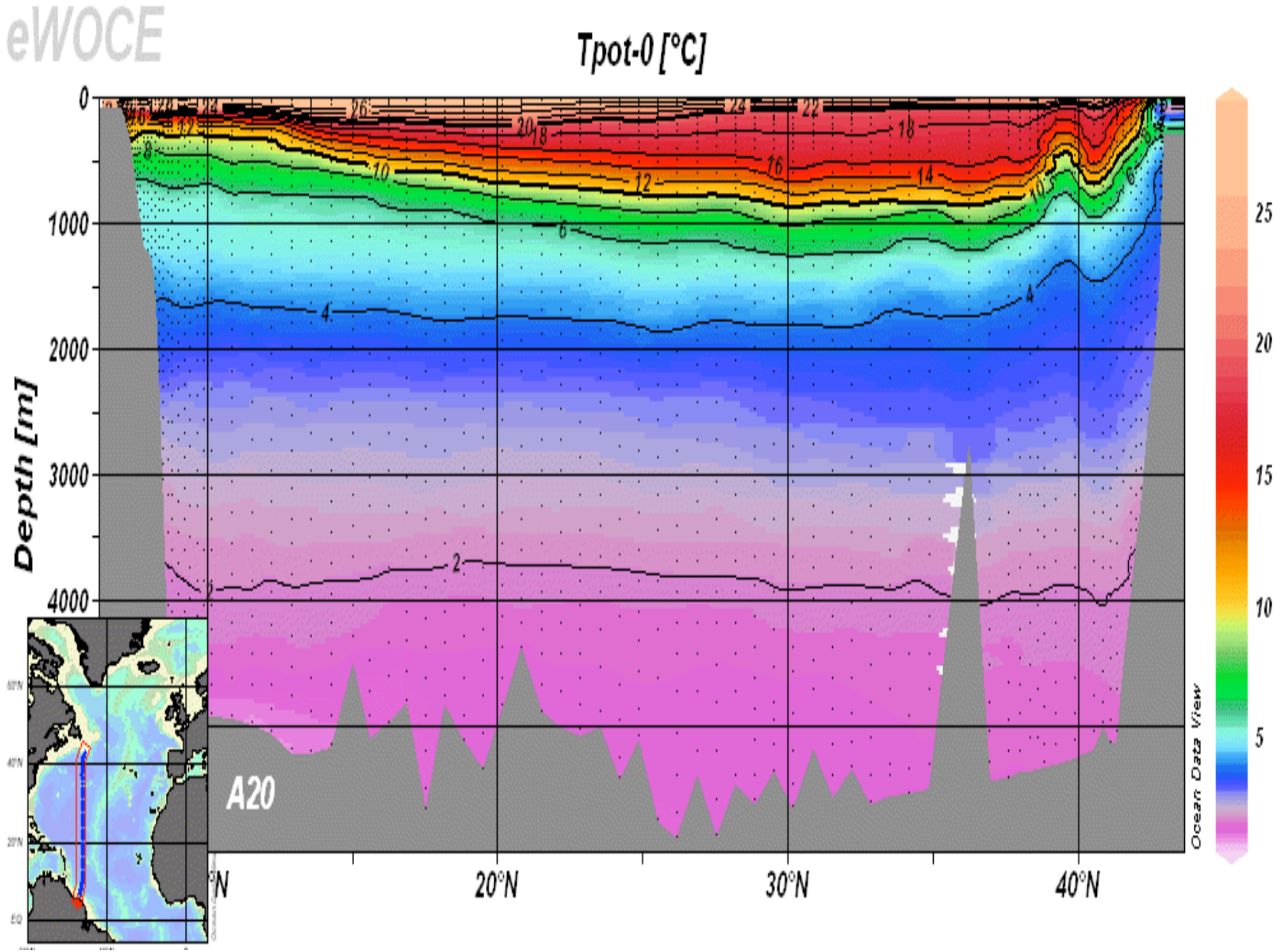
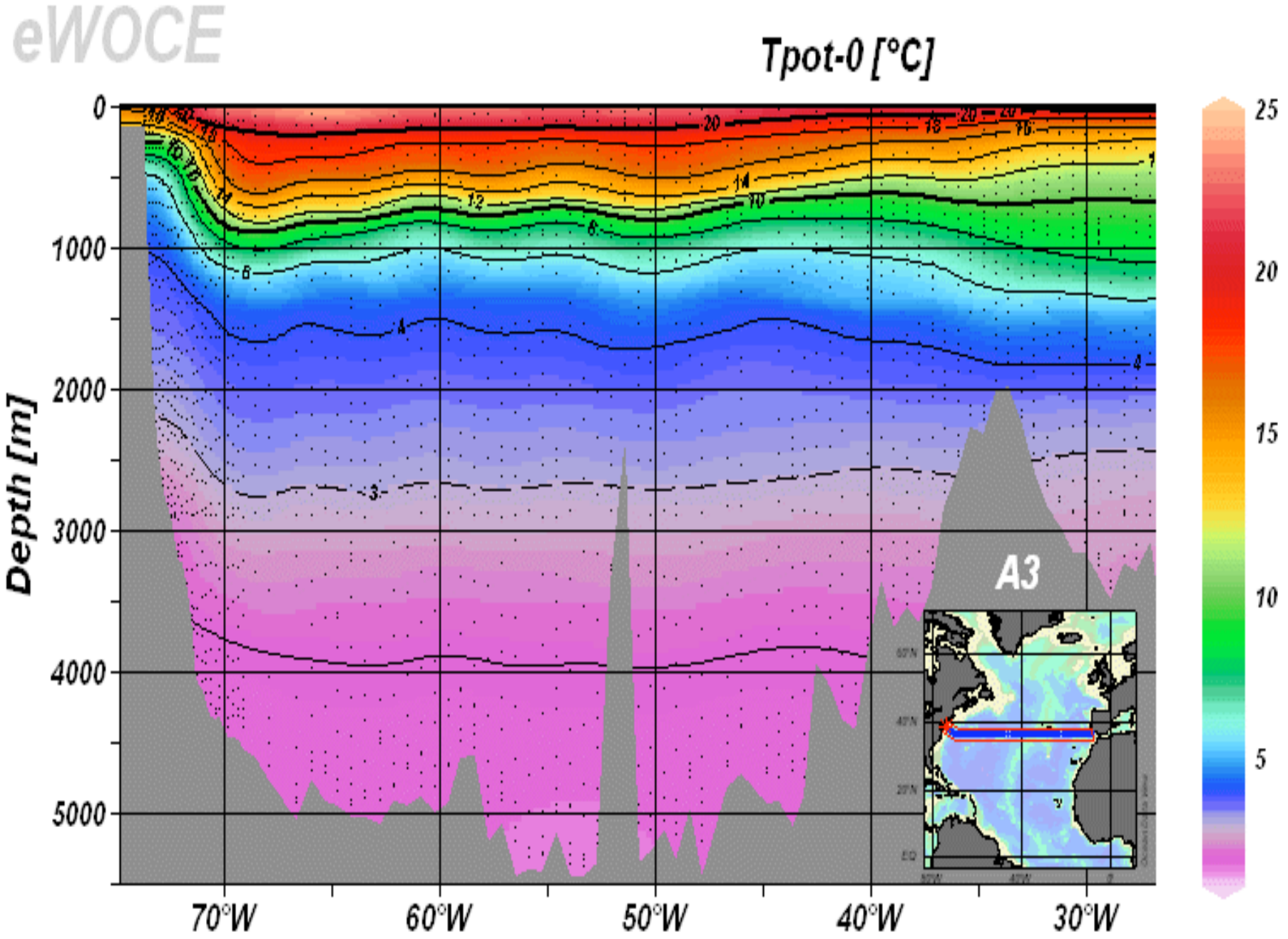
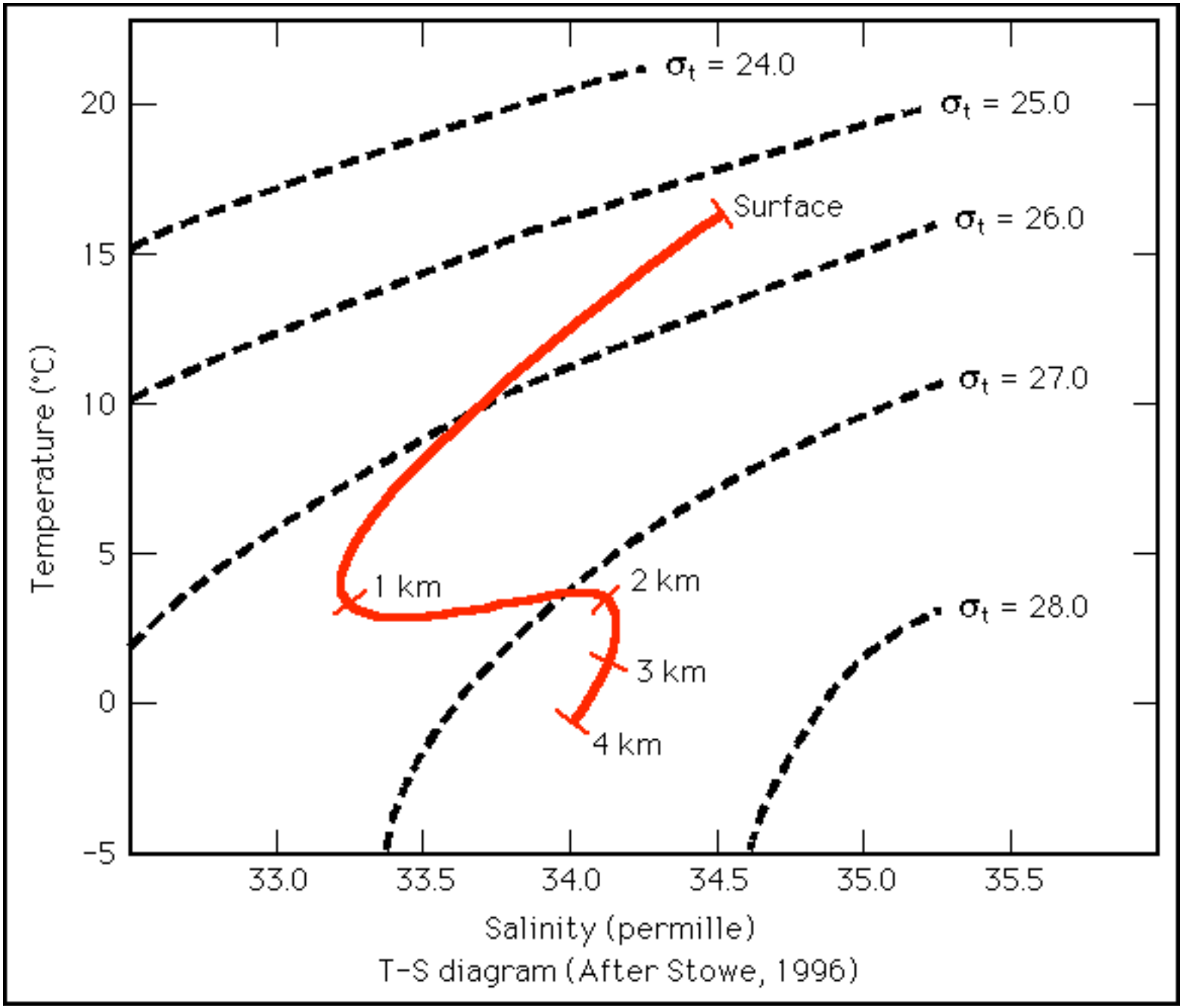
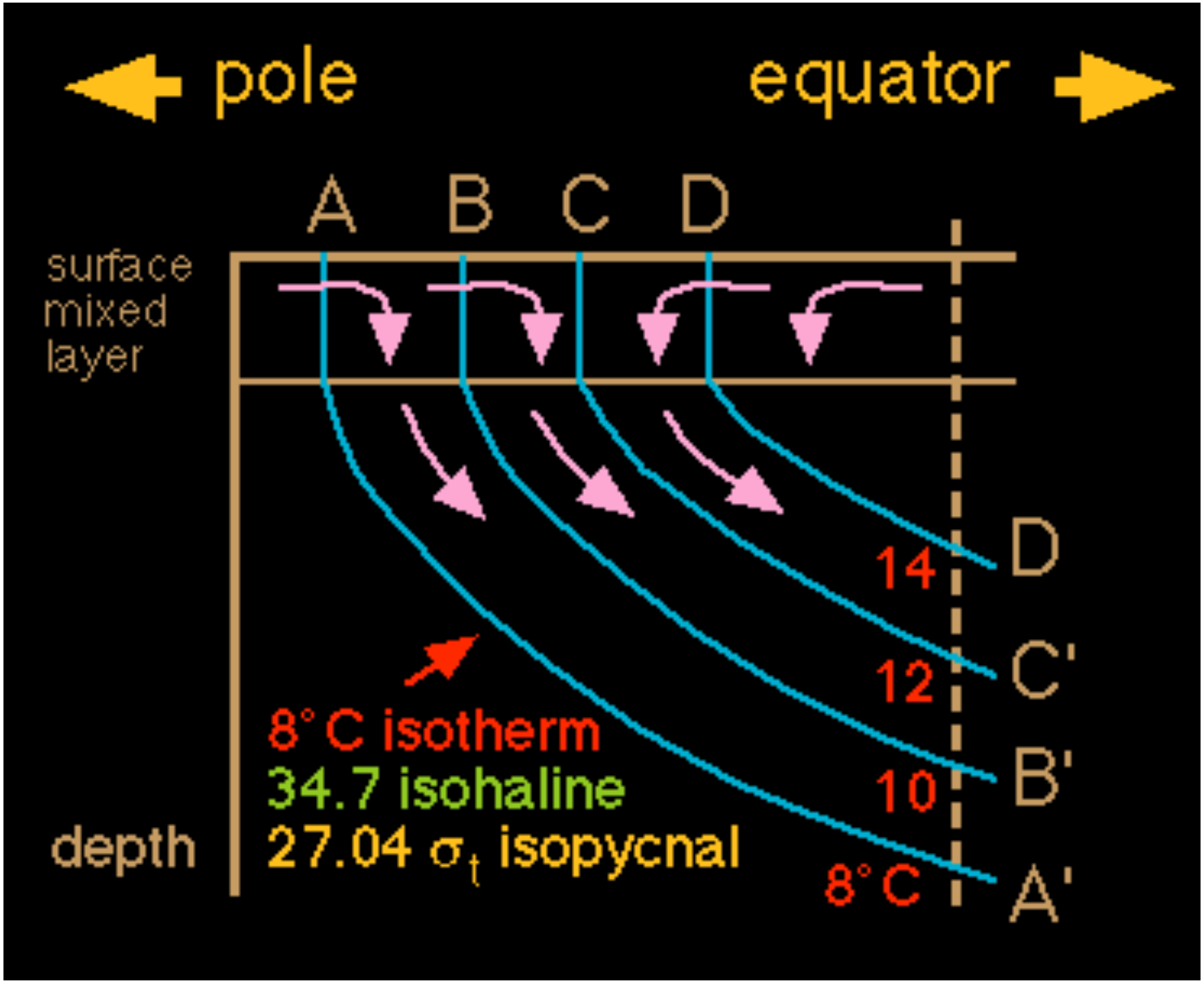
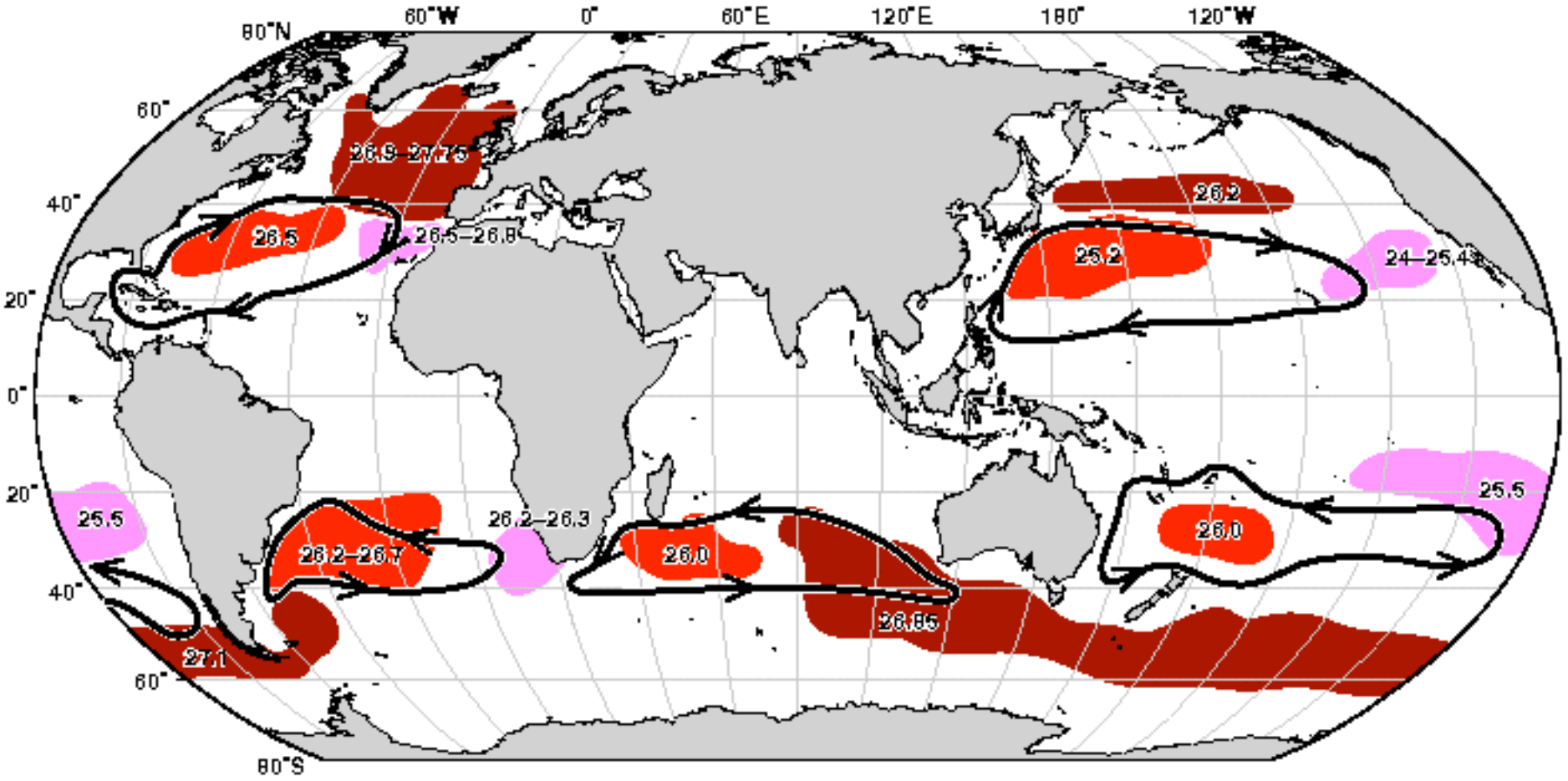

