

Curriculum Vitae

Dr. Mayank Shekhar
(Scientist 'B')

Birbal Sahni Institute of Palaeosciences, Lucknow, (U.P) India
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Major research achievements

- **Total Publications: 40 peer-reviewed publications in 21 different journals and chapters in 6 edited books.**
- ***h*-index: 10 (Google Scholar)**
- **i10-index: 10**
- **Total citations: 367**
- **Media coverage: News reports (4), Print media (4)**
- In the last eight years, I have published first and corresponding-authored **five research articles and one book chapter, including one in Nature Scientific Report (IF: 5.51), one in the Journal of Hydrology: Regional Studies (IF: 5.43), one in Earth-Science Reviews (IF: 12.03), two in Quaternary International (IF: 2.45), and one book chapter in Climate Change: Impacts, Responses, and Sustainability in the Indian Himalaya. Publisher: Springer.**
- Trained and worked in reputed Palaeosciences and Dendrochronology laboratories such as Birbal Sahni Institute of Palaeosciences, Lucknow, India (<https://www.bsip.res.in>) and the Swiss Tree-Ring Lab (<https://dendrolab.ch>), Switzerland.
- Journal referee for **Nature Scientific report, Global Change Biology, Earth Science Informatics, Forest Ecology and Management, Remote Sensing of Environment, Acta Geophysica, Journal of Climate Change** etc.

Education

- **Ph.D. (Botany), 2014;** Thesis title: **Application of Multi-proxy tree-ring parameters in the reconstruction of climate vis-à-vis glacial fluctuations from the Eastern Himalaya.** Under the supervision of **Dr. Amalava Bhattacharyya** (Ex Emeritus Scientist BSIP Lucknow; an alumnus of the University of Arizona's **The Laboratory of Tree-Ring Research (USA)**).
- **M.Tech.** Environmental Science (Natural Resource Management), **2008;** Institute of Environment and Development Studies, Bundelkhand University Jhansi, India.
- **M.Sc. Applied Botany, 2006;** Department of Botany, Bundelkhand University Jhansi, India.
- **B.Sc. Botany (Hon's), 2003;** Ram Krishna Dwarika College Lohia Nagar Patna, Magadh University, Bodh-Gaya-Bihar, India.

Employment History

- **28-10-2021, Scientist-B,** Birbal Sahni Institute of Palaeosciences, Lucknow, India
- **2019–2021,** Birbal Sahni Research Associate, Birbal Sahni Institute of Palaeosciences, Lucknow, India
- **2015–2019,** Young Scientist, Birbal Sahni Institute of Palaeosciences, Lucknow, India
- **2013–2015,** Research Associate, Birbal Sahni Institute of Palaeosciences, Lucknow, India
- **2012–2013,** Research Associate, Birbal Sahni Institute of Palaeosciences, Lucknow, India
- **2011–2012,** Senior Research Fellow, Birbal Sahni Institute of Palaeosciences, Lucknow, India
- **2008–2010,** Junior Research Fellow, Birbal Sahni Institute of Palaeosciences, Lucknow, India

Research interests

- My research focuses on Quaternary climate, monsoon dynamics, glacier fluctuations, and vegetation changes in the Himalayan and core monsoon regions, with an emphasis on climate reconstruction. In addition, modelling and visualization of multivariate palaeodata e.g., hydrometeorological, fossil, isotopic, oceanic, geochemical, and other proxy data through ages.

Research grants received

- **2015-2019;** PI. A start-up grant for Young Scientist from the Department of Science and Technology. New Delhi Project entitled "Reconstruction of climate and dating of geo-hazard related to hydro-geomorphic evidences from Sikkim Himalaya based on tree-ring proxy", DST Project no. SR/FTP/ES-127/2014

- **2014-2015**; Co-PI; “Assessment of risk and hazard in Kullu district, Himachal Pradesh” by the Indian Himalayas Climate Adaptation Programme (IHCAP) of the Swiss Agency for Development and Cooperation (SDC) Embassy of Switzerland New Delhi, India.

