



United Nations  
Educational, Scientific and  
Cultural Organization



Japanese National Committee  
for the International  
Hydrological Programme



RSDC  
International Program on Resilient Society  
Development under Changing Climate

## International Hydrological Programme

# Integrated Basin Management under Changing Climate

## The 31<sup>st</sup> IHP Training Course

13<sup>th</sup> – 23<sup>rd</sup> December, 2021

Kyoto, Japan

Water Resources Research Center, Disaster Prevention Research Institute,

**Kyoto University**

Institute for Space-Earth Environmental Research, **Nagoya University**



Institute for  
Space-Earth  
Environmental  
Research

## **Outline**

The Online Training Course (OTC) on integrated basin management strategies, which aims to present, via the internet, aspects of water resources and water-related disasters under climate change for participants from Asia-Pacific regions as a part of Japanese contribution to the UNESCO International Hydrological Programme (IHP). The OTC consists of a series of lectures, exercises including self-paced practicing of various software and virtual field visit for the target river basin. The OTC is organized by the Water Resources Research Center (WRRC) of Disaster Prevention Research Institute (DPRI), Kyoto University from 13<sup>th</sup> to 23<sup>rd</sup> December 2021.

## **Objectives**

The online training course is oriented to the study of integrated basin management: hydrological extreme analysis, hydrological measurements, assessing the impacts of climate change, rainfall-runoff-inundation modelling, reservoir sustainability, optimum operation and management, as well as knowledge of the interrelationship with river ecosystem and environment. Development of resilient society has become an inevitable issue under the recent climate change that is increasing the frequency of extreme phenomena such as unprecedented floods and severe droughts. In order to make our society more resilient for such unprecedented extremes, social adaptation and countermeasure are required based on technologies for prediction and vulnerability assessments to meet the requirements of future water availability under changing climate.

In light of the Focal Area 1.1 “Risk management as adaptation to global change” and 1.2 “Understanding coupled human and natural processes” under the Theme 1 “Water-related disasters under hydrological change” of the IHP-VIII, the 31<sup>st</sup> IHP OTC - Kyoto will give an opportunity for participants: 1) to acquire the latest knowledge on climate change impacts on water resources, water and weather-related disasters, hydrological measurements of large river basins and ecosystem services, 2) to make a practice on rainfall-runoff-inundation analysis at river basin scale, and 3) to discuss effective strategies of integrated basin management based on scientific knowledge to realize a resilient society under climate change.

## **Outcomes**

It is expected that participants will comprehend the following:

- The basics of hydrology, climatology and water management.
- The challenges of water resources under the impact of climate change as well as river ecosystem and environment.
- The fundamental of rainfall runoff modeling, statistical and numerical approaches.
- The application of the advanced models and approaches on land surface process, rainfall runoff modeling, extreme analysis, downscaling and reservoir management.
- Fostering of the collaborative networking between the participants and Kyoto University’s Professors.

**Dates:** 13<sup>th</sup> – 23<sup>rd</sup> December, 2021

## Conveners

Convener: Tomoharu HORI (DPRI, Kyoto University)

Coordinator: Mohamed SABER (DPRI, Kyoto University)

Secretary: OBARA, Hisae (DPRI, Kyoto University), IBARAKI, Junko (DPRI, Kyoto University)

## Lecturers

HORI, Tomoharu	(DPRI, Kyoto University)
ICHIKAWA, Yutaka	(Graduate School of Engineering, Kyoto University)
KANTOUSH, Sameh A.	(DPRI, Kyoto University)
KIM, Sunmin	(Graduate School of Engineering, Kyoto University)
NAKAKITA, Eiichi	(DPRI, Kyoto University)
SAYAMA, Takahiro	(DPRI, Kyoto University)
SUMI, Tetsuya	(DPRI, Kyoto University)
TACHIKAWA, Yasuto	(Graduate School of Engineering, Kyoto University)
TAKARA, Kaoru	(Graduate School of Advanced Integrated Studies in Human Survivability, Kyoto University)
TAKEMON, Yasuhiro	(DPRI, Kyoto University)
TANAKA, Kenji	(DPRI, Kyoto University)
TANAKA, Shigenobu	(DPRI, Kyoto University)
YOROZU, Kazuaki	(Graduate School of Engineering, Kyoto University)

## Online Lectures

Lecture 1 Resilient society development under changing climate	K. Takara
Lecture 2 UNESCO-IHP and climate change adaptation strategy in Asia	Y. Tachikawa
Lecture 3 Fundamentals of basin-scale hydrological analysis	Y. Ichikawa
Lecture 4 Fundamentals of land-surface processes	K. Tanaka
Lecture 5 Fundamentals of rainfall-runoff-inundation modelling	T. Sayama
Lecture 6 Fundamentals of optimum operation of reservoir systems	T. Hori
Lecture 7 Climate change impact assessment on disaster environments	E. Nakakita
Lecture 8 Fundamentals of hydrological extreme analysis	S. Tanaka
Lecture 9 Hydrological measurements of large river basins	S. A. Kantoush
Lecture 10 Integrated sediment management for reservoir sustainability	T. Sumi
Lecture 11 Management of river ecosystem under changing climate	Y. Takemon

## Online Exercises

Exercise 1 & 2 Processing method of meteorological and geographical data	K. Tanaka & K. Yorozu
Exercise 3 Rainfall-runoff-inundation modelling	T. Sayama
Exercise 4 Optimum operation of reservoir systems	T. Hori
Exercise 5 Statistical downscaling of GCM data	S. Kim
Exercise 6 Self-paced practicing of RRI and modelling the target river basin	Trainees
Exercise 7 Hydrological extreme analysis	S. Tanaka
Exercise 8 Follow-up of Exercises with Q & A session	T. Hori, K. Tanaka, S. Kim & T. Sayama
Exercise 9 Follow-up of Exercises with Q & A session	T. Hori, K. Tanaka, S. Kim & T. Sayama

## Virtual/Self-Guided Field Visits

Due to current pandemic situation worldwide, the virtual or self-guided field visits are applied. Please select the target river basin for your case study and required presentations.

Examples:

- 1- River Basin nearby your **current residential area**;
- 2- River Basin within your **home country**;
- 3- River Basin **worldwide** based on your interest.

## **Requirements**

IHP-Training course participants should be graduate students or Engineers with reasonably proficient in English to understand lectures. Several software's such as MobaXterm, Image Magick, Fortran compiler or gfortran, OpenGrADS, R should be setup in your laptop/PC before the training. Moreover, trainees should be familiar with the selected target river basin in their region.

**Please complete the attached qualification sheet by Oct. 15<sup>th</sup>**

## **Oral presentations and talks by trainees**

As described in the program all trainees will be asked to provide various oral presentations and talks:

- 1- Self-introduction and country report (13<sup>th</sup> December 2021)
- 2- Report presentation related to your selected case study of target river basin (23<sup>rd</sup> December 2021)
- 3- Talks during the closing ceremony and awarding of IHP-TC certificate of completion

## **Training course materials**

The training course materials will be available on our website (<http://wrrc.dpri.kyoto-u.ac.jp/IHPkyototraining.html>) in due course. The trainees are requested to download them in advance for preparation for the training course.

## **Instructions**

After receiving your registration form, we will announce Zoom ID to access the online IHP-TC lectures and exercises. We will have a trial online session one day before the official start. If you have any questions and concerns, please feel free to contact us. We are looking forward to seeing you soon.

(Last updated on 2<sup>nd</sup> April, 2021)