

NWM Sponsored Field-Training Programme

2nd National HimSchool

on

**‘Cryosphere & Climate Change Studies’
(NHC3S-2: 2026)**

August 12-23, 2026

--- For Postgraduate & PhD Students and Young Professionals ---



Organized by

Centre for Cryosphere & Climate Change Studies

National Institute of Hydrology (NIH)

(A society under Department of Water Resources, River Development and Ganga Rejuvenation,
Ministry of Jal Shakti, Govt. of India)
Roorkee – 247 667, Uttarakhand, India
www.nihroorkee.gov.in

Technical Partner

Himalayan Cryosphere Studies

National Centre for Polar and Ocean Research (NCPOR)

(Ministry of Earth Sciences, Govt. of India)
Headland Sada, Vasco-da-Gama, Goa - 403 804, India

Sponsored by

National Water Mission (NWM)

(Department of Water Resources, River Development and Ganga Rejuvenation
Ministry of Jal Shakti, Govt. of India)
New Delhi, Delhi -110003

Motivation

The cryosphere constitutes one of the most sensitive components of the Earth system and plays a crucial role in regulating regional hydrology, climate processes, and freshwater availability. The Hindu-Kush-Himalaya (HKH) region, often referred to as the “Third Pole,” contains nearly 54,000 glaciers covering an area of approximately 60,000 km² and serves as the headwater source for several major Asian river systems. These glaciers form the backbone of water security for nearly 1.8 billion people across South Asia.

Despite their immense hydrological and environmental significance, only a limited number of Himalayan glaciers have been systematically investigated for glacio-hydro-meteorological processes, energy and mass balance, glacier dynamics, snow-cover variability, debris-cover evolution, glacial lake development, paleo-glacial records, and meltwater hydrochemistry. Such glaciers are generally recognized as benchmark glaciers and provide critical insights into glacier-climate interactions and long-term cryospheric change. However, the Himalayan cryosphere is currently undergoing rapid transformation under the influence of climate change, including accelerated glacier retreat, mass loss, expansion of glacial lakes, altered hydrological regimes, and increasing occurrence of cryosphere-related hazards such as Glacial Lake Outburst Floods (GLOFs).

These emerging challenges have highlighted the urgent need for strengthening scientific understanding, technical expertise, and institutional capacity in the field of Cryosphere and Climate Change studies. The complexity of glacier-climate interactions, coupled with the growing risks associated with high-mountain hazards and downstream hydrological sustainability, necessitates interdisciplinary research and advanced observational capabilities. Furthermore, the application of modern monitoring approaches has become increasingly important for generating high-quality scientific datasets and improving predictive capabilities.

In this context, the proposed training programme under the NHC3S-2: 2026 Initiative is envisaged as a capacity-building platform to strengthen scientific and technical competencies in Cryosphere, Climate Change, and Water Resources Management, with special emphasis on glacial lake processes, GLOF risks, and downstream hydrological sustainability. The programme aims to provide participants with both theoretical understanding and practical exposure to glacier systems, glacio-hydro-meteorological processes, glacier mass balance fluctuations, glacier dynamics, and climate-induced cryospheric hazards. In addition, the programme will promote hands-on training in advanced field and geospatial techniques, thereby enhancing the technical and operational capabilities of researchers and professionals engaged in cryosphere and mountain hydrology studies. The primary objectives of the program are to:

- To provide comprehensive knowledge on cryosphere and climate change research through theoretical and practical exposure to glacio-hydro-meteorology, glacier systems, mass balance fluctuations, glacier dynamics, glacial lake processes, and risks associated with Glacial Lake Outburst Floods (GLOFs).
- To enhance the technical expertise and operational capabilities of researchers and professionals in the use of advanced monitoring tools and techniques, including Automatic Weather Stations (AWS), steam-driven ice drill, remote sensing platforms, Unmanned Aerial Vehicles (UAVs), and real-time hydro-meteorological monitoring systems.
- To develop a skilled next-generation workforce in cryosphere and water resources research by promoting emerging research frontiers and interdisciplinary approaches in cryosphere science, climate adaptation, hydrological modelling, and mountain hazard assessment at both national and international levels.

