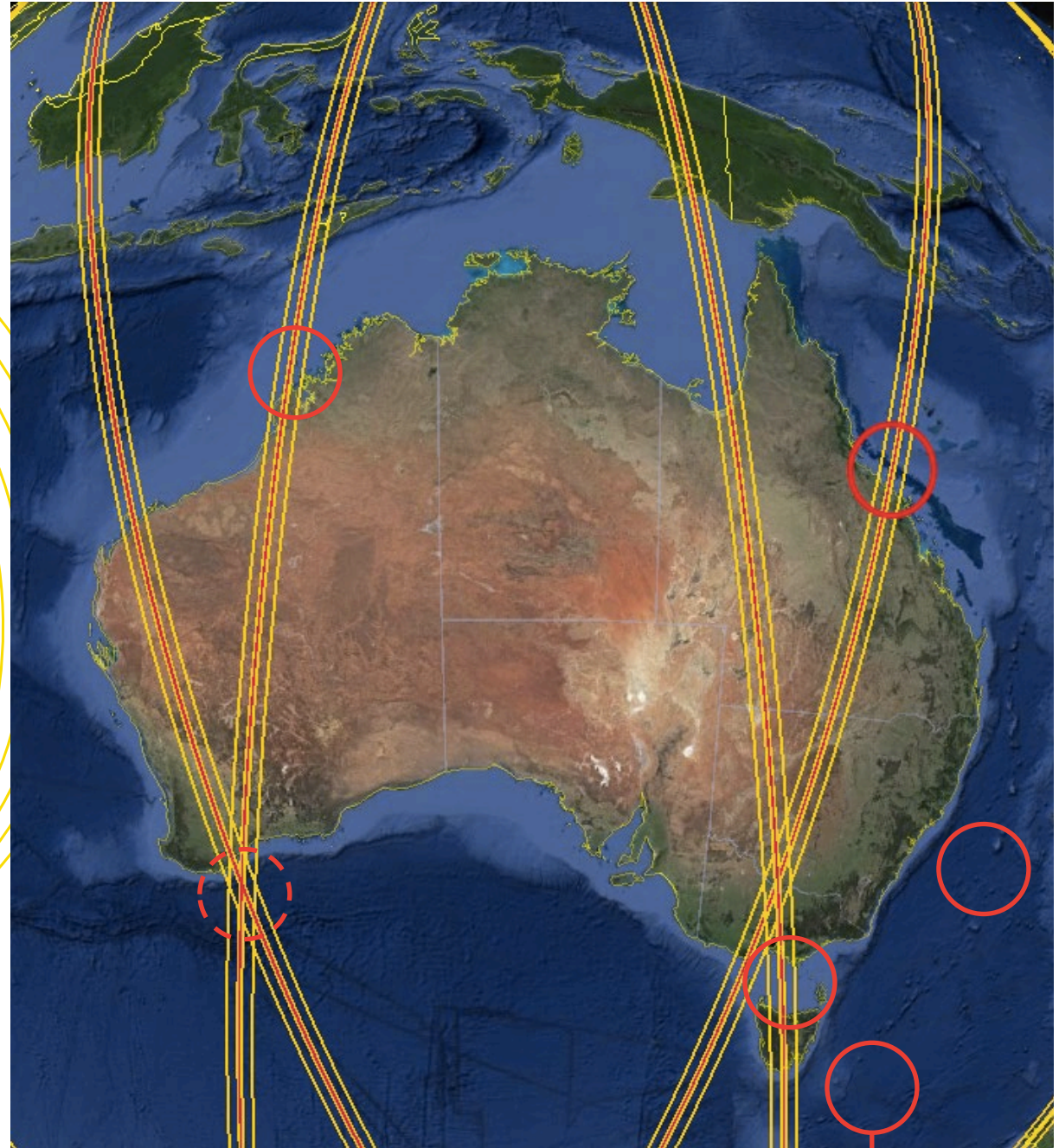




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Planned SWOT field campaigns in the Australian region

Shane Keating (UNSW) with contributions from
Moninya Roughan, Colette Kerry (UNSW)
Nicole Jones, Matt Rayson (UWA)
Benoit Legresy (CSIRO)
Christopher Watson (U. Tasmania)
Callum Shakespeare (ANU)
Madeleine Cahill (CSIRO)
Gary Brassington (Bureau of Meteorology)
...and others





auswot.org



Australian Surface Water Ocean Topography working group

ABOUT US

SWOT MISSION

ACTIVITIES

WORKSHOP

OPPORTUNITIES

CONTACT

Welcome to the AUSWOT working group

We are a consortium of researchers and stakeholders that aims to develop capacity in Australia for the next generation of Earth-observing satellites.

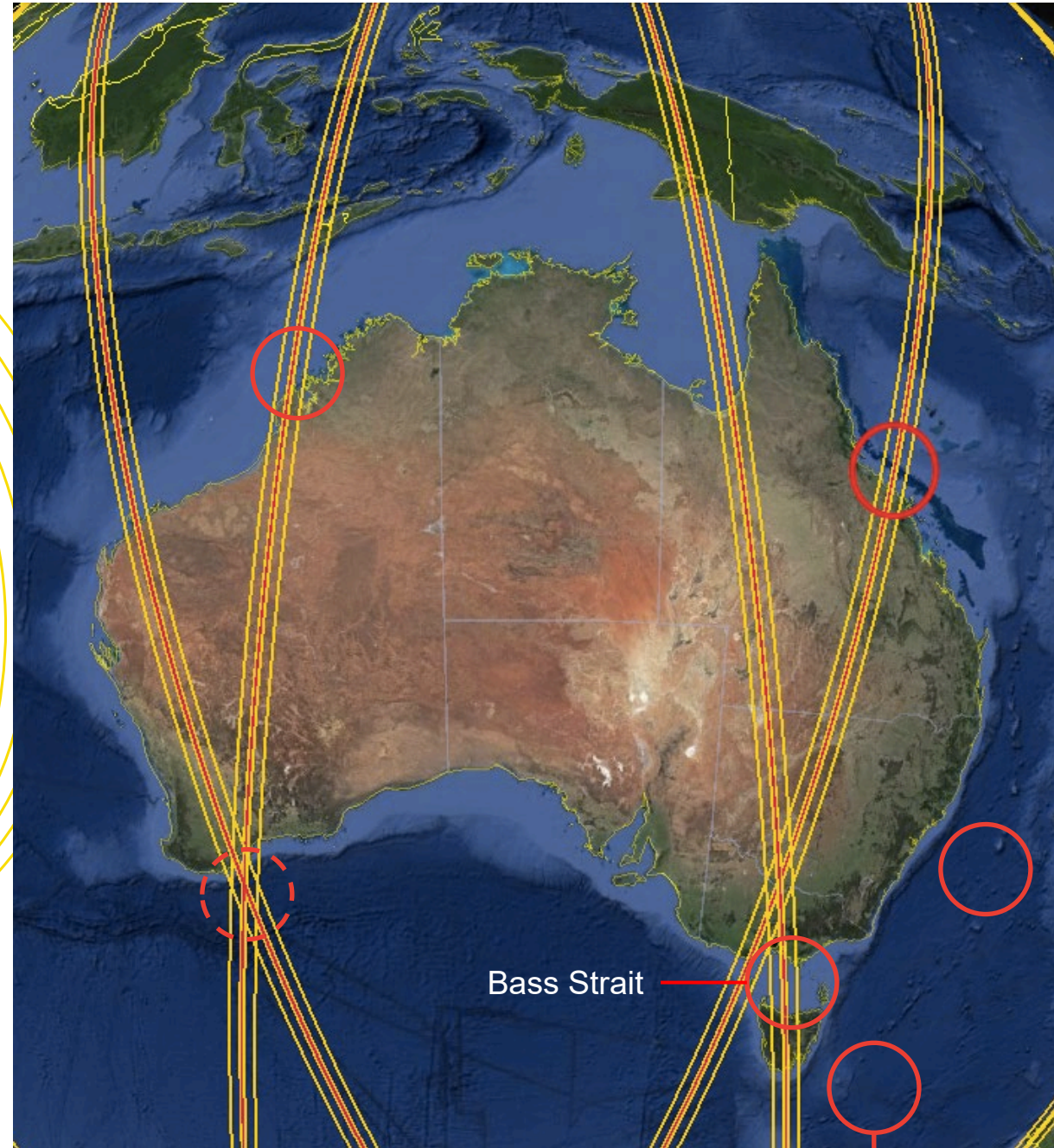
[Find out more](#)



