Earth Sciences Department | Barcelona Supercomputing Center — Centro Nacional de Supercomputación

Forecast Briefing

January 2026

Paloma Trascasa, Aleksander Lacima and Pep Cos

Climate Services Team (CST)

Earth System Services (ESS)

Barcelona Supercomputing Center (BSC)

Tuesday 20th Jan 2026

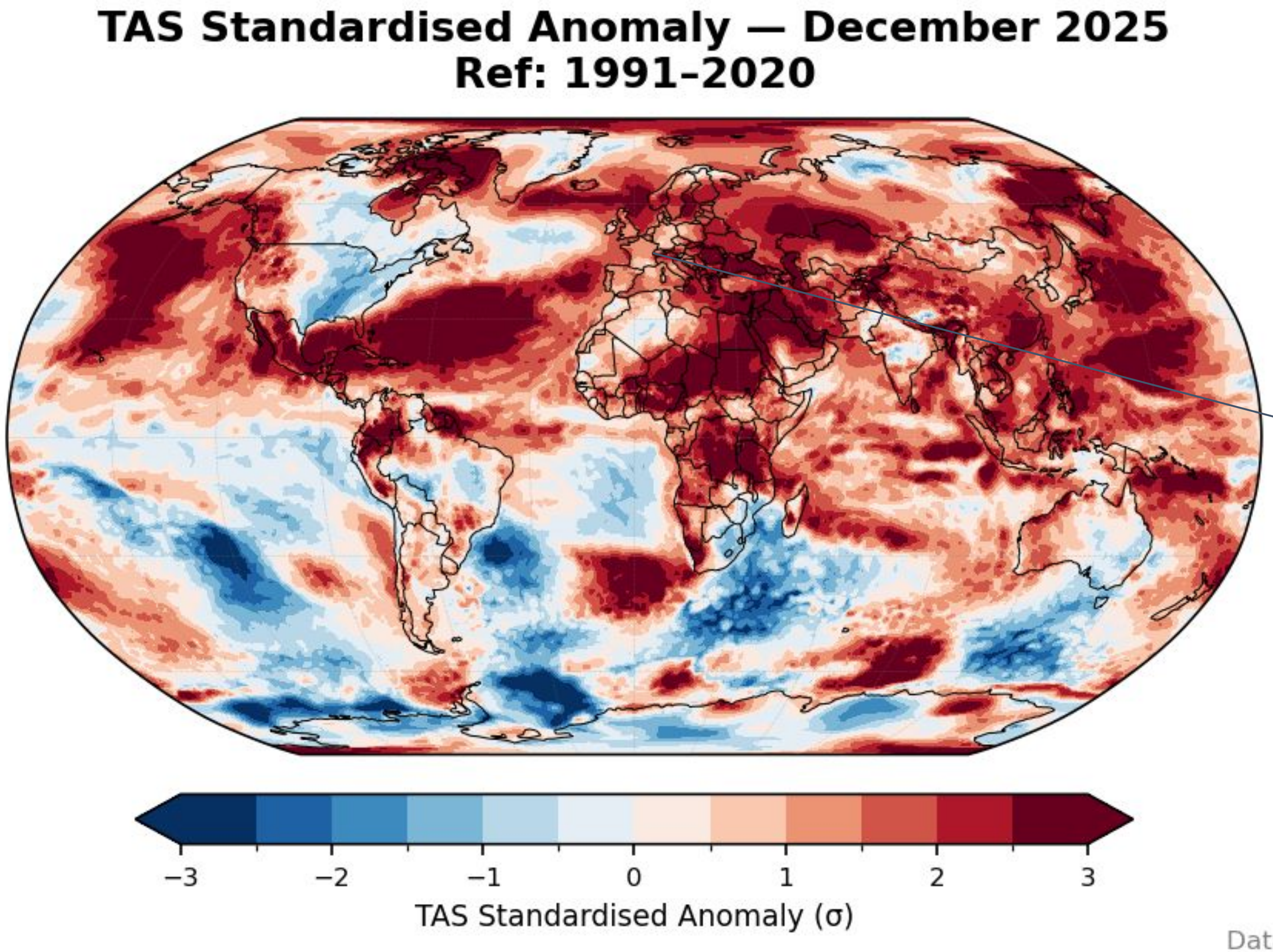
Outline

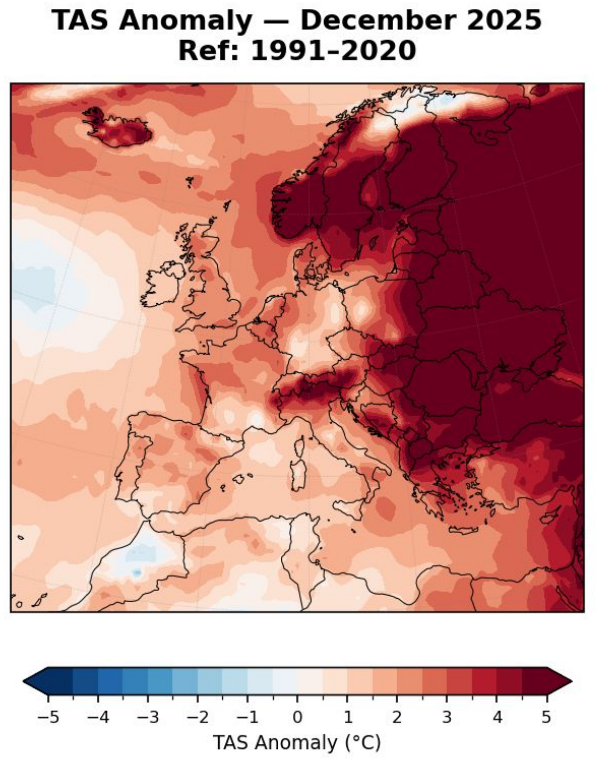
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

I. Recent state of the climate

I. Recent state of the climate

Temperature





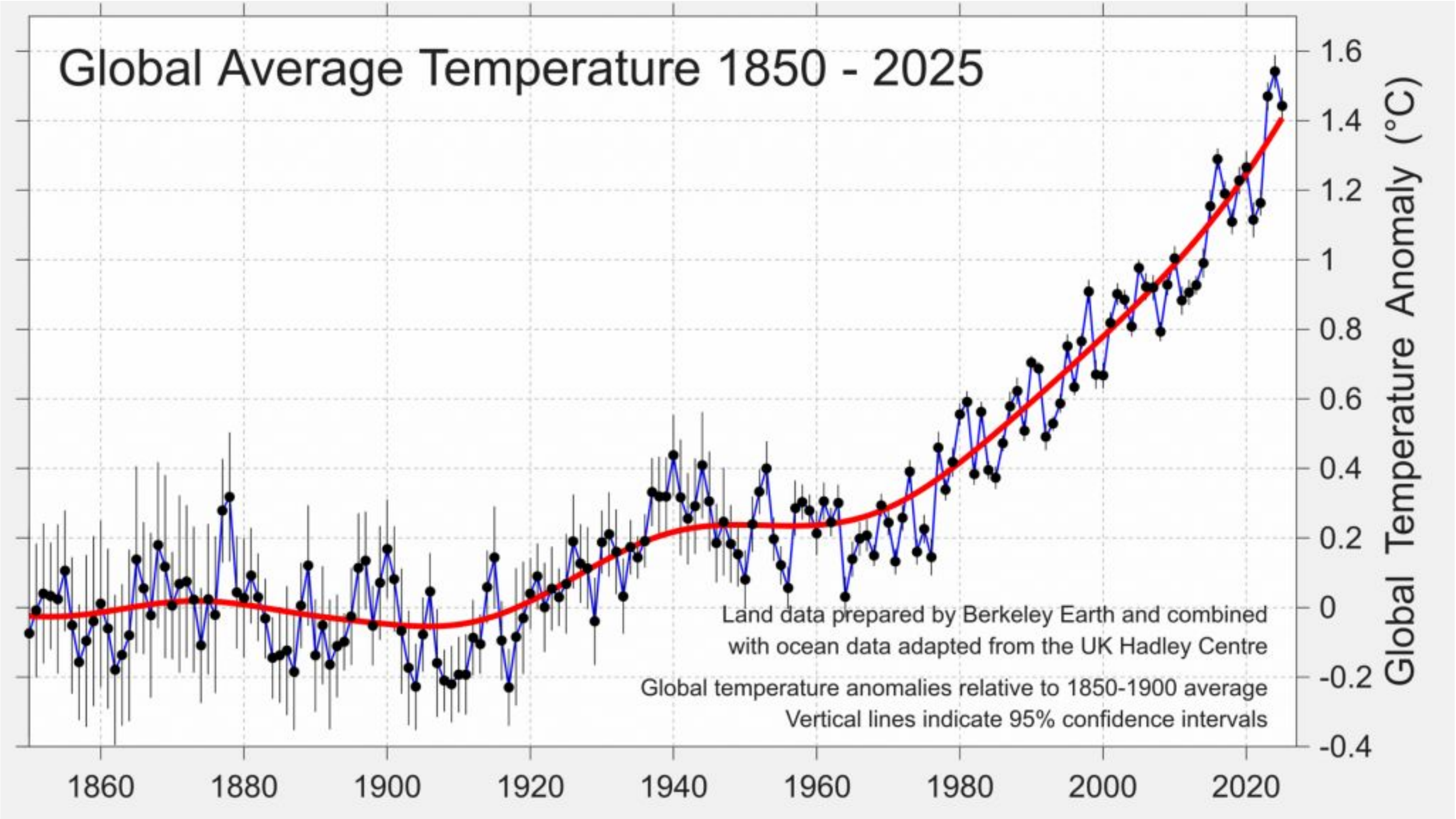
Data source: ERA5

Data source: ERA5

- ➢ Strong positive anomalies in the northern hemisphere
- ➢ Arctic sea-ice extent ranked as the lowest on record for December.
- ➢ Iceland Christmas Eve at 19.8°C

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Temperature

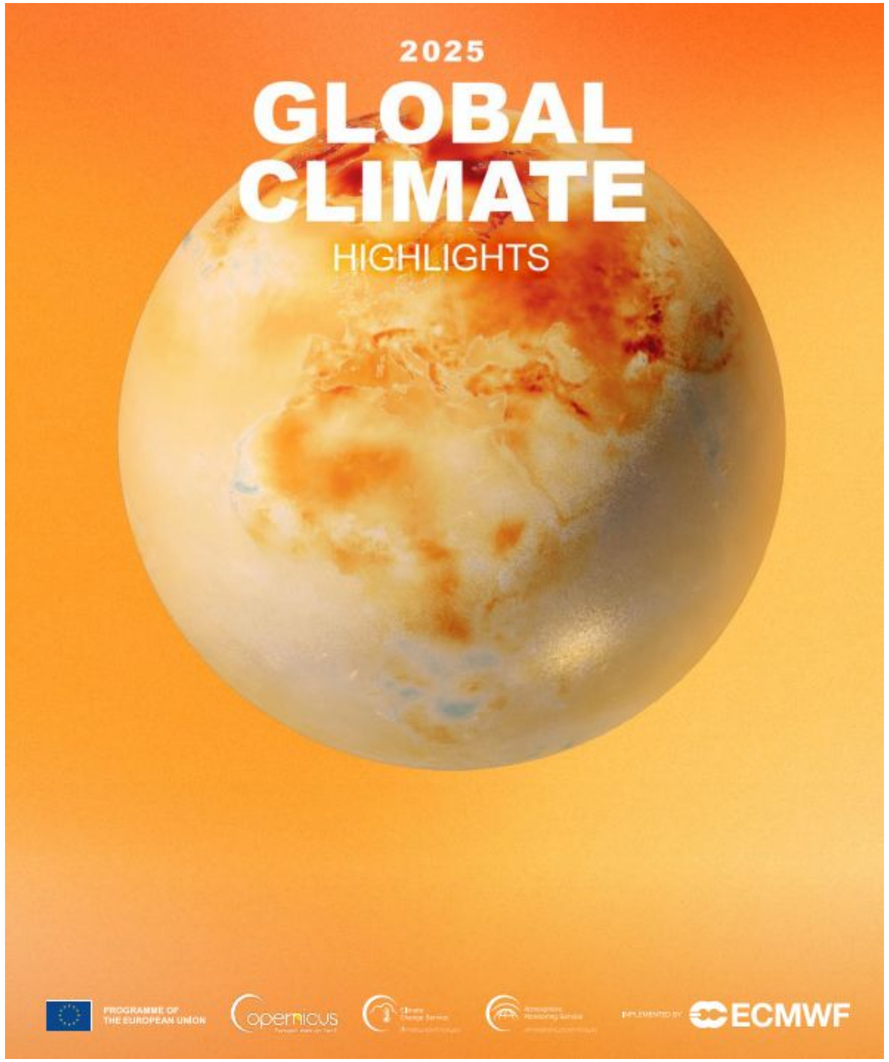


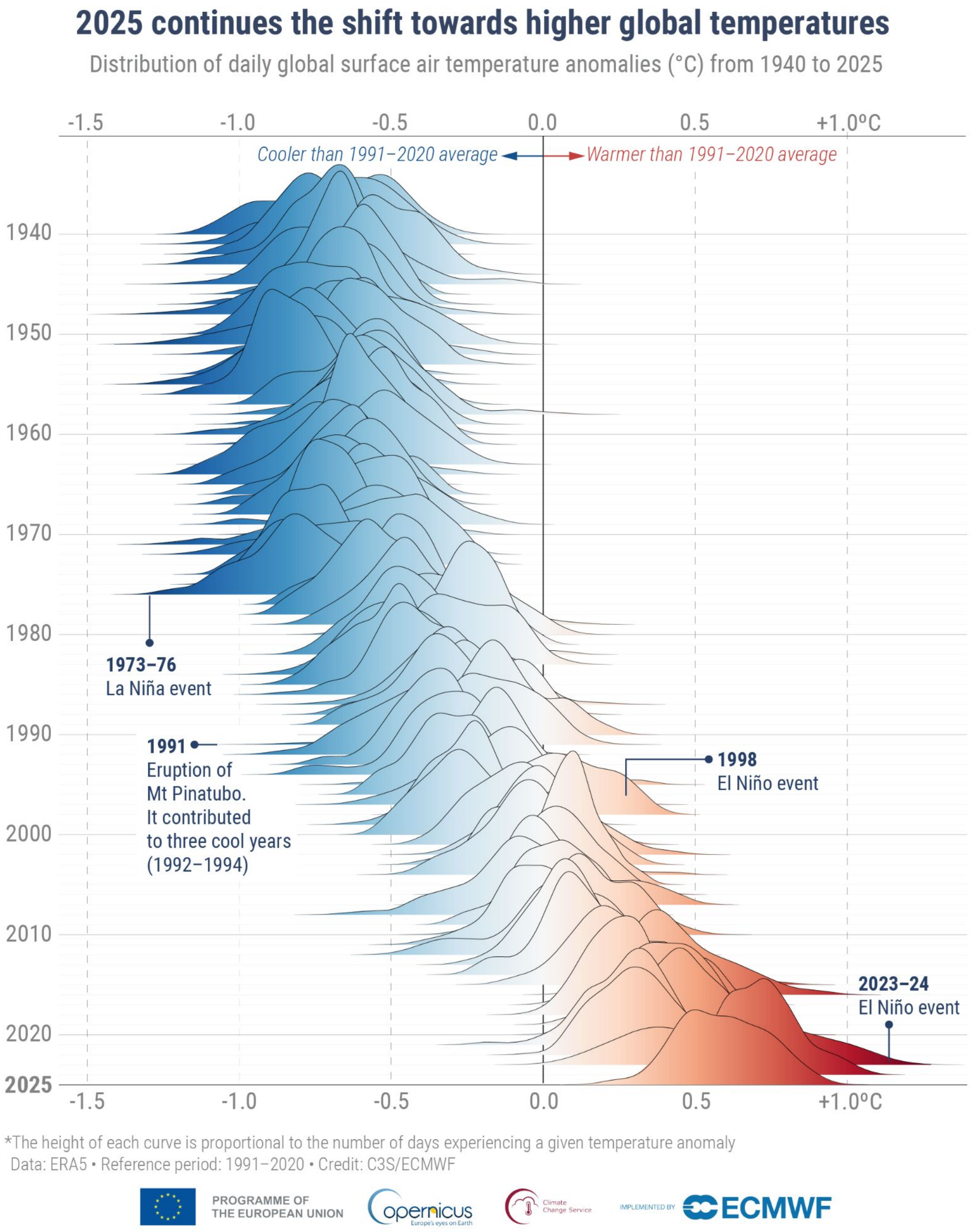
- 2025 has been the **3rd warmest year on record**
- GMST anomaly **1.44 ± 0.09 °C** above pre-industrial times

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://berkeleyearth.org/global-temperature-report-for-2025/

- Copernicus released the 2025 Global Climate Highlights report.





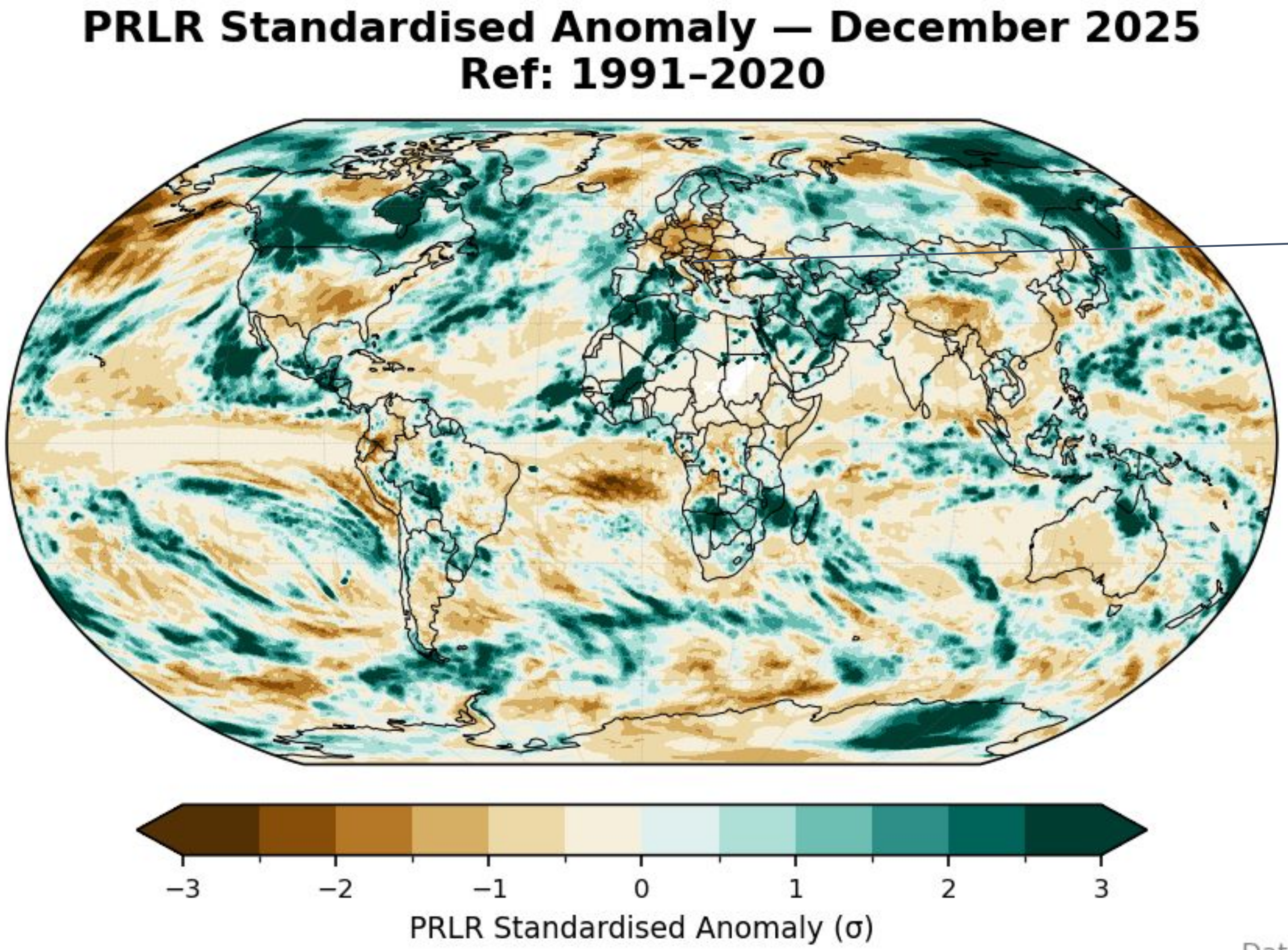
- Every day in 2025 has been above the 1991-2020 mean.

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

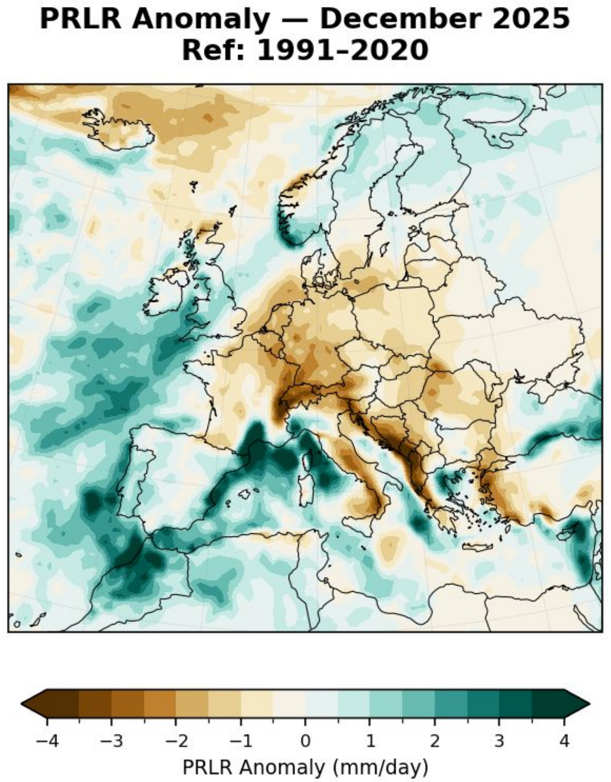
Source: Link

I. Recent state of the climate

Precipitation



Data source: ERA5

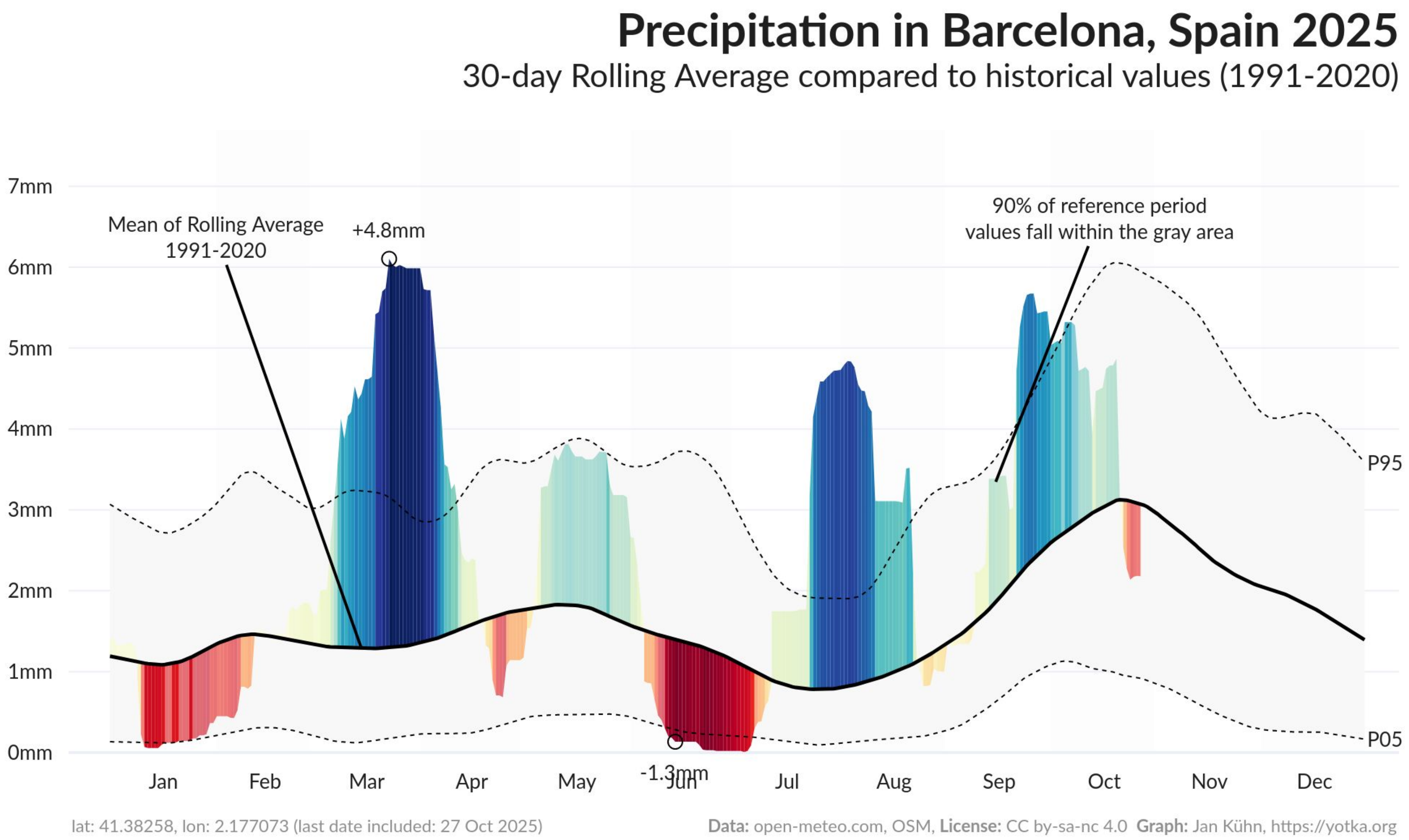


Data source: ERA5

- Storm Byron in eastern Greece (4-9 Dec)
- Storm Bram in Ireland and the UK (9-10 Dec)
- Flooding in Montpellier

I. Recent state of the climate

Barcelona

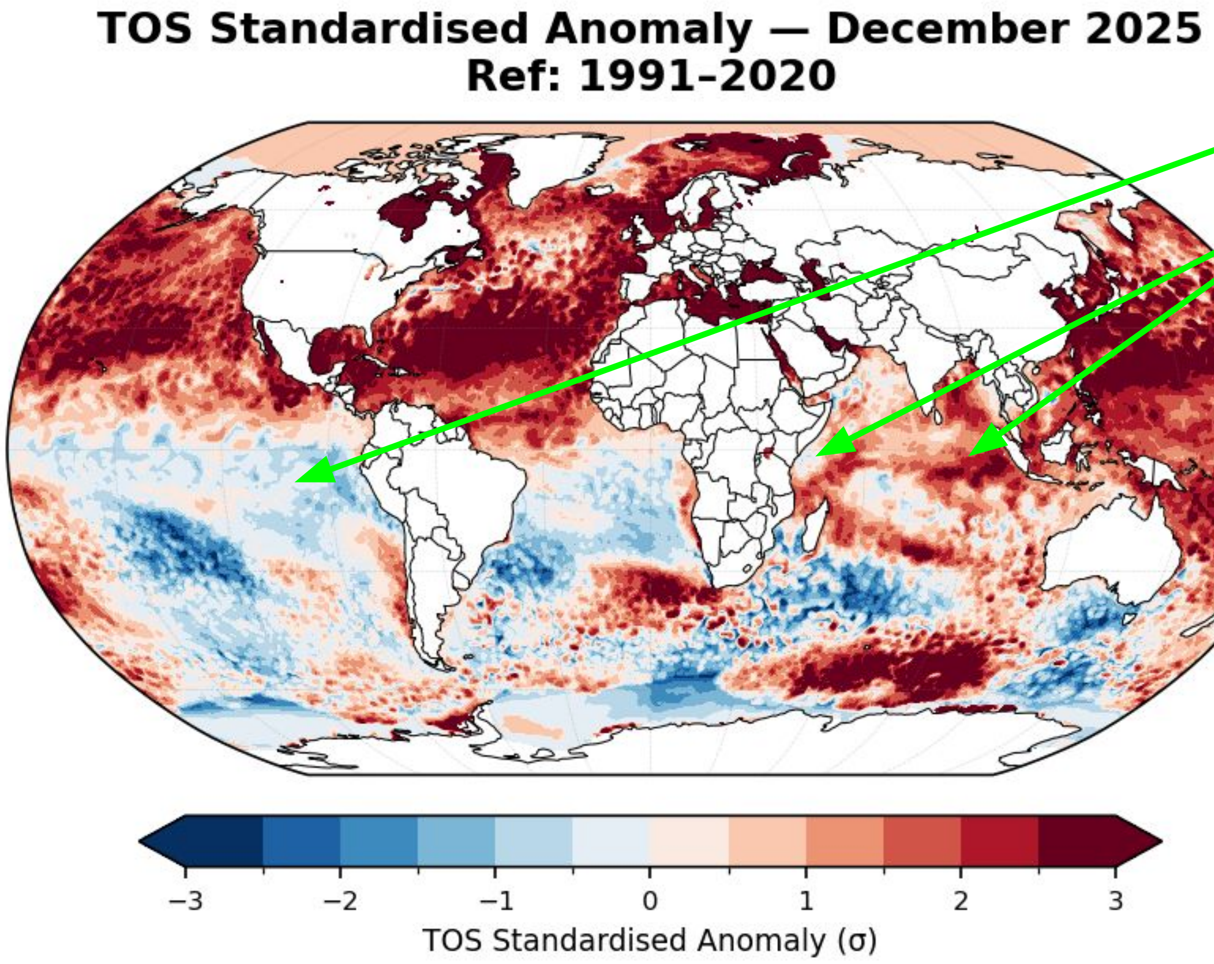


Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://yotka.org/meteo-hist

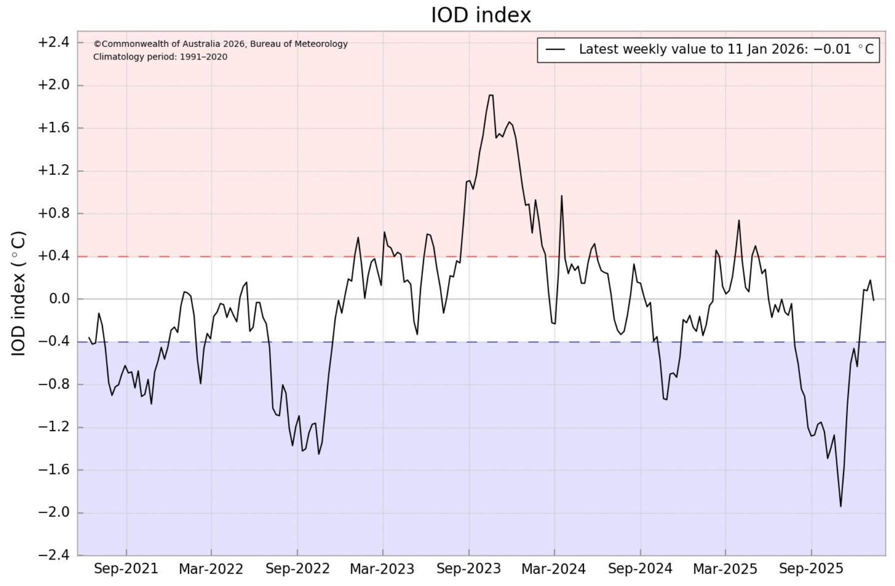
I. Recent state of the climate

Sea surface temperature (SST)



Data source: ERA5

- ➢ Super warm anomalies over the Northern Hemisphere.
- ➢ La Niña conditions are present in the Tropical Pacific.
- ➢ Neutral IOD (the whole Indian Ocean is warmer) - looks like a positive phase of the Indian Ocean Basin mode

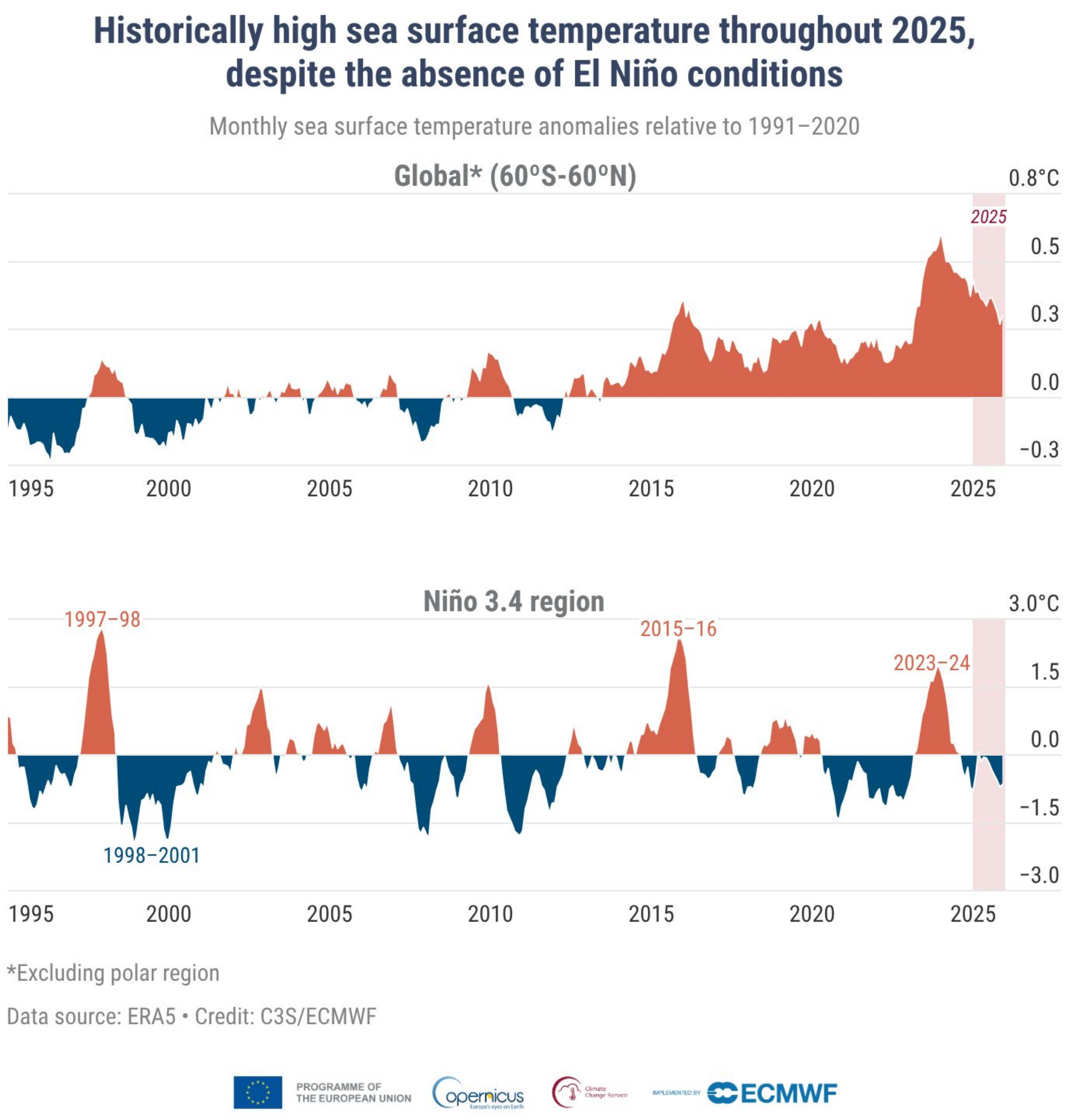


Source
https://www.bom.gov.au/climate/enso/?ninoIndex=nino3.4&index=nino34&period=weekly#tabs=Indian-Ocean

