Dr. Biswajit Roy

Scientist C
Past Climate and Ocean Studies Division
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I am a biogeochemist studying the modern to geological record of carbon cycle through the lens of molecular biological, sedimentological and organic geochemical techniques.

Research interests

- Biogeochemical cycles, Carbon storage in marine and terrestrial realms.
- Changing carbon cycles in warming Earth conditions and anthropogenic influences.
- Organic geochemistry, Stable isotope geochemistry, Non-isotopic biomarkers.
- Pedology, Fluvial sedimentology, Sedimentary basin analysis, Petrography.
- Paleo climate and environment reconstructions, Climate-Human dispersals.

Education

2016 – 2020 **PhD in Earth Sciences**
Indian Institute of Science Education and Research Kolkata
Title: *Late Miocene-Pleistocene vegetation composition and environmental conditions of overfilled deposits in the Himalayan Foreland Basin*
Ph.D. Supervisor: Prof Prasanta Sanyal

2013 – 2016 **MSc in Geological Sciences**
Indian Institute of Science Education and Research Kolkata
Title: *Geochemical study of paleosols to understand the evolution of the Himalayan Foreland Basin: a case study from Nurpur, Himachal Pradesh*.

2010-2013 **B.Sc (Geology Hons.)**
Durgapur Government College, Burdwan University

Research Experience

Dec,2025-Till now Scientist at NCPOR Goa, MoES

2023-Dec, 2025 DST-INSPIRE Faculty at PCOS Division NCPOR Goa

2022-till now Visiting Researcher at Department of Geosciences, Christian-Albrecht University of Kiel.

2021- 2023 Early Career Fellow at Indian Institute of Technology Gandhinagar

2021 Research Assistant at Indian Institute of Science Education and Research Kolkata (January 2021-August 2021).

Instrument Experiences

- GC-MS/MS and HPLC-MS
- IRMS (Isotope-ratio mass spectrometry) (MAT 253 and Delta V)
- GC-IRMS
- Ion Chromatography
- Kiel IV Carbonate
- XRF, ICPMS, SEM-EDS

Awards & Recognition

2026 Selected as Associate of Indian Academy of Sciences (IASc), Bangalore

2025 Selected as Young S&T Leaders (below 45 years).for ESTIC 2025

2025 Awarded "Young Polar Scientist Award" at NCPOR Goa (MoES).

2024 Awarded research project (Co-PI) for 15th Indian Arctic Expedition-2024 from MOES, Govt. of India

2023 Awarded research project (Co-PI) and participated in 14th Indian Arctic Expedition, MOES, Govt. of India

2022 Awarded DST-INSPIRE faculty fellowship 2021 for five years, with a research grant of 44000 $ for five years

2022 Awarded International visiting fellow award from Kiel University Germany

2021 Awarded prestigious Early Career Fellowship from IIT Gandhinagar with fellowship of 38336 $ (including Salary) for two years

2021 Awarded support of 1000 $ to attain GSA, 2021 at Portland, USA

2020 Best poster award in DES annual Day, 2020, IISER Kolkata.

2020 Awarded full support (SRSP 600€) to attain the 36th *International Geological Congress* 2020 in New Delhi, India.

2019 Awarded full support (2400€) for presenting a talk at *International Union for Quaternary Research* 2019 (INQUA) (Funded by INQUA) in Dublin, Ireland

Awarded travel support (100000 Yen) for presenting a talk at *Japan Geoscience Union* 2019 in Chiba, Japan

Awarded full support (200000 Yen) for presenting a talk at *European Geosciences Union* 2019 (Funded by JpGU Biogeoscience) in Vienna, Austria

