

Coastal Monitoring of the Persian Gulf

(North Pars Special Economic Energy Zone)

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Abstract

The nutrient concentration, benthos community structure, zooplankton community composition, sedimentology and coastal morphology, topography and hydrodynamic of environmental conditions were monitored during Feb. 2014 throughout the North Pars Special Economic Energy Zone (NPSEEZ) and Mond River Estuary using fishing boat. The environmental parameters such as temperature, salinity, turbidity, DO and conductivity were measured at the sampling stations.

The surface mean values of nutrients concentration were $7.25 \mu\text{g.L}^{-1}$, $120.68 \mu\text{g.L}^{-1}$, $4.92 \mu\text{g.L}^{-1}$ and $144.50 \mu\text{g.L}^{-1}$ for Phosphate, Silicate, Nitrite and Nitrate respectively. Statistical analysis showed no significant difference between surface and bottom (3 to 10 m) values of nutrient in the studied area ($p < 0.05$).

Four groups of macrobenthos were identified that belong to Polychetha, Mollusca, Crustacea and other benthos. Statistical analyses showed significant difference between abundance and density of benthos in study area which could be correlated with combination factors.

The zooplankton community was numerically dominated by copepods, with various meroplankton and other non-copepod zooplankton present in lower abundances. Mean zooplankton abundance calculated 1714 ind.m^{-3} (± 12.44). The maximum copepod

abundance among the 10 sampling stations was 274 ind.m^{-3} at station 8. Environmental conditions showed Pearson correlation test showed a significant positive correlation between zooplankton abundance and temperature ($p < 0.05$).

Coastal morphology and sediment dispersal patterns in NPSEEZ were studied. The coastal morphology has controlled by tectonic setting and NW-SE Shamal wind. Tidal domain have been controlled by coastal slope and coastal currents. Its domains decreased where coastal slope is steeper also tidal direction is matching by N-S coastal currents. The bottom sediments are often fine. Northern and near shore section of southern part are covered by coarser sediments where the water velocity is higher, whilst in the central part and off-shore sections finer sediments are dominated. Carbonate fraction developed in the coarser sediment and its frequency increased is from north to south, as well as, CaCO_3 has negative correlation with TOM. The organic matters linked with fine grain deposited in the off-shore and low water velocity area. Finally the result of geochemistry and heavy minerals has shown that, the sources of terrigenous sediments are often mafic igneous and metamorphic rocks that reworked from hinterland by temporary streams.

Also current velocity, water fluctuations, temperature and salinity of the Mond River Estuary were investigated at 4 stations from mouth to 20 km at upstream during two spring and neap tidal cycles in Feb. 2014. Results showed that tidal asymmetry (tidal amplitude ratio of M_4/M_2) often increases toward upstream. Estuarine currents are tidal dominant currents which have two main directions along the estuary axis. M_2 induced Current has the most influence on tidal current. The inflow of Mond River Estuary was estimated $40 \text{ m}^3/\text{s}$ at the estuary upstream. Also salt intrusion is reached

into estuary to 10 km upstream.

Keywords

Persian Gulf, North Pars Special Economic Energy Zone, Mond River, Nutrient, Zooplankton community composition, Sedimentology, Hydrodynamic