

NUTRIENTS RICH GROUND WATER INJECTIONS TO ARABIAN SEA – ROLE IN COASTAL NUTRIENT DYNAMICS

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Southwest coastal waters of India (Arabian Sea) have a special environmental importance due to the formation of mud banks in southwest monsoon months. The present investigation in one of such mudbank regions indicated a possible subterranean flow from Vembanad Lake (Cochin Backwaters) that supplies primary nutrients to the adjacent coastal waters and precondition it for rich primary production during non-monsoon months. The activated trending faults in regions of submerged porous lime shell beds are probably coupling the adjacent watershed and the sea. Significance of this study is that subterranean flows could redefine the very concept of formation of mudbanks, which are presently recognized only as an oceanographic process. Unlike the existing theories, it is argued that formation of mudbanks are not entirely forced by coastal oceanographic processes; instead a remote forcing from the land involving a subterranean flow through the submerged coral beds, appears to be an initiative mechanism. The increased fresh water input through these passages stratifies the coastal waters by forming a surface lid of low saline waters, thereby diverting the incoming currents and wave energy to the bottom to disturb the bottom sediments. If the existence of the subterraneous channels linking Vembanad Lake to the adjacent coast is proved, it might even re-construct the historical evidence that the subterraneous flow plays a decisive role in the formation of mudbanks along this region. In view of the extreme sensitivity of Arabian Sea coastal zone to the introduction of nutrients into the Vembanad Lake, large variability in the coastal water quality can be expected on a variety of time scales. An increased delivery of fresh water and nutrients into the coastal zone can be expected during the southwest monsoon period, when the hydraulic level difference between the sea and lake is at the maximum. A sub aqueous injection of nutrients into the coastal waters through this region is possible even after the monsoon season. This assumption need further study to establish cause and affect mechanisms and quantify actual trends created by increased nutrient loading. The idea that land-use mosaic among sub-watersheds influence coastal processes such as mudbanks form an original work and this ostensible hypothesis may apply globally to any coastal regions hugged by wetlands and underlain with limestone deposits to develop into a region of mudbanks.