

Comment on **essd-2021-364**

Anonymous Referee #2

Referee comment on "New SMOS SSS maps in the framework of the Earth Observation data For Science and Innovation in the Black Sea" by Estrella Olmedo et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-364-RC2>, 2021

This work presents the new regional SSS product for the Black Sea as part of the EO4SIBS project. It is an interesting attempt to fill the gap in the knowledge of sea surface salinity in the basin from satellite observations.

This paper requires additional work before the publication. In the following, some comments/suggestions.

- The introduction on Black Sea oceanography is a bit weak and almost taken from Stanev et al. 2005. There are many references that can be taken into account, starting from the most recent Stanev et al. 2019, Lima et al. 2021 and associated bibliography to keep into account for describing the peculiarities of the estuarine basin. Figure 1, in particular, shows the catchment area and it is not strictly connected to the concept exposed in Ln. 25-28.
Ln. 30-35 is from Stanev et al. 2005. The importance of salinity in the Black Sea is not well focused with respect to its connection with the Mediterranean Sea and it seems to be not adequately connected to the main objective of the work.
- In Section 2, an introduction to the overall method used for the generation of EO4SIBS SMOS SSS product would help.
- Ln.80, 83: CMEMS products have a dedicated DOI and references to product identifier than can be easily used (for example, Ln. 80 can be simply SST_BS_SST_L4_REP_OBSERVATIONS_010_022 and not the cmems_SST_BS_SST_L4_REP_OBSERVATIONS_010_022 which refers to dataset name).
- Ln. 83 about OISST_HR_NRT-GOS-L4-BLK-v1.0: in the paper, the reference to CMEMS is issues. However, the near real time SST observations are provided by SST_EUR_PHY_L4_NRT_010_031 product: is this the product effectively used? The product OISST_HR_NRT-GOS-L4-BLK-v1.0 is then not part of CMEMS.
- Section 2.2 "Algorithm description" is missing on a general description of the overall adopted methodology, so it results quite hard to understand the overall process just referring to single subsections.
- Figures 2 and 3, as well as Figure 5, report data also in the Marmara Sea and a portion

of the Mediterranean Sea, which is not the scope of the paper: would it be possible to mask them? Otherwise, could you please explain how you applied the methodology in both additional sub-basins?

- Would it be possible to improve the quality of figures? Fonts are small. Would it be possible to refer subplots also inside the text? (Suggestion: use index by letters to identify each subplot. It applies to all 2D maps plots).
- Brightness Temperature is referred as TB inside the text: would it be more coherent to use BT?
- Section 3 "Quality assessment" would benefit of an introduction that prepares the reader to the incoming list of data and methods the authors adopted for the validation exercise. It is not immediately clear for how many years the validation is accounting for.
- In Section 3.1.3 would it be possible to plot a map of the spatial distribution of available ARGO floats as used in the validation exercise? And for SeaDataNet insitu data?
- Have you performed also validation of SMOS SSS against climatological fields from SeaDataNet?
- Section 3.2.5: the conclusion is not clear. In particular, in which sense "the EO4SIBS SMOS SSS is consistent in describing the dynamics in the Black Sea when comparing with other geophysical variables"?
- Ln. 494: the model is able to reconstruct the salinity fields, not to observe it. Furthermore, if you refer to Black Sea Physics Reanalysis, please keep into account that ARGO from CMEMS and SeaDataNet have been assimilated.
- Figure 15: authors refer to model generically, which it is assumed to be the BLKSEA_MULTIYEAR_PHY_007_004? Could you please clarify?
- Is there any reason why the product is provided at 0.25 degree resolution? Could you please comment?