

The simulations of the forest fire emission and its impact on the long-range transport of aerosols using the K computer

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The large and continuous forest fire emission occurred around Lake Baikal in September 2016. The surface concentration of black carbon (BC) was observed at the “R/V Mirai” from August 2016 to September 2016 in Arctic Cruise (MR16-06), and the maximum BC concentration was detected in 25–26 September around Aleutian Islands. We perform the aerosol transport simulation using the Nonhydrostatic Icosahedral Atmospheric Model (NICAM) - SPRINTARS to determine the forest fire impacts on the long-range transport of BC and organic carbon (OC) from Lake Baikal to Aleutian Islands. The aerosol transport simulation with global 3D model requires larger computational resource than that with dynamical model, and we used K computer to perform NICAM-SPRINTARS simulations. The emission scheme of previous model used the constant injection height about 3 km. We replace the model's injection height of forest fire events by the observational injection height using the CAMS Global Fire Assimilation System (GFAS) dataset. We also use the daily fire flux of BC, OC, and SO₂ of GFAS. The model results of carbon concentration indicate the maximum in 25–26 September around Aleutian Islands, in agreements with the MR16-06 observation. Since the injection height of this events was about 2 km around Lake Baikal, the carbon concentration of new model is smaller than that of previous model (constant injection height about 3 km). In the NICAM-SPRINTARS, the high AOT area moves from Lake Baikal (9/21) to Aleutian Islands (9/25-26) through Northeast China (9/22-23) and the Sea of Okhotsk (9/23-24), in agreement with the Himawari-8 AOT observations provided from JAXA.

Keywords: forest fire emission, aerosol transport model