



# NOAA 2021 Updated Atlantic Hurricane Season Outlook

Matthew Rosencrans

NOAA / NWS / NCEP / Climate Prediction Center

Collaboration With

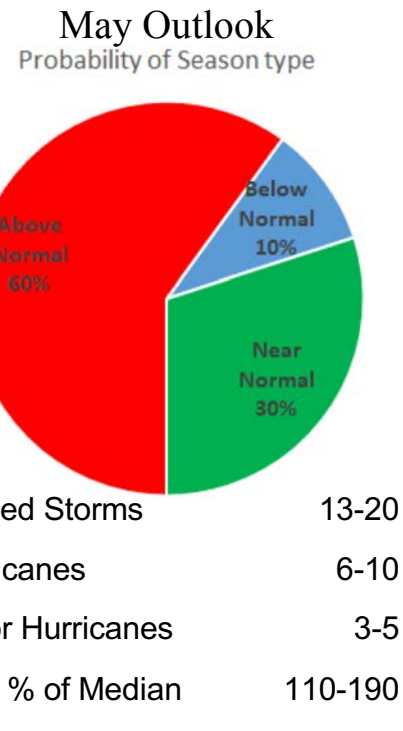
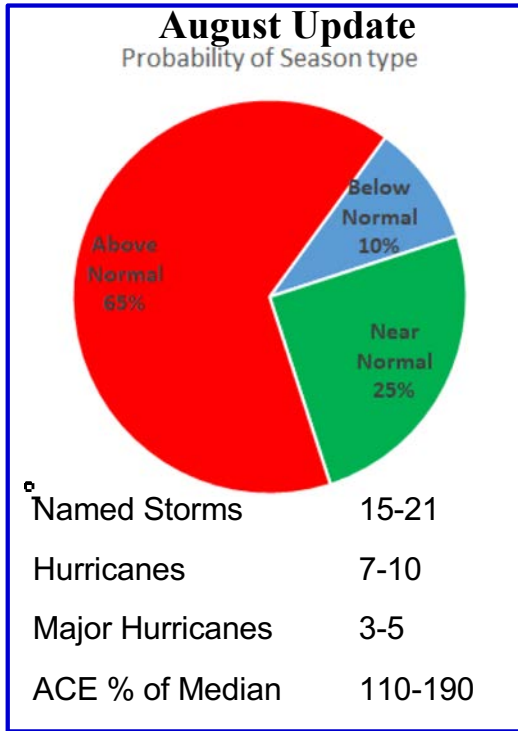
NOAA/ NWS / NCEP / National Hurricane Center

