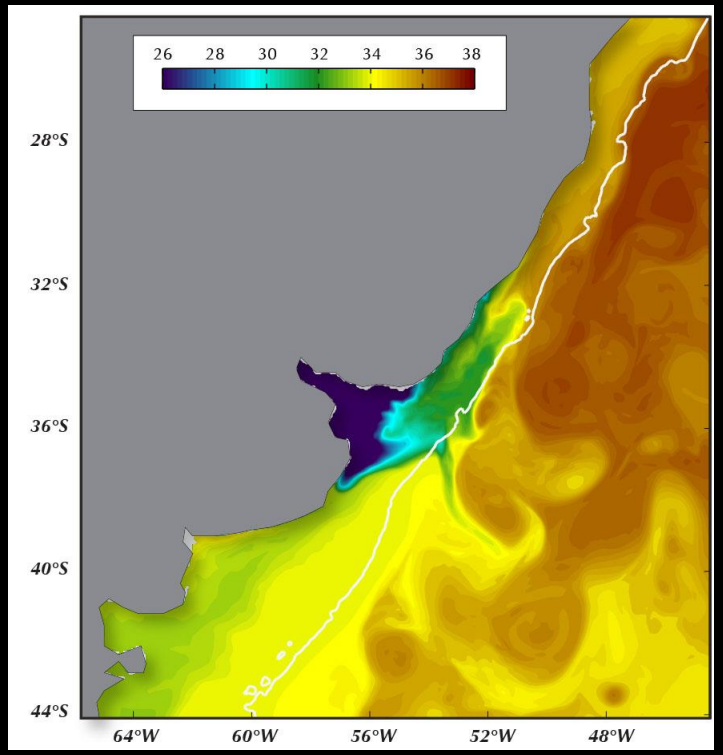
The Salinity Signal of the Shelf/Deep-Ocean Exchanges in the Southwestern Atlantic Region: Numerical Simulations

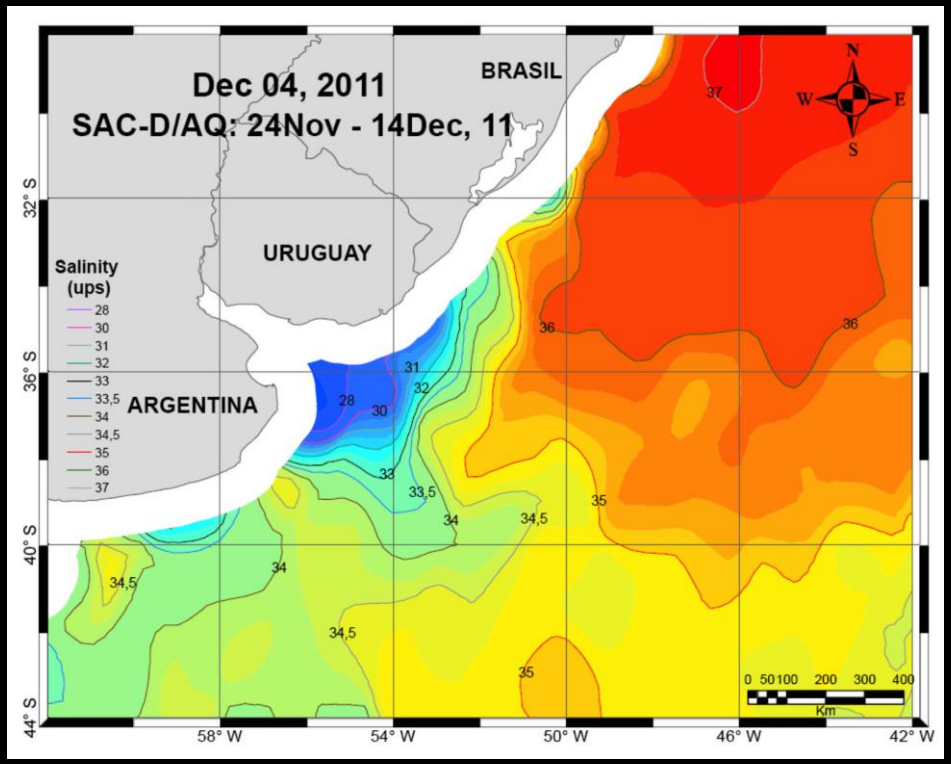
R. Matano , V. Combes, E. Palma, R. Guerrero , H. Fenco, T. Strub

