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Australian Government

Geoscience Australia

Geoscience Australia's AusBathyTopo Grids

**How Australia overcame challenges
to create a seamless national scale
BathyTopo surface**

**Matt Ellis – Assistant Director Marine Resources
Oceans, Reefs, Coasts, and the Antarctic Branch**

**Presentation developed from content courtesy of Geoscience
Australia and Rob Beaman (James Cook University)**

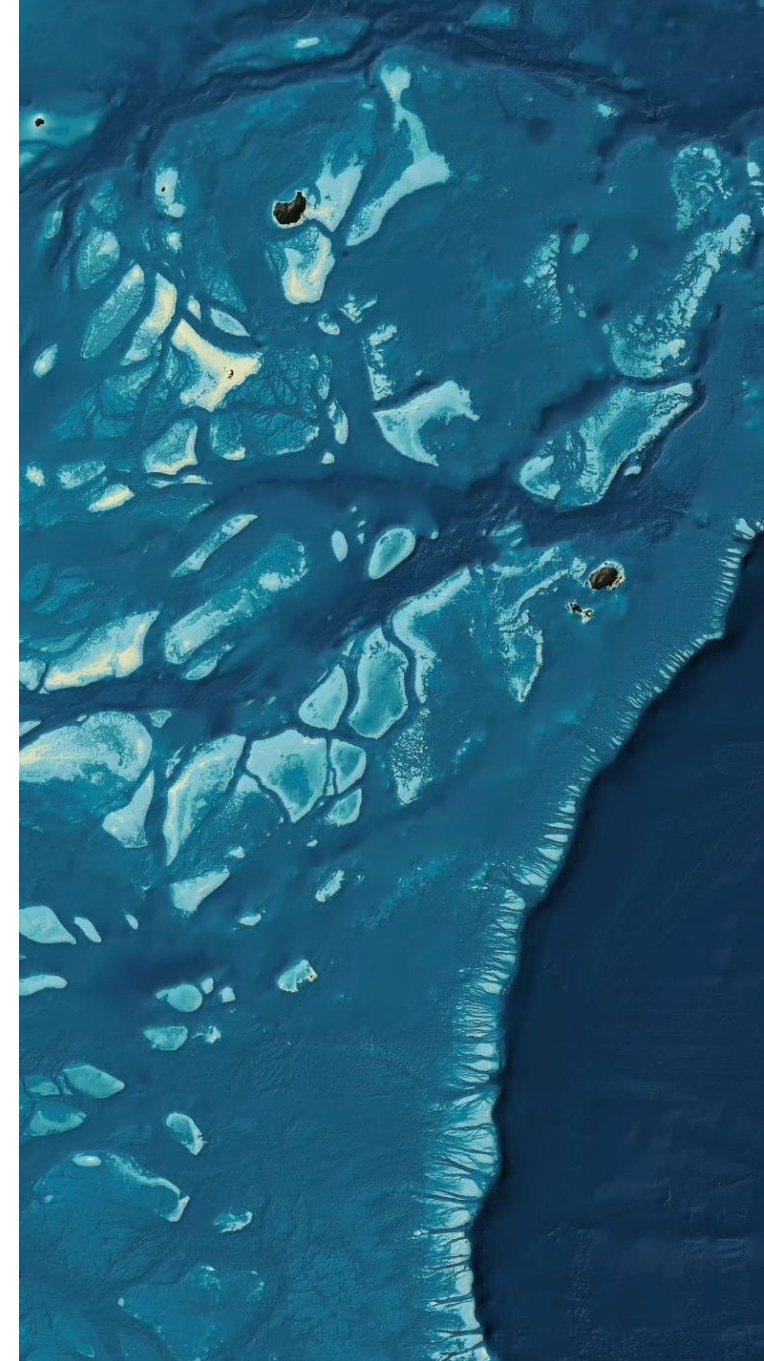


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Earth sciences for Australia's future | ga.gov.au

Why does Australia need a national seamless Bathymetric and Topographic Grid?

1. **Australians overwhelmingly live in coastal communities**
2. **Activities on land impact our oceans**
3. **Integrated Jurisdiction Management requires knowledge of the land/sea interface**



What are GA's AusBathyTopo Grids

- The **AusBathyTopo (ABT) 250m 2023 Grid** is a high-resolution elevation and depth model for Australia
- ABT 2023 replaces the Australian Bathymetry and Topography Grid, June 2009.
- ABT is a **seamless elevation model** meets requirements for many integrated management and scientific applications.
- A new version of the 250m ABT grid will be released **early 2025.**



