

Quantifying the differences in the ensemble forecasts during calm and perturbed weather conditions

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Abstract:

Ensemble prediction system (EPS) is a numerical weather prediction (NWP) system which aims to provide the probabilistic forecast. The global EPS of National Centre for Medium Range Weather Forecasting (NCMRWF) (NEPS) is running at a resolution of ~ 12 km, which is same as that of the control from the deterministic NCMRWF Unified Model (NCUM). NEPS gives the forecast based on 23 ensemble members (22 perturbed forecasts + 1 control from the deterministic model). Objective of this study is to quantify the magnitude differences in different ensemble member forecasts during calm and perturbed weather conditions. The important meteorological parameters like temperature, relative humidity and wind are considered in this study. 14 -21 February 2019 is considered as the calm period, when there were no significant systems over the India and the surrounding Oceanic regions, while 27 April to 4 May 2019 is selected as the perturbed weather period when the Fani tropical cyclone was active. The mean differences in relative humidity and temperature at three different pressure levels (850hPa, 500hPa, 100hPa) of each ensemble member forecast from the deterministic forecast is estimated. The domain average (India domain, lat=0-30 N, long=60-110 E) of the relative humidity and temperature fields at the above three pressure levels are also calculated. The spread in temperature among the ensemble members in different forecast lengths is found to be less than 1K, and the same in relative humidity is less than 5% at 850hPa and 500hPa pressure level. Location specific comparison of wind field with the in-situ radiosonde observations shows that the actual observation is falling in between the ensemble forecasts.