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Long-term variations of SST and heat content in the Atlantic Ocean

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Recent studies (eg. Wen et al. 2010; Servain et al. 2014) suggest that subsurface processes influence the interannual variability of sea surface temperature (SST) in the tropical Atlantic through the Meridional Overturning Circulation (MOC) with time lags of several months. In this study, we used observed SST and Ocean heat content to test such hypothesis during the period 1964-2013. First results indicate great similarities in the positive linear trends of monthly standardized anomalies of SST, upper ocean heat content (0-500m) and deeper ocean heat content (500-2000m) averaged over the whole Atlantic Ocean. Strong positive trends of SST and deeper heat content occurred in the equatorial Atlantic, while a strong positive trend of the upper heat content was observed in the northeast Atlantic. These positive trends were the highest during the last two decades. The lagged positive correlation patterns between upper heat content anomalies over the whole gridded Atlantic Ocean and SST anomalies averaged over the equatorial region (60ºW-15ºE; 10ºN-10ºS) show a slow temporal evolution, which is roughly in agreement with the upper MOC. More detailed works about the mechanism, as well as about the origin of the highest positive trend of the deeper heat content in the equatorial region, are presently under investigation.

References

Servain J., G. Caniaux, Y. K. Kouadio, M. J. McPhaden, M. Araujo (2014). Recent climatic trends in the tropical Atlantic. Climate Dynamics, Vol. 43, 3071-3089, DOI 10.1007/s00382-014-2168-7.