

Birbal Sahni Institute of Palaeosciences
Monthly Summary of Research Activities
(September 2024)

1. Area of Focus

The institute carries out research on fundamental as well as applied aspects of Palaeosciences that includes Evolutionary history of biota, Paleoclimate, studies of past civilization, Human history and contemporary Climate Change issues, following an integrated and multi-disciplinary approach.

Key research activities under following objectives:

- ☐ Understanding origin and evolution of life through time and space.
- ☐ Understanding climate change in recent and deep geological times.
- ☐ Understanding past civilization and human history.
- ☐ Application of Palaeosciences in exploration of fossil fuel and coal industry.

1. Important Highlights of Major Research Activity

a. Key Scientific Findings of the Month (September 2024)

There has been a significant rise in cancer-related mortality in the Ladakh region during the past 10 years. The most common type of case is gastrointestinal cancer, which has been linked in theory by medical research to lifestyle factors, high altitude conditions, and the prevalence of *Helicobacter pylori* bacteria brought on by poor hygiene. Nevertheless, the precise cause of the rise in cancer cases is still unknown. Concurrently, there has been a significant change in Ladakh's water use practices due to development, improved basic utilities, and related vocational shifts. The local population has become increasingly reliant on groundwater since it provides a year-round, continuous water supply for home and agricultural uses. In this study, we assessed heavy metal contamination in groundwaters and associated human health risks. The results indicate that 46–96% of the groundwater samples have heavy metal pollution with a health hazard index > 1 , which means using these groundwaters for drinking, food preparation, and agriculture is likely to result in carcinogenic and non-carcinogenic health hazards. The main heavy metal contaminants found in the groundwater of the Leh district include Cr, As, Hg, and U. According to the health risk assessment, 46–76% of the groundwater samples contain unsafe levels of Cr and As. Prolonged exposure to these levels is likely to cause gastrointestinal cancer in the local population. Acute to chronic exposure to U and Hg concentrations present in some groundwater samples is likely to result in various non-carcinogenic health risks (Ansari et al., 2024).

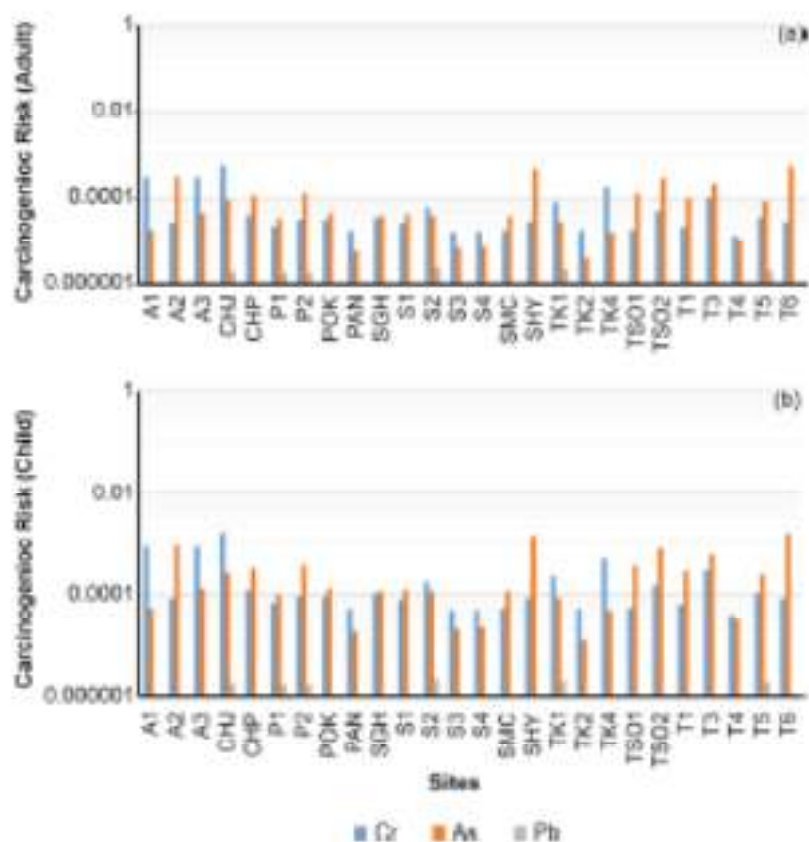


Figure 1. The bar plot shows the carcinogenic risk associated with Cr, As, and Pb contamination in the groundwater samples. The values along the x-axis (log10 scale) represent the possibility of cancer cases for (a) the adult population and (b) the child population. For example, 0.0001 denotes the possibility of 1 case per 10,000 inhabitants

b. Student Interaction Forum (SIF) Lecture (July2024)

Dr. Masud Kawsar, research scholar, BSIP, delivered a talk on ‘Demonstration of Data analyses and Hypothesis Testing in R on 19th September 2024 in BSIP auditorium under SIF. The SIF is a forum for discussion on various aspects of science, completely managed by PhD students with faculty coordinator. The lecture was attended by institute scientists, post-doctoral fellows and research scholars.

