



4TH IGI-YGF INTENSIVE TRAINING PROGRAMME

REPORT ON THE 4TH INTENSIVE TRAINING PROGRAMME (ITP)

FOR

THE YOUNG GEOMORPHOLOGISTS OF INDIA

Organiser: IGI-Young Geomorphologists Forum

Event Dates: 28 Novemebr – 01 December 2023

Host Institute: CSRD, Jawaharlal Nehru University

Convener: Dr. Manasi Debnath (President, IGI-YGF)

Co-convener: Dr. Sumantra Sarathi Biswas (Vice-President, IGI-YGF)

Date: 15.12.2023

The Indian Institute of Geomorphologists Young Geomorphologists Forum (IGI-YGF) is an academic organized group for the early career reserchers under the umbrella of Indian Institute of Geomorphologists (IGI) constituted in 2019. The IGI-YGF is in the Young Geomorphologists network of the International Association of Geomorphologists (IAG) and one of the most active groups outside Europe. The IGI-YGF organizes Intensive training programme every years for engaging yound minds with advanced techniques in contemporary geomorphological research. With this trend, the IGI-YGF has successfully organized its Fourth Intensive Training Programme (ITP) for the Young Geomorphologists of India held in Centre for the Study of Regional Development of Jawaharlal Nehru University (JNU-lecture series) (*Plate 1*) and at Kalesar, Yamunanagar, Haryana (field study) (*Plate 2*), India from 28 Novemebr to 01 December 2023. The Fourth edition of the ITP has been commenced just after the 35th Indian Institute of Geomorphologists (IGI) Annual Conference at CSRD, JNU from 25 November to 27 November 2023, with an aim to train Early Career Researchers (ECR) in advanced geomorphological research. This fourth ITP has been organized under the aegis of the International Association of Geomorphologists (IAG) and the Indian Institute of Geomorphologists (IGI). Dr. Manasi Debnath (President, IGI-YGF and Assistant Professor, Department of Geography, Nagaland University, Nagaland, India) as the convener and Dr. Sumantra Sarathi Biswas (Vice-President, IGI-YGF; and Assistant Professor, Department of Geography, Sukumar Sengupta Mahavidyalaya, West Bengal, India) as the co-convener of the 4-days long ITP mostly emphasise bringing the paprticipants from different parts of the country, trained in the field with advanced techniques and briding the gap between conventional mapping technique and advanced ones.

With this aim, 4th IGI-YGF Intensive Training Programme entitled “**Methods of Geomorphological Mapping and Geochronology**” has the following focal theme:

Focal Theme:

Geomorphological Mapping & Geophysical Survey to Reconstruct the Landform Development Process with the dating techniques of Optically Stimulated Luminescence (OSL) Dating and Cosmogenic Radionuclide Dating (CRN).



Plate 1. Group photo at CSRD, JNU, New Delhi, India (Inauguration day, 28 Novemebr 2023)



Plate 2. Group photo on the Yamuna River terrace, Kalesar, Yamunanagar, Haryana, India



4TH IGI-YGF INTENSIVE TRAINING PROGRAMME

Programme at a Glance

The 4-days long ITP has 4 major entities, such as:

- Inaugural Session
- Lecture session, and Hands on training in the OSL and Geochemistry laboratory
- Intensive Field Exercises with the help of advanced Geophysical and Geomorphological mapping technique
- Session on the Post-Processing of collected data and Valedictory Session

Inaugural Session (28 November 2023):

The 4th Intensive Training Programme organised by the IGI-YGF started with the welcome address by Professor S. Sreekesh, Chairman of CSRD, JNU to the participants. Showcase of the newly published book on geography was captured at this platform (*Plate 3*).

Following this was an inaugural speech by Prof. A. R. Siddiqui, Secretary General of the IGI (*Plate 4*), and highlighted the importance of Geomorphology in academia. He added that such a programme to train young minds is necessary to carry forward the legacy of this field. He discussed new data sources such as satellite imagery, digital elevation models etc for geomorphological mapping.