NOAA/ OAR / AOML / Hurricane Research Division



# NOAA's 2021 Atlantic Hurricane Season Outlooks

*Forecasts are for the entire June-November Hurricane Season*



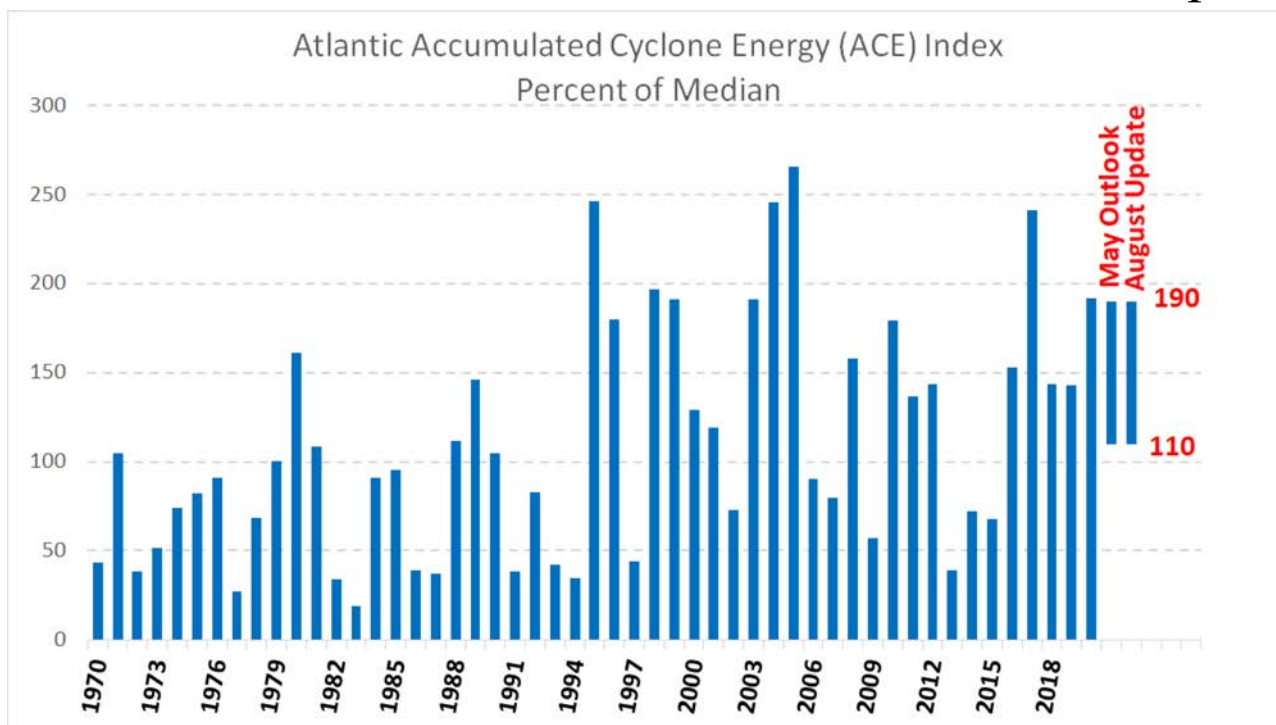
Averages

Named Storms	14
Hurricanes	7
Major Hurricanes	3
% Median ACE	100%

- (Left) An above-normal Atlantic hurricane season is likely (65% chance), equal with the May outlook (Right).
- Predicted ranges are now centered at 18 named storms, 9 hurricanes, and 4 major hurricanes, and remain above the 1991-2020 seasonal averages of 14 NS, 7 H, and 3 MH.



## The 2021 Atlantic Outlooks in a Historical Perspective



- The predicted ACE range of 110% - 190% of the median is largely in the above normal range (>130%) with some overlap into the hyper-active range (>165%)
- The predicted ACE range is now centered at 150% of median.

• *ACE measures overall season strength by accounting for the combined intensity and duration of tropical storms and hurricanes.*



# 2021 Atlantic Tropical Cyclone Names

~~Ana~~  
~~Bill~~  
Claudette  
~~Danny~~  
~~Elsa~~  
~~Fred~~  
~~Grace~~

~~Henri~~  
~~Ida~~  
~~Julian~~  
~~Kate~~  
Larry  
Mindy  
Nicholas

Odette  
Peter  
Rose  
Sam  
Teresa  
Victor  
Wanda

15

Names provided by the World Meteorological Organization

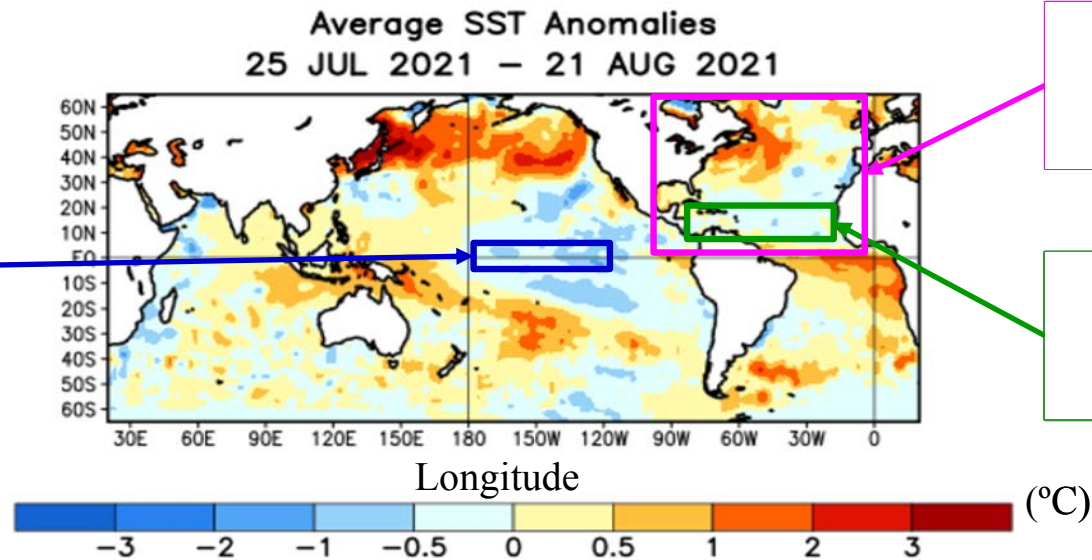


## Take-Away Messages from Updated 2021 Atlantic Hurricane Season Outlook

1. The updated outlook is in line with the pre-season outlook issued in May, but with a slight increase in the predicted range of named storms and hurricanes due to the fast start of the season. The updated 2021 Atlantic hurricane season outlook is scheduled to be released on Wednesday August 4th at 11:00 am EDT
1. For the entire season, expect **15-21 Named Storms (NS)**, **7-10 Hurricanes (H)**, **3-5 Major Hurricanes (MH)**. These ranges are centered above the 1991-2010 averages of 14 NS, 7 H, and 3 MH.
1. There have been 11 named storms, 4 hurricanes, and 1 major hurricane to date. Expect an additional 5-9 named storms and 3-6 hurricanes.
1. Reasoning behind the outlook:
  - Atmospheric and oceanic conditions are **generally favorable**, but **some mixed signals**. One climate factor is the warm phase of Atlantic Multi-decadal Oscillation (AMO).
  - **Potential La Niña** development later in the season. Ocean temperatures and winds support La Niña (+ later)
  - A robust West African Monsoon (+)
  - **Cooler Atlantic sea-surface temperatures (-)** ----- cooler than the rest of the tropics. (-)
  - Model guidance is almost the same as that from May, but we had a fast start
    - All years with a hurricane in the deep tropics in July have been active. (+)



## Recent Observed Sea-Surface Temperature (SST) Anomalies



ENSO- neutral  
(but lean cold)

SSTs have been slightly below average in the main development region. This has been a persistent feature in the SST pattern for a couple of months.

