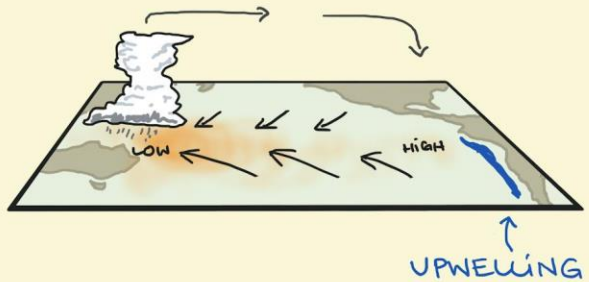
EL NIÑO BASICS

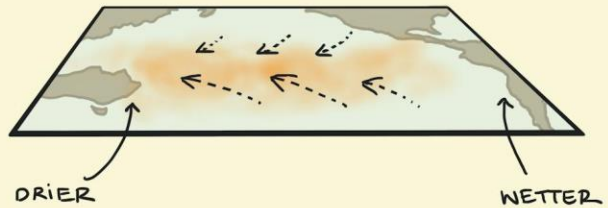
THE 3 PHASES OF THE EL NIÑO-SOUTHERN OSCILLATION

NEUTRAL



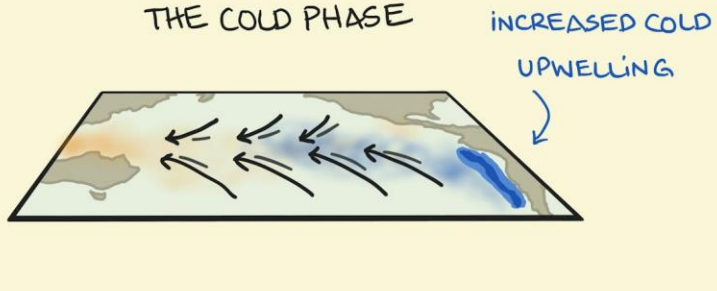
EL NIÑO

THE WARM PHASE



LA NIÑA

THE COLD PHASE

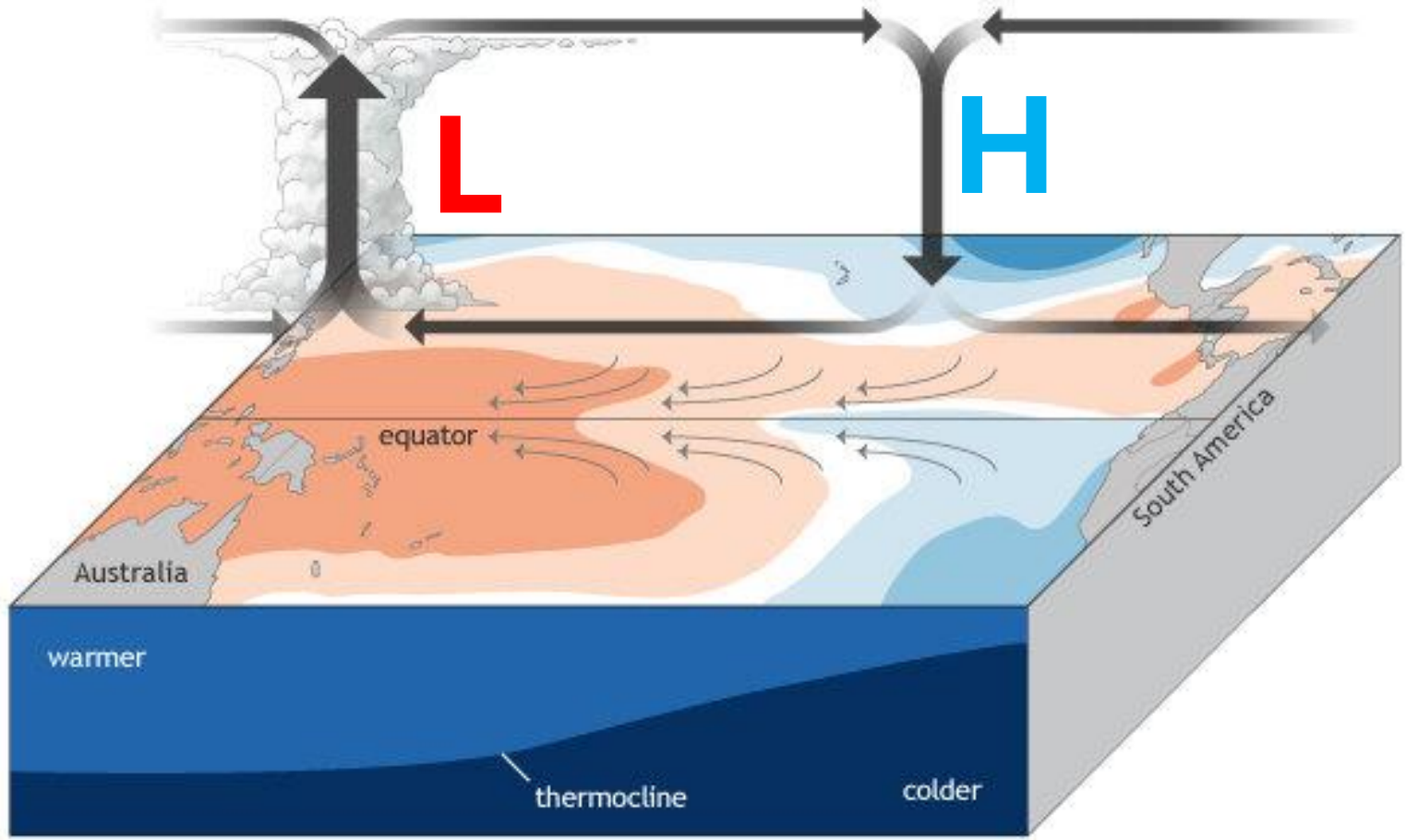


TRADE WINDS	Blow west	Weaken or reverse	Strengthen
WARM SURFACE WATER	Pushed west	Shifts east	Pushed further west
UPWELLING	Cool, nutrient-rich water in the east	Slows in the east, nutrients decline	intensifies in the east, ocean temps drop
RAINFALL	Typical patterns hold	increases in the east, drops in the west	increases in the west, drier in the east

