



Monitoreo y pronóstico de El Niño

Noviembre 2016

Comité Técnico ENFEN

09 de diciembre de 2016

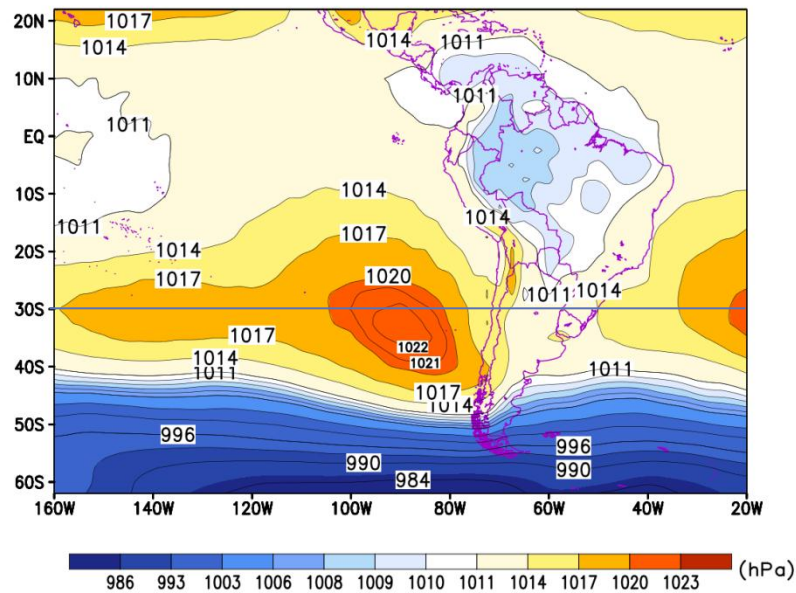


INDECI
INSTITUTO NACIONAL DE DEFENSA CIVIL

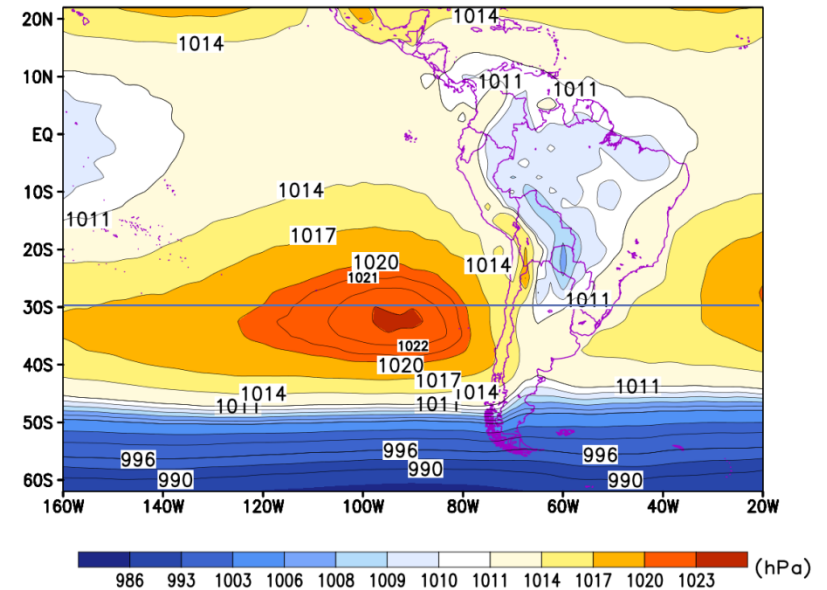


CAMPOS DE PRESIONES

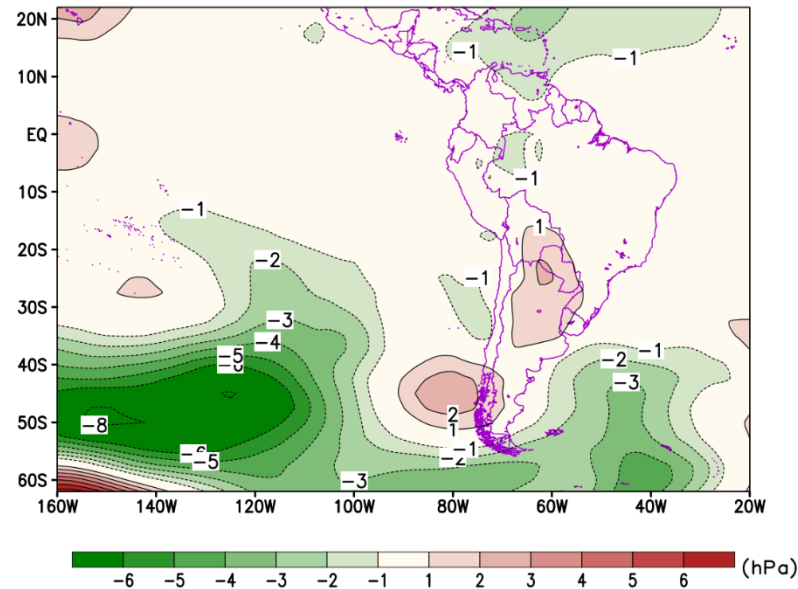
PRESION A NIVEL DEL MAR – 2016 NOVIEMBRE



CLIMATOLOGIA DE LA PRESION A NIVEL DEL MAR – NOVIEMBRE

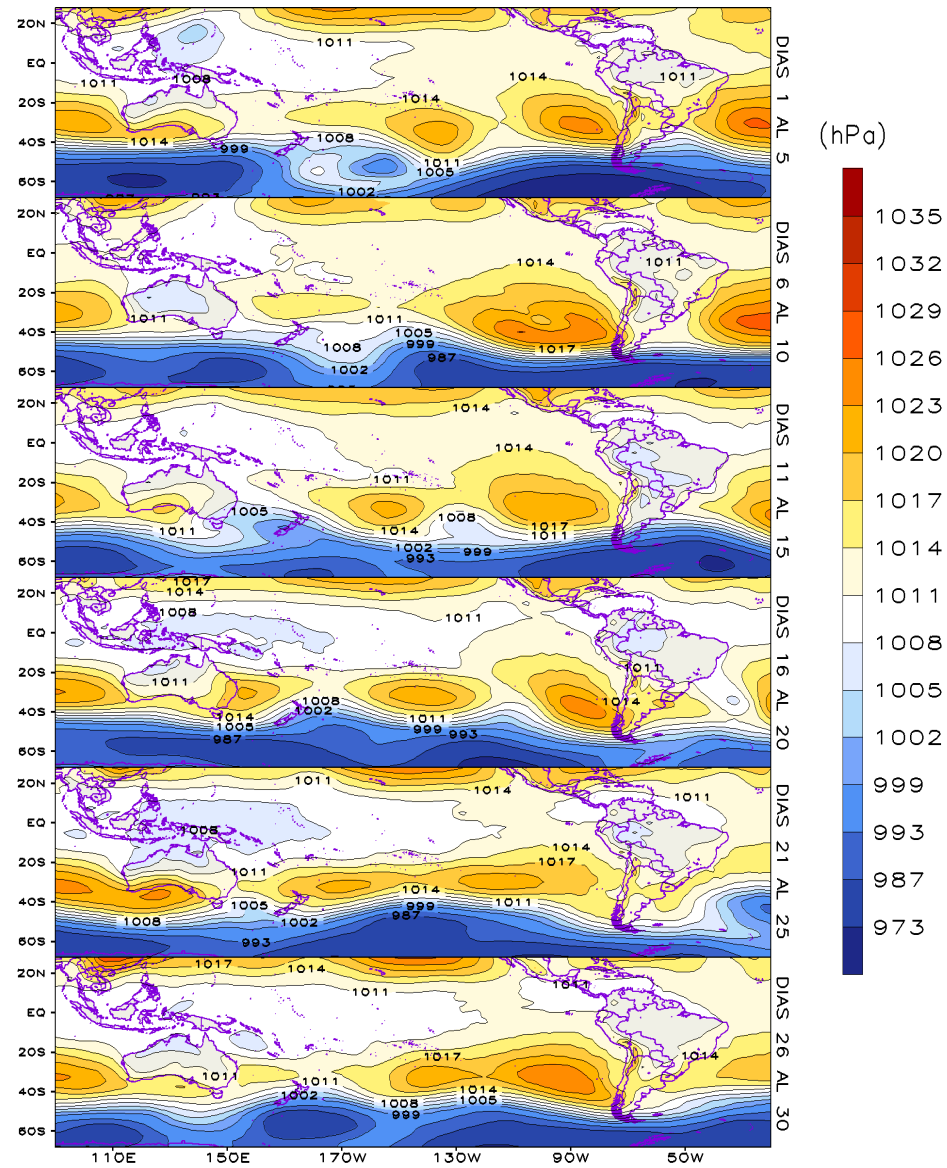


ANOMALIA DE LA PRESION A NIVEL DEL MAR – 2016 NOVIEMBRE

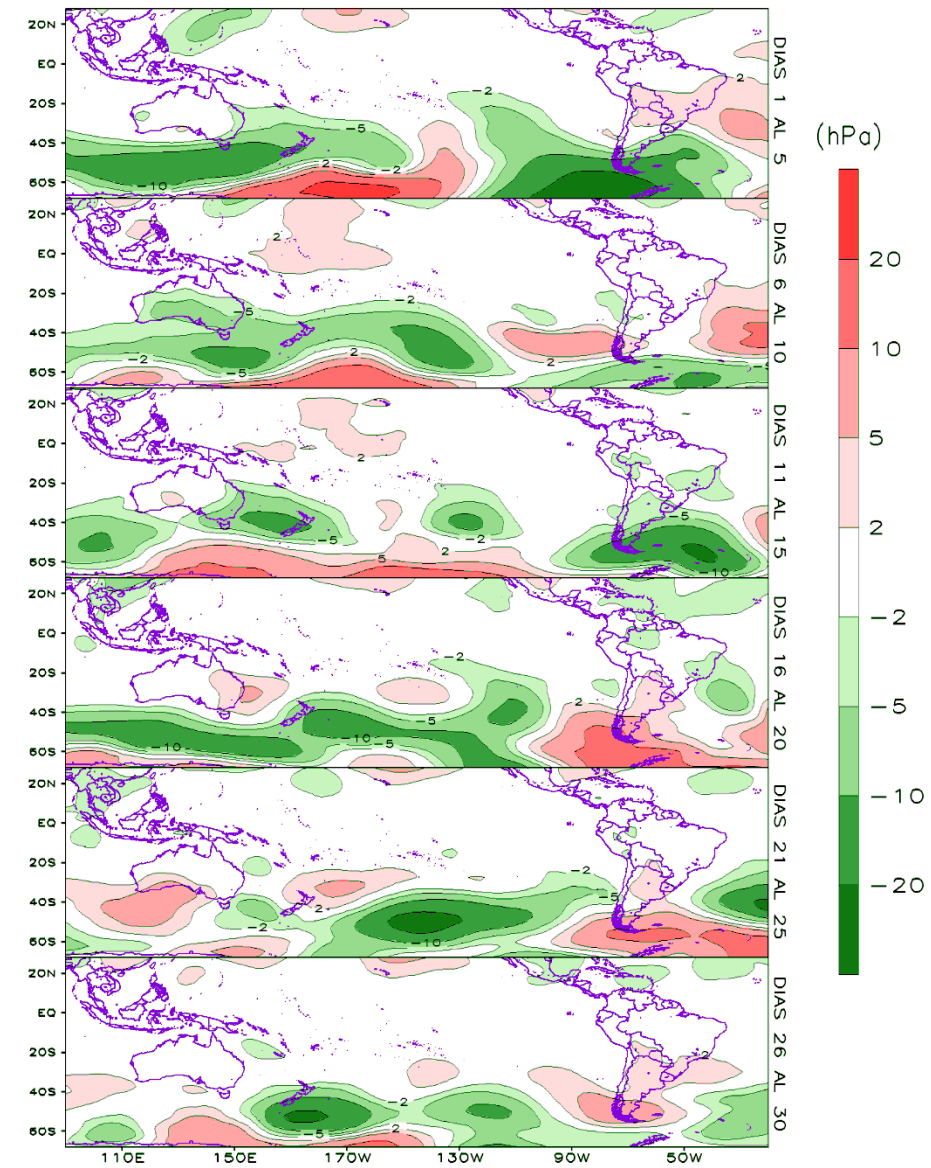


CAMPO DE PRESION Y ANOMALÍAS CADA 5 DIAS

PRESION A NIVEL DEL MAR – NOVIEMBRE 2016



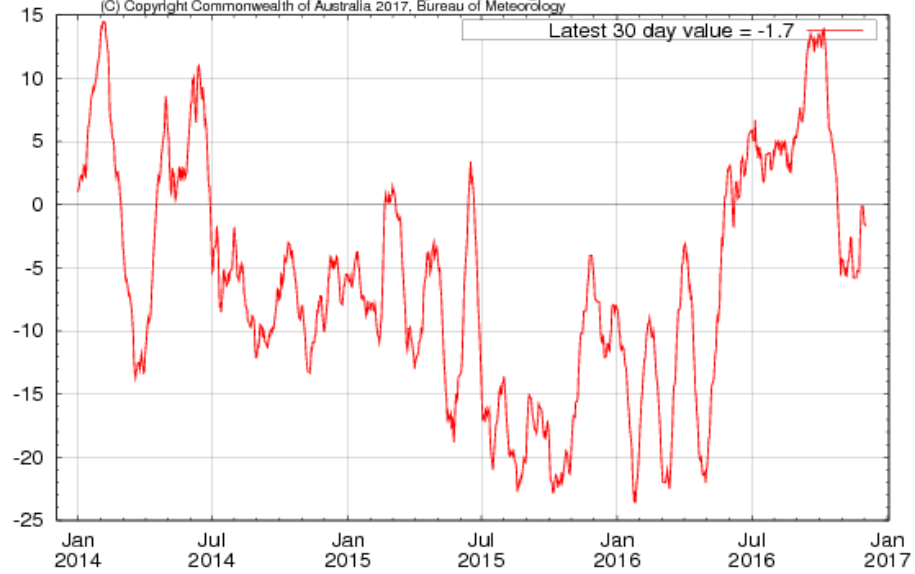
ANOMALIA DE LA PRESION A NIVEL DEL MAR – NOVIEMBRE 2016



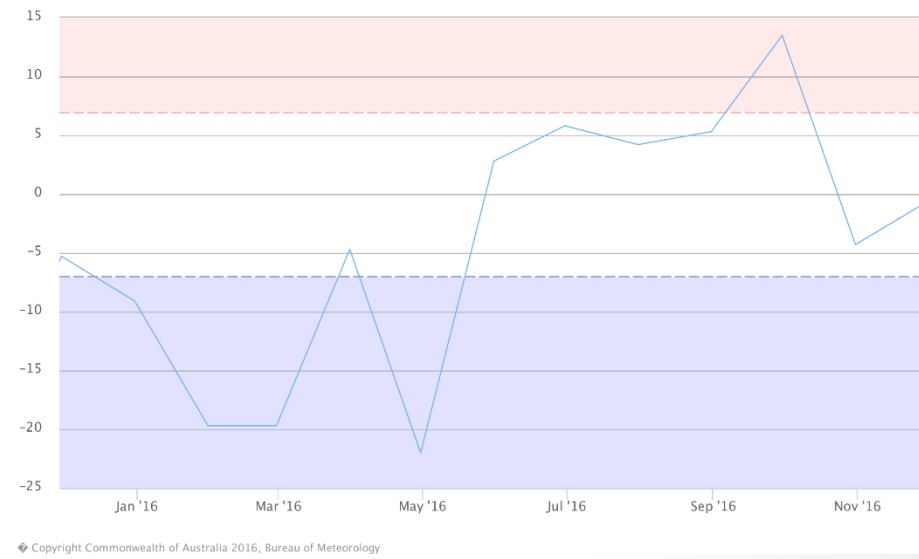
INDICE IOS

30 Day Moving SOI

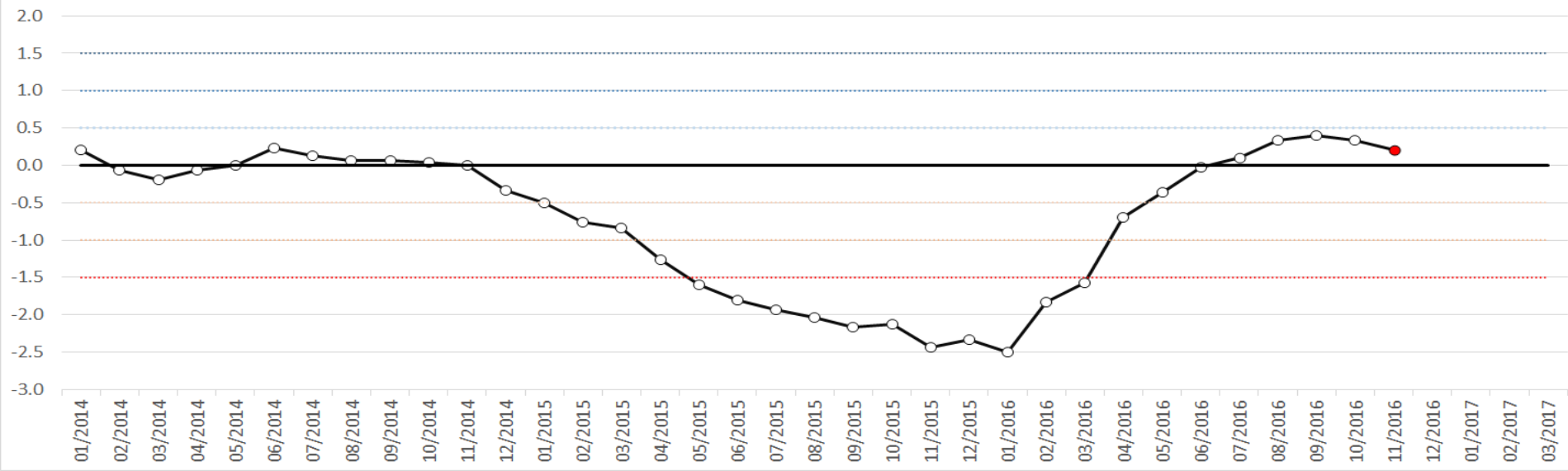
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Southern Oscillation Index – monthly

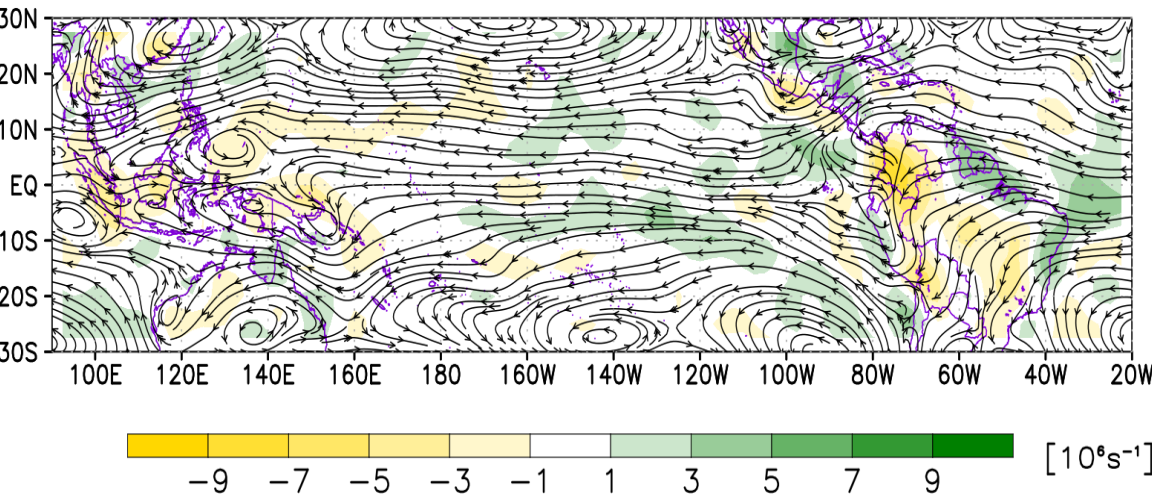


IOS-ECUATORIAL

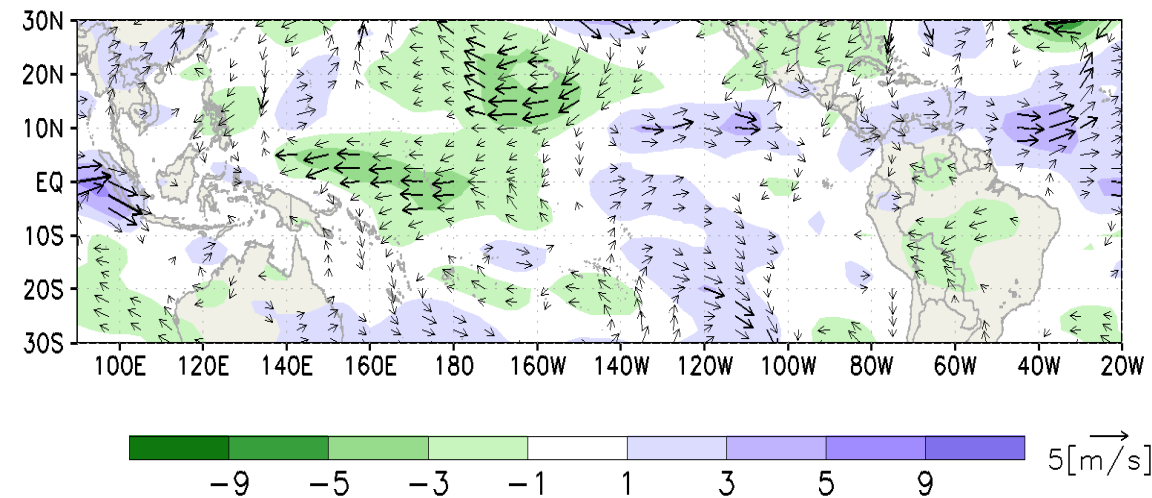


VIENTOS A 850hPa

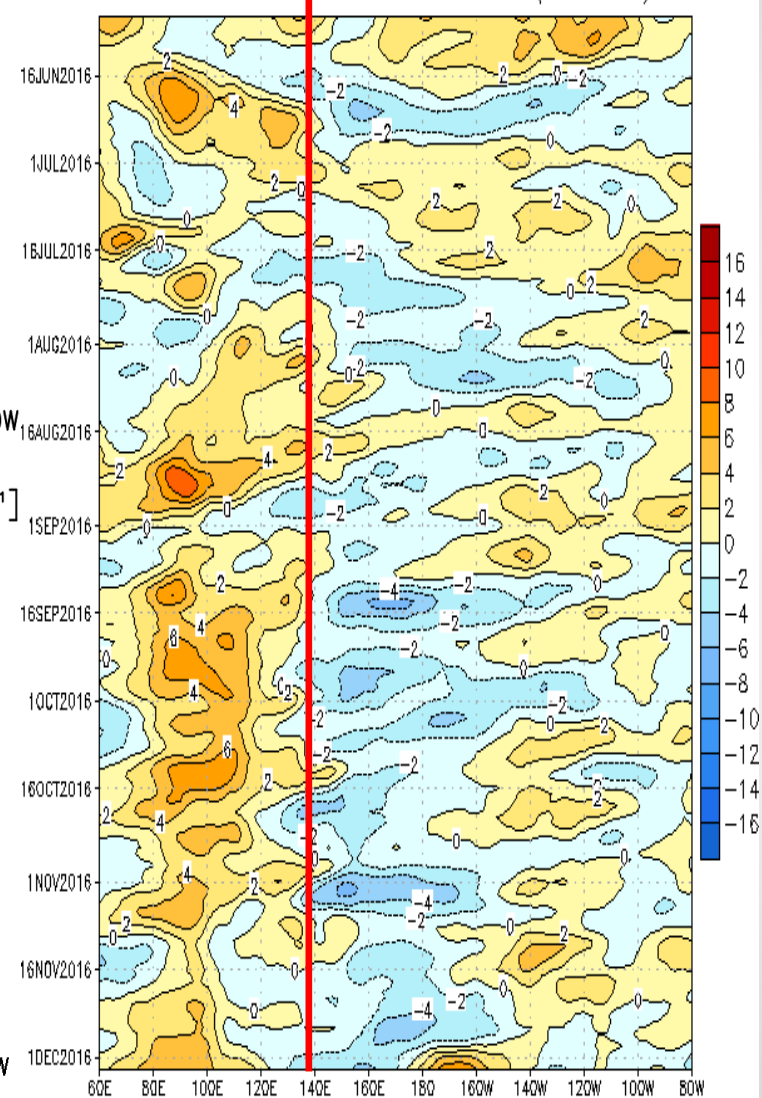
VIENTO PROMEDIO a 850hPa NOVIEMBRE 2016
NCEP-NOAA / SENAMHI -DCL



ANOMALIA DE VIENTO a 850hPa NOVIEMBRE 2016
NCEP-NOAA / SENAMHI -DCL



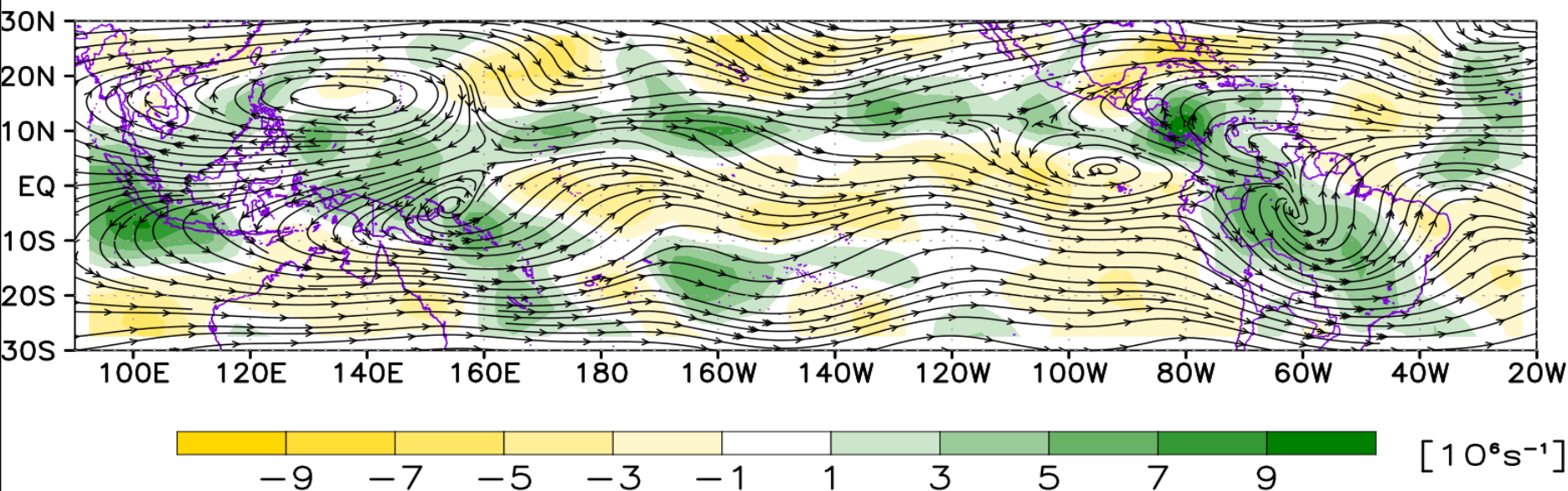
CDAS 850-hPa U Anoms. (5N-5S)



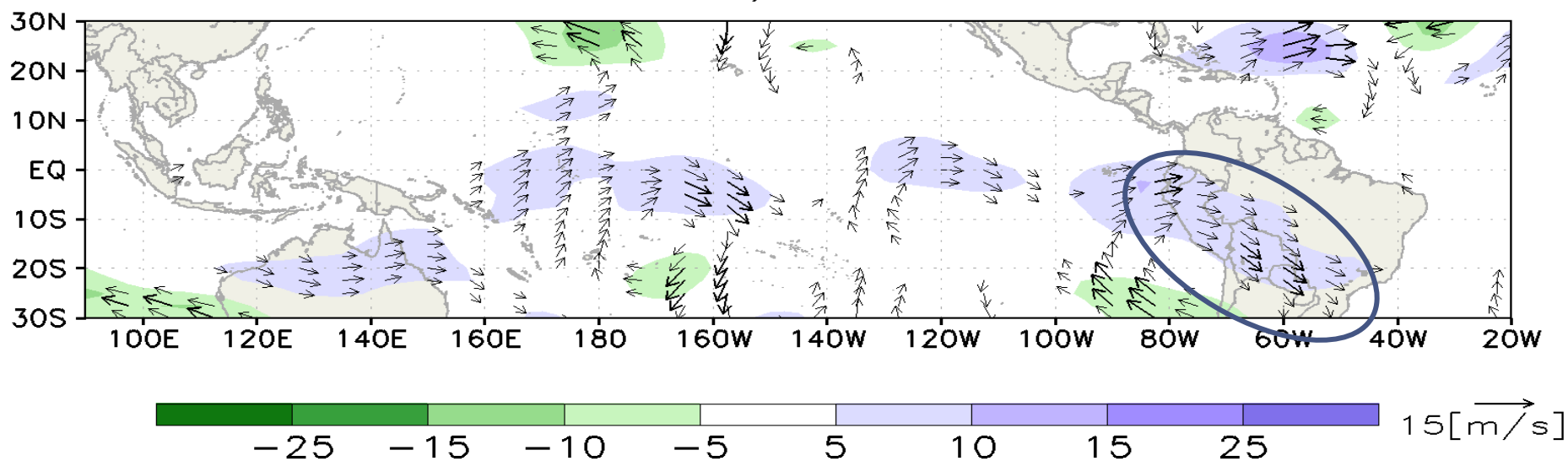
Data updated through 03 DEC 2016

VIENTO A 200 hPa

VIENTO PROMEDIO a 200hPa NOVIEMBRE 2016
NCEP-NOAA / SENAMHI -DCL



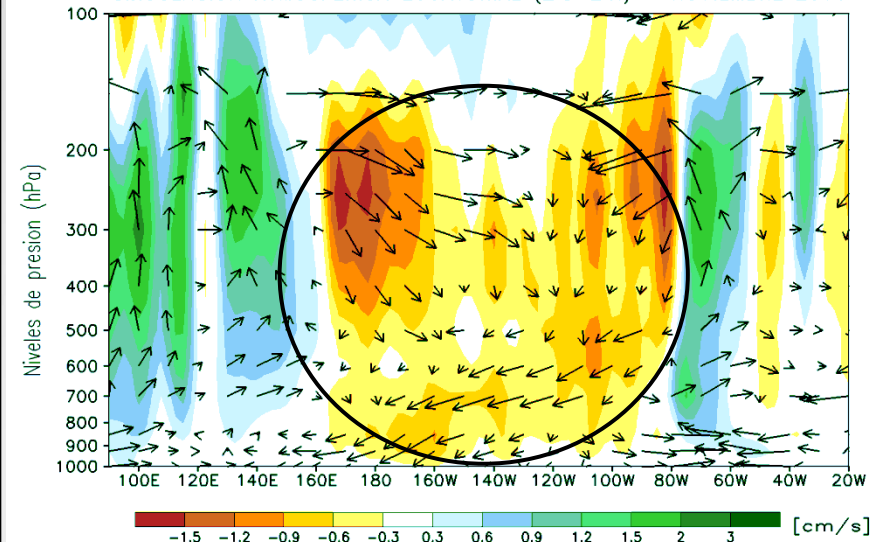
ANOMALIA DE VIENTO a 200hPa NOVIEMBRE 2016
NCEP-NOAA / SENAMHI -DCL



MONITOREO DE LA CIRCULACION ATMOSF. EC. 5°N-5°S

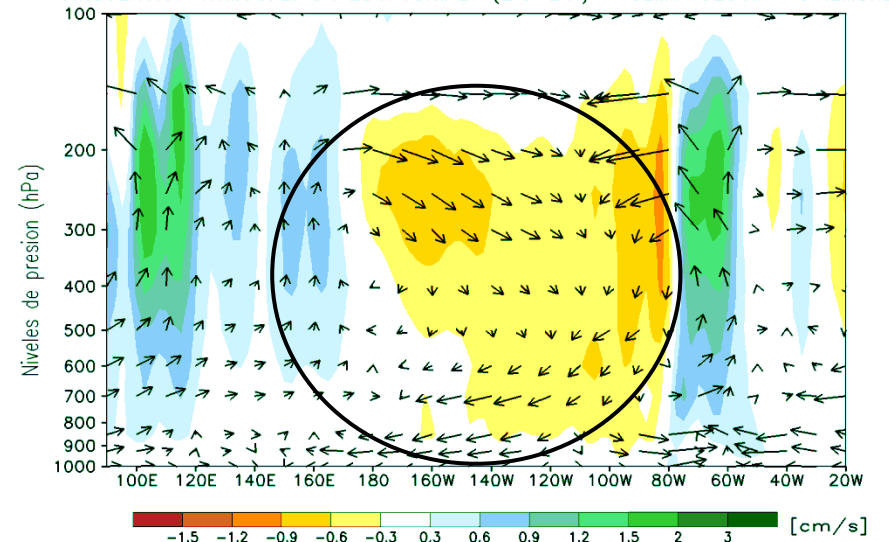
a)

CIRCULACION ATMOSFERICA ECUATORIAL (2°S-2°N) - NOVIEMBRE 2016



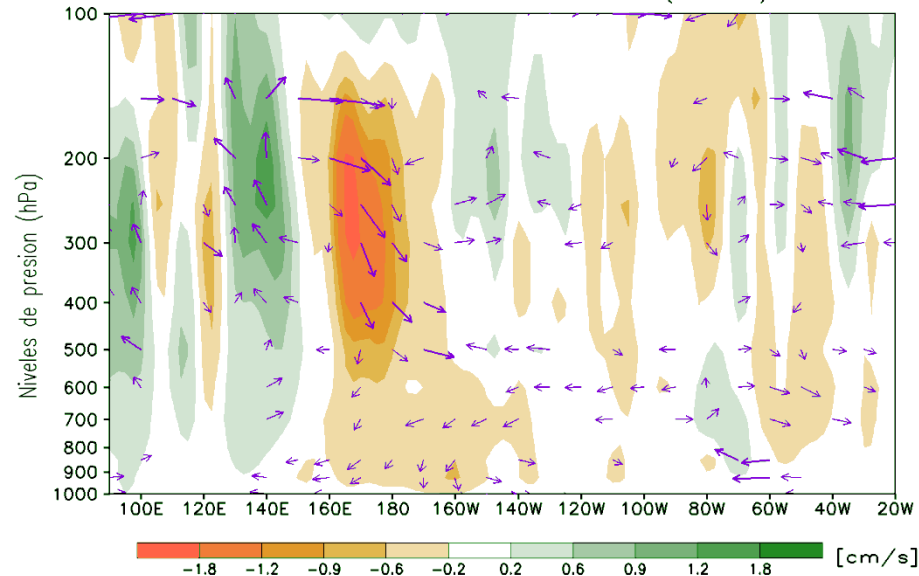
b)

CIRCULACION ATMOSFERICA ECUATORIAL (2°S-2°N) - CLIMATOLOGIA NOVIEMBRE



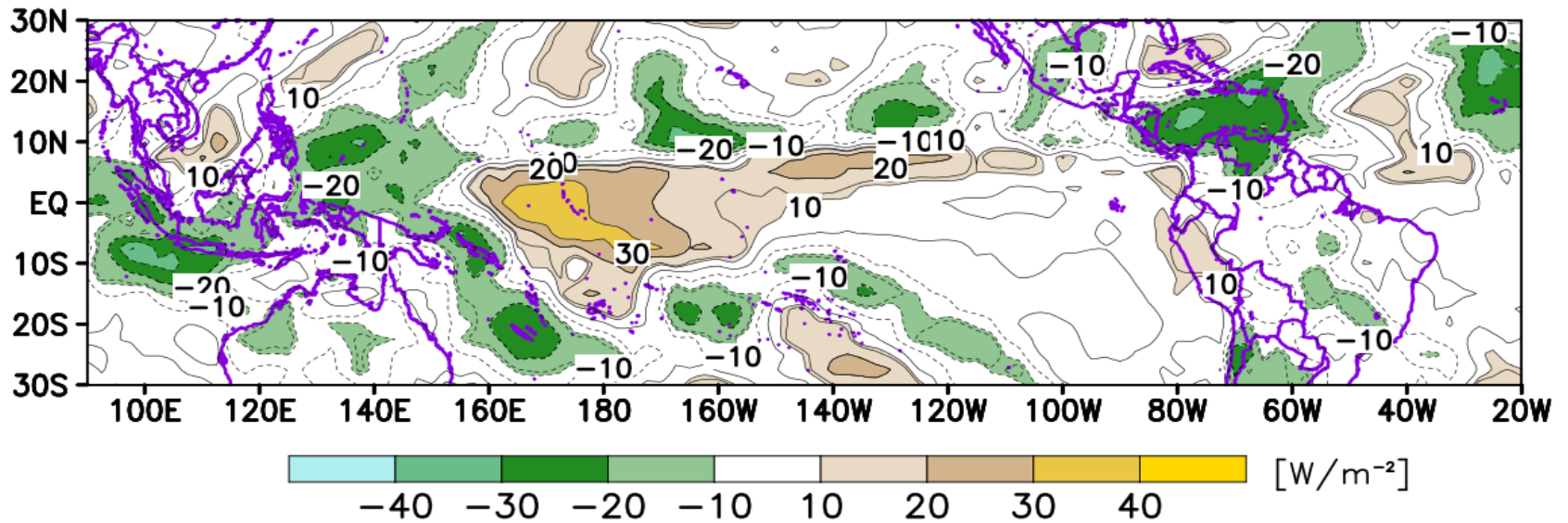
c)

ANOMALIA DE LA CIRCULACION ATMOSFERICA ECUATORIAL (2°S-2°N) - NOVIEMBRE 2016

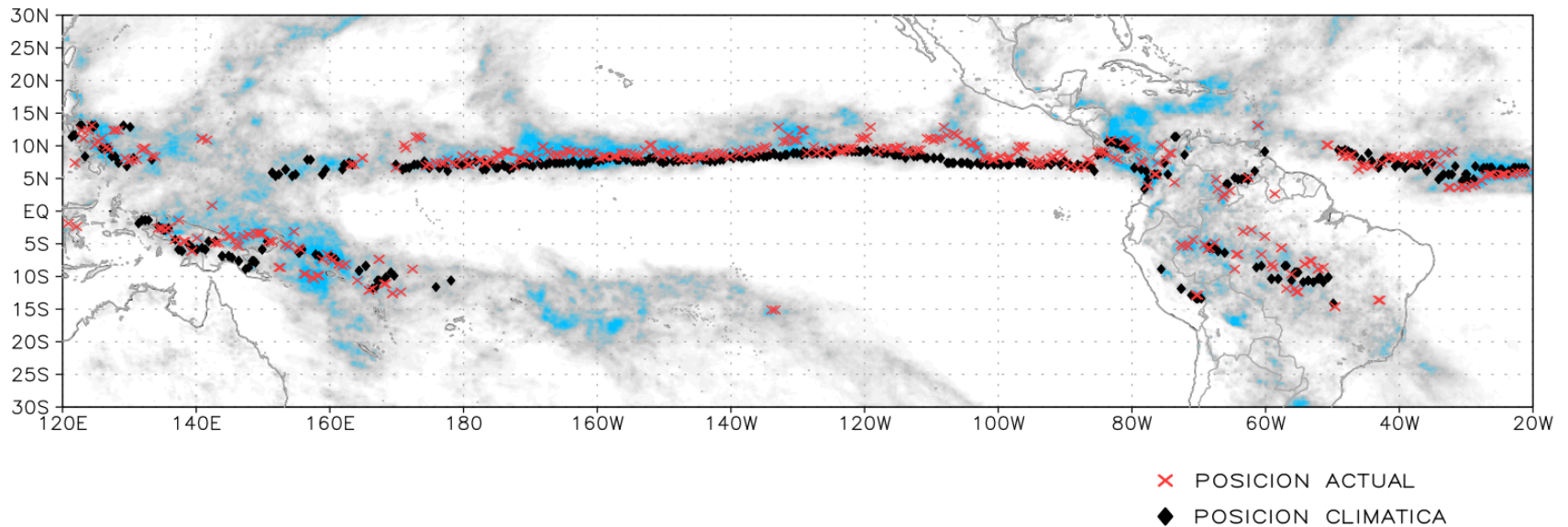


CONVECCIÓN & PRECIPITACIÓN

ANOMALIA DE OLR – 2016 NOVIEMBRE

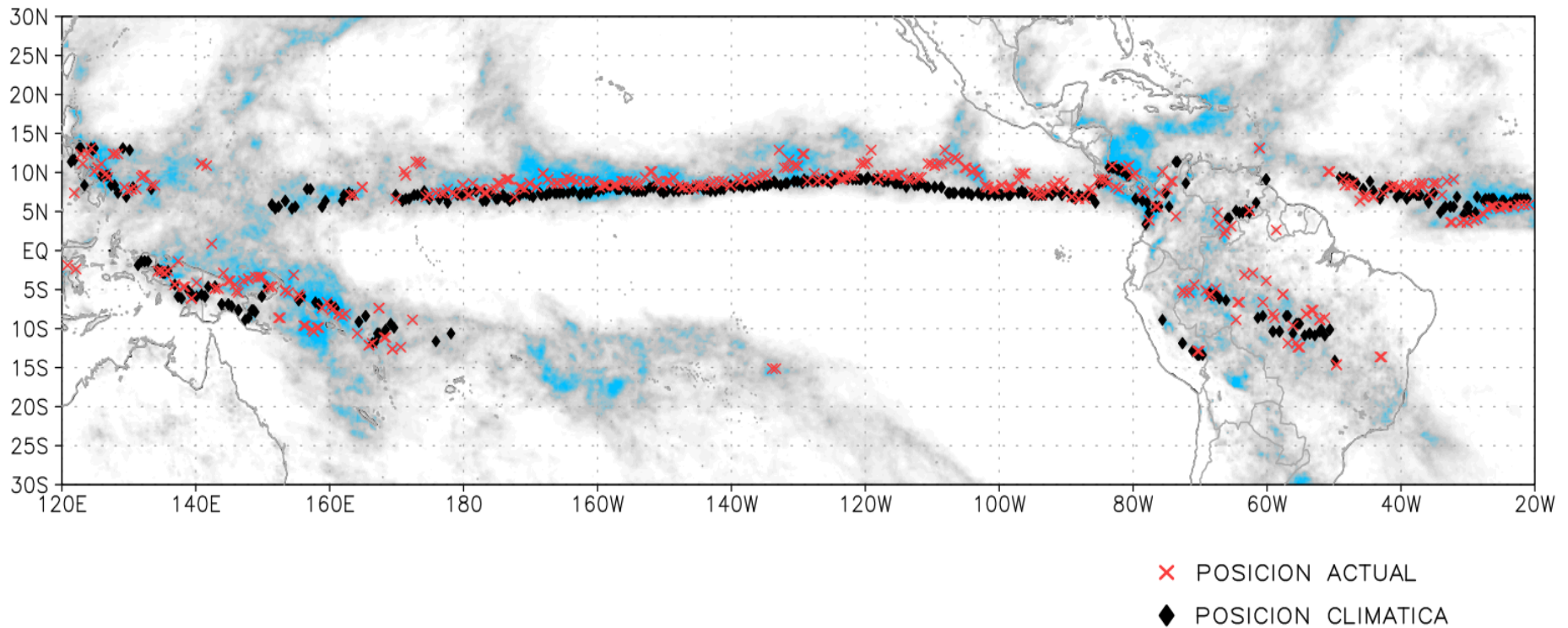


ZCIT – NOVIEMBRE DE 2016



CONVECCIÓN & PRECIPITACIÓN

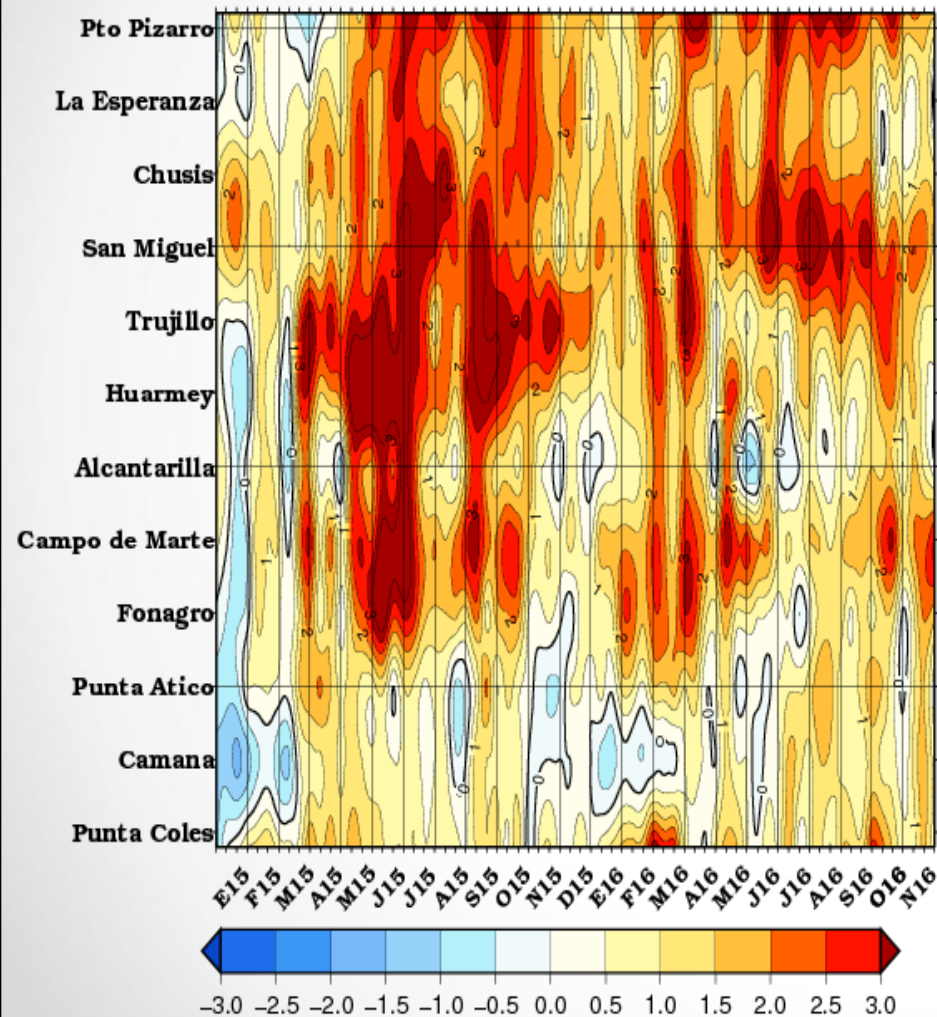
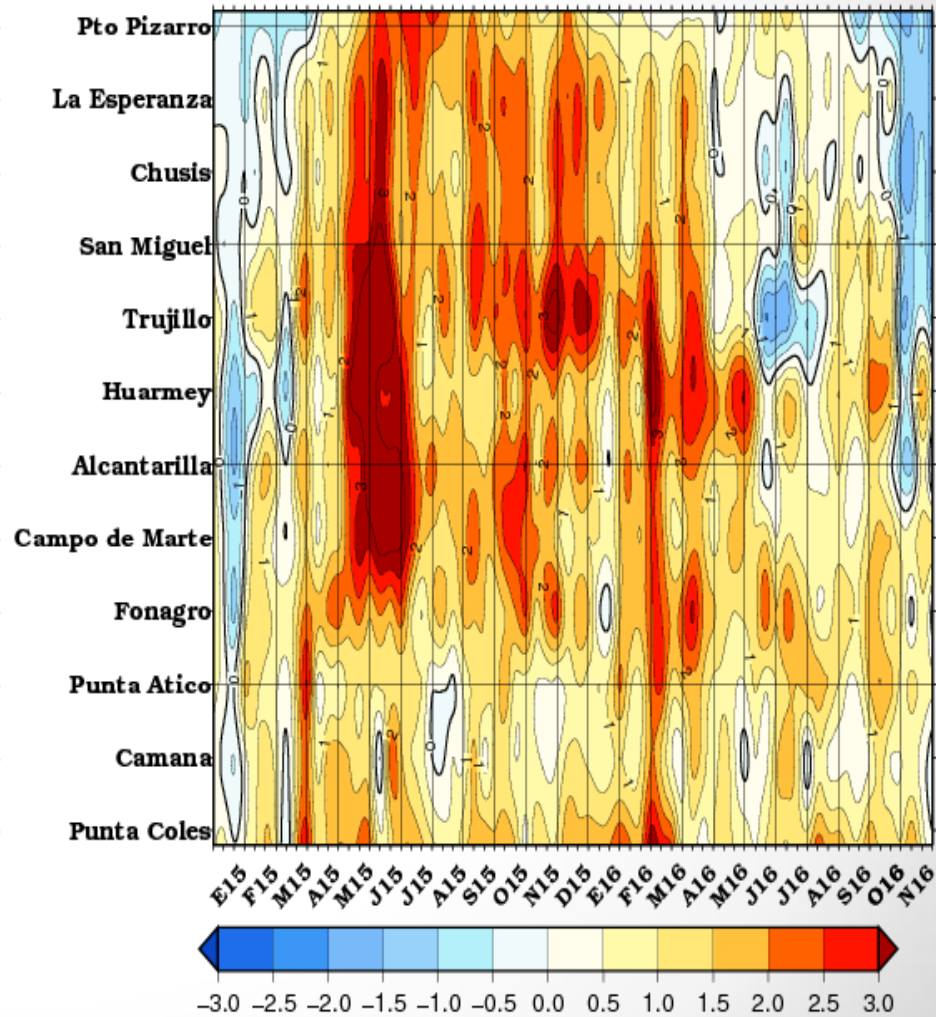
ZCIT – NOVIEMBRE DE 2016



