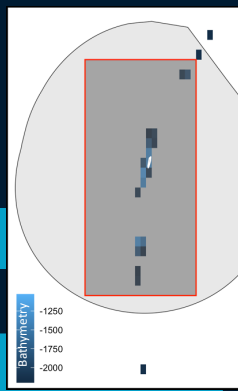




Climate & Ecosystem Status Report

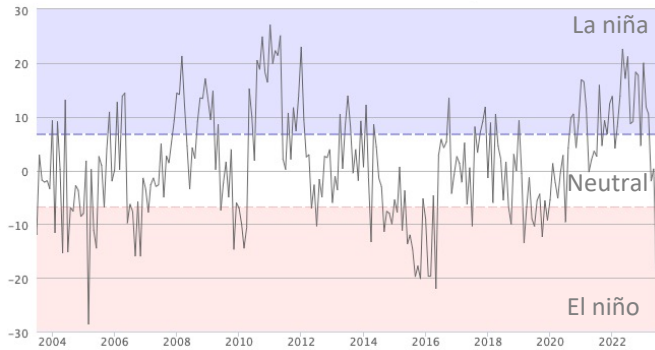
Macquarie Island Toothfish Fishery

August 2023

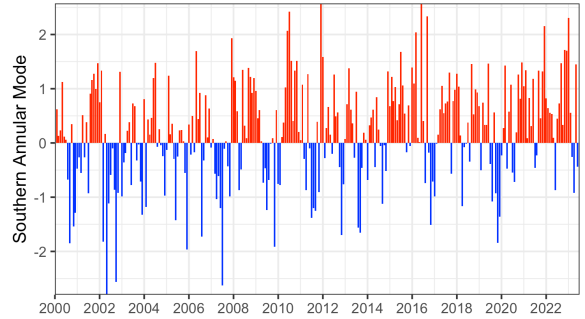


Historical Period

Climate Drivers



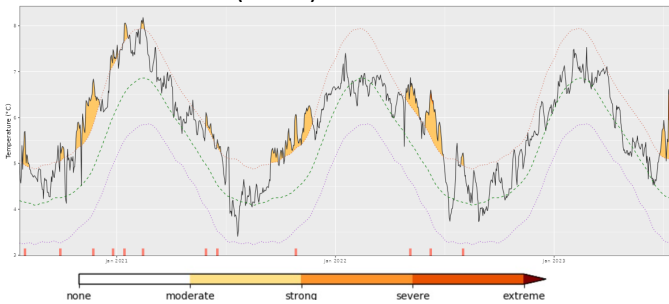
Monthly Southern Oscillation Index¹ ([link](#)).



Southern Annular Mode¹ ([link](#)) where positive phases have become more common. When positive, westerlies & fronts move poleward, & sea ice extent increases.

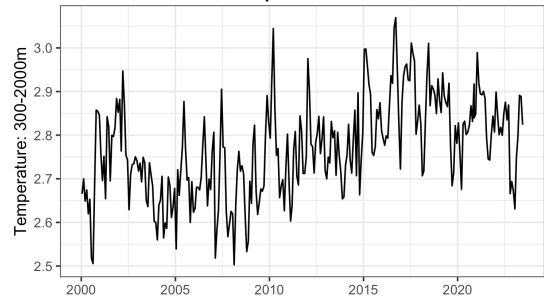
Regional Dynamics

Marine Heatwave (MHW)



A strong-to-extreme MHW was present during July 2023². The ecosystem level impacts are unknown. ([link](#)).

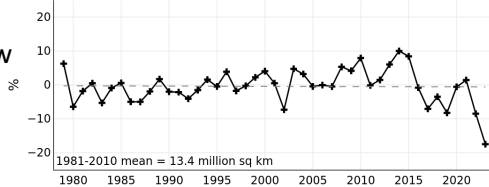
MITF Bottom Temperature



Temperature from 380-2225 m is variable but has increased over time³.

Ecosystem and Fishery

Sea Ice Extent Anomalies. Recent years have had very low sea ice extent².



Observations

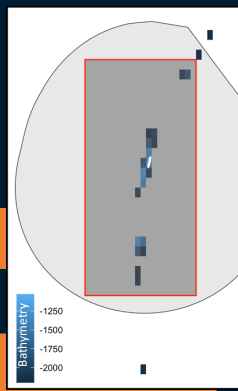
- Initial fishing efforts finding good sized fish
- No obvious signs of the impact of low sea ice extent
- The interaction and location of currents in this region are of interest, and a better indicator of ecosystem and fishing conditions compared to sea ice extent.



