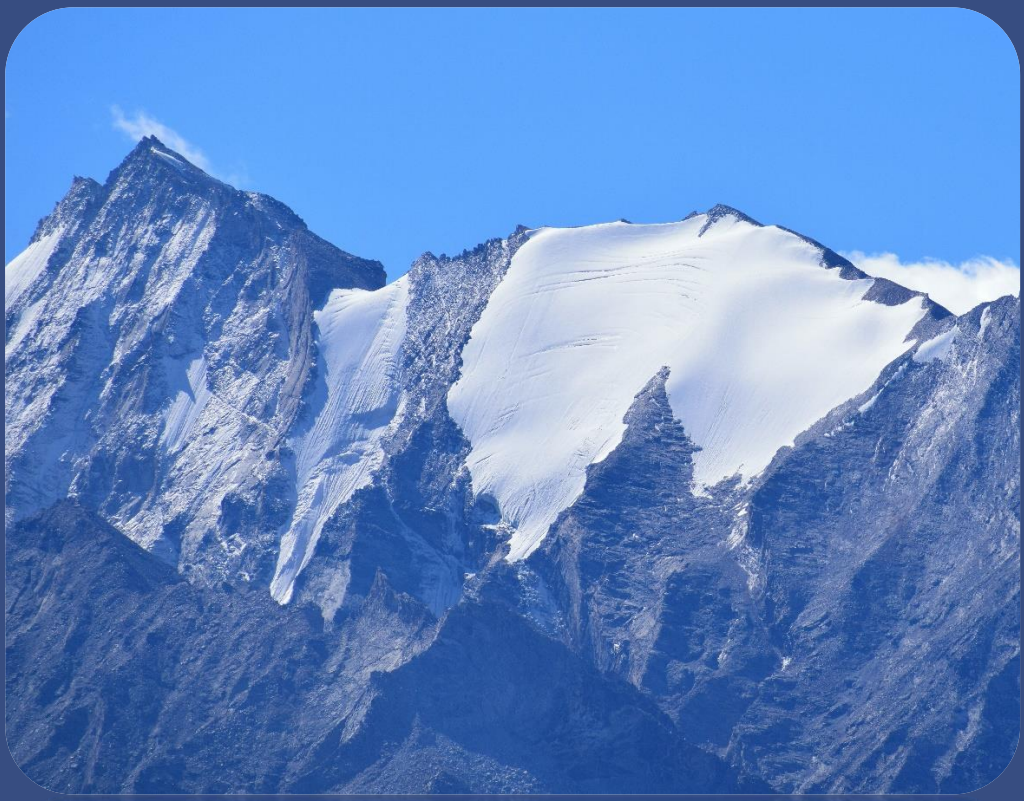
TRAINING ON GLACIER STUDIES AND REMOTE SENSING



Sponsored by

June 04 -14, 2018

Divecha Centre for Climate Change,
Indian Institute of Science,
Bengaluru – 560 012

Introduction

Glaciers, ice and seasonal snow at Himalaya are the major reservoir for North Indian rivers like Ganga and Indus. A large volume of glacier stored water makes those rivers perennial and has helped to sustain and flourish the Indian civilization along their banks. Since areal extent of glaciers are changing constantly under the influence of climate change, continuous monitoring of Himalayan glaciers is important to assess future changes in the water availability in those areas. However, Himalaya has very rugged terrain and conventional field-based methods been difficult to use. Therefore, remote sensing has emerged as an alternative method for collecting information on glaciers. However, due to limited number of well-trained manpower in India, reliable information is difficult to generate. Therefore, Divecha Centre for climate change organizes training for scientists working in the field of glaciology.

The training will be organized by faculty of Divecha Centre for Climate Change, Centre for Atmospheric and Oceanic Sciences at Indian Institute of Science. In addition, well known scientists working in the field of cryosphere and remote sensing will be invited as a guest faculty.

Training on
Glacier studies and Remote sensing
DCCC, IISc, Bengaluru – June 04-14, 2018

Syllabus

1. Distribution of Glaciers and snow cover

Importance of glaciers, general principle of the meteorology of precipitation, formation of snow, physical characteristics of snow crystals, areal distribution of glaciers/snow cover and factors controlling the distribution of snow cover.

2. Climate

General circulation of atmosphere and oceans, climate variability, spatial and time scales, errors and accuracy assessment, feedback mechanism and carbon cycle.