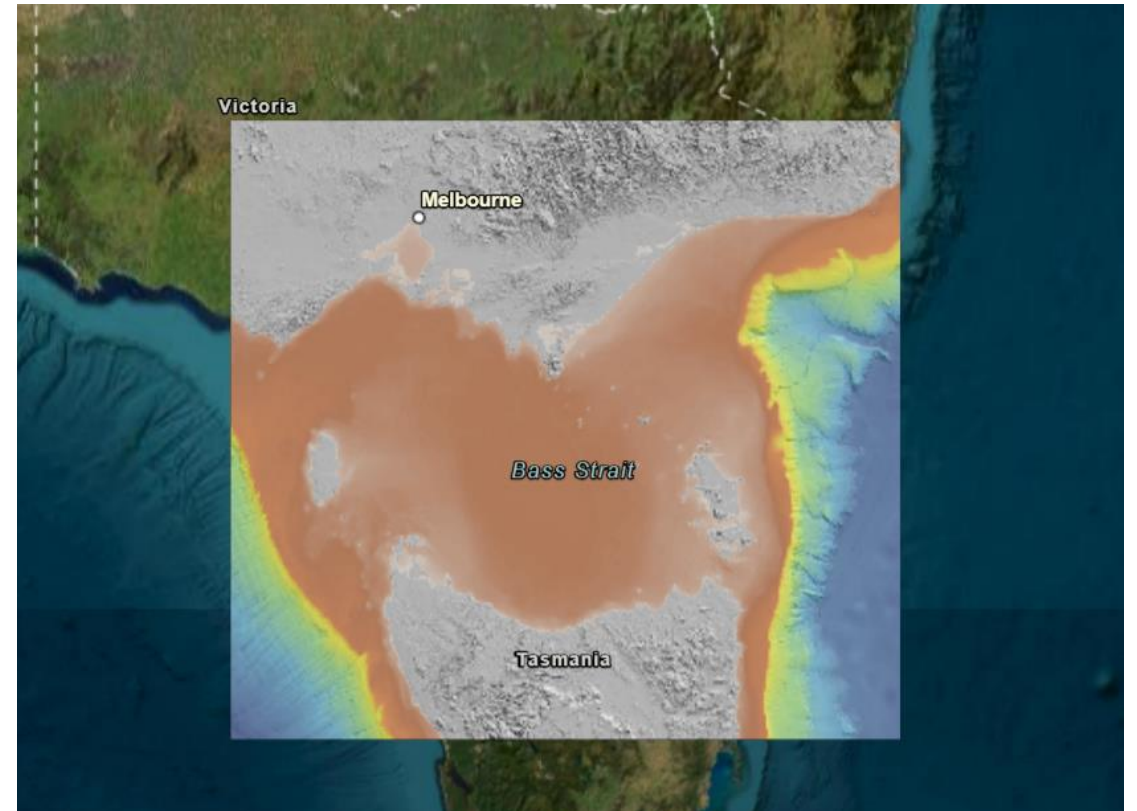
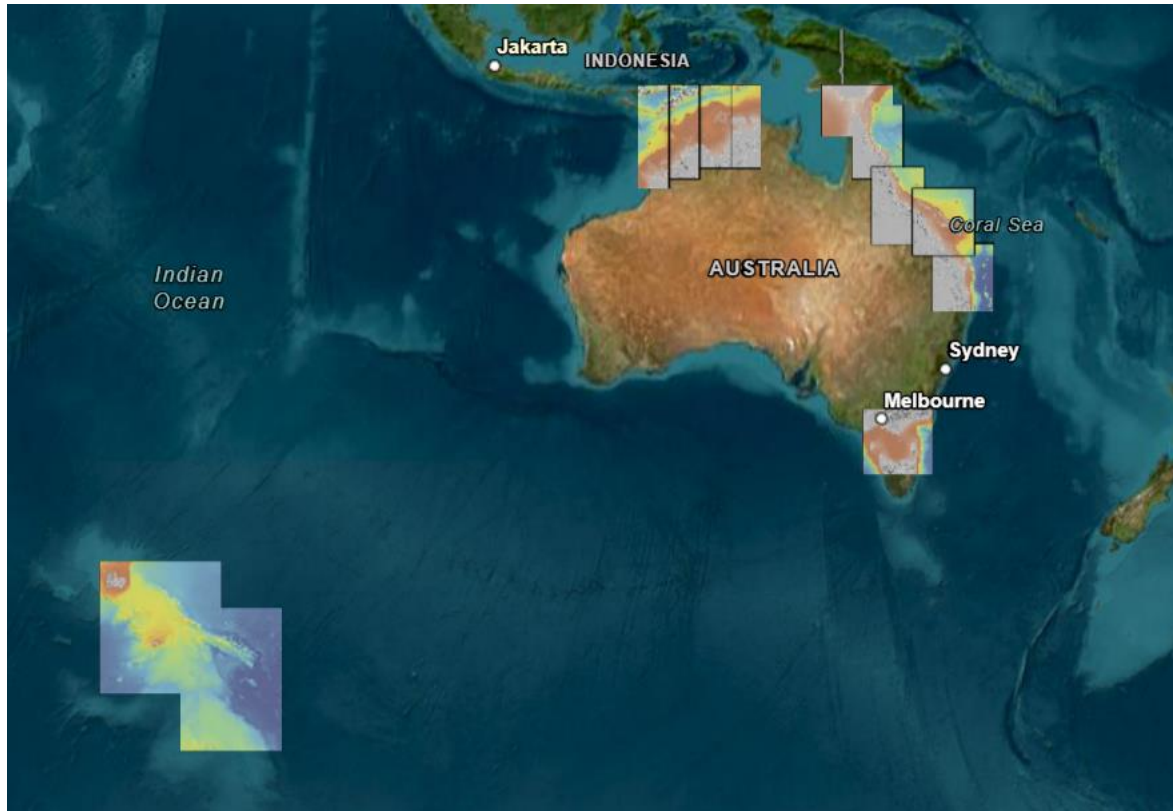
What are GA's AusBathyTopo Grids

