

## Research Institute for Applied Mechanics

## Leading Edge of Advanced Mechanical Studies and its Applications for Earth's Environmental and Energy Problems

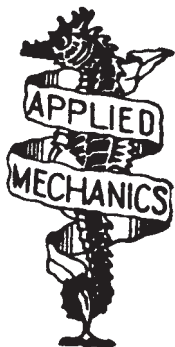
<http://www.riam.kyushu-u.ac.jp/english/index-e.html>



Main buildings of RIAM under autumn sky

### Research on

- Renewable Energy and its Peripheral Technologies
- Nuclear Fusion Science
- Structure and Dynamics of Plasma
- Earth Environment Dynamics
- Ocean and Atmosphere in East Asia

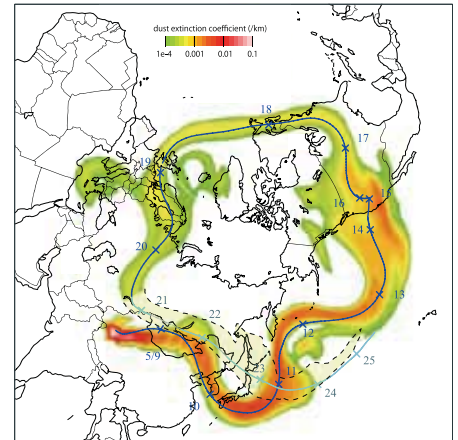


The Research Institute for Applied Mechanics (RIAM) was established in 1951, with two research divisions to pursue research in fluid mechanics and solid mechanics. Through various reorganizations, RIAM was recognized as an interuniversity collaboration research institute and became a Center of Excellence (COE), nationally promoted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in 1997.

RIAM was reorganized again and was recognized as the based research group of "Applied Mechanics" by MEXT in 2010.

At present, RIAM consists of three research divisions and three research centers: the Division of Renewable Energy Dynamics, the Division of Earth Environment Dynamics, the Division of Nuclear Fusion Dynamics, the Center of East Asian Ocean-Atmosphere Research (COAR), the Advanced Fusion Research Center (AFRC), and the Renewable Energy Center (REC). The research areas of RIAM encompass a wide range of experimental and theoretical fields from micro mechanical phenomena on an atomic scale to macro mechanical phenomena on a global scale. In addition to individual research at the divisions and centers of RIAM, three large research projects have been organized in interdisciplinary research areas; the ocean atmosphere science and engineering research project, the fundamental fusion research project utilizing a spherical tokamak "QUEST", and the project regarding efficient and integrated utilization of natural energies.

The RIAM academic faculty plays an important role in education by participating in the departments of the Interdisciplinary Graduate School of Engineering Sciences and the Graduate School of Engineering at Kyushu University.



Asian dust transported one full circuit around the globe



Kyushu(Q-shu) university experiment with steady state spherical tokamak (QUEST) to research fundamentals for a steady state operation of future fusion power plants



100kW Wind-lens turbine

## II. Recent achievement of research and the significance for disaster mitigation

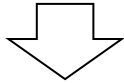
Daily forecast of air pollutant PM 2.5 is uploaded on RIAM websites, and has been utilized to mitigate health damage.

Research Institute for Applied Mechanics, Kyushu University



- Application system utilizing software **SPRINTARS** which is developed to study of atmospheric environment modeling and climate changes with Asian and global scales, was developed for daily forecast of PM 2.5 and yellow sand.
- On a web page (<http://sprintars.net/forecastj.html>), a prediction based on the simulated result of transport processes and climate impact of Asian dust and air pollutants is published as a **daily and weekly forecasts of air pollutions**.
- The information on the website is reprinted on newspapers and is aired as TVs news for citizens.

- A system for daily forecasts of PM 2.5 and yellow sand is developed utilizing SPRINTARS.

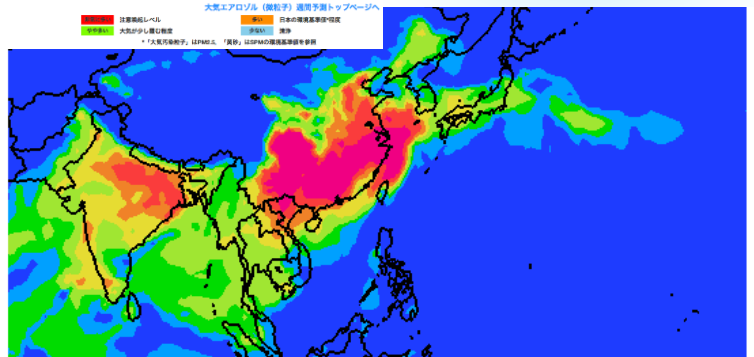


1. Everyday, concentration predictions of PM 2.5 and yellow sand on the website are updated based on SPRINTARS.
2. The information is delivered to citizens through multi-media.
3. Citizens can utilize this information easily in order to **protect themselves from air pollutions**, because the information is on many media.
4. Many findings by SPRINTARS about climate change were referred in the IPCC reports.
5. A professor of RIAM is a lead author of the 5th assessment report of IPCC.

