



SECOND CIRCULAR

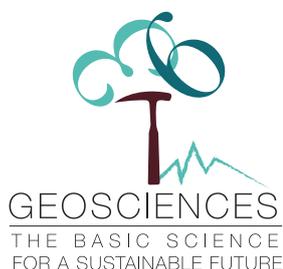
DECEMBER 2018

# 36TH INTERNATIONAL GEOLOGICAL CONGRESS



THE INDIAN SUBCONTINENT INVITES YOU TO THE 36TH IGC  
GEOSCIENCES: THE BASIC SCIENCE FOR A SUSTAINABLE FUTURE

2 - 8 MARCH 2020  
INDIA EXPO CENTRE  
DELHI, INDIA



# 36th International Geological Congress

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Geological Survey of India  
Nodal Organization for organizing the 36th IGC

# Message from the President, Co-President and Secretary General

With great pleasure, we present to you the Second Circular of the 36th International Geological Congress. It provides the framework of the Science Program, the Field Trips and the Geohost Program, besides the timelines of important sub-events.

The Science Program has been designed with the concerted efforts of the Science Program Committee and the theme coordinators. Subsequent to the publication of the First Circular, on request from various quarters, two new themes have been added to the Science Program, thereby taking the total to 44. The 36th IGC has invited symposium and business meeting proposals from all scientific and IUGS-affiliated organizations. New proposals of regional and specialized symposia are still welcome.

We have kept the registration fee reasonably low for the various categories to encourage better participation of geoscientists. However, an abstract submission fee of USD 40 removes uncertainties while scheduling the scientific proceedings of the Congress.

With strong support from the Government of India to promote geosciences, we feel privileged to introduce our Geohost Program that envisages providing, at the minimum, 1000 scholarships for registration, travel and local hospitality.

India Expo Centre and Mart, the venue for the Congress, is a state-of-the-art convention centre with sprawling space for organising the Geoexposition. Details of the Geoexposition are being worked out and will be published in the Third Circular.

We are happy to announce that the Field Trip list has been expanded, offering more choices to delegates to visit the geological marvels of the Indian subcontinent. We have endeavored to make all the field excursions exciting with inclusion of places of unique historical, archaeological and cultural value.

March, in Delhi, is known for its pleasant weather. We invite you to participate in the 36th IGC and also experience the amazing beauty and hospitality of India.



**V. P. Dimri**  
President, 36th IGC



**Dinesh Gupta**  
Co-President, 36th IGC



**P. R. Golani**  
Secretary General, 36th IGC



# 36TH INTERNATIONAL GEOLOGICAL CONGRESS

## SECOND CIRCULAR

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General distribution of this and the subsequent circulars for the 36th IGC will be via email. Please feel free to forward it to others who may be interested. If necessary, limited number of hard copies will be provided on request by email to the Secretary General, 36th IGC: [igc.delhi2020@nic.in](mailto:igc.delhi2020@nic.in)

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# Important Dates

<b>15 February 2019</b>	:	Super Early Bird registrations open
<b>31 March 2019</b>	:	Release of Third Circular; Field trip bookings open
<b>30 June 2019</b>	:	Super Early Bird registrations close
<b>31 August 2019</b>	:	Abstract submissions close ( <i>see page 41</i> )
<b>31 August 2019</b>	:	Geohost support applications close ( <i>see page 42</i> )
<b>31 October 2019</b>	:	Field trip bookings close (full payment)
<b>30 October 2019</b>	:	Presenter's registrations close
<b>30 November 2019</b>	:	Early Bird registrations close
<b>31 December 2019</b>	:	Requests for Business Meetings close
<b>31 January 2020</b>	:	Standard Congress registrations close. Late registrations commence

## Core Organizing Committee

V.P. Dimri	President
Dinesh Gupta <i>DG, Geological Survey of India (Ex-Officio)</i>	Co-President
P.R. Golani	Secretary General
Talat Ahmad S.K. Ray and P.P. Chakraborty	Chair, Science Program Co-Chairs, Science Program
Somnath Dasgupta and N.R. Ramesh	Co-Chairs, Field Trip Program
Fareeduddin	Chair, Legacy Program
Gopal Dhawan	Chair, Sponsorship Program
R. Shankar	Chair, Geohost Support Program
AL. Ramanathan	Chair, Volunteer Program
M. Chandra Das <i>Dy. DG, Geological Survey of India (Ex-Officio)</i>	Chair, Finance Committee
Representative of Ministry of External Affairs Representative of Ministry of Home Affairs	Members
D.M. Banerjee	Member, Executive Committee
B.K. Bansal	Member, Executive Committee
Joyesh Bagchi	Member, Executive Committee
S.N. Bhagat	Treasurer
L.P. Singh	Administration & Co-Convenor, Geohost Support Program
Saibal Ghosh	Convener, Science Program
Snigdha Ghatak	Convener, Field Trip and Geohost Support Programs, YES and Inter-Ministerial Liaising
Debasish Rout	Convener, Legacy and Sponsorship Programs
H.S. Mandal	Convener, Volunteer Program & Co-convenor, Science Program
Tanvi Arora	YES Representative





## Super Early Bird Registration Offer

Super Early Bird registration would be open from February 2019 to June 2019. It offers an excellent opportunity to register oneself at a substantially reduced rate compared to Early Bird and Standard registration rates. Separate rates have been provisioned for students, delegates, senior citizens and guests under this category of registration as given below:

**Students** : US \$ 325

**Delegates** : US \$ 650

**Senior Citizens** : US \$ 450

**Welcome Reception (Guest Ticket)** : US \$ 40

The details will soon be hosted on the Congress website ([www.36igc.org](http://www.36igc.org)).

Registration in this category can be made at the website. Every registered delegate will be entitled to lunch, morning and afternoon refreshments, welcome reception and Congress materials, including the Congress Program and Abstracts (in digital format).

Super Early Bird registration fee must be paid by credit card after filling out the registration form. Super Early Bird fee is non-refundable and the maximum number of registrants under this category will be 1500.

The window for Early Bird registration will open in July 2019.





## Message from the Chairs, Science Program Committee

With great delight, we place before you the Science Program of the 36th IGC. Questions abound, when it comes to the issue of sustainability of the Earth. The path to a sustainable future is not easy. However, the endeavour has to continue, ceaselessly and unitedly. The Science Program Committee, after long deliberations has identified 44 themes to address the spirit of the Congress - Geosciences: The Basic Science for a Sustainable Future. The Congress aims to offer a platform for the geoscientists to contemplate, debate and deliberate on the issue and suggest ways and means to orient our actions towards a sustainable future.

We take this opportunity to thank the members of the Science Committee, the coordinators, the Earth-science friends and well-wishers who have, with great thoughtfulness, provided inputs to the Science Program of the 36th IGC.

We look forward to your participation in large numbers and contribution to the growth and propagation of geosciences for achieving the objective enshrined in the Congress theme.

*Talat Ahmad*  
Chair

*S. K. Ray*  
Co-Chair

*P.P.Chakraborty*  
Co-Chair



# Draft Program Timetable

The draft schedule for the 36th IGC Science Program is given below. It will be spread over seven days, with the Opening Session on 2nd March and the Closing Ceremony on 8th March, 2020. Each day during 3-7 March will have multiple concurrent sessions and will comprise two Plenary Sessions - one pre-lunch and one post-lunch. The 2nd and 8th March will have only one Plenary Session each.

Time	March 02	March 03	March 04	March 05	March 06	March 07	March 08	
0830 – 1045	Registration opens	OPENING SESSION GENERAL	Session D Concurrent sessions – D1, D2, D3....	Session H Concurrent sessions – H1, H2, H3...	Session L Concurrent sessions – L1, L2, L3...	Session P Concurrent sessions – P1, P2, P3...	Session T Concurrent sessions – T1, T2, T3,....	
1045 – 1115		Break	POSTER	POSTER	POSTER	POSTER	POSTER	
1115 – 1300	Registration Continues *	Session A Concurrent sessions – A1, A2, A3.....	Session E Concurrent sessions – E1, E2, E3...	Session I Concurrent sessions – I1, I2, I3...	Session M Concurrent sessions – M1, M2, M3...	Session Q Concurrent sessions – Q1, Q2, Q3,...	Session U Concurrent sessions – U1, U2, U3,...	
1300 – 1400	Break	PLENARY #2 POSTER	PLENARY #4 POSTER	PLENARY #6 POSTER	PLENARY #8 POSTER	PLENARY #10 POSTER	PLENARY #12	
1400 – 1545	Inaugural Ceremony	Session B Concurrent sessions – B1, B2, B3.....	Session F Concurrent sessions – F1, F2, F3...	Session J Concurrent sessions – J1, J2, J3...	Session N Concurrent sessions – N1, N2, N3...	Session R Concurrent sessions – R1, R2, R3,...	Closing Ceremony	
1545 – 1615		POSTER	POSTER	POSTER	POSTER	POSTER		
1615 – 1715	Plenary #1	Session C Concurrent sessions – C1, C2, C3...	Session G Concurrent sessions – G1, G2, G3...	Session K Concurrent sessions – K1, K2, K3...	Session O Concurrent sessions – O1, O2, O3...	Session S Concurrent sessions – S1, S2, S3,...		
1800 – 1900	Icebreaker	PLENARY #3	PLENARY #5	PLENARY #7	PLENARY #9	PLENARY #11		
1900 on-ward	Icebreaker	Business Meetings/ Workshops (May be scheduled during daytime too)						

Each oral presentation, including discussion, will be for 15 minutes. Keynote addresses will be for over 30 minutes. E-posters will be displayed at a prominent place with high foot fall. Abstracts of all accepted papers - oral and poster - will be published in the 'Congress Abstracts'.





## Science Symposia

The Science Program of the 36th IGC comprises 264 Symposia under 44 Themes. The outline of the Scientific Program is presented in the following pages. It is also available on the 36th IGC website ([www.36igc.org](http://www.36igc.org)), where a summary of each symposium can be viewed as hyperlinked text. The call for abstracts will be based on this program. The schedule will be finalised after all the abstracts are received.

The symposium/session proposals received, and expected to be received from IUGS-affiliated and other organisations/fora are placed under a special theme (Theme 45). This excludes symposia already incorporated in the relevant science themes.

The entire Science Program will be open to all delegates with full IGC registration.

All Symposia in the Scientific Program are expected to include both oral and e-poster presentations. Participants will be permitted to deliver only one oral presentation in the program, but they may co-author multiple oral presentations and may make multiple poster presentations. Invited keynote speakers and presenters in IUGS-related specialist symposia may deliver a second oral paper in the science program.

The official language of the Congress will be English; translation services will not be provided. Any questions or requests for further information should be addressed to the Communicating Theme Coordinators or Symposium Convenors, whose email addresses are listed in the program, with intimation to the Convener, Science Program.



**Coordinators:** **R. Shankar** *rshankargeo@gmail.com (India)*,  
**Anish K. Warrior** *akwarrier@gmail.com (India)*,  
**Chris King** *chrisjhking36@gmail.com (UK)*

## Symposia

### 1.1 Geoscience Education

Roberto Greco *greco@ige.unicamp.br (Brazil)*, Chris King (UK)

### 1.2 Geoscience Communication and Outreach

Iain Stewart *istewart@plymouth.ac.uk (UK)*, Kirsten v. Elverfeldt (Austria), Eduardo de Mulder (The Netherlands), Courtney Jermyn (The Netherlands)

### 1.3 Geodiversity, Geoheritage and Geoconservation

José Brilha *jbrilha@dct.uminho.pt (Portugal)*, Benjamin van Wyk de Vries (France), Denise Gorfinkiel (Uruguay), Károly Németh (New Zealand), Kyung-Sik Woo (S. Korea), Nickolas Zouros (Greece), Pushpendra Singh Ranawat (India)

### 1.4 Natural Stones and Architectural Heritage

Fareeduddin *fareedromani@gmail.com (India)*, Gurmeet Kaur (India), Dolores Periera (Spain)

### 1.5 Geosciences, Art and Heritage

José Sellés-Martínez *pepe@gl.fcen.uba.ar (Argentina)*, Tom Heldal (Norway), Mónica Álvarez del Buergo Ballester (Spain)

### 1.6 The History of Geology and the Dissemination of Geological Knowledge

Barry Cooper *barry.cooper@unisa.edu.au (Australia)*, Marianne Klemun (Austria)

### 1.7 Geoethics: Ethical, Social and Cultural Aspects in Geosciences

Silvia Peppoloni *silvia.peppoloni@ingv.it (Italy)*, Nic Bilham (UK), Peter T. Bobrowsky (Canada), Martin Bohle (Belgium), Vincent S. Cronin (USA), Giuseppe Di Capua (Italy)

### 1.8 Forensic Geology

Laurance Donnelly *geologist@hotmail.co.uk (UK)*, Biplob Chatterjee (India)

### 1.9 Role of Medical Geology to Protect Human Health from Toxic and other Harmful Elements in the Environment

Viqar Husain *prof.viqarhusain@yahoo.com (Pakistan)*, Zafar Fatimi (Pakistan), S.D. Limaye (India)

### 1.10 Geoparks, Geoheritage & Geo-Tourism in Low-Income Countries

Afia Akhtar *afia@agni.com (Bangladesh)*, Shahina Tariq (Pakistan)

### 1.11 Earth Science and Society

Eduardo de Mulder *e.demulder@planet.nl (The Netherlands)*, Gbenga Okunlola (Nigeria), Marko Komac (Slovenia)



**Coordinators:** **M.E.A. Mondal** [erfan.mondal@gmail.com](mailto:erfan.mondal@gmail.com) (India),  
**C. Manikyamba** [cmaningri@gmail.com](mailto:cmaningri@gmail.com) (India),  
**Jaana Halla** [jaana.halla@helsinki.fi](mailto:jaana.halla@helsinki.fi) (Finland)

### Symposia

#### **2.1 Hadean to Archaean Earth: Geological, Geochemical, Geochronological, Geophysical, and Numerical Perspectives**

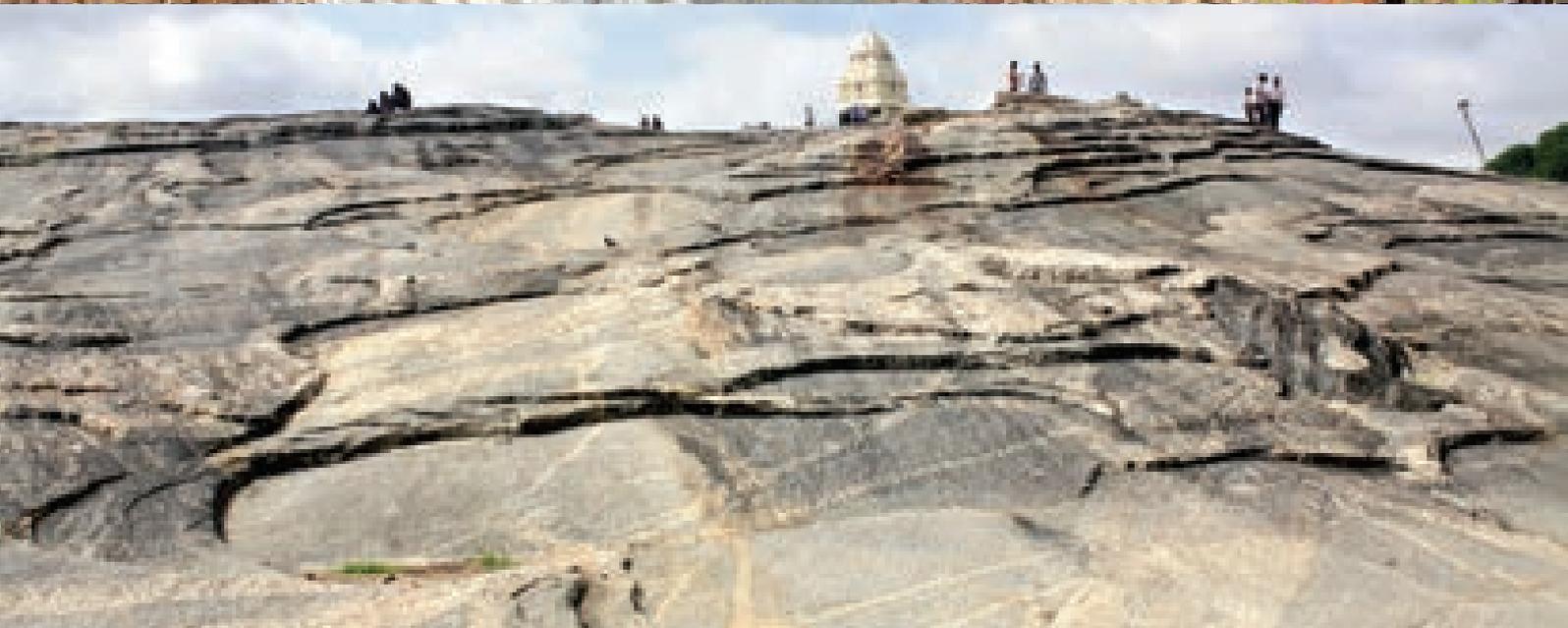
Martin Whitehouse [martin.whitehouse@nrm.se](mailto:martin.whitehouse@nrm.se) (Sweden), Kristoffer Szilas (Denmark)

#### **2.2 Archaean Biosphere and Ecosystem**

Mukund Sharma [mukund\\_sharma@bsip.res.in](mailto:mukund_sharma@bsip.res.in) (India), Robert Riding (USA)

#### **2.3 Origin and Evolution of the Crust-Mantle Reservoirs during the Hadean to Archaean**

Rajneesh Bhutani [rbhutani@gmail.com](mailto:rbhutani@gmail.com) (India), J S Ray (India)



## Theme 3 | *Proterozoic Earth*

**Coordinators:** Partha Pratim Chakraborty *parthageology@gmail.com (India)*,  
V. Ravikant *ravikant.vadlamani@gmail.com (India)*,  
Abhijit Basu *basu@indiana.edu (USA)*

### Symposia

#### 3.1 Proterozoic Orogenesis and Supercontinent Formation and Breakup

Elton Luiz Dantas (Brazil) *Elton@unb.br*

#### 3.2 Proterozoic Orogeny and Sedimentary Basins

Nick MW Roberts (UK) *nickmwroberts@gmail.com, nirob@bgs.ac.uk*

#### 3.3 Nuances of Sedimentation in Proterozoic Cratonic Basins

Pradip K. Bose (India) *jugeopkb@gmail.com*

#### 3.4 Proterozoic Ocean; Chemistry and Oxygenation

Partha Pratim Chakraborty (India) *parthageology@gmail.com*

#### 3.5 Proterozoic Atmosphere and Expressions of Life

Joydip Mukhopadhyay (India) *Joydip17@gmail.com*

#### 3.6 Proterozoic Geodynamics and Subcontinental Lithosphere (SCLM) Evolution from Geochemical Evolution of Magmatism Over Time

Peng Peng (China) *pengpengwj@mail.iggcas.ac.cn*

## Theme 4 | *Supercontinent Cycles and Geodynamics*

**Coordinators:** M.K. Pandit *manoj.pandit@gmail.com (India)*,  
Tapan Pal *paltapan62@gmail.com (India)*,  
J.G. Meert *jmeert@ufl.edu (USA)*

### Symposia

#### 4.1 Supercontinent Amalgamation, Breakup, and the Driving Forces (IGCP 648)

Zheng-Xiang Li *z.li@curtin.edu.au (Australia)*, David Evans (USA), Shijie Zhong (USA),  
Bruce Eglington (Canada)

#### 4.2 Extremes of Metamorphism during the Supercontinent Cycle

Chris Clark *c.clark@curtin.edu.au (Australia)*

#### 4.3 Sedimentary Records and Correlation of Supercontinent Crustal Blocks

Wei Wang *wwz@cug.cn (China)*, Christopher Spencer (Australia)



## Theme 5 | *Ancient and Modern Coasts and Continental Margins*

**Coordinators:** Subir Sarkar *ssarkar@geology.jdvvu.ac.in (India)*,  
B. Nagender Nath *nagendernath@yahoo.com (India)*,  
Peter D. Clift *pclift@lsu.edu (USA)*

### Symposia

#### 5.1 Advances in the Extensional Tectonics of Continental Margins

Sascha Brune *brune@gfz-potsdam.de (Germany)*, Marta Péres-Gussinyé (Germany), Zhen Sun (China), Gianreto Manatschal (France), Anne Briaux (France)

#### 5.2 Carbonate Sedimentation at Continental Margins

Christian Betzler *christian.betzler@uni-hamburg.de (Germany)*, Gregor P. Eberli (USA), Jody Webster (Australia)

#### 5.3 Environmental Record of Margins – Ancient Records of Continental Conditions

Selvaraj Kandasamy *selvaraj@xmu.edu.cn (China)*, Shouye Yang (China)

#### 5.4 Gas Hydrate Systems on Continental Margins and Associated Geo-hazards

Pawan Dewangan *pdewangan@nio.org (India)*, Shyam Chand (Norway), Priyank Jaiswal (USA)

#### 5.5 Metals in Coastal Marine Environment: Distribution, Speciation and Bioavailability in Soil, Water, and Sediment

Parthasarathi Chakraborty *parthachemistry@gmail.com, pchak@nio.org (India)*

#### 5.6 Marine Oxygen Minimum Zones: from Sedimentary Rocks to Modern Oceanographic Record.

Aninda Mazumdar *maninda@nio.org (India)*, Wriddhiman Ghosh (India)

## Theme 6 | *Critical events, mass extinctions and evolution of biosphere*

**Coordinators:** Vandana Prasad *prasad.van@gmail.com (India)*,  
Rajeev Patnaik *rajeevpatnaik@gmail.com (India)*,  
Robert A. Spicer *r.a.spicer@open.ac.uk (UK)*

### Symposia

#### 6.1 At the Open and the Close: Boundary Events of the Palaeozoic Era

Nigel Hughes *nigel.hughes@ucr.edu (USA)*, Asish R. Basu (USA)

#### 6.2 Deccan Volcanism and its Role in Mass Extinction and Paleobiodiversity

Gerta Keller *gkeller@princeton.edu (USA)*, N. Malarkodi (India)

