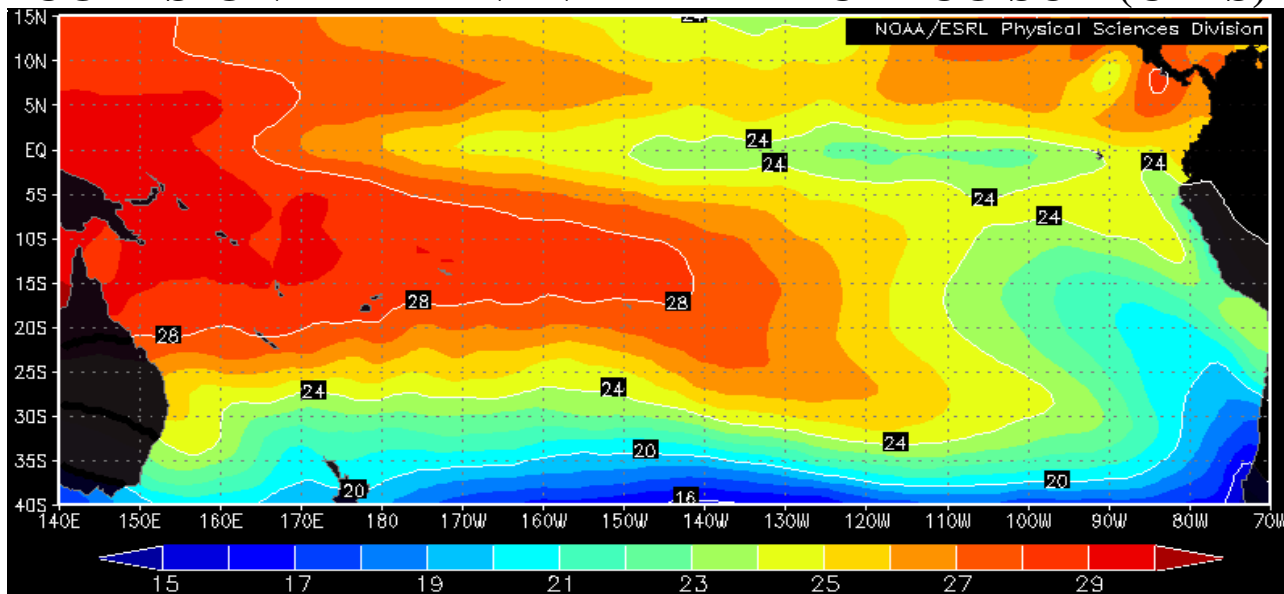


# COMISIÓN PERMANENTE DEL PACÍFICO SUR (CPPS)



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

JANUARY 2008

BAC N° 208

## *ERFEN*

(Estudio Regional del Fenómeno El Niño)

# BOLETÍN DE ALERTA CLIMÁTICO *CLIMATE ALERT BULLETIN*



OMM



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COLOMBIA  
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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

In January the cold event “La Niña” initiated its retirement of waters of the Southeastern Pacific, reducing the negative anomalies of the temperature of the sea, and towards month ends it even got to present slight positive anomalies; nevertheless in the Region of the Central Pacific the negative anomalies of the temperature of the sea stayed.

During the last week of January the temperature of the sea presented anomalies of -1,6°C in the Western Pacific, -1,7°C for the Central Pacific and -0,1°C in the Eastern Pacific, continuing with the tendency to the reduction of the negative anomalies observed the previous month and that during the last week of January seems to have generalized 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, one stayed in the region of the Southeastern Pacific the predominance of winds of the south and Southeastern with speeds slightly superior to the normal rank for the date.

The Index of Oscillation of the South, by sixth consecutive month presents positive values being in this occasion of 1,9. During January the Mean Sea Level in the Southeastern Pacific fluctuated thus near its normal patterns, as opposed to the coasts of Ecuador was 8.6 cm on the average; in Peru the values of the anomalies fluctuated between 0,0 cm (Paita, Chimbote and Callao) and -3,0 cm (Talara, Pisco and San Juan); in Chile the level of the sea maintained negative anomalies in all the stations of monitoreo, fluctuating between the -2,8 and -9,6 cm, the greater anomalies were registered in the stations of Valparaiso and Talcahuano, with values of -6,9 and -9,6 cm. respectively.

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 the Sea Surface Temperature will be located slightly on the normal one; whereas in the central Pacific the negative anomalies will stay, maintaining the tendency to reduce the negative anomalies.

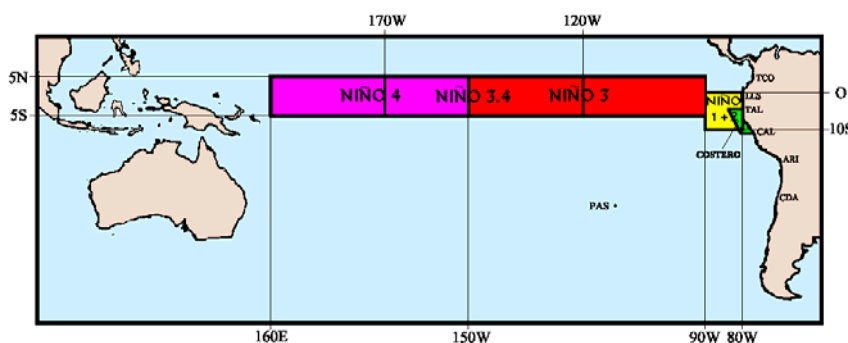


Figure 2.- Map indicating locations and codes of series. Rectangles show the average area of Sea Surface Temperature (SST °C)

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**CLIMATE ALERT BULLETIN**  
**BAC Nº 208, JANUARY 2008****I. GLOBAL AND REGIONAL IMAGE**

In January the Equatorial Pacific Ocean continued exhibiting Sea Surface Temperature (SST-TSM) below its climatologic value; although the anomaly in the region of the Southeastern Pacific was of hardly  $-0,1^{\circ}\text{C}$ . In the regions "El Niño" the monthly anomaly of the SST (TSM) continued negative, whose values for January with respect to the previous month in the region of the Western Pacific (El Niño 4 Region) were increased of  $-0,97^{\circ}\text{C}$  to  $-1,5^{\circ}\text{C}$ , in the Central Pacific (El Niño 3.4 Region) the anomaly happened of  $-1,5^{\circ}\text{C}$  to  $-1,8^{\circ}\text{C}$ , whereas in the region of the Eastern Pacific (El Niño 1+2 Region) a remarkable reduction of the anomalies appears, happening of  $-1,8^{\circ}\text{C}$  to  $-0,7^{\circ}\text{C}$ .