The contemporary President of the IGI, Prof. Milap Chand Sharma (*Plate 5*), also graced the occasion with his encouraging words for the participants. He talked about the new emerging horizons such as the use of different geochronological techniques (OSL, CRN, Radiocarbon) in geomorphology. It is important to know the past to predict the future, he reiterated.

This was followed by an orientation speech by Dr. Manasi Debnath, President of IGI-YGF 2023-2024 and the convenor of the 4th ITP (*Plate 6*). She emphasized how hands-on training sessions for young students of Geomorphology is critical to prepare the next generation of researchers in this field. Following this speech, the participants introduced themselves and their research to the house (*Plate 7*).

Prof. Sunil Kumar De (*Plate 8*), President of the International Association of Geomorphologists (IAG) (2022-2026) shared the chronology of YGF India, from its inception in 2019 after tireless discussion and deliberation. The IGI started the ITP under the YGF programme in 2020. Prof. De's insightful presentation on mapping and its evolution since 1914 with the advent of advanced technologies was splendid. By emphasizing on the preparation of large-scale regional geomorphological maps in India, Prof. De urged the young geomorphologists to take the lead and take up study areas in different parts of this country. His most informative presentation was ended by sharing how young researchers can make use of different opportunities such as funding for research and attending conferences worldwide. He took pride in the fact that the YGF India is the most active group among the YGFs all across the globe.



4TH IGI-YGF INTENSIVE TRAINING PROGRAMME

Prof. De's address was followed by the Vote of Thanks by Vice-President of IGI-YGF, Dr. Sumantra Sarathi Biswas.

Plate 3. Showcase of the newly published book at the end of Inaugural session.

From left side: Prof. S. Pardeshi, Prof. A.R. Siddiqui, one of the members of the published book, Prof. Milap Chand Sharma, Prof. Sunil Kumar De, Prof. S. Sreekesh, one of the members of the published book.



Plate 4. Inaugural speech by Prof. A. R. Siddiqui (on the dias) and Prof. S. P. Pardeshi (on the right)



Plate 5. Lecture by Prof. Milap Chand Sharma (on the dias)





4TH IGI-YGF INTENSIVE TRAINING PROGRAMME

Plate 6. Orientation speech by Dr. Manasi Debnath (On the dias) and Dr. Sumantra Sarathi Biswas (left side)



Plate 7. Interactive session with the participants



Plate 8. Special lecture on geomorphological mapping and role of IAG given by Prof. Sunil Kumar De (On the dias)



Plate 9. Lecture by Prof. S. Pardeshi





4TH IGI-YGF INTENSIVE TRAINING PROGRAMME

Plate 10. Scientist Dr. Pankaj kumar was interacting with participants (From left: Dr. Pankaj Kumar, Dr. Ishita Manna)



Plate 11. Presentation on OSL dating techniques by Dr. Atul Kumar



Lecture session, and Hands-on training inside the OSL and Geochemistry laboratory (28 November 2023):

Lecture Session

An intriguing lecture on methods of geomorphological mapping using modern geospatial datasets and tools by Prof. Sudhakar Pardeshi, Professor and Head, S.P. Pune University, India (*Plate 9*). He highlighted the advantages of geospatial tools such as GIS software, Remote sensing and UAV (Drone-based) imageries/dataset that provides a bird's eye view of the landscape and gives the opportunity for large-scale and detailed geomorphological mapping. He pointed out that the integration of geomorphology in landscape modification exercise such as road construction can minimise the risk of any future hazard.

The post-lunch session was initiated with a discussion on cosmogenic radionuclide (CRN) dating. Dr. Pankaj Kumar, a scientist from Inter-University Accelerator Center (IUAC), New Delhi, India (*Plate 10*) talked on



4TH IGI-YGF INTENSIVE TRAINING PROGRAMME

the topic entitled “Deciphering the records written in cosmic ink” and threw light on how geomorphologists can integrate this new technique in their research. He discussed the basic principles of CRN dating and also showed how to take samples for CRN dating. He also shared how the young geomorphologists can make use of the facilities available at IUAC and bring a new dawn in geomorphological research.

