

Oceanography, plankton, productivity

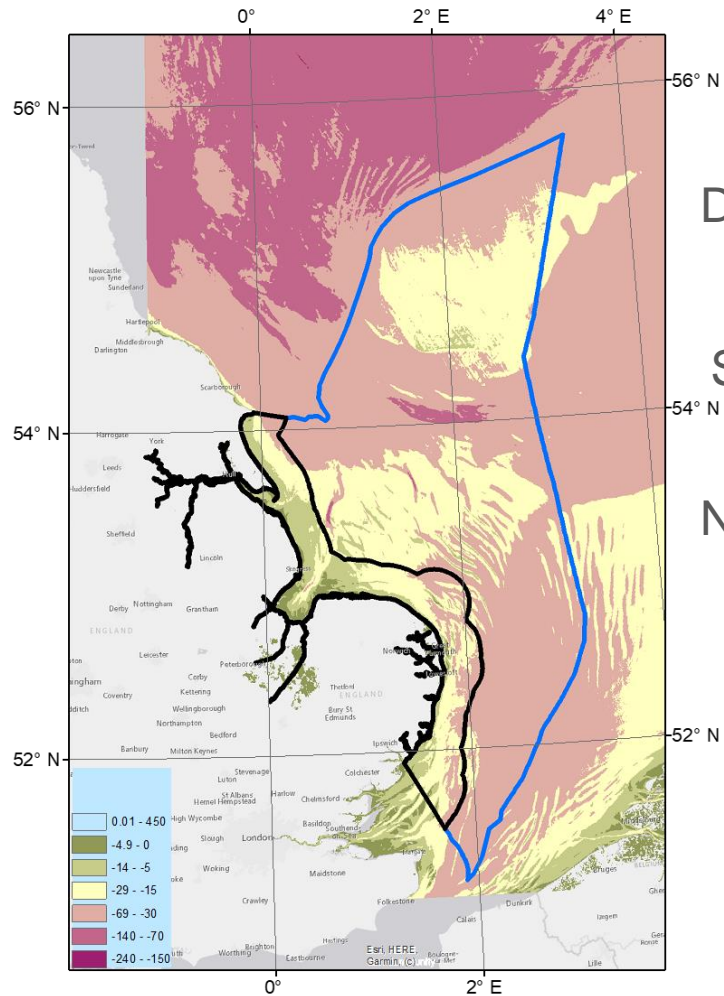
Rodney Forster
Hull Marine Laboratory
University of Hull

East Marine Ecosystems

Reporting Annual Change in the
East Region & Building Social Capital



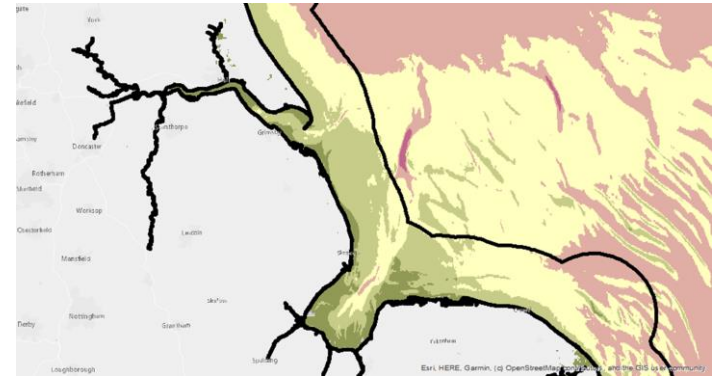
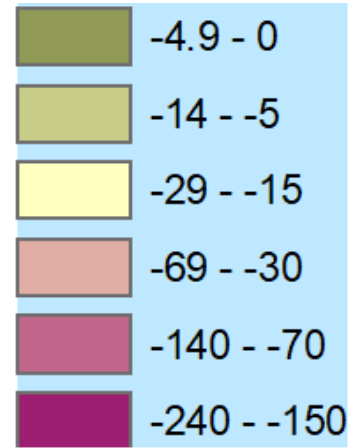
Bathymetry



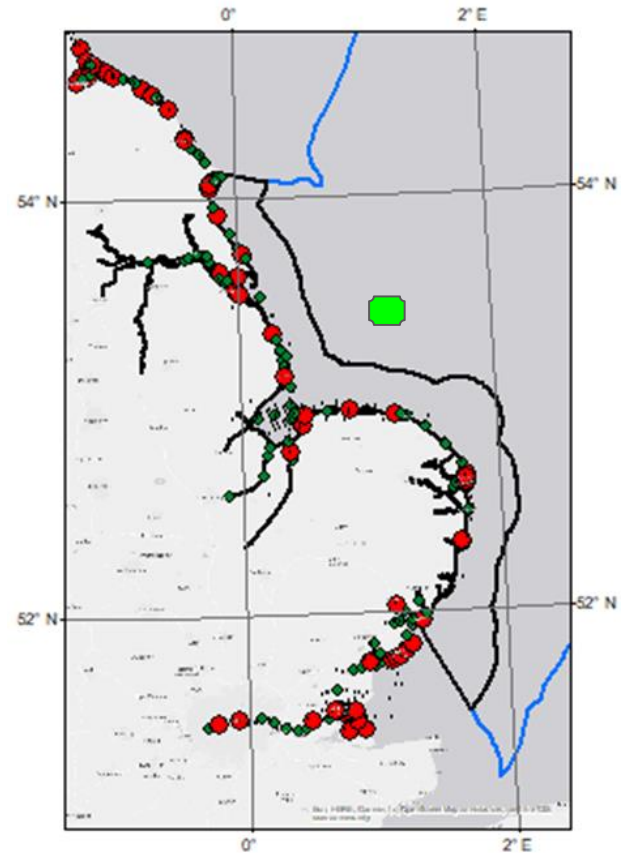
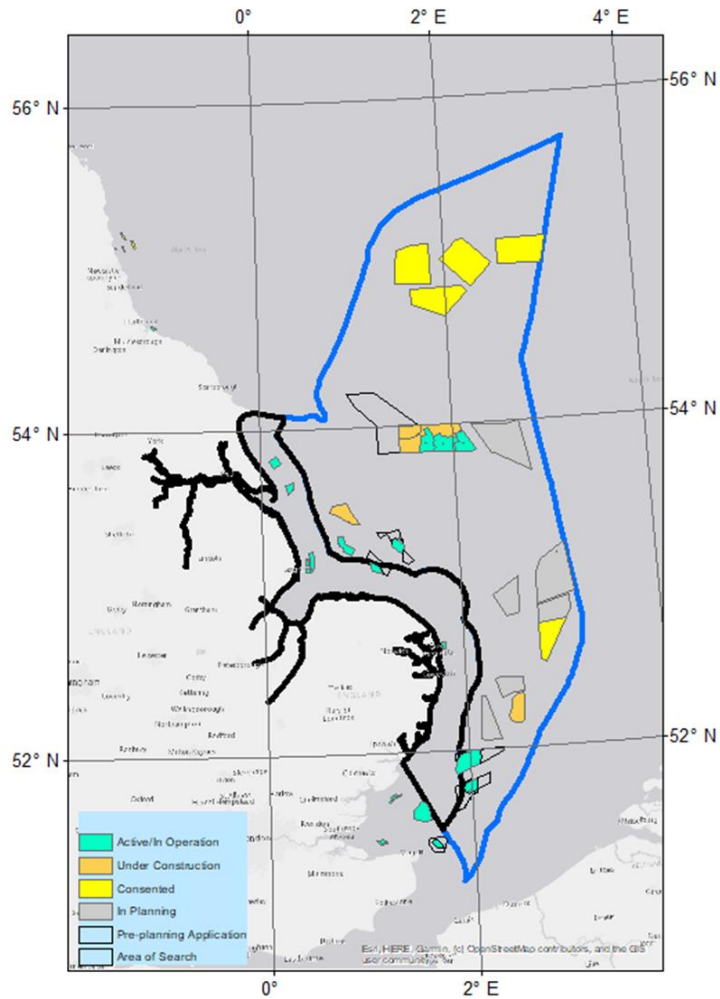
Dogger Bank

