"ACCESS-OM2-01 with biogeochemistry captures the impacts of the recent Antarctic sea ice minima on the decline of primary production by sea ice algae."

Interannual variability of primary production by algae in Antarctic sea ice during the satellite era

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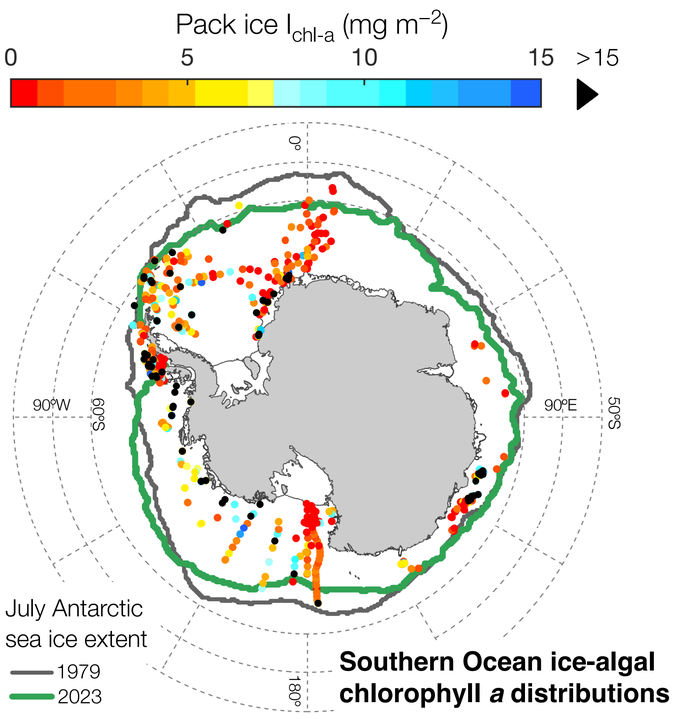
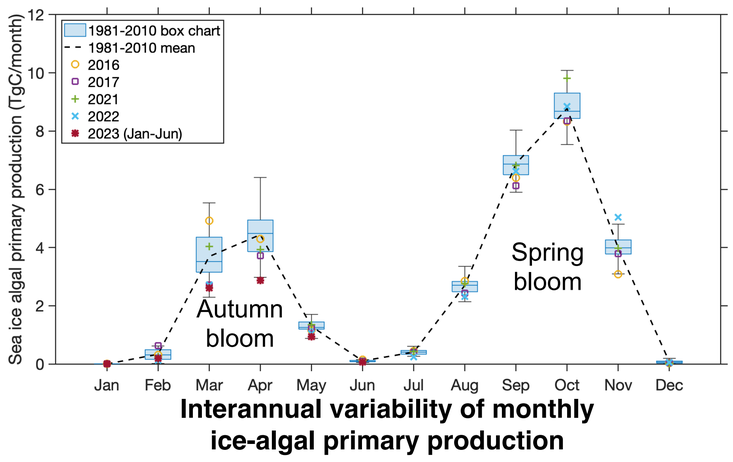
Observations of primary production by algae in Antarctic sea ice are discontinuous, sparse, and under-described.



Southern Ocean ice-algal chlorophyll *a* distributions

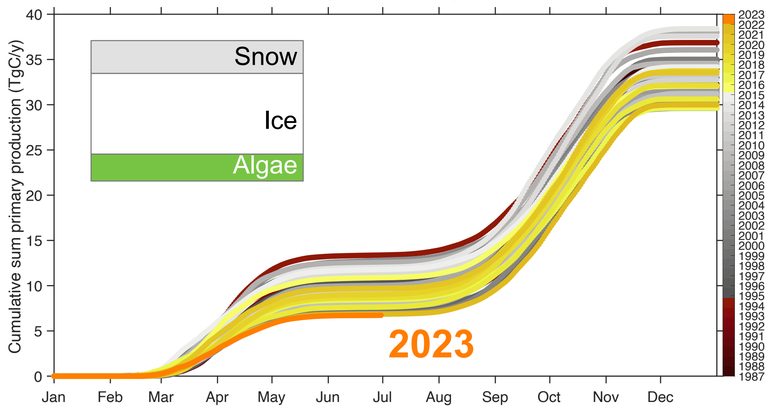
We use a high-resolution (0.1°) ice-ocean-biogeochemistry model of the Australian Community Climate and Earth System Simulator - Ocean Model version 2 (ACCESS-OM2-01)[1]. The biogeochemical model is composed of the Whole Ocean Model of Biogeochemistry and Trophic-dynamics (WOMBAT[2]) and the CICE 5.1[3].



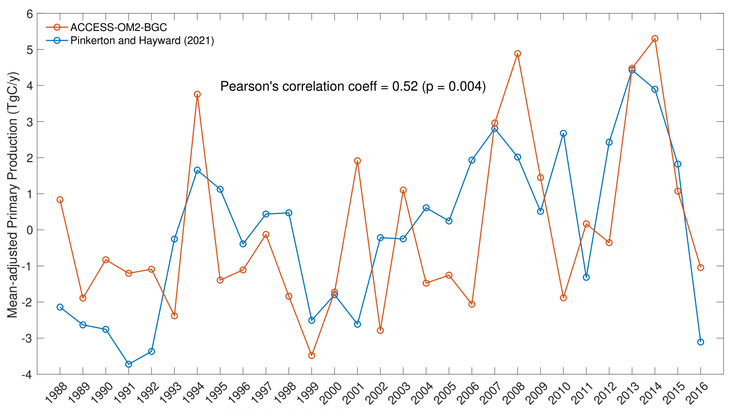
Interannual variability of monthly ice-algal primary production

Key Point 1: The ACCESS-OM2-01 model was forced with a reanalysis product (JRA55-do; 1979–2023) and evaluated with a satellite-based light penetration index during 1988–2016[4] to study the impact of Antarctic sea ice extremes on the algal primary production.

Interannual variability of the cumulative sum of sea ice algal primary production



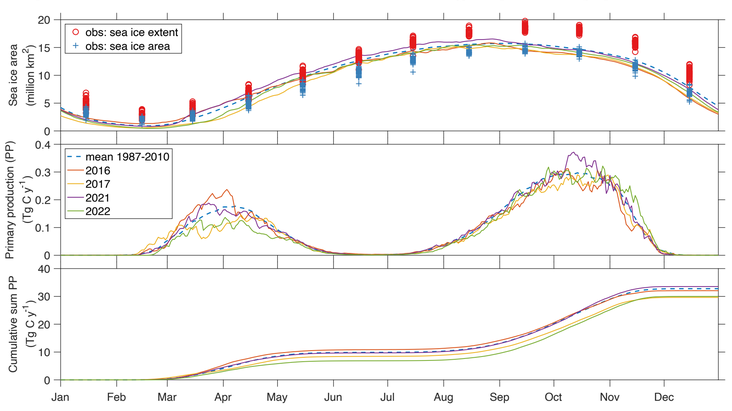
Key Point 2: There is a significantly positive correlation between simulated ACCESS-OM2-BGC and satellite-derived primary productions.



Evaluation of 1986-2016 ice-algal primary production

Key Point 3: The model captures the impacts of the recent increase of Antarctic sea ice variability on the changes of sea ice algal primary production.

Impact of sea ice extremes on ice-algal primary production



References 1. Kiss et al. (2020) 2. Oke et al. (2013) 3. Jeffery et al. (2016) 4. Pinkerton & Hayward (2021)

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Scan QR code to access the summary of COSIMA's ACCESS-OM2-01 IAF Cycle 4 with biogeochemical outputs

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