- ABT 2023 features **improved coastline definition** and greater clarity of the **transition between land and sea**
- The ABT grids are **the best achievable surfaces with available data**
- Produced to prioritise **morphological integrity** over geodetic precision
- Enabled by **innovations in Earth Observation Science** to deliver the **coastline control** required for management of the jurisdiction



AusBathyTopo Regional Grids

- Under the Australian Government's Resourcing Australia's Prosperity initiative, Geoscience Australia is delivering regional grids ABT grids.





What are the AusBathyTopo grids used for?

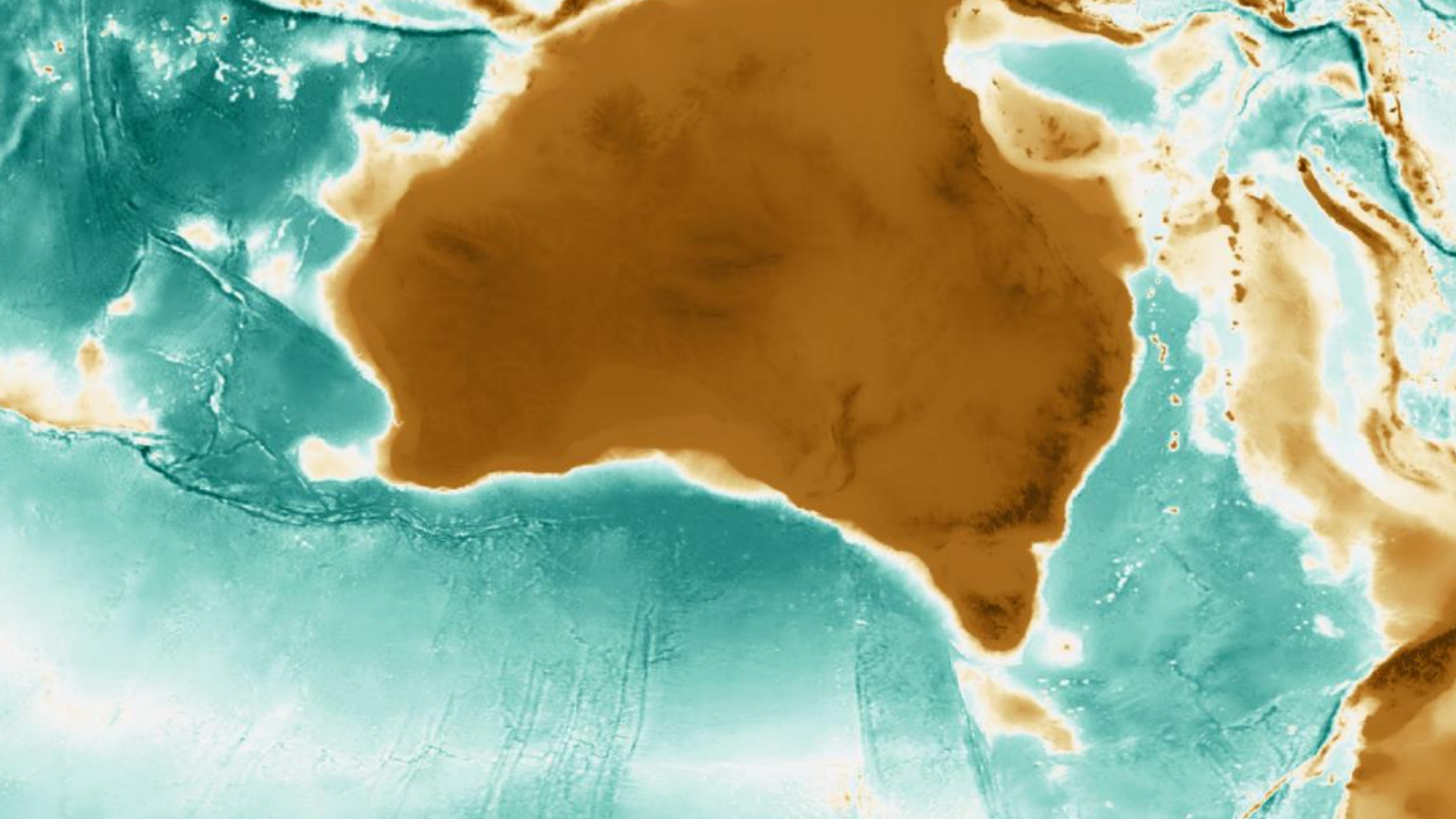
- Use cases:
 - **Applications that value surface shape more than geodetic integrity**
 - Maritime Jurisdiction Management
 - UNCLOS Baseline Delineation
 - Geomorphological Classification
 - Blue Economy Industry Development (Including Offshore Wind Establishment)
 - Hazard/Tsunami Risk Modelling
 - Coastal Zone Management
 - Climate Vulnerability Assessments

