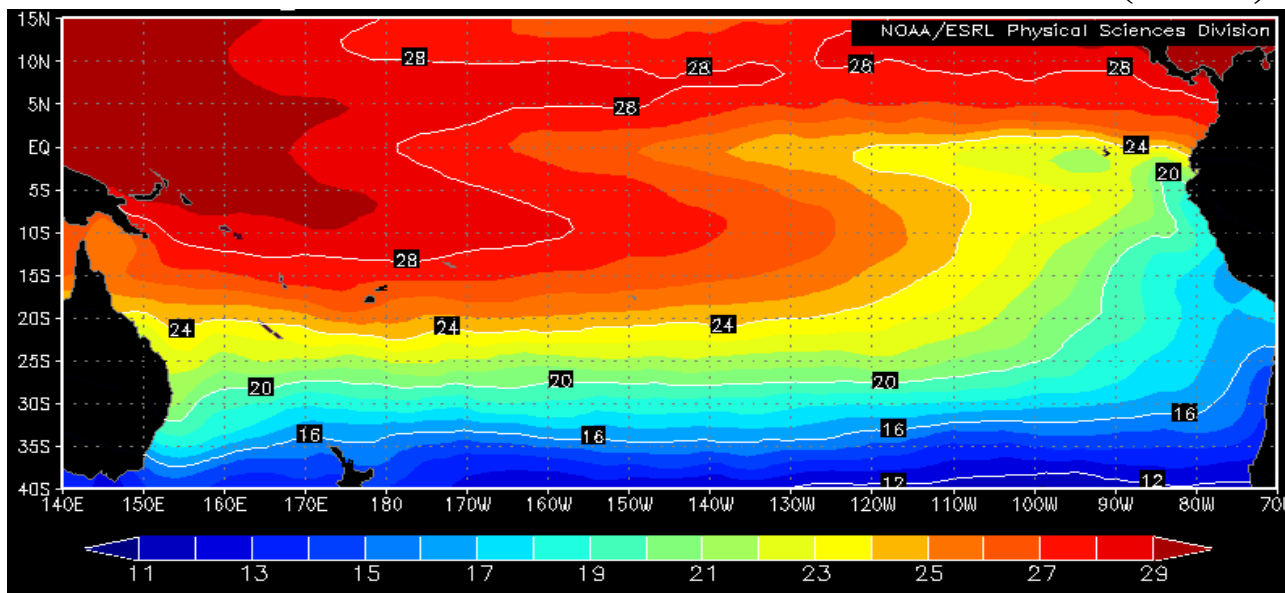


COMISIÓN PERMANENTE DEL PACÍFICO SUR (CPPS)



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

SEPTEMBER 2008

BAC N° 216

ERFEN

(Estudio Regional del Fenómeno El Niño)

BOLETÍN DE ALERTA CLIMÁTICO *CLIMATE ALERT BULLETIN*



OMM



CPPS



COI

COLOMBIA
CCCP

ECUADOR
INOCAR

PERÚ
DHN

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; 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 September, the Equatorial Pacific Ocean continuous with process of reduction of Sea Surface Temperature, presenting in this occasion negative anomalies in almost all “El Niño” regions, except in “El Niño” region 1+2 where in spite of having positive values, a tendency of normalization is observed that passed of 1, 0°C to 0, 6°C.

The anomaly of Sea Surface Temperature during the last week of September in “El Niño” regions presented following values; in the region of Western Pacific (“El Niño” Region 4) it was of -0, 2°C; in the Central Pacific (“El Niño” Region 3, 4) the anomaly was of -0, 5°C and; in the region of Eastern Pacific (“El Niño” Region 1+2), it was of 0, 3°C.

The subsurface thermal structure in the Central Equatorial Pacific showed the presence of a located thermal dipole between 100 and 200 ms of depth; the warm nucleus with anomalies of 3, 0°C located to the west of the line of date; and the cold nucleus, with anomalies of -4, 0°C, located to the east of the line of date. In the Eastern edge of the Pacific, in the superficial layer of 40 ms a small volume of water is located with positive anomalies of 1°C approximately.

The Mean Sea Level in the South eastern Pacific (continuous) during this month presenting tendency to oscillate around its normal patterns; in front of Ecuadorian coasts it presented positive anomalies between 3 and 6 cm; in the Peruvian coast anomalies fluctuated between +4, 0 cm (Lobos de Afuera) and -2, 0 cm (Mollendo), whereas, San Juan presented a behaviour similar to its normal. In front of Chile behaviour of sea level was characterized to present small variations with respect to values registered during August 2008.

The Index of Oscillation of the South continued in the positive phase, increasing its value that in this occasion was of 1, 5. The Intertropical Convergence Zone most of the time stayed more to the north of the normal for the time (between 8 and 10 °N) and with convective activity especially towards the Eastern edge of the Pacific Ocean.

As far as surface winds, in the region of the South eastern Pacific, like in the previous month, they appeared predominantly of the south and south-east; as far as the speeds of the same, generally they appeared fluctuating around or slightly on the average value for the month.

Taking into account present thermal behaviour from the Equatorial Pacific Ocean, as well as results of several models of numerical simulation are anticipated that during next month Sea Surface Temperature in the Eastern sector of the Equatorial Pacific Ocean will continue (slightly) on its normal value and slight cooling in the central and western equatorial Pacific.

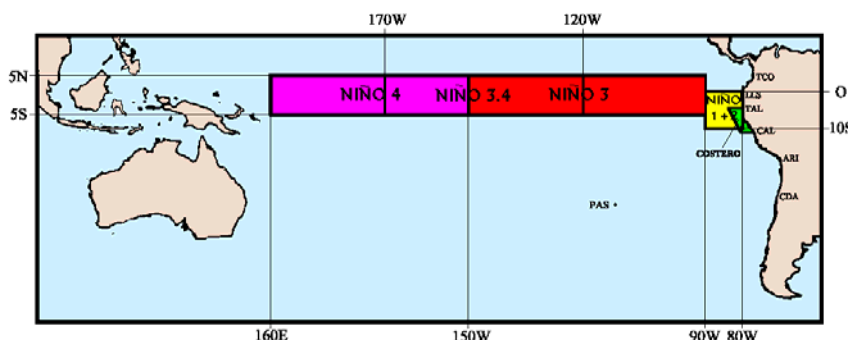


Figure 2.- Map indicating locations and codes of series. Rectangles show the average area of Sea Surface Temperature (SST °C)

INSTITUCIÓN	Dirección electrónica
CCCP - Centro Control de Contaminación del Pacífico (Colombia);	cccp@cccp.org.co
IDEAM - Instituto de Estudios Ambientales (Colombia);	meteorologia@ideam.gov.co
INOCAR - Instituto Oceanográfico de la Armada (Ecuador);	nino@inocar.mil.ec
DHN - Dirección de Hidrografía y Navegación (Perú);	oceanografia@dhn.mil.pe
SHOA - Servicio Hidrográfico y Oceanográfico de la Armada (Chile)	shoa@shoa.cl
DMCh - Dirección de Meteorología (Chile)	metapli@meteochile.cl
NOAA - AOML Miami (USA)	JHARRIS@aoml.noaa.gov

**CLIMATE ALERT BULLETIN
BAC Nº 216, SEPTEMBER 2008****I. GLOBAL AND REGIONAL IMAGE**

During September, Sea Surface Temperature (TSM - SST) in the Central Equatorial Pacific Ocean maintained the tendency to reduce positive anomalies in some regions to show negative values. The monthly anomaly of the SST for September in the "El Niño" regions stayed in negative values with the exception of "El Niño" region 1+2 where still are observed positive values although with tendency to reduce their values: In the Western Pacific region ("El Niño" Region 4) it happened of -0, 3 to -0, 4°C, in the Central Pacific ("El Niño" Region 3, 4) the anomaly happened of 0, 1 to -0, 2°C; in the region of the Eastern Pacific ("El Niño" Region 1+2) the anomalies happened of 1, 0 to 0, 6°C.

