La circulation du Pacifique sud-ouest:

sa rôle dans la climat à la grande échelle

Travail en cours!

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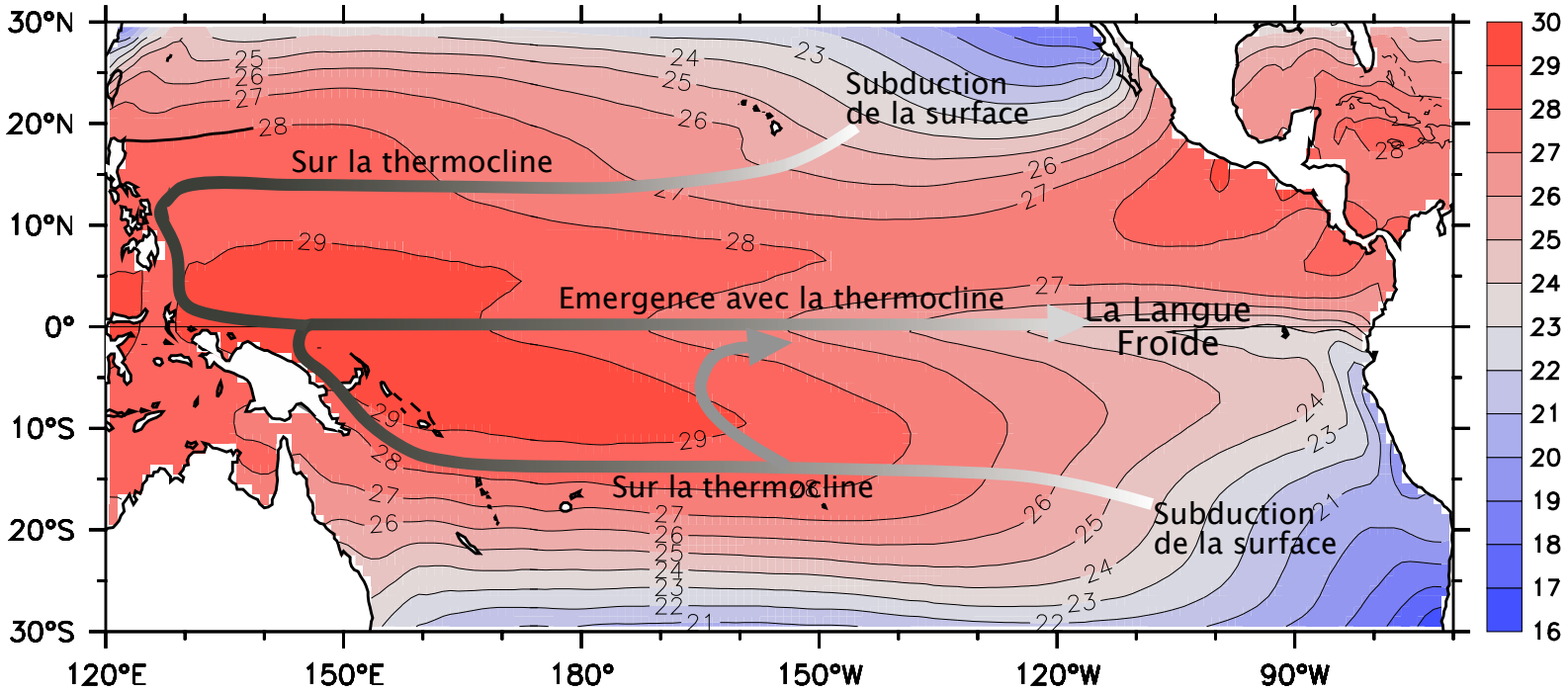
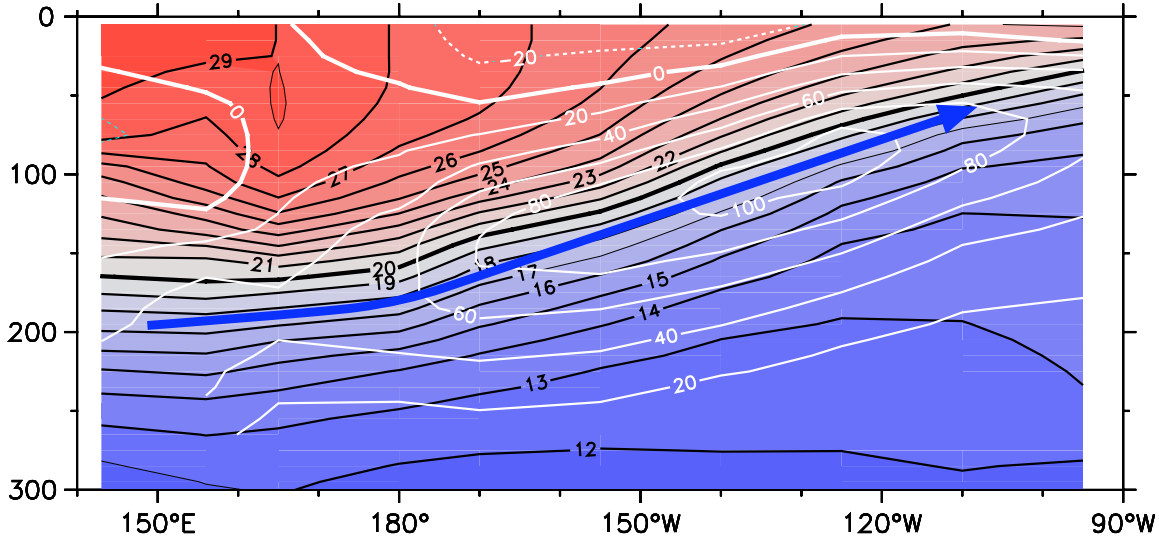
L'accomplissement le plus important ici:
je m'ai fait des amis et des collégues

L'eau de la Langue Froide provient des subtropiques



Temperature de surface
(Reynolds SST)

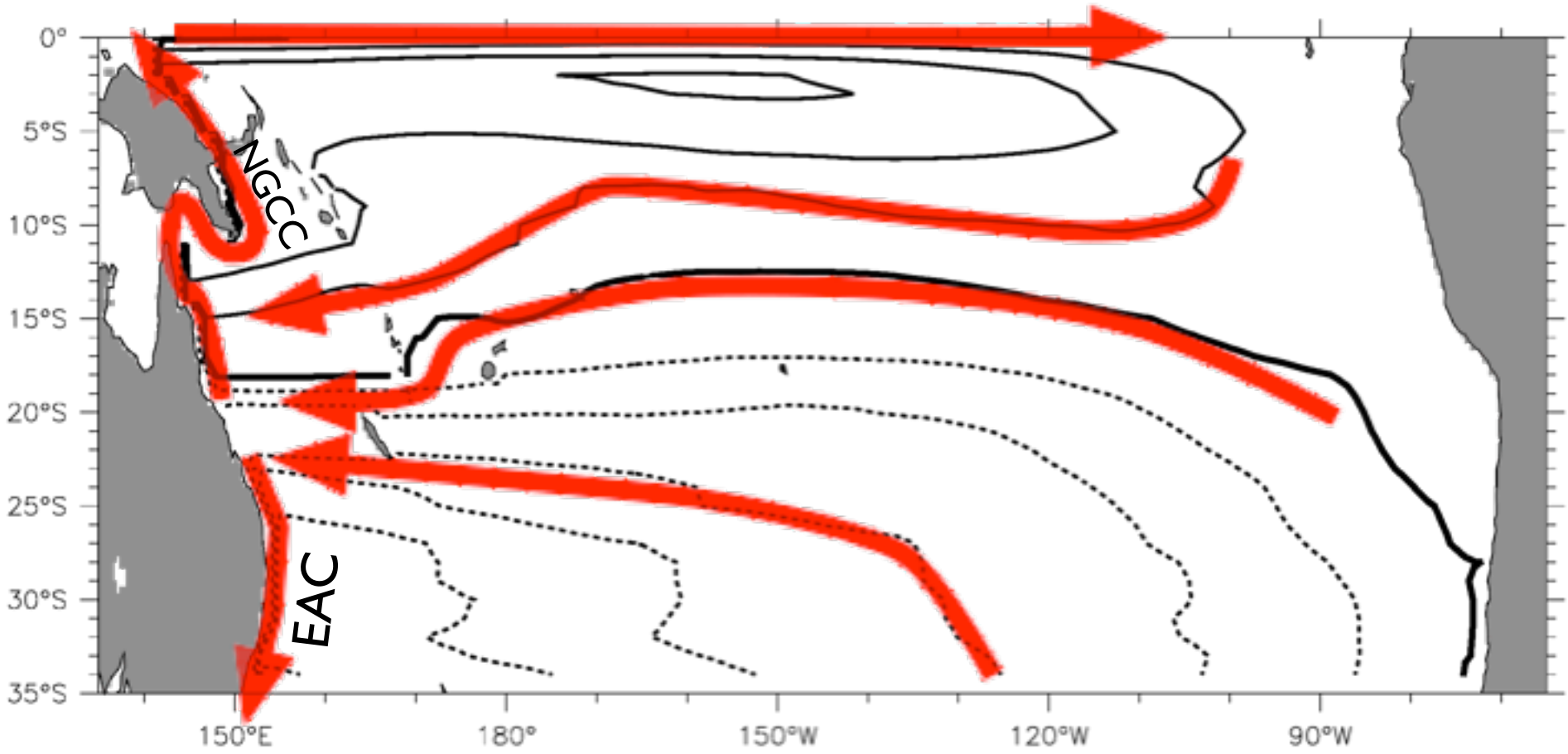
Chemins schematiques de subduction et resurgence equatoriale.
Gris foncé = plus profond



Section verticale sur l'equateur

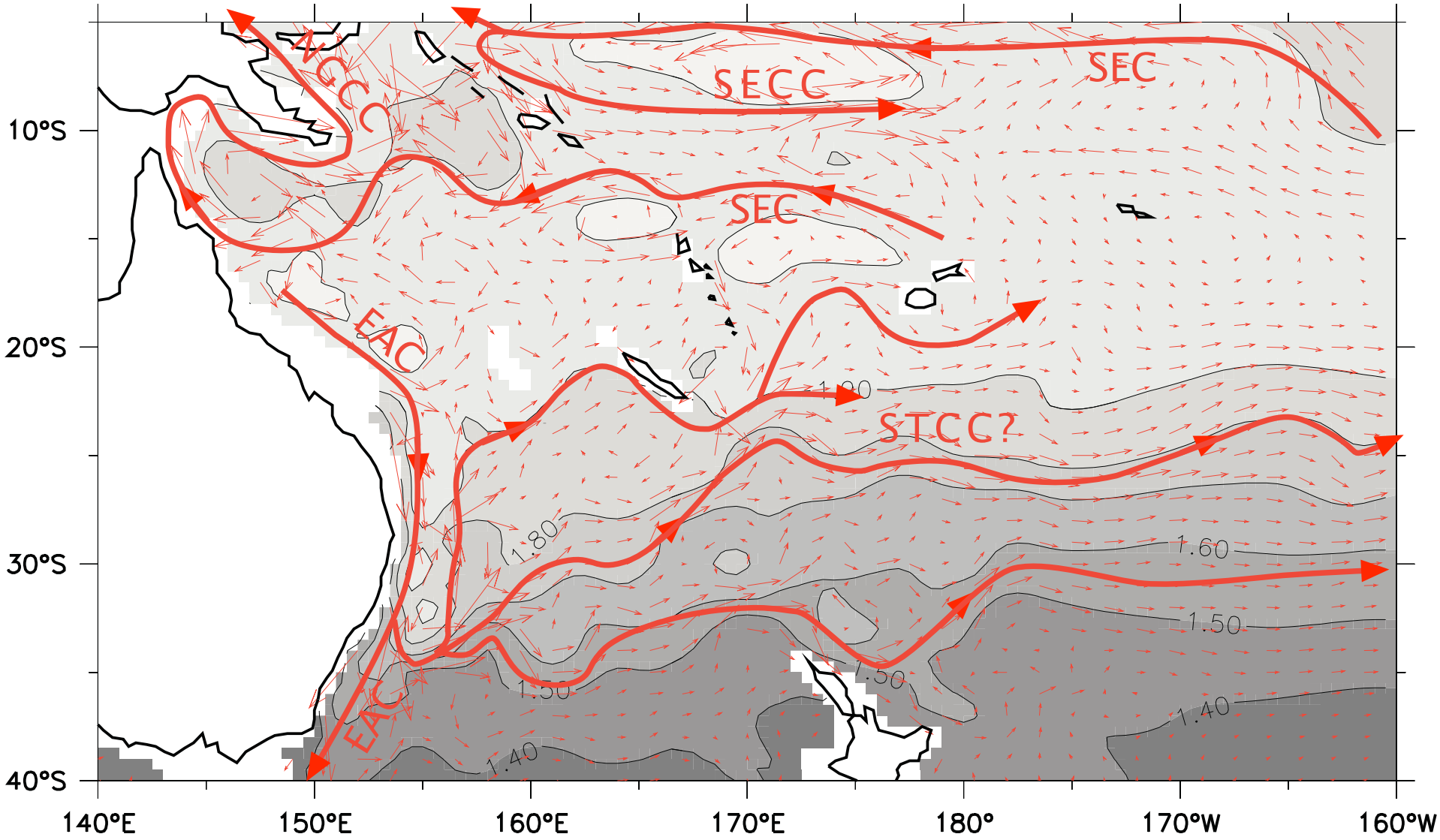
Couleur: Temperature
Contours blancs: Vitesse
Flêche bleue: SouCourant Equatoriale
(TAO CTD/ADCP)

