2022 Seasonal Hurricane Outlook

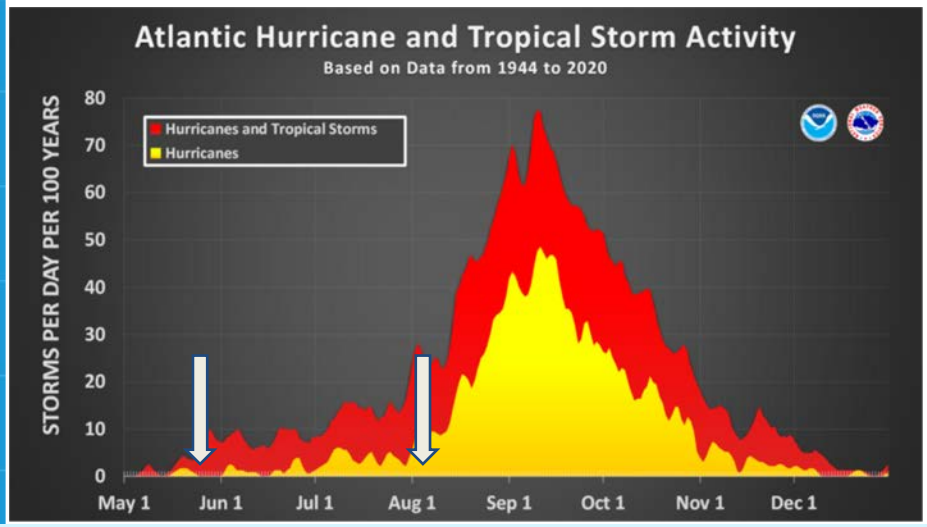
Matthew Rosencrans
NOAA's Lead for the Seasonal Hurricane Outlook

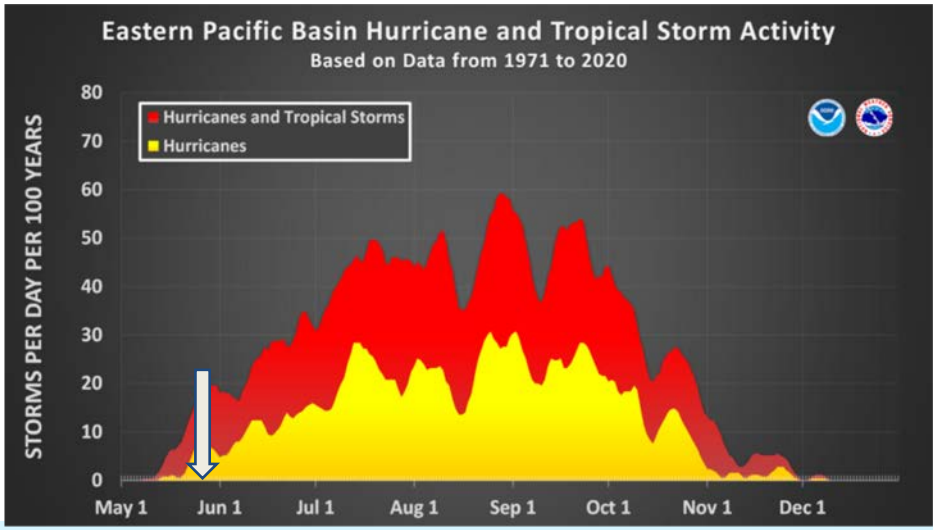
Seasonal Hurricane Outlooks - When

Seasonal Hurricane Outlooks are release in late May and early August.

May - Atlantic, East Pacific, Central Pacific, West Pacific

August - Atlantic only (West Pacific is “if needed”)

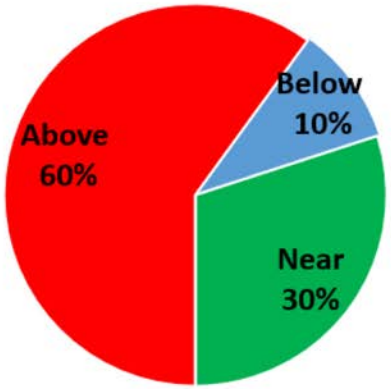




NOAA's 2022 Hurricane Season Outlooks

Updated August Outlook

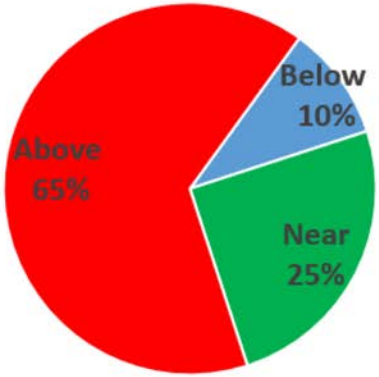
Probability of Season type



Named Storms	14-20
Hurricanes	6-10
Major Hurricanes	3-5
ACE % of Median	110-190

May Outlook

Probability of Season type



Named Storms	14-21
Hurricanes	6-10
Major Hurricanes	3-6
ACE % of Median	115-200

Averages 1991-2020

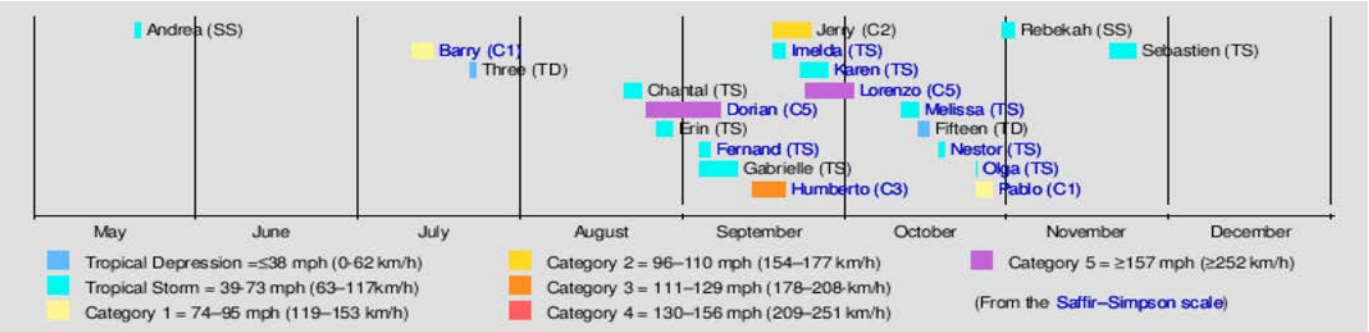
Named Storms	14
Hurricanes	7
Major Hurricanes	3
% Median ACE	100%

For the Atlantic hurricane regions, the outlooks indicate a 60% (65%) change of a above-normal season, a 30% (25%) chance of a near-normal season, and a 10% chance of an below-normal season.

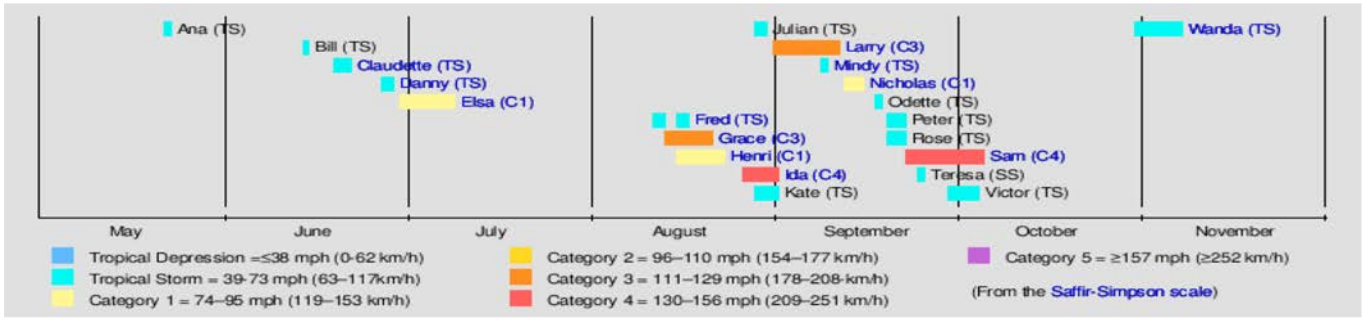
These outlooks are for the overall seasonal activity. They are not a hurricane landfall forecast.