eWOCE
Tpot-0 [°C]
Depth [m]
0
1000
2000
3000
4000
20°N
30°N
40°N
A20
Ocean Data View
25
20
15
10
5

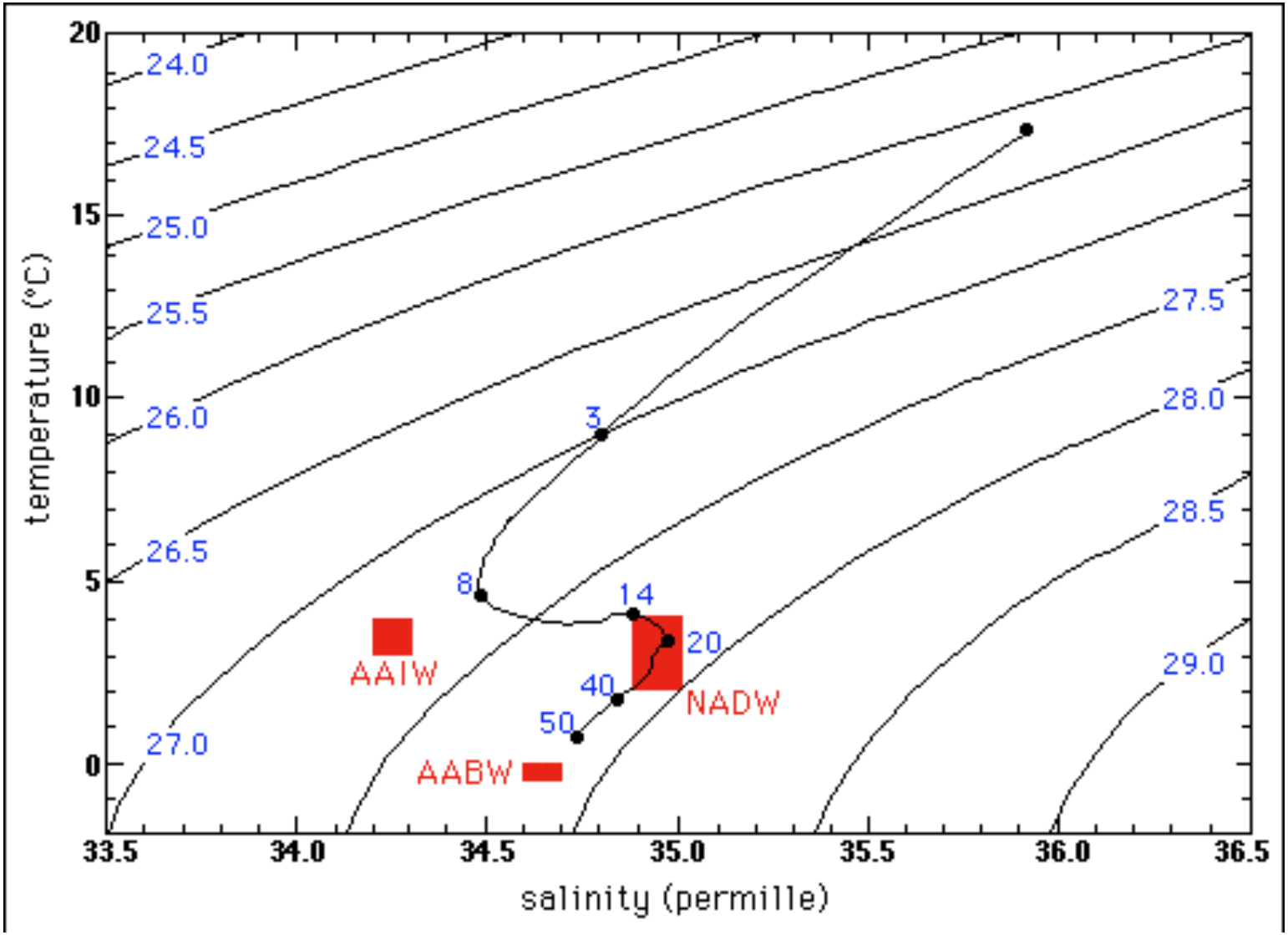

eWOCE
Tpot-0 [°C]
Depth [m]
0
1000
2000
3000
4000
5000
70°W
60°W
50°W
40°W
30°W
A3
25
20
15
10
5

