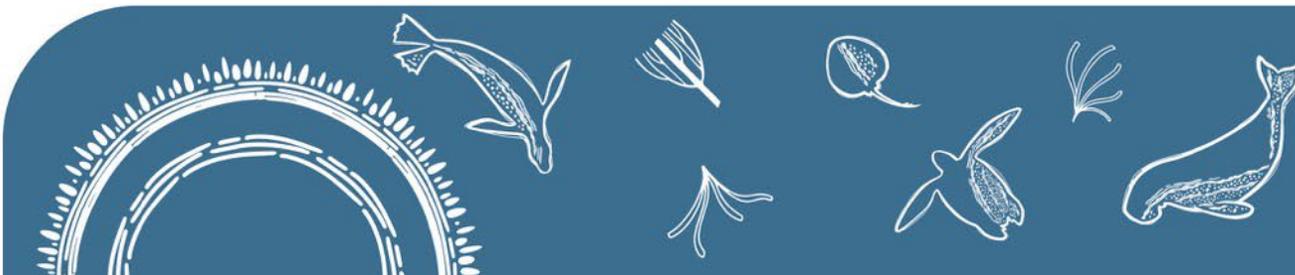
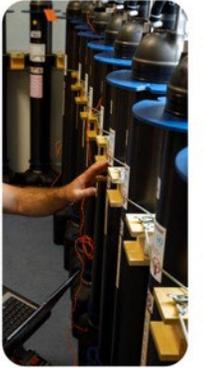
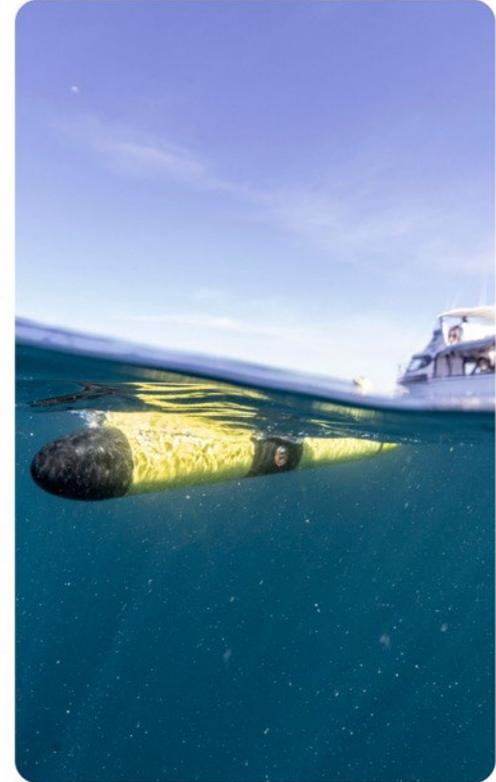


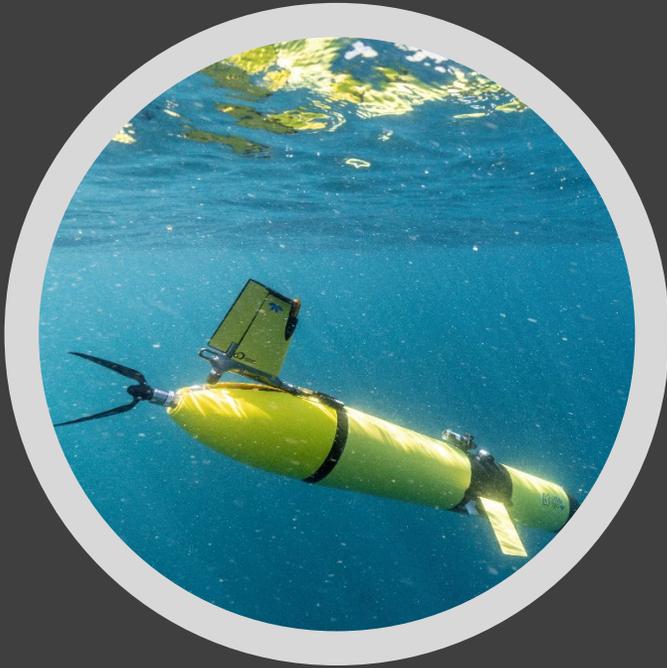


# Ocean Gliders

Chari Pattiaratchi &  
The UWA Glider Team



IMOS acknowledges the Traditional Custodians and Elders of the land and sea on which we work and observe, and recognise them as Australia's first marine scientists and carers of sea Country. We pay our respects to Aboriginal and Torres Strait Islander peoples past and present.



# Ocean Gliders

# Ocean Gliders: Before IMOS



## Achievements (2009-2026):

Total missions: **423**

Days in water: **> 10,000**

Distance traversed: **> 125,000 km**

Vertical profiles: **> 1.5 million**

Essential ocean variables (EOV):

**3.45 billion** data points collected



## UWA IMOS glider facility staff (2007-2026):

Charitha Pattiaratchi

Ben Hollings

**Dennis Stanley**

**Mun Woo**

**Christine Hanson**

Paul Thomson

Florence Verspecht

Sarath Wijeratne

Kah Kiat Hong

Alessandra Mantovanelli

Claire Gourcuff

Martin Coia

**Robert Wochesländer**

**Cailin Burmaster**

**Ruth Gongora-Mesas**

# UWA Ocean Glider Team

Christine Hanson

Dennis Stanley

Christine Hanson

Mun Woo

Robert Worslander

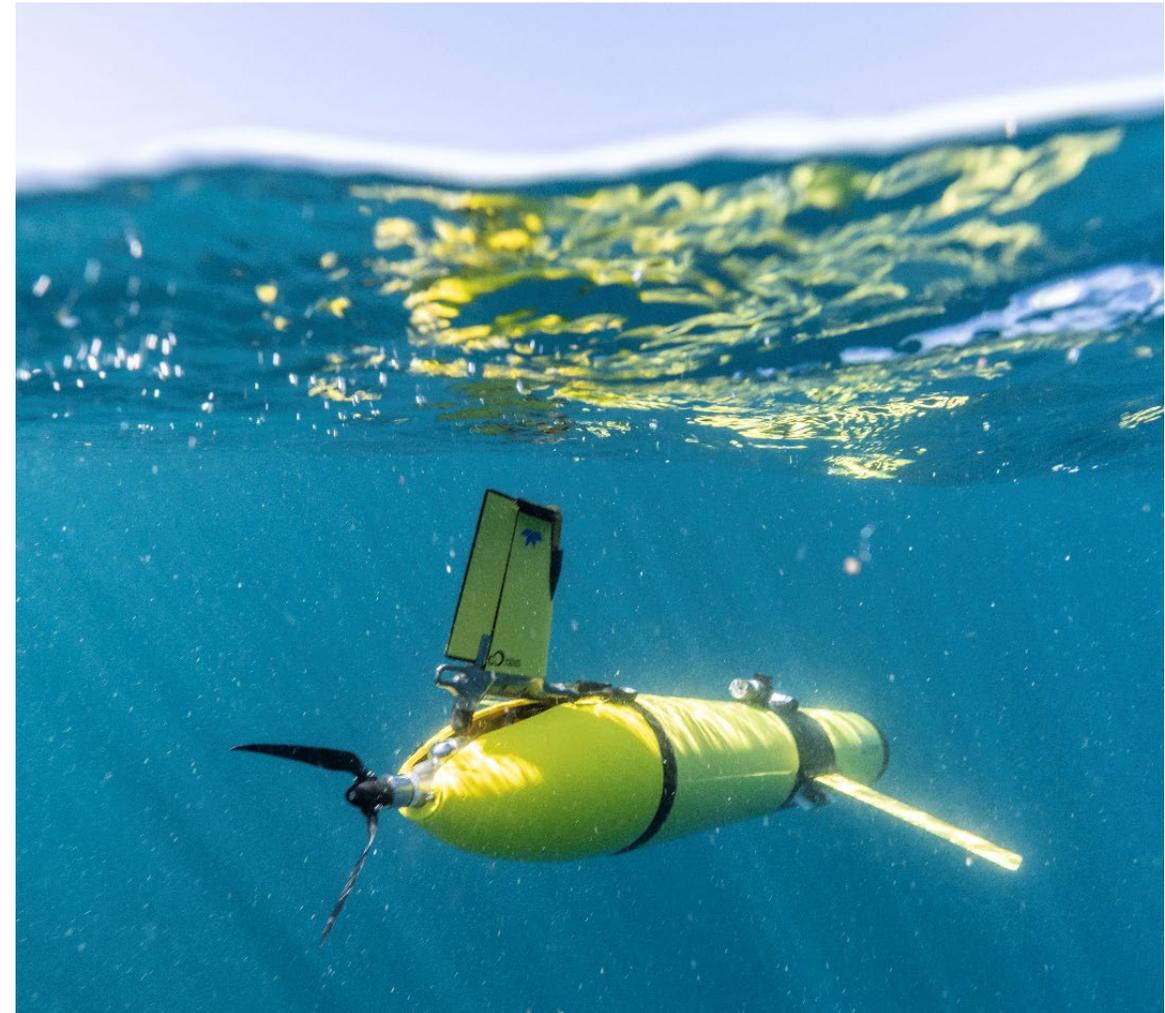
Cailin Burmaster

## Current Fleet (8)

4 Slocum G2

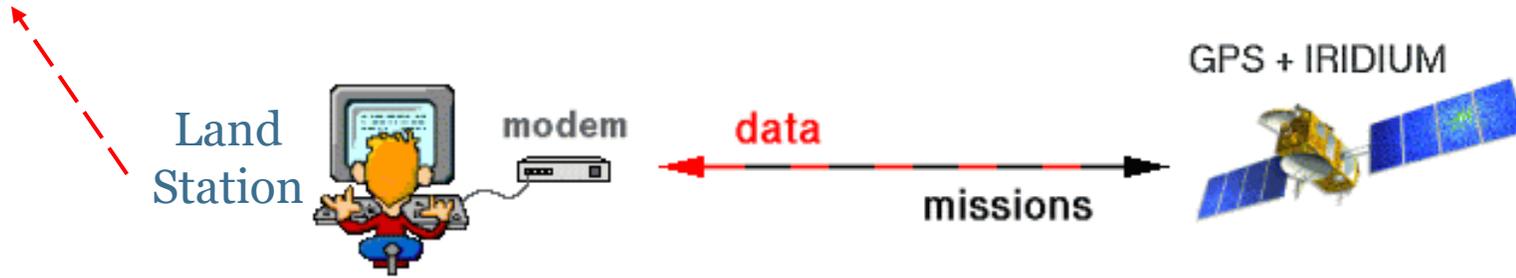
3 Slocum G3

+ 1 order

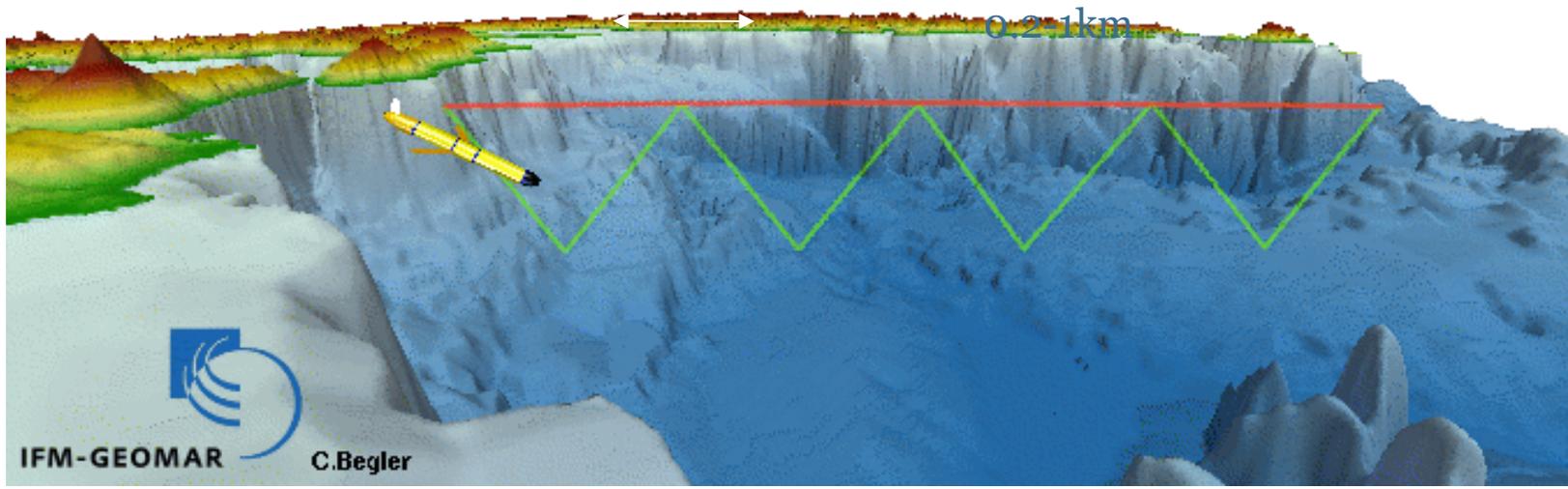


# Ocean Glider Operation

users

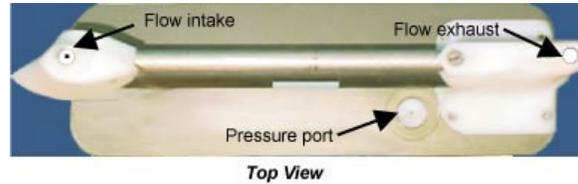


- $U \sim 25$  km/day
- 'dive' in  $\sim 0.5$ -5h
- 2 'vertical' profiles spaced by  $\sim 0.2$ -5 km



# What EOV's are being measured?

- Conductivity (salinity)
- Temperature
- Depth



- 4-channel downwelling irradiance

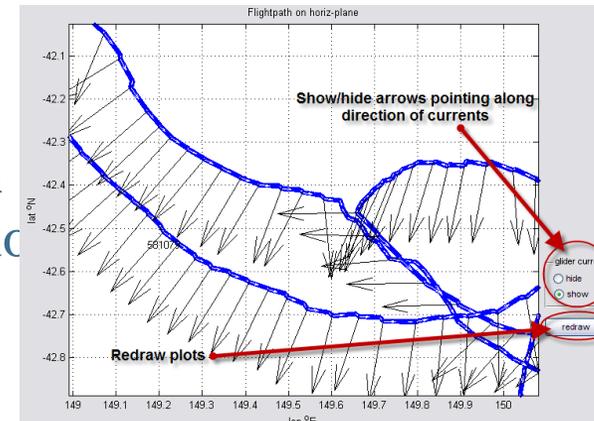


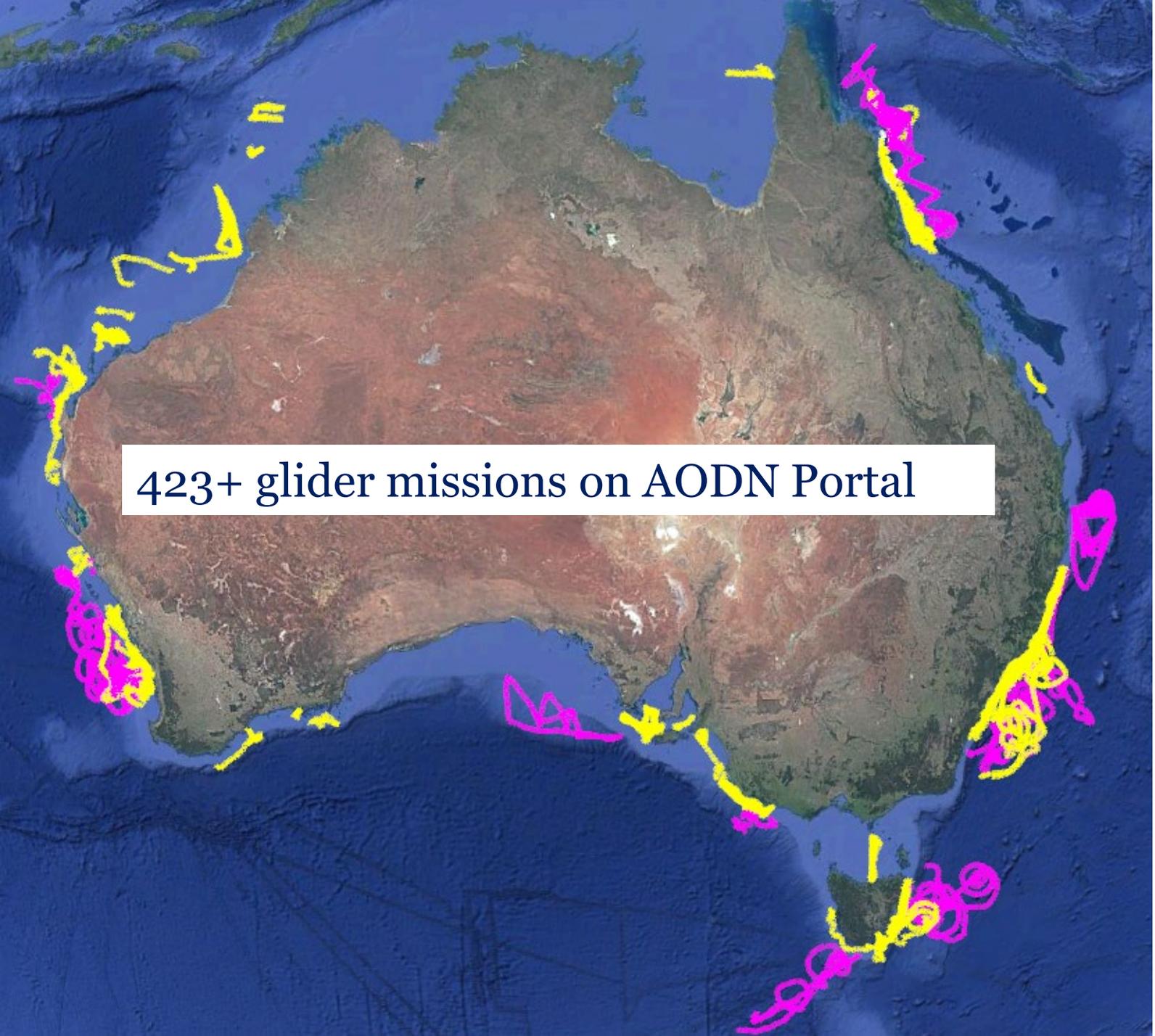
- Dissolved oxygen



- Optical backscatter (650 nm)
- Chlorophyll *a* fluorescence
- CDOM (coloured dissolved organic matter)