A. R. Piola R., Y. Chao, M. Saraceno

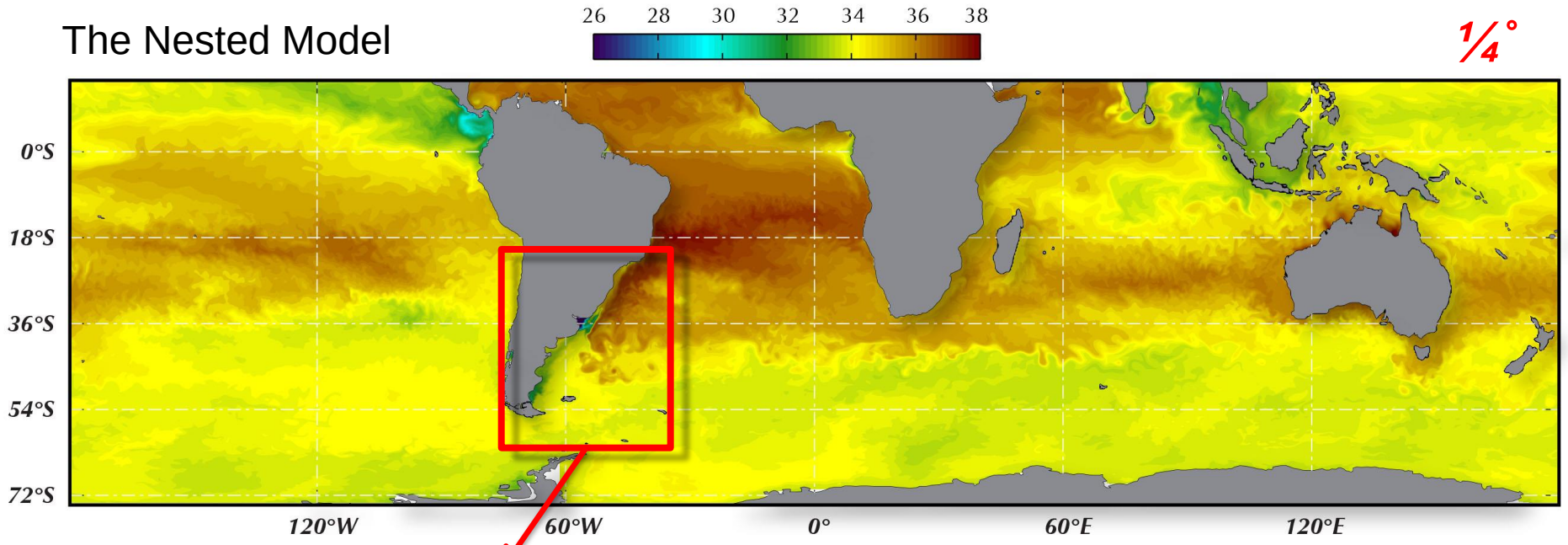
Model

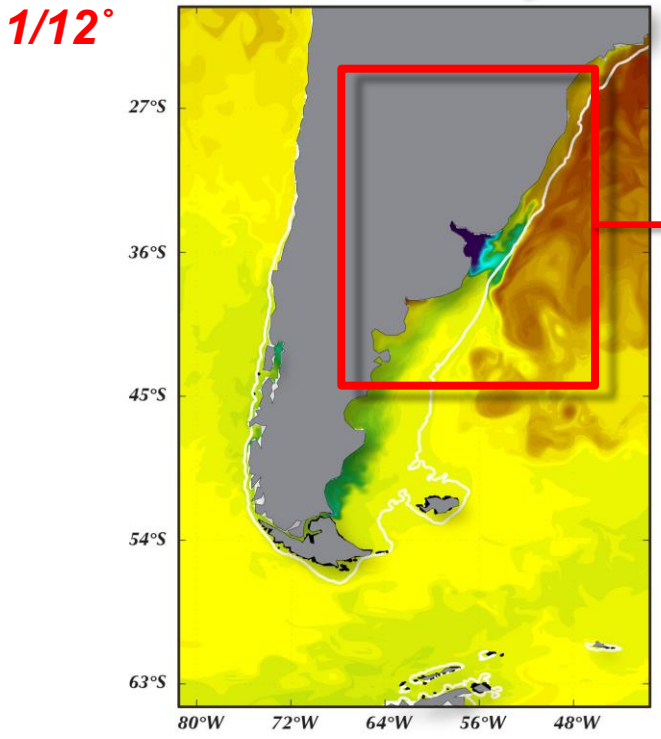


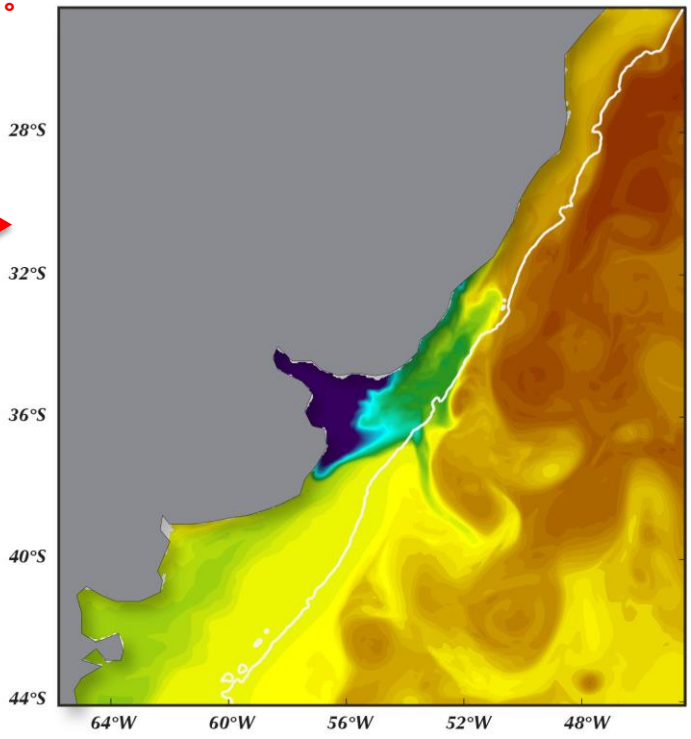
Aquarius

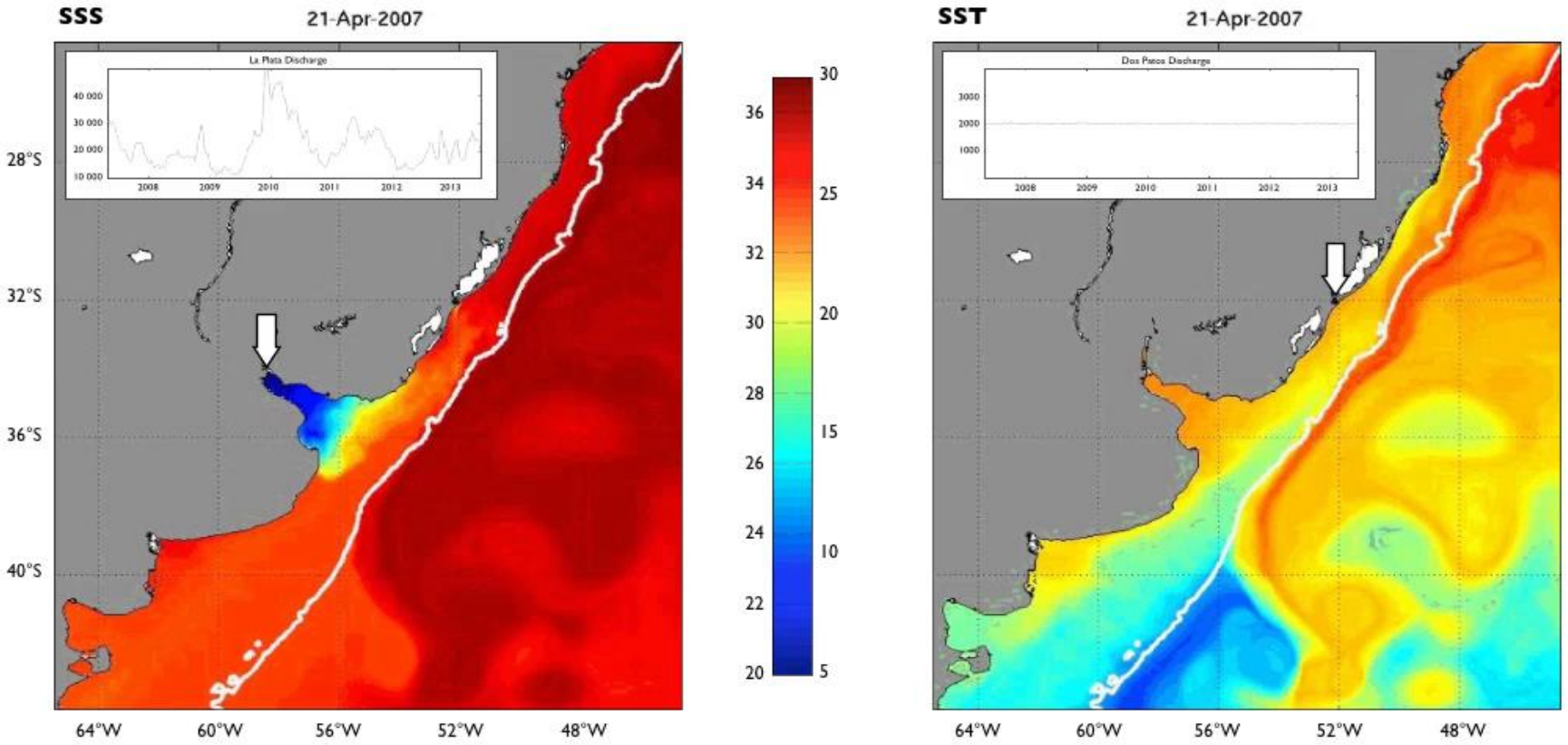


The Nested Model



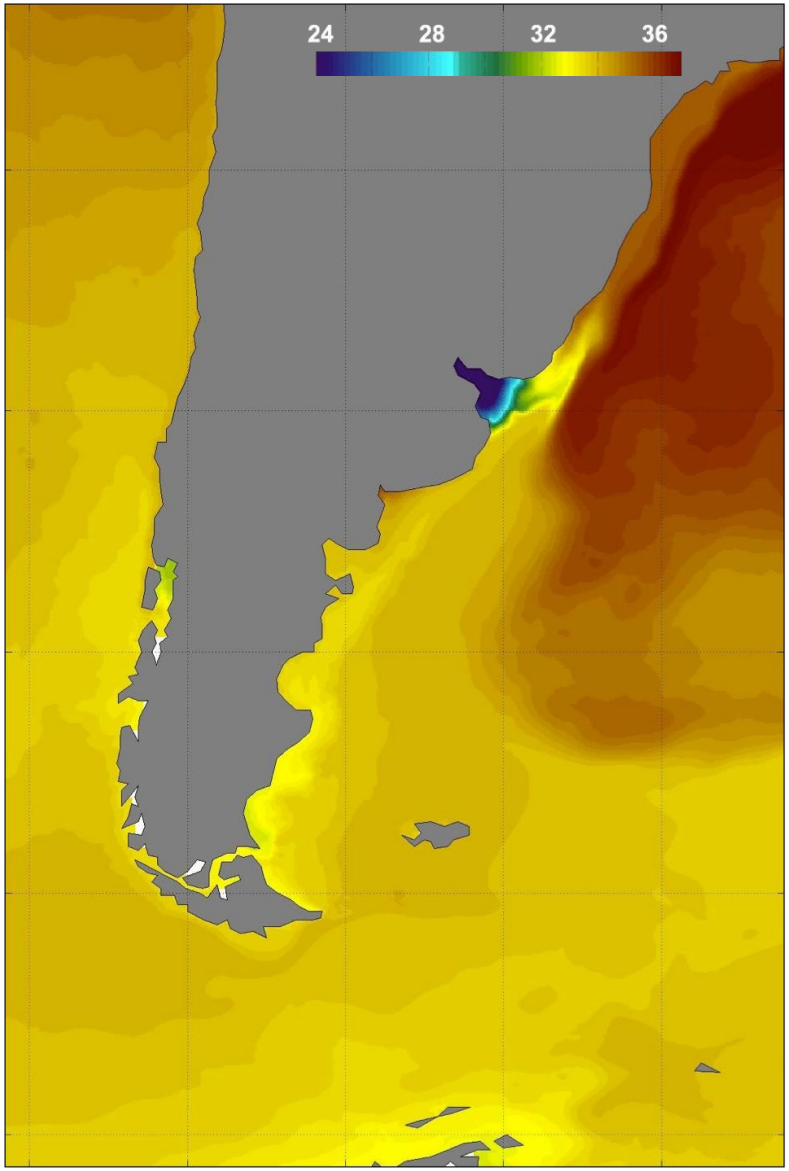




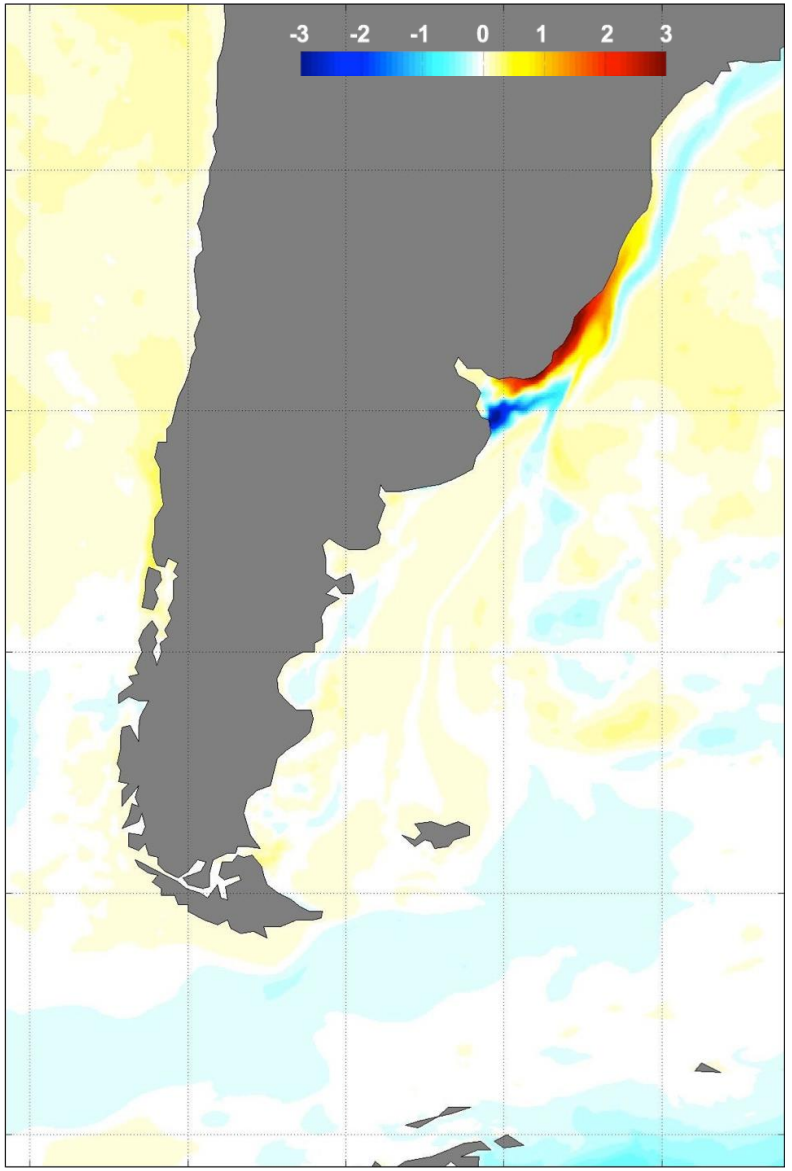

SSS
21-Apr-2007
La Plata Discharge
40 000
30 000
20 000
10 000
2008
2009
2010
2011
2012
2013
28°S
32°S
36°S
40°S
64°W
60°W
56°W
52°W
48°W
36
34
32
30
28
26
24
22
20
30
25
20
15
10
5
SST
21-Apr-2007
Dos Pasos Discharge
3000
2000
1000
2008
2009
2010
2011
2012
2013
64°W
60°W
56°W
52°W
48°W