Silver Pit

Norfolk banks



Space use and monitoring

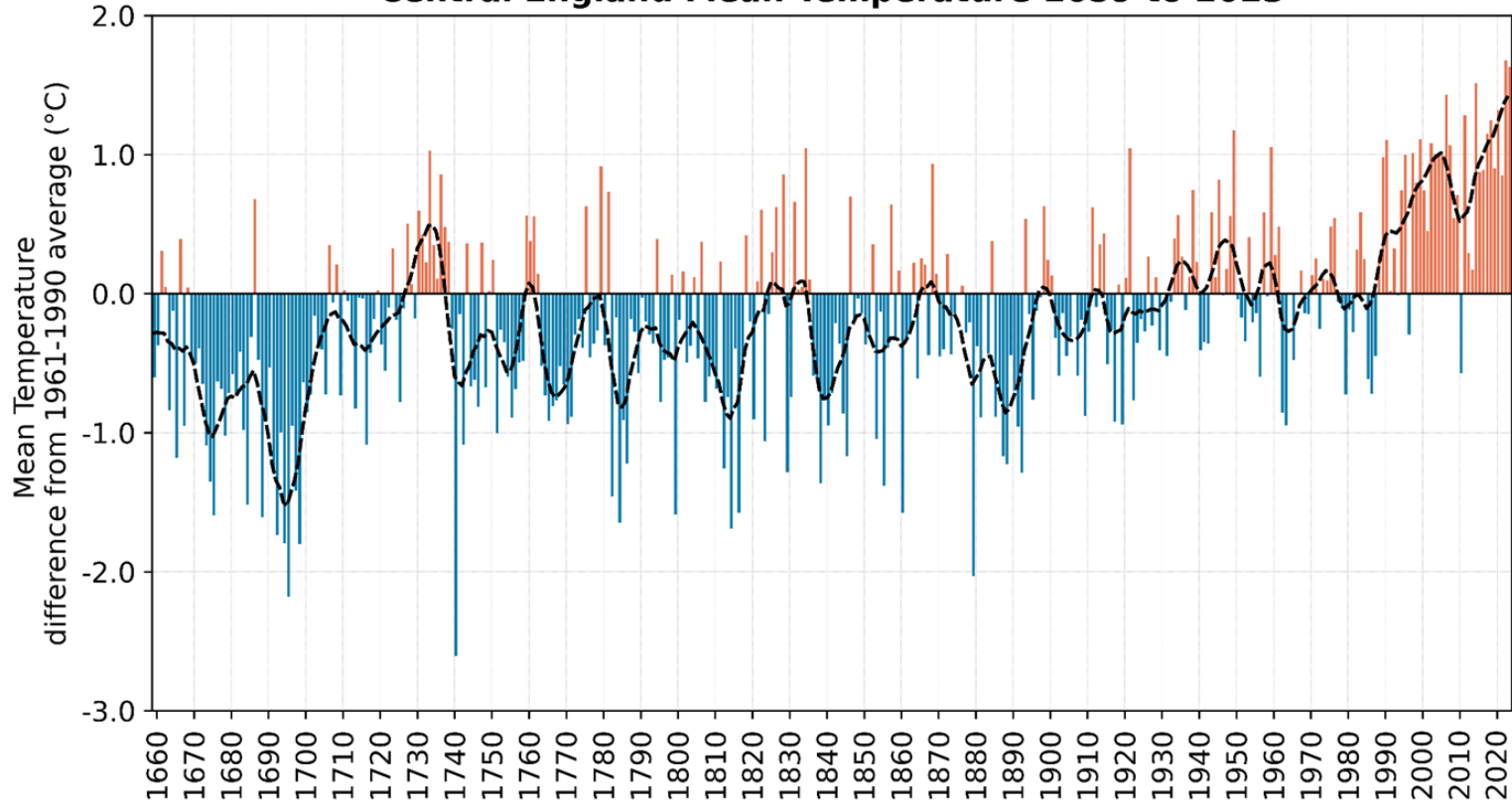


2023 UK climate

Overall, 2023 was a very warm and rather wet year for the UK.
The most notable features were

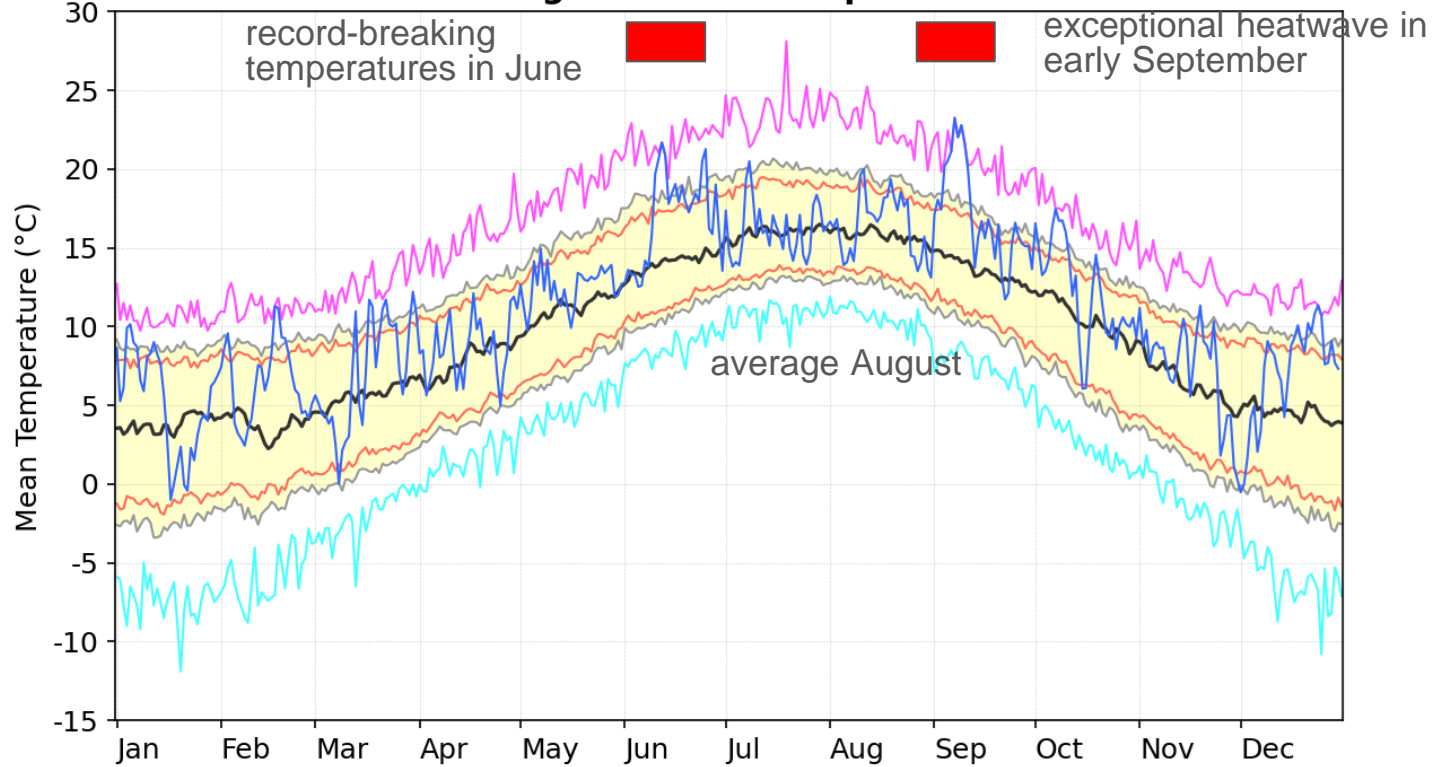
- the record-breaking temperatures in June,
- the exceptional heatwave in early September
- and run of named storms through the autumn and early winter.

