

**Birbal Sahni Institute of Palaeosciences**  
**Monthly summary on Research Activities**  
**(January, 2023)**

**1. Areas 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.

**2. Important Highlights of Major Research Programmes**

**a. Key Scientific Findings of the Month (January 2023)**

The study provides new tree-ring stable oxygen isotope ( $\delta^{18}\text{O}_{\text{TR}}$ ) record based longest summer drought variability (508 years, 1508-2015 CE) for Kumaon-Garhwal Himalaya. The reconstructed past drought variability are observed to be reoccurring in the recent decades but the intensity is similar to the early part of the past extreme drought. The strength of the Indian Summer monsoon has declined over high altitude regions in the KGH. The  $\delta^{18}\text{O}_{\text{TR}}$  regional record of Kumaon-Garhwal Himalaya is linked to oceanic phenomenon such as sea surface temperature (SST) in the Pacific and Indian Ocean (Shah et al 2023).

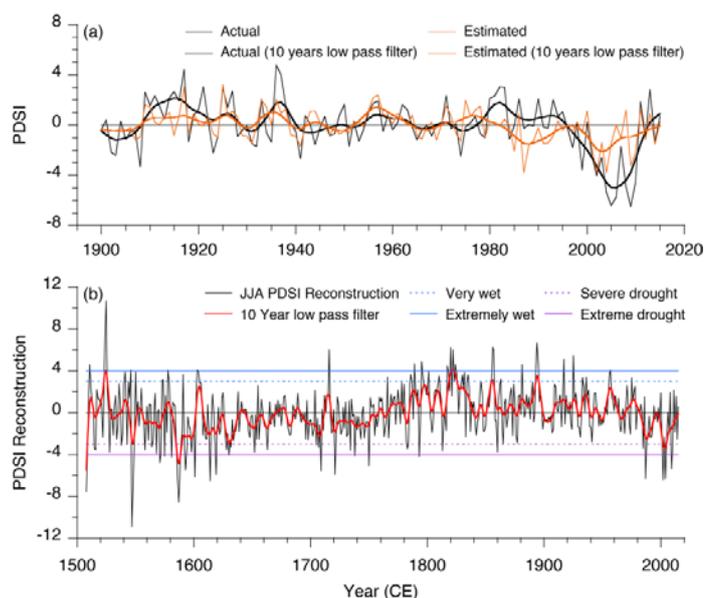


Figure (a) The actual and estimated JJA<sub>PDSI</sub> for calibration period of 1901-2015 CE (b) JJA<sub>PDSI</sub> reconstruction with 10-year low-pass filter for Kumaun-Gharwal Himalaya. The horizontal black solid line indicate the mean of the JJA<sub>PDSI</sub> reconstruction. The blue solid and dashed line are PDSI value for extreme wet (+4.0) and very wet (+3.0) respectively. The purple solid and dashed line are PDSI value for extreme drought (-4.0) and severe drought (-3.0) respectively.

## b. Friday lecture series talks

S.No.	Speaker	Title of the talk	Date
1.	Mr. Masud Kawsar, BSIP	Advance insights into grain size interpretation in the context of paleoclimate and paleoceanographic research: Case studies from marine and terrestrial archives	January13, 2023
2.	Dr. Mahi Bansal,BSIP	Biotic dispersal between the Indian Plate and other Gondwanan continents and Eurasia during Cretaceous-Paleogene: Testing hypotheses for paleobiogeographic implications	January20, 2023

Scientific members of the Institute and Project staff members. Research Associates and scholars attended the talks of the Friday Lecture series.

## c. Curtain Raiser for India International Science Festival-2022 (January 13, 2023)

During curtain raiser event, the outreach activities were organized by the institute on January 13 under the banner of India International Science Festival-2022 in which 40 students from different colleges visited BSIP, its museum & several other laboratories, they were introduced

to "Fossils & BSIP's contribution in development of Geo-heritage parks" by Dr SSK Pillai, Scientist, BSIP.

**d. Showcase of best scientific findings/practices at IISF 2023, Bhopal (21-24 Jan 2023 )**

A team of BSIP senior scientists participated in IISF 2023 and showcased various scientific findings as well as scientific practices followed at BSIP to general public. BSIP also showcased its achievement and further appealed for greater scientific collaboration of all stake holders.

**e. Outstation Scientific outreach Program**

Dr. Santosh K Shah briefed about the Dendrochronology to the students of Department of Forestry Wildlife & Environmental Science, Guru Ghasidas Vishwavidyalaya Chhattisgarh. He also explained about its application in the palaeoclimatic study.

**f. Campus visit outreach activity**

S. No.	University/College/School	Standard/Grade/Post-Grad	No. of Students	Details of Visit& Date
01	Lucknow University	M.Sc. Archeology	7-8	Visit to Museum, SEM lab, Central Geochemical Facility (03-01-2023)

**List of research publications (Jan 2023):**

- Joshi, P., Phartiyal, B.,** Joshi, M., **Agrawal, S.,** Kumar, P., Sharma, R. (2023). Reconstruction of landscape and climate of the largest drainage basin in the Ladakh Range, NW Trans Himalaya during the last 7000 years. *Catena* 106907. DOI: 10.1016/j.catena.2022.106907 (**Impact factor: 6.367**).
- Shah, S.K.,** Berkelhammer, M., Li, Q., **Mehrotra, N.,** Thomte, L., Shell, R., Pandey, U., Gaire, N.P., Kathayat, G., Sinha, A. (2023). Regional tree-ring oxygen isotope deduced summer monsoon drought variability for Kumaun-Gharwal Himalaya. *Quaternary Science Reviews* 301. 107927. DOI.: 10.1016/j.quascirev.2022.107927. (**Impact factor: 4.456**).
- Dhyani, R., Bhattacharyya, A., Joshi, R., **Shekhar, M.,** Kuniyal, J.C., **Ranhotra, P.S.** (2023) Tree rings of *Rhododendron arboreum* portray signal of monsoon precipitation in the Himalayan region. *Frontiers in Forest and Global Change* 5:1044182. DOI.: 10.3389/ffgc.2022.1044182. (**Impact factor: 4.332**).