Climate & Ecosystem Status Report

Macquarie Island Toothfish Fishery

August 2023

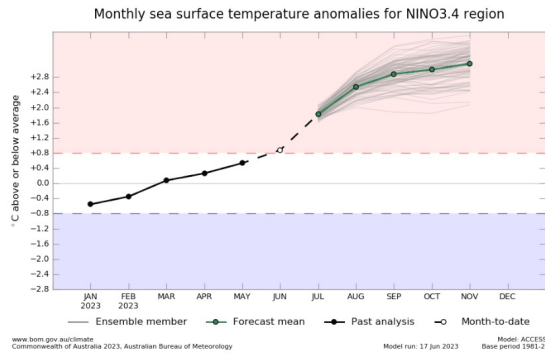


Future Outlook for 2023

Climate Drivers

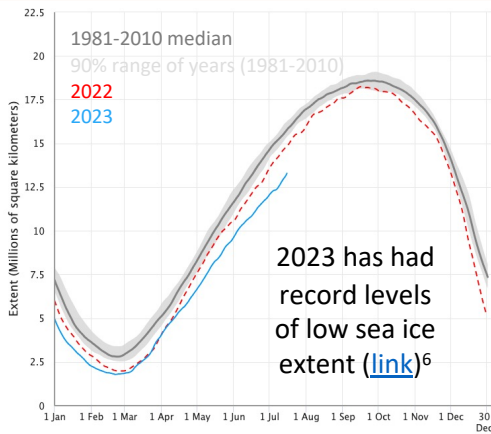


Currently transitioning to El Niño¹ ([link](#))



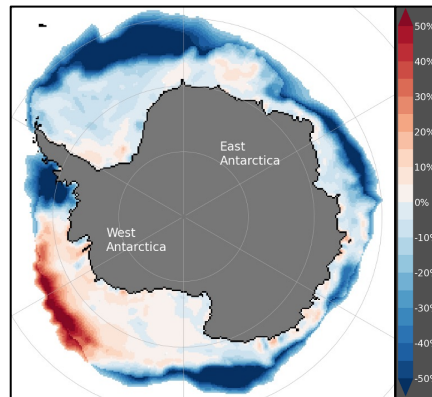
El Niño is predicted. During El Niño, the Southern Annular Mode tends to shift to negative phases, where westerly winds move north and result in weak circumpolar westerlies. ([link](#)).

Regional Dynamics



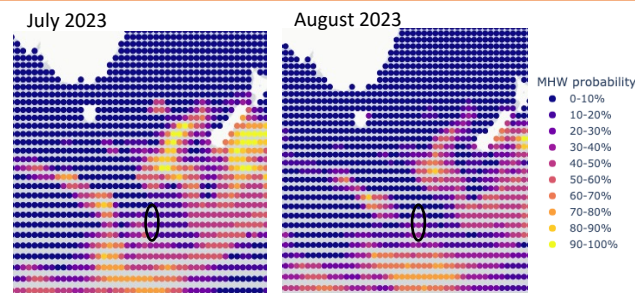
2023 has had record levels of low sea ice extent ([link](#))⁶

Sea Ice Concentration anomalies: June 2023



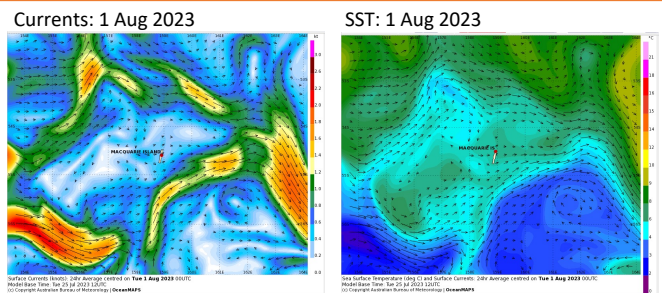
Spatial map of sea ice anomalies show low concentrations across most of Antarctica ([link](#))⁶.

Marine Heatwave Forecast



Marine heatwaves are forecast in the southern ocean adjacent to the MITF region through July and decreasing through August. Forecasts are 1° spatial resolution, with black circle on MI ([link](#))⁷.

Ecosystem and Fishery



10-day forecasts show the position of fronts that are important foraging regions for top predators. Other variables are available online ([link](#))¹.