- Depth-averaged currents (estimated based on variation between dead reckoned position and GPS position)





423+ glider missions on AODN Portal

2009-2026

10408 glider days  
(> 28 years)

231676 km

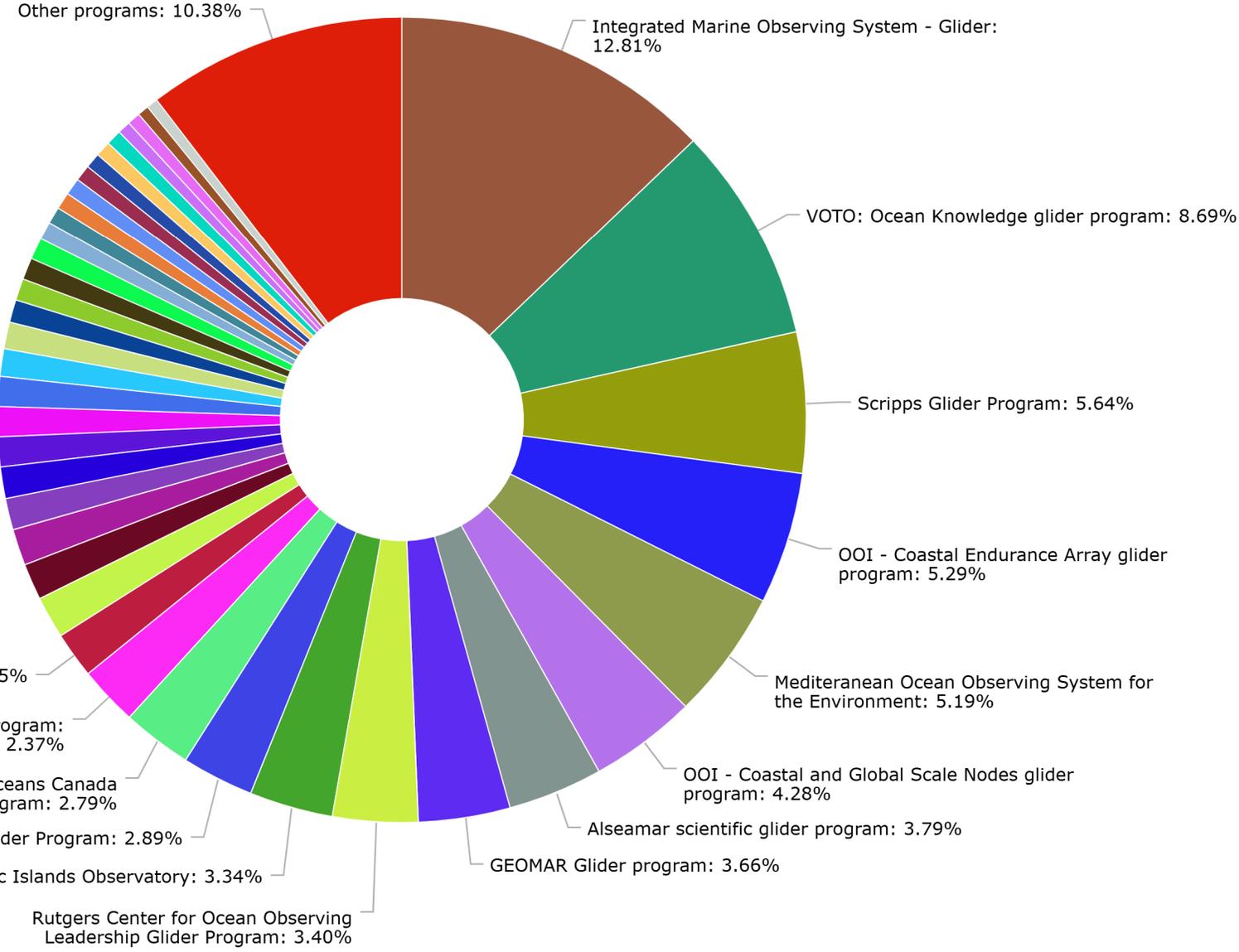
2 missions/month

1 deployment/recovery per  
week

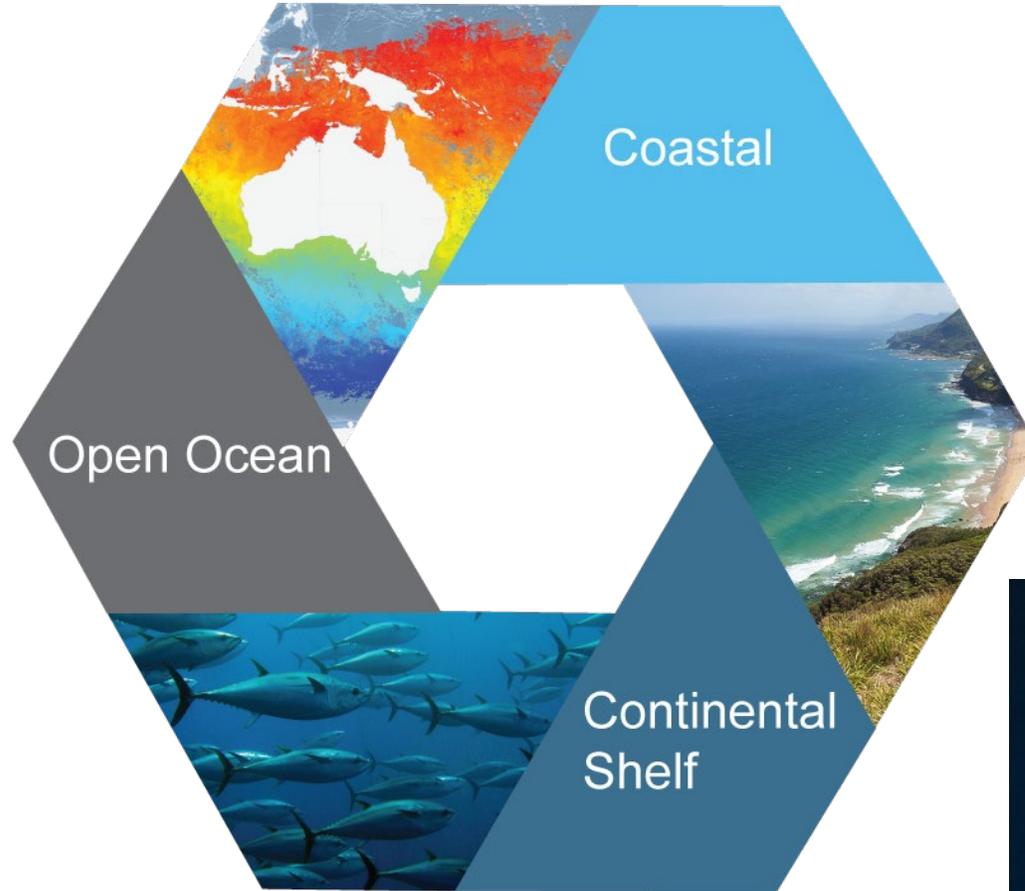
~1000+ field trips



# Global Glider deployment

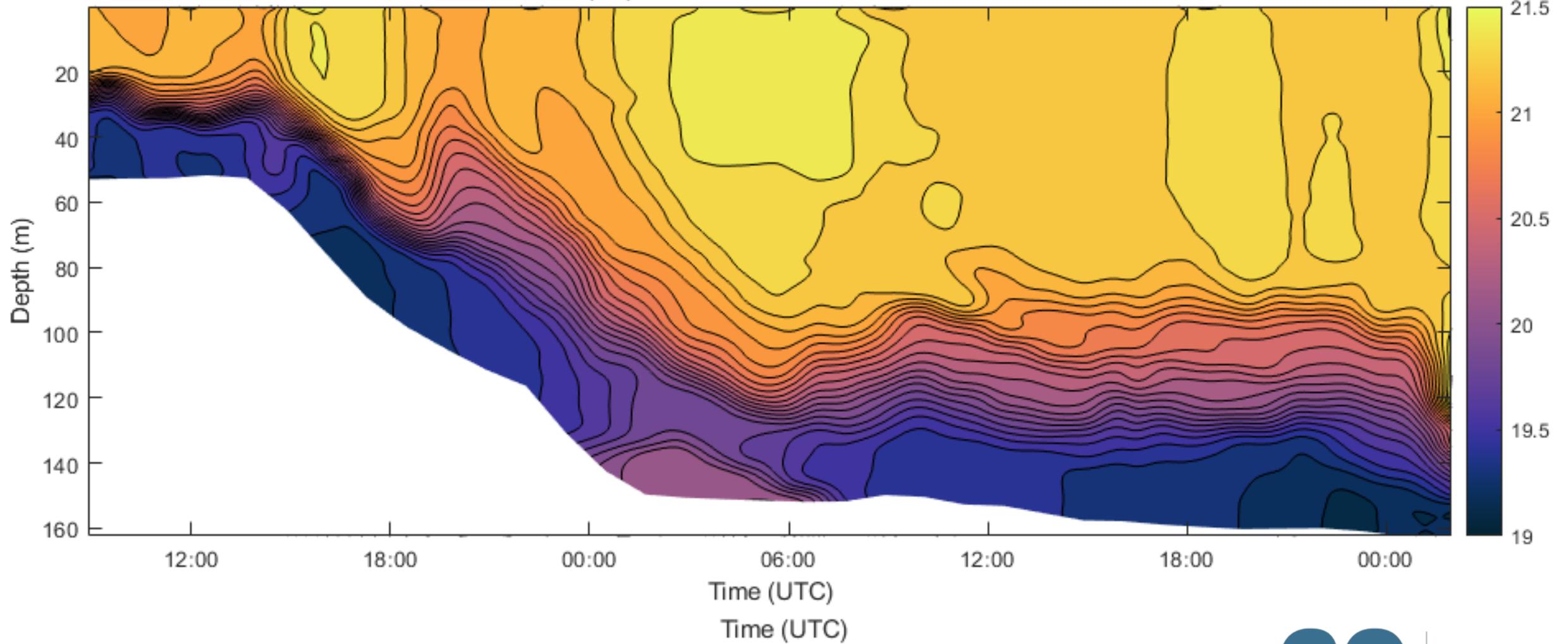


# Different modes of use

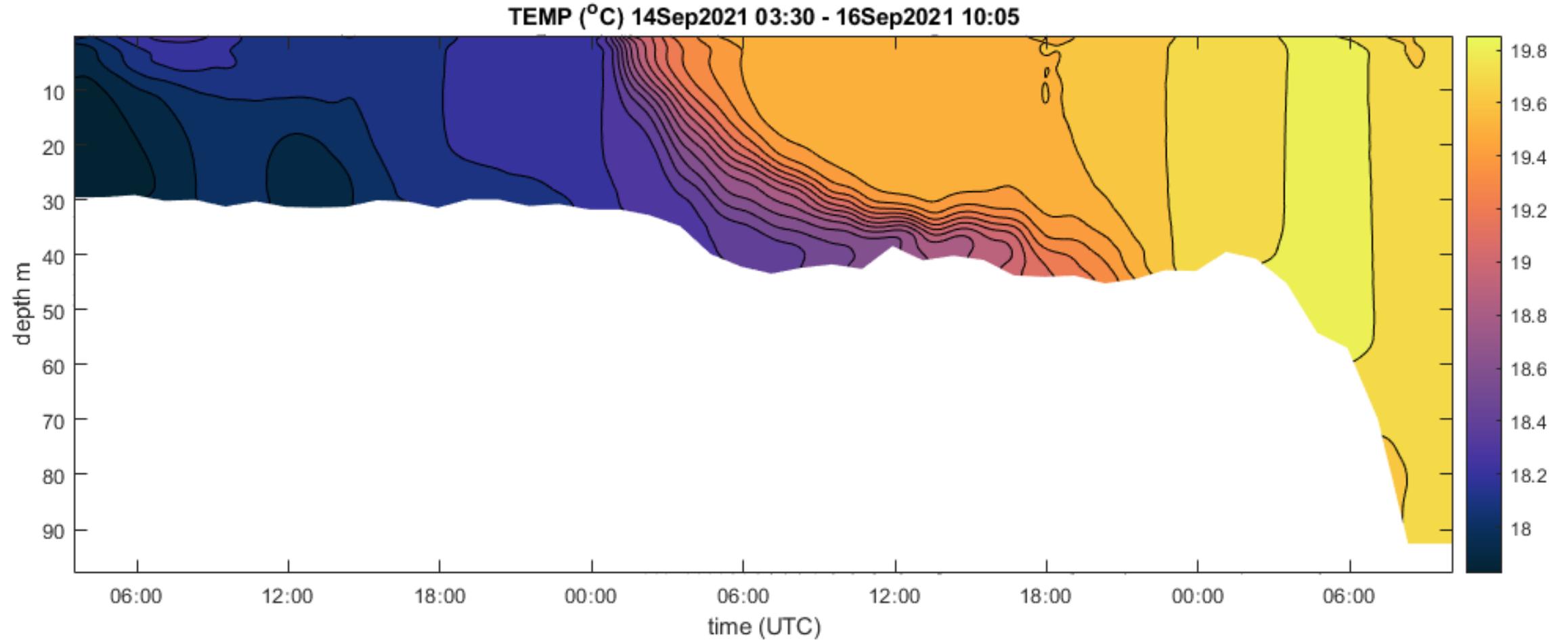


# First glider transect under IMOS

TEMP (°C) 03Jul2008 08:53 - 05Jul2008 01:58

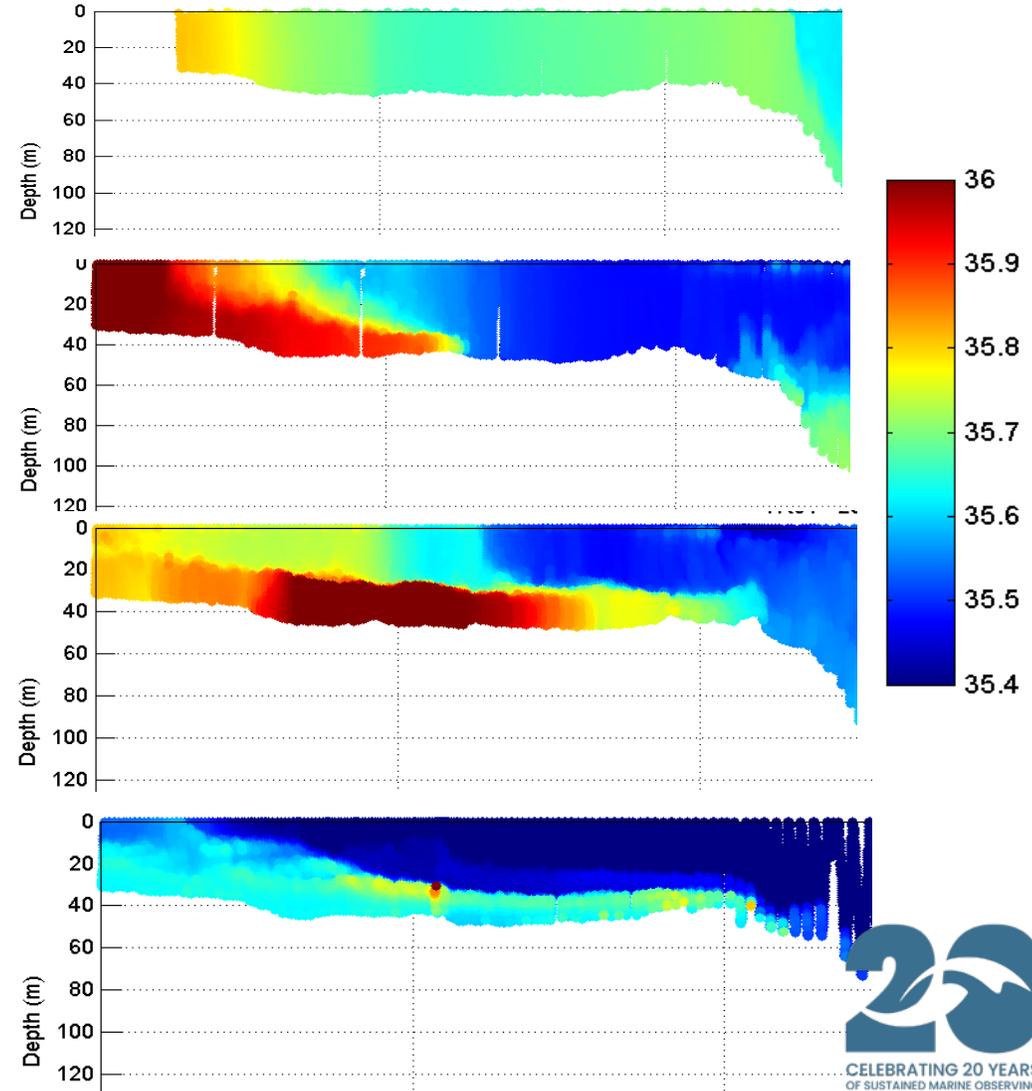
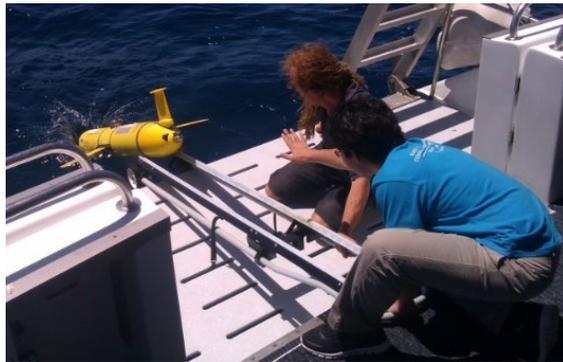
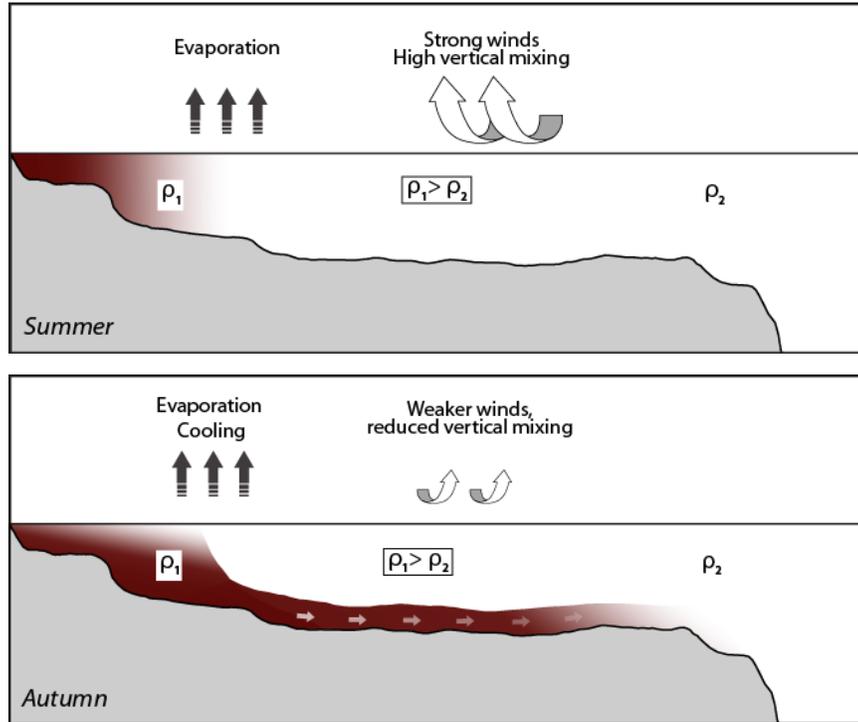


# Dense shelf water transport

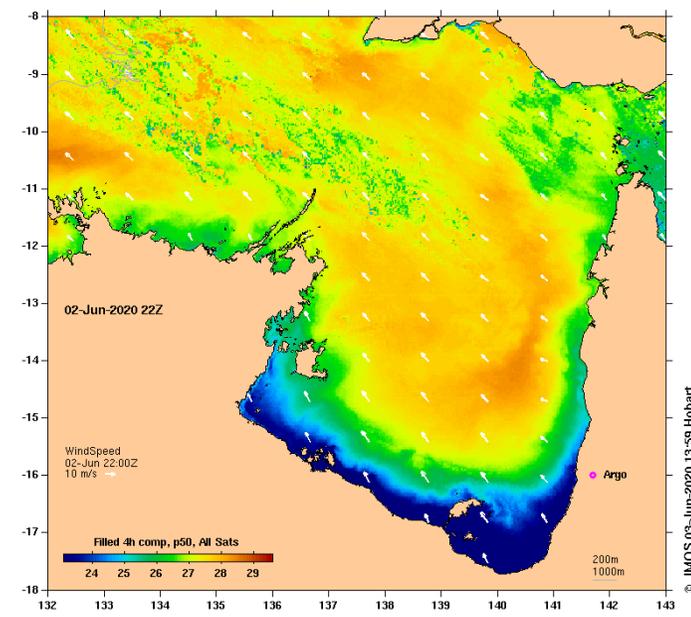
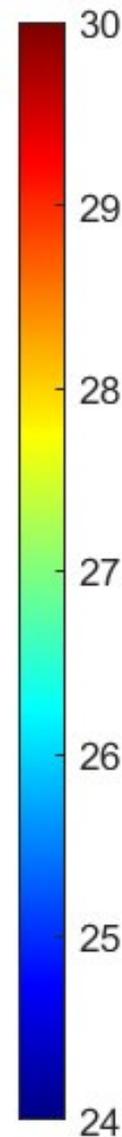
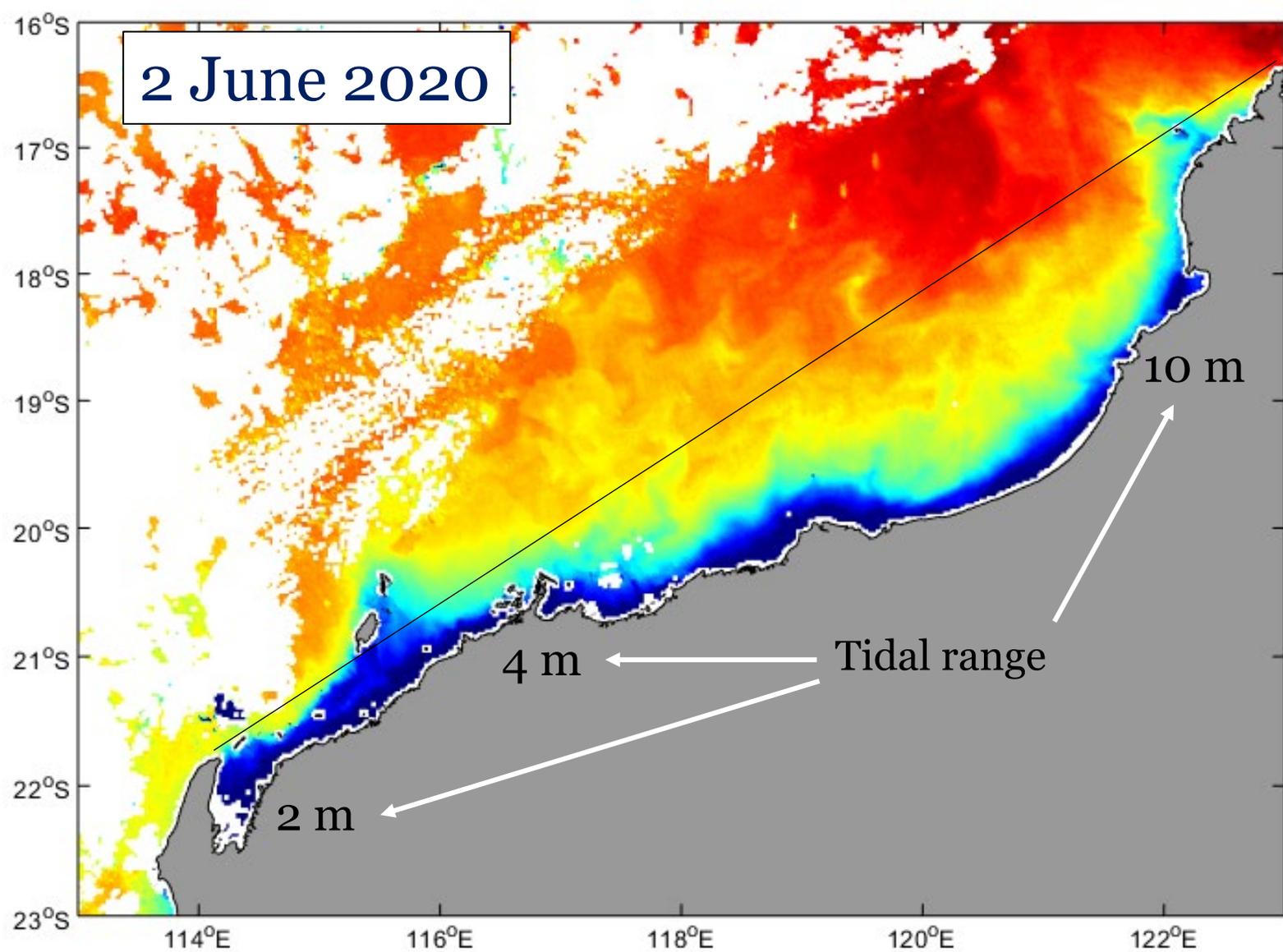


