

Dear Editor Fadji Zaoua Maina:

We are grateful to receive comments and suggestions on our manuscript of 'HESS-2023-177' from you and the reviewers. We have carefully considered these comments and made revisions. Furthermore, we have adjusted the color schemes for Figures 1 and 3. All the modifications in the revised manuscript are highlighted in blue color. The responses to the reviewer's comments are also appended for your convenience.

We hope the revision will be satisfactory. If you have any further questions or concerns, please let us know. Once again, we appreciate your time on this manuscript.

Yours sincerely,

Liangsheng Shi

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Thank you for your response and the revisions undertaken. Regarding the content of your response, I have some minor questions and suggestions that require further clarification and consideration:

Response:

We truly appreciate the time and effort you invested in providing constructive feedback. Your valuable insights have significantly contributed to the improvement of our paper. We have considered the suggestions and carefully reworded expressions to improve the manuscript.

1. Concerning the question I previously raised: "Can the authors provide the training and testing times of the model?" I intended to inquire about the specific dates used for the training and testing datasets.

Response 1:

Thank you for your comment. The specific dates used for the training, validation, and testing datasets at each site are summarized in Table D2 in the Appendix D.

2. Suggestions: The static attribute data are not only important for the model's transferability but also crucial for the model to capture the spatiotemporal variation in soil moisture. Static attributes can provide the model with additional dimensions of information. For example, under identical precipitation conditions, the soil moisture content typically differs between sandy and clayey soils. Without including this additional information, or not using a larger model, even a trained model might struggle to accurately capture the static features of different sites.

Response 2:

Thank you for your comment. The static attribute holds significant importance in capturing spatiotemporal variation in soil moisture within the context of physical modeling. However, in data-driven models that neglect transferability, such as a model specifically trained for a particular site, providing static attributes as inputs may show no apparent benefits for the model.

3. Since the authors mentioned using data from only the past four days, is the term "long-term prediction" used in the article accurately precise? A week's duration is difficult to be referred to as a long time series prediction.

Response 3:

Thank you for your comment. We acknowledge that the term "long-term prediction" used in Line 474, 479, 576, 681, and 688 is not appropriate. Consequently, we have replaced it with either "7-day prediction" or "weekly prediction."

4. Although positional encodings are an indispensable part of the Transformer model, their capability to handle long-term dependencies might require additional technical support or modifications to the standard Transformer model.

Response 4:

Thank you for your comment. We agree that additional technical modifications may be necessary for the standard Transformer model when applied to long-term tasks. The core component of the Transformer, self-attention, holds potential for modeling long-term dependencies, as demonstrated in the study by Wang et al. (2018). We hypothesize that incorporating time-dependent variables or devising specific positional encodings and model structures could enhance the model's capacity in

capturing seasonality and long-term dependencies.

Reference:

Wang, X., Girshick, R., Gupta, A., and He, K.: Non-local neural networks, in: Proceedings of the IEEE conference on computer vision and pattern recognition, 7794–7803, 2018.