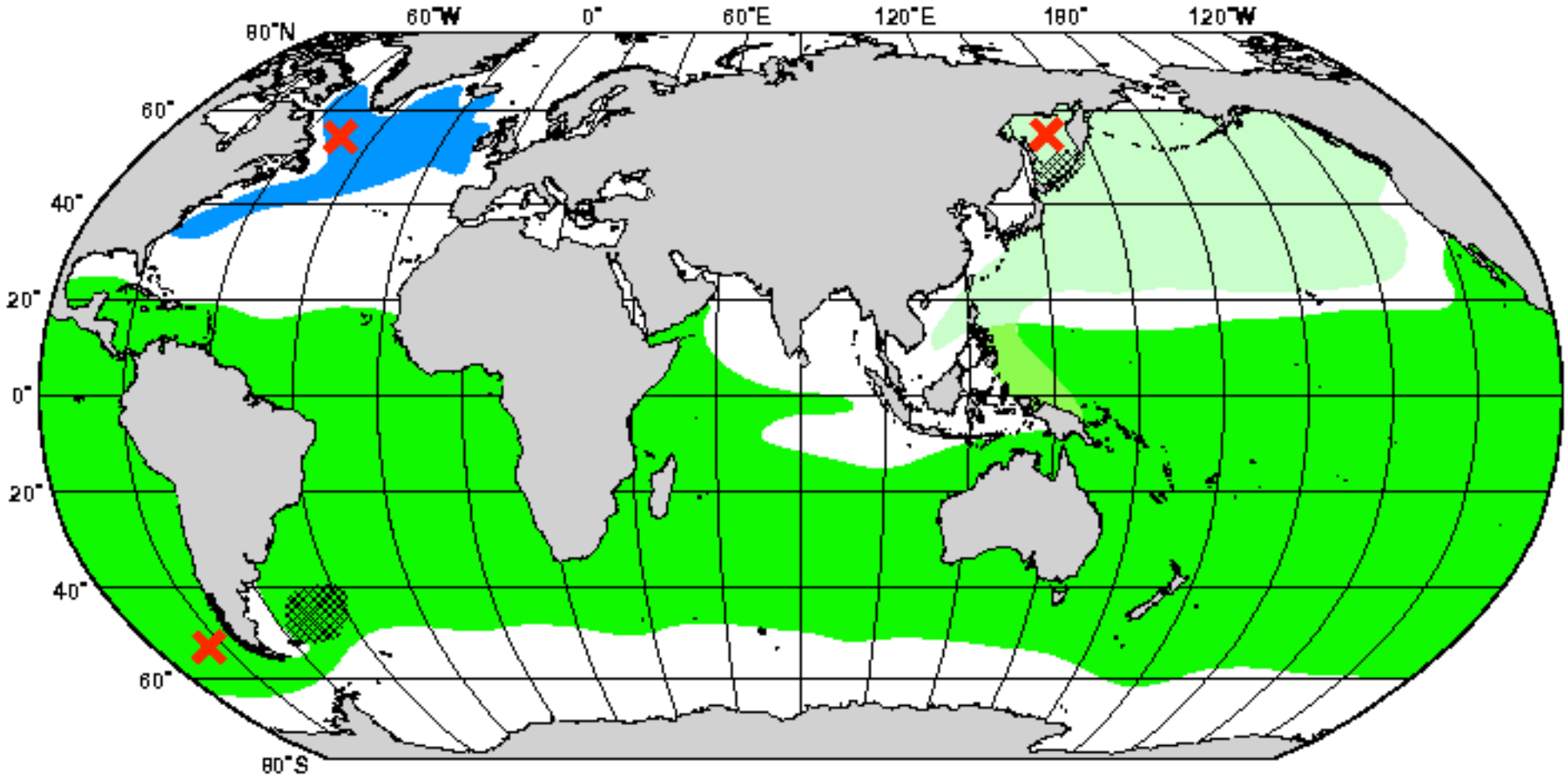


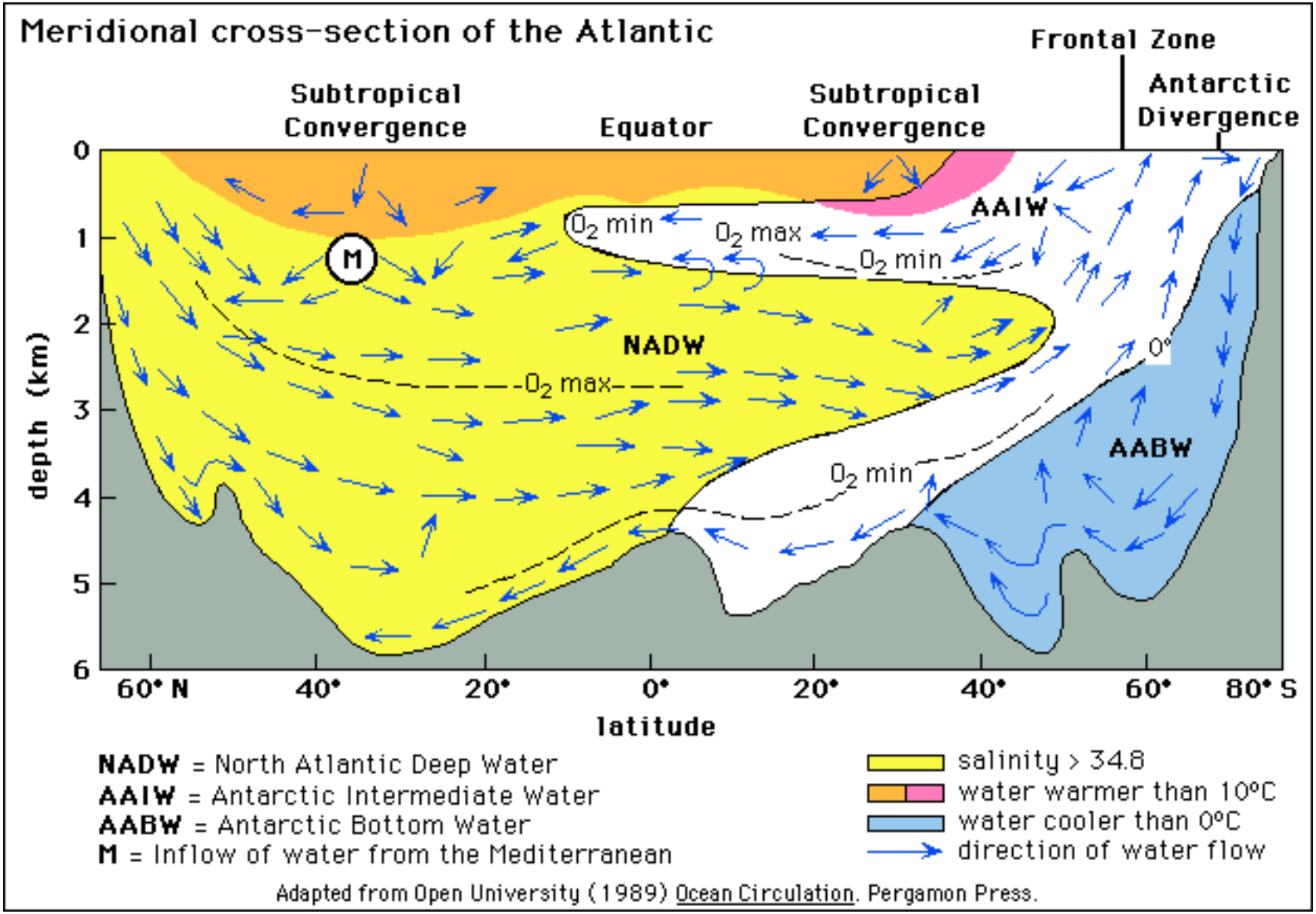
T-S diagram (After Stowe, 1996)


pole
equator
A
B
C
D
surface
mixed
layer
14
12
10
8°C
D
C'
B'
A'
8° C isotherm
34.7 isohaline
27.04 σt isopycnal
depth

