

Birbal Sahni Institute of Palaeosciences

Monthly summary on Research Activities

(April, 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:

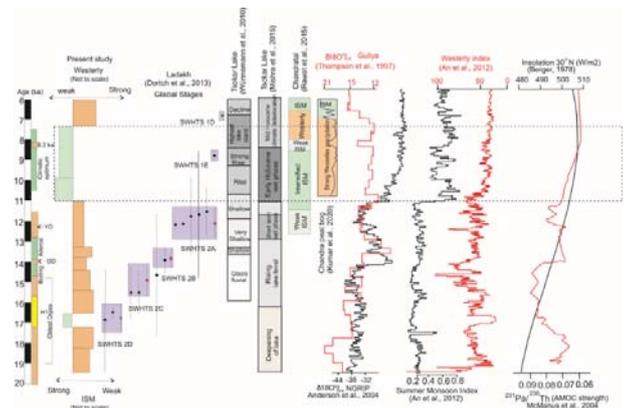
- Understanding origin and evolution of life through time and space.
- Understanding climate change in recent and deep geological times.
- Understanding past civilization and human history.
- Application of Palaeosciences in exploration of fossil fuel and coal industry.

2. Important Highlights of Major Research Programmes

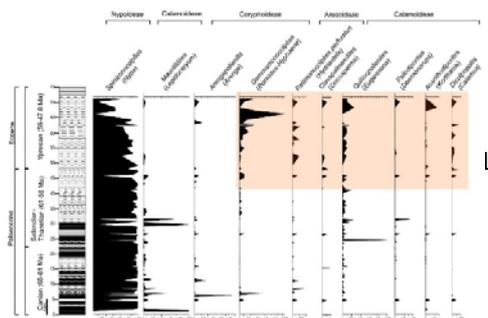
a. Key Scientific Findings of the Month (April 2023)

(i). The present study provides a millennial to centennial scale climate record in an attempt to gain insights into the past climate variations since the last deglaciation that followed the Last Glacial Maxima. The results indicate cold arid Westerly circulation dominated the region from 19.6 to 11.1 ka and 7.5 to 6.1 ka. The mid-Holocene climate variability coinciding with decreasing insolation, weakening monsoon and enhanced El Nino activities. While two wet phases at 17.4-16.5 ka and 11.1 to 7.5 ka under influence of monsoon is reported following the orbitally controlled solar insolation that influenced the position of ITCZ (Nag *et al.* 2023).

Fig. Comparison of reconstructed palaeoclimate variation of Khalsi sequence with other global and regional data.



(ii). The recovery of ten *Arecaceae* (palms) type fossil pollen from the early Palaeogene deposits of India suggests the dispersal of palms from Africa to India via the Kohistan-Ladakh Island Arc during Maastrichtian-Palaeocene, contributing



to the "Africa-India Floristic Interchange". Following the early Palaeogene warming, wet and humid climatic regimes of the palaeoequatorial Indian Plate served as an evolutionary and diversification hotspot for palms. Later, palms dispersed to Southeast Asia following the India-Asia collision and thus corroborates the "Out-of-India" dispersal hypothesis. Palms biodiversity further declined on the Indian subcontinent in response to the strengthening of monsoon and aridification during the Neogene global cooling (*Parmar et al. 2023*).

Fig. Tilia pollen diagram showing the proliferation of palms (peaks in shaded area) in the early Ypresian sediments of the Sonari Lignite Mine, western Rajasthan, India.

b. Cleanliness campaign, 31st March 2023 onwards

BSIP officials have started a cleanliness campaign at the premises on 31st March, 2023 and are regularly monitoring and cleaning of laboratories/ lavatory and plantation in the Institute premises and they are also keeping a record of the work done through photographs (after and before) of each place.

c. Floral tribute to Institute Founder, Late (Prof.) Birbal Sahni (April 10, 2023).