Central England Mean Temperature 1659 to 2023





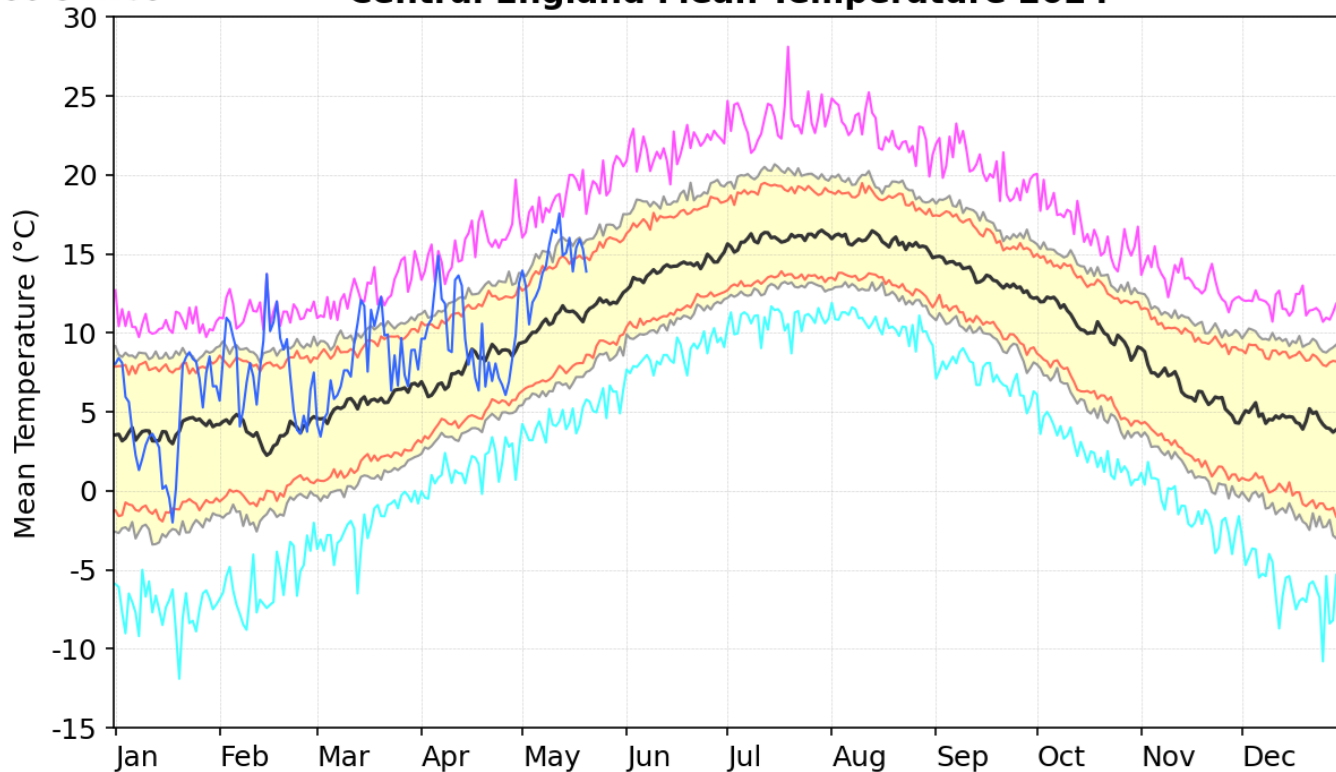
Central England Mean Temperature 2023



— 1961-1990 — lowest — 5% — 10% — 90% — 95% — highest — daily CET



Central England Mean Temperature 2024



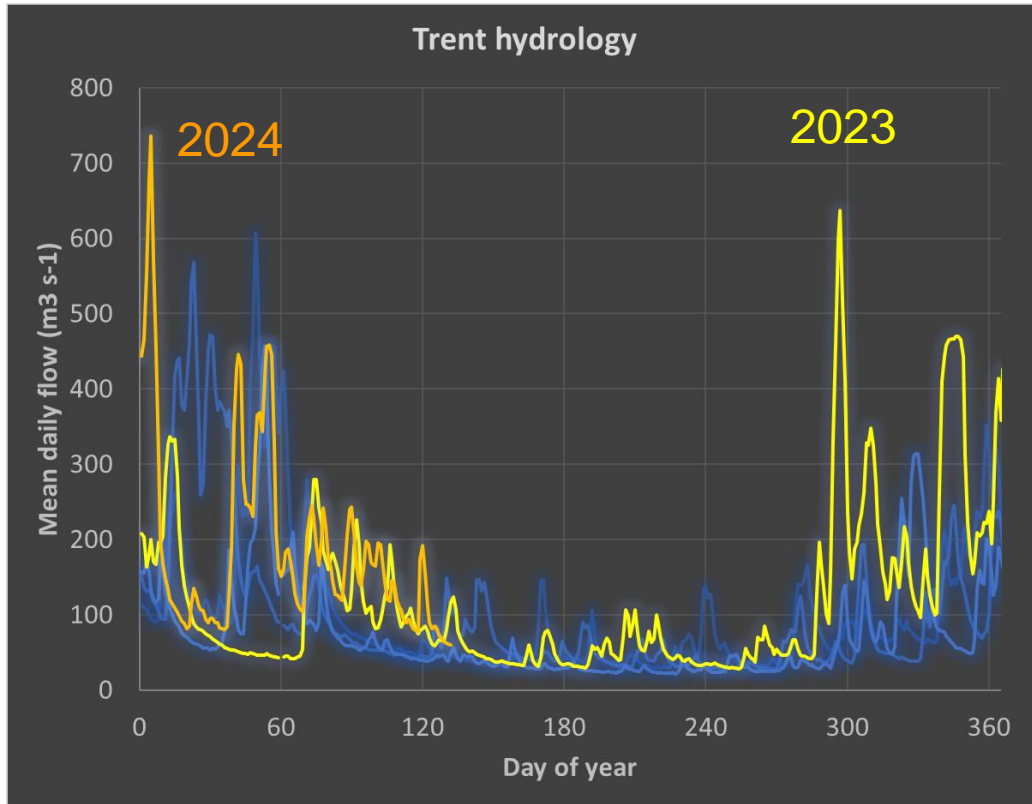
2024

Continues warm trend

Above-average monthly temp since Dec 2022

— 1961-1990 — lowest — 5% — 10% — 90% — 95% — highest — daily CET