Course Contents

Theory Module: Himalayan Glacier and Snow Cover, Glacio-hydro-meteorology, Glacier energy-mass balance measurements, Cryo-hazards, Stable Water Isotopes, Weather and Climate Modelling, Impact of Aerosols over Cryosphere, Himalayan Springshed Management, Himalayan Case Studies, Challenges identified for Himalayan Communities due to melting glaciers and adaptation Plan/Practices.

Training Module: Glacio-hydrological modelling, Application of Remote Sensing & GIS, Glacier Lake outburst Floods (GLOFs), Cryo-climate data Mining, Role of Google Earth Engine in Cryo-climate studies, Instrumentation.

Glacier Field Visit: A one-week field training expedition will be organized at Batal Glacier, Lahaul and Spiti, Himachal Pradesh, where participants will receive practical training in the use of field instruments (AWS, AWLVR, Ice Drill, DGPS, UAV, Smart Sonar, etc.)

Who should Attend?

Enthusiastic Postgraduate/early-stage PhD students and Research Fellows (<35 years) from R&D Institutes/Recognized Universities and Young Professionals (<40 years) from Central/State Government/PSU Private Companies/Organizations/Individuals having keen interest and working in the area of Cryosphere and Climate Change studies are eligible to apply. The school can accommodate 25 participants.

Eligible female candidates are strongly encouraged to apply for the school as per the promotion policies of the Institute & Govt. of India'

Important Dates

School Dates	: August 12-23, 2026 (12 days)
Last Day for Registration	: August 02, 2026
Confirmation to Selected Participants	: August 03, 2026

Registration Fee & Process (Online)

Central / State Govt. Departments/PSUs	: NIL	A/c Name : NIH Project
Recognized Academic Institutions	: NIL	Bank: Punjab National Bank
MSc/PhD Students/ Researchers	: NIL	Branch: IIT Roorkee
Private Companies/ Individuals	: Rs. 15,000	A/c No.: 4044000100174852
		IFSC: PUNB0404400

Applicants are advised to fill the application form online using following link –

<https://forms.gle/aTkPVwFE9PfZRS57>

Field Visit – Batal Glacier, Lahaul and Spiti, Himachal Pradesh

As part of the programme, a one-week field training expedition will be organized at Batal Glacier, Lahaul and Spiti, Himachal Pradesh (32°22'00.5"N; 77°36'56.5"E, average temperature: 10°C, with mild showers of rain, elevation: 4290 m a.s.l.; approximately 560 km from Roorkee), where participants will receive hands-on training in the use of field instruments for monitoring hydro-meteorological parameters, glacier surface accumulation and ablation processes, glacier geomorphology, and related cryospheric observations. Travel, boarding, and lodging facilities during the field programme will be arranged by the organizers on a sharing basis.

For Outstation Applicants

Institute's Sindhu Guest House has limited number of accommodation facilities, which can be arranged on a sharing and payment basis for the applicants. Allocations will be made on a first-come, first-served basis.

Patron

Dr. Y.R.S. Rao
Director, NIHR

Convenor

Dr. Surjeet Singh
Scientist 'G' & Head: C4S, NIHR

Coordinator

Dr. Kapil Kesarwani
Scientist 'D', C4S, NIHR

Co-Coordinators

Dr. Lavkush Kumar Patel
Scientist 'D', C4S, NIHR

Dr. Akshaya Verma
Scientist 'C', C4S, NIHR

Venue

Centre for Cryosphere & Climate Change Studies (C4S)
National Institute of Hydrology
Roorkee – 247 667, Uttarakhand, India

<https://nihroorkee.gov.in/scientific-divisions/climatehydrologydivision/about-division>

Roorkee city (Uttarakhand) is around 187 km from Delhi and is well connected to the other cities of North India by Rail, Road, and Air (Dehradun Jolly Grant Airport). To reach the NIH Roorkee, public transports are available from Roorkee bus stand and Railway Station.

The average temperature in Roorkee in August for a typical day range from a high of 26°C to a low of 24°C. There is a high chance of rain during this month.

