

## **Ocean Salinity From Space: Advances and Challenges in L-band Radiometry**

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The Aquarius L-band radiometer/scatterometer system is designed to provide monthly salinity maps at 150 km spatial scale to an accuracy of 0.2 psu. The sensor was launched on June 10, 2011, aboard the Argentine CONAE SAC-D spacecraft. The L-band radiometers and the scatterometer have been taking science data observations since August 25, 2011.

The Aquarius salinity retrieval algorithm takes radiometric measurements and transforms them into ocean surface salinity. The main parts of the algorithm has been developed by Remote Sensing Systems and is used in the Aquarius Data Production System ADPS at Goddard Space Flight Center.

The required 0.2 psu salinity accuracy translates into a radiometric accuracy of about 0.1 K, which poses a big challenge for the instrument design and calibration as much as it does for the salinity retrieval algorithm. Many sizeable spurious signals have to be removed. The first part of our presentation discusses the most important ones and the methods for their removal or mitigation:

1. Effects of the wind roughened ocean surface, which contributes the largest geophysical error to the salinity retrieval. If unaccounted an error in wind speed of 1 m/s will translate into a salinity error of more than 0.5 psu. The Aquarius L-band scatterometer has proven to be an invaluable tool to correct for the effects of the rough ocean surface.
2. Intruding celestial radiation, foremost from the galaxy.

In the second part of our talk we presents a validation study for the new salinity product, which consists in an intercomparison between Aquarius, in-situ salinity measurements from ARGO, RAMA, TRITON, TAO, and PIRATA buoys and the HYCOM model salinity field. The analysis shows that the Aquarius salinity meets indeed the aforementioned mission requirement of 0.2 psu. The Aquarius salinity shows a fresh bias in the tropics when compared to HYCOM and ARGO buoy measurements. This indicates that the Aquarius instrument can pick up rain freshening of the ocean surface.