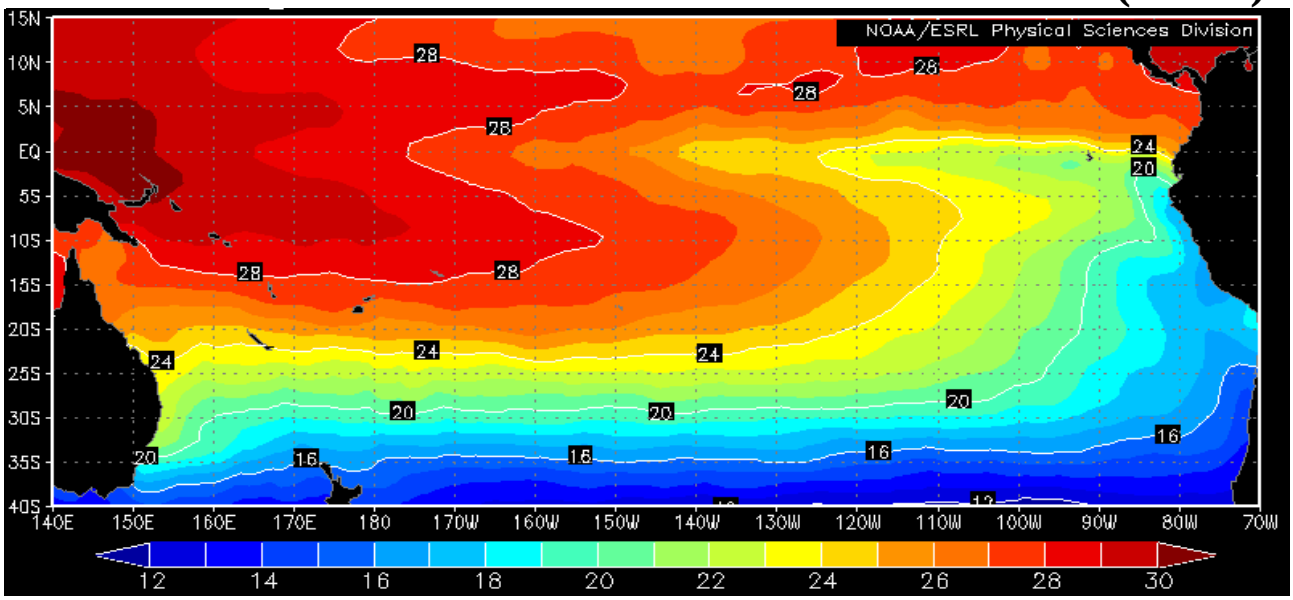
COMISIÓN PERMANENTE DEL PACÍFICO SUR (CPPS)



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

OCTOBER 2008 BAC N° 217

ERFEN

(Estudio Regional del Fenómeno El Niño)

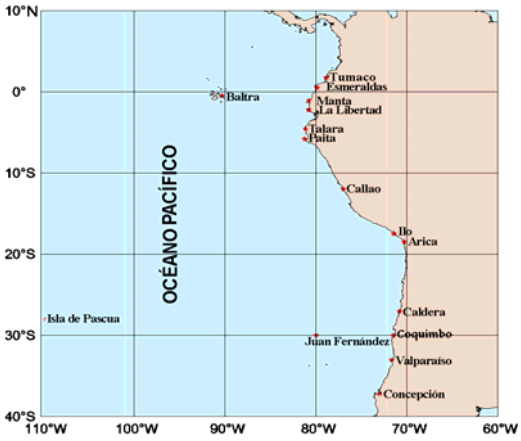
BOLETÍN DE ALERTA CLIMÁTICO

CLIMATE ALERT BULLETIN

OMM **CPPS** **COI**

COLOMBIA	ECUADOR	PERÚ	CHILE
CCCP	INOCAR	DHN	SHOA

COMISIÓN PERMANENTE DEL PACÍFICO SUR
SECRETARIA 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 October, "ENSO neutral conditions" continued in the Equatorial Pacific Ocean, where Sea Surface Temperature was near its average value and presented in this occasion negative anomalies in all "El Niño" regions, included in "El Niño" region 1+2 where until last month registered positive values; this behaviour of Equatorial Pacific tending to present Values below the average, would stay until present year ends.

During last week of October, anomaly of Sea Surface Temperature in the "El Niño" regions presented following values; in the region of Western Pacific ("El Niño" Region 4) it was of -0, 2ºC; in the Central Pacific ("El Niño" Region 3,4) the anomaly was of -0, 1ºC and; in the region of the Eastern Pacific ("El Niño" Region 1+2), it was of -0, 8ºC. At Subsurface level, "the presence" of a thermal dipole in the Central Equatorial Pacific stays, located between 100 and 200 ms of depth; the warm nucleus with anomalies of +3, 0°C located to west of the line of date and the cold nucleus, with anomalies of -3, 0°C, located to east of the line of date. In past weeks it was possible to observe a slight displacement of the warm nucleus towards east, nevertheless during second half of October notices a reduction of the speed of progress, of this warm nucleus, towards coasts of South America.

The Mean Sea Level in the South eastern Pacific during this month presented tendency towards values below its normal patterns. Throughout Peruvian coast, it registered in average a reduction of around 3, 0 cm with respect to previous month. In front of Chile behaviour of Sea Level, maintained negative tendency observed in the previous months (August and September), with negative anomalies that fluctuated between -6.0 cm (Caldera) and -10.1 cm (Valparaiso).

The Index of Oscillation of the South continuous in the positive phase, although in this occasion underwent a slight reduction with respect to previous month, being of 1, 3 its value in this opportunity.

The Intertropical Convergence Zone stayed to north of the normal position for the time (between 8 and 10ºN) and with convective activity towards Eastern edge of the Pacific Ocean.

In the region of the South eastern Pacific surface winds appeared with South South-east direction and speed in this occasion was a little more intense, predominating the positive anomalies between enters 0.4 m/s and 1, 7 m/s.

Taking into account present Equatorial Pacific Ocean's thermal behaviour, as well as several models of numerical simulation are anticipated that during next month Sea Surface Temperature in the Eastern sector of the Equatorial Pacific Ocean will remain slightly under its normal value.

