Impact of Marine Fish Cage Farming on Enclosed Coastal Sea Environments

Shigeru Montani

Kagawa University,Japan

Since the past three decades, fish farming using pen has developeed in the coastal areas throughout the Seto Inland Sea, Japan. The farming fisheries here make an annual catch of about 400,000 tons. However, this new style of fishery is often accompanied with serious organic pollution of the water and bottom sediment in the vicinity of the cages, since approximately 90 % of the baits for fishes results in organic discharge to the environment around the fish farm. The organic pollution tends to cause depletion of dissolved oxygen in the bottom water and production of high level of hydrogen sulfide in the sediment in summer.

This work was designed to investigate, from the chemical point of view, the fate of bioelements such as carbon, nitrogen, phosphorus and silica introduced by feeding into fish farming cage culture through integrated studies of their consumption, transformation processes by organisms and scavenging mechanisms. Coordinated field investigations were conducted on (1) distribution of nutrients and suspended particles, (2) estimation of bioelements fluxes by sediment trap experiments, (3) processes of deposition and scavenging of bioelements in water culumn and sediment.

The results of the present study clearly established a conceptual model of carbon budget in the vicinity of the fish farming cages. An approximately 90 % of the food carbon for the yellowtail culture results in organic discharge to the environment around the fish farm. However, only 1.3 % of the food carbon sinlks and bury in sediment just below the fish farm.