



International Hydrological Programme

## Precipitation Measurement from Space and its Applications

The Twenty-second IHP Training Course

18 November - 1 December, 2012

Nagoya, Japan

Hydrospheric Atmospheric Research Center, Nagoya University

Supported by

Water Resources Research Center, Disaster Prevention Research Institute, Kyoto University

National Institute of Information and Communications Technology

Atmospheric Research Promotion Team, Hydrospheric Atmospheric Research Center, Nagoya University

Japan Aerospace Exploration Agency



## **Outline**

A short training course on precipitation measurement from space and its applications will be programmed for participants from Asia-Pacific regions as a part of Japanese contribution to the International Hydrological Program (IHP). The course is composed of a series of lectures and practice sessions.

## **Objectives**

Precipitation is one of the major components of the Earth climate system. Precipitation has also a big impact as a major fresh water resource to the ecosystem and human activity. Thus, observation of precipitation distribution is crucial not only for understanding and predicting changes of precipitation under the current global climate change but also for human activities. Global or even locally, precipitation observation is, however, difficult, because it has large spatiotemporal variations.

Progress of Earth observation technology from space is remarkable. The observation targets are land/ocean surface conditions, air quality, cloud distribution, etc. Precipitation is one of the major targets of Earth observation from space. However, the spatial and temporal resolutions and accuracy of the rain retrieval from space are far from sufficient. To meet the requirements, along with the sensor and rain retrieval algorithm developments, other ideas to construct global precipitation maps have emerged. One is the so-called "constellation" satellites in which multiple satellites data are utilized to construct global precipitation maps. The other is data merging in which the satellite precipitation data and ground-based rain gauge data are combined. Nowadays, several satellite-satellite based precipitation maps have already been available, and tests on utilization of the maps to short-term weather forecast, river runoff prediction and flood warning have already started.

In this training course, the basics of precipitation retrieval from space and current global precipitation maps will be introduced. The accuracy will also be included. Examples of global precipitation maps from space will be demonstrated. Practices are for learning skills to utilize the precipitation maps.

## **Conveners**

Convener: Prof. NAKAMURA, Kenji

Chief assistant: Prof. KUMAGAI, Tomoomi

Assistant: Dr. TOMITA, Hiroyuki

Secretary: Ms. HAGA, Saori

Hydrospheric Atmospheric Research Center, Nagoya University

## **Lecturers**

NAKAMURA, Kenji

MASUNAGA, Hirohiko

TOMITA, Hiroyuki  
 UYEDA, Hiroshi  
     Hydrospheric Atmospheric Research Center, Nagoya University  
 KACHI, Misako  
 KUBOTA, Takuji  
     Japan Aerospace Exploration Agency  
 YAMAMOTO, Munehisa  
     Kyoto University  
 USHIO, Tomoo  
     Ohsaka University  
 FUKAMI, Kazuhiko  
     Public Works Research Institute  
 HIROSE, Masafumi  
     Meijo University  
 IGUCHI, Toshio  
     National Institute of Information and Communications Technology  
 AONASHI, Kazumasa  
     Meteorological Research Institute  
 K. Krishna Reddy  
     Yogi Vemana University, India

### **Lectures' contents at Nagoya University**

Basics of precipitation measurement from space	K. Nakamura
Radar measurement from space (1)	T. Iguchi
Radar measurement from space (2)	M. Hirose
Microwave radiometer measurements	K. Aonashi
Microwave radiometer/radar combined rain retrieval	H. Masunaga
Ground validation of rain data (1)	H. Uyeda
Ground validation of rain data (2)	M. Yamamoto
Global rain map (1)	T. Kubota
Global rain map (2)	T. Ushio
Rain maps in the Tropical Cyclones	K. Krishna Reddy
River runoff and flood warning	K. Fukami

### **Practices**

Exercise on satellite data	H. Tomita
Exercises on global rain map	T. Kubota, M. Kachi

### **Technical visits**

Research and Survey Division, Nakanihon Air Service, Co., Ltd.

## Schedule (18 November to 1 December, 2011)

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18 (Sunday)	Arrival at Central Japan International Airport and movement to Nagoya University
19 (Monday)	Registration & Guidance (morning), Lectures 1 and 2 (afternoon) Welcome party (evening)
20 (Tuesday)	Lecture 3 (morning) Lecture 4 (afternoon)
21 (Wednesday)	Exercise 1 (morning and afternoon)
22 (Thursday)	Lecture 5 (morning) Lecture 6 (afternoon)
23 (Friday)	Lecture 7 (morning) Lecture 8 (afternoon)
24 (Saturday)	Tour for Japanese culture
25 (Sunday)	Tour for Japanese culture
26 (Monday)	Lecture 9 (morning) Lecture 10 (morning)
27 (Tuesday)	Exercise 2 (morning & afternoon)
28 (Wednesday)	Technical visit to Nakanihon Air Service Co., Ltd.
29 (Thursday)	Lecture 11 (morning), Making reports and discussions (afternoon)
30 (Friday)	Report presentations and discussions (morning) Completion ceremony of this course Farewell party (afternoon)
1 (Saturday)	Departure from Central Japan International Airport

### Downloading the Textbook for Participants from the Net

The textbook of “the 22nd IHP Training Course”, which is converted in PDF style, will be prepared and will be put on the IHP Nagoya forum website of “[www.ihpnagoyaforum.org](http://www.ihpnagoyaforum.org)”. The participants are requested to download such a PDF file from the website in advance as a preparation to the several lectures of the training course. The textbook should be constituted of contents (referred sentence bodies, figures, tables, pictures, equations and observed/calculated results) with authorized copyrights.

### Web broadcasting the Lectures

The lectures except with the exception of field trips will be webcasted to some universities in Asia via the UNESCO Office Jakarta and with other technology facilities. The slide materials will be distributed to the participants from the Net in advance. The materials are requested to be filtered out whenever copyrights apply in case of web broadcasting; part or its whole slides will be masked out with digital treatments such as overlaying mosaic images or with black-out screening during web broadcasting.