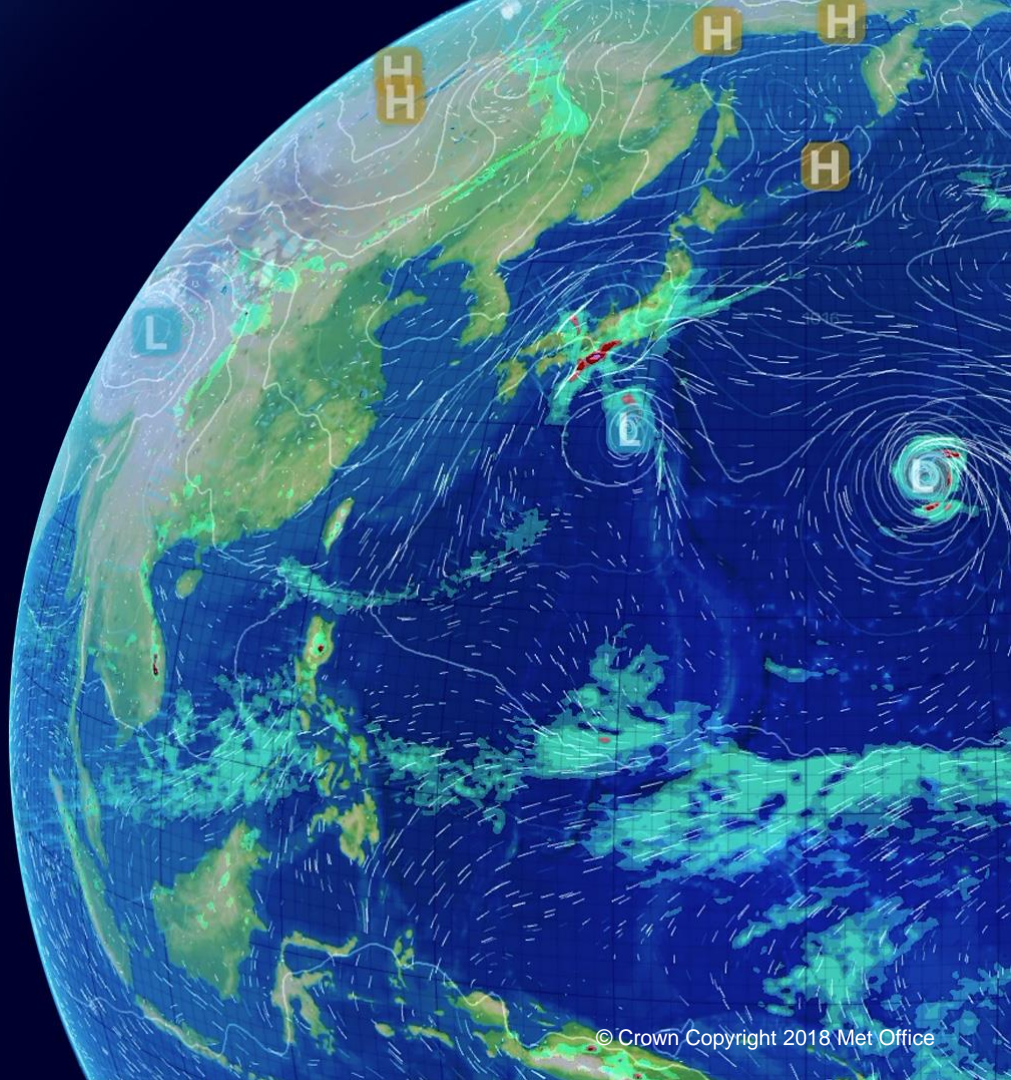


Current state of the global climate system

Jun – Sep (JJAS) Season 2021

Dr. Stefan Lines (Met Office, UK)