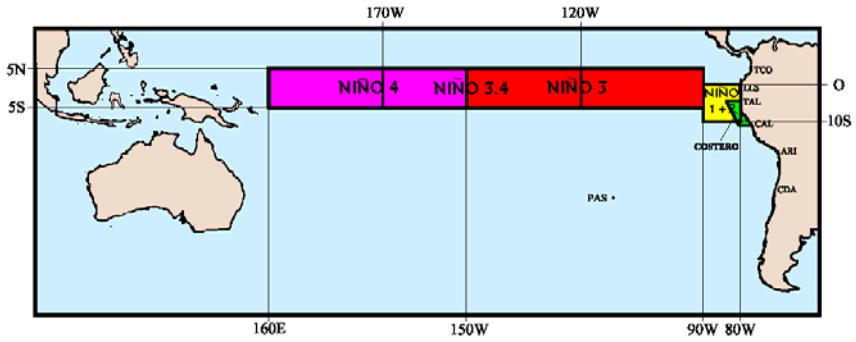


Figure 2.- Map indicating locations and codes of series. Rectangles show the average area of Sea Surface Temperature (SST °C)

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

Permanent Commission
for the South Pacific (CPPS)

CLIMATE ALERT BULLETIN
BAC Nº 217, OCTOBER 2008

I. GLOBAL AND REGIONAL IMAGE

The Sea Surface Temperature (SST) reached negative values of anomalies for all "El Niño" regions. The monthly anomaly of the SST for October in the "El Niño" regions stayed in negative values; in "El Niño" region 1+2 too, in this region until the previous month positive values had occurred: In the region of the Western Pacific ("El Niño" Region 4) it happened of -0.4 to -0.1ºC, in the Central Pacific ("El Niño" Region 3.4) the anomaly happened of -0.2 to -0.3ºC; in the region of the Eastern Pacific ("El Niño" Region 1+2) the anomalies happened of 0.7 to – 0.15ºC.

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 the cold nucleus of -4.0°C located to the east of the line of date. Both nuclei are located around 150m of depth (In the Eastern edge of the Pacific).

The Mean Sea Level (MSL) in the South eastern Pacific presented tendency to values below its normal Patterns; In front of the coasts of Peru and Chile Level of the Sea continued presenting negative anomalies between -3.0 and -9.0 cm.

A reduction of around 4.0 cm is observed in average, with respect to the previous month. The anomalies of the MSL fluctuated between +4.0 cm (Lobos de Afuera) and -2.0 cm (Mollendo); San Juan presented behaviour similar to its normal; in front of Chile the level of the sea was characterized because it doesn't present big variations with respect to the values registered during August 2008. Nevertheless, it is possible to emphasize that in the North and Centre-South zones of the country, the Sea Level anomalies did not report significant differences in their values, taking in account that 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 1.3.

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

As far as surface winds, in the region of the South eastern Pacific they appeared predominantly of the south and south-east, with speeds that were slightly on the average value between 0.4 and 1.7 m/s.

II. NATIONAL IMAGE

A. CONDITIONS IN THE COLOMBIAN COAST

The Institute of Hydrology, Meteorology and Environmental Studies (IDEAM) informs that during October amounts of rain were increased mainly in Andean and Caribbean regions and in the south of the Pacific one; the formation and development of some processes ocean-atmospherics in the

Atlantic and especially in the Caribbean Sea were the main factor again so that conditions of cloudiness and rainy weather predominated mainly in a big part of the country. Important to indicate, the formation of tropical depression No. 16 in neighbourhoods of the Archipelago of San Andres and Providencia, and of the tropical storm Omar to the north east of the peninsula of the Guajira; these two systems generated forts heavy showers in their areas of influence and affected the volumes of precipitation that appeared in some precise zones of the centre and north of Colombia. Thus, especially in some areas of the Caribbean region, totals of rain were registered that exceeded in more a 40% the averages of the month. Product of it continued the emergencies by high levels in the coastal zones of the rivers: Sinú, San Jorge and in the low parts of the rivers Magdalena and Cauca; similarly, by slidings, especially in centre and north of the country.

In the regions Andean and Pacific, amounts of precipitation next to the averages or a little superior predominated, although in some zones of the centre of the country, they appeared slight deficits. On the other hand, towards the east of the Colombian territory (since it had been anticipated) in most of the Orinoquía, volumes of precipitation between near the averages or slightly inferiors were registered; opposite case, in the Amazonia, where rains were generally slightly excessive, due to the frequent humidity entrance from Brazilian earth by the presence of frontal systems of the South hemisphere. The zone of Intertropical confluence stayed most of the time between 8 and 10ºN, and its position was influenced by the passage of tropical waves of the East and occasionally by frontal systems in the Atlantic.

The Pollution Control Center for the Pacific (CCCP) declares that during monitoring of October 2008, realised by the area of Operational Oceanography of the CCCP to fixed station coastal Nº 5 located to 10 miles of the bay of Tumaco, between coordinates 78, 51 ºW and 2 ºN, can be observed that registry of SST for this month was of 27.3 and 27.5ºC for the first and second fortnight respectively, presenting a monthly average of 27.4ºC. A positive anomaly at surface level of 0.05 °C appears with respect to the historical average which is of 27.07ºC.

In October, the thermocline was positioned on the 10 meters, and for the second fortnight it was positioned on the 35 meters approximately. The isotherm of 15ºC does not become visible for this month, the isotherm of 27ºC promotes until the 3 meters, presenting to this depth a negative anomaly of 0.2ºC; at the 15 meters we can observe a negative anomaly of -0.01ºC, which corresponds to ascent of the thermocline until surfaces levels.

As far as the behaviour of the salinity, it respectively registered at surface a value of 31.99 and 32.17 for the first and second fortnight of October, showing a monthly average of 32.08. A positive anomaly of 0.5 appears at surface level with respect to the historical average that is of 31.37.

The maximum value of salinity appears in the first fortnight of the month, with a value of 35.02 to a depth of 42 meters, approximately. The halocline was positioned for the first and second fortnight on the 10 and 37 meters. The isohaline of 34 was registered to the 18 meters, whereas the isohaline of 35 was registered to the 100 meters.

B. CONDITIONS IN THE ECUADORIAN COAST

The Oceanographic Institute of the Navy of Ecuador (INOCAR) reports that the temperature of the air throughout the Ecuadorian coast fluctuated between 22.4 and 26.0ºC during October 2008, what it means anomalies between 0 and 0.7ºC. As far as the SST, it presented values between 22.5 and 26.4ºC giving anomalies of -1.3 and 0.5ºC.

Rains were present during this month, throughout the North sector of the Ecuadorian coast with a monthly accumulated of 30 mm, which it means a positive anomaly of 18%. Rains in the Ecuadorian Coast were characterized for being minimum during these months, except in the North end of the country that is influenced by the loosening of originating convective nuclei of the ITCZ.

The winds appeared within awaited normal rank and were of the south south-east.

Considering present behaviour of the ocean-atmospheric conditions in front of Ecuador, it is anticipated that in November the volume of precipitations in the Ecuadorian coast continues minimum. As far as the sea and air temperature in the Ecuadorian coast, esteem that will appear slightly below their average 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 1.0ºC with respect to the previous month, predominating the negative anomalies; with the exception of Mollendo, that presented an anomaly of +0.3ºC, and in the stations of Chimbote and Callao, that presented a behaviour similar to their normal one. The negative anomalies fluctuated between -0.2°C (Talara) and -1.1ºC (Paita).

With respect to the Mean Sea Level (MSL) throughout the Peruvian coast, it registered an average reduction (in general) in relation to previous month of around 3.0 cm. The negative anomalies predominated, fluctuating between -2.0 cm (San Juan) and -6.0 cm (Talara and Paita); with the exception of the stations of Lobos de Afuera, Chimbote and Callao, that presented an anomaly of +1.0 cm, respectively.

