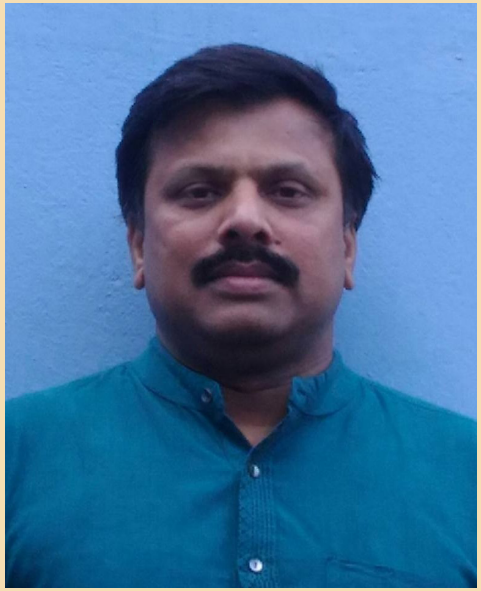
The Proterozoic Earth: a geochemical insight from rocks of India



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Many of the most exciting events in Earth's history occurred during the Proterozoic Eon that began 2.5 billion years ago and lasted for about 2 billion years, covering 42.5% of the entire geologic time. Life evolved into more advanced forms, oxygen started to build up in the atmosphere, stable continents formed and began to accrete with the help of plate tectonics, and climate underwent extreme changes resulting in several global glaciations. Evidence for these and many other global and regional events comes from the ancient sedimentary deposits. Modern geochemical tools/tracers have been at the forefront of the research aimed at decoding the information locked up in these rocks. Whereas conventional (e.g., C, O, N, S) and non-traditional (e.g., B, Fe, Mo, Cu) stable isotopes have been widely used to understand processes linked to global events, the radiogenic isotopes (Sr, Nd); trace elements and detrital zircon geochronology have been instrumental in deciphering the provenances of sediments and thus the tectonic and climate control on basin evolution. Having remained part of most of the supercontinents of the Proterozoic and being home to an almost pristine sedimentary record, largely marine, the Indian subcontinent holds keys to our understanding of the early evolution of life, atmosphere, tectonics and climate on our planet. In my presentation I shall review results of important geochemical studies done in the Proterozoic basins of India and bring out the gaps in our knowledge, justifying a more focussed effort in unravelling mysteries of the boring billions from the Indian rocks.

PROFILE

Dr. Jyotiranjan S. Ray is a Professor at the Physical Research Laboratory (PRL), Ahmedabad. He had his early education in Odisha. He did his M.Tech. in Applied Geology from University of Roorkee in 1992 and Ph.D. from PRL in 1998. After spending four years in Canada and USA as a postdoctoral researcher, he joined back in PRL as a scientist in 2003. Dr. Ray is a Geochemist by profession. He uses novel geochemical and isotopic proxies to understand geological processes. His main research interests are: Evolution of Earth's mantle through time, Subduction zone magmatism and Evolution of sedimentary basins. His skills include stable isotope geochemistry, U-Pb/Sm-Nd/Ar-Ar geochronology, and major/trace element geochemistry. His contributions to the studies of carbonatite magmatism, age of the Vindhyan Supergroup and evolution of the Andaman subduction zone are noteworthy. His efforts have been rewarded with several national awards including the INSA Young Scientist Award in 2000, National Geoscience Award in 2009 and Shanti Swarup Bhatnagar Prize in 2015.

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