Rain and river flow

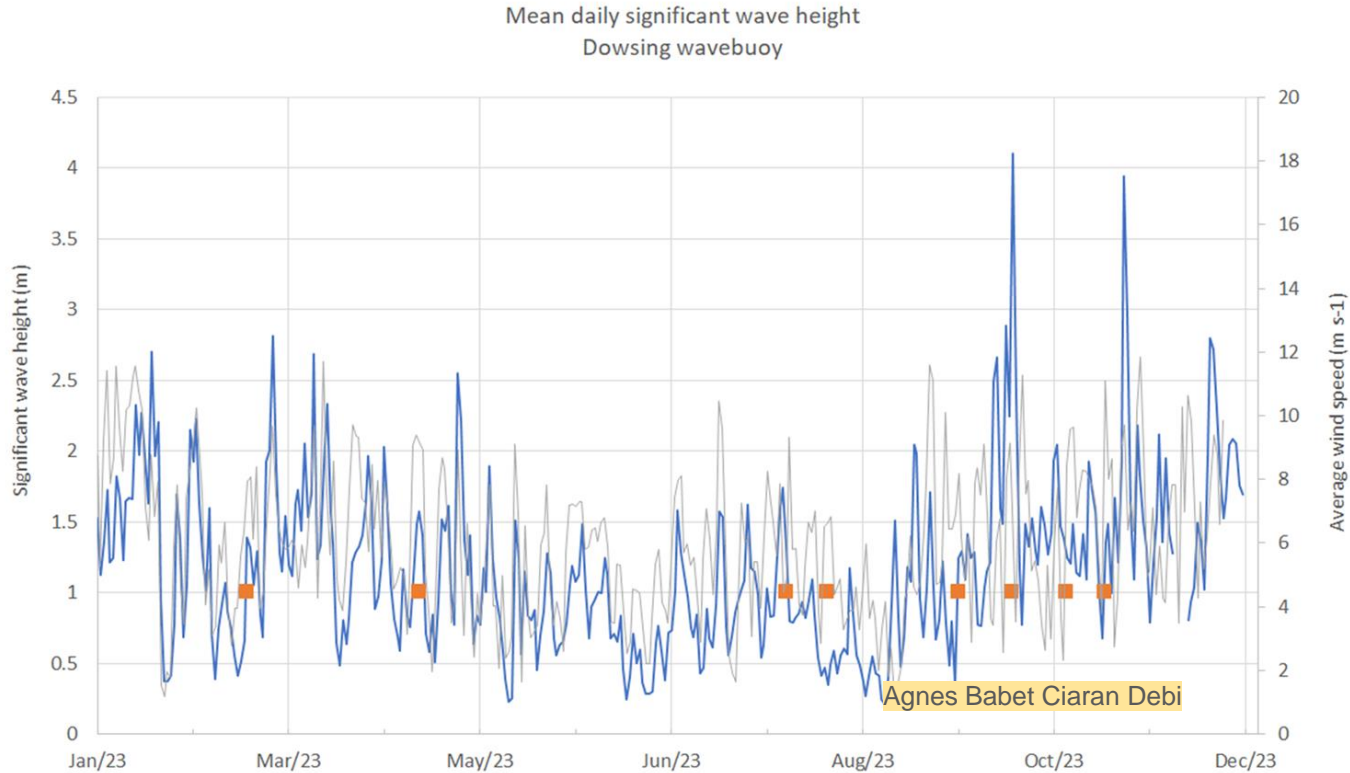


River Trent
North Markham flow station

Exceptional flow rates in
Autumn 2023

Data: EA Hydrology Explorer

Waves, wind storms and surge



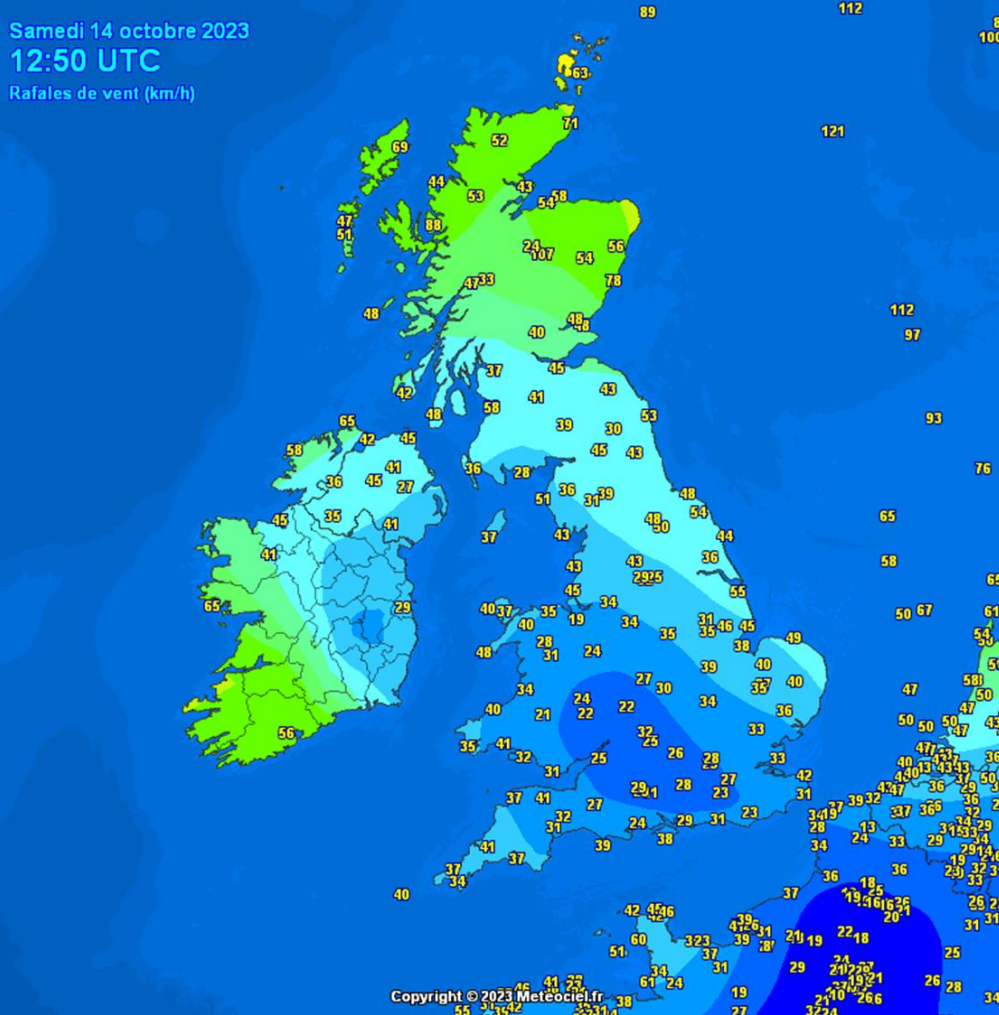
A run of named storms in the autumn of 2023 generated stormier conditions.

Data: Wavenet, Copernicus

Samedi 14 octobre 2023

12:50 UTC

Rafales de vent (km/h)

