

Physical observation methods in the artificial upwelling area

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The R&D of the artificial upwelling system is focused on the expansion technology of CO₂ sinks in the ocean based on the large capacity of the ocean for carbon storage. An Artificial Upwelling System is the technology of generating an upwelling using natural energies, such as a tidal current, combined with the submarine structure, for enhancement of plankton photosynthesis by supplying oceanic macronutrients.

Objective of this study is confirmation of the physical processes concerning the artificial upwelling system using Observation, proposal of effective observation technique. This knowledge was used for evaluation of the effective area and amount of upwelling for CO₂ fixation by the upwelling system.

The observation was executed by the cooperation of Nagasaki university, Tokyo University of Marine Science and Technology, Nagasaki Prefectural Institute of Fisheries, Ikitsuki fishermen's cooperative.

Results of the field observations, clear upwelling phenomenon was measured in the data of echo intensity by ADCP and temperature, salinity and density by MVP. On the other hand, Turbulent flow caused by the marine structure was shown in the TurboMap data. As a result of the observation by various methods, ADCP, MVP and TurboMap were most effective for the observation of the artificial upwelling area.