

Towards an Operational Model of the Southeastern Brazilian Shelf

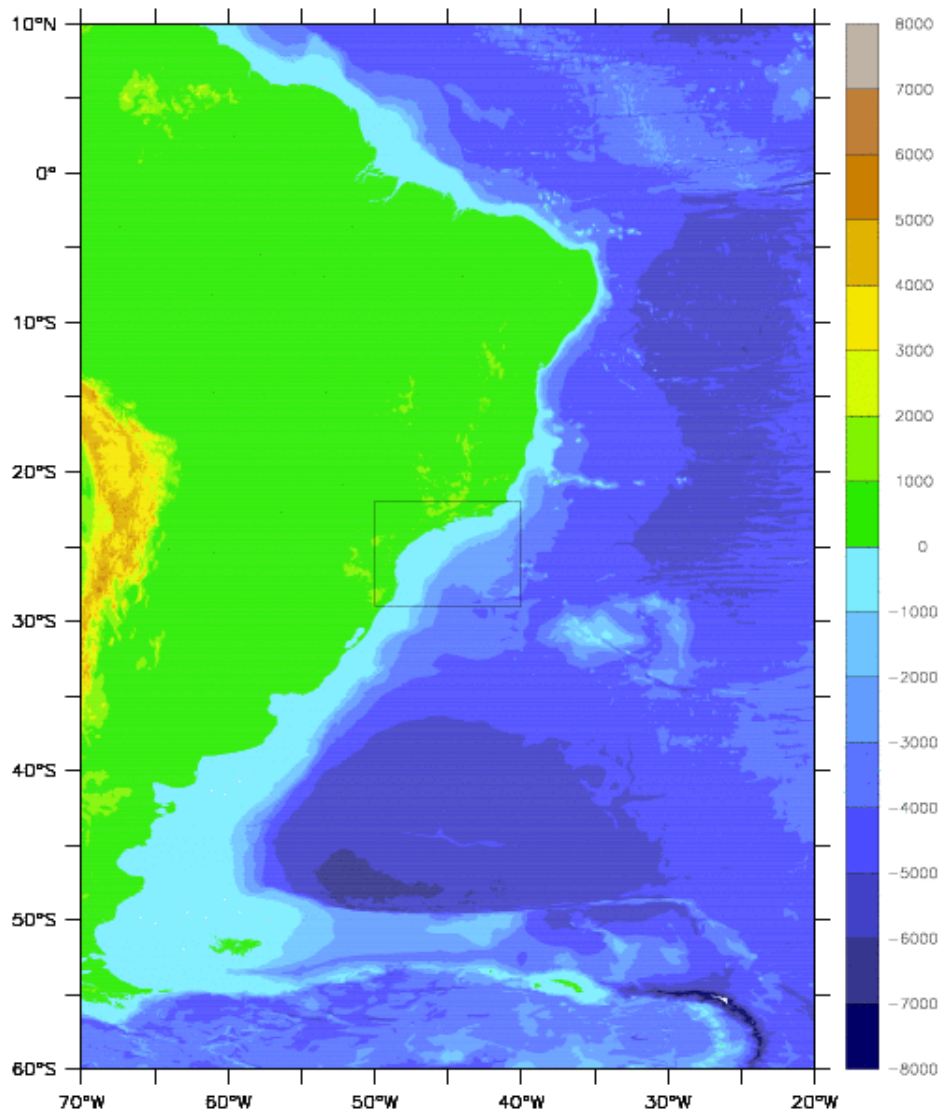
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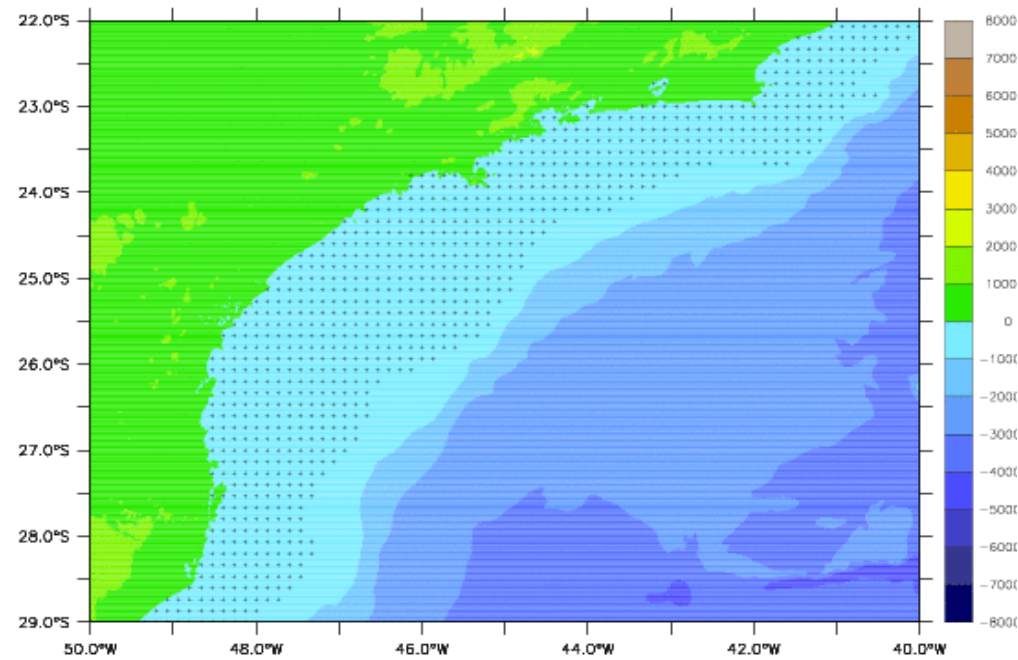
2-Management Unit of the North Sea Mathematical Models, Belgium

JONSMOD 2012

Southwest Atlantic



Southeastern Brazilian Shelf



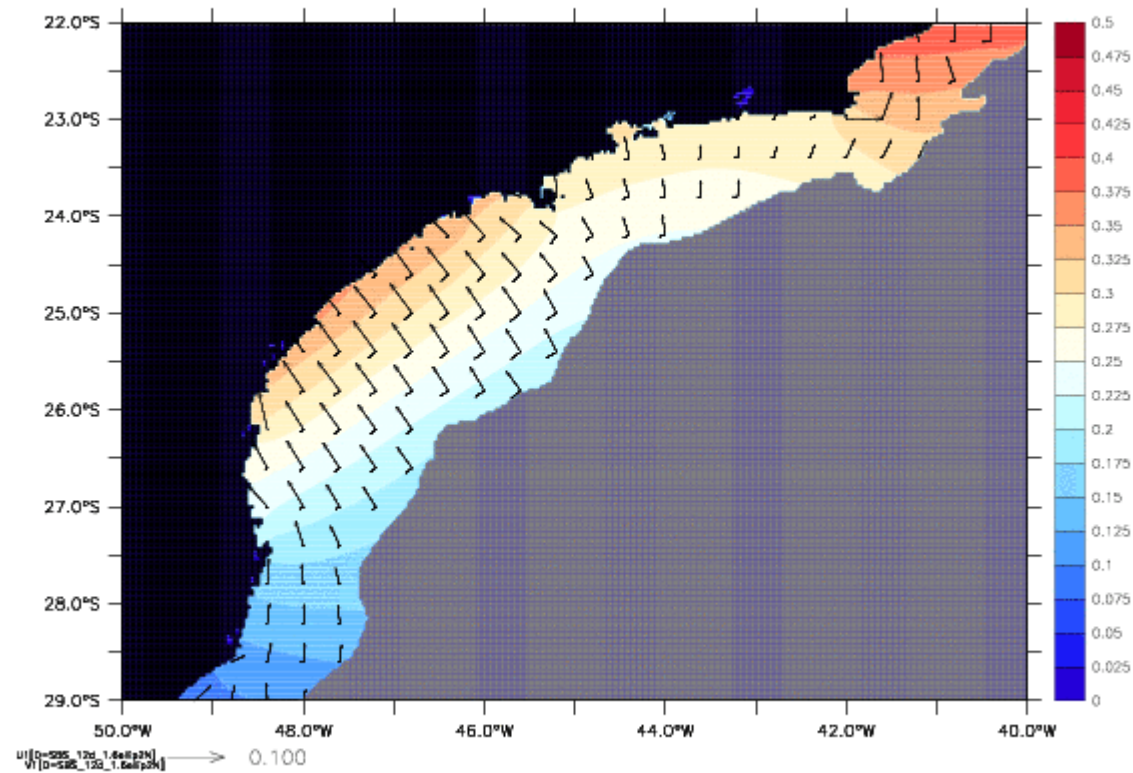
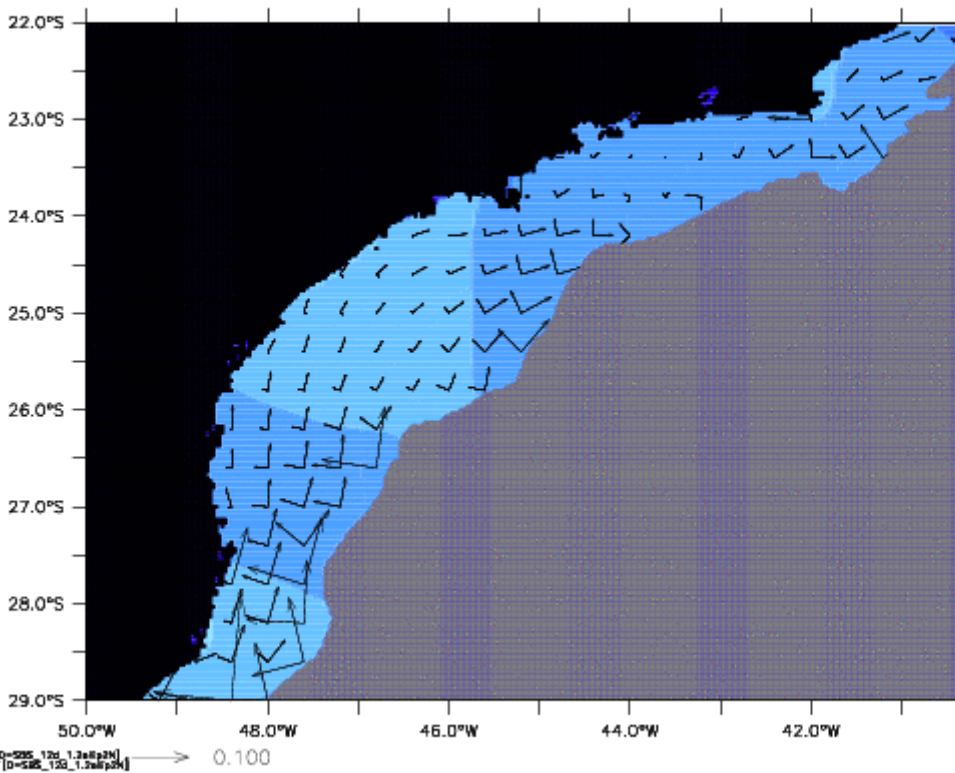
Model setup

