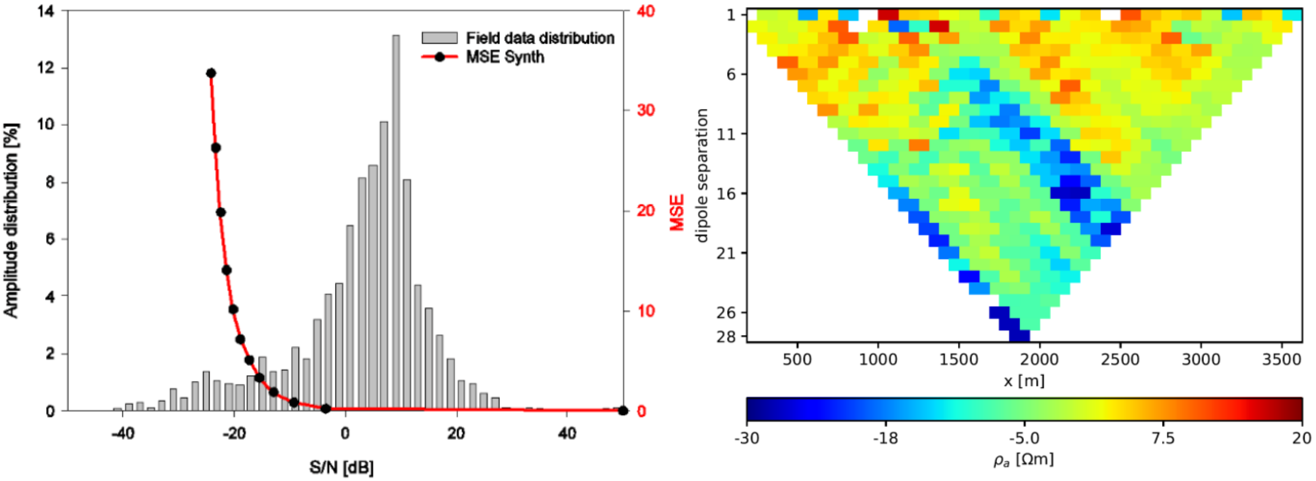
7. Figures: Figure 15: I suggest to add the unit (may be "m") for the X axis

Response: We have added units for x and y axis as suggested and rearranged the colorbar to be non-redundant:



Modified Figure 15: Calculated apparent resistivity (top) and normal reciprocity (bottom) for the three analysis approaches Lock-In (left), Stacking (center) and FFT (right).

Accordingly, Figure 14 was also changed:



Modified Figure 14: Signal-to-noise (S/N) values of field data: (a) Histogram compared to MSE of synthetic data, (b) pseudosection representation.

New references:

Balasco, M., Galli, P., Giocoli, A., Gueguen, E., Lapenna, V., Perrone, A., Piscitelli, S., Rizzo, E., Romano, G., Siniscalchi, A., Votta, M.: Deep geophysical electromagnetic section across the middle Aterno Valley (central Italy): preliminary results after the April 6, 2009 L'Aquila earthquake, Bollettino di Geofisica Teorica ed Applicata 52(3), 443-455, doi:10.4430/bgta0028, 2011.

Colella A., Lapenna V., Rizzo E.: High-resolution imaging of the High Agri Valley basin (Southern Italy) with Electrical Resistivity Tomography. Tectonophysics, 386, 29-40, 2004.

Rizzo E., Colella, A., Lapenna, V. and Piscitelli, S. High-resolution images of the fault controlled High Agri Valley basin (Southern Italy) with deep and shallow Electrical Resistivity Tomographies. Physics and Chemistry of the Earth, 29, 321-327, 2004.

Santilano A, Godio A, Manzella A, Menghini A, Rizzo E, Romano G. Electromagnetic and DC methods for geothermal exploration in Italy, state-of-the-art, case studies and future developments. First Break 33 (8), 81-86, 2015.

Schünemann, J., Günther, T., Junge, A.: 3-dimensional subsurface investigation by means of large-scale tensor-type dc resistivity measurements. Ext. abstract, 4th International Symposium on Three-Dimensional Electromagnetics, Freiberg, 2007.

Tamburriello G., M. Balasco, E. Rizzo, P. Harabaglia, V. Lapenna, A. Siniscalchi. Deep electrical resistivity tomography and geothermal analysis of Bradano foredeep deposits in Venosa area (Southern Italy): first results. Annals of Geophysics, 51 (1), 203-212, 2008.