Underwater rivers

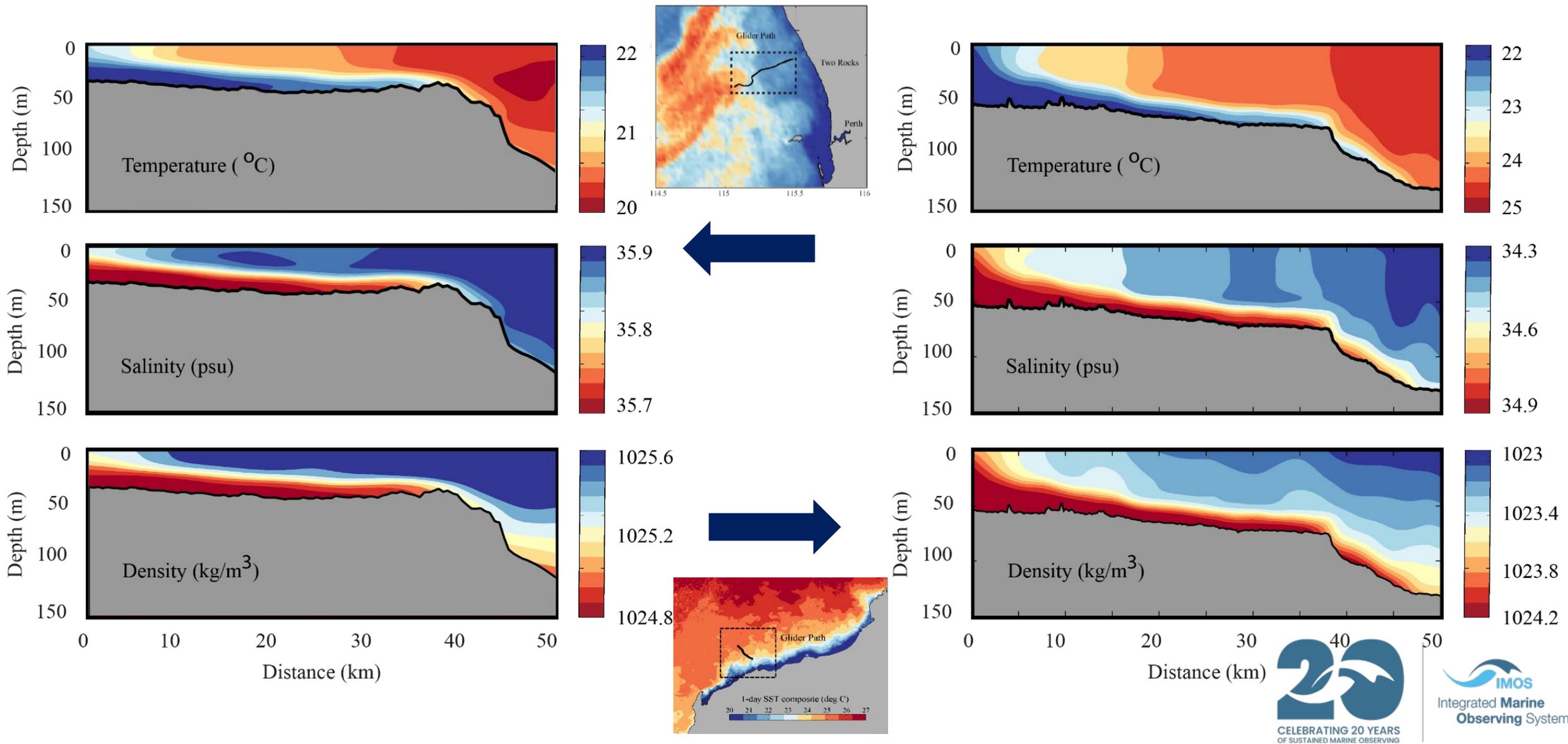
# Dense shelf water transport



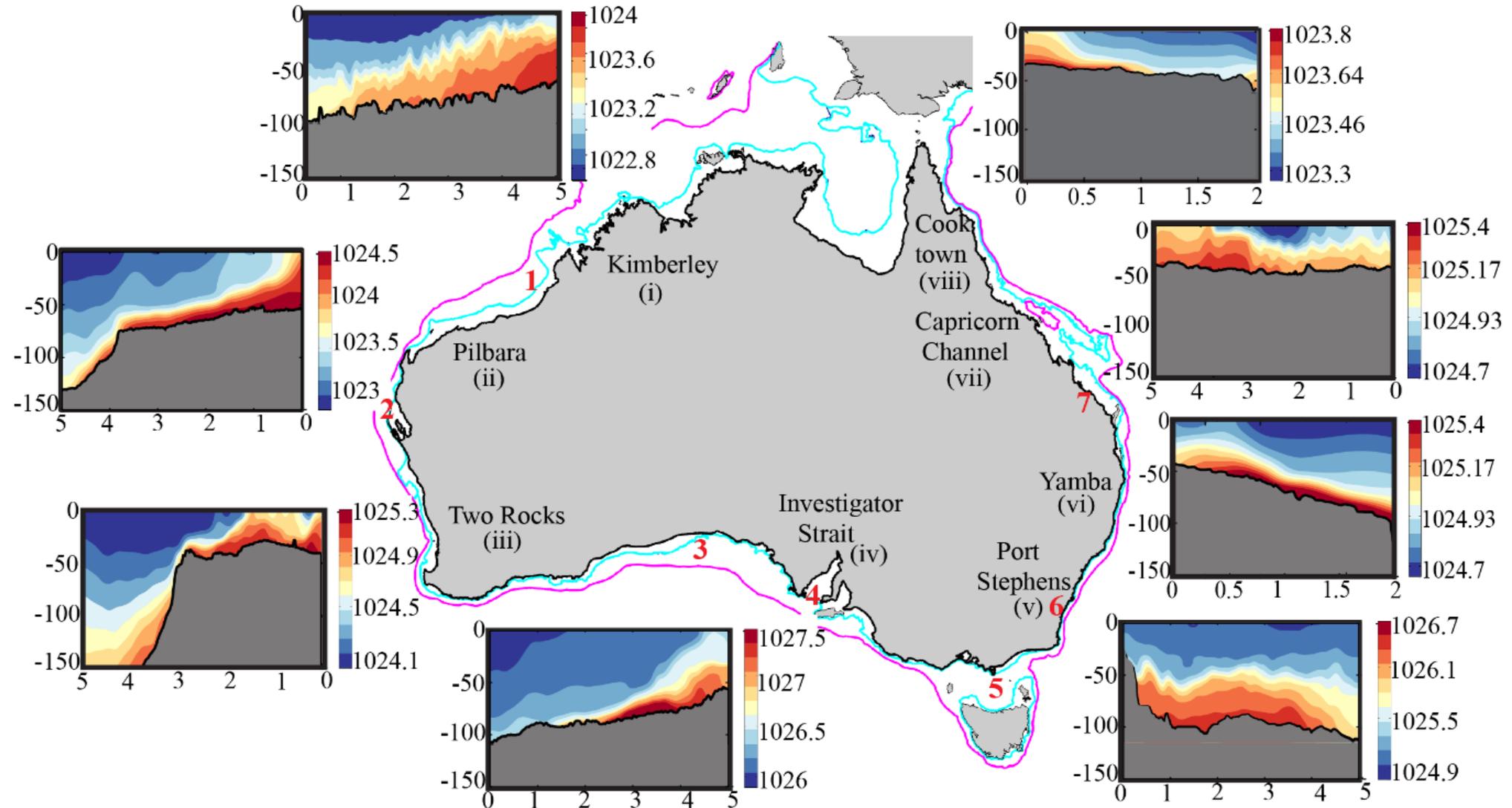
# Australian North-west Shelf



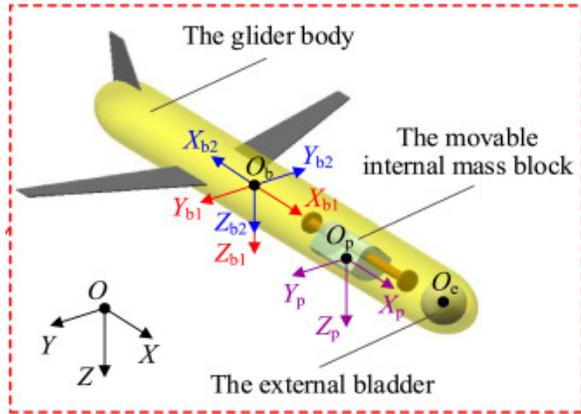
# Dense shelf water transport



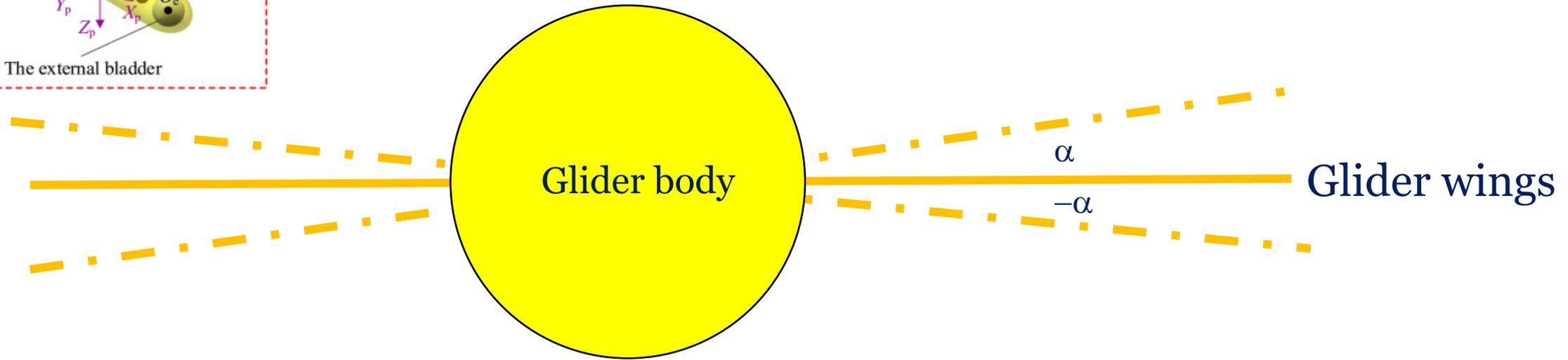
# Dense Shelf Water Transport



# Glider motion



roll ( $\alpha$ ) – motion in the  $Y_{b1}$ - $Y_{b2}$  plane  
pitch ( $\theta$ ) – motion in the  $X_{b1}$ - $X_{b2}$  plane

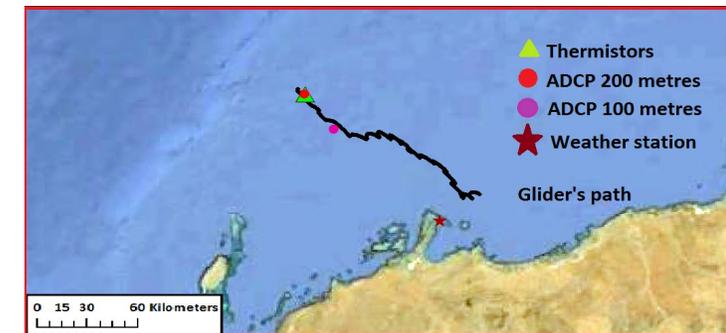
