

Ocean Surface Topography Science Team Meeting (OSTST)

19-23 October, 2020

Virtual meeting

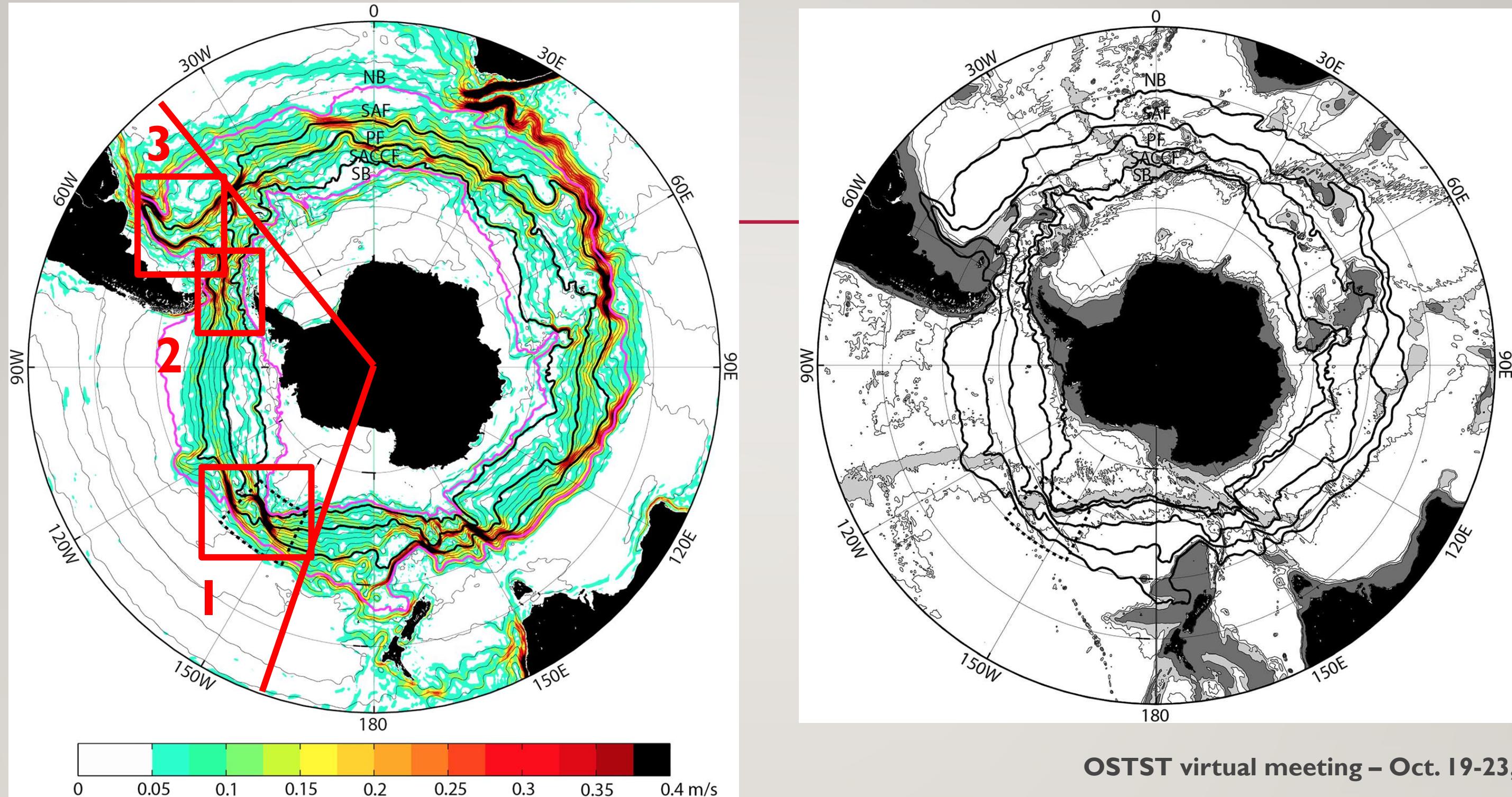


PHANTOM: On the ACC between 160°W and 40°W

C. Artana, C. Provost, Y.H. Park, N. Sennéchael, L. Poli, I. Durand,
C. Bricaud, J.M. Lellouche, G. Garric, M.H. Rio, I. Pujol, M. Ballarota
R. Ferrari, T. Park, T.-W. Kim, S.-H. Lee, C.-S. Hong, J.H. Lee



PHANTOM: On the ACC between 160°W and 40°W. from Udintsev Fracture Zone to the Malvinas Current via Drake Passage



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Mean Dynamic Topography (light black lines every 0.1 m) of the Southern Ocean from the CNES-CLS- 2018 MDT.

Thick black lines stand for 3 major ACC fronts, from the north: SAF $\equiv -0.10$ m, PF $\equiv -0.58$ m, and SACCF $\equiv -1.00$ m.

