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The observation data confirms the existence of a longshore freshwater zone in Meimaosha area in the Changjiang Estuary during dry season. Used the three-dimensional numerical model ECOM and considered the multiple dynamic factors, this paper focuses on the formation dynamic mechanism of the freshwater ribbon zone. The calculated current velocity, direction, and salinity well match the observed data, and the phenomena of intermissive appearance of the freshwater zone at upper Meimaosha during ebb current in spring tide is produced. Validation results qualify the model of correctly simulating the hydrodynamic process in the Changjiang Estuary. As shown in the residual current field, the residual current in Meimaosha area in the south passage is mostly come into being the river discharge. Upriver freshwater passing here is the main cause of the formation of the Meimaosha freshwater zone. Under the interaction of river discharge and tidal current, the freshwater zone is temporal and spatial variation. As heavy saltwater intrusion from out sea during flood current, the freshwater zone disappeared. While the upper low salinity water is advected to the area during ebb current, the salinity reduces. The oscillation of tidal current during spring tide is much greater than the one during neap tide, it can easily bring freshwater from farther upper reaches into the area and the time interval freshwater appears. Although the saltwater intrusion from out sea is strengthened in spring tide and the salinity is serious increases during flood current, the minimum salinity during ebb current in spring tide is still lower than the one during ebb current in neap tide. The freshwater zone forms when the river discharge becomes larger, and disappears when the river discharge becomes smaller. The interaction of river discharge and tidal pump is the primary formation dynamic mechanism of the MeiMaoSha freshwater zone in the South Passage.

Reservoir de-siltation and rapid mud deposition in river and estuary - risks to ecosystem health and human uses

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The water in the estuarine portion of major river Periyar of Cochin backwater system experienced rapid changes to red in 2007. The discoloration, taste and smell changes along with high turbidity were resulted from the unprecedented action of emptying a major reservoir and the running down of the decomposed bio-waste and sediments collected in the reservoir for 18 years. Pumping and distribution of the muddy water employing the traditional treatment methods using chlorine and alum seemed to be insufficient for human consumption. Though the present crisis occurred only on account of the negligence on the part of the officials to clean the reservoir once in two years- but cleaning was never done in the last 18 years; similar openings of dam shutters can occur due to the heavy precipitations associated with climate changes. It is worthy to examine the water quality changes in the river and estuary and the manner in which the 40 lakh people depending on this river for potable water reacted to the alarming situations of the spreading of waterborne diseases and also to look into the urgent precautionary measures taken by the authorities. The turbidity level in the river had varied between 58 and 68 ntu and after treatment with alum and lime, the water quality level returned to the acceptable limits (4 - 7) ntu. The local NGOs after waiting in vain for some help to come by from the authorities concerned had to approach the judiciary for the release of water from another dam to remove the muddy water and for a direction to the government to constitute a high-power monitoring committee to take appropriate action and for the release sufficient funds to meet the situation. Growing public discontent forced the Government to release water from two other dams to check the turbidity. To pre-empt eutrophication, the authorities were forced by NGOs to step up inflow to stabilize the pH factor and oxygen content in the estuary and authorities had diverted water from another reservoir. It is high time for authorities to device mitigation plans for dam shutter openings anticipated with heavier monsoons linked with global warming.

Origin of particulate organic matter in the Yura River, Japan

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