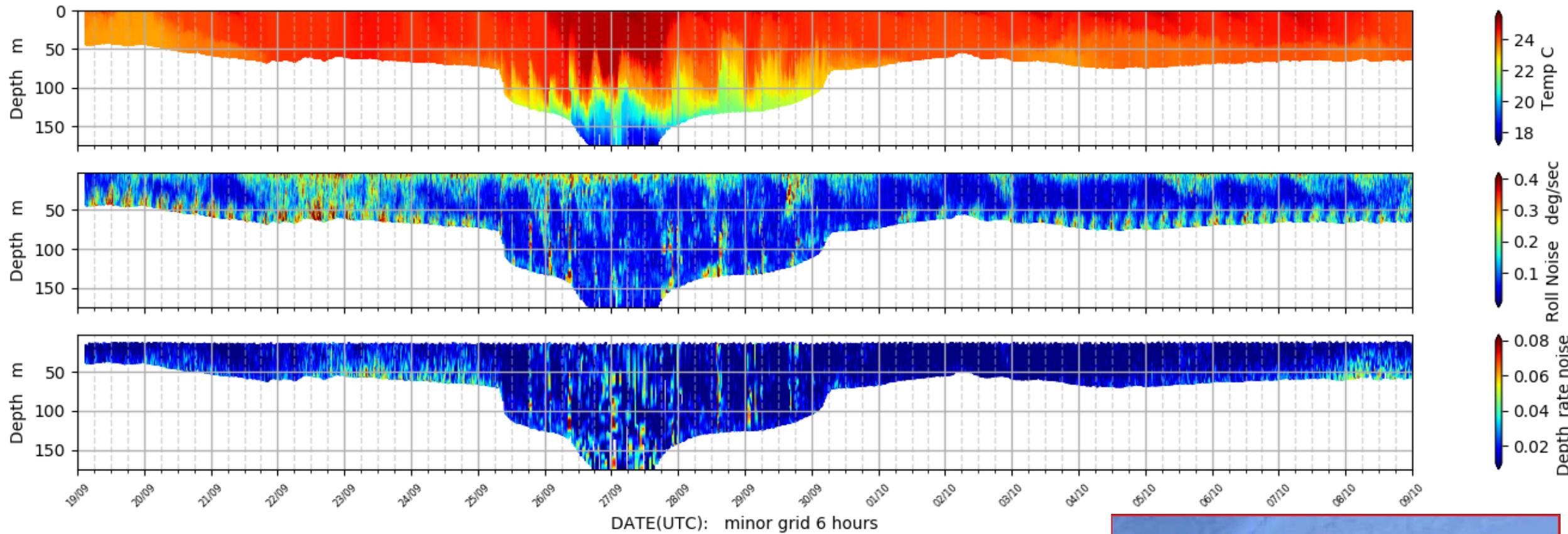


$\pm \alpha$  is the roll

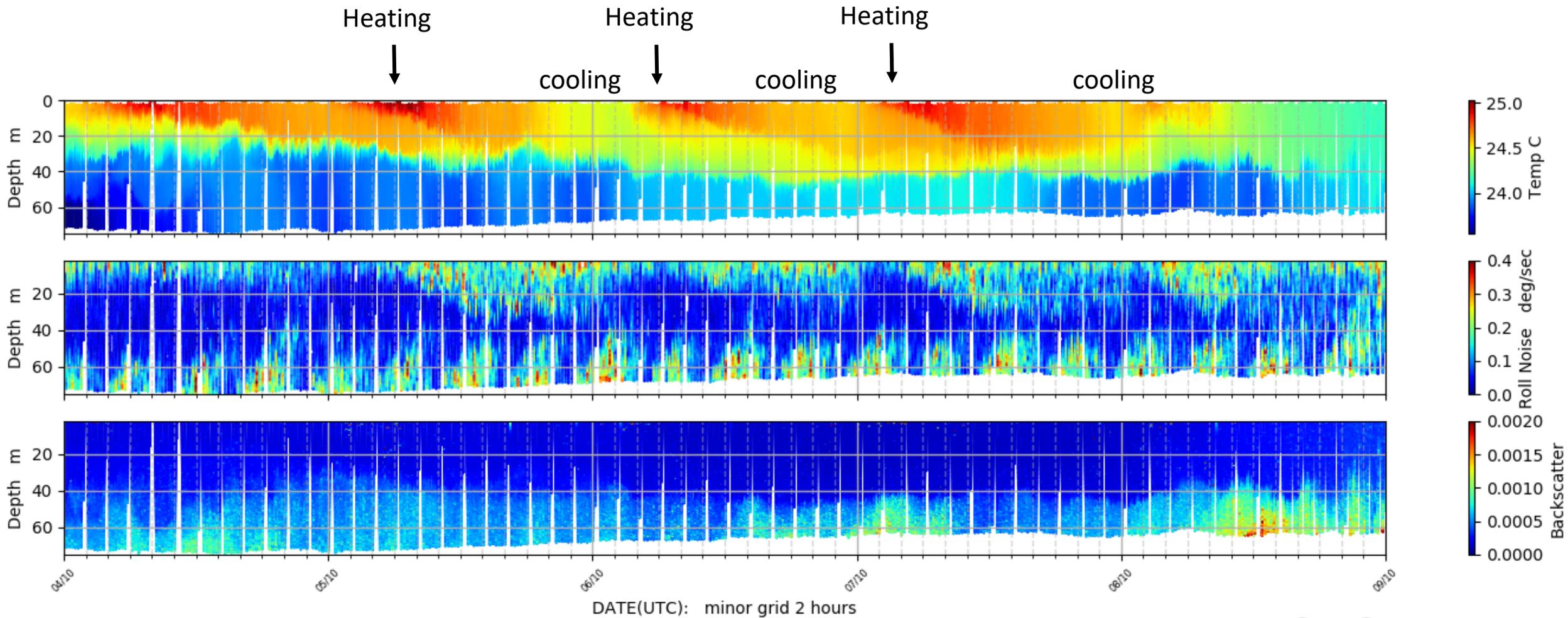
$$roll\_rate = \left| \frac{\partial \alpha}{\partial t} \right|$$

We use the roll\_rate as a proxy for turbulence/mixing

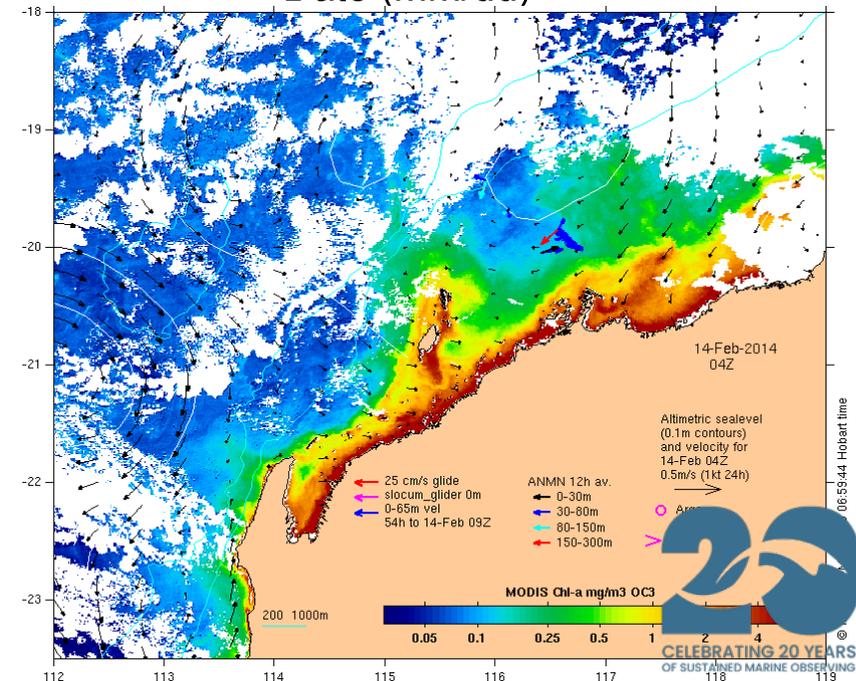
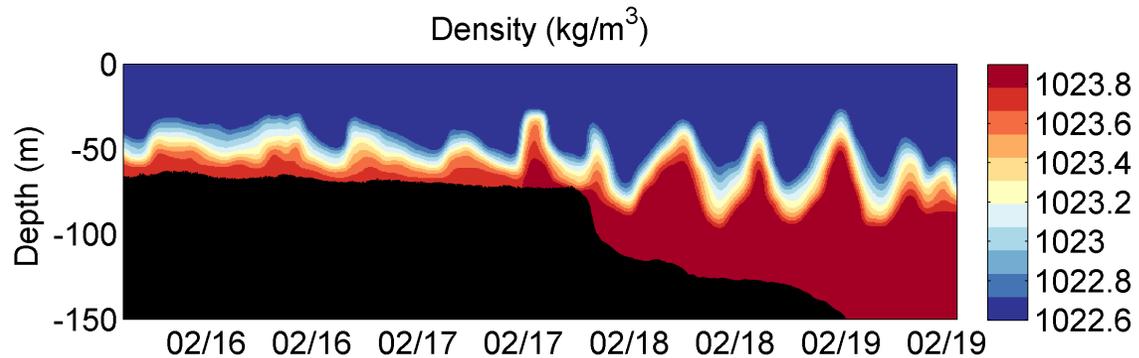
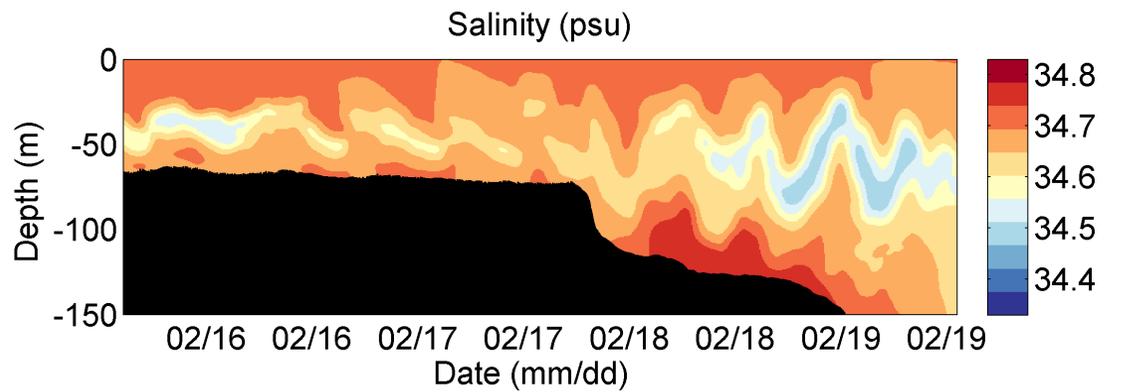
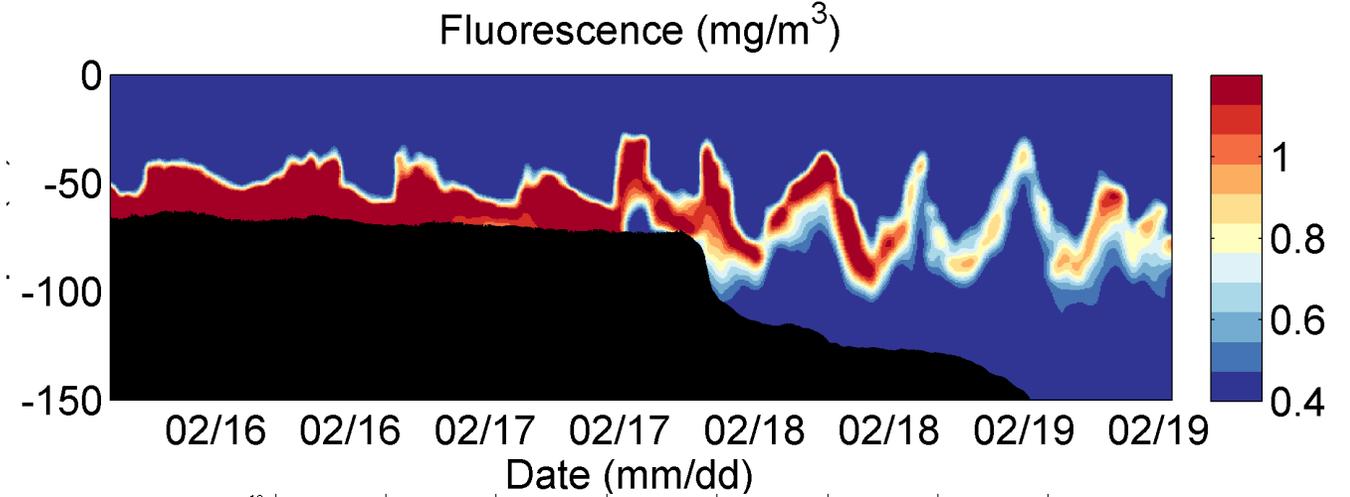
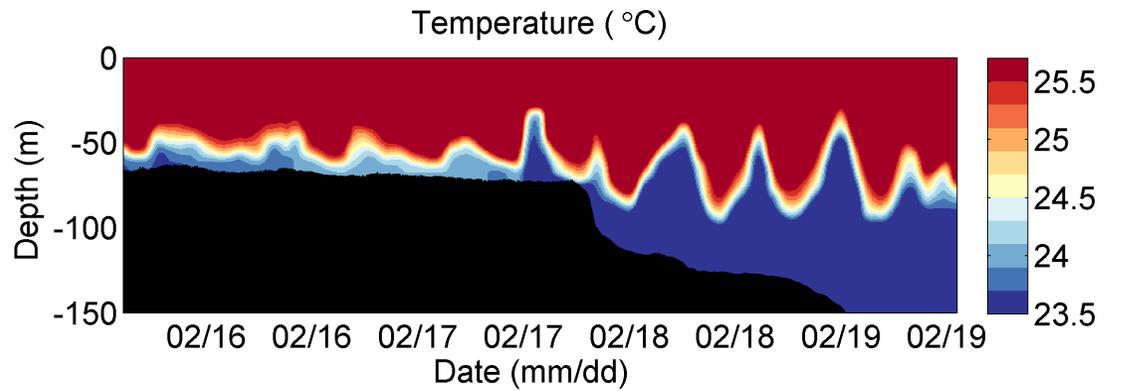
# Pilbara: tidal mixing