- COHERENS V2.2
- 2'x2' model grid (GEBCO Digital Atlas)
- meteo: NCEP at 6h intervals ($1.875^{\circ}/2.5^{\circ}$)
- 8 tidal harmonics
- initial and open boundary condition (T,S) from (WOA05) Levitus atlas

Amplitude and Tidal Ellipse - SBS-2d

O1

M2

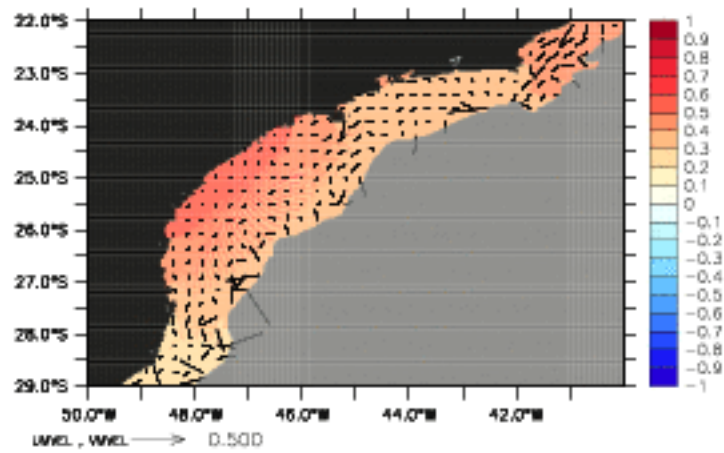


Major tidal constants for Cananéia and Ubatuba

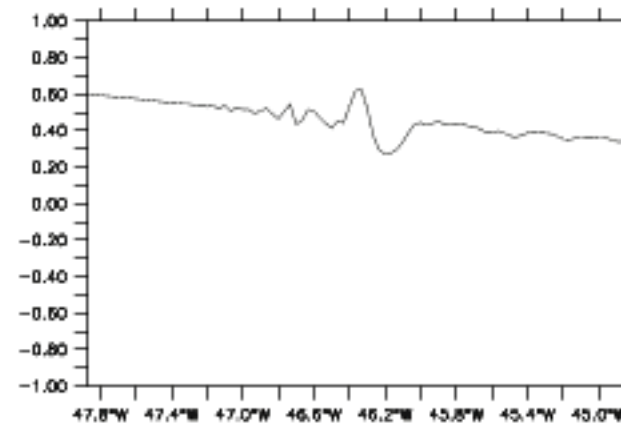
Constituent	Cananéia		SBS-2d		SBS-3d-a		SBS-3d-g	
	H(m)	G(deg)	H(m)	G(deg)	H(m)	G(deg)	H(m)	G(deg)
O_1	0.115	129.5	0.123	122.1	0.110	170.9	0.101	170.9
K_1	0.064	194.2	0.054	194.5	0.069	198.5	0.108	212.4
M_2	0.371	188.4	0.361	170.8	0.377	230.7	0.373	232.4
S_2	0.240	195.4	0.241	178.8	0.259	168.0	0.255	167.8
Constituent	Ubatuba		SBS-2d		SBS-3d-a		SBS-3d-g	
	H(m)	G(deg)	H(m)	G(deg)	H(m)	G(deg)	H(m)	G(deg)
O_1	0.109	125.3	0.091	124.3	0.081	181.1	0.078	181.4
K_1	0.061	186.7	0.069	192.2	0.076	206.2	0.105	216.7
M_2	0.298	166.2	0.299	163.8	0.307	234.9	0.307	235.6
S_2	0.172	171.8	0.180	175.2	0.186	177.4	0.179	177.0

Table 1: Tidal constants for the four major constituents at Cananéia (top) and Ubatuba (bottom) and its values for the COHERENS simulations at the nearest grid point.

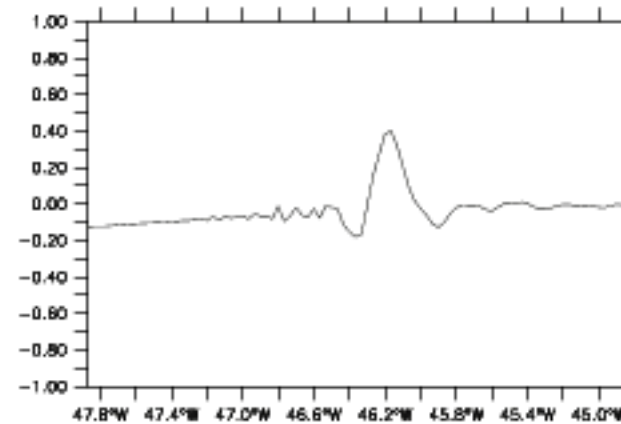
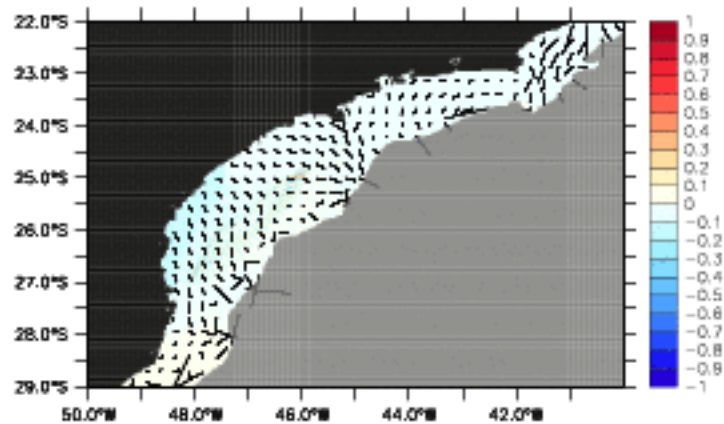
Noise - SBS-3d-a Feb-2003



