

# First Insights From SWOT Fast Sampling Phase: High Frequency Coastal Trapped Waves Over the Patagonian Shelf

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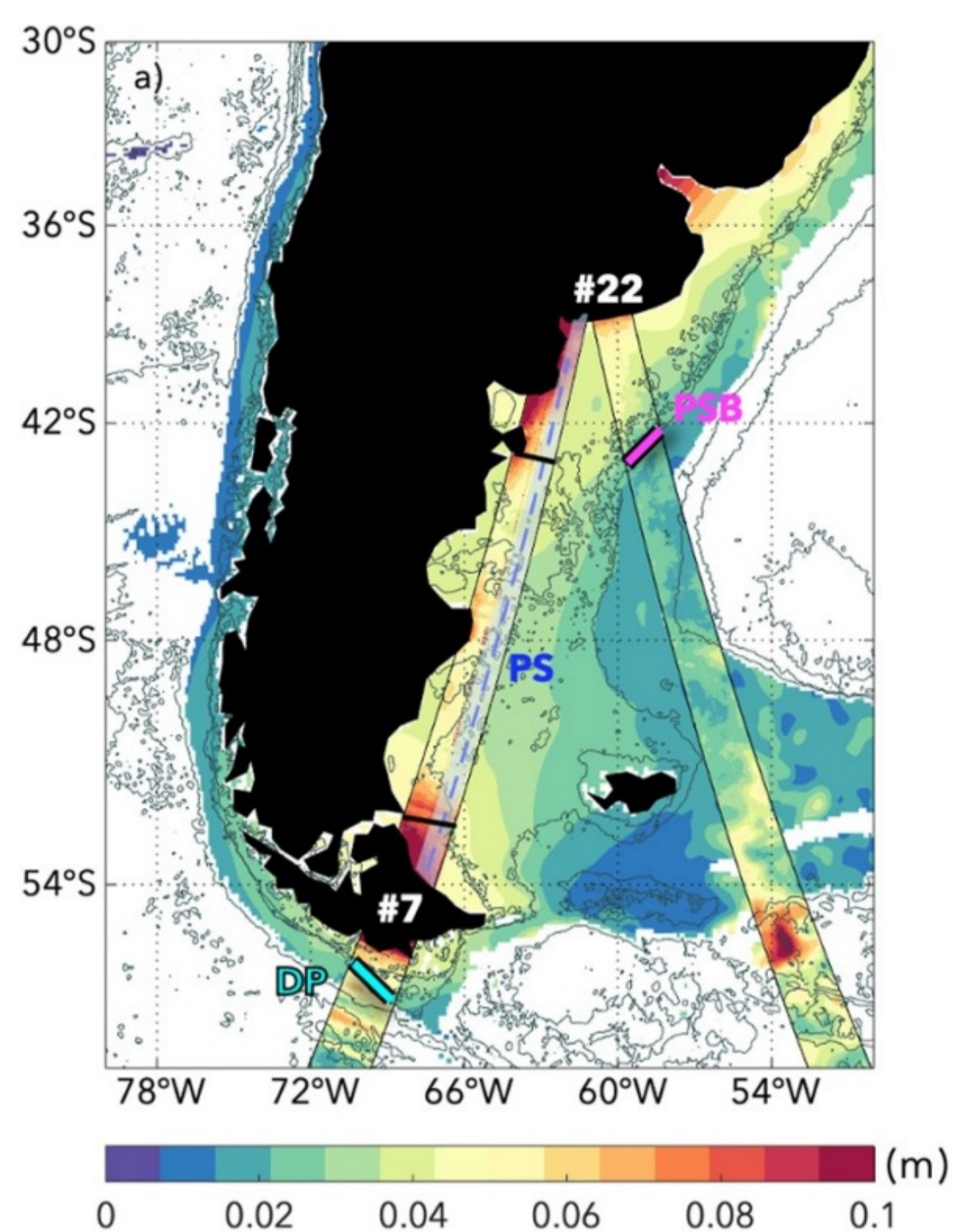
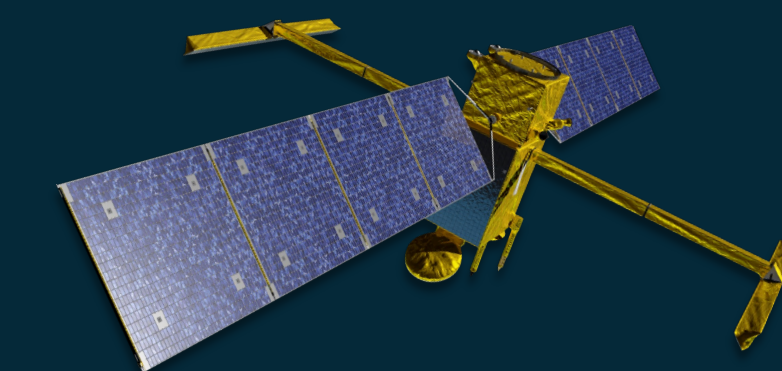


Figure 1 : Standard deviation of high-pass filtered (<20days) SLA (MIOST/SWOT.)