This session was followed by an equally insightful lecture by Dr. Atul Kumar Singh (NEHU, Shillong) on Optically Stimulated Luminescence (OSL) dating (*Plate 11*). He discussed how this geochronological method can be used in dating riverine, lacustrine, glaciological and other sediments.

Hands-on Training and Laboratory Participation

Hands-on training for Optically Stimulated Luminescence (OSL) dating inside the OSL and Geochemistry lab of CSRD headed by Prof. Milap Chand Sharma was also part of the programme. Dr. Ishita Manna and Dr. Sandip Tanu Mandal demonstrated different types of equipment required for OSL sampling in the field. They also demonstrated the lab procedures involved in sample processing in the Luminescence dating facility, JNU. Sampling processing in dry lab, sieving, chemical leaching, magnetic separation of pure quartz and sample loading in the OSL reader machine were demonstrated.

A sense of curiosity was instilled in the young minds. Enthusiasm and excitement among the YGs were a scene to observe during each of the sessions.

Intensive Field Exercises with the help of advanced Geophysical and Geomorphological mapping technique

Field Surveys for geomorphological mapping and sample collections for geochronology (29 November 2023):

The journey to Kalesar, Yamunanagar, Haryana commenced at early morning and reached Hathnikund Guest house, Haryana before lunch time. Following lunch, the entire team visited a field site on the Yamuna River at Lal Dhang near Kalesar. Prof. Milap Chand Sharma shared detailed information on 'Geomorphology and Processes pertinent to Kalesar, Himalayan Foothills' (*Plate 12*). He introduced various conventional field instruments such as GPS, Clinometer compass, Distometer etc., and explained their applications. Dr. Atul Kumar conducted a hands-on session on Facies mapping and the processes of sample collections for OSL and ^{14}C dating methods (*Plate 13*), along with the identification of geomorphological processes at the bank of the Yamuna River.

Brainstorming Session (29 November 2023):

The evening featured by an extraordinary and most informative lecture on the 'Quaternary evolution of the Himalayan taper wedge' by the eminent resource person Prof. Pradeep Srivastava, INQUA Vice-President & Professor, Department of Earth Sciences, Indian Institute of Technology Roorkee, India (*Plate 14*). Following dinner, an interactive session for participants with Dr. Pradeep Srivastava was organized by the conveners,



4TH IGI-YGF INTENSIVE TRAINING PROGRAMME

during which he offered suggestions to the participants regarding their individual research problems and the brain storming session was carrying out till night at 11 pm.

Methods on Palaeo-environment reconstruction and Geophysical Surveys (30 November 2023):

On the third day of this ITP, the whole day was devoted to the palaeo-environment reconstruction techniques and identify the palaeo-processes operated in the study region, River terrace facies analysis and followed by DGPS and Ground Penetrating Radar (GPR) survey. Eminent resource persons Prof. Pradeep Srivastava and Prof. Milap Chand Sharma have taken the responsibility for the objectives have set previously on the process dependent landform reconstruction.

Dr. Pradeep Srivastava and Prof. Milap Chand Sharma introduced the formation of the multi-faceted dipped thrust trench. Dip angles of clasts were recorded at the visited site using the clinometer compass and Prof. Pradeep Srivastava explained the detailed behind its geological formation. Measuring the dip and direction of the deposited clasts per area could reveal the palaeo-nature of fluvial processes such as moderate water flow or suddent high energy discharge etc, has been trained by Prof. Srivastava (**Plate 15**). In addition, Professor also has given idea on the reconstruction of Plaeo-River thalwage. Subsequently, expedition forwarded towards the Four set of terraces on the Yamuna River, while Dr. Pradeep Srivastava has focused on the zone of Himalayan Front Fault (HFT). Prof. Srivastava has explained the varieties of gravel-boulders deposited on the river bank and possible sourced-provincences of those rocks or boulders (**Plate 16**). He emphasised on the new technique of inheritance studies of boulders that need to be carried out extensively (**Plate 17**).

