Assessing CFS Version 2 Forecasts for Heavy Precipitation Using CPC Gauge – Satellite Merged Analysis

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Supported jointly by Hydrometeorological Testbed (HMT), Climate Program Office (CPO), and couple other projects, a suite of global precipitation analyses have been developed at NOAA Climate Prediction Center (CPC) to improve various NOAA operation and services activities in weather, climate and water. Called CPC Unified Precipitation Products, the suite of precipitation sets include gauge-based analysis of daily precipitation over global land, CMORPH integrated satellite high-resolution precipitation estimates and gauge-satellite merged analyses of regional land precipitation.

In this study, we applied the CPC Unified Precipitation Products to examine the performance of CFS Version 2 model in forecasting the intensity and frequency of heavy precipitation events over global land and oceanic areas. To this end, the bias in the CFS Version 2 precipitation forecasts is first removed by matching the probability density function (PDF) of CFS Version 2 daily precipitation against that for the daily gauge analysis over land and for the bias-corrected CMORPH satellite estimates over ocean. The PDF tables used to remove the bias are constructed for each T126 grid point and for each of the 365 calendar day and for each leading time step to account for the seasonal, regional and intensity-dependence of the CFS bias.

Once the bias is removed, performance of the CFS Version 2 precipitation forecasts is then examined through comparison against the gauge analysis and the satellite estimates over land and ocean, respectively. Performance statistics (e.g. anomaly correlation, probability of detection) is then examined for the CFS Version 2 forecasts of daily precipitation for different region, season, forecast leading times, and target precipitation intensity. Detailed results will be reported at the meeting.

Preliminary results demonstrated values of the new gauge and satellite precipitation data sets to the assessment and refining of climate model forecasts, suggesting potential importance of capitalizing R&D achievements in observations to the improvements of climate monitoring and forecasts in a systematic manner through the supports and coordination of Climate Testbed (CTB).