At subsuperficial level, the behaviour of the thermal structure during January in the Eastern Equatorial Pacific maintains the presence of negative anomalies whose nucleus presents values of  $-3,0^{\circ}\text{C}$  that is located around the level of the 60 meters between  $90^{\circ}\text{W}$  and  $160^{\circ}\text{W}$ . Towards the west of the line of date, to 160 meters depth the nucleus stays with positive anomalies of until  $5,0^{\circ}\text{C}$ , presenting a slight increase in the size of this nucleus with respect to the previous month.

In January the Mean Sea Level in the Southeastern Pacific fluctuated below its normal patterns with exception as opposed to the coasts of Ecuador where it was 8,6 cm on the average; in Peru the values of the anomalies diminished in average 5.0 cm with respect to the previous month and fluctuated between 0.0 cm (Paíta, Chimbote and Callao) and  $-3,0$  cm (Talara, Pisco and San Juan); in Chile the level of the sea maintained a behaviour similar to the observed in the preceding months, with negative anomalies in all the stations of monitoreo, fluctuating between the  $-2,8$  and  $-9,6$  cm, the greater anomalies were registered in the stations of Valparaíso and Talcahuano, with values of  $-6,9$  and  $-9,6$  cm. respectively.

The Index of Oscillation of South (IOS) by sixth consecutive month stayed in the positive phase with a value of 1,9.

The Intertropical Convergence Zone (ITCZ) in the Eastern sector of the Pacific appeared around  $5^{\circ}\text{N}$ , towards the last days of the month the location of the ITCZ moved towards the south being located around  $2^{\circ}\text{N}$ .

As soon as rains in the coasts of Ecuador appeared with surplus reaching in average an excess of the 115% on the climatologic value of the month; in Peru the stations of Talara, Callao and Mollendo registered rains by intermittent drizzles; in Chile the south and austral regions of the country the precipitation was characterized to be below the average of the month, being Temuco ( $38^{\circ}\text{S}$ ) and Puerto Montt ( $42^{\circ}\text{S}$ ), the cities with greater deficit with 32 and 51 mm respectively.

With respect to surface winds, they predominated of the South and the Southeastern with positive anomalies that fluctuated between 0.2 to 4.0 m/s.

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## II. NATIONAL IMAGE

### A. CONDITIONS IN THE COLOMBIAN COAST

The Center for the Pollution Control of the Pacific (CCCCP) and the Hydrology, Meteorology and Environmental Studies Institute (IDEAM) inform that from beginnings of the month the low volumes of rain characterized the regions Caribbean and Orinoquía, settling down the dry season; first of them in individual, it was influenced by systems of high pressure of the North Atlantic, whereas in “Llanos Orientales” the fortification of tradewinds of the northeast they were definitive to increase the dry air in this part of the country. On the other hand, although in good part of the Andean departments excessive amounts of rain appeared, in the zones central and North of the region the conditions were very variable with intervals of 4 and 5 days dry, alternated with two or three days rainy (situation that generated the excesses referred) because the Intertropical Convergence Zone of unusual way was located between 4 and 6 degrees of North latitude; only towards end of the month the ITCZ moved more to the South in neighbourhoods of 2°N, situation that generated quite strong rains in the south of the Andean region and a greater atmospheric stability in areas of the north and centre, where by own condition of the time predominated the dry time. The Colombian Amazonia registered rains during almost all the month due to the high humidity originating from the north of Brazil.

During the monitoreo of January of 2008 made by the Area of Operational Oceanography of the CCCCP, the fixed station coastal N° 5 located to 10 miles of the cove of Tumaco between the coordinates 78.51°W and 2°N, it is possible to be observed that the registry of Sea Surface Temperature for January was of 27,32°C presents a positive anomaly at superficial level of 0,26°C, with respect to the historical average (July 1999 - January 2008) which is of 27,06°C.

In January, the termoclina promoted 10 meters with respect to the last registry of the month of December, positioning itself on the 50 meters. The isotherm of 15°C does not become visible for this month, the isotherm of 27°C ascends until the 30 meters, approximately 19 meters with respect to the previous month, throwing to this depth a positive anomaly of 3,08°C. The positive anomaly descends around 5, 11°C, the anomaly has diminished remarkably, which denotes a gradual stabilization in the conditions of temperature of the superficial and subsuperficial layers.

As far as the behaviour of the salinity, it registered at superficial level a value of 30, 91. A negative anomaly of 0, 44 at superficial level appear, with respect to the historical average that is of 31,36ups.

The maximum value of salinity of the month was of 35, 02 and it was registered approximately to a depth of 129 meters. The haloclina was positioned approximately on the 50 meters. The isohaline of 34 and 35 was registered respectively to the 50 and 125 meters.

### B. CONDITIONS IN THE ECUADORIAN COAST

The Oceanographic Institute of the Navy of Ecuador (INOCAR) reports that during January of 2008 the originating wind presence of the south occurred and towards month ends occasionally winds of the north appeared. The temperature of the air throughout the Ecuadorian coast fluctuated between 25°C and 25.7°C giving to anomalies between -0, 1°C and -0, 8°C. As far as the Sea Surface Temperature in average it presented value of 26, 1°C. It was a negative anomaly of -4, 4°C.

In January, the Ecuadorian Coast experienced the greater number of days with rain of variable intensity, that produced in average a surplus of up to 240%, being the area of the Gulf of Guayaquil

the one that experiment the greater surplus as a result of the originating humidity contribution of the north and southwestern with the presence of layer cloudiness in low and average levels.

Considering the present behaviour of the conditions ocean-atmospheric and that is one of the rainiest months of the year, one hopes for February of 2008 that in the Ecuadorian coast, the precipitations (rains and drizzles), appear around their normal values, whereas in the Galápagos Islands the precipitations would continue deficit.

### **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 north zone the most significant changes with presence of positive anomalies have appeared, whereas in the rest of the coast still they continue the negative anomalies. The anomalies of the SST fluctuated entre +1, 2° C (Talara) and -2, 8° C (Chimbote).

The Mean Sea Level throughout the Peruvian coast continued presenting negative anomalies; nevertheless, these values oscillated closely together to their normal patterns of the month. The values of the anomalies diminished in average 5, 0 cm with respect to the previous month and fluctuated between 0, 0 cm (Paita, Chimbote and Callao) and -3, 0 cm (Talara, Pisco and San Juan).

The air temperature also stayed by underneath monthly average, with exception of Ilo, that presented a positive anomaly (0, 8°C). The negative anomalies fluctuated between -0, 3°C (San Juan) and -0, 8°C (Chimbote) respectively.

Single in the stations of Talara, Callao and Mollendo plans by intermittent drizzles were registered during the month.

