

Evolución del ENSO y otros patrones de variabilidad interanual e intraestacional de gran escala

Carolina Vera

Grupo DIVAR

Dinámica de la Variabilidad
Atmosférica sobre
Sudamérica



.UBA
Universidad de
Buenos Aires

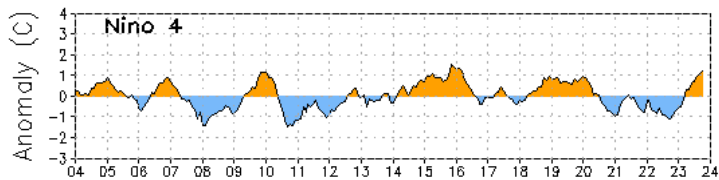
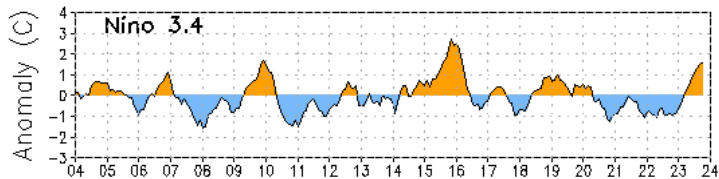
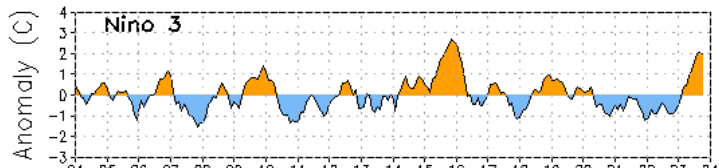
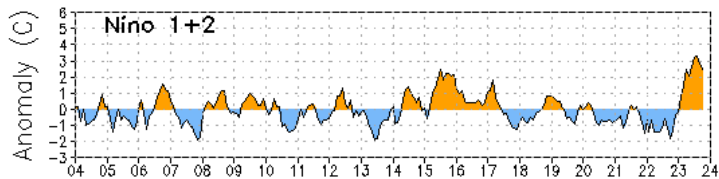


C I M A

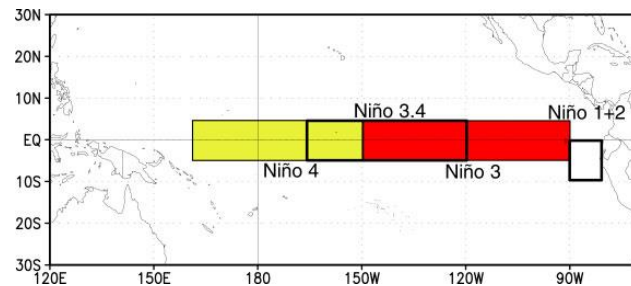
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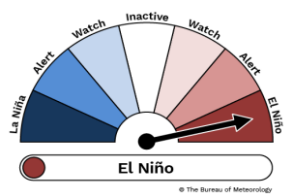
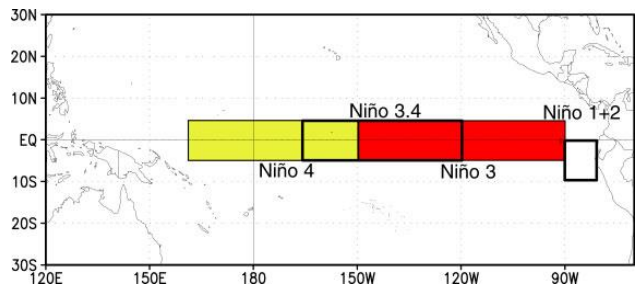
Anomalías de Temperatura de la superficie del mar



Data updated through October 2023



Evolución reciente de las anomalías de SST (°C) en las regiones Niño



The latest weekly SST departures are:

Niño 4	1.5°C
Niño 3.4	2.1°C
Niño 3	2.3°C
Niño 1+2	2.0°C

EL NIÑO/OSCILACIÓN DEL SUR (ENSO, por sus siglas en inglés)
DISCUSIÓN DIAGNÓSTICA

emitida por el

CENTRO DE PREDICCIONES CLIMÁTICAS/NCEP/NWS
y el Instituto Internacional de Investigación para el Clima y la Sociedad
Traducción cortesía del: NWS-WFO SAN JUAN, PUERTO RICO

14 de octubre de 2021

Estatus del Sistema de alerta del ENSO: [Advertencia de La Niña](#)

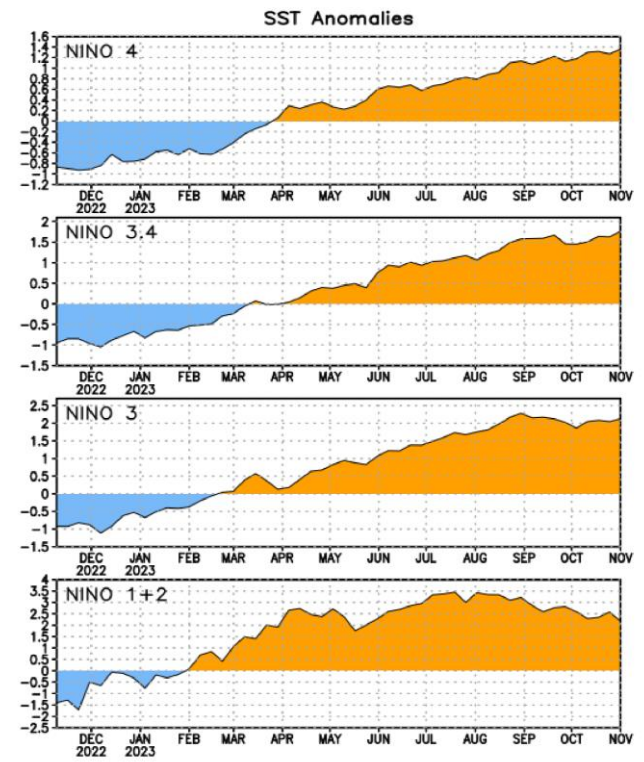
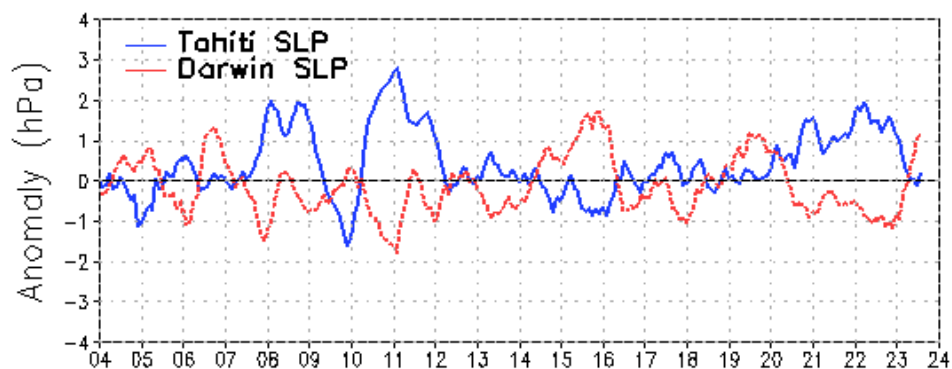
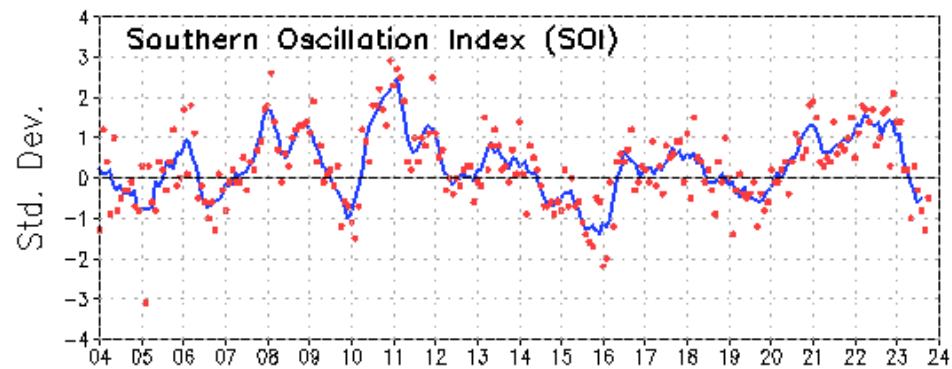
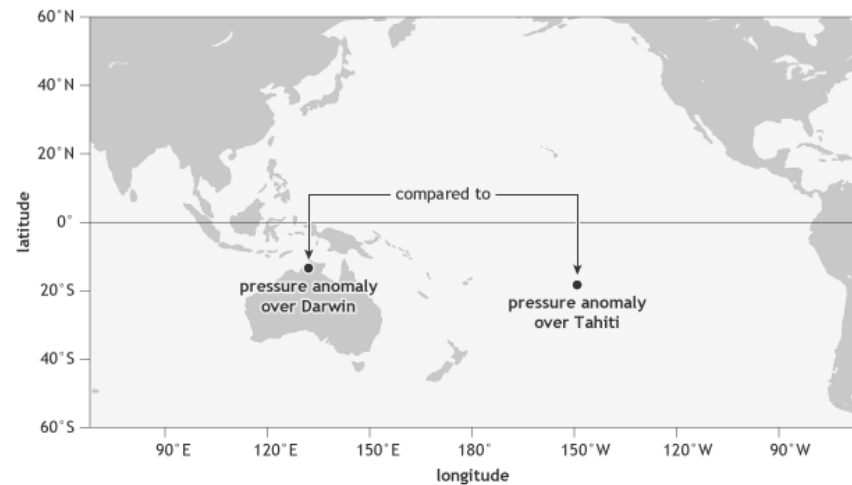


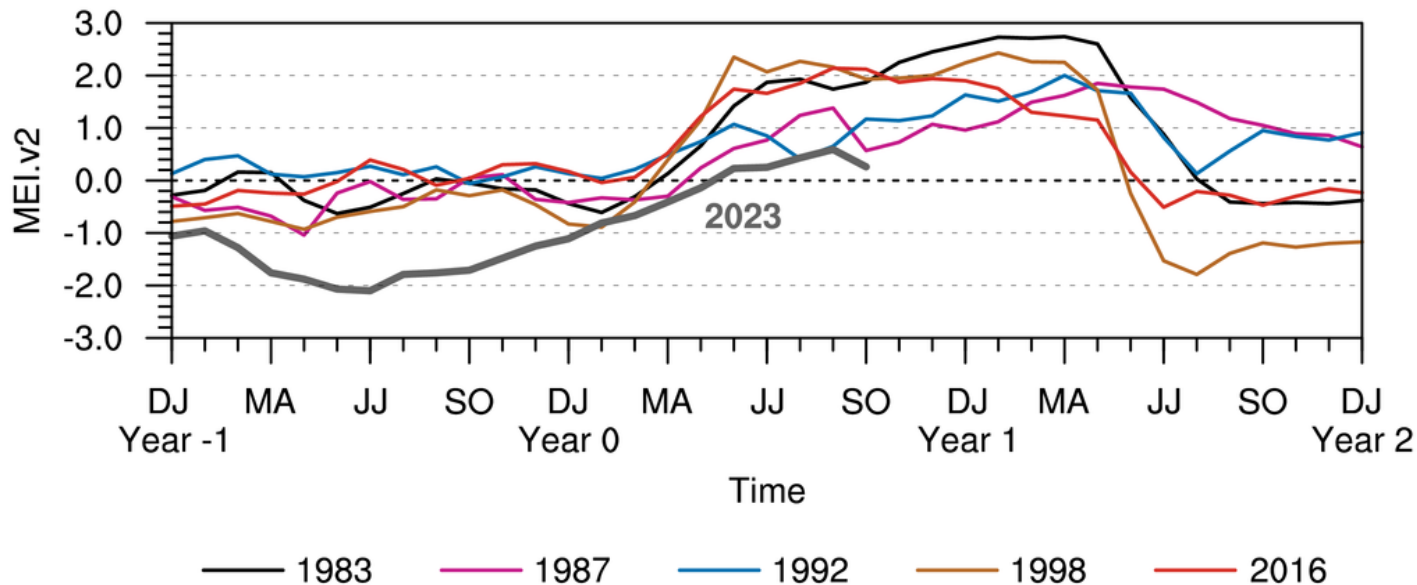
Figure 2. Time series of area-averaged sea surface temperature (SST) anomalies (°C) in the Niño regions [Niño-1+2 (0°-10°S, 90°W-80°W), Niño-3 (5°N-5°S, 150°W-90°W), Niño-3.4 (5°N-5°S, 170°W-120°W), Niño-4 (5°N-5°S, 150°W-160°E)]. SST anomalies are departures from the 1991-2020 base period weekly means.