#### 6.3 Cenozoic Paleoclimate and Ecosystem

Robert Spicer *r.a.spicer@open.ac.uk (UK)*, Torsten Utescher (Germany)

#### 6.4 Evolutionary History, Phylogenetic Studies and Biogeography

Robert Morley *bobmorley100@gmail.com (UK)*, Uma Ramakrishnan (India)





## Theme 7 | Geological Timescale and Dynamic Record

**Coordinators:** G.V.R. Prasad [guntupalli.vrprasad@gmail.com](mailto:guntupalli.vrprasad@gmail.com) (India),  
Kishor Kumar [kishorsri@gmail.com](mailto:kishorsri@gmail.com) (India),  
Stanley C. Finny [Stan.Finney@csulb.edu](mailto:Stan.Finney@csulb.edu) (USA),  
Bilal Haq [haq@purdue.edu](mailto:haq@purdue.edu) (Finland)

### Symposia

#### 7.1 Recent Headways in Geological Time Scale

Stanley C Finny [Stan.Finney@csulb.edu](mailto:Stan.Finney@csulb.edu) (USA)

#### 7.2 Evolution of Palaeozoic Sedimentary Basins in the Tethys Himalaya - Biodiversity, Biozonation & Bioprovinces

Nigel Hughes [nigel.hughes@ucr.edu](mailto:nigel.hughes@ucr.edu) (USA), S K Parcha (India)

#### 7.3 Chronostratigraphy, Geochronology, Depositional Environments and Biotic Turnovers Across Major Mass Extinction Boundary Intervals in Marine and Continental sections

V. C. Tewari [vctewari@cus.ac.in](mailto:vctewari@cus.ac.in) (India)

#### 7.4 Gondwana Sedimentation, Climate and Life

P K Singh [prakashbhu@rediffmail.com](mailto:prakashbhu@rediffmail.com) (India), Saswati Bandyopadhyay [saswati@isical.ac.in](mailto:saswati@isical.ac.in) (India), A K Singh (India)

#### 7.5 Break-up of Gondwana, Evolution of Indian Ocean and Development of Marginal Marine Basins

D K Pandey [dhirendrap@hotmail.com](mailto:dhirendrap@hotmail.com) (India)

#### 7.6 Mesozoic Marine Revolutions - Sea Level Changes, Extreme Climates, Mesozoic Bioevents, Biotic Recoveries, & Correlation

B Haq [haq@purdue.edu](mailto:haq@purdue.edu) (USA)

#### 7.7 India's Northward Flight, Closing of Tethys, Rise of Himalaya, Biological Evolution

V C Thakur [thakurvc12@gmail.com](mailto:thakurvc12@gmail.com) (India)

#### 7.8 Paleogene Hyperthermal Events – Sedimentologic, Geochemical & Biotic Responses

Vandana Prasad [prasad.van@gmail.com](mailto:prasad.van@gmail.com) (India)



**Coordinators:** **N.C. Pant** *pantnc@gmail.com (India)*,  
**Thamban Meloth** *tmeloth@gmail.com (India)*,  
**Martin J Siegert** *m.siegert@imperial.ac.uk (UK)*

### Symposia

#### **8.1 Polar Ice Sheets and Their Interactions with Geosphere, Atmosphere, and Ocean**

Kenichi Matsuoka *kenichi.matsuoka@npolar.no (Norway)*, Frank Pattyn (Belgium), Rene Forsberg (Denmark), Fausto Ferraccioli (UK), Thamban Meloth (India)

#### **8.2 Past Polar to Mid-Latitude Climate Variability and their Teleconnections with the Tropics**

Manish Tiwari *manish@ncaor.gov.in (India)*, Alan Haywood (UK), Jochen Knies (Norway), Simon Belt (UK), Yusuke Yokoyama (Japan), Raja Ganeshram (UK)

#### **8.3 Climate variability from Ice Cores – Evidence from the Three Poles**

Liz Thomas *lith@bas.ac.uk (UK)*, Thamban Meloth (India), Paul Vallelonga (Denmark), Mariusz Potocki (USA)

#### **8.4 Southern Ocean – Past Global Linkages**

Crosta Xavier *xavier.crosta@u-bordeaux.fr (France)*, Luke Skinner (UK), Rahul Mohan (India)

#### **8.5 Changing Arctic and its Impact on Ecosystems**

K.P. Krishnan *kpkrishnan@gmail.com (India)*, Maarten J.J.E. Loonen (The Netherlands), A. A. Mohamed Hatha (India), Masaki Uchida (Japan)

#### **8.6 Fluctuations of the East Antarctic Ice Sheet during Cenozoic**

Carlota Escutia *cescutia@ugr.es (Spain)*, N C Pant (India)

#### **8.7 Exploring Subglacial Antarctica**

Martin Siegert *m.siegert@imperial.ac.uk (UK)*, Dustin Schroeder (USA)

#### **8.8 Rodinia to Gondwana - the PEL and the India Connection**

Somnath Dasgupta *somnathdasg@gmail.com (India)*, N C Pant (India)

#### **8.9 Coupled Structural and Thermal Evolution of the Antarctic Lithosphere**

Ian Dalziel *ian@ig.utexas.edu (USA)*, Donald Blankenship (USA), Jamin Greenbaum (USA)





## Theme 9 | *Glacial Mass Balance: Approaches and Problems*

**Coordinators:** **Shakil A Romshoo** *shakilrom@kashmiruniversity.ac.in (India)*,  
**D.P. Dobhal** *dpdobhal@wihg.res.in (India)*,  
**Tobias Bolch** *tobias.bolch@geo.uzh.ch (Switzerland)*

### Symposia

#### **9.1 Glacier Mass Balance and Dynamics**

S.P. Shukla *satya\_shukla63@rediffmail.com (India)*, D. P. Dobhal (India)

#### **9.2 Glacial Hydrology and Sediment Transfer**

A. L. Ramanathan *alr0400@mail.jnu.ac.in (India)*, Sanjay Jain (India)

#### **9.3 Impact of Climate Change on Glacier Health**

Kireet Kumar *kireet@gbpihed.nic.in (India)*, Shakil Ahmad Romshoo (India)

#### **9.4 Remote Sensing of Cryosphere**

Anil Kulkarni *anilkulkarni@iisc.ac.in (India)*, Tobias Bolch (Switzerland)

#### **9.5 Glacier Mass Balance Modelling**

Ramachandran Shankar *shankar@imsc.res.in (India)*, H.C Nainwal (India)





## Theme 10 | *Orogens through time*

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**Coordinators:** **Deepanker Asthana** [deepanker.asthana@gmail.com](mailto:deepanker.asthana@gmail.com) (India),  
**Anil M. Pophare** [apophare@gmail.com](mailto:apophare@gmail.com) (India),  
**Peter Cawood** [Peter.Cawood@monash.edu](mailto:Peter.Cawood@monash.edu) (Australia)

### Symposia

#### **10.1 Timescales and Tracers: Unpicking Orogenies Through Time**

Oliver Nebel [Oliver.Nebel@monash.edu](mailto:Oliver.Nebel@monash.edu) (Australia), Nicholas Gardiner (Australia), Tim Johnson (Australia)

#### **10.2 Proterozoic Orogens, Tectonic Geography and the Earth System**

Allan Collins [alan.collins@adelaide.edu.au](mailto:alan.collins@adelaide.edu.au) (Australia), Grant Cox (Australia), Morgan Blades (Australia)

#### **10.3 Phanerozoic Orogenesis in Asia – the Record of the Tethys Opening and Closing**

Guochun Zhao [gzhao@hku.hk](mailto:gzhao@hku.hk) (Hong Kong), Yunpeng Dong (China) and Di-Cheng Zhu (China)

#### **10.4 Secular Change in Magmatism and Metamorphism: the Fingerprints of Orogenesis**

Tim Johnson [Tim.Johnson@curtin.edu.au](mailto:Tim.Johnson@curtin.edu.au) (Australia)

#### **10.5 Precambrian Orogenic Processes and the Formation of Continents: Insights from Models and Observations**

Paul Tackley [paul.tackley@erdw.ethz.ch](mailto:paul.tackley@erdw.ethz.ch) (Switzerland), Tara Garya (Switzerland)

#### **10.6 The Pre-Mesozoic Record of the India-Asia Collision Zone**

Paul Myrow [pmyrow@coloradocollege.edu](mailto:pmyrow@coloradocollege.edu) (USA), Nigel Hughes (UK), Mike Searle (UK)

#### **10.7 Intraplate Tectonics and Continental Development: Orogens and Basins**

Alan Aitken [alan.aitken@uwa.edu.au](mailto:alan.aitken@uwa.edu.au) (Australia), Weronika Gorczyk (Australia), Sandra Occhipinti (Australia), Klaus Gessner (Australia)

#### **10.8 Convergent Margins and Mineralization**

Jeremy Richards [JRichards2@laurentian.ca](mailto:JRichards2@laurentian.ca) (Canada)



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## Symposia

### 11.1 Thermal Evolution of the Himalaya

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### 11.2 The Himalaya - Surface Processes

George Mathew [gmathew@iitb.ac.in](mailto:gmathew@iitb.ac.in) (India)

### 11.3 Crustal Deformation of the Himalaya

Vineet Gahalaut [vkgahalaut@yahoo.com](mailto:vkgahalaut@yahoo.com) (India)

### 11.4 Tectonic Evolution of the Himalaya

Talat Ahmad [tahmad001@gmail.com](mailto:tahmad001@gmail.com) (India), Mike Searle (UK), Rodolfo Carosi (Italy),  
Peter Cawood (Australia)

### 11.5 Brittle vs. Viscous Deformation in the Himalaya – Field to Experiments

Rodolpho Carosi (Italy), Santanu Bose [bose.santanu@gmail.com](mailto:bose.santanu@gmail.com) (India)

### 11.6 Role of Fluids in Himalayan Tectonics

Sandeep Singh [san662005@gmail.com](mailto:san662005@gmail.com) (India)

### 11.7 Phanerozoic and Precambrian Ophiolites as Oceanic Tracers of the Assembly & Disassembly of Gondwana

Yildirim Dilek [dileky@miamioh.edu](mailto:dileky@miamioh.edu) (USA), Brian F Windley (UK), D V Subba Rao (India),  
Reyaz Ahmad Dar (India)



## Theme 12 | *Quaternary Environments: Sedimentation and Landform Evolution*

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Rasmus C. Theide *rasmus.thiede@ifg.uni-kiel.de (Germany)*

### Symposia

#### 12.1 Deserts: Past and Present

Deepak M. Maurya *dmmaurya@yahoo.com (India)*, Amal Kar (India)

#### 12.2 Soil-Geomorphology and Landscape Evolution

Pankaj Srivastava *pankajps@gmail.com (India)*, Peter Kühn (Germany)

#### 12.3 Mountain Landscape: Tectonics and Climate Feedbacks

Rasmus C Theide *rasmus.thiede@ifg.uni-kiel.de (Germany)*, Pradeep Srivastava (India),  
Manfred Strecker (Germany), Bodo Bookhaagen (Germany)

#### 12.4 Glaciers: Past and Present

Aparna Shukla *aparna.shukla22@gmail.com (India)*, Manish Mehta (India), Dirk Scherler (Germany)

#### 12.5 Extreme Hydrological Event -Present and Past

Alpa Sridhar *alpasridhar@gmail.com (India)*, Bruno Wilhem (France), Tao Liu (USA)

## Theme 13 | *Imaging Earth's Interior*

**Coordinators:** V.M. Tiwari *virendram.tiwari@gmail.com (India)*,  
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Hitoshi Kawakatsu *hitosi@eri.u-tokyo.ac.jp (Japan)*

### Symposia

#### 13.1 Recent Advances in Near-Surface Geophysics

Gerald Gabriel *gerald.gabriel@leibniz-liag.de (Germany)*

#### 13.2 Images of the Deep Earth and Geodynamics

Hitoshi Kawakatsu *hitosi@eri.u-tokyo.ac.jp (Japan)*, Claudio Faccenna (Italy), Thorsten W. Becker (USA)

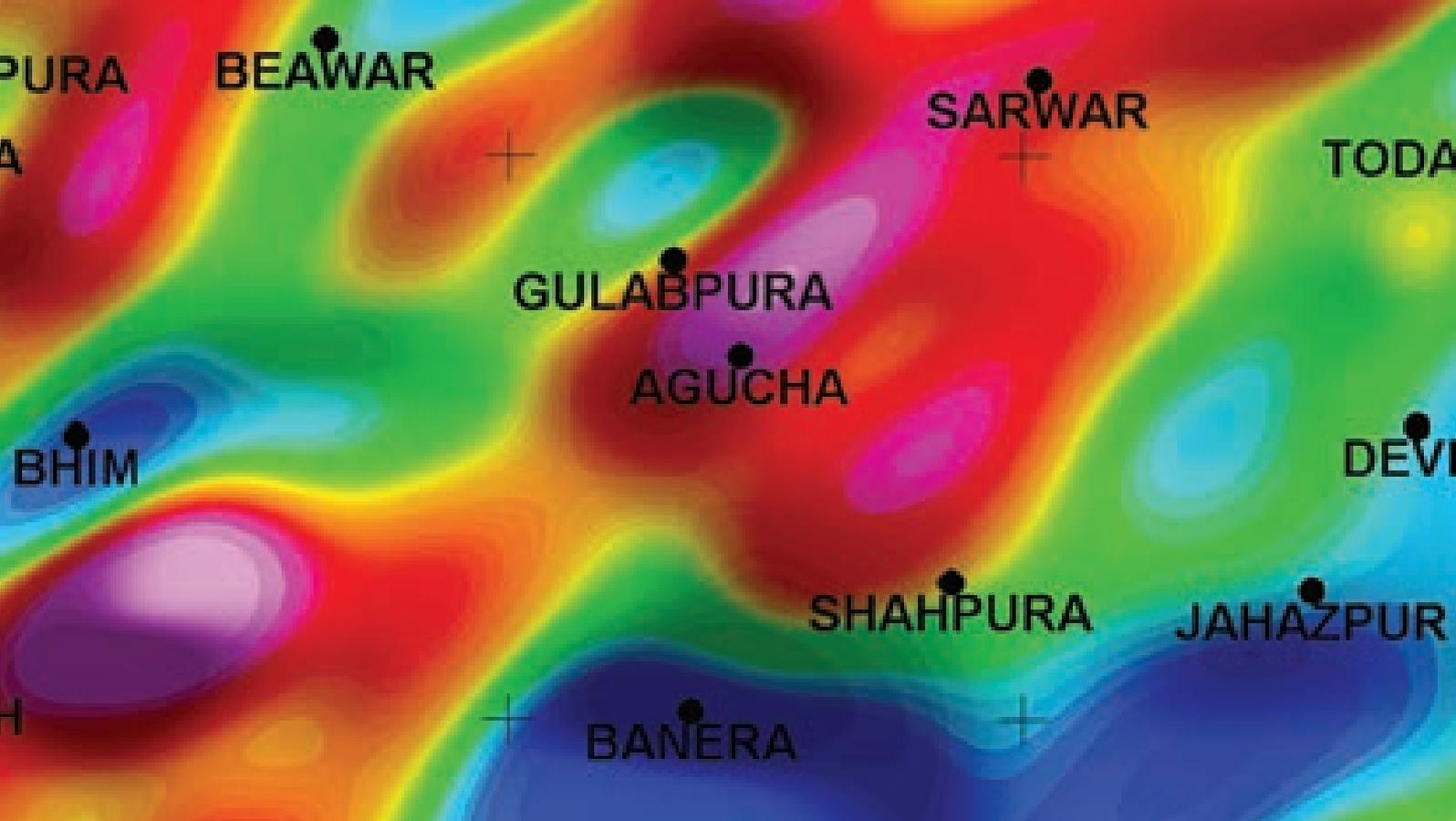
#### 13.3 Imaging the Crust and Lithosphere Beneath the Continents

M. Ravi Kumar *mravi@isr.res.in (India)*

#### 13.4 Crustal Structure and Deformation in Active Tectonic Regions with Special Reference to the Himalaya

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Theme 14 | *Emerging Trends in Exploration for Deep and Concealed Resources*

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 Richard Blewett *Richard.Blewett@ga.gov.au (Australia)*

## Symposia

### 14.1 Regolith Geology and Concealed Mineral Deposits

Ignacio González-Álvarez *Ignacio.Gonzalez-Alvarez@csiro.au (Australia)*

### 14.2 Application of Aerogeophysical Data Sets for Target Delineation Through Basement Mapping/ Predictive Geological Mapping of Potentially Covered Terrains

B. K. Sahu *sahubk2010@gmail.com (India)*

### 14.3 Mineral System Approach for Enhancing Mineral Deposit Discovery Rate in the Potentially Covered Terrain

M. N Praveen *praveenmn74@gmail.com (India)*

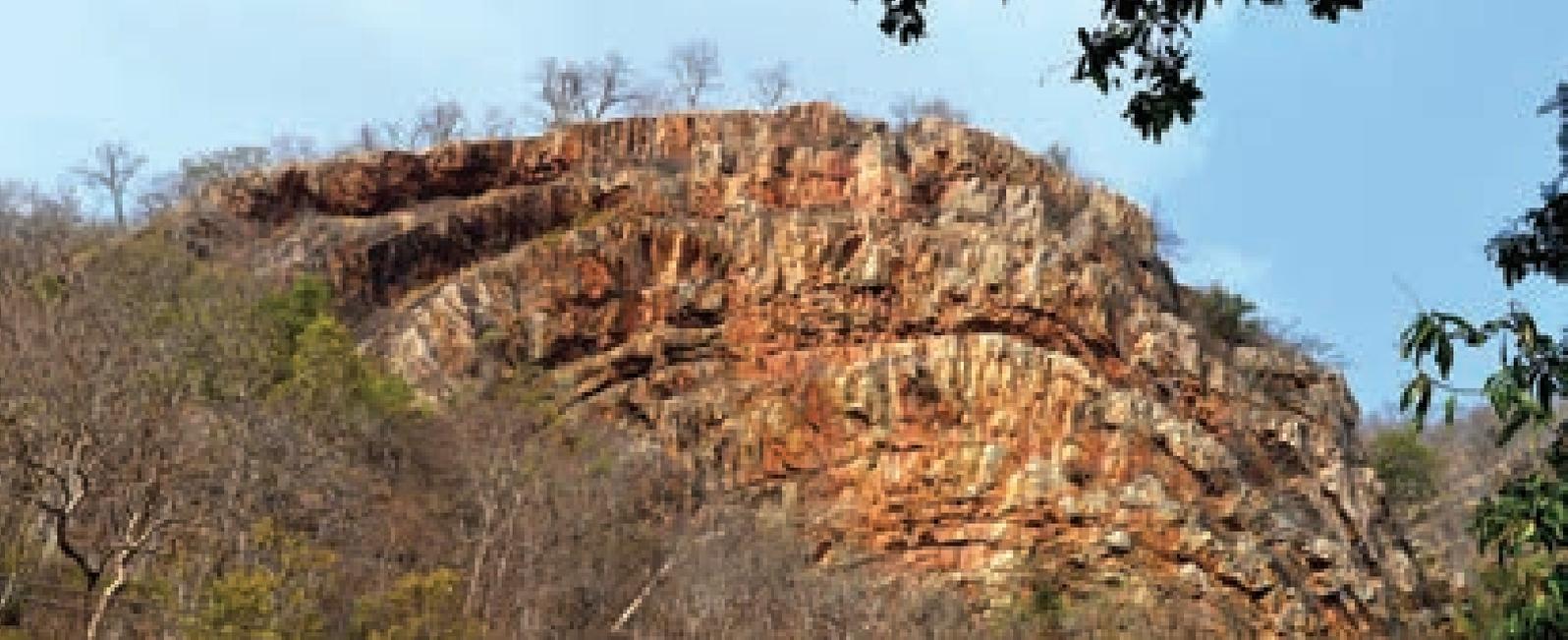
### 14.4 Advances in Geophysical Approaches for Tracing Concealed and Deep Structures and Materials

M. K. Mukherjee *mrinal\_km67@yahoo.co.in (India)*

### 14.5 Ground Geophysical Methods of Gravity, Magnetic, Electrical, Electromagnetic to Bring Out Concealed Fertile Bodies

G. Karunakar *karunakar65@yahoo.com (India)*





#### **14.6 Geochemical Techniques of Tracing Distal Footprints of Concealed Mineral Deposits**

David Cohen [d.cohen@unsw.edu.au](mailto:d.cohen@unsw.edu.au) (Australia)

#### **14.7 Recent Advances in Detection of Concealed Mineral Deposits by Integration Geoscience**

M. N. Mishra [mnmishra4@yahoo.co.in](mailto:mnmishra4@yahoo.co.in) (India), R. Balaji (India)

#### **14.8 Developments in Targeting Concealed and Deep Seated Uranium –REE Mineralization**

A. K. Chaturvedi [anandlko57@gmail.com](mailto:anandlko57@gmail.com) (India)

## Theme 15 | *Volcanology: Geological, Archeological and Contemporary*

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### **Symposia**

#### **15.1 Continental Flood Basalts and related Volcanics: Current status of knowledge and future work possibilities**

Stephen Self (USA), Raymond A. Duraiswami [raymond.duraiswami@gmail.com](mailto:raymond.duraiswami@gmail.com) (India),  
Hetu Sheth (India)

#### **15.2 Island Arc Volcanics**

Hiro Yamagishi (Japan), Martin Jutzeler [martin.jutzeler@utas.edu.au](mailto:martin.jutzeler@utas.edu.au) (Australia), Tapan Pal (India)

#### **15.3 Volcanism and its influence on human civilization**

Loyc Vanderkluysen (USA), Karol Nemeth (New Zealand), Makarand Bodas [makarandbodas@gmail.com](mailto:makarandbodas@gmail.com) (India), Himanshu Kulkarni (India)





## Theme 16 | *Magmatism and Petrogenetic Processes*

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Richard E Ernst [richard.ernst@ernstgeosciences.com](mailto:richard.ernst@ernstgeosciences.com) (Canada)

### Symposia

#### **16.1 Large Igneous Provinces and their Plumbing Systems**

Rajesh K. Srivastava [rajeshgeolbhu@bhu.ac.in](mailto:rajeshgeolbhu@bhu.ac.in) (India), Richard E Ernst (Canada)