TEMPERATURAS EXTREMAS DEL AIRE

Anomalías de la
Temperatura Máxima

Anomalía de la
Temperatura Mínima



TEMPERATURAS EXTREMAS DEL AIRE

Figura 1

Distribución de las estaciones meteorológicas en el litoral peruano

ANOMALIAS PROMEDIO TEMPERATURA MÁXIMA

Estación	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEPT	OCT	NOV
Costa Norte	1.4	1.7	1.9	1.5	1.6	2.1	2.2	2.4	2.1	2.0	1.2
Costa Centro	1.0	1.7	2.0	1.3	1.8	1.2	0.8	0.8	1.2	2.3	1.4
Costa Sur	0.3	1.0	1.4	0.7	0.9	0.5	1.0	1.2	1.1	0.9	1.0

ANOMALIAS PROMEDIO TEMPERATURA MÍNIMA

Estación	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEPT	OCT	NOV
Costa Norte	1.6	1.5	1.2	1.0	0.4	-0.1	0.0	0.0	0.1	0.1	-1.3
Costa Centro	1.0	2.0	1.8	2.1	1.9	0.5	0.7	0.8	1.0	1.1	0.7
Costa Sur	0.2	1.8	1.5	1.3	0.7	0.9	1.2	1.1	0.8	1.0	0.2

DATA EXTENDIDA

Estación	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEPT	OCT	NOV
Puerto Pizarro	1.1	1.9	2.1	2.7	2.1	2.7	2.6	3.1	2.4	3.0	1.6
La Esperanza	1.2	1.3	1.2	1.4	1.7	2.1	1.7	1.7	1.5	1.1	0.4
Chusis	1.5	1.7	2.4	1.7	2.1	2.5	2.3	2.1	2.0	1.2	1.2
San Miguel	1.8	2.3	1.9	1.8	2.3	3.3	3.3	3.3	2.9	2.6	2.1
Lambayeque	1.3	1.1	1.5	-0.1	0.9	1.4	1.9	2.1	1.8	1.9	1.2
Trujillo	1.4	1.8	2.3	1.7	0.8	0.9	1.4	2.0	1.9	2.4	0.9
Huarmey	1.0	1.8	2.2	1.1	2.0	1.6	1.1	0.7	0.8	2.2	0.9
Alcantarilla	0.3	1.2	1.8	0.7	0.5	0.2	0.2	0.4	0.9	1.5	0.8
Campo de Marte	1.7	2.0	2.1	2.1	2.9	1.6	1.2	1.4	1.8	3.1	2.5
Fonagro	1.3	2.2	2.5	1.5	1.3	0.5	0.1	1.2	0.8	1.3	1.5
Punta Atico	0.7	1.0	1.5	0.7	0.4	0.2	1.0	1.5	1.3	0.6	0.8
Camana	-0.6	-0.4	0.1	0.4	0.7	0.1	1.2	1.3	0.8	0.6	1.2
Punta Coles	0.8	1.7	1.8	0.5	1.2	0.5	1.0	1.0	1.6	1.3	1.0
Ite	0.2	1.0	1.0	0.7	1.2	1.2	1.3	1.5	1.6	1.1	1.2
La Yarada	-0.4	0.6	1.2	0.4	0.6	0.4	1.2	0.5	0.6	0.5	0.5

DATA EXTENDIDA

Estación	ENE	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEPT	OCT	NOV
Puerto Pizarro	0.7	0.7	0.5	0.4	0.7	0.6	0.7	0.2	-0.6	-1.0	-1.5
La Esperanza	1.8	1.3	1.2	0.9	0.4	0.3	0.4	0.3	0.7	0.7	-1.4
Chusis	1.4	1.4	1.2	1.0	0.1	-0.2	-0.1	0.2	0.3	-0.7	-1.6
San Miguel	1.7	1.6	1.7	1.4	0.7	0.4	0.7	0.7	1.4	1.2	-1.3
Lambayeque	1.8	1.5	1.2	0.4	0.0	-0.4	-0.6	-1.9	-1.9	-1.1	-0.8
Trujillo	2.0	2.6	1.4	1.7	0.5	-1.4	-1.3	0.2	0.9	1.3	-1.0
Huarmey	1.1	2.1	2.3	2.7	2.6	0.9	1.0	1.0	1.6	1.8	0.8
Alcantarilla	0.8	2.1	1.8	1.7	1.5	0.3	0.8	0.6	0.5	0.1	-0.4
Campo de Marte	1.2	1.9	1.4	2.0	1.5	0.3	0.2	0.8	0.8	1.5	1.7
Fonagro	0.5	1.9	2.3	2.3	1.1	1.7	1.9	0.8	1.4	0.7	0.2
Punta Atico	1.4	1.4	1.9	1.3	0.6	0.9	1.6	1.5	0.9	1.7	0.9
Camana	0.8	1.3	0.7	1.2	0.6	0.7	0.9	0.5	0.3	0.7	0.2
Punta Coles	1.8	2.2	1.8	0.7	0.9	0.9	1.2	1.6	1.2	1.3	0.8
Ite	0.1	1.4	0.9	0.8	0.9	0.6	0.8	1.2	1.0	1.2	0.0
La Yarada	-3.3	2.5	1.5	1.3	0.2	0.4	0.9	1.1	0.2	0.5	-1.1



Velocidad y Dirección del Viento (noviembre 2016)

01-05/11/16

05-10/11/16

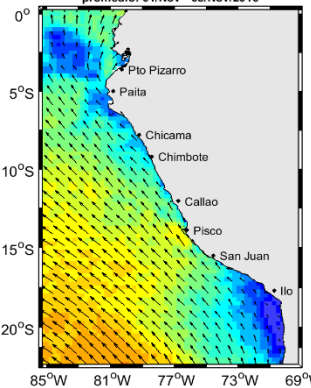
11-15/11/16

16-20/11/16

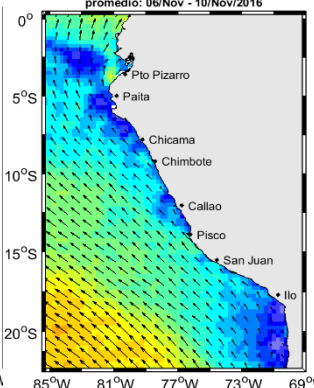
21-25/11/16

26-30/11/16

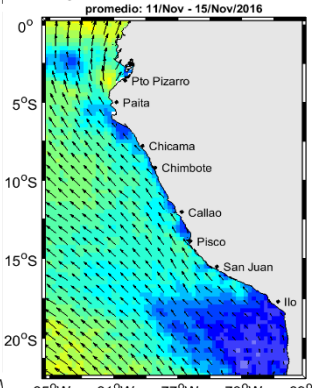
Velocidad y Dirección del Viento, Satellite ASCAT - IMARPE
promedio: 01/Nov - 05/Nov/2016



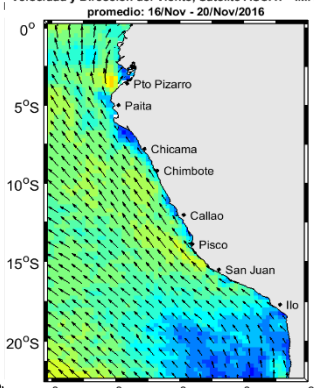
Velocidad y Dirección del Viento, Satellite ASCAT - IMARPE
promedio: 06/Nov - 10/Nov/2016



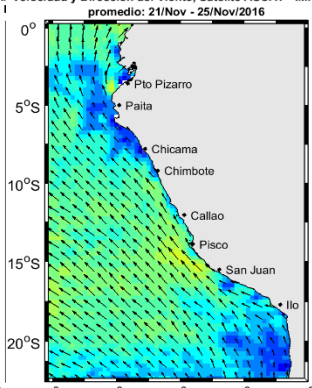
Velocidad y Dirección del Viento, Satellite ASCAT - IMARPE
promedio: 11/Nov - 15/Nov/2016



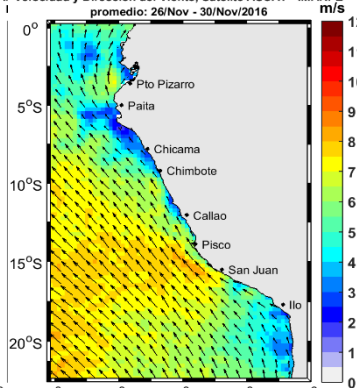
Velocidad y Dirección del Viento, Satellite ASCAT - IMARPE
promedio: 16/Nov - 20/Nov/2016



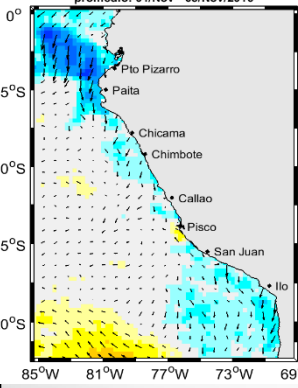
Velocidad y Dirección del Viento, Satellite ASCAT - IMARPE
promedio: 21/Nov - 25/Nov/2016



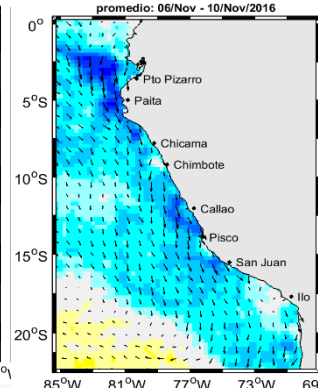
Velocidad y Dirección del Viento, Satellite ASCAT - IMARPE
promedio: 26/Nov - 30/Nov/2016



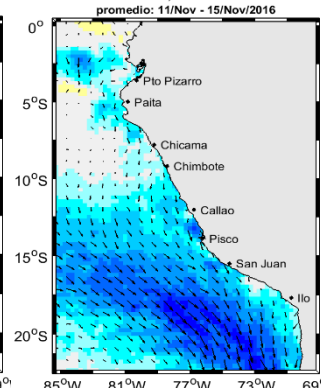
Anomalia del Viento, Satellite ASCAT - IMARPE
promedio: 01/Nov - 05/Nov/2016



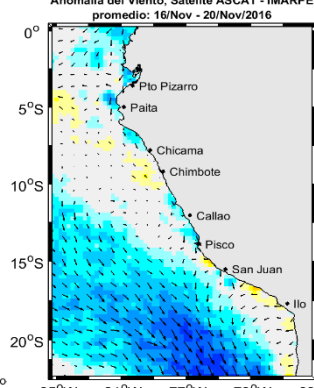
Anomalia del Viento, Satellite ASCAT - IMARPE
promedio: 06/Nov - 10/Nov/2016



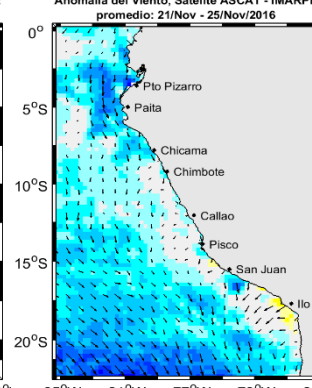
Anomalia del Viento, Satellite ASCAT - IMARPE
promedio: 11/Nov - 15/Nov/2016



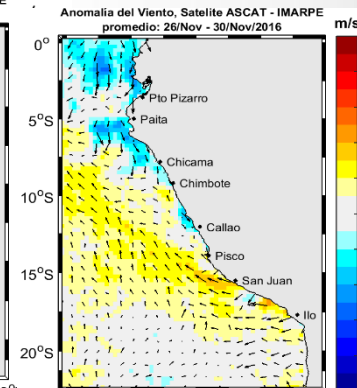
Anomalia del Viento, Satellite ASCAT - IMARPE
promedio: 16/Nov - 20/Nov/2016



Anomalia del Viento, Satellite ASCAT - IMARPE
promedio: 21/Nov - 25/Nov/2016

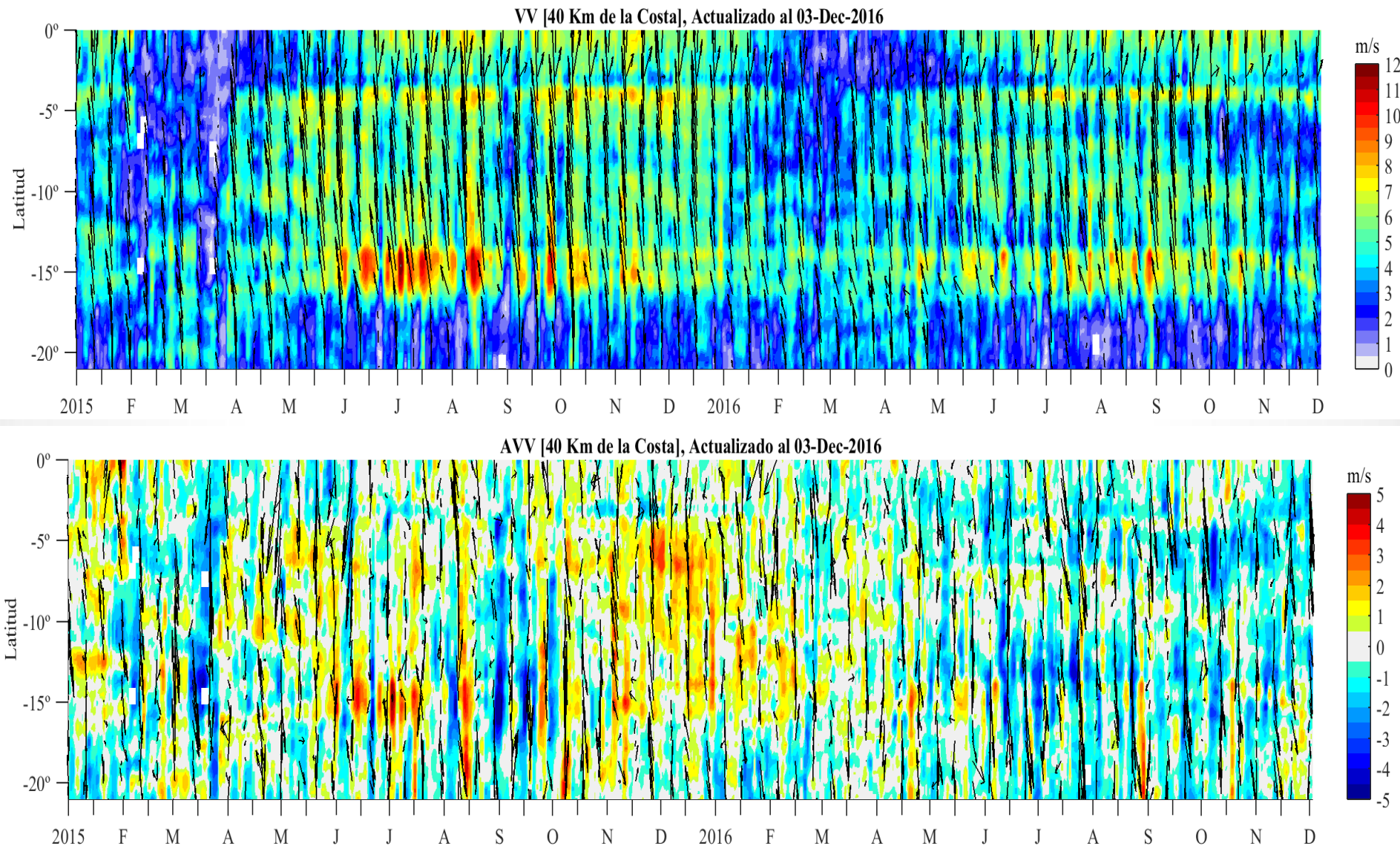


Anomalia del Viento, Satellite ASCAT - IMARPE
promedio: 26/Nov - 30/Nov/2016



Mapas promedio **5 días** de la velocidad y anomalía del viento registrado por el Satélite ASCAT (frente a la costa de Perú): Fuente: Satélite ASCAT, Procesamiento: Laboratorio de Hidro-Física Marina, IMARPE.

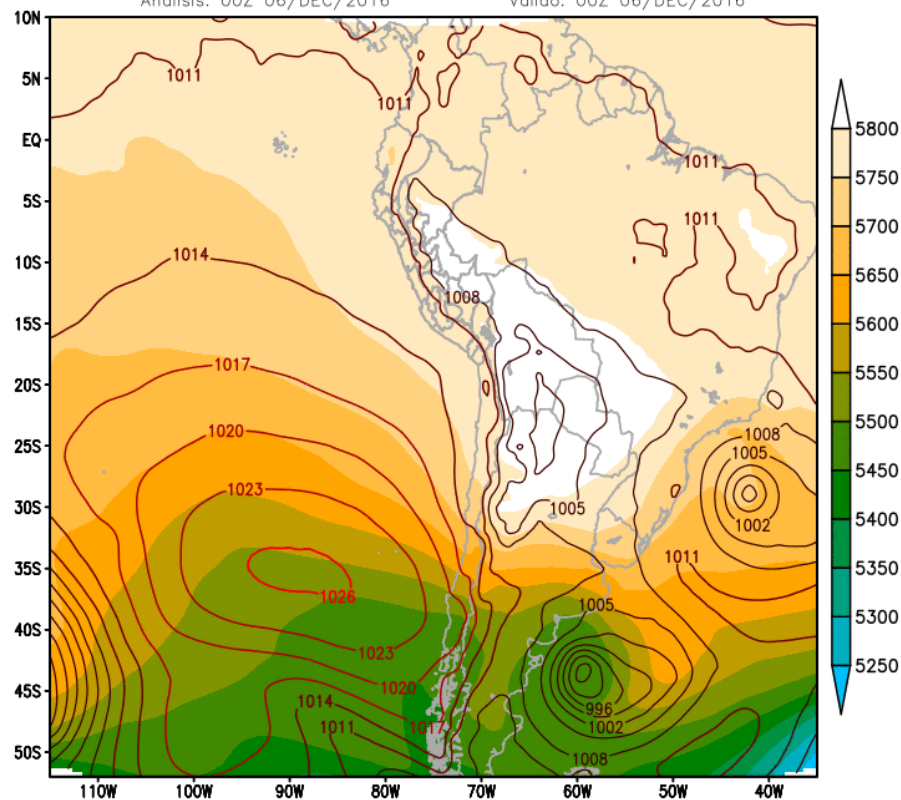
Velocidad y Anomalías del Viento



Viento Satelital (40 Km frente a la costa del Perú): a) Velocidad del viento (m/s), b) Anomalía de la velocidad del viento (m/s). Fuente: Satélite ASCAT, Procesamiento: Laboratorio de Hidro-Física Marina, IMARPE

PRONOSTICO

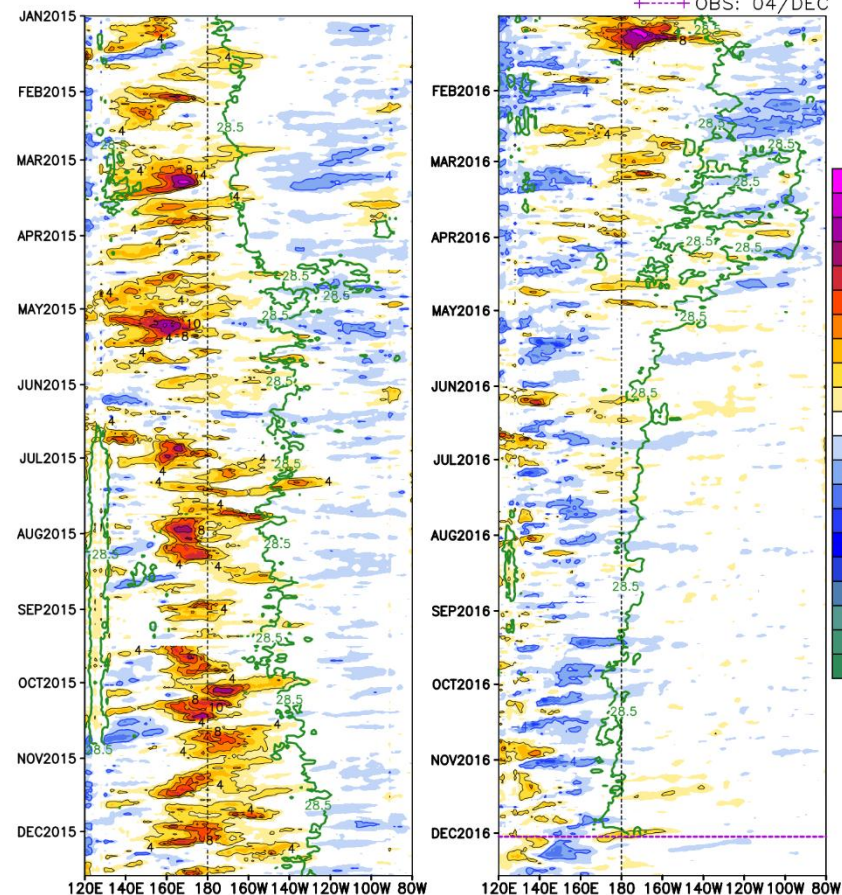
SUBDIRECCION DE MODELAMIENTO NUMERICO DE LA ATMOSFERA
PRESION REDUCIDA A NIVEL MEDIO DEL MAR (hPa) ESPESOR GEOPOTENCIAL 500/1000 hPa
Analysis: 00Z 06/DEC/2016 Valido: 00Z 06/DEC/2016



Viento Oceanico Superficial (m/s) – 10mts – "Media Diaria Satelital"
Anom.Viento Zonal <2°S–2°N>

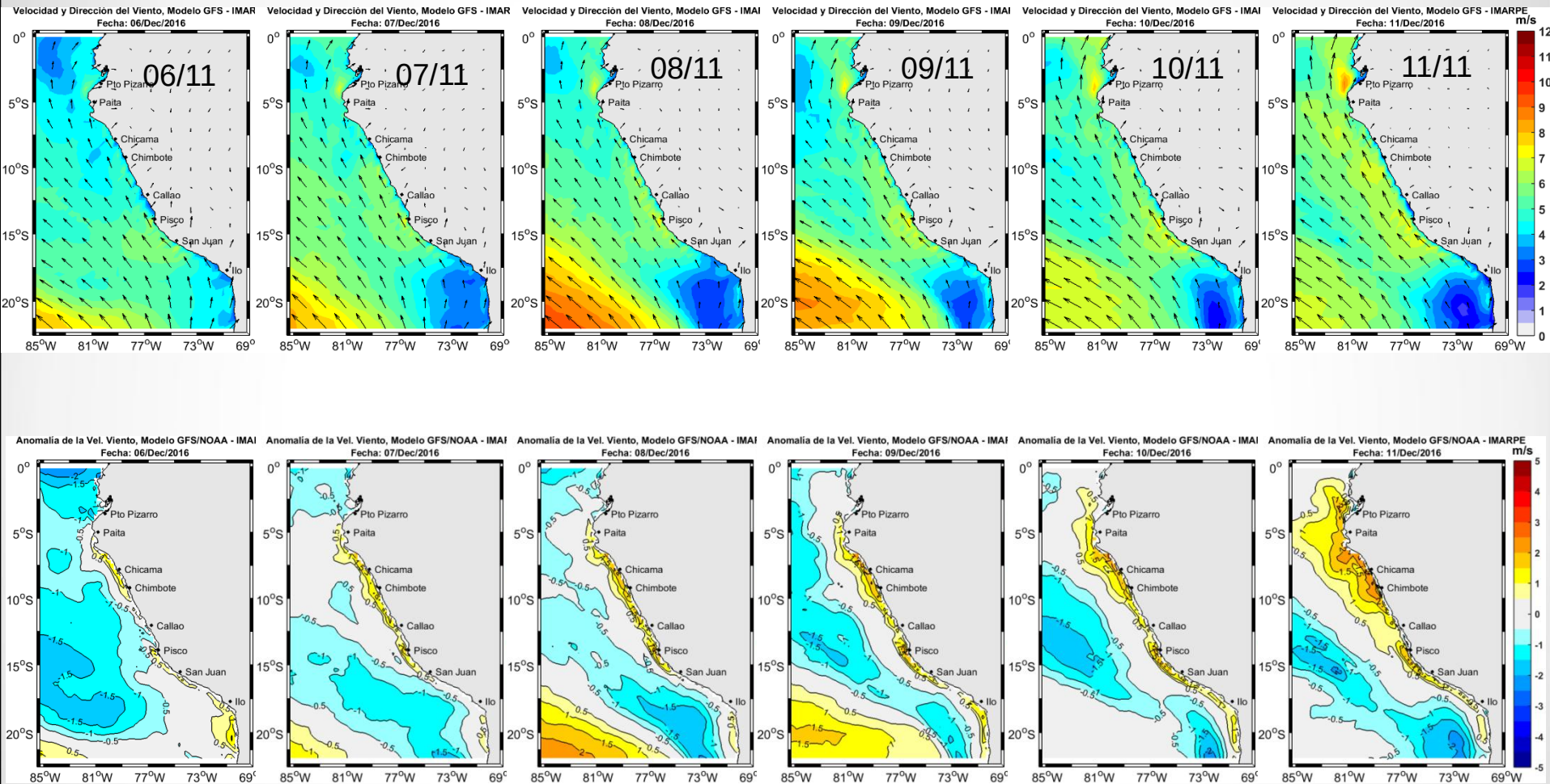
SENAMHI – DCL

+---+ OBS: 04/DEC



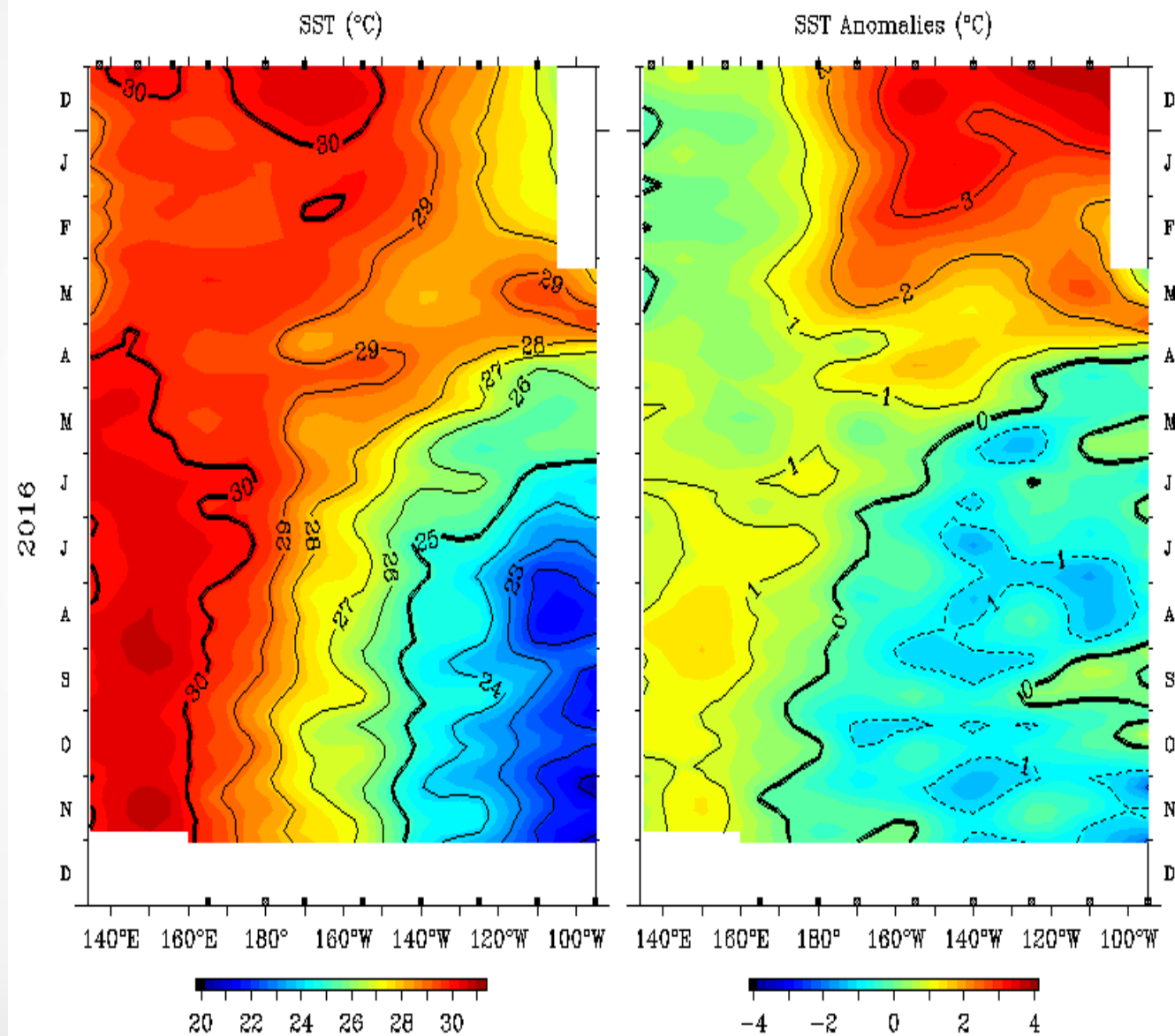
Datos Pronosticados hasta 18 DEC 2016.

Mapas del Pronóstico de la Velocidad (Modelo GFS)

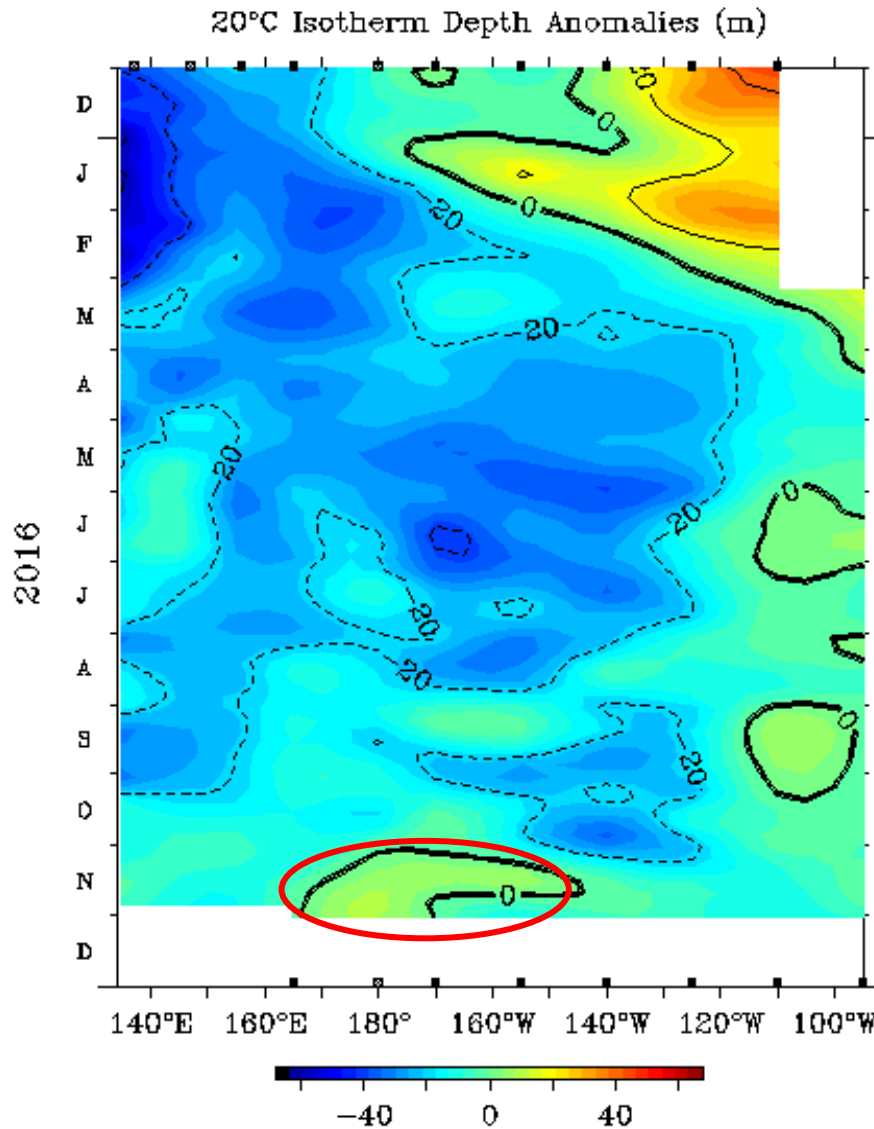
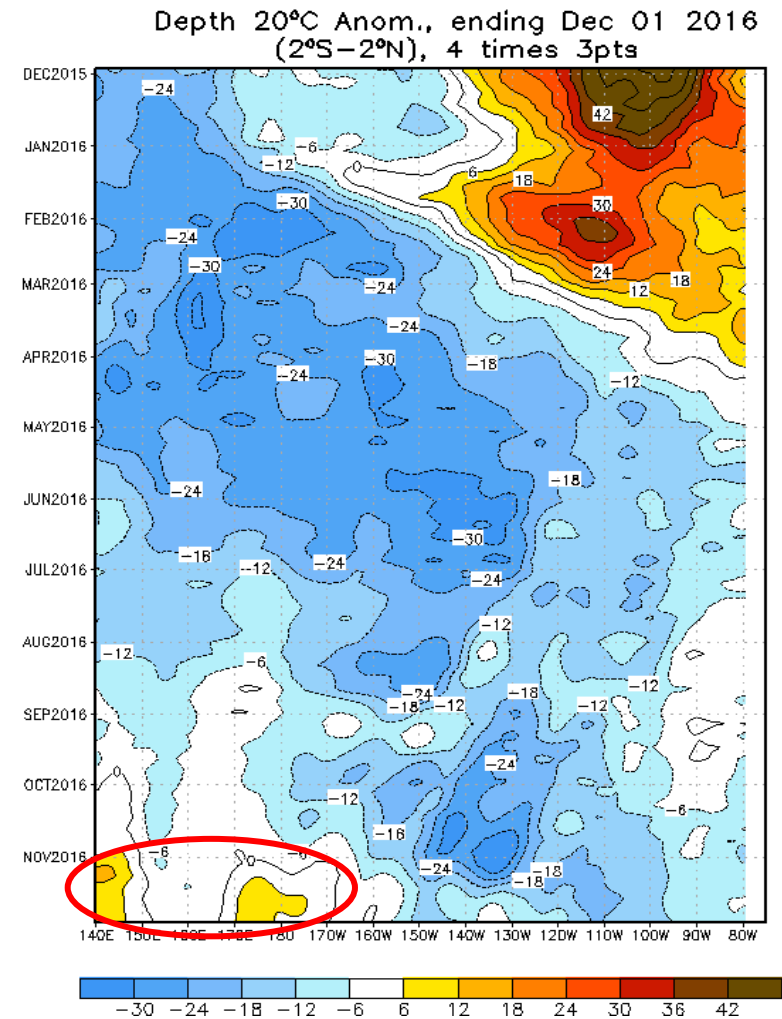


Mapas de la velocidad y dirección del viento pronosticado por el modelo GFS (frente a la costa de Perú): Fuente: Modelo GFS-NOAA, Procesamiento: Laboratorio de Hidro-Física Marina, IMARPE

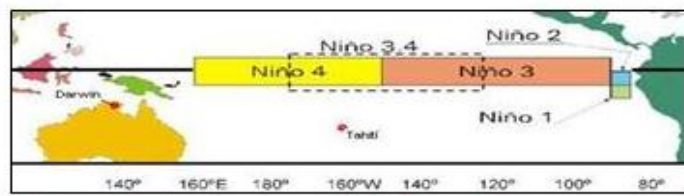
ANOMALÍAS DE LA TEMPERATURA SUPERFICIAL EN EL PACÍFICO ECUATORIAL



ANOMALÍAS DE LA PROFUNDIDAD DE LA ISOTERMA DE 20 °C EN EL PACÍFICO ECUATORIAL

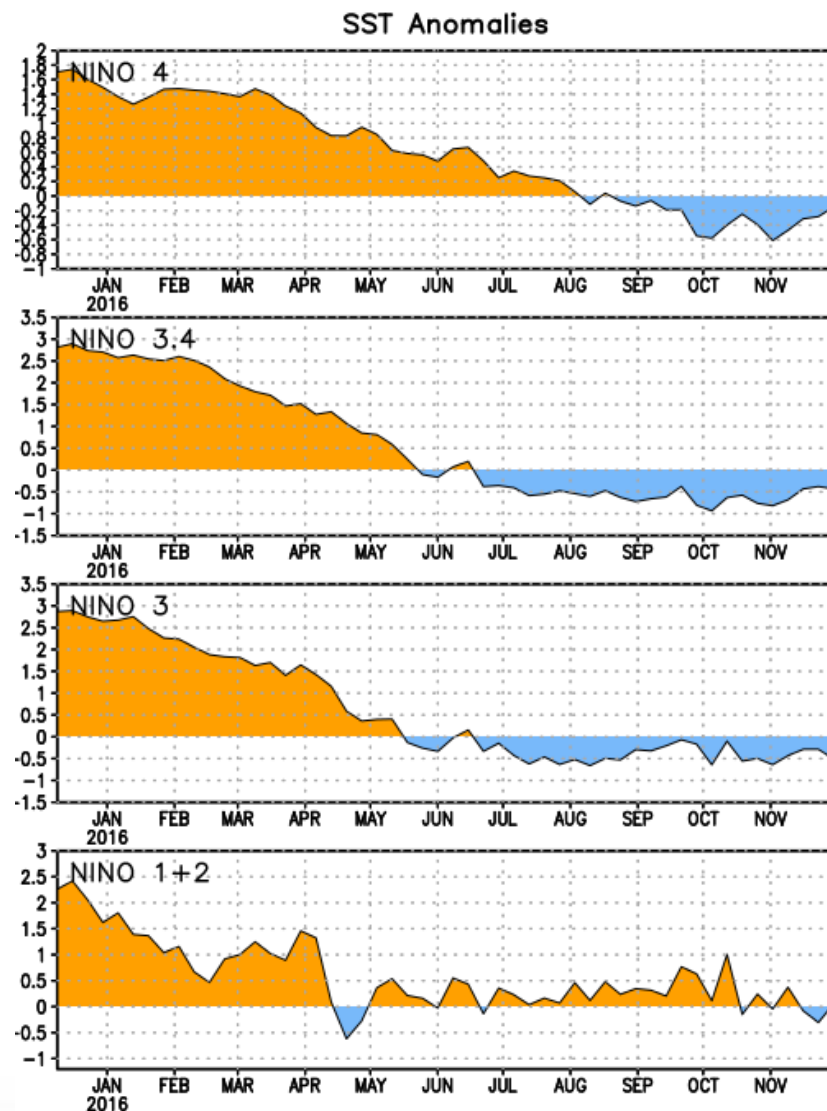


ANOMALÍAS DE LA TEMPERATURA SUPERFICIAL DEL MAR POR REGIONES NIÑO EN EL PACÍFICO ECUATORIAL



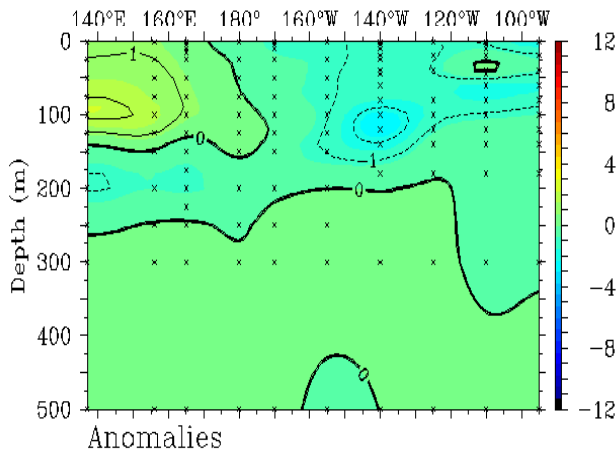
Regiones Niño	ATSM (Semanales)			
	Niño 1+2	Niño 3	Niño 3.4	Niño 4
02-nov-16	21.2 0.0	24.3 -0.6	25.8 -0.8	28.0 -0.6
09-nov-16	21.8 0.4	24.5 -0.4	26.0 -0.7	28.1 -0.5
16-nov-16	21.5 -0.1	24.7 -0.3	26.2 -0.4	28.3 -0.3
23-nov-16	21.6 -0.3	24.7 -0.3	26.3 -0.4	28.3 -0.3
30-nov-16	22.2 0.1	24.5 -0.5	26.2 -0.4	28.4 -0.2

