

# **Impact of Land Surface Processes on the South Asian Monsoon Simulations using WRF modeling**

Kar S.C., P.Mali and A. Routray,

## **Abstract**

The Weather Research and Forecasting model has been used to examine the role of land surface processes on Indian summer monsoon simulations. Isolated experiments have been carried out with physical parameterization schemes (land surface and planetary boundary layer) and data assimilation to examine their relative roles in the representation of regional hydroclimate in model simulations. The impact of vegetation green fraction on the model simulations has been extensively studied by replacing the default United States Geological Survey (USGS) vegetation cover data with that of Indian Space Research Organisation (ISRO) data. Results indicate that differences in the treatment of surface processes in the model lead to large differences in precipitation simulation over the Indian domain. Several hydroclimate parameters from the simulations using ISRO and USGS vegetation green fractions were examined. It is seen that the role of vegetation green fraction in these experiments has been to increase latent heat flux to the atmosphere. Two sets of data assimilation experiments were also carried out for an entire year using the same set of observed data but with different land surface parameterization schemes. It is found that even when using the same observed data, the differences in land surface schemes reduce the impact and contribution of observed data being assimilated into the model. The hydroclimate over the region becomes a function of the land surface scheme. This study highlights the importance of vegetation green fraction and land surface schemes in the context of the regional hydroclimate over South Asia.