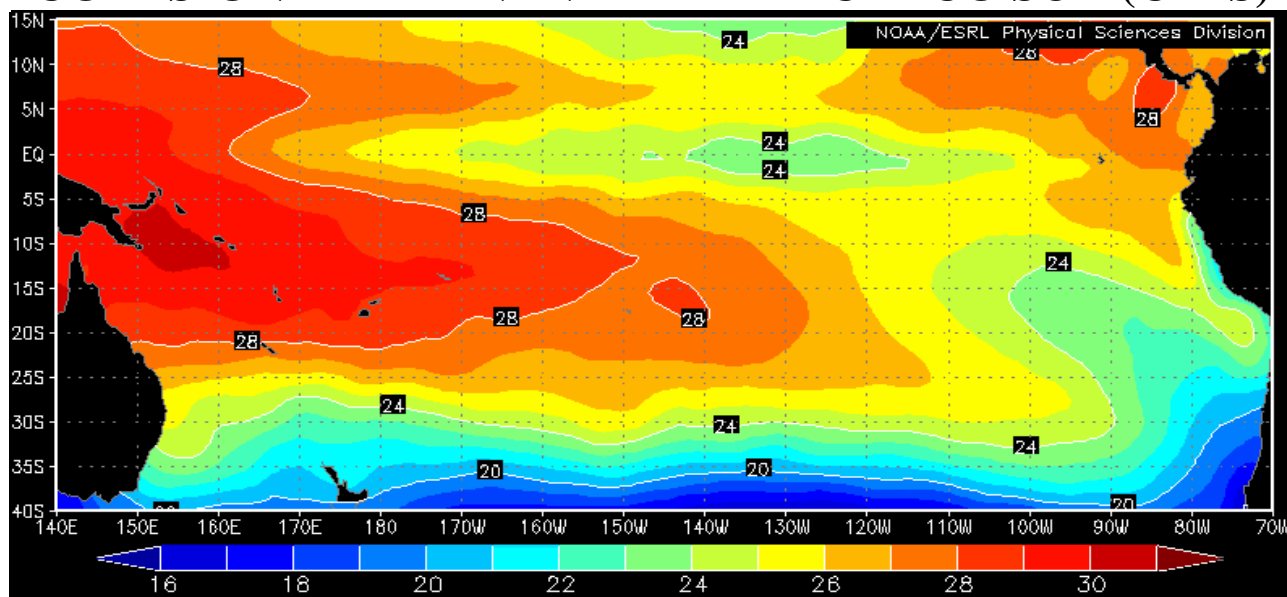


# COMISIÓN PERMANENTE DEL PACÍFICO SUR (CPPS)



Sea Surface Temperature, February 2008, NOAA-CIRES/Climate Diagnostic Center

FEBRUARY 2008

BAC N° 209

## *ERFEN*

(Estudio Regional del Fenómeno El Niño)

# BOLETÍN DE ALERTA CLIMÁTICO *CLIMATE ALERT BULLETIN*



OMM



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COLOMBIA  
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PERÚ  
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CHILE  
SHOA

COMISIÓN PERMANENTE DEL PACÍFICO SUR  
SECRETARÍA GENERAL  
GUAYAQUIL, ECUADOR



The Boletín de Alerta Climático (BAC) is a monthly publication of the CPPS in which the oceanic and atmospheric conditions of the region of the Southeastern Pacific within the Regional Study of El Niño (ERFEN) are analyzed. The digital version of the BAC is available from the 15 of every month in the pages Web of the CPPS: <http://www.cpps-int.org> and of the INOCAR: <http://www.inocar.mil.ec>

The suggestions, commentaries or scientific information will be welcome to the electronic mails: [dircient@cpps-int.org](mailto:dircient@cpps-int.org); [nino@inocar.mil.ec](mailto:nino@inocar.mil.ec), (Group BAC ECUADOR), or by means of written communication directed to the seat of the Permanent Commission for the South Pacific, General Secretariat, Complex Albán Borja, Building CLASSIC, 2nd floor, Guayaquil-Ecuador, FAX: (593)4-2221201.

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

EXECUTIVE SUMMARY

February was characterized to present increase of the Sea Surface Temperature next to the coast of South America; reason why it would be possible to be considered that in this month the cold event “La Niña” would have fortified its process of weakening of waters of the Southeastern Pacific, reaching towards month ends positive anomalies of to 1, 5°C. Nevertheless in the region of the Central Pacific Ocean the negative anomalies of the temperature of the sea have stayed in 2, 0°C approximately. During the last week of February the temperature of the sea presented anomalies of -1, 7°C in the Western Pacific, -1, 6°C for the Central Pacific and 1, 1°C in the Eastern Pacific, showing a clear tendency to reduce the negative anomalies observed the previous month and that during the second fortnight of February becomes general to all the strip of the equatorial Pacific; being more remarkable this reduction in the region of the Southeastern Pacific. As far as surface winds, in the region of the Southeastern Pacific variables with predominance of the south and southeastern appeared, with wind occurrences of the north for some of the stations of Ecuador and Peru; and speeds slightly superior to the normal rank for the time. The Index of Oscillation of the South, by seventh consecutive month reached a positive value of 2, 7 being the higher since the phenomenon of “La Niña” began, in august of 2007. During February the Mean Sea Level (MSL) in the Southeastern Pacific fluctuated thus near its normal patterns, as opposed to the coasts of Ecuador was 1, 0 cm on the average; throughout the Peruvian coast it continued presenting negative anomalies, with the exception of Talara and Paita, that they presented slight positive anomalies; in front of Chile the level of the sea was characterized to maintain anomalies negative that they fluctuated between -4, 3 cm (Arica) to -8, 5 cm (Antofagasta) and -6, 7 cm in Valparaíso. Taking into account the present thermal behaviour from the Equatorial Pacific Ocean, as well as the exits of several models of numerical simulation, are anticipated that during the next month in the Eastern sector of the Pacific and west coast of South America the Sea Surface Temperature will remain on the normal one; whereas in the Central Pacific the negative anomalies stay, conserving the tendency to reduce the negative anomalies during the following months.