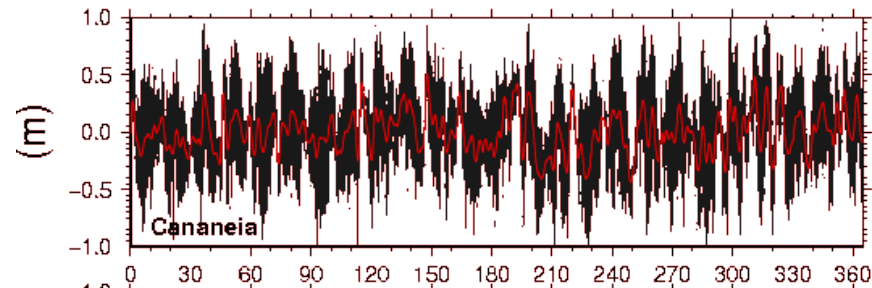
Surface



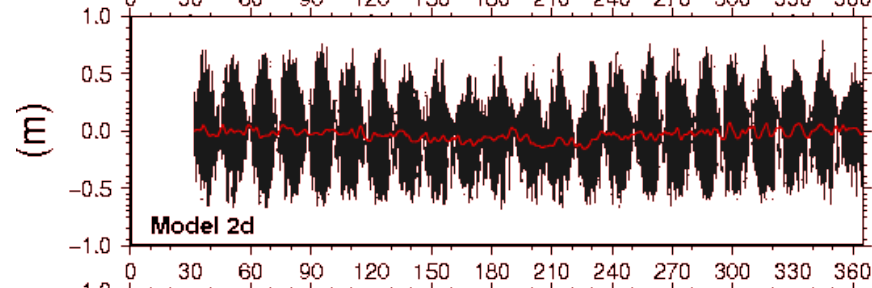
Section 25°S



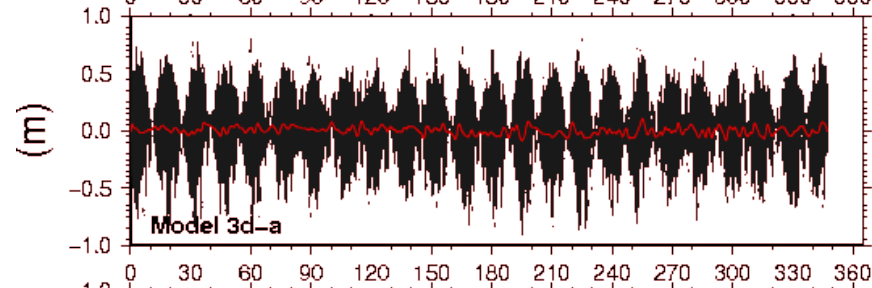
Sea-level at Cananeia Station



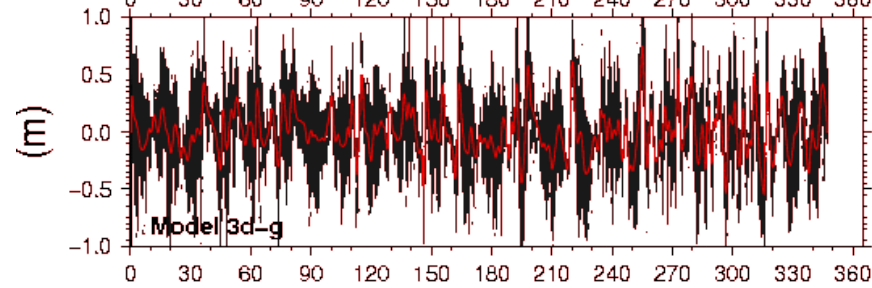
Data



SBS-2d



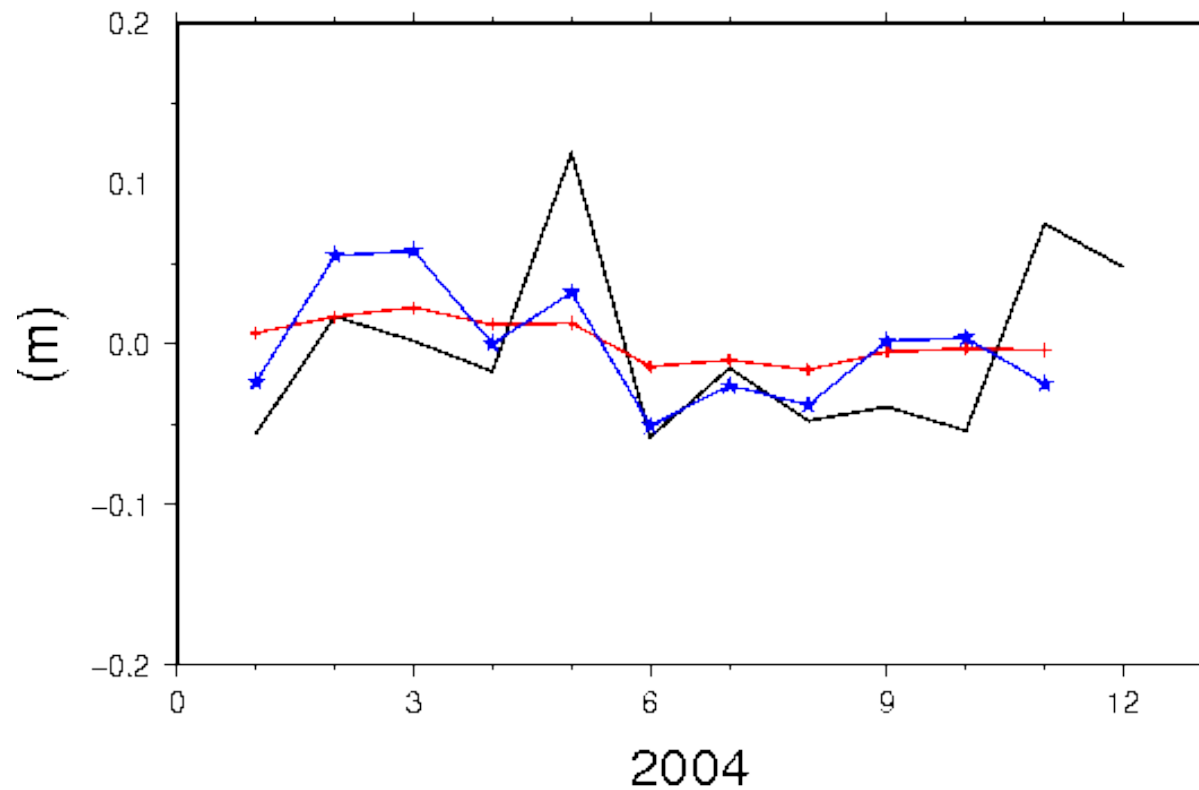
SBS-3d-a



SBS-3d-g

DoY 2004

Monthly sea-level at Cananeia Station

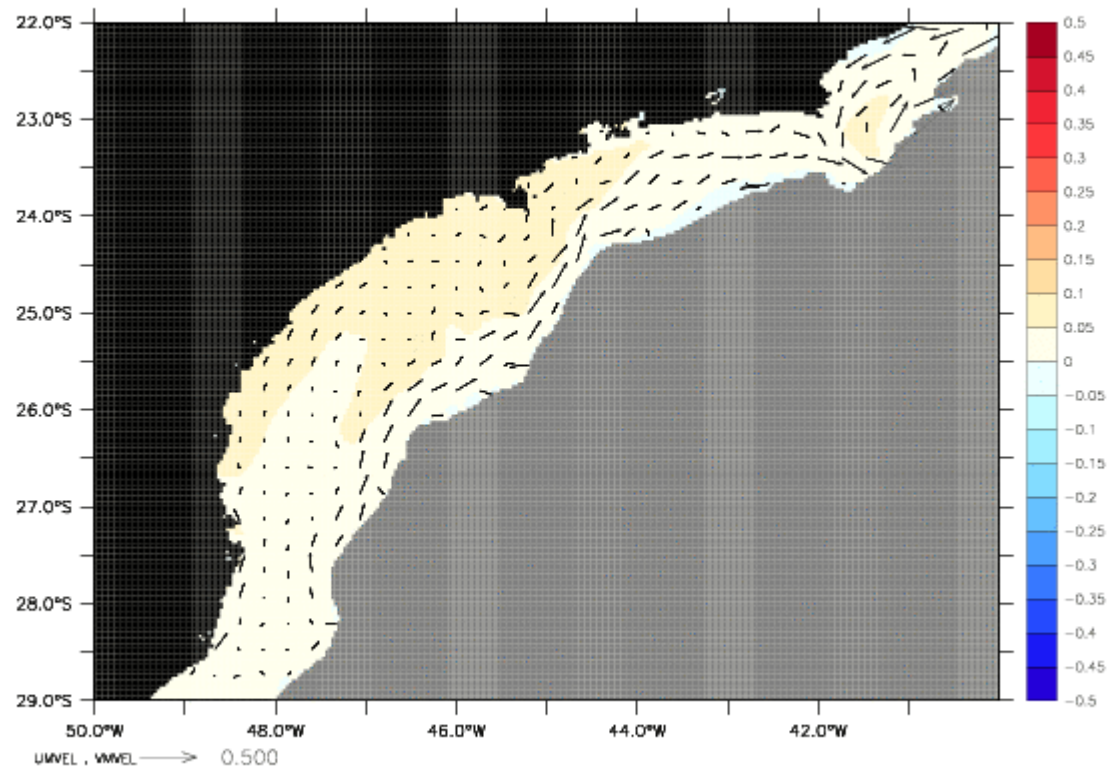
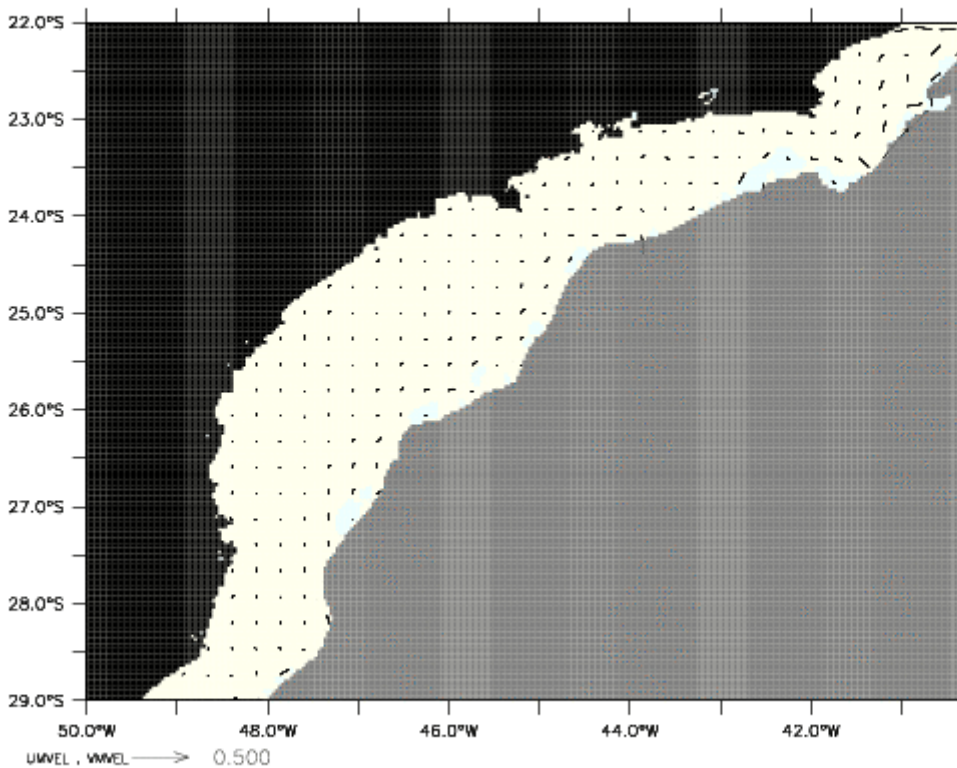