Throughout the Peruvian coast winds of South direction predominated; with the exception of the stations of Lobos de Afuera and Mollendo in which winds of the Southeastern appeared. In relation to the wind speed, the positive anomalies predominated that fluctuated between 0, 2 to 3, 5 m/s; with the exception of Paita and Callao that presented anomalies of -1, 7 and -0, 3 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 monitoreo 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 January of 2008 is:

With respect to the TSM, although one slight tendency is observed to increase in the monthly averages of this variable, the negative anomalies stay like the happened thing in previous months, with values that fluctuate between the -0,1 and -1,8°C, being Arica the station that presented the greater negative anomaly (-1, 8°C).

The level of the sea maintained behaviour similar to the observed one in the preceding months, with negative anomalies in all the stations of monitoreo. These negative anomalies are considered within the normal ranks for time since they fluctuate between the -2, 8 and -9, 6 cm. The greater differences were registered in the stations of Valparaiso and Talcahuano, with values of -6, 9 and -9, 6 cm respectively.

The Meteorological Direction of Chile (DMCh) shows that during January the average temperature of the air was characterized by the presence of positive anomalies to a large extent of the country, being the central, south and austral regions which presented the greater anomalies with values between 1, 5 and 2, 5°C.

The Maxima temperature of the air, unlike the previous month, presented in most of the country positive anomalies, concentrating the greater values in the south and austral region with values that surpassed the average of the month between 2, 9°C (Temuco) and 3, 5°C (Balmaceda). Single some localities of the coastal region of the north zone (Arica) and centre (La Serena and Valparaiso) of the country presented slight negative anomalies between -0, 4 and -0, 7°C.

The minimum temperature of the air presented positive anomalies to a large extent of the country with the greater positive anomalies in the coastal zone of the north of the country (Iquique) and centre (Curicó) with values between 1, 0 and 3, 0°C.

The dominant circulation in Chile was characterized by the presence anticyclonal circulation that affected the South and austral region mainly of the country, reinforced by the entrance of ridges in height (average troposphere), whose anomalies surpassed between 2 and 3 hPa the monthly average of the pressure at level of the sea. This atmospheric condition favoured the increase of the temperature in surface level and presence of extreme warm episodes of 2 to 3 days of duration and daily positive anomalies of 10, 0 to 15, 0°C by on the daily normal value.

The precipitation was characterized to be below the average of the month in the south and austral regions of the country. Between Chillán (37°S) and Punta Arenas (53°) the rains anomalies were around 20 mm below the climatologic average, being the cities with greater deficit Temuco (38°S) and Puerto Montt(42°S) with 32 and 51 mm respectively.

### **III. PERSPECTIVE**

#### **A. GLOBAL**

Taking into account the present predictions from several numerical models, as well as the behaviour of the main oceanic and atmospheric indicators, is considered that the Equatorial Pacific will continue showing cold conditions of the SST during the next month, although the tendency is towards 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 slightly 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 coasts from Chile to the south of Ecuador.

As far as the MSL this one would also stay fluctuating around its average value with certain tendency to maintain the negative anomalies particularly in front of Chile. With respect to rains, the tendency for the coast of Ecuador is to present a surplus; whereas for the rest of the region the tendency of precipitations is to stay below the normal thing, in special the coast centre-south 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
NOV 07	1.9	11.2	10.7	27.4	25.1	23.2	19.4	17.7	12.2	7.6	0.9
DEC 07	6.1	11.6	10.2	27.4	25.0	23.5	20.8	19.6	12.5	6.0	1.8
JAN 08	2.8	12.5	10.6	26.6	24.7	24.1	23.8	***	1.5	4.9	1.9

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	
NOV 07	27.1	23.8	13.8	16.8	16.6	15.8	15.3	13.2	
DEC 07	27.5	25.5	13.8	16.4	17.2	15.8	16.3	13.5	
JAN 08	27.3	26.4	15.0	18.3	20.4	16.6	18.2	15.2	

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	
NOV 07	***	2622	970	1541	626	1192	850	621	
DEC 07	***	2640	970	1540	640	1215	877	651	
JAN 08	***	2705	1060	1602	687	1248	902	691	

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)

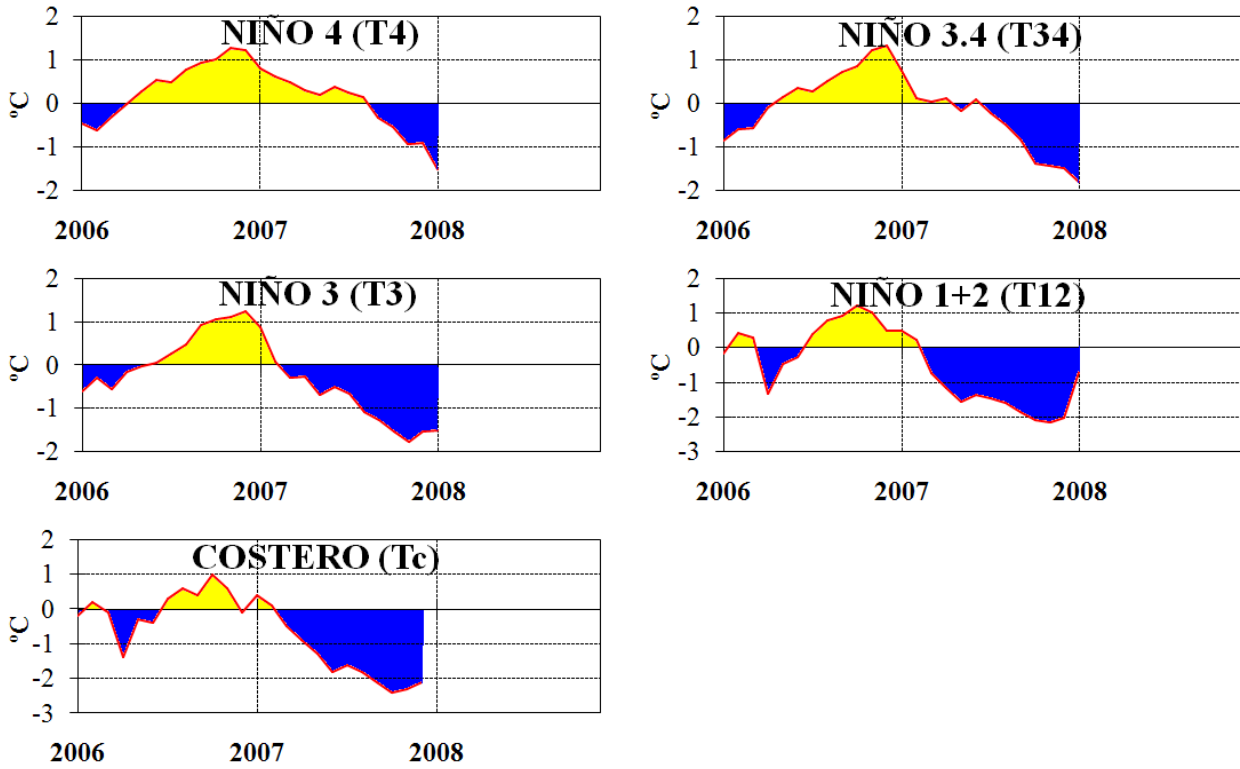
PENTADS	Sea Surface Temperature (SST)			Mean Sea Level (MSL)		
	BALTRA	TALARA	CALLAO	BALTRA	LLS (INOCAR)	CALLAO
DEC 03	***	15.8	13.6	***	259.7	98.1
08	***	15.4	14.0	***	259.0	94.9
13	***	16.2	13.9	***	266.0	96.3
18	***	17.5	13.7	***	262.2	97.0
23	***	18.3	13.8	***	267.4	96.9
28	***	20.4	13.6	***	269.9	** *
JAN 02	***	***	***	***	266.2	***
07	***	***	***	***	269.4	***
12	***	***	***	***	277.0	***
17	***	***	***	***	269.9	***
22	***	***	***	***	271.4	***
27	***	***	***	***	269.8	***