2018 Awarded travel grant (100000 Yen) for Poster presentation in *Japan Geoscience Union* 2018 at Chiba, Japan

2015 Awarded travel grant for presentation in *Himalaya-Karakoram-Tibet* workshop, 2015, Dehradun, India.

2013 Awarded MHRD-funded Integrated MS-PhD fellowship between 2013 and 2020

Publications : (*First Author: 9, co-authored: 5)*

Under Review and Submission

1. Mukhopadhyay, S., **Roy, B**., et al. Climatic and sedimentation shifts during the Late Pleistocene-Holocene at Barakar Paleolithic site, Western Lower Ganga Basin: Impacts on vegetation and Human adaptations (*Under revision: Quarternery Science Reviews*)
2. **Roy, B.,**, Samantaray, S., Mukhopadhyay, S., Goyal, K., Impact of soil edaphic factors on the organic matter distribution in a tropical ecosystem (*Revision: Organic Geochemistry*)

Peer-reviewed, published articles

1. **Roy, B.,**Ghosh, S. and Sanyal, P., 2020. Morpho-tectonic control on the distribution of C3-C4 plants in the central Himalayan Siwaliks during Late Plio-Pleistocene. *Earth and Planetary Science Letters*, *535*, p.116119.
2. **Roy, B.,**Ghosh, S. and Sanyal, P., 2020. Impact of monsoon, vegetation, and landscape on pedogenesis: A case study using organic and inorganic tracers from the Himalayan foreland sediments. *Palaeogeography, Palaeoclimatology, Palaeoecology*, p.109854.
3. **Roy, B.,**Patra, S. and Sanyal, P., 2020. The carbon isotopic composition of occluded carbon in phytoliths: A comparative study of phytolith extraction methods. *Review of Palaeobotany and Palynology, 281*, p.104280.
4. **Roy, B**., Roy, S., Goyal, K., Ghosh, S. and Sanyal, P., 2021. Biomarker and carbon isotopic evidence of marine incursions in the Himalayan Foreland Basin during its overfilled stage. *Paleoceanography and Paleoclimatology*, p.e2020PA004083.
5. Ghosh,'S., Bera, M.K., **Roy, B.,**andSanyal, P., 2021 Revisiting the diachronous transition of C_3 to C_4 plants in the Himalayan foreland and other parts of the globe: A sedimentological perspective, *Sedimentology*.68, p. 2473-2499
6. **Roy, B.,** and Sanyal, P., 2022, Isotopic and molecular distribution of leaf-wax in plant-soil system of the Gangetic floodplain and its implication for paleorecords*(Quaternary International,* 607, pp.89-99*).*
7. **Roy, B.,**Baidya, D., Jain, V., 2023 Hydrogeomorphic response of charcoals during river transits and its impact on the carbon cycle *(JGR: Earth Surface, p.e2023JF007133)*
8. Mukhopadhyay, S., **Roy, B**., Sangode, S.J., Jaiswal, M.K. and Dutta, S., 2023. Late Quaternary sediments from Barakar-Damodar Basin, Eastern India include the 74 ka Toba ash and a 17 kamicrolith toolkit. *Journal of Asian Earth Sciences:X, p.100135*.
9. Sanyal, P, Adhyay, P, **Roy, B**…….. Geologic History of Plants and Climate in India. *Annual Review of Earth and Planetary Sciences, 2024, Vol-52*
10. Ghosh,' S., **Roy, B.,** and Sanyal, P.,The Late Neogene distribution of C3-C4 plants in the Himalayan foreland basin: Insight from the $\delta^{13}C$ values and sedimentological architecture of the Siwaliks*, Geological Society of London, 2024.*
11. Singh, A., Jain, A., Singh, R., Singh, K.S., **Roy, B.,** Tiwari, M., David, T.D. and Jagtap, A., 2024. Tracing marine and terrestrial biochemical signatures of particulate organic matter in an Arctic fjord (Kongsfjorden). *Marine Chemistry*, p.104468.
12. **Roy, B.,** Kharpuli, T., Baidya, D., and Sanyal, P., Distribution and stability of lipid biomolecules across different soil size fractions and terrestrial ecosystems *JGR:Biogeosciences,* 2025, 130, e2024JG008424
13. **Roy, B**., Singh, A., Tiwari.M., 2025 Tracing macroalgal-induced changes in carbon dynamics of high-Arctic fjords using biomarker fingerprinting *JGR: Oceans*,. 130, e2024JC021900
14. **Roy, B.,** Theide, R., Thomas, S.,.., Elling, F, 2025 Bacterial branched GDGTs in soil record optimum growth conditions: A global and regional perspectivefrom altitudinal transects, *Global and Planetary Change, p.105101*.