Data (black)
SBS-3d-a (red)
SBS-3d-g (blue)

27-Mar-2004 Mean Sea-level/Surface Currents

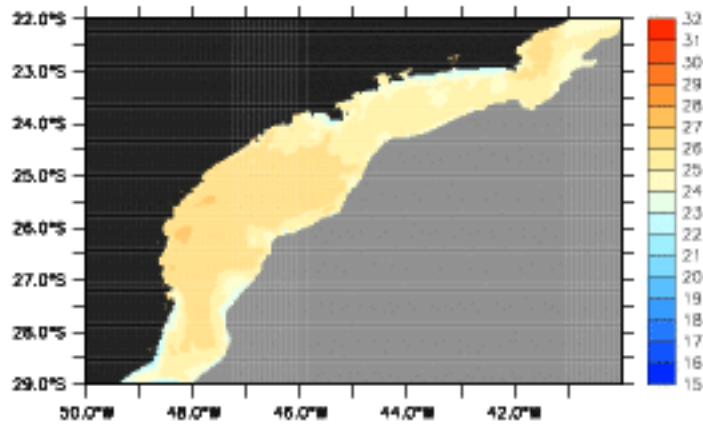
SBS-3d-a

SBS-3d-q

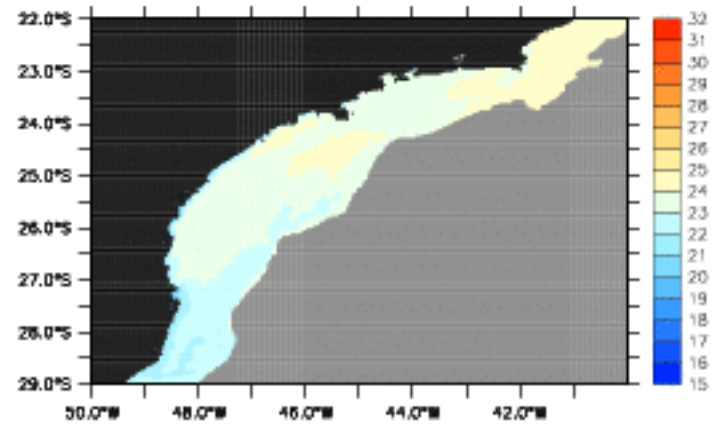


Surface Temperature - SBS-3d-a

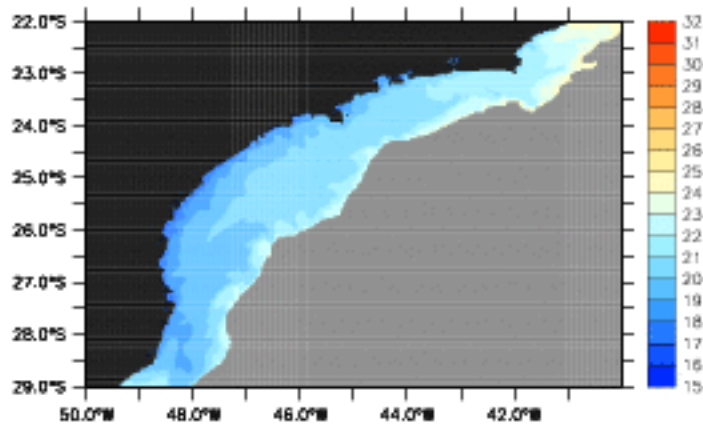
summer



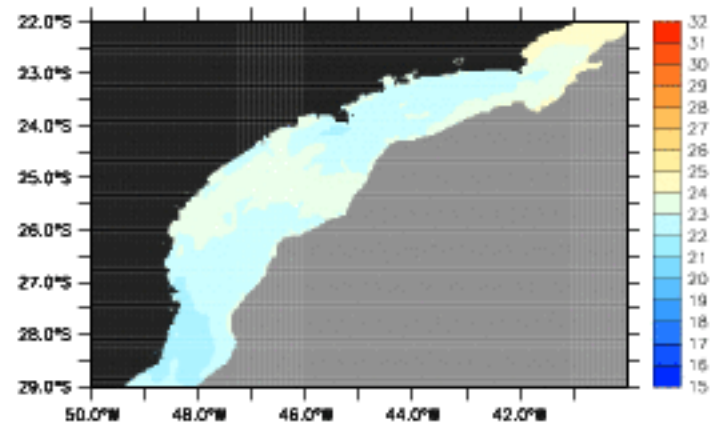
autumn



winter

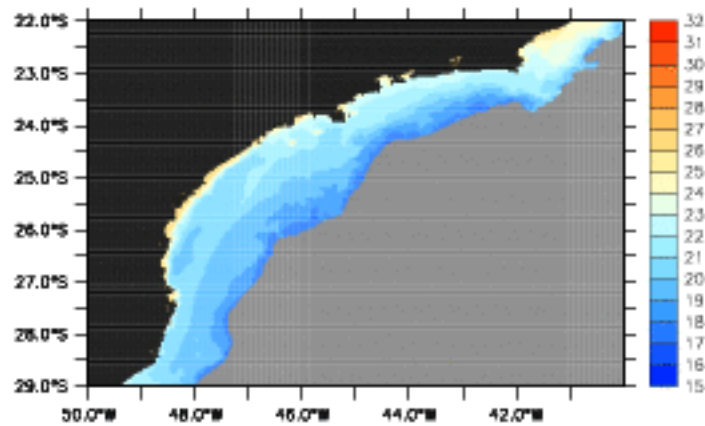


spring

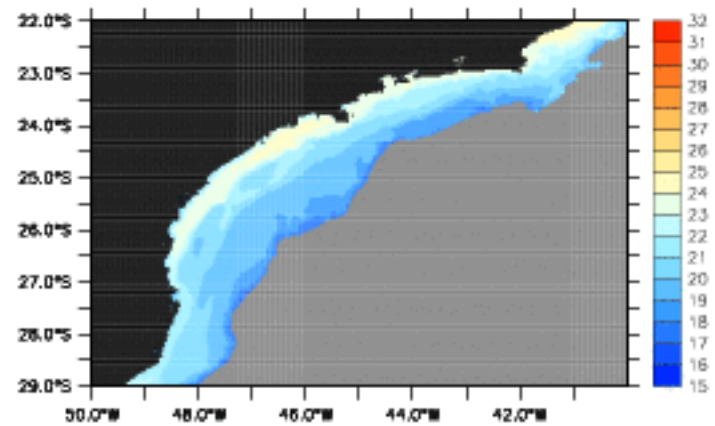


Bottom Temperature - SBS-3d-a

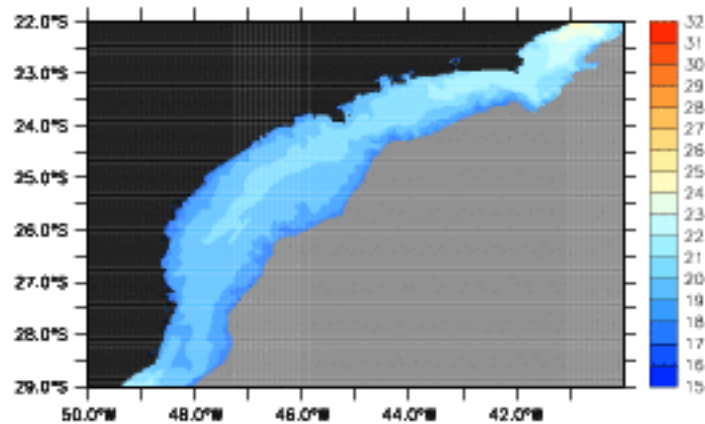
summer



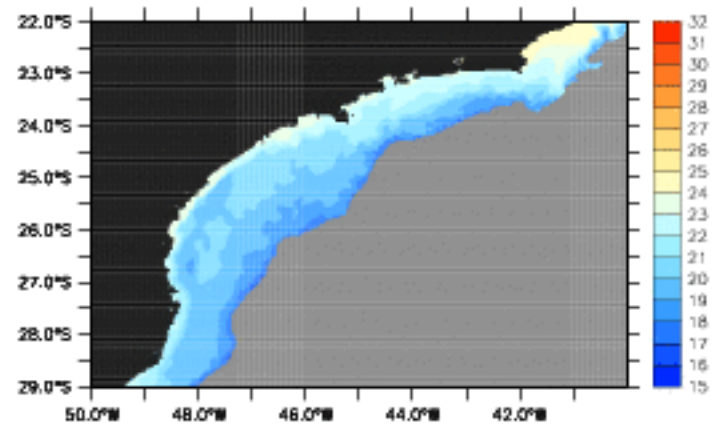