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

I. Recent state of the climate

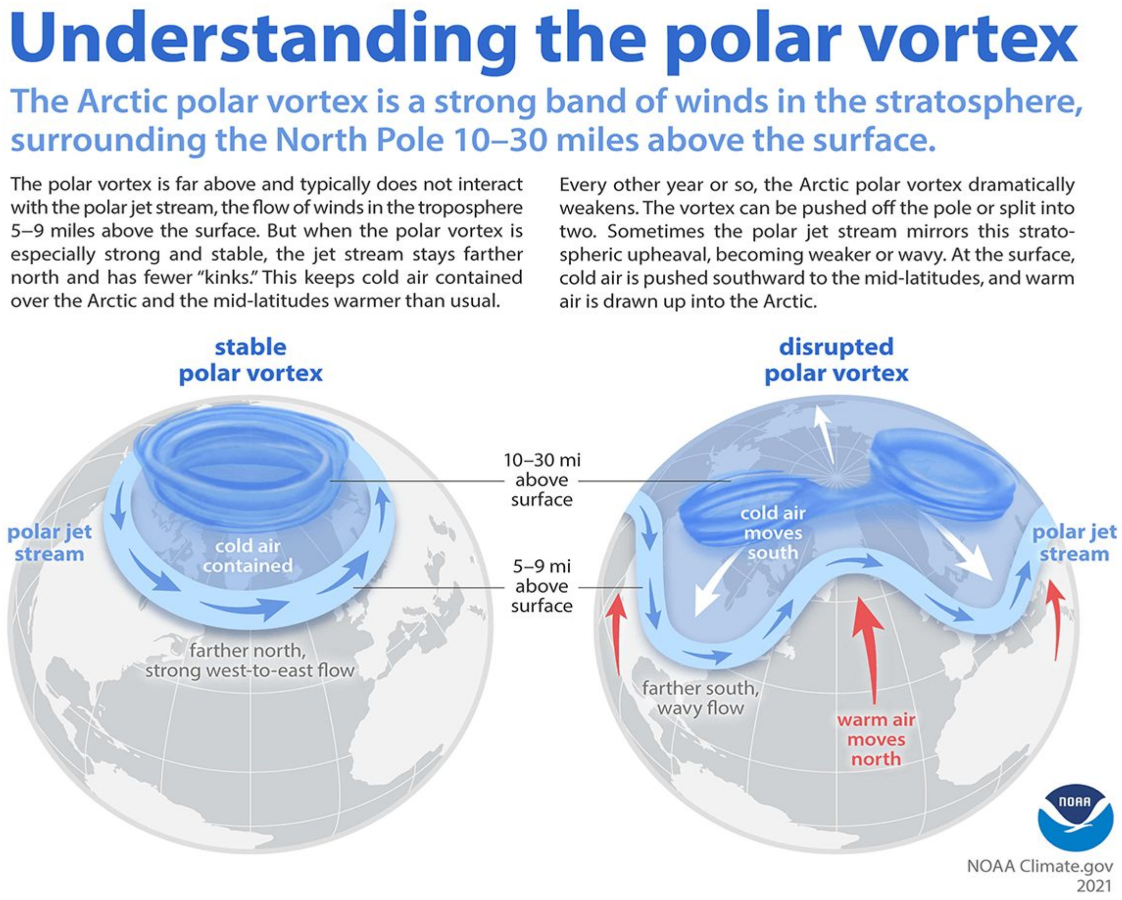
Sea surface temperature (SST)

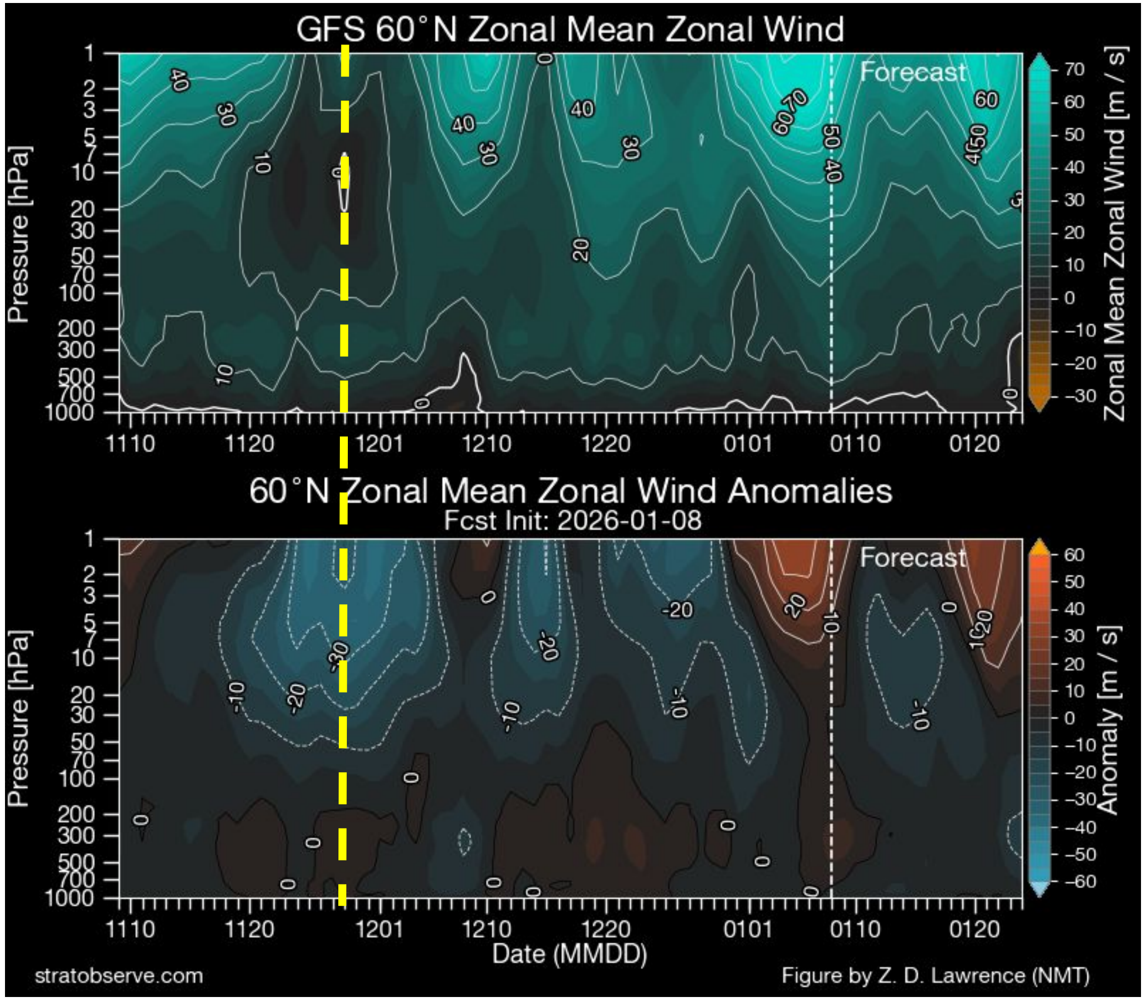


Source: Link

Stratospheric polar vortex (SPV)

- ➢ Weakening of the PV at the end of last November did not have impacts at the surface.





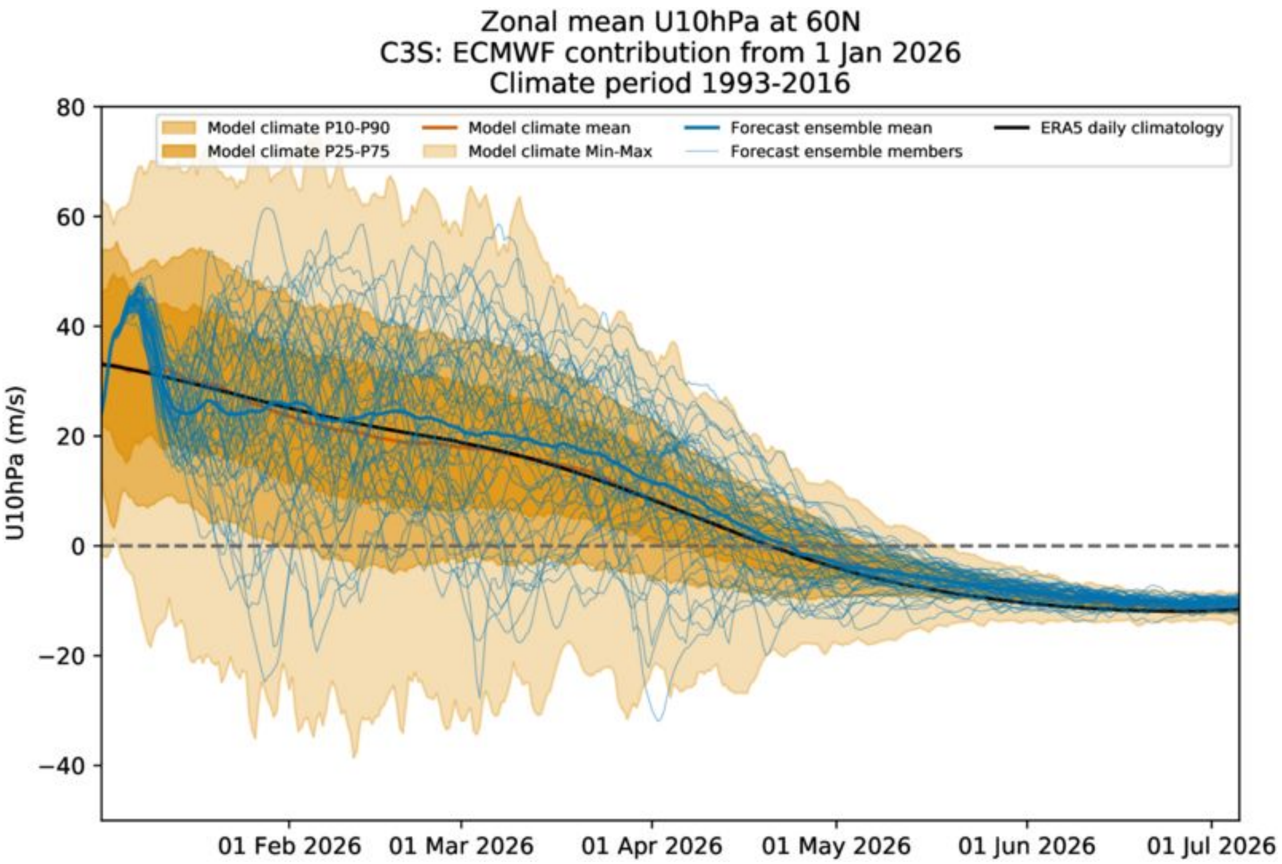
Source: https://stratobserve.com/anom_ts_diags

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

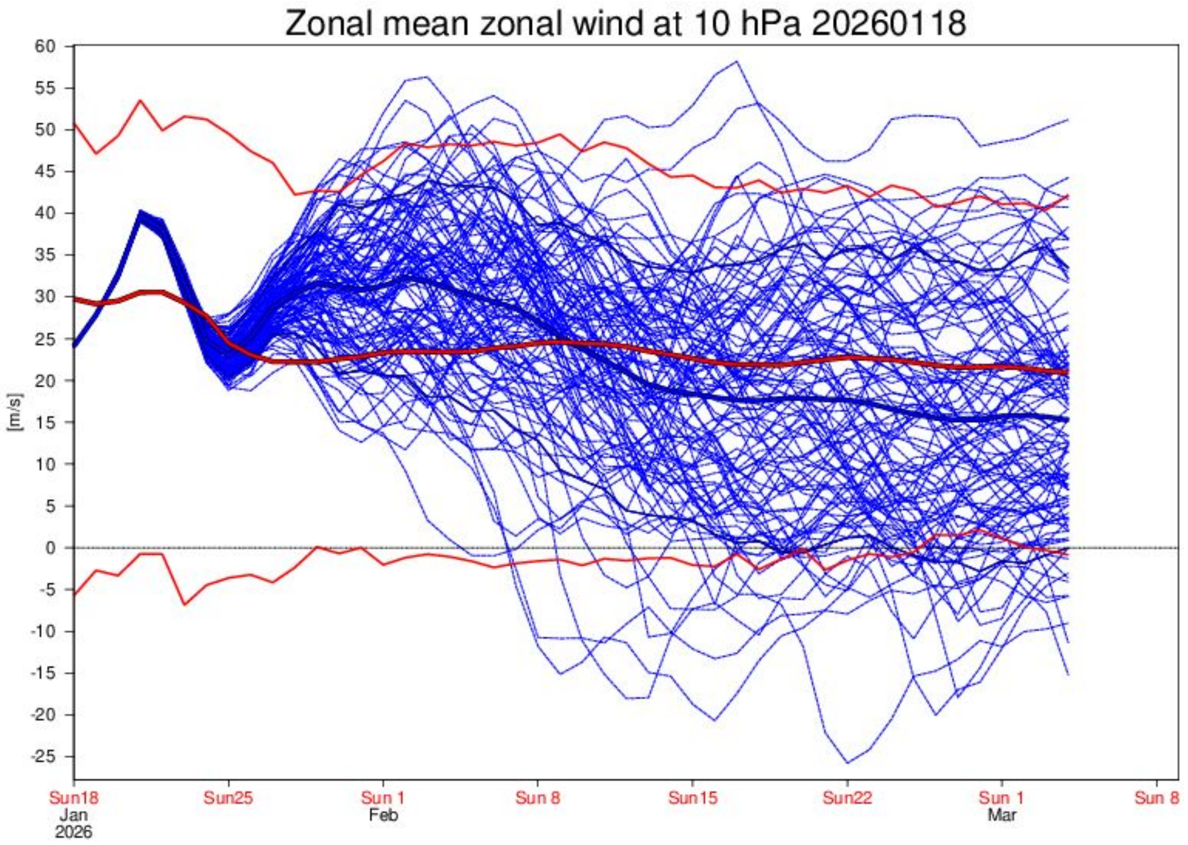
I. Recent state of the climate

Stratospheric polar vortex

➢ Seasonal forecasts



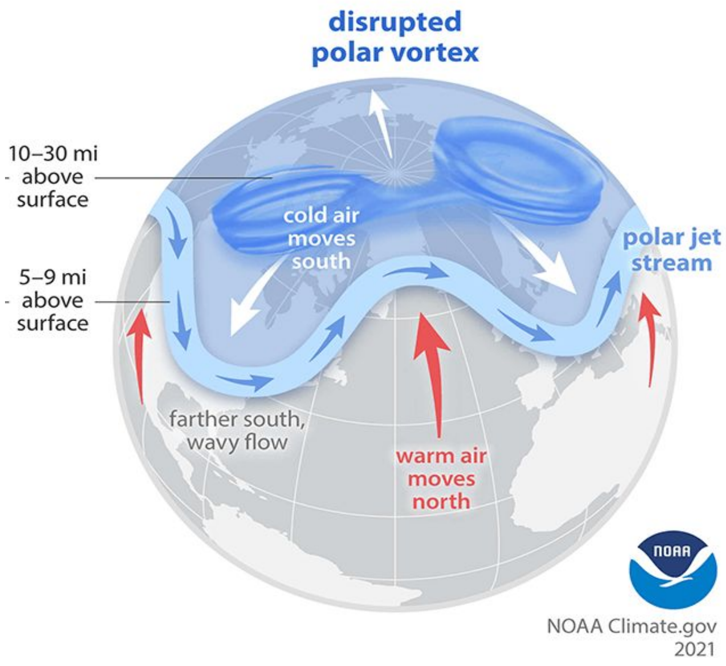
➢ Subseasonal forecasts



Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://charts.ecmwf.int/ / https://climate.copernicus.eu/charts/packages/c3s_seasonal/

Polar jet stream



Disruption of the polar jet stream on the first week of January - cold air

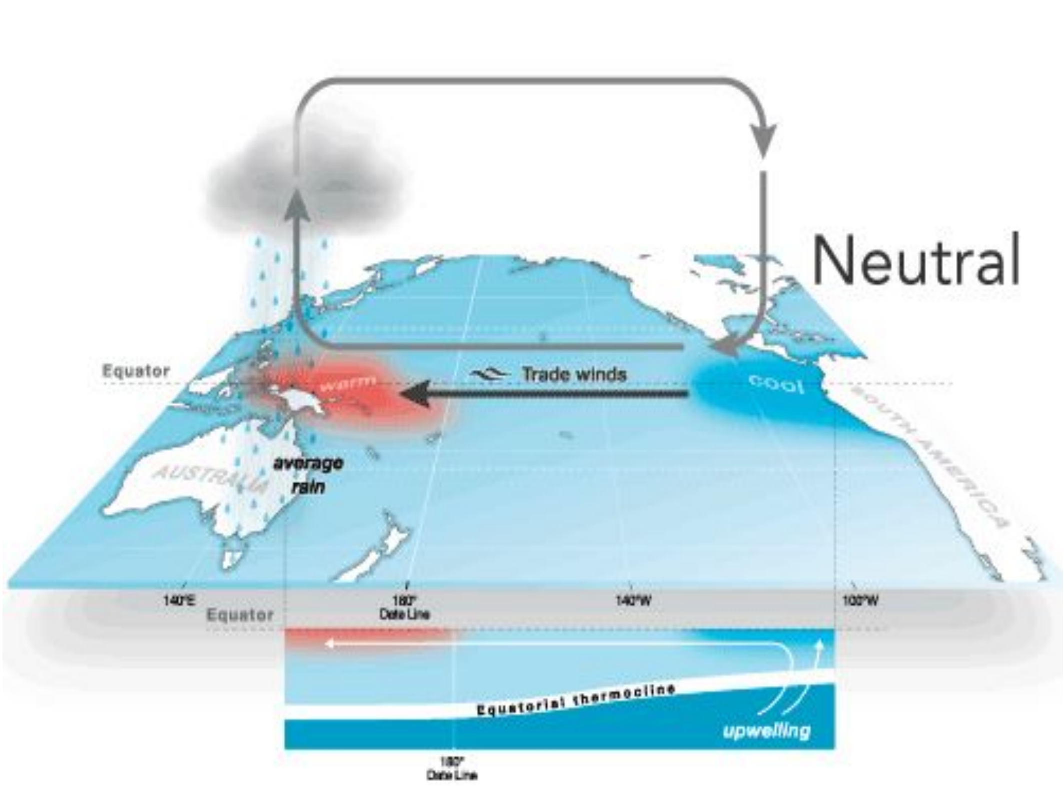
Try g500 zonal mean removed to see meandritos

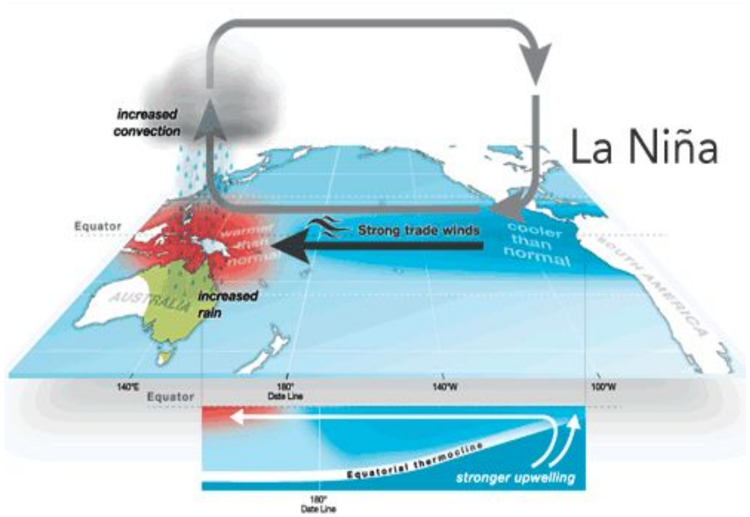
EFFECTS OF THE SSW

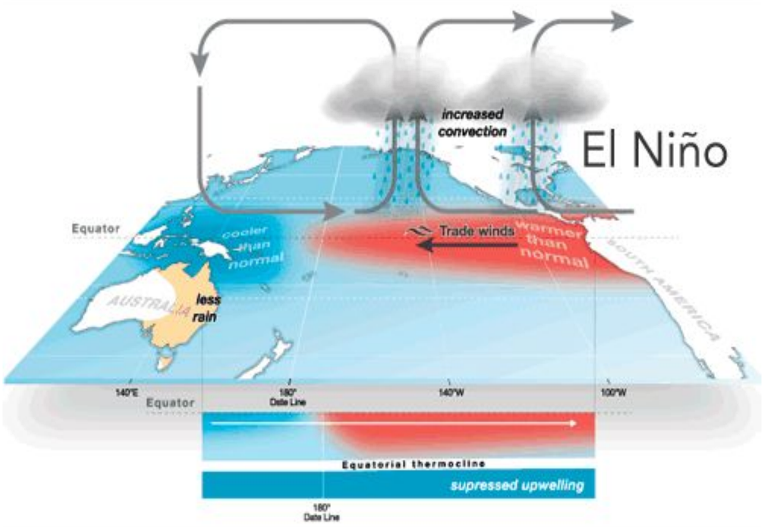
https://www.severe-weather.eu/global-weather/arctic-cold-blast-winter-storm-snow-bomb-forecast-europe-january-2026-mk/

El Niño-Southern Oscillation (ENSO)

➢ ENSO is the leading mode of natural variability at seasonal to interannual (S2I) time scales and is considered as an internally occurring coupled ocean-atmosphere phenomenon.

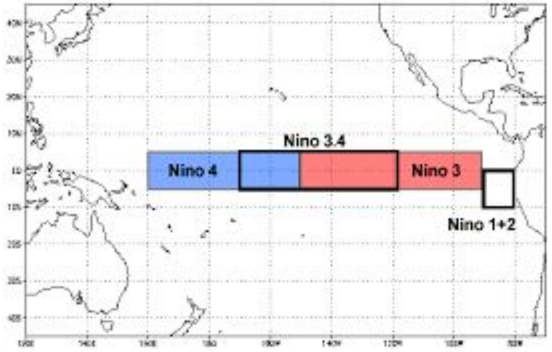


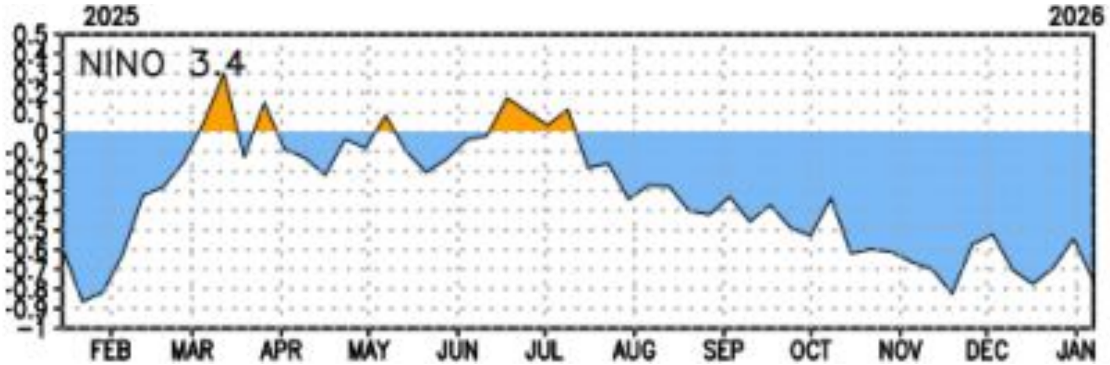


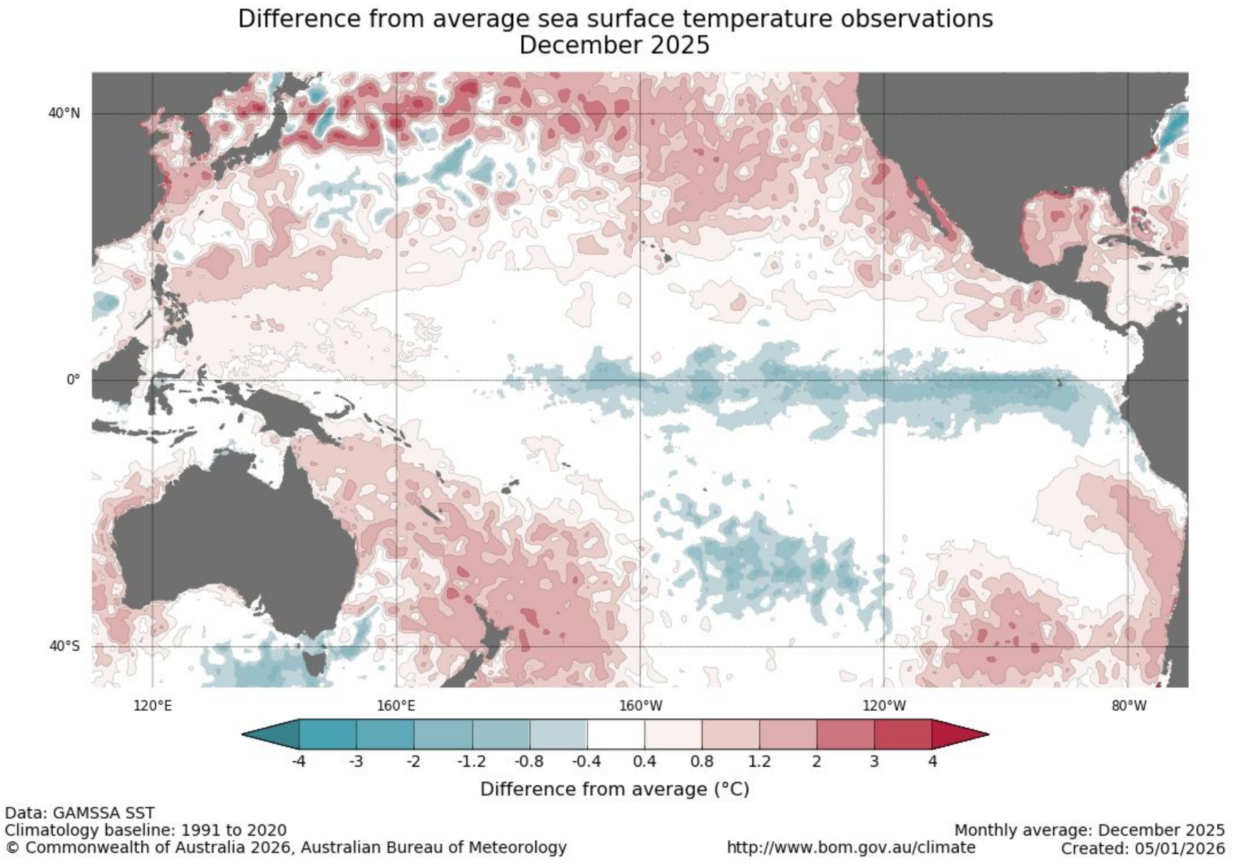


El Niño-Southern Oscillation (ENSO)

➢ ENSO alert system status: **La Niña Advisory**





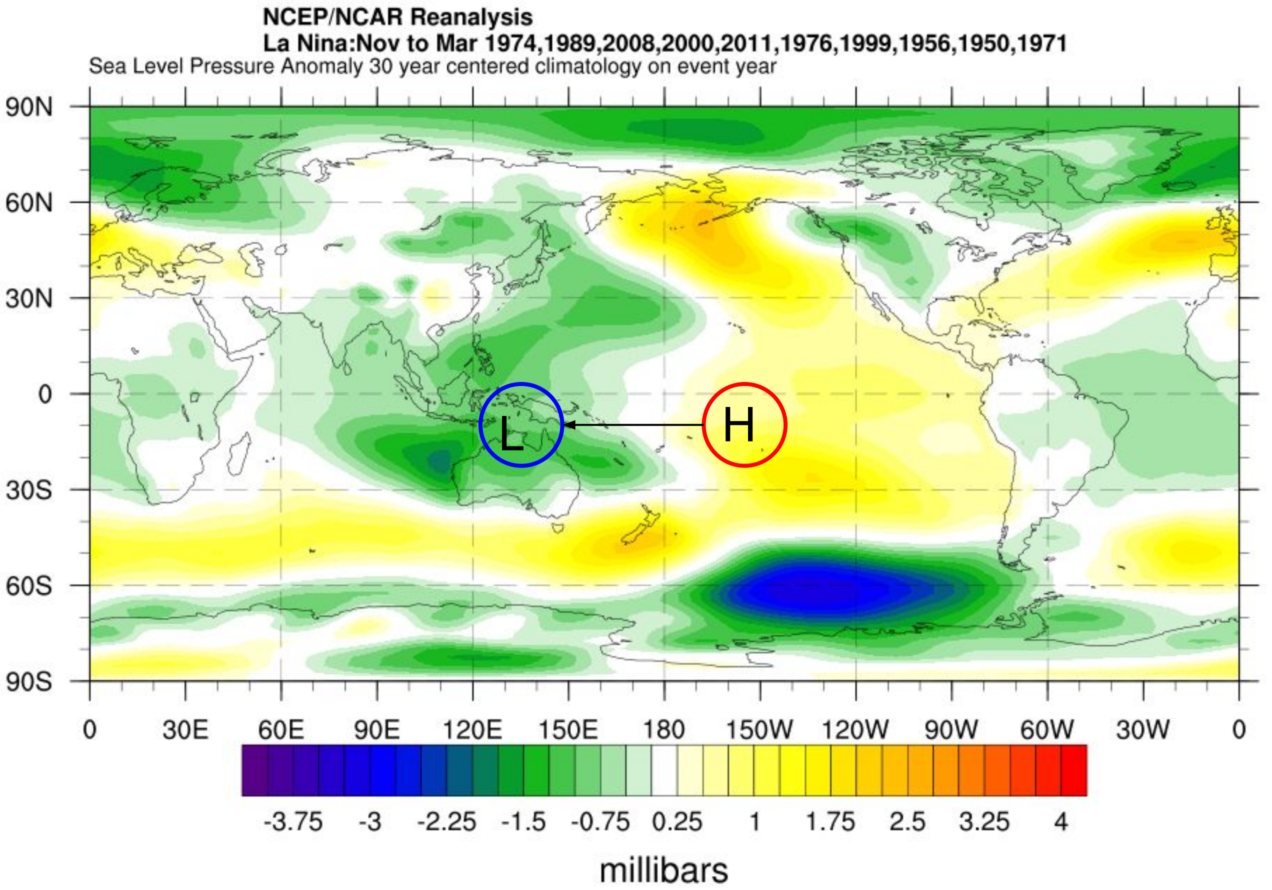


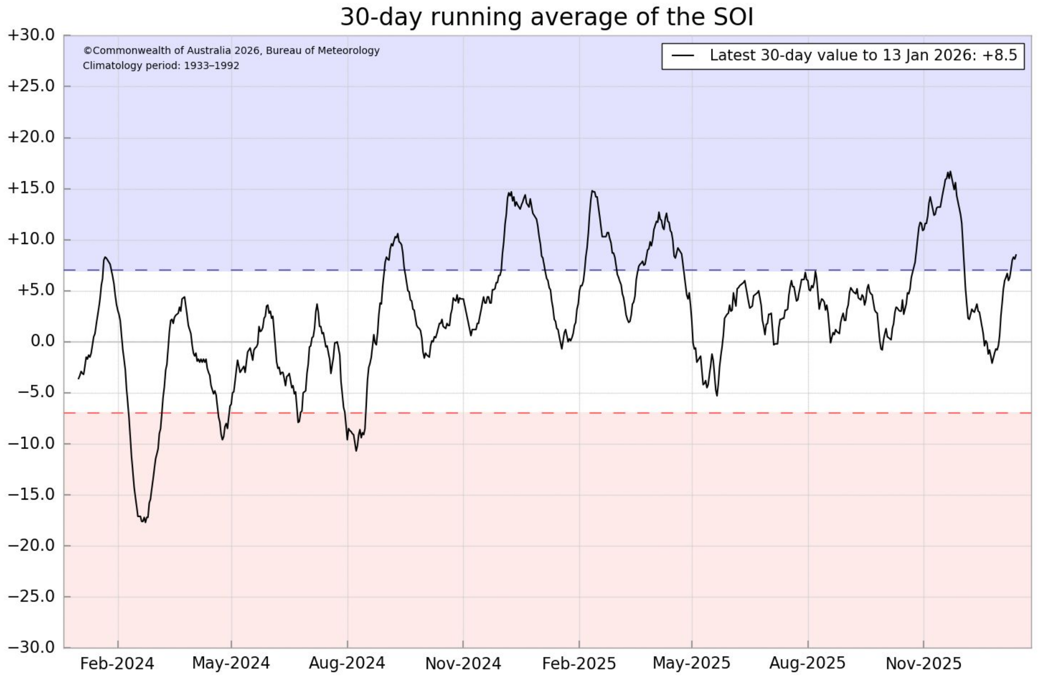
➢ Negative SST anomalies in the Niño 3.4 region, known as the **Oceanic Niño Index** (ONI).

