

Improved prediction of the Indian Ocean Dipole Mode by use of subsurface ocean observations

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The numerical seasonal prediction system using the SINTEX-F ocean-atmosphere coupled model has so far demonstrated good performance of predicting the Indian Ocean Dipole Mode (IOD) despite that the system adopts a relatively simple initialization scheme with nudging only the sea surface temperature (SST). However, it is easily expected that the system is not sufficient to capture the subsurface oceanic precondition. Therefore, we have introduced a new three-dimensional variational ocean data assimilation (3DVAR) method that takes 3D profiles of observed ocean temperature and salinity into account. Since the new system has successfully improved the IOD prediction, the present study has clearly shown that the ocean observational efforts in the tropical Indian Ocean are quite useful for improvement of the IOD prediction and may contribute to rich socio-economic activities, particularly in the Indian Ocean rim countries.

Keywords: Indian Ocean Dipole Mode, Seasonal prediction, Subsurface ocean observation