The Seasonal Cycle: January—March

SSS

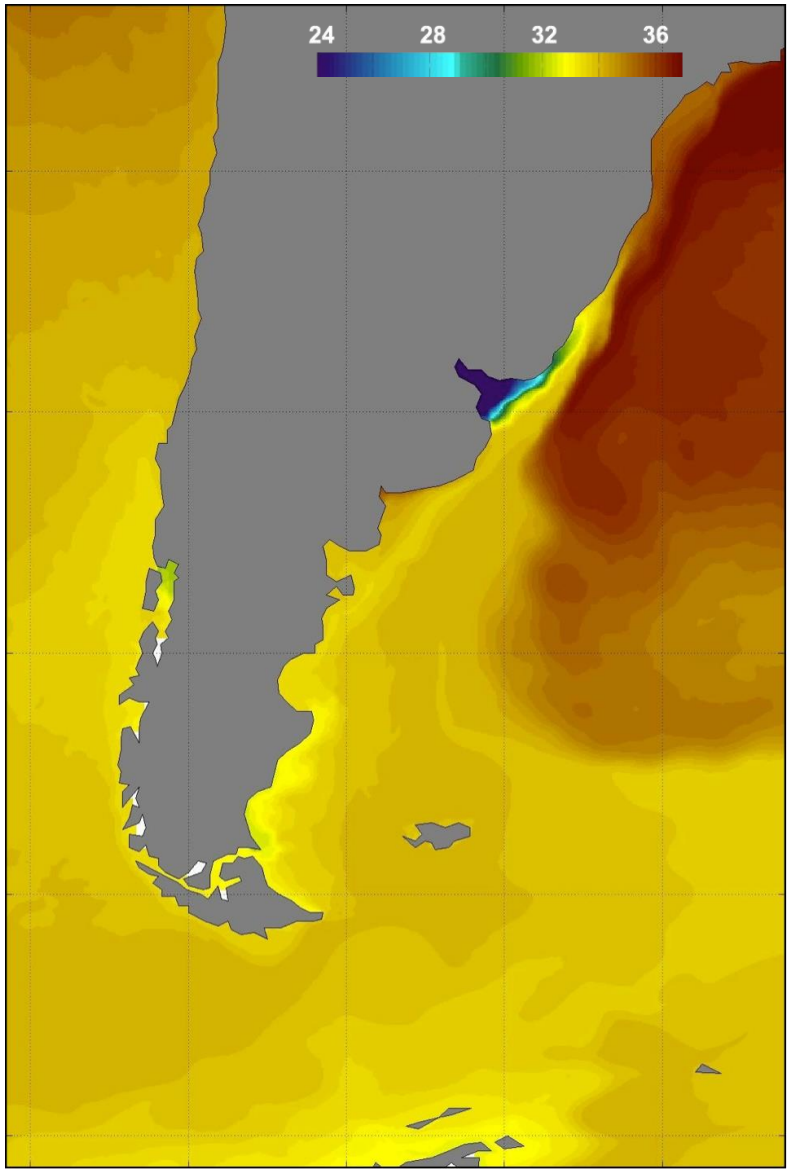


SSS Anomaly

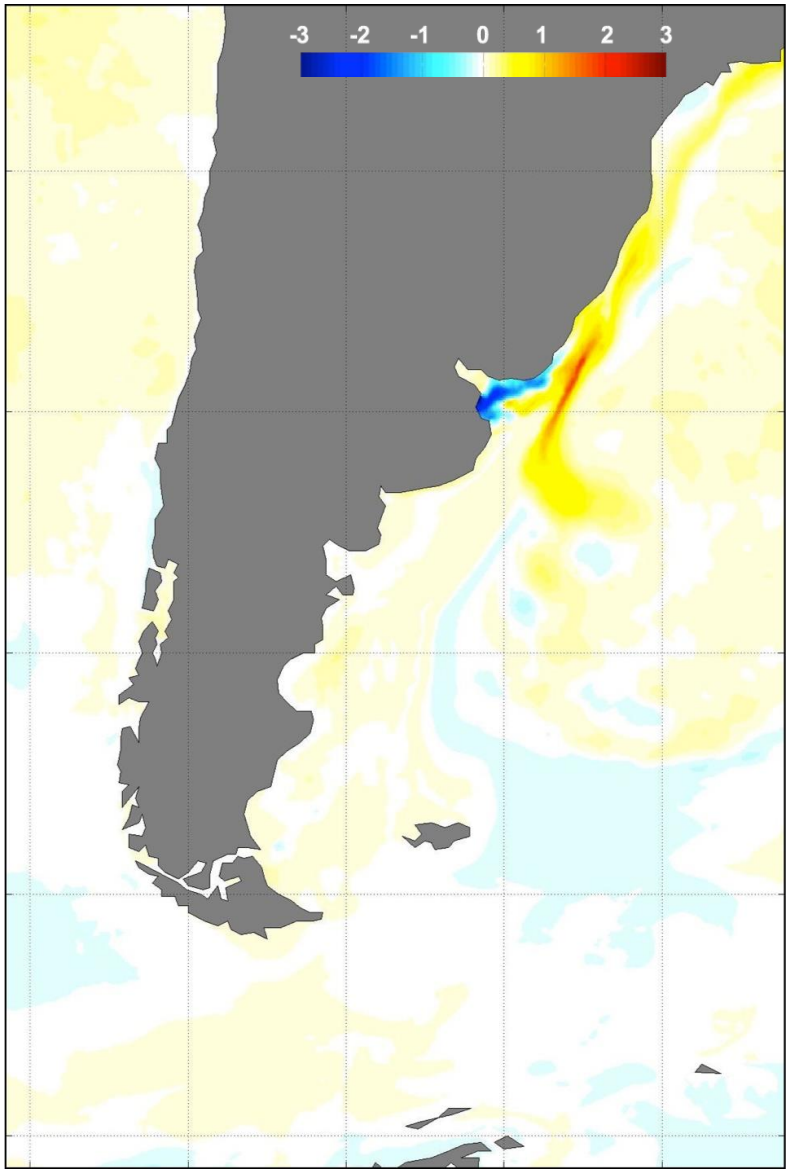


The Seasonal Cycle: April—June

SSS

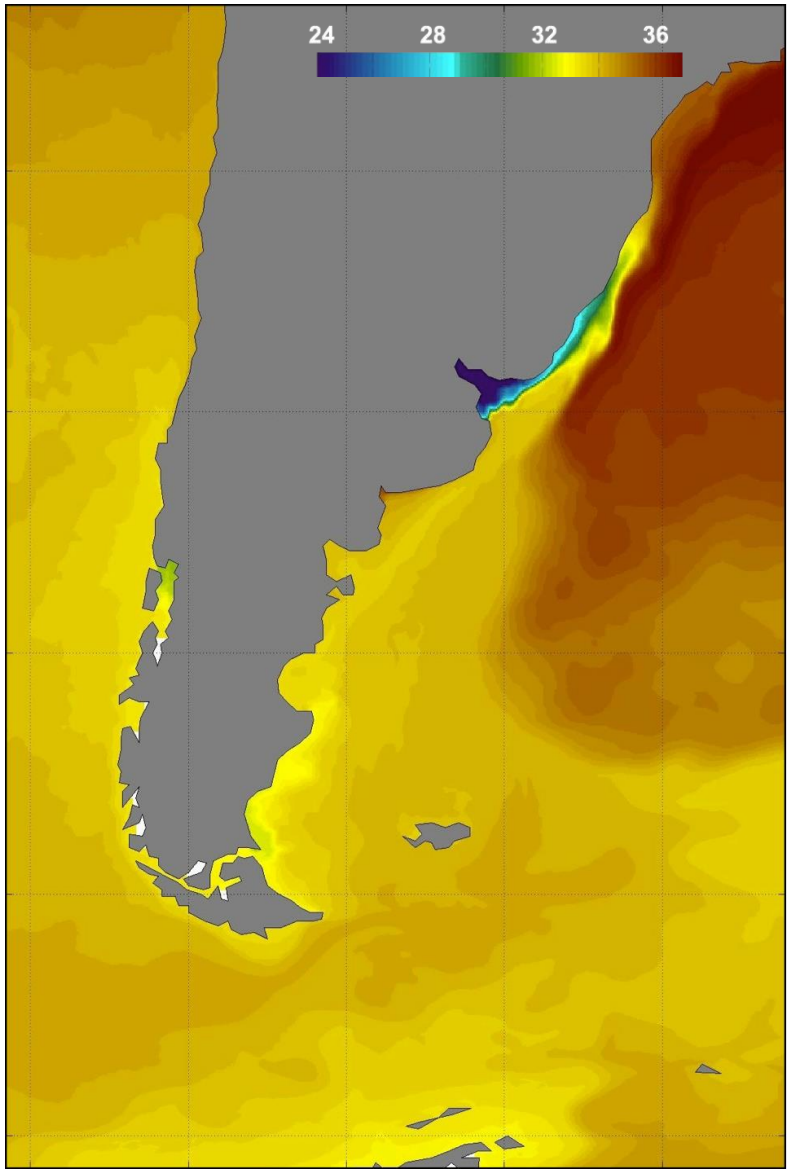


SSS Anomaly

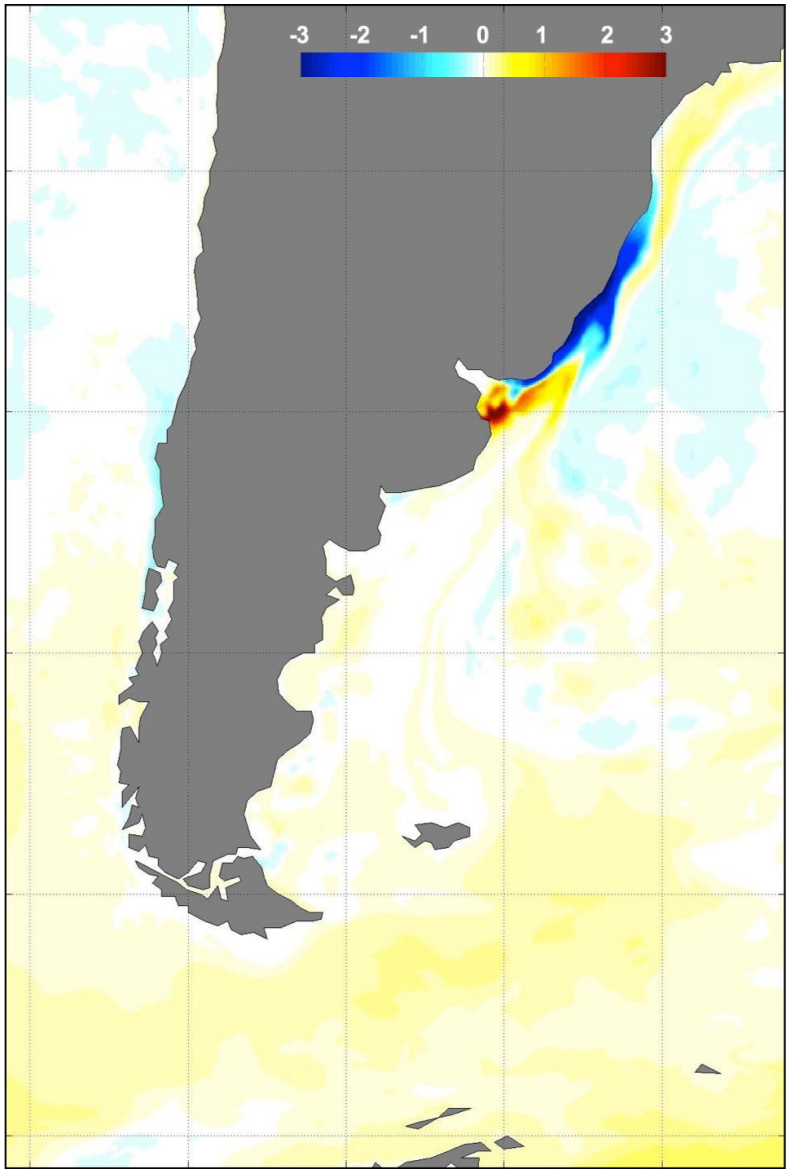


The Seasonal Cycle: July—September

SSS

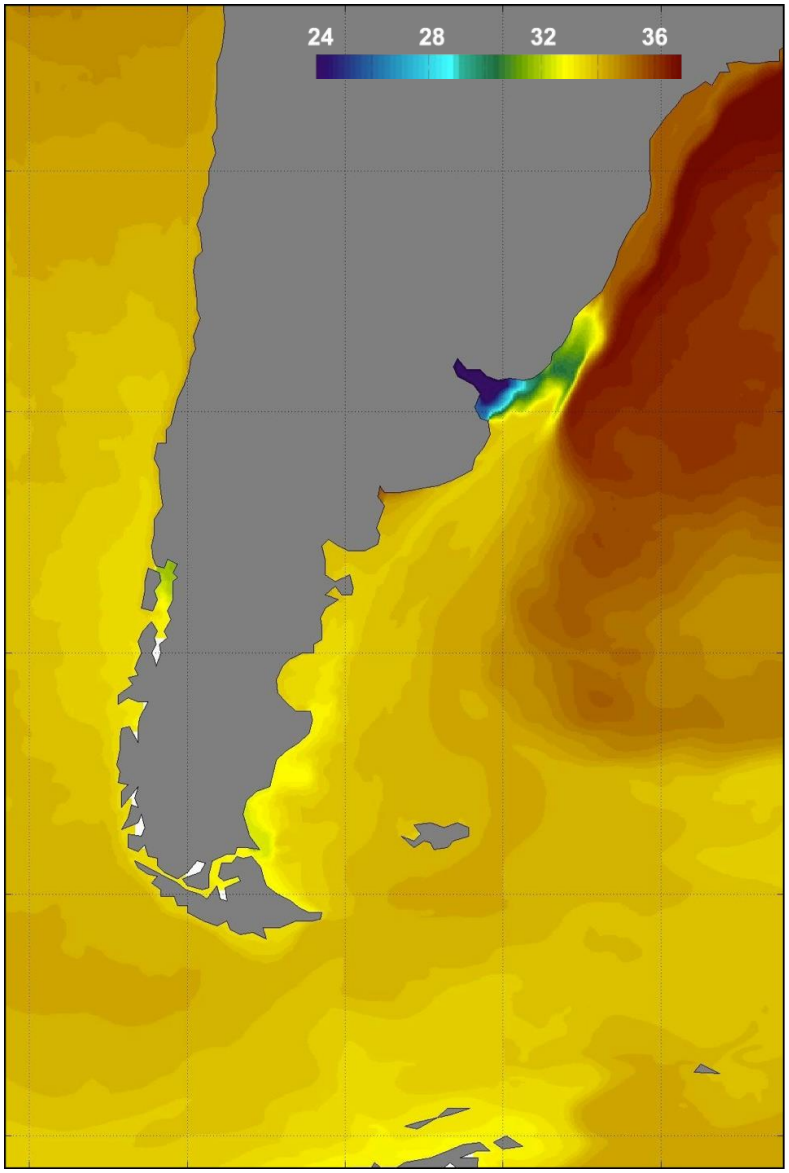


SSS Anomaly

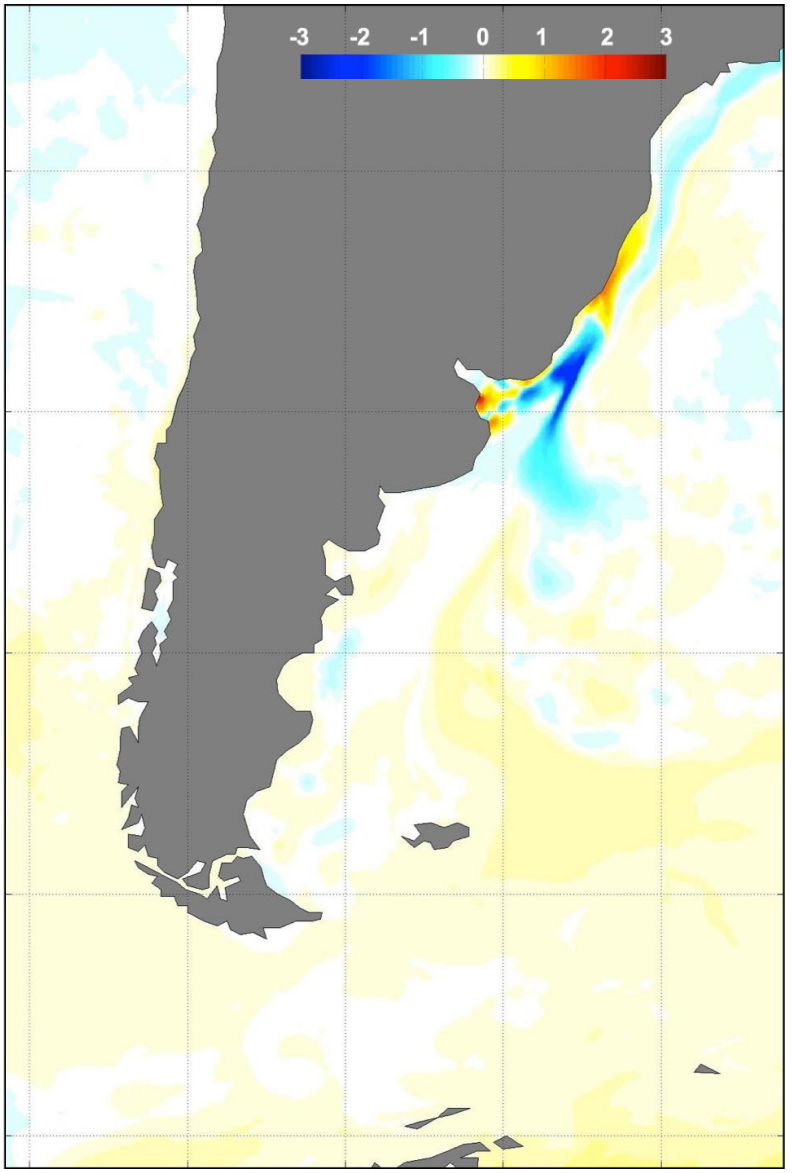


