

## Prospects for near-term Antarctic sea ice prediction and implications for biological systems

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Antarctic sea ice undergoes a large annual cycle and varies considerably on interannual timescales. This variability is driven in large part by anomalous atmospheric circulation that affects both ice transport and surface heat fluxes. Variations in sea ice can in turn affect the underlying ocean by modifying shortwave heating and freshwater exchange. The associated ocean anomalies can act as a source of memory in the Antarctic system, and through subsequent impacts on ice conditions, can provide predictability for sea ice on seasonal to interannual timescales. Given the influence of sea ice on light availability for the marine ecosystem and open water access for marine predators, this also has implications for the biology of the Southern Ocean. Here we use observations and models to explore the mechanisms giving rise to Antarctic sea ice predictability and assess how and why this varies regionally. Using results from the Community Earth System Model, we analyze the implications for marine biogeochemistry and discuss other potential impacts on the biology of the region.