

Moumita Das, Ph.D

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Educational Qualifications:

B.Sc (Geology Hons) 1999 from Burdwan University
M.Sc (Applied Geology) 2001 from Jadavpur University
M.Tech (Applied Geology) 2003 from Indian Institute of Technology, Kharagpur
Ph.D (Applied Micropaleontology/ Paleoclimatology) 2006 from Indian Institute of Technology, Kharagpur

Professional Record:

October 2007 to January 2015: Research Analyst at MAXIMUS Inc., Reston, VA, USA
February 2015 to October 2017: Post-Doctoral Research/ DST Women Scientist at Department of Geology, Indian Institute of Kharagpur, WB, India
October 2017 to Present: Assistant Professor, Geology Section, MMV, Banaras Hindu University, UP, India

Research Interests:

Current Project: Centennial Scale Variability in the Indian Monsoon over the Last 100K Years as Observed in Sediments from the South Eastern Arabian Sea

The margins of the Arabian Sea differ markedly in productivity and the shelf to deep water sediments experience differing degrees of oxygen depletion. Sediment records show that monsoon driven productivity, as well as intensity of the Oxygen Minimum Zone (OMZ) and associated processes have undergone major changes in the past, with potentially far-reaching consequences on ocean nutrient budgets and climate.

High resolution records of microfossil content in multiple sediment-cores from different depths of the Southeastern Arabian Sea (obtained by Sagarkanya expedition SK 291) are being studied, along with total organic carbon content and elemental analysis of the sediments. The different independent proxies, like the benthic/ planktic foraminifer ratio, the changes in the major thermocline and mixed species of planktic foraminifera, changes in species diversity of benthic foraminifera, the benthic foraminiferal assemblages, the percentage of other microfossils present (like pteropod, ostracod and bivalves), the stable isotope analysis of benthic/planktic foraminifera and the TOC content of sediments will help to

- study the changes in the OMZ in the region,
- examine the effect of coastal upwelling and surface water run-off on the biota,
- identify the multidecadal to century scale shifts in the Indian monsoon, and
- investigate the variations of surface water temperature, salinity and fresh water input in the region during the late Pliocene

Previous Research Projects:

Variations in Indian Summer Monsoon intensity over the last thirteen thousand years:

The study of population abundance of planktic foraminifer *Globigerina bulloides* from the deep-sea sediments of the Arabian Sea near the Oman margin, helped decipher the changes in intensity of the Indian monsoon. The changes during the Holocene can be correlated to the North Atlantic Climate changes; intervals of summer monsoon minima were observed during periods of decreased solar activity. Spectral analysis of the *G. bulloides* time series during the Allerød period revealed a strong solar 208-year deVries or Suess cycle, suggesting that the centennial scale variability in Indian summer monsoon winds during the Allerød interstadial was driven by changes in the solar irradiance through stratospheric-tropospheric interactions.

Paleoceanographic changes at ODP 723A during the Holocene:

The benthic foraminifera record from the ODP 723A was studied at high resolution, specially focusing on the benthic foraminifera diversity and relative abundance of oxic and dysoxic species. The study showed that OMZ was weak at the study site during Early Holocene and intensified mid-Holocene onwards.

Paleoceanographic and paleoclimatic evolution of ODP Site 752A, Broken Ridge, during the Late Neogene: The study of deep-sea benthic foraminiferal assemblage of 92 samples from the ODP Site 752A, Broken Ridge, southeast Indian Ocean, ranging in age from late Miocene to recent times, gave an idea about the paleoceanography of the area. This study quantitatively analyzed the percentage abundance data of the 57 highly ranked species during the Late Neogene.

Publications:

- Holocene strengthening of the Oxygen Minimum Zone in the north-western Arabian Sea linked to changes in intermediate water circulation and Indian monsoon intensity. Moumita Das, Raj K. Singh, Anil K. Gupta and Ajoy K. Bhaumik, *Palaeogeography, Palaeoclimatology, Palaeoecology*, <http://dx.doi.org/10.1016/j.palaeo.2016.10.035>, 2016
- Solar forcing of the Indian summer monsoon variability during the Allerød period. Anil K. Gupta, Kuppasamy Mohan, Moumita Das and Raj K. Singh, *Scientific Reports* 3, Article 2753, doi: 10.1038/srep02753, 2013
- Paleoceanographic significance of deep-sea benthic foraminiferal species diversity at southeastern Indian Ocean Hole 752A during the Neogene. Raj K. Singh, Anil K. Gupta and Moumita Das, *Paleogeography, Paleoclimatology, Paleoecology*, 361-362: 94-103, 2012
- Benthic foraminiferal faunal and isotopic changes as recorded in Holocene sediments of the northwest Indian Ocean. Anil K. Gupta, Moumita Das, Steven C. Clemens and Baidehi Mukherjee, *Paleoceanography*, 23, PA 2214, doi:10.1029/2007PA001546, 2008
- Occurrence of the Biogenic Bloom in the Oligotrophic southeastern Indian Ocean: Evidence from Late Neogene Deep-sea benthic foraminifera (ODP Hole 752A). Anil K. Gupta and Moumita Das, *Journal of The Geological Society of India*, 69(2): 331- 343, 2007
- South Equatorial Current (SEC) driven changes at DSDP site 237, Central Indian Ocean during the Plio-Pleistocene: Benthic foraminiferal faunal and isotope data. Anil K. Gupta, Moumita Das, K. Bhaskar, *Journal of Asian Earth Science*, 28: 276-290, 2006
- Deep-Sea Paleoceanographic and Surface Productivity Changes in the Northwestern Arabian Sea Driven by the Indian Southwest monsoon During the Last Millennium. Moumita Das, Anil K. Gupta and David M. Anderson, *Journal of The Geological Society of India*, 68(3): 387-394, 2006