Promedios mensuales 2015						
Regiones Niño	ATSM					
	Niño 1+2		Niño 3		Niño 3.4	
Nov.2016	0.09	21.7	-0.4	24.5	-0.6	26.1
Oct.2016	0.36	21.2	-0.4	24.5	-0.7	26.0
Set.2016	0.53	20.9	-0.2	24.7	-0.6	26.1
Ago.2016	0.4	21.0	-0.5	24.5	-0.5	26.3
Jul.2016	0.2	21.8	-0.5	25.1	-0.5	26.7
Jun.2016	0.3	23.2	-0.1	26.3	-0.1	27.5
May.2016	0.3	24.6	0.0	27.1	0.3	28.2
Abr.2016	0.2	25.8	0.8	28.3	1.1	28.8
Mar.2016	0.9	27.6	1.6	28.7	1.7	28.9
Feb.2016	0.7	26.8	1.9	28.4	2.4	29.1
Ene.2016	1.4	25.9	2.6	28.2	2.6	29.2



ANOMALÍAS DE LA TEMPERATURA SUBSUPERFICIAL EN EL PACÍFICO ECUATORIAL

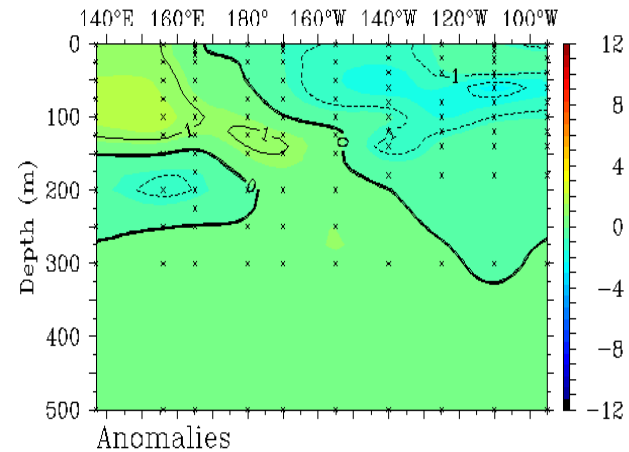
TAO/TRITON 5-Day Mean Temperatures (°C)
Ending on November 5 2016 2°S to 2°N Average



TAO Project Office/PMEL/NOAA

Dec. 2 2016

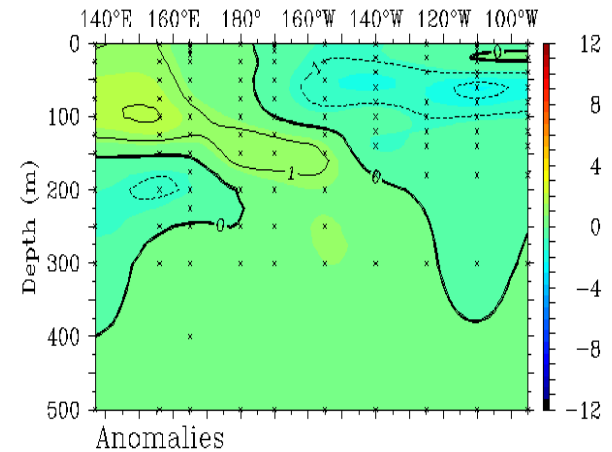
TAO/TRITON 5-Day Mean Temperatures (°C)
Ending on November 10 2016 2°S to 2°N Average



TAO Project Office/PMEL/NOAA

Dec. 2 2016

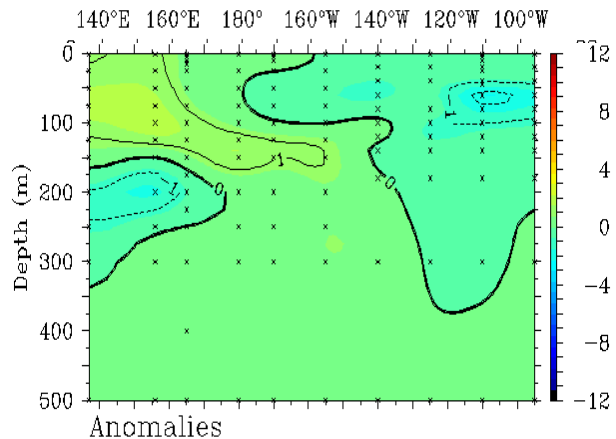
TAO/TRITON 5-Day Mean Temperatures (°C)
Ending on November 15 2016 2°S to 2°N Average



TAO Project Office/PMEL/NOAA

Dec. 2 2016

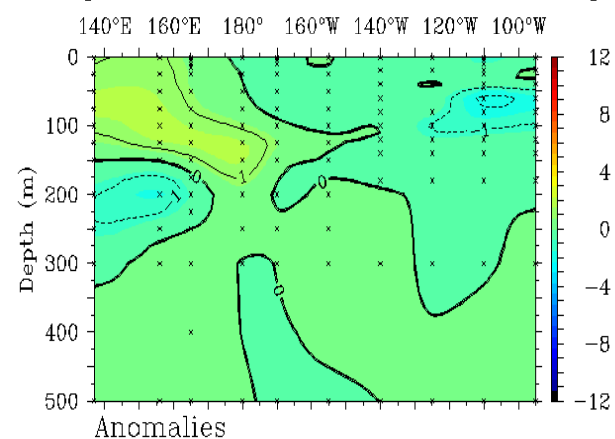
TAO/TRITON 5-Day Mean Temperatures (°C)
Ending on November 20 2016 2°S to 2°N Average



TAO Project Office/PMEL/NOAA

Dec. 2 2016

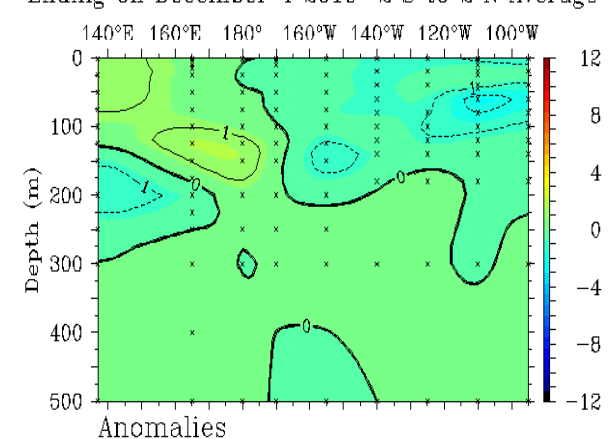
TAO/TRITON 5-Day Mean Temperatures (°C)
Ending on November 25 2016 2°S to 2°N Average



TAO Project Office/PMEL/NOAA

Dec. 2 2016

TAO/TRITON 5-Day Mean Temperatures (°C)
Ending on December 4 2016 2°S to 2°N Average

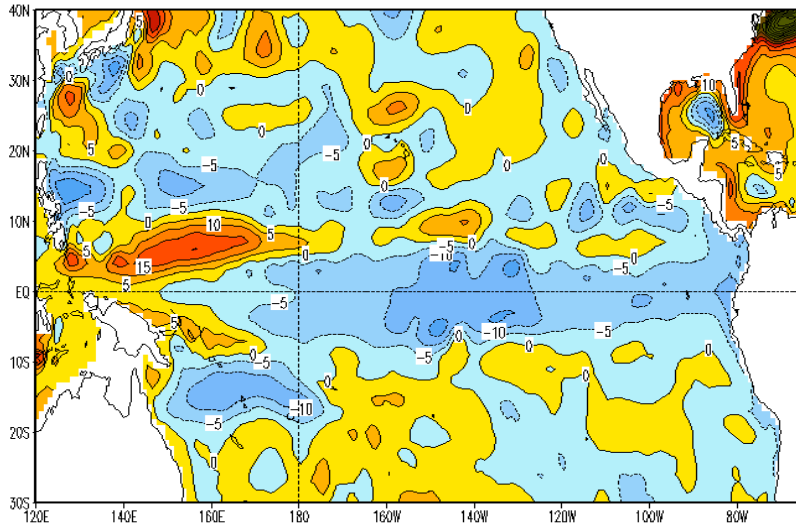


TAO Project Office/PMEL/NOAA

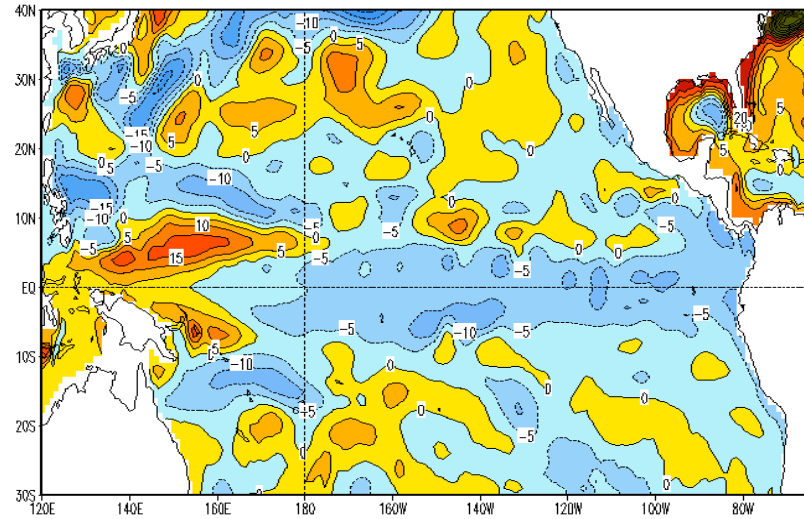
Dec. 6 2016

ANOMALÍAS DEL NIVEL DEL MAR EN EL PACÍFICO TROPICAL

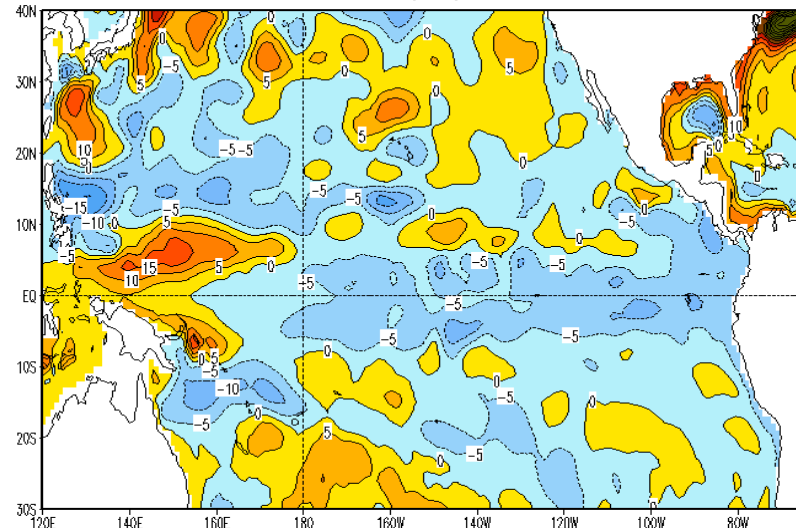
Sea Level Anom (cm), Oct 30 2016



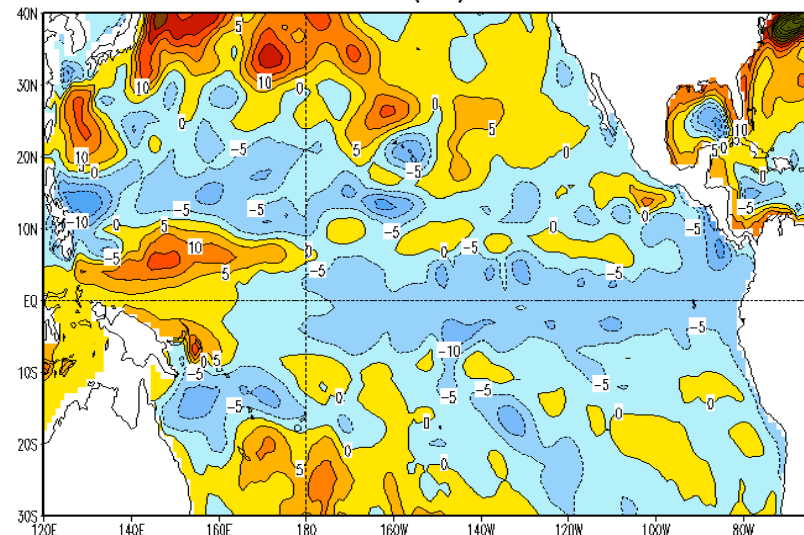
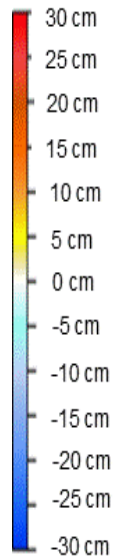
Sea Level Anom (cm), Nov 14 2016



Sea Level Anom (cm), Nov 24 2016

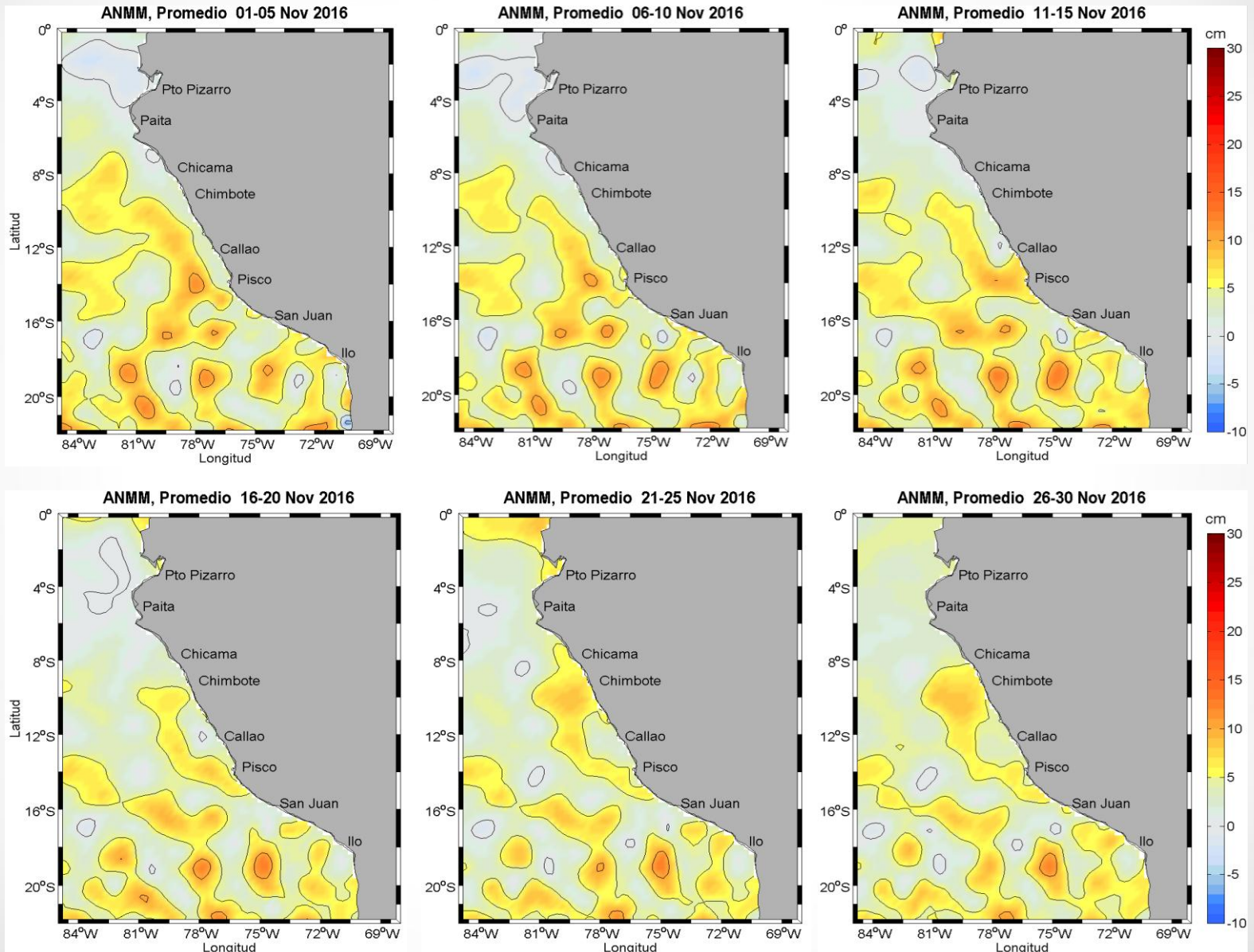


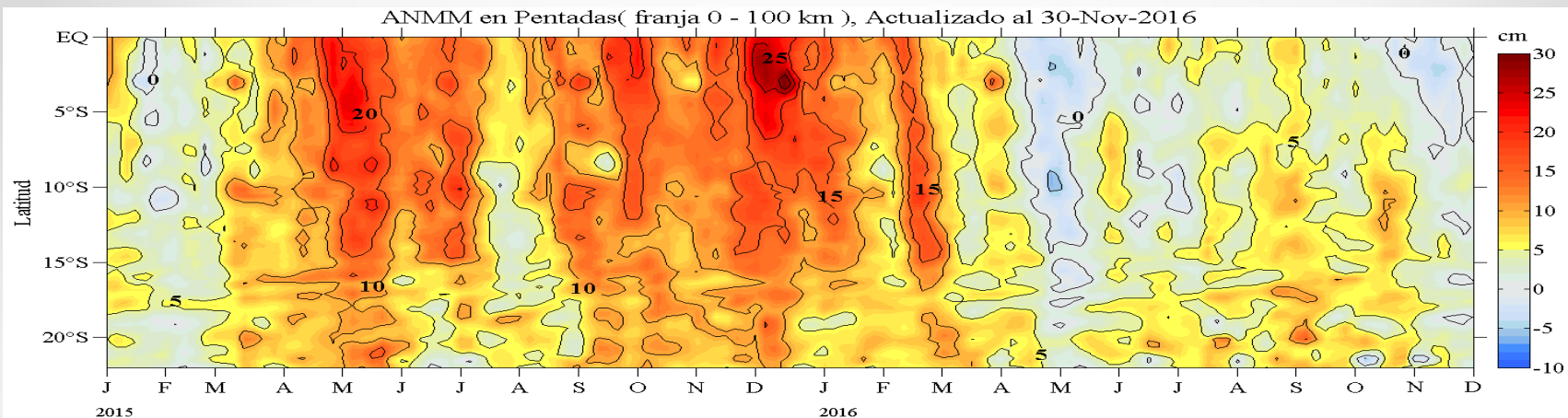
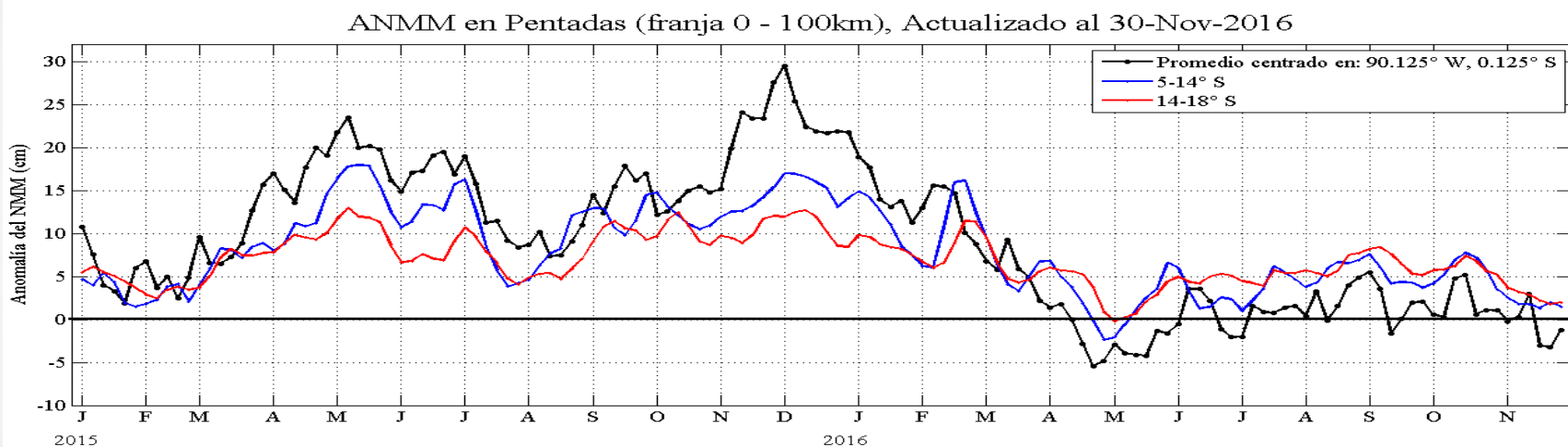
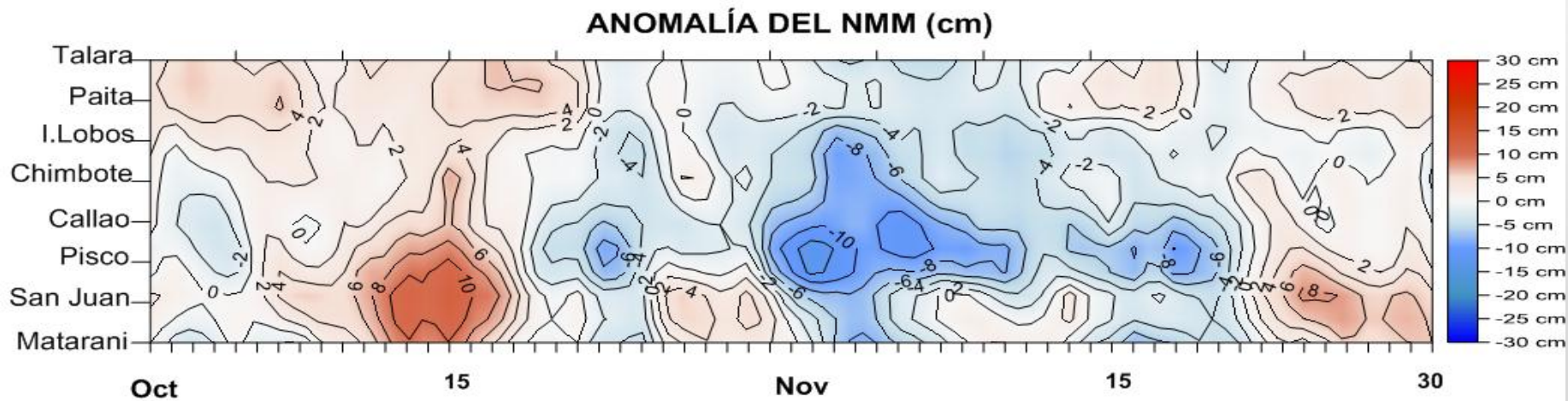
Sea Level Anom (cm), Nov 29 2016



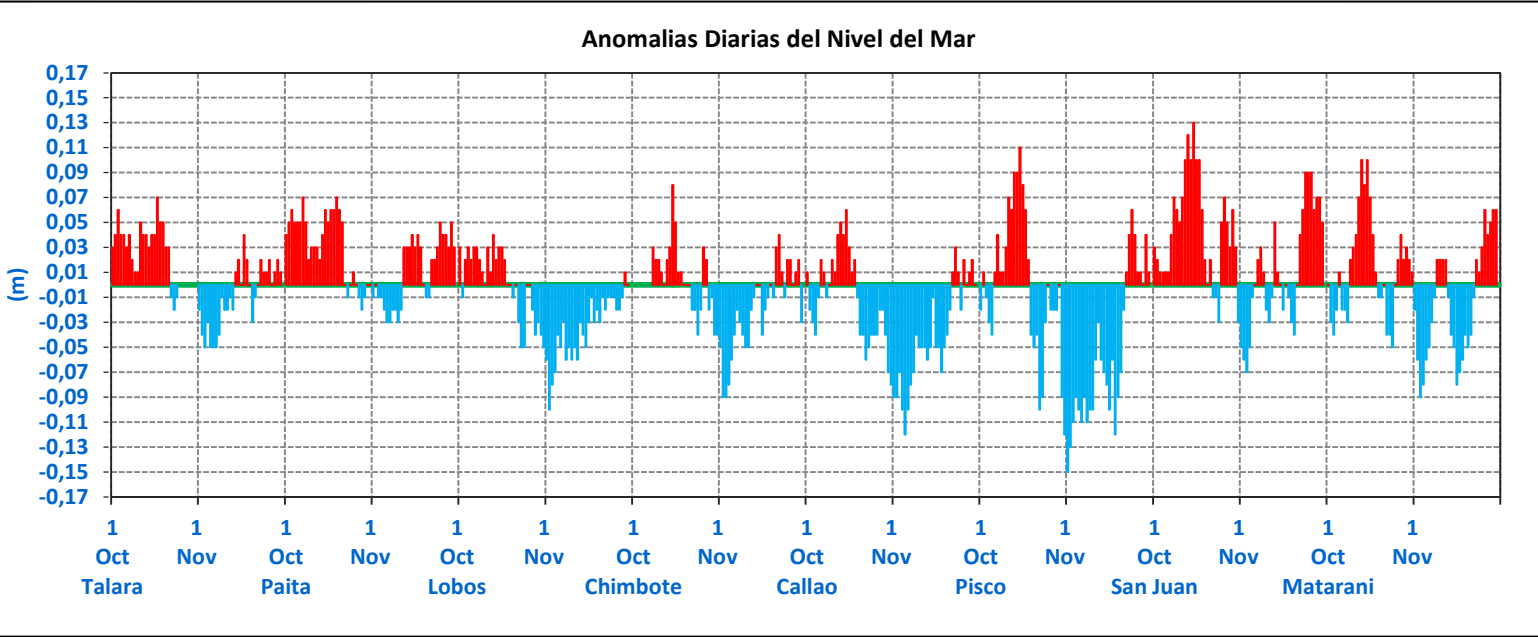
MONITOREO DE ANMM, (noviembre 2016)

Mapas de ANMM en Pentadas





ANOMALÍAS DEL NIVEL MEDIO DEL MAR EN EL LITORAL PERUANO

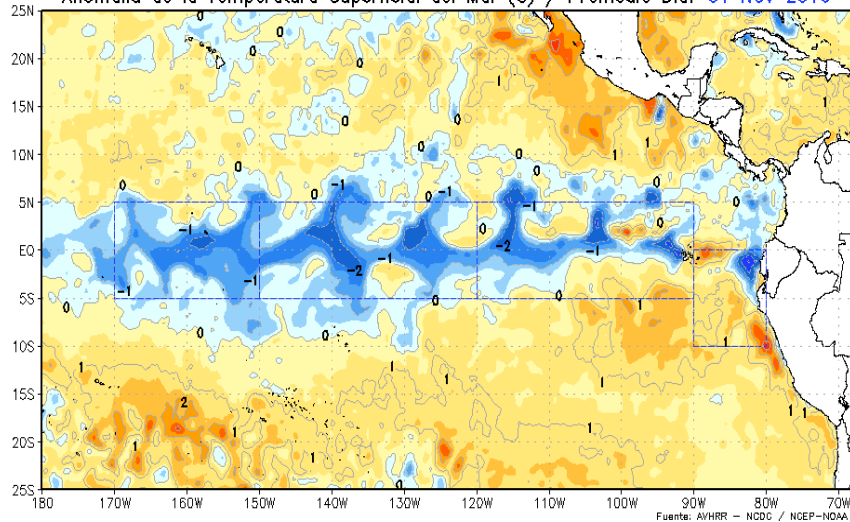


Estación	2016 ANMM (cm)										
	Ene.	Feb.	Mar.	Abr	May.	Jun.	Jul.	Ago.	Set.	Oct.	Nov.
Talara	5	8	4	0	1	1	2	4	2	3	-1
Paita	8	10	5	-1	2	2	4	6	4	3	1
Isla Lobos de Afuera	7	7	2	-3	0	-1	1	2	0	0	-4
Chimbote	5	11	2	-6	0	-2	2	3	1	1	-2
Callao	2	7	-3	-5	-3	-3	-1	0	-4	-1	-4
San Juan	6	9	1	0	2	1	4	4	2	5	-5
Matarani	7	10	2	1	1	3	5	5	2	1	-1

ANOMALÍAS DE LA TEMPERATURA SUPERFICIAL DEL MAR EN EL PACÍFICO ECUATORIAL

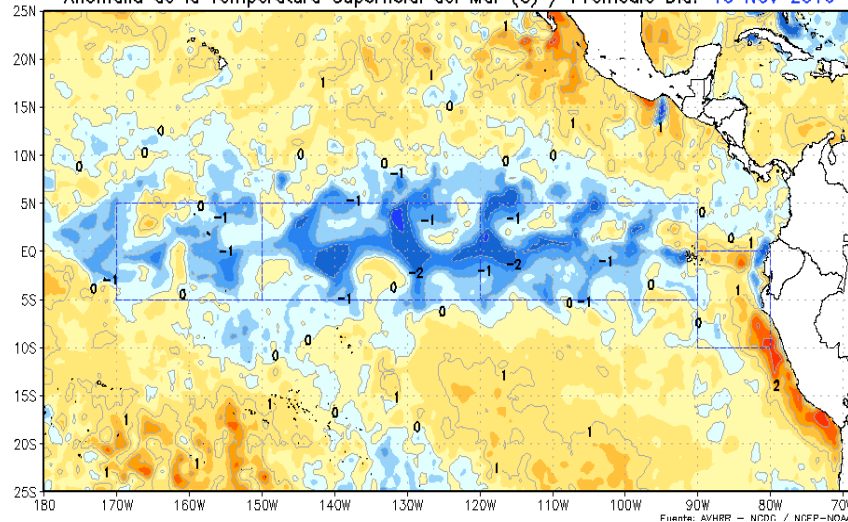
DIRECCION DE HIDROGRAFIA Y NAVEGACION
DPTO OCEANOGRAFIA – DIV METEOROLOGIA

Anomalia de la Temperatura Superficial del Mar (C) / Promedio Día: 01 NOV 2016



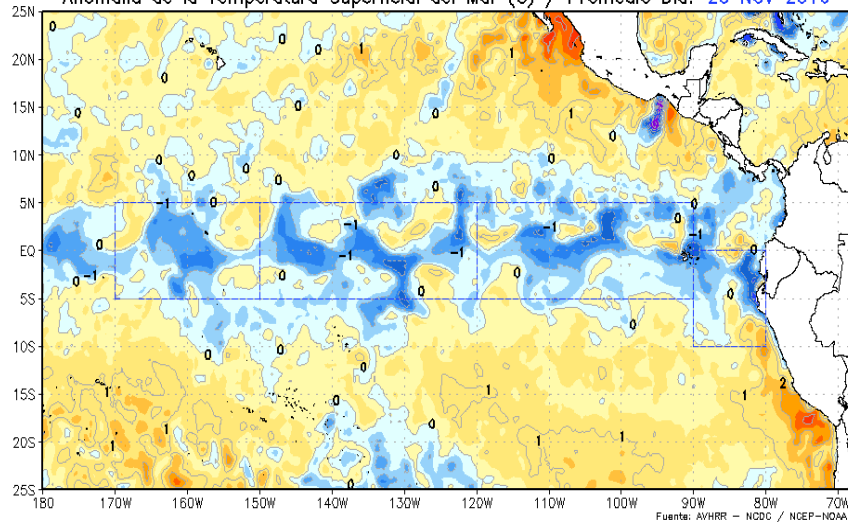
DIRECCION DE HIDROGRAFIA Y NAVEGACION
DPTO OCEANOGRAFIA – DIV METEOROLOGIA

Anomalia de la Temperatura Superficial del Mar (C) / Promedio Día: 10 NOV 2016



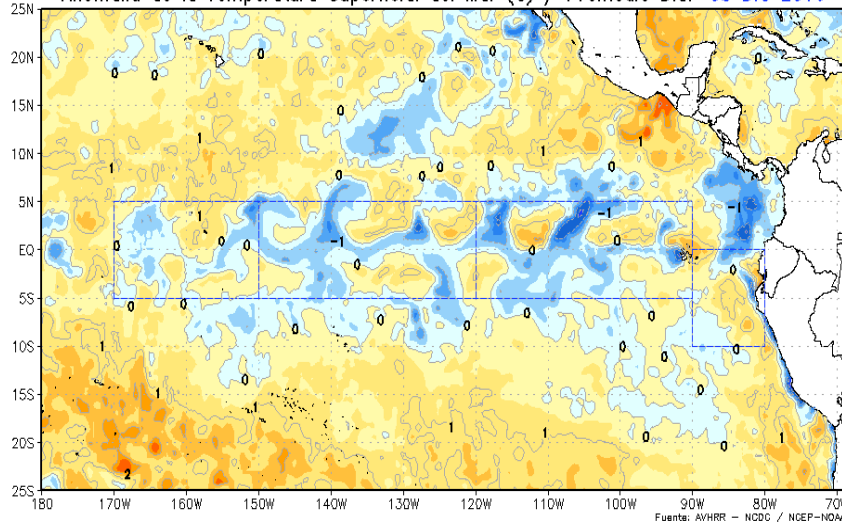
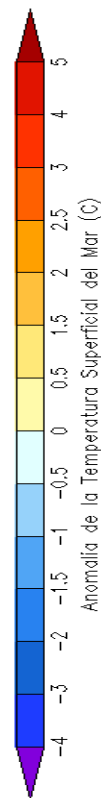
DIRECCION DE HIDROGRAFIA Y NAVEGACION
DPTO OCEANOGRAFIA – DIV METEOROLOGIA

Anomalia de la Temperatura Superficial del Mar (C) / Promedio Día: 20 NOV 2016



DIRECCION DE HIDROGRAFIA Y NAVEGACION
DPTO OCEANOGRAFIA – DIV METEOROLOGIA

Anomalia de la Temperatura Superficial del Mar (C) / Promedio Día: 05 DIC 2016



OBSERVACIONES VÍA SATÉLITE (noviembre 2016)

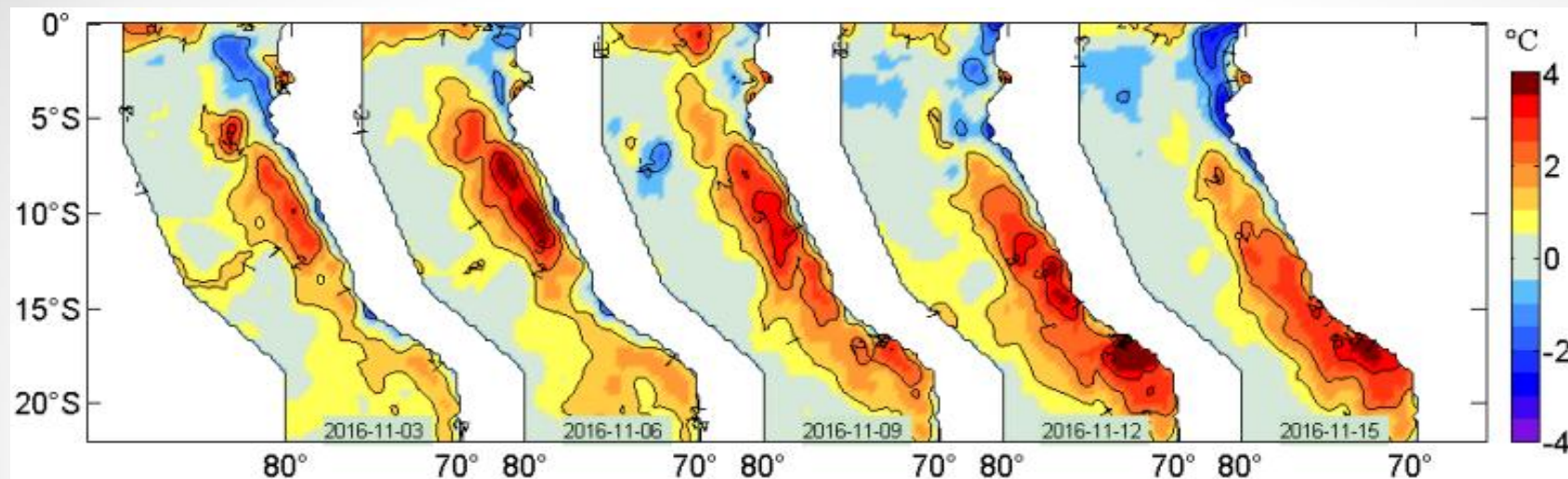
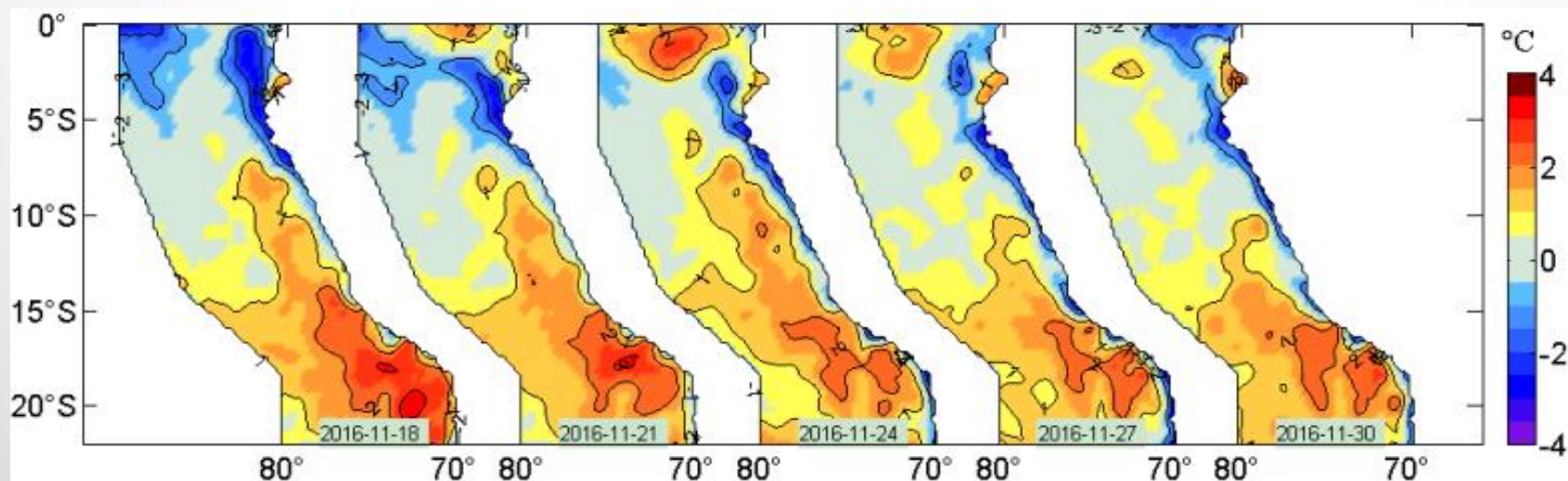
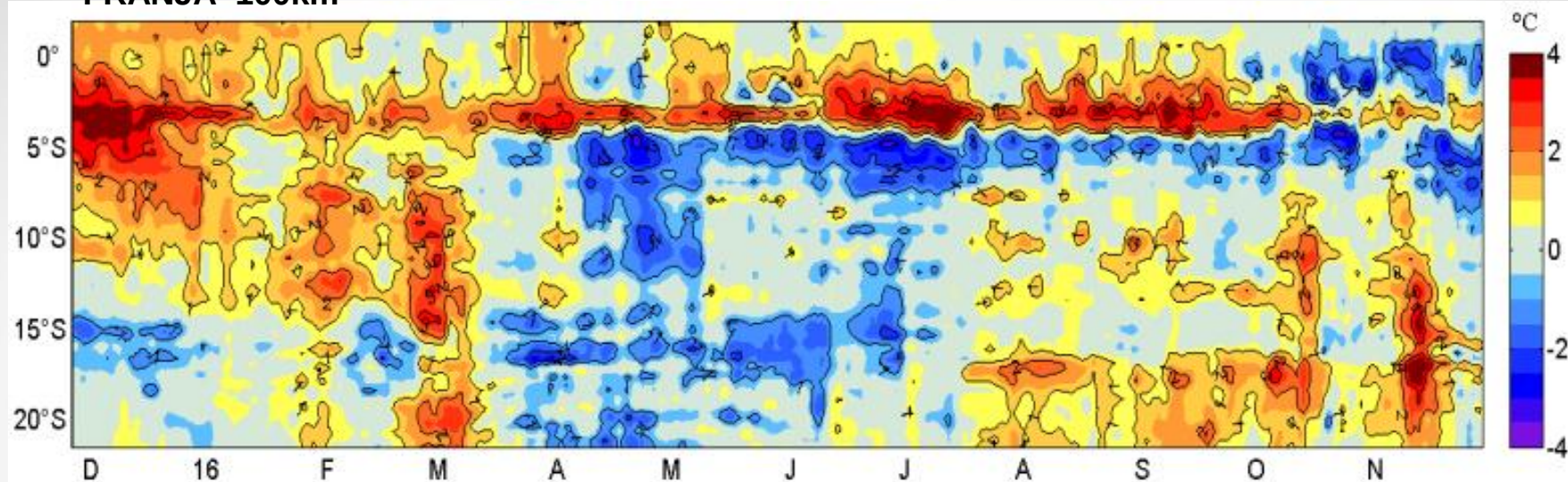
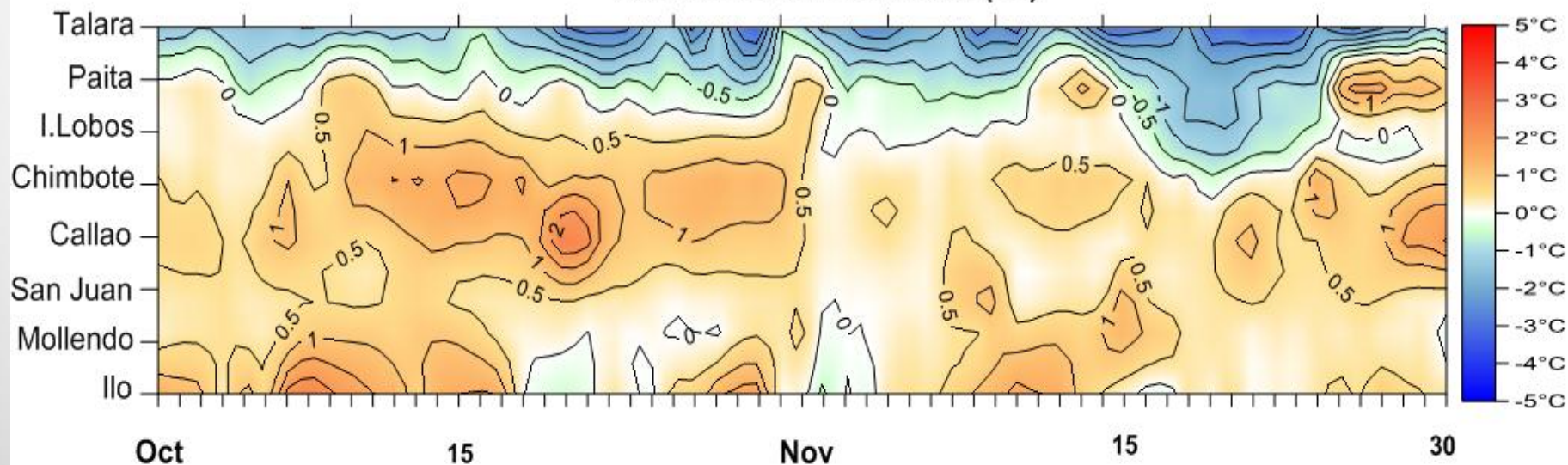


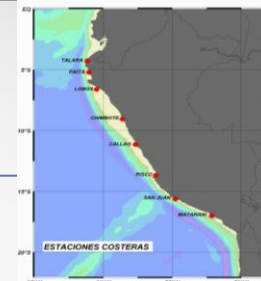
Diagrama Hovmöller de ATSM

FRANJA 100km



ANOMALÍA DE LA TSM (°C)

