S2T2

Error Characterization in iQuam SSTs Using Triple Collocations with Satellites Measurements

Feng Xu[1,2,3] and Alexander Ignatov[1]

1 NOAA STAR, College Park, MD 20740, USA

2 Fudan University, Shanghai, China

3 GST Inc, Greenbelt MD, USA

NOAA's in situ SST Quality Monitor (iQuam; www.star.nesdis.noaa.gov/sod/sst/iquam/) [1] was established in 2009 to support calibration and validation of satellite and blended sea surface temperature (SST) products. Recently, iQuam has been upgraded to version 2, which now includes SSTs from Argo floats and several local or experimental programs, in addition to the customary SSTs from drifting and moored buoys and ships, and covers the full satellite era back to 1981 [2]. All in situ SSTs are uniformly quality controlled, using end-to-end robust procedures. This study aims at quantifying the random errors in various in situ data types in iQuam using triple-collocations with SST retrievals from NOAA17 AVHRR and ENVISAT AATSR, derived by the ESA SST Climate Change Initiative (CCI) program [3]. The CCI data were selected because the corresponding retrievals are derived independently of in situ data and AVHRR and AATSR sensors employ very different measurement principles and therefore are expected to be maximally independent. Seven years of AVHRR L2P v1.0 and ATSR L3U v1.1 data from 2003-2009 are used in this study obtained from CEDA website (www.ceda.ac.uk/). The triple-collocation matchups are generated by finding the closest satellite observation for each in situ measurement within (25 km, 3hr) space-time window. By calculating the variance of the difference between each pair of measurements, triple-collocation analysis [4] is employed to estimate the absolute root mean squared errors (RMSE) of three measurements, which are considered independent. Preliminary results show that drifters, tropical moorings and Argo floats have comparable errors of 0.20-0.25K, whereas coastal moorings and ships have larger RMSEs, on the order of 0.45K and 0.75K, respectively. These estimates are largely in line with what is found in the literature. The AVHRR CCI SST shows RMSE~0.45K, whereas the AATSR RMSEs are found to be from 0.20-0.40K. Ongoing analyses include exploration of geospatial and seasonal patterns of the platform-specific errors, as well as trending their performance in time.

Keywords – iQuam, error quantization, sea surface temperature, triple collocation, AVHRR, AATSR.

References

[1] Xu, F. and A. Ignatov, 2014: In situ SST Quality Monitor (iQuam). JTech, 31, 164–180. doi:10.1175/JTECH-D-13-00121.1

[2] Ignatov, A., F. Xu and X. Zhou, 2016: Redesigned in situ SST Quality Monitor: iQuam version 2, in preparation

[3] Merchant, C. J., et al. (2014), Sea surface temperature datasets for climate applications from Phase 1 of the European Space Agency Climate Change Initiative (SST CCI). Geoscience Data Journal, doi:10.1002/gdj3.20

[4] O'Carroll, A., et al, 2006: Validation of the AATSR Meteo product sea surface temperature. JTech, 23, 711–726

Oral

- **Quantification and estimation of uncertainty**