

Vartika Singh



Research Career

2023-Present Scientist E

2018-2022- Scientist D

2014- 2017-Scientist C

2008- 2013: Scientist B

2008: Birbal Sahni Research Associate

2007-2008: Senior Research Fellow

2005-2007: Junior Research Fellow

Qualifications

Ph.D. Geology, University of Lucknow

M.Sc. Geology, University of Lucknow

B.Sc. Geology & Botany, Lucknow University

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Research Vision

My research utilizes diverse microfossils such as dinoflagellates, thecamoebians, diatoms, dispersed organic matter, palynofacies, phytoliths to reconstruct past environments and unravel ecological responses to climate variability. Through extensive fieldwork in the Polar Regions (Arctic and Antarctic) and the Himalaya, I investigate fragile ecosystems undergoing rapid transformation, linking paleoenvironmental archives with present-day climate challenges. The research work not only advances fundamental understanding of Earth's history but also informs societal resilience, offering insights into water resource management and sustainability.

Recognized internationally through fellowships, memberships, and invited contributions, my vision is to integrate micropalaeontology with global climate science, bridging past and present to guide strategies for a more sustainable future.

Research

My research focuses on the application of diverse microfossils:

My research explores the use of microfossils including dinoflagellates, thecamoebians, diatoms, phytoliths, dispersed organic matter, and palynofacies analysis as robust proxies for palaeoenvironmental reconstruction. These assemblages provide critical insights into ecological dynamics and are instrumental in addressing complex palaeoecological questions.

The research applies microfossils and organic matter as **robust proxies for palaeoenvironmental reconstruction**, providing critical insights into ecological dynamics and complex palaeoecological questions. I have conducted fieldwork in **extreme environments of the Arctic, Antarctic, and Himalaya**, combining micropalaeontological techniques with sedimentological and ecological studies to reconstruct past climates and identify indicators of resilience and vulnerability in Himalaya and polar systems.

Beyond academic contributions, this research has societal impact: it informs water resource management, hazard preparedness, and sustainable development strategies for communities facing the consequences of glacial retreat and climate variability. By connecting palaeoenvironmental archives with contemporary challenges, my work advances both scientific knowledge and practical solutions for climate-affected societies.

Specific research interests and activities

Polar Expeditions & Sediment Studies

- Conducted fieldwork in the High Arctic (Ny-Ålesund, Svalbard) as part of the Indian Scientific Expedition to the Arctic.
- Investigated vegetation and Quaternary sediments of Ny-Ålesund during the Indian Arctic Summer Expedition.
- Collected and analyzed Quaternary sediments during the 28th Indian Scientific Expedition to Antarctica.
- Studied siliceous sediments from the Southern Indian Ocean and the Southern Ocean surrounding Antarctica.

Microfossil Discoveries & Extinction Studies

- Pioneered a novel study of *Thecamoebians* and dispersed organic matter from the Permian–Triassic Guryul Ravine Section, Kashmir.

- First global report of *Thecamoebians* from any PTB section, offering new insights into biotic responses during Earth's largest mass extinction event.

Oceanographic & Climate Reconstructions

- Documented lateral transport of Antarctic diatoms into the SW Indian Ocean, advancing understanding of ocean circulation pathways.
- Applied dinoflagellate cyst analysis to reconstruct the North Atlantic Warm Current during the Late Pleistocene of Svalbard.
- Extended studies on Quaternary to modern dinoflagellates across India and Polar regions.

Vegetation & Civilization Studies

- Utilized phytoliths to reconstruct palaeovegetation patterns, monsoon variability, and their role in shaping human civilization.