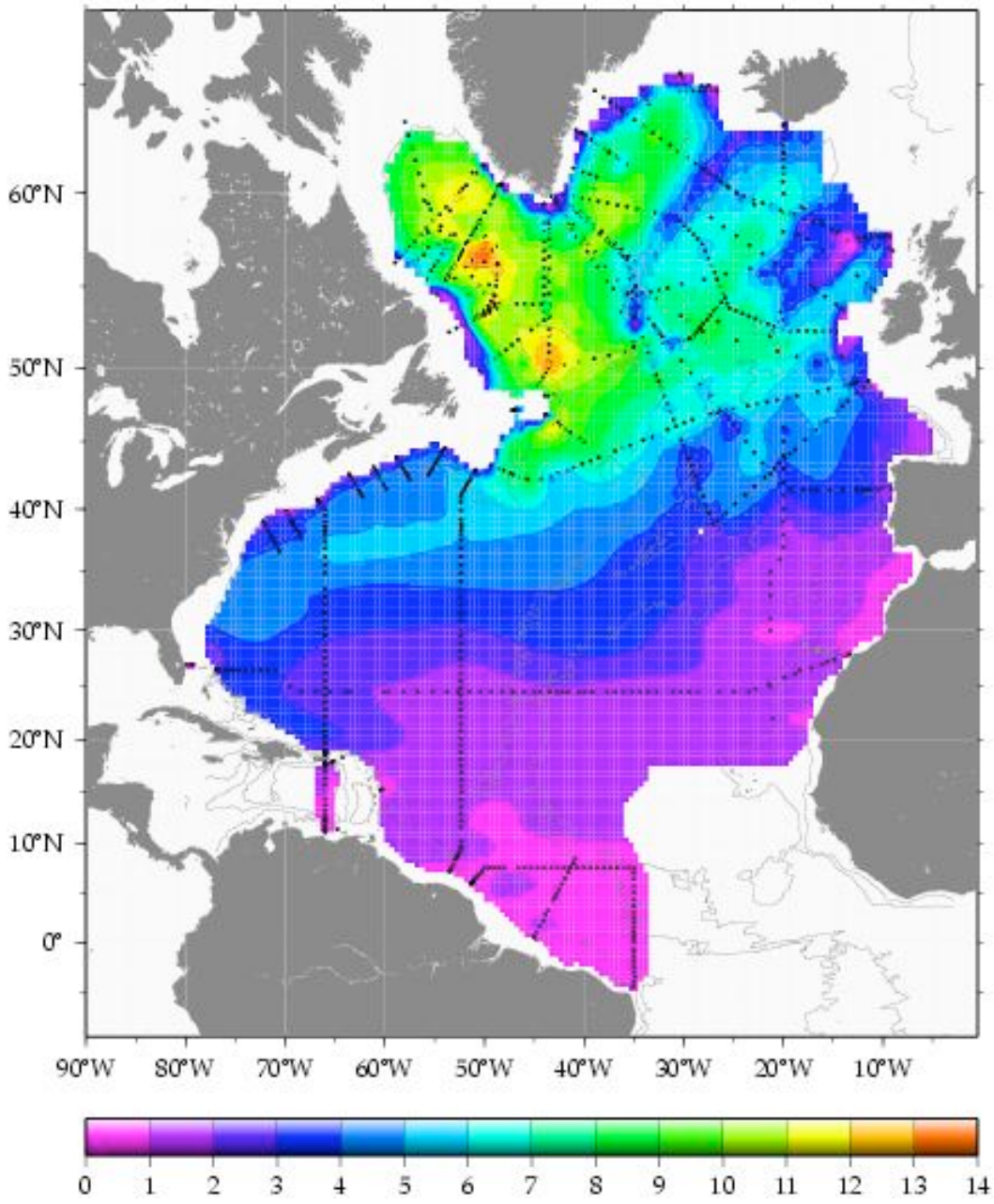

60°W
0°
60°E
120°E
180°
120°W
80°N
60°
40°
20°
0°
20°
40°
60°
80°S
26.9–27.75
26.5
26.5–26.8
26.2
25.2
24–25.45
25.5
25.5
26.2–26.7
26.2–26.3
26.0
26.0
26.85
27.1

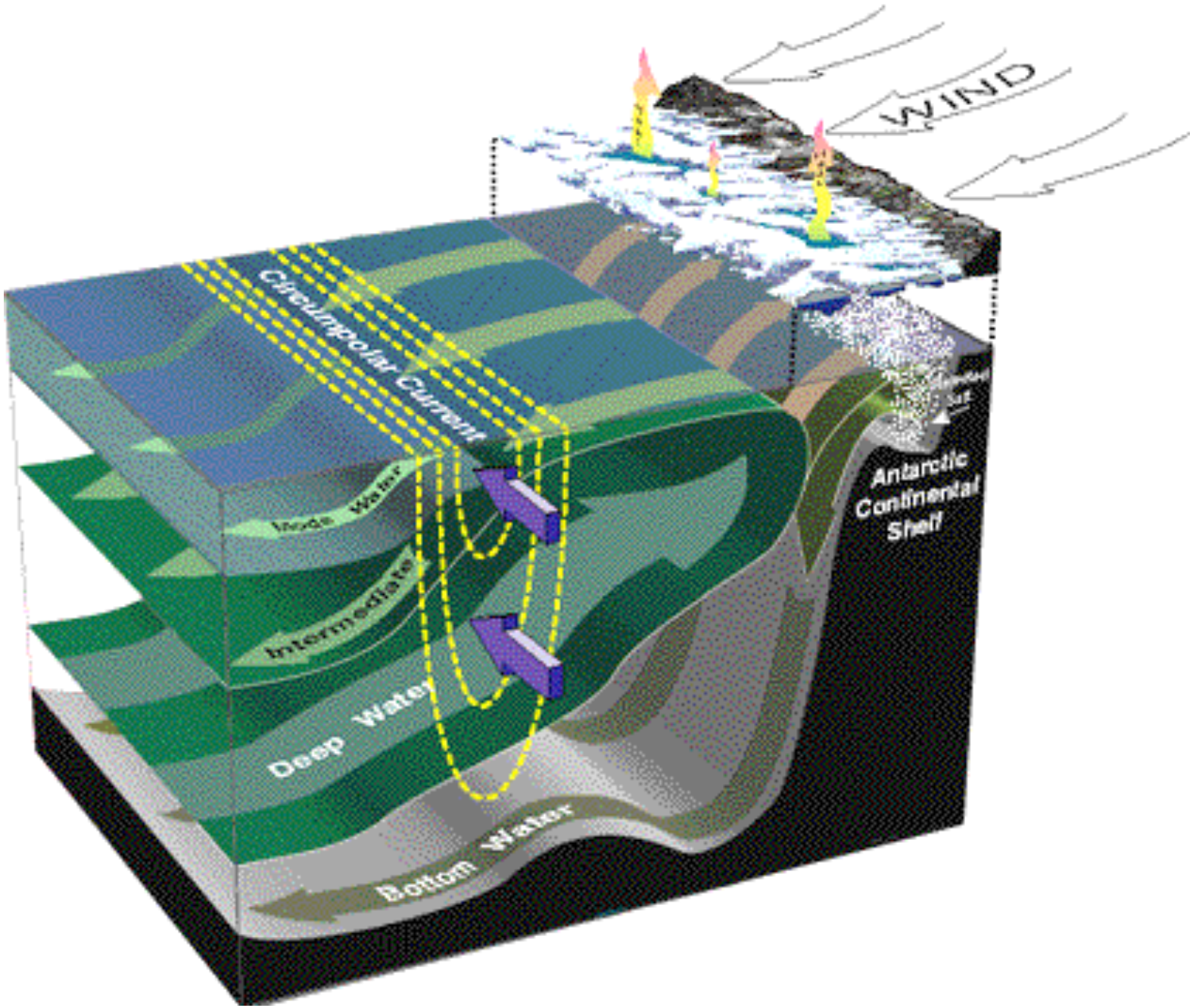

temperature (°C)
salinity (permille)
20
15
10
5
0
33.5
34.0
34.5
35.0
35.5
36.0
36.5
24.0
24.5
25.0
25.5
26.0
26.5
27.0
27.5
28.0
28.5
29.0
3
8
14
20
40
50
AAIW
NADW
AABW

