REPORT ON
THE 9th INTERNATIONAL CONFERENCE ON GEOMORPHOLOGY (9TH ICG)

Conference Dates: November 6-11, 2017
Conference Venue: Vigyan Bhawan, New Delhi
Conference Convener: Prof. (Dr.) Sunil Kumar De

Focal Theme: GEOMORPHOLOGY AND SOCIETY

Conference Highlights
- 40 Technical Sessions
- 8 Plenary Lectures
- 30 Lead Talks
- 488 delegates
- 314 foreign delegates
- 174 Indian delegates
- 46 countries represented
- 2 Pre-conference field trips
- 5 Post-conference field trips
- 3 Mid-conference field visits
- 1 Post-conference Intensive Course for young geomorphologists
- Lunching of IGI website
- Release of the Atlas of Geomorphosites in India
- Exhibition
- Cultural Program and Gala Dinner

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**REPORT ON**

**The 9th International Conference on Geomorphology (9th ICG)**

**(6-11 November, 2017)**

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**The Conference:**

The 9th International Conference on Geomorphology (9th ICG) was held from 6 to 11 November 2017 at Vigyan Bhawan, New Delhi. The ICG is the official conference of the International Association of Geomorphologists (IAG) and is held once in every four years. The last conference (8th ICG) was held in Paris in 2013. This nearly 2½ week event (including pre- and post-conference field trips), was organized by the Indian Institute of Geomorphologists (IGI) and the North-Eastern Hill University (NEHU), Shillong. Professor (Dr.) Sunil Kumar De (the Secretary General of the IAG and now the Vice-President of IAG) and Professor of Geography at NEHU, was the Conference Convener. This was the first international conference on geomorphology held in India and the second ICG in Asia. The 5th ICG was held in Tokyo (Japan) in 2001.

The main objectives of the conference were – (i) to bring together leading and young geomorphologists to exchange and share their research findings on all aspects of geomorphology, (ii) to provide a platform for active researchers to present and discuss trends, innovations, challenges and solutions adopted in various fields of geomorphology, (iii) to advance knowledge related to earth surface processes, extreme events and natural hazards for the benefit of the society, and (iv) to foster capacity building for young researchers.

**Conference Participants:**

In all, 488 young geomorphologists, research students and distinguished geomorphologists from different parts of the world attended this mega-event. Of the total registered delegates, nearly two-third (314) participants were from other countries, and nearly one-third (174) were from India. Forty six (46) countries were represented, with high numbers (>20) from Brazil, China, France, Italy, Poland and UK. Academicians, scientists and experts from different fields, such as geography, geology, hydrology, geo-archaeology, environmental sciences, social sciences, tourism, disaster...
management, etc., attended this international conference. The following graph gives the details of the international representation.

![Graph showing international representation]

*Data Source: Pritam Santra, Shehashis Ghosh, Saheli Bhattacherjee and Subhamita Chaudhari*

### Conference and Session Program:

The opening and closing sessions of the conference were chaired by the President of the IAG (Prof. Eric Fouache and Prof. Mauro Soldati, respectively). Dr. M. R. Bhutiyani (Director, DTRL) and Prof. R. L. Hangloo (VC, Allahabad University) were respectively the Chief Guests during the opening and closing sessions. Prof. Sunil Kumar De (the Conference Convener) and Prof. S. Singh (the President of IGI) welcomed and addressed the gathering during the opening and closing sessions.

The Atlas of Geomorphosites in India, Edited by Prof. Vishwas S. Kale was released during the opening session, along with the Conference Abstract Volume and the Field Guide Books. All the registered delegates received a copy of the Atlas, providing glimpses of India’s rich geodiversity and geoheritage.

On this occasion, the 5th volume of the IGI’s Journal of Indian Geomorphology was also released and distributed to all the participants. This special issue of the IGI journal contains a memoir and an extended article by Prof. Leszek Starkel of the Polish Academy of Sciences.
During the opening session, the official website of the IGI was lunched. The website (http://indiageomorph.org) was designed and created by the Editor of the IGI's research journal, Professor Suando Bandyopadhyay of the Calcutta University.