58th GHACOF
May 27th 2021



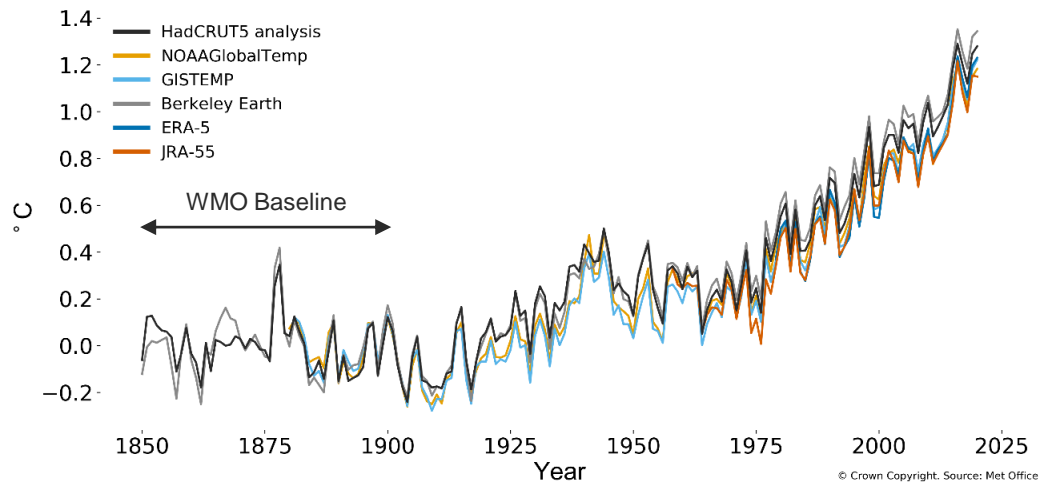
Status of global scale **drivers** of climate variability over the Greater Horn of Africa

- Continued evidence of global climate warming
- Why monitor and review the state of global climate?
- El Niño / La Niña – current and projected status
- Indian Ocean Dipole (IOD) – current and projected status

Evidence Of Continuing Global Climate Warming

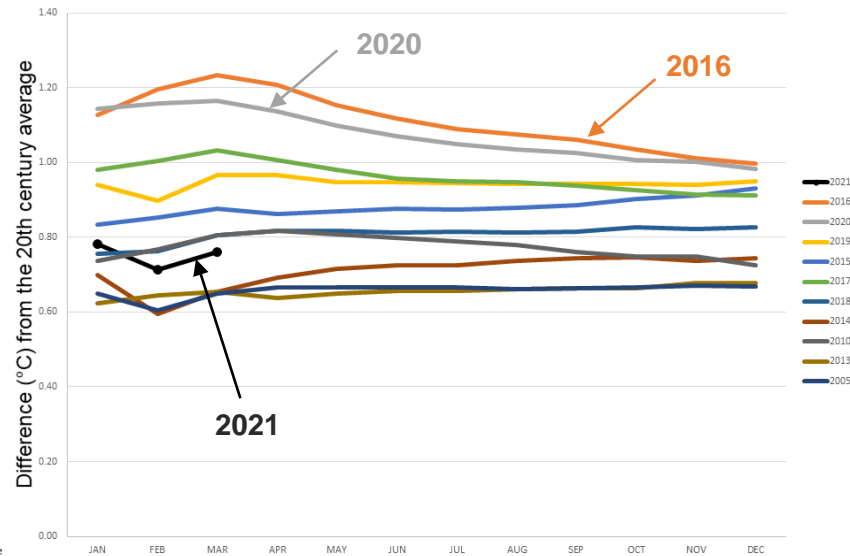
Met Office

Global mean temperature difference from 1850-1900 (°C)



Year-to-Date Temperatures

for 2021 and the ten warmest years on record

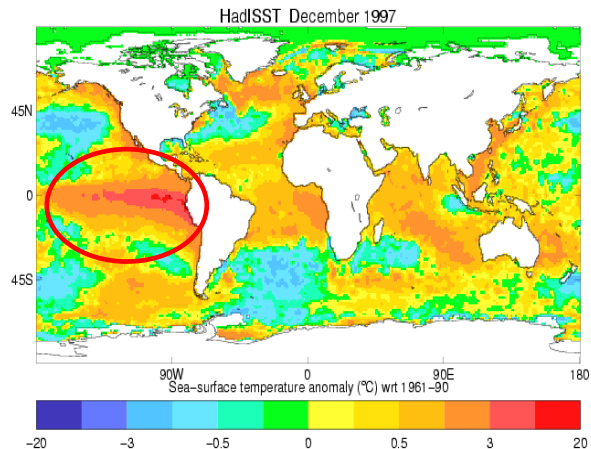


The year 2020 was the **second warmest** year on record. The annual global temperature in 2020 was 1.28°C warmer than the average for 1850-1900 (WMO).