Southern Oscillation Index

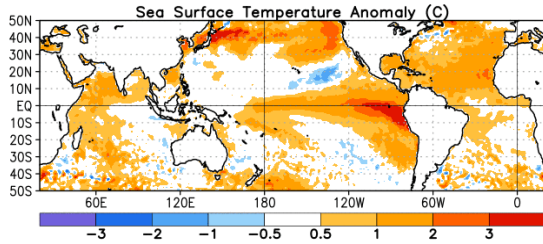
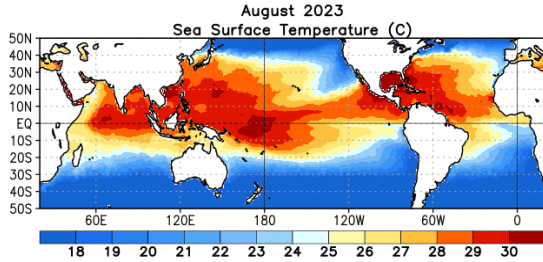


MEI.v2 Evolution of Current ENSO Event in Historical Context

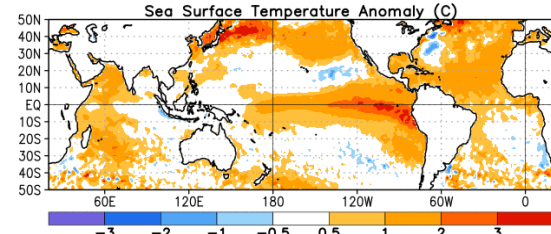
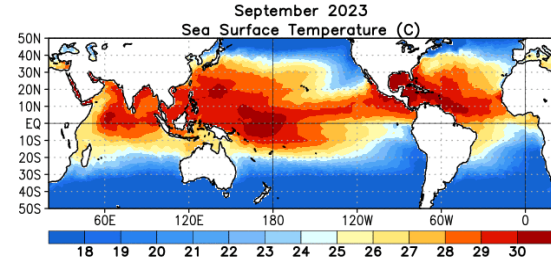


Medias y Anomalías de temperatura de superficie del mar

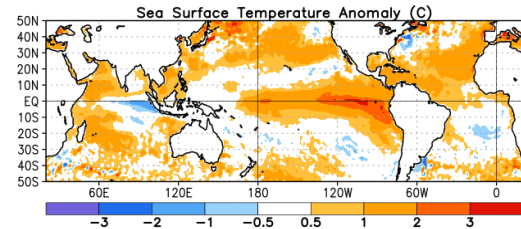
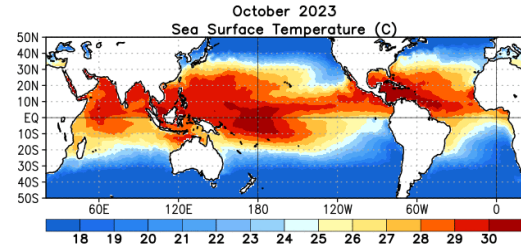
Agosto
2023



Septiembre
2023

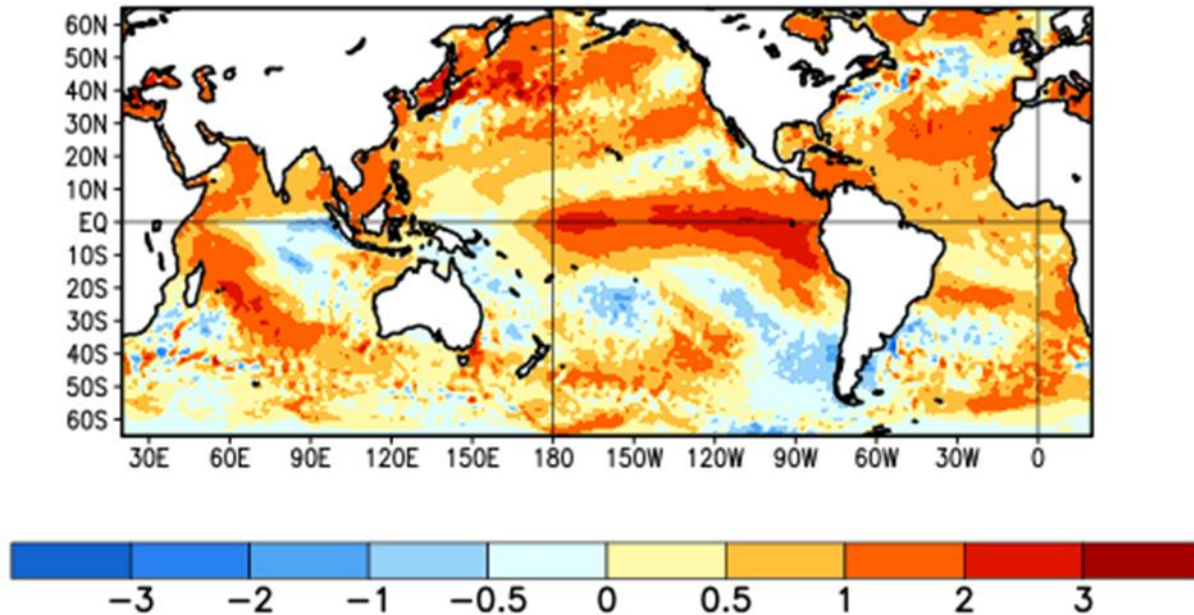


Octubre
2023

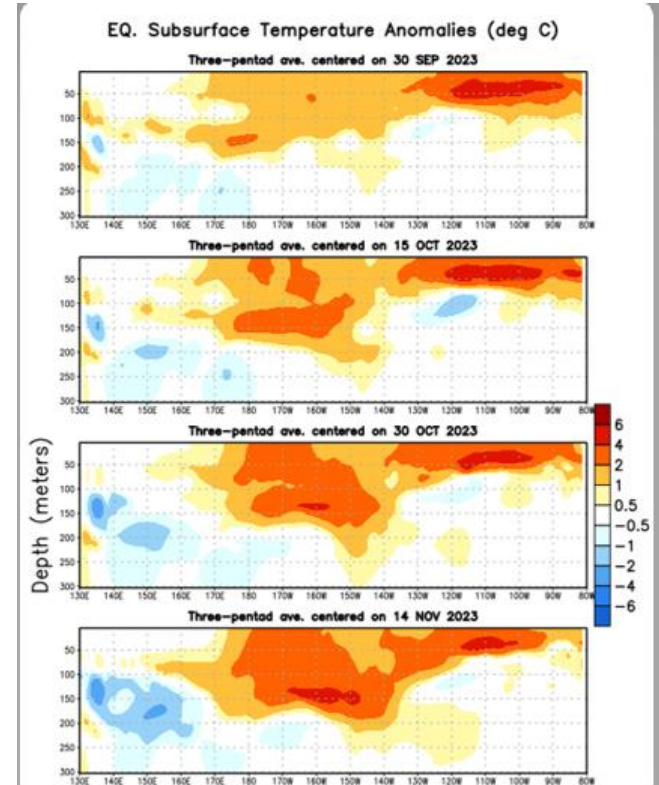
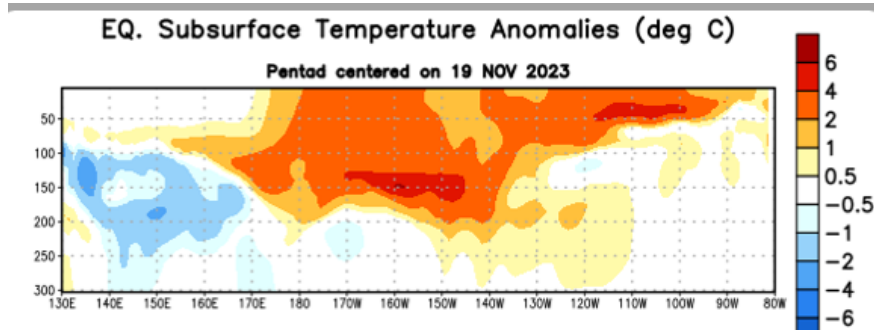


Anomalías de SST (°C) durante las últimas 4 semanas

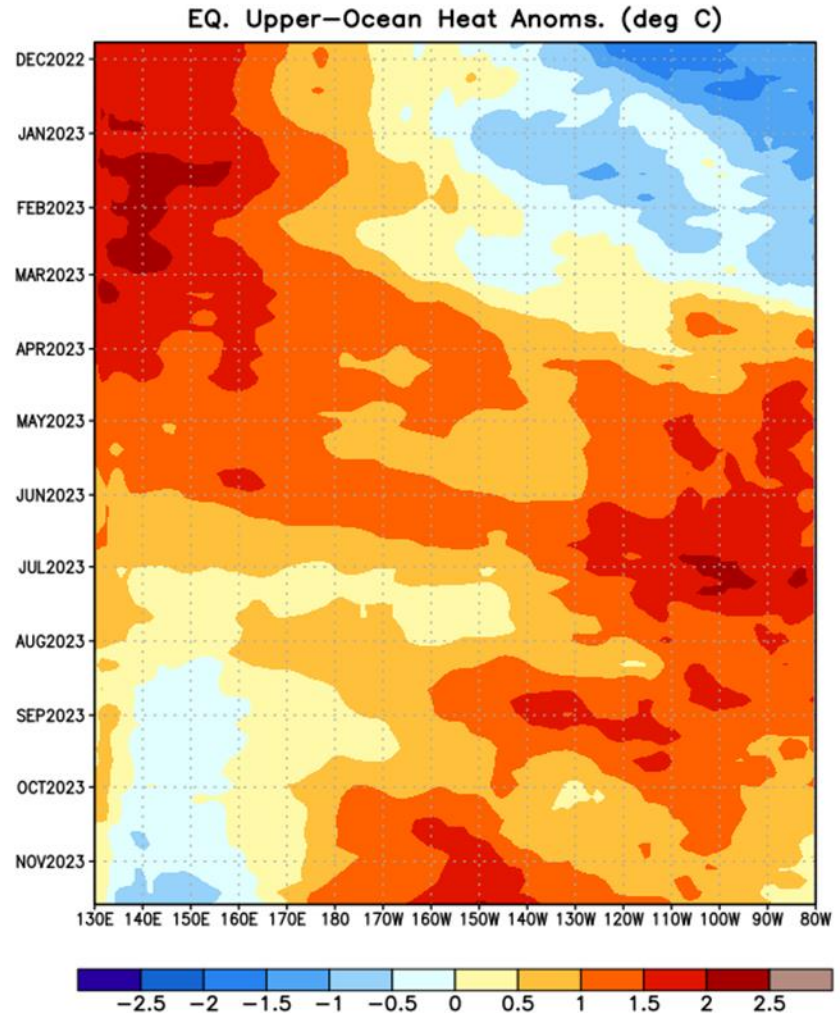
Average SST Anomalies
29 OCT 2023 – 25 NOV 2023



