
Dr. Prashant Kumar



Dr. Prashant Kumar is working on applications of the Satellite Data in the Numerical Weather Prediction (NWP) models. He customized and implemented the WRF (Weather Research and Forecasting) model and its three/four dimensional variational data assimilation method for operational weather forecast. This forecast is operationally disseminated from MOSDAC, Space Applications Centre, ISRO. He provided crucial Weather forecasts for satellite launches from SHAR, ISRO. He published 54 publications in international peer reviewed journals and various SAC/ISRO scientific reports.

He developed a procedure to assimilate all-sky radiances from SAPHIR Megha-Tropiques and INSAT-3D & 3DR satellites in the WRF model.

He also developed a procedure for assimilation of non-linear and non-Gaussian satellite observations in the numerical model using particle filter.

He developed a hybrid data-assimilation technique to assimilate satellite observations for Martian and Venusian Atmosphere. He recently highlighted the importance of satellite rainfall assimilation using 4D-Var on Indian summer monsoon rainfall forecasts.

To assess the impact of satellite observations, Dr. Kumar has carried out various observation sensitivity experiments (OSE) using sea surface winds from Oceansat-2 & SCA TSat-1 Scatterometer and Advanced Scatterometer (ASCA T), sea surface wind speed and precipitable water from MADRAS, AMSR2, SSM/1, and TMI; atmospheric motion vectors from Kalpana-1, INSAT-3D & 3DR, and temperature and moisture profiles from INSAT-3D & -3DR Atmospheric Infrared Sounder (AIRS) and Infrared Atmospheric Sounding Interferometer (IASI), etc.

He has also performed the sensitivity tests for land-surface parameters available from Indian satellites like vegetation fraction from INSA T-3A CCD and land surface albedo from Kalpana-1 VHRR, LULC, etc.

Dr. Kumar also developed a procedure to assimilate DWR observations using High Resolution Rapid Refresh (HRRR) method and demonstrated applications to predict extreme weather events like thunderstorm, cyclone.

Currently, he is working on assimilation of non-Gaussian and non-linear observations using Particle Filter, development of model error, modeling of background error for hydrometeors (like rain, cloud, etc.), weak constraint variational data assimilation, model parameter optimization using variational method, etc.

In recognition to his outstanding research contributions in the field of Earth System Sciences, the Ministry of Earth Sciences honours Dr. Prashant Kumar with the “Young Researcher Award in the field of Earth System Science” for the year 2019.