

Forecast Briefing

July 2026

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Tuesday 14th July 2026

Outline

- I. Recent state of the climate
- II. Tropical variability
- III. Extratropical variability
- IV. Seasonal forecasts
- V. Decadal predictions

I. Recent state of the climate

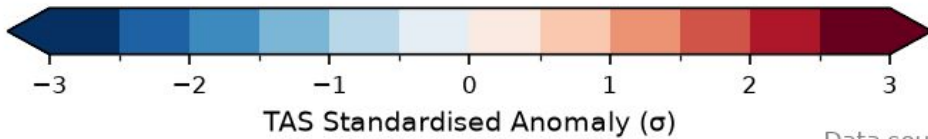
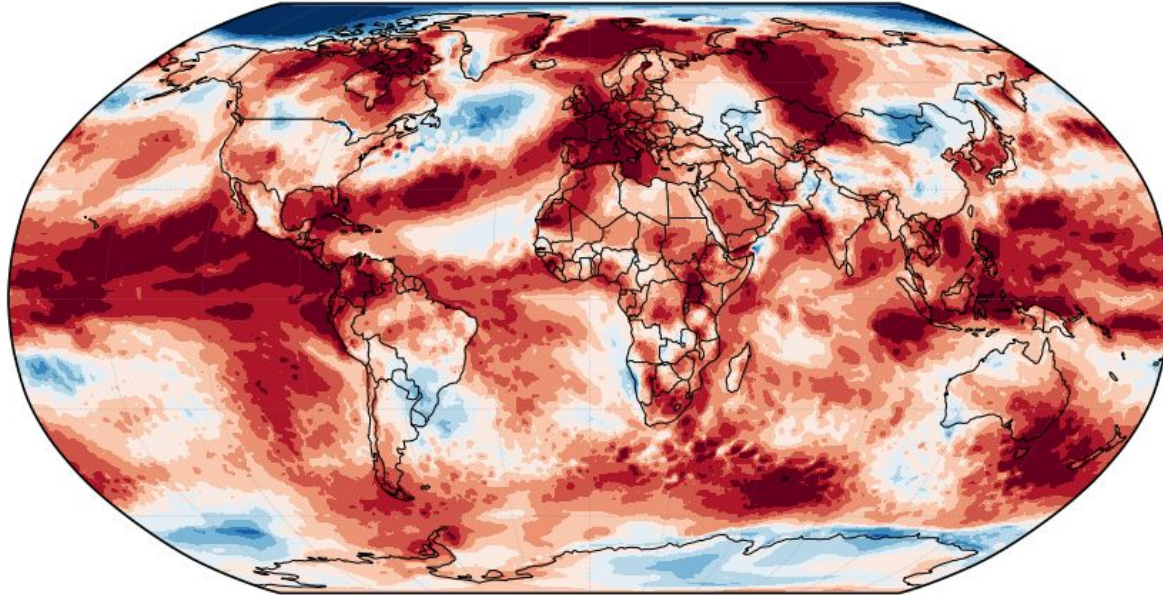
I. Recent state of the climate

Temperature



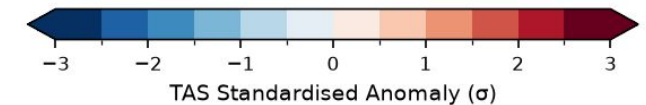
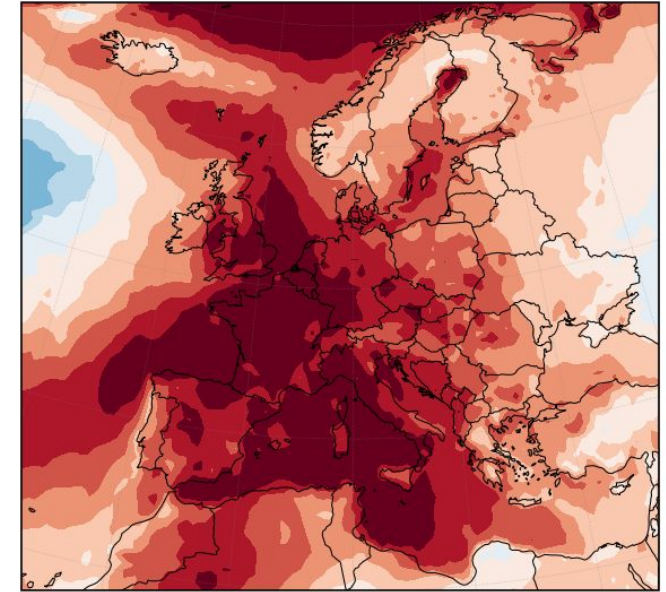
3.06°C above June 1991-2020 for Western Europe

TAS Standardised Anomaly — June 2026
Ref: 1991-2020



Data source: ERA5

TAS Standardised Anomaly — June 2026
Ref: 1991-2020



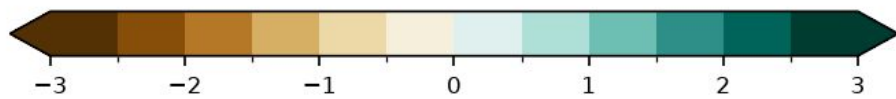
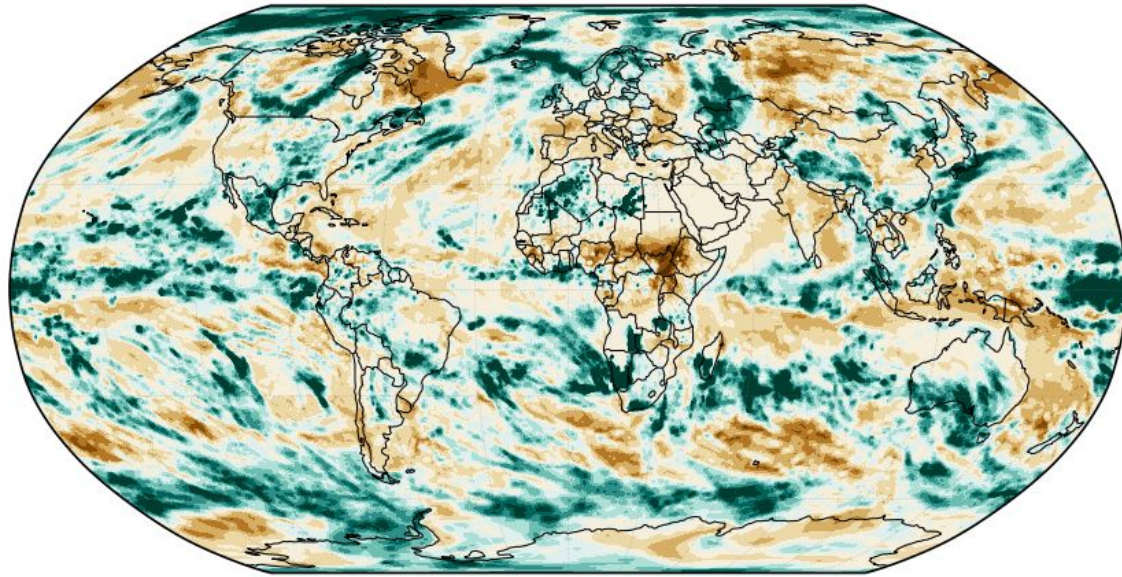
Data source: ERA5

- Warmest June on record for western Europe, second-warmest globally
- Intense heatwave second half of June (Coschen in eastern Germany -> 41.7 °C June 28)

I. Recent state of the climate

Precipitation

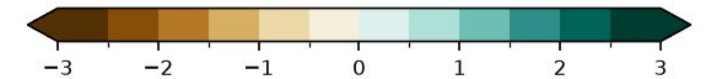
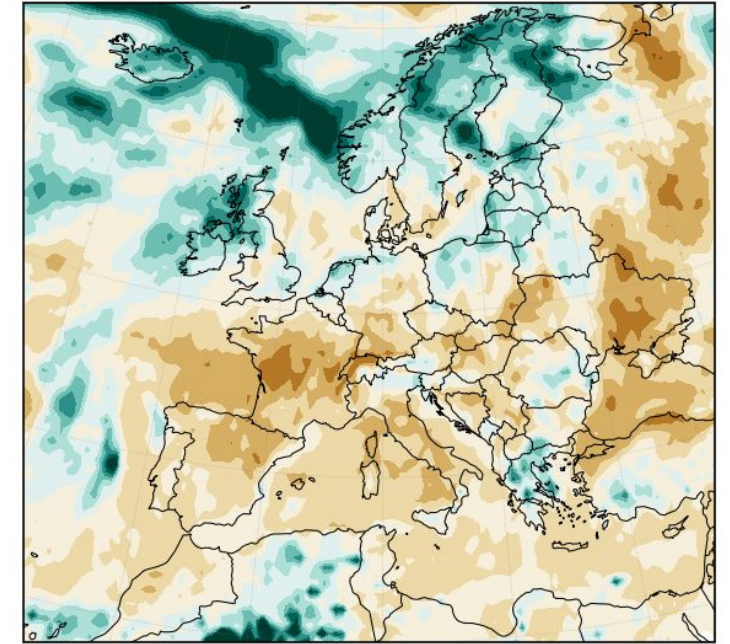
PRLR Standardised Anomaly — June 2026
Ref: 1991-2020



PRLR Standardised Anomaly (σ)

Data source: ERA5

PRLR Standardised Anomaly — June 2026
Ref: 1991-2020

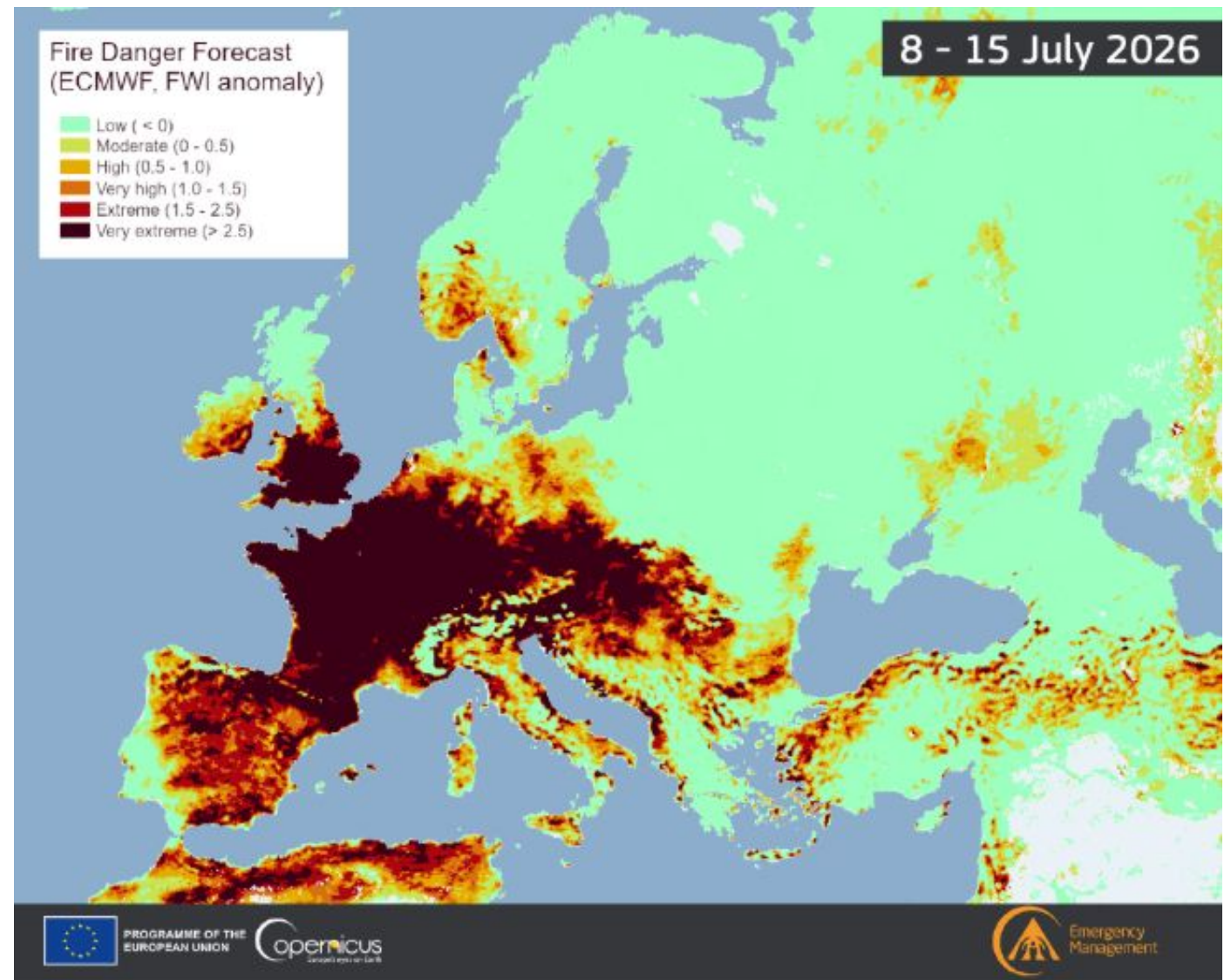
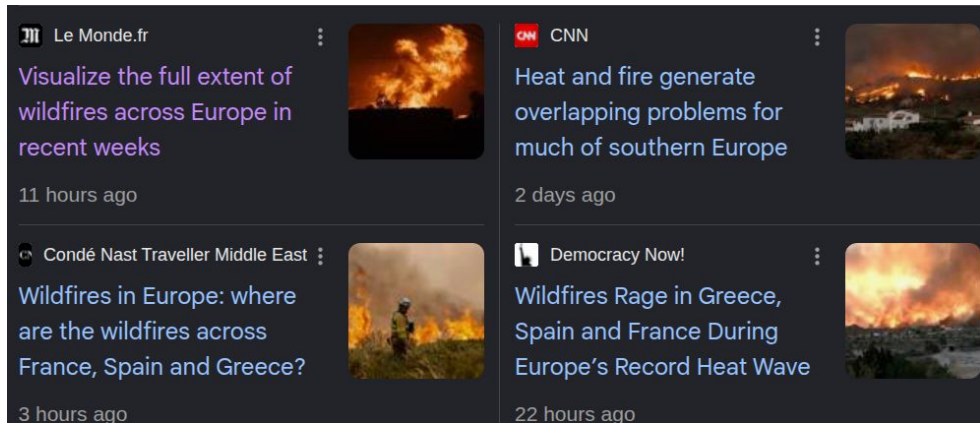


PRLR Standardised Anomaly (σ)

Data source: ERA5

- Drier-than-average in western Europe and central Africa
- Wetter-than-average in parts of North America, easternmost Asia, southern Africa and Australia, with flooding in several regions

I. Recent state of the climate



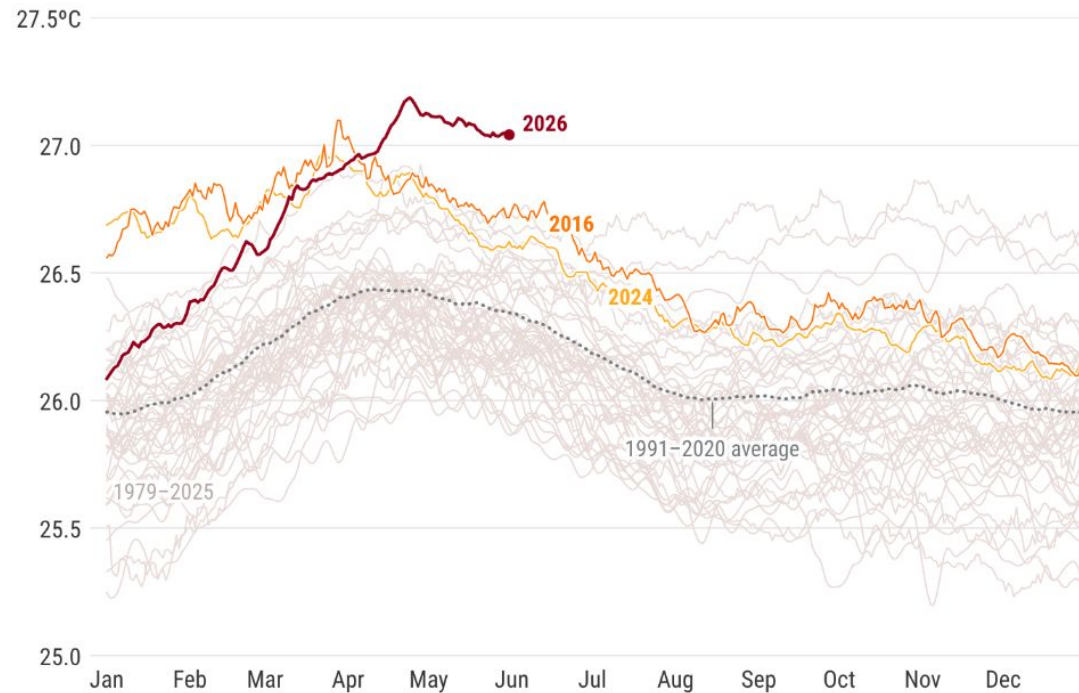
Median Fire Weather Index (FWI) anomaly map. Anomalies are computed as a standard deviation from the 30-year historical mean value

© EU, 2026. Licensed under CC BY 4.0. Source: EU Forest Fires Information System (EFFIS), Copernicus Emergency Management Service.

Record-breaking ocean temperatures in the Tropical Pacific

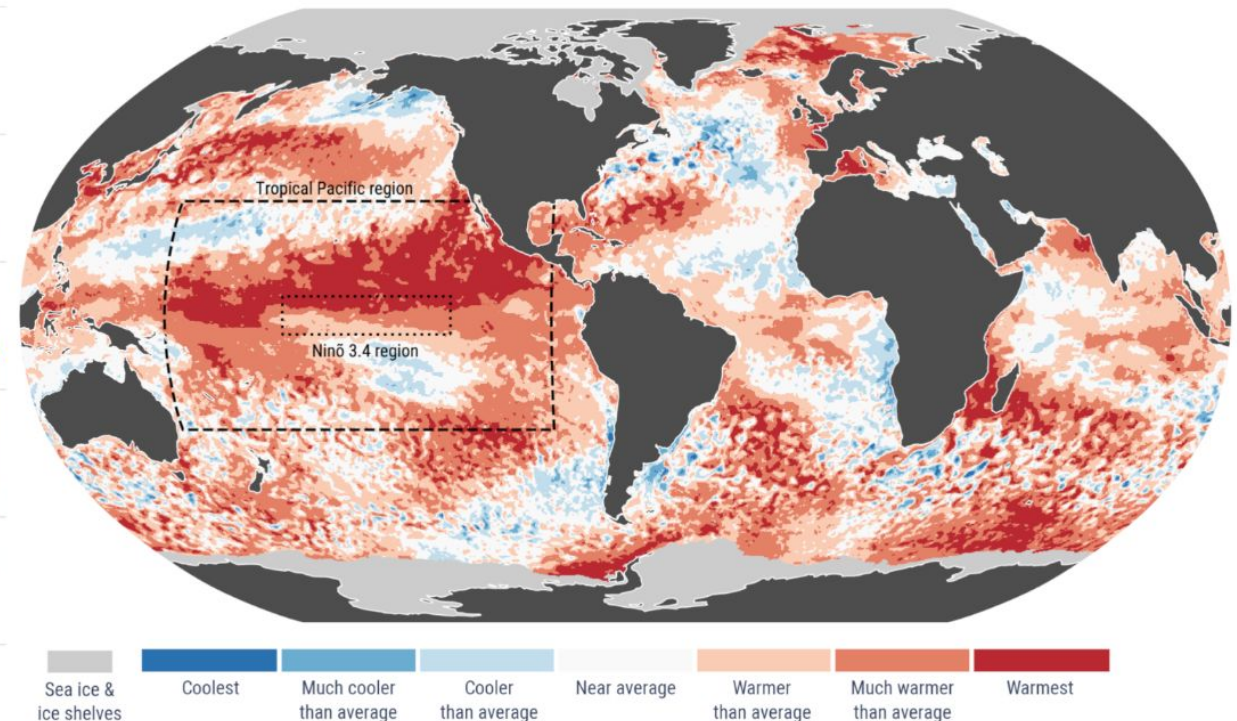
Daily sea surface temperature for Tropical Pacific

Data: ERA5 • Area: 155°E–90°W, 30°S–30°N • Credit: C3S/ECMWF



Anomalies and extremes in sea surface temperature in May 2026

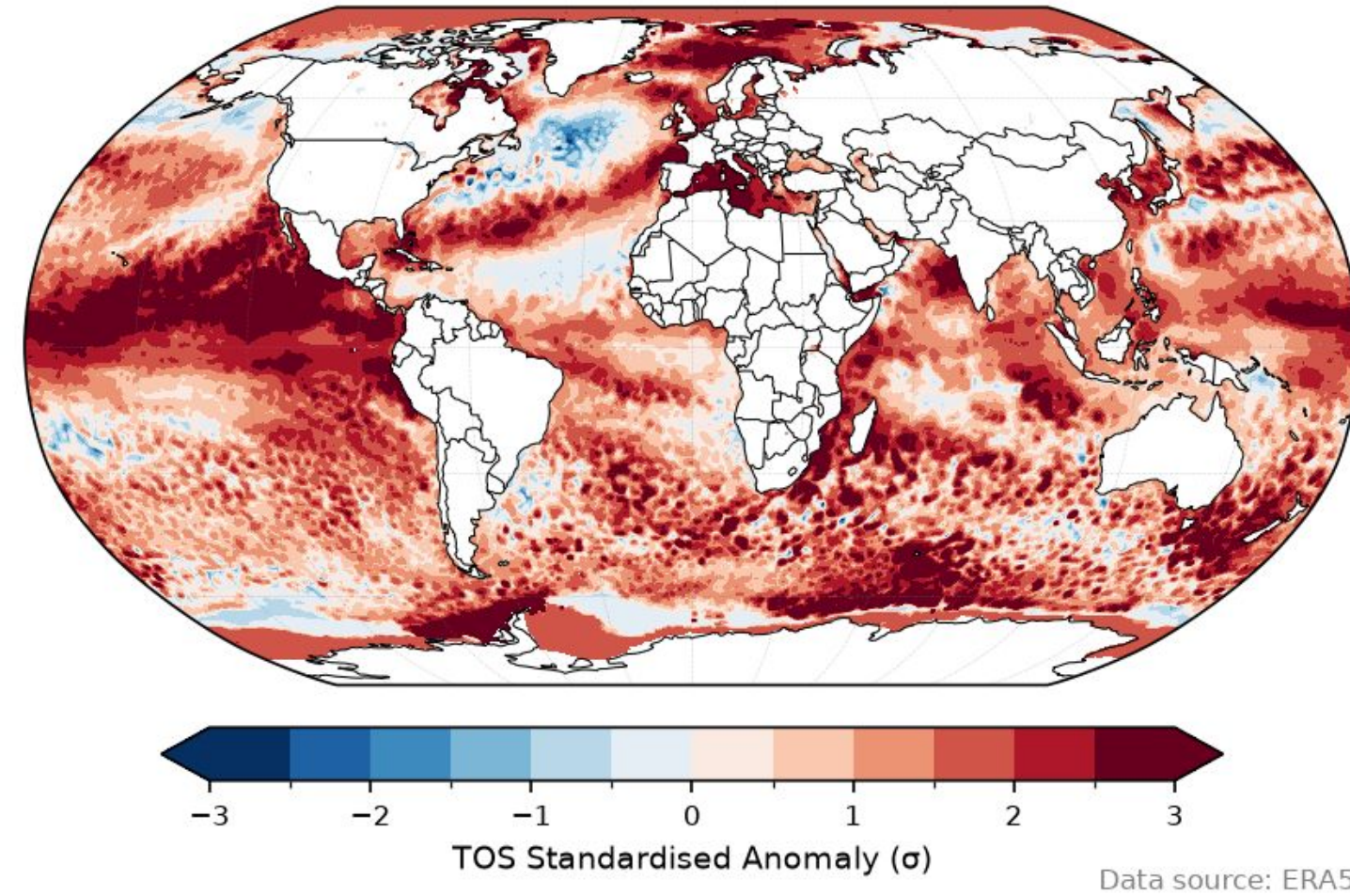
Data: ERA5 1979–2026 • Reference period: 1991–2020 • Credit: C3S/ECMWF



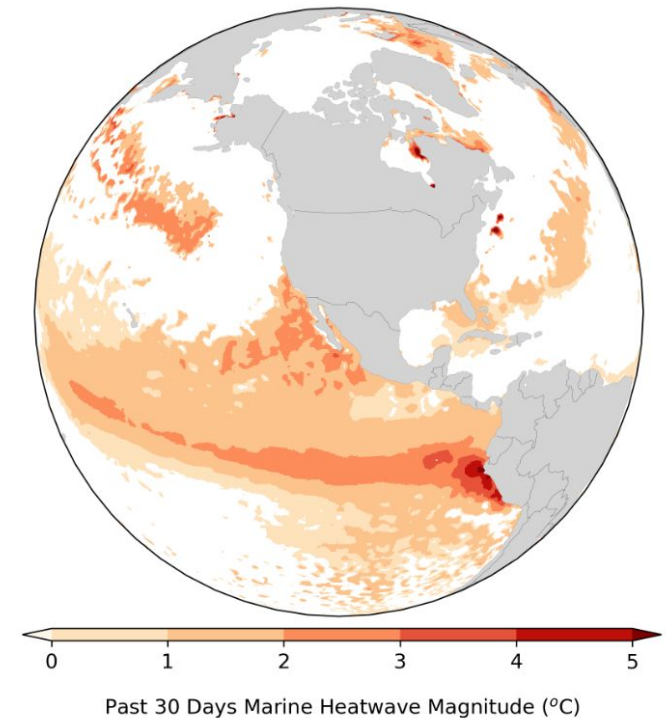
I. Recent state of the climate

Sea surface temperature (SST)

TOS Standardised Anomaly — June 2026
Ref: 1991-2020



- SST extra-polar ocean highest on record for June
- Developing El Niño conditions in equatorial Pacific.
- Continuation of US west coast marine heatwave.



