EFFECTS OF STORM WATER ON WATER QUALITY OF TOKYO BAY

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Tokyo Bay is a typical enclosed sea facing highly urbanized areas where approximately 28 million of populations are living, so that enormous anthropogenic load derived from the intensive human activity has been released to it via sewer systems. Daily average amount of the treated wastewater released from the Tokyo Metropolitan sewage treatment plants (STPs) to Tokyo Bay reaches approximately 4.8 million m^3. Moreover, its sewerage has been employing a combined system where the wastewater is flowing into sewer together with storm water, consequently enormous intact wastewater has directly overflowed into Tokyo Bay without being treated at STPs because they cannot tolerate vast amounts of sewages which are transiently increased by rainfalls. Much attention has been paid to the effects of combined sewerage overflow (CSO) in terms of the release of hazardous persistent organic pollutants and postulated excess macronutrients (such as nitrogen and phosphorus) load leading to eutrophication in Tokyo Bay. However, the concrete contribution of the eventual CSO to the total load of macronutrients to Tokyo bay remains to be elucidated. We conducted a field survey at Tokyo Bay to monitor the water qualities affected by the storm water and CSO immediately after a big typhoon passed thorough in autumn of 2002 in which we had two surveying courses: one is southern offshore from Ara River (the biggest river flowing into Tokyo Bay) and another one is the Keio Channel which is most severely influenced by released wastewater from STPs including the biggest plant in Japan. Extremely high concentrations of dissolved total nitrogen (DTN: up to 6.6 mg-N/L) and phosphorus (DTP: up to 0.54 mg-P/L) were found to spread out more than 15 km southern offshore from the Ara River estuary concomitant with a surface layer comprised of high turbidity (namely, dense suspended solid) and low salinity. On the other hand, dissolved organic carbon (DOC) did not spread so extensively as DTN and DTP, implying that DOC would be more readily decomposed than DTN and DTP.