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

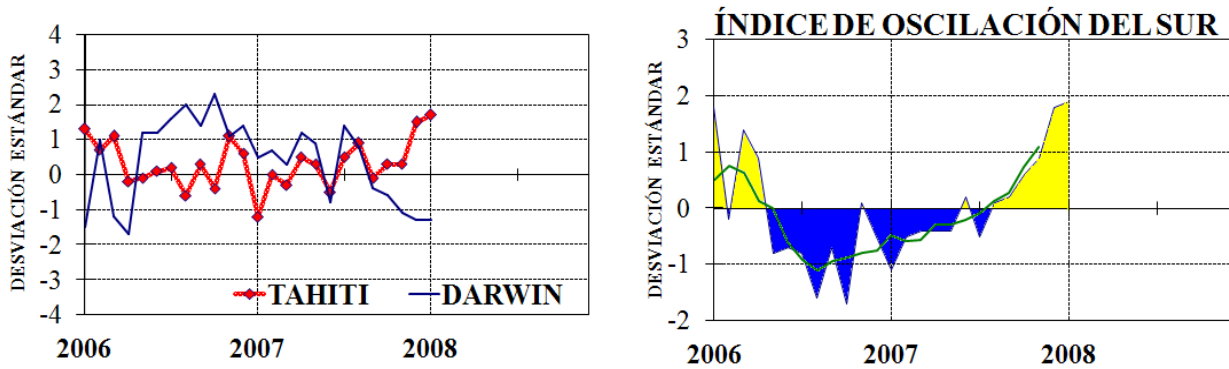
Note.

\* Values revised

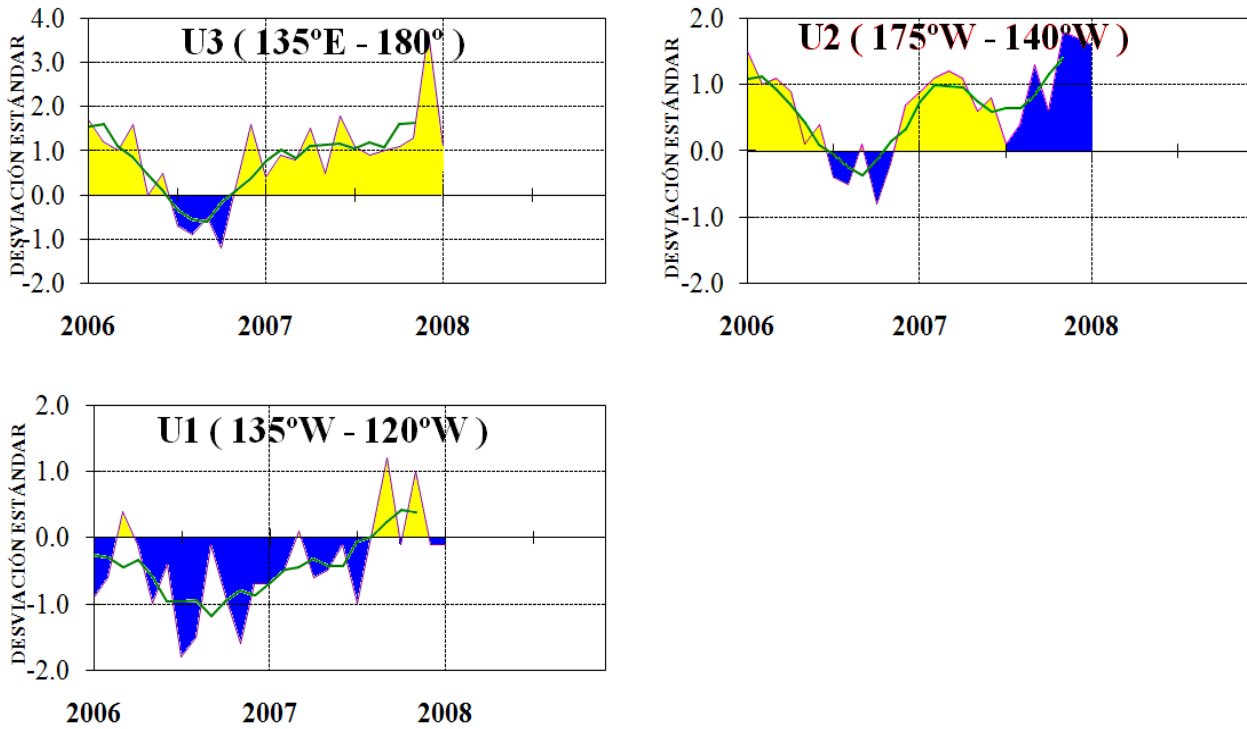
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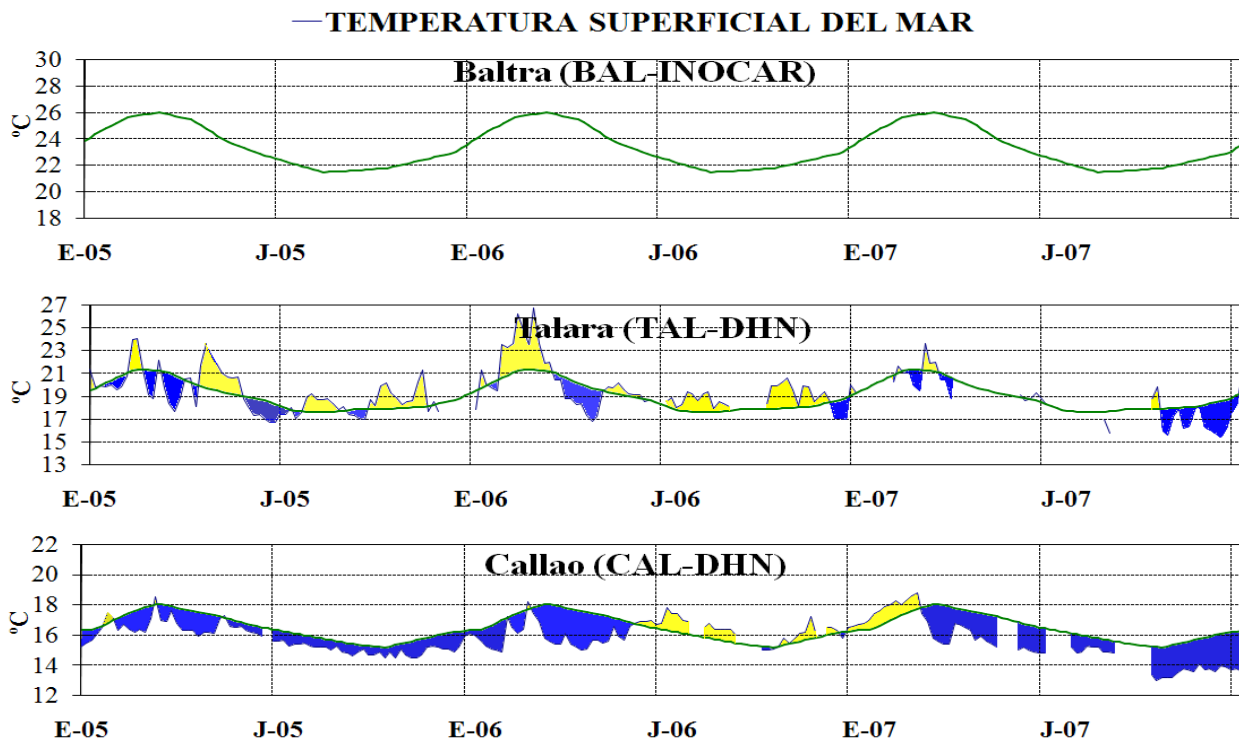
**Figure 3.-** Oceanic anomalies indices (Niño 4, Niño 3.4, Niño 3, Niño 1+2 and Tc). The location of the oceanic indices appears in figure 2. (Source: NCEP/NWS/NOAA/USA).