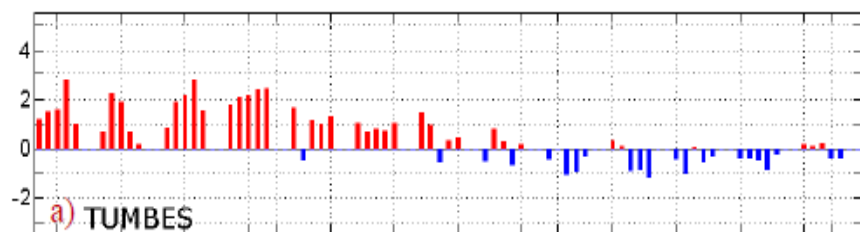
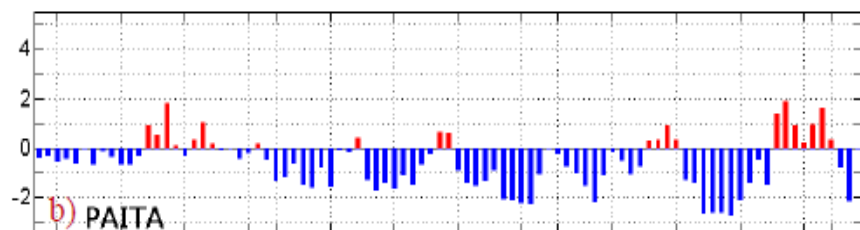
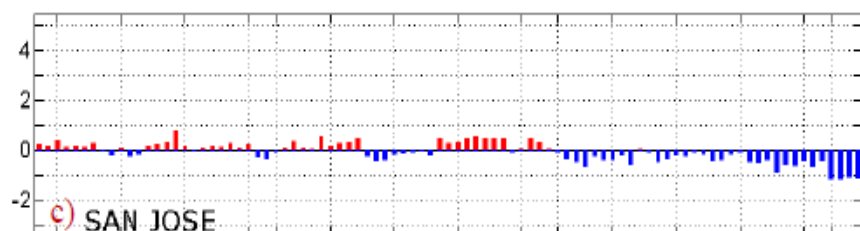
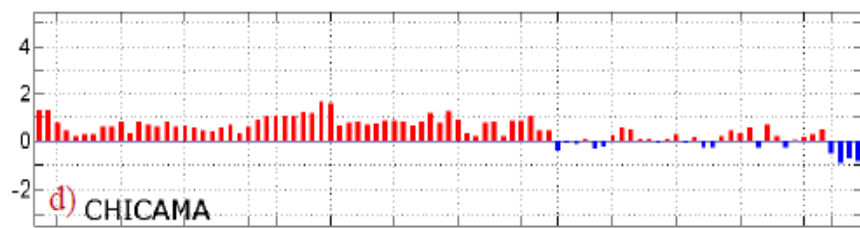
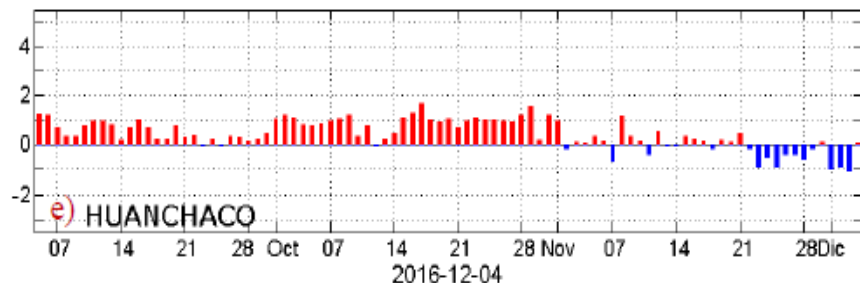
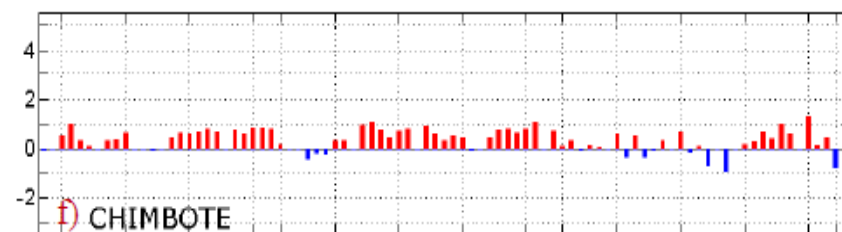
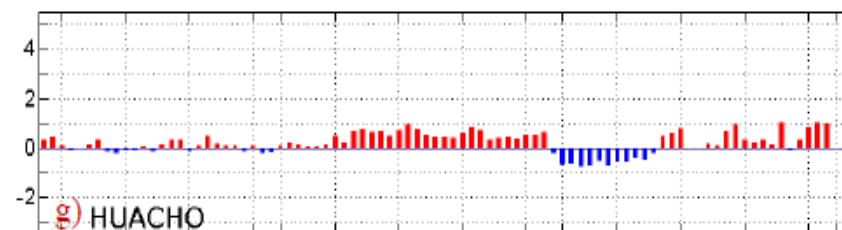
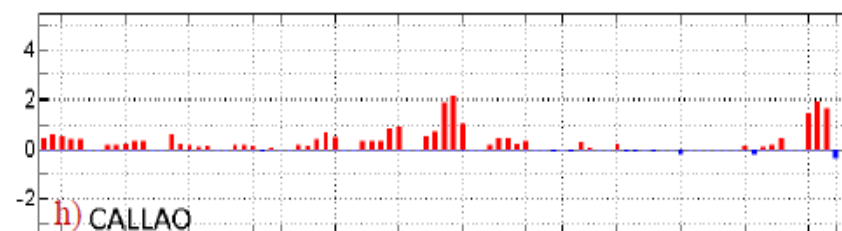
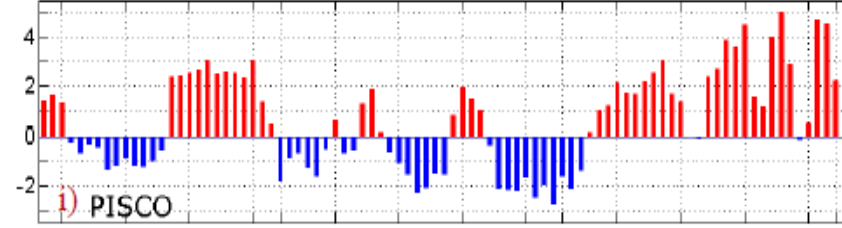
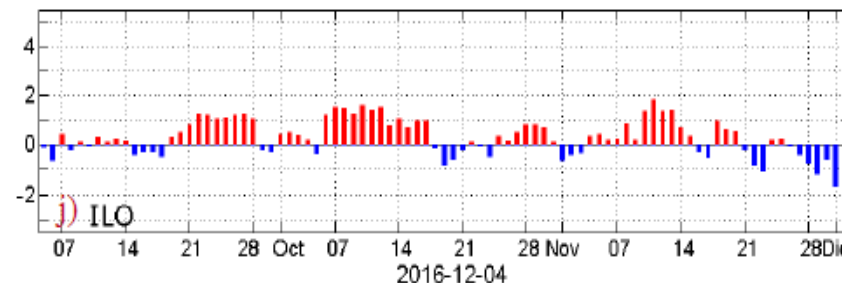




0.27

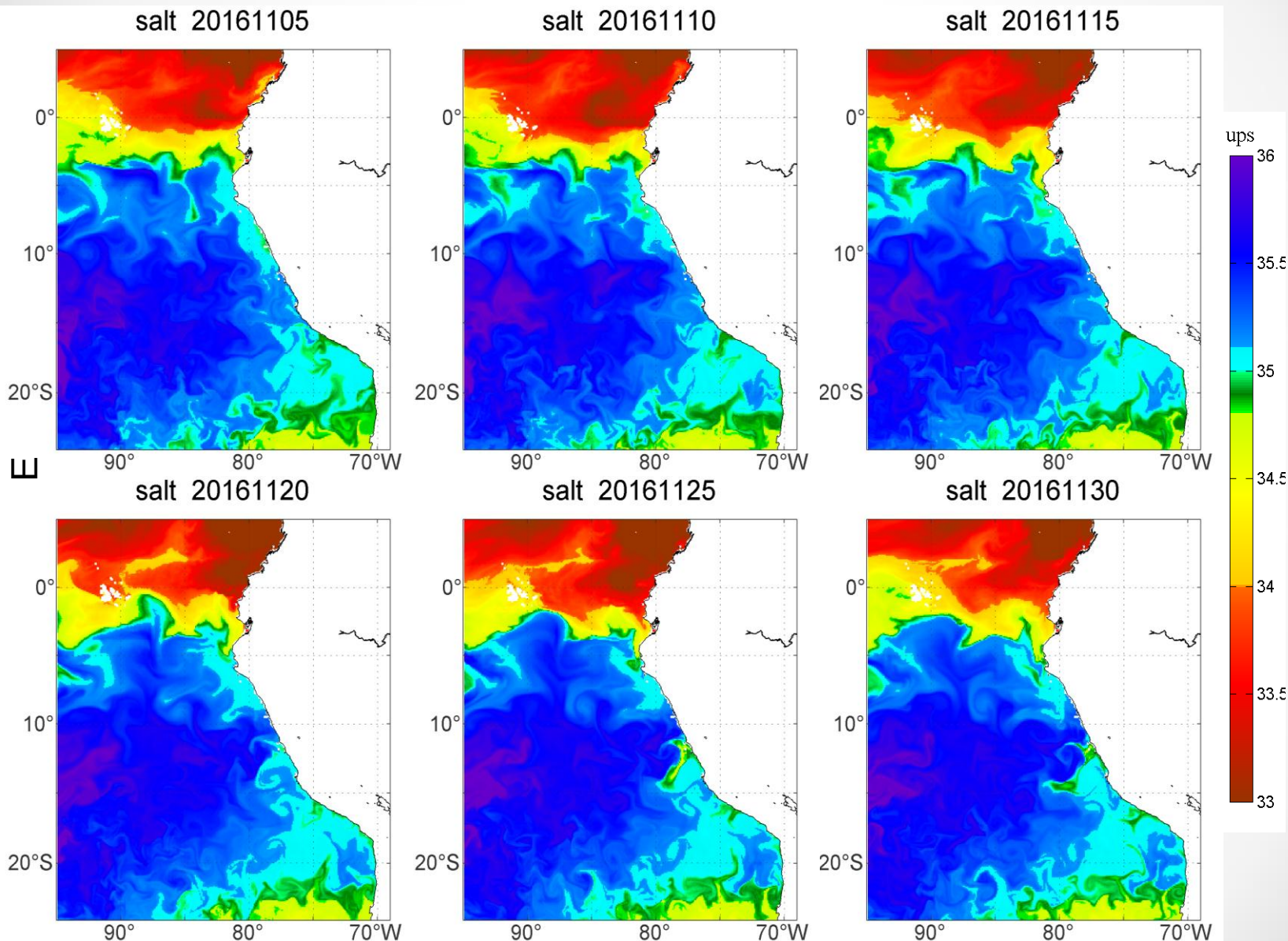
ATSM CON REGISTROS DE LOS LABORATORIOS

CONTENIDO

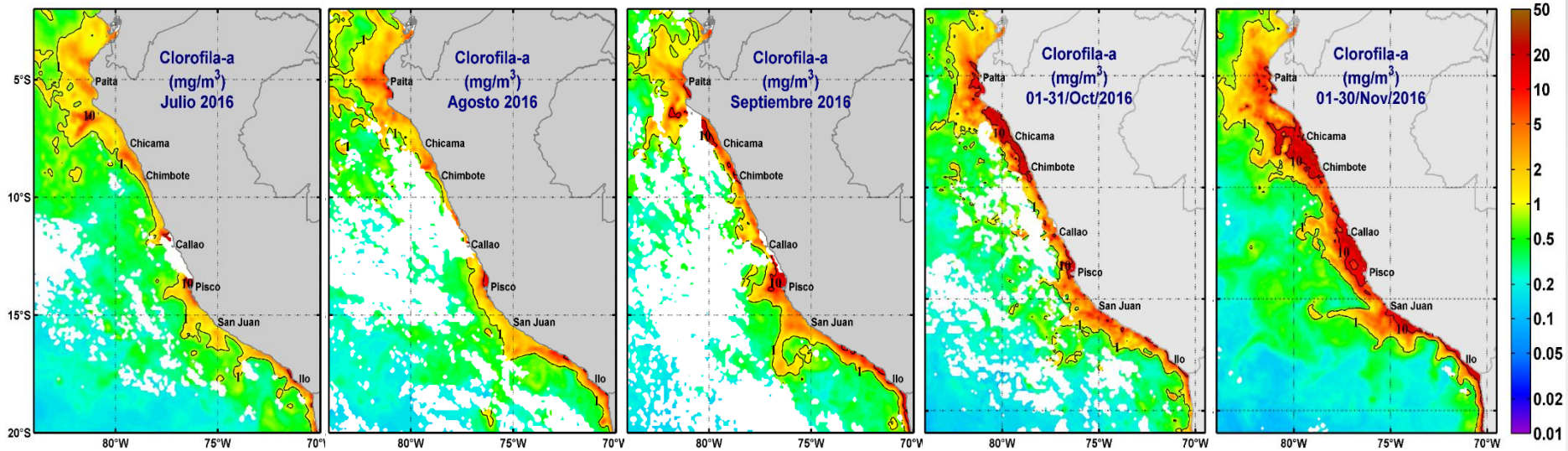
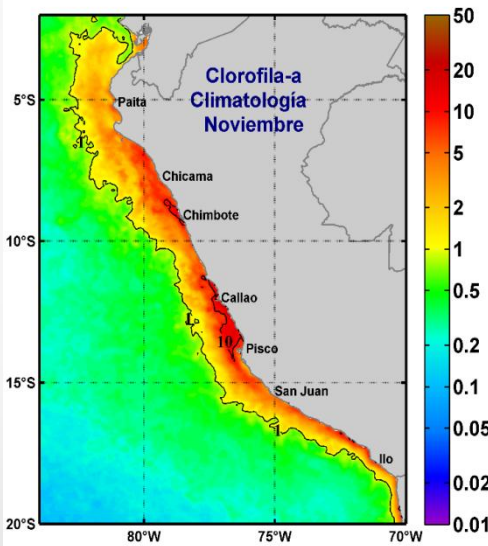
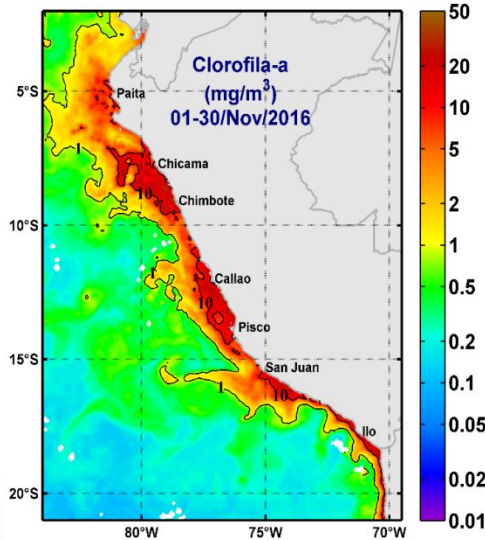
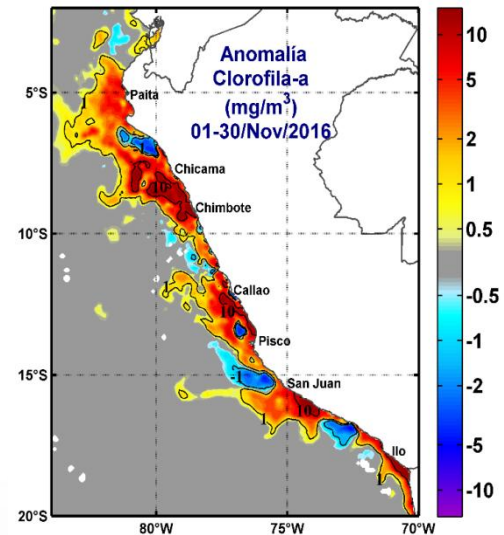


Distribución espacial de Salinidad Superficial del Mar (HYCOM), los días 04, 10, 15, 20, 25 y 30 de setiembre del 2016

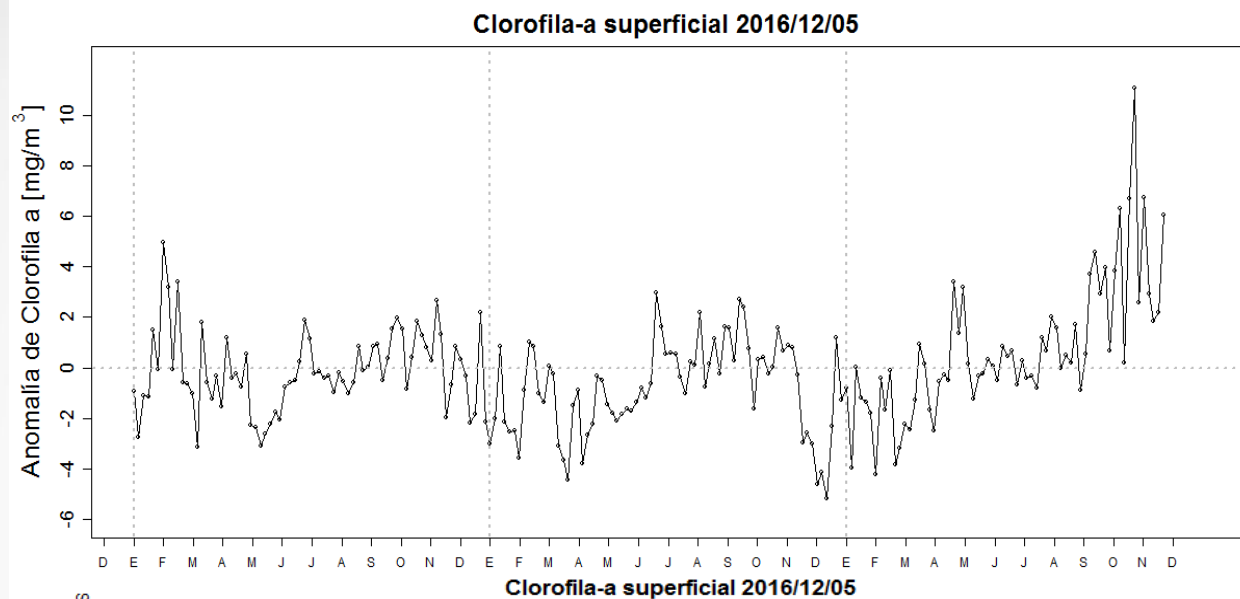
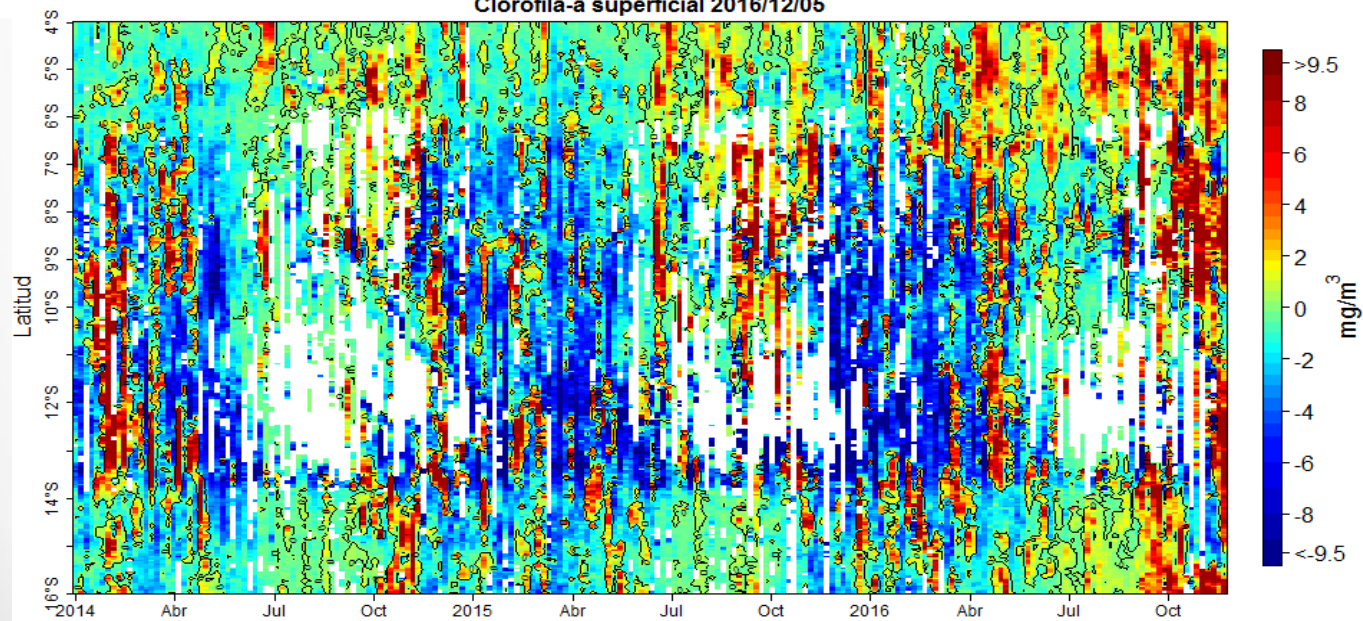
NOVIEMBRE

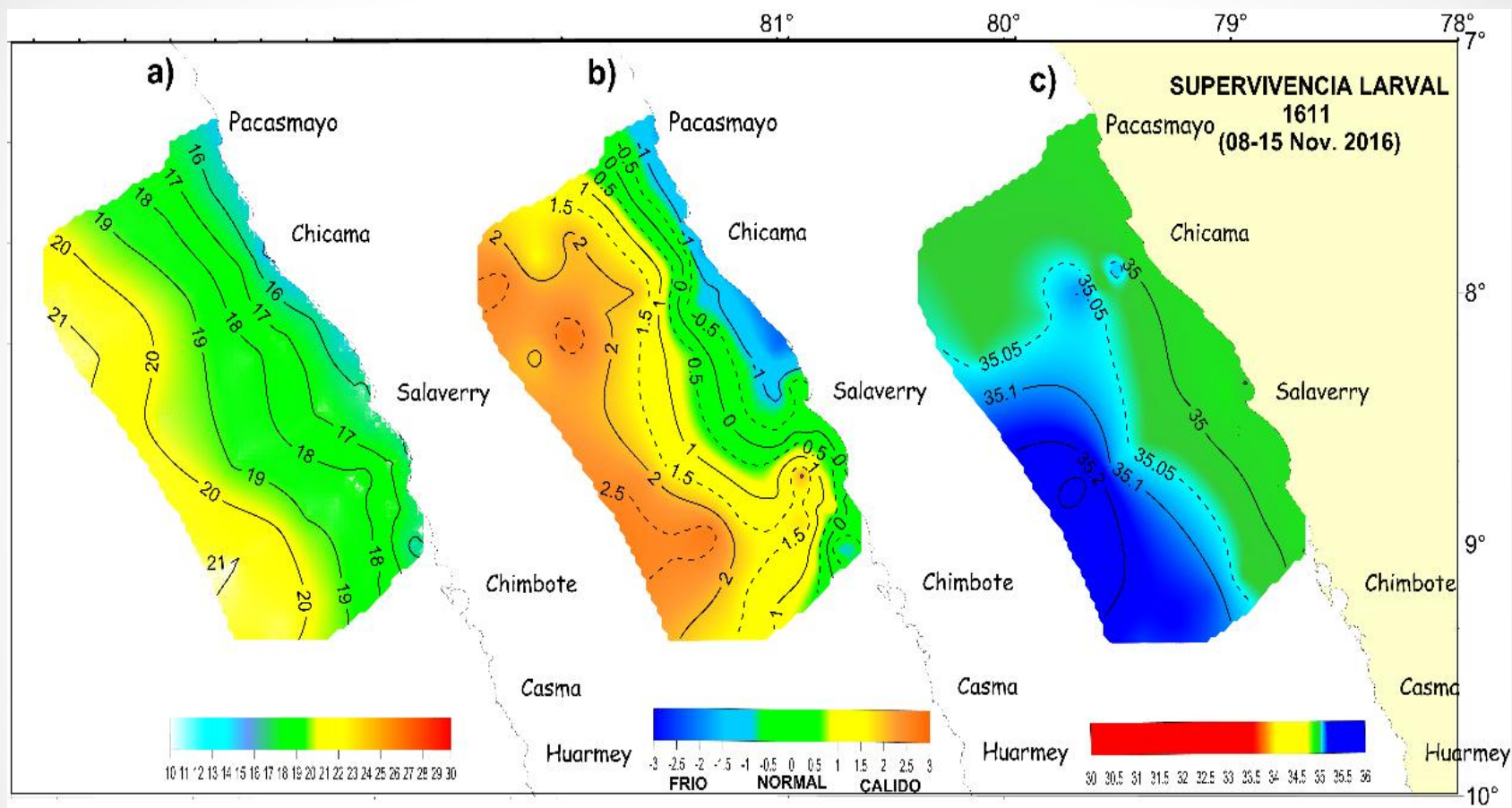


Clorofila Superficial

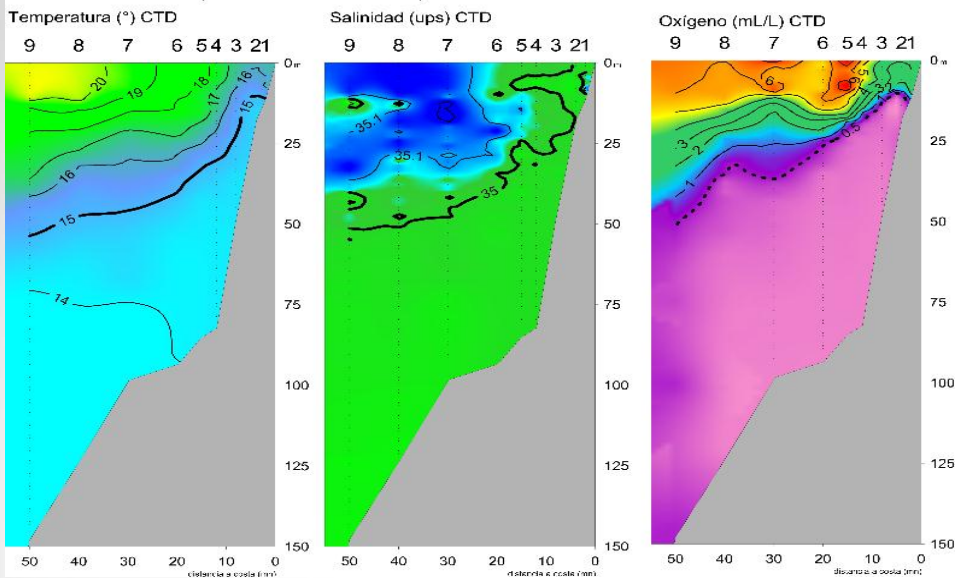


Clorofila Superficial

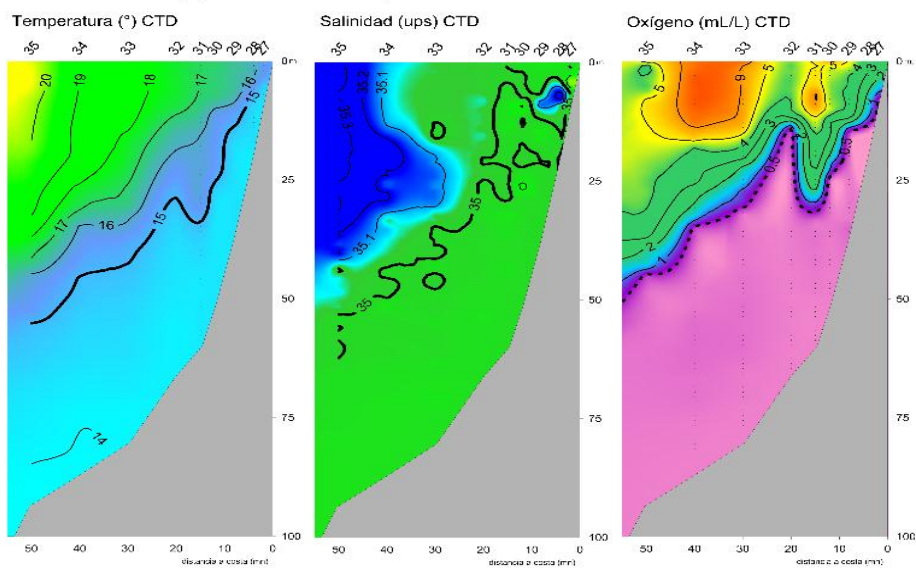




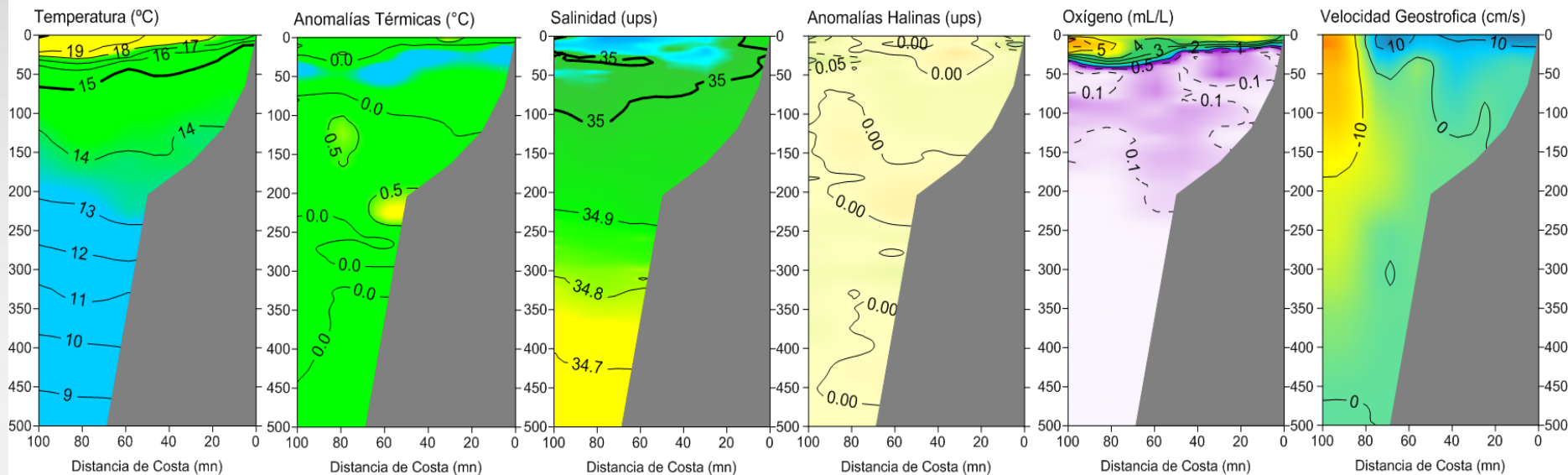
Temperatura (°) CTD



Temperatura (°) CTD



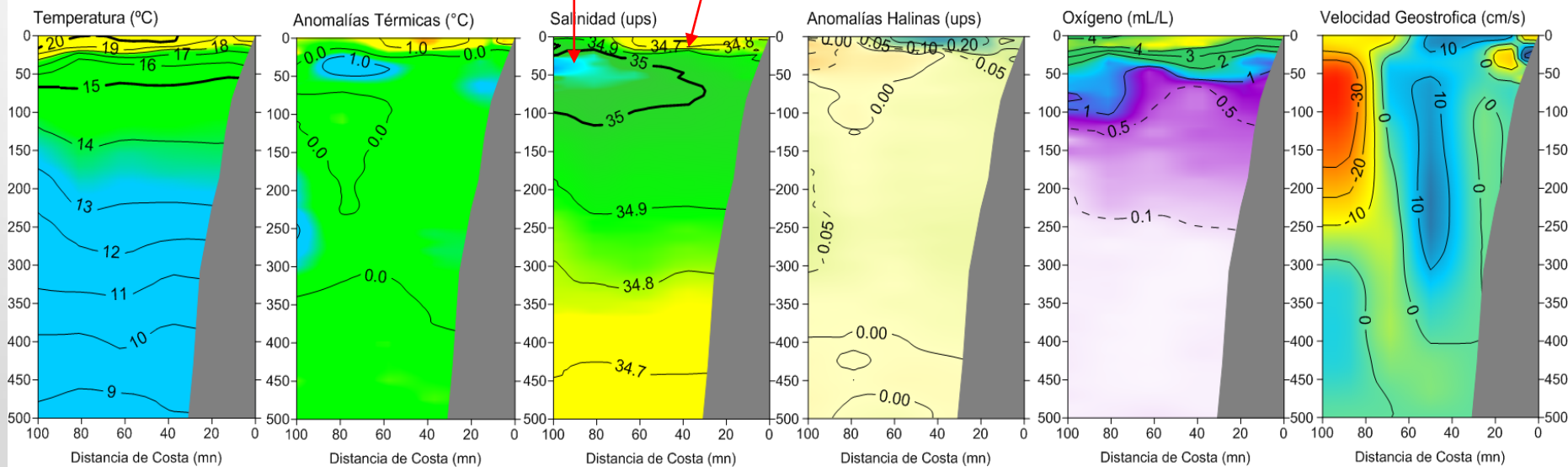
SECCION CHICAMA (25-26 de Noviembre del 2016)



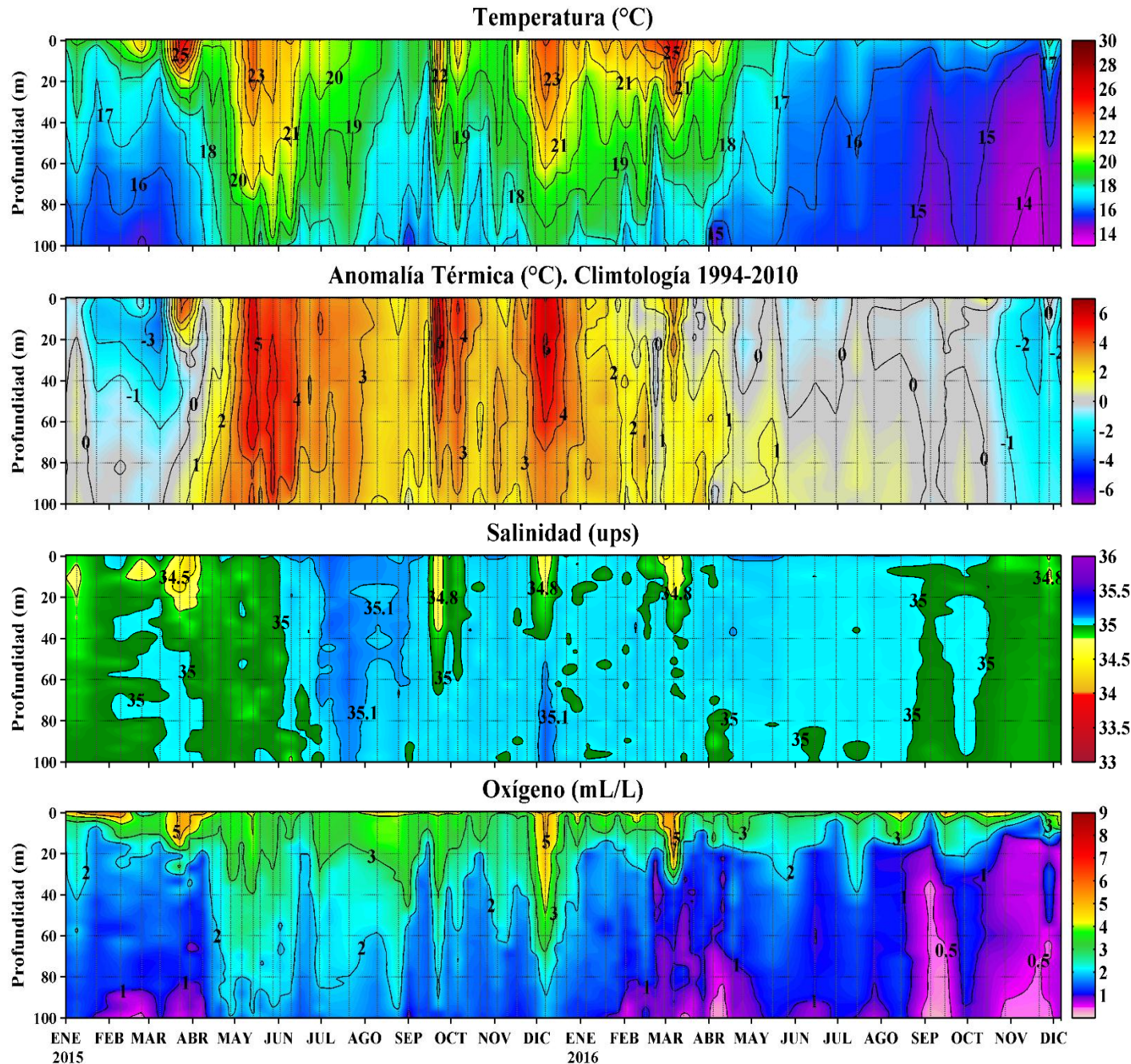
MEZCLA

AES

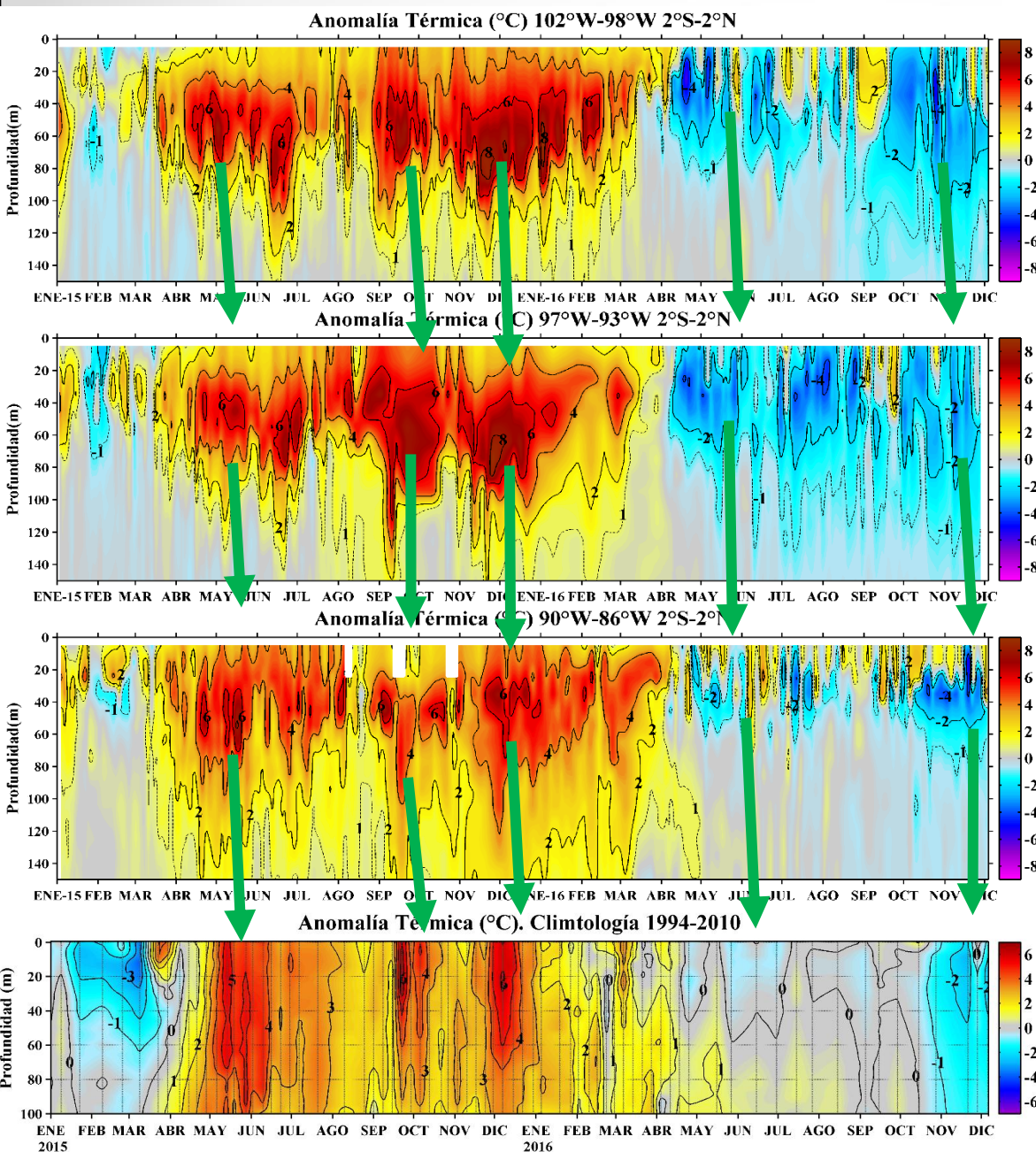
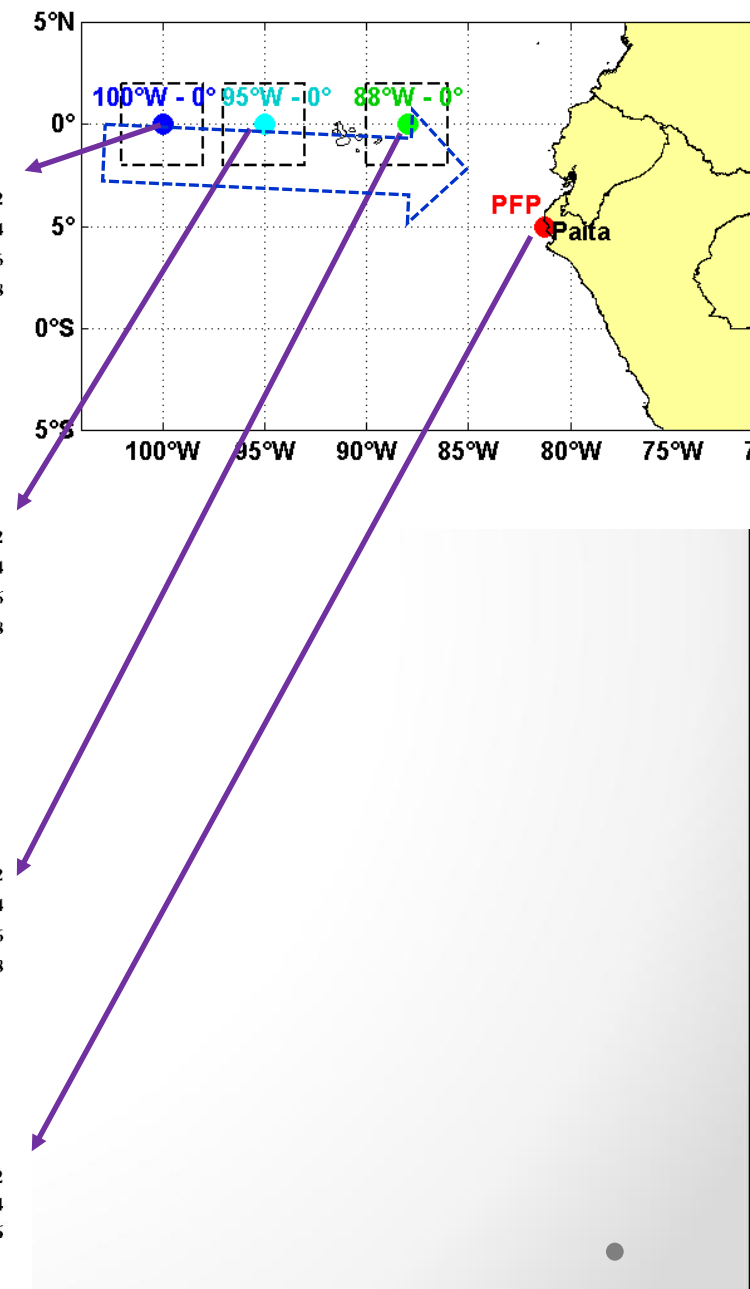
SECCION PAITA (27-28 de Noviembre del 2016)



PUNTO FIJO DE PAITA (06 DE DICIEMBRE 2016)

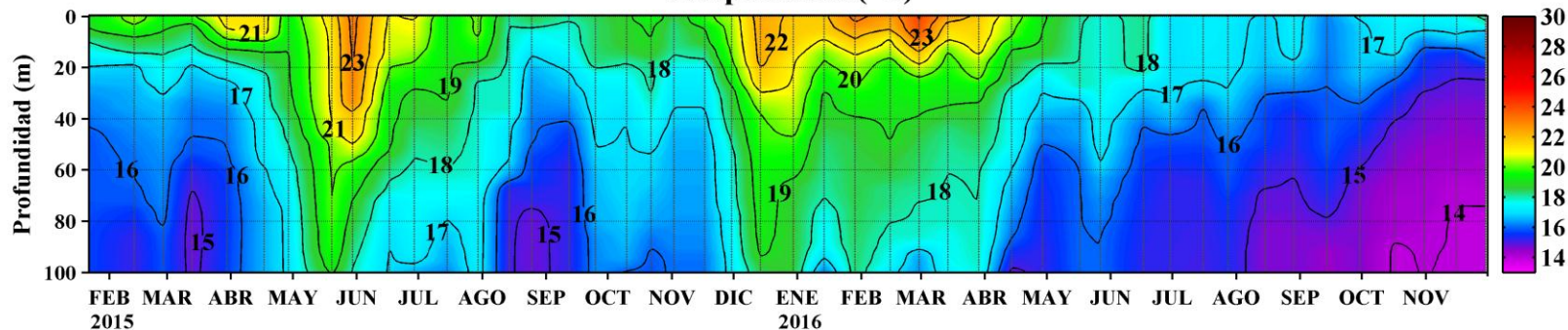


**SERIE DE TIEMPO DE ANOMALÍA TÉRMICA USANDO DATOS ARGOS (ENERO 2015 - 04 DE DICIEMBRE 2016),
CLIMATOLOGÍA GODAS (1993-2015) Y PUNTO FIJO DE PAITA (ENERO 2015 - 28 DE OCTUBRE DE 2016)**

