

NEPS-G forecast Skill of Indian Summer Monsoon 2018

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Abstract: The quality of ensemble precipitation and zonal wind forecasts from National Centre for Medium Range Weather Forecasting (NCMRWF) Global Ensemble Prediction System (NEPS-G) is investigated for Indian summer monsoon period between June–September 2018. NEPS-G features 1 control and 22 perturbed members with 12 km horizontal resolution and 70 vertical levels. The initial condition (IC) perturbations are generated by Ensemble Transform Kalman Filter (ETKF). Physics perturbations are obtained from Stochastic Kinetic Energy Backscatter (SKEB) and Random Parameters schemes. Perturbations of sea-surface temperature, deep soil temperature and soil moisture are also added to the ICs, to remove the deficiency of spread in variables close to the surface. The quantitative precipitation forecasts are verified with fine-scale Integrated Multi-satellite Retrievals for Global Precipitation Measurement (IMERG GPM). Ranked probability skill score of precipitation with respect to Tropical Rainfall Measuring Mission (TRMM) daily climatology from 1998-2018 is positive till day-7 forecast lead time. The model has a systematic tendency to over-predict precipitation over Western Ghats, east central India, Himalayan ranges, Assam, Meghalaya, Arunachal Pradesh and Myanmar. Precipitation forecasts exceeding 2.5 mm/day are more reliable over longer lead times. Rank histogram and reliability diagram for zonal wind at 850 hPa forecasts indicate over-forecasting by the EPS over Indian region, with high bias and under-dispersion in the ensemble members. Continuous ranked probability skill score (CRPSS) of zonal wind speed quantified with reference to ERA-interim 1988-2018 climatology lies between 0.75 for day-1 forecast and 0.6 for day-7 forecast. Large value (>0.5) of area under relative operating characteristic curve (ROCA) till day-7 forecast lead time indicates high discriminating ability of NEPS-G.