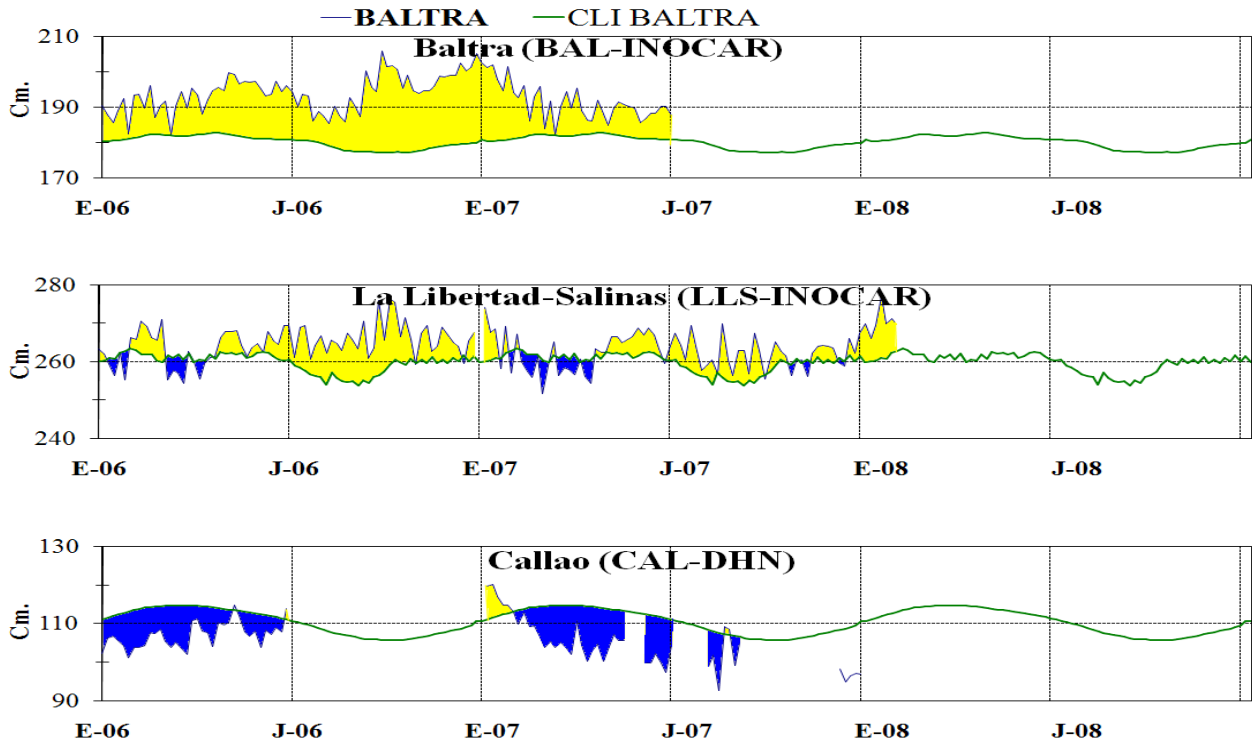
**Figure 4.-** Left Panel: Five-months running mean for atmospheric pressure anomalies in Tahiti and Darwin (mb). Right Panel: Southern Oscillation Index. (SOI) with monthly values and five-months running mean graphed as a green line. The SOI is based on the difference between standardized pressure values: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



