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OVERVIEW OF 5 YEARS OF SMOS DATA OVER THE OCEANS

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THEME: MARI **Marine and coastal environment, resources and dynamics**

I am invited to contribute to the special session on "The Scientific Achievements of ESA's Earth Explorer Missions"

KEY WORDS: SMOS, Surface salinity, L-band, High winds

ABSTRACT:

While it is well known that the ocean is one of the most important components of the climate system, with a heat capacity 1100 times greater than the atmosphere, the ocean is also the primary reservoir for freshwater transport to the atmosphere and largest component of the global water cycle. Two new satellite sensors, the ESA Soil Moisture and Ocean Salinity (SMOS) and the NASA Aquarius SAC-D missions are now providing the first space borne measurements of the sea surface salinity (SSS). In this talk, we will present examples demonstrating how SMOS-derived SSS data are being used to better characterize key land-ocean and atmosphere-ocean interaction processes that occur within the marine hydrological cycle. In particular, we shall illustrate how SMOS and its ocean mapping capability provides observations across the world's largest tropical ocean fresh pool regions and we will discuss intra-seasonal to interannual precipitation impacts as well as large-scale river runoff from the Amazon-Orinoco and Congo rivers and its offshore advection. Synergistic multi-satellite analyses of these new surface salinity data sets combined with sea surface temperature, dynamical height and currents from altimetry, surface wind, ocean color, rainfall estimates, and in situ observations will be shown to yield new freshwater budget and ocean circulation insight. Examples of SMOS capabilities of monitoring salt exchanges across the Gulf Stream through meso-scale eddies will be provided. SSS observations from the SMOS and Aquarius/SAC-D sensors are combined to examine the response of the upper ocean to tropical cyclone passage including the potential role that a freshwater-induced upper ocean barrier layer may play in modulating surface cooling and enthalpy flux in tropical cyclone track regions.