

Interactive comment on “Water movement through plant roots: Exact solutions of the water flow equation in roots with varying hydraulic properties” by Félicien Meunier et al.

Anonymous Referee #2

Received and published: 22 March 2017

This work presented analytical solutions of the water flow equation for roots with linear and exponential radial and /or axial hydraulic conductivity with the distance from the root tip. My impression is that there are many hypotheses such as the function of the varying hydraulic properties, and the work is so mathematical, not hydrology. The following is my main concerns. 1. Numerical solutions have been obtained for the same problem with any conductivity functions. The authors only obtained the analytical solutions for linear and exponential radial and/or axial hydraulic conductivity. The authors should try to get the semi-analytical solution for any conductance variation. This is great advancement, not only for just two special functions. 2. Why the authors choose linear and exponential functions? How to determine the parameters in the functions?

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Any proposed function should have physical meaning, and it should be derived from experimental data, not just hypotheses, also for the parameters in the functions. 3. The authors used the obtained solutions to evaluate the impact of root maturation vs. root growth on water uptake, and obtain a so called optimal root traits that maximize water uptake. However, there were not based on real life and biology, and the physical meaning and implication of the results were not substantially discussed.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-633, 2016.

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