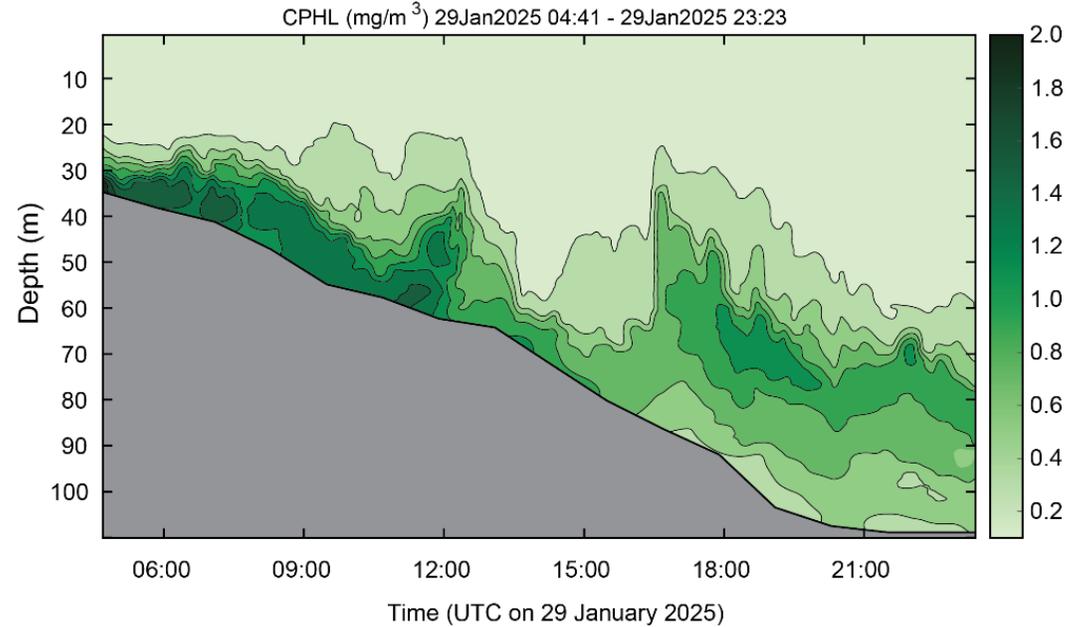
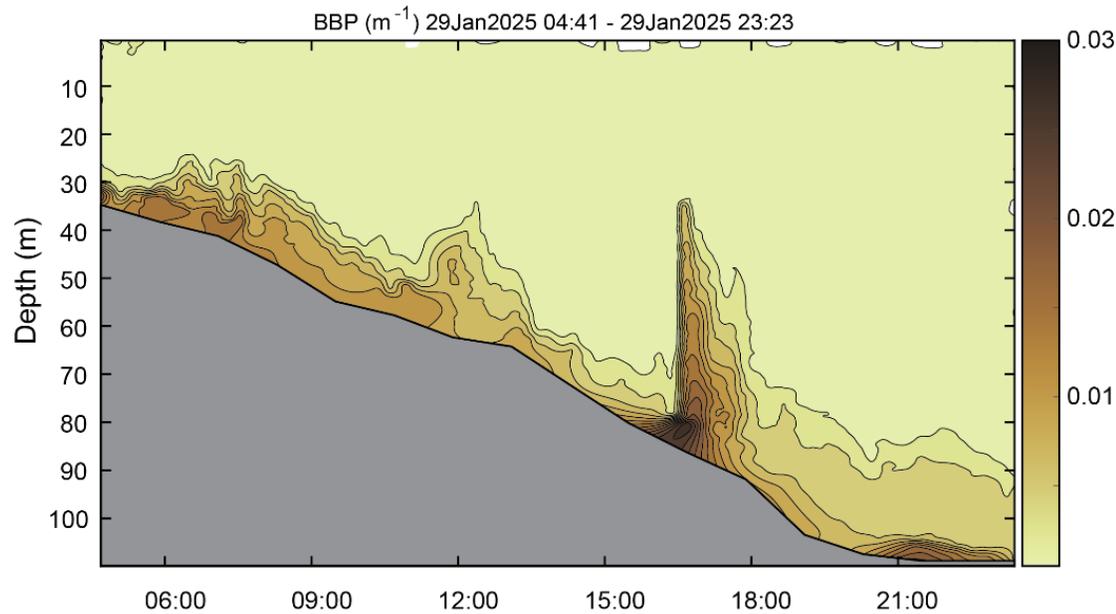
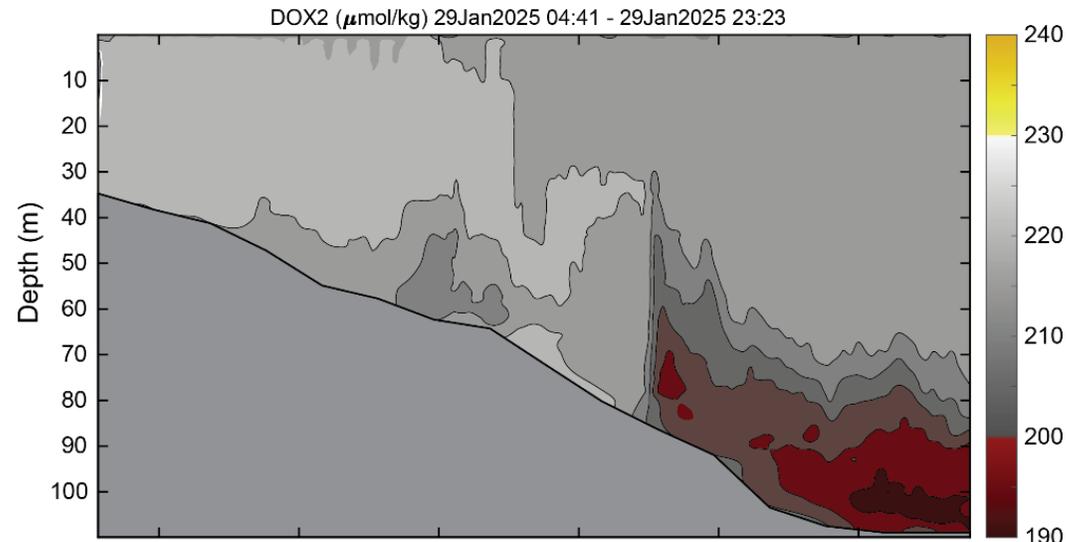
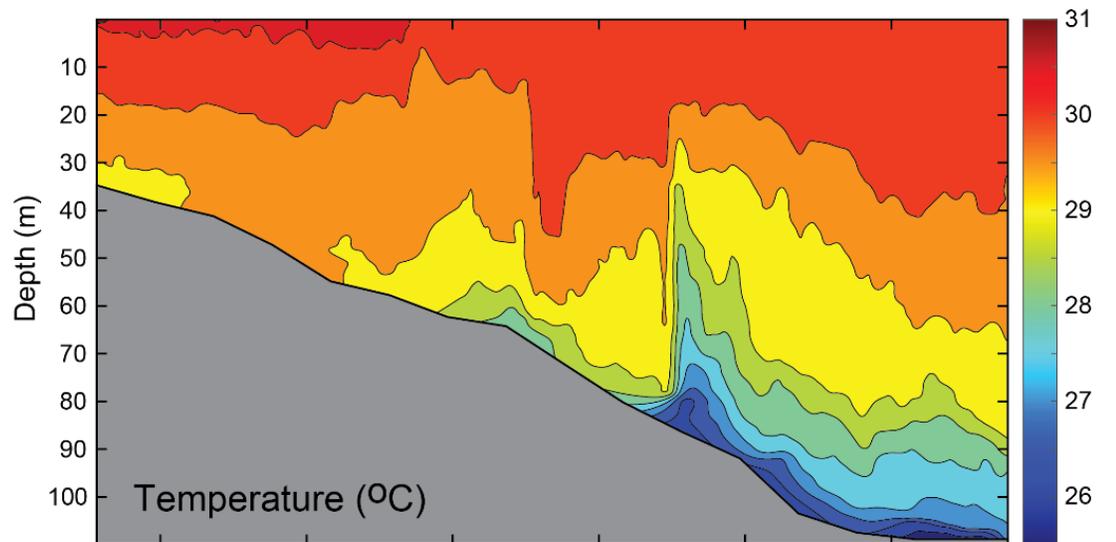
# Pilbara



# Ocean Glider observations: Pilbara



# Solitary wave

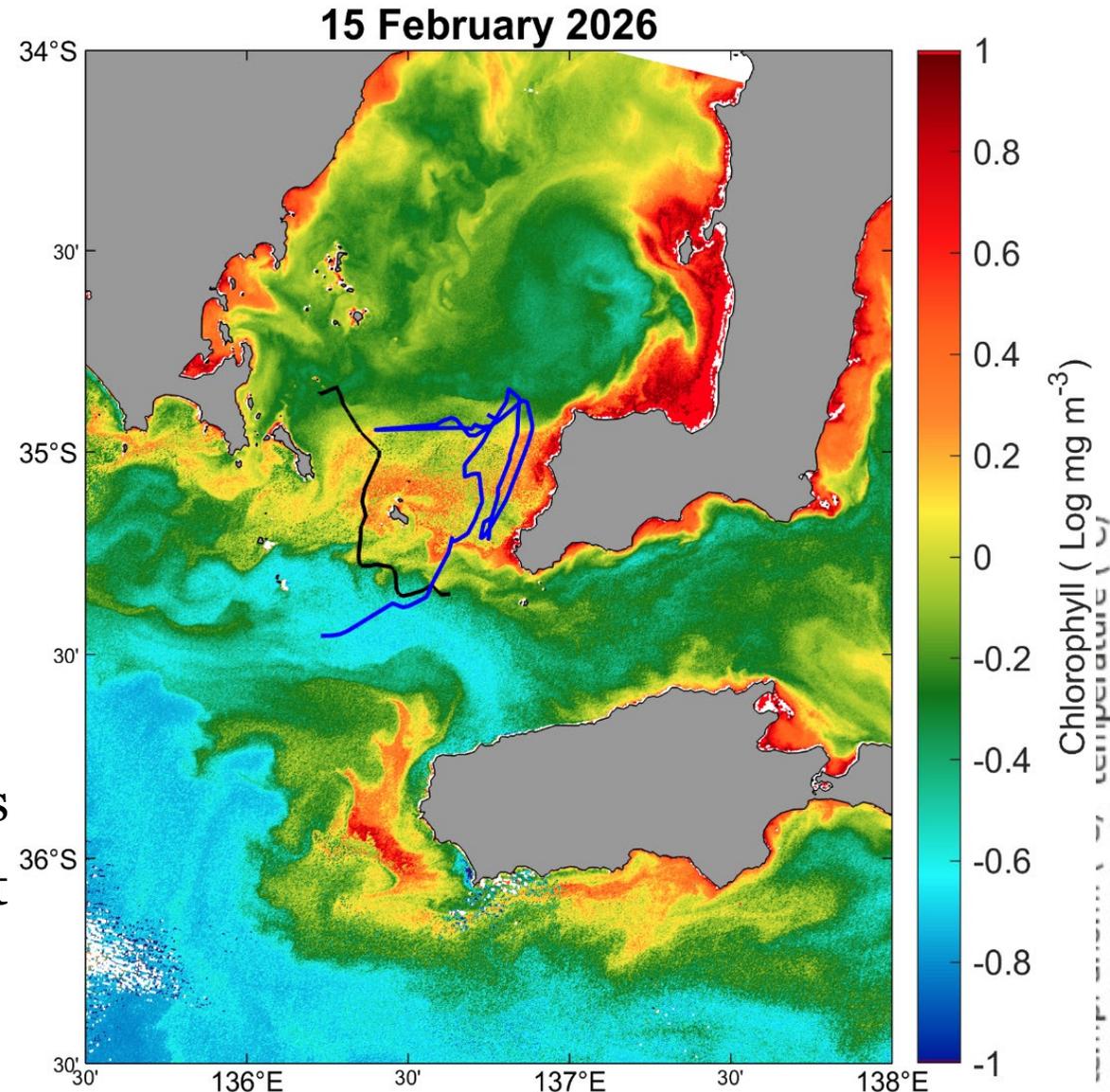


# IMOS Event Based Sampling (EBS)

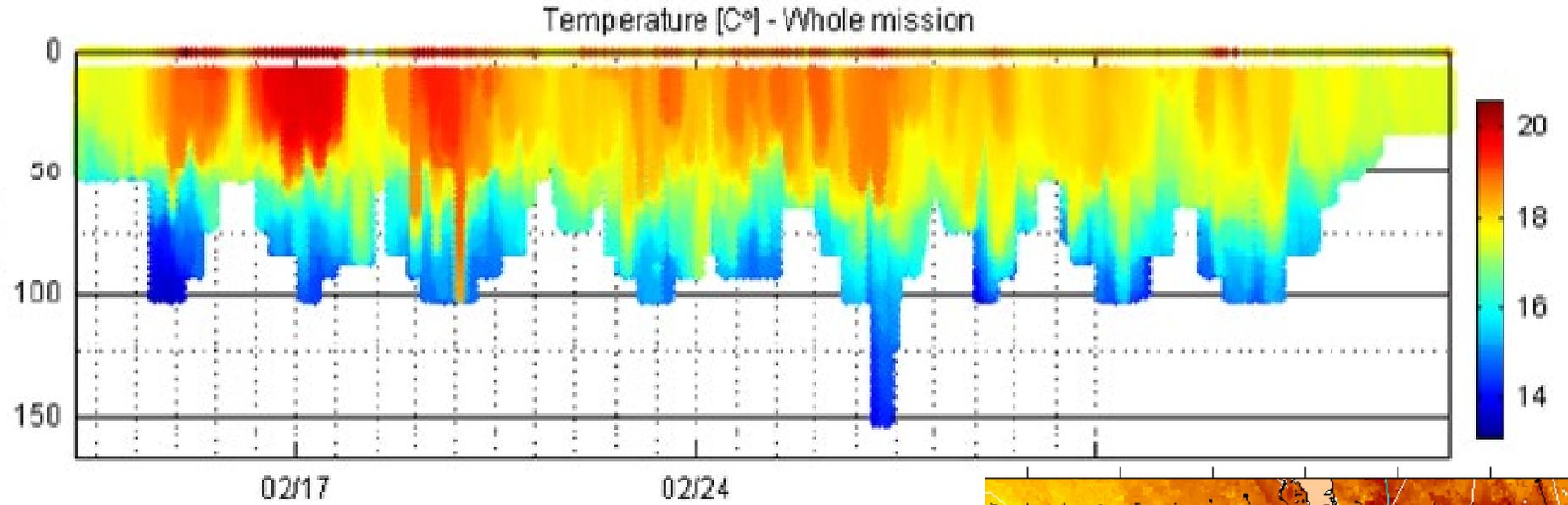
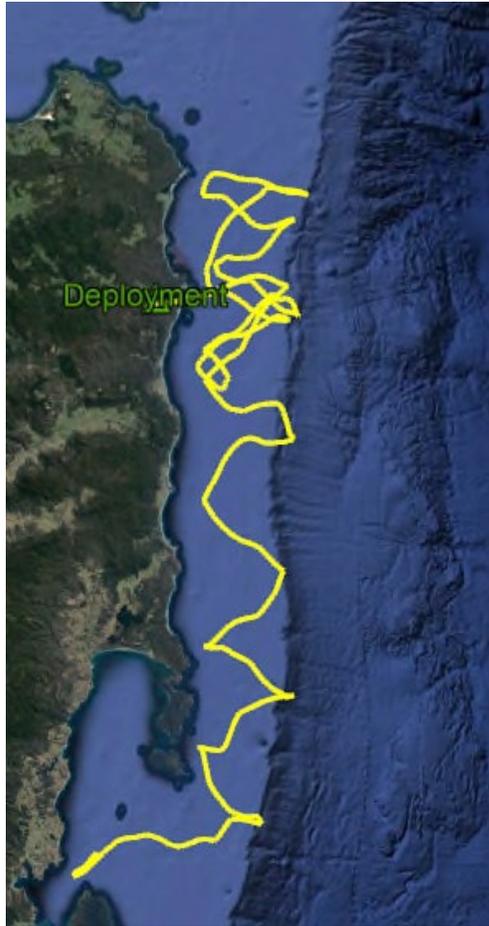
Broadening IMOS sampling of extreme events

