

# **Birbal Sahni Institute of Palaeosciences**

## **Monthly Summary of Research Activities (July 2024)**

### **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 Activity**

#### **a. Key Scientific Findings of the Month (July 2024)**

The present study provides an assessment of the distribution of key Non-Timber Forest Product species in India, namely *Aegle marmelos* (L.) Correa, *Buchanania lanzan* Spreng., *Madhuca longifolia* (J. Koenig ex L.) J. F. Macbr., *Phyllanthus emblica* L. and *Terminalia bellirica* (Gaertn.) Roxb. The suitable habitat was analyzed under current climate scenarios and subsequently, the future distribution (2050s and 2070s) was mapped under RCP 2.6 and 8.5 scenarios, along with the past distribution (mid-Holocene, ~6000 cal year BP) using the MaxEnt species distribution model. The distribution of all species is primarily driven by key bioclimatic factors, including annual precipitation (Bio\_12), mean annual temperature (Bio\_1), isothermality (Bio\_3) and precipitation of the coldest quarter (Bio\_19). The results indicate that the present distribution of these species is mainly centred in the Western Ghats regions, Central Highlands, North-eastern India and Siwalik hills. The current study suggests that under the future climate change, the suitable habitat for *A. marmelos* and *T. bellirica* is expected to increase while for *B. lanzan*, *M. longifolia* and *P. emblica*, it is projected to decline. *A. marmelos* and *T. bellirica* are anticipated to exhibit resilience to future climate changes and are expected to be minimally affected, while *B. lanzan*, *M.*

*longifolia* and *P. emblica* are highly sensitive to high temperature and alteration in rainfall pattern expected under future climate changes. The projections of habitat suitability areas can be used as a valuable foundation for developing conservation and restoration strategies aimed at alleviating the climate change impacts on NTFP species.(Saraf et al. 2024).