The Seasonal Cycle: October—December

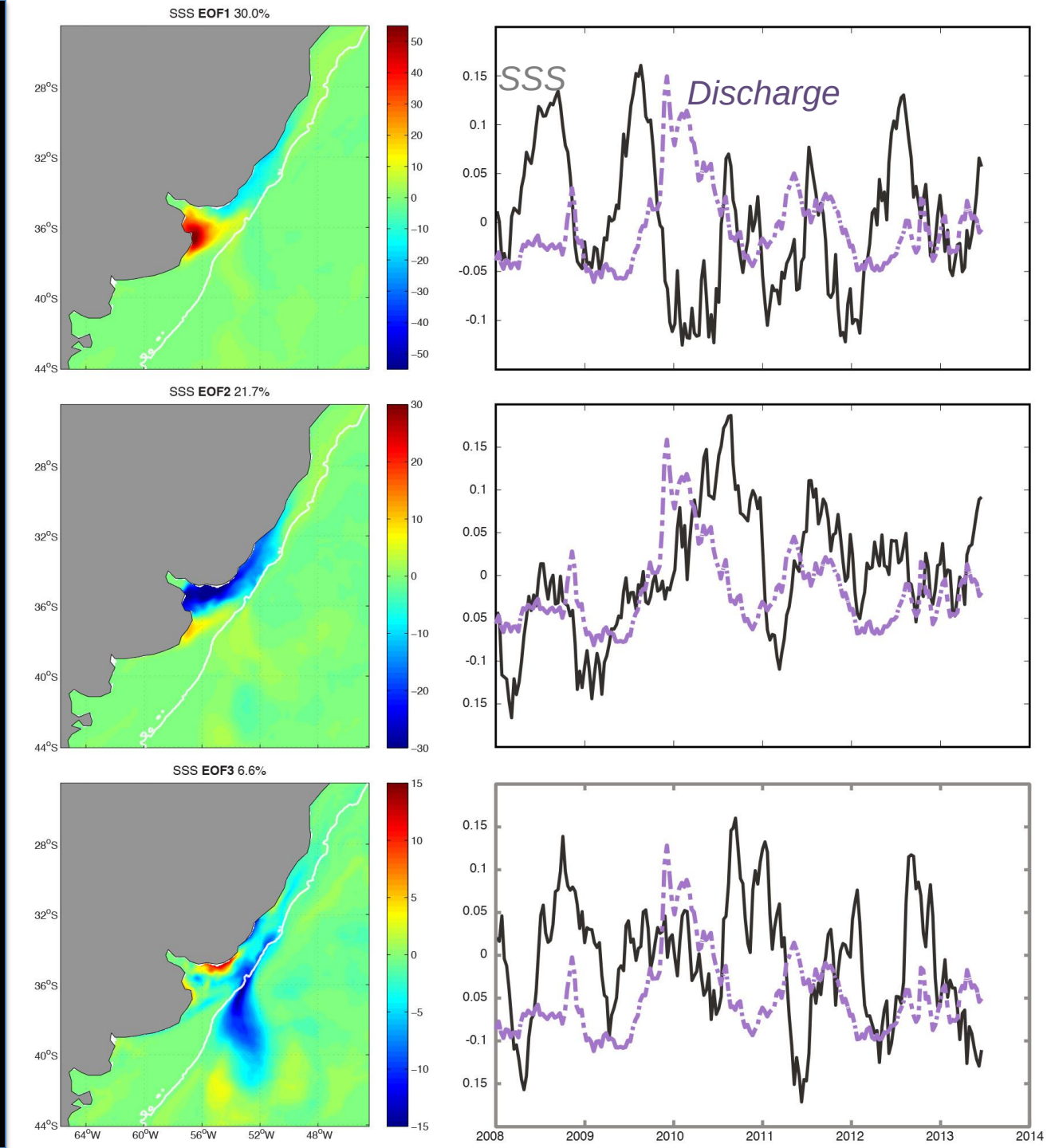
SSS



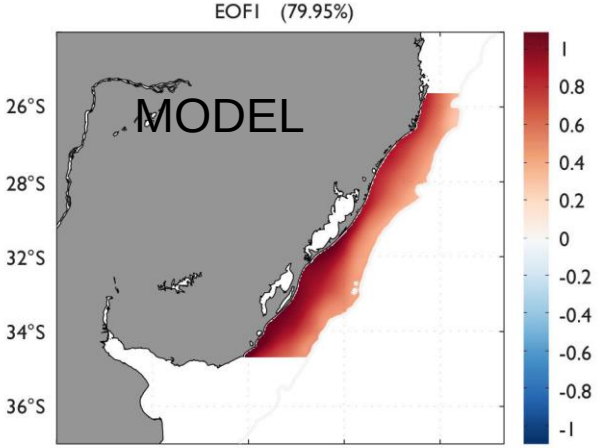
SSS anom

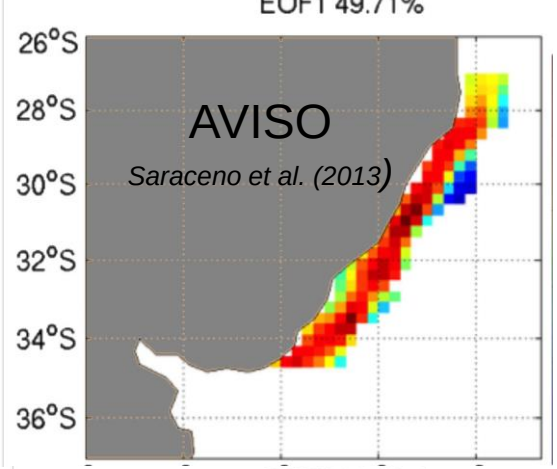


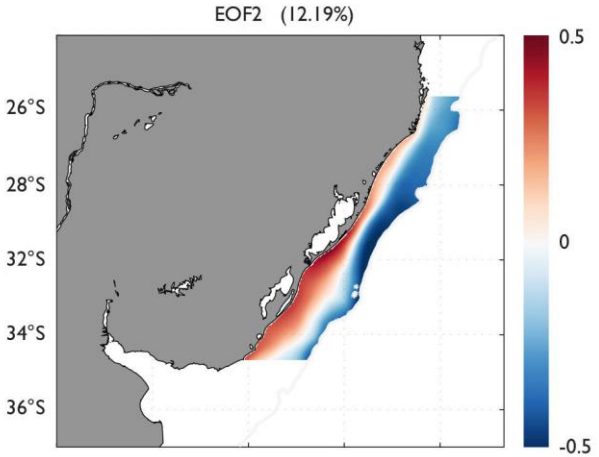
SSS — EOFs

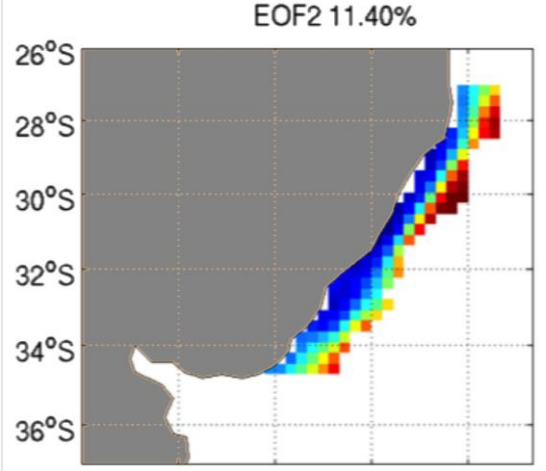

SSS EOF1 30.0%
SSS EOF2 21.7%
SSS EOF3 6.6%
28°S
32°S
36°S
40°S
44°S
64°W
60°W
56°W
52°W
48°W
SSS
Discharge
2008
2009
2010
2011
2012
2013
2014

