

Oceanic data assimilation in a global high resolution wave-tide-circulation coupled model

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A data assimilation scheme based on ensemble adjustment Kalman filter have been designed for a global high resolution wave-tide-circulation coupled forecast system has been established based on the FIOCOM (wave-tide-circulation coupled ocean model developed by the First Institute of Oceanography, State Oceanic Administration of China). The circulation component of this system is based on MOM5 with the parameterized non-breaking-surface-wave-induced mixing (Bv) incorporated into the K-profile parameterization (KPP) vertical mixing scheme. The wave induced mixing is calculated by the MASNUM wave model with the same horizontal resolution. The horizontal resolution of all the components of this system is 0.1 degree. An irregular quasi-rectangular domain decomposition scheme is used in wave model and the data assimilation for high efficient in parallel computing. The near-real time observations including the sea surface temperature (SST), sea surface height (SSH) and profiles of temperature and salinity from Argo have been assimilated into this system operationally, and a 7 days forecast is started at each day since 1 May 2016. The consideration of interactions among various ocean motions (wave and tide) makes the results more reasonable. The results of this system was compared with AVHRR SST and buoy measurements in Tropic regions (TAO in Pacific Ocean, RAMA in Indian Ocean, PIRATA in Atlantic Ocean), the validation of reanalysis results generated by this system and daily operational forecasts show that this system performs well.