autumn



winter

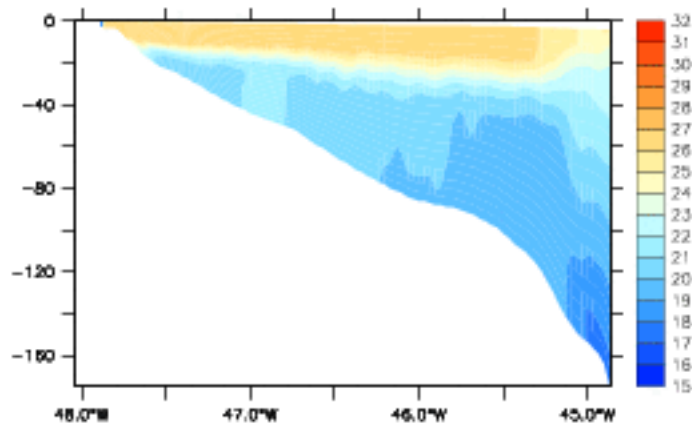


spring

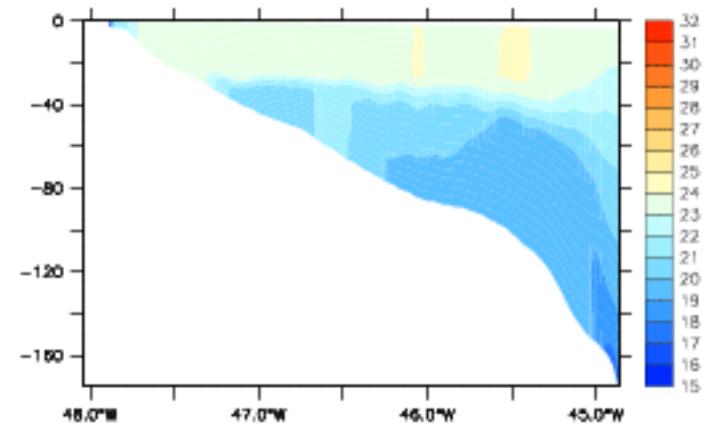


Temperature 25°S section - SBS-3d-a

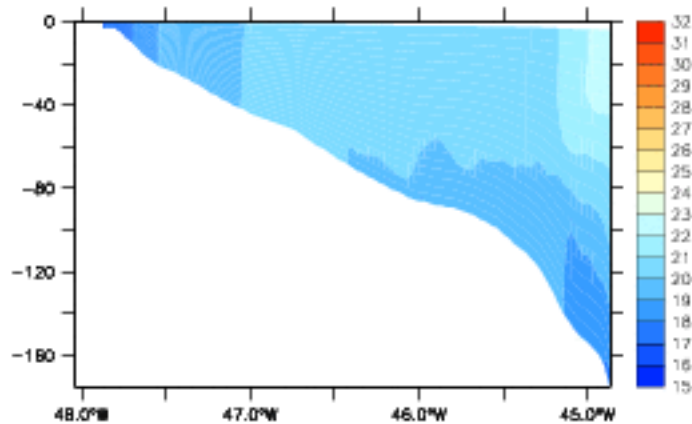
summer



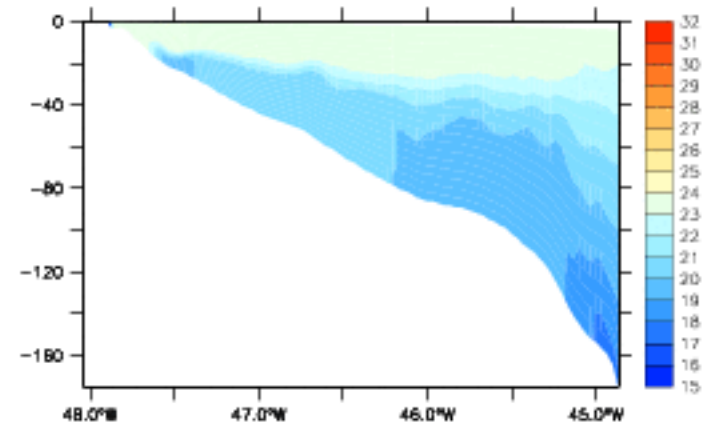
autumn



winter

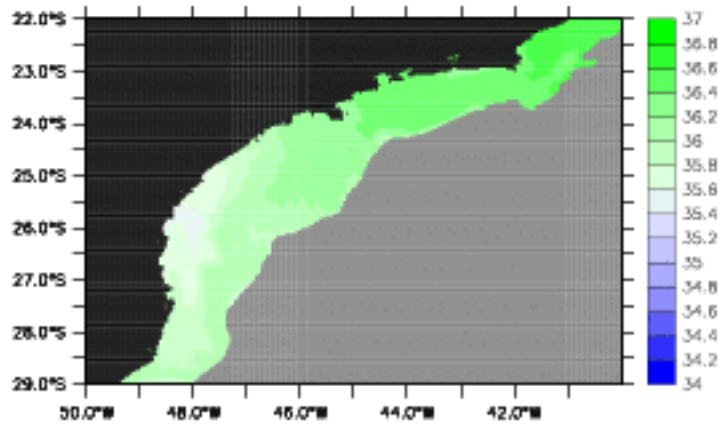


spring

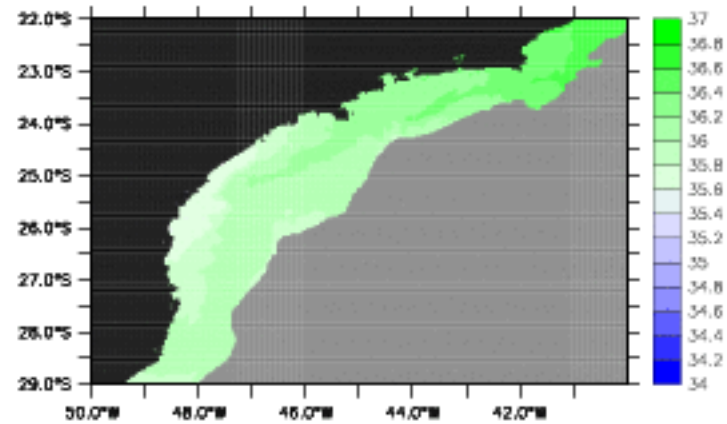


Surface Salinity - SBS-3d-a

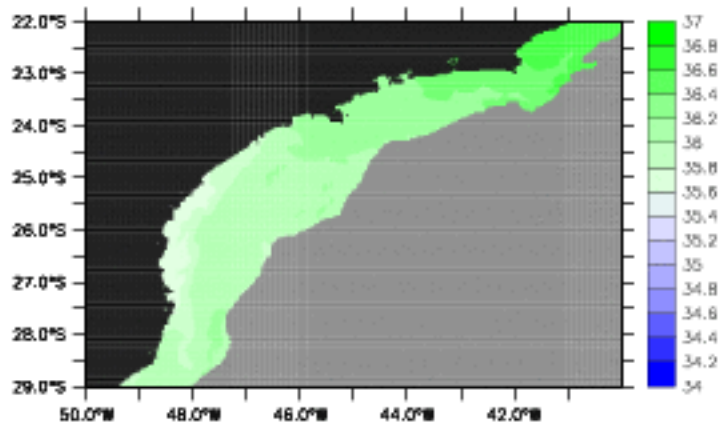
summer



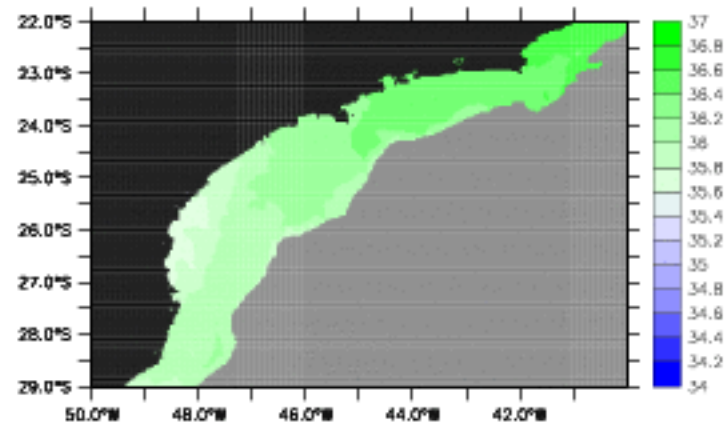
autumn



winter

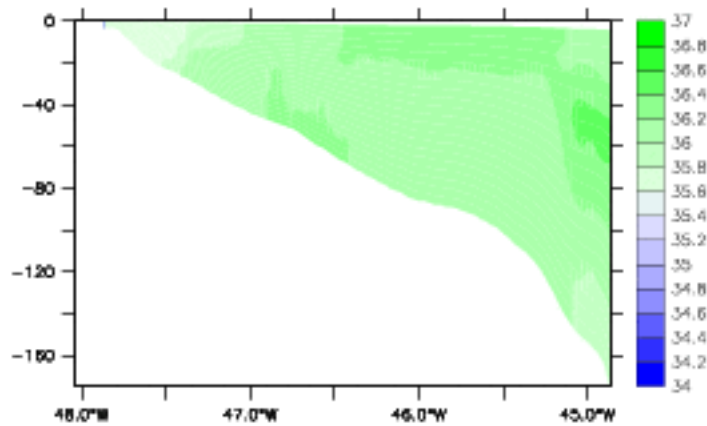


spring