During the IAG General Assembly, on the 2nd day of the conference, three distinguished senior geomorphologists from different parts of the world were honoured by giving felicitation for their life-long contributions to the field of Geomorphology. A young geomorphologist from Brazil was awarded the Jean Tricart Scholarship.

The focal theme of the conference was "Geomorphology and Society". Eight keynote lectures and 30 lead talks were delivered during the four days of the conference. The following chart gives the conference schedule at a glance.

The conference included 40 sessions covering the majority of geomorphological topics and themes. Six technical sessions were held simultaneously in six conference rooms and halls, with state-of-the-art audio-visual facilities. On all the conference days,
poster sessions were held in another hall of the Vigyan Bhawan Complex. The following chart gives the main themes covered during the conference.

| S1: Theoretical Geomorphology | S23: Geomorphological Mapping |
| S2: Applied Geomorphology | S24: Geomorphology and Allied Disciplines: Mutual Contributions for the Progress of Integrated Environmental and Disaster Studies |
| S3: Geomorphic Processes in coupled human and natural systems (Session of the IGU Commission) | S25: Future Earth: Research for Global Sustainability |
| S4: Geomorphological Resources | S26: Connectivity in Geomorphology |
| S5: Volcanic Geomorphology | S27: Sediment Budgets (IAG-WG SEDIBUD) |
| S6: Karst Geomorphology | S28: Tropical Rivers (IAG-WG) |
| S7: Anthropocene Geomorphology | S29: Geomorphology of Rocky coasts (IAG-WG) |
| S8: Geomorphological Outreach | S30: Submarine Geomorphology (IAG-WG) |
| S9: Bio-geomorphology | S31: Landform Assessment for Geodiversity: General Geomorphology, Geodiversity, Geoconservation (IAG-WG) |
| S10: Weathering, Soils and Regolith on different time scales | S32: Planetary Geomorphology (IAG-WG) |
| S12: Palaeohydrology and Fluvial Archives - hydrological extreme and critical events (HEX) | S34: Geoarchaeology (IAG-WG) |
| S13: Fluvial processes and landforms | S35: Geomorphological Hazards and Risks (IAG-WG): risk mitigation through new techniques under the challenges of environmental changes |
| S14: Large Rivers | S36: Geomorphosites and Geotourism (IAG-WG) |
| S15: Integrated River Management | S37: Danxia Geomorphology (IAG-WG) |
| S16: Coastal Geomorphology and Management | S38: Extreme Events in Geomorphology |
| S17: Arid and Semi-arid Geomorphology | S39: Land Degradation and Hazards in a Changing Environment (Session of the IGU Commissions on Land Degradation and Desertification as well as Hazard and Risk) |
| S18: Tropical Geomorphology | S40: Young Geomorphologists' Session |
| S19: Glacial and Periglacial Geomorphology | |
| S20: Mountain Geomorphology | |
| S21: Application of Remote Sensing (RS) and Geographical Information System (GIS) in Geomorphology | |
| S22: Quantitative Geomorphology and Modeling | |

The diagram given below shows the distribution of scientific papers and posters presented under different themes during the conference.

Data Source: Pritam Santra, Shehashis Ghosh, Saheli Bhattacherjee and Subhamita Chaudhari

High numbers of research papers were presented (oral and poster) under the following seven technical sessions:

- S13: Fluvial Processes and Landforms (64)
One keynote lecture and seven plenary lectures were arranged in the spacious Plenary Hall of the Vigyan Bhawan. Eminent geomorphologists such as Prof. Mike Crozier (New Zealand), Prof. Gerald Nanson (Australia), Prof. Takashi Oguchi (Japan), Prof. Morgan De Dapper (Belgium), Prof. Francisco Gutierrez (Spain), Prof. Savindra Singh (India), Prof. Avijit Gupta (Australia), and Prof. Irasema Alcantara Ayala (Mexico), delivered the one-hr lectures on topics ranging from theoretical geomorphology to applied geomorphology. The keynote address by Prof. Mike Crozier was on "Geomorphology and Society", the focal theme of the conference.

