Hydrology and Earth System Sciences

Discussions

Interactive comment on "Estimation of subsurface soil moisture from surface soil moisture in cold mountainous areas" *by* Jie Tian et al.

Anonymous Referee #3

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This manuscript describes three approaches (ANN, Exponential filter, and CDF) to estimate subsurface soil moisture from surface soil moisture data in the Qilian Mountains of China. Authors identified the Exponential filter as the best model and applied this model in different ways throughout the manuscript. The topic is of great interest, but I think that the manuscript requires a significant restructuring in order to be considered acceptable for publication on HESS. My major concerns are:

1) The organization of the manuscript and its presentation is not fluent. It seems that a series of tests and analysis have been listed one after the other without a logic.

2) For instance, I do not see any added value is the preliminary analysis of the soil moisture data. It is quite obvious that surface and subsurface soil moisture are linked or coupled. Remove this part or avoid stating that it is an outcome of the study.

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3) Second step in the manuscript is the intercomparison of different models. In this step, it seems that the use of ANN is made just applying a matlab tool without providing enough details about the approach adopted.

4) The intercomparison may be influenced by the different approaches used for the calibration of the methods. In fact, authors states that 70% of the data was used for validation of ANN and CDF, but they do not provide such indication for the exponential filter. If they used the entire database for this last, this may affect the results.

5) I personally do not understand the need to include a section of the cross-correlation analysis. It seems out of the scope of the manuscript. Moreover, no significant result are discussed herein. Please remove this section.

6) Authors proposed some multilinear functions to describe relative value of T, which is fine, but it is not connected with anything else in the manuscript. It is another element somewhat independent from the main objective of the manuscript. Consider to

7) In the last section, we start another new section where SMAP is used first in comparison with the observation revealing some limitation for higher values. Such statement should take into consideration the existing gap in the spatial resolution of the two measurements. Rough resolution tend to smooth out higher values. This is quite obvious.

8) Finally, authors close with a comparison of exponential filter applied on SMAP. The regression are not used for this scope, other methods are not considered in this section, crosscorrelation and spatial dynamics also neglected. I reached this point and I realised that authors are following a random walk of activities and I felt confused and disoriented.

This manuscript requires a DRASTIC RESTRUCTURING and REORGANIZAITON before being considered for publication. It will also benefit of a significant shortening of useless contents.

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603, 2019.

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