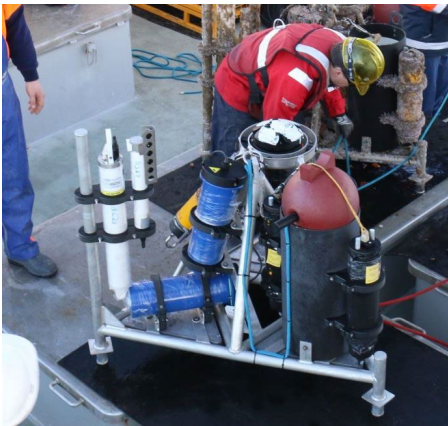
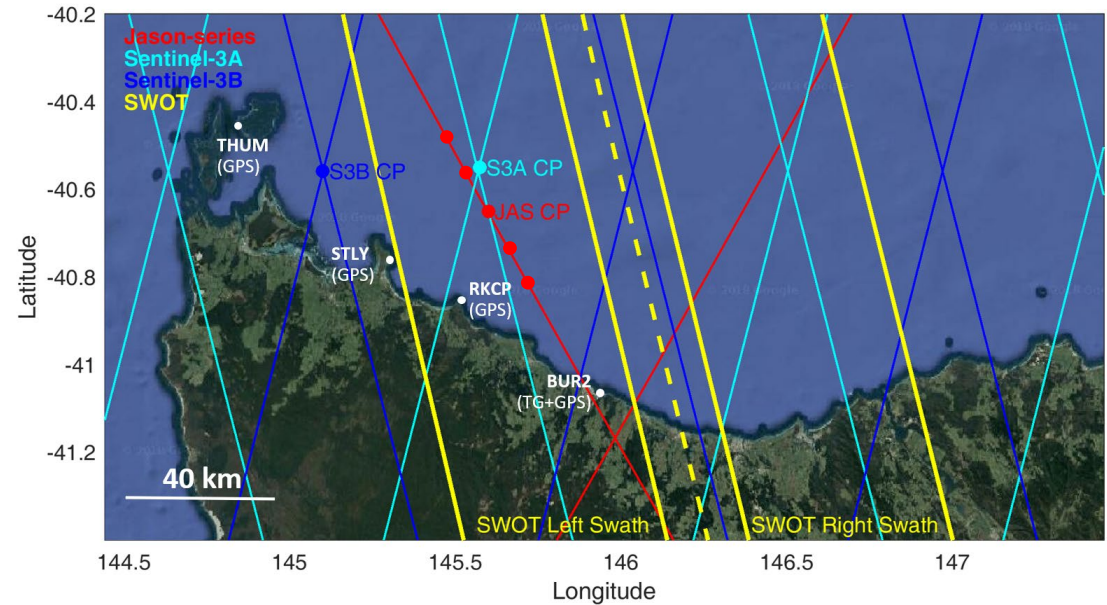
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SWOT geometric validation in the Bass Strait

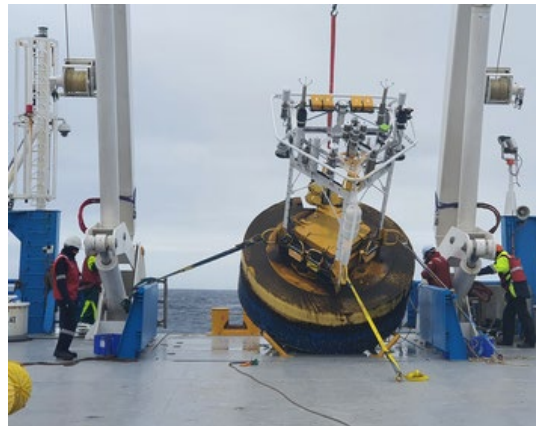
Christopher Watson (U. Tasmania)
Benoit Legresy (CSIRO)



- Shift towards proven sustained observation at multiple locations off-shore along-track in preparation for SWOT Fast Sampling Phase.
- Six new GNSS/INS buoys completed and currently deployed for ~70 days along Sentinel-6 pass in Bass Strait as rehearsal for FSP. Various enhancements to improve precision and accuracy.
- Current, wave and pressure inverted echo sounder (CWPIES) instrumentation deployed simultaneously at three locations.
- Successful GNSS based observations of SSH and SWH in high wave environments in the Southern Ocean (SOFS).



One of three CWPIES Mooring currently deployed in Bass Strait



Southern Ocean SOFS Mooring. Successful GNSS observations of SLA and SWH in high wave environment.



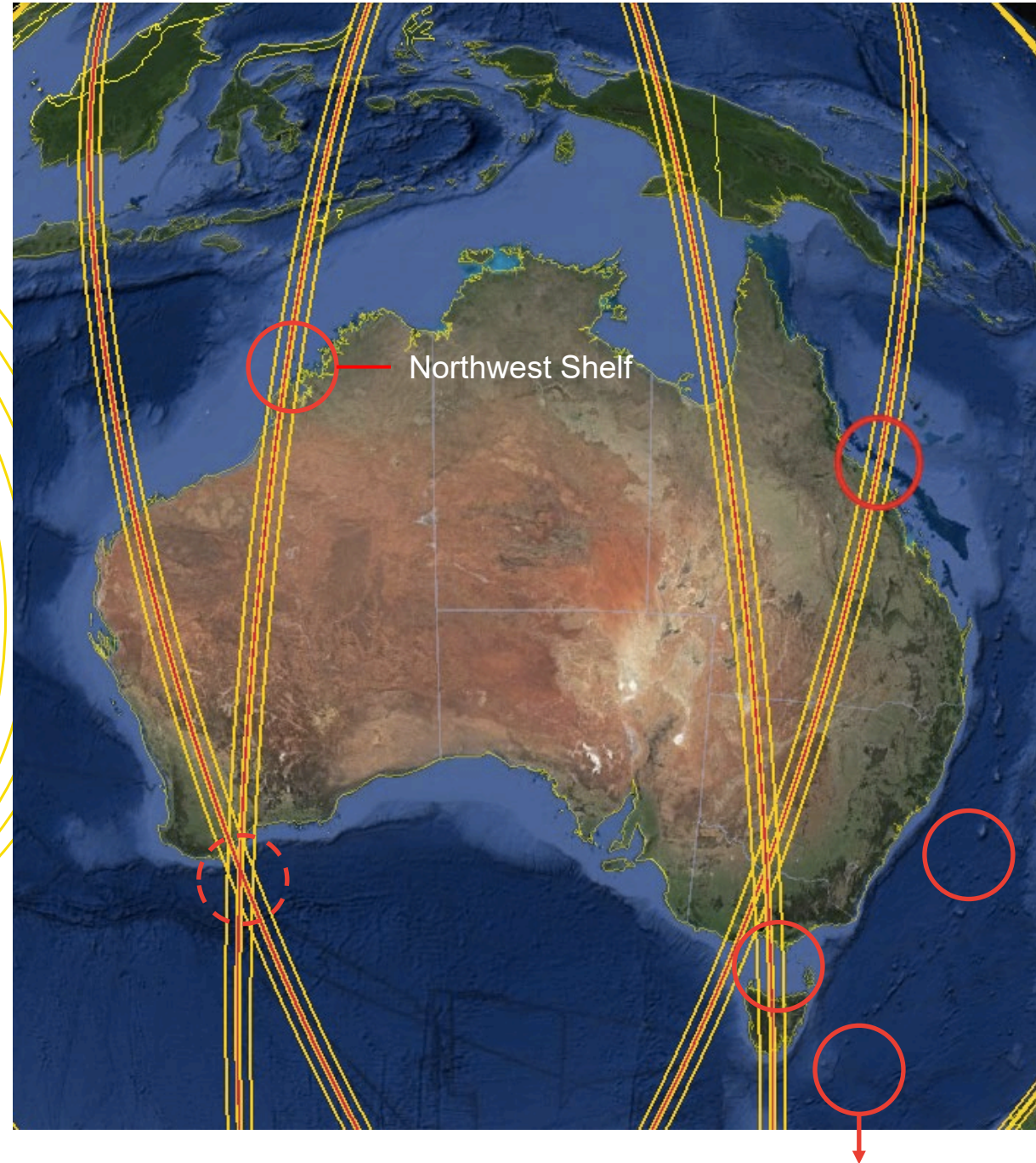
One of six new GNSS/INS equipped buoys currently deployed in Bass Strait. Aiming for 9 buoys by time of SWOT Fast Sampling Phase.