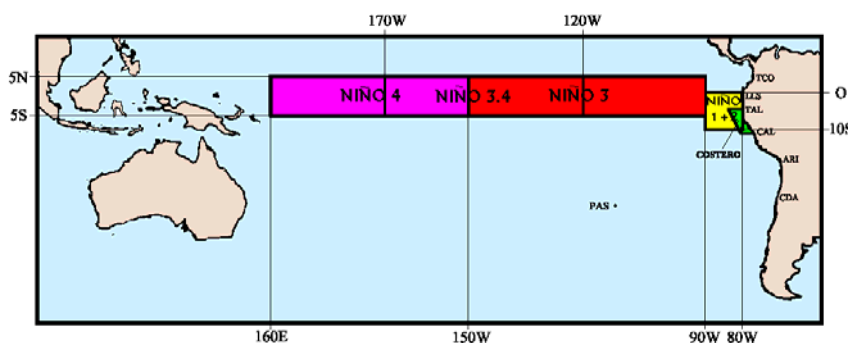


Figure 2.- Map indicating locations and codes of series. Rectangles show the average area of Sea Surface Temperature (SST °C)

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**CLIMATE ALERT BULLETIN  
BAC N° 209, FEBRUARY 2008****I. GLOBAL AND REGIONAL IMAGE**

In February the Equatorial Pacific Ocean continued presenting Sea Surface Temperature (SST-TSM) below its climatologic value; nevertheless the monthly anomaly in the region of the Southeastern Pacific, for the first time after 11 months, was positive of 0, 2°C. In the “El Niño” regions the monthly anomaly of the SST(TSM) continued mainly negative, whose values for February with respect to the previous month in the region of the Western Pacific (“El Niño” 4 Region) were increased of -1, 5°C to -1, 6°C, in the Central Pacific (“El Niño” 3,4 Region) the anomaly happened of -1, 8°C to -1, 9°C, whereas in the region of the Eastern Pacific (“El Niño” 1+2 Region) a remarkable increase of the anomalies appears, happening of -0, 7°C to 0, 2°C.

At subsuperficial level, the behaviour of the thermal structure during February in the Eastern Equatorial Pacific maintained the presence of negative anomalies whose nucleus presents values of -3, 0°C that is located around the level of the 60 m. of depth between 90°W and 160°W. Towards second half of the month the presence of a thin superficial water cloak is observed next to the coast of South America, until the 50 m. of depth, with positive anomaly of 2°C. Towards the west of the date line, to 160 m. depth the nucleus with positive anomalies of until 4, 0°C stays, demonstrating a slight displacement towards the east with respect to the previous month.

During February the Mean Sea Level (MSL) in the Southeastern Pacific fluctuated thus near its normal patterns, as opposed to the coasts of Ecuador was 1, 0 cm on the average; throughout the Peruvian coast it continued presenting negative anomalies, the most significant changes appeared in the South zone, where the negative anomalies of the MSL increased with respect to the previous month; with values that fluctuated between 2, 0 cm (Paita).and -9, 0 cm (stations of the south, San Juan and Matarani); in front of Chile the MSL was characterized to maintain negative anomalies that they fluctuated between -4, 3 cm (Arica) to -8, 5 cm (Antofagasta).

The Index of Oscillation of the South, by seventh consecutive month presented a positive value being in this occasion the one of greater magnitude with 2, 7. The Intertropical Convergence Zone (ITCZ) in the Eastern sector of the Pacific appeared around 2°N, and in the last days of the month the ITCZ was branched off, with the second branch located in 3°S.

The rains in the coasts of Ecuador appeared with surplus reaching in average an excess of the 120% on the climatologic value of the month. In Peru during the second and third week of the month drizzles and precipitations appeared that they accumulated 70, 3 in Talara, 8 mm in the stations of Paita, Lobos de Afuera, Chimbote and Mollendo, 7, 8 mm in Ilo and 1, 0 mm in San Juan. The precipitation in the South region of Chile, between Chillán (37°S) and Balmaceda (46°S) was characterized by a rain deficit between 25 and 50 mm below the climatologic average; only the austral region reached a surplus equivalent to 60% respect to the monthly average.

The surface winds in the region of the Southeastern Pacific appeared variables with predominant direction of the south and southeastern and sometimes winds of the north for some of the stations of Ecuador and Peru. Whatever at the speeds these were slightly superior to the normal rank for the time.

## II. NATIONAL IMAGE

### A. CONDITIONS IN THE COLOMBIAN COAST

The Center for the Pollution Control of the Pacific (CCCP) and the Hydrology, Meteorology and Environmental Studies Institute (IDEAM) inform that during the first days of February the anticyclonal systems of the north hemisphere moved more towards the south, and the Intertropical Convergence Zone was located around 2° of north latitude; this meteorological situation favoured that the dry season of year beginnings intensified in the regions Caribbean and Orinoquía and that in addition extended towards the Andean departments and the Amazonia. Nevertheless, the previous thing was interrupted at the beginning of the second decade of February in the Andean departments, Orinoquía and Amazonia due to a continue advance of cold fronts of the north hemisphere laid out the ITCZ more towards the north, added to entered constantly of humidity from Brazil by the level Southeastern of Colombia to the “Llanos Orientales”. In general the atmospheric conditions were very variable in the Andean region with alternate dry days with rainy days, especially during the third week of the month (between 17 and 21 of February). During the last days of the month the intensity of rains lowered well-known in the referred region.

During the monitoreo of 11 February of 2008 made by the Area of Operational Oceanography of the CCCP, the fixed station coastal N° 5 located to 10 miles of the cove of Tumaco, the profile of temperature of station 5, it showed like the temperature varied of 26, 5°C in surface until 14, 5°C in a reduction of 82 meters. Stability of the temperature could be observed approximately until the 29 meters of depth, and to a depth of 35 meters the temperature reached approximately to 15, 7°C. The halocline presented a typical behaviour of the salinity in the water column, where in surface psu reached an approximated value of 30, 7 and to the 50 meters psu was Maxima with 35.

### B. CONDITIONS IN THE ECUADORIAN COAST

The Oceanographic Institute of the Navy of Ecuador (INOCAR) reports that during February of 2008 originating winds of the south and of the north appeared occasionally. The temperature of the air throughout the Ecuadorian coast fluctuated between 25°C and 25, 7°C representing an anomaly between -0, 1°C and -0, 8°C. As far as the Sea Surface Temperature in average it presented value of 26, 1°C what mean anomaly of -0, 4°C.

In February, the Ecuadorian Coast registered a strong weather, characterized in rains during most of the month; with variable intensity and daily maximums of up to 115 mm. accumulated the monthly one was of 480 mm, with a surplus of up to 240%. The inner area of the Gulf of Guayaquil experimented the greater surplus as a result of the originating humidity contribution of the north and southeastern.

Considering the present behaviour of the conditions ocean-atmospheric and that March is another one of the rainiest months of the year, it is hoped that in the Ecuadorian coast they continue taking place showers and rains with electrical storm presence, with high probabilities of surpassing the average values of March.

As far as the temperature of the sea and the air in the Ecuadorian coast they will maintain the tendency to increase its values.

### 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 have been increased towards conditions a little warmer in the zone between Talara and Callao, appearing variable anomalies (positive and negative); whereas, in the south zone they have diminished prevailing the negative anomalies. The anomalies of the SST fluctuated between 2, 3°C (Talara) and -2, 7°C (San Juan).

The Mean Sea Level (MSL) to long it of the Peruvian coast continued presenting negative anomalies, with exception of Talara and Paita that they presented slight positive anomalies, and Lobos de Afuera with a value similar to its normal pattern of the month. The most significant changes have appeared in the south zone where the negative anomalies of the level of the sea have increased with respect to the previous month. The anomalies of the MSL fluctuated between 2, 0 cm (Paita).and -9, 0 cm (stations of the south, San Juan and Matarani).