**Within prediction time scale for glider deployment**

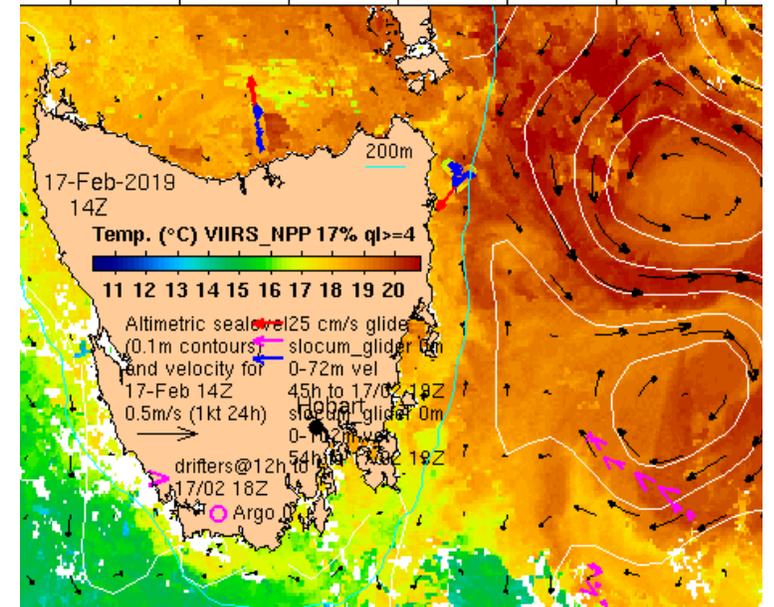
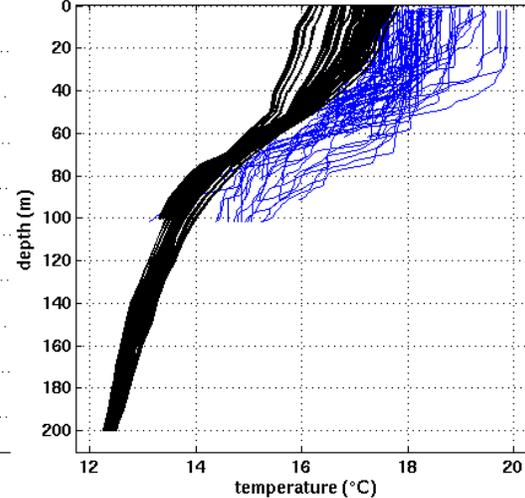
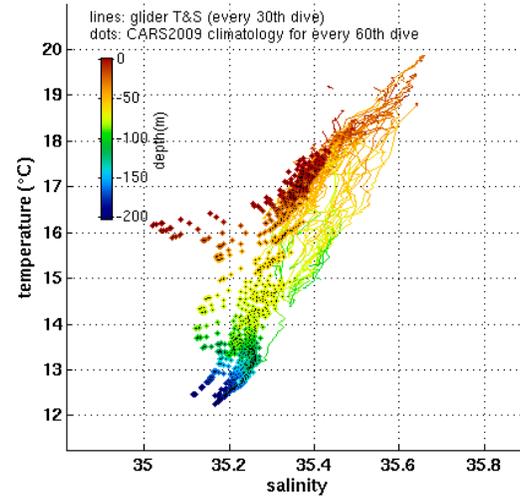
- Marine heatwaves and cold spells
- Tropical cyclones, severe storms (East Coast Lows)
- River plumes and coastal discharge
- Bushfire (dust and smoke) impacts
- Harmful Algal Blooms (HABs) and other pathogens
- Unplanned contaminant discharges (oil & pollutant spills)



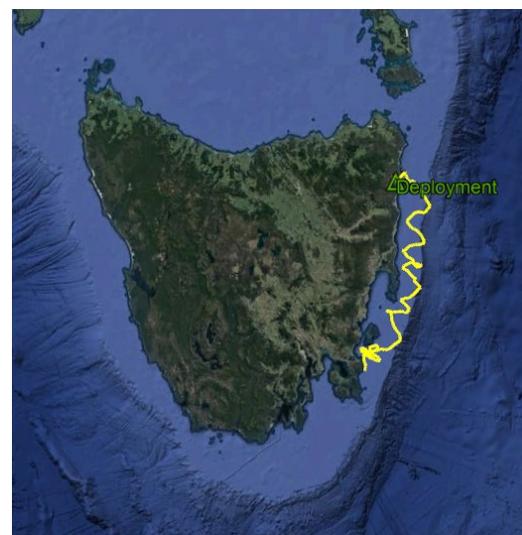
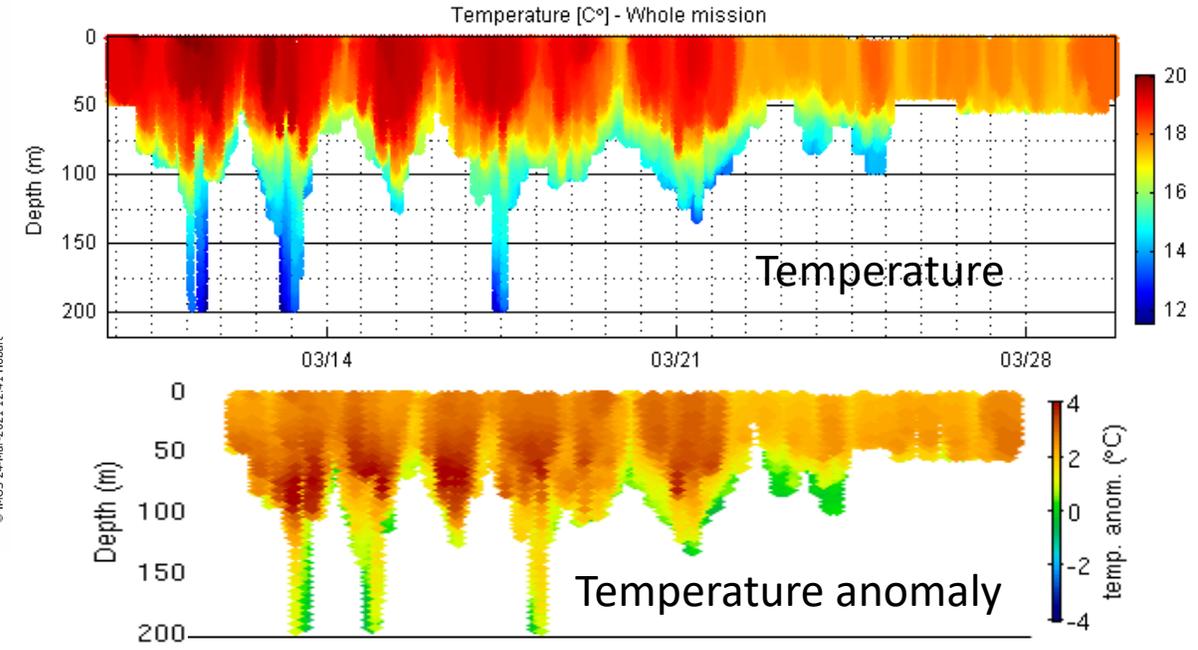
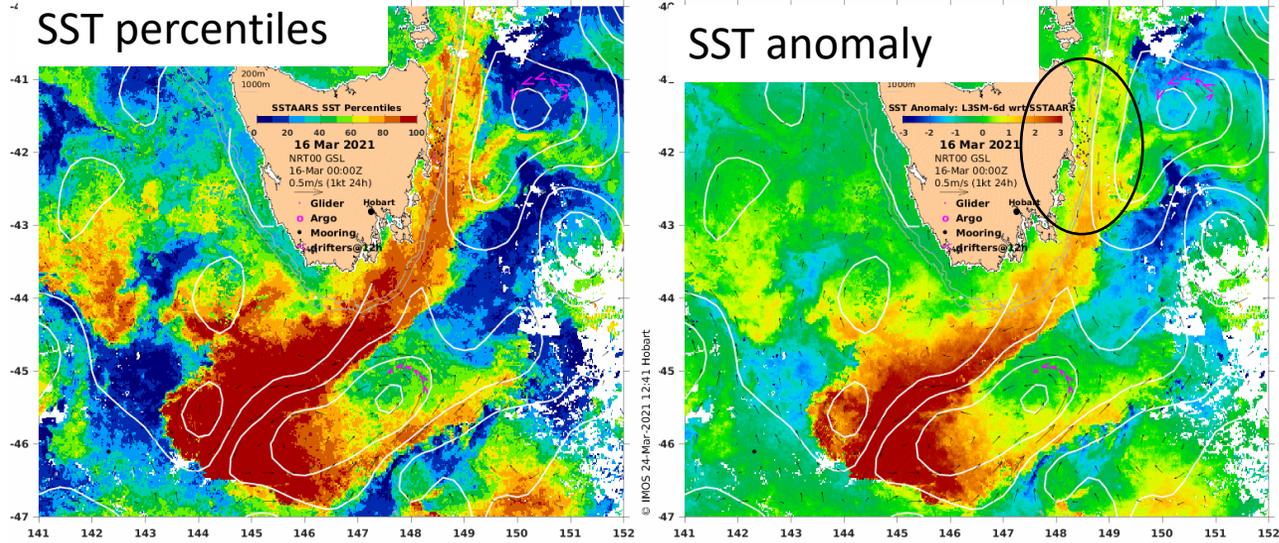
# East Tasmania: Feb 2019



IMOS slocum\_glider SL281 TasEastCoast20190213 148 149 -43 -41



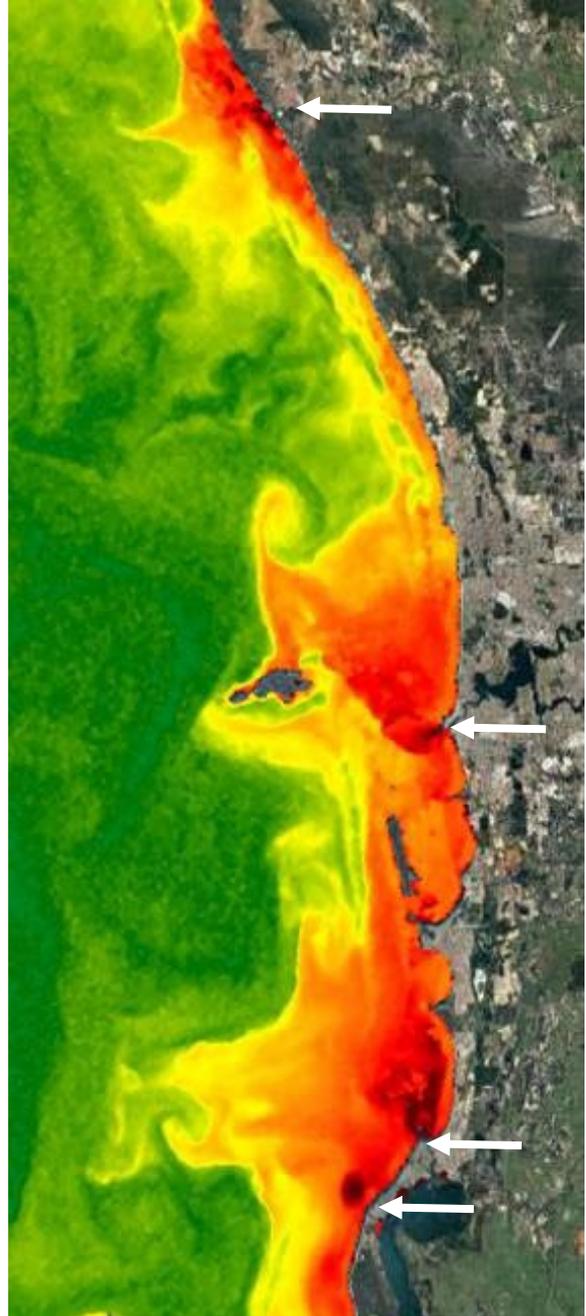
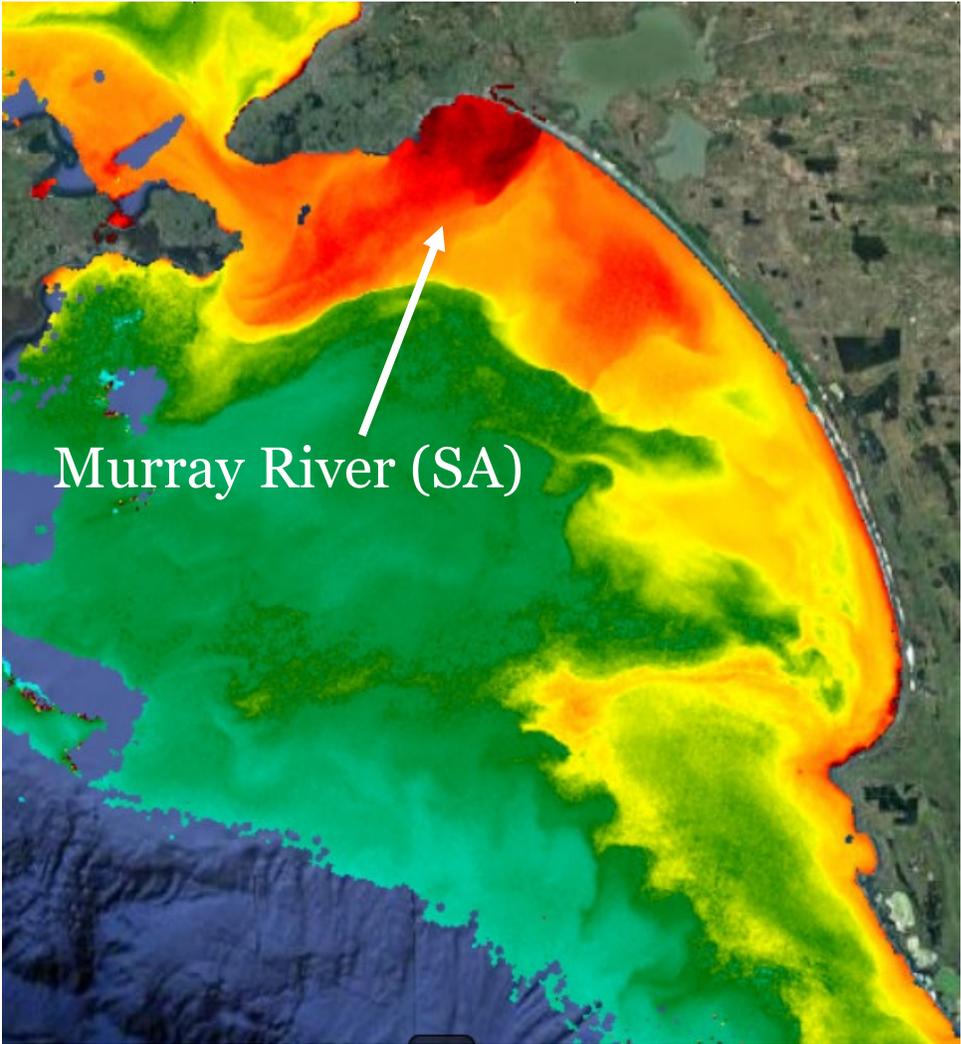
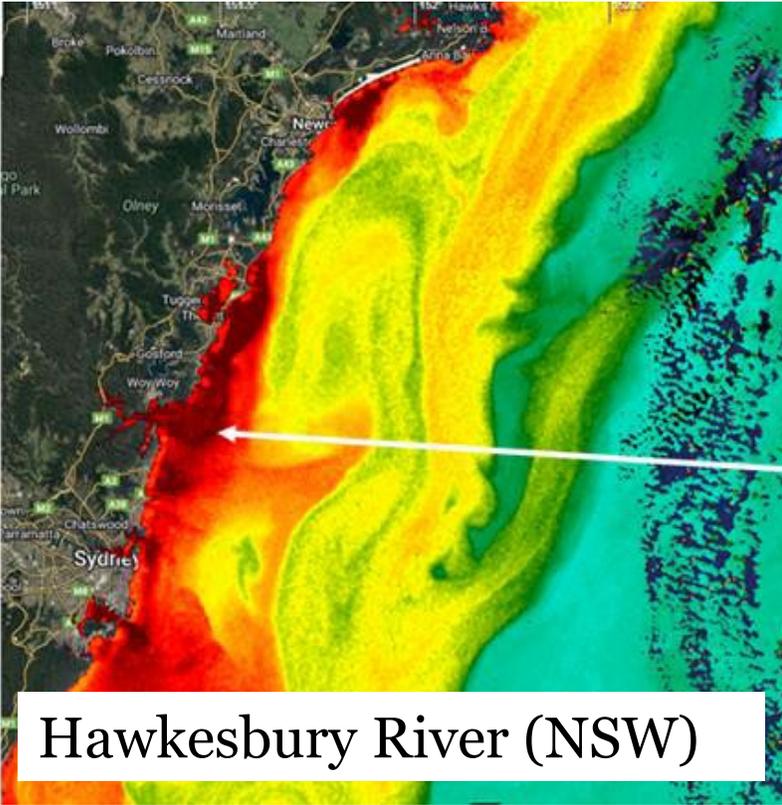
# East Tasmania: March 2021