The late afternoon session was carried on hands-on training for the Geophysical survey using the Differential Global Positioning System (DGPS) and Ground Penetrating Radar (GPR) was conducted by Dr. Ishita Manna, Dr. Sandip Tanu Mandal, Mr. Shashi Sekhar Shukla, and Miss. Elora Chakroborty over the terraces near to guest house (**Plate 18-19**).

Brainstorming Session (30 November 2023)

The evening snack was followed by Prof. Milap Chand Sharma's presentation on 'How to collect exposed rock samples for CRN dating from the Himalayan region?' In his talk, he introduced various sampling methods and possible issues on collecting appropriate samples (**Plate 20**). Additionally, Professor has given insightful knowledge on the inheritance study as well.

4TH IGI-YGF INTENSIVE TRAINING PROGRAMME



Plate 12. Demonstration on the field mapping and identification of landform development by Prof. Milap Chand Sharma



Plate 13. OSL dating sample collection demonstration in the field by Dr. Atul Kumar (Holding the PVC pipe)

4TH IGI-YGF INTENSIVE TRAINING PROGRAMME



Plate 14. Brainstorming session at late evening by Prof. Pradeep Srivastava (on the left) at Hathnikund Guest House while Dr. Manasi Debnath (on the right) introducing the resource person with the participants.



Plate 15. Field demonstration on the identification of palaeo discharge using the clasts fabric by Prof. Pradeep Srivastava

4TH IGI-YGF INTENSIVE TRAINING PROGRAMME



Plate 16. Prof. Pradeep Srivastava on the river bed facies analysis



Plate 17. Discussion on the inheritance studies of rock and its profound importance in geosciences

4TH IGI-YGF INTENSIVE TRAINING PROGRAMME



Plate 18. Hands-on training using the GPR

(Training given by Dr. Ishita Manna, Dr. Sandip Tanu Mandal and Miss. Elora Chakroborty)



Plate 19. Hands-on training using DGPS (Training given by Mr. Shashi Shekhar Shukla)

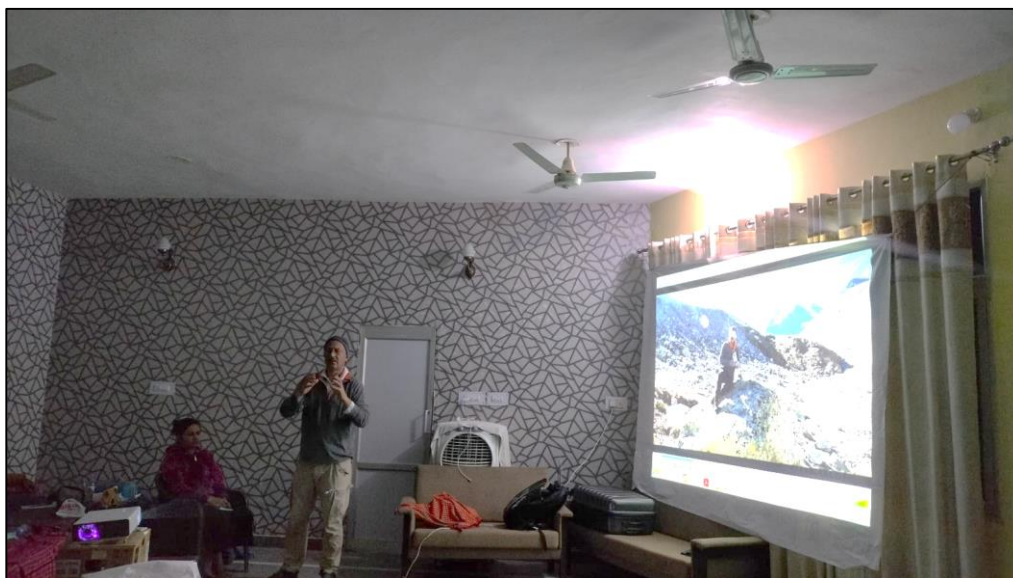


Plate 20. Brainstorming session on CRN dating technique headed by Prof. Milap Chand Sharma at late evening

