



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

Supported by:



REPORT ON **The 9th International Conference on Geomorphology (9th ICG)** **(6-11 November, 2017)**

The Conference:

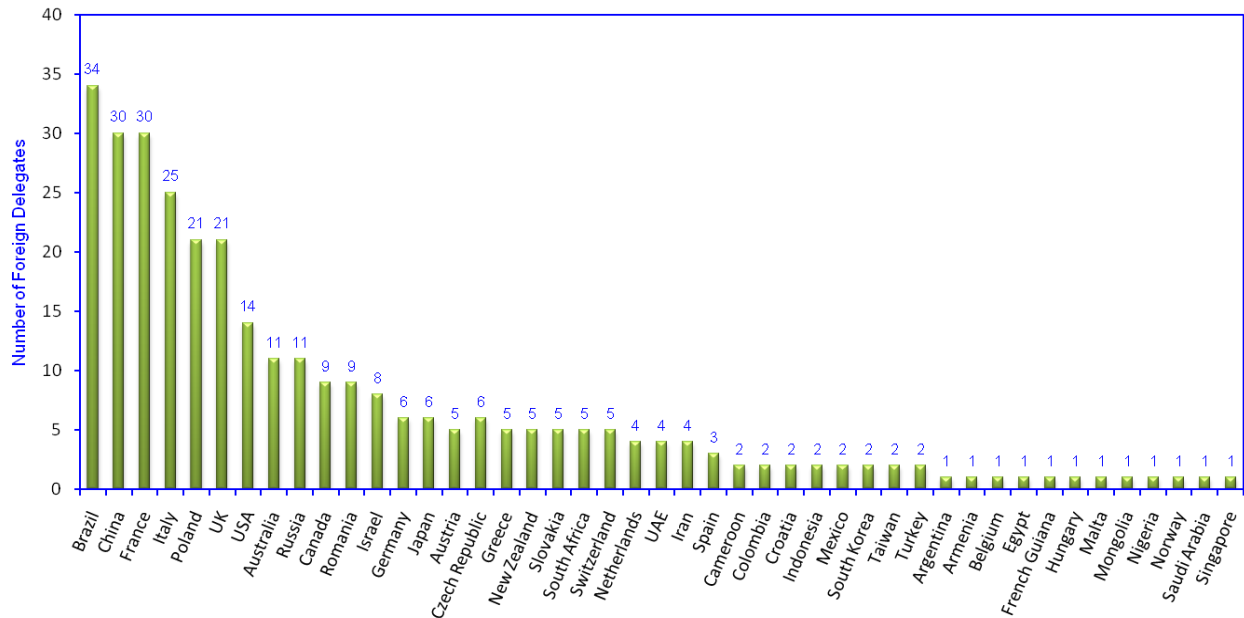
The 9th International Conference on Geomorphology (9th ICG) was held from 6 to 11 November 2017 at Vigyan Bhawan, New Delhi. The ICG is the official conference of the International Association of Geomorphologists (IAG) and is held once in every four years. The last conference (8th ICG) was held in Paris 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.



Data Source: Pritam Santra, Shehashis Ghosh, Saheli Bhattacharjee 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 launched. 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.

9TH INTERNATIONAL CONFERENCE OF GEOMORPHOLOGY
VIGYAN BHAWAN, NEW DELHI, INDIA (6-11 NOVEMBER, 2017)
PROGRAMME AT A GLANCE

30TH OCTOBER -5TH NOVEMBER, 2017 - PRE-CONFERENCE FIELD TRIPS

6.11.2017

| | | | | | | | |
|--|-------------------|----------------|--------------------|--|--------------------|-------------|--------------------|
| | Business Centre | Room No. 2 & 3 | Room No. 4 | Room No. 5 | Plenary Hall | Atrium Hall | Plenary Hall |
| | 11.30-17.30 | 13.30-15.00 | 13.30-15.00 | 14.00-15.00 | 16.00-17.30 | 17.30-18.30 | 18.30-20.00 |
| | REGISTRATION OPEN | IGI EC MEETING | IAG/AIG EC MEETING | IAG-WG ON LANDFORM ASSESSMENT FOR GEODIVERSITY | INAUGURAL CEREMONY | HIGH TEA | CULTURAL PROGRAMME |