4. Colleps, C.L., Mckenzie, N.R., Beek, P.V.D., Guenther, W.R., **Sharma, M.**, Adam R. Nordsvan, A.R., Daniel F. Stockli, D.F. (2023). Assessing the long-term low-temperature thermal evolution of the central Indian Bundelkhand craton with a complex apatite and zircon (U-Th)/He dataset. *American Journal of Science* 322 (10) 1089-1123. DOI.: 10.2475/10.2022.01. (**Impact factor: 5.62**).
5. **Chandra, K., Shukla, A., Mehrotra, R.C., Bansal, M., Prasad, V.** (2023). Fossil Mahogany from the Early Paleogene of India. *Journal of Geological Society of India* 99: 65–72. DOI: 10.1007/s12594-023-2268-2(**Impact factor: 1.466**).
6. **Agnihotri, P., Singh, H.** (2023). Stratigraphic Harudi signatures at the Umarsar Lignite Mine, KutchBasin, Gujarat, India. *Journal of Palaeontological Society of India* 67(2): 357-362. (**Impact factor: 0.705**).
7. **Singh, P.K., Singh, H., Singh, S.K., Prasad, M.** (2023). Fossil leaf and fruit of the genus *Harpullia* Roxb. from Upper Miocene (Siwalik) sediments in the Sub-Himalayan zone of West Bengal and its biogeographic and palaeoclimatic significance. *Journal of Palaeontological Society of India* 67(2): 342-348. (**Impact factor: 0.705**).
8. **Kumar, R., Aggarwal, N., Das, N., Pandey, B., Kumar, K.** (2023). Palaeoenvironmental reconstruction based on palynofacies analysis of the Early to Middle Jurassic of the Lathi Formation, Jaisalmer Basin, India. *Journal of Palaeontological Society of India* 67(2): 262-272. (**Impact factor: 0.705**).
9. Agarwal, S., **Shukla, S.K., Srivastava, P., Sundriyal, Y.** (2023). Peat sequence diatoms from Kedarnath, Central Himalaya, used to reconstruct mid-late Holocene hydroclimatic conditions. *Palaeogeography, Palaeoclimatology, Palaeoecology* 612. 111381. DOI.: 10.1016/j.palaeo.2022.111381. (**Impact factor: 3.565**).
10. **Misra, S., Sharma, A., Maurya, R.S., Misra, K.G.** (2023). Wetlands as Potential Zones to Understand Spatiotemporal Plant–Human–Climate Interactions: A Review on Palynological Perspective from Western and Eastern Himalaya. In book: Pandey, M., Pandey, P.C., Ray, Y., Arora, A., Jawak, S.D., Shukla, U.K. (eds.) *Advances in Remote Sensing Technology and the Three Poles*. Wiley online library. DOI.: 10.1002/9781119787754.ch23.
11. **Trivedi, A., Srivastava, A., Farooqui, A., Khan, S., Pokharia, A.K., Ferguson, D.K., Singh, V.K.** (2023). Pollen morphological study in subfamily Papilionoideae using Confocal Laser Scanning Microscopy. *Journal of Palaeosciences* 71(2), 123–142. DOI.: 10.54991/jop.2022.538.

12. **Tripathi, S., Srivastava, J., Garg, A., Khan, S., Farooqui, A., Quamar, M. F., Thakur, B., Ranhotra, P. S., Basumatary, S. K., Trivedi, A., Pandey, S., Anupama, K., Prasad, S., Reghu, N.** (2022). Surface pollen quantification and floristic survey at Shaheed Chandra Shekhar Azad (SCSA) Bird Sanctuary, Central Ganga Plain, India: a pilot study for the palaeoecological implications. *Journal of Palaeosciences*, 71(2), 159–176. DOI: 10.54991/jop.2022.1838.
13. Sharma, S., **Pokharia, A. K.**, Kumar, A., Srivastava, A., & Yadav, R. (2022). *Carthamus L.*: Origin, distribution and its archaeological records in India. *Journal of Palaeosciences*, 71(2), 177–186. DOI: 10.54991/jop.2022.1840.
14. **Arora, P., Singh, P., Ali, S.N., Morthekai, P., Shekhar, M., Ghosh, R.** (2023). Climate Variability and Its Causal Mechanisms Over the Northeastern Indian Himalaya. In: Phartiyal, B., Mohan, R., Chakraborty, S., Dutta, V., Gupta, A.K. (eds) *Climate Change and Environmental Impacts: Past, Present and Future Perspective*. Society of Earth Scientists Series. Springer, Cham. DOI: 10.1007/978-3-031-13119-6\_6.
15. **Chandra, K., Shukla, A., Mehrotra, R.C.** (2023). Early Paleogene Megaflora of the Palaeoequatorial Climate: A Case Study from the Gurha Lignite Mine of Rajasthan, Western India. In: Phartiyal, B., Mohan, R., Chakraborty, S., Dutta, V., Gupta, A.K. (eds) *Climate Change and Environmental Impacts: Past, Present and Future Perspective*. Society of Earth Scientists Series. Springer, Cham. DOI: 10.1007/978-3-031-13119-6\_2.

**Photographs showing important highlights of major programs/research activities organized during January, 2023:**

