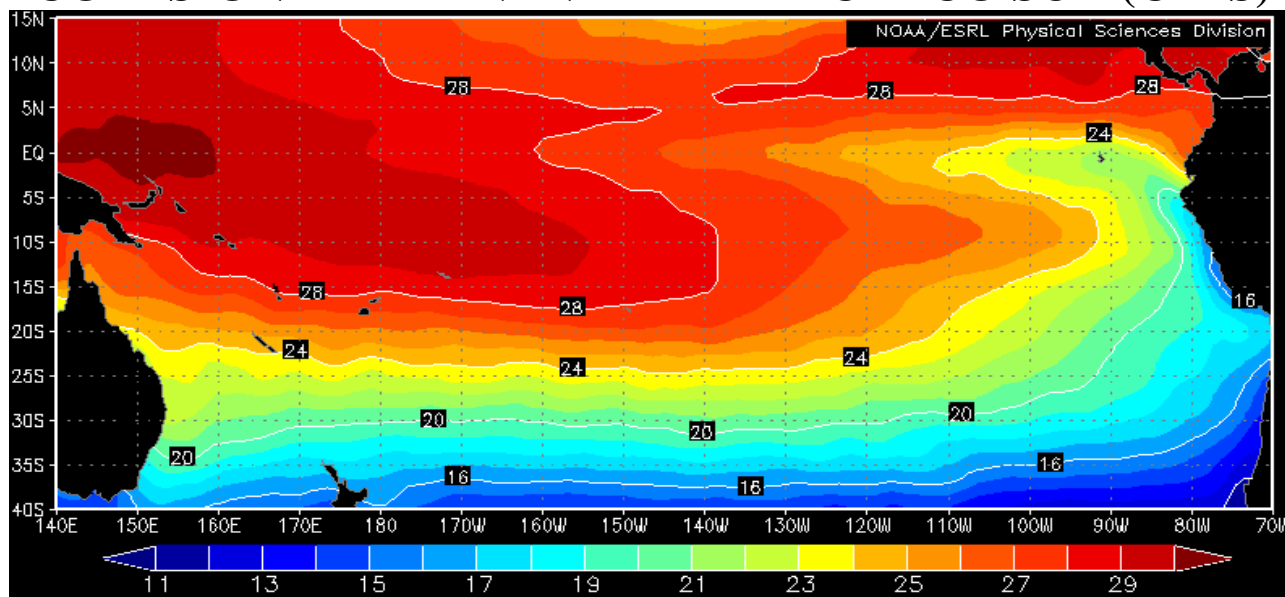


# COMISIÓN PERMANENTE DEL PACÍFICO SUR (CPPS)



JUNE 2007

BAC N° 201

## *ERFEN*

(Estudio Regional del Fenómeno El Niño)

# BOLETÍN DE ALERTA CLIMÁTICO *CLIMATE ALERT BULLETIN*



OMM



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COLOMBIA  
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ECUADOR  
INOCAR

PERÚ  
DHN

CHILE  
SHOA

COMISIÓN PERMANENTE DEL PACÍFICO SUR  
SECRETARÍA GENERAL  
GUAYAQUIL, ECUADOR



El Boletín de Alerta Climático (BAC) es una publicación mensual de la CPPS en la que se analizan las condiciones oceánicas y atmosféricas de la región del Pacífico Sudeste dentro del Estudio Regional del Fenómeno El Niño (ERFEN). La versión digital del BAC está disponible a partir del 15 de cada mes en las páginas *web* de la CPPS: <http://www.cpps-int.org> y del INOCAR: <http://www.inocar.mil.ec>

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Figure 1.- Shore stations locations in the Southeast Pacific region.

EXECUTIVE SUMMARY

The Process of cooling observed in the Eastern Pacific Ocean continued during June, characterized during the first fortnight of the month, by a slight reduction in the cooling process, decreasing the negative anomalies and getting even to appear a warm cell with positive anomalies of until 1,0°C in the central coast of Ecuador. In the second fortnight started again the process of cooling of the sea, reaching towards month ends anomalies of to -2,5°C, disappearing also the observed warm nucleus during the previous fortnight.

The anomalies of the sea temperature during the last week of June were of 0,2°C in the Western Pacific, -0,6°C for the Central Pacific and -1,9°C in the Eastern boundary, values similar to those of the last week of the previous month; with which continue in the equatorial Pacific the neutral conditions with tendency towards cold conditions.

As far as surface winds in the Southeastern Pacific appeared with speeds that fluctuated within the normal rank of variability for the period. With respect to their direction the winds from the south and Southeastern predominated in the entire region.

The South Oscillation Index, for the first time in this year passed to the positive phase, with a small value 0,2.

During this month the Mean Sea Level in the Southeastern Pacific, was characterized for fluctuate closely together in the coasts of Ecuador and Peru of its normal patterns for June; towards the center-south of Chile, the anomalies were about -10.0 cm.

Taking into account the present Equatorial Pacific Ocean cooling, as well as the result of several numerical models simulation, is anticipated that, during the next months in the sector of the Eastern Pacific and Central the sea temperature would continue below its normal value.

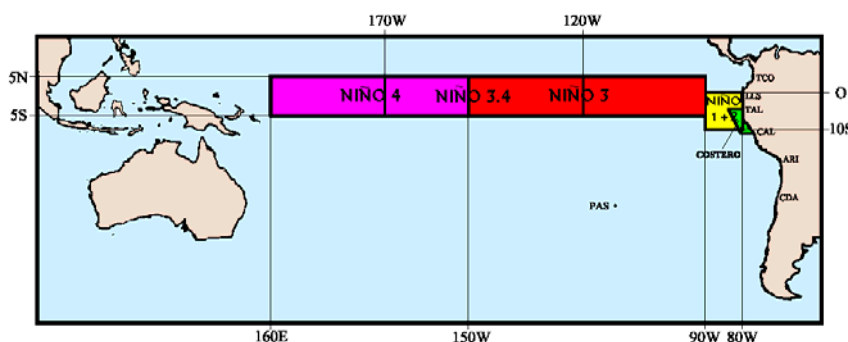


Figure 2.- Map indicating locations and codes of series. Rectangles show the average area of Sea Surface Temperature (SST °C)

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**CLIMATE ALERT BULLETIN**  
**BAC N° 201, JUNE 2007****I. GLOBAL AND REGIONAL IMAGE**

At Beginnings of June the Equatorial Pacific Ocean showed a reduction in the process of cooling of the Sea Surface Temperature (SST), particularly in the Eastern sector, in front the coast of Ecuador, where the presence of a warm cell with positive anomalies of until 1,0°C could be appreciated; later, towards the last week of the month, the cooling of the sea started again reaching SST anomalies of -2,5°C in the region of the Southeastern Pacific. The monthly SST anomaly in the “El Niño” regions shows a slight increase during June with respect to the previous month: For the Western Pacific region (Niño 4) the monthly value of the anomaly was increased from 0,2°C to 0,4°C, in the Central Pacific (Niño 3.4) the anomaly passed from -0,2°C to 0,1°C and in the Eastern Pacific (Niño 1+2), it passed from -1.6°C to -1.4°C.

At Subsurface level below the thermocline in the Equatorial Pacific Central-Oriental, during June a reduction of the water body was observed with negative anomalies, appearing small patches with positive anomalies that move near the surface towards the eastern edge of the Pacific. At the end of the month the subsurface negative anomalies in the Southeastern Pacific intensify again, whereas in the Western Pacific, to the east of the date line appears in the level of 200m a nucleus with positive anomalies of 1,0°C.