4TH IGI-YGF INTENSIVE TRAINING PROGRAMME



Plate 21. Group photo in the field in front of Himalayan Front Fault (HFF)



Plate 22. Valedictory session ended with the group photo of participants and dignitaries (Seated on the chair, from left to right: Dr. Manasi Debnath, Dr. Munib, Prof. Padmini Pani, Prof. S. Sreekesh, Prof. Milap C Sharma, Dr. Sumantra Sarathi Biswas)

Session on the Post-Processing of collected data and Valedictory Session

The journey back from Kalesar (*Plate 21*) to New Delhi commenced early in the morning on December 1, 2023. Upon arrival at CSRD, JNU, at post lunch, the training on the post-processing of data gathered through DGPS, GPR, including both traditional and mechanized instruments was held and given training by Dr. Munib.

The valedictory function began at 4:00 pm, chaired by Prof. Milap Chand Sharma, Prof. Padmini Pani, Prof. S. Sreekesh (CSRD, JNU), Dr. Munib, Dr. Manasi Debnath and Dr. Sumantra Sarathi Biswas marking the conclusion of the ITP with the distribution of certificates and Group Photo. (*Plate 22*).

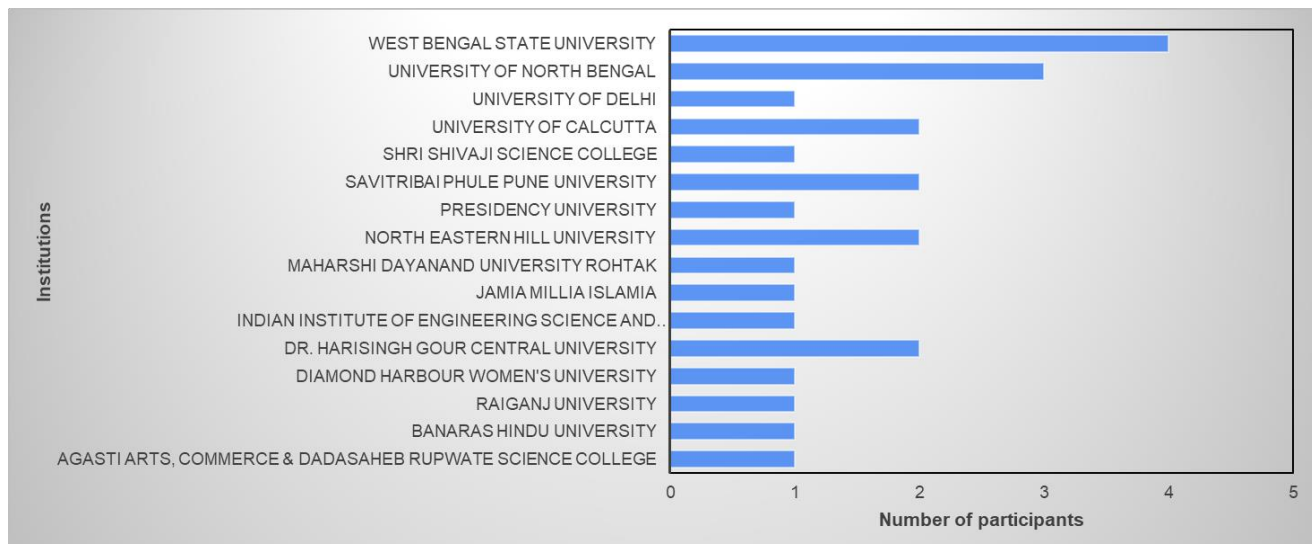


4TH IGI-YGF INTENSIVE TRAINING PROGRAMME

PROGRAMME SCHEDULE	
Day 1: 28th November, 2023 (Tuesday)	
Venue: Cartography Lab, Centre for the Study of Regional Development, Jawaharlal Nehru University	
8.30 am	Registration of the Participants
INAUGURAL SESSION	
10.00 am	Inaugural speech by Prof. Milap Chand Sharma <i>President, Indian Institute of Geomorphologists (IGI)</i>
10.10 am	Welcome Address to Participants by Prof. S. Sreelesh <i>Professor and Chairperson, CSRD, JNU</i>
10.20 am	Orientation and Introduction to the programme by Dr. Manasi Debnath <i>Convener, 4th IGI-YGF Intensive Training Programme</i>
10.25 am	Address by Prof. Azizur Rahman Siddiqui <i>Secretary General, Indian Institute of Geomorphologists (IGI)</i>
10.40 am	Address by Prof. Sunil Kumar De on "Geomorphological mapping and the role of the IAG" <i>President, International Association of Geomorphologists (IAG)</i>
11.10 am	Vote of Thanks by Dr. Sumantra Sarathi Biswas <i>Co-Convener, 4th IGI-YGF Intensive Training Programme</i>
11.15 am	Tea Break
