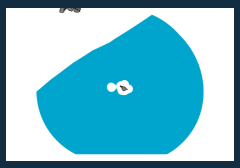
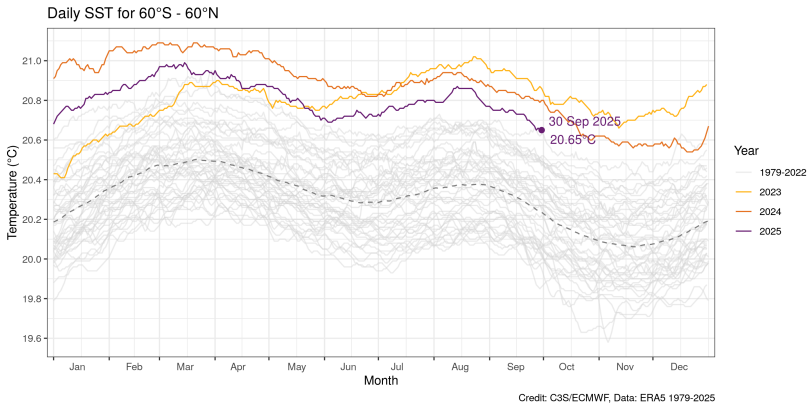
Heard Island and McDonald Islands Fishery



October 6, 2025

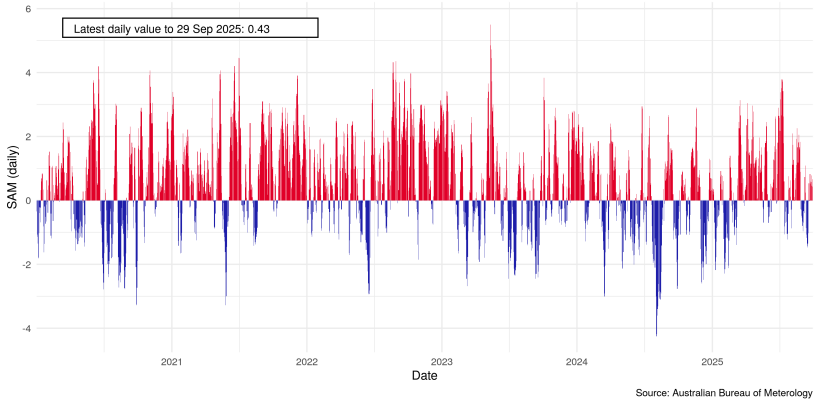
Historical Period

Climate Drivers: Sea Surface Temperature (SST)



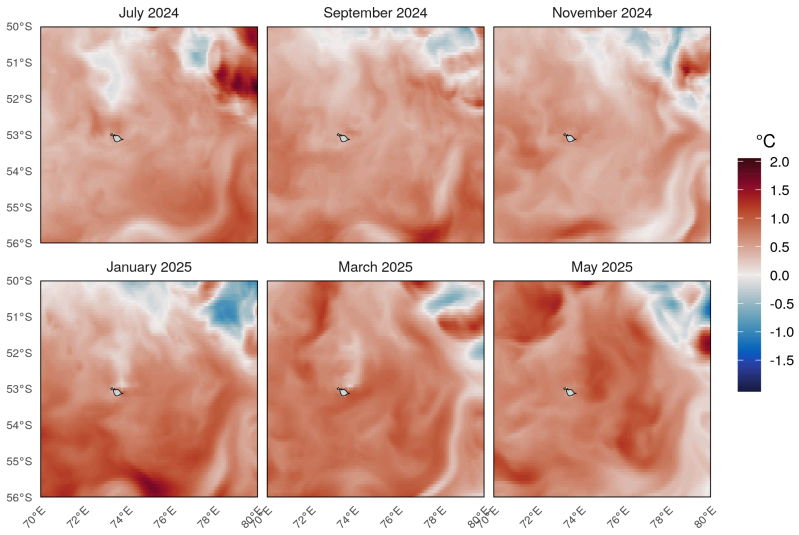
Global Sea Surface Temperatures (SST) have remained at record highs in 2025 (*Copernicus*)[1].

Climate Drivers: Southern Annular Mode (SAM)



Southern Annular Mode (SAM) indicates the N-S movement of westerly winds in the mid-high latitudes. Positive SAM (westerlies move south) have become more common over time and are associated with increased sea ice extent[2]. (*BOM SAM*).