à plus grande échelle



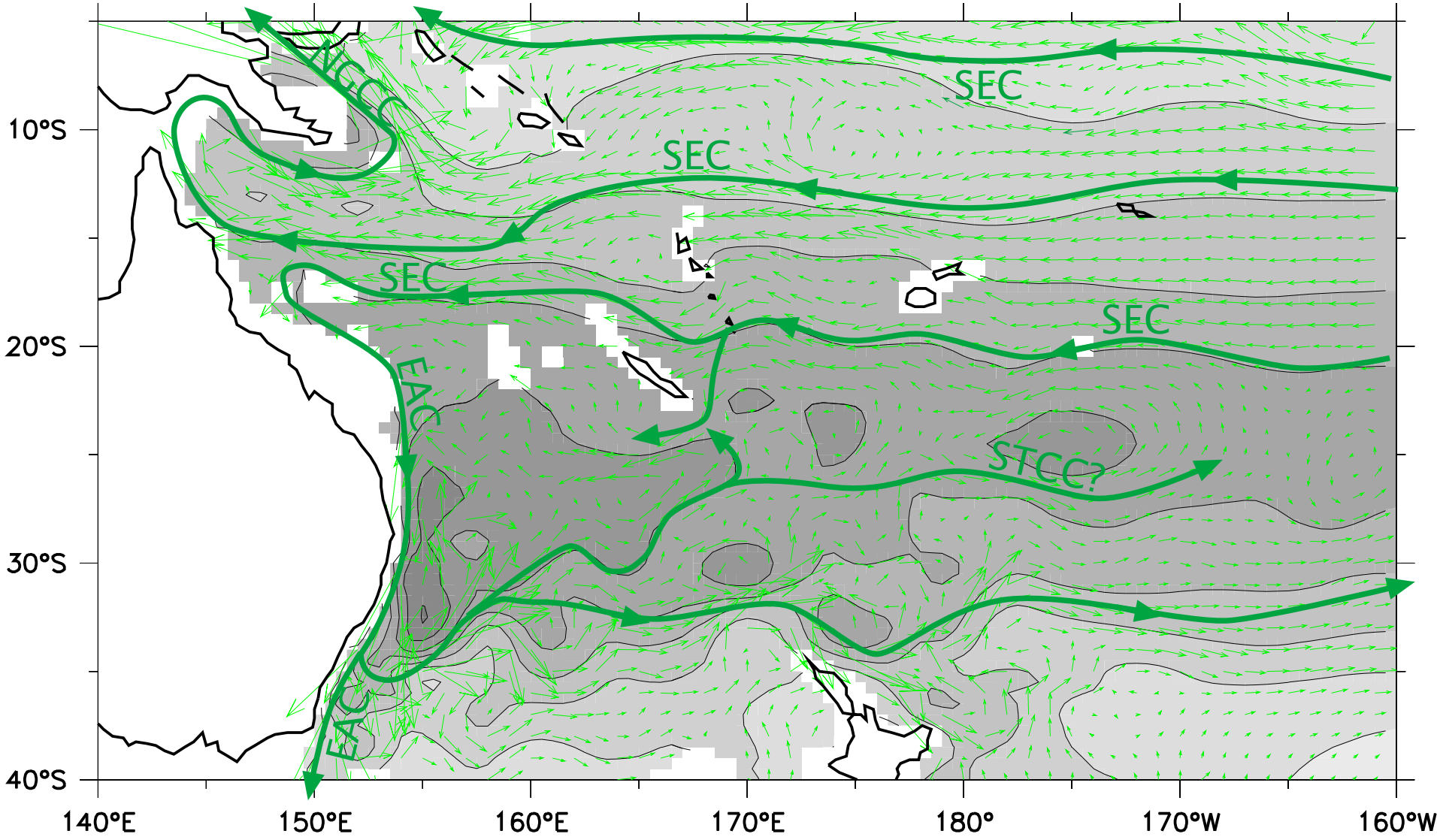
Que se passe t'il quand le transport
qui entre dans la Mer du Corail varie?

Courants de surface



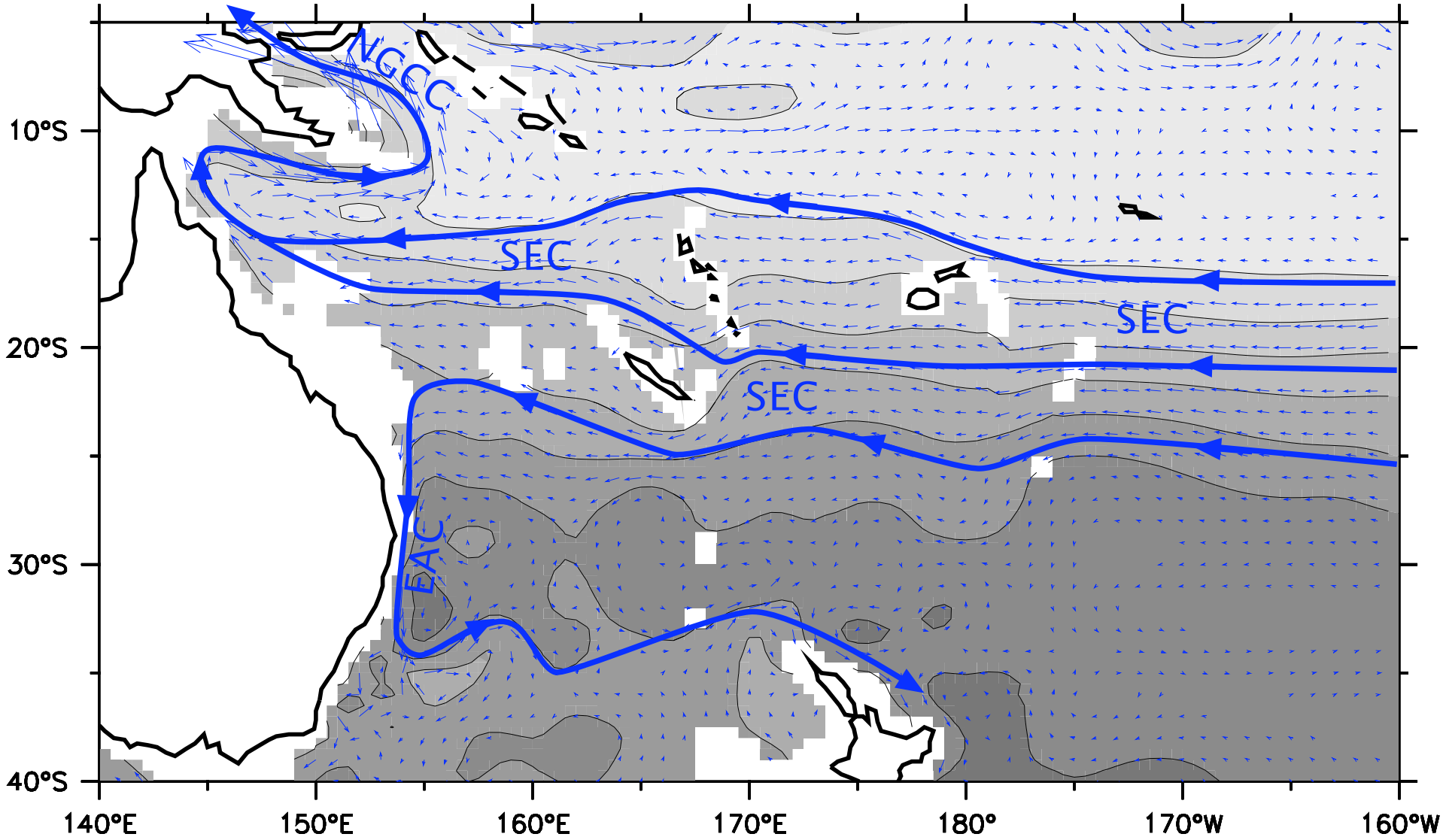
Courants geostrophiques relatif 2000m (CARS)

Courants sur Sigma-T = 26 (central thermocline)



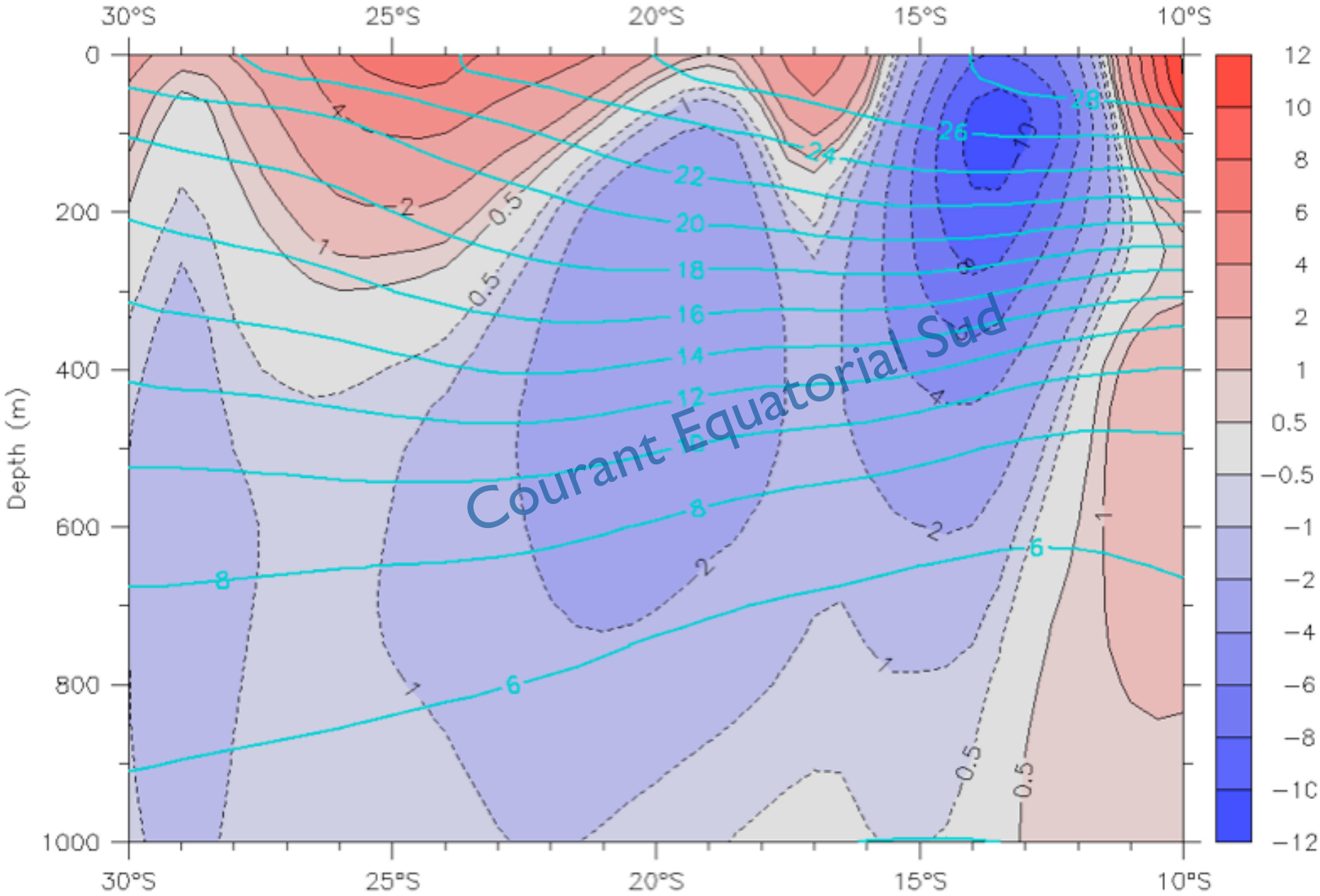
Courants geostrophiques relatif 2000m (CARS)