7.11.2017

8.11.2017

| | | | | | | | | | | | | |
|-------------|-----|-----|-------------|-------------------------------------|-----|-----|-----|-----|-----|--|------|-----|
| | PH | 2 | 3 | 4 | 5 | 6 | PH | 2 | 3 | 4 | 5 | 6 |
| 8.30-10.00 | | | | IAG/AIG 1st General Assembly | | | S19 | S31 | S32 | S21 | S16 | S5 |
| 10.30-11.30 | | | | KEY NOTE SPEECH (Michael Crozier) | | | | | | PROF. S. R. BASU MEMORIAL PLENARY LECTURE (Morgan De Dapper) | | |
| 11.30-13.00 | S19 | S8 | S35+S38+S25 | S7 | S1 | S10 | S13 | S31 | S33 | S21 | S16 | S11 |
| | | | | | | | | | | | | |
| 14.00-15.00 | | | | PLENARY LECTURE (Takashe Oguchi) | | | | | | PLENARY LECTURE (Francisco Gutierrez) | | |
| 15.00-16.30 | S19 | S20 | S35+S38+S25 | S7 | S1 | S10 | S13 | S24 | S33 | S21 | S6 | S11 |
| 17.00-18.30 | S19 | S20 | S35+S38+S25 | ICG 1 st Council meeting | S16 | S10 | S13 | S24 | S33 | S22 | ESPL | S11 |

9TH NOVEMBER, 2017 - MID CONFERENCE FIELD TRIPS

10.11.2017

11.11.2017

| | | | | | | | | | | | | |
|-------------|-----|-----------|---------|-------------------------------------|-----|-----|-----|-----|----------|---|-----|-----|
| | PH | 2 | 3 | 4 | 5 | 6 | PH | 2 | 3 | 4 | 5 | 6 |
| 8.30-10.00 | S13 | S3 | S33 | S22 | S36 | S17 | S14 | S28 | S2+S4+S9 | S34 | S39 | S29 |
| 10.30-11.30 | | | | PLENARY LECTURE (Gerald C. Nanson) | | | | | | PLENARY LECTURE (Avijit Gupta) | | |
| 11.30-13.00 | S13 | S3 | S33a | S23 | S36 | S17 | S15 | S12 | S2+S4+S9 | S34 | S39 | S30 |
| | | | | | | | | | | | | |
| 14.00-15.00 | | | | PLENARY LECTURE (Savindra Singh) | | | | | | PLENARY LECTURE (Irasema Alcantara Ayala) | | |
| 15.00-16.30 | S13 | S26 (4+1) | S33a | S23 | S27 | S17 | S15 | S12 | S2+S4+S9 | S34 | S40 | S30 |
| 17.00-18.30 | S14 | S26 (5) | S18+S37 | IAG 2 nd Council Meeting | S27 | S29 | | | | VALIDICTORY FUNCTION | | |