But we've been quiet…

2019
July 11 to Aug 20
18 Total

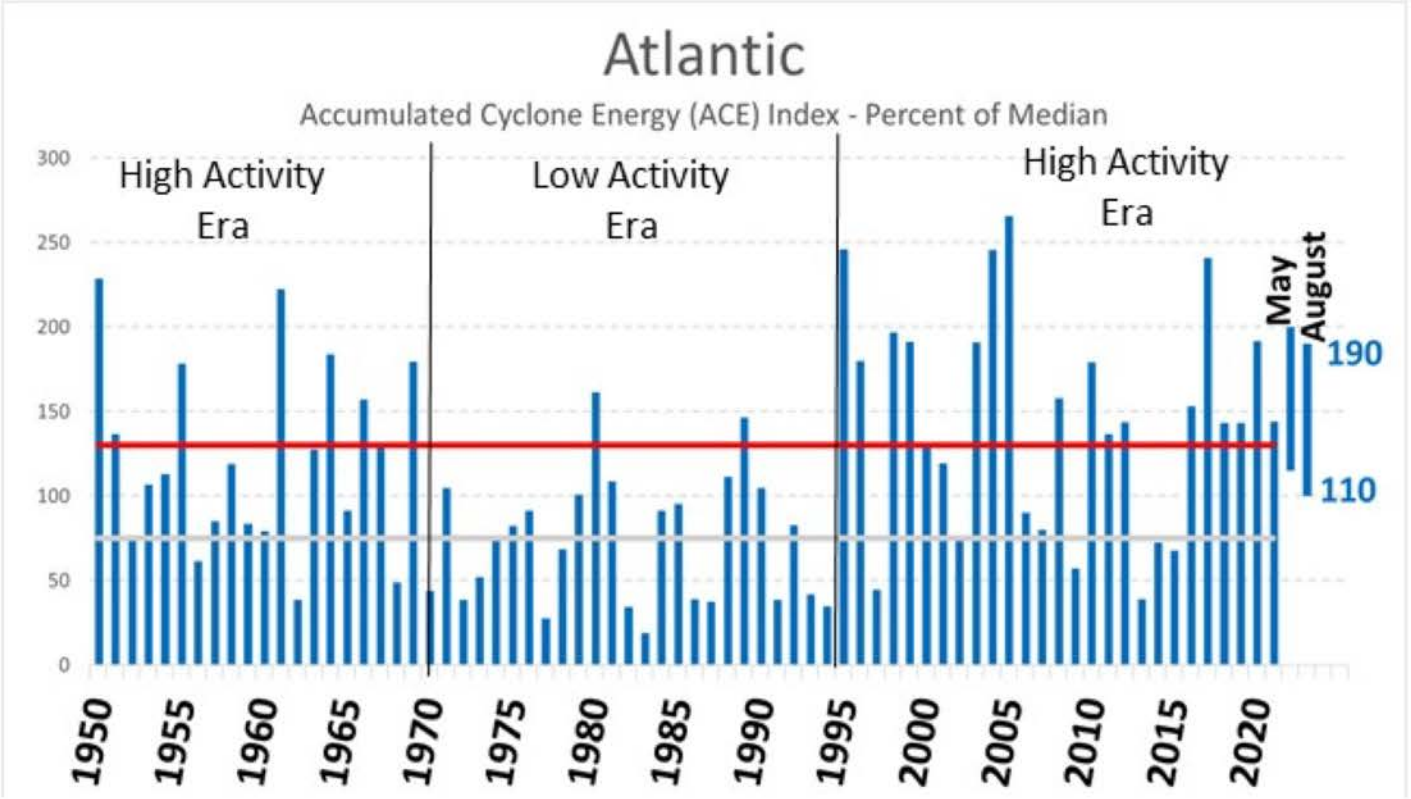


2021
June 30 to Aug 11
21 total



Climo to 8/4 - 3 Named Storms 0.8 Hurricanes 0.1 MH 10.8 ACE
Obs to 8/4 - 3 0 0 2.8
Bonnie real diff (Moved to East Pac, first since 2016 - Otto)

The 2022 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.*

Model Forecast Summary

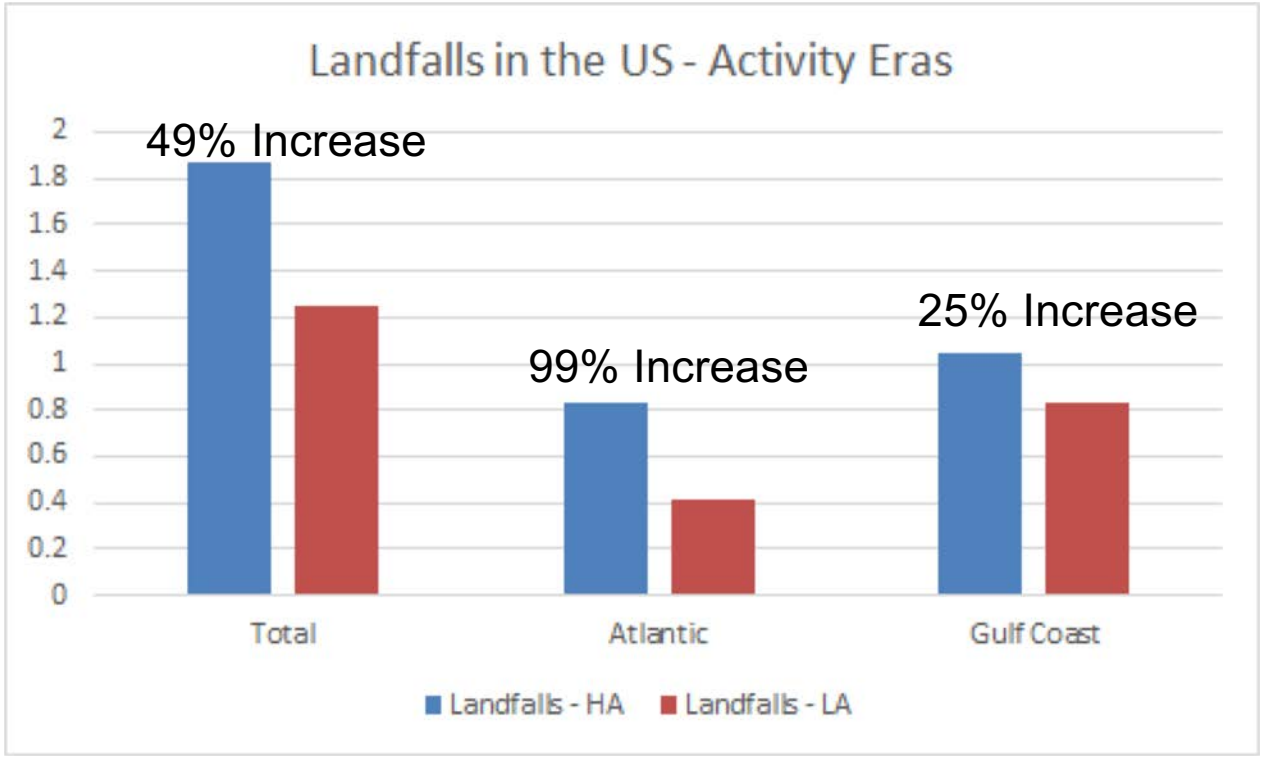
(Includes 3 NS, 0H, 3% medn. of ACE added to dynamical models)

