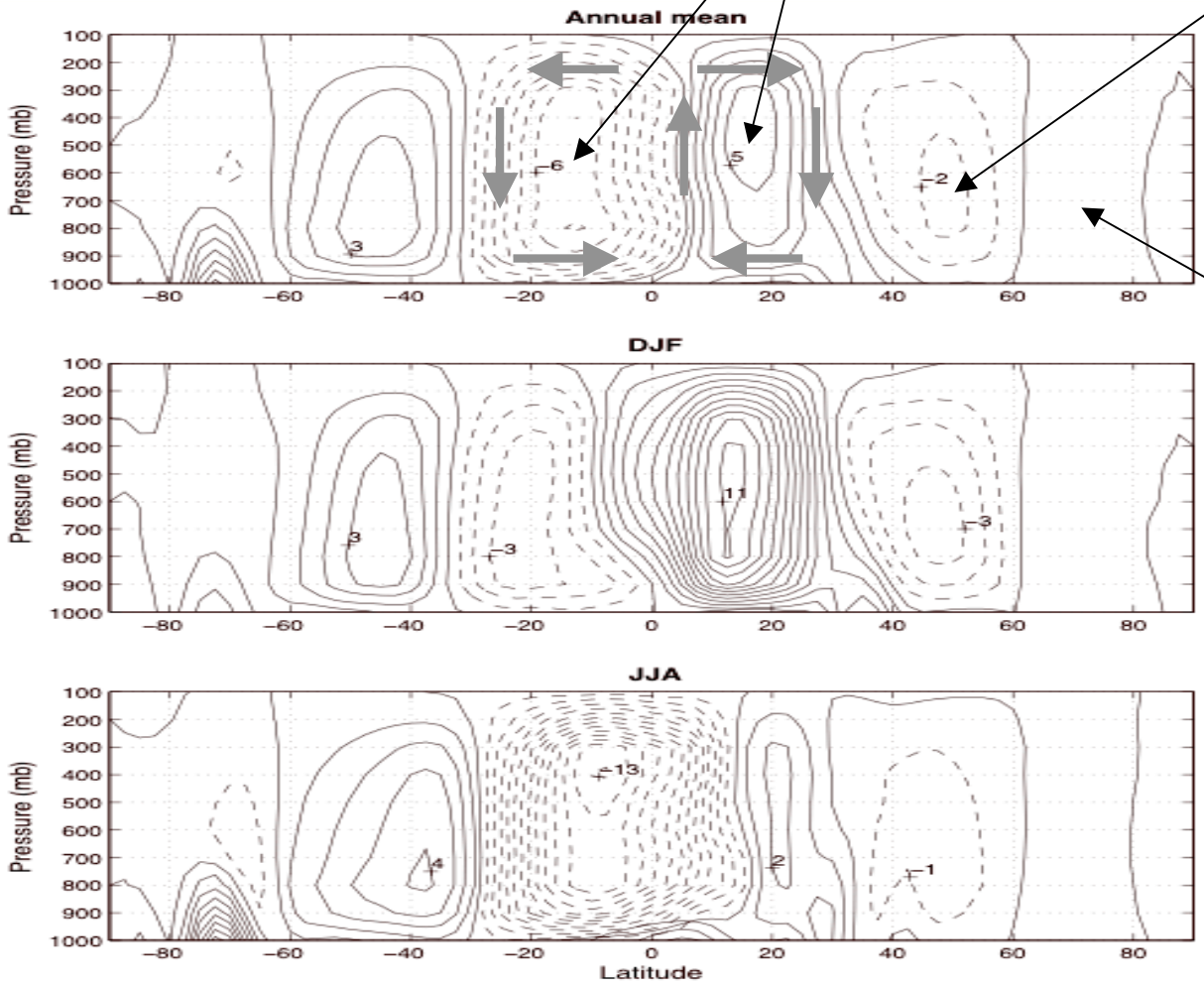
Mean meridional circulation
of the atmosphere

Hadley Cells (thermally direct)

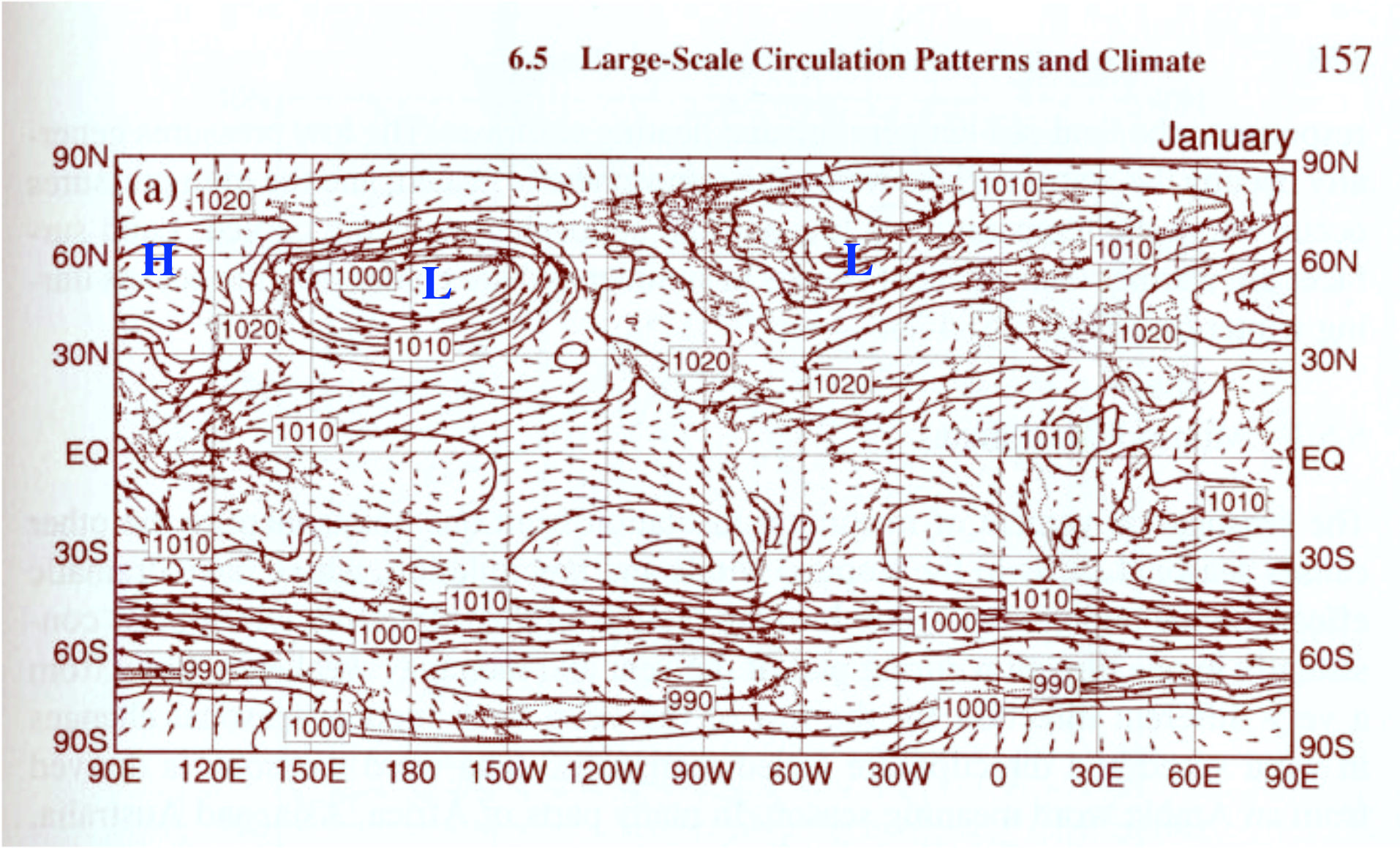
Ferrell Cell
(thermally
indirect)