Deputation and Training undertaken

- Rifle training course in Ny-Alesund, Svalbard, Norway, 2016.
- Deputation for the Indian Scientific Expedition to the Arctic, July-August, 2016.
- Workshop on Phylogenetic Biology by Prof. R Geeta, Botany Department, Delhi University, Delhi, (March 2-4, 2015).
- Workshop on Acritarchs, 7-10 January 2014 in the BSIP by Dr. Shuhai Xiao, Professor of Geology, Department of Geo-sciences, Virginia Tech, USA.
- Course work on the Paleosols conducted by Prof. Gregory J. Retallack, University of Oregon, USA, 4 -11, November 2013.
- Training Programme and field work on Late Cenozoic Dinoflagellate Cysts, by Prof. Martin J. Head, Brock University, Canada, BSIP, 2012.
- Rifle training course by the Norwegian Kings Bay company at Ny-Alesund, Svalbard, Norway to carry out field work and sample collection outside the protected zone, for protection against polar bears, 2012.
- Deputation for the Indian Arctic Expedition Summer phase, July-August, 2012.
- Deputation to attend the 99th Session of the Indian Science Congress and the special session on Women in Science, January, 2012.
- Deputation to attend the GEO India 2011 conference, Greater Noida.
- Training programme on sedimentology and Sequence Stratigraphy, BSIP, 2009.

- Deputation to attend the GEO India 2008 conference, Greater Noida.
- Deputed for the 28th Indian Scientific Expedition to Antarctica for a period of three months from December, 2008 – March, 2009. Visited Larsemann hills and Schirmacher Oasis regions of East Antarctica and collected water and sediment samples from fresh water, coastal and marine environments.
- Pre-Antarctic Expedition training at the Mountaineering and Skiing Institute, Indo-Tibetan Border Police Force (ITBP), Auli, Utatrakhand, India, 2008.

Awards & Recognition

International

- **Invited for the POLAR DIALOGUE ROUNDTABLE** (By Invitation Roundtable Meeting)
The Roundtable is part of the Arctic Circle Polar Dialogue, **chaired by H.E. Katrín Jakobsdóttir, Prime Minister of Iceland, October, 2025**
- The prestigious **Visiting Scientist Fellowship of the Polish Academy of Sciences**, Poland in the year **2021**.
- The prestigious **Visiting Scientist Fellowship of the Polish Academy of Sciences**, Poland in the year **2019**.
- Professional member of the The Geological Society of America (GSA) Boulder, Colorado, USA
- Member of the Association of Polar Early Career Scientists (APECS) Tromso, Norway- An International and Interdisciplinary organization with interests in Polar Regions and the wider cryosphere
- Selected as a **Scientific Reviewer for the International Climate Literacy and Energy Awareness Network, (CLEAN)** Funded by the **National Science Foundation (NSF) and National Oceanic & Atmospheric Administration (NOAA), USA**.
- **Invited** to deliver a talk on, Biological Response of Late Quaternary Glaciation and Sea Level Conditions from Svalbard, Norway: Evidence from Raised Beach Sediments, at the Nova Scotia 2010- **Joint Meeting of AASP-CPC-CAP, Nova Scotia, Canada**.
- 2005, **Best Abstract award** by the International **PAGES-Past Global Changes** (core project of IGBP, funded by the U.S. and Swiss National Science Foundations and NOAA) Committee, Bern Switzerland.
- **Invited** to deliver talk at the **PAGES Second Open Science Meeting, Beijing, China, 2005**.

National

- Selected as team member of the **Indian Scientific Expedition to the Arctic in 2016 and 2012**.
- Selected as a team member for the **28th Indian Scientific Expedition to Antarctica in 2008**.
- **Birbal Sahni Research Associate, 2008** under the Institute's new thrust area of Polar Research.
- 2007, **Best Poster Prize** in the **XXI Indian Colloquium on Micropalaeontology and Stratigraphy**, BSIP, Lucknow, India.