AMO is still positive (0.149) (2020 value was 0.260)

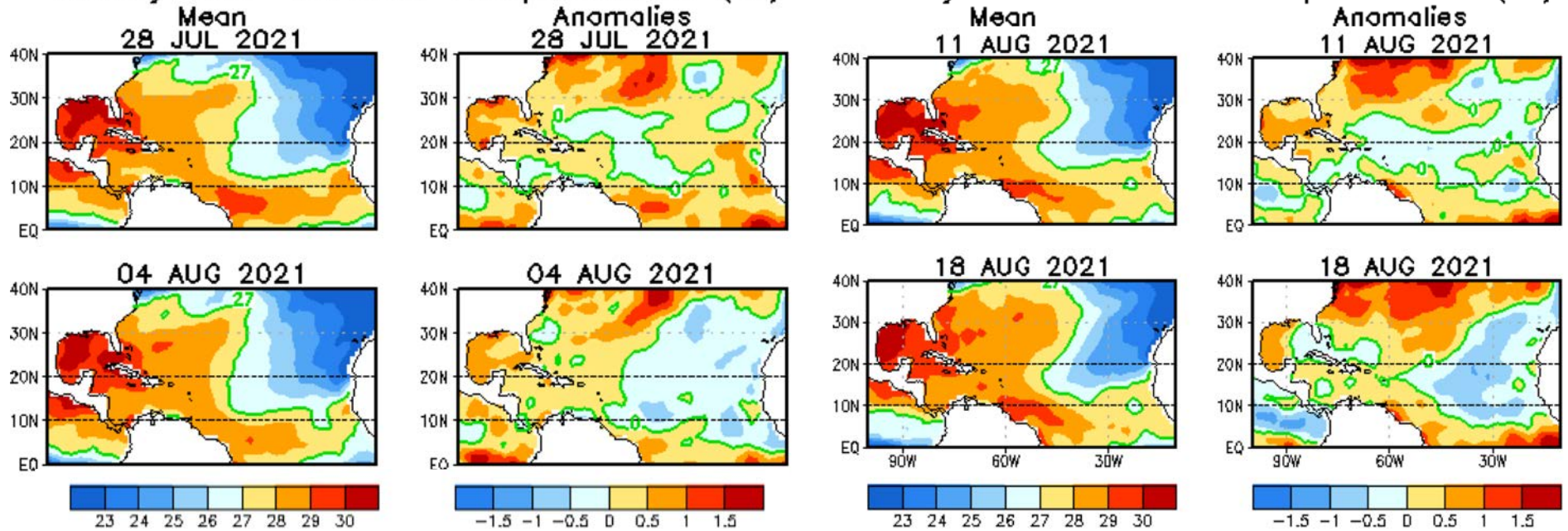
ENSO-neutral conditions (no El Niño or La Niña) are present (Blue box), but with below-average SSTs across the eastern half of the equatorial Pacific Ocean. At depth, temperatures are also below-average.



## Recent Observed Sea-Surface Temperature (SST) Anomalies

### Weekly Sea-Surface Temperatures (°C)

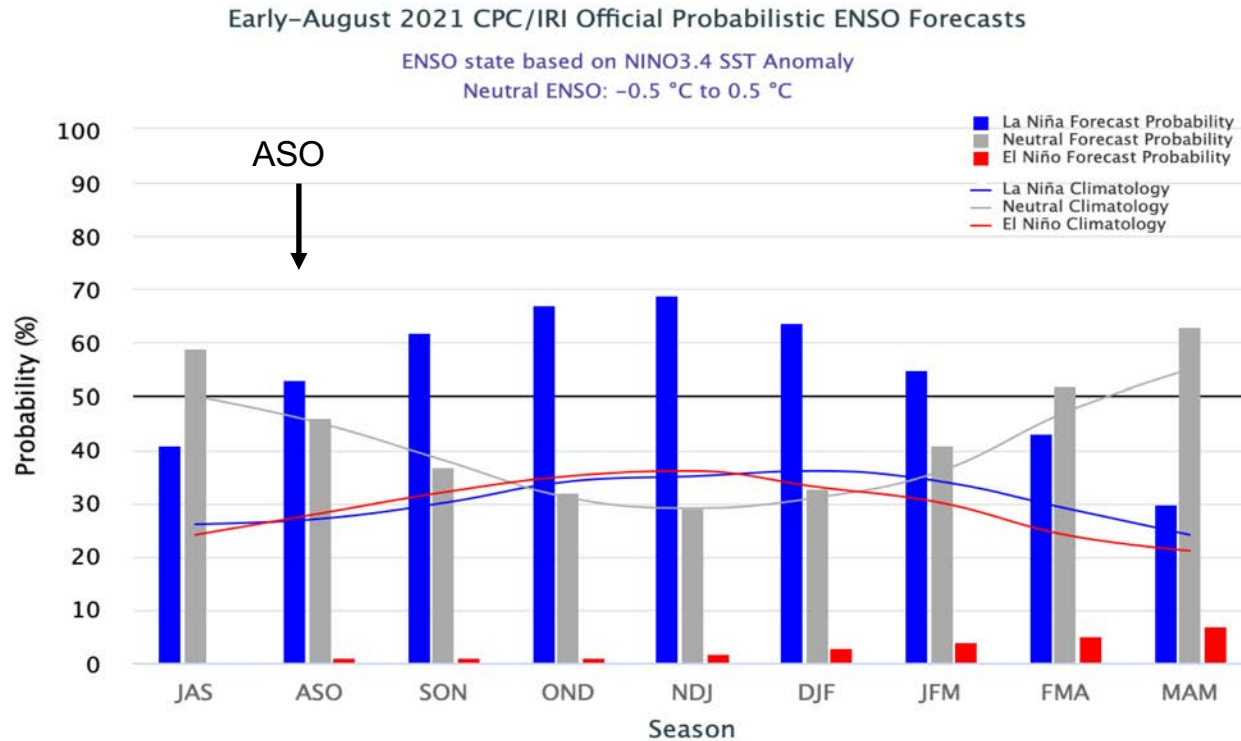
### Weekly Sea-Surface Temperatures (°C)