sketchplanations

Atmosphere-ocean feedbacks during El Niño-Southern Oscillation

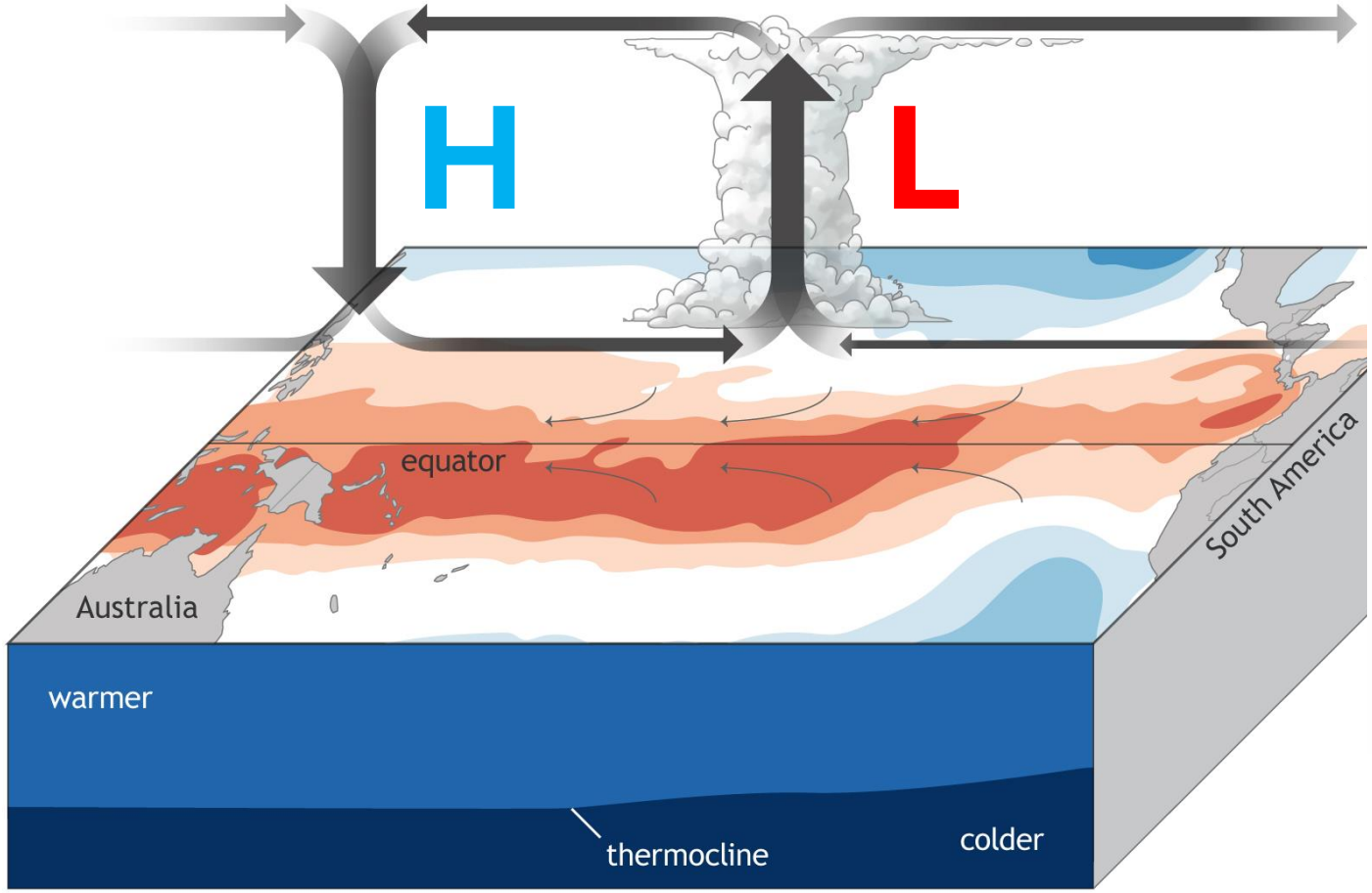
Neutral

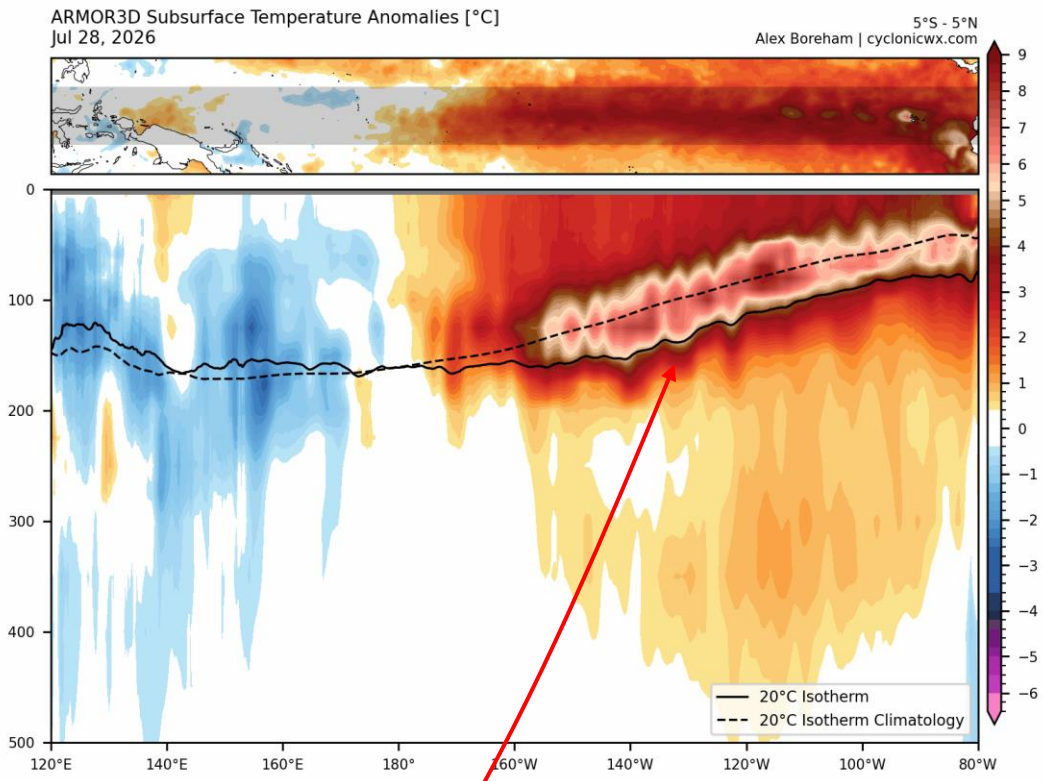


NOAA Climate.gov

Atmosphere-ocean feedbacks during El Niño-Southern Oscillation

El Niño



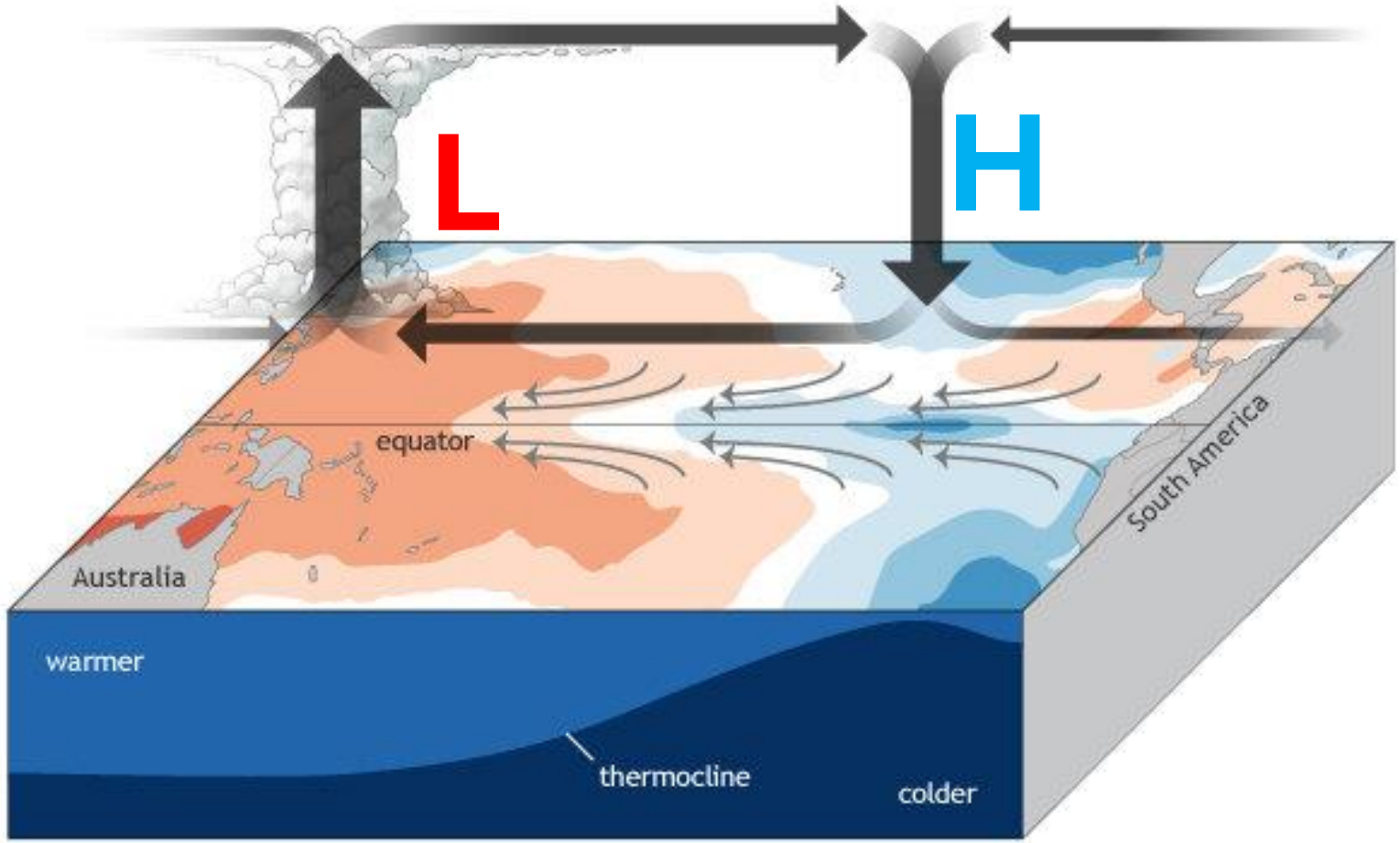


NOAA Climate.gov

Kelvin Waves are slow-moving (~10 mph) ”waves” which move west to east along the equator. They’re triggered by wind stress changes, and transport warmer water west → east, raising and depressing the “thermocline” – a sharp sub-surface gradient in temperature