#### **16.2 Granites - Petrogenesis to Metallogenesis**

N M W Roberts [nirob@bgs.ac.uk](mailto:nirob@bgs.ac.uk) (UK), Naveen Chaudhri (India), Parampreet Kaur (India)

#### **16.3 Subduction Zone Magmatism**

Georg Zellmer [G.F.Zellmer@massey.ac.nz](mailto:G.F.Zellmer@massey.ac.nz) (New Zealand), Jun-Ichi Kimura (Japan)

#### **16.4 Magmatism in an Extensional Environment**

Gautam Sen [gautam.sen@lehman.cuny.edu](mailto:gautam.sen@lehman.cuny.edu) (USA), Sarajit Sen Sarma (India)

#### **16.5 Intraplate Alkaline Magmatism**

N V Chalapathi Rao [nvcrao@bhu.ac.in](mailto:nvcrao@bhu.ac.in) (India), Lukáš Krmíček (Czech Republic)

#### **16.6 Melts and Fluids in the Earth's Mantle**

Sujoy K Ghosh [sujoy.ghosh@gg.iitkgp.ac.in](mailto:sujoy.ghosh@gg.iitkgp.ac.in) (India), Nachiketa Rai (India)

#### **16.7 Dynamics of Magmatic Processes**

Santosh Kumar [skyadavan@yahoo.com](mailto:skyadavan@yahoo.com) (India), Gregory Shellnutt (Taiwan), Steve Denyszyn (Australia), K R Hari (India)



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Andrey Bekker [andrey.bekker@ucr.edu](mailto:andrey.bekker@ucr.edu) (USA)

## Symposia

### 17.1 Geochemical and Chronological Perspective of Stars to Planets

G. Srinivasan [gopalan.srinivasan@gmail.com](mailto:gopalan.srinivasan@gmail.com) (India)

### 17.2 Geochemistry of Earth's Crust and Crustal Evolution

Allen Nutman [anutman@uow.edu.au](mailto:anutman@uow.edu.au) (Australia)

### 17.3 Evolution of Earth's Atmosphere and Ocean: Geological and Geochemical Perspective

Andrey Bekker [andrey.bekker@ucr.edu](mailto:andrey.bekker@ucr.edu) (USA)

### 17.4 Surface Geochemistry Past and Present

Albert Galy [agaly@crpg.cnrs-nancy.fr](mailto:agaly@crpg.cnrs-nancy.fr) (France)

### 17.5 Biogeochemistry

R. Baskar [rbaskargjuhisar@yahoo.com](mailto:rbaskargjuhisar@yahoo.com) (India)

### 17.6 Environmental Forensics of the Transport and Fate of Contaminant in Soil and Freshwater Systems

Prosun Bhattacharya [prosun@kth.se](mailto:prosun@kth.se) (Sweden), Manish Kumar (India)

### 17.7 Advances in Analytical Geochemistry

Martin Whitehouse [martin.whitehouse@nrm.se](mailto:martin.whitehouse@nrm.se) (Sweden)

### 17.8 Challenges and Opportunities of Global-Scale Geochemical Mapping (4th Arthur Darnley Symposium)

David B. Smith [dsmith@usgs.gov](mailto:dsmith@usgs.gov) (USA), Katherine Knights (Ireland), Patrice de Caritat (Australia), Xueqiu Wang (China), Alecos Demetriades (Greece)



## Theme 18 | *Advances in Mineralogy, including Ore mineralogy, Gemmology and Geometallurgy*

**Coordinators:** K.L. Pruseth *klpruseth@gmail.com (India)*,  
Jayshree Panjekar *jayshreepanjekar@gmail.com (India)*

### Symposia

#### **18.1 Minerals and Geochronology**

K L Pruseth *pruseth@gg.iitkgp.ac.in (India)*, Dewashish Upadhyay (India)

#### **18.2 Geology and Gemstones**

Jayshree Panjekar *jayshreepanjekar@gmail.com (India)*

#### **18.3 Advances in Synthetic Gemstones**

Pornsawat Wathanakul *pwathanakul2@gmail.com (Thailand)*

#### **18.4 Diamonds Today**

Andy Hsi-Tien Shen *ahshen1@ymail.com (China)*

#### **18.5 Gem Species and their Varieties**

Lee A. Groat *groat@mail.ubc.ca (Canada)*

#### **18.6 Quantitative Mineralogy – Applications and Value in Geoscience Systems**

Shaun Graham *shaun.graham@zeiss.com (UK)*, Vishwanath Uppugunduri (India)

## Theme 19 | *Metallogeny in relation to Geodynamics and Crustal Evolution – Archean to Recent*

**Coordinators:** Mihir Deb *mihirdeb@gmail.com*,  
M.L. Dora *dorageol@gmail.com (India)*

### Symposia

#### **19.1 Metallogeny of South East Asia with Focus on Tectonics and Geochronology**

Khin Zaw Khin *Zaw@utas.edu.au (Australia)*, Hai Than Tranh (Vietnam)

#### **19.2 Iron Oxide Copper-Gold (IOCG) Deposits: New Developments in Characterisation, Understanding of Ore-Forming Processes, and Geodynamic Setting**

Roger Skirrow *Roger.Skirrow@ga.gov.au (Australia)*, Huayong Chen *huayongchen@gig.ac.cn (China)*

#### **19.3 Granite Magmatism and Metallogeny**

Yamuna Singh *yamunasingh2002@yahoo.co.uk (India)*, Mohd. Shareef (India), M.L.Dora (India)

#### **19.4 Metallogeny in Relation to Subduction**

Kirtikumar R. Randive *randive101@yahoo.co.in (India)*, Boris Belyatsky (Russia), Craig Storey (UK)



### 19.5 Plume Related Mineralization

K. R. Hari krharigeology@gmail.com (India), E. Shaji (India)

### 19.6 Manganese Metallogenesis in Terrestrial Rock Record

Dillip Ranjan Kanungo dilliprkanungo@gmail.com (India)

### 19.7 Rift Related Mineralization: Geological and Geophysical Perspectives

Prabodha Ranjan Sahoo prabodha@iitism.ac.in (India), G Sreenivas Rao (India), Sahendra Singh (India)

## Theme 20 | *Sustainable Development and Mining – An Integrated Approach*

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### Symposia

#### 20.1 Biodiversity

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#### 20.2 Reporting Sustainability

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#### 20.3 Policy Initiative and Framework

Ashish Dash [ashis001@gmail.com](mailto:ashis001@gmail.com) (India)

#### 20.4 Mineral Security and Self Dependence

Partho Banerjee [banerjee@fomento.com](mailto:banerjee@fomento.com) (India)

#### 20.5 Innovative Approaches in Sustainability

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## Theme 21 | *Earth Observation System – Climate Variables, Proxies and Modelling*

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A.P. Dimri [apdimri@mail.jnu.ac.in](mailto:apdimri@mail.jnu.ac.in) (India)

### Symposia

#### **21.1 Altering Biogeochemical Cycles in Changing Climate**

Rajesh Agnihotri [rajagni9@gmail.com](mailto:rajagni9@gmail.com) (India), Mark A. Altabet (USA)

#### **21.2 Climate Proxy Records: A Tool for Future Climate Modelling**

Anupam Sharma [anupam110367@gmail.com](mailto:anupam110367@gmail.com) (India), Liviu Giosan (USA)

#### **21.3 Asian Monsoons and their Drivers from Mid-Holocene through Current Period**

Karumuri Ashok [ashokkarumuri@uohyd.ac.in](mailto:ashokkarumuri@uohyd.ac.in) (India), Mat Collins (UK)

#### **21.4 Air Quality, Environment and Public Health Impacts in Asia**

Prabir K. Patra [prabir@jamstec.go.jp](mailto:prabir@jamstec.go.jp) (Japan), A P Dimri (India)

#### **21.5 Aerosol-Cloud-Radiation-Land Surface Interactions and Feedbacks: Consequences to Water Cycle During India Summer Monsoon**

Sachchida (Sachi) N Tripathi [snt@iitk.ac.in](mailto:snt@iitk.ac.in) (India), Ilan Koren (Israel)

#### **21.6 Monsoon Dynamics**

Roxy Mathew Koll [roxy@tropmet.res.in](mailto:roxy@tropmet.res.in), [roxy.koll@noaa.gov](mailto:roxy.koll@noaa.gov) (USA), Deepti Singh (USA)

#### **21.7 Climate Change and Earth Surface Processes in the Himalaya: Past and Present**

Bodo Bookhagen [bodo.bookhagen@uni-potsdam.de](mailto:bodo.bookhagen@uni-potsdam.de) (Germany), Rajiv Sinha (India)

#### **21.8 Dynamical Downscaling of Climate Projections for Use in Impact Studies at Very High Resolutions**

Sushil Kumar Dash [skdash@cas.iitd.ernet.in](mailto:skdash@cas.iitd.ernet.in) (India), R. Bhatla (India), Erika Coppola (Italy)



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**Pallavi Anand** *pallavi.anand@open.ac.uk (UK)*

### Symposia

#### **22.1 Advances in Our Understanding of Global Hydro-Climate Dynamics Before Cenozoic**

Robert A Spicer *r.a.spicer@open.ac.uk (UK)*, Vandana Prasad (India)

#### **22.2 Evolution of Monsoon Variability on Tectonic Scale During the Cenozoic**

Ann Holbourn *ann.holbourn@ifg.uni-kiel.de (Germany)*, Raj K. Singh (India)

#### **22.3 Monsoon Evolution Pattern on Orbital to Suborbital and Centennial to Interdecadal Scales**

Stephan Steinke *ssteinke@xmu.edu.cn (China)*, Sushant Naik (India)

#### **22.4 Holocene Monsoon History with Focus on Changes During Last Two Millennia**

Ashish Sinha *asinha@csudh.edu (USA)*, Gayatri Kathayat (China), Prosenjit Ghosh (India)

#### **22.5 Megadroughts: Past, Present, and Future**

Gayatri Kathayat *kathayat@xjtu.edu.cn (China)*, Ashish Sinha (USA)

## Theme 23 | *Hi-Tech and Critical Mineral Commodities*

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**Taofa Zhou** *tfzhou@hfut.edu.cn (China)*

### Symposia

#### **23.1 Carbonatites and Alkaline Rocks: Origin and Evolution with Special Reference to Rare Metal and REE Mineralisation**

Anton R. Chakhmouradian *chakhmou@cc.umanitoba.ca (Canada)*, P. Krishnamurthy (India), S. G. Viladkar (India)

#### **23.2 Non-Carbonatites Related REE Mineralisation and Their Production**

Yasushi Watanabe *y-watanabe@gipc.akita-u.ac.jp (Japan)*, Kenzo Sanematsu (Japan),

#### **23.3 Rare Earths – A Global Perspective**

P L Hellman *phillip\_hellman@bigpond.com (Australia)*

#### **23.4 Critical Raw Materials for Sustainable Development: Geology, Resources, Production and Socio-Economics**

Harikrishnan Tulsidas *harikrishnan.tulsidas@un.org (Switzerland)*

#### **23.5 Critical Metal Deposits and New Technology**

Shao-Yong Jiang *shyjiang@cug.edu.cn (China)*





### **23.6 Raw Materials for the Electric Vehicle Revolution: Geology, Mineralogy and Geometallurgy**

Kathryn Goodenough [kmgo@bgs.ac.uk](mailto:kmgo@bgs.ac.uk) (UK)

### **23.7 Mineral Processing Technology for Cleaner Production of High-Tech and Critical Metals**

T Sreenivas [tsreenivas@gmail.com](mailto:tsreenivas@gmail.com) (India), Abhilash (India)

### **23.8 Pegmatite: Mechanism of Emplacement, Genesis, Deposits and Economic Significance**

M.B. Verma [director.amd@gov.in](mailto:director.amd@gov.in) (India)

## Theme 24 | *Oceans in a Changing World*

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### **Symposia**

#### **24.1 Spatio-Temporal Variability of Carbon Burial in the Oceans**

Rajeev Saraswat [rs.niog@gmail.com](mailto:rs.niog@gmail.com) (India)

#### **24.2 Assessing Coastal Vulnerability in a Warming World**

R. Mani Murali [mmurali@nio.org](mailto:mmurali@nio.org) (India)

#### **24.3 Response of Marine Organisms to Ocean Acidification**

Haimanti Biswas [haimanti.biswas@nio.org](mailto:haimanti.biswas@nio.org) (India), Suhas Shetye (India), Dineshram R (India)

#### **24.4 Reconstructing Past Pollution Levels from Marginal Marine Regions**

G.N. Nayak [gnnayak@unigoa.ac.in](mailto:gnnayak@unigoa.ac.in) (India), Rajiv Nigam (India)

#### **24.5 Sea Level Changes During Late Pleistocene and Holocene Periods and its Implications of Coastal Landforms.**

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### Symposia

#### **25.1 Geoarcheology and Paleoenvironment**

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#### **25.2 Late Quaternary Climate Shifts and Human Adaptation to Landscape: A Geoarchaeological Approach**

Hema Achyuthan *hachyuthan@yahoo.com (India)*

#### **25.3 Terrain, Time and Tools: Pleistocene to Early Holocene Prehistoric Adaptations**

Rakesh Tewari *rakesh.tewari53@gmail.com (India)*, Shanti Pappu (India), Kumar Akhilesh (India), Yanni Gunnell (France), Partha Chauhan (India)

#### **25.4 Recent Scientific Methods In Coastal And Inter-Tidal Archaeology**

Supriyo Kumar Das *sdas.geol@presiuniv.ac.in (India)*, Kaushik Gangopadhyay (India)

## Theme 26 | *Metamorphic Processes and Petrogenesis*

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**G.L. Clarke** *geoffrey.clarke@sydney.edu.au (Australia)*

### Symposia

#### **26.1 Accessory Minerals to Metamorphic Processes: Trace Elemental and Isotopic Insights**

Craig Storey *craig.storey@port.ac.uk (UK)*, James Darling (UK)

#### **26.2 Early Earth Orogenesis**

Santanu K. Bhowmik *santanu@gg.iitkgp.ac.in (India)*, Sankar Bose (India)

#### **26.3 Metamorphism at Convergent Plate Margins: Tales from the Upper Plate**

Richard Mark Palin *rmpalin@mines.edu (USA)*, Nick Roberts (UK)

#### **26.4 Characterization, Duration, Tectonics and Implications of Ultrahigh Temperature Metamorphism**

Somnath Dasgupta *somnathdasg@gmail.com (India)*, Pulak Sengupta (India)

#### **26.5 HP- to UHP Metamorphism: From Small Scale Observations to Mountain Forming Processes**

Hans-Peter Schertl *hans-peter.schertl@rub.de (Germany)*, Jingsui Yang (China)

#### **26.6 Metamorphic Products of Lithospheric Convergence: Subduction Zones**

Philippe Agard *philippe.agard@sorbonneuniversite.fr (France)*, Sarah Penniston-Dorland (USA)





## Theme 27 | *Rock Deformation and Rheology*

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**Rodolfo Carosi** [rodolfo.carosi@unito.it](mailto:rodolfo.carosi@unito.it) (Italy)

### Symposia

#### **27.1 Field Structures – Macro to Meso Scale Deformation Processes**

Bernhard Grasemann [bernhard.grasemann@univie.ac.at](mailto:bernhard.grasemann@univie.ac.at) (Austria), T. K. Biswal (India)

#### **27.2 Rheology and Deformation Mechanisms in the Earth**

Nibir Mandal [nibirmandal@yahoo.co.in](mailto:nibirmandal@yahoo.co.in) (India), Susan Ellis (New Zealand), Joel Sarout (Australia), Santanu Misra (India)

#### **27.3 Fabric Analysis – Past, Present and Future**

Richard Law [rdlaw@vt.edu](mailto:rdlaw@vt.edu) (USA), Toru Takeshita (Japan), Koushik Sen (India)

#### **27.4 Structural Control on Fluid Flow and Mineralization**

Paul D. Bons [paul.bons@uni-tuebingen.de](mailto:paul.bons@uni-tuebingen.de) (Germany), Tridib Kumar Mondal (India), Sivaji Lahiri (India)

#### **27.5 Extrapolating Experimental Rock Deformation Results to Field Structures**

Alison Ord [alison.ord@uwa.edu.au](mailto:alison.ord@uwa.edu.au) (Australia), Santanu Bose (India), H.B. Srivastava (India), J.H. Kruhl (Germany), Virginia G. Toy (New Zealand)

#### **27.6 Structural Geology and Society - Restoration, Geothermal Energy and Hydrocarbons**

Rosalda Punturo [punturo@unict.it](mailto:punturo@unict.it) (Italy), Domenico Liotta (Italy), Chris Hilgers (Germany), Susanta Kumar Samanta (India), Sandeep Bhatt (India)



## Theme 28 | *Ore forming processes and systems*

**Coordinators:** **Sisir K. Mondal** *sisir.mondal@gmail.com (India),*  
**Biswajit Mishra** *bmgg@iitkgp.ac.in (India),*  
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**Richard Goldfarb** *rjgoldfarb@mac.com (USA),*  
**David Lentz** *dlentz@unb.ca (Canada),*  
**A. Pitawala** *apitawala@yahoo.com (Sri Lanka)*

### Symposia

#### **28.1 Magmatic Processes and Ore Deposits**

Mei-Fu Zhou *mzzhou@hku.hk (Hong Kong, China),* Ibrahim Uysal (Turkey), J. Gregory Shellnutt (Taiwan), Shoji Arai (Japan)

#### **28.2 Hydrothermal Processes and Ore Deposits**

Franco Pirajno *franco.pirajno@uwa.edu.au (Australia),* Nigel Cook (Australia)

#### **28.3 Sedimentary Processes and Ore Deposits**

Andrey Bekker *andreyb@ucr.edu (USA),* Nicolas J Beukes (South Africa), Harilaos Tsikos (South Africa), Carlos Alberto Rosière (Brazil), Joydip Mukhopadhyay (India), Bertus Smith (South Africa)

#### **28.4 Fluid/Melt Inclusions, Trace Element and Isotope Geochemistry in Study of Ore Deposits**

Robert Bodnar *rjb@vt.edu (USA),* Svetlana Tesselina (Australia)

#### **28.5 Solubility of Metals in Melt/Fluid Systems**

Anna Vymazalová *anna.vymazalova@geology.cz (Czech Republic),* Hassan Helmy (Egypt)

#### **28.6 Metamorphism and Ore Remobilization**

Xiaochun Li *lix1986@hku.hk (Hong Kong, China),* Richen Zhong (China)



**Coordinators:** **Manas Roychowdhury** *manasmayukh@gmail.com (India)*,  
**P.S. Parihar** *pariharps1954@gmail.com (India)*,  
**Patrice Bruneton** *p.bruneton@orange.fr (France)*

## Symposia

### **29.1 Uranium Mineral Systems: Genetic Models and New Understandings of Uranium Deposits**

Susan M Hall *susanhall@usgs.gov (USA)*

### **29.2 Advances in Uranium Exploration and Exploitation**

Michel Cuney *michel.cuney@univ-lorraine.fr (France)*

### **29.3 Unconventional Uranium Resources: A Global Perspective**

Patrice Bruneton *p.bruneton@orange.fr (France)*

### **29.4 Thorium: Future Energy Source Exploration, Resources and Technology**

Harikrishnan Tulsidas *harikrishnan.tulsidas@un.org (Switzerland)*

### **29.5 Uranium Resources and the Fuel Cycle for the 21st Century**

Christophe Xerri *c.xerri@iaea.org (Austria)*, Harikrishnan Tulsidas (Switzerland)

### **29.6 Geological Aspects, Exploration and Economics of Coal Deposits**

A.B. Dutt *amit22dutt@yahoo.co.in*, Chandan Chakraborty (India), Anjan Rai Choudhuri (India), Goutam Mukherji (India)

### **29.7 Coal: Characterization, Beneficiation and Utilization**

Uttam Kumar Bhui *Uttam.bhui@spt.pdpu.ac.in (India)*, V. A. Mendhe (India), Naeem Ahmad (India), Sudip Bhattacharyya (India)



## Theme 30 | *Hydrocarbon Systems*

**Coordinators:** Kalachand Sain *kalachandsain@yahoo.com (India)*,  
P. Chandrasekharan *pcran@oilindia.in (India)*,  
Richard Coffin *Richard.Coffin@tamucc.edu (USA)*

### Symposia

#### 30.1 Petroleum System

Keyu Liu *liukeyu@upc.edu.cn (China)*, Indrajit Barua (India), K. Vasudevan (India)

#### 30.2 Shale Gas & Coal Bed Methane

A. M. Dayal *anurodhisotope@gmail.com (India)*, Brian Horsfield (Germany), Rajiw Lochan (India)

#### 30.3 Gas-Hydrates: Future Major Energy Resources

Ingo Pecher *i.pecher@auckland.ac.nz (New Zealand)*, Bjørn Kvamme (Norway), Kalachand Sain (India), Giuliana Panieri (Norway)

#### 30.4 Sub-Volcanic Mesozoic Sediments

Kalachand Sain *kalachandsain@yahoo.com (India)*, N. Chandrasekhar (India)

#### 30.5 Enhanced Oil Recovery

Masoud Riazi *mriazi@shirazu.ac.ir (Iran)*, Manouchehr Haghighi (Australia)

#### 30.6 Carbon capture, utilization and storage experiment

P S R Prasad *psrprasad@ngri.res.in (India)*, Baleshwar Kumar (India), Dag Nummedal (USA)

## Theme 31 | *Geohazards*

**Coordinators:** O.P. Mishra *opmishra2010.saarc@gmail.com (India)*,  
Saibal Ghosh *saibal.ghosh.gsi@gov.in (India)*,  
Fausto Guzzetti *fausto.guzzetti@irpi.cnr.it (Italy)*

### Symposia

#### 31.1 Geosciences for Disaster Risk Reduction

Fausto Guzzetti *fausto.guzzetti@irpi.cnr.it (Italy)*, Warner Marzocchi (Italy), Hongey Chen (Taiwan)

#### 31.2 Geohazards in Inter and Intra Plate Tectonic Regimes

Sandip K Som *sksom999@gmail.com (India)*, A. P. Singh (India), Shuichi Hasegawa (Japan)

