The estimate of the denitrification using nitrogen gas excess in the Sea of Okhotsk

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Backgrounds

Nitrogen Cycle in the Ocean
Nitrogen (N) cycle in the ocean balances with biological source (N₂ fixation) and sink (denitrification). Most recent studies suggest that the oceans are on balance, losing fixed nitrogen, but the magnitude of the net loss is not well quantified [Codispoti et al., 2001, 2007].

The Sea of Okhotsk
Dense shelf water (DSW)
⇒Okhotsk Sea Intermediate Water (OSIW)
⇒North Pacific Intermediate Water (NPIW)
(e.g., Ohshima and Martin, 2004; Yasuda, 1997)

The Sea of Okhotsk has the same trends as global, which has been caused by weakening of formation/circulation of the NPIW as a response to the reinforcement of ocean stratification (e.g., Watanabe et al., 2001).

The occurrence of denitrification in benthic water of the western basin by a low N* (denitrification) and sink (nitrogen fixation) and sink [Codispoti et al., 2001, 2007].

Methods

Study sites and data
We obtained the seawater samples of dissolved gas properties from 10m to bottom depth and determined the precisions of N₂, Ar and O₂ by using a high accuracy GC method (Tanaka and Watanabe, 2007). The analytical precisions of N₂, Ar and O₂ were 0.04%, 0.05%, and 0.02%, respectively.

Result and Discussion

N* and O₂ concentration profile

Concept for estimating N₂ excess in the seawater

Estimate of the rate of denitrification

Results and Discussion

References