- The Patagonian Shelf is one of the widest continental shelves in the world ocean and hosts **Coastal Trapped Waves (CTWs)** and one of the **strongest tidal regimes** of the world ocean.
- The daily repeated phase of SWOT provides an unprecedented opportunity to examine rapidly changing signals over the Patagonian Shelf.
- We combine **SWOT measurement** with **MIOST** product to contextualize the SWOT observations that have limited spatial coverage.
- We focus on high-frequency (<20 days) sea surface height variability (Figure 1) :

## A Coastal trapped waves (long wavelength)

## B Shorter wavelength signals

### A Coastal trapped waves (long wavelength)

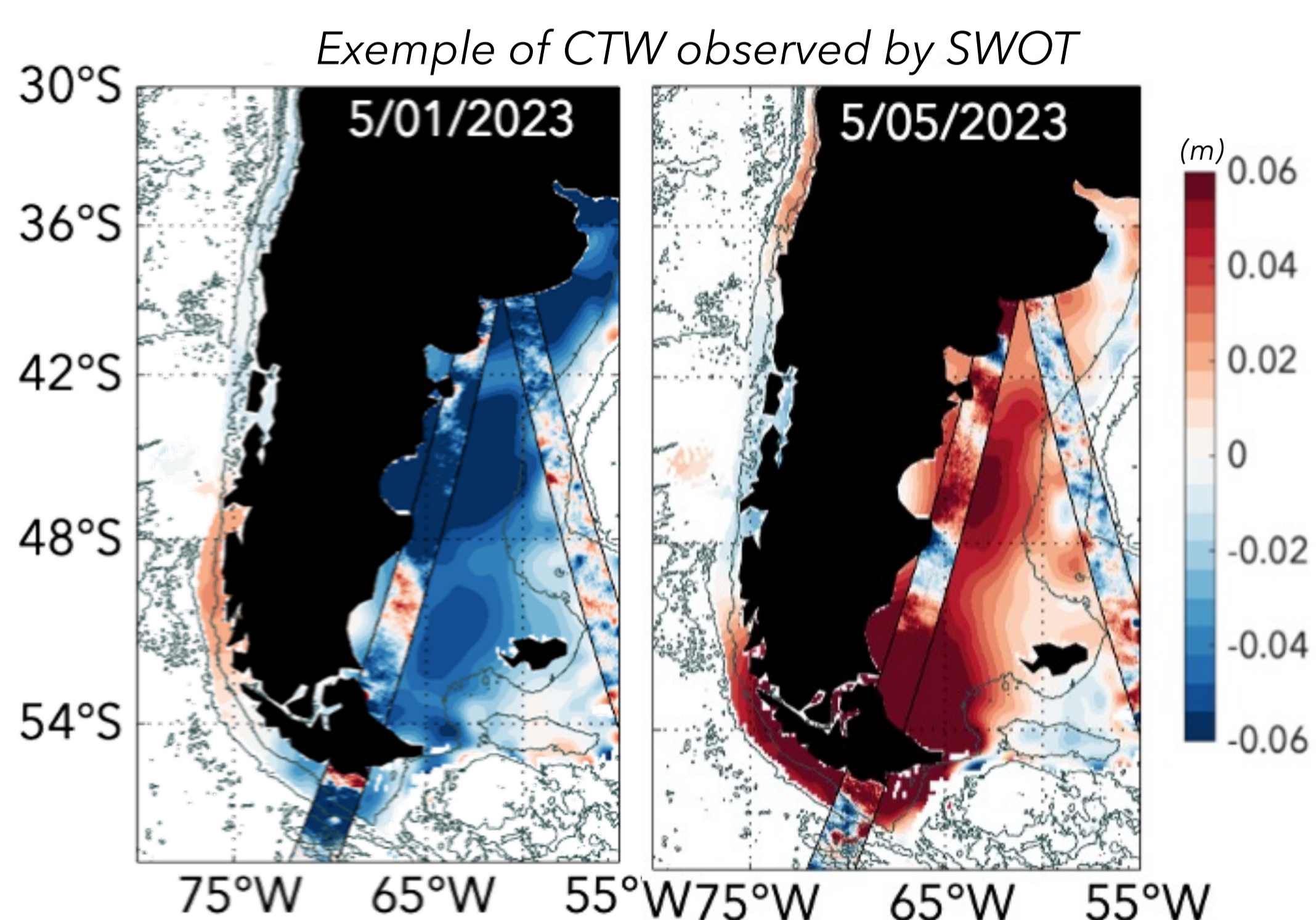


Figure 2 : Snapshots of an event with superimposed signals with a smaller scale visible in the SWOT swaths