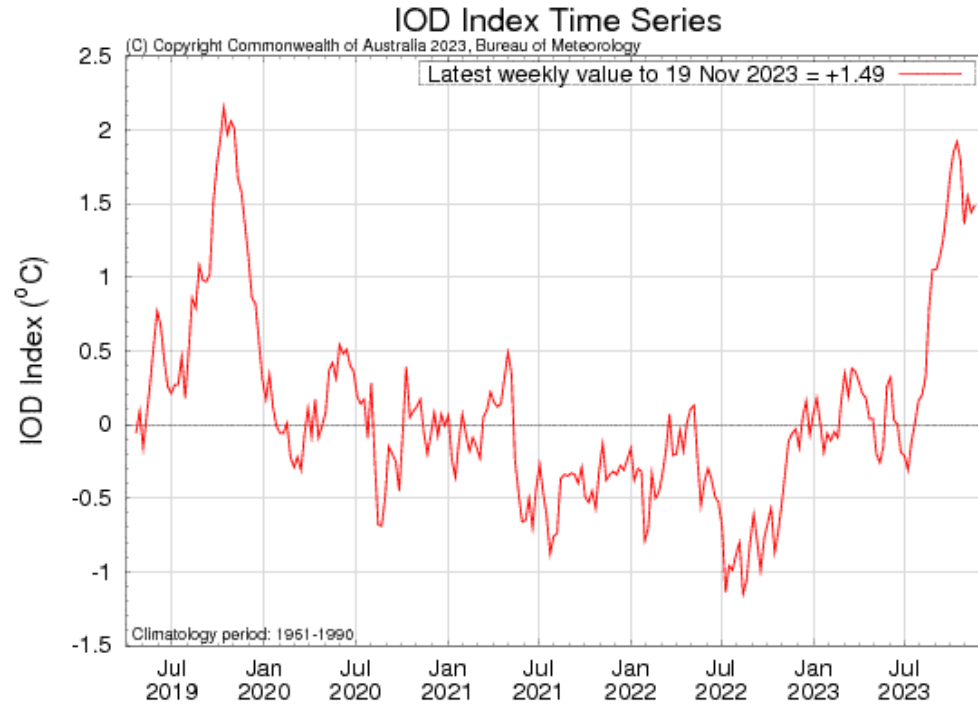
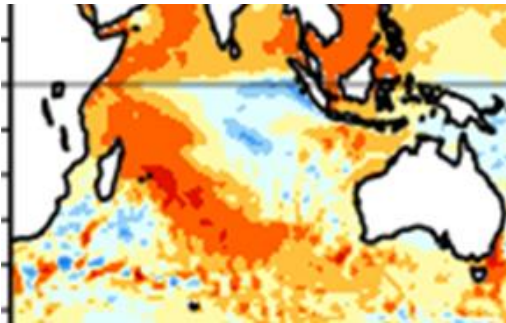
Anomalías de Temperatura subsuperficial en el Pacífico Ecuatorial



Evolución semanal de contenido de calor en el Pacífico Ecuatorial

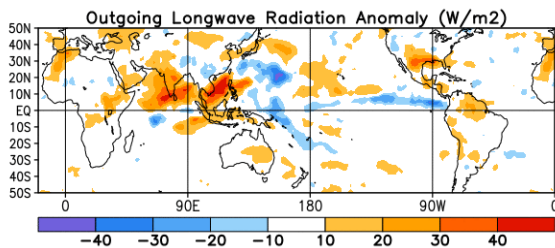
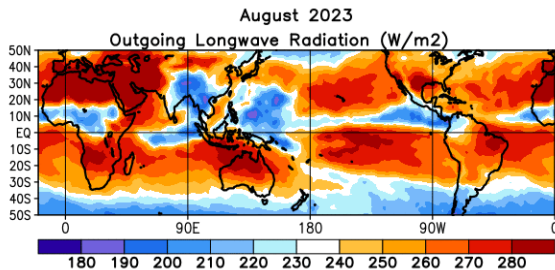


Dipolo Océano Índico (IOD)

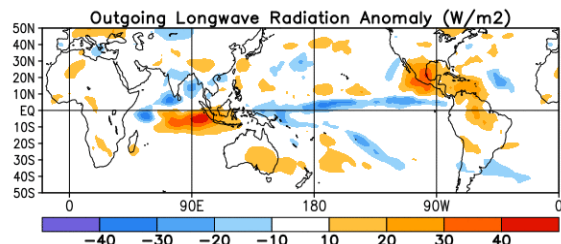
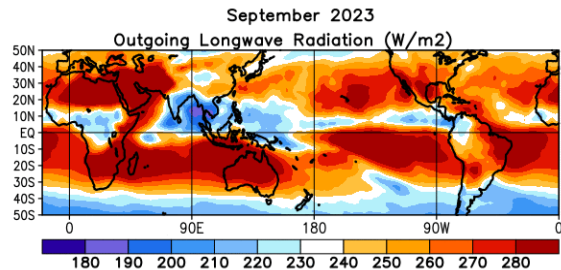


Medias y Anomalías de OLR

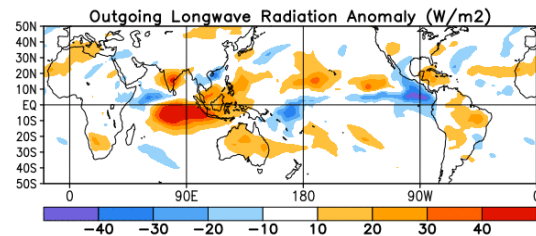
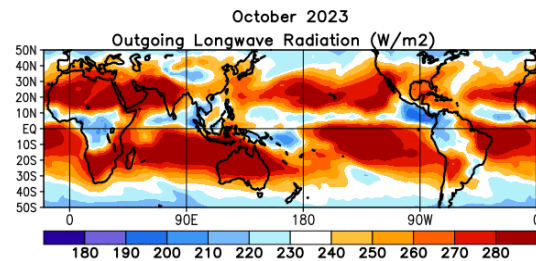
Agosto
2023



Septiembre
2023



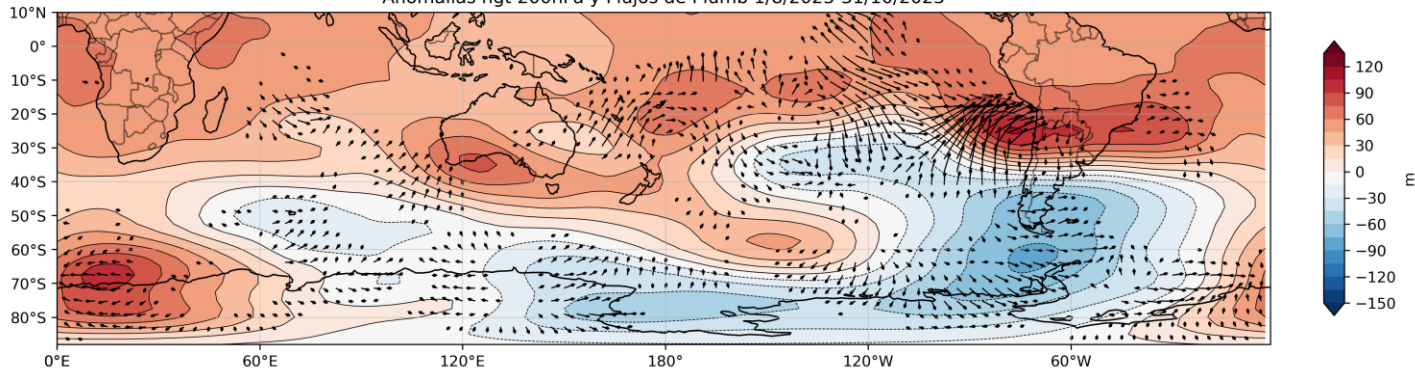
Octubre
2023



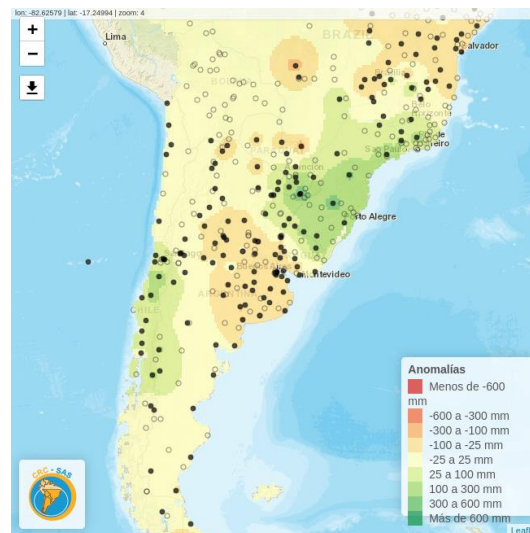
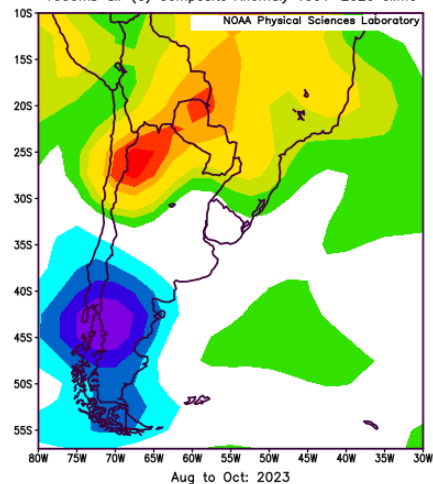
ASO - 2023

Z' (200 hPa)

Anomalías hgt 200hPa y Flujos de Plumb 1/8/2023-31/10/2023

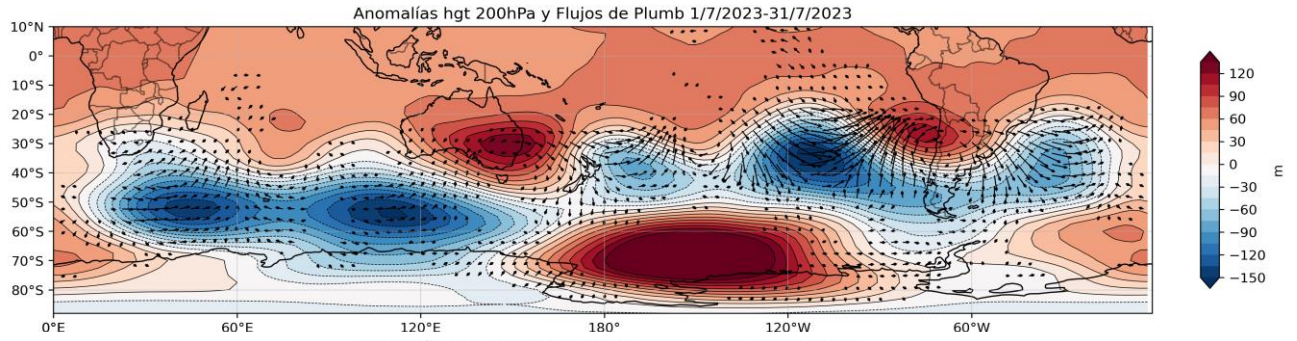


NCEP/NCAR Reanalysis
1000mb air (C) Composite Anomaly 1991-2020 climo

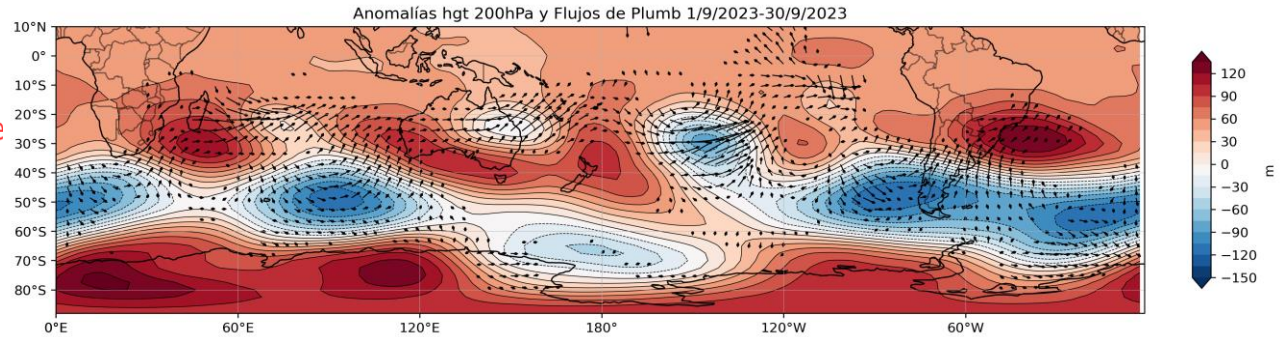


Z' (200 hPa)