Source: https://www.climate.gov/news-features/blogs/enso / http://www.bom.gov.au/climate/enso/?ninoIndex=nino3.4&index=nino34&period=weekly#tabs=Pacific-Ocean&pacific=SOI / https://www.nnvl.noaa.gov/view/#SSTA

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

El Niño-Southern Oscillation (ENSO) - **The atmosphere**



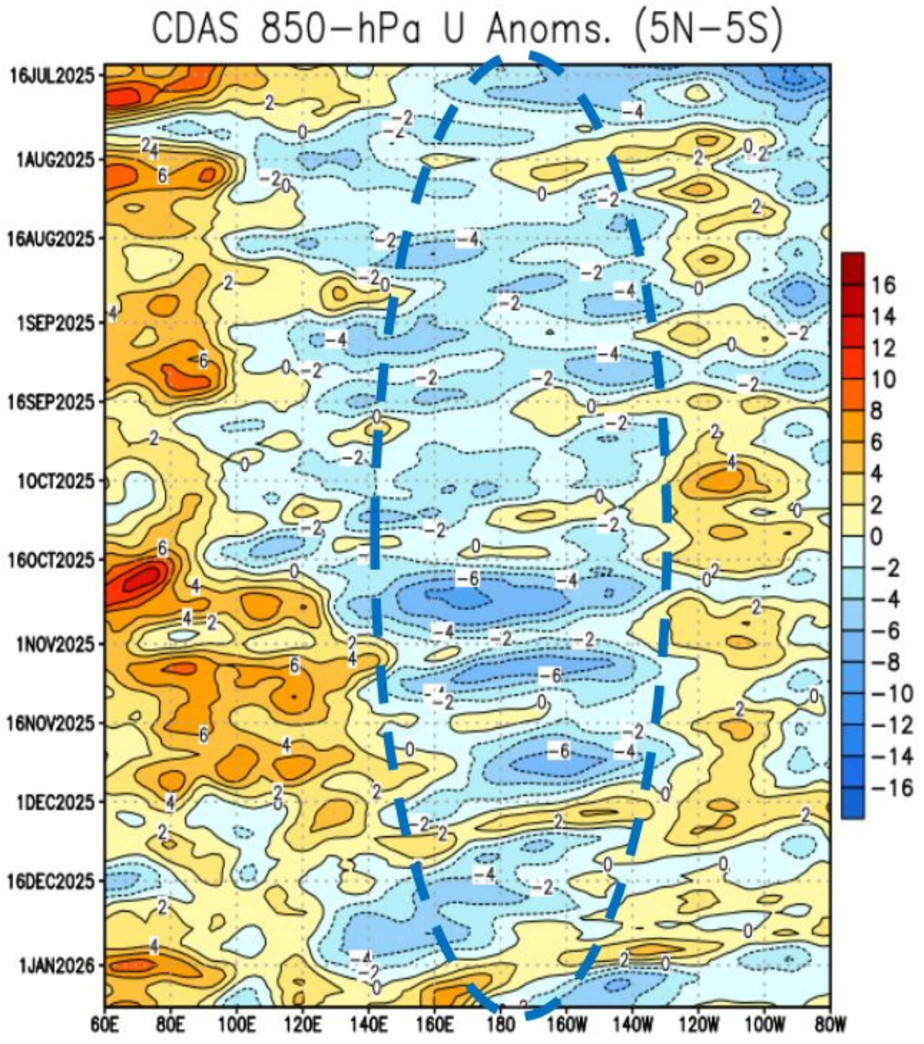


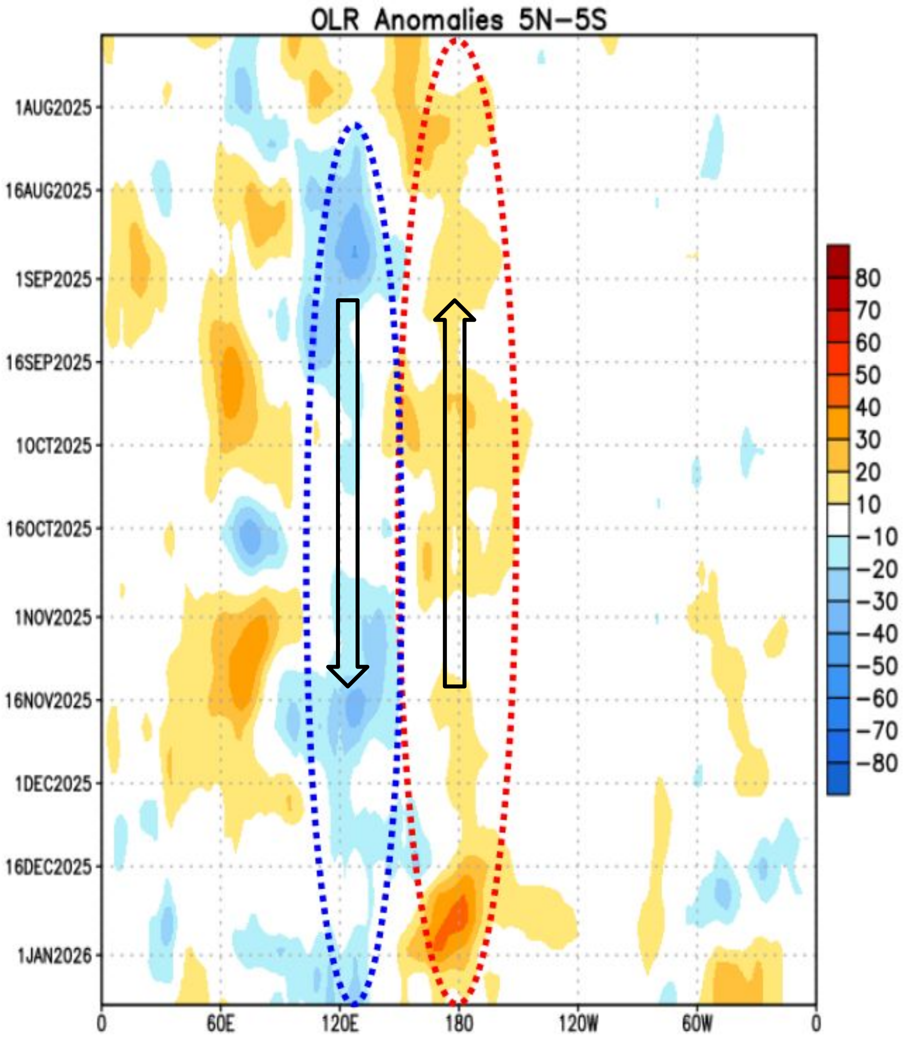
- **Southern Oscillation Index (SOI)** : the difference in mean sea level pressure between Darwin and Tahiti.
- **Positive SOI** = High pressure over Tahiti, low pressure over Darwin -> strong Walker circulation -> La Niña

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://www.climate.gov/news-features/blogs/enso / http://www.bom.gov.au/climate/enso/?ninoIndex=nino3.4&index=nino34&period=weekly#tabs=Pacific-Ocean&pacific=SOI / https://www.nnvl.noaa.gov/view/#SSTA

El Niño-Southern Oscillation (ENSO) - **The atmosphere**





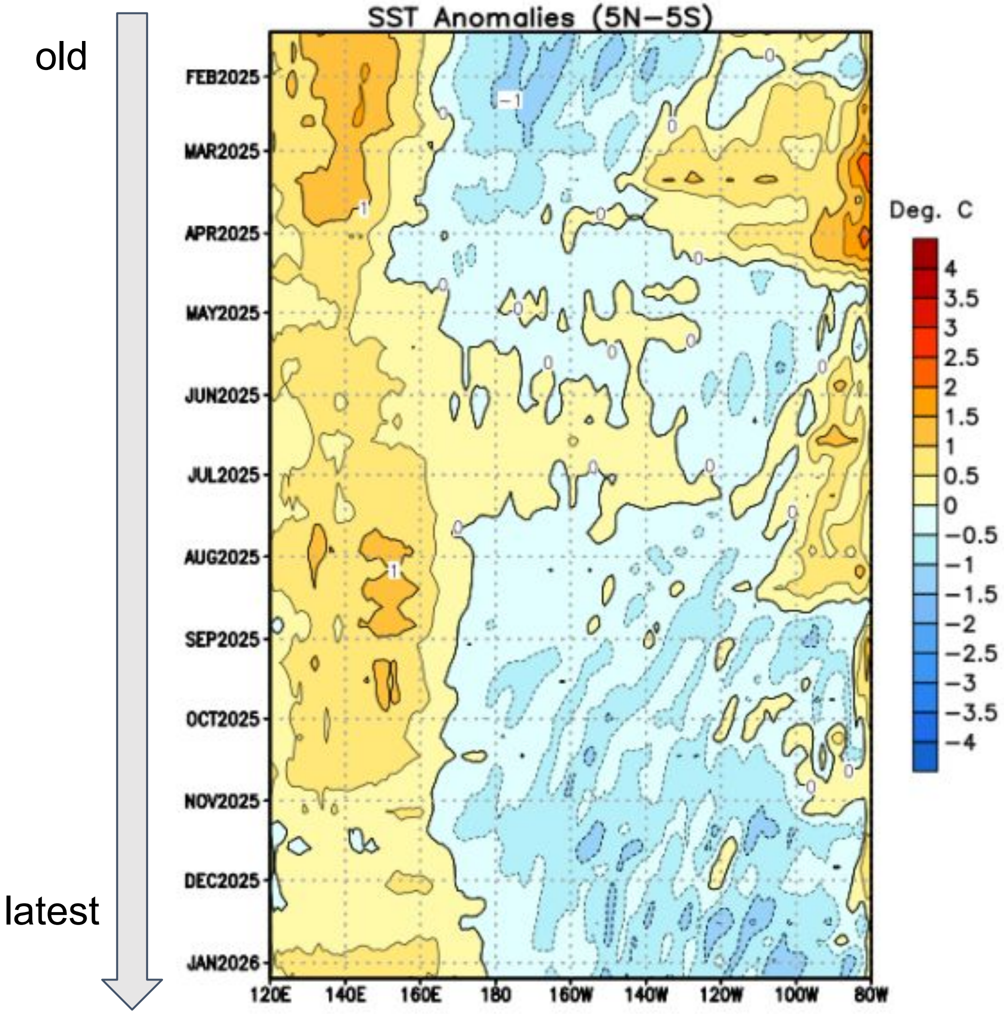
Central Pacific dominated by easterly wind anomalies (blue color in left plot), also consistent with a La Niña.

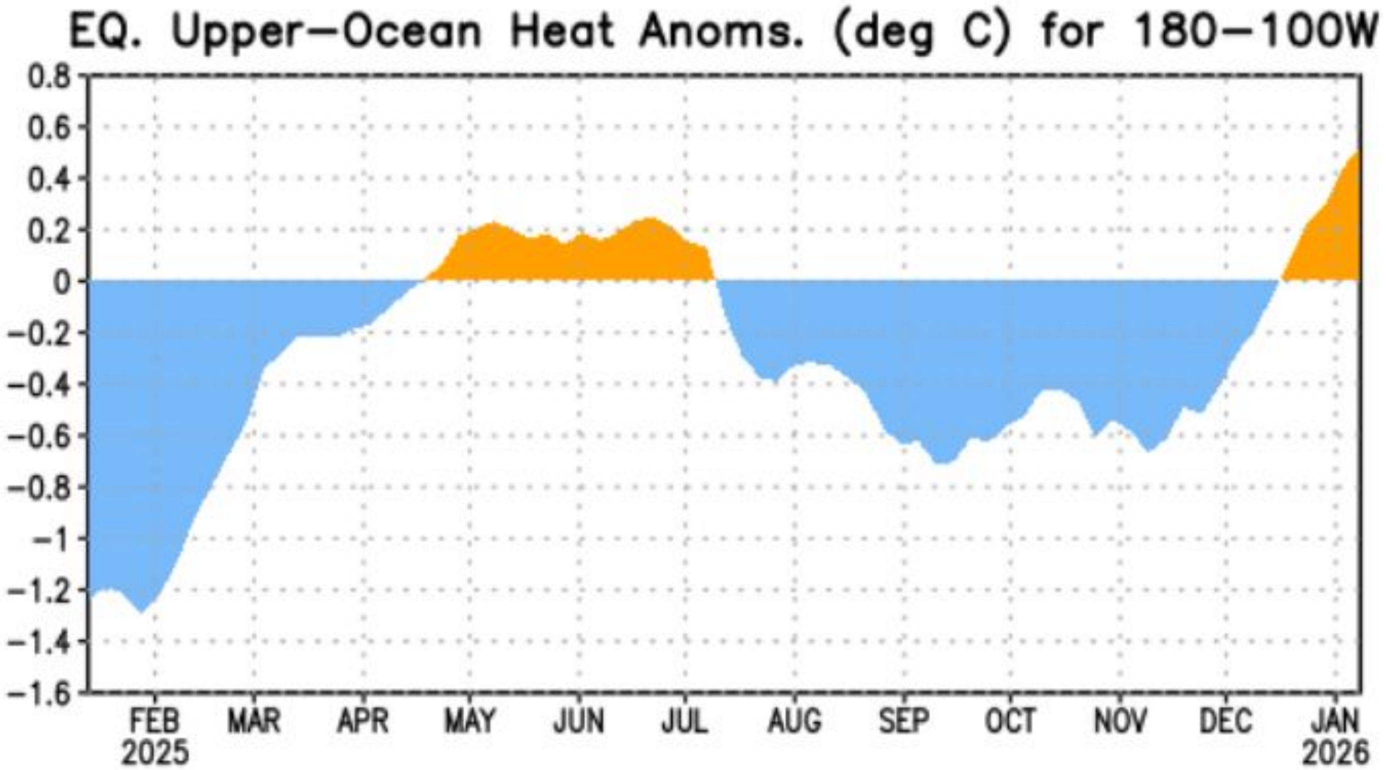
Strong subsidence (positive OLR anomalies) over the Date Line and enhanced convection (negative OLR anomalies = enhanced precipitation) over the Maritime Continent are consistent with a La Niña.

Source: https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf / https://www.pmel.noaa.gov/gtmba/assorted-plots

I. Recent state of the climate

El Niño-Southern Oscillation (ENSO) - **The ocean**





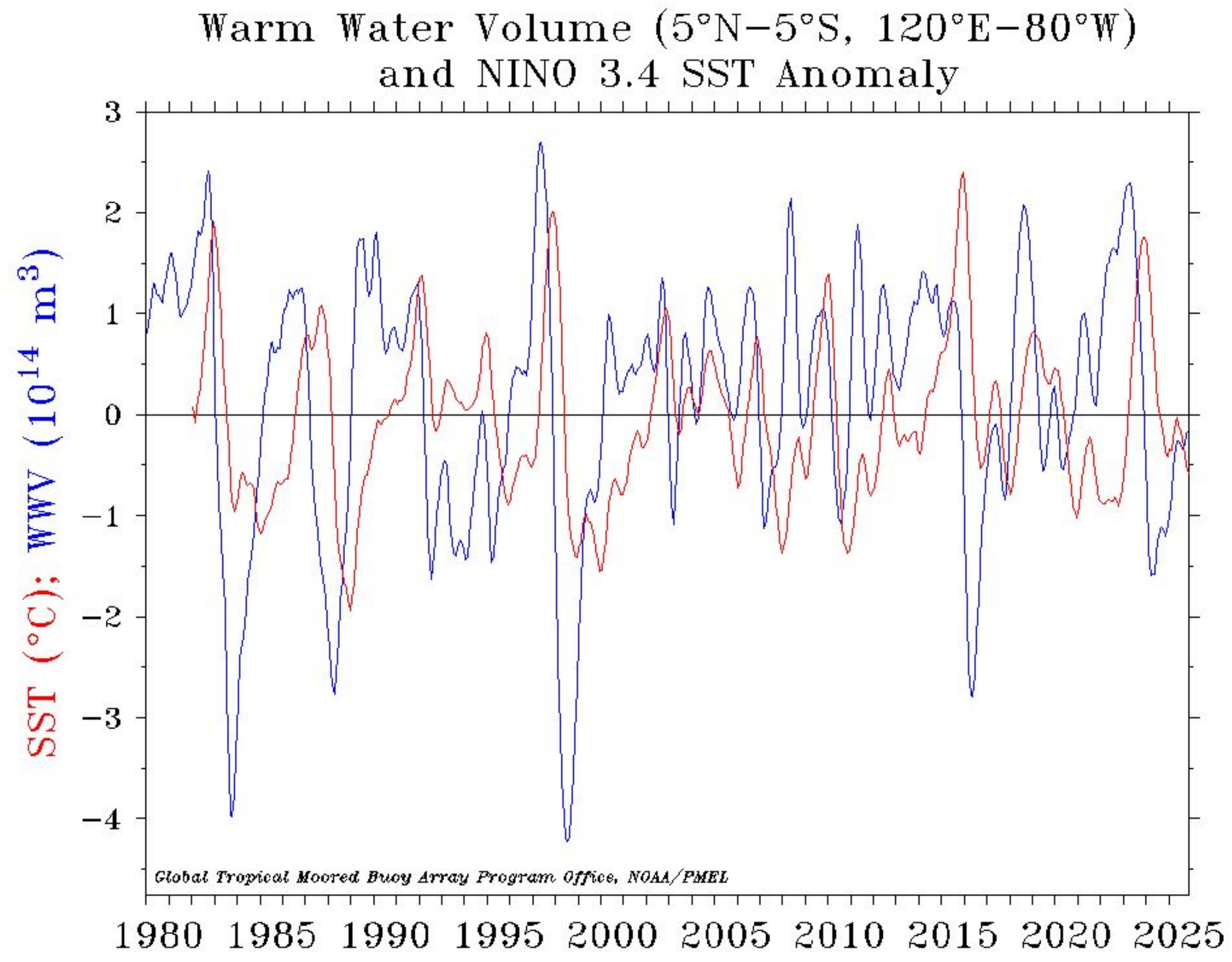
- ➢ Temperature of the ocean between the surface and 300m depth from the central to the eastern equatorial Pacific.
- ➢ **ENSO precursor** (most of the times!)

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf / https://www.pmel.noaa.gov/gtmba/assorted-plots

Heat content in the upper ocean as ENSO precursor

- ➢ ENSO-related SST anomalies usually follow anomalies in warm water volume a few months later.
- ➢ **Key for predicting ENSO conditions**

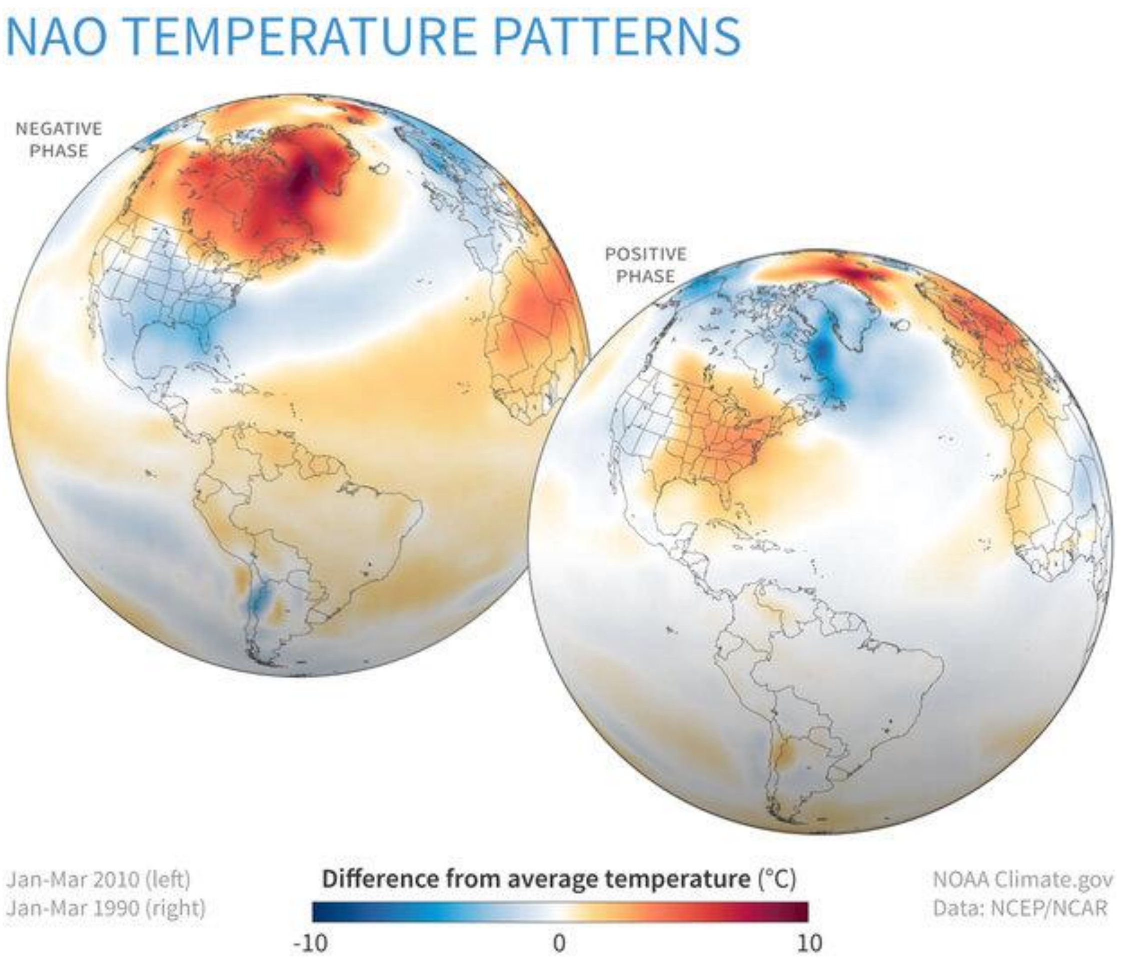


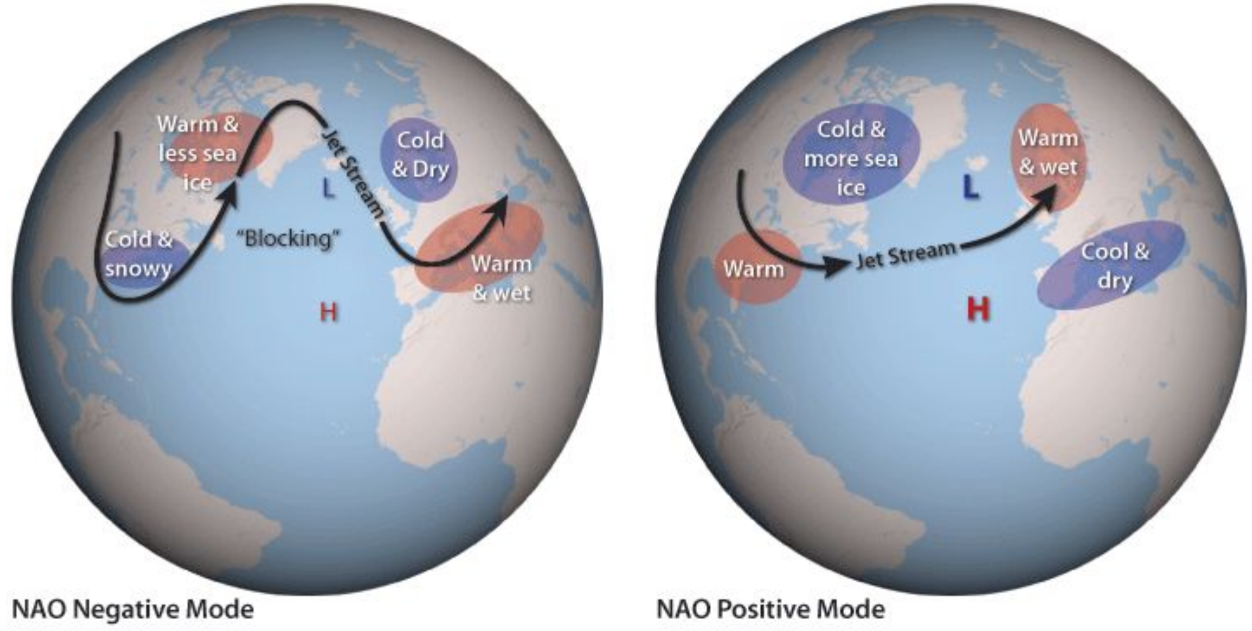
Source: https://www.pmel.noaa.gov/elnino/upper-ocean-heat-content-and-enso

I. Recent state of the climate

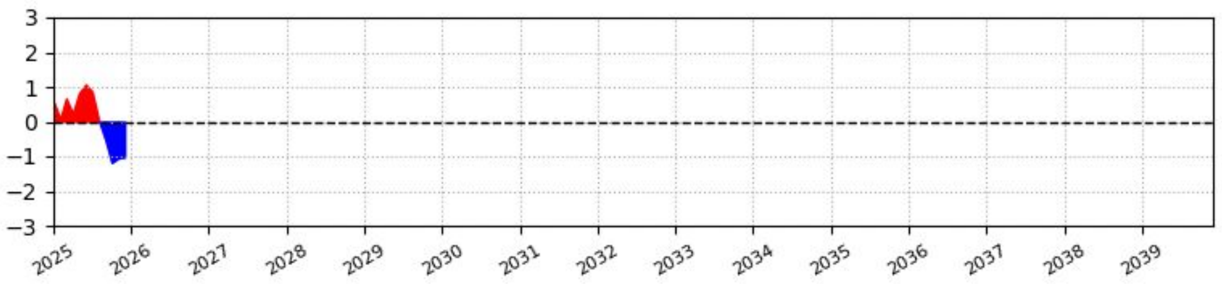
North Atlantic Oscillation (NAO)

- The North Atlantic Oscillation (NAO) is the leading mode of large-scale atmospheric variability in the North Atlantic basin.



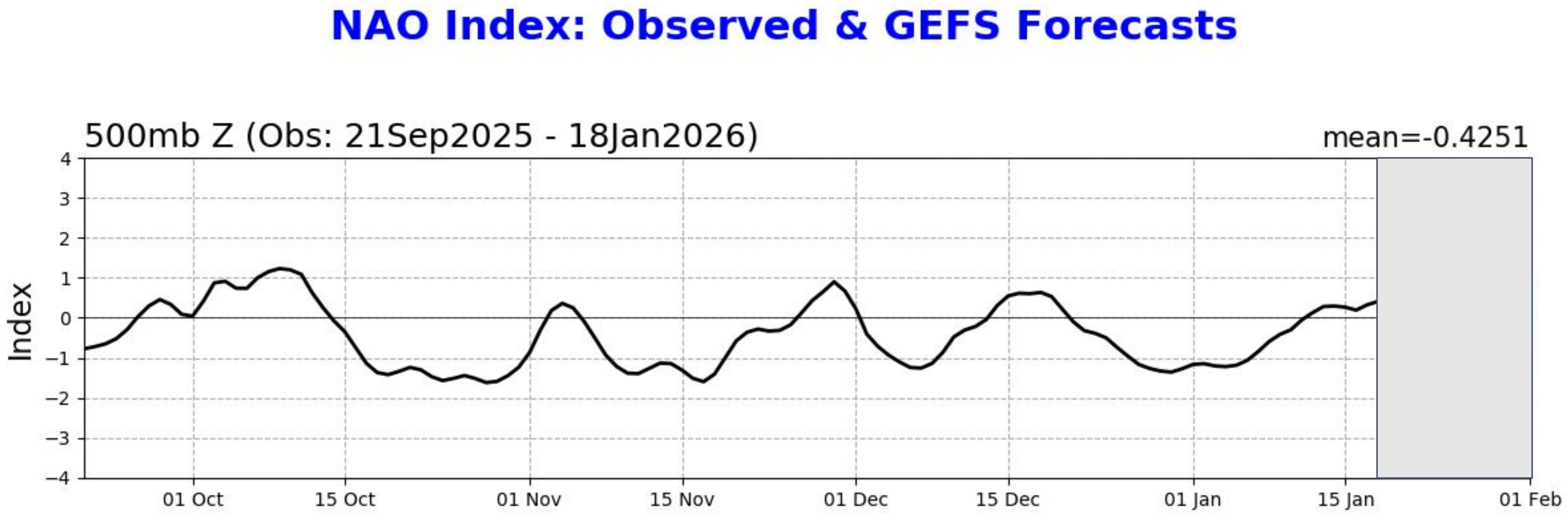


NAO index: Standardized 3-month Running Mean Index (through Jan 2025)



Source: https://www.cpc.ncep.noaa.gov/data/teledoc/nao_ts.shtml

North Atlantic Oscillation (NAO)

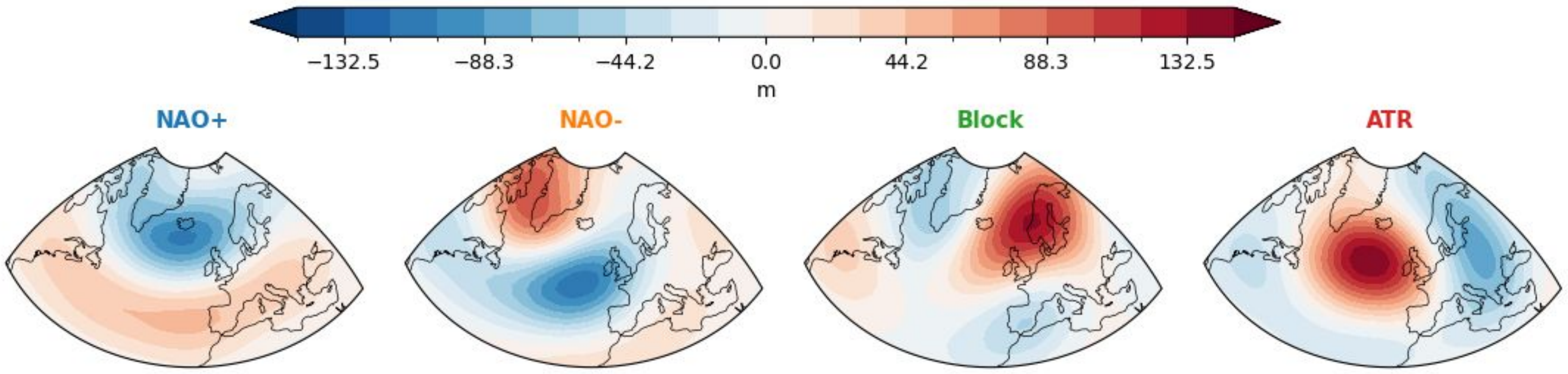


Barcelona Supercomputing Center
Centro Nacional de Supercomputación

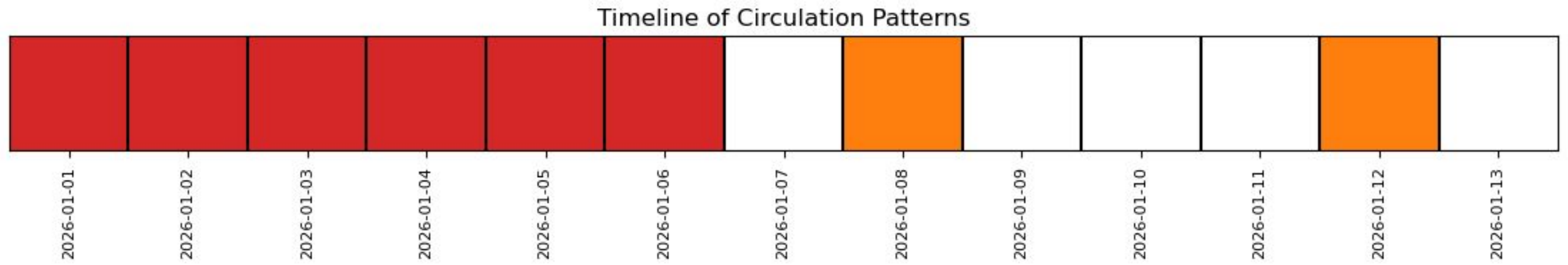
Source: https://www.cpc.ncep.noaa.gov/products/precip/CWlink/pna/nao_index_ensm.shtml

I. Recent state of the climate

European weather regimes



- ➢ Geopotential height anomaly composites at 500 hPa
- ➢ 1980 - 2008 ONDJFMA (k-means clustering)

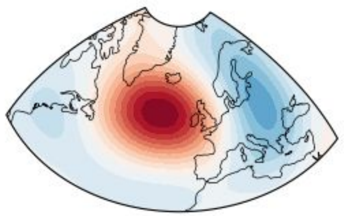


- ➢ **Blocking:** Cold and dry anomalies in Northern Europe, Wet anomalies in Southwestern Europe. Onset through anticyclonic wave breaking over Europe in the upper troposphere (Michel et al., 2012).
- ➢ **NAO+:** Westerly winds predominate bringing mild, wet and stormy winter conditions to northern Europe and eastern USA while southern Europe is more likely to see cold, dry winter conditions.
- ➢ **NAO-:** (Generally weaker pressure differences) Spells of easterly winds bring cold dry and calm winters with fewer and weaker storms to northern Europe and eastern USA.
- ➢ **ATR:** NEurope: Drier and slightly milder due to being under the influence of ridging on the upstream side. SEurope: Can be wetter (particularly Iberia and western Med) due to enhanced storm tracks directed southward. Eastern Med may be less affected.

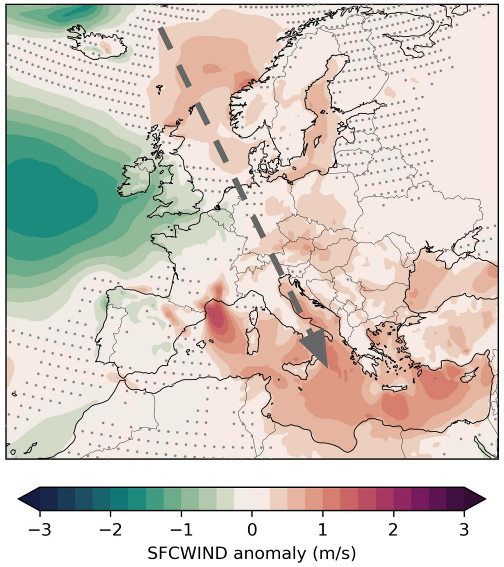
I. Recent state of the climate

Composite of ATR and surface climate

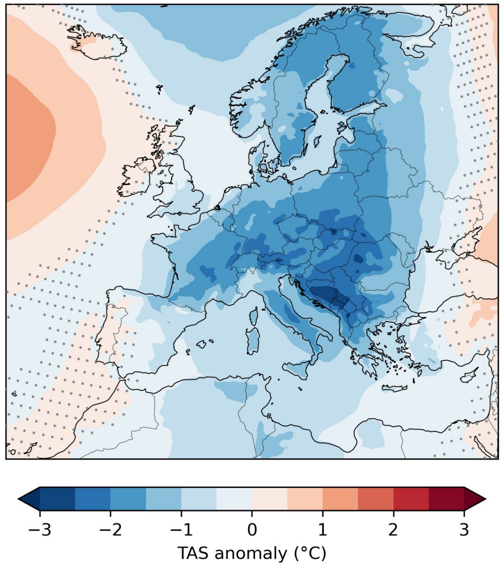
ATR



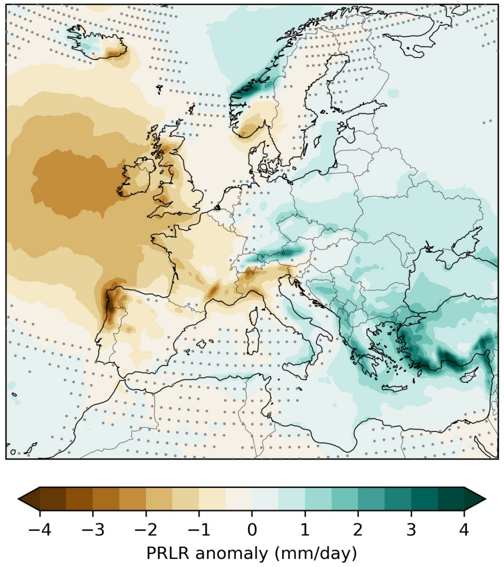
ΔSFCWIND composite — Atlantic Ridge
ERA5 (1980–2008)



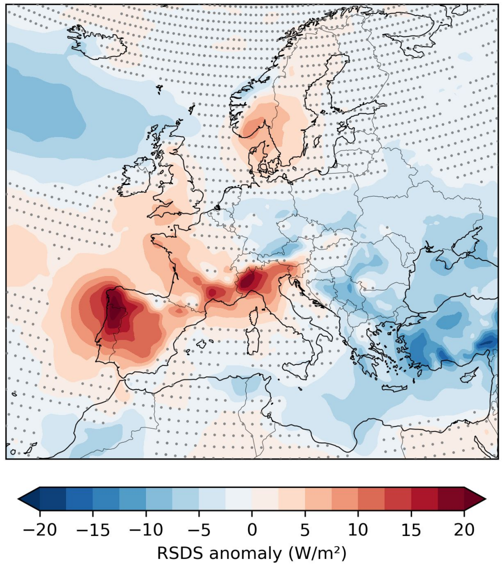
ΔTAS composite — Atlantic Ridge
ERA5 (1980–2008)



ΔPRLR composite — Atlantic Ridge
ERA5 (1980–2008)



ΔRSDS composite — Atlantic Ridge
ERA5 (1980–2008)



➢ The Atlantic Ridge (ATR) pattern entails strong winds coming from polar latitudes, bringing very cold temperatures to almost all Europe, and increased precipitation over eastern Europe.