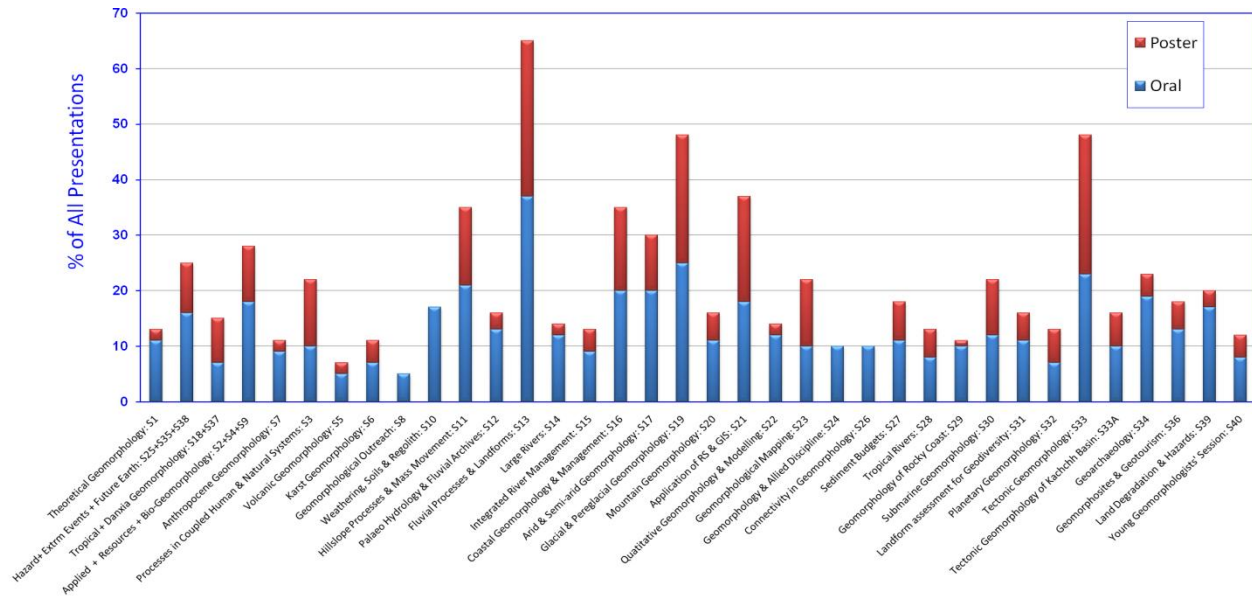
12TH -20TH NOVEMBER, 2017 - POST-CONFERENCE FIELD TRIPS

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 S2: Applied Geomorphology S3: Geomorphic Processes in coupled human and natural systems (Session of the IGU Commission) S4: Geomorphological Resources S5: Volcanic Geomorphology S6: Karst Geomorphology S7: Anthropocene Geomorphology S8: Geomorphological Outreach S9: Bio-geomorphology S10: Weathering, Soils and Regolith on different time scales S11: Hillslope Processes and Mass Movements S12: Palaeohydrology and Fluvial Archives - hydrological extreme and critical events (HEX) S13: Fluvial processes and landforms S14: Large Rivers S15: Integrated River Management S16: Coastal Geomorphology and Management S17: Arid and Semi-arid Geomorphology S18: Tropical Geomorphology 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 | S23: Geomorphological Mapping S24: Geomorphology and Allied Disciplines: Mutual Contributions for the Progress of Integrated Environmental and Disaster Studies S25: Future Earth: Research for Global Sustainability S26: Connectivity in Geomorphology S27: Sediment Budgets (IAG-WG SEDIBUD) S28: Tropical Rivers (IAG-WG) S29: Geomorphology of Rocky coasts (IAG-WG) S30: Submarine Geomorphology (IAG-WG) S31: Landform Assessment for Geodiversity: General Geomorphology, Geodiversity, Geoconservation (IAG-WG) S32: Planetary Geomorphology (IAG-WG) S33: Tectonic Geomorphology (IAG-EGU Joint Session) S33a: Tectonic Geomorphology of Kachchh Basin S34: Geoarchaeology (IAG-WG) S35: Geomorphological Hazards and Risks (IAG-WG): risk mitigation through new techniques under the challenges of environmental changes S36: Geomorphosites and Geotourism (IAG-WG) S37: Danxia Geomorphology (IAG-WG) S38: Extreme Events in 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) S40: Young Geomorphologists' Session |
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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 Bhattacharjee 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)

- S33: Tectonic Geomorphology (48)
- S19: Glacial and Peri-glacial Geomorphology (47)
- S21: Application of Remote Sensing and GIS in Geomorphology (37)
- S11: Hillslope Processes and Mass Movements (35)
- S16: Coastal Geomorphology and Management (33)
- S17: Arid and Semi-arid Geomorphology (28)

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.

| | | |
|---|-------------------------------|---|
| Plenary 1 | Prof. Takashe Oguchi | Applications of geospatial technology in geomorphology: historical review and future perspectives |
| Plenary 2 (S. R. Basu Memorial Lecture) | Prof. Morgan De Dapper | Geomorphology: My way |
| Plenary 3 | Prof. Francisco Gutierrez | Applied geomorphological investigations using the trenching technique. Sinkholes, faults, landslides, floods |
| Plenary 4 | Prof. Gerald Nanson | Equilibrium theory, evolution and least action principle; factors determining self-adjustment in Geomorphology and Earth's fluvial stratigraphic record |
| Plenary 5 | Prof. Savindra Singh | Indian Geomorphology : Past, Present and Future |
| Plenary 6 | Prof. Avijit Gupta | Rivers in the Humid Tropics |
| Plenary 7 | Prof. Irasema Alcantara Ayala | Geomorphology, disaster risk reduction & policy making: on the road to Sendai |

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

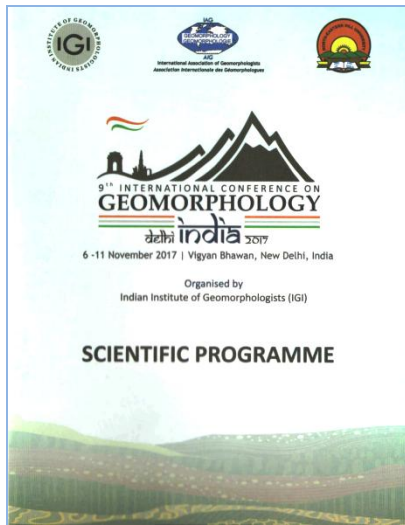


9th ICG participants at the Grand Reception after the Opening Session on 6th November

