



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 33rd IHP Training Course

20th November – 30th November 2023

Kyoto, Japan (Online)

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 20th November – 30th November, 2023.

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, and also to put forward the IHP-IX’s mission related to capacity building, the 33rd 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: 20th November – 30th November 2023

Conveners

Convener: Kenji TANAKA (DPRI, Kyoto University)

Coordinator: Masafumi YAMADA (DPRI, Kyoto University)

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

Lecturers (Alphabetical order)

AMANO, Kunihiko	(DPRI, Kyoto University)
HORI, Tomoharu	(DPRI, Kyoto University)
ICHIKAWA, Yutaka	(Graduate School of Management, Kyoto University)
KANTOUSH, Sameh A.	(DPRI, Kyoto University)
KOBAYASHI, Sohei	(DPRI, Kyoto University)
KIM, Sunmin	(Graduate School of Engineering, Kyoto University)
NAKAKITA, Eiichi	(DPRI, Kyoto University)
SABER, Mohamed	(DPRI, Kyoto University)
SAYAMA, Takahiro	(DPRI, Kyoto University)
SUMI, Tetsuya	(DPRI, Kyoto University)
TANAKA, Kenji	(DPRI, Kyoto University)
TOUGE, Yoshiya	(DPRI, Kyoto University)
YAMADA, Masafumi	(DPRI, Kyoto University)
YOROZU, Kazuaki	(DPRI, Kyoto University)

Online Lectures

Lecture 1: Fundamentals of basin-scale hydrological analysis	Y. Ichikawa
Lecture 2: Hydrological measurements of large river basins	S. A. Kantoush
Lecture 3: Fundamentals of land surface processes	K. Tanaka
Lecture 4: Fundamentals of rainfall-runoff-inundation modelling	T. Sayama
Lecture 5: Integrated sediment management for reservoir sustainability	T. Sumi
Lecture 6: River habitat responses to flow and sediment changes in the basin	S. Kobayashi
Lecture 7: Fundamentals of optimum reservoir operation	T. Hori
Lecture 8: River ecosystem featured by abiotic and biotic interaction	K. Amano
Lecture 9: Bias correction of GCM output	K. Yorozu
Lecture 10: Climate changes impact prediction on disaster environments	E. Nakakita
Lecture 11: Machine Learning Approaches and Hydrological Modeling for Flood Risk Assessment	M. Saber

Online Exercises

Exercise 1: Processing method of meteorological and geographical data	K. Yorozu & Y. Touge
Exercise 2: Rainfall-Runoff-Inundation modelling	T. Sayama
Exercise 3: Self-paced practicing and modelling the target river basin (1)	Trainees
Exercise 4: Statistical downscaling of GCM output	S. Kim
Exercise 5: Self-paced practicing and modelling the target river basin (2)	Trainees
Exercise 6: Field visit (description on next page)	Trainees
Exercise 7: Optimum operation of reservoir systems	T. Hori
Exercise 8: Follow-up of exercises with Q & A session	Lecturers
Exercise 9: Self-paced practicing and modelling the target river basin (3)	Trainees
Exercise 10: Follow-up of exercises with Q & A session (2)	Lecturers

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: River Basin nearby your **current residential area**; River Basin within your **home country**; 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, and python or other programming languages for data visualization should be setup in your laptop/PC **BEFORE** the training by trainees themselves. Moreover, trainees should be familiar with the selected target river basin in their region.

Registration

You are kindly requested to submit the registration form **not later than 25 Oct.** at:
<https://forms.gle/vsQSVzfsCDVt7TrX9>

If you have any question about registration, please contact Dr. Masafumi YAMADA, chief coordinator of this course by e-mail (masafumi.yamada.7n+ihptc [replace with at-sign] kyoto-u.ac.jp) with the subject “[IHP-TC2023] Integrated Basin Management under Changing Climate : Enquiry”. We are looking forward to seeing you in the course.

Notice: IF the registrants are more than the expected number, some screening selection will be conducted.

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 (20th November 2023)
- 2- Report presentation related to your selected case study of target river basin (30th November 2023)
- 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 5th October 2023)