[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-P06]The computational aspect of the SCLAE-LETKF data assimilation system for rapid-update-cycle, high-resolution radar data assimilation

★ Invited Papers
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Keywords:SCALE-LETKF, Radar data assimilation

We have developed the SCALE-LETKF system, utilizing the Scalable Computing for Advanced Library and Environment-Regional Model (SCALE-RM) model and the Local Ensemble Transform Kalman Filter (LETKF). The initial purpose is to use this system for the rapid-update-cycle, high-resolution assimilation of the Phased Array Weather Radar (PAWR) data. An ultimate goal of real-time PAWR assimilation with 100 ensemble members, at 100-m model resolution, and with a 30-second update cycle, using the full capacity of the K computer, has been set for this development. This requires very careful design in every part of the code, including computation and I/O, to achieve high parallelization efficiency to meet the goal. Memory space needs to be thriftily used in single processes to allow processing the big observational data. Besides, separate execution of many small programs, which is typical in ensemble data assimilation systems, needs to be avoid; instead, only two MPI programs, the model and the data assimilation programs, are executed for the entire data assimilation cycles. In the past three some years, we have made remarkable progress of the code development towards this goal, although the actual real-time operation has not been achieved yet. Meanwhile, we believe that the SCALE-LEKTF system has become a useful tool for broad mesoscale data assimilation studies. This presentation will summarize our achievement so far with the SCALE-LETKF system in the computational aspect.