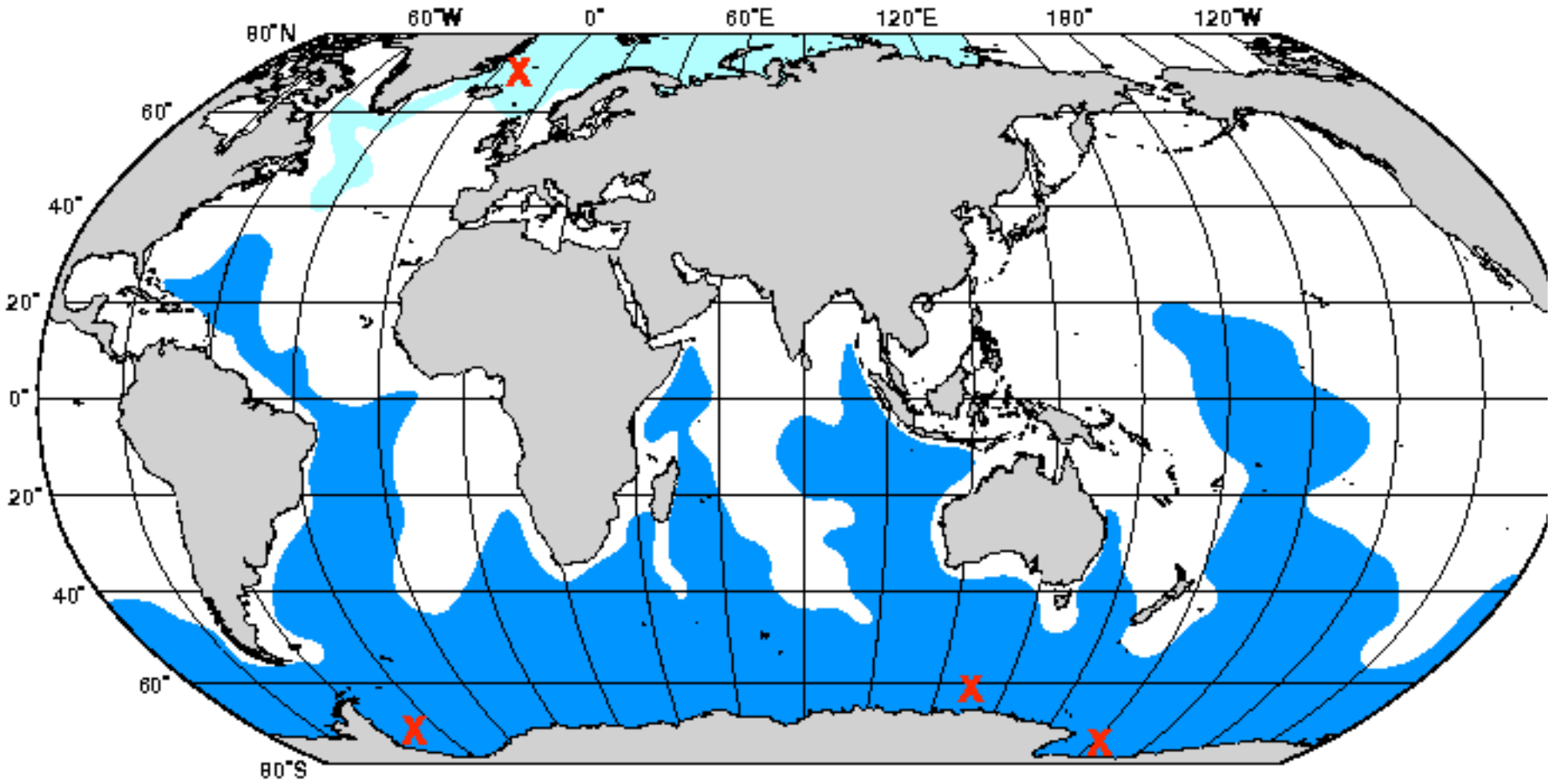

60°W
0°
60°E
120°E
180°
120°W
80°N
60°
40°
20°
0°
20°
40°
60°
80°S

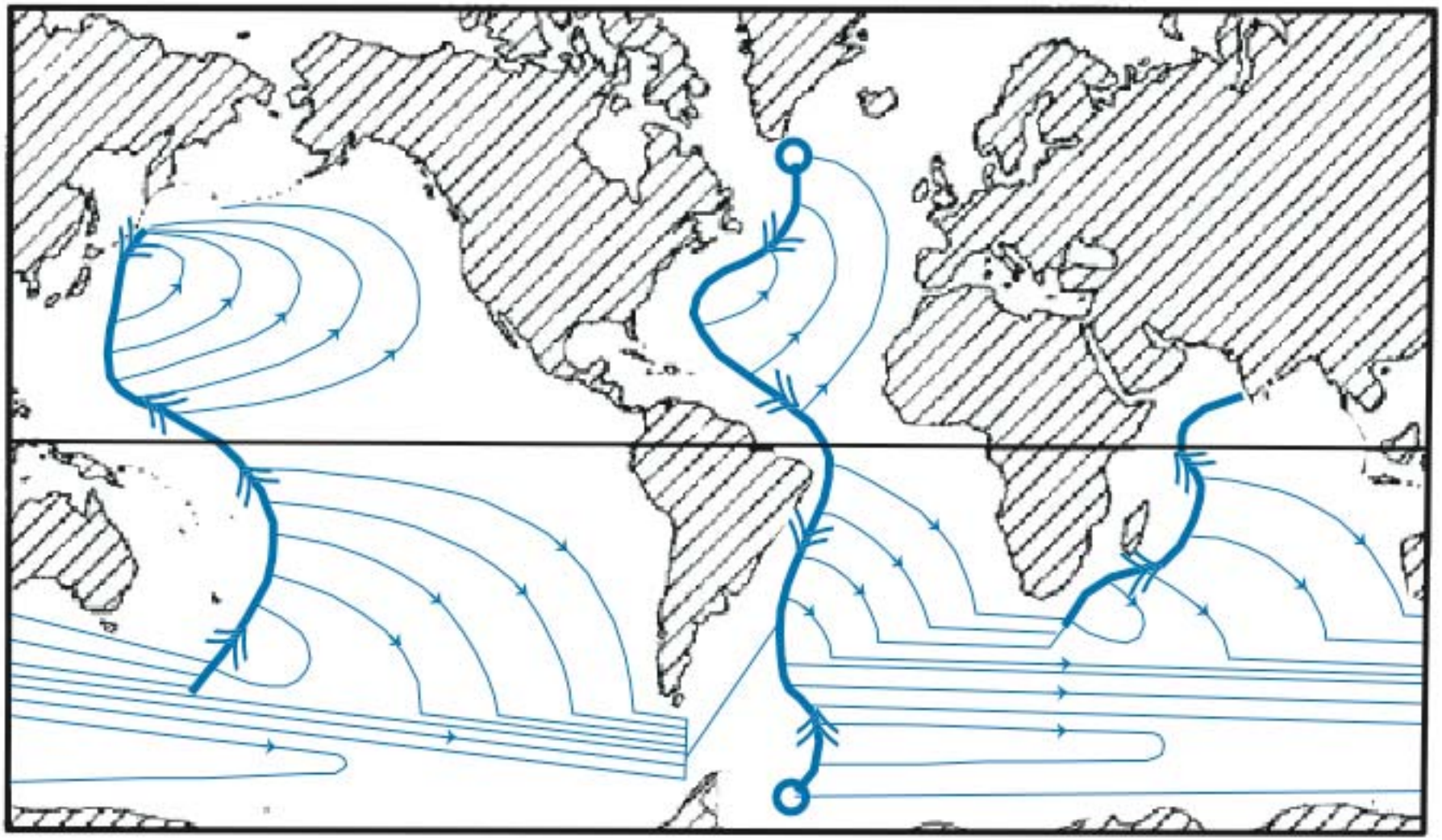

Meridional cross-section of the Atlantic
Frontal Zone
Subtropical Convergence
Equator
Subtropical Convergence
Antarctic Divergence
AAIW
O_2 min
O_2 max
O_2 min
M
NADW
O_2 max
0°
AABW
O_2 min
depth (km)
0
1
2
3
4
5
6
60° N
40°
20°
0°
20°
40°
60°
80° S
latitude
NADW = North Atlantic Deep Water
AAIW = Antarctic Intermediate Water
AABW = Antarctic Bottom Water
M = Inflow of water from the Mediterranean
salinity > 34.8
water warmer than 10°C
water cooler than 0°C
direction of water flow
Adapted from Open University (1989) Ocean Circulation. Pergamon Press.

Total CFC-11 Inventory [mol km^{-2}]




WIND
Circumpolar Current
Antarctic
Continental
Shelf
Deep Water
Bottom Water


60°W
0°
60°E
120°E
180°
120°W
80°N
60°
40°
20°
0°
20°
40°
60°
80°S



Ocean's *Conveyor Belt* Circulation Schematic

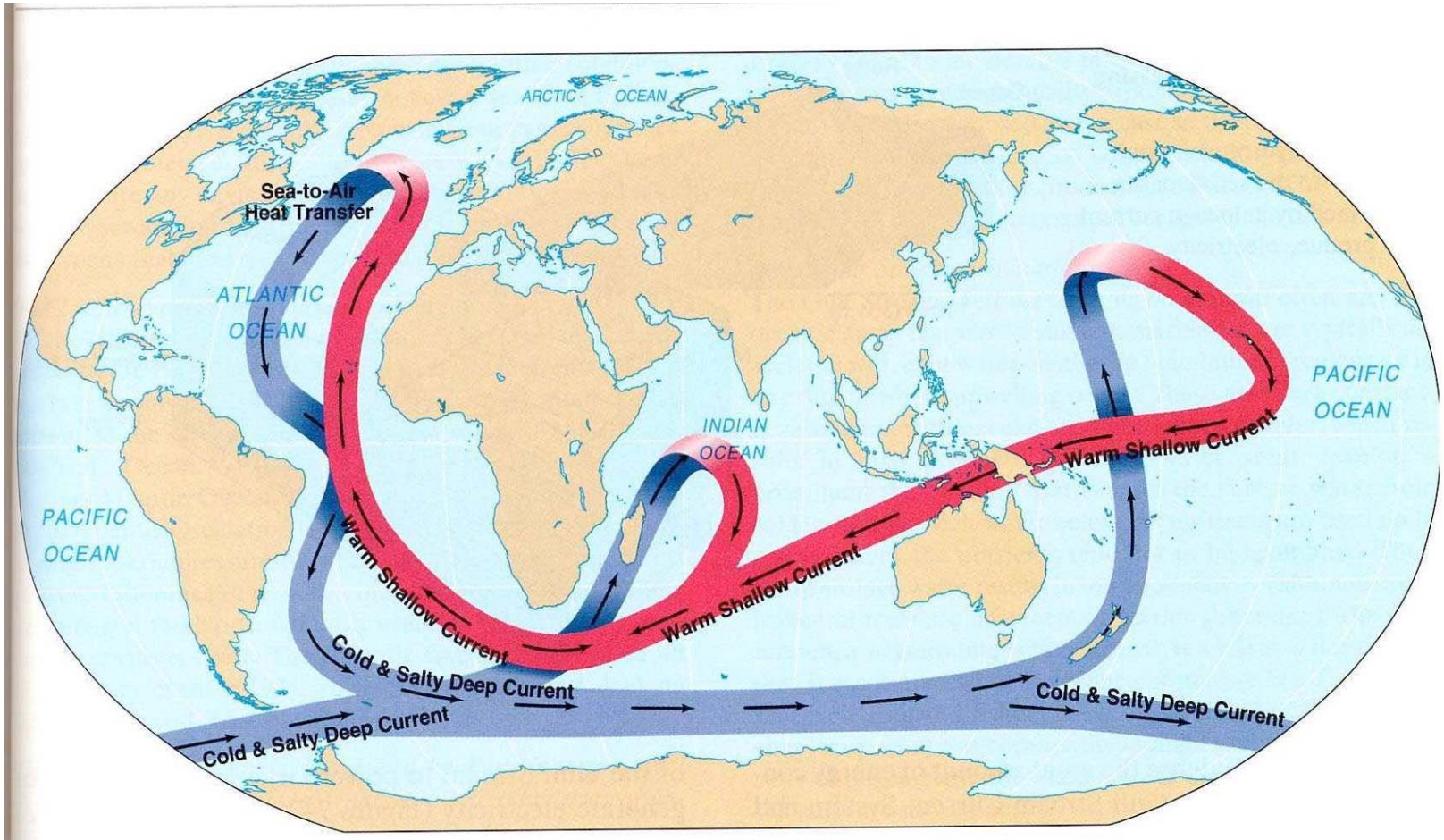
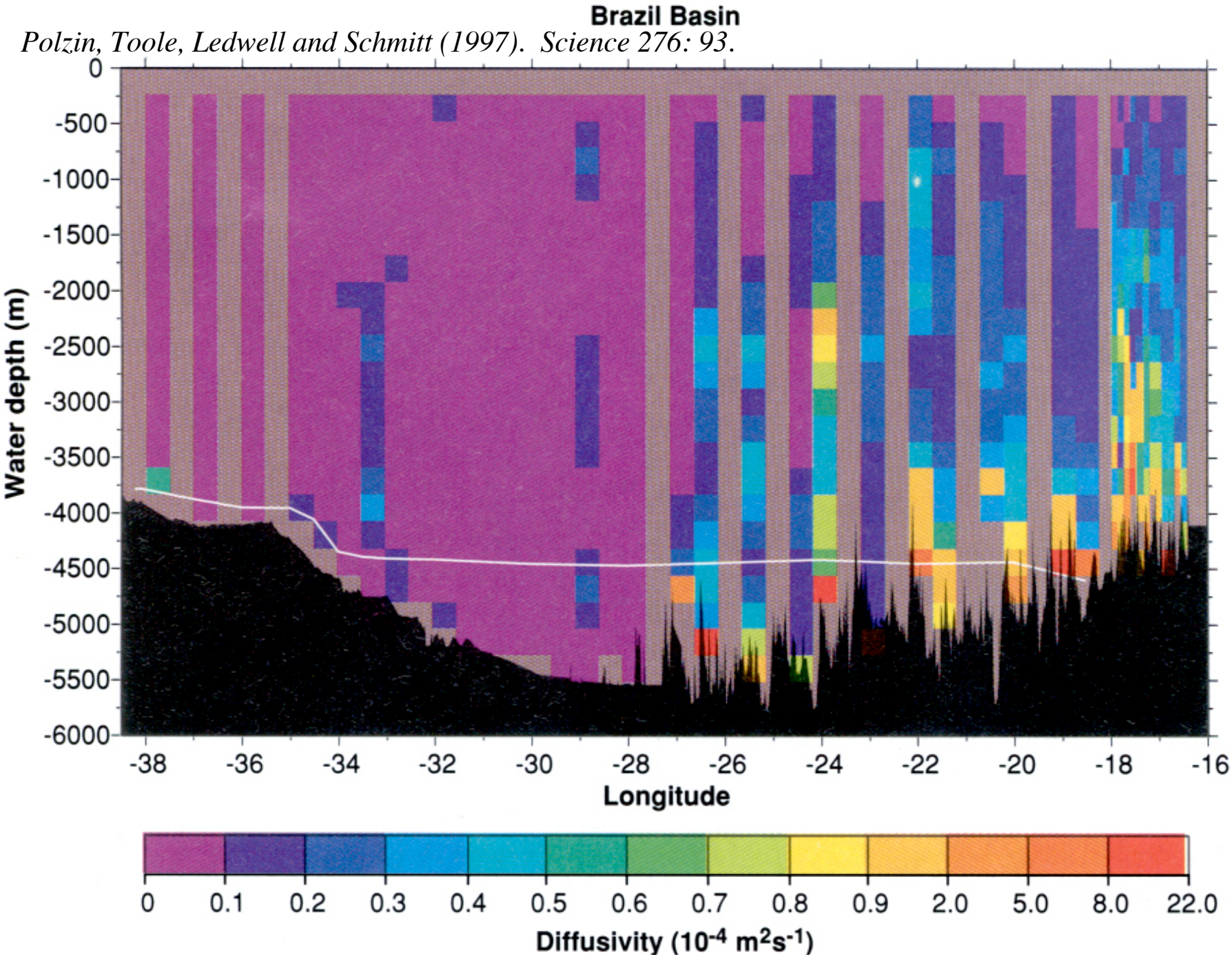
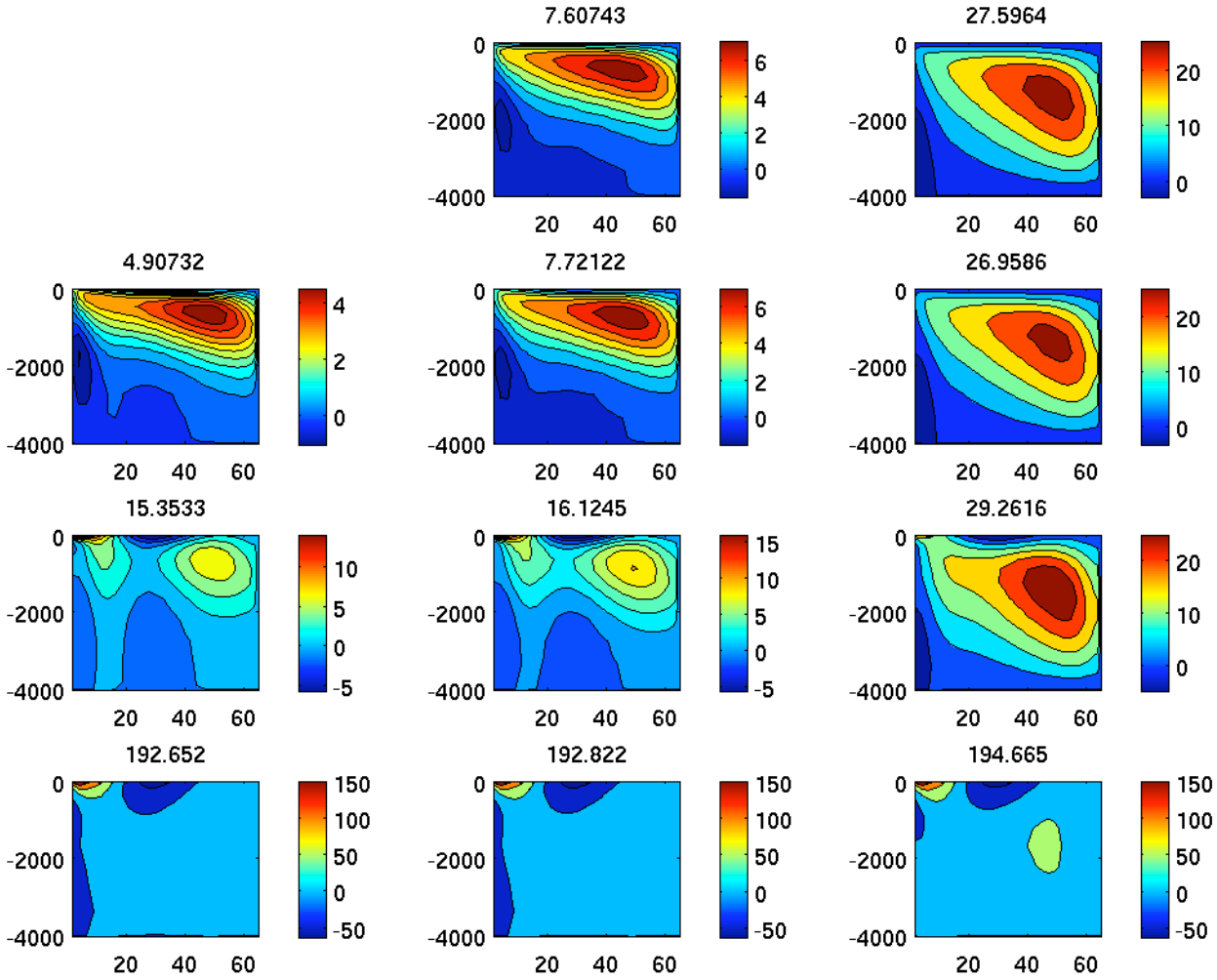