The temperature of the air also stayed below the monthly average, with the exception of Lobos de Afuera and Ilo that presented slight positive anomalies of 0, 3°C and 0, 1°C, respectively. The negative anomalies fluctuated between -0, 2°C (Chimbote) and -1, 1°C (Mollendo).

During the second and third week of the month, drizzles and precipitations appeared that they accumulated 70, 3 mm in Talara, 8 mm in the stations of Paita, Lobos de Afuera, Chimbote and Mollendo, 7, 8 mm in Ilo and 1, 0 mm in San Juan.

Throughout the Peruvian coast winds of South direction predominated; nevertheless, also they presented components of the southwest, southeastern and the northwest in the stations of Talara and Paita, Lobos de Afuera, Mollendo, and Chimbote, respectively. In relation to the wind speed the positive anomalies predominated that fluctuated between 0, 4 to 4, 1 m/s; with the exception of Paita and Callao, that presented anomalies of -2, 6 and 0, 0 m/s, 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. A description of the Sea Surface Temperature and the level of the sea between Arica (18°29'S) and Talcahuano (36°41'S) for February of 2008 is:

During this month a cold condition with negative anomalies was observed in the north zone of the country that oscillated between -1, 0°C (Arica and Antofagasta) and -2, 3°C (Caldera). Whereas, the zone north-centre presented values near the historical average with positive anomalies of 0, 2°C in the station of Coquimbo and 0, 1°C in Valparaiso.

The behaviour of the MSL was characterized to maintain anomalies negative that they fluctuated between -4, 3 cm (Arica) to -8, 5 cm (Antofagasta). In the case of this variable, the second greater difference was registered in the station of Valparaiso, with a value of 6, 7 cm under the historical average.

The Meteorological Direction of Chile (DMCh) shows that during February the average temperature of the air was characterized by the presence of positive anomalies by on 1°C in the central, south and austral zone of Chile, being the warmest region the region of Valdivia (3, 2°C) and Coyhaique (3, 4°C), respectively. The Maxima temperature by second consecutive month showed a heating generalized, specially the inner regions with anomalies by on 4°C between Temuco (38°S) and Coyhaique (45°S). Single the region of the north coast maintained negative

anomalies with values of -1, 5°C in Arica and -0, 6°C in Antofagasta. The minimum temperature presented positive anomalies in all the country, being the greater values in the central and south zone with values of 3, 7°C (Curicó) and 2, 6°C (Coyhaique).

The anticyclonal circulation in the average and low troposphere was the dominant pattern that affected great part of the central and south zone of Chile. This condition was associated to the predominance of present ridges of great scale on central South America. The anomalies of the pressure at Mean Sea Level showed positive anomalies in the central and south zone with values between 1, 5 and 2, 5 hPa.

The precipitation in the south region of the country between Chillán (37°S) and Balmaceda (46°S) was characterized by a rain deficit being 25 and 50 mm below the climatologic average. Single the austral region reached a surplus equivalent to 60% respect to the monthly average.

### **III. PERSPECTIVE**

#### **A. GLOBAL**

Taking into account the present predictions from several dynamic and statistical models as well as the behaviour of the main oceanic and atmospheric indicators, it is considered that during the next month the Central Equatorial Pacific will continue exhibiting negative anomalies of the SST with a gradual tendency to the reduction of the negative anomalies.

#### **B. REGIONAL**

In agreement with 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, it is anticipated that during the next month warm values of the SST in the eastern and coastal Equatorial Pacific appear, like the temperature of the air that will present values around its normal one, particularly from the north coasts from Chile to the south of Ecuador.

As far as the MSL, this one would also stay fluctuating around its average value; with respect to rains the tendency for the coast of Ecuador and north of Peru is to continue presenting a surplus; whereas for the rest of the region the tendency of precipitations is to stay below the normal thing, in special the centre and south coast of Chile.

**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
<b>DEC 07</b>	6.1	11.6	10.2	27.4	25.0	23.5	20.8	19.6	12.5	6.0	1.8
<b>JAN 08</b>	2.8	12.5	10.6	26.6	24.7	24.1	23.8	***	1.5	4.9	1.9
<b>FEB 08</b>	6.5	12.2	8.9	26.4	24.8	25.0	26.2	25.1	13.8	4.7	2.7

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	
<b>DEC 07</b>	27.5	25.5	13.8	16.4	17.2	15.8	16.3	13.5	
<b>JAN 08</b>	27.3	26.4	15.0	18.3	20.4	16.6	18.2	15.2	
<b>FEB 08</b>	26.5	27.3	16.2	19.3	19.5	15.8	18.6	16.0	

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	
<b>DEC 07</b>	***	2640	970	1540	640	1215	877	651	
<b>JAN 08</b>	***	2705	1060	1602	687	1248	902	691	
<b>FEB 08</b>	***	2630	1070	1587	675	1245	906	693	

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)

