[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-OS Ocean Sciences & Ocean Environment

[A-OS09]Marine ecosystems and biogeochemical cycles: theory, observation and modeling

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The ocean accounts for about 50% of global net primary production. This production is significant for carbon cycling and ecosystem functioning, and is related directly or indirectly to a variety of climatic and ecological phenomena. The responses to natural and anthropogenic environmental stressors that influence marine production and diversity can cause perturbations to marine ecosystems that alter trophic dependencies and interactions among organisms at a range of space and time scales. Quantification of the principal mechanisms driving spatio-temporal variability of marine ecosystem remains to be done, especially in terms of evaluation of uncertainty in responses. As a result, evaluating vulnerability of marine ecosystems to environmental change requires systematic and holistic approaches that integrate physics to ecology and are based in observations and modelling. This session aims to provide a venue for discussing recent advances in understanding marine biogeochemical cycles, ecosystems and their interactions. Observational and modeling studies that consider linkages between biogeochemical and ecosystem processes, biodiversity and biogeochemistry, and the effects of multiple stressors are especially encouraged.

[AOS09-P04]Investigation of the relationship between salinity and stable oxygen isotope of surface seawater based on high resolution δ^{18}O mapping in Tsushima warm current area and the Sea of Japan

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Stable oxygen isotope of seawater (δ$^{18}O_{sw}$) correlates with salinity, because δ$^{18}O_{sw}$ varies by the effects of evaporation, influx of fresh water, etc. Besides, this correlation is also changed by regional and seasonal characteristics of those effects. Recently Horikawa et al. (2015) and Kodaira et al. (2016) reported the relationship between δ$^{18}O_{sw}$ and salinity in the Tsushima warm current area, from the East China Sea to the Sea of Japan. On the other hand, the details of seasonal and yearly fluctuations of δ$^{18}O_{sw}$ for each area are not well understood. In this study, we conducted sampling of the surface seawater in the Sea of Japan and the East China Sea in a wider area to detect the variations of relationship of δ$^{18}O_{sw}$ and salinity. Then, we verify the consistency with previous studies and calculate δ$^{18}O_{sw}$-salinity relation formula for each area.

Seawater samples used for the study were sampled at more than 100 stations by using a bucket or a pump on the ship, from 2015 to 2017, in the East China Sea and the Sea of Japan (30 - 43 degrees north latitude: 124 - 140 degrees east longitude).

For the analysis, δ$^{18}O_{sw}$ and δD_{sw} were determined by using a cavity ring-down spectroscopy

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stable isotope ratio analyzer (CRDS: Picarro L2130-i) and a customized continuous-flow stable isotope ratio analytical system (Headspace CO2 equilibrium method: MICAL3c + IsoPrime). Salinity was measured using a sensor calibrated with Autosal or Autosal.
The relation of δ$^{18}O_{sw}$-salinity obtained in this study was roughly in agreement with the previous studies on the Tsushima warm current area. The slope of the relational expression was slightly different between the East China Sea and the Tsushima Strait. Furthermore, as a result of detailed comparison in the eastern part of Tsushima Strait, intercepts of relational expression were different between the middle of the Sea of Japan, Tsushima Strait and Toyama Bay. These results indicate that there will be the possibility that the δ$^{18}O_{sw}$ -salinity relationship differs among each sea areas. In this study, we will also discuss the d18Osw data of seawater sampled after the autumn of 2017 for each area.
Hereafter, we plan to proceed with seawater sampling for δ$^{18}O_{sw}$ with high temporal-spatial resolution (e.g. vertical sampling in water column and seasonal sampling) in the East China Sea - the Sea of Japan to detect the characteristics of δ$^{18}O_{sw}$ variations. The findings obtained are expected to bring us important information to discuss related studies, for example, elucidation of migration history of fish based on δ$^{18}O_{sw}$ analysis of fish otoliths, and formation process of Japan Sea proper water.

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