Polar cell

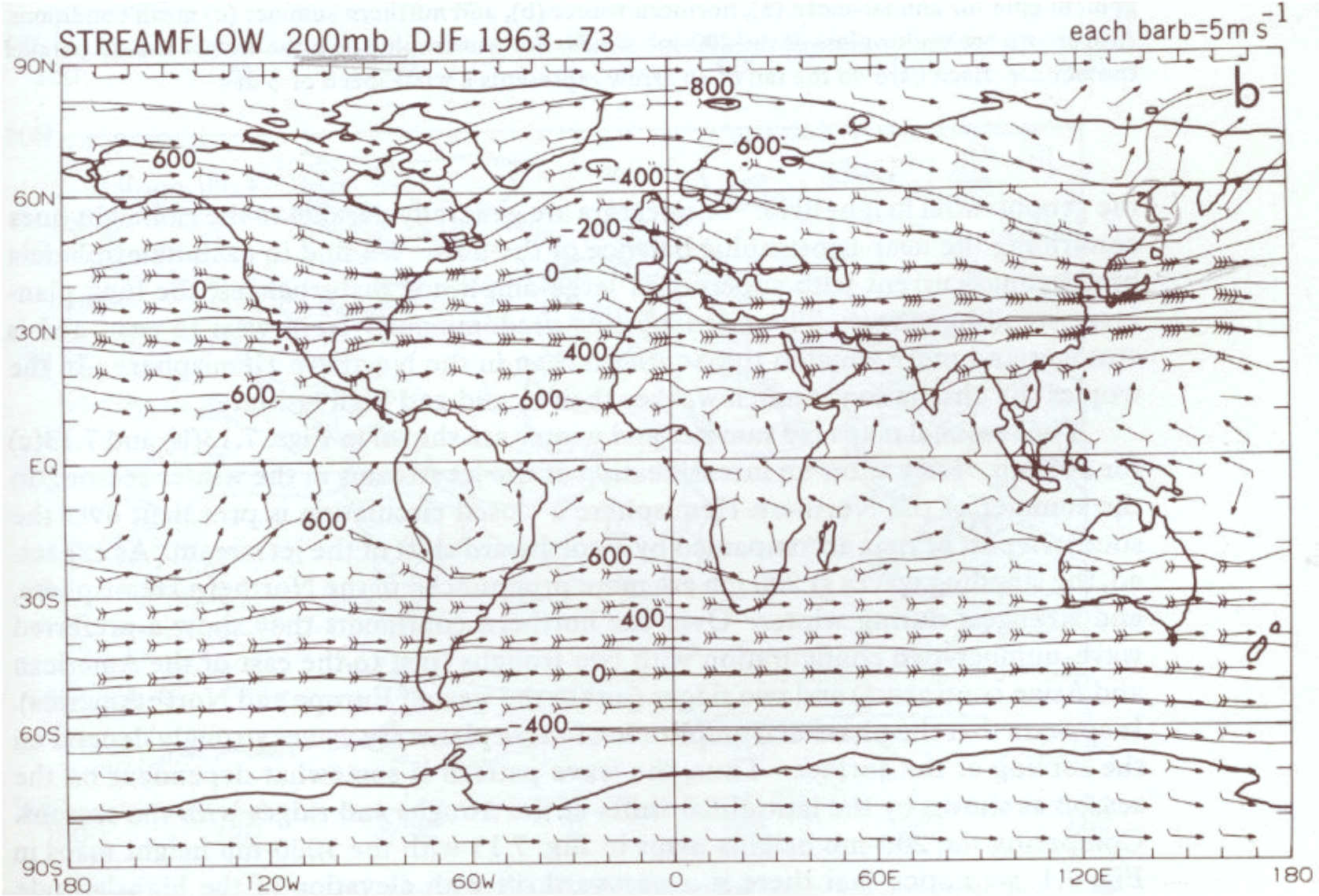


NCEP reanalysis

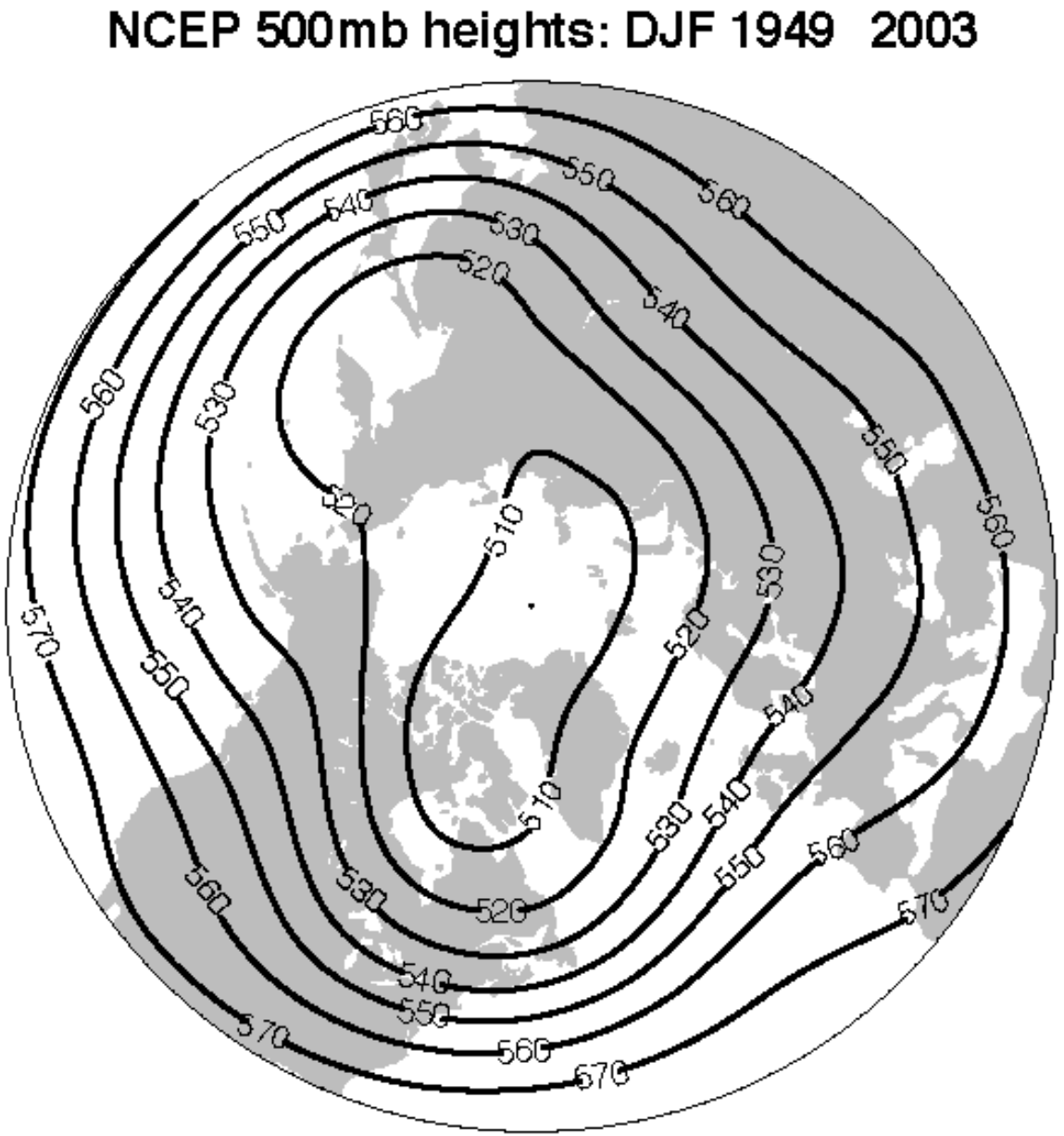
Circulation at the surface: January