Invited Lectures

2010, Antarctica: A Voyage for Science

Department of Botany,
Bappa Shri Narayan Vocational Post Graduate College

2010, Antarctica: Geological Perspective

Department of Geology,
Bappa Shri Narayan Vocational Post Graduate College

2009, Incredible Antarctica

Pioneer Montessori Degree College, Lucknow

Publications:

Singh V, Barinova S, Saini A, Patel K., 2026 Microfossil Archives from Lacustrine Microhabitats of the Garhwal Himalaya: Tracing Environmental Conditions and Anthropogenic Impacts. (under preparation)

Morthekai, P., Agrawal, S., Rajesh, V. Quamar, F. M. Singh, V. Ali, S. N. Singh, P., Shekhar, M. Kumar, K., Ali, S. Farooqui, A. Sharma, A. Reddy, D. V. Kapur, V.V. Thakur, B. and Singhvi, A. K. 2026 Irrigation tank sediment as social-ecological archive? : A case study from an ENSO controlling south-eastern peninsular India since Medieval Period (under preparation)

Singh V, Barinova S, 2025 Bridging Modern and Late Quaternary Microfossil Assemblages: A Novel Approach to Palaeoenvironmental Reconstruction in the High Arctic (being revised)

Singh V, Barinova S, 2024 Multiproxy reconstruction of late Pleistocene glacial runoff using ciliate cysts and dispersed organic matter, Svalbard (Polar Research)

Singh V, Barinova S, 2023 The last Interglacial period in Svalbard and the response of benthic foraminifera (Marine Micropaleontology)

Singh V, Barinova S, 2023 Palaeoecological insights from terrestrial microbiota under hydrological variability, Ny-Ålesund, Svalbard

Singh V, Barinova S, 2022 Palynological analysis of surface sediments in a High Arctic pond revealing desmids as indicators of wetlands and climate change. The wetlands diversity, Transylv. Rev. Syst. Ecol. Res. 24.1, 1-16

Singh V, Barinova S, 2022 Status and scope of Pleistocene palaeoenvironmental studies of Svalbard coastal sediments. Biodiversity Int J. 6,1, 1–5. DOI: 10.15406/bij.2022.06.0020

Singh V., Head M. J., Radmacher W. 2022. Last Interglacial paleoceanography at ODP Site 986 on the Svalbard margin, Fram Strait, based on dinoflagellate cysts. 14 International Conference on Paleoceanography, Bergen Pv-204 (Pp. 295) Abstract

Radmacher W., **Singh V.**, Head M 2022 Paleoceanography of the subpolar North Atlantic ODP Site 984 for the Last Interglacial (Late Pleistocene): preliminary results based on dinoflagellate cysts. 14 International Conference on Paleoceanography, Bergen P2-083 (Pp.249) Abstract 3.

Singh, V., Barinova, S., 2021 Cladocera from the sediment of high Arctic Lake in Svalbard (Norway). Transylv. Rev. Syst. Ecol. Res. "The Wetlands Diversity"23 (2), 13-20.

Singh, V., 2020 The study of the palynological remains of desmids from the High Arctic Region of Svalbard, Norway (Accepted for the 36th International Geological Congress)

Radmacher, W., Head M. J., **Singh, V.**, 2020 Paleooceanography of the subpolar North Atlantic ODP Site 984 for the Last Interglacial (Late Pleistocene): preliminary results based on dinoflagellate cysts. (Accepted for the 36th International Geological Congress)

Radmacher W., Head M, J., **Singh V.**, 2020. Paleooceanographic implications during the Last Interglacial at high northern latitudes. Climate changes in the geological past Warsaw Climate changes in the geological past Warsaw, Poland, 9-11 December 2020. (Published)

Singh N., **Singh V.**, Krishnaiah. 2018 The study of atmospherically deposited Spheroidal Carbonaceous Particles (SCP) from the Kongsfjorden, Svalbard. Czech Polar Reports. 7 (2): 206-215.

Kumar, K., Tewari, R., Agnihotri D., Sharma, A., Pandita, SK., Pillai, SSK., **Singh, V.**, Bhat, GD., 2017, Geochemistry of the Permian-Triassic sequences of the Guryul Ravine section, Jammu, and Kashmir, India: Implications for oceanic redox conditions, **GeoResJ** 13, 114–125.

Singh V., Pandita S K., Tewari R., van Hengstum P J., Pillai SSK., Agnihotri D., Kumar K., Bhat GD. 2015, Thecamoebians (Testate Amoebae) Straddling the Permian-Triassic Boundary in the Guryul Ravine Section, India: Evolutionary and Palaeoecological Implications. **PLOS ONE** 10(8): e0135593.doi:10.1371/journal.pone.0135593.