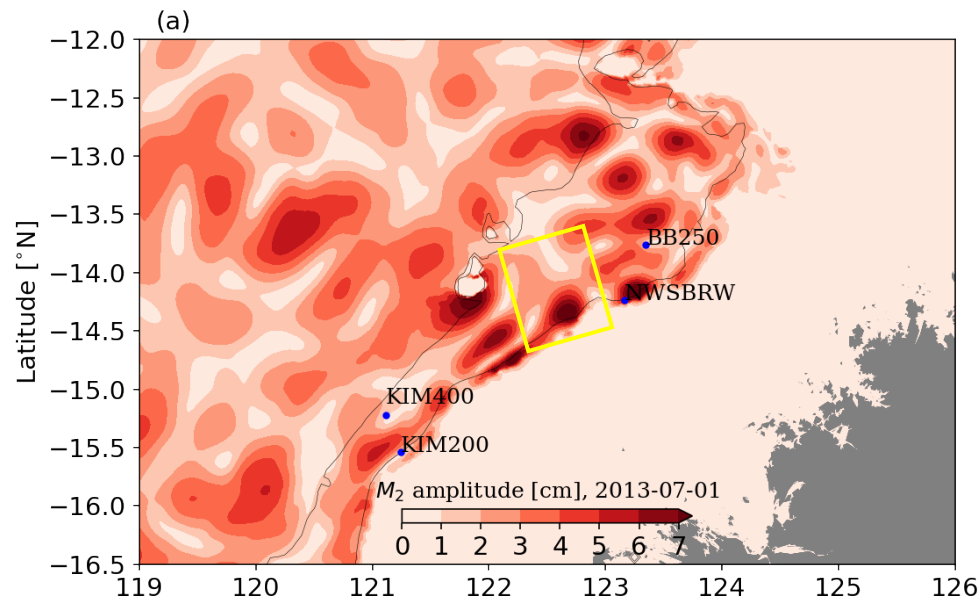


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Submesoscales and internal tides on the Northwest Shelf

Nicole Jones, Matt Rayson, Jen-Ping Peng, Greg Ivey (UWA)
Shane Keating (UNSW)
Callum Shakespeare (ANU)
Aurelian Ponte (Ifremer)





Browse Basin, Australian Northwest Shelf

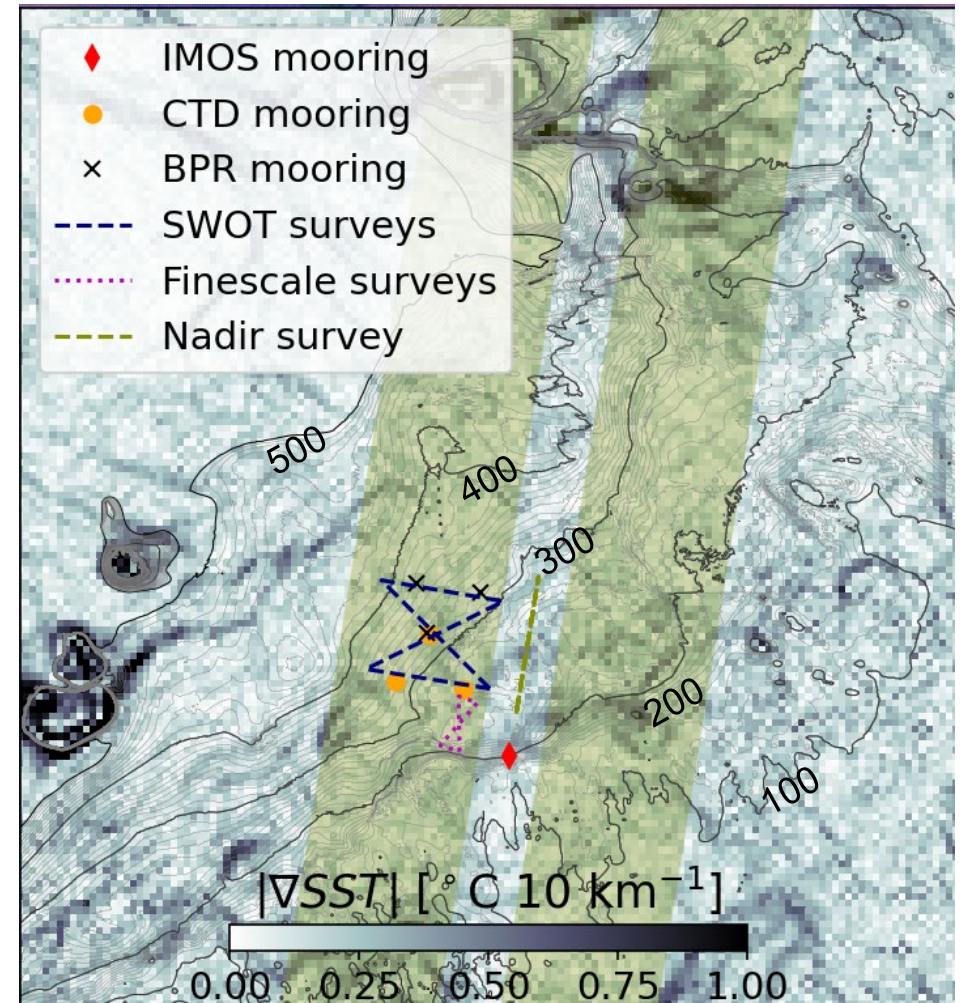
- Relatively predictable, large amplitude internal tides
- Active submesoscale eddy field

Field campaign under SWOT fast-sampling orbit

- 3x through-water column CTD + ADCP moorings:
- 3x bottom pressure recorders (BPR)
- Triaxus (towed profiling CTD + ADCP) surveys

Ocean models (SUNTANS) and analysis metrics

- 2km basin scale + 25m non-hydrostatic nested shelf scale
- Test schemes for IT/IW separation with Lagrangian filtering



Rayson et al. *JGR Oceans* (2021)