Challenges

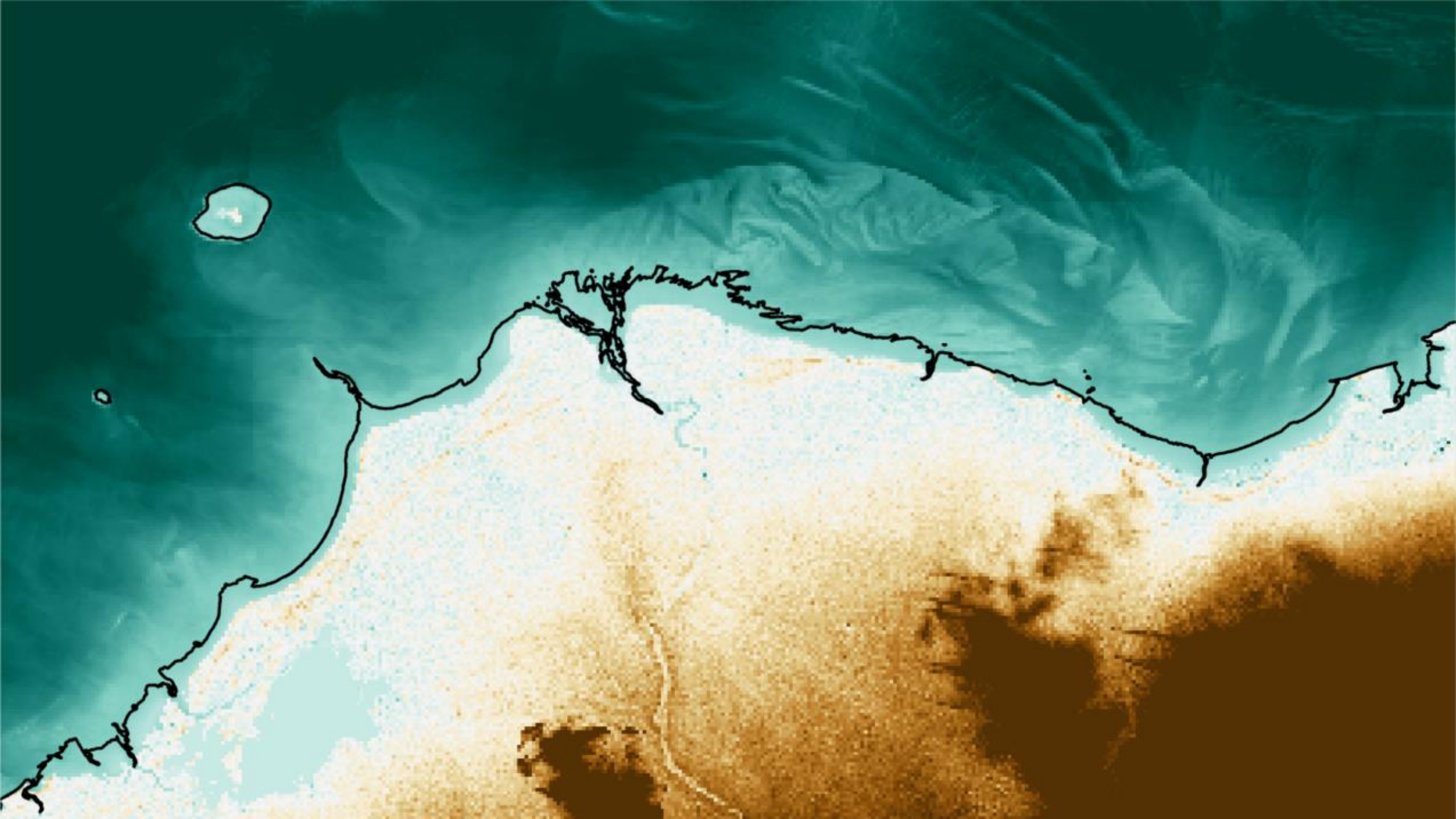
Australia has a **vast marine estate**, spread out across a **large geographic area**. Without the means to accurately survey our entire marine estate, we need to find cost effective solutions to source data to build national scale surfaces.

1. **Acquiring data on a national scale to ensure effective coastline control**
2. **Removing the ‘datum step’ between land and sea**
3. **Integrating data from multiple sensors, datums, and varying quality**

Geoscience Australia is actively developing Geodetic Solutions to these challenges such as the Aushydroid model. In the meantime, we can still produce a surface for applications with low precision requirements through manual intervention.