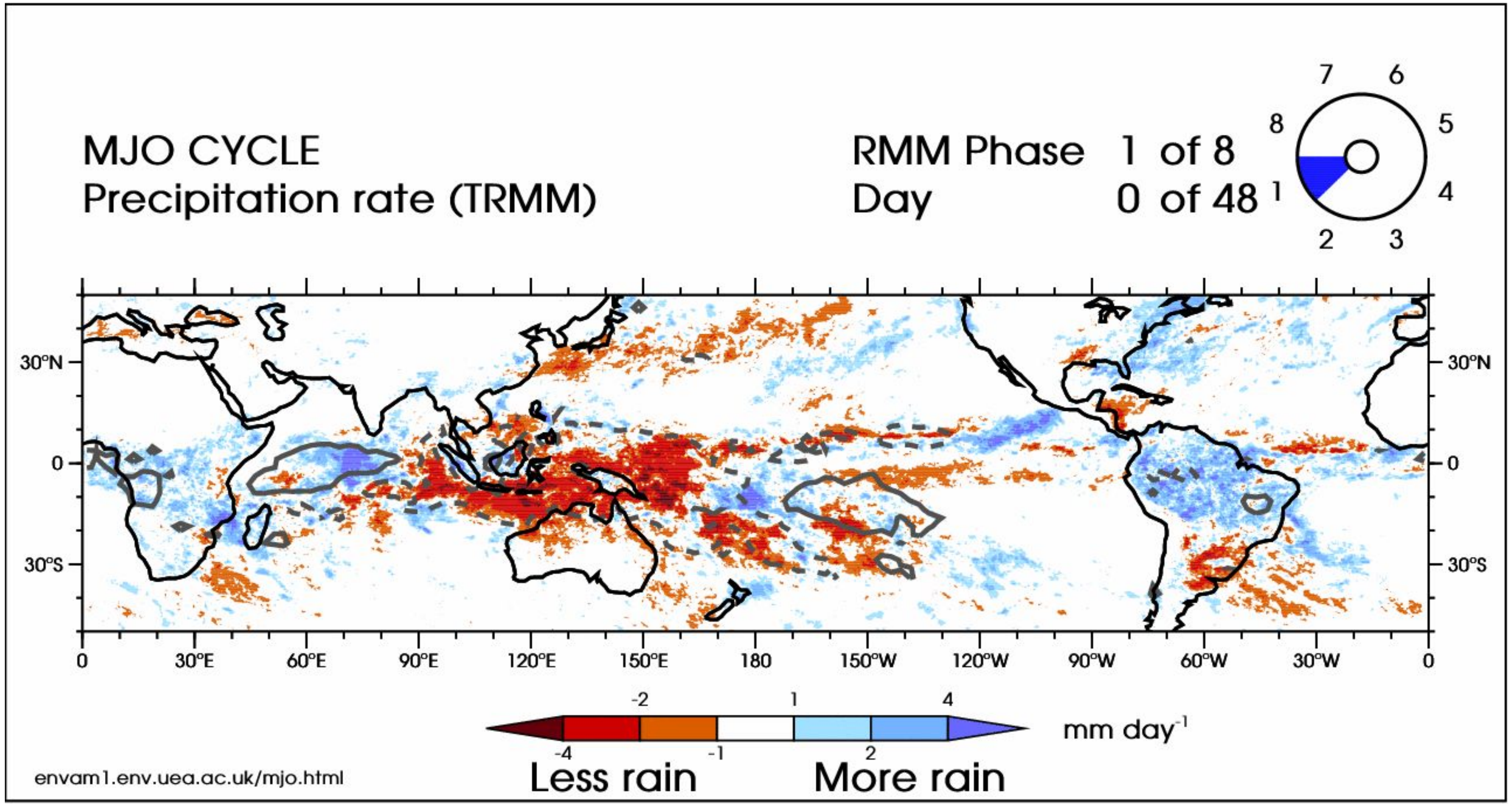
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

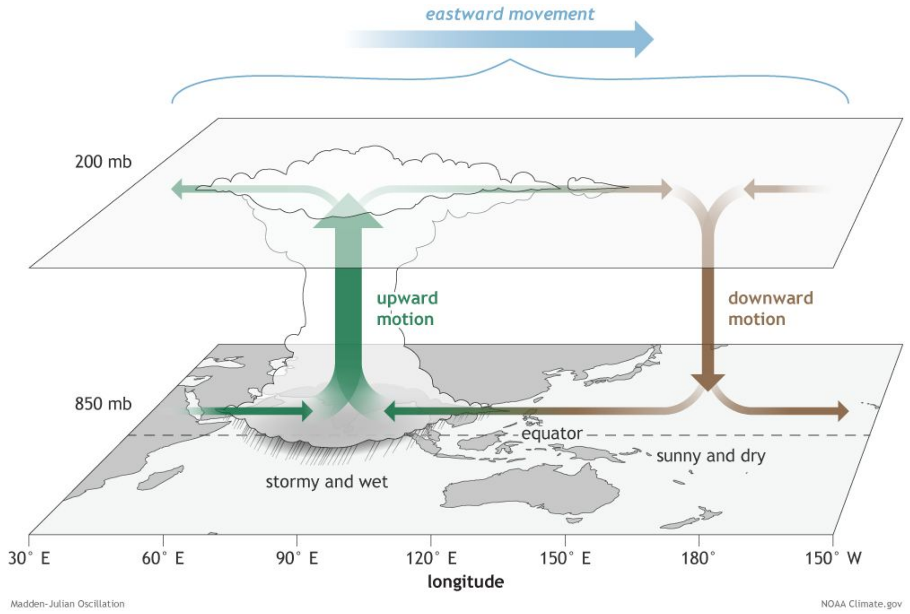
I. Recent state of the climate

II. Subseasonal forecasts

Madden-Julian Oscillation (MJO)

➢ The MJO is the leading mode of tropical subseasonal variability with a 20–90 days time scale. It is an important source of regional climate variability and predictability across the globe at subseasonal time scales.



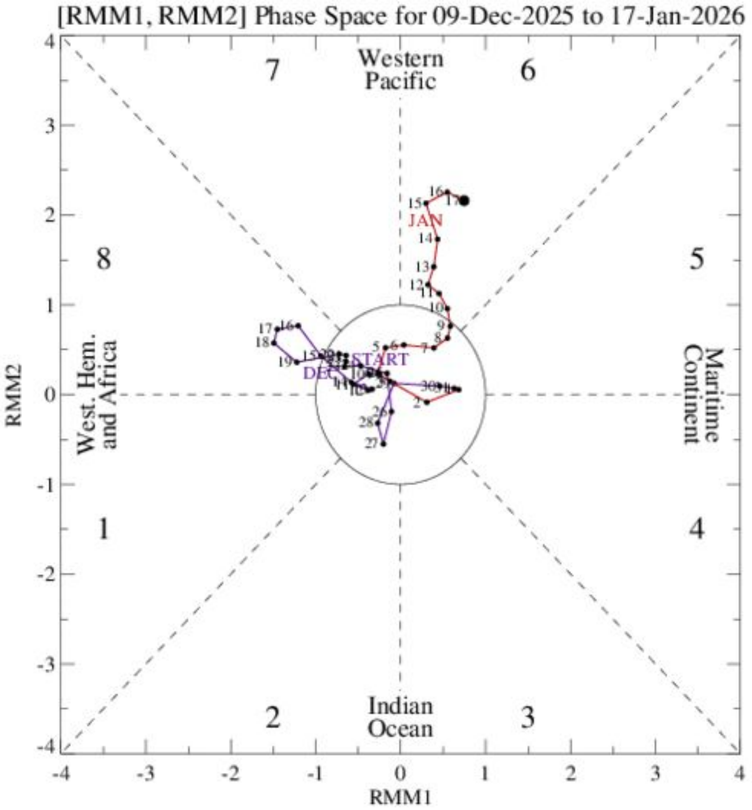


Barcelona Supercomputing Center
Centro Nacional de Supercomputación

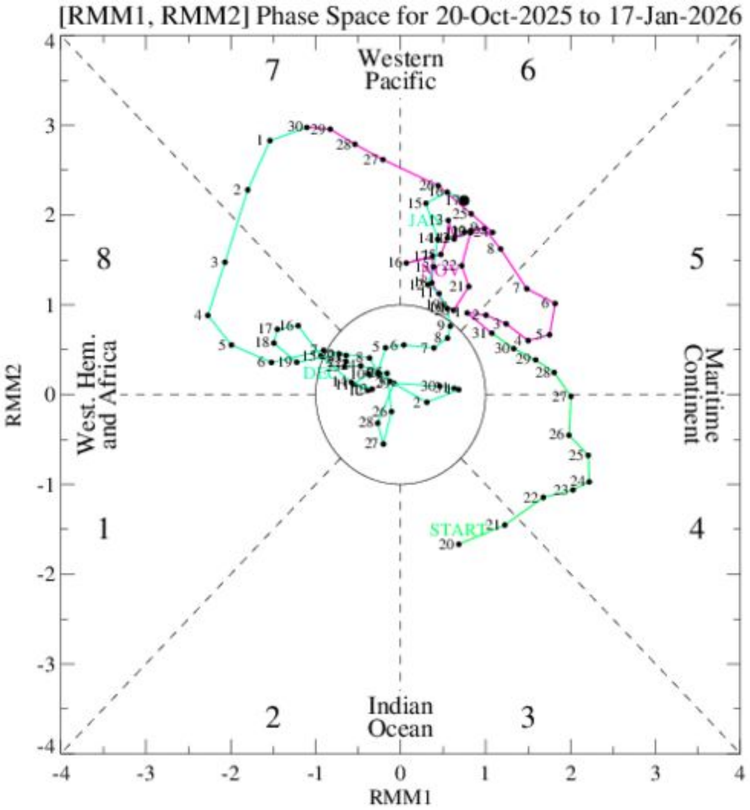
Source: https://www.climate.gov/news-features/blogs/enso/what-mjo-and-why-do-we-care

MJO phase status

- ➢ RMM phase diagram for the latest 40 days



- ➢ RMM phase diagram for the latest 90 days



- ➢ **RMM index**

RMM = Real-time Multivariate MJO Index

Developed by Matthew Wheeler and Harry Hendon (2004).

A multivariate index that combines:

- ➢ **Outgoing Longwave Radiation** (a proxy for convection)
- ➢ **Zonal winds at 850 hPa** (low-level winds)
- ➢ **Zonal winds at 200 hPa** (upper-level winds)

Projects these variables onto two principal components (RMM1 and RMM2) to define the MJO's location and intensity in an 8-phase diagram.

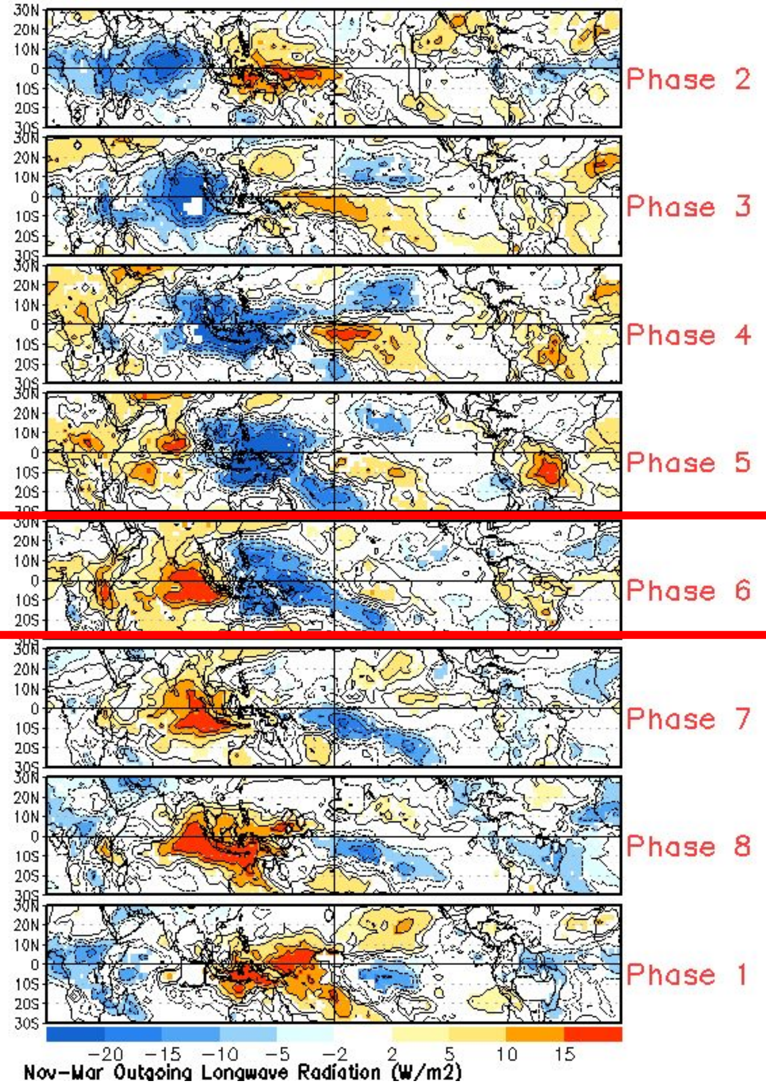
- ➢ During November and December the MJO has been quite active, remaining in phases 5 and 6 (Nov) and going through 7 and 8 (Dec). After being inactive, it reemerged in phase 6 (Jan).

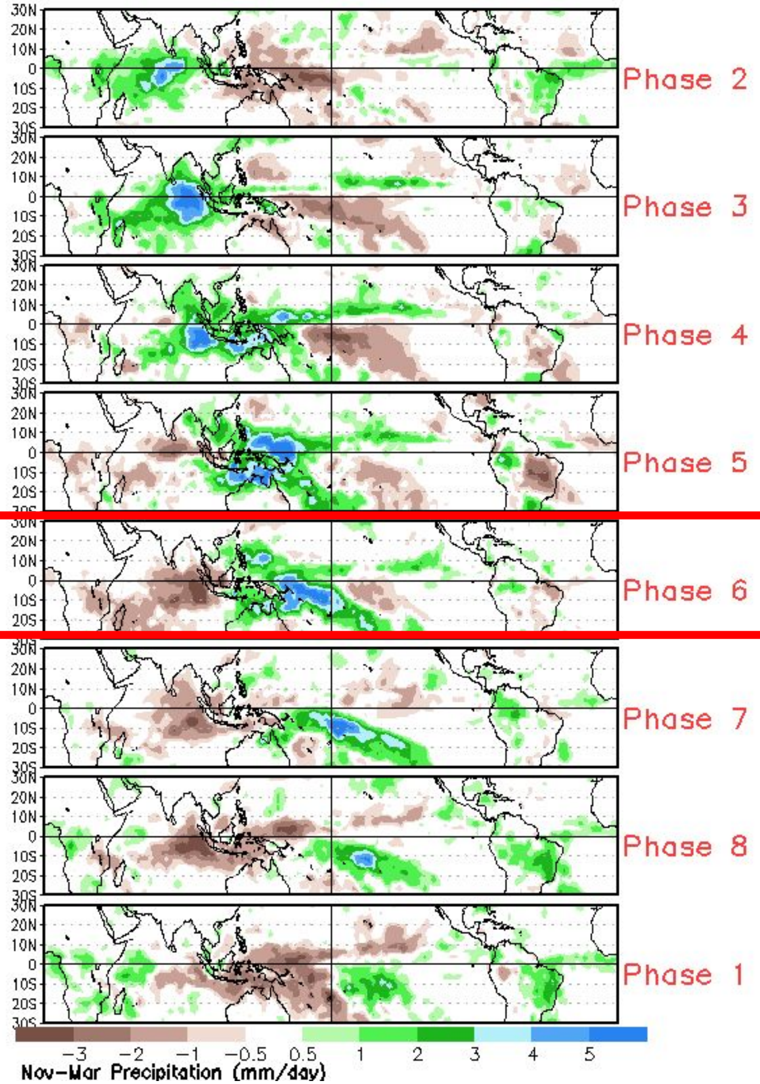
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/whindex.shtml / https://psl.noaa.gov/mjo/

MJO composites

- OLR anomalies composites (Nov - Mar)
- Precipitation composites (Nov - Mar)





Low OLR (enhanced convection) / High OLR (suppressed convection)

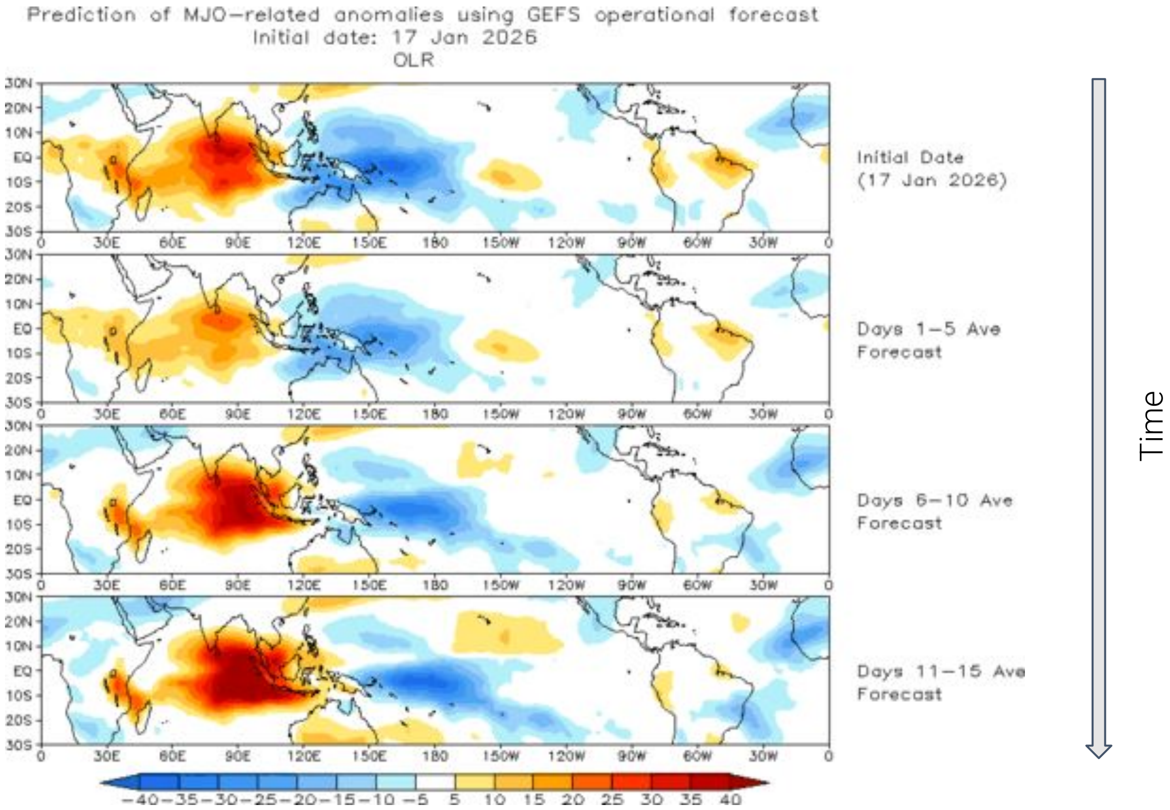
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/Composites/Tropical/olr.shtml

II. Subseasonal forecasts

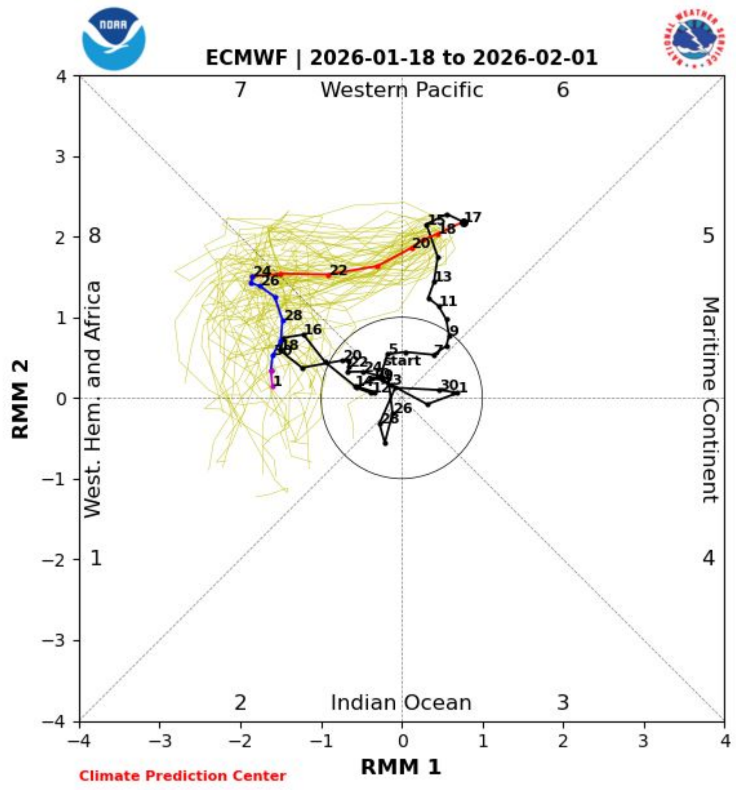
MJO forecasts

➢ OLR anomalies [W/m2] (ensemble mean GEFS)



Low OLR (enhanced convection) / High OLR (suppressed convection)

➢ Evolution of last 40 days of observations + ensemble forecast



Mean forecasts: 1-7 day, 8-14 day, >= 15 days

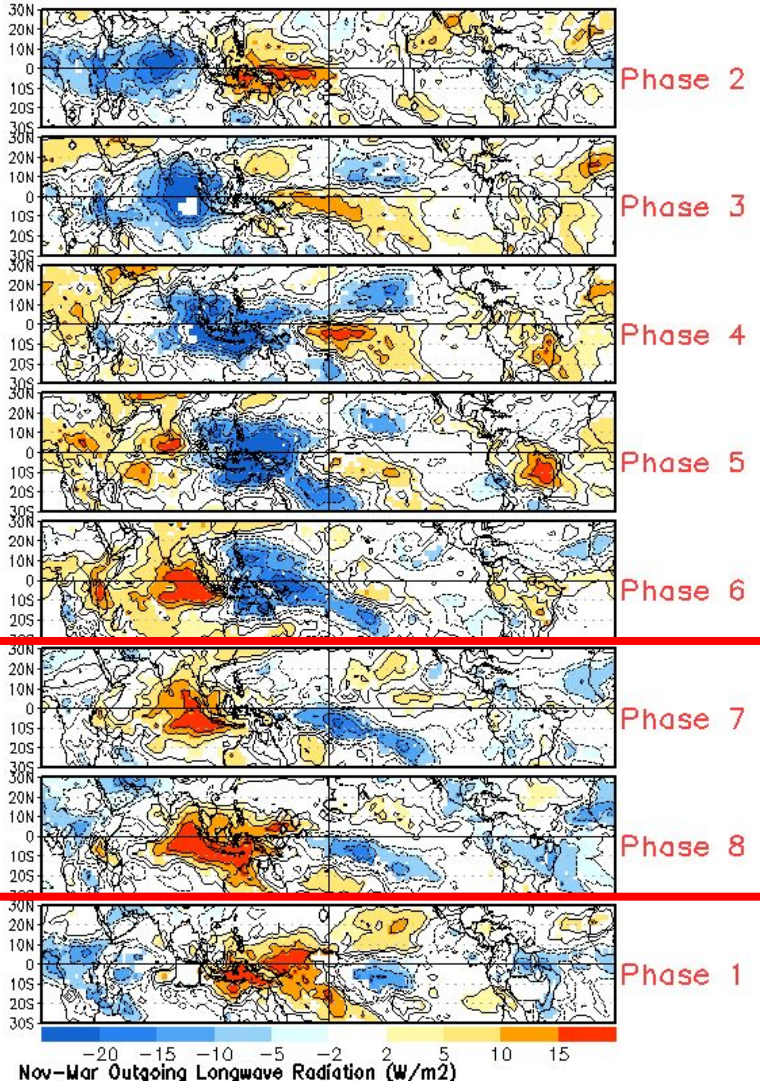
➢ MJO is expected to transition towards phase 7 (Western Pacific) and 8.

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

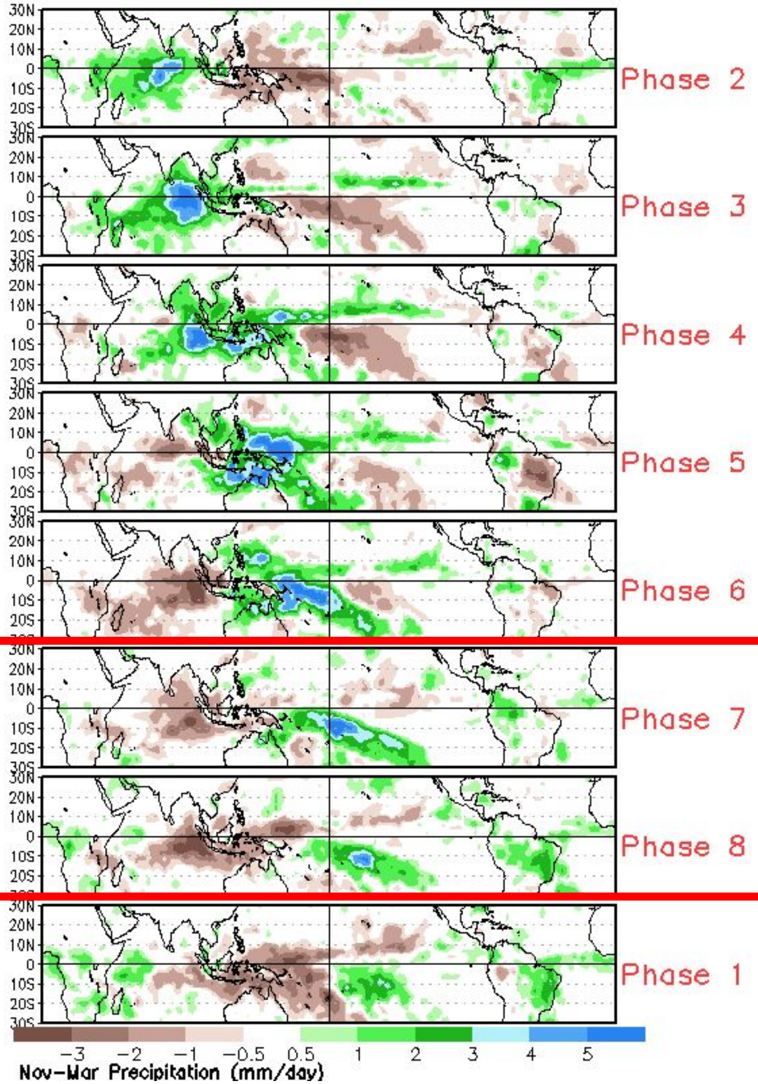
Source: https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/foregfs.shtml / https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/CLIVAR/ecmf.shtml

MJO composites

- ➢ OLR anomalies composites (Nov - Mar)



- ➢ Precipitation composites (Nov - Mar)

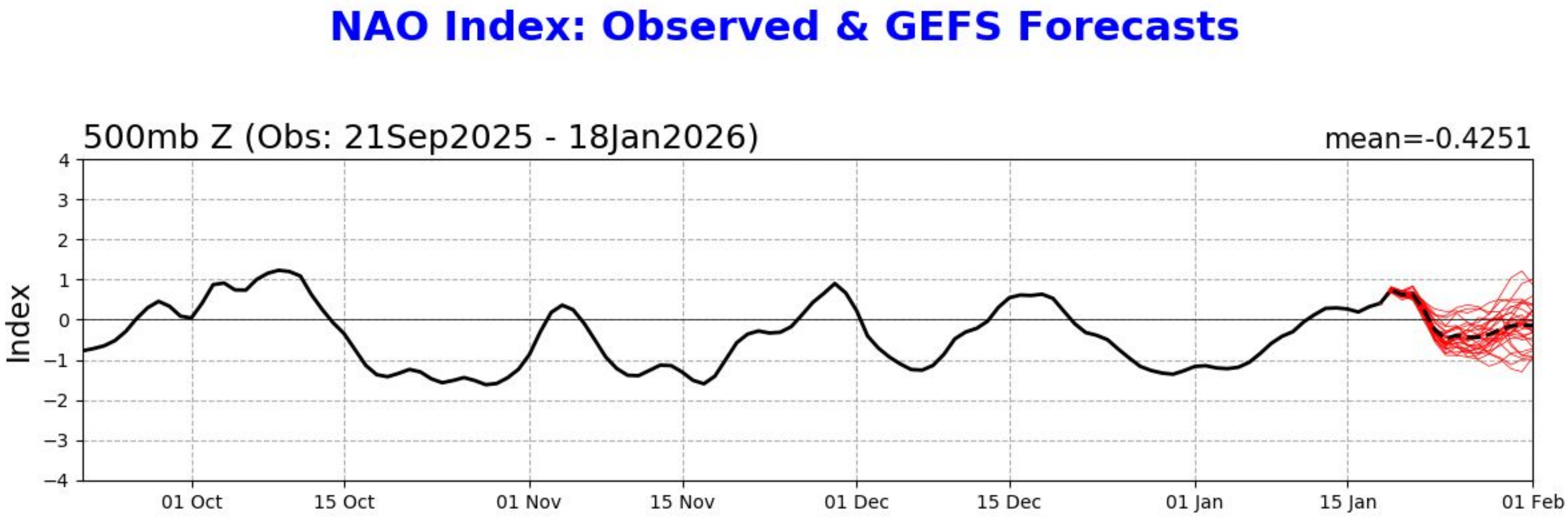


Low OLR (enhanced convection) / High OLR (suppressed convection)

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/Composites/Tropical/olr.shtml

NAO forecast

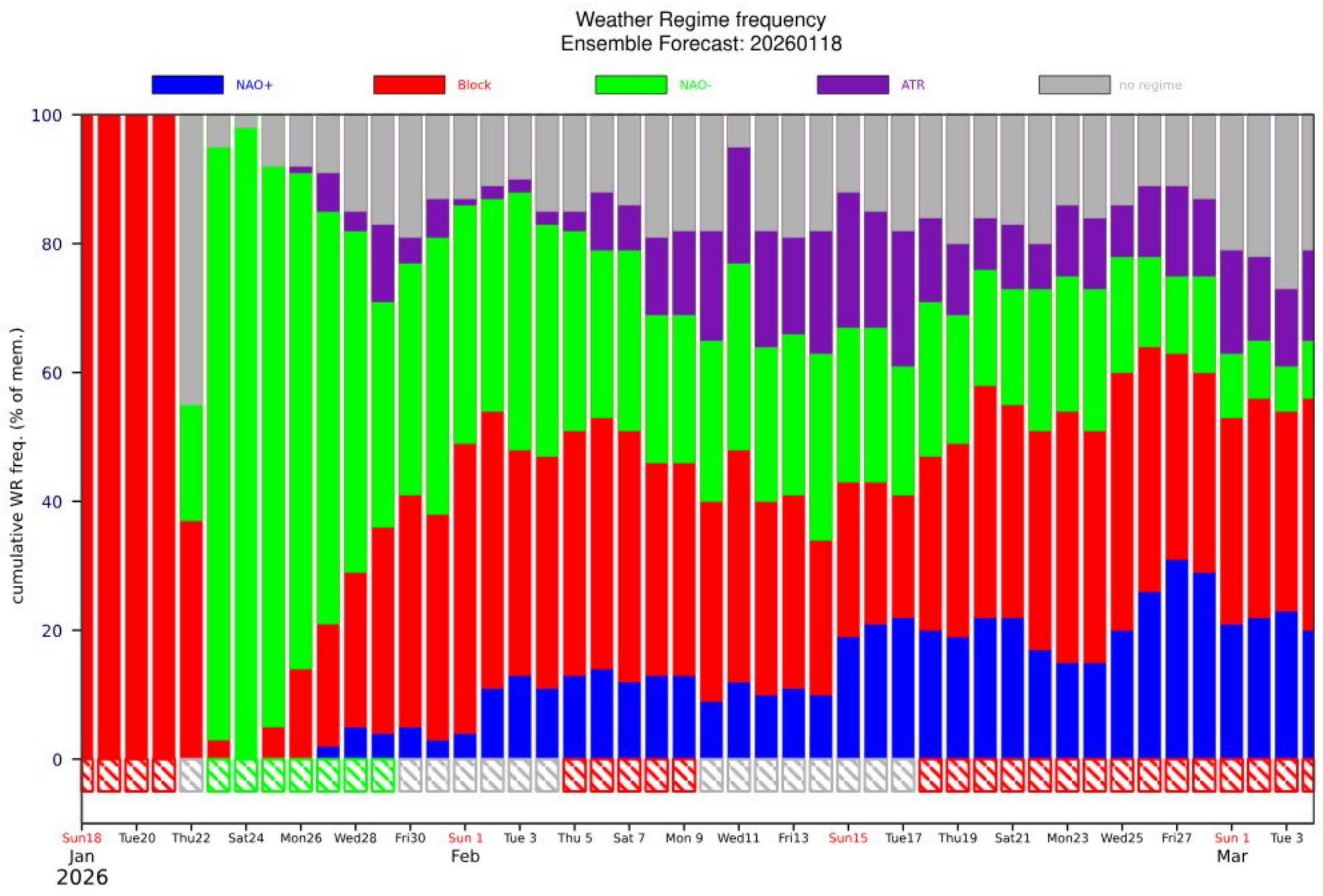


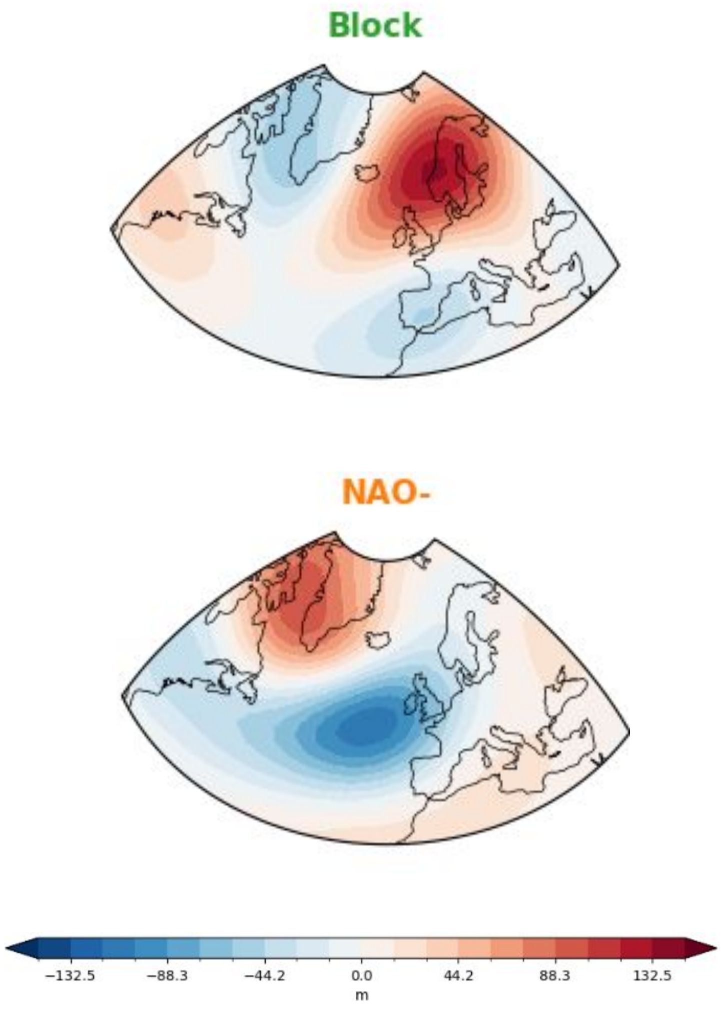
- Negative NAO from the third week of January.