SSTs in the Atlantic have been variable over the past month. Generally cooler than normal in the eastern Atlantic, transitioning to above normal in the western Atlantic..



# CPC/ IRI ENSO Probability Forecast (issued Aug 12th)



AUG forecast for ASO - 53%

JUL forecast for ASO - 45%

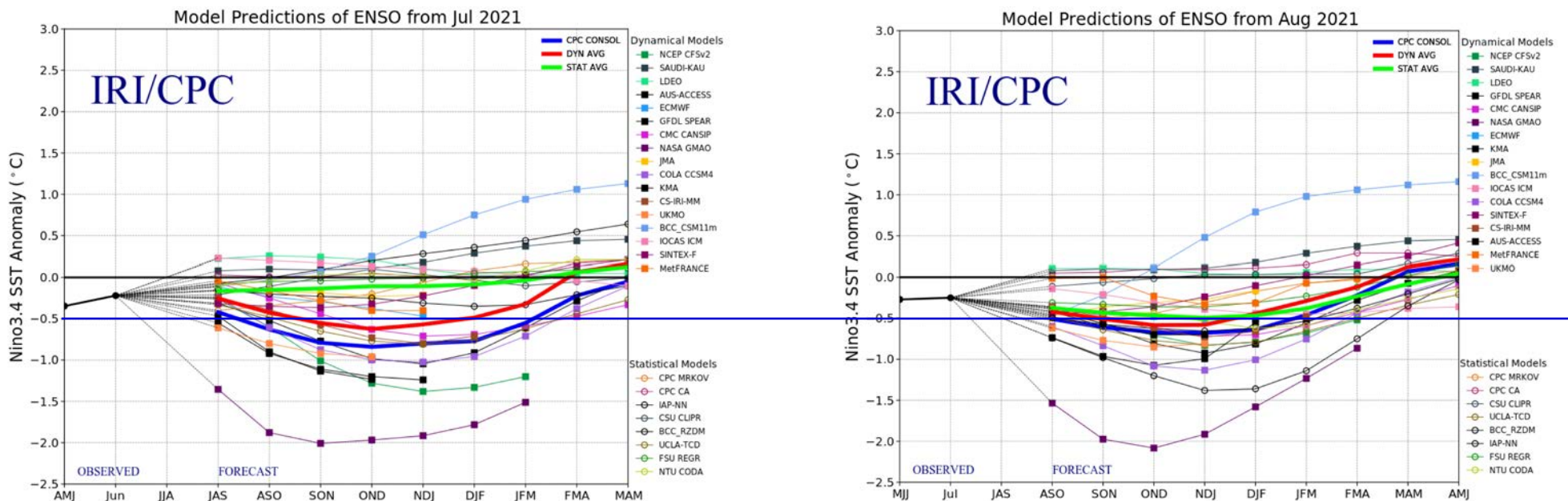
Caption: Seasonal forecast probabilities for El Niño (red bars), ENSO-neutral (grey bars), and La Niña (blue bars). The climatological probabilities for these phases of ENSO are indicated by red, grey, and blue lines, respectively. Black dashed line indicates the 50% threshold.

The official CPC/ IRI forecast issued in early Aug indicates ENSO neutral as most likely through JAS 2021. Odds for La Niña during ASO have increased since the initial outlook. Beginning in ASO 2021, the outlook indicates a 50+% chance of La Niña through 2021.





## Model SST Anomaly Forecasts for Niño-3.4 Region



Caption: Model predicted seasonal SST anomalies (°C) for the equatorial Pacific Ocean Niño-3.4 region (see inset, between 170°W-120°W, 5°N-5°S). NOAA uses the Niño 3.4 region to classify ENSO events. Thin colored lines correspond to the models at right. Thick red (green, blue) line indicates the dynamical (statistical, CPC consolidation) model average.