The glider sampled waters off eastern Tasmania, where SST was 1-2 deg C warmer than usual,

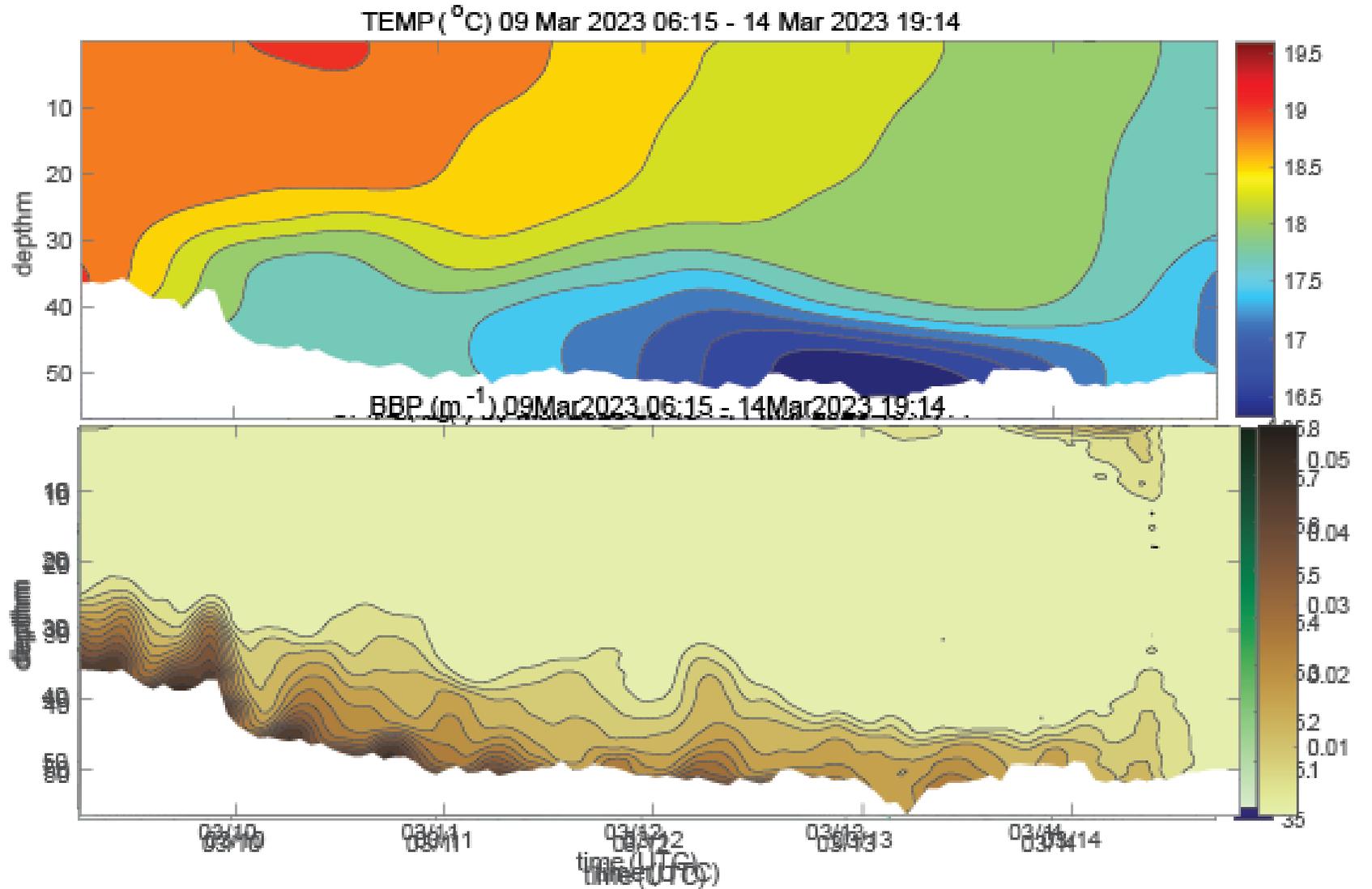
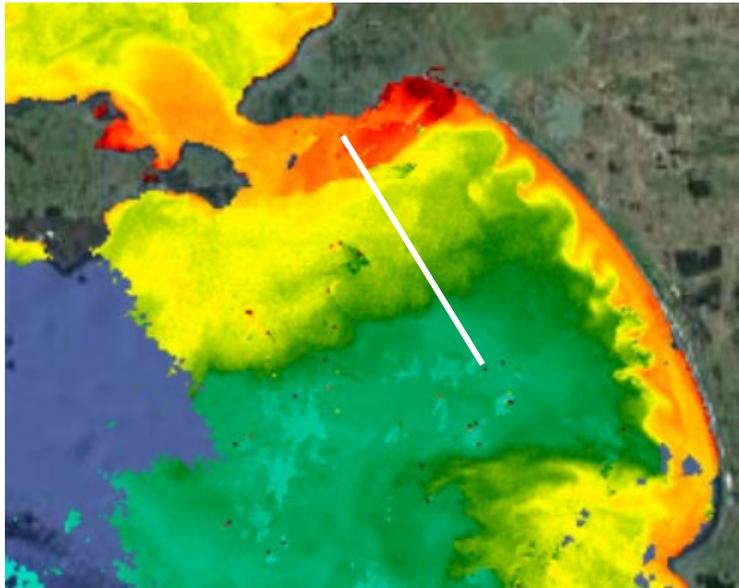
Temperature anomalies were greater at depth (reaching 4 deg C) than near the surface, as the warm water extended down between 50 to 100 m depth.

# River outflows

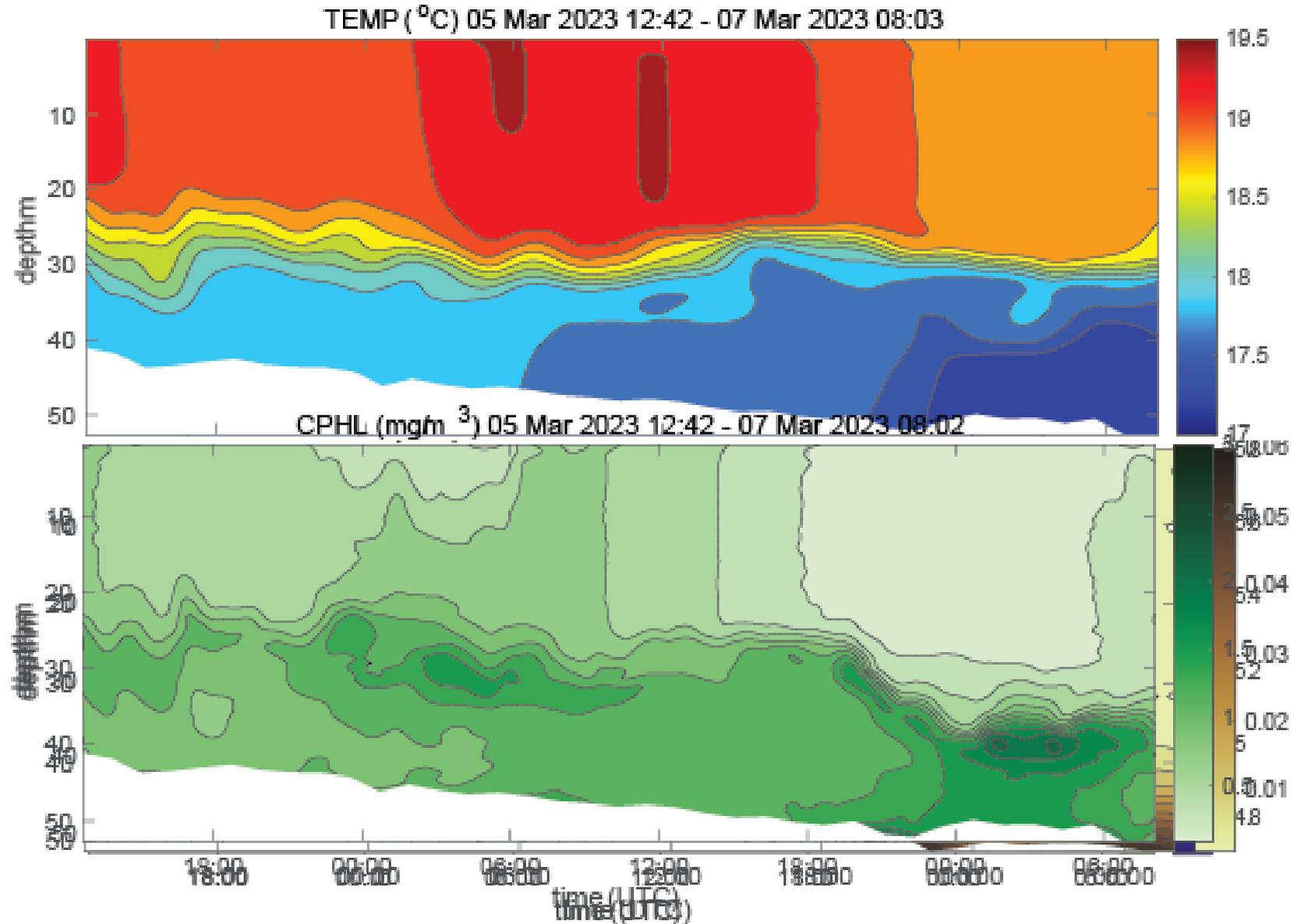
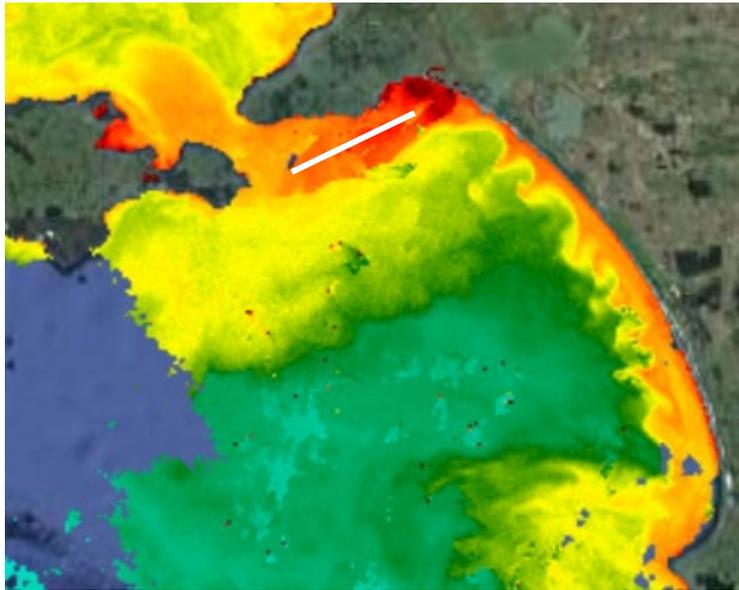


Rottnest shelf (WA)

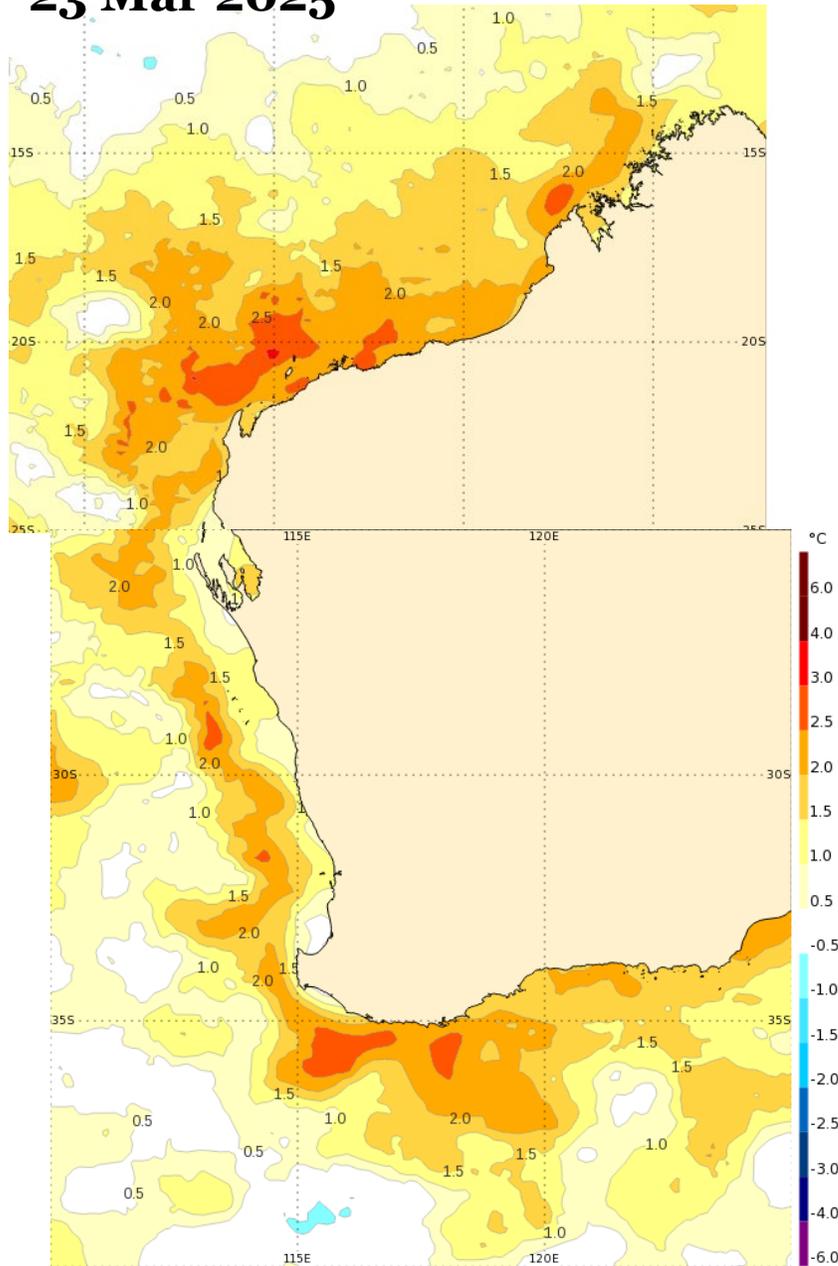
# Murray River



# Murray River



23 Mar 2025



Sea surface temperature anomaly (deg C): Daily analysis for Sun 23 Mar 2025  
(c) Copyright Australian Bureau of Meteorology | RAMSSA | Climatology 1961-1990

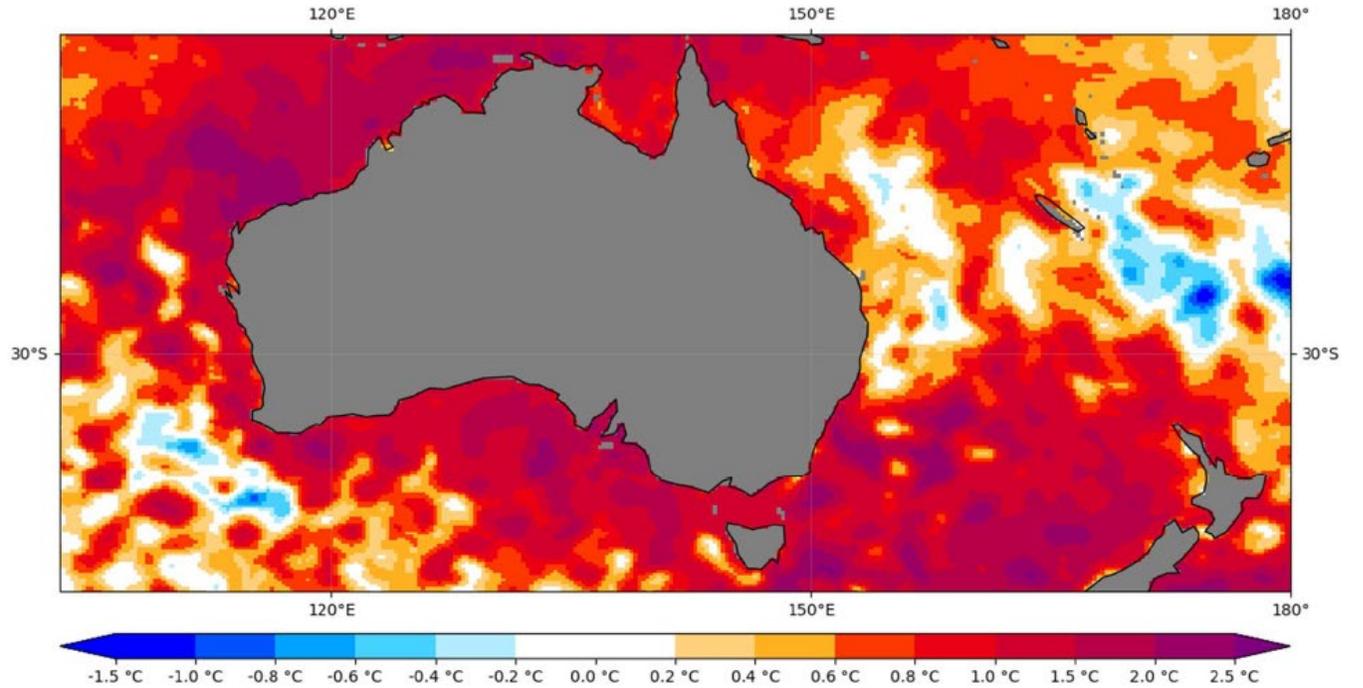
Pallavi Govekar (BoM)