Model	Named Storms	Hurricanes	Major Hurricanes	ACE (% Median)
CPC Regression: Nino 3.4 (-1 to -0.2C) MDR SSTA (-0.12 to 0.25C) MDR-Tropics (-0.25 to 0.25C)	12.8-15.1 (13.95)	4.6-6.7 (5.65)	1.8-3 (2.4)	80-134 (107)
CPC Binning high-activity era: 5 cases: Nino 3.4 (-1 to -0.2C) MDR SSTA (-0.12 to 0.25C) MDR-Tropics (-0.25 to 0.25C)	10.5-19.44 (15)	5-9.35 (7.2)	1.5-6.06 (3.8)	79-216 (147)
CFS: Hi-Res (bias adjusted)	14-20 (17)	5-12 (8.5)		109-204 (157)
CFS-V2 T128	12-15 (13.5)	6-8 (7)	3-4 (3.5)	109-152 (131)
NMME (CFS-v2, GEM-NEMO, CANCM4, CCSM4	14-16 (15)	7-9 (8)	3-4 (3.5)	143-187 (165)
GFDL (SPEAR-MED, HiFLOR-S)	15-20 (17.5)	7-11 (9)	3-5 (4)	120-179 (150)
ECMWF:	13.7-22.5 (18.1)	4.4-11.4 (7.9)		122-254 (188)
UKMET	10-20 (15)	3-9 (6)	2-6 (4)	73-233 (153)
Guidance Mean	**12.8-18.5 (15.6)**	**5.3-9.6 (7.4)**	**2.4-4.7 (3.5)**	**104-195 (150)**
NOAA Predicted Activity	**14-20 (17)**	**6-10 (8)**	**3-5 (4)**	**110-190 (150)**

The guidance mean for ACE is 150% of median, well into the above normal category

ACE range for near-normal season is 75% - 130% of median
ACE >= 165% indicates hyper-active.

Hurricane Landfalls - Activity Era



During high activity eras, largest increase in hurricane landfalls is along Atlantic coast

U.S. sees almost a doubling of seasons with multiple landfalling hurricanes: Occur about every other year compared to about every fourth year.

ENSO Outlook

ENSO Materials

Weekly ENSO Update (Monday morning):

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

Monthly ENSO Diagnostic Discussion (2nd Thursday, 0900 ET)

https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.shtml

Monthly Climate Diagnostics Bulletin (mid-month, approx 13th)

http://www.cpc.ncep.noaa.gov/products/CDB/

ENSO Tutorial:

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensocycle/enso_cycle.shtml

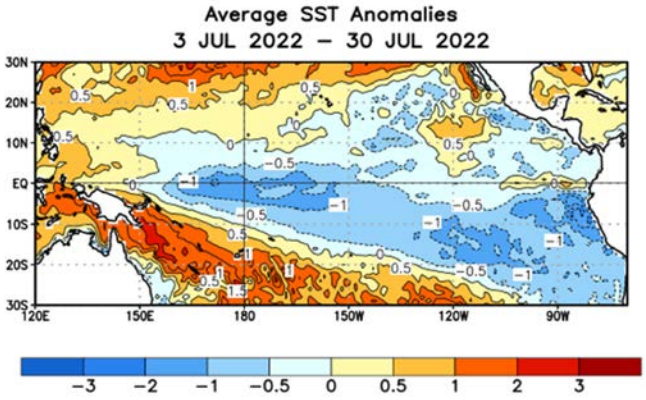
ENSO Status

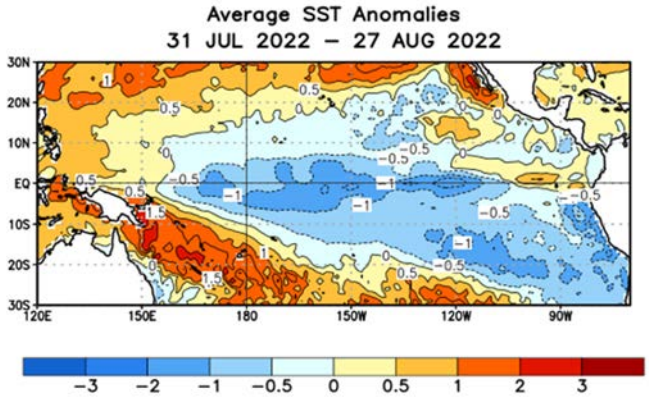
La Niña (Robust, coupled, ongoing)

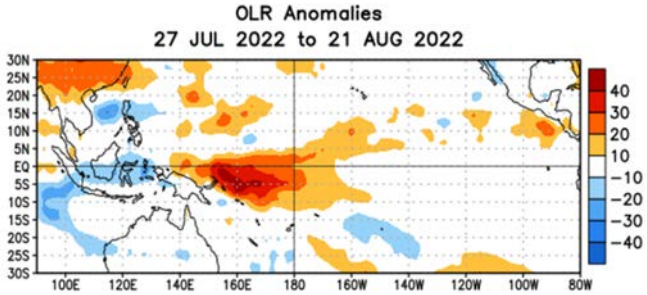
Aug 17 - Niño 3.4 = -0.9°C (7th lowest for Aug)

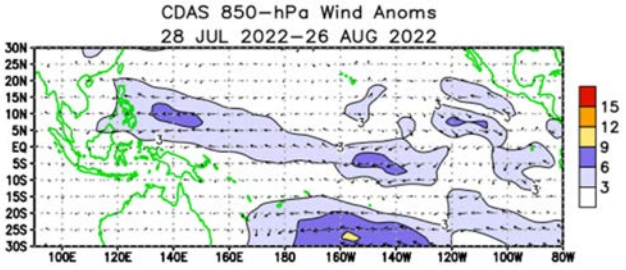
MJJ ONI - 3th lowest on record

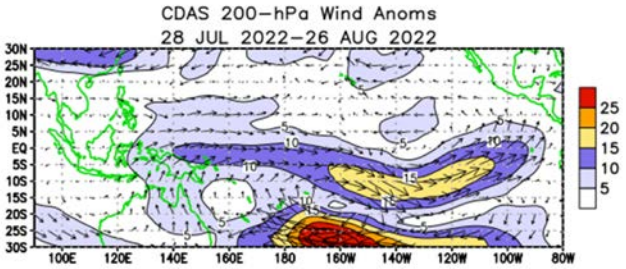
3 of 7 prior years with Nino3.4 ≤ 2021 had ASO La Niña