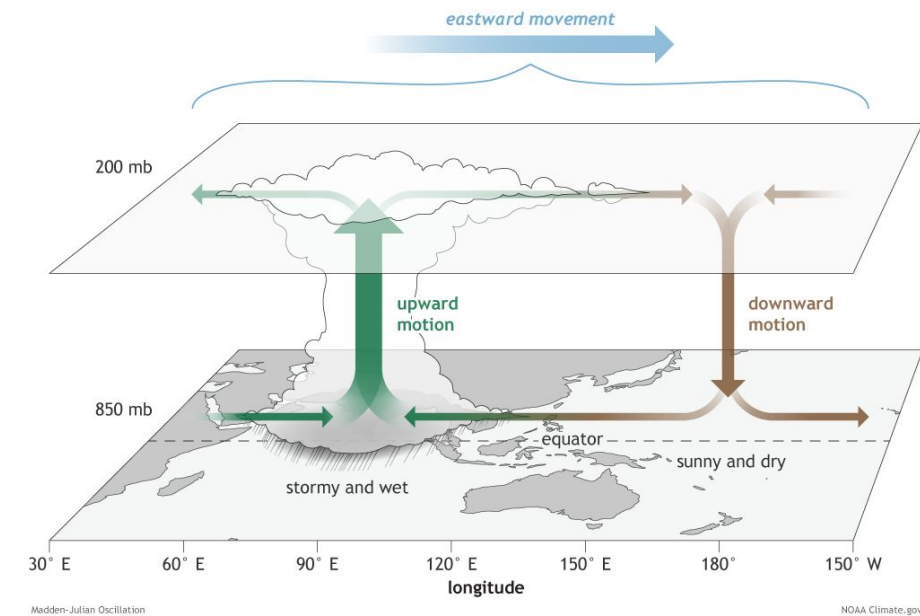
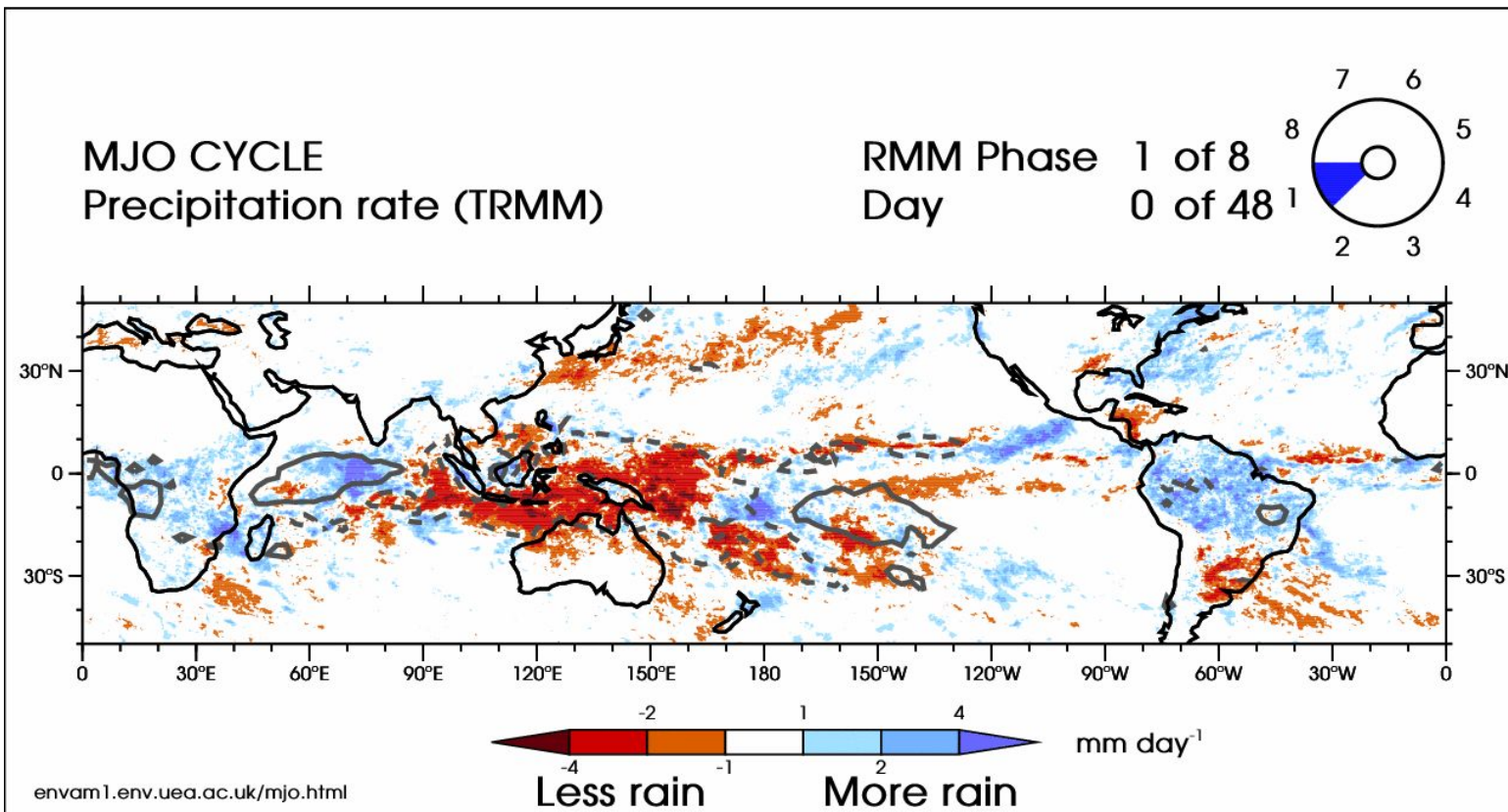
I. Recent state of the climate

II. Tropical variability

II. Tropical variability

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.

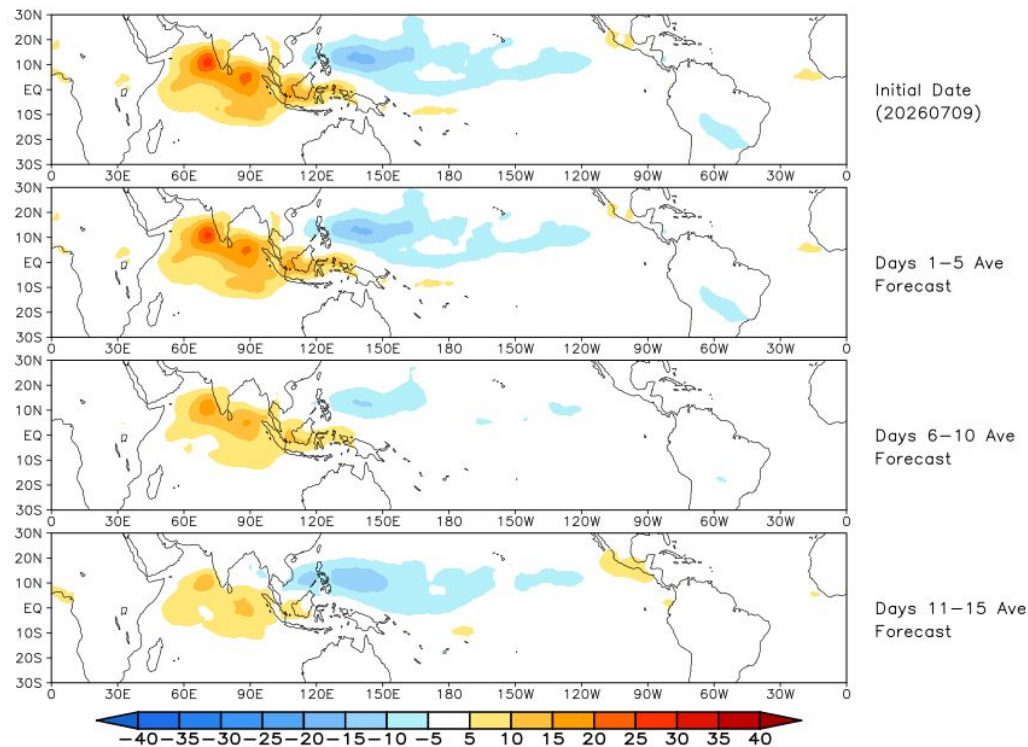


II. Tropical variability

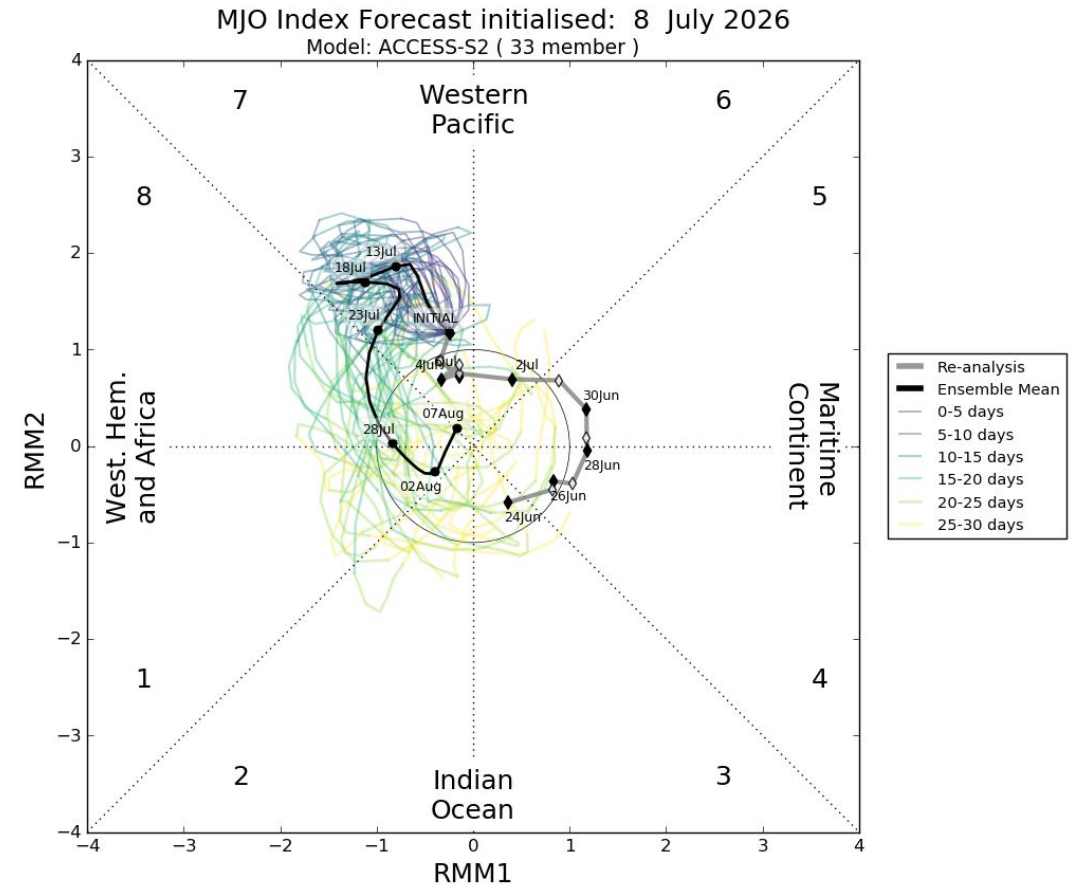
MJO forecasts

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

OLR prediction of MJO-related anomalies using GFS model reconstruction by RMM1 & RMM2 (20260709)



- Evolution of last days of observations + ensemble forecast



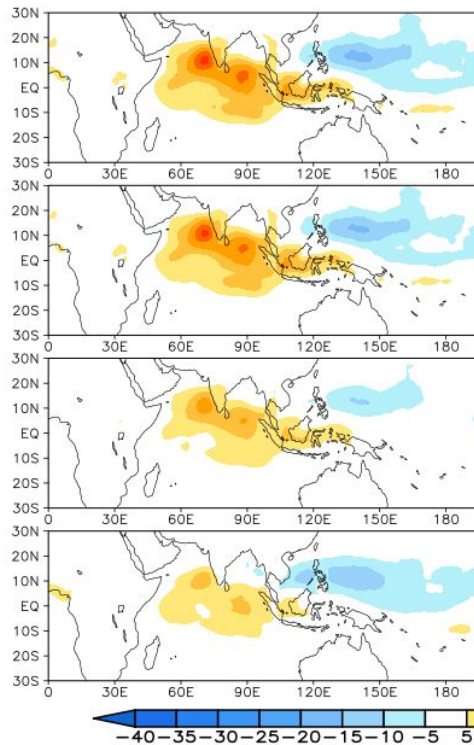
- MJO has remained inactive during the past days, although the forecasts now point to a strong ~12 days phase 7 strong pulse. Suppressed monsoon rainfall over India and interactions with el niño.

II. Tropical variability

MJO forecasts

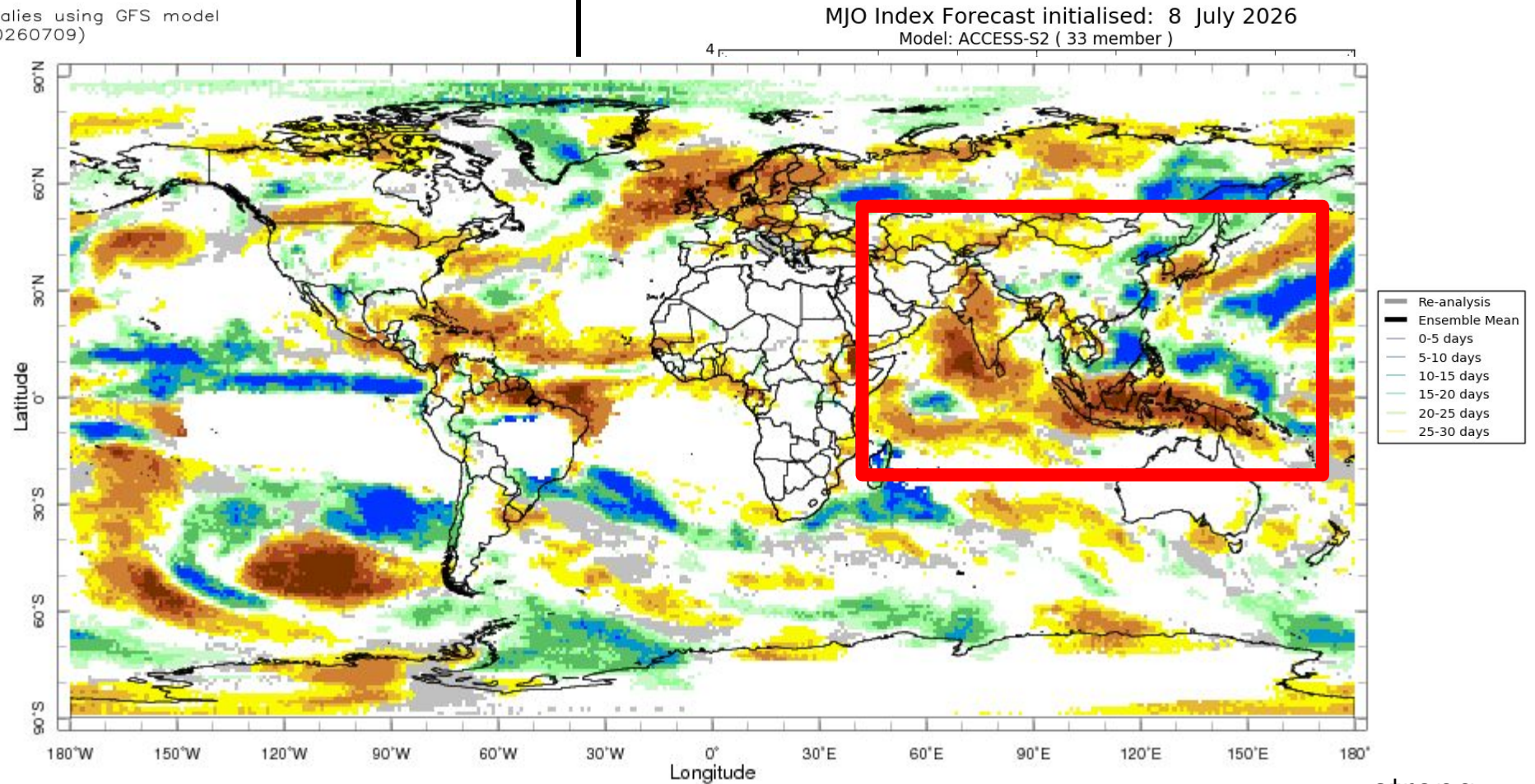
- OLR anomalies [W/m²] (ensemble mean GEFS)

OLR prediction of MJO-related anomalies using GFS model reconstruction by RMM1 & RMM2 (20260709)



Low OLR (enhanced convection) / +

- Evolution of last days of observations + ensemble forecast



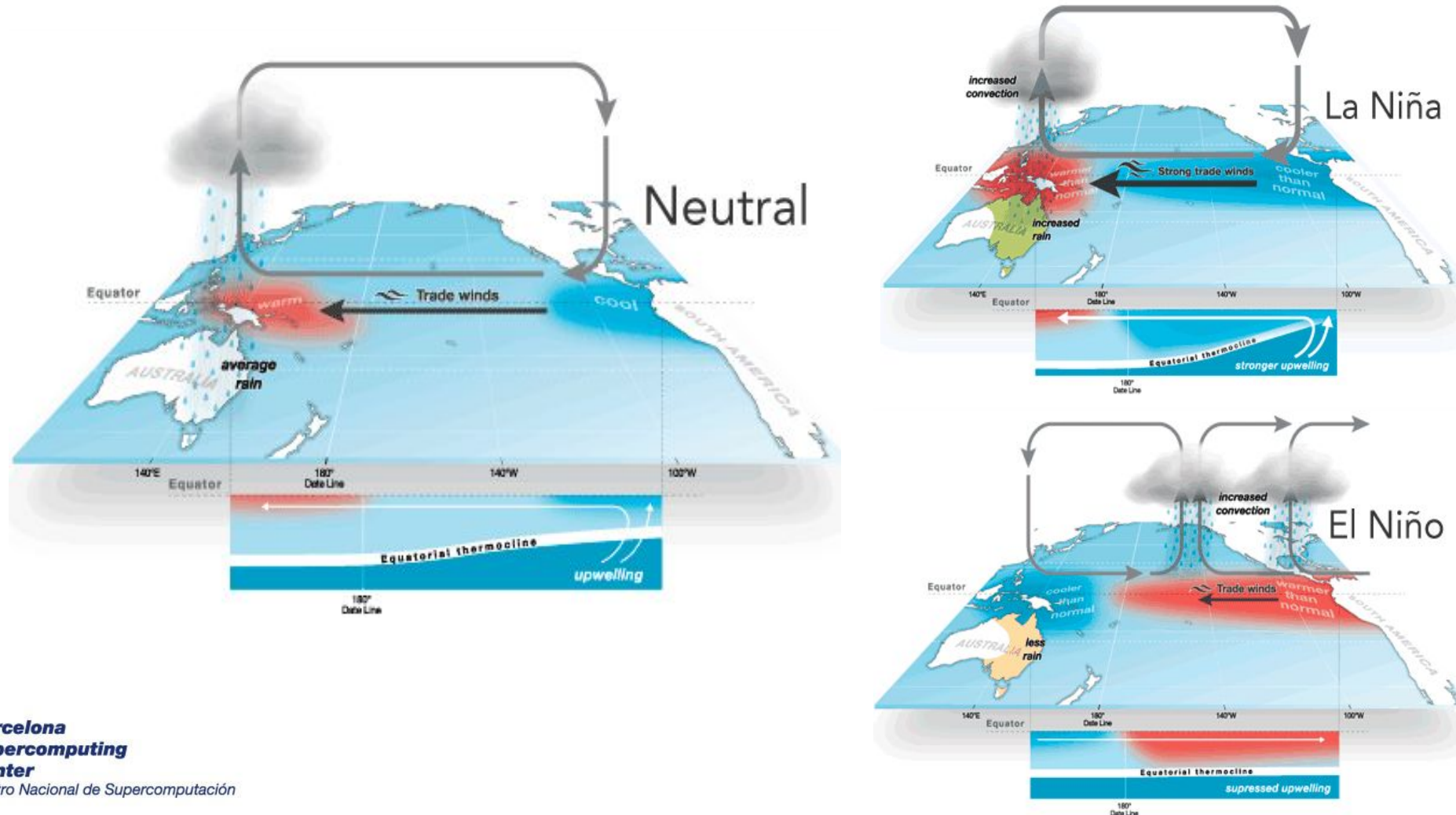
➤ 11-17 Jul 2026 IRI SubX Precipitation Forecast issued 0000 10 Jul 2026
~12 days phase 7 strong pulse.

strong

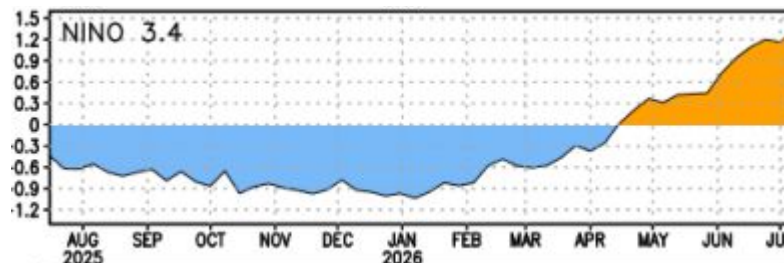
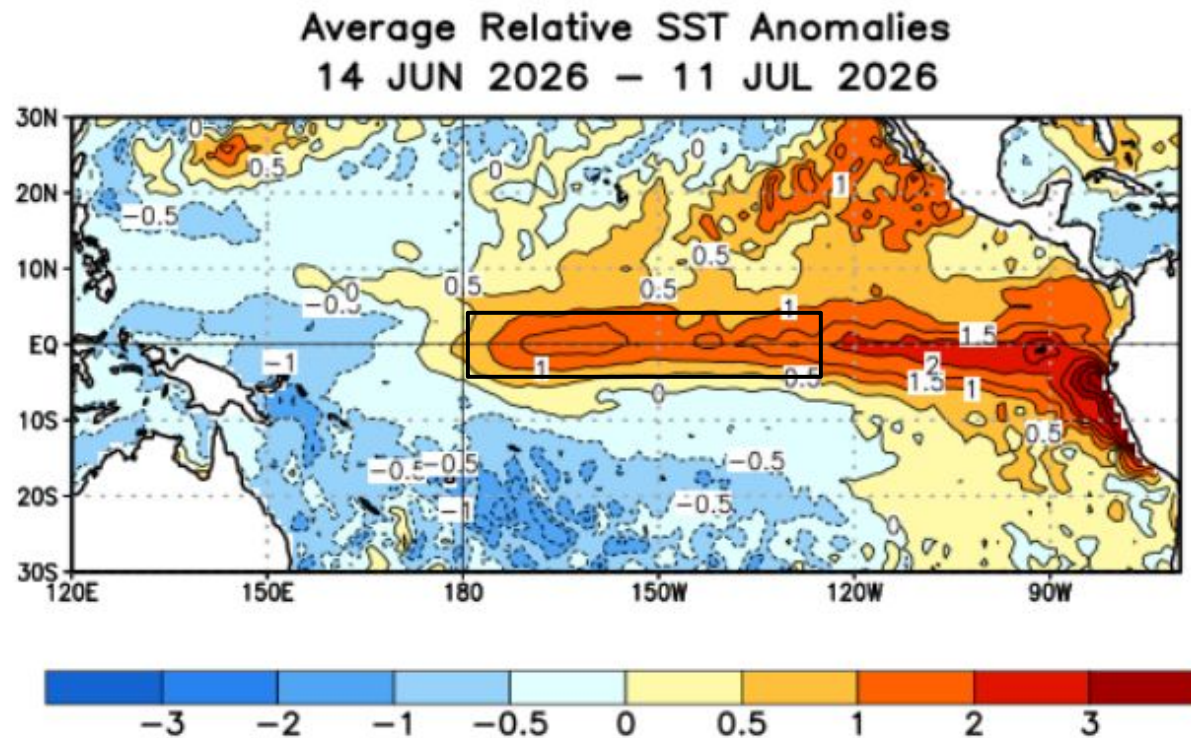
II. Tropical variability

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.



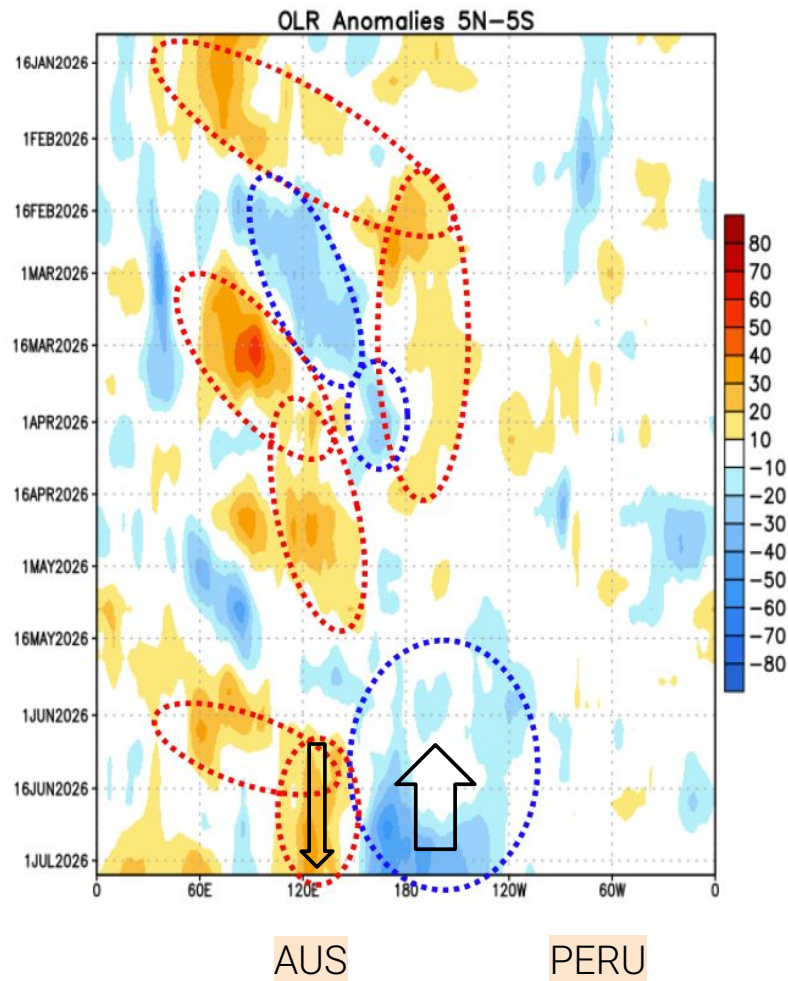
El Niño advisory (AMJ RONI = 0.5°C)



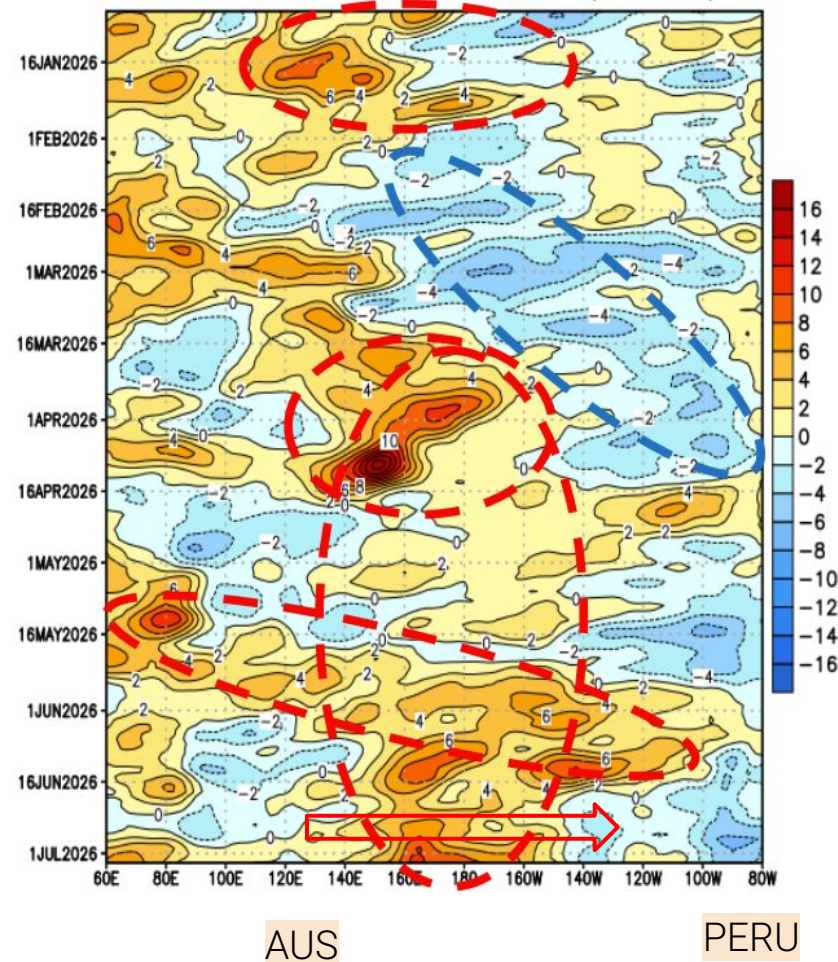
II. Tropical variability

El Niño-Southern Oscillation (ENSO) - The atmosphere

Past



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



➤ Strong upward motion = **deep convection** in the central Pacific associated with El Niño. **Subsidence** over the Maritime continent.

