Intergovernmental Hydrological Programme

Integrated Basin Management under Changing Climate

The 34th IHP Training Course

18th November – 28th November 2024

Online

Water Resources Research Center, Disaster Prevention Research Institute,

Kyoto University

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

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 Intergovernmental 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 18th November – 28th November, 2024.

Objectives

The online training course is oriented to the study of integrated basin management: 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 34th 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 modelling, statistical and numerical approaches.
- The application of the advanced models and approaches on land surface process, rainfall runoff modelling, downscaling, bias correction and reservoir management.
- Fostering of the collaborative networking between the participants and Kyoto University's Professors.

Dates: 18th November – 28th November 2024

Conveners

Convener: Kenji TANAKA (DPRI, Kyoto University)
Coordinator: Kazuaki YOROZU (DPRI, Kyoto University)
Secretary: OBARA, Hisae (DPRI, Kyoto University)

Lecturers (Alphabetical order)

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)
KHUJANAZAROV, Temur	(DPRI, 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: Climate changes impact prediction on disaster environments	E. Nakakita
Lecture 5: Bias correction of GCM output	K. Yorozu
Lecture 6: Machine learning approaches and hydrological modeling for flood risk assessment	M. Saber
Lecture 7: Fundamentals of rainfall-runoff-inundation modelling	T. Sayama
Lecture 8: Fundamentals of optimum reservoir operation	T. Hori
Lecture 9: Integrated sediment management for reservoir sustainability	T. Sumi
Lecture 10: River habitat responses to flow and sediment changes in the basin	S. Kobayashi

Online Exercises

Exercise 1: Processing method of meteorological and geographical data	K. Yorozu, Y. Touge & K. Temur
Exercise 2: Statistical downscaling of GCM output	S. Kim
Exercise 3: Machine learning approaches and hydrological modeling for flood risk assessment	M. Saber
Exercise 4: Self-paced practicing and modelling the target river basin (1)	Trainees
Exercise 5: Rainfall-Runoff-Inundation modelling	T. Sayama
Exercise 6: Self-paced practicing and modelling the target river basin (2)	Trainees
Exercise 7: Field visit (described below)	Trainees
Exercise 8: Optimum operation of reservoir systems	T. Hori
Exercise 9: Follow-up of exercises with Q & A session (1)	Lecturers
Exercise 10: Follow-up of exercises with Q & A session (2)	Lecturers
Exercise 11: Self-paced practicing and modelling the target river basin (3)	Trainees

Virtual/Self-Guided Field Visits

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

The IHP online 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 October 18th at:

https://forms.gle/ztyPGse4FhwDz7Uj7

If you have any question about registration, please contact Dr. Kazuaki YOROZU, chief coordinator of this course by e-mail (yorozu@rwes.dpri.kyoto-u.ac.jp) with the subject "[IHP-OTC2024 Inquiry]". 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.
2- Report presentation related to your selected case study of target river basin.
3- Talks during the closing ceremony and awarding of IHP-OTC certificate of completion.

Course materials

The 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 online training course.

Instructions

After receiving your registration form, we will announce Zoom ID to access the IHP-OTC 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 11th September 2024)