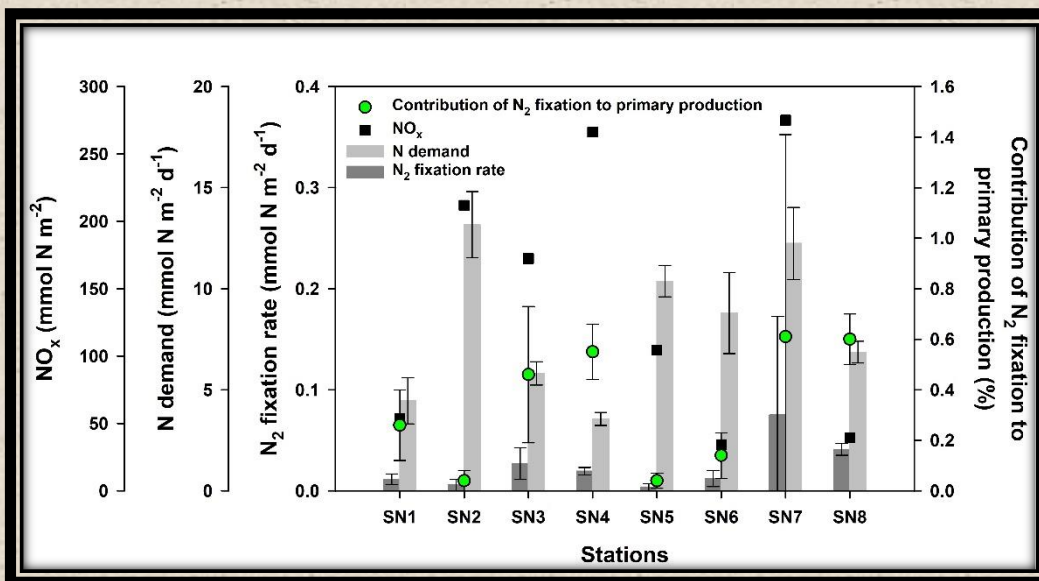
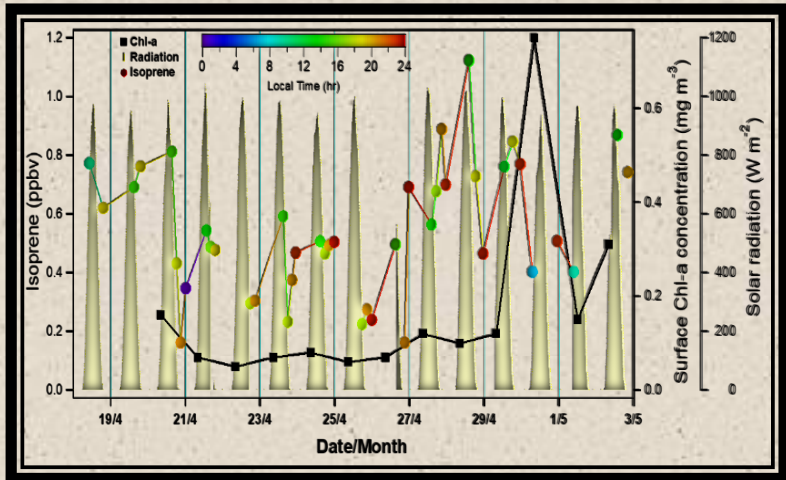
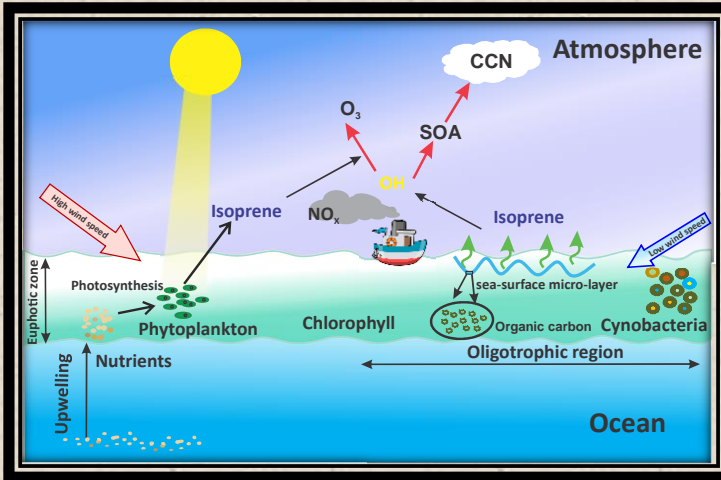