The Mean Sea Level (MSL) in the Southeasters Pacific during June, fluctuated near its normal patterns for the month in front the coasts of Ecuador and Peru; towards the center-south of Chile (Coquimbo to Talcahuano), the anomalies were up to -10,0 cm.

The South Oscillation Index (SOI), for the first time in this year passed to the positive phase, with a small value 0,2. With respect to the atmospheric anomalies of pressure, Tahiti and the Darwin’s reached values of -0.5 and -0.8, indicating, with respect to the previous month, a slight predominance of high pressures in the basin of the Subtropical Pacific.

The Intertropical Convergence Zone (ITCZ), in the Eastern Pacific Ocean, appeared like a cloudy band, with its located central axis around 8°N, with presence of convective cells of regulating activity, with influence on the Central America region.

The continuous advance of frontal systems of the North hemisphere altered the tropical flow, generating a displacement of the ITCZ more to the north of the normal thing for this month.

As far as surface winds they predominated of the South and the Southeastern; with respect to the speeds these fluctuated around the normal value of the month.

With respect to rains, as of the first days in Colombia, the precipitations diminished in the center and the south of the Andean region, with exception of the Eastern zone of the departments of Cundinamarca and Boyacá; in Ecuador some episodes of rains in the North coast appeared, that did not exceed the normal value for the month. In Peru, only in the south locality of Ilo appeared a light drizzle during the day 23 of June, registering itself 2.0 mm of accumulated precipitation; whereas, in the Callao plans were registered during the first days of the second fortnight of the month. Chile by second consecutive month

showed a deficit condition in most of the localities of the central and south zone of the country. The city with greater rain deficit was Concepcion.

## II. NATIONAL IMAGE

### A. CONDITIONS IN THE COLOMBIAN COAST

The Center Control Contamination of the Pacific (CCCP) and the Hydrology, Meteorology and Environmental Studies Institute (IDEAM) inform that at beginnings of the month the tropical storm Barry appeared, which formed in the Gulf of Mexico, day 31 in afternoon and lasted until day 2 when it became tropical depression. During this month a anticyclonal system in the Atlantic Ocean prevailed, which exerted influence so that the tropical waves of the East moved more to the south, being these meteorological systems the main rain generators in the Caribbean region, since when arriving at the northwest of the country they generated greater activity when interacting with the ITCZ and the anchored loss of Panama. By the previous thing, the ITCZ was located during most of the month around the 10 degrees of North latitude. As of the first decade, the precipitations diminished in the center and the south of the Andean region, with exception of the Eastern zone of the departments of Cundinamarca and Boyacá, where winds of Level moderate intensity which they dragged humidity of the Eastern plains and caused drizzles, particularly in the Savannah of Bogotá .

During the supervision of June of 2007, made by the area of Operational Oceanography of the CCCP, to the fixed station coastal N° 5 located to 10 miles of the cove of Tumaco between the coordinates 78°51'W and 2°N, was a SST (TSM) average of 27,1°C, whereas the temperature of the homogenous layer respectively oscillated between 26,7°C and 27.6°C for the first and second fortnight, throwing a monthly average of 27,2°C. A positive anomaly at superficial level of 1,8°C appears, with respect to the historical average (March 2000 - June 2007), which was of 25,3°C.

In June, the termoclina for the first fortnight promoted 7 meters with respect to the last registry of May, positioning itself on the 32 meters, whereas for the second fortnight it was positioned approximately on the 28 meters. The isotherm of 15°C became visible for this month to a depth of 43 meters, and the isotherm of 27°C stayed in the 19 meters, with respect to the month of May, throwing to this depth a positive anomaly of 0.15°C and at the 15 meters it observed a positive anomaly of 0.5°C.

The salinity registered variation at superficial level presenting a value of 30.8 in the first fortnight and 28.6 UPS during the second fortnight with a difference of 2.2 UPS. A positive anomaly of 0.51 at superficial level with respect to the historical average appeared which is of 32.11 UPS. The maximum value of salinity appeared in the first fortnight of the month, with a value of 35.0 to a depth of 40 meters approximately. The haloclina was positioned respectively for the first and second fortnight on the 35 and 29 meters. The isohaline of 34 was registered to the 31 meters, whereas the isohaline of 35 was registered to the 53 meters

### B. CONDITIONS IN THE ECUADORIAN COAST

The Oceanographic Institute of the Navy of Ecuador (INOCAR) reports that June of 2007, the originating wind presence of the southwest affected the central and south zone of the coast, transporting to the region humid and cold air masses that generated associated cloudiness to drizzles and light rains; as well as a sustained reduction of the temperature of the air. In the North part the behaviour was variable, with presence of moderate precipitations and warmer temperatures something.

During June, accumulated rain on the Coastal Region and the Galápagos Islands presented deficit, with the exception of the north of the Esmeraldas province where they were observed in excessive around a 22%.

The air temperature (AT) continued presenting tendency to diminish, although the observed values stayed slightly on the normal in the entire coastal Region. The SST, during the month presented values above its normal (1.0°C) in the North coast, decreasing the anomalies as advances towards the South part of the Ecuadorian coast, arriving at 0°C in the South border. According to the present behaviour of the ocean-atmospheric conditions, it would be expected for July of 2007, that in the Ecuadorian coast the precipitations (rains and drizzles) are little, according to the typical thing of the dry station, with accumulated values near his normal. In the Galápagos Islands, the precipitations will continue deficit.

With respect to AT and SST they would stay fluctuating around the rank of normality with tendency to the reduction, particularly towards the south of 0° of latitude, whereas in the Galápagos Islands stays below its normal.

### C. CONDITIONS IN THE PERUVIAN COAST

The Direction of Hydrography and Navigation of Peru (DHN) informs that in all Peruvian coast the registries of the SST continued below the monthly average, being observed in the stations of Chimbote, Callao and San Juan, a reduction of the values towards conditions more cold; whereas, in the stations of Talara, Paita and Ilo, was observed a slight increase of the SST, associated with smaller anomalies of -1.0°C. The anomalies of the SST fluctuated between -0.6°C (Paita) and -2.1°C (Chimbote).

The values of the MSL throughout the Peruvian coast, continued fluctuating closely together of their normal patterns of June. The minimum anomaly appeared in the stations of Pisco and Matarani (-0.03 meters), and the **maxima** anomaly, in the station of Paita (0.03 ms).

The temperature of the air also stayed below the monthly average, diminishing around 2.0°C with respect to the month of May, being appraised in the coast, conditions **more cold**. The **maxima** negative anomaly appeared in the station of Chimbote (-3.4°C); whereas, the minimum anomaly appeared in the station of Paita (-1.8°C).

In the month, only in the south locality of Ilo appeared a light drizzle during the day 23 of June, registering itself 2.0 mm of accumulated precipitation; whereas, in the Callao plans were registered during the first days of the second fortnight of the month.

Throughout the Peruvian coast winds of South direction predominated; with the exception of the stations of Talara, San Juan and Mollendo, in which winds of the Southeastern predominated. In relation to the wind speed, positive anomalies predominated; with the exception of Paita and Callao, with negative anomalies of -0,9 and -0,4 meters/second, respectively.

### D. CONDITIONS IN THE CHILEAN COAST

The Hydrographic and Oceanographic Service of the Navy of Chile (SHOA) maintains throughout the coast a network of stations of level of the sea to **monitoring a series** of oceanic and atmospheric variables. Next a description of the SST and the MSL between Arica (18°29'S) and Talcahuano (36°41'S) for June 2007.

