

Session 2

Sea Surface Salinity signature of the tropical Atlantic interannual climatic modes

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Abstract

A consistent Sea Surface Salinity (SSS) signature of the tropical Atlantic meridional and equatorial interannual modes is extracted from in situ observations and a regional numerical simulation, by a statistical analysis on the 1980-2012 period. Oceanic and/or atmospheric processes responsible for the signature of each mode are identified through a mixed-layer salt budget in the validated model. The meridional mode is associated in spring with a meridional SSS dipole in the equatorial band, due to changes in fresh water flux related to a meridional shift of the Inter-Tropical Convergence Zone (ITCZ). It is also associated with large SSS anomalies in the north and south west tropical Atlantic, due to advection of relatively fresh equatorial waters by strengthened western boundary currents, and off the Congo River where both meridional and vertical advection are involved. The equatorial mode is associated in summer with 3 zonal bands of alternating SSS anomalies between 5°S and 10°N. The southernmost band is due to vertical advection and diffusion at the mixed layer base, the two others to a shift of the ITCZ-related rainfall maximum, with additional contribution of meridional advection in the northernmost band. The equatorial mode also leads to large SSS anomalies in the North Brazil Current retroflexion region, mainly due to horizontal advection of equatorial SSS anomalies. The SSS signatures of the meridional and equatorial modes are well captured by the SMOS satellite during particular events.



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