Monday, October 8
Poster Session 1
16:00–18:00

Poster 200

SPATIAL VARIABILITY IN THE PHOTOPHYSIOLOGICAL RESPONSE OF PHYTOPLANKTON THROUGHOUT THE SOUTHERN OCEAN

Phytoplankton photophysiology in the Southern Ocean (SO) is generally controlled by bottom-up processes, namely limited concentrations of bioavailable trace metals and variability in light. Spatial differences in environmental conditions and the taxon-specific responses to those conditions results in spatial heterogeneity of phytoplankton photophysiology across the SO. However, our understanding of the dominant drivers of this heterogeneity as well as its consequences is limited. We present a spatial analysis of phytoplankton bulk community photophysiological parameters recorded using flow-through and bench-top fast repetition rate chlorophyll-a fluorometers during the Austral Summer of 2016/2017 as part of the Antarctic Circumnavigation Expedition on-board the RV Akademik Tryoshikov. Continuous measurements of single turnover fluorescence induction are analysed for the spatial patterns in the efficiency of light harvesting (PhiPSII and SigmaPSII), regulation of the PSII turnover time (TauPSII) and induction of non-photochemical quenching (NSVPSII). Fluorescence light curves revealed the spatial heterogeneity in electron transport parameters (ETRRCII, alphaRCII and EKRCII). The maximum rate of electron transport was highly variable across the voyage track. Phytoplankton communities in the Indian and Atlantic Ocean sectors with higher chlorophyll-a, higher POC biomass and dominated by microplankton demonstrated higher light use efficiencies (alphaRCII and SigmaPSII) and lower electron transport saturation irradiances (EKRCII). The depth-distribution of dark-regulated photosynthetic traits was also investigated using discrete depth samples at 26 stations along the voyage track. The influence of environmental conditions and phytoplankton community structure and biomass on the phytoplankton photophysiological response is explored.

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