



Phytoplankton  
biomass and diversity

# PHYTOplankton biomass and diversity Climate Change Initiative (PHYTO-CCI)

Gemma Kulk, Victor Martinez-Vicente, Marco Bellacicco, Astrid Bracher, Robert Brewin, Ana Brito, Vanda Brotas, Andrei Chuprin, Sarah Conners, Alexander Hayward, Lianne Jackson, Lekshmi Krishnakumary, Angus Laurenson, Peter Miller, Jane Netting, Emanuele Organelli, Graham Quartly, Ralf Quast, Salem I. Salem, Shubha Sathyendranath, Xuerong Sun, Hongyan Xi

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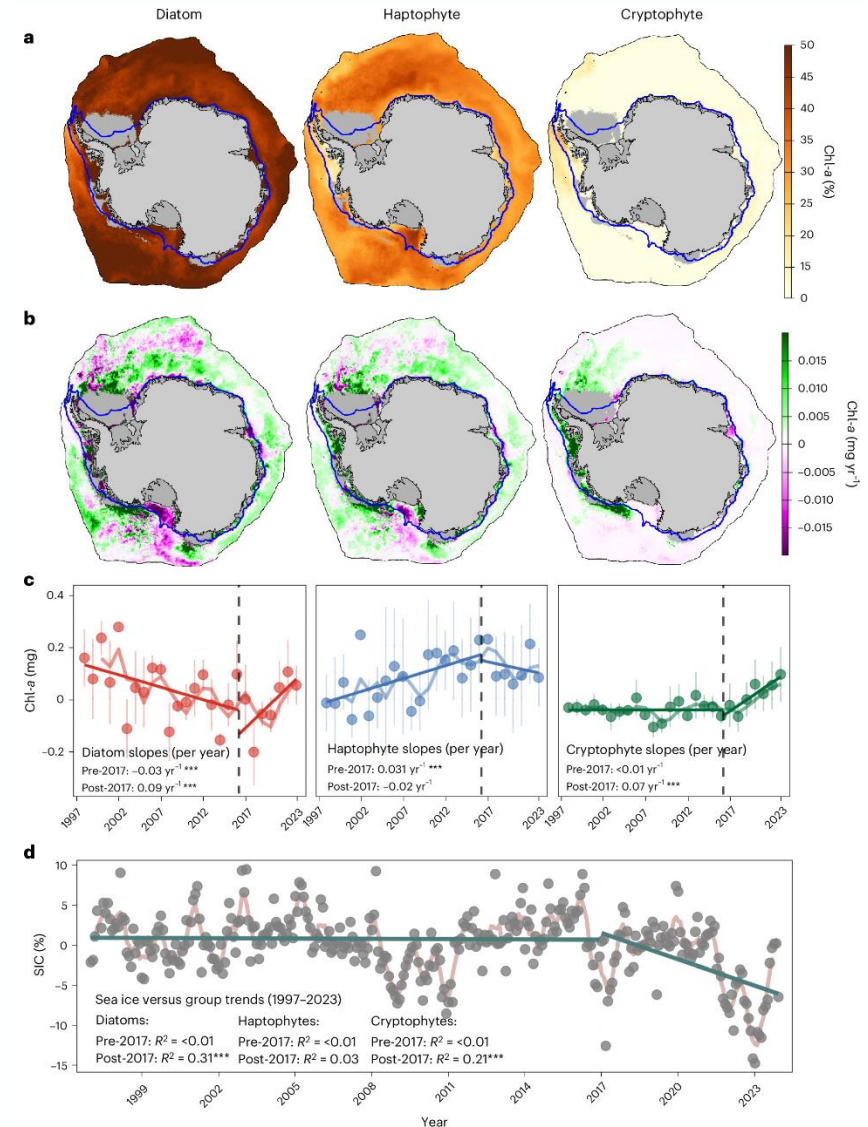
# Why PHYTO-CCI?