The subsurface thermal structure of the Equatorial Pacific was characterized by the presence of a thermal dipole with the warm nucleus of 3, 0°C located to the west of the line of date and cold nucleus of -4,0°C located to the east of the line of date, both nuclei are located around 150 ms of depth. In the Eastern edge of the Pacific, presence of a warm water cell is observed in the first 49 ms, prisoner in that region of the ocean.

The Mean Sea Level (MSL) in the South eastern Pacific presented certain tendency to distribute around its normal patterns; in front of Ecuadorian coasts MSL continued presenting small positive anomalies between 3 and 6 cm, also in the Peruvian coast is observed in average a reduction of around 4, 0 cm, with respect to previous month; whose anomalies fluctuated between +4, 0 cm (Lobos de Afuera) and -2, 0 cm (Mollendo), San Juan presented a behaviour similar to its normal. In Chile, MSL was characterized by to present major variations with respect to values registered during August 2008. Nevertheless, it is possible to emphasize that in the North and Centre-South zones of the country, anomalies of sea level did not report significant differences in their values, since they fluctuated between -6,4 and -8,5 cm.

The Index of Oscillation of South (IOS) like in the previous month, it continued in his positive phase and in this occasion the value was of 1,5.

The central axis of the Intertropical Convergence Zone (ITCZ) appeared in the Eastern sector of the Pacific between 8 and 10°N with significant convective activity.

As far as surface winds, in the region of the South eastern Pacific they appeared predominantly of south and south-east, with speeds that were slightly on the average value waited for this month between 0, 5 and 1, 0m/s.; towards north of latitude 3°S was observed a slight weakening of trade winds.

II. NATIONAL IMAGE**A. CONDITIONS IN THE COLOMBIAN COAST**

The Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) informs that at the beginning of the month an intensification of tropical revolving storms in the Atlantic appeared forming tropical storms Ike and Josephine. These tropical systems were added to which were formed at the end of August (tropical storm Hanna located on Haiti and Gustav that entered in the United States at the beginning of September). The strong rain occurrence was very well-known days 3 and 4 of September in the Caribbean and Pacifica regions, and north and centre of Andean region, by indirect influence of tropical storm Hanna, whose cloudy bands associated to the system were located in the mentioned zones. This meteorological situation stayed during two days, even when the system arrived at the coast of the United States, losing connection with the present cloudiness in the Colombian territory.

Since second decade of the month a diminution in the intensity of the waves and tropical revolving storms, as well as a smaller frequency in its passage by the Colombian Caribbean affected remarkably so that volumes of rain in

Colombia were not the awaited. It is important also to indicate that during some days of the month strong winds were registered, which caused weakening of cloudiness and therefore, minors precipitations; especially since second fortnight of the month atmospheric conditions were alternating between rainy days and dry days, with intervals of two or three days, like a situation characteristic of transition of dry season to rains season. The ITCZ stayed most of the time more to the north of the normal for the time (between 8 and 10 ° N) and with activity especially towards the Pacific Ocean. It is possible to emphasize in addition, that at the beginning of the second decade of the month, humidity coming from Brazil caused strong rains in the areas of the Eastern slope of the Eastern mountain range ("Cordillera Oriental") in Colombia. The amounts of rain when finalizing the month were deficit to a large extent of the Andean and Pacific regions, whereas in the Caribbean region predominated volumes of precipitation over the average values; on the other hand in the east of the national territory behaviour of rains was differential, with predominance of amounts between normal and slightly over the usual for the time. Despite to have registered smaller amounts of precipitation to the hoped, some emergencies associated with slidings appeared, especially in the north and the centre-West of the Andean region and in some sectors of the Eastern slope of the Eastern mountain range ("Cordillera Oriental"). Similarly, rivers Magdalena and Cauca in their low parts presented some problems by high levels, causing to emergencies by floodings and floods to the coastal populations. As a result of official beginning of "second season of rains" some smaller emergencies related to crescents and gales were reported in the country. With respect to tropical revolving storms development in the Atlantic, during September were twelve tropical storms.

The Center for the Pollution Control of the Pacific (CCCP) declares that during monitoring of September 2008, realised by the area of Operational Oceanography of the CCCP to fixed station coastal N° 5 located to 10 miles of the bay of Tumaco, between coordinates 78, 51° W and 2° N, can be observed that registry of SST for September was of 27, 07 and 26, 92 °C for the first and second fortnight respectively, presenting a monthly average of 26, 99 °C. A negative anomaly at surface level of -0, 14°C appears with respect to the historical average which is of 27, 10°C.

In September, thermocline for the first fortnight promoted 1 meter with respect to last registry of August, positioning on the 43 meters, and for the second fortnight it was positioned approximately on the 48 meters. The isotherm of 15°C became visible during the second fortnight of this month from 103 meters of depth.

As far as behaviour of the salinity, it registered at surface a value of 30, 52 and 31, 04 ups, for the first and second fortnight of September respectively, showing a monthly average of 30, 78 ups. A negative anomaly of -0, 17 ups appears at surface with respect to the historical average that is of 30, 95 ups. The maximum value of salinity appeared in the first fortnight of the month, being of 35, 014 ups to a depth of 66 ms approximately. The halocline was positioned for the first and second fortnight on the 43 and 49 ms, respectively.

B. CONDITIONS IN THE ECUADORIAN COAST

The Oceanographic Institute of the Navy of Ecuador (INOCAR) reports that during September 2008 air temperature throughout Ecuadorian coast fluctuated between 23, 2 and 26, 3°C what it means anomalies between -0,2 and 1,0°C. Sea Surface Temperature presented values between 23, 4 and 26, 7°C giving anomalies of 0,2 and 1,0°C.

This month, throughout Ecuadorian coast appeared occasional rains with a "monthly accumulated" between 0 and 6, 3 mm. Last months, rains in the Ecuadorian Coast have been characterized for be minimum between 0 and 10 mm.

Taking in to account data obtained during oceanographic cruise conducted by "BAE Orión", first conclusions indicate that Sea Surface Temperature fluctuates from 20, 5 in the south to 25, 5°C in the north end of cruise area, which gives a positive anomaly of 0, 5 to 1, 0°C to a large extent of sampled area. The Equatorial Front appears like an ample zone band with a weak termohaline gradient, possibly associated to weak incursion of south cold current towards equatorial region.

The superficial salinity presents values of 33 ups in the north end (towards north of 0°) and 35 ups towards southwest: Also a weak gradient haline is observed in surface.

At subsurface level presence of positive anomalies in the superficial layer of 30 ms is observed, and towards south end of section in the layer located between 50 and 200 ms, with anomaly of until 1°C.