PRL NEWS – THE SPECTRUM

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APRIL-MAY 2020



Dinitrogen fixation rates in the Bay of Bengal during summer monsoon

(Himanshu Saxena, Deepika Sahoo, Mohammad Atif Khan, Sanjeev Kumar, A. K. Sudheer, Arvind Singh)

Phytoplankton in the oceans perform approximately 50% global primary production. Bioavailable nitrogenous nutrients (e.g., nitrate, nitrite, ammonium, excluding dinitrogen (N₂) gas) are often

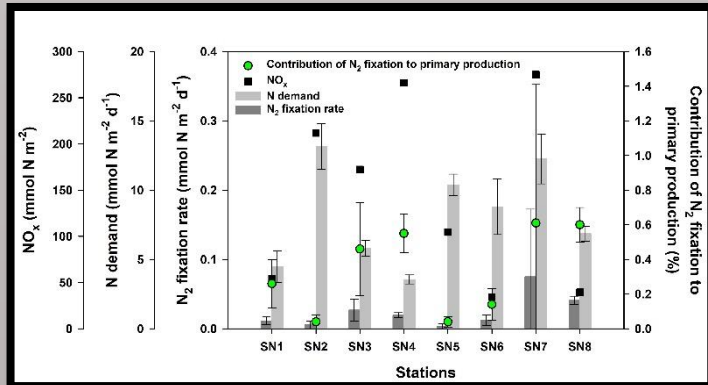


Figure: Photic zone integrated NO_x (nitrate + nitrite), N demand, N₂ fixation rate and contribution of N₂ fixation to primary production at all the stations.



Himanshu Saxena

pointed out as a factor that limits primary production in the oceans. On the contrary, low nitrogenous nutrients in the oceans provide a suitable niche for N₂ fixing microorganisms which reduce the most abundant N₂ to NH₄⁺ and thus, help in sustaining ocean fertility. The Bay of Bengal is one such region which is generally nitrate-poor and warm, and thus, could favour N₂ fixation. Therefore, we commenced the first N₂ fixation study in the photic zone of the Bay of Bengal during summer monsoon (12 July - 2 August 2018) at eight stations. N₂ fixation rates varied from 4 to 75 μmol N m⁻² d⁻¹ which are low in terms of percentage contribution (< 1%) to primary production. However, the upper bound of observed N₂ fixation rates is higher than the rates measured in other oceanic regimes, such as the Eastern Tropical South Pacific, the Tropical Northwest Atlantic, and the Equatorial and Southern Indian Ocean. This underscores the global importance of the Bay of Bengal in the global marine nitrogen cycle. Source: [10.1088/2515-7620/ab89fa](https://doi.org/10.1088/2515-7620/ab89fa)

High levels of isoprene in the marine boundary layer of the Arabian Sea during spring inter-monsoon: Role of phytoplankton blooms

(Nidhi Tripathi, L. K. Sahu, Arvind Singh, Ravi Yadav, Kusum Komal Karati)

Isoprene is one of the most abundant biogenic volatile organic compounds (BVOCs) in the earth's atmosphere with estimated global emissions of 500–750 TgCyr⁻¹. Emission of isoprene and its transformation in the atmosphere lead to production of ozone and secondary organic aerosols (SOA). Overall, BVOCs have a profound effect on the atmospheric chemistry, radiative balance and carbon cycle over the oceans. Photosynthetic organisms are an important source of the isoprene over the oceanic region. The measurements of isoprene, micro-organisms and chlorophyll-*a* over the Arabian Sea were made onboard FORV *Sagar Sampda* (SS#359) during inter-monsoon period of April-May 2017. In this interdisciplinary approach, seawater parameters are used to explain distribution of isoprene in the marine atmosphere over the highly productive and oxygen-deficient region of the Arabian Sea. Time series of isoprene mixing ratio, surface chlorophyll-*a* concentration, and solar radiation flux over the Arabian Sea are shown in Figure 1. The Elevated levels of isoprene (> 0.6 ppbv) were associated with the blooms of *Trichodesmium* and *Thalassiosira* in oligotrophic

