Geophysical Research Abstracts,
Vol. 11, EGU2009-4139-1, 2009
EGU General Assembly 2009

Stable isotopic nitrogen and oxygen composition of nitrate and nitrite in the Arabian Sea

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Nitrogen loss in the mid-water oxygen minimum zone (OMZ) of the Arabian Sea is one of the major sinks of DIN in the worlds‘ ocean. Previous estimates decipher the regional release of N_2 to about 26 Tg N a^{-1}. To verify this estimate, we performed a comprehensive survey of water column nitrate and nitrite isotopic composition (δ^{15}N NO_x^- and δ^{18}O NO_x^-) using the denitrifyer method in the Arabian Sea during the late SW-monsoon to fall inter-monsoon season in September/October 2007. Depth profiles show strongly enriched δ^{15}N and δ^{18}O ratios in the nitrate-depleted zone between 250 and 325 m, where nitrite concentrations exceed 5 μM, and δ^{15}N NO_x^- and δ^{18}O NO_x^- increase to 19 ‰ and 17.8 ‰ respectively. In the western Arabian Sea, a secondary δ^{18}O maximum is developed between 600 and 800 m water depth that coincides with an enrichment of dissolved oxygen of approximately 4 μM. Both maxima plot within the Red Sea Water (RSW) at 27.2 kg m^{-3} indicating that evaporated and ^{18}O-enriched RSW provides oxygen for nitrification of remineralized organic nitrogen in the western Arabian Sea.