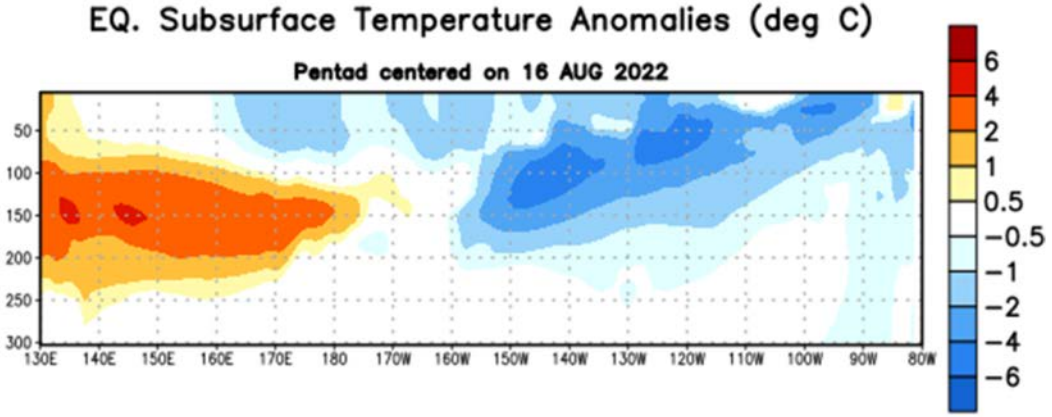




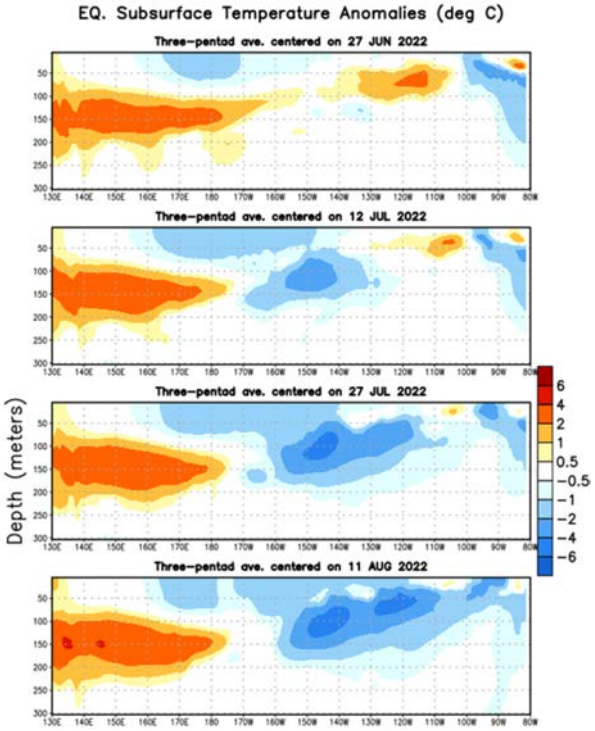


ENSO Status

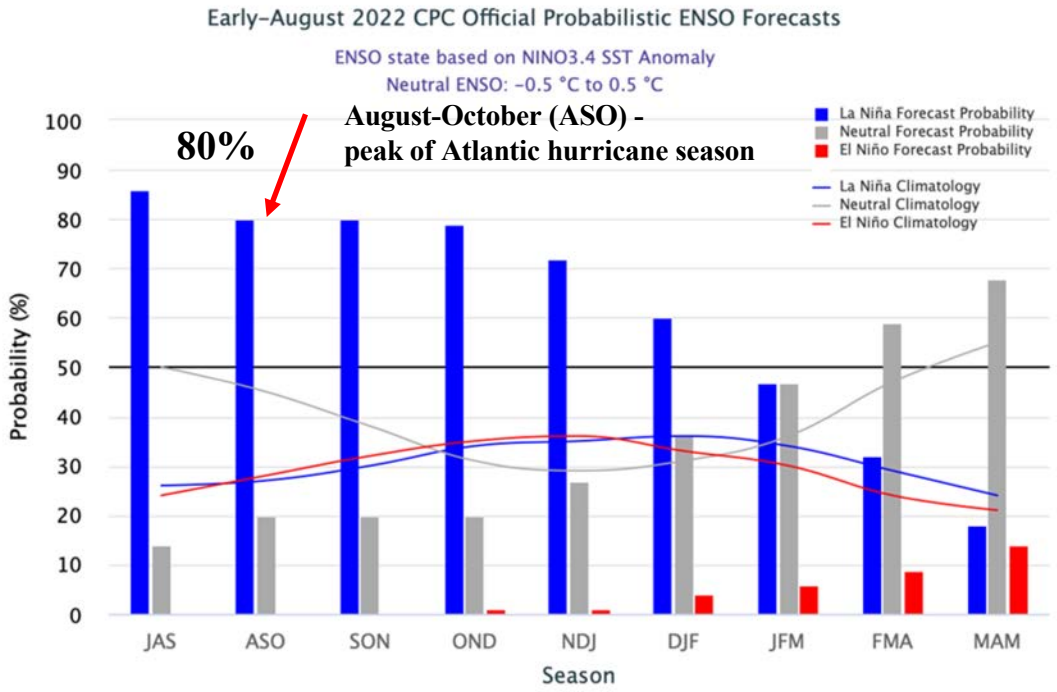
During the last two months, negative subsurface temperature anomalies reemerged at depth in the east-central Pacific Ocean, and extended to the surface.



Positive subsurface temperature anomalies have persisted, at depth, in the western Pacific Ocean.

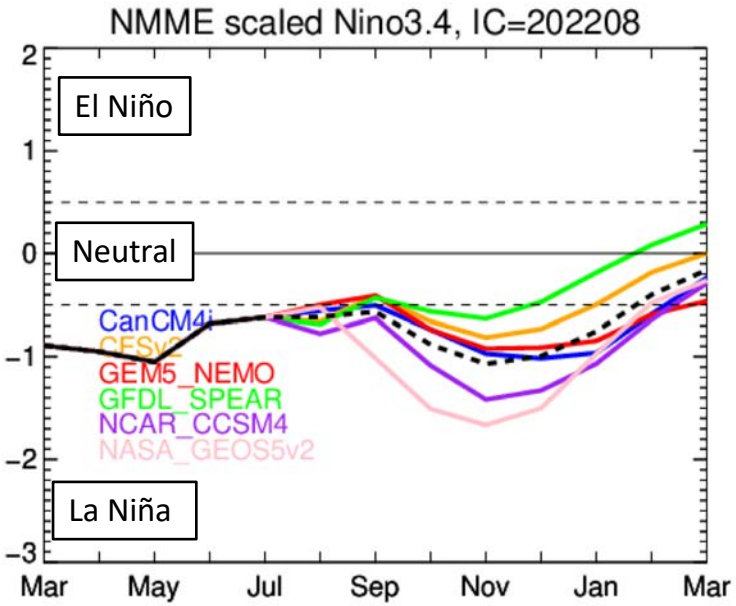


CPC/ IRI Probabilistic ENSO Forecast
11 Aug 2022

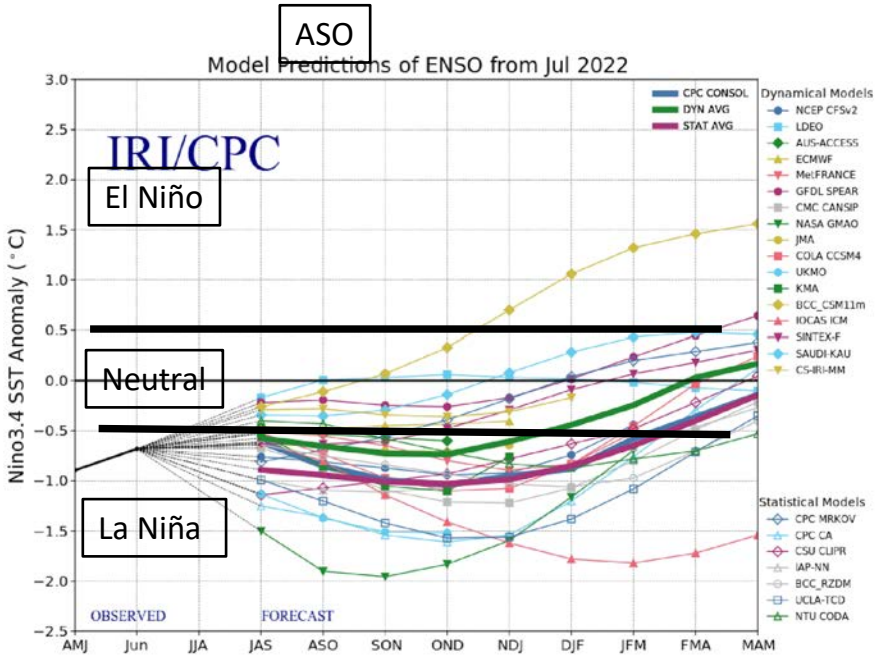


The official CPC/ IRI forecast issued in mid-July indicates a 80% chance of La Niña during ASO 2022, a 20% chance of ENSO-Neutral.
La Niña favors increased tropical storm/hurricane activity in the Atlantic, decreased in East Pacific.

ENSO Forecast Plumes



(Left) The North American Multi-Model Ensemble (NMME) average predicts the continuation of La Niña through Autumn 2022. The GFDL SPEAR shows ENSO-neutral.

