

4th workshop on assimilating satellite cloud and precipitation observations for NWP



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All-sky assimilation of temperature-sounding microwave data

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Satellite radiances affected by cloud and precipitation are usually associated with meteorologically important regions. As research development has been intensified in the past decade in major NWP centers on the use of all-sky radiance observations, the assimilation of cloudy radiances from the Advanced Microwave Sounding Unit-A (AMSU-A) for ocean fields of view became operational in the hybrid 4D Ensemble-Variational (EnVar) Global Forecast System (GFS) at Environmental Modelling Center (EMC) at NCEP in 2016. Later, with the implementation of the FV3 GFS data assimilation system in 2019, the all-sky assimilation was expanded to the radiances of Advances Technology Microwave Sounder (ATMS). To deal with model errors, especially the errors of clouds, only selected data sample was used in the variational radiance bias correction scheme and situation-dependent observation error inflation was applied. The all-sky radiance assimilation has improved GFS analysis and forecast. The configuration of the all-sky radiance assimilation at NCEP, with the flow-dependent background error covariance provided by the ensemble forecasts, will be presented. The application of VIIRS cloud products in the all-sky microwave data quality control will also be briefly discussed. In addition, efforts have been invested at EMC on the all-sky assimilation of radiances sensitive to land, and the status and progress of this work will be given. At the workshop, a brief overview of other AMSU-A assimilation work (e.g. Met Office and ECMWF) will be presented as well.

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