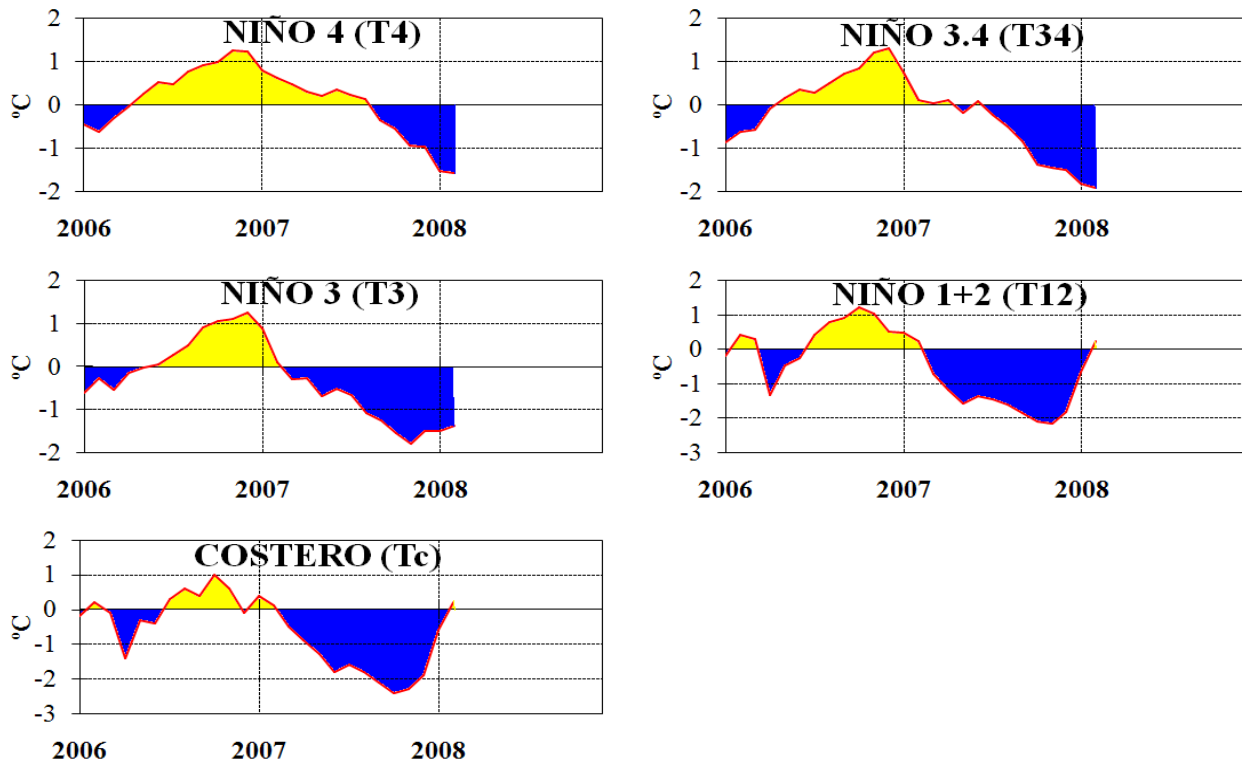
PENTADS	Sea Surface Temperature (SST)			Mean Sea Level (MSL)		
	BALTRA	TALARA	CALLAO	BALTRA	LLS (INOCAR)	CALLAO
<b>ENE</b> 02	***	19.8	13.4	***	266.2	97.3
07	***	18.4	13.7	***	269.4	99.9
12	***	20.3	14.9	***	277.0	105.6
17	***	22.0	16.3	***	269.9	112.6
22	***	21.8	15.0	***	271.4	112.4
27	***	23.6	16.3	***	269.8	109.1
<b>FEB</b> 02	***	25.4	15.6	***	261.7	104.1
07	***	24.5	15.6	***	260.2	103.2
12	***	22.1	15.6	***	261.6	103.7
17	***	21.7	16.3	***	266.2	106.0
22	***	24.0	16.4	***	***	111.8
27	***	25.6	17.8	***	268.8	***

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

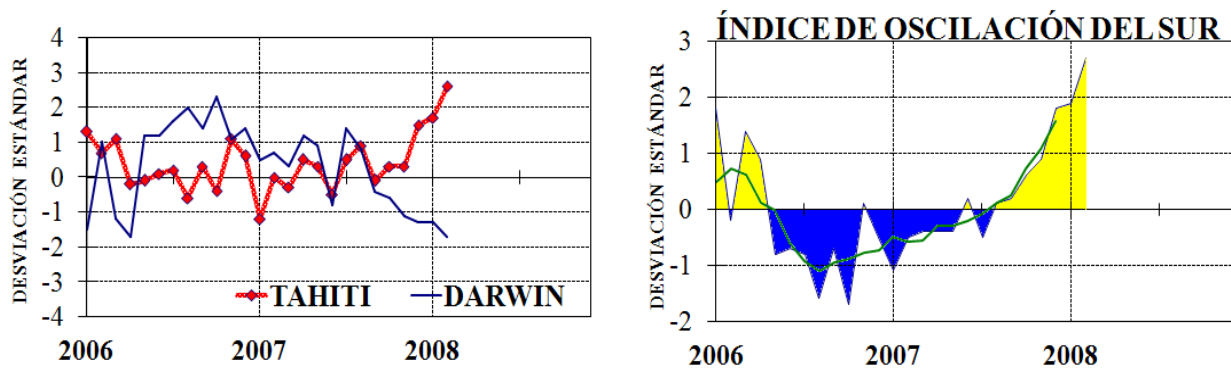
Note.

\* Values revised

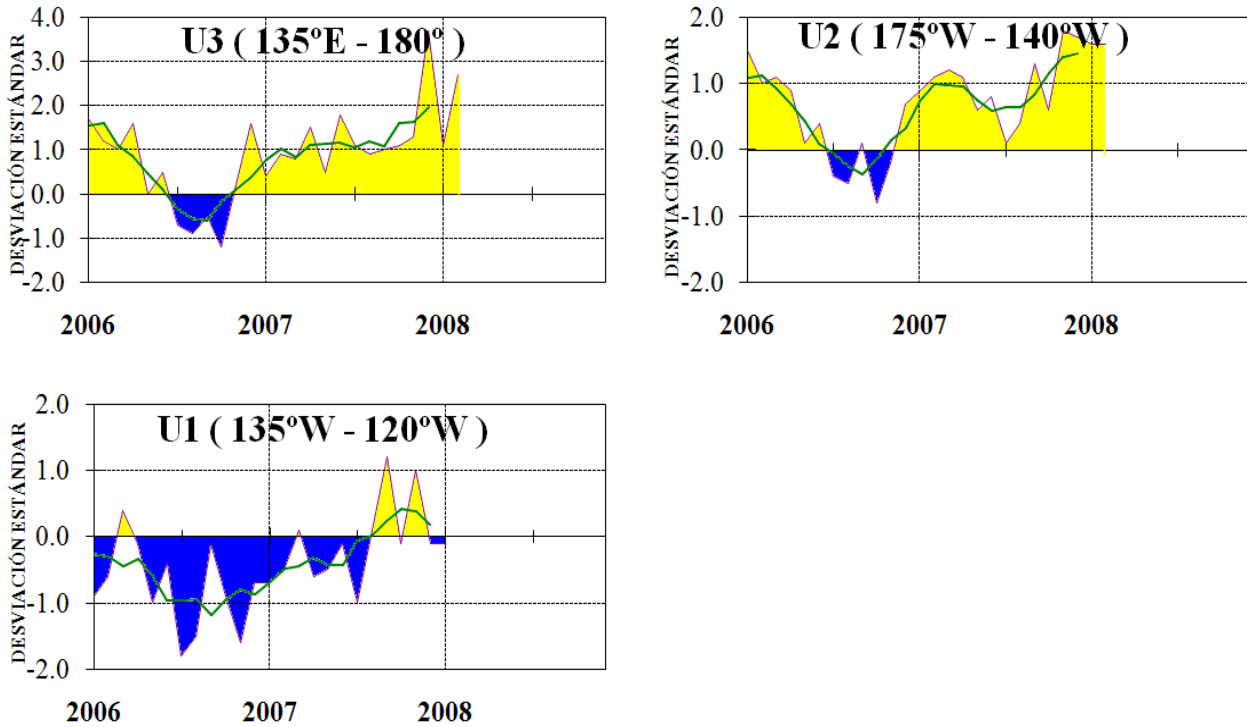
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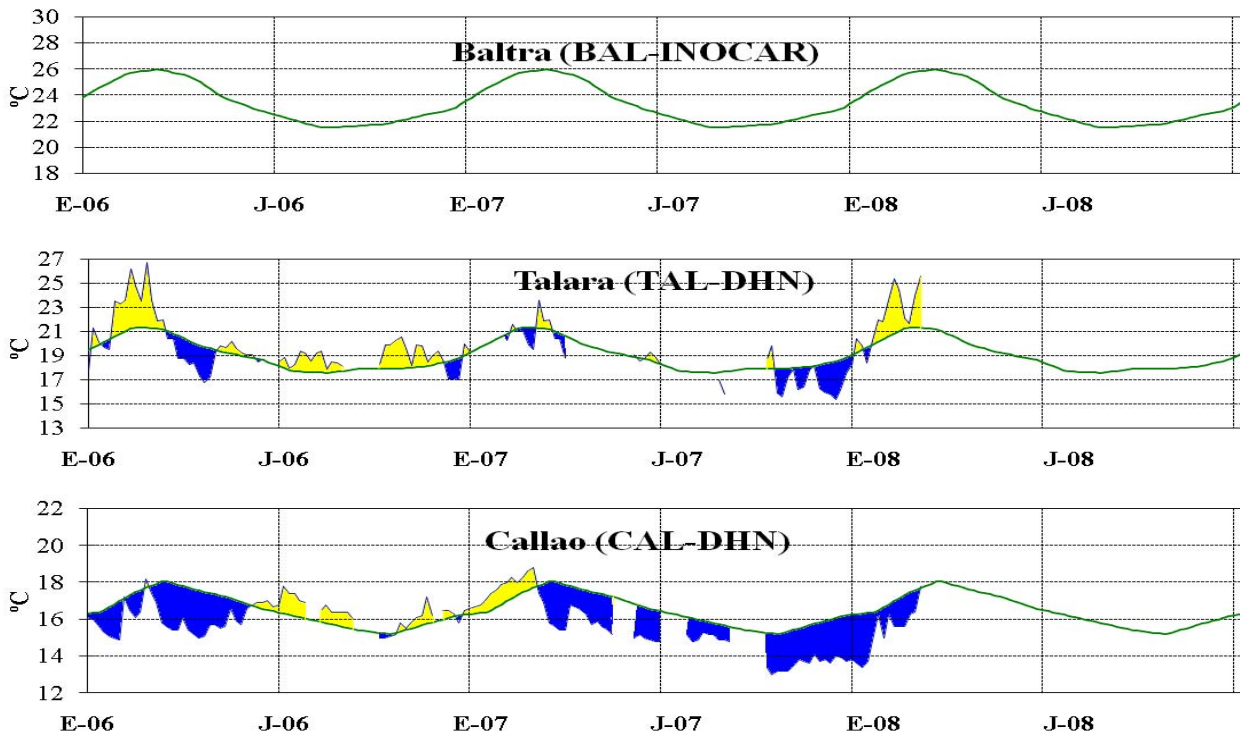
**Figure 3.-** Oceanic anomalies indices (Niño 4, Niño 3.4, Niño 3, Niño 1+2 and Tc). The location of the oceanic indices appears in figure 2. (Source: NCEP/NWS/NOAA/USA).



