



Physical Research Laboratory, Ahmedabad

COLLOQUIUM - 13 – 23

Speaker: Prof. R. Ramesh
Outstanding Scientist, Geosciences Division, Physical Research Laboratory,
Ahmedabad.

Title: Oceanic nitrogen cycling: new results based on isotopic tracers

Abstract

Nitrogen is abundant in the Earth's atmosphere, but much of it is not directly useful for life. Reactive nitrogen is needed for life processes and a small amount of reactive nitrogen is controlling life processes and hence the global carbon cycle. Over the last decade, we have investigated various aspects on the marine nitrogen cycle in the Indian Ocean. Using ^{15}N and ^{13}C tracers we have quantified, besides the biological productivity in the ocean (rate at which carbon is fixed by photosynthesis by marine planktons, measured in units of $\text{g C m}^{-2}\text{day}^{-1}$) and its temporal and spatial variability, the 'new production', the fraction of the carbon that is dispatched to the deep ocean to stay for longer time scales. We have developed experimental methodologies to measure the direct fixation of atmospheric nitrogen by marine diazotrophs such as *Trichodesmium* in the water column and also sediments. Further we have quantified the nitrification process, which compensates for the loss of reactive nitrogen to the atmosphere by denitrification. For the latter, we have modified the traditional Rayleigh isotopic fractionation model. We have also evaluated the nitrogen transport to the ocean through rivers and atmospheric transport. In this talk, while highlighting some important new results, we also propose to discuss current and future research in this area.

The Speaker

Prof. Ramesh obtained his BSc (Physics) (1976) and MSc (Physics) (1978) from the University of Madras, and PhD (1984) from Gujarat University, Ahmedabad while working at the Physical Research Laboratory (PRL), Ahmedabad. Subsequently, he joined PRL as faculty member. He was Visiting Research Associate with late Prof. Devendra Lal at the Scripps Institution of Oceanography (1992-93). His areas of interest include Stable isotope mass spectrometry, paleoclimate and paleoceanography, isotopic tracers in earth system, climate modelling, and productivity measurements in the ocean using nitrogen isotopes. His important contributions include paleoclimatic reconstructions from natural archives such as tree rings, corals, foraminifera, peat deposits and speleothem using stable isotope systematics, and quantification of various aspects of the regional carbon cycle. He is an honorary member of the science faculty of Delhi University and the Sardar Patel University, and a visiting professor at Central University, Hyderabad. In addition to being a fellow of TWAS, he is also a fellow of the three science academies of India, Geological Society of India, and a member of the American Chemical Society, the Indian meteorological Society, Indian Society for Mass spectrometry and the Gondwana Geological society. He was a recipient of the INSA Young Scientist medal 1987, S. S. Bhatnagar Prize 1998, TWAS Prize 2006, K. R. Ramanathan Gold Medal 2011, and Citation for Nobel Peace Prize 2007 for contributing to the IPCC AR4. He is currently a lead author for the Paleoclimate Chapter of IPCC AR5, to be released later this month. He has authored more than 100 papers and has 3251 citations.

Wednesday: 04 September, 2013, 16:00 hrs

K.R. Ramanathan Auditorium, PRL

Tea at 15:30 hrs

ALL ARE WELCOME