Nitrogen Sources for New Production in the NE Arabian Sea

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New productivity measurements using the ^{15}N tracer technique were conducted in the north-eastern (NE) Arabian Sea during six expeditions from 2003 to 2007, mostly in winter. Entrainment of NO_3^- which supports the observed nitrogen uptake has been quantified. Deepening of mixed layer below 100 m (from its inter-monsoon value between 30-40 m) transferred often more than 100 mmol N-NO_3^- m^{-2} into the surface layers from below. The observed winter blooms in the region are supported by such input and are sustained for more than a month, as is also observed in satellite imagery. Higher new production and *f*-ratios have been found in late winter, whereas transport of NO_3^- is maximum in early winter. In general, new production and *f*-ratios vary progressively during winter. Fickian diffusive fluxes of NO_3^- into the surface layer range from 0.51 to 1.38 mmol N-NO_3^- $m^{-2}d^{-1}$, and can account for 67% and 78% of the observed nitrogen uptake in the coastal and open ocean regions, respectively, during spring. We document the intra-seasonal and inter-annual variations in new productivity during winter and identify sources of nitrate which support the observed new productivity during winter and spring.