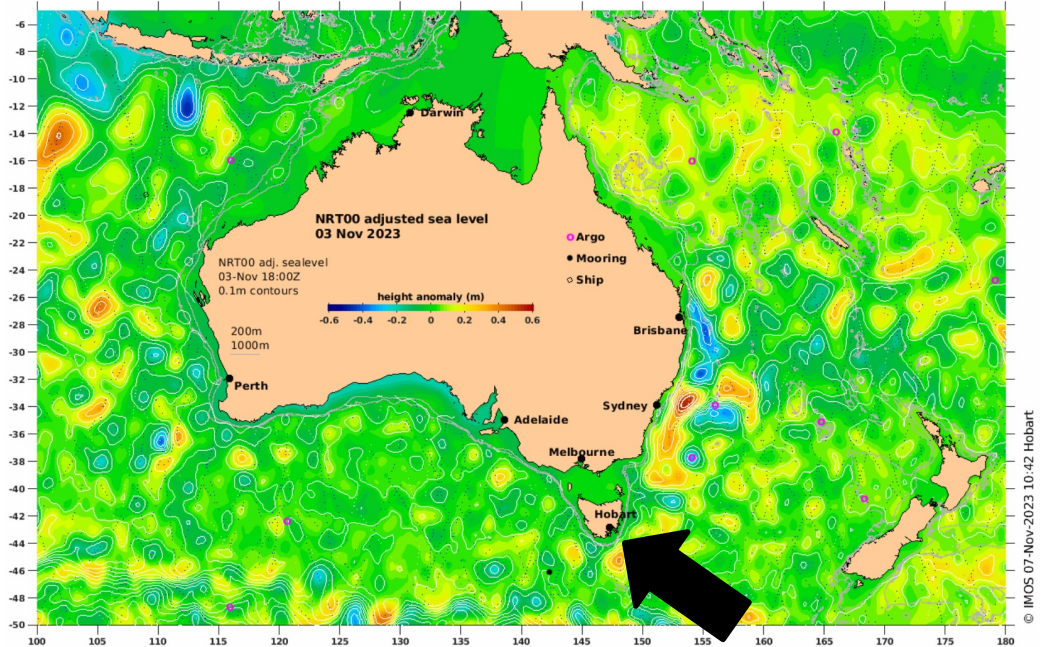




## Raising awareness of Sea Level Anomaly (SLA) adjustments in the [IMOS-OceanCurrent website](https://www.imos.gov.au/ocean-current/)

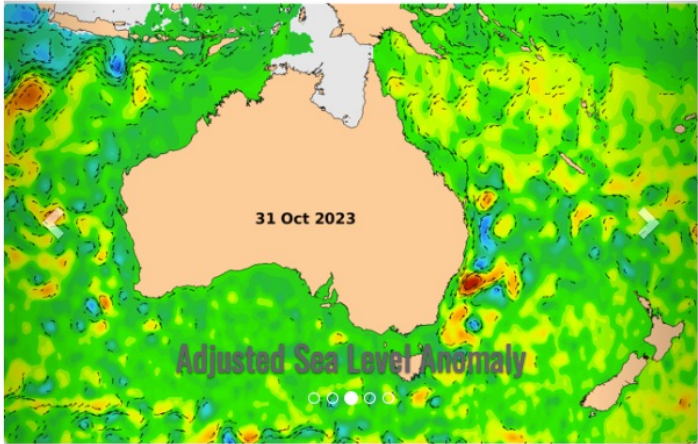
Gabriela Pilo & David Griffin  
CSIRO (Hobart, Australia)





IMOS-OceanCurrent provides a **data visualisation and explanatory service** to members of the scientific community and the public who are interested in **current and past conditions** of the ocean around Australia.

