ASSOCIATION OF QUATERNARY RESEARCHERS

Society Reg. No. LUC/08076/2019-2020

2020-2021

Annual Report

Association of Quaternary Researchers (AOQR)

Address - Birbal Sahni Institute of Palaeosciences,
53 University Road, Lucknow – 226 007,
Uttar Pradesh, India.

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FROM AOQR SECRETARY'S DESK

The Association of Quaternary Researchers (AOQR) is establishing itself with initial steps towards achieving proposed aims and has set course to begin its journey. We have started advancing towards the first steps, e.g. bank account, selection of logo, and an AOQR website. The website will give notifications of various national and in-house academic events like training workshops, and conferences for the holistic development of Quaternary Researches in India in addition to publications of note to the community. On behalf of the President, AOQR, I humbly request all of you to register as members of this Association and join the journey to put us in the global map. Your support in this voyage would be invaluable for success in the accomplishment of the goals of our Association. The Quaternary timescale is dynamic, and the Indian subcontinent is diverse. Both these dimensions have to be dealt with a vision as research prospects in this region have large spatiotemporal and socioeconomic scales. The subcontinent is unique in its setting, geology, populace, and interactions between all its spheres. The historically high population density in this region leads to long-term feedback between industrial activities and climate. Preserving few of the oldest human-climate interaction records this subcontinent is an ideal observatory to study long and short-term earth interactions and their input to climate change of the entire 2.6 Ma time span. We dream of integrating the Quaternary Researchers of the subcontinent with cooperation with techniques, equipment etc. so that we become at par with the global research developments and fill in the gaps evident for the region in the global datasets.

Climate variability in the subcontinent during the Quaternary have been studied multiple times, but quantified datasets for paleoclimate modelling remains unavailable. We need to focus on working on long terrestrial sediment cores from the distinct physiographic regions, i.e. NE Himalaya, NW Himalaya, Gangetic plain, Thar Desert, Core Monsoon Zone, East Coast, and West Coast along with marine sediment cores. These datasets will represent the climate fluctuations in the subcontinent, dynamics of the seasonally reversing monsoon wind system and the resultant precipitation exhibiting vast spatiotemporal variations. The accuracy of the climatic reconstructions dramatically depends on the quality of the database with judicious usage of proxy indicators. Hence, type section studies from each geographic locale of the region giving clear images of local, regional and global forcings. To obtain an eloquent picture of regional past climate variability in the subcontinent, we need a distinctively different approach due to the sheer diversity of all aspects. Then only the information gathered would evolve into a complete and comprehensive picture utilizable for prediction, policy formulation and management of resources.

Under the AOQR banner, brainstorming sessions and open panel discussions will be conducted to design programs focussing on issues of the subcontinent emphasizing on quantitative results necessary for accurate predictions of the past and future climate variability. On behalf of all the founder members, I thank all the participants of the logo hunt competition and congratulate Mr. Vikas Agarwal, the winner of this competition. I wish AOQR success in every step of its future.

Dr. Binita Phartiyal, *Secretary - AOQR*
Scientist - E, BSIP, Lucknow

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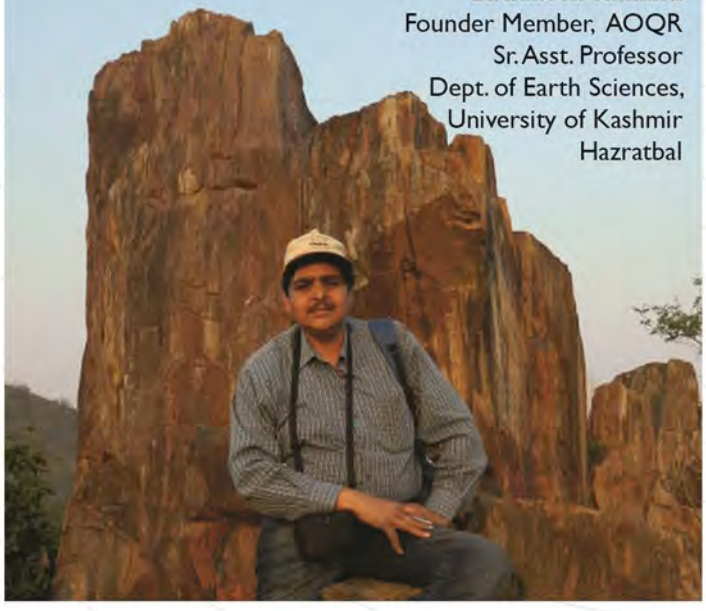
PERSPECTIVES

It is now widely accepted that Quaternary geology is a central discipline for understanding the climate variability and associated tectono-geomorphologic evolution in all earth systems in the past 2.6 million years. The sediments deposited during this period have become a subject of multidisciplinary scientific studies. Though it is a tiny time span comprising less than 0.1% of the earth's history, the geological processes operated during this time have had a much more significant effect on sculpturing the architecture of the earth's crust. It has been well established that during Plio-Pleistocene the Himalaya uplifted rapidly and gave rise to various tectono-geomorphic regimes and preserved vital records of climate variability during Quaternary Period. Such repository of sediments represents an archive for Quaternary cold-arid glacial and warm-humid interglacial climatic events. Especially the Karewa sediments of Kashmir Valley provide excellent opportunity to decipher the tectono-climatic history of NW Himalaya.

I feel happy and proud that AOQR, has the purpose of fostering coordinated programs among various research groups among the multidisciplinary earth scientists, organizations and associated research societies, so that more in-depth insights into this subject matter of critical concern may be developed. I do feel that it is an opportune time to pursue research in the geosciences, particularly focused on the Quaternary earth surface processes, and environmental change that insights on the origins of our genus and species, the response of earth systems to past, current and future climate variability and anthropogenic sourced change and how expanding urban populations can sustainably interface with tectonic hazards and rapidly changing hydrologic conditions. I wish the AOQR a great success in all its future ventures and extend all possible supports to the association.

Dr. Rakesh Chandra
Founder Member, AOQR
Sr. Asst. Professor
Dept. of Earth Sciences,
University of Kashmir
Hazratbal



The Quaternary Research in India covers wide disciplines in various aspects and on spatio-temporal scales. The Quaternary palaeoclimate is one of the widely studied areas using different proxies from marine and terrestrial Geological, Glaciological, Biological and Historical archives, indicating climatic variability that India experienced in both local and regional scale. The analyses of the past climate events recorded in various geographical regions of India through multiple proxies should be the trend in Indian Palaeoclimatic scenario. This is more evident in the last two millennia, which witnessed manifold rise in human activities and impact of agricultural, livestock and industrial pursuits. I hope the AOQR can help the Quaternary researchers of India, working on various low and high resolution proxies to come under the same umbrella and discuss the future possible out come of their research findings. In the Indian scenario of the higher education system, there is a lacuna in learning computation and analysis of the data. So in my opinion, at the Postgraduate level research methodology with special emphasis on computer programming should be implemented. So that when a student joins PhD, it will be much more convenient for him/ her to analyze the data towards PhD thesis compilation. The bank account for the AOQR is in process. Once the bank approves it, further information shall be circulated along with the fees structure to become a member of AOQR. I also request that if any one is willing to support the AOQR in this initial phase, we are happy to receive some voluntary amount as support funds to our association.

Dr. Santosh K. Shah
Treasurer, AOQR
Scientist - D, BSIP, Lucknow.

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The Women of Quaternary Sciences

International Women's Day (March 8) is a global day celebrating the social, economic, cultural and political achievements of women. The theme for International Women's Day-2020 was, ***I am Generation Equality: Realising Women's Rights.*** In celebration, this article felicitates our country's Quaternary Women Scientists in gratitude for their contribution in this field. Quaternary Science has women scientists and researchers all over the country, we salute them all and are listing names of some outstanding researchers who have carved a niche for themselves in this field.

Prof. Hema Achyuthan, Anna University started her research journey from her pioneering work on the Palaeolithic archaeological site, Didwana, Thar desert, Rajasthan and has the exceptional record of guiding more than 25 PhD scholars and M.Phil. students' from our country & abroad. Her interests are in Quaternary geomorphology and paleoclimate with a current focus on late paleomonsoon reconstruction using lake and marine sediments.

The BSIP, Lucknow has the largest group of Quaternary scientists' in India. Fittingly, the institute has as its Director, one of the most cited scientists' in India, **Dr. Vandana Prasad,** who is AOQR's President too. She is renowned globally for her work on, dinoflagellates, phytoliths and pollen.

Dr. Anjum Farooqui, BSIP is a renowned Quaternary Palynologist specialising on mangroves of southern and western India.

She heads the Quaternary division in BSIP, Lucknow. A contemporary of Dr. Vandana Prasad, both ladies have done extensive and pioneering fieldwork in remote areas during past decades when female officers were seen with amazement in small distant villages.

Dr. Binita Phartiyal of the same institute is an expert on the Third Pole (Ladakh) Geomorphology, Neotectonics and Palaeoclimate of Himalayan ranges and Trans-Himalayas. She has been to both the poles (Antarctica and Arctic) as member of the Indian Scientific Expeditions organised by NCPOR, Goa. She has established the Paleomagnetic laboratory in BSIP to study climate & chronology of recent and downtime sediments.

Prof. Sheila Mishra is a retired professor of Geoarchaeology and the Head of the Department of of Archaeology, Deccan College, Pune, with about 30 years of experience in working in the field of Acheulian studies in India. Her research shows that Acheulian artefacts of India are closer

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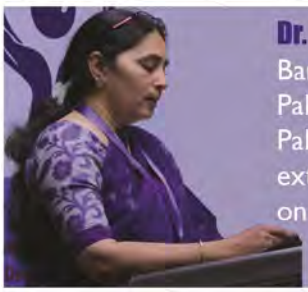
The Women of Quaternary Sciences....

in age with those in Africa and by the time these are found in Europe, their time in the subcontinent was already over.



Dr. Alpa Sridhar from MS University Baroda, expertises in Quaternary Palaeoclimate, Geomorphology and Palaeohydrology and has worked extensively in western India. Her work on Palaeo-floods and slack water deposits are commendable.

Prof. Shanti Pappu, an Indian Archaeologist, who has been instrumental in showing that the path of human migration out of Africa has gone through the subcontinent and presence of Acheulian Hominins in South India. In addition Prof. Pappu is presently working for popularisation of prehistory, palaeoenvironments, ethnoarchaeology, history of archaeology and public archaeology, especially among children and teachers.

Dr. Anupama Krishnamurthy from the French Institute, Pondicherry has more than 25 years of experience in Pollen and Phytolith studies, Quaternary Paleoecology, Archaeopalynology, Melissopalynology, Aeropalynology and Tropical Forest Ecology. Actively engaged with international networks such as PAGES for two decades; her current focus is on application and interpretation of biotic datasets in climate modelling.

Dr. Nandini Nagarajan is the first female Geophysicist graduate of IIT-Kharagpur, who headed the geomagnetic observatory, NGRI, Hyderabad.

Her observations of Earth's magnetic field at Hyderabad and various places around South Asia, especially at the geomagnetic equator was commendable. In addition to this, electromagnetic field measurements for groundwater and ore prospecting surveys led to her having a high fieldwork experience.

Prof. Sulochana Gadgil, Indian Institute of Science, is a 1970 Harvard PhD with renowned expertize in Ocean Dynamics, Ocean-atmosphere coupling, Rainfall variability and impact on agriculture.

Prof. Gadgil is often seen in NOAA documentaries and other international platforms explaining monsoon processes.

Dr. Rachna Raj, from JNU, New Delhi is an expert on Quaternary Geomorphology and Palaeoclimate. Her work is based on multi-proxy studies of the lakes/ponds and abandoned channels along with geomorphological and tectonic-geomorphological studies of the mainland Gujarat, western India.

The presence of women scientists in wide areas of quaternary science is unequivocal and the feature on 'The Women of Quaternary Science' is to be continued in the upcoming issues as well.

Written by Dr.Trina Bose with inputs from google author profiles, ResearchGate, Dr. Prachi Joshi, Dr. Veena MP & Dr. Navin Shankar.

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PhD Theses

Late Quaternary oceanographic and climatic reconstructions based on foraminifera and sediment geochemical signatures from the northeastern Arabian Sea

Submitted by: **Syed Azharuddin**

Supervisor (s): Dr Pawan Govil, BSIP & Prof A. D. Singh, Dept. of Geology, BHU

This research aims to understand the drivers of the paleoclimatic and paleoceanographic variability in the northeastern Arabian Sea, from where very few high-resolution records exist. The study was conducted on two sediment gravity cores from offshore Saurashtra. The author observes progressive strengthening of southwest monsoon throughout the Holocene and records short term centennial scale events. Abrupt cold events including YD, 8.2 ka and 4 ka events (corresponding to the weakened monsoons), a warm event of preboreal (corresponding to the strengthened monsoons) and a new cold event centering around 10.1 ka are reported. Further, spectral analyses of the high-resolution $\delta^{18}O_{G.ruber}$ time series records from the investigated cores reveal the cyclicity of ~256 years in the monsoons, which corresponds to Holocene deVries solar cycle. Two more periodicities of ~296 years and ~1609 years have also been recorded from the $\delta^{18}O_{G.ruber}$ time series, which match with the 282 years cyclic event in the North Atlantic and the 1500±500 years Bond cycle respectively.

Drainage reorganization and subsurface stratigraphy of the paleo-Yamuna River in Haryana plain, NW India and its linkage to Harappan Civilization

Submitted by: **Imran Khan**

Supervisor (s): Prof. Rajiv Sinha, IIT Kanpur

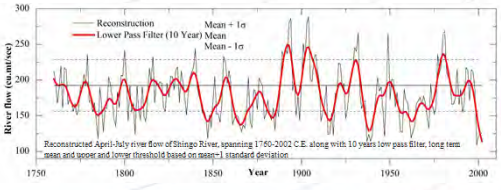
The present doctoral thesis focuses on the eastern tributary of the ancient Sarasvati River, the paleo-Yamuna, and uses an integrated approach of geophysical surveys, drilling and coring, and optically stimulated luminescence (OSL) dating of buried sands to establish the subsurface existence, chronostratigraphic framework and depositional environments during the Late Quaternary period in NW India.

Dendroclimatology of the Liddar Valley and adjoining areas of the Kashmir Himalaya

Submitted by: **Uttam Pandey**

Supervisor (s): Prof. Munendra Singh, Dept. of Geology, U.of Lucknow & Dr. Santosh K. Shah, BSIP

This thesis develops tree-rings network of twenty chronologies from 1753 tree cores of four taxa for Liddar valley and adjoining areas in the Himalaya to establish self-calibrated Palmer Drought Severity Index (scPDSI), winter temperature and past river flow of the Shingo River of the Indus Basin. The work constructs the scPDSI of summer, based on tree-ring chronologies of *A. pindrow*, *C. deodara* and *P. smithiana* which demonstrates the reconstructions for years 1581-2012 CE are consistent with wet-dry episodes of regional and adjoining regions of Western Himalaya, Karakorum and Tibetan Plateau, reflecting increase in pluvial condition since the 1970s to present. Another reconstruction of the winter temperature, based on *P. wallichiana* for 1855-2012 CE, shows recent abrupt warming trends after the 1970s and reflected regional-scale temperature variability. Lastly, based on tree-ring chronology of *A. pindrow* from Sindh valley, a first of its kind river flow reconstruction for period (1760-2002 CE) of the Shingo River of Indus Basin is presented.



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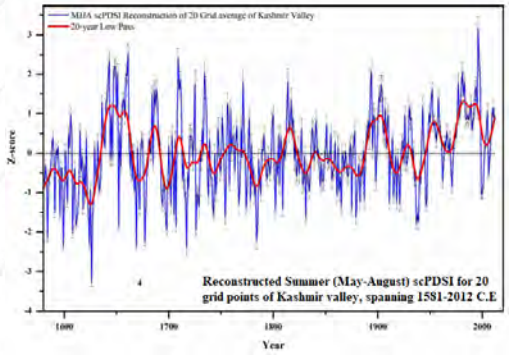
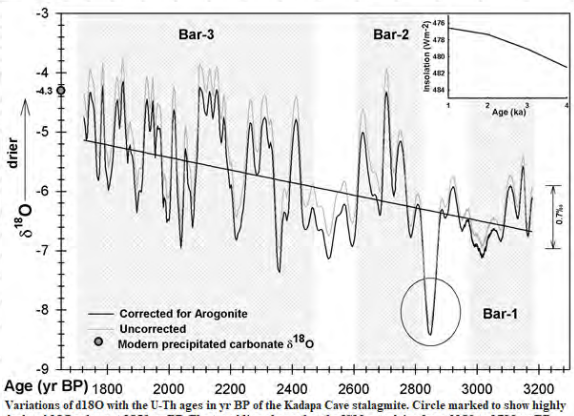


Isotopic studies of rainfall and its reconstruction using speleothems from the Indian subcontinent

Submitted by: **Nitesh Sinha**

Supervisor (s): Dr S. Chakraborty, IITM, Pune

This thesis presents an extensive dataset of modern daily rainfall isotopic composition from sites in the Indian subcontinent and Bay of Bengal during 2012 - 2017 to analyse changes in rainfall amount and corresponding isotopic signatures. The Port Blair rainwater $\delta^{18}O$ maintains a temporally dependent correlation with the average rain variation over the Core Monsoon Zone (CMZ), though the rainfall over these two regions shoes none. Consequently, the correlation between rainfall over the CMZ and $\delta^{18}O$ of Port Blair rain provides evidence of the transport of the Bay of Bengal moisture to parts of Indian mainland during the summer monsoon, attributable to monsoon intra-seasonal oscillations. The Indian summer monsoon (ISM) for period 1.7-3.2 ka is also studied using geochemical analyses of stalagmite from peninsular India (Kadapa Cave), producing the highest ever ~1 year resolution dataset. A declining trend is observed in the ISM, that identifies an associated abrupt event at ~2.8 ka. A further comparison with Chinese records and a synthesis of 26 studies from India. This results suggest synchronous variations of the Indian and the East Asian Monsoon systems and elucidate influences of various major climatic events, such as LIA, MWP, and RWP.



Variations of d18O with the U-Th ages in yr BP of the Kadapa Cave stalagmite. Circle marked to show highly depleted 18O values at 2850 yr BP. The trend line shows that the ISM gets drier from 3180 to 1720 yr BP following northern hemispheric solar insolation (shown in inset). Three distinct bars (1, 2, and 3) marked to show observed variability in monsoon associated with different periods (wet period, ~2.8Ka abrupt change, and dry period respectively).

Workshops/Conferences

Organized:

Advanced Training Program on Analytical Geochemistry (A CSIR-Integrated Skill Initiative)

The 3rd advanced training program on "Analytical Geochemistry (A CSIR- Integrated Skill Initiative)" was organized at the CSIR- National Geophysical Research Institute (CSIR-NGRI), Hyderabad, during February 10-19, 2020. The main theme of the workshop was to develop skilled human resources in the field of Analytical Geochemistry. The ten-day workshop was designed and conducted to introduce the concept, applications and operation of modern instrumental methods for chemical analysis applied in the field of Earth & Environmental Sciences. Equal emphasis was given on theoretical aspects and practical sessions for high-quality data processing through various software applications. About 60 eminent scientists, research scholars, and technical personnel from different parts of the country participated in the program. Hands-on training sessions were provided on different types of sample preparation, sample reduction, thin sectioning, and mineral separation techniques, along with a strong emphasis on contamination control at various stages of the analytical proce-

dure. Quality assurance (QA) and quality control (QC) methods, which are the most important aspect used in the field of analytical geochemistry, were also taken into consideration and discussed. The spectroscopic technique, such as X-ray Fluorescence (XRF) and Inductively Coupled Plasma- Mass Spectrometry (ICP-MS) for the major, trace and REE elements, mineral characterization by XRD, SEM-EDS, EPMA and LA-HR-ICP-MS and high precision mineral geochronology (Pb-Pb Baddeleyite) by using TE-TIMS were also addressed.

