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Interactive Comment

Interactive comment on “Magnetotelluric investigation in the High Agri Valley (southern Apennine, Italy)” *by* M. Balasco et al.

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We would like to thank referee Dr. Makris for your comment s and suggestions to our manuscript. We will provide a point to point reply.

Referee: To my opinion, an overall very good and interesting paper indeed. Minor typing mistakes should be corrected in proofs. Allow me some more constructive comments: Provide a schematic of the “double L” configuration of the electric lines and explain the control of static shift.

Reply: The presence of surficial and very small-scale conductivity anomalies (respect of skin depth of the electromagnetic waves) can cause a shift between the two components of the apparent resistivity curves. The "double L" configuration of the electric lines allows to obtain a simultaneous acquisition of two adjoining soundings (two soundings along the xy direction or two in yx direction, depending on the availability of space at the several sites). When a very small inhomogeneous body is localized just below the sounding, the static shift might affect only one of the two double components. It could be possible recognize and partially remove these effects. This concept, in the final version of the paper will be explain better.

Referee: Make a comment concerning the model change if the parameter tau=10 (max curvature). Due to expected geological complexity a higher model roughness could be endurable? Even so, I believe that the generated model reveals remarkably the geological and seismotectonic setting!

Reply: The normalized r.m.s. values versus roughness of the models for different values of the regularization parameter tau (L-curve in Fig. 3 of the paper) show that the maximum curvature occurs for tau=10. Analyzing the different output models for each different tau, we observed that a large SW dipping zone, named in the paper F1 and interpreted as fault, is well-defined at tau=10. Nevertheless, considering the geological complexity of the investigated area and the scarcity of available data on deep geological structures we preferred to show warily, a final smoother model (tau=30).

Referee: Did you try to consider more seismic events, e.g. by including events in broader area around the MT-profile? I notice in Table 1, that events Nos 9 through 13 (5 out of 22) actually correspond to the same seismic activity (constrained both in time and space) and it seems unjustified to extend (even with dashed lines) both fault lines F2 and F3 to this focal area.

Reply: Most of the 1,185 events located in HAV belong to induced seismicity concentrated near the Pertusillo reservoir with shallow hypocentres (Stabile et al., 2014a). Therefore, there are few events related to natural seismicity in the HAV. If we consider a broader area around the MT profile, we include also induced events related to different small and shallow structures that are outside our MT profile. As concern the presence of the F2 and F3 faults, the MT model does not show clear evidences of these faults but there are two indications that could support this hypothesis: i) There is a series of surface and deep geological information in the literature that highlight the presence of the Eastern Agri Fault System (EAFS), a NW-trending, SW-dipping normal-fault system, and of the Monti della Maddalena Fault System (MMFS), a NW-trending, NE-dipping normal-fault system (see references in the paper for details). ii) The computation of focal mechanisms of two events (highlighted in bold in Tab. 1) display normal-faulting kinematics on two possible NW and SE trending fault plane solutions, which are compatible with the fault systems described above. Therefore, we preferred to trace the F2 and F3 faults with dashed lines with the aim to hypothesize their existence even if they are blind in the MT model.

Referee: My intuition is that more attention should be given to fault structure F1, as I also suspect that may be correlated with geological features more to the south of the Val d' Agri (e.g. the lake). It must be certainly further investigated by parallel MT profiles to generate a grid and a 3D-model.

Reply: The very complexity of the area requires that further geophysical surveys should be carried out.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 6747, 2014.