- Australia's national research infrastructure
- Includes several universities and national agencies



**OceanCurrent News**  
**How strong is the East Australian Current? The science is finally in.**  
*Bernadette Sloyan, David Griffin, and Gabriela Pilo*  
 13 October, 2023

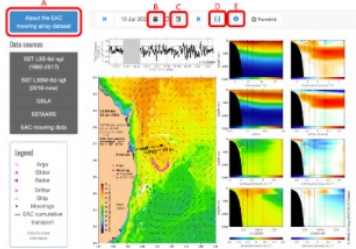


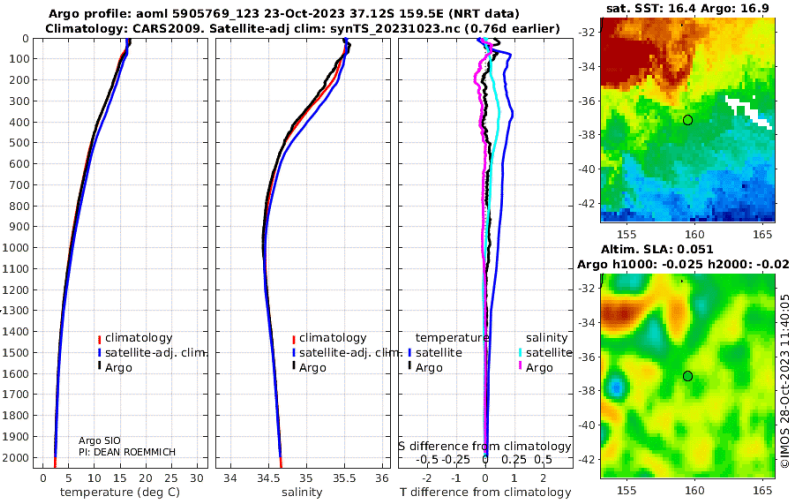
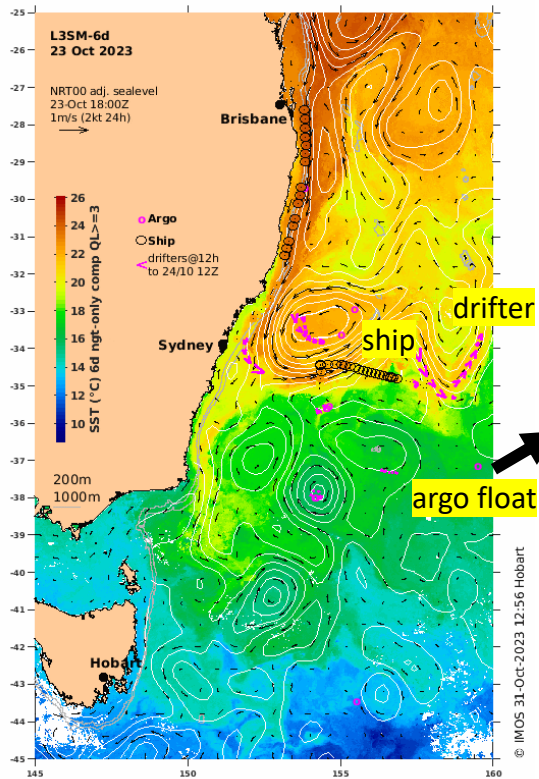
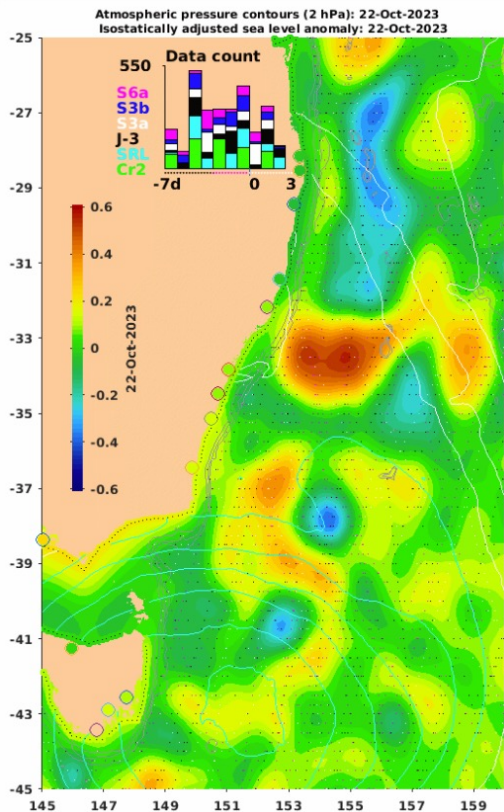
Figure 1. Overview of the EAC mooring array product. The upper left plot is the time series of the EAC 500-m depth surface to 1000-m depth. The map below is a 100-km resolution with 10-min resolution EAC strength. The plots on the right show the EAC mooring array temperature, salinity, and northward and eastward velocity in a 3.0 km grid along the mooring line segment (black dashed line and 100 m grid). The first column on the right displays velocity, and the second column on the right shows the 2012-2022 seasonal mean of mooring. For a complete description of the data, see the figure in the news item on the right.