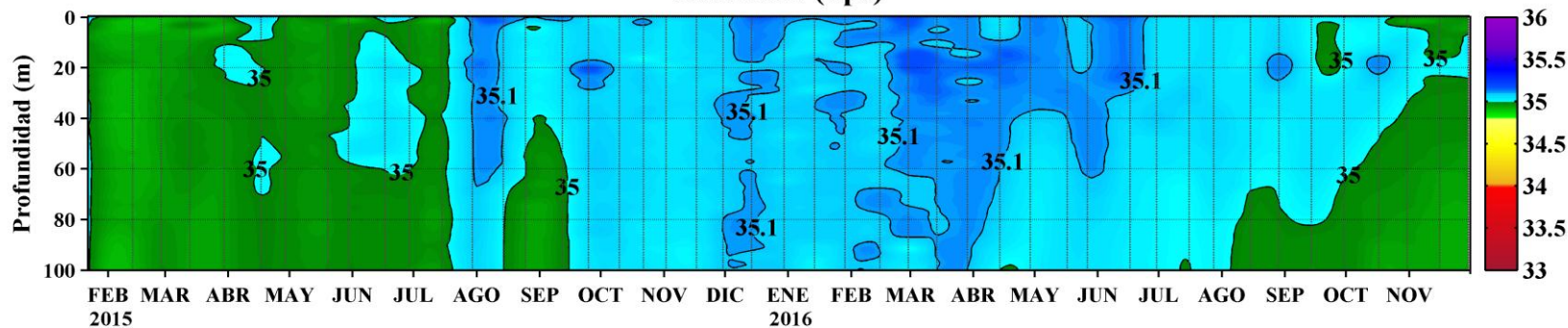


PUNTO FIJO DE CHICAMA (30 DE NOVIEMBRE 2016)

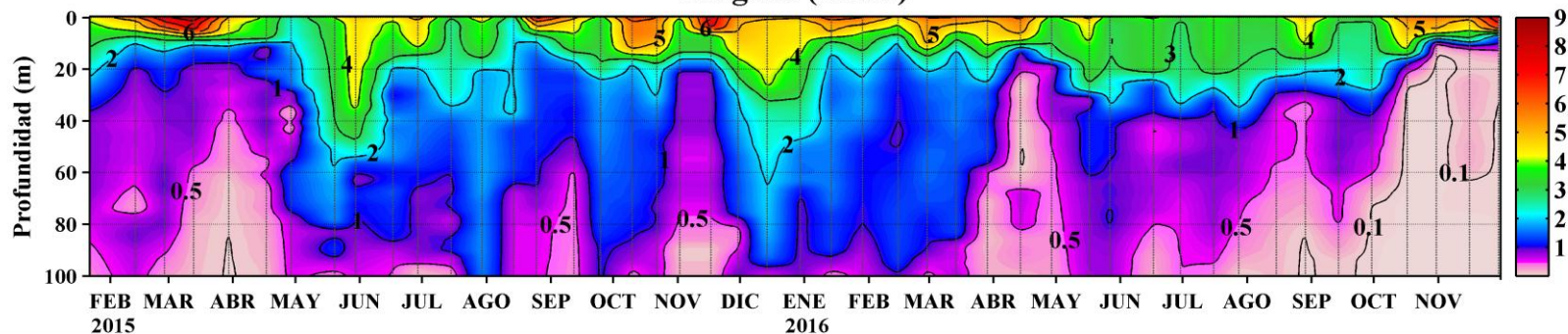
Temperatura (°C)



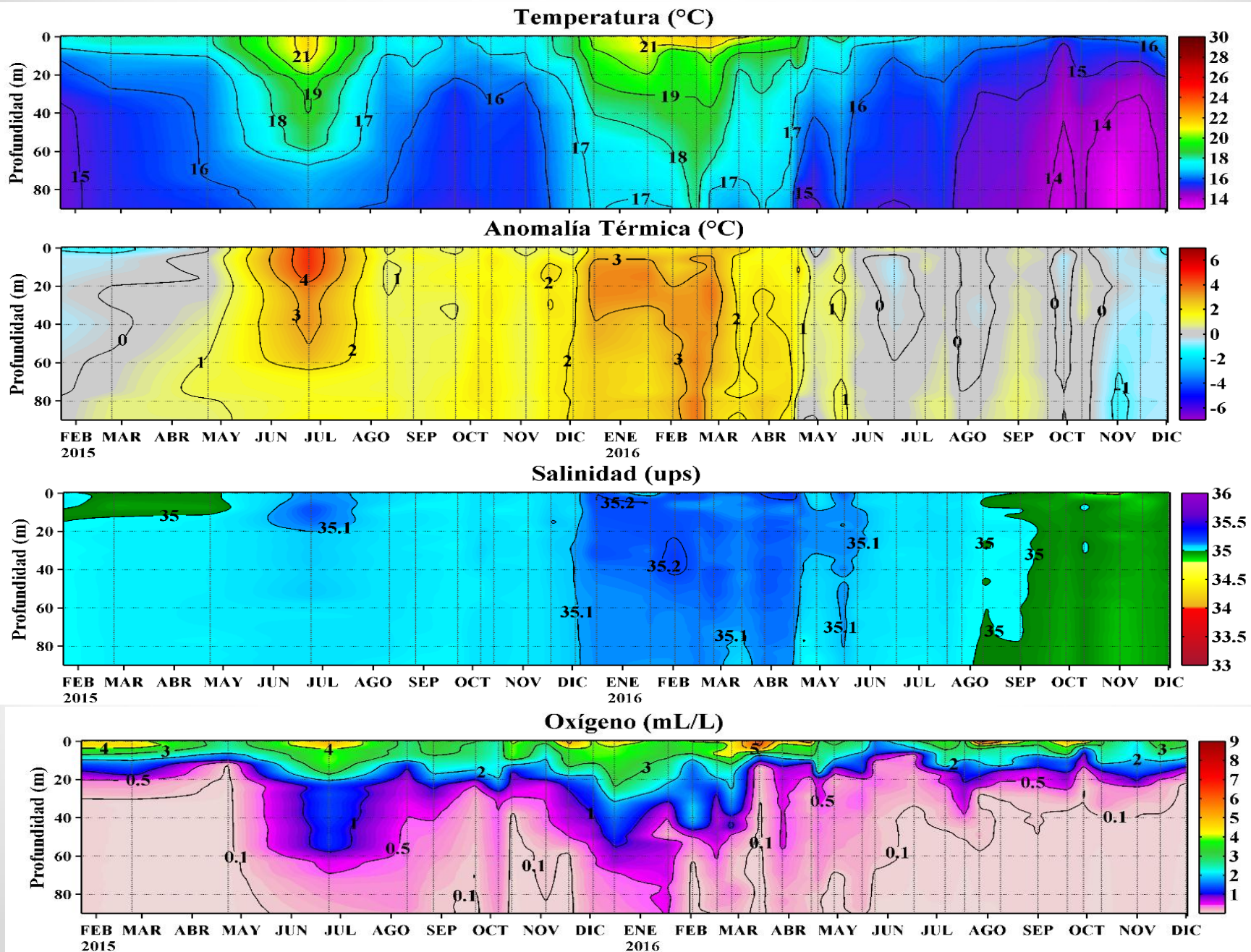
Salinidad (ups)



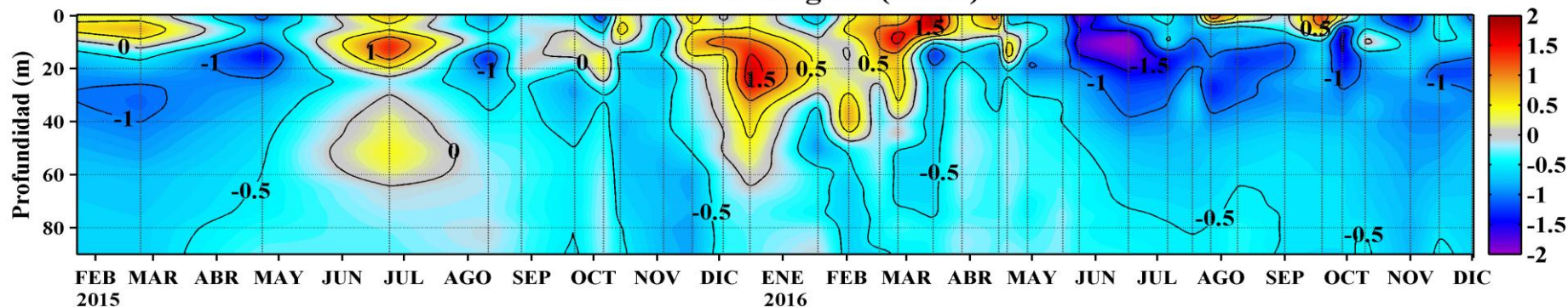
Oxígeno (mL/L)



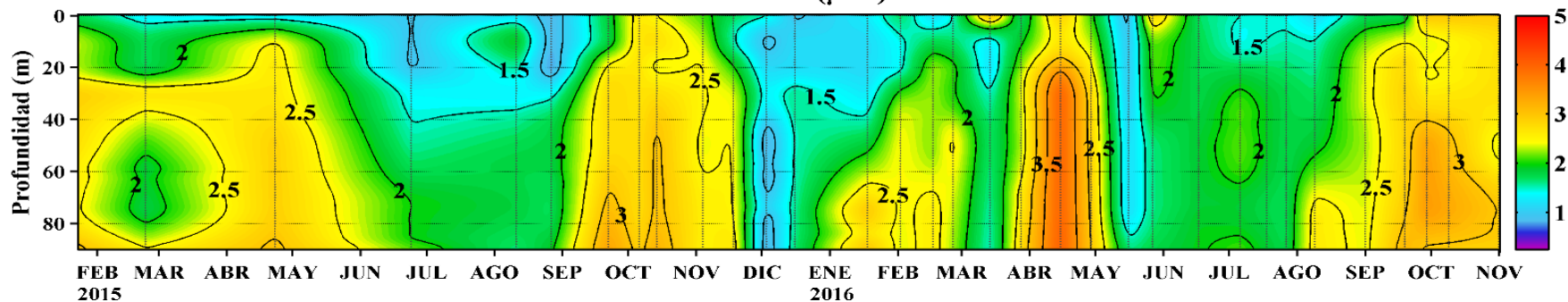
PUNTO FIJO DE CALLAO (01 DE DICIEMBRE 2016)



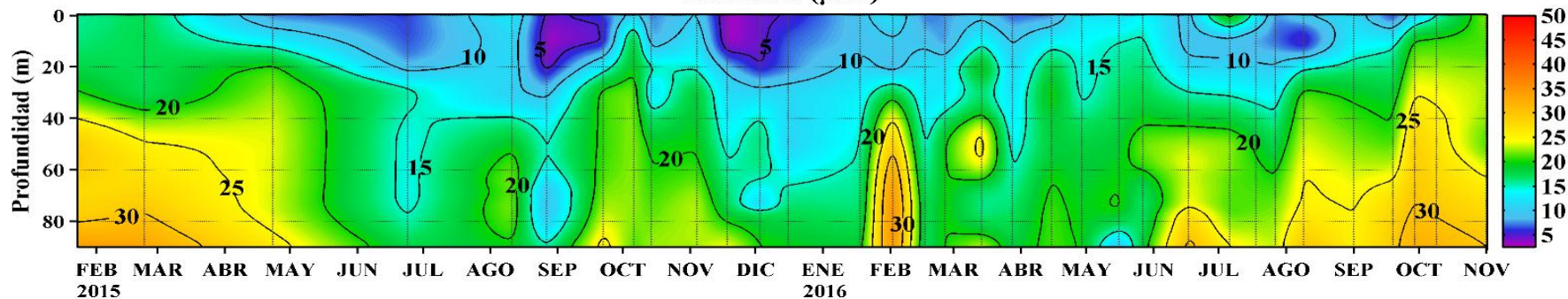
Anomalia de Oxígeno (mL/L)



Fosfatos (μM)



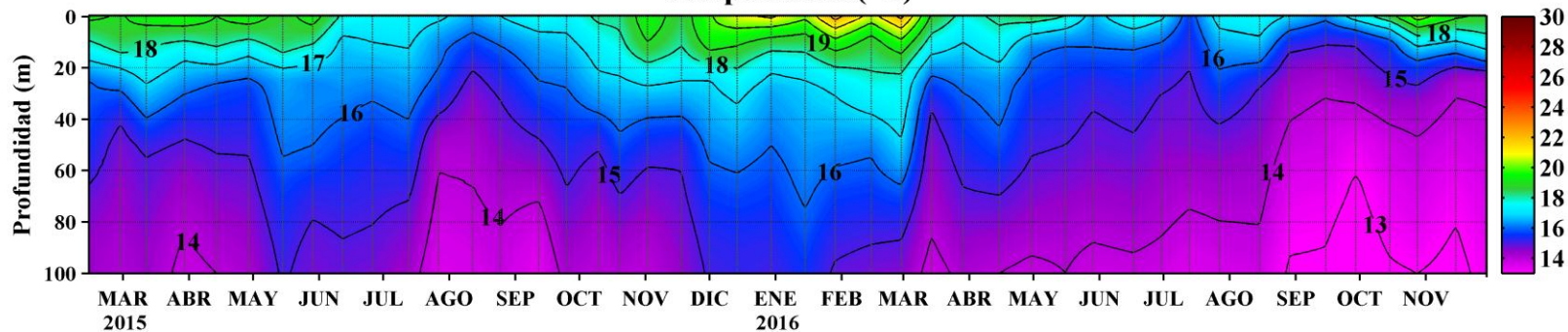
Silicatos (μM)



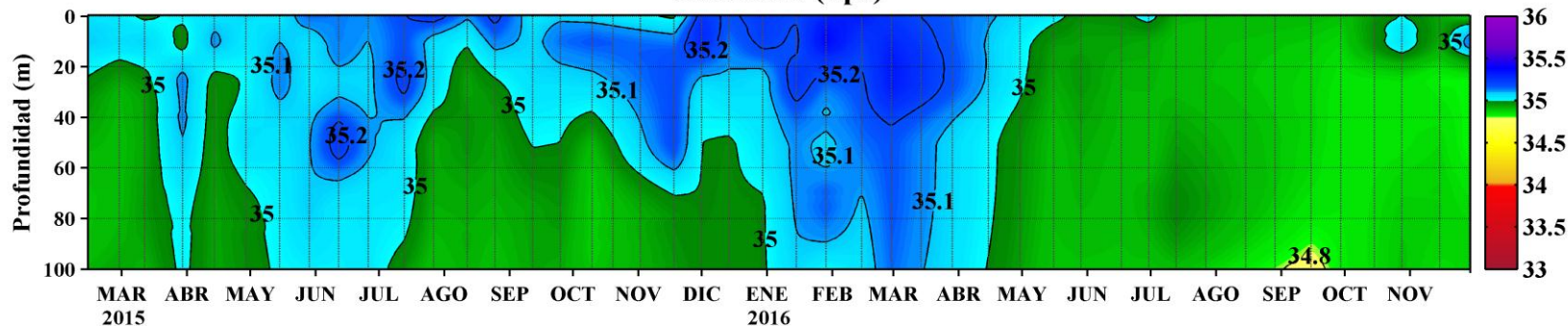
Entre Octubre y Noviembre 2016 la variables química de oxígeno, fosfatos y silicatos, se encuentran alrededor valores habituales para la primavera

PUNTO FIJO DE ILO (29 DE NOVIEMBRE 2016)

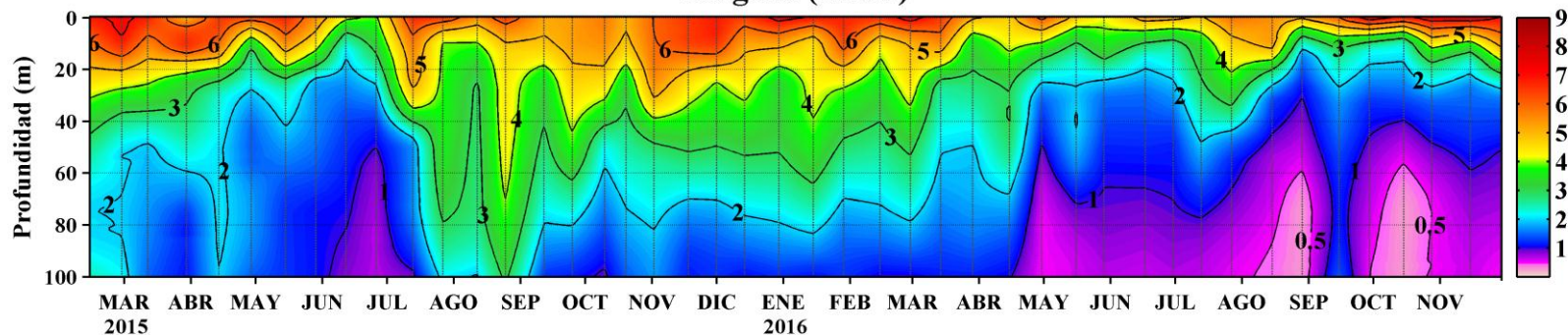
Temperatura (°C)



Salinidad (ups)



Oxígeno (mL/L)



Desembarque industrial de los principales recursos pelágicos – Noviembre 2016

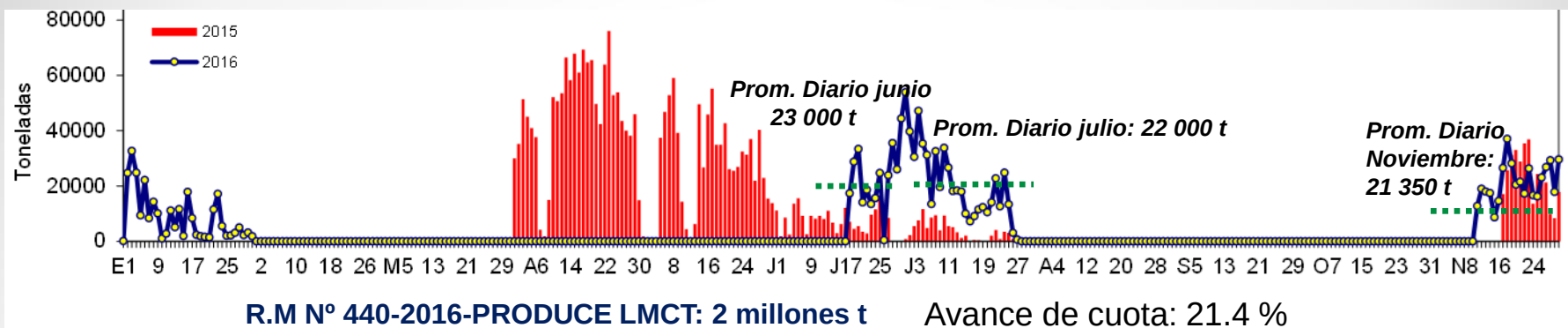
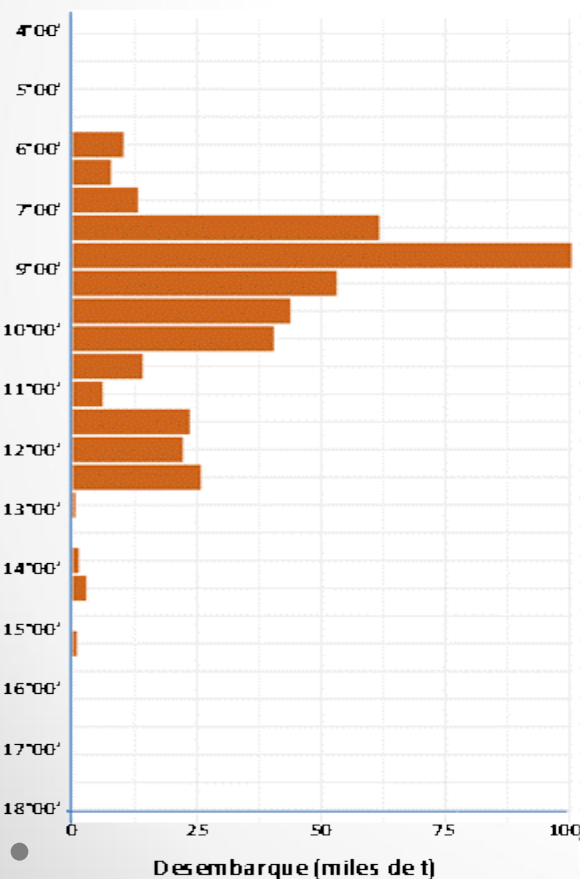
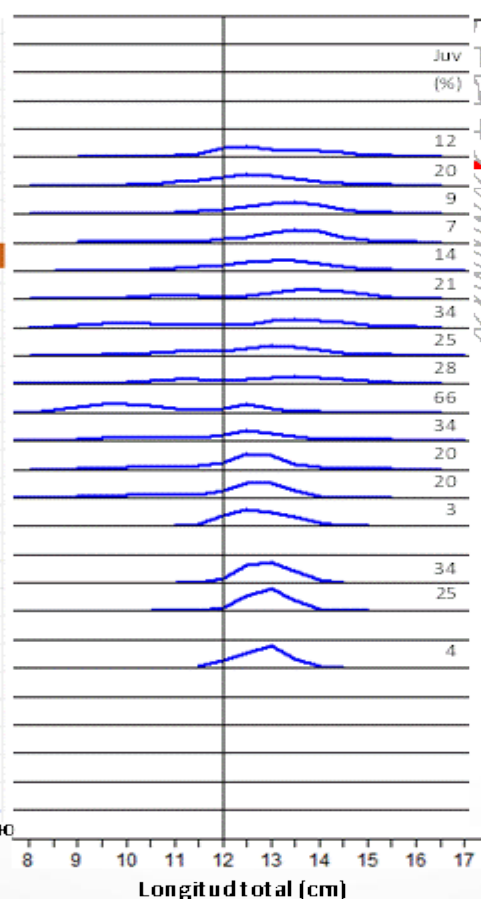
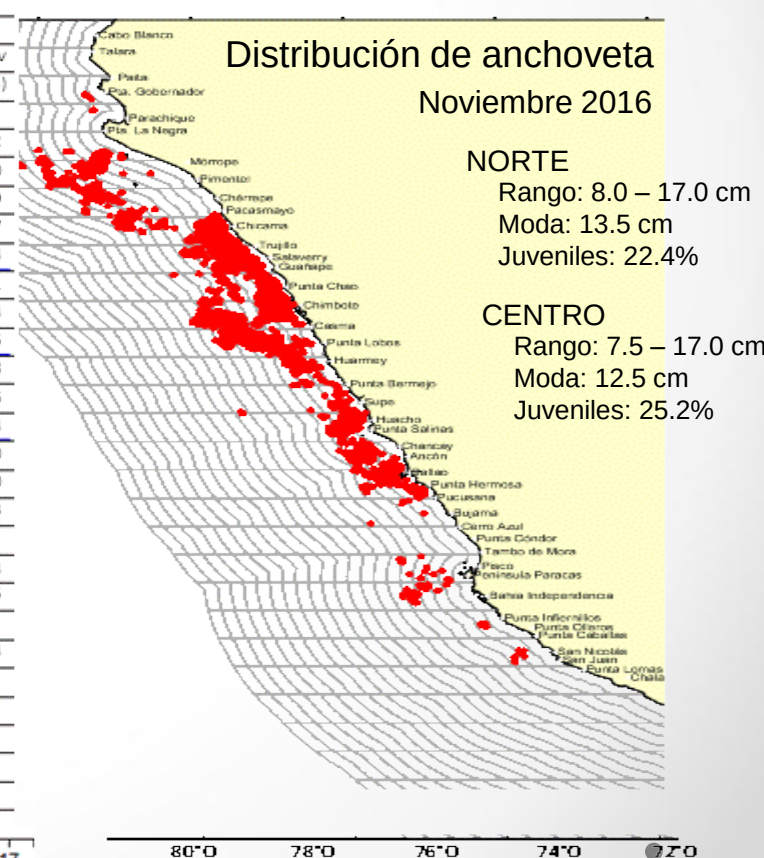
Especie \ Flota \ Región		Año Calendario (01 Ene. al 30 Nov. 2016)					
		Norte	Centro	N+C	Sur	Total	%
Anchoveta	FI Acero	496 277	718 511	1214 788	176 081	1390 869	75.48
	FI Madera	242 180	101 959	344 138	6 386	350 524	19.02
Sub-total		738 456	820 470	1558 926	182 468	1741 394	94.50
%		42.41	47.12	89.52	10.48	100.00	
Sardina		0	0	0	0	0	0.00
Jurel		0	0	0	0	0	0.00
Caballa		32 632	48 070	80 702	55	80 757	4.38
Samasa		17 996	270	18 265	0	18 265	0.99
*Otros		174	2 114	2 287	57	2 344	0.13
Total		789 257	870 923	1660 180	182 580	1842 760	100.00
%		42.83	47.26	90.09	9.91	100.00	

* Otros incluye principalmente: Falso volador, múnida, cachema

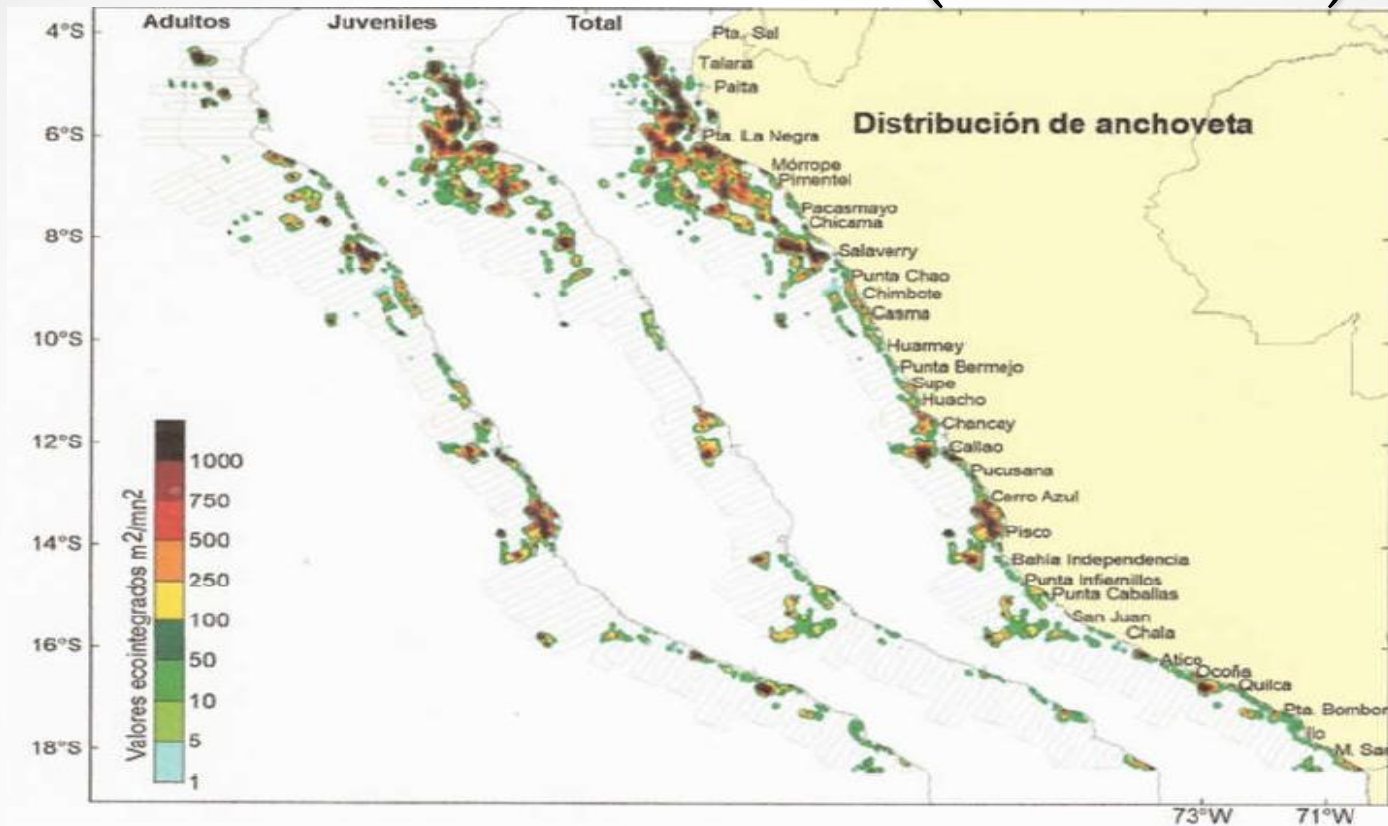
Cifras preliminares de uso científico

Fuente: AFIRNP

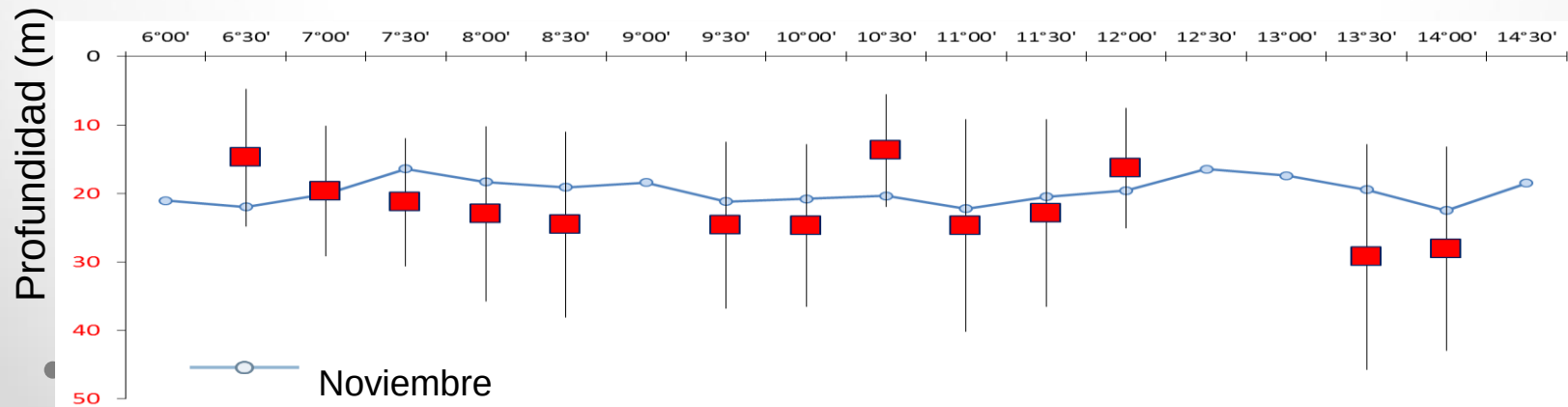
Distribución espacial de capturas, tallas de anchoveta. Noviembre del 2016



Biomasa de anchoveta (Cr1010-11)

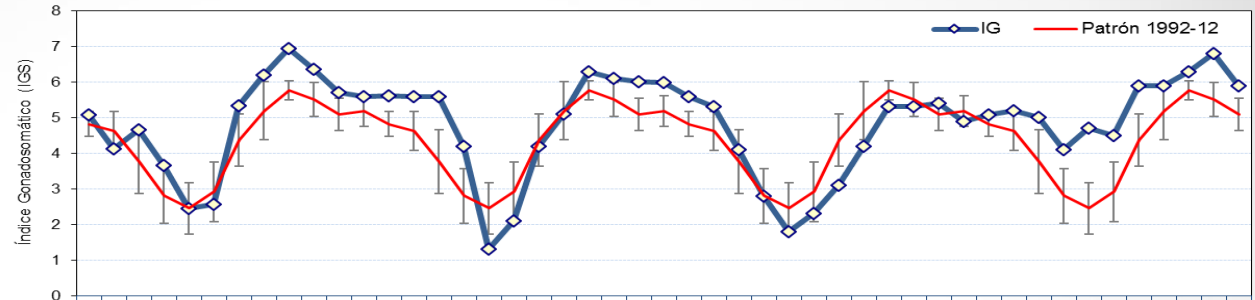


Distribución vertical de anchoveta. Noviembre del 2016

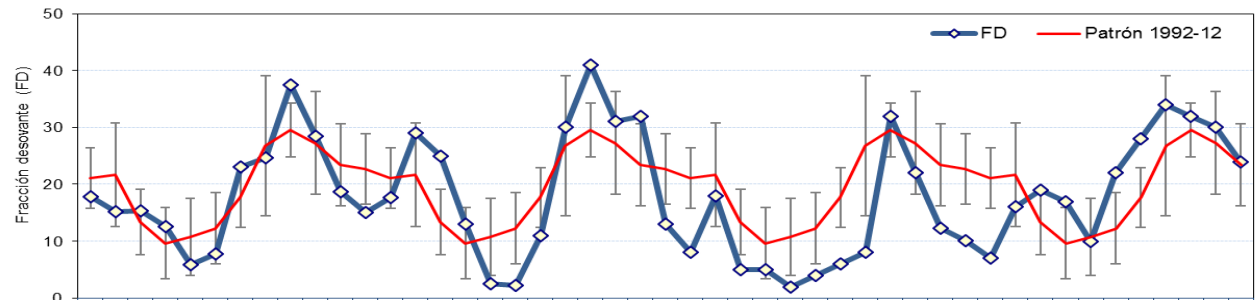


Condición reproductiva de anchoveta (Noviembre 2016)

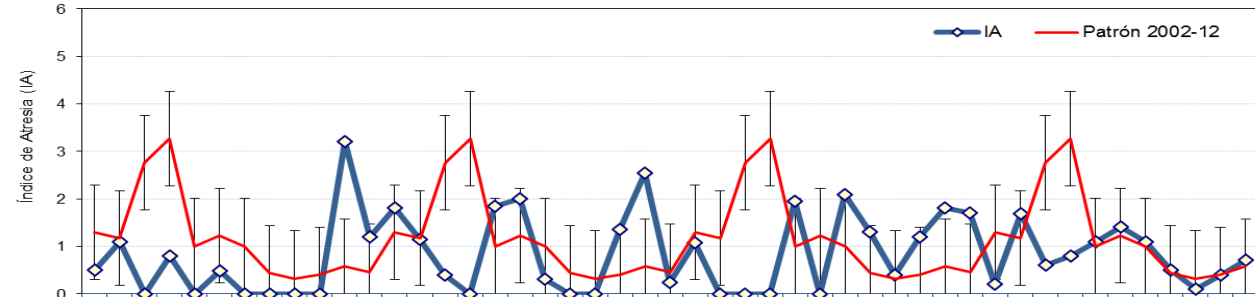
Índice
Gonadosomático



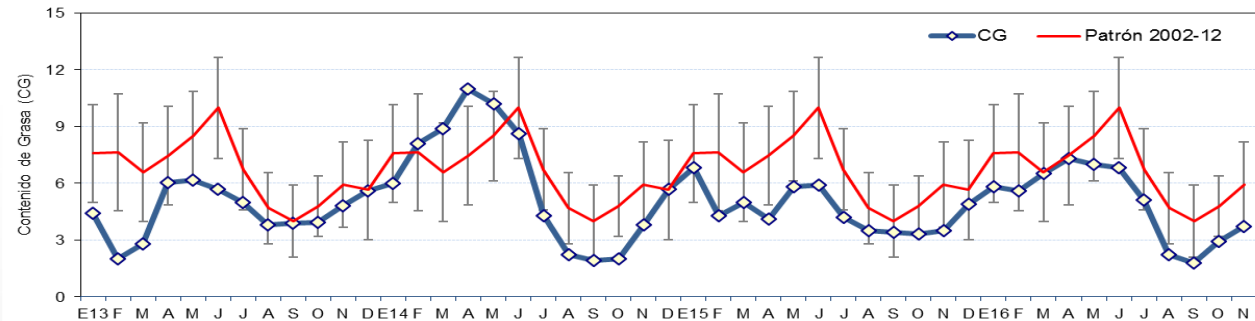
Fracción
desovante



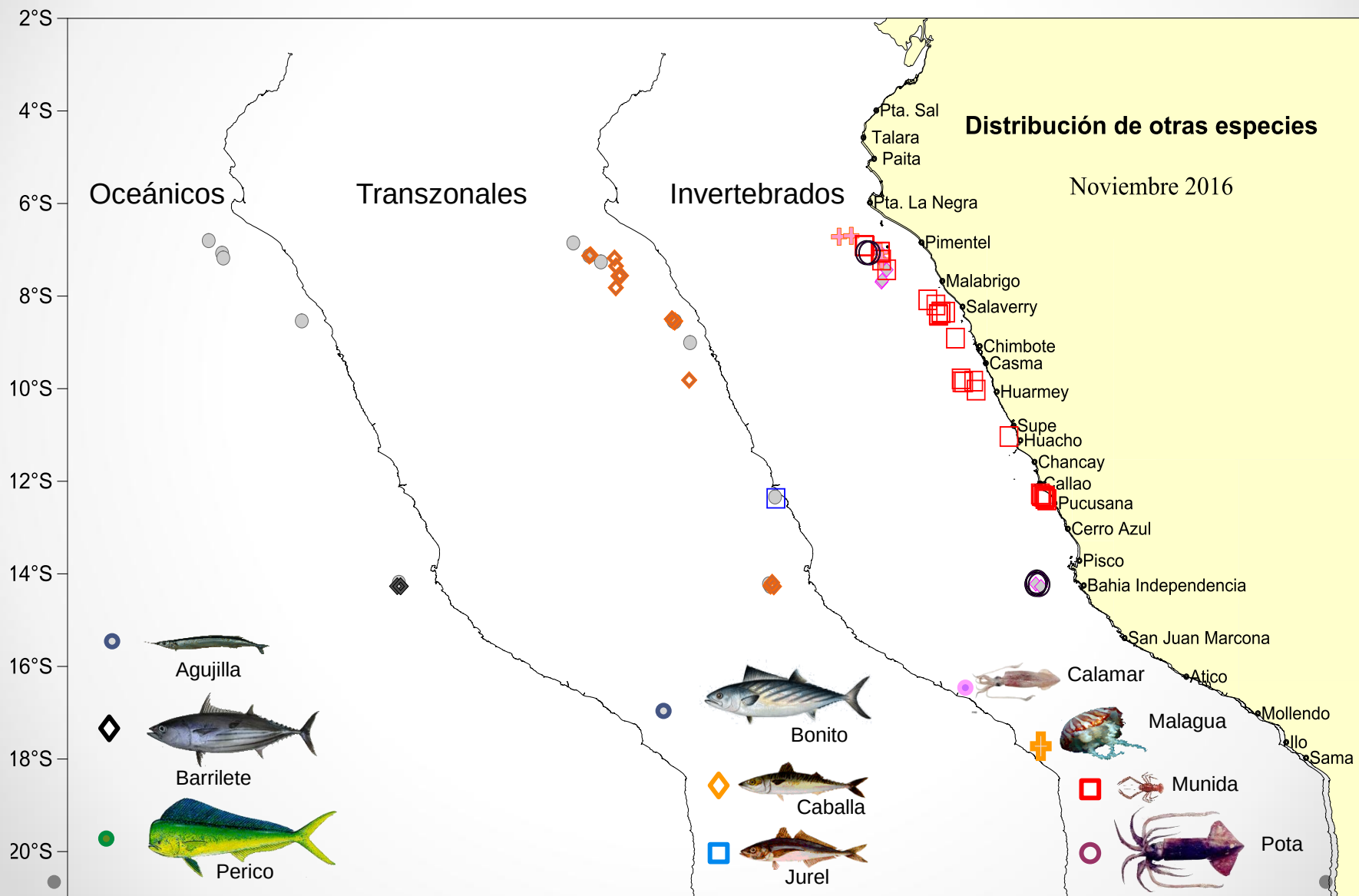
Índice de
atresia



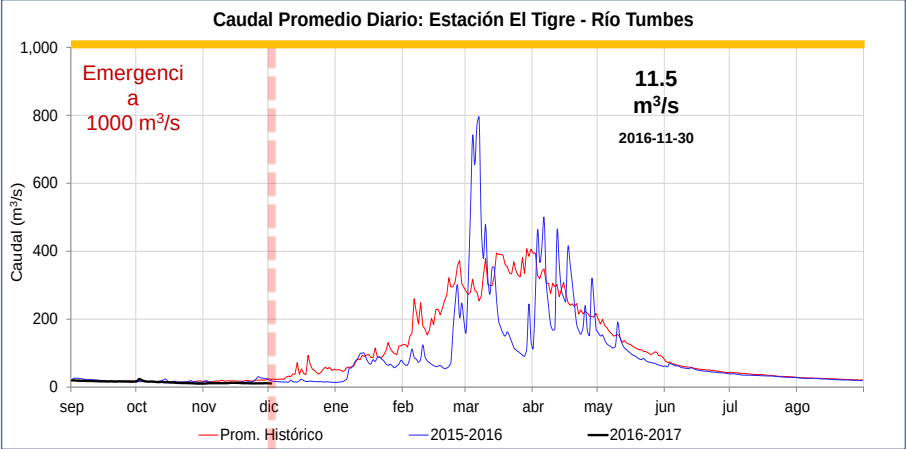
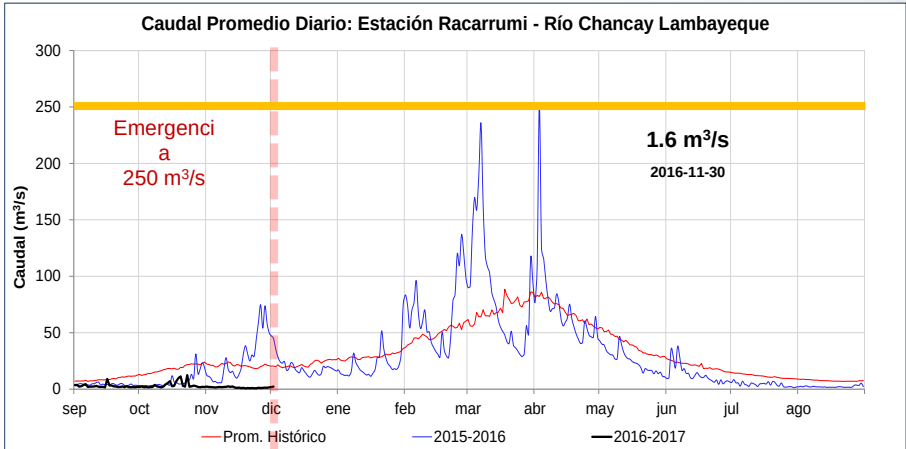
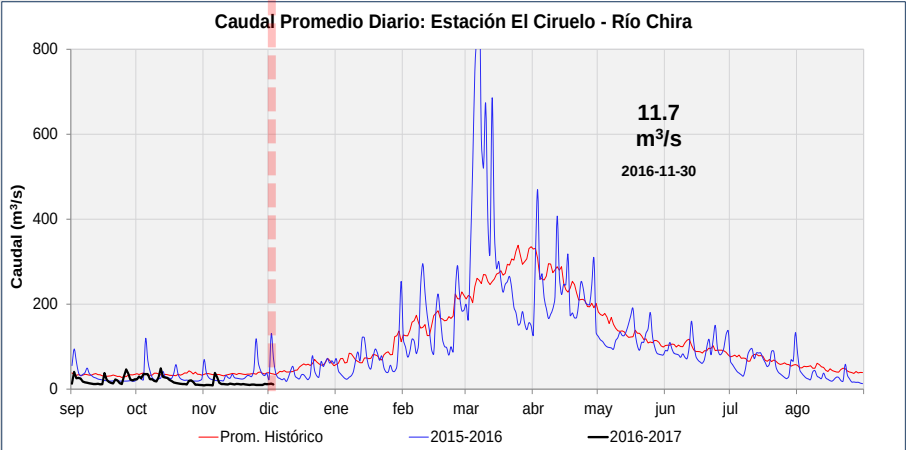
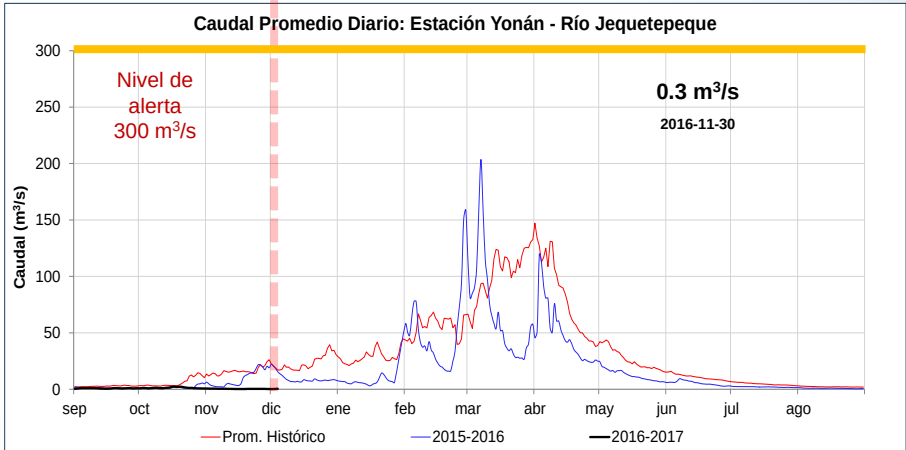
Contenido
graso