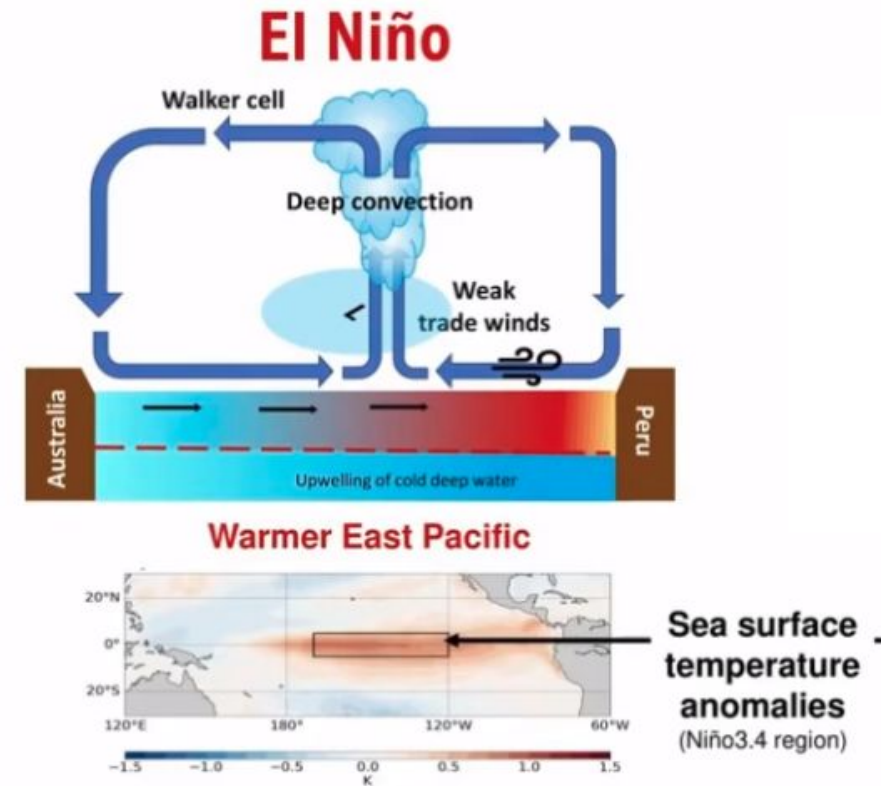
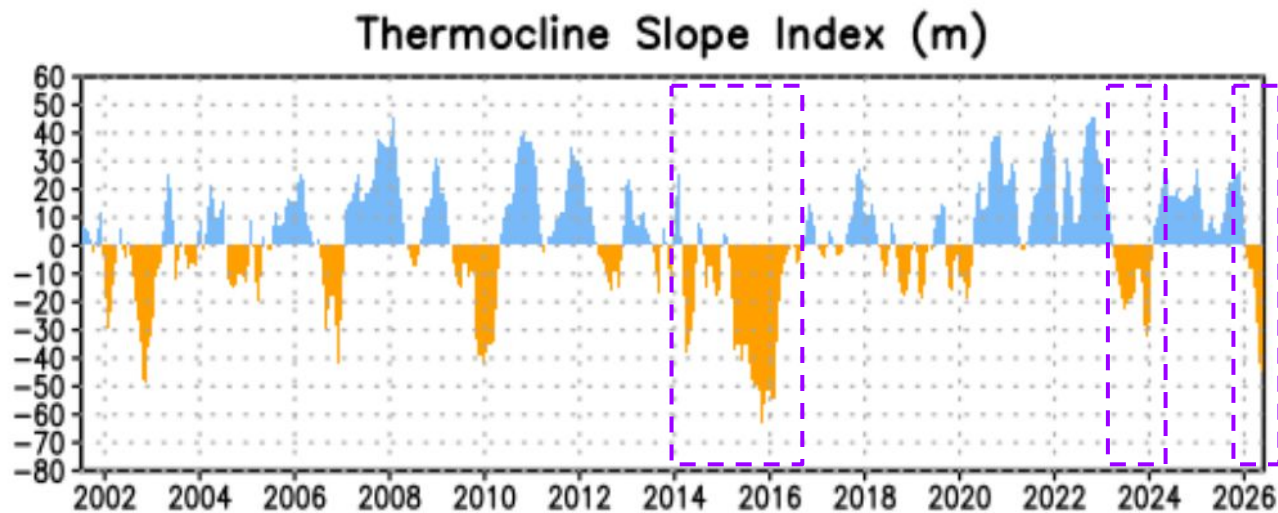
➤ **Westerly anomalies** now dominate across the equatorial Pacific.

Blue = negative OLR, enhanced convection/rainfall.

Red = positive OLR anomalies, subsidence, suppressed rainfall

Blue = easterly wind anomalies

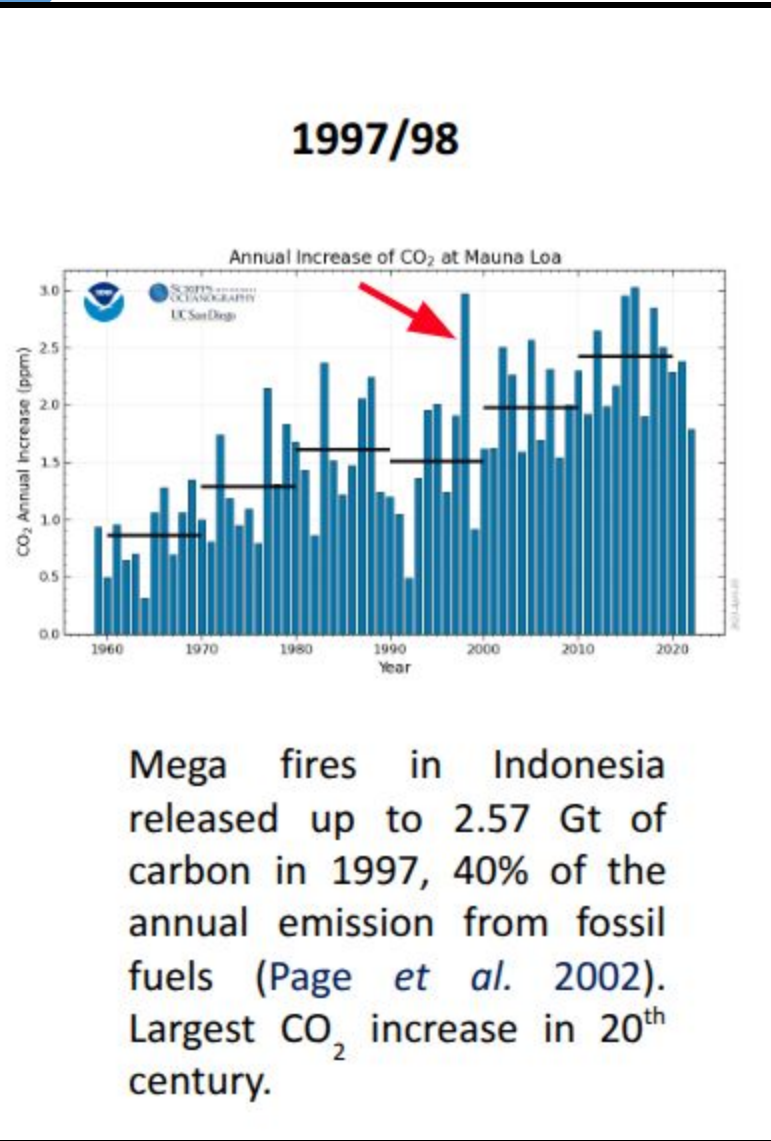
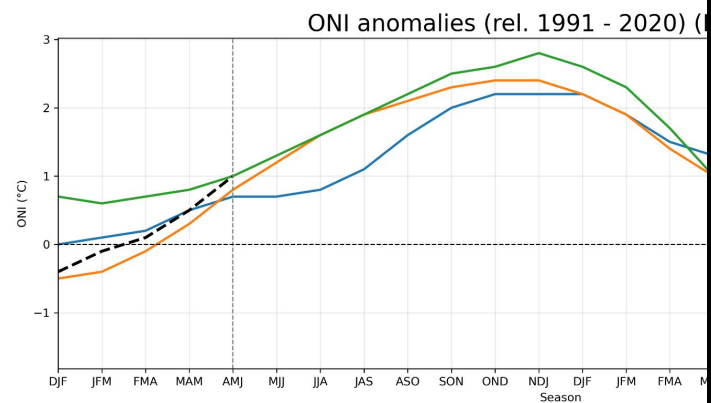
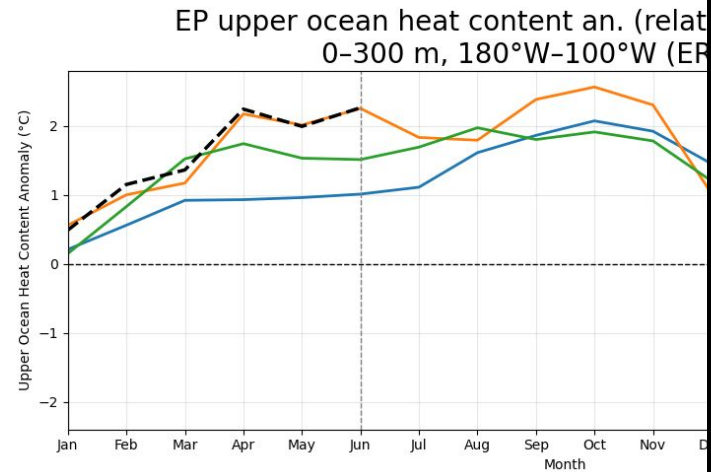
Red = westerly wind anomalies



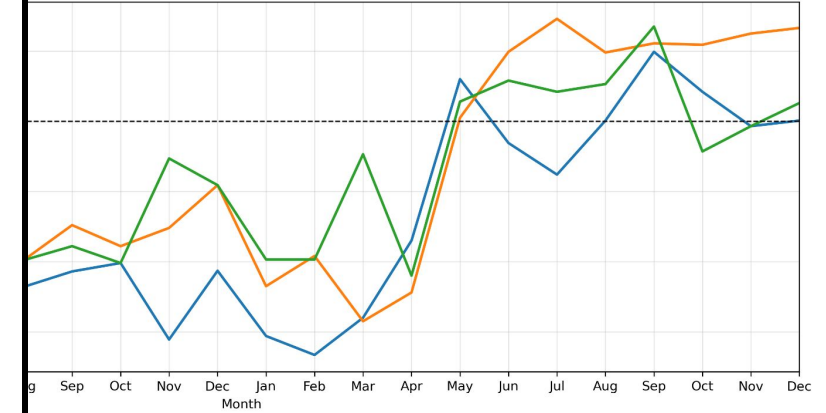
- **Very negative thermocline slope**, indicating the 20°C isotherm has flattened across the equatorial Pacific. This always happens during El Niño event with varying intensity.

II. Tropical variability

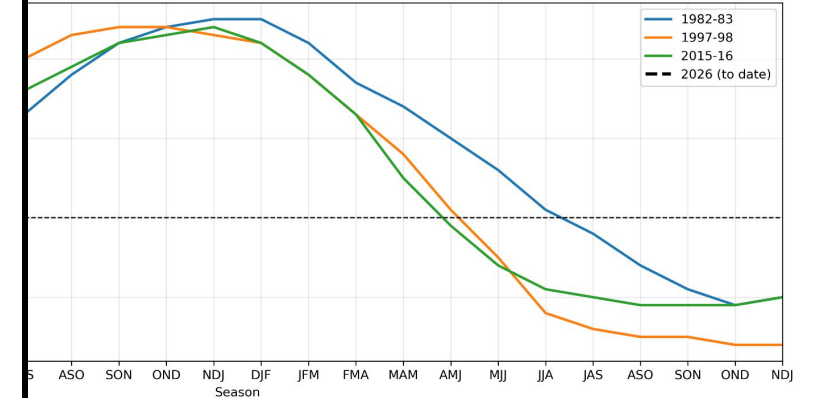
Comparison with previous strong El Niño events



ern Oscillation index (rel. 1933 - 1992)



anomalies (rel. 1991 - 2020) (ERSSTv5)



➤ So far t

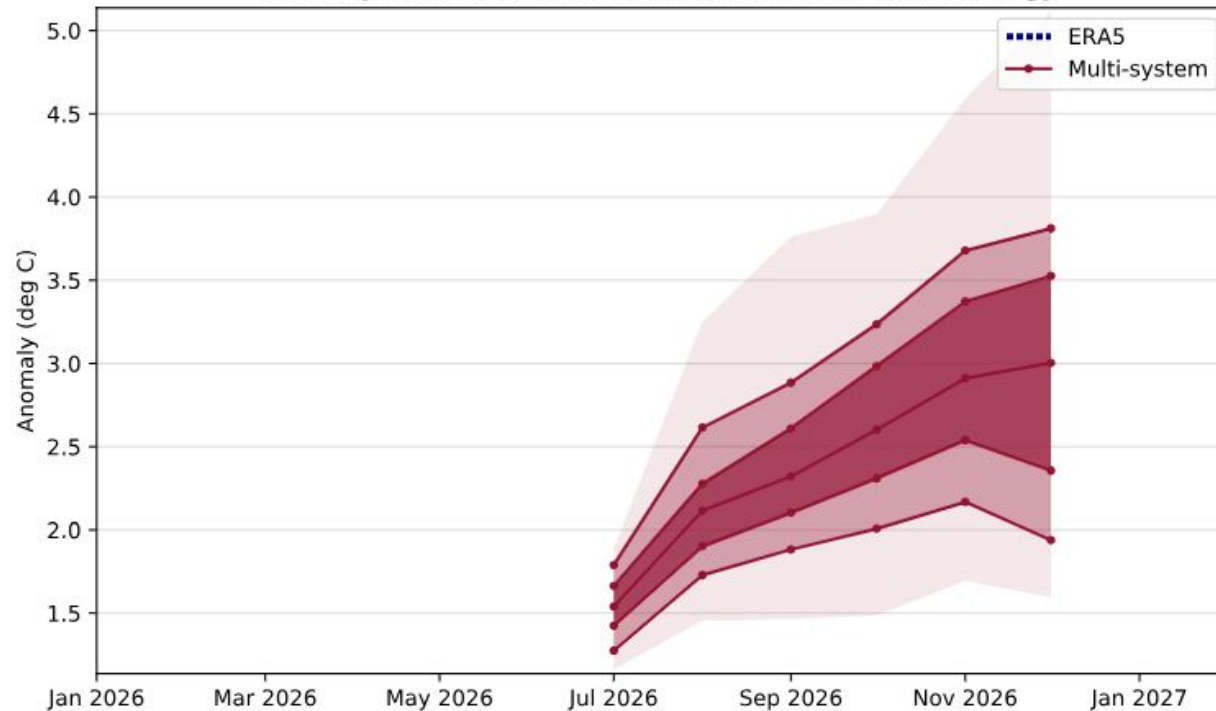
1997-98 one.

II. Tropical variability

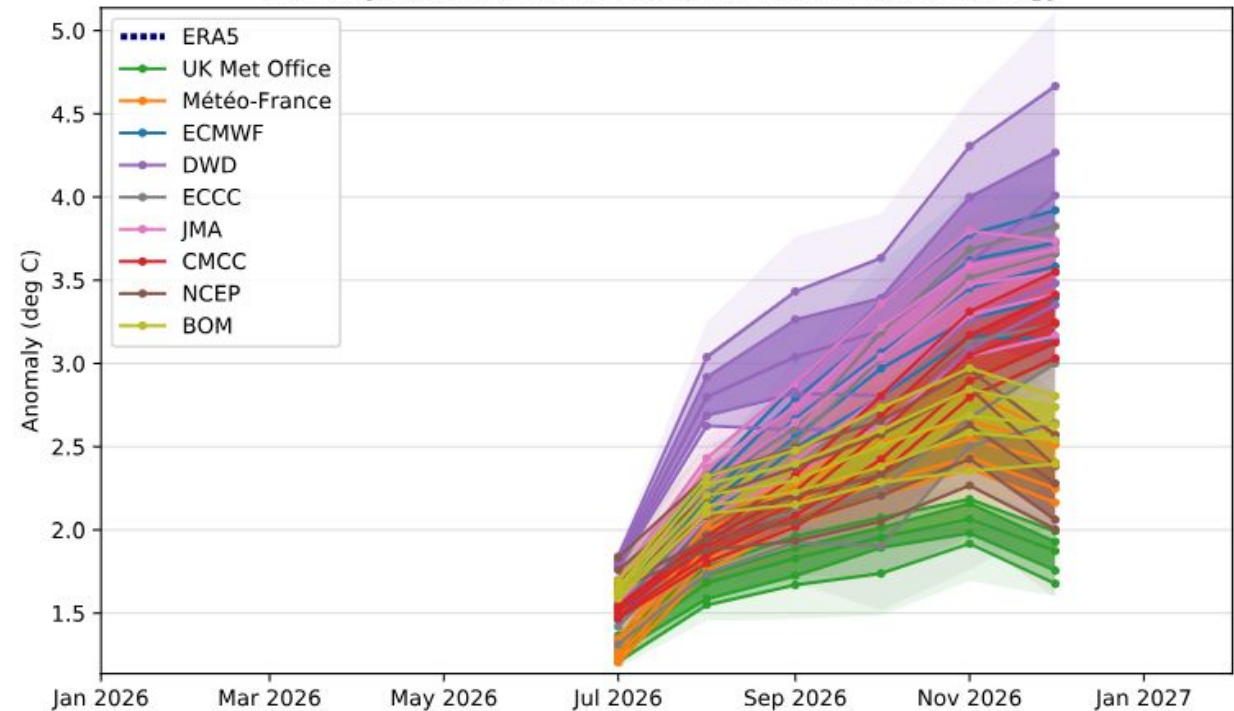
ENSO forecasts: C3S multi-system

- In the C3S multi-system, 50 % of the ensemble members fall above the 3.0 °C threshold by November 2026.
- C3S has recently started using the relative Oceanic Niño Index (RONI).

Relative NINO3.4 SST anomaly percentiles 10, 25, 50, 75, 90 (lines) and full range
C3S: Multi-system forecast from 1 July 2026
monthly mean anomalies relative to 1991-2020 climatology



Relative NINO3.4 SST anomaly percentiles 10, 25, 50, 75, 90 (lines) and full range
C3S: Multi-system forecast from 1 July 2026
monthly mean anomalies relative to 1991-2020 climatology

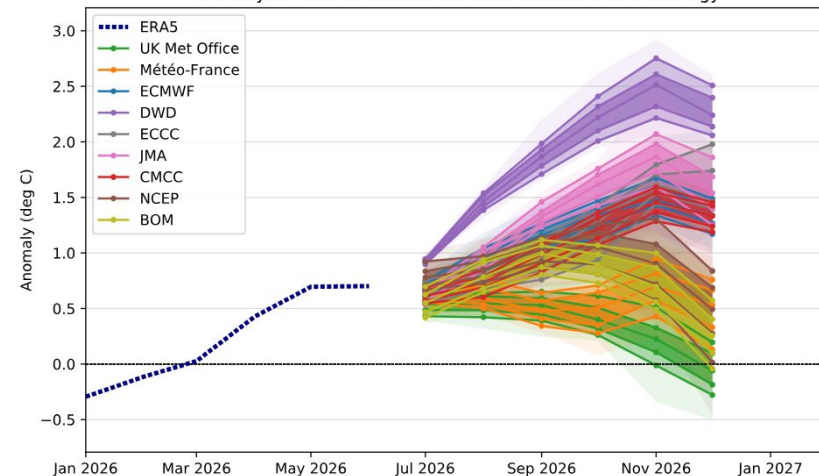


II. Tropical variability

ENSO forecasts: C3S multi-system

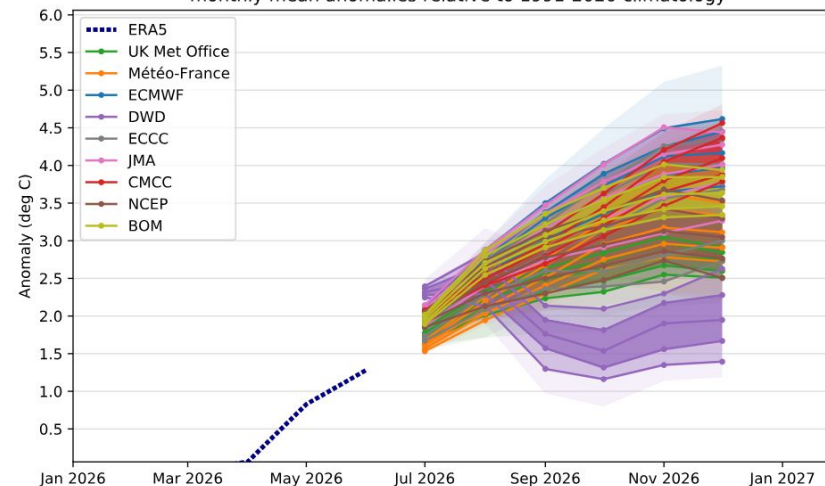
- The inter-model spread is considerably larger in other ENSO monitoring regions, with some models even cooling in the coming months.

Relative NINO4 SST anomaly percentiles 10, 25, 50, 75, 90 (lines) and full range
C3S: Multi-system forecast from 1 July 2026
monthly mean anomalies relative to 1991-2020 climatology



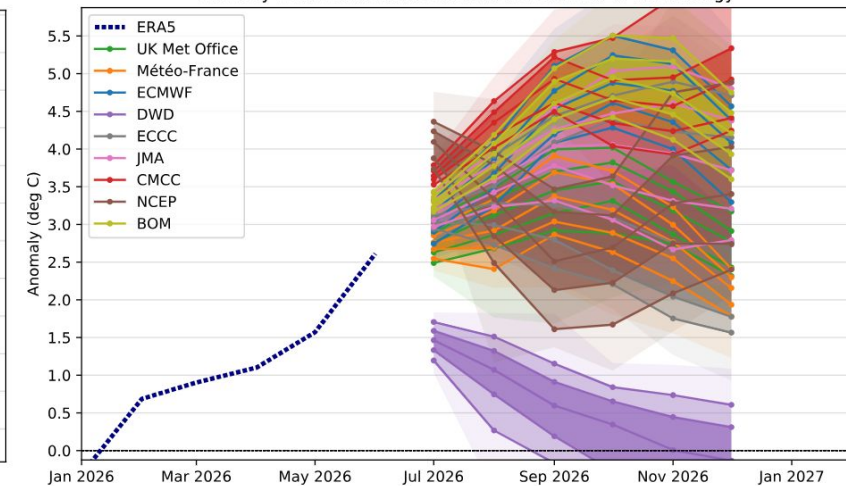
NINO4

Relative NINO3 SST anomaly percentiles 10, 25, 50, 75, 90 (lines) and full range
C3S: Multi-system forecast from 1 July 2026
monthly mean anomalies relative to 1991-2020 climatology



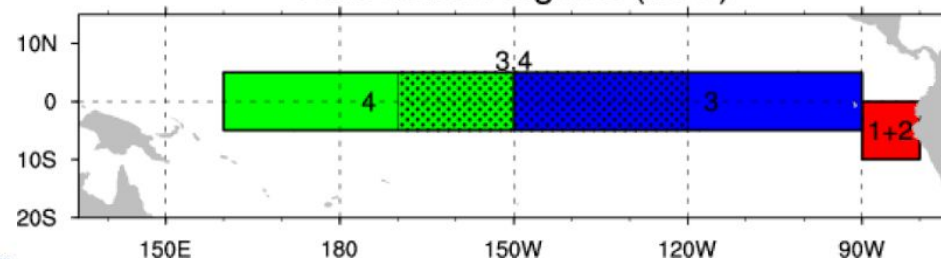
NINO3

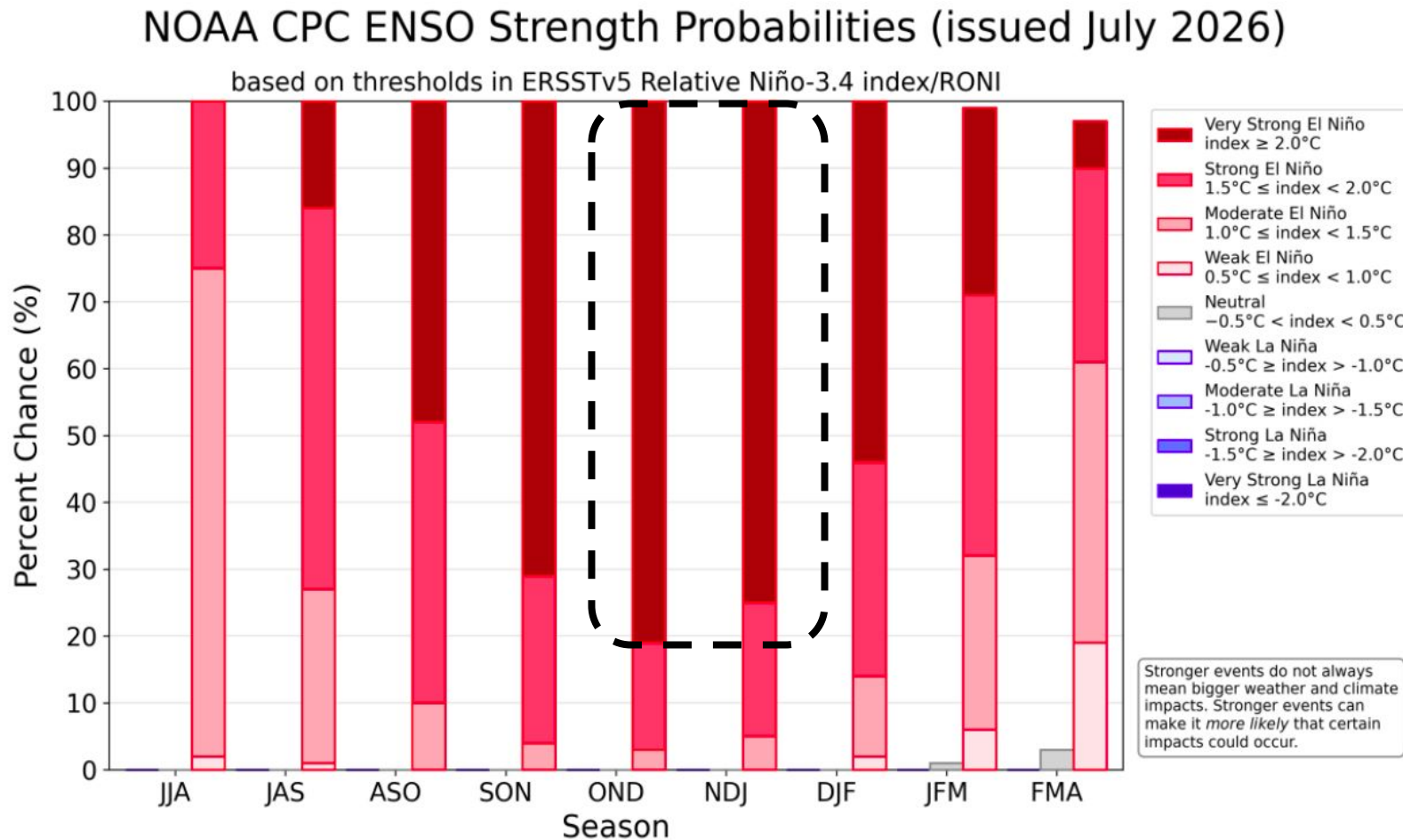
Relative NINO1+2 SST anomaly percentiles 10, 25, 50, 75, 90 (lines) and full range
C3S: Multi-system forecast from 1 July 2026
monthly mean anomalies relative to 1991-2020 climatology



NINO1+2

Nino Index Regions (SST)

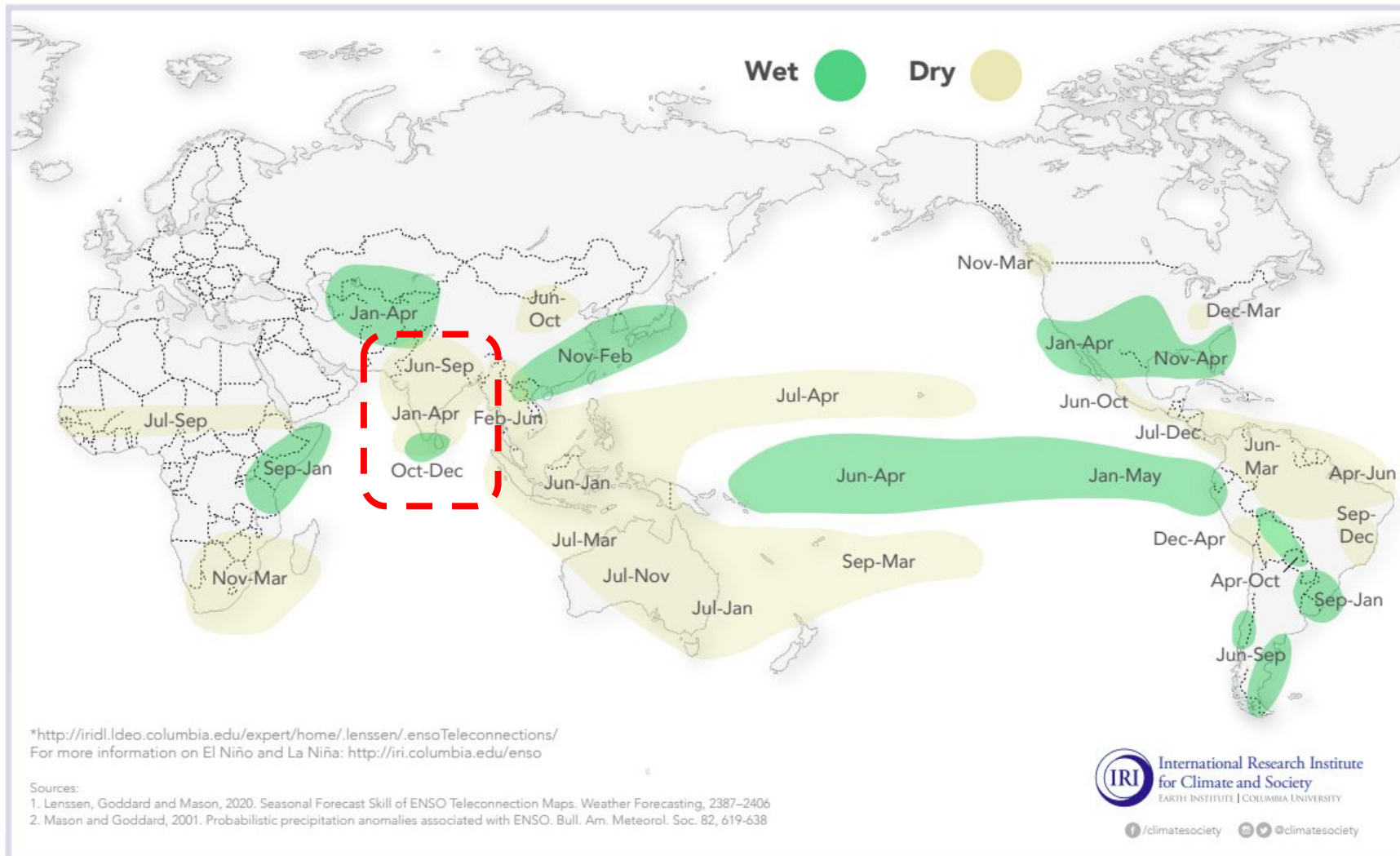




- The probability of having a very strong El Niño by NDJ has double compared to May.
- Reduced probability of having a weak El Niño.

