

Atmospheric Environment, Radioactivity and Organic Pollutants in Pan- Japan Sea Area (AERO-PJS)

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Atmospheric Environment, Radioactivity and Organic Pollutants in Pan-Japan Sea Area (AERO-PJS)

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Abstract - Research proposal entitled "Atmospheric Environment, Radioactivity and Organic Pollutants in Pan-Japan Sea Area (AERO-PJS)" from Atmospheric Environment division in Kanazawa COE project has been described.

I. Introduction

Several decades ago air and water pollution were serious social issues and were called as public nuisance but they appeared at limited areas such as industrialized areas. They have been overcome considerably but nowadays adverse effects have appeared in many fields and become worldwide environmental issue, Japan Sea is surrounded between Eurasia continent and Japanese Island and it has very narrow openings at north and south, and circumpolar westerlies is prevailing in this area so that the area is very sensitive to environmental changes and is thought to be a sensor of worldwide environmental changes.

Final target of Kanazawa University COE program is to find out the appropriate protection and remediation schemes for the environmental issues around Pan Japan Sea area through monitoring and predicting long- and short-term dynamics of the area. To accomplish this, there are many tasks and steps such as measurement, analysis & evaluation, prediction of the environment and finally establish the appropriate protection and remediation scheme.

Atmospheric division of this COE group is composed of 6 scientists studying atmospheric issues but from different disciplines. They decided that they put their focus on suspended particulate matter and to investigate its behaviors from different aspects and to find out suitable indices for the prediction and protection of the environment around Pan Japan Sea Area. What follows are the brief summary of the proposal.

II. Objectives

Objectives of this project is to forecast the change of atmospheric environment, to find effective indices and/or phenomena to predict the long and short term dynamics of environment of Pan Japan Sea Area, and to obtain the quantitative relation between indices and atmospheric environment.

In the stratosphere, circumpolar westerlies is prevailing so that once particulates and gaseous pollutants are blown up

into this layer, they will travel long distance to east direction and they will change their states both chemically and physically due to the mutual interactions and the other surroundings and then some of them will deposit during the transportation. Hence one can expect that the deposit will show useful indication of environment through the comparison of the chemical and physical states of deposits at different places and different times.

III. Possible phenomena and indices

When we choose some material or phenomenon as index of the change, it is desirable that it represents the phenomenon in interest either qualitatively or quantitatively and its change can be expressive with location, time, composition in the material and so on. From this point of view, PAH/NPAH generated from petroleum and coal combustion, decay characteristics of some radionuclide and dust like Aeolian, diesel, fly ash and can be candidate also.

It is important to obtain the quantitative and reliable correlations between phenomenon and those indices by choosing appropriate phenomena. Phenomena which should be involved are mechanism of aero-dispersion of dust, interactions between gas and gas, gas and particle, and particle and particle, transportation of gases and particulates, deposition and accumulation of gases and particulates in the atmosphere and land and so on.

IV. Research plans

AERO-PJS project will be carried out by the group member listed below and research plan of each member are listed below and general scheme of the project is shown in Fig. 1.

Member	Name	Affiliation	Speciality
	C. Kanaoka	K-INET	Aerosol and powder technology
	K. Hayakawa	Graduate School	Pharmaceutical sciences
	S. Kimura	K-INET	Fluid dynamics
	T. Ibusuki	Graduate School	Photo chemistry
	R. Kizu	Graduate School	Pharmaceutical sciences
	T. Sato	K-INET	Environmental mineralogy

A. Research topics of member

Kanaoka

- (1) Developments of large capacity aerosol sampler with size classification function and novel technique for source emission control.
- (2) Development of large capacity aerosol sampler with size classification function
- (3) Development of the suppression of dioxin generation accompanying thermal treatment of waste materials

Hayakawa

- (1) Dynamic behavior of PAH and NPAH in the city atmosphere around pan-Japan Sea area
- (2) Investigation of emission characteristics of PAH and NPAH
Long-range transportation of combustion dust originated from continent

Kimura

- (1) Analysis of aerodynamic deposition process suspended dust originated at continent
Doppler-sorder observation of air dynamics in the atmospheric boundary layer
- (2) Direct simulation of the deposition process of Aeolian dust

Ibusuki

- (1) Development of highly sensitive environmental sensors and long-range transport model for pollutants
- (2) Development of highly sensitive environmental sensors
- (3) Development of detection technique for ultra low concentration pollutants
- (4) Evaluation of pollutants load based on long-range transport model

Kizu

- (1) Endocrine disrupting effect of airborne particulate matter
Relationship between endocrine disrupting effect and agonist content in AhR
Investigation of endocrine disrupting mechanism of AhR

