

# ***Interactive comment on “Monitoring and modelling of soil–plant interactions: the joint use of ERT, sap flow and Eddy Covariance data to characterize the volume of an orange tree root zone” by G. Cassiani et al.***

**G. Cassiani et al.**

giorgio.cassiani@unipd.it

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We thank Mr. Evaristo for his positive comments, and also for his constructive criticisms. In particular we acknowledge that it is fair to introduce some reference to the use of stable isotopes. We will make sure the final paper reports some comments on this. However we would also like to warn the readers about putting too much confidence on stable isotope analysis alone. This is not a new method in hydrology (it may be in root uptake studies) and it is known to depend strongly on assumptions about

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full mixing water contributions that, in turn, cannot be verified. The modelling itself of mixing in the unsaturated zone is not by any means established on sound basis. Therefore conclusions based solely on stable isotopes have the unpleasant characteristic of being extremely local (they are only point measurements) and heavily based on unverified assumptions. However, we strongly believe that stable isotopes in conjunction with other methods can give a fundamental contribution to the understanding of water mixing and provenance studies.

As for the other specific comments: - We do not quite agree with the complaint that “the authors, however, failed to provide possible mechanisms. . .” regarding (1) water replenishment of the root zone and (2) water uptake at the maximal RWU depth. In fact, our simplified 1D modelling clearly shows the prevalence of the replenishment from surface irrigation (we acknowledge though that this point was not specifically addressed in the paper – we will add some detail in this respect). As for point (2), we acknowledge that the specific structure of the root system that is producing the enhanced RWU at the depth of interest was not in the focus of our attention. We rather envisaged the soil-plant-atmosphere as one system and we focussed on understanding its overall functioning. We believe that all mechanisms put forward by the reader (root length density, root biomass etc) may indeed contribute. An analysis in this direction would, however, require destructive testing that we were not ready or indeed willing to perform at the selected study site.

- P13359-60: we acknowledge that
- P13366: canopy coverage is indeed very dense – the photo provided may not render justice to reality – especially along the tree rows. LAI values are around 4 m<sup>2</sup>/m<sup>2</sup>
- P13367: this is a good idea, even though definitely beyond the scope of this paper

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