To south of 2° S between 40 and 150 ms a nucleus of high salinity appears ($> 35, 1$) what possibly is associate to equatorial subcurrent. Towards section of 89°W this nucleus of high salinity reaches from surface to 60 ms approximately. Presence of Equatorial water of 35 ups was observed throughout all sections located between 30 and 150 m.

In summary, to a large extent of cruise area slightly warm conditions exist (of 0, 5 to 1, 0°C on the climatology). The Equatorial Front is weak, is not very evident water presence of Humboldt current in front of Ecuadorian coasts. At subsurface level, warm anomalies in the first 50 m are also observed. In any case, Ecuadorian Pacific sample evidences of temperature increase of the sea observed in the Pacific Eastern region that does not reach to alarming values and the subsurface thermal structure does not show signals of anomalous processes development in the study area.

The winds appeared within awaited normal rank for present season and were of south south-east.

Considering present behaviour of ocean-atmospheric conditions in front of Ecuador, it is anticipated that volume of precipitations in the Ecuadorian coast continues minimum. As soon as sea and air temperature in the Ecuadorian coast, is considered that they remain slightly on the waited for normal value.

C. CONDITIONS IN THE PERUVIAN COAST

The Direction of Hydrography and Navigation of Peru (DHN) declares that Sea Surface Temperature (in general) , throughout Peruvian coast, registered a reduction average in the anomalies, minor of 1, 0°C with respect to previous month, predominating the positive anomalies; with the exception of San Juan, that presented a -0,2 °C anomaly. The maximum positive anomaly appeared in the northern station Lobos de Afuera (+0, 8°C), whereas minimum positive anomaly was registered in Chimbote (+0, 2°C).

The Mean Sea Level throughout Peruvian coast presented (in general) slight anomalies, being observed a reduction average around 4, 0 cm with respect to previous month. The anomalies of MSL fluctuated between +4, 0 cm (Lobos de Afuera) and -2, 0 cm (Mollendo), whereas San Juan presented behaviour similar to its normal.

Throughout Peruvian coast air temperature has registered a variability of +/-0,3°C, with respect to previous month, prevailing positive anomalies; with exception of stations of Chimbote, San Juan and Mollendo with anomalies of -0, 3, -1, 4 and -0, 1°C, respectively. The anomalies of AT fluctuated between +0, 2° C (Callao) and +0, 6° C (Paita and Lobos de Afuera).

In the North coast, in the stations of Talara, Paita and Lobos de Afuera registered drizzles during days 6, 15, 21 and 22 of this month, with an accumulated of 5, 5 , 5, 2 and 0, 7 mm, respectively.

In the central coast, specifically in Chimbote, were registered drizzles isolated during almost all the month and in El Callao only days 4, 5 and 6 of this month, with accumulated precipitations of 11, 1 and 0, 3 mm; whereas, in the south drizzles were registered during day 5 of the month, with accumulated precipitations of 0, 3 mm.

Throughout Peruvian coast winds of South and South-east direction appeared. In relation to wind speed, positive anomalies predominated that fluctuated between 0, 4 to 1, 2 m/s; with exception of Paita and Callao that presented anomalies of -1, 2 and -0, 2 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 Sea Level to monitoring a series of oceanic and atmospheric variables. A description of Sea Surface Temperature and Sea Level between Arica (18°29'S) and Talcahuano (36°41'S) for September 2008 is:

In the case of SST, values very similar to the registered during August 2008 are observed. In the North zone of the country, SST anomalies fluctuated between -0, 1 and -0, 4°C. In the same way, centre-south zone of the country did not present majors fluctuations in the SST anomalies, those that oscillated between -0, 6 and 0, 3 °C.

The Sea Level behaviour also was characterized not to present big variations with respect to values registered during August 2008. Nevertheless, it is possible to emphasize that in the North and the centre-south zones of the country anomalies of Sea Level did not report significant differences in their values, since they fluctuated between -6, 4 and -8, 5 cm.

The data of SST and SL described previously for North and Centre-South zone of Chile are coherent with developed neutral conditions in the Tropical Pacific in September 2008.

The Meteorological Direction of Chile (DMCh) shows that during September, the average Air Temperature in surface, indicated a heating in the central and austral zone of the country, with positive anomalies between 1,0 and 1,3°C, between Santiago and Chillán and of +1,8°C in Punta Arenas. The North zone stayed around its normal values (anomalies between +/- 0,3°C).

The maximum air temperature in surface increased by on its normal values (between 1 and 3°C) that includes a great longitudinal extension between Valparaiso and the austral region of Punta Arenas. In the North region, between Arica and La Serena, was observed a slight cooling whose anomalies were around 0,5°C below climatologic average.

The minimum temperature of the air in surface, showed to an increase with respect to its average values in the North, central and extreme south region of the continent, with heating that surpassed in 1°C their average values. Contrary, the South zone of the country, between Temuco and Balmaceda, dominated negative anomalies whose values reached maximums of -2, 0°C in Coyahique and Balmaceda.

The atmospheric circulation that affected the continental region of the country was characterized to show a high frequency of days with anticyclonic circulation in the troposphere that extended towards high latitudes of the austral Patagonia of South America. This "atypical synoptic pattern" for the time was associate to ridges of great scale and were main cause to intensify the pressures concerning surface, whose principles positive anomalies surpassed in more than 5 hPa historical averages between Puerto Montt and Punta Arenas. Of equal way, the oceanic region was affected by positive anomalies of pressure of 4, 5 hPa in Island of Pascua and 2, 9 hPa in Juan Fernandez.

Precipitations went inferiors to month average, being majors negative anomalies observed in the South and austral region, between Temuco and Coyahique. The regions with greater deficit with respect to normal value of this month were Valdivia (- 117 mm) and Puerto Montt (- 103 mm).

III. PERSPECTIVE

A. GLOBAL

Taking into account present predictions from several numerical models, as well as the behaviour of the main oceanic and atmospheric indicators, is anticipated that during next month to a large extent of the Equatorial Pacific "slight negative anomalies" of SST will appear, although it hopes that remain certain areas of the Eastern Pacific with positive anomalies.

B. REGIONAL

In agreement with pursuit of ocean-atmospheric conditions in the South eastern Pacific Ocean, executed by Program ERFEN (integrated by National Committees ERFEN of Chile, Colombia, Ecuador and Peru), and coordinated by the CPPS, it is not foresee for next month, majors changes in the surface thermal structure in the sector of the Eastern Pacific, hoping that air temperature like SST stays slightly on their average value of this month, conserving tendency to reduce values of positive anomaly.