Throughout the Peruvian coast, the Air Temperature (AT) registered a reduction around 0.7°C, with respect to previous month, prevailing the negative anomalies; with the exception of the station of Ilo, that presented a behaviour similar to its normal one. The anomalies of the AT fluctuated between -0.1ºC (Chimbote) and -1.8ºC (San Juan).

In the North coast, specifically in the localities of Talara and Lobos de Afuera, registered isolated drizzles during the month, with accumulated precipitations of 0.9 and 3.4 mm, respectively; whereas, in El Callao (only) the 9th day was registered a drizzle type “draws up” (“traza”).

Throughout the Peruvian coast winds of South and South-east direction appeared. In relation to the wind speed, the positive anomalies predominated, that fluctuated between 0.4 to 1.7 m/s; with the exception of Paita, Callao and San Juan, that presented anomalies of -1.4, -0.3 and -0.6 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 monitor a series of oceanic and atmospheric variables. A description of Sea Surface Temperature and Sea Level between Arica (18º29'S) and Talcahuano (36º41'S) for October of 2008 is:

The SST Variable characterized to present negative values of anomalies in the majority of the stations; nevertheless, these did not surpass -1.5°C. On the other hand, the station of Coquimbo registered a positive value of 0.3°C that is considered within the normal ranks.

The behaviour of the Sea Level, maintained the observed negative tendency in the previous months (August and September), throughout the Chilean coast, with negative anomalies that fluctuated between -6.0 cm (Caldera) and -10.1 cm (Valparaiso). It is possible to emphasize, that the major anomalies appeared in the centre-south zone of the country, where values of the order of 10 cm under the historical average were reached.

The Meteorological Direction of Chile (DMCh) shows that during October, the surface Air average temperature, presented a heating to a large extent of the country, with the majors positive anomalies present in the central and austral zone, with values of +1.5°C (Curicó) and +0.9°C (Punta Arenas).

The maximum air temperature in surface reached the major heating in the Central, South and Austral zone, with positive anomalies that fluctuated between +1.0 and +1.9°C by on the average of the month. Contrary, in the North zone it continued being observed cold conditions, whose negative anomalies were observed between Arica (- 0.9°C) and La Serena (- 0.2°C).

The minimum air temperature in surface, showed to a large extent of the country light heating, with positive anomalies of +0.7°C in the North zone, +1.0°C in the central zone and +0.8°C in the austral zone. Only the South zone, presented slight cooling, whose negative anomalies fluctuated between -0.6 and -0.9°C with respect to the average of the month.

The atmospheric circulation in the country was characterized to present a predominance of high pressures during great part of the month, associated to anticyclonic conditions that were pronounced throughout the band of average latitudes in the entire South hemisphere. In the austral region of Chile, it was dominated by cyclonal circulation; it was associated to the noticeable zonal flow and passage of frontal systems of moderate intensity. The continental and oceanic weather stations of the country, showed significant positive anomalies of the pressure at sea level, with +3.0 hPa (Island of Pascua), +2.0hPa (Juan Fernandez), +1.4 hPa (Valparaiso) and 2.7hPa (Puerto Montt). The austral zone represented by Punta Arenas, presented negative anomalies of the pressure at sea level of -2.8 hPa.

The precipitations, by second consecutive month, presented totals of the month inferior to the climatologic average, reaching the majors negative anomalies in the South zone. The regions with greater deficit with respect to the normal value of the month appeared in Temuco (- 57 mm), Valdivia (- 71 mm) and Montt Port (- 62 mm).

III. PERSPECTIVE

A. GLOBAL

Taking into account the predictions from several numerical models, as well as the behaviour of the main oceanic indicators and atmospherics, it esteem that will continue present during the negative anomalies of the SST, during the next month, to a large extent of the Equatorial Pacific. Of equal way, at subsurface level, the permanence of the present thermal structure is expected.

B. REGIONAL

In agreement with the pursuit of the 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 will not take place majors changes in the surface and subsurface thermal structure in the sector of the Eastern Pacific, for the next month, hoping that the temperature of the air as the one of the sea, they slightly stay below his average value, conserving the tendency to present negative anomalies.

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).

	ZONAL WIND			NIÑO REGION SST					ATMOSPHERIC PRESSURE		
MONTH	**WEST.**	**CENT.**	**EAST.**	**T4**	**T3.4**	**T3**	**T1+2**	**Tc**	**Tht**	**Dwn**	**IOS**
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
OCT 08	5.6	8.3	6.2	28.3	26.3	24.8	20.8	18.6	16.1	11.0	1.3

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**
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
OCT 08	27.4	22.5	15.0	15.7	16.1	14.7	15.3	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**
AUG 08	***	2704	1070	1507	620	1176	828	625
SEP 08	***	2650	1010	1472	***	1142	807	615
OCT 08	***	2637	1010	1451	593	1160	798	609

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

TABLE 4

COAST OCEANIC DATA OF THE ERFEN REGION: Five–day averages (Pentads) of SST (ºC) and MSL (mm)

	Sea Ssurface Temperature (SST)			Mean Sea Level (MSL)		
PENTADS	**BALTRA**	**TALARA**	**CALLAO**	**BALTRA**	**LLS (INOCAR)**	**CALLAO**
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
OCT 05	***	18.0	16.1	***	268.6	97.7
10	***	***	***	***	266.1	***
15	***	***	***	***	259.6	***
20	***	***	***	***	265.6	***
25	***	***	***	***	264.4	***
30	***	***	***	***	258.5	***
10	***	***	***	***	267.0	***

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

Note.