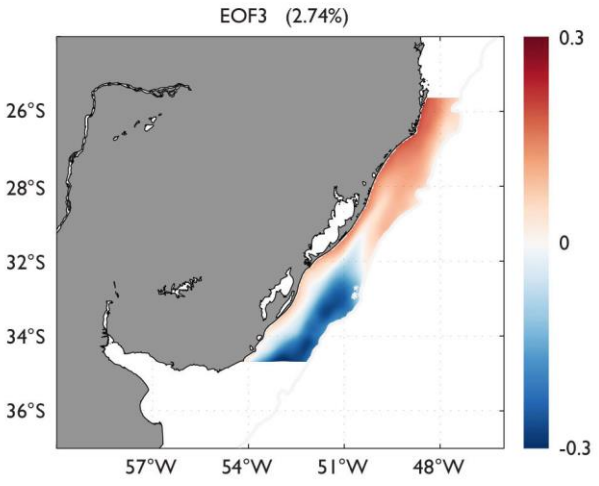
MODEL/AVISO

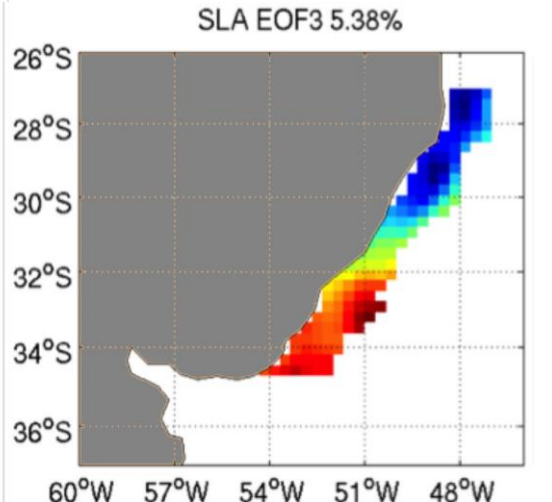

EOF1 (79.95%)
MODEL
26°S
28°S
32°S
34°S
36°S
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


EOF1 49.71%
AVISO
Saraceno et al. (2013)
26°S
28°S
30°S
32°S
34°S
36°S

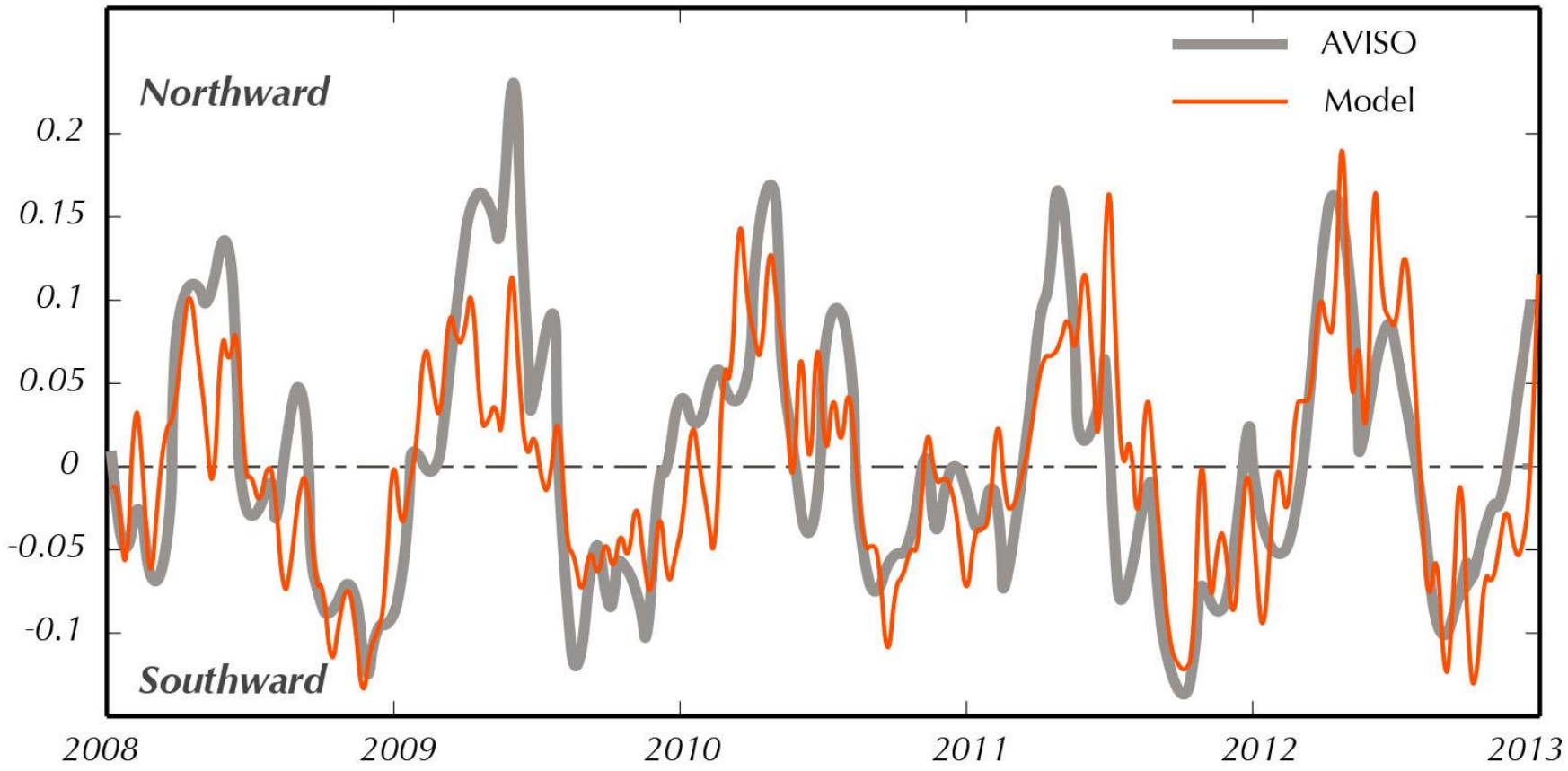

EOF2 (12.19%)
26°S
28°S
32°S
34°S
36°S
0.5
0
-0.5


EOF2 11.40%
26°S
28°S
30°S
32°S
34°S
36°S


EOF3 (2.74%)
26°S
28°S
32°S
34°S
36°S
57°W
54°W
51°W
48°W
0.3
0
-0.3

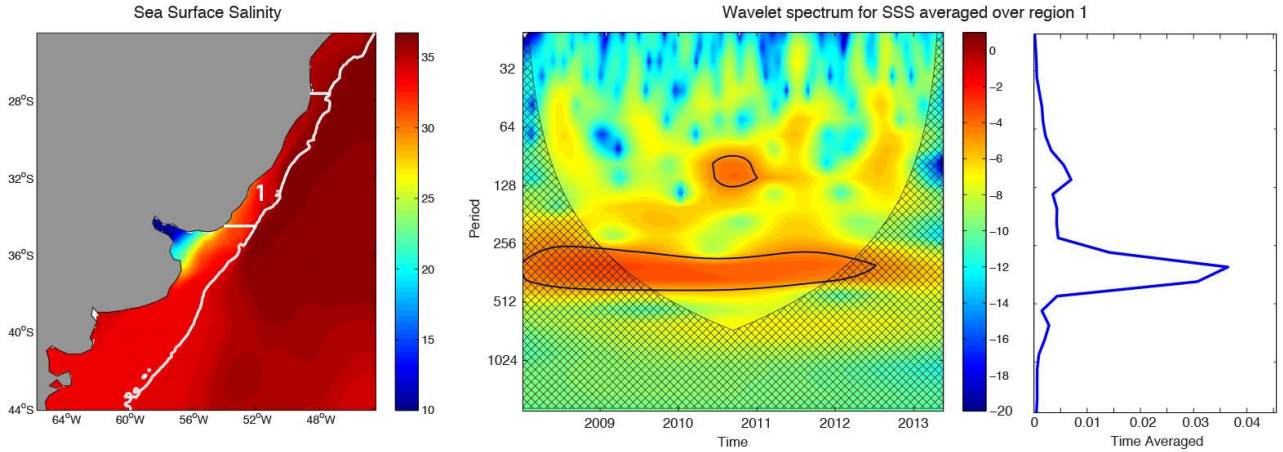

SLA EOF3 5.38%
26°S
28°S
30°S
32°S
34°S
36°S
60°W
57°W
54°W
51°W
48°W

First EOFs of SSHs

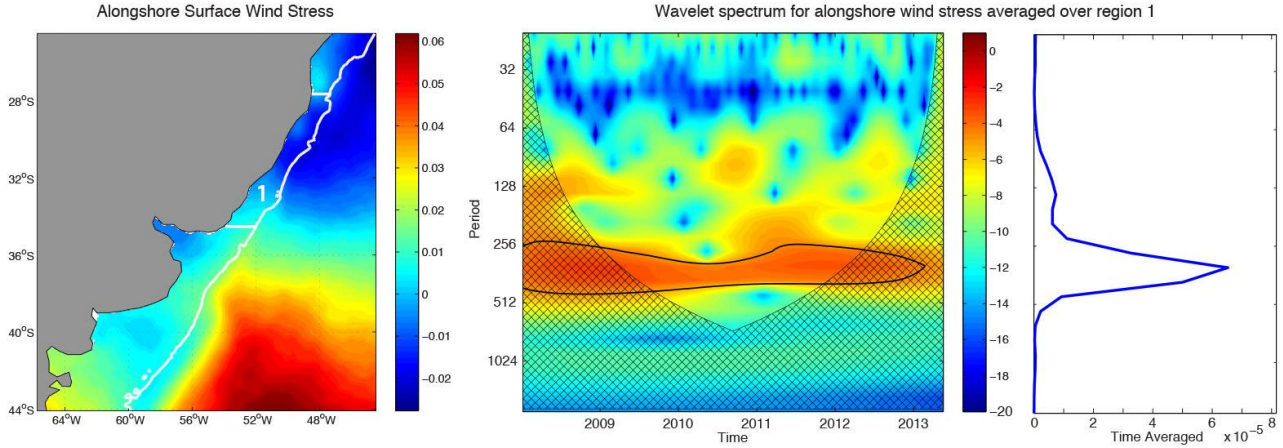


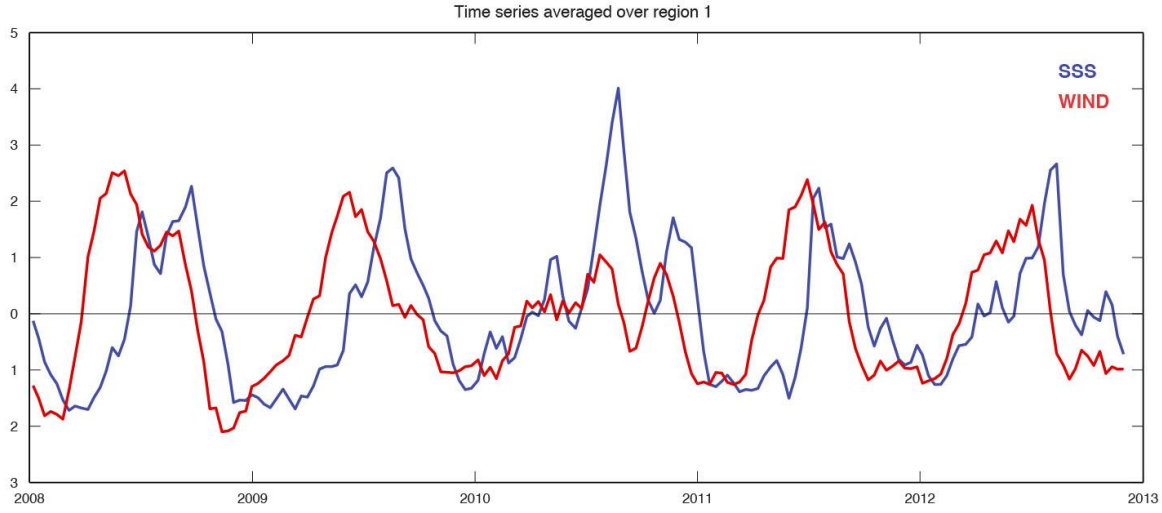
What Drives the SSS signal?