Hidayatullah Khan, BSIP

National Workshop on Quantitative Geomorphology (7-21 Feb, 2020)

Quantitative analysis in geomorphology (or Earth Surface Processes) has recently emerged as an important discipline of geosciences due to its applications in sustainable management of natural resources and effective management of natural hazards. Future of various landforms namely rivers, wetlands, glaciers, hillslopes, desert, coastal region in the challenging Anthropocene time will depend on the in-depth quantitative process understanding with the appreciation of nonlinear dynamics of present-day geomorphic processes(s). The Earth Sciences Discipline at the Indian Institute of Technology Gandhinagar (IITGN) organized 'Quantitative Geomorphology'workshop that focus upon a wider application of state-of-art quantitative techniques in geoscientific studies. The workshop was funded by Oil India Limited and was supported by the Indian National Science Academy (INSA). It was coordinated by Professor Vikrant Jain, Earth Sciences, IITGN. The main objective of the workshop was to expose the young researchers with modern quantitative approaches and methods, which could be applied by them in their research problems. A total of 30 participants from 60 applicants were selected, which included senior PhD students, postdoc fellows and Assistant Professors from 18 different institutions across India. The participants benefitted from the valuable lectures and hands-on exercises conducted by international (Prof. Jerome Lave, CNRS France; Prof. Bodo Bookhagen, Potsdam University) and Indian resource persons (Prof B S Daya Sagar, ISI, Bengaluru; Prof. Argha Banerjee, IISER Pune; Prof. A K Singhvi, PRL, Ahmedabad; Prof. R. N. Singh and Prof. Vikrant Jain, IITGN; Prof. S. K Tandon, IISER Bhopal). The workshop also befitted by evening talks delivered by young faculties and researchers at IITGN to highlight the emerging research areas in geomorphology. The workshop encouraged the young generation of researchers to pose research questions, pursue methods of quantitative analysis and evolve important multi-disciplinary paradigm of geomorphology.

Prof. Vikrant Jain, IIT-Gandhinagar

Upcoming Events:

Number of Scientific meetings have been cancelled/ postponed or rescheduled due to the onset of NOVEL CORONAVIRUS (COVID-19). The present status of the meeting is indicated as per available details on their website (links given in blue are click-able in pdf).

Meetings Postponed

36th International Geological Congress; New Delhi, India. Postponed to 9-14 November 2020. Contact: igc.delhi2020@nic.in Web: 36igc

The PAGES Carbon in Peat on EArth through Time (C-PEAT) workshop "Tropical peatland processes and ecosystem services" C: sakonvan.c@chula.ac.th W: pastglobalchanges peat-carbon

TRACE 2020 – Tree Rings in Archaeology, Climatology and Ecology; Lund, Sweden C: trace2020lund@gmail.com W: trace2020

3rd International Workshop on Stratospheric Sulfur and its Role in Climate (SSiRC); University of Leeds, UK C: l.w.thomason@nasa.gov W: SSiRC

5th International Meeting of Early-stage Researchers in Palaeontology (IMERP); Naujoji Akmenė, Lithuania. C: imerp2020@gmail.com W: imerp2020

35th International Meeting of Sedimentology; Prague, Czech Republic. C: iasprague2020@guarant.cz W: iasprague2020

PalEOclimate and the PeopLing of the Earth (PEOPLE 3000) workshop "Understanding long-term

human-environment feedback loops through the integration of archeology, paleoclimate and ecological models"; Arica, Chile. Tentatively postponed to 31 August to 5 September 2020. C: emgayo@uc.cl

2nd International PalaeoArc Conference on "Processes and Palaeo-environmental changes in the Arctic: from past to present"; Pisa, Italy. Postponed to 28 September to 2 October 2020. C: palaeoarc2020@dst.unipi.it W: palaeoarc2020

Paleoclimate Modelling Intercomparison Project (PMIP) 2020 Conference; Postponed to second half of October 2020. C: pmip2020@126.com W: pmip2020

Meetings Cancelled

EGU General Assembly 2020 C: egu2020@copernicus.org W: egu2020

Asia Oceania Geosciences Society (AOGS) 17th ANNUAL MEETING C: info@asiaoceania.org W: aogs2020

2nd International Conference on Contaminated Sediments C: Nathalie.Dubois@eawag.ch W: Contaminated Sediments2

Joint Scientific Committee on Antarctic Research (SCAR) 2020 C: brittany@laevents.com.au W: scar-comnap2020

Meetings As per schedule: This may be subject to change considering the current/future situation.

PalaeoSIG Science Communication and Writing Workshop; University of Stirling, Stirling, Scotland, UK 13-14 May 2020. C: ald7@st-andrews.ac.uk W: palaeosig

Cities on Volcanoes 11 Conference; Herakion, Crete, Greece 23-27 May 2020. C: info@citiesonvolcanoes11.com W: volcanoes11

Climate Variability Across Scales (CVAS) working group workshop "Beyond Palaeoclimate Ping Pong: Improving estimates of climate variability by consistent data-model comparison"; University of Heidelberg, Heidelberg, Germany 2-5 June 2020. C: paleodyn@iup.uni-heidelberg.de W: ping-pong2020

Goldschmidt 2020 Conference; Hawaii Convention Center and University of Hawaii, Hawaii, USA 21-26th June 2020. W: goldschmidt2020

Sustainability Research and Innovation Congress (SRI2020); Brisbane, Australia 14-17 June 2020. C: sri@futureearth.org W: sri2020

PAGES-supported 9th International Climate Change: The Karst Record (KR9) Conference; Innsbruck, Austria 12-15 July 2020. C: gina.moseley@uibk.ac.at W: 2020KR9

Physics of the Ocean Summer School; Bad Honnef, Germany 12-17 July 2020.

14th International Coral Reef Symposium (ICRS 2020); Bremen, Germany 5-10 July 2020.

Land Use and Ecosystem Change Summer School; Karlsruhe Institute of Technology, Institute of Meteorology and Climate Research, Atmospheric Environmental Research (IMK-IFU), Campus Garmisch-Partenkirchen, Germany 19-26 August 2020. W: landchange-school2020

PAGES-endorsed 19th International Swiss Climate Summer School; Grindelwald, Switzerland 23-28 August 2020. C: info@oeschger.unibe.ch W: SCSS19

26th Annual Meeting of the European Association of Archaeologists (EAA); Budapest, Hungary 26-30 August 2020. C: helpdesk@e-a-a.org W: eaa2020

PAGES-supported Carpathian-Balkan Paleoscience Workshop 2020 (CBPW2020); Sacel, Maramures county, Romania 31 August to 4 September 2020. C: marcel.mindrescu@gmail.com W: CBPW2020

EuroDendro 2020 Conference; Riga, Latvia 31 August to 4 September 2020 C: eurodendro2020@lu.lv W: eurodendro2020

Environment and History: an Introductory Workshop; Istanbul, Turkey 7-8 September 2020. C: anamedprograms@ku.edu.tr W: environment-and-history-workshop

15th International Palynological Congress and 11th International Organisation of Palaeobotany Conference; Prague, Czech Republic C: prague2020@conferencepartners.cz W: prague2020

PALeo-constraints on SEA-level rise (PALSEA) work-

shop "Improving understanding of ice-sheet and solid-Earth processes driving paleo sea-level change"; Palisades, NY, USA 14-16 September 2020. C: jackya@ldeo.columbia.edu W: palsea2020

25th Society of Africanist Archaeologists (SAfA) Conference; Oxford, UK 21-24 September 2020. C: safa2020@arch.ox.ac.uk W: safa2020

Quaternary Interglacials (QUIGS) workshop "Glacial Terminations: processes and feedbacks"; Cassis, France 22-24 September 2020. C: l.menviel@unsw.edu.au

3rd International Conference on Polar Climate and Environmental Change in the Last Millennium; Toruń, Poland 24-26 September 2020. C: polarclimate2020@umk.pl W: polarclimate2020

3rd Climate Reconstruction and Impacts from Archives of Societies (CRIAS) workshop, titled "State of the Art of Historical Climatology in International Perspective"; Hong Kong 25-26 September 2020. C: crias@eduhk.hk

Volcanic Impacts on Climate and Society (VICS) workshop "Moving forward by looking back"; Aarhus, Denmark 30 September to 2 October 2020. C: f.riede@cas.au.dk

LandCover6k 4th General Workshop "New Land-Cover and Land-Use Datasets for evaluation and improvement of Anthropogenic Land-Cover Change Scenarios"; Philadelphia, PA, USA 9-10 October 2020. C: kathy.morrison@sas.upenn.edu, jen-bates@sas.upenn.edu W: 4thLandCover6k

International Partnerships in Ice Core Sciences (IPICS) 3rd Open Science Conference; Crans-Montana, Switzerland 18-23 October 2020. W: 3rdIPICS

PAGES-INQUA joint ECR workshop: Past Socio-Environmental Systems (PASES) for early-career researchers; La Serena y Coquimbo, Chile from 9-13 November 2020. C: workshop.pages.ecn@gmail.com W: pases2020

Selected Publications:

Between December 2019 and March 2020, several novel research papers and book chapters incorporating wide scientific techniques were published in various national and international peer-reviewed journals. Some key highlights include:

In the context of the Himalayan and adjacent mountains, **Owen (2020)** provides an overview of Quaternary Glaciation and its drivers, based on abundant field studies, remote sensing and geochronological methods. The author shows that at least nine major regionally synchronous glacier advances occurred in the region over the past ~400 ka. **Thakur *et al.* (2020)** illustrate cases of active tectonics of Himalayan Frontal Fault Zone in the Sub-Himalaya during the late Pleistocene-Holocene. **Kumar *et al.* (2020)** discuss the late Quaternary sedimentation history of the Himalaya and its foreland, review the published literature in the context and highlight the research gaps that need to be addressed. **Bhambri *et al.* (2020)** combine satellite imageries to demonstrate how a surge of Shispare Glacier, Karakoram in 2017–2019 dammed the proglacial local river, and forming an ice-dammed lake and generating a small glacial lake outburst flood.

In the Ladakh region, **Phartiyal *et al.* (2020)** investigate sediments from a proglacial lake to provide the first high-resolution palaeolimnology record from Karakoram Himalayas and demonstrate various intermittent warm and cold periods during the late Holocene. **Shukla *et al.* (2020)** combine morphological, sedimentological and OSL dating to suggest the preservation of three glacial advances of decreasing magnitude in southern Ladakh attributable to the westerlies. **Sharma *et al.* (2019)** investigate another sedimentary section in the region and follow a multi-proxy approach to reconstruct high-resolution records of monsoonal variability during the late Holocene. **Achyuthan *et al.* (2020)** provide an overview of the C/N ratio and organic matter contents in surface sediments of four Kashmir lakes and discuss their potential value in palaeoclimatic interpretation of fossil sediments in these lake basins to

serve as an analogue with older materials. **Shah et al. (2020)**, based on multi-proxy investigations, present a comprehensive record of the Holocene climate and hydrographic changes around the Wular Lake, Kashmir Valley and identify three key phases of wet climate conditions.

Gupta *et al.* (2019) present a new high-resolution oxygen isotope record from the Wah Shikar Cave in northeast India and identify abrupt changes in the ISM strength during the last ~900 years. In the arid landscape of northwest India, **Kar (2020)** discusses the drivers of aeolian landscape changes in the Thar Desert during the late Quaternary, highlights the issue of sampling strategies in earlier studies, and compares the dune accumulation chronologies generated using older and modern dating protocols. **Shridhar *et al.* (2020)** study a lacustrine sequence at Timbi in the semi-arid region of western India and based on multi-proxy data discuss high magnitude floods in response to southwest monsoon variability. Along the Ganga plains, **Khanolkar *et al.* (2020)** synthesise chronostratigraphic records of cliff sections and drill cores and the subsurface data of the hydrocarbon industry, and discuss the role of the Indian summer monsoon (ISM) and tectonic processes in shaping late Quaternary evolution of the landscape. In central India, **Jha *et al.* (2020)** investigate fluvial sequences of the Belan River and based on stable isotopic composition of soil carbonates and n-alkanes of palaeosols discuss the Late Quaternary climate, vegetation and its implications for prehistoric phases.

In South India, from Sagileru Valley in Andhra Pradesh, **Krishnan and Achyuthan (2019)** investigate biotite flakes from the Young Toba Tuff ash and characterise the state and stage of weathering since ash deposition ~74 ka in the context of dry, semi-arid to arid climatic conditions. **Ahmed and Singh (2020)** conduct geochemical analyses on two drilled cores from the Cauvery delta and discuss the implications of weathering and mineral sorting on rare earth element geochemistry during the late Quaternary. In the context of least explored Andaman Sea, **Sijinkumar *et al.* (2020)** discuss the late Quaternary chronostratigraphy, carbonate mass accumulation rates and palaeocenography in response to the variations in the ISM. **Gupta *et al.* (2020)** review an array of terrestrial and marine records in the context of the ISM reconstruction, and discuss its evolution during the late Quaternary and associated implications for palaeoenvironmental and societal changes.

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ASSOCIATION OF QUATERNARY RESEARCHERS

Quaternary Chronicles

Happenings in the Sub-continent

Vol.2 No.1 April 2020

LOGO HUNT

Result Announcement

THE WINNER IS VIKAS AGRAWAL

AOQR gets a logo!

ASSOCIATION OF QUATERNARY RESEARCHERS

Description of the Logo by the Artist:

The triangles are the ranges of the mighty Himalayas, snow covered, and in several shades of grey, showing diversity of altitude and diversity. The sun that is the main driving force of life on earth and our sustenance is put in yellow color. The letters "AOQR" are closely places depicting an ASSOCIATION and in blue color showing the rich river network of India; In between letter 'a' & 'o' a water drop is placed indication its importance for a sustainable development. The green arrow moving upwards depicts the association's growth and adds positivity; secondly it depicts air/wind which again is important for the processes involved and climate of the subcontinent. The line orange line represents the plains and plateau area of India and the blue wavy line depicts ocean/ sea on three sides of the subcontinent. Human evolution the most important feature of Quaternary Period is shown after the letter 'r' and letter 'q' incorporates the Indian Tricolor- the Indian Quaternary Group.

Vikas Agrawal

About the Artist:

Vikas is basically from Chattisgarh and has won various International Logo Competitions between 2004 and 2018 and now also the winner of the AOQR LOGO competition. He is a Biology graduate and actively involved in the Conservation of habitats rich in wildlife & birds. With course on animal behavior and welfare from the prestigious University of Edinburgh, England (2015); Global Environmental Management course from Technical University of Denmark (2017), he currently is undertaking a study on Biological Diversity (Theories, Measures and Data sampling techniques) from National Research Tomsk State University, Russia. Vikas is a multi-talented person, a Graphic Designer, a Wildlife Photographer and involved in various drives like- training the conservators and guides of various state bio-reserves; spreading awareness amongst the children and public at large for the conservation of nature and working in tandem with the State Government agencies for the conservation and identifying new habitats for the State Flora/Fauna Base.

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Vol.2 No.2 August 2020

From the President's Desk

Greetings!

Amid these stressful times of the COVID pandemic, I hope you are keeping good health. I am happy to announce that AOQR in its first meeting has resolved to have Mentors on board as association's lifetime Patrons. The association is also aware that the scientific contributions and global leadership of the several mentors and stalwarts in Quaternary Science have not only played a pivotal role in bringing Indian geosciences on the world map but has also enthused several strong working groups across the globe. Therefore, AOQR in its first step has offered its Honorary membership to Prof. A. K. Singhvi (Physical Research Laboratory (PRL), Ahmedabad); Prof. Vishwas Kale (Pune); Prof. Hema Achythuan (Anna University, Chennai) and Prof L. S. Chamyal (MS University, Baroda). The consistent guidance and support of these four mentors steered our efforts into a reality in forming the AOQR.

Secondly, I request all of you to register yourself for AOQR Membership *(Fee structure and bank details given in the Newsletter)* and also spread a word amongst your colleagues and students to make the AOQR Fraternity stronger. I understand that due to the pandemic many of our programs could not take shape and were delayed, hence this membership will be valid till March 2022. AOQR needs to have funds and this little contribution from your side will help move a step forward to fulfill the objective of the Association. I express my gratitude to all the Governing Body members for generously and voluntarily donating to the AOQR. This fund will be utilised to develop the website of the association.

We are also organising a webinar for our Early Career Researchers. The details are provided in this Newsletter. I look forward to some very interesting discussions on the thought-provoking topics that are chosen. AOQR is there to give a platform to our young dynamic researchers. I wish the webinar a success and in the future, we would announce more activities. The AOQR office will keep updating on that. Till then, please register for membership. Enjoy the AOQR ECR Webinar Series-2020.

Stay Healthy and Stay Safe.

Dr. Vandana Prasad, The President, AOQR
Director, BSIP, Lucknow

Image courtesy: sortiraparis.com

Quaternary Chronicles
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ASSOCIATION OF QUATERNARY RESEARCHERS

PERSPECTIVES

Quaternary is an important period in the earth's history as not only it has witnessed dramatic climate changes, affecting food resources and the extinction of many species but also because it includes the present. In our country, though the researchers are working on various aspects of Quaternary, a better understanding of the abrupt climate and environmental changes, improved information on the long-term and complex interactions between causal factors and responses of different systems like glaciers, rivers, lakes, aeolian systems etc., are required.

The current scenario calls for the larger concerted efforts with multidisciplinary and multi institutional projects rolling out instead of small incremental proposals, which normally make limited impact. This necessitates a better synergy amongst researchers with varied expertise working on substantive multi-disciplinary projects addressing major scientific questions such as climate changes and anthropogenic activities and develop some mathematical models. In order to understand the processes and feedback mechanism of the outer skin of the earth i.e. Critical Zone, the Ministry of Earth Sciences (MoES) has initiated a new national program on Critical Zone Observatories (CZOs). It is planned to set up CZOs across different climatic and lithologic gradients. Studying the various processes and feedbacks/ interactions will help in improving our understanding of the changes occurring in the Critical zone due to geogenic and anthropogenic forcing. Similarly, other areas need to be identified and taken up in a concerted manner. Likewise, realizing the role of chronology in geosciences, MoES has funded a Centre for Geochronology which is now operational at the Inter University Accelerator Centre, Delhi. Where, Accelerator Mass Spectrometer (AMS), LA-MC-ICPMS, XRF, XRD, FE-SEM have already been installed and are operational. This geochronology facility will soon be equipped with the latest high-resolution secondary ion mass spectrometer (HR-SIMS) and Ion Accelerator for medium and heavy ion AMS measurements for the study of many other radioisotopes. The samples (all across the stratigraphy) can be dated free of cost here. It is a great opportunity for researchers across the country to reconstruct the high-resolution data of various proxies. Ministry also has a High-Power Computing System which can be utilised to model the high-resolution proxy climate data from various Quaternary archives such as speleothems, glacial, marine, lacustrine, fluvial, and aeolian records and understanding the complex response of earth systems.

Ministry, through its "Outreach & Awareness programme", also supports Seminars, conferences & workshops, symposia, brainstorming meetings, field programmes and training activities.

I hope that the formation of the Association of Quaternary Researchers (AOQR) will serve as a platform for Indian researchers to discuss and develop well-defined and quantitative science projects and in this pursuit, the facilities created by MoES can also be optimally utilised. I wish the AOQR a very grand and long future.