Location Coordinates : 29.8685° N, 77.8942° E
Google Map Link : <https://maps.app.goo.gl/b3g2j8VpnP445fbKA>

Standard Guidelines

- ✓ Due to the limited infrastructure facilities at the Institute, selected participants are strongly encouraged to bring their personal laptops to attend the Hands-on Training Modules.
- ✓ Participants are advised to carry essential field kit (rucksack, winter clothes, balaclava cap, heavy duty shoes, gloves, warmers, rain suit, sleeping bag, jackets, umbrella, etc.) to actively participate in the glacier field trip programme.
- ✓ To ensure a safe and conducive learning environment, all participants and staff involved in the program are required to adhere to the established Code of Conduct and Ethics.

We look forward to welcoming you at Roorkee in August 2026...!!

Faculty Members

NIH, Roorkee

Surjeet Singh (Sc. 'G' & Head)	- Ground Water Modelling, River Hydrology, Hydrochemistry
Soban S. Rawat (Sc. 'F')	- Mountainous Hydrology, Spring shed Management
Vishal Singh (Sc. 'D')	- Snowmelt and Glacier melt Runoff Modelling, RS & GIS
Lavkush Kr. Patel (Sc. 'D')	- Glaciology, Glacio-Hydrological modelling, RS & GIS
Kapil Kesarwani (Sc. 'D')	- Cryospheric, Atmospheric and Environmental Sciences
Purushottam Kr. Garg (Sc. 'C')	- Glaciology; Remote sensing
Akshaya Verma (Sc. 'C')	- Glacier dynamics, Stable Water Isotopes, Glacier-hazards
Kuldeep Sharma (Sc. 'C')	- Weather and Climate Modelling, Ensemble Prediction
Riyaz Mir (Sc. 'C')	- Glaciology, Hydro-Geo-Chemistry, RS & GIS
Sachchidanand Singh (Sc. 'B')	- Water Quality, Flood Management, RS & GIS

NCPOR, Goa

Parmanand Sharma (Sc. 'F')	- Glaciology/ Environmental Science
Bhanu Pratap (Sc. 'D')	- Himalayan Cryosphere Studies



For queries

Dr. Kapil Kesarwani
Phone: +91-88813 77714

Dr. Lavkush Kumar Patel
Phone: +91- 77698 73182

E-mail: c4snih@gmail.com

National Institute of Hydrology, Roorkee

National Institute of Hydrology (NIH) is a premier Research and Development organization under the Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation, Government of India. It was established as an autonomous society in 1978 with its headquarters at Roorkee. The main objectives of NIH are to undertake, aid, promote and coordinate systematic and scientific work in all aspects of hydrology. The Institute was declared as a Science & Technology organization in 1987.



Centre for Cryosphere & Climate Change Studies (C4S)

To address the challenges posed by climate change to water resources requires multi-facet approaches. The vision behind the Centre for Cryosphere and Climate Change Studies (C4S) is to develop advance scientific knowledge and understanding of the complex interactions between climate and the hydrological cycle. The Centre aims to contribute to the development of sustainable water resource management practices, adaptation strategies, and policies in the face of climate change.

The Centre is carrying out climate change as well as experimental studies in the Himalayan region (Gangotri Glacier, Milam Glacier, and Triloki Glacier) involving establishment of state-of-art hydrological field observatories with advanced automated instrumentation such as Automatic Weather Station, Automatic Water Level Recorder, etc. Though the Centre is in nascent stage but is carrying out extensive works in the field of snow and glacier contribution and impact of climate change on snow and glacier, glacial lake outburst flood and mass balance, and spring shed management. Application of various models, viz. SNOWMOD, SPHY and VIC, is being done for various hydrologic analysis using remote sensing data and GIS tools. The Centre is also participating in the National Hydrology Project (NHP), DST, IIRS, National Mission for Sustaining the Himalayan Eco-system (NMSHE) and National Mission on Himalayan Studies (NMHS) projects. Furthermore, the centre is also extending the support as technical lead in first census of springs in India. The Centre is actively involved in developing web-based portals for water resource information.