



Perspectivas climáticas para o trimestre JFM

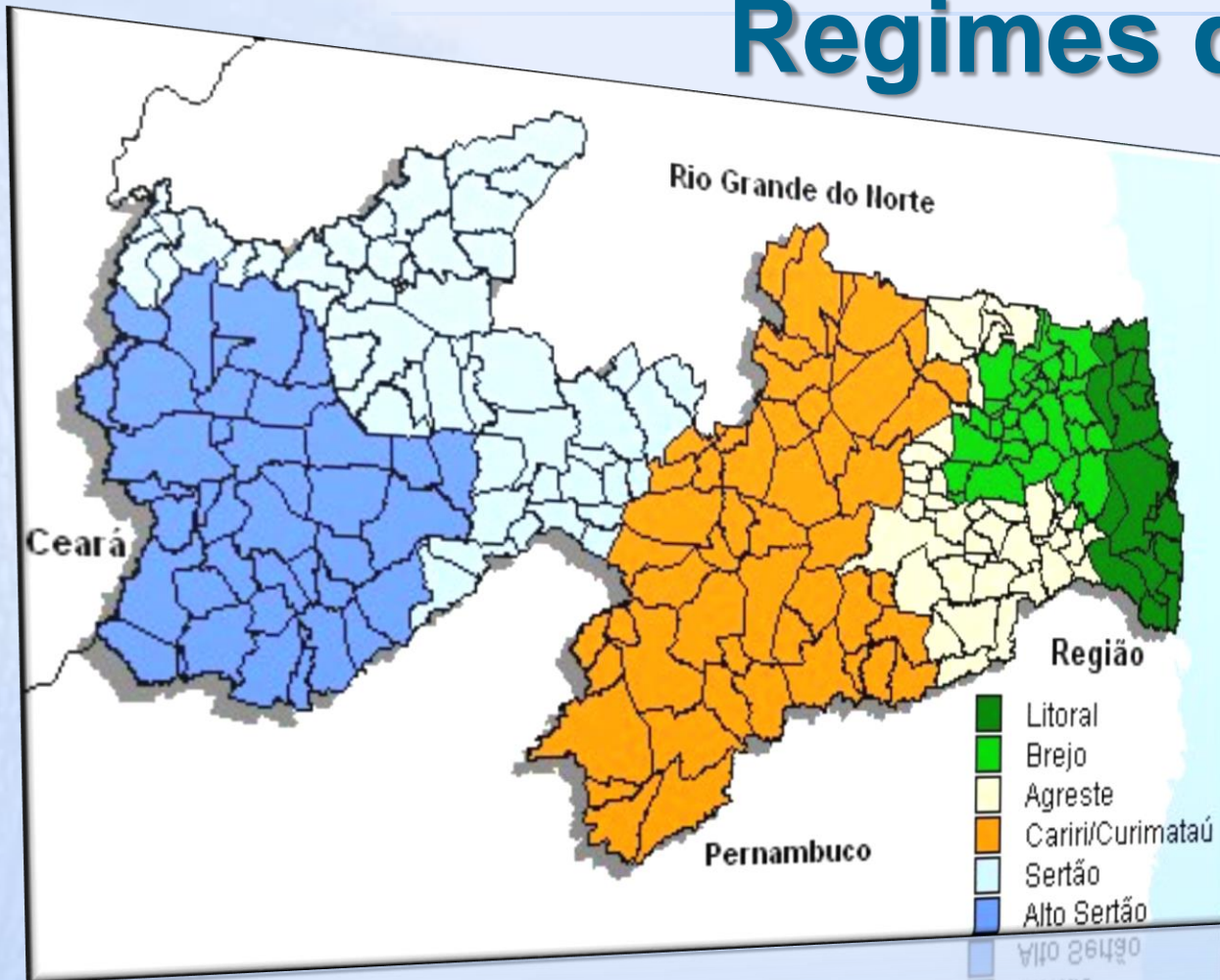


Flaviano Fernandes Ferreira
Meteorologista da AESA



Sistemas de chuva na Paraíba

Regimes de Chuvas



Quadra 1 (Fevereiro a Maio)

**Alto Sertão,
Sertão e**

Cariri/Curimataú

Quadra 2 (Abril a Julho)

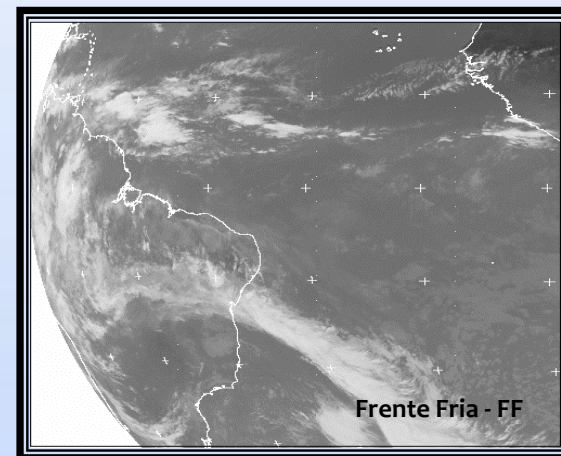
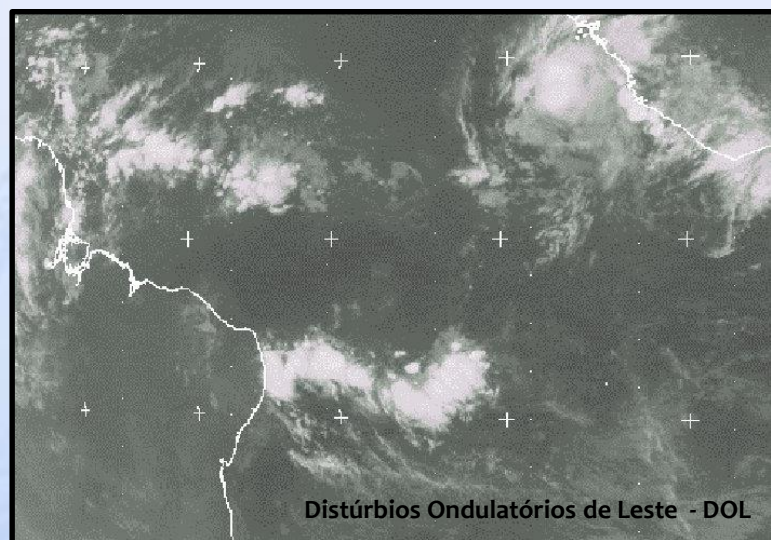
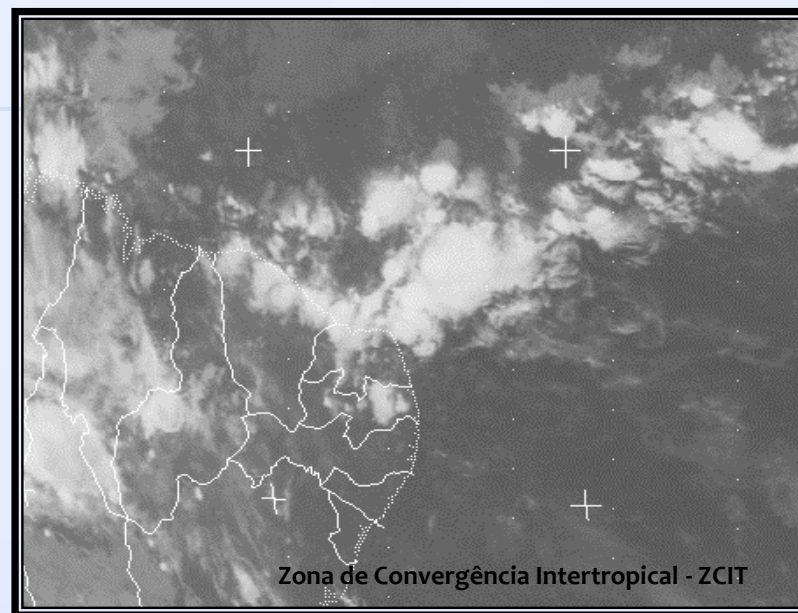
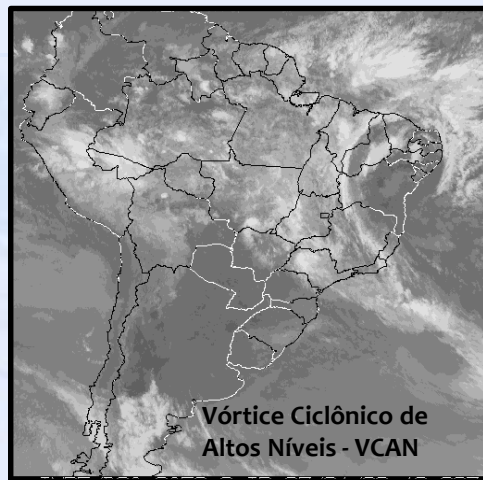
**Agreste,
Brejo e
Litoral**

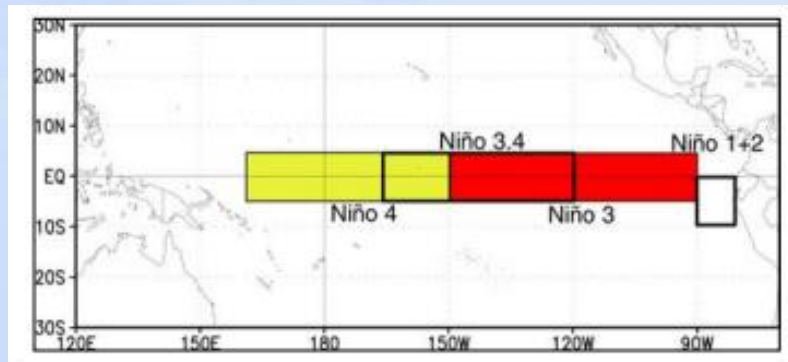
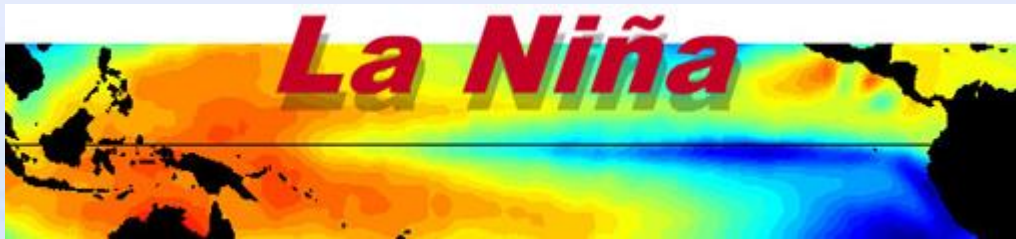
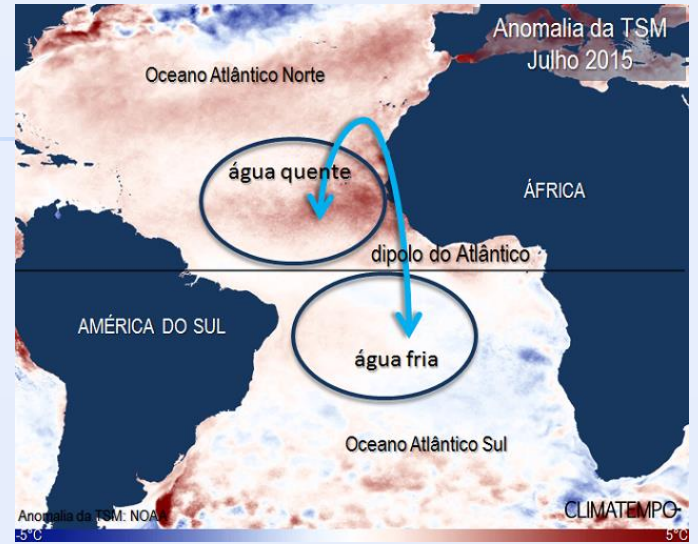
Complexos Convectivos de Meso- escala(CCM)

Linhas de Instabilidade (LI)

Cavados de Nordeste (CN) e

Brisas Marítimas





El Niño

O FENÔMENO CLIMÁTICO EL NIÑO

Em um ano normal:

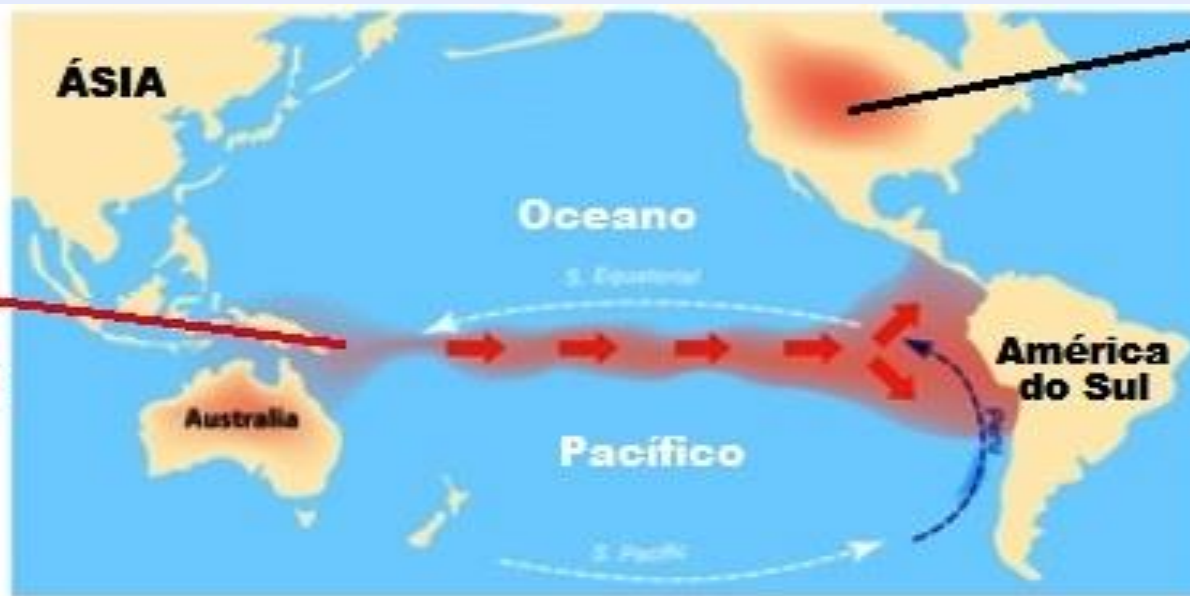
Ventos equatoriais levam água quente para o oeste



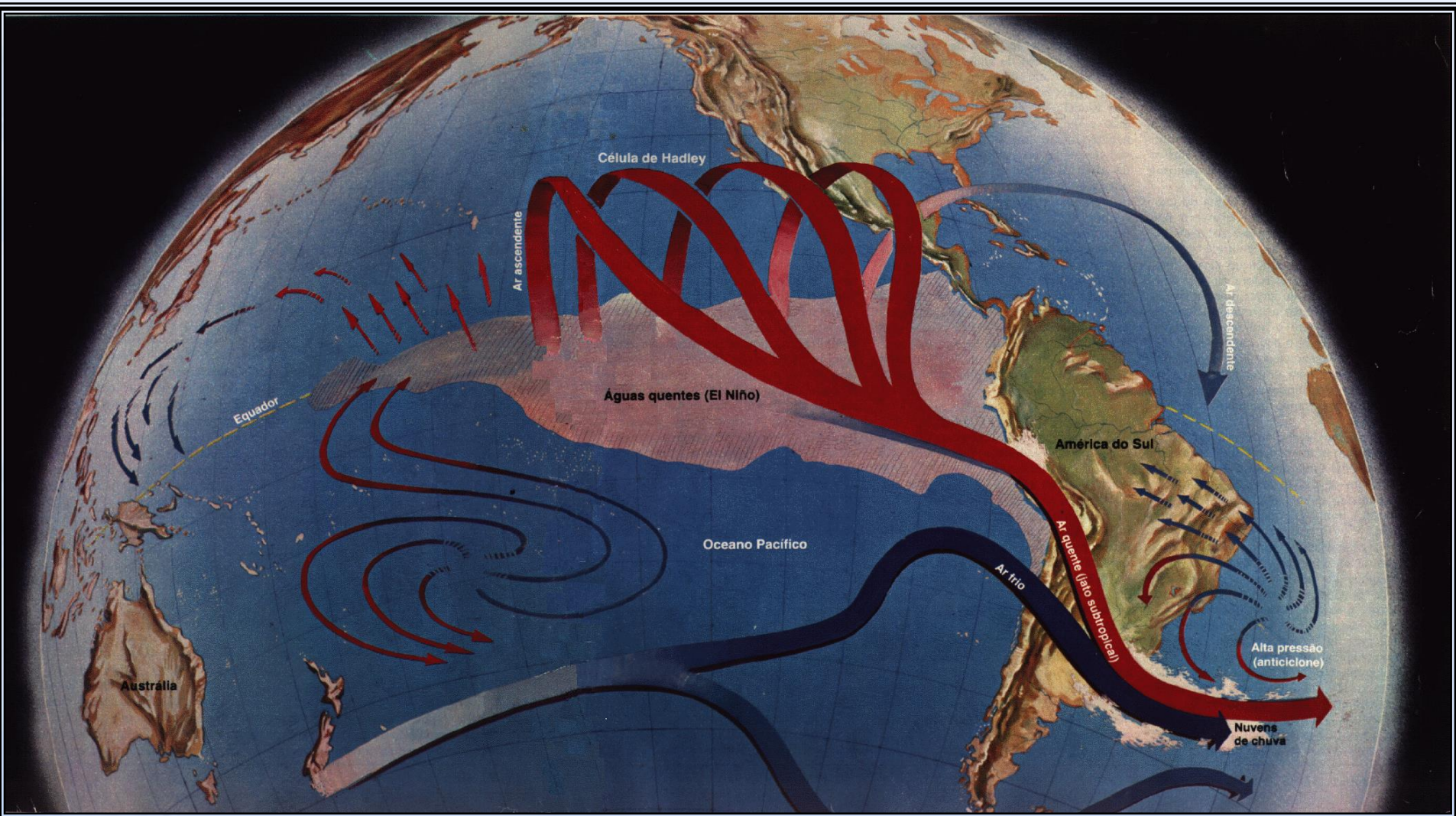
Água fria ao longo da costa da América Sul

O EL NIÑO ACONTECE:

Ventos do leste são fracos e a água quente se move para o leste



EUA: Inverno mais quente e seco

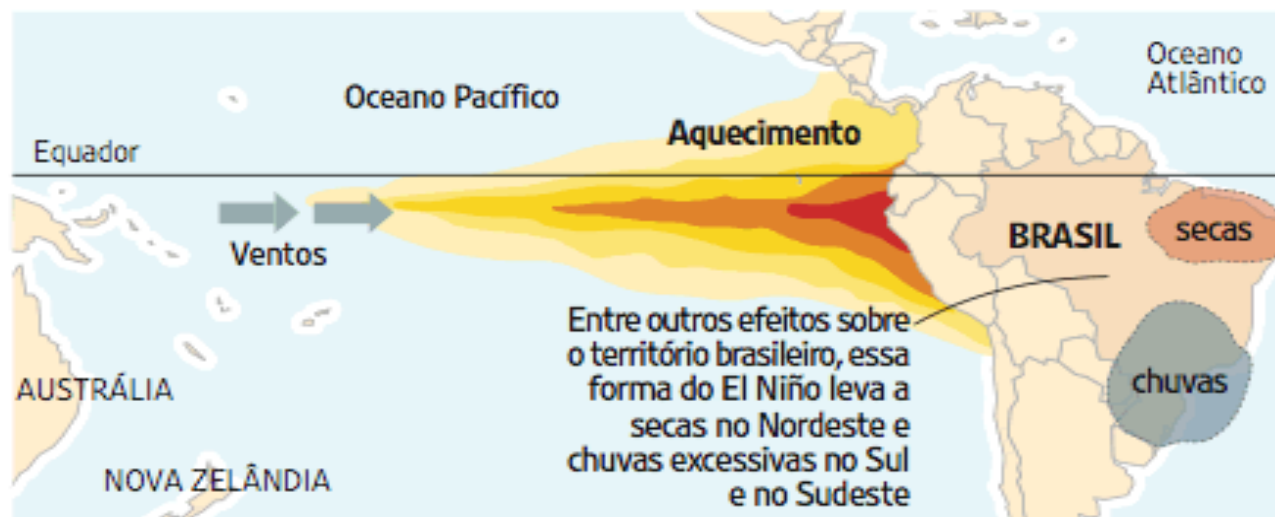


Nova forma do El Niño pode mudar padrões de seca e chuva

AQUECIMENTO DAS ÁGUAS

>> O El Niño normalmente aparece com o aquecimento anormal das águas do leste do oceano Pacífico, perto da costa da América do Sul

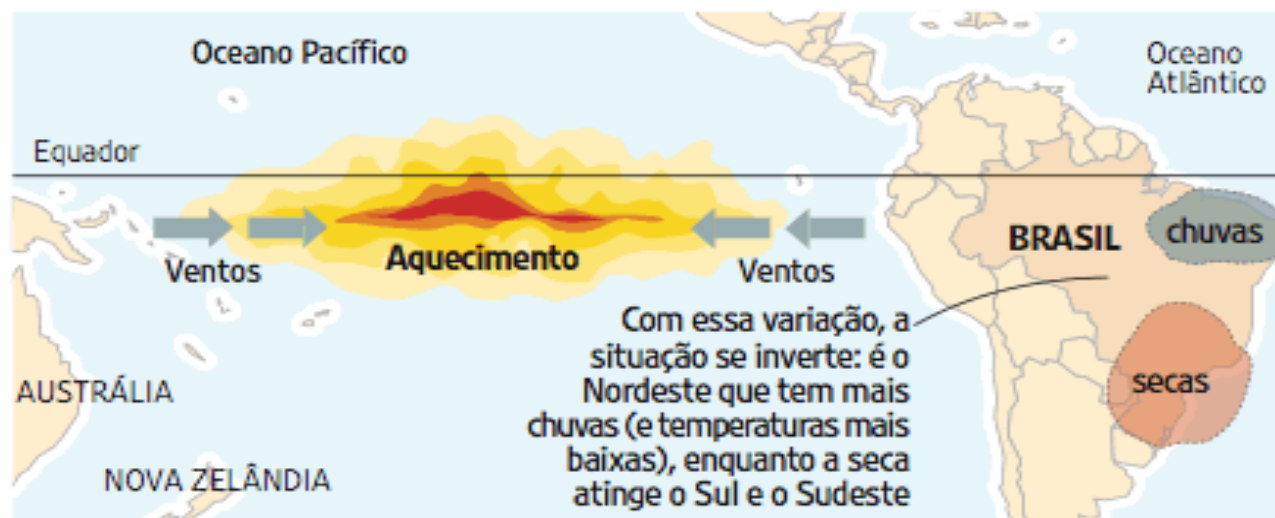
>> Esse aquecimento também altera os ventos e a circulação de umidade



EL NIÑO MODOKI

>> O aquecimento global pode aumentar a frequência de uma forma diferente do fenômeno, o chamado El Niño Modoki

>> Nele, o aquecimento das águas ocorre mais para o centro do Pacífico



Dipolo do Atlântico

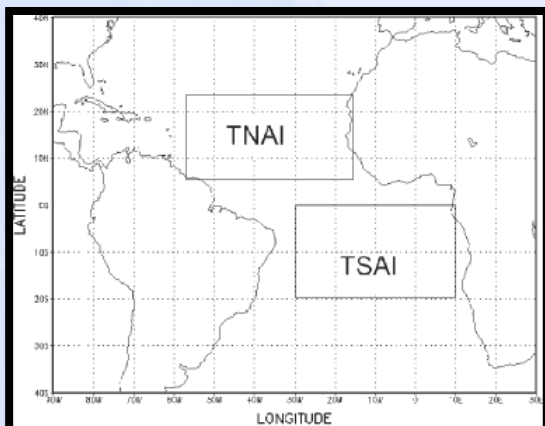
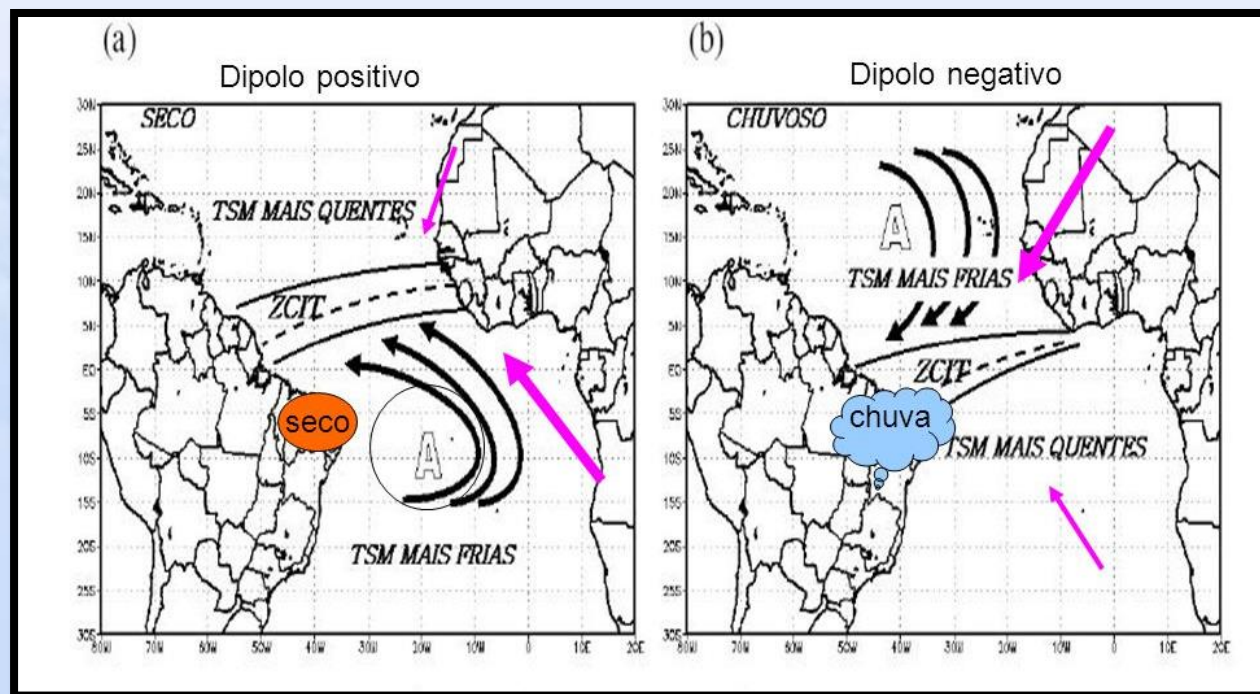


Figura 3 – Áreas do oceano Atlântico Tropical que foram calculados os TNAI e TSAI, associadas ao Padrão de Dipolo de anomalias de TSM no Atlântico

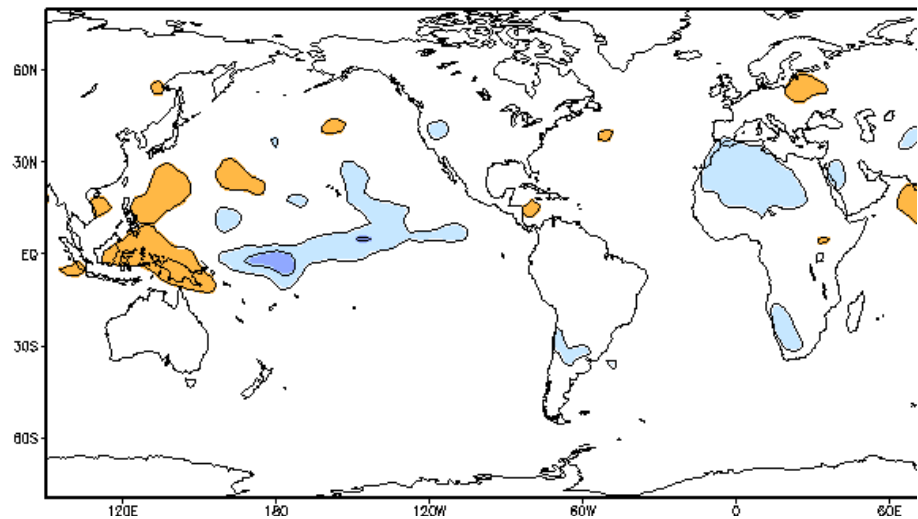
Dipolo de Temperatura do Oceano Atlântico