Dr. Vandana Chaudhry
AOQR Member
Scientist F
MoES, New Delhi

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PERSPECTIVES

Research on varied aspects of the Quaternary period now occupies a place of prime importance in contemporary earth science research and rightly so. India is blessed with high variability of Quaternary terrains that provide ample opportunities for application of a plethora of state of the art techniques available now. The range of Quaternary terrains in our country is truly amazing. These include the Quaternary fluvial, glacial, lake and colluvial sediments in the Himalayas, the alluvial terrains of the northern India and mainland Gujarat, the hyper-arid belt including Thar desert and Great Rann of Kachchh, large deltas on the east coast, significant river valley deposits in the peninsular India along with in-situ and reworked volcanogenic sediments and not to miss out the long coastline and the contiguous offshore basins. This allows us the wonderful opportunity to determine the reliability of the reconstructions of the past, cross-validation from a variety of proxies and different methods and approaches. The importance of precise and accurate reconstruction of past environmental parameters from high-resolution palaeo-environmental studies can never be considered as over emphasized. Based on these data only, the climate models can be realistically tested which can then form a priority input for formulation of appropriate policies to deal with the consequences of climate change.

In addition to the available information on past climates, there are all indications in the present-day world that the global climate changes will have a worldwide impact on nature and society. The only way forward is to generate high-resolution information on past climate change that adds to our understanding of natural climate change and human-induced climate change. Distinguishing between the two requires detailed and reliable information about the past. An important outcome of the research during the last couple of decades in India is the realization of the importance of post-glacial variability of conditions in the subcontinent and its connection with global scale mechanisms of change. Understandably, proxy records from the Indian subcontinent show that the Holocene climate has been highly variable; however, global data suggest multiple controls that must have been responsible for this variability. Also, emphasis needs to be placed on generating more data on Rapid Climate Change (RCC) during this period.

Global data shows that some of the RCC events have occurred in fairly regular patterns, and the frequency of these RCCs appears to have increased since the middle Holocene. Given the widely variable settings of Quaternary terrains in the subcontinent, the responses may not be synchronous or equal during these events. Lag in response time to climate changes can also vary from one region to another and also between different proxies. For example, vegetation response to climate change may sometimes be slower than other physical or chemical proxies. In the context of the complexity of Holocene climate change, it is important to generate widely distributed terrain-specific paleoclimatic data, which can also help prevent using data from one area to extrapolate to another.

AOQR is a timely and welcome step in the direction of guiding and facilitating in setting up the agenda of future research in our country. I wish it success.

Prof. Deepak M. Maurya
The M. S. University of Baroda
Vadodara-390002,
Gujarat, India.

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PERSPECTIVES

Quaternary science provided new insights about cause-effect based process understanding of the dynamic Earth surface. Earth Surface Processes (ESP) is presently growing as an emerging field of Earth Sciences, which is opening various new opportunities for Quaternary geoscientists. Last two decades have seen major new initiatives in this area, which are as follows:

(a) Integration of scale is the foremost of them, which is characterised by integration of spatial as well as temporal scales. For example, the millennial-scale evolutionary trajectory of a landscape is now being analysed using equations derived from modern-day sediment transport processes. Our physical understanding of movement of a sediment particle is providing new knowledge about the mountain building process.

(b) This integration of processes at different temporal scales led to a new focus to ESP studies i.e. focus on the future. Earth sciences as a subject has remained focused in the past and 'The present is the key to the past' remained the main driving principle. However, now there are new interests in knowing the future of our landscape and landforms namely rivers, glaciers, desert, coastal, hillslopes, etc while keeping the main focus on process quantification. That has posed new research challenges for geoscientists, and Quaternary researchers with in-depth process-based understanding of cause-effect at different temporal scales can lead this new exciting area.

(c) ESP studies in 21st century have also seen conceptual changes with the arrival of quantitative dataset. Equilibrium and linearity assumption between cause and effect has paved the way for new concepts of 'nonlinearity' and 'complexity' to explain ESP processes. Quantification of geomorphic 'threshold' and 'connectivity' has now become new tools to analyse nonlinearity and complexity in the Earth systems.

(d) This period has also seen significant growth of interdisciplinary research. Integration with basic sciences has become more important with better focus on process quantification. Geochemistry, geochronology (physics), hydrology and stream power (physics) and mathematical modelling based approaches provided new insights about ESP at Quaternary and modern time scales. New interdisciplinary sciences like Critical Zone Science, River Science are making new avenues for inclusion of further new disciplines to understand the dynamic Earth.

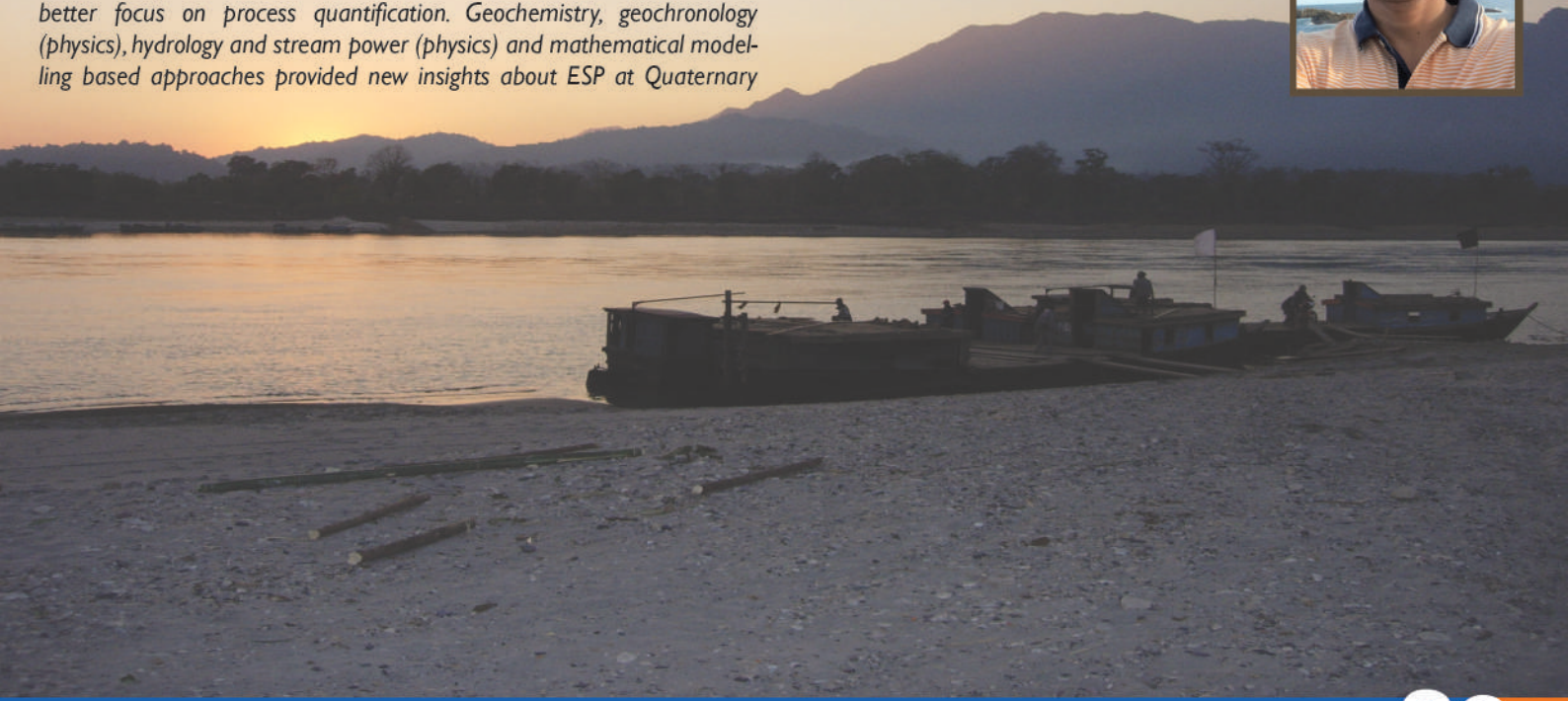
(e) New technological advances are adding new and large dataset about landscapes at different scales, and new disciplines like data science, machine learning are knocking the door of Earth Sciences.

Today, the new challenges of climate change and human impacts in this time of Anthropocene has opened the opportunity for all to contribute in the area of ESP, be it computer scientists, hydraulic engineering, social scientist, oceanographer, atmospheric scientist, (micro)biologist, archaeologist or expert in any branch of basic sciences or engineering. This is a time for the Earth Sciences community to open more windows and doors to have better interaction with other researchers, which will help to change the gear of the already fast growing subject of ESP.

Hence, this is the most fascinating time for Quaternary geoscientists with a large number of opportunities opening for them. Quaternary researchers can walk across scales and could make a significant impact on society. Next decade is going to witness the path-breaking works and emergence of new branches of Earth Science. The initiation of AOQR could not have been taken at a more appropriate time. This is the most timely and important initiative. I hope that the AOQR will become a national platform to lead new exciting interdisciplinary areas related to Earth at cross-over of scales.

I wish all the best for its success.

Prof. Vikrant Jain
Discipline of Earth Sciences
IIT Gandhinagar



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HONORARY MEMBERS OF AOQR


Prof. A. K. Singhvi


Prof. Vishvas Kale


Prof Hema Achythuan


Prof. L. S. Chamyal

GET INVOLVED WITH PAGES
PAST GLOBAL CHANGES

Past Global Changes (PAGES; http://www.pastglobalchanges.org) is a registered organization affiliated to Future Earth that promotes multinational, interdisciplinary coordinated programs involving climate, biogeochemical cycles, ecosystem processes, biodiversity and human dimensions, at various time scales - from the Pliocene to the recent past. The activities of PAGES are subscribed by more than 5000 scientists across 125 countries. The network of PAGES is now a core project of the Future Earth (https://futureearth.org) and funded by Swiss Academy of Sciences and supported by the University of Bern, Switzerland. The activities of PAGES are structured by its Scientific Steering Committee (SSC) that is composed of members chosen as representative of important paleoscience techniques or discipline and geographic regions. I will be representing India for three years as an SSC member starting January 2021.

PAGES actively brings out a magazine, it organizes Open Science Meets (OSM) and Young Scientists Meet (YSM). The 6th edition of OSM and 4th edition of YSM will be held from 16-22 May 2021 in Agadir, Morocco (visit https://www.pages-osm.org/ for details). Working groups (WGs), tenured for 3 years, normally formed in consultation with SSC members that provide a platform for discussion and research are among the core of PAGES activities. PAGES helps formulation of these groups and may fund organizing group meetings. At present, there is an active network of 14 such groups (visit http://pastglobalchanges.org/science/wg/intro) and with this I wish to enthuse AOQR members and Quaternary researchers in India to come forward and propose new WGs and make use of PAGES network in strengthening their ideas and leadership.

I encourage AOQR community to get involved in PAGES by creating their profile in its People Database (http://www.pastglobalchanges.org/people/people-database/introduction) and subscribe to receive PAGES Magazine (http://www.pastglobalchanges.org/products/pages-magazine) and updates for free.

Dr. Pradeep Srivastava,
Vice-President, AOQR
Scientist-F
Wadia Institute of Himalayan Geology,
Dehradun.

futureearth

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Dr Sheela Kusumgar (March 2, 1939 - June 10, 2020)

Dr. Sheela Kusumgar, a renowned pioneer in establishing the radiocarbon dating method in India, breathed her last on 10 June, 2020, due to age-related ailments.

She was a researcher who devoted her entire life to radiocarbon dating and its developments. Dr. Kusumgar was instrumental in setting up the first radiocarbon dating laboratory in India at the Tata Institute of Fundamental Research, Mumbai. The laboratory subsequently served as a national facility for the Indian archaeology and geology. In 1973, as the radiocarbon dating laboratory was shifted to the Physical Research Laboratory (PRL), Ahmedabad, Dr. Kusumgar also joined PRL and initiated the development of new methodologies to improve analytical qualities. In the 1970s, conventional techniques were in use wherein the natural carbon samples were carefully processed in radiochemical-vacuum lines. Each sample took about a week's time for the final age estimate. Out of a couple of thousands of results, she delivered during her career, about 500 radiocarbon ages were pertinent to key archaeological sites, which brought out part-contemporaneity of Southern Neolithic, Chalcolithic and Harappan cultures, suggesting no unilineal societal evolution in India.

Dr. Kusumgar was an M.Sc. in 1966 in Physics from Bombay University and earned her doctorate degree on Kashmir Karewas under the then renowned scientist Prof. Devendra Lal in 1980. She was trained at the Groningen radiocarbon dating laboratory, Netherlands; Universities of Oxford and Cambridge in the UK to understand evolving techniques in geosciences and to implement back home at the PRL. Her expertise included techniques of low-level radioactivity measurements, fission-track methods, paleo-magnetism and alpha and beta spectroscopy and an excellent ability to design and develop very sensitive low volume gas proportional counters with efficient suppression of cosmic ray produced background. In the 1990s, she played essential roles in the efforts by the PRL, to bring Accelerator Mass Spectrometry technique in India. She was instrumental in developing radiochemical lines, the first time in India, required to convert sample carbon into graphite.

The AOQR family will always remember her immense contributions and landmark outcomes in developing the radiocarbon facility, and understanding of the chronology of Indian archaeology and several other Quaternary disciplines.

- Dr. M G Yadava, Geosciences Division,
Physical Research Laboratory,
Ahmedabad

Dr Sheela Kusumgar will always be missed by the Quaternary fraternity of India.

The Women in Quaternary Sciences

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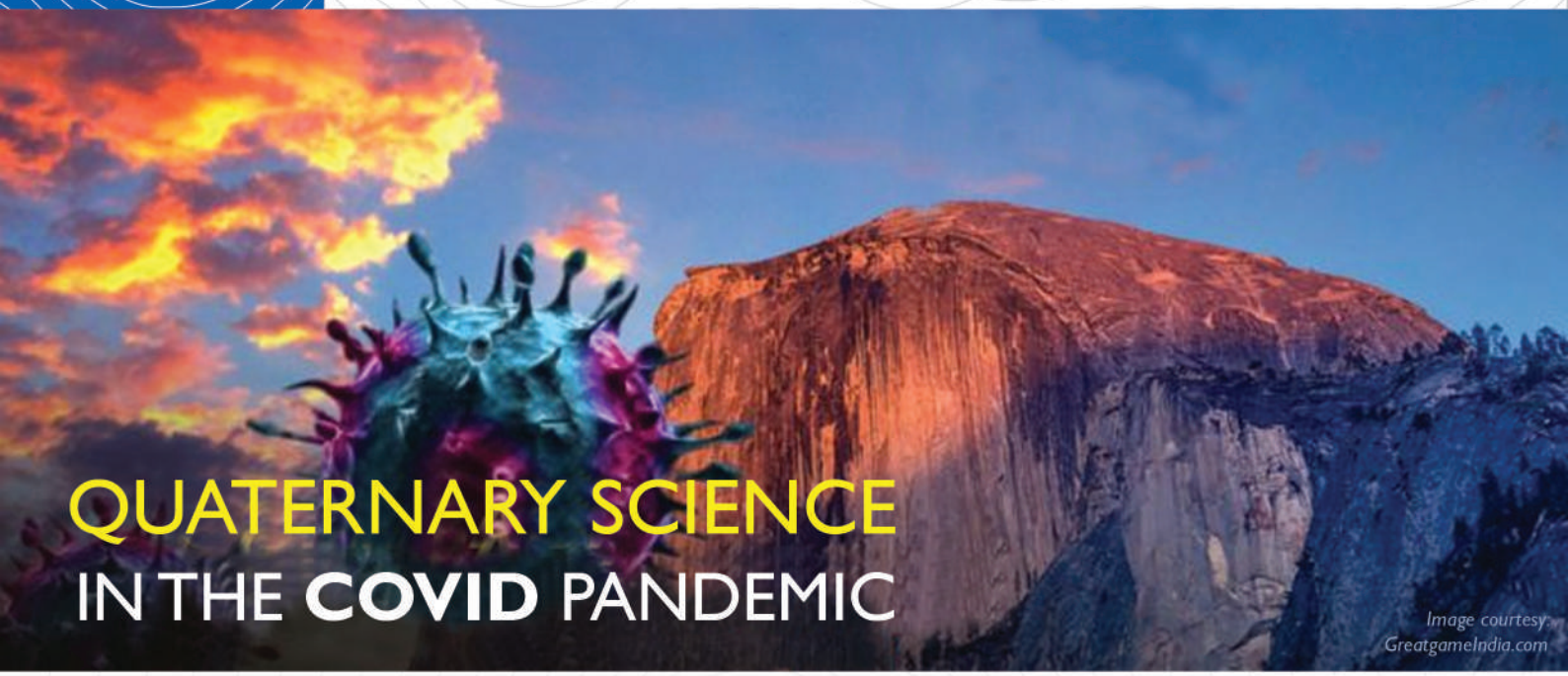

QUATERNARY SCIENCE IN THE COVID PANDEMIC

Image courtesy: GreatgameIndia.com

The coronavirus disease (COVID) pandemic has disrupted life throughout the world. The states have imposed lockdowns to minimize personal contacts as it helps to contain the spread of highly infectious disease. All walks of life are severely affected by the disease. People are confined to homes for months at a stretch, something unprecedented. Except for those involved in the discovery of drugs and vaccines against the COVID, a majority of the researchers are also forced to stay away from the labs. These testing times, however, offer a never-before-and-hopefully-never-again opportunity to collect the environmental data. The closure of a majority of the factories and minimal vehicular traffic, significantly reduced the anthropogenic input to both the air and water bodies. A near-complete closure of anthropogenic contribution, of course, barring the sewage discharge, can be used to collect the baseline data. This data is hard to get during the regular days. In the case of sediments, the ones deposited before the industrial revolution are often used for background levels. The diagenetic changes, however, restrict the reliability of considering the pre-industrial sediments for the background levels.

Therefore, the data collected during the lockdown time will immensely help to understand the extent of anthropogenic contribution to the levels of various harmful elements in the ambient environment. As personal safety is the foremost concern, efforts should be on developing a network of collaborators, each collecting a specific set of parameters from a close-by area with minimal movement. The importance of such data collection during these testing pandemic times was highlighted in a recent letter published in Science (Saraswat & Saraswat, 2020).

Dr. Rajeev Saraswat
Principal Scientist
National Institute of Oceanography,
Dona Paula, Goa, India

Science AAAS
R. Saraswat, D.A. Saraswat, 2020.
Research opportunities in pandemic lockdown.
Science, v. 368, pp. 594-595.