Mr. Utpalendu halder delivered a lecture on Glacial diamictites record crustal growth and chemical weathering: Insights from $^{87}\text{Sr}/^{86}\text{Sr}$ on 23rd September 2024 in BSIP Auditorium under SIF. The lecture was attended by institute scientists, post-doctoral fellows and research scholars.

Dr. Prgya Singh delivered a talk on ‘Clay minerals in Boles: A window to paleoenvironment during Deccan volcanism’ on 24th September 2024 in BSIP auditorium under SIF. The lecture was attended by institute scientists, post-doctoral fellows and research scholars.

c. Brainstorming Workshop on Museum (28th - 29th August 2024)

BSIP organized **Brainstorming Workshop on Museum** with an aim to discuss the modernization through technology integration, enhancing visitors' experience and showcasing of diverse paleontological findings for BSIP Museum from 28th – 29th August 2024. The event involved lectures from various museum experts and directors of national museums from all over the country.

d. Participation in National/International conferences/workshops/Symposium

Dr. Srinivas Bikkina, Scientist F, BSIP successfully completed the Arctic expedition 2024. The expedition was organized by NCAOR Goa, in which scientists working on a different spectrum of science participated. Dr Srinivas Bikkina collected samples from the Svalbard region to trace the aeolian dust and footprints of forest fires over the Arctic.

Dr. Shilpa Pandey, Scientist-E, invited as Keynote Speaker at the Regional Science City Lucknow to deliver a Talk on "Ozone for Life: Protect the Ozone and Preserve our Future" to create awareness to protect the Ozone layer and how the Ozone depletion can be reduced?

Dr. Ranveer Negi, Scientist B participated and delivered a talk at the 37th International Geological Congress (IGC) 2024 in Busan, South Korea, from August 25-31, 2024.

Dr. Adrita Choudhuri Scientist C delivered a talk as an invited speaker at the National Conference “Women in Geosciences” at NCESS, Thiruvananthapuram from 2nd-4th September, 2024.

Dr. Pooja Tiwari, Mr. Deveshwar Prakash Mishra, Mr. Piyal Halder, Mr. Suraj Kumar, and Ms. Nidhi Tomar, Research scholars from BSIP, Lucknow, India presented their work through oral and poster presentations in International Geological Congress (IGC), 2024 at Busan, South Korea in the Busan exhibition Centre and convention hall, BEXCO.

e. BSIP Foundation Day celebration, 10th September, 2024

BSIP celebrated its 78th foundation day on September 10, 2024, at its campus by offering floral tribute to Late Prof. Birbal Sahni by Director, Prof. Mahesh G Thakkar along with other scientific, technical, and administrative staff members of the institute. On this auspicious occasion, Dr. S. Sundar Manoharan, Director General, Pandit Deen Dayal Energy University, Gandhinagar, was the chief guest of the occasion. Dr. Bhaskar Narayan was guest of honour for the function. Prof. D K Pandey, delivered the 78th Foundation Day lecture on the topic “Corals, Civilization and Geological Significance”. The event was well attended by all the scientists, technical and research scholars of the institute. The third issue of "पुराविज्ञान स्मारिका पत्रिका", Hindi magazine of BSIP was also released during the event, showcasing the latest research in Palaeosciences.

f. GEOFEST Keynote Lecture (12 September 2024)

Prof. Mahesh G. Thakkar, Director BSIP delivered an insightful keynote address on the topic "Is Earthquake a Natural Disaster or an Event of Creation?" at GEOFEST 2024, hosted by the Geology Department of Geology, Lucknow University. The lecture was attended.

g. हिंदी पखवाड़ा समारोह (September 14-26, 2024)

हिंदी पखवाड़ा के उद्घाटन समारोह में प्रो श्री अभिषेक कुमार सिंह, वरिष्ठ तकनीकी अधिकारी (राजभाषा प्रकोष्ठ), ICAR-भारतीय गन्ना अनुसंधान संस्थान, लखनऊ ने एक महत्वपूर्ण विचारशील विषय 'हिन्दी नीति और निर्देश' पर व्याख्यान दिया। हिंदी पखवाड़ा 2024 के अंतर्गत BSIP में टंकण, टिप्पण, अनुवाद प्रतियोगिता में BSIP के कर्मचारियों व शोधार्थियों ने प्रतिभाग किया और अपनी राजभाषा के प्रति अपना समर्पण दिखाया। डॉ साधन बसुमतारी वैज्ञानिक ई ने "पुरापास्थितिकी एवं पुराशाकाहार विश्लेषण हेतु वैकल्पिक आधार" विषय पर विशेष व्याख्यान दिया। हिंदी पखवाड़े के अंतर्गत वाद-विवाद प्रतियोगिता, इमला एवं निबंध एवं पोस्टर इत्यादि प्रतियोगिताओं का आयोजन किया गया जिसमें BSIP के कर्मचारियों व शोधार्थियों ने उत्साह से प्रतिभाग लिया जिससे दर्शक दीर्घा में भी रचनात्मक विचार-उत्तेजना का संचार हुआ।

h. Ms. Tarasha Chitkara is awarded with her PhD degree on the topic "Quaternary Palaeoclimatic Studies using Multi Proxy Approach around Kurukshetra, Haryana, India" under the supervision of Dr Anupam Sharma from Kurukshetra University, Kurukshetra.