* Values revised

***. Information not received

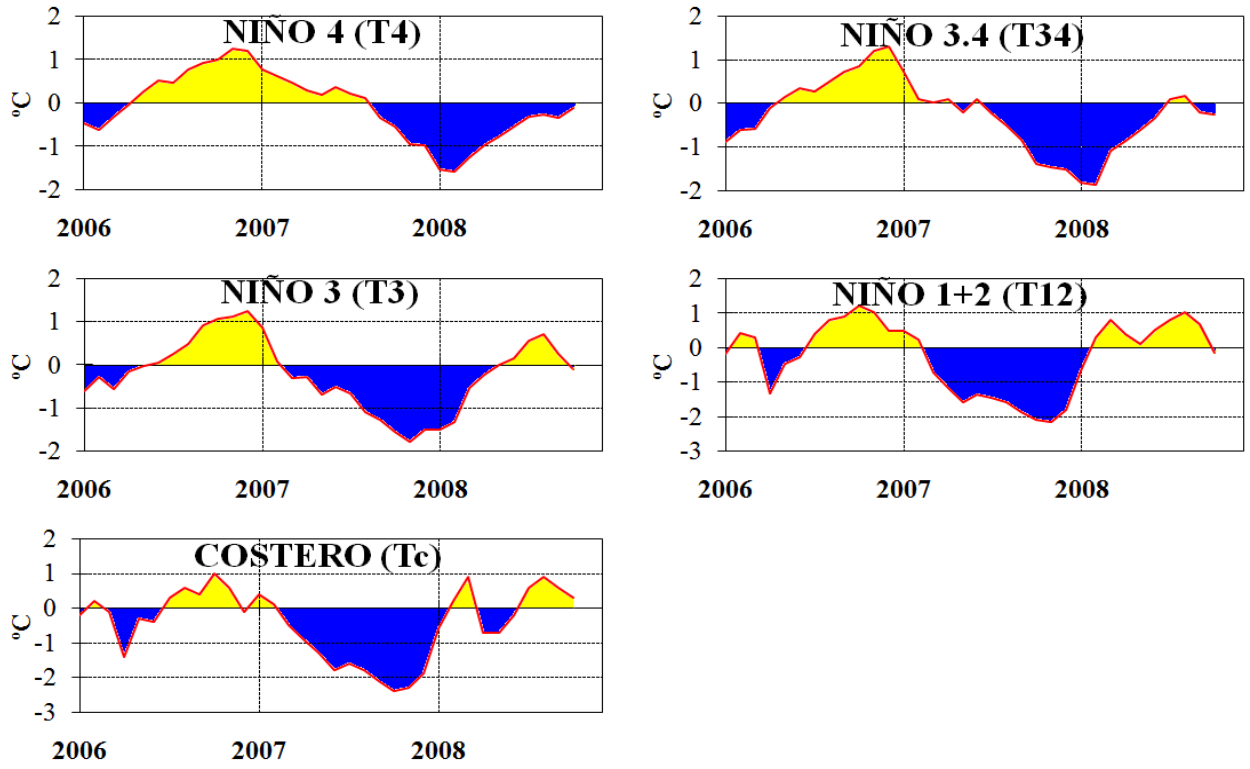


Figure 3.- Oceanic anomalies indices (Niño 4, Niño 3.4, Niño 3, Niño 1+2 and Tc). The location of the oceanic indices appears in figure 2.
(Source: NCEP/NWS/NOAA/USA).

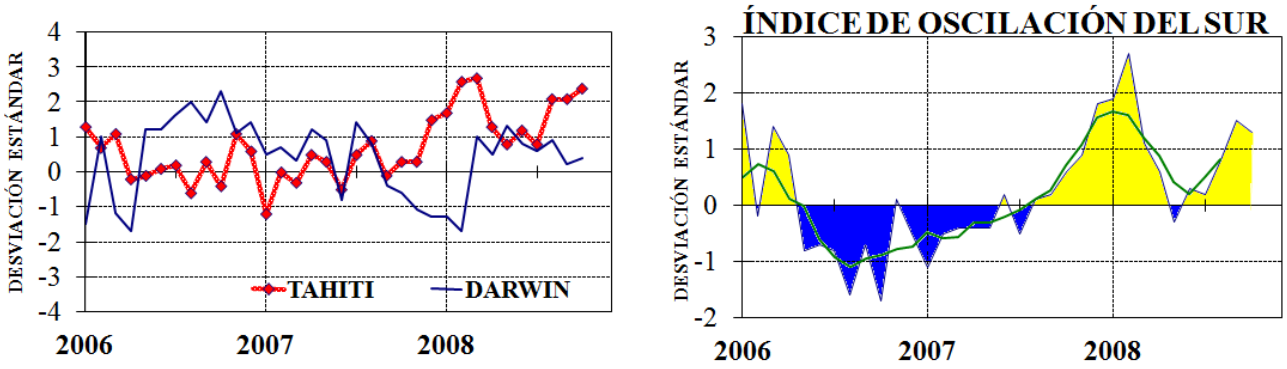


Figure 4.- Left Panel: Five-months running mean for atmospheric pressure anomalies in Tahiti and Darwin (mb). Right Panel: Southern Oscillation Index. (SOI) with monthly values and five-months running mean graphed as a green line. The SOI is based on the difference between standardized pressure values: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

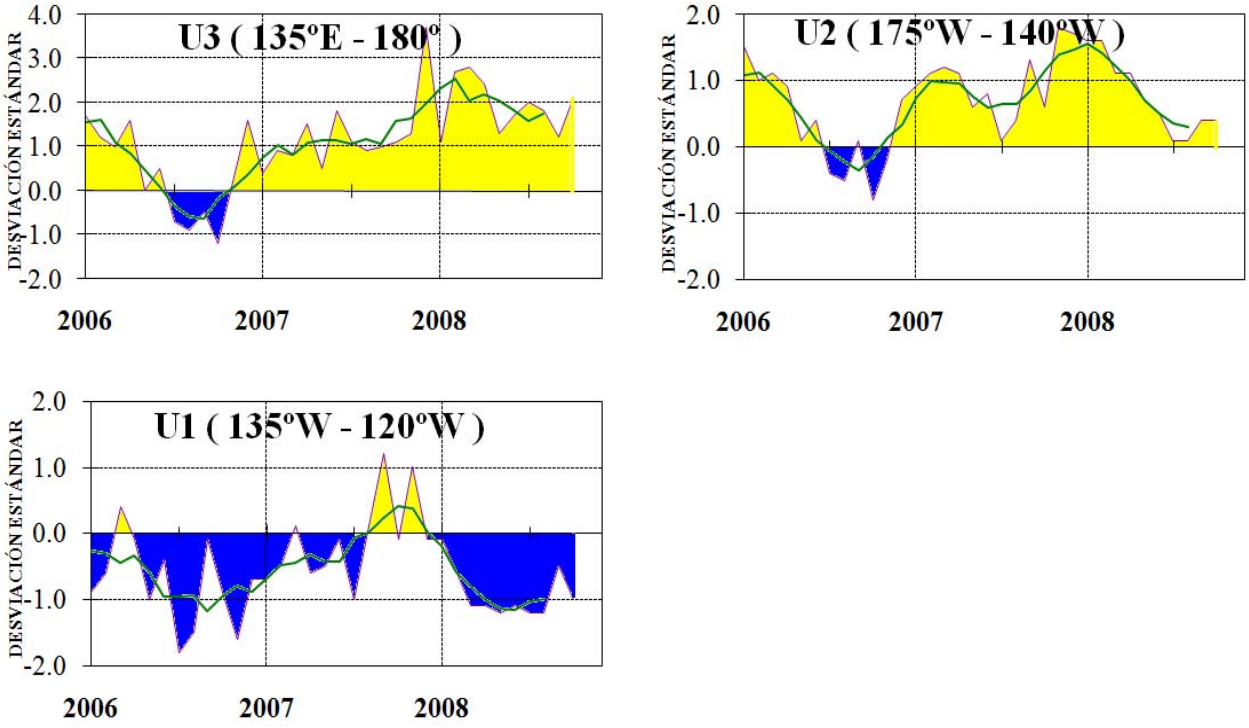


Figure 5.- Series and moving averages of five months of zonal wind standardized anomalies (m/s) averaged between 5°N and 5°S for three Equatorial zones: western (U3), central (U2) and eastern (U1). (Source: NCEP/NWS/NOAA/USA).

