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## ***Interactive comment on “The European Alps as an interrupter of the Earth’s conductivity structures” by D. Al-Halbouni***

### **Anonymous Referee #2**

Received and published: 17 November 2013

The paper submitted by D. Al-Halbouni deals with the electrical conductivity distribution below the alps deduced from long period MT & GDS data in the period range of  $T = 10\text{--}100000$  s. The MT site coverage is obviously poor and is arranged on a north south transect from the Rhine Graben structure over the western part of the Alps down to the northern rim of the Po basin. There are only few long period EM studies in the Alps so far. Therefore the data set of each single station is interesting to analyze in detail and to be shown to the EM community. Generally, I have my doubts that the few MT & GDS data are significant enough to be used in 3D model study. Familiar with MT and GDS papers I have problems in reading the manuscript and to understand the conclusions of the author. He should shorten the manuscript and try to change his manuscript structure in a more standard way. In the present form I cannot recommend the manuscript for publication. It is very difficult for me to judge the manuscript without

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any detailed information on the raw data that is used to support his conclusions. Therefore, based on my experience in EM studies I would like to see in the manuscript more information on the data, simply to judge the data for myself and to estimate its impact on the conductivity distribution for the shown 3D model. Let me start my list from the beginning of the project:

1) Is there any reason to conduct a MT survey in the Alps during winter and spring time? To overcome man made noise that is concentrated in the dense populated valleys one should always try to set up the instruments on top of the mountains. This is not possible in winter time. 2) What is the e-field line length? Why did you use 16 bit instruments instead of modern 24 bit MT&GDS instruments freely available from the instruments pool in Potsdam? 3) How long did you record time series at individual sites? A few days or weeks? 4) How did you choose windows of time series with high coherency for the statistical frequency analysis? 5) Show standard figures such like apparent resistivities and phases as well as induction arrows against period for each individual site. 6) Show for selected periods apparent resistivities and phases as well as GDS transfer functions along the transect. 7) Based on these raw data you will then have to explain why you confine yourself on GDS and MT phase data. 8) Keeping your period range in mind, the skin depth at  $T = 10$  s might give you information from approx. 5 km down to 5000 km. For this large skin depths you will get also get information from lateral conductivity distributions. I suspect that you will not have any information about the conductivity distribution for the first 3-5 km in your data sets. 9) Try to get MT & GDS data from previous measurements to compare your 3D model response with their and your measured data. 10) Comparing your study with previous work in the alps, did you observe in your model response any anomalous behavior of real part induction arrows for locations in the eastern part of the Alps ?

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Interactive comment on Solid Earth Discuss., 5, 1031, 2013.

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