Adopting a Crossover between **SWOT and the Antarctic Circumpolar Current.**

Benoit LEGRESY[1,2], Nathan BINDOFF[3,2,4], Helen PHILLIPS[3], Max NIKURASHIN[3], Steve RINTOUL[1,2]

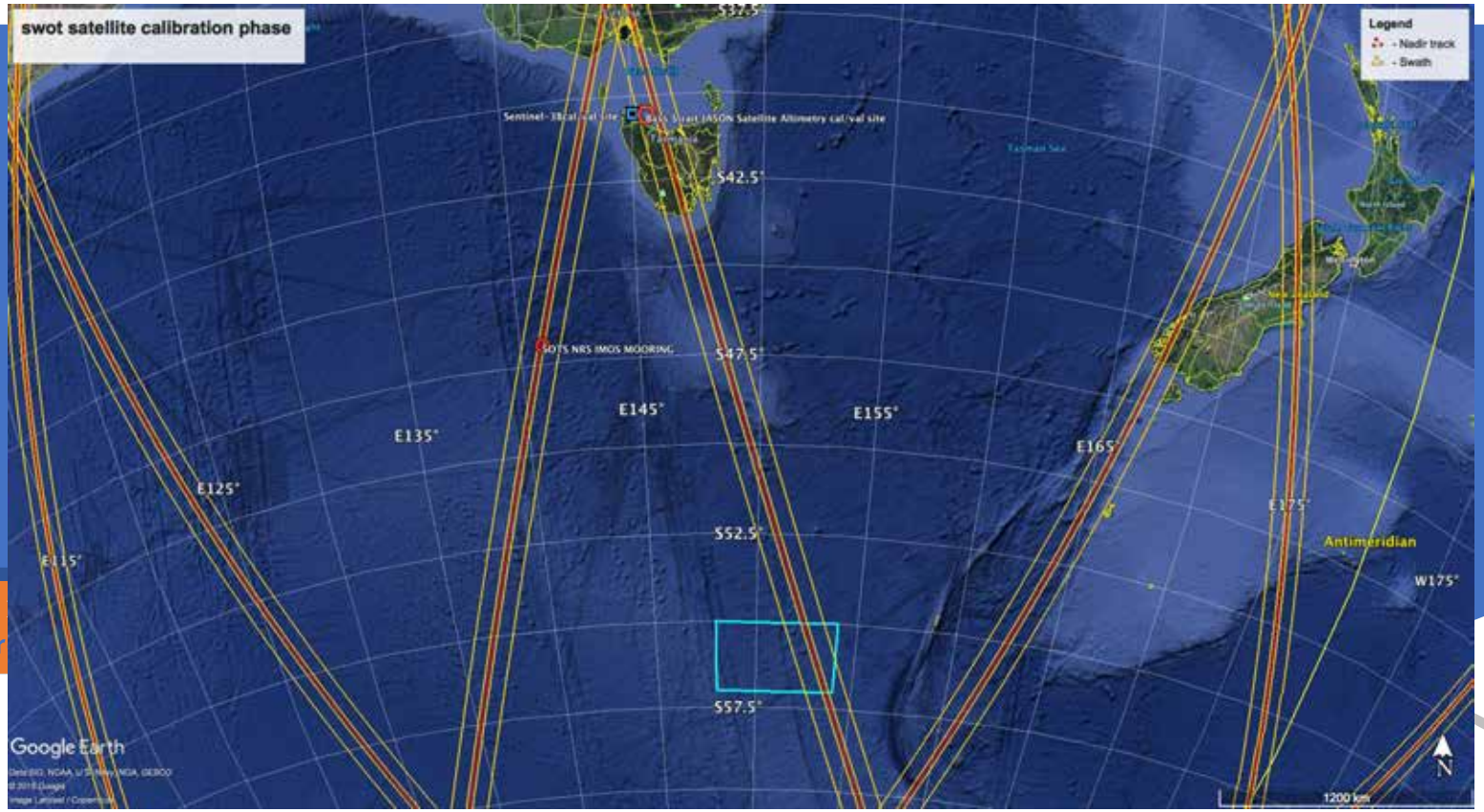
1, CSIRO Climate Science Centre

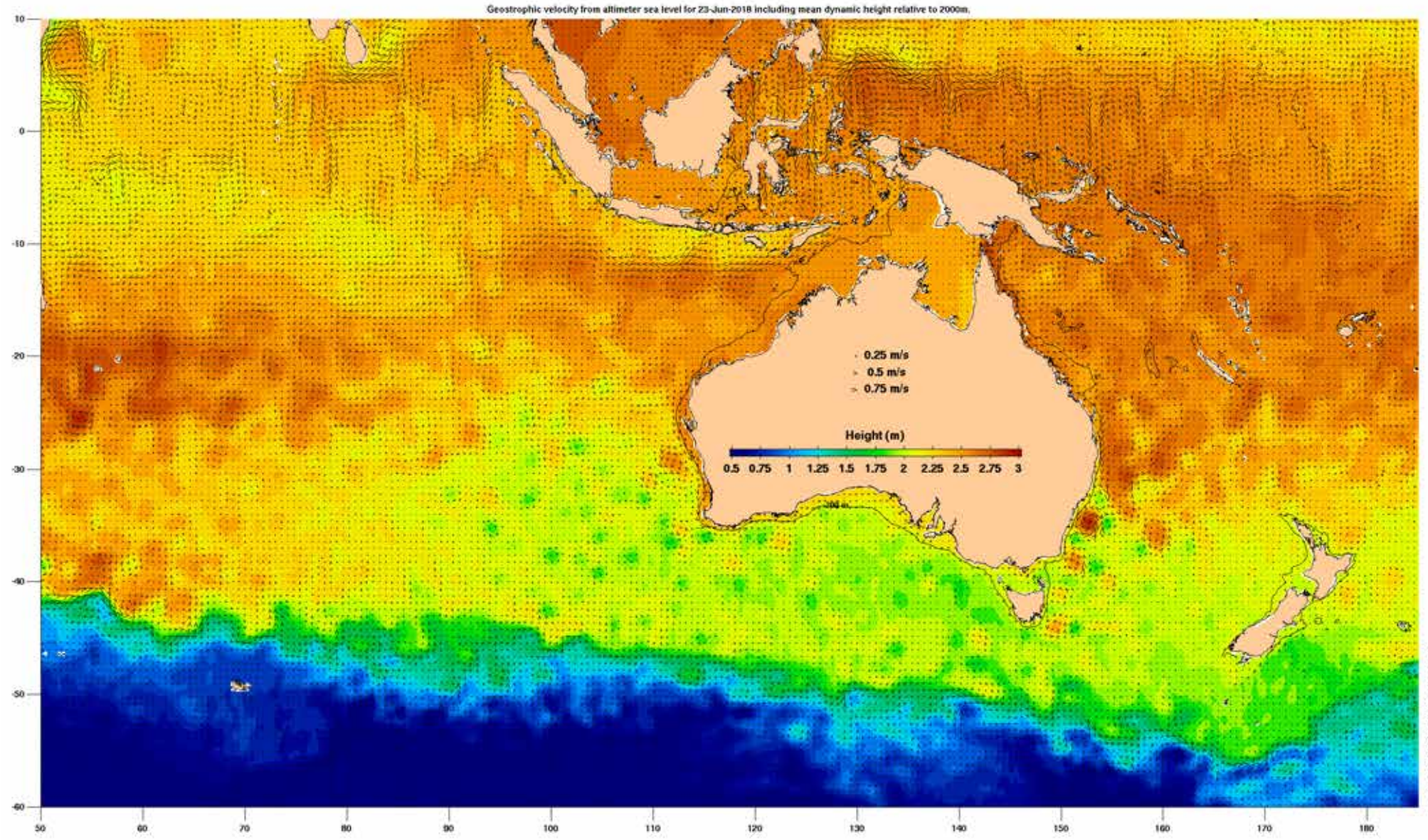
2, Antarctic Climate and Ecosystems CRC

3, Centre for Southern Hemisphere Ocean Research

