Dual Salinity Drifters: Investigating the Processes Contributing to the Salinity Differences between Aquarius and in situ Measurements

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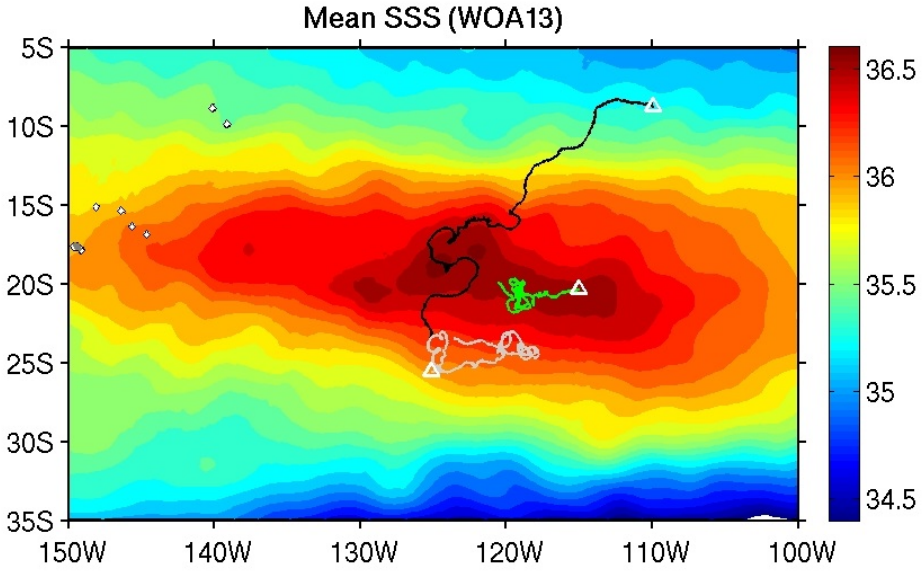
Sea surface salinity (SSS) measurements provide valuable observations to study the global hydrological cycle and, thus, advance our understanding of the Earth's climate system as a whole. Prior to their application in climate studies, space-borne SSS measurements need to be compared with *in situ* salinity in order to assess the accuracy of remote sensing products and, ultimately, to improve the satellite SSS retrieval algorithms. The direct comparison, however, is challenged by the fact that microwave radiometers onboard satellites measure salinity at a depth of 1 cm, whereas *in situ* measurements of SSS are taken at depths from 1 to 5 m. Knowledge of the near-surface salinity structure is, therefore, fundamental for interpreting the differences between satellite and *in situ* SSS measurements.

The ultimate goal of this project is to maximize the value of the SSS measurements provided by satellites. In order to reach this goal, we have established the following two specific objectives: (1) validate satellite SSS retrievals, and (2) investigate the surface salinity stratification in the upper 5 m of the ocean. In particular, we aim to explore the effect of salinity differences at the two measurement depths on the salinity differences between satellites and Argo.

To accomplish the two objectives of our investigation, we deployed an array of salinity drifters in the subtropical South Pacific (3), and the South Atlantic (3). Additional six salinity drifters will be deployed in the Eastern Tropical Pacific in 2016 and 2017. Each drifter is equipped with two conductivity/temperature probes at 15-20 cm and 5 m depth. These drifters are specifically designed for this project. The drifter records will provide a valuable data set to validate satellite SSS retrievals and to improve our knowledge of the near-surface salinity structure. Ultimately, better SSS product will advance our understanding of the global climate system. In total, we will deploy 12 drifters. Eight out of these 12 drifters are contributed by NOAA/AOML.



Trajectories of the three salinity drifters deployed in the subtropical South Pacific in April/May 2015. White triangles indicate the location of deployments. Color map shows the mean sea surface salinity from the World Ocean Atlas 2013.