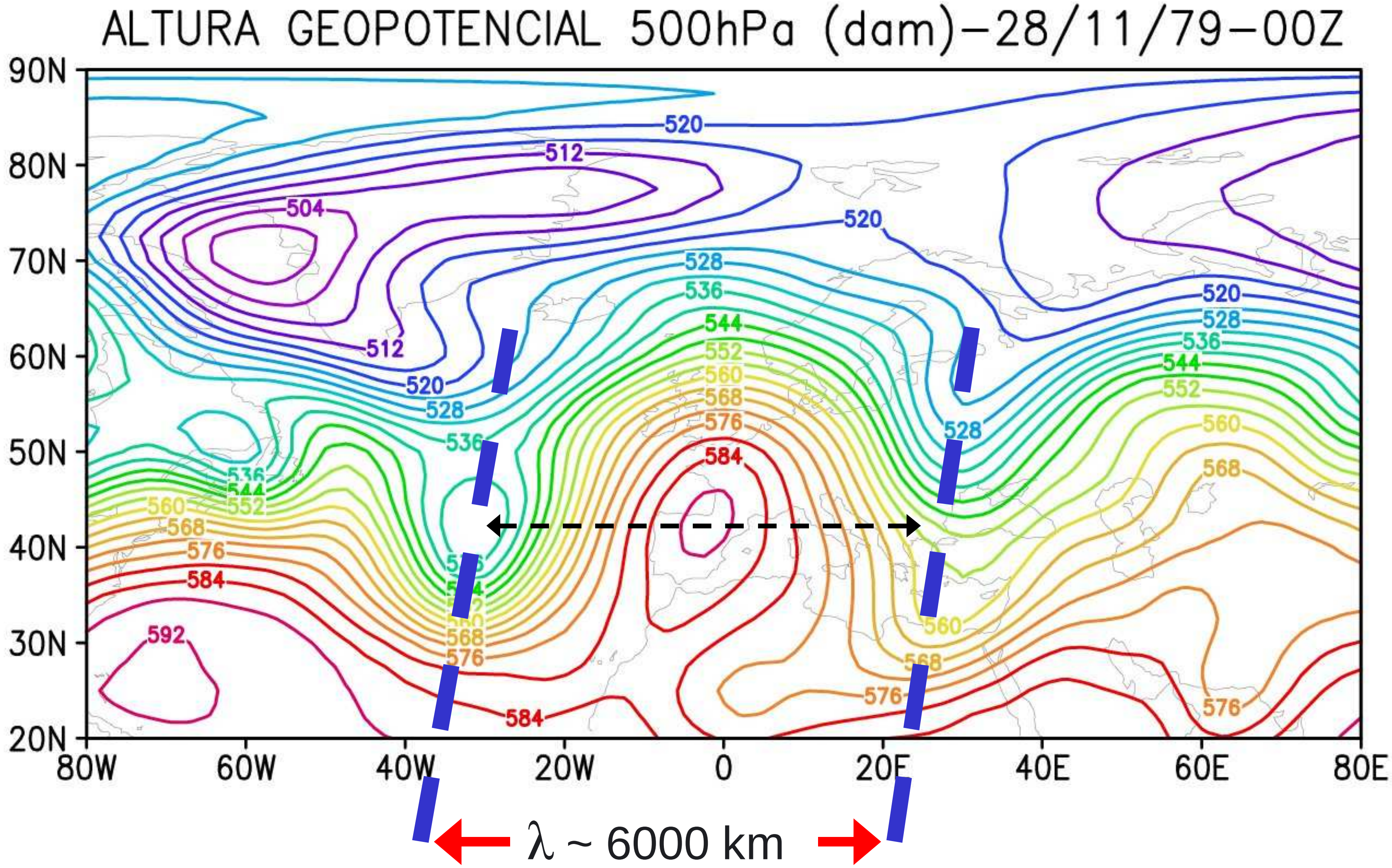
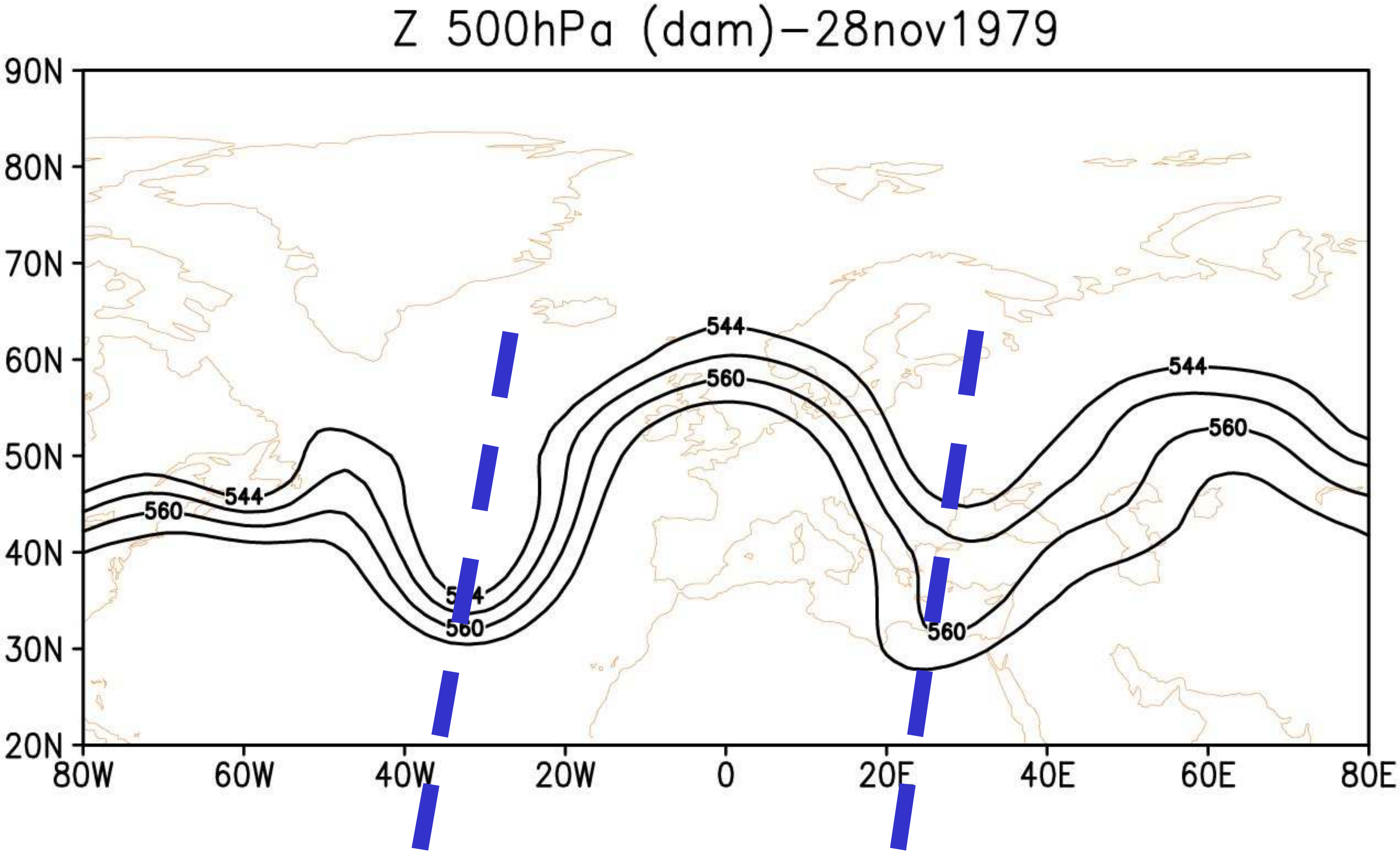
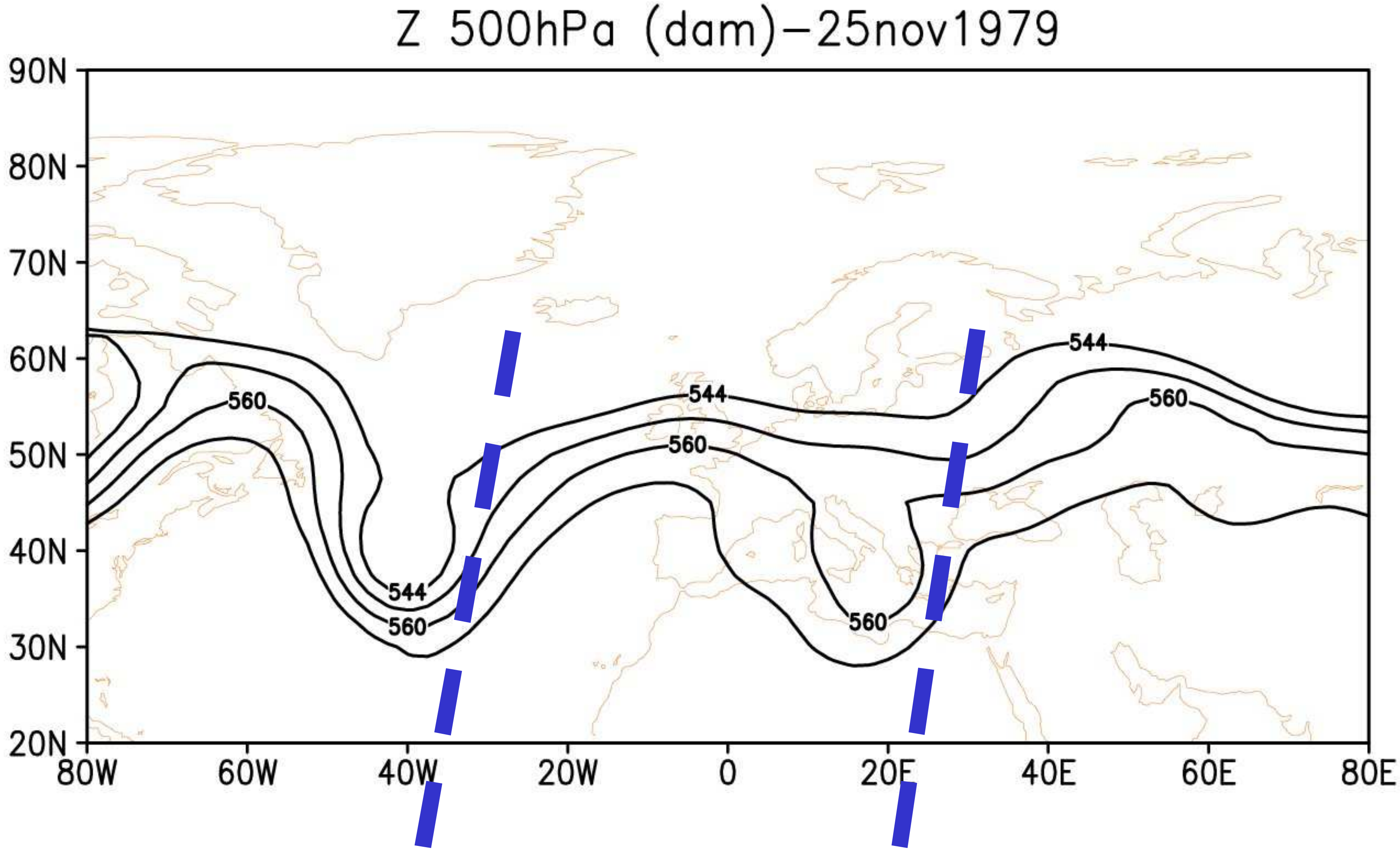
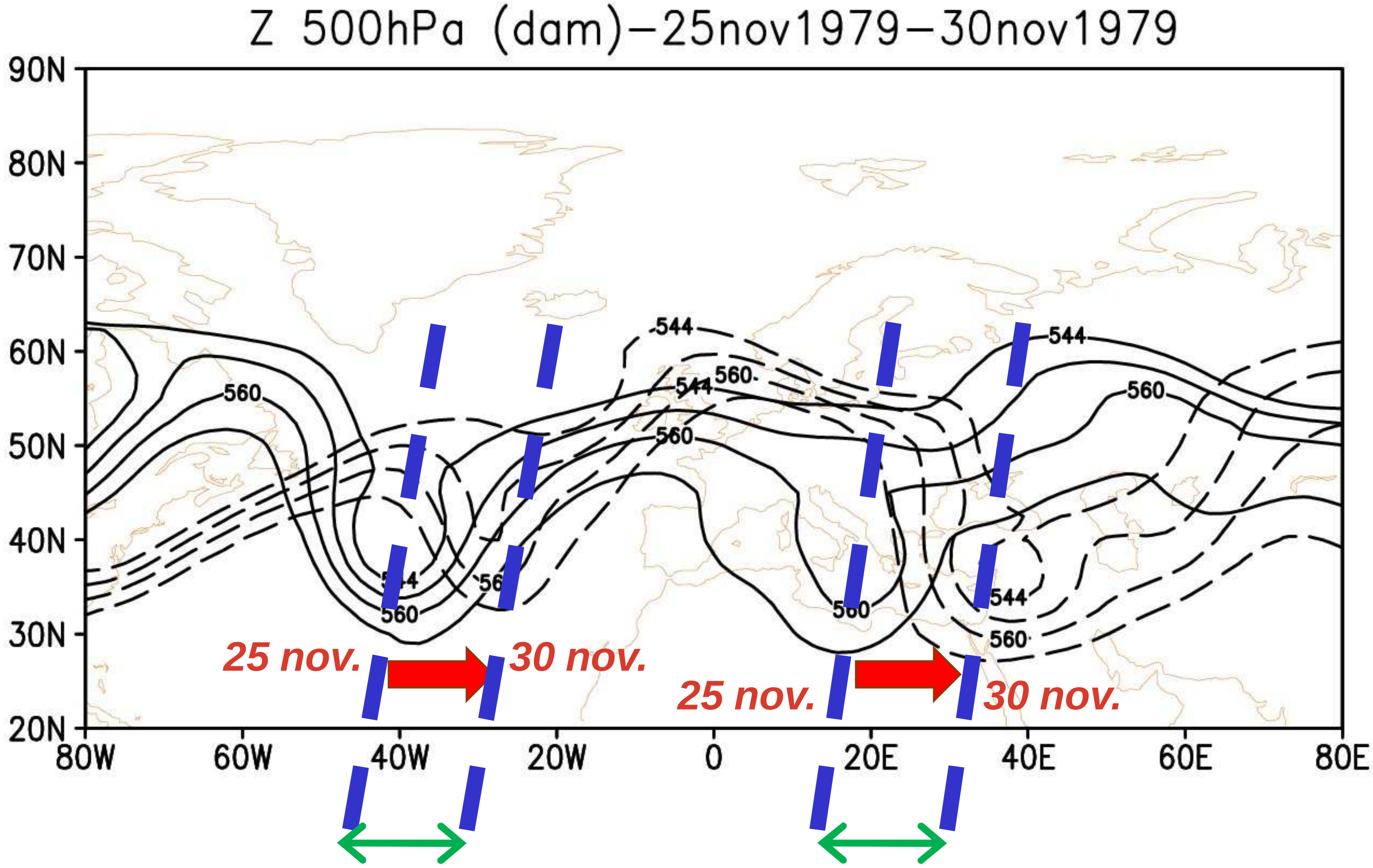
- Vorticidad planetaria y relativa
- Divergencia horizontal
- Ondas de Rossby

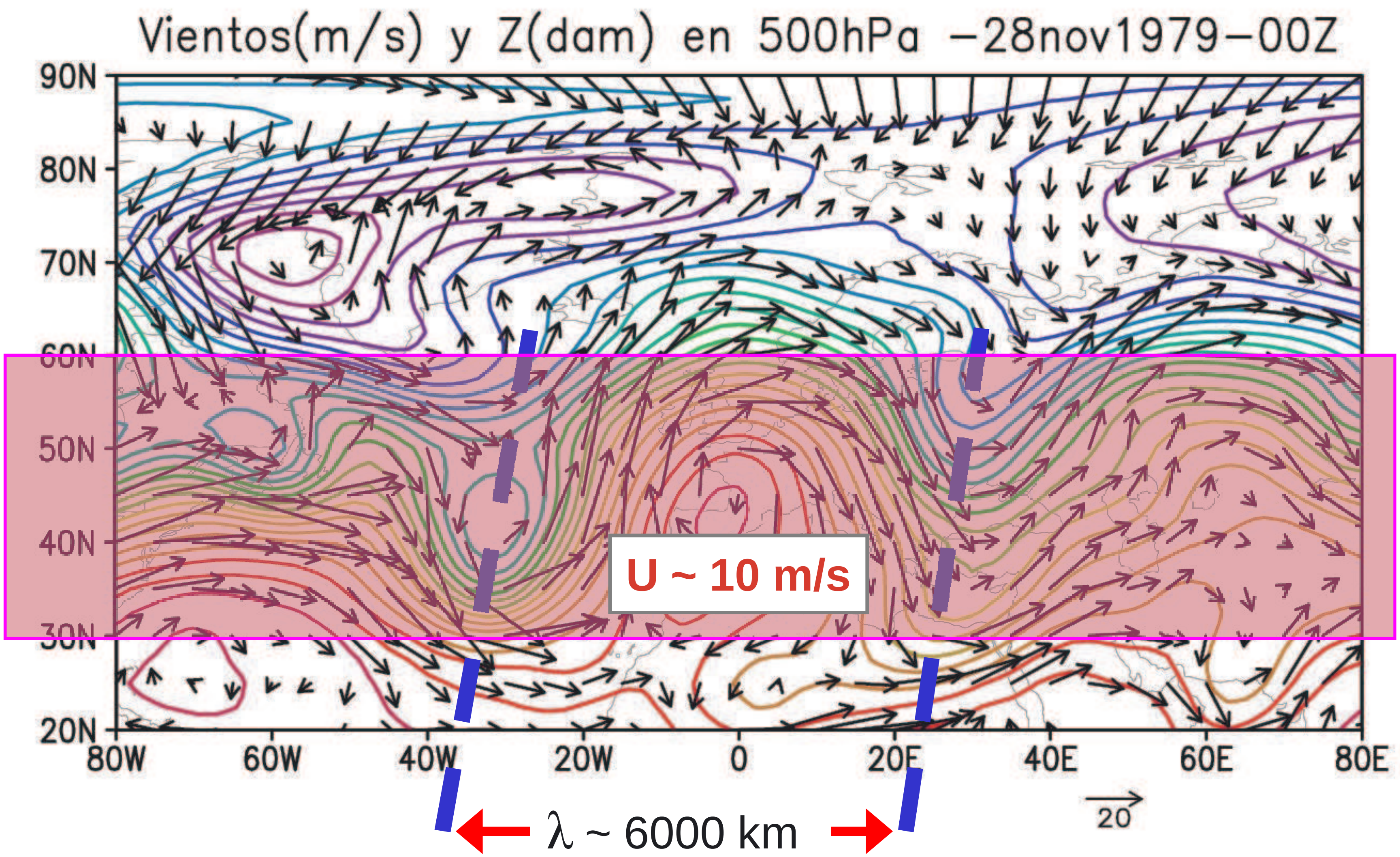

ALTURA GEOPOTENCIAL 500hPa (dam)–28/11/79–00Z
90N
80N
70N
60N
50N
40N
30N
20N
80W
60W
40W
20W
0
20E
40E
60E
80E
λ ~ 6000 km

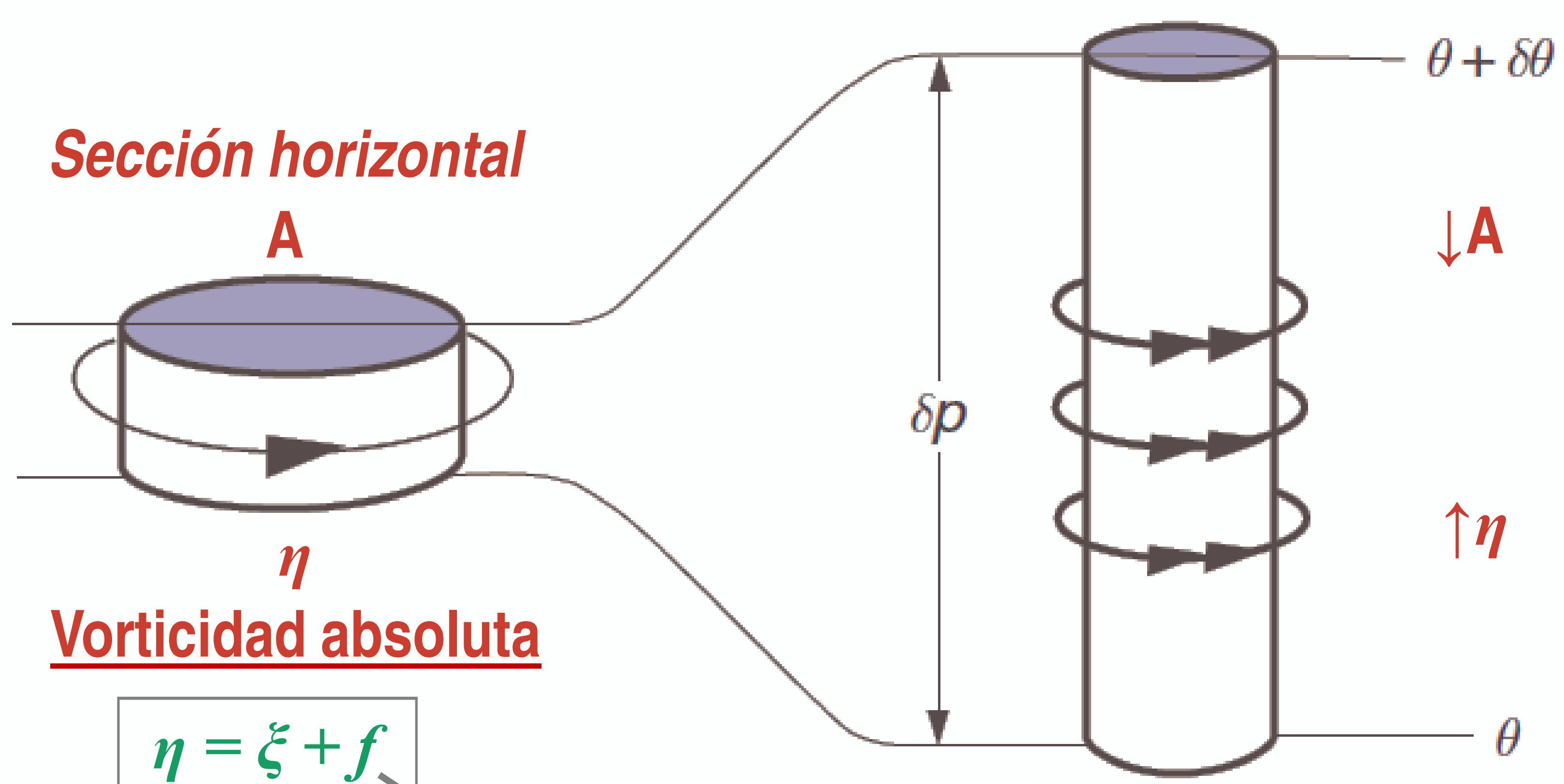

Z 500hPa (dam)–28nov1979
90N
80N
70N
60N
50N
40N
30N
20N
80W
60W
40W
20W
0
20E
40E
60E
80E
544
560


Z 500hPa (dam)–25nov1979
90N
80N
70N
60N
50N
40N
30N
20N
80W
60W
40W
20W
0
20E
40E
60E
80E
544
560
544
560
544
560
560
544
560




~ 1000 km → c ~ 2 ms$^{-1}$


Vientos(m/s) y Z(dam) en 500hPa -28nov1979-00Z
90N
80N
70N
60N
50N
40N
30N
20N
80W
60W
40W
20W
0
20E
40E
60E
80E
20
U ~ 10 m/s
λ ~ 6000 km

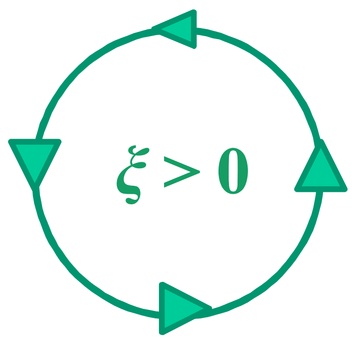


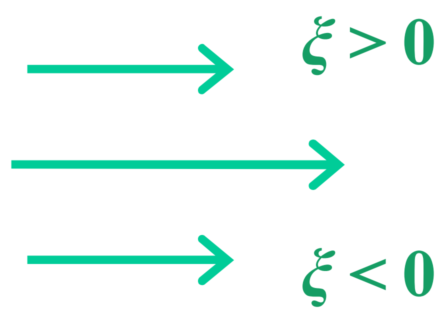

$$\eta = \xi + f$$

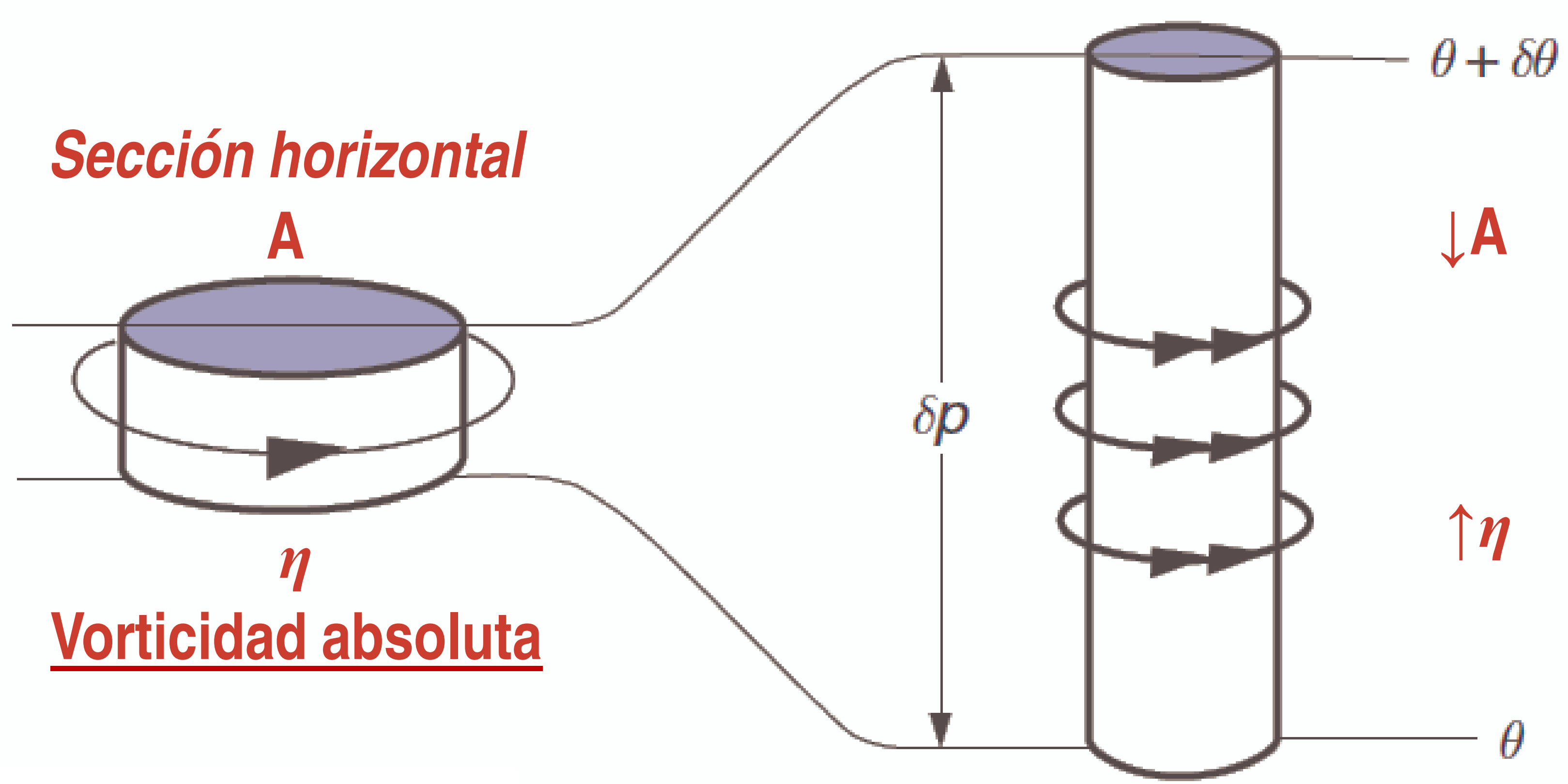
Vorticidad planetaria

Vorticidad relativa

$$\xi = \frac{\partial u}{\partial x} + \frac{\partial v}{\partial y}$$






Conservación
de la **vorticidad potencial**

$$\frac{D(\eta A)}{Dt} = 0$$

**Divergencia horizontal**

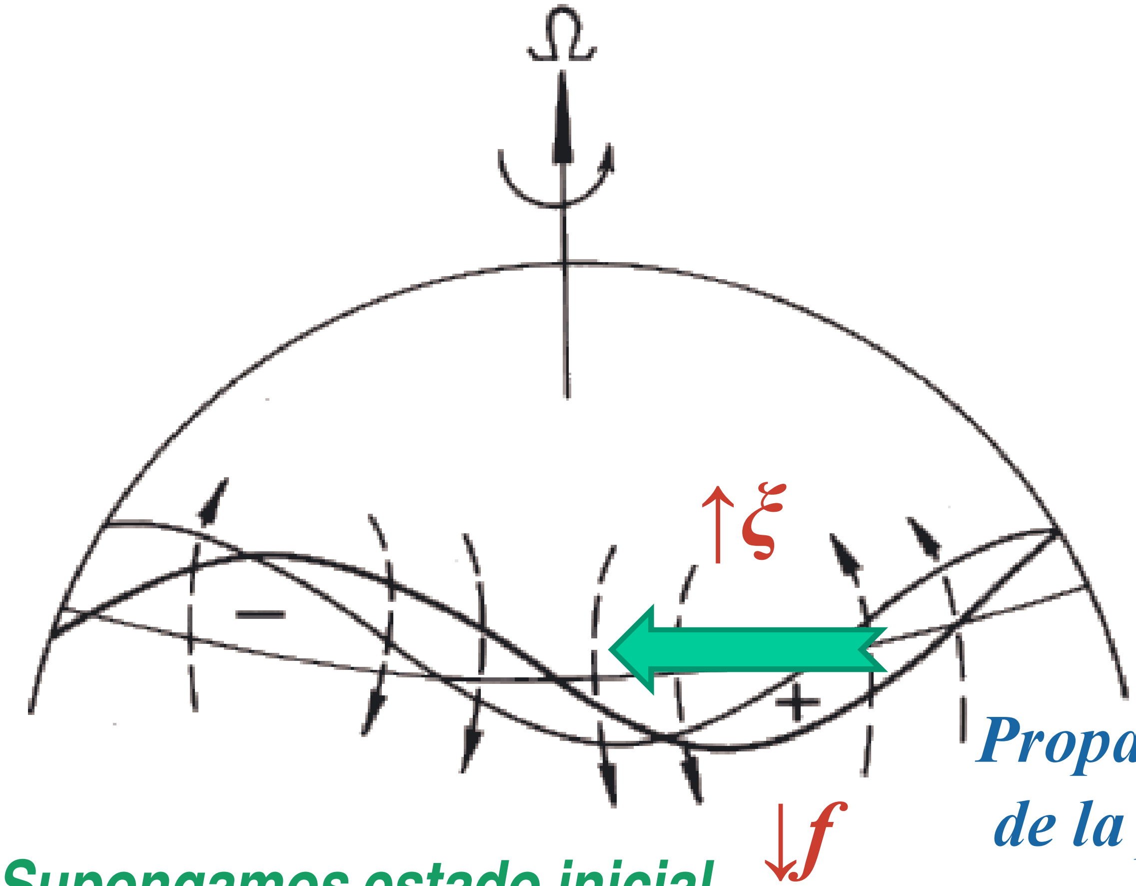
$$\frac{1}{\eta}\frac{D\eta}{Dt} = -\frac{1}{A}\frac{DA}{Dt} = -\left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y}\right) = \underbrace{-\nabla_H \cdot \mathbf{V}}$$

Si la divergencia horizontal ~ 0 → la vorticidad absoluta se conserva

$$\eta = \xi + f = cte.$$

$$\beta = \frac{df}{dy} = \frac{2\Omega \cos\phi}{R_T}$$

variación de f con la latitud

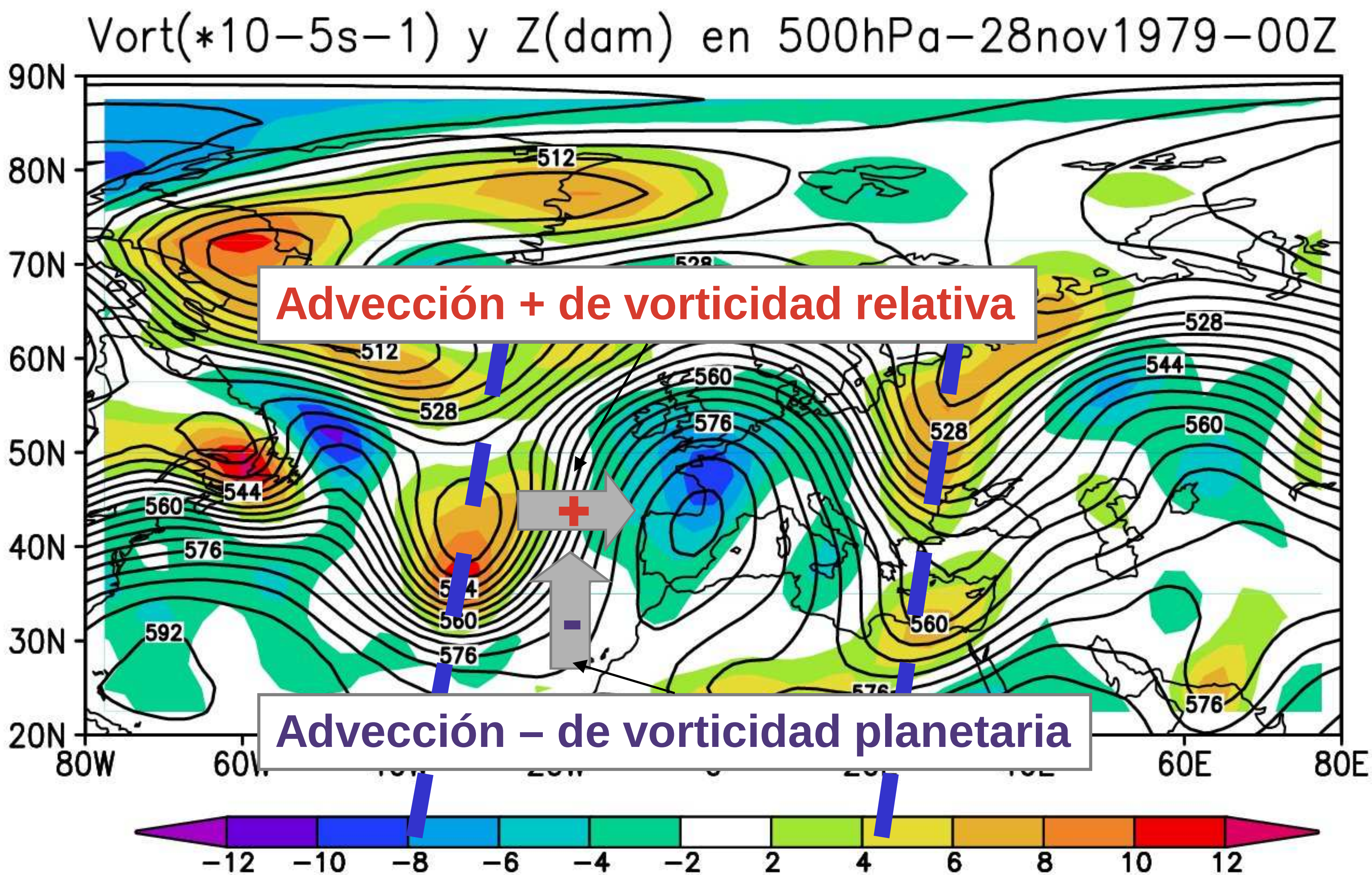


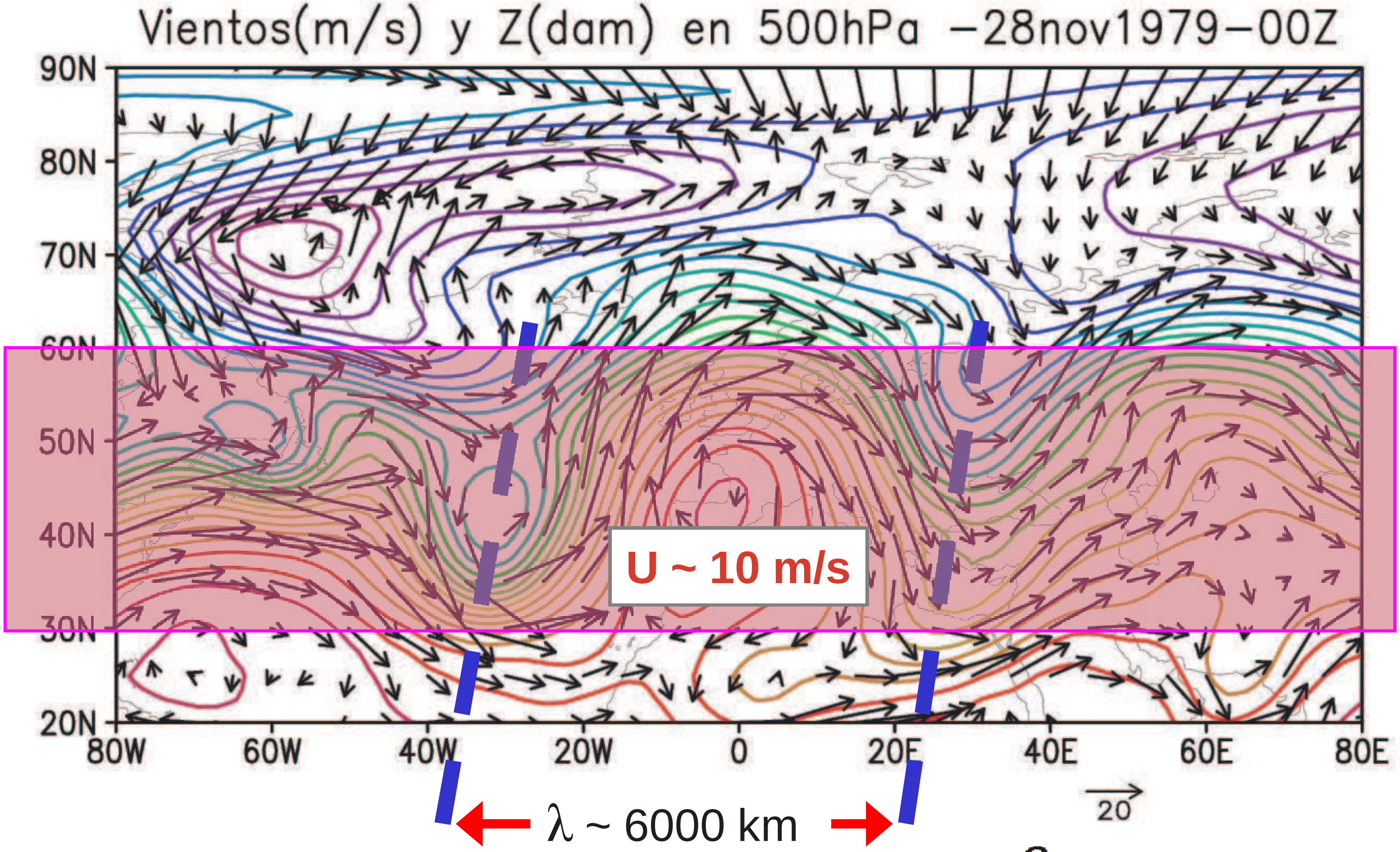

$$c_R = -\frac{\beta}{(2\pi)^2}\lambda^2$$

*Propagación de la perturbación hacia el oeste*

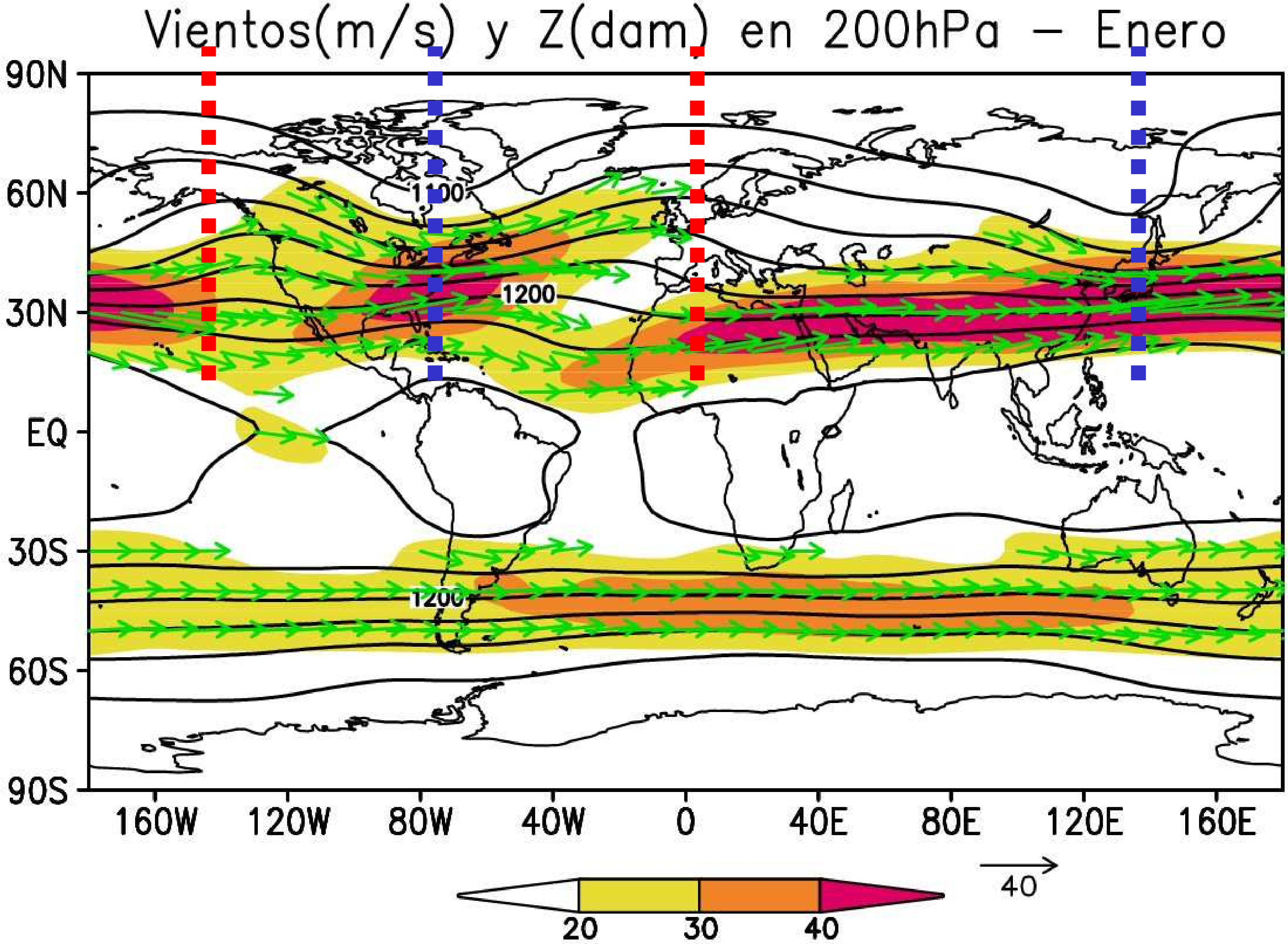
Supongamos estado inicial en reposo, en el que surge una perturbación…

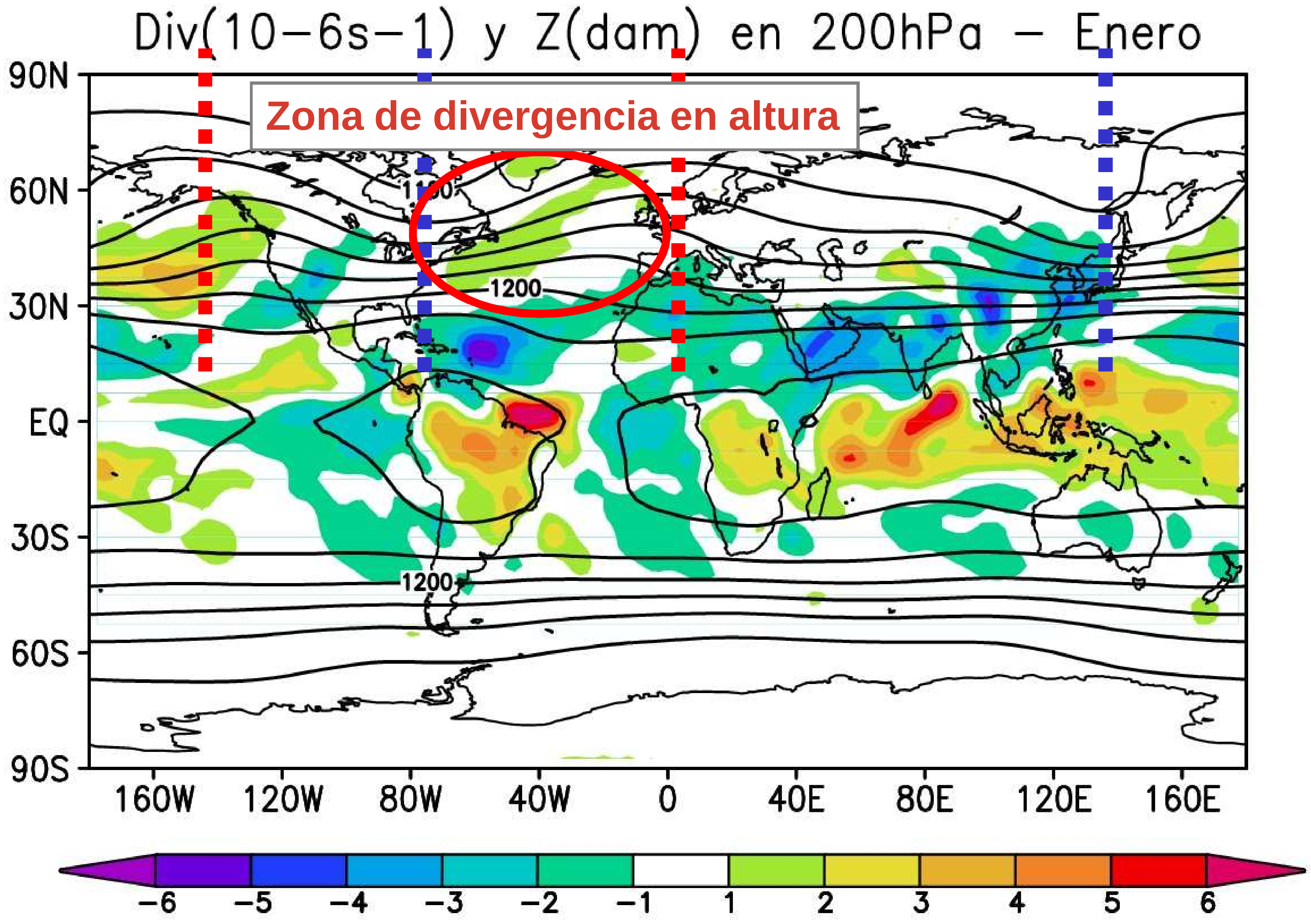
**Onda de Rossby**


Vort(*10-5s-1) y Z(dam) en 500hPa-28nov1979-00Z
Advección + de vorticidad relativa
Advección – de vorticidad planetaria
+
-
90N
80N
70N
60N
50N
40N
30N
20N
80W
60E
80E
512
528
544
560
576
592
-12
-10
-8
-6
-4
-2
2
4
6
8
10
12




$$c_{ef} = U - \frac{\beta}{(2\pi)^2}\lambda^2 \sim 1\, ms^{-1}$$


Vientos(m/s) y Z(dam) en 200hPa – Enero
90N
60N
30N
EQ
30S
60S
90S
160W
120W
80W
40W
0
40E
80E
120E
160E
1100
1200
1200
20
30
40
40



Div(10−6s−1) y Z(dam) en 200hPa − Enero
Zona de divergencia en altura
1100
1200
1200
90N
60N
30N
EQ
30S
60S
90S
160W
120W
80W
40W
0
40E
80E
120E
160E
−6
−5
−4
−3
−2
−1
1
2
3
4
5
6