El Niño and Rainfall

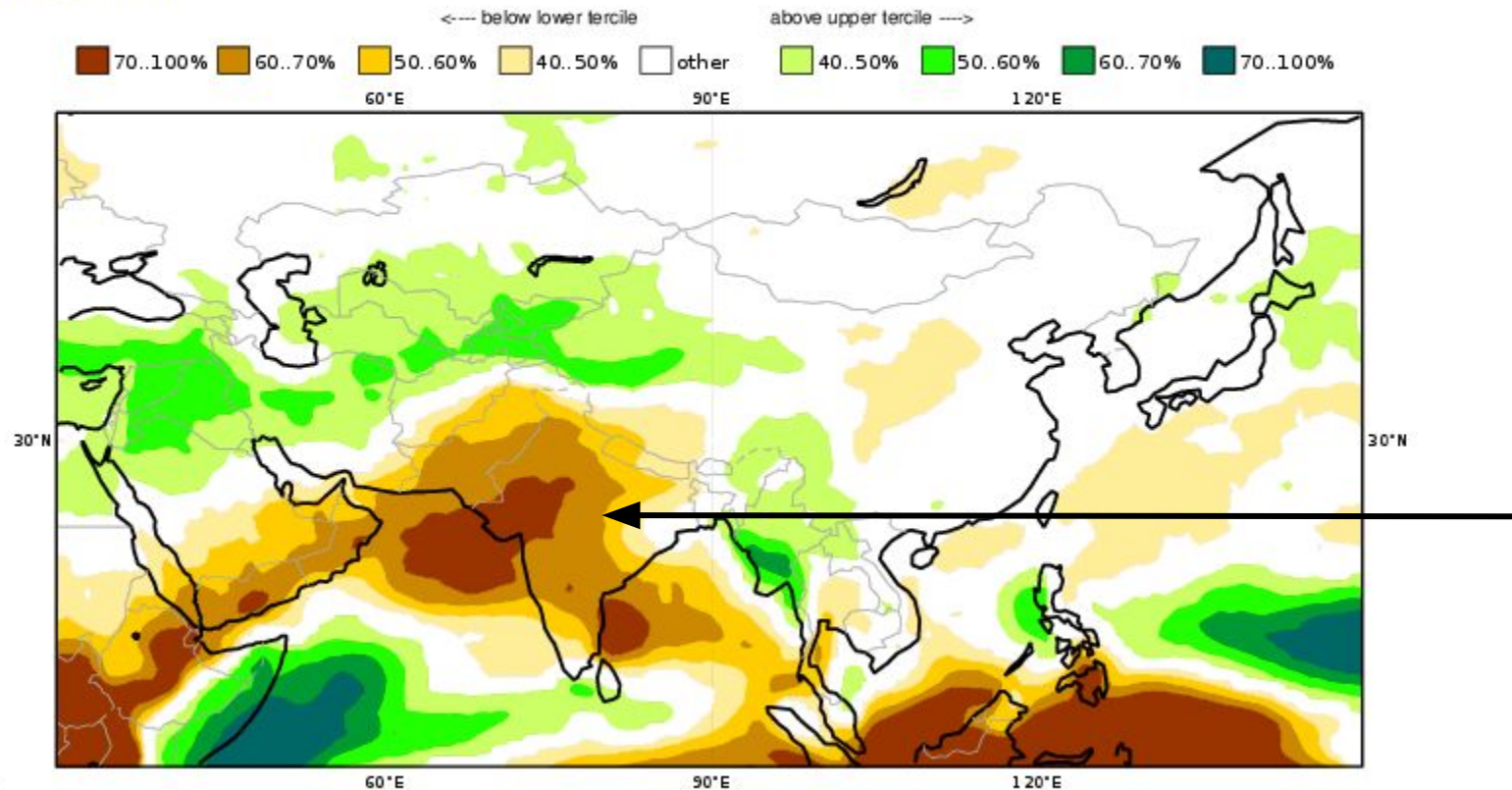
El Niño conditions in the tropical Pacific are known to shift rainfall patterns in many different parts of the world. The regions and seasons shown on the map below indicate typical but not guaranteed impacts of La Niña. For further information, consult the probabilistic information* that the map is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



II. Tropical variability

ENSO impacts: The Indian summer monsoon

C3S multi-system seasonal forecast ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA/ECCC/BOM
Prob(most likely category of precipitation)
Nominal forecast start: 01/06/26
Unweighted mean

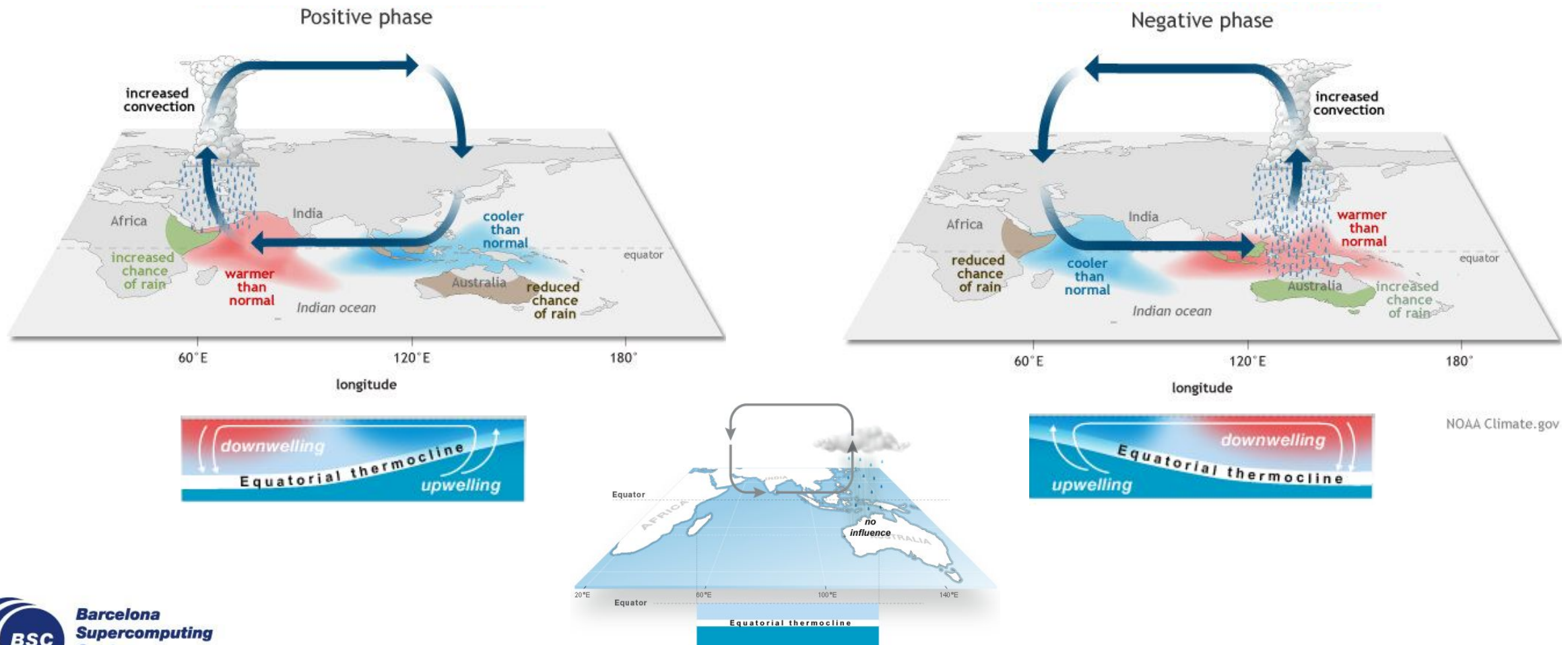


- 60 to 100% probability of **below normal precipitation** over the Indian subcontinent in the **JAS** season.
- The developing of El Niño will likely weaken the summer Indian monsoon, leading to strong impacts on the agriculture system.

II. Tropical variability

Indian Ocean Dipole (IOD)

- The **Indian Ocean Dipole (IOD)** is one of the dominant modes of interannual climate variability in the Indian Ocean, characterized by a zonal dipole of SST anomalies in the tropics.

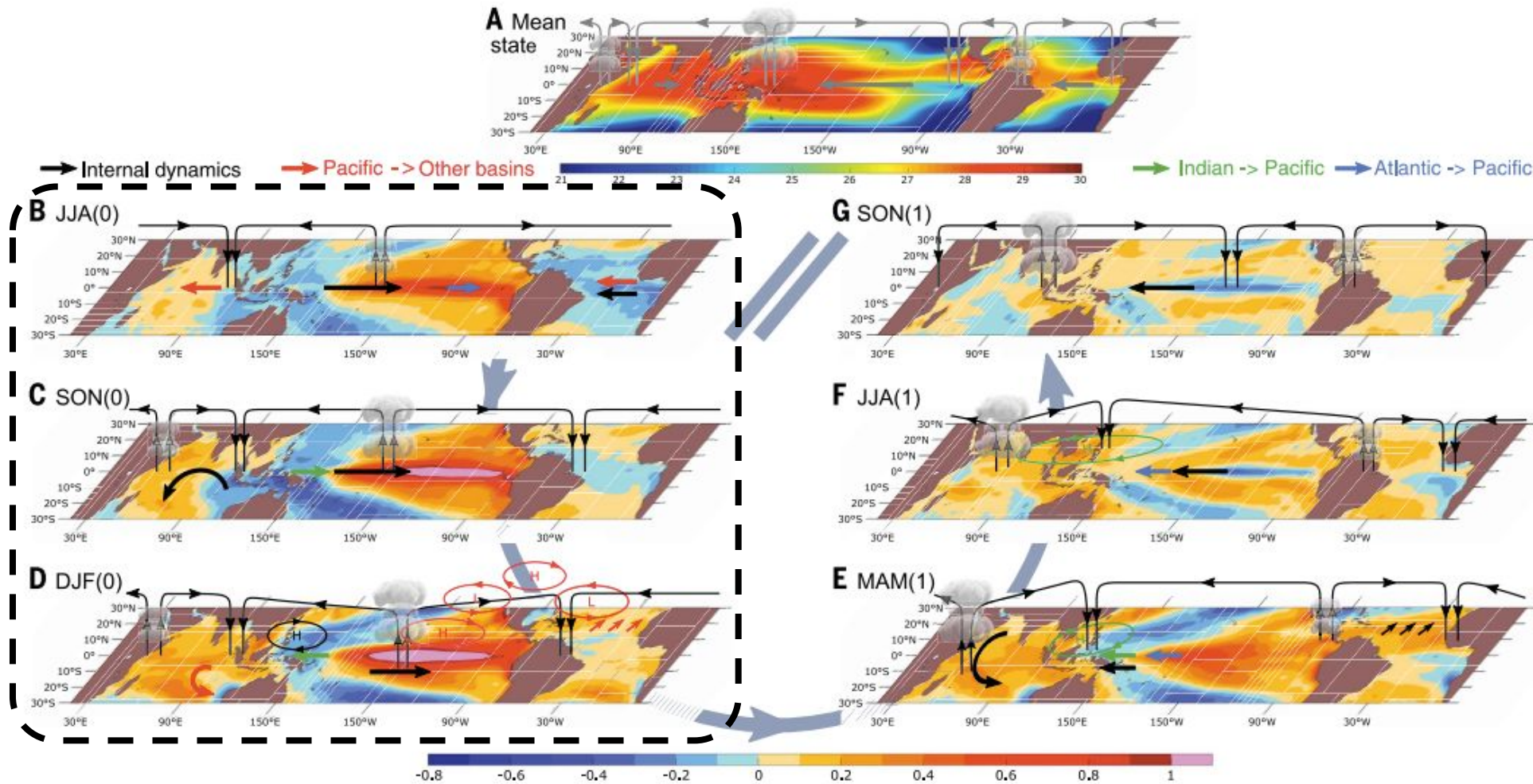


NOAA Climate.gov

II. Tropical variability

Tropical basin interactions (TBI)

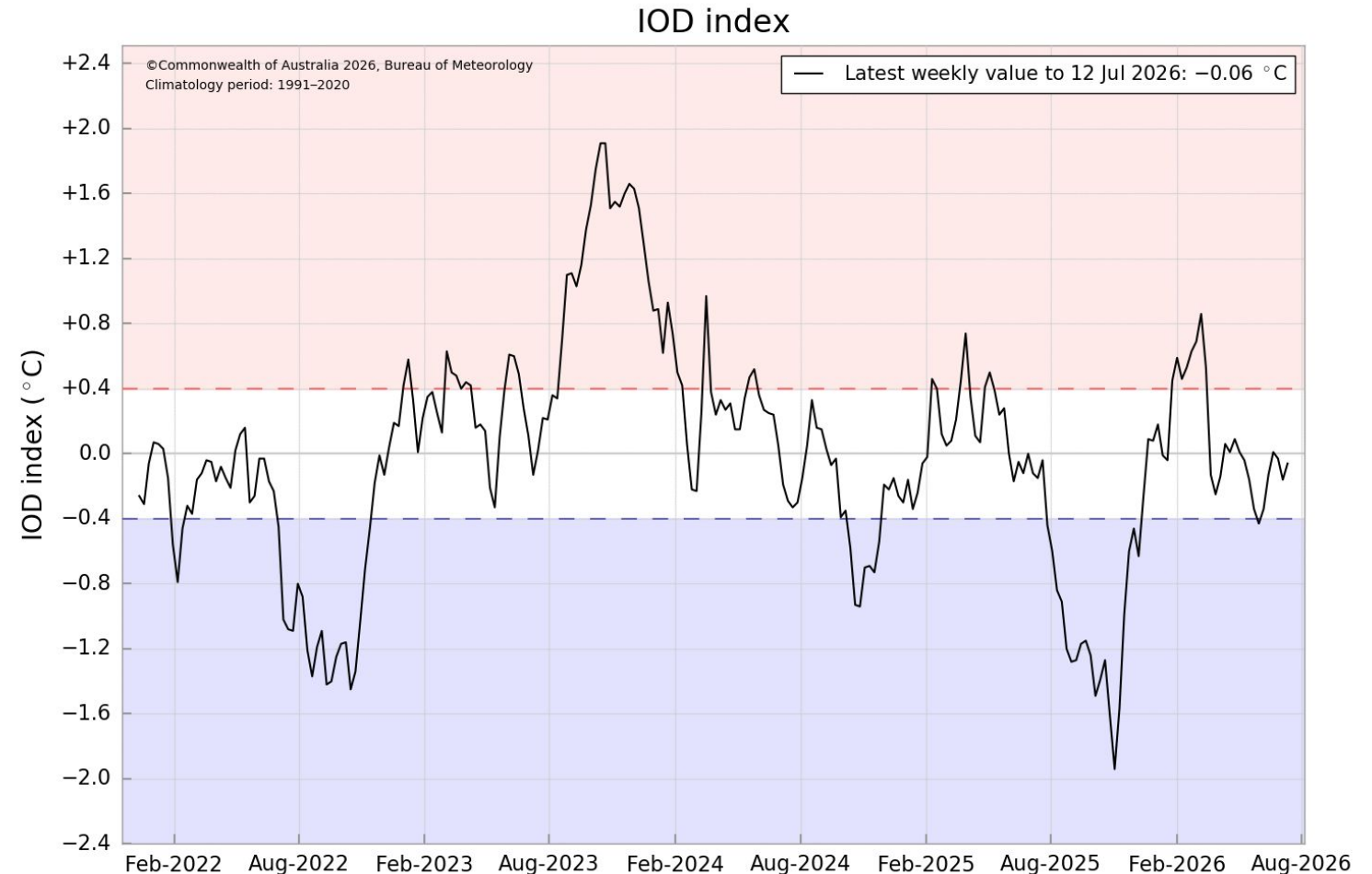
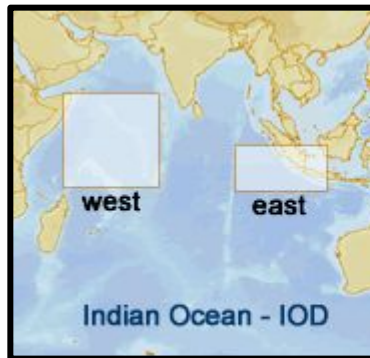
- The tropical oceans are connected through the atmospheric **Walker circulation**.



II. Tropical variability

IOD monitoring

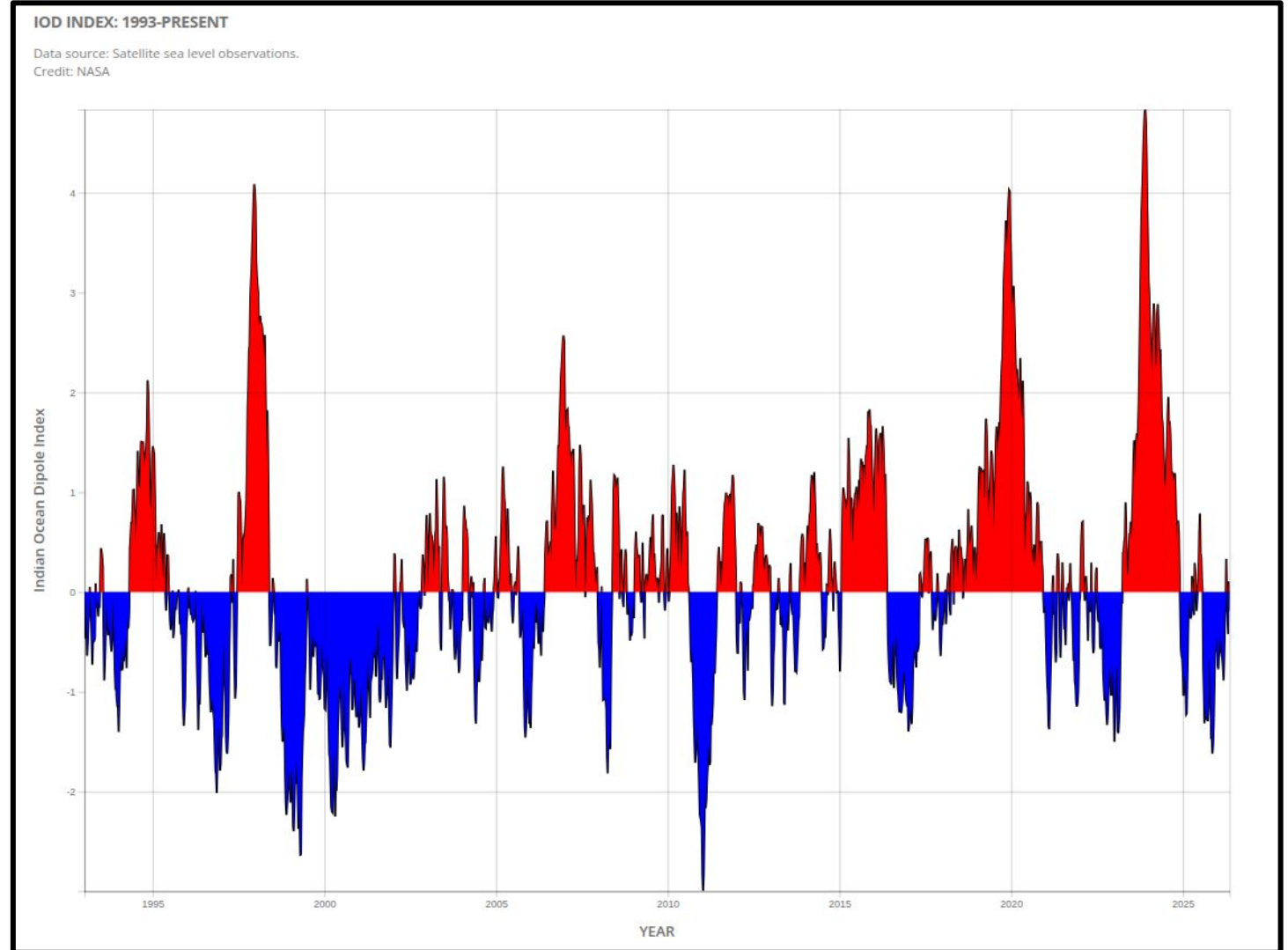
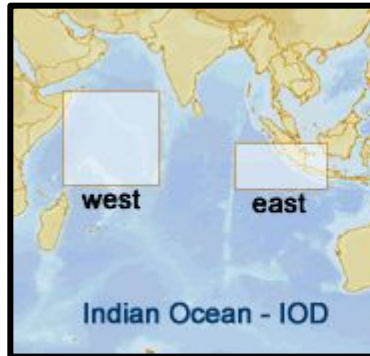
- Although El Niño events tend to cause **positive IOD events**, which peak in SON, there's currently no indication of this happening.
- In fact, the **IOD index** has been evolving towards its negative phase.
- IOD monitoring region:**



II. Tropical variability

IOD monitoring

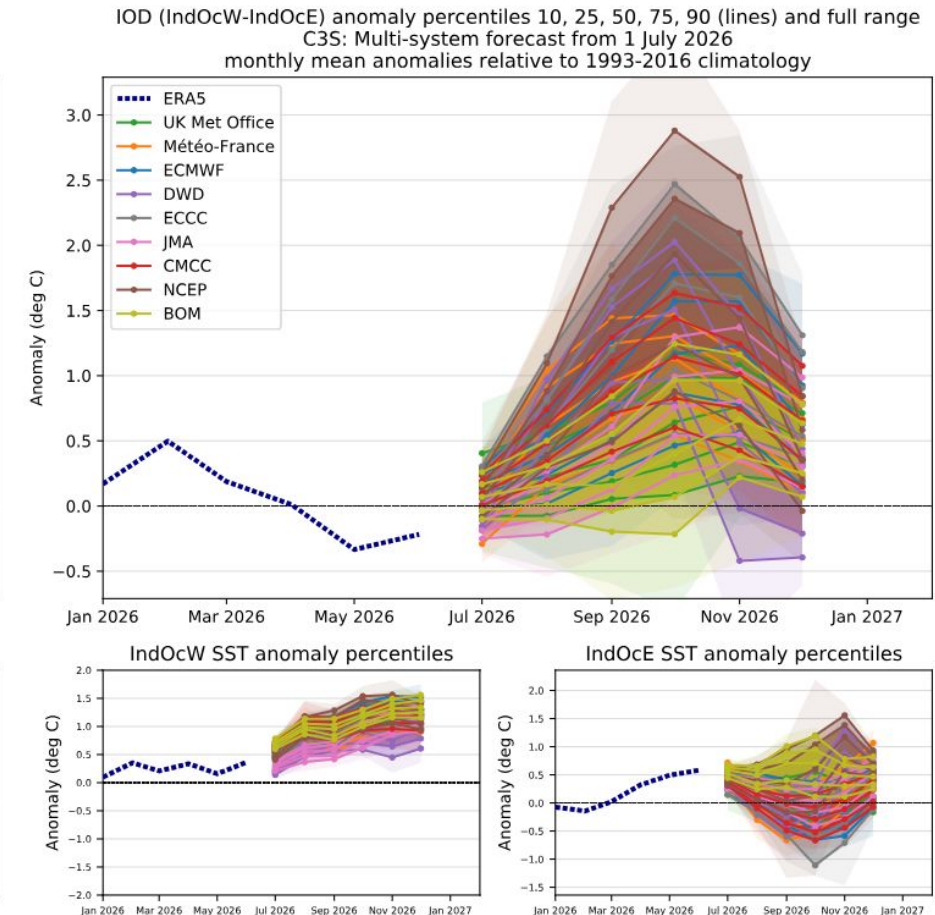
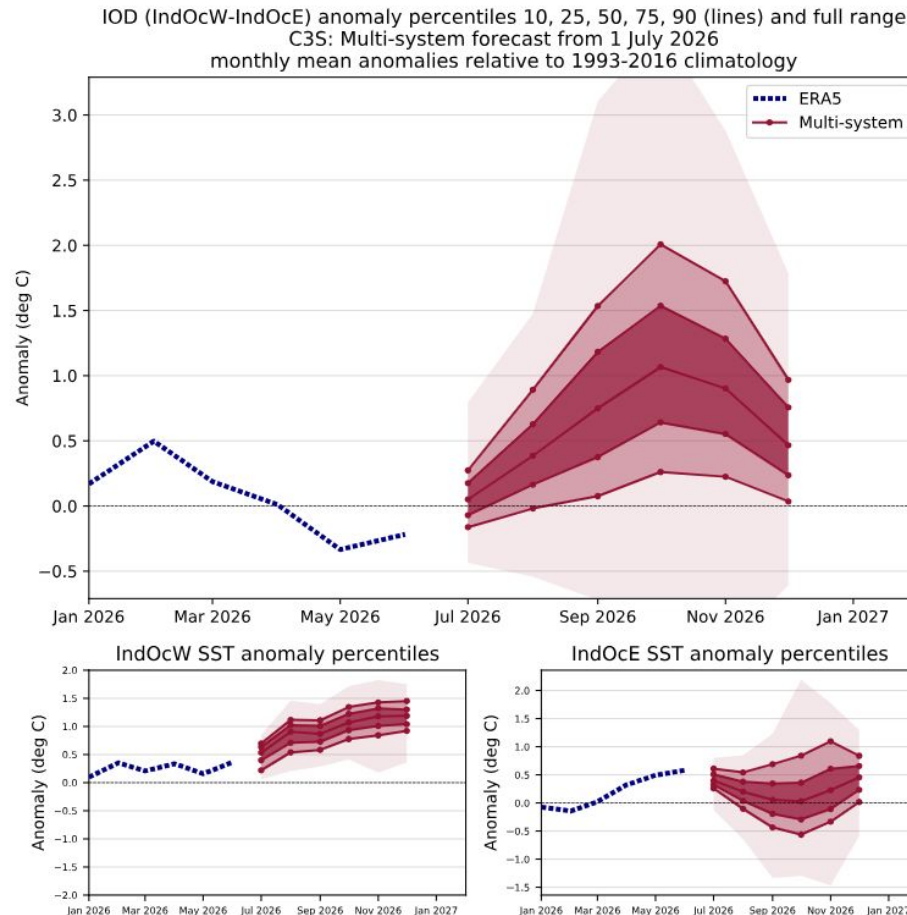
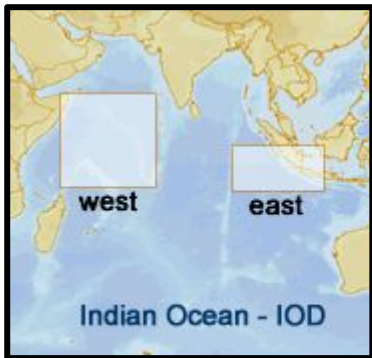
- If we look at a wider historical period, very strong positive IOD events have always occurred in conjunction with very strong El Niño events.
- The only notable exception would be the 15/16 El Niño.
- **IOD monitoring region:**