Training acquired

- **2017**. Statistical analysis using R Software [STARS-2017] at the Indian Institute of Technology, Kanpur, 4–8 December.
- **2015**. Learned various techniques of Dendrogeomorphology at the Laboratory of Dendrogeomorphology (dendrolab.ch) at **the University of Bern, Switzerland**, for three months (July to September).
- **2015**. Climate Modeling and Climate Change Research, Innovation and Services April 8–10, GLACINDIA: **Jawaharlal Nehru University, New Delhi**.
- **2013**. The Indo-Swiss Capacity Building Programme on Himalayan Glaciology. (IHCAP) jointly by the Swiss Agency for Development and Cooperation (SDC) and the Climate Change Programme of the Department of Science & Technology, Government of India and organized by the School of Environmental Sciences, **Jawaharlal Nehru University, New Delhi** (April 1 to April 27).
- **2012**. Adaptation to Changing Water Resources Availability in Northern India with Himalayan Glacier Retreat and Changing Monsoon pattern” held at **Department of Civil Engineering, Indian Institute of Technology** Delhi, India “HighNoon Spring School” programme under EU funded project (2nd-6th April).
- **2010**. A short-term course on statistical modeling for data analysis” (December 20-26) held at the **Indian Institute of Technology, Kharagpur W.B.**
- **2009**. Snow Characterization” Workshop held at **the Defence Research & Development Organization (DRDO)**, SASE Manali from 13th to 15th April.
- **2009**. Acquired higher training in Concept in Quaternary Climate Studies with Emphasis on Dendrochronology and Palynology, held at **Birbal Sahni Institute of Palaeosciences Lucknow** from May 12-18, Organised by Prof. Peter Brown, Rocky Mountain Tree-Ring Research, 2901 Moore Lane, Fort Collins, CO 80526, USA and Dr. Amalava Bhattacharyya (Ex Emeritus Scientist BSIP).

Experience

- **Operating system**: MS-DOS, Windows XP. Windows 7, 8, 10, and Mac.
- **Data analysis**: high-level analytical skills, proficiency in R, Origin Pro 2019, Canoco-5, and experience working with large datasets such as dendrochronological, climatological, hydrometeorological, fossil, isotopic, oceanic, geochemical, and other proxy data
- **Field expeditions**: Conducted and assisted in more than 12 field expeditions in and adjoining areas of the Western, Eastern, Kashmir Himalaya, Uttar Pradesh, and also in the Swiss Alps, which involved the extraction of tree-ring cores, soil, and other biological samples for palaeoclimate and palaeoglaciology studies.
- **Laboratory experience**: 15 years of experience in handling dendrochronological samples, preparation, ring-width measurements using the Velmex-TA and Rinntech Lintab-6 system, and stable isotope analyses.
- **Scientific writing**: Scientific papers and book chapters for peer-reviewed journals and books.
- **Languages**: English, Hindi.
- **Student supervision**: Supervised M.Sc. dissertation of Miss Bhawana Yadav (Babasaheb Bhimrao Ambedkar University, Lucknow) entitled “**Palaeoclimate reconstruction using dendrochronology**,” Summer, 2022.

Selected recognitions

- **2022**. Participated in the IQC-2022, and presented a paper entitled “**Tree-ring width data from four agricultural drought-prone districts of Central India.**”
- **2019**. Participated in the 6th Asian Dendrochronology Conference (ADA 2109) during November 24–30, at the Birbal Sahni Institute of Palaeosciences, contributed to 7 papers, and presented a paper entitled “**Reconstructions of hydrometeorological and glacial fluctuations from the Himalaya based on Dendrochronology.**”
- **2018**. Participated in the international conference on “The State of the Cryosphere in the Himalaya:

with a focus on Sikkim and the Eastern Himalayas, Gaps, Challenges, and Opportunities,” 19-20 February Sikkim, India and presented a paper entitled “**Tree-ring based reconstruction of natural hazards from Lachung valley, Sikkim.**”