During this month, it continued the reduction of the values of SST observed in May, nevertheless, in this opportunity was reflected so much for the stations of the North zone, center and the south of the country (Arica to Talcahuano). This implied a noticeable negative tendency with anomalies that fluctuated between -1.8°C and -1,2°C. It is possible to emphasize, that the coldest zone appeared towards the North sector of Chile with a uniform anomaly of -1,8°C in Arica, Antofagasta and Caldera.

The behaviour of the sea level like the observed for SST, was characterized to present a negative tendency with values of anomalies that oscillated between -14,0 cm and -2,4 cm. The station of Arica

closest registered the value to the historical average (-2,4 cm), whereas, towards the zone the center-south of the country, the anomalies were up of -10,0 cm (Coquimbo to Talcahuano).

The Meteorological Direction of Chile (DMCh) as much shows that June was characterized to present the temperature of the air, the *maxima* as the minim, below its normal values to a large extent of the national territory.

The North zone of the country (18 to 30°S), presented the greater cooling, being the *maxima* average temperature of the month the one that reached the greater negative anomalies with values between -2,2° and -2.8°C, however the minimum temperature was around its normal values for the time.

The central zone of the country (30 to 38°S), was dominated by the greater cooling surface level and that persisted most of the month, with a negative anomaly average of -1.7°C in the minimum temperature and -1.4°C in the *maxima* temperature.

The South and austral zones (38 to 53°S), also presented cooling but of smaller magnitude, with anomalies of the *maxima* temperature average of -0.7°C and in minimum temperatures of -0.1°C.

The behaviour of the atmospheric pressure in the central and South region of Chile (30 to 45°S), associated to a greater persistence of anticyclonal circulation, presented values of pressure at sea middle level by on the normal, with positive anomalies that they fluctuated between 0.7 and 2.0 hPa. Contrary, the austral zone (45 to 53°S), dominated by a greater frequency of frontal systems and low pressures that crossed the Drake Passage, gave origin the 5.0 to negative anomalies that surpassed hPa.

As far as the precipitation, by second consecutive month, it showed a condition of water deficit fallen in most of the localities of the central and South zone of the country. The city with greater rain deficit was Concepcion with 129 mm less than the monthly average value (218,2 mm). Contrary, the austral region continued showing a slight surplus of fallen water.

### III. PERSPECTIVE

#### A. GLOBAL

Taking into account the predictions from several numerical models, as well as the present behaviour of the main oceanic and atmospheric indicators in the Tropical Pacific Ocean, is considered that the Equatorial Pacific continues in phase of transition between the neutral condition and the entrance to a cold period in the Eastern and coastal Equatorial Pacific in the next months.

#### B. REGIONAL

According to the pursuit of the ocean-atmospheric conditions in the Southeastern Pacific Ocean, executed by Program ERFEN (integrated by National Committees ERFEN of Chile, Colombia, Ecuador and Peru), and coordinated by the CPPS, esteem that during the next month, stays the cooling of the SST in the Eastern and coastal Equatorial Pacific, whereas the temperature of the air would slightly exhibit values around or below its normal; as far as the MSL would slightly continue below its average value with tendency to maintain the anomalies negative and with respect to rains, will present an accumulated distribution according to the normal, specially for the Pacific coast of Colombia and North coast of Ecuador; whereas for the rest of the region the tendency is of precipitations below the normal value.

**TABLE 1**

**LARGE SCALE DATA:** From left to right, monthly median for the last three months of the zonal wind component at lower levels (U3, U2, U1 in the Equatorial Pacific central western, central and central eastern, respectively in m/s with positive values from East to West). SST (T4,T3.4,T3,T1+2,Tc corresponding to the Equatorial Pacific central western, central and central eastern, close to the coast and the coastal area, Talara-Callao, respectively: in °C), atmospheric pressures in Tahiti (Tht) and Darwin (Dwn), expressed in an excess over 1000 Hpa and South Oscillation Index (SOI).

MONTH	ZONAL WIND			NIÑO REGION SST					ATMOSPHERIC PRESSURE		
	WEST.	CENT.	EAST.	T4	T3.4	T3	T1+2	Tc	Tht	Dwn	IOS
APR 07	4.4	9.7	6.3	28.7	27.8	27.1	24.4	22.8	12.3	10.6	-0.4
MAY 07	3.6	8.7	6.9	28.8	27.6	26.4	22.8	21.0	12.8	11.8	-0.4
JUN 07	6.4	10.0	8.6	29.0	27.6	25.9	21.7	19.3	13.2	11.5	0.2

Source: NCEP/NWS/NOAA/USA.

**TABLE 2**

**COASTAL OCEAN DATA OF THE ERFEN REGION:** Monthly medians of the last three Months for Sea Surface Temperatures (SST) in degrees °C. Stations: Tumaco (TCO), La Libertad-Salinas (LLS), Callao (CAL), Arica (ARI), Antofagasta (ANT), Caldera (CDA), Coquimbo (COQ) and Valparaíso (VAL).

Sea Surface Temperature (SST)									
MONTH	TCO	LLS	CAL	ARI	ANT	CDA	COQ	VAL	
APR 07	27.6	26.9	16.2	17.9	16.7	14.9	16.0	15.0	
MAY 07	27.2	27.4	15.3	15.9	15.0	14.3*	14.7	12.6	
JUN 07	***	24.9	15.0	15.0	14.2	13.0	12.4	11.7	

Source: CCCP (Colombia), INOCAR (Ecuador), DHN (Perú), SHOA (Chile).

**TABLE 3**

**COASTAL OCEAN DATA OF THE ERFEN REGION:** Monthly medians of the last three Months for the Mean Sea Level (MSL) in mm. Stations: Tumaco (TCO), La Libertad-Salinas (LLS), Callao (CAL), Arica (ARI), Caldera (CDA), Coquimbo (COQ) and Valparaíso (VAL).

Mean Sea Level (MSL)									
MONTH	TCO	LLS	CAL	ARI	ANT	CDA	COQ	VAL	
APR 07	***	2603	1070	1591	633	1187	859	622	
MAY 07	***	2667	1090	160.8	652	1235	909	635	
JUN 07	***	2646	1050	1566	599	1187	838	590	

Source: CCCP (Colombia), INOCAR (Ecuador), DHN (Perú), SHOA (Chile).