Regional Dynamics: SST Anomaly

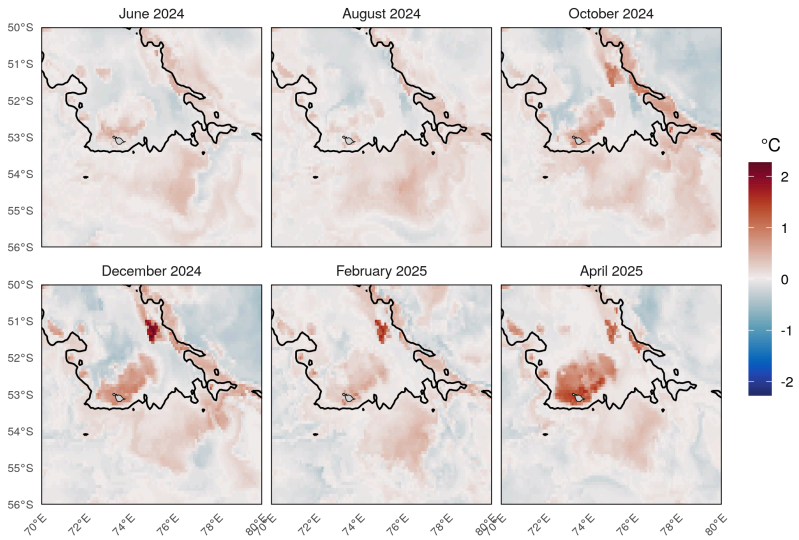


Source: CMEMS

Bi-monthly maps of SST anomalies show the HIMI region has largely been anomalously warm for the last year[3]. Anomalies are relative to 1993-2016. Patches of anomalously cool water can be seen in the north-east corner of the domain.

Marine heatwaves (MHW), regions of anomalously warm water, occurred across most of the region over the past year (*MHWtracker*)[5]. The impacts to the fishery are unknown.

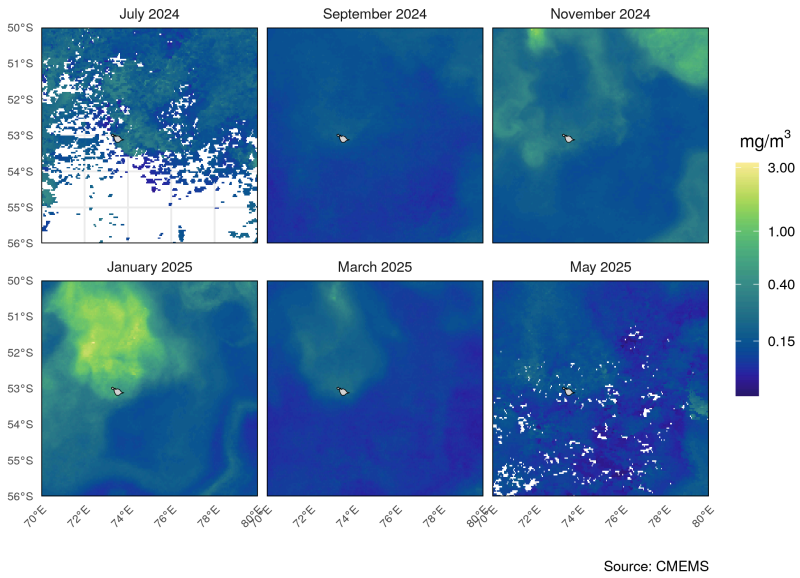
Regional Dynamics: Bottom Temperature Anomaly



Source: CMEMS, Climatology: 1993-2016

Bi-monthly maps of bottom temperature anomalies, with the 1000 m contour shown in black. The HIMI region has seen anomalously warm waters along the 1000 m contour in the north-east, in shallower waters around Heard Island, and in the southern part of the domain[3]. Anomalies are relative to 1993-2016. Patches of anomalously cool water can be seen on the plateau north of Heard Island. Low (high) temperatures can decrease (increase) toothfish catchability at a lag of ~6 months[4].

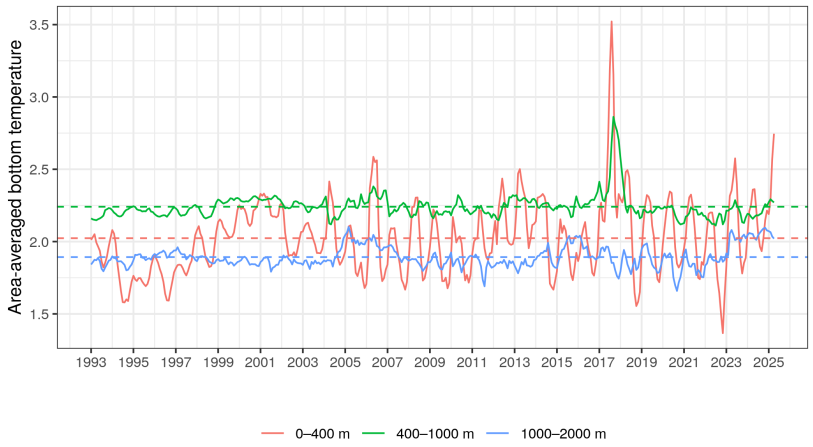
Regional Dynamics: Chlorophyll-a



Source: CMEMS

Bi-monthly maps of surface chlorophyll-a (log scale; mg/m3)[3]. Surface chl-a is a proxy for ecosystem productivity. Elevated surface chl-a persists in the north of the HIMI region throughout the year. Peaks in surface chl-a are notable during spring and summer months. White values indicate cloud cover.

