Dr. Arvind Singh

Dr. Arvind Singh is an excellent observational oceanographer and a decisive data miner. He has contributed vastly to our understanding of marine carbon and nitrogen cycles, atmospheric chemistry and deposition fluxes, and paleoclimate studies using stable isotopes. His present research focus is to understand the C:N:P stoichiometry from cellar to matter scale. His research has not only provided the first quantitative estimates of the elemental fluxes in biogeochemical processes but also unravelled mysteries of these processes in the northern Indian Ocean. He discovered that the N2 fixation rates are the highest in the Arabian Sea compared to that anywhere in the world ocean. In fact, diazotrophs supply surplus bioavailable nitrogen for photosynthetic organisms in the Arabian Sea. This could be due to major contribution of heterotrophic diazotrophs to N2 fixation. Contrary to our Indian Ocean understanding, his synthesis and modelling work of the data obtained on JGOFS cruises and beyond suggested that carbon export to the deeper ocean in the Arabian Sea and Bay of Bengal is comparable. His immense data mining efforts have led us to conclude that atmospheric deposition's contribution to export production is 3% in the Indian Ocean8. In contributing to global modelling efforts, he provided revised estimate of total atmospheric nitrogen inputs to the global ocean (39 Tg N yr-1), and suggested that the impacts of atmospheric deposition on ocean biogeochemistry can result in a net increase (0.15 Pg C yr-1) in CO2 uptake. Increasing nutrient inputs may lead to intensification of hypoxic conditions and increased fluxes of the greenhouse gas N2O, making the Bay of Bengal of particular interest, which has low subsurface oxygen concentrations but minimal water column denitrification and N2O production at present. Even modest increases in export production in the future could lead to substantial denitrification and N2O production. In a major implication to our understanding of paleo-salinity and paleo-monsoon based on foraminifera isotopic composition, his study suggested that the relationship of oxygen isotopic composition (δ18O) and salinity is variable in ocean10. He has updated Rayleigh isotope fractional mass balance model to understand δ18O-S variation. This is widely used by isotope geochemists. In fact, this novel approach provided estimate of Himalayan glaciers loss in the last decades

In recognition to his outstanding research contributions in the field of Ocean Science and Technology, the Ministry of Earth Sciences honours Dr. Arvind Singh with the "Young Researcher Award in the field of Earth System Science" for the year 2020.