Courants sur Sigma-T = 27 (lower thermocline)



Courants geostrophiques relatif 2000m (CARS)

Courants zonales sur 170°E –180°



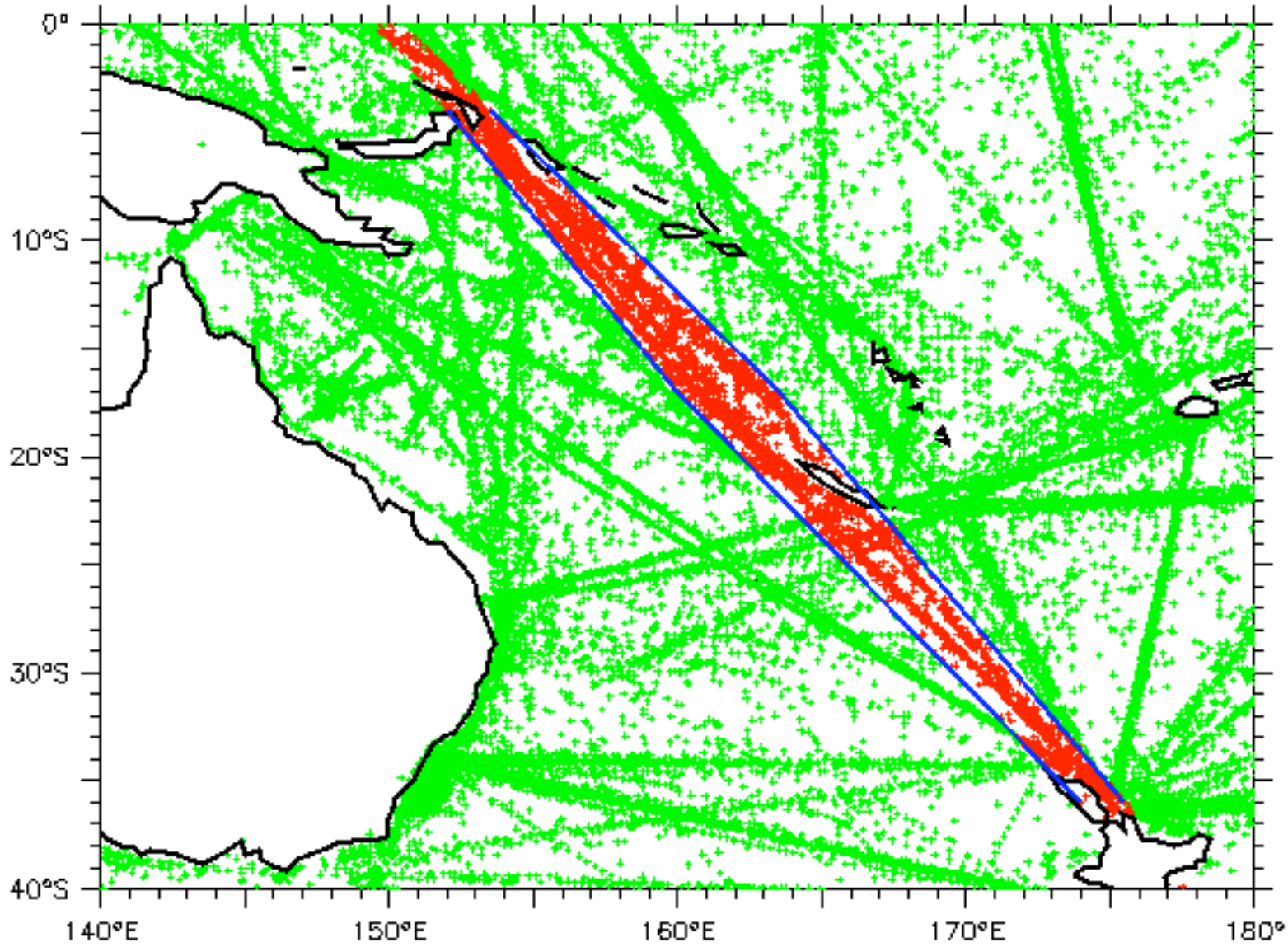
Les contours bleus indiquent la temperature. Courants relatifs à 2000m

Après cette introduction:

- Sur la plupart du sud-Pacifique, les courants en surface vont vers l'est, mais la circulation en total va vers l'ouest.
  Nous reviendrons à cette question ....
- Maintenant, nous voudrions comprendre la variabilité du SEC, et sa conséquence.

Auckland–Bismarck Strait XBT track

IFREMER XBT data 1985–2002. 4734 of 68215 profiles



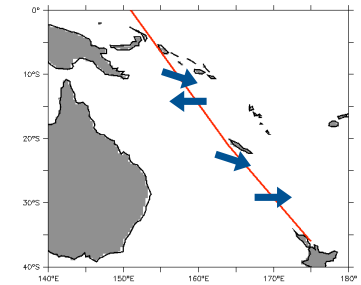
Pourquoi utiliser les données XBT?

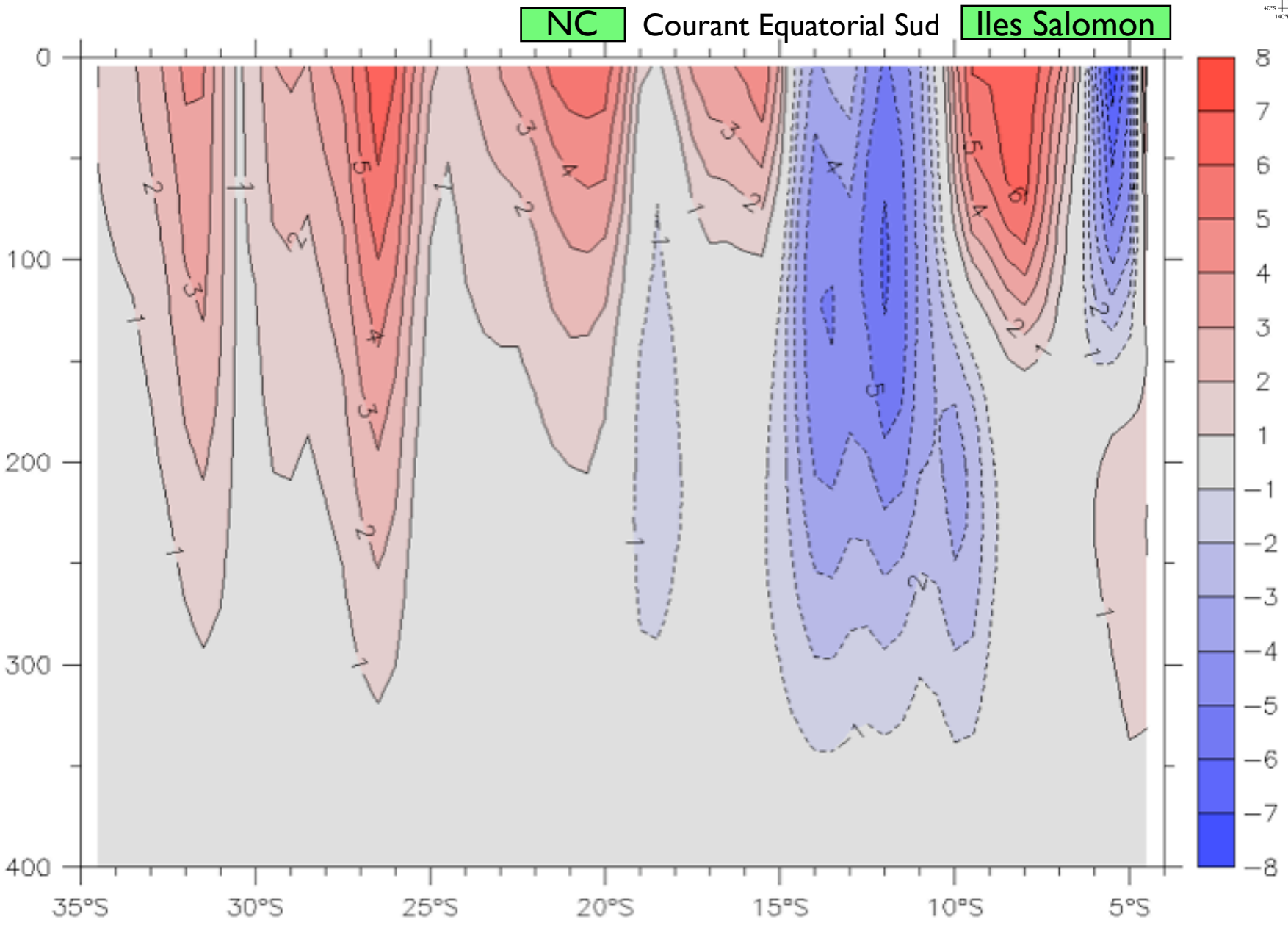
Elles sont très irrégulieres et difficiles à traiter. Mais, par contre .....

- On peut rallonger la time series, au moins jusqu'aux années 1980. C'est très important parce que les années 1990s sont marquées par le grand événement de 1997-98.
- On peut étudier la structure verticale. Comme nous avons vu, un des traits fondamentaux du Pacifique Sud est son cisaillement des courants.