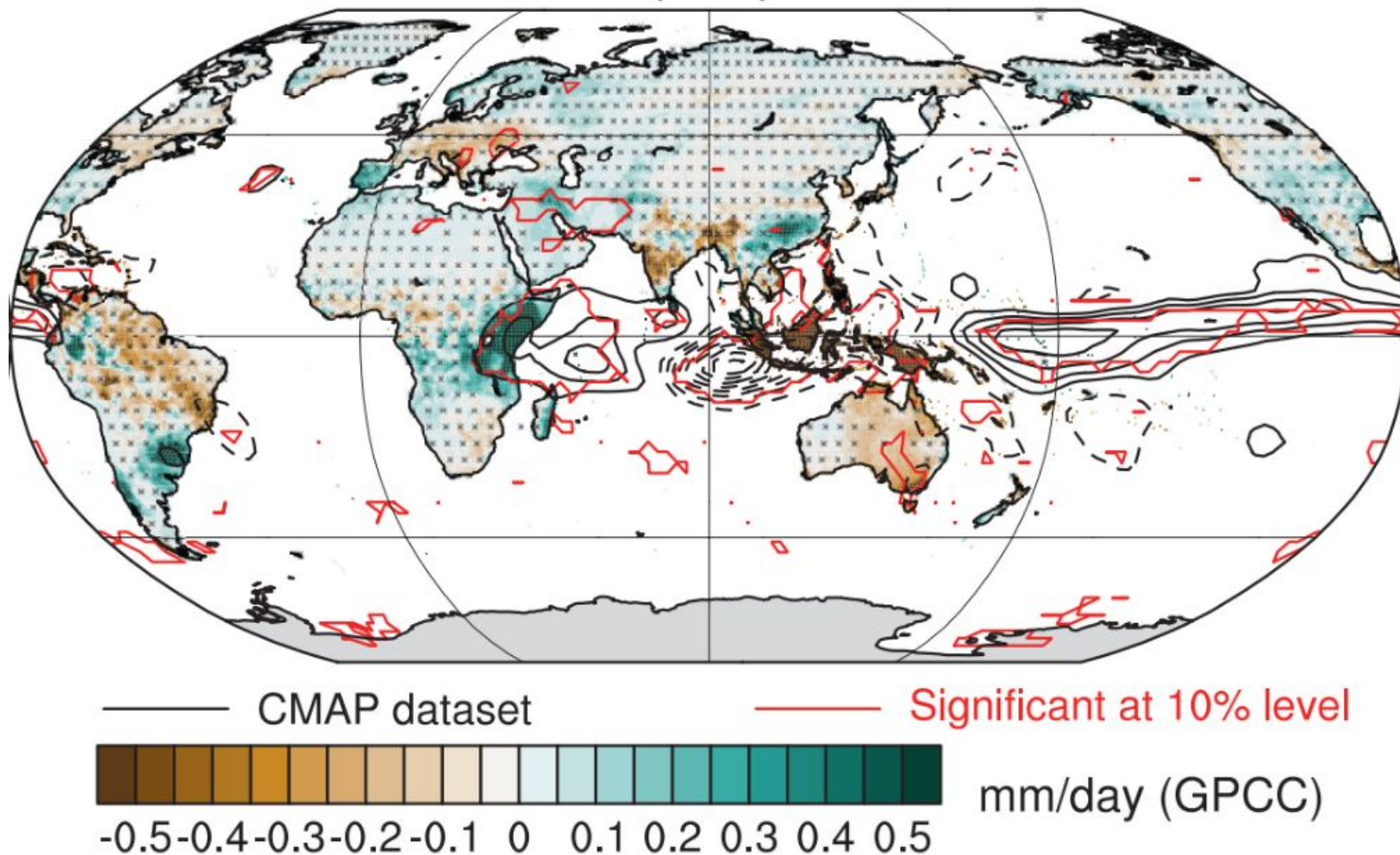
II. Tropical variability

IOD forecasts

- The IOD forecast from C3S points towards a positive IOD phase by SON, although there's a lot of spread in the multi-system ensemble.
- **IOD monitoring region:**



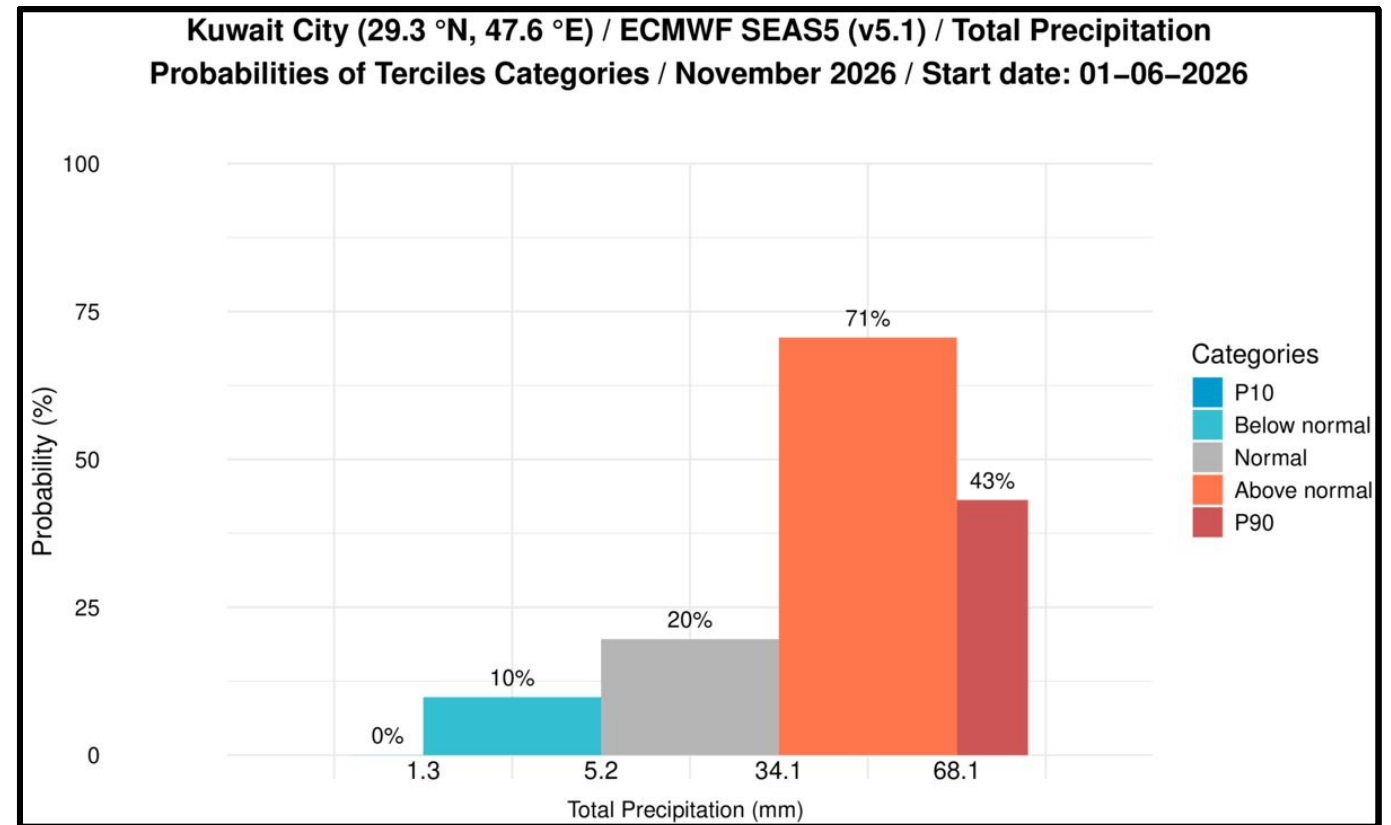
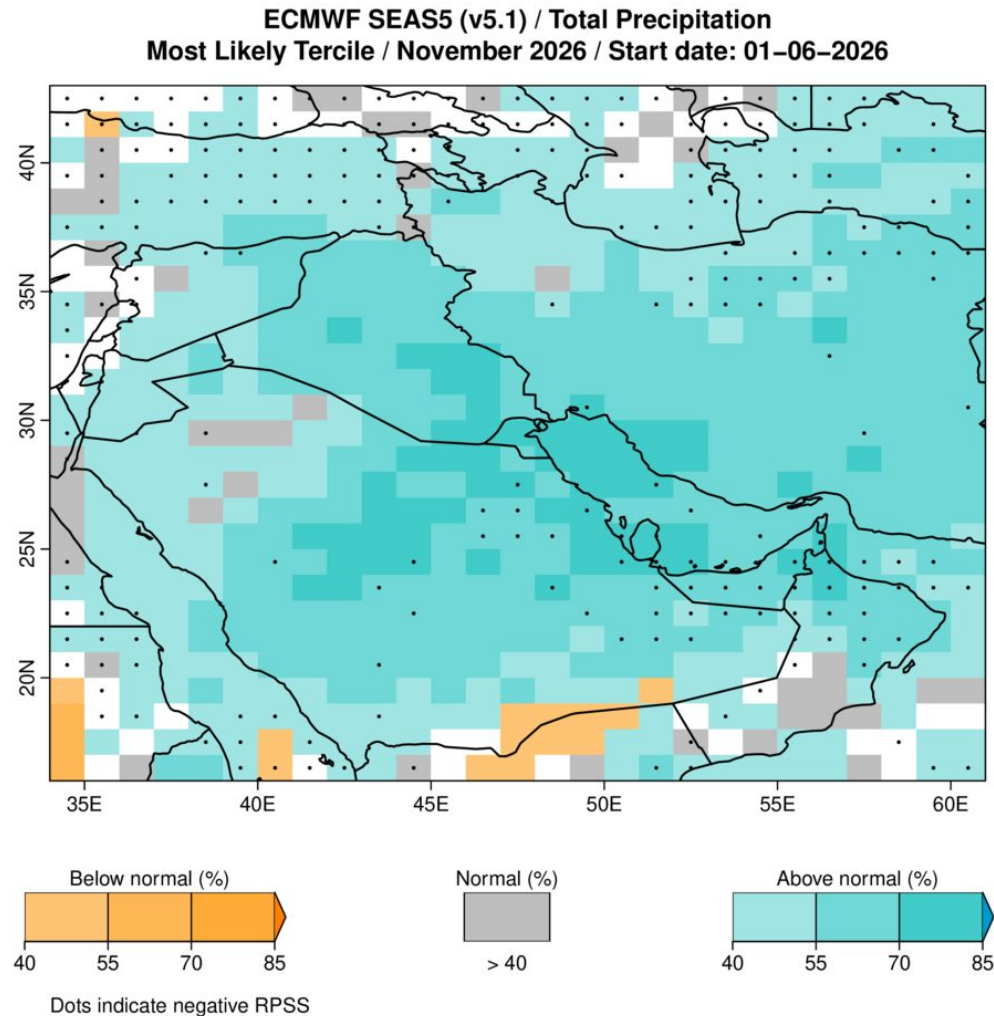
d. SON IOD teleconnection for precipitation



II. Tropical variability

Windows of opportunity

- Precipitation forecasts over the Middle East (initialised in June 2026):

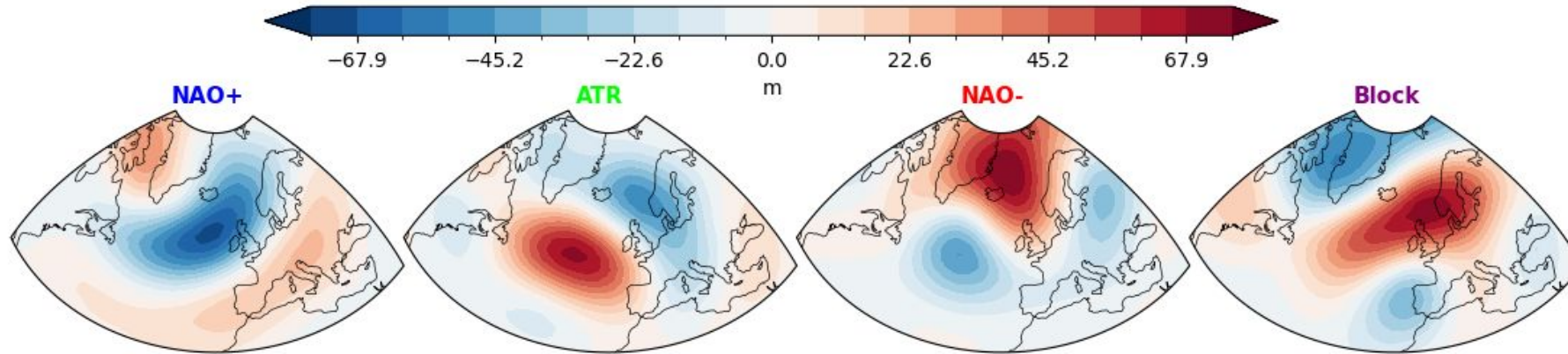


- Strong and skilful signal emerging under specific dynamic conditions.

- I. Recent state of the climate
- II. Tropical variability
- III. Extratropical variability

III. Extratropical variability

Euro-Atlantic weather regimes

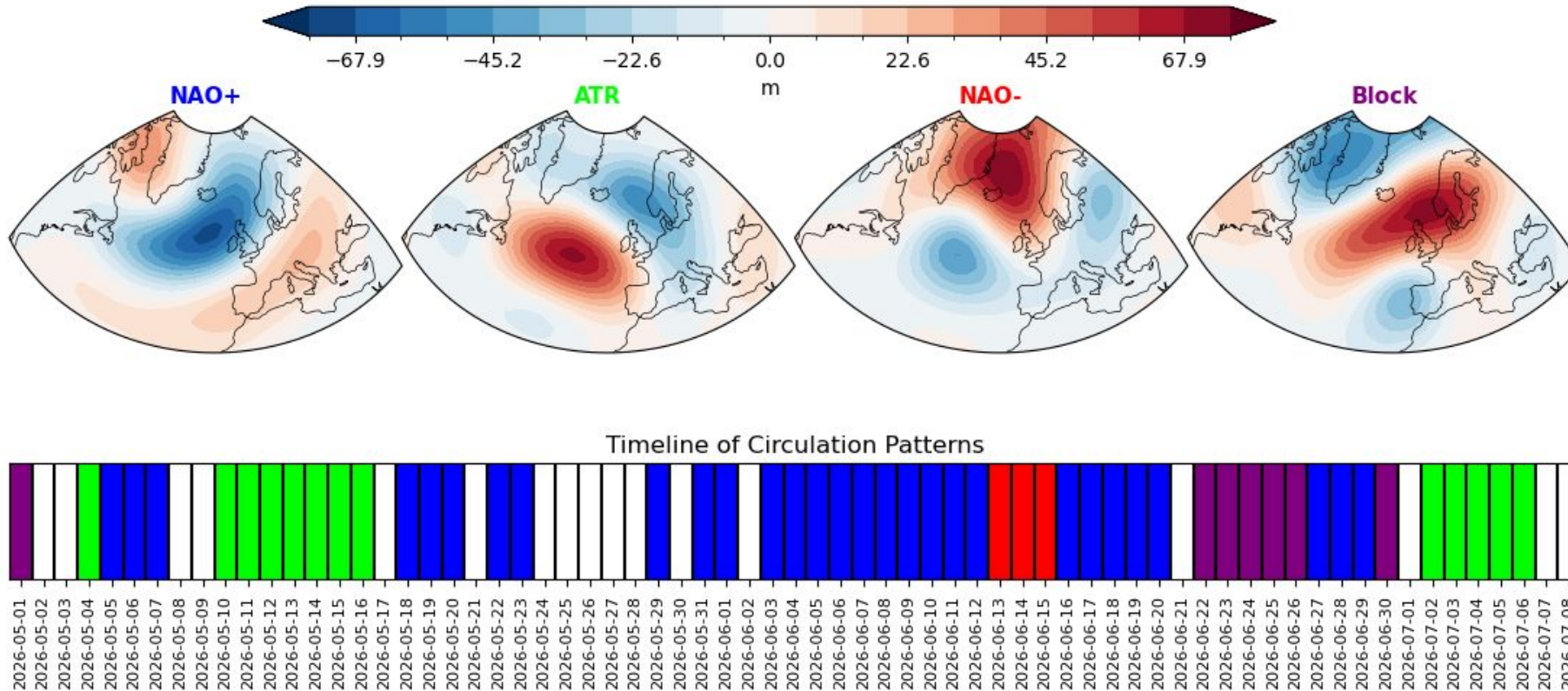


- Geopotential height anomaly composites at 500 hPa.
- 1980 - 2008 **MJJAS** (k-means clustering).
- In summer, the amplitude of the anomalies are weaker than for winter

- **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 conditions to northern Europe and eastern USA while southern Europe is more likely to see cold, dry winter conditions.
- **NAO-:** Spells of easterly winds bring cold dry and calm winters with fewer and weaker storms to northern Europe and eastern USA.
- **ATR:** Northern Europe: Drier and slightly milder due to being under the influence of ridging on the upstream side. Southern Europe: Can be wetter (particularly Iberia and Western Mediterranean) due to enhanced storm tracks directed southward. Eastern Mediterranean may be less affected.

III. Extratropical variability

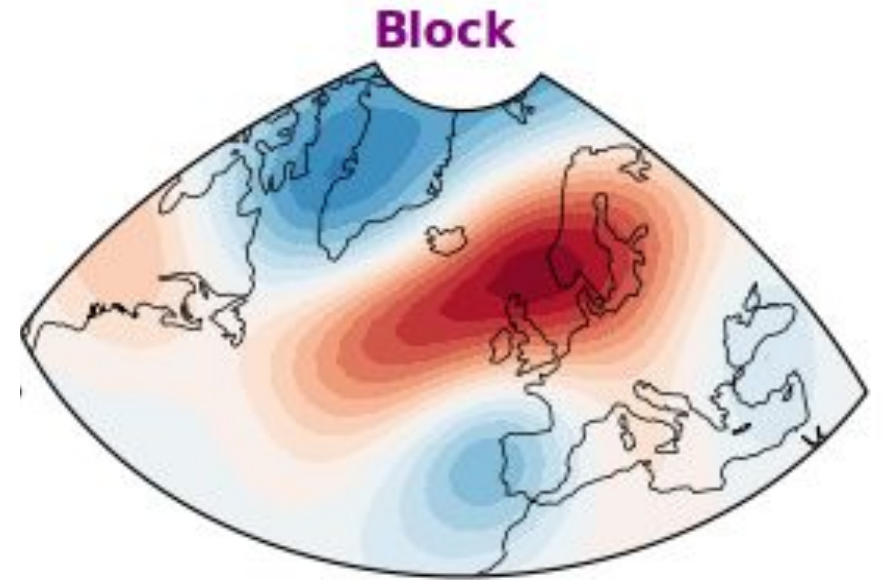
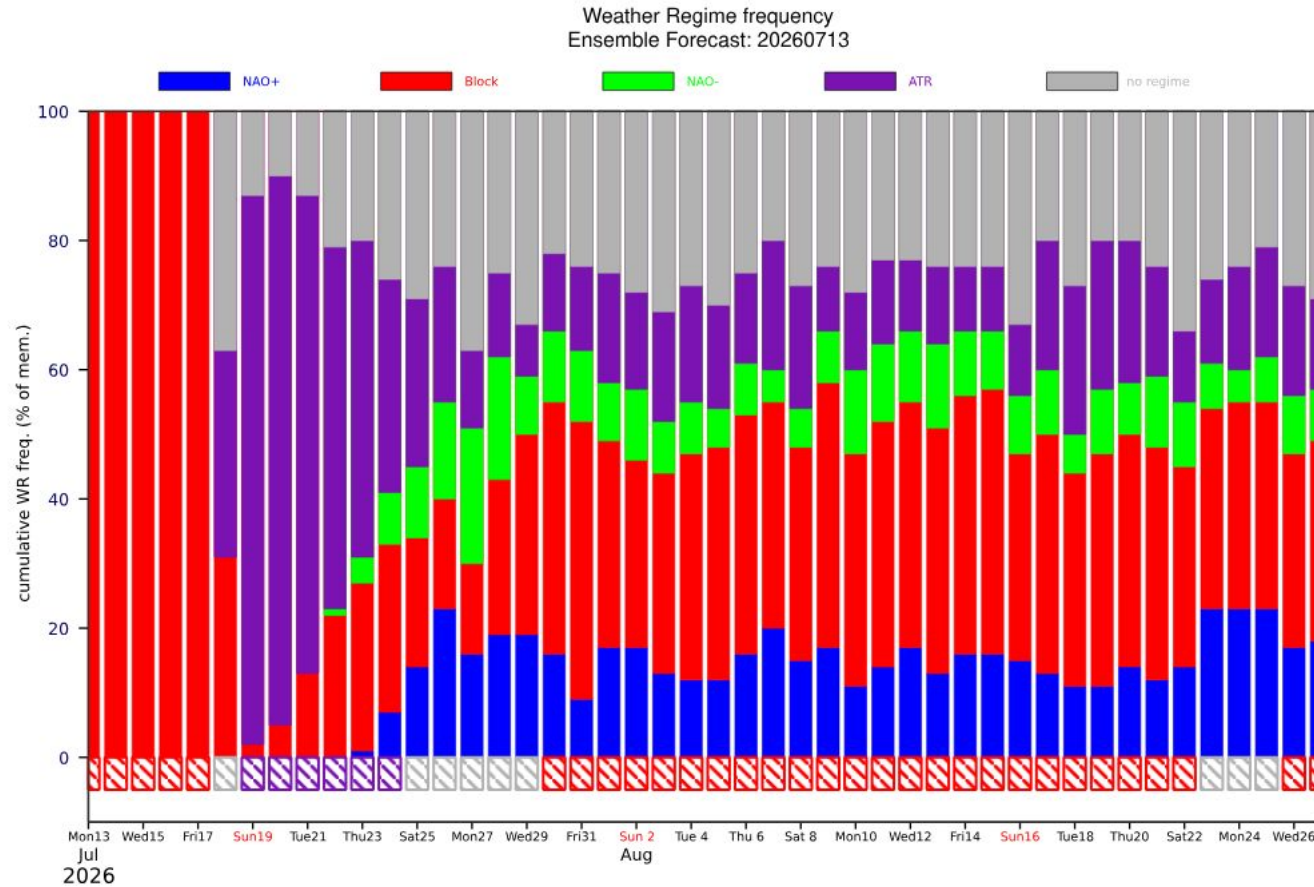
Euro-Atlantic weather regimes



- Geopotential height anomaly composites at 500 hPa.
- 1980 - 2008 **MJJAS** (k-means clustering).
- In summer, the amplitude of the anomalies are weaker than for winter

III. Extratropical variability

Euro-Atlantic weather regimes



- ECMWF subseasonal forecast.
- ECMWF more in favour of Scandinavian Blocking.

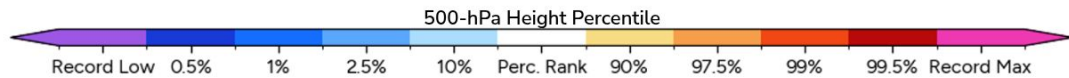
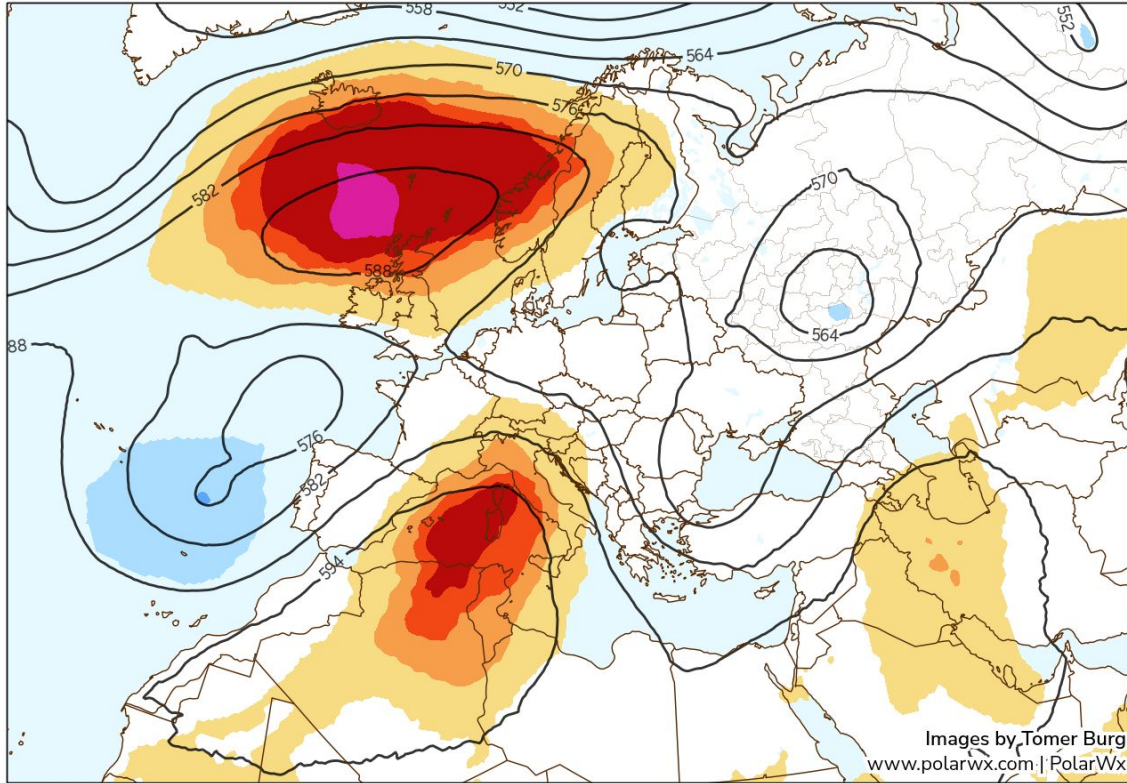
III. Extratropical variability

Euro-Atlantic weather regimes

0.25° ECMWF • 500-hPa Height 3-Week Percentile Rank (ERA5, 1979-2021)

Init: 0000 UTC Tue 14 Jul 2026 | Hour: [0] | Valid: 0000 UTC Tue 14 Jul 2026

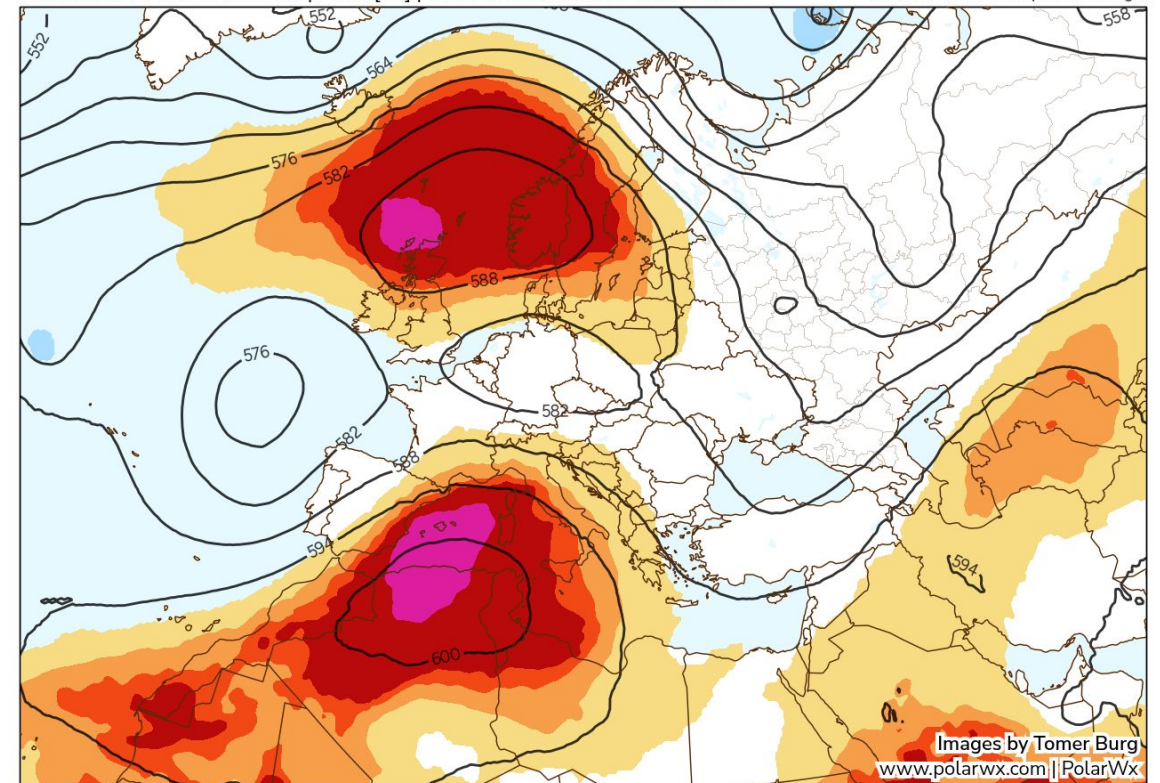
Contour: 500-hPa Geopotential Height



0.25° ECMWF • 500-hPa Height 3-Week Percentile Rank (ERA5, 1979-2021)

