

The eutrophication states of Jakarta, Lampung and Semangka Bays: Nutrient and phytoplankton dynamics in Indonesian tropical waters

Abstract

Eutrophication states of the three different tropical embayments in Indonesian waters were studied. Effects of anthropogenic nutrient inputs on seasonal nutrient gradients and dynamics of phytoplankton biomass were studied over a one year period in three Indonesian embayments, subjected to different levels of anthropogenic pressure. Jakarta Bay receives by far the highest estuarine nutrient load (21260 t DIN 6741 t P 52417 t Si 3/ '), followed by Lampung Bay (5003 t DIN y-1, 1096 t P y-1, 14731 t Si y'1) and Semangka Bay (1378 t DIN y-1, 419 t P , 16449 t Si y-1). As a consequence, mean annual levels of dissolved inorganic nutrients in Jakarta Bay, which accounted for 20 uM N, 5 pA4 P and 45 tiM Si, fairly exceeded those of the two other bays, resulting in high annual means of phytoplankton biomass (13 ug Chl-a 1-1) when compared to Lampung Bay (4 us Chl-a 1-') and Semangka Bay (0.8 pig Chl-a ri). In all of the bays, the phytoplankton community was dominated by diatoms. The occurrence of Dinoflagellates, Chlorophyceae and Cyanophyceae was mainly restricted to the river mouths and their surrounding waters. In total, spatial variability of parameters was much more pronounced than temporal variability, which is congruent with the moderate meteorological fluctuations typical for tropical regions. Despite high loads into Jakarta Bay, a major part still exhibits an acceptable water quality status with respect to dissolved oxygen saturation, which never falls below 50%.