- Ocean covers ~71% of the Earth's surface and forms its largest ecosystem
- Phytoplankton play a key role in the marine ecosystem and have high bio- and functional diversity
- Phytoplankton biomass and diversity are recognised as GCOS ECVs
- ESA CCI portfolio only contained one phytoplankton-related ECV
- PHYTO-CCI aims to develop CCI data products for phytoplankton carbon biomass and pigment diversity



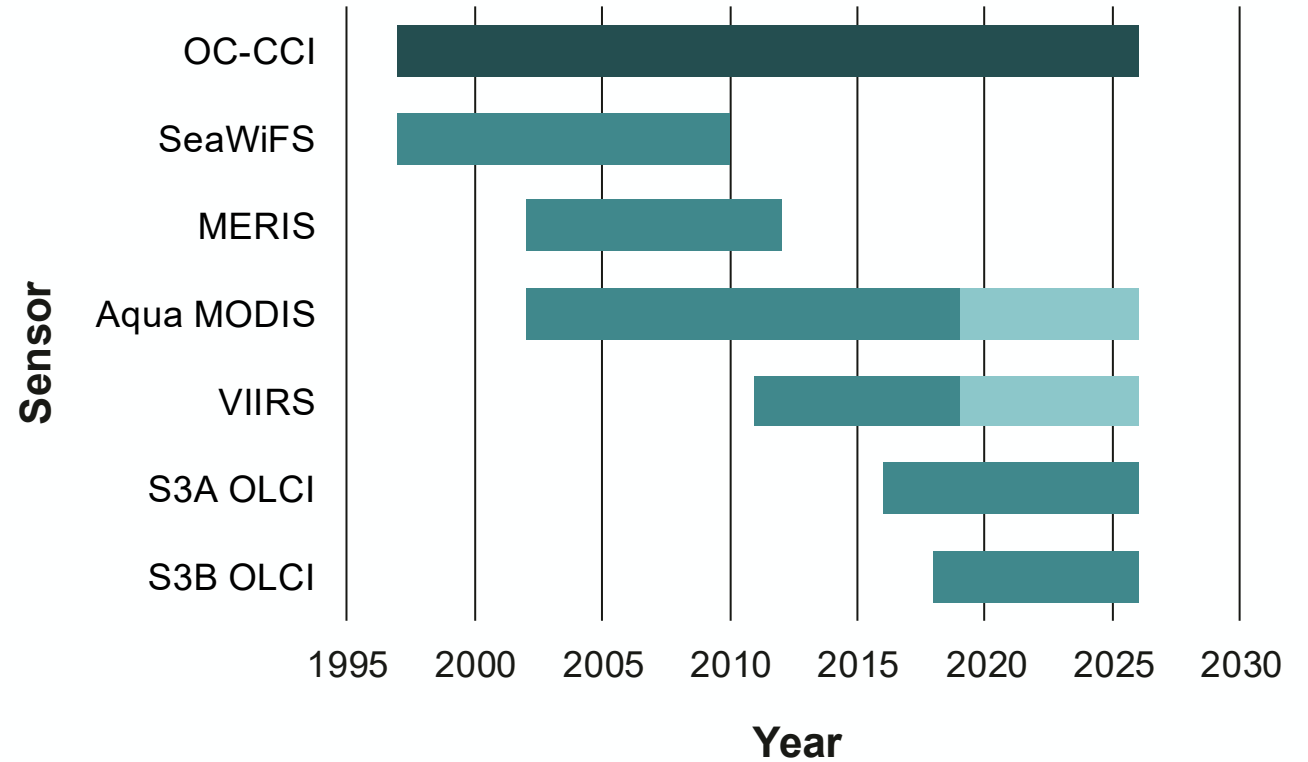
Study by Hayward *et al.* (2025) in the Antarctic:

- Showed declines in diatoms and increases in haptophytes and cryptophytes during austral summer, but trends reversed after 2016
  - Changes were linked to sea ice cover, with loss of sea ice since 2016
  - Long-term shifts in phytoplankton could reduce dominance of krill-centric food web and diminish biologically mediated carbon export
- Based on phytoplankton pigment data



Hayward, A., Wright, S.W., Carroll, D. et al. Antarctic phytoplankton communities restructure under shifting sea-ice regimes. *Nat. Clim. Chang.* 15, 889–896 (2025). <https://doi.org/10.1038/s41558-025-02379-x>

- PHYTO-CCI makes use of data from the Ocean Colour Climate Change Initiative (OC-CCI)
- OC-CCI is a merged, bias-corrected ocean colour dataset based on 6 different multispectral satellite sensors
- PHYTO-CCI uses remote sensing reflectances (Rrs), chlorophyll-a and inherent optical properties (IOPs) as input to phytoplankton carbon and pigment algorithms
- Data record from September 1997-present