4, Institute for Marine and Antarctic Science

5, Auatralian Research Council Centre of Excellence for Climate Change





Last 10 days SSH M. Cahill, **http://oceancurrent.imos.org.au**

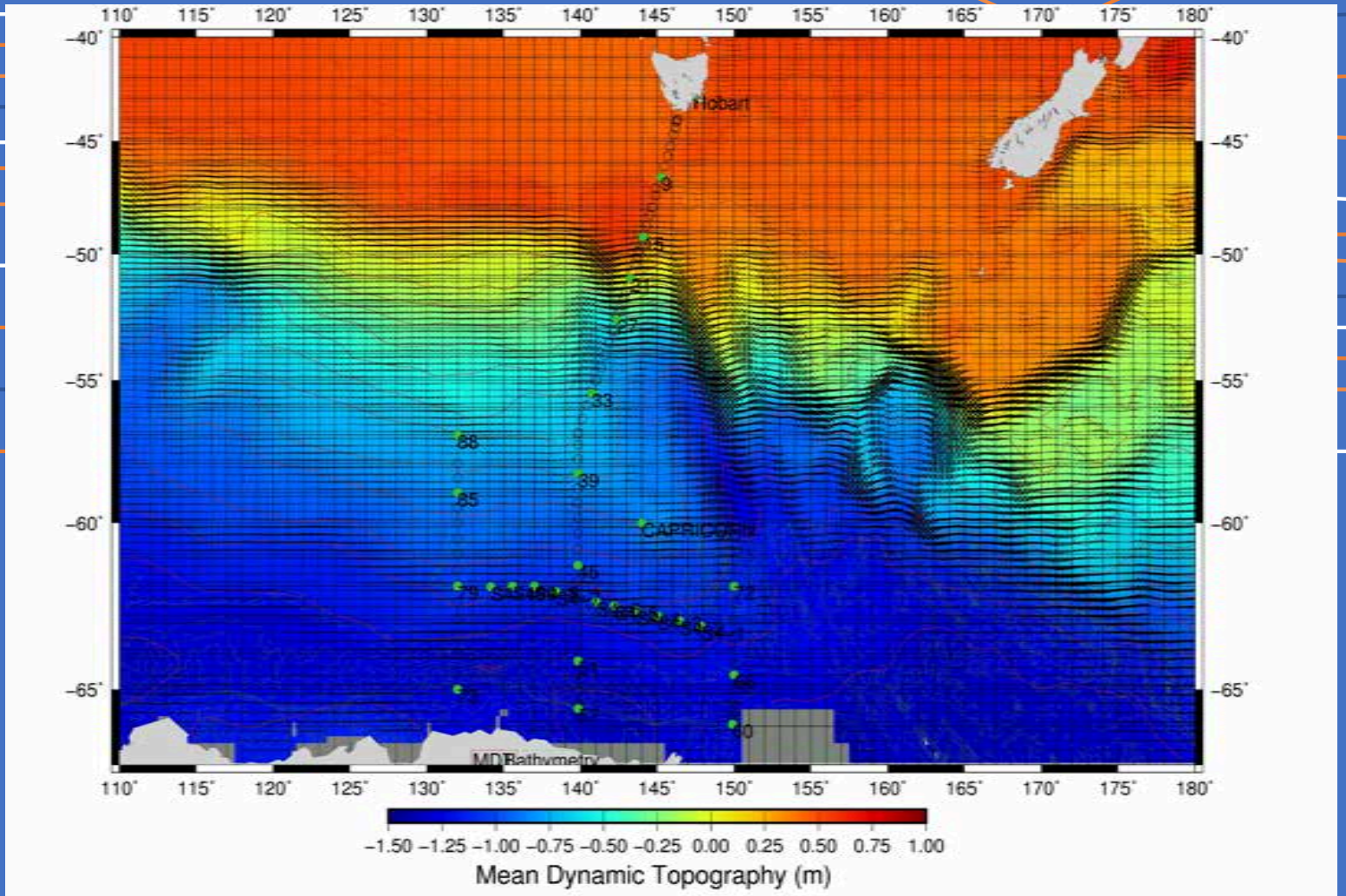
Science question

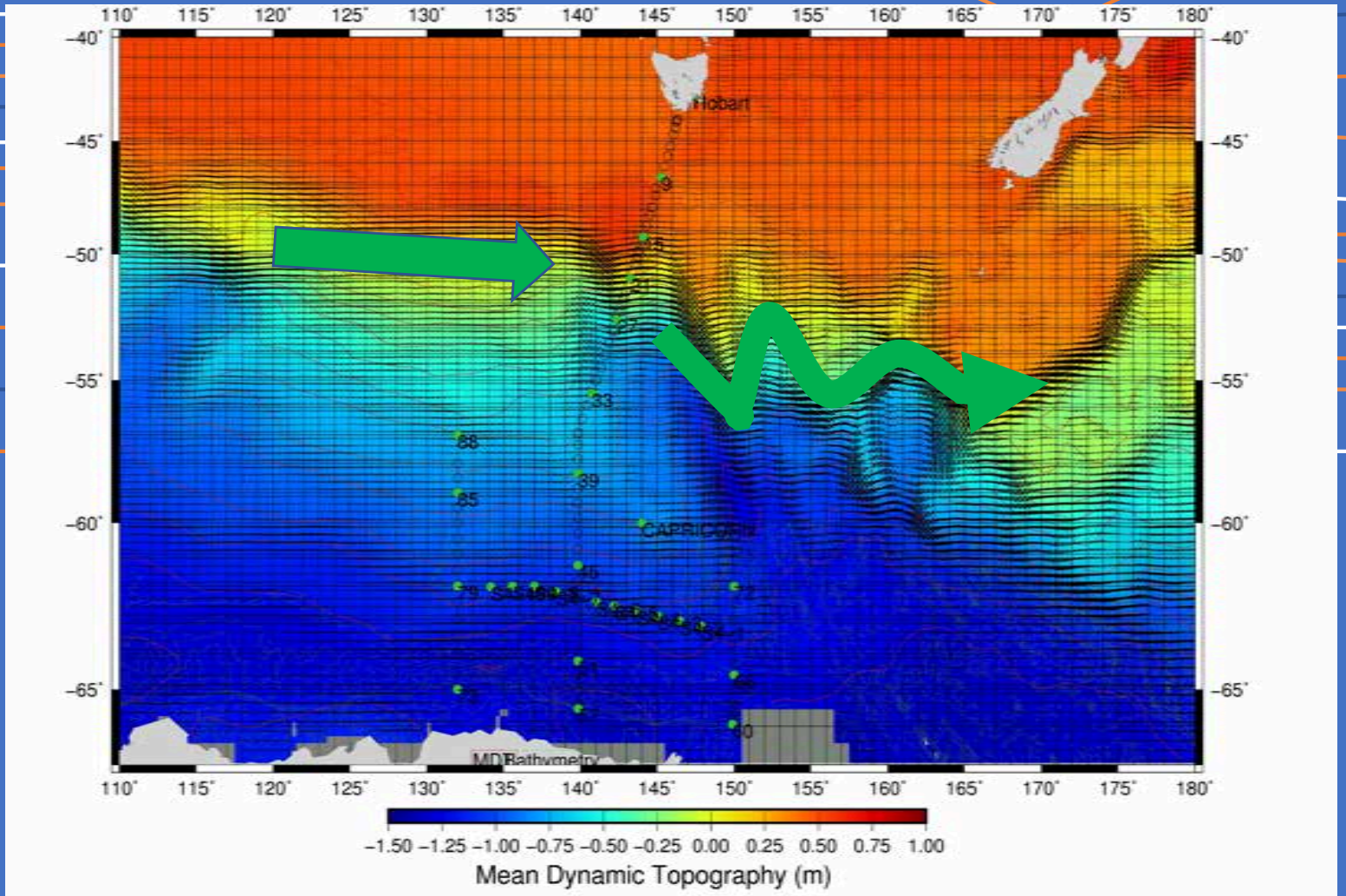
➢Southern Ocean > 60% of heat and > 25% of $CO2_{ant}$ uptake

- Uptake processes ?
- Transfer processes ?