Init: 0000 UTC Tue 14 Jul 2026 | Hour: [36] | Valid: 1200 UTC Wed 15 Jul 2026

Contour: 500-hPa Geopotential Height

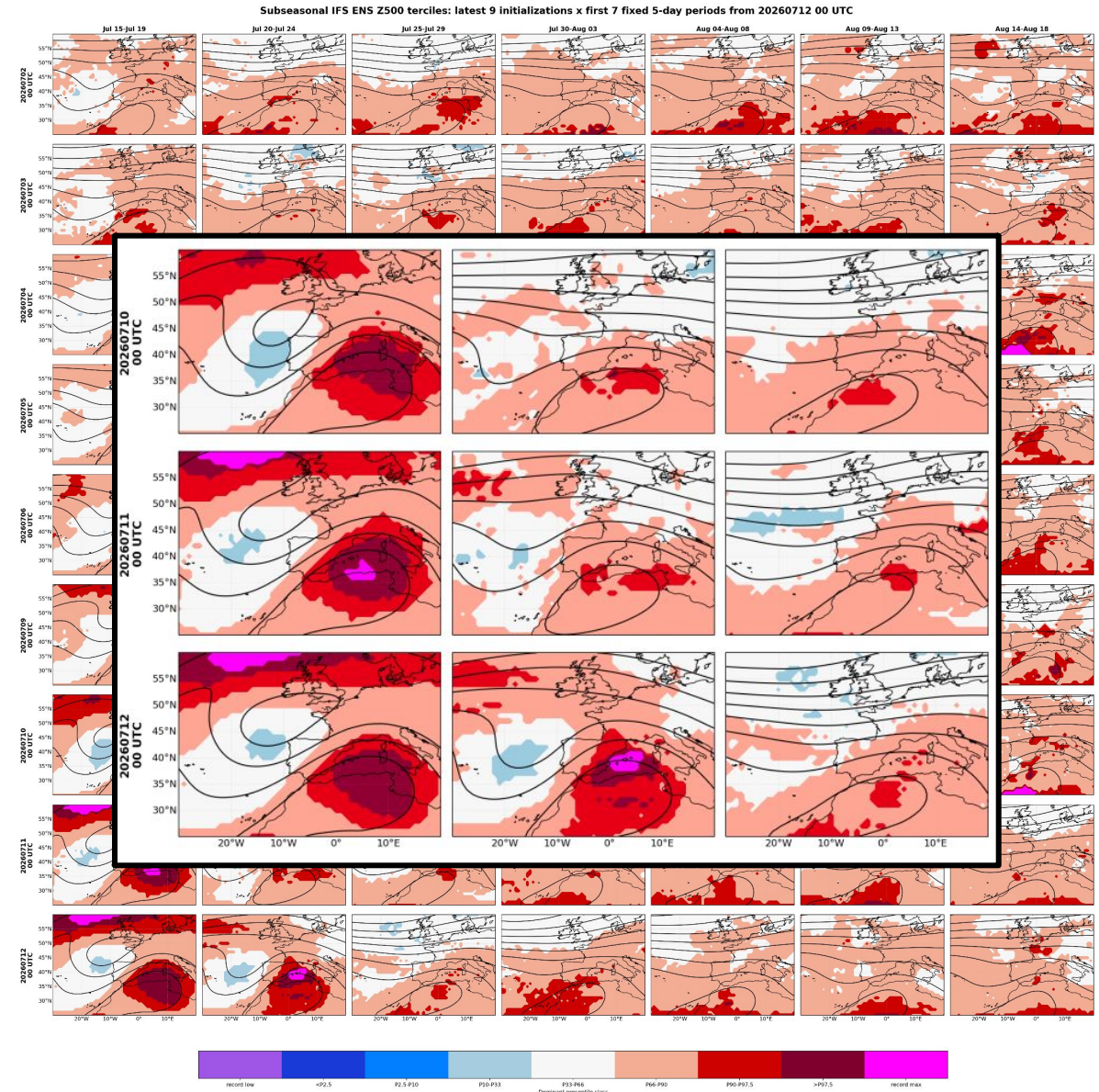
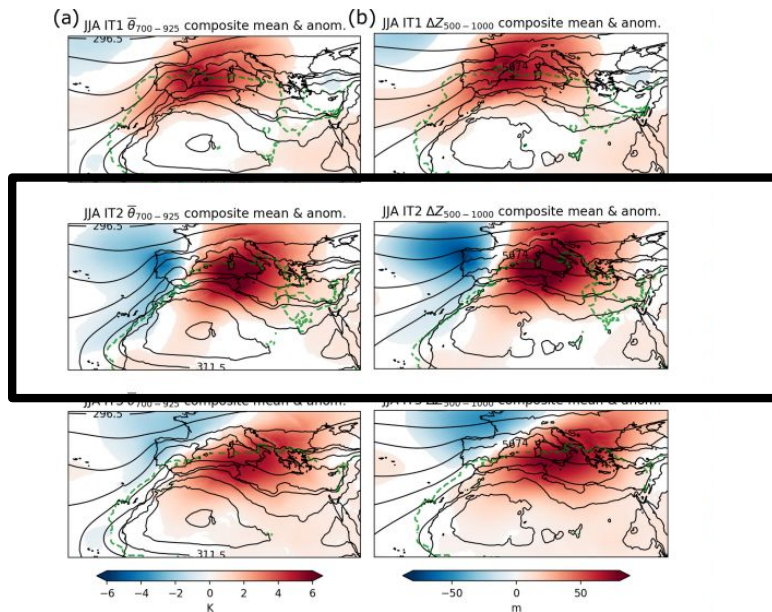


III. Extratropical variability

Geopotential height at 500m

- IFS subseasonal forecast points towards the formation of a warm air intrusion south west of the Iberian Peninsula.
- The pattern persists up to the 24th of July

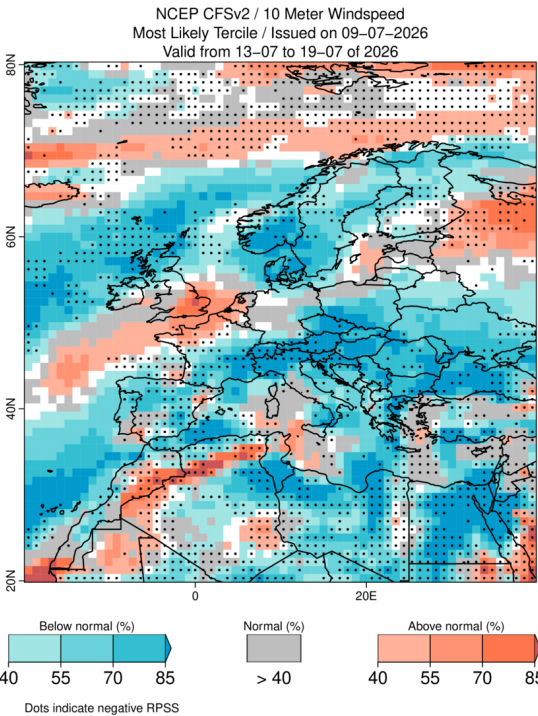
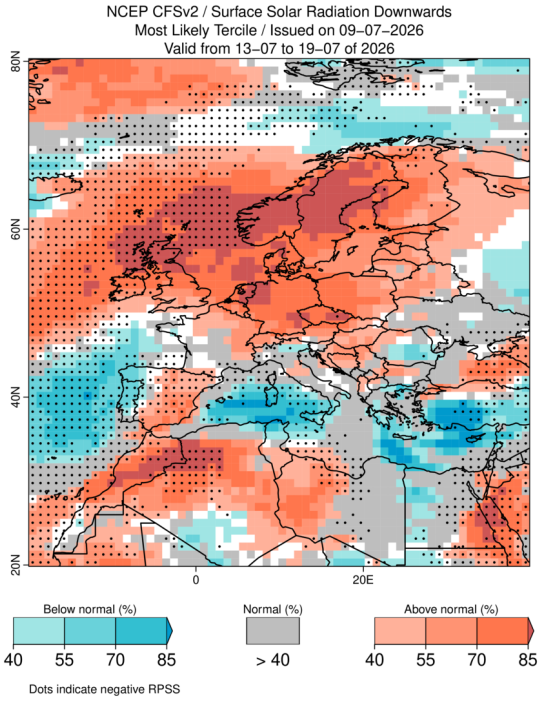
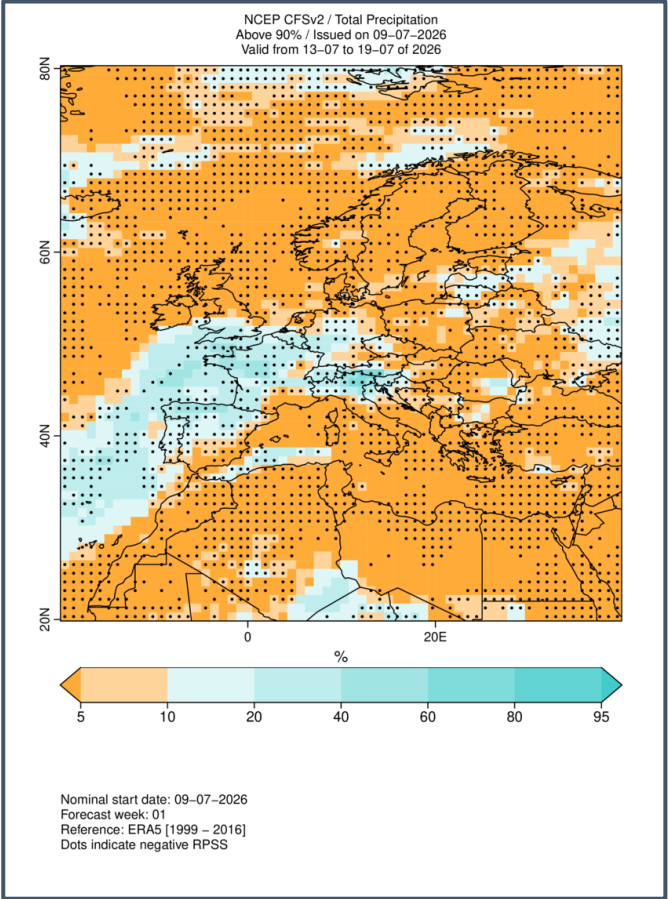
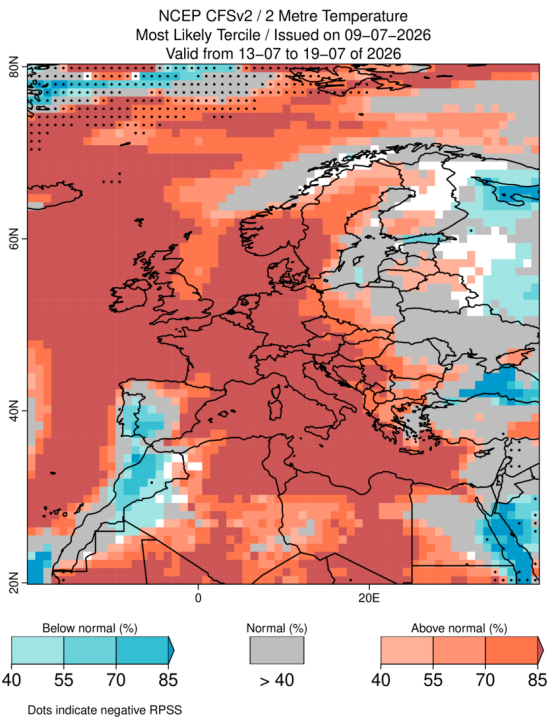
P. Cos et al.: Saharan warm-air intrusions in the western Mediterranean



III. Extratropical variability

Valid on 13 - 19 July [Init. 9 July]

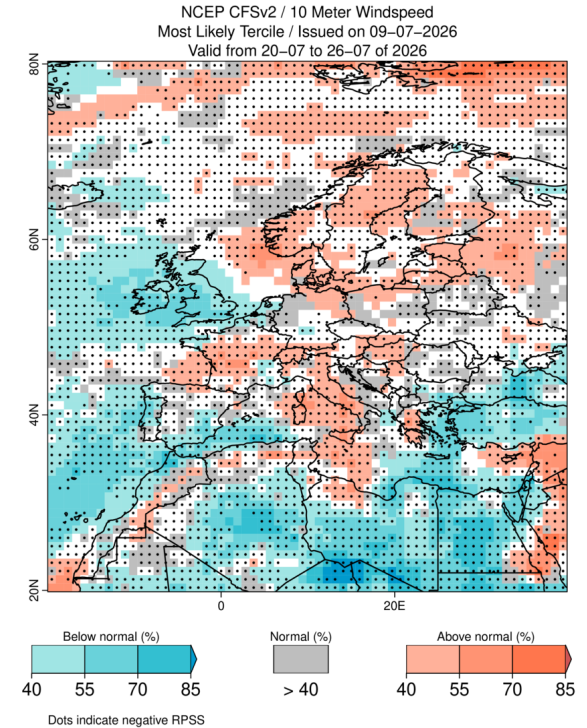
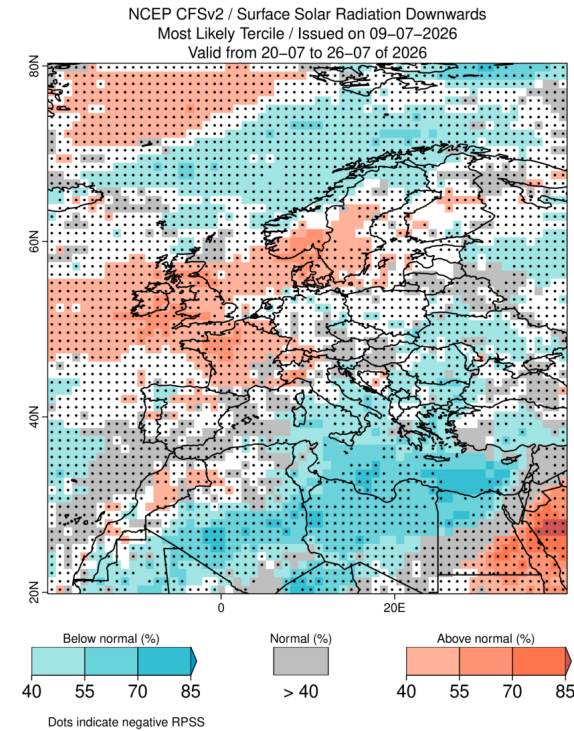
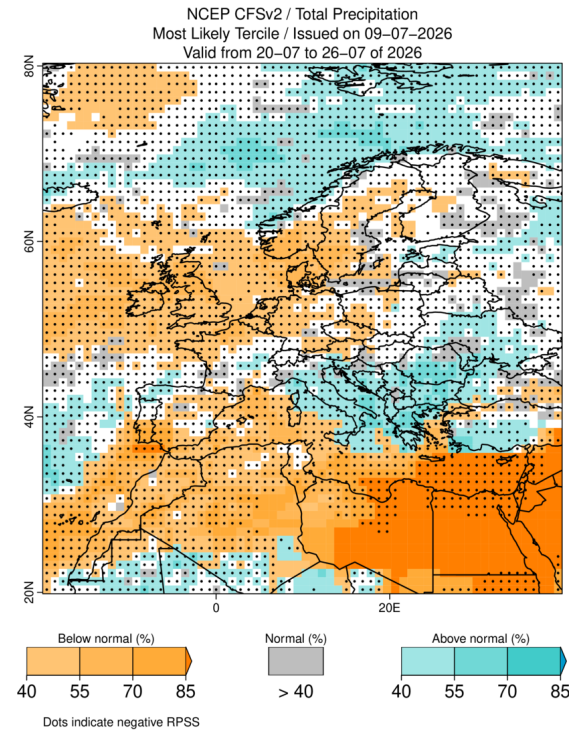
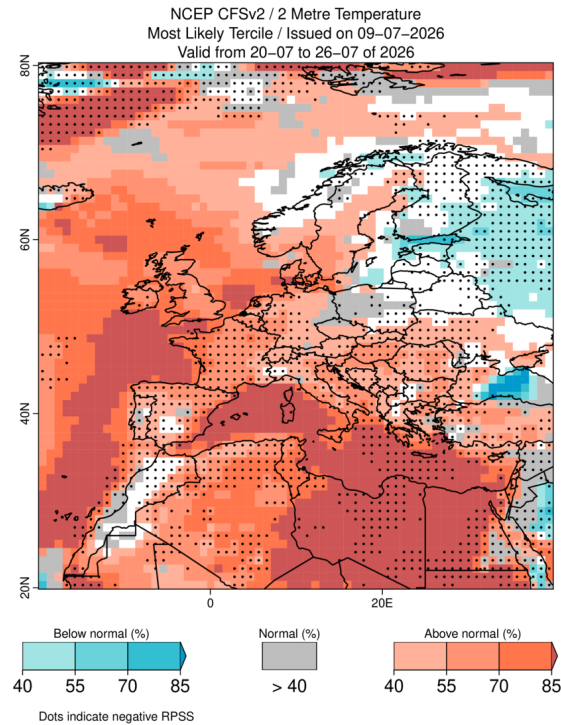
Hindcast period: 1999 - 2016



III. Extratropical variability

Valid on 27 July - 2 August [Init. 9 July]

Hindcast period: 1999 - 2016



Temperature



Precipitation



Solar radiation

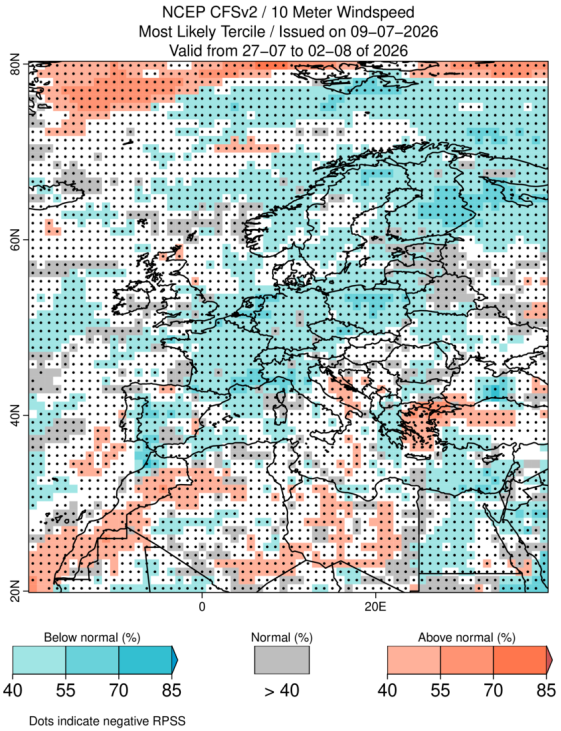
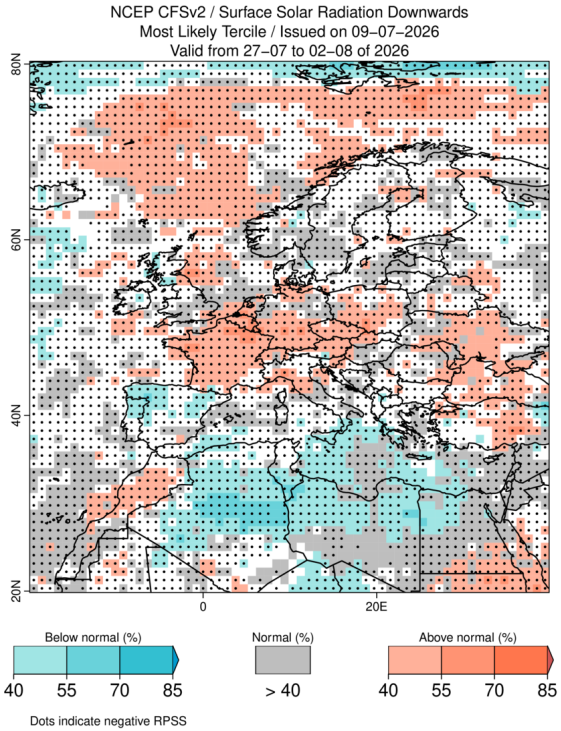
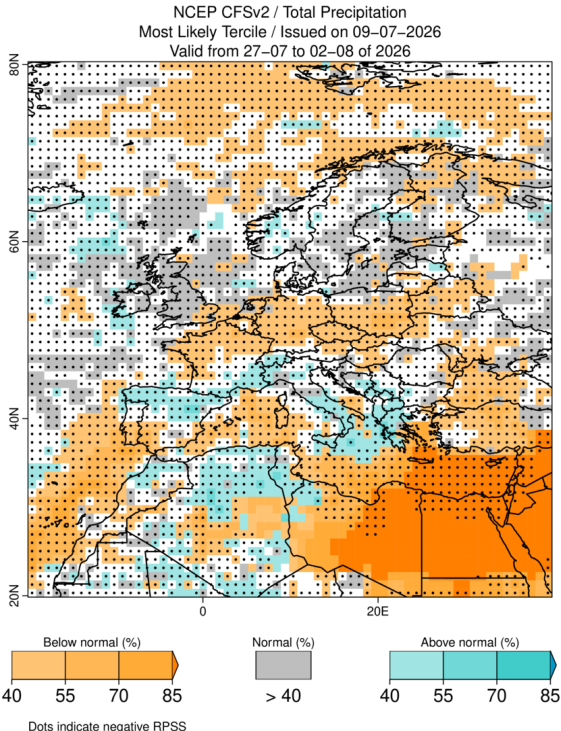
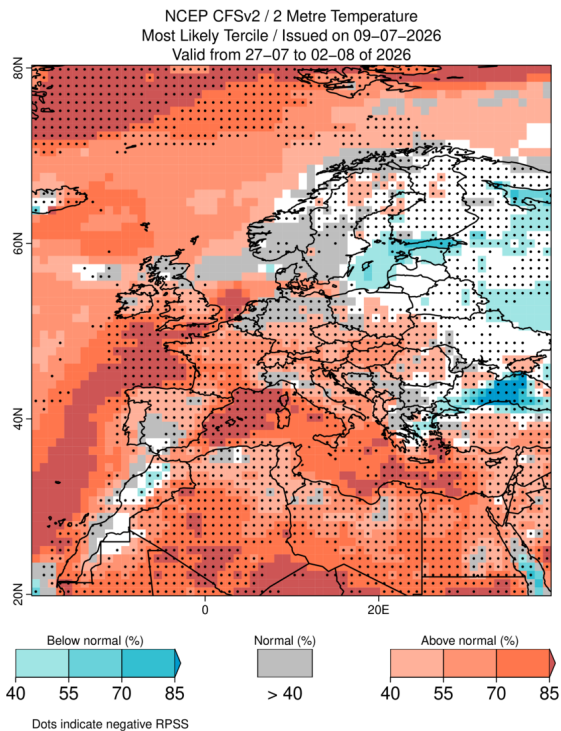


Surface wind

III. Extratropical variability

Valid on 10 - 16 August [Init. 9 July]

Hindcast period: 1999 - 2016



Temperature



Precipitation



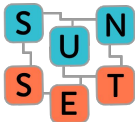
Solar radiation



Surface wind



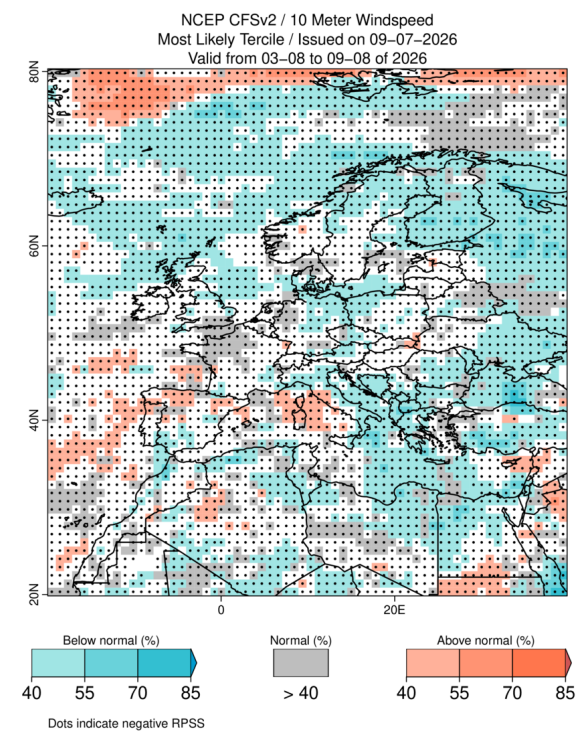
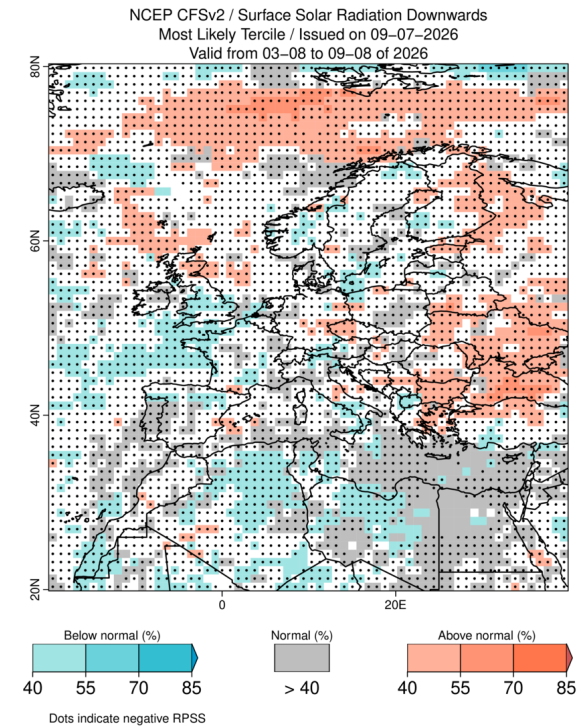
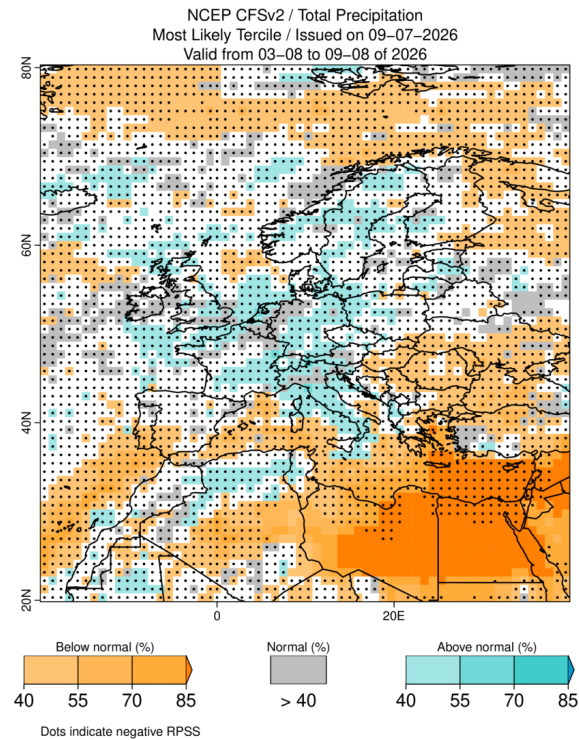
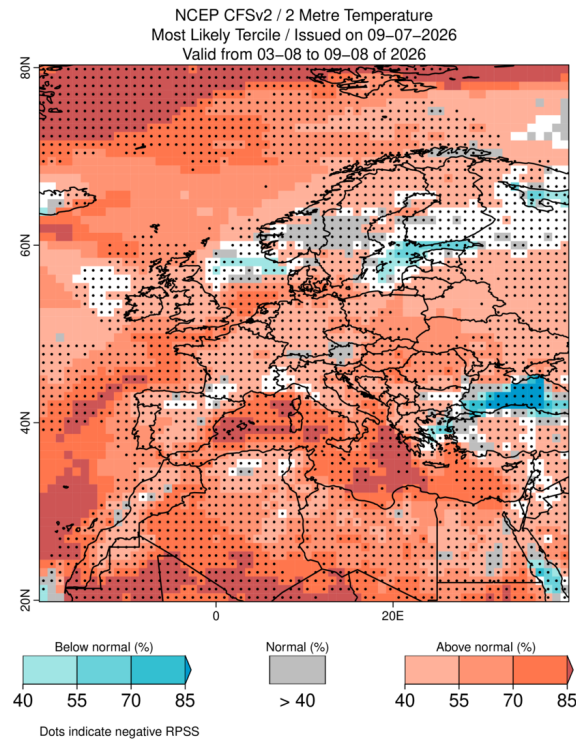
Barcelona
Supercomputing
Center
Centro Nacional de Supercomputaci3n



III. Extratropical variability

Valid on 13 - 19 July [Init. 9 July]