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
JUL 08	6.6	8.6	7.6	28.2	27.2	26.1	22.6	20.4	14.7	13.4	0.2
AUG 08	6.8	8.8	7.0	28.2	27.0	25.7	21.8	***	16.6	13.5	0.8
SEP 08	6.2	9.0	6.9	28.1	26.5	25.1	21.2	19.1	16.4	11.7	1.5

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	
JUL 08	27.4	23.7	17.6	16.0	15.2	13.8	13.0	12.1	
AUG 08	27.4	23.3	16.9	16.1	15.5	13.8	13.4	12.1	
SEP 08	27.0	23.4	15.7	16.4	15.9	14.1	14.2	12.5	

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	
JUL 08	***	***	1130	1561	703	1228	889	704	
AUG 08	***	2704	1070	1507	620	1176	828	625	
SEP 08	***	2650	1010	1472	***	1142	807	615	

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
AUG 01	***	19.2	17.6	***	274.8	110.6
06	***	18.8	17.2	***	275.6	105.9
11	***	19.2	17.3	***	268.6	111.9
16	***	19.1	16.7	***	269.4	106.0
21	***	18.2	16.7	***	270.0	105.0
26	***	17.5	16.5	***	263.0	106.5
31	***	17.8	16.5	***	270.7	110.6
SEP 05	***	18.0	16.1	***	268.6	97.7
10	***	17.8	16.0	***	257.6	98.4
15	***	18.2	15.8	***	264.6	107.2
20	***	18.0	15.5	***	267.6	100.7
25	***	17.5	15.3	***	263.2	102.1
30	***	17.3	15.4	***	267.4	104.0

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

Note.

* Values revised

***. Information not received

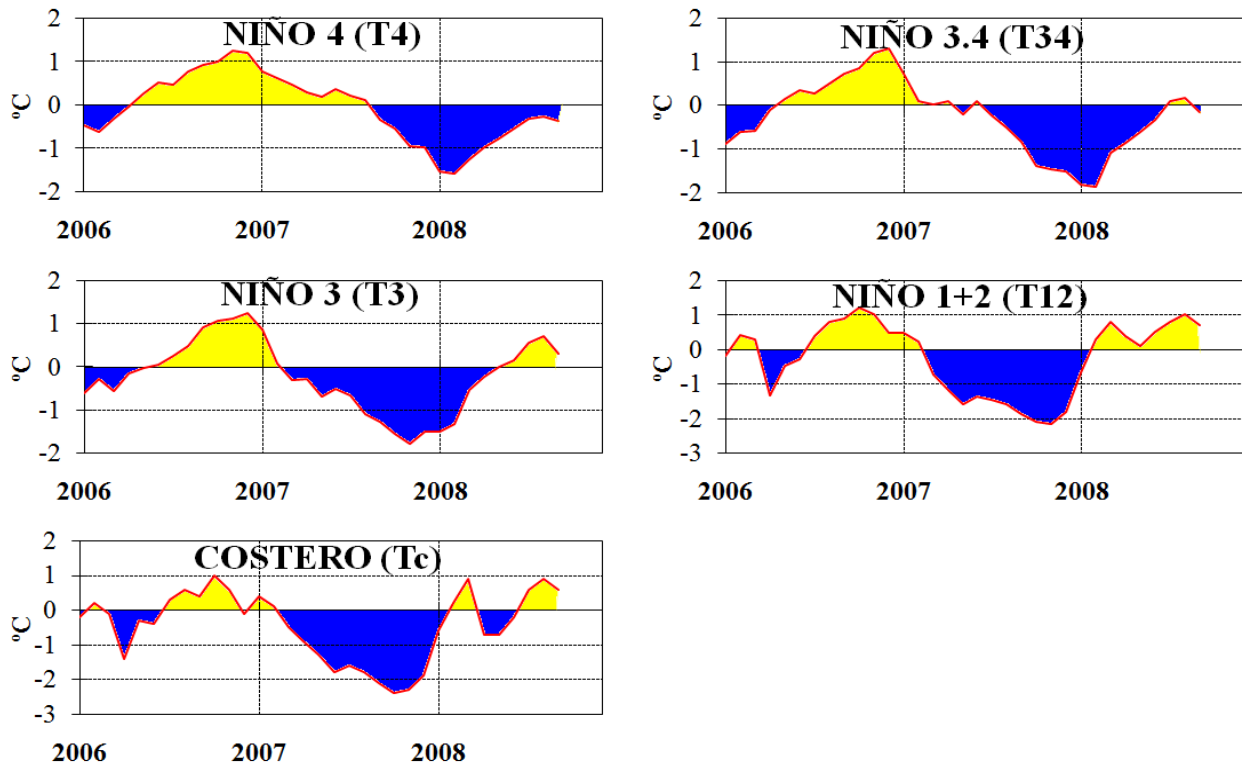


Figure 3.- Oceanic anomalies indices (Niño 4, Niño 3.4, Niño 3, Niño 1+2 and Tc). The location of the oceanic indices appears in figure 2. (Source: NCEP/NWS/NOAA/USA).

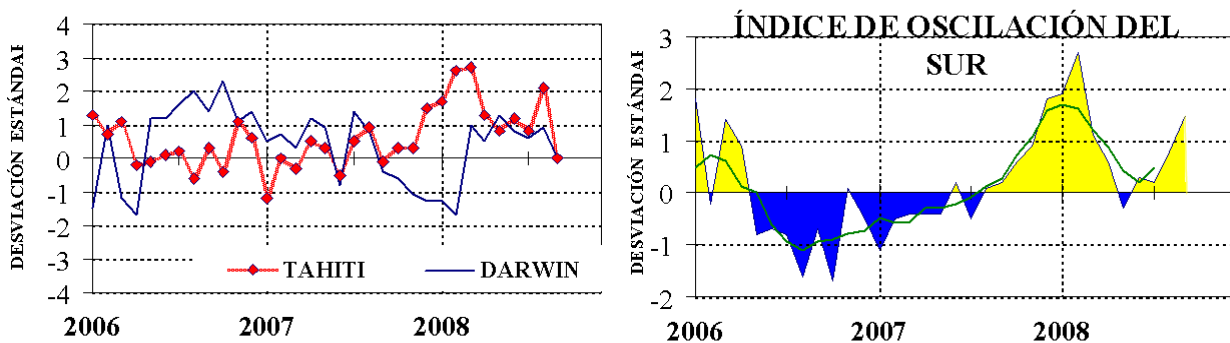


Figure 4.- Left Panel: Five-months running mean for atmospheric pressure anomalies in Tahiti and Darwin (mb). Right Panel: Southern Oscillation Index. (SOI) with monthly values and five-months running mean graphed as a green line. The SOI is based on the difference between standardized pressure values: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