- A few standing meanders where the ACC encounters rough topography are known to play crucial role

  ↳ 3-dimensional survey of a standing meander


110° 115° 120° 125° 130° 135° 140° 145° 150° 155° 160° 165° 170° 175° 180°
-40° -45° -50° -55° -60° -65°
Hobart
CAPRICORN
MD Bathymetry
−1.50 −1.25 −1.00 −0.75 −0.50 −0.25 0.00 0.25 0.50 0.75 1.00
Mean Dynamic Topography (m)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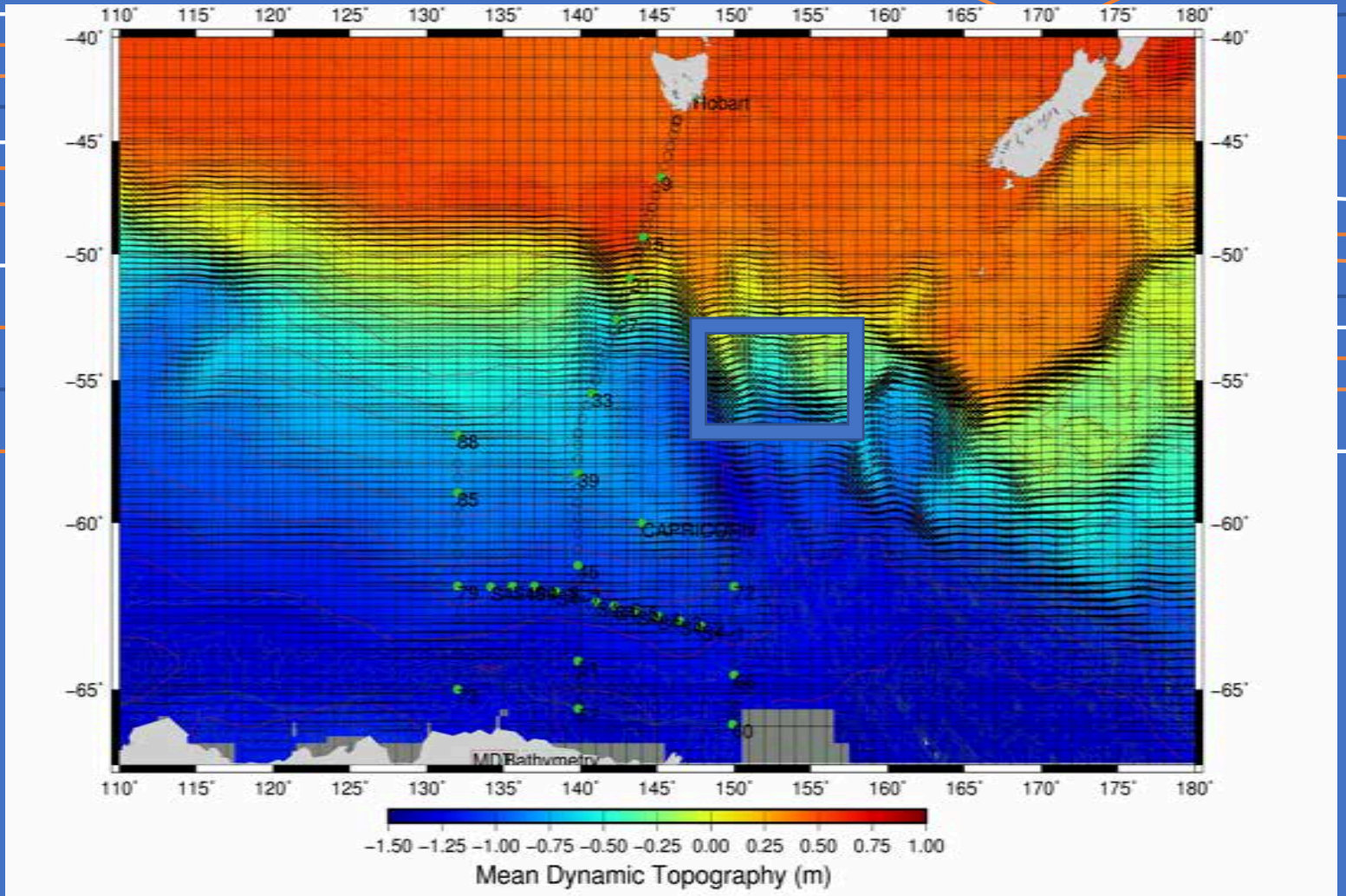
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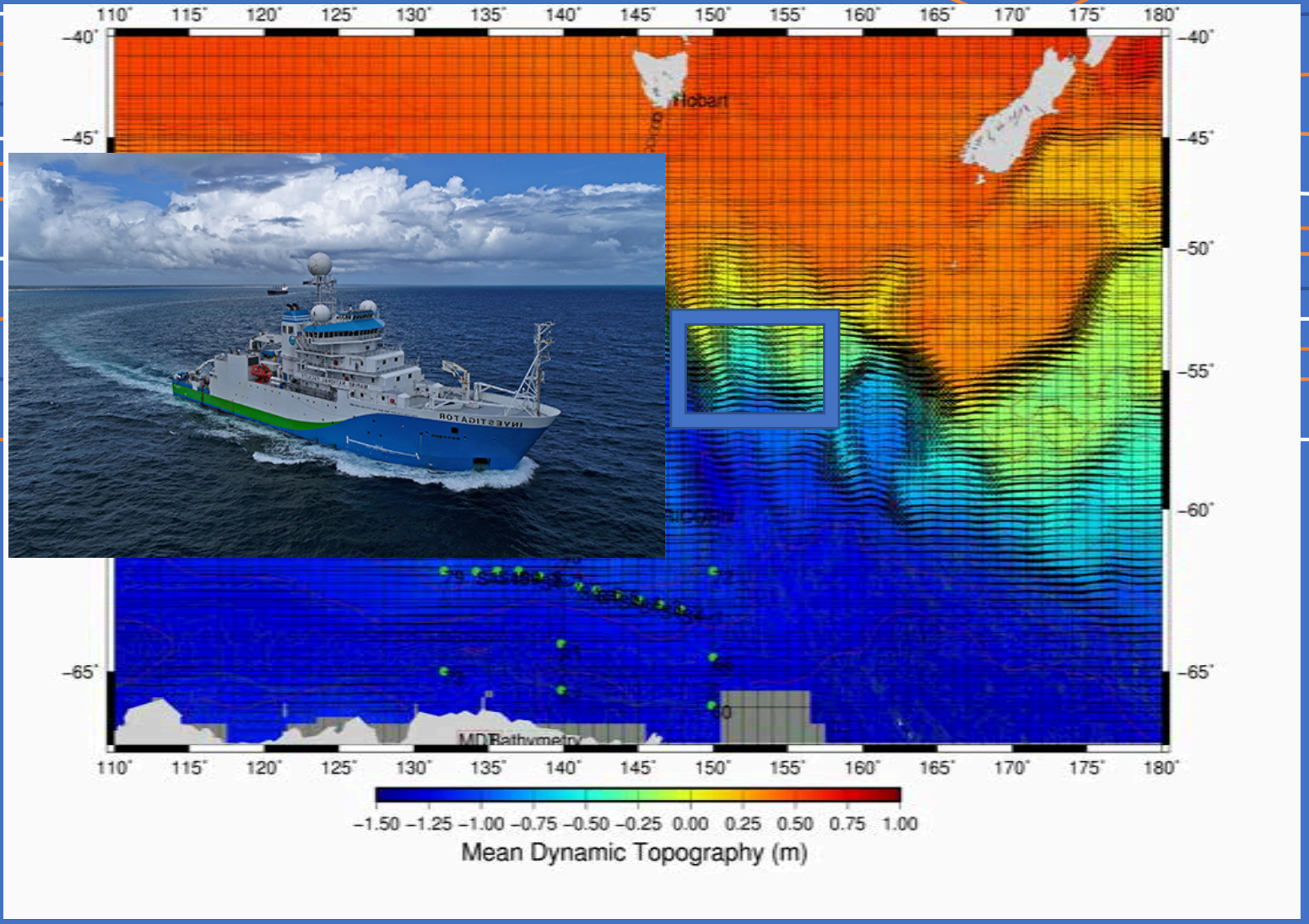
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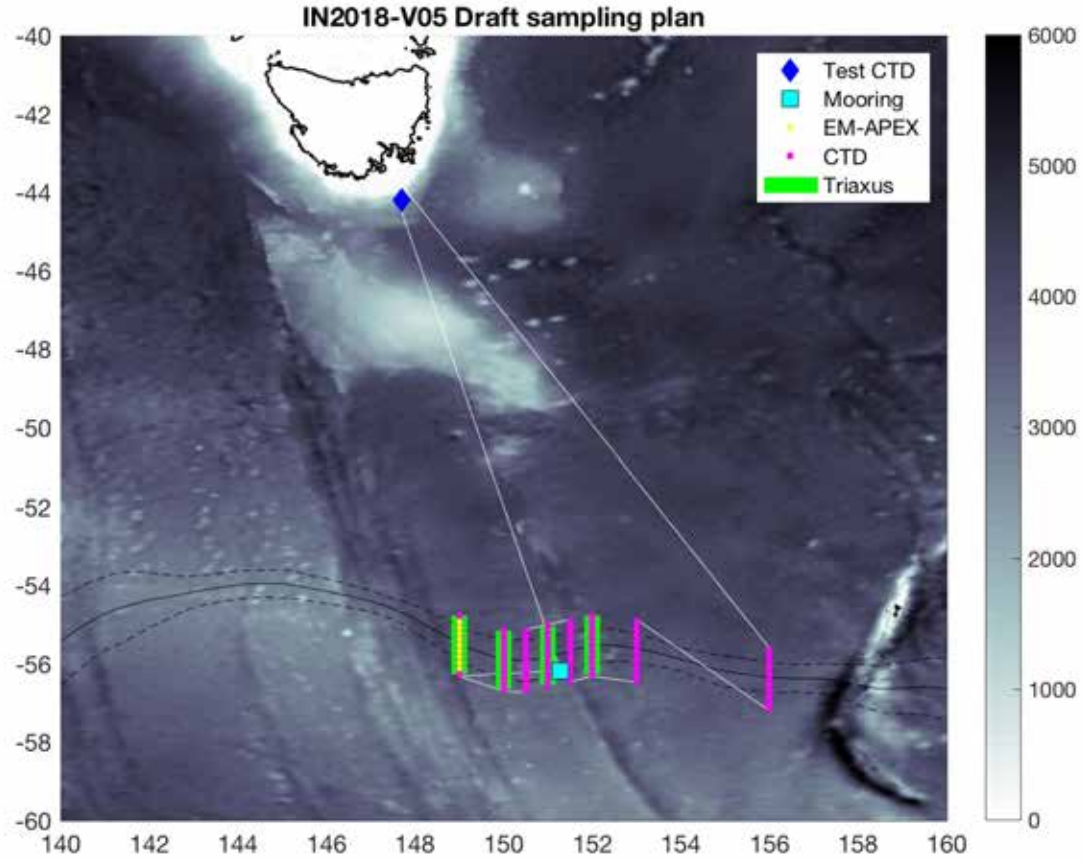
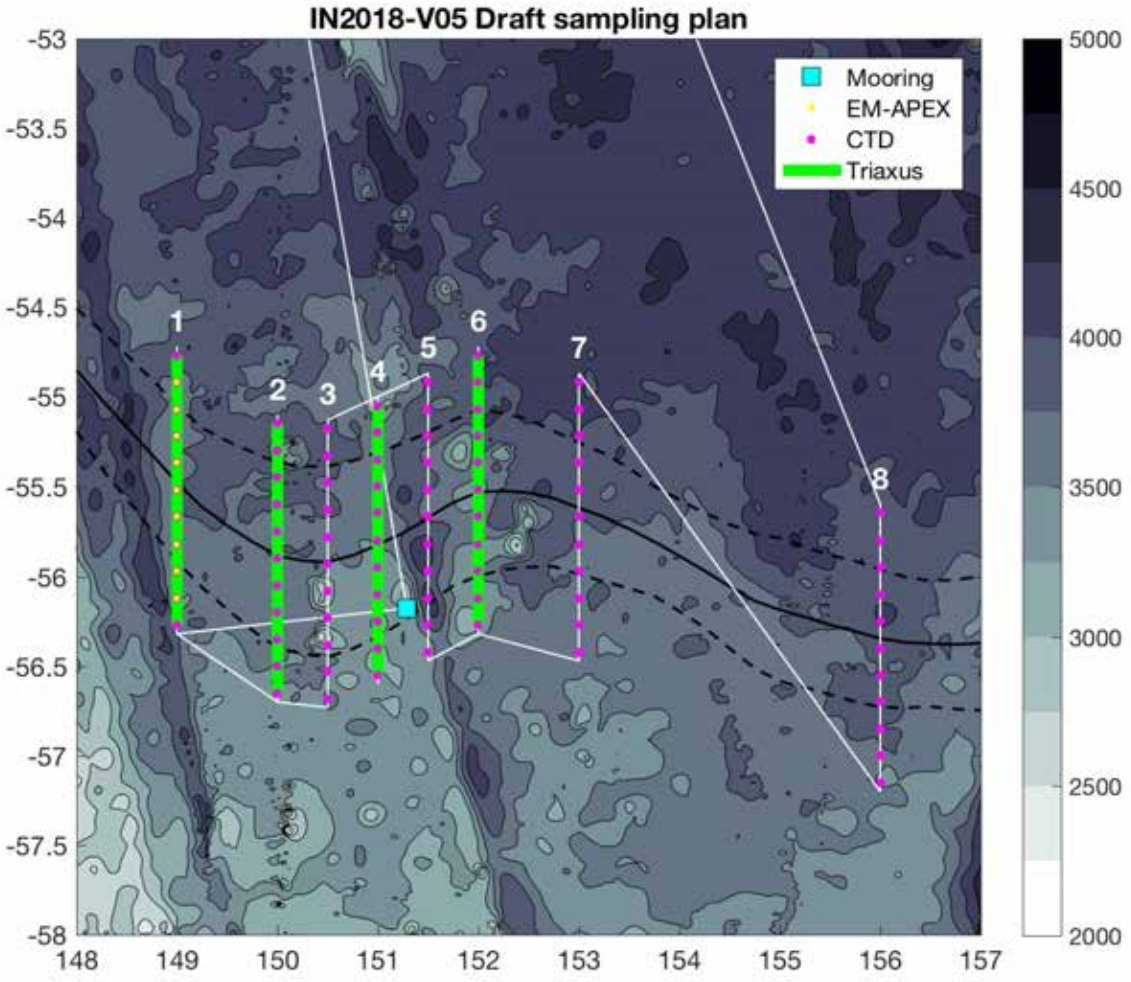
Mid-October to mid-November 2018 Cruise



