

Impact of observed salinity assimilation in MOM5-GODAS

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Abstract

The National Centers for Environmental Prediction (NCEP) produces ocean-only global ocean analysis and reanalysis operationally based on the Global Ocean Data Assimilation System (GODAS). The GODAS is based on a quasi-global configuration of the GFDL MOM.v3 and 3DVar assimilation techniques. The model domain extends from 75 °S to 65 °N and has a resolution of 1° by 1° enhanced to 1/3° in the N-S direction within 10° of the equator. The Global Ocean Data Assimilation System (GODAS) adopted from NOAA/NCEP has been operationalized at INCOIS (INCOIS-GODAS) in 2013. This model is configured globally from 80 °S to 90 °N. The meridional resolution is 1/4° between 10 °S and 10 °N, gradually increasing to 1/2° poleward of 30 °S and 30 °N. Zonal resolution is a uniform 1/2°. This system uses state-of-the-art ocean general circulation model MOM4p0d and 3DVar assimilation techniques. NCEP GODAS assimilates observed temperature profiles and synthetic salinity profiles to produce analysis and reanalysis. In contrast, INCOIS-GODAS assimilates temperature and salinity profiles from all in-situ observations over the global ocean. The upgraded GODAS with MOM5 shows improvements in ocean analysis/reanalysis. In this study, we show the impact of assimilating actual observed salinity over synthetic salinity assimilation over the global ocean. Notable improvements are seen near the equatorial oceans by using actual salinity. Although not much difference can be seen between the SST of the two experiments, there is an improvement in upper ocean properties with the use of actual salinity. The upper ocean salinity and currents along the equator show improvement in the experiment with actual salinity when compared with reanalysis and in situ observation data.