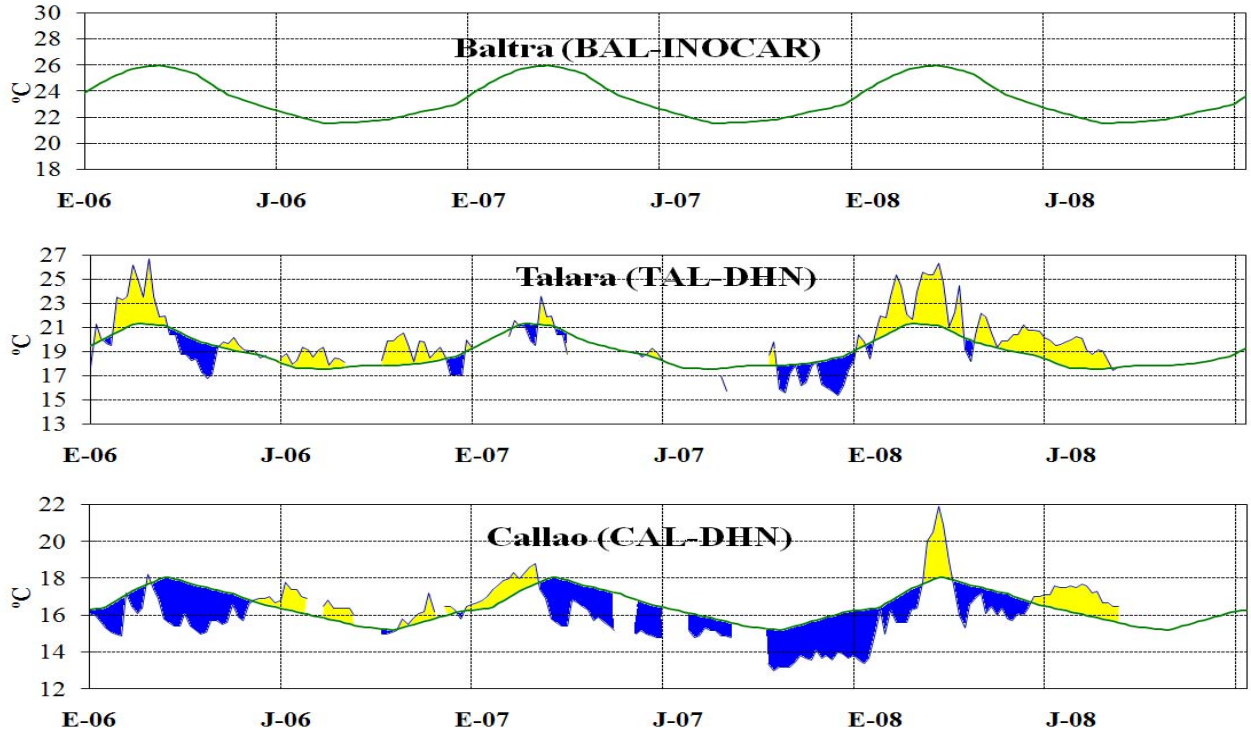


Figure 6.- Five day averages (pentads) of SST (°C) in Ports of Ecuador and Peru. The green curve indicates climatology. The location of oceanic indices appears in figure 1.
(Source: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami.)

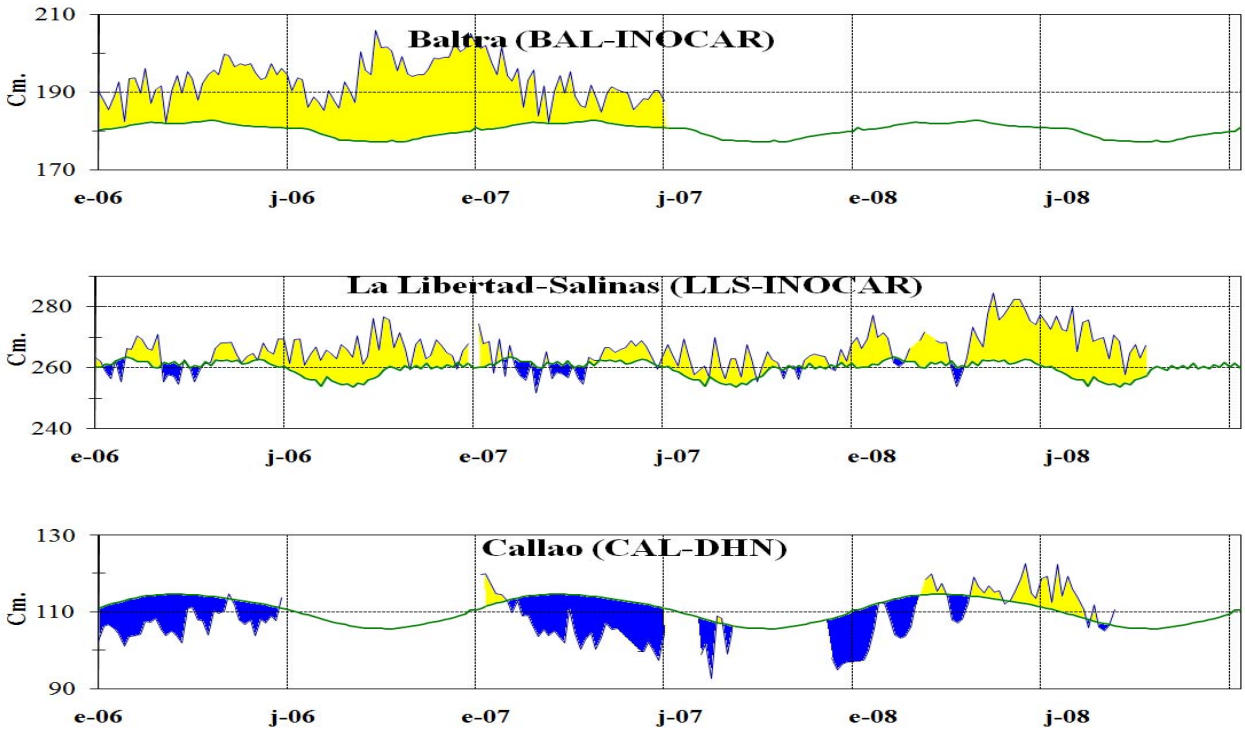


Figure 7.- Five-day running mean (pentads) of MSL (cm) in Ports of Peru and Ecuador. The green curve indicates climatology. The location of oceanic indices appears in figure 1.
(Sources: NOAA/Atlantic Oceanographic and Meteorological Laboratory – Miami, e INOCAR).

