

FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

Project Title: Reliable assessment and forecast for influences of atmospheric aerosols on environment by a numerical model

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1. Background of research

Suspended particle matters, aerosols, in the atmosphere (e.g., soot, dust, etc.) affect visibility and respiratory organs of human and other animals. They also cause climate change. It is, however, still difficult to predict aerosol concentrations precisely in the atmosphere and to estimate the aerosol effects on the climate system quantitatively. A principal investigator (PI) of this research project has developed a global aerosol climate model, SPRINTARS, which simulates spatial and temporal distributions of main tropospheric aerosols, i.e., black carbon, organic matter, sulfate, soil dust, and sea salt, and their effects on the climate system. Research results with SPRINTARS have been used in various fields. For example, not only they were cited by the 4th Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) (2007), but also the PI of this research project was a Contributing Author of IPCC AR4 and is a Lead Author of IPCC 5th Assessment Report (AR5) (2013).

2. Research objectives

Atmospheric pollution and climate change due to aerosols will be assessed reliably with the global aerosol climate model, SPRINTARS.

3. Research characteristics (incl. originality and creativity)

A next-generation aerosol climate model will be developed to express cloud-aerosol interaction in detail. Atmospheric pollution and climate change due to aerosols will be predicted in the decadal scale. A weekly aerosol forecasting system with high precision will be developed by incorporation of data assimilation methods with observational data.

4. Anticipated effects and future applications of research

Results of the weekly aerosol forecast are opened to the public via SPRINTARS website (<http://sprintars.net/forecastj.html>), which will be useful information for controlling costs of various aspects, e.g., human health. The outcomes will contribute to predicting climate change reliably and then will be cited by the IPCC AR5 that is a scientific basis for international policies of climate change.