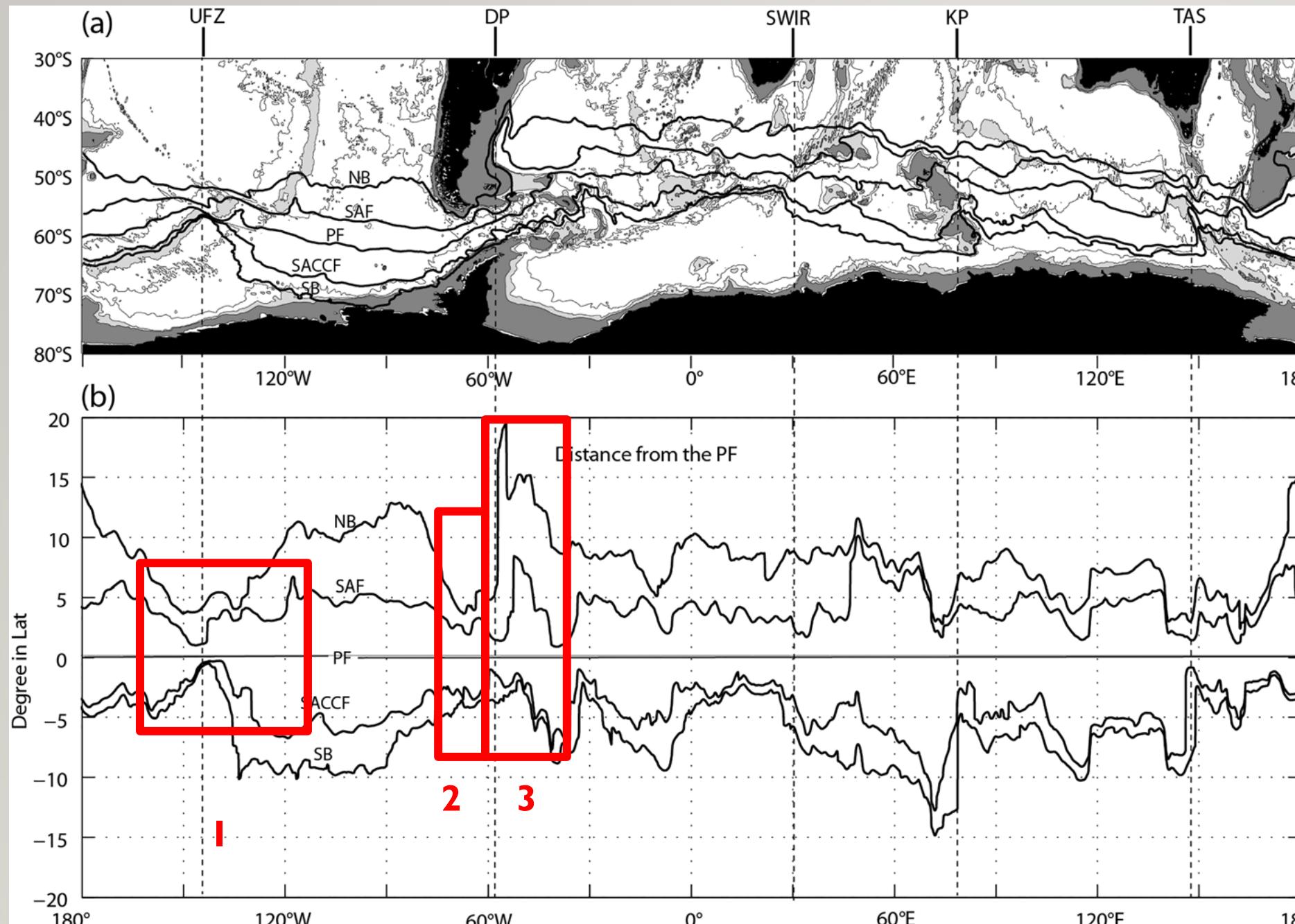
The northern boundary (NB) and southern boundary (SB) of the ACC (NB $\equiv 0.30$ m, SB $\equiv -1.11$ m) are indicated with thick magenta lines.

The intensity of surface geostrophic currents is shown with color (m/s).

NB = northern boundary; SAF = Subantarctic Front; PF = Polar Front; SACCF = Southern Antarctic Circumpolar Current Front; SB = southern boundary

To the right: mean location of ACC fronts and prominent topographic features. Isobaths 2,000, 3,000, and 4,000m are indicated, and depths shallower than 2,000 (3,000) m are heavily (lightly) shaded.

1 Udinstev Fracture Zone the ACC at its narrowest latitudinal extent



RECOVERY CRUISE OF INSTRUMENTATION/ EARLY 2018
ON BOARD KOREAN ICEBREAKER ARAON

(a) The 5 ACC fronts with topography on a Mercator projection.

Major five choke points are indicated, from the west: UFZ = Udintsev Fracture Zone; DP = Drake Passage; SWIR = Southwest Indian Ridge; KP = Kerguelen Plateau; TAS = Tasmania.