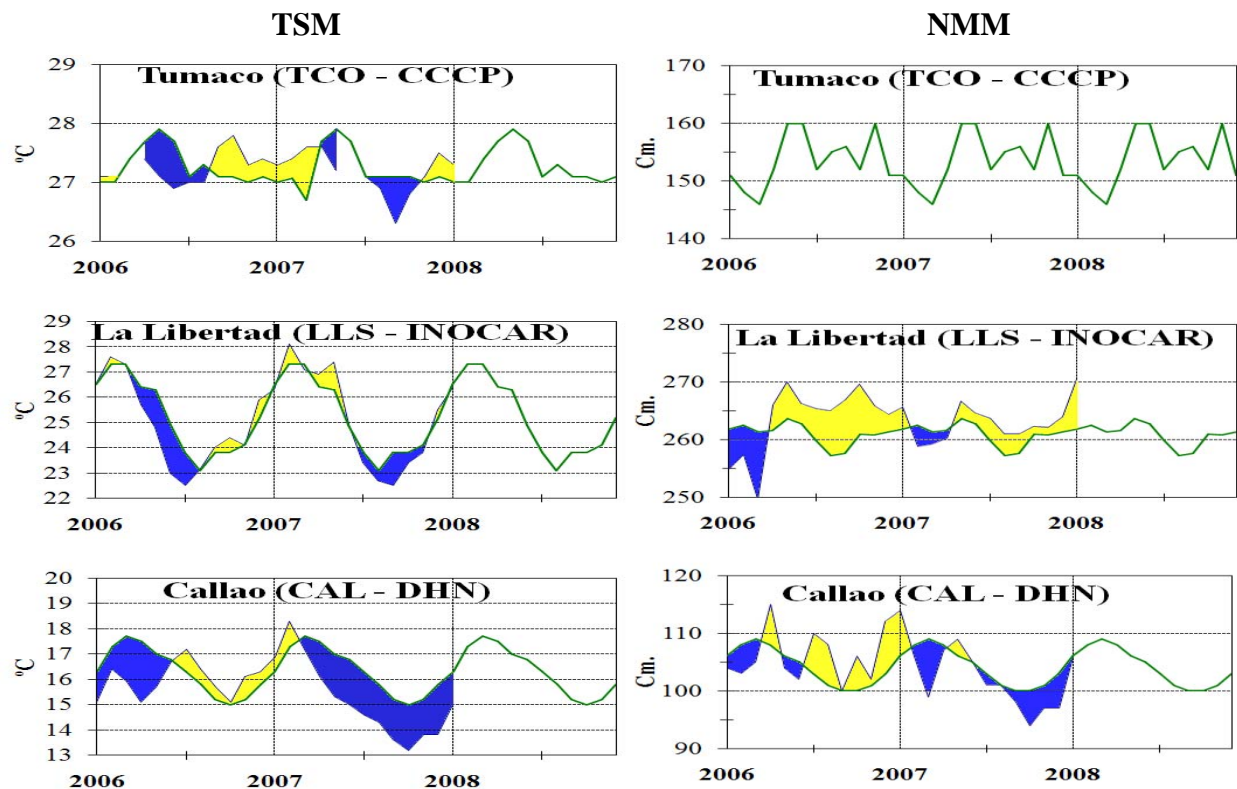
**Figure 5.-** Series and moving averages of five months of zonal wind standardized anomalies (m/s) averaged between 5°N and 5°S for three Equatorial zones: western (U3), central (U2) and eastern (U1). (Source: NCEP/NWS/NOAA/USA).



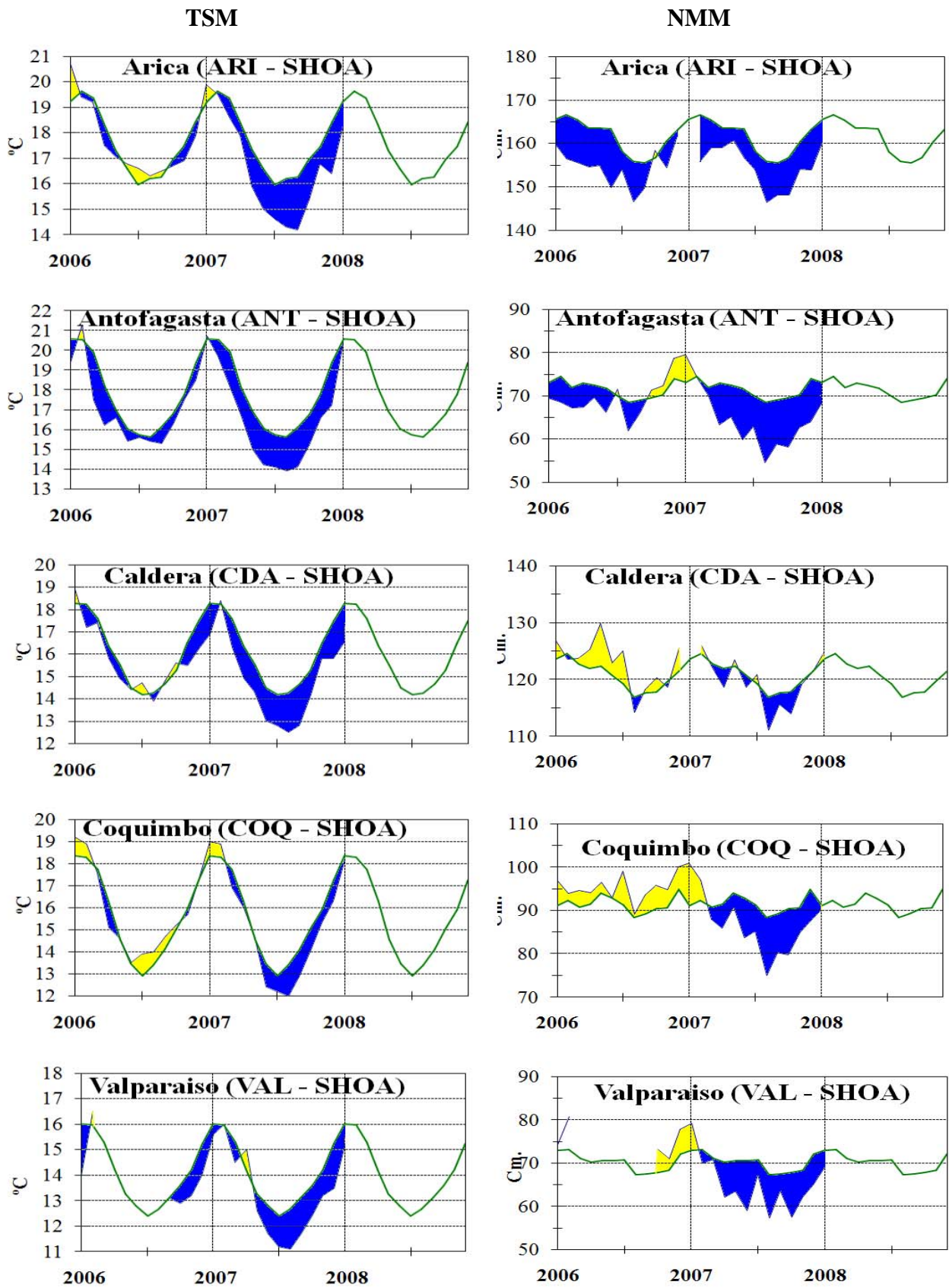
**Figure 6.-** Five day averages (pentads) of SST (°C) in Ports of Peru and Ecuador. The green curve indicates climatology. The location of oceanic indices appears in figure 1. (Source: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami.)