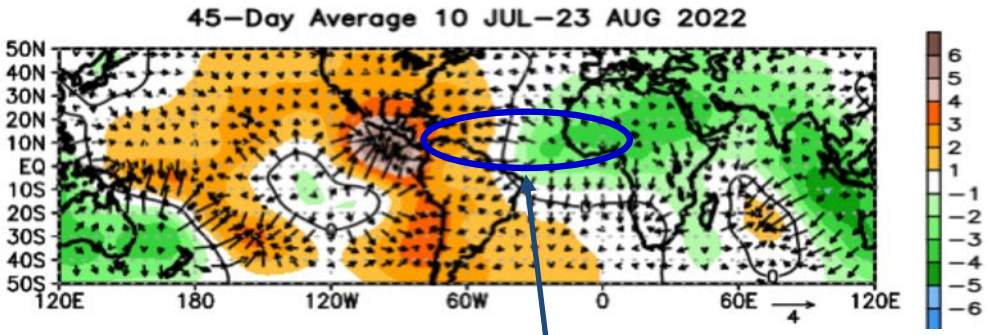


(Right) Multi-model dynamical and statistical model averages predict La Niña to continue through Autumn 2022.

Atlantic Conditions

Enhanced West African Monsoon

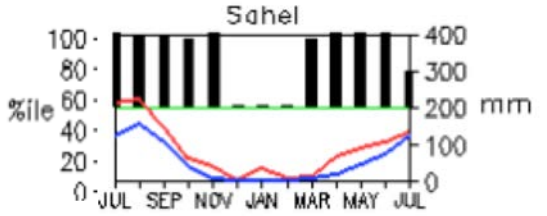
200-hPa: Anomalous Velocity Potential and Divergent Wind Vectors



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.

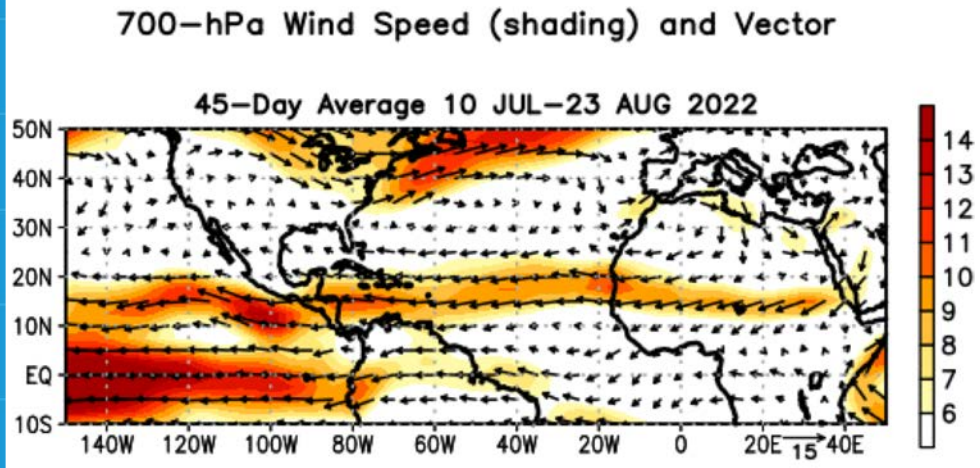
Observed Monthly Precipitation Percentiles for the African Sahel

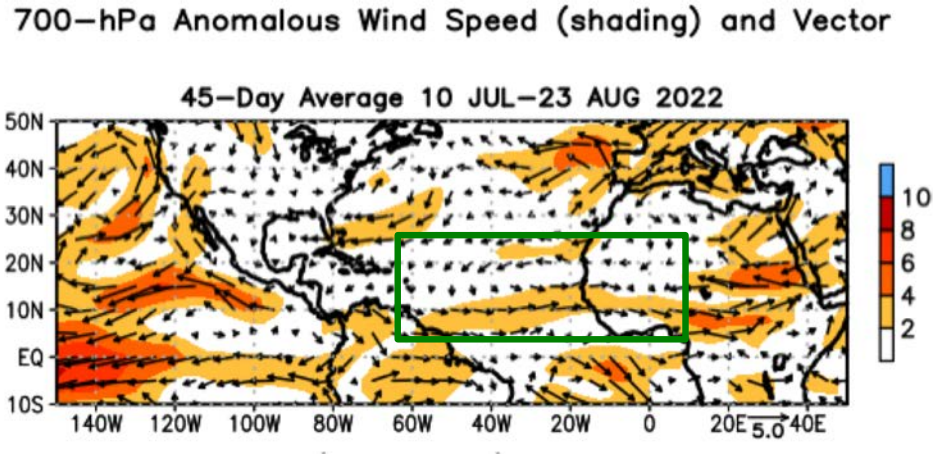


2021 2022

In the African Sahel (i.e., the West African monsoon region) rainfall has been above average May-July, with area-averaged totals above the 70th percentile of occurrences. Peak monsoon season is July-September.

Circulation over the Atlantic





(Right) Low-level winds anomalies over the Atlantic show a northward displacement in the African Easterly Jet. Northward displacement is favorable for more activity. **Not as far displaced as last 2 years, slower to get there.**

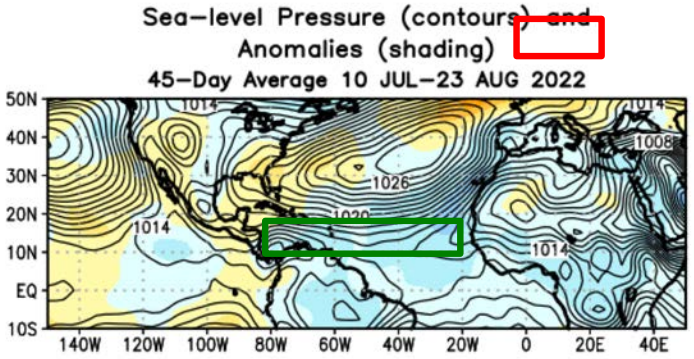
Sea-level Pressure Analysis and Forecasts for ASO 2022

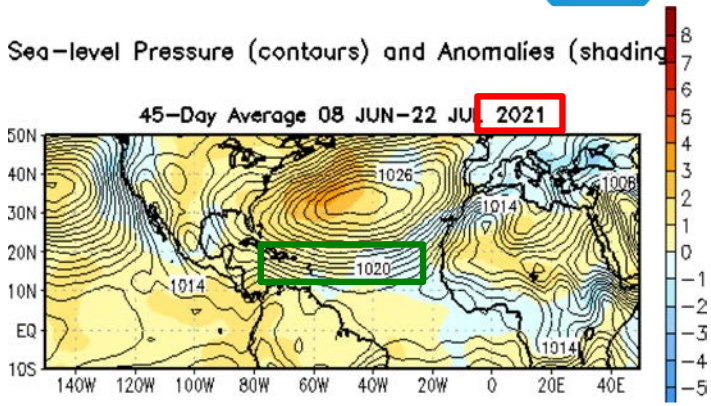
(Upper Left) Across the MDR, sea-level pressure has been below average (blue shading) throughout the summer.

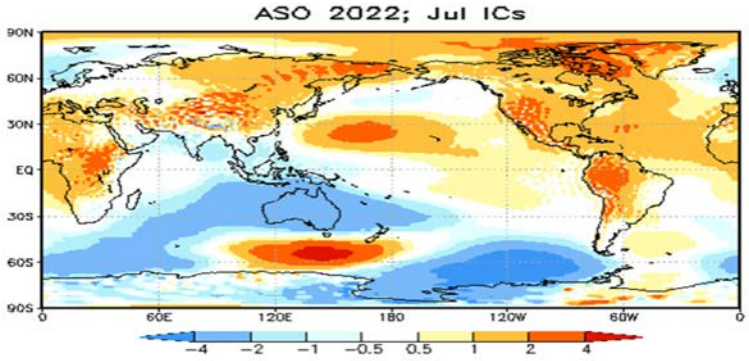
(Upper Right) SLP anomalies were positive or less negative in 2021 than in 2022.