The East Australian Current (EAC) is Australia's most influential ocean feature. But do we know its vital

- [EAC Mooring Array](#)
- [MyOceanCurrent](#)
- [Tidal Currents](#)
- [Follow El Nino with SLA](#)
- [Animations](#)
- [Google Earth View](#)
- [Argo](#)
- [Current Meters](#)
- [Gliders](#)



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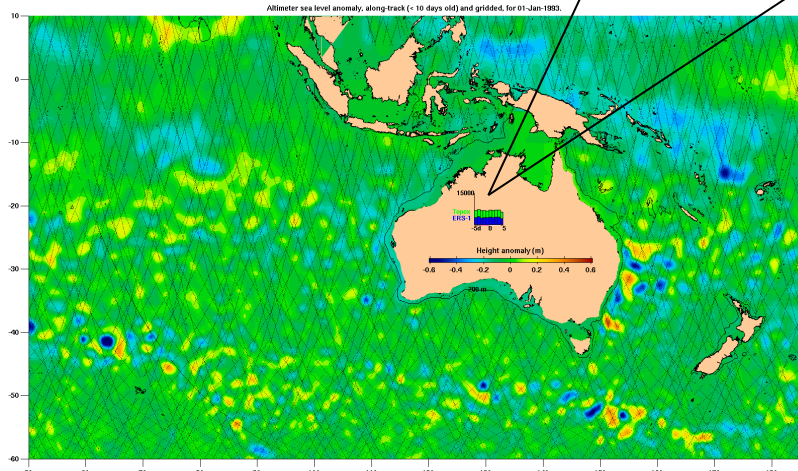
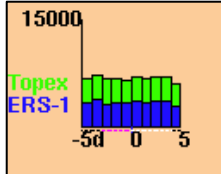




IMOS-OceanCurrent provides a **data visualisation and explanatory service** to members of the scientific community and the public who are interested in **current and past conditions** of the ocean around Australia.

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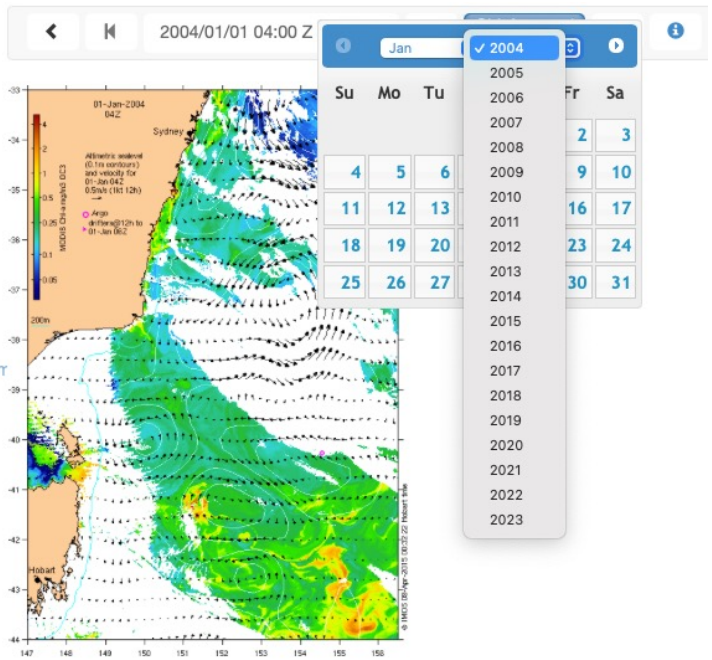


- Select region
- Snapshot SST
- Four hour SST
- 6-Day SST & Centiles
- Climatology
- SST Anom vs Time
- Snapshot Chlorophyll
- Adj. Sea Level Anom.
- Non-Tidal Sea Level Anom.

**Legend**

- Argo
- Glider
- ▬ Radar
- Drifter
- Ship

Click for more information





IMOS-OceanCurrent provides a **data visualisation and explanatory service** to **members of the scientific community and the public** who are interested in **current and past conditions** of the ocean around Australia.