Courants moyens sur la piste XBT

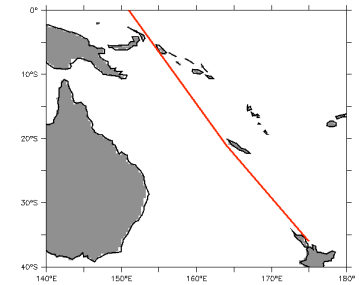
(Juste à l'ouest de Nouvelle Calédonie)

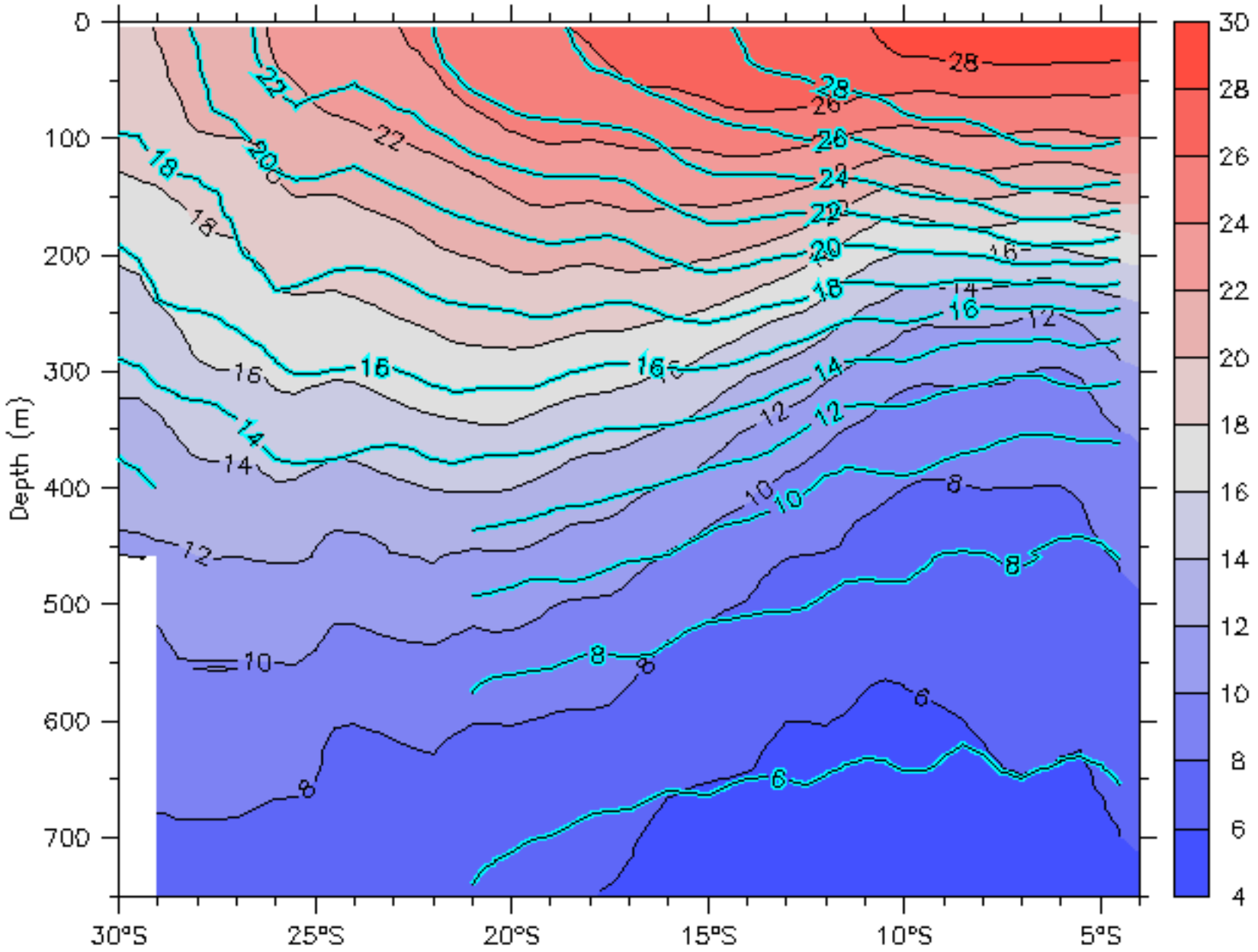




Températures pendant 1992

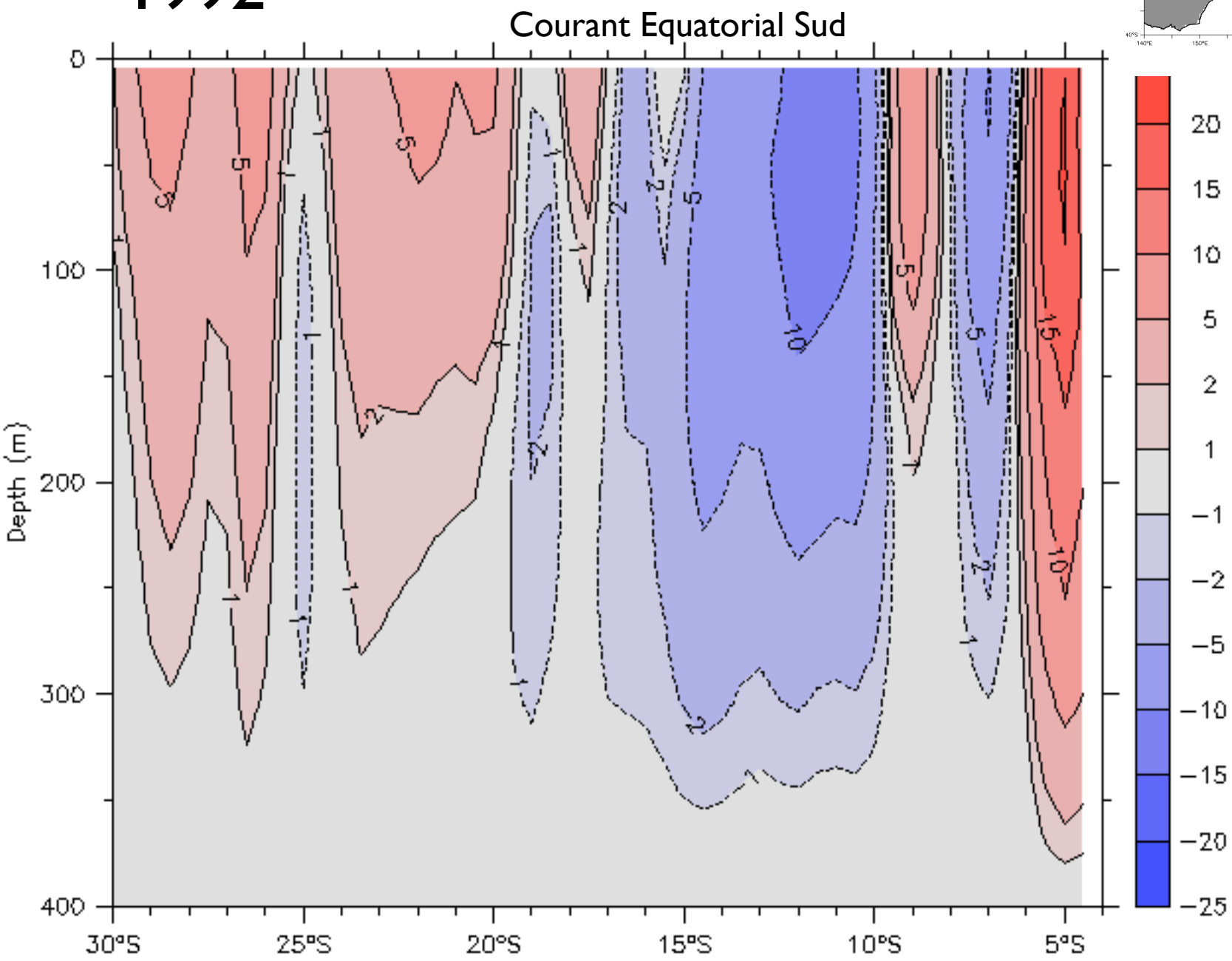
Superpose 1989

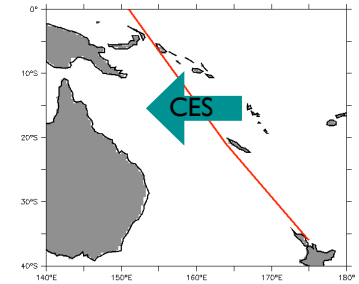




Composante perpendiculaire

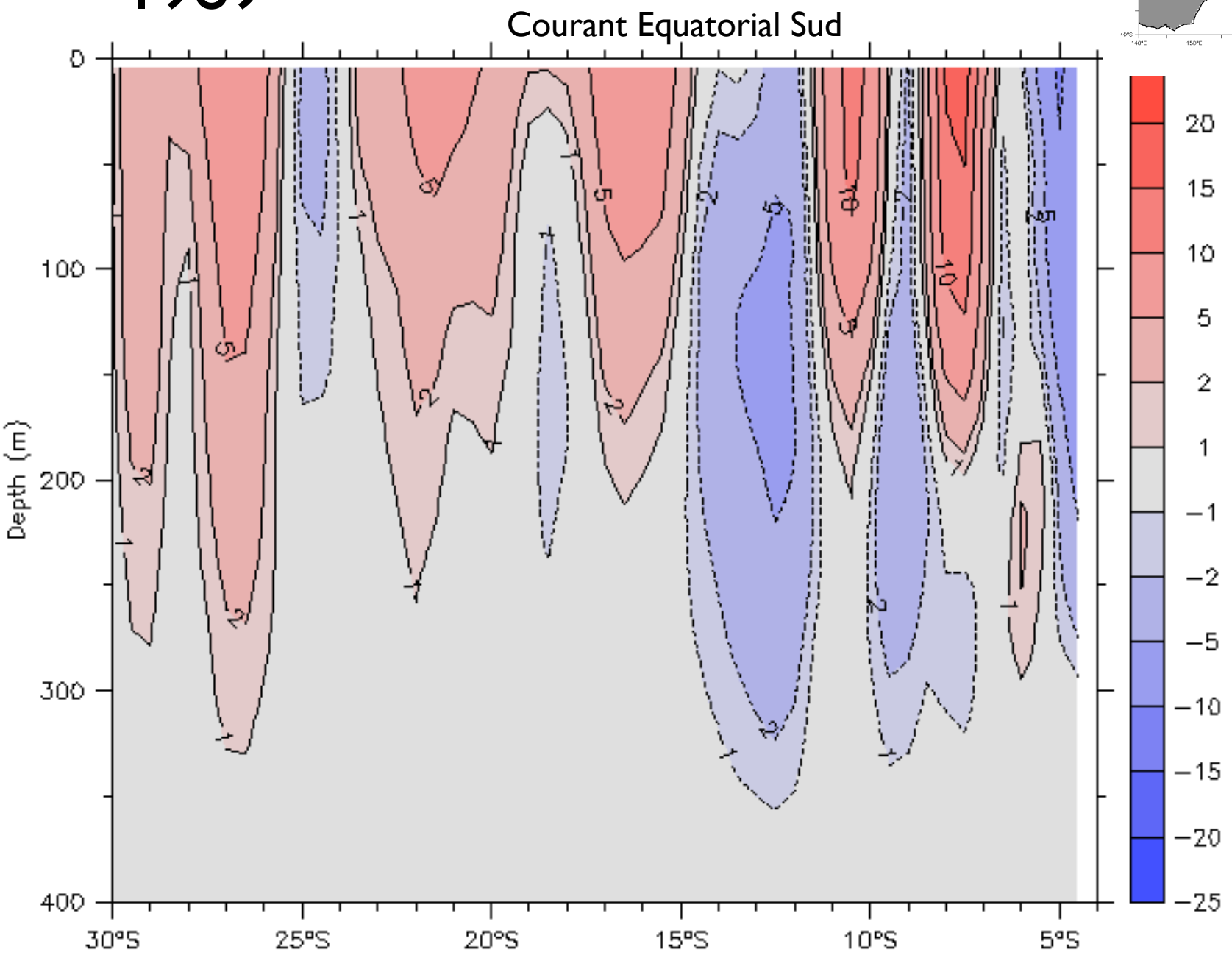
1992

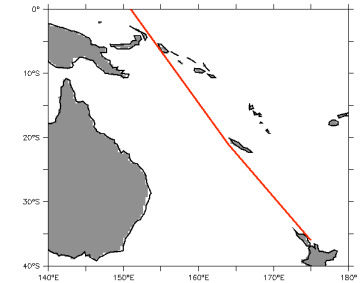


