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Ocean reanalyses benefit from multivariate ocean data assimilation and model bias mitigation methods serving as a constraint to reduce systematic biases and long-term drifts resulting from errors in initialization, air-sea flux formulation and process parameterization. In the Mercator Ocean system, assimilation procedures are based on a large-scale 3D-Var correction for the slowly evolving large scale error of the model in temperature and salinity, and a reduced-order Kalman filter with a 7-day assimilation cycle which presumably corrects patterns at smaller spatial and temporal scales (mesoscale activity). Based on the global reanalysis GLORYS12 at 1/12° horizontal resolution and its twin simulation without data assimilation FREEGLORYS12, we address here the question of how data assimilation on weekly and longer time scales can influence on SST diurnal variations in the tropical Atlantic. Unlike FREEGLORYS12, we first demonstrate that large-scale patterns of temperature and salinity are consistently reproduced in GLORYS12 when compared with PIRATA observations. These background modifications by data assimilation are seen to improve high-frequency variability. The analysis of the mixed layer temperature budget will help to determine which processes explain such high-frequency modification by the background conditions. This demonstrates that tropical moorings are unique information for data assimilation allowing to evaluate and improve the representation of the ocean by physical models.
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