#### 31.3 Landslides, Other Related Mass-Wasting Hazards and Associated Risks

Jonathan Godt *jgodt@usgs.gov (USA)*, Oded Katz (Israel), Fausto Guzzetti (Italy), Niroj K. Sarkar (India)

#### 31.4 Transboundary Disasters: Prediction, Preparedness and Prevention

Cees J. van Westen *c.j.vanwesten@utwente.nl (The Netherlands)*, Peter T. Bobrowsky (Canada)



### **31.5 Monitoring, Predictability and Early Warning of Geohazards**

Chandan Ghosh cghosh24@gmail.com (India), Hemanta Hazarika (Japan), Anand J Puppala (USA)

### **31.6 Urbanization and Geohazards**

R K Srivastava srivastava.rks@gmail.com (India), Mriganka Ghatak (India)

### **31.7 Mining and Industrial Hazards and Subsidence**

D. Jean Hutchinson hutchinj@queensu.ca (Canada), Gurdeep Singh (India)

### **31.8 Geohazards Risk Reduction Measures and Mitigation**

Helen J. Reeves hjre@bgs.ac.uk (UK), D. Jean Hutchinson (Canada)

### **31.9 Geohazards Risk: Communications, Education & Knowledge Exchange**

Bruce D. Malamud bruce.malamud@kcl.ac.uk (UK), Maneesha V. Ramesh (India), Mirianna Budimir (UK)

### **31.10 Global Disaster Risk Reduction Policies: Status, Scope and Future Perspectives**

Mriganka Ghatak mghatak.sdmc@gmail.com (India), Shahnaz Huq Hussain (Bangladesh)

## Theme 32 | *Environmental Geosciences*

**Coordinators:** J.K. Tripathi [jktrip@yahoo.com](mailto:jktrip@yahoo.com) (India),  
C.V. Dharma Rao [venchasa@gmail.com](mailto:venchasa@gmail.com) (India),  
Vijay P. Singh [vsingh@tamu.edu](mailto:vsingh@tamu.edu) (USA),  
Rohana Chandrajith [rohanac@pdn.ac.lk](mailto:rohanac@pdn.ac.lk) (Sri Lanka)

## Symposia

### **32.1 Human Activities and the Geoenvironment**

Imasiku A Nyambe inyambe@unza.zm (Zambia), Benjamin Mapani (Namibia), Brian Marker (UK)

### **32.2 Environmental Geochemistry**

Jayant K. Tripathi [jktrip@yahoo.com](mailto:jktrip@yahoo.com) (India), Abhay Kumar Singh (India), Sudesh Yadav (India), Archana Gattupalli (India), David Smith (USA), C V Dharma Rao (India)

### **32.3 Palaeosols and Palaeoweathering Profiles: Indicators of Palaeoclimates and Palaeoenvironments**

Mohammed Rafi G. Sayyed [mrgsayyed@yahoo.com](mailto:mrgsayyed@yahoo.com) (India), Jayant K. Tripathi (India)

### **32.4 Water resources**

C V Dharma Rao [venchasa@gmail.com](mailto:venchasa@gmail.com) (India), Vijay P. Singh (U.S.A.), Abhay Kumar Singh (India)

### **32.5 Urban Geosciences**

Daniel Schertzer [Daniel.Schertzer@enpc.fr](mailto:Daniel.Schertzer@enpc.fr) (France), Klaus Fraedrich (Germany), Stefano Tinti (Italy)



**Coordinators:** **K.S. Rao** *raoks@civil.iitd.ernet.in (India)*,  
**Scott F. Burns** *burns@pdx.edu (USA)*

### Symposia

#### **33.1 Recent Advances in Engineering Geology**

Gopal Dhawan *gdhawangeologist@gmail.com (India)*, Imran Sayeed (India), Ranjith Rath (India)

#### **33.2 Soil Mechanics and Geoenvironmental Engineering**

N. K. Samadhiya *samadhiyank@gmail.com (India)*

#### **33.3 Rock Engineering and Underground Structures**

Mahendra Singh *singhfce@iitr.ac.in (India)*, Amit Shrivastava (India)

#### **33.4 Soil Dynamics and Earthquake Geotechnical Engineering**

Neelima Satyam *neelimasatyam.d@gmail.com (India)*, Ganesh W Rathod (India)

## Theme 34 | *Geomagnetism: Origin of Geomagnetism, Seismology from Space*

**Coordinators:** **Mita Rajaram** *mitarajaram@yahoo.com (India)*,  
**S. Gurubaran** *gurubara@iigs.iigm.res.in (India)*,  
**C.D. Reddy** *cdreddy@iigs.iigm.res.in (India)*,  
**Pierdavide Coisson** *coisson@ipgp.fr (France)*

### Symposia

#### **34.1 The Main Geomagnetic Field: Understanding the Structure, Dynamics and History of the Earth**

B. Sreenivasan *bsreeni20@yahoo.com (India)*, G. Vichare (India), Yujhi Yamamoto (Japan)

#### **34.2 Decoding Seismic Imprints in the Earth and its Near Space Environment**

Lucie Rolland (France), Mala Baggiya *mala@iigs.iigm.res.in (India)*, P. S. Sunil (India)

#### **34.3 Remote Sensing of Lithosphere Using Natural Source Magnetic and Electromagnetic Method for Structure, Tectonics and Resource Evaluation.**

Jérôme Dyment *jdy@ipgp.fr (France)*, D. Ravat (USA), Gautam Gupta (India), Anand. S.P. (India)





Theme 35 | *Advances in Mathematical Geosciences,  
Mineral Resource Evaluation and Mine-Planning*

**Coordinators:** H.S. Pandalai [pandalai@iitb.ac.in](mailto:pandalai@iitb.ac.in) (India),  
P.V. Rao [drpvrao@gmail.com](mailto:drpvrao@gmail.com) (India),  
Jennifer McKinley [j.mckinley@qub.ac.uk](mailto:j.mckinley@qub.ac.uk) (UK)

## Symposia

### 35.1 Mathematical Geosciences and Mineral Resource Evaluation

B. S. Daya Sagar [bsdsagar@isibang.ac.in](mailto:bsdsagar@isibang.ac.in) (India)

### 35.2 Mine Planning and Scheduling

TN Gunaseelan [guna@dmt-group.com](mailto:guna@dmt-group.com) (India), Ernst Bernhard Teigler (Germany)

### 35.3 Risk Analyses in Mineral Resource Evaluation, Mine Planning and Operations

Abani R Samal [arsamal@gmail.com](mailto:arsamal@gmail.com) (USA), Edson Ribeiro (Brazil), Mark Burnett (UK)





## Theme 36 | *Exploration and Mining of Marine Mineral Resources*

**Coordinators:** **S. Rajan** *rajan.ncaor@gmail.com (India),*  
**Rasik Ravindra** *rasikravindra@gmail.com (India),*  
**John Kurian** *john@ncaor.gov.in (India),*  
**Tetsuro Urabe** *urabe@oa.u-tokyo.ac.jp (Japan)*

### Symposia

#### **36.1 Polymetallic Nodules: Geological Characteristics and Resource Potential**

Abhishek Saha *asaha@nio.org (India)*, Kali Sanjay (India), Thomas Kuhn (Germany)

#### **36.2 Modern Seafloor Hydrothermal Systems and Massive Seafloor Sulphides**

Kamesh Raju *kameshraj@gmail.com (India)*, John Kurian (India), Jérôme Dymont (France)

#### **36.3 Cobalt-rich Ferromanganese Crusts: Formation and Occurrence**

Sridhar D. Iyer *iyer@nio.org (India)*, V. K. Banakar (India), James R. Hein (USA)

#### **36.4 Exploration for Deep-sea Mineral Resources: The Scientific and Technological Challenges**

G. A. Ramadass *ramadass@niot.res.in (India)*, John Kurian (India), Georgy Cherkashev (Russia)

#### **36.5 Mining of Deep-sea Minerals: Potential Impacts on the Marine Environment, Remedial Measures and Mitigation Strategies**

Rahul Sharma *rsharmagoa@gmail.com (India)*, Baban Ingole (India), Yoshihisa Shirayama (Japan), Teresa Radziejewska (Poland)

#### **36.6 Deep Sea Mining Within and Beyond National Jurisdictions: Technological Developments and Regulatory Frameworks**

M. A. Atmanand *atma@niot.res.in (India)*, Tetsuro Urabe (Japan), S. Rajan (India)

#### **36.7 Extended Continental Shelves under UNCLOS: Sovereign Rights for Exploiting Non-living Resources Beyond 200 Nautical Miles**

Bimal N. Patel *vc@gnlu.ac.in (India)*, Rasik Ravindra (India), S. Rajan (India)

#### **36.8 Mineral Resources of the Continental Margins, Excluding Hydrocarbons**

V. Purnachandra Rao *vprao55@gmail.com (India)*, A. Anil Kumar (India), Craig R. Glenn (USA)



## Theme 37 | *Critical Zone and Sustainable Development*

**Coordinators:** **Vimal Singh** *vimalgeo@gmail.com (India)*,  
**Sekhar Muddu** *sekhar.muddu@gmail.com (India)*

### Symposia

#### **37.1 Ecohydrology**

Karl Schneider *karl.schneider@uni-koeln.de (Germany)*

#### **37.2 Critical Zone Science in Tropical System**

Laurent Ruiz *Laurent.Ruiz@inra.fr (France)*

#### **37.3 Biogeosciences**

Jean Riotte *jean.riotte@get.obs-mip.fr (France)*

## Theme 38 | *Hydrogeology and Sustainable Development*

**Coordinators:** **L. Elango** *elango34@hotmail.com (India)*,  
**Dipankar Saha** *dsaha002@yahoo.com (India)*,  
**Makoto Taniguchi** *makoto@chikyu.ac.jp (Japan)*

### Symposia

#### **38.1 Mapping, Investigation, Characterisation and Management of Aquifers**

Dipankar Saha *dsaha002@yahoo.com (India)*

#### **38.2 Groundwater Chemistry and Contamination**

L. Elango *elango34@hotmail.com (India)*

#### **38.3 Managed Aquifer Recharge and Groundwater Resource Sustainability**

R C Jain *ratan.jain@gmail.com (India)*

#### **38.4 Fragile Hydrogeology of Coastal, Island and Other Sensitive Areas**

Abhijit Mukherjee *amukh2@gmail.com (India)*

#### **38.5 Deeper and Trans-Boundary Aquifers**

Sashank Sekhar *sashankshekhar@gmail.com (India)*

#### **38.6 Impact of Climate Change on Groundwater**

Makoto Taniguchi *makoto@chikyu.ac.jp (Japan)*



**Coordinators:** **Alok Porwal** *alok.porwal@gmail.com (India)*,  
**Vinod Kumar** *vinodkumar\_k@nrsc.gov.in (India)*,  
**M.N. Mishra** *mnmishra4@yahoo.co.in (India)*,  
**Ignacio González-Álvarez** *Ignacio.Gonzalez-Alvarez@csiro.au (Australia)*

### Symposia

#### **39.1 Mineral Systems Approach to Exploration Targeting**

Alok Porwal *alok.porwal@gmail.com (India)*, Ignacio González-Álvarez (Australia)

#### **39.2 Mineral Prospectivity Modelling: State of the Art**

E John M Carranza *ejmcarranza@gmail.com (South Africa)*, Alok Porwal (India)

#### **39.3 Remote Sensing & Geosciences**

Carlos Roberto de Souza Filho *betos@ige.unicamp.br (Brazil)*

#### **39.4 Geocomputation and Data Analytics for Geological Data Mining and Knowledge Discovery**

E J Holden *eun-jung.holden@uwa.edu.au (Australia)*, Jens Klump (Australia)

## Theme 40 | *Planetary Sciences*

**Coordinators:** **Mahesh Anand** *mahesh.anand@open.ac.uk (India)*,  
**Jayanta K. Pati** *jkpati@gmail.com (India)*,  
**Wolf Uwe Reimold** *wolf.uwer@gmail.com (Germany)*

### Symposia

#### **40.1 Planetary Surface Processes on Moon, Mars and Venus**

P. Senthil Kumar *senthil@ngri.res.in (India)*, S. Vijayan (India), R. Phani Rajasekhar (India)

#### **40.2 Cosmochemistry of Planetary Materials and Planetary Processes.**

Luigi Folco *luigi.folco@unipi.it (Italy)*

#### **40.3 Impact Cratering – The Works**

Wolf Uwe Reimold *wolf.uwer@gmail.com (Germany)*

#### **40.4 Remote Sensing-based Compositional Studies of Planetary Bodies and Planetary Geomorphology**

Deepak Dhingra *deepdpes@gmail.com (India)*, Neeraj Srivastava (India), Megha U. Bhatt (India)

#### **40.5 Comparative Planetary Mineralogy and Petrology using Terrestrial Analogues**

V. J. Rajesh *rajeshvj@iist.ac.in (India)*, Satadru Bhattacharya (India)

#### **40.6 Space Instrumentations and Innovations – Downsizing and Energy-efficient Technology**

Varun Sheel *varun@prl.res.in (India)*, M Shanmugam (India), Debabrata Banerjee (India)

#### **40.7 Planetary Habitability and Astrobiology**

Anil Dutt Shukla *anilds@prl.res.in (India)*





## Theme 41 | *Quantification of Non-linear Geological Processes*

**Coordinators:** R.K. Tiwari [rktiwari54@gmail.com](mailto:rktiwari54@gmail.com) (India),  
Abhey Ram Bansal [abhey.bansal@gmail.com](mailto:abhey.bansal@gmail.com) (India),  
Maurizio Fedi [fed@unina.it](mailto:fed@unina.it) (Italy)

### Symposia

#### 41.1 Chaos and Fractal theory

Vipin Srivastava [vipinsri02@gmail.com](mailto:vipinsri02@gmail.com) (India), G. Rangrajan (India)

#### 41.2 Earthquake Triggering/Interaction

Zhigang Peng [zpeng@gatech.edu](mailto:zpeng@gatech.edu) (USA), Ian Main (UK), A. R. Bansal (India)

#### 41.3 Statistical Seismology

J. Zhuang [zhuangjc@ism.ac.jp](mailto:zhuangjc@ism.ac.jp) (Japan), S. S. Teotia (India), D. Shanker (India)

#### 41.4 Mathematical Modelling of Seismology and Earthquake Engineering

Sohichi Hirose [hirose.s.aa@m.titech.ac.jp](mailto:hirose.s.aa@m.titech.ac.jp) (Japan), S K Tomar (India)

#### 41.5 Scaling, Stochastic Processes, and Complex Networks

Daniel Schertzer [Daniel.Schertzer@enpc.fr](mailto:Daniel.Schertzer@enpc.fr) (France), Juergen Kurths (Germany)

#### 41.6 Nonlinear Processes in Potential Field

Maurizio Fedi [fed@unina.it](mailto:fed@unina.it) (Italy), V P Dimri (India)

#### 41.7 Quantification and Modelling of Nonlinear Processes in Climate Change and Extreme Events

A. S. Sharma [ssh@astro.umd.edu](mailto:ssh@astro.umd.edu) (USA), R. K. Tiwari (India), Saumen Maiti (India)

#### 41.8 Hydrology and Reservoir dynamics

Giorgio Cassiani [giorgio.cassiani@unipd.it](mailto:giorgio.cassiani@unipd.it) (Italy), Shib S. Ganguli (India)

#### 41.9 Application of Nonlinear Methods in Geological Processes

Qiuming Cheng [qiuming.cheng@iugs.org](mailto:qiuming.cheng@iugs.org) (China), Bishwajit Chakraborty (India)

#### 41.10 Geophysical Inversion Methods and Optimization

Michael S. Zhdanov [michael.zhdanov@utah.edu](mailto:michael.zhdanov@utah.edu) (USA), Upender Singh (India)



## Theme 42 | *Geological Sequestration of CO<sub>2</sub> and Enhanced Oil Recovery*

**Coordinators:** **Nimisha Vedanti** *nimisha@ngri.res.in (India),*  
**Vikram Vishal** *v.vishal@iitb.ac.in (India),*  
**Sally Benson** *smbenson@stanford.edu (USA)*

### Symposia

#### **42.1 Deccan Trap Basement: Evolution and Processes**

Om Prakash Pandey *om\_pandey@rediffmail.com (India),* J P Shrivastava (India)

#### **42.2 Carbon Capture and Utilization as a Pathway to Reliable Storage**

Jennifer Wilcox *jlwilcox@wpi.edu (USA)*

#### **42.3 CO<sub>2</sub> Storage/ Trapping Mechanism**

Qi Li *qli@whrsm.ac.cn (China)*

#### **42.4 CO<sub>2</sub> Storage Associated with Enhanced Oil Recovery**

Richard A. Esposito *raesposi@uab.edu (USA)*

#### **42.5 Geologic storage of CO<sub>2</sub> in deep saline aquifers / Geologic site characterization and monitoring**

Jonathan Pearce *jmpe@bgs.ac.uk (UK),* John Williams (UK), S P Pradhan (India)

## Theme 43 | *Kimberlites, Xenoliths and Diamonds: Snapshots of the Earth's Mantle*

**Coordinators:** **S. Ravi** *sraviyers@gmail.com (India),*  
**E.V.S.S.K. Babu** *evsskbabu@gmail.com (India),*  
**Fareeduddin** *fareedromani@gmail.com (India),*  
**Abhijeet Mukherjee** *abhijeetmukherjee64@gmail.com (India),*  
**Sebastian Tappe** *sebastian@uj.ac.za (South Africa)*

### Symposia

#### **43.1 Exploration and Mining for Kimberlites**

Biplob Chatterjee (India) *biplob.chatterjee@geovale.com*

#### **43.2 Emplacement of Kimberlites and related rocks**

Barbara Scott (Canada) *barbara@scottsmithpetrology.com*

#### **43.3 Petrology of Kimberlites and related rocks**

S. C. Patel (India) *scpatel@iitb.ac.in*



#### **43.4 Mafic, ultramafic xenoliths and Xenocrysts: physical and chemical architecture of the subcontinental lithospheric mantle (SCLM)**

Stephen Haggerty (USA) haggerty@fiu.edu

#### **43.5 Deep Mantle processes: Petrological, geochemical and isotopic studies from mantle xenoliths and xenocrysts**

Sebastian Tappe sebastian@uj.ac.za (South Africa),

#### **43.6 Recipes for Diamonds: evidences from fluids and inclusions**

J.N.Das (India) jndas7@gmail.com

## Theme 44 | *Non-invasive 3D Groundwater Mapping for Resource Management*

**Coordinators:** Shakeel Ahmed *shakeelifcgr@gmail.com (India)*,  
Subash Chandra *schandra75@gmail.com (India)*,  
John W. Lane *Jr.jwlane@usgs.gov (USA)*

### **Symposia**

#### **44.1 Assessing Sub-Surface from Space and Remote Sensing**

Saumitra Mukherjee *saumitramukherjee3@gmail.com (India)*, Atiqur Rahman (India),

#### **44.2 High Resolution 3D Geophysical Mapping of Geological Formations Using Airborne Survey**

Esben Auken *esben.auken@geo.au.dk (Denmark)*, Subash Chandra (India)

#### **44.3 Characterization of Litho-Units for Aquifer Delineation by Integrating Ground Survey Data**

Prabhat C. Chandra *chandrapc67.gwgp@gmail.com (India)*, Kishore C. Naik (India)

#### **44.4 Geological and Geotechnical Characterisation for Fracture Pathway in Hard Rocks**

Subash Chandra *schandra75@gmail.com (India)*, Rana Chatterjee (India)

#### **44.5 Geophysically Constrained Hydrogeological Parameters Estimation**

Mohammed Israil *mohdfes@iitr.ac.in (India)*, Sarah (India)

#### **44.6 Diverse Applications in Discovering Paleo-Channels, Optimizing Artificial Recharge and Waste Disposal Sites, Smart Cities etc.**

S.K. Verma *skvngri@gmail.com (India)*, Jainendra K. Rai (India)



## Theme 45 | *Symposia and Sessions proposed by IUGS-affiliated bodies and other Major Fora*

These Symposia / Sessions are organised by groups associated with the IUGS and other international and national organisations. The oral/ e-poster presentations under this category will be by invitation of the conveners.