SSS

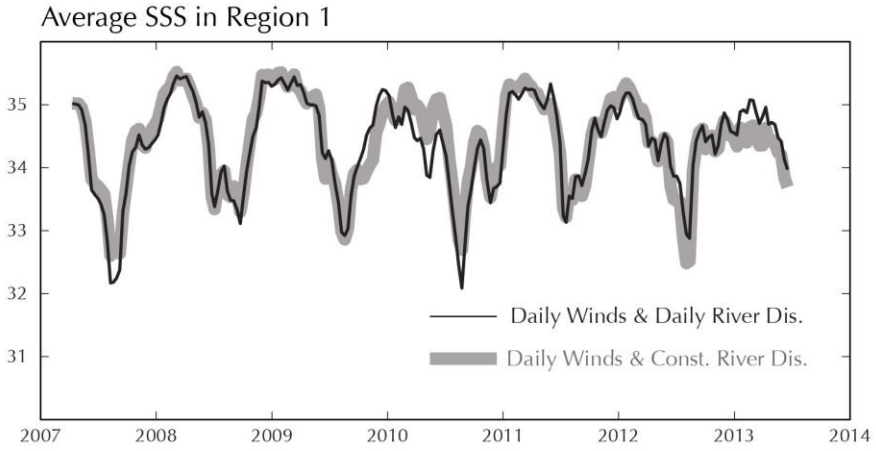


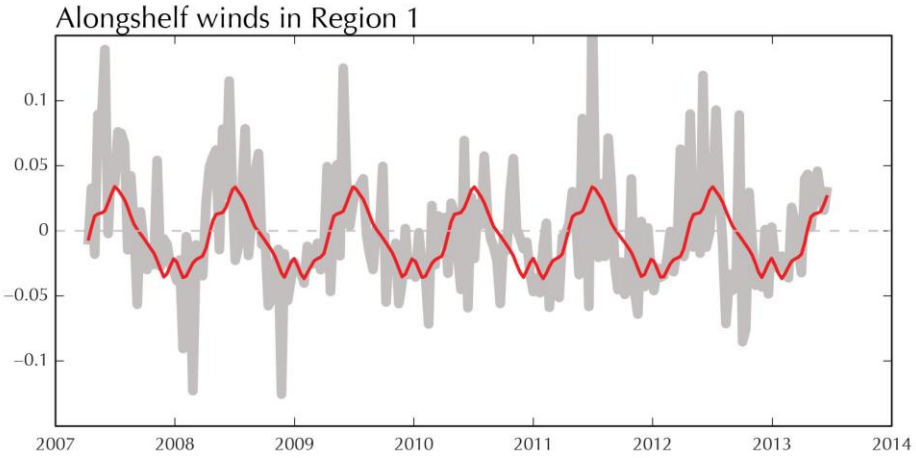
Alongshelf Wind Stress

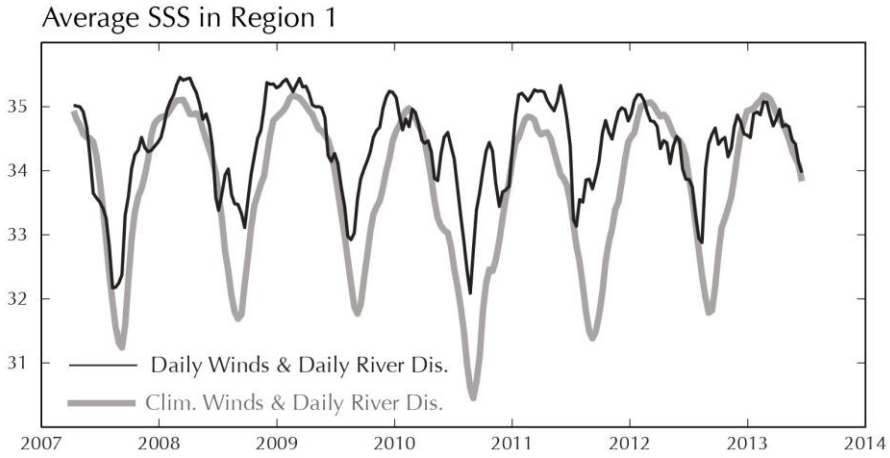


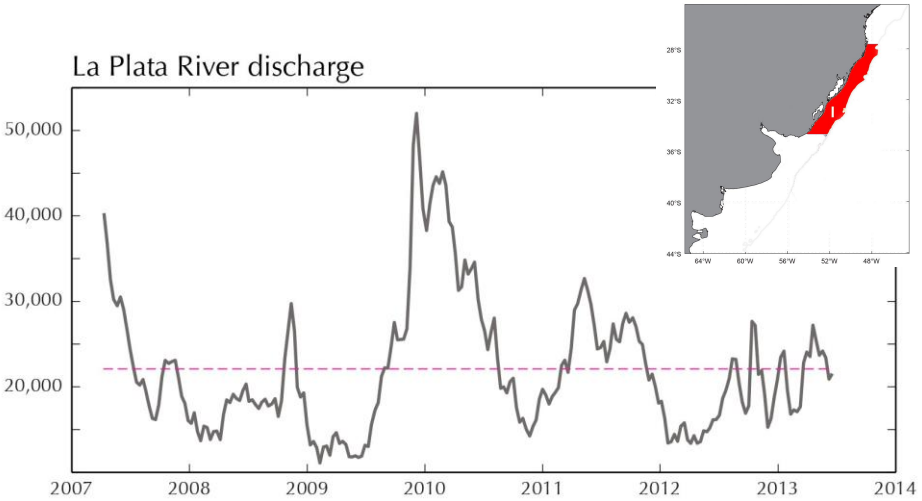


What drives the SSS in Region 1: Wind or River Discharge?

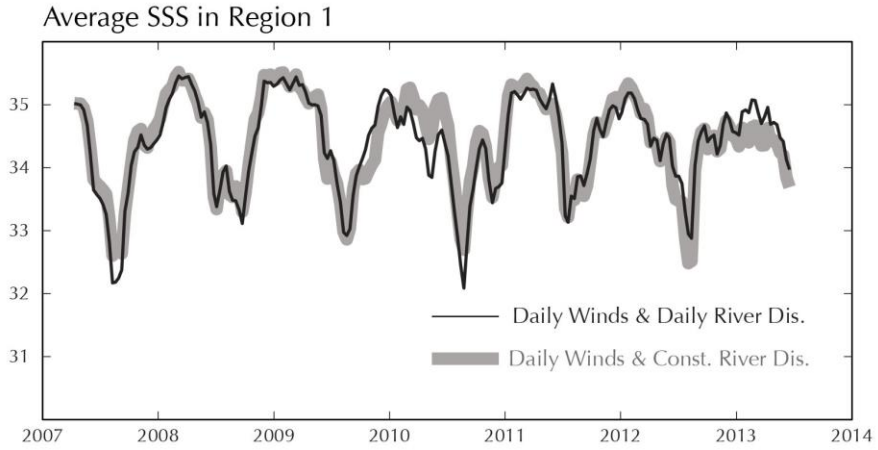


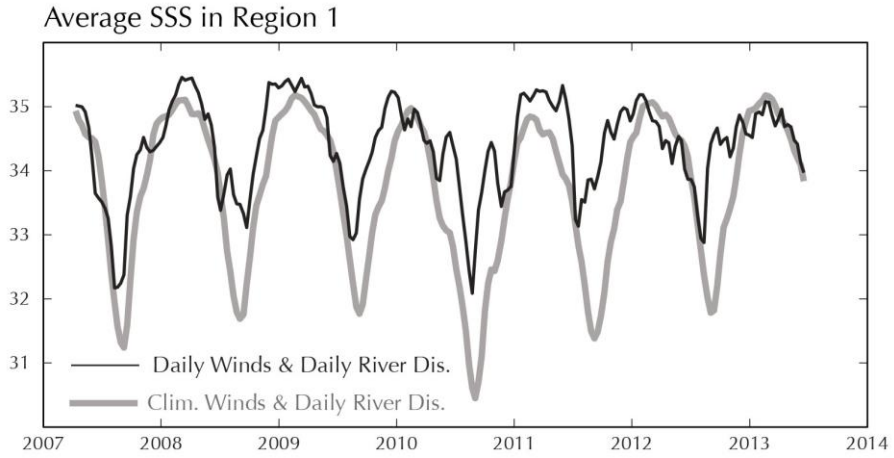


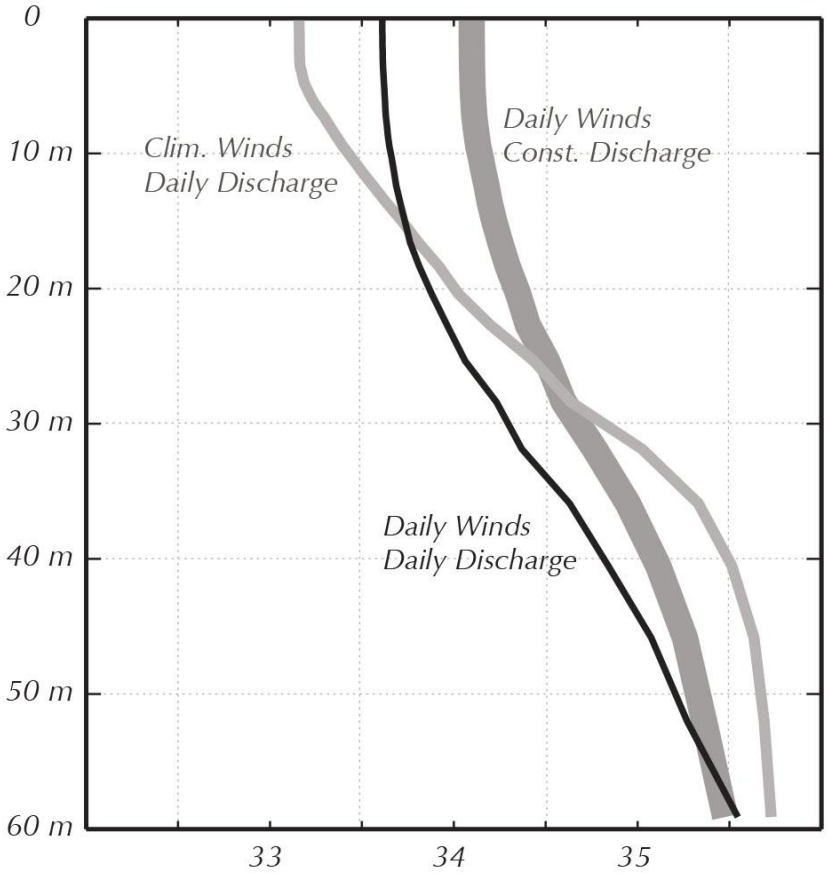




What drives the SSS in Region 1: Wind or River Discharge?