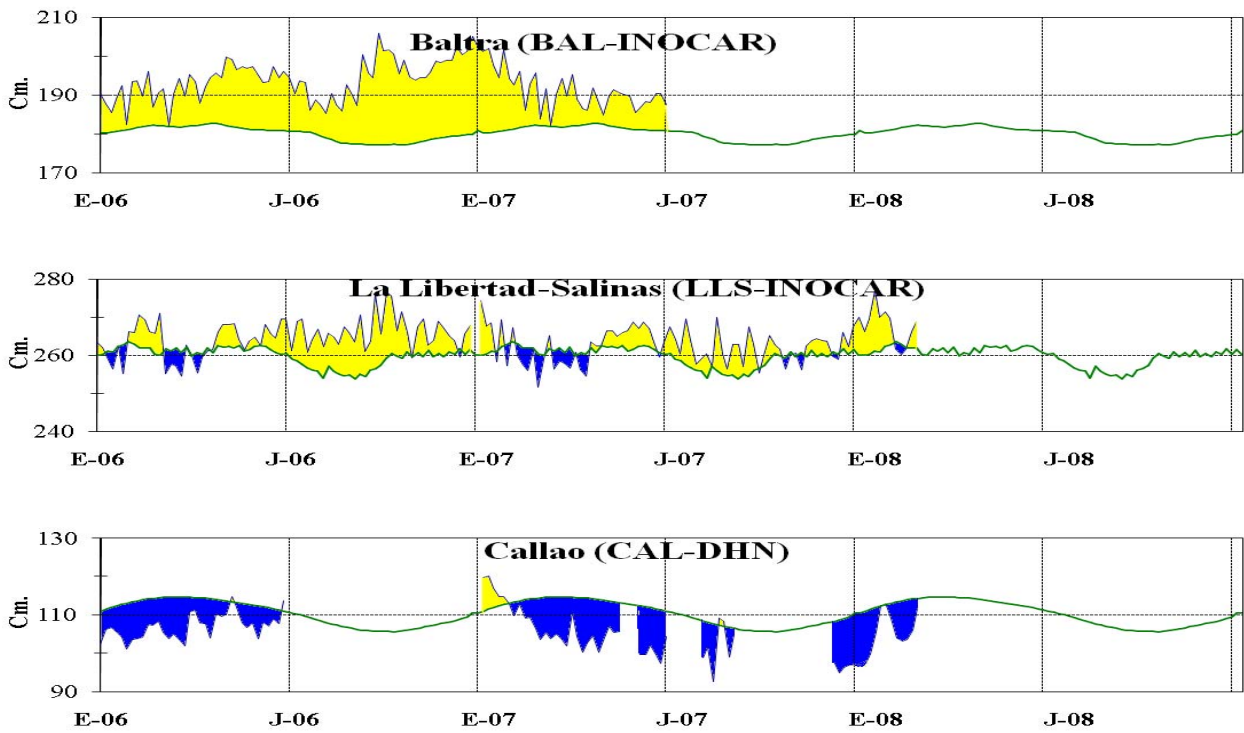
**Figure 4.-** Left Panel: Five-months running mean for atmospheric pressure anomalies in Tahiti and Darwin (mb). Right Panel: Southern Oscillation Index. (SOI) with monthly values and five-months running mean graphed as a green line. The SOI is based on the difference between standardized pressure values: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