Os campos Meteorológicos

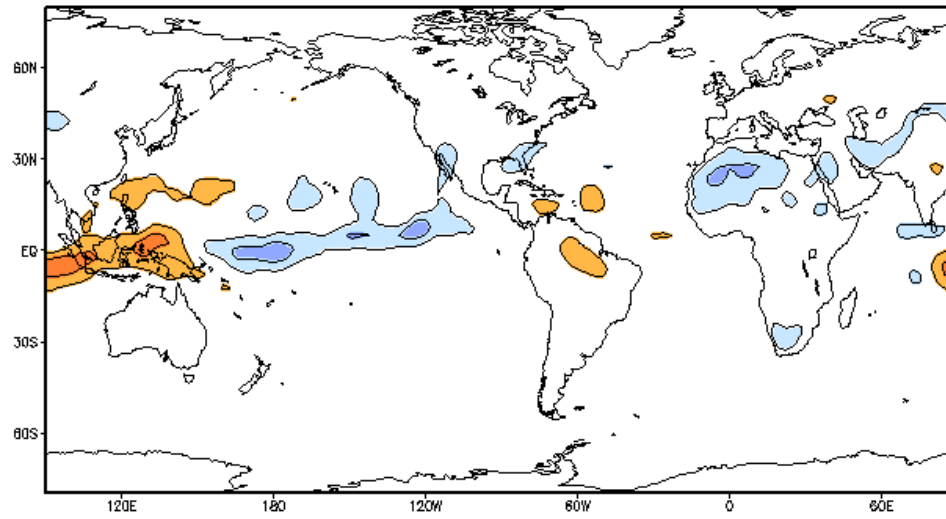
INPE/CPTEC

Anomalia de Radiação de Onda Longa AUG2015



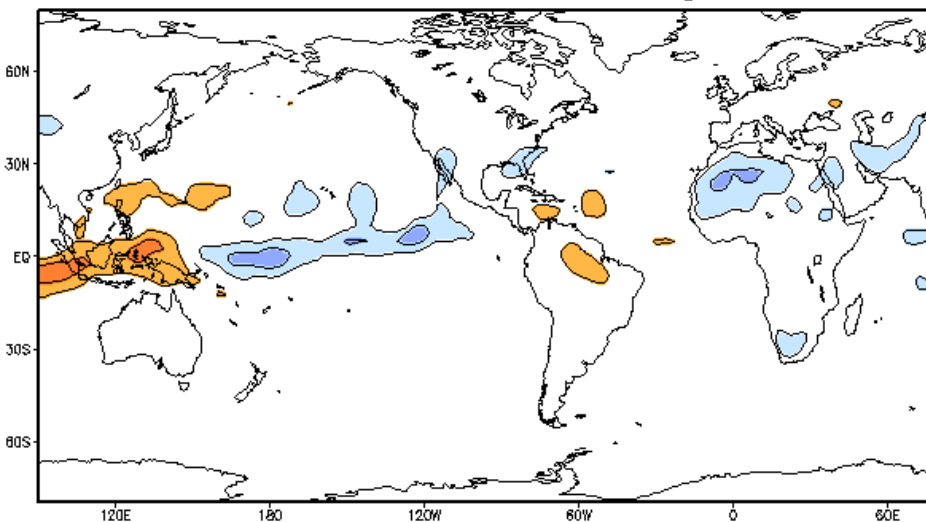
INPE/CPTEC

Anomalia de Radiação de Onda Longa SEP2015



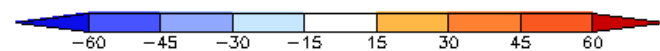
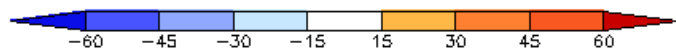
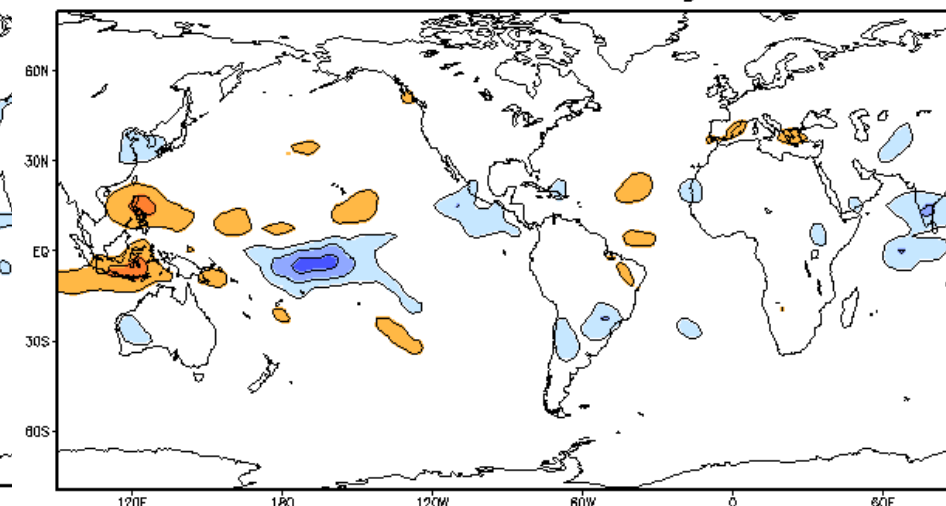
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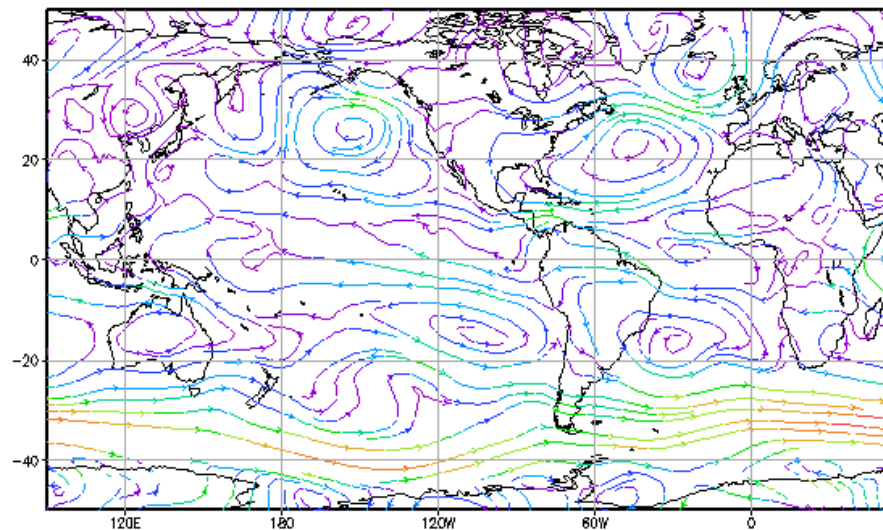
INPE/CPTEC

Anomalia de Radiação de Onda Longa NOV2015



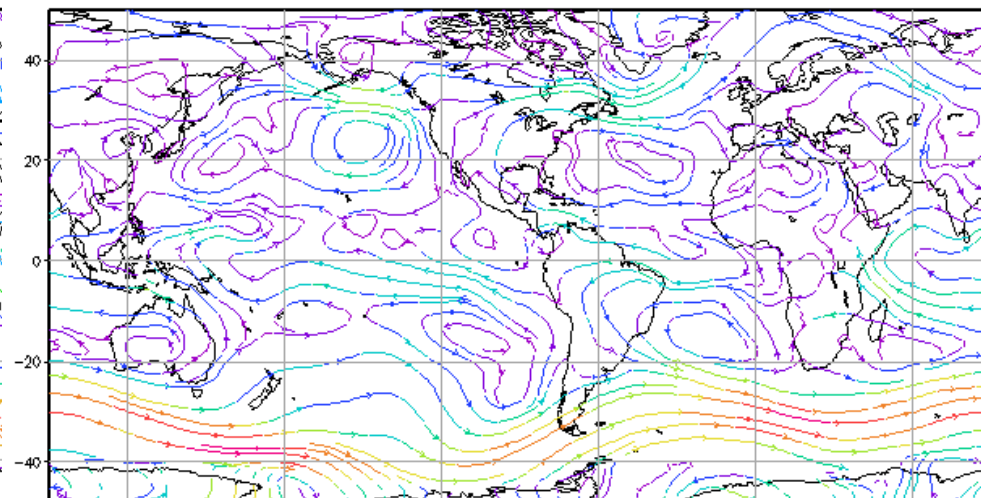
INPE/CPTEC

Linhas de Corrente em 850 hPa AUG2015



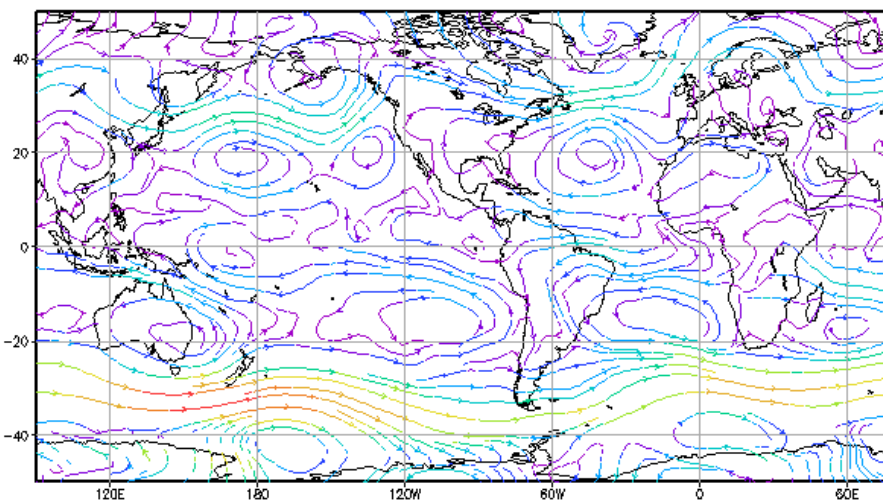
INPE/CPTEC

Linhas de Corrente em 850 hPa SEP2015



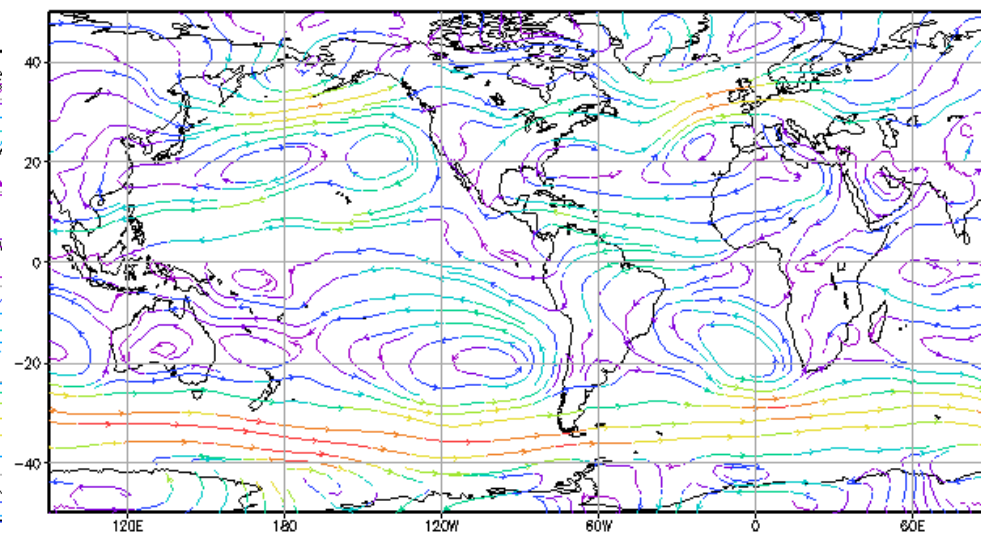
INPE/CPTEC

Linhas de Corrente em 850 hPa OCT2015



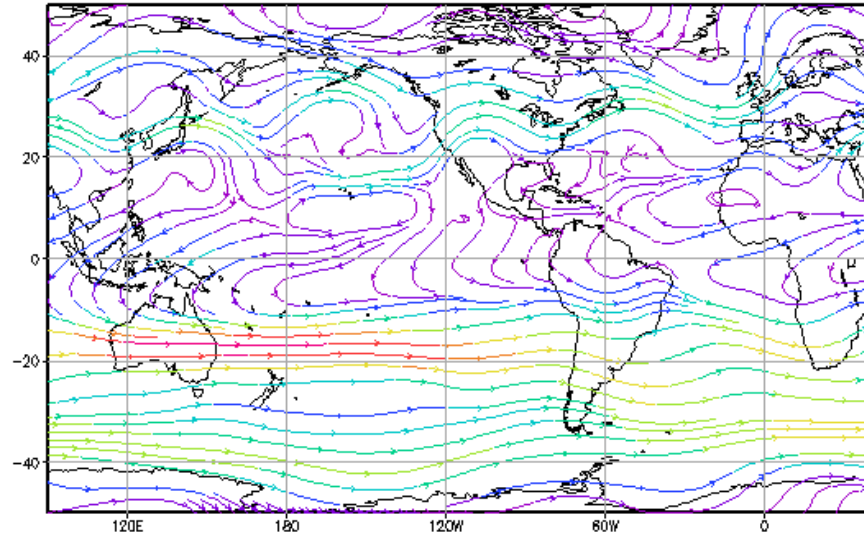
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Linhas de Corrente em 850 hPa NOV2015



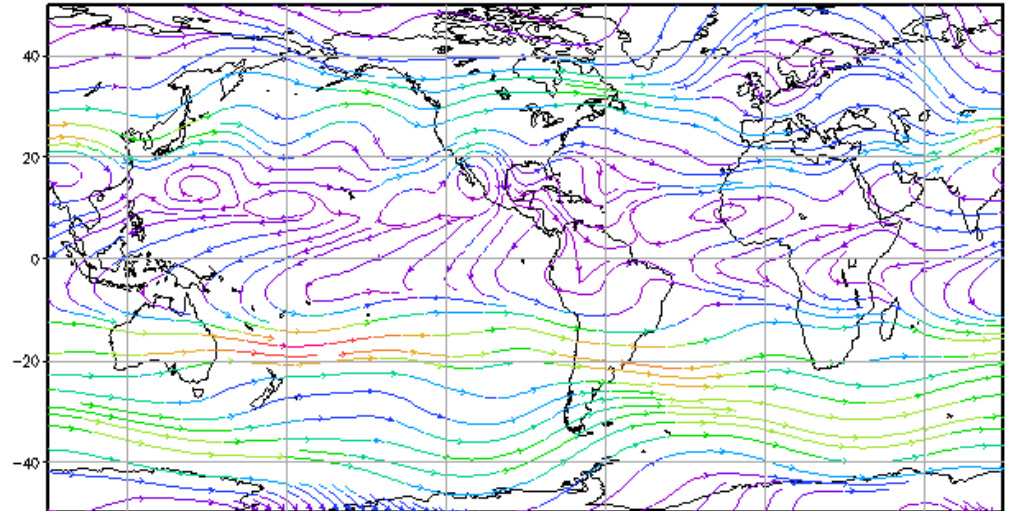
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Linhas de Corrente em 200 hPa AUG2015



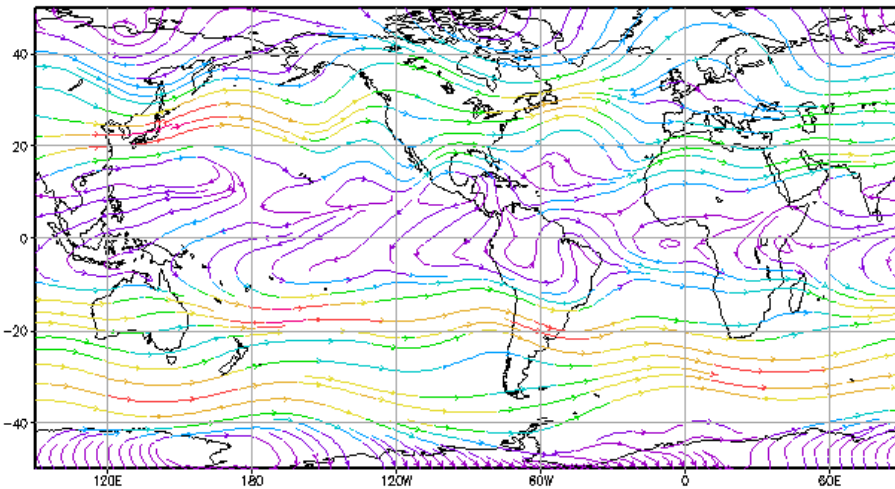
INPE/CPTEC

Linhas de Corrente em 200 hPa SEP2015



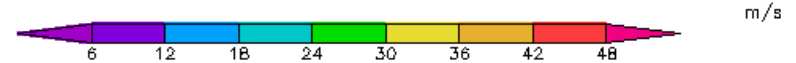
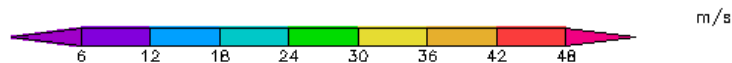
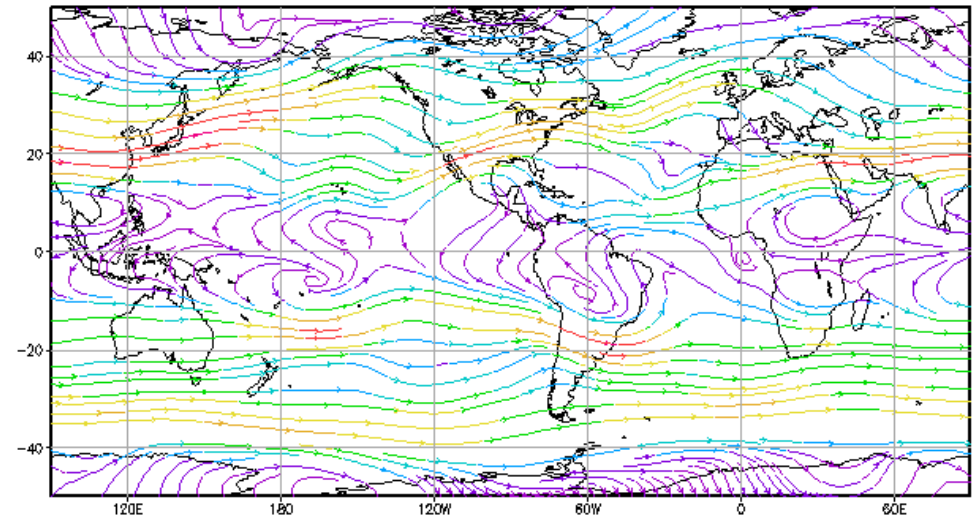
INPE/CPTEC

Linhas de Corrente em 200 hPa OCT2015



INPE/CPTEC

Linhas de Corrente em 200 hPa NOV2015

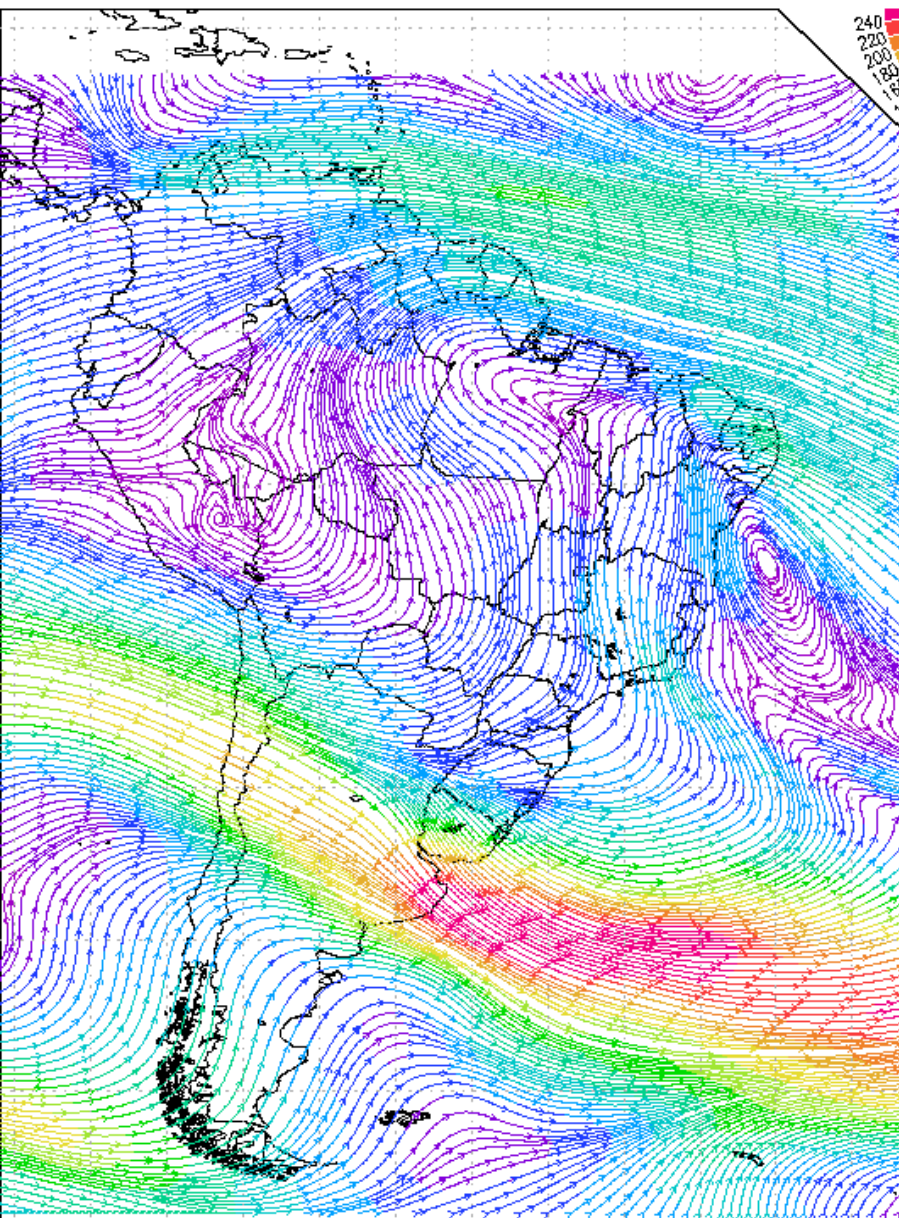


Regional Eta (11 dias) 15 X 15km

Análise Inicializada em: 18/12/2015, 12 UTC (Sexta-feira) Válida para: 18/12/2015, 12 UTC (Sexta-fe

Variável: Linhas de Corrente e Magnitude do Vento e m 200 hPa

CPTEC/INPE

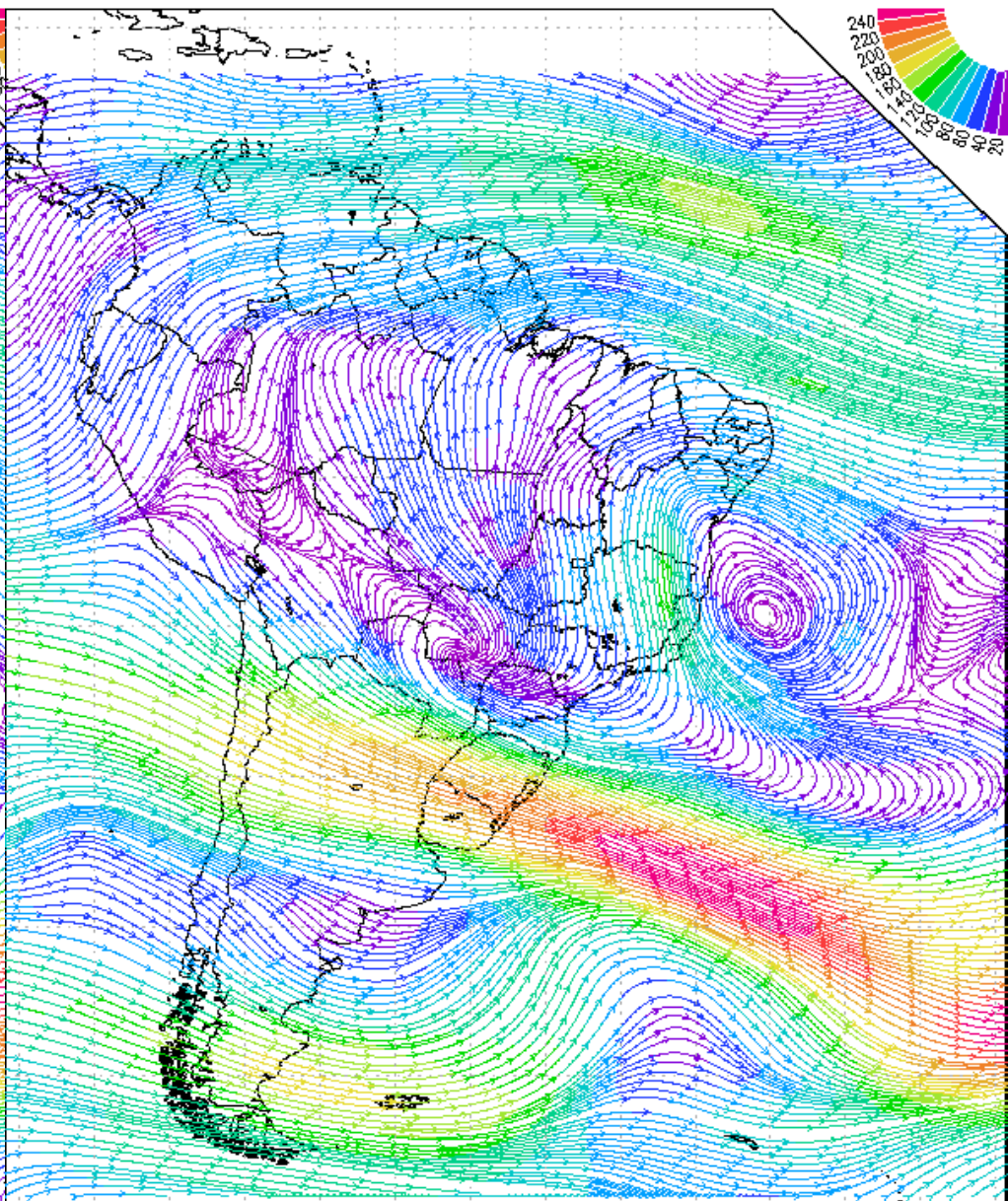


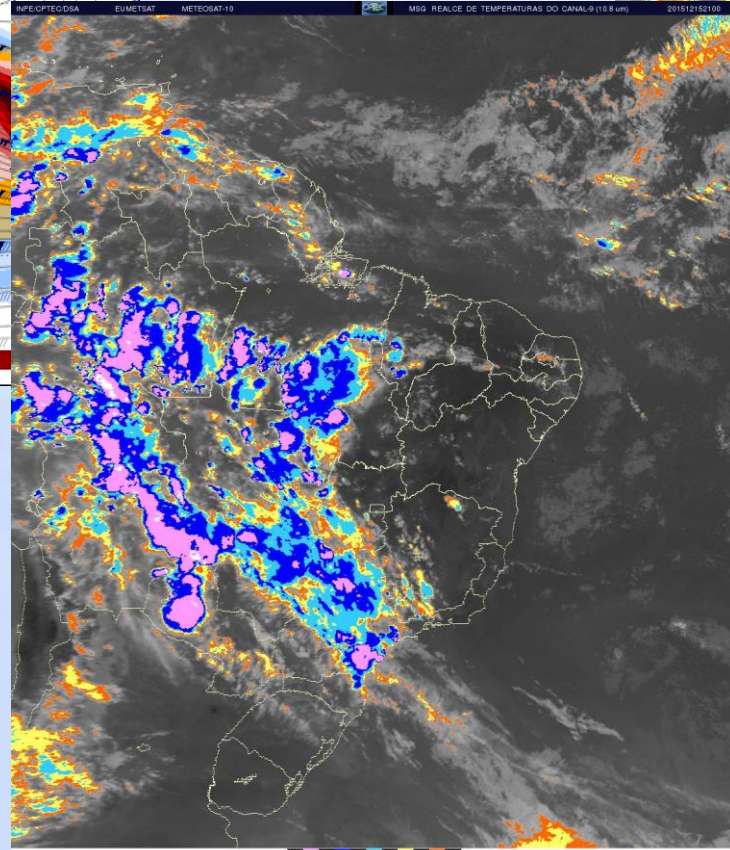
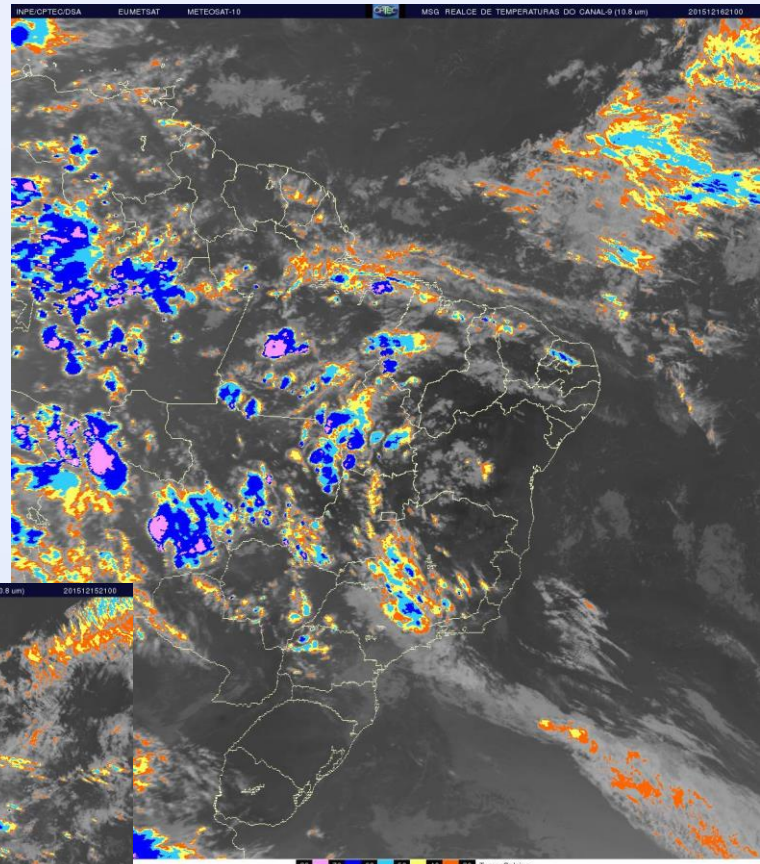
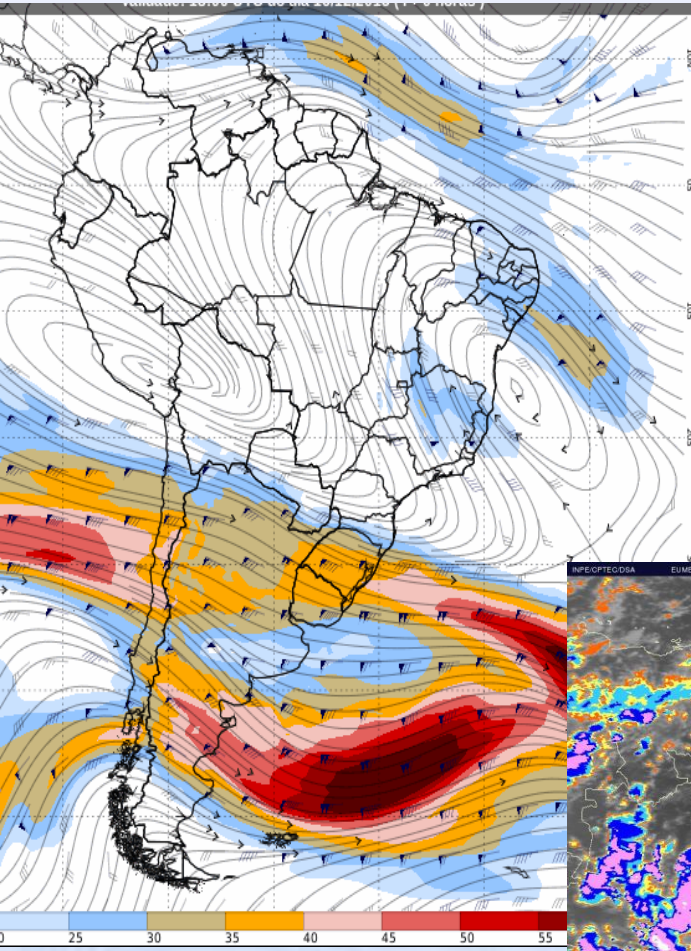
Regional Eta (11 dias) 15 X 15km