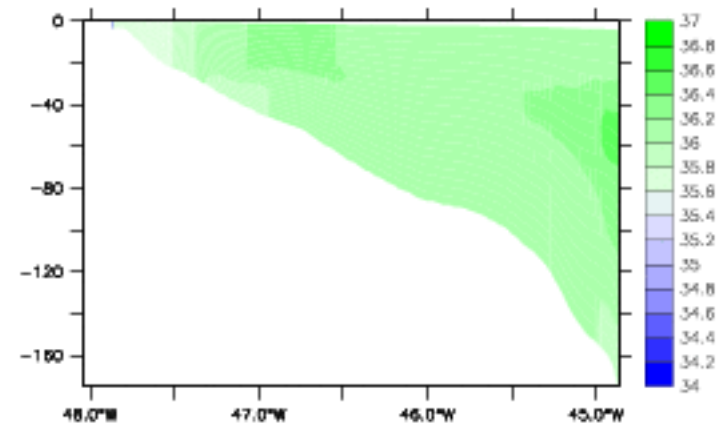


Salinity 25°S section - SBS-3d-a

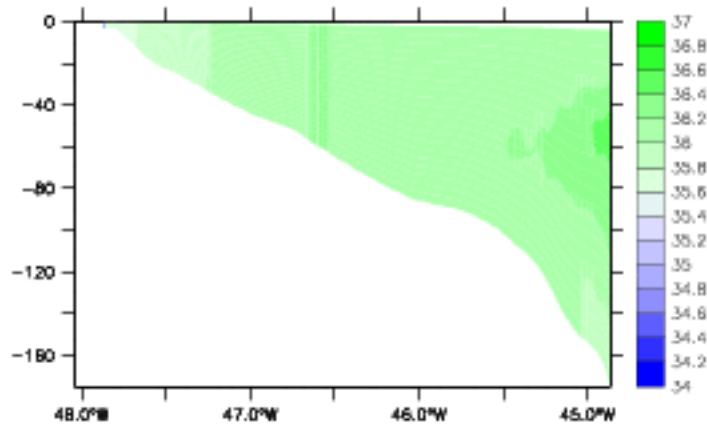
summer



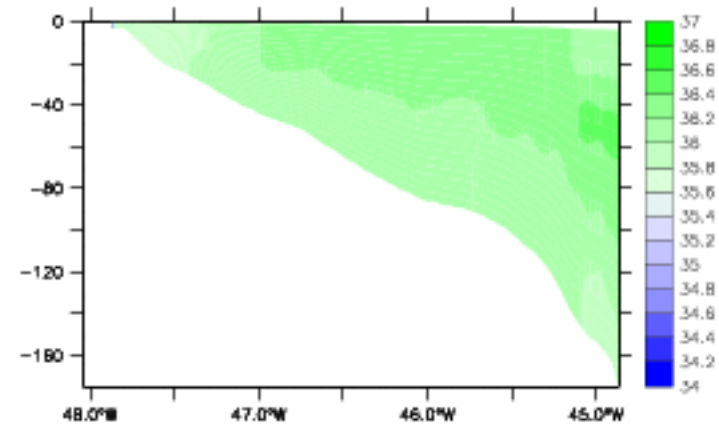
autumn



winter

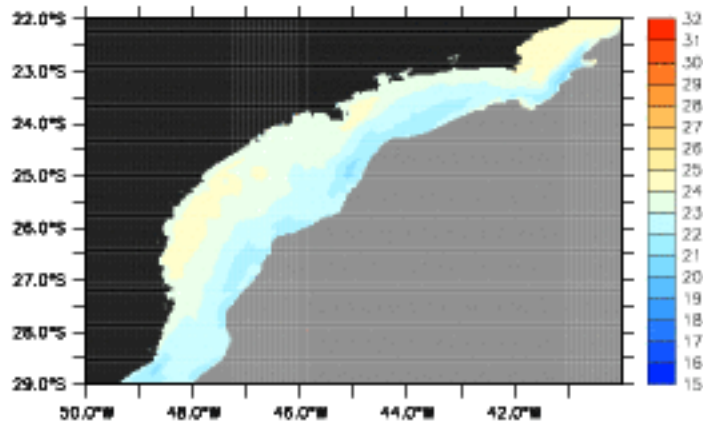


spring

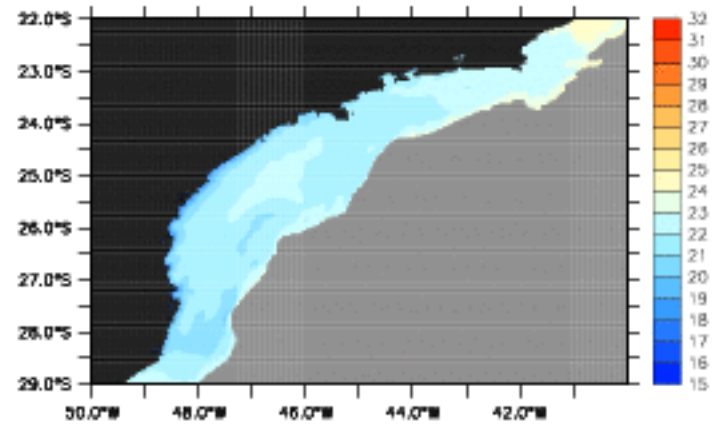


Surface Temperature - SBS-3d-g

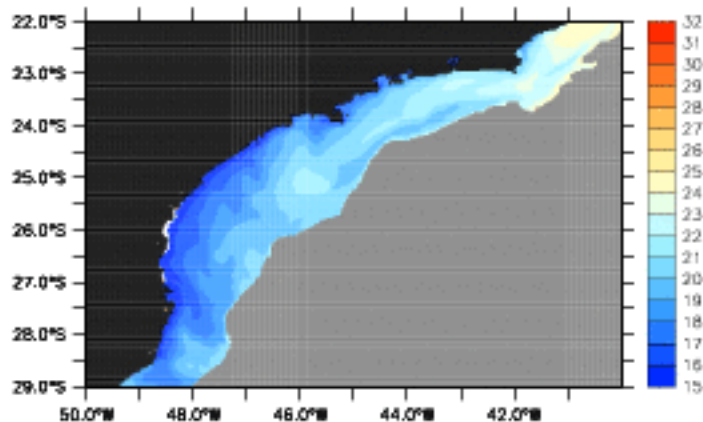
summer



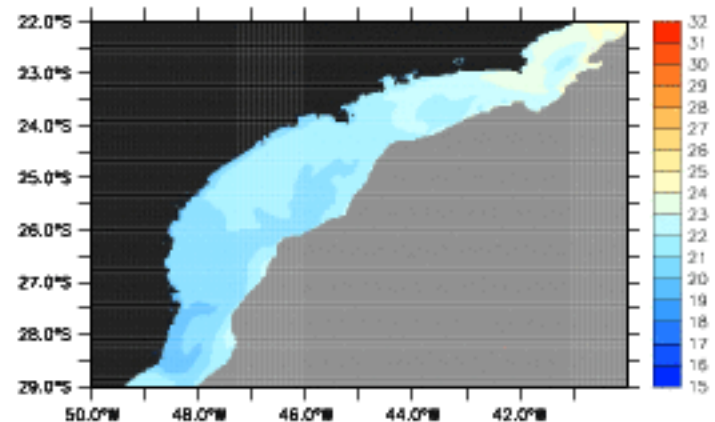
autumn



winter

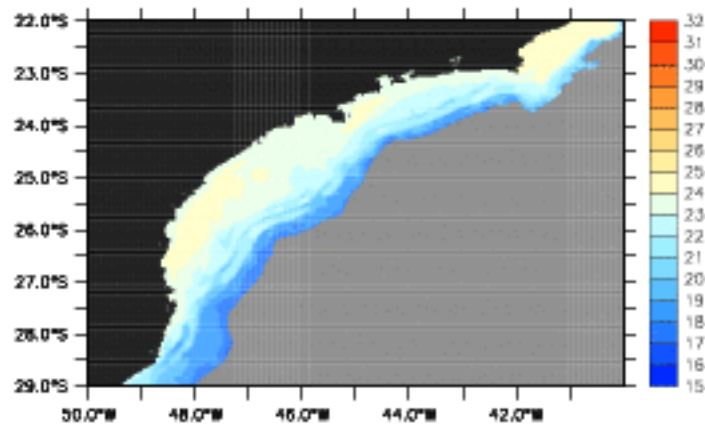


spring

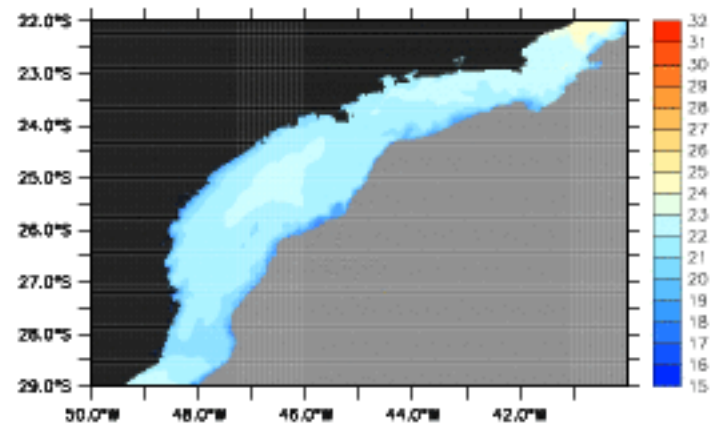


Bottom Temperature - SBS-3d-g

