[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-P09]Numerical simulation of a heavy rain event in Hiroshima city on 19-20 August 2014

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In Hiroshima, heavy rainfall caused debris flows on 19-20 August 2014. The heavy rain was a line-shaped rainband caused by “back-building formation” in a relatively narrow region. To predict and mitigate this kind of disaster, an accurate numerical prediction is necessary.

In this study, we investigated important factors in a numerical weather prediction (NWP) model that impact on a performance of heavy rainfall forecast. The investigated factors were grid spacings (5 km to 250 m), planetary boundary layer (PBL) schemes, model domain sizes, lateral boundary conditions in nesting simulations, and terrain representations.

Results indicated that ultra-high-resolution (500-250 m grid spacing) experiments showed better performance than coarser-resolution experiments (5 and 2 km grid spacing) in the rainfall cases. The differences of grid spacings had a larger impact on the position of rainband. These results demonstrate that the ultra-high-resolution NWP model has the possibility to improve predictions of heavy rainfall.