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“IT WAS VERY EXCITING IN THOSE DAYS.
WE WERE EXPLORERS.”

Marie-Tharp [1920-2006], Oceanographer

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Physical-Biogeochemical Coupling in Polar Regions: Refining New Nitrogen Fluxes



Ecosystem biomass in the Arctic Ocean is limited by bioavailable nitrogen (N) concentrations. However, there remain key unknowns in the Arctic nitrogen (N) cycle, particularly in the context of biogeochemical-physical coupling under global change.

Here we review the current understanding of new N fluxes into and within the Arctic and assess the potential for new physical and biogeochemical data to constrain estimates of current and future fluxes. Key injection processes of interest include N-fixation, double diffusion, turbulent mixing, remineralization of allochthonous dissolved organic matter and sub-mesoscale/mesoscale processes. We briefly consider N losses, including denitrification and particle export. We identify the scales where physical – biogeochemical coupling is particularly important for N injection, and export, of new nitrogen into and out of the euphotic zone.