

**Prediction Skill and Bias of Tropical Pacific Sea Surface Temperatures  
in the NCEP Climate Forecast System Version 2**

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The prediction skill and bias of tropical Pacific sea surface temperature (SST) in the retrospective forecasts of the Climate Forecast System Version 2 (CFSv2) of the National Centers for Environmental Prediction were examined. The CFSv2 was initialized from the Climate Forecast System Reanalysis (CFSr) over 1982-2010. There was a systematic cold bias in the central-eastern equatorial Pacific during 1982-1998 that reaches  $-2.5^{\circ}\text{C}$  during summer/fall. The cold bias suddenly reduced to  $-1^{\circ}\text{C}$  around 1999 due to a sudden change in equatorial ocean heat content bias in the CFSr.

SST anomaly (SSTA) was computed by removing model climatology for the period 1982-1998 and 1999-2010 separately. The standard deviation (STD) of forecast SSTA agreed well with that of observation in 1982-1998, but in 1999-2010 it was about 200% too strong in the eastern Pacific and 50% too weak near Dateline during winter/spring. The shift in STD bias was related to change of ENSO characteristics: central-Pacific (CP) El Niños are more frequent than eastern-Pacific (EP) El Niños after 2000. The CFSv2 had a tendency to delay the onset phase of the EP El Niños in 1980s and 1990s, but predicted their decay phases well. In contrast, the CFSv2 predicted the onset phase of the CP El Niños well, but prolonged their decay phase. In 1982-1998 the CFSv2 forecasts beat the persistence for almost all initial months and lead months, but in 1999-2010 they are less skillful than the persistence for winter season forecast starting from summer/fall, indicating there is a room for improvement.