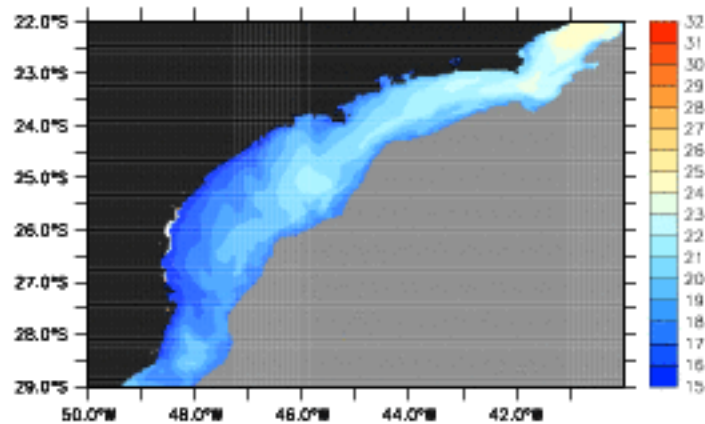
summer



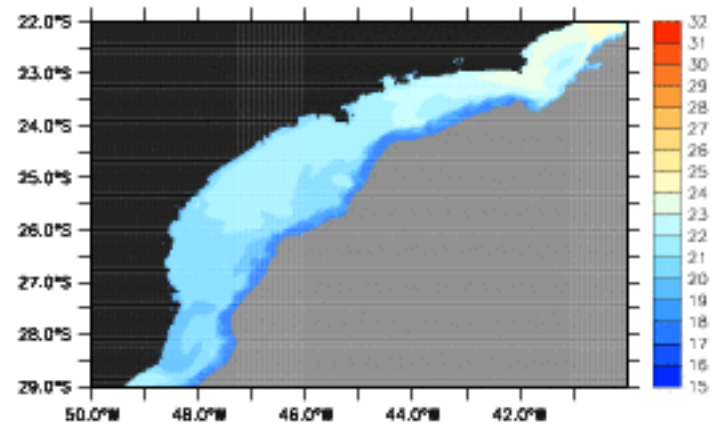
autumn



winter

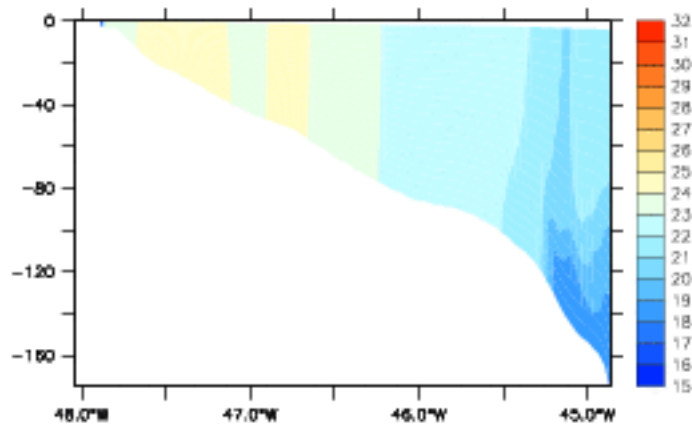


spring

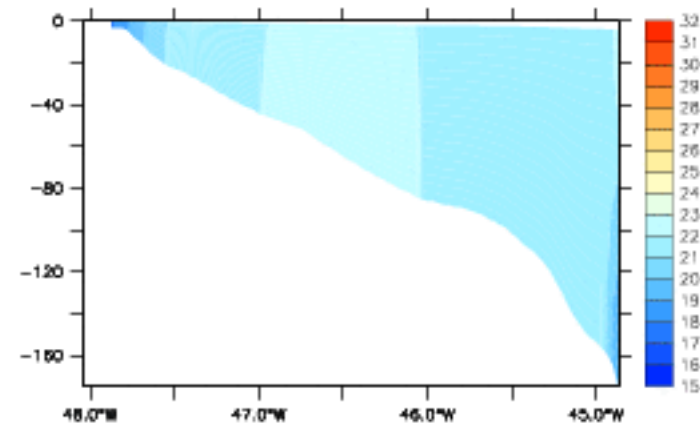


Temperature 25°S section - SBS-3d-g

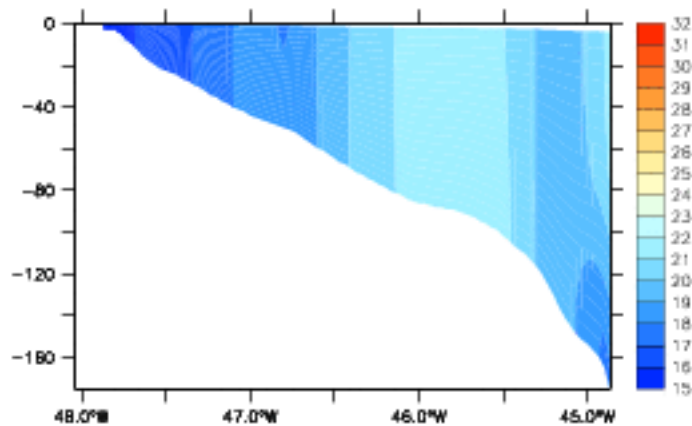
summer



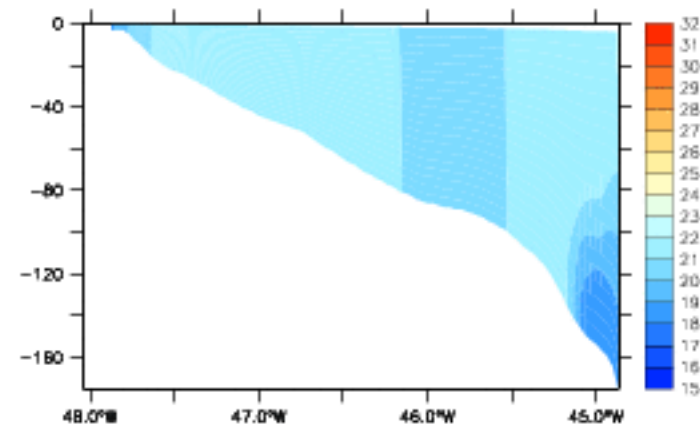
autumn



winter

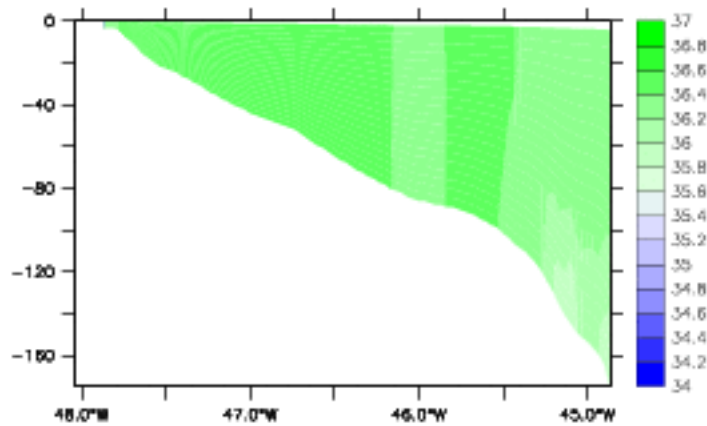


spring

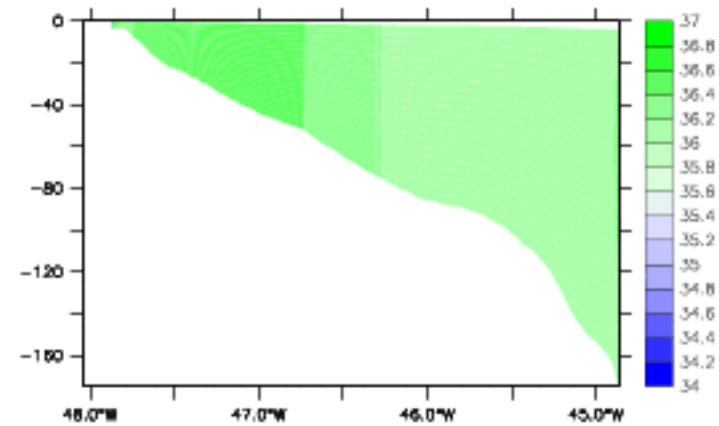


Salinity 25°S section - SBS-3d-g

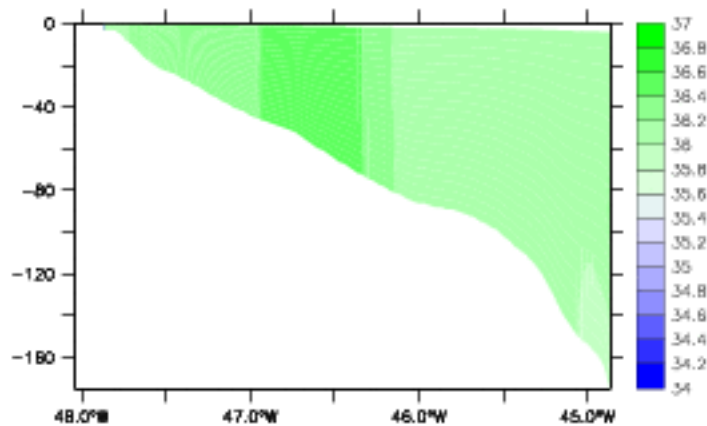
summer



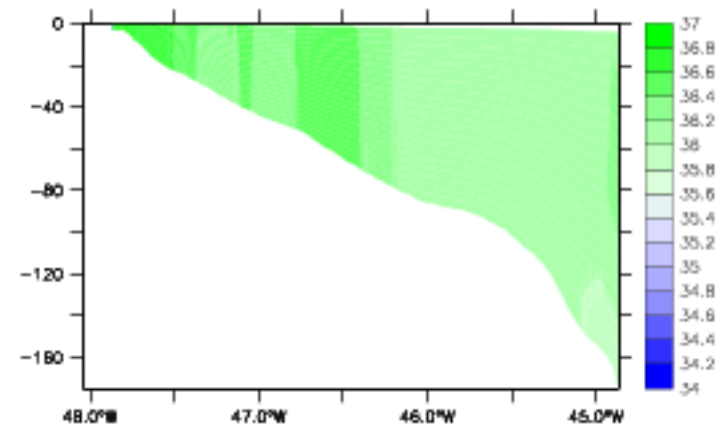
