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Salinity and water cycle: The Canary Current, its role in the North Atlantic Subtropical salinity maximum freshwater budget

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Eddies propagating westward from the subtropical eastern boundary regime may be effective in injecting cool, low salinity surface water into the evaporative, surface salinity maximum (SSS-max) subtropical ocean regime. Research ship underway data, with CTD stations, and hull mounted ADCP, cutting across the central region of the SSS-max of the North Atlantic between 20^{o} to 30^{o}N, 25^{o} and 50^{o}W frequently observe the presence of relatively cool (~0.2^{o}C), low salinity (~0.15) features, with horizontal scale along the ship track of up to 200 km. The T/S characteristics of these features indicate a likely source from the upwelling regime of the Canary Current. Satellite altimeter data within the North Atlantic SSS-max region reveal an abundance of 'eddies' drifting westward at 3 to 4 km/day. CTD stations show that the most prevalent of these cool/low salinity surface features extend to at least 50 m. A water column with pure "Canary Current" characteristic (a SSS depression of 1.0 relative to the ambient SSS-max water column to the west) for the upper ~50 m transformed into the low salinity features observed within the SSS-max subtropics, would offset about 1 meter of E-P forcing, which is almost equivalent to a full year of E-P forcing in the North Atlantic subtropics. The full impact of the subtropical eastern boundary features on the subtropical SSS-max depends on their 'population' and on the rate to which they blend into the resident fluid. We propose that the EBC upwelling region low salinity water plays a significant role in the overall salinity [freshwater] budgets of the subtropical SSS-max; its relative importance to the subtropical shallow meridional overturning circulation needs to be quantified. This issue will be addressed as part of the 2012/13 Salinity Processes in the Upper-Ocean Regional Study (SPURS) program, and by the Aquarius satellite program.