<table>
<thead>
<tr>
<th>Plenary 1</th>
<th>Prof. Takashe Oguchi</th>
<th>Applications of geospatial technology in geomorphology: historical review and future perspectives</th>
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</thead>
<tbody>
<tr>
<td>Plenary 2 (S. R. Basu Memorial Lecture)</td>
<td>Prof. Morgan De Dapper</td>
<td>Geomorphology: My way</td>
</tr>
<tr>
<td>Plenary 3</td>
<td>Prof. Francisco Gutierrez</td>
<td>Applied geomorphological investigations using the trenching technique. Sinkholes, faults, landslides, floods</td>
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<tr>
<td>Plenary 4</td>
<td>Prof. Gerald Nanson</td>
<td>Equilibrium theory, evolution and least action principle; factors determining self-adjustment in Geomorphology and Earth’s fluvial stratigraphic record</td>
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<td>Plenary 5</td>
<td>Prof. Savindra Singh</td>
<td>Indian Geomorphology: Past, Present and Future</td>
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<tr>
<td>Plenary 6</td>
<td>Prof. Avijit Gupta</td>
<td>Rivers in the Humid Tropics</td>
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<tr>
<td>Plenary 7</td>
<td>Prof. Irasema Alcantara Ayala</td>
<td>Geomorphology, disaster risk reduction &amp; policy making: on the road to Sendai</td>
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</tbody>
</table>
In addition, 30 lead talks were organized at the beginning of all the key technical sessions. The 30-minute lead lectures were delivered by the following distinguished geomorphologists from different countries (some experts delivered 2 lead talks).

1. S. Lane, Switzerland
2. M-L. Byre, Canada
3. O. Slaymaker, Canada
4. M. S. Guettouche, Algeria
5. G. Mastronuzzi, Italy
6. C. Augustin, Brazil
7. M. Fort, France
8. F. Faccini, Italy
9. N. Mangold, France
10. J. Ramirez, Switzerland
11. A. C. Narayana, India
12. A. Micallef, Malta
13. T. Panek, Czech Republic
14. R. Wasson, Singapore
15. P. Carling, UK
16. V. Vasconcelos, Brazil
17. P. Migon, Poland
18. A Van Der Beek, France
19. David S. G. Thomas, UK
20. P. D’Odorico, USA
21. K. Rowntree, South Africa
22. M. Williams, Australia
23. A. Mather, UK
24. I. Rutherfurd, Australia
25. L. Pawlik, Poland
26. E. Fouache, UAE
27. A. K. Paull, USA
28. B. Amblas, UK

Pre- Mid- and Post-Conference Field Trips:

Two pre-conference and five post-conference field excursions in different parts of India were organized. From north to south, these excursions included parts of – Kashmir (Drs. S. Bhat and B. Ahmad), Darjeeling (Drs. S. Sarkar and S. Bhattacharyya), Nepal (Drs. B. R. Adhikhari, Monique Fort and N. R. Khanal), Rajasthan (Dr. P. C. Moharana), Gujarat (Drs. L. S. Chamyal and D. M. Maurya), Maharashtra (Dr. V. U. Joshi) and Kerala (Dr. S. Chattopadhyay). Printed field guide books prepared by the field coordinators, giving details of the geosites/stops, were provided to all the participants of the field trips. Dr. Amal Kar and Prof. M. N. Koul were the Editors of the field guide books. A Mid-conference field trip on the Geomorphology of Delhi and its surroundings was organized by Dr. M. C. Sharma.

In addition to these field trips, a post-conference Intensive Course for Young Geomorphologists was conducted from 13-16 November 2017 at Dehradun. Resource Persons included four geomorphologists from India and four experts from abroad. The field visits to the Siwalik Hills and Lesser Himalaya were coordinated by scientists from the Indian Institute of Remote Sensing - IIRS (Dr. P. K. Champati Ray) and the Wadia
Institute of Himalayan Geology (Dr. George Phillip). The 4-day field workshop was attended by 25 young geomorphologists from Europe, South America, Africa and Asia (including 5 from India).

**Social Events:**

Social events were also organized during the conference. These included a grand reception after the Opening Session, followed by a 2-hr Indian classical and folk dance program on 6th November, and a Gala Evening on 10th November. In addition, two mid-conference trips were also organized for the overseas participants on 9th November, one to Agra Fort and Taj Mahal, and another to Neemrana Fort Palace, Rajasthan.

