

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Reply on RC1

Anonymous Referee #2

Referee comment on "Modelling the artificial forest (*Robinia pseudoacacia* L.) root–soil water interactions in the Loess Plateau, China" by Hongyu Li et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-304-RC2>, 2021

Based on the in situ observations, the manuscript proposes a root growth model that simulates both the dynamic rooting depth and fine root distribution. Subsequently, the model was used to simulate the forest–soil water relationships, including soil water availability and the temporal–spatial dynamics distribution of the dynamic rooting depth and fine root distribution in the Loess Plateau (LP) of China. Further, a long-term simulation was performed to address the drying soil layers issues in the region. The results show that incorporating the dynamic rooting depth into the currently available root growth models is necessary for accurately reproducing the drying soil processes. The manuscript is well-written and innovative. The proposed provides a much needed and powerful tool to address the drying soil layer issue than in situ sampling techniques. The findings on the thickness of the drying soil layer and the difficulties in recovery offer insight and strong implications for forest–water management in this region. The manuscript is of interest to the readers of the journal as well the wider ecohydrology community. I only have the following minor suggestions for the authors to consider:

- Yes, it is true how the black locust roots and soil water interact has not been addressed in previous modelling studies in the Loess Plateau of China, a brief and precise of similar findings/studies for other tree species in other regions/countries would help readers understand the current research gap and strengthen the innovative nature of the manuscript.
- P7 Eq. 6 defines the relationship between the coarse and fine roots. An addition of the definition of coarse and fine roots in the introduction would also clarify the potential confusion about the distinction of the two.
- P3, Line 79, "potentially beneficial..." should be "potentially benefit.."

After these minor revisions, I recommend the manuscript be accepted for publication.