### **45.1 Hillslope process and climate change**

Mauro Soldati (Italy), Sunil Kumar De [desunil@yahoo.com](mailto:desunil@yahoo.com) (India), Mihai Micu (Romania)  
International Association of Geomorphologists (IAG)

### **45.2 Geomorphological Hazards and Risks mitigation through new techniques**

Bianca Vieira (Brazil), Sunando Bandyopadhyay [odnanus@gmail.com](mailto:odnanus@gmail.com) (India), Helene Petschko (Austria) International Association of Geomorphologists (IAG) Working Group on GEOMORPHOLOGICAL HAZARDS (IAGGeomhaz)

### **45.3 Status of mineral resources of SAARC nations for cooperative mineral-based industries**

O. P. Verma [igcroorkee@gmail.com](mailto:igcroorkee@gmail.com) (India) Indian Geological Congress

### **45.4 Special IAMG Award Keynote session**

Jennifer McKinley [j.mckinley@qub.ac.uk](mailto:j.mckinley@qub.ac.uk) (UK), Christien Thiart (South Africa) International Association for Mathematical Geosciences (IAMG)

### **45.5 Special IAMG Session on IAMG Delegate Meeting**

Jennifer McKinley [j.mckinley@qub.ac.uk](mailto:j.mckinley@qub.ac.uk) (UK) International Association for Mathematical Geosciences (IAMG)

## Theme 45 | *Symposia/Sessions proposed by YES Network*

### **45.6.1 Shear Zones and Crustal Deformations (SZCD)**

Durga Prasanna Mohanty [durgamohanty.online@gmail.com](mailto:durgamohanty.online@gmail.com) (India), Ankush Singh (USA)

### **45.6.2 Water: Sustainability for Life (WS)**

N. Srinivasa Rao [srinarukula@gmail.com](mailto:srinarukula@gmail.com) (India), Md. Taufique Warsi (India), Faisal Kamal Zaidi (UAE)

### **45.6.3 Integrated Geoscience (IG)**

Kumar Batuk Joshi [kr.batukjoshi@gmail.com](mailto:kr.batukjoshi@gmail.com) (India), Vineet Goswami (USA)

### **45.6.4 Crunch in Computational Geoscience (CCG)**

Anand Singh [anandsingh.gg.iitkgp@gmail.com](mailto:anandsingh.gg.iitkgp@gmail.com) (India), Mahak Singh Chauhan (India), Shuang Liu (China)

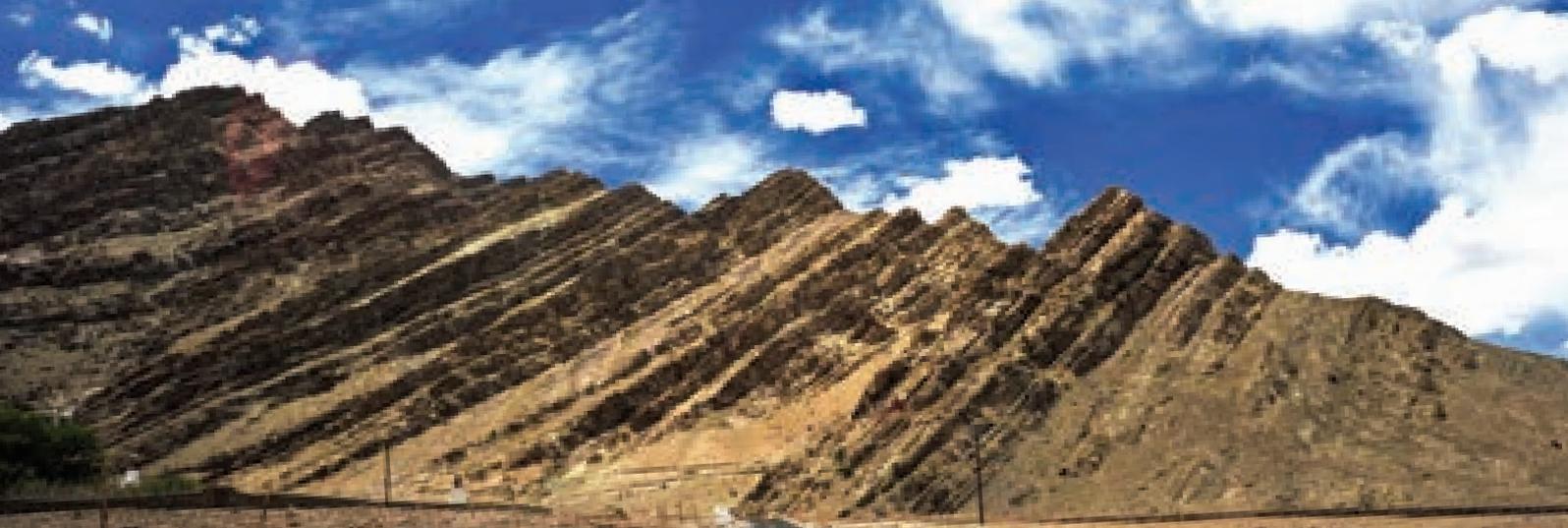
### **45.6.5 Geoscientific Challenges and Advances in Natural Resource Exploration**

Chandra Prakash Dubey [p.dubey48@gmail.com](mailto:p.dubey48@gmail.com) (India), Shib Sankar Ganguli (India), Srikumar Roy (UK)

### **45.6.6 Tectonics, Surface Processes and Climate**

Sajid Ali [sajidali7861@gmail.com](mailto:sajidali7861@gmail.com) (India), Madhav K. Murari (Germany)





#### **45.6.7 Hydrogeophysical Studies for Vadose Zone Characterizations**

Tanvi Arora tanvi@ngri.res.in (India)

#### **45.6.8 Non-invasive Geophysical Methods and Numerical Modelling for Groundwater Resources Exploitation and Management**

Payal Rani payal.gpy@gmail.com (India), Zoi Dokou (USA)

#### **45.6.9 Multi-proxy Approach in Paleo Monsoon Reconstruction During Quaternary Period**

Upasana S. Banerji upasana.s.banerji@gmail.com (India), Chandana K.R. (India)

#### **45.6.10 Quaternary Landform Evolution in a Mountainous Landscape**

Rahul Devrani rahuldevrani18@gmail.com (India), Anil Kumar (India)

#### **45.6.11 Forward Modelling of Present Day Continents: Challenges and Solutions**

Ravi Shankar ravisingh82.2@gmail.com (India), R. V. Gireesh (India)

#### **45.6.12 Advances in Earth and Planetary Sciences**

Rajeev Kumar Yadav rs123.bhu@gmail.com (India), Ramdayal Singh (India)

#### **45.6.13 Geochemical Signatures of Paleo Monsoon Variability**

Barnita Banerjee barnita.gem@gmail.com (India), Mahjoor Ahmad Lone (Taiwan)

#### **45.6.14 Understanding the Earth Structure and Mantle Dynamics through Geophysical Observations**

Padma Rao B padmarao.india@gmail.com (India), Sunil Rohilla (India), Sunil Roy (India), Dipankar Saikia (India)

#### **45.6.15 Geodynamic Significance and Mineralization Potential of the Precambrian Ultramafic Complex**

Niranjan Mohanty niranjanmohanty9090@gmail.com (India), Abhinay Sharma (India)

#### **45.6.16 Biogeochemical Cycling of Carbon and Nitrogen in Terrestrial and Coastal Environments**

Punyasloke Bhadury pbhadury@gmail.com (India), Anwasha Ghosh (India), Ajcharaporn Piumsomboon (Thailand)

#### **45.6.17 Ichnology in shallow marine and transitional environments**

Carlos Cónsole-Gonella carlosconsole@csnat.unt.edu.ar (Argentina), Silvina de Valais (Argentina), Ignacio Díaz-Martínez (Argentina), Paolo Citton (Argentina).

#### **45.6.18 UNESCO Global Geoparks in Latin America and the Caribbean: lessons learned and the way ahead**

Denise Gorfinkiel d.gorfinkiel@unesco.org (Uruguay).



# Business Meetings/ Workshops

Organisations wishing to conduct business meetings during the 36th IGC are invited to make a request by visiting [www.36igc.org](http://www.36igc.org). The Business Meetings options will be notified shortly. The closing date for making requests is December 31, 2019.

Business Meetings are scheduled generally 7:00 PM onwards during 3-7 March 2020. However, organisations requiring bookings for the entire day may approach us specifically.

Rooms for Business Meetings will be provided in non-theatre style seating format at no charge. Any special room set up, and audio-visual and catering requirements will be at the cost of the meeting organisers; such arrangements will have to be made by the meeting organisers themselves.

The Third Circular will have further details on Business Meetings.

## Call for Abstracts

Invitation for submission of abstracts will be notified shortly on the website of 36th IGC. The window for abstract submission will open in January 2019. Abstracts can be submitted by paying a non-refundable abstract submission fee of USD 40. Authors are permitted to submit only one abstract for oral presentation, but may submit multiple abstracts for e-posters and be non-presenting co-authors of other oral presentations. Keynote speakers, and invited presenters in IUGS symposia/sessions under Theme 45 may submit an additional abstract for oral presentation. All abstracts must be prepared and submitted in the required format as per the instructions on the 36th IGC website. Abstracts must be limited to 250 words. Tables, figures, references and other graphics will not be accepted in abstracts. Abstracts must be submitted by the presenting author (oral and poster) only. All abstracts will be reviewed by the designated Symposium Conveners.

## Professional Development Workshops and Short Courses

The 36th IGC will offer opportunities to individuals, companies, institutions and organisations to conduct Professional Development Workshops and Short Courses in association with the Congress. The following are the options:

- i. **PRE-CONGRESS:** At a suitable venue to be notified later.
- ii. **DURING CONGRESS:** At the Congress venue after 7:00 PM.
- iii. **POST-CONGRESS:** At a suitable venue to be notified later.

Approved Professional Development Workshops and Short Courses will be included in the 36th IGC Program, and announcement for participation will be made on the website. Participation will be limited to persons who register for the 36th IGC as full delegates. Organizers of all pre-Congress and post-Congress workshops will have to make the necessary arrangements and pay for the associated costs.

The details of the Professional Development Workshops and Short Courses will be made available shortly on the website of 36th IGC.



# Publications

The 36th IGC will publish standard accepted abstracts electronically at the Congress, but will not publish full papers. The scientific sponsor of the IGC, the IUGS, has an arrangement with The Geological Society of London (GSL) Publishing House for the publication of books arising from its programs and other activities, including International Geological Congresses. GSL may approach selected IGC Symposia Conveners to encourage them to consider producing a Geological Society Special Publication (GSSP). Symposium conveners and groups wishing to publish papers presented at the 36th IGC are requested to independently enter into agreements with the Geological Society of London under GSSP series. The GSSPs are indexed in the Web of Science in the Book Citation Index or the Conference Proceedings Citation Index. They are also indexed in Scopus. These allow authors to obtain citation counts for their articles and they accrue towards their h-index. The Special Publications do not have to be comprehensive treatments, but they do need to be balanced and have a strong subject focus. Ideally they comprise 18-25 papers, although there have been longer and shorter versions. More information is available at [www.geolsoc.org.uk/sp](http://www.geolsoc.org.uk/sp). If GSL rejects a proposal, then symposium conveners/guest editors are free to independently enter into agreements with other publishing houses or to choose not to publish full papers.

## Geohost Support Program

The Geohost Support Program is designed to enable deserving geoscientists and geoscience students to participate in the International Geological Congress (IGC). Under this program that has helped thousands of scientists to attend IGC's over the years, we would be providing support to meritorious young/financially disadvantaged geoscientists and students to participate and present their research at the 36th IGC in Delhi.

### ***Geohost Support on offer:***

The Geohost Support Program of the 36th IGC will strive to help active geoscientist whose abstract has been accepted for presentation. Financial support will be provided based exclusively on scientific merit.

As per our commitment made in the bid document presented at the 34th IGC in Brisbane, the Geohost program would be unprecedented, comprising 1000 registration fee waiver, 1000 travel support and 1000 local hospitality, which may be awarded as either full or partial support. This will include the Youth Geohost program under which meritorious students from IUGS-adhering countries would be offered fully funded Geo-host grant (one per country) for participation in the 36th IGC. Details of eligibility criteria and application procedure will be published soon at [www.36igc.org](http://www.36igc.org).

With industry support anticipated, we should be able to offer Geohost support to more number of aspiring geoscientists. We encourage potential applicants to seek financial support from other sources before applying for Geohost support.





Trans Himalayan Landscape

## Field Trips

### Message from the Chairs, Field Trip Committee

The Indian subcontinent, by virtue of being a constituent of several older supercontinents, has common geological ancestry with many parts of the globe. Subsequent to the breakup of the Gondwanaland, the Indian landmass moved northward for over 5000 km to collide and get stitched with the Asian landmass, resulting in the present landforms, typified by the Himalayan mountain chain. The subcontinent is also host to a wide range of geological marvels - from the Archaean crustal nuclei to the present day volcanism.

We welcome you to witness the congress/scientific theme(s) showcased through an attractive assortment of pre-, post- and during-Congress field trips. The field trips have been designed to also include geotourism sites of unique cultural, historical and archaeological value so as to give a fulfilling and enriching experience of the tours to the participants. There will also be an interesting array of one-day trips during the Congress. Details of these trips will be made available in the Third Circular.

Description of the multi-day trips and their location in the map of the subcontinent (*page no. 82*) are given below. Full tour itineraries and cost will be released in the Third Circular (due in March 2019). Delegates may choose field trips of their interest on the Congress website: [www.36igc.org](http://www.36igc.org).

We take this opportunity to extend our invitation to you to join the field trips and be part of the journey, witnessing the unparalleled geological antiquity of the Indian subcontinent, the memories of which will remain with you forever.

*Somnath Dasgupta*

*N R Ramesh*



# Pre- and Post-Congress Field Trips in India

## 1 | *NER001: Geodynamic Evolution of Northeastern Himalayas: Traverse along Tezpur-Bomdila-Tawang section Assam and Arunachal Pradesh*

This post-IGC trip starts and ends at New Delhi;

Participants: 30 max.; Duration: 4 days;

Trip coordinators: Bashab N. Mahanta and Tapos Kr. Goswami

**Trip overview:** The Bhalukpong-Tawang section in western Arunachal Pradesh showcases the complete Himalayan thrust system resulting from India-Eurasia collision. Disposition of different lithologic sequence (separated by major dislocation planes) starting from Brahmaputra alluvium, the Sub Himalayan Siwalik belt, Gondwana sediments and the Lesser Himalayan low grade metamorphic sequence can be examined during the field excursion. The Gondwana rocks represent the northeastern-most rift system in India and bears signatures of marine transgressions in Sakmarian times.

**Geo-tourism spots:** Tawang Monastery (second largest in world), tea gardens of Assam, Tipi Orchidarium etc.

## 2 | *NER002: Nagaland Ophiolite Complex: Type locality for Intra-Oceanic Subduction within the Neo-Tethys*

This post-IGC trip starts and ends at Dimapur, Nagaland;

Participants: 20 max.; Duration: 6 Days;

Trip coordinators: Santanu Kumar Bhowmik and Aliba Ao

**Trip overview:** The Nagaland Ophiolite Complex (NOC) is one of the rare ophiolite belts in the world where high-pressure metamorphic rocks along clockwise and counter-clockwise metamorphic P-T paths occur in close spatial associations but in two different metamorphic sequences. This is the only metamorphic belt in the Indus-Yarlung-Tsangpo-Suture Zone where the history of the full cycle of Neo-Tethys evolution from subduction to end of the subduction cycle, as manifested by collisional tectonics and ophiolite emplacement is preserved in the rock archive.

**Geo-tourism spots:** Naga heritage village, Kohima etc.



### 3 | *NER003: A Glimpse of the Enigmatic Himalayan Inverted Metamorphic Sequence: A Classic Section across the Darjeeling-Sikkim Himalayas*

This post-IGC trip starts and ends at New Delhi;

Participants: 25 max.; Duration: 7 days;

Trip coordinators: Sudipto Neogi, Ravikant Vadlamani and Kathakali Bhattacharyya

**Trip overview:** Himalayan tectonics and metamorphism has been largely considered within the framework of the collision and subduction of the Greater Indian Plate with the Eurasian Plate during the Eocene (~ 50 Ma), resulting in intense crustal shortening and deformation, accommodated by intracontinental thrusts and internal deformation of Greater Indian Plate. Causes for the metamorphism in abnormally thickened crust has been addressed involving thermal modelling, field studies, quantitative P-T estimation, geochronological and isotopic studies. An enigmatic feature of Himalayan metamorphism is the presence of a sequence of progressively higher grade rocks occurring at shallower structural levels, reported from the Darjeeling- Sikkim region, and later described with remarkable similarity from all along the nearly 2000 km length of the Himalaya referred to as “inverted” metamorphism.

**Geo-tourism spots:** Lachung, Yumthang valley, Lachen etc.

### 4 | *NER004: Tectonic Evolution of NE Indian Craton, Meghalaya Plateau: Journey from Pre-Grenvillian - Grenvillian Orogeny to Pan-African Orogeny and Gondwana Break-Up*

This post-IGC trip starts and ends at New Delhi;

Participants : 20 max.; Duration: 5 days;

Trip coordinator: Tapan Pal

**Trip overview:** Meghalaya Plateau is a part of the Eastern Indian shield since the Mesoproterozoic time. It preserves signatures of major global events ranging from Rodinia assembly to Gondwana assembly, Gondwana break-up and K-T boundary. Tertiary limestone of Meghalaya Plateau also records Paleocene-Eocene Thermal Maxima (PTEM) event. Relatively less known Northeast Indian craton is an area to explore Pan-Gondwana reconstruction.

**Geo-tourism spots:** Meghalaya- “The Abode of Clouds”, Mawsynram (heaviest rainfall receiving area), caves and magnificent waterfalls, Mumluh cave, Cherrapunjee- GSSP for Meghalayan Age etc.





## 5 | *NER005: Unfolding of Quaternary History and Associated Geoarchaeological Remains of Tripura, Northeastern India*

This post-IGC trip starts and ends at Agartala;

Participants: 20 max.; Duration: 5 days;

Trip coordinators: N.R. Ramesh, Manjil Hazarika and B.C. Poddar

**Trip overview:** Intermontane Khowai and Haora valleys in Tripura have extensive outcrops of older Quaternary fluvial deposits, developed as terraces. They contain buried, multi-layered, prolific Stone Age sites with abundant exquisite artefacts of fossil wood, discovered in a unique stratigraphic framework. Pleistocene valley sediments laid over deformed Neogene sedimentary sequences are also deeply incised. Integrated study on environmental setting of cluster/pattern of sites and their radiometric dating have led to prove habitation of late Pleistocene early man in a region stretching from Bengal basin to Irrawaddy valley. Evolution of human culture in sync with evolution of river valleys is well demonstrated here. The traverse aims at examining the geo-archaeological context of the sites based on morpho-stratigraphy, litho-stratigraphy and chrono-cultural stratigraphy and unique nature of prehistoric tool assemblages.

**Geo-tourism spots:** Geo-archaeological sites in Khowai Valley, Unakoti rock-cut sculptures etc.

## 6 | *ER001: Sundarban Delta System*

This pre-IGC trip starts and ends at Kolkata ;

Participants: 40 max.; Duration: 4 days;

Trip coordinator: Debasis Sengupta

**Trip overview:** Sundarban Delta, the largest mangrove forest in the world is recognised as Ramsar Site of International Importance since 1992 and was declared as a Natural World Heritage Site in 1997 (UNESCO). It has earned global attention of conservationists, researchers and nature lovers. It has also been recognized as a wetland of international importance. Processes of delta building, erosional and accretional landforms, endanger flora and fauna including variety of mangroves, archaeological evidences (500 to 1500AD) etc. are few of the things that would be showcased.

**Geo-tourism spots:** Nayachar, Ghoramara, Sagar Island, Bakkhali, Henry Island, G-Plot, Kalash Beach, Bonnie Camp, Dobankee, Sudhanyakhal, Sajnekhali, Satjelia, Jharkhali etc.





Monastery, Sikkim

## 7 | *ER002: Proterozoic Gold Mineralizing System in North Singhbhum Mobile Belt*

This post- IGC trip starts and ends at Ranchi, Jharkhand;

Participants: 25 max.; Duration: 4 days;

Trip coordinators: Pankaj Kumar and Sahendra Singh

**Trip overview:** The Paleo- to Mesoproterozoic North Singhbhum Mobile Belt (NSMB) in eastern India has a long and significant history of gold exploration activities with recent finding of many small gold deposits. The NSMB has two prominent crustal scale shear zones in its northern and southern parts. The region is well known for the numerous ancient gold working and abandoned gold mines apart from a long history of the gold panning activities in the Subarnarekha River and its tributaries.

**Geo-tourism spots:** Jonha, Hundru, Dasam fall, Dalma Wildlife Sanctuary etc.

## 8 | *ER004: Rajgir-Bodh Gaya-Barabar Geotourism: A Unique Geological and Historical Heritage of Bihar*

This pre-IGC trip starts and ends at Patna;

Participants: 30 max.; Duration: 4 days;

Trip coordinator/s: A. Bishwapriya, S.K. Dutta and M. Ahmad

**Trip overview:** Roughly falling between Jehanabad, Gaya, Bodh Gaya Rajgir and Nalanda, the region offers an excellent geotourism opportunity wherein geology and archaeology are juxtaposed and complement each other. The area gains its importance worldwide due to historical and cultural aspects related to Buddhism & Jainism, all set within the Gaya-Rajgir volcano-sedimentary belt and associated magmatic complex situated on the northern fringe of Chotanagpur Gneissic Complex (CGC) in eastern India.

**Geo-tourism spots:** Venuvan, Japanese Temple, Bodhi Temple, Monasteries of various countries etc.





## 9 | *ER005: The Teesta Chronicle: Tectonics – Climate and Human-Landscape Dynamics*

This pre-IGC trip starts and ends at Bagdogra/Siliguri;

Participants: 20 max.; Duration: 5 Days;

Trip coordinators: Mriganka Ghatak, Sanjeeb Bhattacharya and Sreemati Gupta

**Trip overview:** The foothills of Sikkim Himalayas are known for active tectonism. The proposed traverses in the Teesta megafan, at the Eastern Himalayan foothills provides an insight into the tectonism, sedimentation processes and influence of engineering interventions on the fluvial regime of Teesta and its environs. The excursion plans visit to observe sedimentation processes and signatures of neotectonic activity along the transverse and regional faults. The effect of engineering interventions on Teesta River and its environs shall also be showcased.

**Geo-tourism spots:** Tea estates of Dooars, wild life sanctuary/ reserve forest and Darjeeling Himalayan Railway (DHR) ride etc.

## 10 | *ER007: Geological Field Excursion to the Jharia Coal Field: A Tribute to Sir Cyril Sidney Fox (A legacy of 125 years of Indian Mining and Mineral Industry)*

This pre-IGC trip starts and ends at Dhanbad;

Participants: 25 max.; Duration: 5 days;

Trip coordinators: Sahendra Singh and P. R. Sahoo

**Trip overview:** The Jharia Coal Field was mapped by Sir Cyril Sidney Fox, fellow of Indian National Science Academy. The coal field contains one of the best exposed sections of the lower Gondwana Formation i.e. Talchir & Barakar within a distance of 0.5 km. Boulder bed overlying the basement, dolerite dykes and lamprophyres are the other interesting features to examine.

**Geo-tourism spots:** Maithon Dam, Hydrel Tunnel on Barakar River, Parasnath Hill/Jain Temple, Longwall Mining at Munidih etc.





Landslide, Uttarakhand

## 11 | *ER008: Landslide Failure Mechanisms, Hazard and Risk Scenarios in Darjeeling Himalaya*

This post-IGC trip starts and ends at Bagdogra;  
Participants: 30 max.; Duration: 5 Days;  
Trip coordinators: Saibal Ghosh and Timir Baran Ghoshal

**Trip overview:** The proposed field trip area is part of the active Himalayan Fold-Thrust-Belt (FTB) where interplay of varied geological factors vis-a- vis rapid urbanization and growth are responsible for initiating different types of landslides for over a century. Several landslide failure mechanisms and their intimate relationships with a series of varied Himalayan lithology and regional tectonic structures and the interactions of landslide hazards with thick settlement and built-up areas in the Darjeeling Himalayas would be showcased with added measures for evaluating risk.