- Fisheries and aquaculture industries
- Education sector
- Scientific community:
  - cruise planning
  - near-real-time operations
  - understanding past events
- General community:
  - for sea-going activities
  - understanding anomalous events at their location (e.g., anomalously cold waters during summer, or unusual species washing ashore)
  - enquiries into causes of marine incidents (oil spills, shipping accidents, missing persons, whale strandings).

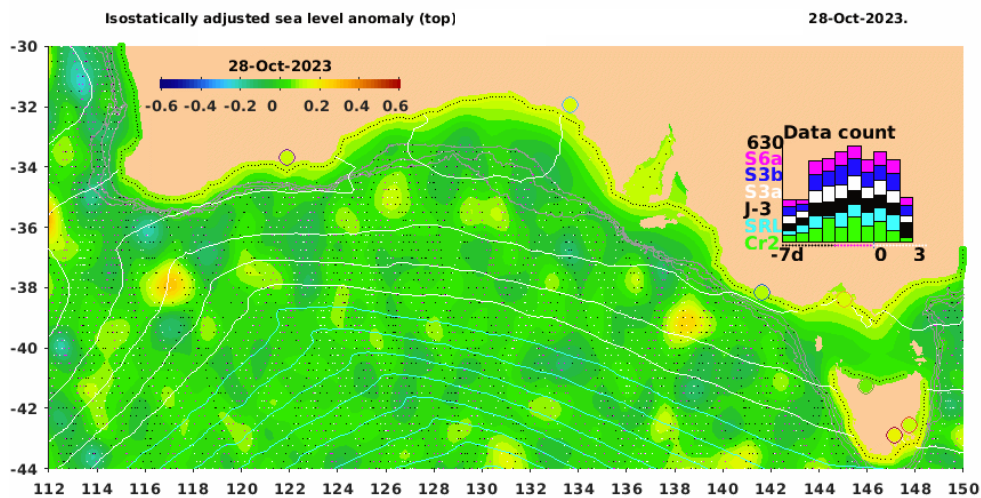
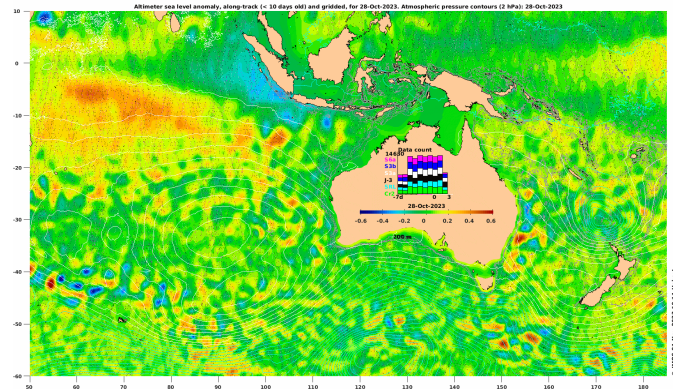
Updates to the website  
are driven by:

