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Geoscientific Instrumentation Methods and Data Systems Discussions

Interactive comment on "The Sodankylä in-situ soil moisture observation network: an example application to Earth Observation data product evaluation" *by* J. Ikonen et al.

Anonymous Referee #1

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1 General Comments

This paper describes the Sodankylä in-situ soil moisture observation network and uses the in-situ observations to verify the ESA CCI blended soil moisture product. The Sodankylä observing network is located in northern Finland and the dominant land cover types are forests and bogs. The network currently contains eight soil moisture stations.

2 Specific Comments

1) i) The authors correctly state on P612L27 to P613L3 that: "... GLDAS-Noah model data to impose absolute soil moisture values to the CCI data product renders statistical comparison metrics such as root-mean-square-difference and bias somewhat scientifically meaningless. The CCI soil moisture product should in fact be used, and considered as a reference product for computing correlation statistics, not as an absolute soil moisture content estimate ...". These statements should be made earlier by moving them to section 4 that describes the ESA CCI product. In addition, remove from the Abstract this sentence "All years exhibit a negative (dry) bias ranging from 0.0346 to 0.046".

ii) Please also provide statistics for the temporal correlation between the in-situ and ESA-CCI soil moisture anomalies.

iii) A number of verification studies convert the in-situ and remotely sensed soil moisture to soil wetness (rescaling to soil wetness using the time-series maximum and minimum values) prior to calculating bias and root mean square difference. These additional statistics would be very useful since the soil wetness is less affected by the high spatial variability of soil and vegetation types.

2) Please provide more information on the accuracy of the in-situ soil moisture measurements and the area-representative in-situ soil moisture average. Perhaps the field measurement campaigns data can be analysed to provide more information.

3) Microwave C-band AMSR2 and ASCAT derived soil moisture is representative of the top 1cm of soil. Often, an exponential filter is used to relate the remotely sensed soil moisture measurements to the in-situ measurements at a depth of 5cm. What is the representative soil depth for the ESA-CCI product? Does an exponential filter need to be applied to the ESA-CCI product?

4) The verification suggests high temporal correlation between the in-situ soil moisture

average and the ESA-CCI product for the years 2012 and 2013. However, for 2014 the temporal correlation is much smaller. To properly investigate this difference, verification statistics should be calculated for the individual components of the ESA-CCI product: ASCAT, AMSR2 and GLDAS-NOAH. The LPRM algorithm provides estimates of VOD, is there much inter-annual difference in VOD? Is there much inter-annual difference in snow cover during the years 2012, 2013 and 2014?

5) Please improve the caption for figure 5 and provide a clearer explanation of what the figure shows. What do the vertical bars represent?

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., 5, 599, 2015.