*The warmest 6 years have **all** been since 2015.*

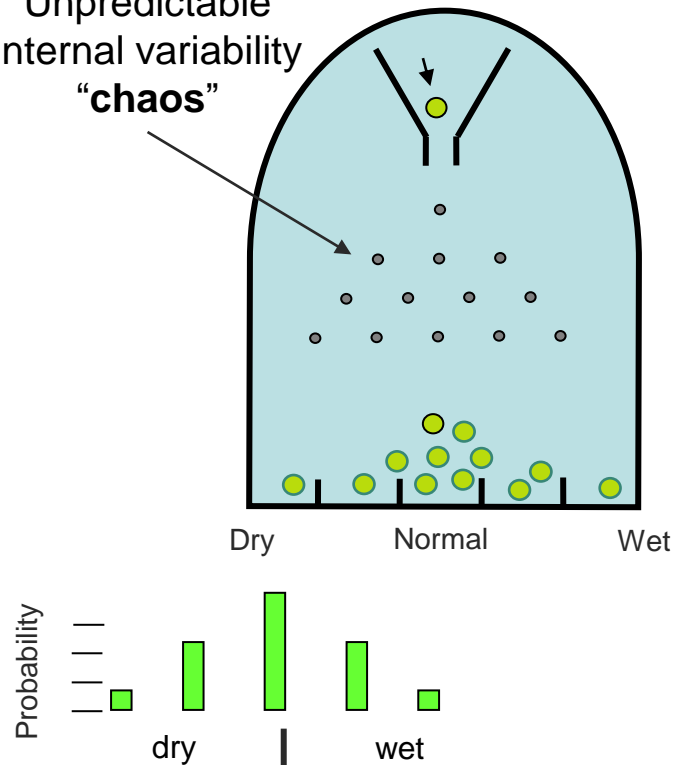
What Drives The Year-to-Year Differences In Rainfall For A Given Season/Region?

Sea surface temperature (SST) anomalies



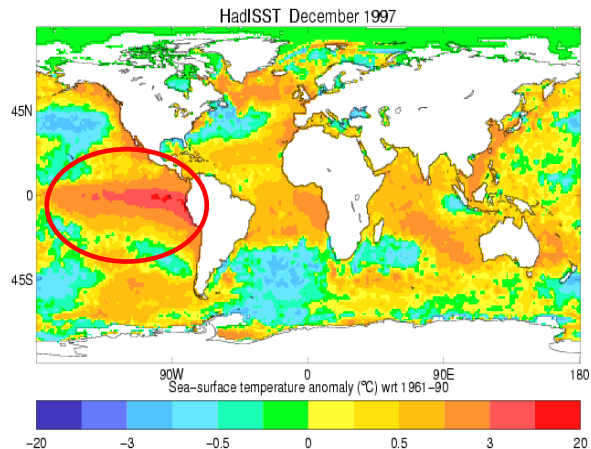
Climate drivers, e.g. El Niño / La Niña (ENSO) / Indian Ocean Dipole (IOD) underly the most predictable part of the variability - but they **do not fully** determine the season outcome

Unpredictable
internal variability
“chaos”