Shorter time and space scales processes within the tortured large scale ACC

Mid-October to mid-November 2018 Cruise

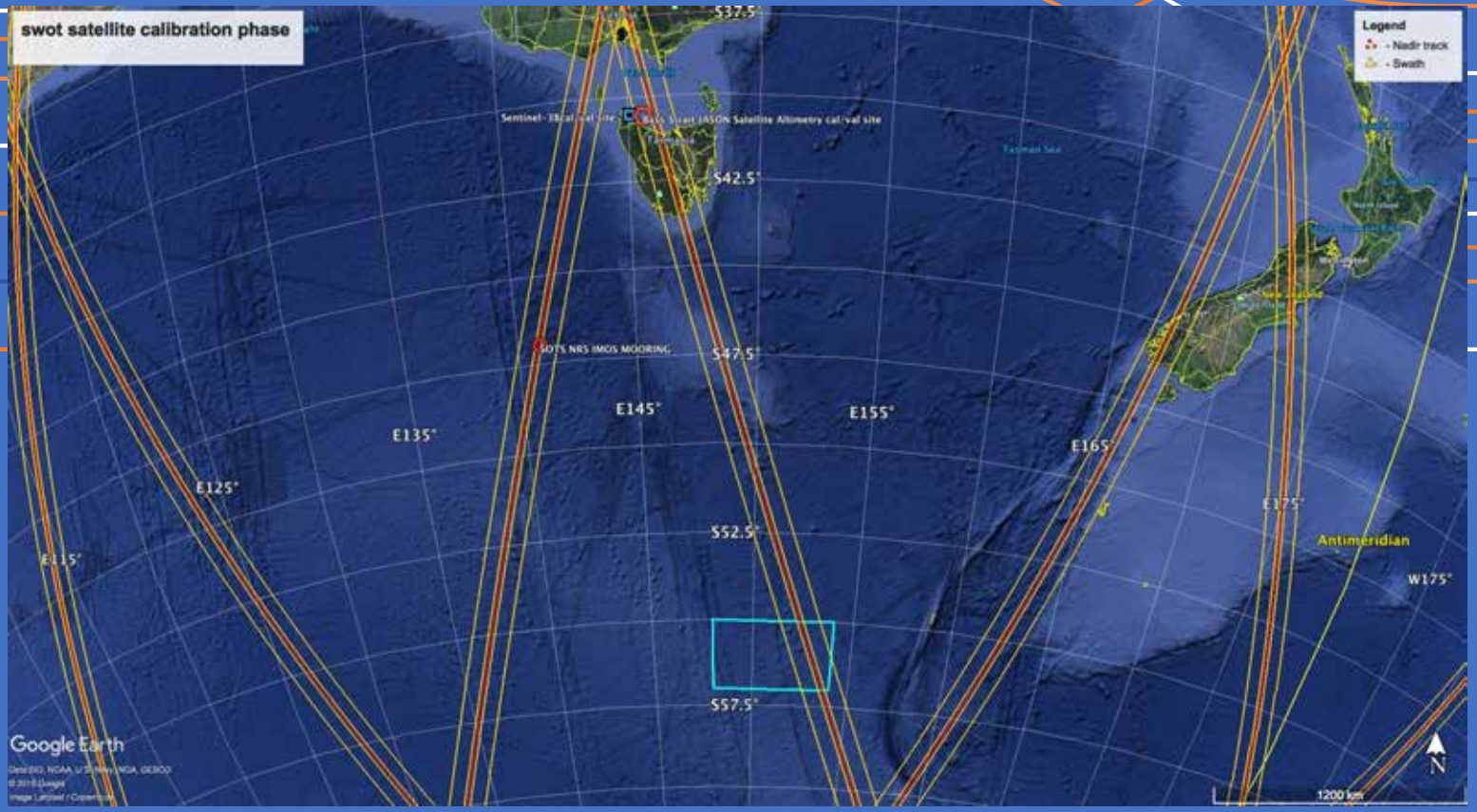


Plan :

- **Deployment of a fleet of EM-APEX profiling floats**
- **Deployment of drifters**
- **88 full depth CTDs**
- **33 Microstructure Vertical Profiles**
- **400km of Triaxus cont. profiling (0-300m)**
- **Deployment of mooring**
- **Station repeat several times over inertial cycles**
- **+BGC sampling**

- **High Res Model**

Sub-mesoscale in the Sub-Antarctic Front what preparation for the SWOT Satellite ?



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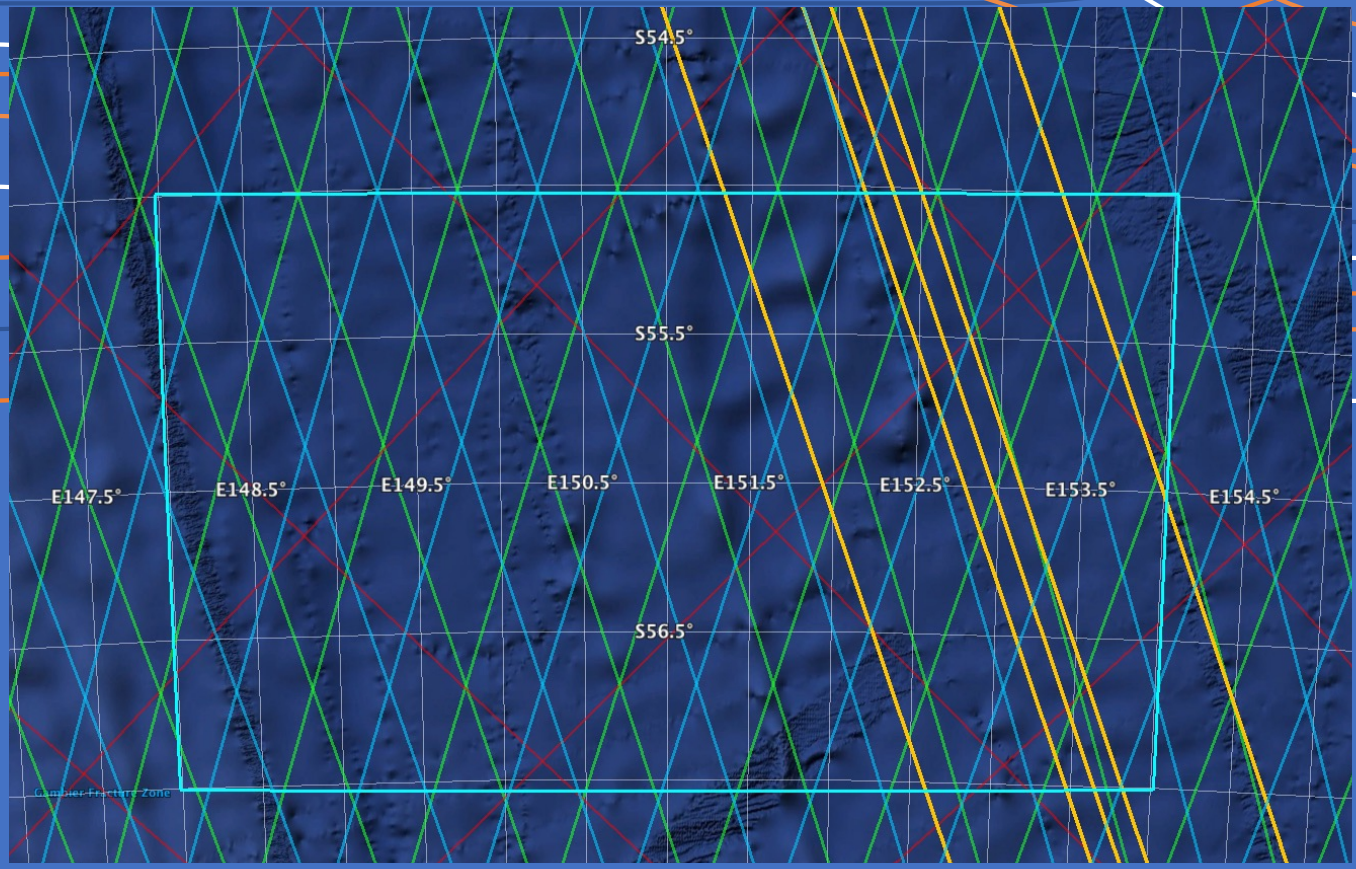

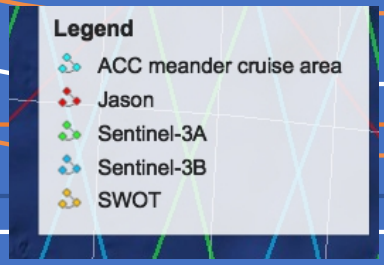

Actions :

- **SWOT meeting**
- **2018 Cruise plan**
- **SWOT validation Science Plan**
- **Feed experience from 2018 cruise into SWOT validation science plan**
- **Prepare MNF application for April 2019 (or earlier)**
- **evaluate possibilities / develop plan of measurements :**

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Challenges :

- Maximize the Science impact
- Optimize the relevance to / benefit from SWOT

- Ideally the big cruise during the 1d cal/val phase
- Mitigate the timing of science operations with season, satellite schedule, ship schedule

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Plan to maximize the success through adversity

Evaluate possibilities / develop plan of measurements :

- Moorings
- CTDs
- Triaxus/seasor/toyo…
- Drifters, what kind ?
- ARGOs, what kind ? classic, BGC, EM-APEX, deep floats ?
- Gliders ?
- AUVs ?
- BGC ?
- Other in situ (air/sea, etc..)?
- Other remote sensing validation/use ?
- Second ship to do the fast profiling ?
- …

Any idea, contribution, aim to collaborate : benoit.legresy@csiro.au

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ADOPT CROSSOVER ADOPTERS !