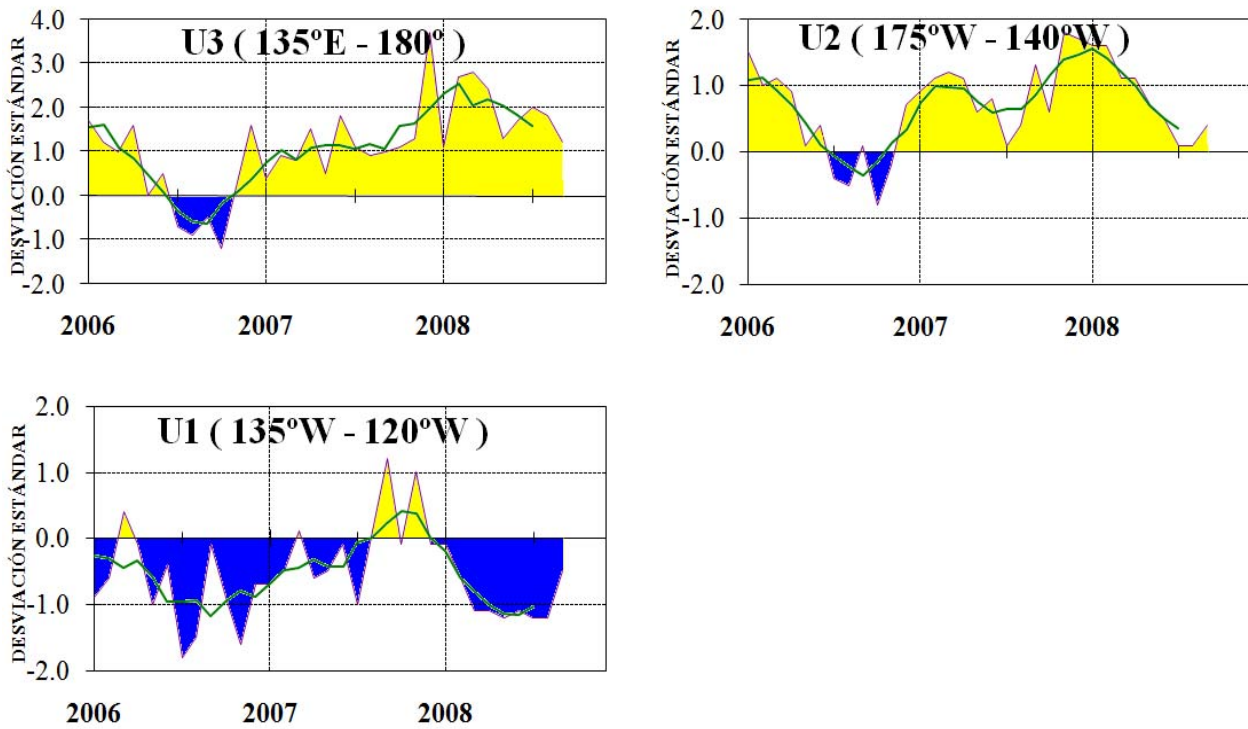


Figure 5.- Series and moving averages of five months of zonal wind standardized anomalies (m/s) averaged between 5°N and 5°S for three Equatorial zones: western (U3), central (U2) and eastern (U1). (Source: NCEP/NWS/NOAA/USA).

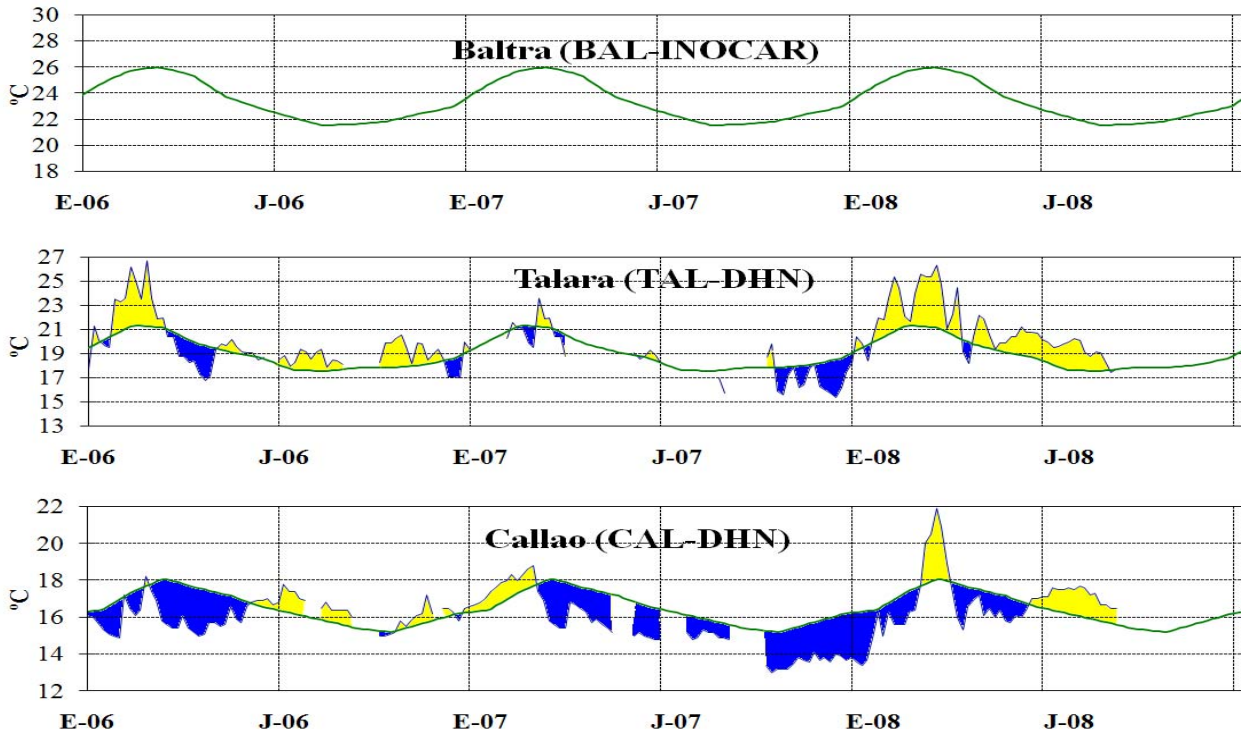


Figure 6.- Five day averages (pentads) of SST (°C) in Ports of Ecuador and Peru. The green curve indicates climatology. The location of oceanic indices appears in figure 1. (Source: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami.)

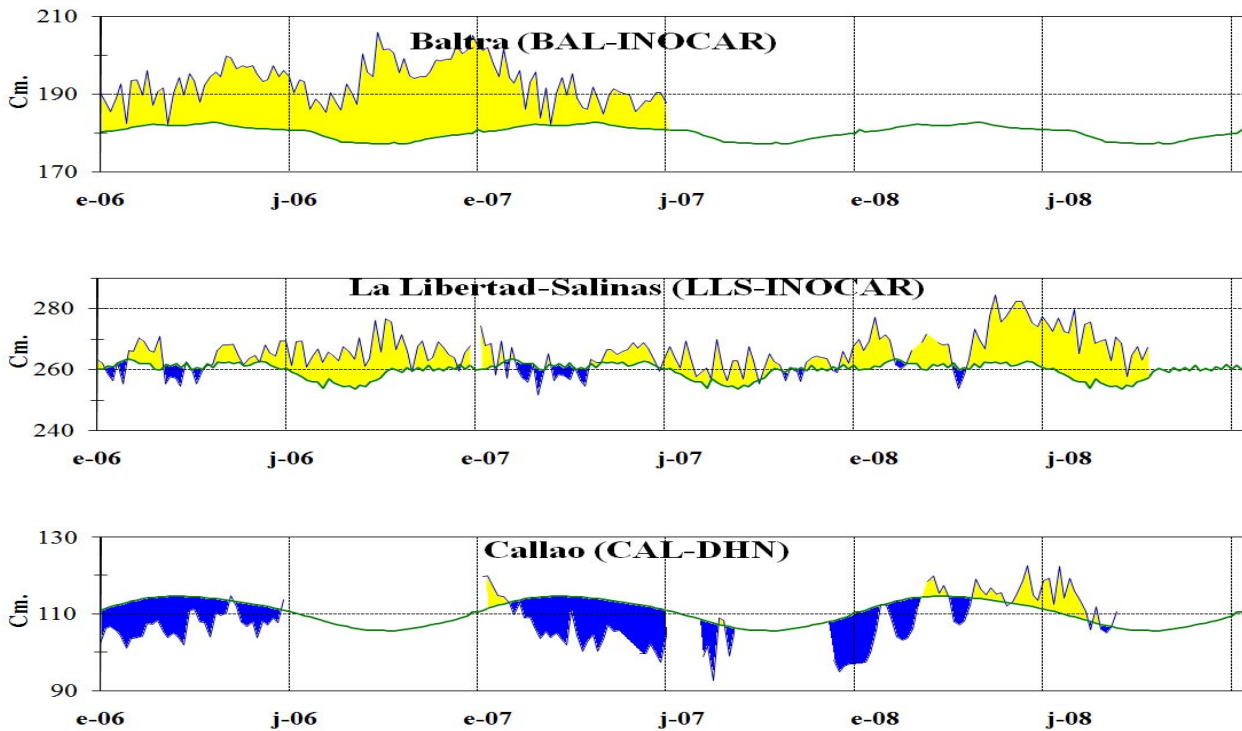


Figure 7.- Five-day running mean (pentads) of MSL (cm) in Ports of Peru and Ecuador. The green curve indicates climatology. The location of oceanic indices appears in figure 1. (Sources: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami, e INOCAR).