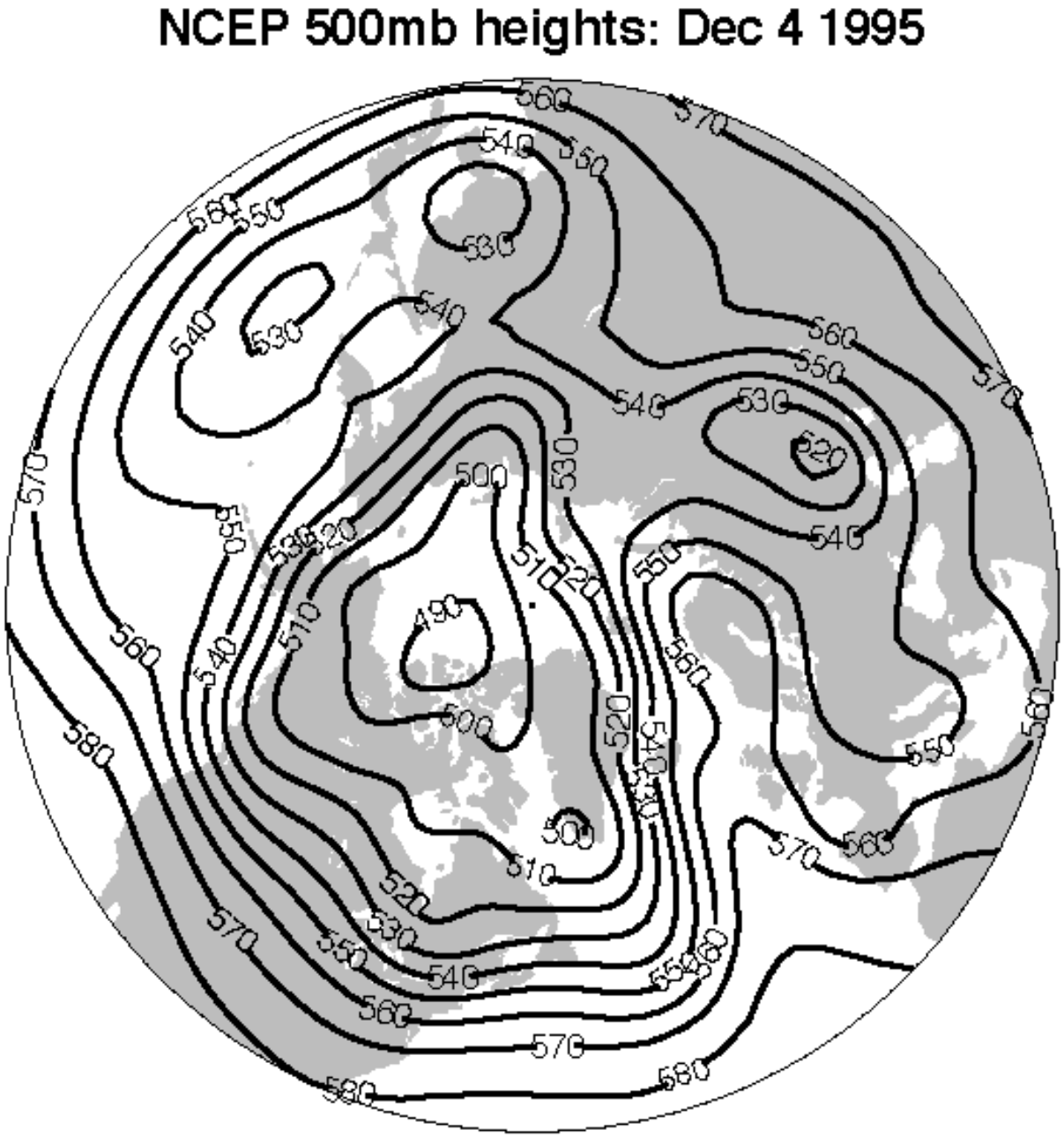
Circulation at 200mb(~10km) DJF



NCEP reanalysis DJF 500mb geopotential heights



Dec 4, 1995 500mb geopotential heights



