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Sea ice as a habitat: A combined observational and modeling approach

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Sea ice is a key component of polar oceans, and its persistence for several months or even year-round, shapes the dynamics of the surface ocean over time and space, influencing biogeochemistry and the entire pelagic ecosystem -from microbes to marine mammals. Especially for those organisms that live inside the ice (sea ice algae) or in its close proximity (sympagic zooplankton), sea ice creates a very special habitat limiting the amount of light available as well as the amount of nutrients. Understanding, measuring and modeling how sea ice affects the transmission of light is crucial for properly representing ecosystem phenology, such as algal bloom and zooplankton seasonal migration. At the same time, the flux of nutrients at the ice-ocean interface is key in quantifying biomass accumulation in sea ice and thus feed availability for zooplankton. By combining in-situ observations, data collected with newly developed ice-tethered systems, and modeling efforts, the present work provides new insights into how sea-ice and its properties shape the phenology of Arctic marine ecosystems.