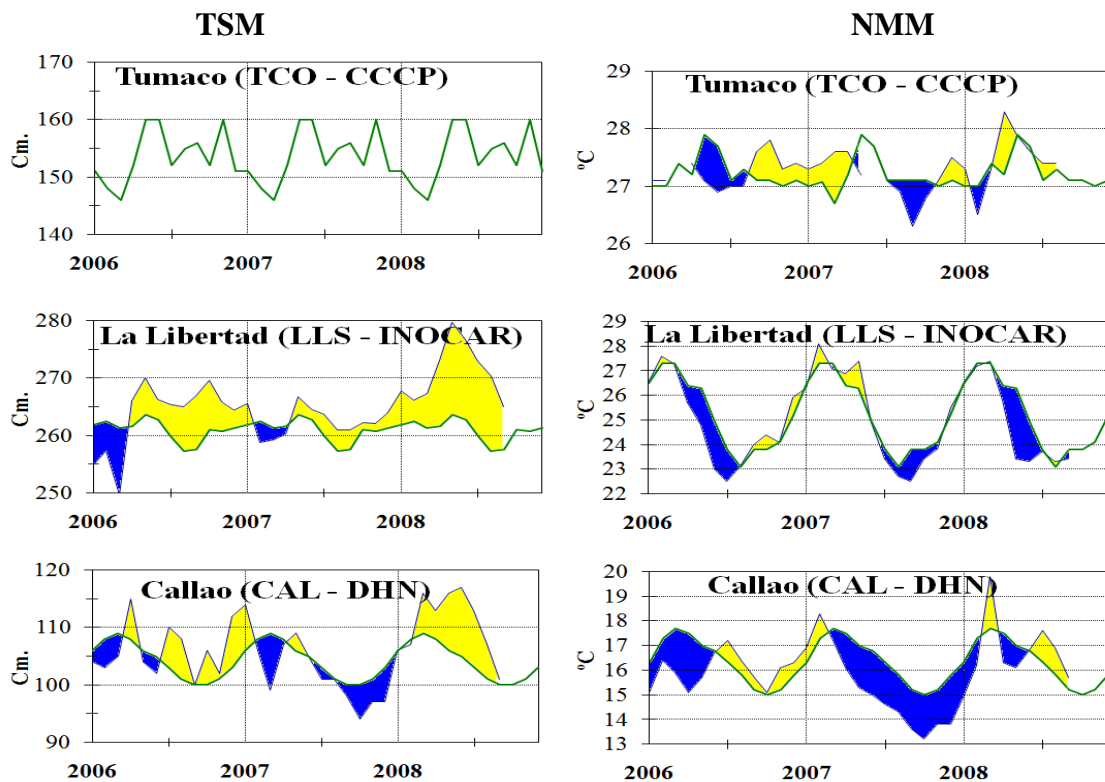


Figure 8a.- Monthly means of the SST (°C) and MSL (cm) in five stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Sources: CCCP, INOCAR y DHN).

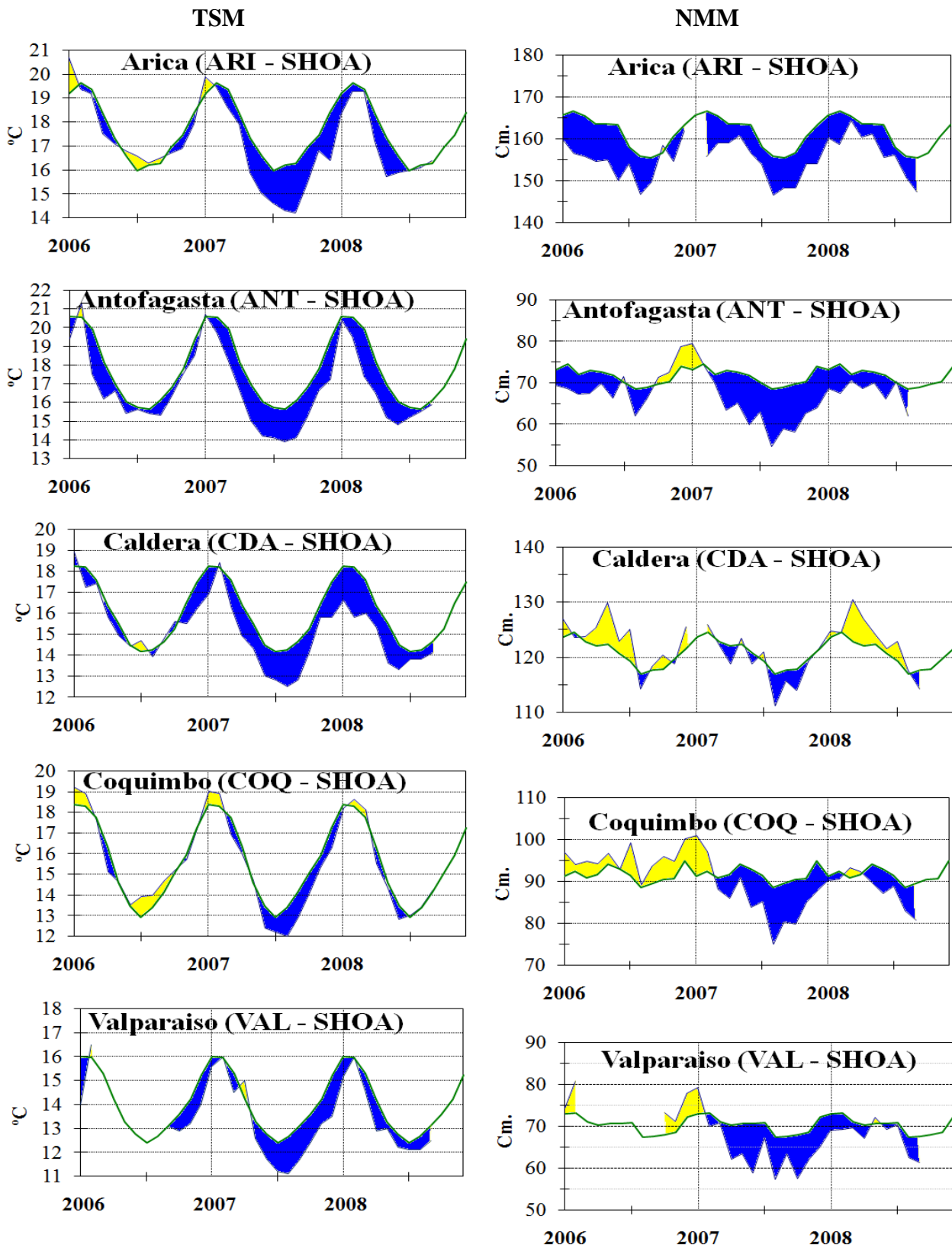


Figure 8b.- Monthly means of the SST (°C) and MSL (cm) in five stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Source: SHOA).