Storm tracks in the atmosphere

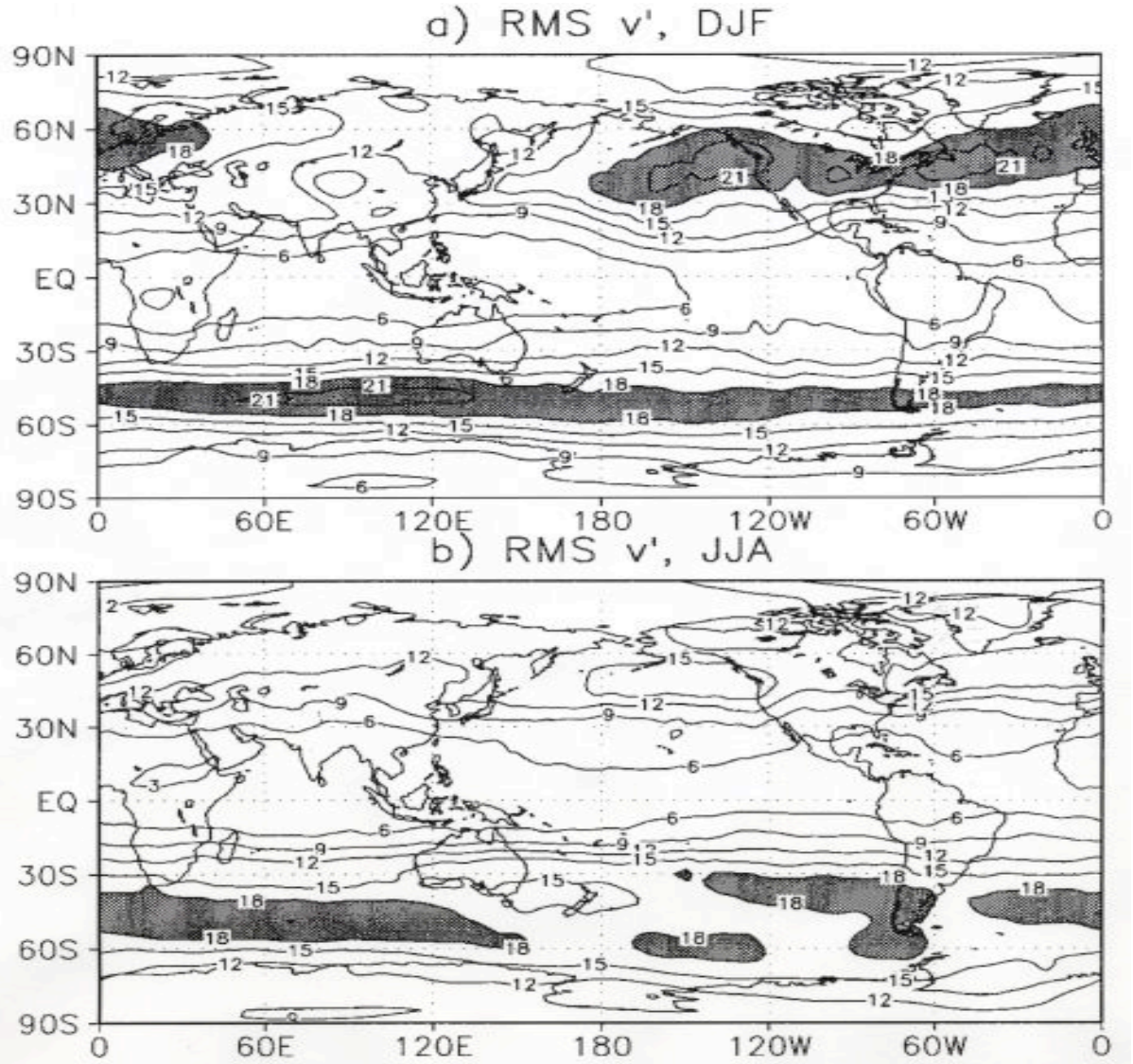
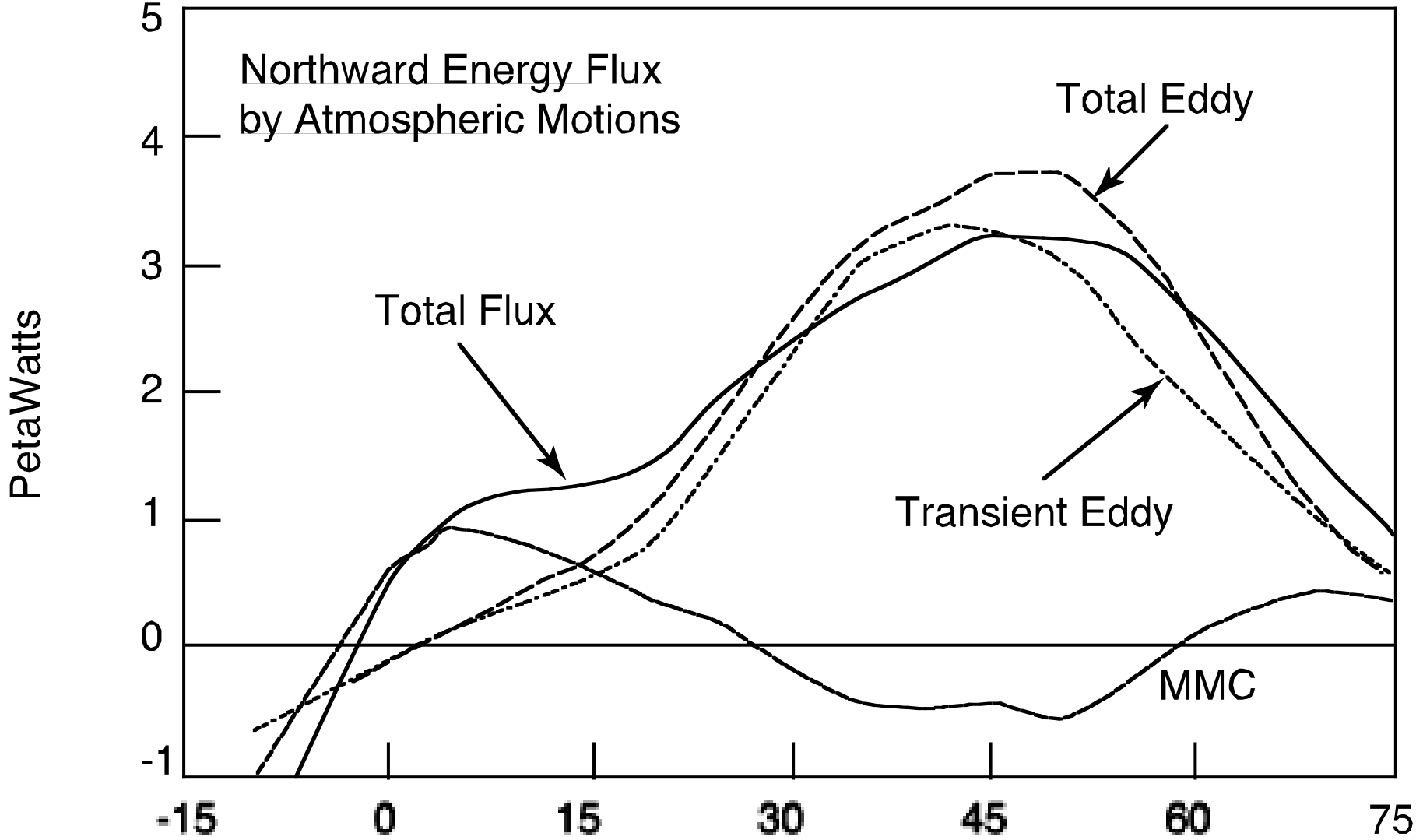
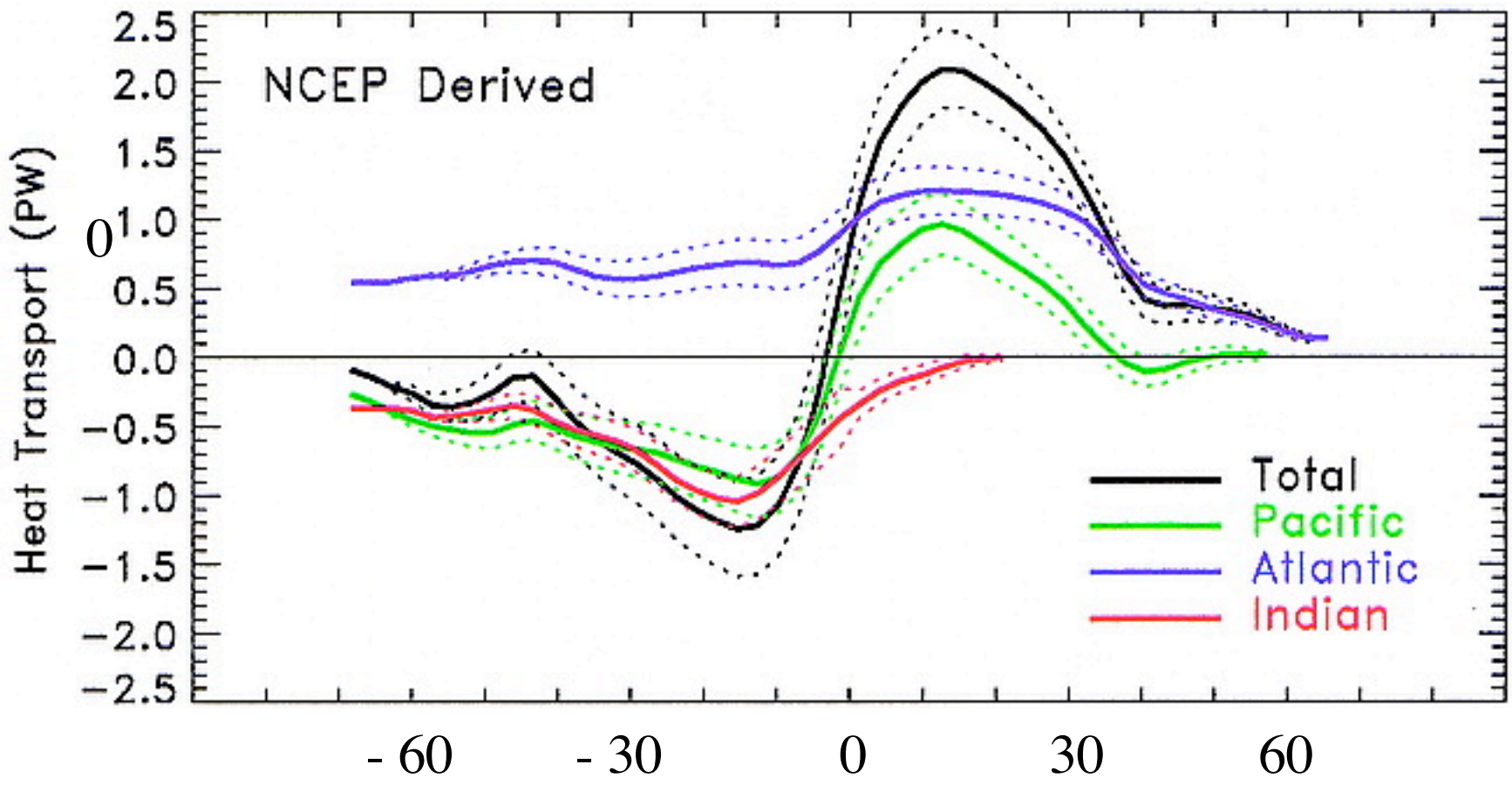