Regional Dynamics: Bottom Temperature Time-series



Area averaged monthly bottom temperature of three depth bins from Jan-2000 to May-2025[3]. The past year has been warmer than the longterm average (solid line) across both depth bins, but most notable at shallow (0-400 m) and deeper depths (1001-2000 m). 2℃ is the lower preferred temperature of Patagonian toothfish.

Observations

2025 observations

- Fishing has been good, with fish found in all locations. Lots of small fish noted.
- Less sea lice than normal.
- Boats reporting the worst winter weather in a long time.
- Catches were high at start of season, but dropped off over Jun-Jul.

2024 observations

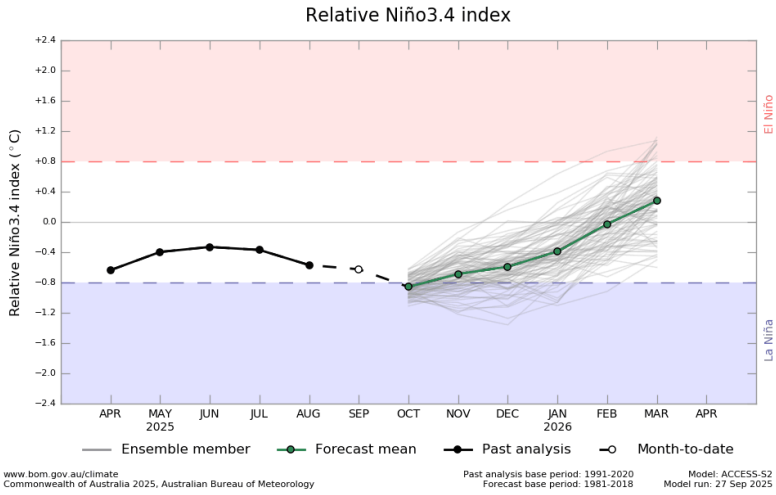
- Trips and catch rates have been standard.
- Catch sizes have been average, ranging 5-7 kh depending on the area.
- No Orcas seen; Minkes sighted; Sperm whale depredation occurred.

2023 observations

- Catches have been unremarkable, but in line with the past few years.
- Two size classes of toothfish in catches.
- Small increases in fish size compared to last year.
- Increaseased interferance from sea lice (depredation or eating bait).
- Orcas observed and the 90-mile move-on rule worked effectively.
- Sea ice observed to clear faster this year. No obvious signed of the impact of low sea ice extent.

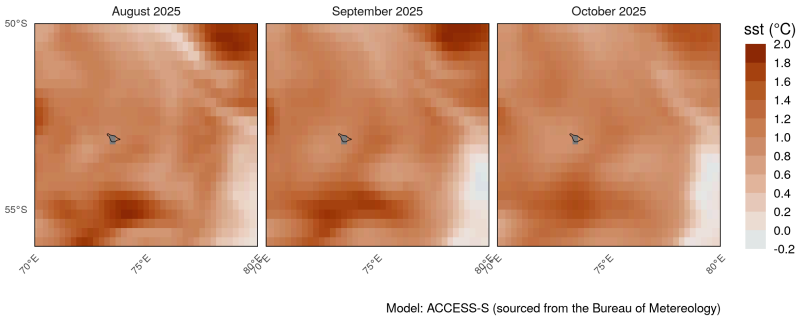
Future Outlook

Climate Drivers: Nino3.4



ENSO is forecast to remain neutral until December. During La Niña, the Southern Annular Mode tends to shift to positive phases, where westerly winds move south and result in strong circumpolar westerlies (*BOM OceanT*)[6].

Regional Dynamics: SST Anomaly



Forecasts of SST anomalies for the next three months indicate anomalously warm conditions across most of the region (*BOM*)[7]. Forecasts are updated regularly.

Sources:

(1) https://pulse.climate.copernicus.eu/.

(2) http://www.bom.gov.au/climate/sam/

(3) Copernicus Marine Service.

(4) https://www.frdc.com.au/project/2019-169

(5) https://www.marineheatwaves.org/tracker.html.

(6) http://www.bom.gov.au/climate/ocean/outlooks/?index=nino34

(7) https://access-s.clide.cloud/