Development of GPM/DPR assimilation method in Km-scale Hybrid-4DVar system

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A new km-scale hybrid-4DVar data assimilation system is being developed to improve short-range precipitation forecasts at the Japan Meteorological Agency. One of the purposes of developing this system is to enable the assimilation of high spatial and temporal resolution observations related to hydrometeors. For assimilation of such observation, simplified 6-class 3-ice 1-moment bulk cloud microphysics scheme suitable for the tangent linearization has been developed. In this microphysics scheme, the ice and snow particle is defined as non-spherical and soft particle. The space-borne radar simulator as observation operator in data assimilation has been developing to assimilate the reflectivity of snowflakes. In addition, the background error covariance of hydrometeors is constructed using ensemble perturbations because the vertical error correlation depends strongly on meteorological situations. Using this km-scale hybrid-4DVar data assimilation system, the impact of Dual-frequency Precipitation Radar (DPR) on board the Global Precipitation Measurement (GPM) core satellite has been investigated. The DPR instrument was developed by the Japan Aerospace Exploration Agency (JAXA) in cooperation with the National Institute of Information and Communications Technology (NICT). This space-borne precipitation radar can observe three dimensional distribution of reflectivity all over the earth. The result of GPM/DPR assimilation experiment will be presented.

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