Hindcast period: 1999 - 2016



Temperature



Precipitation



Solar radiation



Surface wind

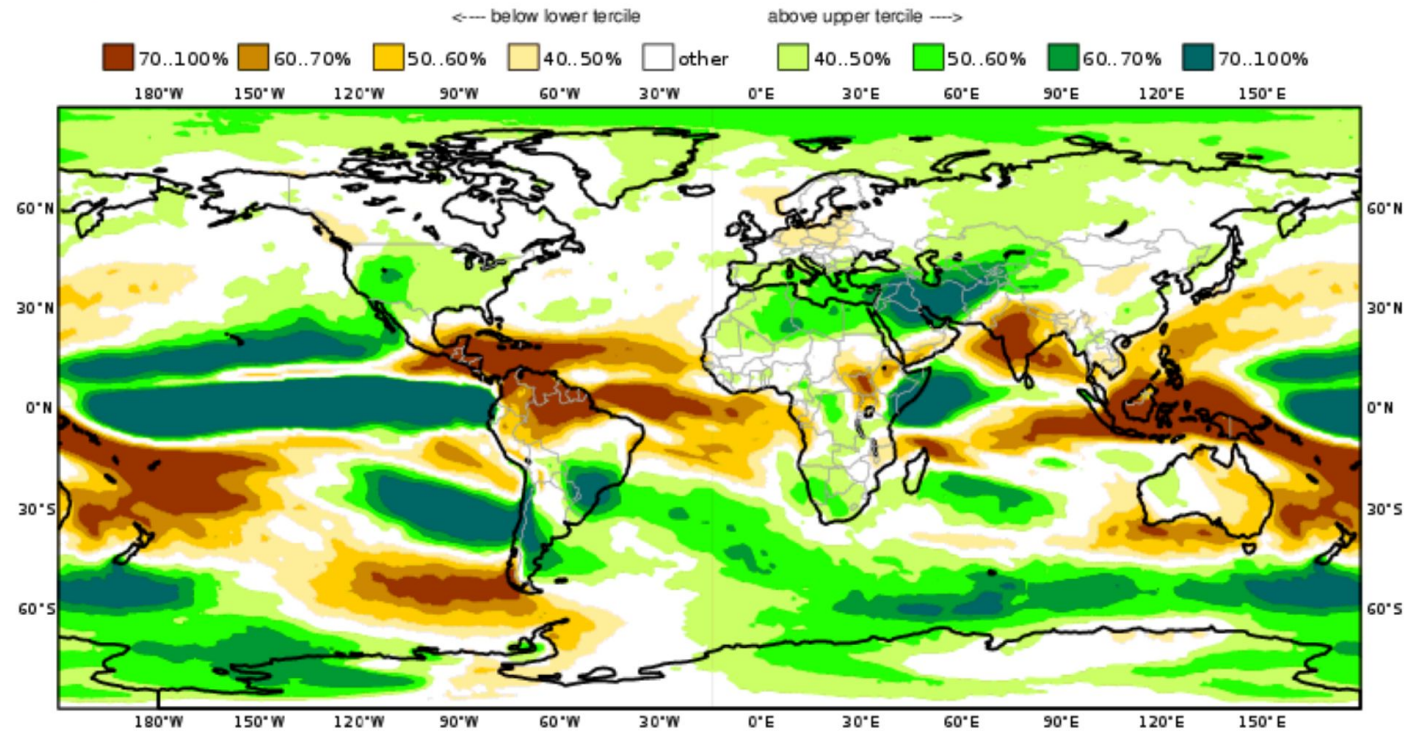
- I. Recent state of the climate
- II. Tropical variability
- III. Extratropical variability
- IV. Seasonal forecasts

IV. Seasonal forecasts

Precipitation

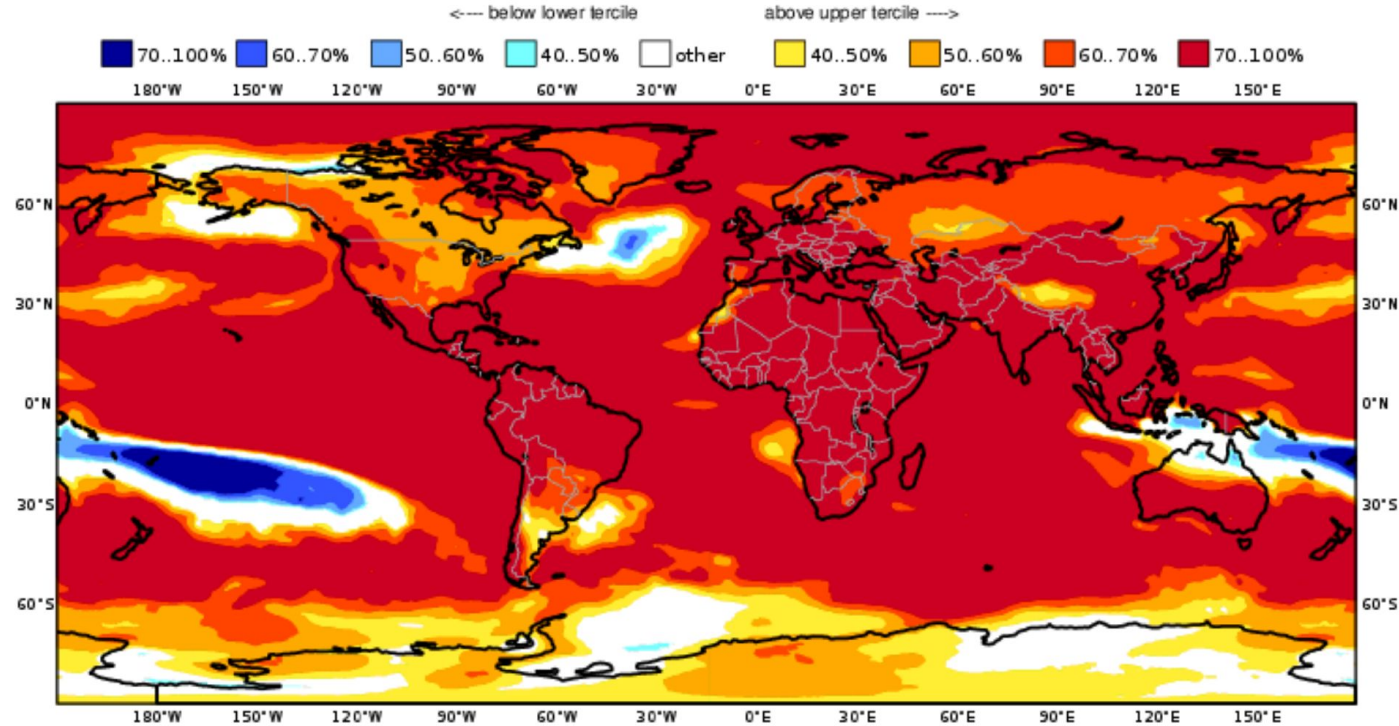
C3S multi-system seasonal forecast ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA/ECCC/BOM
Prob(most likely category of precipitation)
Nominal forecast start: 01/07/26
Unweighted mean

ASO 2026



- Positive Coast of Peru, SW & SE south America, Horn of Africa, Gulf of Guinea and Southern Africa. NW US
- Negative Caribbean, Eastern Africa, South Arabia, India, Maritime continent and eastern Australia

C3S multi-system seasonal forecast ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP/JMA/ECCC/BOM
 Prob(most likely category of 2m temperature)
 ASO 2026
 Nominal forecast start: 01/07/26
 Unweighted mean



- Typical global warming signal.
- Parts of North Atlantic, North Australia and SW Pacific blob with below normal temperature.

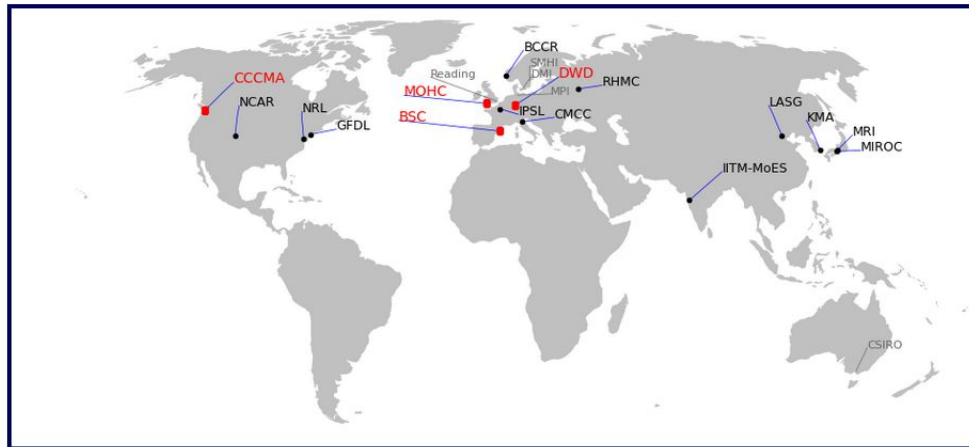
- I. Recent state of the climate
- II. Tropical variability
- III. Extratropical variability
- IV. Seasonal forecasts
- V. Decadal predictions

V. Decadal predictions



WMO Lead Centre for Annual-to-Decadal Climate Prediction

The Lead Centre for Annual-to-Decadal Climate Prediction collects and provides hindcasts, forecasts and verification data from a number of contributing centres worldwide.



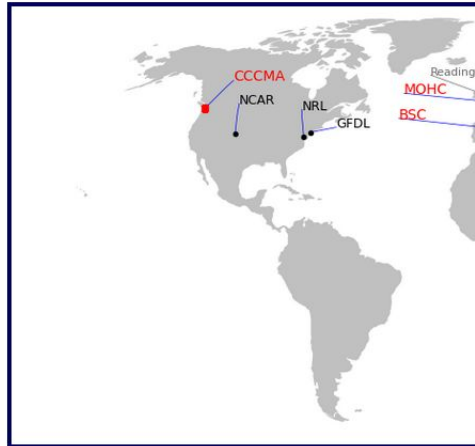
<https://hadleyserver.metoffice.gov.uk/wmolc/>

V. Decadal predictions



WMO Lead C
Annual-to-D

The Lead Centre for Annual-to-Deca
provides hindcasts, forecasts and v
contributing centres worldwide.



<https://hadleyserver.me>

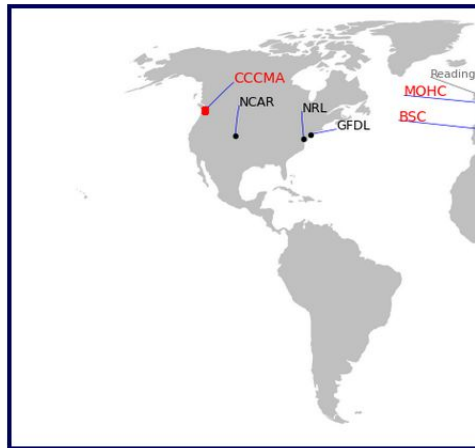


V. Decadal predictions

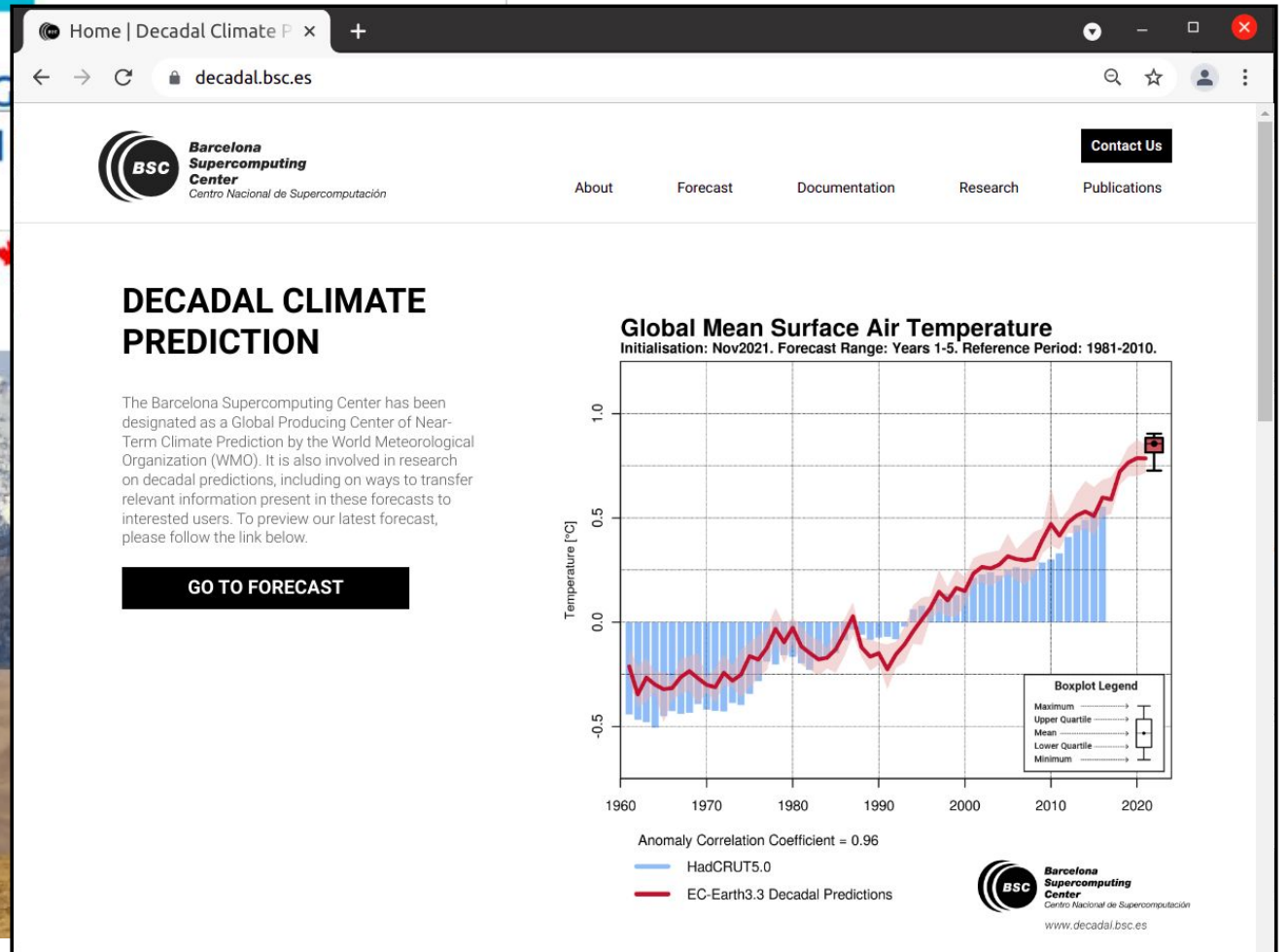


WMO Lead C
Annual-to-D

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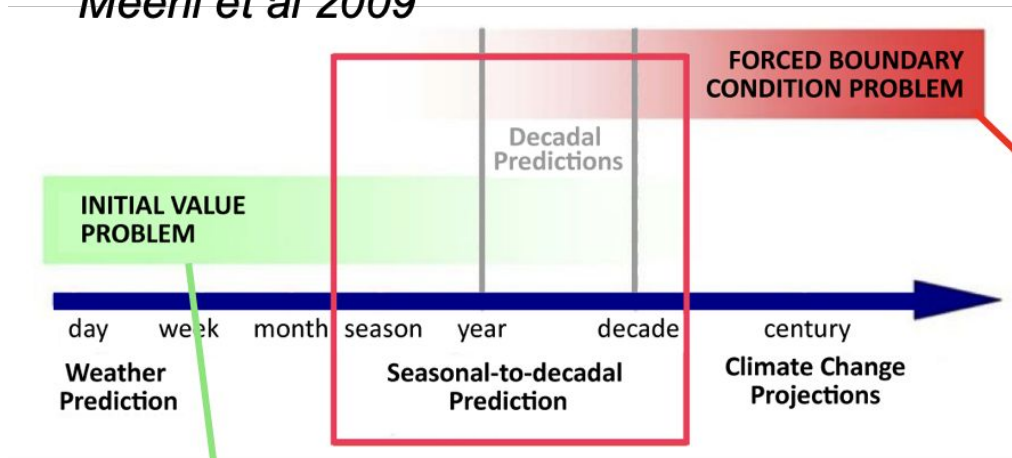
<https://hadleyserver.me>



<https://decadal.bsc.es>

V. Decadal predictions

Meehl et al 2009



Predictability relying on
good guess of future
changes in **radiative forcing**

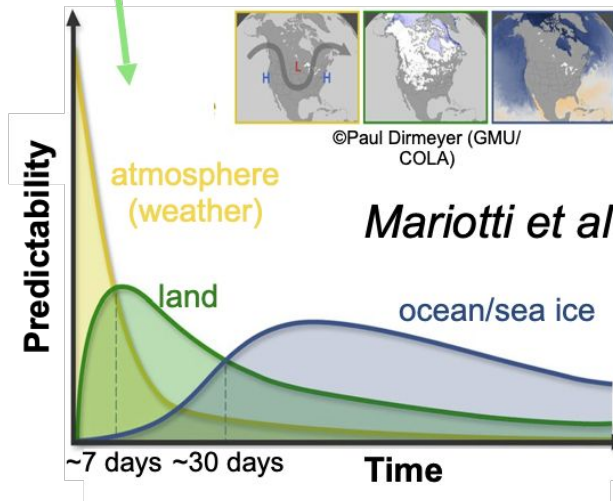
Solar Activity



Volcanic Aerosols



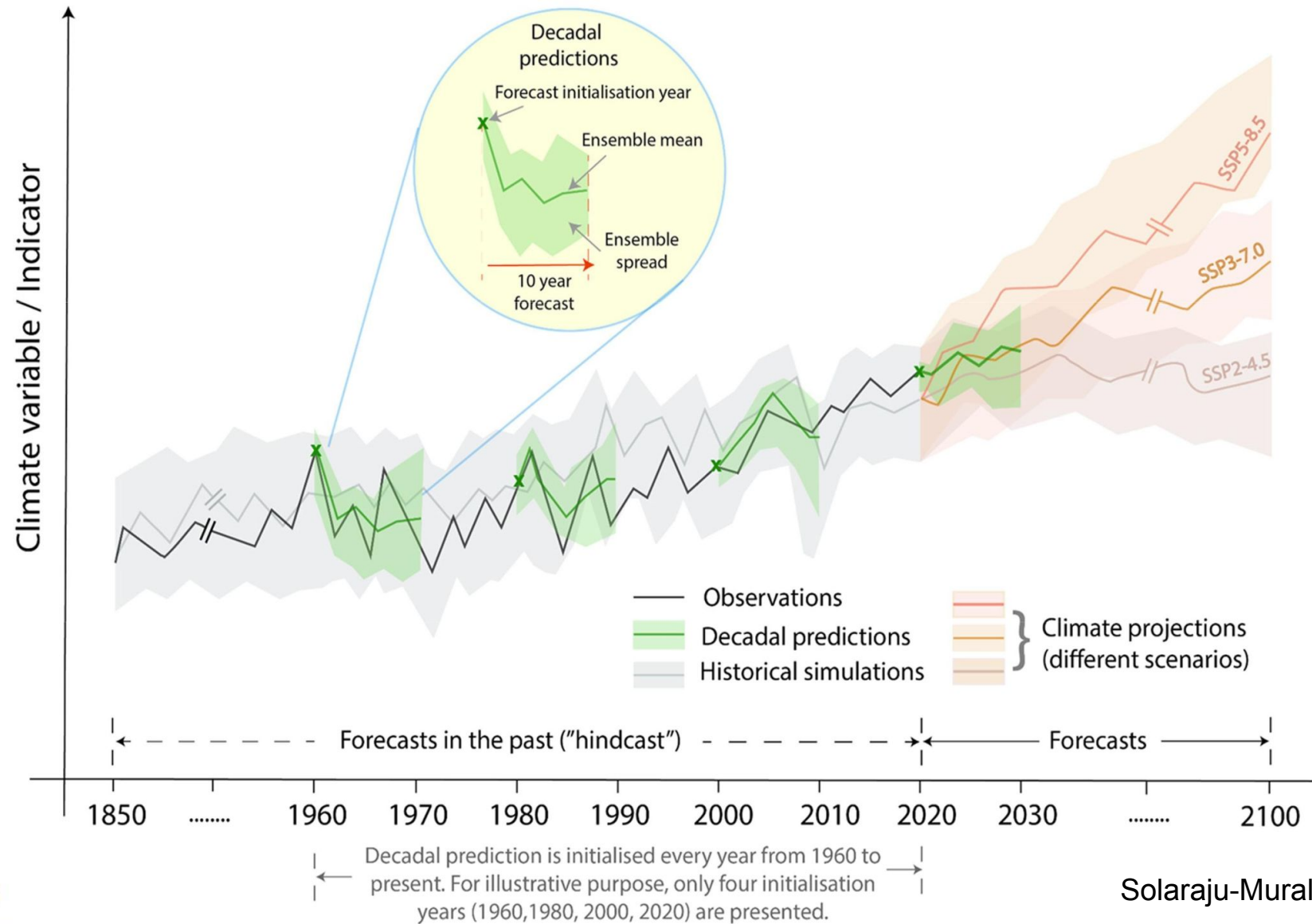
GHGs



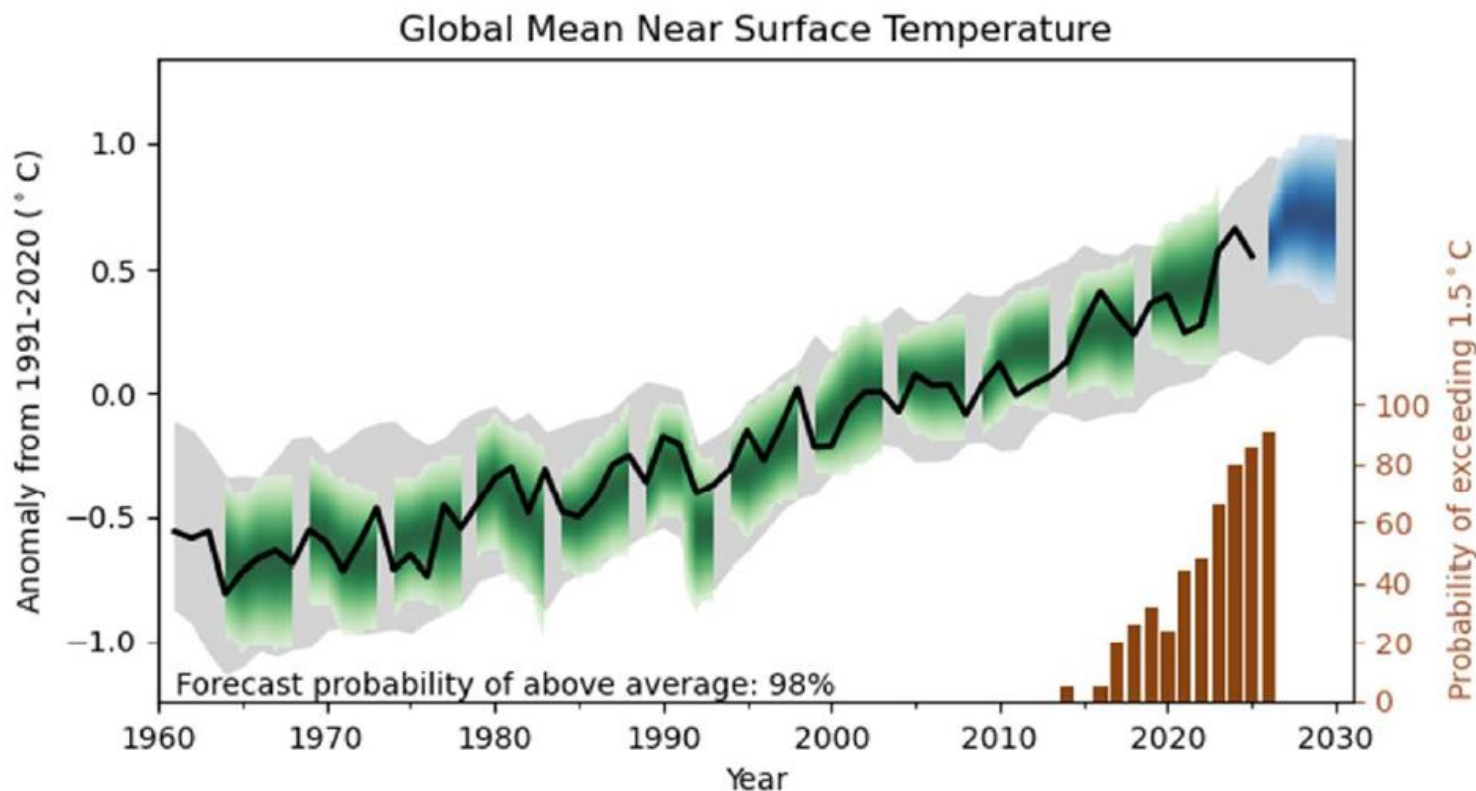
Mariotti et al 2018

Predictability arising from **memory**
and **slow processes** in the different
climate system components

V. Decadal predictions



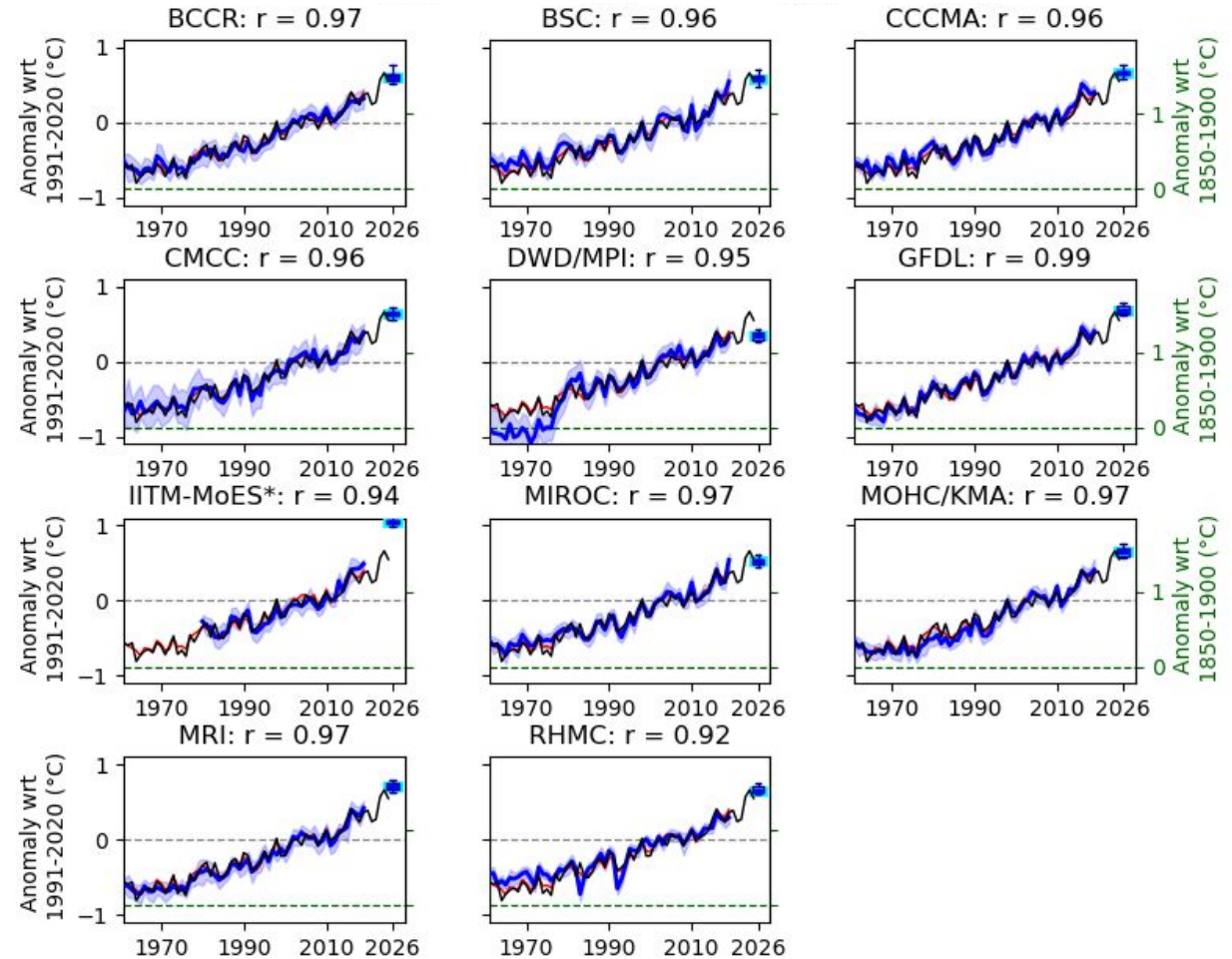
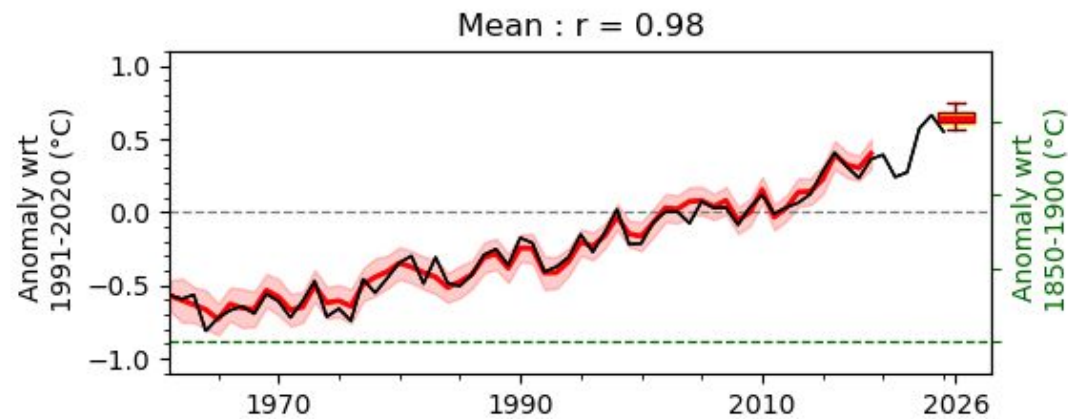
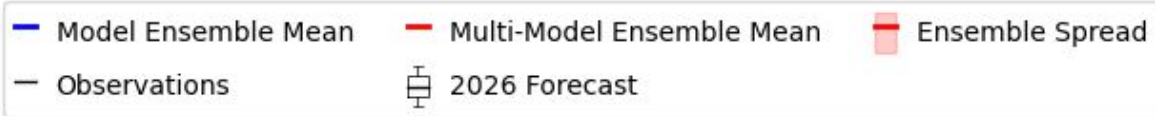
V. Decadal predictions



- The annually averaged global mean near-surface temperature for each year between 2026 and 2030 is predicted to be between 1.3°C and 1.9°C higher than the average over the years 1850-1900.
- It is very likely (91% chance) that global mean near-surface temperature will exceed 1.5°C above the 1850-1900 average levels for at least one year between 2026 and 2030.
- It is likely (86% chance) that at least one year between 2026 and 2030 will set a new annual record (currently 2024).