Análise Inicializada em: 20/12/2015, 00 UTC (Domingo) Válida para: 20/12/2015, 00 UTC (Domingo)

Variável: Linhas de Corrente e Magnitude do Vento e m 200 hPa

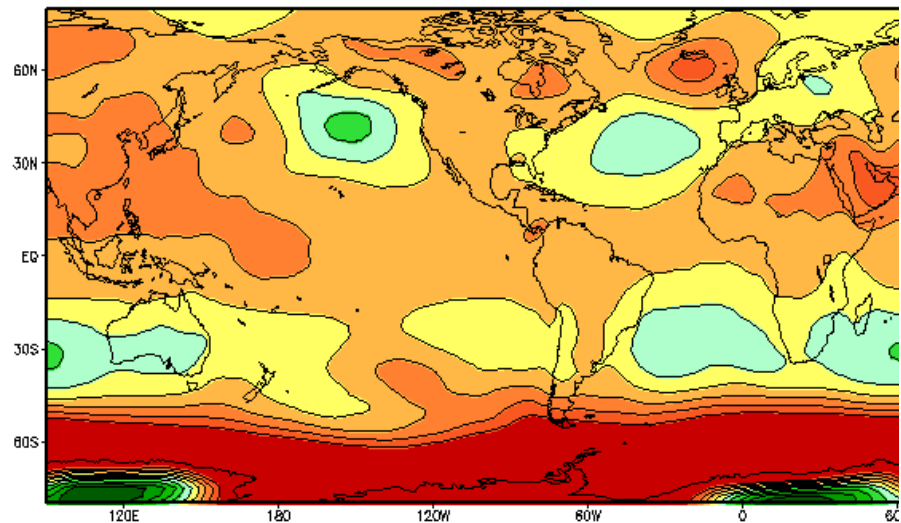
CPTEC/INPE





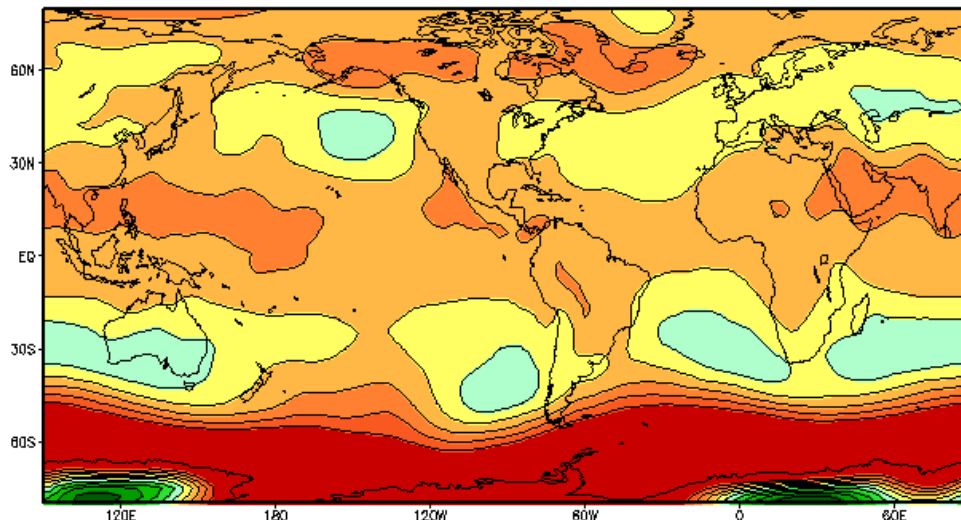
INPE/CPTEC

Pressao ao Nivel do Mar (-1000)AUG2015



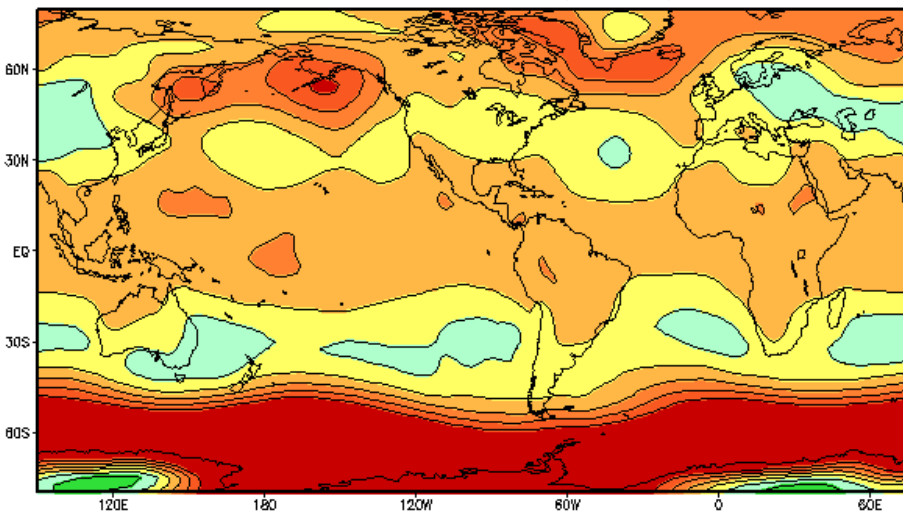
INPE/CPTEC

Pressao ao Nivel do Mar (-1000)SEP2015



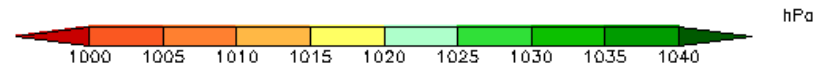
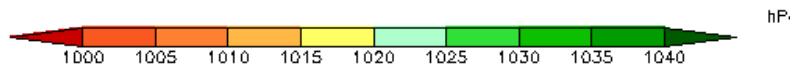
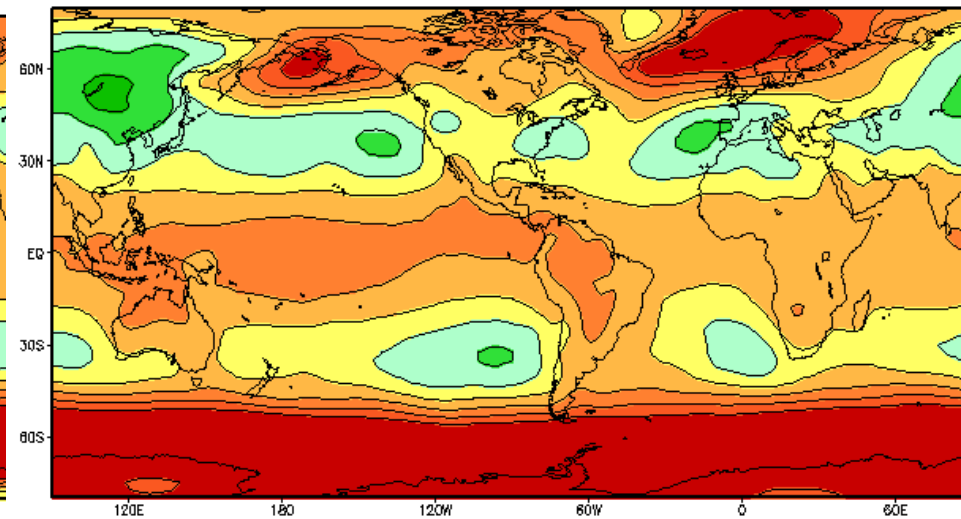
INPE/CPTEC

Pressao ao Nivel do Mar (-1000)OCT2015



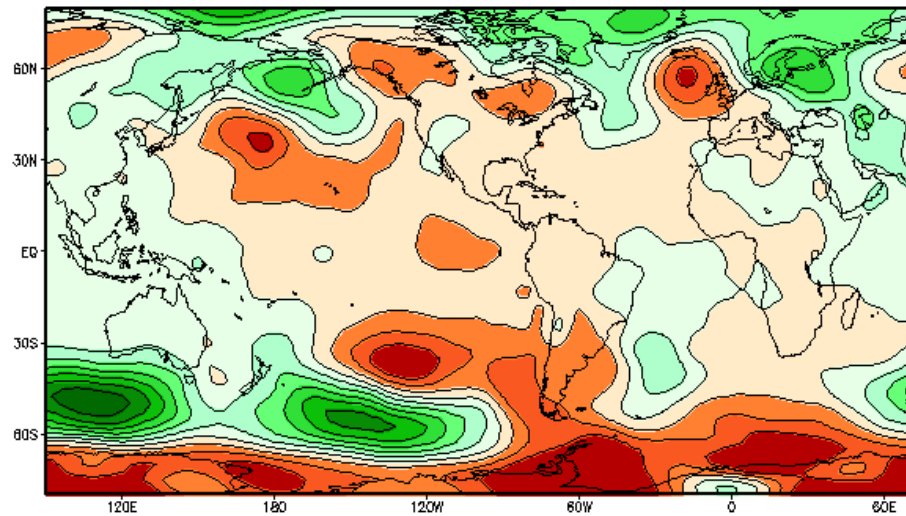
INPE/CPTEC

Pressao ao Nivel do Mar (-1000)NOV2015



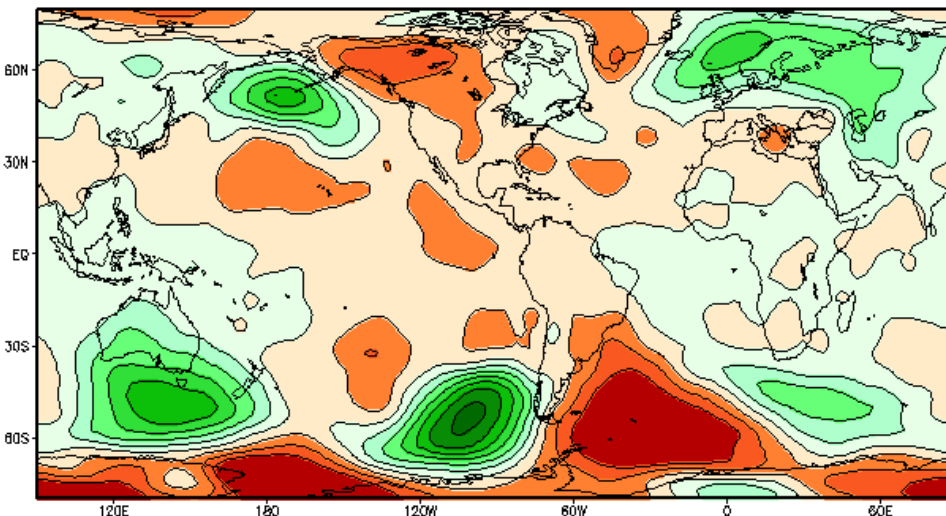
INPE/CPTEC

Anomalia de Pressao ao Nivel do Mar AUG2015



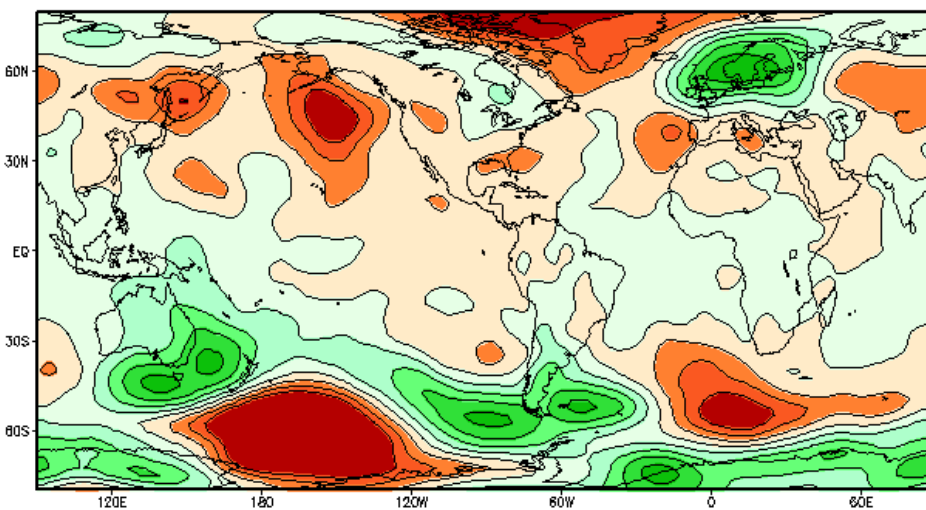
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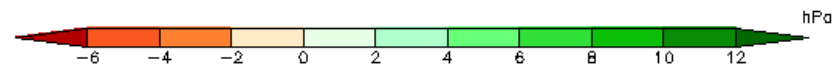
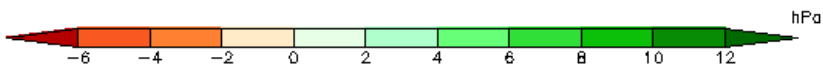
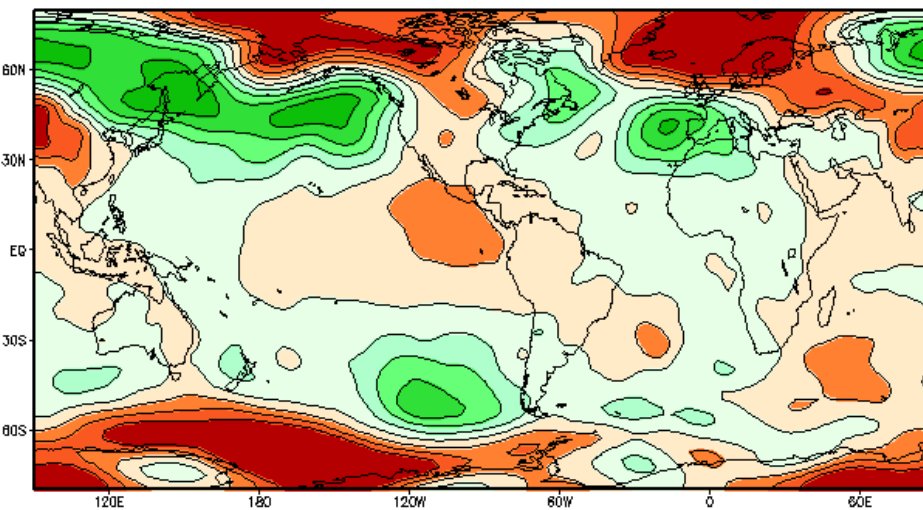
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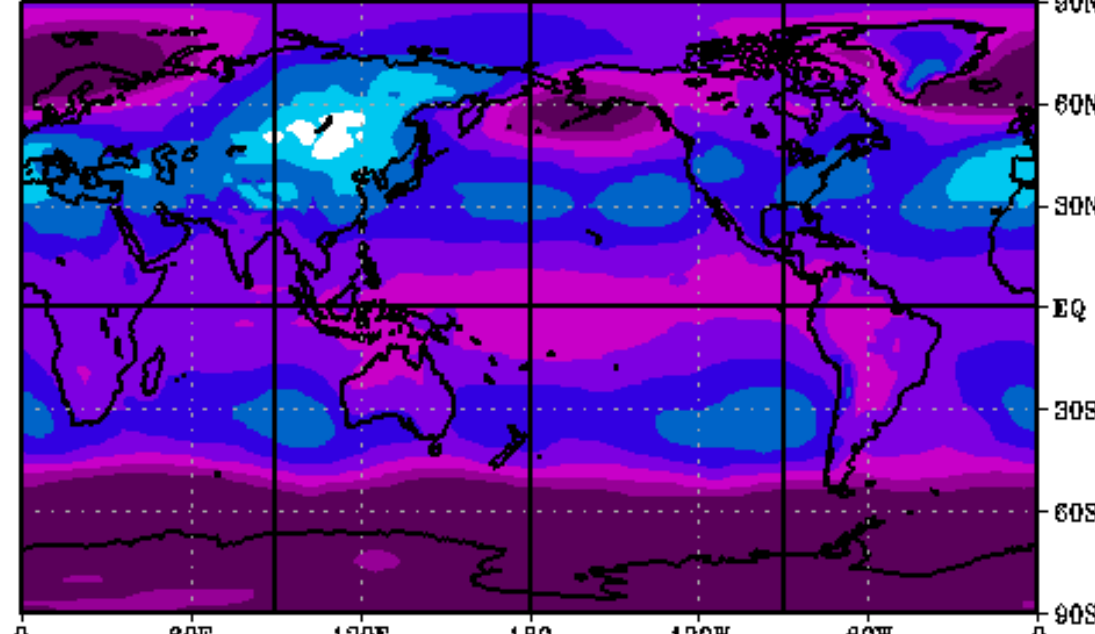
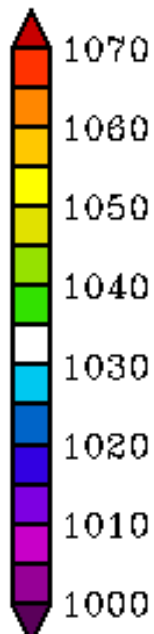
Anomalia de Pressao ao Nivel do Mar OCT2015



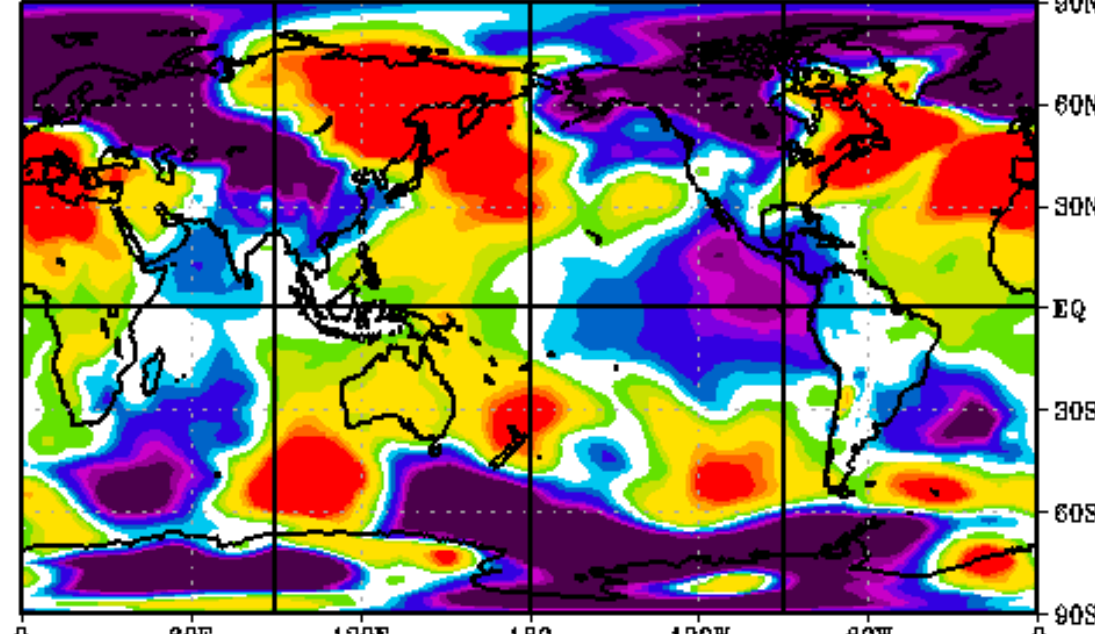
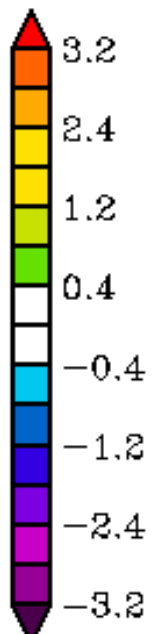
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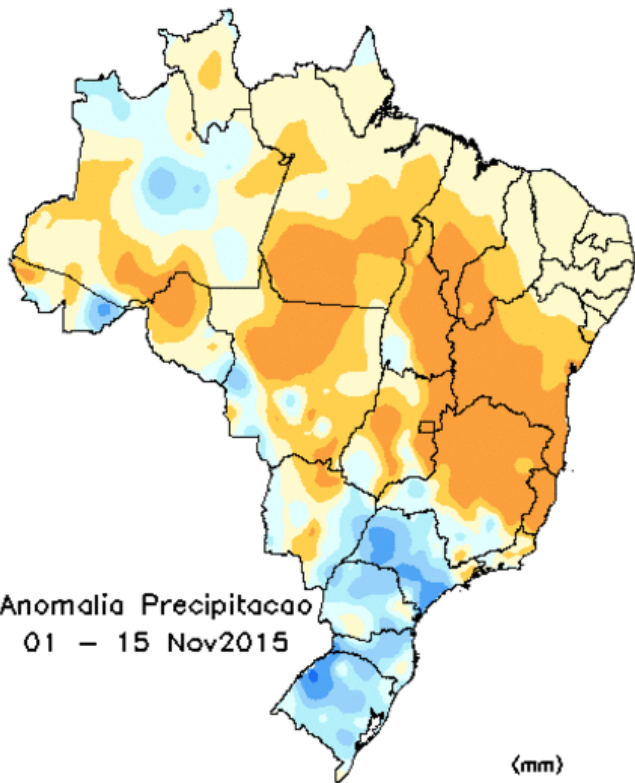


REANALYSIS DATA SEA LEVEL PRESSURE (mb) 30-DAY MEAN FOR: Thu NOV 12 2015 - Fri DEC 11 2015

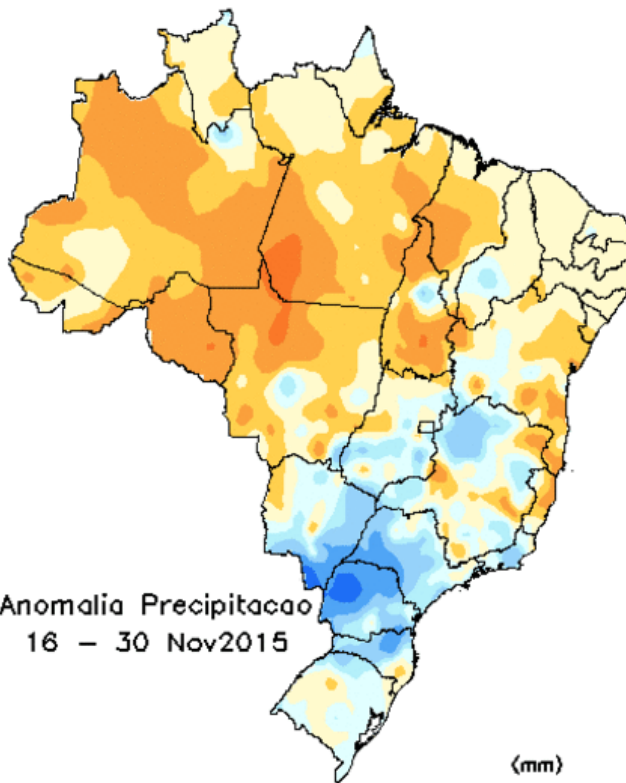
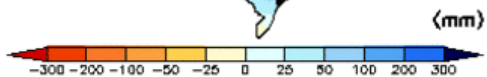


REANALYSIS DATA SEA LEVEL PRESSURE (mb) 30-DAY ANOMALY FOR: Thu NOV 12 2015 - Fri DEC 11 2015

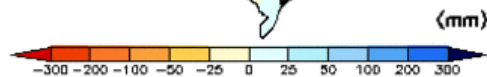
(NCEP Reanalysis climatology data: 1981-2010, smoothed with 5-day running mean)



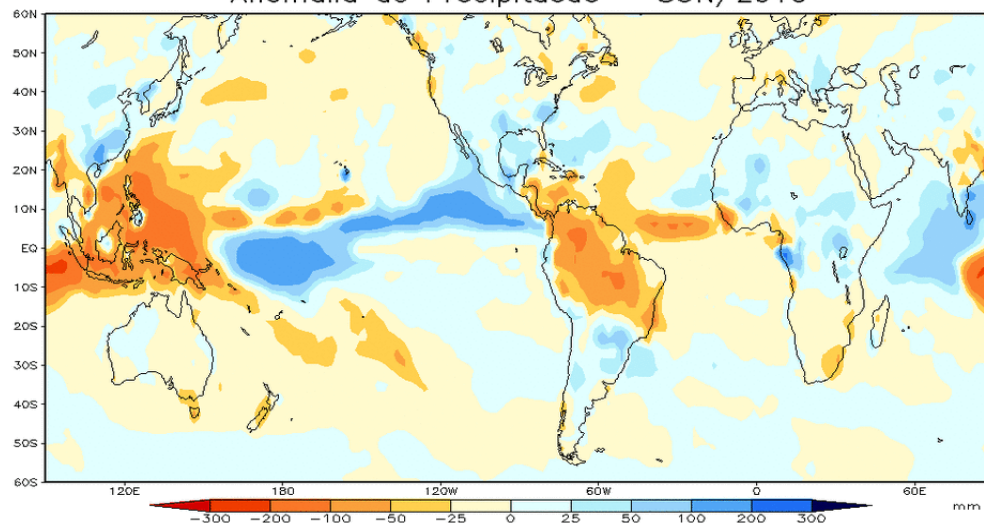
Anomalia Precipitacao
01 - 15 Nov2015



Anomalia Precipitacao
16 - 30 Nov2015



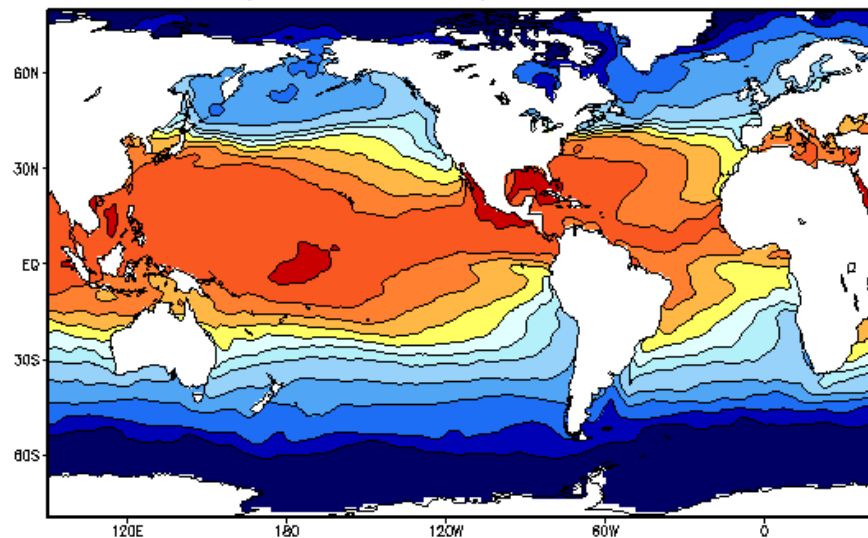
Anomalia de Precipitacao - SON/2015



Temperatura das águas oceânicas

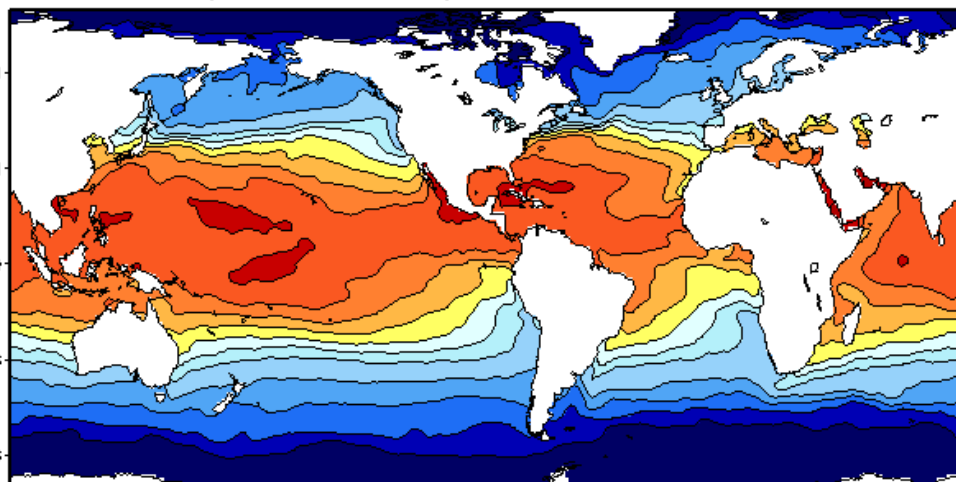
INPE/CPTEC

Temperatura da Superfície do Mar AUG2015



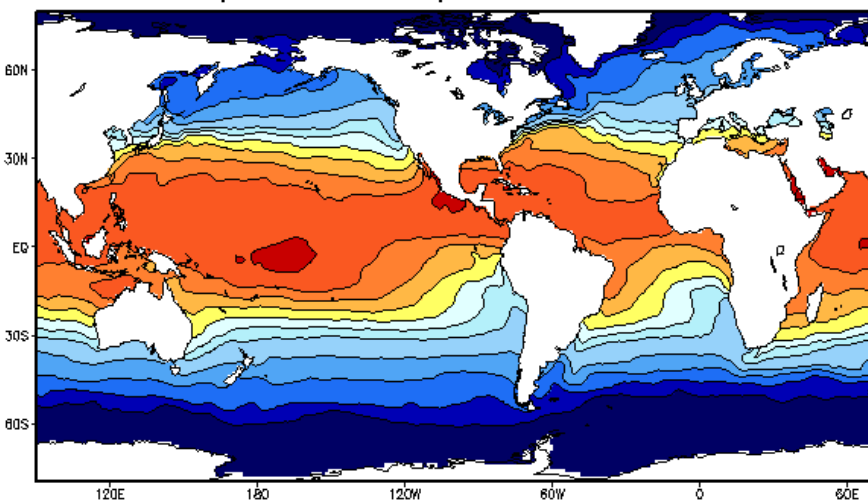
INPE/CPTEC

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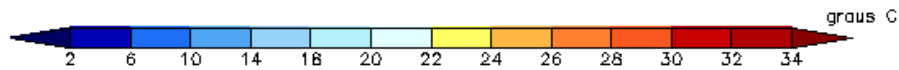
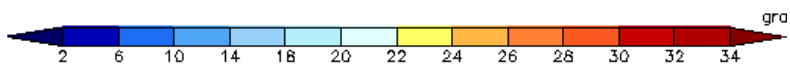
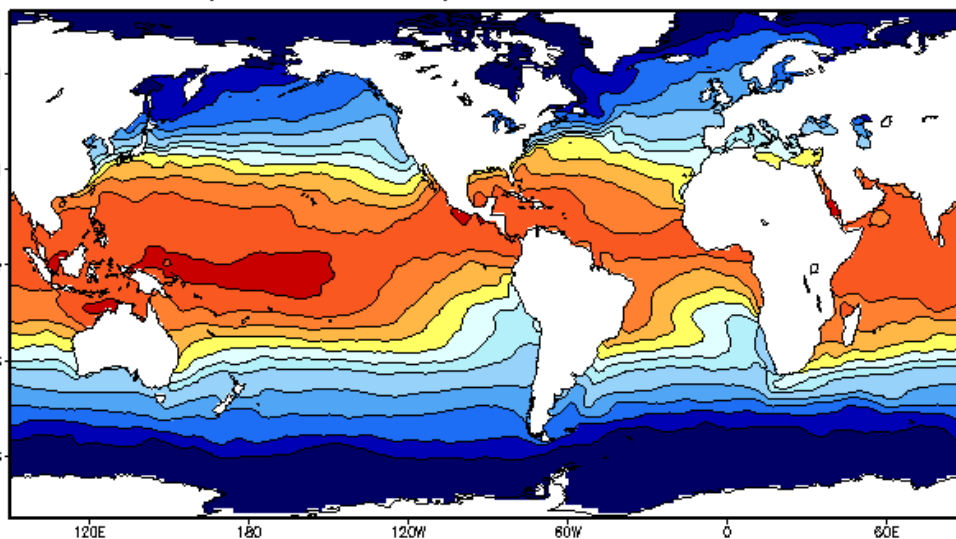
INPE/CPTEC