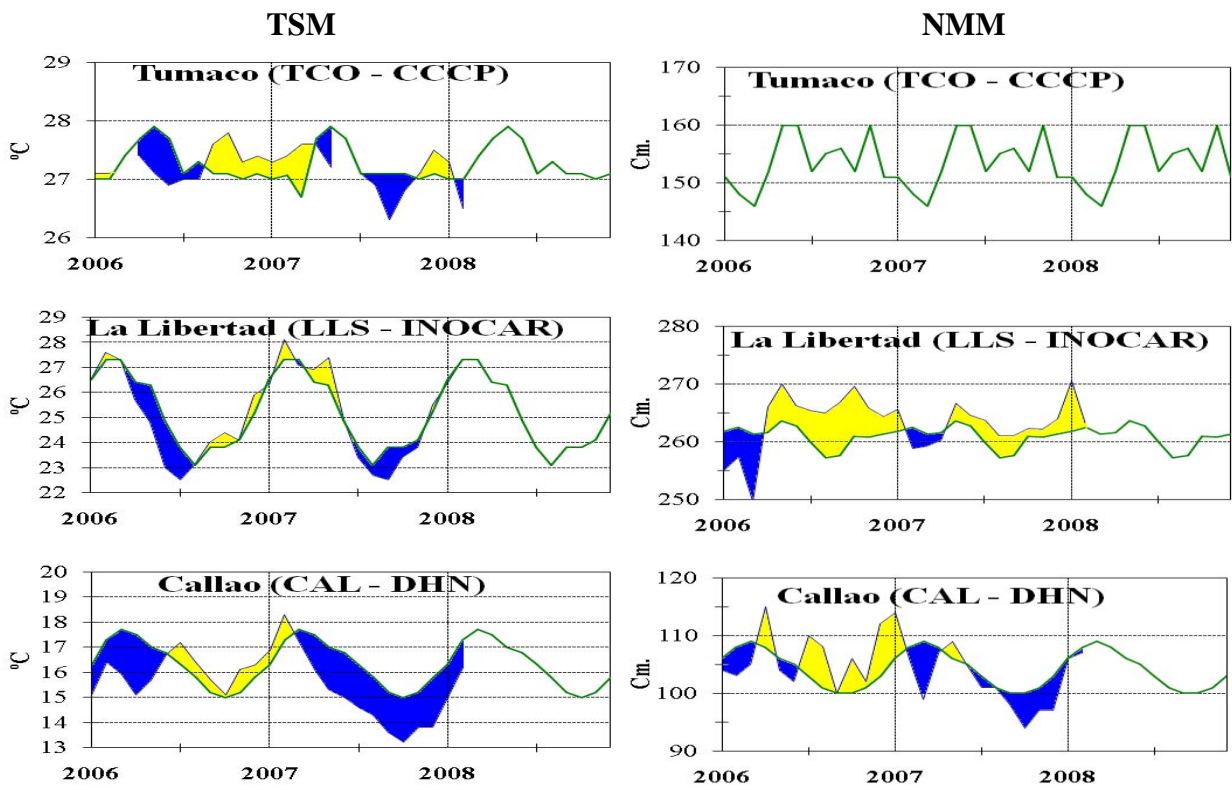
**Figure 5.-** Series and moving averages of five months of zonal wind standardized anomalies (m/s) averaged between 5°N and 5°S for three Equatorial zones: western (U3), central (U2) and eastern (U1). (Source: NCEP/NWS/NOAA/USA).



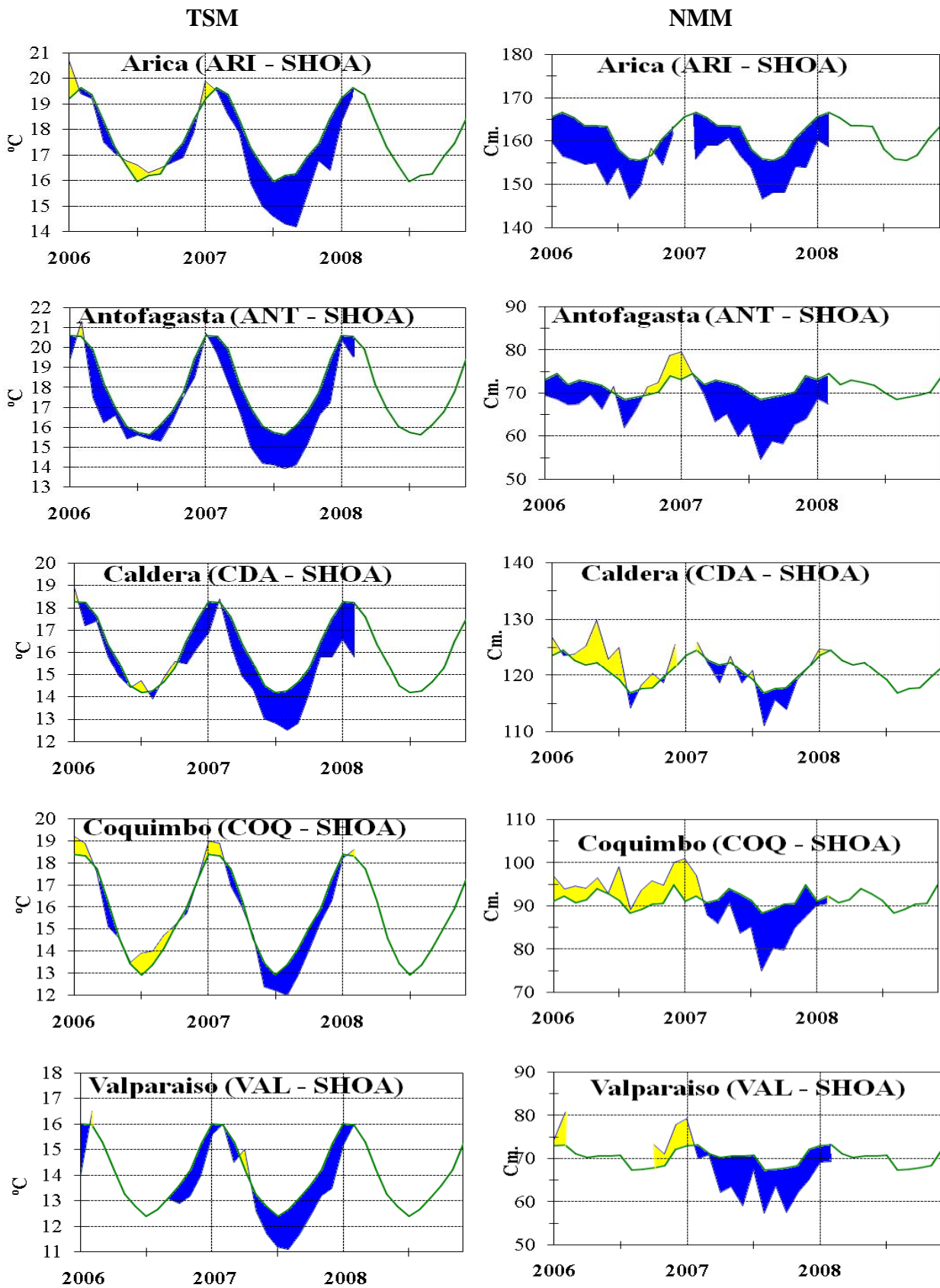
**Figure 6.-** Five day averages (pentads) of SST (°C) in Ports of Peru and Ecuador. The green curve indicates climatology. The location of oceanic indices appears in figure 1. (Source: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami.)