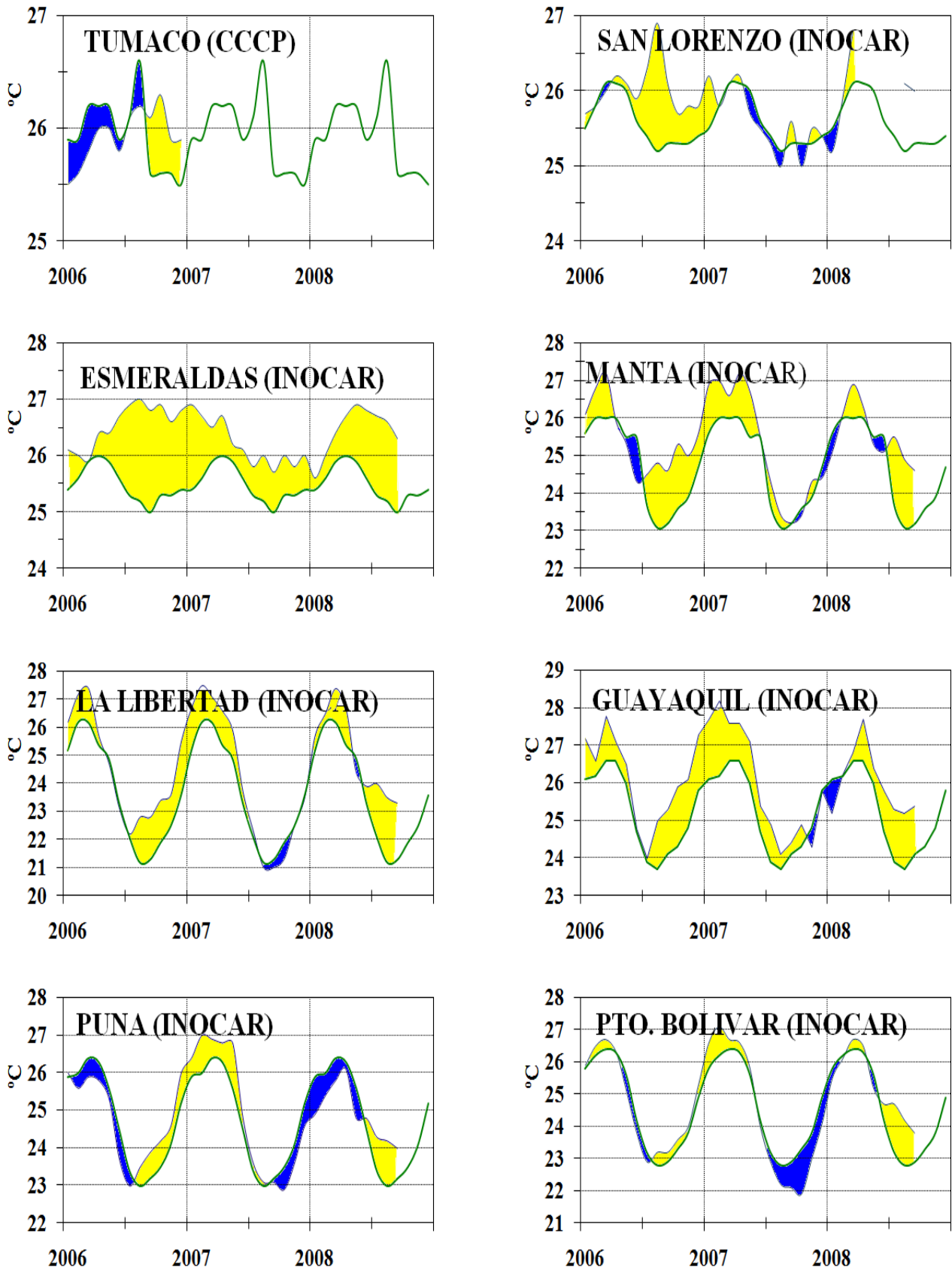


Figure 9a.- Monthly means of the air temperature (°C) in 8 stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Sources: CCCP & INOCAR).

