

EVALUATION OF SEDIMENT QUALITY FROM VIEWPOINT OF BENTHIC METABOLISM

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As a result of eutrophication in enclosed coastal seas, not only water pollution but also deterioration of sediment quality is very prominent in many places. Deterioration of sediment quality seriously affects benthic ecosystem mainly because polluted sediment causes depletion of dissolved oxygen in bottom water and formation of toxic substances such as hydrogen sulfide.

In order to evaluate sediment quality from the viewpoint of benthic metabolism and benthic ecosystem, sediment samples monthly collected from 15 stations of 5 coastal areas in Japan during summer season were analyzed for oxidation reduction potential (ORP), acid volatile sulfide (AVS-S), ignition loss (IL), sediment oxygen demand (SOD) and macrobenthic biodiversity.

As a result, quantitative relationship among ORP, AVS-S, SOD and biodiversity index H' of macrobenthos community was established. From these results, it is concluded that among sediment parameters, level of ORP and AVS-S is primarily important in determining in the benthic biodiversity. Under the high ORP and low AVS-S condition when SOD was always not so high, high H' values were generally observed. In this condition, it is expected that a variety of benthic organisms decompose sediment organic matter and supply oxygen to the sediment through bioturbation and water circulation. On the contrary, under the anoxic condition, deterioration of sediment quality has a serious impact on the benthic community which then accelerates the deterioration of sediment quality. This can be termed as "negative feedback" of sediment quality deterioration. Therefore, for the sustainability of both benthic community and sediment quality, it is recommended that sediment quality should be maintained at least at a level better than that of -50mV of ORP (Eh) and 0.2 mg/g dry sediment of AVS-S.