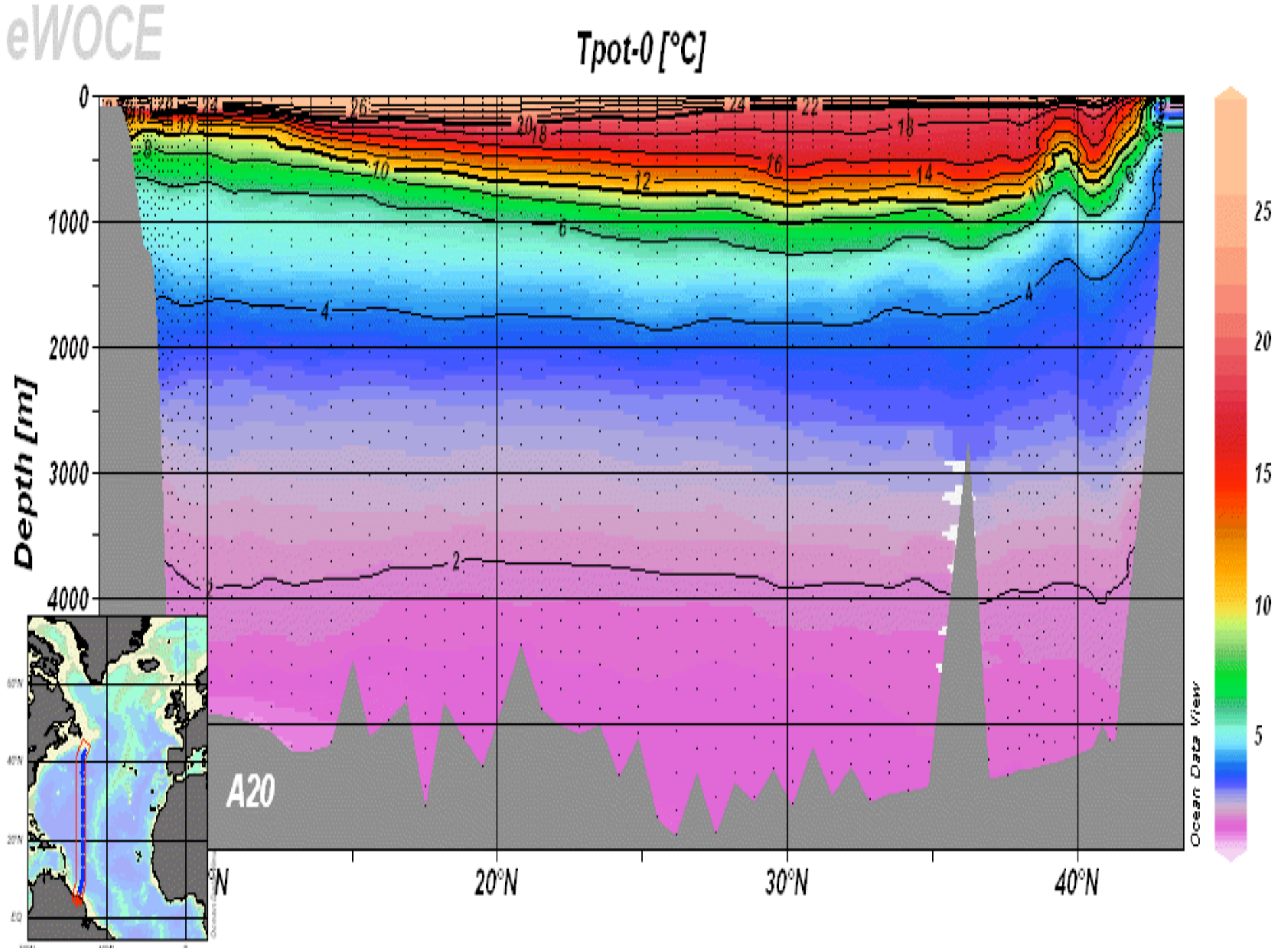
FIG. 2. Standard deviations of 300-hPa v', averaged over 1980–93, for (a) DJF and (b) JJA. Contour interval is 3 m s^{-1}. Shaded areas denote values over 18.