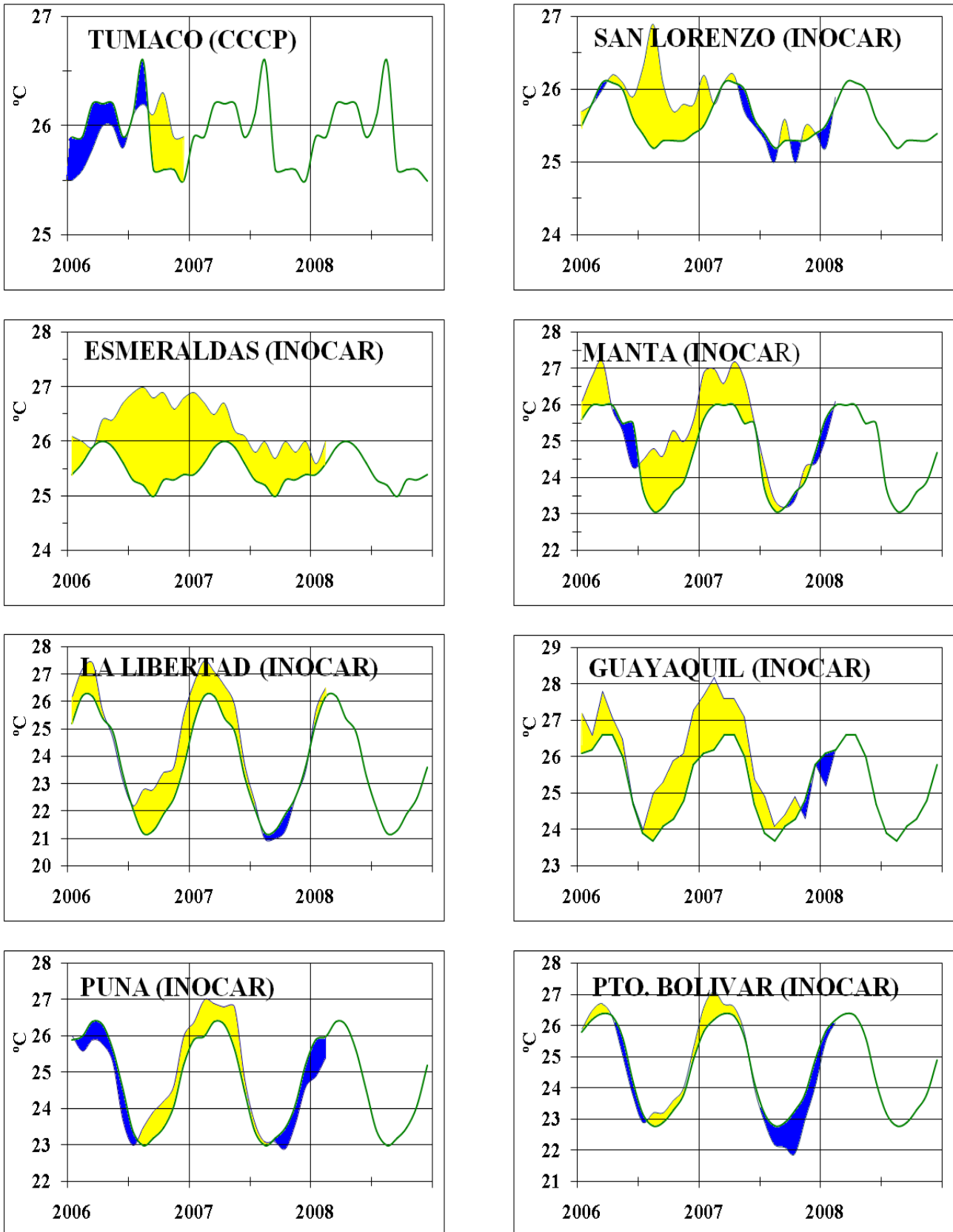
**Figure 7.-** Five-day running mean (pentads) of MSL (cm) in Ports of Peru and Ecuador. The green curve indicates climatology. The location of oceanic indices appears in figure 1. (Sources: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami, e INOCAR).



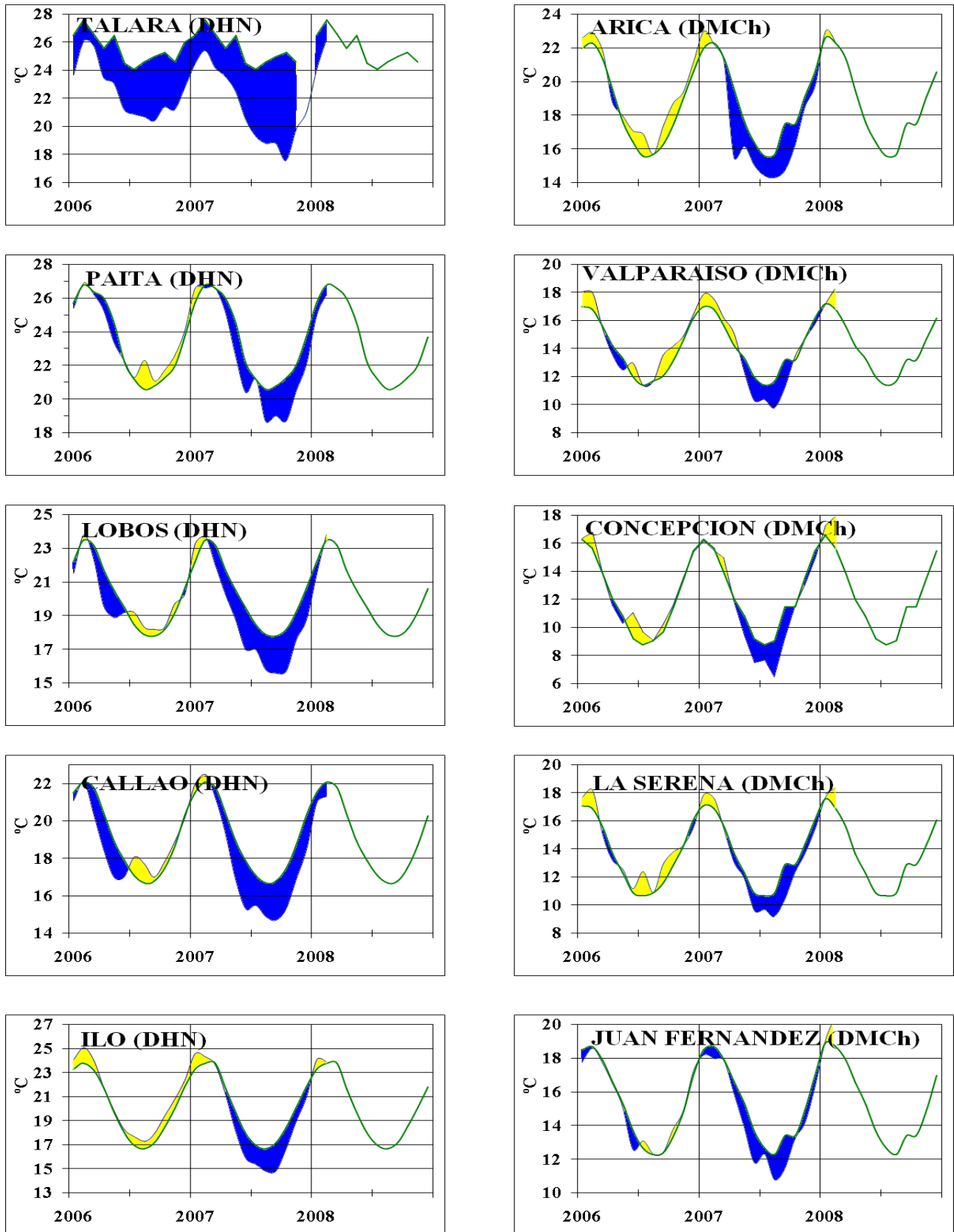
**Figure 8a.-** Monthly means of the SST (°C) and MSL (cm) in five stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Sources: CCCP, INOCAR y DHN).