3. Morphology of glaciers

Classification of glaciers, Crevasses and icefall, moraines, dead ice, depositional and erosional landforms of glacier.

4. Transformation of snow to ice

Different types of metamorphism, transformation of snow into ice, Zones in a glacier, effect of metamorphism on albedo of snow and ice, grain growth.

5. Paleo glaciation

Milankovitch cycles and Greenhouse effect, Little ice age (LIA), Glacial and interglacial cycles.

Training on
Glacier studies and Remote sensing
DCCC, IISc, Bengaluru – June 04-14, 2018

6. Distribution of temperature in glaciers

Thermal parameters of snow/ice, types of glacier based on temperature distribution, temperature profiles, seasonal variation of temperature as function of depth.

7. Flow and sliding of glaciers

Driving and resisting stresses, Vertical profile of flow, simple models of glacier flow, deformation, steady and non-steady flow of glacier.

8. Glacier Mass Balance

Summer and winter mass balance, Stake method, Geodetic method, ELA, AAR methods, hydrological method.

9. Ice and Snow ablation

Physics of snow melt, heat budget and radiation. Snow melt runoff model.

10. **Fundamentals of remote sensing**
Interaction of electromagnetic radiation with common objects on the Earth. Laws governing this interaction. Spectral reflectance characteristics of the common objects as snow, ice and glaciers.

11. **Optical properties of snow and ice**
Reflectance characteristics of snow in optical regions, effect of mineral dust and black carbon on reflectance of snow and ice.

12. **Response of glaciers to climate change**
Reaction to change in mass balance and reaction to additional forcing.

PRACTICAL:

Runoff Estimates in Himalayan river, Depth estimate using different techniques, Climate Change and mass balance, Topographic corrections of reflectance, Simple estimates of glacier flow.

Faculty

- **Dr. Anil Kulkarni**

Distinguished Scientist, Divecha Centre for Climate Change, Indian Institute of Science, Bengaluru.

- **Dr. S. K. Satheesh**

Professor, Centre for Atmospheric and Oceanic Sciences, Indian Institute of Science, Bengaluru.

- **Dr. J. Srinivasan**

Distinguished Scientist, Divecha Centre for Climate Change, Indian Institute of Science, Bengaluru.

- **Dr. Bala Govindasamy**

Professor, Centre for Atmospheric and Oceanic Sciences, Indian Institute of Science, Bengaluru.

Guest Lectures

Guest Lectures by well-known Scientists.

Training on
Glacier studies and Remote sensing
DCCC, IISc, Bengaluru – June 04-14, 2018

Venue and Date

Divecha Centre for Climate Change, Indian Institute of Science, Bengaluru, India

June 04 - 14, 2018.

Eligibility

Post Graduate M.Sc., M.Tech., M.E. and Ph.D. students from recognized Institutes/Universities.

Registration

No registration fees for the trainees.

Deadline

Last date for submission of application form: May 04, 2018
Intimation to selected candidates: May 09, 2018

Accommodation

Accommodation will be provided to deserving candidates by Divecha Centre for Climate Change.

Training on
Glacier studies and Remote sensing
DCCC, IISc, Bengaluru – June 04-14, 2018

How to reach

The IISc campus is conveniently located for those arriving by air as well as those choosing to travel by train. The new Bengaluru International Airport is 35 km from the campus. The campus is equidistant from the City Railway Station (Majestic) and the Cantonment Railway Station which are both about 7 km away. The Yeshwanthpura Railway Station is no more than 2 km.

Course Director

Please send the application forms along with a recent passport size photograph to the following address:

Dr. Anil V. Kulkarni
Distinguished Scientist,
Divecha Centre for Climate Change,
Indian Institute of Science,
Bengaluru- 560 012, India
E-mail id: glacier.dccc@iisc.ac.in

Training on
Glacier studies and Remote sensing
DCCC, IISc, Bengaluru – June 04-14, 2018

Application Form

Passport size photograph

Name.....

Class:.....

University/Institute:.....

Telephone:.....

E-mail Id:.....

Academic: Give marks, year and Board/ University from Standard 12 on separate sheet

Area of Research/ Study: _____

_____

Relevance of training in future research. Give one page write up in separate sheet

Signature of Candidate

_____

If the above student is selected, he/she will be given leave to participate in the training program.

Name and Signature of P.I. / Guide / H.O.D

Seal of the organization

Training on
Glacier studies and Remote sensing
DCCC, IISc, Bengaluru – June 04-14, 2018