

Comparison Among Organic-Matter Parameters Observed in Tokyo Bay

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Tokyo Bay is known as one of the most-eutrophicated enclosed seas in Japan. In the bay, high levels of nutrient concentrations continue in all seasons, and cause several red-tide blooms and anoxic bottom water masses during the summer season. Although governments have controlled the nutrient and organic matter load, organic pollution level is still high to damage marine ecosystems and fisheries in the bay.

It has been discussed that organic matter in enclosed seas originated from two processes; one was the land load and the other the primary production. Primary production in eutrophicated enclosed seas has been observed to be very high especially during the summer season; photosynthesized products and their degraded substances constitute a dominant part of organic matters in the area. Precise observation and evaluation on organic matters are necessary to regulate water quality in enclosed area.

Monitoring and control of organic matter in enclosed seas have been conducted on the basis of COD_{Mn} in Japan. However, the COD_{Mn} method has been criticized because of its difficulty to present good reproducibility and its vague chemical meaning. On the other hand, recent development in the combustion-infrared method has enabled us to determine total organic carbon (TOC) of samples precisely and routinely. After acidifying and subsequent purging samples to remove inorganic carbon, the method affords precise carbon values as nonpurgeable organic carbon (NPOC). It is widely accepted that the chlorophyll *a* (Chl-*a*) concentration is a major parameter to define the primary production, and potentially describes a contribution of phytoplankton in organic matters in sea waters.

A monthly observation has been conducted to obtain an interrelation among organic parameters such as COD_{Mn} , TOC, Chl-*a* on a northeast part of Tokyo Bay, head of the bay where nutrient and organic-matter concentrations were observed to be generally higher than those for other parts. A good correlation was obtained between COD_{Mn} and TOC except samples collected from anoxic layers where many chemical elements and compounds existed as their reduced forms. The ratio TOC/Chl-*a* showed a clear seasonal change probably due to the variety in composition of organic matter and phytoplankton species. Careful considerations, on compositions of organic particles in enclosed seas, must be necessary to evaluate organic pollutions from parameters obtained with different methods, or to use one parameter alternatively as an index of organic matters.