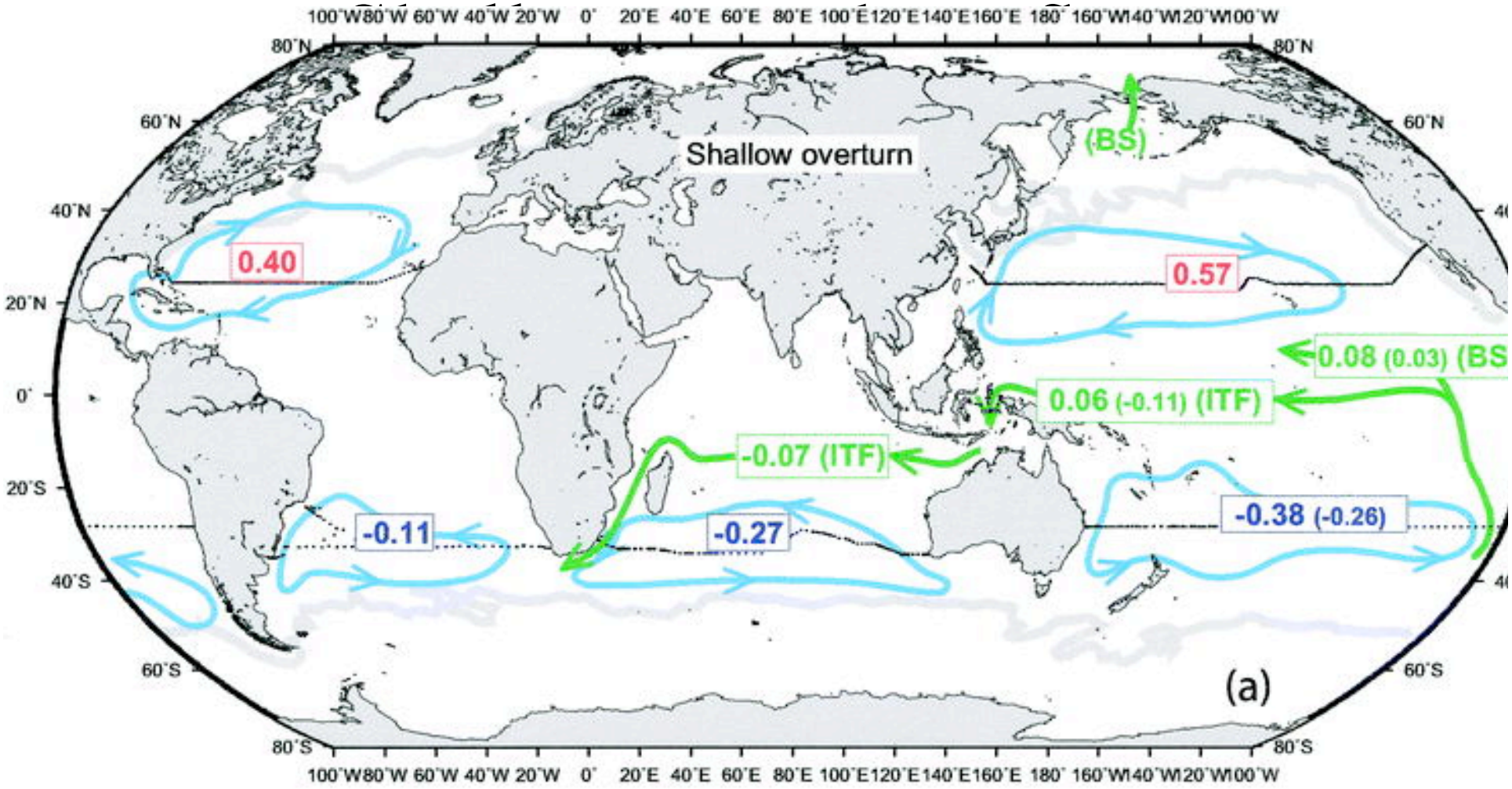
Chang, 99


Northward Energy Flux
by Atmospheric Motions
Total Eddy
Total Flux
Transient Eddy
MMC
PetaWatts
5
4
3
2
1
0
-1
-15
0
15
30
45
60
75