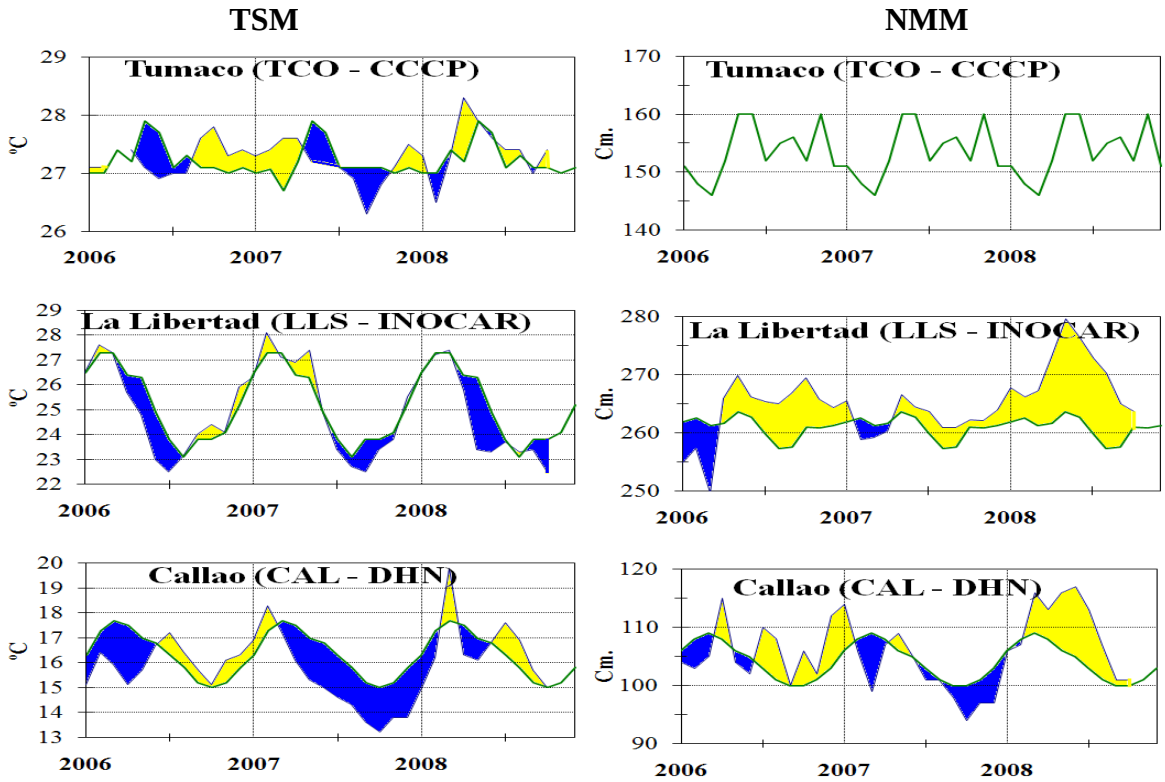


Figure 8a.- Monthly means of the SST (ºC) and MSL (cm) in five stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1.
(Sources: CCCP, INOCAR y DHN).

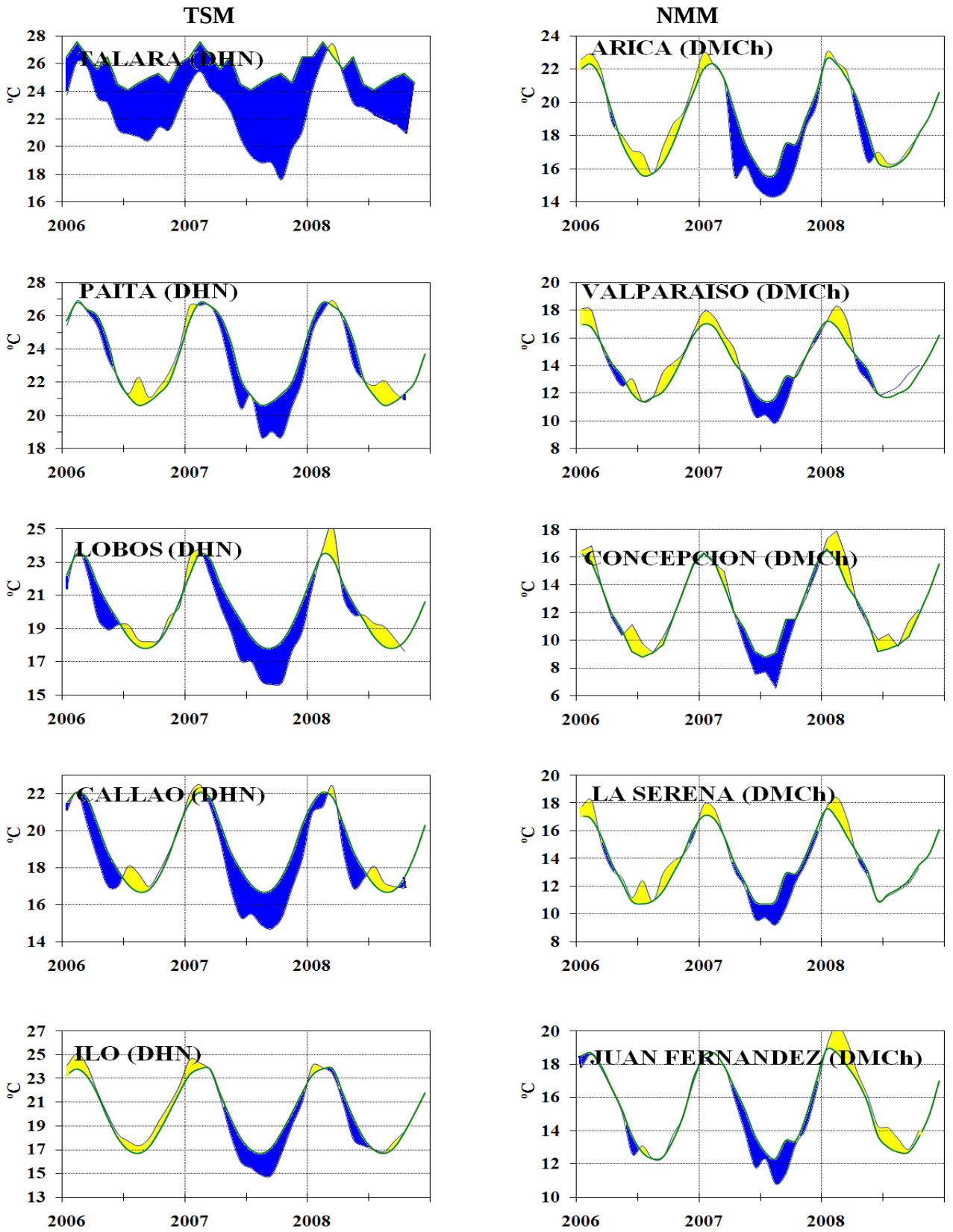


Figure 8b.- Monthly means of the SST (ºC) and MSL (cm) in five stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Source: SHOA).