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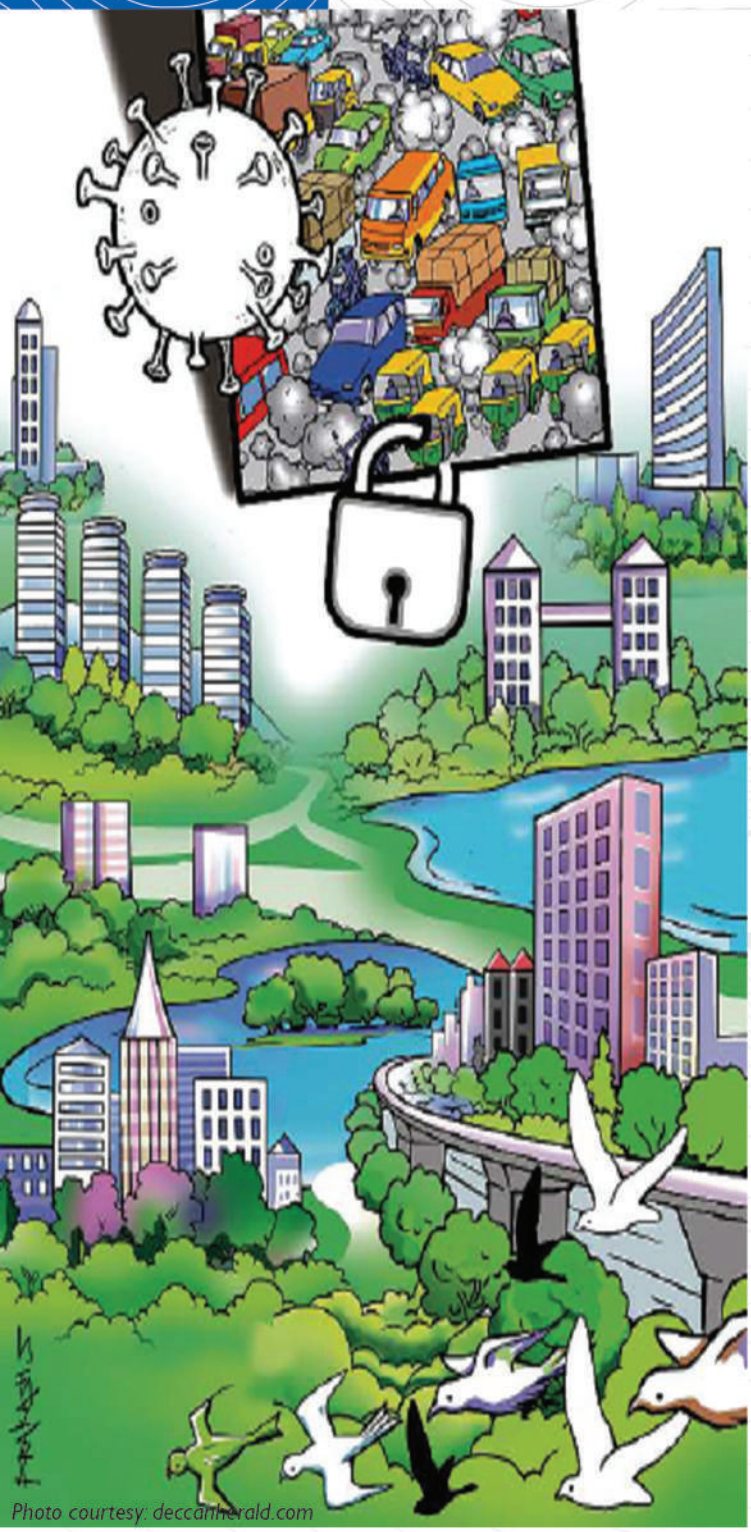


Photo courtesy: deccanherald.com

ECOLOGICAL IMPACTS OF CORONAVIRUS LOCKDOWN OR 'ANTHROPAUSE'

In December 2019, an unidentified illness which was later named as SARS-CoV-2 emerged in Wuhan, China. The disease had affected more than 220 countries within a period of six months and has become a global pandemic, carrying distressing consequences. The pace of the world has changed ever since and the virus has put a pause in many areas of human interaction, with enhanced activities channelized into the digital world. In order to contain the virus from spreading, many countries have enforced dramatic measures to cut interpersonal interaction, including factories shuttered, social distancing directives and isolation in place, largely arresting human mobility. The term 'anthropause' has been proposed by some researchers, indicating the situation[1].

This COVID-19 lockdown imposed all over the world has brought about numerous impacts on the environment and climate. Changes in the air, water quality and transitory wildlife habitat repossession were among the apparent changes related to the COVID-19 lockdown, primarily due to restricted movement and reduced industrial activity. Short-term reductions in Nitrogen dioxide (NO_2) was correlated with the reduction in the use of fossil fuels[2]. There is marked reduction in the seismic noise in earth's crust observed at the Royal Observatory of Belgium in Brussels, which scientists say would be useful in detecting signals of natural events in similar frequency[3].

Before 2020, the escalation in the amount of greenhouse gases produced since the commencement of the industrialization era has led to an increase in the average global temperature of the Earth, affecting the melting of glaciers and resulting rising sea levels. Human induced environmental degradation was fast due to the pollution of resources such as air, water and soil. Prior to the COVID-19 pandemic, climate researchers appealed that reduced economic activity would aid in reducing global warming as well as air and marine pollution, letting the environment to gradually flourish. Then shortly after the COVID-19 lockdown began, there were slight variations in the environment which made us realize that our positive actions can actually influence the Earth's sustainability. Though the improvements on ecology is not to sound a siren on stopping all sorts of development activities, certainly it should be an eye opener for the allied benefits of living sustainably and in a cleaner environment. There is also visible reduction in the chronic and acute ailments associated with respiratory and other diseases due to prolonged exposure to pollutants arising from this apparent development spree.

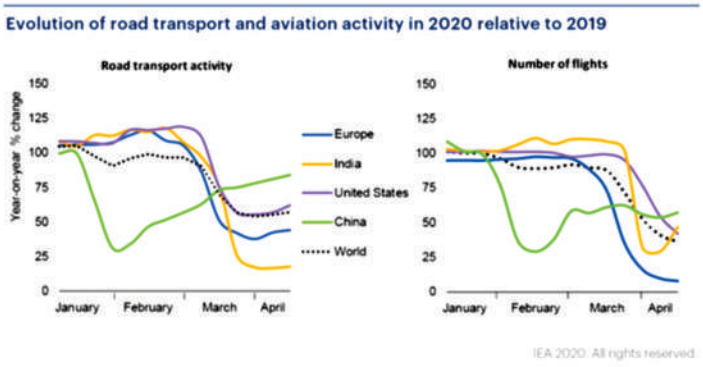
Right from breathing cleaner air in cities to greener trees or spotting wildlife regaining its positions into the occupied cities, some significant ecological changes that could be seen during and after the COVID-19 lockdown include:

1. Improvement in air quality

After the lockdown was imposed globally, industries were shut down, with companies' largely practicing work from home and there was

less commuting using private and public transportation. This in turn led to a significant drop in air pollution, as there was a marked decline in emission of airborne pollutants like CO_2, CO and nitrous oxide. According to the International Energy Agency (IEA) the world's CO_2 emissions are expected to fall by 8% this year, due to COVID-19 related restrictions which is equivalent to the annual emission cut required to limit the warming rate to <1.5°C above the pre-industrial temperature[4]. A large-scale drop in air pollutants in China and in many other cities across the world has also been reported. New Delhi was graded as the most polluted city in the world by the World Health Organization (WHO) in May 2014. The normal air quality of India's national capital according to the air quality index (AQI) used to be 200.

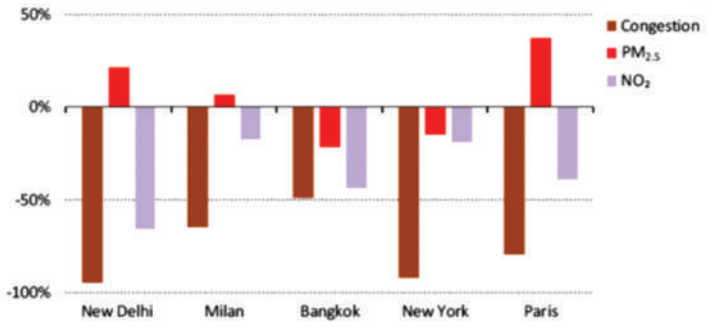
However, when the pollution level hit the top, it climbed to 900 and more. Although an AQI of 200 itself is around 25% higher than the unsafe level estimated by WHO. During the lockdown, New Delhi's transportation services were taken off the roads and workshops, construction activities were put to a standstill, and AQI levels have fallen below 20. Major reduction in the rush- hour traffic congestion during the lockdown in New Delhi had shown 66% drop in NO_2[2]. The sky suddenly turned piercing blue within a week. One of the other effects of the lockdown on the environment is the noticeable drop in coal consumption and associated reduction in CO2 emission. In India, the CO2 emissions have fallen by an estimated amount of 15-30% during March and April months due to lockdown enforced due to the pandemic[5].



Source: IEA analysis based on Apple Mobility, Rystad Energy and OAG data.

2. Improvement in water quality

The Uttarakhand Pollution Control Board tested the water from Har-ki-Pauri in Haridwar and the results reveal that the Ganga water in Haridwar is 'fit for drinking after chlorination', which happens to be for the first time in decades[8]. It could be due to the reduction in the drainage of industrial waste into the river water due to the lockdown. Another surprising ecological impact of COVID-19 lockdown has been detected in Venice, Italy. Since the number of tourists decreased due to the lockdown, the water in Venice's canals got cleaner when compared to the past. Since there were no boats in the canals, the sediment churning and addition of



Changes in air quality between the weeks before and after lockdowns only partially reflect decreased congestion as most $PM_{2.5}$ emissions do not come from road vehicles.

Notes: Rush-hour traffic congestion refers to the expected percentage increase in travel time compared to free-flow conditions on an average Monday at 09:00. Change in traffic congestion 2019 annual average versus April 2020.

Source: IEA analysis based on TomTom International (2020).

other water pollutants dropped efficiently which cleared up the water. The water became so clear that the fishes could be seen once again and there was better water flow also[10]. Hence, because of the lesser human interference even the oceans are recovering and aquatic life is blooming.

3. Effect on flora and fauna

The lockdown has realized a decline in fishing activities, which supported an increase in fish biomass that was almost depleted due to overfishing. Apart from that, many animals were spotted moving freely in places where once they were never seen. Sea turtles have been seen returning to areas where they never visited for laying eggs due to the absence of human interference. Due to reduced water pollution in River Ganga, the critically endangered South Asian River Dolphins known as Ganges Dolphins have been once spotted again at several Ganga Ghats in Kolkata after 30 years[9]. As a result of the COVID-19 lockdown thousands of flamingos had gathered in Navi Mumbai[11]. These birds usually migrate to the area every year, but this year there has been a massive increase in their number. With all human activities at a halt, plants would thrive and grow to produce more coverage, better canopy and produce more oxygen. This time has given us the opportunity to identify the critical threshold of human- wildlife interactions, improve criteria of coexistence, beyond which it may turn detrimental to both or lead to possible conflicts[1].

Ways to Maintain this Sustainability in Post-lockdown World

As discussed, there is a good side that the coronavirus related lockdown initiatives put forth by the various governments have helped in improving air and water quality and rendered us with a cleaner and greener environment. This pandemic, however, has also triggered extensive job losses and threatened the sustenance of millions of people as industries are struggling after the shut-down in order to contain the spread of virus. Economic activities have been

stopped and stock markets fell along with the drop in carbon emission. A pandemic of this kind which is taking people's lives certainly must not be seen as a way of improving our natural resources and bringing an environmental change. According to IEA executive Director, Fatih Birol the improvements "resulting from the premature deaths and economic trauma around the world, the historic decline in global emission is absolutely nothing to cheer". Firstly, it is not certain for how long this dip in carbon emission would last as whenever the pandemic would finally subside, the carbon and other pollutant emissions would also increase, reverting the changes that we see at the moment. The recent data shows that China's fossil CO_2 emissions rebound and surged past the pre- coronavirus levels in May at a rapid rate[6].

As COVID-19 is spreading fast in all the parts of the world, there could be a big issue in the medical waste management system. Waste management companies of various medical health organizations have now started taking measures towards coronavirus decontamination services as it is becoming an extremely crucial matter for the governments of different countries. Plastic-based surgical masks and empty bottles of hand sanitizer which are long lasting in the environment after they are disposed have led to an increased ocean or landfill. For example, in Hong Kong, where the COVID-19 infection started in January 2020, the medical wastes have now polluted the whole environment. The survey report of an environmental NGO Ocean Asia in Soko islands, Hong Kong detected loads of discarded single-use masks carried away up to a 100-m stretch of the beach[10]. During the COVID-19 outbreak, people have started wearing single-use masks and gloves as a precautionary measure, which in turn is increasing the amount of trash in the environment. This discarded waste can easily enter the animal's natural habitat in both land and ocean and this could be eaten up by animals, mistakenly and lead to their death[12].

Though the changes during the pandemic stage may appear temporary, it is certain that some traces of behavioural and operational changes in human interaction are likely to stay even in the post-COVID era. This pandemic time has provided an opportunity for rudimentary learning of personal as well as community hygiene and sanitization measures in some places, which may possibly lead to responsible disposal and management practices of solid waste. Following such a social decorum will not only stop the diseases, but will reduce the consumption of resources to maintain the hygiene and living standard otherwise, which will have a positive feedback on ecological stress in the long term. In academic and research communications, it would enhance the usage of virtual platforms for conferences and joint educational programs among global institutions, which may likely reduce the dependence of physical presence in a space as it was the case in pre- COVID era. This may reduce the ecological stress arising from global human mobility and associated resource utilization.

The improved air quality and country's pro-renewable energy policy may add momentum to adopt strengthened targets and standards during post-COVID era in India. The COVID lockdown also portrayed a positive image and sense of optimism among the stakeholders that the environment quality may be improved by putting proper mitigation measures in place. With IEA's report on green recovery plan for post COVID era[2], the global leaders and countries are already signalling about green stimulus spending to boost economic growth with a caption of 'builds back better'[7].

- **Dr Jyoti Srivastava,** Scientist, BSIP, Lucknow, India
Dr Linto Alappat, Asst. Prof., Christ College, Thrissur, India

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WORKSHOPS & CONFERENCES

Most of the conferences planned during this period were either cancelled or postponed. But few of them have gone online. Here we have listed some of the major conferences that will be conducted in virtual mode in the upcoming months.

1.The Scientific Committee on Antarctic Research (SCAR) 2020 Open Science Conference *will be held online from 3-7 August 2020. SCAR's Open Science Conferences have been a focal point for the Antarctic research community for over 15 years. Go to the official website: https://www.scar2020.org/*

2.The PALeo-constraints on SEA-level rise (PALSEA) *working group will hold the "PALSEAExpress" online meeting from 15-16 September 2020. Abstract submission is now online and will close 15 August 2020. Go the working group website: https://palseagroup. weebly.com/2020-virtual-meeting.html*

3. The Annual Meeting of the Geological Society of America 2020 (GSA 2020) *originally scheduled to be held in Montréal, Canada, from 25–28 October 2020 will now be held from 26–30 October 2020 as "GSA 2020 Connects Online". Abstract deadline is 4 August. Early registration deadline is 21 September. Register here: https://community.geosociety.org/gsa2020 /registration*

4. AGU Fall Meeting 2020: *The 2020 AGU Fall Meeting will be held mainly online, and potentially also in San Francisco, California, USA, from 7-11 December 2020. Go to the official website: https://www.agu.org/Fall-Meeting.*

A REPORT ON THE ***INTERNATIONAL CONFERENCE ON PALEOCLIMATE CHANGES*** *(ICPC – 2020)*

School of Civil Engineering, Vellore Institute of Technology (VIT) Chennai organized an International conference on Paleoclimate Changes (ICPC – 2020) during July 9-10, 2020 in the online platform. The goal of the conference is to stimulate an observational attitude and to promote an open discussion on Paleoceanography and Paleoclimatology signals in order to improve our present vision and to ground future perspectives. The industrial sponsor of the conference is M/s SenseImage Technologies, Chennai. Fifty papers, accepted for presentation by peer review and presented in this conference which includes 26 keynote and invited talks. The key note and invited speakers are from top universities/institutions from India and aboard. Researchers from 12 universities and R&D organizations from 9 countries outside India presented their research work. Eminent researchers from 35 various academics, industry and R&D organizations from India presented their work in the conference. Among the themes featured in the technical sessions were: (1) Paleoceanography and paleoclimatology proxies: Development and its application (2) Evolution and Development of Indian monsoon system (3) Climate changes in geological time: lessons to learn (4) Climate changes, bio-diversity and human adaptations (5) Climate dynamics and Ocean-continent-atmosphere linkages.

About 600 participants from 350 organizations from India and abroad actively participated and simulated the discussion in the conference. ICPC-2020 aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results on all aspects of Paleoceanography and Paleoclimatology Conference. The conference was inaugurated by Dr V.S. Kanchana Bhaaskaran, Pro Vice Chancellor, VIT Chennai who welcomed the participants and Dr. Anil K. Gupta, Professor, IIT Kharagpur and former Director of Wadia Institute of Himalayan Geology, Dehradun delivered the inaugural address.

-Dr. Mohan K and Dr. Saravanan K, Conveners of ICPC-2020, Geosciences Research Lab, School of Civil Engineering, VIT, Chennai.

SELECTED PUBLICATIONS

Between April 2020 and June 2020, several novel research papers and book chapters incorporating wide scientific techniques were published in various national and international peer-reviewed journals. Some key highlights include:

Ghosh et al. (2020), *use δD_{C29}, $\delta^{13}C_{C29}$ values of alkane and $\delta^{13}C$ values of organic matter, for the first time, from a relict lake in the central Himalayas to reconstruct monsoonal rainfall and contemporary vegetation for last 10.5 ka with an emphasis on the early Holocene.* ***Ali et al. (2020)*** *investigate a proglacial sedimentary profile from the same region of the Himalayas, and following a multi-proxy approach, provide important insights on the climate variability in the region during the last ~15 ka. In the northwestern Himalayas,* ***Chahal et al. (2020)*** *use lumines-*

scence dating and sedimentology to present a preliminary assessment of the geological evidence of the megafloods generated due to catastrophic lake outburst in the upper Zanskar catchment during the late Pleistocene.

Suresh and Kumar (2020), through integrated geomorphological, sedimentological and chronological studies of late Quaternary fluvial succession along the frontal Janauri-Bhaddi anticline report reorganisation of the Beas-Satluj rivers in the Kangra re-entrant in the last ~50 ka. **Pokharia et al. (2020)** present the first systematic evaluation of the relationship between the archaeological and palaeoclimatic record from urban sites of Chandravati in northwestern India , and based on the presence of summer and winter crops suggest dominant climatic conditions during the past millennium. In the arid landscape of northwest India, **Srivastava et al. (2020)** apply dune accumulation intensity modelling methodology to luminescence age data sets to discuss the drivers of dune activity in the Thar Desert and reconstruct paleoenvironments during the Holocene.

In the southern Kachchh mainland of western India, **Das et al. (2020)** employ geomorphology, sedimentology, geochemistry and luminescence dating to integrate the fluvial to fluvio-marine records, and evaluate the potential of dryland environments in archiving the palaeo-events in the context of reconstructing fluvial systems' response to variations in monsoonal strength. **Kothyari et al. (2020)** undertook geomorphological and palaeoseismological investigations coupled with luminescence dating along the central segment of Kachchh Mainland Fault and discuss the stratigraphic evidences of four palae-earthquakes which occurred in the Holocene.

Kumar et al. (2020) investigate Quaternary sediments from the Dadra and Nagar Haveli area of Konkan Coastal Belt and identify the trigger mechanism for the soft sediment deformation structures in preserved sediments. Deformation in studied sediments implies the presence of neotectonic activity and links to a recent earthquake. **Rajkumar et al (2020)** studied the distribution and biodiversity of recent Ostracoda from the continental shelf to slope sediments of Gulf of Mannar. Core-wise distributions of ostracod species, ecological implications and species diversity have also been discussed. New organic walled dinoflagellate cysts have been identified from the Bay of Bengal and eastern Arabian Sea by **Uddandam et al., (2020).** The new taxa appear to be related to high nutrient concentrations and persistent low salinity conditions.

Farooqui et al (2020) studied the distribution of Testate Amoebae (Thecamoebians) in a desiccating lake, India. Fifteen species of testate amoebae belonging to six generatate amoebae belonging to six genera were identified and are correlated to a variety of environmental and climatic parameters.

Kasilingam et al., (2020) studied the nearshore benthic foraminifera along the Palk Strait, Southeast Coast of India, Tamil Nadu. Along with this environmental parameters such as water depth, pH, dissolved oxygen, salinity, CaCO3, organic matter, sand, silt and clay contents were compared. **Kaushik and Thirumalai (2020)** reported Psammophaga simplora (Arnold, 1982) for the first time from the recent intertidal surface sediments of Rajapury creek, west coast of India, Arabian Sea.

