

Mud banks

The calm, turbid region in the coastal waters of Kerala are called the mud banks. Two well known mud banks are formed along the coast of Cochin and Alleppy. These mud banks appear during the southwest monsoon season. The mud gets churned up and this mud is kept in suspension making the water highly turbid. The muddy waters are free from surface disturbance because there being no waves even during peak monsoon season. Portion of the beach corresponding to mud banks are free from wave action, while regions of the adjacent beach experiences severe erosion. The mud banks act as a barrier and save the beach being eroded. These mud banks are unique in nature, which are not reported from anywhere in India. It is a periodic phenomenon taking place between Cannanore and Quilon.

First mention of mud banks recorded in 1755 by Captain Cope and described in his book entitled "A new history of East Indies". Later attempts were made to study the chemistry, physics and geology of these mud banks. Two major mud banks are formed along the coast of Alleppy and Narakkal (Cochin), two smaller ones near Calicut. Mud banks form close to the beach and extend in a semicircular shape towards the sea and maximum seaward limit being at 6 fathom lines.

To substantiate the calmness of the mud bank

- (1) According to W. King (1881) attribute to the presence of oil along with mud which causes damping of the waves
- (2) Keen and Russle attribute the calming effect to the mud itself – i.e. mud is suspension increases viscosity of water and causes damping of waves. This is also referred as liquid mud.

Generally, the mud colour is dark green and contains some forameniferan remains. The fineness of mud gives it an oily feeling consisting of 3/4th clay ($<2\mu\text{m}$ or $<0.002\text{ mm}$) and 1/4th of silt ($2\mu\text{m}$ to $20\mu\text{m}$ or 0.002 mm to 0.02 mm). The rich phosphate content of the mud was observed by Jayaraman and Sheshappa.

Underground Discharge of Mud from Backwaters

This theory was put forwarded by John Rhode in 1886. He started that the mud bank at Alleppy is formed by an underground discharge of mud by the hydraulic pressure developed during the monsoon due to the increased water level. The addition of water during monsoon season increases the hydraulic pressure from above towards the bottom. This dispels and forces the bottom mud into the sea, which moves out as underground mud. The mud volcanises and cones bubbles up and bursts at the surface forming the mud banks. This theory does not account for the lack of mud banks in Vembanad and other regions.

Wave Action on Bottom Mud

The mud of the sea bed itself is kept in suspension in the mud bank. Du-cane and others suggested that high wave generated by the pre-monsoon winds feed energy continuously to keep the mud in suspension.

Upwelling and Mud Bank Formation

This theory was put forwarded by Ramasastry and Myrland in 1959. According to this, mud bank formation is associated with upwelling and divergence near the bottom between 20 and 30 m depth along the coastline. This produces vertical acceleration resulting in lifting of fine bottom mud.

Flocculation and Deflocculation

Suspended particles in sea water either be deflocculated or flocculated depending on whether the salinity is high or low. In lower salinity conditions, particles remain in suspension, while in higher salinity condition, they get flocculated. A flocculated suspension can be deflocculated by lowering the salinity. This deflocculation takes place when the salinity falls down 2.5 ppt and flocculation above 20 ppt. Between these two salinity range, the flocculated mud gets deflocculated and kept in suspension, thus become the responsible factor for formation of mud banks.

The first two theories are doubted and combination of last two theories could possibly explain the formation of mud banks. Elsewhere in the world, artificial mud banks are created to protect the precious beaches and other coastal structures. There are reports of mud bank formation along the coast of Benguela and Peru.

Mud Banks and Fisheries

These mud banks are boon to marginal fisherman of Kerala. The calm condition facilities marginal fisherman to venture into the sea during peak monsoon season and operates the available gears to catch the maximum fish wealth. This phenomenon has left an indelible mark in the fisherman's society, which they celebrate with lot of pomp and show at the time of mud bank formation. This phenomenon is locally referred as 'chagara'. Mud banks are rich in penaeid prawns, oil sardine, mackerel, *Stolephorus* and various other soles. Since bottom mud is churned and kept in suspension, the food present at the floor of the sea is made available to various commercially important pelagic fishes, even some of the demersal forms do migrate to overlying waters for feeding. The higher phosphate content of sediment facilitates increased primary productivity leading to increased zooplankton population. Commercially important fishes tend to carry around these areas for feeding making the mud banks rich in fishery wealth.