

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

The study analyses the palynological data from the Core Monsoon Zone (CMZ) of India on the Indian Summer Monsoon (ISM) rainfall variability since the Last Glacial Maximum (LGM: ~20,000 calyr BP) and its correlation with the marine and continental records from the Indian subcontinent. The CMZ is the area or zone in which the variation of rainfall during the months of July and August (peak rainfall months in India) well-represents the intensity of the annual ISM. The areas lying between latitudes 18 °N and 28 °N, and longitudes 65 °E and 88 °E fall under the CMZ of India. The CMZ, being sensitive to the ISM fluctuations, is regarded as the key region for the identification of weak or intense monsoon periods, referred to as ‘break’ or ‘active’ spells, respectively. It was observed that the LGM was cool and dry (reduced monsoon) in the central CMZ, whereas the peripheral CMZ showed strengthened Northeast Monsoon (NEM: Oct.-Dec.) during the LGM. Moreover, the Bølling-Allerød (B/A: ~14.8–12.9 ka) event is seldom demarcated by any of the paleoclimate records from the CMZ except a few, which showed an intensification of the ISM. The globally observed YoungerDryas (YD: ~12.9–11.7 ka) was cool and dry (weak ISM) in the central CMZ

region, whereas peripheral CMZ records suggested monsoonal influence. The Holocene Climate Optimum (HCO; 7000–4000 yr BP) was observed to be asynchronous in the central Indian CMZ. The extreme climatic events, such as at 8.2 ka and 4.2 ka, were poorly registered in the central CMZ, possibly because the central CMZ is more sensitive towards intensified monsoon phases rather than the weaker monsoon spells. The last two millennia have been observed to be climatically dynamic with intensified ISM phases manifested by the Roman Warm Period (RWP; 2500–1450 yr BP), the Medieval Climate Anomaly (MCA; 1050–650 yr BP) and the Current Warm Period (CWP; 100 yr BP–present); with intermittent weak ISM phases, such as the Dark Ages Cold Period (DACP; 1450–1050 yr BP) and the Little Ice Age (LIA; 650–100 yr BP). Against this backdrop, extensive and high-resolution multi-proxy studies from the CMZ are further required to address the monsoon variability during the last two millennia. This would be helpful in simulating models for a better understanding of future climate change scenarios. (*Quamar et al.*)

**Figure.** Climate reconstruction depicting the global climatic events from the studies conducted in the central part of the CMZ (Madhya Pradesh and Chhattisgarh)

**b. Earth Science Week (October 8-14, 2023)**

Center for Promotion of Geoheritage & Geotourism, (CPGG-BSIP) organized & celebrated “Earth Science Week- 2023” themed “Geoscience innovating for Earth & People” to engage young researchers & public to sensitize towards the role of Earth Sciences. Chief Guest Dr. Navin Juyal delivered an engaging talk on “Significance of Geoscience & its Societal Implications in the Himalayan region”. BSIP scientists also delivered talks during the occasion to enlighten the students about Earth Sciences and Fossils. 2<sup>nd</sup> day of Earth Science Week was marked with engaging laboratory & museum visits, offering students a unique opportunity to explore the fascinating world of fossils. On the 3<sup>rd</sup> day, a geoscience competition on “Earth and Society” was organized in which students participated with enthusiasm. The function was concluded by a speech from the Chief Guest of the day Dr. Suchita Chaturvedi, member, Child Commission, UP followed by the presidential remarks from Prof. MG Thakkar, Director BSIP.

**c. स्वच्छता पखवाड़ा (September 15- October 2, 2023)**

स्वच्छता पखवाड़ा, 2023 के अंतर्गत वृक्षारोपण कार्यक्रम का आयोजन दिनांक 2 अक्टूबर को BSIP के प्रांगण में सफलता पूर्वक आयोजित किया गया।

"Ek Tareekh, Ek Ghanta, Ek Saath", all members of BSIP dedicated 1 hour of shramdaan to make our nation cleaner & greener on October 1, 2023.