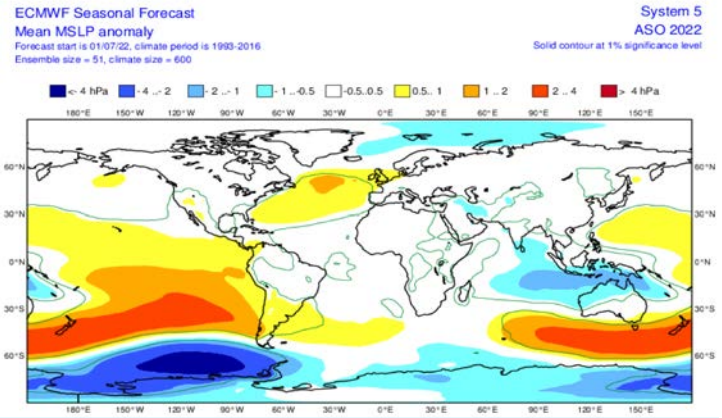
(Lower Left) CFS Hi-Res is predicting above-average SLP during ASO across the MDR. Same as 2021

(Lower Right) ECMWF SEAS5 is predicting near to below normal SLP in the MDR, with higher SLP to the north, similar to 2021 observations.

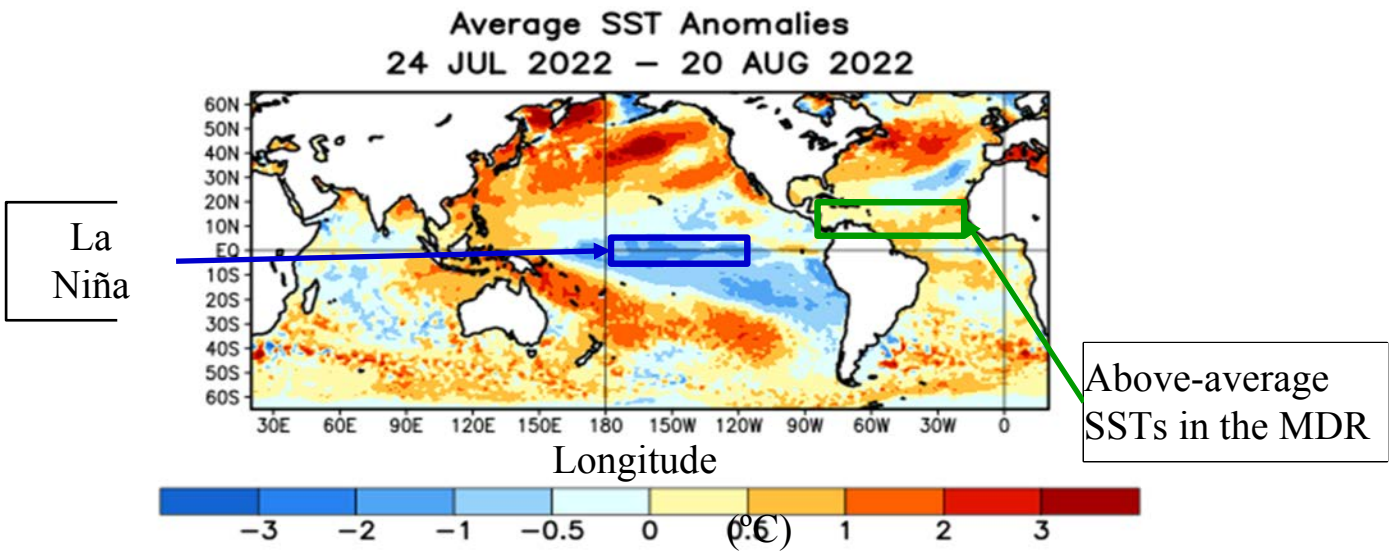








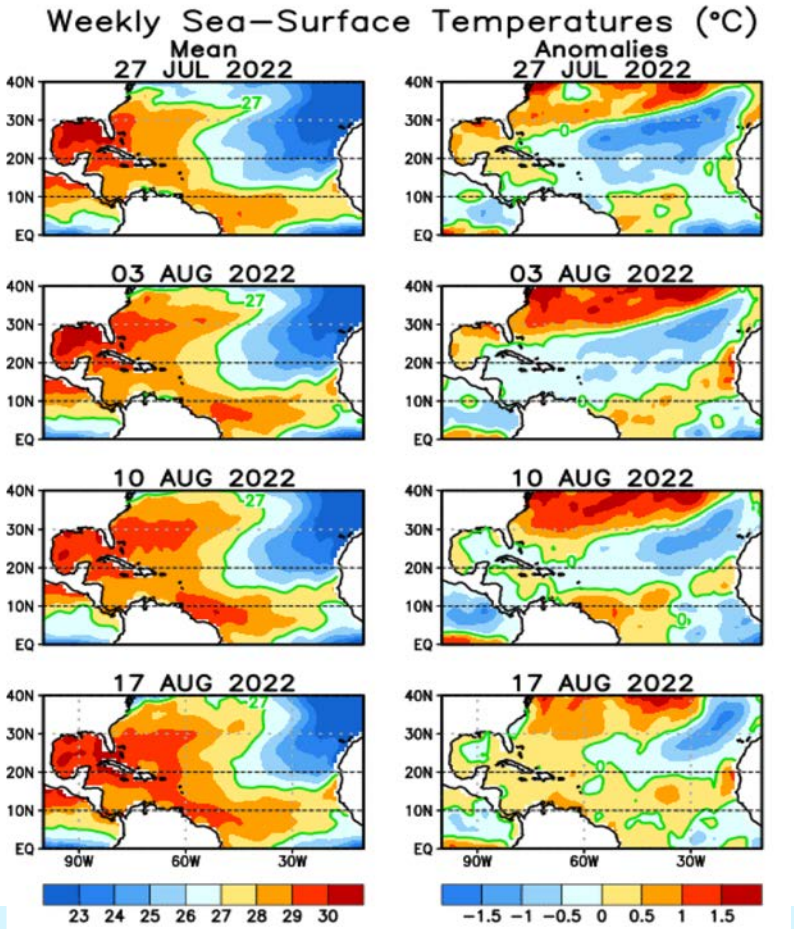
Recent Observed Sea-Surface Temperature (SST) Anomalies



- SSTs are slightly above average in the main development region, but varying on both sides of normal. Different SST datasets are showing anomalies of different sign due to different inputs and averaging periods.
- AMO is still positive (0.140) (2021 June value was 0.214)
- La Niña conditions are present (Blue box), with below-average SSTs across the eastern equatorial Pacific Ocean. At depth, temperatures are also below-average.

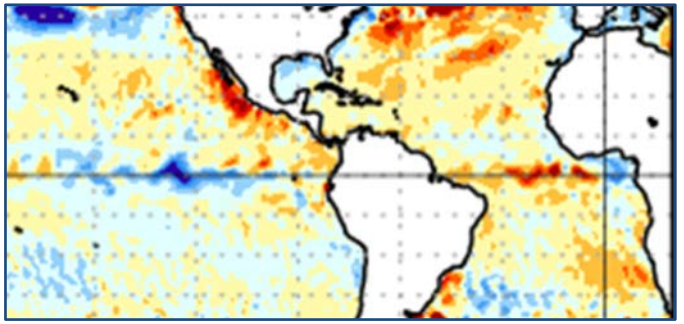
Caption: Sea surface temperature anomalies (ºC) during the last 4-weeks. Blue box denotes the ENSO region and green box denotes the Atlantic hurricane Main Development Region (MDR). Data is from the OI-SST dataset. Anomalies are departures from the 1991-2020 means.