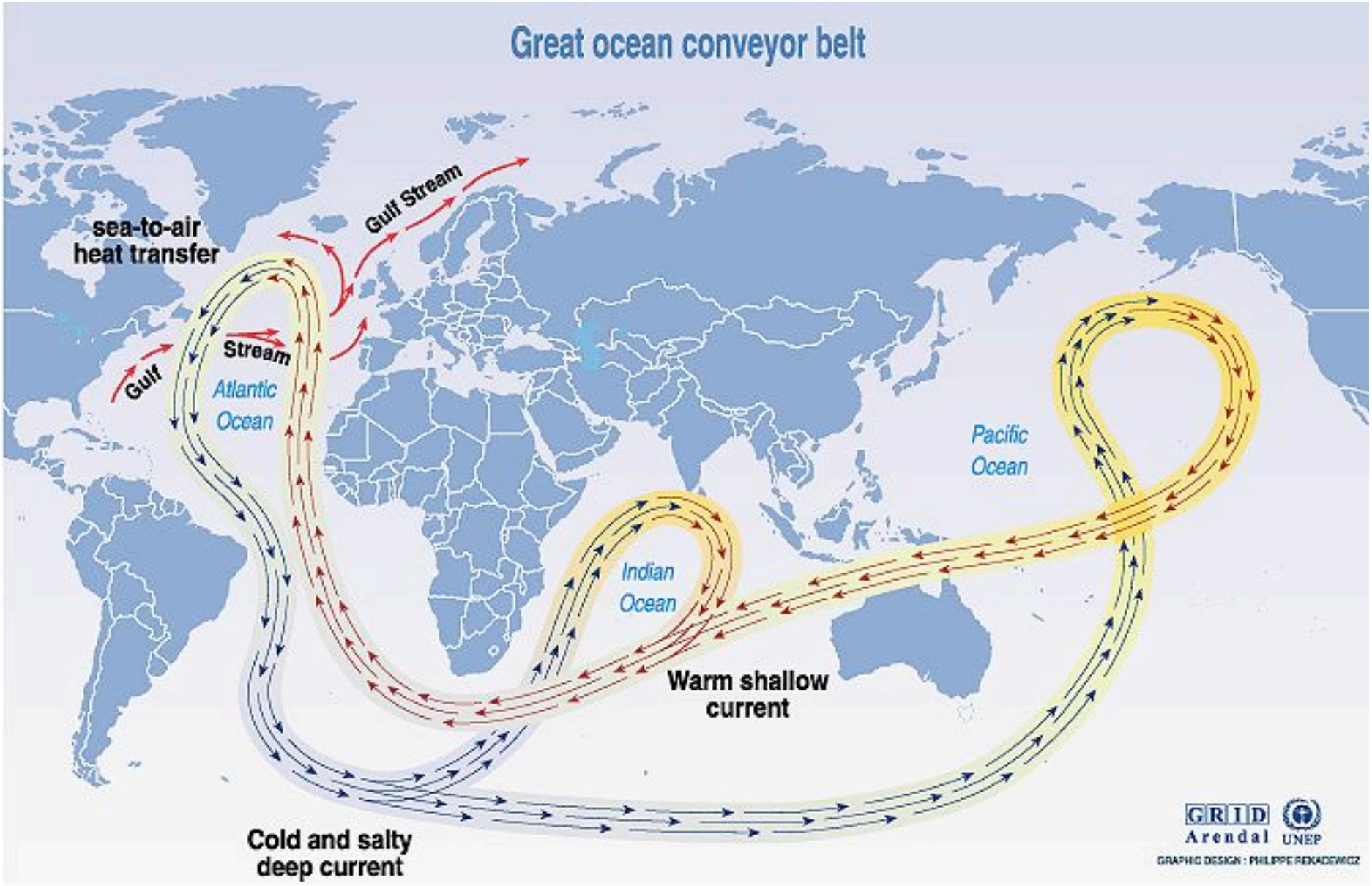


Trenberth and Caron (2001)


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

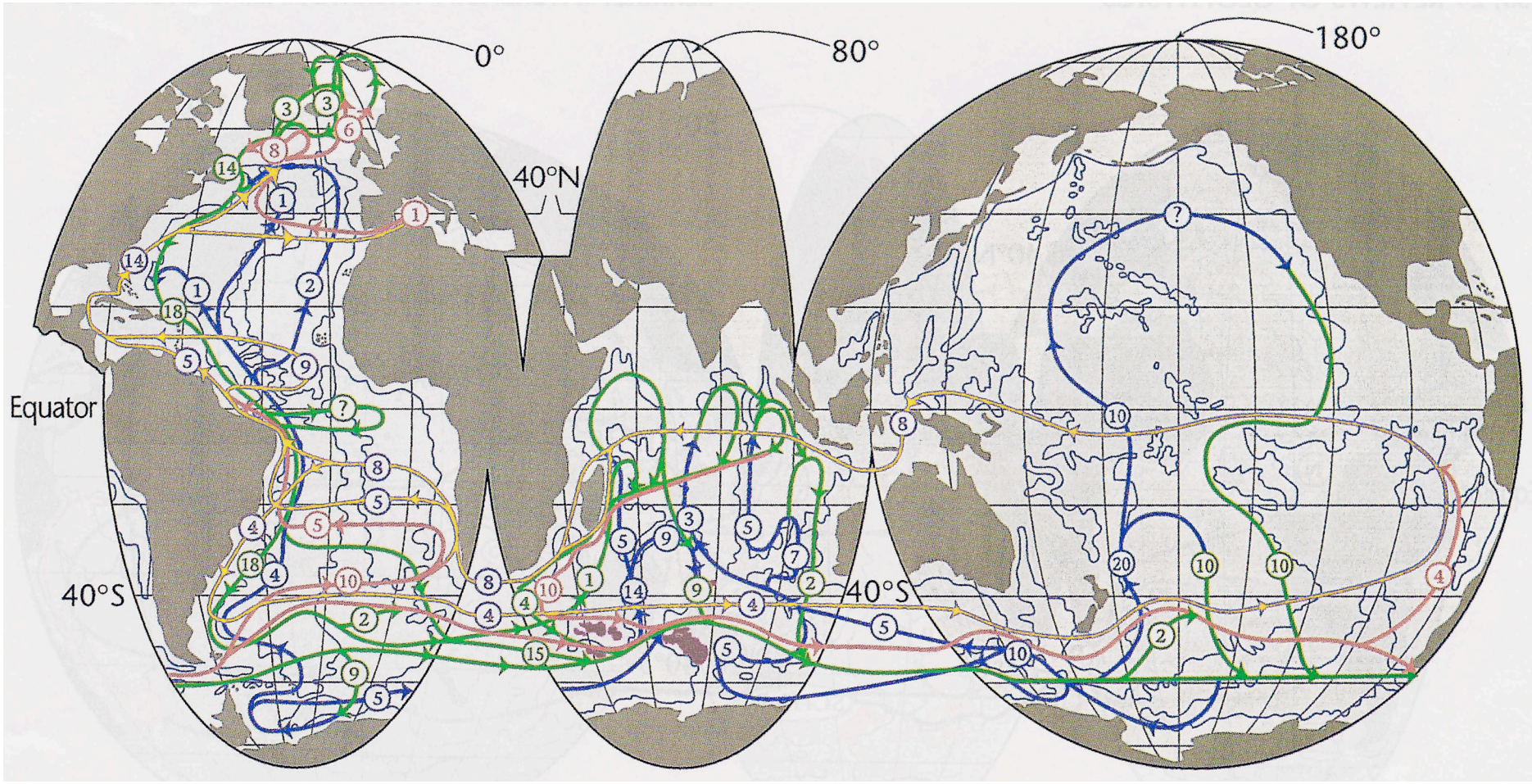

Shallow overturn
(BS)
0.40
0.57
0.08 (0.03) (BS
0.06 (-0.11) (ITF)
-0.07 (ITF)
-0.11
-0.27
-0.38 (-0.26)
(a)

Talley (2003)



