GODAS Data Discontinuity and Impact on CFS Forecast Bias

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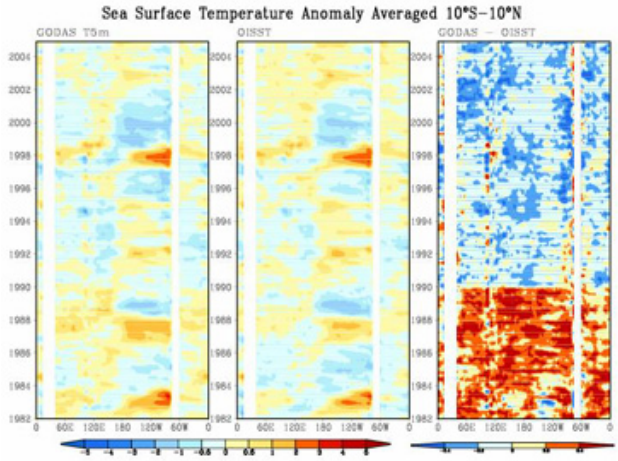
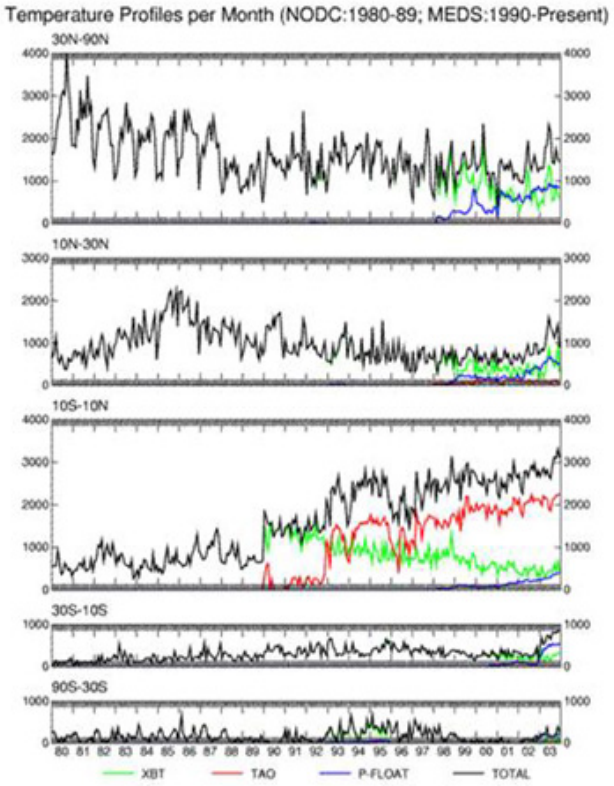
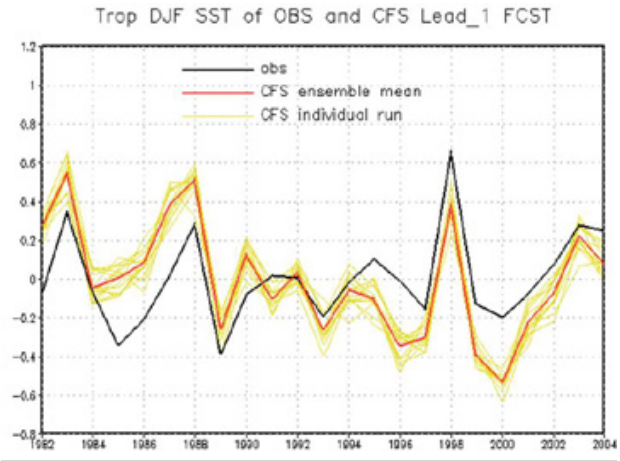
Recent diagnostic study conducted by Peitao Peng of NOAA/NWS/Climate Prediction Center found the increase of observational data used for Global Ocean Data Assimilation System (GODAS) since 1990 caused the assimilated tropical and subtropical SST systematically lower (~0.5C) than previous time. Its impact on the Climate Forecast System (CFS) also showed discontinuity of the tropical SST anomaly forecast bias, which was systematically warmer before 1990 and cooler afterwards.



▲ The longitude-time plots of the tropical (10S-10N) SST anomalies. From the left to the right panels are GODAS SST, Optimum Interpolation (OI) SST and their difference, respectively. The discontinuity of the GODAS SST bias around 1990 is evident as shown in the right panel.



▲ Temperature profiles per month used for GODAS in five consecutive latitude bands. The third panel from the top shows that in the tropics (10S-10N) there was a big increase of observational data from the Expendable Bathythermograph (XBT) and the Tropical Atmosphere Ocean Array of Moored Buoys (TAO) around 1990, which may suppress the model warm bias and cause the SST discontinuity shown in Figures 1 and 2.



▲ DJF SST anomaly averaged over the global tropics (10S-10N) for the period of 1982-2004. The black, red and yellow lines represent the observations (OI SSTs), the ensemble mean of CFS 1-month lead forecasts and the individual members of the CFS forecasts, respectively. It is obvious that in the earlier period (1982-1990), the CFS forecasted SSTs are warmer than the observed, while in the later period the situation is

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