

SOLAS Korea

compiled by Kitack Lee

1. Scientific highlights

Enhanced DMS production due to grazing activity in greenhouse world

We examine the effects of seawater $p\text{CO}_2$ concentration (400 and 950 ppm) and temperature (ambient and 2.5°C higher) on the DMS production from a natural assemblage of mixed phytoplankton obtained from a carefully controlled, 21-day mesocosm experiment. This experiment was carried out between 26 November and 17 December 2008, in Jangmok (34.6°N and 128.5°E), located near the southern coast of Korea. During the experimental period, in all treated enclosures (high CO_2 and high CO_2 /high temperature), the population of microzooplankton increased considerably relative to that in controlled enclosures. Grazing activity was also enhanced in the treated enclosures. Consequently, the production of DMS (high $p\text{CO}_2$ and high $p\text{CO}_2$ /high temperature) was substantially higher in the treated enclosures than in the controlled enclosures. Our study indicates that grazing-induced DMS production can be enhanced in the future greenhouse world [1].

1. Kim, J.M. et al. (2009) *Enhanced DMS production due to grazing activity in greenhouse world, in preparation.*

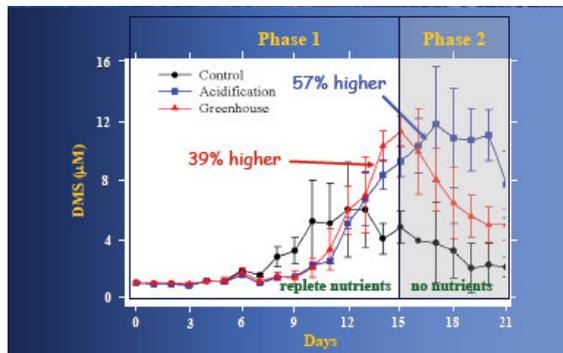
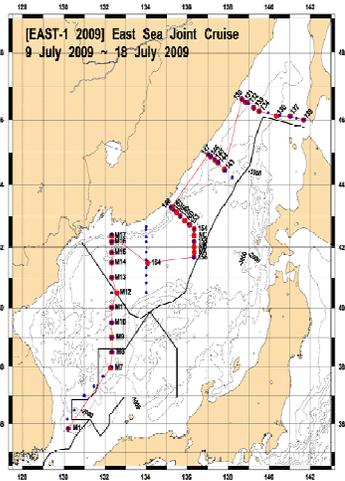


Figure. (left) Mesocosm enclosures used in the present study. (right) DMS concentrations in controlled, high CO_2 , and high CO_2 /high temperature enclosures

2. Main accomplishments (research projects, cruises, special events, workshops, outreach, capacity building, remote sensing used etc)



The East/Japan Sea in the western temperate North Pacific is ventilated from the surface to the bottom over decades. This short overturning circulation indicates that the anthropogenic CO₂ content of the East/Japan Sea is intimately tied to changing surface conditions over similarly short periods. As a consequence of the changing nature of the East/Japan Sea, this basin is an excellent site for investigating temporal trends in oceanic uptake of anthropogenic CO₂ in response to regional or global climatic change. As part of the East Asian Seas Time-series-1 project (funded by the Ministry of Land, Transport and Maritime Affairs of Korea), the 2009 data were collected on the Russia *R/V Akademik M.A. Lavrentyev* from 9–18 July 2009 (Figure). A team of 33 scientists from six institutes (POI, SNU, POSTECH, PNU, CNU, KDU) was participated in this cruise. At 38 hydrographic stations salinity, temperature, oxygen and nutrient concentrations were measured, and concentrations of total dissolved inorganic carbon and total alkalinity were determined at 27 of these stations. Total inorganic carbon and total alkalinity were measured using coulometric titration and potentiometric acid titration in a VINDTA system.

3. Top 10 publications in 2009 (Reports, articles, models, datasets, products, website etc)

1. Kim, H.C., K. Lee, 2009, Significant contribution of dissolved organic matter to seawater alkalinity, *Geophysical Research Letters*, 36, L20603, DOI:10.1029/2009GL040271 (2009/10/20).
2. Park, G.-H., K. Lee, P. Tischchenko. 2008, Sudden, considerable reduction in recent uptake of anthropogenic CO₂ by the East/Japan Sea." *Geophysical Research Letters*, 35, DOI:10.1029/2008GL036118. (2008/12) "Selected as Editors Journal Highlights".

4. International interactions and collaborations

5. Goals and plans for future activities

6. Other comments