

Summary of changes from V4.0 to V5.0

In brief, the changes to the salinity retrieval algorithm from V4.0 to V5.0 are:

1. The source of the ancillary sea surface temperature (SST) field has been changed from the NOAA OI SST to the SST field from the Canadian Meteorological Center (CMC).
2. The reference sea surface salinity (SSS) field that is used in the sensor calibration and in the derivation of TA_expected (i.e. forward algorithm) has been changed from HYCOM SSS to the analyzed monthly Scripps ARGO SSS.
3. The model for the component of celestial radiation reflected from the surface into the radiometer antenna has been updated based on a model derived from the difference between fore and aft observations of the SMAP (Soil Moisture Active Passive Mission) L-band radiometer. The advantage of this approach is that it includes both the effects of the model for celestial radiation at L-band and the effect of surface roughness.
4. The empirical symmetrization correction which corrects asc/dsc differences has been rederived to reflect improvements in the correction for the reflected galaxy.
5. The model for absorption by atmospheric oxygen has been changed from Wentz and Meissner (2016) to Liebe et al. (1992).
6. Various components of the surface roughness correction model have been updated from the model of Meissner et al. (2014):
 - a. The SST dependence of the wind induced emission has been adjusted.
 - b. The correction table depending on wind speed and VV radar backscatter has been updated.
 - c. The correction table depending on wind speed and significant wave height (SWH) has been omitted.
 - d. The 1st guess SSS field that is used in the HHH wind speed retrieval (Addendum III, section 2) has been updated.

7. A few changes have been made to the sensor calibration and calibration drift correction:
 - a. When calculating the global average of $TA_{\text{measured}} - TA_{\text{expected}}$ in the sensor calibration, the observations are filtered for rain using the instantaneous rain rate from the Aquarius RA product (see item 9).
 - b. A small channel dependent constant offset is added to the measured specular surface brightness temperature $TB_{\text{sur},0}$ in order to ensure matching between measured and expected TB and between measured and reference SSS and thus enforcing closure between sensor calibration and salinity retrievals.
8. In the maximum likelihood estimate (MLE) of the salinity retrieval algorithm, V-pol and H-pol have equal weight.
9. The L2 files include instantaneous rain rates based on the NOAA CMORPH rain product. They are used to filter data for rain in the calibration drift correction and also for validating the Aquarius salinity versus ARGO in-situ measurements.