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## Towards an improved temporal stability of CCI+SSS time series

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This study is performed in the frame of the European Space Agency (ESA) Climate Change Initiative (CCI+) for Sea Surface Salinity (SSS), which aims at generating global SSS fields from all available satellite L-band radiometer measurements over the longest possible period with a great stability. By combining SSS from the Soil Moisture and Ocean Salinity, SMOS, Aquarius and the Soil Moisture Active Passive, SMAP missions, CCI+SSS fields (Boutin et al. 2020) are the only one to provide a 10 year time series of satellite salinity with such quality: global rms difference of weekly 25x25km<sup>2</sup> CCI+SSS with respect to in situ Argo SSS of 0.17 pss, correlation coefficient of 0.97 (see [https://pimep.ifremer.fr/diffusion/analyses/mdb-database/GO/cci-l4-esa-merged-oi-v2.31-7dr/argo/report/pimep-mdb-report\\_GO\\_cci-l4-esa-merged-oi-v2.31-7dr\\_argo\\_20201215.pdf](https://pimep.ifremer.fr/diffusion/analyses/mdb-database/GO/cci-l4-esa-merged-oi-v2.31-7dr/argo/report/pimep-mdb-report_GO_cci-l4-esa-merged-oi-v2.31-7dr_argo_20201215.pdf)). Nevertheless, we found that some systematic biases remained. In this presentation, we will show how they will be reduced in the next CCI+SSS version.

The key satellite mission ensuring the longest time period, since 2010, at global scale, is SMOS. We implemented a re-processing of the whole SMOS dataset by changing some key points. Firstly we replace the Klein and Swift (1977) dielectric constant parametrization by the new Boutin et al. (2020) one. Secondly we change the reference dataset used to perform a vicarious calibration over the south east Pacific Ocean (the so-called Ocean Target Transformation), by using Argo interpolated fields (ISAS, Gaillard et al. 2016) contemporaneous to the satellite measurements instead of the World Ocean Atlas climatology. And thirdly the auxiliary data (wind, SST, atmospheric parameters) used as priors in the retrieval scheme, which come in the original SMOS processing from the ECMWF forecast model were replaced by ERA5 reanalysis.

Our results are showing a quantitative improvement in the stability of the SMOS CCI+SSS with respect to in situ measurements for all the period as well as a decrease of the spread of the difference between SMOS and in situ salinity measurements.

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