Temperatura da Superfície do Mar OCT2015

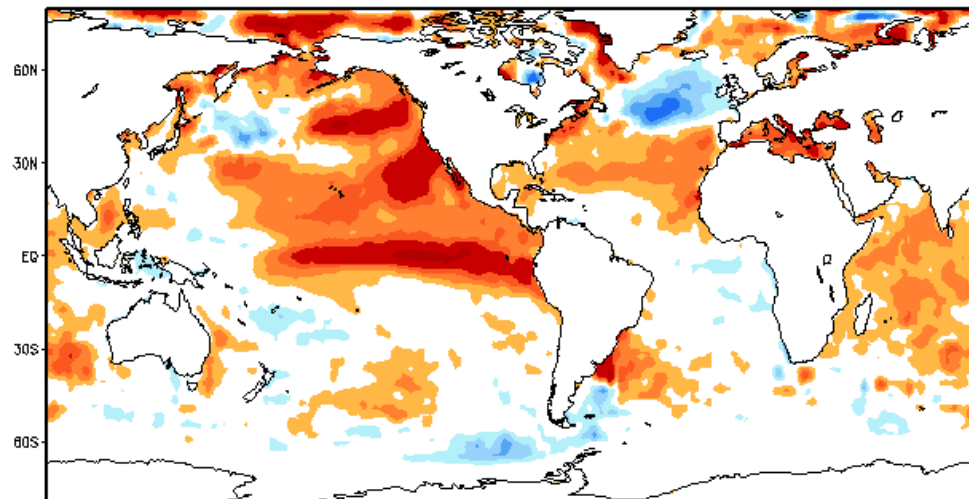


INPE/CPTEC

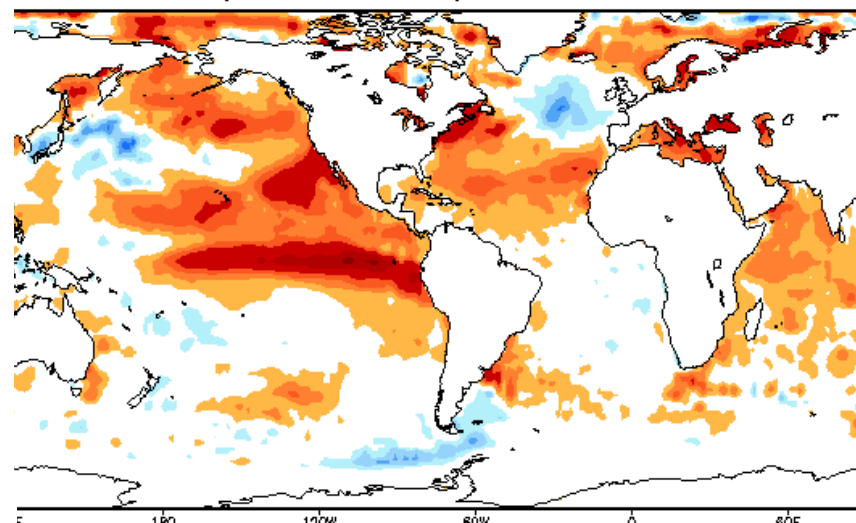
Temperatura da Superfície do Mar NOV2015



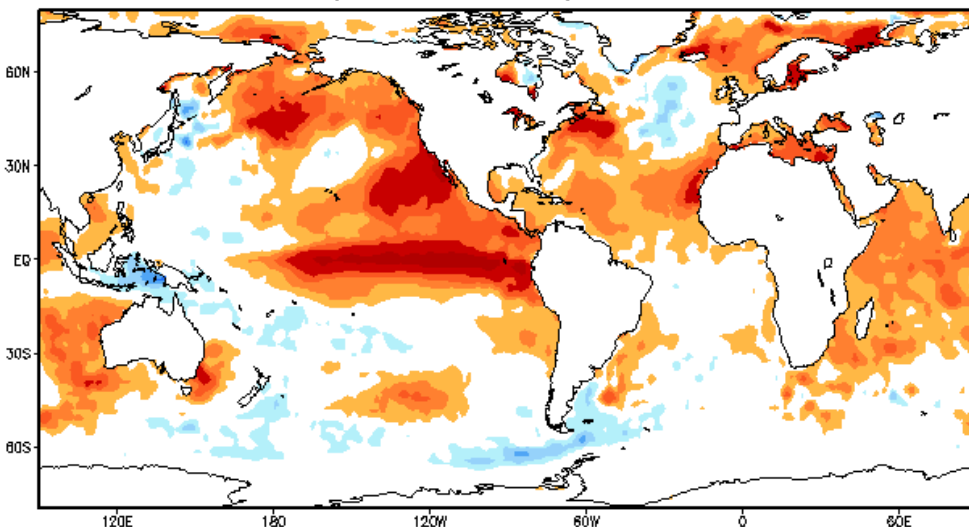
Anomalia de Temperatura da Superfície do Mar AUG2015



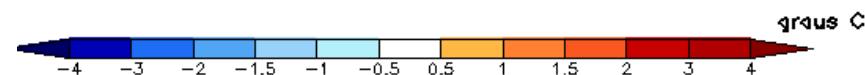
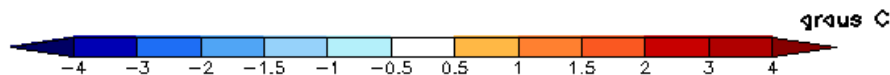
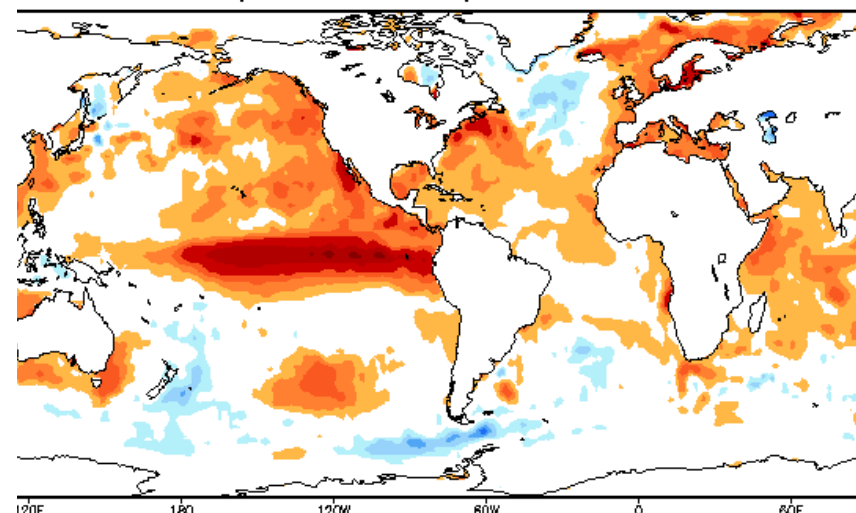
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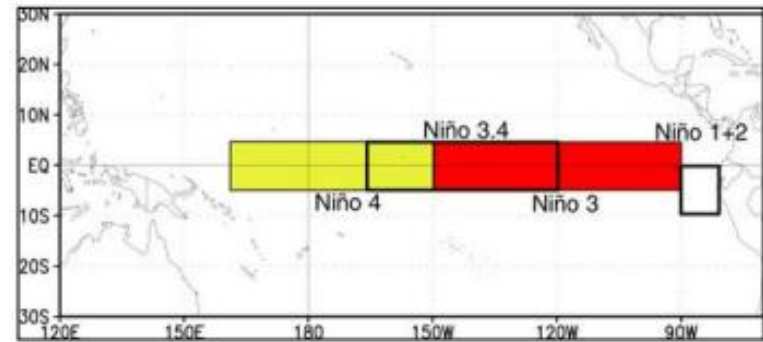
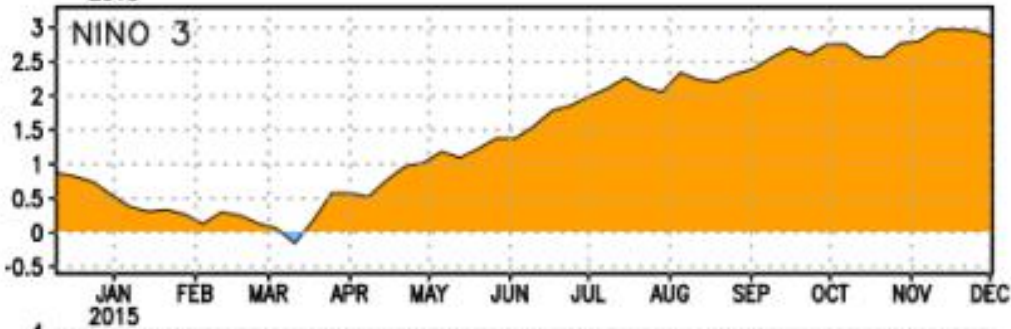
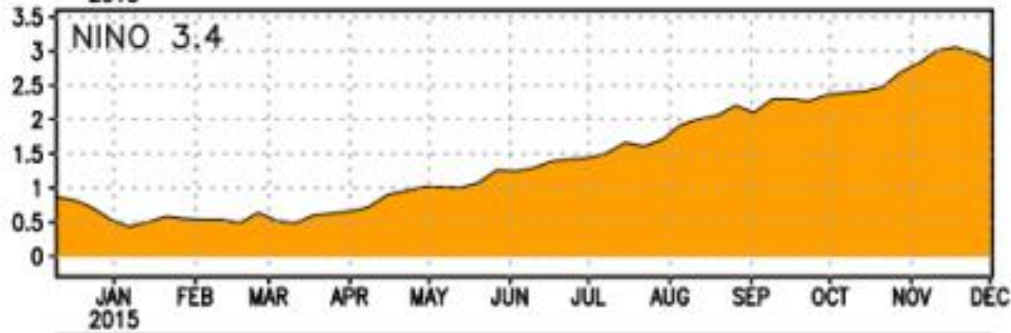
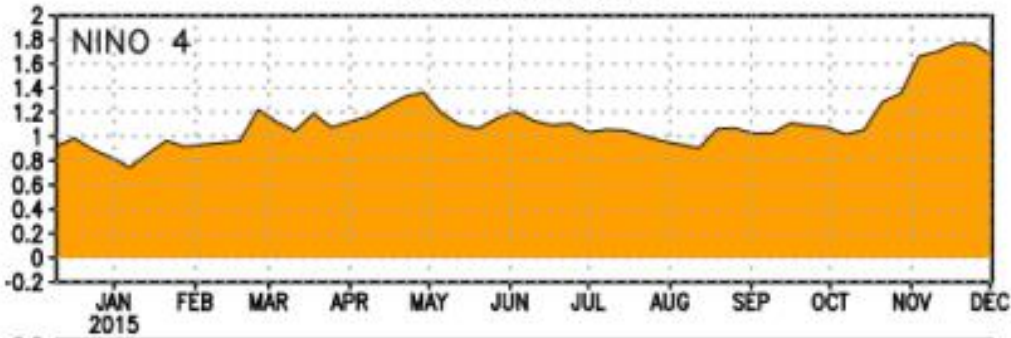
Anomalia de Temperatura da Superfície do Mar OCT2015



Anomalia de Temperatura da Superfície do Mar NOV2015

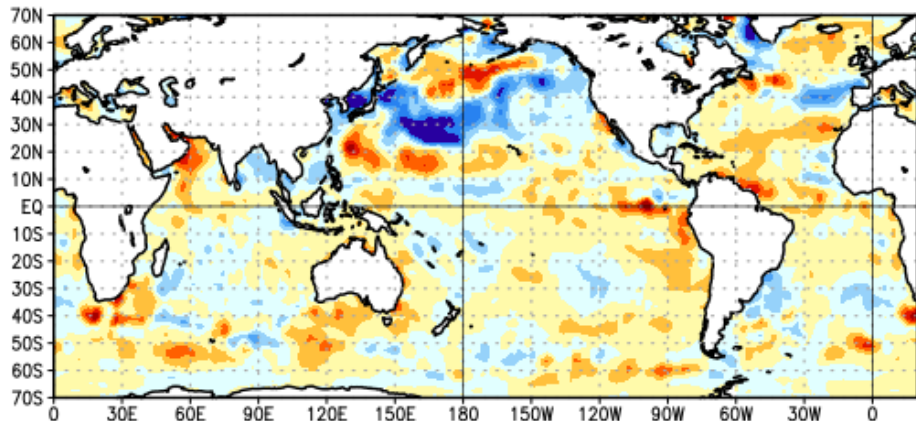


SST Anomalies



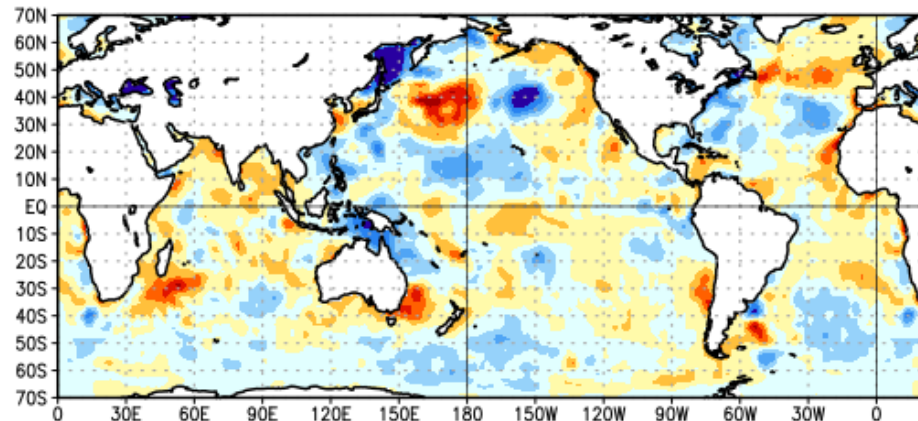
Change in Weekly SST Anoms (°C)

16SEP2015 minus 19AUG2015



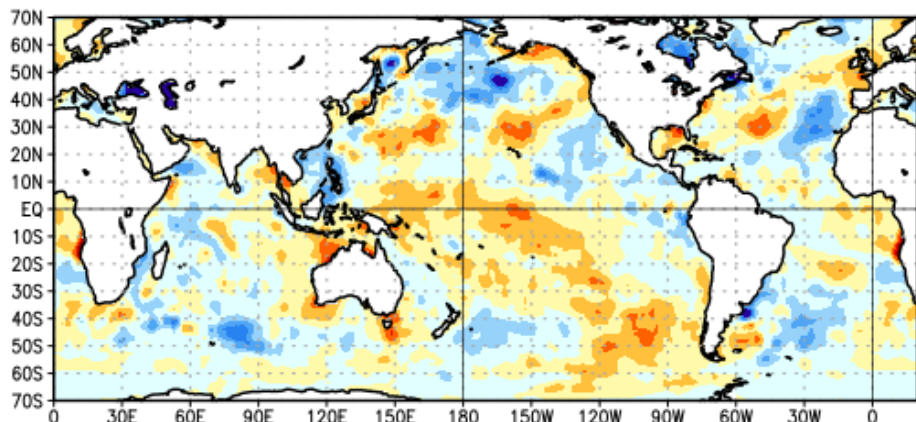
Change in Weekly SST Anoms (°C)

21OCT2015 minus 23SEP2015



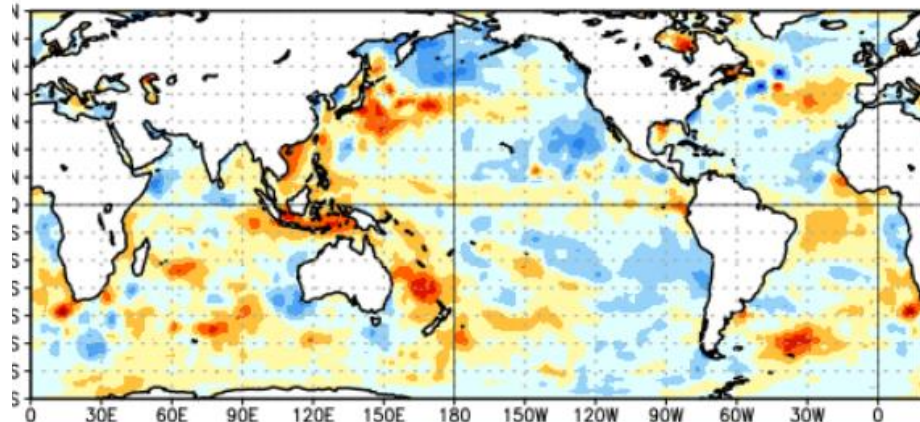
Change in Weekly SST Anoms (°C)

04NOV2015 minus 07OCT2015

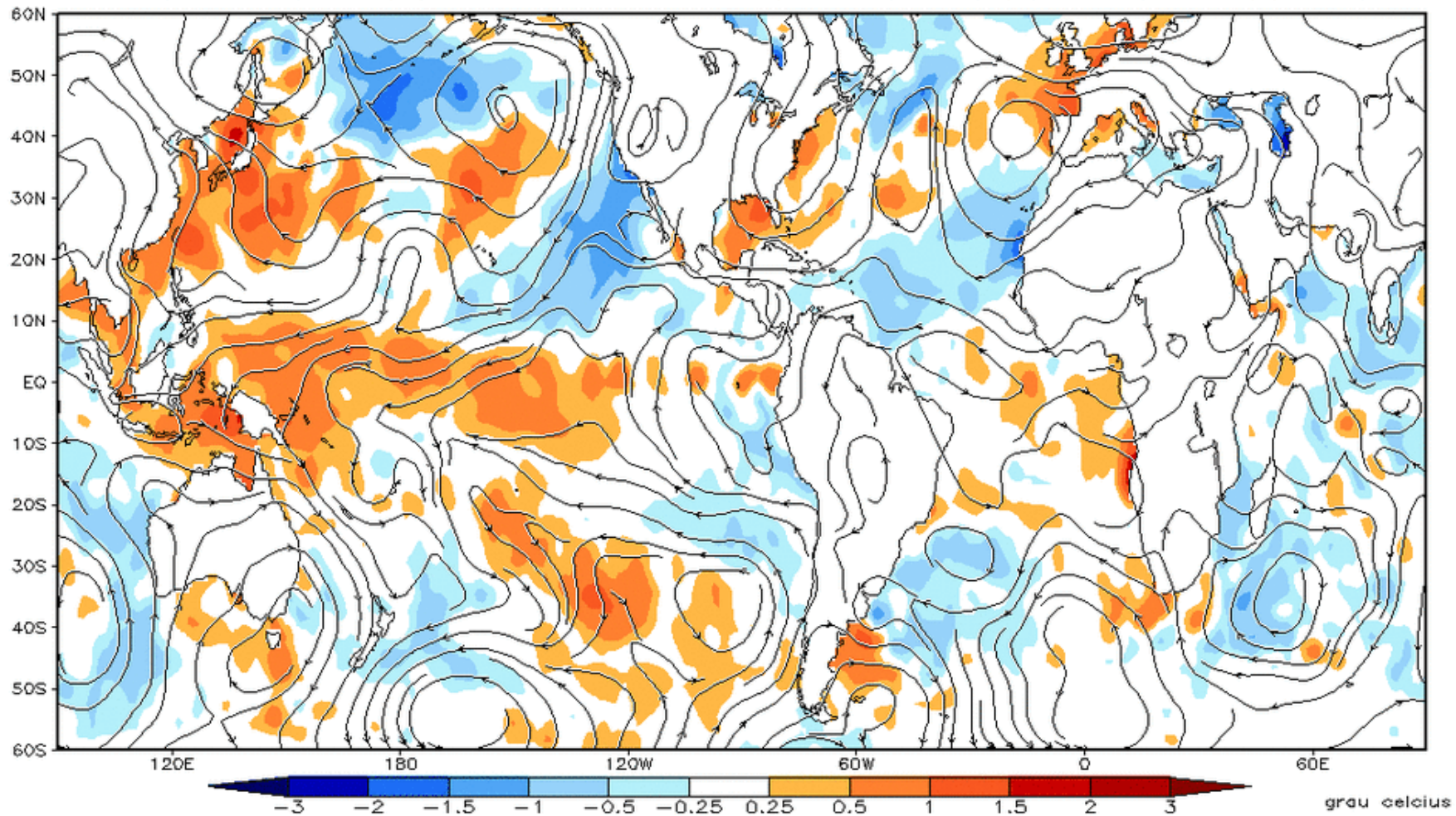


Change in Weekly SST Anoms (°C)

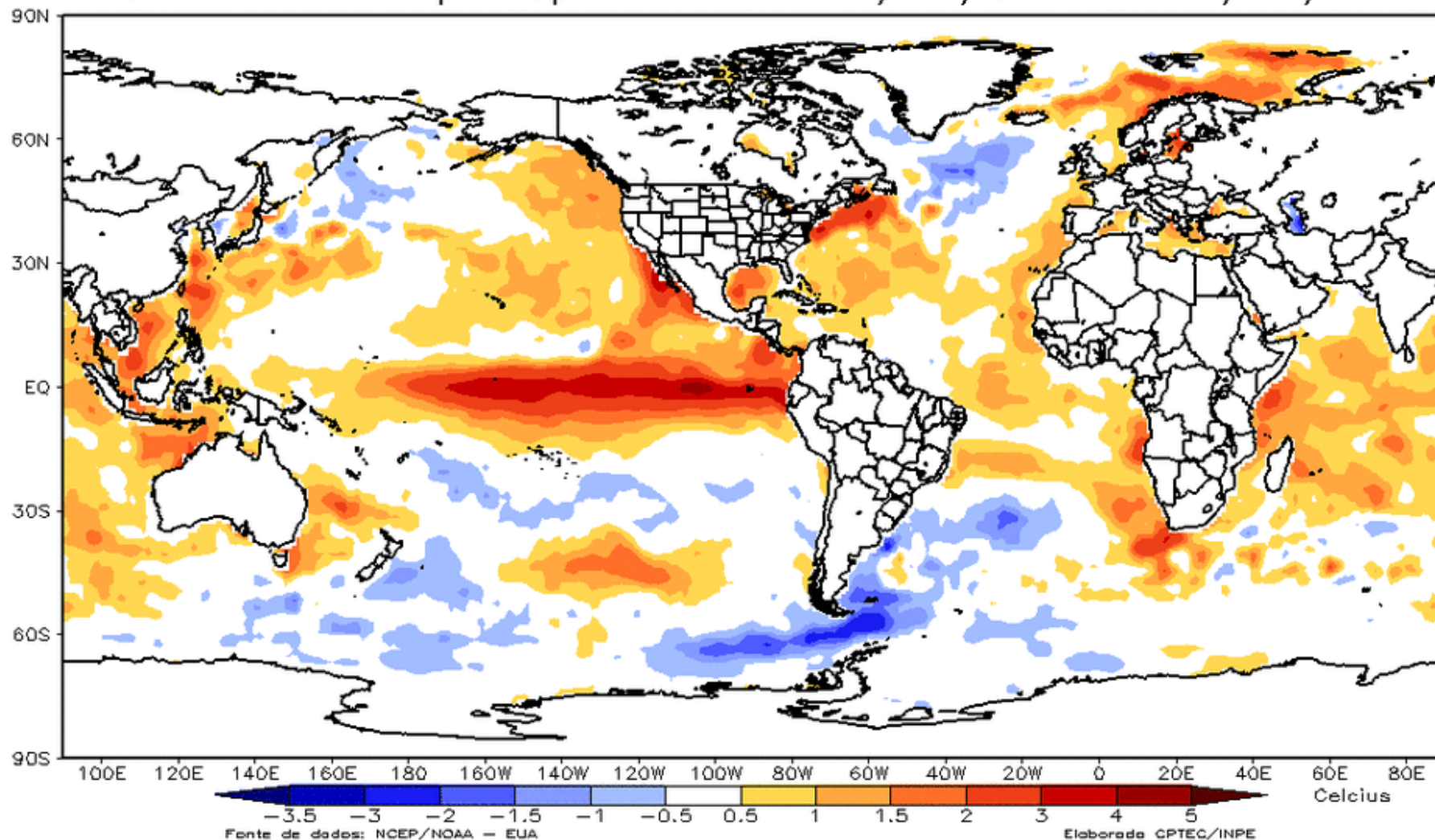
02DEC2015 minus 04NOV2015



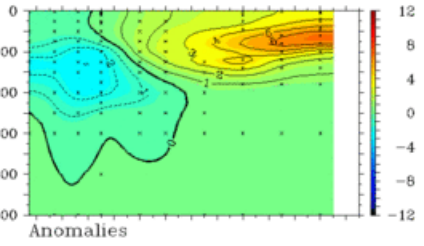
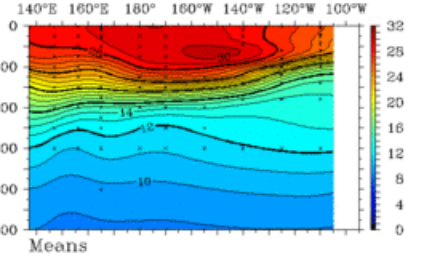
Tendência da Anom. de TSM + Vento em 850 hPa – NOV–OCT



Anomalia de Temp. Superfície Mar 06/12/2015 a 12/12/2015

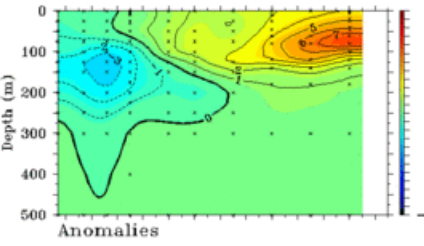
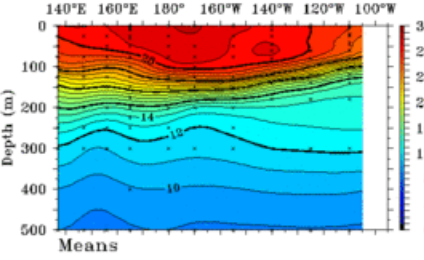


Monthly Mean TAO Temperatures (°C)
August 2015 2°S to 2°N Average



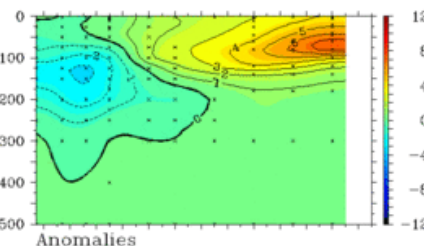
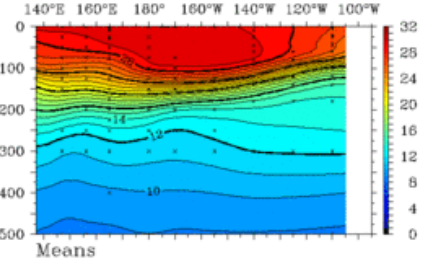
TAO Project Office/PMEL/NOAA Sep 11 2015

