Topic:water quality issue(eutrophication)

Eutrophycation and Oxygen-Deficient Bottom Water in Tokyo Bay

Hisako OGURA (chief researcher, Chiba Prefectural Laboratory of Water Pollution, Mihama-ku, Chiba 261-0005, Japan, TEL:043-243-2935, FAX: 043-243-2960, e-mail:VYL11027@nifty. ne. jp)
Akira IIMURA (researcher, Chiba Prefectural Laboratory of Water Pollution, Mihama-ku, Chiba 261-0005, Japan, TEL:043-243-2935, FAX: 043-243-2960)
Koichi OGUMA(professor, Chiba Univercity, faculty of engineering, Inage-ku, chiba 263, Japan)

In Tokyo Bay, the COD concentration was the highest in 1970s, but subsequent regulations of industrial wastewater have succeeded in substantial reduction of influent organics. Influent nutrients, however, could not be reduced much and the COD amount remained large because of primary production, and thus the COD concentration in the Bay continued to be at a high level. So the local governments around Tokyo Bay led factories to cut down the discharge of nitrogen and phosphorous, and in 1993 Water Pollution Control Law was amended to regulate the discharge of nitrogen and phosphorus.

Consequently, COD and T-N(total nitrogen) concentrations showed a downward trend, though only slightly, since the latter half of 1980s, with a growing expectation of improvement of the water quality of Tokyo Bay.

We are observing the oxygen-deficient bottom waterin the inner part of Tokyo Bay from 1992, which is brought about as a consequence of the eutrophication. From the results, it may be presumed that organics produced in the surface layer water (phytoplankton, etc.) had settled down to consume the dissolved oxygen in the bottom water. The fact described below also backs up the relationship of the oxygen-deficient condition of the bottom water with the DO over-saturation of the surface layer water.

We found that the oxygen-deficient water is formed more readily in the depressions where the water tends to stay more readily than on the natural sea bottom, which is considered to be responsible for the occurrence of the aoshio.

The aoshio occurs in Tokyo Bay several times from June to September every year. It is a phenomenon of where the sea water changes color to a bluish white. Specifically, the oxygen-deficient water at the bottom formed during a stratifying period wells up along the coast, contacting the surface layer water to produce colloidal sulfide ions and turning the sea water a bluish white. As the oxygen-deficient water is almost always formed at the bottom of the middle of the Bay during the stratifying period, so we could confirm therefore that the occurence of the aoshio is closely related to blowing of the north wind .

Presentater : Hisako OGURA (Poster presentation)