

## ***Interactive comment on “Evolution of the ESA CCI Soil Moisture Climate Data Records and their underlying merging methodology” by Alexander Gruber et al.***

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### OVERVIEW:

The paper by Gruber et al., presented the three major versions 2-4 of the ESA CCI soil moisture product and the different approaches used for the fusion of the satellite passive and active products. Finally, the three ESA CCI passive, active, and combined products were evaluated and compared to the ISMN in situ soil moisture ground-based measurements.

### GENERAL COMMENTS:

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It was a pleasure to read the well and clearly written manuscript. I only have few concerns that may make this manuscript more informative and enlightening:

-It would be interesting to see if there is also a difference in the representation of each product going from V2 to V4. In other words, the authors can add three maps for V2, V3, and V4 to show the spatial contribution of each satellite product.

- The CCI soil moisture team focused too much on improving the merging methodology but other aspects should be also considered such as forests regions which are masked in the current CCI versions, which limits the use of the ESA CCI SM product, and finding other methods that can avoid the use of the GLDAS-Noah land surface model.

- Also, I am surprised to read “This may be particularly problematic for trend analysis because such rescaling imposes any natural or spurious trends existing in the model to a certain degree on to the harmonised ESA CCI SM product” as it was always claimed that the trend of CCI is not affected by the GLDAS-Noah land surface model. In this regard, can the authors suggest for the end-users what kind of climate analysis that they do not recommend using the ESA CCI SM product (i. e. what are the cases where CCI will just reflect the GLDAS-Noah land surface model)?

- Finally, although the paper is focusing on the evolution of the CCI product, I would suggest the authors to add a “recommendations” section about the use of CCI product in applications, validations, .etc.

### SPECIFIC COMMENTS:

In Figure 9 for some periods, V3 was giving slightly better correlations than V4 for the passive products. Can the authors comment on this?

### RECOMMENDATION:

I found the document to be well written and well structured. The content provides valuable information about the ESA CCI product which is the achievement of significant team work. This paper is, therefore, worth publishing in the journal Earth System

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Science Data (ESSD).

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