ABSTRACT

Nutrient Cycling and Chemical Transformations in the Gulf of Paria

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This thesis presents the results of a study of the major nutrient forms of nitrogen, phosphorus and silicon, as well as manganese, iron, chlorophyll-a, particulate organic carbon and particulate nitrogen carried out on the Oropouche Bank in the Gulf of Paria, Trinidad. Samples of water and sediment were taken once per month between October 1989 and March 1991, except during the peak of the dry and wet seasons when more frequent samlples were taken, at four stations on the Oropouche Bank.

There was high month to month variation in nutrients with no discernible seasonal trends. Nitrate/phosphate (N/P) ratios indicated the possibility of nitrate limitation perhaps as a result of high rates of denitrification and/or low rates of nitrification, with organic nitrogen accounting for the major part of the total nitrogen. Phytoplankton biomass showed significant positive correlations with nitrate, phosphate, silicate, iron and photosynthetically active radiation (PAR). PAR and iron appeared to be more important for netplankton, while silicate appeared to be more important for nanoplankton. Correlations displayed spatial differences, but no explanations could be fowarded for this observation. Carbon/nitrogen ratios indicated a large terrestrial component. However, in the dry season these values approached that due to autochthonous production.

Inorganic phosphorus was dominant in inshore sediment with the possibility of conversion to organic phosphorus and transport offshore. Phosphorus levels in sediment were high (in mg/g range) and revealed significant contamination. Manganese and iron in sediment appeared to be mainly associated with organic matter which was mainly of terrigenous origin.