- **2018.** Awarded “**Dr. B. S. Venkatachala Memorial Medal**” (2-January) **for outstanding research work during 2017-2018 by Birbal Sahni Institute of Palaeosciences, Lucknow, India.**
- **2014.** Awarded Start-up grant for Young Scientist” from SERB-DST for the project entitled ‘*Reconstruction of climate and dating of geo-hazard related to hydro-geomorphic evidences from Sikkim Himalaya based on tree-ring proxy*’. [No. SR/FTP/ES-127/2014]
- **2014.** Participated and presented a paper entitled “*Application of tree ring data in analyzing glacier movement from the Himalayan region*” held at Shimla, Himachal Pradesh, India from October 30-31, organized by Science & Engineering Research Board, DST, Government of India & H.P. State Centre on Climate Change.
- **2006-2008.** University topper in M. Tech. Environmental Science (NRM).
- **2004-2006.** University topper in M.Sc. Applied Botany.

Publications [Research papers/Review/ Book Chapters and Reports]

(Full list at: <https://scholar.google.co.in/citations?user=zys60LgAAAAJ&hl=en>)

1. Singh N., **Shekhar, M.**, Parida, B.R., Gupta A.K., Sain, K., Rai S.K., Bräuning, A., Singh Charkaborty, J., Sharma, V., Kamal Tiwari, R., Chauhan, P., and Montagnani, L. (2022). Tree-Ring Isotopic Records Suggest Seasonal Importance of Moisture Dynamics Over Glacial Valleys of the Central Himalaya. *Frontiers in Earth Science*. 10:868357. <https://doi.org/10.3389/feart.2022.868357>
2. **Shekhar, M.**, Sharma, A., Dimri, A., Tandon, S.K. (2022). Asian summer monsoon variability, global teleconnections, and dynamics during the last 1,000 years. *Earth-Science Reviews*. 230, 104041. <https://doi.org/10.1016/j.earscirev.2022.104041>
3. **Shekhar M.**, Ranhotra P.S., Bhattacharyya A., Singh A., Dhyani R., Singh S. (2022) Tree-Ring-Based Hydrological Records Reconstructions of the Himalayan Rivers: Challenges and Opportunities. In: Rani S., Kumar R. (eds) *Climate Change. Springer Climate. Springer, Cham*. https://doi.org/10.1007/978-3-030-92782-0_3
4. Ranhotra P.S., **Shekhar M.**, Roy I., Bhattacharyya A. (2022) Holocene Climate and Glacial Extents in the Gangotri Valley, Garhwal Himalaya, India: A Review. In: Rani S., Kumar R. (eds) Climate Change. *Springer Climate. Springer, Cham*. https://doi.org/10.1007/978-3-030-92782-0_6
5. Azharuddin, S., Govil, P., Chalk, T. B., **Shekhar, M.**, Foster, G. L., & Mishra, R. (2022). Abrupt upwelling and CO₂ outgassing episodes in the north-eastern Arabian Sea since mid-Holocene. *Scientific reports*, 12(1), 1-12. <https://doi.org/10.1038/s41598-022-07774-4>
6. Dhyani, R., Joshi, R., Ranhotra, P. S., **Shekhar, M.**, & Bhattacharyya, A. (2022). Age dependent growth response of *Cedrus deodara* to climate change in temperate zone of Western Himalaya. *Trees, Forests and People*, 8, 100221.
7. Singh R., Kumar R., Latief S.U., Kumar R., **Shekhar M.** (2022) Recession of Gaglu Glacier, Chandra Basin, Western Indian Himalaya. In: Rani S., Kumar R. (eds) *Climate Change. Springer Climate. Springer, Cham*. https://doi.org/10.1007/978-3-030-92782-0_5
8. Roy, I., Tomar, N., Singh, A., **Shekhar, M.**, Ranhotra, P. S., Bhattacharyya, A., & Sharma, Y. K. (2022). Hydroclimatic and Glacial Variabilities in the Himalayan and Tibetan Regions since Last Glacial Maxima: A Synthesis. In *Climate Change* (pp. 73-102). https://doi.org/10.1007/978-3-030-92782-0_4
9. Dhyani, R., Bhattacharyya, A., Rawal, R. S., Joshi, R., **Shekhar, M.**, & Ranhotra, P. S. (2022). Is tree ring chronology of Blue pine (*Pinus wallichiana* AB Jackson) prospective for summer drought reconstruction in the Western Himalaya?. *Journal of Asian Earth Sciences*, 105142. <https://doi.org/10.1016/j.jseaes.2022.105142>
10. Roy, I., Ranhotra, P.S., Tomar, N., **Shekhar, M.**, Agrawal, S., Bhattacharyya, A., Kumar, P., Patil, S.K. and Sharma, R., (2022). Reconstruction of the Late Holocene climate variability from the Summer Monsoon dominant Bhagirathi valley, western Himalaya. *Journal of Asian Earth Sciences*, 105080. <https://doi.org/10.1016/j.jseaes.2022.105080>
11. Dhyani, R., **Shekhar, M.**, Joshi, R., Bhattacharyya, A., Ranhotra, P.S., Pal, A.K., Thakur, S. and

