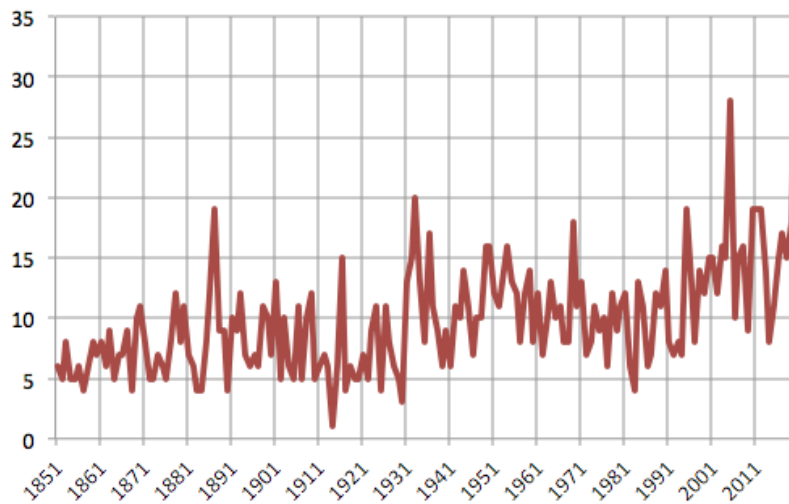


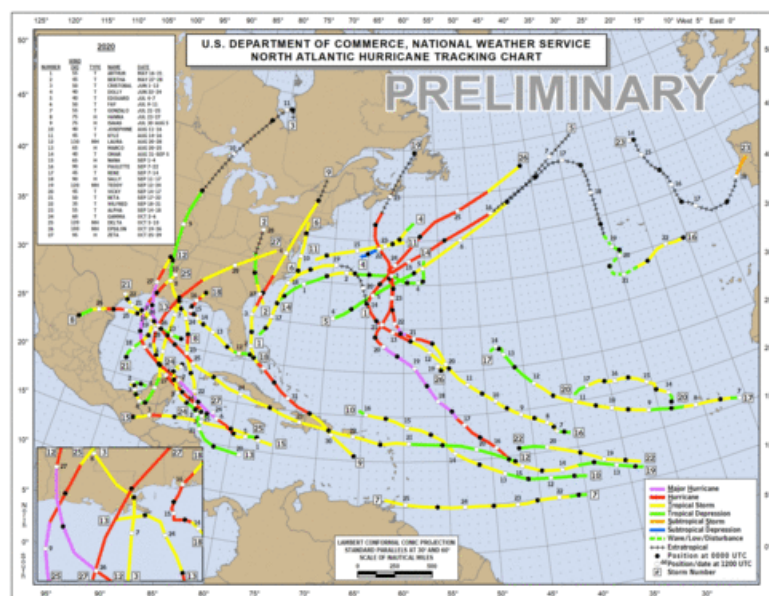
HURRICANE SEASON 2020 UPDATE (12/16/2020)

The 2020 hurricane season in the Atlantic Basin is the most active in history with 30 named storms, breaking the previous record set in 2005 (which had 28). 6 storms were major storms including Iota, setting a record for the latest Major hurricane.

Number Named Storms North Atlantic



The Gulf and Central America were hard hit, reminiscent of the 1988 to 1990 period ([see](#)).



Despite the busy Atlantic, the Pacific was quiet and the hemisphere as a whole had a quieter than normal (78% of normal) season.

Northern Hemisphere Tropical Cyclone Activity for 2020 (2020/2021 for the Southern Hemisphere)

