[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

convener:Shin-ichi Ito(Atmosphere and Ocean Research Institute, The University of Tokyo), Takafumi Hirata(Faculty of Environmental Earth Science, Hokkaido University), Eileen E Hofmann (共同), Enrique N Curchitser (Rutgers University New Brunswick)

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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-P06]Plankton diversity and community structure based on a cabled observatory data

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Understanding the planktonic community structure is fundamental for the complete comprehension of the ecological and ecosystemic importance of marine life. Due to their tight coupling with – and non-linear response to – the environment, the planktonic community can be used as indicators for environmental changes, which could potentially lead to ecological and economical implications. In this context, a multi–parameter cabled observatory (CO) covering physical, biological and chemical environment was deployed near Habu harbor at Oshima Island, Japan. This CO also included a plankton imaging system and gathered a data set over the time span of two years. Analyzes of plankton community composition and alpha diversity were conducted in order to elucidate the local plankton dynamics. The following conclusions were obtained: a. plankton alpha diversity showed a seasonal pattern and decreased towards winter; b. an inter-annual variability in diversity was correlated to a difference in water mass composition; c. the alpha diversity power spectrum density showed a 1/f power law signature (“pink noise”) slope, with peaks at a daily frequency that were correlated with zooplankton diurnal vertical migration; d. marine aggregate dominated with at least 75% of the total particle abundance. These findings are novel in the scientific literature and represent the value of a high-frequency observational approach that covers the planktonic ecosystem.

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