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Spatio-temporal evaluation of coastal pollution of Chennai city, India

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Assessment of coastal water quality is highly crucial and has a significant societal and economical implication as it sustains biodiversity, fisheries, transportation, recreation and water supply. Since 1990s, Ministry of Earth Sciences (MoES) has a program Coastal Ocean Monitoring and Prediction System (COMPAS) along the Indian coast to assess the health of the coastal ecosystem. In this paper, decadal, annual, seasonal and monthly variations of water quality parameters viz., salinity, pH, dissolved oxygen, nutrients, chlorophyll-a, primary productivity, phyto and zooplankton, bacteria off Chennai coast are evaluated for the current status. Long term (1992-2010) data for 3 transects indicate that low dissolved oxygen (~5 mg/l) levels and high concentration of nutrients (phosphates, nitrates) are mostly confined to canal, creek and rivers due to direct discharge of untreated municipal and industrial wastes. In situ monthly water quality data for 30 locations during January 2013 - June 2014 reveal strong seasonal trend and hydrodynamics play a major role in distribution of pollutants. Excess nutrients from untreated effluents have lead to eutrophication resulting occurrence of algal blooms. High chlorophyll-a (21-66 mg/l) and Phaeocystis spp. a toxin producing bloom are observed might be attributed to phosphate enriched effluents released through Couvam river affecting the entire coast. Phytoplankton species diversity index (H) falls under the category of 'Poor' (H=<2.0). Increase in pathogenic bacteria to an alarming level is observed. Based on observations, statistical and numerical analytical methods are being applied for identification of pollution sources and understanding the hydrodynamics and fate of pollutants on a spatio-temporal scale for development of a water quality prediction system for the coast for effective management.

Biography

Pravakar Mishra is currently working as Scientist- E in Integrated Coastal Marine Area Management - Project Directorate (ICMAM-PD), Ministry of Earth Science, Government of India based at Chennai. He has obtained his Doctorate degree from the University of Tokyo, Japan. He has authored/co-authored 40 research publications on beach morphology, coastal processes, coastal pollution, Kuroshio warm core rings and Oyashio-Kuroshio pelagic environment. He has been involved in various MoES programs i.e., Shoreline Management Plan for Odisha coast, Vulnerability mapping of 2004 Tsunami for Odisha and West Bengal and Predictions of Water quality for Chennai coast.

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