

Interactive comment on “Time-lapse monitoring of root water uptake using electrical resistivity tomography and Mise-à-la-Masse: a vineyard infiltration experiment” by Benjamin Mary et al.

Anonymous Referee #2

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This manuscript deals with the application of geoelectrical methods for imaging and monitoring roots activity and water flow in the context of the soil-plant atmospheric continuum. The authors conducted time-lapse ERT and MLAM surveys around two grapevines plants differing in their age. The subsurface electrical resistivity was monitored before and after an infiltration experiment. The ERT data were inverted using a standard algorithm, and a simple algorithm for the imaging of the current source distribution was used. The work presented here is an extension of Mary et al (2018), but with the addition of an infiltration experiment, demonstrating the ability of the combined methods to monitor water content and RWU dynamics.

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Overall, the work presented is interesting for the reader of SOIL, the manuscript is well written, and the methods and data analysis are adequate. The main pitfall is the lack of supplementary information that prevents a quantitative analysis of the (very interesting) dataset. Specifically, water content and water salinity were not measured or assessed. Differences between the transpiration of the two plants were not considered or measured (e.g., with sap flow meter). Nevertheless, even if this data is not available, the time laps MLAM provides qualitative information, at a high spatial resolution, on water content dynamics and RWU processes. In conclusion, I recommend publishing after some moderate revisions.

General comments:

1. The limitations in the interpretation of the results due to the lack of supplementary data (water content, salinity, formation factor) should be discussed in details.
2. In my view, one of the most interesting parts is the maps in Figure 5, showing the time-lapses differences between the young and old plants. However, a discussion on this observation is missing. Figure 5 is not mentioned in the text at all (perhaps in L252). I would strongly suggest to give a detail explanation of those results and to link them to the expected behavior of the different plants.

Specific comments: 1. L123: I guess that the water holding capacity is related to the pore size distribution and not to the porosity.

2. L142: you report the EC of the irrigation water, but what is the EC of the pore water? Do you expect heterogeneity in the pore water salinity? This should be discussed.

3. L223: Due to the lack of supplementary information, the arguments about the size and extent of the root systems are not solid enough. Is it the size of the root system or the total transpiration that differ?

Mary, B., Peruzzo, L., Boaga, J., Schmutz, M., Wu, Y., Hubbard, S. S., and Cassiani, G.: Small-scale characterization of vine plant root water uptake via 3-D electrical resistivity

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