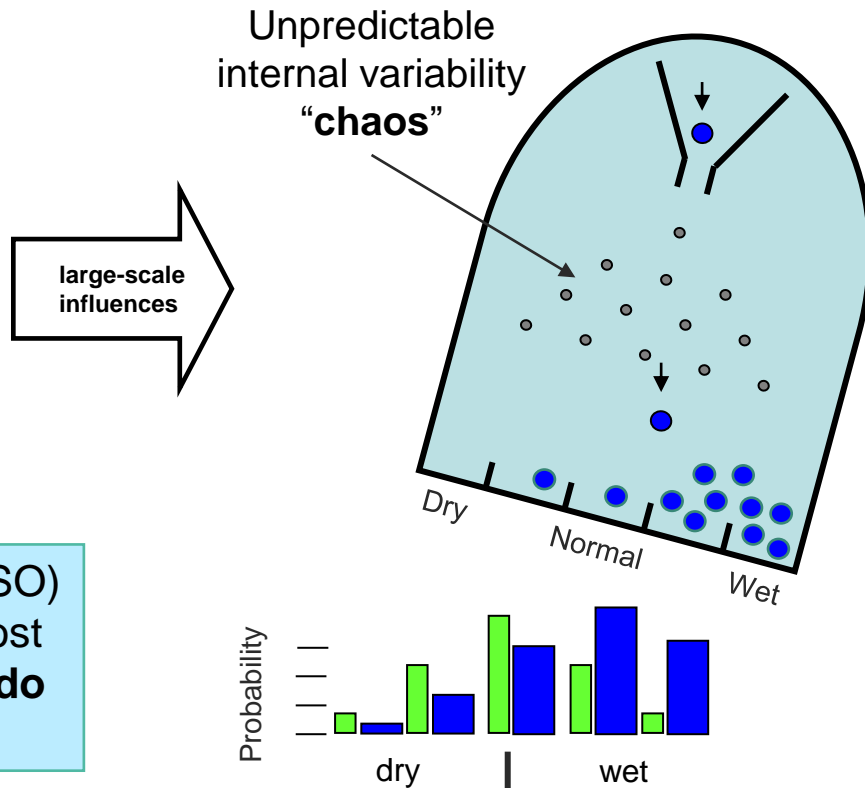


What Drives The Year-to-Year Differences In Rainfall For A Given Season/Region?

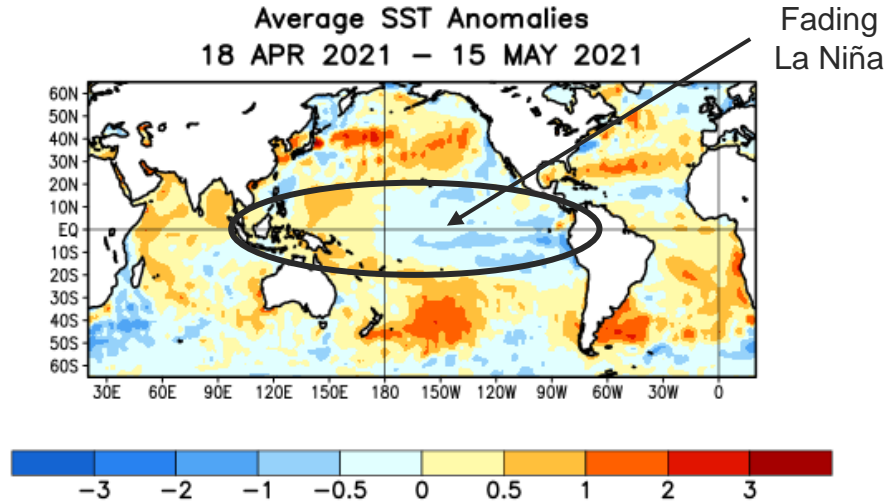
Sea surface temperature (SST) anomalies



Climate drivers, e.g. El Niño / La Niña (ENSO) / Indian Ocean Dipole (IOD) underly the most predictable part of the variability - but they **do not fully** determine the season outcome