**TABLE 4**

**COAST OCEANIC DATA OF THE ERFEN REGION:** Five-day averages (Pentads) of SST (°C) and MSL (mm)

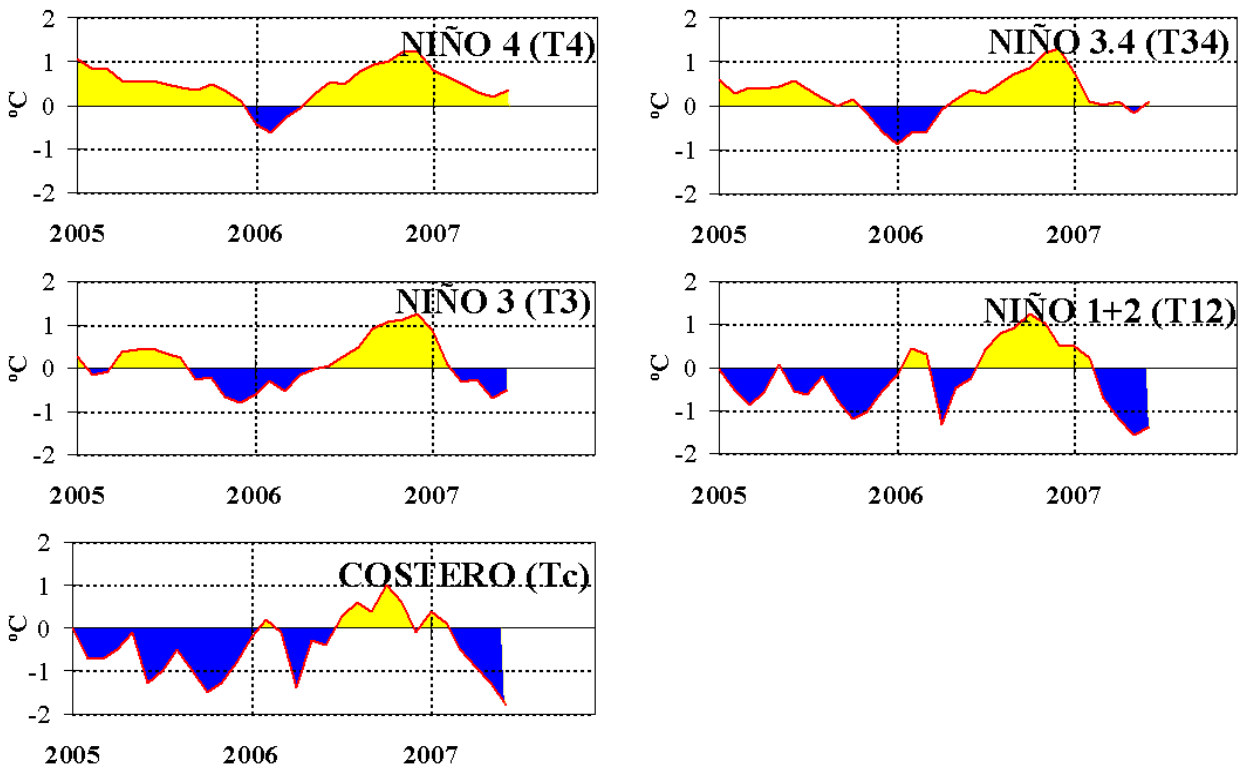
PENTADS	Sea Surface Temperature (SST)			Mean Sea Level (MSL)		
	BALTRA	TALARA	CALLAO	BALTRA	LLS (INOCAR)	CALLAO
MAY	03	***	***	15.60	189.7	107.1
	08	***	***	15.40	191.3	105.5
	13	***	***	15.20	190.6	105.7
	18	***	***	***	190.2	***
	23	***	***	***	189.7	***
28	***	***	***	185.5	***	
JUN	02	***	19.10	15.00	186.6	99.7
	07	***	18.60	15.20	188.3	99.7
	12	***	18.80	15.00	188.2	102.2
	17	***	19.30	14.90	190.3	99.7
	22	***	18.90	14.80	190.3	97.4
27	***	18.30	14.80	187.6	104.5	

Source: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami.

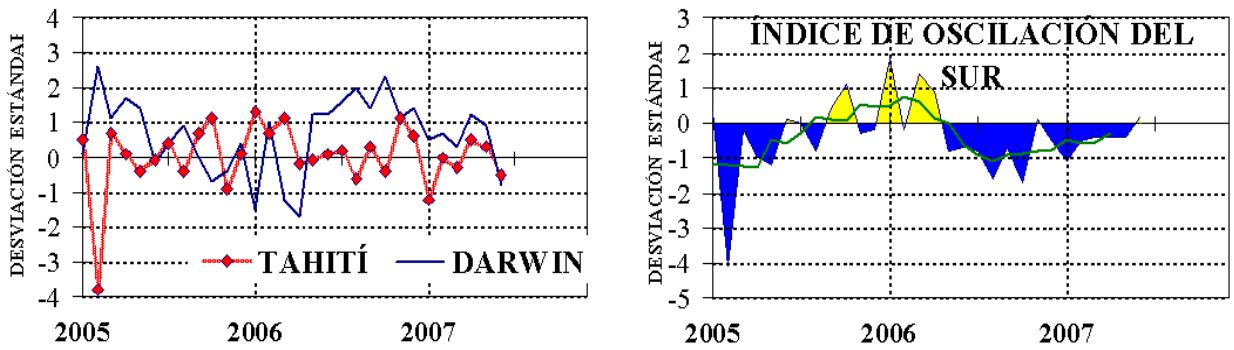
Note.

\* Values revised

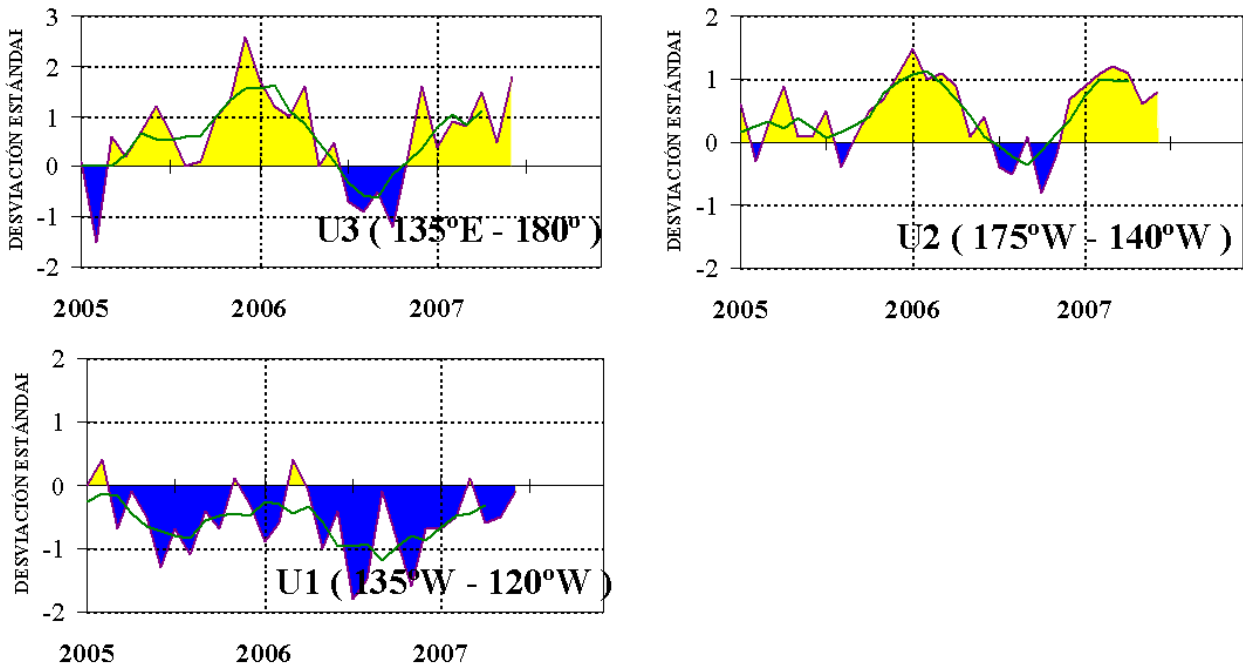
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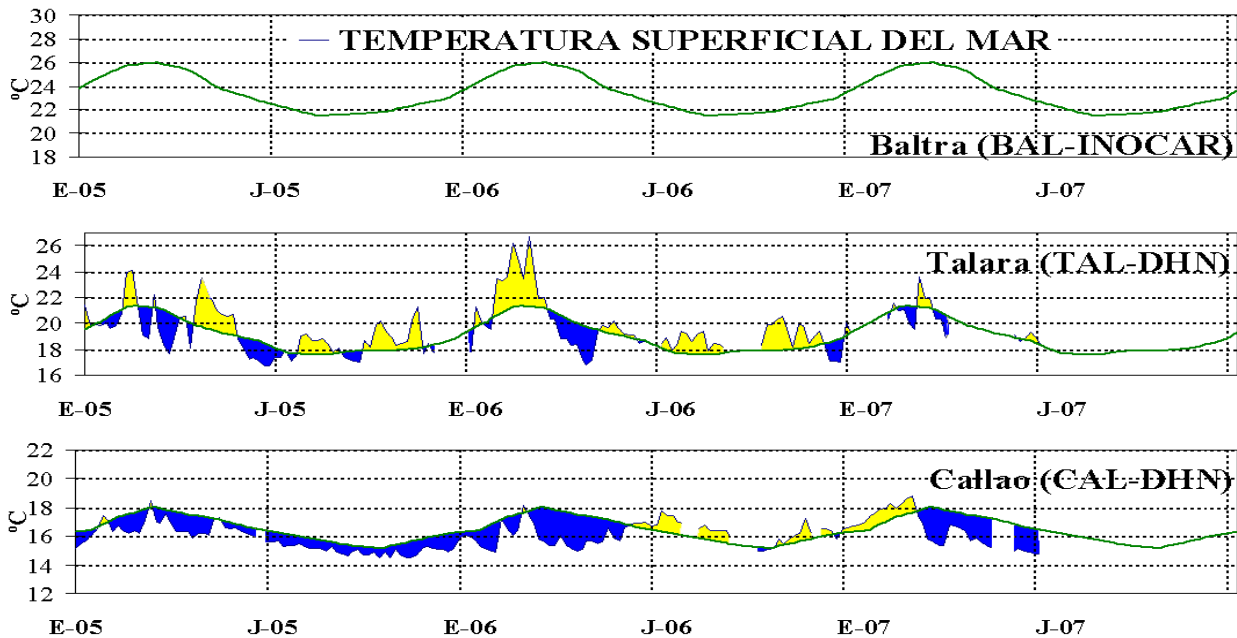
**Figure 3.-** Oceanic anomalies indices (Niño 4, Niño 3.4, Niño 3, Niño 1+2 and Tc). The location of the oceanic indices appears in figure 2. (Source: NCEP/NWS/NOAA/USA).