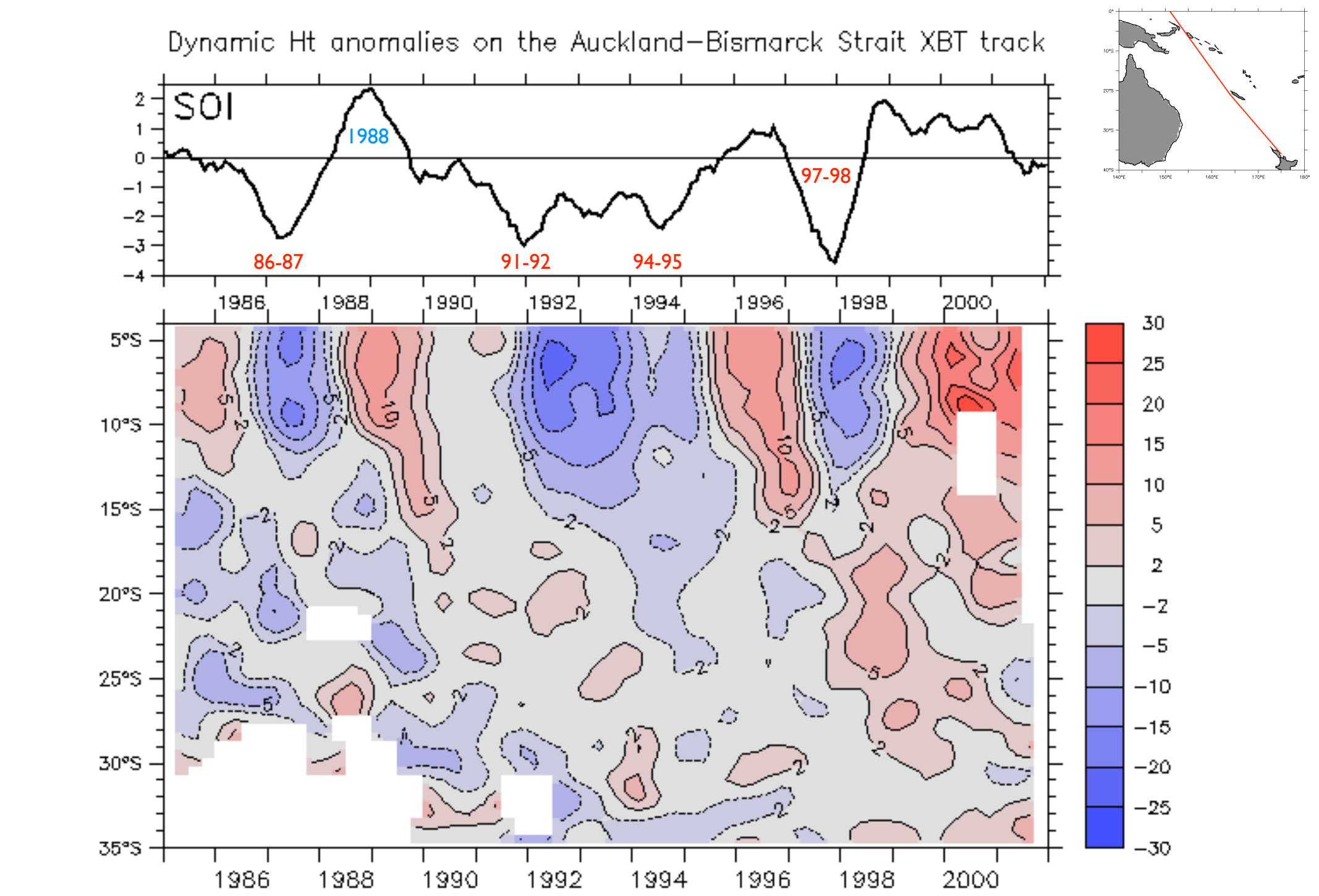


Composante perpendiculaire

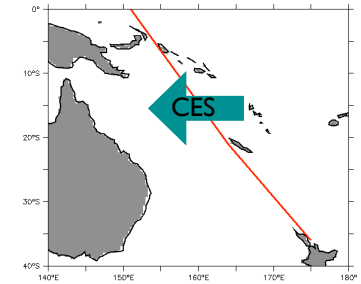
1989

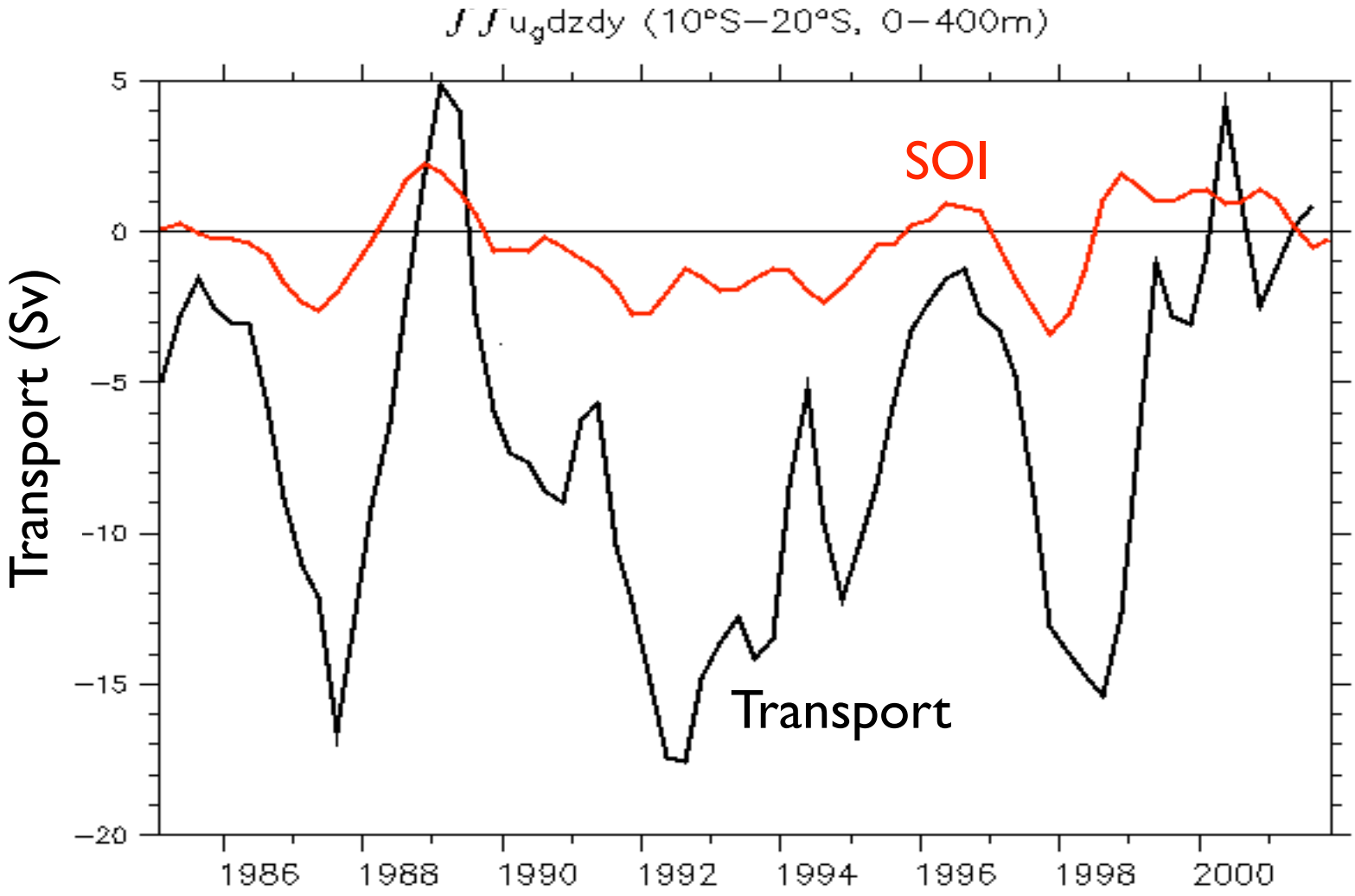





Dynamic Ht anomalies on the Auckland–Bismarck Strait XBT track
SOI
1988
86-87
91-92
94-95
97-98
2
1
0
−1
−2
−3
−4
1986
1988
1990
1992
1994
1996
1998
2000
5°S
10°S
15°S
20°S
25°S
30°S
35°S
30
25
20
15
10
5
2
−2
−5
−10
−15
−20
−25
−30

