Diurnal and inter-seasonal variation of nutrients in Dhamra estuary,East coast of India: Application of multivariate Statistical techniques

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Abstract: The research article has focused on intra and inter-seasonal variation of water quality over diurnal and tidal rhythm. Two different seasons were considering for the following study, one from dry period as pre-monsoon and another from the wet period as post-monsoon during the year 2016. The hydro-chemical environmental variables were monitoredfor 15 variables*viz.*, salinity, pH, water temperature, conductivity, dissolved oxygen,biochemical oxygen demand, suspended solid, nitrite, nitrate, total nitrogen, inorganic phosphate, total phosphate, and silicate.Multivariate statistical analysis wasadopted to the data set through person correlation matrix, multi-dimensional scaling, principal component analysis and euclidean distance cluster analysis to know the loading and possible sources of nutrients input to the estuarine water column. The proposed statistical model based on PCA gave a reasonable explanation on the relation between physico-chemical parameters. The PCA extracted five factors in which the first factor attributed to influx of marine water and all the other factors (PC-2 to PC-5) attributed to river run-off during pre-monsoon or dry season. During post-monsoon season or wet period, PCA extracted 4 factors. The first two factors (PC-1 and PC-2) explained positive loading of nutrients attributed to influx of anthropogenic input. It clearly explains nutrients input through riverine system played an active role during post-monsoon or wet season. The PCA-3 and PCA-4 constitute showed less input of nutrients to the estuary. The MDS plot and euclidean distance cluster extracted 3 groups both in dry and wet season by combining 15 environmental variables. All the inorganic-nutrients were clustered in one group while other variables were makinga different grouping. This may prove the nutrients are correlated with each other and their sources might be from a common origin of influents and accumulates through riverine discharge.

Keywords: Inter seasonal and diurnal variation, nutrients, Dhamra estuary, East coast of India.

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