- The variance at period shorter than 20 days is dominated by coastal trapped waves (62% of the variance).
- Period of 8-10 days, 4000km wavelength phase velocity between 5 and 13 m/s (Figure 2 and 3b).
- Wind bursts along the Pacific side contribute to their generation (Figure 3c).

Statistic over the period (April-July 2023)

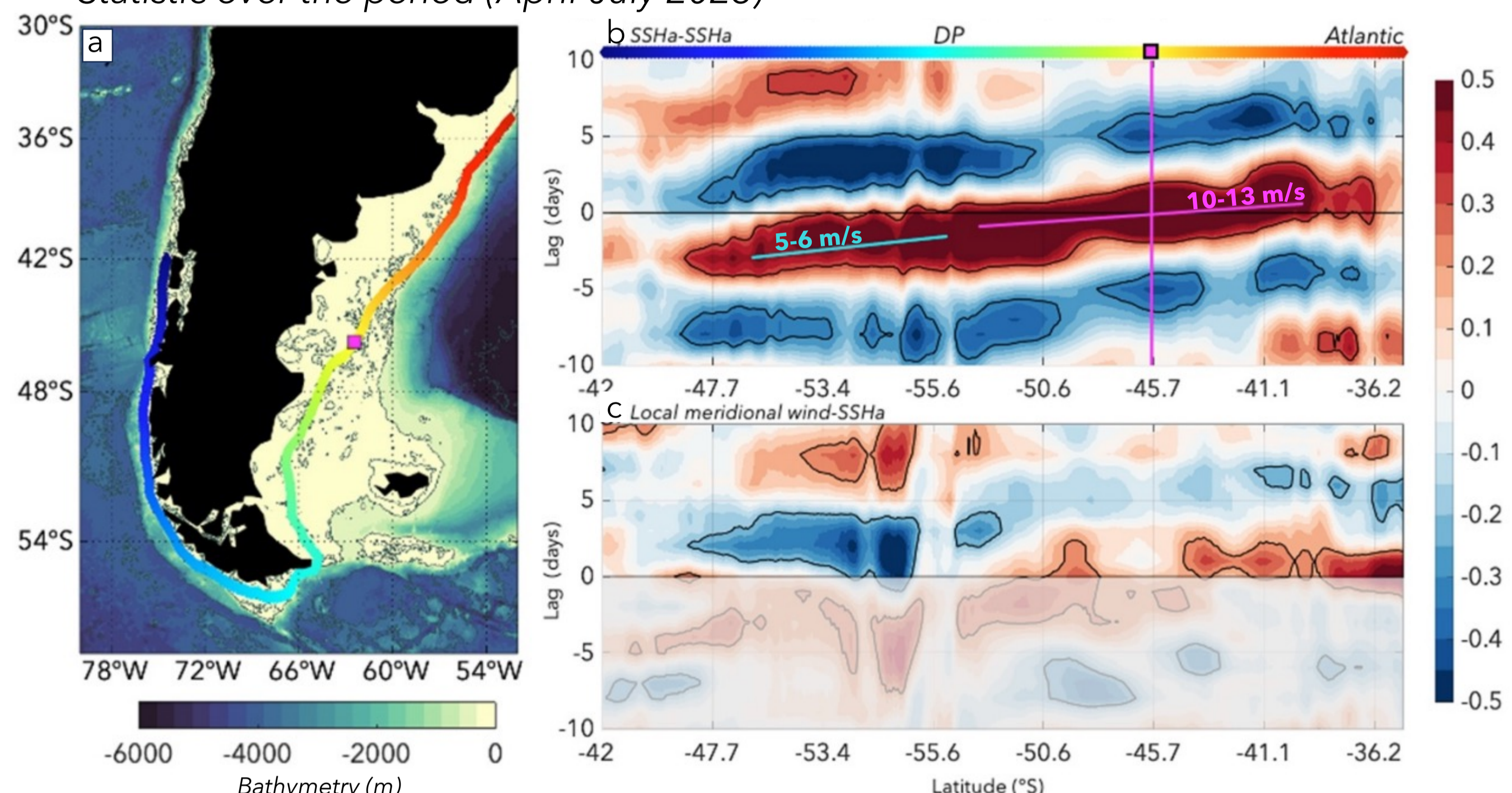


Figure 3 : a) Path along the 100m isobath. b) Lagged correlation diagram : high-frequency MIOST SSHa at -45.7° and high-frequency MIOST SSHa c) Lagged correlation: meridional wind and MIOST SSHa.

