

Interactive comment on “Electrical Resistivity Tomography surveys for the geoelectric characterization of the Montaguto landslide (southern Italy)” by Jessica Bellanova et al.

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Reviewer #2:

The authors greatly thank the Anonymous reviewer for his comment. Replies to the questions from the reviewer are as follows:

1) Lines 46-47: the sentence seems relatively questionable, since it is quite unrealistic that the slope failure started in the mid spring of 2006. Based on the historical data, the lower portion of the earth-flow mass obstructed the SS90 National Road on April 2006 and this means that the earthflow was activated some months before, with a run-out of several hundred of meters. In 2010 there was a strong reactivation of the landslide

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mass already accumulated at the toe of the slope in the previous years. Answer: Thanks for the kind advice. According to the reviewer comment, the sentence was modified in: "On 26 April 2006 a large remobilization of earth-flow, with an estimated volume of 6×10^6 m³, covered the SS90 National Road (Guerriero et al. 2013)"

2) Line 97: a maximum value of earth-flow width equal to 420 m seems too high. Probably, the authors refer also to a portion of the landslide mass that invaded the valley located at the right-hand side of the proper valley occupied by the landslide mass, but that portion should not be considered as a real part of the main earth-flow body. Therefore, a more precise value of the landslide width should be about 150-200 m. Answer: We based our statement on Ventura et al. (2011) where a width range between 45 and 420 m was reported. Further, for the 2010 movement Giordan et al. (2013) reported an average (?) width equal to 420 m.

3) Throughout the manuscript the authors distinguish between the active landslide material and the underlying inactive one, only based on the ERT data interpretation. This seems too strong, since there is not a clear instrumental evidence of what is the active part of the landslide. Moreover, for this type of landslides it is quite frequent that recently-activated landslide surges travelling above pre-existing landslide masses that rest along the landslide channel are capable of reactivating the latter. Probably, a more rigorous classification should be between "recent" and "old" landslide mass, or something similar. Answer: Thanks for the suggestion. We decided to distinguish the landslide material as 'active' and 'inactive' according to the terminology used by Guerriero et al. (2014). The manuscript text and the figures have been modified accordingly.

4) Lines 166-168: related to the previous point, the difference between the ranges of electrical resistivity values corresponding to the active landslide material and those of the inactive and old earth-flow seems to be practically negligible. The authors need to provide a more detailed explanation on this point. Answer: Thanks for the kind advice. To calibrate the ERT and to directly correlate electrical resistivity values with the lithostratigraphic characteristics we used data from literature (e.g. in Giocoli et al., 2008

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and Mucciarelli et al., 2009 resistivity measurements on the Faeto Flysch were carried out), geological surveys, exploratory boreholes, direct and indirect surveys (e.g. static cone-penetration tests and shallow-seismic profiles from Guerriero et al., 2014) and direct resistivity measurements on outcrops. The manuscript text has been modified accordingly.

5) Line 204: “underlying” should be replaced by “overlying”; the active earth-flow is above the old landslide body. Answer: Thanks for the kind advice. We replaced “underlying” with “overlying”.

Some conclusions proposed by the authors are questionable, as for example: 6) Lines 277-279: the efficiency of a drainage intervention cannot be measured by means of the water content measurements and, therefore, by the resistivity values observed between different areas of the landslide material. A drainage intervention works fine only if it is capable of reducing the pore water pressures (or piezometric heads) within the landslide mass, which need to be measured effectively to this purpose. Answer: Thanks for highlighting this subtle but important difference: the sentence was changed according to the reviewer suggestion as following: “From a geophysical point of view, considering that the material included between the drainage channels is characterized by moderate resistivity values ($6 < \rho < 12 \text{ } \Omega\text{m}$) respect to the more conductive surrounding material, it is possible to hypothesize that the complex drainage system installed on the slope is effective in continuously draining and drying the subsoil. In any case, only a multi-temporal survey (e.g. by using time-lapse ERT and in situ pore pressure measurements) could verify the effectiveness of this intervention.”

7) Lines 281-284: what does the sentence “the lithotypes outcropping on the slope, mainly sands and clays, represent the predisposing factor for landsliding” exactly mean? Also, what does the sentence “the increase of water content in the subsoil, due to the occurrence of intense rainfall events, can be considered the triggering factor” mean? Both the previous sentences are too generic and need to be clarified in a more rigorous way. Answer: According to the reviewer and taking into account the

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results obtained by the other authors (Guerriero et al., 2014; Lollino et al., 2014), we modified the conclusions of our paper by removing generic sentences and focusing the attention on the information coming only from geophysical results.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2016-28/nhess-2016-28-AC2-supplement.pdf>

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., doi:10.5194/nhess-2016-28, 2016.