Observed Sea-Surface Temperature (SST), Anomalies, and Trend



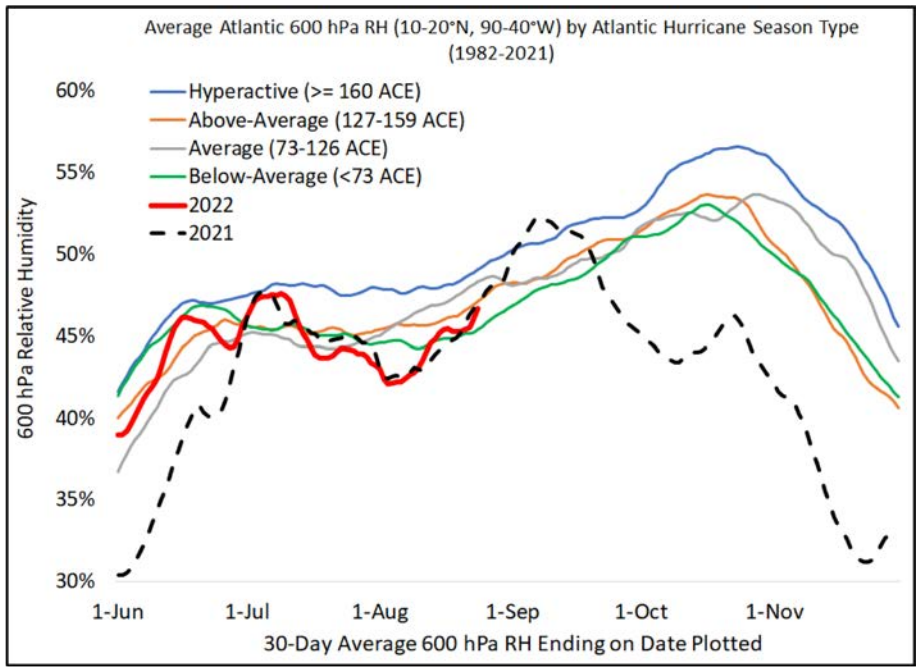
Weekly sea–surface temperatures (°C) (Left) Means and (Right) Anomalies for the last four weeks. Anomalies are departures from the 1991–2020 period weekly means. NOAA/NWS/NCEP/CPC

SST Change - 4 Weeks

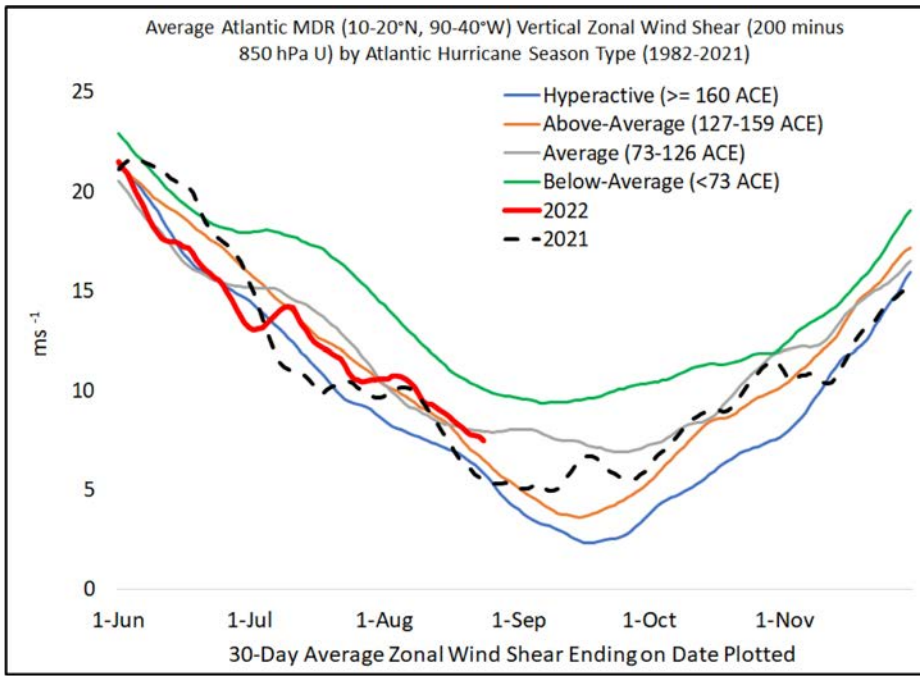


Moisture and Shear This Season

Observed



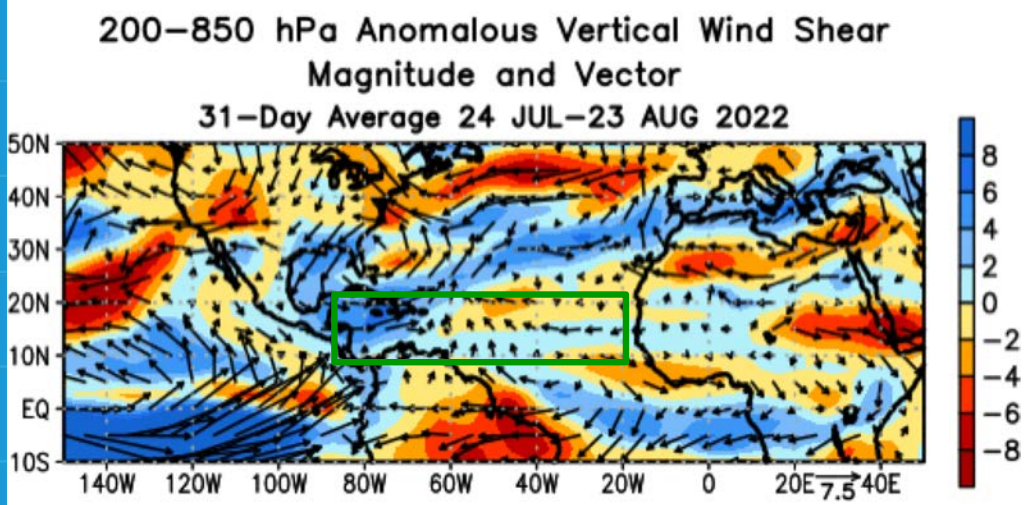
Observed



Courtesy of Phil Klotzbach, PhD (Colorado State)

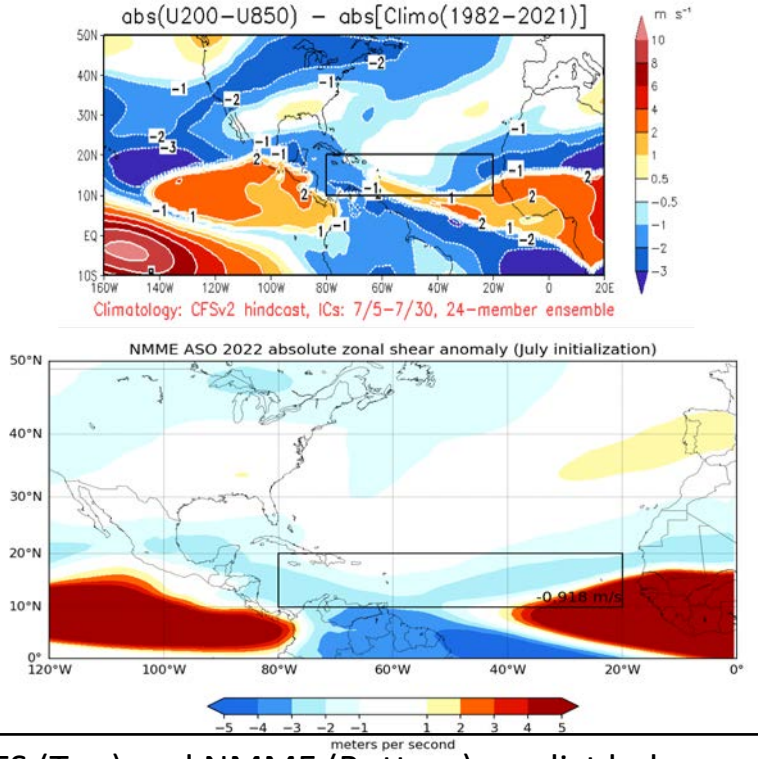
Observed and Forecast 200-850 hPa vertical wind shear/anomalies

Observed



Vertical wind shear has been stronger than normal across the Caribbean/GoMex, and parts of MDR.
Opposite of model predictions so far…..