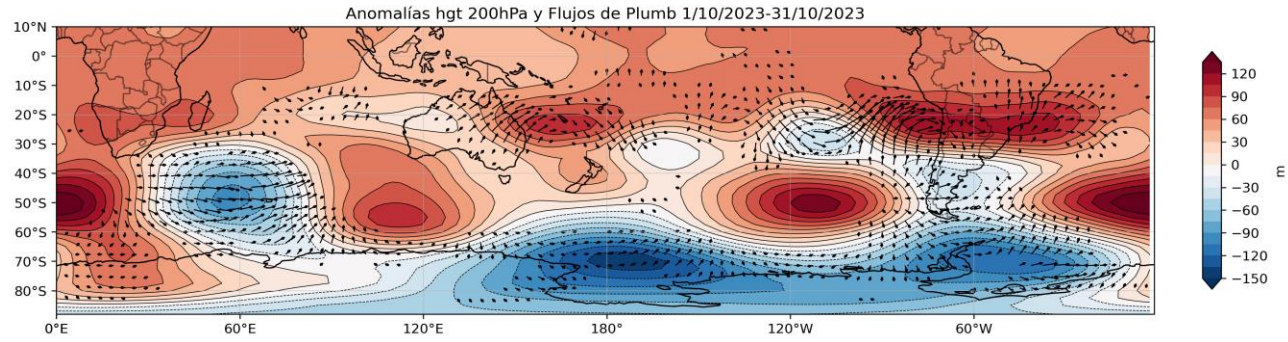
Agosto
2023



Septiembre
2023

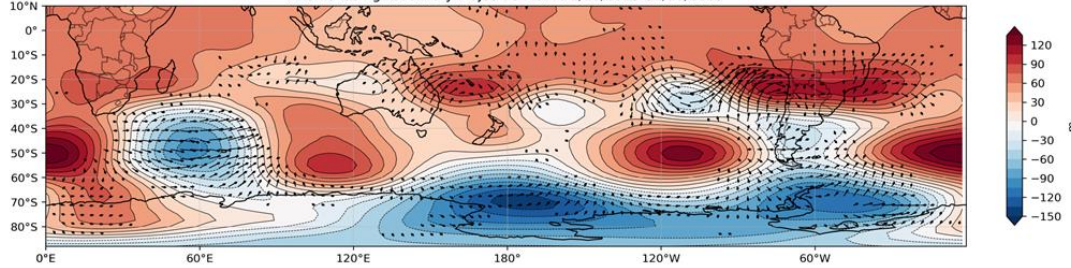


Octubre
2023



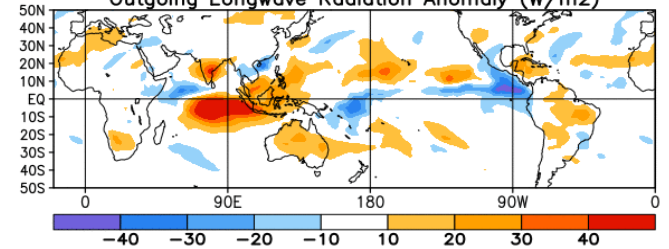
Z' (200 hPa) y flujos de actividad de onda

Anomalías hgt 200hPa y Flujos de Plumb 1/10/2023-31/10/2023

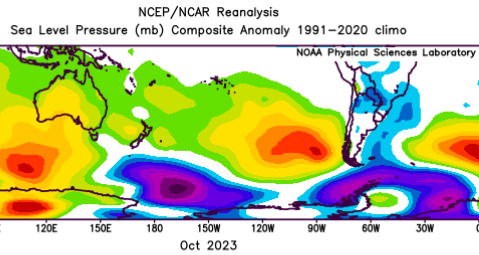


OLR

Outgoing Longwave Radiation Anomaly (W/m²)

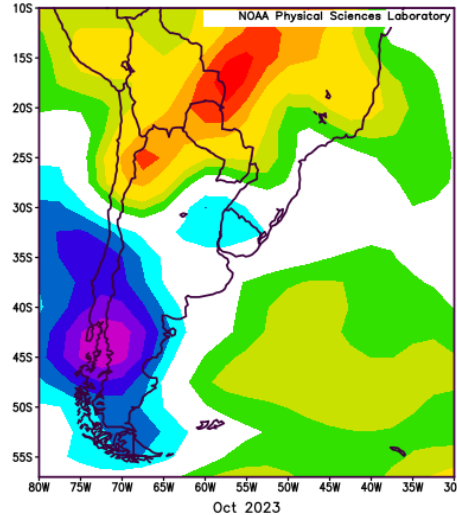


Presión al nivel del mar

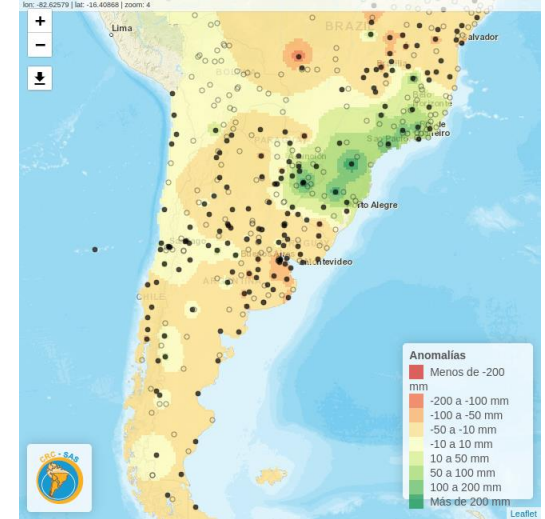


Temperatura 1000 hPa

NCEP/NCAR Reanalysis
1000mb air (C) Composite Anomaly 1991-2020 clima

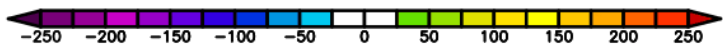
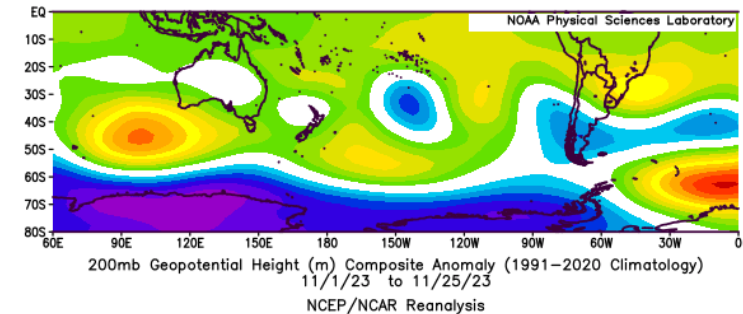


Precipitación

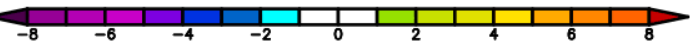
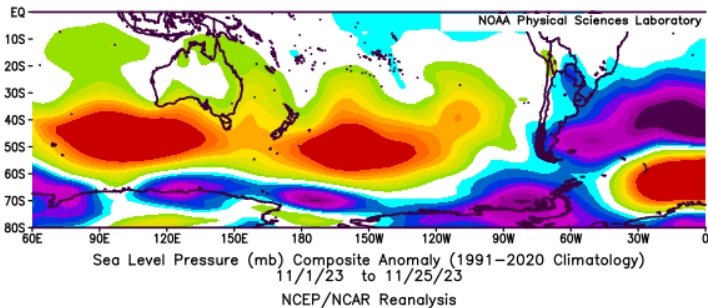


Altura geopotencial en 200 hPa

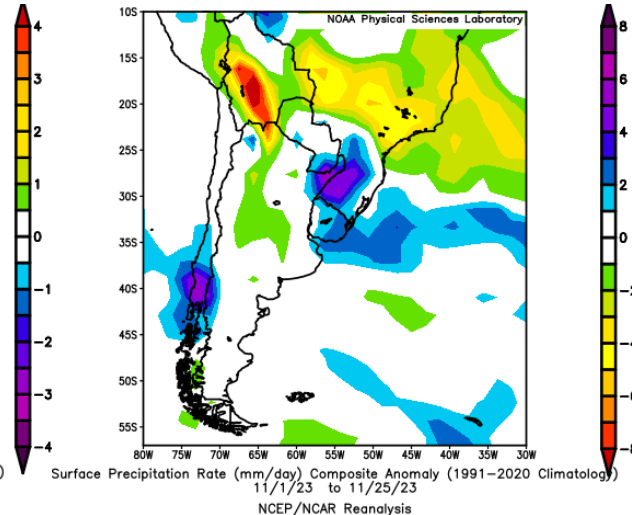
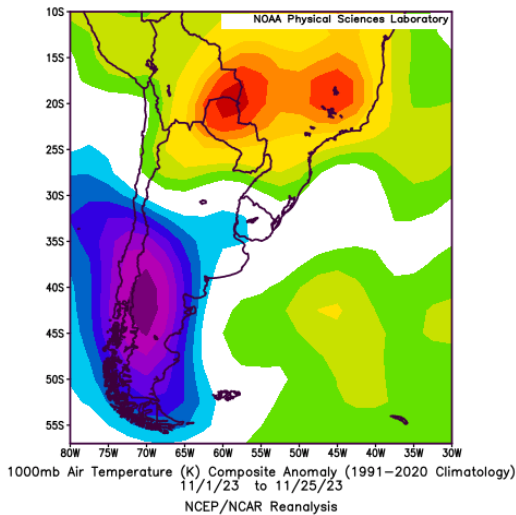
1-25 Noviembre 2023



Presión al nivel del mar



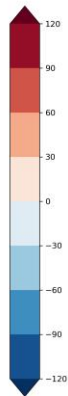
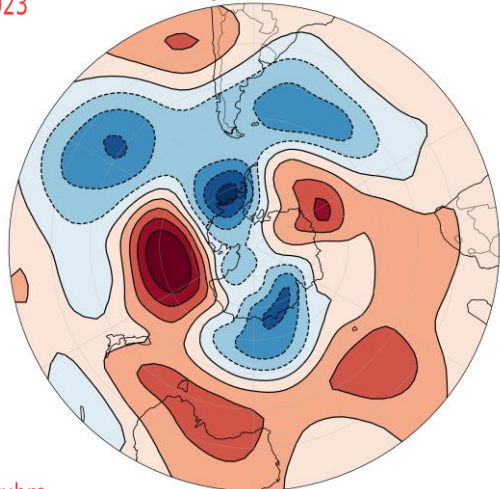
Temperatura 1000 hPa



Anomalías de Altura geopotencial 500 hPa

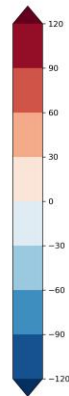
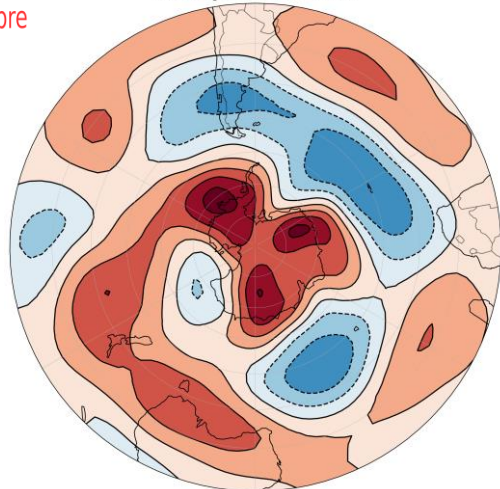
Agosto
2023

Anomalías hgt 500mb 1/8/2023-31/8/2023



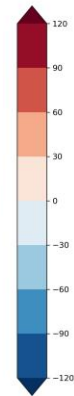
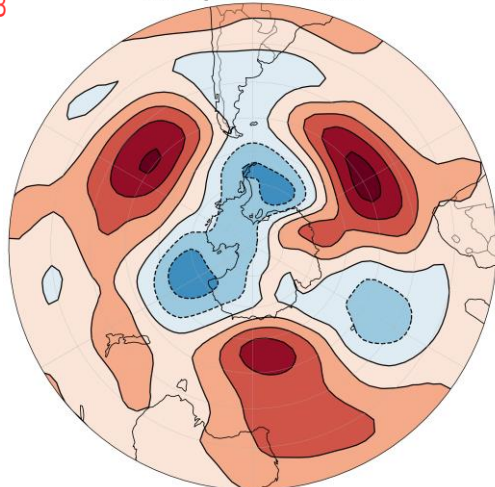
Septiembre
2023

