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Ocean Science Discussions

Interactive comment on "Evaluation of Arctic Ocean surface salinities from SMOS and two CMEMS reanalyses against in-situ data sets" *by* Jiping Xie et al.

Anonymous Referee #2

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The paper aims to quantify uncertainties of Arctic observation-based sea surface salinity to be included in the TOPAZ reanalysis. Two SMOS products are considered and compared against climatologies, observed data sets and reanalysis. This is an important problem in advancing in the data assimilation technics and improving the quality of CMEMS reanalyses. Anyway this study is not a significant step along that path. The paper has some unclear or incomplete reasoning. I do not feel that this research is ready to be published in OS. I do encourage resubmission after a much more detailed and careful investigation.

My primary concerns are i) the research is poorly presented, with vital details missing

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ii) the BEC SMOS product selected from this study should actually be updated to version 2

iii) the PHC data set is old, is included in WOA13 and assimilated in TOPAZ. It does not add much to the analysis

iv) MOI is not a reanalysis. The CMEMS product MULTI-OBS_GLO_PHY_REP_015_002 is a combination of four data set. I do define a reanalysis as a combination of ocean modeling, data assimilation scheme and observed data sets. I would rather include in this study a global CMEMS ocean/sea ice reanalysis to be compared with TOPAZ4

v) The region of interested is the Arctic Ocean, but results are mostly related to the North Atlantic/Nordic Seas area

vi) Section 5 summarizes main results but a proper discussion to support the BEC SMOS and the "certain benefit (line 537) is missing.

These points significantly detract from the conclusions of the study, make the conclusions much weaker than the present manuscript states.

English need to be generally improved.

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