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

Anonymous Referee #1

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The paper explores methods to estimate subsurface soil moisture from surface soil moisture based on an in-situ observations in cold mountainous areas since 2013. This variable is important for different scientific and applied topics. Authors explored the availability of three methods and applied the exponential filter method to the SMAP product. Research showed the improvement of profile soil moisture estimations in the mountainous. Many useful data, figures, and results were shown in the manuscript. I recommend a minor revision.

General comments: The paper is well written and the results are well presented. Bibliography very exhaustive. The analyzed dataset is interesting and the results can be useful to improve the estimation of subsurface soil moisture and could be potentially useful for hydrological modelling. The results show that the combination of exponen-
tial filter method and satellite surface product can improve the estimation of profile soil moisture, and the availability of the area-generalized Topt in the cold mountainous areas. Related researches in high mountain ranges are limited around the world. Therefore, the presented results add new knowledge on those relevant hydrologic topics. 1. Line 111, The half-hourly measurements were averaged to obtain daily SM values that will be used for the estimation of subsurface SM, which cover up the response of soil moisture to precipitation in a day if it’s a rainstorm in where are a big soil porosity. 2. Figure 12, please explain this figure in detail about the temporal variation of soil moisture. It’s obvious that SM increased in August. You can link the impact of climate change to moisture source and so on.