### B Shorter wavelength signals

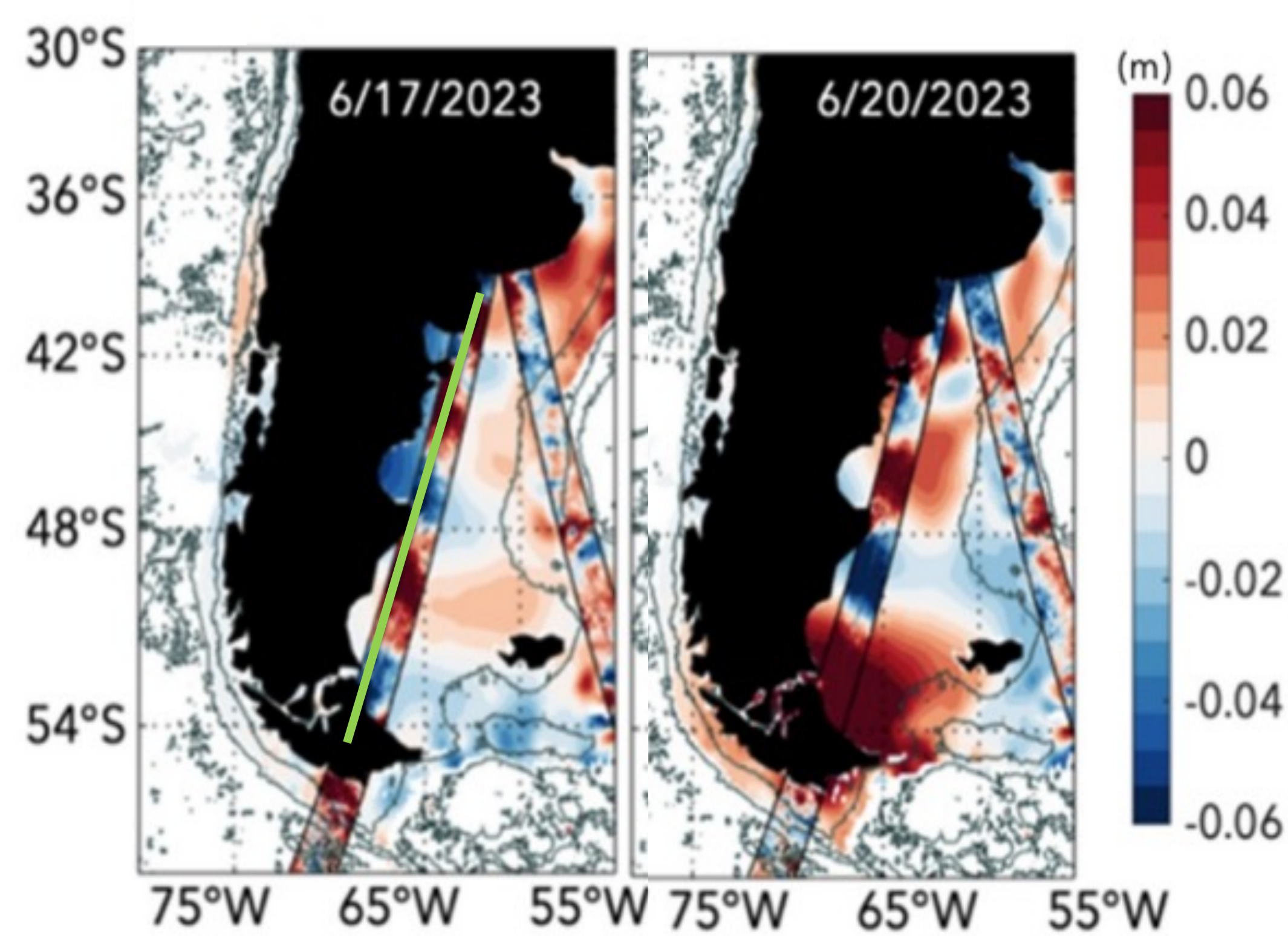


Figure 4 : Filtered SLA snapshots of MIOST product in the background and for SWOT