Atmosphere-ocean feedbacks during El Niño-Southern Oscillation

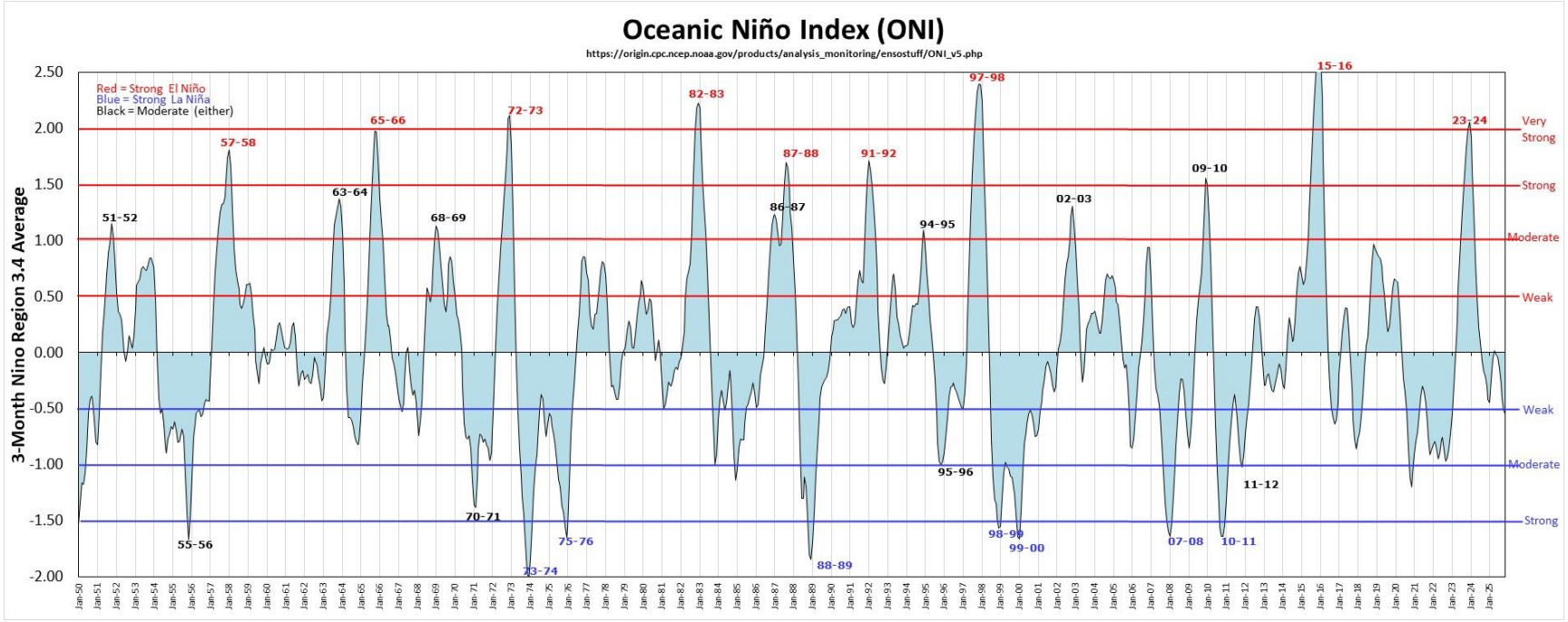
La Niña

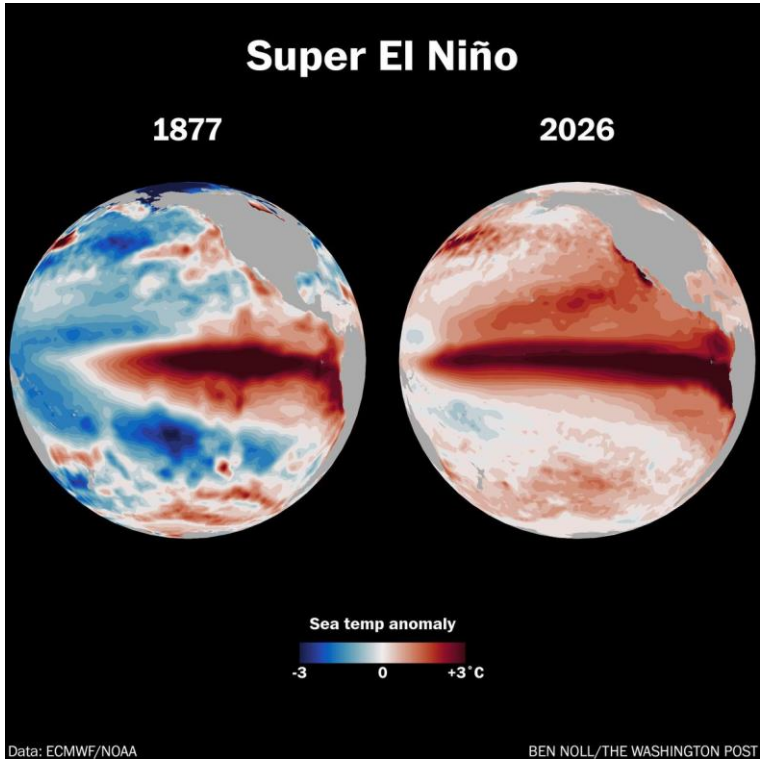


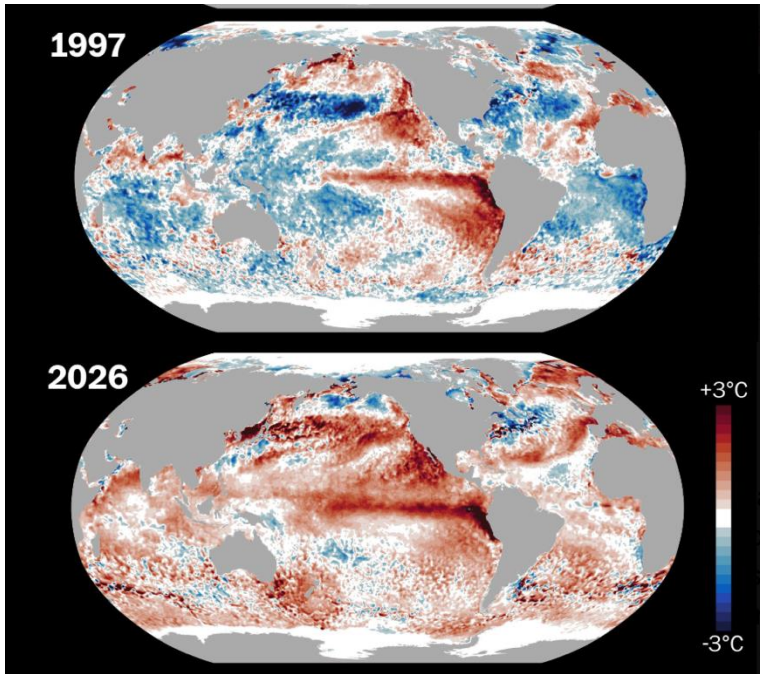
NOAA Climate.gov

History of “Super-Ninos”

- 1877-1878 | Indian famine, Chinese famine, Grande Seca (“Great Drought”) in Brazil
  - Strongest El-Nino on record; 2026-2027 will give this a run for its money
- 1997-1998 | Severe droughts to Indonesia and Australia
  - Estimated $5.7T within the five years after the event
- 1982-1983 | Droughts in Africa, Indonesia, Australia
- 2014-2016
- 2023-2024





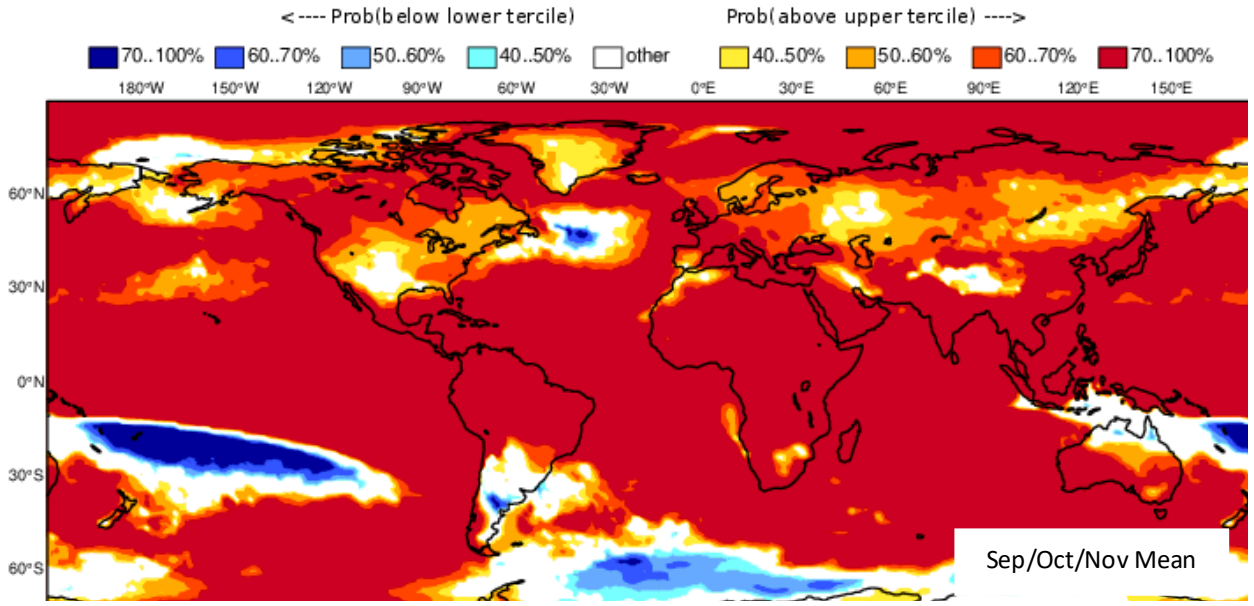


ECMWF Seasonal Forecast

Prob(most likely category of 2m temperature)