Source: https://www.cpc.ncep.noaa.gov/products/precip/CWlink/pna/nao_index_ensm.shtml

II. Subseasonal forecasts

Weather regimes





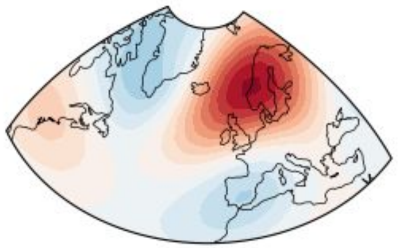
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

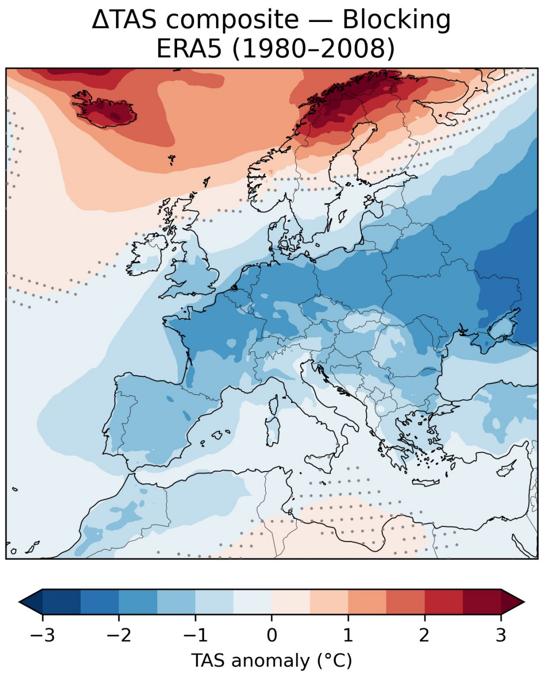
Source: https://charts.ecmwf.int/products/extended-regime-probabilities?forecast_from=latest

II. Subseasonal forecasts

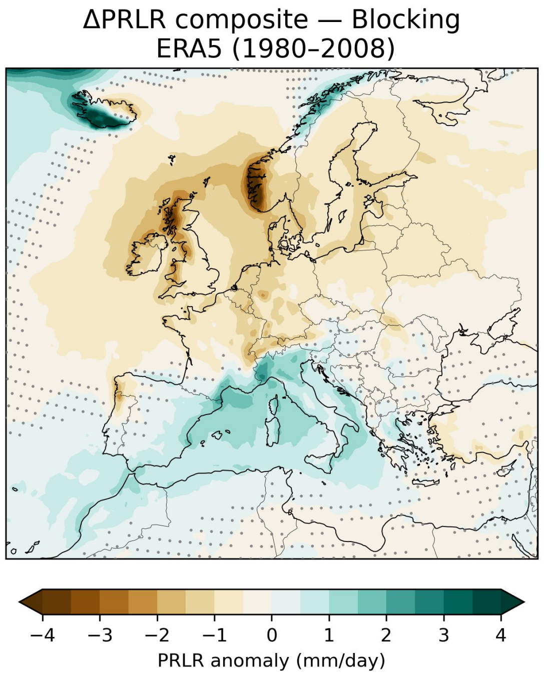
Composite of Block and surface climate

Block

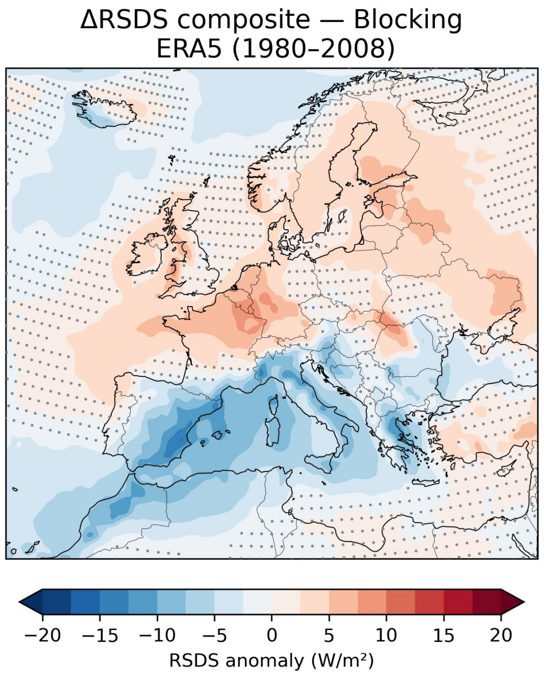




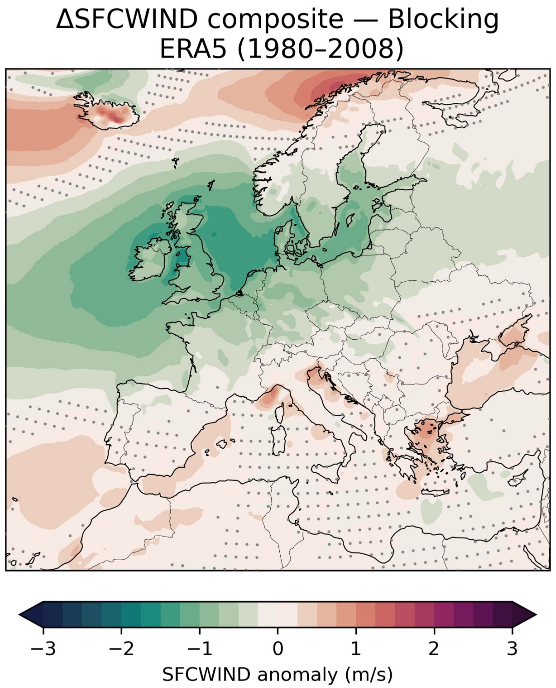
Temperature



Precipitation



Solar radiation

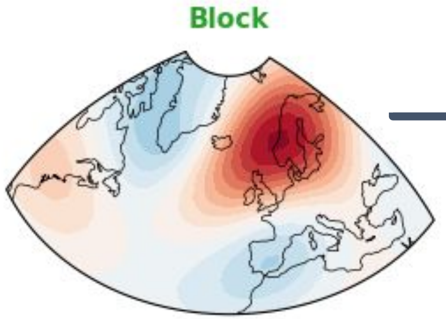


Surface wind

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

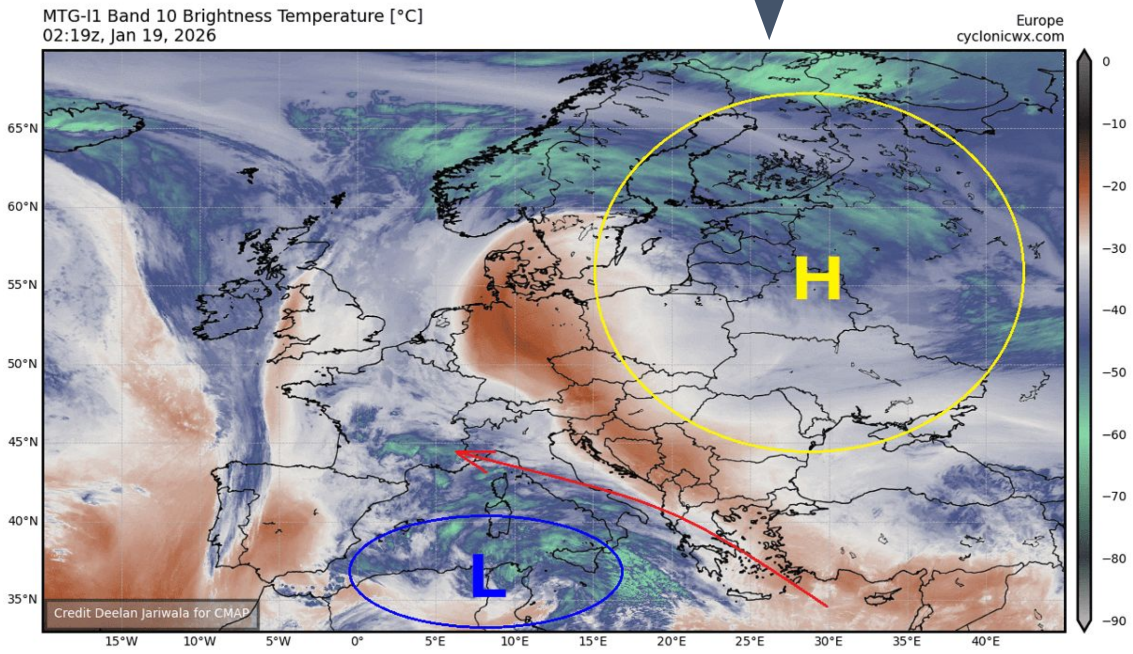
II. Subseasonal forecasts

Effects of Block in current meteorological state

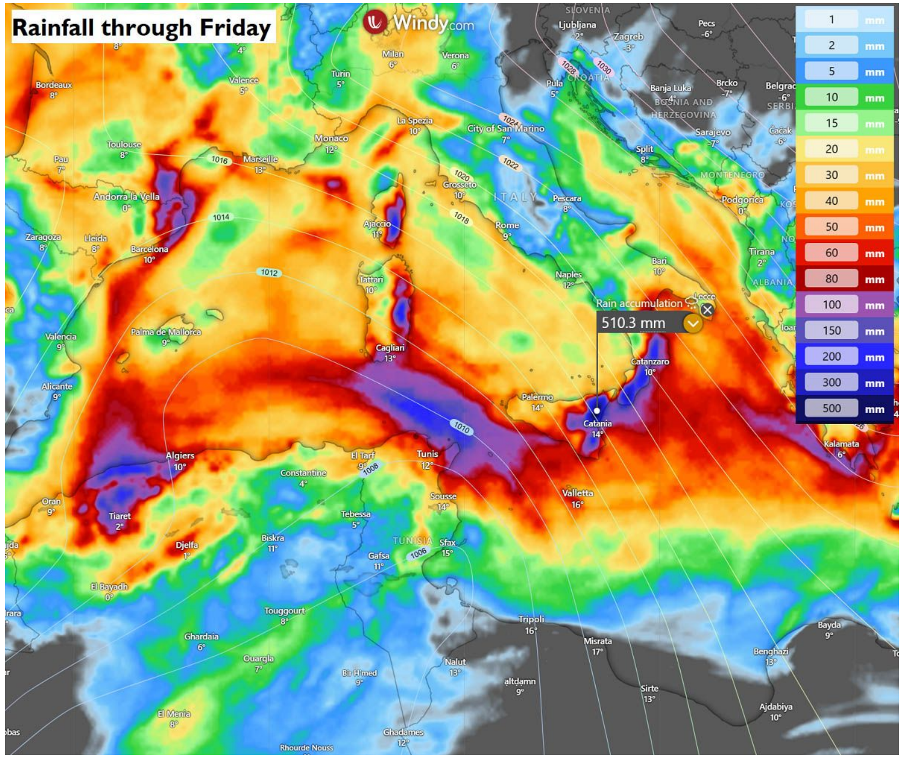


The current **blocking** situation is expected to result in an **extreme rainfall** event in the **Mediterranean region.**

Driver: a **train** of deep lows moving southeastward from the North Atlantic into southern Europe. The most affected areas will be **Southern Italy, including Sicily and Sardinia, Malta, and Northern Algeria.**



Accumulated rainfalls of up to 500mm.



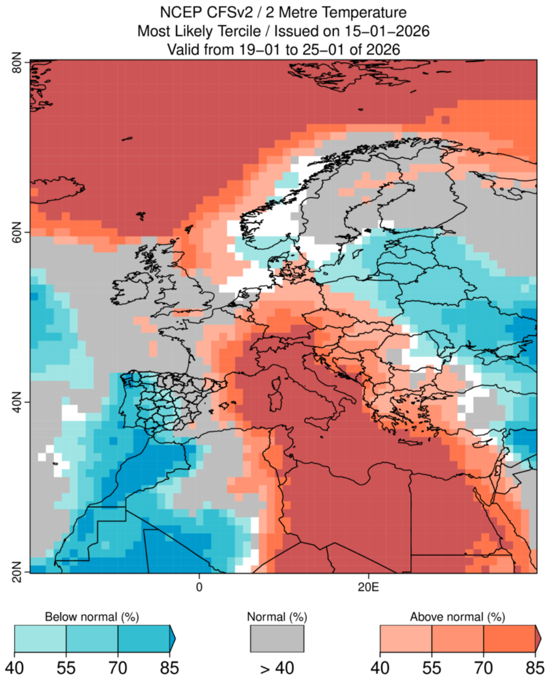
Persistent Atmospheric Block → Widespread Flood Threat → Extreme Rainfall Totals: *cold Atlantic air with warm Mediterranean waters is expected to produce heavy rainfall and flash flood conditions*.

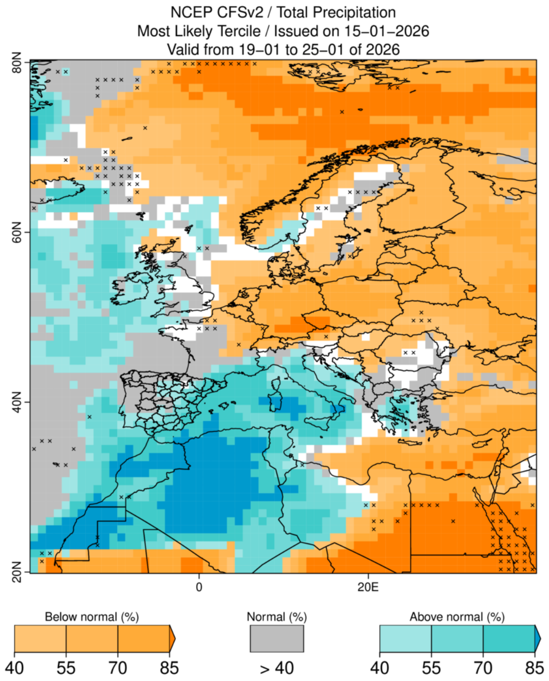
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

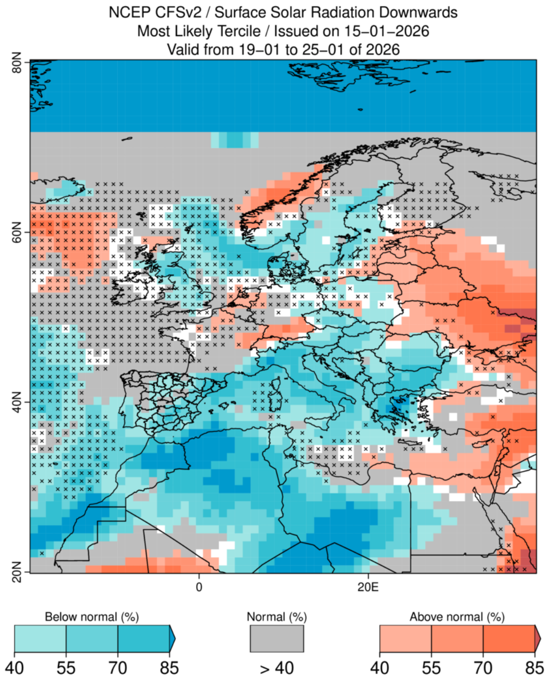
Source: https://www.severe-weather.eu/global-weather/mediterranean-flooding-risk-rainfall-threat-italy-deep-low-floods-mk/

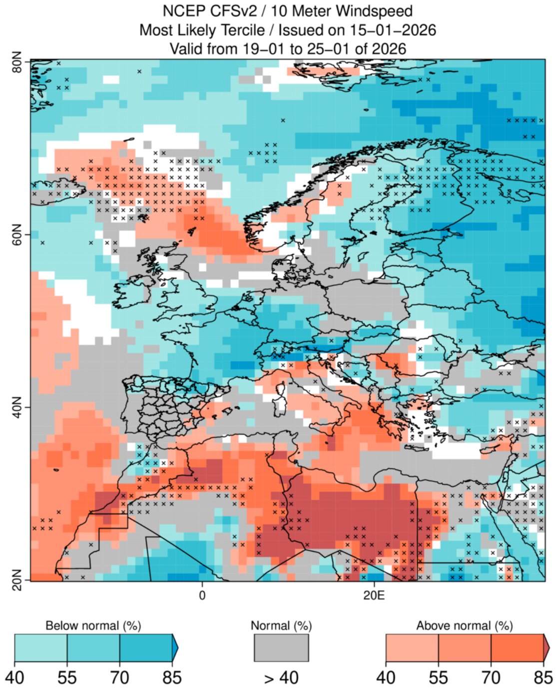
II. Subseasonal forecasts

Week 1: 19 Jan to 25 Jan









Temperature

Precipitation

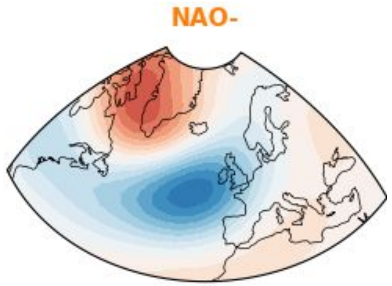
Solar radiation

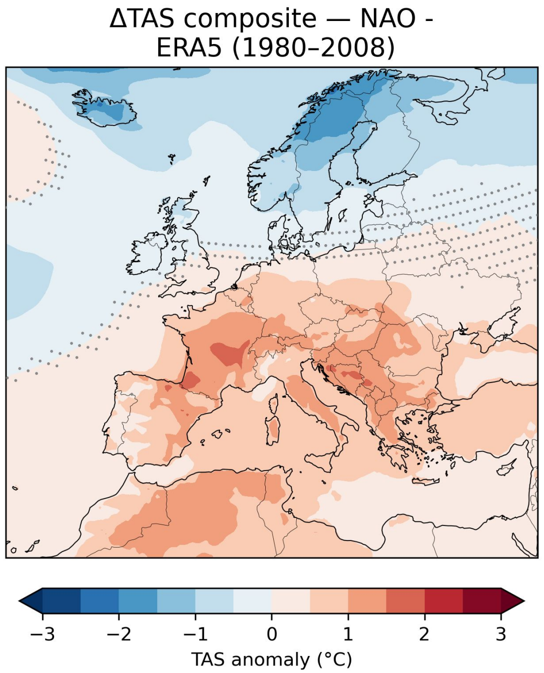
Surface wind

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

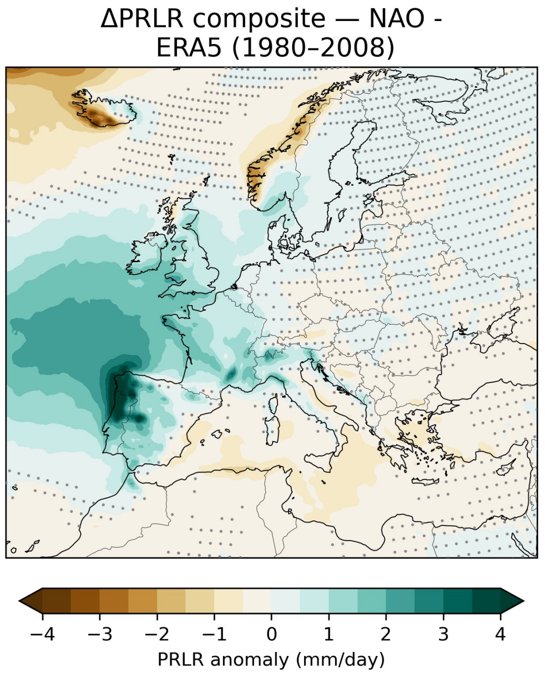
II. Subseasonal forecasts

Composite of NAO- and surface climate

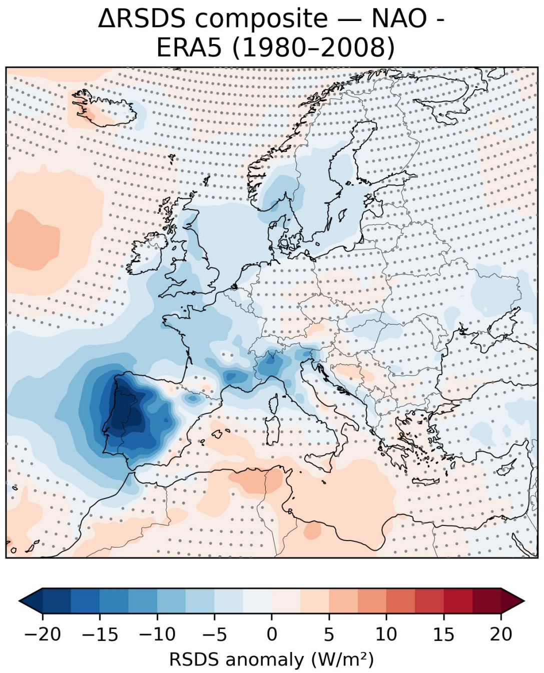




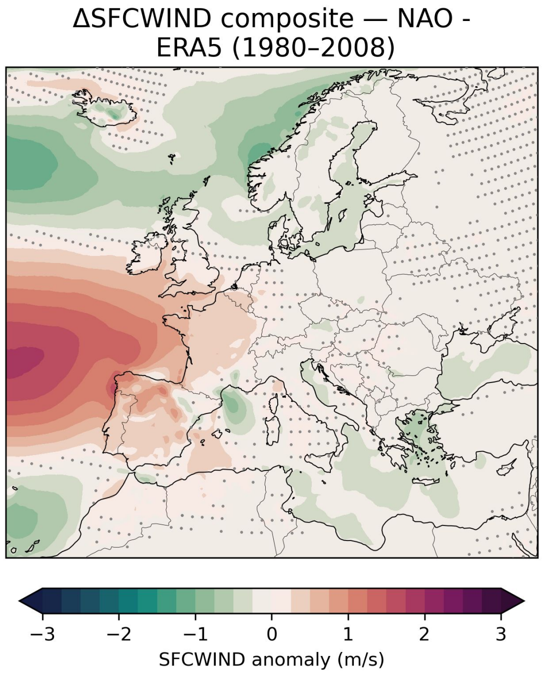
Temperature



Precipitation



Solar radiation

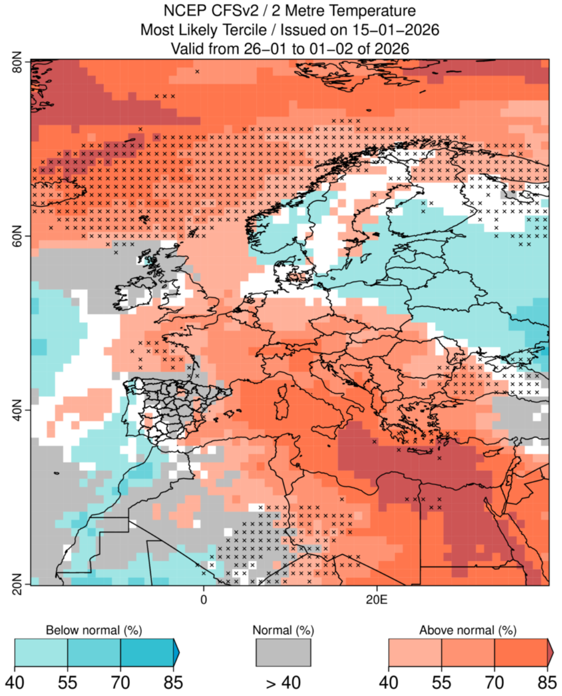


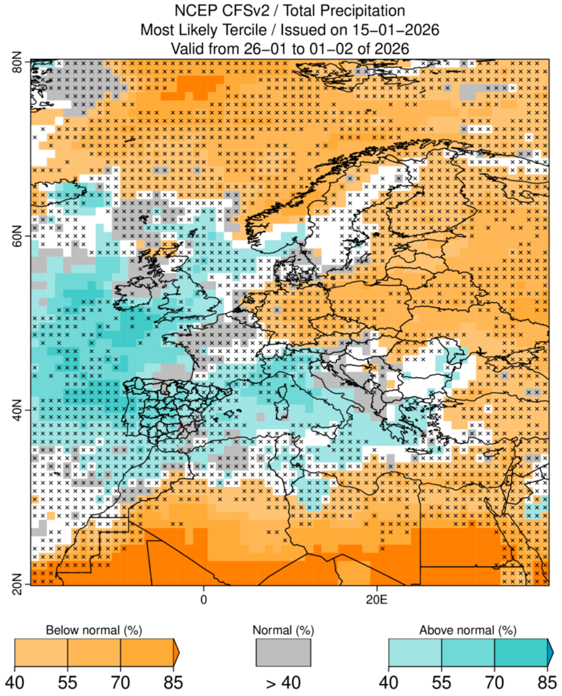
Surface wind

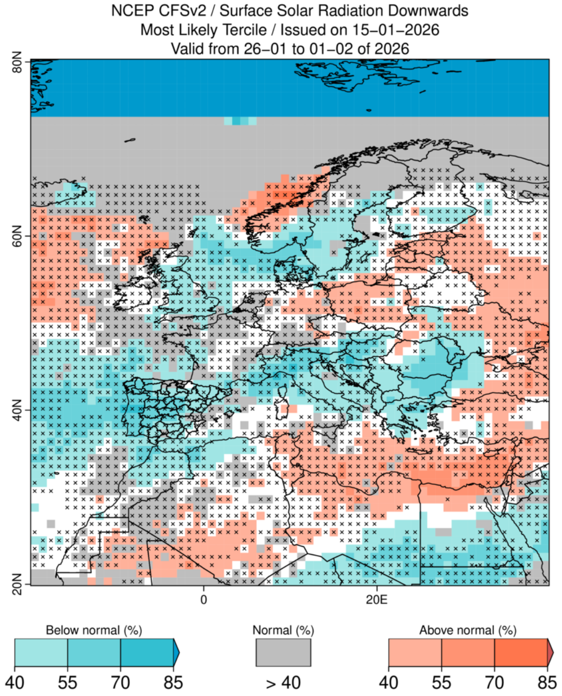
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

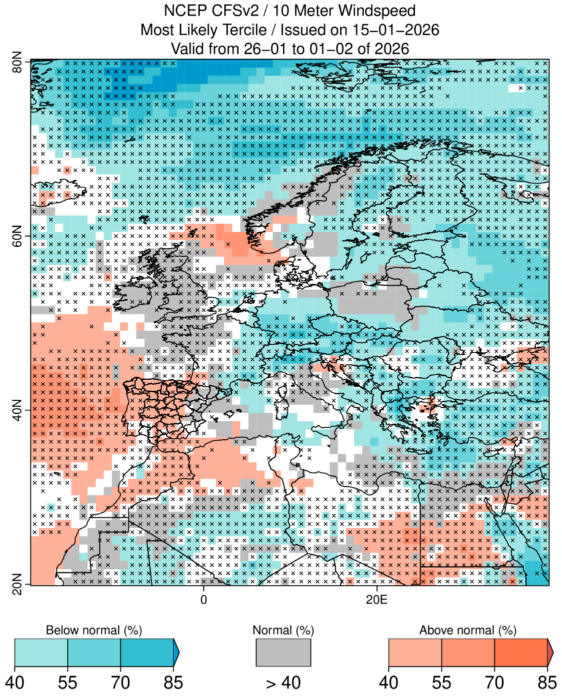
II. Subseasonal forecasts

Week 2: 26 Jan to 1 Feb









Temperature

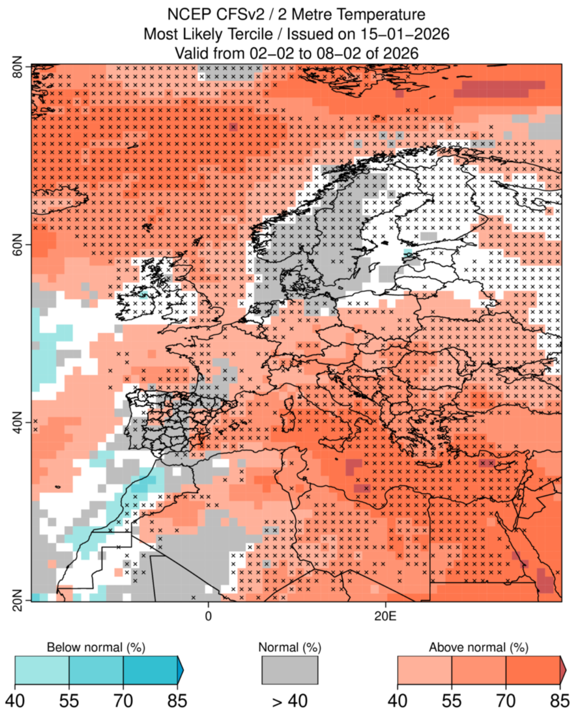
Precipitation

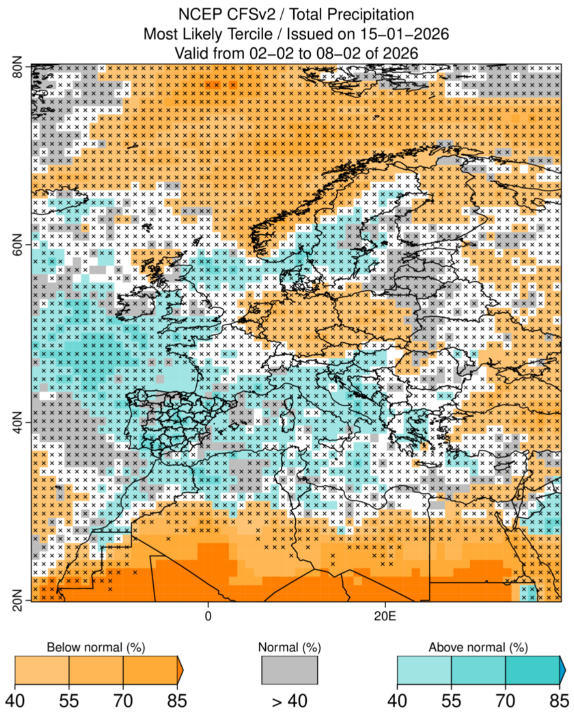
Solar radiation

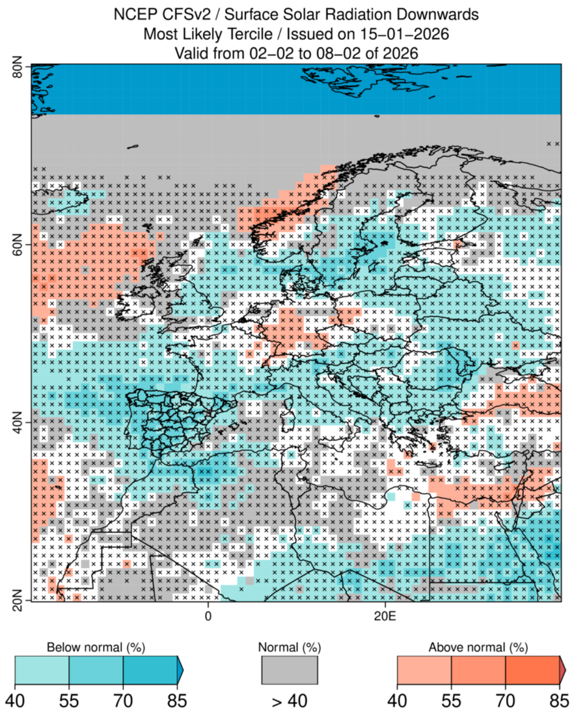
Surface wind

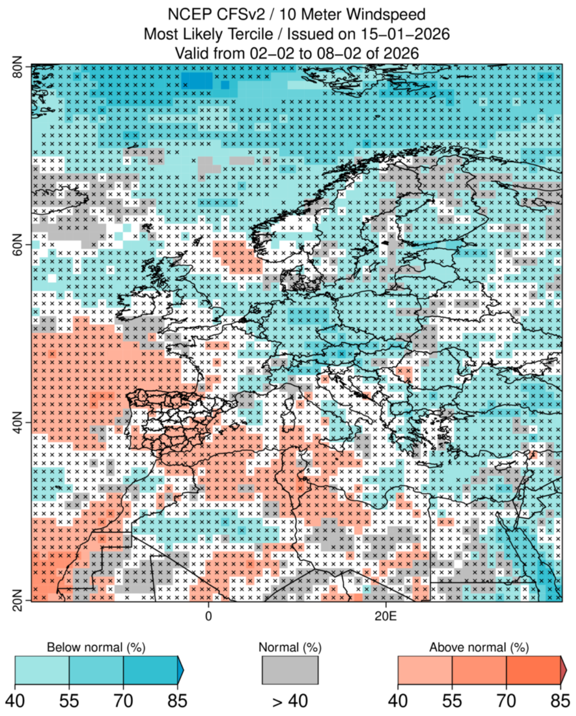
II. Subseasonal forecasts

Week 3: 2 Feb to 8 Feb









Temperature

Precipitation

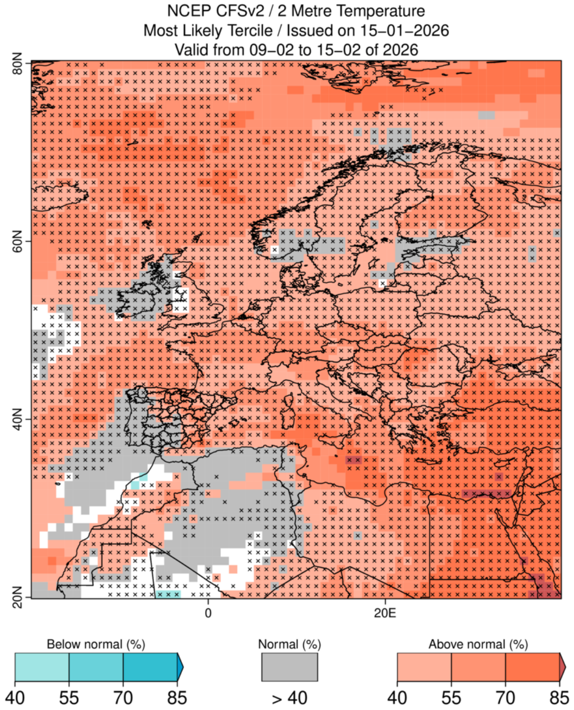
Solar radiation

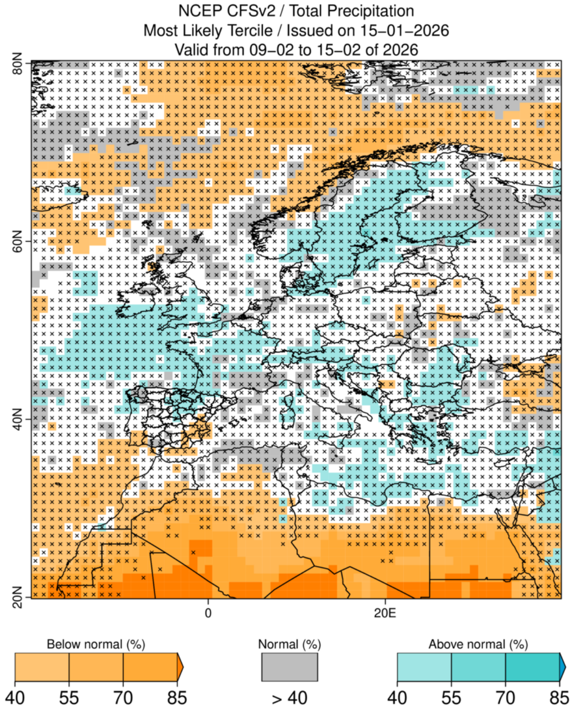
Surface wind

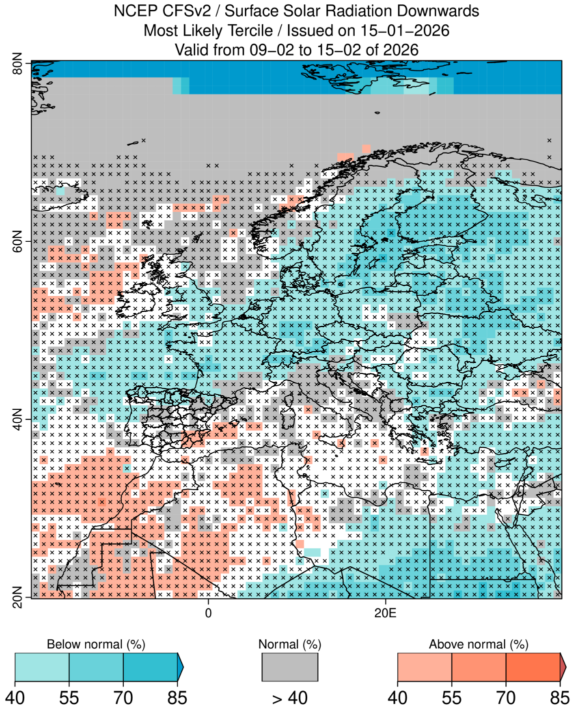
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

