

Diagnosing export pathways in the biological pump: A first look at sediment trap data from the EXPORTS North Pacific field campaign

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The magnitude of particulate carbon export from the upper ocean and the efficiency of its transfer into the interior are among the least predictable processes influencing the global carbon cycle. NASA's EXport Processes in the Ocean from RemoTe Sensing (EXPORTS) program aims to develop and improve models that predict the strength and efficiency of the biological pump using ocean color remote sensing data. This requires collection of detailed physical, chemical, and biological observations that together can be used to resolve the many pathways and mechanisms that contribute to the biological pump. The first EXPORTS field campaign to Ocean Station Papa (50°N, 145°W) in the North Pacific in August 2018 resulted in the collection of one of the most comprehensive observational datasets of the biological pump to date. We carried out three cycles of sediment trap deployments during the month-long occupation of the field site, and during each cycle there were 5-6 neutrally-buoyant sediment traps (NBSTs) and a 5-depth surface tethered trap array (STT) in the water, spanning depths from 95-500 m. All traps collected bulk particle flux samples and carried polyacrylamide gel traps to collect samples for optical microscopy and sequencing analysis. We will present bulk elemental fluxes and attenuation length scales, and examine them within the context of the broader physical and biological environment sampled during the cruise. Using observations from replicate trap platforms drifting a few kilometers apart, we will also discuss sources of variability in particle flux measurements collected by sediment traps during the campaign.