- scientific advances
- data providers' needs
- users' needs



# Gridded SLA product for the Australian region

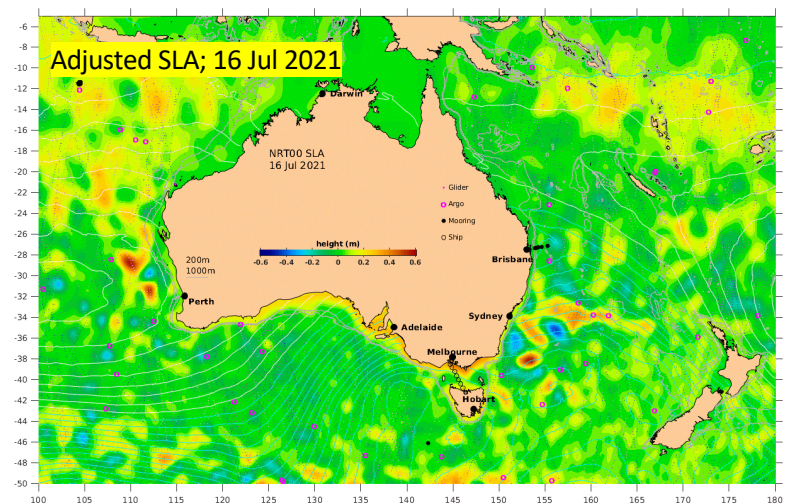
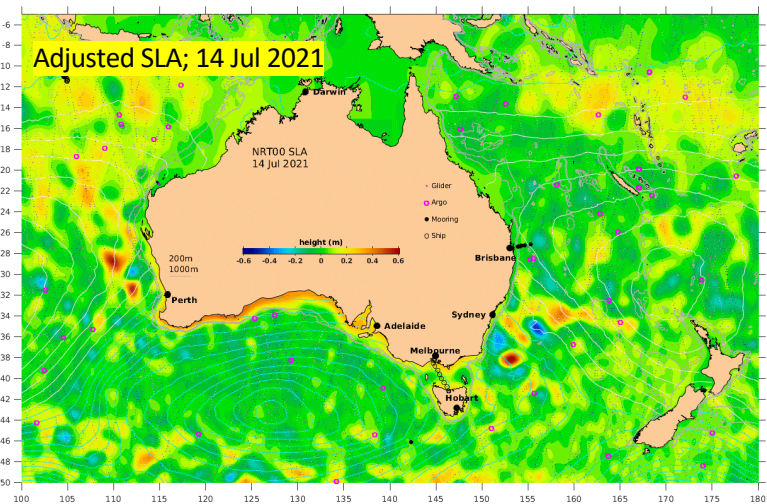
- Near-real time & delayed-mode products
- Input:
  - SLA from [RADS](#)
  - Coastal tide-gauge data (filtered, adjusted)
- Linear interpolation along the coastline (tide gauge data) + optimal interpolation across the shelf
- Freely available via the Australian Ocean Data Network ([AODN](#))





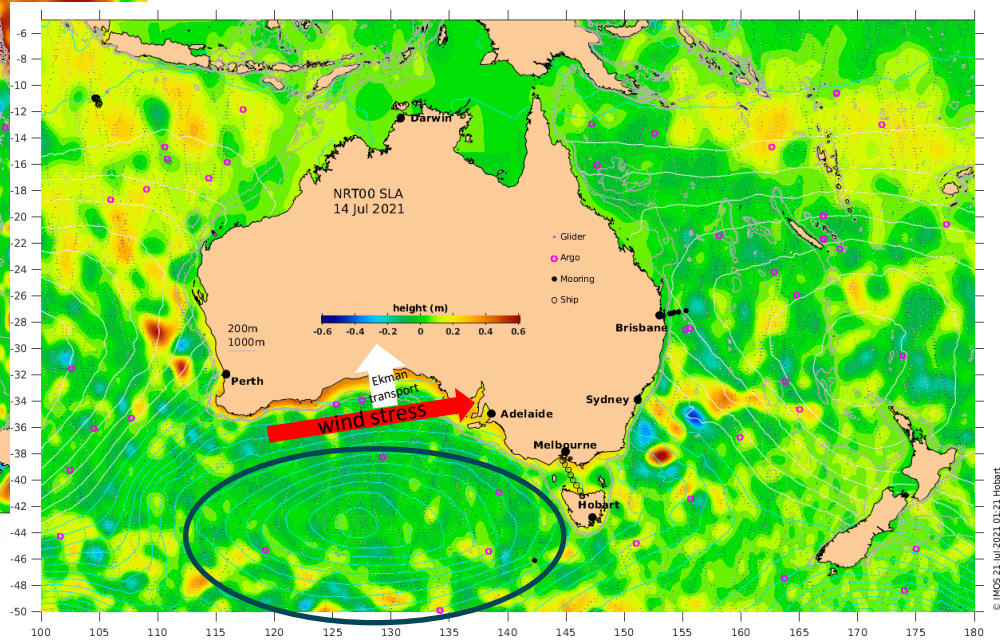
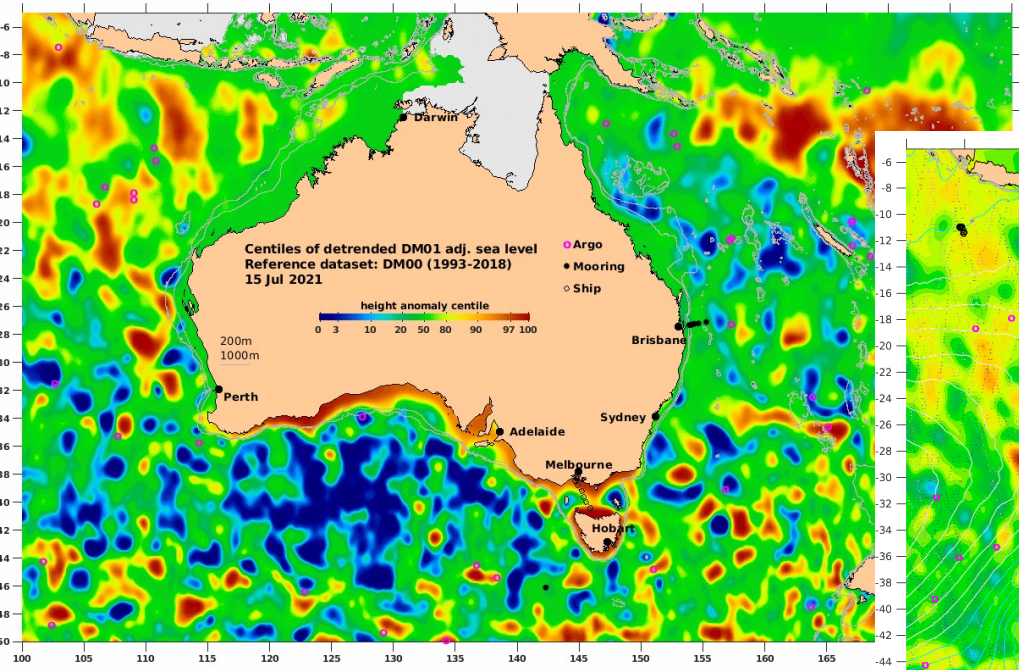
# But what do we see at the beach?