LECTURE SESSION I	
11.30 am	Address on the theme of the 4 th IGI-YGF ITP by Prof. Padmini Pani <i>Professor, CSRD, JNU</i>
11.50 pm	Address by Prof. S. Pardeshi <i>Professor and Head, S.P. Pune University,</i>
12.10 pm	Lecture by Dr. Pankaj Kumar on "Deciphering the records written in cosmic ink" <i>Scientist Inter-University Accelerator Centre, New Delhi</i>
01.10 pm - 2:00 pm : Lunch	
LECTURE SESSION II	
02.00 pm	Lecture by Dr. Atul Kumar on "Optically Stimulated Luminescence Dating: An Introduction" <i>Assistant Professor, North-Eastern Hill University, Shillong, Meghalaya</i>
03.00 pm : Tea break	
HANDS-ON-TRAINING FOR OSL DATING IN LAB	
03.30 pm	OSL Sample preparation at Geochemistry Lab, JNU (Dr. Sandip Tantu, Mobius Foundation)
04.30 pm	OSL Sample processing technique at Geochemistry Lab, JNU (Dr. Ishita Manna, Ernst & Young & Elora Chakraborty, JNU)
Day 2: 29th November, 2023 (Wednesday)	
Venue: Kalesar	
06.30 am	Move towards Kalesar, Yamunanagar, Haryana
02.00 pm	Lecture on Geomorphology and Processes in particular to Kalesar, Himalayan Foothills Prof. Milap Chand Sharma , Professor, JNU
03.00 pm	Hands-on Landscape Mapping using DGPS and Geophysical survey over fluvial Terraces along the Yamuna River (GPR, Compass etc.) Ms. Elora Chakraborty, CSRD, JNU Mr. Shashi Sekhar Shukla, CSRD, JNU Mr. Soumik Das CSRD, JNU
05.30 pm	Post processing of data gathered through DGPS and GPR
Day 3: 30th November, 2023 (Thursday)	
Venue: Kalesar	
09.00 am	Lecture on Neotectonic Evolution of Himalaya and Successive Field Training Dr. Pradeep Srivastava , Professor, INQUA Vice-President & Professor, Department of Earth Sciences, Indian Institute of Technology Roorkee
01.00 pm	Hands-on Facies mapping, Geochronology sample collection (For OSL & Carbon), and identification of geomorphological processes Prof. Milap Chand Sharma , Jawaharlal Nehru University
5.30 pm	Post-processing of data gathered through DGPS, GPR including traditional and mechanised
Day 4: 1st December, 2023 (Friday)	
Venue: Kalesar	
VALEDICTORY SESSION	
09.00 am	VALEDICTORY SESSION
10.00 am	Leave Kalesar and Return to Delhi
06.30 pm	Reach at Delhi

