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Sea Surface Salinity structure of the meandering Gulf Stream revealed by SMOS sensor

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Measurements from the SMOS satellite acquired over year 2012 in the western North Atlantic are used to reveal the evolution of the sea surface salinity (SSS) structure of the meandering Gulf Stream with an unprecedented space and time resolution. Combined with *in situ* surface and profile measurements, satellite-derived surface currents, sea surface height (SSH), surface temperature (SST), and Chlorophyll (Chl) data, SMOS SSS observations are shown to help better delineating meanders pinching off from the current to form well identified salty (warm) and fresh (cold) core Gulf Stream rings. A covariance analysis at two distant locations along the separated Gulf stream path (south of Nova Scotia and in the Gulf stream extension) reveals a systematically higher correlation between SSS and sea-level variability than between SST and SSH during the warmer half of the year. In the North Western Atlantic domain [75˚W-40˚W;30˚N-50˚N], Chl concentration is also found to significantly depend on the SSS as SST increases above 20˚C.