Changes in Transparency and Dissolved Oxygen during Recent Decade in the Sea of Harima, Japan

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An additional investigation of the water quality has been conducted once a month in the Sea of Harima since 1992, which is located in the eastern part of the Seto Inland Sea, Japan. Monitoring sites were determined in the northern sea area near industrial areas (stn.1, 2), in the central area which had a water depth of 27 to 43 m (stn.3, 4, 5, 6), and near the Akashi straight where the water is strongly mixed by the tidal current (stn.7). The transparency, water temperature, salinity and saturation percentage of dissolved oxygen (DO %) from the surface to the bottom were measured using the secchi disk, the STD (Alec AST-1000) and DO meters (Kent Model7135) once a month.

Sea states in the northern and the central parts of the Sea of Harima have shown seasonal variation, that is, the stratification was formed in the spring and developed until late summer, and broken in September. The stratification was not formed until next spring. The transparency also showed a seasonal variation. The DO % in the surface layer supersaturated for most of the sites during the period between the spring and autumn. The DO % near the bottom layers became less than 30 % at stn.5 and stn.6 in July or August. When the stratification was broken in September, the vertical DO distribution showed similar values from the surface to the bottom layer. The stratification was not formed during the year at Stn.7.

Even though the measured transparency values showed monthly and yearly changes, the moving average for twelve months showed a tendency to increase during the period of the investigation except for stn.7, which remained constant. The slopes of the regression lines for the monthly transparency changes were positive at all sites. The DO % of the surface layer often showed supersaturation during the period from April to August, which may be related to the great proliferation of phytoplankton. On the other hand, the DO % of the bottom layer at stn.5 and stn.6 decreased to less than 20 % in the summer. The slopes of the regression lines for the monthly DO % changes in the bottom layers were positive at three sites of the four sites, even though these were not judged whether or not it was statistically significant.

These results suggest that it may be an indication of the improvement of the water environment in the Sea of Harima. It seems to be related to the many policies for the improvement of the water environment in the Seto Inland Sea including the Sea of Harima which the national and local governments have conducted since 1973. We should continuously pay attention to these changes.