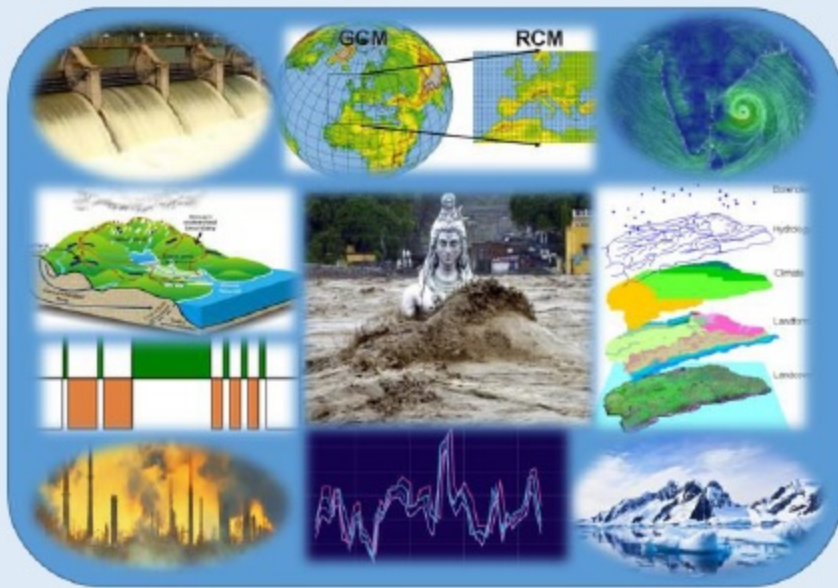


## One-Week Training Course

on

### HYDRO-METEOROLOGICAL DATA ANALYSIS FOR CLIMATE CHANGE STUDIES

(November 20 – 24, 2023)



Organised by



**NATIONAL INSTITUTE OF HYDROLOGY**  
**JAL VIGYAN BHAWAN**  
**ROORKEE – 247 667**  
**UTTARAKHAND, INDIA**

## INTRODUCTION:

Water is the most essential natural resource for life and is likely to become a critical scarce resource in the coming decades due to continuous increase in population and the impacts of anthropogenic and climatic changes. The changing climate is projected to impose significant changes on various components of the hydrological cycle, influencing the spatial distribution of water resources. From earlier studies, it is well understood that the hydrological phenomenon of Indian watersheds is highly complex and spatially variable, and so the changing climate could have a significant impact on the available water in the future. In this context, hydro-meteorological data plays a vital role in the assessment of the availability of water resource as well as investigation and design of various water resources infrastructure.

Meteorological observations are made especially for the analysis and interpretation of weather patterns, to make weather forecast, provide real-time disaster warning, etc. Whereas hydrological data is important to determine the extent and pattern of available water resources and hydrological extreme events. Observed streamflow in particular is vital in management of available water resources and in design & planning of various water resources infrastructure. However, changing climate, rainfall and temperature in particular since the beginning of the 20<sup>th</sup> century, is posing a substantial challenge to the management of existing water resources.

Several studies from the past few decades indicate a significant shift in the temporal and spatial patterns of monsoon rainfall with consequences on surface runoff, surface and groundwater storage, and water quality. In

particular, these studies indicate significant changes in the characteristics, i.e. magnitude, intensity, frequency, and spatial & temporal variability of hydrological extremes, floods and droughts in particular. The knowledge of the shifts in characteristics of extreme hydroclimate is vital for an effective planning, design, and operation of water resources infrastructure for efficient distribution and management of available water. Therefore, the engineers (decision makers) and policymakers should be well equipped with the knowledge of the hydrological impacts of climate change, which allows them to take preventive measures in order to reduce or mitigate the adverse impacts.

## COURSE CONTENTS:

The training course will consist of lectures by scientists and professors with wide range of expertise on the subject. Major emphasis through the duration of this training course will be laid on hands-on exercises. This training gives an overview of the techniques and methods of various hydro-meteorological data analysis for climate change studies. The training will include wide range of topics relevant to the subject, but in particular the following topics will be covered:

1. Long-term hydro-meteorological and climate data analysis techniques
2. The wet and dry spell analysis
3. Extreme Rain Event (ERE) analysis
4. Development of global climatic indices and teleconnections
5. Recent advances in weather, climate and hydrological modelling

6. Climate data downscaling, projections and scenarios for climate change studies
7. GCM data verification and uncertainty analysis
8. Climate data visualisation and analysis tools
9. Impact assessment of various components hydrological cycle
10. Climate change impact on monsoon and EREs

In particular, the participant will be directed to the sources of historical (observed) and future (projected) climate data. In addition, participants will be presented with various case studies, to get a better understanding on the impacts of climate change.

#### **DATES AND VENUE**

The training course will be held at **National Institute of Hydrology, Roorkee** during November 20 – 24, 2023.

#### **PARTICIPATION**

The training course is open to the residents of India only. It is intended for the professionals (engineers, scientists, policymakers, and academicians) of various government and private organizations actively working in water resources sector, and agencies concerned with the impacts of changing climate on water resources and their management. Post graduate students and research scholars are encouraged to attend this training course.

#### **REGISTRATION:**

The registration fee per participant including GST is as follows

Government / Private Organisations / PSUs / NGOs and Academicians	₹10,000/-
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Bonafide Student	₹7,000/-
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The fee includes the registration, course material, working lunch on all working days, and session tea. The stay arrangements in single or twin sharing basis will be made in NIH guest house on payment basis as per the institute rates. The participants will have to arrange for TA/DA from their own organization. A course completion certificate and course material will be given to all participants.

The seats are limited to 30 participants and the registration shall be done on the first come first served basis after the registration fees has been paid. To register, the intending participants are requested to fill in the registration form online ([Click Here](#)) **latest by 30<sup>th</sup> October 2023**. After acceptance of the application, a confirmation email will be sent to the participant with all the details required to pay the registration fee. It should be noted that the participation in the course will only be confirmed after the receipt of registration fee.

#### **VENUE:**

The training course is proposed to be held at the National Institute of Hydrology (NIH), Roorkee. NIH, an autonomous society under the Ministry of Jal Shakti, Govt. of India, is the country's premier research institute in the field of hydrology. It was established in 1978 with an objective to undertake, aid, promote and coordinate systematic and scientific work in all aspects of hydrology and water resources management. The institute was declared a Science and Technology (S&T) Organisation in 1987. NIH has organised a number of training courses on

various aspects of hydrology. For more details, please visit [nihroorkee.gov.in](http://nihroorkee.gov.in).

Roorkee is a medium-sized town situated in Haridwar District of Uttarakhand and is well connected by road and rail from Delhi, Dehradun and Haridwar. During the last week of November, the weather is pleasant during day and cold during night.

#### **PATRON**

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#### **CONVENOR:**

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#### **COURSE COORDINATOR(S):**

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All correspondences related to the training course should be made with the course coordinator(s)