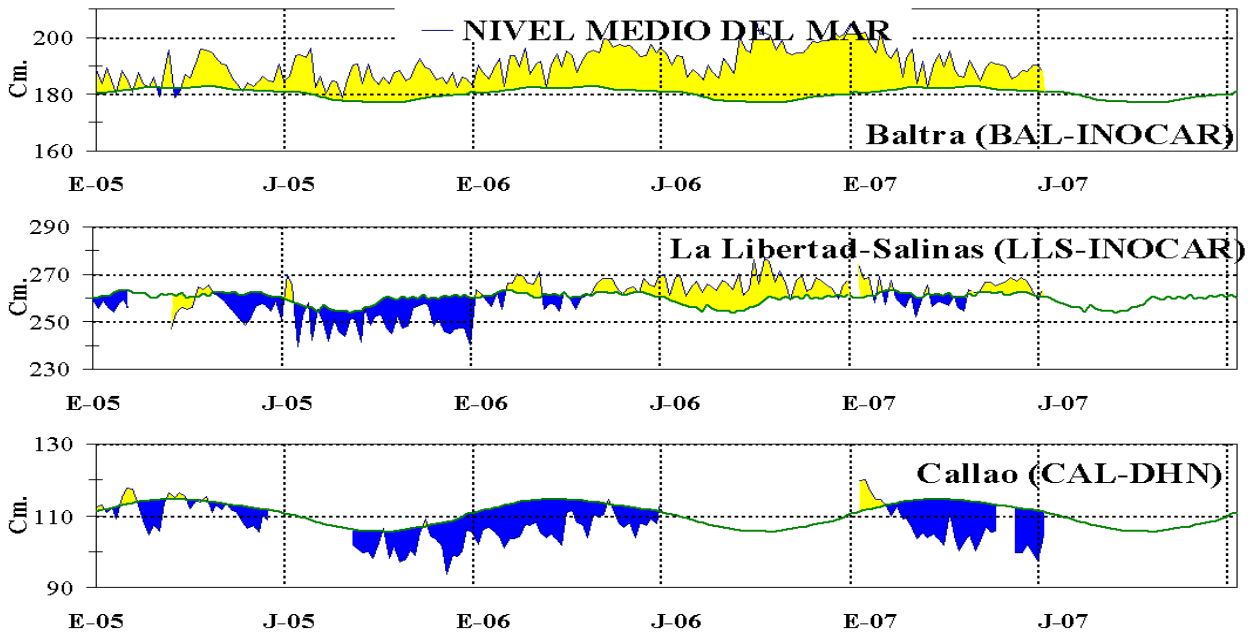
**Figure 4.-** Left Panel: Five-months running mean for atmospheric pressure anomalies in Tahiti and Darwin (mb). Right Panel: Southern Oscillation Index. (SOI) with monthly values and five-months running mean graphed as a green line. The SOI is based on the difference between standardized pressure values: Tahiti minus Darwin. The differences are also standardized for standard deviation of yearly values. (Source: NCEP/NWS/NOAA/USA).



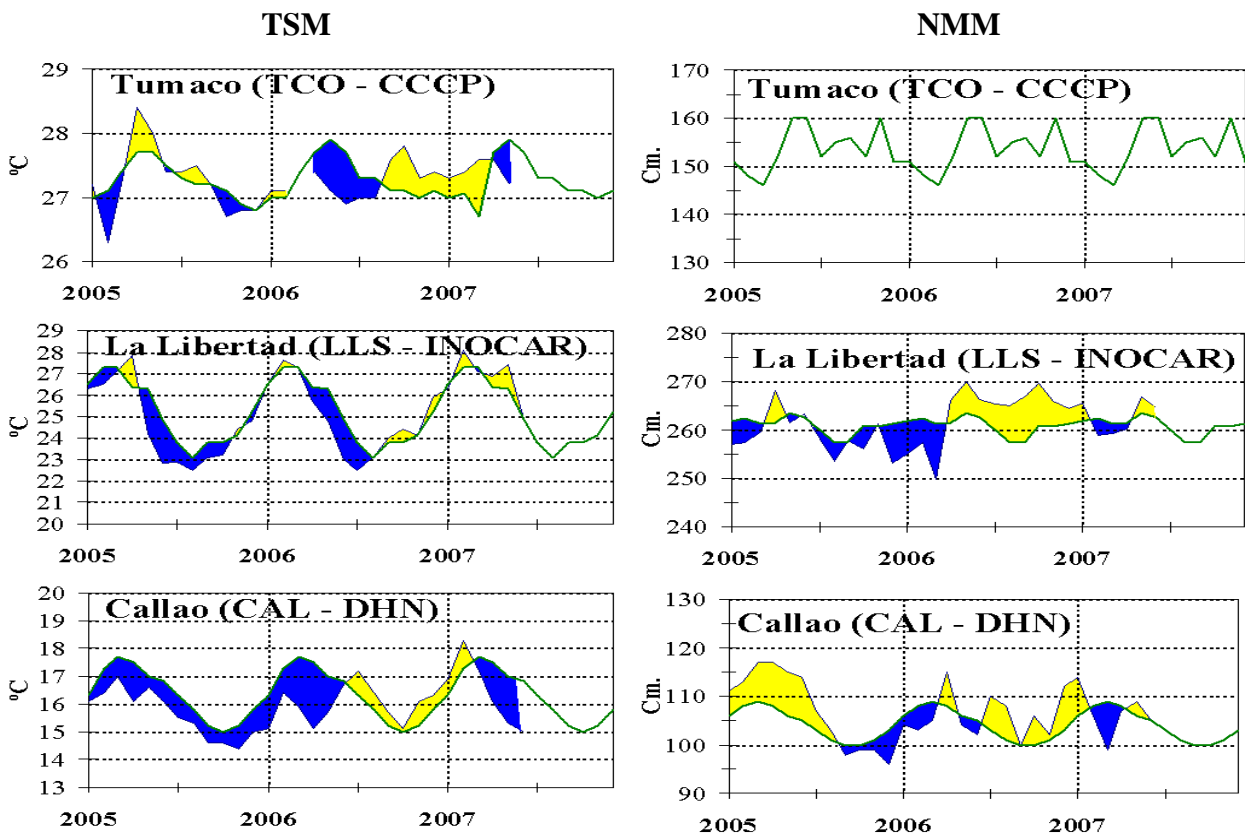
**Figure 5.-** Series and moving averages of five months of zonal wind standardized anomalies (m/s) averaged between 5°N and 5°S for three Equatorial zones: western (U3), central (U2) and eastern (U1). (Source: NCEP/NWS/NOAA/USA).