- 14-16 July 2021: ‘highest sea level in the Tasmania over many years’  
– caused by an atmospheric low
- But we couldn’t see it in the Adjusted SLA maps





We can see the response of the ocean to the wind associated with the low pressure system (Ekman Transport along the south Australian coast)



But we can't see the effect of the atmospheric low pressure system in the ocean's free surface - because we removed it!



# Non-tidal Sea Level Anomaly maps

We felt the need for maps of ‘observable’ SLA, including:

- Wind and pressure-driven changes of sea level
- Other (non-tidal) causes of variation (e.g., El Niño and eddies).



We call this product ‘**non-tidal SLA**’ (because it is calculated from sea level values that include everything, except the tides)

Adjusted SLA +

Static inverse barometer response at 6-h intervals

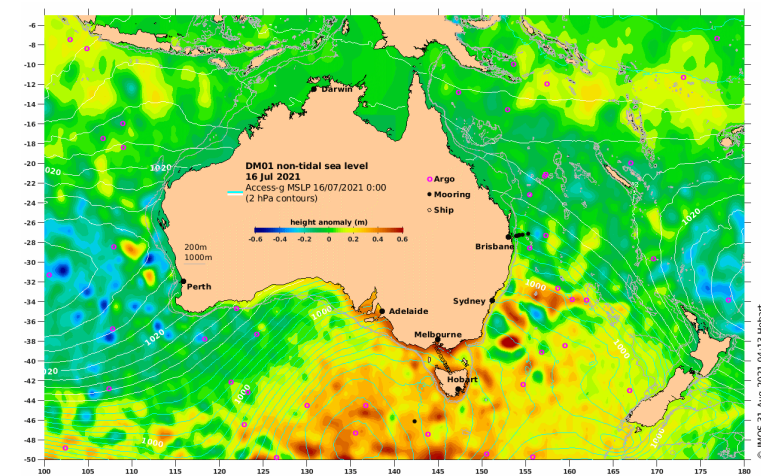
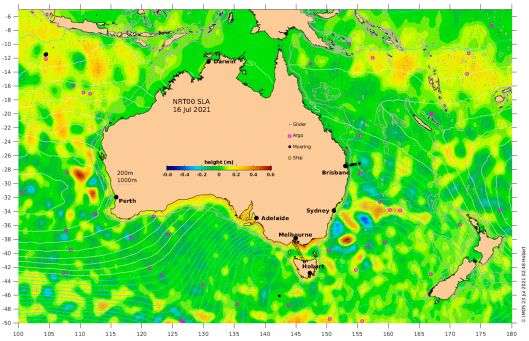
= Non-tidal SLA