Floral tributes were offered to Late Prof. Birbal Sahni on his Samadhi at the Institute premises on 10th April, 2023 by scientific, technical and administrative staff of the institute.

d. Outstation Scientific outreach Program

- A team of BSIP scientists conducted a science outreach programme for students in the western Vidarbha region of Nagpur, Maharashtra.
- A one-day workshop was organized in the University of Ladakh Leh as a part of collaborative project (BSIP, University of West of England, Bristol, Ladakh Arts and Media Organization) on 'Ecologies of Water-care in the Himalayas' with a focus on Changthang. Padmashree Chewang Norphel graced the event as the guest of honor.
- BSIP under Department of Science and Technology organized a colossal awareness & plantation program of rare & common orchids among the local people of Bodo tribes in Goalpara District Assam under the aegis of Jan Bhagidaari outreach event lead by Dr Sadhan K Basumatary Scientist, BSIP.
- BSIP scientists participated in the Indo-German Science & Technology (IGSTC) Outreach Event at Lucknow on 18th April, 2023.

List of research publications (April 2023):

1. **Nag, D., Phartiyal, B., Agrawal, S., Kumar, P., Sharma, R., Kumar, K., Sharma, A., Joshi, M. (2023).** Westerly-monsoon variations since the last deglaciation from semi-arid Ladakh region, Trans Himalaya, India. *Palaeogeography, Palaeoclimatology, Palaeoecology* 618, 111515. DOI: 10.1016/j.palaeo.2023.111515 (**Impact factor: 3.565**).

2. **Thomte, L., Shah, S.K., Mehrotra, N.,** Saikia, A., Bhagabati, A.K. (2023). Dendrochronology in the tropics using tree-rings of *Pinus kesiya*. *Dendrochronologia* 78,126070. DOI.: 10.1016/j.dendro.2023.126070(**Impact factor: 3.071**).
3. **Parmar, S.,** Morley, R.J., **Bansal, M.,** Singh, B.P., Morley, H., **Prasad, V.** (2023). Evolution of family Areaceae on the Indian Plate modulated by the Early Palaeogene climate and tectonics. *Review of Palaeobotany and Palynology* 313, 104890. DOI.: 10.1016/j.revpalbo.2023.104890(**Impact factor: 2.493**).
4. **Shukla, S.K.,** Crosta, X., Ikehara, M. (2023). Synergic role of frontal migration and silicic acid concentration in driving diatom productivity in the Indian sector of the Southern Ocean over the past 350 ka. *Marine Micropalaeontology* 181, 102245. DOI.: 10.1016/j.marmicro.2023.102245(**Impact factor: 2.102**).
5. **Samal, P.,** Singarasubramanian, S.R., **Srivastava, J.,** Jena, P.S., Shivam, A., Bhushan, R. (2023). Coastal vegetation dynamics in response to climatic and relative sea level changes in the Mahanadi River delta, northeast coast of India. *Palynology*, 2134937. DOI.: 10.1080/01916122.2022.2134937(**Impact factor: 1.949**).
6. **Ali, S.N.,** Pandey, P., **Singh, P.,** Mishra, S., **Shekhar, M., Mishra, K.G., Morthekai, P.** (2023). Intimidating Evidences of Climate Change from the Higher Himalaya: A Case Study from Lahaul, Himachal Pradesh, India. *Journal of Indian Society of Remote Sensing*. DOI.: 10.1007/s12524-023-01686-0.
7. Sagwal, S., Sengupta, D., Kumar, A., Dutt, S., Srivastava, P., **Agnihotri, R.,** Gahlaud, S.K.S., Jena, P.S., Shivam, A., Bhushan, R. (2023). Late-Holocene wildfire record from the Stagmo peat section, Leh valley, NW Himalaya. *The Holocene*. DOI.: 10.1177/09596836231157066(**Impact factor: 3.092**).
8. Gaire, N.P., **Shah, S.K.,** Sharma, B., **Mehrotra, N.,** Thapa, U.K., Fan, Z., Aryal, P.C., Bhujju, D.R. (2023). Spatial minimum temperature reconstruction over the last three centuries for eastern Nepal Himalaya based on tree rings of *Larix griffithiana*. *Theoretical and Applied Climatology* 152, 895–910. DOI.: 10.1007/s00704-023-04432-1(**Impact factor: 3.410**).

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