**Geo-tourism spots:** UNESCO World Heritage Site- Darjeeling-Himalayan Railway; Tea Gardens etc.

## 12 | *ER009: Glacial to Post-glacial Fluvio-marine Sedimentation System: Evidences from West Bokaro Coal Field*

This post-IGC trip starts and ends at Hazaribagh, Jharkhand;  
Participants: 25 max.; Duration: 4 days;  
Trip coordinator: Hareshwar N Sinha

**Trip overview:** The Lower Gondwana sequence of West Bokaro Coal basin is attributed to the transitional nature of the glacial-fluvial-marine interactive systems in the frame of post-glacial transgressive-regressive (T-R) setup. Such T-R cycles during the Late Paleozoic- Lower Gondwana sedimentation reveals prograding and retrograding successions, sediment-organism interaction pattern, sea level fluctuations, sediment supply and basinal tectonism. The Dudhi River section exposes one of the most well preserved Gondwana successions.

**Places of Geotouristic interest:** Surya Kunda, Bodh Gaya, Jhumri-Telaiya Dam etc.





Ratnagiri, Odisha

### **13 | *ER010: Andaman Islands: An anatomy of the Accretionary Prism in an Active Burma-Andaman-Java subduction zone***

This pre-IGC trip starts and ends at New Delhi;  
Participants: 20 max.; Duration: 6 Days;  
Trip coordinator: Tapan Pal

**Trip overview:** The Andaman ophiolite belonging to the western belt of Indo Burma Ridge (IBR) preserves a complete ophiolite sequence (mantle–cumulates–lavas) in the outer arc of the active Burma-Andaman-Java subduction zone. Its unique polygenetic setting, MORB mantle and supra-subduction zone mantle reveal the intricacies of physicochemical processes of the subduction system.

**Geo-tourism spots:** Cellular Jail (Light & Sound), Corbyn’s Cove beach, Chidiatapu / Mundapahar Beach, Ross Island, Wandoor Beach, Mud Vocano and Limestone Cave in Baratang, Natural bridge at Neil Island etc.

### **14 | *ER012: Eastern Ghats Belt, India: A Type Locality of Ultrahigh Temperature Proterozoic Orogenic System***

This pre- IGC trip starts and ends at Bhubaneswar and Vishakhapatnam respectively;  
Participants: 15 max.; Duration: 5 days;  
Trip coordinators: Sankar Bose and Jayanta Kumar Nanda

**Trip overview:** This transect to showcase the making and breaking of a supercontinent, runs parallel to the Eastern Khondalite- the complexly evolved Eastern Ghat Belt (EGB) where two geologically distinct crustal domains, namely the Chilka Lake and the Visakhapatnam domains will be visited. Key rock occurrences including the different varieties of granulites and anorthosite will be shown. While the UHT metamorphosed and isobarically cooled lower crustal rocks of the Visakhapatnam domain preserved history of the Rodinia assembly, the enigmatic isothermally decompressed UHT metamorphosed rocks of the Chilka Lake domain preserved the history of Rodinia breakup.

**Geo-tourism spots:** Chilka lake, Borra Caves etc.





## 15 | *SR003: The Deep Crust of the Archaean Dharwar Craton*

This post- IGC trip starts at Bangalore and ends at Coimbatore;

Participants: 18 max.; Duration: 6 days;

Trip coordinators: C. Srikantappa, K.G. Ashamanjari and K.N. Prakash Narasimha

**Trip overview:** Granite-greenstone belts and granulite-gneiss terrain are well exposed in the Archaean Dharwar Craton (3.5- 2.5 Ga, DC). The rocks show regional metamorphism with pressures of 6 to 11 k bars and temperatures of 650 to 820°C. The Dharwar Craton (DC) is bounded to the South by the E-W trending Moyar-Bhavani Shear Zone, where the lower continental crust is extensively reactivated during the Pan-African event (~ 0.5 Ga). Archaean metasedimentary units, chromitite bearing layered igneous complexes, two different types of granulites, incipient charnockite formation, it's structures, and geochemical signatures shall be examined.

**Geo-tourism spots:** Waterfalls, Mysore Maharaja Palace, Ancient Hindu temple architecture, Tiger reserve forest, Nilgiri mountains etc.

## 16 | *SR005: Neoproterozoic -Early Cambrian Crustal Evolution in South India: Implications of East Gondwana Assembly*

This post-IGC trip starts at Coimbatore and ends at Trivandrum;

Participants: 20 max.; Duration: 6 days;

Trip coordinators: S. Raju, N.P. Nathan and T.R.K. Chetty

**Trip overview:** The Granulite Terrain of Southern India is selected to showcase the Neoproterozoic-Early Cambrian crustal evolution events encompassing the accretionary tectonics, metamorphic, magmatic episodes (Ophiolites) and the kinematics of the major shear zones for understanding the East Gondwana assembly. Palghat-Cauvery Shear Zone (PCSZ) and Neoproterozoic mobile belt extending up to the southern tip of Indian Peninsula will be covered during this excursion.

**Geo-tourism spots:** Meenakshi Temple, Kodaikanal hill station, Rock Memorial at Kanyakumari, Kovalam Beach etc.



## **17 | *SR006: Diamond Fields of South India – Wajarakarur Kimberlite Field, Eastern Dharwar Craton, Southern India***

This pre-IGC trip starts at Bengaluru and ends at New Delhi;

Participants: 30 max.; Duration 5 days;

Trip coordinators: S.Ravi and E.V.S.S.K.Babu

**Trip overview:** Southern India, the land of first diamond finds in the world, consists of both primary and secondary deposits for diamond in Archaean granite-greenstone terrains of Dharwar Craton. It is known to have produced the most celebrated diamonds viz. Koh-i-Noor, Great Mogul, Orloff, etc. The mining activity dates back to 13-18 centuries AD. The trip envisages visiting some of the kimberlites in the Wajarakarur and Raichur-Tungabhadra Kimberlite Fields, as well as Cuddapah Basin lamproites. Visit to Kimberlite Park and Museum, Geological Survey of India at Wajarakarur (to showcase drill cores and large size samples of kimberlites, mantle xenoliths) and visit to historic diamond mines in the paleo-placers of the Neoproterozoic sediments and the alluvial placers are included in the trip.

**Geo-tourism spots:** Vijayanagara Temple (14th-16th Century AD), Belum Caves etc.

## **18 | *SR007: A journey from Paleo to Neoproterozoic; Sedimentation, Magmatism and Mineralization in the Cuddapah Basin, India***

This post- IGC trip starts and ends at Tirupati;

Participants: 20 max.; Duration 5 days;

Trip coordinators: V.V. Sessa Sai and Santanu Bhattacharjee

**Trip overview:** The Proterozoic Cuddapah Basin in the eastern Dharwar Craton is a prominent Precambrian sedimentary basin in India that has well-preserved clastic and non-clastic sedimentary sequences. It witnessed significant magmatic activity during sedimentation. Evidences for the Palaeoproterozoic life in the form of stromatolites; organo-sedimentary structures are well preserved in the Vempalle Formation of the Cuddapah Supergroup. The Neoproterozoic Kurnool basin consists of a sequence of rudaceous-arenaceous-argillaceous-carbonate rocks. The well-known Banaganapalle conglomerate horizon; the lower Formation in the Kurnool Group is known for ancient diamond activity in India. The proposed field traverses include best exposed type sections in the basin.

**Geo-tourism spots:** Natural Arch of Tirumala, Belum caves etc.



## 19 | *SR009: Jurassic Park in P-G Valley*

This pre-IGC trip starts and ends at Hyderabad;  
Participants: 20 max.; Duration 5 days;  
Trip coordinators: K. Ayyasami and B. Gowtham

**Trip overview:** The Pranhita-Godavari Basin, India, is a pericratonic basin that came into existence following rifting along eastern Indian Craton in early Mesozoic. The basal Proterozoic rocks of about 6 km thickness are termed as the Godavari Supergroup. Their distribution is widespread on both sides of the Gondwanas with small inliers. The coal-bearing Gondwana sediments includes Talchir, Barakar, Barren Measures, Kamthi (Lower Gondwana Group), Maleri, Kota, Gangapur and Chikiala formations (Upper Gondwana Group). The Maleri and Kota Formations provide the bulk of fossil remains. The Gangapur Formation is a storehouse of plant fossils. The succession terminates with the eruption of volcanic rocks noted in the neighbourhood of Rajahmundry. The infra- and inter-trappean beds offer some of best molluscan remains in this part of the region.

**Geo-tourism spots:** Kakatiya architecture in Warangal and Bhadrachalam Temple.

*Rock-cut Temple, Mahabalipuram*



## 20 | *SR010: Cretaceous Stage Boundaries*

This post- IGC trip starts and ends at Chennai;  
Participants: 20 max.; Duration: 5 days;  
Trip coordinators: B Gowtham and K Ayyasami

**Trip overview:** The Talchir Formation of Lower Gondwana comprising boulder bed, conglomerates, splintery shale is limited to outcrops in Guduvanchery near Chennai. It exposes a near complete sequence of the Cretaceous from the Aptian through Maastrichtian. The oldest sedimentary unit is the fluvial, plant fossil bearing Upper Gondwana clay of Aptian age. The overlying marine rocks begin with basal coral-algal reefoidal limestone. The overlying gypsiferous clay and sandstone yield many fossils. A younger shell bank facies is exposed in 3 sub-basins, viz. Ariyalur, Vriddachalam and Puducherry. The overlying coarse sandstone contains dinosaur fossils. Rocks of Danian age top the succession. An integrated bio-stratigraphic study on invertebrates reveal the remarkable coincidence of biozonal boundaries with many lithostratigraphic levels.

**Geo-tourism spots:** Mahabalipuram- ancient rock cut Temples.

## 21 | *SR015: Coral Reef ecosystem around Lakshadweep, Arabian Sea, Western India*

This post-IGC trip starts and ends at New Delhi and Cochin respectively;  
Participants: 20 max.; Duration 5 days;  
Trip coordinator: Dharendra Kumar Pandey

**Trip overview:** Located about 225 to 450 km west of the Kerala coast, the Lakshadweep Archipelago in the Arabian Sea consists of ~ 36 coral islands. The archipelago lies on the submerged Chagos-Lakshadweep Ridge. There are about 11 inhabited islands. The rock formations that can be observed include coral facies followed by coral-algal facies, algal rudstone/ coralline limestone and finally coral facies. The oldest sediments are composed of terrigenous clastics, probably of Paleocene age. The biological components are dominated by skeletal fragments of corals, coralline algae, other algae, mollusks, foraminifera, and echinoderms in the order of abundance.

**Geo-tourism spots:** Karavatti natural museum



## 22 | *SR016: Gravity Gliding of Mesoproterozoic Sedimentary Cover of Kaladgi Basin*

This pre- IGC trip starts and ends at Bagalkot, Karnataka;

Participants: 20 max.; Duration 3 days;

Trip coordinators: Mrinal Kanti Mukherjee, Sohini Das and Sudipto Ghosh

**Trip overview:** The deformation pattern in the Kaladgi Basin during Mesoproterozoic, is unique of its kind in an intracratonic setup. The deformation of the Mesoproterozoic sedimentary cover originated by a southerly-directed gravity gliding of the cover over the basement along the basement–cover contact (unconformity) that served as a surface for detachment shall be demonstrated along a N-S transect across the basin. A continuous passage from extensional domain in the north and contractional domain in the south with a contrast in structural geometry between the unaffected basement and deformed cover shall be showcased.

**Geo-tourism spots:** Badami cave temple- renowned UNESCO heritage site.





## **23 | SR017: Neoproterozoic Alkaline Carbonatite Complexes, Southern India**

This post IGC trip starts and ends at Bengaluru ;  
Participants: 25 max.; Duration: 4 days;  
Trip coordinators: M.Srinivas and N.V.Chalapathi Rao

**Trip overview:** Neoproterozoic alkaline carbonatite complexes in southern India, (within a 200km long NNE – SSW trending belt extending from Gudiyattam in the north to Bhavani in the south) help to examine the Precambrian plate tectonics and crustal evolution processes. Three major carbonatite bodies are reported within this zone, viz. Sevattur carbonatite, Samalpatti carbonatite and Pakkanadu-Mulakkadu carbonatite. The alkaline and carbonatite rocks occur rarely, and carry enormous significance in terms of their economic potentiality, genesis and petrological association.

**Geo-tourism spots:** Hogenakal waterfalls, Elagiri Hill etc.

## **24 | SR018: Quaternary Evolution of Western Continental Margin of Karnataka-Goa Coasts with emphasis on Resources and Environment**

This pre- IGC trip starts from Mangalore and ends at Panjim, Goa;  
Participants: 20 max.; Duration: 5 Days;  
Trip coordinators: K. S. Jayappa, N. R. Ramesh and K R Subrahmanya

**Trip overview:** A variety of spectacular coastal landforms along the dynamic coastal tract, it's natural resources and scenic beauty shall be visited. St. Mary Group of Islands (National Geological Monuments) exposing remarkable columnar joints, picturesque table top lateritic uplands, lateritic profiles juxtaposed over the Precambrians and Neogene rocks, misfit rivers, nick points, sea caves, tombolo, abrasion platforms, spectacular spits, pocket beaches are all to be experienced. Quaternary formations of marine, fluvial and aeolian origin and coastal hazards (efficacy of coastal engineering protection) can be readily examined.

**Geo-tourism spots:** St. Mary's Islands, Yana karst topography and Kudle Beach, Pilikula Nisarga Dhama, wild life, cultural heritage etc.



## **25 | *SR019: Resource Survey for Dimension Stone Granite Deposits in Granulitic Terrain of Tamil Nadu, Southern India***

This pre-IGC trip starts from Chennai and ends at Madurai;

Participants: 20 max.; Duration: 4 Days;

Trip coordinators: K Jayabalan and K. Arvind

**Trip overview:** The state of Tamil Nadu is known for extensive occurrences of granite, charnockite and bronzite gabbros that are quarried for dimensional stones. The granulitic terrain of Tamil Nadu is studded with several quarries which produce commercially important dimensional stones like Jet/Kunnam Black (equivalent to Ebony black of Sweden), a unique variety like Paradiso, Thippu/ Melur/Kashmir white, Star Galaxy, Tiger Skin, Pink/Blue Multi, Blue Pearl, Colombo/Tropical Juparana, Lady Dream, Viyarah, Rosa Verde, Raw Silk etc. During the proposed field transacts, different lithounits and their equivalent commercial grade, granite landforms will be visited and various aspects of commercial valuation will be discussed.

**Geo-tourism spots:** Lady of Lourdes Church, Tiruchirappalli; Rock fort and Srirangam Temple (Chola Architect), Meenakshi Amman Temple (Pandiya Architect) etc.

## **26 | *SR020: Geological Study of Neyveli Lignite Deposit, Ariyalur Fossiliferous Beds and nearby Geoheritage Sites, Tamil Nadu***

This post-IGC trip starts and ends at Chennai;

Participants: 20 max.; Duration: 3 days;

Trip coordinators: T. Ramkumar, T. Kannadasan and S Vasudevan

**Trip overview:** Neyveli lignite deposit is found in Mio-Pliocene Cuddalore Sandstone deposited in the Ariyalur-Pondicherry depression. The delegates would experience the mining practices adopted at Neyveli Lignite Corporation India Ltd. The transect also covers visit to Tiruvakkarai fossil wood park, the fossiliferous Ariyalur area representing strong evidences of the great Cenomanian (98 Ma) transgression, 26 December 2004 Tsunami (caused by the Great Sumatra Earthquake) affected Cuddalore Coast and Pichavaram, the second largest Mangrove forest in the world.

**Geo-tourism spots:** Nataraja Temple, Chidambaram, Pondicherry-French colonial settlement etc.





Backwaters, Kerala

## **27 | SR021: Gold and Copper Mineralization in Kolar and Chitradurga Schist Belts, Dharwar Craton**

This pre- IGC trip starts and ends at Bengaluru;  
Participants: 20 max.; Duration 5 days;  
Trip coordinators: V. N. Vasudev, R. H. Sawkar and N Rajendran

**Trip overview:** Neoproterozoic metallogenic provinces of polymetallic and gold mineralization of Chitradurga and Kolar Greenstone belts of West and East Dharwar Cratons will provide an opportunity to study the geological and structural set up of the mineralisation and exploration methodologies.

**Geo-tourism spots:** Geological monument of pillow lava; heritage sites of pre-historic Chandravalli caves near Chitradurga and Chitradurga fort.

## **28 | SR022: Gold, Iron and Manganese Mineralization in Dharwar-Shimoga, Gadag, Sandur, Hutti-Maski and Jonnagiri Schist Belts, Dharwar Craton**

This post- IGC trip starts at Hubballi, Karnataka and ends at Gooti, Andhra Pradesh;  
Participants: 20 max.; Duration: 5 Days;  
Trip coordinators: V. N. Vasudev and R. H. Sawkar

**Trip overview:** The excursion covers Neoproterozoic metallogenic provinces of gold mineralisation across the East and West Dharwar Cratons in different geological setups. The trip also covers the iron and manganese mineralisation in Sandur Greenstone Belt

**Geo-tourism spots:** World Heritage site at Hampi, Yerragundi Rock Edicts of Ashoka and Chalukya architecture at Lakkundi.





Chandratal, Spiti

## 29 | WR001: *Palaeoproterozoic Lead-Zinc-Copper Sulphide Metallogenesis in Aravalli-Delhi Orogenic Belt, South Central Rajasthan*

This pre-IGC trip starts at Udaipur and ends at Jaipur;

Participants: 25 max. ; Duration: 4 days;

Trip coordinators: Shubhabrata Mukhopadhyay and Sunil Vashisht

**Trip overview:** This trip will focus on medium to large lead, zinc and silver ore deposits that occur in diverse tectonic settings such as in the Palaeoproterozoic Aravalli Supergroup (Zawar) and intra-cratonic metasedimentary belts at Rajpura-Dariba and Agucha. The three main deposits at Zawar in the south of Udaipur, Rajpura-Dariba-Sindesar in the north of Udaipur and Agucha in Rajasthan, cumulatively constitute over 400 million tonnes of stratiform Pb-Zn ores of economic significance.

**Geo-tourism spots:** Udaipur lake city, 2500 years old ancient smelting sites at Zawar etc.

## 30 | WR002: *Copper Mineralisation of Khetri, Rajasthan*

This post-IGC trip starts at Delhi and ends at Jaipur;

Participants: 20 max.; Duration: 3 days;

Trip coordinators: Shubhabrata Mukhopadhyay, V. N. Mishra and Nagesh Rajpurohit

**Trip overview:** Copper mining in Khetri area of Rajasthan dates back to over 2000 years in the Mauryan period. The Khetri Copper Belt is studded with several copper deposits and prospects, spread over 80 km. Extensive Cu mineralization with subordinate iron sulphide, Au, Ag, REE and uranium is hosted by rocks of the Mesoproterozoic Delhi Supergroup. There is growing evidences and opinions that the mineralization is of IOCG type. Zones of albitisation host low grade uranium deposits.

**Geo-tourism spots:** Copper mines at Khetri, forts, palaces, museum and solar observatory of Jaipur.





### 31 | *WR003: Neoproterozoic Magmatism and Tectonics of NW Indian Block: Tracing the Rodinia Break-up*

This pre-IGC trip starts at Jodhpur and ends at Udaipur;

Participants: 25 max.; Duration: 5 days;

Trip coordinators: M. K. Pandit and K. K. Sharma

**Trip overview:** The Neoproterozoic Malani Igneous Province (MIP) and Erinpura Granites in western India constitute a major igneous terrain that occurs to the immediate west of the Aravalli Mountain Range. The MIP is dominated by ~750 Ma old rhyolitic flows and tuffs that occupy about 50,000 sq. km. expanse in the desertic terrain of western India. This magmatic terrain has implications for Rodinia fragmentation, Neoproterozoic geodynamics and paleoposition of NW India.

**Geo-tourism spots:** Mahendragarh Fort and Mount Abu.

### 32 | *WR004: Thar Desert: its Evolution and Geoheritage*

This pre-IGC trip starts and ends at Jodhpur;

Participants: 30 max.; Duration 5 days;

Trip coordinators: S. C. Mathur, P. C. Mohrana and S. K. Wadhawan

**Trip overview:** The Thar Desert, located at West Rajasthan Shelf [WRS], occupies a unique tectonic-sedimentary domain in north-western India. The desert represents one of the most thickly populated dry land environments of the world. The Thar Desert has several unique features and distinctive Neogene continental geological basin configurations. A large variety of characteristic golden sand dune fields ranging from clustered parabolic to transverse, linear, reticulate, star and barchanoid have been mapped across the vast span of the Thar Desert. The Malani Igneous Province lies mainly within the desert.

**Geo-tourism spots:** Jodhpur-‘Sun City’, Jaisalmer- ‘Golden City’ within Thar Desert etc.



### 33 | *WR008: Quaternary Miliolitic Limestone of Saurashtra*

This Pre-IGC trip starts at Porbandar and ends at Diu;

Participants: 30 max.; Duration: 6 days;

Trip coordinators: Nilesh Bhatt and K. S. Mishra

**Trip overview:** The biogenic carbonate deposits of Late Quaternary age are widespread along the tropical and the sub-tropical coast around the globe, and are used to define the history of Quaternary sea level change in Bahamas and Bermuda. In Indian context these rocks occur along the Gujarat coastline, particularly along Saurashtra. These deposits are well studied for its clues to the sea level changes and local tectonics during 120 to 40 ka.

**Geo-tourism spots:** Mahatma Gandhi's birthplace Porbandar, Buddhist caves, Portuguese fort, coastal geomorphosites at Diu, Asiatic lion sanctuary etc.

### 34 | *WR009: A walk on Mars : Jarosite localities of Kachchh, India*

This pre-IGC trip starts and ends at Ahmedabad ;

Participants: 30 max.; Duration: 5 days;

Trip coordinators: Saibal Gupta and Satadru Bhattacharya

**Trip overview:** This trip to Kachchh, western India, showcases the occurrence of the hydrous sulphate mineral, jarosite, widely reported from the surface of Mars but rare in natural terrestrial localities, in various horizons of a Cenozoic succession.