- Nandi, S.K. (2022). Reconstruction of pre-monsoon relative humidity since 1800 CE based on tree-ring data of *Pinus roxburghii* Sarg.(chir–pine) from Pithoragarh, Western Himalaya. *Quaternary International*, 629, 4-15. <https://doi.org/10.1016/j.quaint.2021.04.026>
12. Singh, N., **Shekhar, M.**, Singh, J., Gupta, A. K., Bräuning, A., Mayr, C., & Singhal, M. (2021). Central Himalayan tree-ring isotopes reveal increasing regional heterogeneity and enhancement in ice mass loss since the 1960s. *The Cryosphere*, 15(1), 95-112. <https://doi.org/10.5194/tc-15-95-2021>
 13. Singh, S.P., Bhattacharyya, A., Mittal, A., Pandey, A., Tewari, A., Latwal, A., David, B., Adhikari, B.S., Kumar, D., Negi, G.C.S., Ahmad Mir, I.A., Tamta, K.K., Sambhav, K., **Shekhar, M.**, Phulara, M., Manzoor, M., Singh, N., Tewari, P., Ranhotra, P.S., Singh, P., Dhaila, P., Sah, P., Kumar, R., Joshi, R., Rawal, R.S., Renu Rawal, R., Singh, D.P., Shah, S., Sharma, S., Nanda, S.A., Gumber, S., Singh, S., and Reshi, Z., (2021). Indian Himalayan timberline ecotone in response to climate change--initial findings. *Current Science* (00113891), 120(5):859-871.
 14. Srivastava, G., Farnsworth, A., Bhatia, H., Mehrotra, R.C., **Shekhar, M.**, Su, T., Utescher, T. and Valdes, P.J. (2021). Climate and vegetation change during the Upper Siwalik—a study based on the palaeobotanical record of the eastern Himalaya. *Palaeobiodiversity and Palaeoenvironments*, 101(1), 103-121. <https://doi.org/10.1007/s12549-020-00457-w>.
 15. Chinthala, B.D., Tomar, N., **Shekhar, M.**, Singh, A., Ranhotra, P.S., Phulara, M., Singh, C.P. and Bhattacharyya, A., (2021). Tree-Ring Based Age-Girth Stand Structure of Himalayan Fir Along the Treeline Transects in Western Himalaya: An Ecological Perspective. Available at SSRN: <https://ssrn.com/abstract=3982923> or <http://dx.doi.org/10.2139/ssrn.3982923>
 16. Ansari, A. H., Pandey, S. K., Kumar, K., Agrawal, S., Ahmad, S., & **Shekhar, M.** (2020). Palaeoredox link with the late Neoproterozoic–early Cambrian Bilara carbonate deposition, Marwar Supergroup, India. *Carbonates and Evaporites*, 35(2), 1-13. <https://doi.org/10.1007/s13146-020-00574-9>
 17. Ali, S.N., Quamar, M.F., Dubey, J., Morthekai, P., Bisht, P., Pandey, P., **Shekhar, M.** and Ghosh, R. (2020). Surface pollen distribution in alpine zone of the higher Himalaya: a case study from the Kalla glacier valley, India. *Botany Letters*, 167(3), 340-352. <https://doi.org/10.1080/23818107.2020.1753567>