autumn



winter

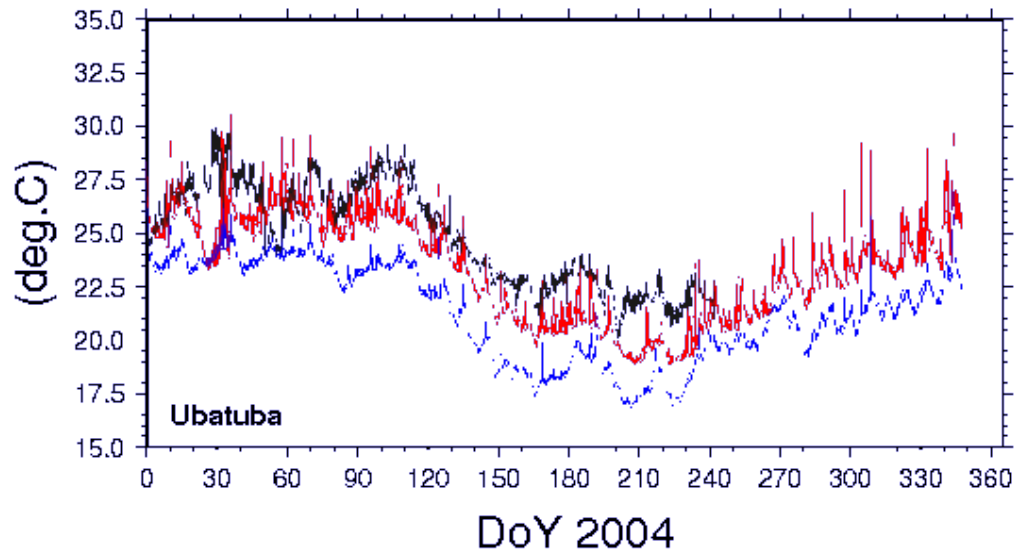
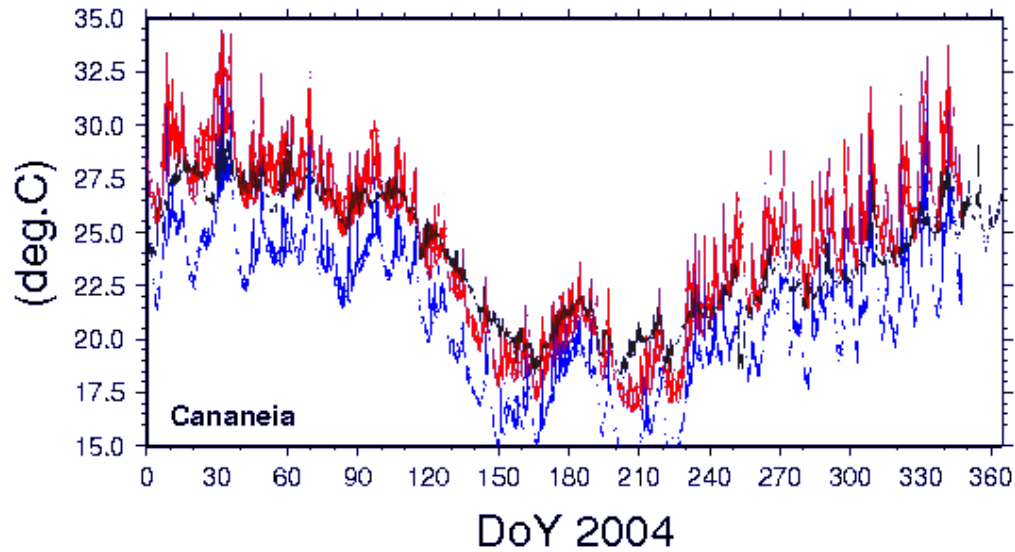


spring



Sea-water temperature - 2004

Cananeia and Ubatuba Stations



Data (black)
SBS-3d-a (red)
SBS-3d-g (blue)

Conclusions

- Tides – sea-level and currents – are well simulated by COHERENS in the Southeastern Brazilian Shelf
- Atmospheric forcing field, mainly wind velocity, is not adequate to run an operational model of the Southeastern Brazilian Shelf
- Wind mixing is an important for T and S distribution
- Shelf edge currents ?