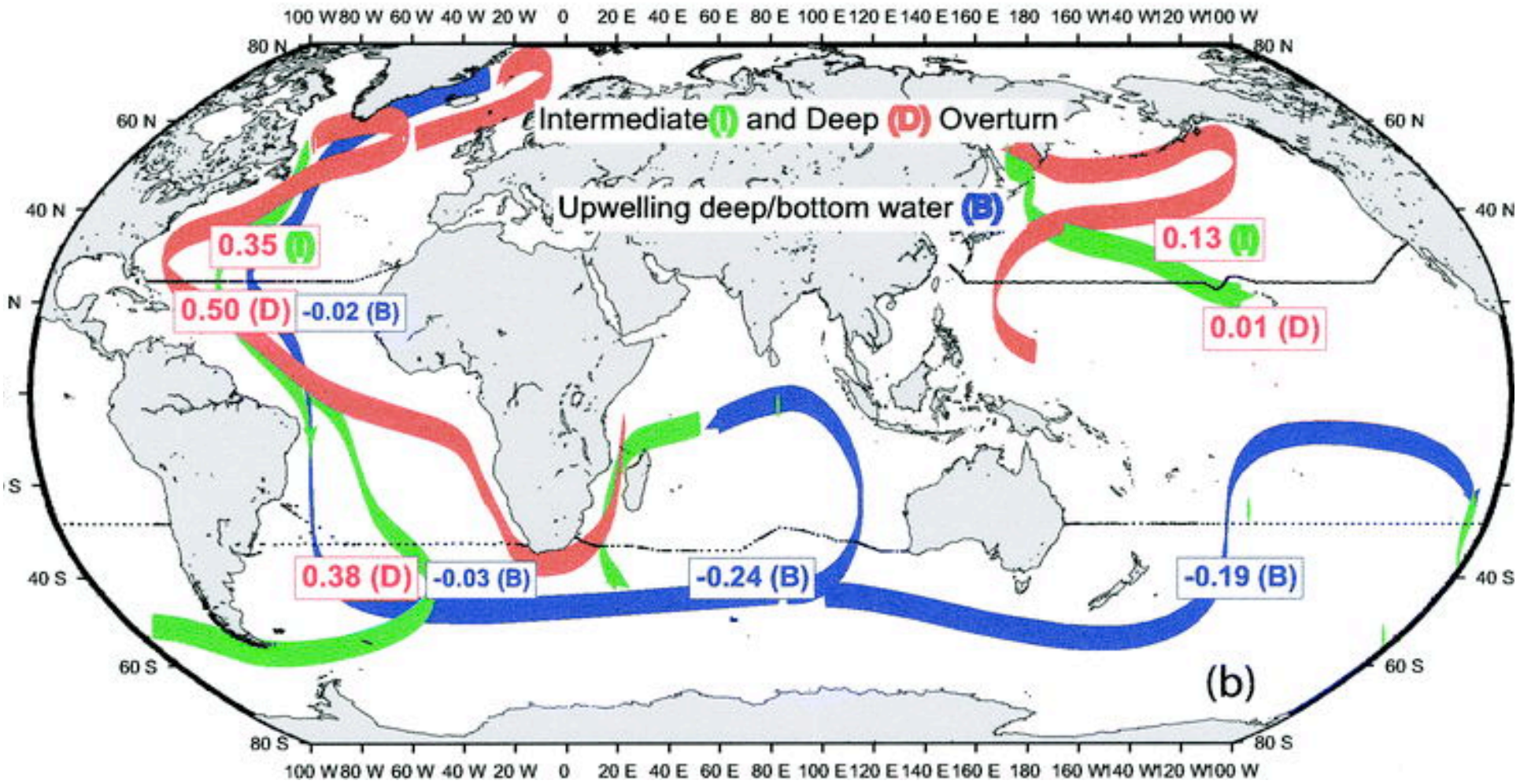
Source: Broecker, 1991, in Climate change 1995, Impacts, adaptations and mitigation of climate change: scientific-technical analyses, contribution of working group 2 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge press university, 1996.

Schmitz (1995). Rev. Geophys. 33: 151

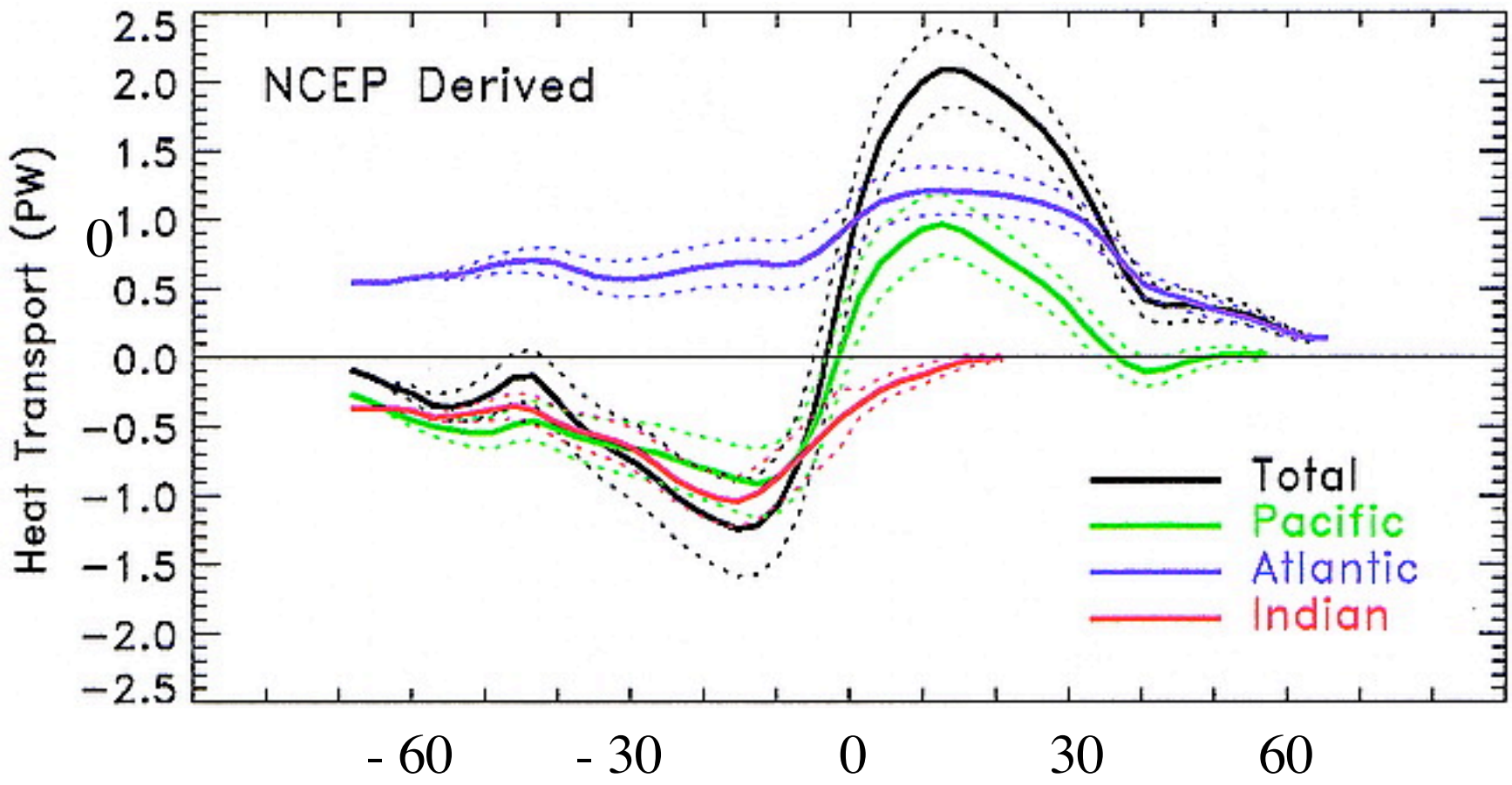


Below 4000 m

1500 to 4000 m


Intermediate (I) and Deep (D) Overturn
Upwelling deep/bottom water (B)
0.35 (I)
0.50 (D)
-0.02 (B)
0.13 (I)
0.01 (D)
0.38 (D)
-0.03 (B)
-0.24 (B)
-0.19 (B)
(b)
100 W 80 W 60 W 40 W 20 W 0 20 E 40 E 60 E 80 E 100 E 120 E 140 E 160 E 180 160 W 140 W 120 W 100 W
80 N
60 N
40 N
40 S
60 S
80 S

Talley (2003)



Trenberth and Caron (2001)