Forecast start is 01/08/26, climate period is 1993-2016

Ensemble size = 51, climate size = 600

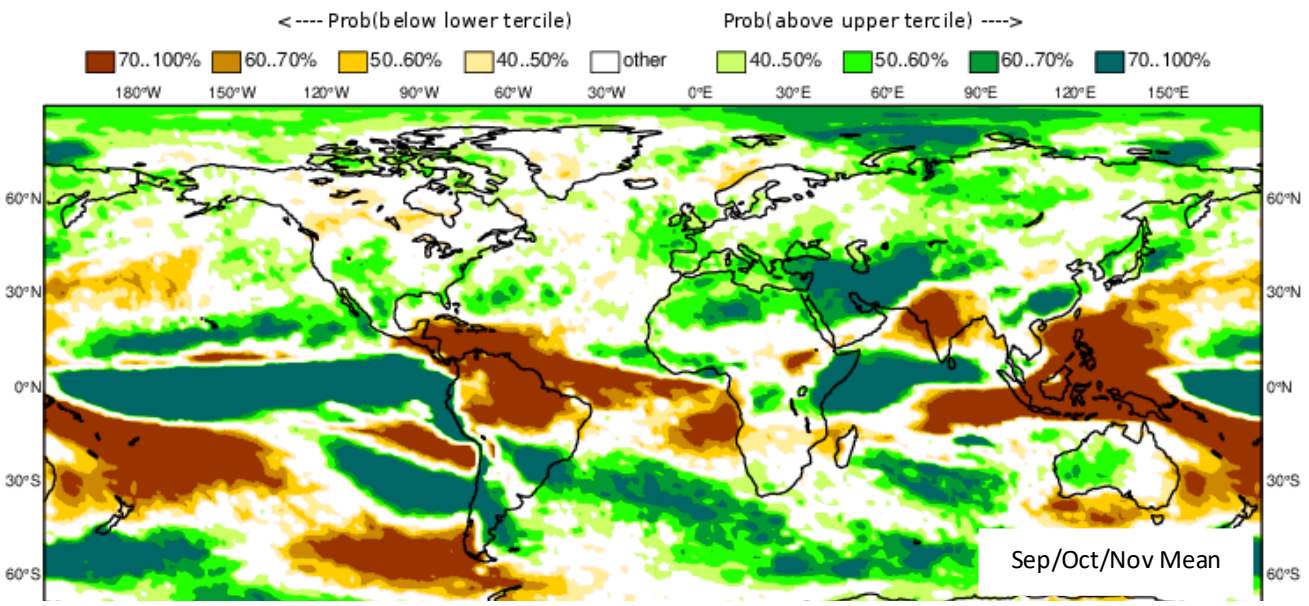


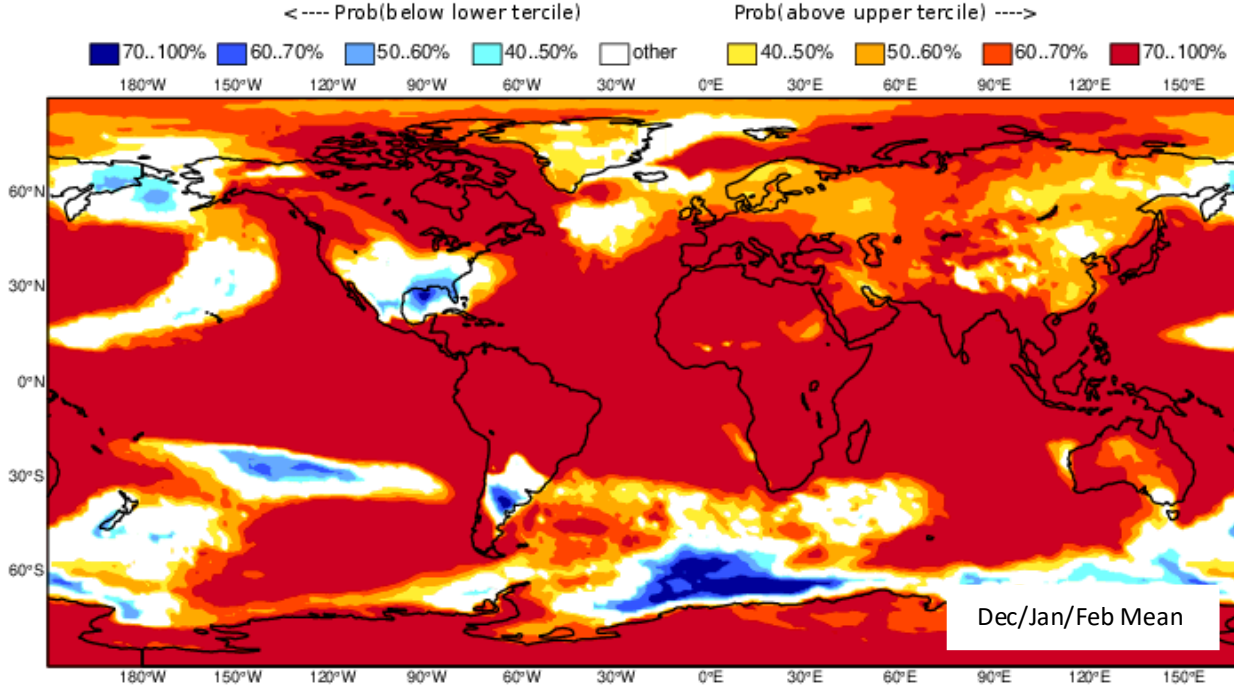
ECMWF Seasonal Forecast

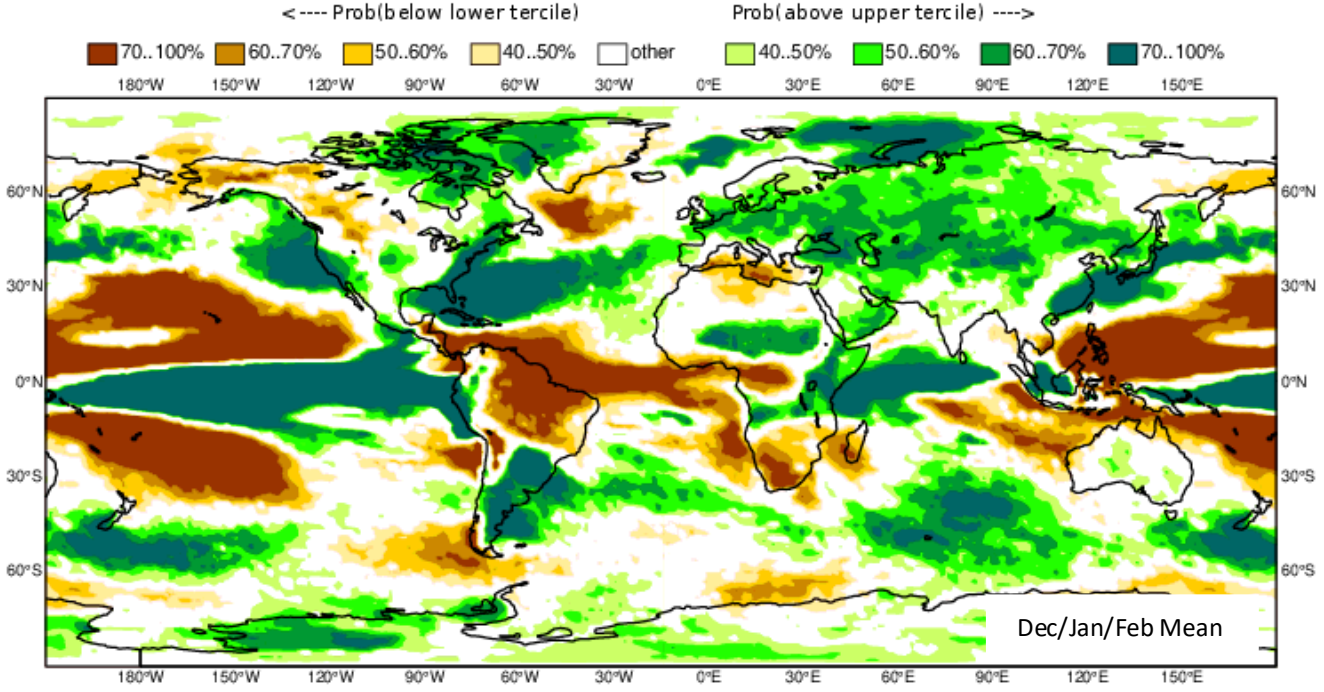
Prob(most likely category of precipitation)

Forecast start is 01/08/26, climate period is 1993-2016

