GSI Based Three-Dimensional Ensemble–Variational Hybrid Data Assimilation to Improve the Short Range Prediction of Indian Summer Monsoon

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Abstract

The accurate prediction of the Indian Summer Monsoon Rainfall is of paramount importance as it impacts the agrarian economies such as India. The forecast skill of any Numerical Weather Prediction (NWP) model is dependent on the accurate depiction of the initial state of the atmosphere. In this study, the impact of assimilation of satellite radiance data on the short range prediction of the Indian Summer Monsoon Rainfall will be examined. GSI based Hybrid 3DEnVar method will be used as the assimilation strategy to improve the initial conditions for the WRF-ARW model. Sensitivity study with respect to the ratio of static and ensemble background error covariance, and vertical and horizontal localization scales will be examined. The impact of radiance data on the rainfall will be validated against the IMERG data. Impact of assimilation on winds and moisture over land and ocean regions will also be examined.