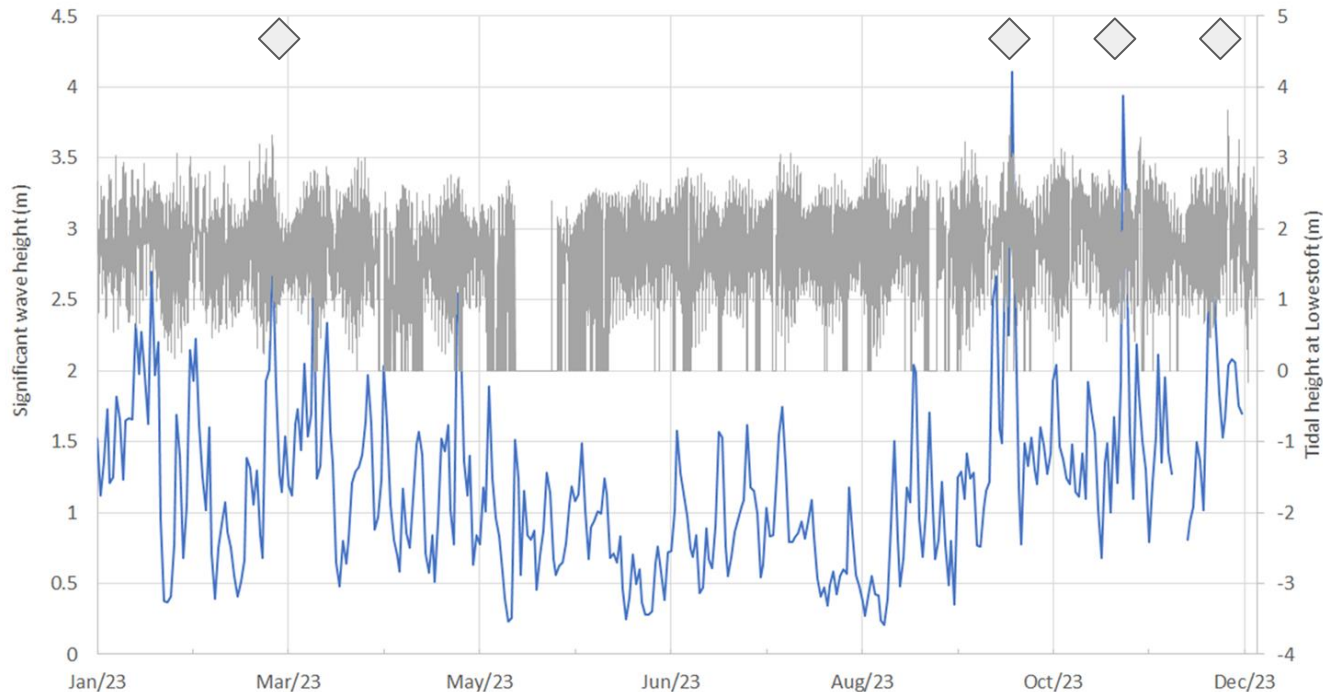


Storm Babet around 15th October had strong northerly winds

Data: meteociel

Waves, wind storms and surge

Mean daily significant wave height
Dowsing wavebuoy

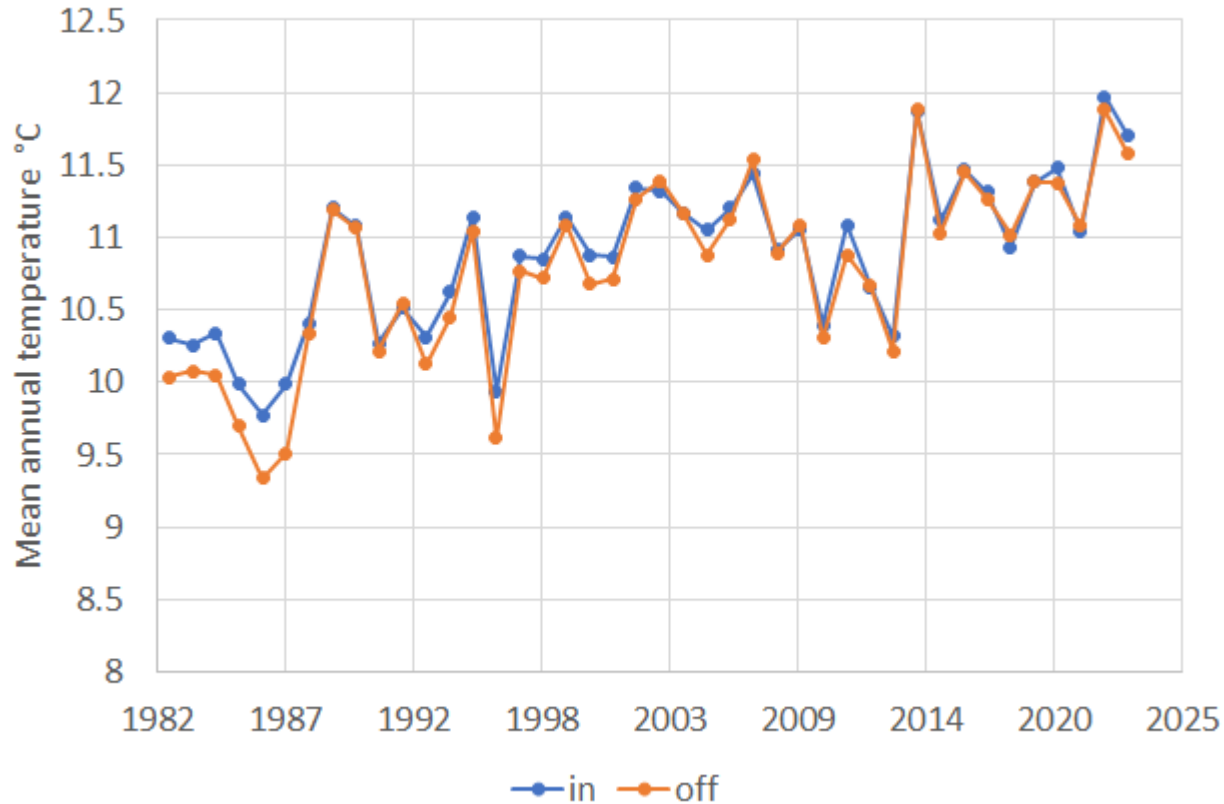


Notable storm surges in the North Sea - 16th March, 14th Oct, 18th Nov, 27th Dec

Data: NTSLF - Lowestoft tide gauge

Sea surface temperature - East region

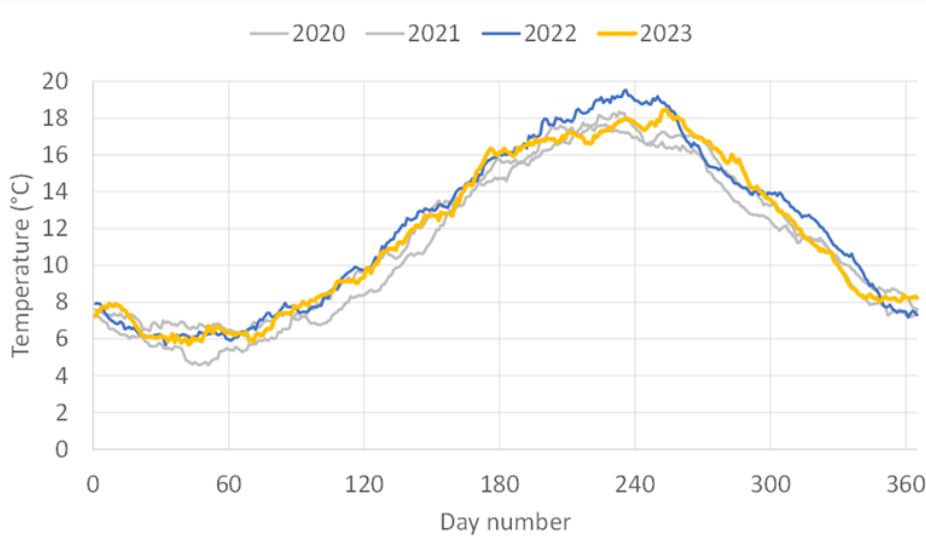
Annual average sea surface temperature



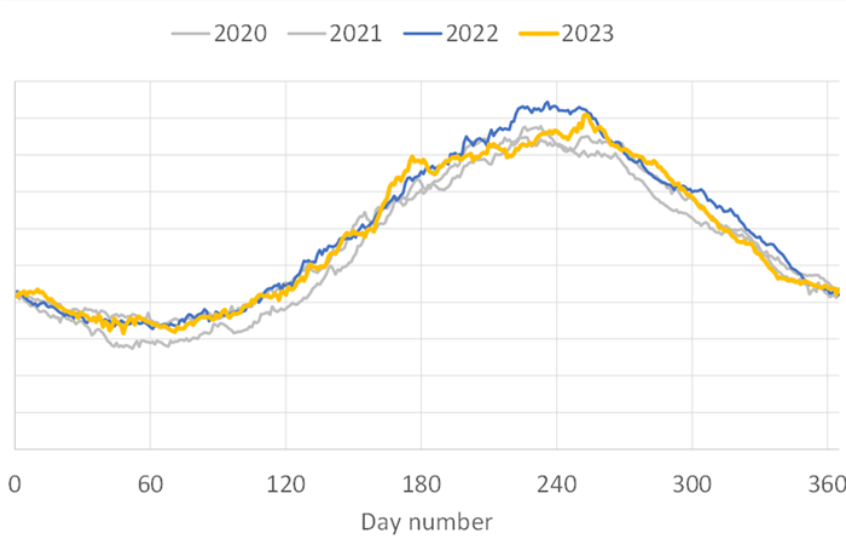
2023 continues the trend of warming surface waters