Figure 7–26 Conveyer-belt circulation.

Conveyer-belt circulation is initiated in the North Atlantic Ocean, where warm water cools and sinks below the surface. This water moves southward as a subsurface flow and joins water near Antarctica. This deep water spreads into the Indian and Pacific Oceans, where it slowly rises and completes the conveyer as it travels along the surface into the North Atlantic Ocean.

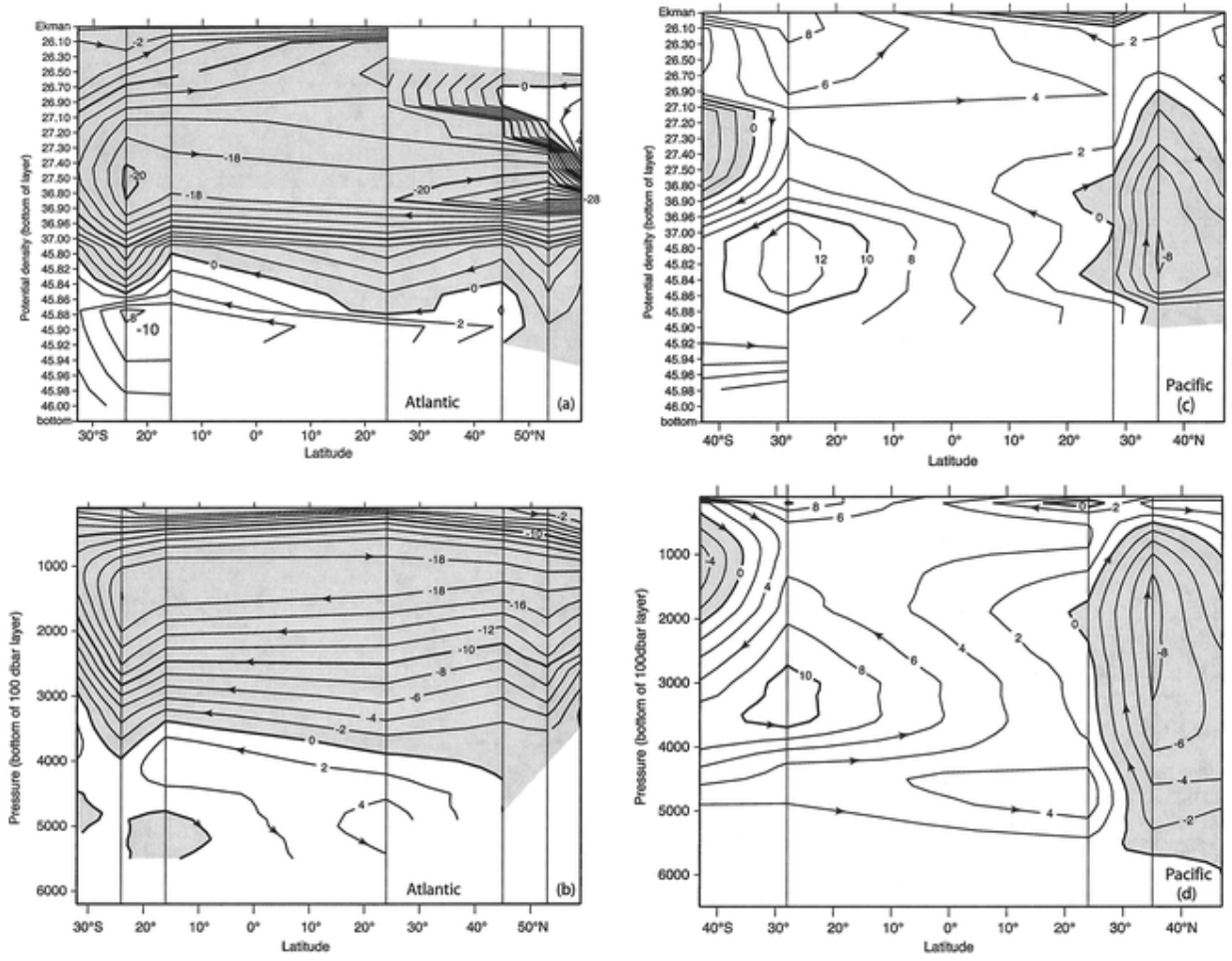
Polzin, Toole, Ledwell and Schmitt (1997). Science 276: 93.