<http://sprintars.net/>



Webpage of the left side has a few thousands or more visitors every day. Air pollutants of PM 2.5 and yellow sand are classed in 4 level in every Japanese areas. This information is used as a part of weather report on many media, everyday. Especially, citizens who are sensitive to the air pollutions utilize as one of criterion about use of mask and works on outdoors.



SPRINTARS

IPCC: Intergovernmental Panel on Climate Change

[Wikipedia] The Intergovernmental Panel on Climate Change (IPCC) is a scientific intergovernmental body under the auspices of the United Nations, set up at the request of member governments. It was first established in 1988 by two United Nations organizations, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), and later endorsed by the United Nations General Assembly through Resolution 43/53. Membership of the IPCC is open to all members of the WMO and UNEP. The IPCC's Fifth Assessment Report (AR5) was completed in 2014. AR5 followed the same general format as of AR4, with three Working Group reports and a Synthesis report. The Working Group I report (WG1) was published in September 2013.

②近年の重要な研究成果とその災害軽減への意義

PM2.5濃度予測を毎日公表し

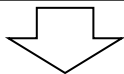
被害軽減に役立てていただいております

機関名：九州大学応用力学研究所



- 大気中の浮遊粒子状物質(エアロゾル)の気候に対する影響を解明することを主目的として開発しているソフトウェアSPRINTARSを応用して、日々のPM2.5や黄砂の濃度を予測するシステムを開発しました。
- ホームページ(<http://sprintars.net/forecastj.html>)にて、研究成果として得られた、当日・翌日並びに週間の、**大気汚染粒子の拡散予測結果を公開**しております。
- さらに、この公開情報を、多くの報道機関が毎日転載することにより、非常に多くの人々が情報を活用しています。

- SPRINTARSを応用して、日々のPM2.5や黄砂の濃度を予測するシステムを開発しました。

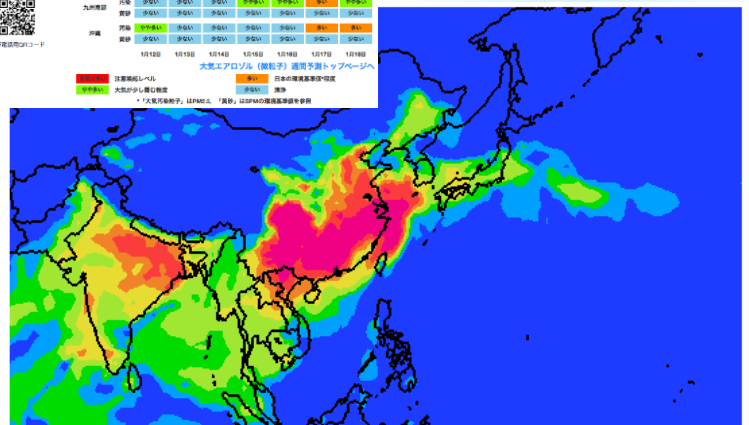


1. SPRINTARSを用いたPM2.5や黄砂の濃度予測を毎日運用しております。
2. 予測結果はホームページで公開され、多くの報道機関を通して、広く市民に情報提供されております。
3. 様々な形で公開されている情報は、多くの人々が手軽に入手できるため、**日常生活における大気汚染物質被害の軽減**に活用されております。
4. SPRINTARSを利用した研究成果は、気候変動に関する政府間パネル(IPCC)評価報告書に多数引用されました。
5. 当研究所教員がIPCC第5次評価報告書にて代表執筆者(Lead Author)に選出されました。

<http://sprintars.net/>



SPRINTARSホームページには1日あたり数千~数万アクセスあるほか、PM2.5濃度予測の結果はテレビやラジオでの天気予報・地方紙・放送局ホームページなどに毎日転載されています。特にPM2.5に敏感に影響を受ける人々の日常生活に活用されています。



SPRINTARS  
少ない やや多い 多い 非常に多い

用語説明: 気候変動に関する政府間パネル(IPCC)

世界気象機関(WMO)および国連環境計画(UNEP)により1988年に設立され、気候変動に関する科学的・技術的・社会経済的な評価を行い、得られた知見を政策決定者を始め広く一般に周知する役割を担っている専門家集団です。3つの作業部会により構成されており、当研究所は第1作業部会に貢献しています。最新の第5次評価報告書は、2013~2014年に公表されました。