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Supporting Information for

**Satellite-based Sea Surface Salinity designed for Ocean and Climate Studies**

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Figures S4, S5, S7 and S8

**Introduction**

This supporting information illustrates maps of climatology of SSS variability taken as input in the OI , Aquarius representativity uncertainties and SSS anomalies computed with ISAS SSS fields.

All the material presented here is not essential to the comprehension of the article but provides more detailed information to the reader.

1. **Climatology of monthly SSS variability relative to the whole period SSS mean**

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**Figure S4**. Examples of climatological maps of monthly SSS variability relative to the whole period SSS mean. a) February; b) May; c) August; d) November.

1. **Climatology of weekly SSS variability relative to monthly mean:**

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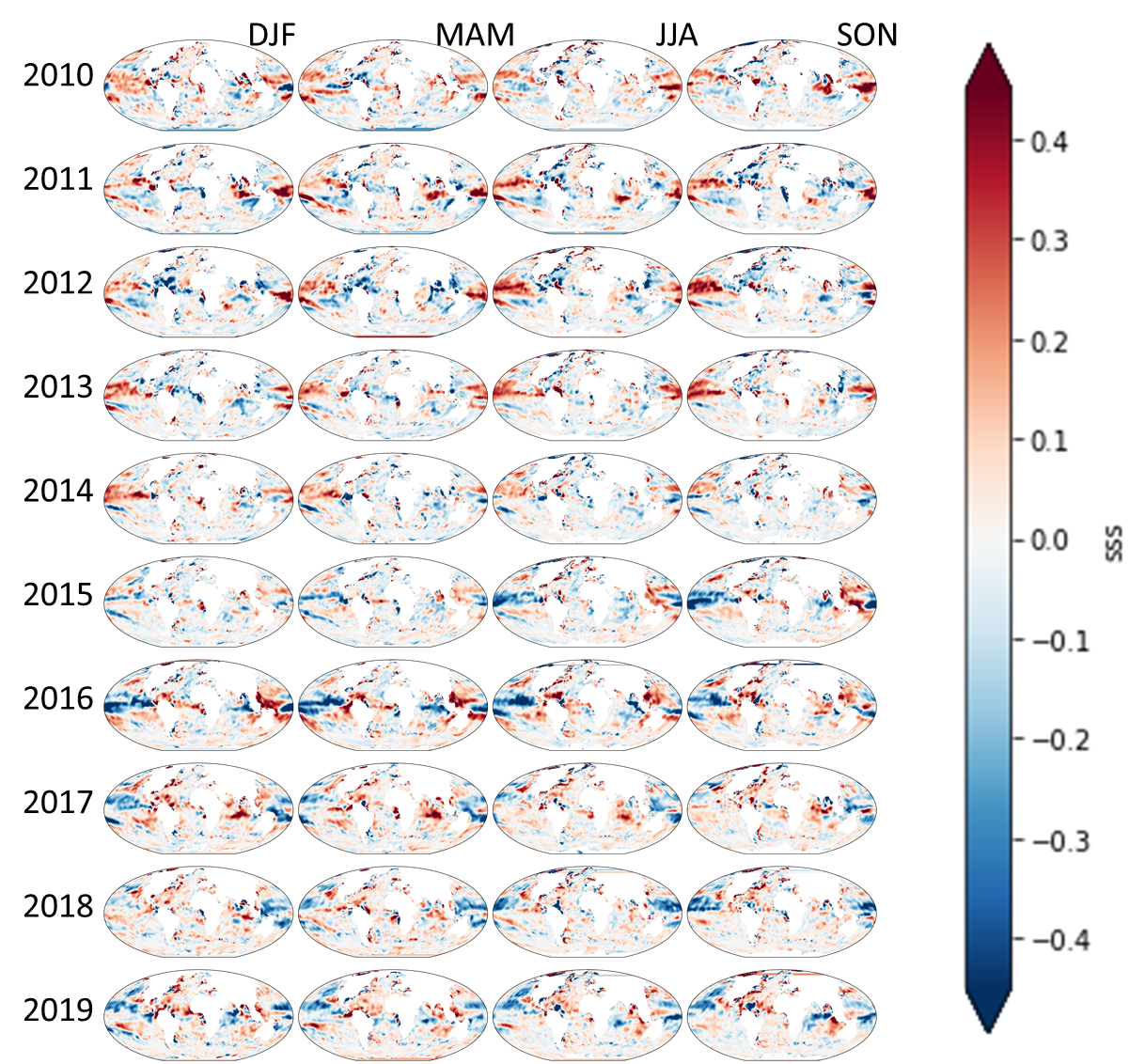
**Figure S5.** Examples of variability of weekly SSS relative to monthly mean SSS taken as input information in weekly OI , from GLORYS reanalysis. A) February; b) May; c) August; d) November.

1. **Aquarius representativity uncertainties**

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**Figure S7.** Examples of representativity uncertainties between Aquarius and SMOS/SMAP (150km/7day Aquarius, 50km/30days), from GLORYS simulations. A) February; b) May; c) August; d) November.

1. **Maps of SSS anomalies derived from ISAS SSS**

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**Figure S8.** Quarterly SSS anomalies derived from ISAS SSS (only grid points with PCTVAR<95% have been retained to avoid grid points very far from in situ measurements and almost only affected by climatological values).