Selected Conference Contributions

- Organic matter control on remobilization of the element in paleosol profile, Siwalik NW Himalaya, in HKT Abstract 2015, Dehradun.
- Role of tectonics on the abundance of C3-C4 plants: Evidence from the Mio-Pliocene Siwalik deposits of Central Himalaya" in Abstract HKT 2018.
- Insight into the pedogenesis of Siwalik sediments in the Himalayan foreland basin: the role of monsoon, vegetation and basin stability" in AMESS 2017, IISER Kolkata
- Morpho-tectonic control on the distribution of C_3-C_4 plants in the central Siwaliks during Late Plio-Pleistocene" in JpGU 2018, Japan.
- Understanding present geomorphic and pedogenic forcing on the organic matter distribution from vegetation to soil and its use in paleovegetation reconstruction" in EGU 2019, Austria.
- Geomorphic and pedogenic forcing on the organic matter distribution from vegetation to soil: a concern for paleoenvironment studies in JpGU 2019, Japan.
- Difference in adaptation rates among plants with C_3 and C_4 photosynthetic mechanism in AGU 2019, USA
- Morpho-tectonic control on the distribution of C3-C4plants in the central Himalayan Siwaliks during Late Plio-Pleistocene, EGU virtual 2020
- Exploring the use of Biomarkers to understand the paradox of the depository settings in Eastern Siwaliks of Himalayan foreland Basin, Goldschmidt virtual 2020.
- Reconciling marine influences in the Eastern Siwaliks through the use of biomarkers and reconstructing the Miocene-Pliocene closure of Himalayan Foreland Basin, JpGU-AGU virtual 2020.
- Distribution and stability of n-alkyl biomolecules across particle-size fractions of different terrestrial ecosystems, AGU virtual 2021.
- Tracing macroalgal-induced changes in carbon dynamics of high-Arctic fjords using biomarker fingerprinting, AGU Virtual 2024

Teaching Experience

I am strongly engaged in teaching geosciences at IISER Kolkata, IIT Gandhinagar and NCPOR, and have been involved in undergraduate and post-graduate semester-long teaching courses as well as a laboratory section. For these classes, I have developed new class materials, designed and held lectures, and led laboratory exercises, field trips, group discussions and review sessions. I was further responsible for the pastoral care of students as well as for exam design and grading. Courses taught:

2015-2020 *Sedimentology* theory and *Isotope Geology* course of BS-MS programme as a Teaching Assistant at IISER Kolkata.

2015-2020 *Sedimentology Laboratory* course of BS-MS programme as a Teaching assistant at IISER Kolkata.

2015-2020 Assisted several batches of BS-MS programme in Sedimentological fieldwork at IISER Kolkata.

2021-2023 Assisted Prof. Vikrant Jain in River Ecology courses and Field Geology courses at IIT Gandhinagar

2023-till now Introduction to Polar biogeochemistry and Organic Geochemistry at NCPOR Goa

Mentoring Experience

I have advised seven students (five BS-MS and four MSc), two research students, and ten project students in their research project. Four thesis advisees continued to pursue PhD in foreign universities. Three advisees have co-authored their first publication under my mentorship. Presently supervising one PhD as a co-pI and as well as supervising two MS students at NCPOR.

Reviewer: Nature Communication, Geochimica et Cosmochimica Acta, Organic Geochemistry, Applied Geochemistry, Frontiers in Earth Sciences, Plant and Soil

Google Scholar: https://scholar.google.co.in/citations?user=5VcdfToAAAAJ&hl=en

Website: *https://sites.google.com/view/biswajitroygeochemistry/home*

Twitter: https://twitter.com/Biswa_92_Soils