$$P' / (\rho g)$$

where

$P'$  is atmospheric pressure minus the daily, global over-ocean mean

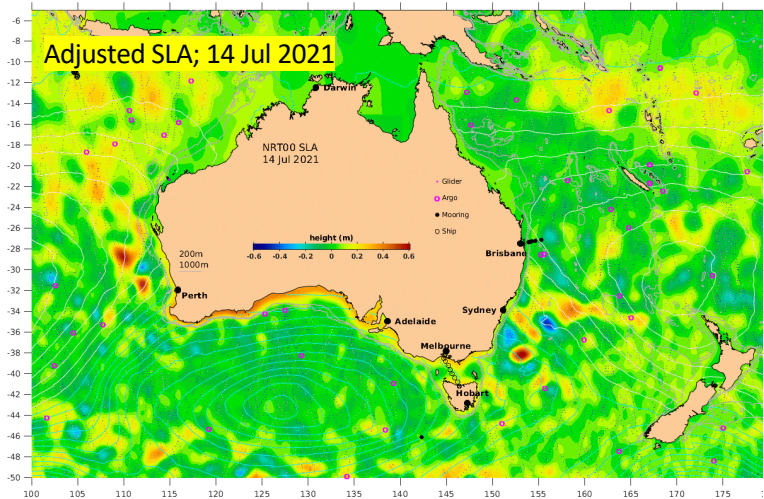
$\rho$  is the average density of sea water and  $g$  is gravity