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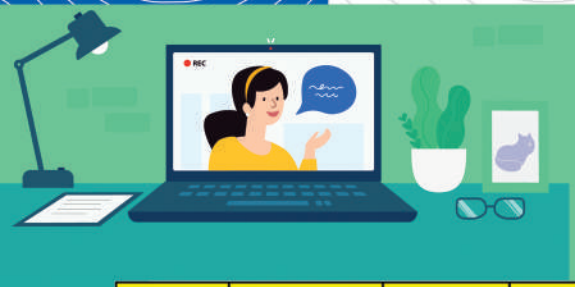
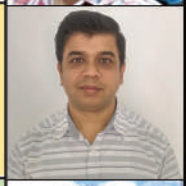
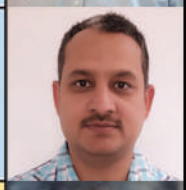
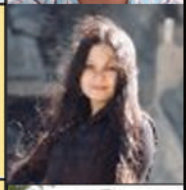


AOQR - ECR - Webinar Series:

Association of Quaternary Researchers is organizing a webinar series in which selected Early Career Researchers (ECRs) from reputed organizations within India and abroad, will present their data on emerging areas of research in Quaternary Science for the benefit of the larger Quaternary Science community. It will be conducted in the virtual platform in the month of September 2020.

Upcoming AOQR - ECR - Webinar series

S.No.	Date	Time (Hrs)	Resource Person & Affiliation	Title of the talk	
1.	07.09.20	1400	**Sushant S. Naik** CSIR-National Institute of Oceanography (NIO), Dona Paula, Goa-India	Role of the oceans in glacial/interglacial variations in atmospheric carbon dioxide	
2	07.09.20	1530	**Amzad Hussain Laskar** Geosciences Division, Physical Research Laboratory (PRL), Ahmedabad, Gujarat-India	Paleoclimate reconstruction using stable isotopes in natural archives	
3	14.09.20	1430	**Waliur Rahaman** National Centre for Polar and Ocean Research (NCPOR), Vasco da Gama, Goa-India	Ocean acidification threats under high CO_2 world: A lesson from past records of ocean pH	
4	14.09.20	1600	**Midhun M** University of Michigan, USA and Cochin University of Science & Technology (CUSAT), Cochin, Kerala-India	Coherent Variability in Sahel and Indian Summer Monsoon Rainfall Recorded in Oxygen Isotopes of Rain/Speleothem	
5	21.09.20	1400	**Naveen Chauhan** Atomic, Molecular and Optical Physics Division, Physical Research Laboratory (PRL), Navrangpura, Ahmedabad, Gujarat-India	A Revised Optimized Protocol for Violet Stimulated Luminescence (VSL) Dating to Extend the Dating Range using Quartz	
6	21.09.20	1530	**Madhav Krishna Murari** Geochronology Group, IUAC, Delhi-India	Cosmogenic Radionuclides: Application to geomorphological processes	
7	28.09.20	1400	**Gayatri Kathayat** Assoc. Prof. of Global Environmental Change, Xi'an Jiaotong University, China.	The '4.2 ka BP Event' in the Indian Subcontinent? An Objective Synthesis of Proxy Records	
8	28.09.20	1530	**Parth R Chauhan** Assistant Professor, Humanities and Social Science, IISER-Mohali, India.	Climates and cultures: Quaternary environmental dynamics and human adaptations in India	

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AOQR MEMBERSHIP CALL FOR 2020 - 2022 IS OPEN NOW!

*The **AOQR membership call for 2020 - March 2022** is open now for researchers of Quaternary Science of Indian sub-continent. You are welcome to submit your application.*

When you join the AOQR, you become a part of a multidisciplinary team of researchers, and practitioners of Quaternary Science and represent Indian Quaternary Science at an international level. Members can get priorities at our annual e-conferences, publish in the edited books/ journal volumes by the members of the AOQR, access to webinars, e-conferences and specialized thematic workshops etc.

Join AOQR - Become Member!

Your membership makes our association grow, while you get access to professional development opportunities with the largest network of researchers of Quaternary Science in India with common interest to learn, interact, and collaborate. The membership of the AOQR is open to all members of academia and industry. Any researcher who is affiliated to a university, institute, and those who conduct independent research, interested corporate houses and organizations are eligible for AOQR membership subjected to verification.

AOQR classifies its membership for researchers and organizations into the following categories and the details of annual subscription cost are as follows:

Member	At the time of admission	Annual Subscription
Academic Member	INR: 1,000	INR: 5,000
Student Member	INR: 500	INR: 2,500
Corporate Member	INR: 2,000	INR: 10,000

Membership Form

Name* Date of Birth* DD/MM/YYYY
Affiliation*
Type of membership*
☐ Academic ☐ Student ☐ Corporate
Quaternary Interests*
(Keywords separated by commas)
About You and Quaternary
Email*
This will be your login id.
Mobile
Mailing Address*
Permanent Address
Fields marked as * are mandatory.

Please submit duly filled Membership form and payment transfer confirmation to ***aoqr2019@gmail.com.***

BANK DETAILS

A/C Name: **ASSOCIATION OF QUATERNARY RESEARCHERS**
A/C Number: **187302000000206**
Bank Name: **Indian Overseas Bank**
Branch: **BSIP, Lucknow**
Account Type: **Current**
IFSC Code: **IOBA0001873**

Do join QuatChron_AOQR Google Group!
As a member of the group for Quaternary researchers working in South Asia, you will receive our Newsletter and other related information.
[To join: open https://groups.google.com/, login (using Gmail account), search for "QuatChron_AOQR" and ask to join.]

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"Every Pandemic is a Puzzle, mere intelligence will not help, you need to be inquisitive"

- Senthil Kumar Sadasivam
ECR - Team AOQR
Geomicrobiologist & Recipient of the Best Poster Award @ INQUA 2019

Image credit: Joe Lingeman for The New York Times

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Vol.2 No.3 December 2020

1st Birthday of AOQR

From the President's Desk

Dear Quaternary Family,

We are completing one year on 12th December 2020. This journey was difficult due to most of it being in COVID times but was successful because of several online activities. I congratulate you all, and invite you for the First Foundation Day of AOQR, do join the Foundation Day celebrations virtually! I thank Prof. S. N. Rajguru for having accepted the association's Honorary membership.

The Quaternary Chronicles newsletter volume 2(3) December issue is here. This issue contains the Quaternary sciences' news of the last four months (August-November 2020) regarding the Indian Subcontinent. Apologies if something is missed. In the previous four months, we have lost Prof. Nilesh Bhatt, Prof. Eric. C. Grimm, Prof. G. B Pant, and Prof. K.S. Valdiya who contributed to Quaternary sciences immensely in their capacities and ways. The Quaternary fraternity of India will always remember them and salutes them for their contributions. I hope you enjoyed the AOQR-ECR webinar series (7th September to 29th October) that was organised by our dynamic ECR Team. I am elated to see your feedback and assure you of many more such activities on this platform. All the talks have been uploaded on our website and YouTube channel. Further, I thank all the webinar speakers for connecting through AOQR, abstracts of these talks are being published in this issue. The Quaternary Palynology training will be organised in January 2021, it will be free for members, and a nominal fee will be charged for non-members.

I announce a special membership offer, only valid till 31st December 2020. All the members registered with AOQR this year will enjoy extended membership till 31st March 2023. This offer is for a limited time only, as decided by the Governing Body to mark the completion of one year of the association.

We have launched our website: https://aoqr.org/. I would request all Quaternary researchers to register and become a part of the discussion forum and join the working groups. We need Group Leaders and Group Secretaries for all the five working groups. Please apply in for it and become an active part of this association. Last but not least, I would like to thank the office bearers and the ECR team again for having worked meticulously for a successful webinar series to bring out this issue of the newsletter on time. Your support is always a boon to the AOQR.

The next issue of the QuatChron newsletter will come out in April 2021. Do share the Happenings in the field of Quaternary sciences with the ECR team so that it can be incorporated in the next issue.

Stay Safe. With best wishes,

Dr. Vandana Prasad, *The President, AOQR*

Director, BSIP, Lucknow

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PERSPECTIVES

India is a country rich in geodiversity, geomorphic diversity and biodiversity. The sub-continent displays a large variety and complexity of earth surface processes and landforms. India's extraordinary geodiversity and geoheritage are a combination of various quaternary deposits & landforms with high aesthetic, scientific, educational, & ecological values in the populace.

The Quaternary Period has been a time of dramatic climatic and environmental changes, and an vital phase of landscape evolution and human development in the Indian Subcontinent. In the last couple of decades, a variety of terrestrial and marine archives have been investigated to reconstruct the Pleistocene and Holocene climate and environmental changes. However, there are significant knowledge gaps in the current understanding of the nature of climate changes and their geomorphic and ecological impacts as well as the human history during the last 2.6 million years in general and the last 11,500 years in particular. Knowledge of environmental changes in the Quaternary on different spatio-temporal scales, based on rigorous data analyses and objective interpretation, is essential for a better understanding of the consequences of human-induced current and future environmental changes.

An experiential and multidisciplinary natural science, Quaternary research heavily relies on empirical evidence with a variety of qualitative, quantitative field and laboratory data. This research leads to the necessity of a knowledge of various latest concepts, tools, techniques and methods, as well as dialogue with scientists from cognate fields. The Association of Quaternary Researchers (AOQR) was formed to provide a forum to fulfil this necessity. The association aims to bring together Indian earth scientists and researchers from allied disciplines interested in the Quaternary and to facilitate dialogue and discussions on emerging approaches, new developments, and challenges in the field of Quaternary Science as well as to undertake joint research programs by sharing research facilities. Like other disciplines of natural sciences, Quaternary Science is also now moving towards greater openness in terms of scientific data, generated in the field and the laboratory by researchers working in different universities and research institutes. Data sharing not only contributes to improving the accuracy of the research findings but also contributes towards enhanced understanding and better interpretation of the results. In the Indian context, AOQR can play a crucial role in this regard.

I am confident that the AOQR will achieve its objectives of advancing and diffusing the knowledge of Quaternary Science in India through scientific meetings, training programs, research publications and outreach activities. The interactions amongst active researchers from different organisations under the banner of AOQR may lead to multidisciplinary and multi-institutional collaborations that may further lead to increased scientific productivity and academic innovations in the field of Quaternary Science in India.

I take this opportunity to express my sincere thanks to the President of AOQR and the members of the Governing Council for kindly offering me the Honorary Membership of the AOQR. I would like to express my special appreciation and thanks to the Secretary of AOQR and the editorial team for bringing out the highly informative issues of Quaternary Chronicles on time and for organising the AOQR-ECR Webinar series in September and October 2020.

I wish the AOQR great success in all its present and future endeavours.

Prof. Vishwas S. Kale
Former Professor and Head,
Department of Geography
SP Pune University, Pune

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Prof. A. D. Singh *(Convener, ICMS-2019), Commonwealth Fellow (UK), Micropaleontology, Oceanography & Marine Geology Laboratory, Center of Advanced Study in Geology, Banaras Hindu University, Varanasi-221005, India*

Quaternary Science, a multidisciplinary field of research has grown over recent decades. In the current scenario of global warming and rapid shift in climate, there is a growing interest to address contemporary environmental issues including climatic instability during the Quaternary on different time scales, based on terrestrial and marine records in low-latitude regions, in general, and monsoon dominated regimes, in particular. These interests underpin our concerns for the changing climate and its consequences and impacts on time scales relevant to human societies. Observational and modelling studies are being vigorously pursued to estimate the degree and amplitude of rapid climate changes and their possible socio-economic implications. Understanding the nature of past monsoon-climate variability both in time and space, and the mechanism by which these oscillations are transmitted through the Earth's climate system is a high priority scientific issue for the Quaternary researcher in India. The instrumental records of climate variability are limited to a short duration; generally, less than two hundred years. Various natural archives (terrestrial and marine) are the only alternative to document and assess natural variability on tectonic, millennial, centennial to decadal, or even annual scales.

In recent years, a large number of research groups across the country are actively involved in investigating the Quaternary climate variability and associated processes using different land and ocean-based proxy records. Although a fair amount of understanding about past monsoon variability has been achieved, there are unresolved issues which need to be addressed. Some of these issues are: the timing and conditions under which monsoon circulation or precipitation initiated or intensified, and its linkages with other major low- and high-latitude climate components; the behaviour of South Asian monsoon, its spatial distribution and rainfall pattern over the Subcontinent during crucial time intervals within the Quaternary Period, which could be considered as possible analogues for future climate change; and the response of terrestrial and marine biota to these climatic perturbations. A key challenge in understanding monsoon dynamics through past records is the inter-comparison of land and ocean-based proxy records. The difference in sensitivity and response-time of proxies used to reconstruct monsoon and associated parameters from land and ocean records remains a fundamental constraint in a direct comparison of land and ocean proxy records.

Association of Quaternary Researchers (AOQR) is doing an excellent job of bringing scientists and young researchers working in different domains of Quaternary Science on to a single platform and promoting interdisciplinary collaborations (national and international), and contributing to the development of Quaternary Science in the country and beyond. I congratulate the vibrant team of the AOQR for being proactive even during current challenging times of the Covid-19 pandemic, and organising lecture series, webinars and interactive sessions, which received an overwhelming response from students, research scholars and faculty. I firmly believe that the scientific and academic activities of AOQR provide an impetus to early career researchers to explore new possibilities of multidisciplinary research in challenging areas of Quaternary Science.

My best wishes to the entire team of AOQR and QC!

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The foundations of modern palynology and its subsequent development, especially in Quaternary studies (but also in deeper time) are already more than a century old (Manten 1967) and have had a tremendous impact on our understanding of vegetation succession (and inter-linked climate changes) going back at least two million years. This field has necessarily evolved as an interdisciplinary one. It is key in making critical spatio-temporal links within the Earth System Science: with climate, with land-cover (vegetation), with soils and with land-use, in relation to the Anthropocene. Several overarching reviews of Quaternary Palynology at global, regional and local scales in terrestrial, fluvial and marine contexts are readily available in recent literature.

This brief overview focuses on quantitative approaches that give the field of quaternary a new dynamism in terms of the valuable inputs they provide as land-use land-cover change (LULC) as well as climate models. This idea highlights the relevance of a network such as the AOQR in helping suffuse this dynamism at the scale of the monsoon dominated Indian subcontinent.

The first approach aims to obtain quantitative land-cover reconstructions from (fossil) pollen data using (mechanistic) modelling approaches that simulate pollen dispersal and deposition. The Landscape Reconstruction Algorithm (LRA) approach uses distance-weighted pollen-vegetation relationships derived from modern analogues. These analogues are derived by combining pollen data from surface samples with quantitative vegetation surveys around these sampling points to obtain the relative pollen productivity (RPP) of individual pollen taxa. This method has worked very well in Europe, North America and other temperate landscapes where the primary mode of pollination is wind (anemophily). The LRA, developed in idealised and hypothetical vegetation landscapes by Sugita (2007a, 2007b) comprises two models: REVEALS (Regional Estimates of VEgetation Abundance from Large Sites) and LOVE (LOcal Vegetation Estimates), and has been empirically tested widely in North America and Europe (Marquer et al. 2020; Sugita et al. 2010) and more recently in other parts of the world including tropical India, Africa, temperate China and the southern hemisphere as well. The beauty of this approach is in its scaling up from the local and regional to a global scale, and finds immediate application in studies of land-cover feedbacks (Gaillard 2010); used in conjunction with archaeological data, this presents a powerful way to improve reconstructions of LULC globally (Harrison et al. 2020). Due to higher species diversity and the preponderance of entomophily & zoophily; tropical regions offer a challenge to the scaling approach, a good beginning has been made in south-east India (Navya 2019). Alternate methods to reconstruct land-cover from pollen data without RPPs have been subsequently developed in regions with dense coverage of pollen datasets and finely resolved chronologies (again, mainly in Europe and North America).

The second approach aims to derive quantitative estimates of past climate conditions from pollen assemblages directly using a range of statistical methods and a calibration dataset of modern pollen and climate analogues. There are several techniques to implement this approach and recently Chevalier et al. (2020) have reviewed these exhaustively and pointed out "quantification deserts", among which is the Indian Subcontinent and much of south-east Asia. Realising the aims of this approach is an important challenge for the near future, requiring the engagement of the entire Quaternary community to not only create the large modern analogue datasets but also facilitate easier access to these reconstruction techniques through training and open access to the relevant software and codes.

With its diversity of climates, ecologies and relief, the presence of monsoon seasonality, and the long history of human occupation, the Indian Subcontinent is an ideal place for the application of such quantitative approaches. Given the nature of the challenge detailed above, the AOQR, that brings together a diverse and vibrant multidisciplinary community of Quaternary scientists specialising in this region, has a key role to play.

Prof. Anupama Krishnamurty
French Institute of Pondicherry
Puducherry, India

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The Quaternary, the shortest formal geological time period, has received great interest from scientists and scholars from a diverse range of disciplines. As in this period, our genus appeared, and it currently forms our present, the importance of this period is profound, and the potential of knowledge it can offer is discerningly intense. As noted by various scientists in previous newsletters, the range of Quaternary terrains in India is truly incredible, which provides an indispensable opportunity to reconstruct the past, better understand the present and sustainably plan for the future. In the last few decades, key research institutions and universities have ensured that Quaternary research in the country (and beyond) presents a multi- and interdisciplinary approach to understanding Earth's past and present in a sophisticated fashion, and it is only cogent to attempt to advance this field of research.

With thriving research interests and expanding fields of enquiries, alongside advances in scientific techniques and rapidly expanding literature, the importance of communicating research with a wider audience should be sincerely considered. With issues like global warming, sea-level rise, desertification, forest fires etc. glaring at our faces, Quaternary Scientists should be encouraged to engage in community-outreach and disseminating research recommendations with policymakers. For modern-day research to be pragmatic and profitable, it is critically significant to work in collaboration with the diverse stakeholders and also considerate of the myriad ways in which research outcomes can be applied beyond academic discourses.

It is no novel idea that scientists are increasingly working towards communicating their work plans and study findings beyond the world of journals and conferences. There is a known accretion in the deliberation of the scientists communicating with laypeople, and this has been a useful approach in the overall impact of the project. It may not be untrue to argue that Quaternary Scientists, in this regard, are yet to make lasting impressions, particularly given the superior quality and highly significant work that they are undertaking.

Communicating one's commitment to a craft may not be as easy as is often speculated; however, we must make sincere attempts. These attempts, however, require skills and training. It is timely and judicious of universities, research institutes, and think tanks to urge researchers to obtain these valuable skills. We must ensure that we can imbibe these techniques efficiently. Outreach can be done in many creative ways, depending on the type and context of the research. It may include delivering public lectures, visiting schools, organising workshops, or as is the "new normal", resort to conducting webinars and activities online. These activities not only enables us to broaden our community of researchers but in the process, helps us to inspire and get inspired. Being able to translate research findings into recommendations that may create grassroots or policy-level impact greatly enhances the very purpose and impetus of research. It is also always a good idea to involve the local community, if and where possible, and regularly communicate the research findings with them.

Social media, like in other fields, is now leading the game and is swiftly transforming and changing how information is produced, transferred, and absorbed. It is an effective platform that allows scientists and academicians to interact with large groups of people in both curated and flexible forms. Depending on the need and target groups, different social media forums offer a variety of tools and resources. It is indeed a cost-effective, quick, equal, and accessible way to channelise and communicate our research while ensuring a greater degree of participation from people of, and beyond, the field of specialisation.