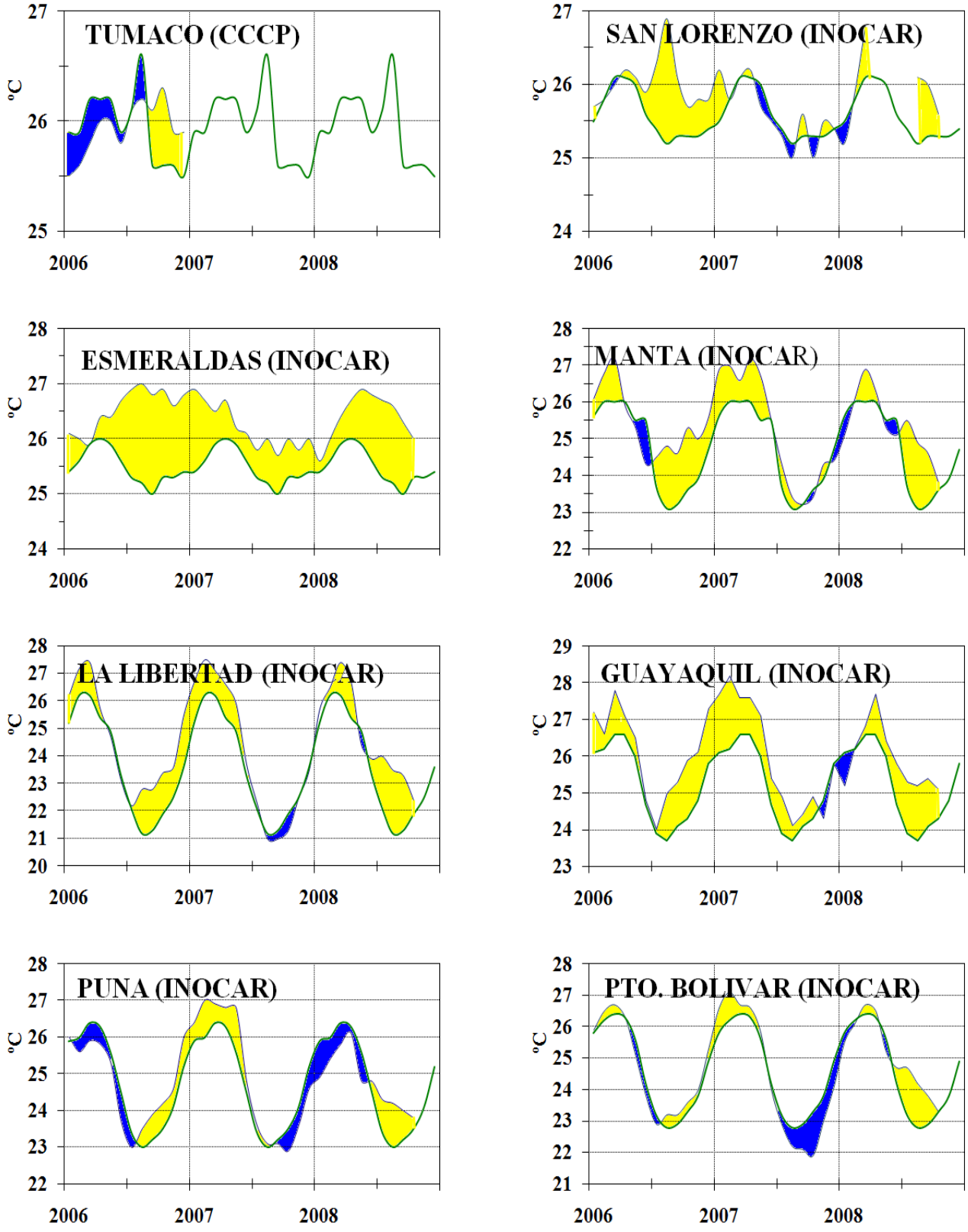


Figure 9a.- Monthly means of the air temperature (ºC) in 8 stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1. (Sources: CCCP & INOCAR).

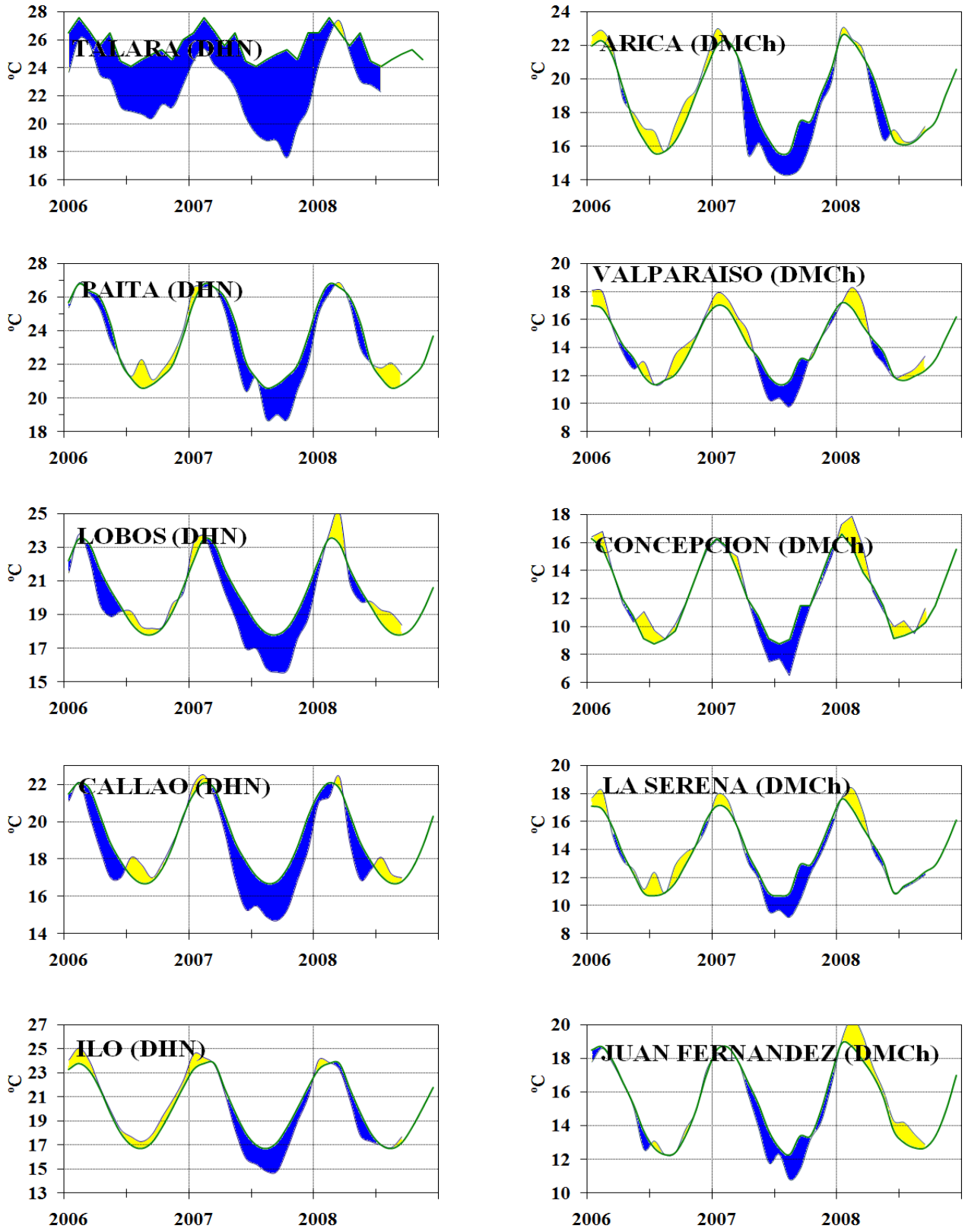


Figure 9b.- Monthly means of the AT (ºC) in 10 stations of the ERFEN region. Green curve indicates historic monthly mean. The location of the stations appears in Figure 1.
(Sources: DHN & DMCh).

