1.138 Data assimilation of the cross-border transport of aerosols/PM2.5 using Himawari 8 data and NICAM-Chem model.

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Abstract:

We are making a forecasting system of air quality for human health from the distributions of aerosols including PM2.5, oxidants (tropospheric ozone), NOx, SOx and so on. A report by WHO estimated that the air pollution due to those species caused the health damage such as lung trouble and cerebrovascular disease corresponding to kill ~3.7 million people in the world during the year of 2012. In the case of Japan, about a half of the observed PM2.5 and tropospheric ozone originate outside of the country, and, especially in the western Japan, the cross-border transport of PM2.5 from the continent is significant. Therefore, in the prediction of air pollution there, the enough consideration of the global-scale transports of aerosols and oxidants is indispensable.
Himawari 8 observes the column distributions of aerosols covering the East Asia with very high resolutions for both time (10 minutes) and space (~5 km), and provide the open observational data sets within a day. We have derived the abundance of PM2.5 near the surface from the data sets assuming the bimodal size distribution of aerosols based on the algorithm by Higurashi and Nakajima (1999) and the vertical profile observed by CALIPSO, and assimilated the density data into the NICAM-Chem general circulation model (Goto et al. 2015). The method of assimilation is based on the optimal interpolation to be adaptable for the fast predictions with small computational resources. In the presentation we show the preliminary results of the assimilated PM2.5 distributions on Japan, and discuss the connection with the km-scale regional simulations to predict the urban air quality.
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