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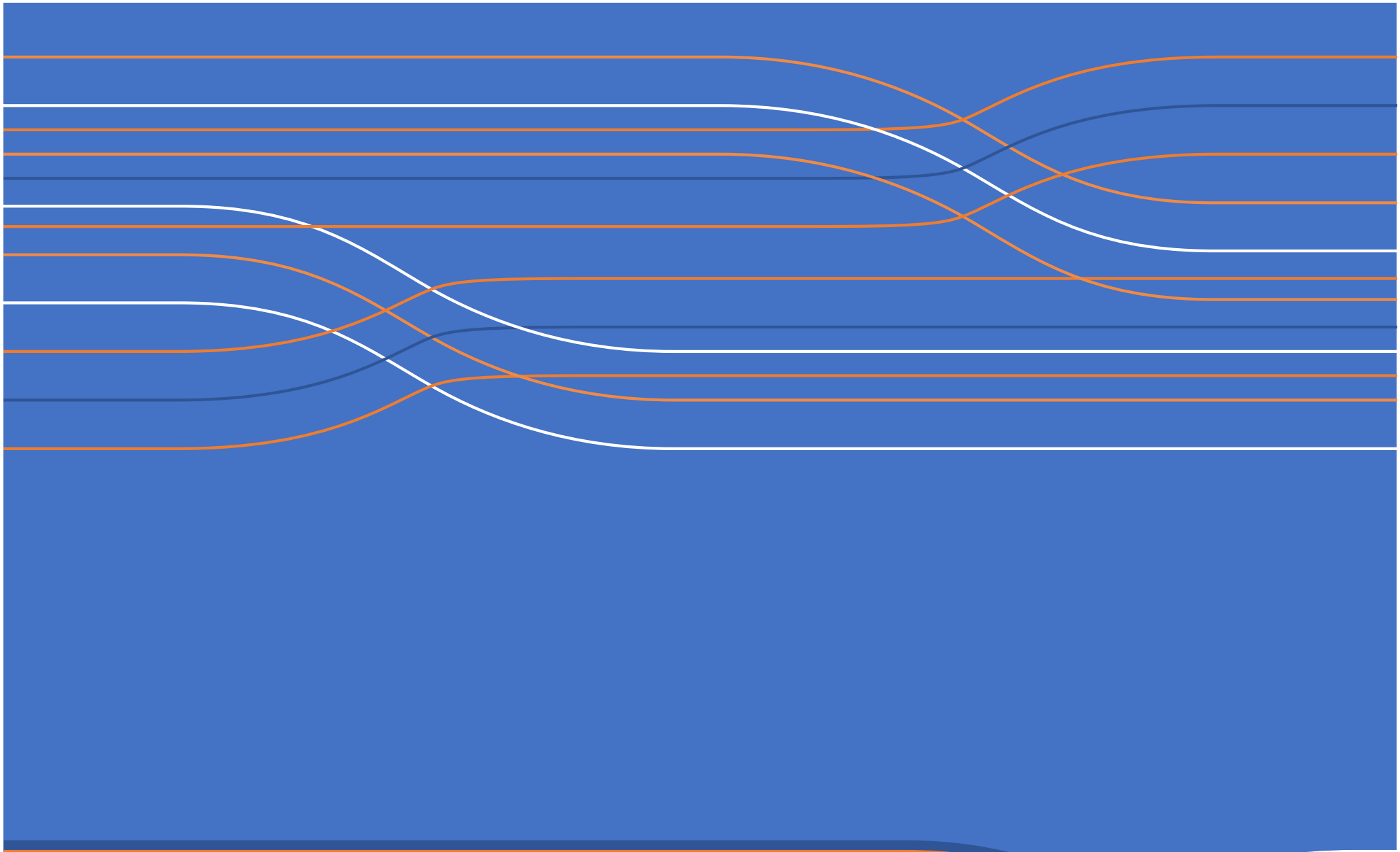


Journal of Geophysical Research: Oceans

RESEARCH ARTICLE
10.1002/2013JC009516

On the nonequivalent barotropic structure of the Antarctic Circumpolar Current: An observational perspective

JGR,2015

H. E. Phillips[1,2] and N. L. Bindoff[1,2,3,4]

Key Points:

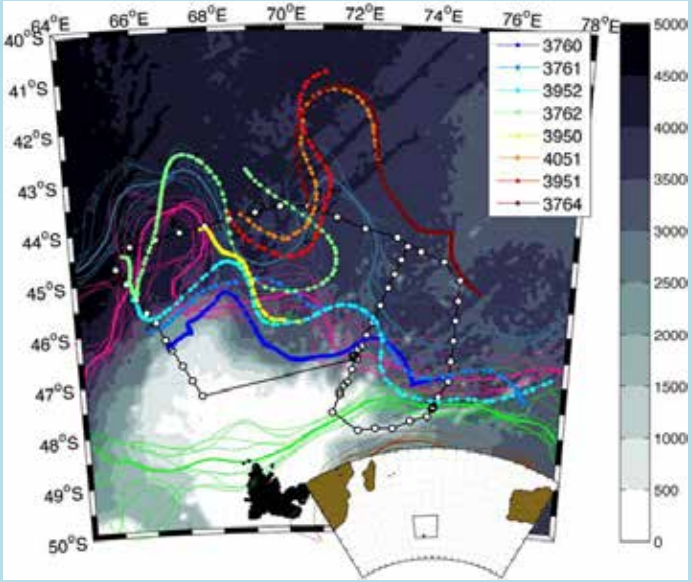


Figure 2. Location of the SOFINE experiment at the northern Kerguelen Plateau. Positions of the CTD/LADCP profiles (white circles) are marked along the ship track. Each profile position along the eight EM-APEX trajectories is shown (colored circles, identified in legend). Color shading is the bathymetry (m) from *Smith and Sandwell* [1997]. Colored contours from north to south mark the location of the northern (gray), central (pink), and southern (green) branches of the Subantarctic Front, and the northern Polar Front (brown) based on *Sokolov and Rintoul* [2009] sea surface height (SSH). Weekly and mean front positions (fine and heavy lines, respectively) are shown for AVISO SSH anomalies over the period 18 November 2008 to 14 January 2009 added to the *Gouretski and Koltermann* [2004] mean dynamic height of 100 dbar relative to 2500 dbar.