Anomalías hgt 500mb 1/9/2023-30/9/2023

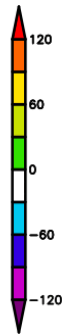
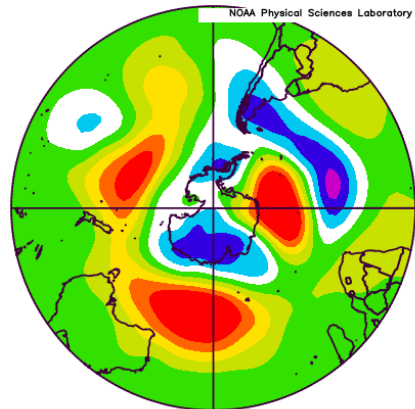


Octubre
2023

Anomalías hgt 500mb 1/10/2023-31/10/2023

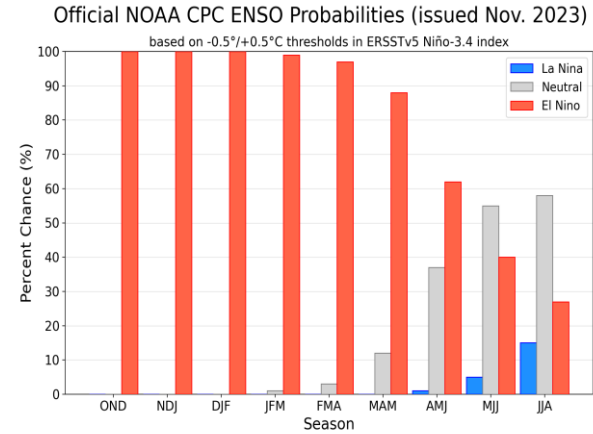
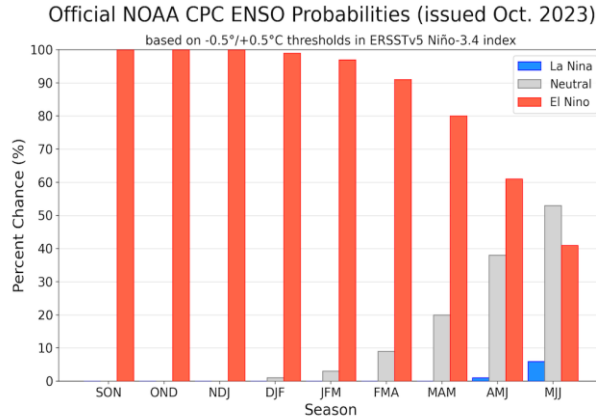


1-25
Noviembre
2023

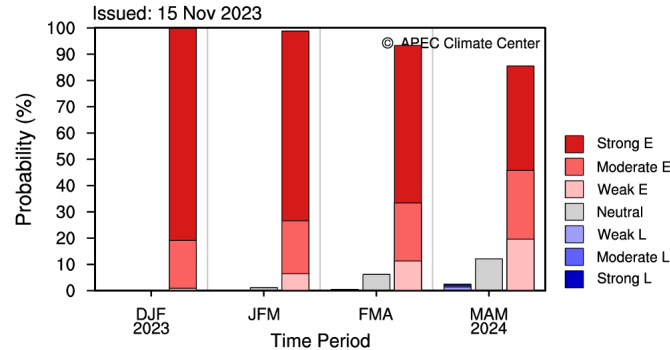


500mb Geopotential Height (m) Composite Anomaly (1991–2020 Climatology)
11/1/23 to 11/25/23
NCEP/NCAR Reanalysis

CPC/IRI Probabilistic ENSO Outlook



Probabilistic ENSO Forecast for 2023 DJFMAM



* ENSO Intensity based on 3M Mean Niño3.4 SST Anomaly (Category Boundaries: $\pm 1.5, 1.0, 0.5^{\circ}\text{C}$)

CPC/IRI Probabilistic ENSO Outlook

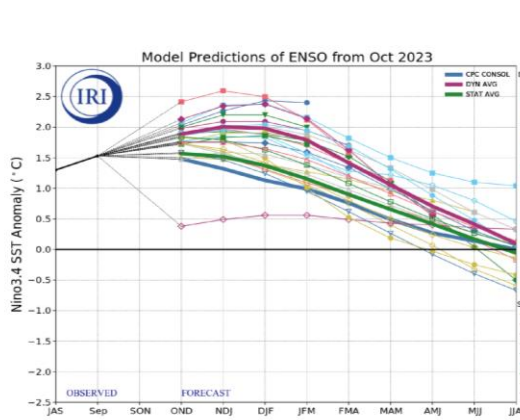
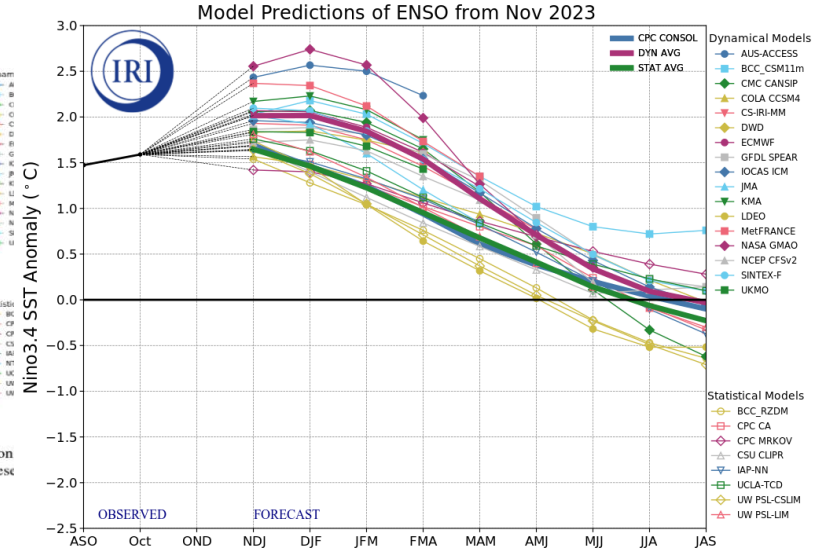
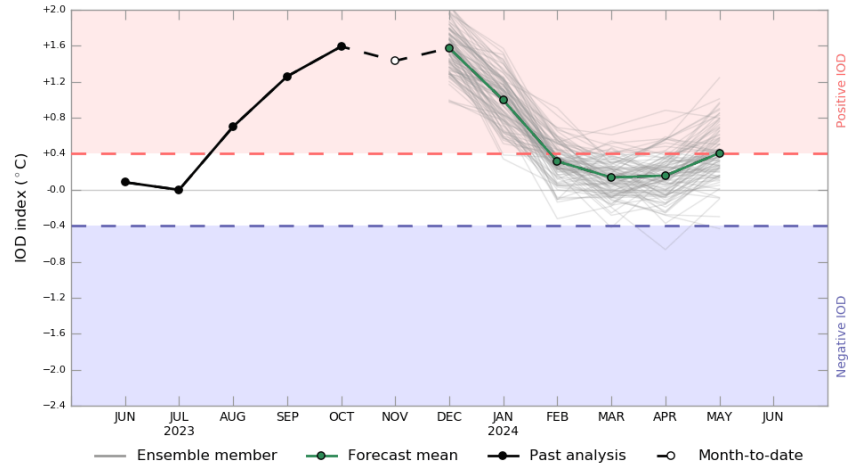


Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region 5°S, 120°W-170°W). Figure updated 19 October 2023 by the International Research Institute (IRI) for Climate and Society.



Pronóstico Dipolo Océano Índico (IOD)

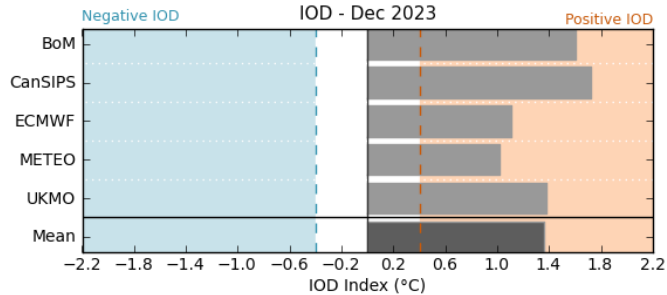
Monthly sea surface temperature anomalies for IOD region



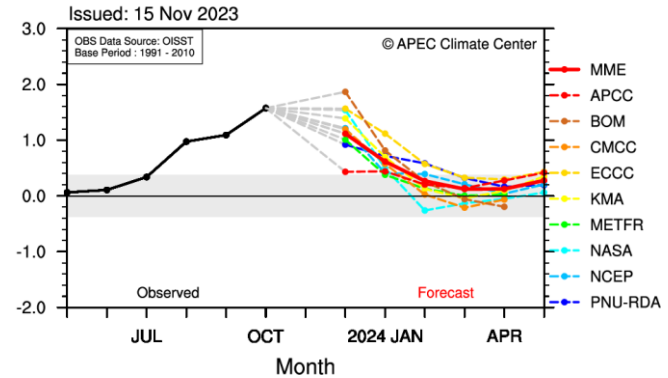
www.bom.gov.au/climate
Commonwealth of Australia 2023, Australian Bureau of Meteorology

Model: ACCESS-S2
Model run: 18 Nov 2023
Base period 1981-2018

IOD Index for 2023 DJFMAM

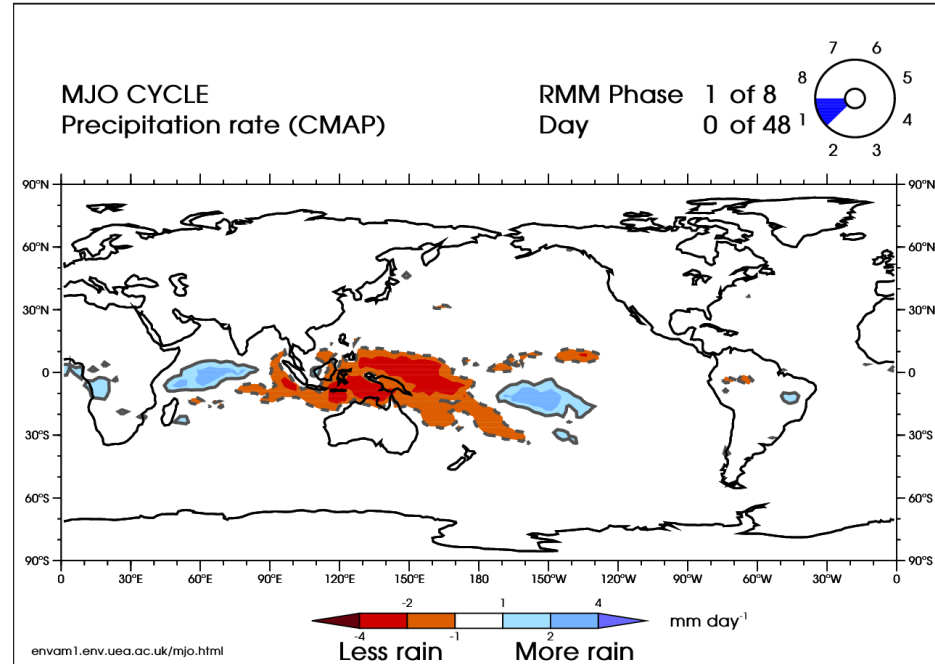
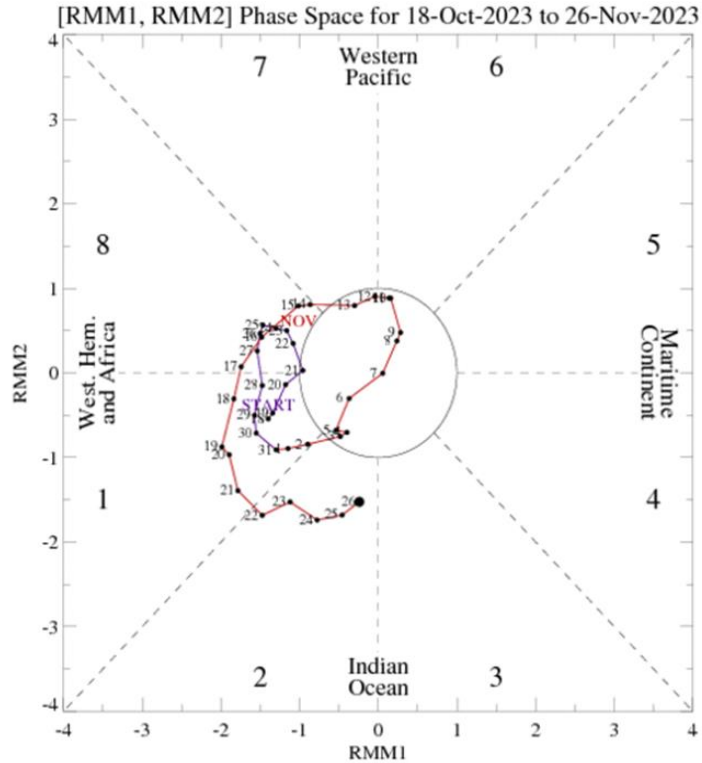