The contributions of Quaternary Science towards (re)imagining and understanding the past and contemporary environmental and climatic issues is indisputably compelling. To ensure our research continues to be profitable and inspiring in the ever-more connected world of science, it is imperative that scientists, particularly ECRs, become more adept in outreach activities. In this regard, the foundation of AOQR could not be better timed. With its vision for the discipline, and diverse and diligent pursuits of its scholars, it is already making a mark. The recent successful conclusion of the first ECR webinar series testifies that social media platforms enable superior connectedness and participation from across the country, and sometimes, from abroad as well. It is my genuine hope and conviction that the AOQR will continue encouraging its members and other keen stakeholders to foster the much-needed engagement between Quaternary Science and young audiences/researchers/students from the Indian Subcontinent and beyond.

Dr. Aayush Srivastava, Research Fellow
School of Earth & Env. Sciences, University of St Andrews, UK

HONORARY MEMBER OF AOQR

Prof. S. N. Rajaguru

Prof. S. N. Rajaguru,
Retd. Professor, Deccan College, Pune
(Date of birth: 26th November 1933)

Professor Sharad N. Rajaguru retired as Joint Director of Deccan College Post Graduate and Research Institute, Pune, after a long and productive career from the same institution in 1993.

In 2011 he was awarded as a life fellow of INQUA, during the session in Switzerland. He has remained active in the field even after his retirement.

He was awarded a gold medal from the Asiatic Society, Kolkata, in recognition of his achievements in 2008. He remains the pre-eminent geoarchaeologist of India. During his career, Dr. Rajaguru travelled to all corners of India, building up an unrivalled insight, and contributed to the knowledge of Pleistocene and Holocene geoarchaeology.

At the age of 86, Prof. Rajaguru is still active in field studies and continues to guide the new generation of archaeologists. Prof. Rajaguru is a man full of simplicity and humbleness, and his sheer enthusiasm in the field and complete dedication to research has always made him popular with both the older and younger generations. With his unique qualities and research, Prof. Rajaguru has made immense contributions to Indian Geoarchaeology, and AOQR is blessed to have him as an Honorary member.

Contributed by Dr. Sushama G. Deo, Retd. Professor and Former Head, Department of AIHC & Archaeology, Deccan College PGRI, Pune.

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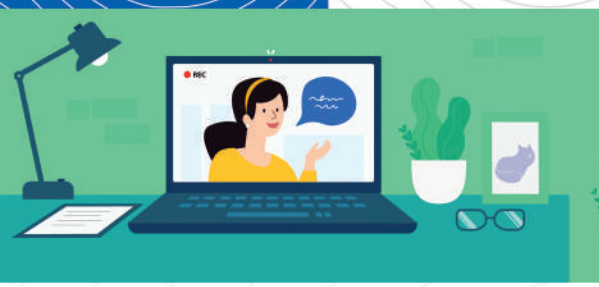

AOQR's Early Career Researchers Webinar: A report

Keeping in line with AOQR's key objectives to bring Quaternary researchers from South Asia on par with key developments globally, as well as to provide a platform for South Asian research scholars to reach a global audience, the ECR team of AOQR organised a series of online lectures by South Asian ECRs working on various aspects of the South Asian Quaternary record. The idea was originally conceived to meet the opportunities presented by the growth and development of online webinar lectures and meetings, which were a revolution in organising academic exchanges. It was also considered to be an ideal platform to highlight the ongoing work of Quaternary researchers in India, especially Early Career Researchers, who could use this platform to disseminate their work to a large audience, leading to the perfect spotlight to feature and promote the equally young association.

This webinar series, titled as 'Emerging Areas of Research in Quaternary Science', was hosted concurrently on Google Meet and YouTube Live, with the requisite technical support provided by the Birbal Sahni Institute for Palaeosciences, Lucknow and Christ College (Autonomous), Irinjalakuda, and promoted employing social media platforms (WhatsApp Groups and Twitter - @AOQRIndia). The webinar series went live on Monday afternoons between 7th September 2020 and 29th October 2020 and featured eight ECR speakers from the length and breadth of India. Each session was moderated by a member of the AOQR ECR team, supported ably by the other members of the ECR team. The sessions were planned to include a presentation of about 40 minutes, followed by an engaging discussion between the speaker and the attendees, which usually accounted for another 20 minutes. The presentations and ensuing discussions were recorded, and are freely available to view and review on the Association of Quaternary Researchers' YouTube channel.
(www.youtube.com/channel/UC0–5r6xYc5FFTgYV-Pmu-A)

The series premiered with Dr. Amzad Hussain Laskar, from the Geoscience Division, Physical Research Laboratory (PRL), Ahmedabad, who highlighted the role of stable isotopes in paleoclimate reconstruction with his talk entitled 'Paleoclimate reconstruction using stable isotopes in natural archives'.

The second talk in the series was delivered by Dr. Waliur Rehaman, from the National Centre for Polar and Ocean Research (NCPOR), Vasco da Gama, Goa, with his talk titled 'Ocean acidification threats under high CO2 world: A lesson from past records of ocean pH'.

Fig. 1 a

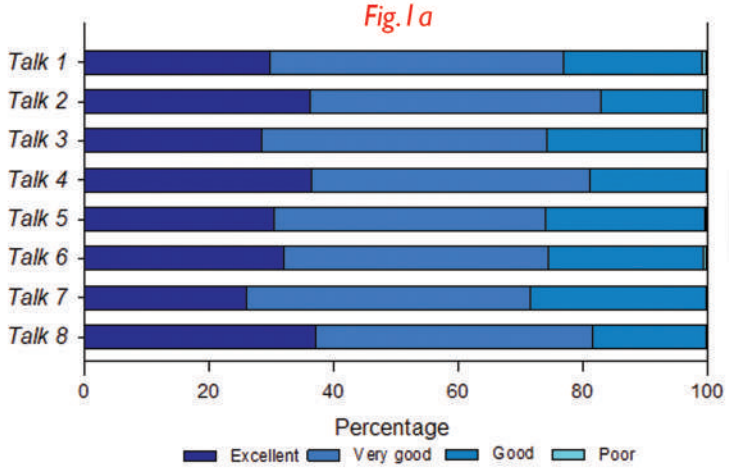

Fig. 1 b

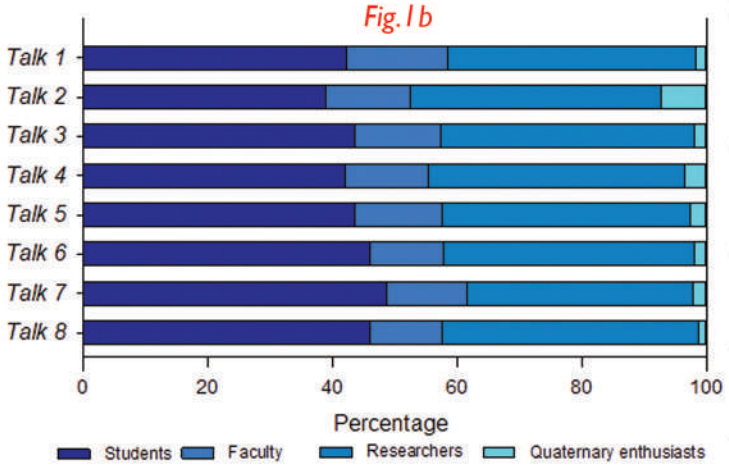

Figure 1: Distribution of (a) participants who attended the talks, and (b) distribution of reviews for the talks organised as part of the AOQR ECR Webinar series

The third talk in the series took a more out-of-this-world experience, with Dr. Madhav Krishna Murari, of the Geochronol-

ogy Group of the Inter-University Accelerator Centre, New Delhi, as he spoke on 'Cosmogenic Radionuclides: Application to geomorphological processes'.

The fourth talk in the series highlighted human and cultural responses to the changing climates of the Quaternary, with Dr. Parth R. Chauhan, from the Department of Humanities and Social Sciences, Indian Institute of Science Education and Research (IISER) Mohali, and his talk entitled 'Climates and cultures: Quaternary environmental dynamics and human adaptations in India'.

Talk five of the series was given by Dr. Gayatri Kathayat, from the Xi'an Jiaotong University, China, who critically examined the recently defined 'Meghalayan Age' in her talk titled 'The '4.2 ka BP Event' in the Indian Subcontinent?'.

The sixth talk in the series was delivered by Dr. Sushant S. Naik, from the CSIR-National Institute of Oceanography (CSIR-NIO), Dona Paula, Goa, who spoke on the 'Role of the oceans in glacial/interglacial variations in atmospheric carbon dioxide: An objective synthesis of proxy records'.

The penultimate talk of the series was presented by Dr. Midhun M., from the University of Michigan, Ann Arbor, and the Cochin University of Science and Technology (CUSAT), Cochin, who presented on the topic entitled 'Coherent Variability in Sahel and Indian Summer Monsoon rainfall recorded in oxygen isotopes of rain/speleothem'.

The final talk of the series was delivered by Dr. Santosh K. Shah, from the Birbal Sahni Institute of Palaeosciences, Lucknow, who gave a talk titled 'Introduction to dendrochronology and its application in climate research in the Himalayas'.

A special session was organised at the end of the lecture series along with the ECR team of INQUA. This session was for all the participants where the INQUA ECR team made short presentations highlighting the various aspects of INQUA, such as its structure and the different commissions which incorporate it, as well as an insight into the plethora of opportunities awaiting ECRs and students with INQUA. This involved details about funding opportunities, information regarding special projects and training sessions, as well as avenues for publications. With this, it was also agreed that there would be continued cooperation and coordination between the ECR teams of AOQR and INQUA in organising and managing future activities and training programs.

The webinar series received critical acclaim from various stalwarts of Quaternary Sciences in South Asia, and drew a wide participation from a wide audience. On average, over 250 viewers attended the lectures and provided their feedback for the same, with ~80% being students and ECRs (Figure 1). Participants represented various regions of India (Figure 2) and the series drew in an international crowd, with participants from diverse countries such as Sweden, Nigeria, the United Kingdom, the United States, Switzerland, Brazil, Pakistan, Philippines, Israel and Taiwan. The success of this series has resulted in more such planned webinar talks, especially aimed at, and by, students of Quaternary Sciences in India and South Asia. Interested students are invited to submit an abstract of their planned talk, along with a small CV, to aoqr2019@gmail.com with the subject Students Webinar Series. Selected applicants will be provided with an opportunity to present their work in the second AOQR webinar series in February and March 2021.

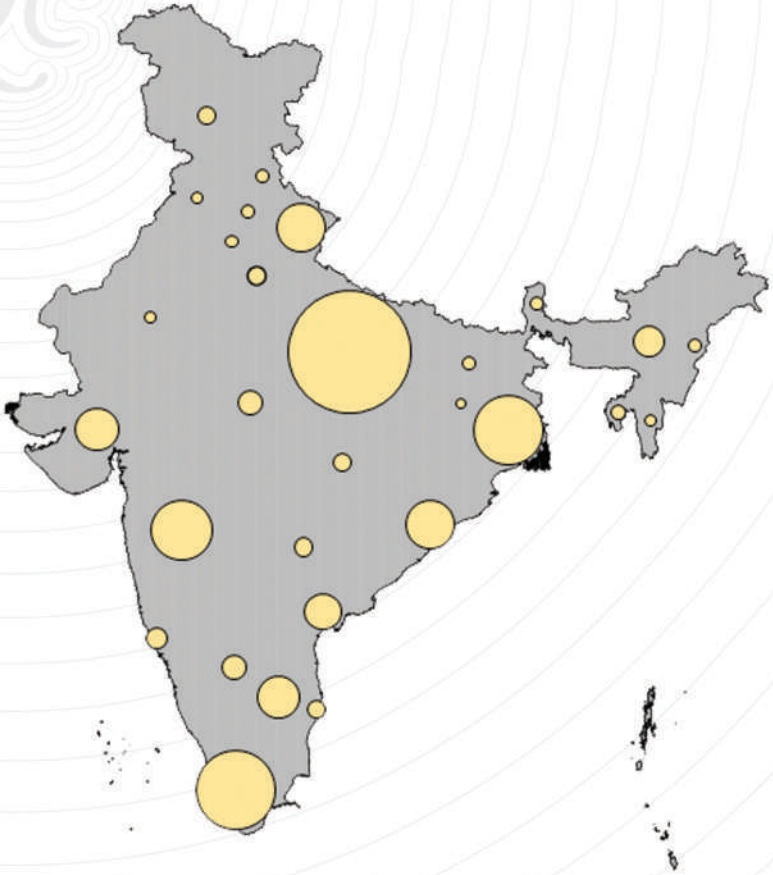

Figure 2: Relative distribution of the location of participants who attended the talks organised as part of the AOQR ECR Webinar series.

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IN MEMORIAM

Prof. Khadg Singh Valdiya

(1937 - 2020)

On 29th September 2020, the Geosciences community was forcefully hustled by destiny to face a void which will be hard to fill. On this day, Prof. Khadg Singh Valdiya: dedicated and innovative researcher, colossal scholar, enlightened teacher, committed environmentalist, incredible writer-speaker, competent institution-builder, potential administrator, and conscious persona, breathed his last. This diverse and magnificent life of the same stature as of the Himalaya stood tall in the tough early phases of his life and life-time hearing disability with his evergreen creative unease.

Valdiya, field geologist par excellence has enriched the whole geosciences community by his revolutionary geological output, especially in the domain of lesser Himalaya and Siwaliks. The extensive revision of the geological history of the whole lesser Himalaya; establishing numerous events in Himalayan stratigraphy; his hypothesis of the lesser Himalaya as the extension of the Vindhyan; are but few of the innovative discoveries from the treasure trove of his research. The geological map of the lesser Himalayan domain made by him is biblical for geologists working in the area. His research on the neotectonics of India, River Saraswati, and Nilgiri hills describe the Quaternary processes prevalent in the subcontinent. He combined all his travels throughout the subcontinent as exploration of the environmental hazards of this region specifically due to faulting, landslides etc. in his books and articles.

He has left a legacy of eighteen books both in English and Hindi, nine edited volumes, a translated book, more than hundred research papers, around forty popular Hindi articles, and few popular English articles. He always inspired and spread "scientific temperament" through his marvellous communication skill in public lectures through society oriented geological work.

(Contribution by Randheer Singh, Birbal Sahni Institute of Palaeosciences, Lucknow)

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Professor Nilesh P. Bhatt

Professor Nilesh P. Bhatt completed his doctoral research at The Maharaja Sayajirao University of Baroda, Vadodara in 1993. He highlighted the famous 'Miliolite Problem', pertaining to its origin and distribution along the coastal Saurashtra region of arid western India. His pioneering work on miliolites attracted a lot of attention worldwide, with his series of publications where he argued for the marine origin of miliolites as its primary nature and aeolian and reworked fluvial milliolites as secondary ones. Apart from that, he studied the shoreline processes along the Gujarat coast for its changes, dynamics and provenance, leading to unravelling the sediment dispersal system of the Gulf of Kachchh region. Up until recently, he initiated work on paleo-tsunami and palaeo-storm deposits along the western coast of India, where he was the first to report paleo-tsunami deposits from Diu island and several other such events from the Kachchh shoreline.

He also reported the first and the only 'tsunamite' from the western shore of India, dating back to 35000 years ago. He trained several PhD students and participated in national and international field expeditions. He began his career as an assistant professor in 1996 at the MS University of Baroda and continued, becoming a professor at the same university, until his last breath. He was the youngest professor in the Geology department of the M. S. University of Baroda, who was a favourite of most of the students for his affinity to teaching and helping many students in distress. He is remembered as one of the calmest, down to Earth, and helpful, amongst the faculty members of the Geology department of the university. He published more than 60 papers in national and international peer-reviewed journals and has more than 450 citations till date.

(Contributed by Dr. Siddharth P. Prizomwala Institute of Seismological Research Raisan, Gandhinagar)

Dr. Govind Ballabh Pant

Dr. Govind Ballabh Pant passed away at his residence on the night of 18th November 2020, leaving his students and friends of all ages upset with grief. Dr Pant was one of the longest-serving Directors (1997-2005) of Indian Institute of Tropical Meteorology (IITM), Pune after serving as a scientist for more than three decades in the same institution. He obtained his MSc degree in Physics from Agra University in 1965, followed by a PhD from Purdue University, USA in 1976.

Apart from pioneering work on ENSO-monsoon relationships, he was one of the first atmospheric scientists to realise the importance of long-term climate variabilities seen in the palaeoclimate data. This idea led him to start the first-ever dendrochronology laboratory in South Asia. In the last four decades, this has progressed to a tree-ring data network spread over the Himalayas, central and peninsular India. He was the leading climate expert from India to be contacted first by the IPCC when they started the work on the First Assessment Report in the late 1980s.

Students and friends remember him as a jovial, boisterous and humble person, who would come to meet juniors instead of ordering them to himself. His quirky way of teaching will be sorely missed where complicated mathematical concepts were explained in simple language with a smattering of poetry in Awadhi and Hindi.

(Contributed by Dr. Trina Bose, BSIP, Lucknow)

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Dr. Eric Christopher Grimm
(1951 -2020)

The sudden passing away of Dr. Eric Christopher GRIMM last Sunday (15th November 2020) leaves a definitive void in Quaternary studies, and more specifically, in Palynology and Paleoecology. An adjunct Professor of Research at the Department of Earth Sciences, University of Minnesota, at the time of his passing, Dr. Eric Grimm had been Director of Science at the Research and Collections Center, Illinois State Museum, for several years until its abrupt closure in 2015.

In a career spanning 33 years, he is best known for the very popular TILIA and CONISS data entry and analyses software linked to the TILIA graph, a program for plotting pollen diagrams that are almost universally used now to depict not only pollen but also other microfossils like phytoliths, charcoal and other non-pollen palynomorphs. His 1987 paper, "CONISS: a FORTRAN 77 program for stratigraphically constrained cluster analysis by the method of incremental sum of squares", has over 2729 citations. The collective, collaborative nature of research in Quaternary Palynology and Paleoecology is truly represented by Eric Grimm's Oeuvre, that includes a core contribution towards the development of a Global Pollen Database that eventually became the larger NEOTOMA Paleoecological database that his 2018 paper, co-authored with Jack Williams and multiple collaborators, presents as "a community-curated data resource that supports interdisciplinary global change research by enabling broad-scale studies of taxon and community diversity, distributions, and dynamics during the large environmental changes of the past".

His passion for such big data collation was rivalled only by his love for the tiny pollen grain, its morphology and nomenclature. Even though a lot of his work includes a great many pollen records from all over the USA, his contributions go beyond, and his publications concern a whole gamut of paleoecological proxies, from charcoal to diatoms to spores, radiocarbon dating and reporting standards. A visionary who has been consistent in his life and his work about openness, transparency and community sharing of geological and biological data for a better understanding of past and future climate change. It was hoped that Dr. Eric Grimm, along with close collaborator Simon Goring, could organise a NEOTOMA workshop in India during the IGC that had to be cancelled due to the pandemic. His detailed publication list can be accessed via Google scholar at http://scholar.google.com/citations?user=nlyPgk0AAAAJ&hl=en. Heartfelt condolences to his near and dear family and friends, and sincere thanks for leaving behind the legacies of TILIA and NEOTOMA for the world community of Quaternary Researchers.