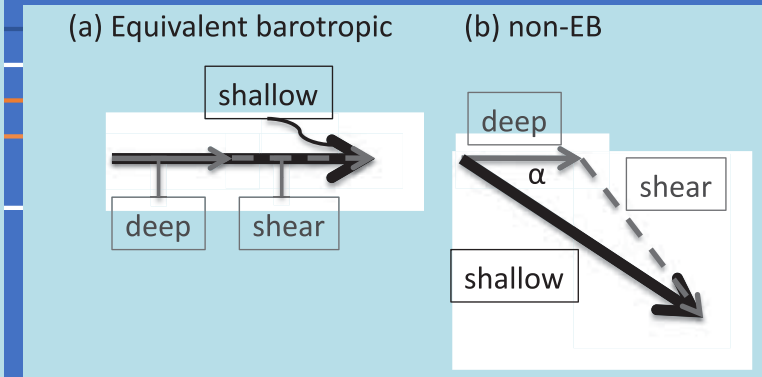


Figure 1. The change in direction of flow from a deep current vector to a shallow one, and the associated vertical shear vector in (a) an equivalent barotropic flow, and (b) a nonequi-

Mesoscale to Submesoscale Wavenumber Spectra in Drake Passage

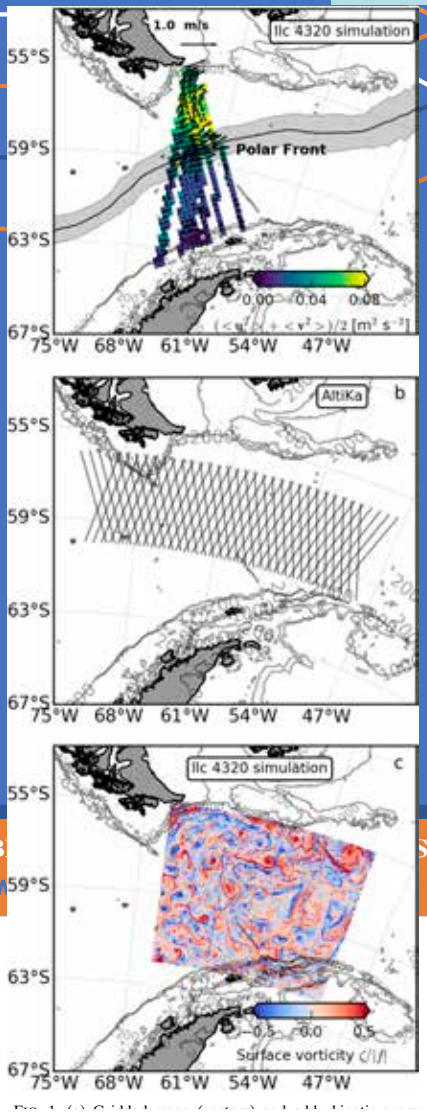
CESAR B. ROCHA, TERESA K. CHERESKIN, AND SARAH T. GILLE

Scripps Institution of Oceanography, University of California, San Diego, La Jolla, California

DIMITRIS MENEMENLIS

Earth Sciences Division, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California

JPO,2016



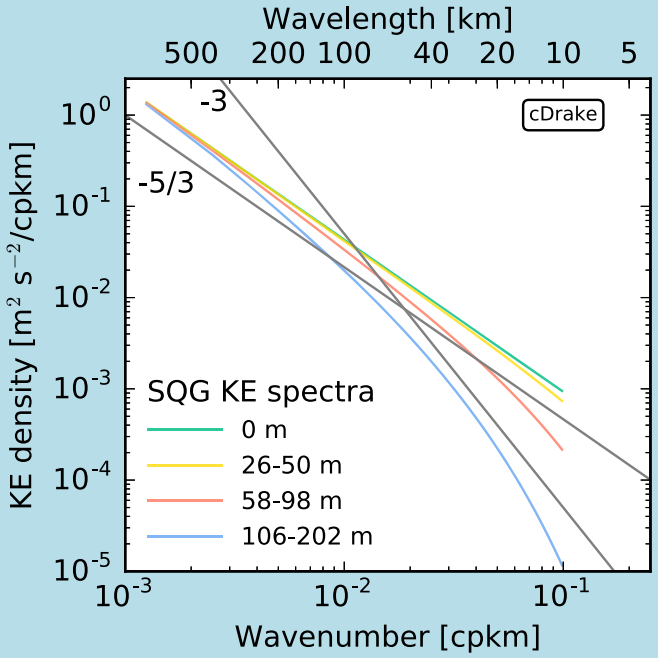


FIG. F1. Depth dependence of SQG-like KE spectra in the range of scales resolved by the ADCP data. The surface spectra follow a $k_h^{-5/3}$ power law. The vertical dependence is computed from the SQG solution's vertical structure for each k_h given the global average stratification from the cDrake experiment. Colors represent spectra in different layers used in computing the ADCP and llc4320 spectral estimates.

SCIENTIFIC REPORTS

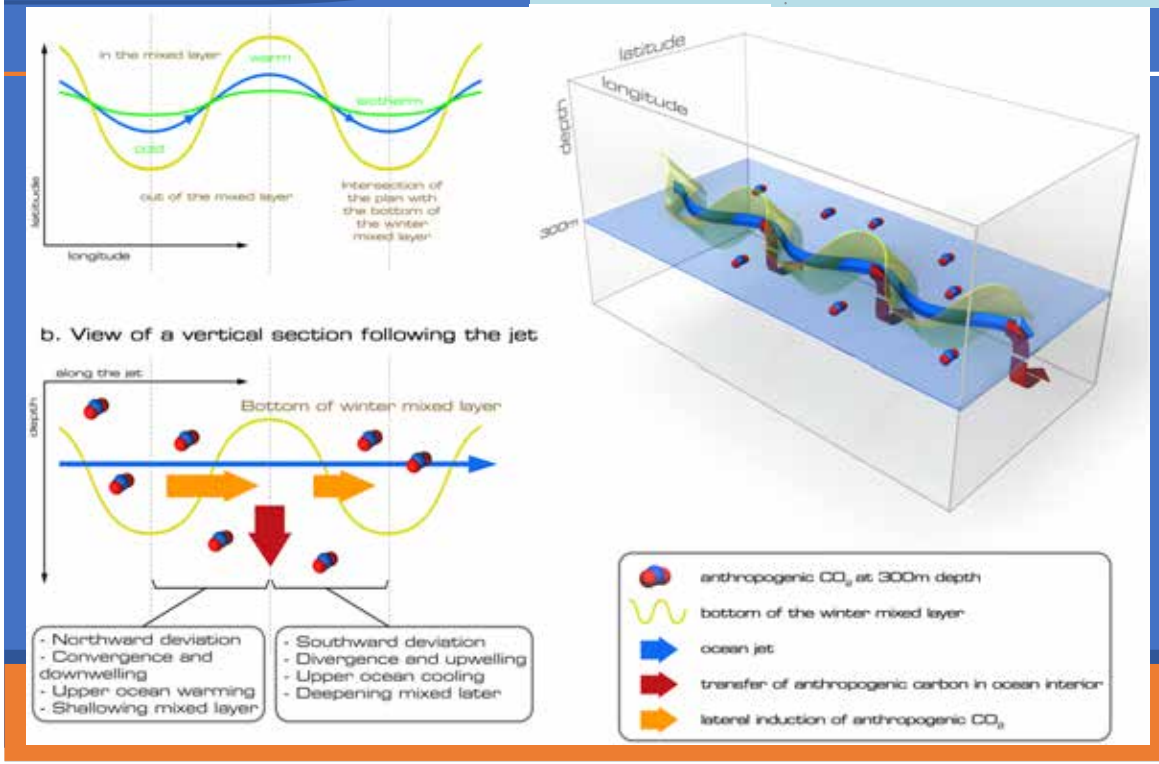
2017

OPEN

Stationary Rossby waves dominate subduction of anthropogenic carbon in the Southern Ocean

d: 7 July 2017
d: 23 November 2017

C. E. Langlais[1], A. Lenton[1,2,3], R. Matear[1], D. Monselesan[1], B. Legresy[1,2], E. Cougnon[2,4] & S. Rintoul[1,2,3]