1981-2010 Climatological Activity Through December 16 in Parentheses

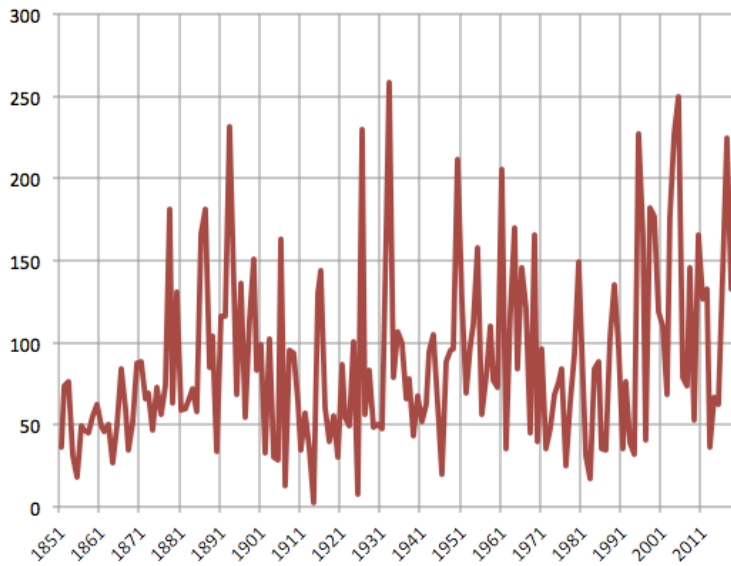
Basin	Named Storms	Named Storm Days	Hurricanes	Hurricane Days	Major Hurricanes	Major Hurricane Days	Accumulated Cyclone Energy
<u>North Atlantic</u>	30 (12.0)	118.00 (59.1)	13 (6.4)	34.75 (24.1)	6 (2.7)	8.75 (6.2)	179.8 (105.2)
<u>Northeast Pacific (East of 180°)</u>	16 (16.6)	52.00 (73.2)	4 (8.9)	14.25 (30.0)	3 (4.3)	5.00 (8.9)	76.5 (131.8)
<u>Northwest Pacific (West of 180°)</u>	23 (26.0)	79.25 (135.3)	12 (16.3)	30.75 (66.6)	6 (8.7)	9.75 (23.2)	148.5 (296.8)
<u>North Indian</u>	5 (4.7)	12.00 (13.9)	4 (1.5)	5.25 (3.0)	2 (0.7)	2.50 (1.0)	26.2 (18.7)
<u>Northern Hemisphere</u>	74 (59.3)	261.25 (281.5)	33 (33.1)	85.00 (123.7)	17 (16.4)	26.00 (39.3)	431 (552.5)
<u>South Indian (West of 135°E)</u>	3 (3.4)	11.00 (14.1)	1 (1.4)	0.75 (4.1)	0 (0.6)	0.00 (1.3)	9.3 (20.9)
<u>South Pacific (East of 135°E)</u>	3 (1.1)	9.00 (3.8)	1 (0.5)	2.50 (1.3)	1 (0.2)	1.50 (0.4)	17.3 (6.2)
<u>Southern Hemisphere</u>	6 (4.5)	20.00 (17.9)	2 (1.9)	3.25 (5.4)	1 (0.8)	1.50 (1.7)	26.6 (27.1)

Global statistics were last modified: December 16 2020 09:00 MT

The ACE of 179.8 ranks 13th behind 2017 and 2005 and the top year 1933.

RANK	SEASON	ACE TOTAL
1	1933	258.6
2	2005	250.1
3	1893	231.1
4	1926	229.6
5	1995	227.1
6	2004	226.9
7	2017	224.9
8	1950	211.3
9	1961	205.4
10	1998	181.8
11	1887	181.3
12	1878	180.9
13	2020	179.8
14	2003	176.8
15	1999	176.5
16	1964	169.8
17	1932	169.7
18	1996	166.2
19	1886	166.2
20	1969	165.7
21	2010	165.5
22	1906	162.9
23	1955	158.2
24	1899	151.0
25	1980	148.9

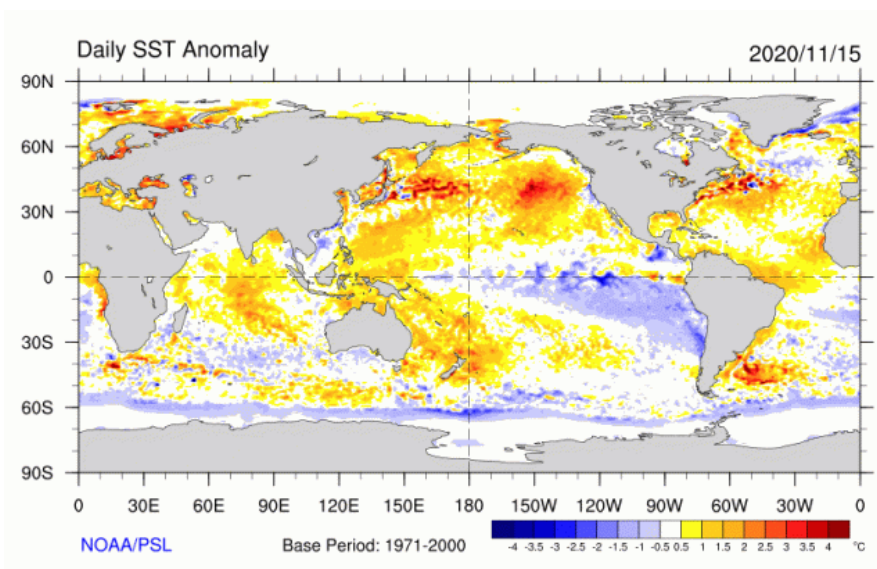
North Atlantic ACE Index Annual



An active season was expected - several factors pointed to it.

