

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

L. Brillante et al.

brillanteluca@live.it

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Review 2

General comments:

The determinants of ER other than water should be clearly identified.

*This aspects has been well reviewed in Samouelian et al. 2005, that we cite.
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We better specify it with this sentence, included in the section 4.3 Modelling of relationship between ER and SW. “Soil ER is dependant on soil properties other than water, such as gravel content, texture class, salinity, temperature, etc. (as reviewed in Samouelian et al. 2005).”

It should clearly be stated that both SW and FTSW can be estimated from ER; the cited reference Brillante et al. 2014 deals with SW and not FTSW.

Both SW and FTSW and ASW can be estimated by ER, and a new reference paper has been included to state it: Brillante et al., “Spatio-temporal analysis of grapevine water behaviour in hillslope vineyards. The example of Corton-hill, Burgundy.” Conference proceedings of the International Terroir Congress 2014.

The paper is available at www.researchgate.net/profile/Luca_Brillante.

Furthermore, this has been clearly stated in the material and method section which as been added with this review.

Specific comments:

generic The authors alternate “terroir expression” and “terroir effect”; I suggest they use only one formulation, “effect” being the simplest.

CHANGED.

P.679 L.4-14 The introduction introduces (shortly) the issue of soil–plant water relations, not the methodological issue of estimating SW (or FTSW) from ER.

*Some lines on methodological issues of estimating SW from ER have been
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inserted. This paper focuses on soil and vine water relationships and it will review the methodology for a new approach to measure soil water and its availability to plants. They are reported here below.

“This paper focuses on soil and vine water relationships and it will review the methodology for a new approach to measure soil water and its availability to plants.

At today, Soil Water (SW) measurements are generally obtained with in-soil devices such as Time Domain Reflectometry (TDR), which can be difficult to carry out in field conditions. Furthermore, these devices only measure a very small volume of the soil, and even when increasing the number of probes, no information is generally obtained about the lateral variation of SW, and only a vertical soil moisture profile can be established. In addition, the number of such devices cannot be increased indefinitely without major perturbations of the system and attaining prohibitive costs. Geophysical imaging techniques, which are rapid, cost effective and low perturbs the soil, have recently been proposed as a good proxy for the spatialisation of SW measurements (to name but a few, Michot et al., 2003; Beff et al., 2013; Garré et al., 2011). Being the technique recent a generalised method does not exist, neither exists a review of the possible approaches to spatially measure SW and its availability through these geophysical techniques, and especially those based on Electrical Resistivity (ER). This is the aim of the present work.”

In addition, the introduction has changed again after your following remark.

P.678 L.21 vegetative growth and yield formation are also affected by the environment of grapevines

True. The sentence has been reformulated to take this into account.

P.680 L.4 It could be stated here that all processes of crop physiology do not have
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the same sensitivity to water stress (Pellegrino et al, 2005. Towards a simple indicator of water stress in grapevine (*Vitis vinifera* L.) based on the differential sensitivities of vegetative growth components. Aust. J. Grape Wine Res. 11, 306-315.

It has been included with this the sentence: “During water stress apexes reduce and then stop their growth, but the reduction in the vegetative growth varies across vegetative organs and physiological processes (Pellegrino et al., 2005)”

P.681 L.17 what is the meaning of more consistent?

It was an unseen error, the word to use here was constant. The word has been changed “stomatal conductance was highly variable, while it was more constant in clayey soil”.

P.682 L.11 “soil is not a homogeneous medium”, this is what justifies the interest for mapping soil water from ER measurements; it could appears earlier, in the introduction

Great suggestion! This clearly improve the introduction and shorten this section as asked by reviewer 1. Introduction has therefore greatly changed with the answer to your comments (look also above).

P.687 L.24 “inverted ER” should be explained

Geophysical inversion is the mathematical treatment used in post-processing electrical resistivity data, when using ERT techniques. Here, inverted just stay for post-processed data, in order to difference it from raw data. Explanation of geophysical inversion cannot be given in few words, in our opinion this is really out of the scope of the present review.

P.690 would it be too long to provide the mathematical formulation of one of the cited models?

We inserted the Archie law, which is the first to be cited.

P.691 L.25 does SVW differ from SW? what is the meaning of ASW and FTSW? (FTSW is defined in the following page)

SVW has been replaced with SW for consistency, it was for Soil Volume Water. The meaning of the other two acronym has been specified.

Figures The title of the ordinate is missing (elevation?)

Yes, it was. Has been inserted.

Conclusion This conclusion is very similar to an abstract. It should rather “conclude” about the relevance, the possible limitations and the perspectives opened by the use of ERT for monitoring and mapping the soil water availability.

Conclusion has changed, as also asked by reviewer #3.

Please also note the supplement to this comment:

<http://www.soil-discuss.net/1/C542/2015/soild-1-C542-2015-supplement.pdf>

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