TAO/TRITON 5-Day Temperature (°C)
End Date: September 9 2015 2°S to 2°N Average



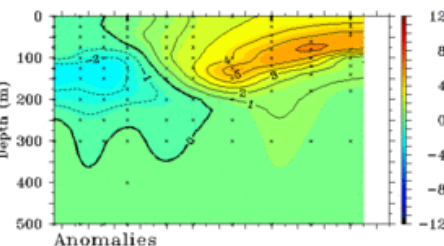
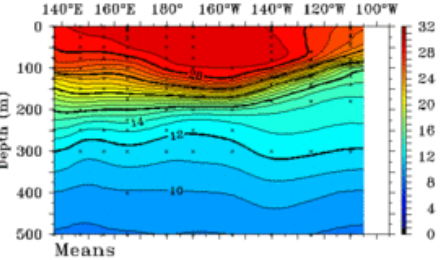
TAO Project Office/PMEL/NOAA Sep 10 2015

Monthly Mean TAO Temperatures (°C)
September 2015 2°S to 2°N Average



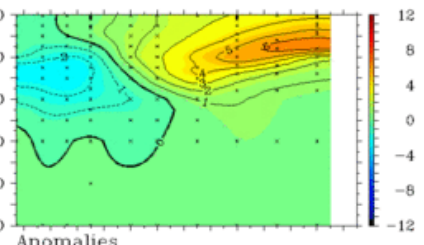
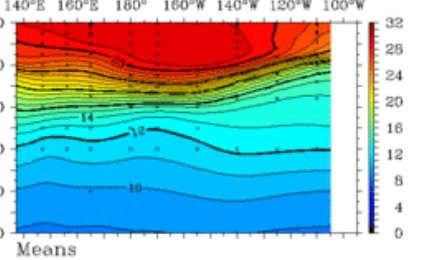
TAO Project Office/PMEL/NOAA Sep 10 2015

TAO/TRITON 5-Day Temperature (°C)
End Date: October 20 2015 2°S to 2°N Average



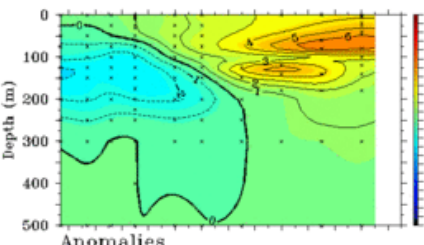
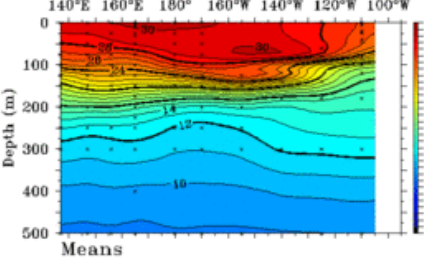
TAO Project Office/PMEL/NOAA Sep 11 2015

Monthly Mean TAO Temperatures (°C)
October 2015 2°S to 2°N Average



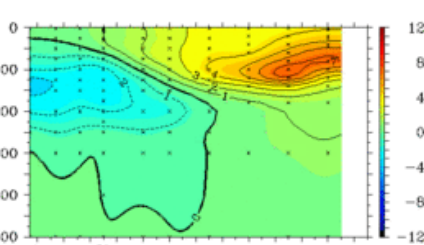
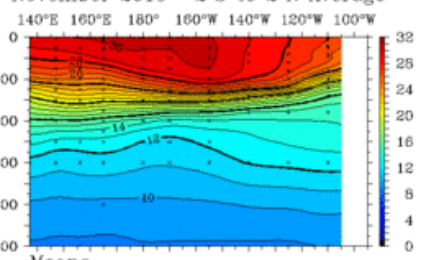
TAO Project Office/PMEL/NOAA Nov 12 2015

TAO/TRITON 5-Day Temperature (°C)
End Date: November 10 2015 2°S to 2°N Average



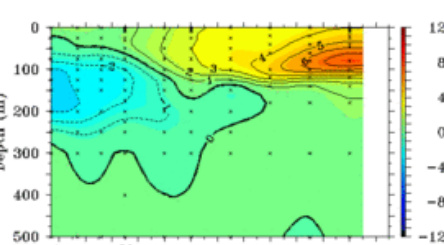
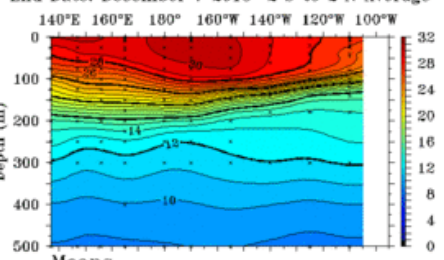
TAO Project Office/PMEL/NOAA Nov 11 2015

Monthly Mean TAO Temperatures (°C)
November 2015 2°S to 2°N Average



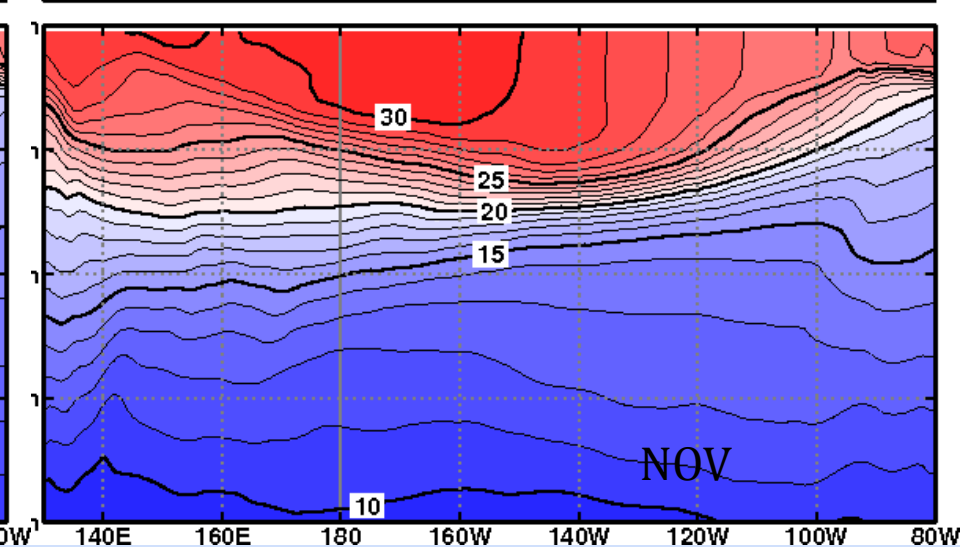
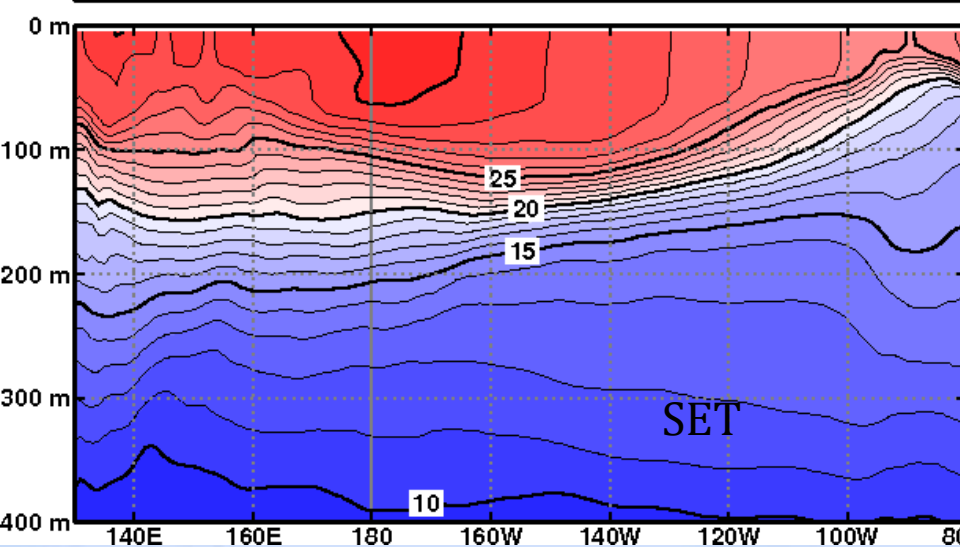
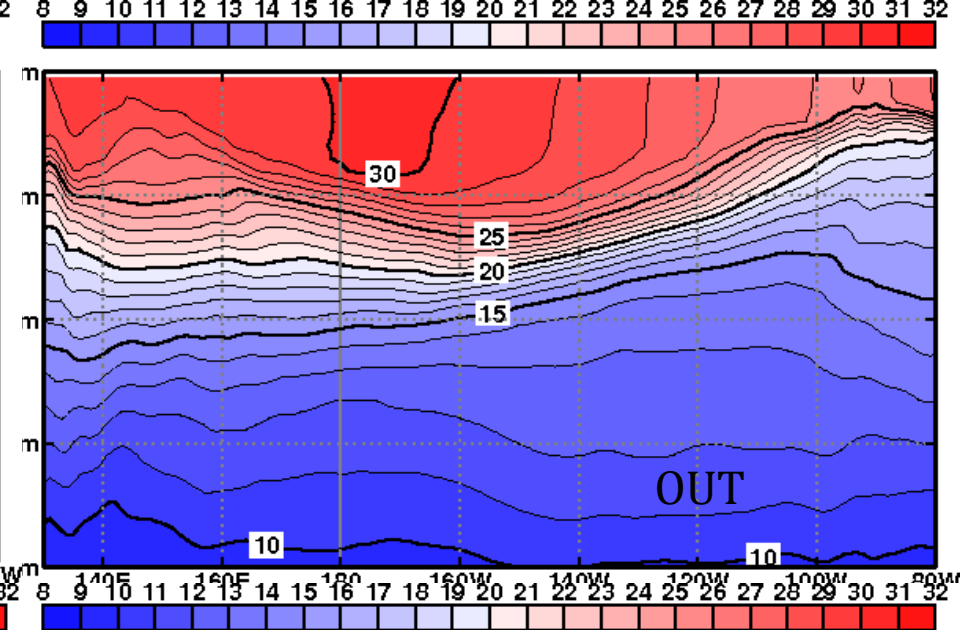
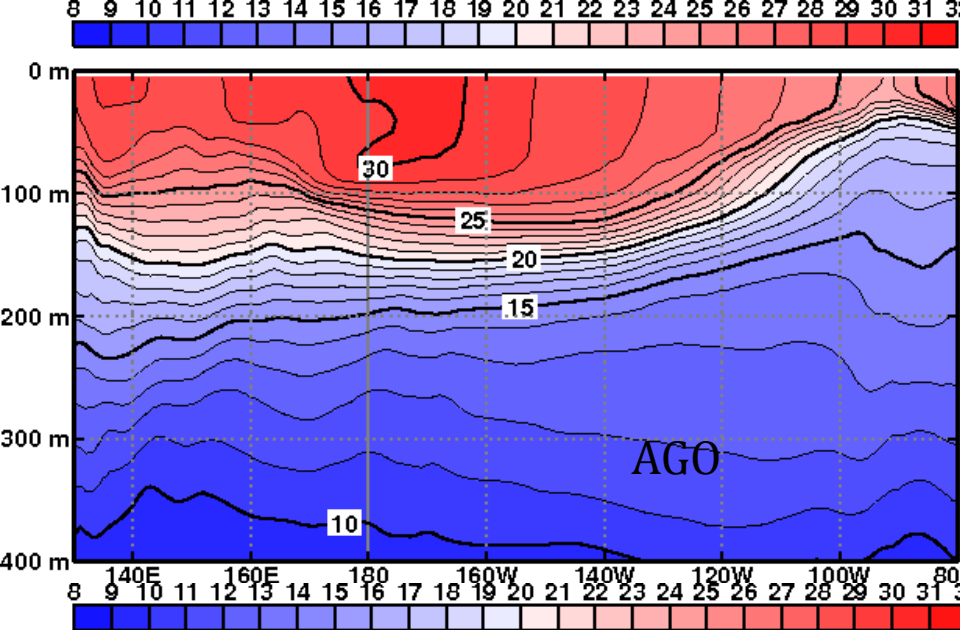
TAO Project Office/PMEL/NOAA Dec 9 2015

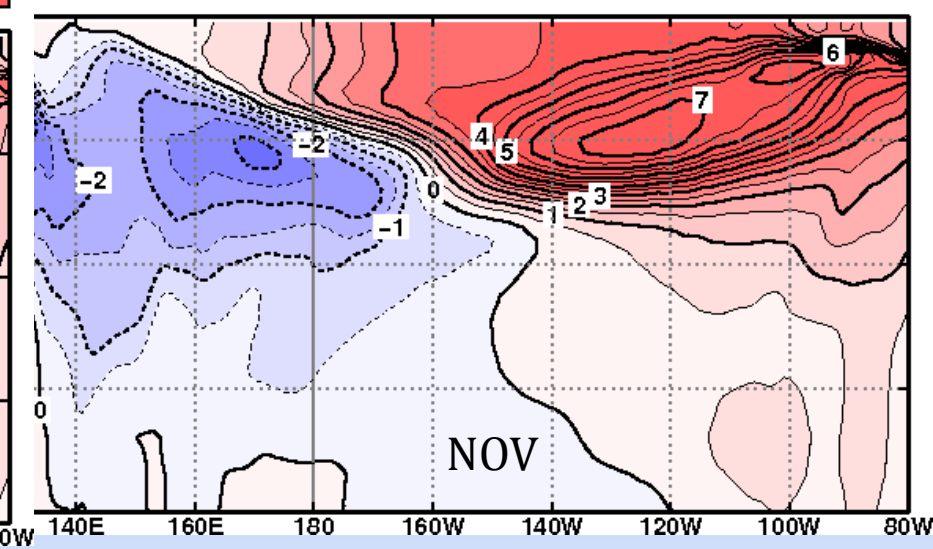
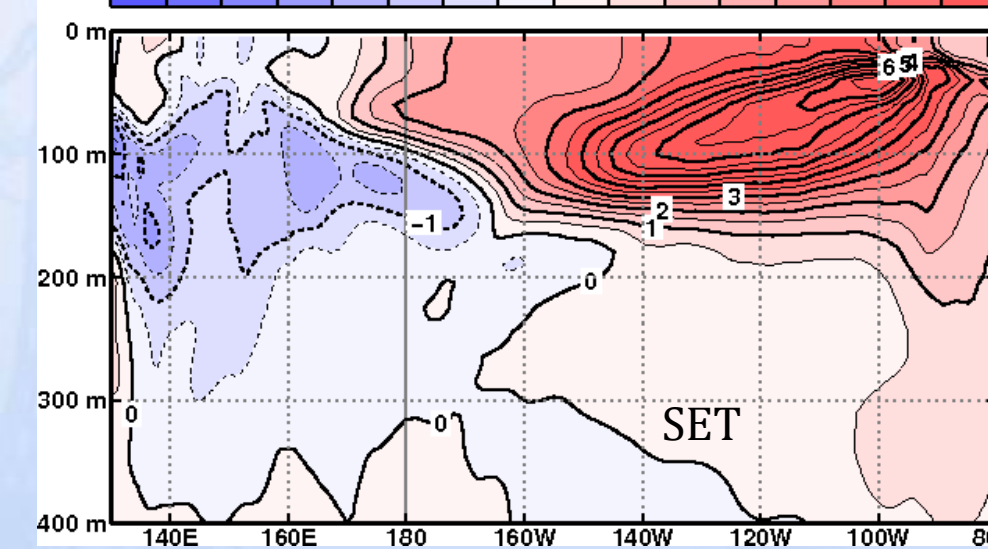
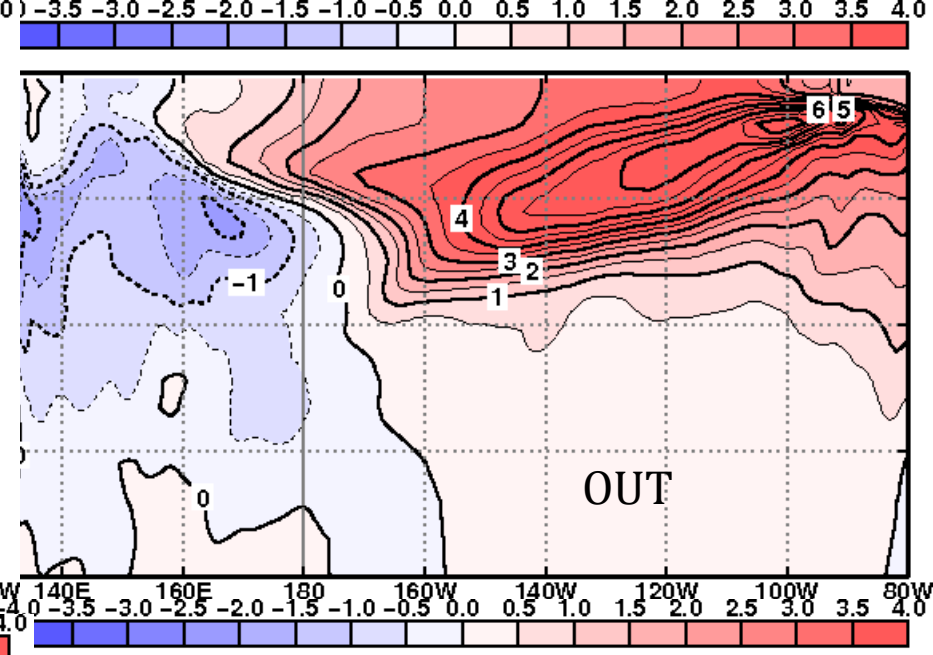
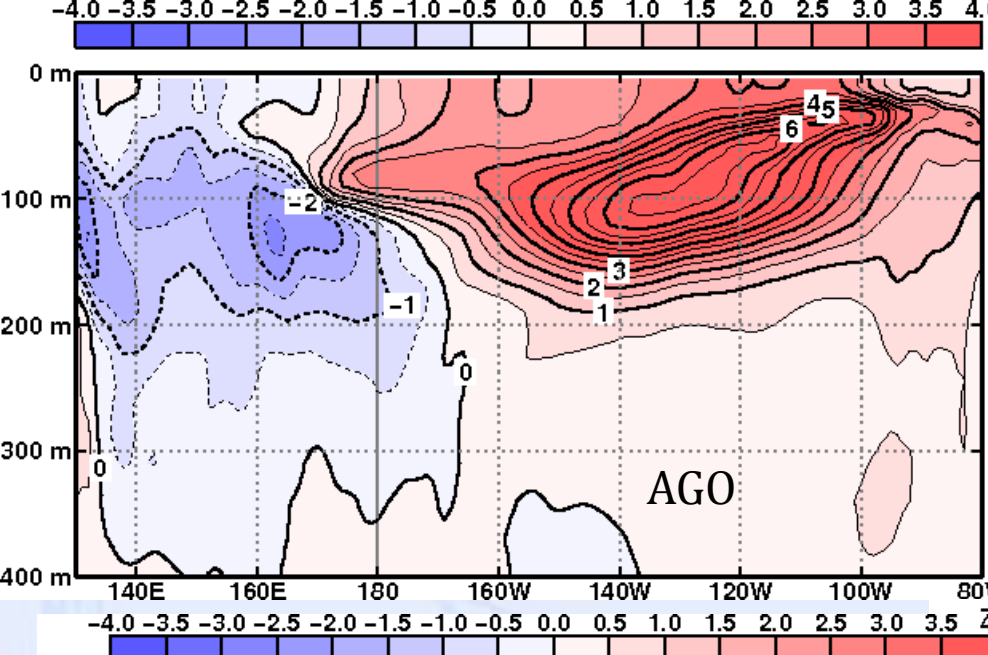
TAO/TRITON 5-Day Temperature (°C)
End Date: December 7 2015 2°S to 2°N Average



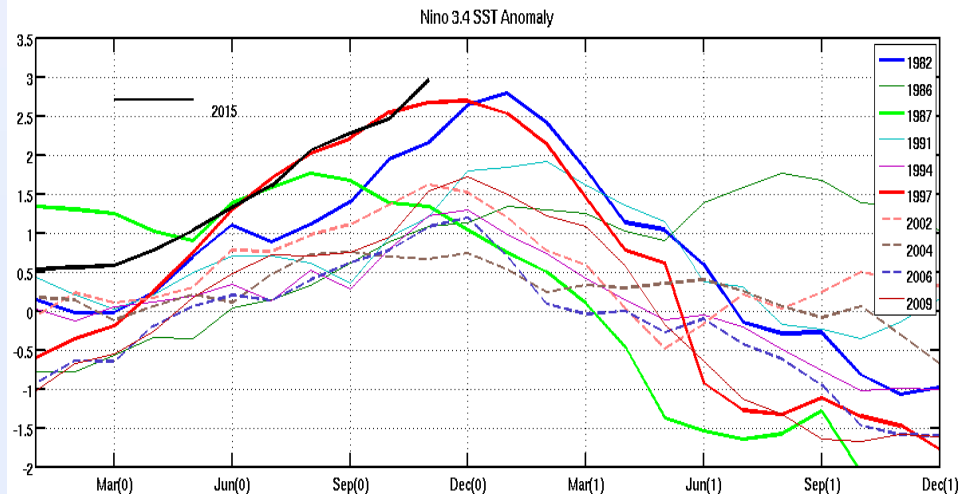
TAO Project Office/PMEL/NOAA Dec 8 2015







SST, D20 and 925hPa Wind Anomalies in November

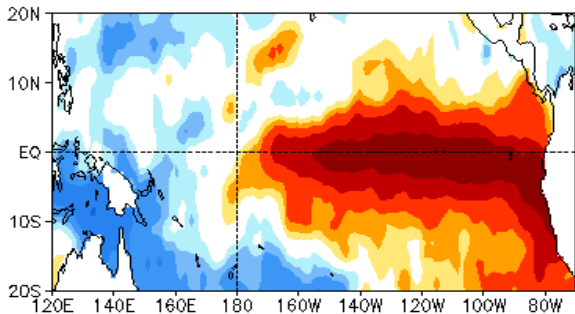


1982

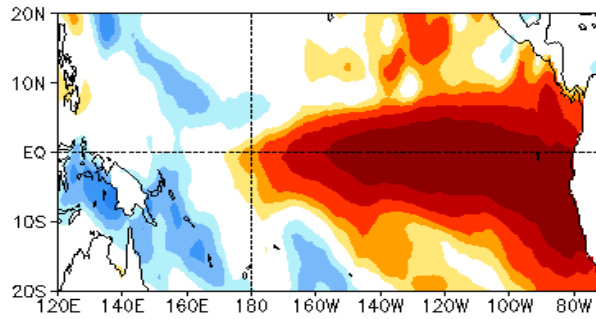
1997

2015

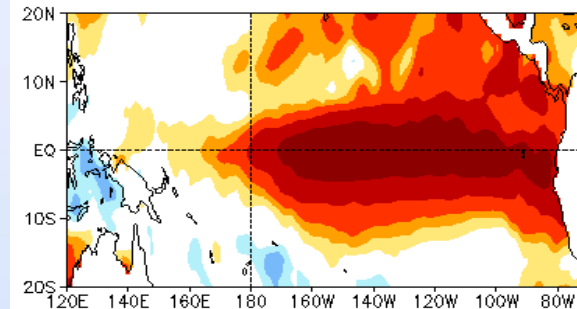
NOV 1982 SST Anom. (°C)



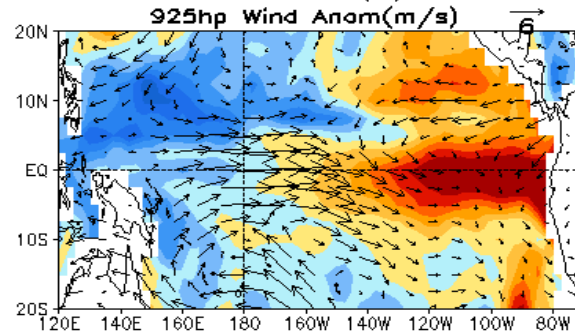
NOV 1997 SST Anom. (°C)



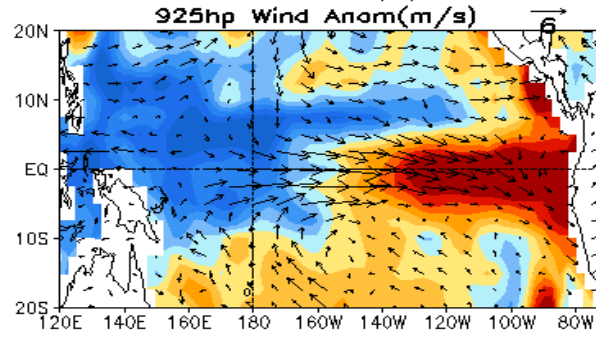
NOV 2015 SST Anom. (°C)



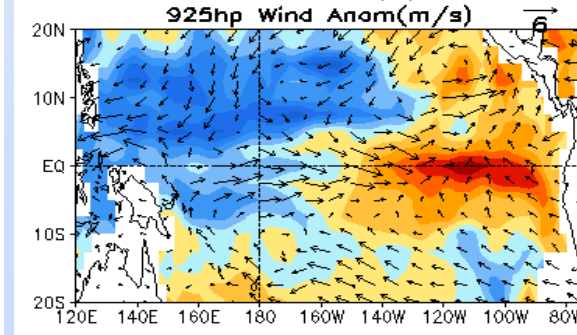
NOV 1982 D20 Anom. (m)



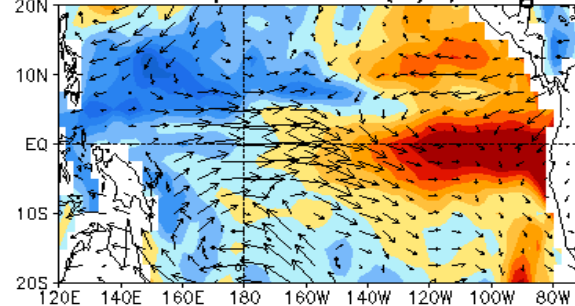
NOV 1997 D20 Anom. (m)



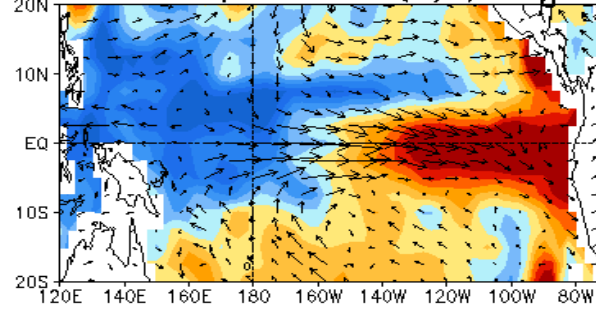
NOV 2015 D20 Anom. (m)



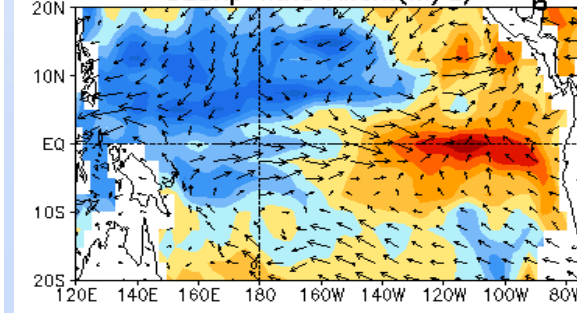
925hp Wind Anom(m/s)



925hp Wind Anom(m/s)

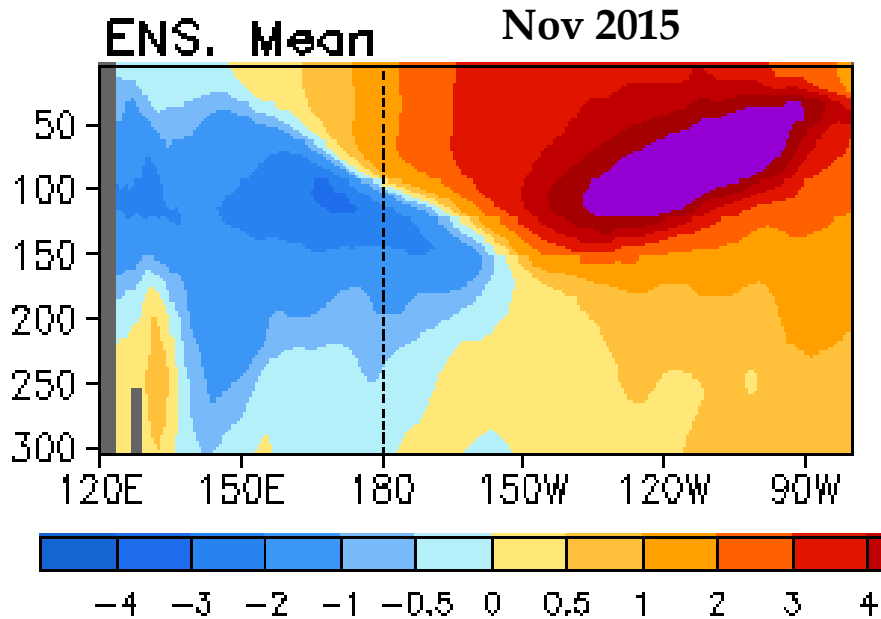


925hp Wind Anom(m/s)

