Development and validation of the improved long-term (1947–2012) global climate reanalysis

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Abstract

The long-term (1947–2012) global climate reanalysis data has been produced based on the GFDL CM2.5 with improved numerical schemes and data assimilation system. The model is composed of atmosphere, ocean, sea-ice, and land components with exchanging fluxes through the FMS coupler system. Ocean observation data such as satellite-borne sea surface temperature (NCDC OISST), sea surface height (AVISO) and hydrographic profiles gathered from the GTSPP are assimilated into the ocean component of the climate model based on the Ensemble optimal interpolation, while the other components are freely integrated. The performance of the climate reanalysis is evaluated in terms of bias of oceanic and atmospheric variables. The comparisons with observational data suggest that our new climate reanalysis shows a great improvement for the well-known positive bias problem of the sea surface salinity in the Southern Ocean. Besides that, the positive bias of boreal winter precipitation in the tropical west Pacific, usually observed from the other reanalysis data, has been reduced in the new climate reanalysis. The better performance of our climate reanalysis seems to be the result of adopting the improved ocean vertical mixing scheme (Noh and Kim 1999) and cloud convection parameterization (Park 2014). Detail information of the climate reanalysis data and validations of other variables will be presented.

Reference

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