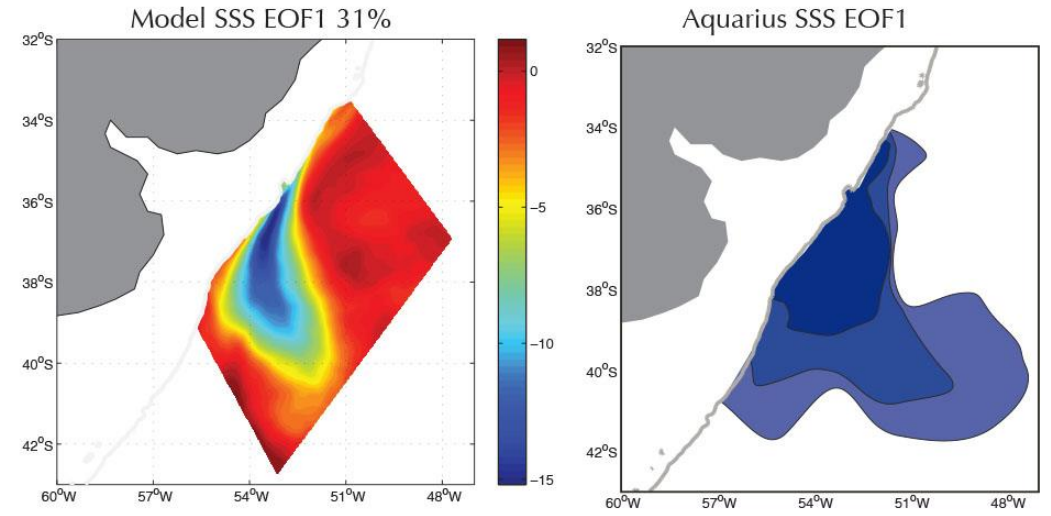


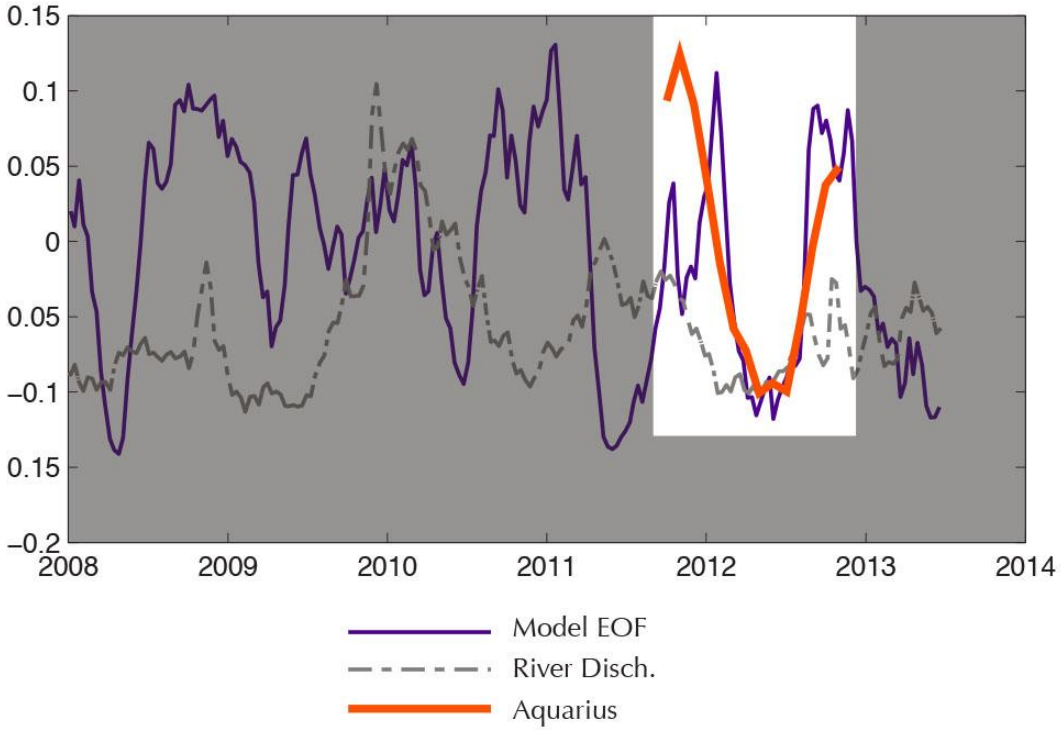




What happens offshore?

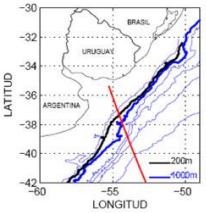
Model/Aquarius

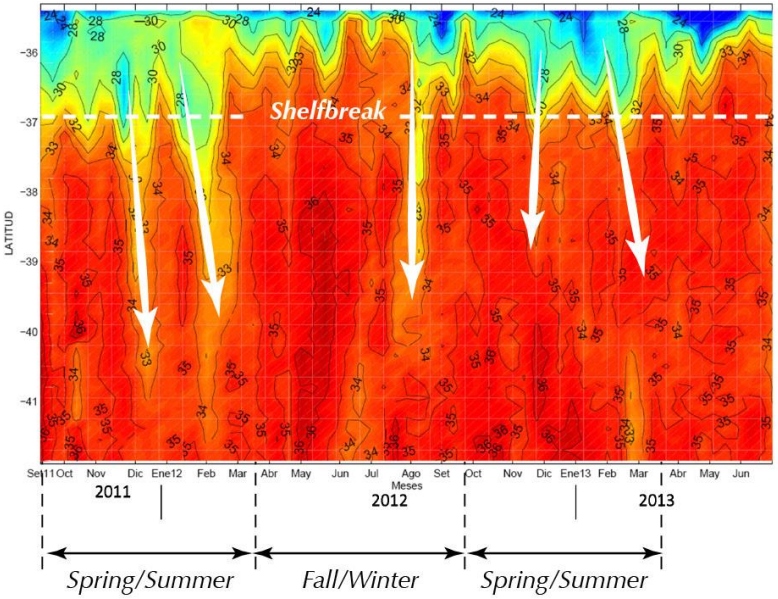




Aquarius
(Guerrero & Fenco)

