

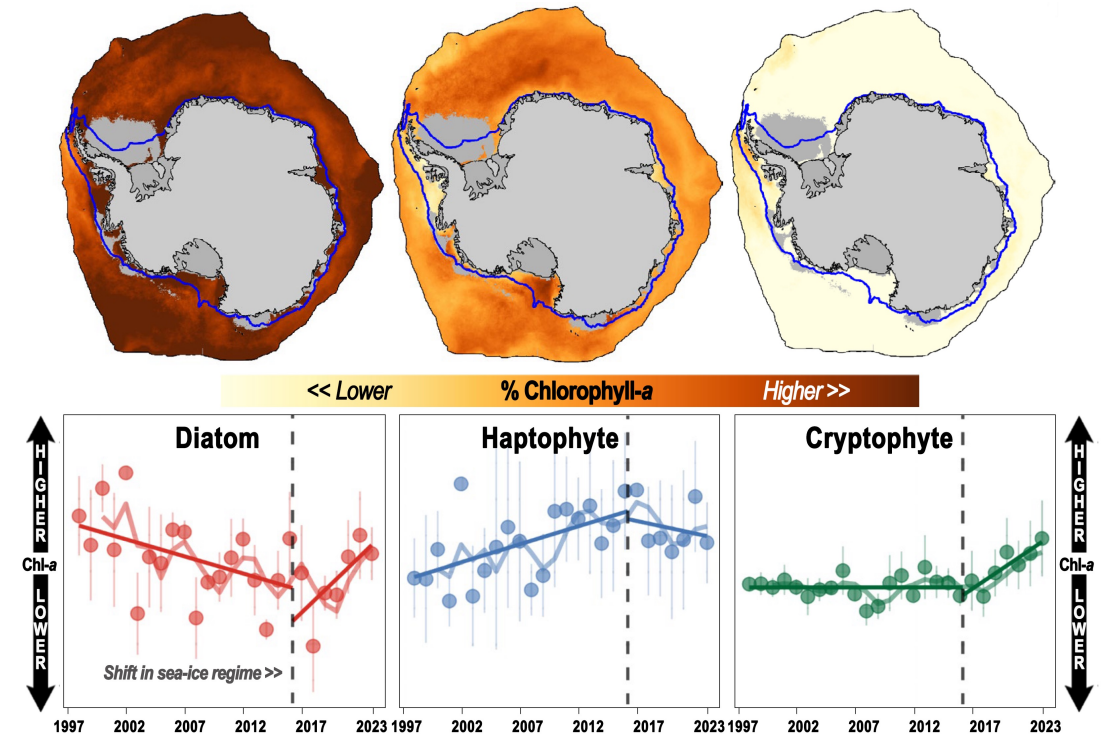
Antarctic Phytoplankton Community Shifts with Sea Ice Loss

- A concurrent change in phytoplankton community composition and the shift in sea-ice coverage highlights the **sensitivity of the Antarctic marine ecosystems to changes in climate**
- Due to their ecological importance, we focus on **three key Antarctic phytoplankton groups**: diatoms, haptophytes (e.g., coccolithophores), and cryptophytes
- We use ECCO-Darwin, a machine-learning framework, and pigment data to show **declines in diatoms and increases in haptophytes and cryptophytes** from 1997 to 2023

We used **random-forest regression** to estimate the chlorophyll-a of each particular phytoplankton group. Our findings reveal changes in total chlorophyll-a along with large shifts in key phytoplankton groups, which can have **critical implications for Antarctic ecosystems and Southern Ocean carbon cycling**.

By integrating environmental data with models trained on phytoplankton pigments, this study has demonstrated how satellite observations can identify long-term changes in environmental conditions linked to taxonomic shifts in phytoplankton community composition.

Hayward, A. et al. (2025) [Antarctic phytoplankton communities restructure under shifting sea ice regimes](#), Nat. Clim. Chang., doi: 10.1038/s41558-025-02379-x



TOP: Phytoplankton groups as a percentage of the total community (1997-2023). BOTTOM: Linear trend of groups' chlorophyll-a compared to long-term average. Significant change in sea-ice concentration shown as dashed line.

Sustained multi-year observations, especially from missions like *PACE*, are crucial to determine if these trends represent a stable reversal or a transient response to environmental anomalies.