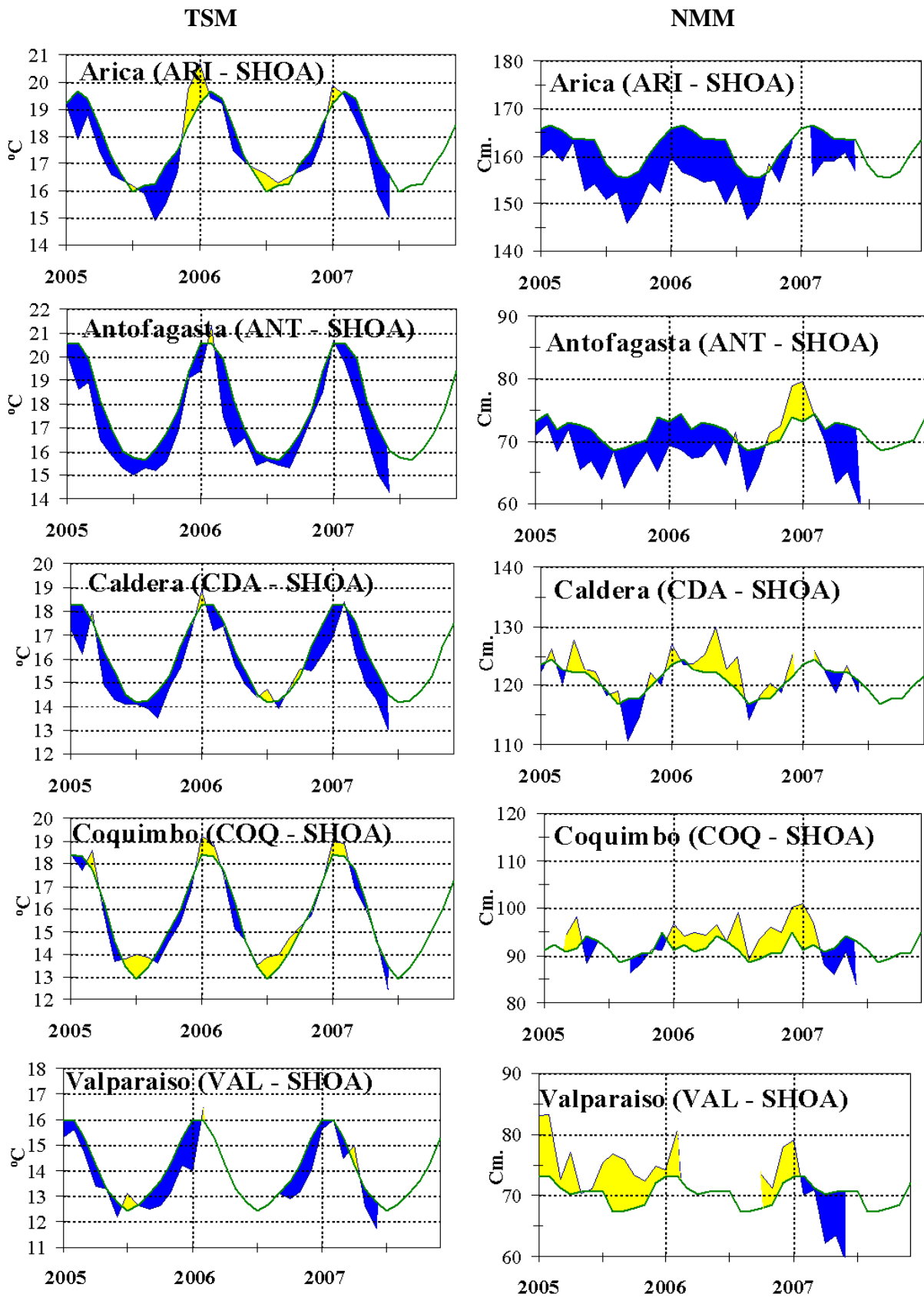
**Figure 6.-** Five day averages (pentads) of SST (°C) in Ports of Peru and Ecuador. The green curve indicates climatology. The location of oceanic indices appears in figure 1. (Source: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami.)



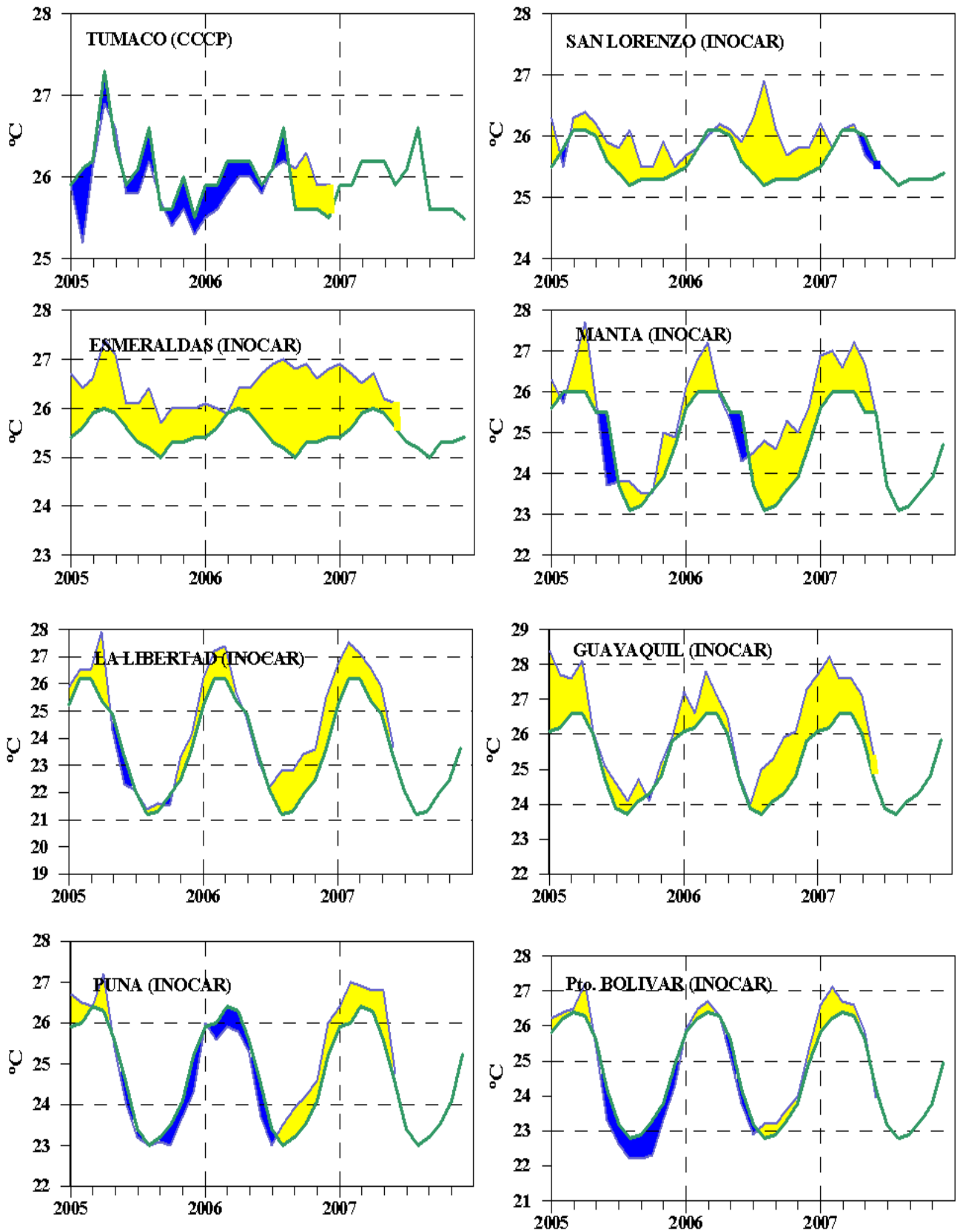
**Figure 7.-** Five-day running mean (pentads) of MSL (cm) in Ports of Peru and Ecuador. The green curve indicates climatology. The location of oceanic indices appears in figure 1. (Sources: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami, e INOCAR).