(Contributed by Prof. Anupama Krishnamurty, French Institute of Pondicherry, Puducherry, India)

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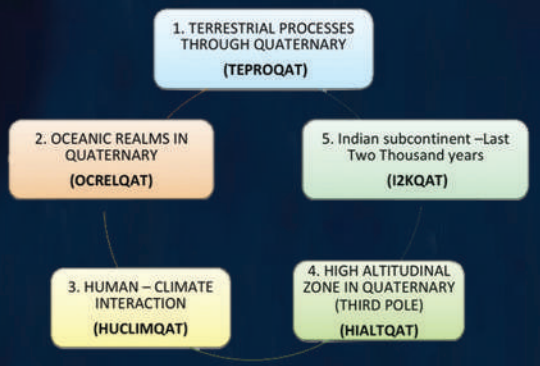
AOQR NEEDS GROUP HEAD(S) & GROUP SECRETARY(S)

Association of Quaternary Researchers (AOQR), a registered academic platform with its headquarters at Birbal Sahni Institute of Palaeosciences, Lucknow is in the process of formulating various research groups in the frontier areas of Quaternary science. Applications and nominations are invited for the position of Group Heads and Group Secretaries for the five themes:

- *Terrestrial Processes through the Quaternary (TEPROQAT)*
- *Oceanic Realms in the Quaternary (OCRELQAT)*
- *Human - Climate Interaction (HUCLIMQAT)*
- *High Altitudinal Zone in the Quaternary - Third Pole (HIALTQAT)*
- *Indian Subcontinent - Last two thousand years (I2KQAT)*



The Group Heads and Group Secretaries steer the scientific programs of the respective groups in a concerted way. AOQR envisages to build a multidisciplinary network and promote well-performing working groups to its international counterparts like INQUA (International Quaternary Union) and PAGES (Past Global Changes). Selected candidate(s) are expected to build thematic group(s) and sub-group(s) and steer research plans accordingly. Selected Group Heads and Group Secretaries will help in selecting the heads for the different sub-groups of the themes listed above. AOQR will provide discussion platforms and help in organising funds. The tenure of each research group will be five years.

Interested young and energetic Quaternary workers are encouraged to apply. Applicants should have demonstrated academic excellence in the form of a good publication record, focusing on an aspect of Quaternary science in India. They should be holding a permanent position in any recognised research organisations, universities, IITs and IISERs etc. in India and should be below the age of 45 yrs. The application should include (i) personal details, including address of correspondence and date of birth (ii) academic qualifications (iii) research expertise in keywords (iv) postdoctoral research experience (150 words) (v) research projects handled (vi) national and international collaborations (vii) full list of publications (viii) research plans as a group leader (200 words).

The candidate can apply or can be nominated by any eminent Quaternary scientist. Application or nomination materials, in a pdf format, should reach the Secretary, AOQR at ***aoqr2019@gmail.com*** *by* ***1700 (IST - GMT+5:30) on 31st December 2020.*** *Please mention GROUP HEAD/ SECRETARY APPLICATION/ NOMINATION as the subject of the email (as applicable). The Governing Body of AOQR will screen and declare the list of selected candidates, and selected groups and leaders will assume their positions on 1st April 2021.*

Quaternary Chronicles
Happenings in the Sub-continent

Announcements:

FIRST FOUNDATION DAY MEMBERSHIP OFFER

ASSOCIATION OF QUATERNARY RESEARCHERS

Pay only one year membership fees and become member till March, 2023

Offer valid till December 31, 2020

First Foundation Day Celebrations and Special Membership Fee Program!!

The Association of Quaternary Researchers (AOQR) cordially invites everyone to attend and participate in the celebration of one year of the foundation of the association on Saturday, 12th December 2020. Prof. Thijs van Kolfschoten, Emeritus Professor of Palaeoecology and Quaternary Biostratigraphy in Leiden University, and President of INQUA will be the Guest of Honour, and Dr. Marie-France Loutre, Executive Director of Past Global Changes (PAGES), will serve as the Chief Guest. The ceremony will be presided over by Prof. Ashok Singhvi, Honorary Member of AOQR. Please find the entire schedule of events and the invitation attached along with this newsletter or at the AOQR website.

In celebration of one year of the founding of the association, we are running a special membership program!! Become a member of AOQR by 31st December 2020, and your annual membership will be extended until the period of 31st March 2023!! This offer applies to annual members classified as Professionals (5000 INR) and Students (2500 INR), and for everyone who has already joined AOQR and will apply only for individuals who apply and obtain membership by 31st December 2020!!

Join AOQR today at https://aoqr.org/become-a-member.php!!

ASSOCIATION OF QUATERNARY RESEARCHERS

Association of Quaternary Researchers (AOQR)

President AOQR and Governing body members

Cordially invite you to the

1ST Foundation Day Function of the
Association of Quaternary Researchers (AOQR)

on

Saturday, December 12, 2020

Prof. Thijs van Kolfschoten, President, INQUA
Emeritus Professor of Palaeoecology and Quaternary Biostratigraphy
Faculty of Archaeology, Leiden University, The Netherlands

will be the Guest of Honour

Dr. Marie-France Loutre, Executive Director
PAGES - Past Global Changes, Bern, Switzerland

will be the Chief Guest

Prof. Ashok Singhvi,
Honorary member, Association of Quaternary Researchers

will preside over the function

PROGRAMME

14:30 IST	Welcome Address	Dr. Vandana Prasad, President, AOQR
14:40 IST	About AOQR	Dr. Binita Phartiyal, Secretary, AOQR
14:50 IST	Foundation Day Talk - 1	Prof. Thijs van Kolfschoten, President, INQUA
15:20 IST	Foundation Day Talk - 2	Dr. Marie-France Loutre, Executive Director, PAGES
16:50 IST	Presiding Address	Prof. Ashok Singhvi, Honorary member, AOQR
17:05 IST	Vote of Thanks	Dr. Pradeep Srivastava, Vice-President, AOQR

Function will be carried out on virtual platform (Meeting link will be shared)

January 2021 Palynology Training

A new year begets new opportunities! This year, the first event of AOQR is a virtual training on Quaternary Palynology!! The AOQR, and the Birbal Sahni Institute of Palaeosciences (BSIP), Lucknow, jointly organise a three-day training session for all interested participants!

The three-day training covers a detailed methodology (sampling techniques, maceration techniques, slide making, light microscopy, scanning electron microscopy, among others), and applications of Quaternary Palynology. Further, means of interpreting the derived datasets, along with case studies and lectures will be handled by experts in the field! More details will follow those who will register!

Quaternary Chronicles
Happenings in the Sub-continent

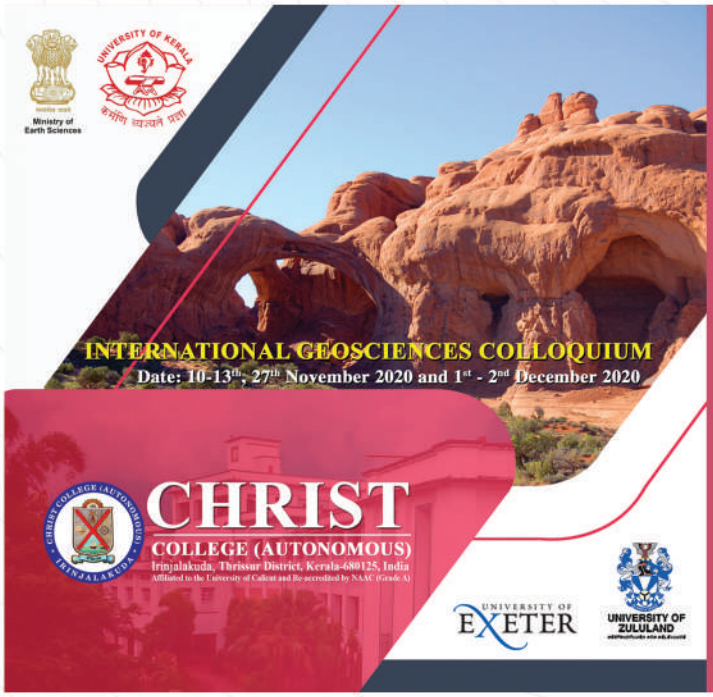
The training session will be free for members of AOQR, and non-members can participate by registering with a nominal fee (in three categories: students (@ 500 INR), research scholars, limited to registered doctoral candidates (@ 1000 INR) and professionals (@ 1500 INR).

Do not miss this opportunity!! Register for the training program by writing to AOQR (aoqr2019@gmail.com) with PALYNOLOGY TRAINING as subject!! Do join AOQR as members, to participate for free!! More such events follow!! For membership, write to us at aoqr2019@gmail.com with the subject as MEMBERSHIP for any details and inquiries.

AOQR Student's Webinar Series!

A special announcement for all PhD and other graduate students of Quaternary sciences!!

After the successful undertaking of the AOQR ECR Webinar Series (between 7th September 2020 and 29th October 2020), the ECR team of the AOQR has decided to conduct a webinar series by, and for, students in the Quaternary sciences. Through this platform, provided by the AOQR, students can promote their current research, and get wonderful insights from a wide range of participants - fellow students, ECRs, faculty members and other stalwarts of Quaternary science! Interested students are invited to submit an abstract of their proposed talk, along with a short CV, to aoqr2019@gmail.com with the subject Students Webinar Series. Selected applicants will be provided with an opportunity to present their work in the second AOQR webinar series tentatively planned for February and March 2021. Further details follow to those who are interested, so follow AOQR on Twitter (@AOQRIndia) for continued updates!



A report on International Geosciences Colloquium, 2020; Session: 'New Proxies of Climate Change of the past and the present'. on International Geosciences Colloquium, 2020; Session: 'New Proxies of Climate Change of the past and the present'.

The Department of Geology and Environmental Science, Christ College (Autonomous), Thrissur, Kerala, India, in collaboration with the University of Kerala, India, the University of Exeter, UK, and the University of Zululand, KwaDlangezwa, South Africa, organised an International Geosciences Colloquium, supported by the Ministry of Earth Science, Government of India. The deliberations in the session on 'New Proxies of Climate Change of the past and the present' helped disseminate cutting edge research in the wide area of Quaternary Geoscience, to the benefit of many graduate students and early career researchers, as well as faculty and more experienced researchers. The programme consisted of well-structured talks of 30 minutes, followed by a 10-minute

discussion on several invited scientific sessions between 10-11th November 2020. The following were the topics covered during this session. Firstly, Dr. Brian M. Chase, Director of Research, Centre National de la Recherche Scientifique (CNRS) and Vice-President, International Union for Quaternary Research (INQUA) gave the keynote for the session; an exciting presentation on perhaps the only proxy for reconstructing past environments in arid areas of the Earth: "Coming of age in a dry place: rock hyrax middens and past climate dynamics in southern Africa". Next Dr. David Naafs, School of Chemistry, University of Bristol, UK, presented his work on reconstructing temperature and methane emissions in the Cenozoic, in a talk entitled: "Biomarkers to reconstruct terrestrial climate and biogeochemistry during the Cenozoic". The following talk, by Dr. Thomas Sim from the Geography Department at the University of Leeds, UK, discussed new research at high latitudes: "Testate amoebae as indicators of past ecological change in Arctic peatlands". Dr. Rabiul Biswas, Institute of Earth Surface Dynamics, University of Lausanne, Switzerland, presented his research on temperature reconstructions using luminescence: "LGM temperature in the Alps quantified using luminescence paleothermometry". Dr. Anne Alexandre, Director of Research, CNRS, CEREGE, Aix-Marseille Université Europôle Méditerranéen de l'Arbois, France, discussed cutting-edge developments in oxygen isotope work in the tropics in her talk: "The triple oxygen isotope composition of phytoliths as a proxy of continental atmospheric humidity".

The following day, the session was opened by Dr. Sakonvan Chawchai, Department of Geology, Faculty of Science, Chulalongkorn University, Bangkok, Thailand, who presented her wide-ranging research reconstructing monsoon variability in Thailand in her talk: "The history and variability of Monsoon in Thailand based on Lake sediments and Speleothems records". We then were delighted to move to a completely different system, glaciers, and hear Dr. Runa Anthony from the Antarctic Cryospheric Studies, National Centre for Polar and Ocean Research, Ministry of Earth Sciences, Goa, India, which highlights the importance of living microbial mass on glaciers in her talk' Biogeochemical processes on glaciers and ice sheets'. Next, Dr. Dylan Young, Department of Geography, University of Leeds, UK, gave an excellent example on how the proxies of the past and present can be used to build and validate models that allow us to make predictions, in a talk entitled: "Using proxy paleo data in a process-based model to explore peatland development over decades to millennia". Dr. Nicole Sanderson, Department of Geography, Universite de Montreal, Canada, closed the session with an important topic in paleo-science, the dating of sediments, in her talk: "Comparing 20th-century carbon accumulation in Canadian peatlands using classical and new Bayesian age-depth models". The colloquium was attended by speakers from over 14 countries representing 29 Institutions with an average of about 200 participants from different parts of the world.

Dr. Angela Gallego-Sala, Geography Department, School of Life and Environmental Sciences, University of Exeter, UK

Dr. Linto Alappat, Department of Geology and Env. Science, Christ College (Autonomous), Thrissur, Kerala, India

A REPORT ON
INTERNATIONAL GEOSCIENCES COLLOQUIUM, 2020
SESSION: 'NEW PROXIES OF CLIMATE CHANGE OF THE PAST AND THE PRESENT'

Publications

Between September 2020 and November 2020, several novel research papers and book chapters incorporating wide scientific techniques were published in various national and international peer-reviewed journals. Some key highlights include:

Singh et al. (2020) address the current knowledge on mass movement activity that occurred in the Gangotri glacier area, Garhwal Himalaya, Uttarakhand. Their field observations coupled with high-resolution imagery of LISS IV suggest that the lower area of Meru glacier experienced an event of intense mass movement in July 2017 which influenced the initial course of the Bhagirathi River and also modified the morphology of the Gaumukh region.

Dubey and Dhar (2020) evaluate the geotechnical characteristics of Quaternary sediments of the Nubra Valley located in the high-altitude Ladakh Himalaya to demarcate the active sediment (soil) zones and their bearing on natural hazards susceptibility and mitigation measures. Based on their analyses of different geotechnical parameters, the authors recommend serious and careful investigations for safe settlements and mitigation measures of natural hazards.

Ali and Achyuthan (2020) investigate loess and loess palaeosols in Kashmir valley and conduct various textural, chronological and geochemical analyses on sediment samples to reveal that climate during the MIS 3 was dominantly warm and dry in the region when the loess layers covered the valley. Since then the loess horizons have undergone weak to intermediate, moderate type of weathering in

cool and dry conditions.

Panda et al. (2020) explore the paleoflood deposits of the Siang River and based on OSL, petrographic and isotopic data suggest that the eastern Himalayan syntaxis, which has the highest uplift and exhumation rate in the area, is not always the highest sediment producing zone. In some instances, the Tibetan plateau produces higher fluxes of sediments via glacial and landslide lake outburst floods.

Ali et al. (2020) examine a sediment core from Zanskar Valley, northwestern Himalayas, and based on multi-proxy studies. The authors provide a record of hydroclimatic conditions and abrupt climate changes over short time scales since the mid-Holocene, which is in agreement with climatic trends of central and western Himalayas.

Vassallo et al. (2020) report that the Medlicott-Wadia Thrust produced several large earthquakes during the Holocene, with the recurrence interval of the large earthquakes being between 500 and 700 years. The authors also postulate that the latest seismic event is compatible with the great 1555 AD Kashmir earthquake and a major seismic event is likely in the next decades.

In western India, Blinkhorn et al. (2020) identify deep Quaternary fluvial deposits in the central Thar Desert and use OLS dating to constrain major episodes of fluvial activity between MIS 6 and 5. Their results highlight fluvial dynamism across the Thar at a key threshold for human dispersal.

In the southern Kachchh mainland, Das et al. (2020) employ geomorphology, sedimentology, geochemistry and luminescence dating to integrate the fluvial to fluvio-marine records and evaluate the potential of dryland environments in archiving the palaeo-events in the context of reconstructing fluvial systems' response to variations in monsoonal strength.

Kale et al. (2020) investigate late Pleistocene Baneta sediments, Central Narmada Basin, Madhya Pradesh, and report that the $\delta 13C$ and $\delta 18O$ content of calcretes indicate their pedogenic and shallow groundwater origin under semi-arid climatic conditions, and C3–C4 mixed vegetation with C4 vegetation dominating.

Manoj et al. (2020) present a 2000 year multi-proxy centennial-scale record from Cherai, southwest India suggesting a complex environmental condition that prevailed at the depositional site augmenting the role of natural as well as anthropogenic agents. The core records a shift towards the drier conditions that started around 1230 cal yr AD with a loss in vegetation diversity.

Srivastava et al. (2020) study the morphological characteristics of Quaternary sediments of the Purna Alluvial Basin, Maharashtra, and suggest that the predominance of calcretes in the entire basin indicates the presence of pedogenic activities under arid to semi-arid climatic conditions during the deposition of sediments.

Gnanachandrasamy et al. (2020) conduct integrated hydro-geophysical surveys to discriminate between fresh and saline groundwater in the coastal aquifer zones in the Quaternary formation of the lower Vellar river basin, south India. Their results identify the freshwater aquifer zones in the central and south-central part of the basin with high potential aquifer thickness and optimum yield.

References

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Do join QuatChron_AOQR Google Group**!**
As a member of the group for Quaternary researchers working in South Asia, you will receive our Newsletter and other related information.
[To join: open https://groups.google.com/, login (using Gmail account), search for "QuatChron_AOQR" and ask to join.]

Quaternary Chronicles
Happenings in the Sub-continent
ASSOCIATION OF QUATERNARY RESEARCHERS

Past Events: AOQR - ECR - Webinar series

AOQR ECR

Webinar series

Know the Speaker:

Dr. Amzad Hussain Laskar did his M. Sc. in Physics at Indian Institute of Technology Guwahati, India and Ph. D. in Physics at Physical Research Laboratory Ahmedabad, India. He was a Marie Skłodowska-Curie Postdoctoral Fellow at Institute for Marine and Atmospheric Research Utrecht, Utrecht Univetsity, Netherlands during 2017-2019. Presently he is in the Geosciences Division of Physical Research Laboratory Ahmedabad, India. His main research interests include isotope biogeochemistry, paleoceanography, geochronology, paleoclimate, atmospheric photochemistry and isotope hydrology.

Abstract: To understand the earth's climate variability and projecting future climate, it is essential to recognize how the environment varied in the past. There are natural archives that record the earth's climate history and can be used to study using various techniques. For example, in the polar and high latitude regions, snow accumulates over time, forming ice deposits. The air bubble, atmospheric dust trapped during snow precipitation as well as the ice itself record the ambient climate. Similarly, sediments deposited in oceans and lakes are also excellent archives. We can decipher the past environment from ice and sediment cores using specific techniques. There are multiple ways to date the cores and readout climate history. Stable isotope ratios (ratio of heavier to lighter isotopes in an element or elements of a molecule) are the most widely used tools to decipher the past climate. Under different climatic conditions when physical and chemical processes are altered, stable isotope ratios vary and are called isotope fractionation. For example, the relative proportions of 16O and 18O in water (H2O) changes when evaporation or condensation takes place, and the extent of the variation depends on the temperature at which the phase change takes place. The degree of isotopic fractionation can be precisely measured with modern techniques such as mass spectrometry and can be used to study the processes that caused the fractionation. For example, the oxygen isotopes in the ice core can address past temperature variation. Similarly, oxygen isotopes in terrestrial archives such as cave carbonate deposits can indicate past temperature or rainfall variation. In the present talk, I will discuss the basic principles and some applications of paleoclimate reconstruction using stable isotopes of oxygen, hydrogen, and carbon.

Dr.