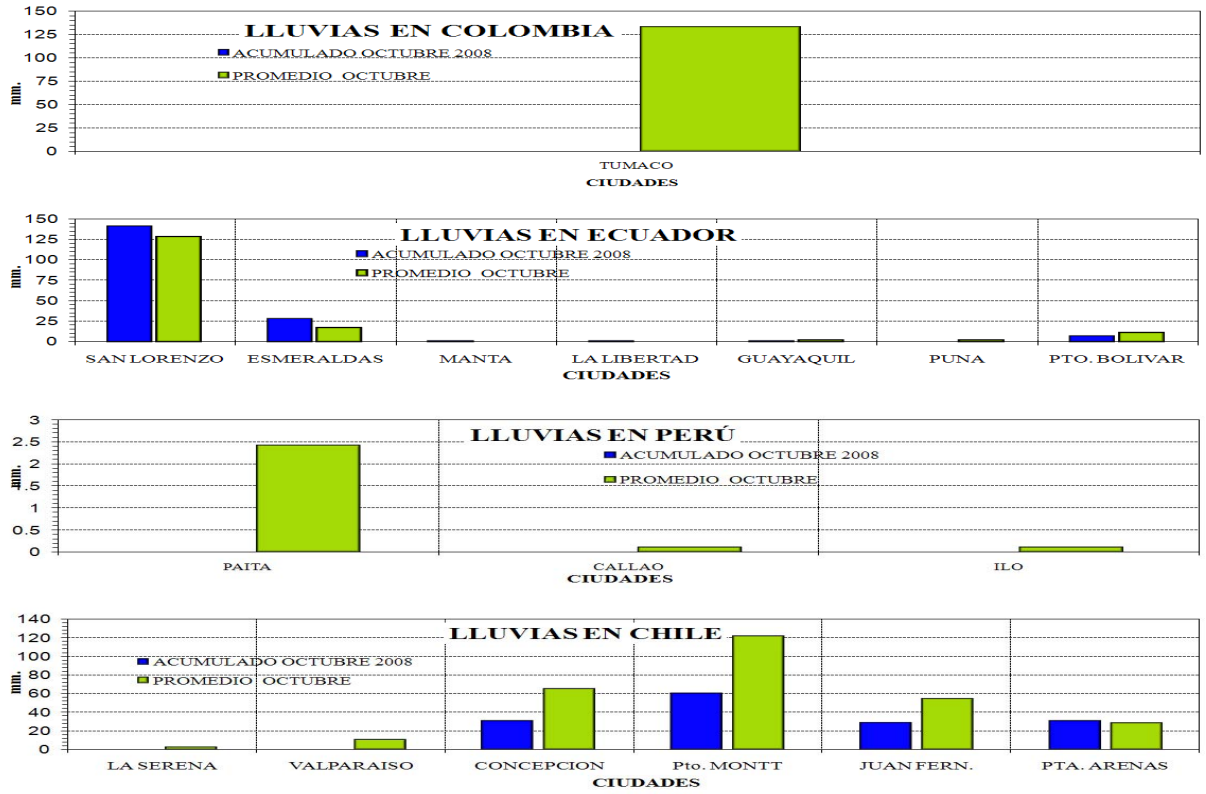


Figure 10.- Rains during October in the coastal stations of Colombia, Ecuador, Peru and Chile. Location of the stations appears in Figure 1.
(Sources: CCCP, INOCAR, DHN & DMCh).

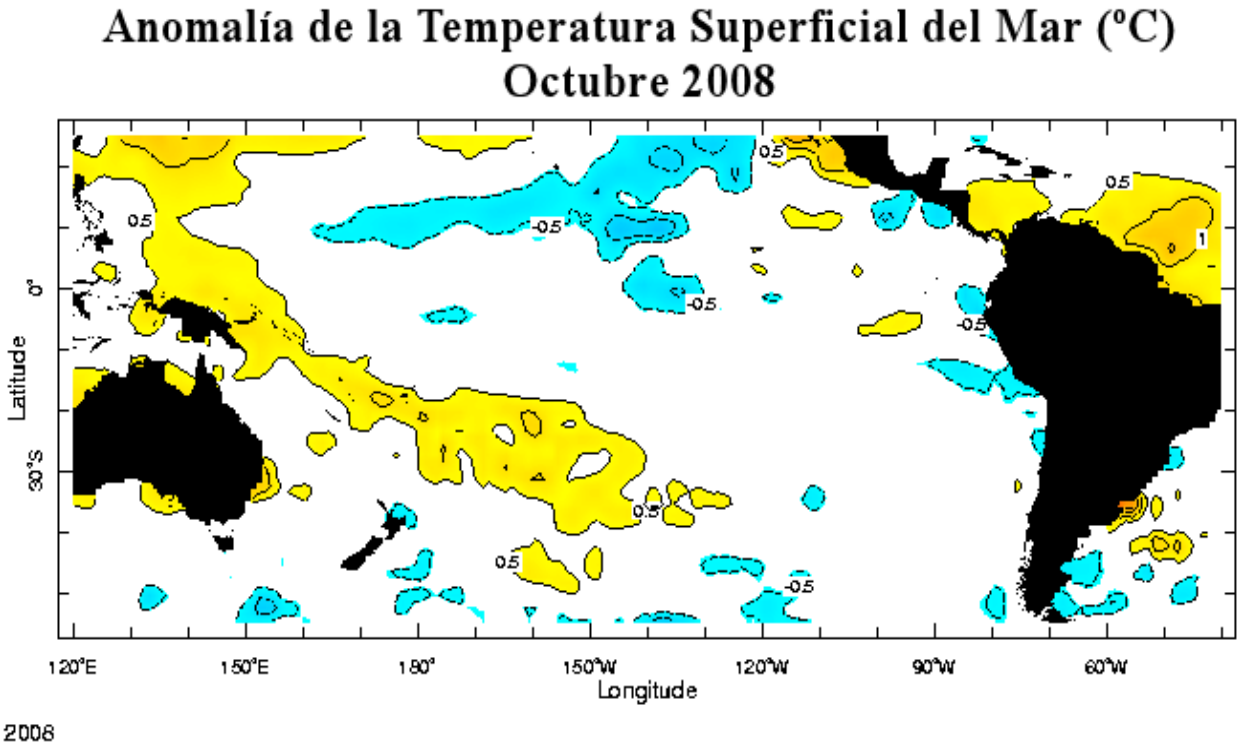


Figure 11.- Sea Surface Temperature Anomalies (ºC) October 2008.
(Source: International Research Institute for Climate and Society)

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