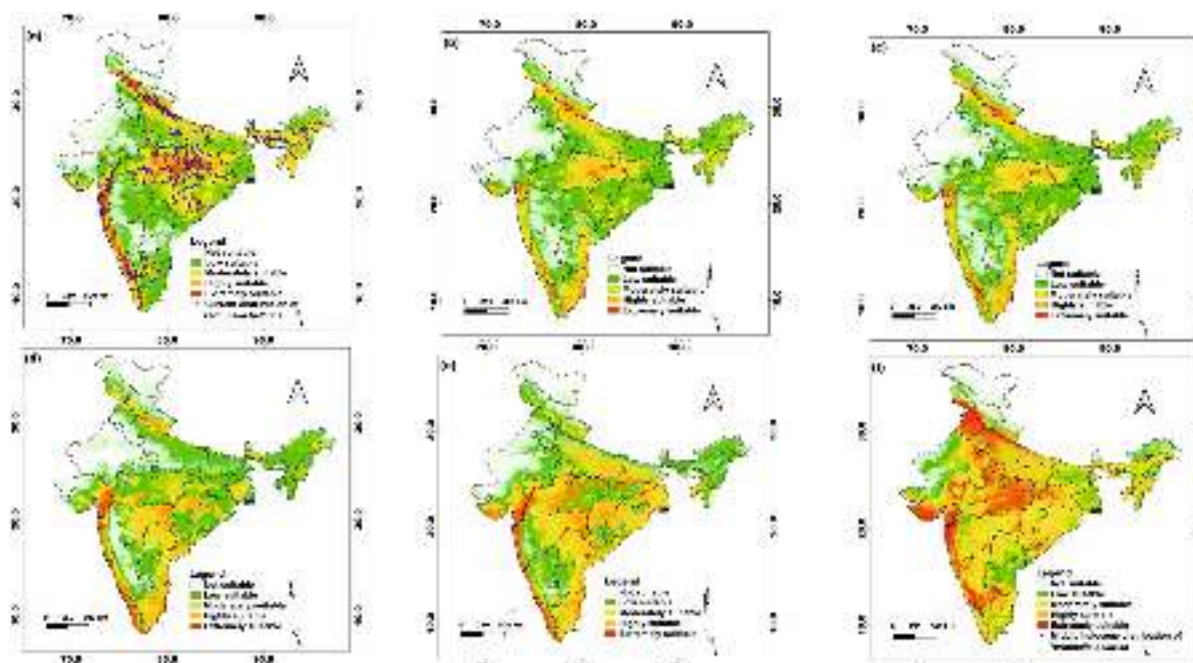


Figure1: The current distribution of *T. bellirica* in India. b Predicted future distribution model of *T. bellirica* under RCP 2.6 (2050),c RCP 2.6 (2070), d RCP 8.5(2050) and e RCP 8.5 (2070) f mid-Holocene distribution of *T. bellirica*.

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

**Prachita Arora**, Research Scholar, BSIP, delivered a lecture on “Decoding Holocene Climate Variability: A new comprehensive Methodological Framework” on 02<sup>nd</sup> July 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.

**Divya Singh**, BSIP, Research Scholar, BSIP, delivered a lecture on “An attempt to understand the genesis of Carbonate concretion in Proterozoic Eon” on 11<sup>th</sup> July 2024 in BSIP auditorium under SIF. The lecture was attended by institute scientists, post-doctoral fellows and research scholars.

**Dr Masud Kaswar**, Research Scholar, BSIP, led a workshop-cum lecture on “End Member Modelling Analysis” using R” from 25<sup>th</sup> – 27<sup>th</sup> July 2024 in BSIP auditorium

under SIF. The lecture was attended by institute scientists, post-doctoral fellows and research scholars.

**c. Organization of PhD Thesis Final Viva-Voce**

<b>S.No.</b>	<b>Name of PhD Students</b>	<b>Supervisor/Co-supervisor</b>	<b>Title of the Thesis</b>	<b>Date</b>
01	Sachin Kumar	Dr. Neraj Rai	Tracing early migration of the Ahom into Northeast India using palaeogenomics and stable isotope approaches	01/07/2024
02	Hidayatullah	Dr. Pawan Govil	Reconstruction of palaeoceanography of western tropical Indian Ocean during late Quaternary	18/07/2024

**d. Man Power Trained (Internship/Dissertation)**

<b>S.No.</b>	<b>Name of Students</b>	<b>Supervisor/Co-supervisor</b>	<b>Broad Area of Training</b>	<b>Duration</b>
01	Shreya Gaur	Dr. Gurumurthy GP	Geochemical Behaviour of Dissolved Molybdenum and Uranium in estuaries, west coast of India	April-July 2024 (3months)
02	Arpita Yaduvanshi	Dr. Gurumurthy GP	Geochemical behaviour of dissolved Rare Earth Elements (REEs) in estuaries, west coast of India	April-July 2024 (3 months)
03	Akriti Dimri	Dr. Veeru Kant Singh	Law Manipulation acid maceration techniques and their implication on Proterozoic microfossils recovery	July 2024 (1 Months)
04	Aman Pundir	Dr. Veeru Kant Singh	Techniques on recovery of Proterozoic microfossil embedded in shales and cherts through	July 2024 (1 Months)

			petrographic thin section.	
05	Garvit Sahai	Dr. Binita Phartiyal	Environmental Magnetism of Sasoma, Ladakh and Pollen Analysis of Dhobia Tal, Bandhavgar, Madhya Pradesh	April 2024 (2 Months)
06	Litty Krishnan G S	Dr Manoj MC	Apportionment of Sediment Sources using End-Member Analysis of Grain Size Records from the Southwestern Indian Ocean since Late Quaternary	May-June 2024 (02 Months)
07	Swathy Mohanan K	Dr Manoj MC	Middle-Late Pleistocene Palaeoceanographic Changes based on the Sedimentary Records from Indian Sector of Southern Ocean	May-June 2024(02 Months)
08	Firdaus Fatima	Dr Manoj MC	Decarbonation Method – A Pretreatment Method for the Determination of Organic Carbon in the Soils and Sediments	May-June 2024(02 Months)
09	Tanya Gupta	Dr Vivesh Vir Kapur	Morphometrics and geochemistry of vertebrate coprolites from the Sonari Lignite Mine, Barmer Basin, Rajasthan State, western India: producer associations and palaeodiet	April-June 2024(03 Months)
10	Tharini S.	Dr Nitesh K Khonde	Late Holocene Palaeoenvironmental Dynamics: A sediment-Based Study of the North-eastern Banni Plains, Kachchh, western India	May-July 2024 (02 Months)

