

Thank you for the opportunity to review this manuscript. It is evident that the authors have made significant contributions to this field, notably through their work on remote-sensing methodologies for monitoring root zone water storage. The concept of emphasizing the root zone as a distinct entity is commendable. However, the manuscript often reads more like a textbook chapter or a commentary rather than a comprehensive review article.

We thank Anonymous Referee #1's endorsement of the relevance of this paper. Indeed, the paper is not like a classical review paper; it holds the middle between a review paper and an opinion paper. In the revision we shall pay attention to this aspect and improve the structure and writing where needed.

The structure and content of this paper are reminiscent of the work by Klos et al. (2017), which, surprisingly, is not cited. The authors seem to be aiming to present a similar vision, albeit with a lesser focus on hydrology. Nevertheless, the level of detail presented does not match that of the referenced work. The manuscript successfully delineates what the root zone is not, through numerous "not equals" subsections. Yet, it falls short in providing a clear conceptual figure or a definitive definition of the root zone. The reliance on a definition from Sprenger et al. (2019) – "The root zone is the upper part of the vadose zone" – raises questions about the exclusion of various types of vegetation, such as phreatophytes, from having a root zone. This definition, alongside the conceptual figures provided, does little to advance the discourse beyond the existing literature.

Thank you for recommending the work by Klos et al. (2017). We shall study it and make appropriate reference to it. Moreover, in the revision, we will give more detailed discussion on the existing definitions, and provide a clearer definition of the root zone.

Conversely, the authors demonstrate a deep understanding of calculating remotely sensed water storage deficits. It is curious why this expertise was not leveraged to further explore the potential advancements in this methodology. Questions regarding the nature of the deficit, methods of measurement, spatial and temporal variations, subsurface implications, and the potential for methodological failures warrant a more thorough investigation.

This is a good suggestion. Except for the general review of the importance of root zone across all the spheres of the Earth system, we will add more details to further explore the potential advancements of our proposed holistic methodology to investigate root zone storage by landsurface observations, including "the nature of the deficit, methods of measurement, spatial and temporal variations, subsurface implications, and the potential for methodological failures".

Furthermore, the manuscript does not adequately address a range of root zone variables, which are crucial given the ambitious title "Root Zone in the Earth System". The section titled "Root zone estimation approaches" particularly falls short of expectations, focusing solely on storage rather than exploring other vital aspects such as carbon, weathering processes, and water transit times within the root zone.

Thank you for this constructive comment. Indeed we shall mention and discuss the vital aspects of carbon, weathering and transit times in the revise version.

In summary, while the authors' expertise is evident, the manuscript could greatly benefit from a more structured review of the literature, a clearer definition and conceptualization of the root zone,

and a more comprehensive exploration of the methodologies and variables pertinent to the root zone's role in the earth system.

We shall follow the reviewer's suggestions, refer to more relevant literature, give a clearer definition of root zone, and expand the discussion of the importance of the root zone in the earth system.