Ensemble size = 51, climate size = 600

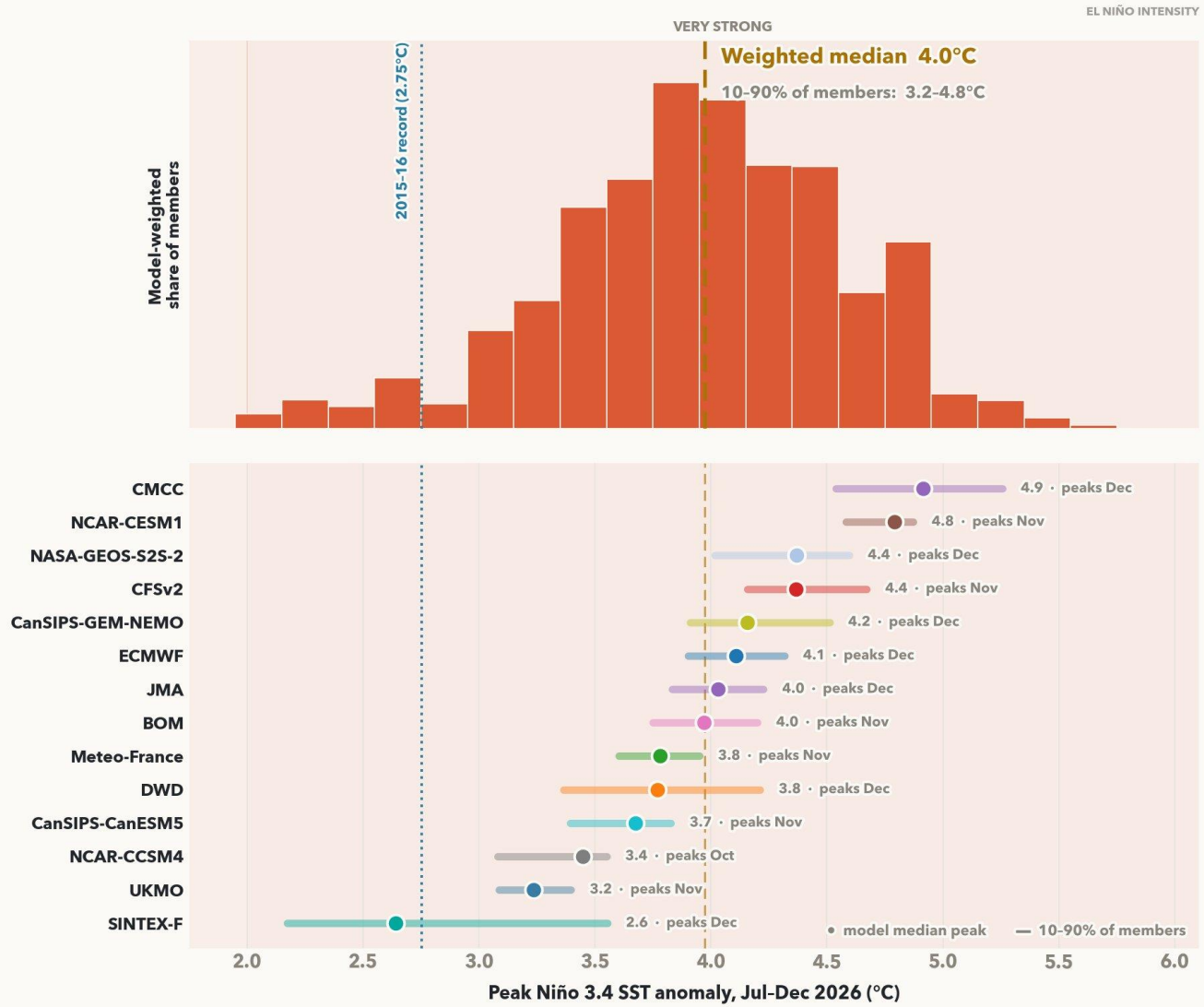






Peak 2026 Niño 3.4 forecast

All 14 seasonal forecast models (674 ensemble members) project a very strong event at its 2026 peak; the multi-model median peak would far exceed the strongest event on record.

