

Impact of Precipitation Rate Assimilation over India and surrounding Regions

Surya K.Dutta & V. S, Prasad

Abstract

An observation System Experiment has been described that examines the impact of precipitation rate, obtained from SSM/I onboard the DMSP satellites and those from the TRMM. Analysis scheme used is Gridpoint Statistical Interpolation (GSI) with the forecast model T254L64. Analyses are carried out globally for four times daily at six hourly intervals from 00z to 18z. Two sets of simulations were performed. Precipitation rate measured by SSM/I and TRMM are assimilated and subsequently forecasts for 168 hour and made through the NCMRWF's GFS for the entire month of June-2009. The analysis and forecasts are also repeated for the entire period without assimilating the precipitation rate data. The results are analyzed globally giving special emphasis over India and surrounding regions. When compared with the observations, improvement of analyses and forecasts from experimental simulations were noticed. Analyses versus observation study showed improvement in terms of lower RMSE over both Tropics and Indian region. Positive impact on temperature analysis is seen over all the three levels of 850, 500 and 250hPa. For vector wind and geo-potential height analysis positive impact of assimilation is seen over 500 and 250hPa pressure levels. In forecast versus analysis comparison, the differences in the values from the two simulations are mostly insignificant. For a few cases, the experimental simulations shows significant improvement over the control runs. When compared with the observations, consistent improvement in the experimental forecast in terms of lower RMSE is found over both Tropics and Indian region. Improvement in all the three parameters (temperature, horizontal wind and geo-potential height) is observed.

Keywords: precipitation rate, SSMI, TRMM, OSE, GSI, assimilation