**Hydrology and
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Interactive comment on "A comparison between remotely-sensed and modelled surface soil moisture (and frozen status) at high latitudes" *by* I. Gouttevin et al.

Anonymous Referee #1

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This paper presents an interesting study in which remote sensing of soil moisture and freeze or thaw conditions are validated against the results of a land surface model. The comparison revealed several shortcomings of as well the retrieval technique as the LSM. Unfortunately, conclusions remain suggestive as the validation of both model and retrieved data could not be done due to lack of in situ data. Latter is a major drawback of this study, but is hard to overcome given the difficult terrain where the study focusses at.

There are some major concerns with respect to this paper:

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- The paper mentions that a better (newer) version of the model is available, however this was not used. Why couldn't the new model be used? Would the new model be more accurate for this type of predictions? It would of course be great if the analysis could be performed with the results of the latest version of OR-CHIDEE.

- There is no assessment of the ASCAT classification of frozen/unfrozen. This makes the comparison with modelled status very difficult.

- The model is run with inaccurate atmospheric forcings, furthermore, the model has problems in accurately representing surface conditions and fluxes. How sensitive is the modelling of surface thaw given these problems? How does this sensitivity relate to the errors in timing of thawing?

- How sensitive are the model results to the inaccurate soil parameterization? What impact does this have on the soil moisture status?

- The model has a Nash-Sutcliffe efficiency less than zero: this value corresponds to a very bad model result: the error that is made is worse than if you would continuously predict the average state... Given such bad model result, wouldn't it be better to first try to focus on getting the model better through improving forcing data, input data, ...? What's the use of assessing model results if you know that the model really performs bad?

- Many conclusions are very speculative, but it is difficult to really pinpoint the disagreements between model and observations, given that the modelling experiences serious problems (data/model structure/...)

Because of these concerns, it is difficult to assess the significance of this paper. Conclusions are very speculative, given the problems of remote sensing products at high latitudes and of the model used. As there was no assessment of the impact of any of

the problems mentioned on the modelling results or on the retrieval results, this paper, unfortunately, does not yield much additional scientific insight.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 11241, 2013.

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