(b) Meridional distance (y axis, degree in latitude) of each front from the Polar Front (PF) as a function of longitude (x axis).

Park et al., 2019

I.THE ACC AT THE UDINTSEV FRACTURE ZONE

- See presentation by Park et al.,:

Low-frequency variability of Antarctic Circumpolar Current transport in the Pacific sector centered at the Udintsev/Eltanin Fracture Zones and concurrent atmospheric forcing

(Science II: Large Scale Ocean Circulation Variability and Change)

2. THE ACC AT DRAKE PASSAGE

- See presentation by Artana et al., :

Twenty-five years of Mercator ocean reanalysis GLORYS12 at
Drake Passage: performance and ACC total volume transport
(Science II: Large Scale Ocean Circulation Variability and Change)

3. MALVINAS CURRENT

- Artana et al., 2019 presentation:

Revisiting the MC from its source (Drake Passage) to th Confluence with the Brazil Current

(Science II: Large Scale Ocean Circulation Variability and Change)

- Poli et al., 2020 presentation:

Anatomy of subinertial waves along the Patagonian shelf break in a $1/12^\circ$ global ocean reanalysis

(Science III: Mesoscale and sub-mesoscale oceanography)

PUBLICATIONS:

- Artana C., R.Ferrari, C. Bricaud, J.-M., Lellouche, G. Garric, N. Sennéchael, J.-H. Lee, Y.-H. Park, and C. Provost (2019). Twenty-five years of Mercator ocean reanalysis GLORYS12 at Drake Passage: velocity assessment and total volume transport, *Advances in Space Research*, doi:[10.1016/j.asr.2019.11.033](https://doi.org/10.1016/j.asr.2019.11.033).
- Artana C., C. Provost, J.M. Lellouche, M.H. Rio, R. Ferrari, N. Sennéchael, (2019). The Malvinas Current at its Confluence with the Brazil Current: inferences from 25 years of satellite altimetry and Mercator Ocean reanalysis, *Journal of Geophysical Research: Oceans*, doi:[10.1029/2019JC015289](https://doi.org/10.1029/2019JC015289).
- Artana C., Lellouche, J.M, Sennéchael, N. And C. Provost (2018). The open-ocean side of the Malvinas Current in Argo floats and 24 years of Mercator Ocean high resolution (I/12) physical reanalysis. *Journal of Geophysical Research: Oceans*, doi:[10.1029/2018JC014528](https://doi.org/10.1029/2018JC014528).
- Artana, C., Lellouche, J.M., Park, Y-H., Garric, G., Koenig, Z., Sennéchael, N., Ferrari, R., Piola, A.R., Saraceno, M. and Provost, C., (2018). Fronts of the Malvinas Current System: surface and subsurface expressions revealed by satellite altimetry, Argo floats, and Mercator operational model output. *Journal of Geophysical Research: Oceans*, doi: [10.1029/2018JC013887](https://doi.org/10.1029/2018JC013887).
- Artana, C., Ferrari, R., Koenig, Z., Sennéchael, N., Saraceno, M., Piola, A. R., & Provost, C. (2018). Malvinas Current Volume Transport at 41° S: A 24 Yearlong Time Series Consistent with mooring data from 3 decades and satellite altimetry. *Journal of Geophysical Research: Oceans*, 123(1), 378-398, doi:[10.1002/2017JC013600](https://doi.org/10.1002/2017JC013600).
- Artana, C., Ferrari, R., Koenig, Z., Saraceno, M., Piola, A. R., Provost, C. (2016). Malvinas Current variability from Argo floats and satellite altimetry. *Journal of Geophysical Research: Oceans*, 121(7), 4854-4872, doi :[1002/2016JC011889](https://doi.org/10.1002/2016JC011889)
- Park, Y.-H., Park, T., Kim, T.-W., Lee, S.-H., Hong, C.-S., Lee, J.-H., M.-H. Rio, M.-I. Pujol, M. Ballarotta, I. Durand, and C. Provost (2019). Observations of the Antarctic Circumpolar Current over the U dintsev Fracture Zone, the narrowest choke point in the Southern Ocean. *Journal of Geophysical Research: Oceans*, doi:[10.1029/2019JC015024](https://doi.org/10.1029/2019JC015024)
- Park et al. (in prep.) Low-frequency variability of Antarctic Circumpolar Current transport in the Pacific sector and concurrent atmospheric forcing (in prep)
- Poli L.,Artana C., Provost C., Sirven J., Sennéchael N., Cuyers Y. and J.M. Lellouche (2020) Anatomy of subinertial waves along the Patagonian shelf break in a 1/12{degree sign} global operational model. *Journal Geophysical Research: Oceans* (revised) doi:[10.1029/2020JC016549](https://doi.org/10.1029/2020JC016549)
- Rio M.H., S. Mulet, H. Etienne, C.Artana, M. Cancet, G. Dibarboure, H. Feng, N. Picot, C. Provost, P.T. Strub (2020) The new CNES-CLS18 Global Mean Dynamic Topography.