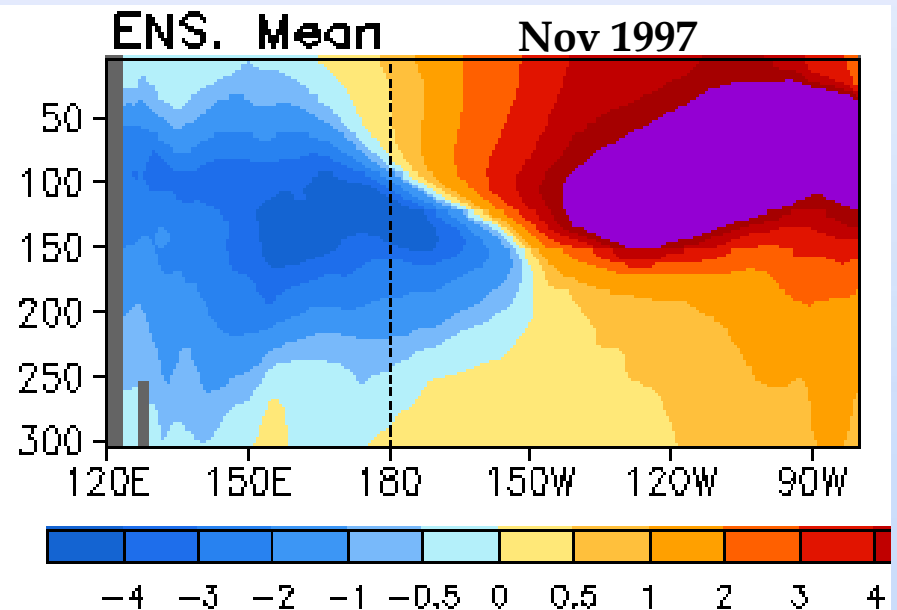
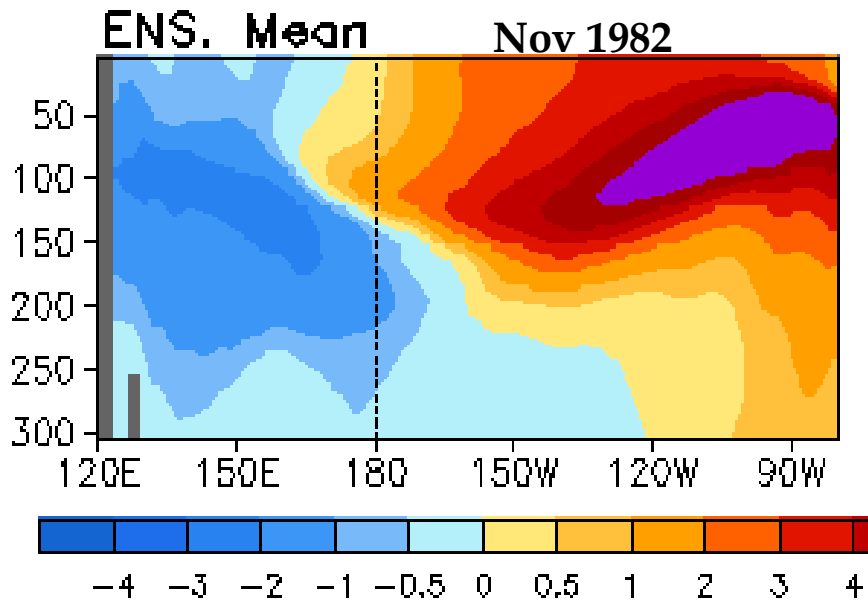


Real-time Ocean Reanalysis Intercomparison Project

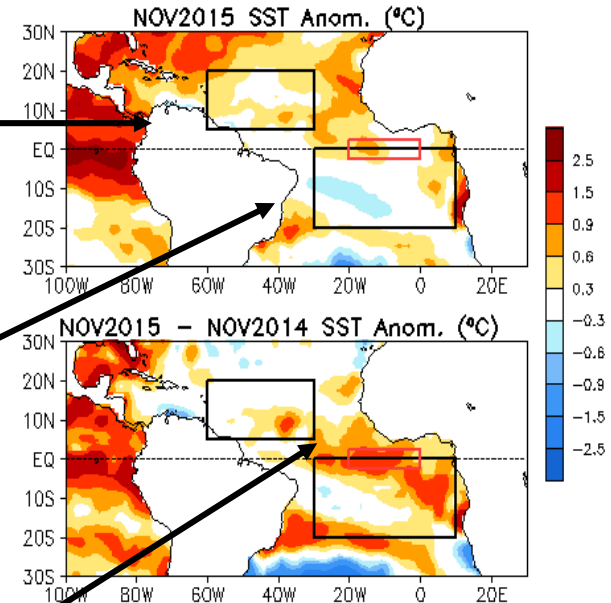
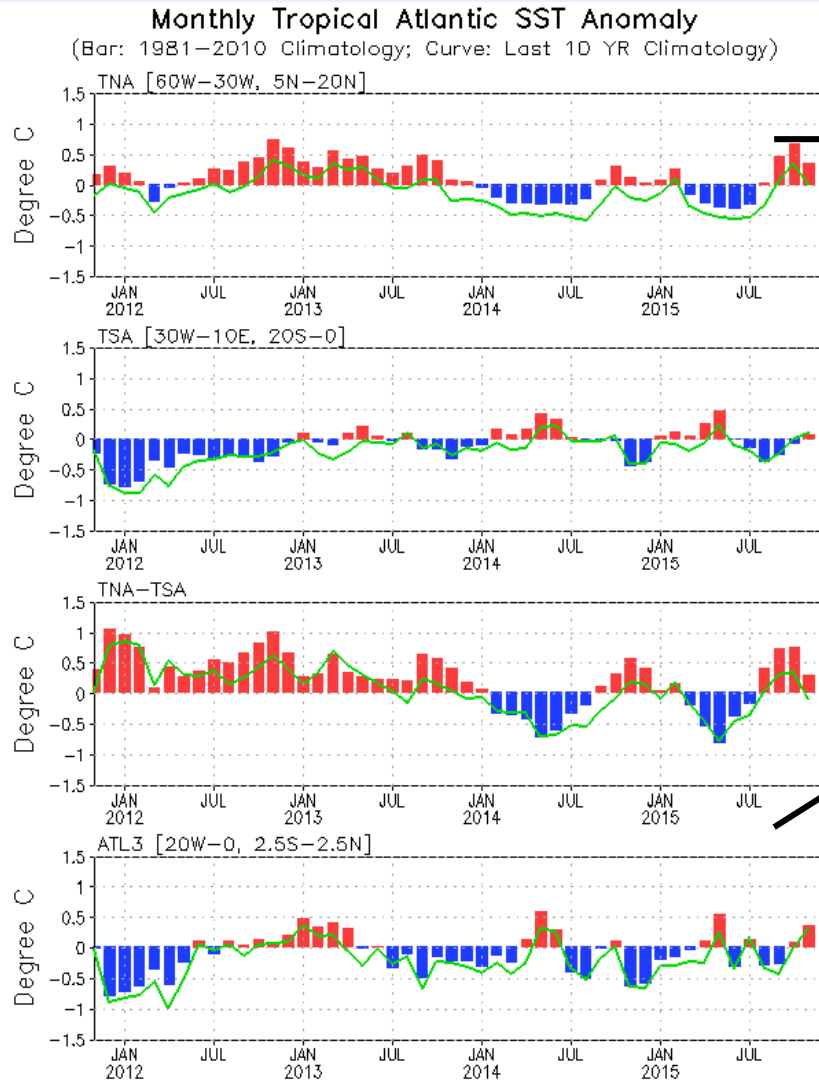
(http://www.cpc.ncep.noaa.gov/products/GODAS/multiora_body.html)



- The subsurface temperature anomaly averaged in 1°S-1°N in Nov 2015 was weaker than that in Nov 1997, but comparable to that in Nov 1982.



Evolution of Tropical Atlantic SST Indices



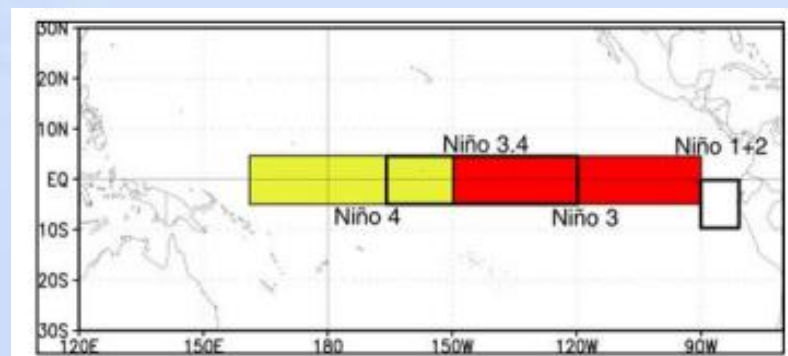
- Positive SSTA in the tropical North Atlantic (TNA) weakened in Nov 2015.
- Positive Meridional Gradient Mode Index (TNA-TSA) also weakened in Nov 2015.

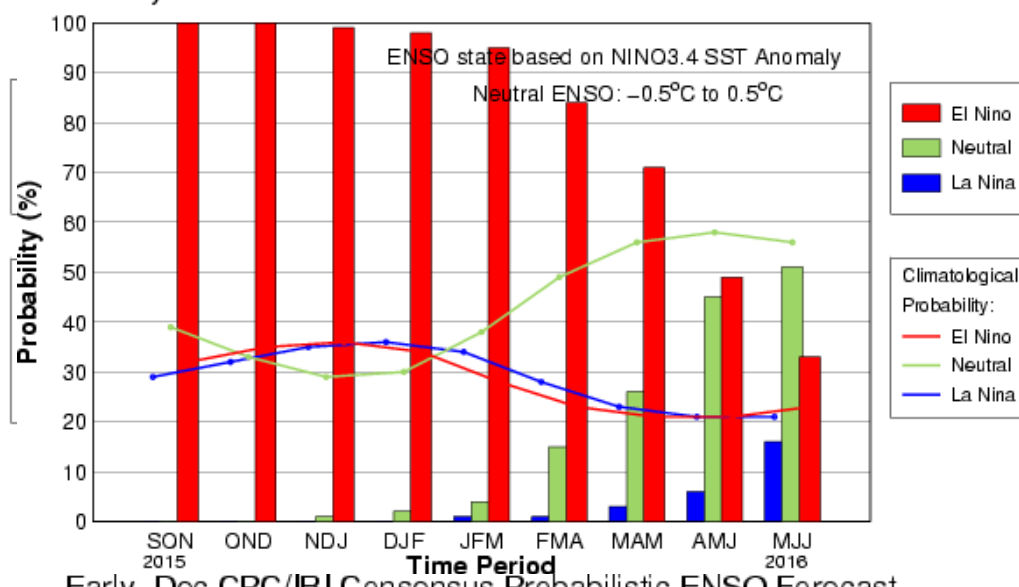
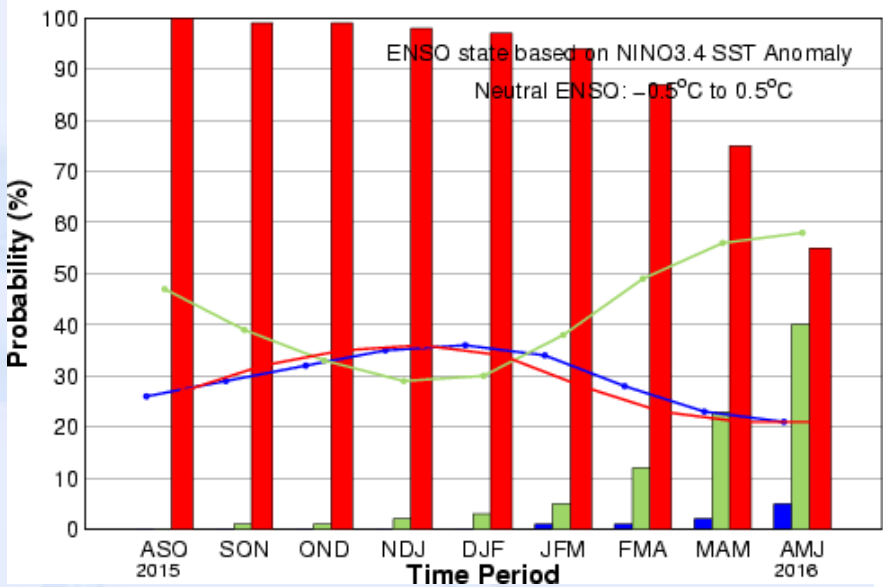
Fig. A1a. Tropical Atlantic Variability region indices, calculated as the area-averaged monthly mean sea surface temperature anomalies (°C) for the TNA [60°W–30°W, 5°N–20°N], TSA [30°W–10°E, 20°S–0] and ATL3 [20°W–0, 2.5°S–2.5°N] regions, and Meridional Gradient Index, defined as differences between TNA and TSA. Data are derived from the NCEP OI SST analysis, and departures from the 1981–2010 base period means and the recent 10 year means are shown in bars and green lines.

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2003	0.9	0.6	0.4	0.0	-0.2	-0.1	0.1	0.2	0.3	0.4	0.4	0.4
2004	0.3	0.2	0.1	0.1	0.2	0.3	0.5	0.7	0.7	0.7	0.7	0.7
2005	0.6	0.6	0.5	0.5	0.4	0.2	0.1	0.0	0.0	-0.1	-0.4	-0.7
2006	-0.7	-0.6	-0.4	-0.2	0.0	0.1	0.2	0.3	0.5	0.8	0.9	1.0
2007	0.7	0.3	0.0	-0.1	-0.2	-0.2	-0.3	-0.6	-0.8	-1.1	-1.2	-1.3
2008	-1.4	-1.3	-1.1	-0.9	-0.7	-0.5	-0.3	-0.2	-0.2	-0.3	-0.5	-0.7
2009	-0.8	-0.7	-0.4	-0.1	0.2	0.4	0.5	0.6	0.7	1.0	1.2	1.3
2010	1.3	1.1	0.8	0.5	0.0	-0.4	-0.8	-1.1	-1.3	-1.4	-1.3	-1.4
2011	-1.3	-1.1	-0.8	-0.6	-0.3	-0.2	-0.3	-0.5	-0.7	-0.9	-0.9	-0.8
2012	-0.7	-0.6	-0.5	-0.4	-0.3	-0.1	0.1	0.3	0.4	0.4	0.2	-0.2
2013	-0.4	-0.5	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3
2014	-0.5	-0.6	-0.4	-0.2	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.6
2015	0.5	0.4	0.5	0.7	0.9	1.0	1.2	1.5	1.8	2.0		

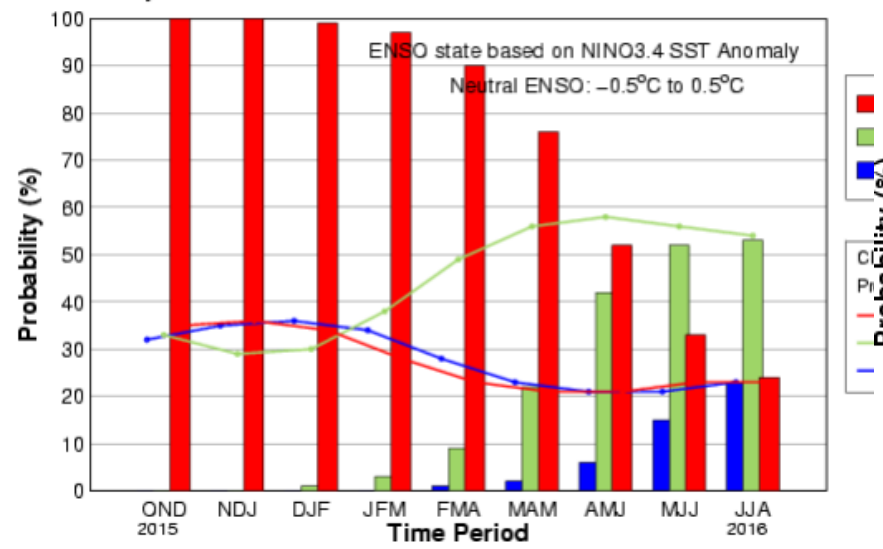
1996	-0.9	-0.7	-0.6	-0.4	-0.2	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.5
1997	-0.5	-0.4	-0.2	0.1	0.6	1.0	1.4	1.7	2.0	2.2	2.3	2.3
1998	2.1	1.8	1.4	1.0	0.5	-0.1	-0.7	-1.0	-1.2	-1.2	-1.3	-1.4
1999	-1.4	-1.2	-1.0	-0.9	-0.9	-1.0	-1.0	-1.0	-1.1	-1.2	-1.4	-1.6

Niño3,4

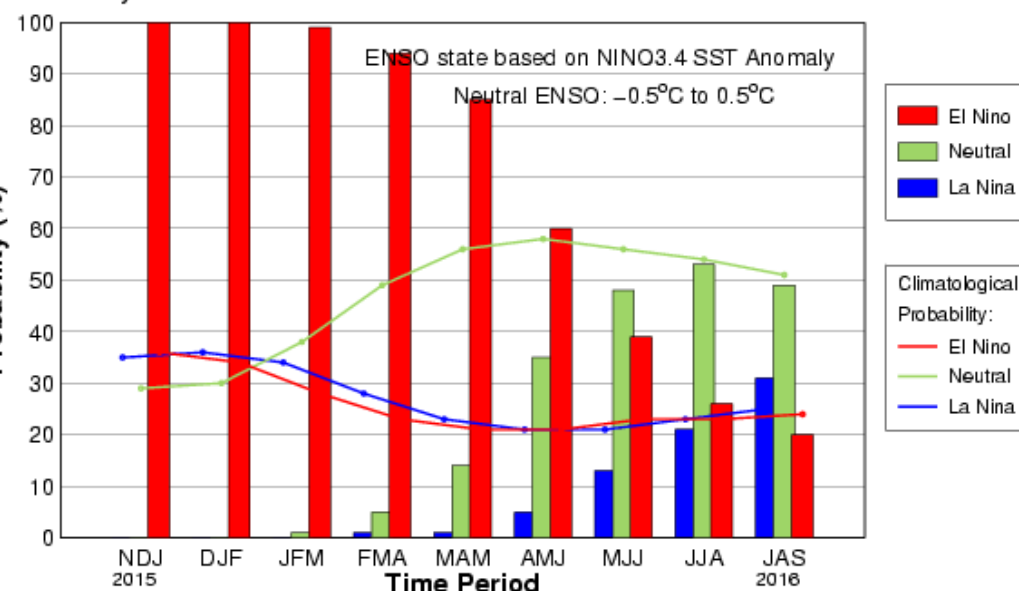




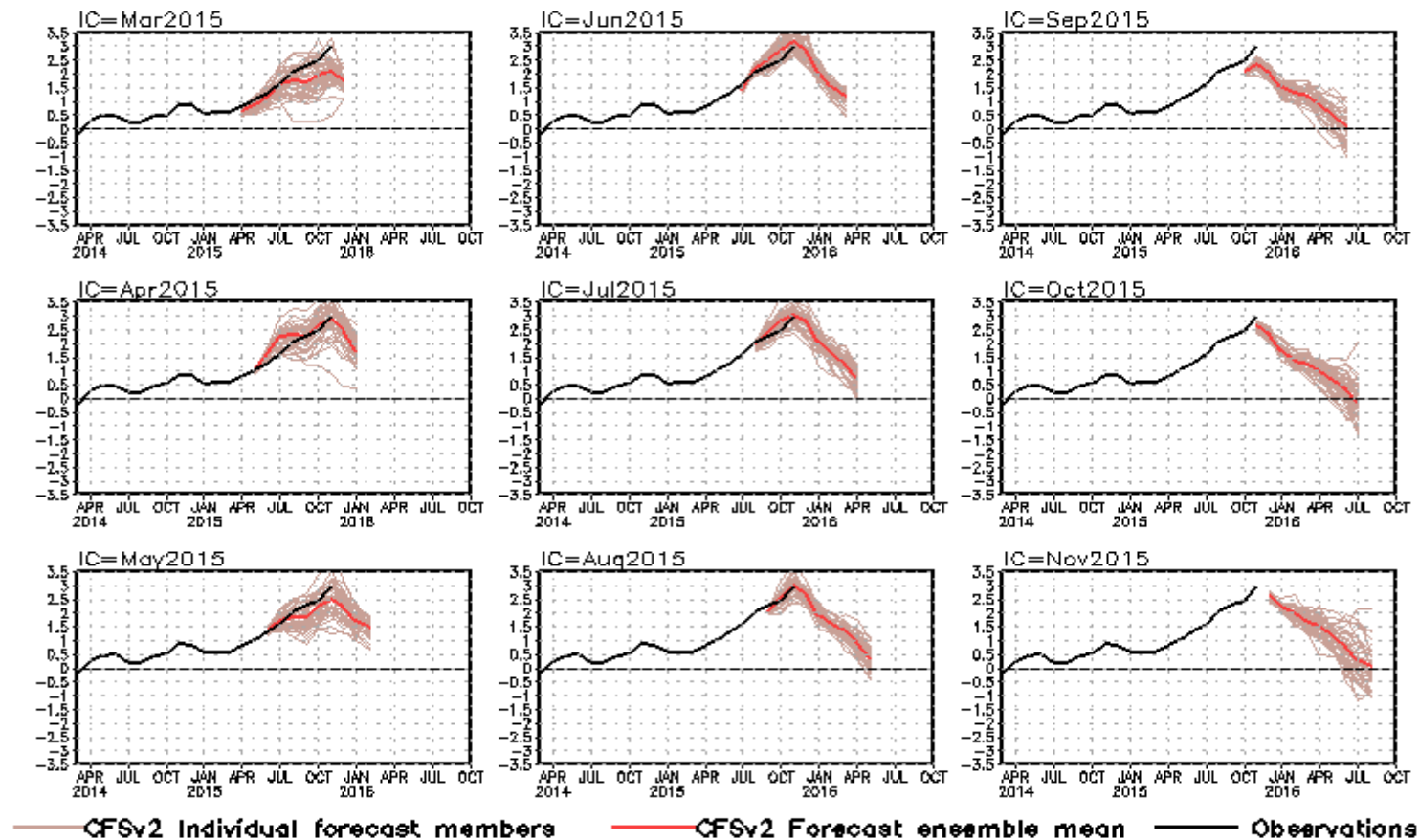
Early-Nov CPC/IRI Consensus Probabilistic ENSO Forecast



Early-Dec CPC/IRI Consensus Probabilistic ENSO Forecast

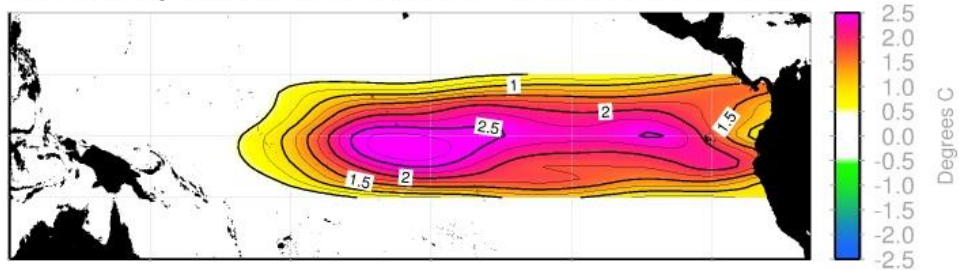


NINO3.4 SST anomalies (K)

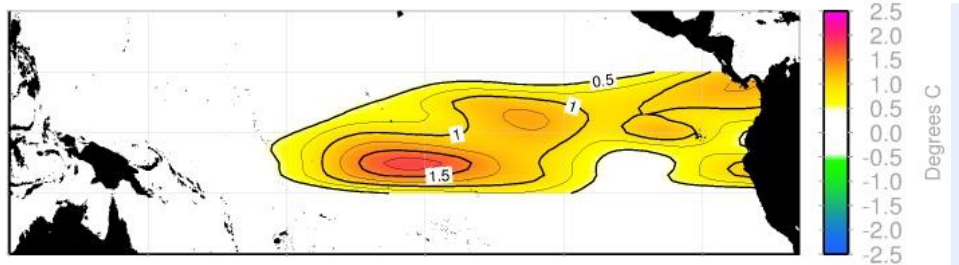


- The ensemble CFSv2 predicted Nino3.4 will gradually dissipate through northern hemisphere winter/spring and transition into neutral conditions by summer 2016.
- The spread in the CFSv2 forecasts is noticeably small since Jun 2015 I.C., indicating a high confidence in the forecast.

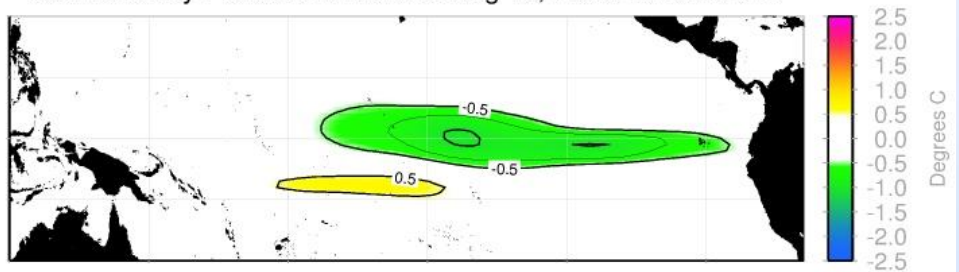
SST Anomaly Forecast for Dec/Jan/Feb 15/16, Made 09 Nov 2015



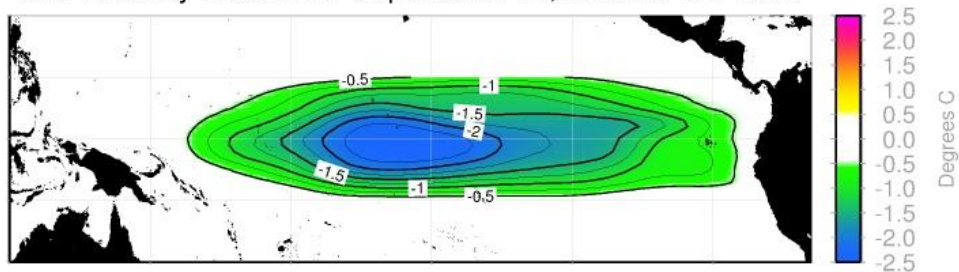
SST Anomaly Forecast for Mar/Apr/May 16, Made 09 Nov 2015



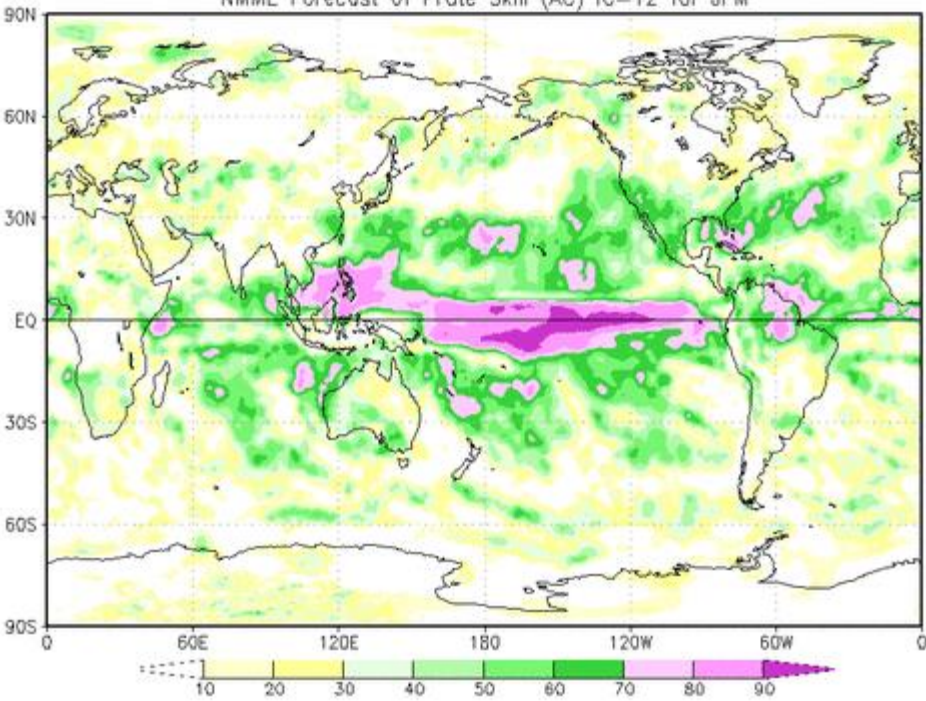
SST Anomaly Forecast for Jun/Jul/Aug 16, Made 09 Nov 2015



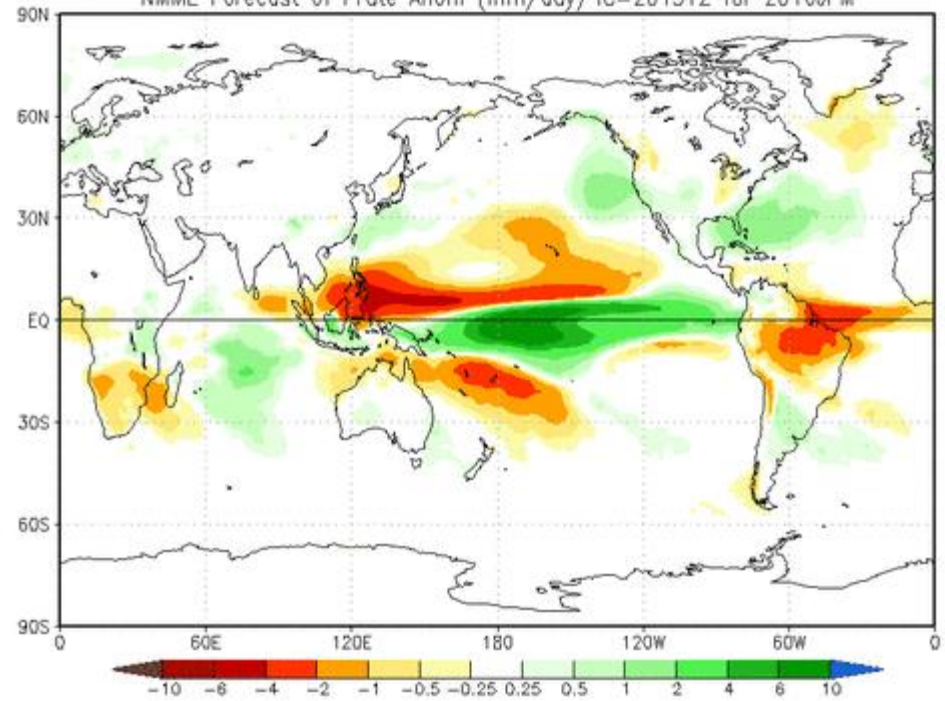
SST Anomaly Forecast for Sep/Oct/Nov 16, Made 09 Nov 2015