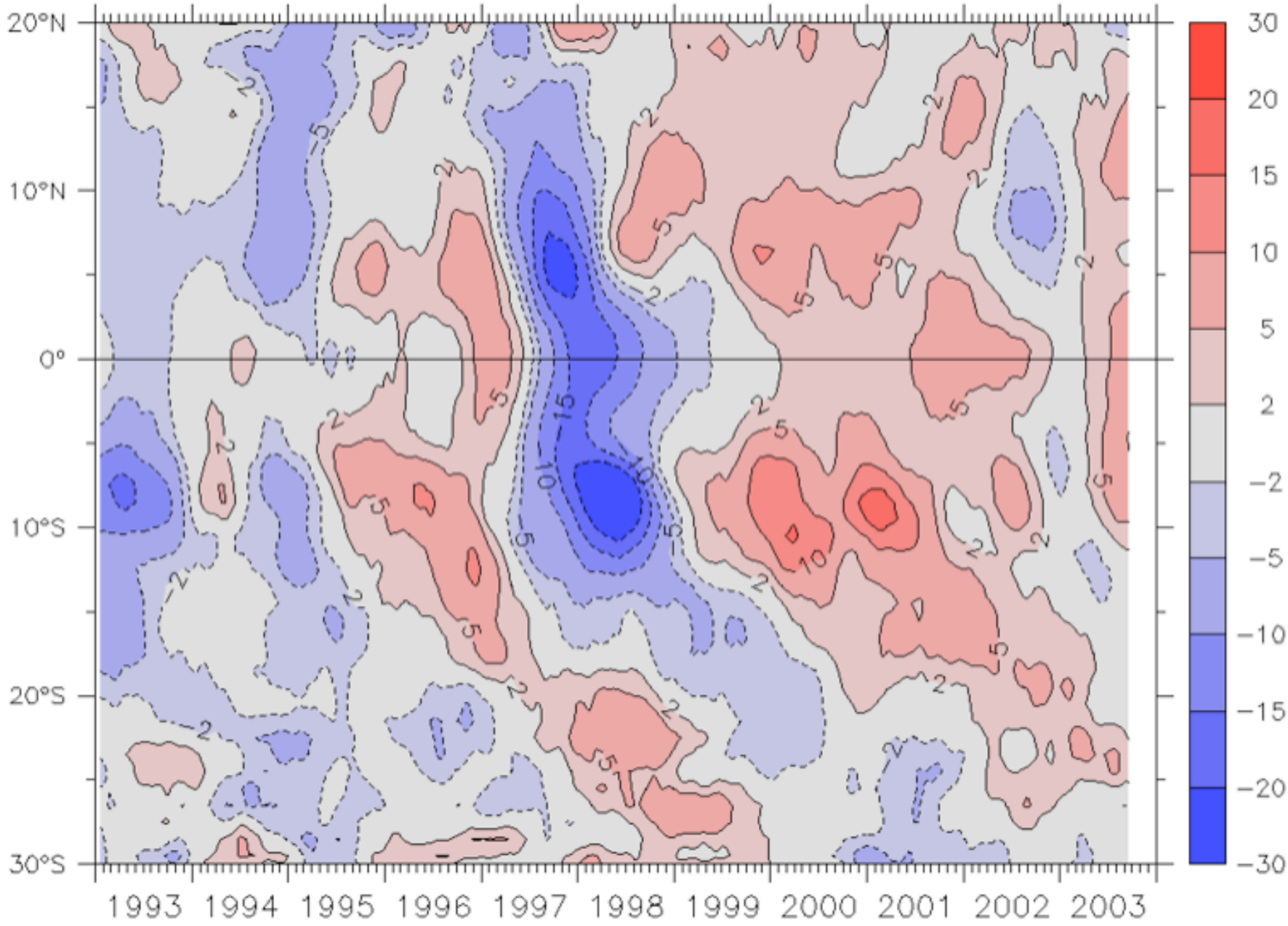
Transport entre NC et les Îles Salomon

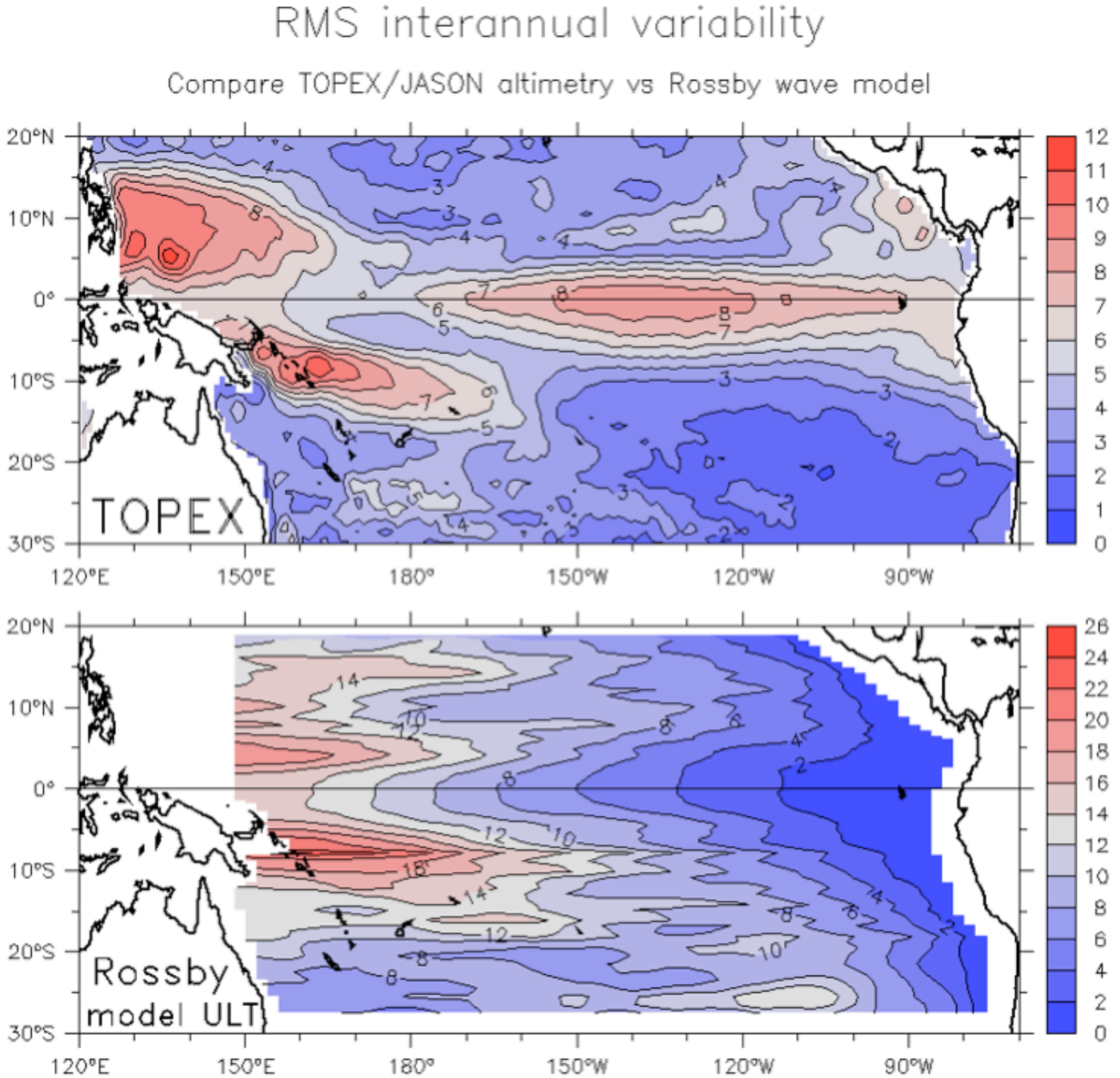




Correlation of transport and the SOI = 0.70

Niveau de la mer le long de 165°E (TOPEX/JASON)

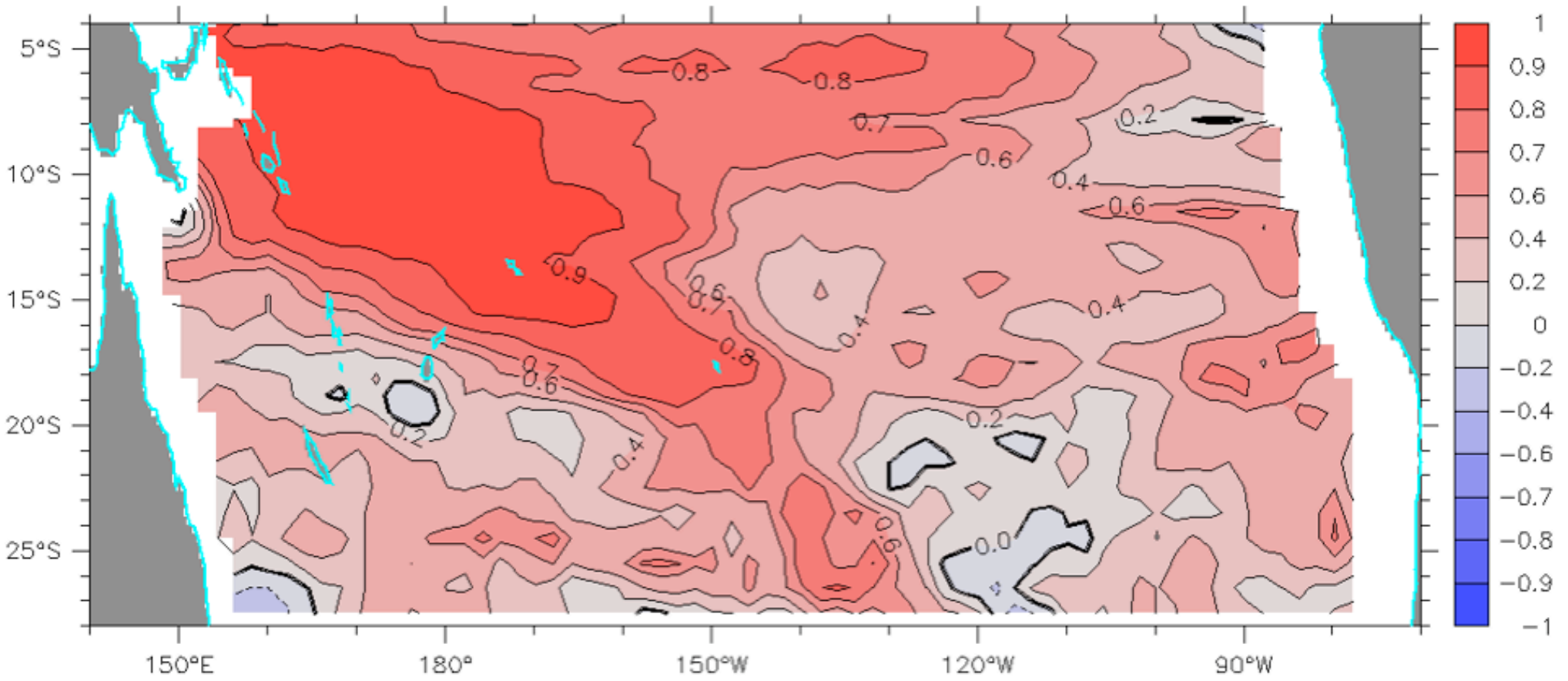




Niveau de la mer (TOPEX) (cm)

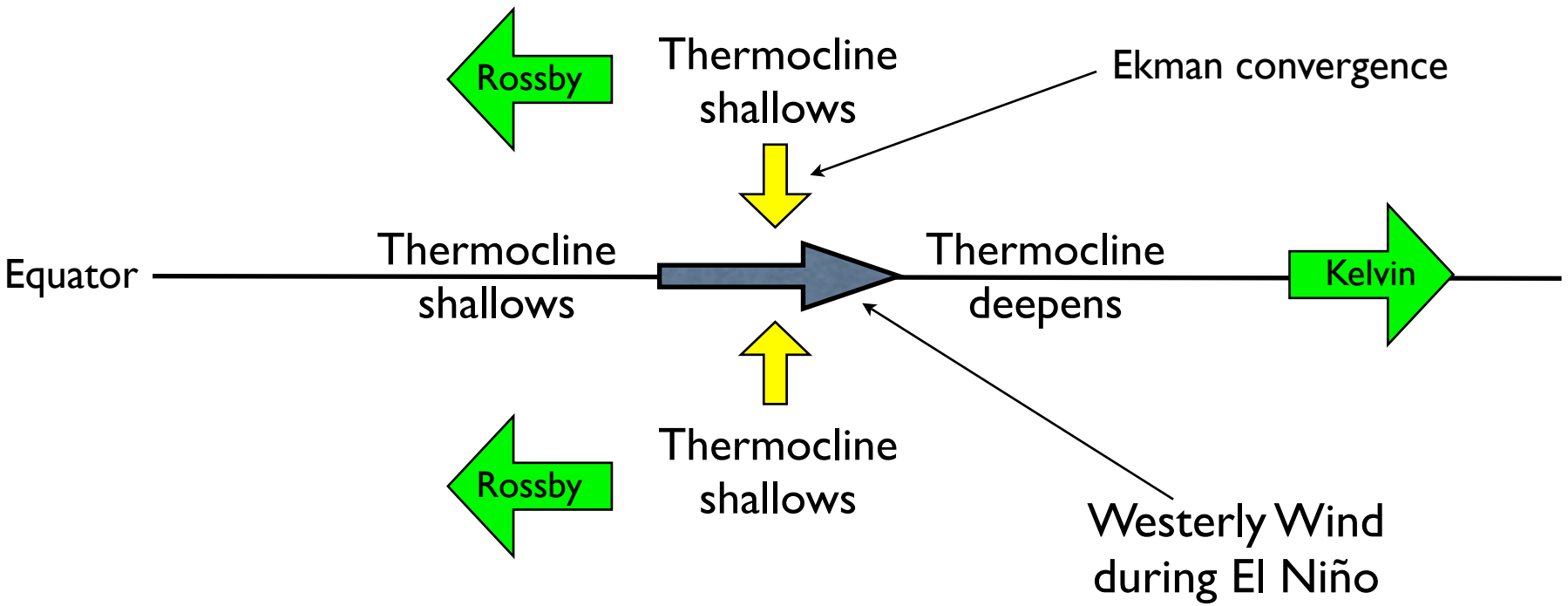
Profondeur de la thermocline (Model) (m)