7.60743
27.5964
4.90732
7.72122
26.9586
15.3533
16.1245
29.2616
192.652
192.822
194.665
0
-2000
-4000
20
40
60
6
4
2
0
20
10
0
4
2
0
10
5
0
-5
15
10
5
0
-5
150
100
50
0
-50

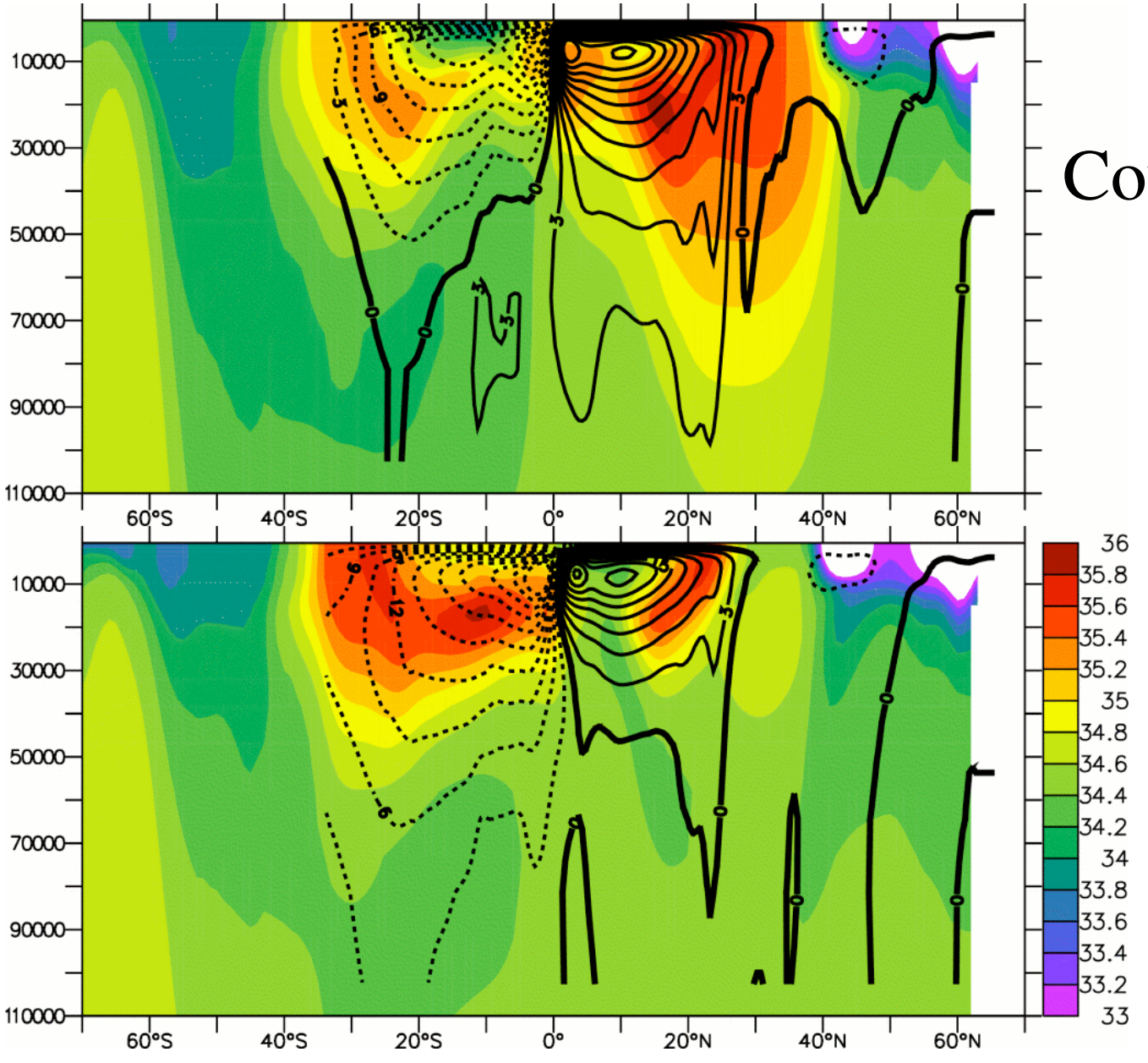
Atlantic

Pacific



From Talley et al 2003, J. Climate

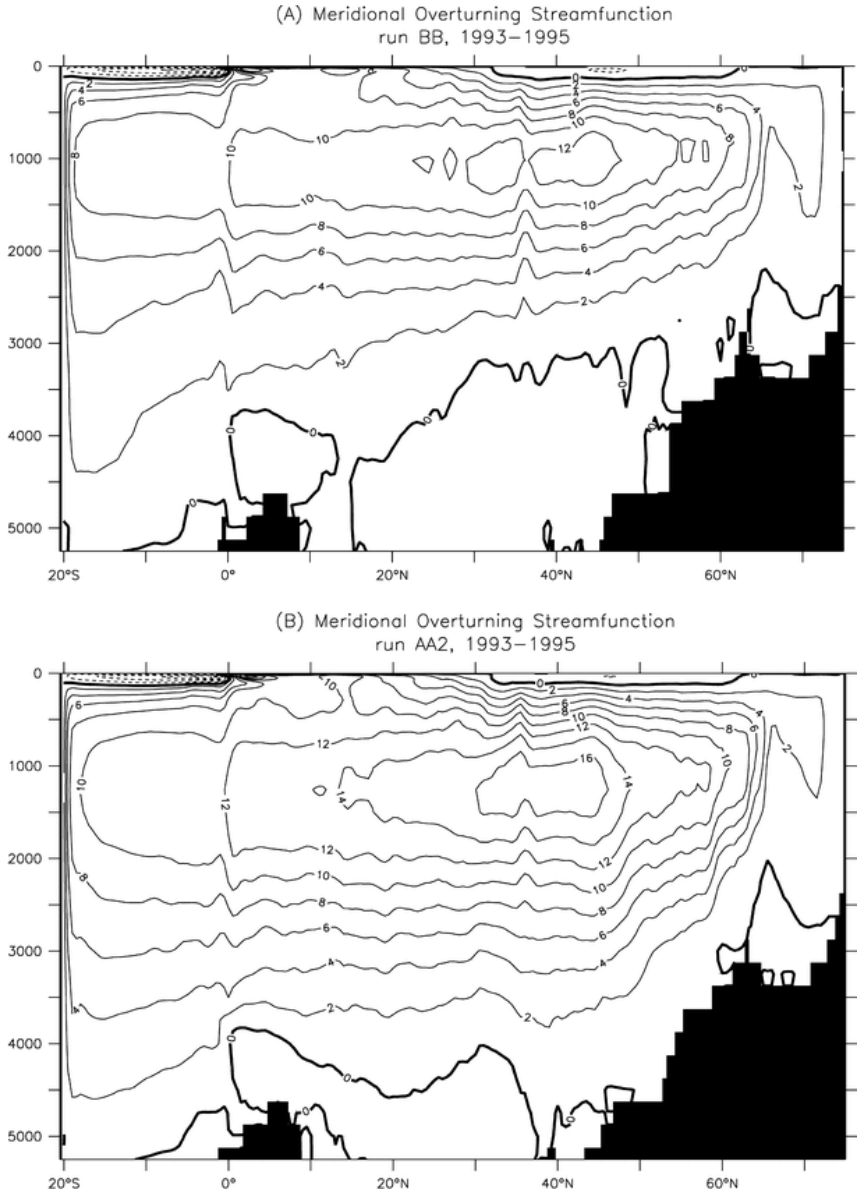
MOC and Salinity



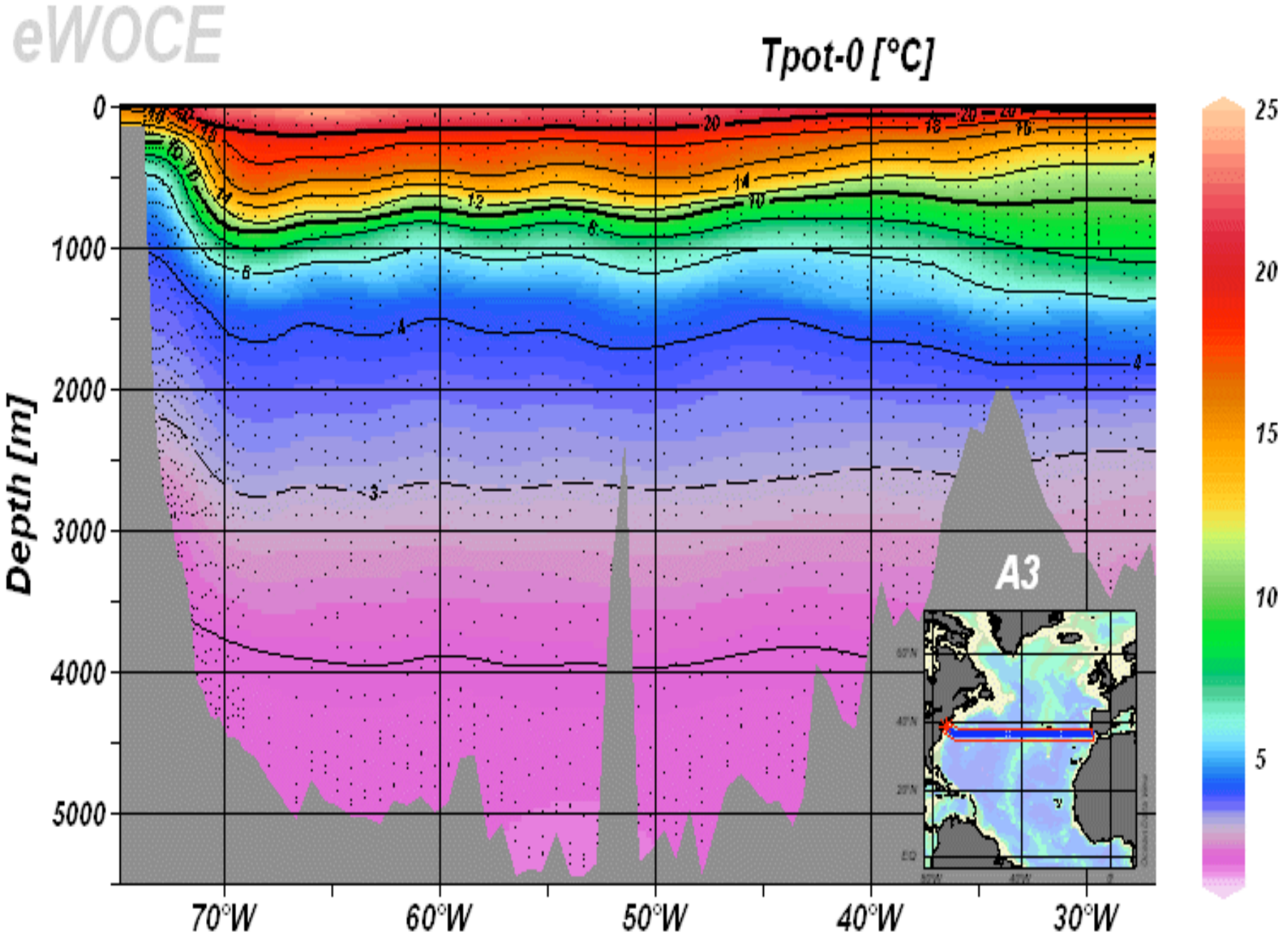
Coupled model

Ocean Only Model