NMME Forecast of Prate Skill (AC) IC=12 for JFM

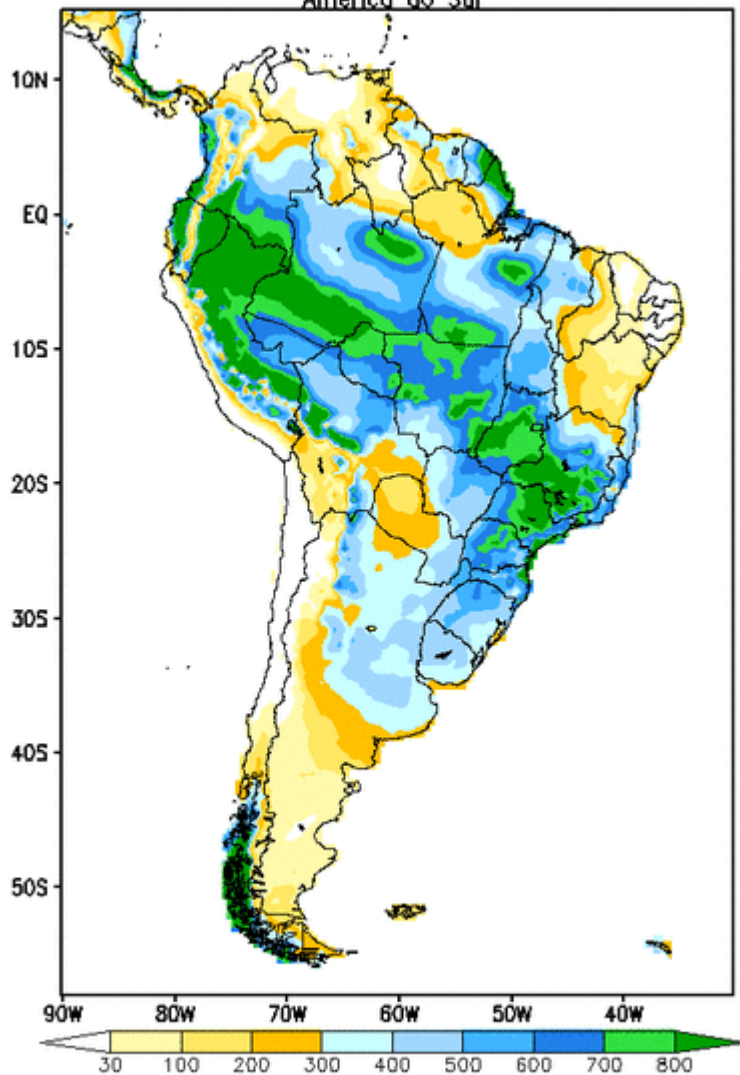


NMME Forecast of Prate Anom (mm/day) IC=201512 for 2016JFM



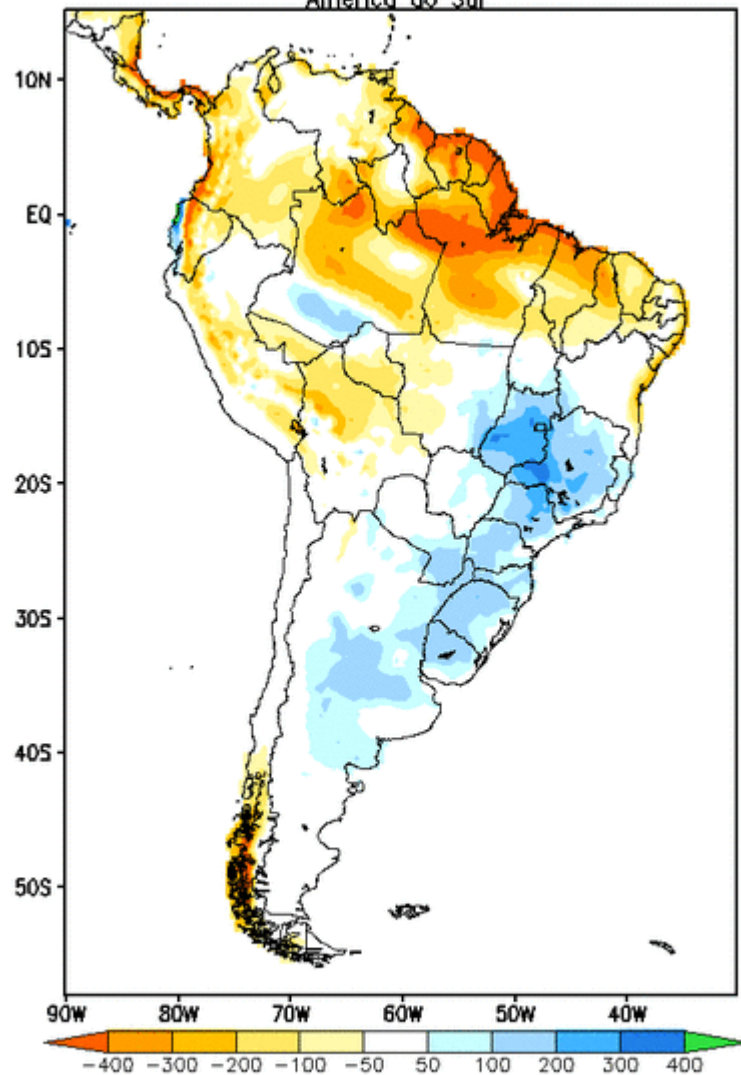
PREVISAO: PRECIPITACAO TOTAL (mm)

ETA-CPTEC: Precipitacao com tsm persistida
Produzida em 12/2015, valida para JFM 2016
America do Sul



PREVISAO: ANOMALIA DE PRECIPITACAO TOTAL (mm)

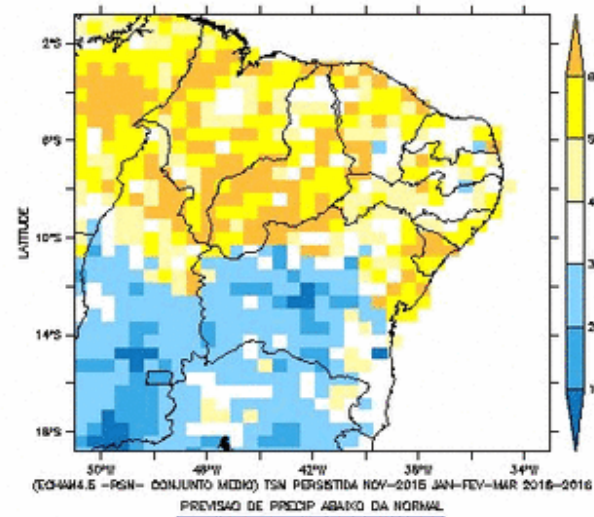
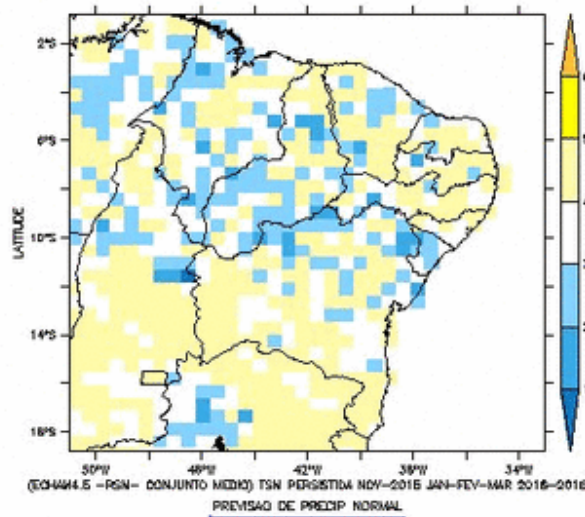
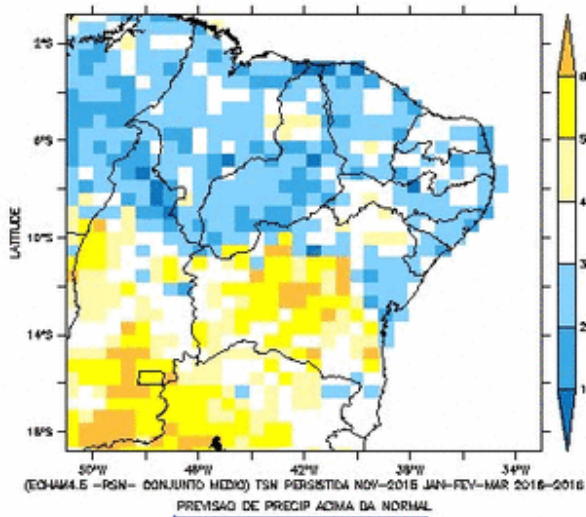
ETA-CPTEC: Precipitacao com tsm persistida
Produzida em 12/2015, valida para JFM 2016
America do Sul



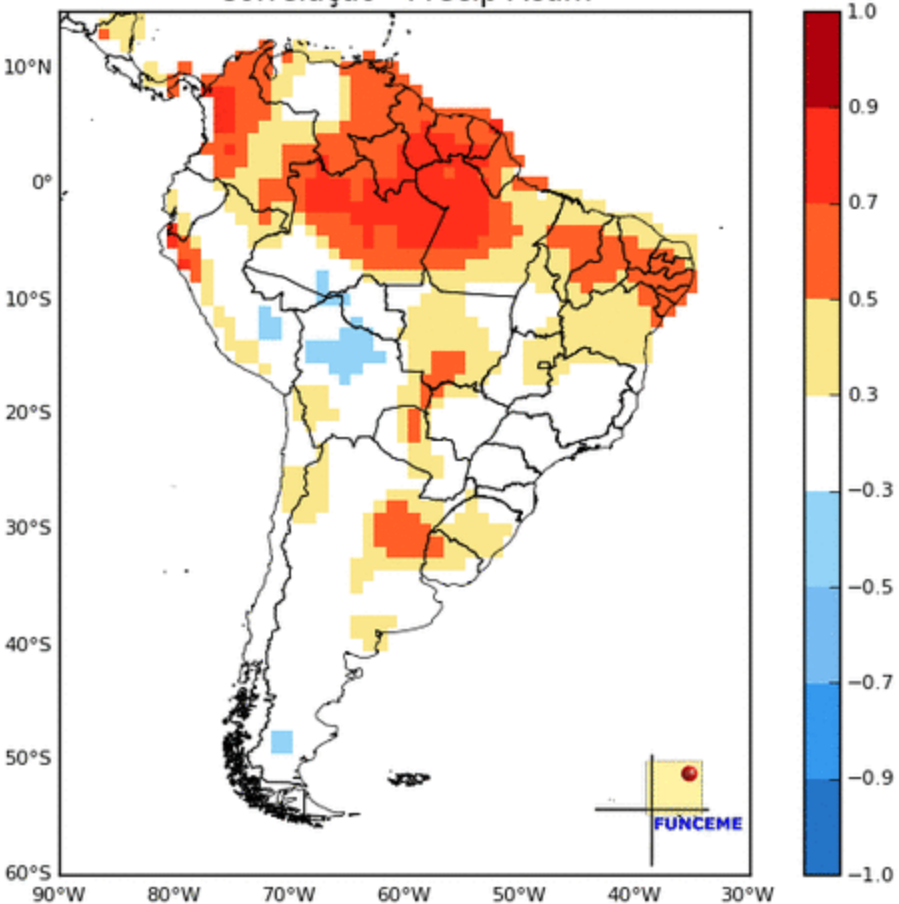




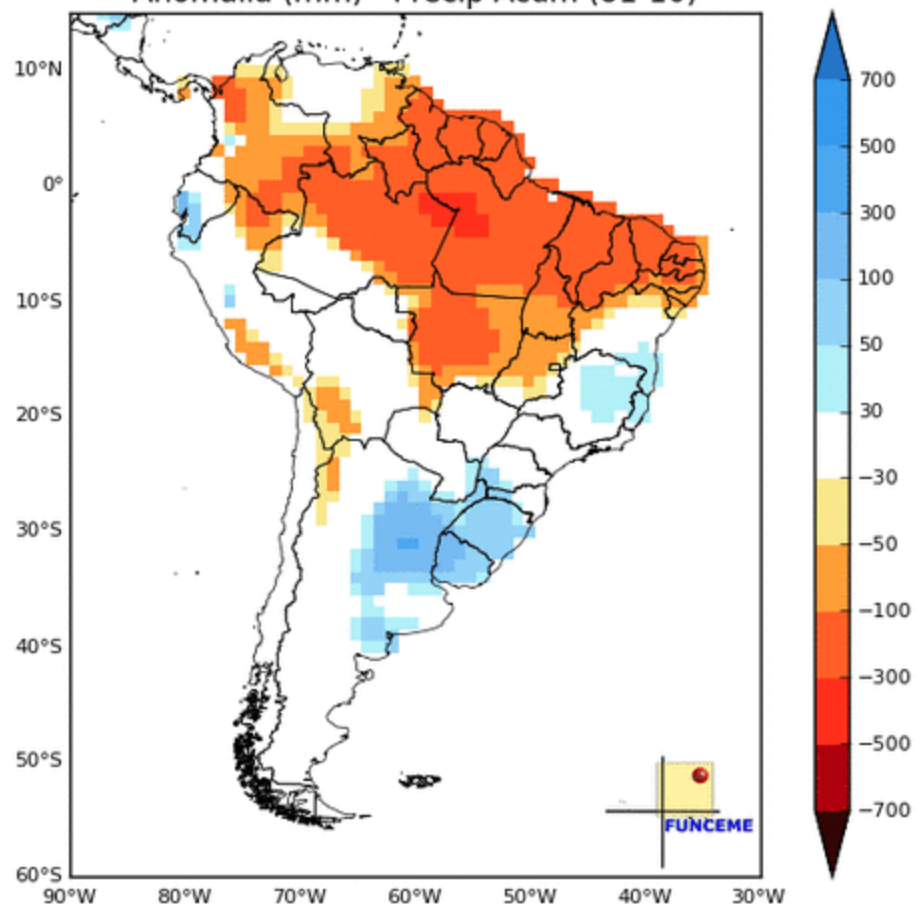
NORDESTE CONJUNTO MÉDIO ECHAM-RSM TSM PERSISTIDA NOV-2015 PREVISÃO JAN-FEV-MAR 2016



ECHAM4.6 x CMAP - DEZ/JFM (81-10)
Correlação - Precip Acum



ECHAM4.6 x CMAP - DEZ/2015 - JFM/2016
Anomalia (mm) - Precip Acum (81-10)



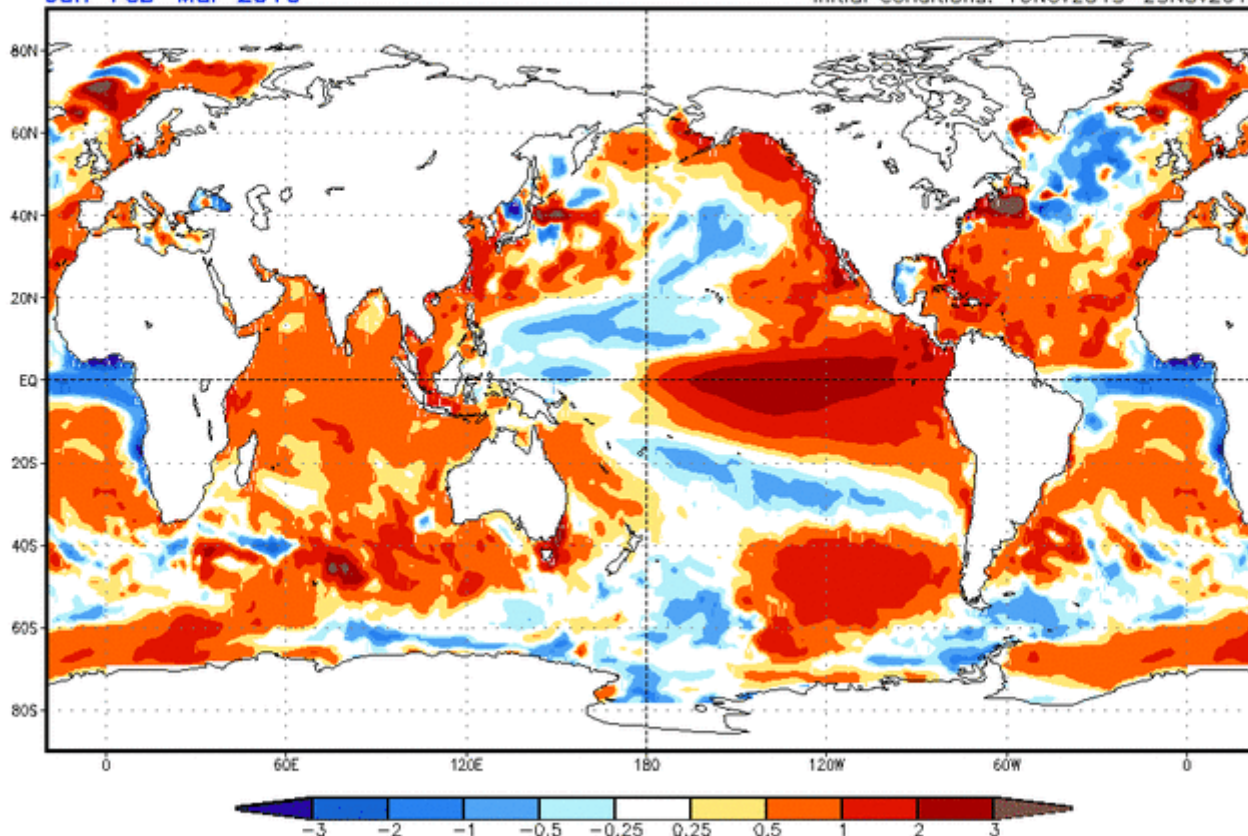


NWS/NCEP/CPC

CFSv2 seasonal SST anomalies (K)

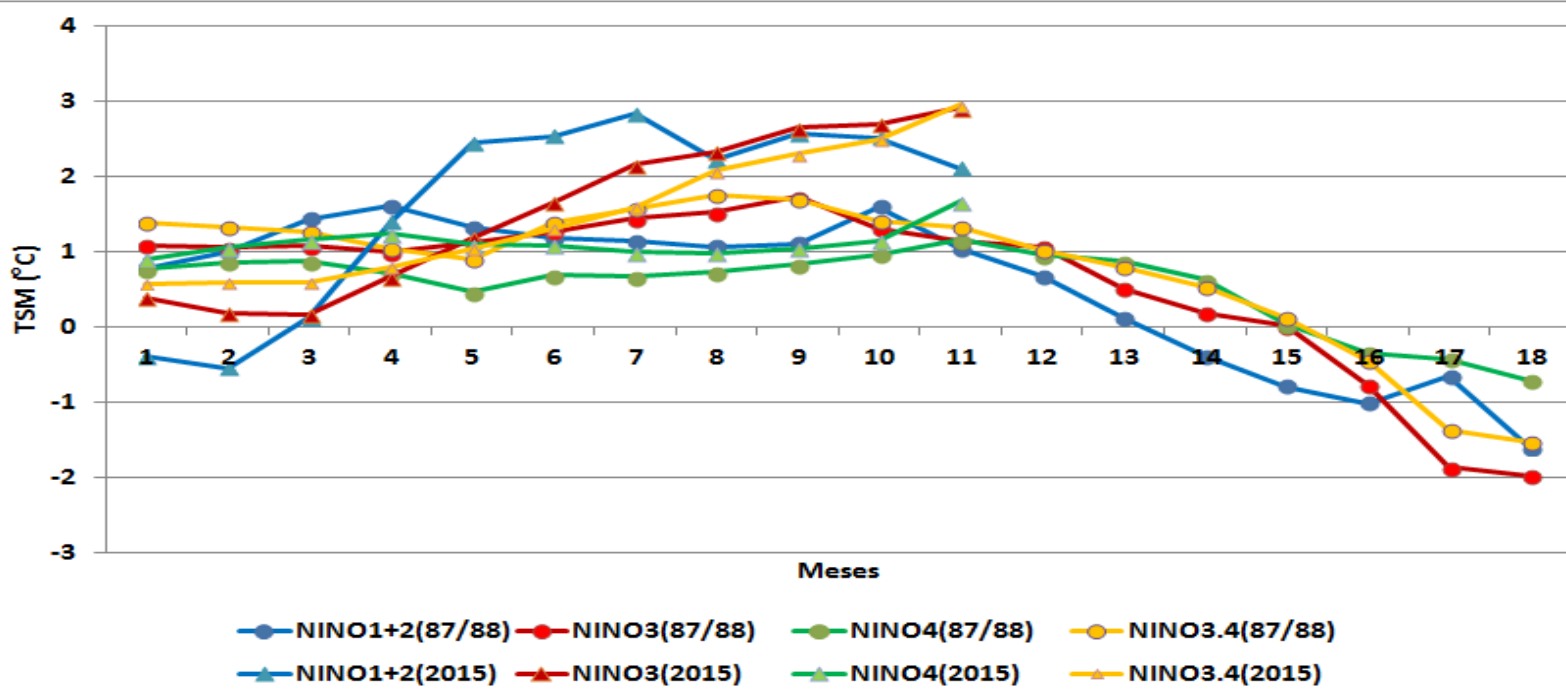
Jan-Feb-Mar 2016

Initial conditions: 16Nov2015-25Nov2015

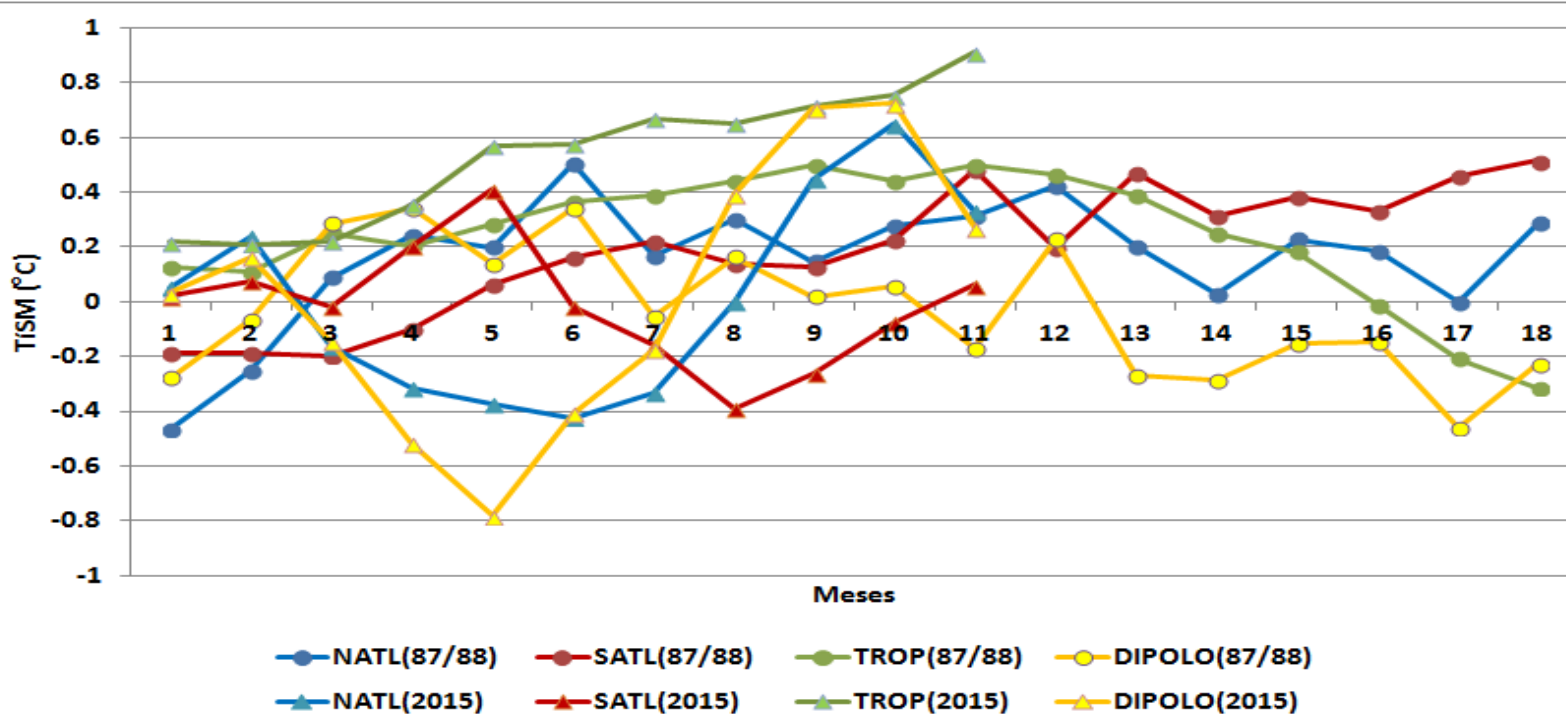


Anos similares

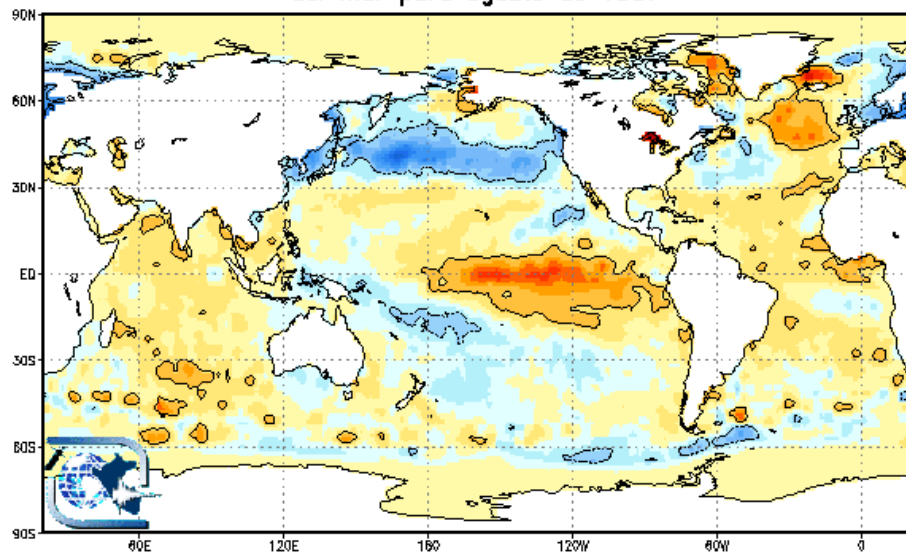
87-88



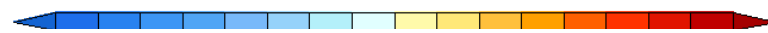
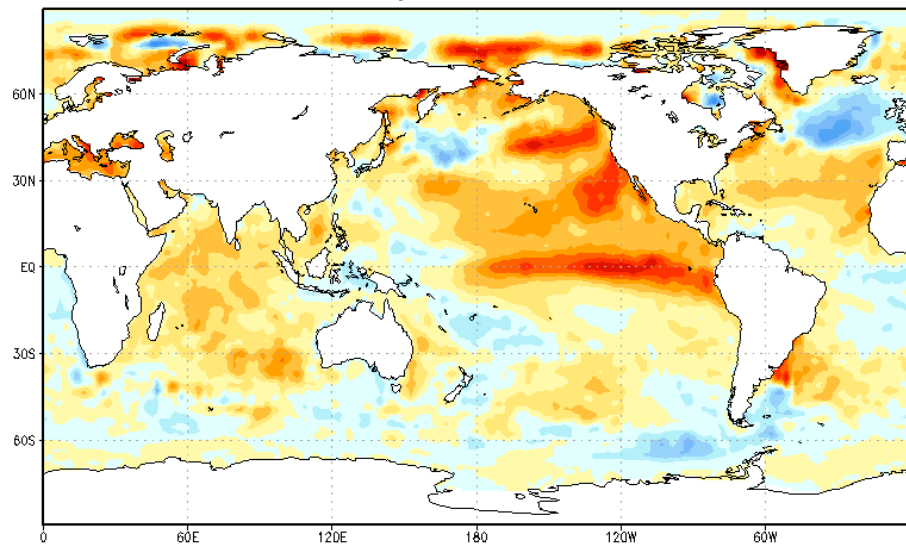
87-88



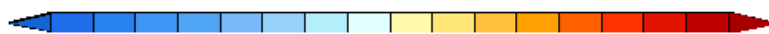
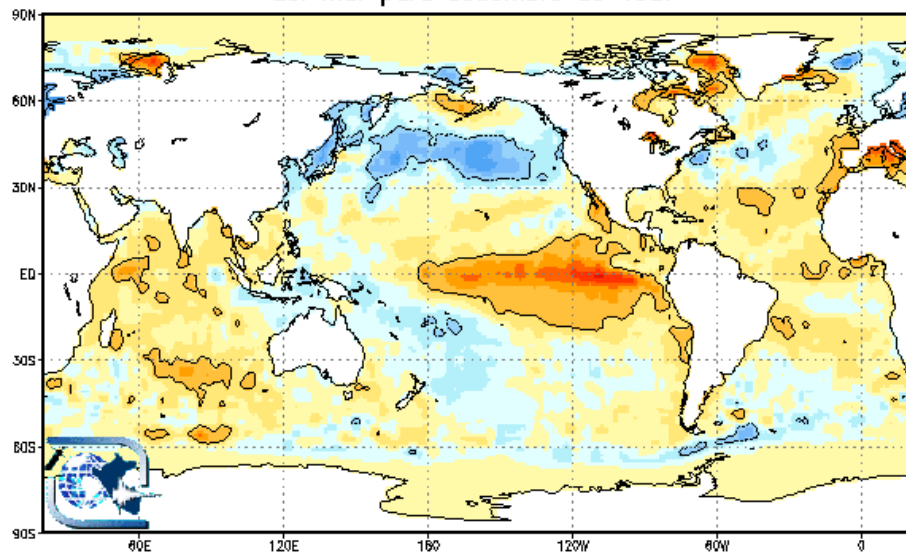
Anomalia de temperatura superficial del mar para agosto de 1987