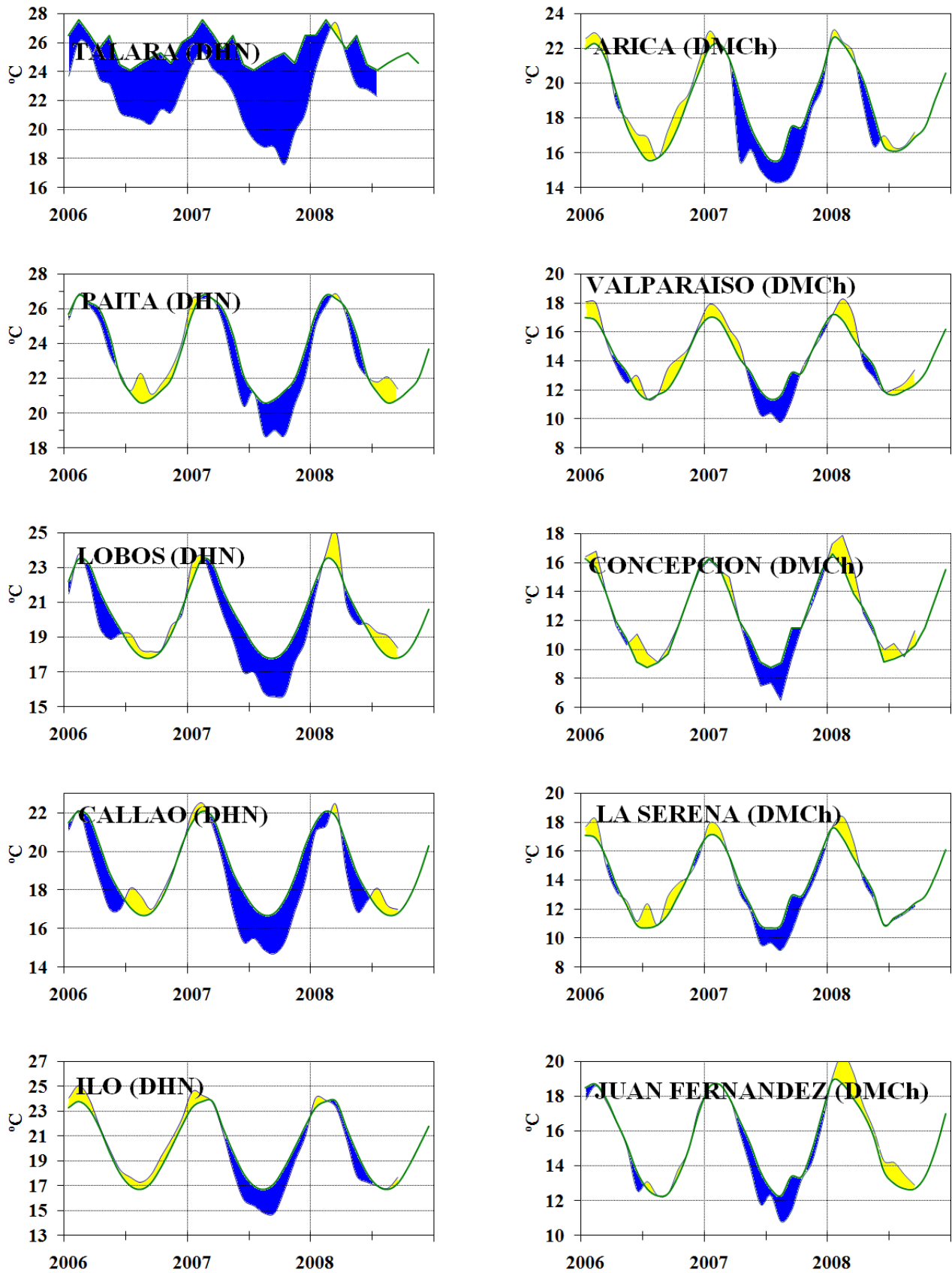


Figure 9b.- Monthly means of the AT (°C) in 10 stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Sources: DHN & DMCh).

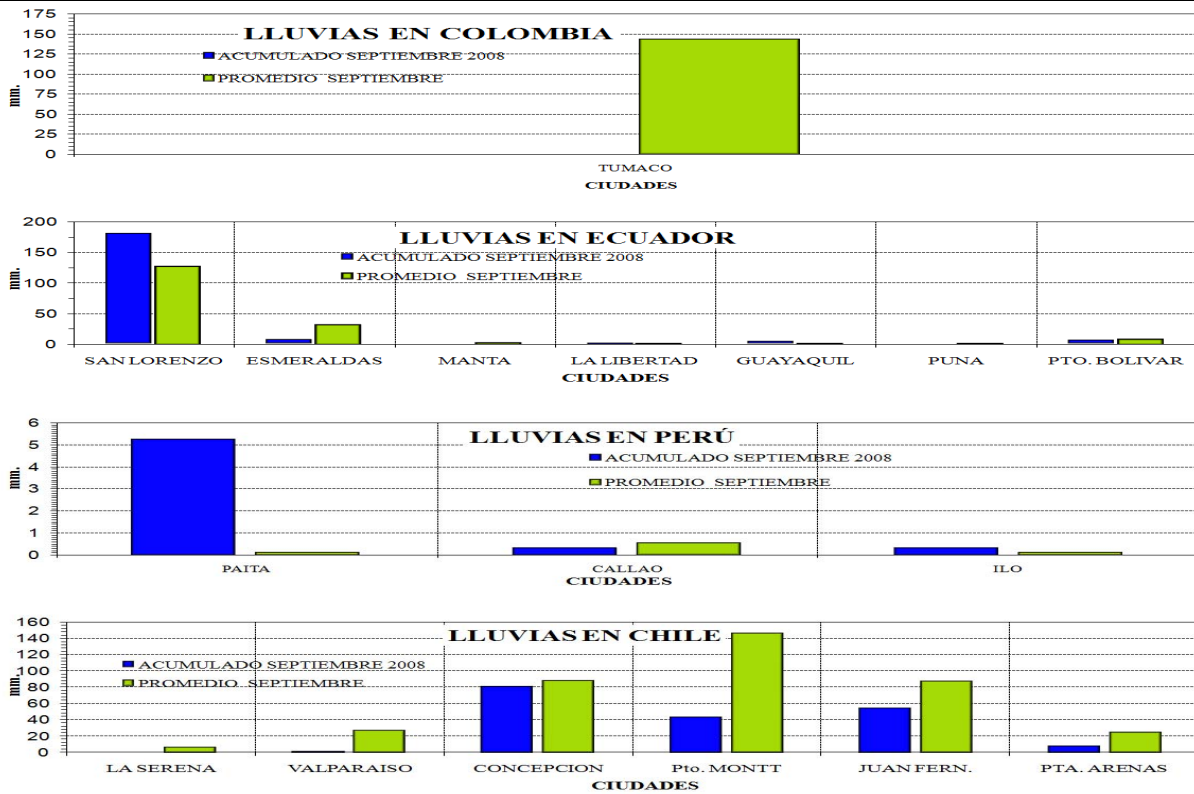
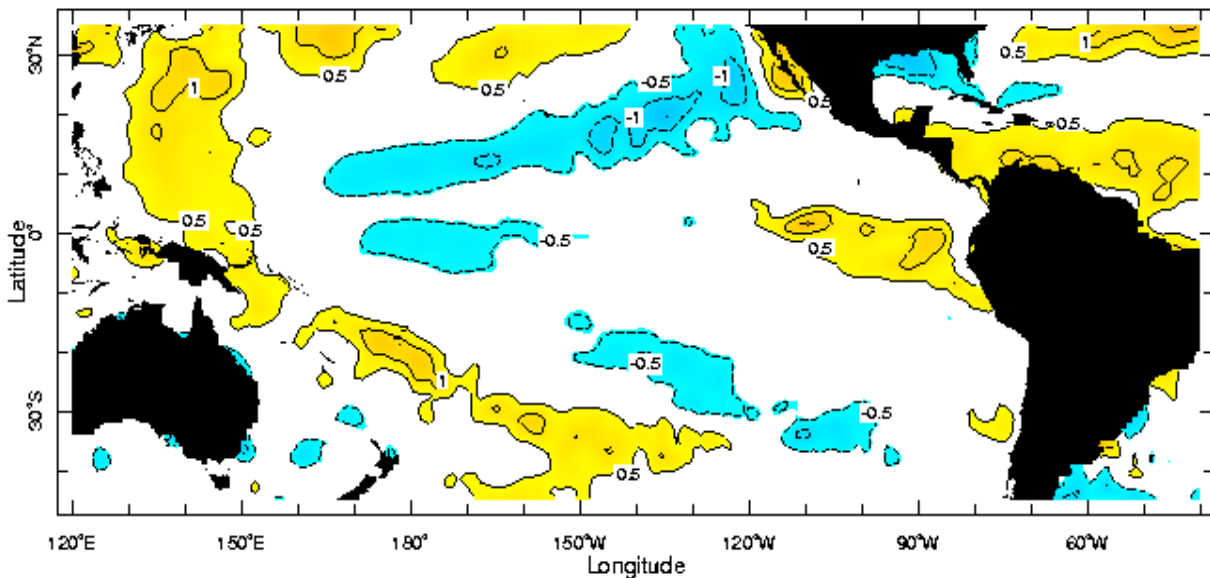


Figure 10.- Rains during September in the coastal stations of Colombia, Ecuador, Peru and Chile. Location of the stations appears in Figure 1. (Sources: CCCP, INOCAR, DHN & DMCh).

**Anomía de la Temperatura Superficial del Mar (°C)
Septiembre 2008**



Sep 2008

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

EDITED IN THE OCEANOGRAPHIC INSTITUTE OF THE NAVY OF ECUADOR

Av. 25 de julio. Base Naval Sur. Guayaquil, Ecuador. P.O. Box 5940. Fax (593)4-2485166. Tel: (593)4-2481300.