

Data Assimilation Experiment of Radio Occultation Refractivity Data by using a Mesoscale LETKF System

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An assimilation method of radio occultation (RO) data for a mesoscale Local Ensemble Transform Kalman Filter (LETKF) (Miyoshi and Aranami, 2006) system has been developed (Seko and Tsuda, 2015). There are the following two difficulties in the assimilation of RO data: (1) An assumption of uniform distribution of refractivity, which is used in the estimation of refractivity profiles at tangent points, is not always valid, and (2) path averaged data is difficult to be assimilated by LETKF system because data assimilation using LETKF is conducted by each grid point. To solve these difficulties, (1) the path averaged refractivity was reproduced from the tangent point data and (2) path- averaged refractivity was divided into the refractivity at grid points around the path by using the statistical data of ensemble forecasts (ensemble average and spread) obtained by LETKF system. This developed method was applied to the RO data observed on 29 July 2011. The assimilation result of this RO data shows that the sign of the difference between the first guess and observation may be changed when the large mesoscale perturbation of refractivity exists around the tangent points, and that the temperature and water vapor are modified more widely when the path-averaged refractivity is assimilated.

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