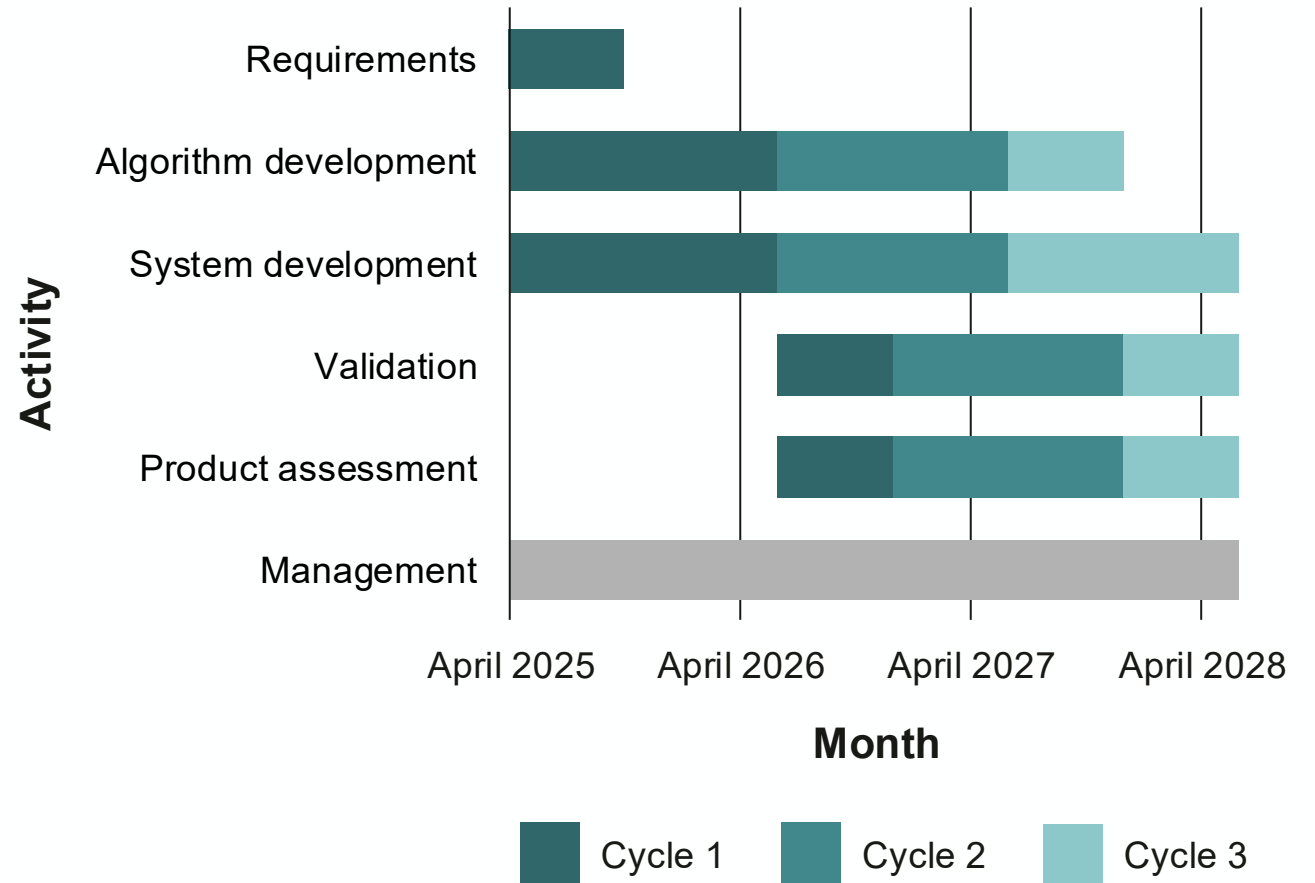


## Product resolutions

- First global dataset will have 4-km spatial and monthly temporal resolution
- With test dataset of *fucoxanthin* at 5-day temporal resolution
- Users show interest in higher resolutions (up to 1-km and 1-8 day)

## Timeline

- First, non-public dataset is due June 2026
- Public dataset is due June 2028



# Thank you



PHYTO-CCI is led by

in collaboration with



Contact us:

Dr. Gemma Kulk  
Science lead  
[gku@pml.ac.uk](mailto:gku@pml.ac.uk)

Lianne Jackson  
Project manager  
[lija@pml.ac.uk](mailto:lija@pml.ac.uk)



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