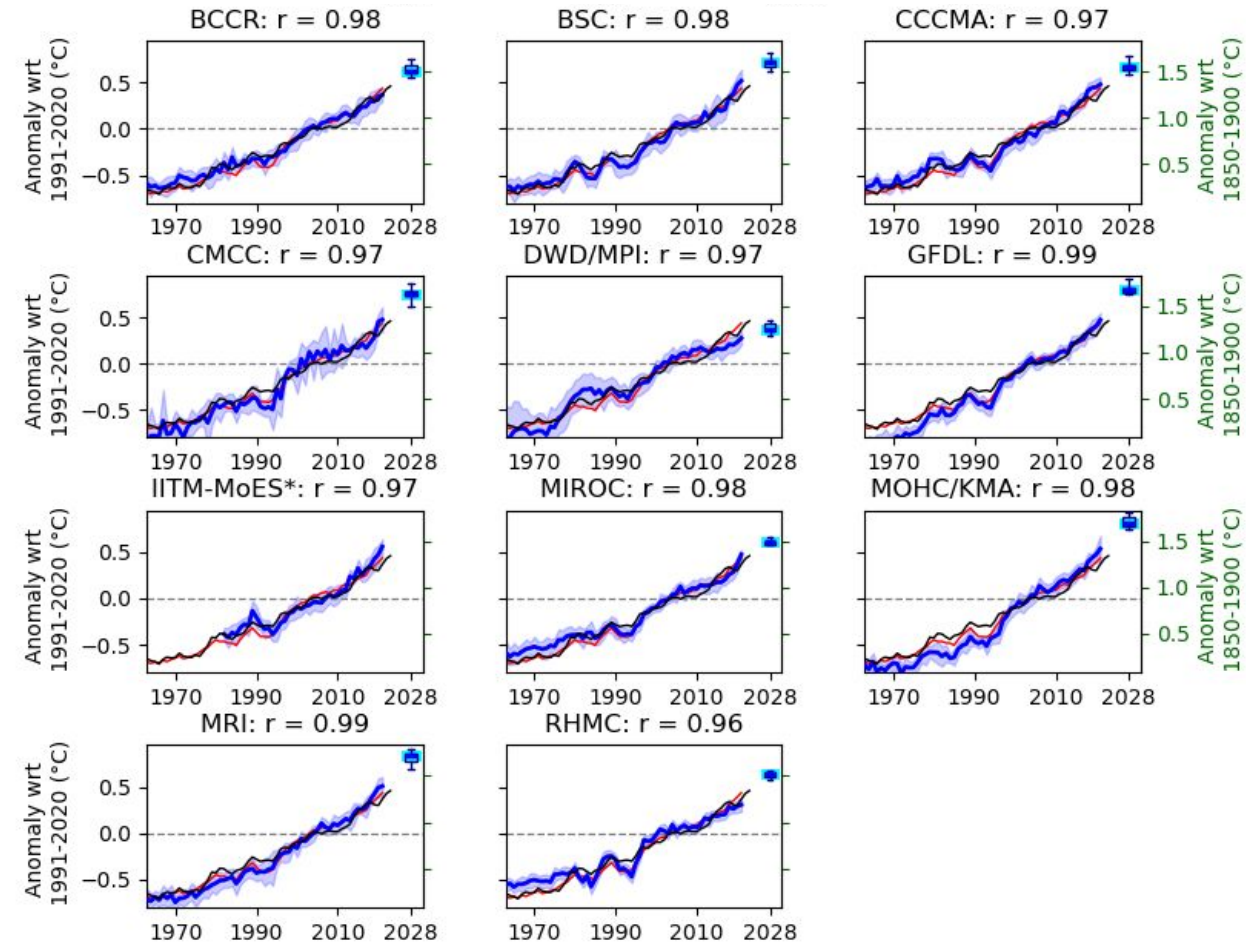
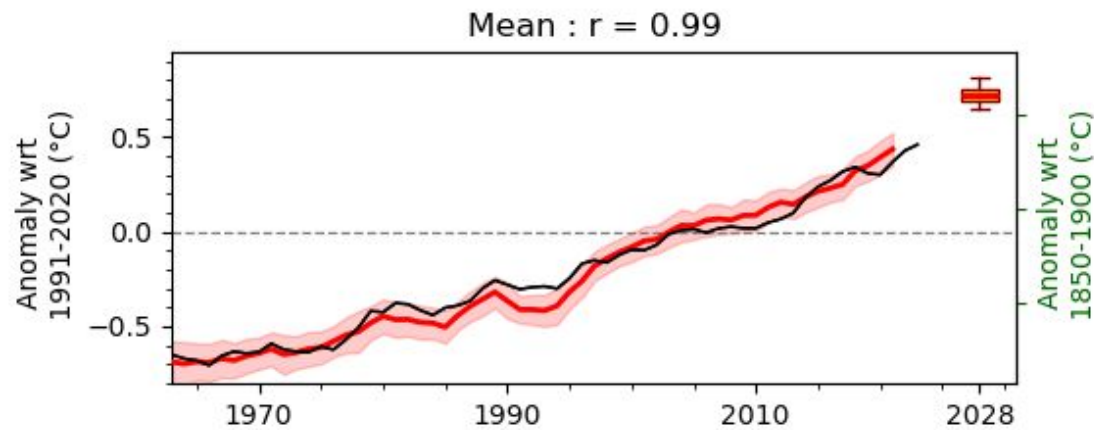
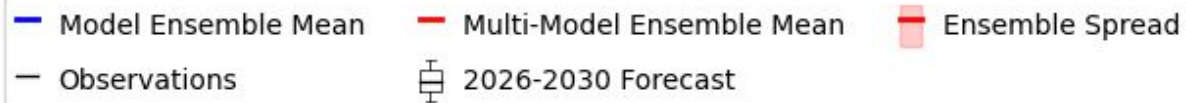
V. Decadal predictions

Timeseries of Global Mean Near Surface Temperature



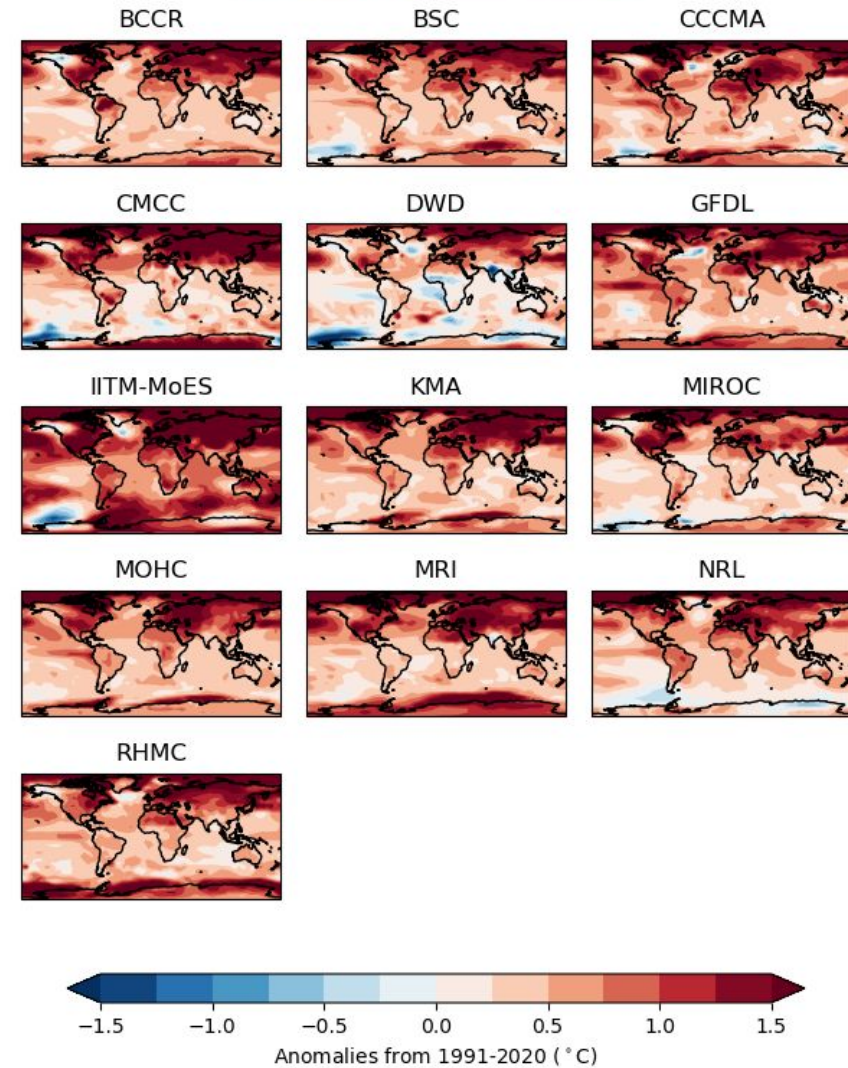
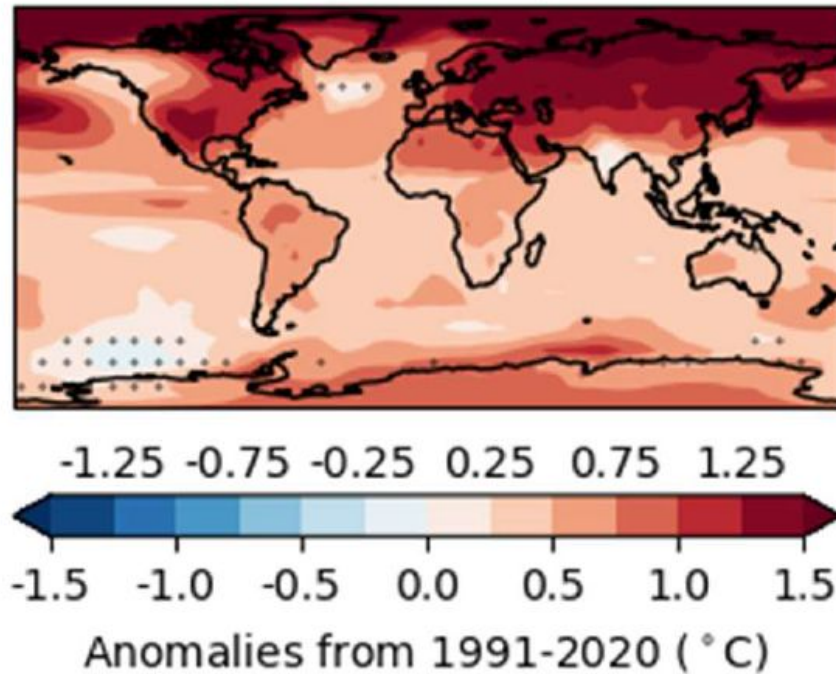
V. Decadal predictions

Timeseries of Global Mean Near Surface Temperature



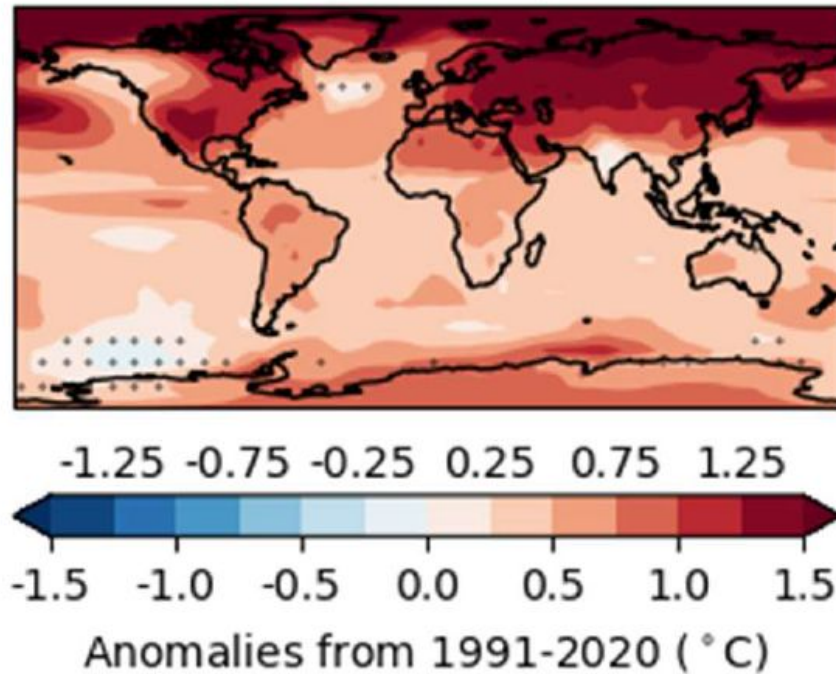
V. Decadal predictions

Ensemble mean forecast 2026
near-surface temperature

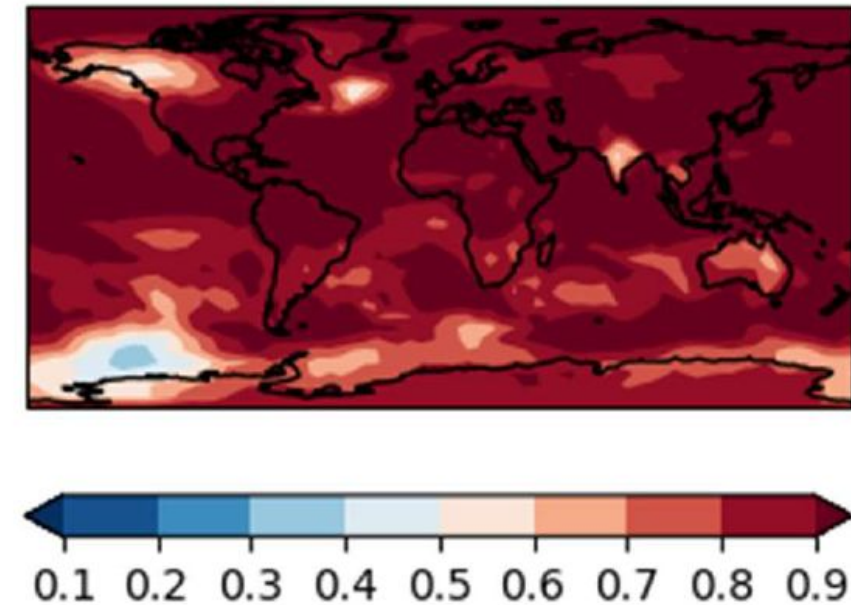


V. Decadal predictions

Ensemble mean forecast 2026
near-surface temperature

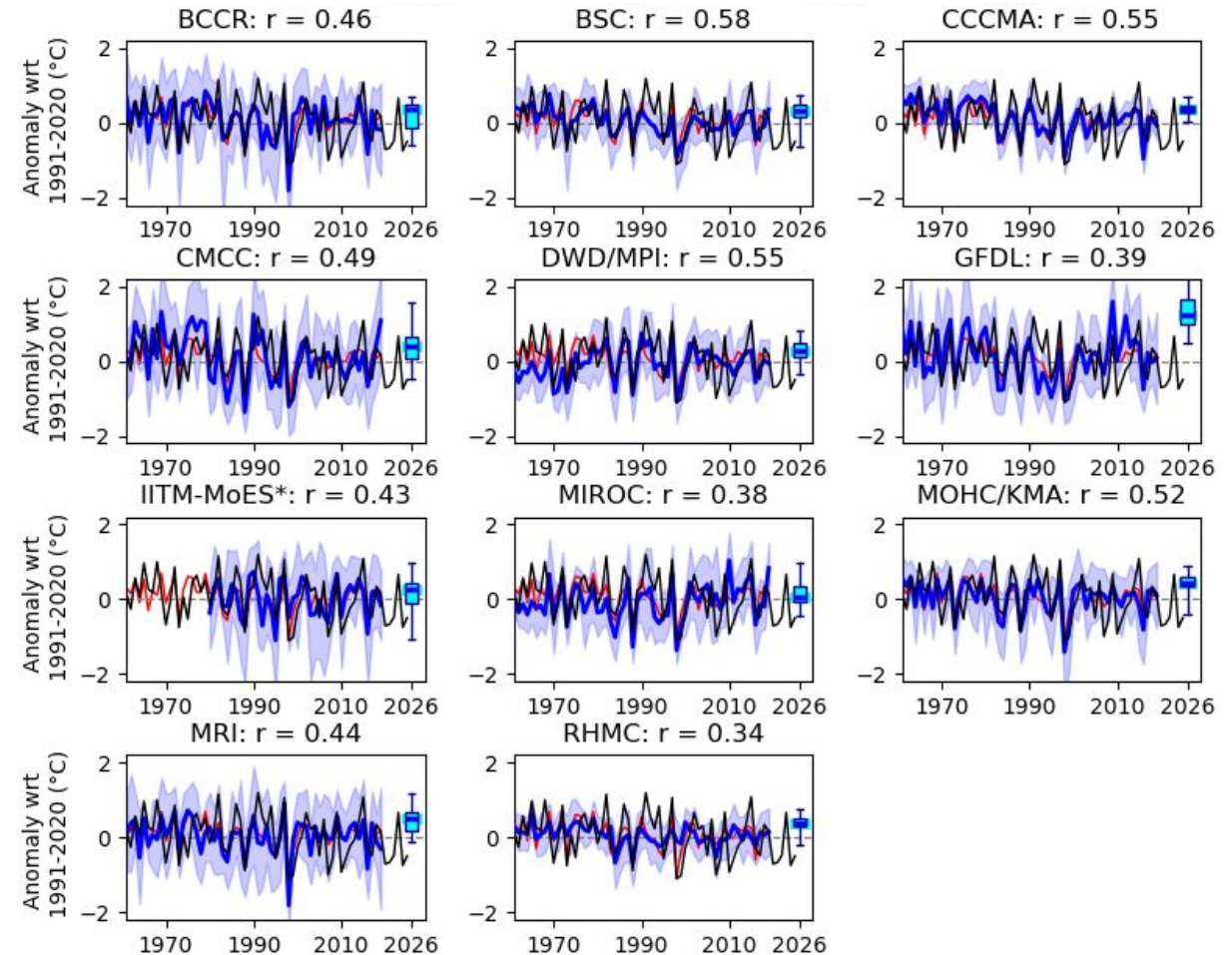
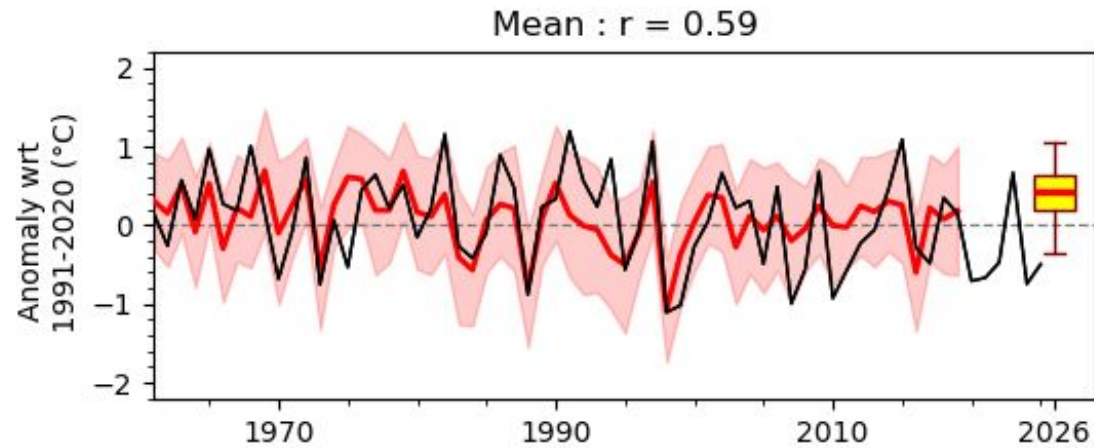
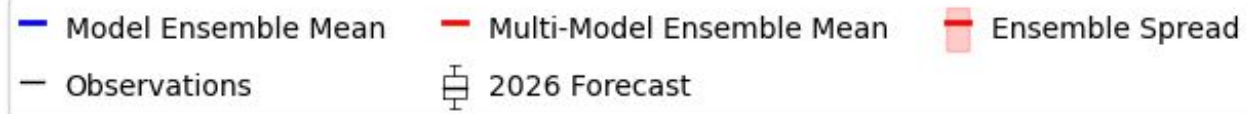


Probability of above average
near-surface temperature



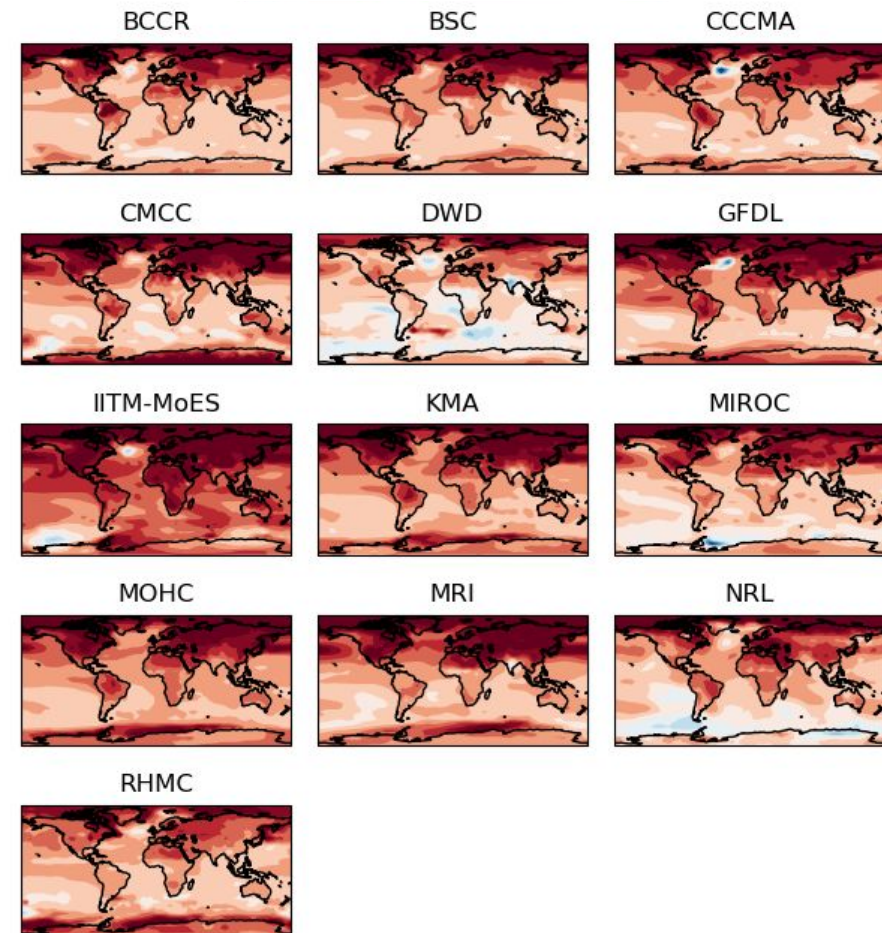
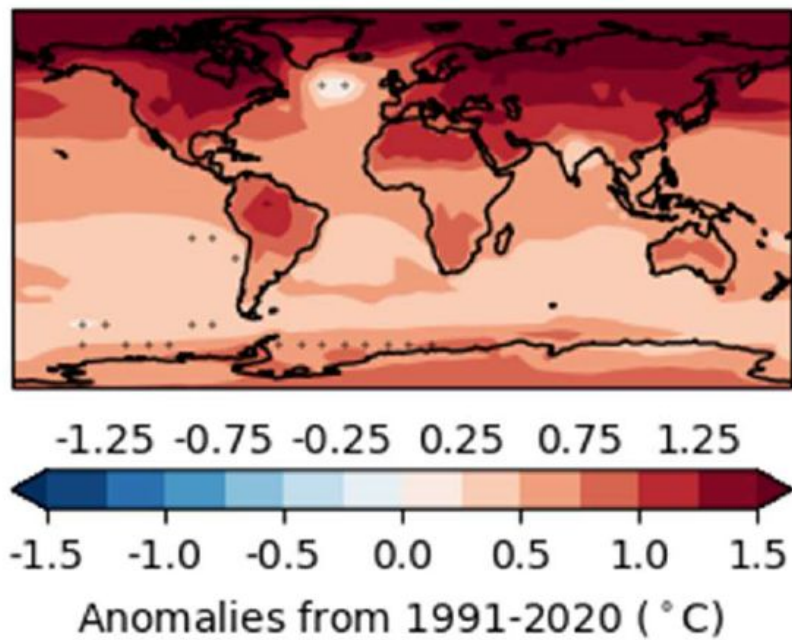
V. Decadal predictions

Timeseries of Relative Nino 3.4 for DJF



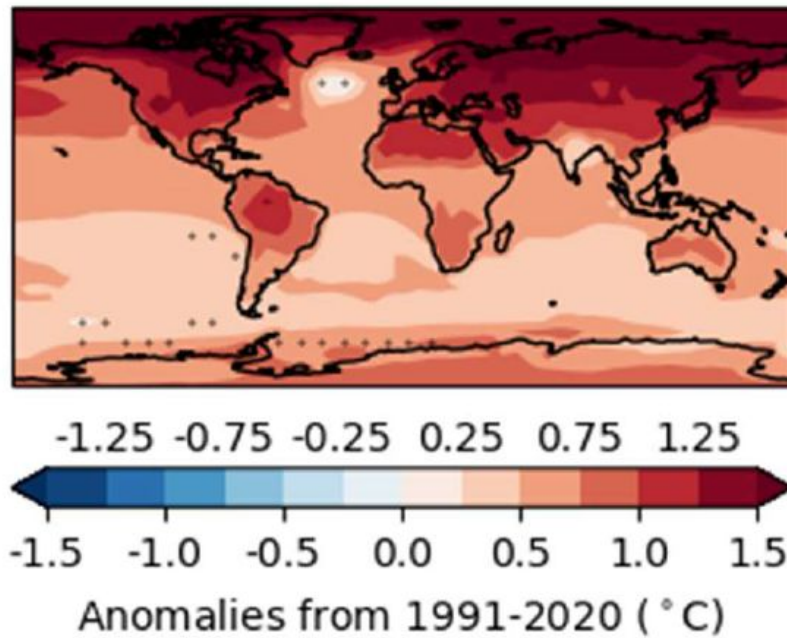
V. Decadal predictions

Ensemble mean forecast 2026-2035
near-surface temperature

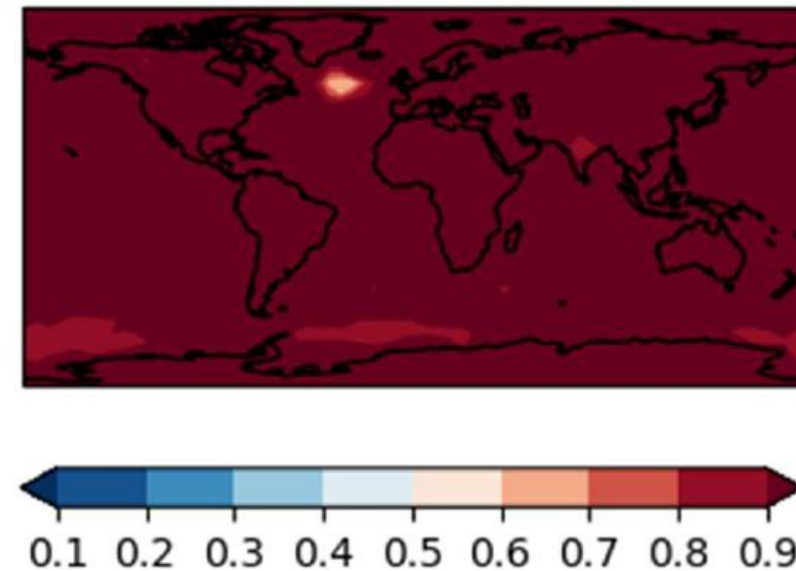


V. Decadal predictions

Ensemble mean forecast 2026-2035
near-surface temperature



Probability of above average
near-surface temperature



Forecast Briefing

July 2026

Contact: paloma.trascasa@bsc.es

Earth Sciences department

Barcelona Supercomputing Center (BSC)