Name: Atul Kumar Sahai
sahai@tropmet.res.in
Scientist F
Indian Institute of Tropical Meteorology
HPC Building
Dr. Homi Bhabha Road, Pashan
Pune-411008
India
Country: INDIA
Title: Current status and prospects of Extended range prediction of Indian summer monsoon using CFS model
Additional authors: S. Abhilash1, N. Borah1, R. Chattopadhyay1, S. Joseph1, S. Sharmila1, S. De1, B. N. Goswami1 and Arun Kumar2
Additional Affiliations: 1Indian Institute of Tropical Meteorology, Pune, India, 2National Center for Environmental Prediction, USA
Abstract:
Extended Range Prediction (ERP) of Indian summer monsoon intraseasonal oscillations (MISO) in 3-4 weeks advance is of utmost important for planing, management and production in all sectors of life. An ensemble prediction system (EPS) is devised for the ERP of MISOs using state-of-the-art NCEP Climate Forecast System model version2 (CFSv2) at both T126 and T382 horizontal resolutions. The EPS is formulated by producing 11 member ensembles through the perturbation of atmospheric initial conditions. The hindcast experiments were conducted at every 5-day interval for 45 days lead time starting from 16th May to 28th September during 2001-2012. Present study compares the ERP skill of the proposed EPS at pentad mean scale for both T126 and T382 experiment. It has been observed that, higher model resolution i.e.T382 has provided better simulation of mean state with large reduction in climatological biases of June-September precipitation than the lower resolution forecast i.e. T126. The forecast error grows faster for T382 compared to the low resolution forecast from T126. Except over the regions where orography is important, prediction skill of T126 is superior to that of T382 for almost all lead pentads. Then we identified the lead dependant bias in the CFSv2 forecasted SST which is believed to limit the predictability. An attempt has also been made to correct the bias in SST forecast from CFSv2 and used to force the atmospheric component, GFSv2 (hereafter: GFSv2bc). Potential predictability limit is comparable (˜16 days) for both GFSv2bc and CFSv2. However, Prediction skills of active and break spells and low-frequency MISO is higher for GFSv2bc at all lead pentads. Though initially same, predictability error after 14 days grows slightly faster for GFSv2bc compared to CFSv2. Bias correction in SST has minimal impact in short-to-medium range, while substantial influence is felt in ER between 12-18 days. Further probability forecasts for active, break and normal categories of rainfall is being generated based on the ensembles. The skill of probability forecast measured as the area under the relative operating characteristic curves (ROC) reveals that skill of CFSv2 T126 is slightly higher than T382 and GFSv2bc outperformed CFSv2 (T126). Based on the three sets of model integration a multi model ensemble technique will be implemented in real-time after rigorous skill analysis.
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