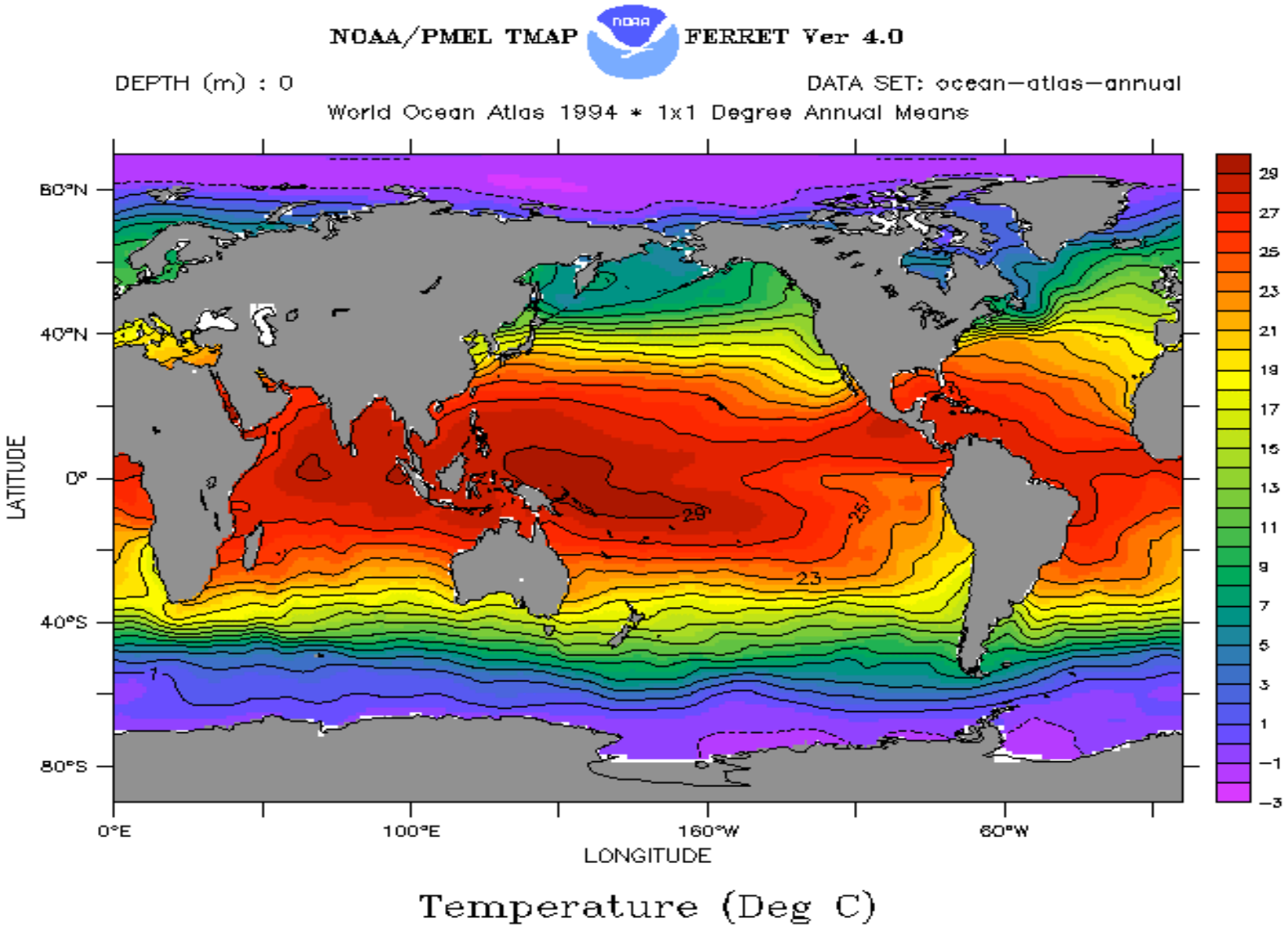
Thompson and Cheng 2008

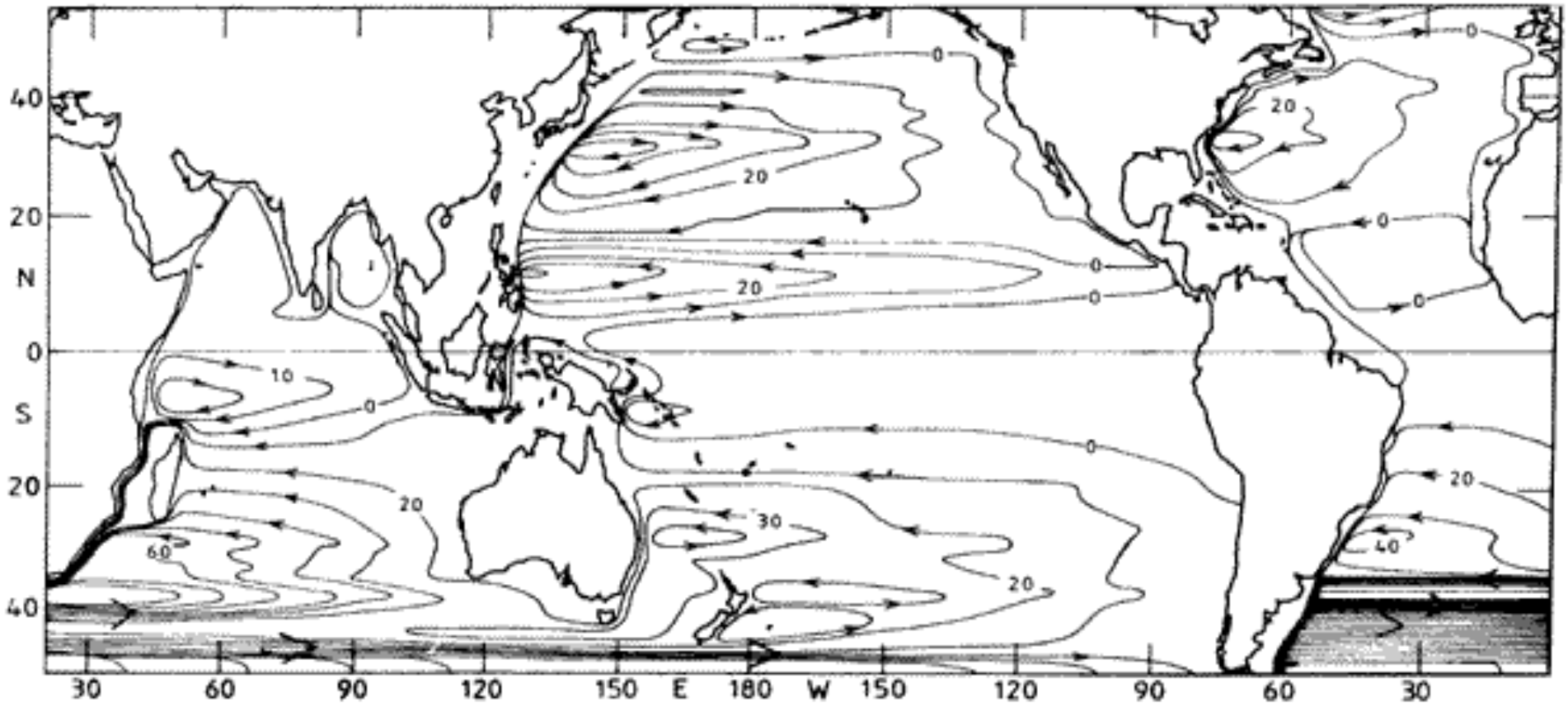


From Smith and Gent, 2004, JPO


eWOCE
Tpot-0 [°C]
Depth [m]
0
1000
2000
3000
4000
5000
70°W
60°W
50°W
40°W
30°W
A3
25
20
15
10
5

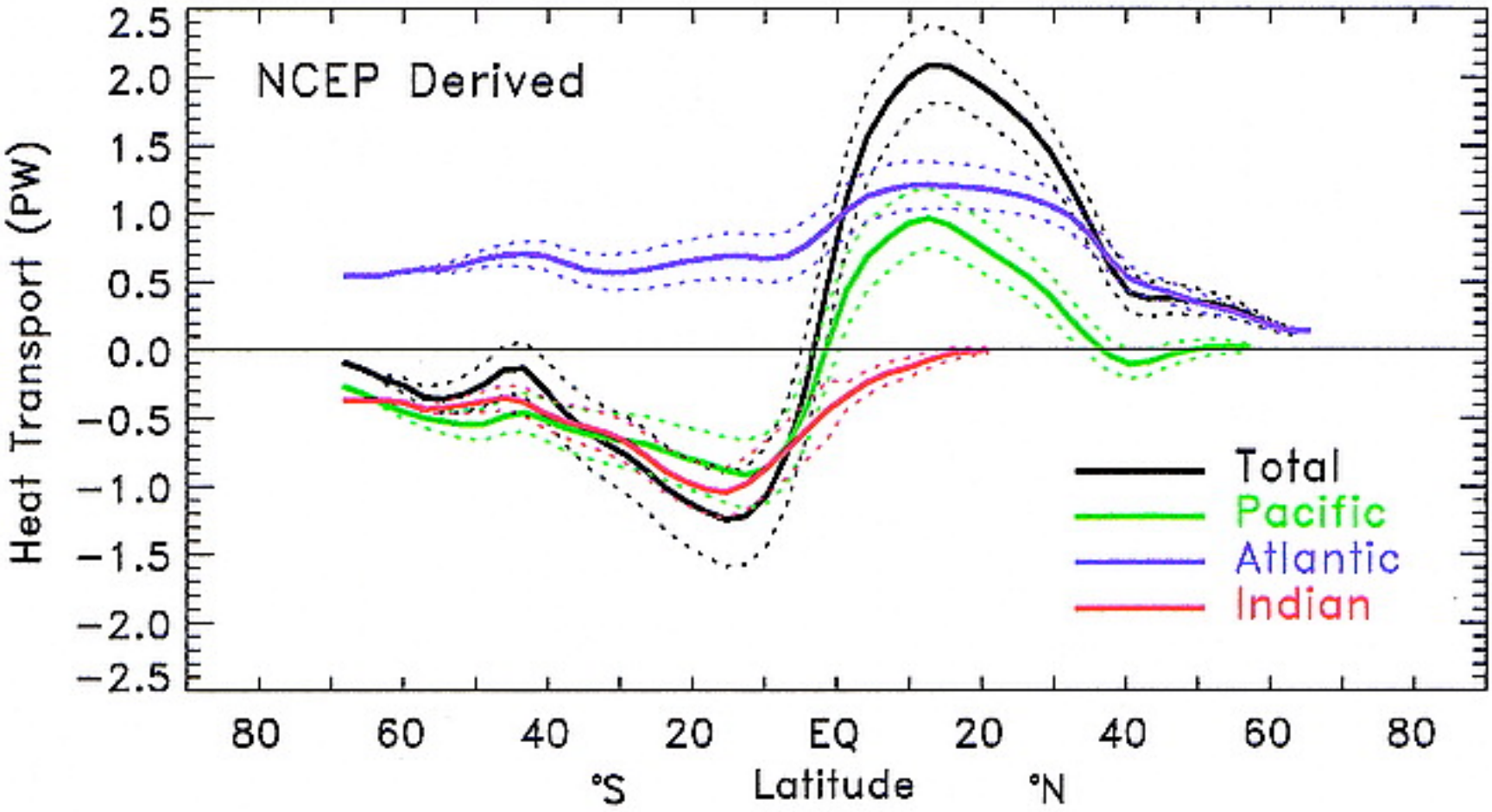
Sea Surface Temperature (SST)





Tomczak and Godfrey (1994)

Heat Transport by the oceans



Heat Transport by the Atmosphere and ocean