

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

**Anonymous Referee #1**

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## **OVERVIEW**

The manuscript describes the different approaches used for merging multiple satellite soil moisture products in the ESA CCI project. Specifically, the three major versions of the ESA CCI soil moisture product are described, the methods used for merging active and passive product, and to finally obtain the combined products. The validation of the three versions with in situ observations is carried out, and the future steps for further

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## GENERAL COMMENTS

The paper is well written and clear. Different approaches have been developed for merging multiple satellite soil moisture products, using different sensors, and integration techniques. The ESA CCI soil moisture project is surely a significant initiative for building a long-term (currently 40 years) global scale soil moisture product, and the documentation of the different steps developed in the project in the scientific literature is needed, definitely. Therefore, I believe the paper deserves to be published on Earth System Science Data and I have some minor comments to be addressed.

Interactive comment

1) The major differences in the ESA CCI soil moisture product versions are the different approaches for weighting the different single products in the merging (apart the addition of SMOS in v3). Therefore, in my opinion, the weight of the different sensors in the merging is the most important factor to be shown. For instance, in version 4 it seems that the major contribution is given by AMSR2 (from Figure 7), that is quite unexpected to me. Can the authors add some figures or statistics for showing the values of the weights in the different versions?

2) The results of the validation with in situ observations are briefly reported and it is not clear how large are the differences between the different product versions. For instance, plotting the difference in correlation with respect to the first version instead of the absolute values will put more evidence on the differences. Additionally, I suggest writing some numbers in the text, or in a Table, for showing the median/mean correlations for different periods and product versions.

## SPECIFIC COMMENTS

Page 1, line 4: Add "iii)" before "a combined active-passive ...".

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Page 1, line 10: I suggest adding the expected date/month in which version 5 will be available.

Page 6, line 2: Change “as required” with “if required”.

Page 6, line 30: “unweighted average”. Is that correct? Likely better “equal weighted”.

Page 9, line 32-33: It's not clear to me how the threshold is applied. What is the cumulative weight? I suggest better clarifying this part.

Page 15, lines 10-16: It is copy-paste with the abstract, I suggest changing.

Caption Tables 2 and 3: Change “p-vale” with “p-value”.

Interactive comment

## RECOMMENDATION

On this basis, I found the paper relevant and useful and I suggest a minor revision before the publication in Earth System Science Data.

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