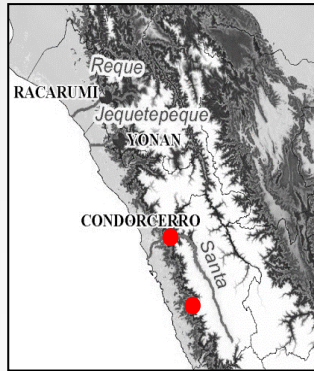
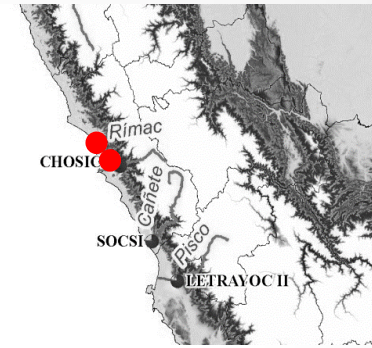
Distribución de otras especies (Noviembre 2016)



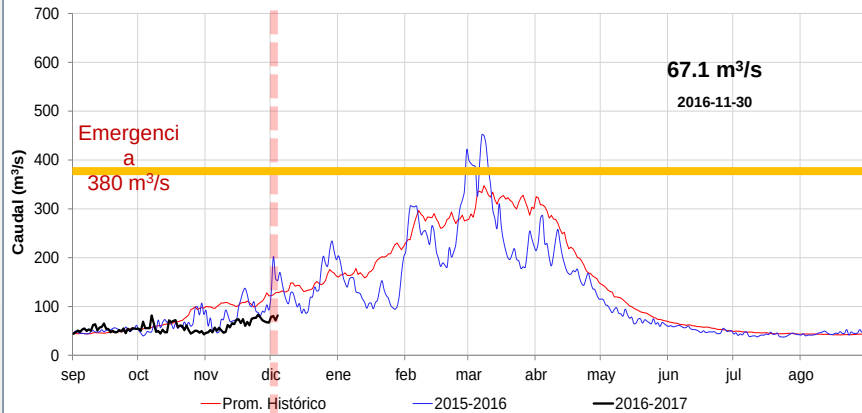
Región hidrográfica Pacífico – Ríos Costa Norte



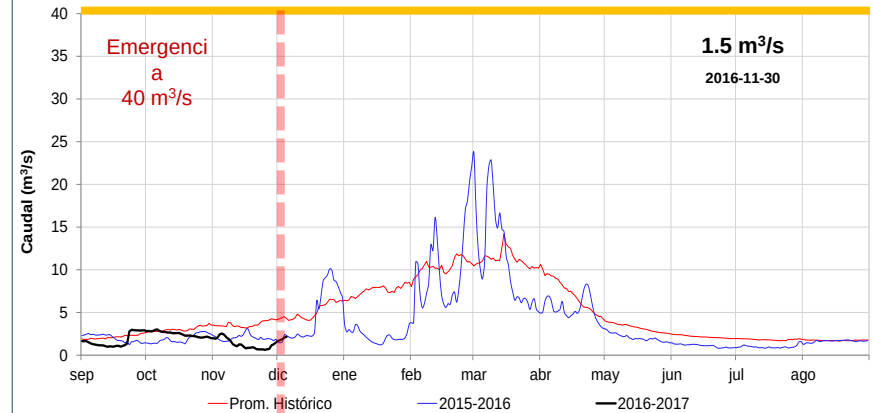
Región hidrográfica Pacífico – Ríos Costa Centro



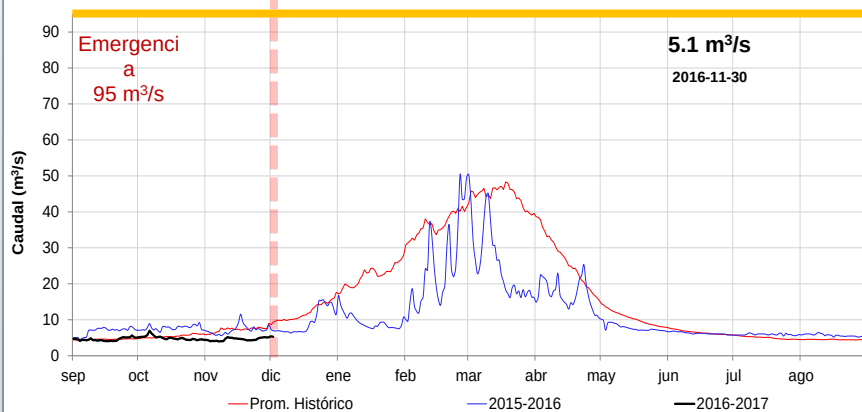
Caudal Promedio Diario: Estación Condorcerro - Río Santa



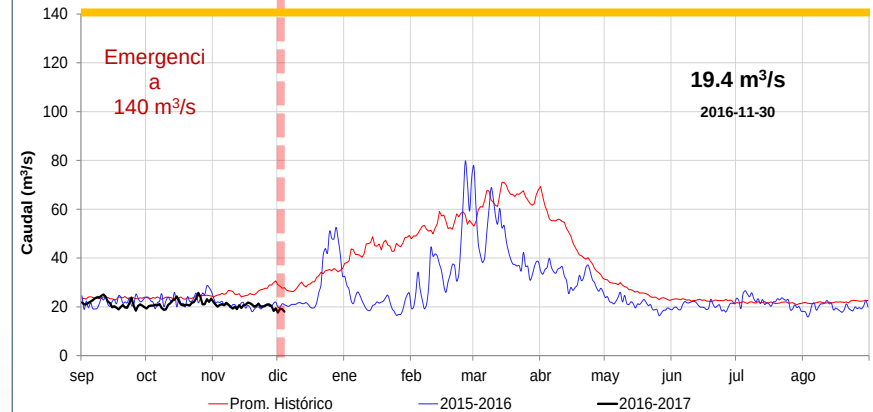
Caudal Promedio Diario: Estación Obrajillo - Río Chillón



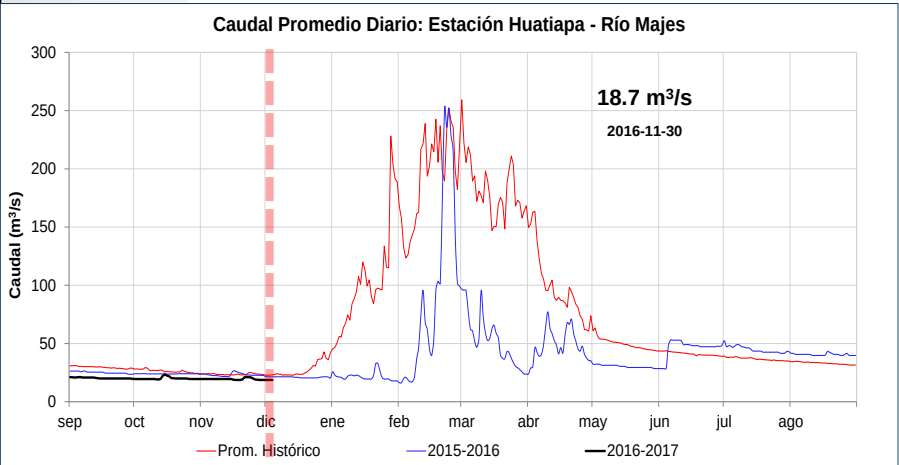
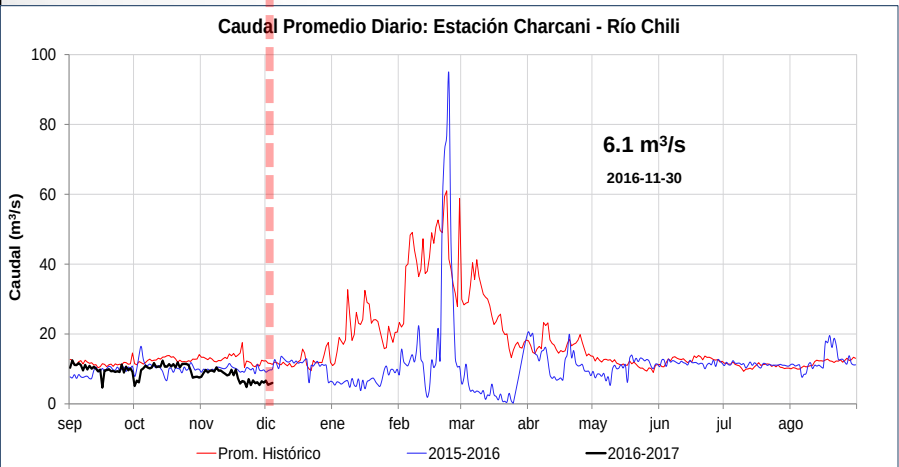
Caudal Promedio Diario: Estación Santo Domingo - Río Chancay Huaral



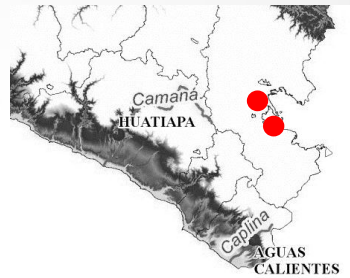
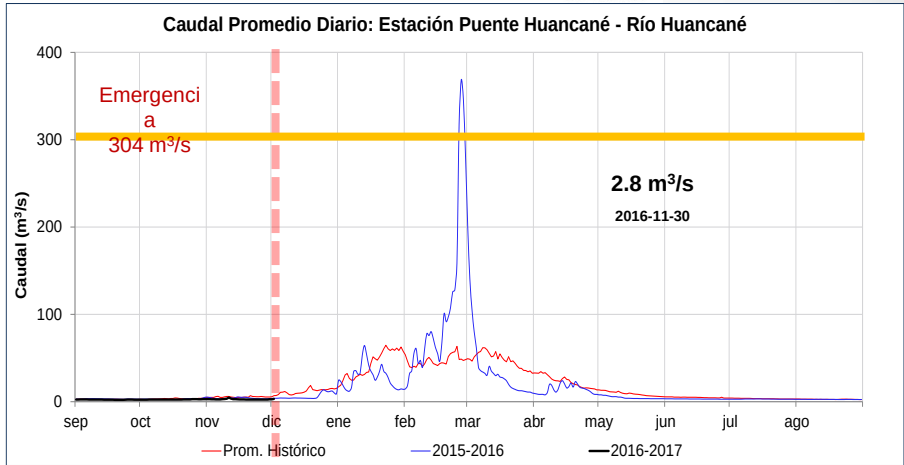
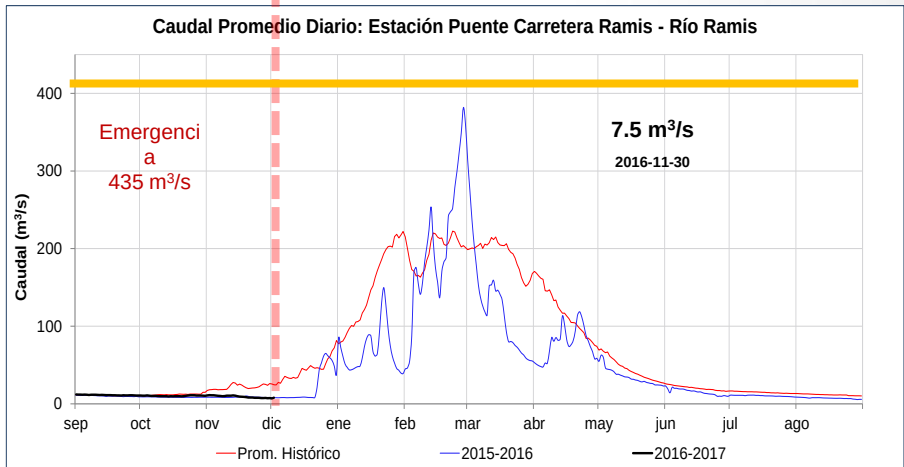
Caudal Promedio Diario: Estación Chosica - Río Rímac



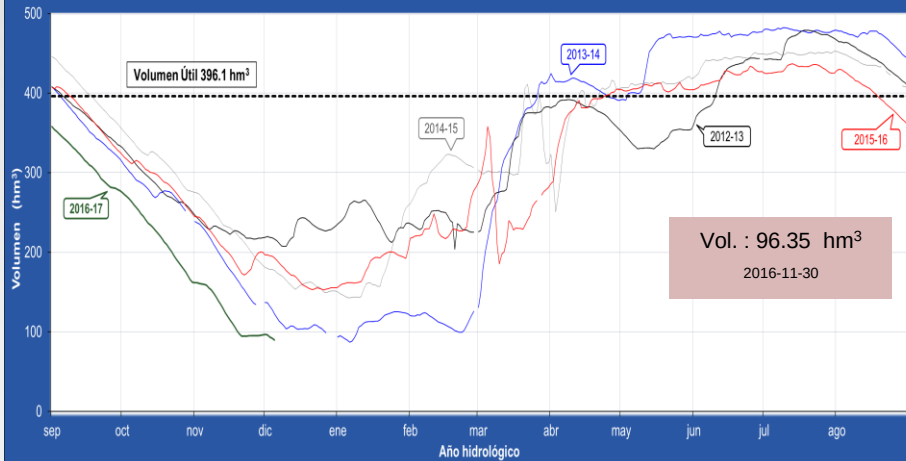
Región hidrográfica Pacífico – Ríos Costa Sur



Región hidrográfica Titicaca



VOLUMEN UTIL DIARIO - RESERVORIO POECHOS



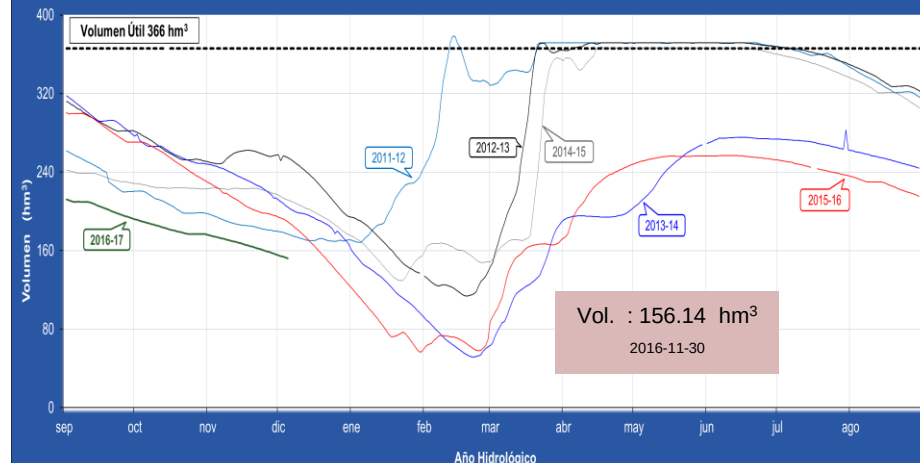
VOLUMEN UTIL DIARIO - RESERVORIO TINAJONES

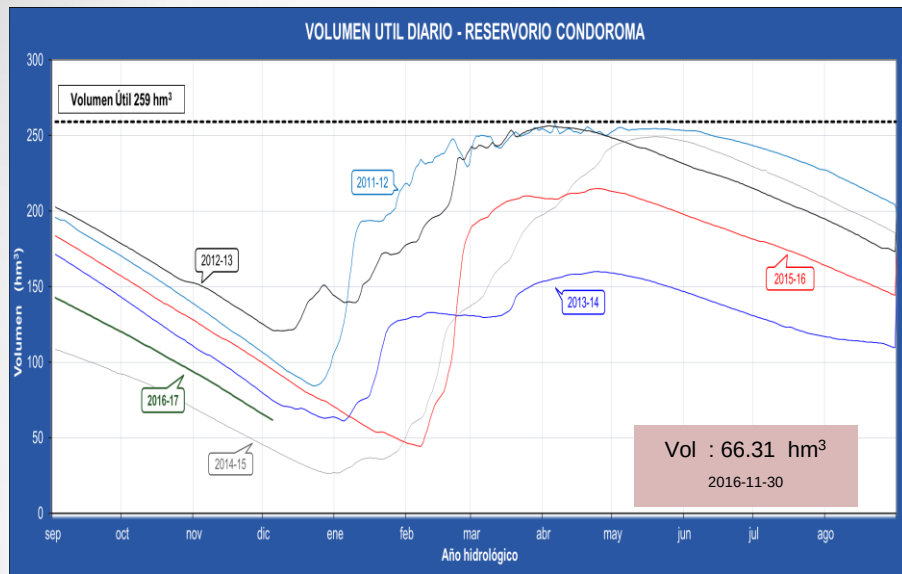
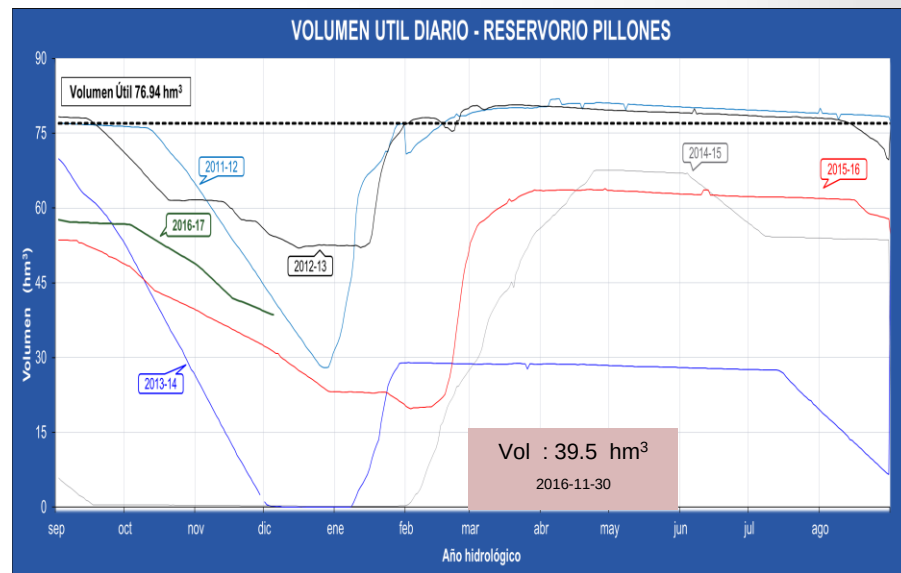
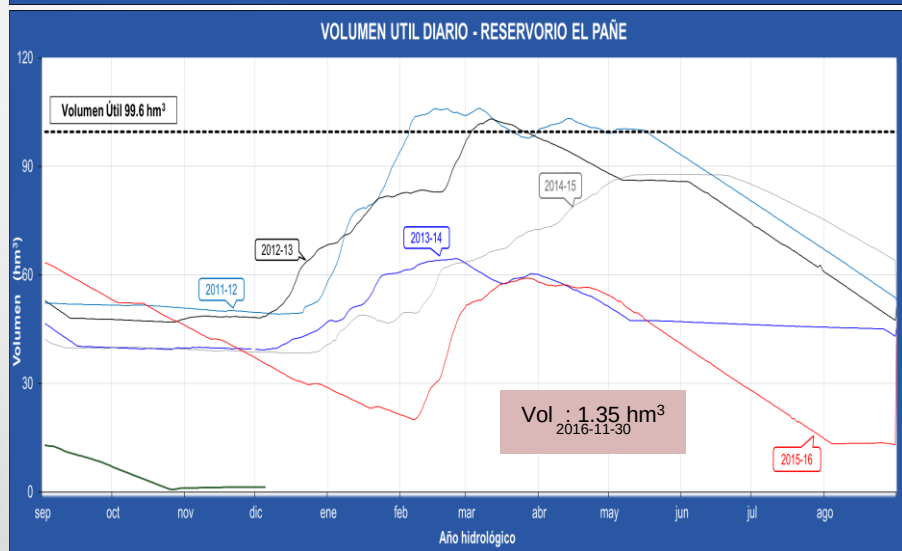
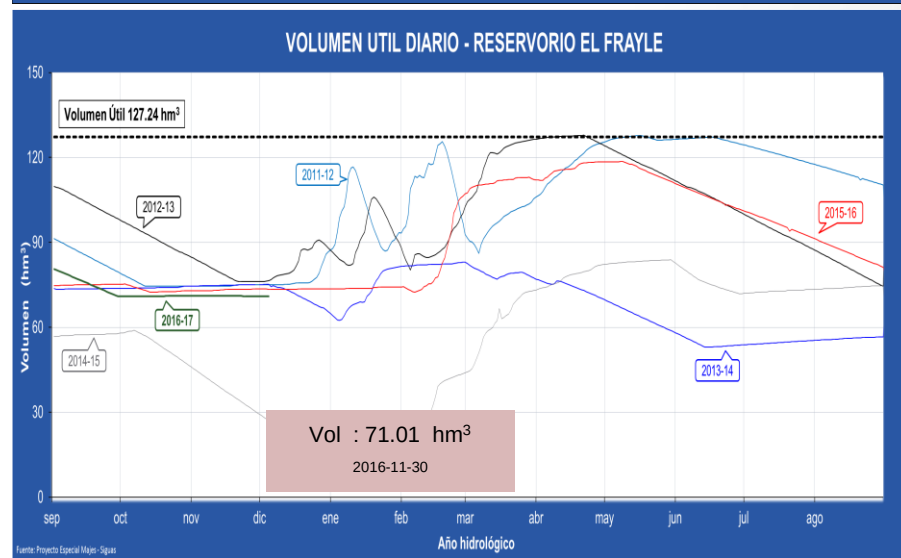


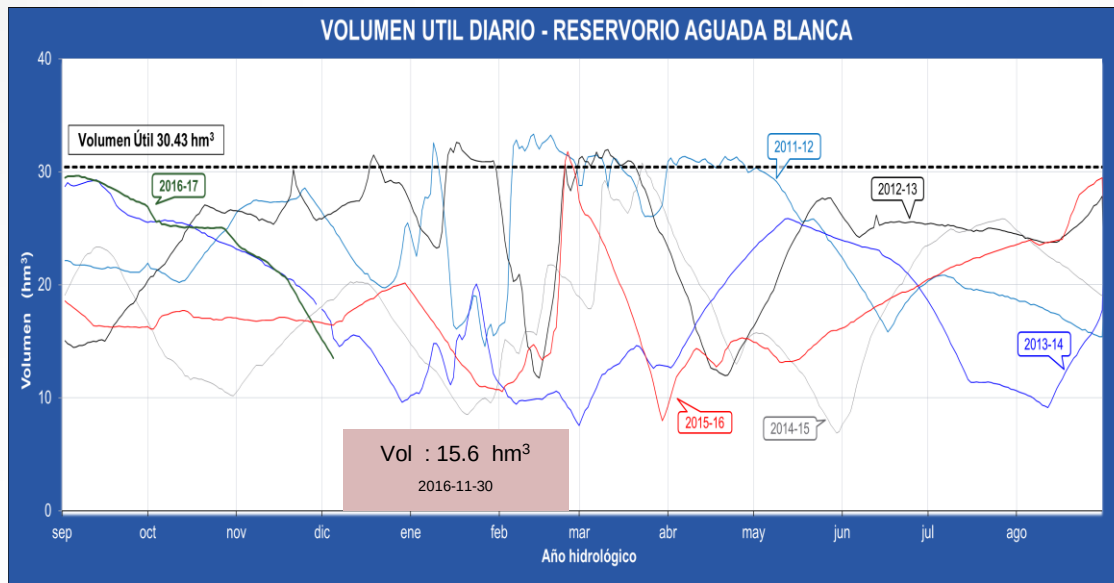
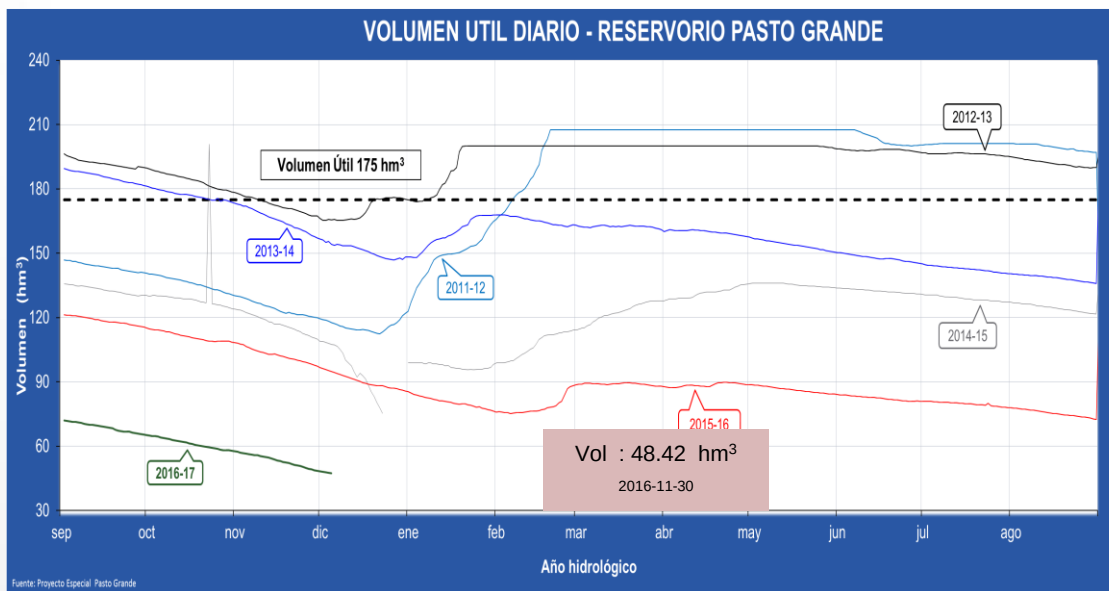
VOLUMEN UTIL DIARIO - RESERVORIO SAN LORENZO



VOLUMEN UTIL DIARIO - RESERVORIO GALLITO CIEGO







Resumen del estado de los principales embalses.

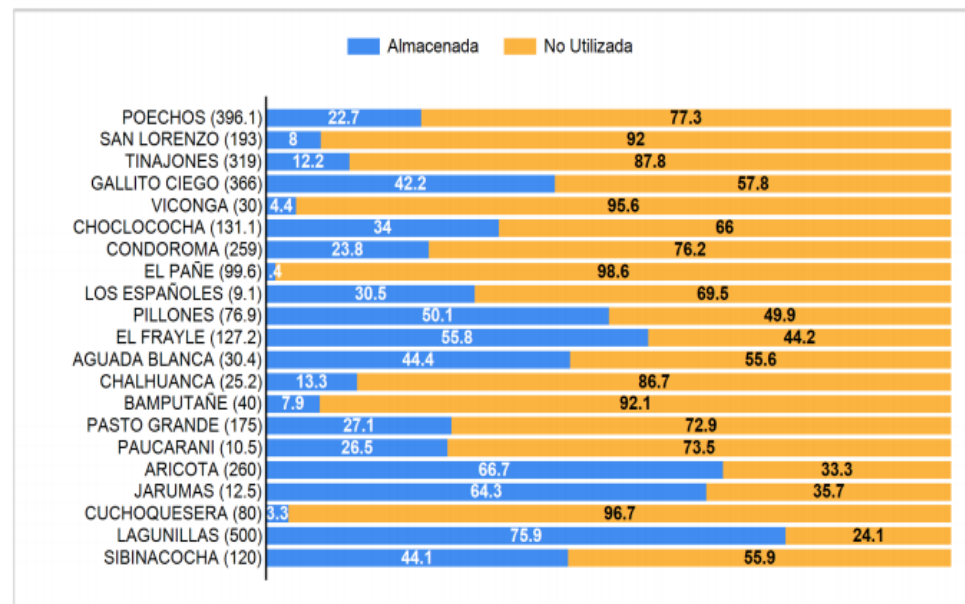


CUADRO: PERÚ: VOLUMEN DE AGUA ALMACENADO EN RESERVIOS PRINCIPALES

Zona	Nombre del Reservorio	Fecha del dato	Departamento de Influencia	Capacidad Hidráulica (hm3)		Capacidad Hidráulica Almacenada (%)
				Útil	Almacenada	
Costa - Norte	POECHOS	05-dic	Piura	396.1	90	22.7
Costa - Norte	SAN LORENZO	01-dic	Piura	193	15.5	8
Costa - Norte	TINAJONES	02-dic	Lambayeque	319	39	12.2
Costa - Norte	GALLITO CIEGO	02-dic	Cajamarca	366	154.5	42.2
Costa - Centro	VICONGA	01-dic	Lima	30	1.3	4.4
Costa - Sur	CHOCLOCOCHA	21-nov	Huancavelica	131.1	44.6	34
Costa - Sur	CONDOROMA	05-dic	Arequipa	259	61.7	23.8
Costa - Sur	EL PAÑE	05-dic	Cusco	99.6	1.4	1.4
Costa - Sur	LOS ESPAÑOLES	05-dic	Arequipa	9.1	2.8	30.5
Costa - Sur	PILLONES	05-dic	Arequipa	76.9	38.6	50.1
Costa - Sur	EL FRAYLE	05-dic	Arequipa	127.2	71	55.8
Costa - Sur	AGUADA BLANCA	05-dic	Arequipa	30.4	13.5	44.4
Costa - Sur	CHALHUANCA	05-dic	Arequipa	25.2	3.4	13.3
Costa - Sur	BAMPUTAÑE	05-dic	Puno	40	3.2	7.9
Costa - Sur	PASTO GRANDE	05-dic	Moquegua	175	47.4	27.1
Costa - Sur	PAUCARANI	02-dic	Tacna	10.5	2.8	26.5
Costa - Sur	ARICOTA	05-dic	Tacna	260	173.4	66.7
Costa - Sur	JARUMAS	30-nov	Tacna	12.5	8	64.3
Sierra - Centro	CUCHOQUESERA	05-dic	Ayacucho	80	2.6	3.3
Sierra - Sur	LAGUNILLAS	05-dic	Puno	500	379.5	75.9
Sierra - Sur	SIBINACocha	02-dic	Cusco	120	53	44.1
Situación Nacional				3260.6	1207.2	37



GRÁFICO: PERÚ: VOLUMEN DE AGUA ALMACENADO EN LOS RESERVIOS PRINCIPALES DEL PAÍS (Porcentaje de la Capacidad Hidráulica Útil)



Valores del Oceanic Niño Index (ONI)

El Niño
en el
Pacífico
Central
duró
hasta
mayo

Mes	ONI	Categoría
02/2016	1.99	Cálida Fuerte
03/2016	1.58	Cálida Fuerte
04/2016	1.09	Cálida Moderada
05/2016	0.60	Cálida Débil
06/2016	0.10	Neutra
07/2016	-0.32	Neutra
08/2016	-0.58	Fría Débil
09/2016	-0.74	Fría Débil
10/2016	-0.84	Fría Débil

<http://www.cpc.ncep.noaa.gov/data/indices/oni.ascii.txt>

Mes	ONItmp	Categoría
11/2016	-0.75*	Fría Débil
12/2016	-0.57**	Fría Débil

* Se usaron los datos de (Oct. Nov. 2016) ERSST4, (Dic. 2016) NMME (CI 2016 11).

** Se usaron los datos de (Nov. 2016) ERSST4, (Dic. 2016 y Ene. 2017) NMME (CI 2016 11)

Valores del Índice Costero El Niño

El Niño
costero
duró
hasta
junio



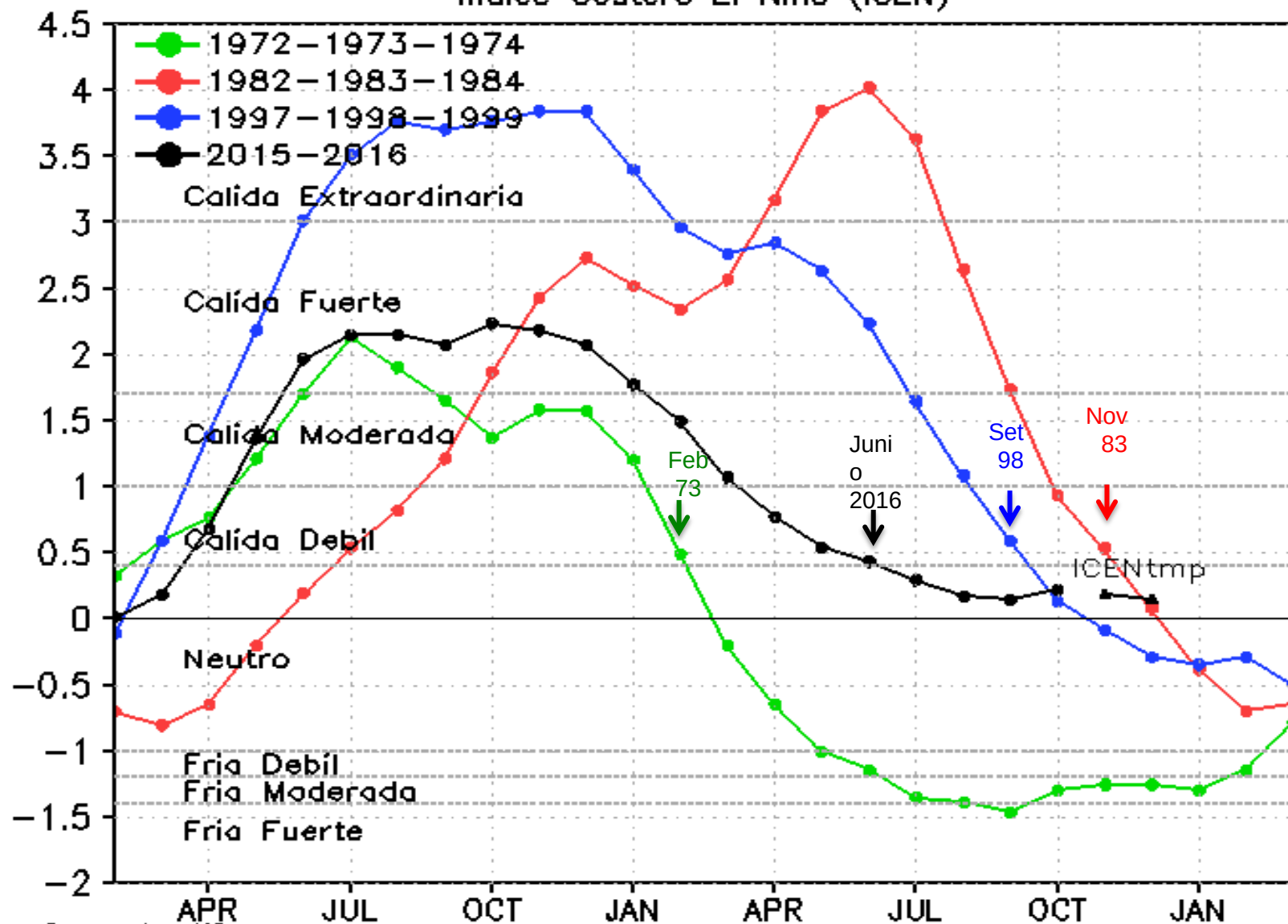
Mes	ICEN	Categoría
02/2016	1.49	Cálida Moderada
03/2016	1.07	Cálida Moderada
04/2016	0.77	Cálida Débil
05/2016	0.54	Cálida Débil
06/2016	0.43	Cálida Débil
07/2016	0.29	Neutra
08/2016	0.17	Neutra
09/2016	0.14	Neutra
10/2016	0.22	Neutra

Mes	ICENtmp	Categoría
11/2016	0.18*	Neutra
12/2016	0.14**	Neutra

* Se usaron los datos de (Oct. y Nov. 2016) ERSST3v, (Dic. 2016) NMME.

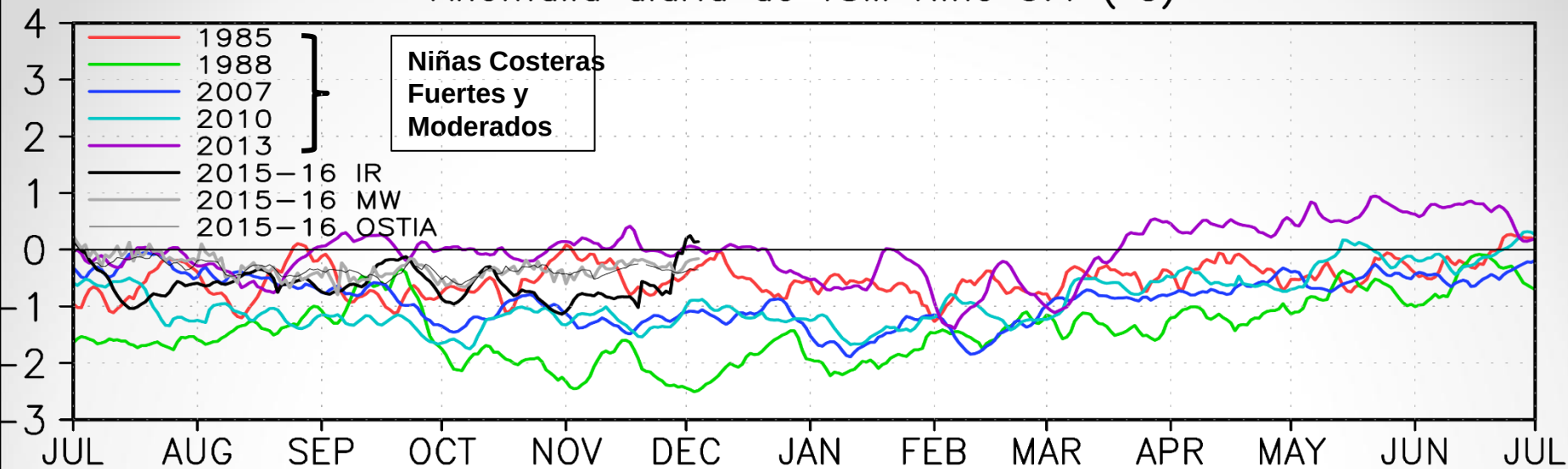
** Se usaron los datos de (Nov. 2016) ERSST3v, (Dic. 2016 y Ene. 2017)NMME
NMME CI 2016 11

Indice Costero El Nino (ICEN)

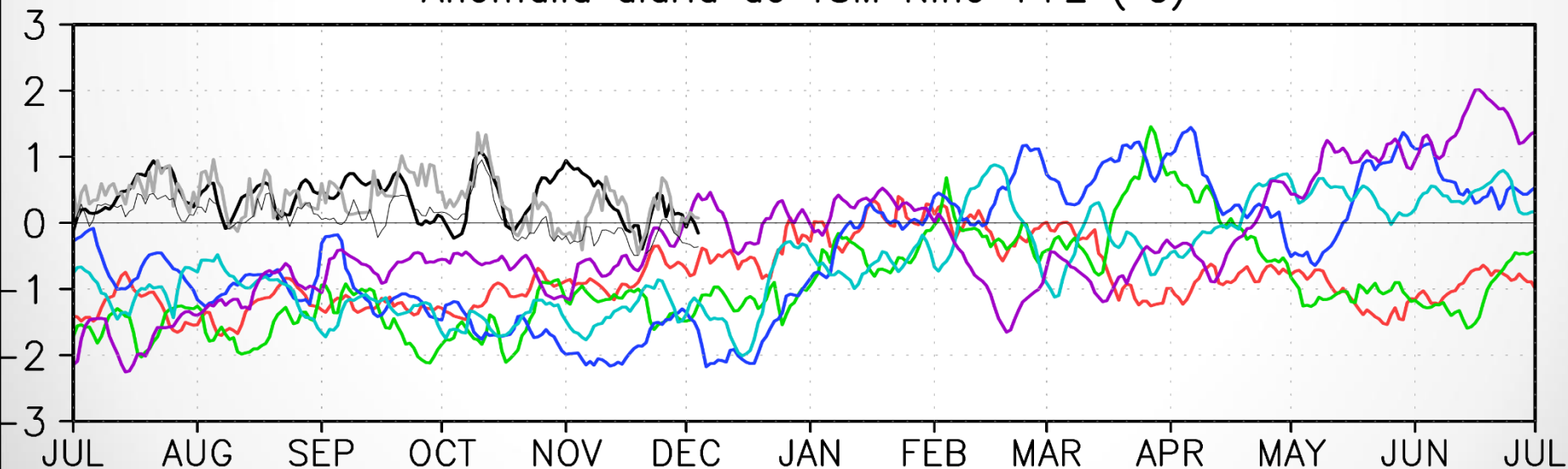


Preparacion: IGP.
Actualizado: 05-12-2016.

Anomalia diaria de TSM Nino 3.4 (°C)



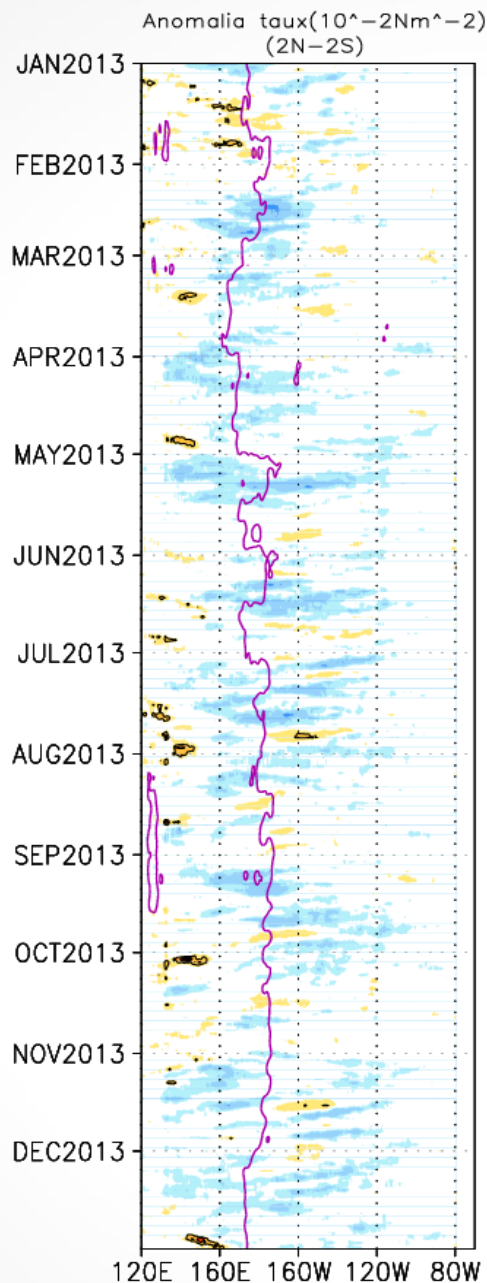
Anomalia diaria de TSM Nino 1+2 (°C)



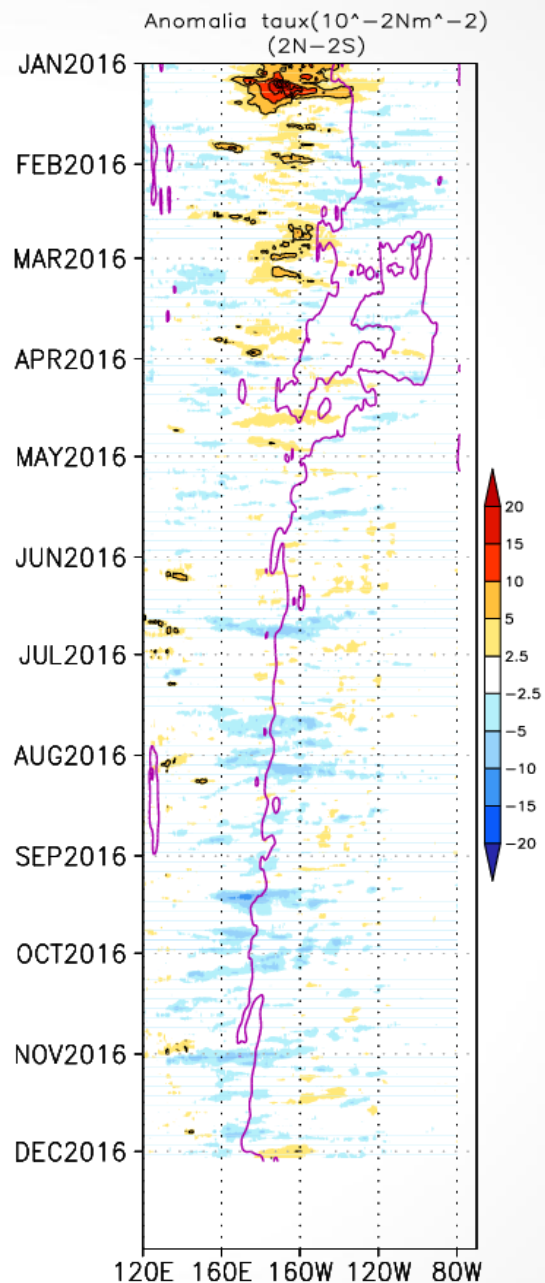
Datos: NOAA Hires OI SST, RSS MW SST, Procesamiento:IGP.