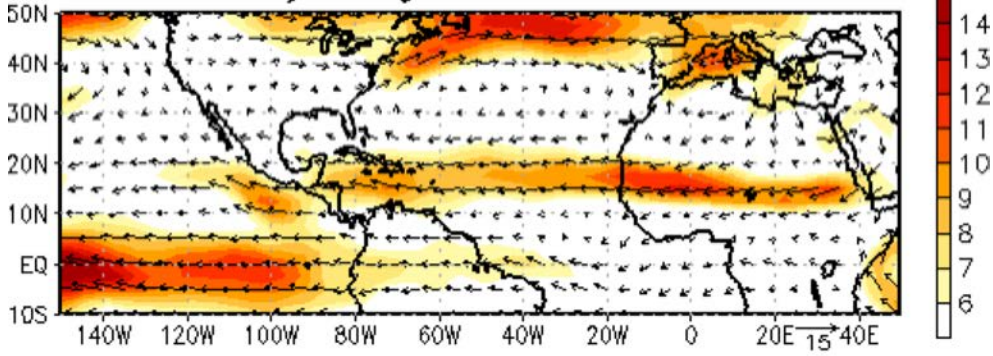
Both the dynamical model average (thick red line) and CPC CON (thick blue line) predict La Niña to develop during the Aug-Oct. or Sep.-Nov time frame. Statistical models (thick green line) predict ENSO Neutral but are colder than last month.



## Circulation over the Atlantic

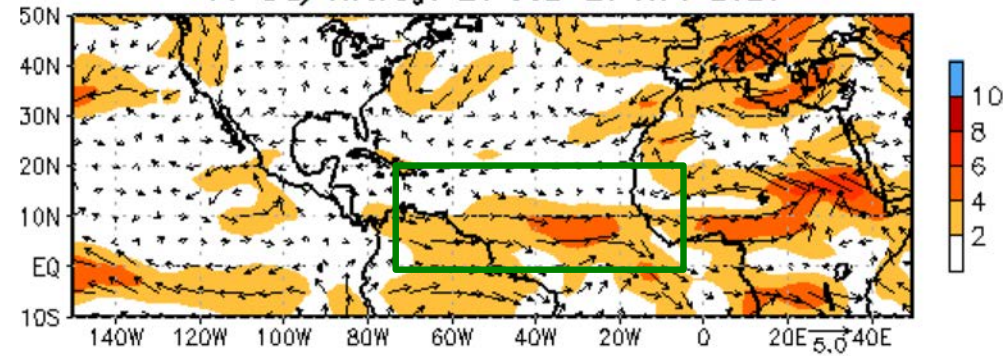
700-hPa Wind Speed (shading) and Vector

31-Day Average 26 JUL-25 AUG 2021



700-hPa Anomalous Wind Speed (shading) and Vector

31-Day Average 26 JUL-25 AUG 2021

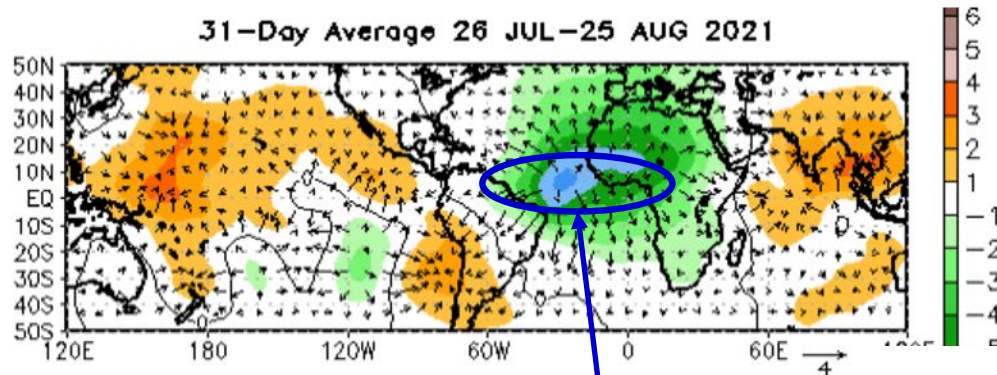


(Right) Low-level winds anomalies over the Atlantic show a northward displacement in the African Easterly Jet (favorable for more activity).



## Enhanced West African Monsoon

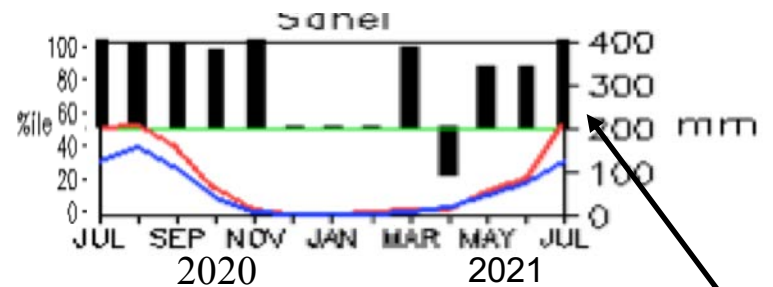
200-hPa: Anomalous Velocity Potential and Divergent Wind Vectors



An enhanced West African monsoon system is indicated by a core of negative velocity potential anomalies (Green shading, blue circle) and anomalous upper-level divergence.