Forecast



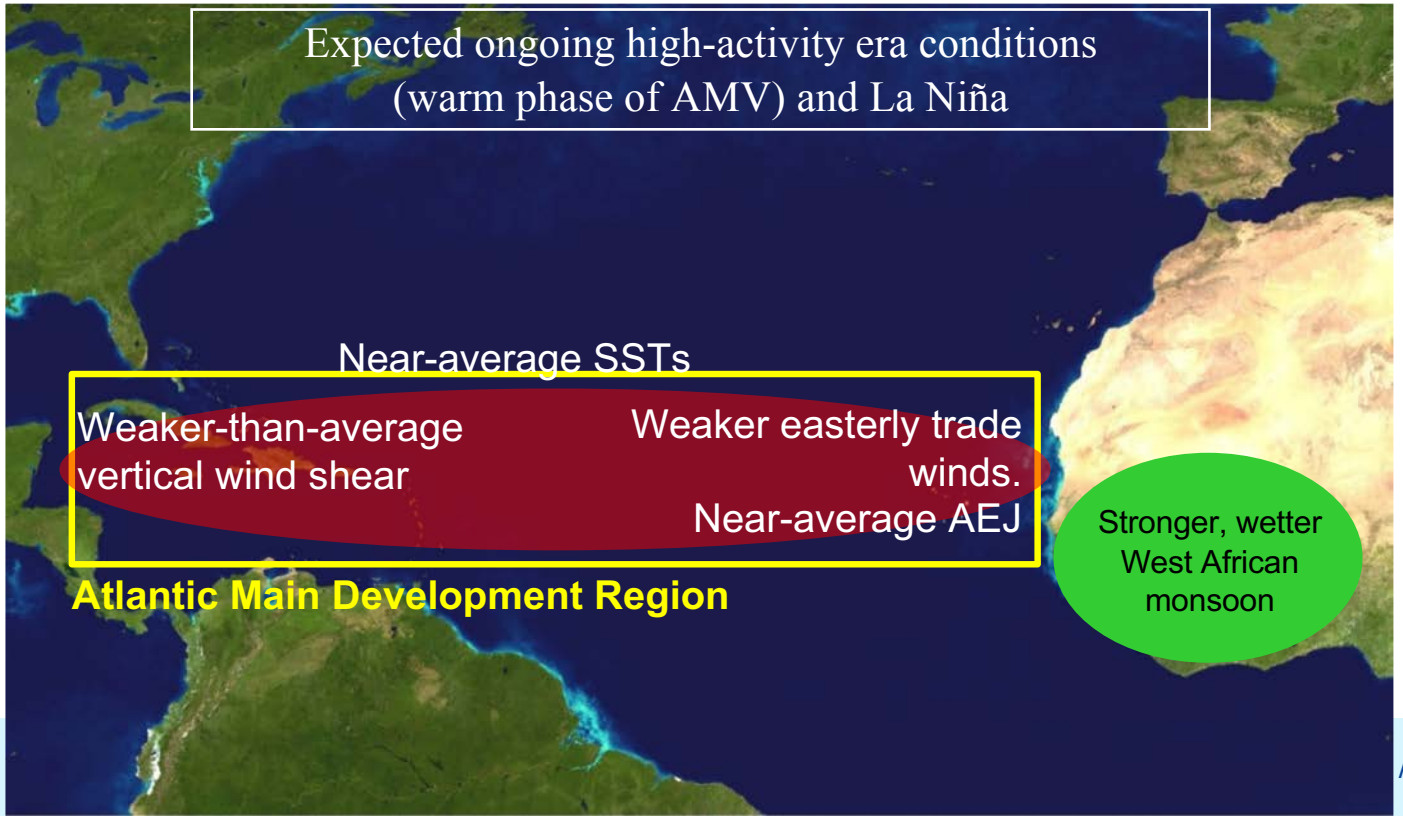
CFS (Top) and NMME (Bottom) predict below normal vertical wind shear in the MDR.

Expected Atlantic Conditions During August-October 2022

Ongoing high-activity era conditions favor more hurricane activity. These conditions include:

- Above-average sea surface temperatures in the Main Development Region.
- Weaker trade winds, weaker vertical wind shear, and a stronger, wetter West African monsoon.

Additionally, with La Niña favored, there would be no suppression of, or potentially a reinforcement of, the high-activity era conditions.



Summary

2022 Atlantic Outlook

Above-normal season most likely.

14-20 Named Storms

6-10 Hurricanes

3-5 Major Hurricanes

Factors: Warm AMO and La Niña

It Only Takes One!

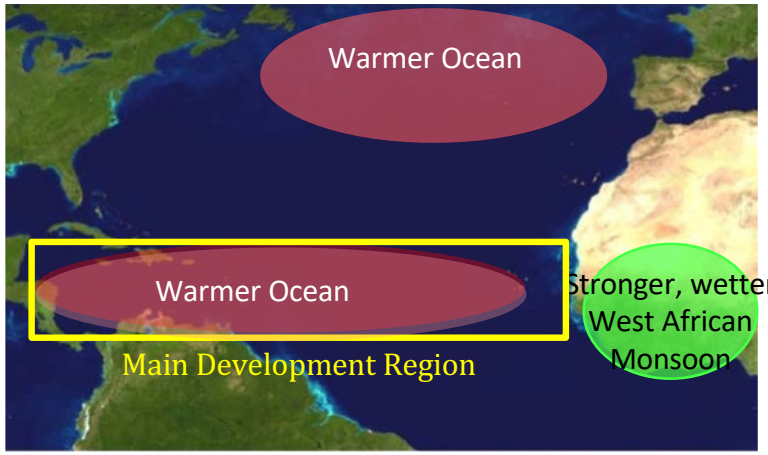
Prepare now!

Help Build a Weather and Climate -Ready Nation

Supplemental

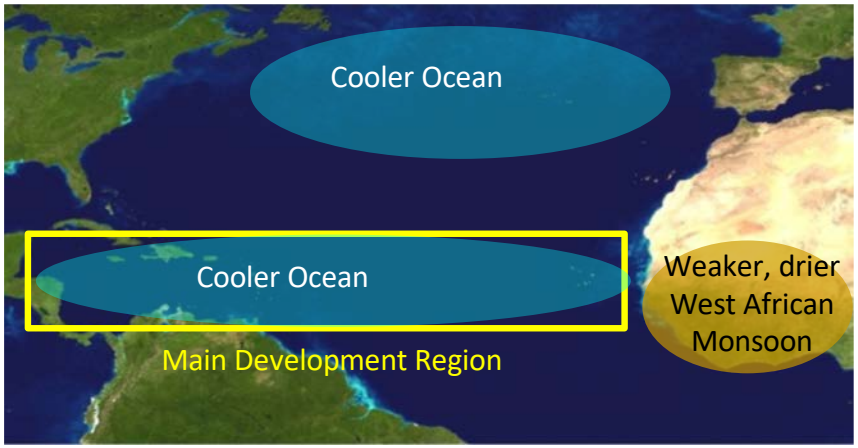
The Atlantic Multi-Decadal Oscillation (AMO)

Warm (Positive) Phase of AMO
Climate Pattern for High-Activity Era



Atlantic: High-activity era
East Pacific: Lower activity

Cold (Negative) Phase of AMO
Climate Pattern for Low-Activity Era



Atlantic: Low-activity era
East Pacific: Higher activity

Caption: Schematic showing sea surface temperature and west African monsoon conditions for opposing phases of the Atlantic Multi-Decadal Oscillation (AMO): (Left) warm phase and (Right) cold phase.