

The role of particulate matter in materials transport in Osaka Bay, Seto Inland Sea, Japan

Akira Hoshika, Terumi Tanimoto Shizuko Hirata,
Yasufumi Mishima and Kichi-ichiro Kawana

Government Industrial Research Institute, Chugoku, Japan

Particulate matter plays important role of the materials transport from coastal area to offshore water area. In coastal area like Osaka Bay, because of the kinetics of particle formation, decomposition, transportation processes, etc. vary in season, it is considered that standing stock, distribution and chemical components of particulate matter are expected to be different in each case. In this study, scientific survey has been conducted with respect to turbidity, and standing stock and distribution of bioelement (C,N,P) in two periods, a summer stratification period and an autumn circulation period of seawater. Kinds of particulate matter was classified in accordance with their existence conditions as follows: (1) total suspended particles, (2) bottom layer suspended particles, and (3) fresh sediment.

High concentration of chlorophyll-a and strong turbidity of surface water were observed in the inner part of the bay during summer period, where pycnocline and eutrophication of seawater was seriously developed, in addition to strong turbidity of bottom layer were observed in the central part of the bay rather than in the inner part of the bay. On the other hand, these phenomena were decayed in autumn period.

The standing stock of total particulate matter in summer period and autumn period were 2.19×10^5 and 1.49×10^5 ton; and that of bottom layer suspended particles were 6.28×10^4 and 2.34×10^4 ton, respectively. Increasing in total suspended particles and bottom layer suspended particles in summer period might be due to high primary production. On summer period, carbon contents of bottom layer suspended particles and fresh sediment in inner part of the bay were 85.3 mgC/g and 42.4 mgC/g respectively, but their standing stock were lower than 10g/m^2 . In addition bioelement contents of bottom layer suspended particles decreased remarkably going from the inner part of the bay to the offshore water area; on autumn period, however, these contents were not so different throughout the bay.

Our results suggested that the differentiation of particulate transport from inner part of the bay to the off shore in the stratification and the circulation period might be due to the presence of strong pycnocline developed in the inner part of the bay.