Data:
Copernicus /
MetOffice

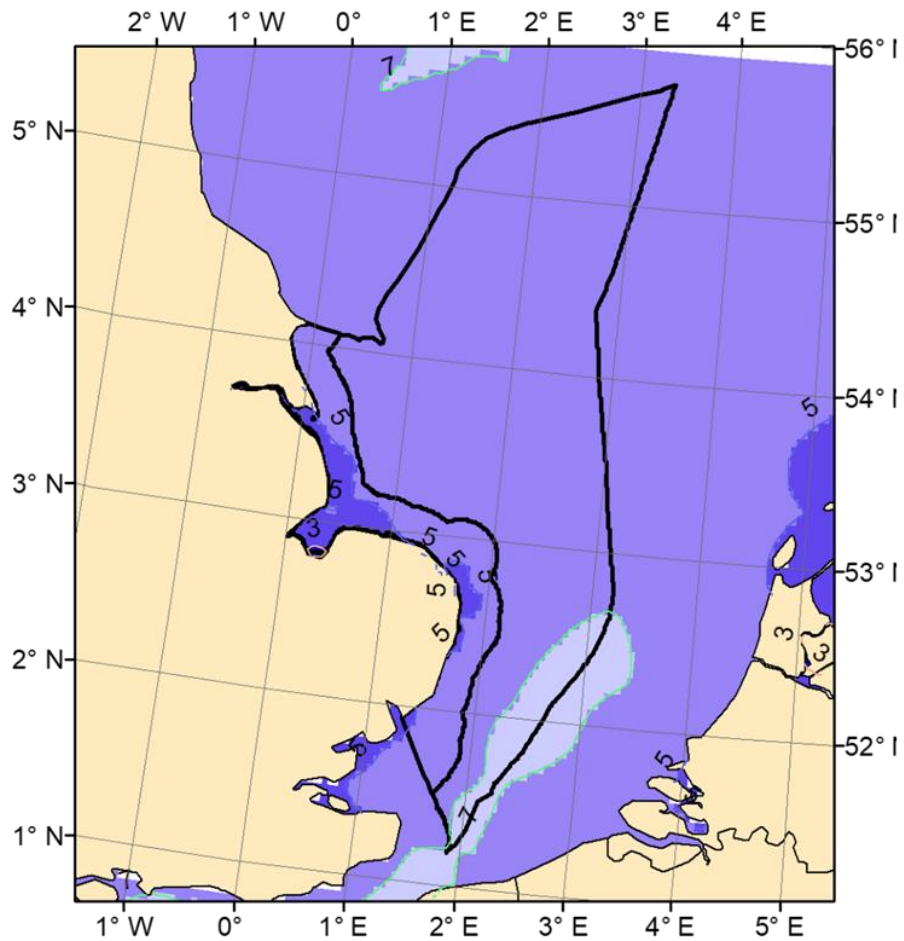
Sea surface temperature



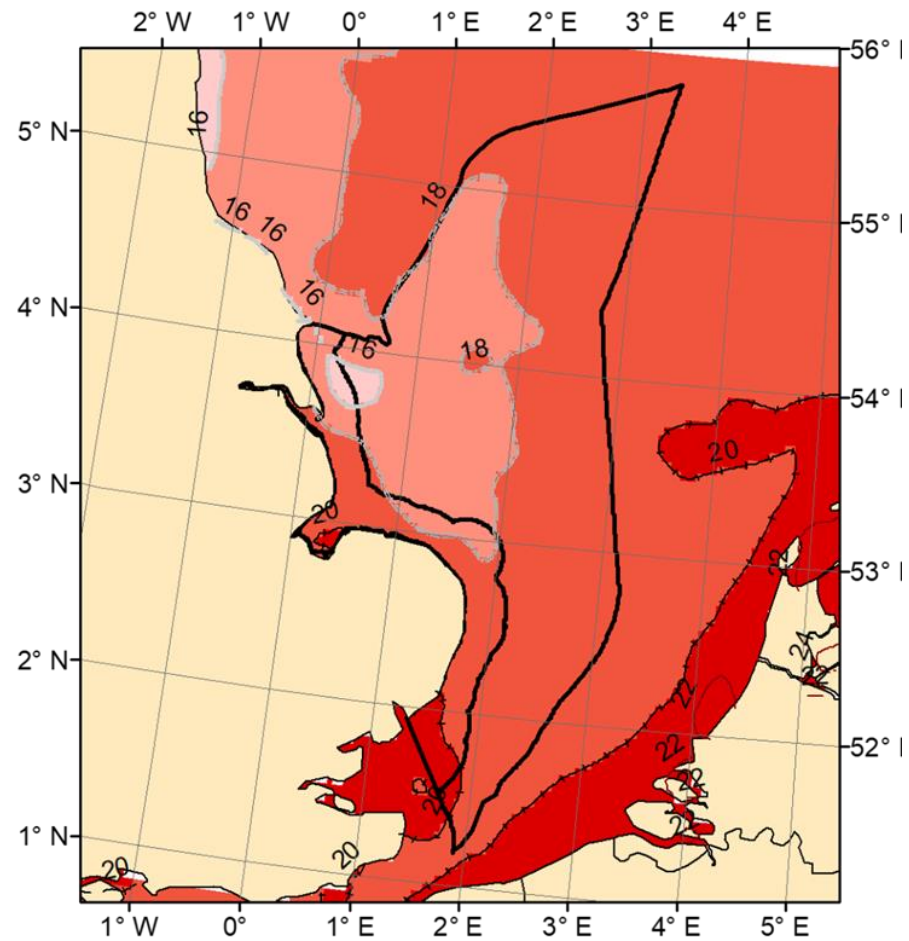
East inshore



East offshore

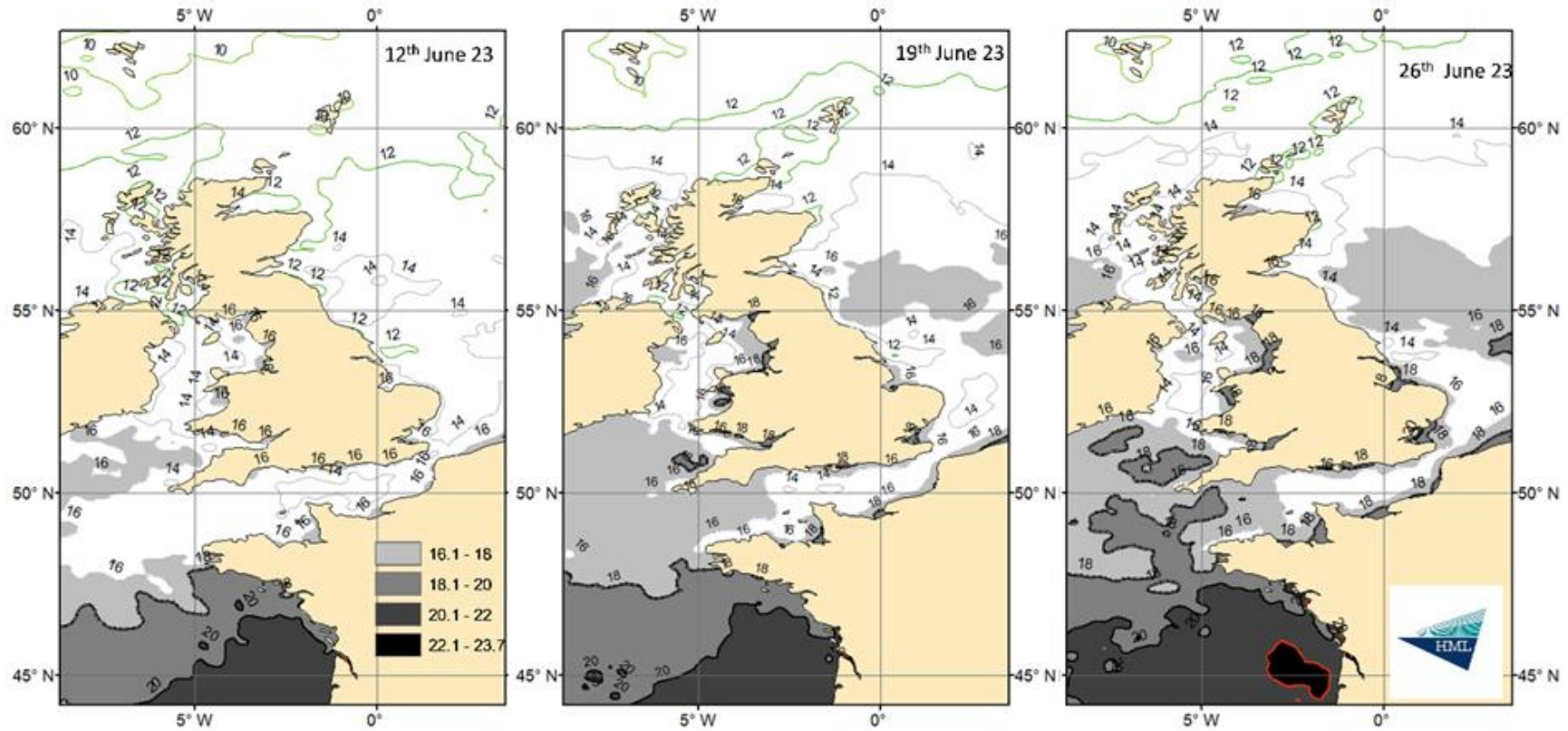


Annual minimum



Annual maximum

Sea surface temperature during June heatwave

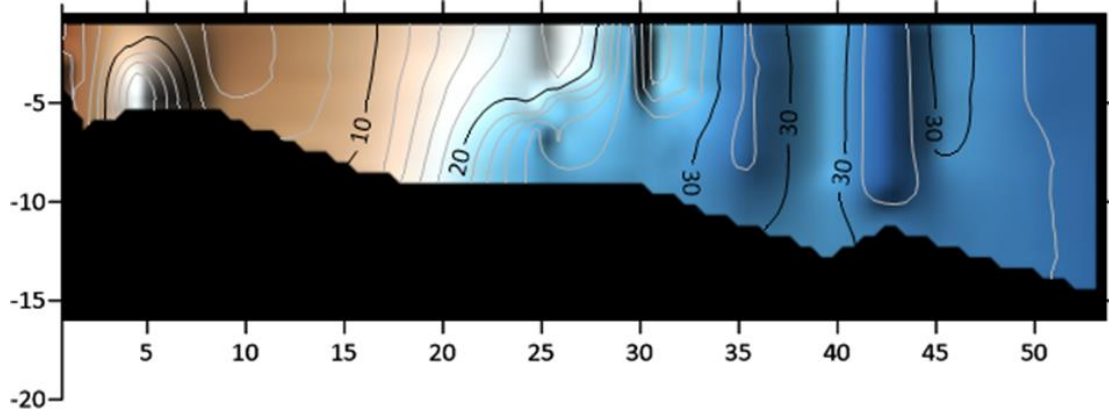


Salinity

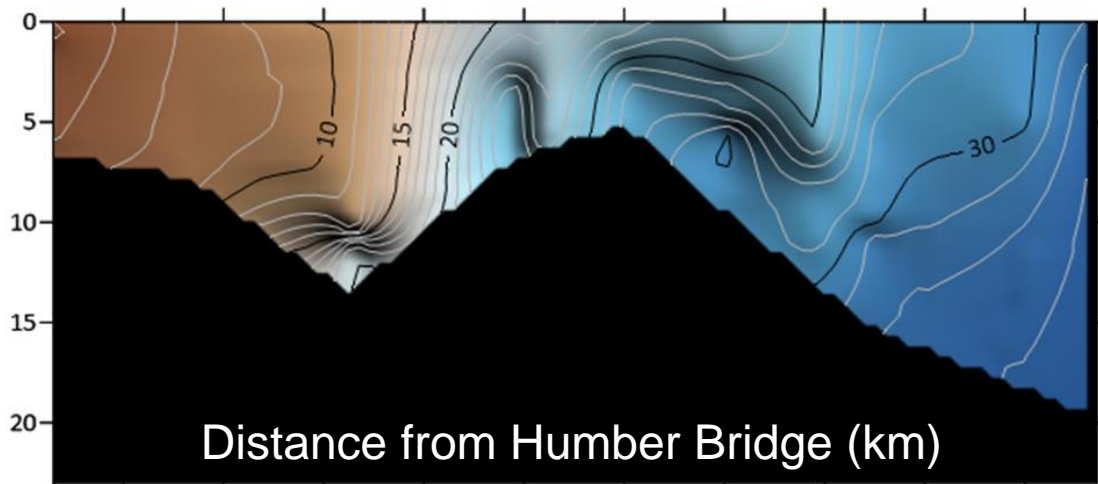
Humber estuary surveys in April



Depth (m)



