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Sea-ice derived meltwater stratification slows the biological carbon pump: results from continuous observations

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The ocean moderates the world's climate through absorption of heat and carbon, but how much carbon the ocean will continue to absorb remains unknown. The North Atlantic Ocean west (Baffin Bay/Labrador Sea) and east (Fram Strait/Greenland Sea) of Greenland features the most intense absorption of anthropogenic carbon globally; the biological carbon pump (BCP) contributes substantially. As Arctic sea-ice melts, the BCP changes, impacting global climate and other critical ocean attributes (e.g. biodiversity). Full understanding requires year-round observations across a range of ice conditions. Here we present such observations: autonomously collected Eulerian continuous 24-month time-series in Fram Strait. We show that, compared to ice-unaffected conditions, sea-ice derived meltwater stratification slows the BCP by 4 months, a shift from an export to a retention system, with measurable impacts on benthic communities. This has implications for ecosystem dynamics in the future warmer Arctic where the seasonal ice zone is expected to expand. (Published in Nature Communications, December 2021, <https://www.nature.com/articles/s41467-021-26943-z>)

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