

# FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

**Project Title:** New generation environmental assessment through establishment and application of super sensitive analysis of organic aerosols

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## 1. Background of research

Countless fine particles (aerosols) exist in the Earth's atmosphere that are made of either liquid or solid (or even mixture of both). They affect not only human health, but also interact with global climate through their ability to scatter, absorb sunlight and modify the properties of cloud. These particles are often composed of mixtures of inorganics and organics with various optical and hygroscopic properties, therefore making the prediction of their climatic impact highly uncertain.

## 2. Research objectives

The East-Asia is recognized as being one of the most aerosol dense region in the globe. Our goal is to establish a new analytical technique sensitive enough to detect slight amount of organics contained within individual particle, and apply this to the actual aerosols of East-Asian origin. We will focus on the microscopic mixing state of particles (e.g. investigate whether bacteria or other harmful organic compounds are attached to Asian dust particles, etc.) and assess its potential climatic and environmental impact.

## 3. Research characteristics (incl. originality and creativity)

Studies on the mixing states of organic aerosols have been hampered mainly by the fact that the detection of organic aerosols relied much on conventional bulk sampling techniques which involved post-sampling treatment (extraction of organics from large amount of samples). Current project aims at realizing analysis of individual organic particle by the employment of an undestructive, state-of-the-art laser based technique. Also, we will exploit the geographical settings of Noto-peninsula (Ishikawa prefecture) for the monitoring of East-Asian aerosols.

## 4. Anticipated effects and future applications of research

Contribution to the more accurate prediction of climate change is anticipated. Possibility remains that an unknown mixing particle be discovered and recommended as a new monitoring item with strong climatic hazard. In addition, expectations are high for assessing the potential health effect of Asian dust storms (e.g. specifying the cause of diseases and suggesting preventive measures).