April
2024



April
2023

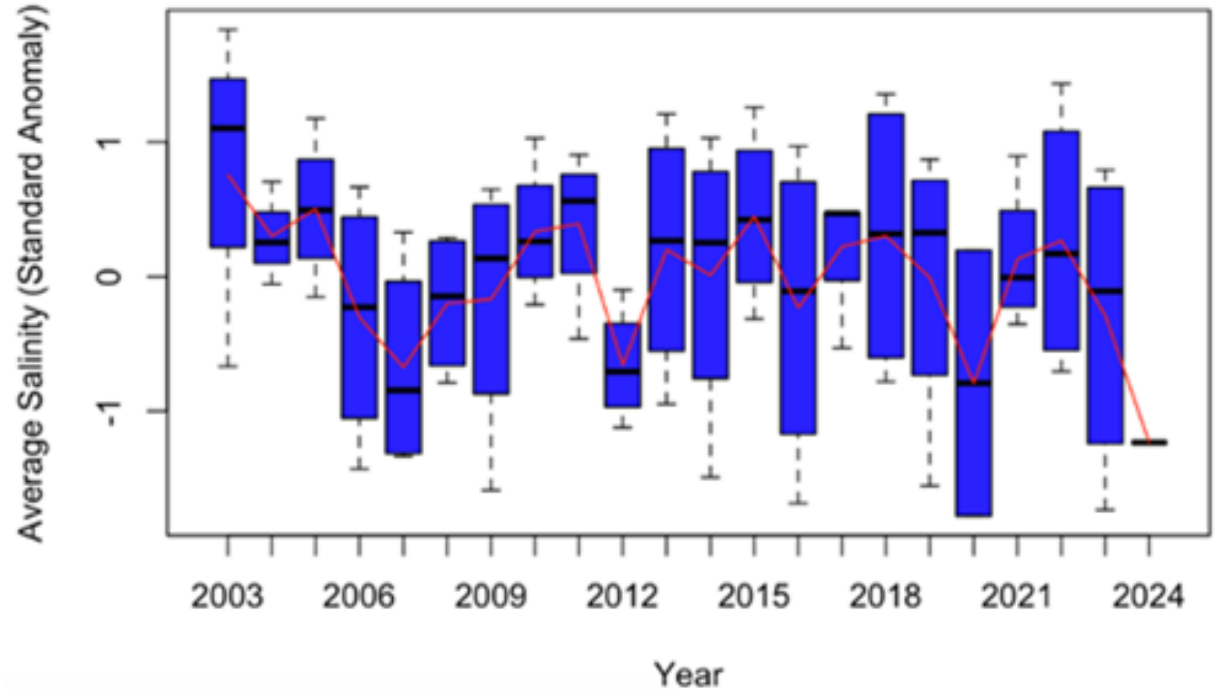
Distance from Humber Bridge (km)

Salinity

Lily Cleary
(Hull)

Early detection
of low salinity at
start of 2024

Overall Salinity Trend 2003-2024



Data: EA WIMS

All EA Humber stations

Biological oceanography in the East region



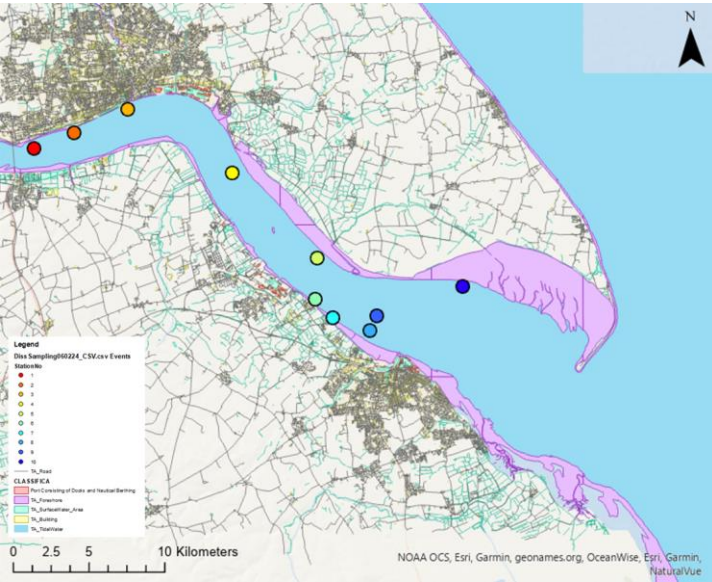
<https://planktonproject.org.uk/>
Elizabeth Beston



Fig. 4: a. *Carcinus maenas*, b. Rotifers (left to right) *Cephalodella* sp., *Keratella* sp., *Notholca* sp. and *Trichocerca* sp.

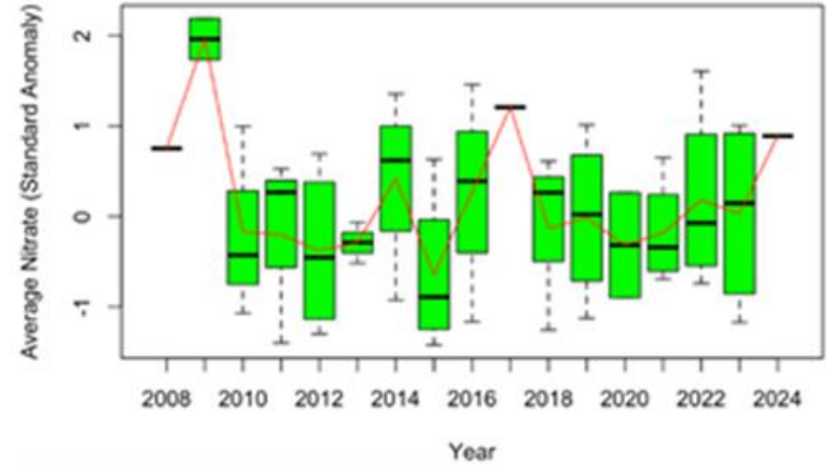
Nutrients (Humber)

Lily Cleary
(Hull)

