



EGUsphere, referee comment RC2
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Comment on egusphere-2022-558

Anonymous Referee #2

Referee comment on "Soil moisture estimates at 1-km resolution making a synergistic use of Sentinel data" by Remi Madelon et al., EGU sphere,
<https://doi.org/10.5194/egusphere-2022-558-RC2>, 2022

The authors propose a study in which the performances of a soil moisture (SM) product at 1 km derived by the S2MP algorithm are assessed. As stated in the paper, high resolution (≤ 1 km) satellite SM data sets are needed for several purposes. Despite the clear usefulness of the outcoming data set, several issue should be addressed before considering the publication of the manuscript.

The main concerns are listed as follows:

The main aim of the paper is not clear. Several times it is stated that the aim of the paper is to explore the possibility of substituting the source of the NDVI data (Sentinel-3 instead of Sentinel-2), but this actually occupies a very small portion of the manuscript. The authors conclude that the performances are comparable, so that go in detail on comparisons between the S2MP output against other products and in-situ data. Hence, is this a paper aiming at exploring the use of Sentinel-3 instead of -2 in the processing chain or is it a validation study of the S2MP retrieval (hence an extension of Bazzi et al., 2019)? The paper should be better organized under the perspective of highlighting the main aim of this research.

The known issue of the S2MP-derived product consisting in unreliable SM estimates associated with NDVI > 0.7 (Bazzi et al., 2019). Is there any benefit in this sense by using Sentinel-3? Is the issue attenuated working at 1 km?

Additional minor issues are listed in the following:

Independently of the SM normalization expressed in eq. (1), I believe that the comparison

with CoperSWI should be carried out by calculating the SWI (with same T value) for the S2MP SM as well.

Potential impacts of a lower coverage of Sentinel-derived observations outside Europe should be discussed.

The purpose of the Sentinel-2 VS Sentinel-3 NDVI comparison at 1 km is not clear to me, since Sentinel-2 data has been processed at higher resolution within the S2MP algorithm.

Lines 273-276. Are the differences attributable to NDVI only? The aggregation to 1 km of Sentinel-1 VV backscattering and of the incidence angle in the S2MP adapted to Sentinel-3 has no impacts?

The higher correlation between in-situ and CR data with respect to HR estimates. Can it be due to the higher temporal resolution of the CR data sets?

Line 435. Maybe this is due to the fact that the CR component in such data sets is more conclusive than the HR one.

Figure 1. Please add an image explicating the location with respect to the countries.

Figure 4. The low spatial variability of the shown indices makes the figure not so informative.