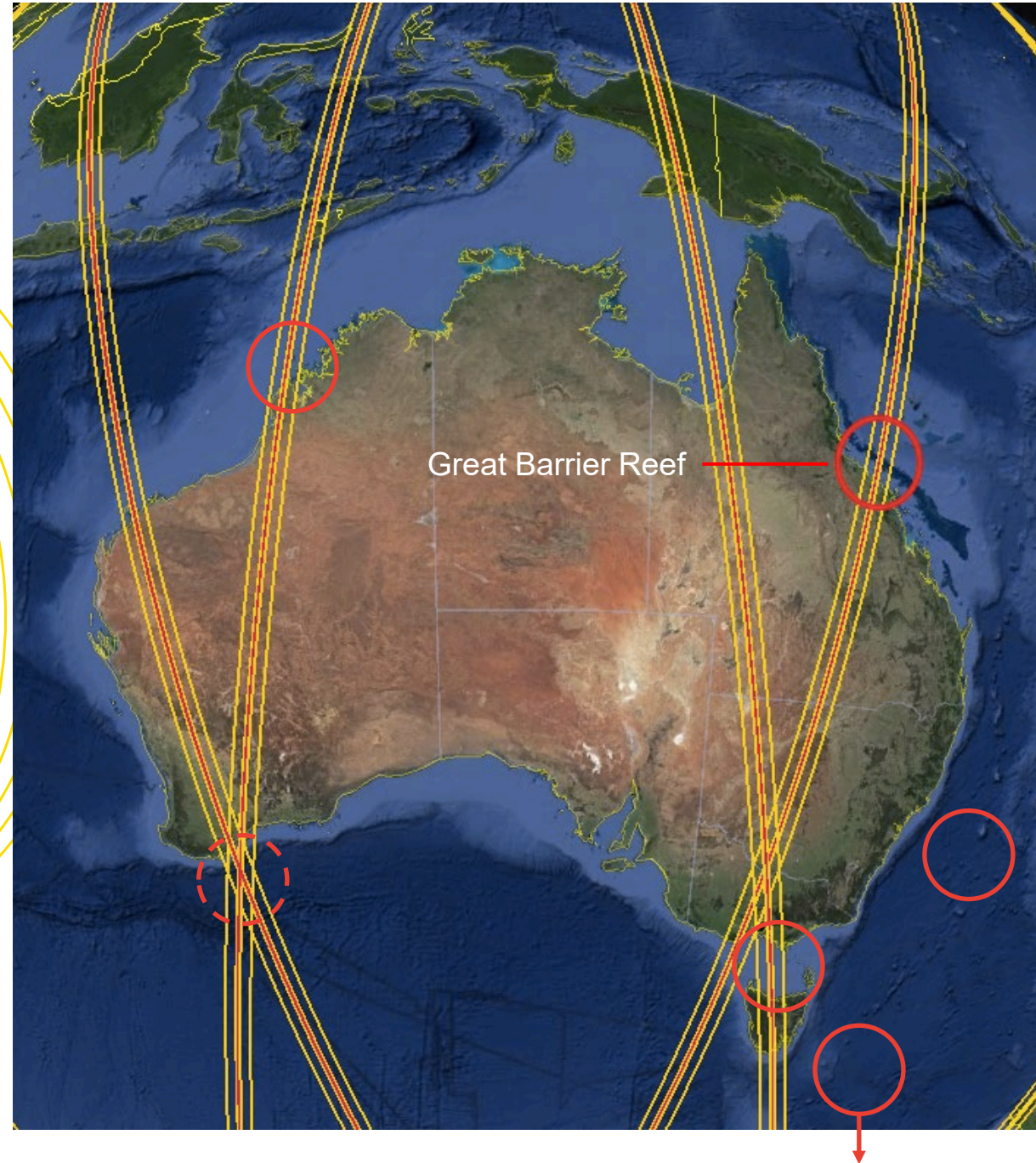
Shakespeare and Hogg *JPO* (2019); Shakespeare et al. *JAMES* (2021)

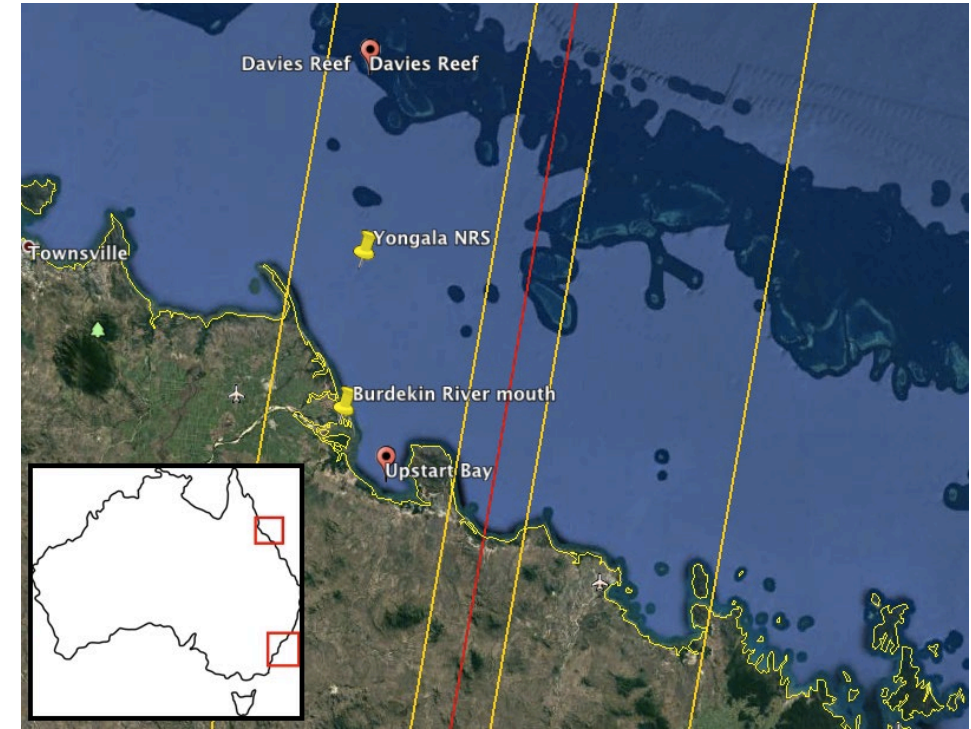
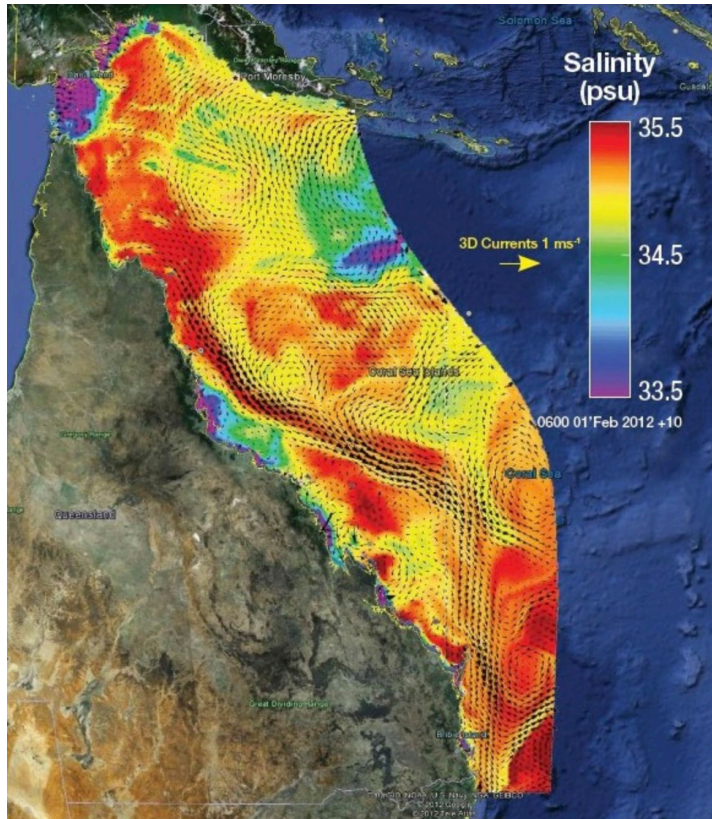


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Surface currents and river outflow on the Great Barrier Reef

Shane Keating, Amandine Schaeffer (UNSW)
Gary Brassington (BOM)
Madeleine Cahill (AIMS)





- SWOT fast-sample orbit captures Burdekin river outflow onto the Great Barrier Reef
- Region covered by Bureau of Meteorology EREIFS data assimilating model