This is a key underlying feature of the ongoing Atlantic high-activity era that began in 1995, and is one of the inter-related set of conducive atmospheric conditions now in place.

Observed Monthly Precipitation Totals/Percentiles for the African Sahel

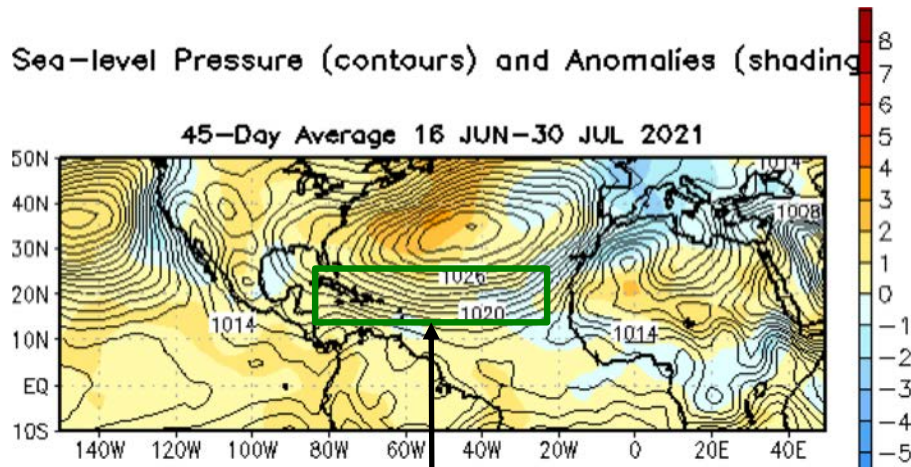


In the African Sahel (i.e., the West African monsoon region) rainfall has been well above average May-Jul, with area-averaged totals above the 80<sup>th</sup> percentile of occurrences. Peak monsoon season is July-September.

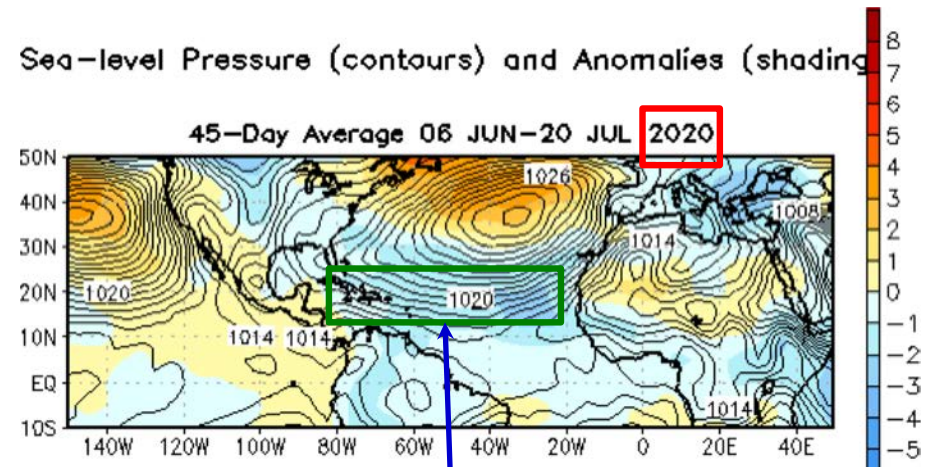




# Sea-level Pressure



Sea-level pressure during 2021 is generally above-average during Jun and July over the tropical Atlantic.