- Southward propagation velocities of around **0.8 m/s** and period of approximately **10-12 days** (period of tidal aliasing)
- Spatial scale of **300-km** (Figure 4): same spatial scales of semidiurnal tides and associated resonances → **Imperfect tidal correction ?**

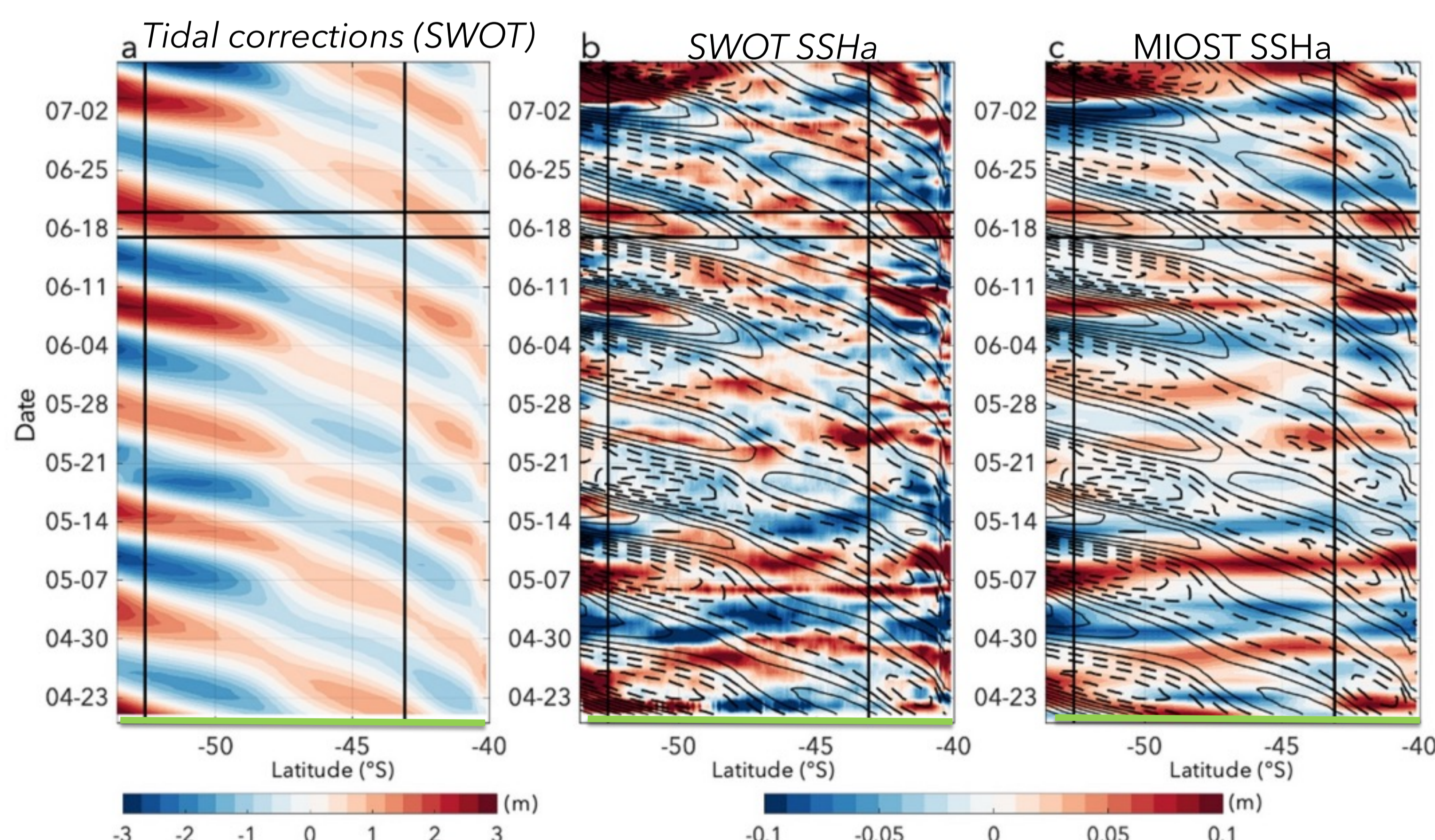


Figure 4 : Time-Latitude diagram along the Patagonian Shelf of : a) the tidal correction applied to the SWOT Data b-c) Background b) SWOT c) MIOST and contours of the tidal correction of the panel a.

- The SWOT daily repeated phase provides observational evidence of CTWs along the Patagonian Platform with **periods of 8-10 days** and **wavelengths of 4000 km**.
- CTW are forced by wind burst along the Pacific side of south America.
- Other important signals with an **apparent southward propagation in SWOT data** are probably related to imperfect tidal corrections.