

A Decade of Net Community Production in the North Pacific from Biogeochemical Profiling Floats

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Over the last decade, the emergence of an international network of autonomous profiling floats equipped with biogeochemical sensors (BGC Argo; biogeochemical-argo.org) has enabled in-situ observations of basin-scale biogeochemical processes. In the Northeast Pacific, six floats have been reporting measurements since 2008 in the vicinity of the NOAA Station Papa mooring. In this study, we present rates of Net Community Production (NCP), an analog of carbon export, over seasonal-to-annual timescales calculated from budgets of NO_3 , O_2 , dissolved inorganic carbon (DIC) and total alkalinity (TA) based on observations from the floats, mooring, and regionally-tuned hydrographic algorithms. With multiple geochemical budgets, we are able to deconstruct these estimates of NCP into pools of particulate (POC) and dissolved (DOC) organic carbon, as well as estimate inorganic carbon (PIC) production by calcifying organisms. By extending these budgets downward in the water column, we are also able to estimate export across various depth horizons and evaluate the accuracy of satellite-based carbon export algorithms over the same time period. In collaboration with the NASA EXPORTS program, we are using the historical float dataset to frame their September 2018 North Pacific field campaign within the context of regional biogeochemistry over the last ~10 years. Additionally, we have deployed two new BGC Argo floats equipped with additional pH sensors for continued observation over the next ~5 years. We will summarize findings from the compiled decadal dataset and discuss observational opportunities made possible by ‘fully-loaded’ biogeochemical floats.