

Relationship between Macrobenthic Fauna and Sedimental Condition in the Seto Inland Sea

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The Seto Inland Sea in Japan is well known world-widely as one of the famous enclosed coastal sea, which is surrounded on all sides by the three large islands of Honshu, Kyushu and Shikoku, and is the largest inland sea in Japan (area; 22,000km², total coastline; 6,600km, average depth; 37m), and is connected to the open sea by three straits. The Seto Inland Sea is dotted with approximately 700 small islands, and is abundant in nature, with the major areas designated as natural parks. The average temperature in this area is 15°C, and its average annual precipitation of 1,200mm, making it mild in climate. The catchment area surrounding the Seto Inland Sea measures 47,000km², and has a population of 30 million people. This study was conducted to obtain the data about the quantity of macrobenthos in the Seto Inland Sea which considered to indicate the sedimental condition, and to assess the sedimental condition by the change of macrobenthic fauna in recent 10 years.

In order to evaluate the environmental change in the Seto Inland Sea, this area was divided into 5 km mesh, and 425 samples of the bottom sediment from 13 sea area were investigated for the second Investigation for the Environmental Management of the Seto Inland Sea (IEMS) in 1991~96. The thirteen sea area were, 1) Osaka Bay, 2) the Sea of Harima, 3) Kii Channel, 4) the Sea of Bisan-Seto, 5) the Sea of Bingo, 6) the Sea of Hiuchi, 7) the Sea of Aki, 8) Hiroshima Bay, 9) the Sea of Hibiki, 10) the Sea of Subo, 11) the Sea

of Iyo, 12) Beppu Bay and 13) Bungo Channel.

The sampling of sediment was conducted in summer. The surface sedimental samples were obtained using the Smith-Macintire type sediment sampler. The samples were treated with filtration with 1 mm-mesh stainless net and the macrobenthos were immobilized by 10 % Formalin. The species composition and the individual numbers of macrobenthos in each sample were measured, and the diversity index (Shannon Index) were calculated to assess the environmental condition of the Seto Inland Sea. To make clear the change of macrobenthic fauna, these results were applied to the comparison with the data of the past report by Water Product Agency of Japan (1979~84). In addition, sedimental quality, that is, water content, IL, grain-size distribution, COD, TOC, T-N and T-P, and water quality, that is, COD, DO, T-N and T-P which had been monitored regularly, were also analyzed for this research.

The results obtained can be concluded as follows:

- 1) The Seto Inland Sea was considered to be in the state which environmental condition is shifting from polluted condition to further polluted condition because of its macrobenthic fauna's state.
- 2) The macrobenthos mainly observed in sediment were Annelida, *Lumbrineris longifolia*, *Paraprionospio* spp. (type A and B) and *Prinospio cirrifera*, and Mollusca, *Theora fragilis*, which were recognized as the indicator species of organic pollution.
- 3) The diversity (the species composition), the individual numbers, and the value of the diversity index (Shannon Index) of macrobenthos tended to decrease in comparison with the results of the past research, and some points where no macrobenthos presents were also observed.
- 4) From the viewpoint of the environmental assessment by biotic indicator such as macrobenthos in sediment, the sedimental condition of the Seto Inland Sea was considered to be rather getting worse, compared with 10 years ago.

From these results, it was suggested that further study for macrobenthos is needed to obtain more scientific information for the environmental improvement of the Seto Inland Sea.

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