- Solar Influence on the Indian summer monsoon during the Holocene. Anil K. Gupta., Moumita Das and David M. Anderson, *Geophysical Research Letters*, 32, L17703, doi:10.1029/2005GL022685, 2005
- Significance of Stable Isotopes in Paleoclimatology and Paleoceanography - A Review. Moumita Das, Anil K. Gupta, R. K. Singh, A. K. Bhaumik, *Indian Journal of Geochemistry*, 17:13-23, 2002

Chapter in book:

- The Great River, Mahanadi. Raj K. Singh and Moumita Das, In: *The Indian Rivers, Scientific and Socio-Economic Aspects*, Ed. DhruvSen Singh, Published by Springer, ISBN 978-981-10-2983-7 <http://www.springer.com/in/book/9789811029837>, 2017.

Conferences attended:

- Paper entitled: "Study of microfossils as proxies to decipher paleanographic changes in Eastern Arabian Sea, off coast of Kochin" Moumita Das, Anil K. Gupta and Subhasish Das at XXVI Indian colloquium on Micropaleontology and Stratigraphy held during 17th – 19th August, 2017 at Department of Geology, University of Madras, India
- Paper entitled: "Linking paleoceanographic changes with the paleomonsoons at northwestern Arabian Sea over the last 13000 years: a study of deep water benthic foraminifera at ODP Hole 723A" Moumita Das and Anil K. Gupta at conference on Quaternary Climate: Recent Findings and Future Challenges held during 28th – 30th April, 2016 at CSIR-National Institute of Oceanography, Goa, India.
- Abstract entitled: "Paleoceanographic conditions at the South Eastern Arabian Sea shelf region over the last 6000 years" Saravanan P., Moumita Das, Anil K. Gupta and M.K. Panigrahi at conference on Quaternary Climate: Recent Findings and Future Challenges held during 28th – 30th April, 2016 at CSIR-National Institute of Oceanography, Goa, India
- Paper entitled: "Changes in the NW Arabian Sea Oxygen Minimum Zone (OMZ) during the Holocene as recorded in benthic foraminifera at ODP Hole 723A" Moumita Das and Anil K. Gupta at XXV Indian colloquium on Micropaleontology and Stratigraphy held during 18th – 20th December, 2016 at Institute of Science, Aurangabad, India.
- Paper entitled: "Signature of Younger Dryas in the Arabian Sea sediments" Moumita Das and Anil K. Gupta, in the Young Scientist Award section of The 93rd Indian Science Congress Meet at Hyderabad, 3rd -5th January, 2006.
- Paper entitled: "Use of foraminifers from the Arabian Sea to study SW monsoon intensity since last 13000 years" Moumita Das and Anil K. Gupta at XX Indian colloquium on Micropaleontology and Stratigraphy held during 24th – 26th October, 2005 at Andhra University, Visakhapatnam, India.
- Abstract published in the PAGES OSM, Beijing, China, August, 2005 in the poster session entitled: "Linking up the Sun and Indian summer monsoon rain through ocean sediments" Moumita Das, Anil K. Gupta and David M. Anderson.
- Poster entitled: "Solar variability and changes in the Indian summer monsoon during the Holocene" Anil K. Gupta, Moumita Das and David M. Anderson at International conference AOGS 2005, Singapore, 20-24th June, 2004.
- Poster entitled: "Changes in the Southwest Monsoon during the past thousand years" Moumita Das and Anil K. Gupta at the International Workshop on the Indian Monsoon and Climate Variability during Holocene held during May 17-18, 2004, Bangalore, India.
- Paper entitled: "SEC driven changes at DSDP Site 237, Central Indian Ocean during the Plio-Pleistocene: Benthic Foraminiferal Faunal and Isotope Data." Moumita Das, Anil K. Gupta and K. Bhaskar at XIX Indian colloquium on Micropaleontology and Stratigraphy and Symposium on

recent developments in Indian Ocean Paleoceanography and Paleoclimate held during 9th – 11th October, 2003 at Varanasi, India

- Attended EILQUEC and POLTRAIN – 2003. Late Quaternary Environmental Change – Emerging Issues, an International PAGES Workshop cum Training Programme on Global Change held during 10th - 15th February 2003 at Pondicherry and presented paper entitled: “Paleoceanographic and Paleoclimatic Evolution of ODP Site 752A, Broken Ridge during the Late Neogene” Moumita Das and Anil K. Gupta