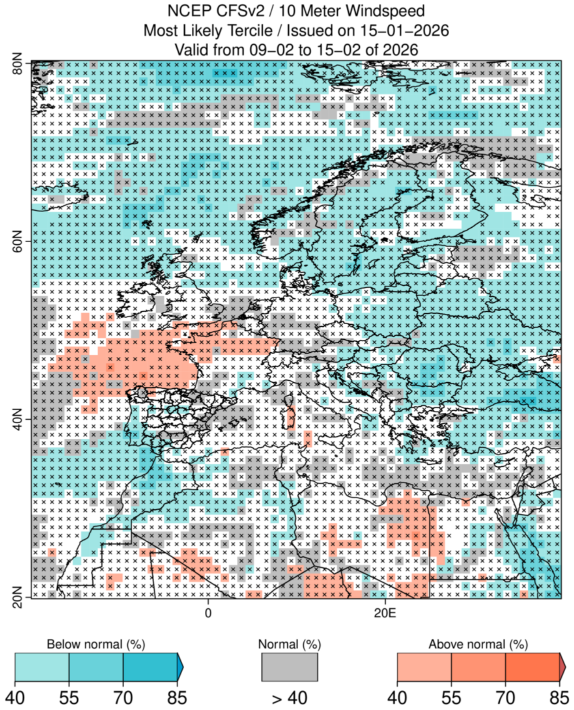
II. Subseasonal forecasts

Week 4: 9 Feb to 15 Feb









Temperature

Precipitation

Solar radiation

Surface wind

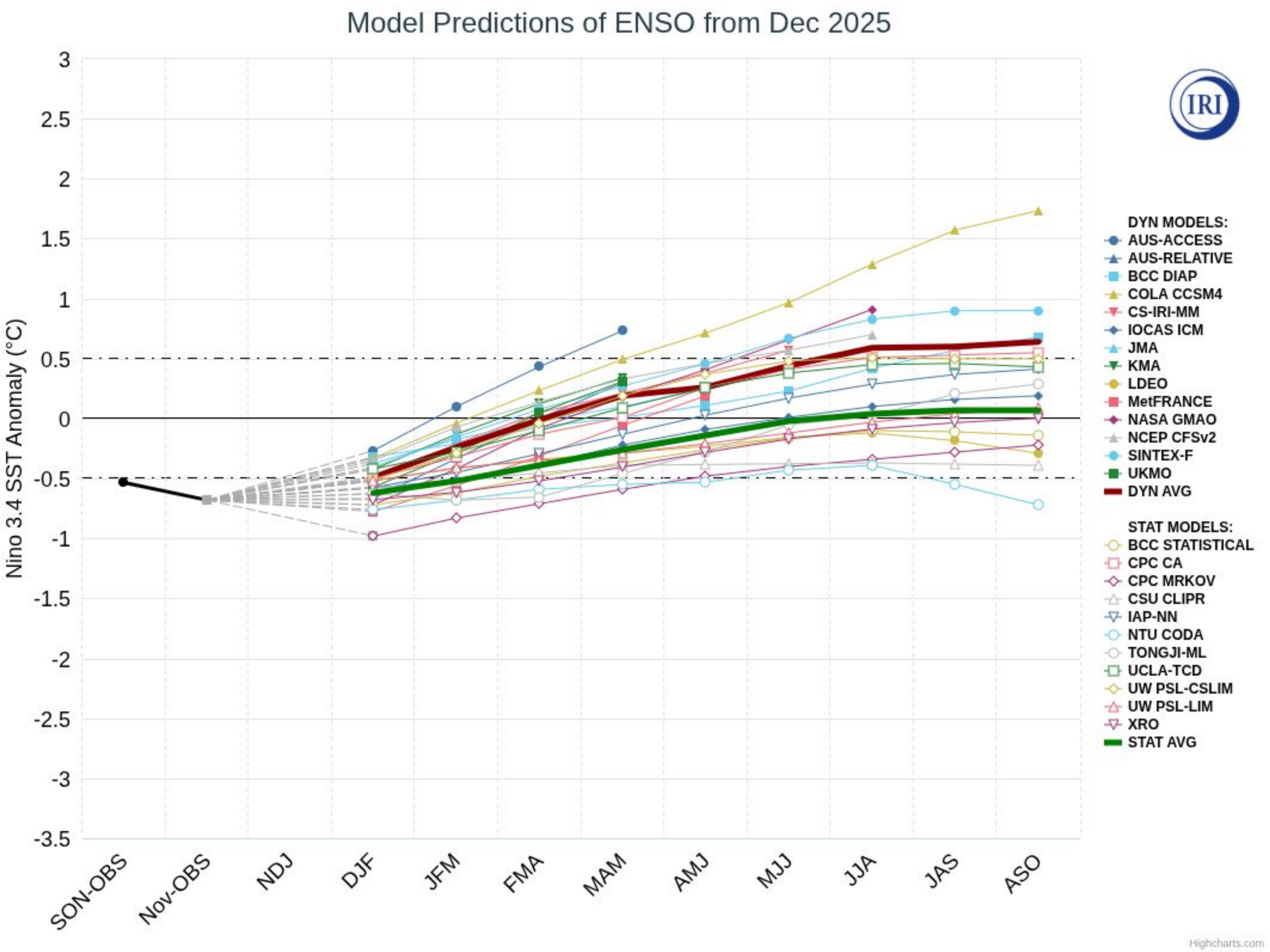
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

I. Recent state of the climate

II. Subseasonal forecasts

III. Seasonal forecasts

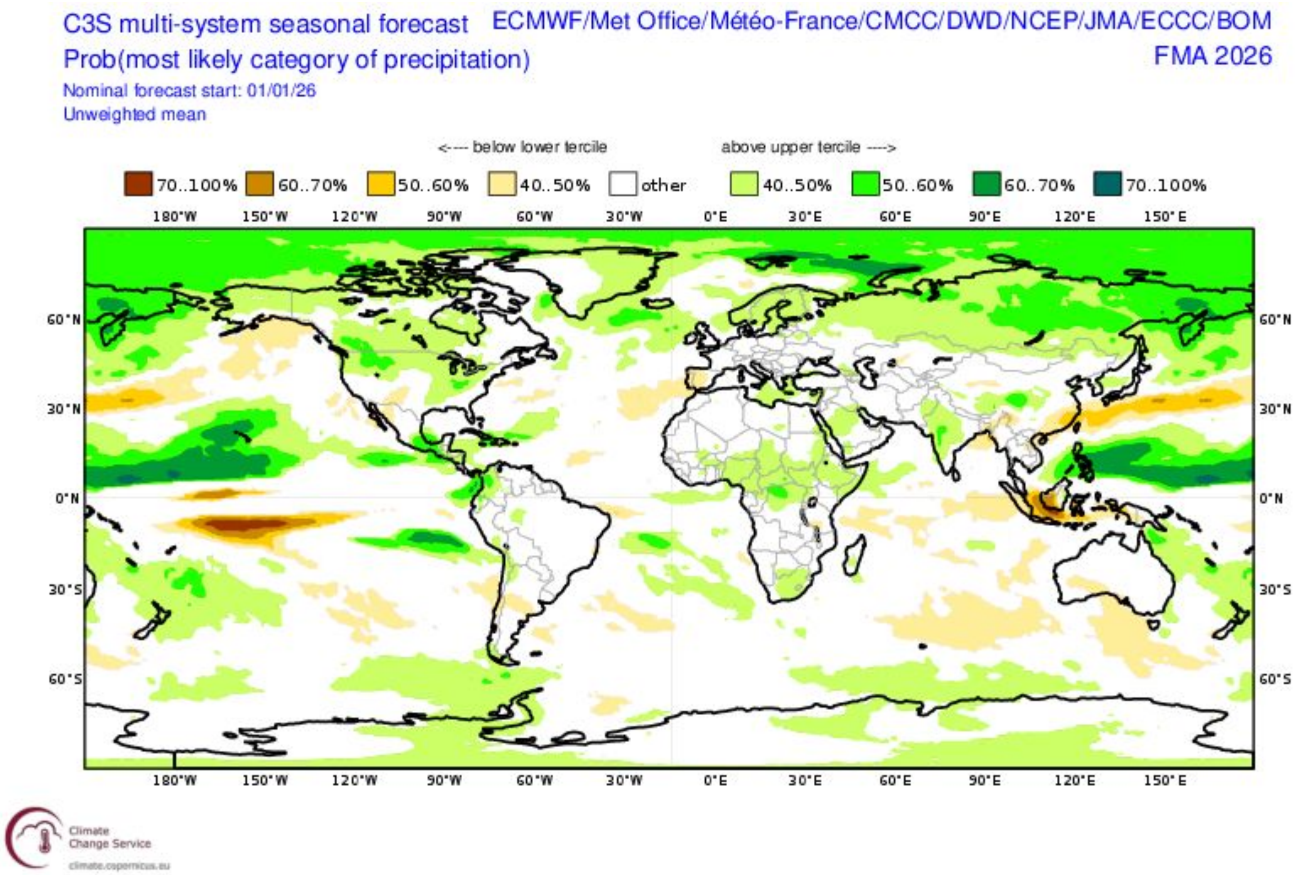
ENSO forecasts



- ➢ Transition towards **ENSO-neutral** conditions in the next months, especially pronounced in the **dynamical** models, that predict a transition towards **El Niño** as early as in JJA.
- ➢ The statistical models predict ENSO-neutral conditions at least until early autumn

Source: https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-sst_table /

Precipitation

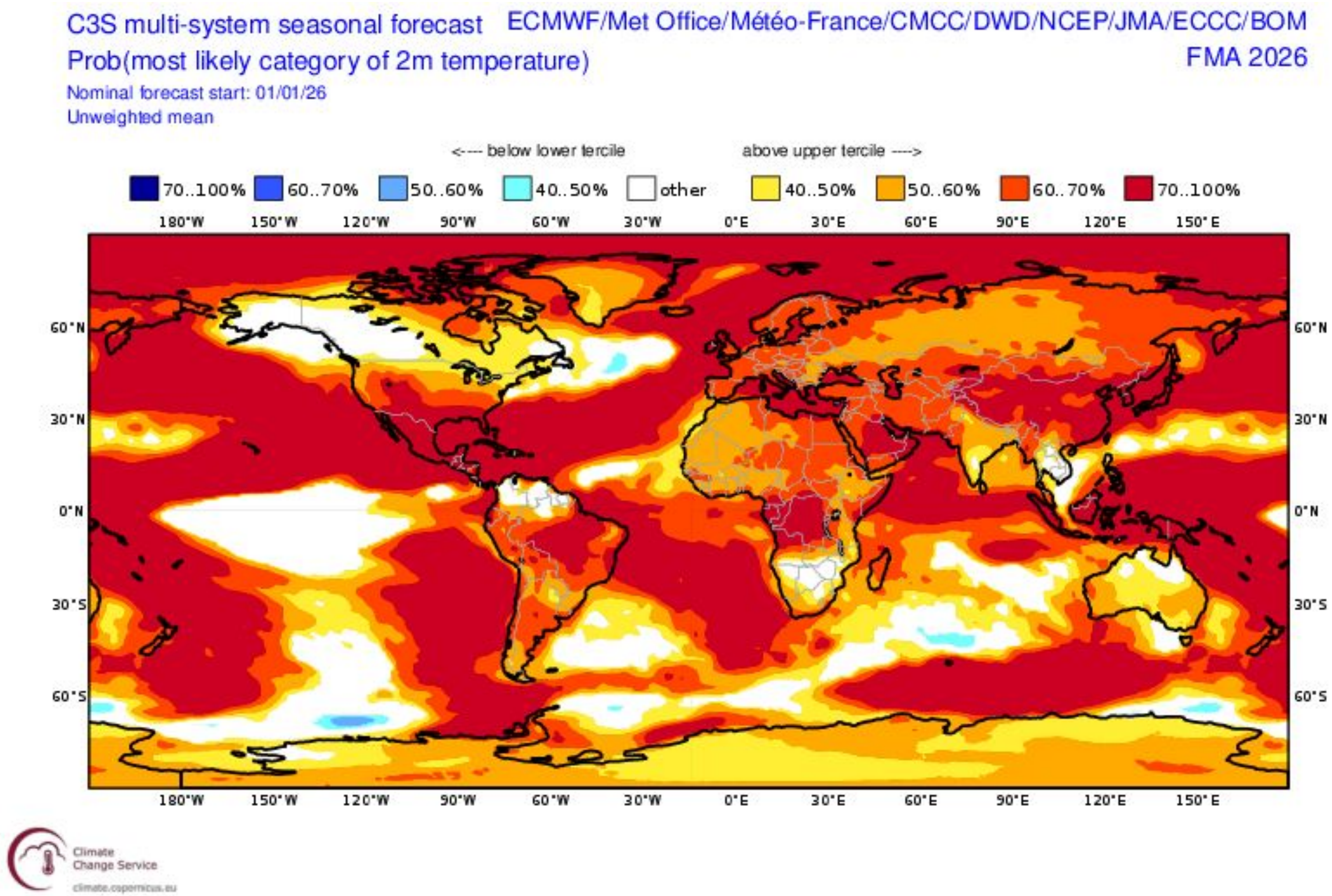


- Positive anomalies in parts of the Pacific, Central America, Siberia, Central Africa, northern North America, Fennoscandia, Philippines, Iceland and Greenland.
- Negative anomalies in Indonesia, eastern China and parts of the Pacific and Indian oceans.

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://climate.copernicus.eu/charts/packages/c3s_seasonal/ / https://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/

Temperature



➢ Typical global warming signal.

➢ Parts of North Atlantic and Southern Ocean with cooler anomalies.

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://climate.copernicus.eu/charts/packages/c3s_seasonal/ / https://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts/

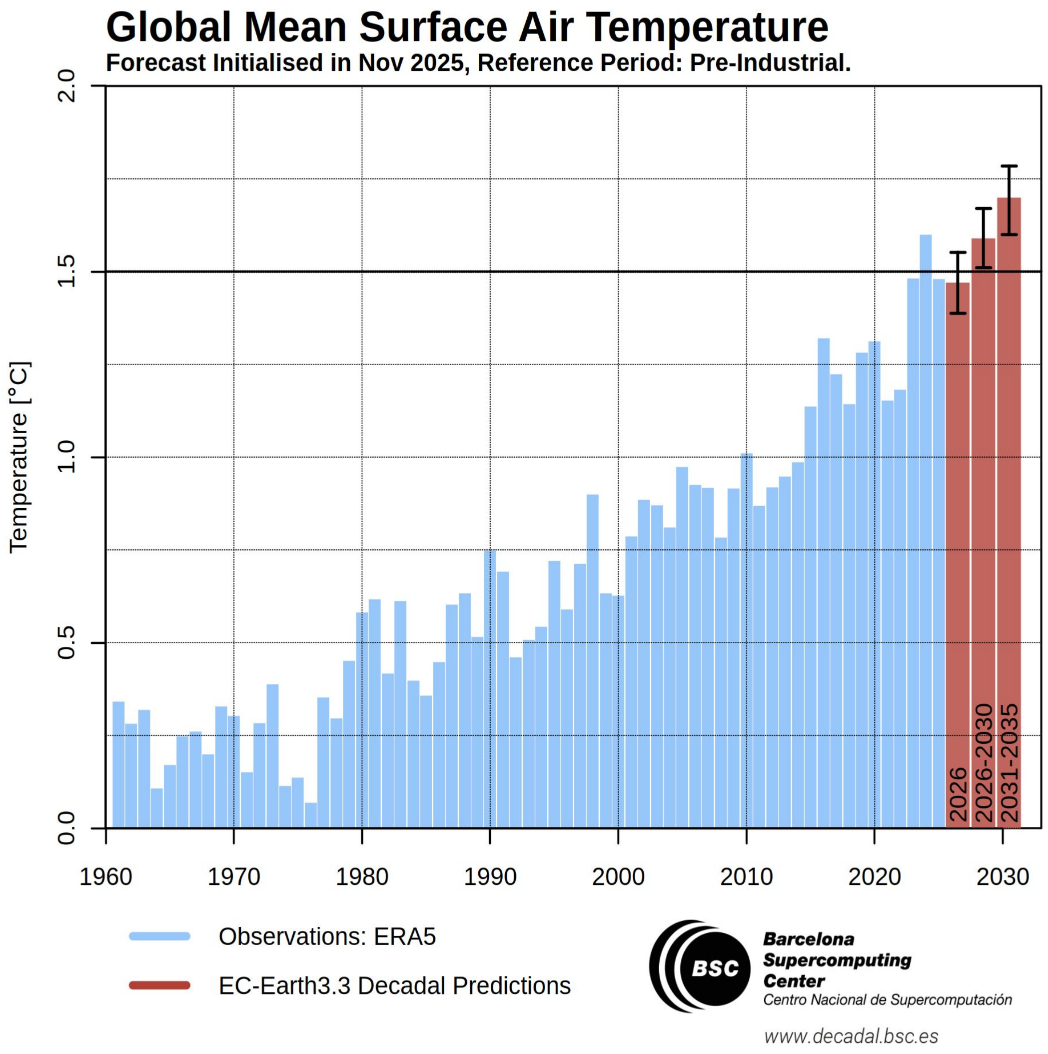
I. Recent state of the climate

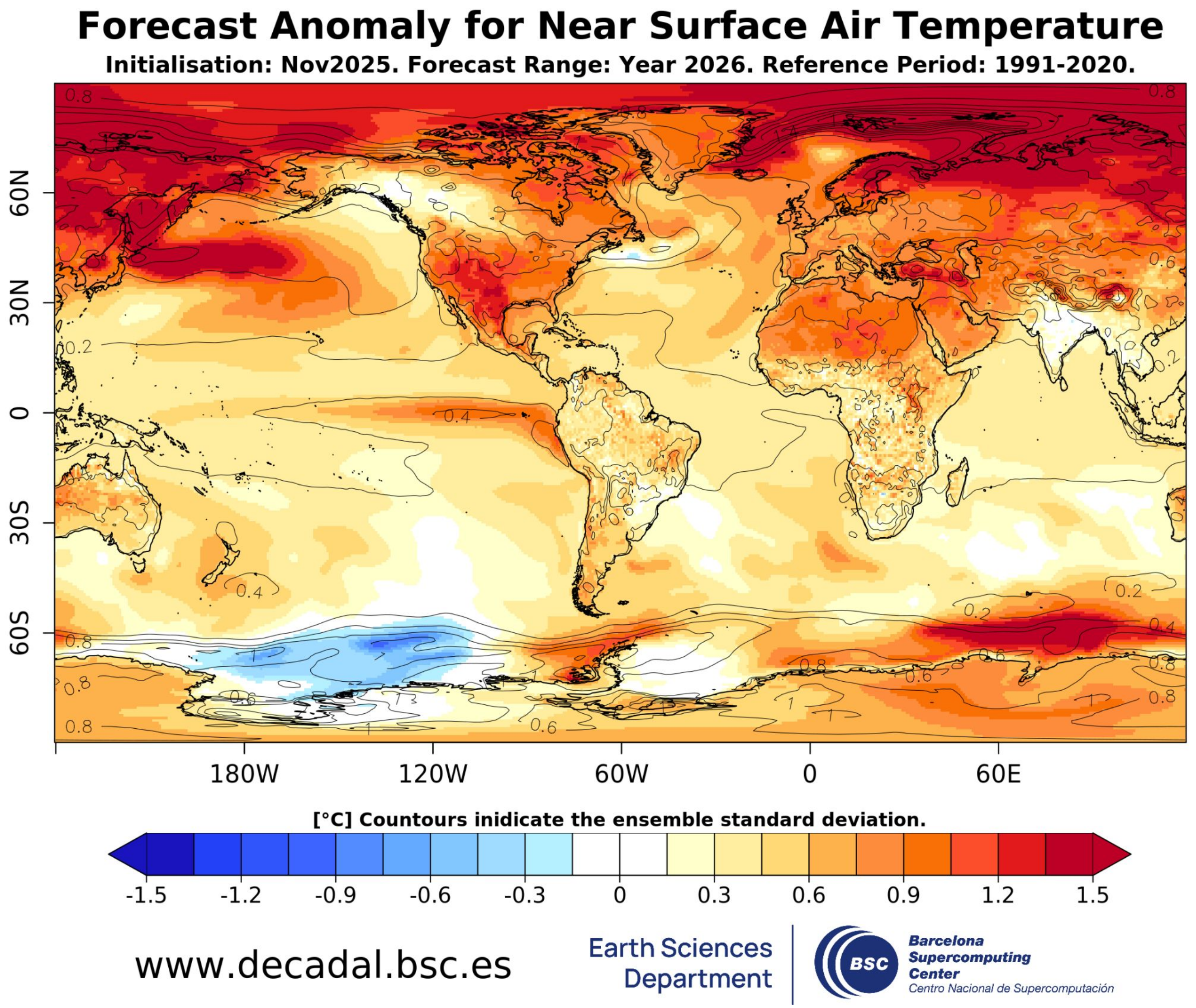
II. Subseasonal forecasts

III. Seasonal forecasts

IV. Decadal forecasts

Decadal forecasts





Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Courtesy of Roberto Bilbao

Earth Sciences Department

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Forecast Briefing

January 2026

Paloma Trascasa, Aleksander Lacima and Pep Cos

Climate Services Team (CST)

Earth System Services (ESS)

Barcelona Supercomputing Center (BSC)

Tuesday 20th Jan 2026

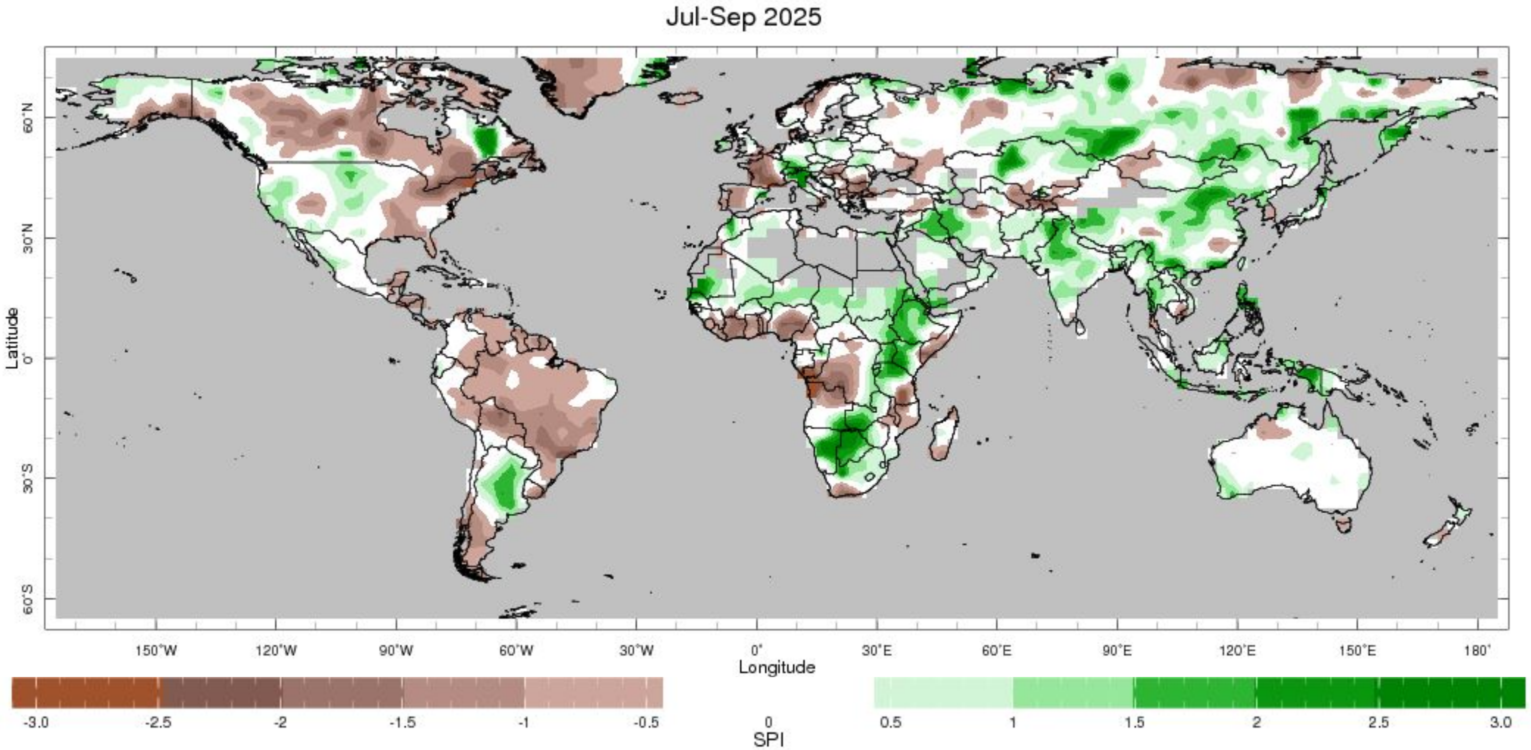
Discussion

- ➢ What lead to the anomalous rainfall in the Iberian peninsula?
- ➢ What impacts will the stratospheric warming have?
- ➢ Inconsistencies between ENSO forecasts and seasonal predictions.

NEEDS UPDATING

Standardized Precipitation index (SPI)

SPI-3



Grey = Regions with an annual average precipitation of less than 0.2 mm/day have been "masked" from the plot.

Other information: 2.5º lat/lon grid, 1979-present climatological base period

- **SPI**

The Standardized Precipitation Index (SPI; McKee 1993) is the number of standard deviations that observed cumulative precipitation (over x number of months) deviates from the climatological average.

- SPI-x:
  Cumulative distribution over x-months.

- Shorter SPI values (SPI-1, SPI-3):
  Respond quickly to rainfall changes, useful for early warning systems.

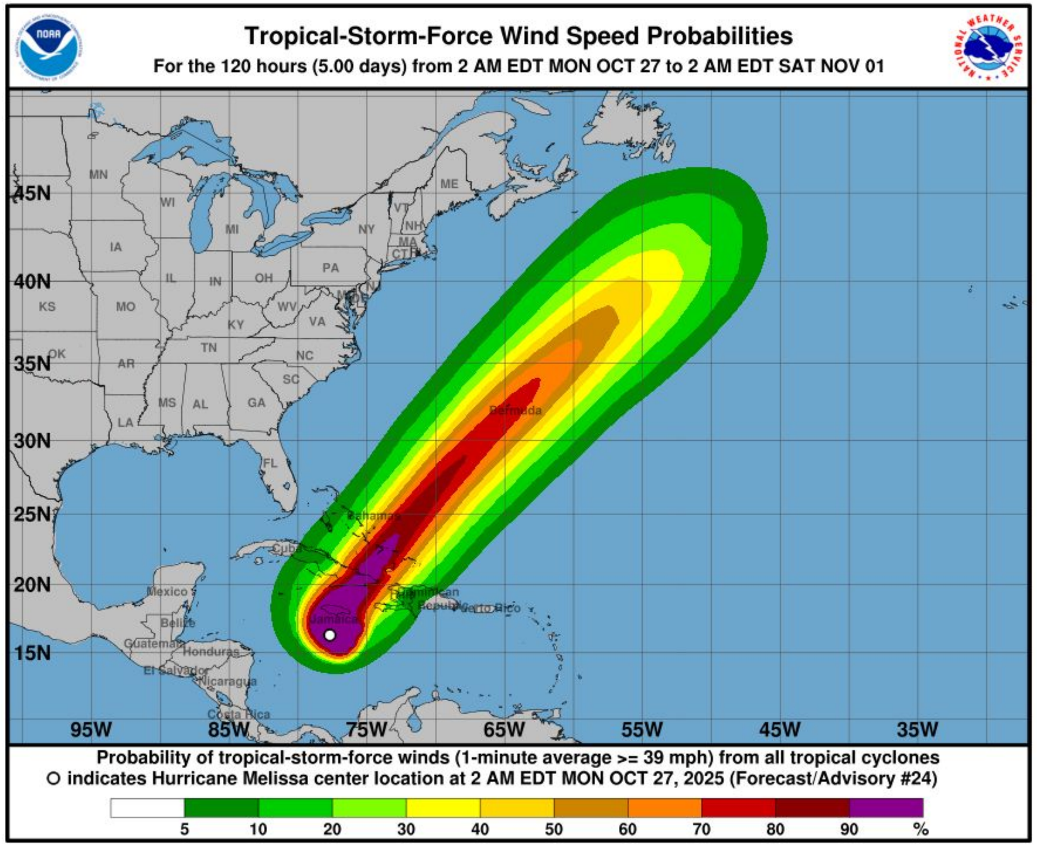
- Longer SPI values (SPI-6, SPI-12, SPI-24):
  Reflect cumulative precipitation trends, useful for long-term water resource management.

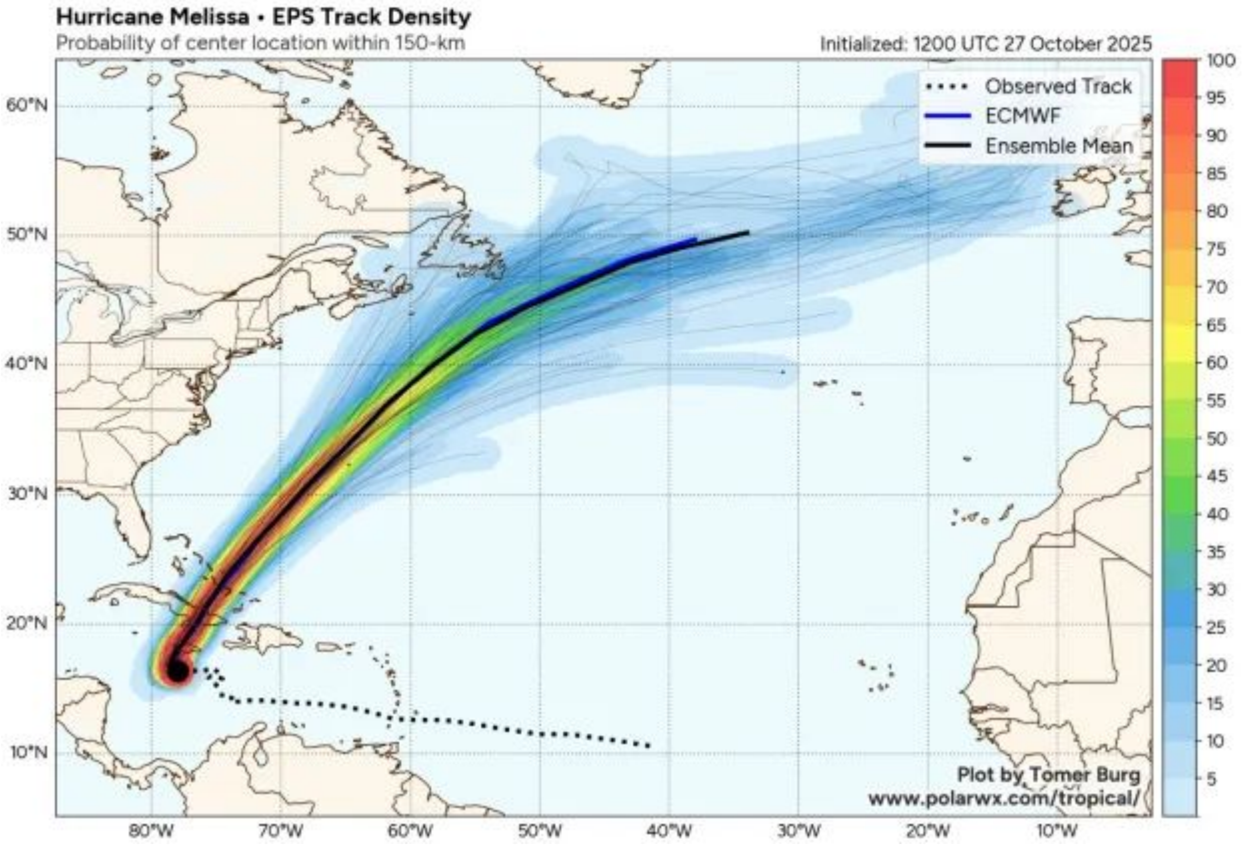
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/SPI.html?var=.SPI-CAMSOPI_3-Month

I. Recent state of the climate

Hurricane Melissa

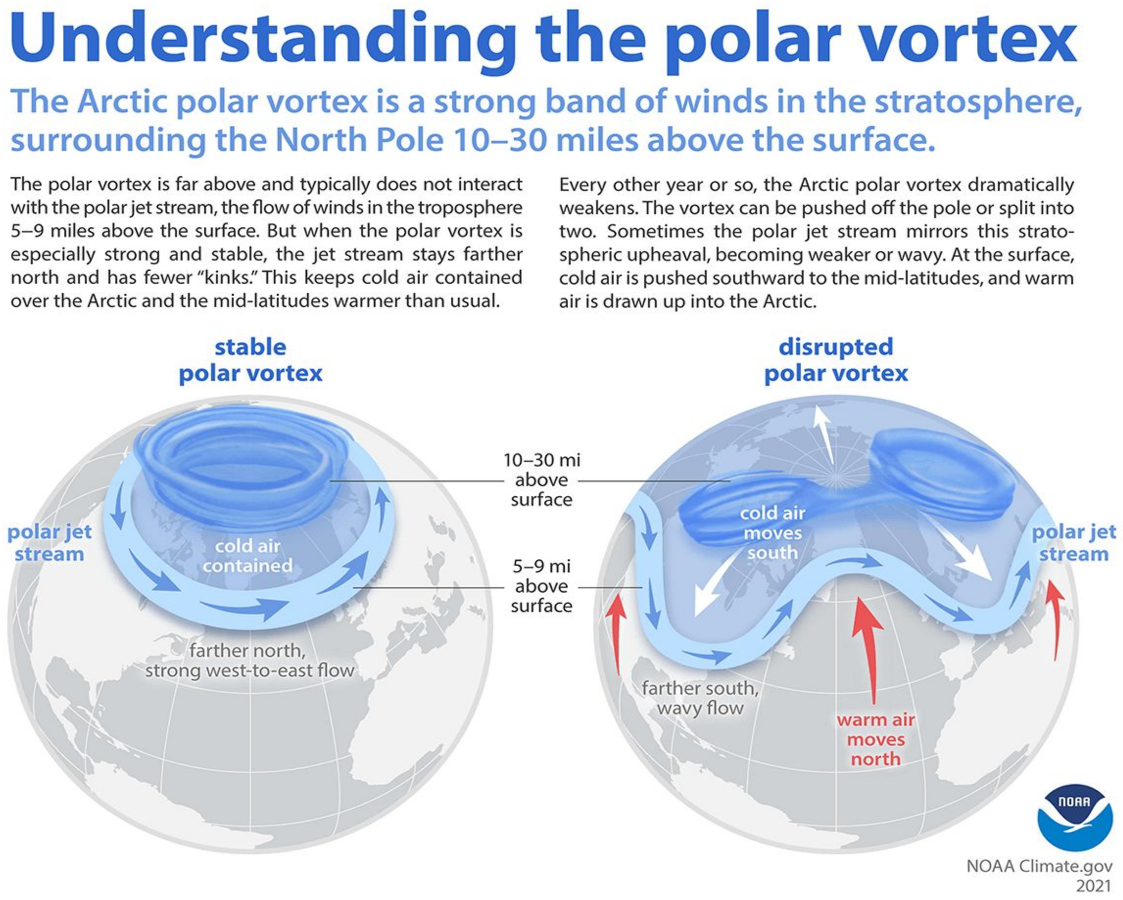


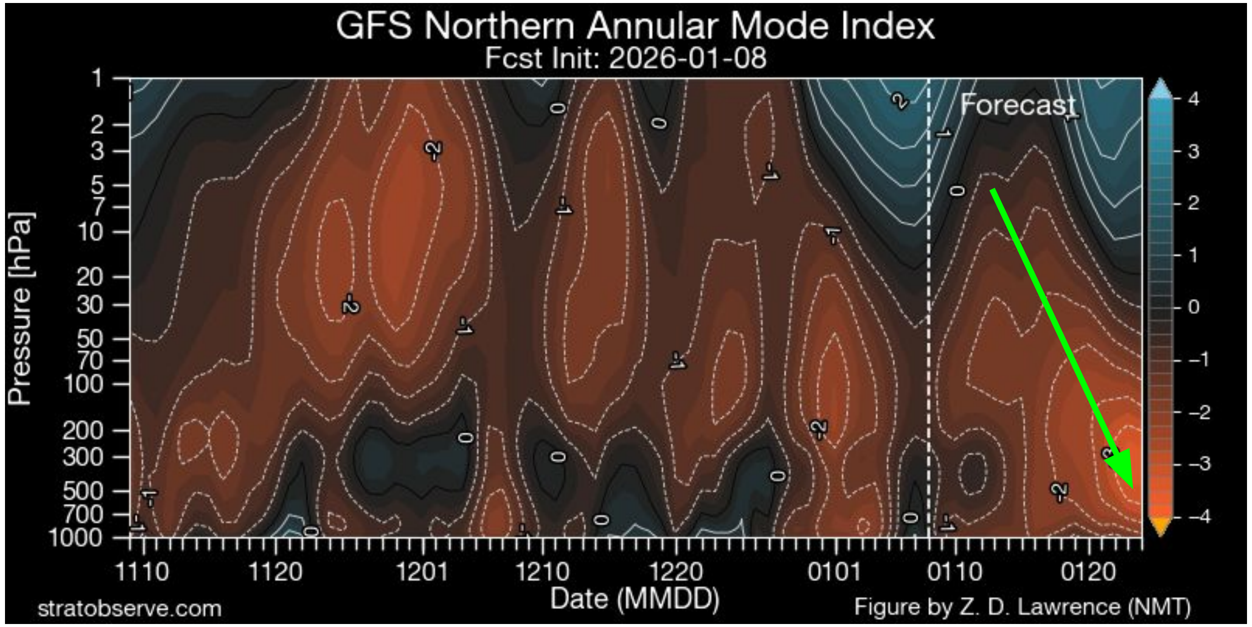


Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Sudden stratospheric warmings (SSWs)

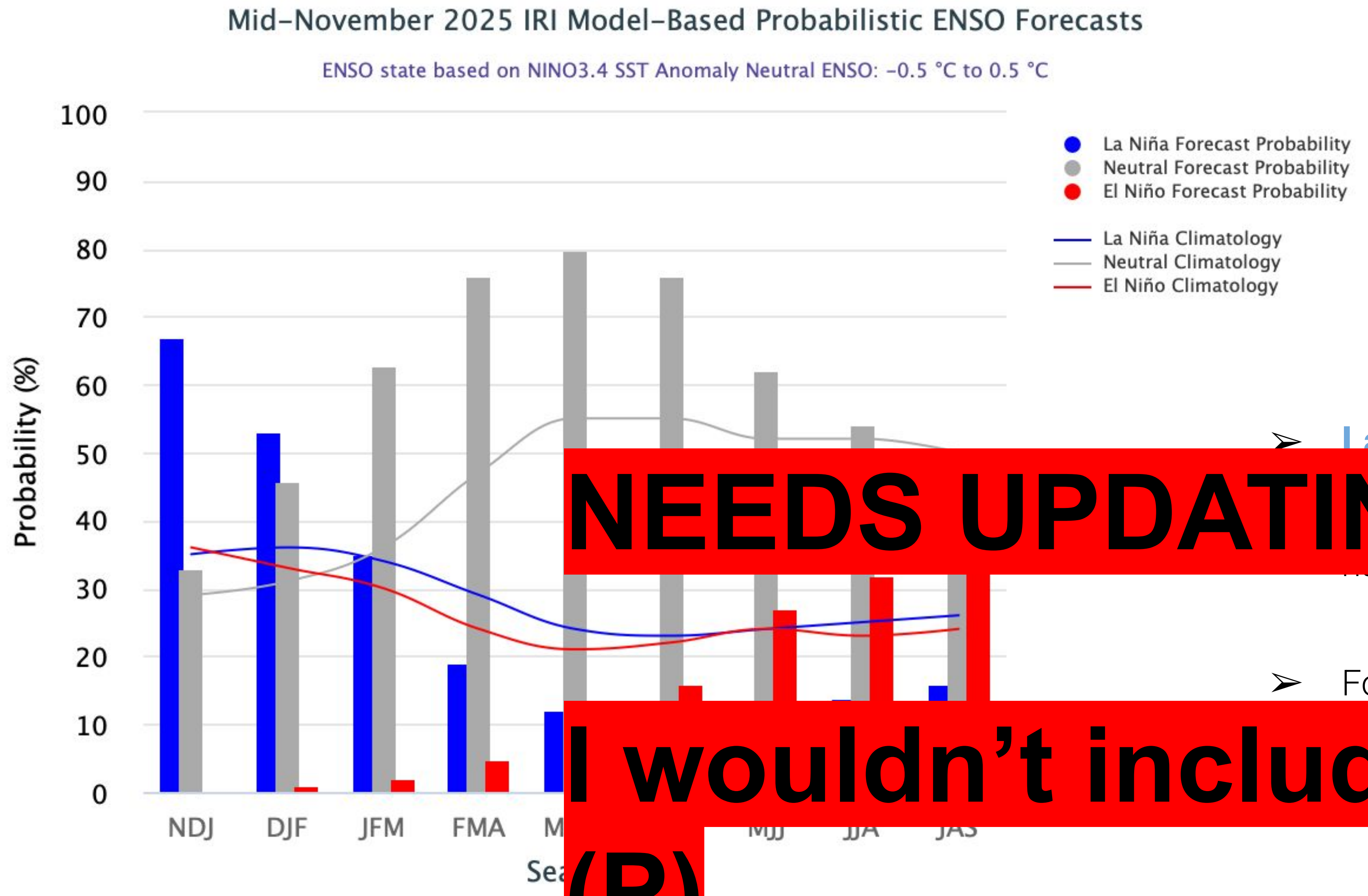
➢ A sudden stratospheric warming can have surface impacts and drive very cold anomalies in northern Europe.





Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://stratobserve.com/anom_ts_diags



NEEDS UPDATING - I wouldn't include this (P)

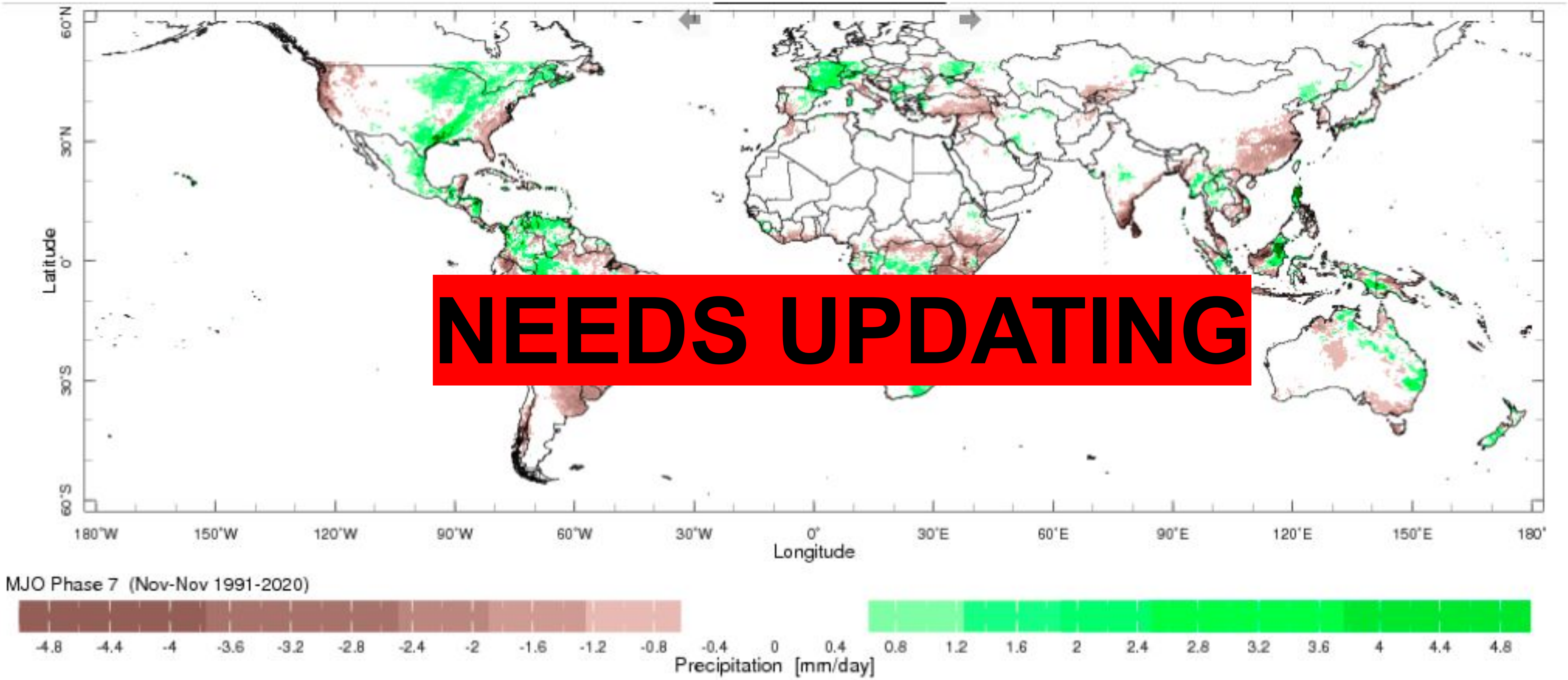
- ➢ **La Niña** conditions expected until ...25. **Neutral** ...pected for the first half of 2026.
- ➢ Forecast probability needs to be ...ainst ...bility.

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/

➢ Precipitation composite during MJO Phase 6 in January

Composite = average pattern

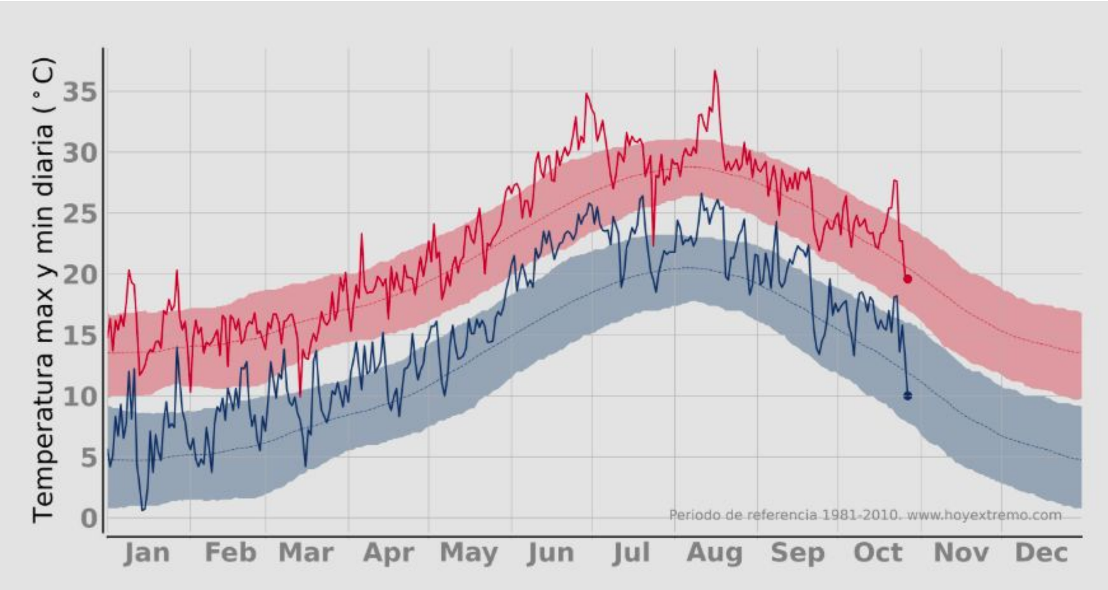


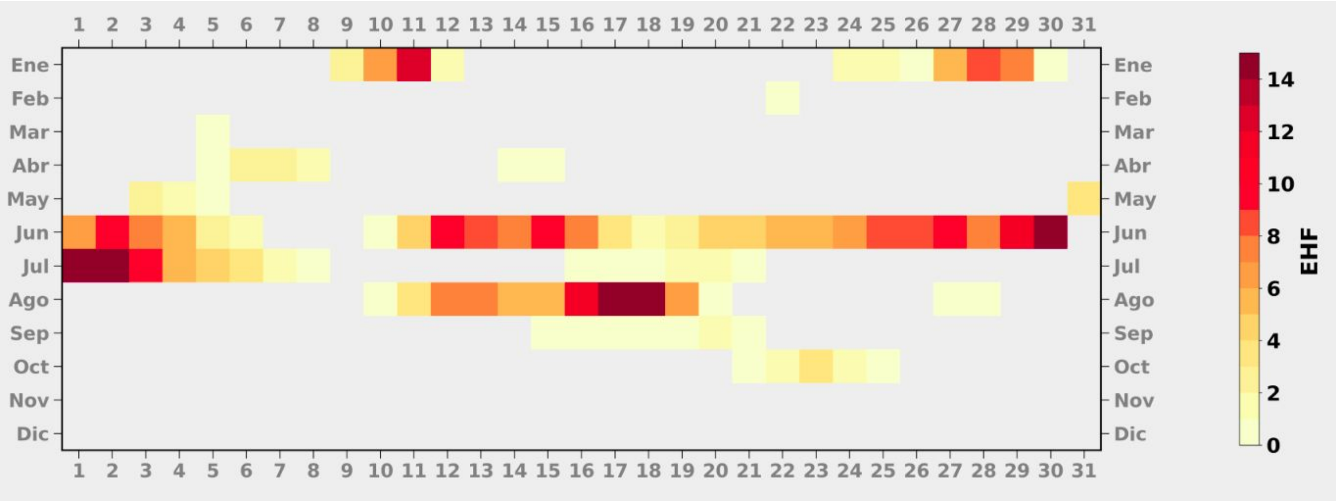
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

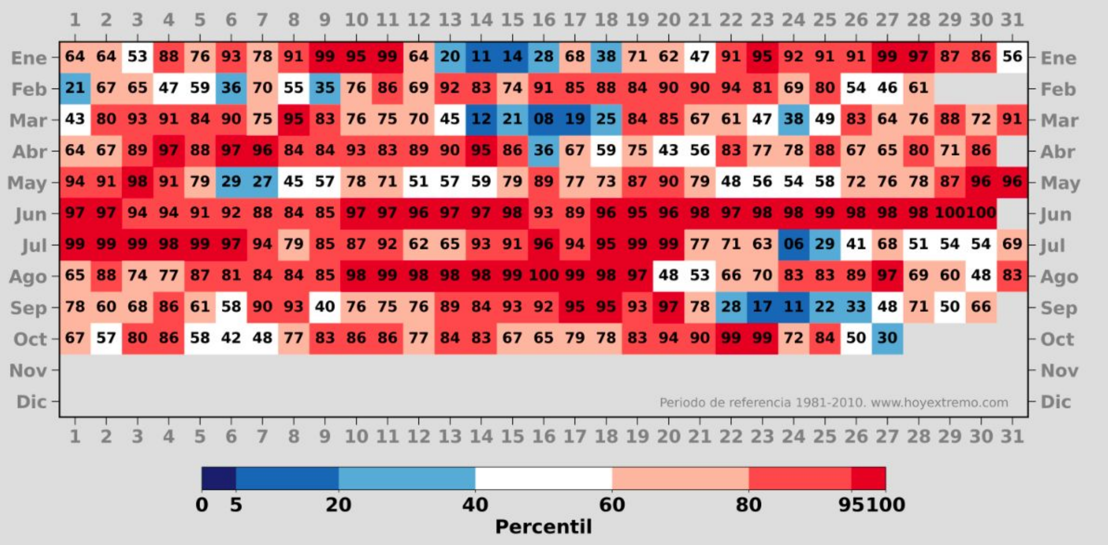
Source: [IRI link]

I. Recent state of the climate

Barcelona







➢ **Excess Heat Factor (EHF)**: Temperature-based index that allows to monitor the extension, duration and intensity of a heat wave.

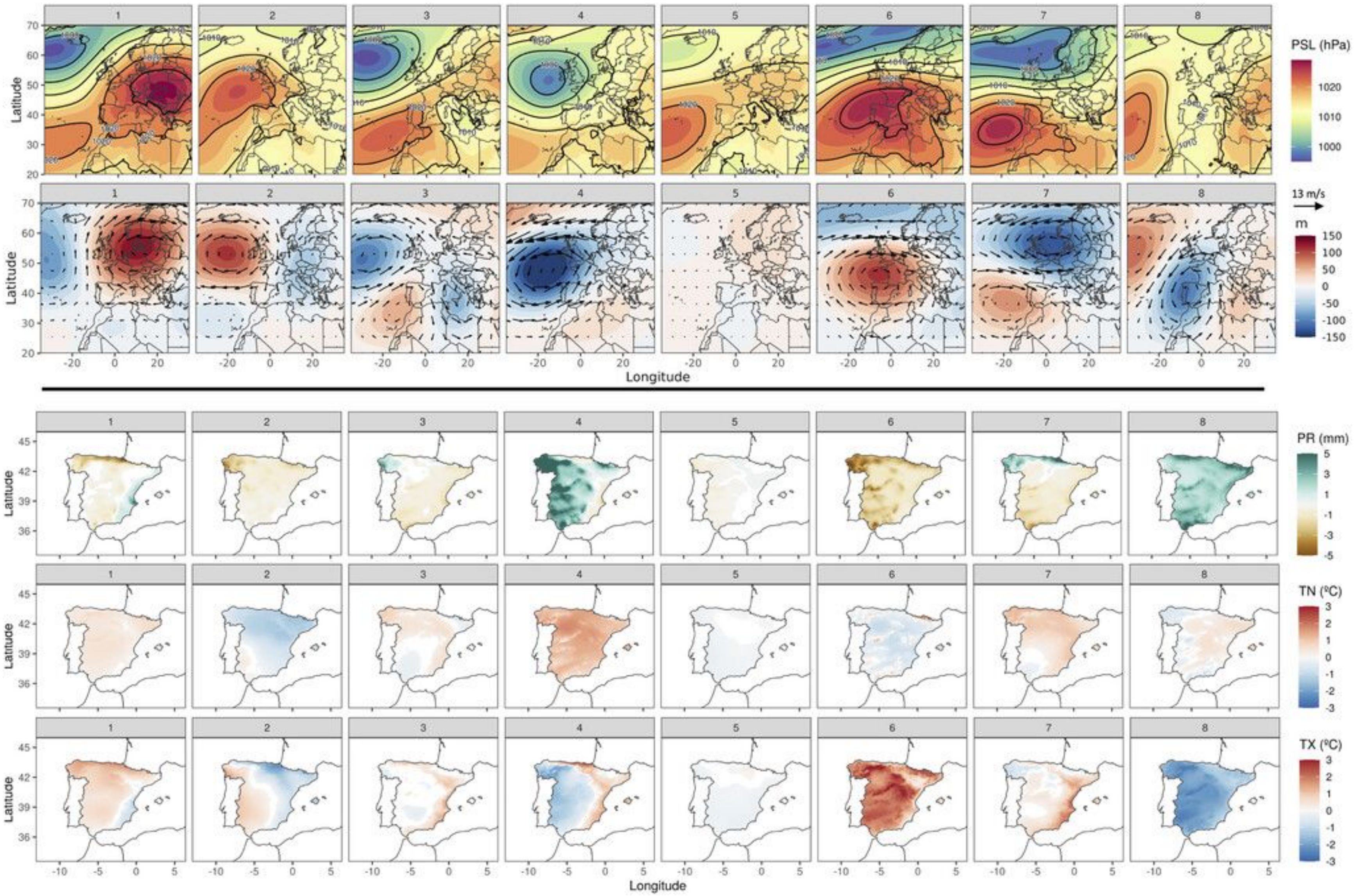
$$EHI_{sig} = (T_i + T_{i+1} + T_{i+2})/3 - T_{95}$$

$$EHI_{accl} = (T_i + T_{i+1} + T_{i+2})/3 - (T_{i-1} + \ldots + T_{i-30})/30$$

$$EHF = EHI_{sig} \times \max(1,\ EHI_{accl})$$

Source: https://hoyextremo.com/city_pages/barcelona/#summary

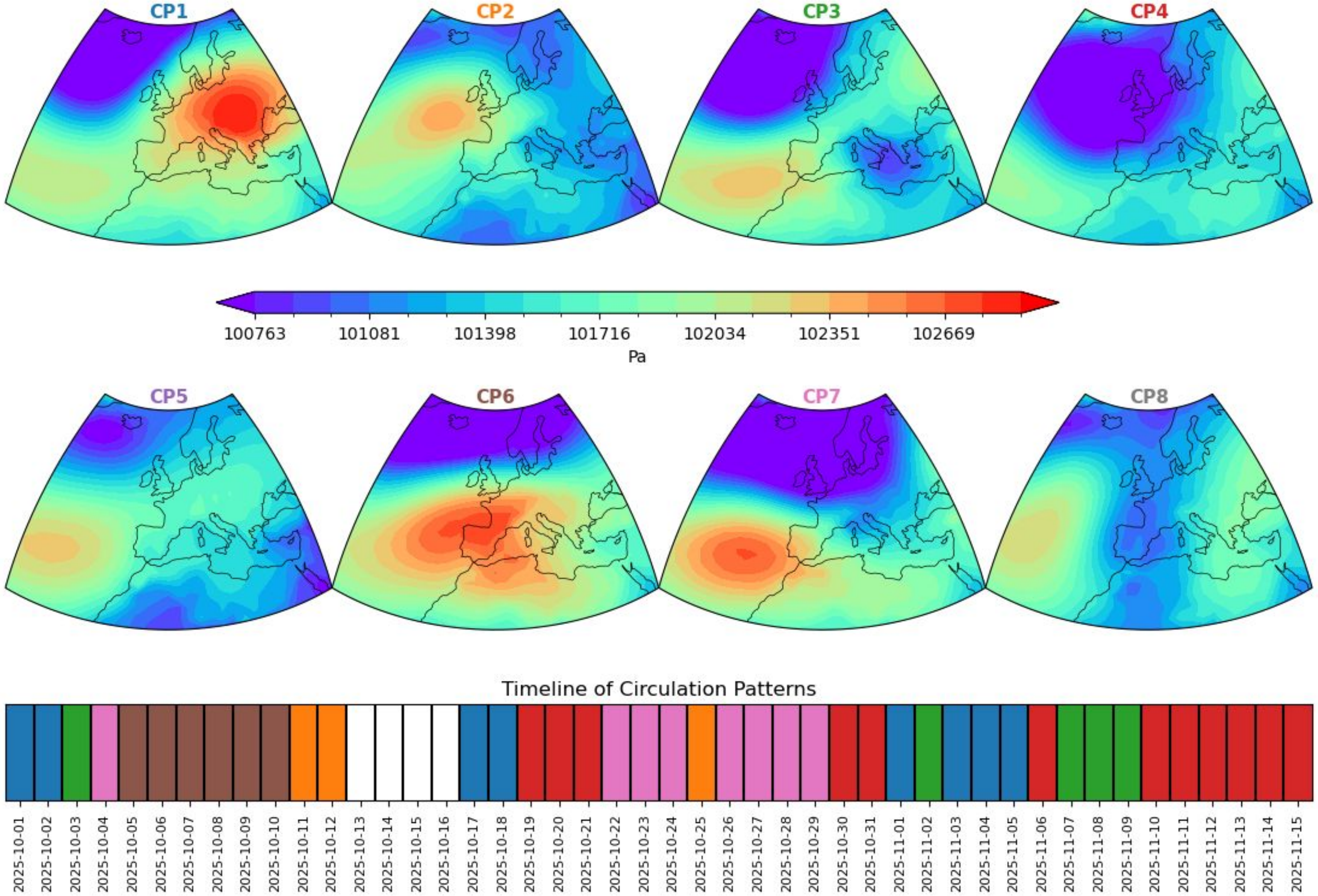
Mati's CPs



PSL (hPa)
1020
1010
1000
13 m/s
m
150
100
50
0
-50
-100
-150
Latitude
Longitude
PR (mm)
TN (ºC)
TX (ºC)
1
2
3
4
5
6
7
8

I. Recent state of the climate

Mati's CPs

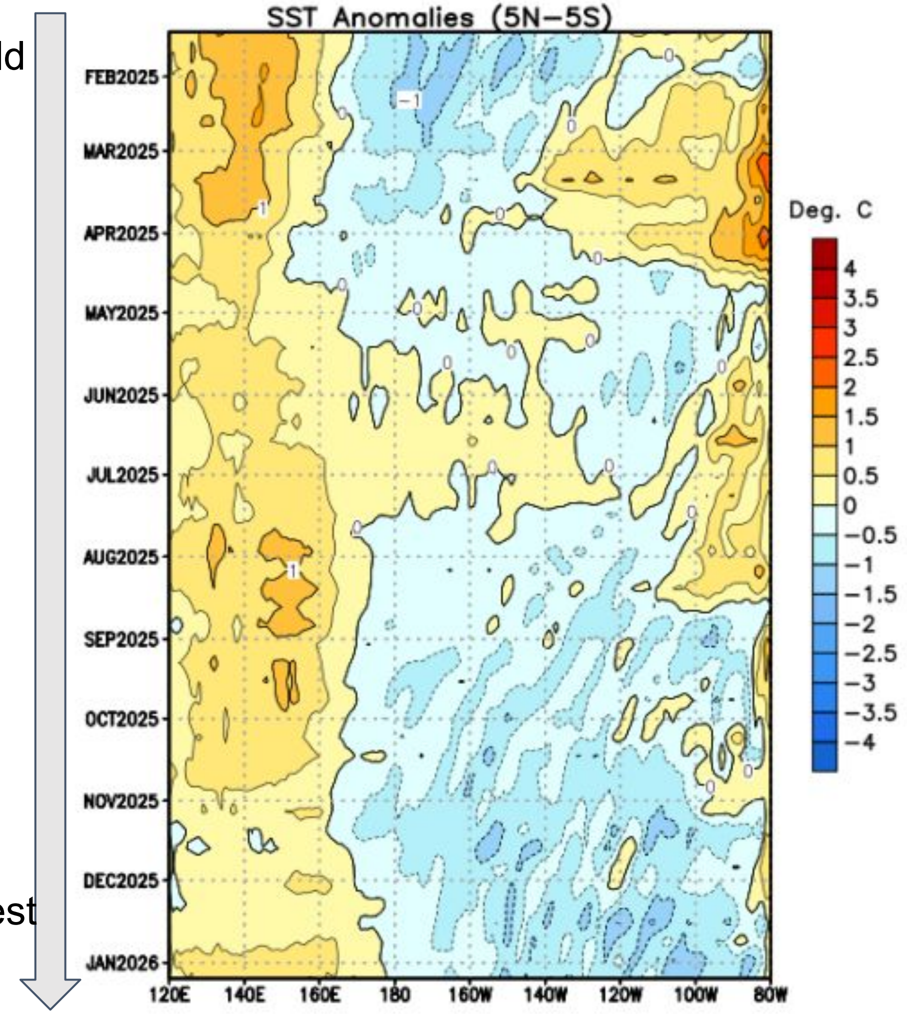


I. Recent state of the climate

El Niño-Southern Oscillation (ENSO) - **The ocean**

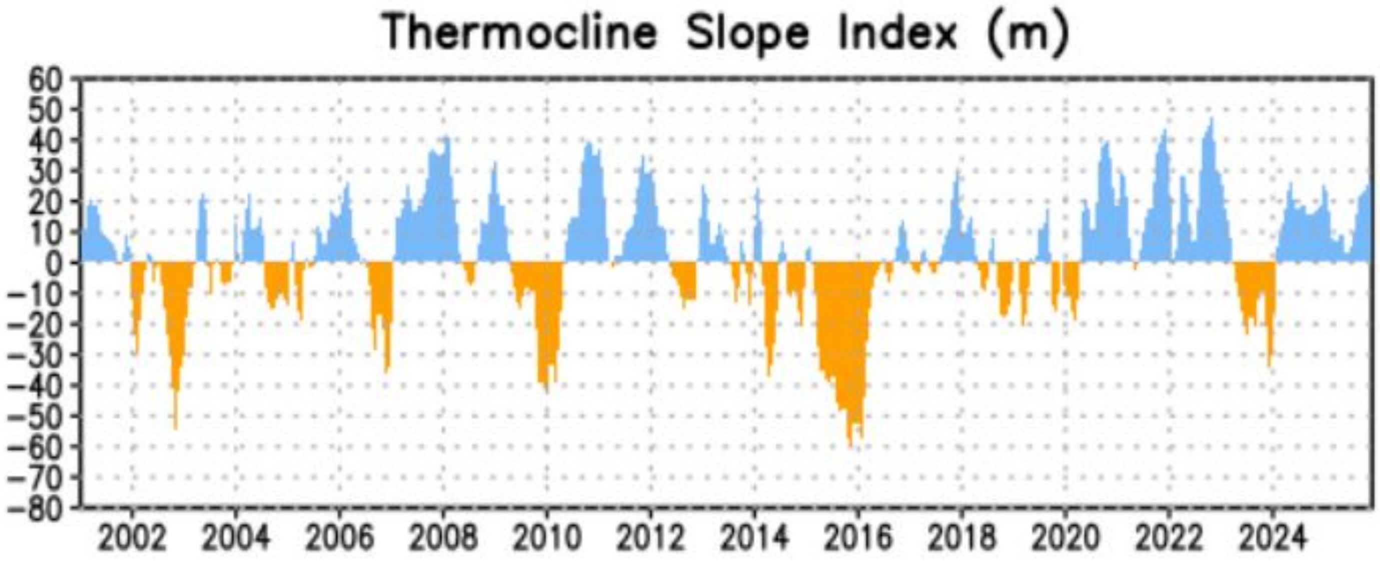
old

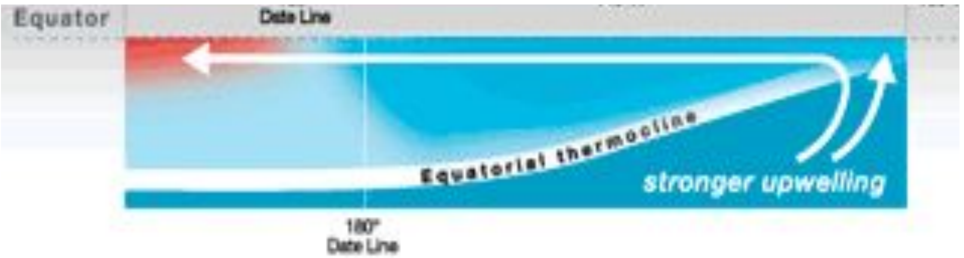
latest



ENSO Alert System Status: La Niña Advisory

La Niña conditions are present.*

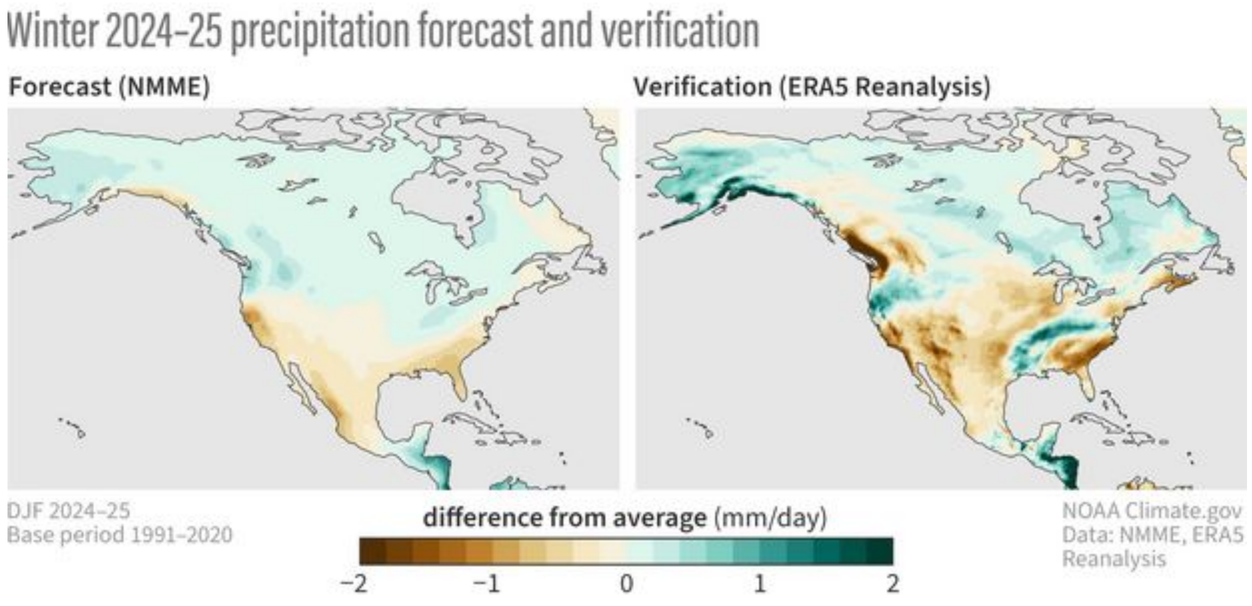


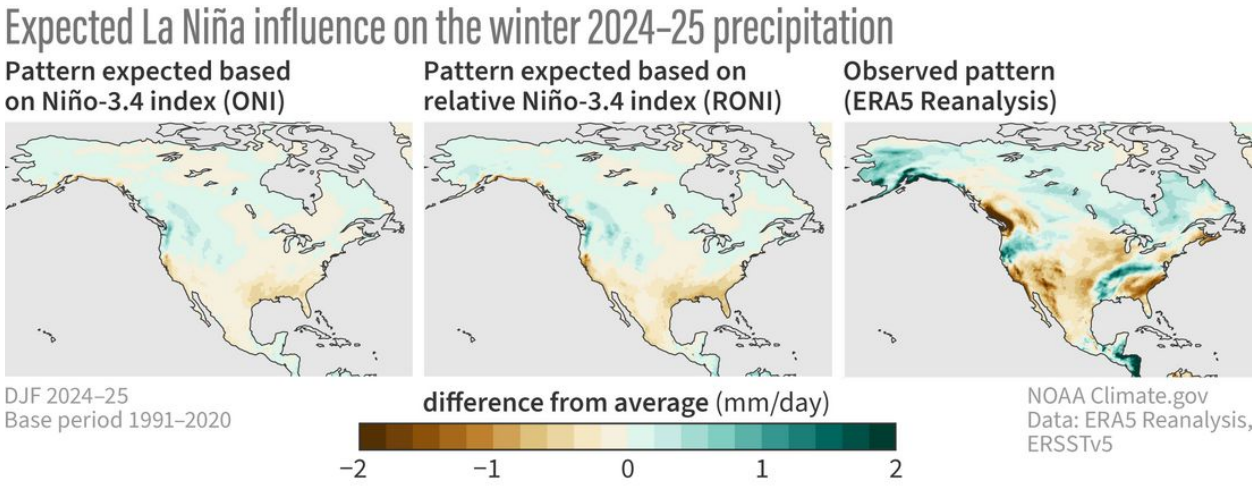


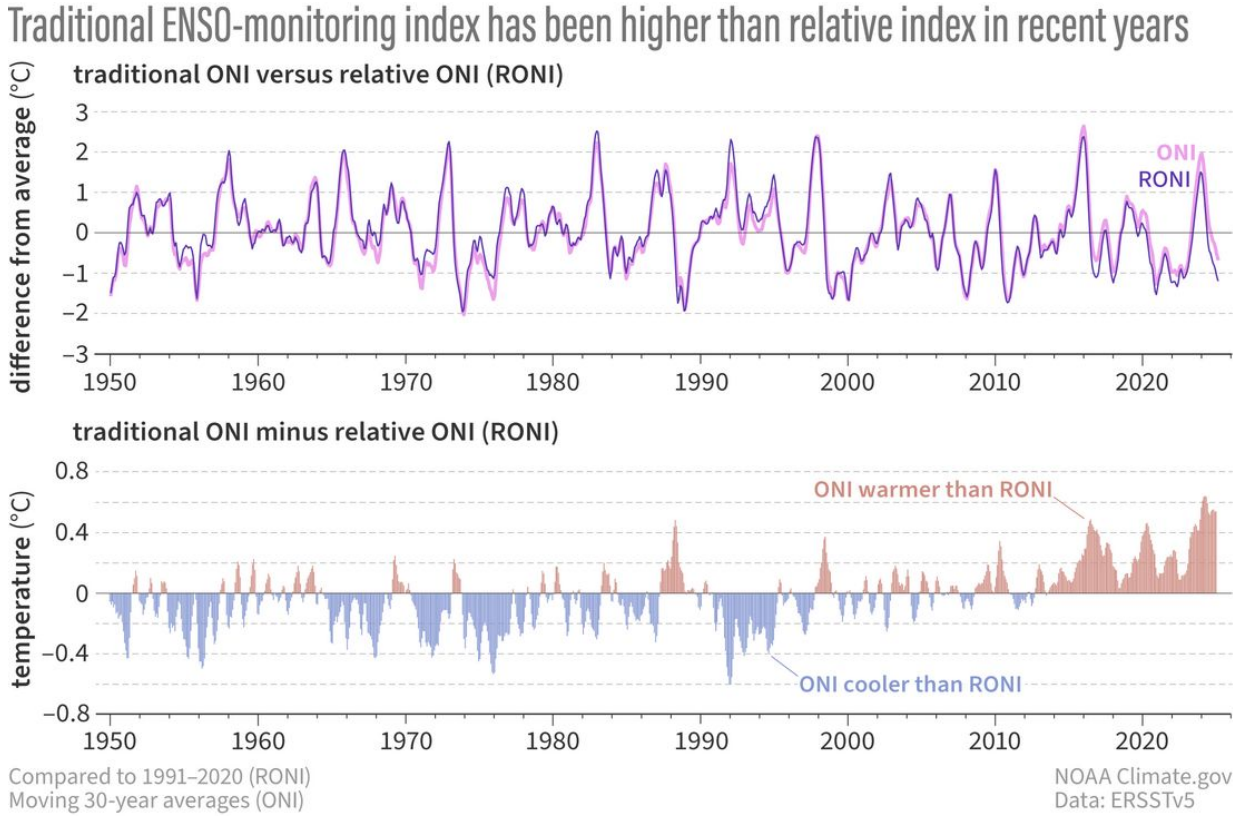
Difference in anomalous depth of the **20ºC isotherm** between the western Pacific (160ºE-150ºW) and the eastern Pacific (90º-140ºW).

