[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-AS Atmospheric Sciences, Meteorology & Atmospheric Environment

[A-AS01]High performance computing for next generation weather, climate, and environmental sciences

convener:Hiromu Seko(Meteorological Research Institute), Chihiro Kodama(Japan Agency for Marine-Earth Science and Technology), Masayuki Takigawa(独立行政法人海洋研究開発機構, 共同), Takemasa Miyoshi(RIKEN Advanced Institute for Computational Science)

Sun. May 20, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

A lot of advanced simulation studies are being conducted by high performance supercomputers such as K computer, Earth Simulator in various fields including meteorology. The high performance supercomputers enables us to conduct numerical simulations and data assimilation of observation big-data (huge high-density and high-frequency data) with an order of magnitude higher resolutions and ensemble numbers than those with previous supercomputers. In addition, the post-K computer will be available as a successor of K, and studies for the post-K computer was started. At the Atmospheric Science session co-organized by the Meteorological Society of Japan, we comprehensively pick up this topic in the Atmospheric and Hydrospheric Sciences Session of this 2018 Union Meeting that enables to comprise the atmospheric, oceanic and land sciences. This session aims to promote recent studies related to the issues on high performance computing in weather, climate, and environmental studies using the K computer and other supercomputers, and to enhance discussions on future directions of numerical simulations in meteorology.

[AAS01-P03]Accounting for the observation error correlation in data assimilation

★ Invited Papers

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Keywords:Data assimilation, Observation error correlation, Condition number, Reconditioning

It is known that some observations such as satellite radiances have the spatial and inter-channel error correlations. The current data assimilation systems in the operational centers mostly neglect the observation error correlations. It is important to account for the observation error correlations to effectively draw the information from the observation “BigData.”

In this study, we developed a method to account for the observation error correlations in the local ensemble transform Kalman filter (LETKF: Hunt et al. 2007), and performed idealized experiments with the Lorenz-96 model (Lorenz et al. 1998) and the non-hydrostatic icosahedral atmospheric model (NICAM: Satoh et al. 2013). The condition number of the observation error covariance matrix (**R** matrix), or the ratio of the maximum and minimum eigenvalues, is essential for the stable performance of the LETKF. Reconditioning can make the **R** matrix well-conditioned by adding a small constant to all the diagonal terms of the **R** matrix. We examined that the reconditioning not only stabilizes the LETKF but also greatly improves the analysis accuracy by including the observation error correlations.