**Exhibition:**

The exhibitors included—BETA Analytic of USA, the Geological Survey of India (GSI), 36th International Geological Congress (IGC), The Geographical Society of China, Cambridge University Press and Springer Germany.

**Sponsors:**

The 9th ICG in New Delhi was jointly organized by the Indian Institute of Geomorphologists (IGI), Allahabad and the North-Eastern Hill University (NEHU), Shillong.

The conference was financially supported by the Ministry of Earth Sciences (MoES), the Geological Survey of India (GSI), the Science and Engineering Research Board, India (SERB), the Defence Research and Development Organization, India (DRDO), the Council of Scientific and Industrial Research, India (CSIR), and the Indian Space Research Organization (ISRO).

All the selected Young Geomorphologists attending the conference and the post-conference workshop were financially supported by the International Association of Geomorphologists (IAG/AIG), European Geosciences Union (EGU), the International Permafrost Association (IPA) and the Italian Association of Physical Geography and Geomorphology (AlGeo).

Dr. Sunil Kumar De, the Conference Convener, thanked all the above funding agencies, as well as the IGI and NEHU for their support during the opening and closing sessions of the conference.
**Key Recommendations:**
Based on presentations and discussions at various technical sessions of this international conference, the following six key recommendations were made:

1) Need for greater focus on developing applied geomorphology research for the benefit of society, especially in developing nations facing multiple and diverse challenges.

2) Improving the scientific understanding of the changes brought about in the landforms and earth surface processes due to human activities and enhanced climate activity in the Anthropocene; evolving strategies for geo-hazard mitigation, environmental protection, nature conservation and sustainable development. This requires collaboration between experts from multiple disciplines and involvement of different agencies (public enterprises, policy makers, private companies and non-government organizations).

3) Developing better quantitative models for predicting landform changes and impacts of human-induced climate changes on shorter and longer timescales. This requires a multi-disciplinary, multi-institutional and multi-national approach.

4) Need to promote geoheritage conservation as a priority in countries that have yet to recognize the importance of conservation of the geomorphologically and geologically important heritage sites. Convincing concerned authorities to include geoheritage conservation as an integral part of the environmental and sustainable development programs.

5) Provide opportunities for interaction and collaborations among young scientists and established research workers in different sub-disciplines of geomorphology and allied fields, as well as promote exchange of information, data and technology, and the dissemination of geomorphological knowledge.

6) Need for organizing training programs and workshops on capacity building of young researchers in the field of geomorphology, to enable them to - (a) undertake scientific research necessary for proper management of human activities that affect landforms, processes and the environment, and (b) provide advice to governments (local to federal) on issues of regional, national and global concern.
PHOTOGRAPHS OF THE OPENING AND CLOSING SESSIONS OF THE 9TH ICG

Professor Sunil Kumar De, the Conference Convenor, welcoming the participants during the Opening Session of the 9th ICG.

Professor Sunil Kumar De (the Conference Convenor) and Prof. S. Singh (IGI President) along with the Executive Committee members of the IAG on the stage during the Closing Session of the 9th ICG.
Young Geomorphologists from Europe, South America, Africa and Asia selected to attend the 9th ICG as well as to participate in the post-conference 4-day workshop at Dehradun, along with the President of IAG and the Conference Convener. The financial support to these young geomorphologists was provided by the IAG, EGU, GFG, IPA, and the Commission on Land Degradation and Desertification
CONFERENCE PUBLICATIONS

Printed booklet giving session-wise detailed scientific program of the 9th ICG

Printed Abstract Volume distributed to all the registered delegates

Field guide book on Kashmir Himalaya. Similar guide books were printed for field trips to Darjeeling, Nepal, Rajasthan, Gujarat, Maharashtra and Kerala

The Atlas of Geomorphosites in India printed on the occasion of the 9th ICG and distributed to all the registered delegates. The Atlas includes 36 interesting geomorphic sites in India.

Printed Special Volume of the IGI’s research journal and distributed to all the registered delegates of 9th ICG. Journal Editor: Prof. Suando Bandyopadhyay