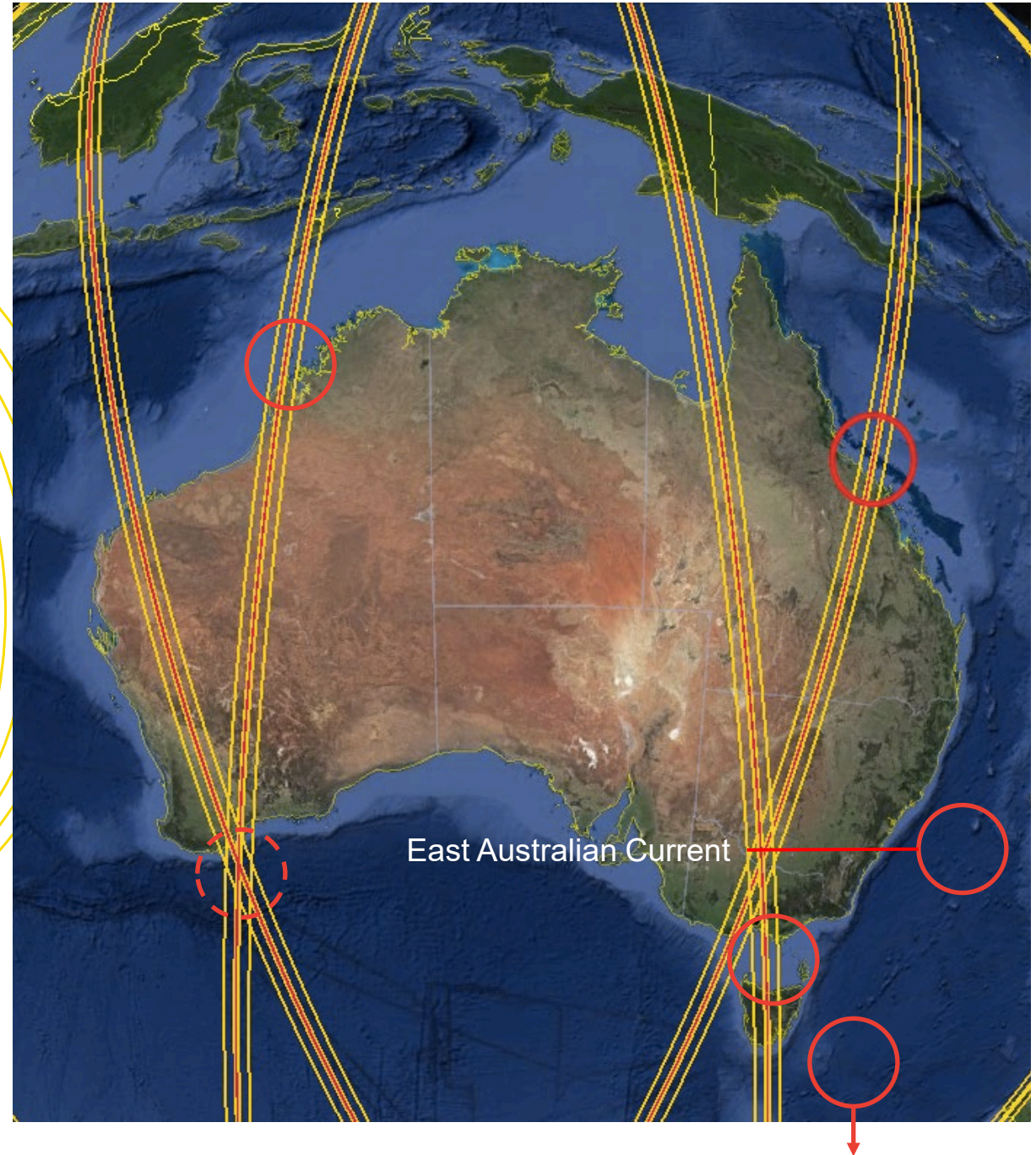
- Deploy 15-20 CARTHE drifters from AIMS research vessels under contrasting conditions
- Additional real-time data from underway TSG, Yongala mooring, Davies reef

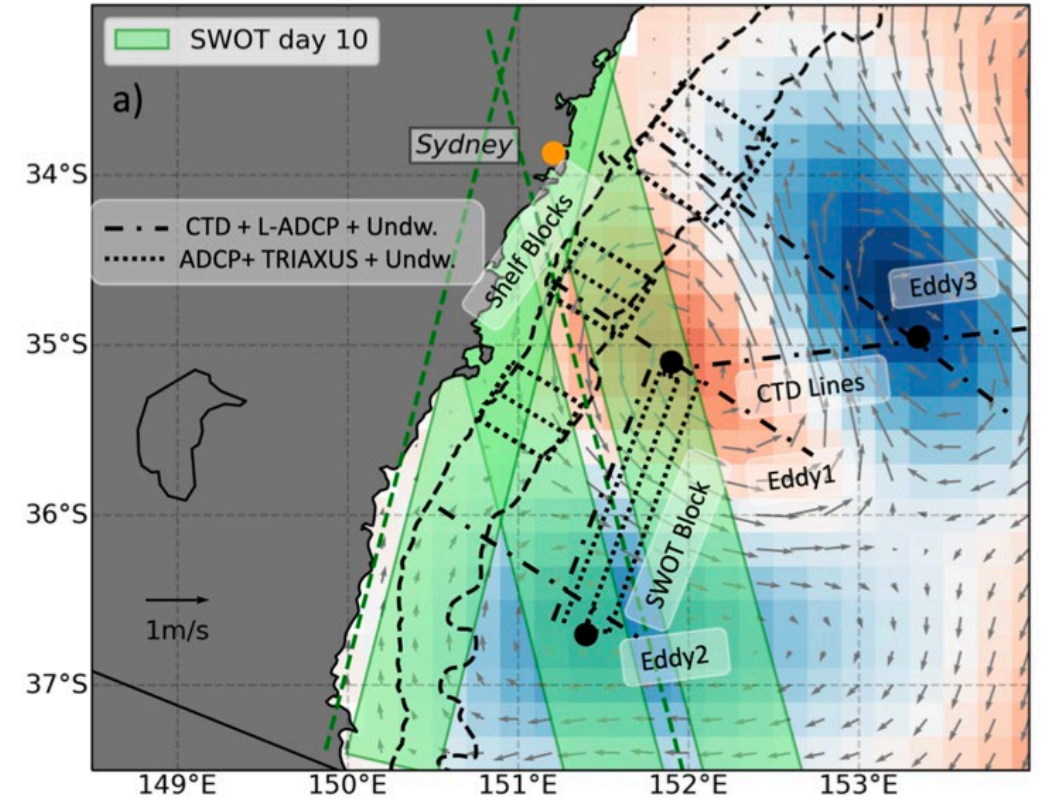
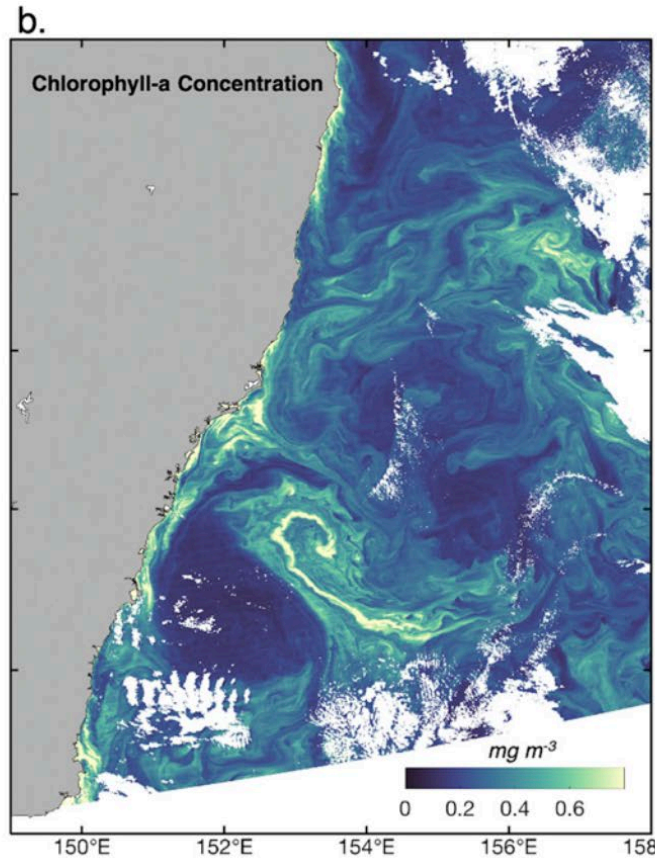
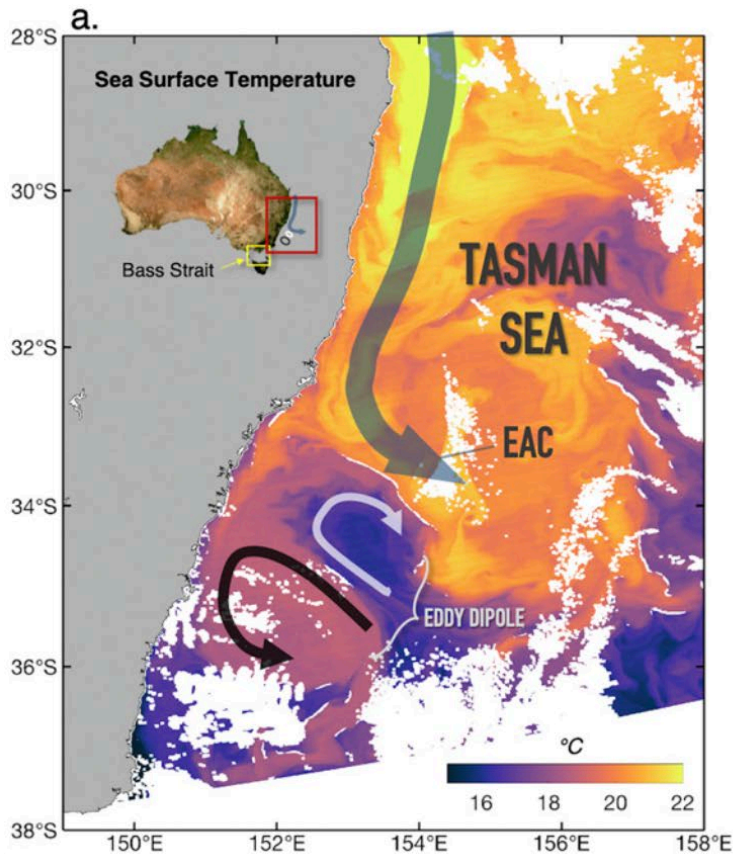


