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Interactive comment on "The use of soil electrical resistivity to monitor plant and soil water relationships in vineyards" *by* L. Brillante et al.

Anonymous Referee #1

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The use of soil electrical resistivity to monitor plant and soil water relationships in vineyards

The paper presents a review of possible techniques to develop models aimed to identify plant and soil water relationships in vineyards, based on Electrical Resistivity Tomography (ERT), and to spatialise soil water available to plants. An application of soil water monitoring using ERT in a grapevine plot of North-East of France is then presented. I agree with the Authors to believe that the use of ERT in eco-physiological studies, coupled with the monitoring of plant water status, is still rare and for this reason, I think that this research line is quite interesting. The methodology used, despite not detailed presented, is attractive, but needs further experimental studies. Considering that the paper represent an approach to monitor spatial and temporal variability of soil water status,

I think that the long introduction related to “Plant and soil water relations in terroir” should e shortened, because it allows only to emphasize the importance of monitoring soil water status spatial/temporal variability. Anyway, reading the manuscript some questions appear only qualitatively explained and there is a lack of details related to the materials and methods used for the experiments. As following suggested, I propose the Author to add a new paragraph as well as to clarify, for the readers benefit, some aspects of the research Following, there are a few indication, some of which represent minor corrections, that should help Authors to improve the quality of the manuscript.

P.2 L.11 – Probably it is better to say “ERT derived variations of the Fraction of Transpirable Soil Water (FTSW)” P.2 L. 12 – I suggest to change “depending on” with “depend on”. P.4 L.27 – Authors should precise on which soils “Water in macro and mesopores is generally more easily available to plants, but it is also more mobile, as it is not retained by capillary forces.” P.9 L.8 – Delete a parenthesis P.15 L.1 Change “more” with “most” P.15 L.13- Authors wrote that “However, the relationship between SW and ER appears linear only when considering a limited range of variations.” Is the range of variations related to both the variables? Please, clarify. P.16 L.5. To benefit the readers, some information of the model to predict the Fraction of Transpirable Soil Watershould be provided. P.16 L.6. Authors show the maps of the variations of the FTSW in a vineyard soil, without providing any detail about the field dimensions, the period of measurement and other information (i.e. irrigation, rainfall, etc.) that could help the readers to better understanding the methodology. It seems that the methodology is presented in other papers, but I suggest to insert a new paragraph in which, even shortly, the experimental setup is presented. Moreover, the soil characteristics should be anticipated in this new paragraph. P. 16 L.7. Which measurements? At what time the measurements were carried out? P.16 L.20. The sentence “Maps of the FTSW can at first sight be somewhat misleading, because the period of variation of all pixels is not equal” is not clear, probably because the lack of methodological info. P.17 L.20 Change “longer” with “longest”. Moreover, values of leaf water potential (LWP) in the period from July 9 to 16 are not showed in fig. 1, so it is not possible to verify the drop

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off in LWP commented by the Authors. P.16 L.22. Errors could cumulate, but even compensate. Of course only in the first case the final errors will result higher. P.18 L.1. Authors refer to the “maps of August when water deficit is higher”. Probably they should precise to which map or maps are they referring to, because only on Aug. 21 the water deficit is relatively higher than the other periods. In any case, it should be noticed that, according to the measured predawn LWPs it seems that the plants, in the considered period, have been never under severe stress conditions. P.18 L.8. Correct “les” with “less” P.18 L.15. Fig. 3 is now related to the “two years of observations” and “28 measurements”, but no details, again, were provided on the materials and methods. In any case all the comments are qualitative and no discussion has been related to the possible effects of soil evaporation, as well as those related to vegetation that should be present between the plant rows. P.19 L.4 I suggest, again to change “depending on” with “depend on”.

Fig. 1 – It is better if Authors provide the color palette near the figure. The x-axes of the “ombrotermic diagram” should be a temporal scale, but the numbers indicated do not allow readers an immediate comprehension of their meaning. Considering that they indicate the period of investigation (from begin of July 2013 to September 13, 2013), Authors should avoid to use 2013 as written on the top of the graph, but the exact period to which the data are referred to. Moreover, are the maps related to a vine row, being the distance between plants about 0.9 m? This information should be specified in the text. Why the temporal scale in the lower left side starts from July 16 and not from July 1, as indicated in the graph on the right?

Interactive comment on SOIL Discuss., 1, 677, 2014.