Observed Tropical Sea-Surface Temperature (SST) *Anomalies* – May 2021

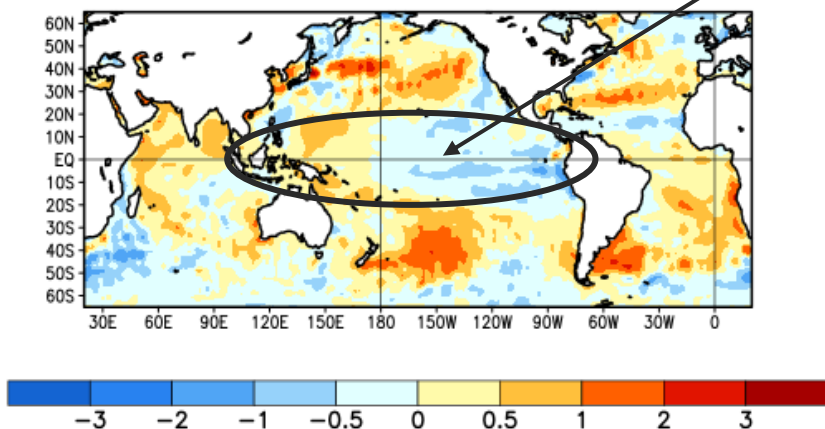


At present, SSTs are **below** average over east pacific and **above** average over western tropical Pacific. Similar east/west pattern in the Indian Ocean.

Observed Tropical Sea-Surface Temperature (SST) Anomalies – May 2021

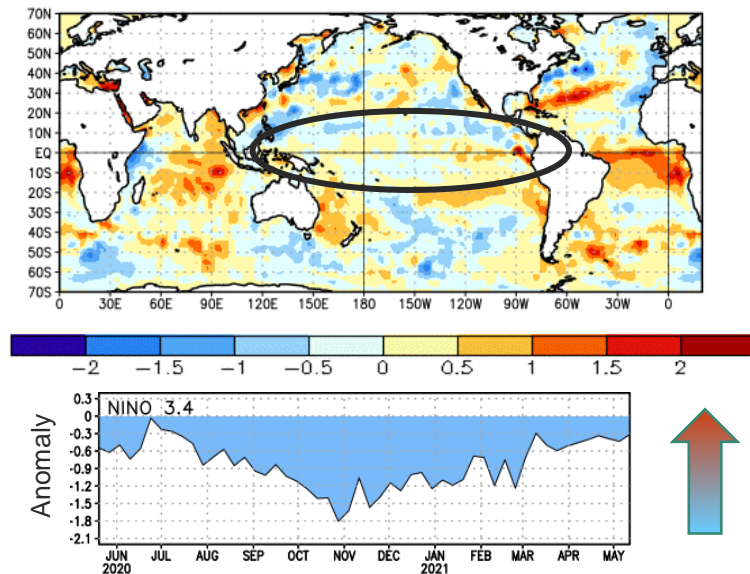
Average SST Anomalies
18 APR 2021 – 15 MAY 2021

Fading
La Niña



At present, SSTs are **below** average over east pacific and **above** average over western tropical Pacific. Similar east/west pattern in the Indian Ocean.

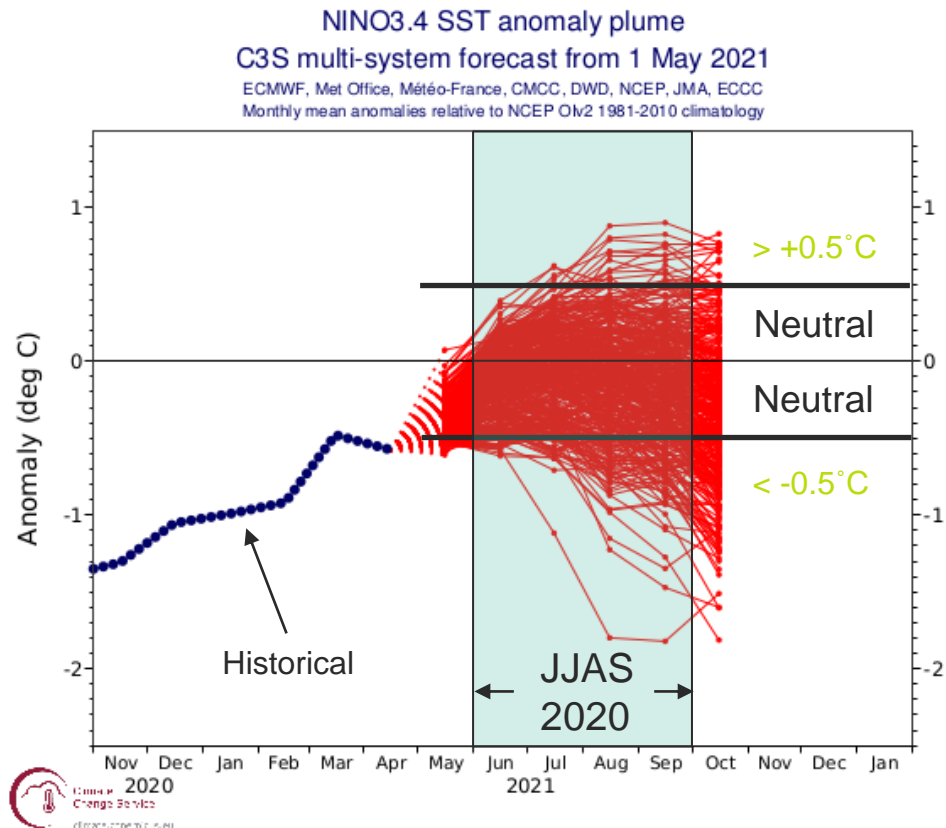
Change in Weekly SST Anoms (°C)
12MAY2021 minus 14APR2021