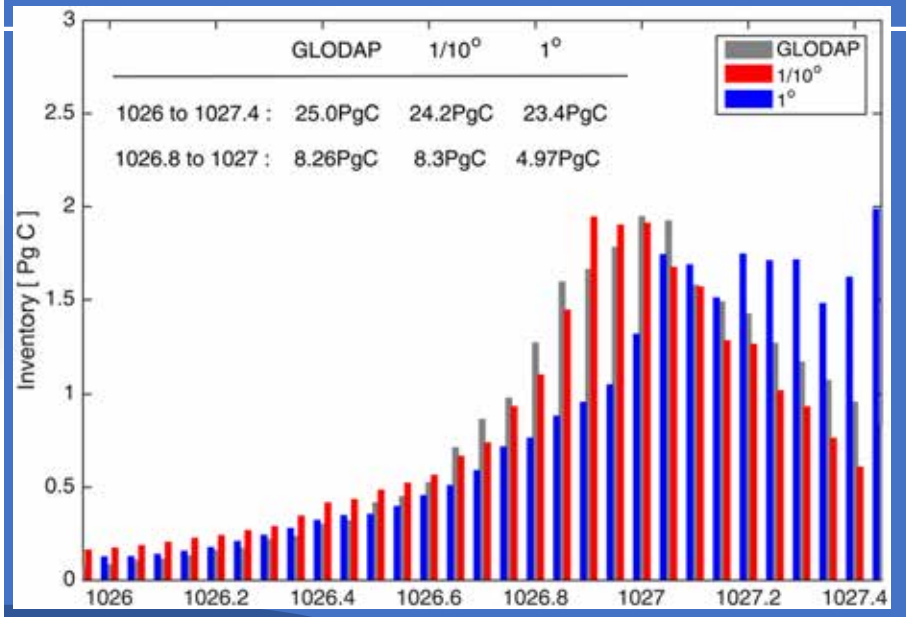


Figure 4. Schematic of the Stationary Rossby Wave-induced anthropogenic carbon transfer: 3 different views of the transfer: horizontal plan (**a**), vertical section along the meandering jet (**b**) and 3D view (**c**). The meander

SCIENCE ADVANCES | RESEARCH ARTICLE

OCEANOGRAPHY

2018

Submesoscale Rossby waves on the Antarctic circumpolar current

John R. Taylor,[1]* Scott Bachman,[2] Megan Stamper,[1] Phil Hosegood,[3] Katherine Adams,[4] Jean-Baptiste Sallee,[5] Ricardo Torres[6]

The eastward-flowing Antarctic circumpolar current (ACC) plays a central role in the global ocean overturning circulation and facilitates the exchange of water between the ocean surface and interior. Submesoscale eddies and fronts with scales between 1 and 10 km are regularly observed in the upper ocean and are associated with strong vertical

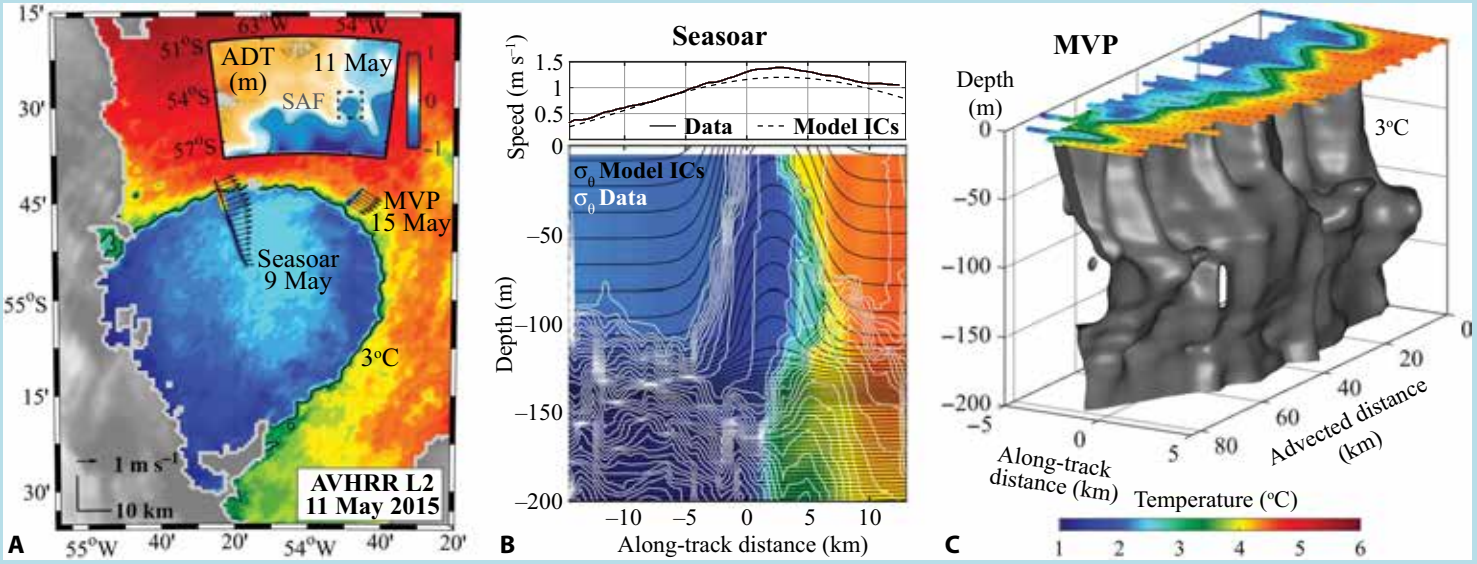


Fig. 1. SeaSoar section and MVP survey. (**A**) Map of survey site with temperature (color, main panel) and Absolute Dynamic Topography (ADT), and locations of the Seasoar section and MVP survey with surface temperature (colored dots) and surface velocity vectors. (**B**) Seasoar section from 9 May with depth-averaged along-front current speed (top)

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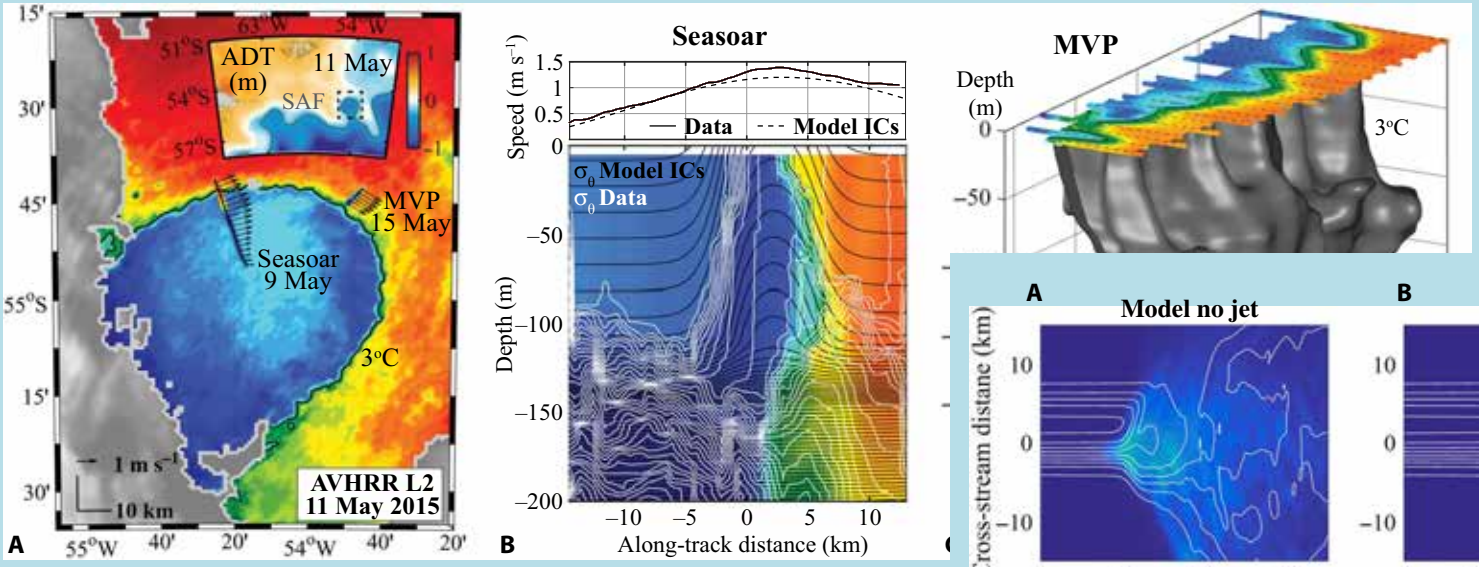

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