**Figure 8a.-** Monthly means of the SST (°C) and MSL (cm) in five stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Sources: CCCP, INOCAR y DHN).



**Figure 8b.-** Monthly means of the SST (°C) and MSL (cm) in five stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Source: SHOA).



**Figure 9a.-** Monthly means of the AT (°C) in 8 stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Sources: CCCP e INOCAR).

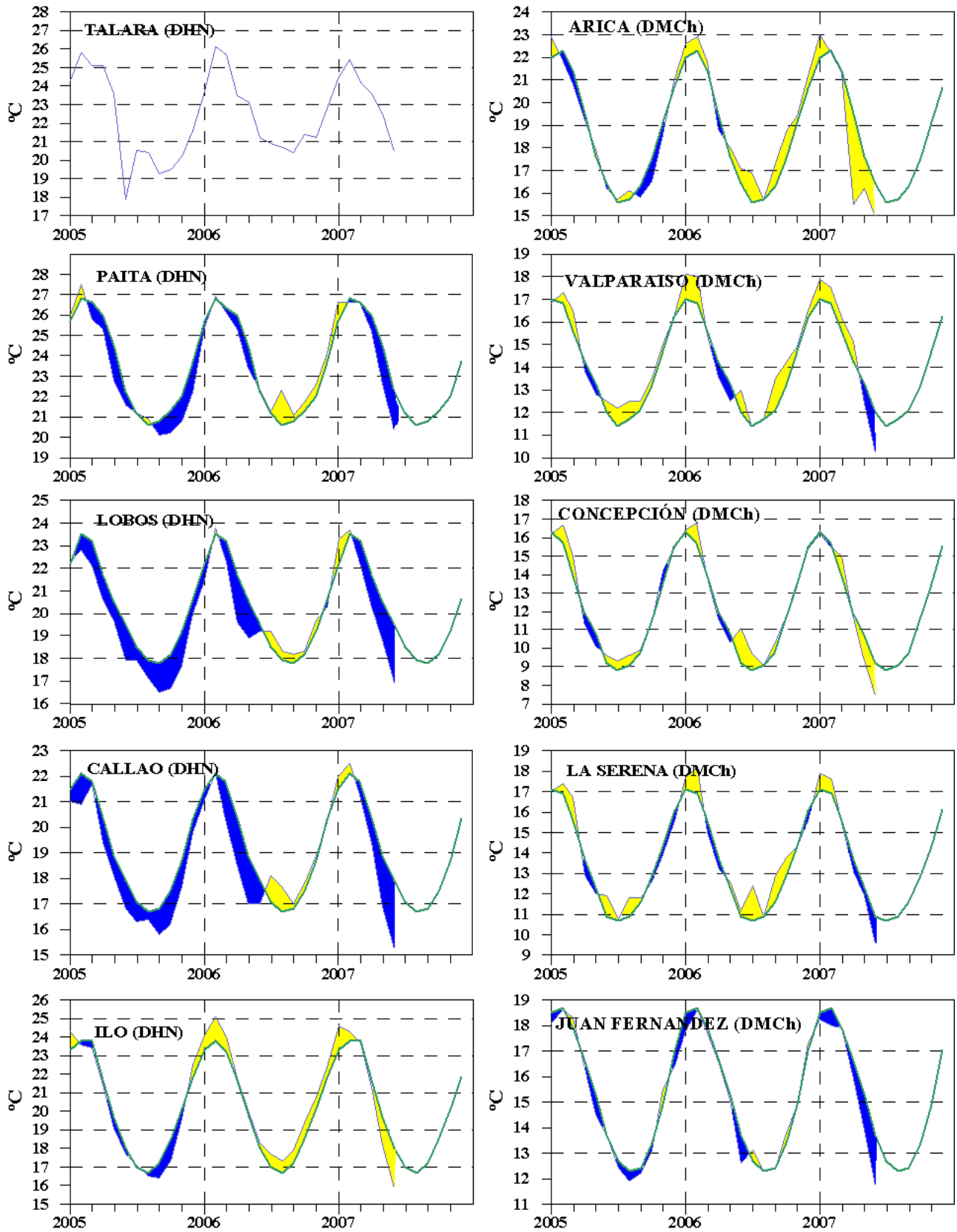
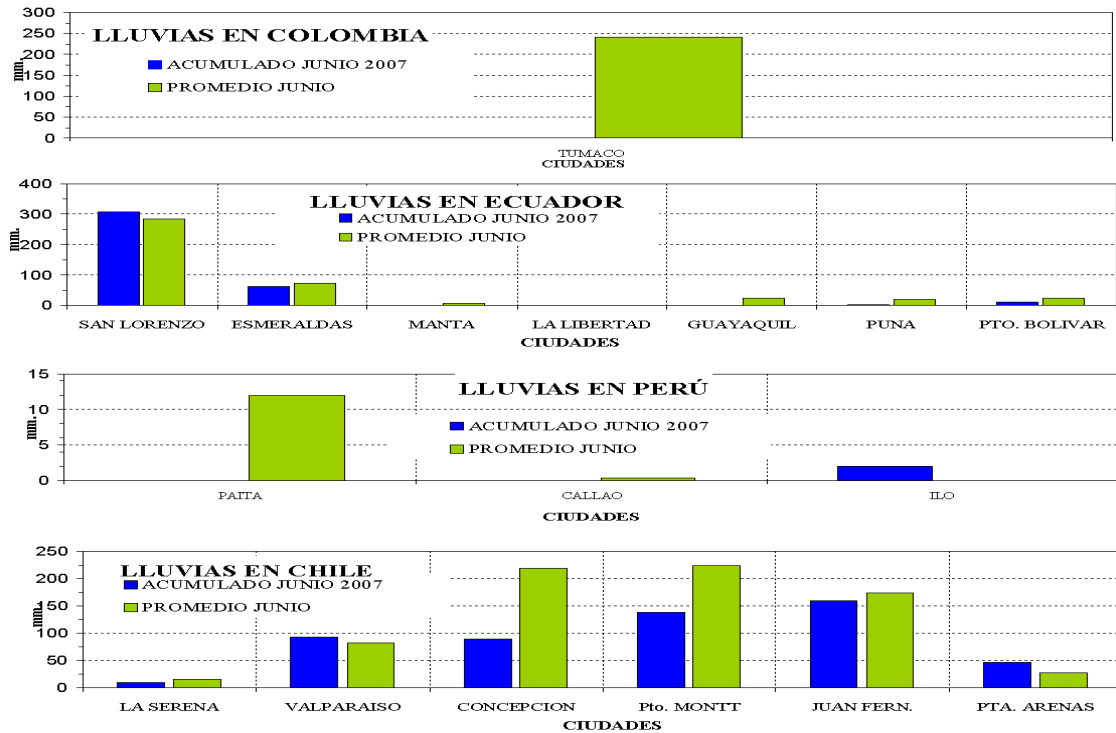
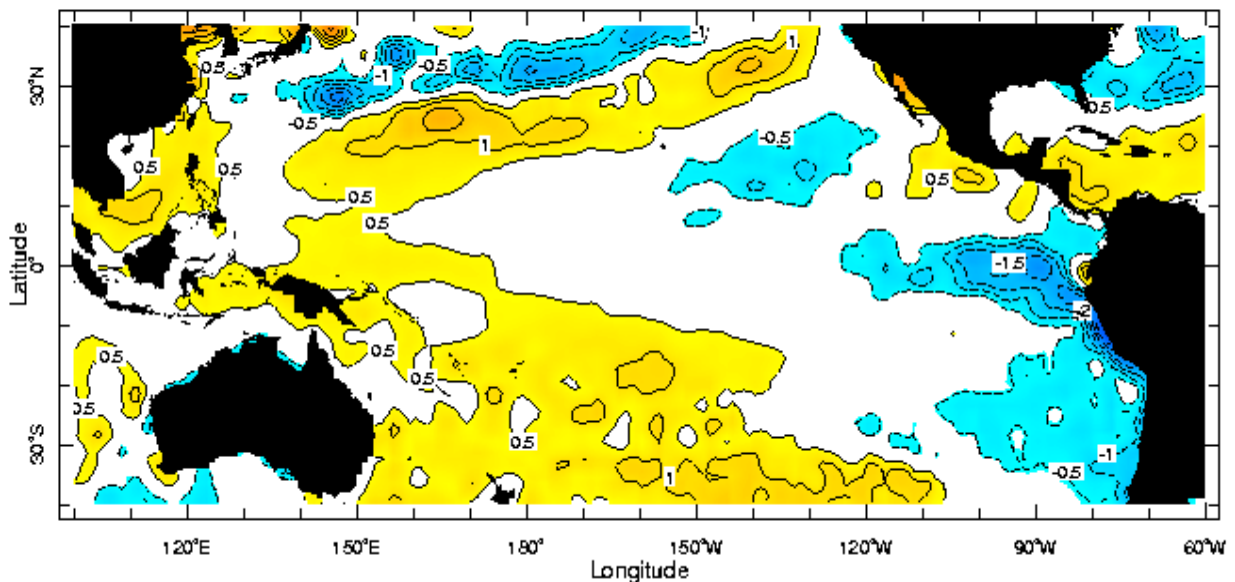