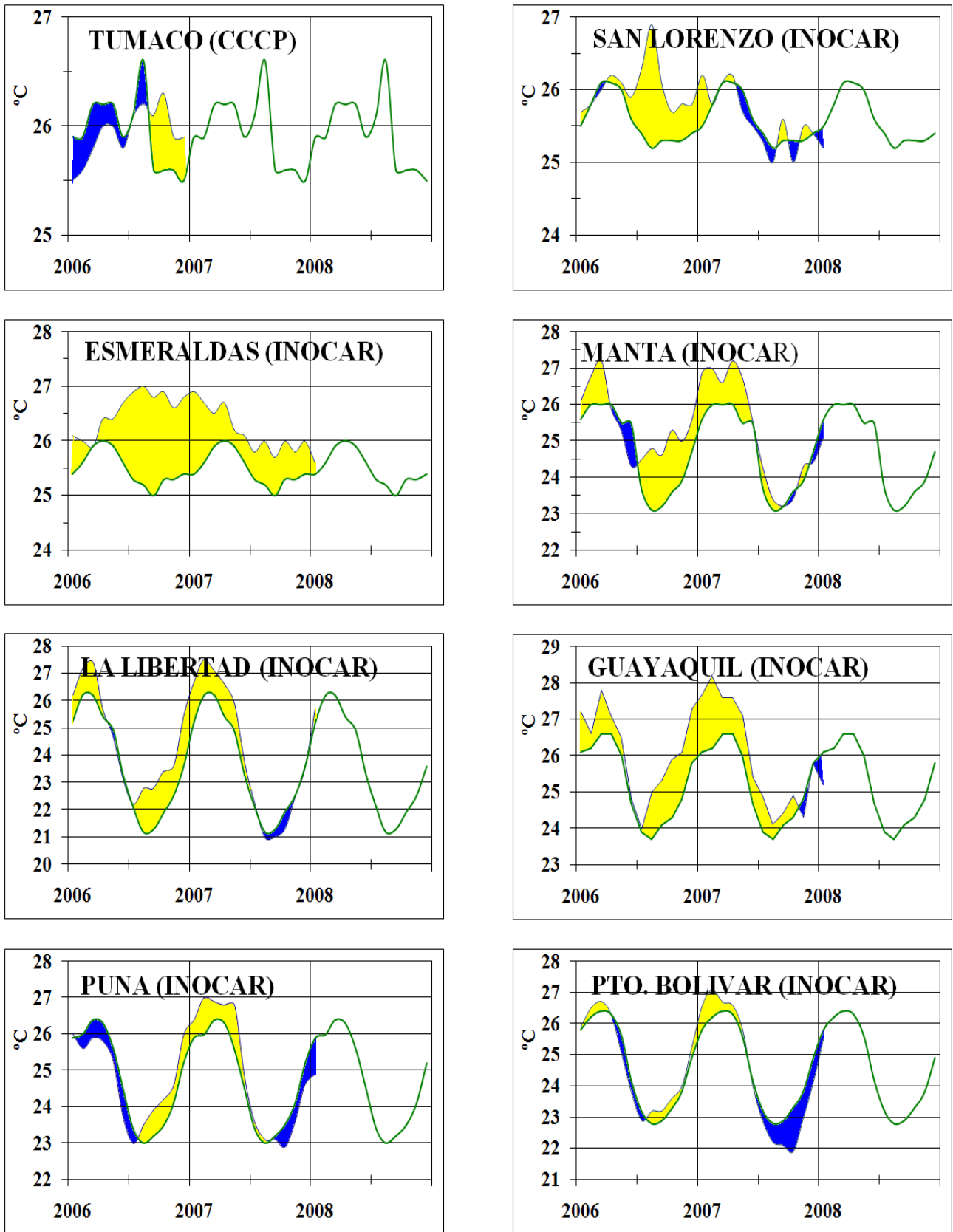
**Figure 7.-** Five-day running mean (pentads) of MSL (cm) in Ports of Peru and Ecuador. The green curve indicates climatology. The location of oceanic indices appears in figure 1. (Sources: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami, e INOCAE).



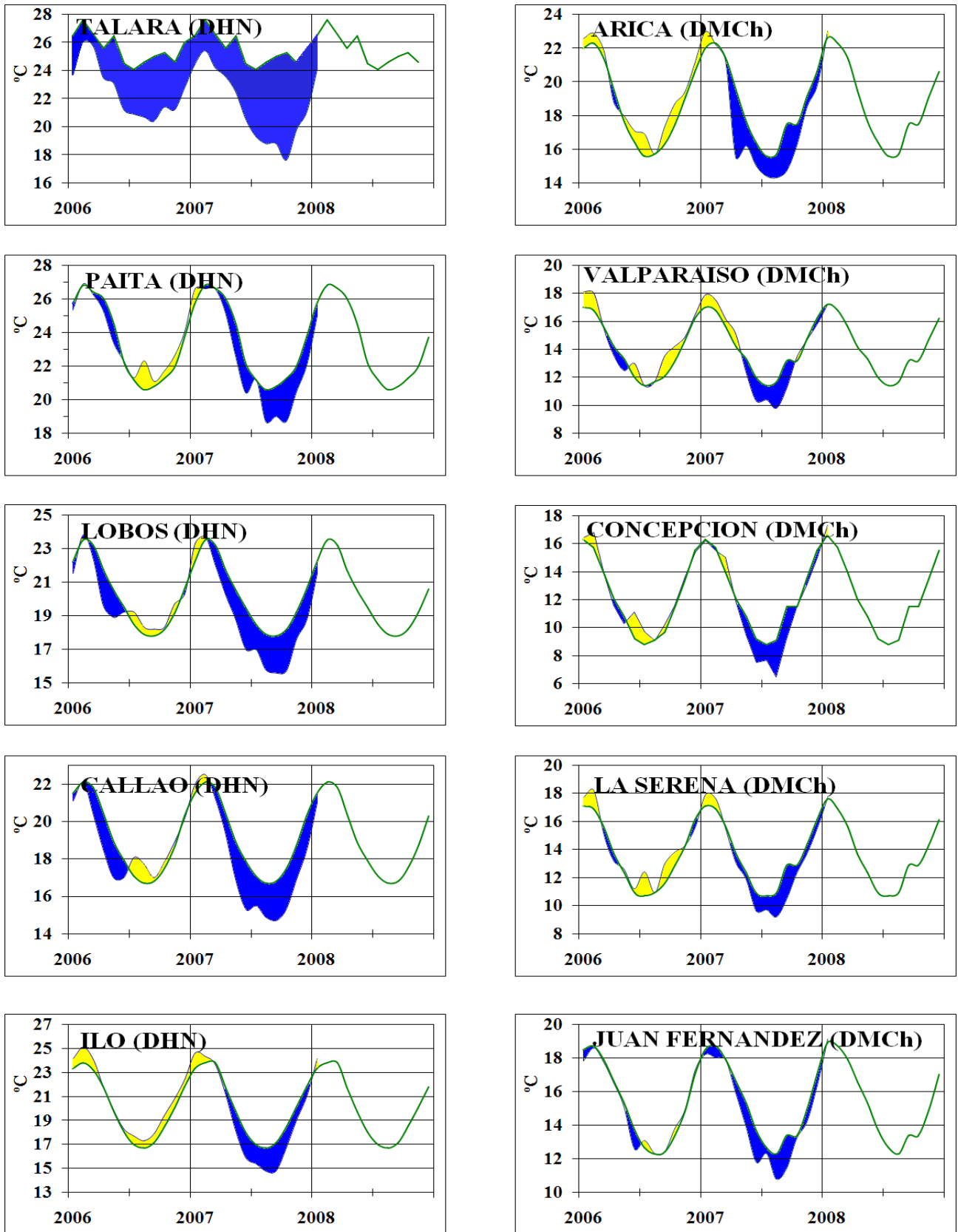
**Figure 8a.-** Monthly means of the SST (°C) and MSL (cm) in five stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Sources: CCCP, INOCAE y DHN).