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MJO y Patrones de Variabilidad intraestacional

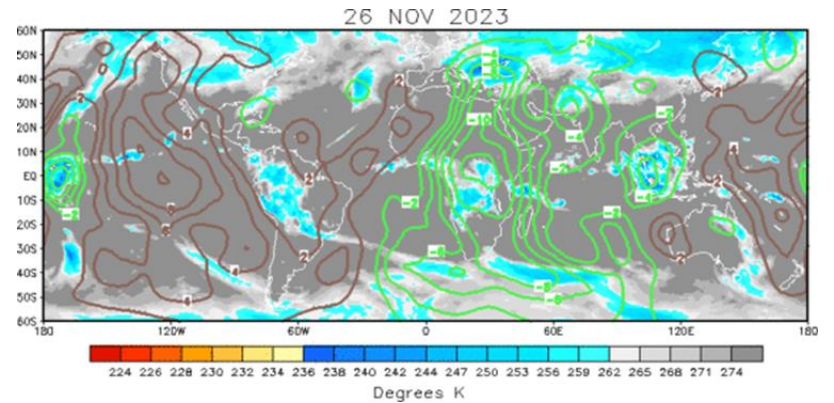
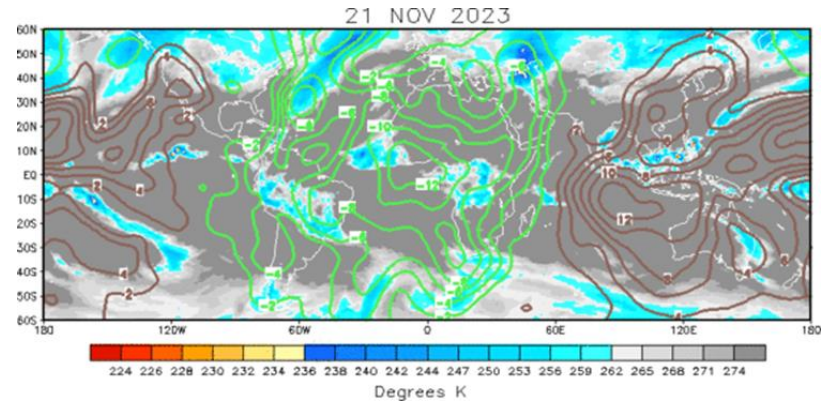
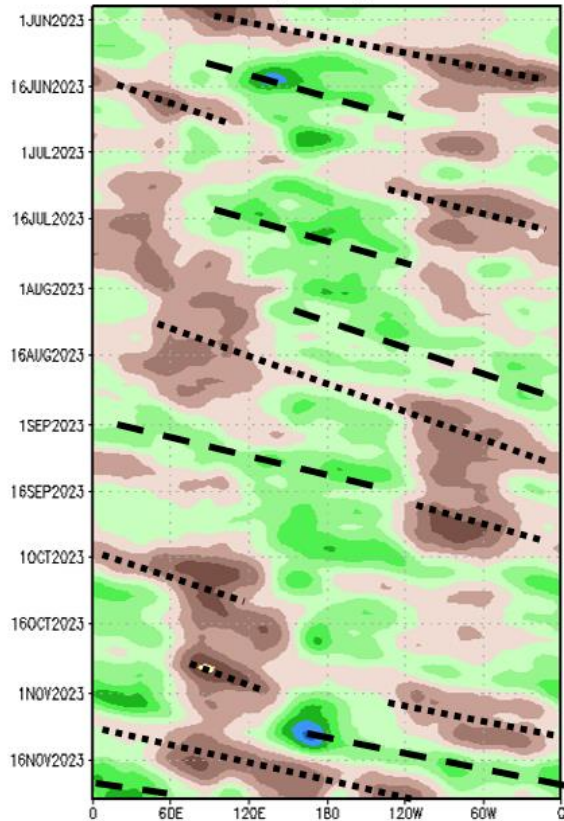
MJO últimos 40 días: índice RMM



Anomalías de potencial de velocidad en 200 hPa

200-hPa Velocity Potential Anomaly: 5N-5S

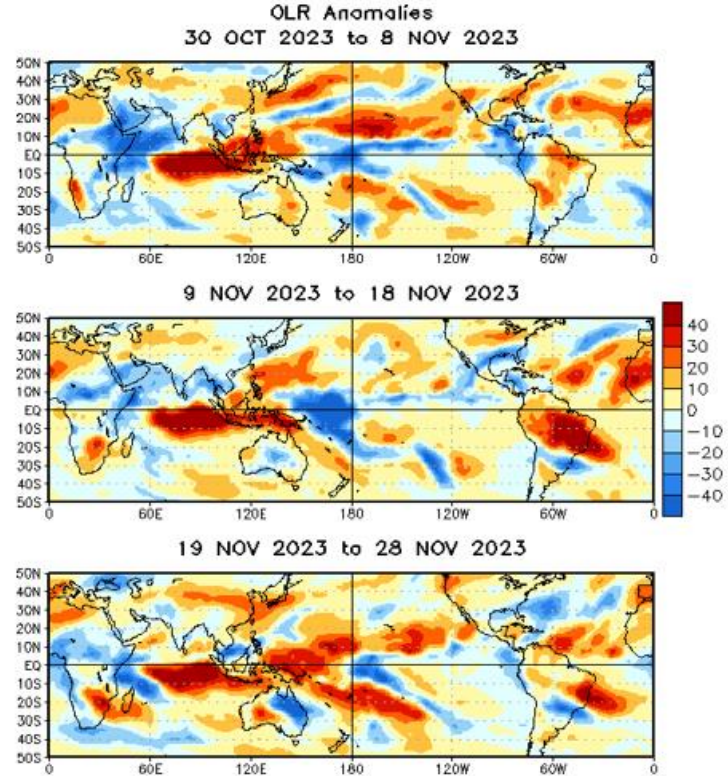
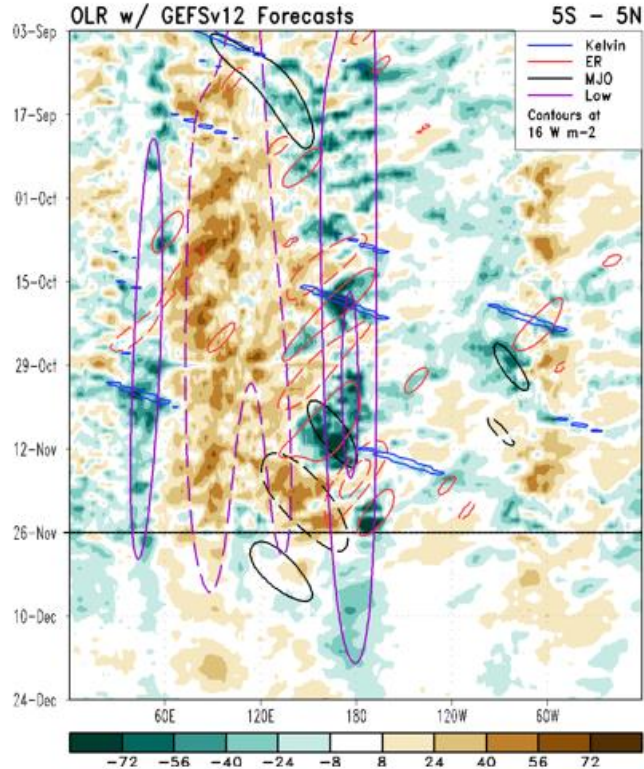
5-day Running Mean



Anomalías de OLR

Green shades: Anomalous convection (wetness)

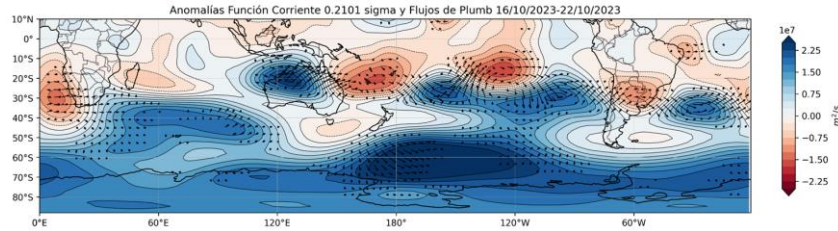
Brown shades: Anomalous subsidence (dryness)



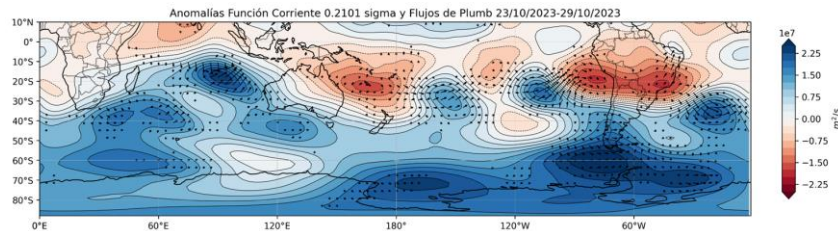
- The positive IOD, MJO, El Niño, and enhanced Rossby Wave activity have contributed to substantial interference with each other in the overall convective pattern across the tropics in the past week.