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Mesoscale eddy dipoles in the East Australian Current

Roughan, Evans, Keating,
Schaeffer, Kerry, Brassington,
Dowdy, Shulz, Strutton,
Schallenberg, Cetina Heredia
Della Penna





- Dedicated 24 day cruise in Sept/Oct 2023 - capture one full science orbit (two passes ~ 10 days apart)

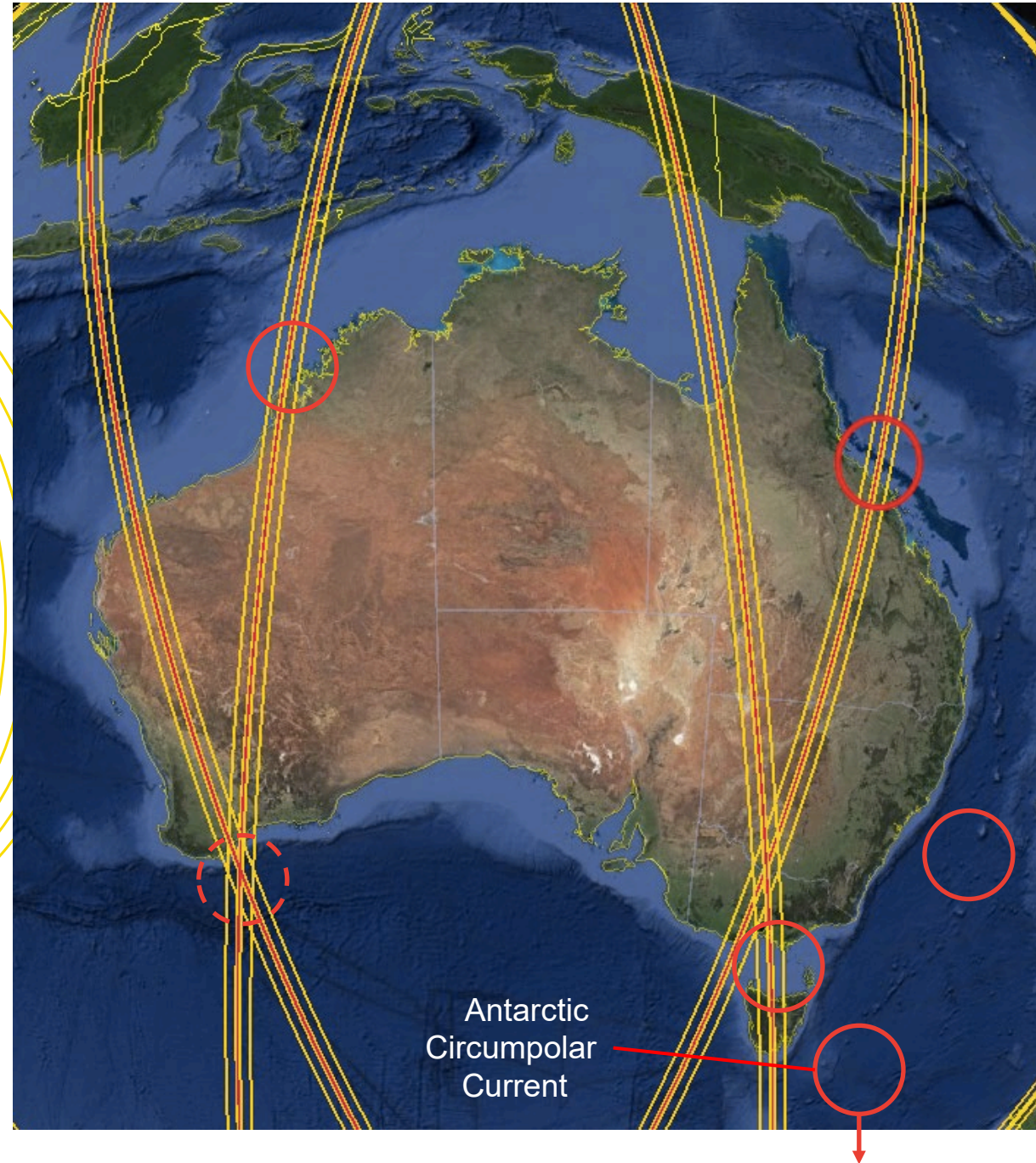
- S-ADCP, Triaxus, TSG, CTD line, L-ADCP, drifters