SSTs are mostly **warming** across the tropical pacific. Strong **warming** in the east Indian Ocean.

NINO3.4 SST:

- Majority of models show warming from April conditions
- There are **very high** chances of ENSO Neutral conditions continuing over JJAS.
- Neutral ENSO means **no strong preference** in JJAS for above/below rainfall - most models concur

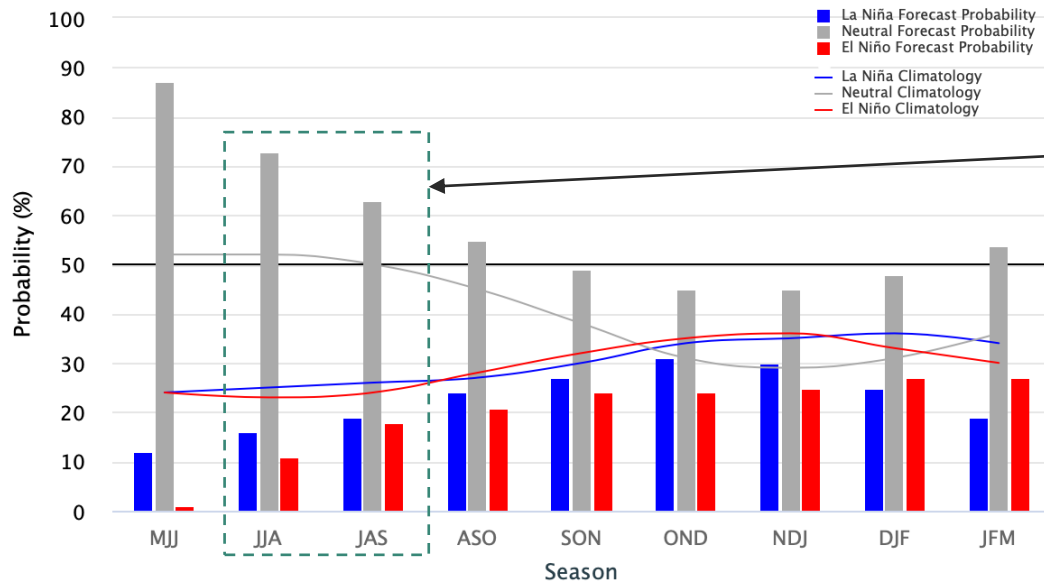


CPC/IRI Predicted Probabilities Of Neutral, El Niño and La Niña (May issue)

