

Subterraneous Injection of Nutrient Rich Brackish Water to Coastal Arabian Sea

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Abstract

The existence of a subterranean flow connecting Cochin Backwater to the Arabian Sea coastal waters through the submerged porous lime shell is indicated from the nutrient distribution in coastal waters. The activation of mud banks during southwest monsoon triggers high productivity in oligotrophic coastal waters of southeastern Arabian Sea. The present investigation represents the period when the mud banks were not activated and the results showed fertilization of the coastal water by injection of nutrients by hitherto unknown processes. The nitrogenous nutrients were low except for the southern transects at Alleppey (Area A). Higher concentrations of ammonia, nitrate and silicate were originating in area A and extending to offshore. Nitrate-N and ammonia concentrations indicated a clear near shore nutrient source in area A with peaks $> 8 \mu\text{M}$ for nitrate. Distribution of silicate-Si ($4 - 10 \mu\text{M}$) was higher than the values for Southeastern Arabian Sea. Enriched particulate organic carbon ($> 3.5 \text{ mg/l}$) and Chlorophyll *a* (14.8 mg/m^3) were also notable features. Higher values of nitrite, POC and chlorophyll- *a* in area A were conspicuous. The regions with high nitrite had nitrate levels up to $6 \mu\text{M}$ and the low levels of ammonia had ruled out the nitrification as the significant process responsible for nitrite accumulation. It is difficult to point out a definite source for the high nutrient values, as the fresh water discharge was at the minimum in post monsoon. A band of $\text{N/P} > 15$ funneling out from area A during non-mud bank period gave a clear indication of an 'external source' of nitrogenous compounds in the coastal water. These sources of nutrients deserve identification as it is traced to a region far away from any river mouth and the injection of nutrients was observed during non-monsoon months when mud banks were passive. Any existence of subterraneous channels might be artifacts of porous nature of the lime shell base.