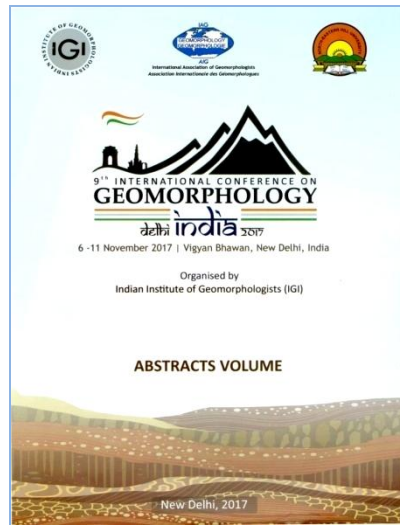


Young Geomorphologists from Europe, South America, Africa and Asia selected to attend the 9th ICG as well as to participate in the post-conference 4-day workshop at Dehradun, along with the President of IAG and the Conference Convener. The financial support to these young geomorphologists was provided by the IAG, EGU, GFG, IPA, and the Commission on Land Degradation and Desertification

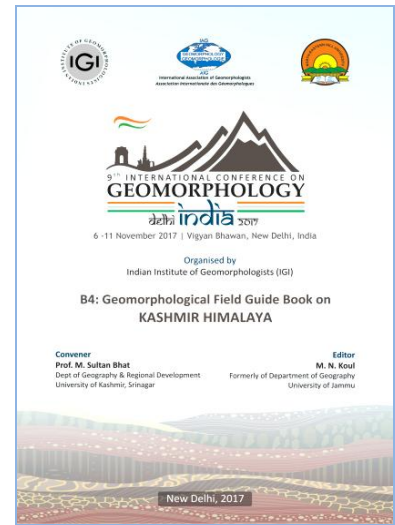
CONFERENCE PUBLICATIONS



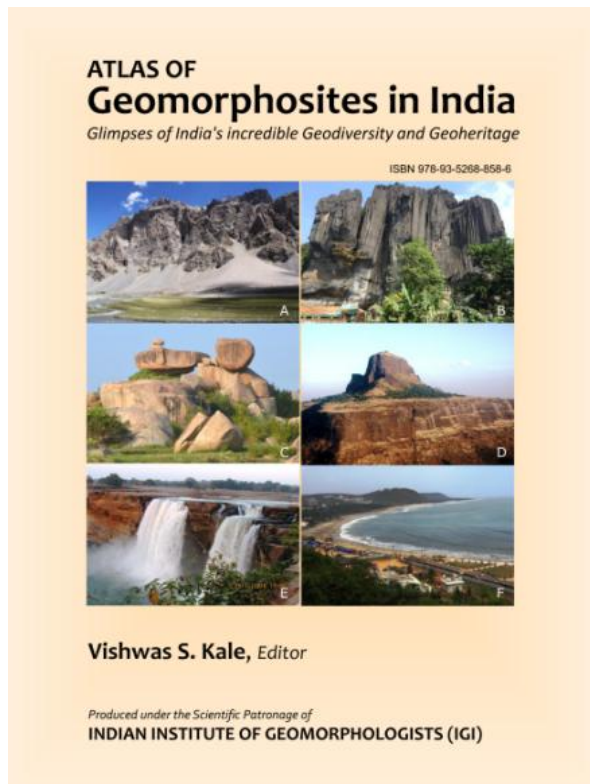
Printed booklet giving session-wise detailed scientific program of the 9th ICG



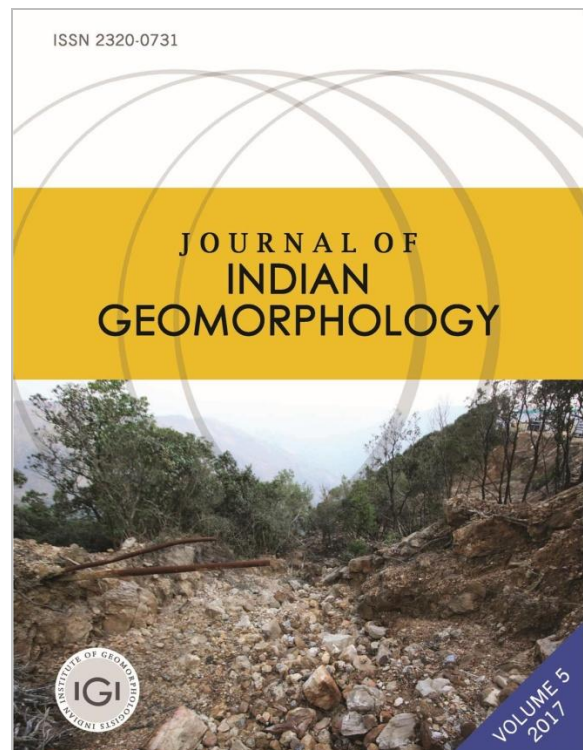
Printed Abstract Volume distributed to all the registered delegates



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