Anomalías semanales de función corriente y WAFs

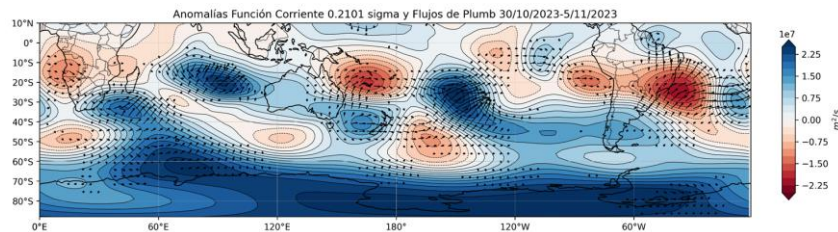
16-OCT al 22-OCT



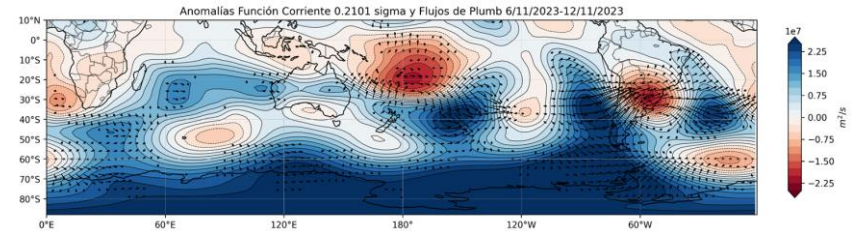
23-OCT al 29-OCT



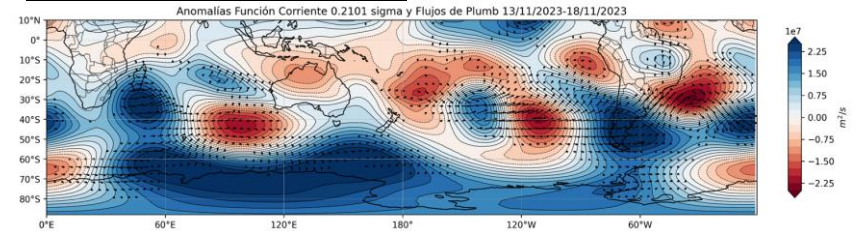
30-OCT al 05-NOV



06-NOV al 12-NOV

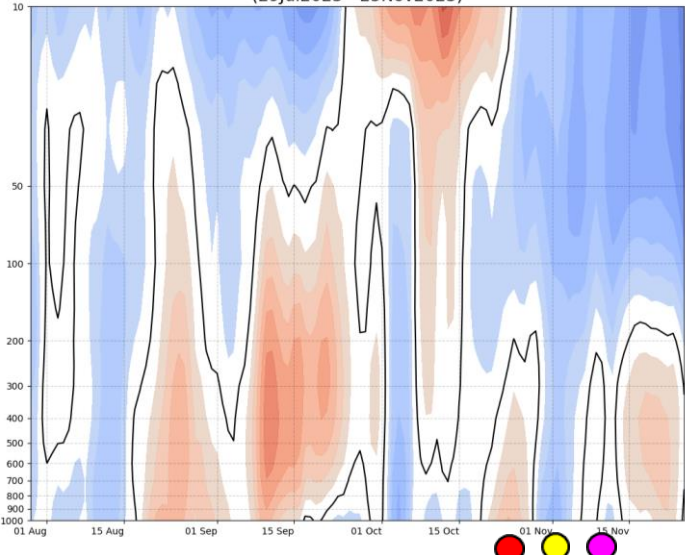


13-NOV al 18-NOV

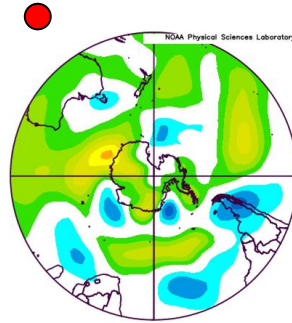


Anomalías de altura geopotencial e índice SAM

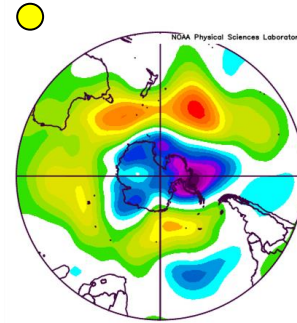
Normalized CDAS GPH Anomaly (65°S-90°S)
(29Jul2023 - 25Nov2023)



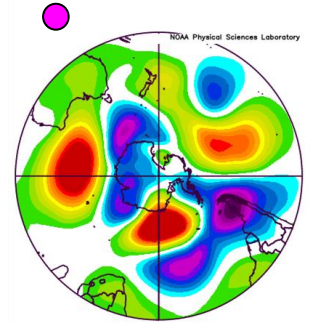
Z'(700 hPa)



nb Geopotential Height (m) Composite Anomaly (1991-2020 Climatology)
10/21/23 to 10/31/23
NCEP/NCAR Reanalysis



nb Geopotential Height (m) Composite Anomaly (1991-2020 Climatology)
11/1/23 to 11/9/23
NCEP/NCAR Reanalysis

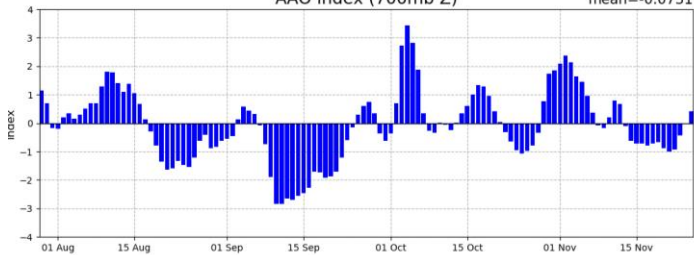


b Geopotential Height (m) Composite Anomaly (1991-2020 Climatology)
11/10/23 to 11/18/23
NCEP/NCAR Reanalysis



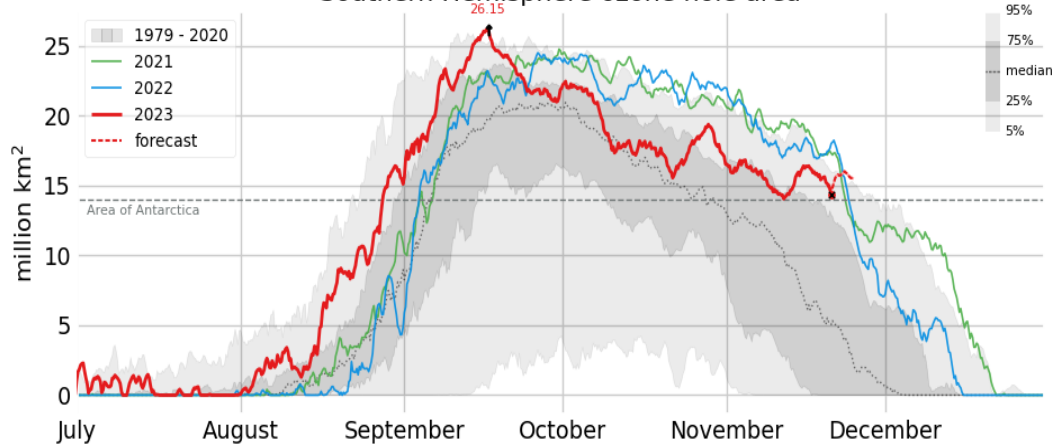
AAO index (700mb Z)

mean=-0.0731



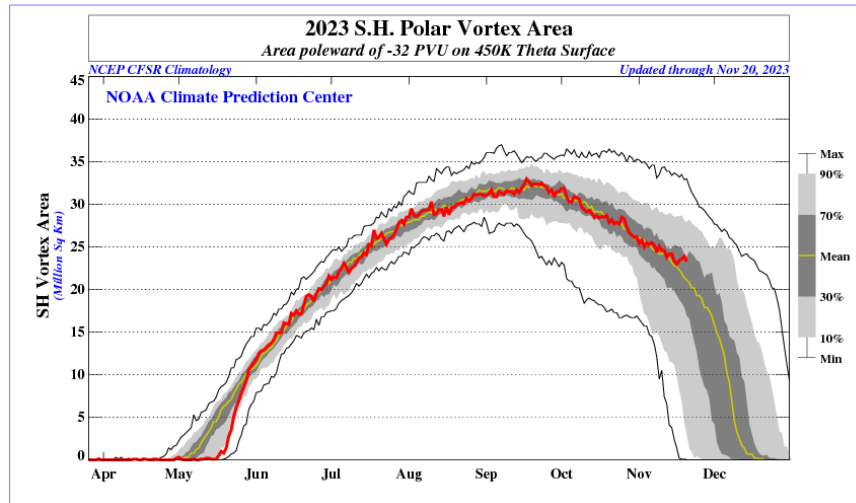
Ozono Antártico

Southern Hemisphere ozone hole area



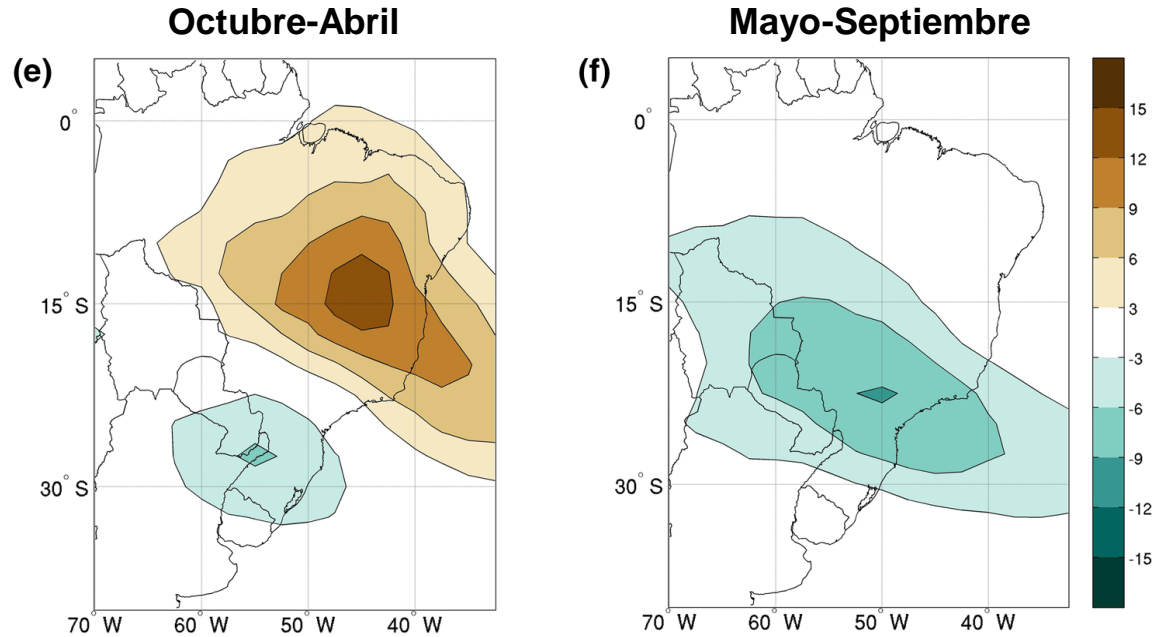
ast update: 2023-11-21T09:56Z

@CopernicusECMW



Patrón Principal de Variabilidad Intraestacional: Patrón SIS

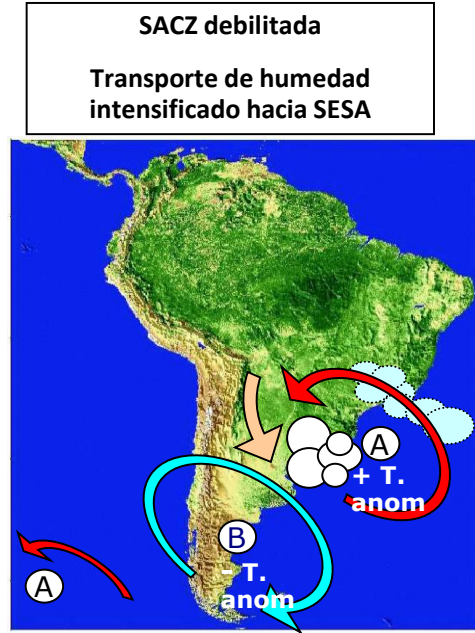
- El patrón SIS tiene una estructura espacial diferente dependiendo de la época del año
- Tiene actividad intraestacional tanto en períodos más largos (30-90 días) como más cortos (10-30 días)



Patrón principal de variabilidad de anomalías de OLR filtradas en 30-90 días

Características del Patrón SIS de octubre a abril

Fase
positiva



Mayor frecuencia de precipitaciones extremas diarias en SESA

(Liebmann, et al., 2004)

(Gonzalez, et al. 2008)