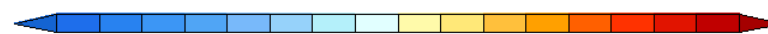
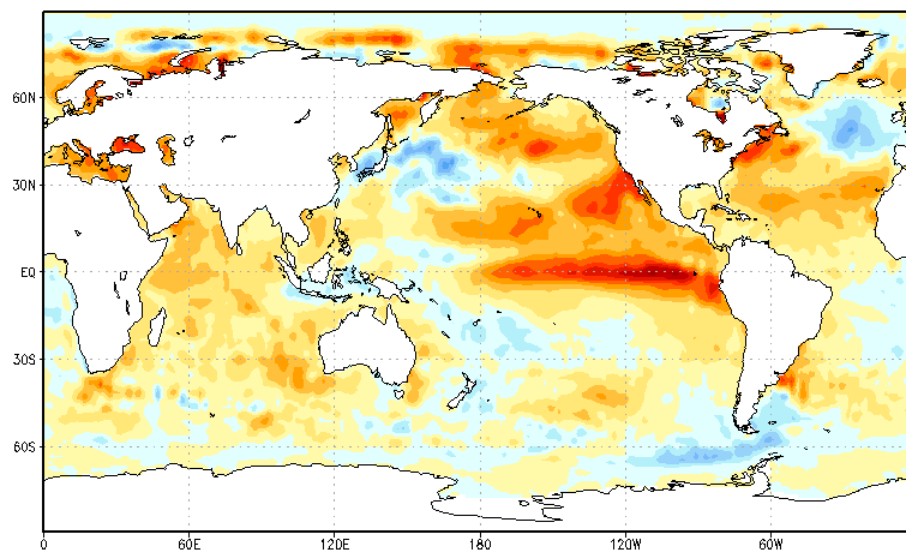
Anomalia TSM (°C) agosto de 2015



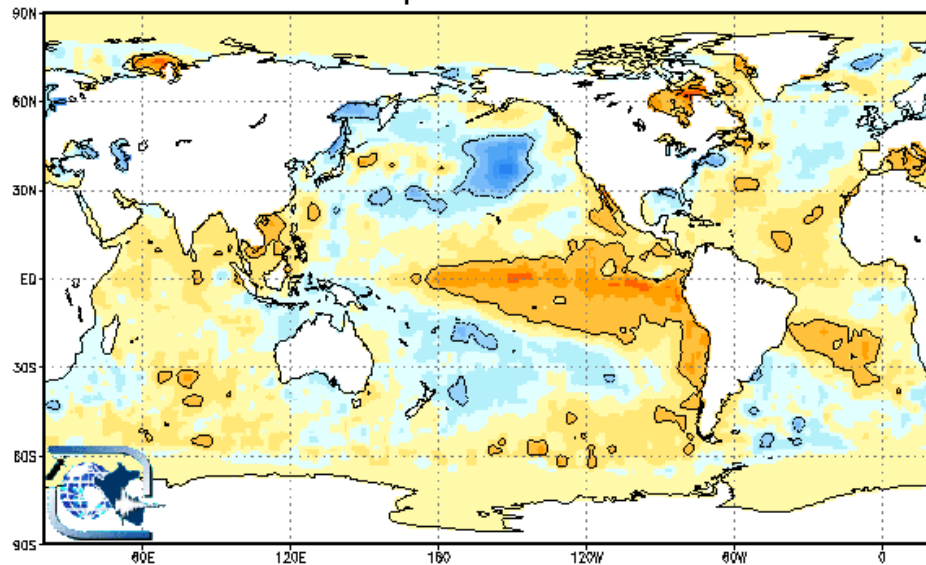
Anomalia de temperatura superficial del mar para setiembre de 1987



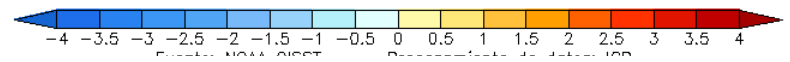
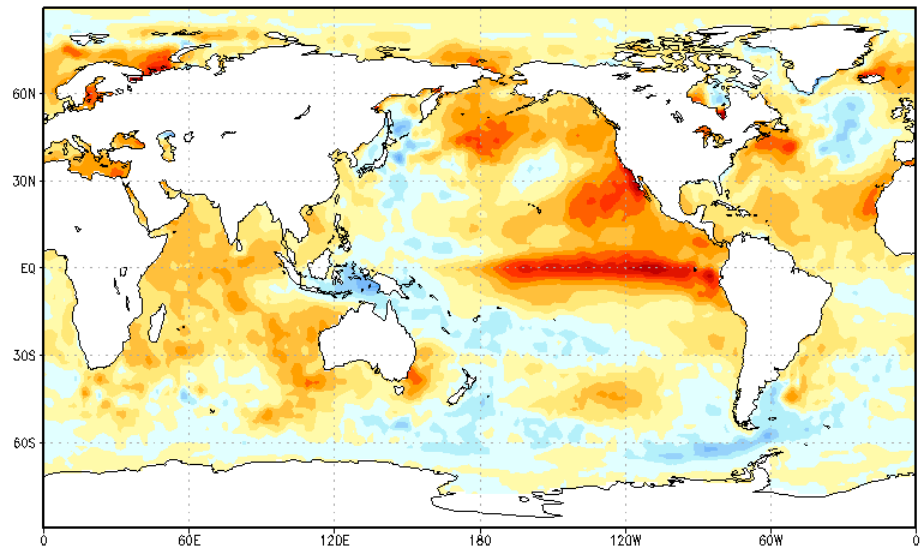
Anomalia TSM (°C) setiembre de 2015



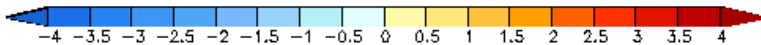
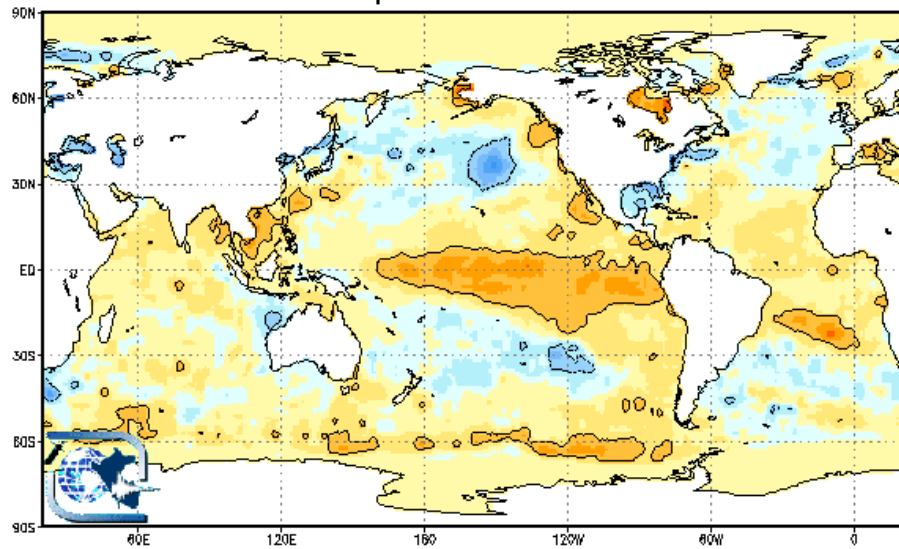
Anomalia de temperatura superficial del mar para octubre de 1987



Anomalia TSM (°C) octubre de 2015



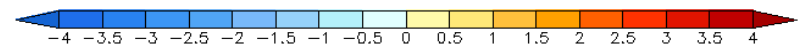
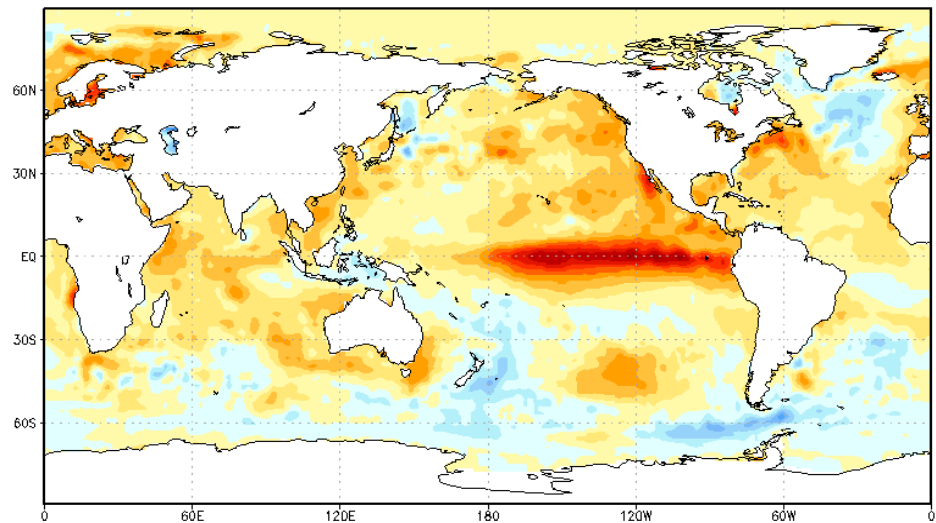
Anomalia de temperatura superficial del mar para noviembre de 1987



Fuente: NCEP

Procesamiento de datos: CPNTC/IGP

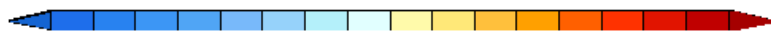
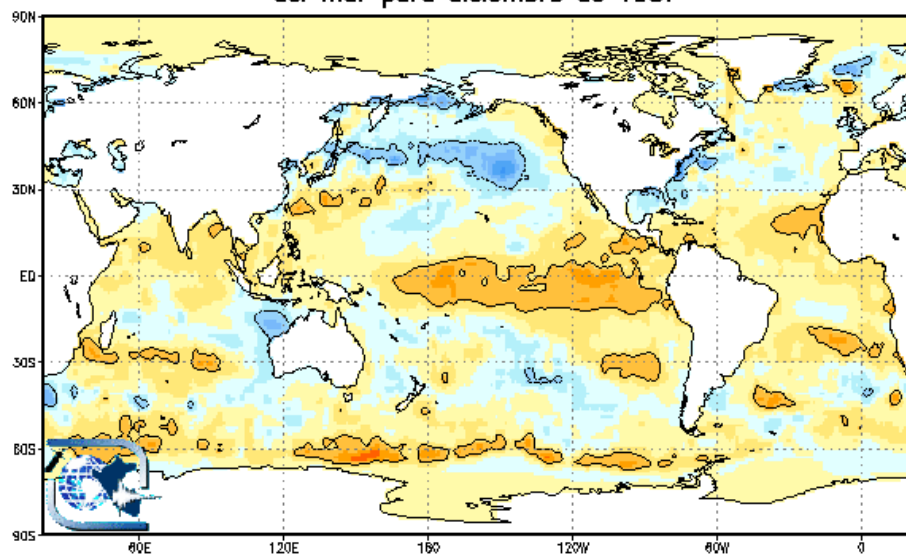
Anomalia TSM (°C) noviembre de 2015



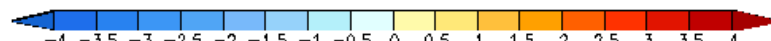
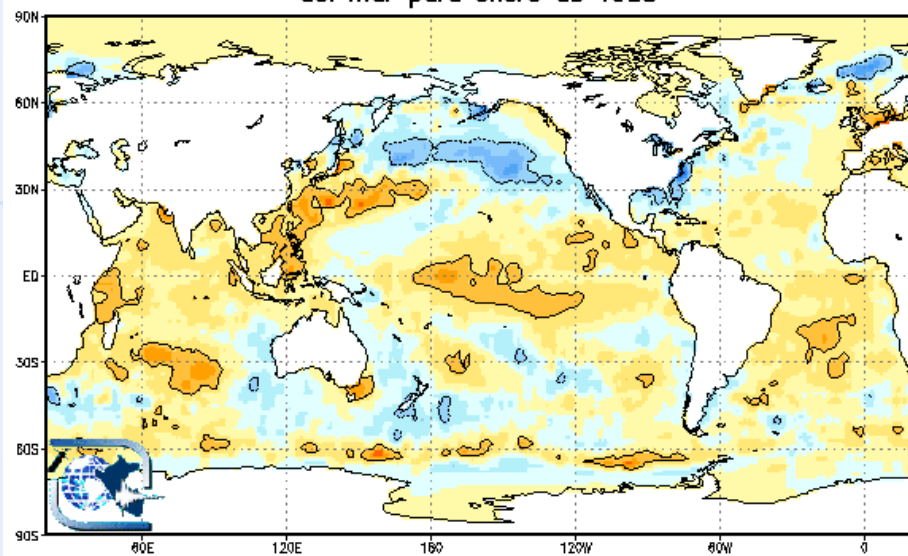
Fuente: NOAA OISST

Procesamiento de datos: IGP

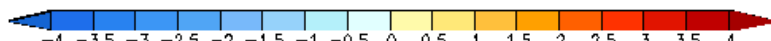
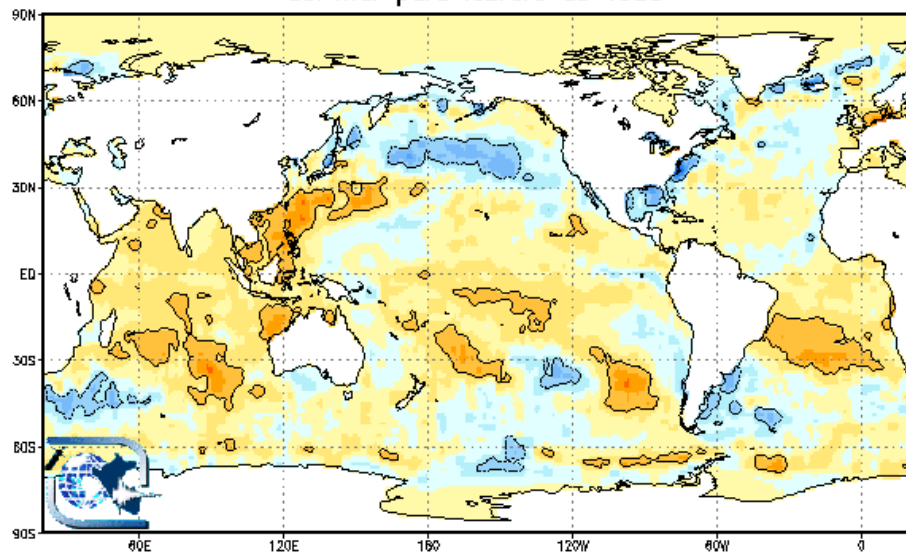
Anomalia de temperatura superficial del mar para diciembre de 1987



Anomalia de temperatura superficial del mar para enero de 1988

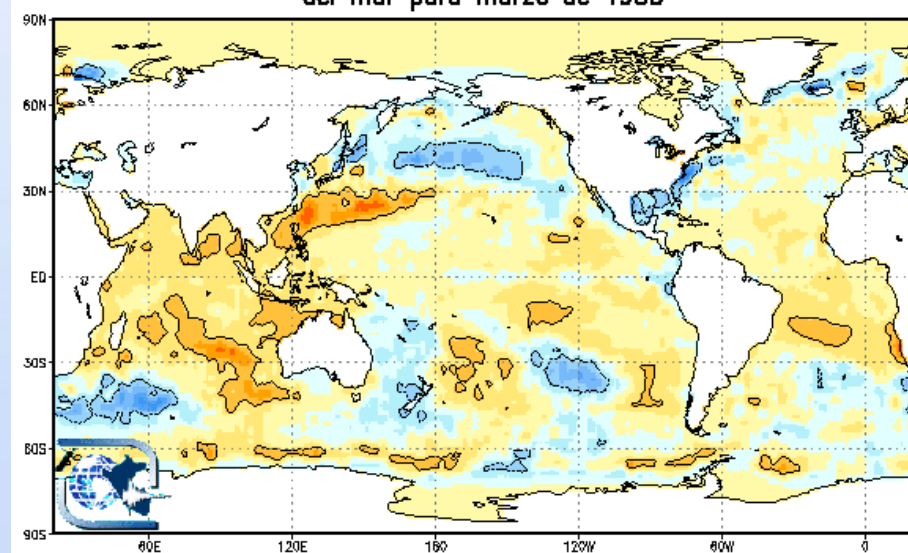


Anomalia de temperatura superficial del mar para febrero de 1988



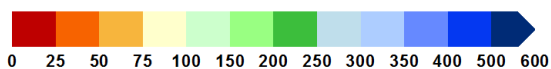
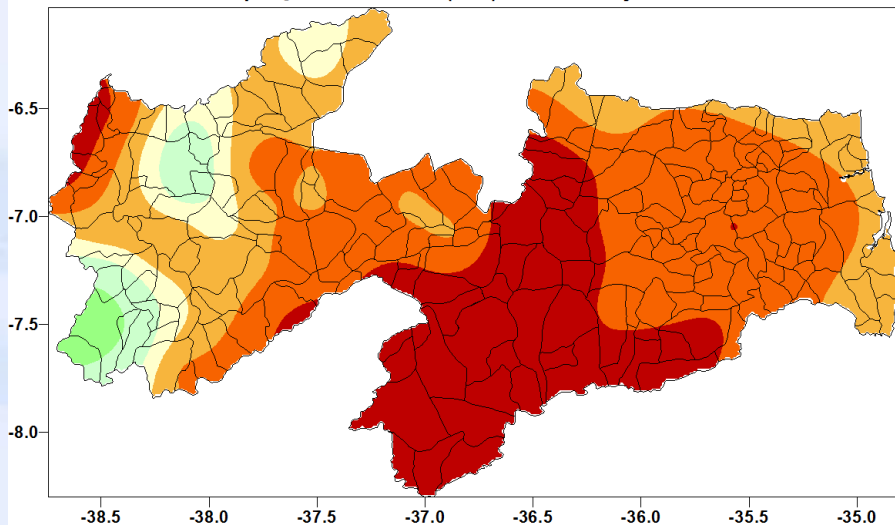
Fuente: NCEP Procesamiento de datos: CPNTC/IGP

Anomalia de temperatura superficial del mar para marzo de 1988

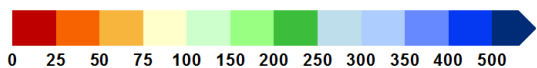
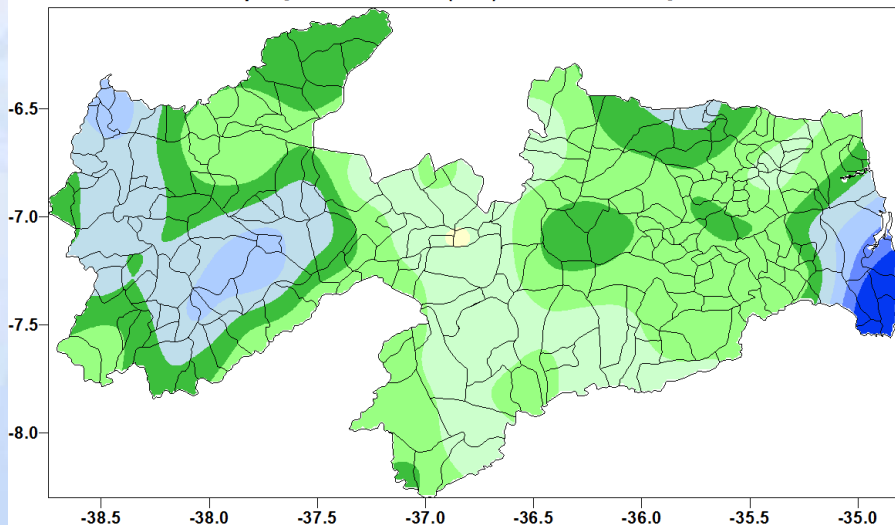


Fuente: NCEP Procesamiento de datos: CPNTC/IGP

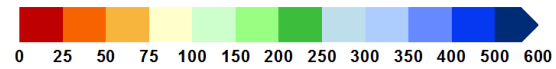
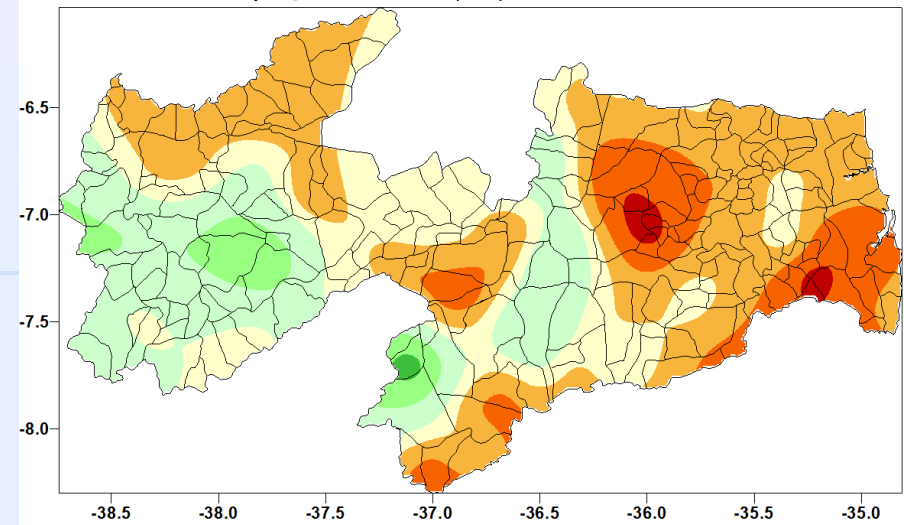
Precipitação Acumulada (mm) - 01 a 31 de janeiro de 1988



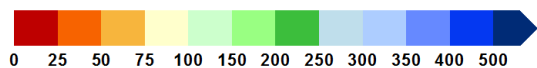
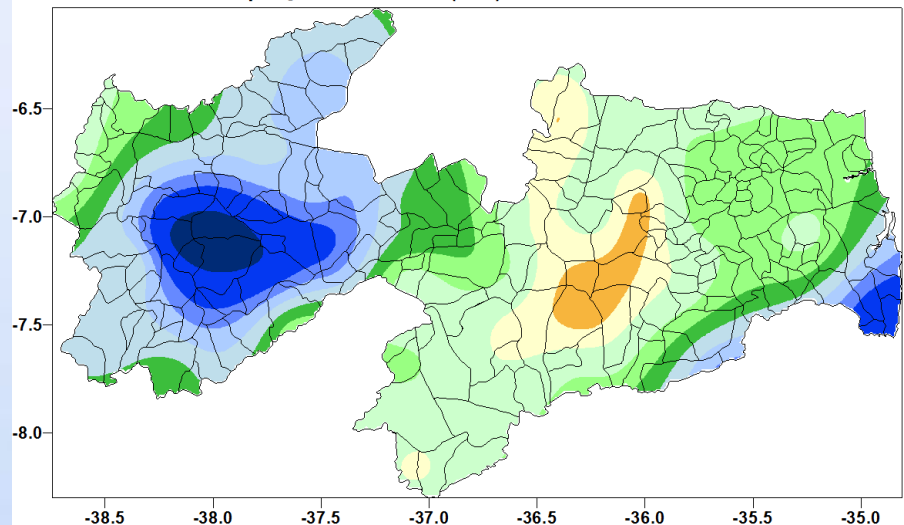
Precipitação Acumulada (mm) - 01 a 31 de março de 1988



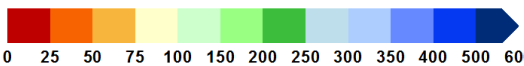
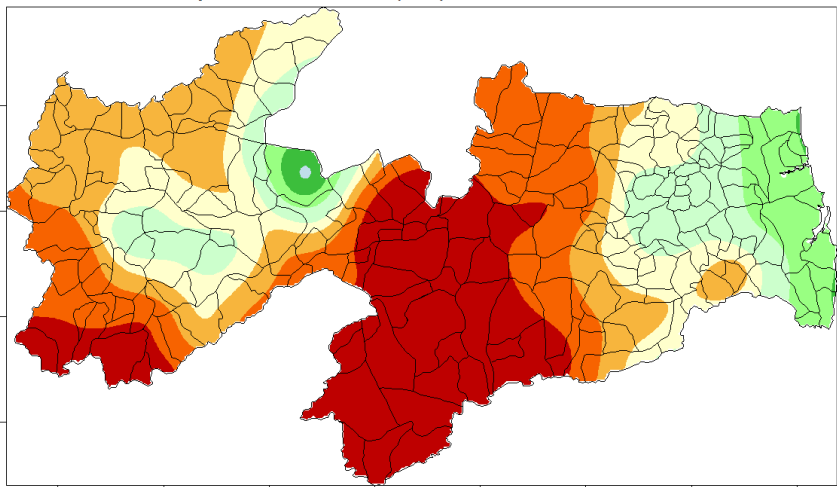
Precipitação Acumulada (mm) - 01 a 28 de fevereiro de 1988



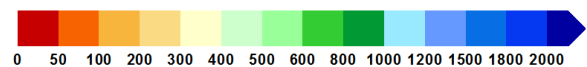
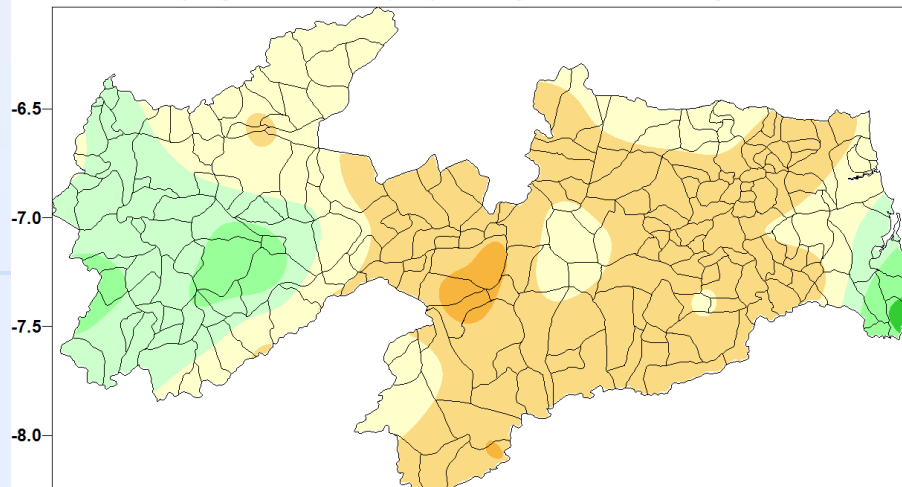
Precipitação Acumulada (mm) - 01 a 30 de abril de 1988



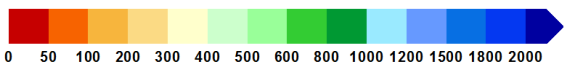
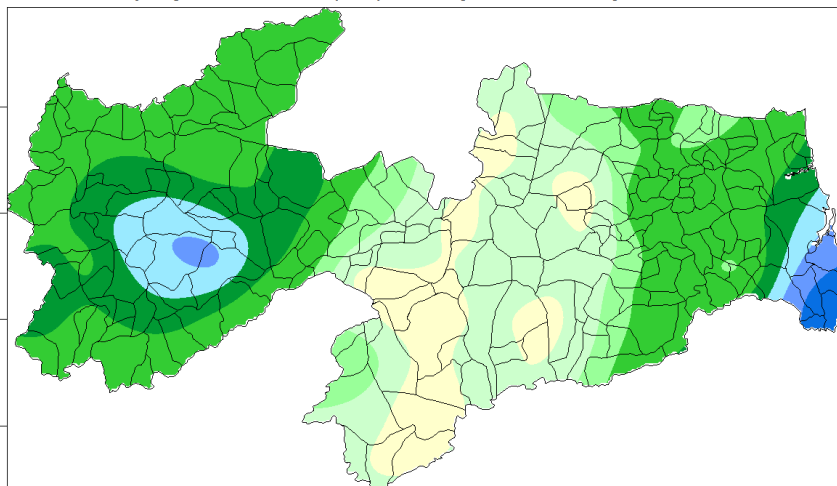
Precipitação Acumulada (mm) 01 a 31 de maio de 1988



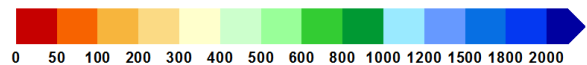
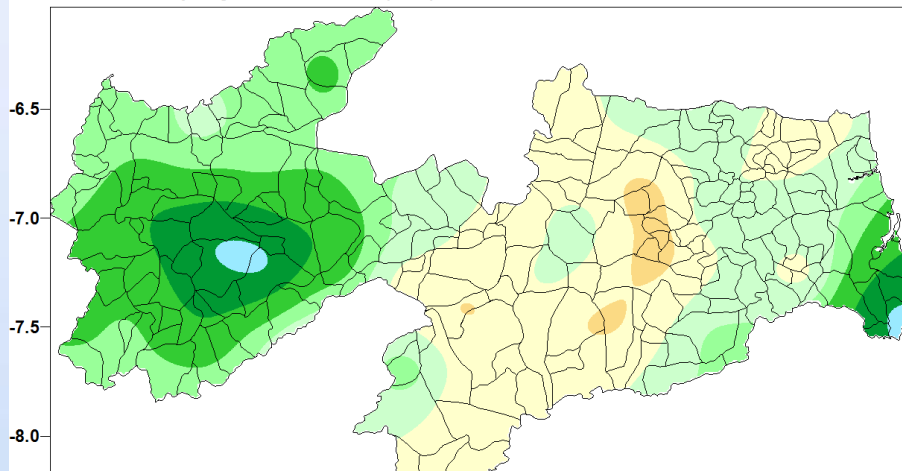
Precipitação Acumulada (mm) - 01 de janeiro a 31 de março de 1988



Precipitação Acumulada (mm) - 01 de janeiro a 30 de junho de 1988



Precipitação Acumulada (mm) - 01 de fevereiro a 30 de abril de 1988



OBRIGADO!

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