Sato

- (1) Studies on transportation and deposition of hazardous materials such as PAH, NPAH, Radionuclides and SO_x on airborne dust
Interactions between hazardous materials and components in airborne Aeolian dust
Effect of human activities and Aeolian dust on the environment recorded in limn-deposit

B. Cooperation

1. In the division
Measurement of PAH/NPAH

Large capacity air sampler with size classification function

2. between divisions
Measurement of radionuclide
Holdout of core samples
Exchange of progress of group project
3. National and International
Research cooperation, exchange of information
Holdout of samples
Technology transfer

C. Sampling

Determination of measuring items
Determination of sampling locations
Construction of sampling network
Accuracy, minimum or maximum number of samples, time and period to sample and interval etc.

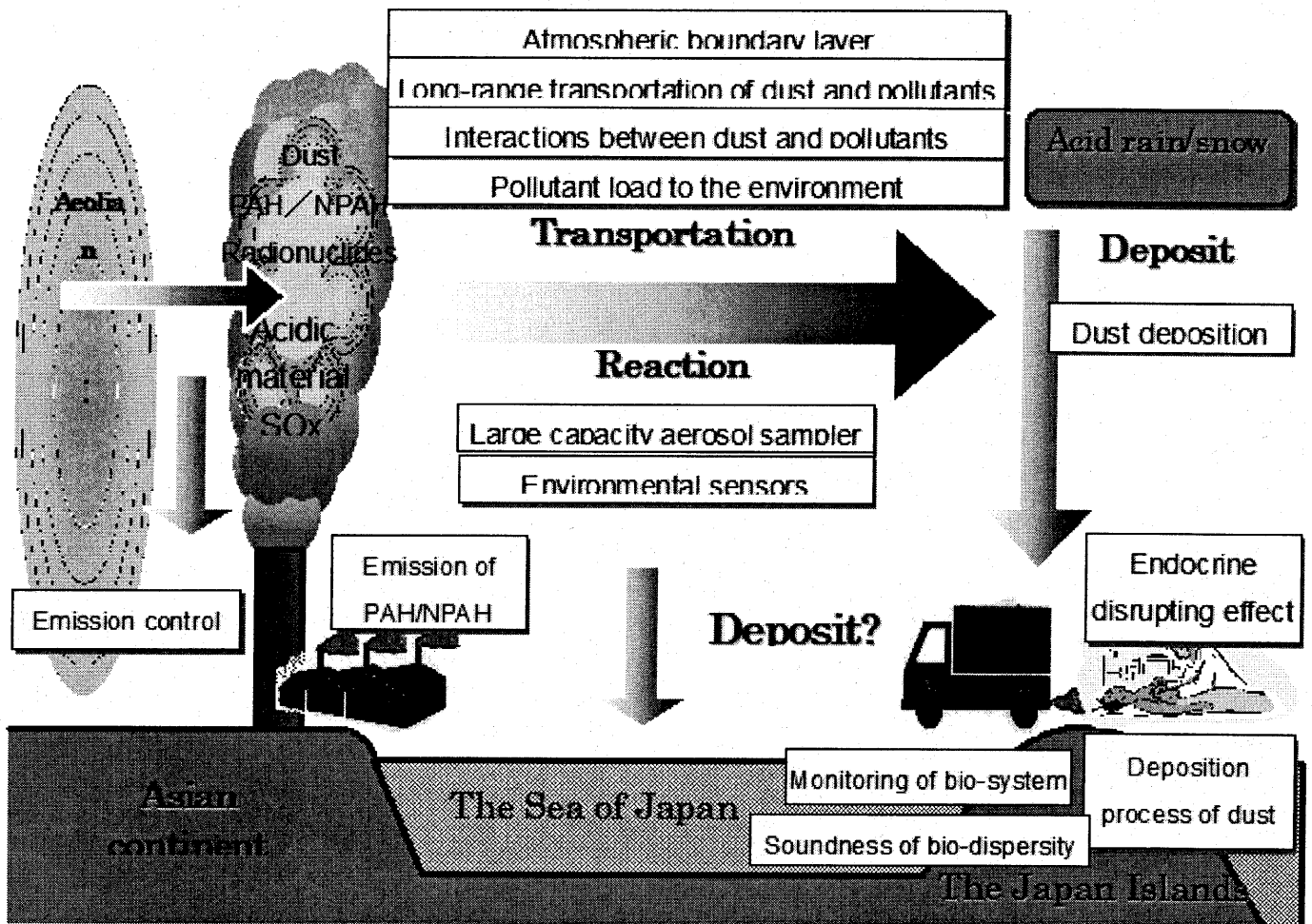


Fig. 1. Summary of the AERO-PJS project