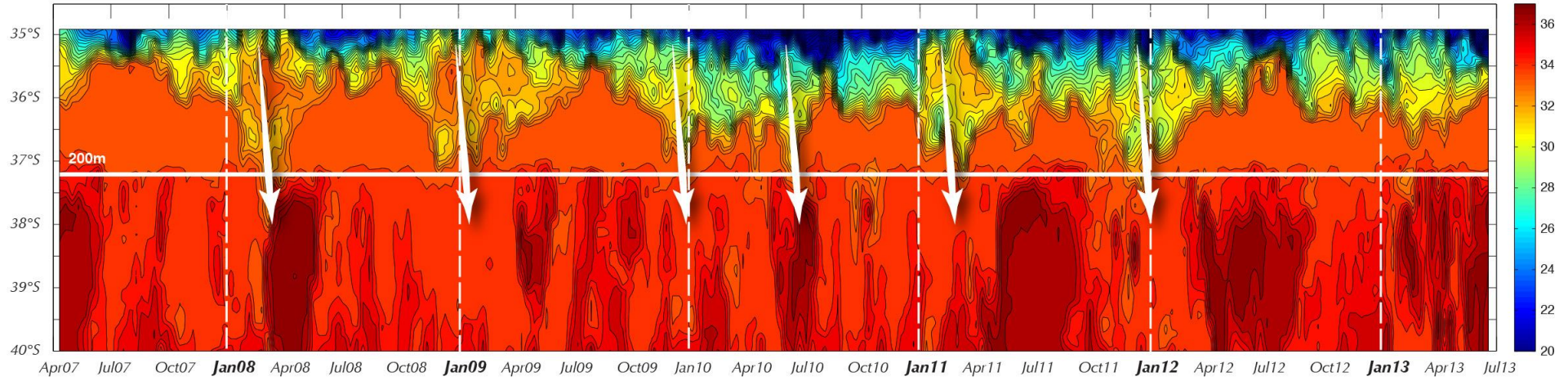
Hovmoller
Beam 2 asc



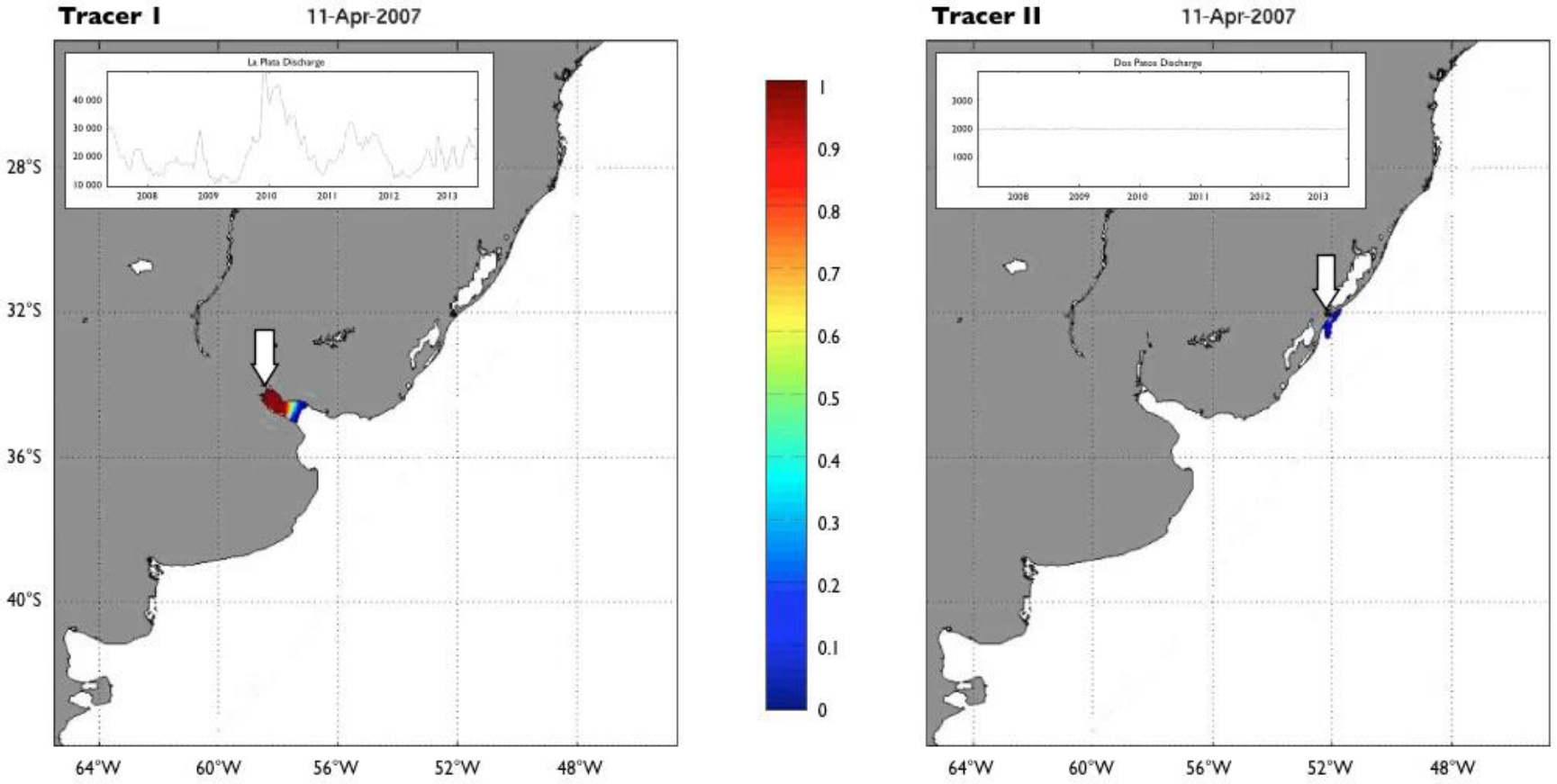


Sea Surface Salinity

Model



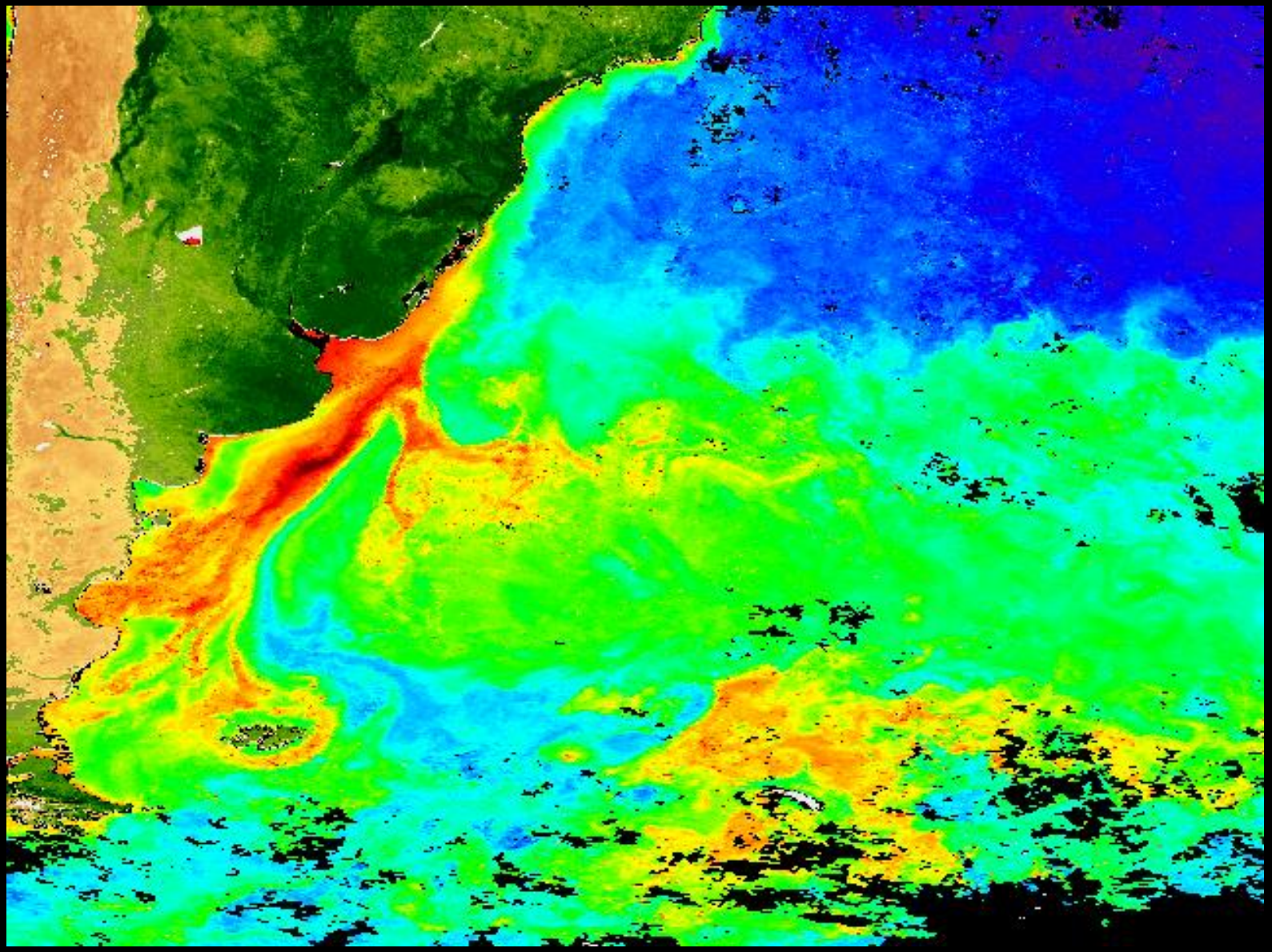
Tracer Experiments

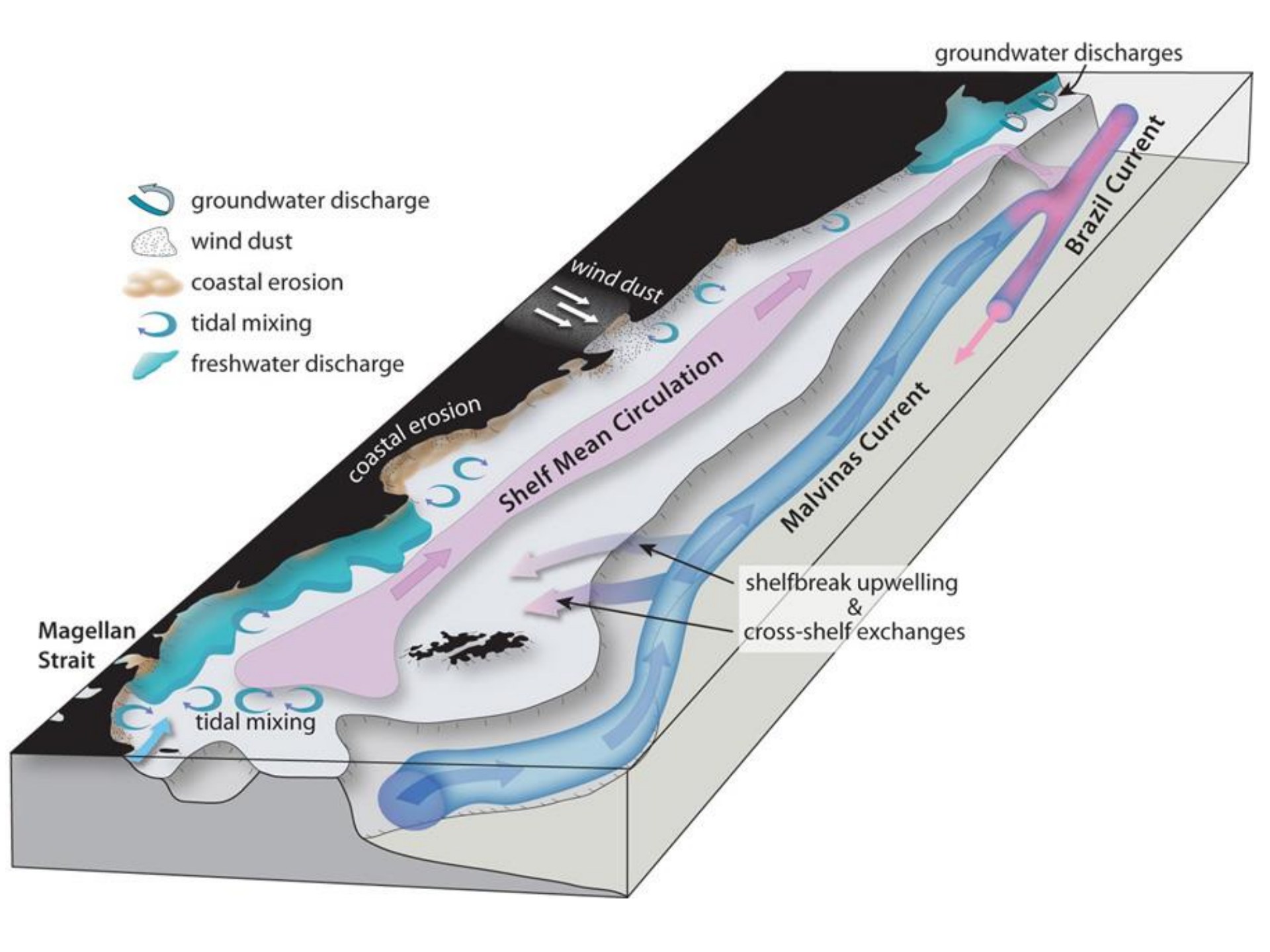


The La Plata River is a cute signal but….

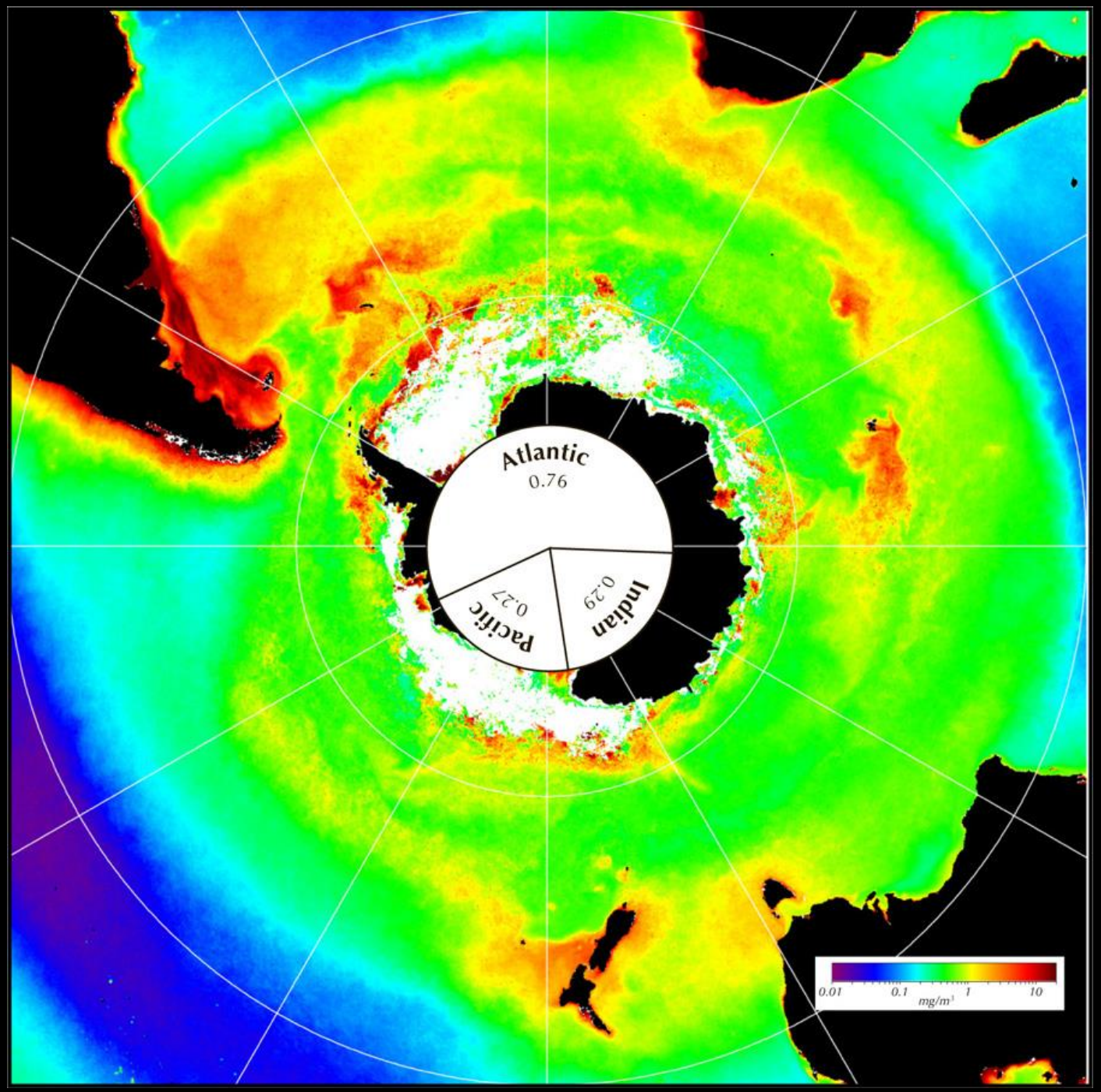
So what?

The Context




groundwater discharges
groundwater discharge
wind dust
coastal erosion
tidal mixing
freshwater discharge
wind dust
coastal erosion
Shelf Mean Circulation
Brazil Current
Malvinas Current
shelfbreak upwelling
&
cross-shelf exchanges
Magellan
Strait
tidal mixing

The Context



The La Plata River is NOT ONLY a cute signal but….

It is also an important signal