**Geo-tourism spots:** White desert (Rann of Kachchh); Dholavira (world's oldest civilisations -Harappan locality) etc.

### 35 | *WR010: Stratigraphic Architecture and Palaeo-environments in the Kachchh Rift Basin during the Jurassic*

This pre-IGC trip starts and ends at Mumbai;

Participants: 35 max.; Duration: 7 days ;

Tour coordinator: Dharendra Kumar Pandey

**Trip overview:** Kachchh is a pericratonic rift basin at the western margin of the Indian Craton. It was in proximity to the Malagasy Gulf and was a part of the Indo-East African province. The basin preserves a Jurassic stratigraphical heritage revealing environments and the biodiversity of the southern margin of the Tethys sea during the Jurassic Period. The stratigraphic succession and the preserved fossils are fascinating and crucial. Jurassic-Cretaceous boundary and several fossiliferous lithostratigraphic units make this trip interesting.

**Geo-tourism spots:** The Great Rann of Kachchh, India bridge, Pachchmaipir Temple etc.





*Jantar Mantar (Observatory), Jaipur*

### **36 |** *WR011: Late Quaternary Palaeoenvironments of Thar Desert Margin and Geo-archaeology*

This post IGC trip starts in New Delhi and ends at Jaipur ;  
Participants: 40 max.; Duration: 4 days;  
Trip coordinators: Hema Achyuthan and S. K. Wadhawan

**Trip overview:** The eastern margin of the Thar Desert is rich in Palaeolithic sites and would have been a corridor for human migration 'Out of Africa'. Kuchaman, Didwana and Talchappar salt lakes occur in the desertic set up. Paleolithic sites such as Singi Talav, a Lower Palaeolithic site, Amarpura a Middle Palaeolithic site, the stabilized sand dune (16 R) nearly 350-ka exhibiting cambisols and associated calciorthids with Palaeolithic tools have been dated by several radiometric dating techniques. Most of these sites occur bordering the present day Didwana Lake. Kataoti, a middle Palaeolithic site associated with ostrich egg shells is an undulating gravel ridge. The boulder and gravel bed, lie disconformable over the ferricrete bed at Jayal. Talchappar is a salt lake bordered by an historical mound that dates back to the Mughal period.

**Geo-tourism spots:** Jaipur, Kuchaman Fort, Kuchaman and Didwana and Talchappar Salt Lake with the Mughal period site and black buck sanctuary.



### **37 |** *WR012: Late Quaternary Continental Sequences of Gujarat, Western India: an Appraisal of Climatic, Tectonic and Eustatic Processes*

This pre-IGC trip starts and ends at Vadodara, Gujarat, India;  
Participants: 15 max.; Duration: 4 days;  
Trip coordinators: D. M. Maurya, L. S. Chamyal and Alpa Sridhar

**Trip overview:** The field trip covers semi-arid belt of Gujarat state in western India. Near complete continental records dating back to ~125 ka B.P. are exposed in 30-50 m high river cliffs of Mahi, Narmada and Sabarmati rivers. The distinct sedimentary facies, aggradation and incision phases show complex interaction between fluvial, marine, aeolian and tectonic processes.

**Geo-tourism spots:** Pavagarh, Champaner (UNESCO heritage site), Lothal, Rani ki Vaav-step well etc.

### **38 |** *WR013: Field Excursion to Dinosaur Fossil Park, Rahioli, Balanisor, Gujarat*

This post-IGC trip starts and ends at Delhi;  
Participants: 20 max.; Duration: 2 days;  
Trip coordinators: Harish Mistry and D.S. Chudasama

**Trip overview:** This site of global significance hosts both the hatcheries and graveyards of titanosaurid sauropods and abilisaurid theropods. Reported species include *Rajasaurus narmadensis*, *Rahiolisaurus gujaratensis* and *titanosaurus*. The dinosaur eggs are taxonomically assigned as *Megaloolithus rahioliensis* (Sauropod eggs). The Late Cretaceous fossil sites are well preserved by the state of Gujarat. This site provides evidence to show that dinosaur buried their eggs in the soft sand of paleo-rivers. Rahioli locality shows nesting sites with sauropod eggs- *Megaloolithus rahioliensis* (Megaloolithidae) and theropod eggs- *Ellpisoolithus khedaensis* (Elongatoolithidae). Both the nest-sites in the calcretised sandstone occur at same stratigraphic level but geographically separated over a distance of less than 400m. It is a unique site in the world, as it hosts prolific and associated skeletal remains of both titanosaurs and abelisaurids.

**Geo-tourism spots:** Sabarmati Ashram, Mahatma Gandhi Museum and Sabarmati River Front, laser Show at Akshardham Temple etc.





Albert Museum, Jaipur

### **39 | *WR014: Visit to the state-of-the-art Marble and Natural Stones Processing Unit at Kishangarh, Rajasthan***

This post-IGCtrip starts and ends at Delhi;

Participants: 30 max.; Duration: 2 days ;

Trip coordinators: K. D. Choudhary, S. Mukhopadhyay and Amit Srivastava

**Trip overview:** The state of Rajasthan is known for marble occurrences that have been used in several historical monumental structures like Taj Mahal- one of the Seven Wonders of the World and several temples and palaces of medieval times. In addition serpentinites (commercially sold as ‘green marble’ and varieties of sandstones) are some of the other heritage stones that are profusely mined in the state. The state of the art marble and natural stone processing unit at Kishangarh- a city 100 km from Jaipur on the national highway is a world class environment-friendly set up that uses advanced technology related to dimensional stones.

**Geo-tourism spots:** Amber Fort, City Palace Museum, Hawa Mahal etc.

### **40 | *WR015: Visit to the Indian Institute of Gems & Jewellery’s Training and Educational Institute at Jaipur, Rajasthan***

This pre-IGC trip starts and ends at Delhi;

Participants: 20 max.; Duration: 2 days ;

Trip coordinators: K. D. Choudhary and S. Mukhopadhyay

**Trip overview:** Jaipur- the capital of Rajasthan state is a world class business centre for colored gemstones, especially for emerald. The Gem Promotion Council of India has a technologically advanced well-equipped training centre that specializes in processing of colored stones. The visit to institute provides an opportunity to understand processing of stones and jewellery designing. The institute awards degrees/diploma related to skill development and jewellery designing.

**Geo-tourism spots:** Jaipur-the Pink City has Amber Fort, City Palace Museum and Hawa Mahal that are places of great tourist attraction.





#### **41 | *NR001: Dhala Structure, India- a Palaeoproterozoic Complex Impact Crater***

This pre-IGC trip starts and ends at New Delhi;  
Participants: 25 max.; Duration: 3 days;  
Trip coordinators: Jayanta Kumar Pati and Kuldeep Prakash

**Trip overview:** The Dhala impact structure covers nearly 64 sq. km in parts of Shivpuri district, Madhya Pradesh in north-central India. It is the seventh oldest impact structure with possibly the oldest known suevite deposit in the world. Despite the deep level of erosion and post-impact tectono-thermal events, the impactites are exceedingly well preserved, with nearly all shock metamorphic features. The impact melt breccia is exposed on surface over a strike length of about 6 km but suevite has only been identified in drill core. Granitoids with high- and low strain zones of Archaean age (2,500-3,600 Ma) are the prevalent country rocks.

**Geo-tourism spots:** Khajuraho Temple-a UNESCO world heritage site etc.

#### **42 | *NR003: Archives of Late Quaternary Climate Fluctuations in Satluj valley, Himachal Pradesh***

This pre-IGC trip starts and ends at New Delhi;  
Participants: 20 max.; Duration: 5 days ;  
Trip coordinators: Md. Atif Raza and Sharat Dutta

**Trip overview:** Satluj River valley lies in the northwestern limits of Indian Summer Monsoon (ISM) tract and is in climatically sensitive zone with humid (along Himalayan front), sub-humid (middle reaches of the valley), to high altitude arid conditions (upper reaches) depending on structurally controlled topographic fronts posing orographic barriers to moisture laden monsoon winds. The Satluj valley is important to address and study Late Quaternary climatic fluctuations. The higher reaches of Himalayas with special reference to late Quaternary climatic archives in selected segments of Satluj and Baspa valleys shall be showcased.

**Geo-tourism spots:** Kalka Shimla heritage train, monasteries, temples, Sangla valley etc.





Golden Temple, Amritsar



Ganga Aarti

### **43 | NR004: Holocene Climate Change and its Impact on the Dispersal of Indus valley/Saraswati Civilization**

This post-IGC trip starts and ends at the Delhi;  
Participants: 20 max.; Duration: 2 days;  
Trip coordinators: M. A. Raza and S. Dutta

**Trip overview:** This excursion is intended to show landscape of the ancient Harappan/Saraswati civilization along with geological archives of Holocene climate change. It will include study of carbonate and sulphate bearing lacustrine deposits signifying monsoon and its weakening during Holocene, palaeochannel of ancient Saraswati River near Fatehabad and modern Ghagghar River, archeological mounds spanning Hakaraware to post-Harappan urban phases, two phases of sand dunes deposition and the fluvio-aeolian transitions.

**Geo-tourism spots:** Archeological mounds of Pre to post Indus/ Harrapan civilization at Rakhigarhi, Kunal, Birrana and Bannawali.

### **44 | NR005: Pre-Himalayan metamorphism – magmatism in the Kumaun Lesser Himalaya**

This post-IGC trip starts and ends at Bhimtal, Uttarakhand, India;  
Participants: 20 max.; Duration: 7 days;  
Trip coordinators: Pankaj Saini, Mallickarjun Joshi and Dinesh Chauhan

**Trip overview:** The Kumaun region shall be examined in terms of tectono- litho-stratigraphy, metamorphic complexities and nature and extent of different tectonic contacts, viz. Himalayan Frontal Thrust (HFT), Main Boundary Thrust (MBT), Ramgarh Thrust (RT), South Almora Thrust (SAT), North Almora Thrust (NAT), Baijnath Thrust (BT), smaller klippen of Dharamghar and Askot and the Main Central Thrust (MCT). The route along the Kathgodam – Garbadhar road would offer a comprehensive synoptic study of Himalayan orogen for making observations relevant to the Himalayan geological framework and its role in the Cenozoic Himalayan exhumation, metamorphism and fore land sedimentation.

**Geo-tourism spots:** Himalayan geomorphology and Nainital.



## 45 | *NR006: Tectonics of the Higher Himalayan Crystallines along Alaknanda-Dhauliganga Valleys, Uttarakhand Himalaya*

This post-IGC trip starts and ends at New Delhi;

Participants: 15 max.; Duration: 7 days;

Trip coordinators: A.K. Jain, D.C. Srivastava and Sandeep Singh

**Trip overview:** The main objectives of this field excursion are to study typical characters of the Cenozoic India-Asia convergence in the Uttarakhand Himalaya along a cross-section in Alaknanda-Dhauliganga Valleys. It includes position and definition of the MCT vis-a-vis the Munsiri and Vaikrita Thrusts, position and characters of the South Tibetan Detachment System (STDS), deformation of the HHC and its detailed shear sense analysis, structural control on melt accumulation of the Himalayan migmatites, Himalayan inverted metamorphism, evolution of high grade metamorphic rocks and the processes involved in their exhumation.

**Geo-tourism spots:** Tapovan Hotspring, Badrinath Temple, Devprayag, Rishikesh and Haridwar.

## 46 | *NR008: Evolution of the Lesser Himalaya – A Columbia-Rodinia-Gondwana Connect*

This post-IGC trip starts and ends at the New Delhi;

Participants: 15 max.; Duration: 7 days;

Trip coordinators: O.N. Bhargava, Shailendra Singh, B.P. Singh, Vibhuti Rai and S.K. Ghosh

**Trip overview:** The Proterozoic Lesser Himalaya sedimentary successions represent a unique record of sedimentation and volcanism during Columbian assembly through Meso-Neoproterozoic passing into Gondwana. The proposed sectors in the excursion represent a unique stratigraphy with sedimentary record of over a period of nearly 1000 Ma. The Lesser Himalaya represent a sedimentation and magmatic history comparable with that of Peninsular basins and a time period wherein no sedimentation occurred in this part of Himalaya after Cambrian except for some patches of Permian sedimentation representing the Gondwana connect. The record of the sedimentary rocks which are interstratified with volcanic rocks with  $1800 \pm 13$  Ma ages suggests the connection of the Indian Plate with the Columbia Supercontinent.

**Geo-tourism spots:** Rudraprayag, Rishikesh and Haridwar and Valley of Flowers- a world heritage site.





Indus Zaskar Confluence, Ladakh

## 47 | NR009: *Trans-Himalayan Ladakh Batholith: A key to Magma Chamber Processes and Dynamics*

This post-IGC trip starts and ends at Delhi;  
Participants: 50 max.; Duration: 5 Days;  
Trip coordinators: Santosh Kumar and Rajneesh Bhutani

**Trip overview:** The Ladakh Batholith represents an integral part of calc-alkaline, Trans-Himalaya magmatic belt extending from east of Nanga Parbat to Lhasa, and is bounded by the Shyok Suture Zone (SSZ) in the north and Indus Suture Zone (ISZ) in the south. The batholith is partly covered by north dipping fore-arc and molasse sedimentary rocks. The beginning of northern subduction of Neo-Tethys at ca 110 Ma below the Asian plate produced vast amount of Andean-type calc-alkaline magmatism forming the Ladakh Batholith and Dras Arc. The spectacular field features of Ladakh Batholith demonstrate tectono-magmatic processes as modern analogue of the older Neoproterozoic and Proterozoic orogens.

**Geo-tourism spots:** The captivating landscape of Trans-Himalayas and monasteries.



## 48 | *NR010: Ladakh- an Archive for Quaternary Landscape, Climate and Neotectonics*

This post-IGC trip starts and ends at New Delhi;  
Participants: 25 max.; Duration: 7 days;  
Trip coordinators: Binita Phartiyal and Pradeep Srivastava

**Trip overview:** This excursion is designed to showcase the landscape of Trans Himalayas (Ladakh) that formed in response of the suture zone tectonics and cold and arid Trans Himalayan climate. Ladakh, offers a rich platform for Quaternary palaeoclimatic studies and is a tectonically active zone between the Indus Suture Zone and the Karakoram Thrust having voluminous Quaternary deposits of glacial, lacustrine, fluvial and aeolian origin. The excursion will present a platform to discuss arid zone geomorphology, processes, riverine landscape, archive of paleoclimate in form of modern and paleolakes, sand ramps and glacial moraines that have been attempted for various dating techniques.

**Geo-tourism spots:** Entire stretch offers geotourism with its lunar/martian topography, barren mountains, highest passes, highest motorable roads, suture zone, batholiths exposures, lakes and palaeolakes and rock art. Several monasteries and gompas are a major attraction and treat to the eyes.

## 49 | *NR011: Siwalik Vertebrates and the Siwalik Fossil Park, Saketi (Himachal Pradesh)*

This pre-IGC trip starts and ends at New Delhi;  
Participants: 20 max.; Duration: 2 days;  
Trip coordinators: V. P. Mishra and R. S. Chandel

**Trip overview:** The Siwalik rocks embody in the form of fossils, the varied flora and fauna that thrived during the middle Miocene to Early Pleistocene. The vertebrate fossil rich Markanda valley can be examined for the whole package of rocks from Lower Siwalik subgroup (Nahan Formation) to Upper Siwalik subgroup (Kalar Formation = Lower Boudier Conglomerate). Siwalik Fossil park at Saketi displays around 300 fossil vertebrate specimens in the museum (a catalogue has been published by Geological Survey of India in 2013).

**Geo-tourism spots:** Siwalik Fossil Park, Saketi, dist. Sirmaur H.P; Dinosaur museum & Rock Garden, Chandigarh; Pinjore Gardens, Pinjor (Haryana) etc.





## 50 | *NR012: Field Workshop on the Vindhyan Supergroup*

This pre-IGC trip starts at Varanasi and ends at the Khajuraho.;  
Participants: 30 max.; Duration: 9 days ;  
Trip coordinator: Mukund Sharma

**Trip overview:** The Vindhyan of the Son Valley are the most interesting geological succession for discussing the global stratigraphic and palaeobiological riddles. The field workshop would cover the entire succession of the Vindhyan Supergroup from the base to the top. In depth studies are published and it is also logistically easily accessible. Important aspects of geological interest include Palaeoproterozoic phosphatic stromatolites of Chitrakoot area, thick porcellanite Formation, spirally coiled algal fossils *Grypania*, and advanced carbonaceous remains of Bhandar Group.

**Geo-tourism spots:** Chitrakoot, Khajuraho etc.

## 51 | *NR013: Paleoseismology along the Foothill Zone of Central Himalaya, Uttarakhand, India*

This Pre-IGC trip starts and ends at New Delhi;  
Participants: 15 max.; Duration: 5 days;  
Trip coordinators: R. Jayagonda Perumal and Javed N. Malik

**Trip overview:** The selected sites showcase excellent examples of active faults and associated landforms marked by lateral-propagation of fault-and-related folding, lateral shifting of rivers – revealed by remnants of paleo-wind gaps. Excavated trenches across active faults will demonstrate the signatures of paleoseismic events along HFT and MBT. Visit to abandon Geo-archaeological site along HFT.

**Geo-tourism spots:** Geo-Archaeological site.



## 52 | NR015: Unravelling the Quaternary Mystic of Great Ganga Canvas-A Myopic Overview along Dehradun-Gangotri-Chamoli Transect, India

This post-IGC trip starts and ends at New Delhi;  
Participants: 15 max.; Duration: 7 days ;  
Trip coordinators: Sanjib Kumar Kar and Surendra Prasad

**Trip overview:** Quaternary successions in the Ganga valley in India depicts a geological response to Himalayan uplift and concomitant neotectonic pulsation, climatic variations, effect of sea level changes and volcanism. The Quaternary sediments unconformably overlie the pre-Quaternary rocks of Central Crystalline Group, Tethyan (Sedimentary) Group and Garhwal Group of rocks. On the basis of various sedimentological parameters, the Quaternary sediments of the area have been classified into glacial, glacio-fluvial, periglacial and fluvial sediments including the lacustrine deposits. These field study modules shall open a new vista for correlation of Quaternary sediments across the globe in response to Quaternary polarity reversal, neotectonic adjustment, volcanism and broad climatic fluctuations.

**Geo-tourism spots:** Sarnath Archaeological site, cultural activities along Ganga and its tributaries.



*Cold desert, Trans Himalayas*



## 53 | *NR016: Outer to Central Himachal Himalaya Transact – Sedimentary and Tectonic Story Unfolded*

This post-IGC trip starts and ends at Chandigarh;  
Participants: 30 max.; Duration: 5 Days;  
Trip coordinators: O.N. Bhargava and S.K. Tangri

**Trip overview:** The Himachal Himalaya is one of the best worked out stretches encompassing sequences ranging in age from Palaeoproterozoic to Quaternary that include (i) type sections of several formations exposed in the Outer and Lesser Himalaya, (ii) full succession of the Himalayan Foreland Basin covering the Thanetian to Pleistocene interval, (iii) excellent exposures of fossiliferous horizons of the Siwalik Supergroup and the Sirmur Group, and (iv) autochthonous, parautochthonous and allochthonous tectonic belts and klippe and windows in the Lesser Himalaya. The proposed transact unfolds comprehensive geodynamic evolution of the Outer and the Lesser Himalaya catering to stratigraphers, sedimentologists, palaeontologists, geomorphologist, structural and metamorphic geologists and also to those interested in Neotectonics.

**Geo-tourism spots:** Scandal Point at Shimla Ridge (a water divide between Ganga and Indus Rivers, Satluj Gorge and Bhimakali Heritage Temple.

## 54 | *NR017: Cryospheric (Glaciological) and Cultural Field Trip to Ladakh*

This post-IGC trip starts and ends at New Delhi;  
Participants: 25 max.; Duration: 7 days;  
Trip coordinators: A. L. Ramanathan and Md. Shoaib

**Trip overview:** Stok village in northern part of Zaskar Range, in the downstream of Stok Glacier will be visited. The Stok village catchment (52km<sup>2</sup>) has 7 smaller glaciers ranging between 0.2-1.2 sq km. The Stok catchment under Hemis National Park is attractive place for the researchers and climbers for understanding cryospheric processes and is a hub for Snow Leopards, Himalayan Blue Sheep, Marmot and several bird species. The elevation at the trekking point is roughly around 3700m asl and the highest point (Stok glacier) lies at about 5400m asl.

**Geo-tourism spots:** Glaciological and geological landscapes, Stok Summit and Paleoglaciation.



## 55 | NR018: The Chenab Arch Bridge: An Engineering Marvel

This pre-IGC trip starts and ends at New Delhi;

Participants: 20 max.; Duration: 2 Days;

Trip coordinator: K.S. Rao

**Trip overview:** The Indian Railways is building the world's highest arch railway bridge over the Chenab River in the northern Indian state of Jammu and Kashmir. The 1315 m long and 359m high bridge will be taller than the Eiffel Tower (324 m). The Chenab Bridge forms a crucial link in the 111-km stretch between Katra and Banihal in Kashmir Himalayas. The railway alignment passes through the Siwaliks and pre-Tertiary rocks overlain by unconsolidated sediments of recent to sub-recent periods. The construction of Chenab Bridge involves modern technology to make it 'blast proof' and is being built to withstand earthquakes. Said to be an engineering marvel, the Chenab railway bridge will be ready by 2020!