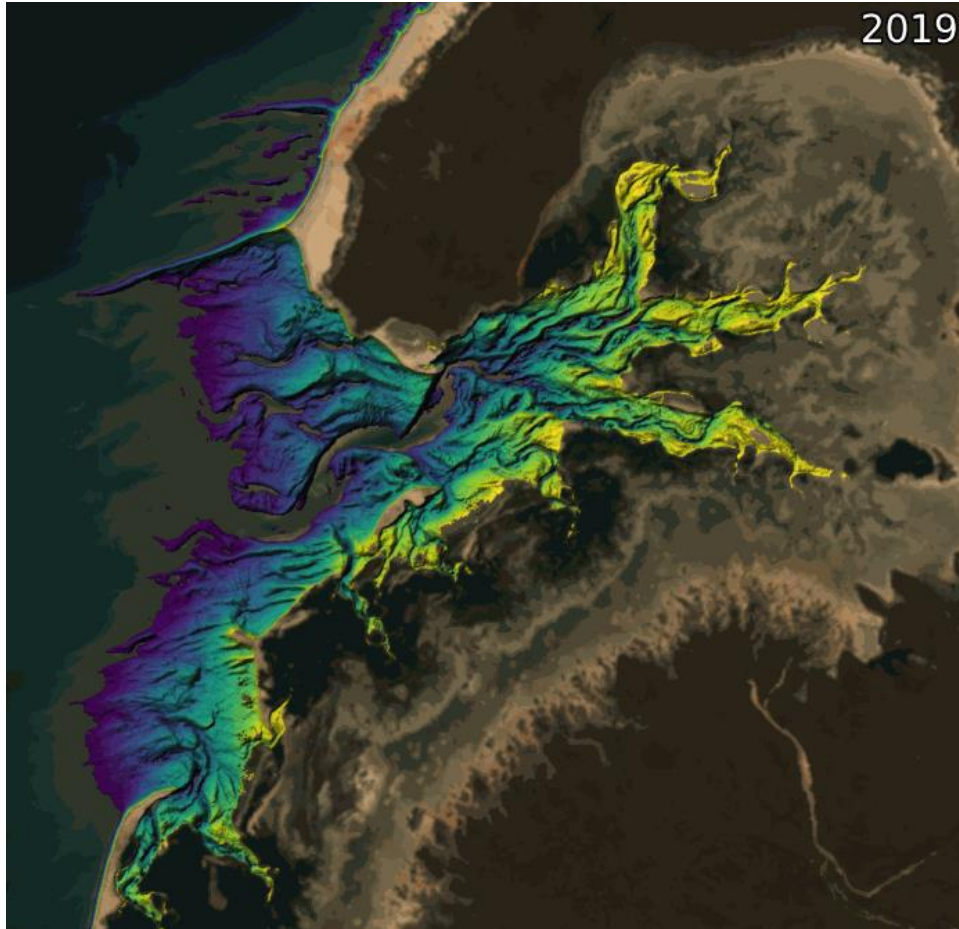




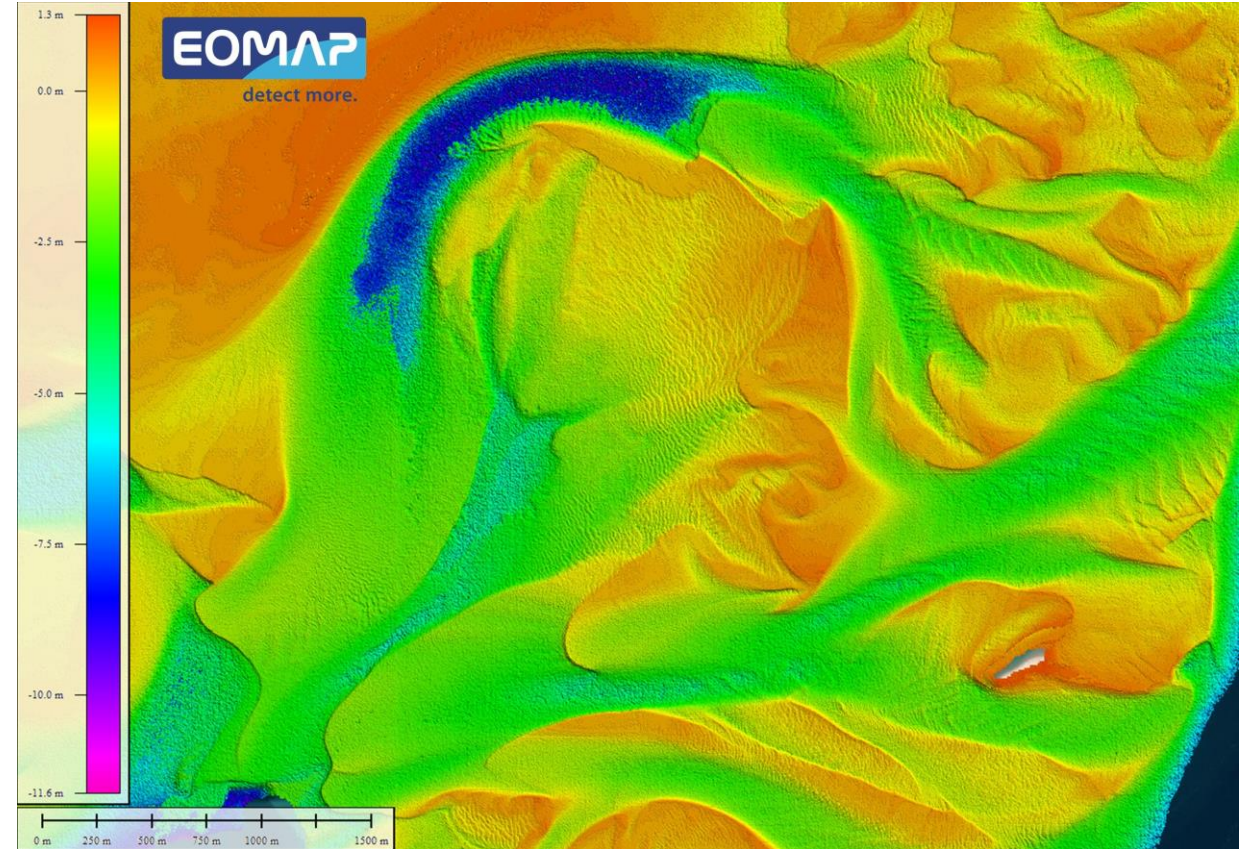


Satellite Data for the Coastal Zone

Geoscience Australia's Intertidal Elevation Product



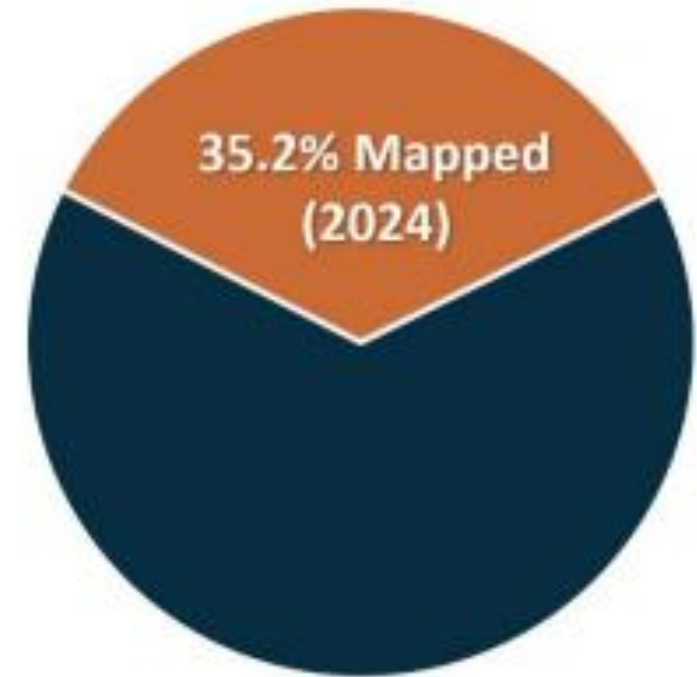
EOMAP Satellite Derived Bathymetry



CHALLENGE: Removing the Datum Step between land and sea

- Australia's maritime jurisdiction is significantly large. We are constrained by the large cost and time required to collect high quality data for the entire jurisdiction.
- ABT Grids utilise a broad range of source bathymetry types to maximise the source data available.
- While we wait for wait for geodetic control and data coverage, we can create a useful product with the data we have now and manual interventions
- Increasingly being solved by the AHO's and the Australia Seabed Mapping community's data collection efforts

“As of August 2024, 35.2% of Australia's Marine Jurisdiction has been mapped in sufficient detail for regional and national scale surfaces”