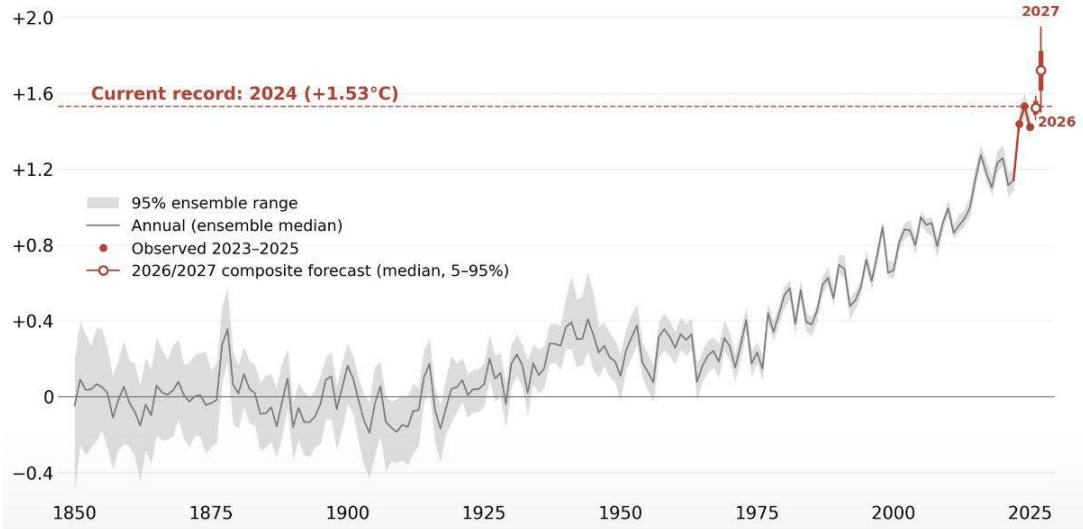


Peak = each member's Jul-Dec 2026 maximum · latest initializations (August 2026, except SINTEX-F: July) · members weighted so every model counts equally

Data: NOAA CPC (NMME, CFSv2) · Copernicus C3S · ECCC CanSIPS · JAMSTEC SINTEX-F Chart: Zeke Hausfather · Aug 10, 2026

Five straight years warmer than anything observed before 2023

Global mean surface temperature relative to preindustrial (1850–1900) · °C



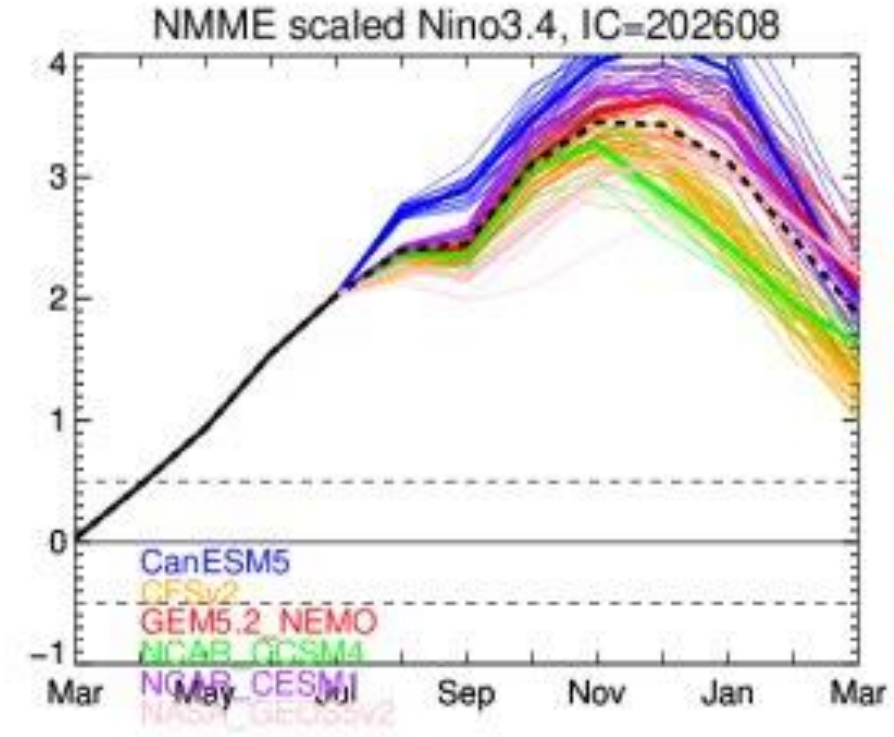
Data: GMST ensemble (10,000 members, accessed August 2026); members aligned on 1981–2010 and shifted to preindustrial by the mean warming (+0.69°C).
Forecasts: composite forecast across six datasets (trend + multi-model El Niño ensemble), normalized to the ensemble scale (+0.02°C). Chart: The Climate Brink

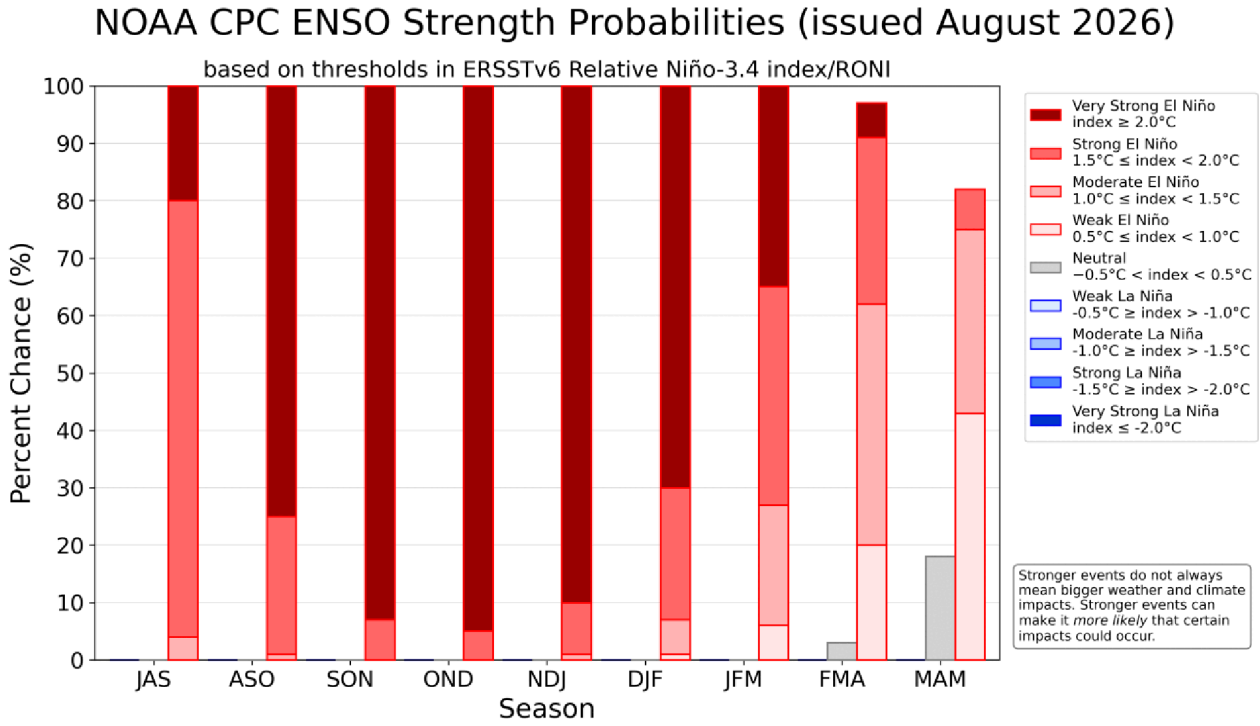
Indian Monsoon is weaker than normal, leading to intensifying drought in sugar and rice regions