**Geo-tourism spots:** The picturesque geomorphological views of lesser and sub-Himalayas.

## 56 | NR019: Field Trip to Natural Stones and Architectural Heritage Sites of Northern and Western India

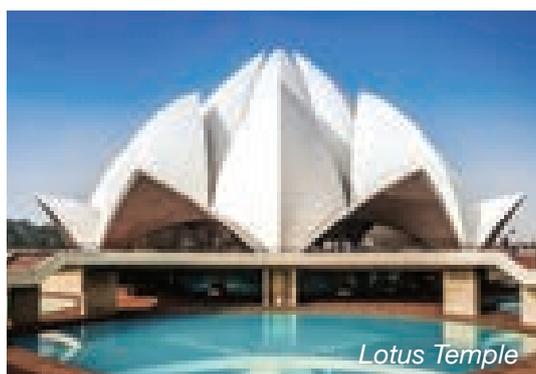
This post-IGC trip starts and ends at New Delhi;

Participants: 30 max.; Duration: 3 days;

Trip coordinators: Fareeduddin and Gurmeet Kaur

**Trip overview:** This trip showcases two main natural stones used since antiquity for construction of most outstanding heritage structures. These are (i) Makrana marble of the Delhi Supergroup and (ii) Red Sandstone of the Vindhyan Supergroup. The Ras Formation of Kumbhalgarh Group of the Delhi Supergroup (1700 - 1000 Ma) hosts Makrana marble. The Bhandar Group sandstone of the Proterozoic Upper Vindhyan has commonly been used as dimension stone. The field trip would adopt the professed aims of Heritage Stone Sub-commission (HSS) of the IUGS to study the above architectural splendours from heritage angle.

**Geo-tourism spots:** Taj Mahal (one of the seven wonders of the world), Agra Fort, Buland Darwaza, Fatehpur Sikri, Vindhyan sandstones in Dholpur etc.





### **57 | *CR001: A Magnificent Trail to Gondwana Geology, Nature and Heritage: Satpura Basin of Central India***

This pre-IGC trip starts from Nagpur and ends at Bhopal;

Participants: 20 max.; Duration: 5 days;

Trip coordinators: V. V. Mugal and R.G. Khangar

**Trip overview:** The Satpura Basin in Central India is unique among all the Indian Gondwana basins by having the longest range of stratigraphic record spanning from Upper Carboniferous to Cretaceous. It is the westernmost Gondwana basin that is located over the Central Indian Tectonic Zone (CITZ) and forms an ENE–WSW trending linear tract between Son–Narmada North Fault in the north and Central Indian Shear Zone in the south. The basin is approximately 200km long and 60km wide and is believed to be originated as pull-apart basin due to extension related to strike-slip movement along Son-Narmada Lineament.

**Geo-tourism spots:** Bhimbetka world heritage site, Bhojpur heritage site and Sanchi Buddhist Stupa.

### **58 | *CR003: Monogenic Alkaline Lava Flow Fields in Deccan Traps-Kachchh & Saurashtra***

This pre-IGC trip starts at Bhuj and ends at Ahmadabad Airport ;

Participants: 25 max.; Duration: 6 days;

Trip coordinators: Raymond A Duraiswami and Nitin R. Karmalkar

**Trip overview:** The Kachchh-Saurashtra in western India is an important and distinctive sub-province of the Deccan Volcanic Province. It exposes monogenic volcanic cones that host mantle xenoliths, acidic igneous complexes and tholeiitic dykes, sills and lava flows. The area is of interest to Earth scientists working in diverse fields like mantle petrology, physical volcanology, geochemical evolution of Continental Flood Basalts (CFBs), K-Pg mass-extinctions, etc.

**Geo-tourism spots:** Great Rann of Kutch, Lothal – Indus Valley Civilization port, Aaina Mahal and Bhujia Fort.



## 59 | *CR004: Sculptures in Deccan Basalt: Impact Crater to Rock-Cut Caves*

This post-IGC trip starts and ends at Aurangabad;  
Participants: 30 max.; Duration: 6 days;  
Trip coordinator: Bibhas Sen

**Trip overview:** Lonar Crater is the best preserved terrestrial impact crater in basalt. It provides unique opportunities for comparison with craters in lunar maria and Mars. Rock cut caves of Ajanta and Ellora are the world heritage sites carved in the pahoehoe lava flows of the Deccan Volcanic Province.

**Geo-tourism spots:** Rock cut caves of Ajanta and Ellora, Daulatabad, Temple Ruins in Lonar, Bibi ka maqbara (tomb) etc.

## 60 | *CR005: Deccan Volcanic Province: Characters and Landscapes*

This post-IGC trip starts and at Pune and ends at Pune/ Mumbai;  
Participants: 30 max.; Duration: 7 days;  
Trip coordinators: Makarand S. Bodas and R. Duraiswami

**Trip overview:** The field traverse is in western part of the Deccan Volcanic Province (DVP). It transects the Main Deccan Plateau, Western Ghat Escarpment zone and the Konkan tract. It provides a chance to observe all the essential components of DVP viz. lava flows, lava channel/ tube, dykes and spectacular landscapes carved out of this stunning lava pile.

**Geo-tourism spots:** Hill as well as island forts of Maratha kingdom and an ancient temple.

## 61 | *CR006: Crustal Evolution and VMS Metallogeny in the Proterozoic Betul Belt, Central India*

This post-IGC trip starts at Nagpur and ends at Bhopal;  
Participants: 20 max.; Duration: 4 days;  
Trip coordinator: M.L. Dora

**Trip overview:** The Betul Belt (BB) is an important component of the Central Indian Tectonic Zone and forms a conspicuous litho-tectonic unit that is interpreted as island arc set up. The maximum and minimum age limits for the Betul supracrustal rocks are  $1550 \pm 50$  and  $850 \pm 15$  Ma (Rb-Sr) respectively. The felsic volcanic rocks within the bimodal volcanic sequence in BB host strata bound Volcanogenic Massive Sulphide deposits (VMS) of Zn-Cu type and Zn-Pb-Cu type.

**Geo-tourism spots:** Bhimbetka Caves and Sanchi Stupa - world heritage sites etc.





Sun Temple, Konark

## One-day/ Short Field Trips

The Congress shall offer regular trips during the Congress days to heritage and geotourism sites in and around Delhi-NCR. They include visits to Tajmahal, Sohna hot springs etc. More details will be published in the Third Circular due for release in March, 2019.

## Field Trips in Nepal

### **62 |** *INTNP003: The Kathmandu Transect across the Middle of the Himalaya: Ancient to Active Tectonics*

This post-IGC trip starts and ends at Kathmandu;  
Participants: 20 Max.; Duration: 6 days;  
Trip coordinators: Bishal Nath Upreti and Alexander Webb

**Trip overview:** The excursion will cover the classic Himalayan geology of the Kathmandu region - Main Frontal Thrust; Intra Siwalik thrusts and Foreland Basin sediments (Siwaliks); the Main Boundary Thrust and Lesser Himalayan sediments; the Ulleri augen gneiss; multiple exposures of the Main Central Thrust system from south to north including the Mahabharat Thrust and permutations of the MCT 'zone;' the Greater Himalayan Crystalline rocks; and the Kathmandu Nappe. Further, the epicentral region of the devastating 2015 Gorkha Earthquake, and the progress and challenges of geological / civil engineering in this area will be showcased;

**Geo-tourism spots:** Nawakot and Langtang earthquake damage zones, view of High Himalaya in Langtang and Kakani, cultural sites of Kathmandu etc.



### **63 | INTNP004: Greater Himalayan Cross-section: The Everest Area, Eastern Nepal**

This post-IGC trip starts and ends at Kathmandu;  
Participants: 15 max.; Duration: 11 days;  
Trip coordinators: Ananta Prasad Gajurel and Mary Hubbard

**Trip overview:** The Everest Region of eastern Nepal includes a complete section of the Greater Himalaya, the metamorphic core of the range, and it includes examples of classic Himalayan leucogranites plus a suite of Quaternary to modern features including glacial valleys, moraines, lake deposits, and recent landslides.

**Geo-tourism spots:** Sagarmatha National Park, Namche Gompa, Phortse, Gompa, Gokyo Tsho Mt. Everest etc.

### **64 | INTNP005: A Full Cross section of the Dynamic Himalaya in Central Nepal**

This post-IGC trip starts at Lumbini, and ends at Kathmandu;  
Participants: 30 max.; Duration: 9 days;  
Trip coordinators: Lalu Paudel, Khum Narayan Paudyal and Jörn H. Kruhl

**Trip overview:** The Lumbini-Pokhara-Muktinath transect is ideal for studying and understanding the structure and evolution of the Himalaya. Complete exposures of the Paleozoic-Mesozoic succession of Tethys sediments are present in the Kali Gandaki River section for examining deformation, magmatism, metamorphism and exhumation caused before and after India-Asia collision.

**Geo-tourism spots:** Kali Gandaki Valley, Caves at Pokhara, Lumbini (birth place of Lord Buddha), Siddhab Baba temple at Butwal, Tal Barahi Temple at Pokhara, World Peace Pagoda at Pokhara, Muktinath Temple, ancient Monastries at Kagbeni, Muktinath etc.

### **65 | INTNP006: Transboundary Geotraverse from Nainital-Almora-Dharchula in India to Darchula-Dadeldhura- Dhangadhi in Nepal**

This post-IGC trip begins from Kathgodam in India and ends at Dhangadhi, Nepal;  
Participants: 20 max.; Duration: 6 days;  
Trip coordinators: Megh Raj Dhital and Chandra Sekhar Dubey

**Trip overview:** The field excursion will be an opportunity to compare geology from both parts of India and Nepal. The excursion will feature the Siwalik, Lesser Himalayan and Higher Himalayan sequences in Nepal and India, including the Miocene strata in the inner belt, active faults, backthrusts, and overturned strata containing columnar stromatolites.





Glacial lake, Nepal

Paleozoic granites, augen gneisses, and amphibolites, radioactive mineralization, talc, dolomite and other economic mineralization sites will also be visited.

**Geo-tourism spots:** Nainital, Almora, Khalanga, Dharchula, Mahakali River, Baitadi Dadeldhura etc.

### **66 | INTNP008: Neotectonics of the Himalayan Active Mega Thrust: Main Frontal Thrust (MFT) from Butwal to Koshi River**

This post-IGC trip starts at Koshi Tappu Wildlife Reserve and ends at Butwal;  
Participants: 20 max.; Duration: 05 days;  
Trip coordinators: Soma Nath Sapkota and Paul Tapponnier

**Trip overview:** The geologic evidence of devastating earthquakes (i.e. rupture of the great 1934 earthquake) will be shown. Spectacular and self-explanatory natural exposures with clear evidence of recent movement of the MFT are available. Key paleoseismological sites that have helped define the Holocene earthquake history of the Nepal Himalaya over the past 30 years will be visited.

**Geo-tourism spots:** Chitwan National Park, Koshi Tappu Wildlife Reserve and Lumbini (birth place of Gautam Buddha), Kathmandu etc.



## 67 | *INTNP014: Hydrogeological Transect from Indo-Gangetic Plain to Lesser Himalaya in Nepal Himalaya*

This post-IGC trip starts and ends at Nepal-India border (Nawalparasi and Bhairahawa);  
Participants: 20 max.; Duration: 7 days;  
Trip coordinators: Dinesh Pathak and Gangula Krishna Rao

**Trip overview:** The diversity of groundwater occurrence, utilization condition, and problems related to different geological and physiographic set up, hydrogeology from plain to mountainous area etc. shall be showcased. The journey shall be across the major geological structure like MFT and MBT.

**Geo-tourism spots:** Chitawan National Park, Lumbini-birth place of Gautam Buddha, Ramapithecus Park at Dobhan, Palpa, Tansen- the ancient town, Pokhara etc.

## Field Trips in Bangladesh

### 68 | *INTBG001: Environmental Geology and Delta-Building Processes at the Mangrove Forest (Sundarbans)*

This pre-IGC trip starts and ends at Sundarbans (along Delhi-Dhaka-Jessore route);  
Participants: 90 max.; Duration: 4-5 days;  
Trip coordinator: Director General, Geological Survey of Bangladesh

**Trip overview:** The Sundarbans is a vast mangrove forest in the coastal region in and around the delta of the Ganges, Brahmaputra and Meghna rivers at the Bay of Bengal. It was recognised in 1997 as a UNESCO World Heritage Site. Located at the south western part of Bangladesh, it is a cluster of islands with an approximate area of 3600 sq. km. forming the largest block of littoral forests with diversified assemblage of flora and fauna. Geoscientists will get the opportunity to experience active delta building processes, its complex network of tidal waterways, mudflats and small islands of salt-tolerant mangrove forests that presents an excellent example of ongoing ecological processes.

**Geo-tourism spots:** Sunderbans - a UNESCO World Heritage Site and the habitat of the Royal Bengal tiger.





Sunderban

### **69 | INTBG002: Environmental & Quaternary Geology with Coral Island (St. Martin's Island) Cox's Bazar - St. Martin's Island**

This pre-IGC trip starts and ends in and around the Cox's Bazar;  
Participants: 100 max.; Duration: 4-5 days;  
Trip coordinator: Director General, Geological Survey of Bangladesh

**Trip overview:** Cox's Bazar is sandy beach with an unbroken length of 155 km making it the longest natural sea beach in the world. The sand at Cox's Bazar beach and surrounding areas is rich in heavy-metal mineral content. St. Martin's Island is a small island in the northeast part of the Bay of Bengal, about 9 km south of the tip of the Cox's Bazar-Teknaf Peninsula. It is the only coral island in Bangladesh.

**Geo-tourism spots:** Himchari, Inanai, Maheshkhali etc.

### **70 | INTBG003: Geological Exposure of Bangladesh (Sylhet)**

This pre-IGC trip starts and ends at Sylhet (Delhi-Dhaka-Sylhet route)  
Participants: 100 max.; Duration: 5 days;  
Trip coordinator: Director General, Geological Survey of Bangladesh

**Trip overview:** Sylhet, located in the northeastern region of Bangladesh has a complex having diverse sacrificial geomorphology; high topography of Plio-Miocene age such as Khasi and Jaintia hills and small hillocks along the border. At the centre there is a vast low lying flood plain of recent origin with saucer shaped depressions, locally called Haors. Sari River section presents an excellent geological section for the Neogene (Mio-Pliocene) sequence in northeastern Bangladesh.

**Geo-tourism spots:** Jaflong, Sari river, Madhablunda etc.





## Field Trips in Sri Lanka

### 71 | *INTSL001: Geology of the High-Grade Proterozoic Terrains of Sri Lanka*

This post-IGC trip starts and ends at Colombo

Participants: 15 max.; Duration: 5 days;

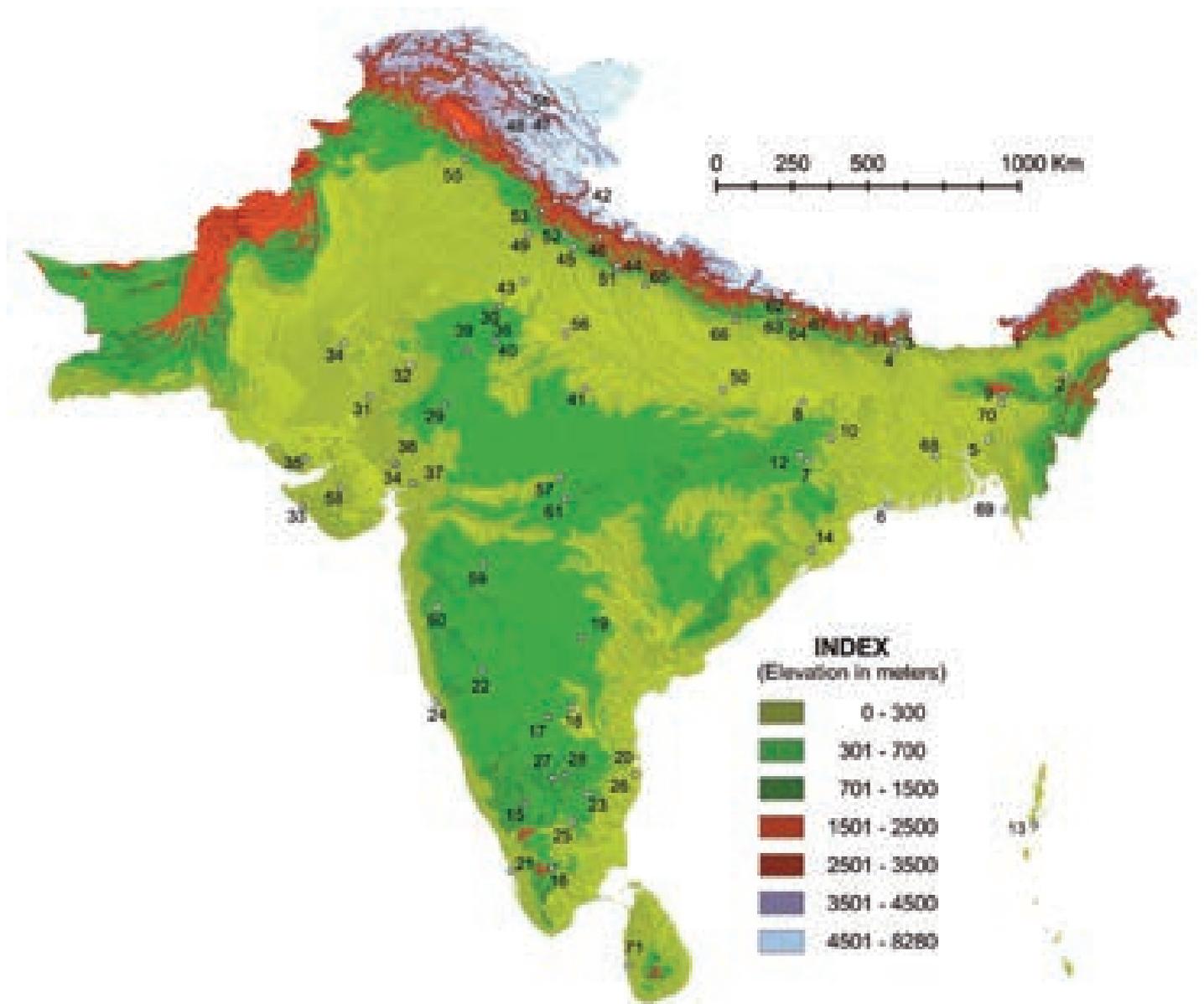
Trip coordinators: L.R.K. Perera and Sanjeeva Malaviarachchi

**Trip overview:** Sri Lanka, the ‘pendant’ of Gondwana, is a collage of distinct crustal blocks that preserve important records of major Neoproterozoic tectonothermal events. The geology of Sri Lanka provides important insights into continental growth in the Neoproterozoic Earth. Tectonics of Sri Lanka has also been in focus in relation to the history of the assembly of supercontinents, particularly because of its central position within the India-Madagascar-Africa-East Antarctica collage of the late Neoproterozoic Gondwana supercontinent. Due to similarities of lithologies, geochronology of the rock in the Lützow-Holm Complex (LHC) of East Antarctica and the Highland Complex (HC) of Sri Lanka, several workers have considered that LHC as an extension of the HC of Sri Lanka. Hence speculation on the East Antarctic Geology may be done standing on Sri Lankan basement.

**Geo-tourism spots:** Dambulla Cave Temple, Wahawa Hotwater Spring and Dolerite dykes, Arrested charnockite around Kurunegala, Temple of Tooth etc.



# Physiographic map of India, Bangladesh, Nepal, Pakistan and Sri Lanka showing locations of the proposed Field Trips



# Exhibition and Sponsorship Opportunities

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An elaborate GeoExpo has been planned at the venue of the 36th IGC - the India Expo Centre, Greater Noida, Delhi. It has been designed to offer a wide range of opportunities catering to the needs and budgets of the exhibitors. It will have pre-fabricated booths of size 9 sq m and its multiples. It will also have open spaces for creating customized booths. There will be a wide range of exhibitor kit items, including panels, furniture and lighting. The Exhibitors' Information Brochure will be published soon. The expo will be located adjacent to the auditorium and meeting rooms.

The 36th IGC will also offer innovative and rewarding sponsorship opportunities. Four major categories of sponsorship have been devised to suit the needs and objectives of the sponsors. In addition, multinational companies are invited to sponsor the "hiring cost of the entire venue, and be the main Congress sponsor. To get the maximum number of organizations on board, there will be opportunities to sponsor several important components of the event like the Congress Breaks, Workshops/Short Courses, Publications, Technical Sessions etc. The cost of sponsorship packages with complete details is being brought out in the Sponsorship Brochure which will be published on the Congress website.



## The Venue

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The 36th IGC will be organized at the India Expo Centre and Mart ([http:// indiaexpomart.com](http://indiaexpomart.com)). The venue is conceptualized to meet the diverse and ever increasing demands of mega congress events that are held concurrently with large scale industry exhibitions. It is India's first integrated international exhibition-cum-convention centre, featuring a mix of state-of-the-art infrastructure and facilities, which along with the marts, encompasses more than 2,32,000 sq m area. Innovatively designed to offer scale and flexibility in layout and planning, it houses 29 meeting rooms, 14 halls, three restaurants and a huge space of over 25,000 sq m for Geoexpo. It can accommodate over 10,000 delegates and run more than 60 parallel sessions with a seating capacity of 200 each. It is located on the Greater Noida Expressway, Delhi-NCR with easy access to places of interest in and around Delhi. There are plenty of options for accommodation of all categories around the venue.





Taj Mahal, Agra

## Delhi – The Host City for the 36th IGC

Delhi, the host city of the 36th IGC, is a sprawling cosmopolitan metropolis. With a history that goes back by many centuries, Delhi exemplifies the amalgamation of a glorious ancient culture and a rapidly modernising society. The seat of many powerful empires in the past, its long history can be traced through its exotic monuments, ancient forts and tombs. Alongside, like any modern city, it has a world class mass transit system, superspeciality medical facilities, bustling markets, vibrant entertainment hubs and fabulous eating places. Delhi is excellently connected with the neighbouring regions and other major cities of India through all modes of transport - air, rail and road. One can opt for the safe, convenient and rapid mode of transport - the Metro Rail - to travel across the city and its neighbouring regions. With English widely spoken in Delhi, our delegates will have a hassle-free communication experience in the city. More information on Delhi is available at [www.delhitourism.gov.in](http://www.delhitourism.gov.in).

***We welcome you to India!***



FIRST CIRCULAR  
15 FEBRUARY 2020

# 36TH INTERNATIONAL GEOLOGICAL CONGRESS



THE INDIAN SUBCONTINENT INVITES YOU TO THE 36TH IGC  
GEOSCIENCES: THE BASIC SCIENCE FOR A SUSTAINABLE FUTURE

2 - 8 MARCH 2020  
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