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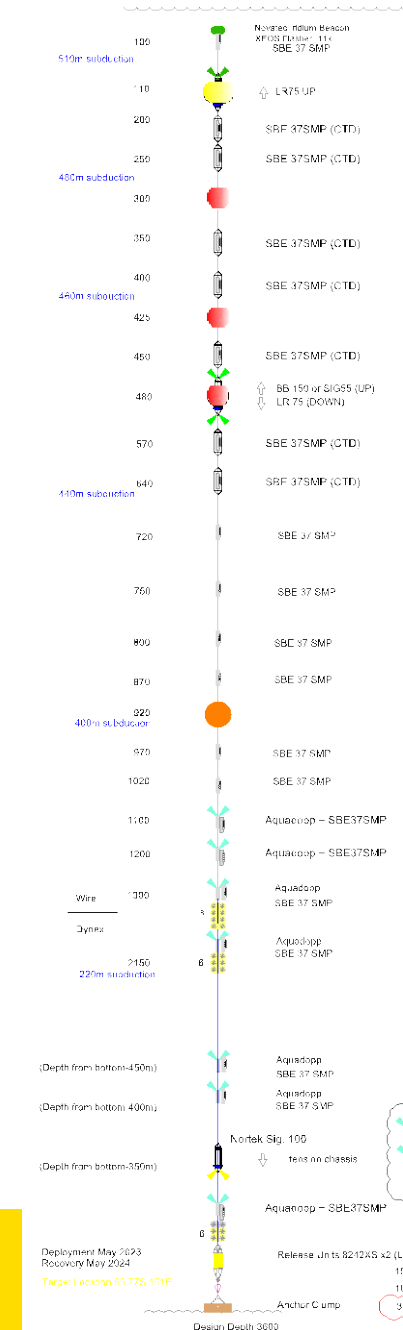
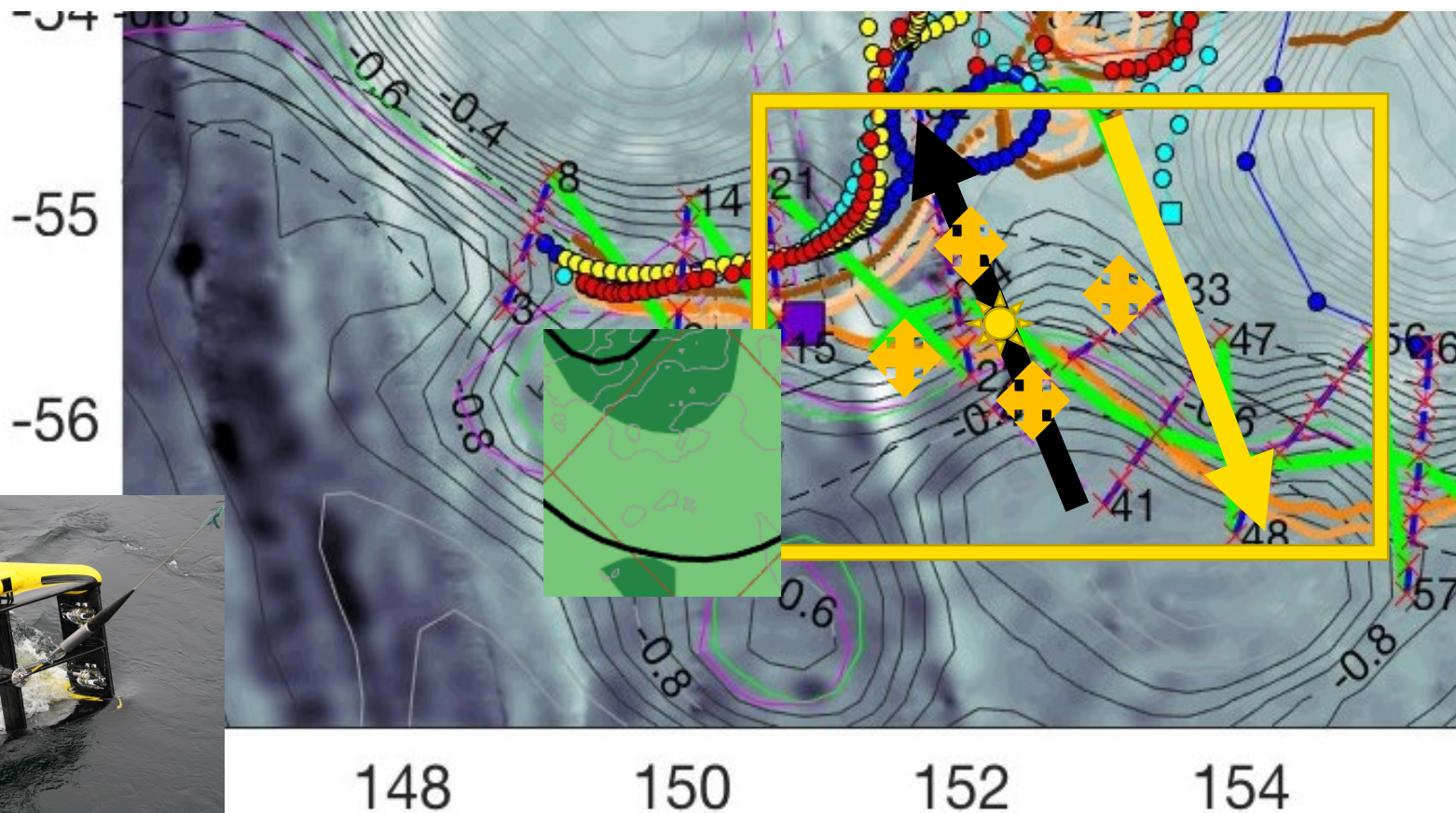
Southern Ocean smaller scales in the ACC

Legresy, Phillips, Thompson,
Polzin, Watts, Fonohue,
Rintoul, Bindoff, Drushka,
Shadwick, Foppert, Pena-
Molina, Nikurashin, Morrow



Southern Ocean smaller scales of the Antarctic Circumpolar Current

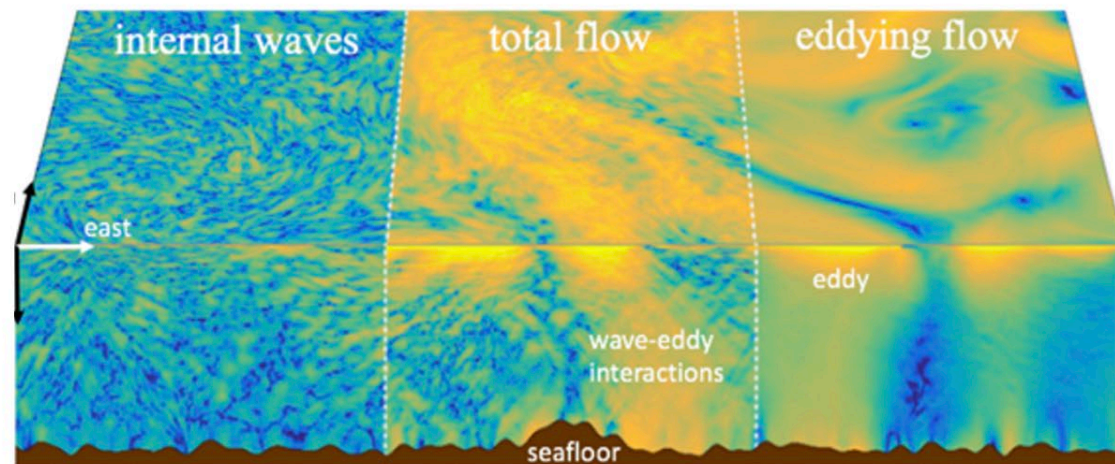
Key are for ocean heat and carbon uptake and lower-higher latitude exchanges



References

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- Shakespeare, C.J. and A. McC. Hogg (2019). On the momentum flux of internal tides. *J. Phys. Oceanogr.* 49 (4): 993-1013.
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Australian Research Council PhD scholarship: *Understanding lateral ocean transport at small scales*



