

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 Dr. Ferre for his appreciative evaluation and very constructive comments.

One key point raised by the referee concerns the approach we take when assigning the RWU to a certain depth range. We acknowledge that assuming a uniform RWU rate distributed along the top 40 cm, with zero uptake below, is a simplified approach. However this modelling approach is actually consistent with the simplification adopted by averaging the ERT data along horizontal planes, thus reducing the analysis to a 1D

C6124

problem. Given this approach, it would probably be pointless to try and infer the root density distribution with depth in more detail, as the 3D nature of root distribution is, at this stage, already lumped into a more simplified scheme. We are also confident that we could, of course, introduce more complex root density distributions with depth (but still concentrated largely in the top 40 cm!) and still obtain practically the same simulated 1D moisture content distribution, provided the total water extracted is maintained the same. In a nutshell: we feel that either we should pursue a full 3D approach leading to an inversion towards the identification of root uptake density (far beyond the scope of this paper), or we should stick to the presented simplified (an yet very informative!) approach.

Another point raised by the referee is the encouragement to allow some of the hydraulic parameters to vary during inversion, in order to get a better fit in the lower part of the profile. In our view this could also be very interesting in order to assess how the uncertainty related to hydraulic parameters propagates into the uncertainty of the estimated RWU zone extent. We plan to perform some sensitivity analysis of this type in the revised version of the paper.

Finally, the referee is encouraging us to try and demonstrate the value of the ERT data by presenting an attempt of estimating RWU without this data. This is potentially doable, relying onto TDR data alone (in addition to sap flow measurements). We plan to make an attempt in this direction and give at least a brief summary of the results in the revised version of the paper.

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C6125