 18. Ali, S.N., Agrawal, S., Quamar, M.F., Dubey, J., Chauhan, N., Bisht, P., Pandey, P., Arif, M., **Shekhar, M.** and Morthekai, P. (2020). Climate variability in the Central Indian Himalayas during the last ~15 kyr: Evidence of ISM variability from multiproxy studies *Journal of the Palaeontological Society of India*. 65(1): 36-54.
 19. Azharuddin, S., Govil, P., Singh, A. D., Mishra, R., & **Shekhar, M.** (2019). Solar insolation driven periodicities in southwest monsoon and its impact on NE Arabian Sea paleoceanography. *Geoscience Frontiers*, 10(6), 2251-2263. <https://doi.org/10.1016/j.gsf.2019.03.007>
 20. **Shekhar, M.**, Pal, A. K., Bhattacharyya, A., Ranhotra, P. S., & Roy, I. (2018). Tree-ring based reconstruction of winter drought since 1767 CE from Uttarkashi, Western Himalaya. *Quaternary International*, 479, 58-69. <https://doi.org/10.1016/j.quaint.2017.08.029>
 21. Singh, R., **Shekhar, M.**, Pandey, V. K., Kumar, R., & Sharma, R.K. (2018). Causes and geomorphological effects of large debris flows in the lower valley areas of the Meru and Gangotri glaciers, Bhagirathi basin, Garhwal Himalaya (India). *Remote Sensing Letters*, 9(8), 809-818. <https://doi.org/10.1080/2150704X.2018.1484956>.
 22. Singh, U., Phulara, M., David, B., Ranhotra, P.S., **Shekhar, M.**, Bhattacharyya, A., Dhyani, R., Joshi, R., & Pal, A.K., (2018). Static tree line of Himalayan silver fir since last several decades at Tungnath, western Himalaya. *Tropical Ecology*, 59(2):351–363.
 23. Roy, I., Ranhotra, P., **Shekhar, M.**, Bhattacharyya, A., Pal, A., Sharma, Y., Singh, S. and Singh, U., (2018). Over-representation of some taxa in surface pollen analysis misleads the interpretation of fossil pollen spectra in terms of extant vegetation. *Tropical Ecology*, 59, 339-350.
 24. Ali, S.N., Dubey, J., Ghosh, R., Quamar, M.F., Sharma, A., Morthekai, P., Dimri, A.P., **Shekhar, M.**, Arif, M. and Agrawal, S. (2018). High frequency abrupt shifts in the Indian summer monsoon since Younger Dryas in the Himalaya. *Scientific reports*, 8(1), 1-8. <https://doi.org/10.1038/s41598-018-27597-6>
 25. **Shekhar, M.**, Bhardwaj, A., Singh, S., Ranhotra, P.S., Bhattacharyya, A., Pal, A.K., Roy, I., Martín-Torres, F.J. and Zorzano, M.P. (2017). Himalayan glaciers experienced significant mass loss during

