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Title: Using Ensemble Reforecasts to improve CPC's Week 2 Forecasts
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Abstract:
 Reforecasts are past weather forecasts generated with a 'frozen' numerical model. They are generated by running one constant version of a model over a specified period. A reforecast dataset can be used to diagnose the performance of a model over a long period of time, allowing one to correct for certain systematic biases in the model. The benefits of using this dataset of past model runs have been outlined by many studies, particularly Hamill et al. 2004 which showed that reforecasts could be used to improve the skill and reliability of week 2 GEFS forecasts.

CPC currently issues probabilistic 6-10 day and week 2 forecasts of surface temperature and precipitation every weekday. The CPC forecasters utilize many tools to make their forecast, including ensemble forecast systems from several centers and several statistical tools. One of the most-used tools is a calibrated forecast developed by the Earth System Research Laboratory (ESRL) in 2006, which is one of CPC's most skillful forecast tools. However, this tool is built upon a 16 year-old model, which limits skill of the model, even after statistical correction using the reforecast dataset. ESRL will be discontinuing this tool, so it will soon become unavailable to the CPC forecasters. However, ESRL recently generated a reforecast dataset using the latest (2012) version of the GEFS. In order to take advantage of this new dataset and to replace the deprecated ESRL tool, CPC started a new project to develop a reforecast-calibrated forecast system that would be run in-house, using ESRL's latest reforecast dataset. Long-term statistics were calculated using the reforecast dataset, and then used to adjust real-time GEFS forecasts to account for error in the mean and spread of the ensemble.

After adjusting the real-time GEFS forecasts, they become much more reliable and skillful than the uncalibrated GEFS forecasts, more skillful than the deprecated ESRL tool, and one of the most skillful tools for the CPC forecasters.
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