**d. हिंदी पखवाड़ा समारोह (September 14-24, 2023)**

हिंदीपखवाड़ा 2023 के अंतर्गत BSIP में 'अंतरिक्ष की तरफ भारत के बढ़ते कदम' जैसे महत्वपूर्ण विषय पर पोस्टर प्रतियोगिता का आयोजन किया गया। इसमें हमारे युवाओं ने अपने विचार, हमारे देश की उपलब्धियाँ और अंतरिक्ष के अनगिनत आविष्कारों का चित्रण कर भारत के सामर्थ्य को प्रकट किया। समापन समारोह में कवि सम्मेलन का आयोजन किया गया। कवियों ने अपनी आवाज़ से भाषा को जीवंत किया और रस भरे काव्य की मिसाल प्रस्तुत की।

#### e. Outstation Scientific outreach Program

- Dr. Ansuya Bhandari, Scientist BSIP, participated in a National workshop cum conference on “Biodiversity & Conservation in the Himalayan Region (NWBC)” organized by University of Ladakh between September 25- 27, 2023.
- Dr. Veeru Kant Singh, Scientist BSIP, was honoured with the prestigious Sharda Chandra Gold Medal in Paleontology by the Paleontological Society of India.
- Ms. Priya Agnihotri, a research scholar of BSIP, was honoured with the prestigious Prof. S.K. Singh Memorial Gold Medal by the Paleontological Society of India.

#### List of research publications (October 2023):

1. **Quamar, M.F., Banerji, U.S., Thakur, B., Kar, R.** (2023). Hydroclimatic changes in the Core Monsoon Zone of India since the Last Glacial Maximum: An overview of the palynological data and correlation with the marine and continental records. *Palaeogeography, Palaeoclimatology, Palaeoecology* 111844, DOI.: 10.1016/j.palaeo.2023.111844. **(Impact factor: 3.0)**
2. **Joshi, H., Aggarwal, N.** (2023). Palynology of the Upper Gondwana deposits from the Chintalapudi Sub-basin, South India: Insights into age and palaeodepositional settings. *Cretaceous Research* 105734. DOI.: 10.1016/j.cretres.2023.105734 **(Impact factor: 2.1)**.
3. **Ansari, A.H., Pandey, S.K., Ahmad, S., Sharma, M., Govil, P., Chaddha, A.S., Sharma, A.** (2023). High primary productivity in an Ediacaran shallow marine basin influenced by strong seasonal to perennial upwelling. *Geological Journal* 160, 1607 – 1623. DOI.: 10.1017/S0016756823000614 **(Impact factor: 2.3)**.
4. **Bhatia, H., Srivastava, G., Mehrotra, R.C.** (2023). Cordiaceae wood from the Miocene sediments of northeast India and its phytogeographical significance. *IAWA Journal*. DOI.: 10.1163/22941932-bja10139 **(Impact factor: 1.9)**.
5. **Sherawat, J.S., Agarwal, S., Kenney, A.P., Grimes, V., Rai, N.** (2023). Use of strontium isotope ratios in potential geolocation of Ajnala skeletal remains: a forensic archeological

study. International Journal of Legal Medicine. DOI.: 10.1007/s00414-023-03109-8(**Impact factor: 2.1**).

6. Gao, Y., Song, A., Deng, W., Chen, L., Liu, J., Li, W., **Srivastava, G.**, Spicer, R.A., Zhou, Z., Su, T. (2023) The oldest fossil record of *Bauhinias.s.* (Fabaceae) from the Tibetan Plateau sheds light on its evolutionary and biogeographic implications, Journal of Systematic Palaeontology, 21:1, DOI: 10.1080/14772019.2023.2244495(**Impact factor: 2.6**).
7. Sehrawat, J.S., **Rai, N.** (2023). Identification of fragmented cranial remains excavated from a site adjoining Ajnala well: a forensic anthropological case report. Egyptian Journal of Forensic Sciences13. DOI.: 10.1186/s41935-023-00362-1

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