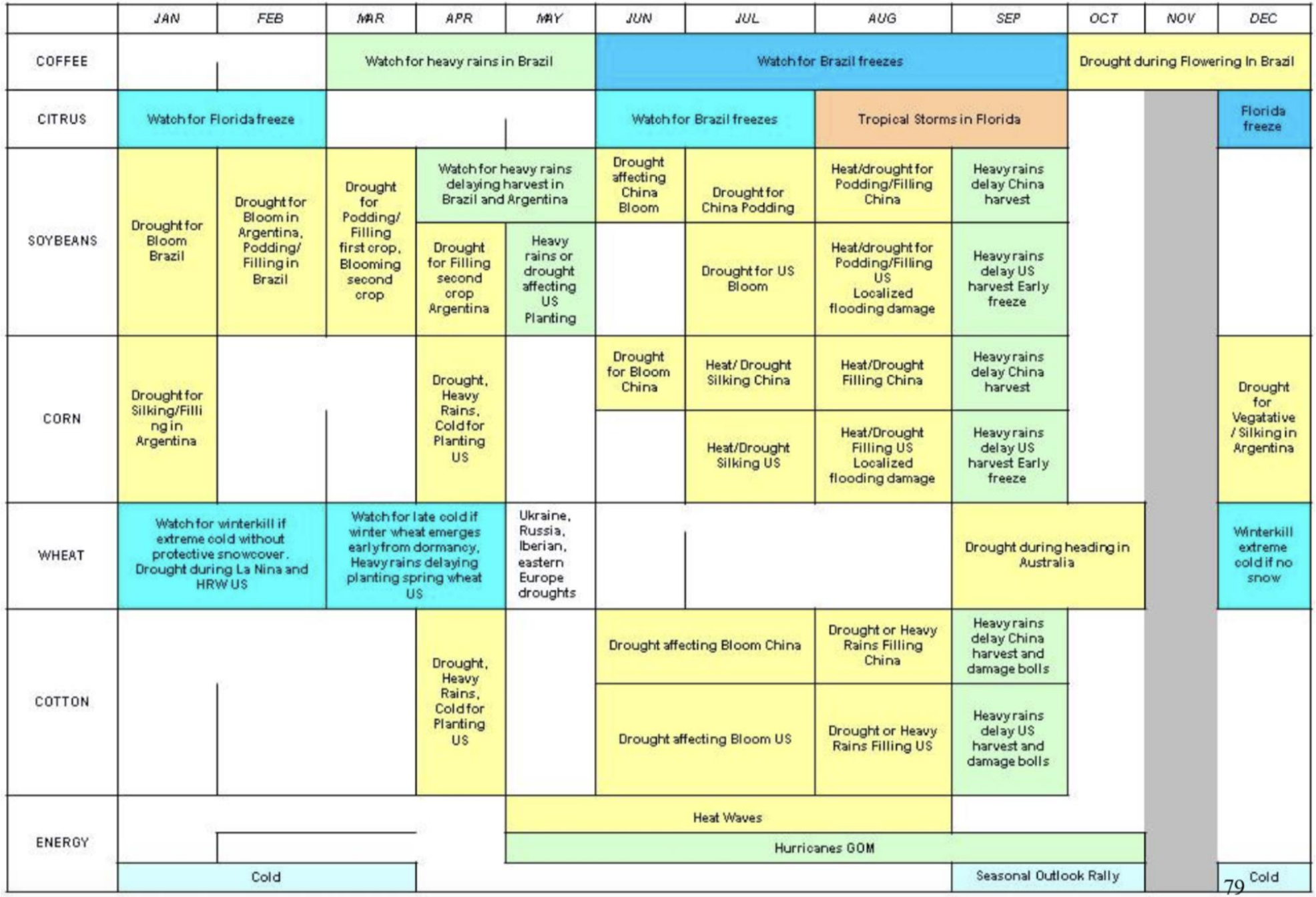
United States: Watch in winter for a brief but sharp hard freeze to the citrus crop

Cocoa in Africa will suffer due to harmattan winds stressing production (expect this to be worse than the 2014-2016 El-Nino event

El-Nino to peak in late fall / early winter → La Nina to establish itself for next summer (timing still slightly uncertain)






JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
COFFEE
Watch for heavy rains in Brazil
Watch for Brazil freezes
Drought during Flowering In Brazil
CITRUS
Watch for Florida freeze
Watch for Brazil freezes
Tropical Storms in Florida
Florida freeze
SOYBEANS
Drought for Bloom Brazil
Drought for Bloom in Argentina, Podding/ Filling in Brazil
Drought for Podding/ Filling first crop, Blooming second crop
Watch for heavy rains delaying harvest in Brazil and Argentina
Drought for Filling second crop Argentina
Heavy rains or drought affecting US Planting
Drought affecting China Bloom
Drought for China Podding
Heat/drought for Podding/Filling China
Heavy rains delay China harvest
Drought for US Bloom
Heat/drought for Podding/Filling US Localized flooding damage
Heavy rains delay US harvest Early freeze
CORN
Drought for Silking/Filling in Argentina
Drought, Heavy Rains, Cold for Planting US
Drought for Bloom China
Heat/ Drought Silking China
Heat/Drought Filling China
Heavy rains delay China harvest
Heat/Drought Silking US
Heat/Drought Filling US Localized flooding damage
Heavy rains delay US harvest Early freeze
Drought for Vegatative / Silking in Argentina
WHEAT
Watch for winterkill if extreme cold without protective snowcover. Drought during La Nina and HRW US
Watch for late cold if winter wheat emerges early from dormancy. Heavy rains delaying planting spring wheat US
Ukraine, Russia, Iberian, eastern Europe droughts
Drought during heading in Australia
Winterkill extreme cold if no snow
COTTON
Drought, Heavy Rains, Cold for Planting US
Drought affecting Bloom China
Drought or Heavy Rains Filling China
Heavy rains delay China harvest and damage bolls
Drought affecting Bloom US
Drought or Heavy Rains Filling US
Heavy rains delay US harvest and damage bolls
ENERGY
Heat Waves
Hurricanes GOM
Cold
Seasonal Outlook Rally
Cold