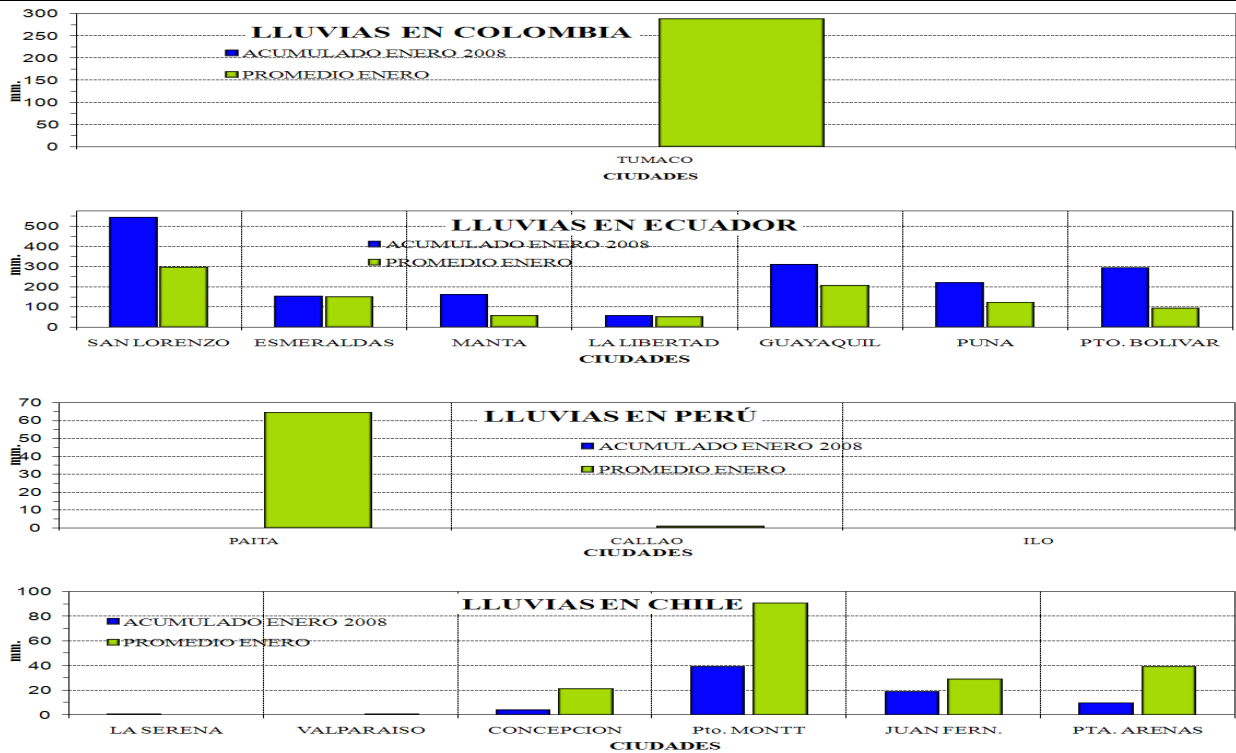
**Figure 8b.-** Monthly means of the SST (°C) and MSL (cm) in five stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Source: SHOA).



**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).

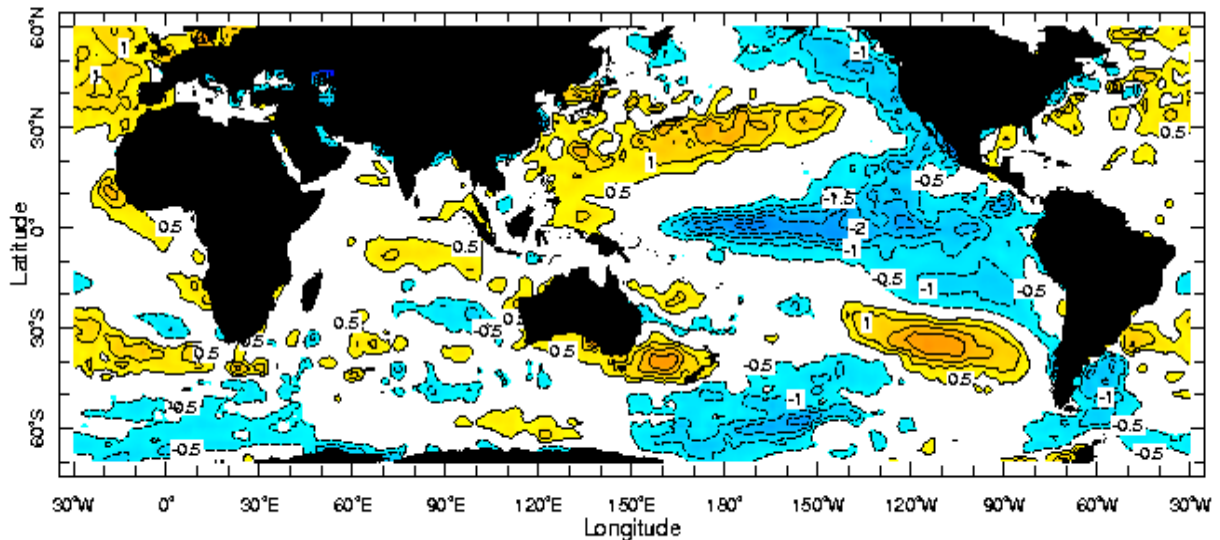


**Figure 9b.-** Monthly means of the AT (°C) in 10 stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Sources: DHN & DMCh).



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

## Anomalía de la Temperatura Superficial del Mar (°C) Enero de 2008



Jan 2008

**Figure 11.-** Sea Surface Temperature Anomalies (°C) January 2008. (Source: International Research Institute for Climate and Society)

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