Figure 9b.- Monthly means of the AT (°C) in 10 stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Sources: DHN y DMCh).



**Figure 10.-** Rains during the month of June in the coastal stations of Colombia, Ecuador, Peru and Chile. Location of the stations appears in Figure 1. (Sources: CCCP, INOCAR, DHN y DMCh).

### Sea Surface Temperature Anomalies (°C) June 2007



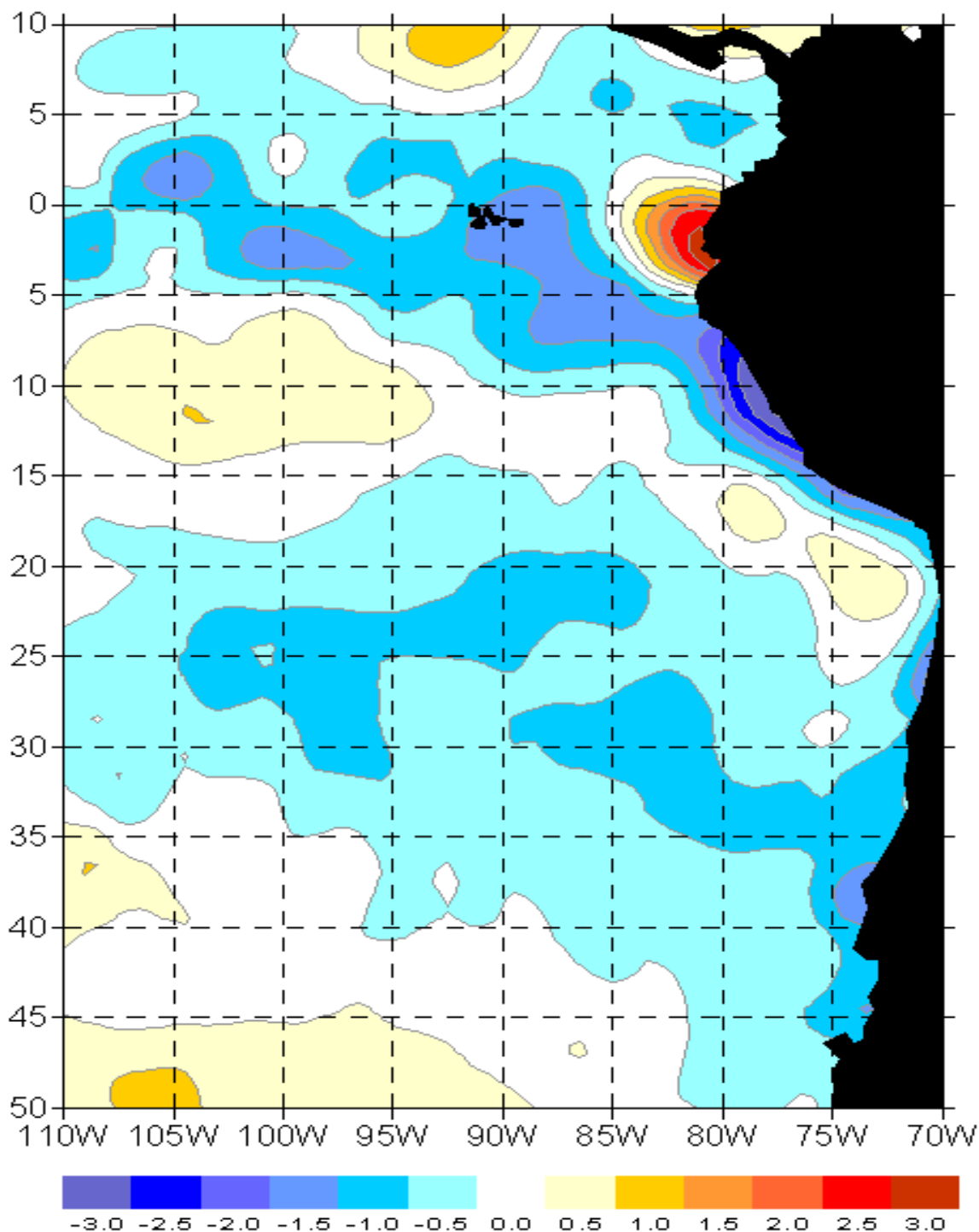
Jun 2007

**Figure 11.-** Sea Surface Temperature Anomalies (°C) June 2007. (Source: International Research Institute for Climate and Society)

# Anomalia de Temperatura Superficial del Mar

14/jun/07 - 20/jun/07

Climatología: Reynolds Oi (AVHRR / TSM In-Situ) Resolución: 0.5°



Fuente: NCEP/NOAA . Procesamiento: INOCAR - CIIFEN, 2007

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