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Far Eastern Pacific Fresh Pool surface salinity variability observed by SMOS and Aquarius sensors over the period 2010-2012

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The seasonal and interannual variability of the Sea Surface Salinity (SSS) deduced from SMOS and Aquarius/SAC-D satellite missions are analyzed over the period 2010-2012 in the Far Eastern Pacific Fresh Pool. The lowest values of salinity in surface layers (<33) in the tropical Pacific Ocean are found in this region of intense precipitation, associated with the northward migration of the Intertropical Convergence Zone (ITCZ) over Central America (Alory et al., 2012). During the boreal winter, as the ITCZ moves southward, the north-easterly Panama gap wind creates a south-westward jet-like current in its path with a dipole of Ekman pumping/eddies on its flanks. As a result, upwelling in the Panama Bight brings cold and salty waters to the surface which erode the fresh pool on its eastern side while surface currents stretch the pool westward. The present study focuses on the fresh pool patterns ranging from the seasonal and interannual variability over the last 3 year period. Each year, satellite SSS products reveal the erosion of the fresh pool by the Panama upwelling. Compared to the SSS climatology from the World Ocean Atlas, satellite SSS data systematically exhibit fresher surface water (by $\sim$0.5 to 1 unit in SSS) just after the occurrence of the maximum SSS reached in the region during the Panama upwelling events (April-May). Using Tropical Rainfall Measuring Mission (TRMM) data, we found that these fresh anomalies coincide with local excess precipitation. Moreover, except during the boreal winter 2011, saltier surface waters than in the climatology were observed during the intensification phase of the Panama upwelling events (Fev-March). Using ASCAT sensor surface winds, TRMM data, surface current deduced from altimeter data combined with the satellite SSS, the study will analyze how these observed SSS anomalies could be related to the interannual variability in the dominant physical mechanisms involved in the fresh-pool dynamics. A particular focus will be set on the consistency between SMOS and Aquarius observations and on the potential role of the surface freshwater induced-barrier layer processes in modulating the interannual signals.