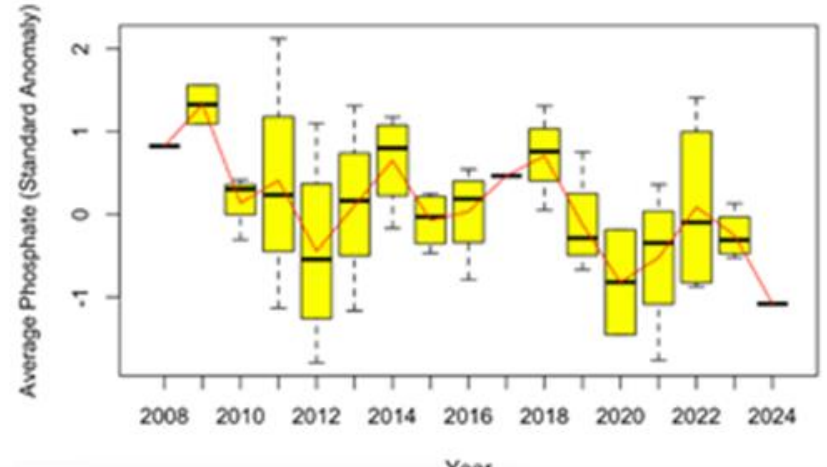


Data: EA WIMS

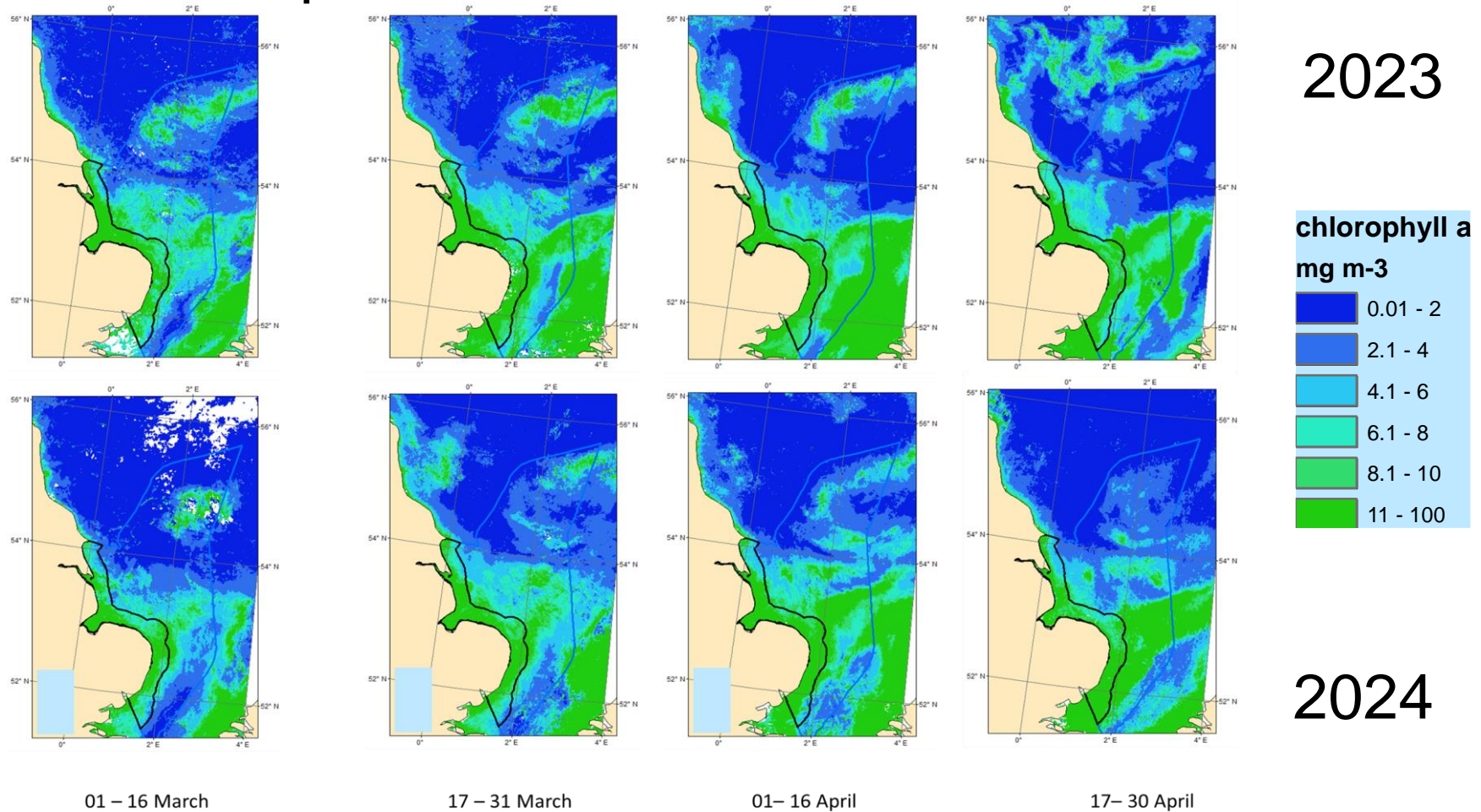
Overall Nitrate Trend 2008-2024



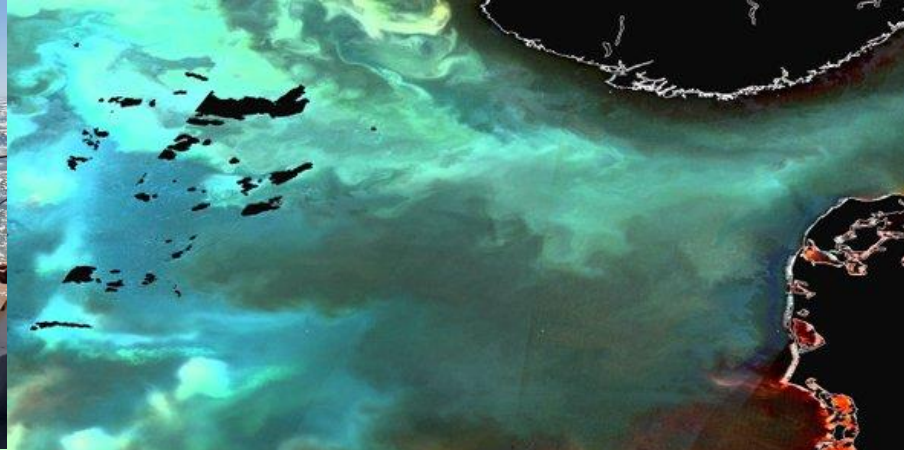
Overall Phosphate Trend 2008-2024



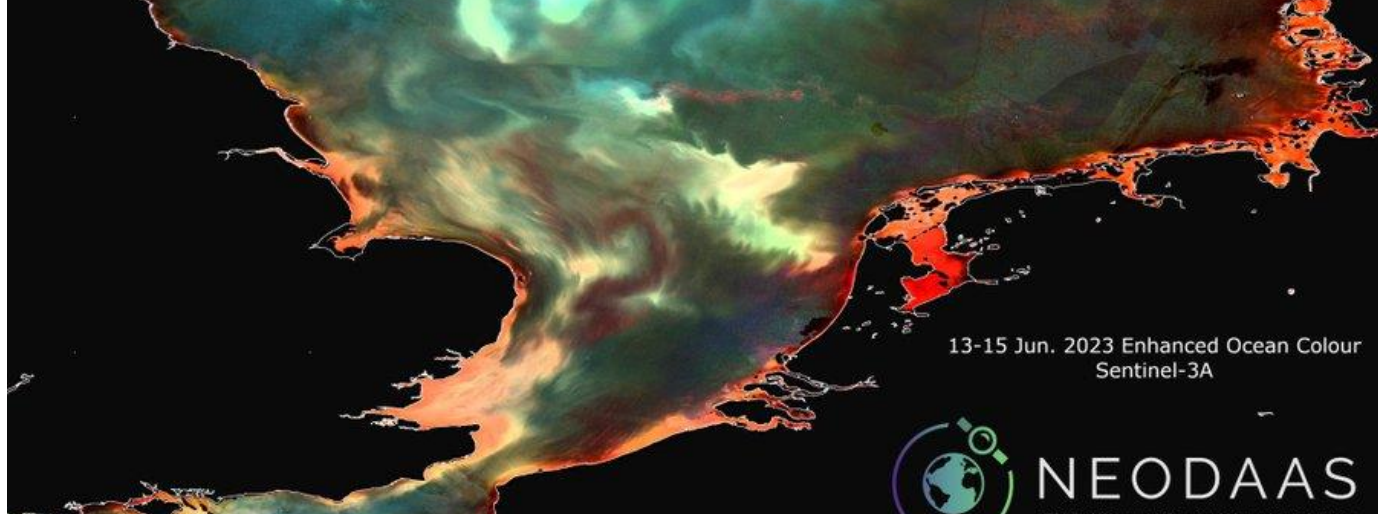
The Spring phytoplankton bloom



Blooms associated with June 2023 heatwave



https://twitter.com/rodney_forster/status/1669753141724688399



13-15 Jun. 2023 Enhanced Ocean Colour
Sentinel-3A



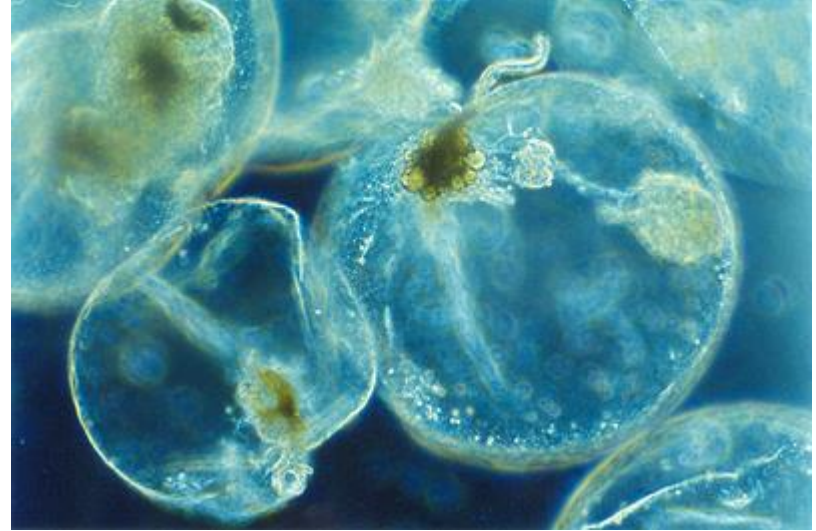
Summary

Lots of 2023 Eastme analysis still to be done:

- Nutrient concentrations and load calculations
- Chlorophyll anomalies
- Turbidity and underwater light
- Zooplankton
- Link to other trophic levels

Any other unusual sightings?

Thanks to the EA and EastMe ocean/plankton team



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