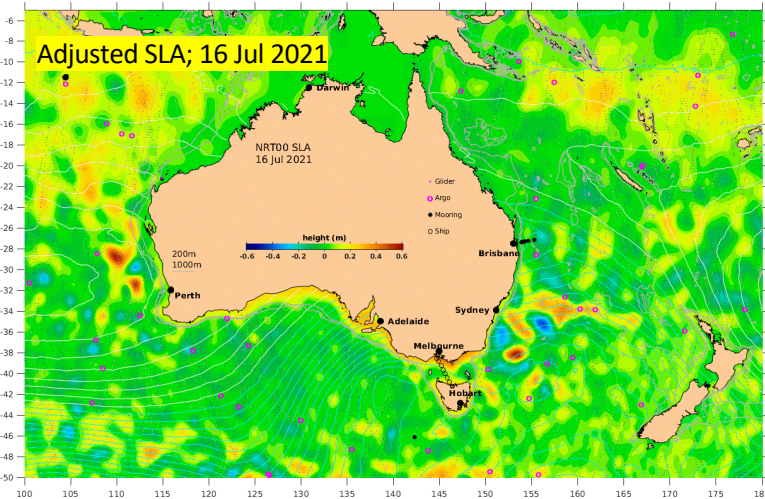




Adjusted SLA; 14 Jul 2021

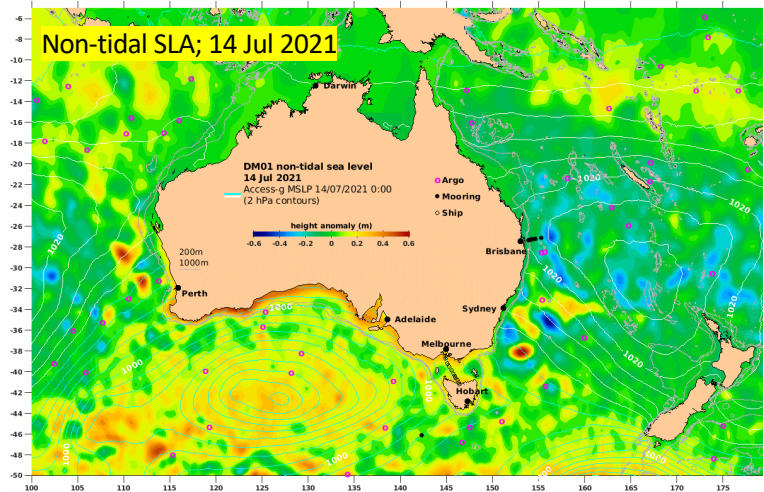


Adjusted SLA; 16 Jul 2021

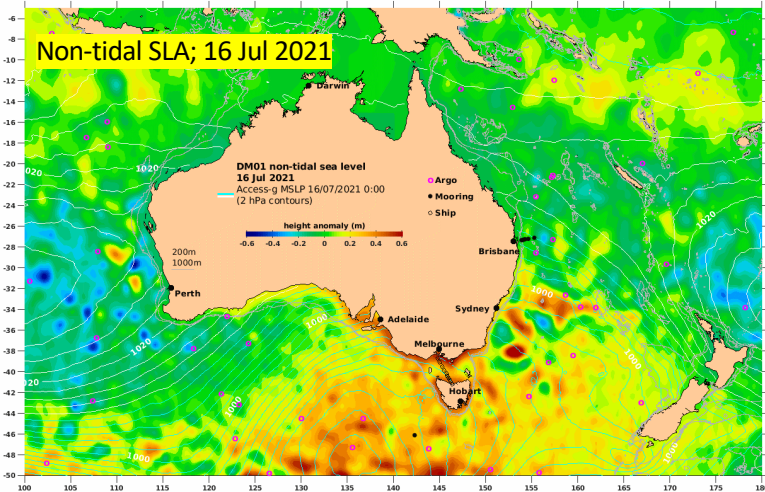


© IMOS 29 Jul 2021 02:48 Hobart

Non-tidal SLA; 14 Jul 2021



Non-tidal SLA; 16 Jul 2021



© IMOS 31-Aug-2021 04:13 Hobart





# Non-tidal Sea Level Anomaly maps

An opportunity to raise awareness to the corrections done to the adjusted SLA maps that we have shown for over 10 years.

## OceanCurrent News

Noticed something interesting, on this website, or on the water?  
Please join the list of contributors.

### Sea level and storms: the inverted barometer effect

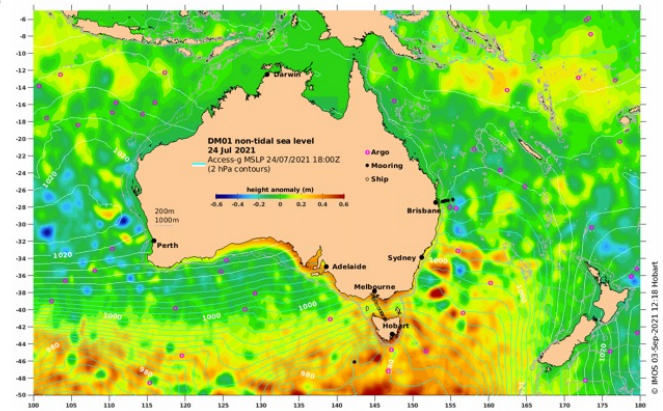
David Griffin

7 September, 2021

Many people know that the sea level goes up when the atmospheric pressure goes down. This is called the inverted (or sometimes inverse) barometer effect, or IB for short. But did you know that our maps of 'sea level' (and/or its anomaly) did **not** include the effect of pressure? Realising that this may disappoint or surprise some users, we have decided to make two changes to our website:

1. We've added a new graphic for the Australia-wide region that **does** include the effect of atmospheric pressure. We're calling this 'non-tidal sea level anomaly' because that's what it is - sea level anomaly minus the effect of tides. It's also 'non-wave-setup' and 'non-tsunami' but there isn't room on the button for all that. Please see the 'legend' and 'info' buttons for details.
2. To indicate that our other maps of sea level anomaly do **not** include the effect of pressure, we are reinstating the traditional term 'adjusted sea level anomaly' for sea level observations that have had the effect of pressure removed. The 'info' button explains why this is the quantity of greater interest to oceanographers, if not to residents of the coast.

How important is the pressure effect? It is approximately 1cm per hPa. That is not much most of the time but in the centre of a 960hPa low pressure system it amounts to a rise of 50cm. Several deep lows passed south of Tasmania in July 2021, resulting, on 25 July, in the highest non-tidal sea level seen for many years. At right you see our new 'non-tidal sea level' map for that day.





# Thank you

## **CSIRO Environment**

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Dr. David Griffin  
[david.griffin@csiro.au](mailto:david.griffin@csiro.au)

<https://oceancurrent.aodn.org.au>