Correlation entre TOPEX (niveau de la mer) et une modèle des ondes Rossby



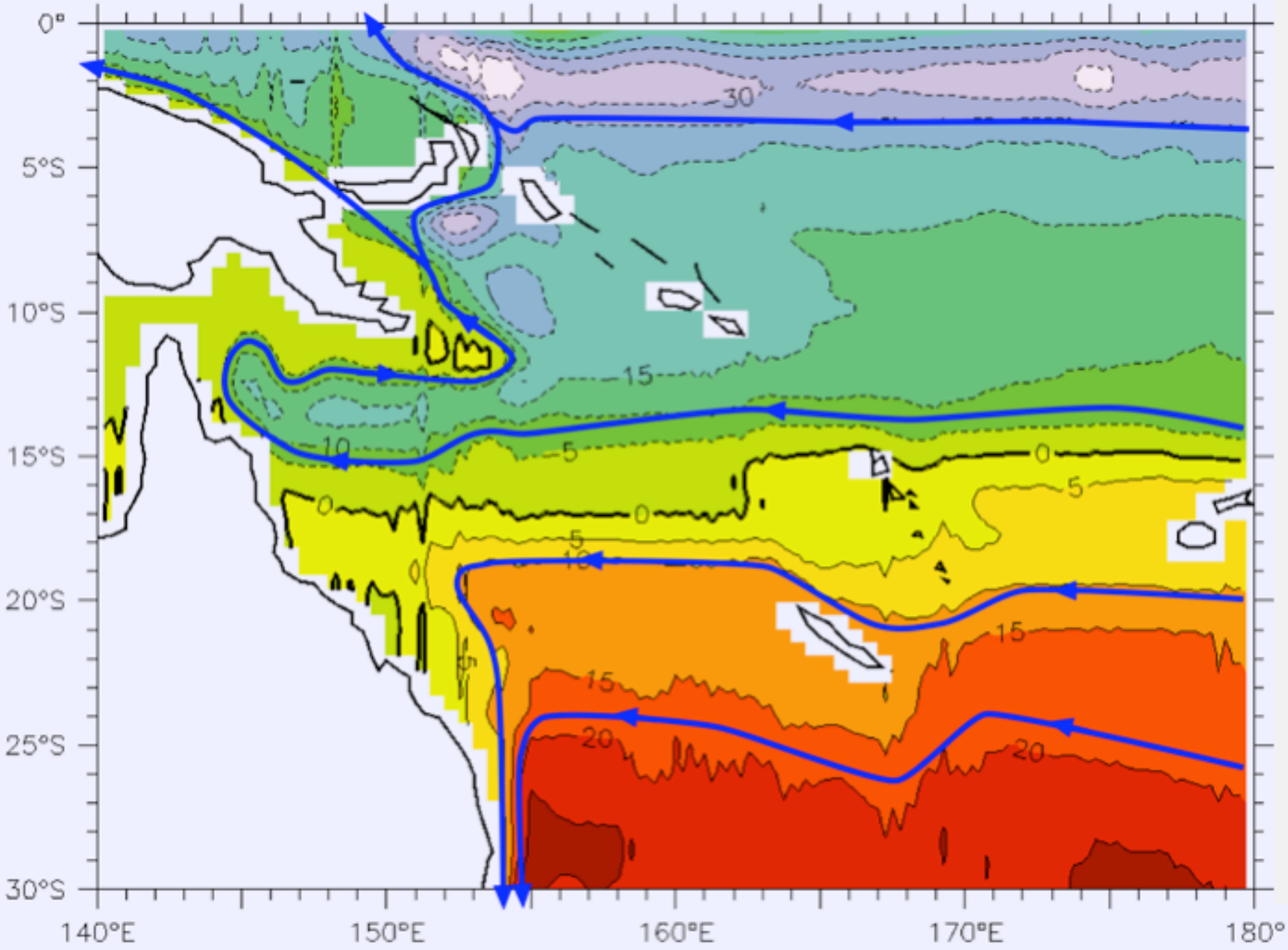
Interannual variations 1991-2003
Interior winds only (no eastern boundary influence)

Equatorial winds generate both Kelvin and Rossby waves

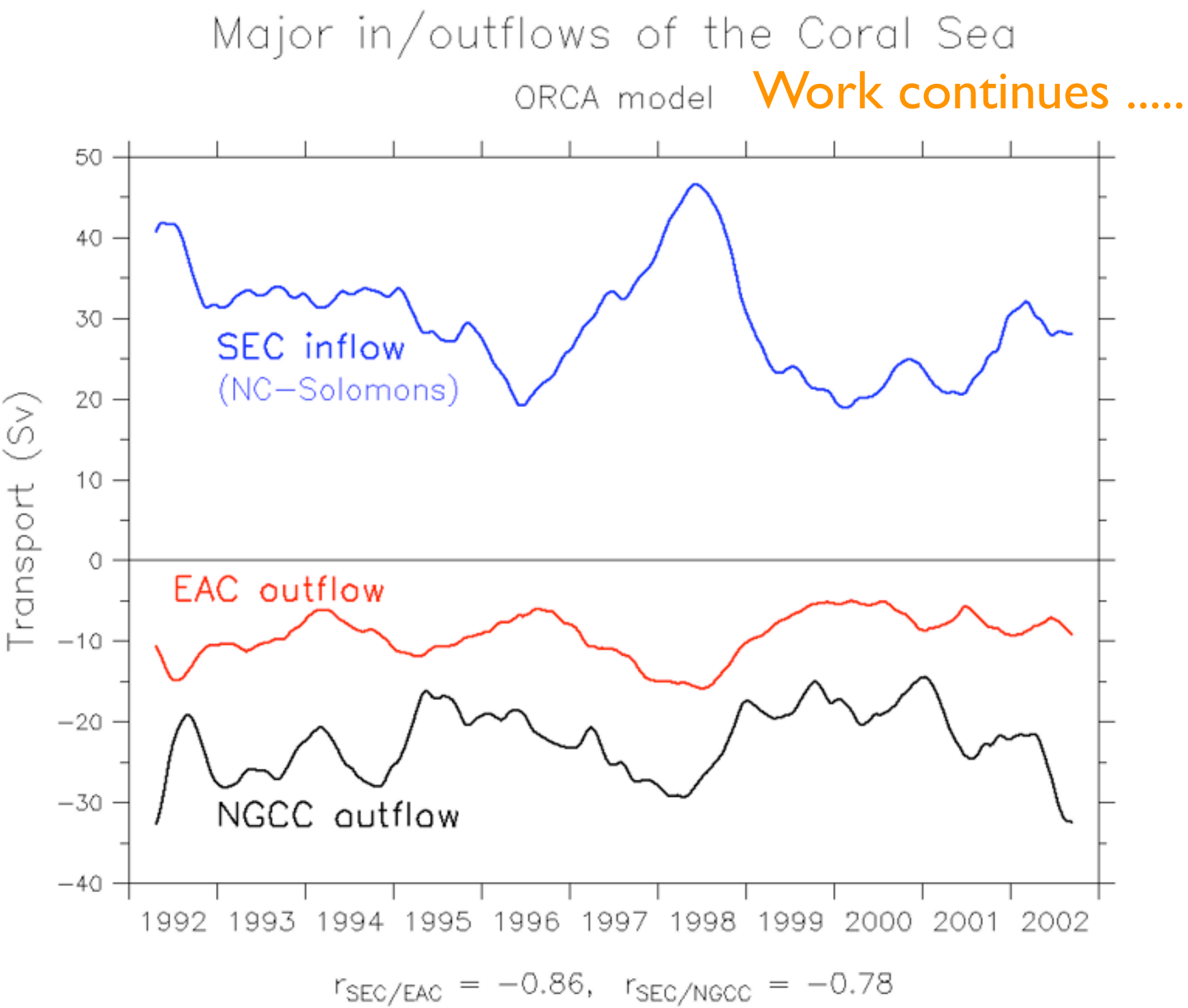


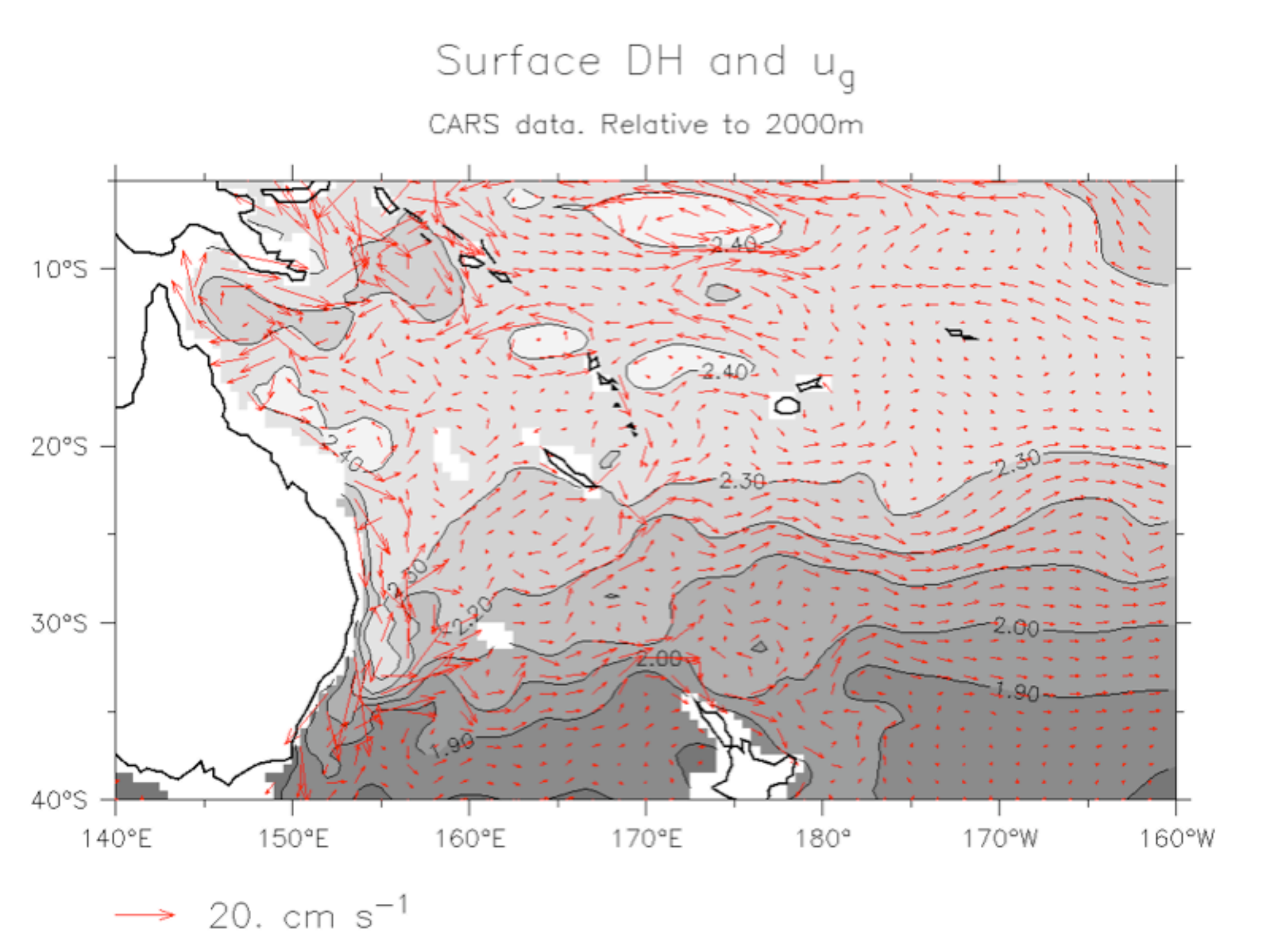
Rossby waves carry the shoaling signal generated by El Niño westerly winds to the off-equatorial western Pacific.