Programme Participants

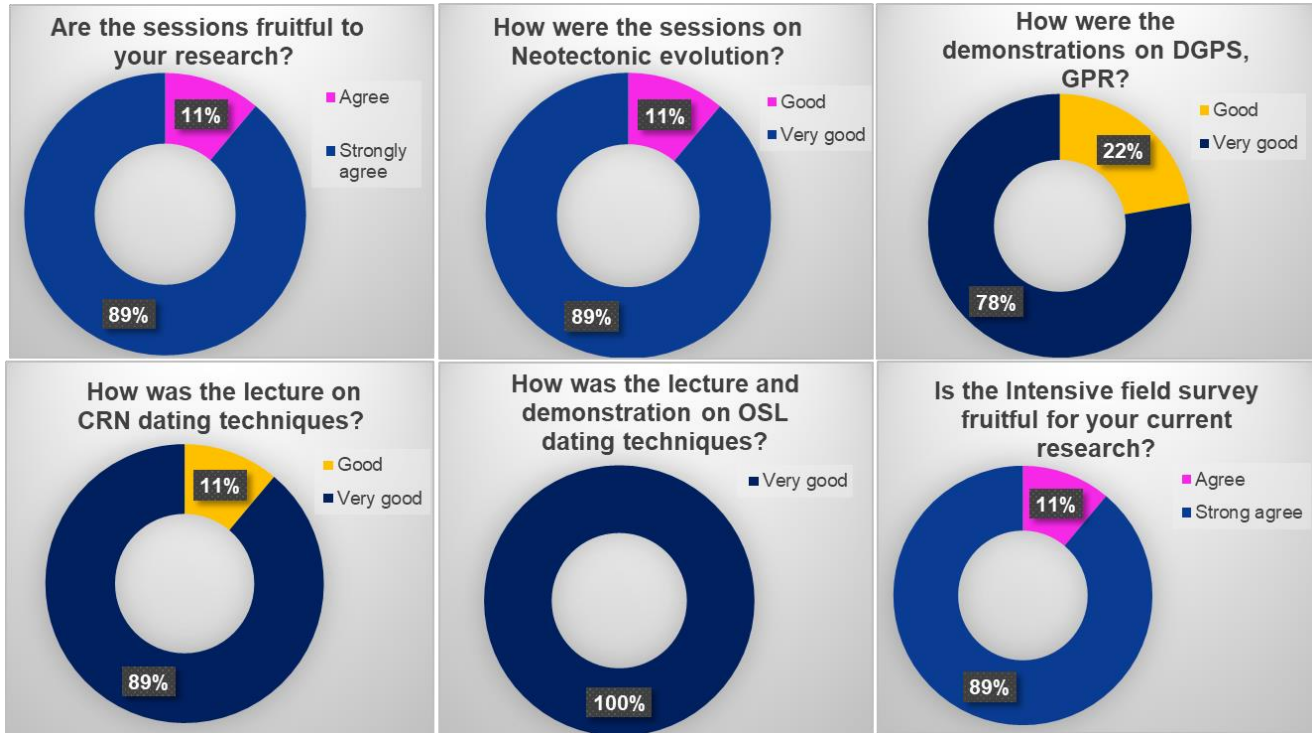
Total of 25 participants from the 16 institutions all across the country has been selected out of around 60 applications based on research thrust, interest and early career point of view to cover the participants from different parts of India.





4TH IGI-YGF INTENSIVE TRAINING PROGRAMME

Participants Feedback



Acknowledgment Towards Programme Support

Young Geomorphologists Forum expressing sincere gratitude and thanks to the International Association of Geomorphologists (IAG) for giving the auspices and financial support to organize the fourth Intensive Training Programme successfully. Members of this forum are sincerely thankful to CSR, JNU to become the host of this programme. We also remain thankful to Prof. Milap Chand Sharma, the President of the IGI, for his generous support to use his Geochemistry and OSL Dating lab, and all kind of instruments (DGPS, GPR etc.) for the young researchers training. Many thanks to the authority of Hathnikund Guest house for providing accommodation within a short period.