Tewari R, Ram-Awatar, Pandita SK, McLoughlin S, Agnihotri D, Pillai SSK, **Singh V**, Kumar K, Bhat GD. 2015, The Permian-Triassic palynological transition in the Guryul Ravine section, Kashmir, India: implications for Tethyan-Gondwanan correlations. **Earth-Science Reviews** 149, 53–66.

Singh V, Singh N. 2015, Study of Entrained Antarctic Diatoms from the Southwest Indian Ocean. **Botanica Pacifica** 4(2). doi: 10.17581/bp.2015.04204.

Singh N., Singh V. 2013, Challenging the fate of Persistent Organic Pollutants. Indian streams research journal 3(5), 1-14.

Reconstruction of North Atlantic warm current using Dinoflagellate cysts: a case study from Ny-Alesund, Svalbard, Norway, 'International Symposium on Cryosphere and Climate Change (C3), Ministry of Defence, Defence R & D Organisation, Snow & Avalanche Study Estt. Manali, Himanchal Pradesh, **2012**.

Siliceous and other dispersed organic matter below CCD in the South Western Indian Ocean: Implications for Oceanography and Global Carbon Cycle, IPY, International Polar Year Conference, Montreal, Canada 22-27, **2012**

Singh, V., Farooqui, **A.**, Mehrotra, N. C., Ravindra, R., Singh, D.S., Tewari, R., Jha N.

2011, Late Pleistocene and Early Holocene Climate of Ny-Alesund, Svalbard (Norway): A Study based on Biological Proxies, **Journal of Geological Society of India**. 78, 109-116.

Biological Response of Late Quaternary Glaciation and Sea Level Conditions from Svalbard, Norway: Evidence from Raised Beach Sediments, Nova Scotia 2010- Joint Meeting of American Association of Stratigraphic Palynologists (AASP)-CPC-CAP (The Palynological Society-GAC Palaeontology Division-Canadian Association of Palynologists) Canada, **2010**.

Late-Quaternary climate of Ny-Alesund Svalbard, A study based on biological proxies, Conference on Climatic Changes during the Quaternary: Special reference to Polar Regions and Southern Ocean at National Centre for Antarctic and Ocean Research Goa, India, **2009**.

Arctic Studies: A Reconnaissance for organic matter and phytoplankton dynamics, Conference on Plant Life Through The Ages, Birbal Sahni Institute of Palaeobotany, Lucknow and The Palaeobotanical Society, **2008**.

Paleo-monsoonal reconstruction using phytoplankton dynamics: A case history from Harshad Estuary, Saurashtra coast, Gujarat, India, DINO-8 Conference Montreal, Canada, **2008**.

Prasad, V., Garg, R., **Singh, V.**, Thakur, B. **2007**, Organic matter distribution pattern in Arabian Sea: Palynofacies analysis from the surface sediments off Karawar coast (west coast of India), **Indian Journal of Marine Sciences**, 36(4), 399 – 406.

Singh, V., Prasad, V and Chakraborty, S. **2007**, Phytoliths as indicators of monsoonal variability during mid-late Holocene in mainland Gujarat, western India, **Current Science**, 92(12), 1754-1759.

Phytoplankton dynamics of the Harshad estuary, Gujarat, XXI Indian Colloquium on Micropalaeontology and Stratigraphy, BSIP, Lucknow, India, **2007**.

Palynofacies study a tool for Paleomonsoonal variability: A case study from Harshad estuary Saurashtra, Dimond Jubilee International Conference, BSIP, Lucknow, India, **2006**.

Phytoliths indicators of monsoonal variability during Late mid Holocene in Mainland Gujarat, Western India, PAGES Second Open Science meeting, Beijing, China, **2005**.

Report: *Arctic studies: An integrated approach for Quaternary Palaeoclimate*

Reconstruction. 2008 (Based on the samples collected during the First Indian Scientific Expedition to the Arctic Region),