CHALLENGE: Removing the Datum step between land and sea

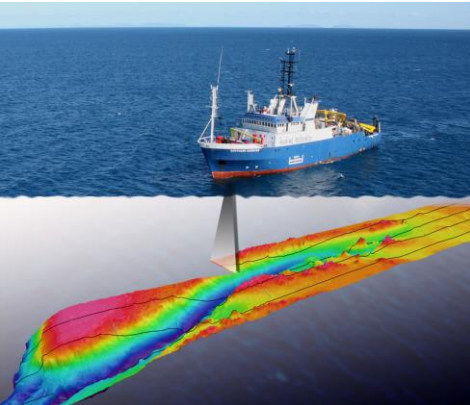
Goal: Produce the best surface possible with available data free of artefacts, suitable for applications that value morphological integrity over accuracy.

A **repair and replace** method is used, where the impact of new data is assessed on the existing grid. Manual interventions are taken when new datasets produce artefacts in the surface.

1. Elevation data is the vertical basis for the grid.
2. The previous grid is used as the base 'skeleton' into which new data will be incorporated.
3. Bathymetric data is shifted to match elevation data when datum steps are encountered
4. Expert knowledge of hydrographic surveying is used to guide manual interventions resolving conflicting bathymetry.
5. Bathymetry that threatens the morphological integrity of the surface is not included.