Amzad Hussain Laskar

speaks on

Paleoclimate reconstruction using stable isotopes in natural archives

07th SEP

MONDAY

1430 (IST)

ASSOCIATION OF QUATERNARY RESEARCHERS

Quaternary Chronicles
Happenings in the Sub-continent
ASSOCIATION OF QUATERNARY RESEARCHERS

Past Events: AOQR - ECR - Webinar series

AOQR ECR

Webinar series

Dr. Waliur Rahaman started his research career at PRL, Ahmedabad as a Junior Research Fellow for his Ph.D. thesis in the field of Isotope geochemistry. His Ph.D. and postdoctoral works at PRL, Ahemdabad during 2005 – 2011 was well recognized by global scientific community. Based on his research work, he was awarded Alexander von Humboldt Fellowship by Humboldt Foundation, Germany in 2013. Dr. Rahaman joined NCPOR, Goa in January, 2012 as a Scientist C. Since then, he has been working in the field of paleo-climatogy based on Antarctic Ice core records, paleo-oceanography and isotope geochemistry. After joining NCPOR, he established a new metal free clean chemistry laboratory "ISOTRACE" equipped with states-of-the arts instruments in the field of isotope geochemistry such as Multi-Collector ICMS (MC-ICPMS), ICPMS (Quadrupole) for the analysis of trace elements, radiogenic and stable isotopes. With addition of these new analytical facilities and laboratories, "ISOTRACE" laboratory at NCPOR has become one of the well reputed isotope geo-chemistry laboratory not only India but also in aboard which has been reflected in terms publications in reputed journals. Currently he is heading the Isotope Geochemistry section at NCPOR, Goa.

Abstract: *Increasing atmospheric CO_2 at unprecedented rate since the industrial revolution (~1850 AD) and its consequences in terms of lowering of ocean pH called "Ocean acidification" has become a growing threat to many calcifying marine organisms. OA reduces carbonate saturation of seawater which has adverse effects on calcifying marine organisms. Atmosphere CO_2 has increased from 280 ppm since the beginning of industrial revolution (AD 1850) to ~ 410 ppm at present. About 20–30% of the anthropogenic CO_2 has been absorbed by ocean during the last century which resulted decrease in ocean pH by ca. 0.1 unit. Model predictions shows that ocean pH is expected to reduce further by 0.2 to 0.3 units by end of the 21st century, however, these predictions are associated with large uncertainties (IPCC, 2007). In order to improve our current understanding about OA process and its future trend, it is important to have knowledge on spatio-temporal evolution of ocean pH. Among various proxies, boron isotopes measured in marine carbonates shows promise and have been employed successfully to reconstruct pH of ocean at various time scales (geological time scale to modern). In my presentation, I will talk about past ocean acidifications, its severity and impacts including mass extinction events. In addition, I will give a brief overview about the future ocean acidification trend with the unprecedented increasing rate of atmospheric CO_2 and its impact.*

Dr.
Waliur Rahaman
speaks on
Ocean acidification threats under high CO_2 world: A lesson from past records of ocean pH

14th SEP
MONDAY
1430 (IST)

ASSOCIATION OF QUATERNARY RESEARCHERS

Quaternary Chronicles
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Past Events: AOQR - ECR - Webinar series

AOQR ECR

Webinar series

Dr. Madhav K Murari is a quaternary geochronologist, geomorphologist (a physicist by education) with specialization in optically stimulated luminescence (OSL) and terrestrial cosmogenic nuclide (TCN) dating of rocks and sediments. He has extensive experience in the application of these techniques towards paleo-environmental reconstruction and landscape evolution. In Germany, he worked towards the establishment of infrared radiofluorescence (IR-RF) as an alternating luminescence dating method for sediment dating application using feldspar mineral. At present he serves as Scientist -E, Geocryology Group, Inter-University Accelerator Centre (IUAC), New Delhi, India. He has taken the responsibilities in Geochronology project at IUAC to develop geochronology oriented new scientific programs mainly focused on quaternary period and research and development towards improving geochronology methods and applications.

Abstract: *From a geological perspective, quartz serves as an excellent primary source material because of its near-ubiquitous distribution in rocks and soils over Earth's surface. In addition, quartz is naturally resistant to chemical weathering processes; therefore, it survives longer period of time. From an analytical perspective, ^{10}Be and ^{26}Al is a good material for analysis because the common nuclides, ^{9}Be and ^{27}Al are natively present in negligible or trace concentrations. Low abundances of the stable analyte nuclides in the quartz phase greatly facilitate low level isotope ratio analysis. Present research for understanding of geomorphological processes is greatly benefited from the use of ^{10}Be and ^{26}Al. I will be discussing a few applications of, ^{10}Be and ^{26}Al nuclides to geomorphological process.*

Dr. Madhav K Murari speaks on Cosmogenic radionuclides: Application to geomorphological process

21st SEP MONDAY 1430 (IST)

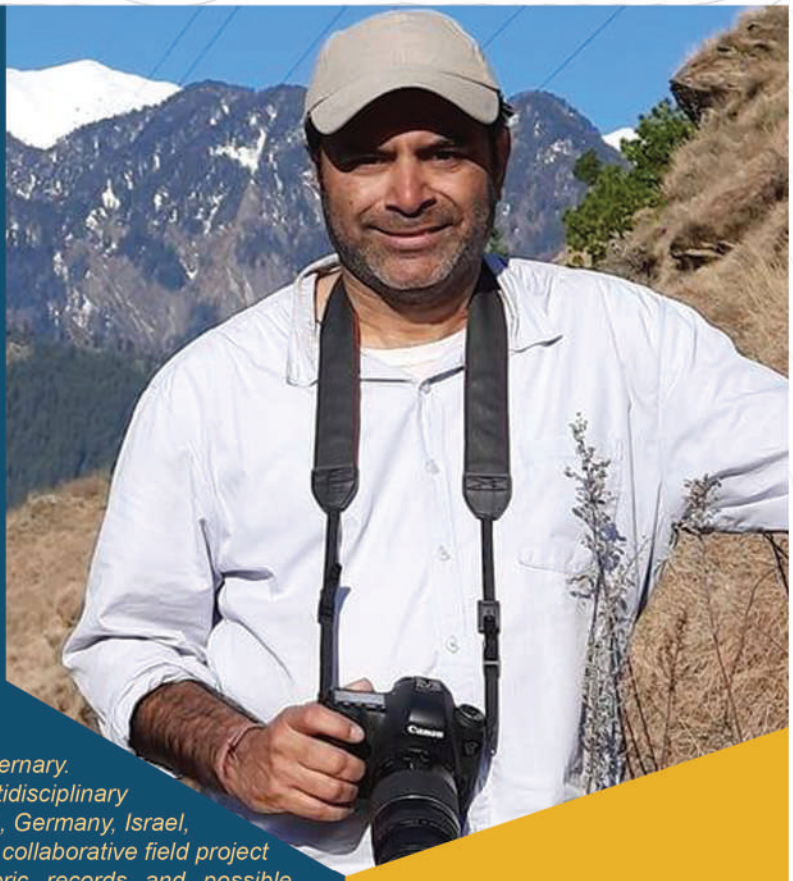
ASSOCIATION OF QUATERNARY RESEARCHERS

Quaternary Chronicles
Happenings in the Sub-continent

Past Events: AOQR - ECR - Webinar series

AOQR ECR

Webinar series



Know the Speaker: *After completing his B.A., M.A. and PhD degrees from the USA, India and UK respectively, Parth R. Chauhan worked as a postdoctoral fellow at the Stone Age Institute (USA) and then as a Fulbright Fellow at Deccan College in India. He is currently based in the Department of Humanities and Social Sciences at IISER Mohali, and his main interests lie in stone tool technology (Palaeolithic and microlithic), vertebrate palaeontology and rock art studies. Through his projects in northern India (Siwalik Hills) and central India (central Narmada and Tapi Basins), he is trying to understand human behavioural evolution, associated environmental adaptations and technological transitions throughout the Quaternary. He is currently collaborating with various multidisciplinary specialists at international institutions in India, Germany, Israel, USA and Australia. In addition, he also has a collaborative field project in Sudan to investigate regional prehistoric records and possible evidence for hominin dispersals out of Africa.*

Abstract: *From a chronological perspective, the Indian Subcontinent has several unique environmental attributes: 1) it is geographically bound by seas and the highest mountain ranges in the world; ii) its monsoon cycle is known to extend to at least 18 million years; iii) it preserves the largest terrestrial source of the ~74-kyr old Younger Toba Tephra (YTT); iv) it has regionally-unique faunal-floral histories and v) it has a rich mosaic of diverse ecological and topographic features. When viewed holistically and collectively with the regional archaeological records, all of these various environmental features and specific events appear to have played a major role in shaping past human evolution and survival throughout the Quaternary period. In addition, specific environmental transitions also played roles in the evolution, demise and migration of various faunal species. Despite the lack of adequate empirical data, this paper attempts to broadly integrate the various environmental parameters and features over time with specific palaeoanthropological and archaeological evidences. Diverse human material records, from the Palaeolithic to the Historical phases, are discussed in the context of environmental change and possibly-associated responses by various cultural groups. I also outline relevant gaps in our knowledge and associated geographic and methodological limitations that can be better addressed through future multidisciplinary research.*

Dr.
Parth R. Chauhan
speaks on
Climates and cultures: Quaternary environmental dynamics and human adaptations in India

28th SEP
MONDAY
1430 (IST)

Quaternary Chronicles
Happenings in the Sub-continent
ASSOCIATION OF QUATERNARY RESEARCHERS

Past Events: AOQR - ECR - Webinar series

AOQR ECR

Webinar series

Know the Speaker:
Gayatri Kathayat is an Associate Professor and a geoscientist at Xi'an Jiaotong University, China, who is passionate about all things monsoon! Her core expertise is in the field of monsoon reconstruction using cave speleothems on a wide range of timescales. She is interested in understanding the climate dynamics and climate impact on human societies.

Abstract: There is now a compelling body of evidence to suggest that the '4.2 ka BP Event' (or the '4.2- 3.9 ka BP Episode') was marked by a major reorganization of the ocean-atmosphere circulation system. Much less compelling though, is our understanding of the climatic manifestation of this event in the Indian subcontinent. Arguments have been presented both for and against the idea that the Indian summer monsoon underwent significant changes during and across this event. Furthermore, even when the results from the proxy records are in broad agreement with each other, they starkly differ in the details. For example, some studies describe the event in terms of a 'shift' (or 'regime change') in the Indian monsoon behavior. Alternatively, it has also been characterized as a singular or a series of discrete (dry) events that were superimposed over a gradually declining monsoon's strength; and one can even go this far, while still staying within the margin of quoted dating errors of some proxy records, to suggest that the 4.2 ka BP event may have manifested as a prominent pluvial rather than a dry event. The current uncertainties about the timing, duration, and climatic expression of the event in the Indian subcontinent stem in large part due to multiple (floating) definitions of the event itself; large age uncertainties/coarse temporal resolutions of proxy reconstructions; high-resolutions and absolute chronology yet due to an imprecise understanding of proxy-sensitivities; and from rather subjective (and occasionally, loose) interpretations of the proxy records. In this talk, we will present an objective synthesis of the existing sub-continent-wide proxy records of the Indian summer monsoon with an aim to understand its spatio-temporal response to the 4.2 ka event. We will show that only a few proxy records from the Indian subcontinent currently have the necessary temporal resolutions and chronological constraints that are critically needed for a precise characterization of the 4.2 ka BP event. The talk will highlight the salient strengths and limitations of these records, and we will discuss their results in the larger context of hemispheric/global climatic changes during this event.

Dr. Gayatri Kathayat speaks on The '4.2 ka BP Event' in the Indian Subcontinent? An Objective Synthesis of Proxy Records

05th OCT MONDAY 1430 (IST)

ASSOCIATION OF QUATERNARY RESEARCHERS

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AOQR ECR

Webinar series

Know the Speaker:
Sushant S. Naik is serving as a Senior Scientist in CSIR-National Institute of Oceanography, Dona Paula, Goa, India. His research interest includes the use of stable isotopes and elements from foraminifera to reconstruct oceanic carbonate system in the geological past. He is recognized as a PhD research guide by the Goa University and currently, four students are pursuing PhD under his guidance. To add to his credits he was a recipient of Merit Certificate for setting up South-Asia's first Ice Core Laboratory by Ministry of Earth Sciences, Govt. of India in 2007.

Abstract: *The atmospheric carbon dioxide is an important greenhouse gas and is correlated with climate over glacial-interglacial timescales. It varies within bounds of 180 to 280 ppmv during the cold and warm periods respectively. The oceans serve as major sinks and source of this gas. How do the oceans keep the atmospheric CO_2 within these limits? We shall try to understand the mechanisms by which the oceans control atmospheric CO_2 variability over the last few glacial-interglacial cycles.*

Dr.
Sushant S. Naik
speaks on
Role of the oceans in glacial/interglacial variations in atmospheric carbon dioxide

12th OCT
MONDAY
1430 (IST)

ASSOCIATION OF QUATERNARY RESEARCHERS

Quaternary Chronicles
Happenings in the Sub-continent

Past Events: AOQR - ECR - Webinar series

AOQR ECR

Webinar series

Know the Speaker: *Midhun Madhavan is at present a Research fellow at Department of Earth and Environmental Sciences, The University of Michigan, Ann Arbor, MI. His research interest includes Paleoclimate, Climate modelling, Stable water isotopes in hydrological cycle, Indian Monsoon, Data-model synthesis and Climate dynamics. He obtained his PhD at the Indian Institute of Technology, Gandhinagar, India.*

Abstract: Coherent fluctuations in Sahel and Indian summer monsoon rainfall affect the socio-economic welfare of several vulnerable regions. Here we identify a common mode of interannual rainfall variability over the Sahel and Indian regions and demonstrate the influence of global scale sea surface temperatures variability on such coherent monsoon fluctuations. Principal component (PC1) of the leading mode of summer rainfall variability (EOF1) in this region correlates well with both Indian summer monsoon and Sahel rainfall indices. ~ 40-year-long monthly observations of rainfall oxygen isotopes (δ18O) at Addis Ababa, Ethiopia also co-vary with PC1. We find that 18O depletion in Ethiopian rainfall during the wet phases of PC1 is due to the intrusion of westerly moisture transport from the Atlantic to Addis Ababa. A century-long δ18O record of an actively growing speleothem from Ethiopia matches PC1 over decadal timescales. We highlight the potential of rainfall isotopic records from Ethiopia to investigate the natural variability and responses of the Sahel and Indian monsoon rainfalls.

Dr.
Midhun . M
speaks on
Coherent Variability in Sahel and Indian Summer Monsoon Rainfall Recorded in Oxygen Isotopes of Rain/Speleothem

19th OCT
MONDAY
1430 (IST)

Past Events: AOQR - ECR - Webinar series

AOQR ECR

Webinar series

Know the Speaker:
Santosh K. Shah is presently working as Scientist 'D' at Birbal Sahni Institute of Palaeosciences, Lucknow. His research interests are in Dendroclimatology; Reconstruction and analysis of climate variability and change over the Common Era; Past Drought, Floods, River flow reconstruction, Glacier fluctuation and Climate Field Reconstruction. He has carried out dendrochronological studies in India, Nepal and Bhutan Himalaya, and Russia. In addition he was a resource person for Dendrochronlogy training program organized in India, Nepal, Bhutan and China. Presently he is President of Asian Dendrochronological Association.

Abstract: Tree-ring series provide the most widely distributed and easily accessible archive of annually resolved proxy, which records history of environment in terrestrial region. The branch of science that deals with study of tree-rings is called "Dendrochronology". The climate of the Himalaya region is unique due to the influence of various kinds of wind patterns. To understand the long-term climate variability, long climate records are a pre-requisite. However, except for few sites, long climate records from the Himalaya region beyond the period of instrumental record are limited. These can be significantly extended using various proxy records on different spatio-temporal resolution. Tree-ring is one of the high-resolution proxy records to reconstruct palaeo-environmental phenomenon. In Himalaya region tree-rings from various conifer and broad-leaved tree taxa has been analyzed to infer past climate (temperature, rainfall, drought), streamflow and other environmental conditions.

Dr. Santosh K. Shah speaks on Introduction to Dendrochronology and its application in climate research in the Himalaya

29th OCT
THURSDAY
1430 (IST)

ASSOCIATION OF QUATERNARY RESEARCHERS

Quaternary Chronicles
Happenings in the Sub-continent
ASSOCIATION OF QUATERNARY RESEARCHERS

AOQR's-ECR wins World Water Challenge 2020

The idea of Senthil Kumar Sadasivam (Asst. Prof. of Botany, National College, Trichy (TN) and also a member of AOQR-ECR Team) to extract water from air at zero energy expenditure to tide over water and energy crisis in India has been adjudged the best solution award in World Water Challenge 2020 - an event where proposals are called for various problems and best solutions are awarded - organized by the Ministry of Environment, South Korea and the Korean water forum.

He won the best solution among 86 entries across 32 countries. By winning the contest, he has got an opportunity to attend the ninth World Water Forum to be held in March next year in Senegal (West Africa) and also receive a cash award of 10 Billion KRW (Approx INR 7 Lakh). He said presenting his idea to world's leading water scientists, activists, policy makers and bureaucrats in the world water forum will be a proud moment. His idea of converting water droplets dripping from air-conditioners for effective use received praise from the Department of Science and Technology (DST) in 2017. DST sanctioned him Rs 25 lakh to come out with water purification option at cheaper or zero energy expenditure.

He pitched the idea under the theme 'urban water scenario with respect to global warming'. "I proved that the quantum of water dripping out of an air-conditioning machine in commercial establishments is surplus or sufficient for daily drinking water needs in the office," he said.

As usage of air-conditioners has increased enormously in recent years, he proved that commercial establishments can easily meet their drinking water need by recycling the water from ACs. "For instance, if an office is purchasing 100 litres of water per day, it takes 400 litres of raw ground water which is purified through various methods. By making use of the water from the AC, not only ground water will be saved, the power to extract water from ground, purification cost and the transportation charge is saved," he said.

"The energy saved reduces carbon emission which is responsible for global warming. Days are not far when saving water dripping from AC will be made mandatory," he added.

- Congratulations from AOQR ECR team!

Senthil Kumar Sadasivam

M/S ASSOCIATION OF QUATERNARY RESEARCHERS
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UNIVERSITY ROAD , LUCKNOW U.P

Balance Sheet As on 31st March 2021

LIABILITIES		AMOUNTS Rs. P.	ASSETS	AMOUNTS Rs. P.
Capital Fund			**Current Assets, Loans & Advances**	
Opening Balance	0.00			
Members Fee	383000.00		Bank Balance	390751.26
Add:Excess of Income	7751.26	390751.26		
Total		**390751.26**	**Total**	**390751.26**

For ASSOCIATION OF QUATERNARY RESEARCHERS

President Seceratory

For Navdeep Maheshwari & Associates
Chartered Accountants

Navdeep Maheshwari
(Proprietor)
M.No.:419269

Place: Amroha
Date: 29/07/2023

M/S ASSOCIATION OF QUATERNARY RESEARCHERS
53 , BIRBAL SAHNI INSTITUTE OF PALAEOSCIENCES
UNIVERSITY ROAD , LUCKNOW U.P

Receipts & Payment account for the year ending on 31/03/2021

PARTICULARS		AMOUNTS Rs. P.		PARTICULARS		AMOUNTS Rs. P.
To Opening Balance			By	Expenses On AOQR		120248.74
Cash	0.00					
Bank	0.00	0.00	By	Closing Balance		
To Donation Received		128000.00		Cash	0.00	
To MmbershipFees		383000.00		Bank	390,751.26	390751.26
		511000.00				**511000.00**

Income & Expenditure account for the year ending on 31/03/2021

To Expenses on AOQR	120248.74	By Donation Received	128000.00
To Excess Of Income over expenditure	7751.26		
Total	**128000.00**	**Total**	**128000.00**

For ASSOCIATION OF QUATERNARY RESEARCHERS

President Seceratory

For Navdeep Maheshwari & Associates
Chartered Accountants

Navdeep Maheshwari
(Proprietor)
M.No.:419269

Place: Amroha
Date: 29/07/2023