

Interactive comment on “¹⁵N enrichment in the surface Particulate Organic Nitrogen of the north-eastern Arabian Sea from the middle to the waning phase of the winter monsoon: possible causes” by S. Kumar and R. Ramesh

Anonymous Referee #1

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Although a limited data set this paper provides new data regarding the spatial and temporal variability of the nitrogen isotopic composition of particulate organic matter in a little studied region of the Indian Ocean. The paper is generally well written and clearly describes the results, but the discussion of the potential causes for the observed increase in ¹⁵N over a short period is largely speculative and, in the main, does not have any complementary data to support or refute the proposed mechanism for the observed enrichment. Inclusion, at this level of argument, is therefore not warranted and should be removed from the discussion.

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The introduction needed more specific information on the isotopic composition and fractionations relevant to the specific location. For readers unfamiliar with the meteorology and hydrology of the region, the paper needed more relevant information (such as location, monsoonal patterns, its effect on water column physical characteristics and nutrient cycling) to set the scene, so that the context for the discussion of the results could be better understood. Only temperature profiles are shown, but are there any strong salinity changes in the region during the monsoonal periods? Can more of the results, such as % abundance of phytoplankton groups (diatoms), protozoa (Noctiluca) and N-fixers (trichodesmium) be included in the data (Table 1). The variability on duplicate samples is given in the methods, but there is no replication of analysis presented in Table 1. Relating the $\delta^{15}\text{N}$ -PON in surface collections, to the physical structure of the water column and sub-surface water characteristics tens of meters below the surface is problematical. The discussion should make more of comparisons to other studies where $\delta^{15}\text{N}$ -PON has been measured under similar conditions currently or in the past (such as in tropical waters, overlying sub-oxic water masses, with similar plankton species, regions with monsoonal influence etc) and remove the speculation that is currently unsupported by independent, complementary data.

For the better description of the location, a map of the wider region and then a combination of Fig1a, b (using different symbols for each cruise). Table 1 include data on MLD, nitrate concentration and % of major phytoplankton species present at each site. Combine Figs 2a, b. Fig 3 requires separate symbols for both cruises. Why are there 18 data points in 3a and only 12 in 3b?

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