

# 生態系モデルの鎮海湾への適用

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## Abstract

In order to evaluate the influence of shellfish farming on water quality, a hydrodynamical and ecological coupled model was applied to Chinhae Bay. We compared results of simulations that included and excluded the presence of farmed shellfishes.

From the hydrodynamic simulation, Chinhae Bay has a calm current system except at the mouth. Bay water exchanges with open sea water through the Caduk and Central channels.

From the simulation that included farmed shellfishes, it was estimated that shellfishes ingested 34% of phytoplankton primary production (including zooplankton and detrital matter), and egested 70% of that organic matter in the form of fecal pellets. Thus according to the simulation, farmed shellfishes reduced the standing stocks of phytoplankton, zooplankton, and POC from water throughout the Bay by 325 tons, 19 tons, and 821 tons respectively. The phytoplankton biomass in this simulation reduced the organic matter the produce which also means a low COD value (concentration). In contrast, amounts of DIN and DIP increased to 508 tons and 50 tons respectively, through fecal pellets excreted by the shellfishes. The nutrient flux from the sediment also increased as a result for these pellets depositing on the sea bed. For example, the DIN and DIP flux from the sediment were approximately 10 and 2 times higher than simulations run excluding shellfishes. Based on these simulation results, it appears that shellfish farming has a great impact on the coastal ecosystem.