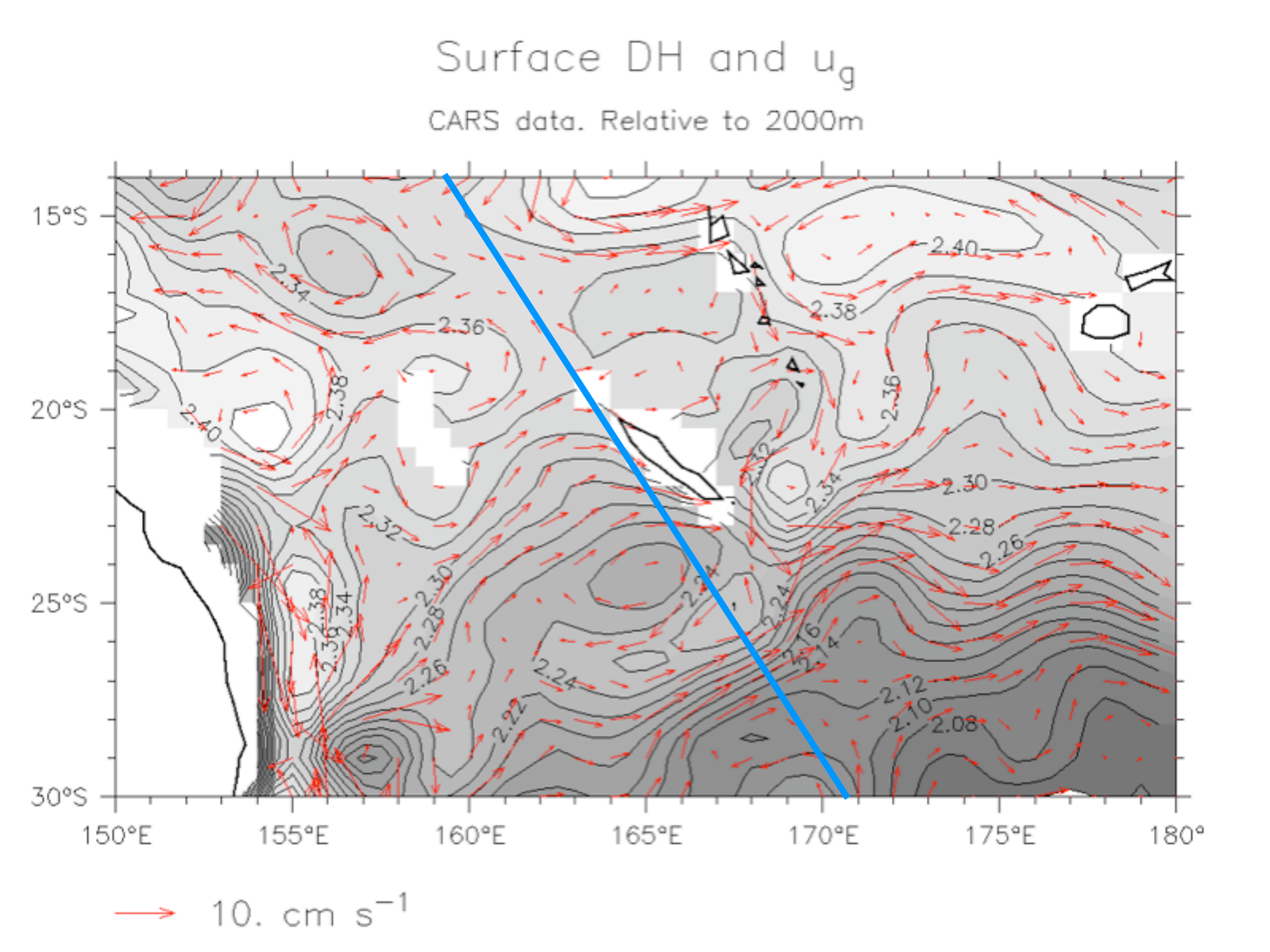
Fonction de courant (modèle ORCA)



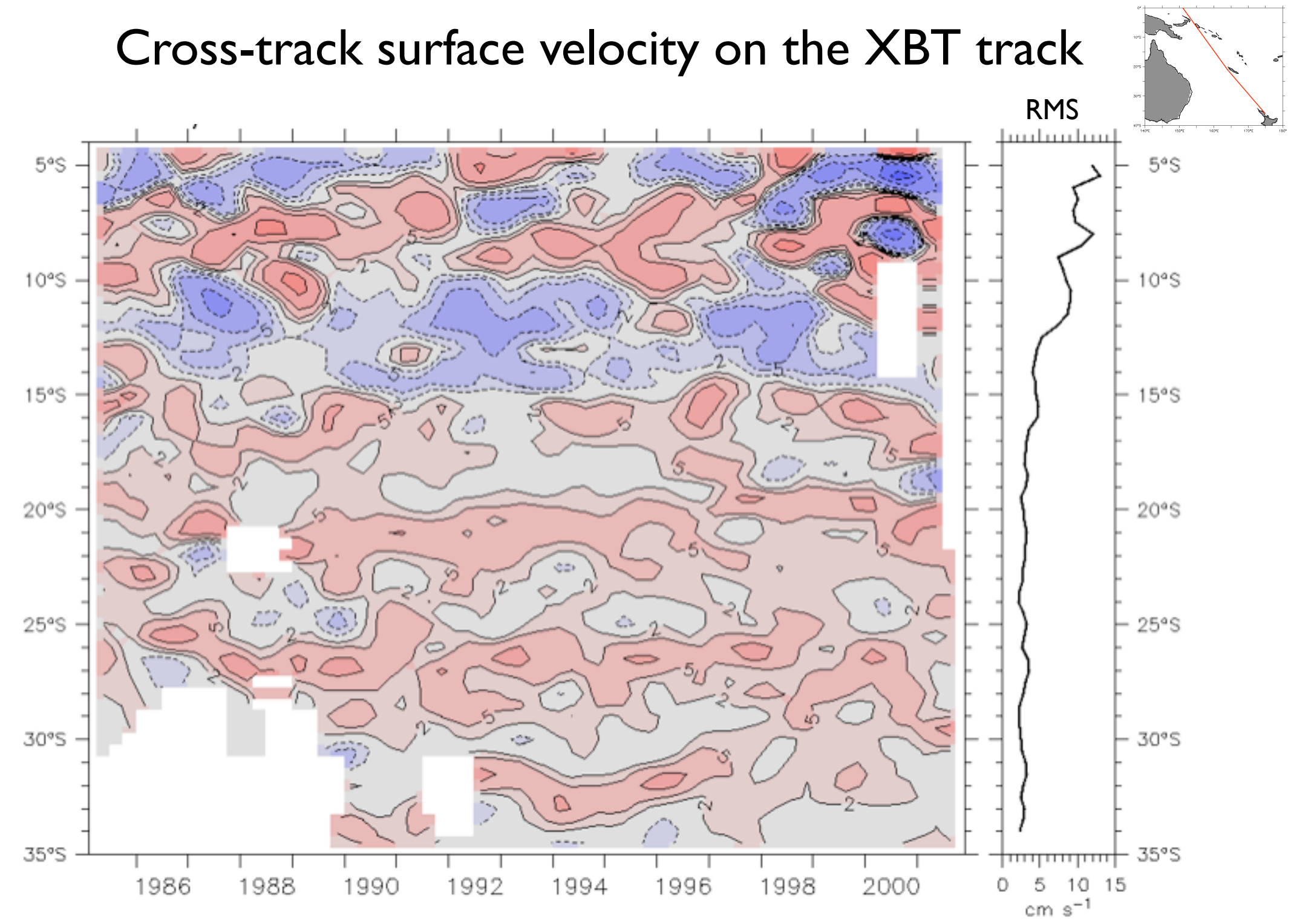
Chaque contour indique 5 Sverdrups transport


Major in/outflows of the Coral Sea
ORCA model
Work continues .....
Transport (Sv)
50
40
30
20
10
0
−10
−20
−30
−40
SEC inflow
(NC−Solomons)
EAC outflow
NGCC outflow
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
$r_{SEC/EAC} = -0.86$, $r_{SEC/NGCC} = -0.78$

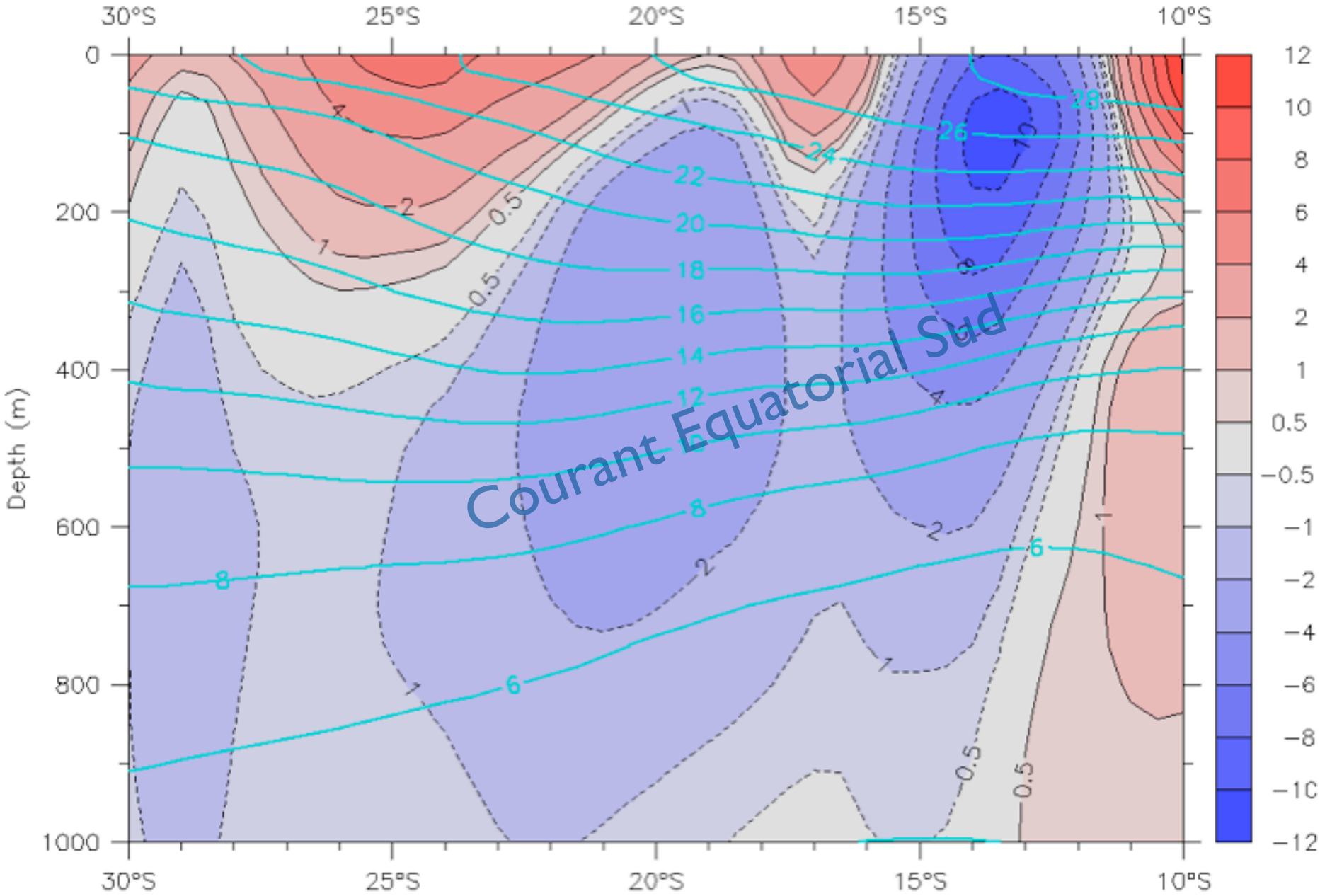

Surface DH and u_g
CARS data. Relative to 2000m
10°S
20°S
30°S
40°S
140°E
150°E
160°E
170°E
180°
170°W
160°W
2.40
2.40
2.40
2.30
2.30
2.30
2.20
2.00
2.00
1.90
1.90
20. cm s^{-1}


Surface DH and u_g
CARS data. Relative to 2000m
15°S
20°S
25°S
30°S
150°E
155°E
160°E
165°E
170°E
175°E
180°
2.40
2.38
2.36
2.34
2.32
2.30
2.28
2.26
2.24
2.22
2.16
2.14
2.12
2.10
2.08
10. cm s^{-1}

Cross-track surface velocity on the XBT track



Courants zonales sur 170°E –180°



Les contours bleus indiquent la temperature. Courants relatifs à 2000m

Le travail poursuit .....

- We observe very strong interannual variability of the South Equatorial Current between NC and the Solomon Islands. This is driven by westward-propagating Rossby waves generated in the central Pacific during the height of El Nino events.
- The large increase and decrease of flow into the Coral Sea is balanced by outflows via the NGCC and the EAC, but how and why these are partitioned remains to be seen (use ORCA model, and plan an observational program).
- The strong upwind surface currents of the South Pacific need a dynamical explanation.