[EJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-OS Ocean Sciences & Ocean Environment

[A-OS13]Physical, biogeochemical, and ecological aspects and their mutual relations in the Indian Ocean

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Recent discovery of new climate modes and development of basin-scale and regional observing systems in the Indian Ocean advance researches on physical, biogeochemical, and ecological aspects of ocean variations. In addition, inauguration of international research programs in the Indian Ocean, such as IIOE-2 and EIOURI, leads high expectation of related studies in earnest both in each of the disciplines and in interdisciplinary ways. This session invites papers on physical, biogeochemical, and ecological aspects in the Indian Ocean and relations among these elements of the ocean variations, to facilitate integrated understanding of the Indian Ocean variability, as well as to stimulate collaborative researches among the relevant scientists.

[AOS13-P01]Nitrate isotope distributions in the eastern Indian Ocean

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Nitrogen isotopic composition of nitrate (δ$^{15}N_{Nitrate}$) is widely used as a tracer of ocean-internal nitrogen cycling (consumption and regeneration) and ocean-external nitrogen inputs and losses (N_2-fixation; fixation of N_2 gas into bioavailable nitrogen such as ammonia by diazotrophs, and denitrification; microbial respiration using nitrate as an electron acceptor). When the phytoplankton assimilates nitrate, nitrogen isotopes are fractionated. A δ$^{15}N_{Nitrate}$ value increases, in conjunction with nitrate depletion, due to an isotopic effect during nitrate assimilation by phytoplankton. When denitrification occurs in the water column, a δ$^{15}N_{Nitrate}$ value extremely increases due to a strong isotopic effect. N_2-fixation produces fixed nitrogen with a δ^{15}N value of ~0‰, as nitrogen fixers take up N_2 gas with little isotopic effect. This fixed nitrogen with low δ^{15}N value is eventually converted into low-δ$^{15}N_{Nitrate}$ through degradation of nitrogenous organic compounds called remineralization and subsequent nitrification. Those signatures of δ$^{15}N_{Nitrate}$ in the euphotic zone are conserved in nitrogenous organic compounds and transfers to the sinking particles and deep-sea sediments. Here we determined δ$^{15}N_{Nitrate}$ and δ$^{18}O_{Nitrate}$ along 110°E in the eastern Indian Ocean during the cruise MR15-05 of R/V *Mirai*. The nitrate concentrations were below 0.1 µM in the surface water of the whole area. The δ$^{15}N_{Nitrate}$ values are expected to increase toward the surface, in conjunction with nitrate depletion. Furthermore, if nutrient uptake by phytoplankton and remineralization occur with Redfield proportions, and if external nitrogen inputs/output do not occur, then a N* value should be ~−2.9 μM. However, in this study area, the δ$^{15}N_{Nitrate}$ value decreased to 4.0‰ and the N* value increased up to −1.3 μM toward the surface. These features suggest that the surface water of this study area is affected by N_2-fixation. In the presentation, we will discuss the nitrogen cycle of the eastern Indian Ocean in more detail by using the δ$^{18}O_{Nitrate}$ values.