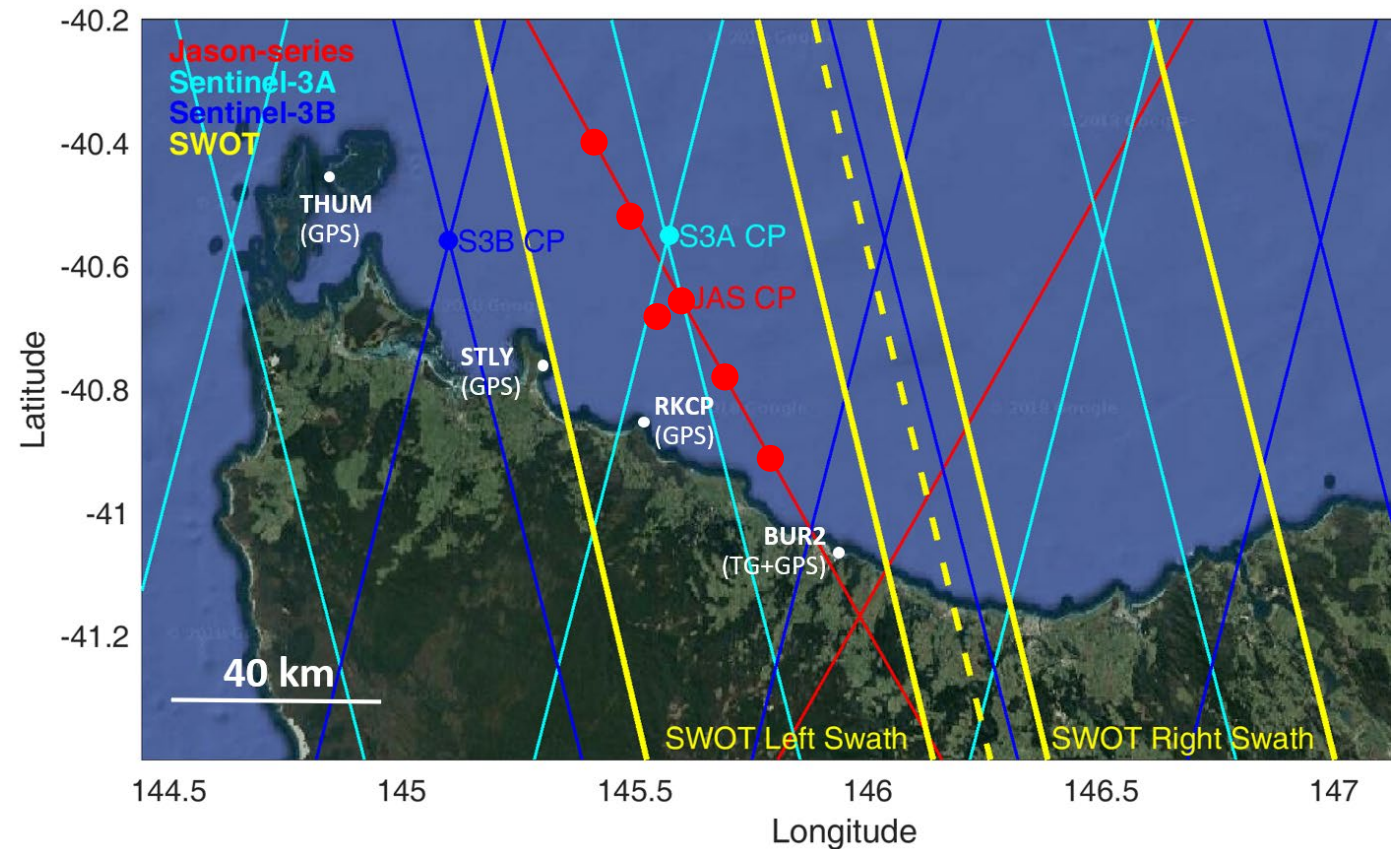
UNSW School of Mathematics and Statistics offers a fully funded PhD scholarship and top-up scholarship in the area of ocean dynamics. The scholarship is funded by an Australian Research Council Discovery Proposal DP210102745 “Understanding lateral ocean transport at small scales”, a collaboration between UNSW Sydney, the University of Western Australia, the Australian National University, and the French Institute for Exploitation of the Sea (Ifremer). The outcomes of this project will contribute to the future NASA-CNES Surface Water and Ocean Topography satellite mission, to be launched in 2022.

Value: \$35,109/year for 3 years (\$27,609 ARC stipend rate + \$7,500 pa top-up).

For more information see www.auswot.org or contact s.keating@unsw.edu.au

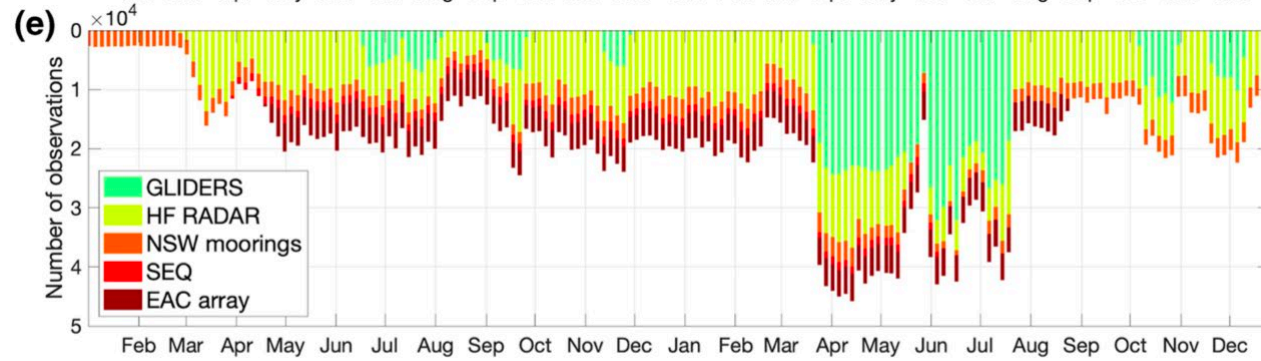
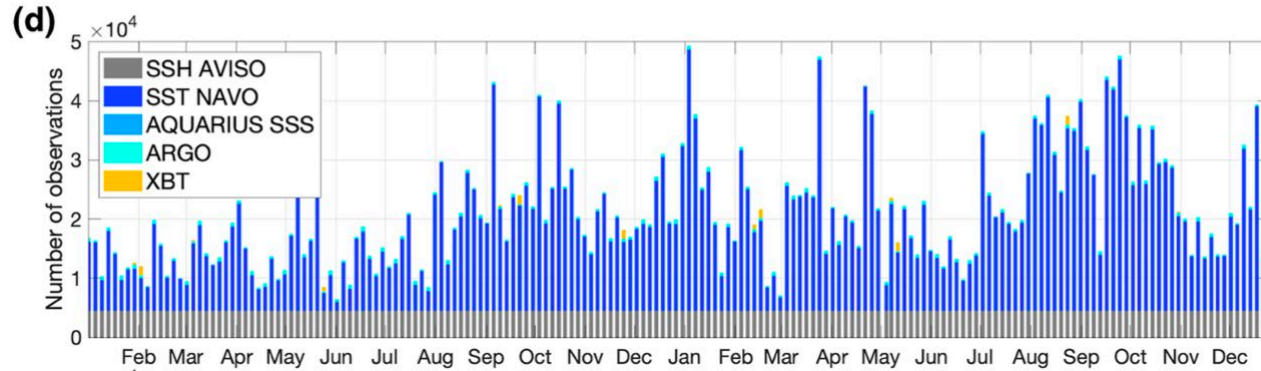
Campaign Overview:

- Aim: Geometric in situ validation over the duration of the fast-sampling phase at the Bass Strait validation facility.
- Point based in situ validation at another two sites within the fast-sampling phase:
 - Southern Ocean (SOFS) – high wave environment.
 - Davies Reef in NE Australia – reef environment.
- In situ instrumentation for Bass Strait:
 - 6(+3) x GNSS/INS equipped buoys (SSH, wet trop, SST, waves)
 - 3 x CWPIES moorings (SSH, U, V, waves, P, density)
 - 3 x Bottom pressure moorings (SSH, P, T, S)
- Modelling effort:
 - 3D finite difference SHOC model nested within the Australian OceanMaps model.
 - 2 km resolution over Bass Strait, 400 m over SW Bass Strait.



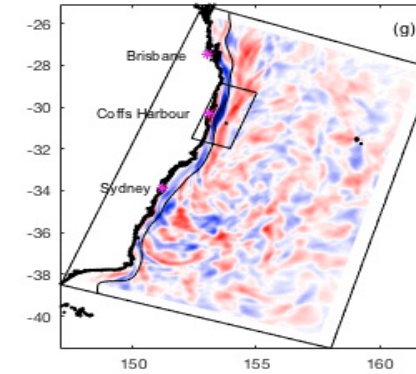
Observation impact: EAC ROMS + 4DVar

“Traditional” observations



“Non-traditional” observations

Time-mean vorticity, FULL- TRAD



Vorticity standard deviation, FULL- TRAD