**e. Participation in National/International conferences/workshops/Symposium**

**Dr. Poonam Verma, Scientist-E, BSIP**, presented her research entitled ‘High rainfall provided resilience to palaeotropical rainforests during Early Eocene Climatic Optimum (EECO): palynological evidence from western India’ in the 56th Annual Meeting of AASP-The Palynological Society at Montpellier, France during June, 24-28, 2024 and also participated in the post-conference fieldwork on June 28<sup>th</sup>, 2024.

**f. Dr Harshita Bhatia** has been awarded her **PhD degree** under the supervision of Dr Gaurav Srivastava from Academy of Scientific and Innovative Research on **12 July 2024**. Her title of the thesis is “Advent of monsoonal climate and evolution of evergreen forest in South Asia: evidence from Oligocene flora of northeast India”.

**g. Collaborative Visits/Collaborations**

**Dr Neraj Rai, Scientist-D**, visited New Delhi to attend a meeting called by ministry of Culture, Govt. of India to discuss the progress of Vadnagar Project.

**List of Research Publications (July 2024)**

**Original Articles/Reviews/Book Chapters**

1. Ahlawat, Bhavna, Hemlata Dewangan, Nagarjuna Pasupuleti, Aparna Dwivedi, Richa Rajpal, Saurabh Pandey, Lomous Kumar, Kumarasamy Thangaraj, and Niraj Rai. 2024. Investigating linguistic and genetic shifts in East Indian tribal groups, *Heliyon*, 10(14), e34354. <https://doi.org/10.1016/j.heliyon.2024.e34354> (IF-4.0).
2. GP Gurumurthy\* (2024). Geochemical split among the suspended and mud sediments in a Peninsular River: compositional similarity with the Deccan Basalt derived sediments and its implications in deciphering the sediment provenance in the Indian Ocean. *Geochemistry, Geophysics, Geosystems*, 25 (7), e2024GC011642 (IF: 2.9).
3. AK Faizan, GP Gurumurthy\*, M Tripti, M Alam, A Sharma (2024). The depositional redox conditions of Fe-Speciation reference materials (BHW and WHIT) using redox-sensitive trace metal enrichment. *Geological Journal* (IF: 1.3).
4. Nayanjot Lahiri, Binita Phartiyal\* and Karthick Balasubramanian. 2024. Significance of radiocarbon Accelerator Mass Spectrometry (AMS) chronology of Bandhavgarh National Park and Tiger Reserve from an archeological perspective. *Current Science* 127(1), 98-101 doi: 10.18520/cs/v127/i1/98-101. (IF: 1.1)
5. Saraf, P.N., Srivastava, J., Munoz, F. Bipin Charles & Pujarini Samal. 2024. How can dry tropical forests respond to climate change? Predictions for key Non-Timber Forest Product

species show different trends in India. *Environmental Monitoring and Assessment*, 196,727. <https://doi.org/10.1007/s10661-024-12876-9>. (IF: 2.9).

6. Joshi, H., Aggarwal, N., and Jha, N., 2024. Palynofloral, palaeovegetational and palaeoenvironmental investigations in the Lower Kamthi. *Journal of Palaeosciences*, 73: 45–65, <https://doi.org/10.54991/jop.2024.1872>.
7. Pradhan, S., Mishra, D., Aggarwal, N.\* and Goswami, S., 2024. Assessment of the source rock potential in the Sirka and Giddi collieries of South Karanapura coalfield, Jharkhand, India: Insights from megaflora, palynology, and geochemistry. *Journal of Asian Earth Sciences*-X, 12:100181, <https://doi.org/10.1016/j.jaesx.2024.100181>. (IF: 1.7).

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

