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Abstract

Biological effects on the case study of ocean carbon sequestration in the subtropical ocean were investigated. Although various organisms are living in the ocean, as copepods is the most dominant zooplankton in the ocean from the surface to the deep sea, we use copepods as a model organisms of the biological effects. We considered the effect on 3 viewpoints; direct collision, acute and chronic mortality.

One is the direct collision of each animal with liquid CO_2 droplet. Although there were the rising liquid CO_2 droplets in the sequestration zone, the mortality rate of zooplankton by the collision with liquid CO_2 droplets was supposed to be small, because zooplankton individuals was expected to move on the stream neighbor of liquid CO_2 droplet and to avoid the striking. Second point is the acute lethality resulted from the exposure with the dense concentration of CO_2 during the dissolution of liquid CO_2. From the acute experiments using the pelagic copepods, no observed effect concentration (NOEC) was estimated as 5,000 μ atm. The last point is a long-term effect of the diffused CO_2 in the ocean. The predicted non-observable effect concentration (PNEC), which no organisms in the ecosystem were affected with the target chemicals, was proposed as a threshold of the long-term effects. PNEC of sequestrated CO_2 was estimated as 500 μ atm calculated with NOEC and the assessment factor. The Assessment factor in the case study was selected as 10, because the NOEC about the reproductive effect of copepods was obtained.

Although the sufficient biological data does not obtained, we can overlook the approach of the biological assessment through the case study. Further accumulation of biological data, e.g. various species or chronic data, is required.