CHALLENGE: Integrating data from Multiple sensors, datums, and varying quality

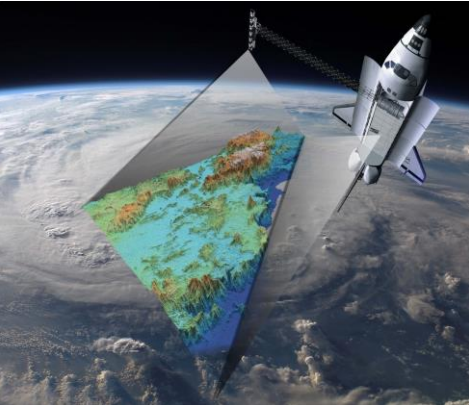
MBES



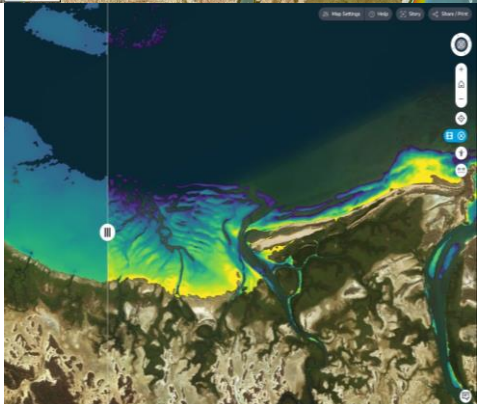
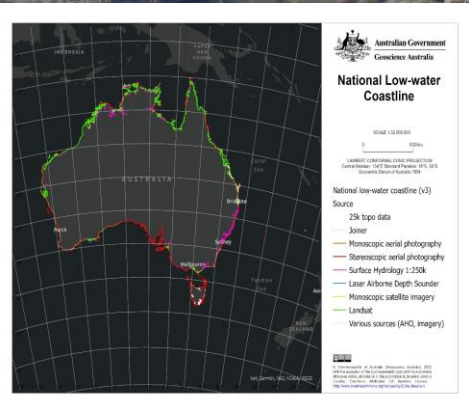
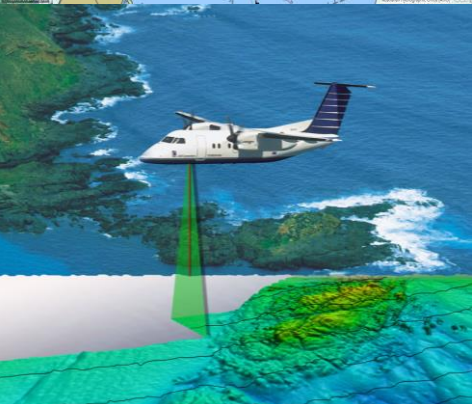
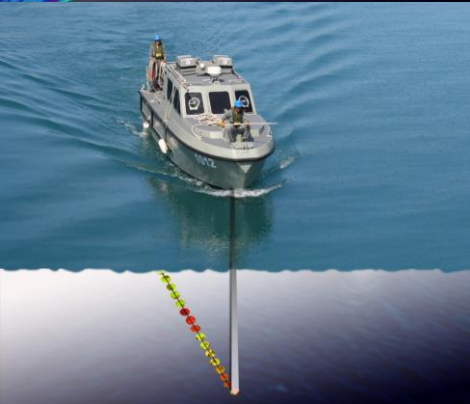
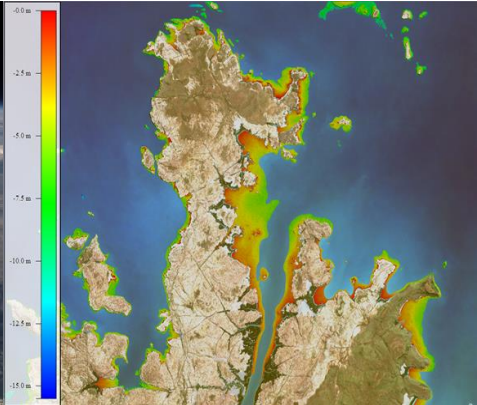
ENC Soundings



Satellite Elevation



SDB



SBES

Lidar/LADS

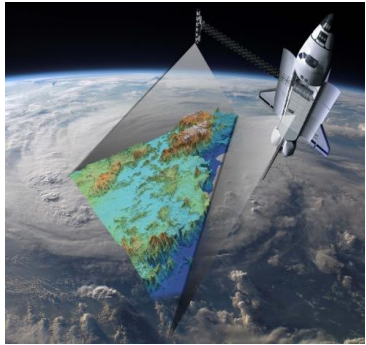
Coastline Data

Intertidal Elevation

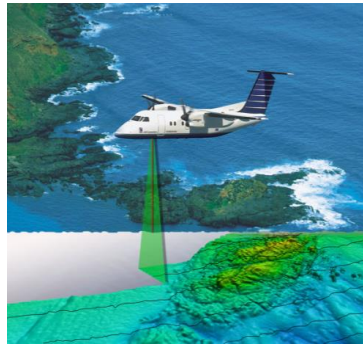
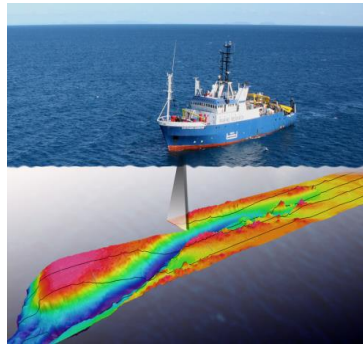
CHALLENGE: Integrating data from Multiple sensors, datums, and varying quality

“Filling in the gaps”