# 2025 WA Marine Heatwave

## Recent SST conditions

Reanalysis Sea Surface Temperature Anomaly  
Region: Australia

Last 7 Days  
Period: 2025-03-16 to 2025-03-22



Created: 2025-03-24 08:43:41

Climatology: 1981 to 2018

Resource: gay548/dx2/reanalysis

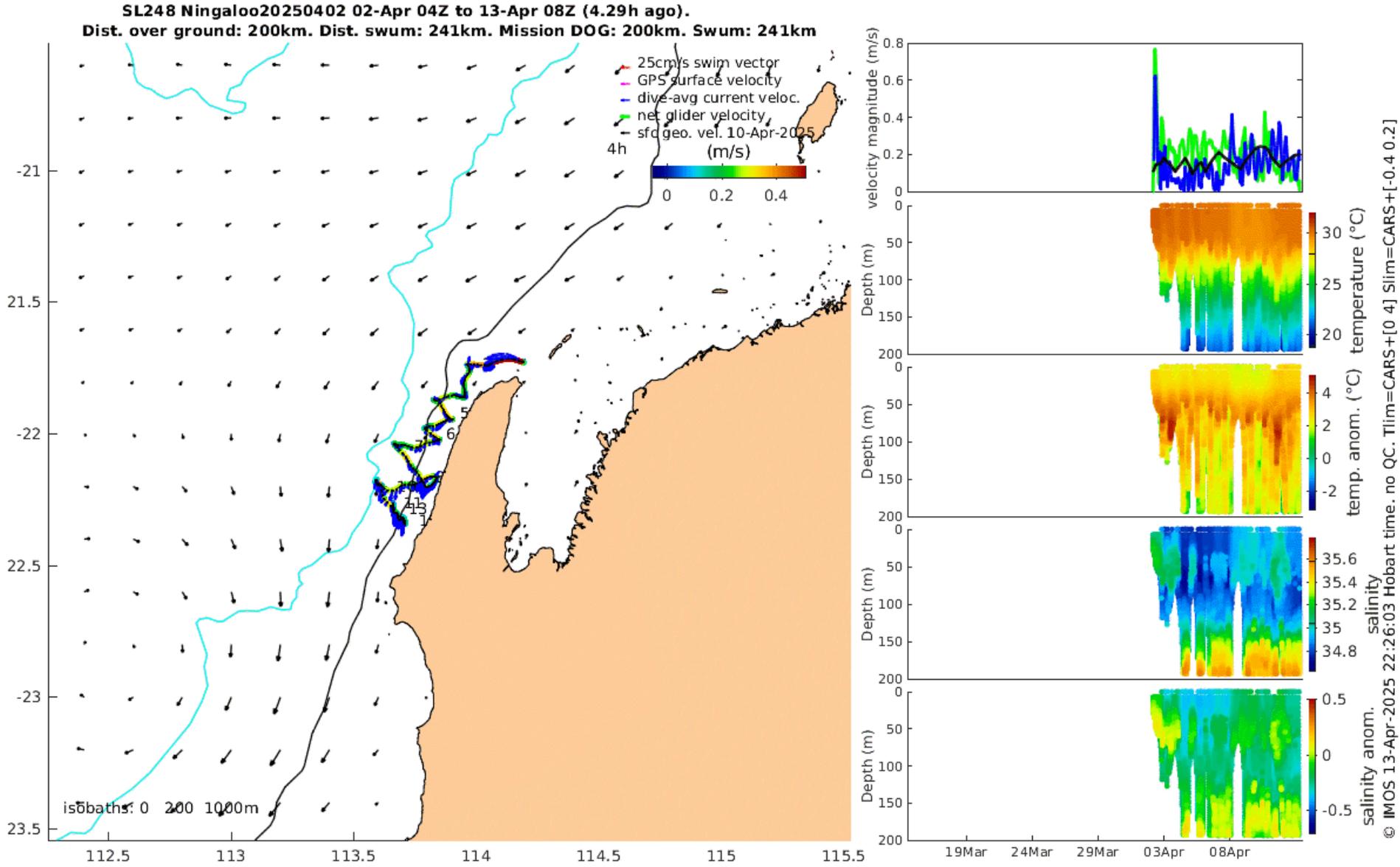
Claire Spillman (BoM)



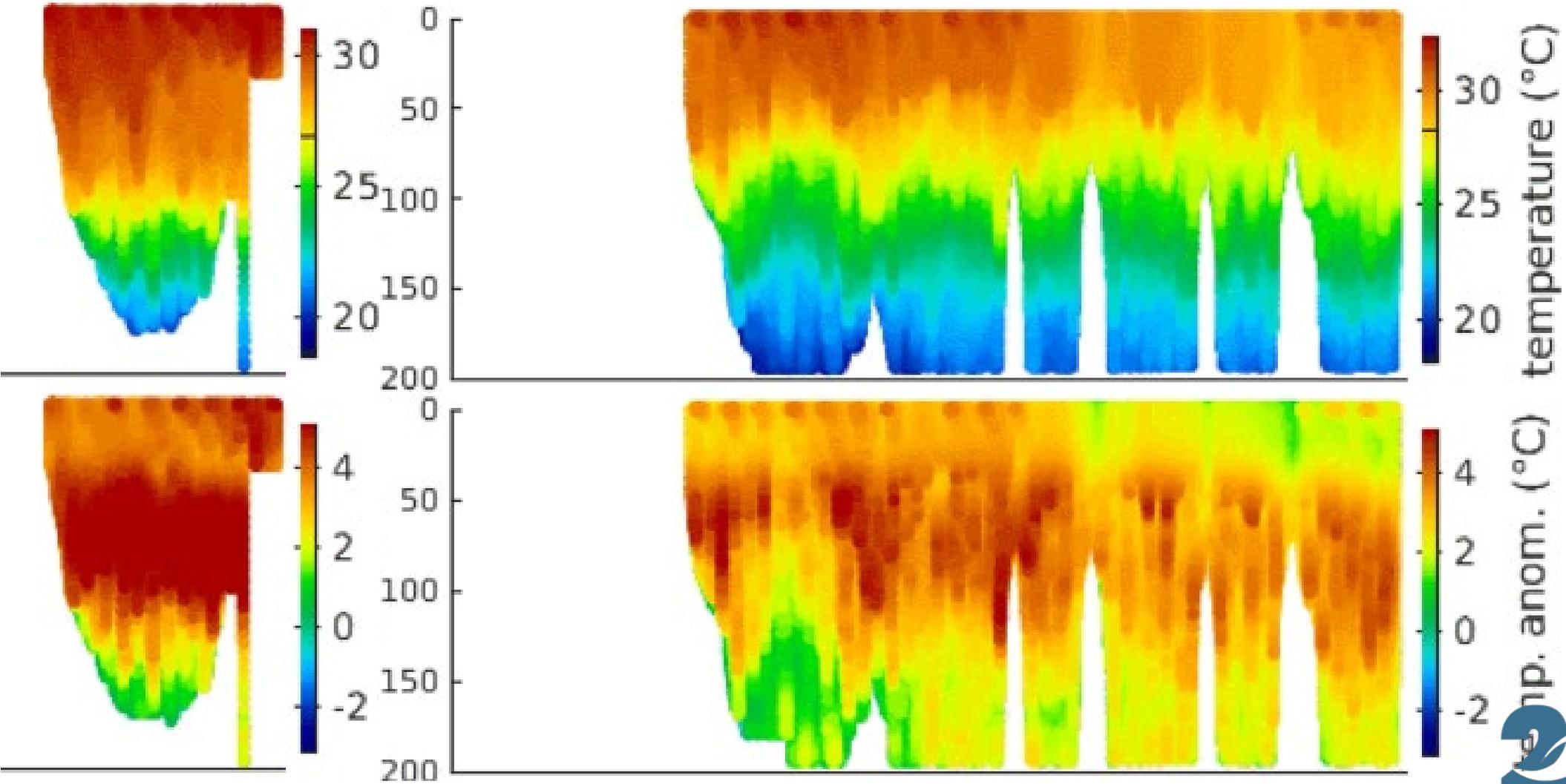
# 2025 WA Marine Heatwave



# Warming in the subsurface



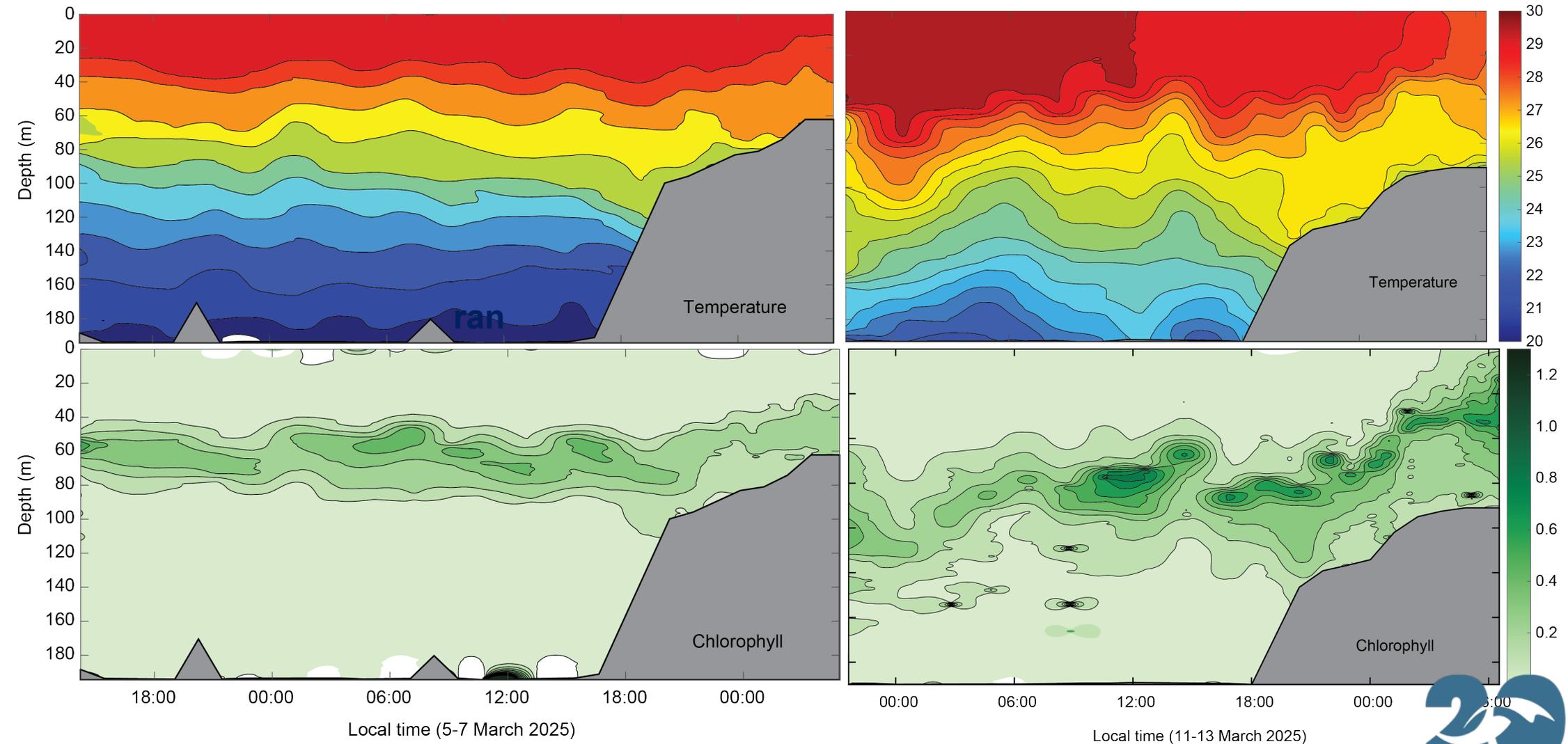
# Warming in the subsurface



# Ningaloo: transition to upwelling

5-7 March 2025

11-13 March 2025

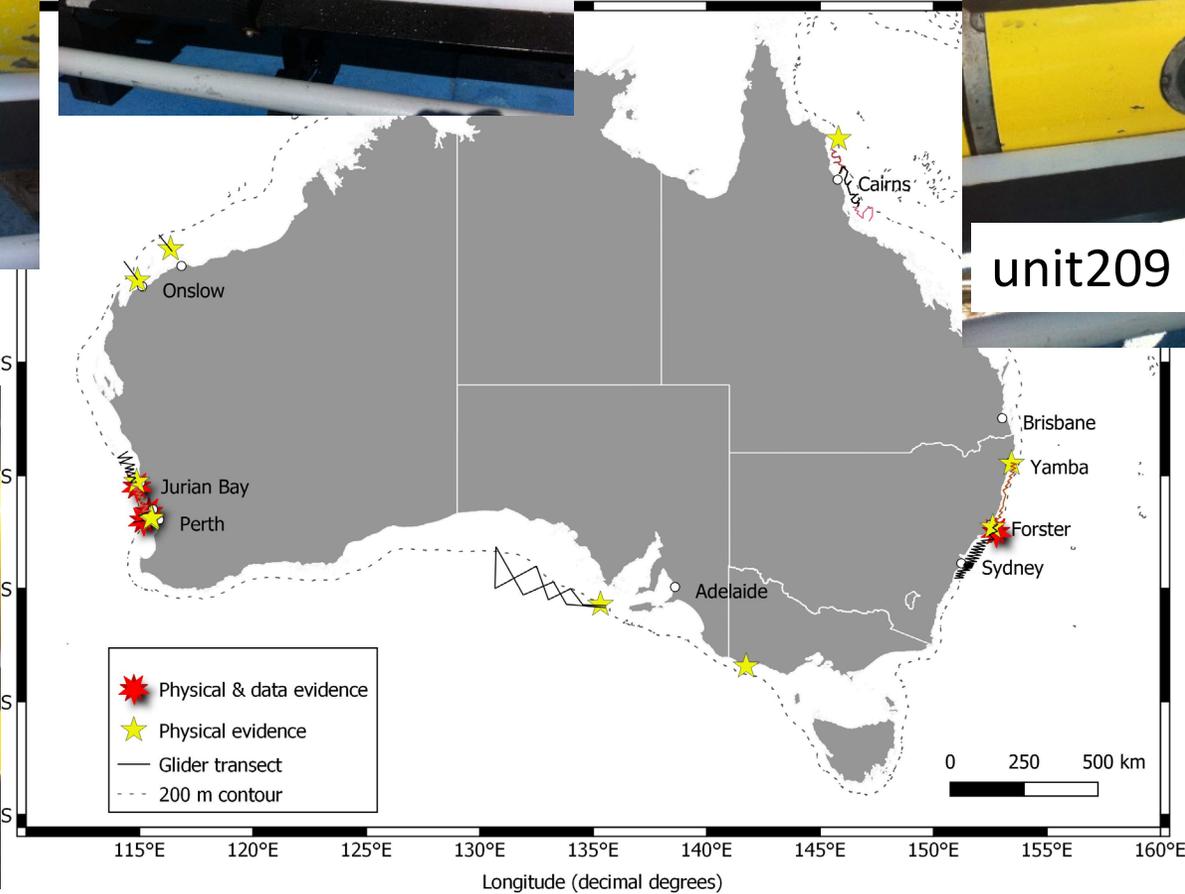


Local time (5-7 March 2025)

Local time (11-13 March 2025)



# Shark Attacks





# INTERNATIONAL UNDERWATER GLIDER CONFERENCE 2026

November 16 - 20 2026

THE UNIVERSITY OF WESTERN AUSTRALIA, PERTH, AUSTRALIA



Website: <http://iugc2026.org>  
Email: [enquiries@iugc2026.org](mailto:enquiries@iugc2026.org)



**Ocean  
Gliders**





Australia's Integrated Marine Observing System is enabled by the National Collaborative Research Infrastructure Strategy (NCRIS). It is operated by a consortium of institutions as an unincorporated joint venture, with the University of Tasmania as Lead Agent.

### PRINCIPAL PARTICIPANTS



SIMS is a partnership involving four universities

### ASSOCIATE PARTICIPANTS



IMOS thanks the many other organisations who partner with IMOS, providing co-investment, funding and operational support, including investment from the Tasmanian and Western Australian Governments.