conditions. In addition to biological parameters, the results also show that the production and emission of isoprene were influenced by meteorological parameters, i.e. solar flux, wind speed and temperature. We estimated the average sea-air isoprene emission flux of ~4.5×10⁷ molecule cm⁻² s⁻¹. Levels and fluxes of isoprene presented in this study are in the higher range of values reported for other highly productive oceans. The production in the seawater and emission in the marine air over open ocean should be further investigated in order to predict the concentration of isoprene and to estimate its contributions in ozone and SOA over the Arabian Sea (Figure 2).

Source: <http://dx.doi.org/10.1021/acsearthspacechem.9b00325>



Nidhi Tripathi

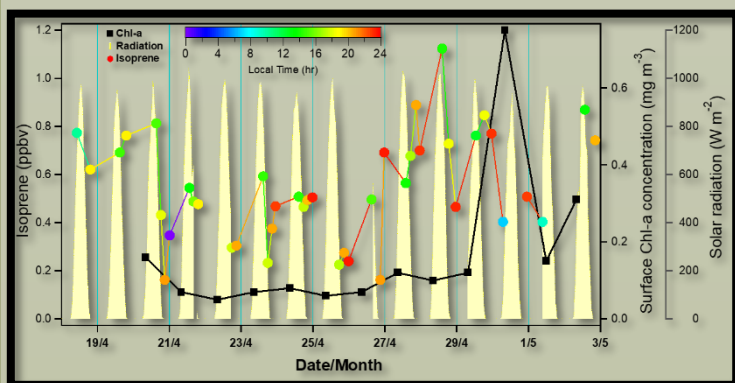


Figure 1: Time series of isoprene mixing ratio, surface Chl-*a* concentration, and solar radiation over the Arabian Sea.

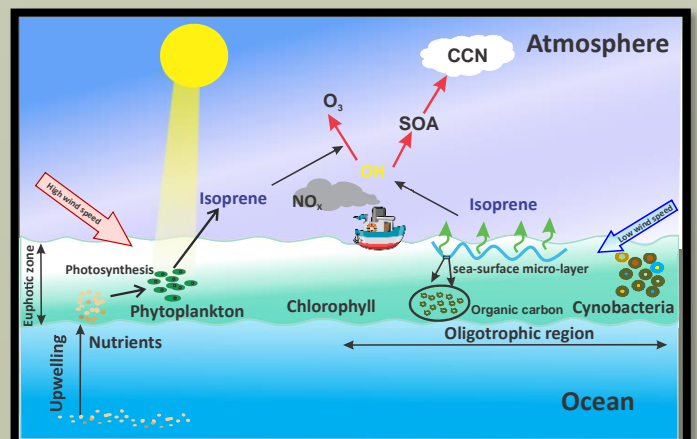


Figure 2: The sea-air exchange of isoprene and its role in atmospheric chemistry over the marine atmosphere.

International Women's Day (IWD) - 2020 Celebration at PRL

The IWD - 2020 was celebrated at PRL on 13th March' 2020. The event commenced with a video on the year round activities by women employees. The cultural programmes began with a welcome dance. A short skit on Each for Equal, the theme for IWD - 2020 was performed by staff and students which was followed by a song performance and a classical dance. Dr. Anil Bhardwaj, Director PRL addressed the audience on the occasion. The invited speaker Prof. Neharika Vohra from IIM Ahmedabad delivered a talk on Gender equal world: Paths to get there. Her talk covered statistical insights into the disparity women face across various areas of life and professions and the ways to move towards a gender equal world. Director PRL felicitated the speaker and presented her with a memento. Mr. C.V.R.G. Deekshitulu gave closing remarks and congratulated the cultural events' participants for their good work. Prize distribution for the essay competition took place and the programme ended with the vote of thanks by Prof. Srubabati Goswami, Chair, Women Cell, PRL.