Fase
Negativa

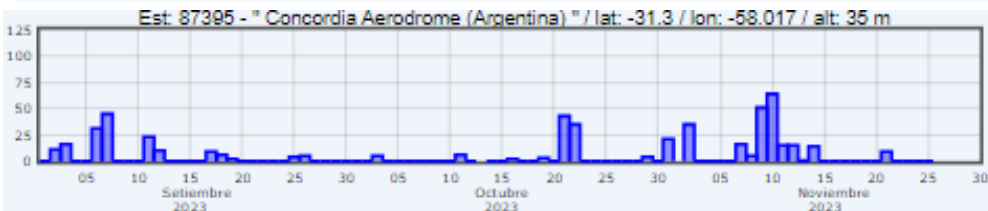
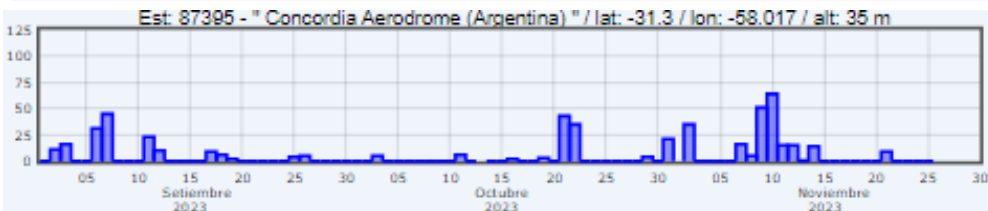
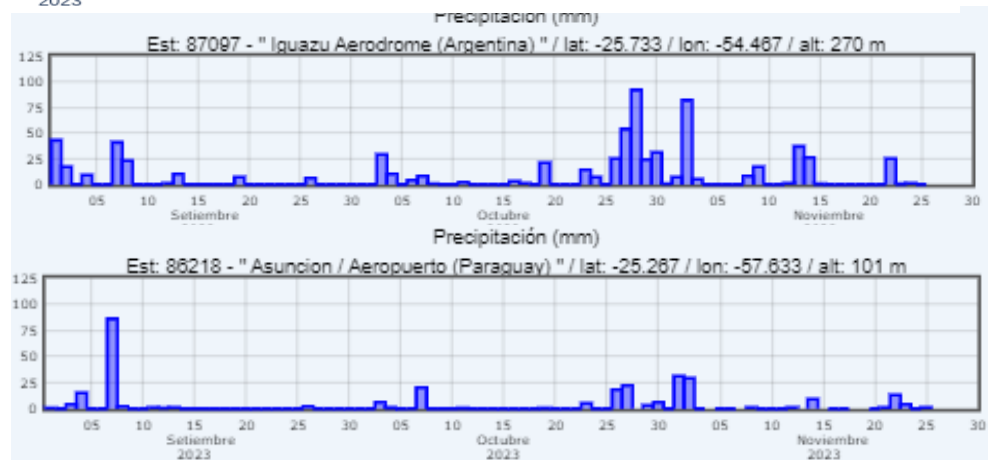
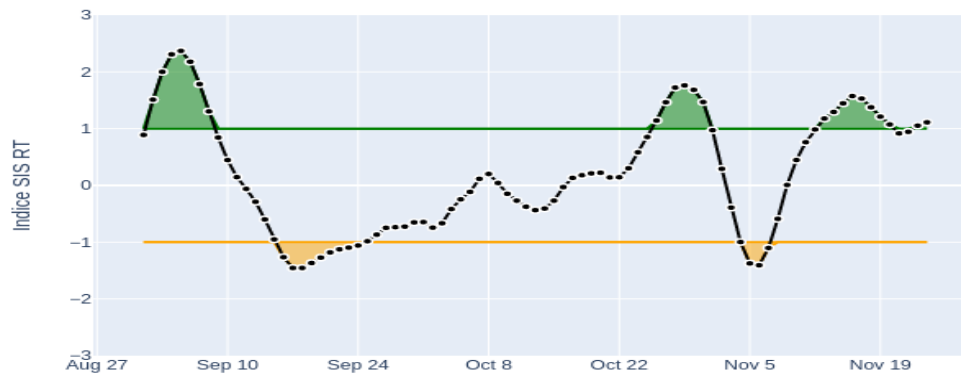


Mayor frecuencia de condiciones secas, olas de calor y fenómenos extremos de temperatura diaria en SESA

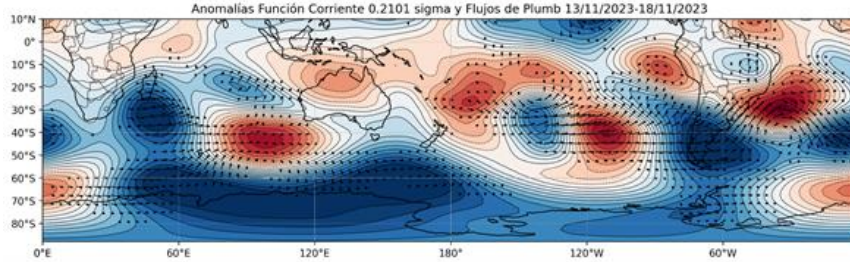
(Cerme and Vera, 2011)

SIS trimestral

Primavera

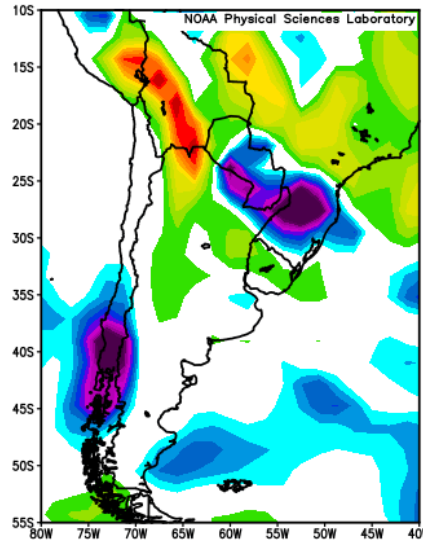


Eventos positivos SIS y precipitación



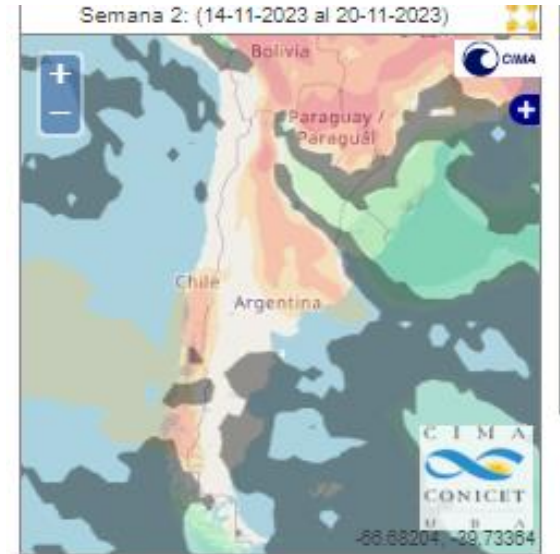
14/11-20/11

Reanálisis

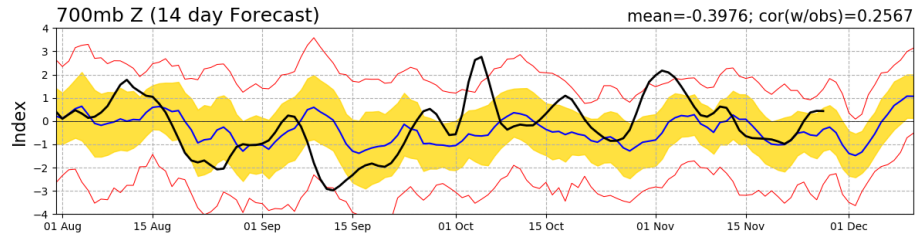
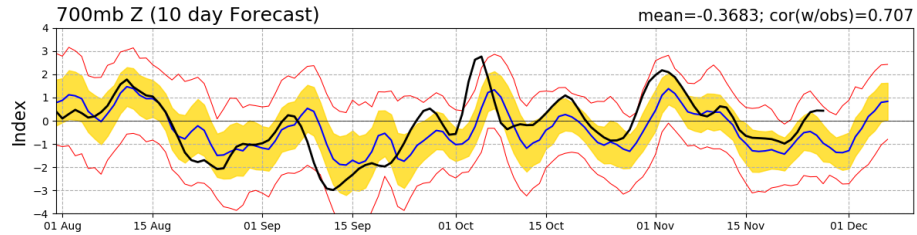
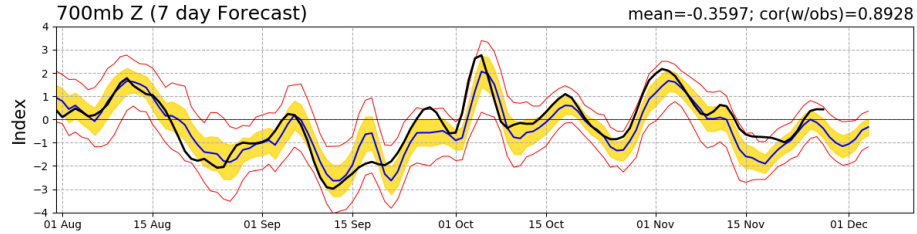
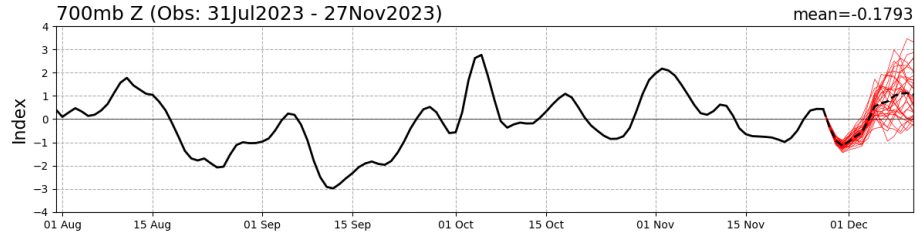


Surface Precipitation Rate (mm/day) Composite Anomaly (1991–2020 Climatology)
11/14/23 to 11/20/23

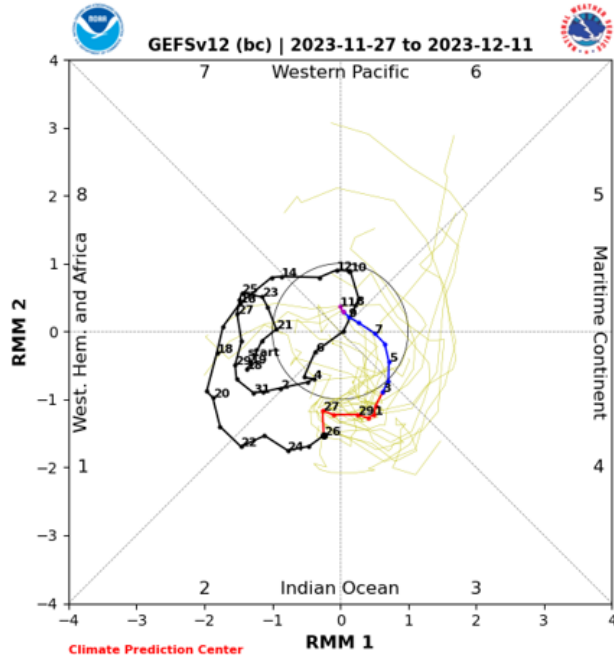
Predicción a 2 semanas



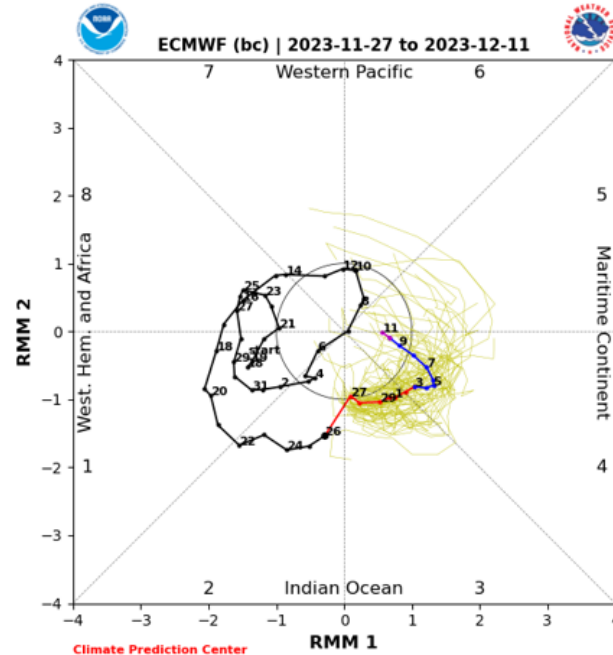
AAO Index: Observed & GEFS Forecasts



Pronóstico de la MJO



GEFS Forecast



ECMWF Forecast

- The GEFS and ECMWF ensembles are in good agreement that the MJO will remain amplified and propagate eastward into the Maritime Continent and Western Pacific during the next 2 weeks.
- In the near-term, the MJO is forecast to destructively interfere with El Niño, with more constructive interference becoming possible as the intraseasonal signal moves toward the Date Line.