Ultimo dato-MW: 04DEC2016
 Ultimo dato-OISST: 04DEC2016
 Ultimo dato-OSTIA: 04DEC2016

La Niña
costera
fuerte 2013



Clim: 2008-2014 corregido con ERA-INT
Ultimos datos: 04DEC2016



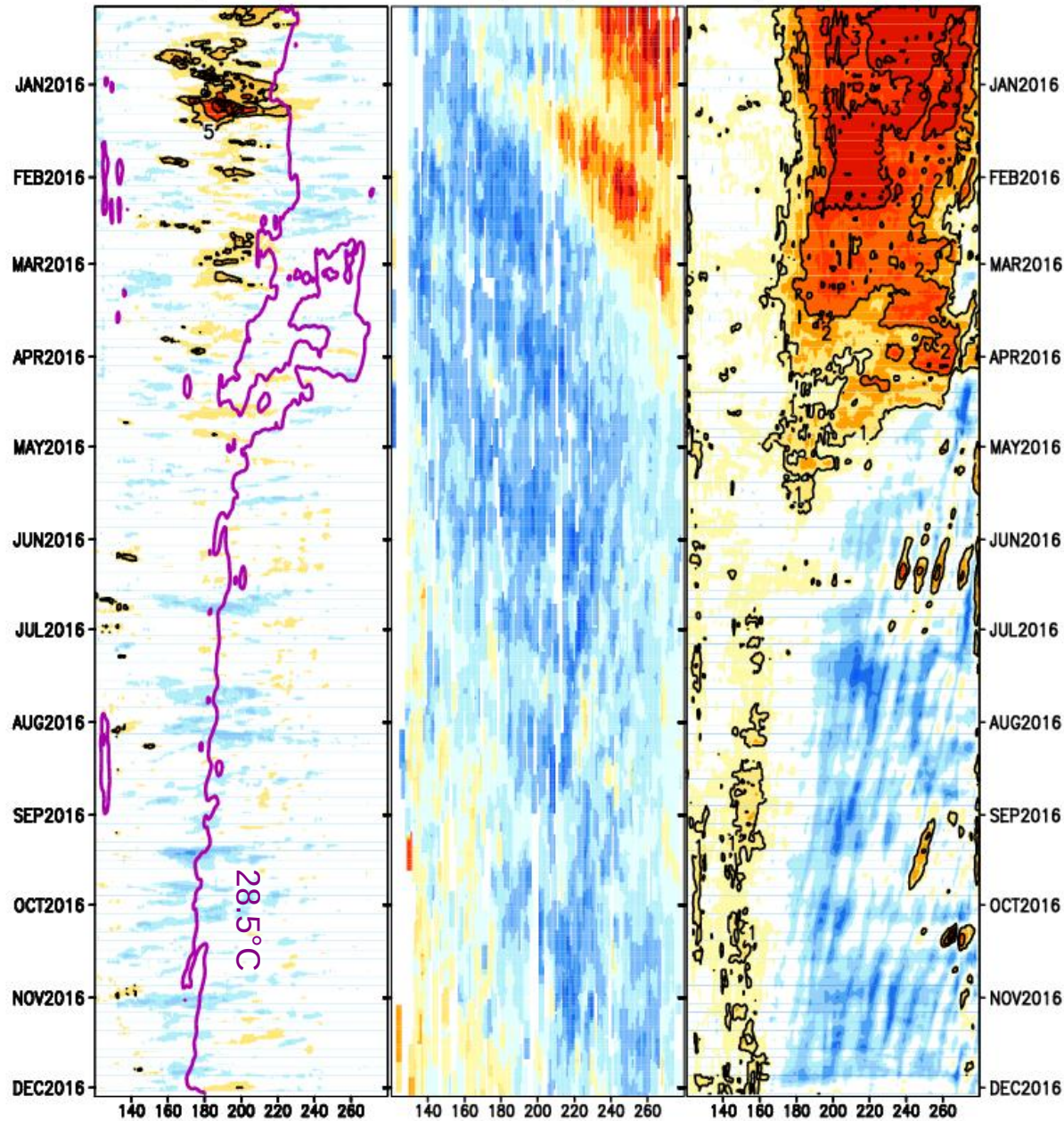
Fuente:ASCAT, Procesamiento: IGP

Equatorial (2°S–2°N)

a) Taux anomaly
(ASCAT)

b) Z20 anomaly
(ARGO)

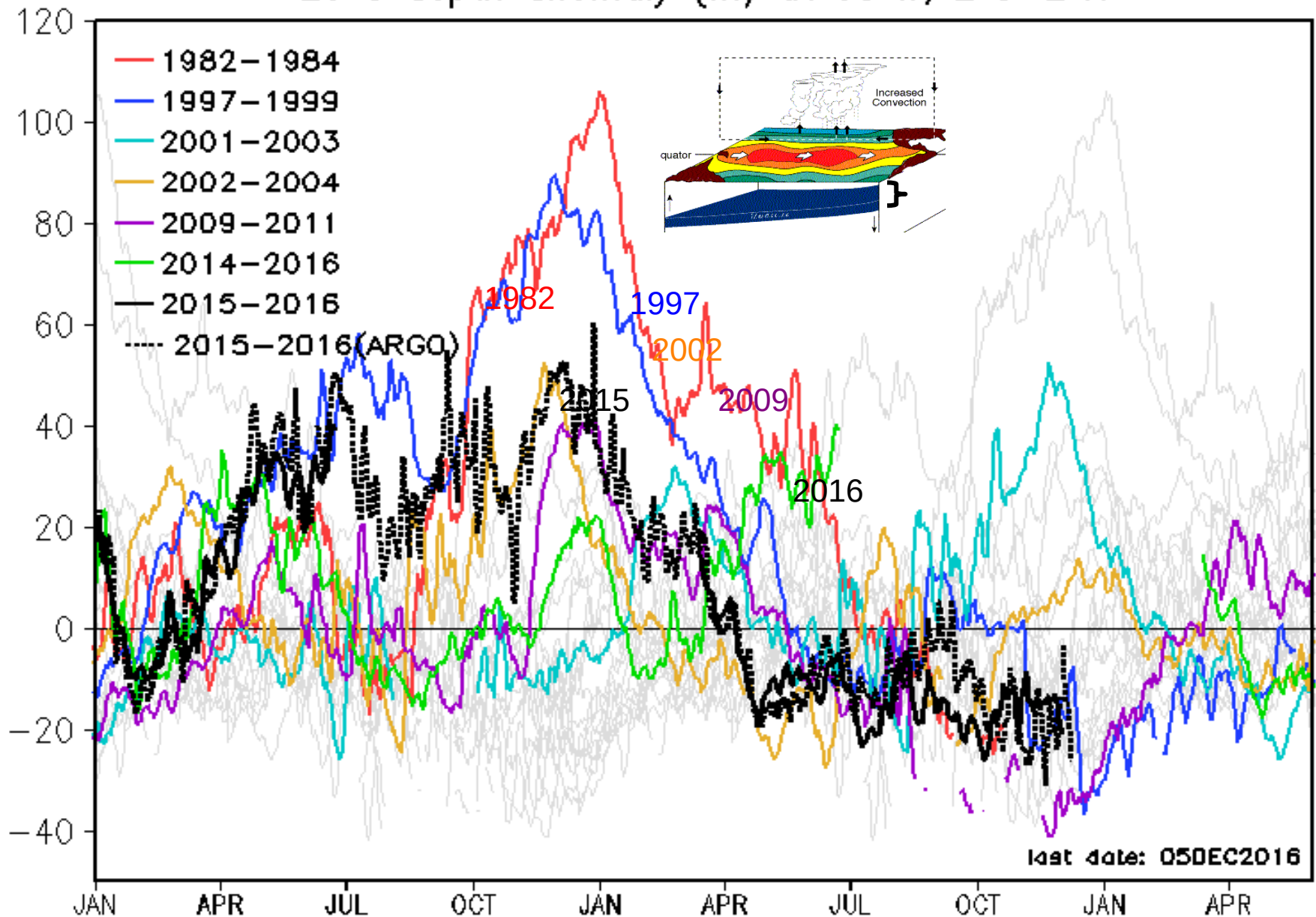
c) SST anomaly
(OISST/NOAA)



a) ASCAT
b) ARGO
c) OISST

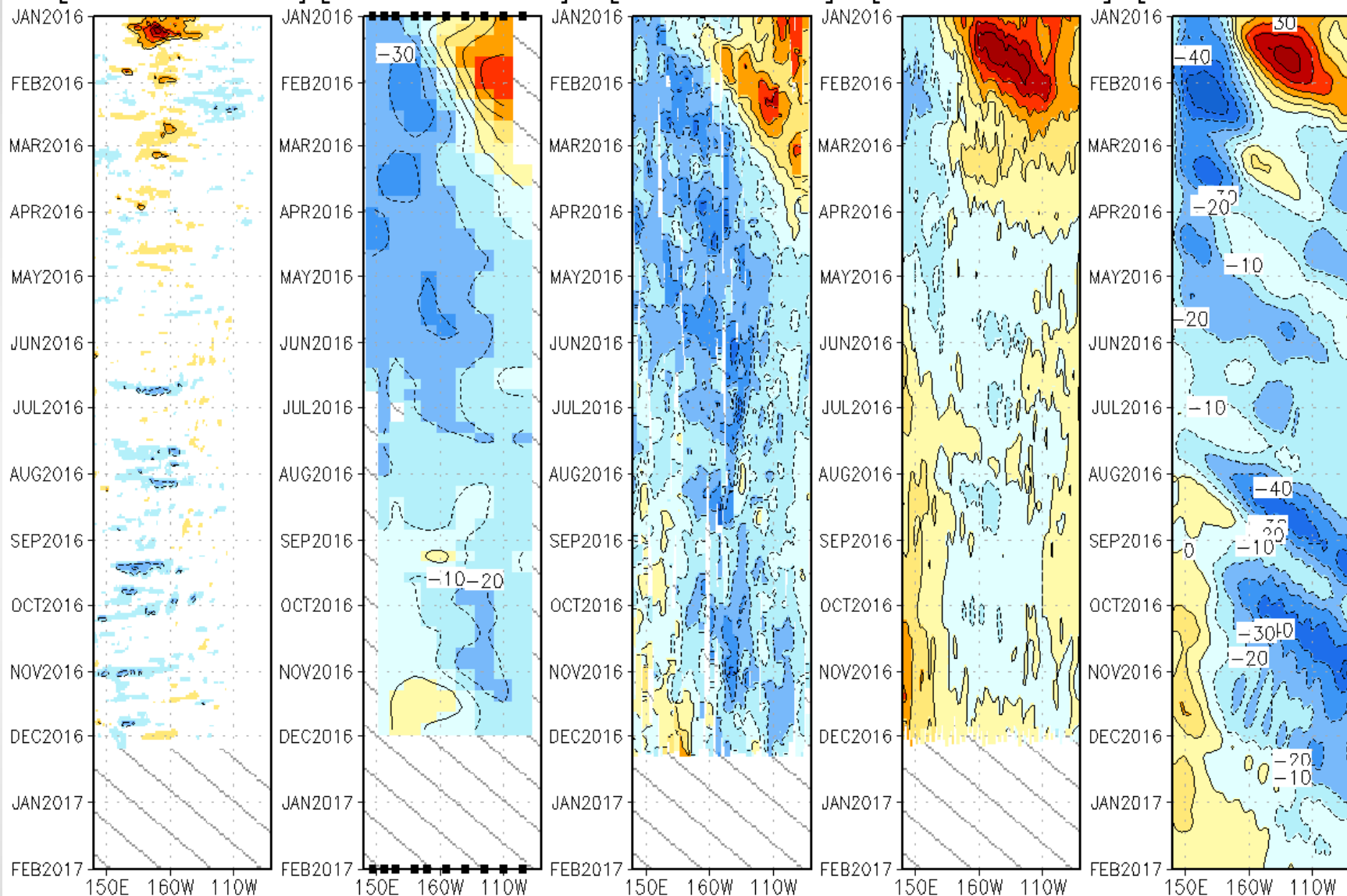
Processing: IGP, Last data: 04APR2016 / Clim:2008–2014(ASCAT corrected with ERA),1980–2009 (GODAS),1981–2010(OISST)

20°C depth anomaly (m) at 95°W, 2°S–2°N



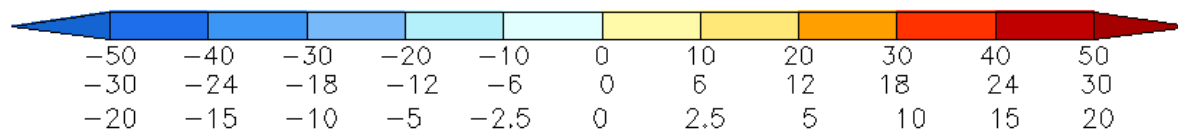
5 day running mean. Data: TAO/TRITON (PMEL) and ARGO (100°W – 90°W), Processing: IGP

(a) ASCAT [clim. 1981–2010] (b) TAO [clim. 1993–2014] (c) ARGO [clim. de GODAS] (d) JASON 2 y 3 [clim 1993–2010] (e) LOM-IGP [clim. 1981–2010]



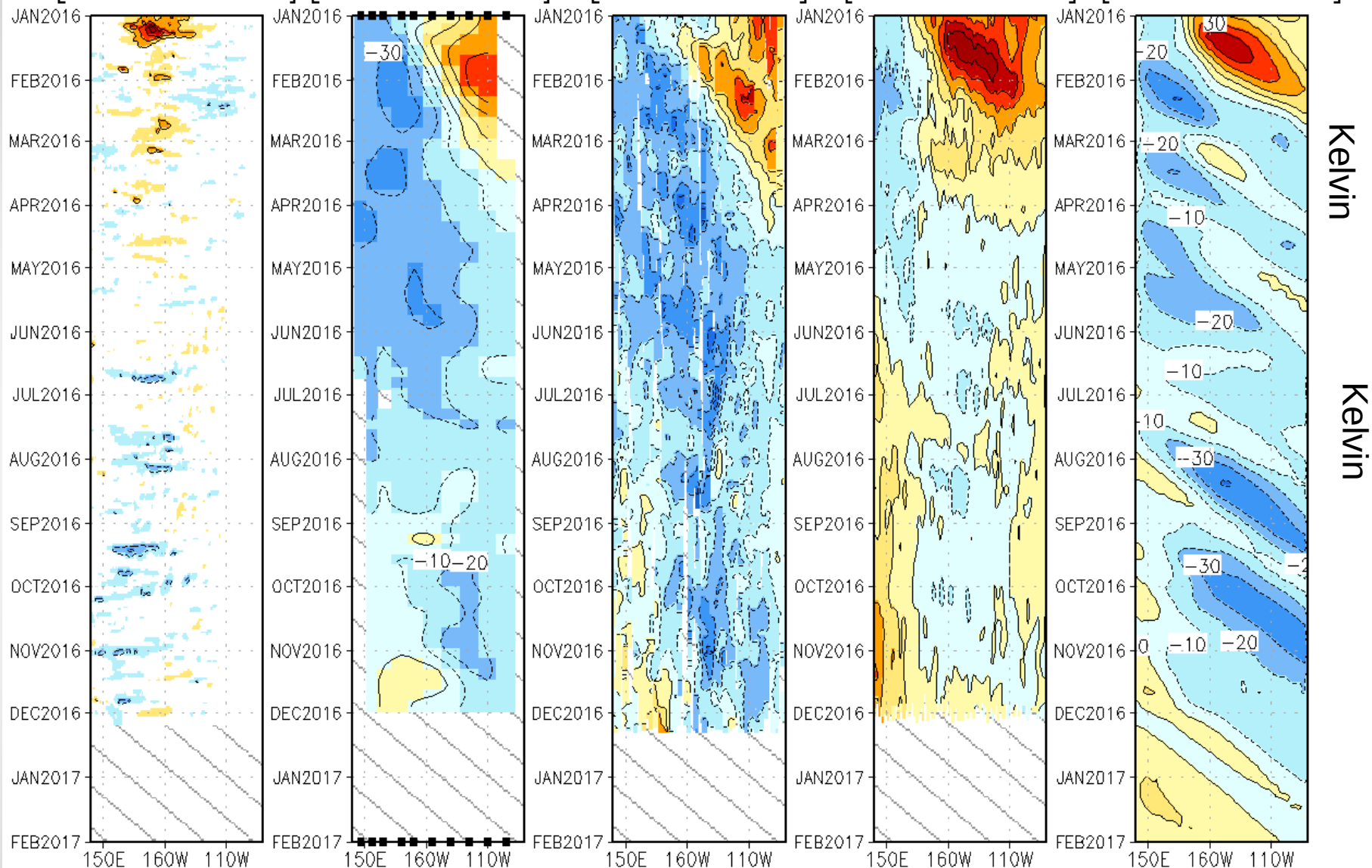
Kelvin+Rossby

Kelvin + Rossby



meters
cm (JASON-2)
 $\times 10^{-2} \text{ Nm}^{-2}$ (ASCAT)

(a) ASCAT [clim. 1981–2010] (b) TAO [clim. 1993–2014] (c) ARGO [clim. de GODAS] (d) JASON 2 y 3 [clim 1993–2010] (e) LOM-IGP [clim. 1981–2010]



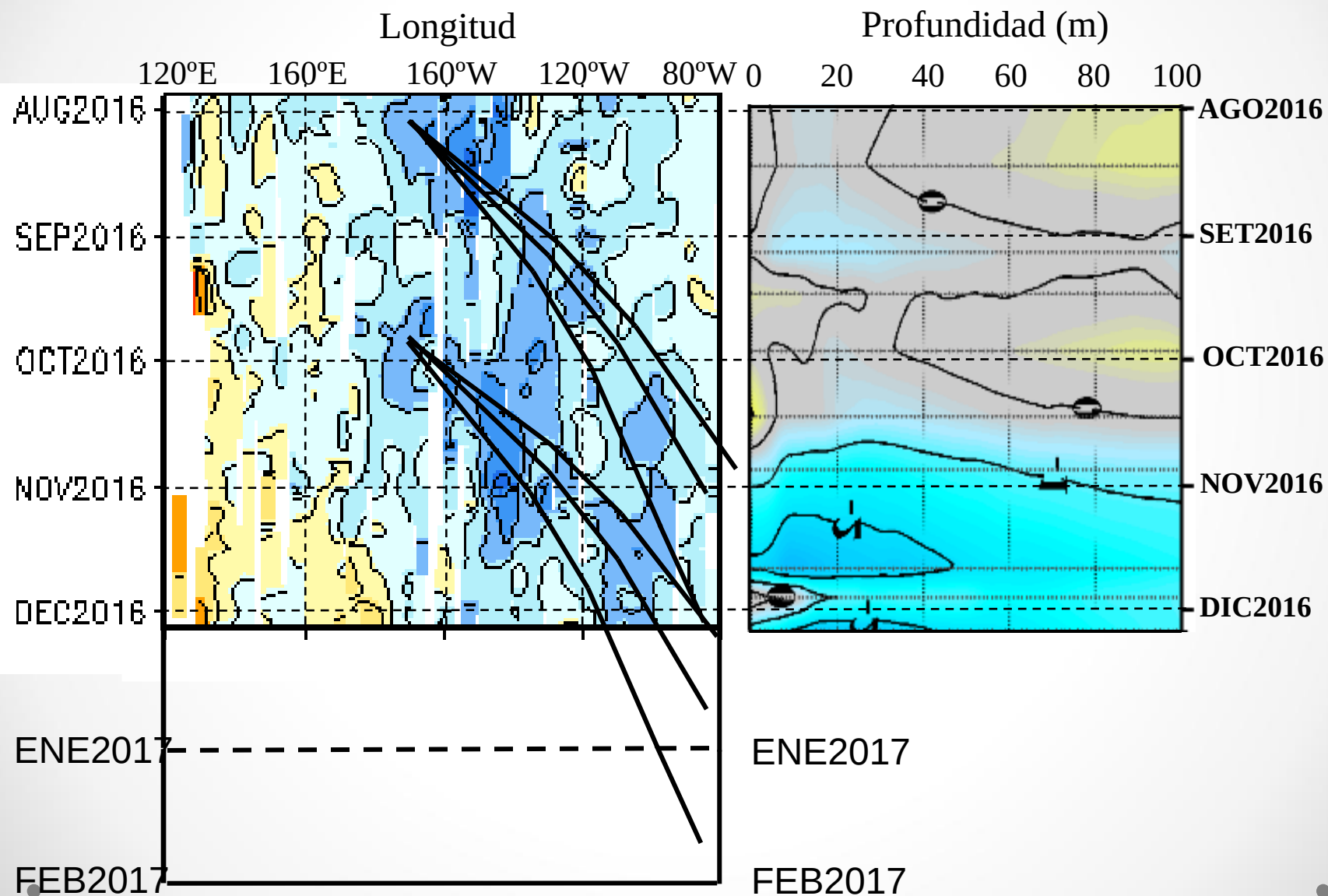
Kelvin

Kelvin

meters
cm (JASON-2)
 $\times 10^{-2} \text{Nm}^{-2}$ (ASCAT)

Anomalía del profundidad de la
isoterma de 20°C (ARGO- IGP)

Anomalía de la temperatura del mar
(Punto fijo Paíta - IMARPE)



Simulación de la propagación de las ondas Kelvin Ecuatoriales

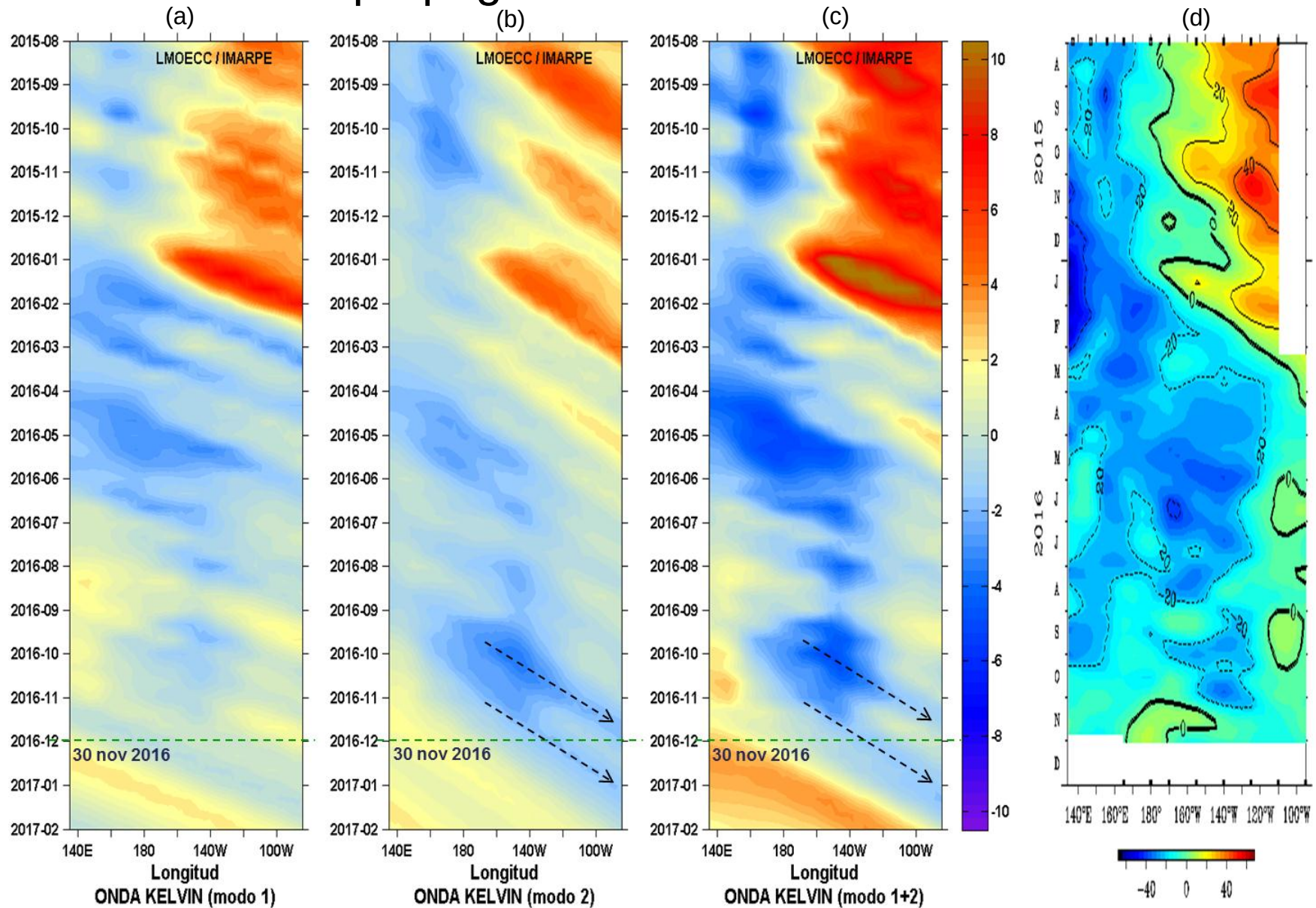
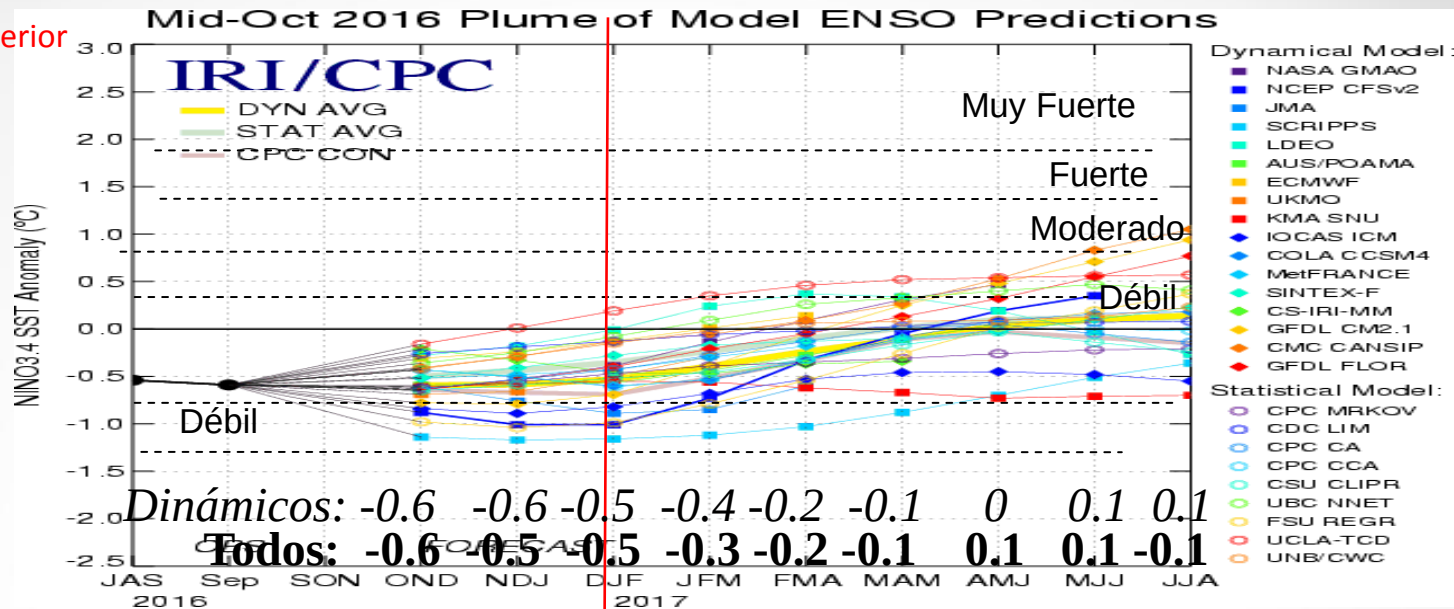
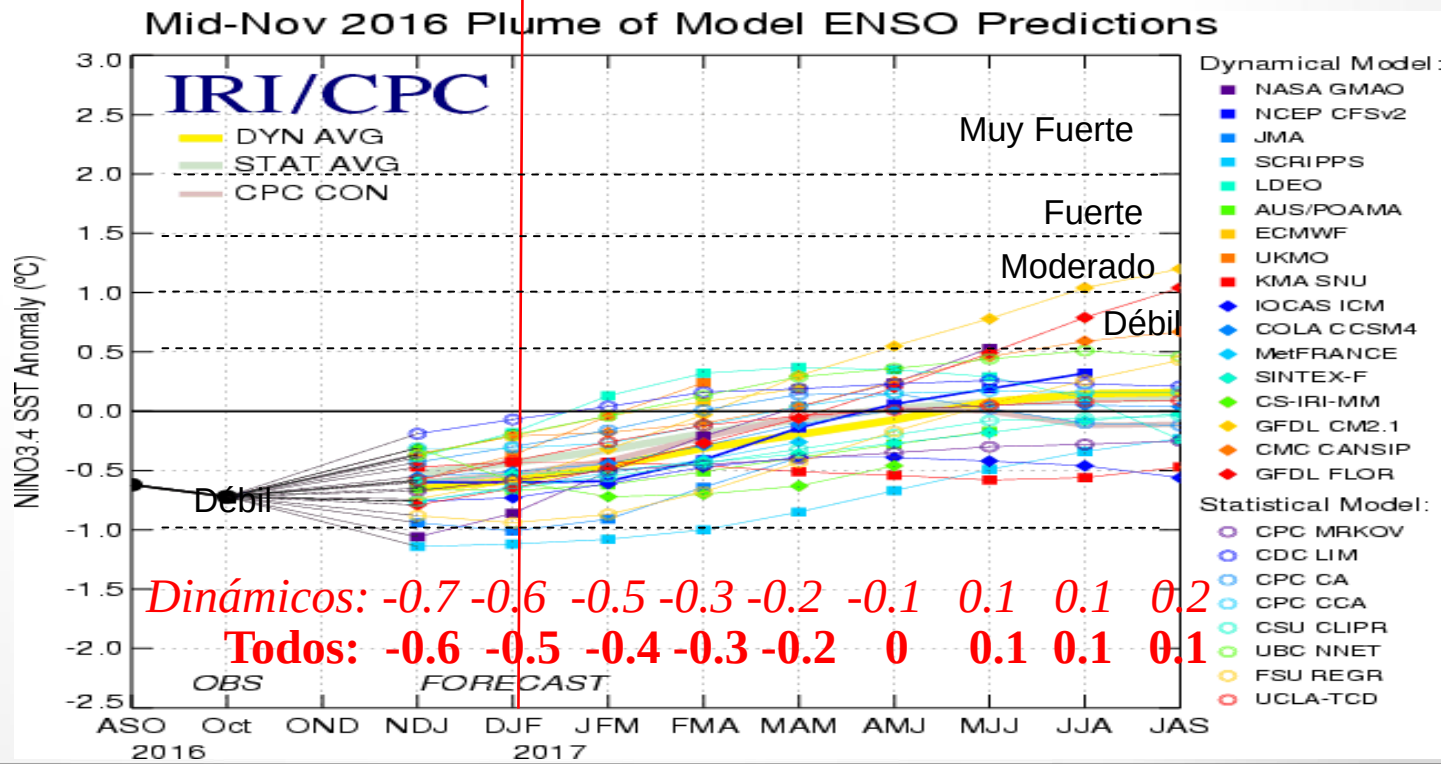


Diagrama Hovmöller longitud-tiempo de las ondas Kelvin en el océano Pacífico ecuatorial (0°N): (a) Modo 1, (b) Modo 2, (c) Modos 1+2 y (d) Anomalías de la profundización de la isoterma de 20°C (m) en la Pacífico Ecuatorial (2°S y 2°N). La línea discontinua horizontal, en verde, indica el inicio del pronóstico sin el forzante de vientos. Fuente: IMARPE, forzado con vientos de NCEP (Figuras a-c) y adaptación de TAO/PMEL/NOAA (Figuras d).

Corrida del mes anterior



Corrida del mes reciente



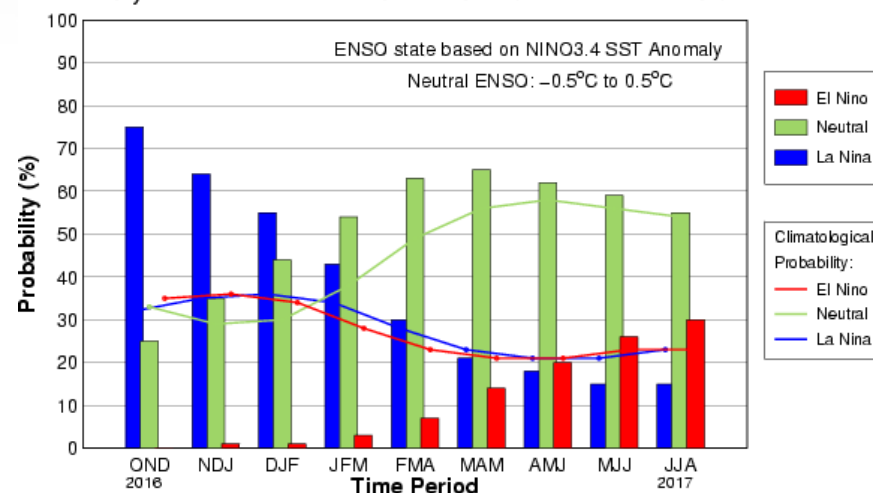
Ensamblado multimodelos (IRI) para Niño 3.4

Probabilidades de El Niño según porcentaje de modelos (IRI) y evaluación experta

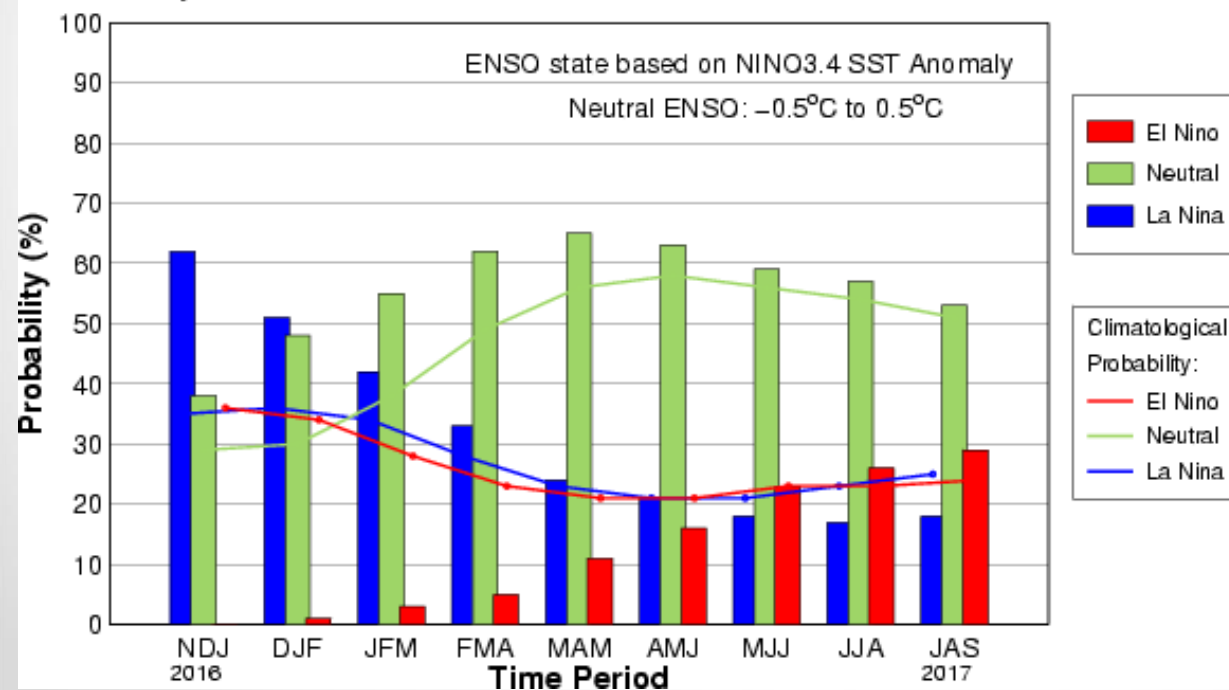
Corrida del mes anterior

Corrida reciente

Early–Nov CPC/IRI Official Probabilistic ENSO Forecast



Early–Dec CPC/IRI Official Probabilistic ENSO Forecast



Según la evaluación experta sobre los resultados de los probabilidades de La Niña en el Pacífico central para el mes enero es 51%, para los meses de feb. y marzo de 2017 es 42% y 33% respectivamente

Pronósticos de ONI por modelos globales (IRI, 17 nov 2016)

Model	NDJ	DJF	JFM	FMA	MAM	AMJ	
NASA GMAO model	-1.1	-0.9	-0.5	-0.2	0	0.2	LN
NCEP CFS version 2	-0.6	-0.6	-0.6	-0.4	-0.1	0.1	LN
Japan Met. Agency model	-0.9	-1	-0.9	-0.6	-0.4		LN
POAMA (Austr) model	-0.7	-0.7	-0.6	-0.5	-0.4	-0.3	LN
ECMWF model	-0.4	-0.2	0	0.1	0.2		N
UKMO model	-0.6	-0.4	0	0.2			N
COLA CCSM4 model	-0.6	-0.5	-0.4	-0.3	-0.1	0	N
MÉTÉO FRANCE model	-0.8	-0.6	-0.5	-0.4	-0.3		LN
Japan Frontier Coupled model	-0.6	-0.5	-0.5	-0.4	-0.4	-0.3	LN
GFDL CM2.1	-0.7	-0.6	-0.3	0	0.3	0.6	N
Canadian Coupled Fcst Sys	-0.4	-0.2	-0.2	-0.1	0	0.3	N
GFDL CM2.5 FLOR	-0.8	-0.7	-0.5	-0.3	-0.1	0.2	LN
<i>Promedio GCMs</i>	<i>-0.68</i>	<i>-0.58</i>	<i>-0.42</i>	<i>-0.24</i>	<i>-0.12</i>	<i>0.10</i>	

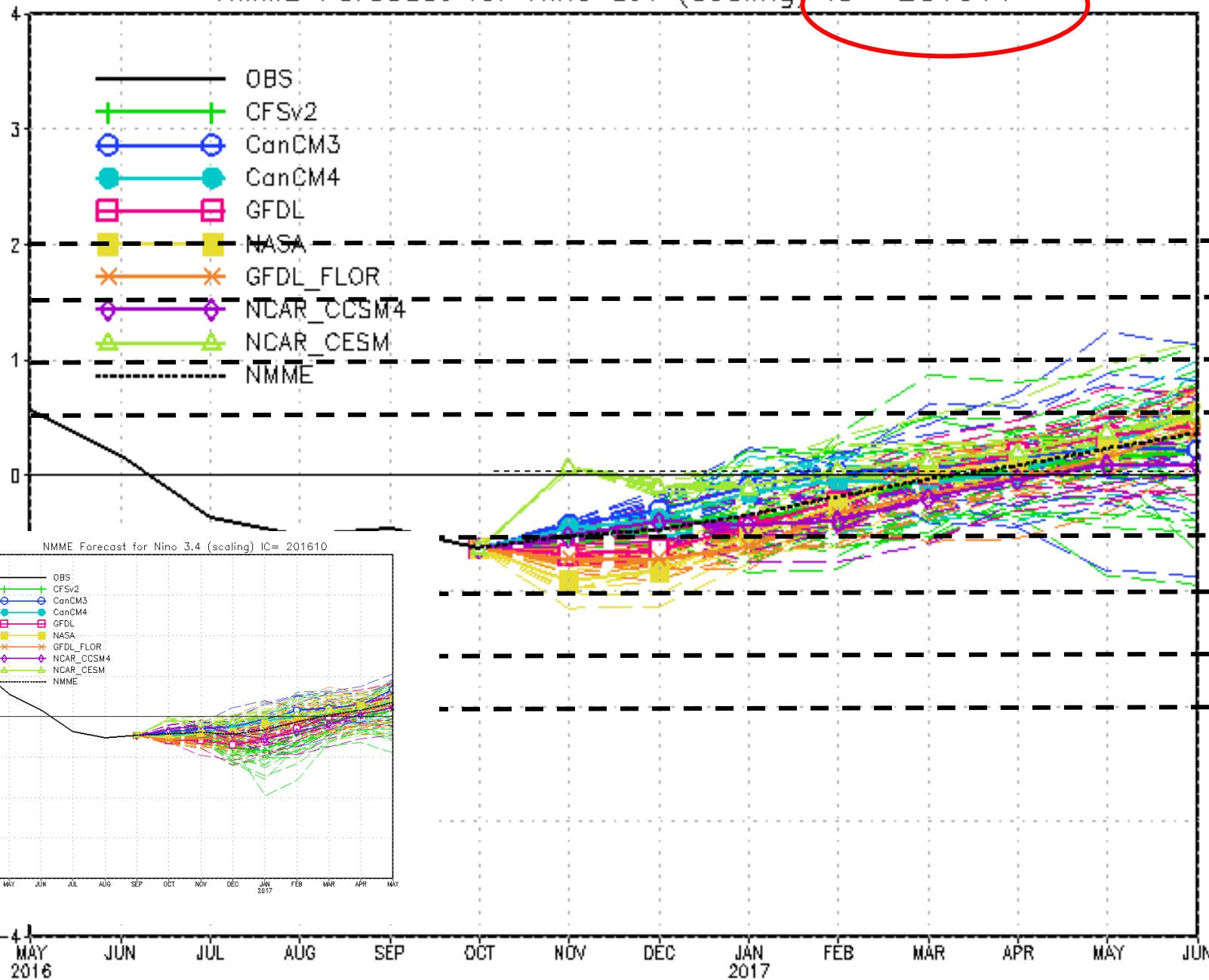
El ONI de octubre confirma La Niña en el Pacífico Central.