**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 & 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 & DMCh).

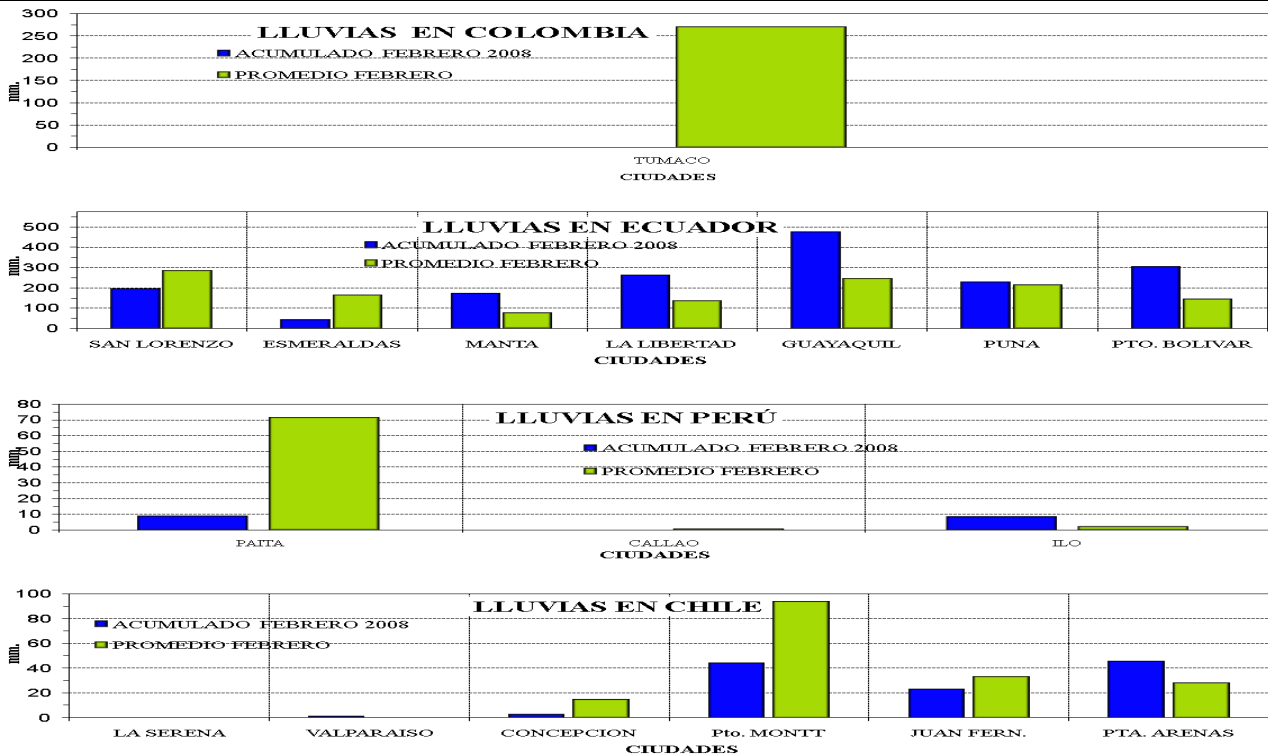
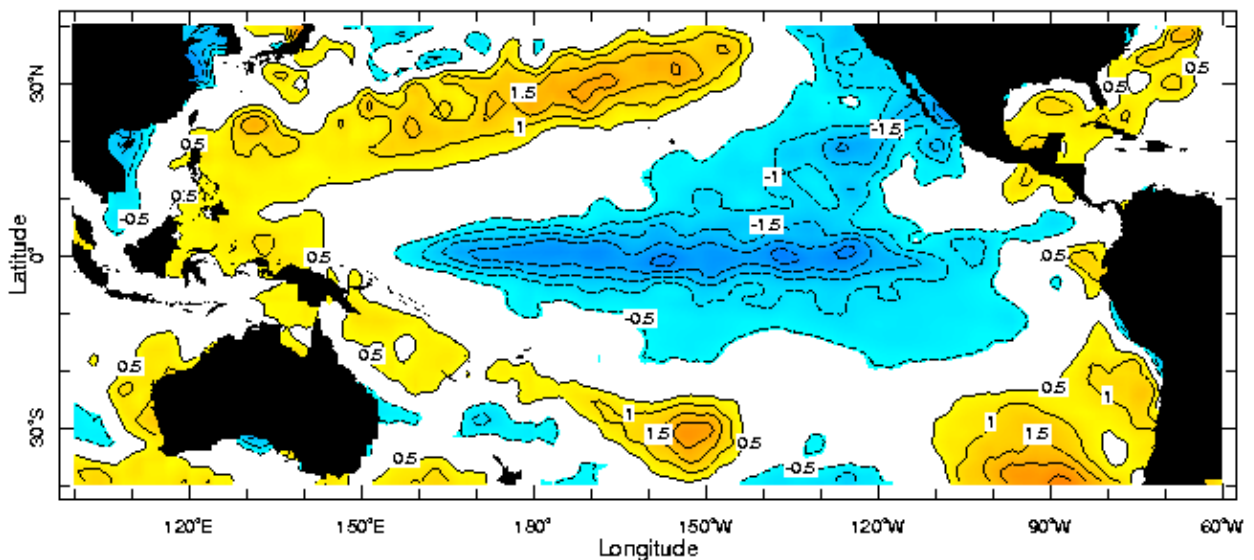


Figure 10.- Rains during February in the coastal stations of Colombia, Ecuador, Peru and Chile. Location of the stations appears in Figure 1. (Sources: CCCP, INOCAR, DHN & DMCh).

## Anomalia de la Temperatura Superficial del Mar (°C) Febrero de 2008



Feb 2008

Figure 11.- Sea Surface Temperature Anomalies (°C) February 2008.

(Source: International Research Institute for Climate and Society)

**EDITED IN THE OCEANOGRAPHIC INSTITUTE OF THE NAVY OF ECUADOR**

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