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

Source: https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf / https://www.pmel.noaa.gov/gtmba/assorted-plots







- ONI has been consistently higher than RONI during the past 15 years (climate change signal).
- The observed anomaly pattern is much stronger than the one forecasted by NMME.

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

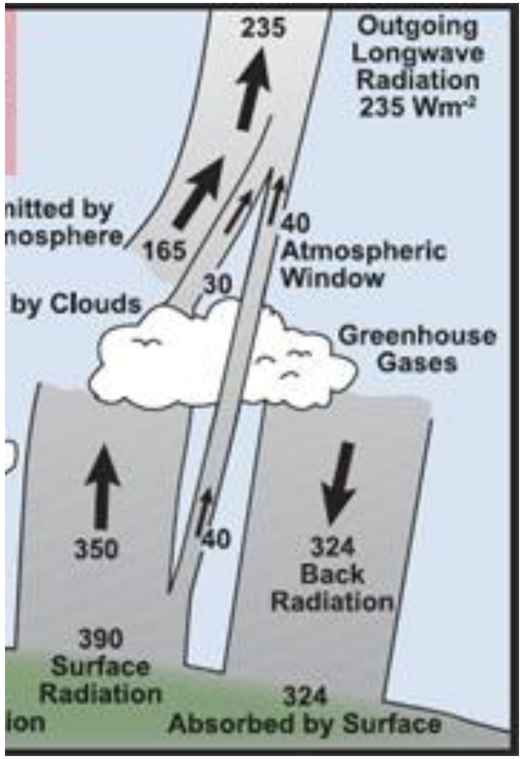
Source: https://www.climate.gov/news-features/blogs/enso/winner-or-bust-did-la-nina-shape-north-american-precipitation-winter

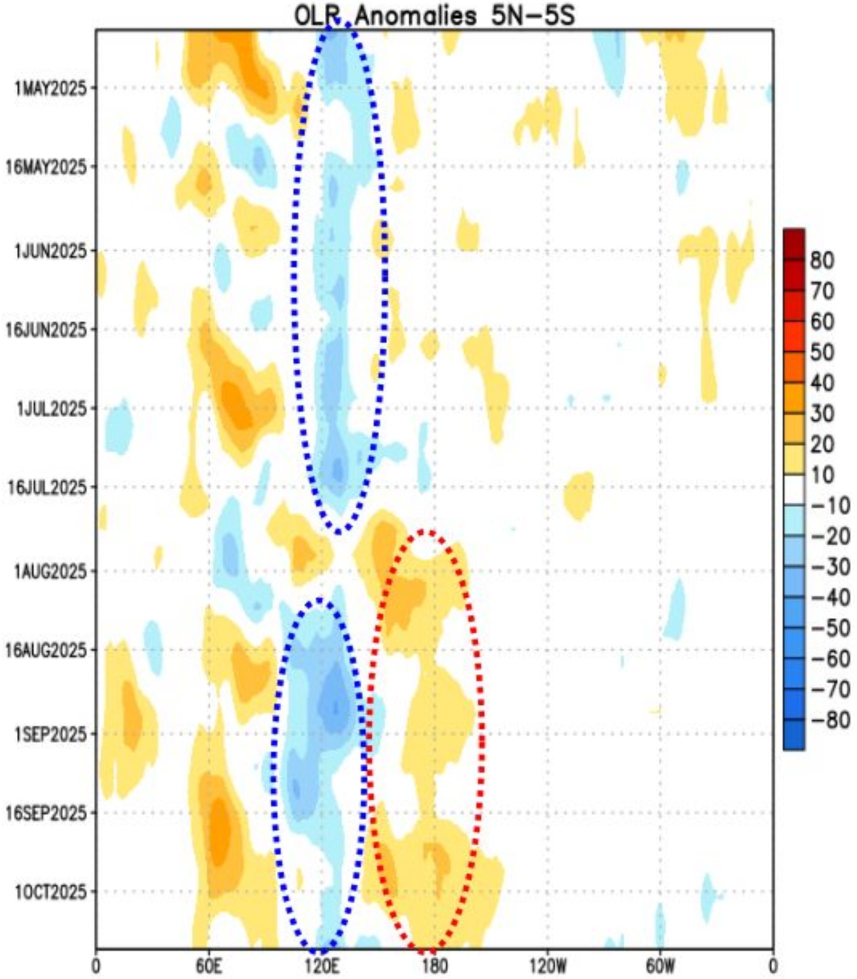
- Negative OLR anomalies:

  Enhanced convection =

  High and deep clouds =

  Their top is cold and emits less emission of longwave radiation back to space.





- Positive OLR anomalies:

  Suppressed convection over the central Pacific is associated with La Niña.

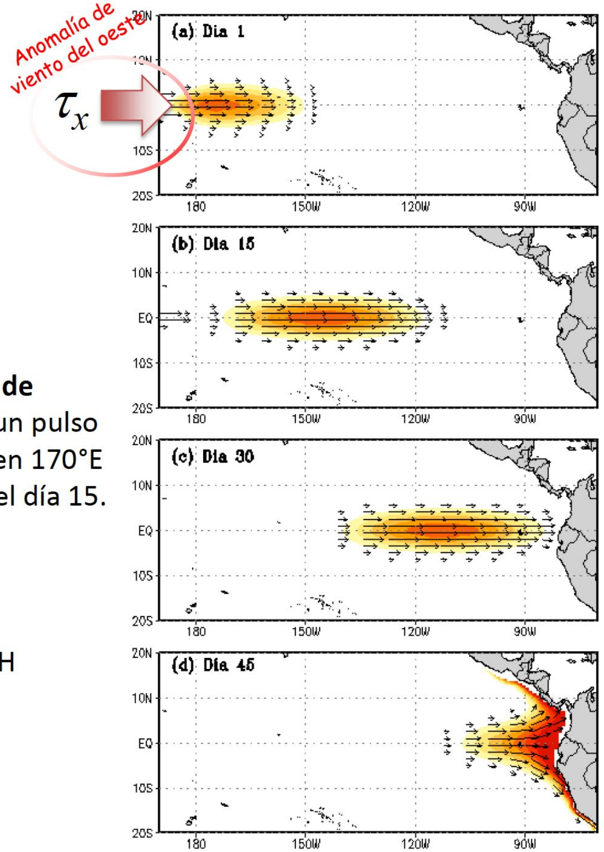
Subsidence (orange/red shading)

Enhanced convection (blue shading)

Source: https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

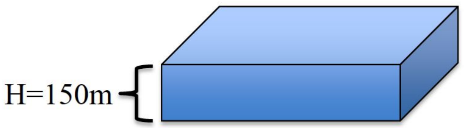
¿Cómo se forma una onda Kelvin cálida?



Mosquera (2014)

Simulación numérica de la propagación de una onda Kelvin Ecuatorial forzada por un pulso de viento del oeste ecuatorial centrado en 170°E durante 30 días con un pico máximo en el día 15.

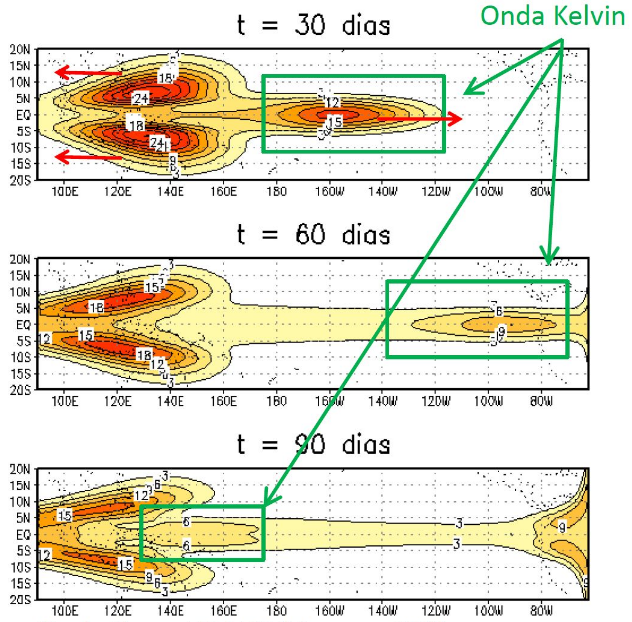
Océano de profundidad H



¿Cómo se forma una onda Kelvin cálida?

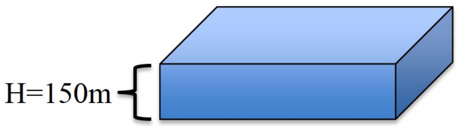
Como consecuencia de la reflexión de la onda Rossby en la frontera occidental

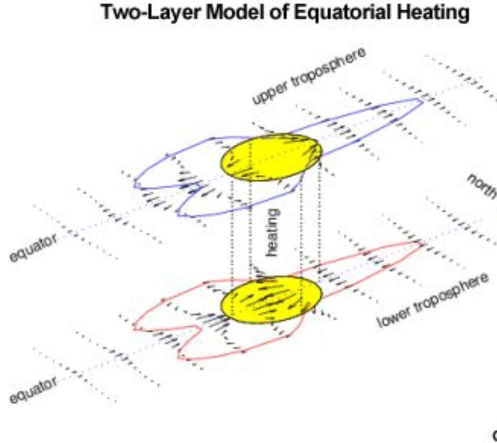
Nivel del mar

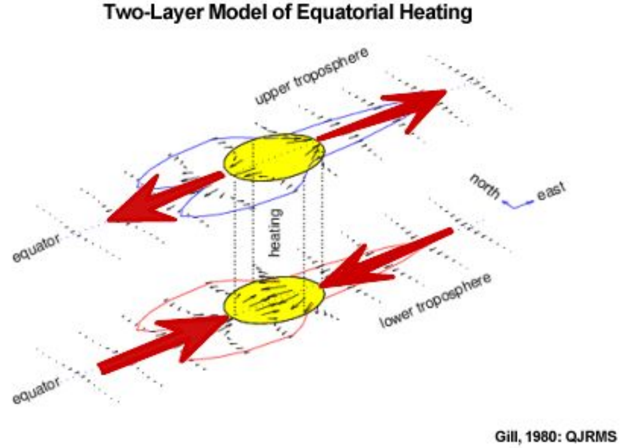


Simulación con LOM-IGP (Mosquera, 2009)

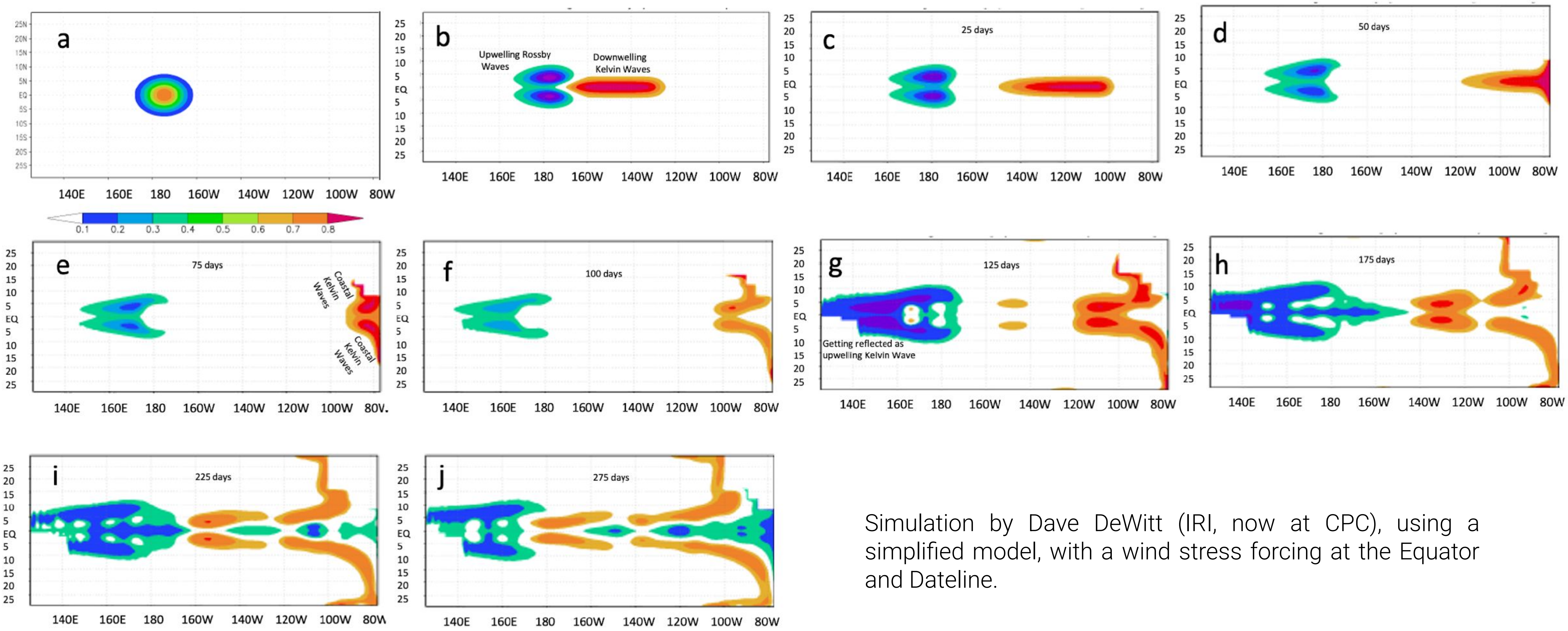
Océano de profundidad H







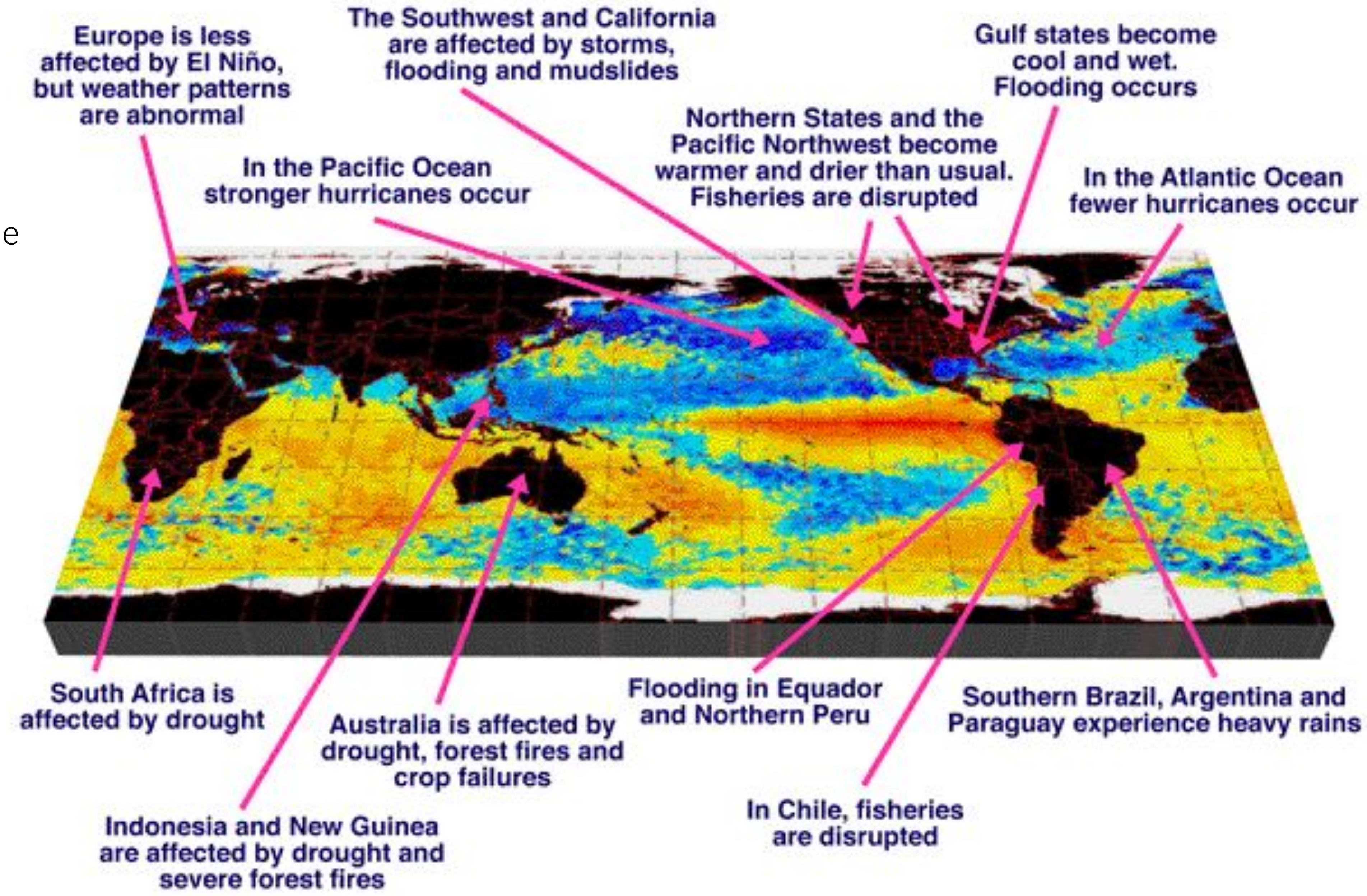
Barcelona Supercomputing Center
Centro Nacional de Supercomputación



Simulation by Dave DeWitt (IRI, now at CPC), using a simplified model, with a wind stress forcing at the Equator and Dateline.

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

- Canonical El Niño impacts across the globe.



Barcelona Supercomputing Center
Centro Nacional de Supercomputación

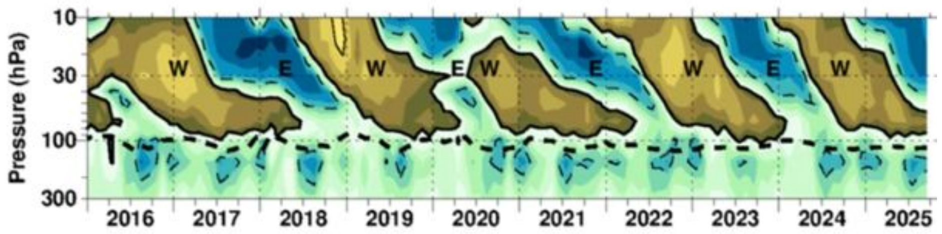
Met Office
Hadley Centre

Summary of teleconnections

- **Positive NAO**
  - La Niña conditions
    → Increases the likelihood of westerly winds in late winter
  - MJO (sub-seasonal, early-mid November)

- **Negative NAO**
  - La Niña conditions
    → Decreases the likelihood of westerly winds in early winter
  - Quasi-biennial Oscillation (QBO) in easterly phase
    → Increased chance of a weaker stratospheric polar vortex
    → Increases the likelihood of sudden stratospheric warmings

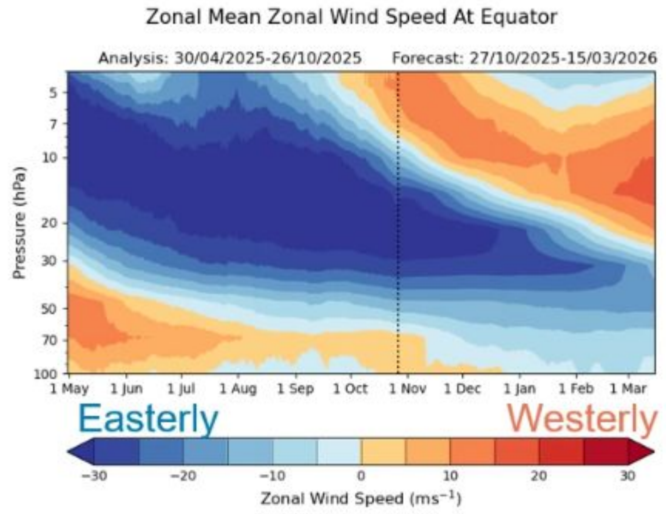
QBO Observations



Paul A. Newman, Larry Coy, Leslie R. Lait (NASA/GSFC) Thu Oct 2 16:20:52 2025

https://acd-ext.gsfc.nasa.gov/Data_services/met/qbo/qbo.html#uwind

QBO Predictions

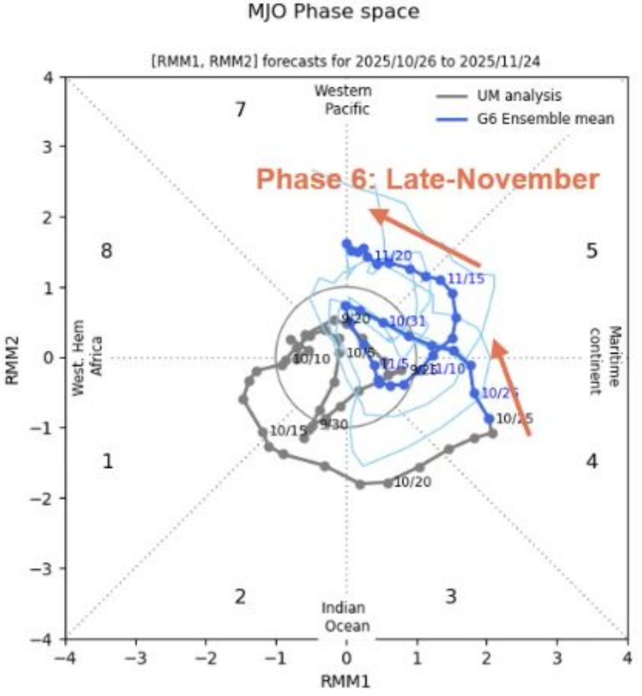


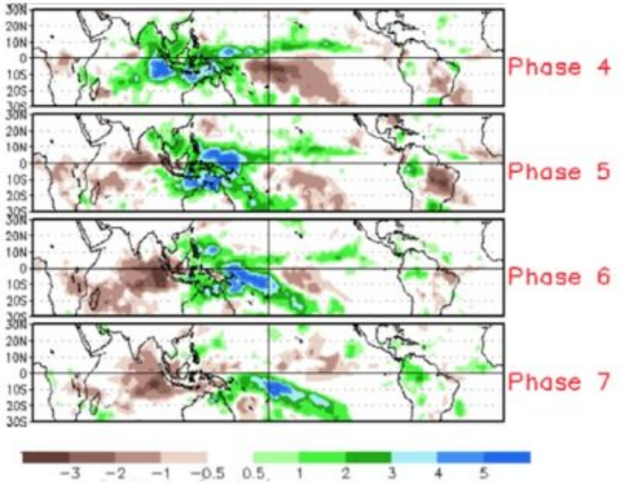
Take control Chat People Raise React View More

Met Office
Hadley Centre

Summary of teleconnections

- **Positive NAO**
  - La Niña conditions
    → Increases the likelihood of westerly winds in late winter
  - MJO (sub-seasonal, early-mid November)
- **Negative NAO**
  - La Niña conditions
    → Decreases the likelihood of westerly winds in early winter
  - Quasi-biennial Oscillation (QBO) in easterly phase
    → Increased chance of a weaker stratospheric polar vortex
    → Increases the likelihood of sudden stratospheric warmings





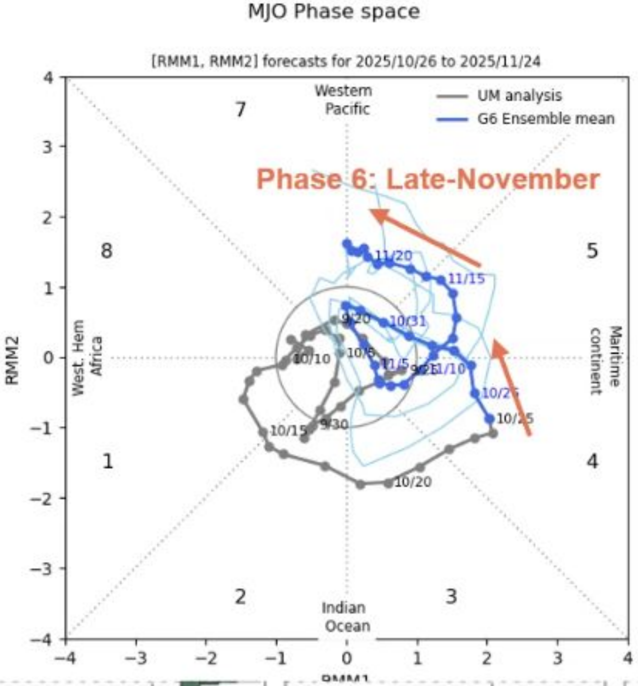
Supercomputing Center
Centro Nacional de Supercomputación

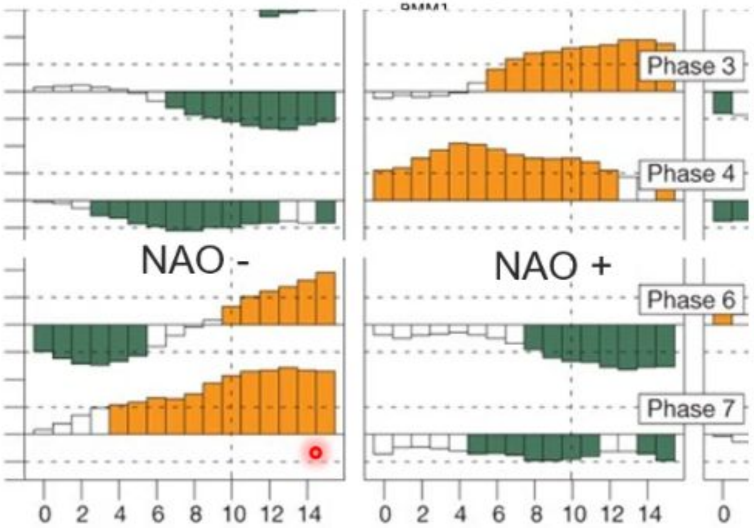
Met Office
Hadley Centre

Summary of teleconnections

- **Positive NAO**
  - La Niña conditions
    → Increases the likelihood of westerly winds in late winter
  - MJO (sub-seasonal, early-mid November)

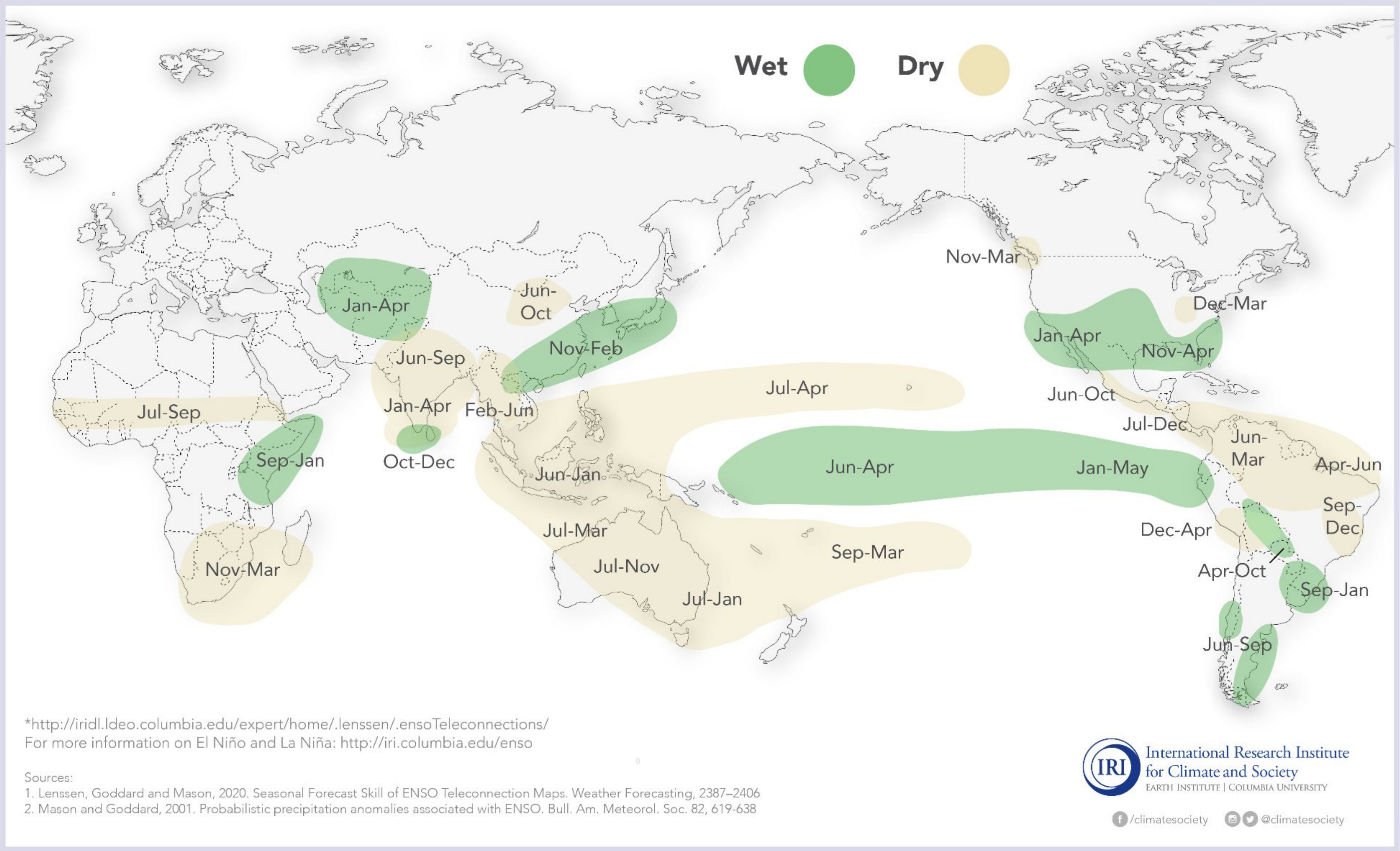
- **Negative NAO**
  - La Niña conditions
    → Decreases the likelihood of westerly winds in early winter
  - Quasi-biennial Oscillation (QBO) in easterly phase
    → Increased chance of a weaker stratospheric polar vortex
    → Increases the likelihood of sudden stratospheric warmings





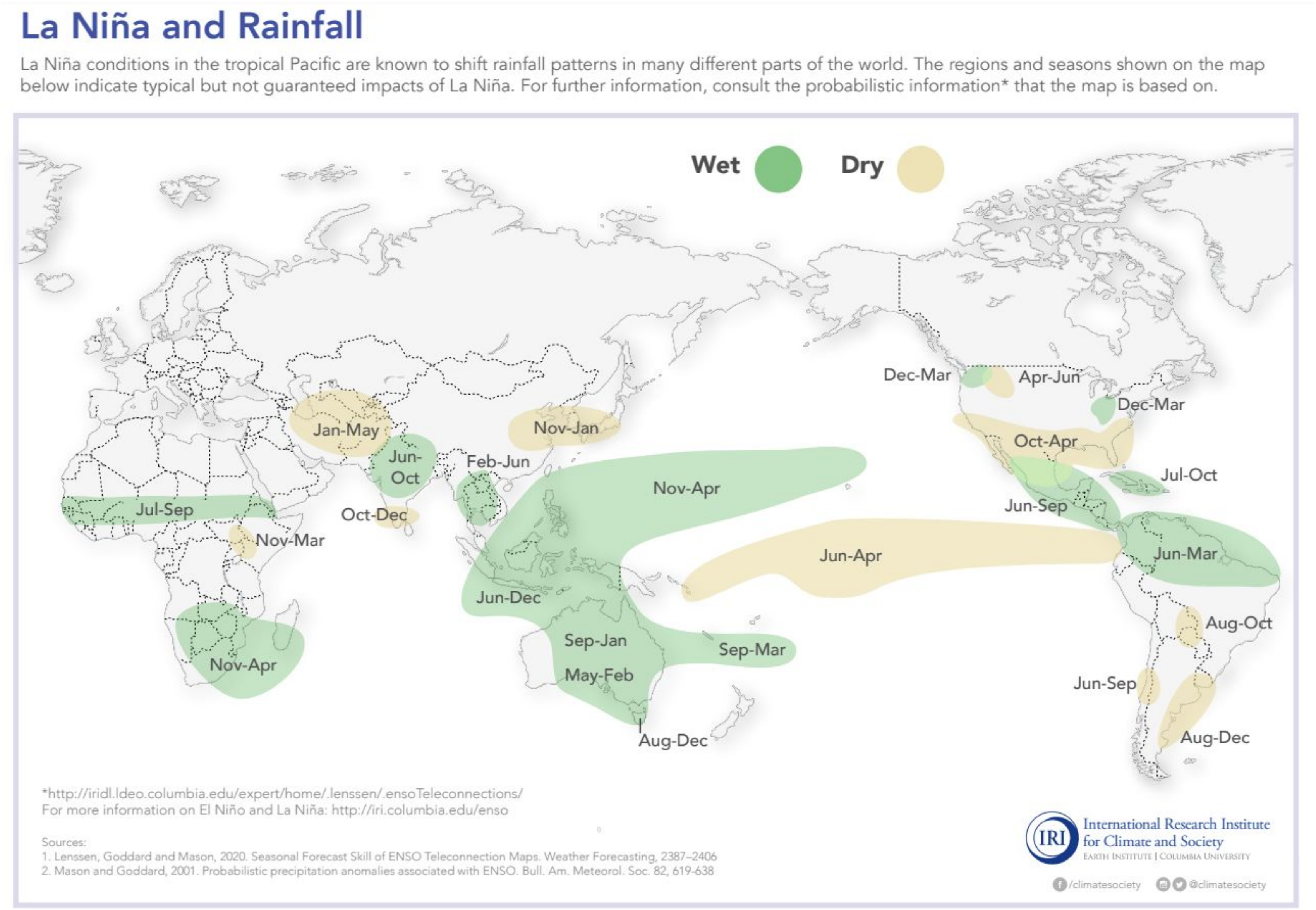
El Niño and Rainfall

El Niño conditions in the tropical Pacific are known to shift rainfall patterns in many different parts of the world. The regions and seasons shown on the map below indicate typical but not guaranteed impacts of La Niña. For further information, consult the probabilistic information* that the map is based on.



- ➢ Canonical El Niño impacts on rainfall patterns across the globe.
- ➢ For *** drier anomalies are expected in:
- ➢ Wetter anomalies are expected in:

Barcelona Supercomputing Center
Centro Nacional de Supercomputación



- ➢ Canonical La Niña impacts on rainfall patterns across the globe.
- ➢ For SON drier anomalies are expected in:
  Parts of South America, southern North America and central Asia
- ➢ Wetter anomalies are expected in: parts of Australia, northern South America, central South America, Southeast Asia, Philippines, Eastern Pacific

Source: https://iridl.ldeo.columbia.edu/maproom/IFRC/FIC/laninarain.html

Summary

Recent state of the climate

- ➢ Persistent observed dry anomalies in most of the Americas, the Guinean coast, Congo, central Asia, parts of Australia, most of Europe, Southeast Asia, eastern China, Madagascar, eastern Siberia, parts of India and Australia.

- ➢ Both record wet (Iberian peninsula, south of France, parts of Italy) and dry in central-north Europe (North of Germany, Alps, (

NEEDS UPDATING

- ➢ Persistent weak **la Niña** with warm anomalies in the Niño 1+2 region (Coastal El niño).

- ➢ Sudden stratospheric warming (likely final event) starting around the 12th of March with likelihood of mild conditions over europe in the upcoming weeks.

- ➢ During February MJO avoided phase 8 due to strong subsidence in the CP. It became active at the beginning of March (phases 1 and 2) and has since then become inactive.

Summary

Seasonal forecasts

- High likelihood of return to neutral conditions during MAM 2025.

- Apart from southern Africa, anomalies in precipitation could be consistent with a La Niña.

NEEDS UPDATING

- Typical global warm sts. Parts of North Atlantic, Southern sea, Indochinese peninsula with cooler anomalies. And northern North America, southern South America, India and southern Africa with less warm signals.