Verano 2016-17: 5 neutros, 7 La Niña en Pacífico Central (58%)

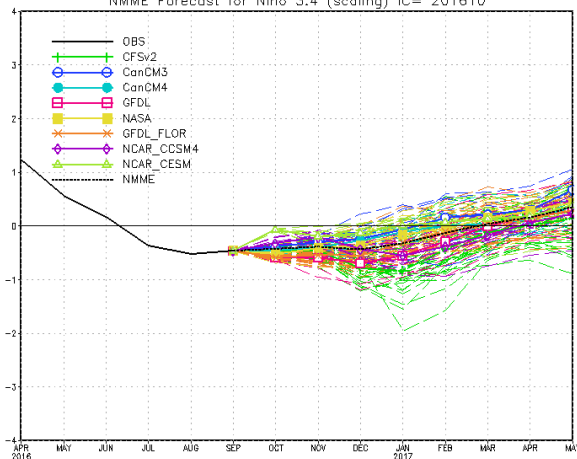
Aumento en La Niña:

La corrida anterior mostraba: 9 neutros, 3 La Niña (25%)*

NMME Forecast for Nino 3.4 (scaling) IC= 201611



NMME Forecast for Nino 3.4 (scaling) IC= 201610



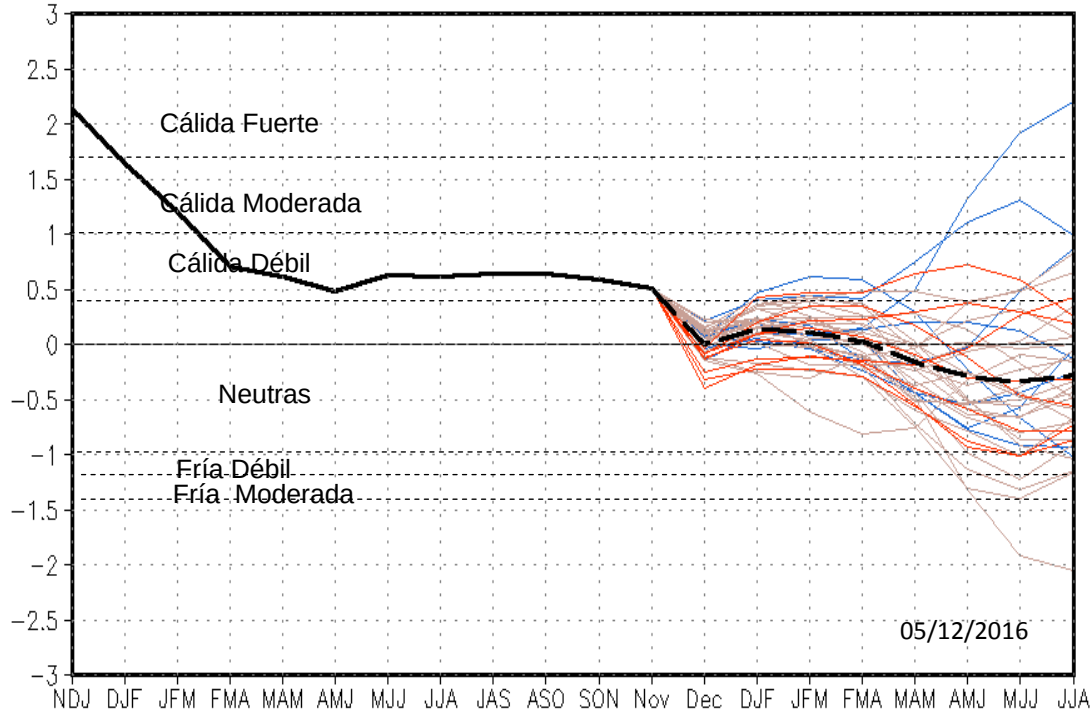
Pronóstico Niño 1+2 de CFS2



NWS/NCEP/CPC

Last update: Mon Dec 5 2016
Initial conditions: 24Nov2016-3Dec2016

CFSv2 forecast Nino1+2 SST anomalies (K)



— Latest 8 forecast members — Forecast ensemble mean
— Earliest 8 forecast members — NCDC daily analysis
— Other forecast members

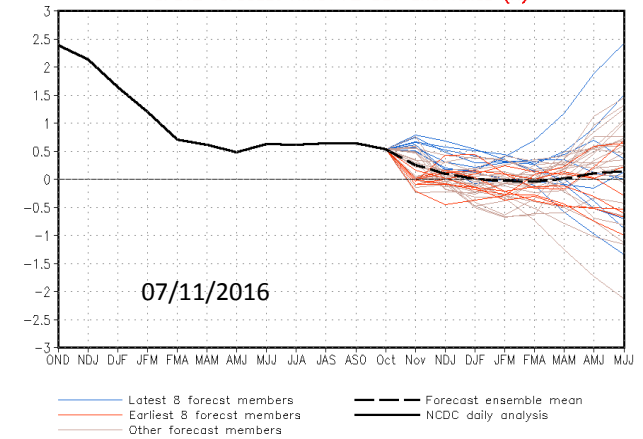
Corrida actual



NWS/NCEP/CPC

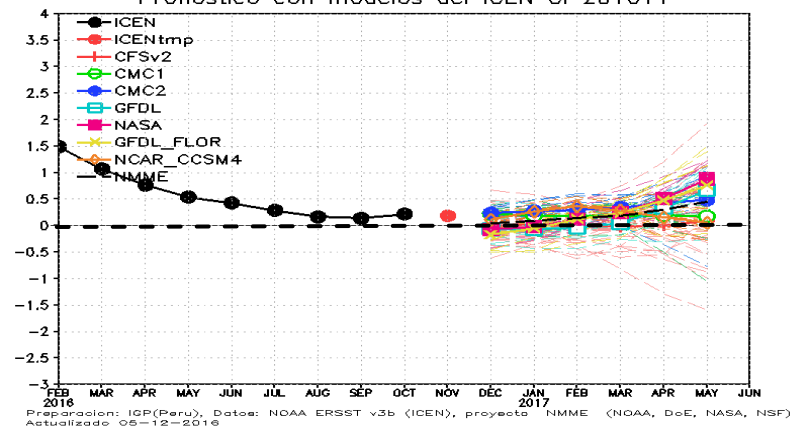
Last update: Mon Nov 7 2016
Initial conditions: 27Oct2016-5Nov2016

CFSv2 forecast Nino1+2 SST anomalies (K)



Corrida anterior

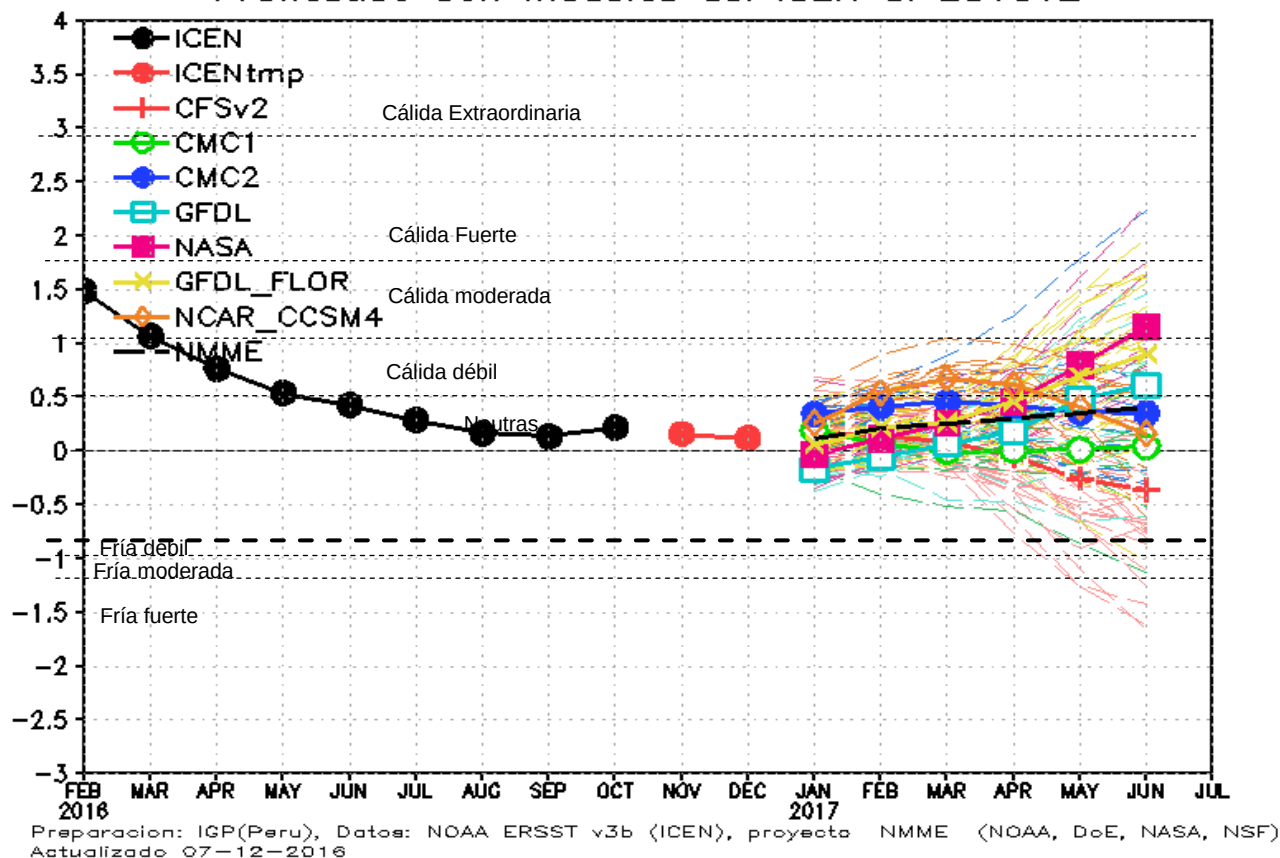
Pronostico con modelos del ICEN CI 201611



Corrida anterior

Pronostico con modelos del ICEN CI 201612

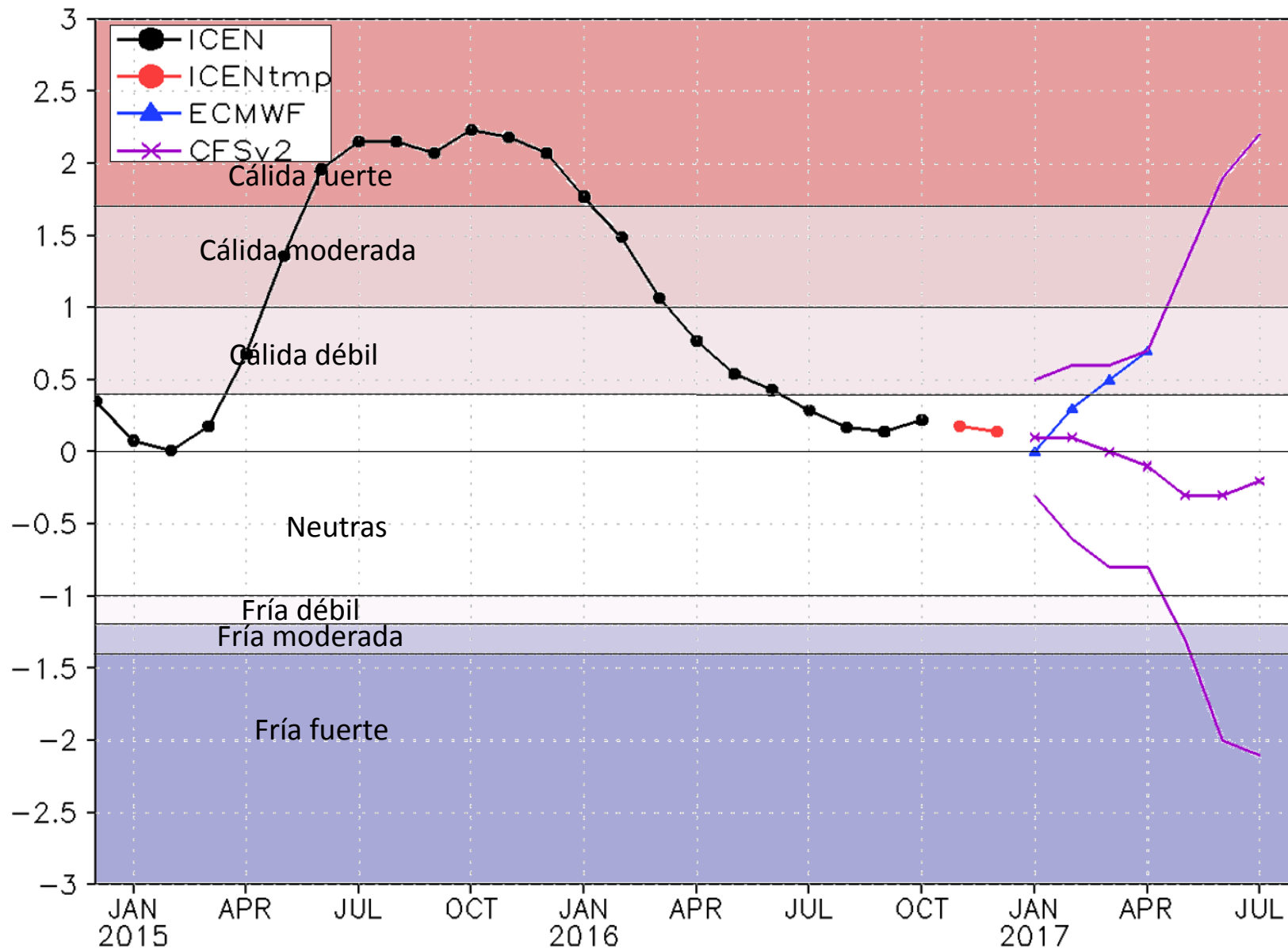
Corrida actual



Valores de pronóstico para ICEN.
ICENTmp1=0.16, ICENTmp2=0.12

Nota: Los pronósticos de los modelos CFSv2, CMC1, CMC2, GFDL, NASA, NCAR y GFDL_FLOR tienen como condiciones inicial el mes de noviembre de 2016.

Pronóstico con modelos del ICEN



Nota: Las líneas delgadas en los pronósticos indican los máximos y mínimos en los "ensembles" de CFS2 CON CI de Noviembre. Para ECMWF no se cuenta con datos del "ensemble".

ECMWF, tiene condiciones iniciales el mes de Octubre

Pronósticos de ICEN por modelos de NMME (promedios trimestrales de los pronósticos de las anomalías en Niño 1+2)

CI 2016 11

Modelo	SON	OND	NDE	DEF	EFM	FMA	MAM	AMJ
CFS2		0.10	-0.01	0.02	-0.01	-0.01	0.01	0.09
CMC1		0.23	0.22	0.19	0.18	0.17	0.20	0.17
CMC2		0.23	0.24	0.28	0.30	0.34	0.42	0.49
GFDL		-0.01	-0.06	-0.07	-0.04	0.04	0.33	0.67
NASA		-0.03	-0.07	-0.02	0.12	0.24	0.51	0.88
GFDL_FLOR		-0.09	-0.16	-0.05	0.12	0.24	0.48	0.70
NCAR_CCSM4		0.08	0.11	0.27	0.36	0.29	0.15	0.06
NMME		0.07	0.04	0.09	0.15	0.19	0.30	0.44
ICENtmp	0.12	0.07						

CI 2016 12

Modelo	OND	NDE	DEF	EFM	FMA	MAM	AMJ	AMJ
CFS2		0.22	0.17	0.15	0.09	-0.05	-0.25	-0.36
CMC1		0.28	0.19	0.08	0.00	0.01	0.02	0.04
CMC2		0.30	0.35	0.41	0.46	0.42	0.37	0.35
GFDL		-0.10	-0.17	-0.05	0.07	0.18	0.48	0.61
NASA		0.02	-0.03	0.12	0.26	0.46	0.80	1.16
GFDL_FLOR		0.07	0.06	0.22	0.27	0.46	0.70	0.90
NCAR_CCSM4		0.15	0.26	0.54	0.67	0.61	0.41	0.16
NMME		0.13	0.12	0.21	0.26	0.30	0.36	0.41
ICENtmp	0.16							

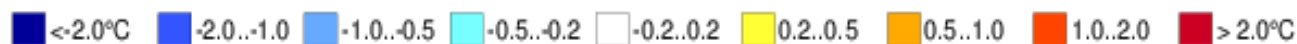
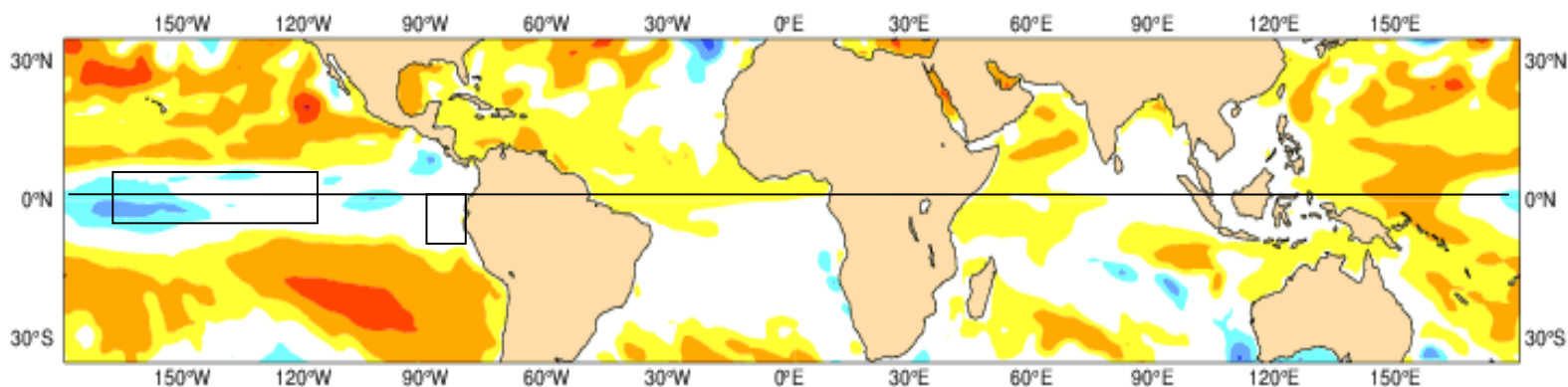
ECMWF Seasonal Forecast
Mean forecast SST anomaly
Forecast start reference is 01/11/16
Ensemble size = 51, climate size = 450

DEF 2016/17

System 4
DJF 2016/17

ECMWF

C.I. Noviembre



Pac. Cen.
-0.3 ° C

Pac. Or.
0° C

CFS2

C.I. Diciembre

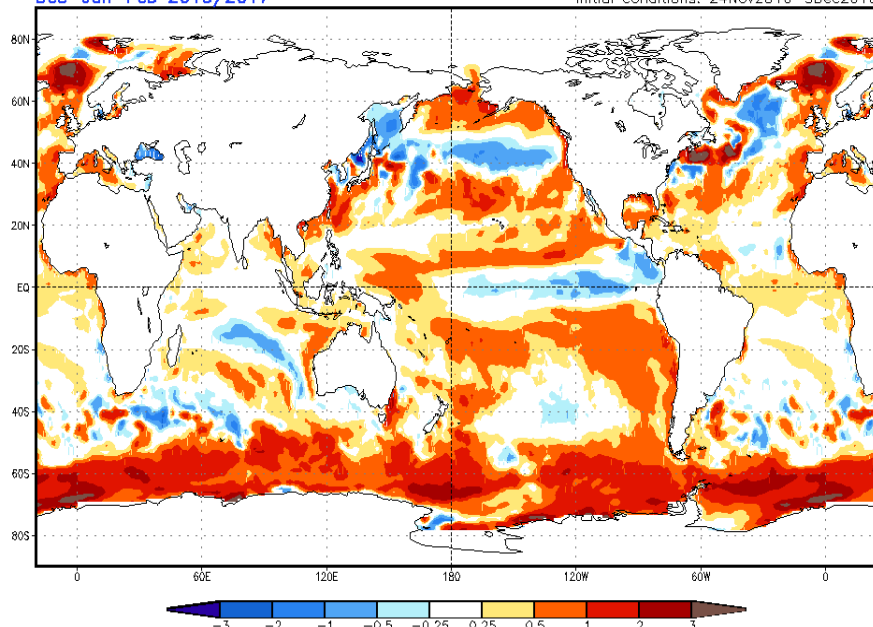
CFSv2 seasonal SST anomalies (K)



NWS/NCEP/CPC

Dec-Jan-Feb 2016/2017

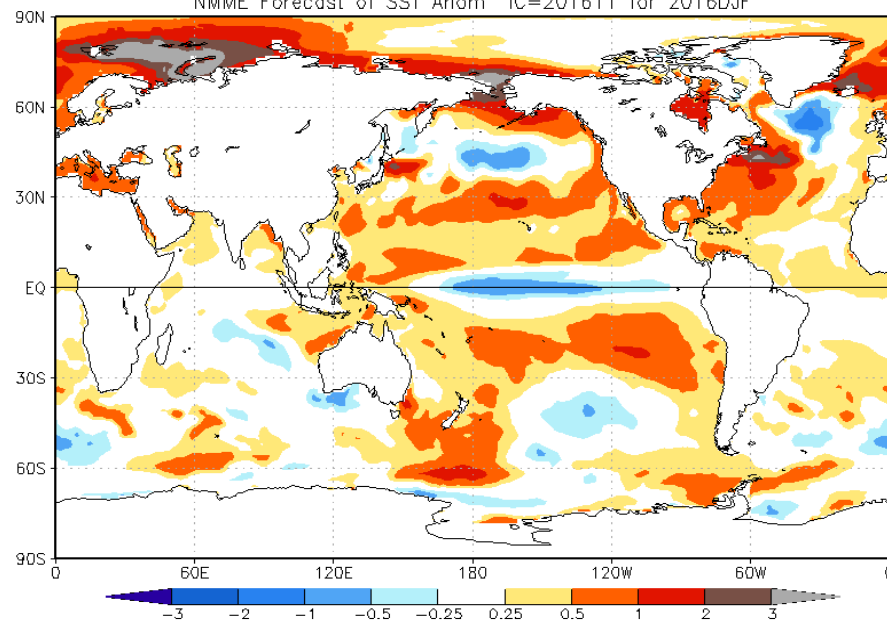
Initial conditions: 24Nov2016-3Dec2016



NMME

C.I. Noviembre

NMME Forecast of SST Anom IC=201611 for 2016DJF



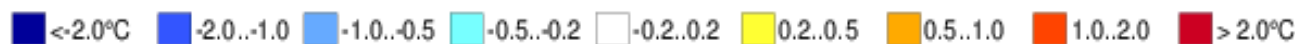
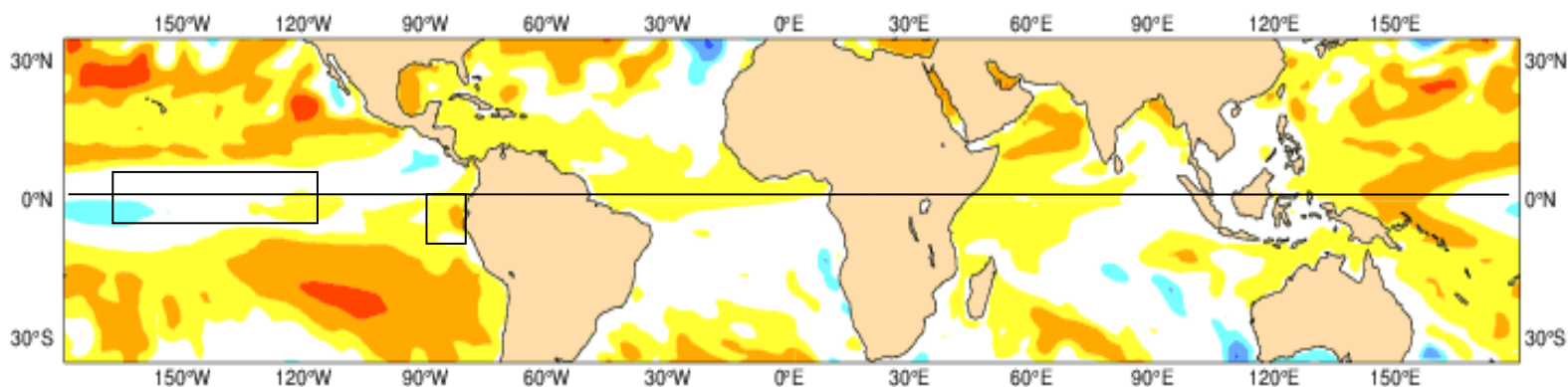
ECMWF Seasonal Forecast
Mean forecast SST anomaly
Forecast start reference is 01/11/16
Ensemble size = 51, climate size = 450

EFM 2017

System 4
JFM 2017

ECMWF

C.I. Noviembre



Pac. Cen.
0.1 ° C

Pac. Or.
0.3° C

CFS2

C.I. Diciembre

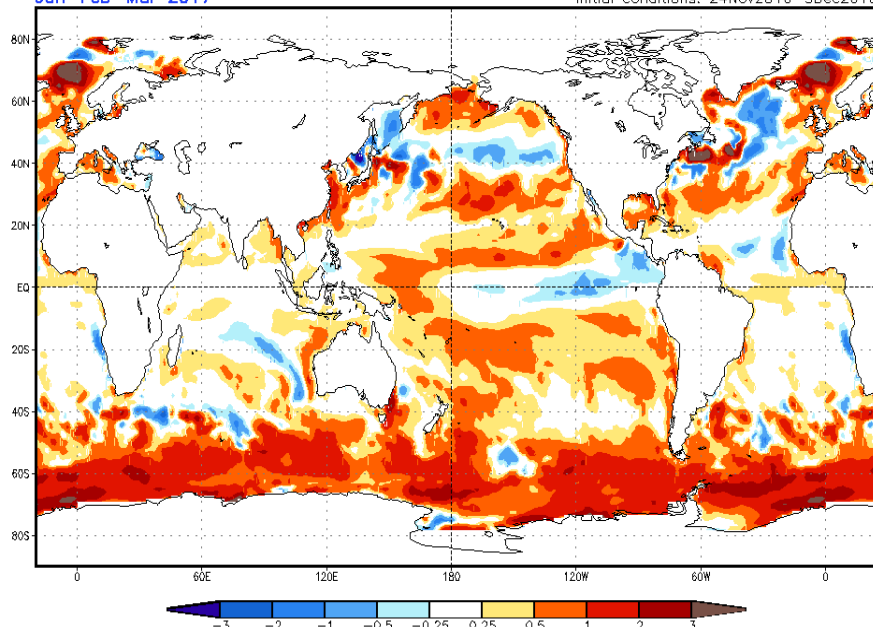
CFSv2 seasonal SST anomalies (K)



NWS/NCEP/CPC

Jan-Feb-Mar 2017

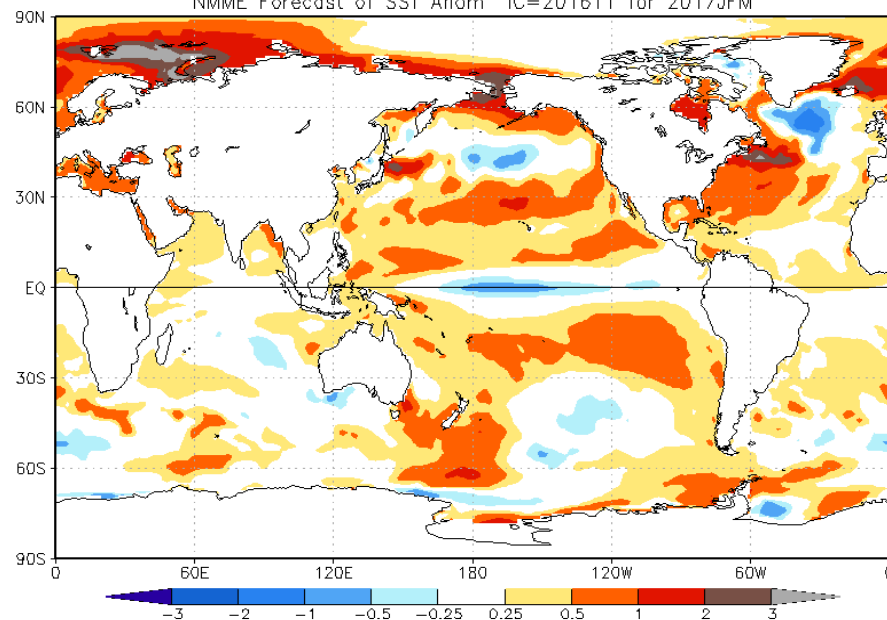
Initial conditions: 24Nov2016-3Dec2016

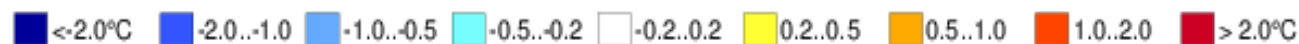
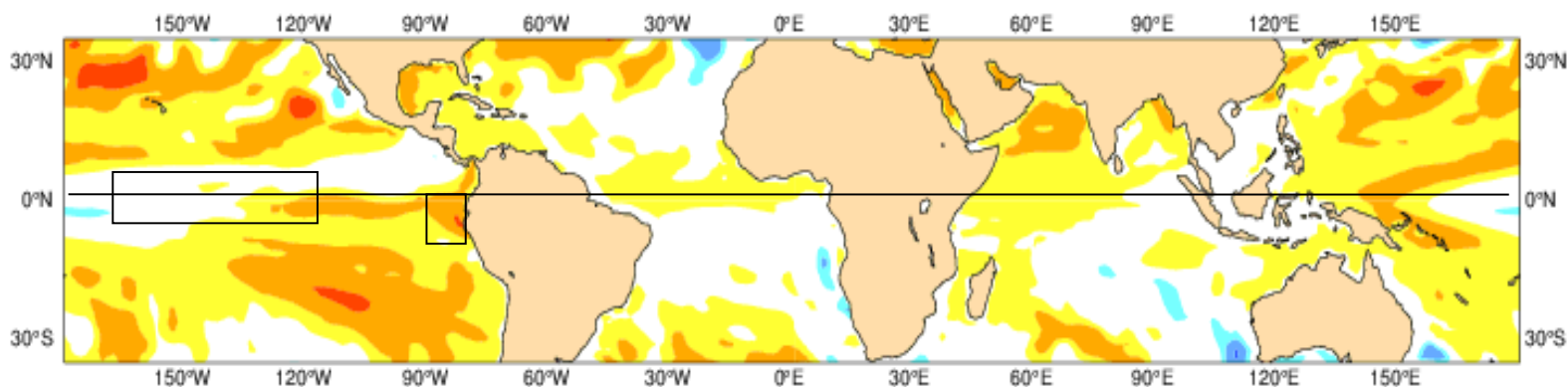


NMME

C.I. Noviembre

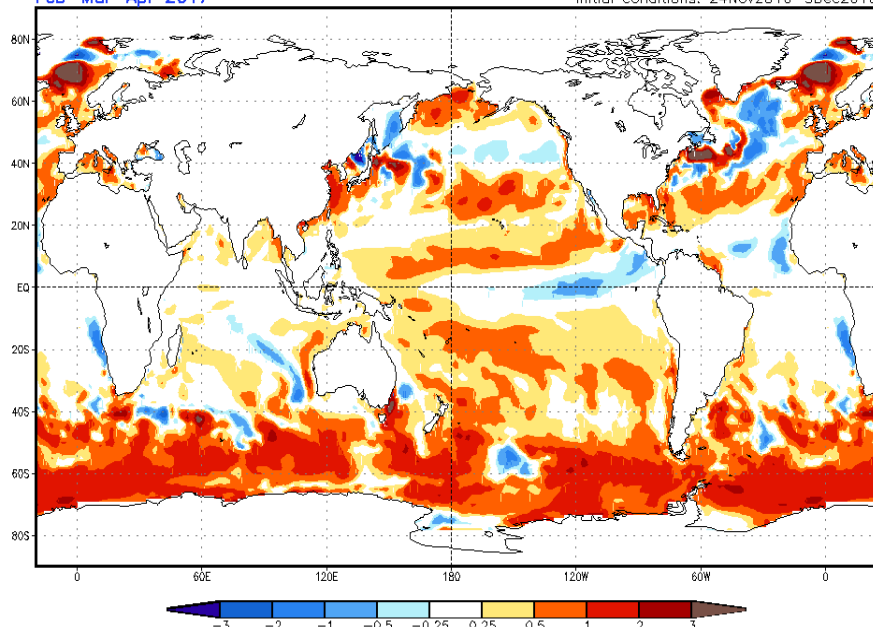
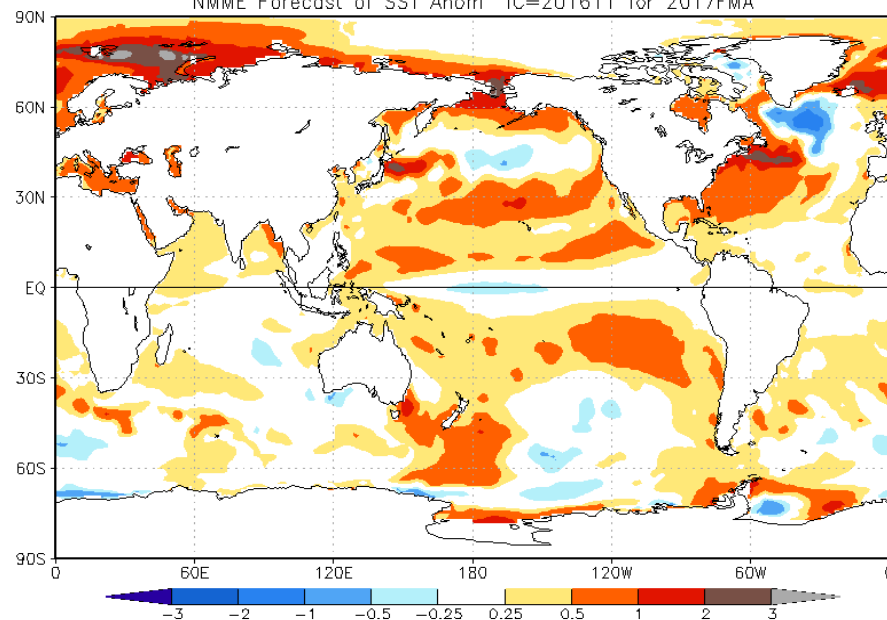
NMME Forecast of SST Anom IC=201611 for 2017JFM





Pac. Cen.
0.2 ° C

Pac. Or.
0.5° C



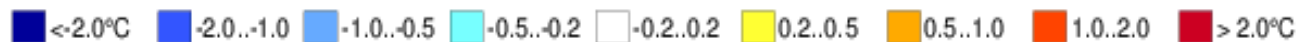
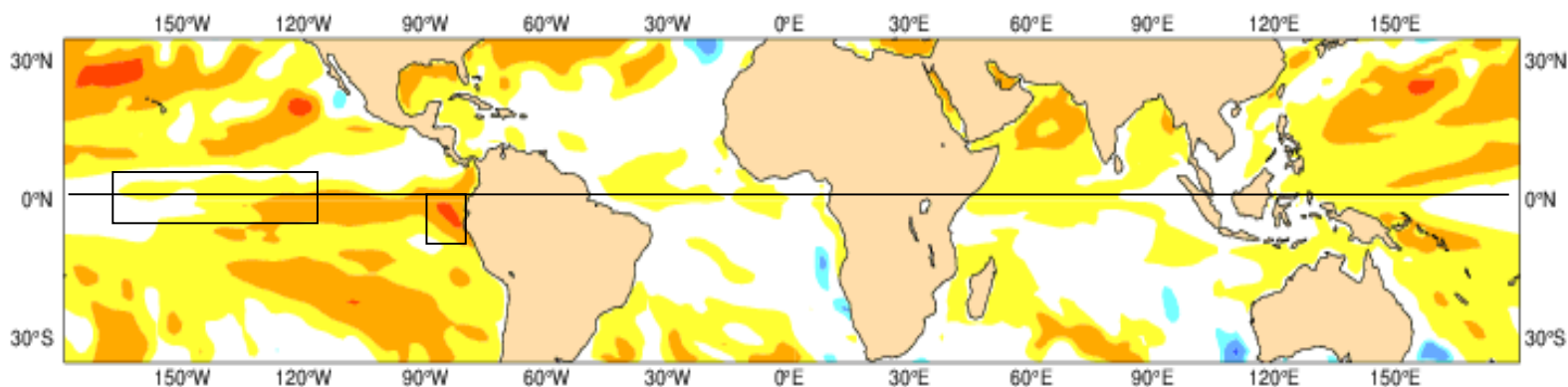
ECMWF Seasonal Forecast
Mean forecast SST anomaly
Forecast start reference is 01/11/16
Ensemble size = 51, climate size = 450

MAM 2017

System 4
MAM 2017

ECMWF

C.I. Noviembre



Pac. Cen.
0.6 ° C

Pac. Or.
0.7 ° C

CFS2

C.I. Diciembre

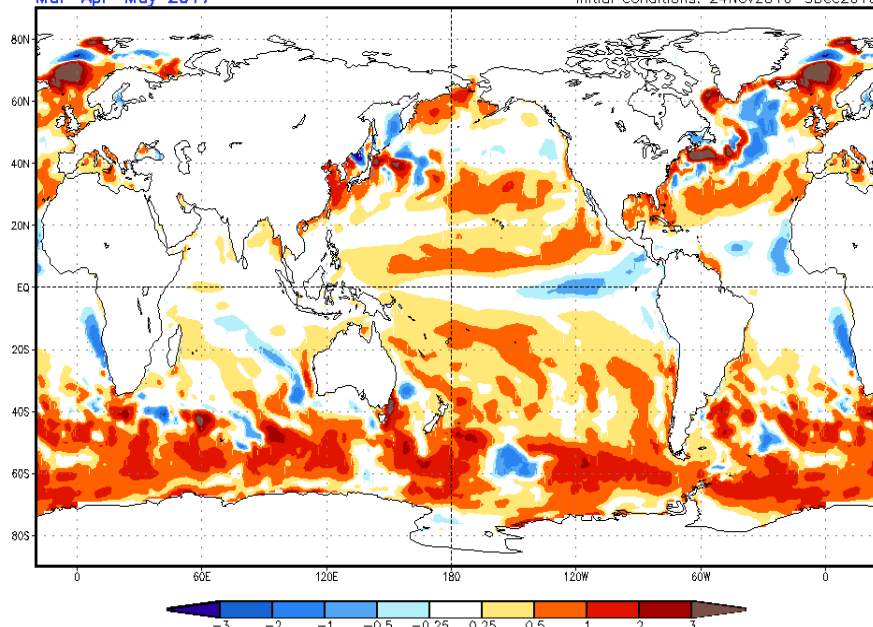
CFSv2 seasonal SST anomalies (K)



NWS/NCEP/CPC

Mar-Apr-May 2017

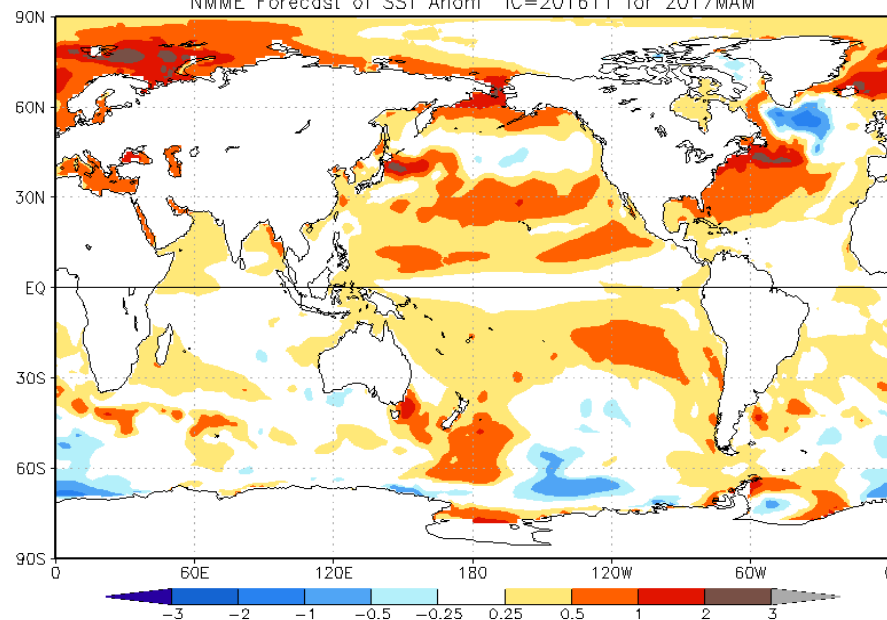
Initial conditions: 24Nov2016-3Dec2016



NMME

C.I. Noviembre

NMME Forecast of SST Anom IC=201611 for 2017MAM



Años que precedieron a La Niña en el Pacífico central en verano

Viento zonal

TSM

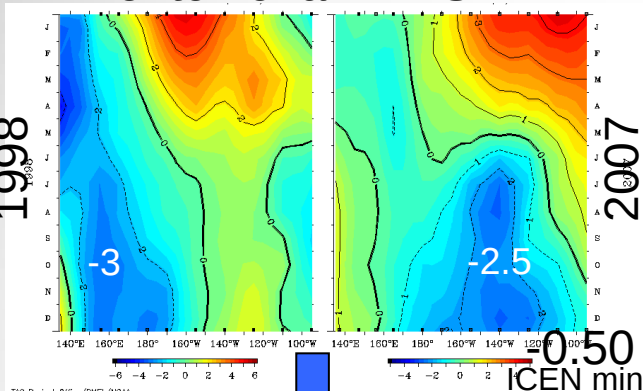
Viento zonal

TSM

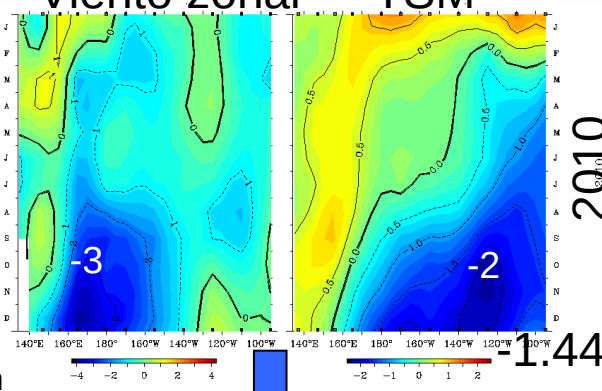
Viento zonal

TSM

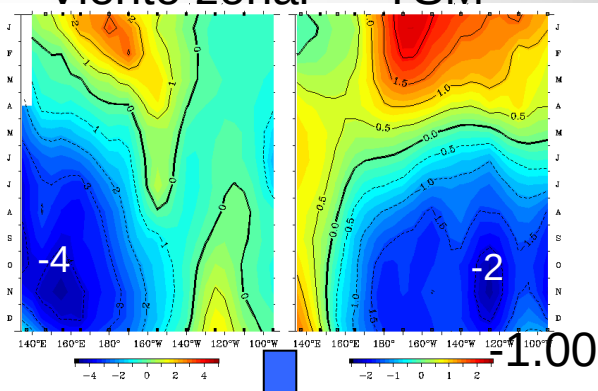
1998



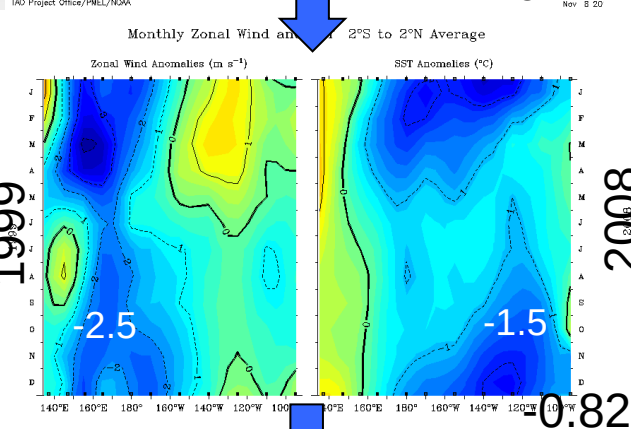
2007



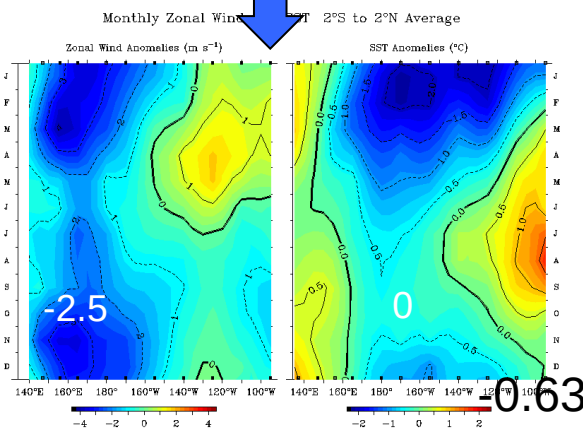
2010



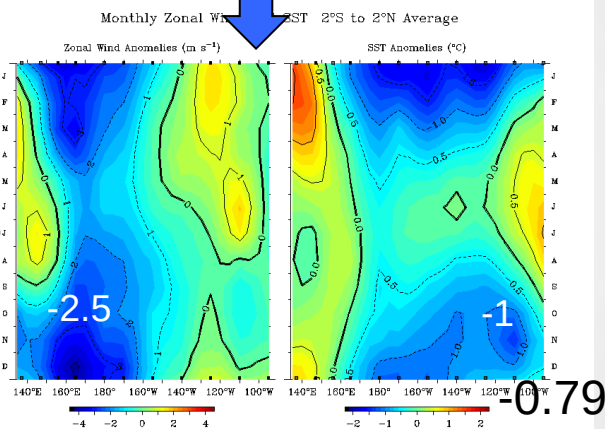
1999



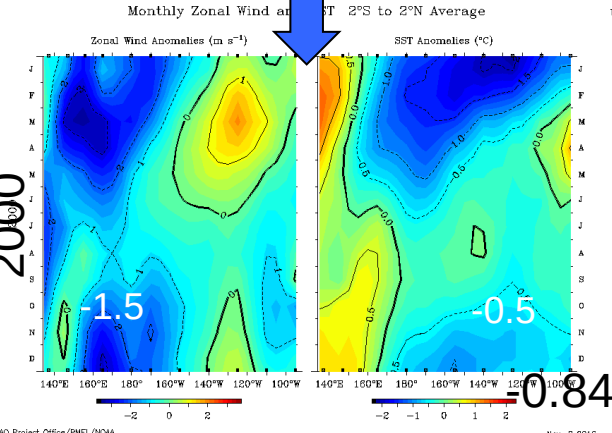
2008



2011



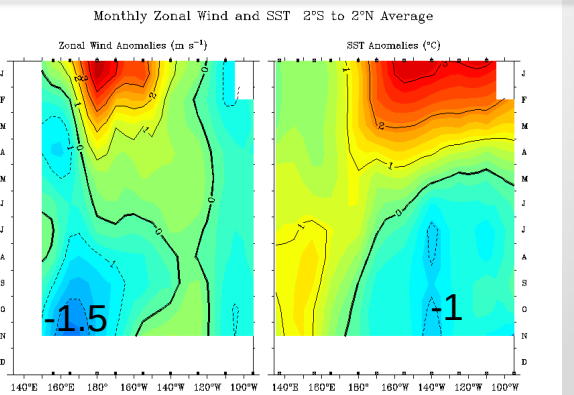
2000



Normalmente La Niña dura 2 años y es más fuerte en el 1ro (ej. después de El Niño), pero el 2016 es comparativamente débil.

TODOS esos veranos fueron neutros en la costa.

2016



Se indica la anom de viento y TSM pico en octubre y el ICEN mínimo del verano siguiente