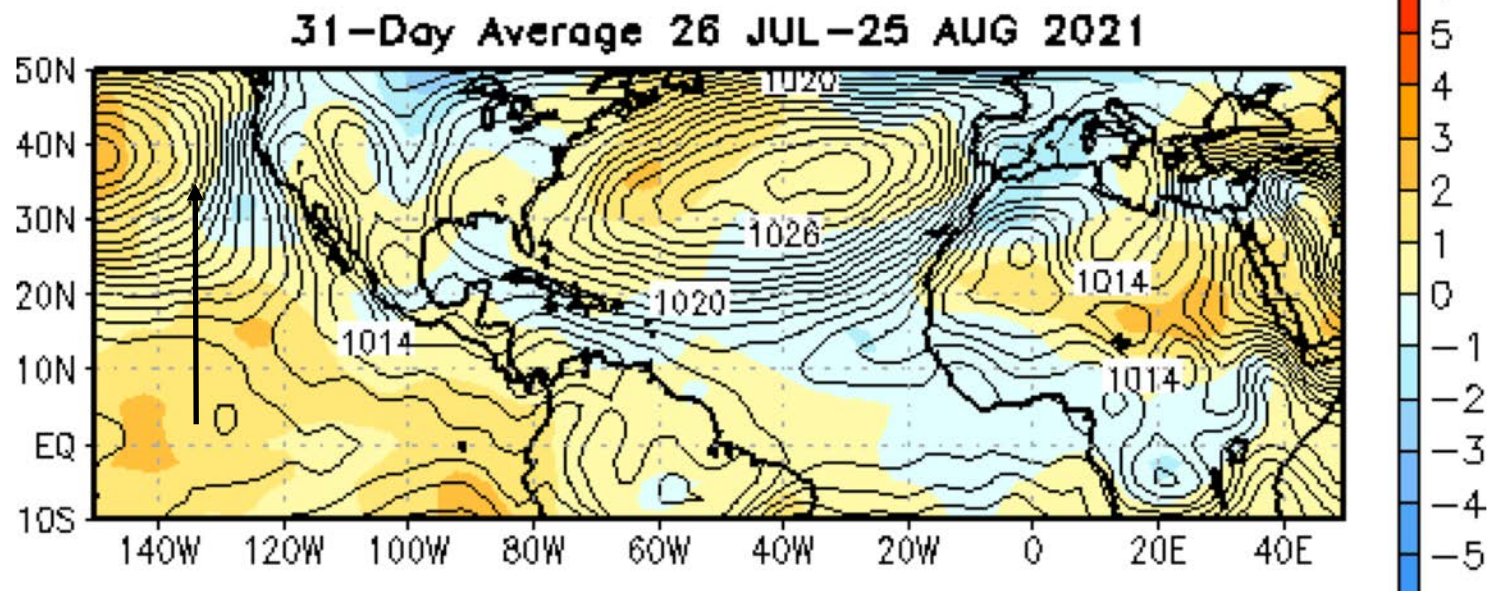
Sea-level pressure during 2020 was well below average during Jun and July over the tropical Atlantic.

(Left) Across the MDR, sea-level pressure has been above average (orange shading) throughout the summer. (Right) Sea-level pressure and anomalies during June and July of 2020, for comparison.



# Sea-level Pressure

Sea-level Pressure (contours) and Anomalies (shading)

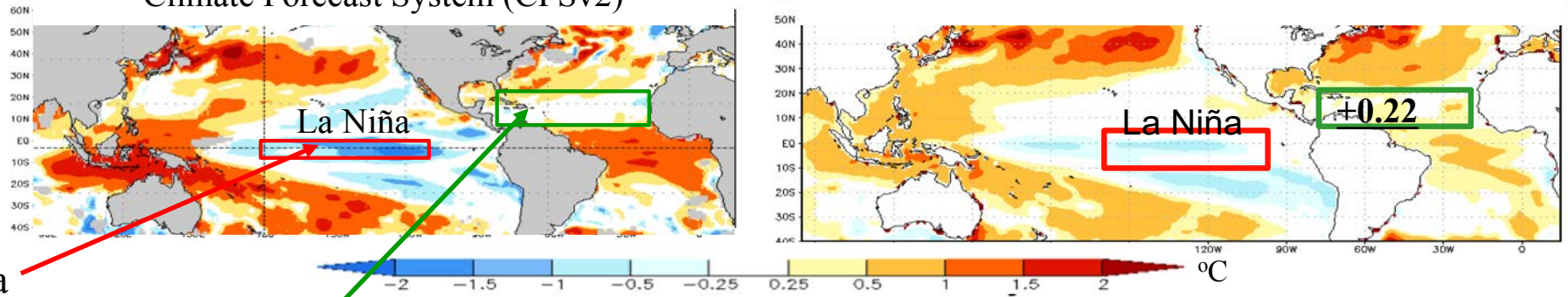


Across the MDR, sea-level pressure has been near average (light blue shading) throughout most of August. For much of July, sea-level pressures were above normal, so this is a change



# Model Predicted Sea Surface Temperature Anomalies for Aug.-Oct. 2021

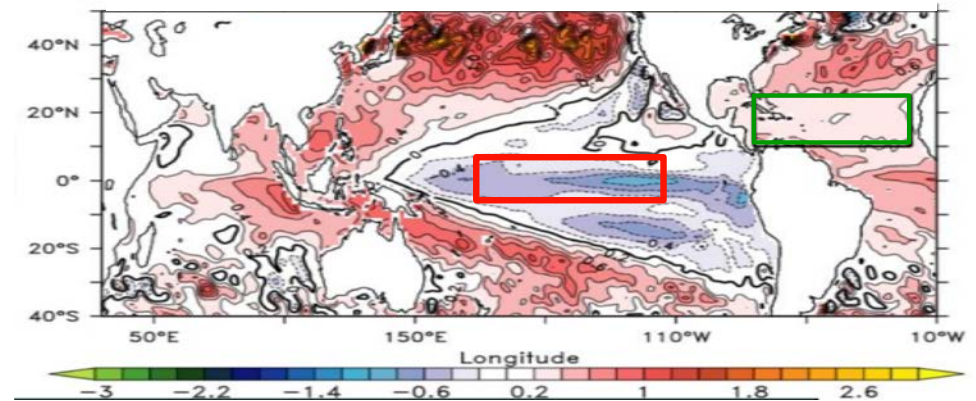
Climate Forecast System (CFSv2)



- La Niña
- Near-average SSTs in MDR

For August-October (ASO) 2021, these models are predicting near to slightly above-average SSTs in the Atlantic MDR (Green box). This would be a change from observed.