Mid-May 2021 IRI/CPC Model-Based Probabilistic ENSO Forecasts

ENSO state based on NINO3.4 SST Anomaly

Neutral ENSO: -0.5°C to 0.5°C



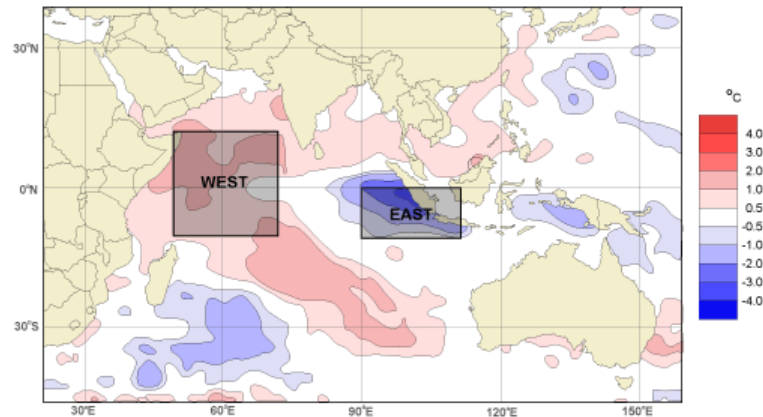
Neutral ENSO
Most Likely

Neutral ENSO: ~ 62-72% chance; La Niña 15-20% chance
Further outlook: chances of La Niña continue to increase towards Short-Rains

The Indian Ocean exhibits east–west sea surface temperature fluctuations on interannual timescales.

This variability is monitored using the Indian Ocean Dipole Index (IOD): this is calculated as the average SST anomaly in **West region** minus that in **East region** (see figure)

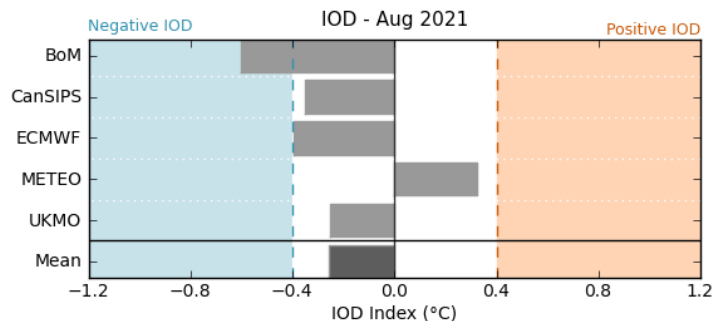
Expected to have a **weak influence for JJAS**.



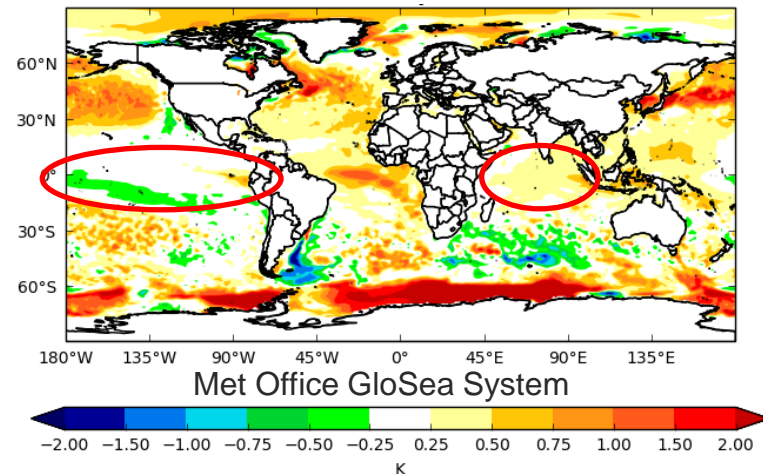
Example SST anomaly during
November 1997 at the height
of the 1997 positive IOD event

Signals From Pacific And Indian Ocean: GPC – Exeter & Other Models

SST anomaly prediction JAS 2021 – from April



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IOD: Most models in agreement for **neutral** conditions.

ENSO: Most models in agreement for **neutral** conditions.

Summary

- **Continued evidence of global warming:** 2020 was second warmest on record and last decade has been the warmest on record.
- **ENSO neutral** conditions are present, tropical Pacific SSTs are warming slightly, and model predict **ENSO neutral conditions to maintain** over JJAS – however increasing chances of return of La Niña by end of the season
 - ➡ ENSO Neutral typically signifies **no preference** for above/below average rainfall
- The IOD index is currently **neutral**, and is expected to **remain neutral** throughout JJAS
 - ➡ Little influence on JJAS so **no preference** for above/below average rainfall
- I have described the expected climate influences on the upcoming season – next talk will present the results of detailed processing of the GPC model data by ICPAC and NMHS representatives in the generation of the **consolidated forecast** for the region.

Thank You - Asante - Ameseginalehu
Merci - اشكر - Mahadsanid - Urakoze