

## ***Interactive comment on “Seasonal and interannual variations of the nitrogen cycle in the Arabian Sea” by T. Rixen et al.***

**Anonymous Referee #1**

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This manuscript is on the seasonal and inter-annual variability of the oxygen minimum zone and biogeochemistry of the Arabian Sea OMZ. The authors are trying to establish that the OMZ of the Arabian Sea has expanded over the years and have also included some aspects of N cycling processes in the region.

Based on the available data in 1991, Naqvi (1991) demarcated the region of the SNM, thereby the OMZ of the Arabian. This would give an approximate feel for the geographical extend of the Arabian Sea OMZ. By no means this was the limit or exact boundary of the OMZ, due to paucity of data. The geographical extend of this zone depends on the intensity of the upwelling and thereby the productivity that supplies organic carbon load to the mid depths and the physical forces that supply DO to the western Arabian Sea, as rightly pointed out by the authors themselves. The main focus

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of this manuscript is to show that the Arabian Sea OMZ has increased by 63%. Due to paucity of historical data and seasonal and interannual variability of this feature, the authors have not convincingly shown that the OMZ has expanded.

Dissolved oxygen by Winklers method is not sensitive enough to address changes between 0 and 5 $\mu$ M. Recent results from the OMZs show that the DO concentration in the core of the OMZ is essentially zero (Dalsgaard et al 2012). Nevertheless, a major portion of the discussion is on the changes in DO concentration in the OMZ in the low range.

Although the focus of the manuscript is the expansion of the OMZ, the introduction is all on N cycling.

The manuscript provides no new insights in understanding the biogeochemistry of the Arabian Sea OMZ, and most of the data presented in this manuscript has been published previously, hence I am not in favor of publishing this manuscript

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