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The nutrient load from the land influences the nutrient concentration in enclosed coastal sea. On the other hand, even if the fishery damage that the nutrient state relates is caused, it is difficult to solve such problems, because extent where the nutrient load from the land influences the sea area water quality is not revealed yet. Then, in Bisan-Seto (central area of the Seto Inland Sea), a research project is started to clarify the behavior of the nutrient from the source (land) to coastal sea consistently. In this project, we are trying to specify the region where the possibility that the fishery damage occurs is high. And, by recycling underground water, we are aiming at technological development to decrease the nutrient concentration of the underground water at the farmland that is the nutrient source. This time, the outline of this project and the characteristics of Bisan-Seto are explained.

1. Outline of this research

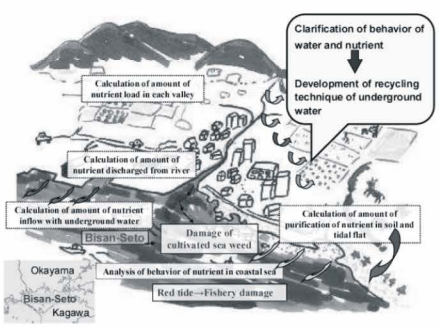
This study project is composed of the item chiefly shown as follows, and shows the image in Figure1.

1) Calculation of behavior of nutrient that discharged from river and underground.

2) Calculation of amount of nutrient purified in soil and tidal flat.

3) Presumption of behavior of nutrient in coastal sea.

4) Development of recycling technique of nutrient contained in underground water in farmland



2. Characteristic of Bisan-Seto

In order to clarify the characteristic of Bisan-Seto, we analyze the water quality data observed by Kagawa Prefecture and Okayama Prefecture. And using these data, numerical model experiments are carried out to calculate water flow field. As a result, the following fact was clarified.

1) The stratification doesn't develop enough even in summer, because tidal current is strong.

2) The nutrient concentration is usually low, except near the shore.

3) The nutrient concentration reaches the maximum value in autumn, though the cause cannot be clarified.

4) Because the stratification doesn't develop in summer, the seasonal variation of residual current is not found except around river mouth.

Nutrients, organic carbon and oxygen budget in semi-enclosed Ago Bay, Japan

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Ago Bay is a small semi-enclosed coastal water body of Japan and is well known as the birth place of the pearl culture. The culture began about a century ago and the production reached a peak point about 40 years ago. Since then, the production has declined and the present production had fallen down to the one fifth of its peak point. The deterioration of the marine environment has become serious in recent years, but it is unclear whether the long usage of the water body by the culture is the cause. The sediment quality in terms of COD at the bay head area has increased and had exceeded far the local regulation limit. The settlement of hypoxic water mass in the bay head area continues during warm season, every year.

Mie Prefecture, which is the local government, had conducted the corresponding research project called CREATE for five years. The outline of the project was presented on the EMECS 7 conference1) to 4). This article reports a

conclusive result for the material budget around the bay. Nutrients, organic carbon and oxygen are the materials of subject, since the cause of the environmental deterioration was presumed to relate to the change of organic matter pathway in the bay.

The data for standing stock, flux and reaction rate of regarding materials were gathered by the extensive observations and the laboratory experiments performed during the project. Then, these data were utilized to set up numerical models, which played a role to produce data for material budget. The models consist of the catchments area model, the hydrodynamic model of seawater, the pelagic water quality model and the sedimentation model. Many features of the material flow in the bay were disclosed through the analysis. An important result is that the contribution of organic matter load to the seabed by the pearl cultivation was quantified. Fig.1 shows the Particulate Organic Carbon (POC) depositioning flux from the pearl oyster is 50 ton yr-1 which corresponds to only 3% of total POC depositioning flux. This result, therefore, changes our view of the deterioration process of the sediment in the shell cultivating sea area. Fig.2 shows Organic Carbon (OC) budget in the sediment, which brought us the information about the degradation pathway for OC in the sediment at the different location in the bay. We will show comprehensive results for material budget of Ago Bay in the conference, including some results for evaluation of the future restoration activity.

References for EMECS 7; 1) S.Chiba, Session 1-7, 2) Anggara Kasih, Session 1-8, 3) T.Kato, Session 3-4, 4) S.Chiba, Session 3-5

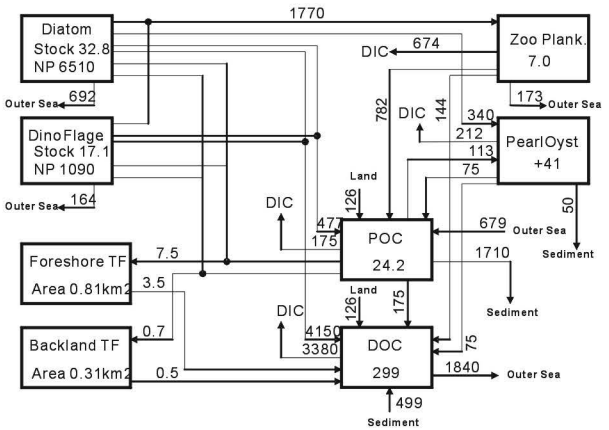

Fig.1 Yearly budget of organic carbon in the entire bay (ton year^{-1}); the data is the sum of the transport, production and consumption. TF means tidal flat

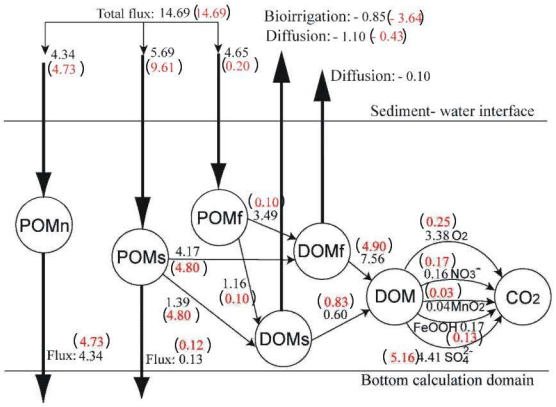

Fig.2 Yearly budget of organic carbon in the sediment (mmol m^{-2} day^{-1}); the values with parenthesis are for the bay center area and those without parenthesis are for the bay head area, respectively

The improvement of the bay environment recorded in a sediment core at Asou Bay in the Tsushima Island, southwestern Japan

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The Tsushima Island is located between the Japanese Islands and the Korean Peninsula, eastern Asia. Asou Bay is present in the middle part of the Tsushima Island. The bay opens to the west and is connected to Miura Bay on the east through the Manzeki-seto Strait, which is an artificial strait and was constructed by the Imperial Japanese Navy in 1900. At that time, the strait was 40 m wide and 4.5 m deep. Afterward, it was extended and dredged in 1975 (width: 40m, depth: 4.5m). We collected a sediment core 18 cm thick in the inner part of Asou Bay (34° 18.069' N, 129° 20.869' E, 16 m in water depth). The core was sliced in 5 mm thick, and 36 samples were obtained. We conducted several analyses to reconstruct the temporal changes of depositional environments; gamma spectrometry (^{210}Pb and ^{137}Cs) analysis, CHN (total organic carbon (TOC) and total nitrogen (TN)) analysis, grain size analysis and meiobenthos (Crustacea: Ostracoda) analysis.

As a result, the sedimentation rate based on ^{210}Pb and ^{137}Cs dating was 0.11 cm/year. Therefore, the estimated age for 18 cm level is about 150 years. The C/N ratio is constant before the 1900s and