i. Man Power Trained (Internship/Dissertation)

S. No.	Name of Students	Supervisor/Co-supervisor	Broad Area of Training	Duration
01	Ayush Yadav and Unnati Pathak	Prasanna K	Elemental analysis of Ganga Plain Sediments	4/09/2024 (one month)
02	Sapna Sonker	Trina Bose	Chemical processing and extraction of Surface core Sediment samples from Western Vidarbha	April to August 2024, (4 months)

03	Mamta	Anjali Trivedi	Aerial Pollen Diversity in Lucknow District and their clinical Signature in allergic disease: A pilot study.	April to July 2024 (4 months)
04	Shreya Singh	Abhijit Mazumder	Study of diatoms for monitoring the environmental settings of Karamnasa River	April to July 2024 (4 months)
05	Archana Verma	Jyoti Srivastava	Modern pollen-vegetation-climate relationship from Central Uttar Pradesh and its implications to palaeoclimate reconstruction	July 2024 (1 months)
06	Gausiya Khatoon	Jyoti Srivastava	Non-pollen palynomorph assemblage from Central Uttar Pradesh, India as a tool for paleoecological reconstruction	July 2024 (1 months)

List of Research Publications (September 2024)

Original Articles/Reviews/Book Chapters

1. Jahan, T., Quamar, M.F., 2024. The '4.2 ka drought event' and the fall of the Harappan Civilization: a critical review. Review of Palaeobotany and Palynology 331, 105187 <http://doi.org/10.1016/j.revpalbo.2024.105187>
2. Prasad, N., Quamar, M.F., Maneesha, M. ET, Tiwari, P., Thakur, B., Sharma, A., Phartiyal, B., Javed, M., 2024. Late Holocene vegetation history and monsoonal climate change from the Core Monsoon Zone of India. Catena 246, 118394 <http://doi.org/10.1016/j.catena.2024.108394>
3. Javed, M., Prasad, N., Farooqui, A., Quamar, M.F., Singh, M., 2024. Taxonomic insights into medicinal plants pollen, using advanced microscopy techniques, from the Western Ghats, India. <http://doi.org/10.1080/00173134.2024.2391515>.
4. Pooja Tiwari*, Biswajeet Thakur**, Purnima Srivastava, Sanjay Kumar Singh Gahlaud, Trina Bose, Anurag Kumar, Ravi Bhushan, Rajesh Agnihotri. 2024. Was LIA synchronous with equatorial climate? A multiproxy study from the southwest coast of India. Quaternary International. <https://doi.org/10.1016/j.quaint.2024.09.004>. (Impact Factor 1.9).
5. Prasanna K, Amrita Sarkar, Anupam Sharma, Manoj M C, Swati Tripathi, Biswajeet Thakur, Sadhan Kumar Basumatary, Kamlesh Kumar, Parminder Singh Ranhotra, Shilpa Pandey, Anjali Trivedi, Mohammad Firoze Quamar, Jyoti Srivastava & Ishwar Chandra Rahi 2024. Heavy Metal Pollutants and Their Spatial Distribution in Surficial Sediments from the Gangetic Plains, Central, and Western Parts of India. Soil and Sediment Contamination: An International Journal, 1–21. <https://doi.org/10.1080/15320383.2024.2395948> (Impact Factor: 1.6).

6. Singh SP, Singh AK, Arif M, Prasad V, Venkateshwarlu M, Naik AS 2024. Magnetostratigraphy and Sedimentology of Deccan Intertrappean Succession from Sagar, Central India: Insights into Palaeoenvironment and End-Cretaceous Palaeogeography. *Journal of Geological Society of India*, 100(8), 1129–1139. <https://doi.org/10.17491/jgsi/2024/173961>. (Impact Factor: 1.2).
7. Ansari, AH, Das, A., Sonker, A., Ansari, NG., Ansari, MA., Morhekal, P. (2024). Assessment of the health risks associated with heavy metal contamination in the groundwaters of the Leh district, Ladakh. *Environ Geochem Health* 46, 369 (2024). <https://doi.org/10.1007/s10653-024-02149-2> (Impact factor = 3.2).
8. Khan, FA., Gurumurthy GP, Muguli T, Alam M, & Sharma, A. (2024). Ganga Basin Sediment (GBS): A Potential Geological Reference Material for Tropical Rivers. *Journal of Geological Society of India*, 100(8), 1189–1199. <https://doi.org/10.17491/jgsi/2024/173966>. (Impact Factor: 1.2).

Photographs showing important highlights of major programs/research activities organized during September 2024:

