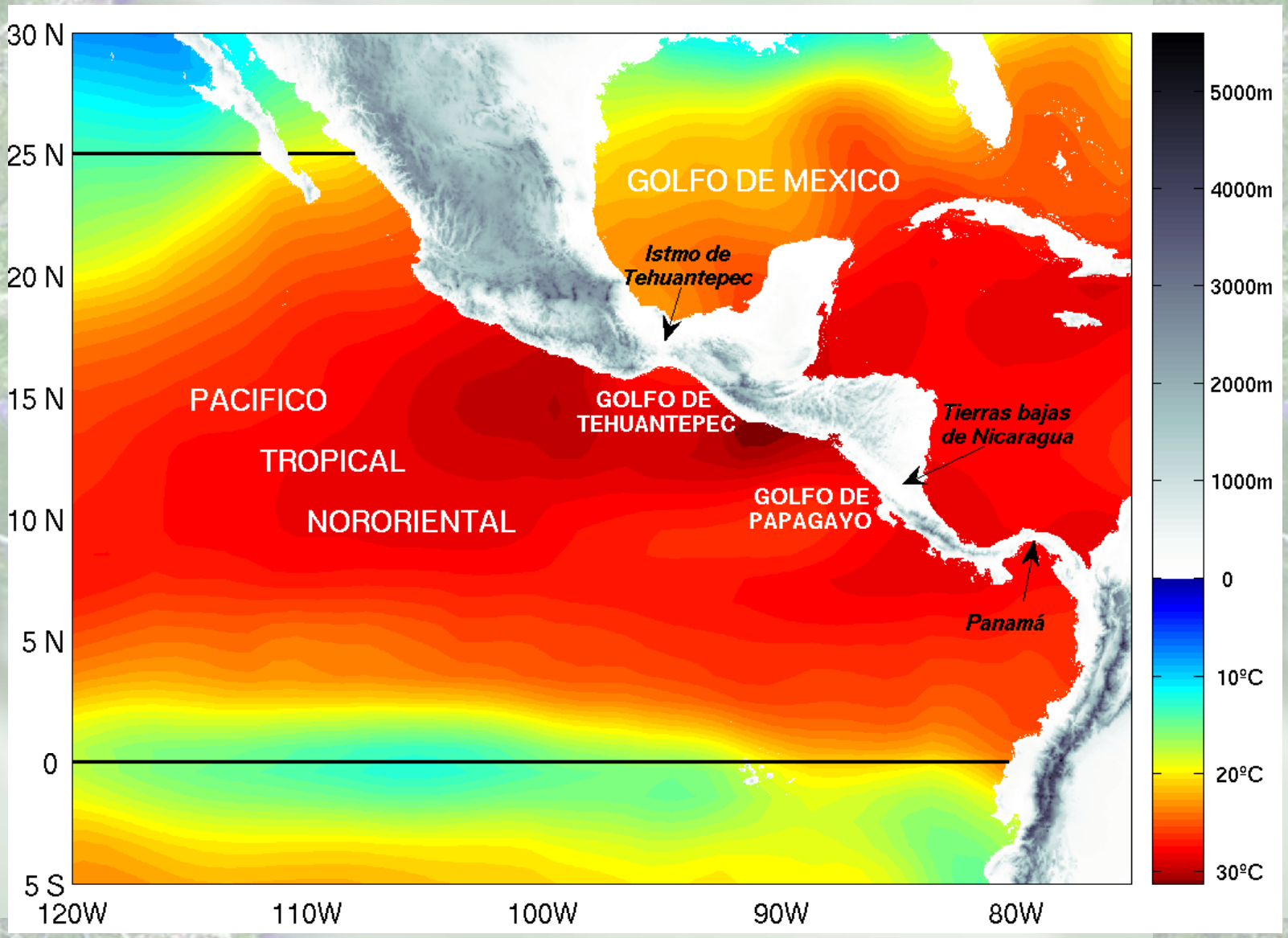
Dinámica del Pacífico nororiental tropical

Jorge Zavala-Hidalgo

3er Curso sobre Ciclones Tropicales con énfasis en el Pacífico Oriental

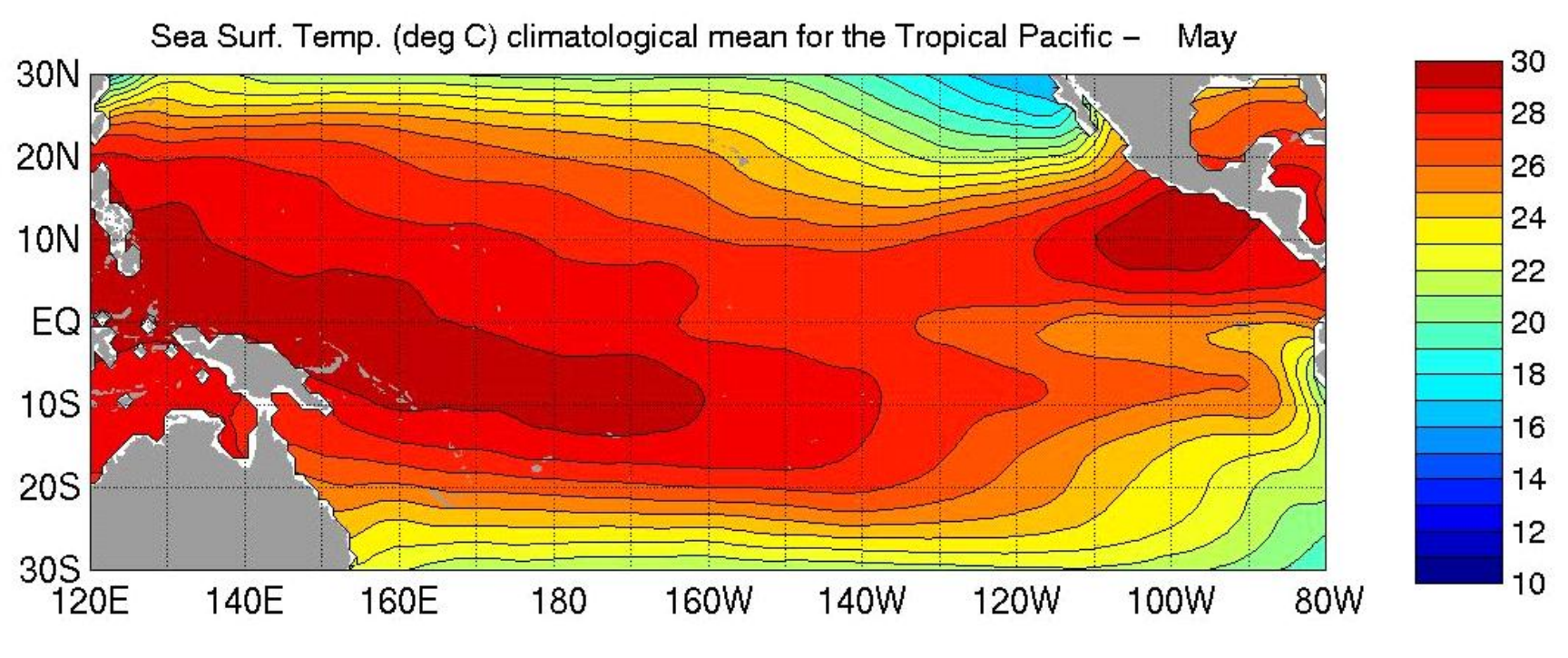
Marzo 2010, La Paz, BCS

- **Temperatura superficial del mar**
- **La circulación media**
- **Remolinos en el PTNO**
- **Ondas de Kelvin**
- **Ondas de Rossby**
- **Variabilidad interanual, El Niño y la Niña**



Romero-Centeno, 2007

Promedio de la temperatura superficial del mar en Mayo



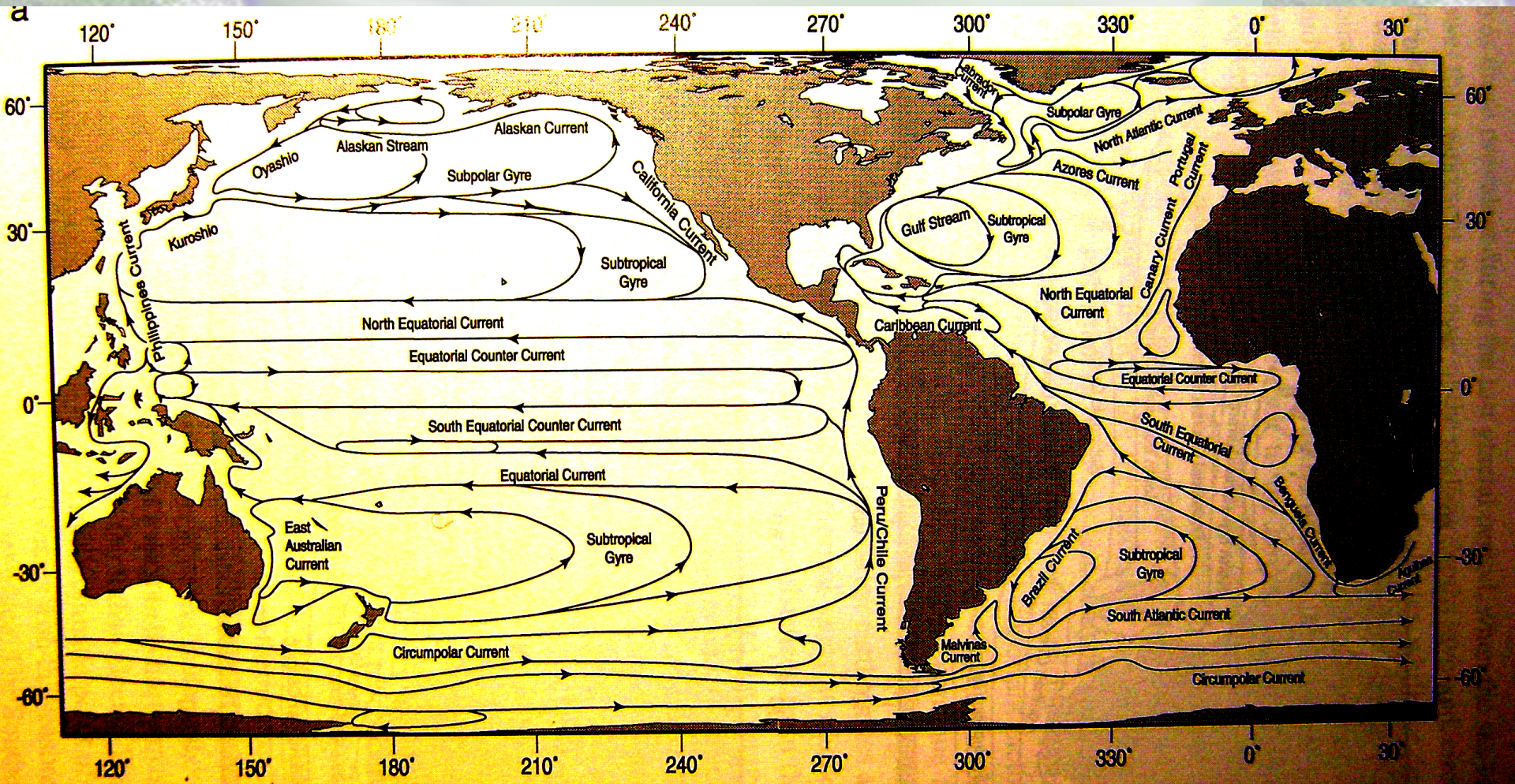
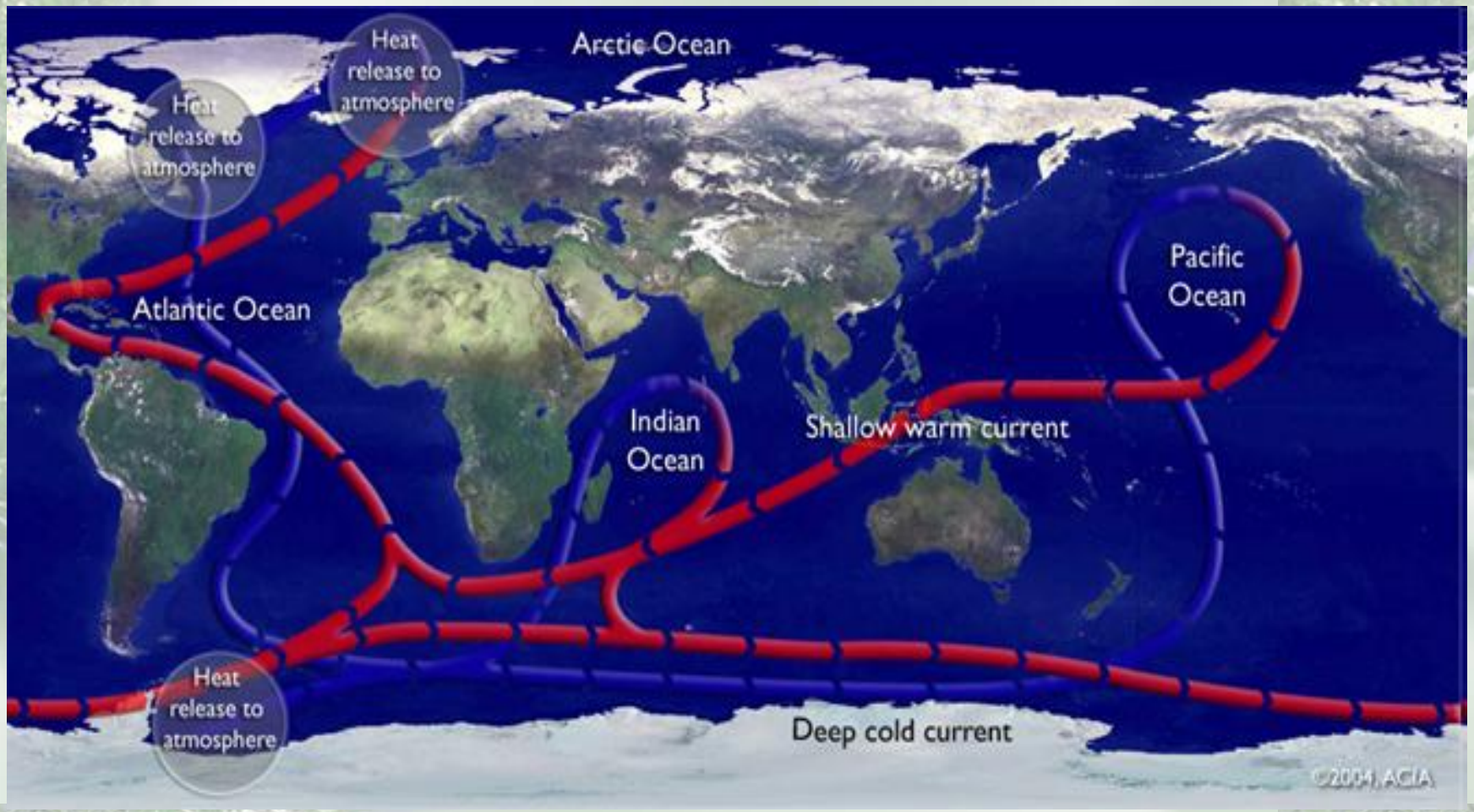
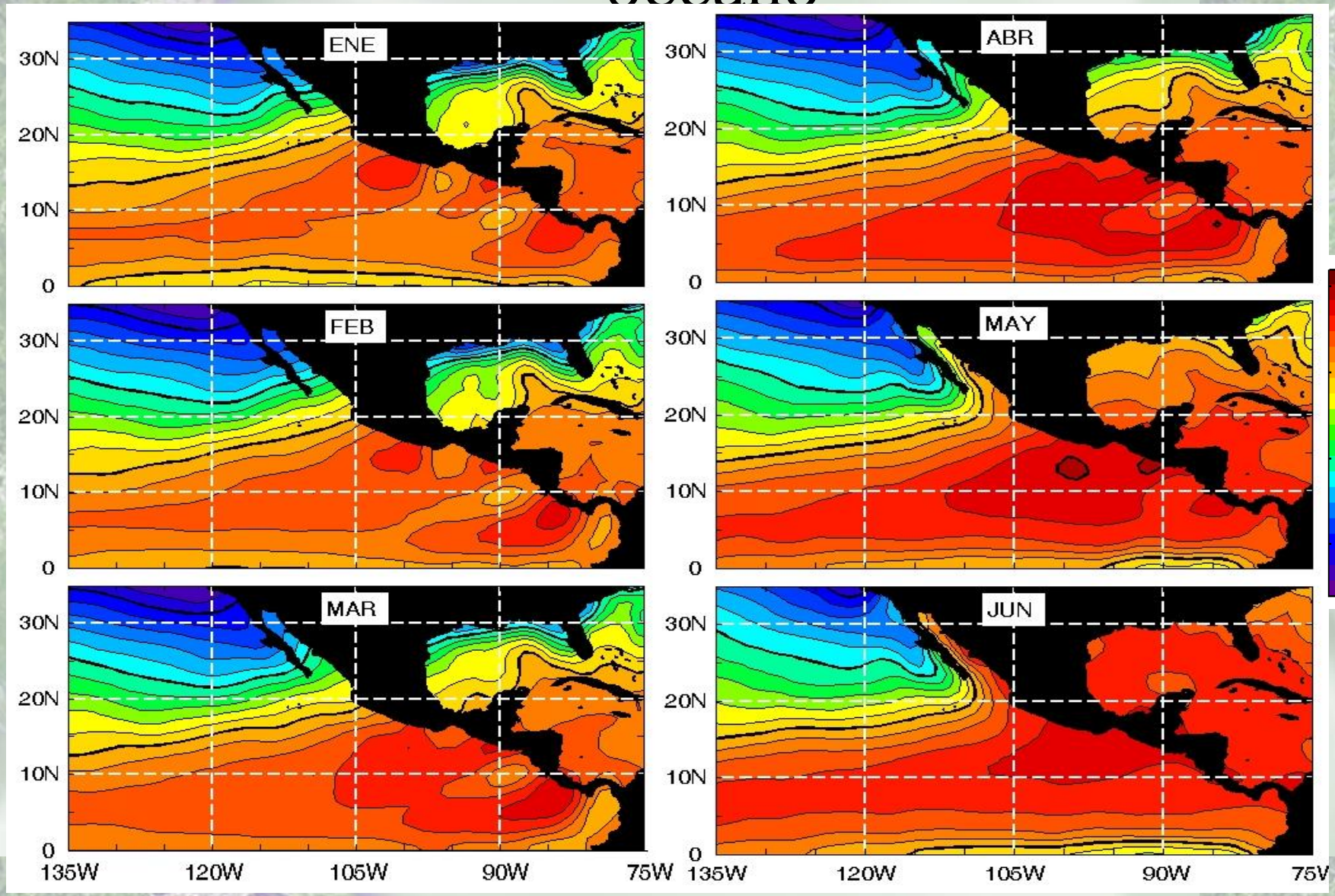


Figure 1.1.2 Broad mean circulation features in the (a) Atlantic and Pacific, and (b) Indian basins. (Based on Tomczak and Godfrey, *Regional Oceanography: An Introduction*, ©1994, Pergamon Press; reprinted by permission of Butterworth Heinemann Publishers, a division of Reed Educational & Professional Publishing Ltd.)

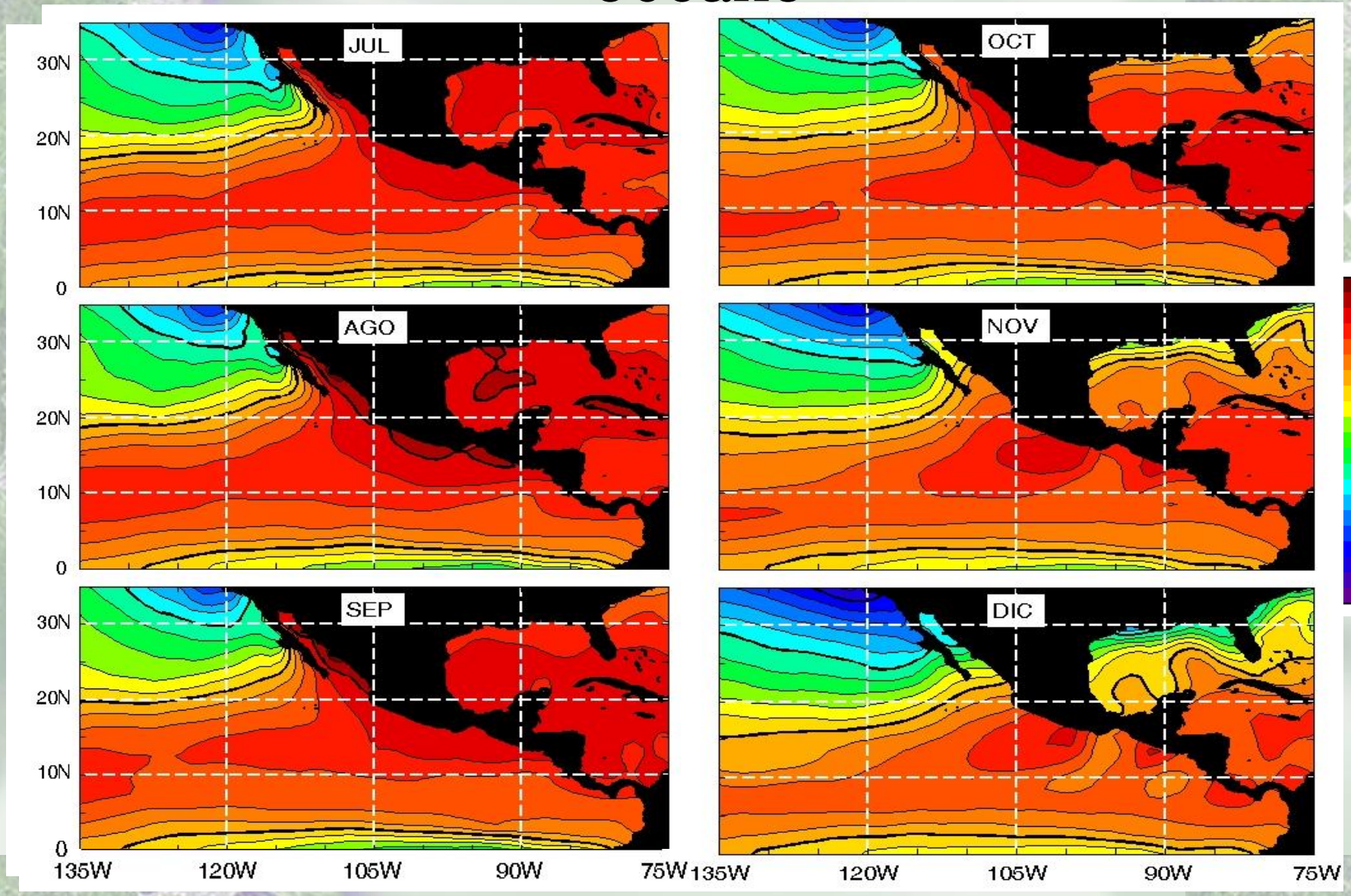

Heat release to atmosphere
Arctic Ocean
Heat release to atmosphere
Atlantic Ocean
Pacific Ocean
Indian Ocean
Shallow warm current
Heat release to atmosphere
Deep cold current
©2004 ACIA

Temperatura superficial promedio del océano



Romero-Centeno, 2007

Temperatura superficial promedio del océano



Romero-Centeno. 2007

Mean SST and Isotherm depth (Kessler 2002, JPO)

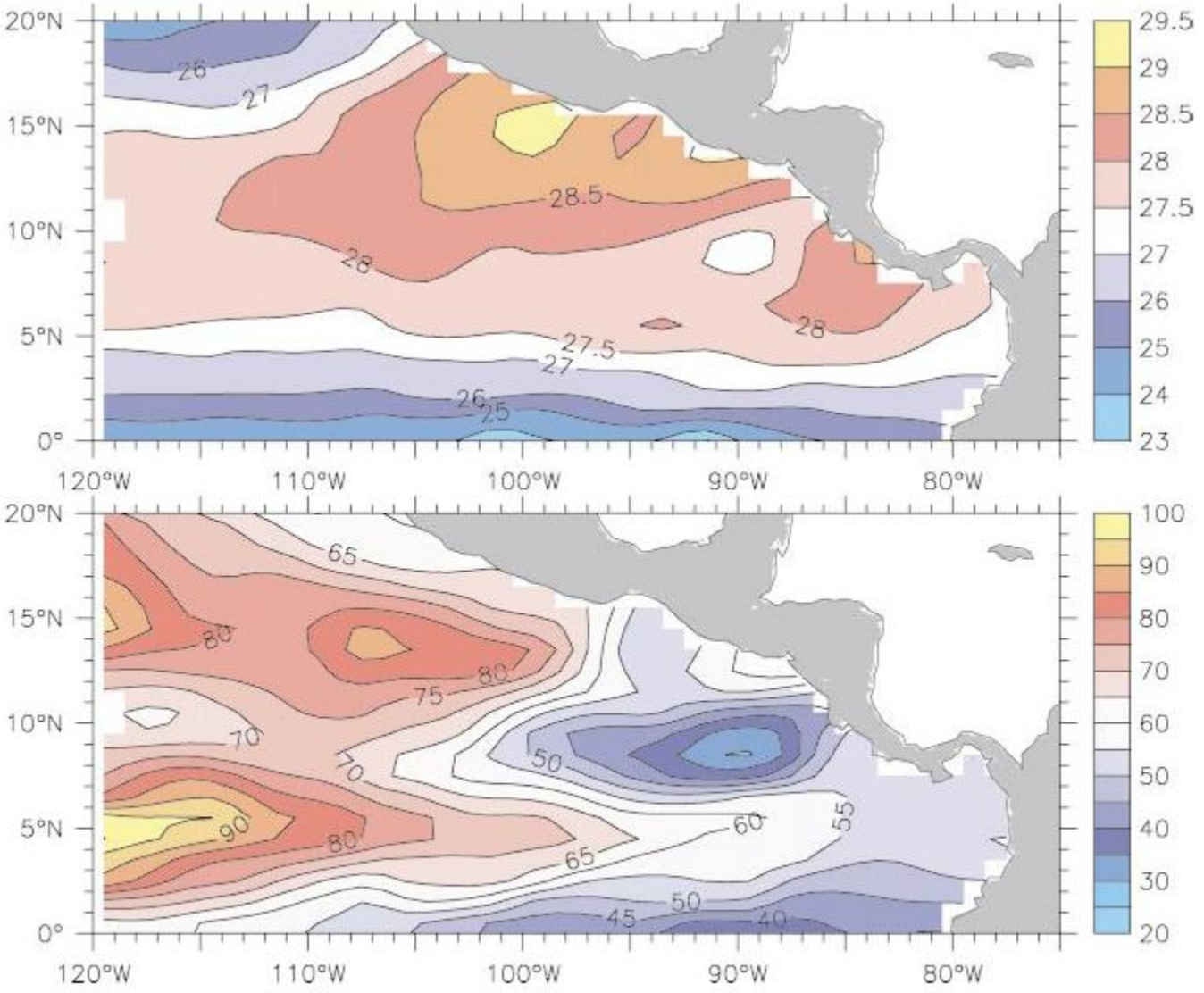
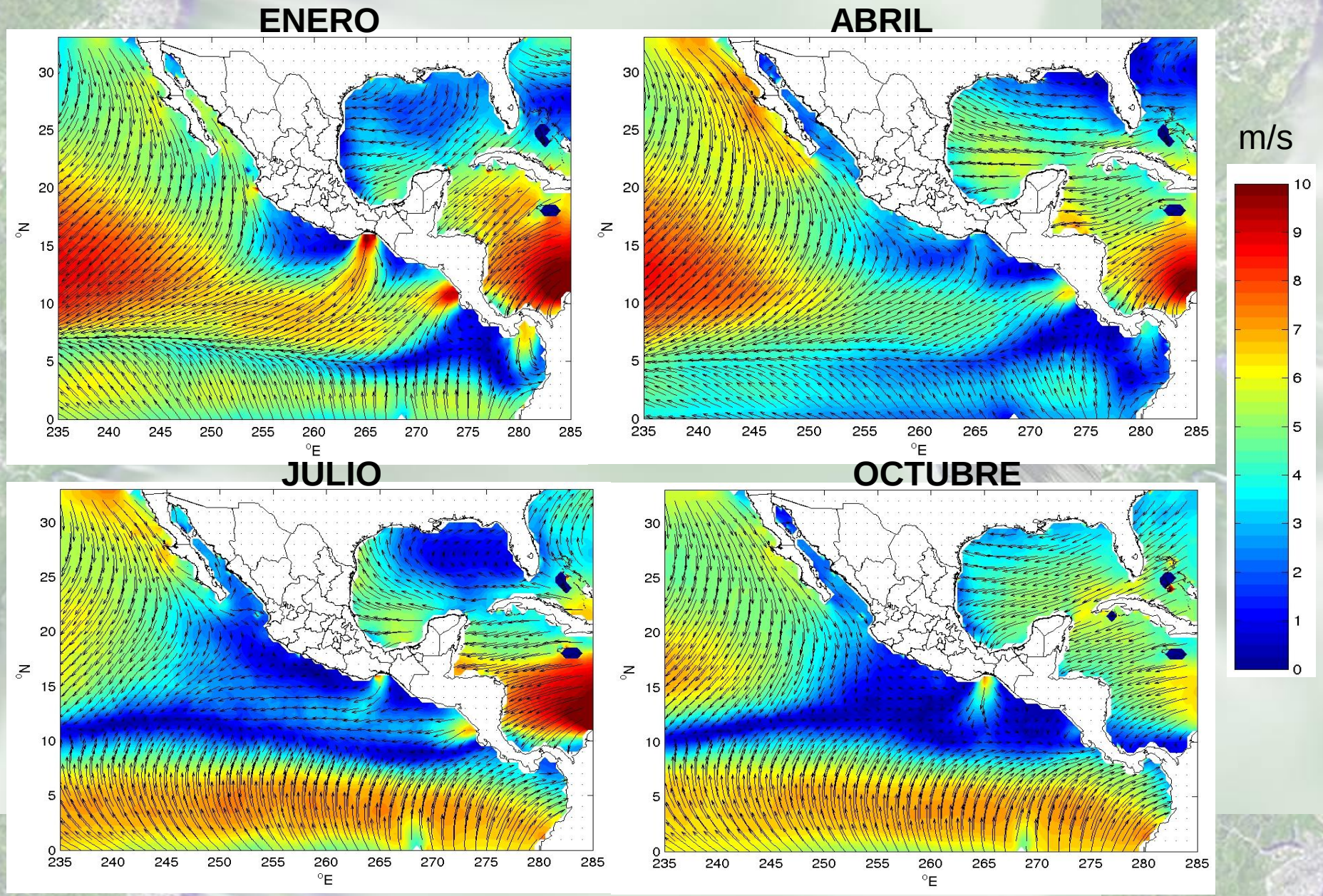


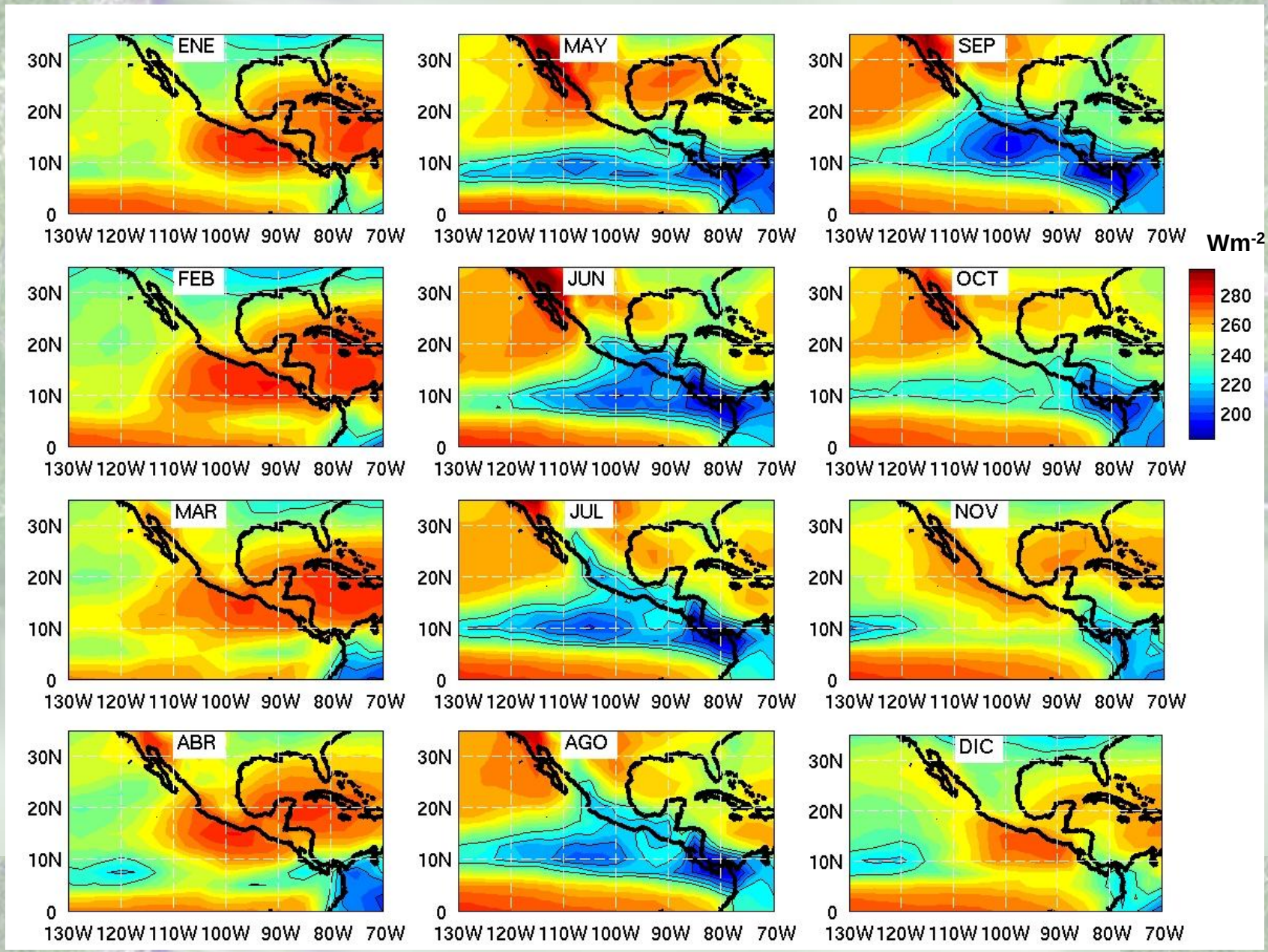
FIG. 2. Mean SST (top) and 20°C isotherm depth (Z20; bottom) from the XBT data. The contour interval for SST is 1°C, with supplementary contours at 27.5° and 28.5°C. Red shading indicates warm SST, blue cool. The contour interval for Z20 is 5 m. Red shading indicates deep thermocline; blue, shallow.

Vientos promedio mensuales a 10 m (QSCAT)

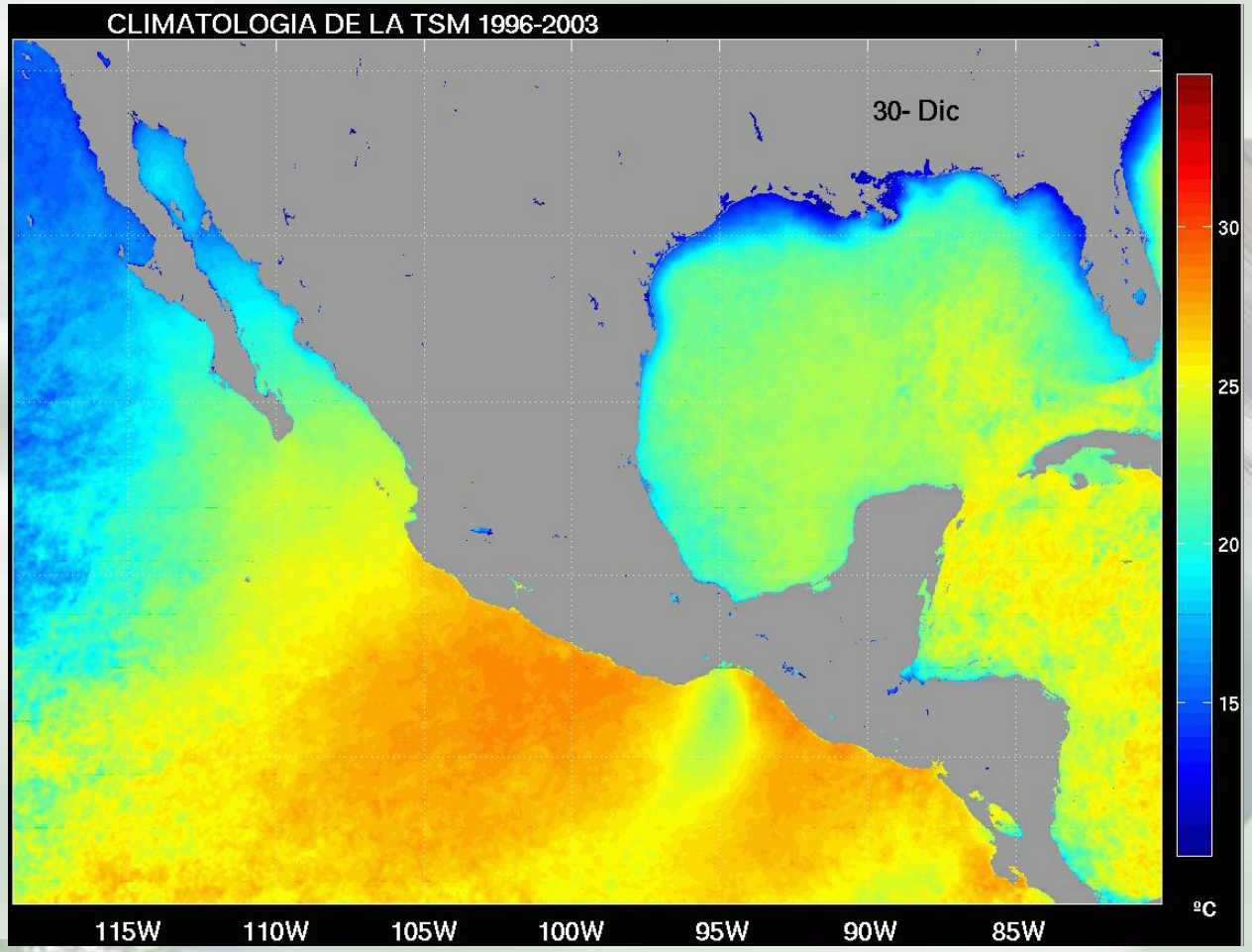


Romero-Centeno et al.,,

Climatología de la radiación de onda corta



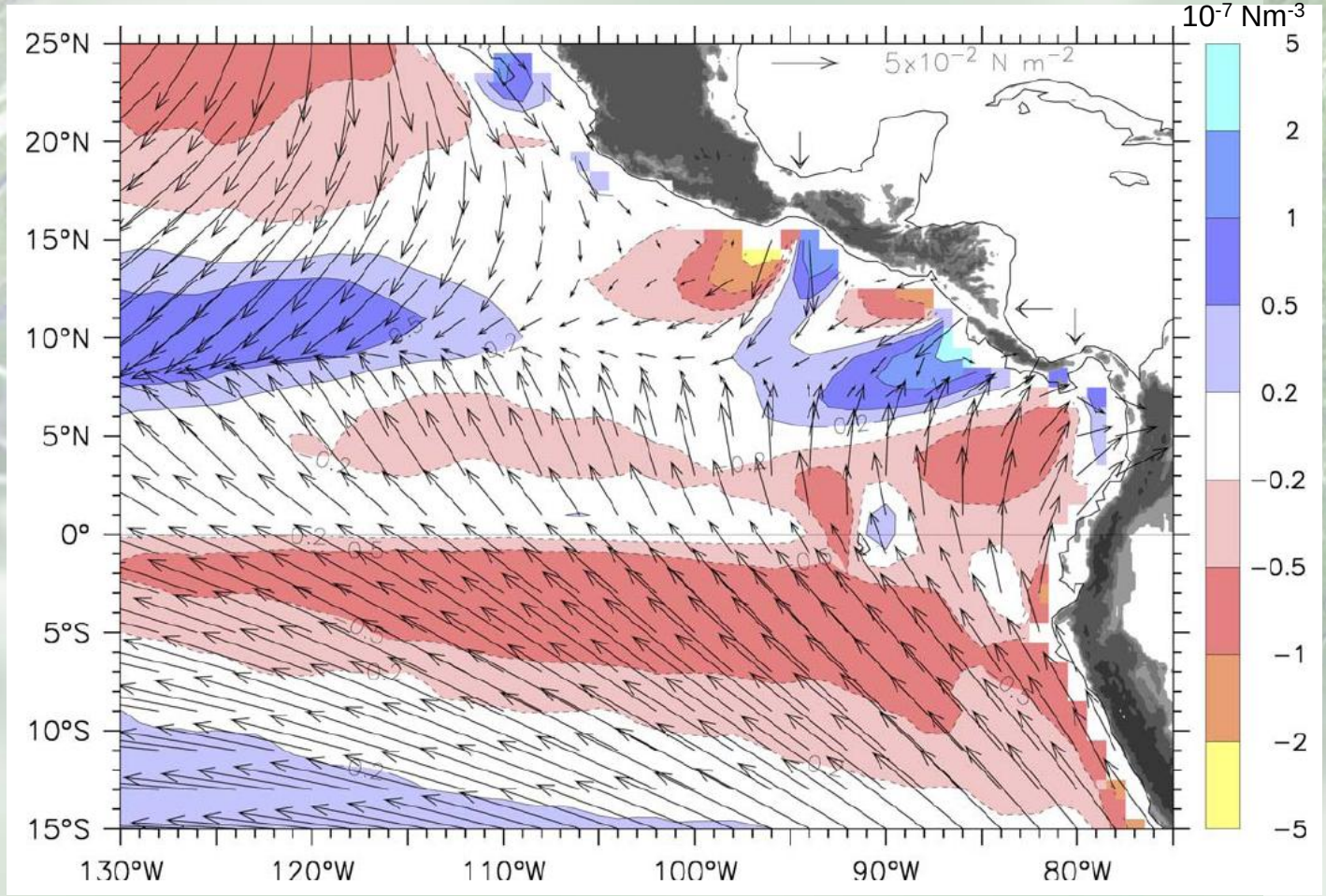
Ciclo anual de la temperatura superficial del océano



Gallegos et al., en prensa

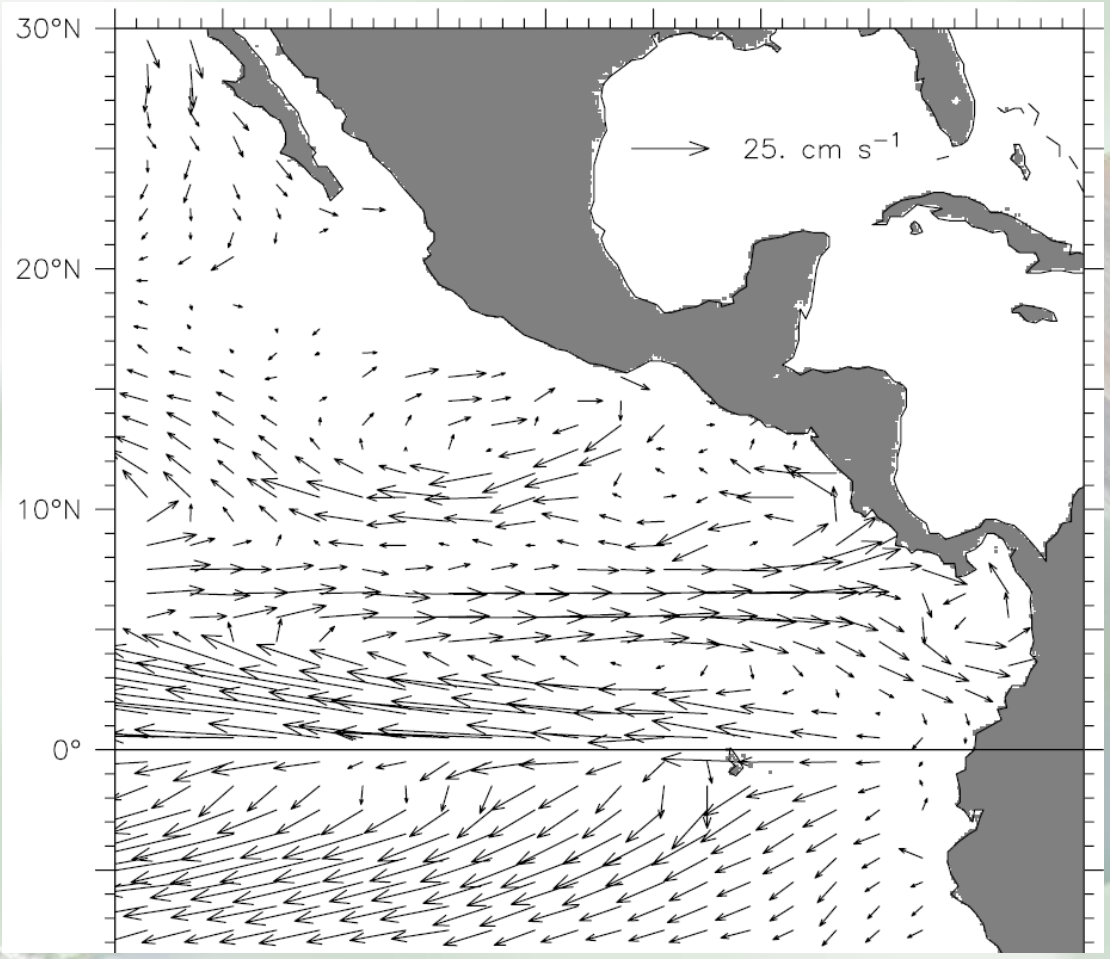
La circulación

Esfuerzo del viento (vectores) y rotacional del esfuerzo del viento (color)



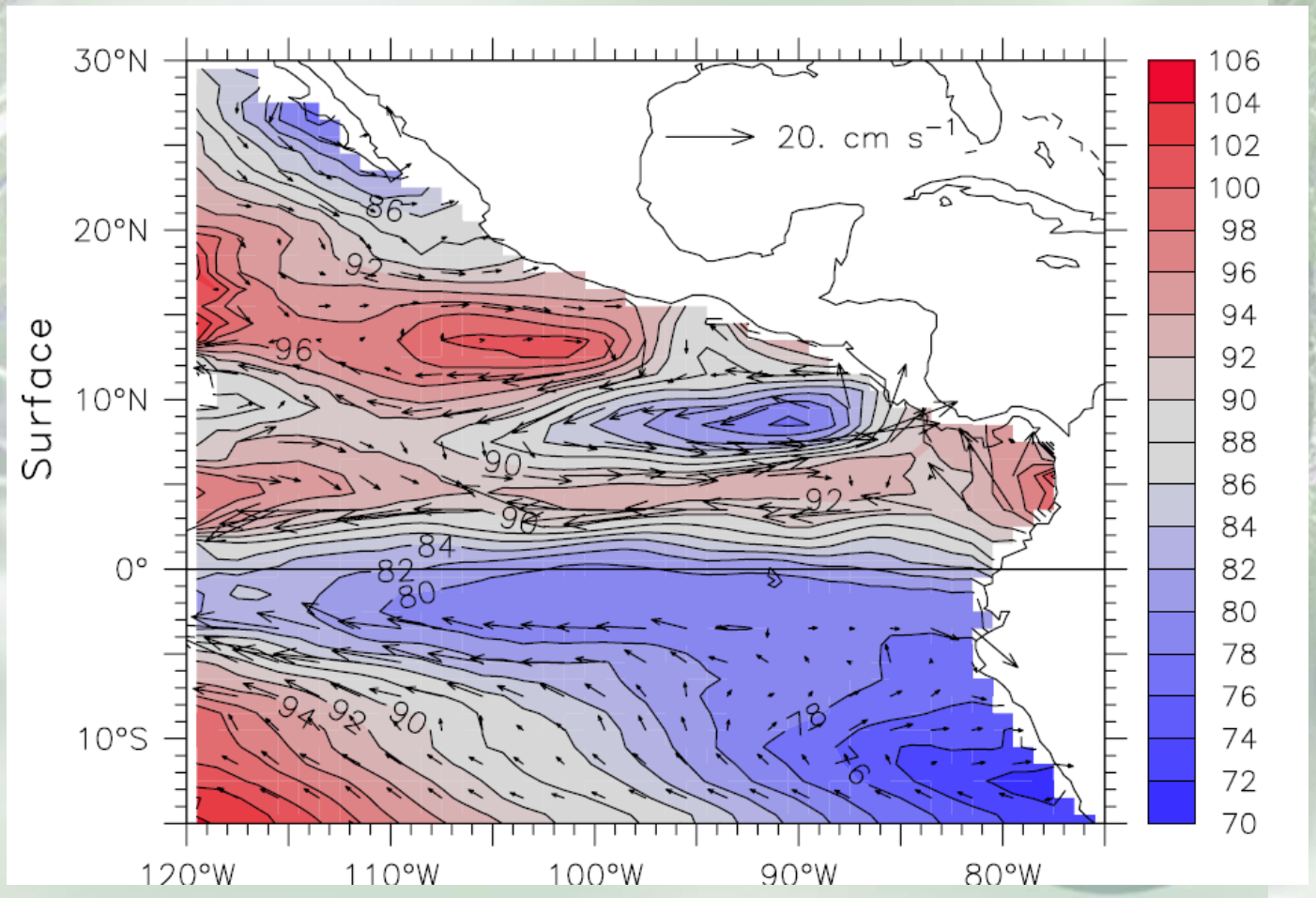
Kessler, 2006

Corrientes superficales medias a partir de derivadores



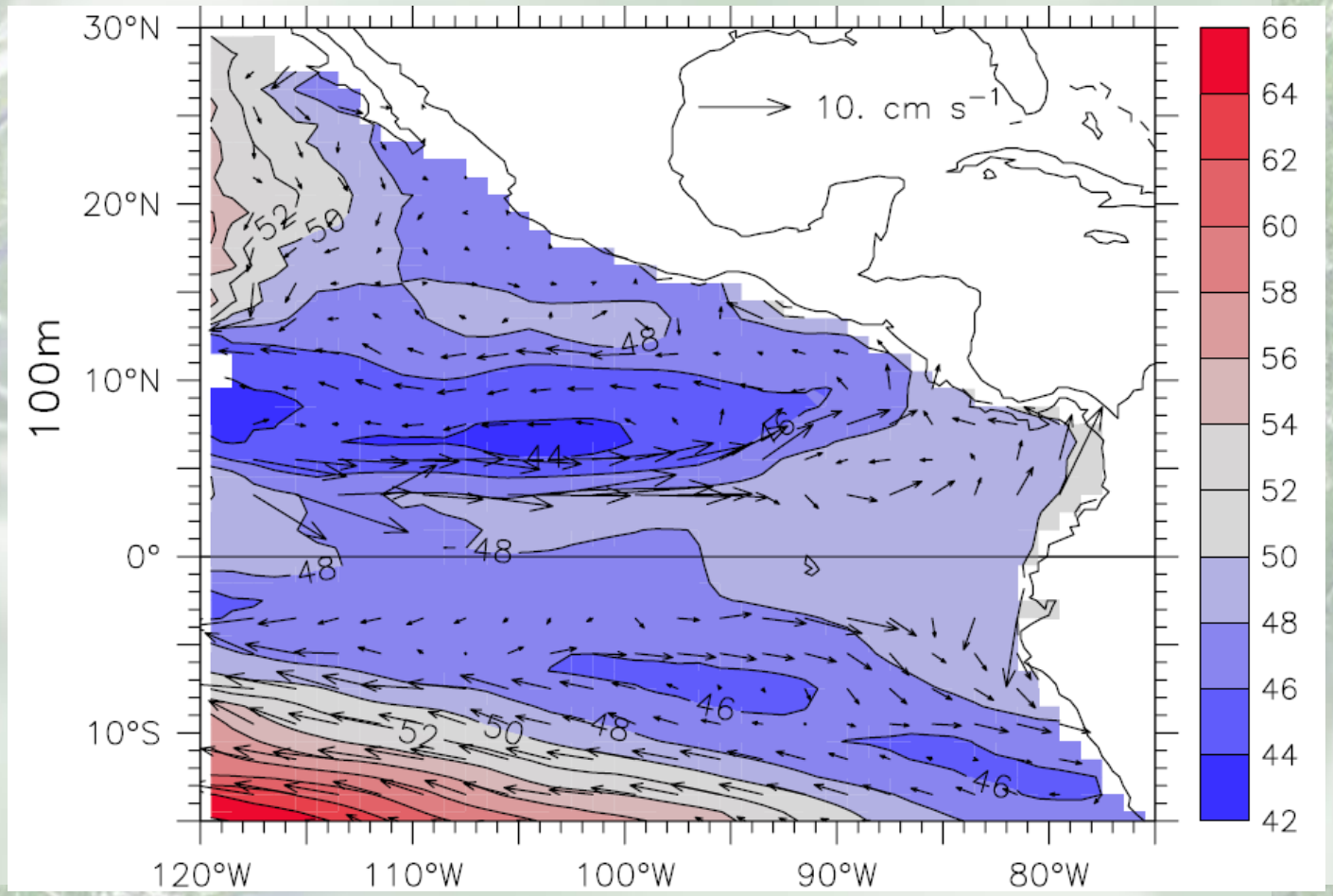
Kessler, 2006

Altura dinámica y corrientes geostróficas en superficie relativas a 400 m



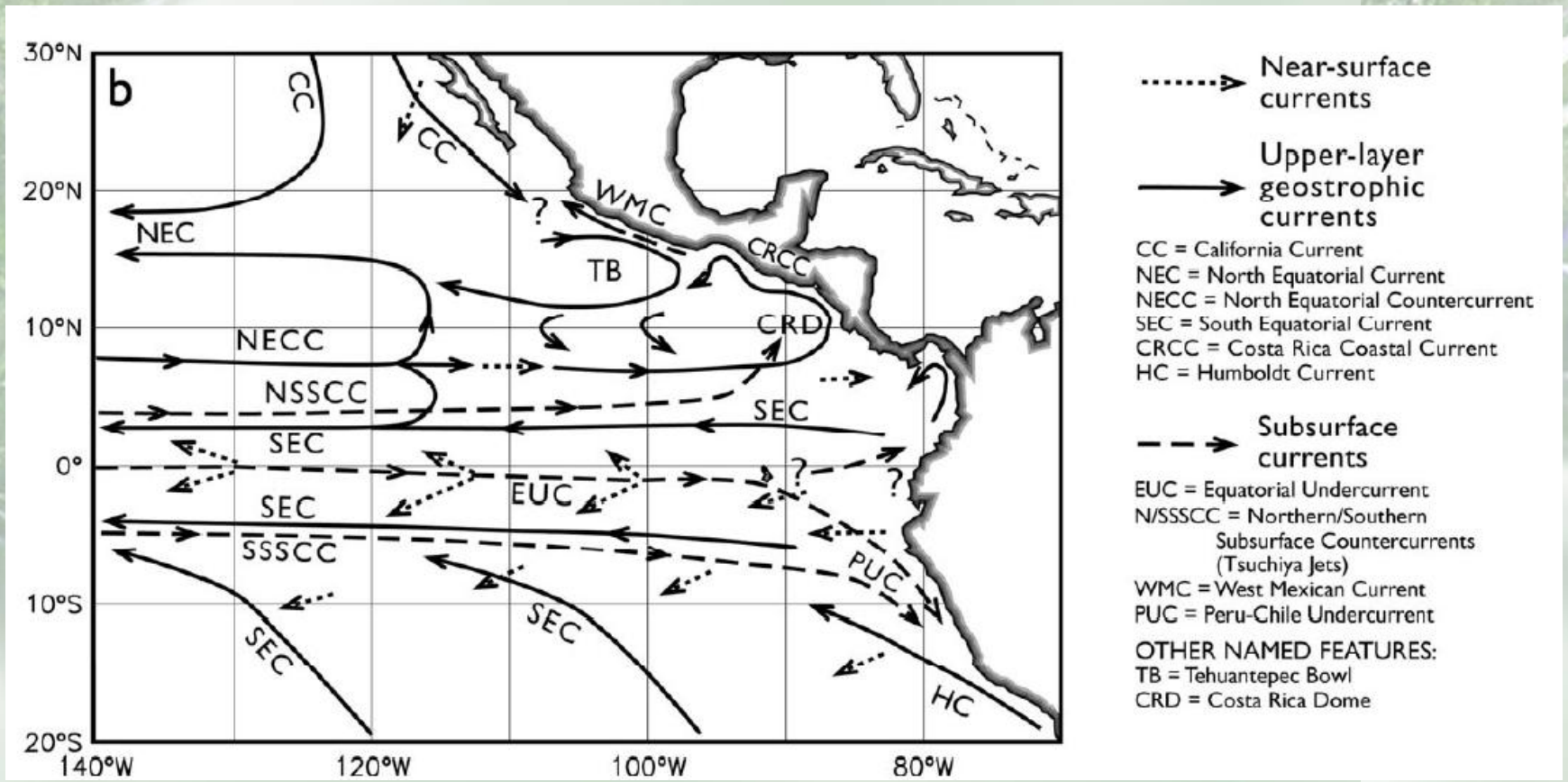
Kessler, 2006

Altura dinámica y corrientes geostróficas a 100 m relativas a 400 m



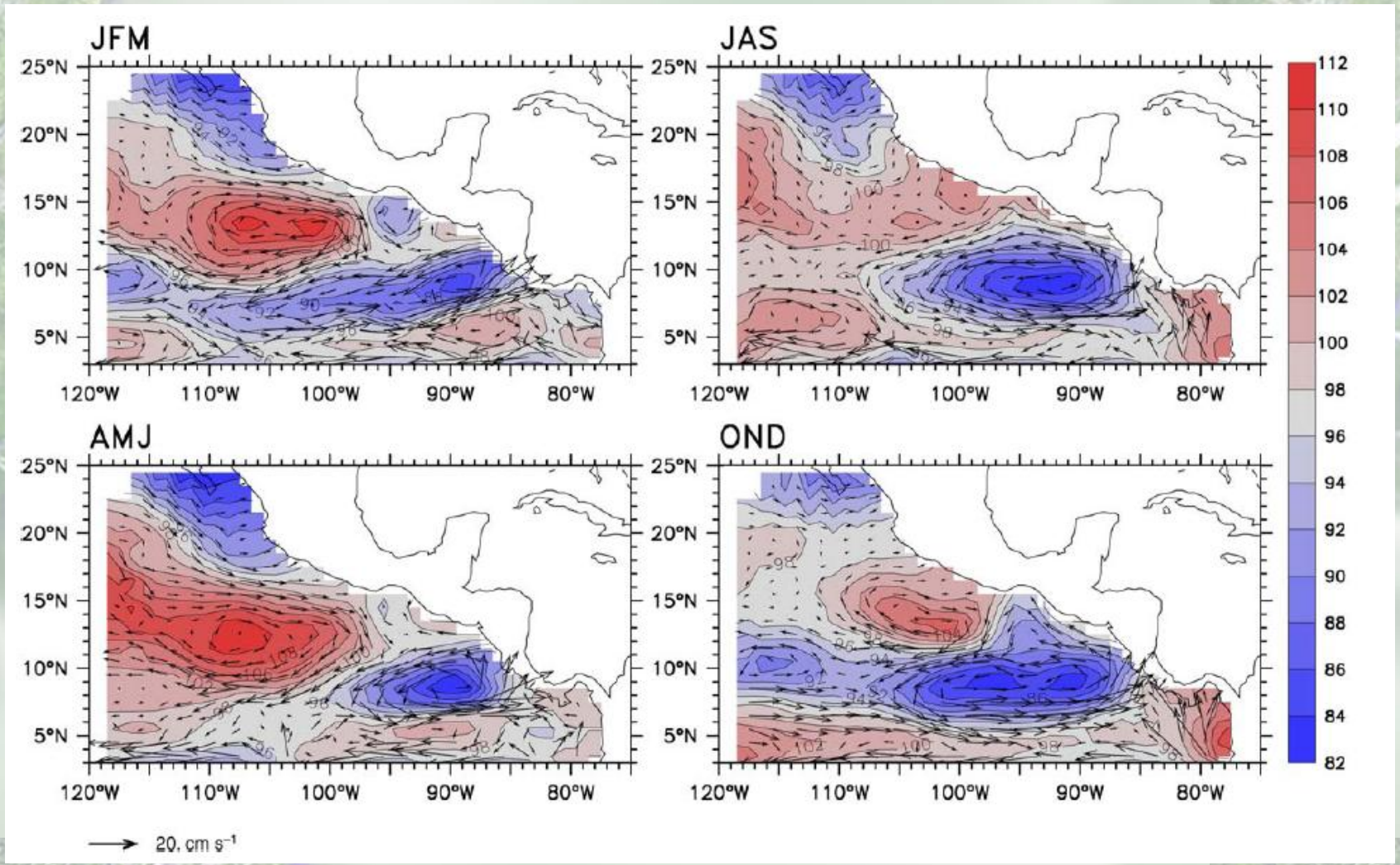
Kessler, 2006

Visión actual de las corrientes superficales medias



Kessler, 2006

Ciclo anual de la altura dinámica y corrientes geostróficas en superficie (relativas a 450 m)



Kessler, 2006

Remolinos en el PTNO

Temperatura Superficial del Océano

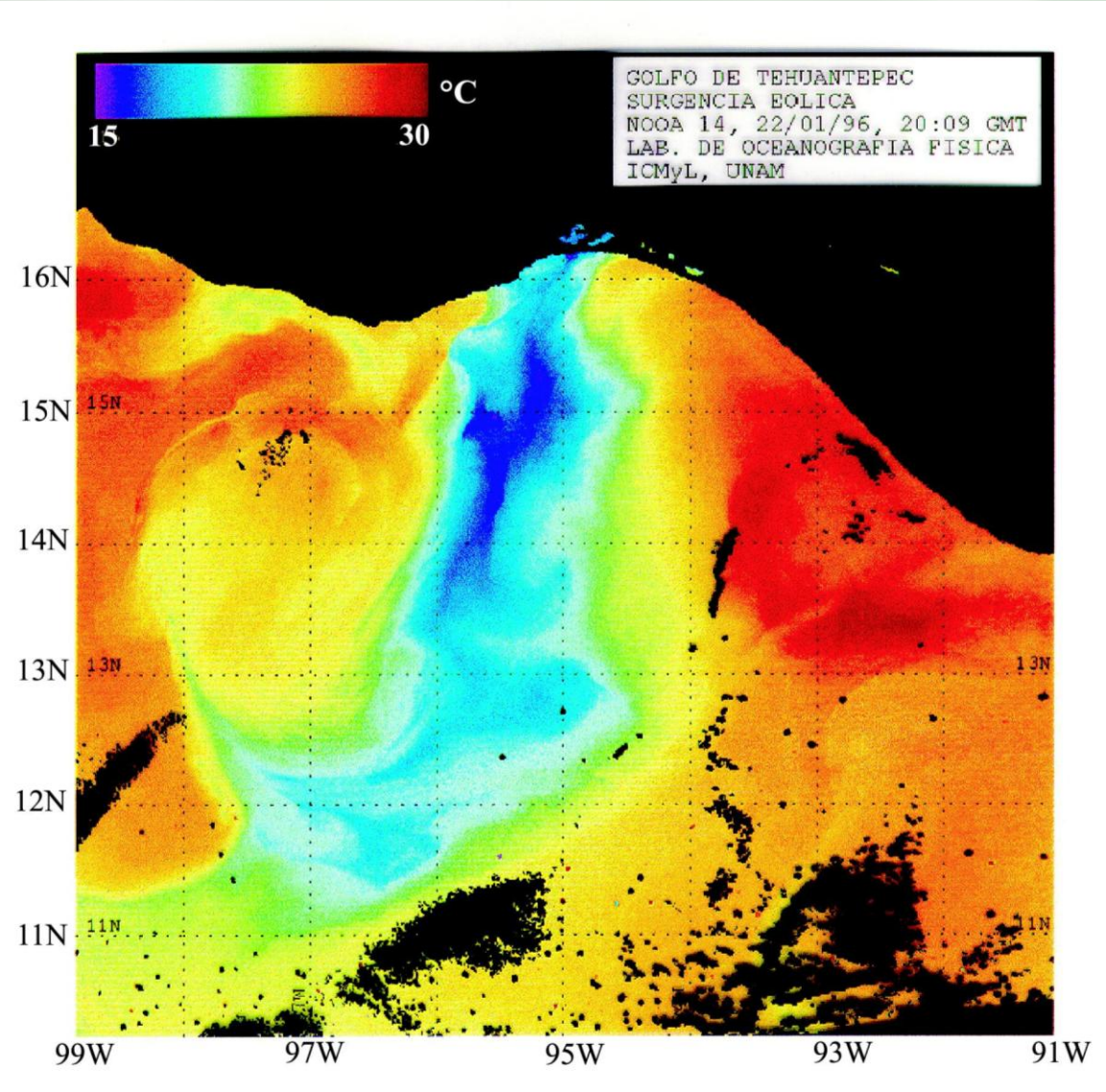
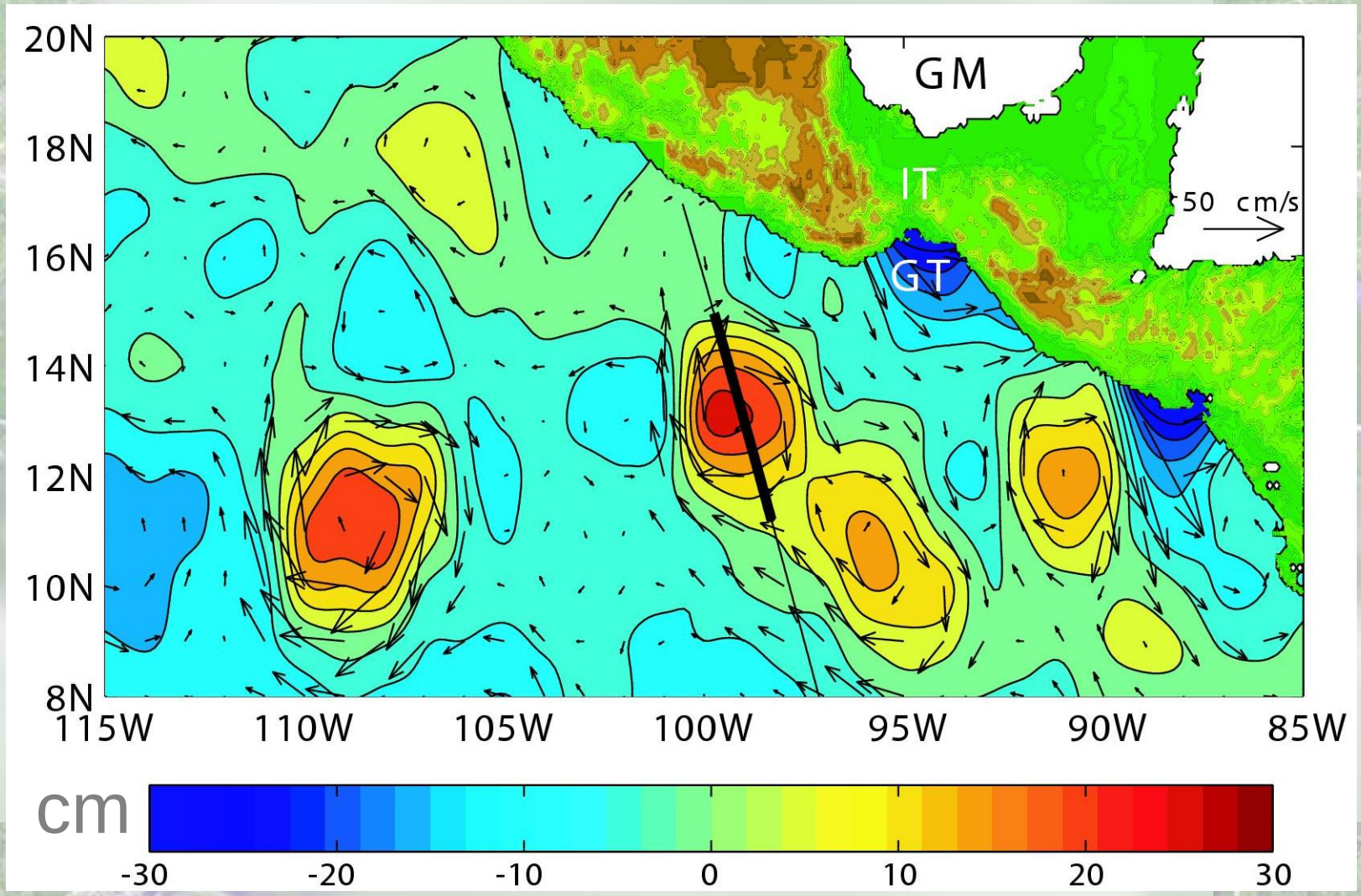
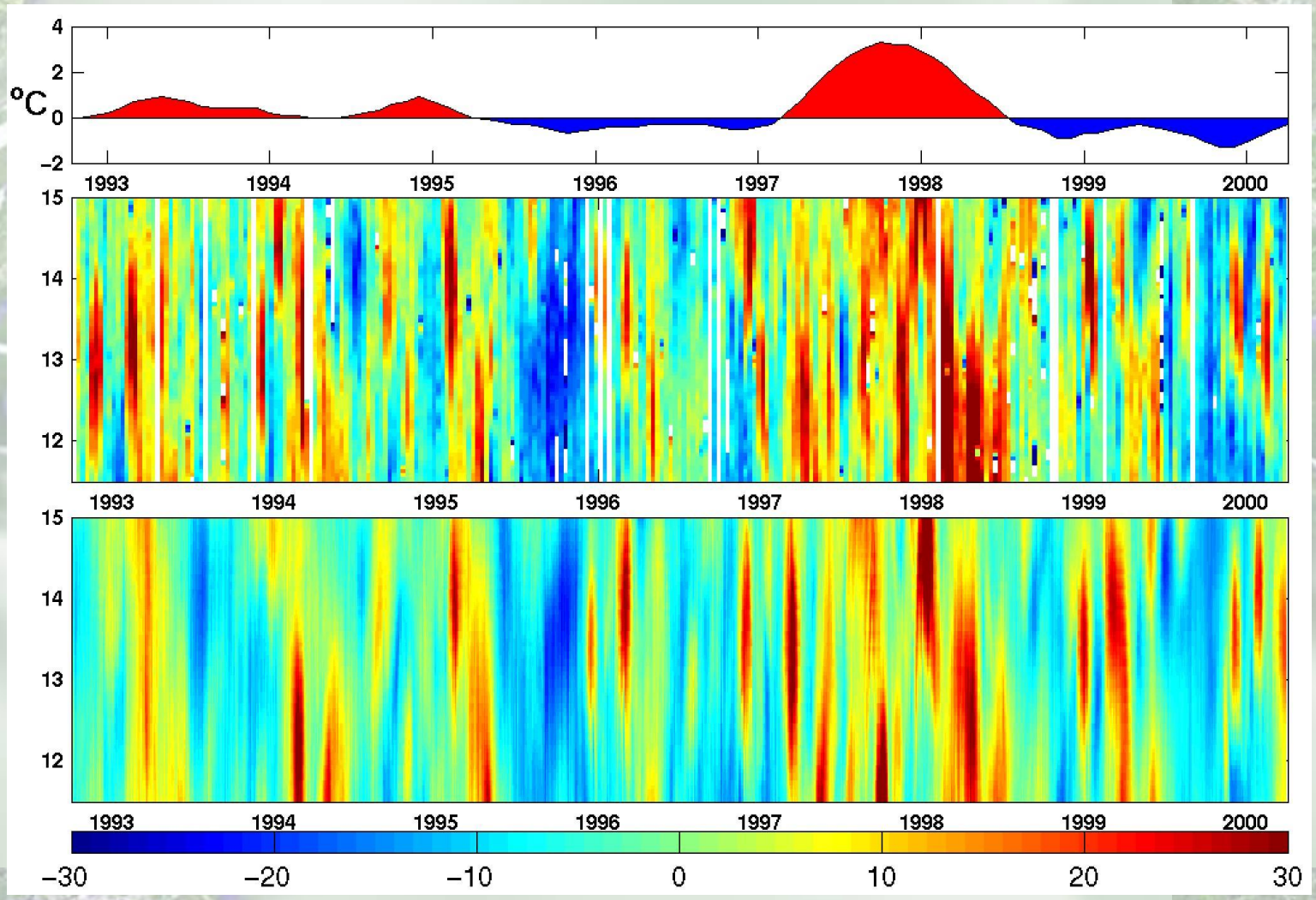


Figura procesada por Agustín Fernández (UNAM)

Nivel del Mar medido por TOPEX/Poseidon

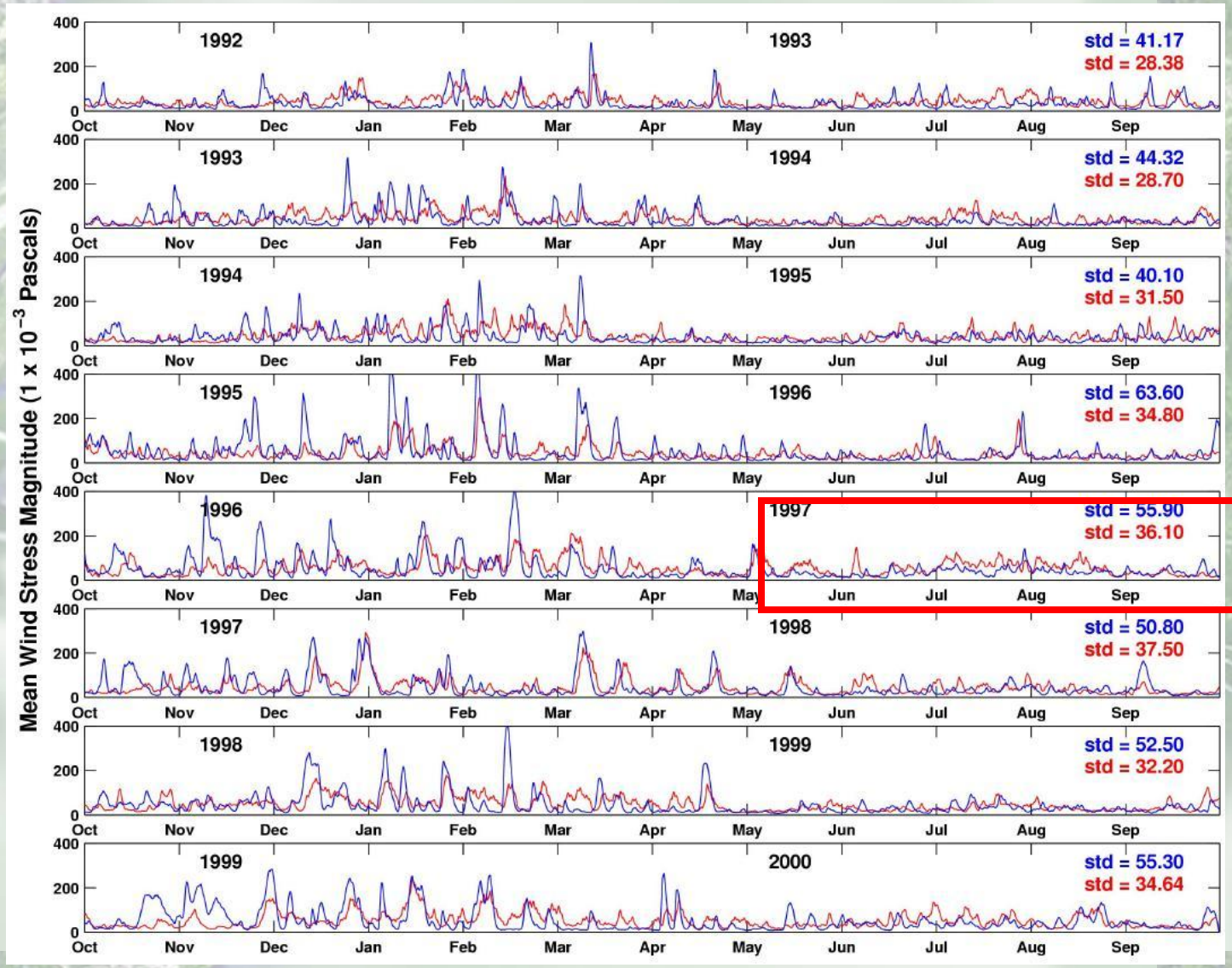


Nivel del mar medido por TOPEX/Poseidon y simulado con NLOM



Zamudio et al,. 2006, JGR

Viento en Tehuantepec y Papagayo

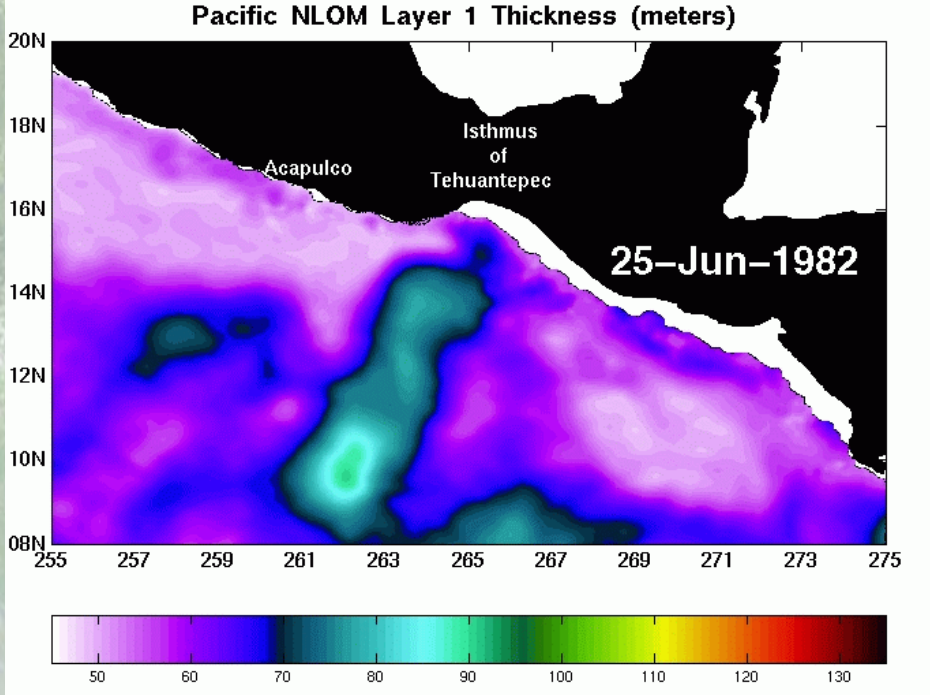


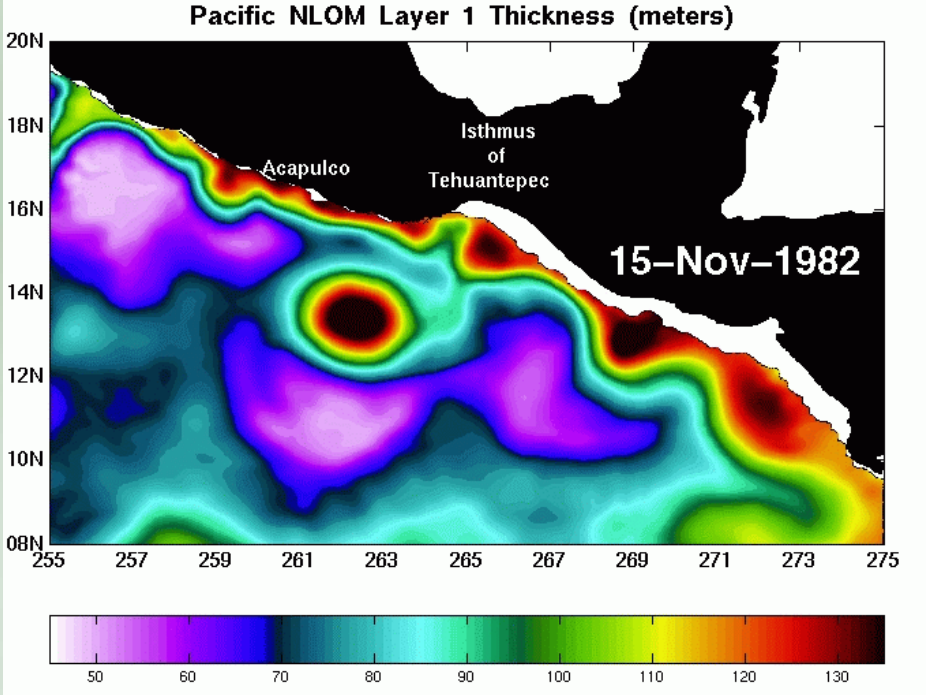
Verano 1997

Viento del Centro Europeo (ECMWF). Resultados similares con viento NOGAPS.

Formación de remolinos:

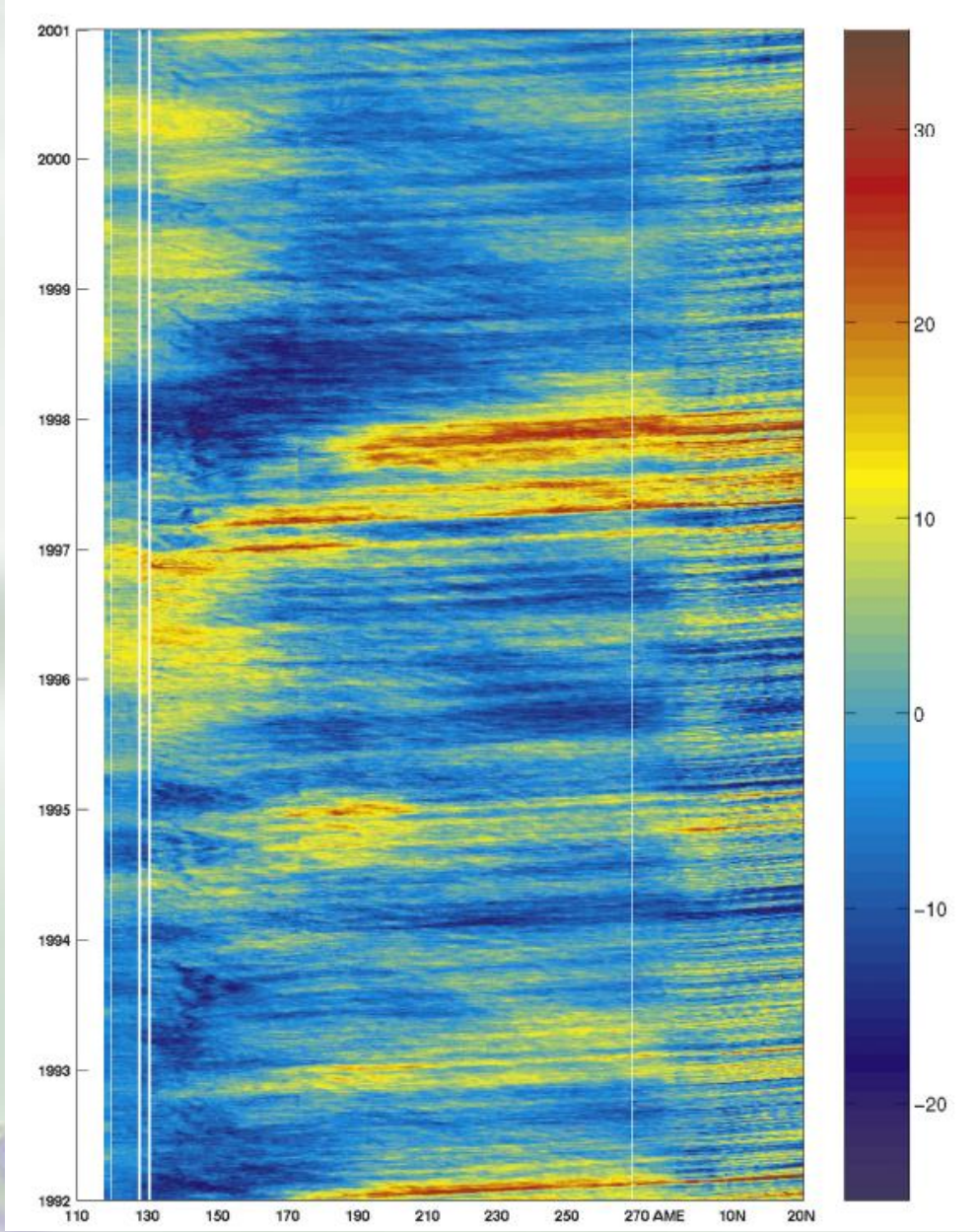
El viento y las ondas atrapadas a la costa como los generadores y moduladores de los remolinos de Tehuantepec

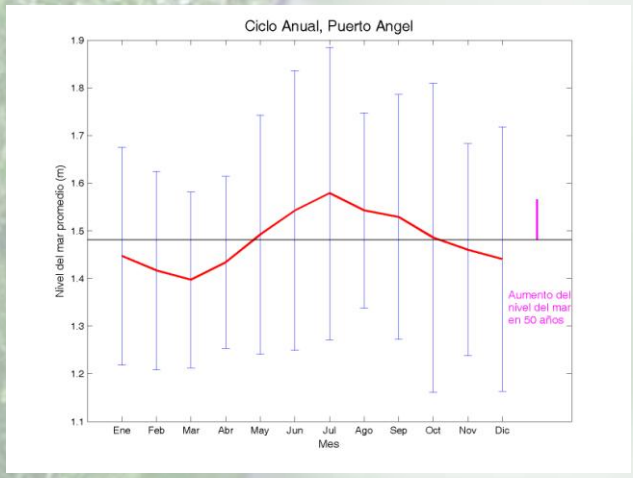


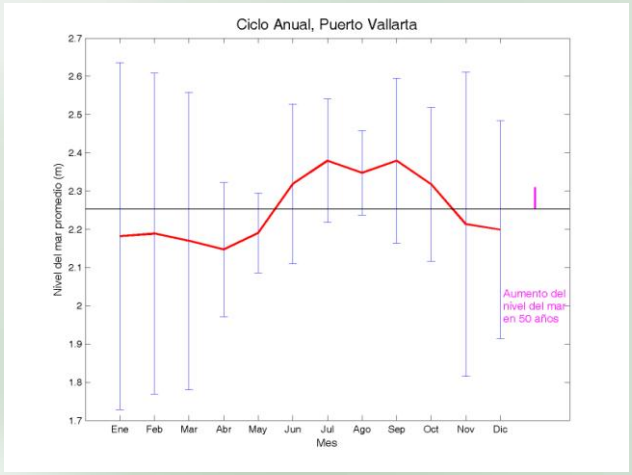


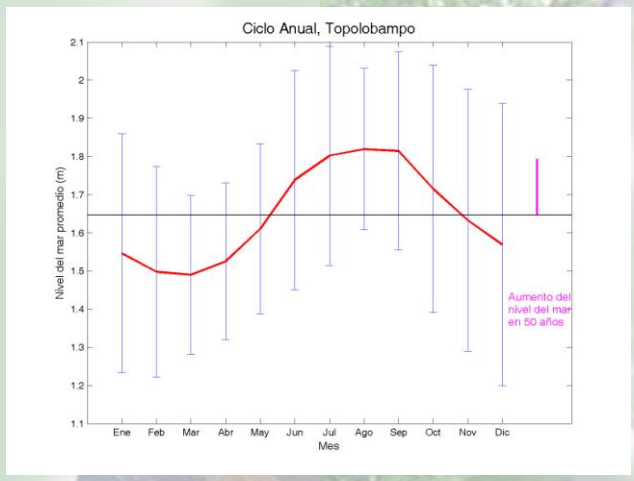
Ondas de Kelvin

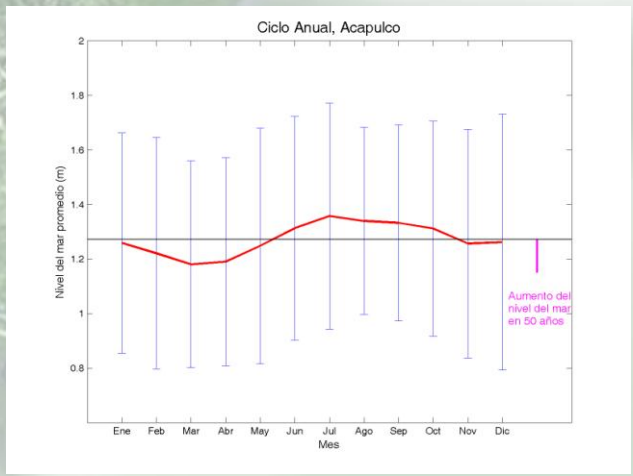
Anomalía del nivel del mar del NLOM

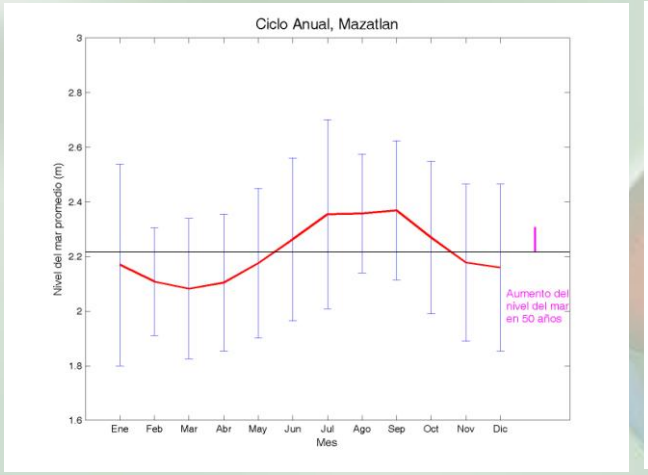


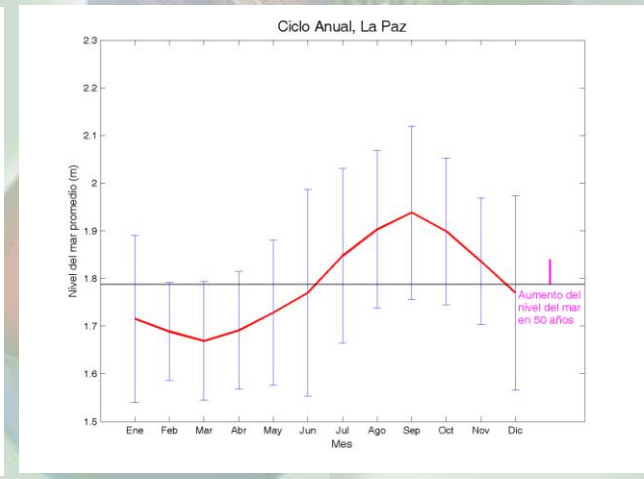

Ciclo Anual, Puerto Angel
Nivel del mar promedio (m)
Mes
Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic
Aumento del nivel del mar en 50 años


Ciclo Anual, Puerto Vallarta
Nivel del mar promedio (m)
Mes
Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic
Aumento del nivel del mar en 50 años


Ciclo Anual, Topolobampo
Nivel del mar promedio (m)
Mes
Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic
Aumento del nivel del mar en 50 años

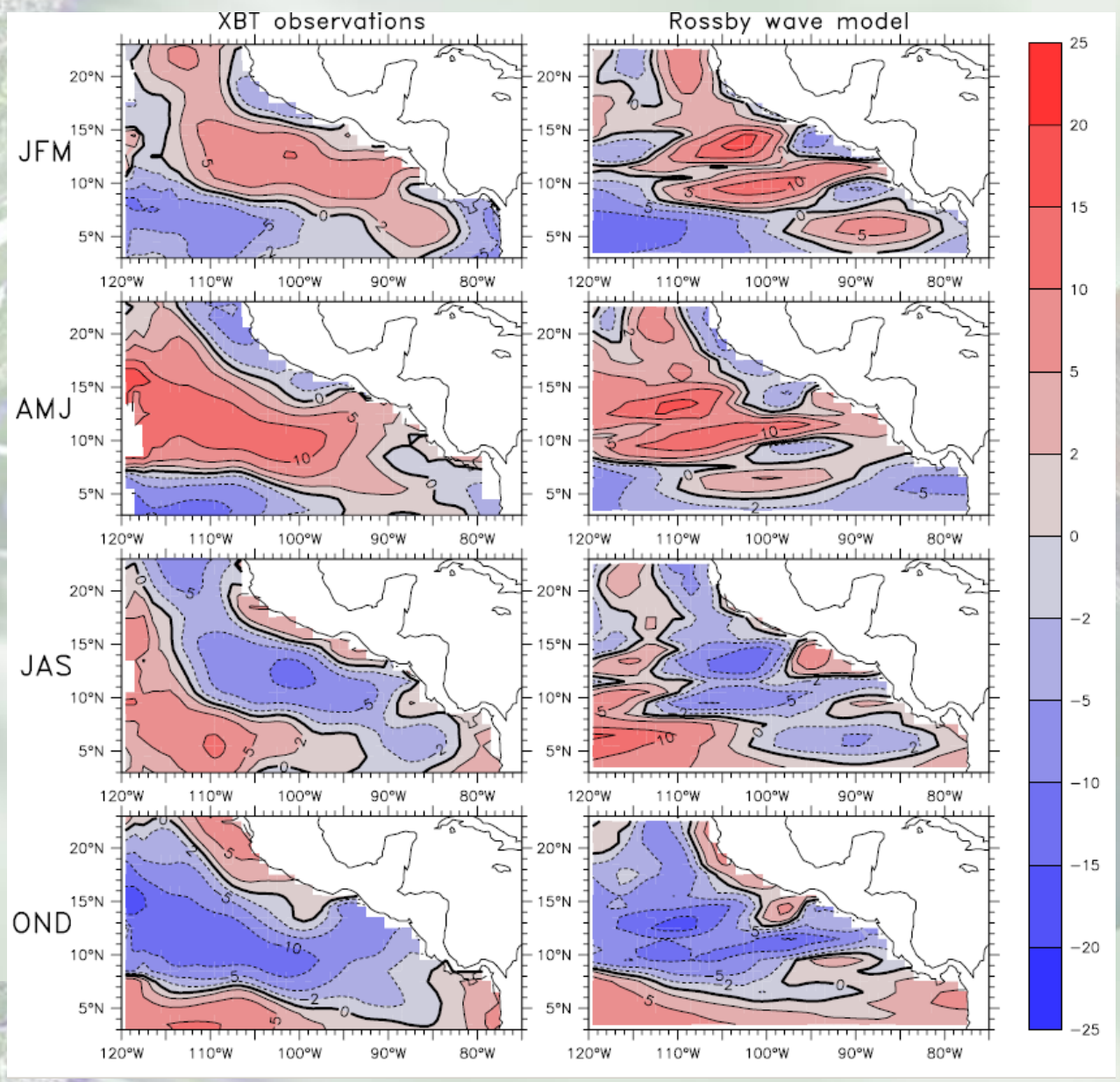

Ciclo Anual, Acapulco
Nivel del mar promedio (m)
Mes
Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic
Aumento del nivel del mar en 50 años


Ciclo Anual, Mazatlan
Nivel del mar promedio (m)
Mes
Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic
Aumento del nivel del mar en 50 años


Ciclo Anual, La Paz
Nivel del mar promedio (m)
Mes
Ene Feb Mar Abr May Jun Jul Ago Sep Oct Nov Dic
Aumento del nivel del mar en 50 años

Ondas de Rossby

Ondas de Rossby

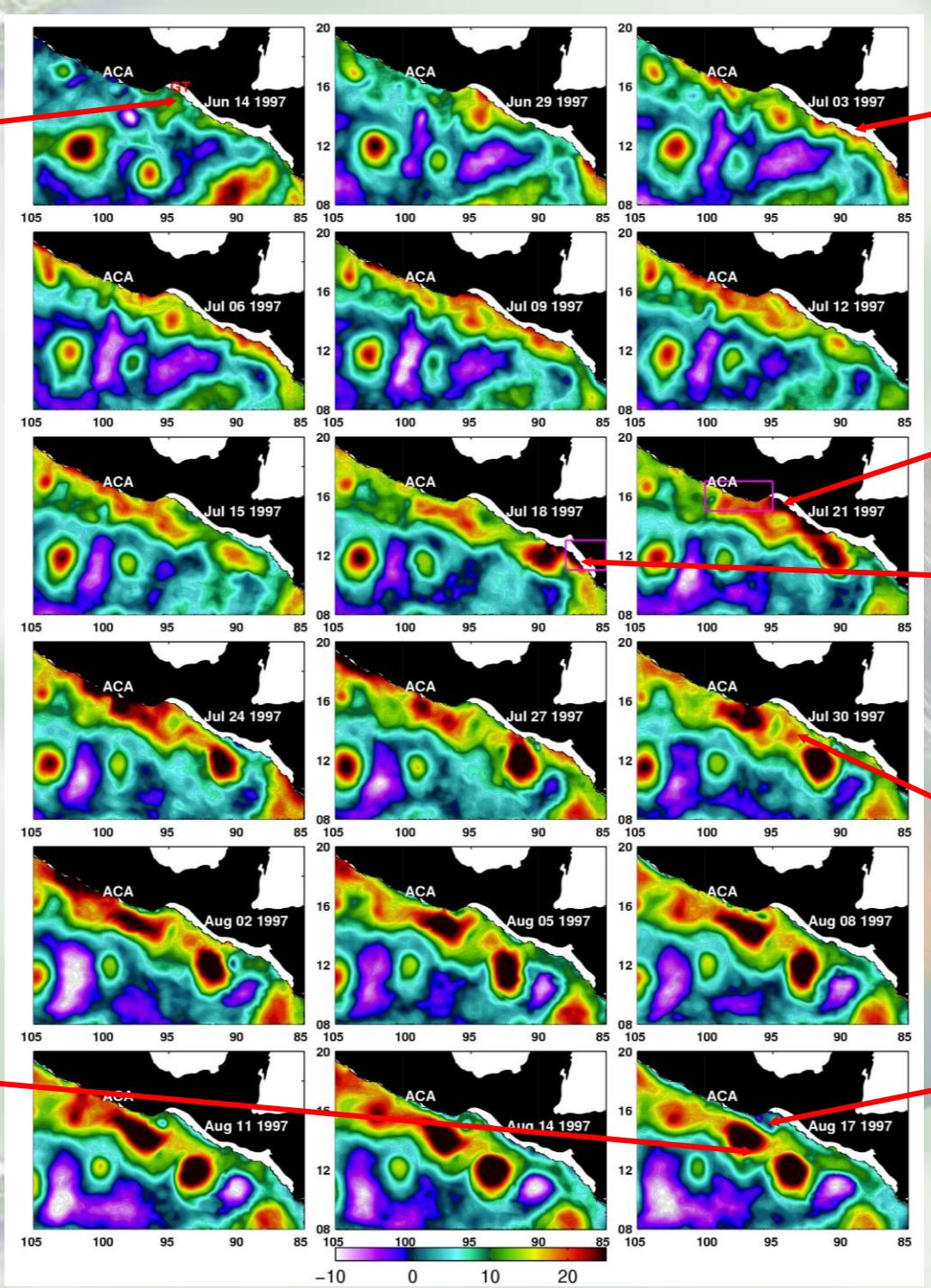


Kessler, 2006

No exiten remolinos ni ondas en la costa **1**

Nivel del mar simulado por NLOM

Inicia la fusión de los remolinos **6**



Onda atrapada a la costa interanual **2**

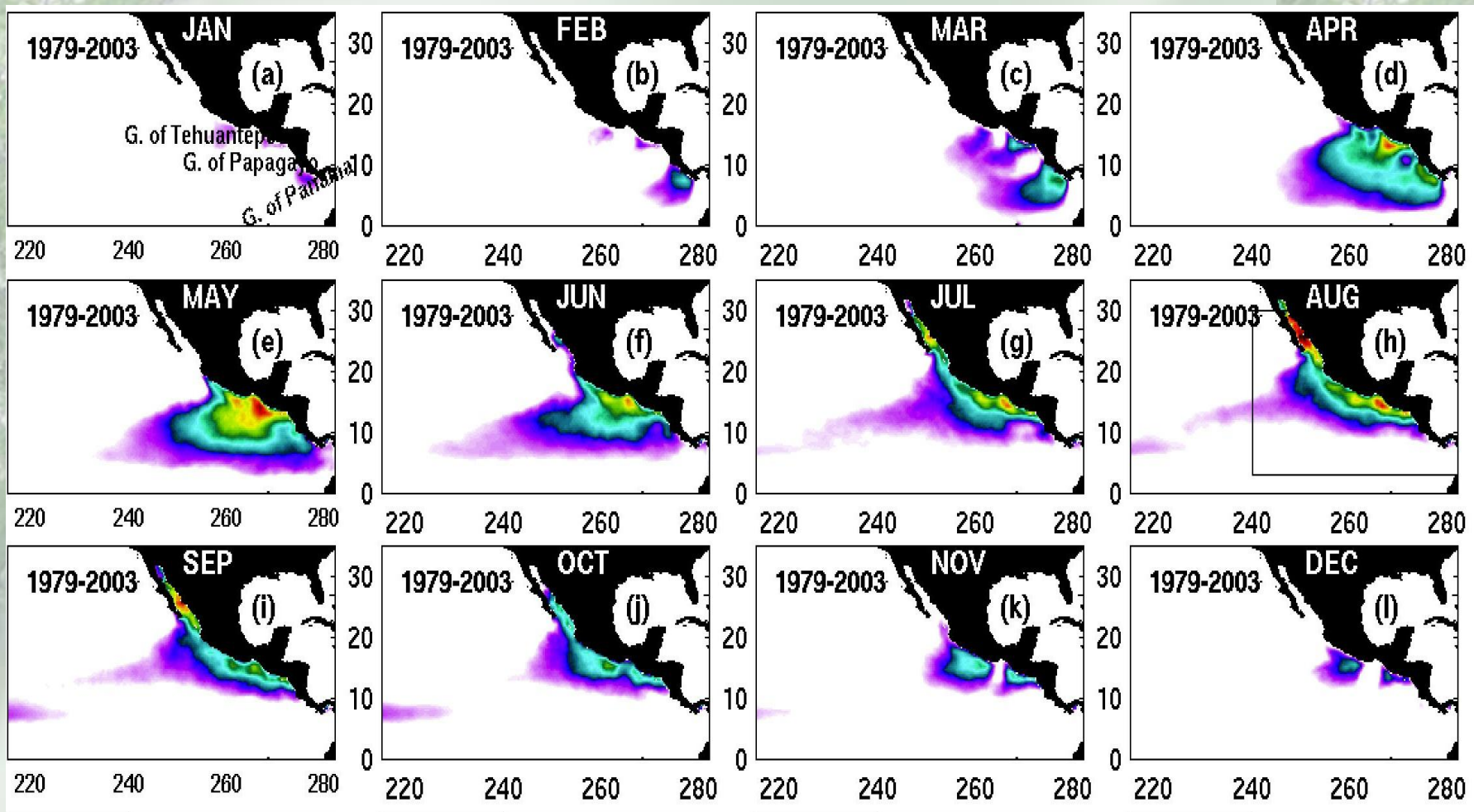
Onda atrapada a la costa intraestacional **3**

Formación de remolinos **4**

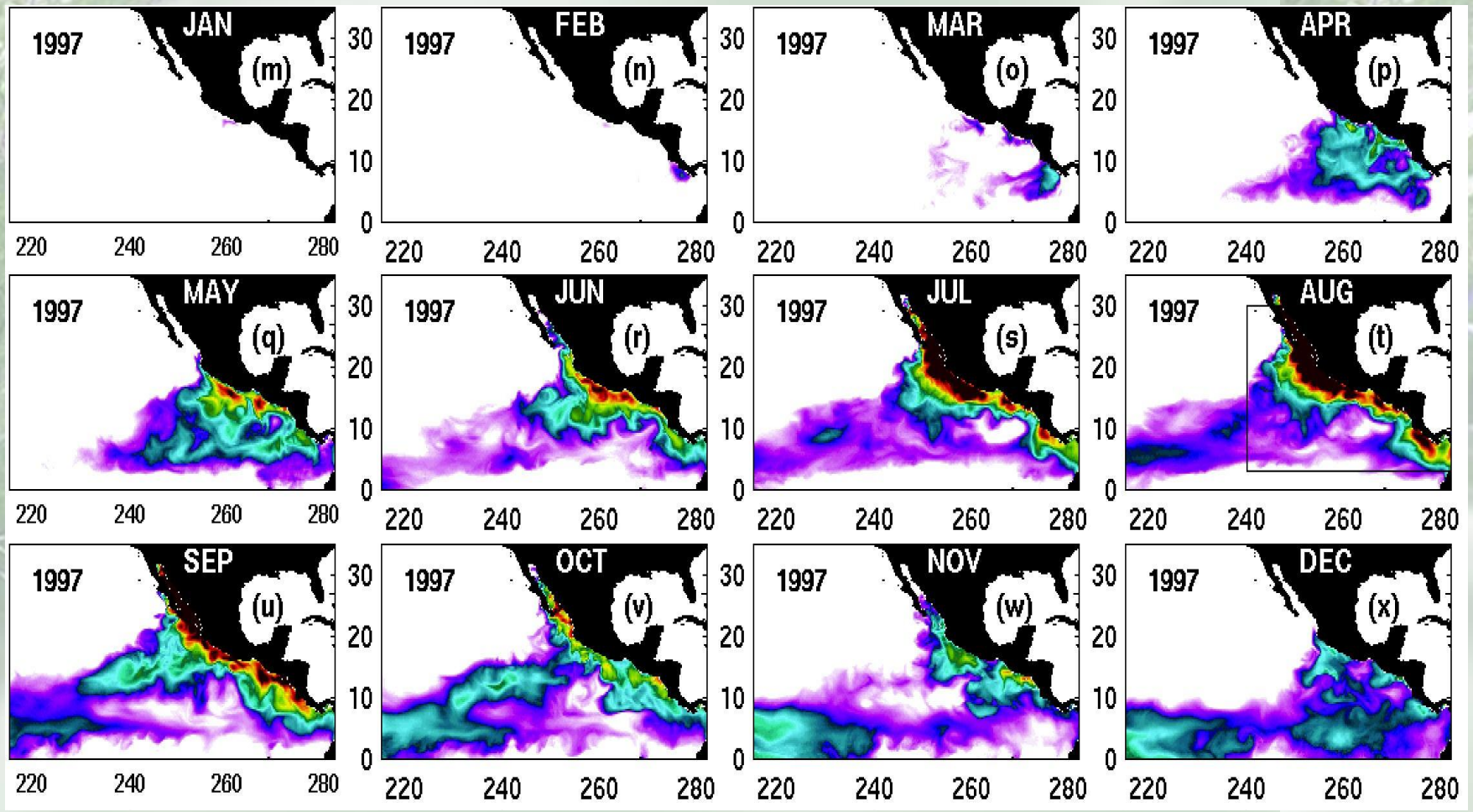
Generación de ondas de Rossby **5**

Variabilidad interanual, El Niño y la Niña

EPWP 1979-2003 climatología



EPWP 1997


1997 JAN (m)
1997 FEB (n)
1997 MAR (o)
1997 APR (p)
1997 MAY (q)
1997 JUN (r)
1997 JUL (s)
1997 AUG (t)
1997 SEP (u)
1997 OCT (v)
1997 NOV (w)
1997 DEC (x)
30
20
10
0
220
240
260
280
28
29
30
31

EPWP 1999

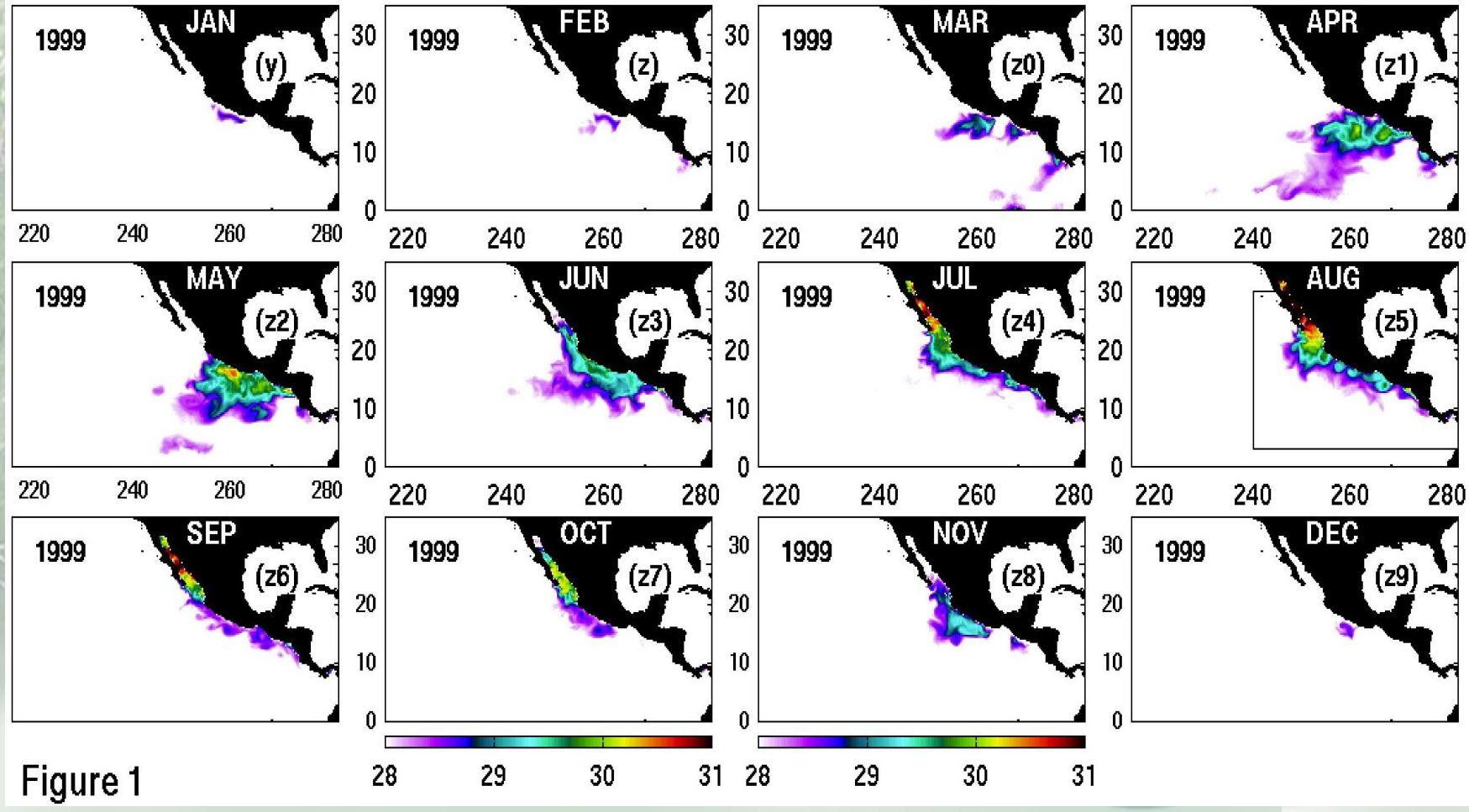


Figure 1

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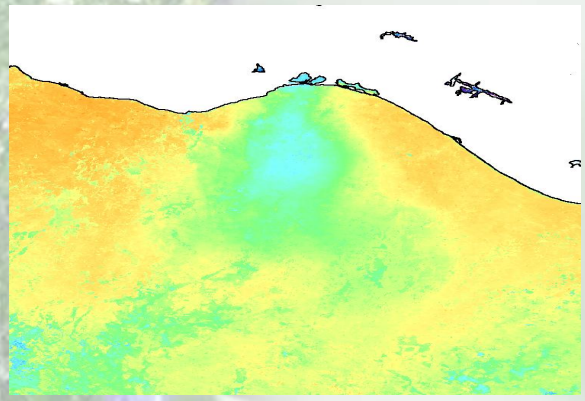
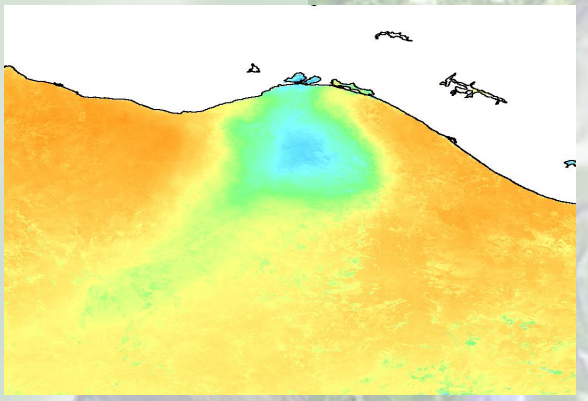
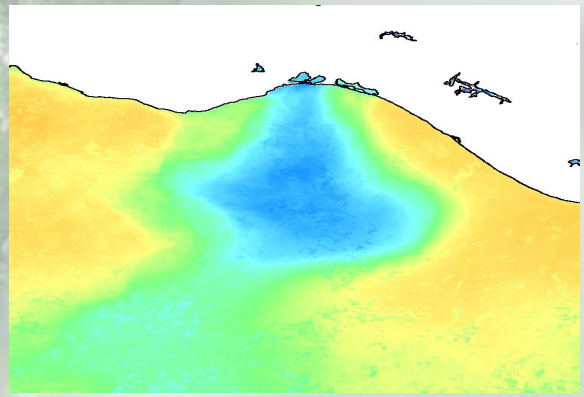


Diciembre 1997

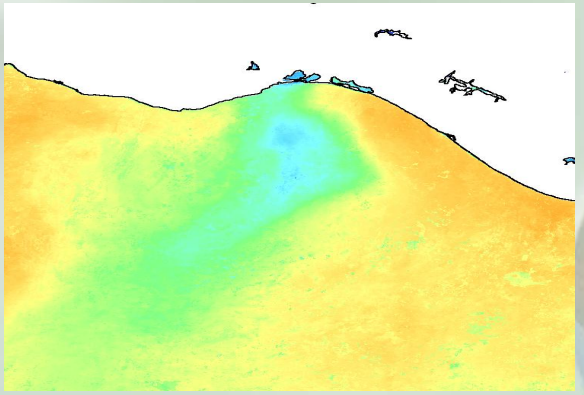
Diciembre 1998



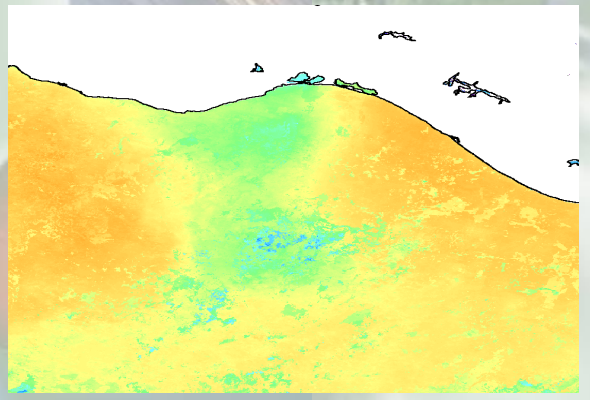
Diciembre 1999



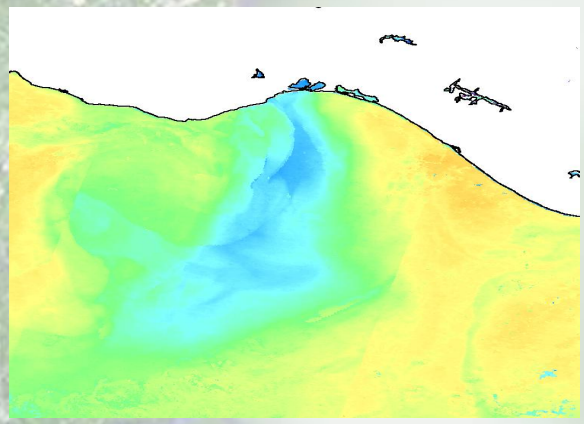
Diciembre 2000



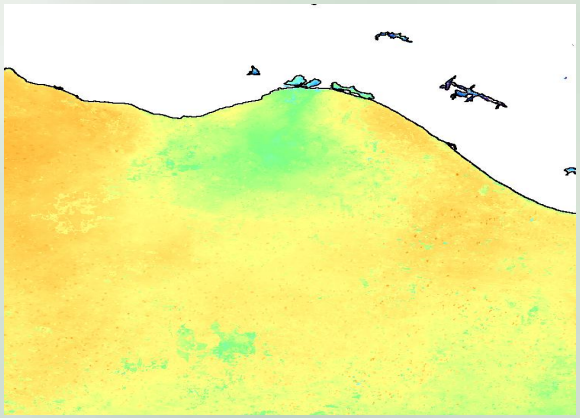
Diciembre 2001



Enero 1996



Enero 1997



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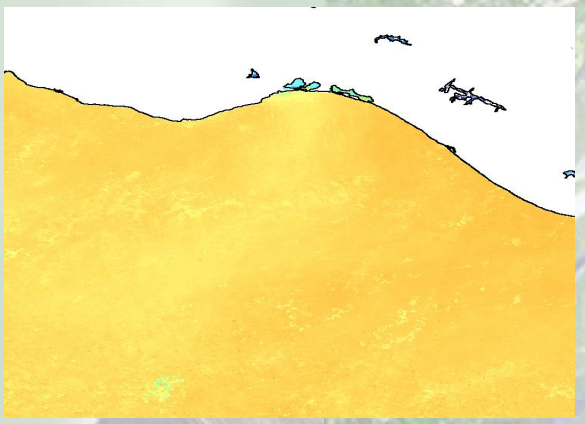

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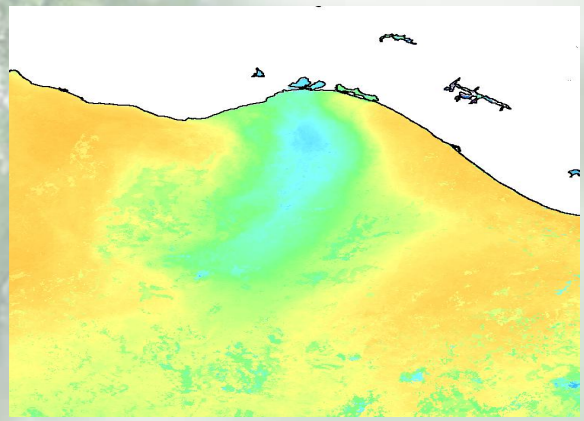

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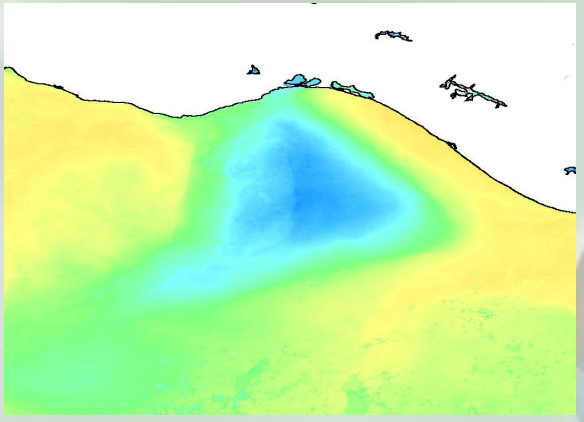

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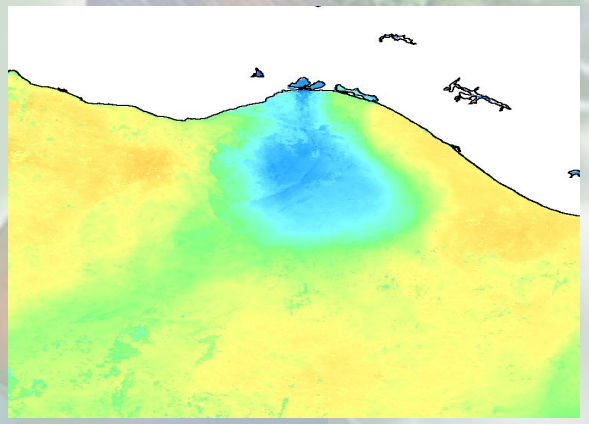
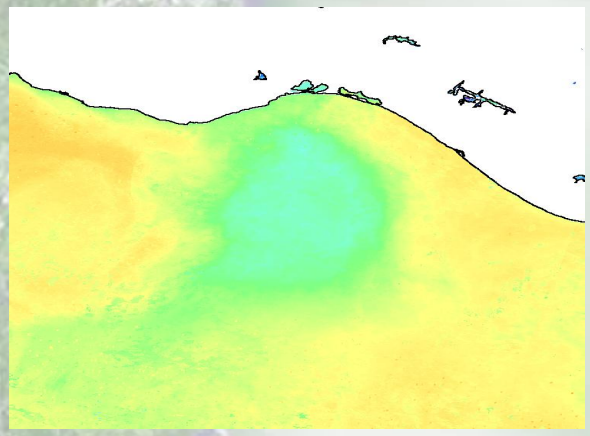
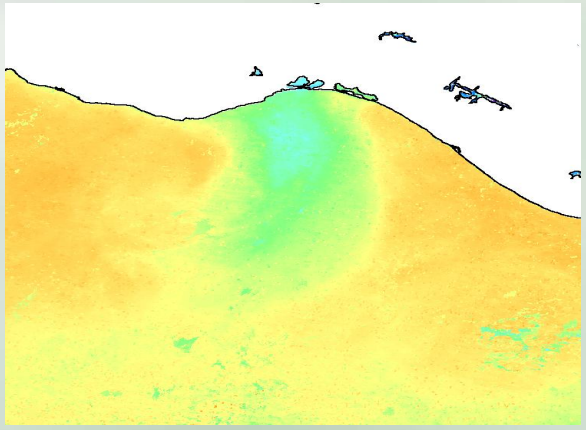


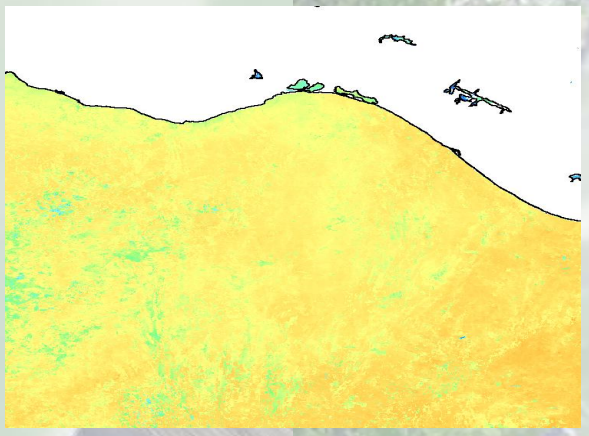
Febrero 1996



Febrero 1997



Febrero 1998



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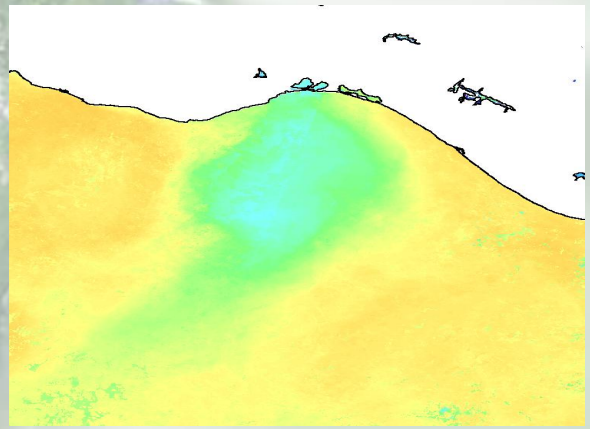

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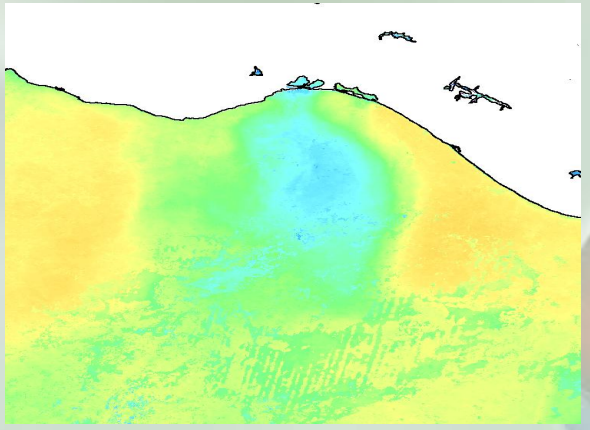
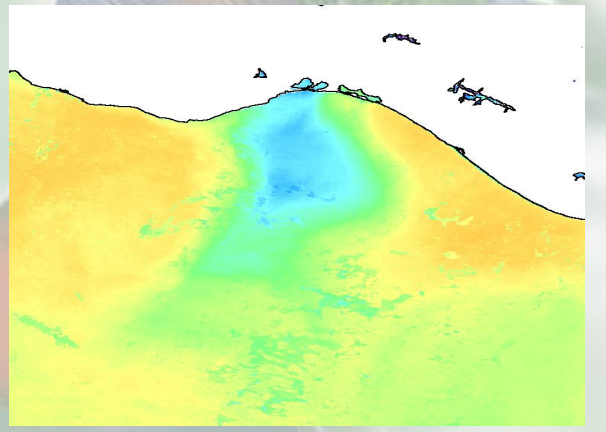


Febrero 2001



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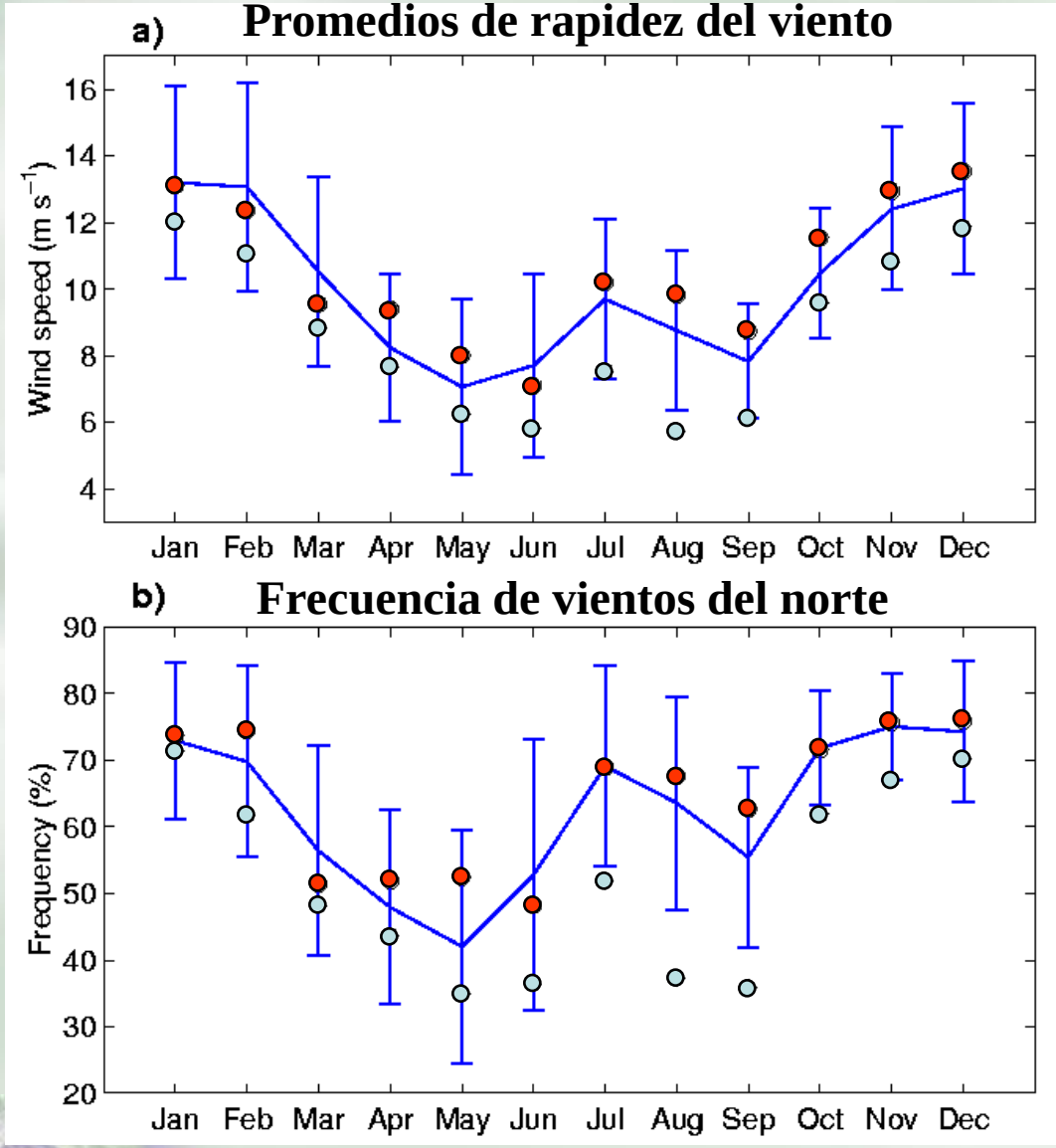

- **El Niño: 65, 69, 72, 76, 82, 86, 87 y 91**
- **La Niña: 64, 67, 70, 71, 73, 75 y 88**

Romero-Centeno et al., J. Climate 2003

Muchas gracias