- later phases of little ice age. *Scientific reports*, 7(1), 1-14. <https://doi.org/10.1038/s41598-017-09212-2>
26. Cánovas, J. B., Trappmann, D., **Shekhar, M.**, Bhattacharyya, A., & Stoffel, M. (2017). Regional flood-frequency reconstruction for Kullu district, Western Indian Himalayas. *Journal of hydrology*, 546, 140-149. <https://doi.org/10.1016/j.jhydrol.2016.12.059>
 27. Bhattacharyya, A., Stoffel, M., **Shekhar, M.**, Cánovas, J. A. B., & Trappmann, D. (2017). Dendrogeomorphic potential of the Himalaya—case studies of process dating of natural hazards in Kullu valley, Himachal Pradesh. *Current Science*, 2317-2324.
 28. Roy, I., **Shekhar, M.**, (2017). Himalayan Cryosphere. *Current Science*, 112 (11), 2185-2186.
 29. Bhattacharyya, A., and **Shekhar, M.**, (2017). Scenario of tree ring study of the Himalayas - present status and future outlook. In A.P Das & Suber Bera (eds) Plant Diversity in the Himalaya Hotspot Region, Vol II. Bishen Singh Mahendra Pal Singh, Dehra Dun (India). Pp 619-632.
 30. Singh, S., Kumar, R., Bhardwaj, A., Sam, L., **Shekhar, M.**, Singh, A., Kumar, R. and Gupta, A., (2016). Changing climate and glacio-hydrology in Indian Himalayan Region: a review. *Wiley Interdisciplinary Reviews: Climate Change*, 7(3), 393-410. <https://doi.org/10.1002/wcc.393>.
 31. Cánovas, J.B., Trappmann, D., Stoffel, M. **Shekhar, M.**, Bhattacharyya A. (2016). Reconstructing extreme monsoon floods in Indian Himalayan headwater streams (Kullu district, Himachal Pradesh).Page No.24-25 at INTERPRAEVENT, Luzern, Switzerland.
 32. Allen, S.K., Arora, M., Awasthi, K., Ballesteros-Cánovas, J.A., Barman,T., Bernet, L., Bhattacharyya, A., Bühler, Y., Dhyani, P.P., Fiddes, J., Frey, H., Gosavi, V.E., Gupta, H.K., Huggel, C., Jyoti., Khan, M.A., Kumar, K.S., Kumar, S ., Kuniyal, J.C., Lal, A.K., Linsbauer, A.D., Lorenzi., L.S., Myint, M., Rana, P., Rana, R.S., Randhawa, S.S., Rohrer, M., Ruiz-Villanueva, V., B. Saklani, B., Salzmann, N., Samant, S.S., Schauwecker, S., Sharma, A., **Shekhar, M.**, Snehmani, K.S., Stoffel, M., Stoll, U., Trappmann, D., (2016). Climate vulnerability, hazards and risk: An integrated pilot study in the Indian Himalayas. Synthesis Report, *Produced by the Indo-Swiss research consortium*. 1–40. <http://www.indiaenvironmentportal.org.in>
 33. **Shekhar, M.**, & Bhattacharyya, A. (2015). Reconstruction of January–April discharge of Zemu Chuu–A first stage of Teesta River North Sikkim Eastern Himalaya based on tree-ring data of fir. *Journal of Hydrology: Regional Studies*, 4, 776-786. <https://doi.org/10.1016/j.ejrh.2015.06.019>
 34. Dey, S.B., Ghosh, R., **Shekhar, M.**, Mukherjee, B. and Bera, S. (2015). What drives elevational pattern of phytolith diversity in *Thysanolaena maxima* (Roxb.) O. Ktze? A study from the Darjeeling Himalayas. *Flora-Morphology, Distribution, Functional Ecology of Plants*, 211, 51-61. <https://doi.org/10.1016/j.flora.2015.01.004>
 35. Raushan R. and **Shekhar, M.**, (2015). Climate variability, demographic changes and development in Trans Himalaya (Ladak), India: An overview. *Population & Environment Bulletin* 12(2), 4-13.
 36. Ali, S.N., **Shekhar, M.**, Pandey, P., Bhardwaj, A. and Singh, S., (2014). Indian Himalayan capacity and adaptation programme: capacity-building in Himalayan glaciology. *Current Science*, 106(3), 346.
 37. **Shekhar, M.**, and Singh, S., (2014). Climate science. *Current Science*, 106, 7(3).
 38. Shah, S. K., **Shekhar, M.**, & Bhattacharyya, A. (2014). Anomalous distribution of *Cedrus deodara* and *Pinus roxburghii* in Parbati valley, Kullu, Western Himalaya: An assessment in dendroecological perspective. *Quaternary International*, 325, 205-212. <https://doi.org/10.1016/j.quaint.2013.09.024>.
 39. Shah, S.K., Bhattacharyya, A. and **Shekhar, M.**, (2013). Reconstructing discharge of Beas river basin, Kullu valley, western Himalaya, based on tree-ring data. *Quaternary international*, 286, 138-147. <https://doi.org/10.1016/j.quaint.2012.09.029>.
 40. Bhattacharyya A, **Shekhar M**, Shah, S.K., (2012). Role of tree-ring study in forest management: prospects in Indian context. In: Panda S, Ghosh C (eds) Diversity and conservation of plants and traditional knowledge. Bishen Singh Mahendra Pal Singh, Dehradun, pp 287–298.