Wednesday, October 10
Poster Session 3
16:00–18:00

Poster 87

SYNCHRONICITY OF MICROBIAL COMMUNITIES IN THE NORTH PACIFIC SUBTROPICAL GYRE

Optical properties are excellent proxies for particle concentration, size, and primary production in the open ocean. We find that the dynamics of microbial growth and abundance in the North Pacific Subtropical Gyre (NPSG) is so intrinsically linked to the light cycle that their collective activity can be captured by bulk changes in optical properties. Here, we describe diel changes in particle concentration, size, production and diversity in the NPSG obtained from high-resolution underway flow-through observations of beam attenuation and particulate backscattering coefficients, particle size distributions (LISST), dissolved oxygen, and imaging flow cytometry data (IFCB). We observe striking coherence between particle concentration estimates (LISST and IFCB) and beam attenuation, oxygen, and particle backscattering. These optical proxies for particle concentration are minimal at dawn and maximal at dusk. This pattern is consistent with the idea that, as a whole, microbial communities double in size, divide, and increase in concentration (and hence carbon) during the day when light is available. Phytoplankton-specific IFCB data corroborate these bulk observations. We observe variation in the amplitude and baseline of diel cycles over time and space. Importantly, these features appear to be related to the seasonal variability and abundance of grazers and detritus. Optically-derived production estimates agree well with incubation-based productivity measurements. We find that medium-sized particles (~2-20 micrometers) control the distribution of bulk optical properties, and that mesoscale features such as eddies modulate community structure and production. These results may help better inform future models of the pathways and fates of carbon in the subtropical ocean.

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