



Numerical simulation of the Northwest Pacific based on the MaCOM regional model

Based on the Mass Conservation Ocean Model (MaCOM) independently developed by China, a new forecast system of Northwest Pacific has been constructed. Firstly, the hindcast simulation of 28 model years (1993-2020) of the mass conservation version for the NWP region was carried out, and the model outputs were validated and compared using reanalysis data, satellite data, and buoy observation data. The results of the hindcast test show that the RMSE of SST is about 0.9°C, the RMSE of SSS is about 0.4 psu, the RMSE of SLA is about 0.09 m, and the RMSE of sea surface current velocity is about 0.2 m/s. The system can accurately reproduce the thermal and dynamical fields in the Northwest Pacific, and can capture climate signals such as sea level rise and increased heat content. Based on the assimilation experiments of temperature and salinity observations conducted by MaCOM with the 3DVAR method, the results show that the RMSE of temperature is reduced by about 45%, the RMSE of salinity is reduced by about 31%, and the influence of tidal and no-tidal on the assimilation of the sub-surface and the deeper layers is not significant. In addition, by examining the error deviation of surface salinity before and after assimilation, it is found that the RMSE is reduced by about 10% after assimilation without tide, which indicates that assimilation of salinity in the subsurface layer and deep layer also improves the simulation effect of surface salinity to a certain extent.

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