# Variability of the South Pacific Subtropical Surface Salinity Maximum

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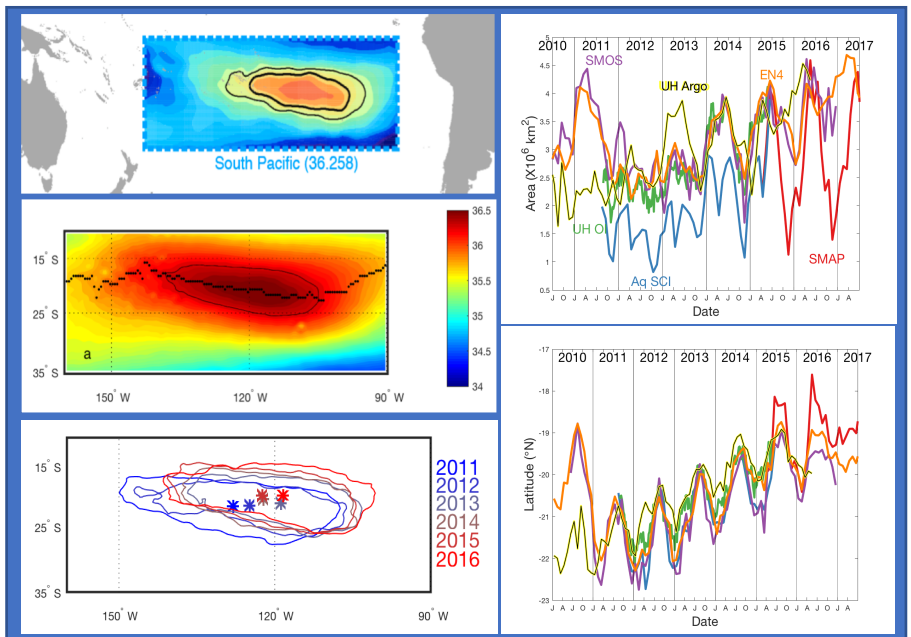


**Upper left**: SSS-Max region in the South Pacific relative to land masses (from Gordon, et al., 2015*)
**Upper right:** Area of the SSS-max over the 2010-2017 period from different satellite and in situ products
**Middle left:** Contour line shows the mean position of the SSS-max region. Color scale shows salinity in pss. Black dots show areas of maximum SSS.
**Lower left:** Yearly mean location of the SSS-max region from 2011-2017.
**Lower right:** Latitude of the SSS-max region based on satellite and in situ data.

*See https://doi.org/10.5670/oceanog.2015.02

**Problem:** Prior to the start of satellite measurement of sea surface salinity (SSS), there was little information regarding the variability of SSS maximum (SSS-max) features in the Southern Hemisphere. These features are huge areas of high SSS in the middle of each subtropical ocean. Data did not exist to describe changes in the SSS-max in the South Pacific or explore how changes in atmospheric and ocean processes might impact the subtropical South Pacific.

**Data and methods:** Using SSS data from multiple sources, we examined the structure and variability of the South Pacific SSS-max and calculated some major terms of the surface salinity balance. Seasonal and interannual variability was determined by noting changes in its location and size.

**Key findings:** Investigation of the variability of the SSS max from January 2010 to July 2017 showed an increase in salinity and area as well as a 1200 km northeastward shift in location (see figures). These results were consistent across multiple independent data sources. Comparison with measured rainfall and evaporation indicated these changes were not a result of shifts in these quantities. Changes in water motion in the subtropical gyre, decreased wind-induced upper ocean transport, and slowing downward motion of water into the ocean interior are factors that contributed to the observed changes.

**Broader significance or implications:** Results of this research provide insights into variations in SSS in the subtropical gyre and contribute to the broader understanding of global ocean dynamics. Major shifts in the location and size of such large surface ocean features had not been observed before. New datasets have allowed us to not only observe these changes, but to gain insight into why they might be occurring.

Publication source: Bingham, F. M., J. J. Busecke, & A. L. Gordon (2019). Variability of the South Pacific subtropical surface salinity maximum. Journal of Geophysical Research: Oceans, 124, 6050– 6066. https://doi.org/10.1029/2018JC014598