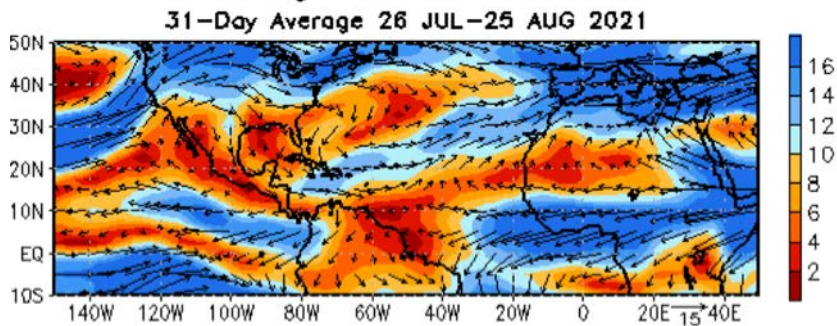
They also highlight a potential La Niña as indicated by below-average SSTs in the Niño 3.4 region (Red box).



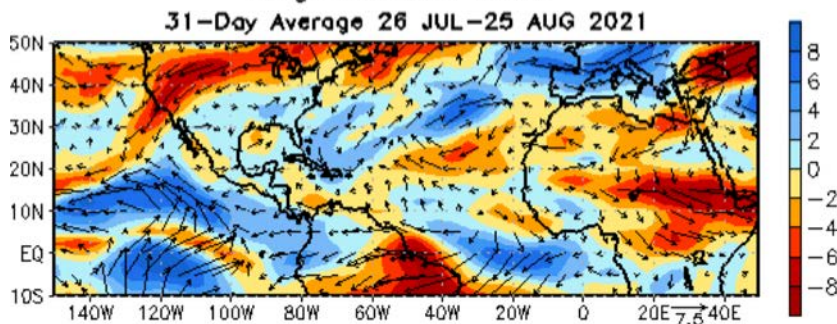


# Observed and Forecast 200-850 hPa vertical wind shear/anomalies

Observed



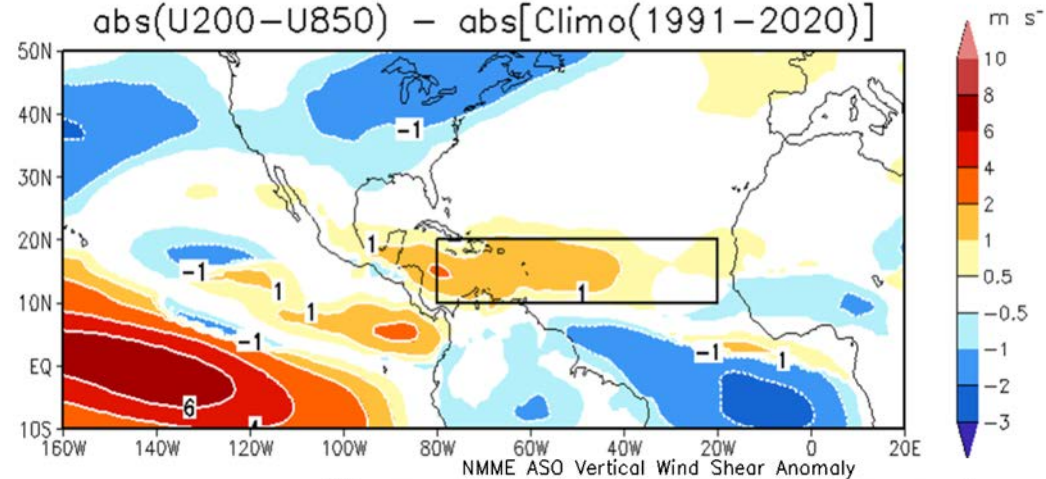
200-850 hPa Anomalous Vertical Wind Shear Magnitude and Vector



200-850 hPa Vertical wind shear magnitude (shading,  $m s^{-1}$ ) and vector; 31-Day average. (Top) Total and (Bottom) Anomalies. Vector

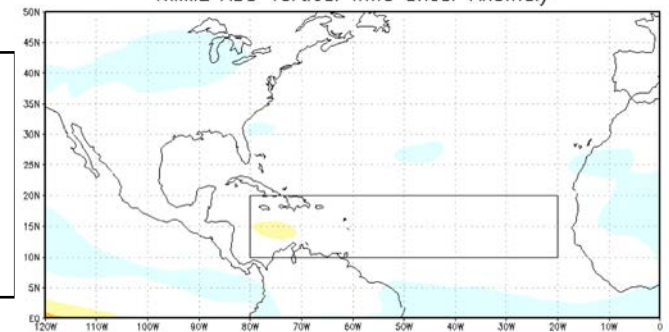
Vertical wind shear has been weaker than average (Bottom) across much of the MDR, though stronger than average of the Caribbean.

$abs(U_{200} - U_{850}) - abs[Climo(1991-2020)]$



CFS LowRes predicts more shear, especially in the western MDR.

NMME predicts closer to average.





## Competing Conditions Predicted For August-October 2021