Satellite Elevation



MBES

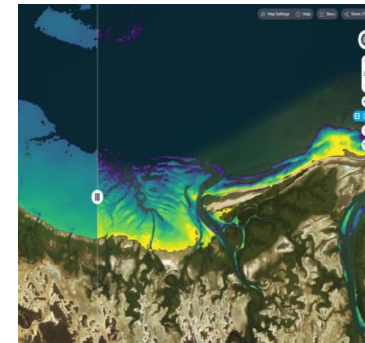


Bathy Lidar

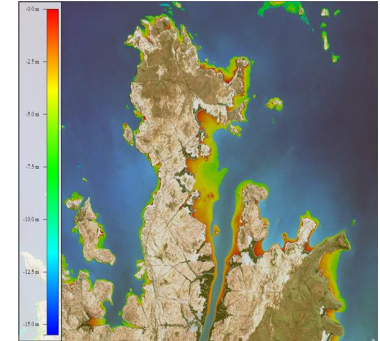
ENC Soundings



Intertidal Elevation

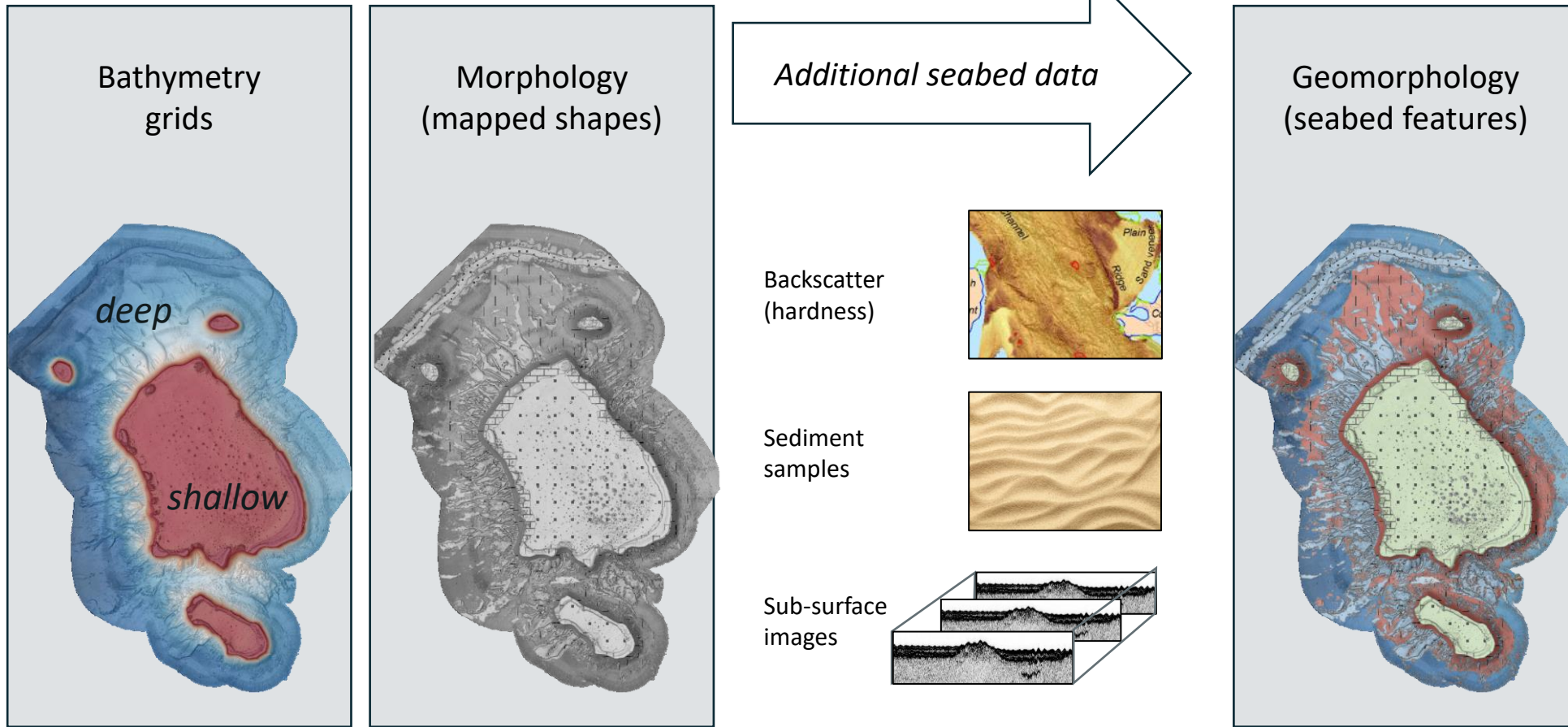
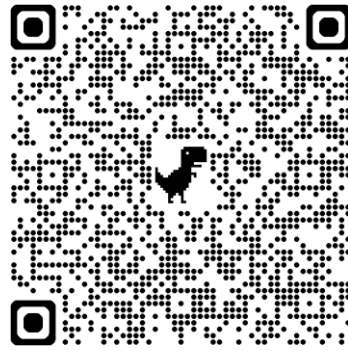


SDB



Geoscience Australia's Semi-automated Geomorphology Classification Scheme

Contact Rachel Nanson – Marine Sedimentologist (Rachel.nanson@ga.gov.au)



Marine applications

-  resources
-  stability
-  sediment budgets
-  past environments
-  management
-  habitat

Final thoughts





Terima Kasih

Further information

Matthew.ellis@ga.gov.au

AusSeabed@ga.gov.au