LA NINA AND LOW SHEAR IN THE ATLANTIC

We have a La Nina in place.



Gerry Bell showed how La Ninas produce fewer east Pacific storms and less shear to the east which favors more Atlantic storms.

Typical El Niño influence

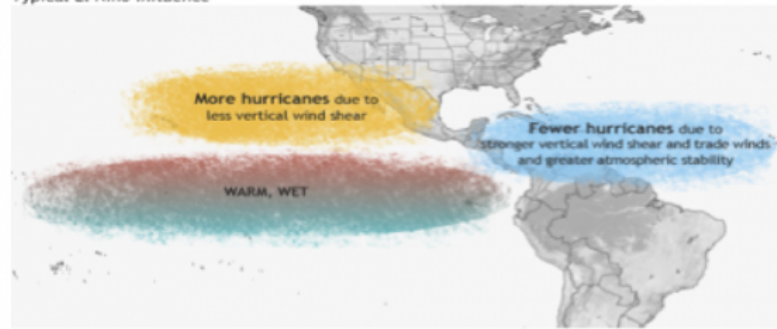


Image courtesy of climate.gov based on originals by Gerry Bell
When La Niñas develop there are usually fewer storms in the eastern Pacific and less shear to disrupt the Atlantic storms.

Typical La Niña influence

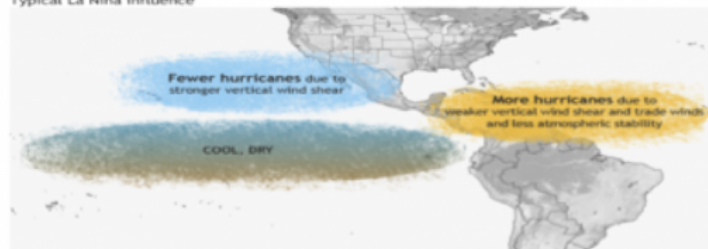
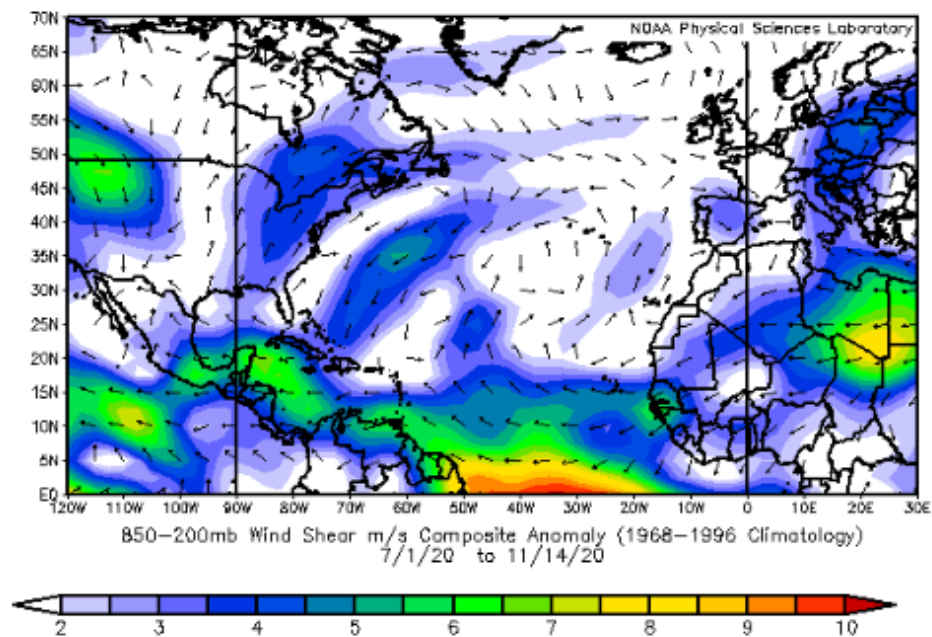
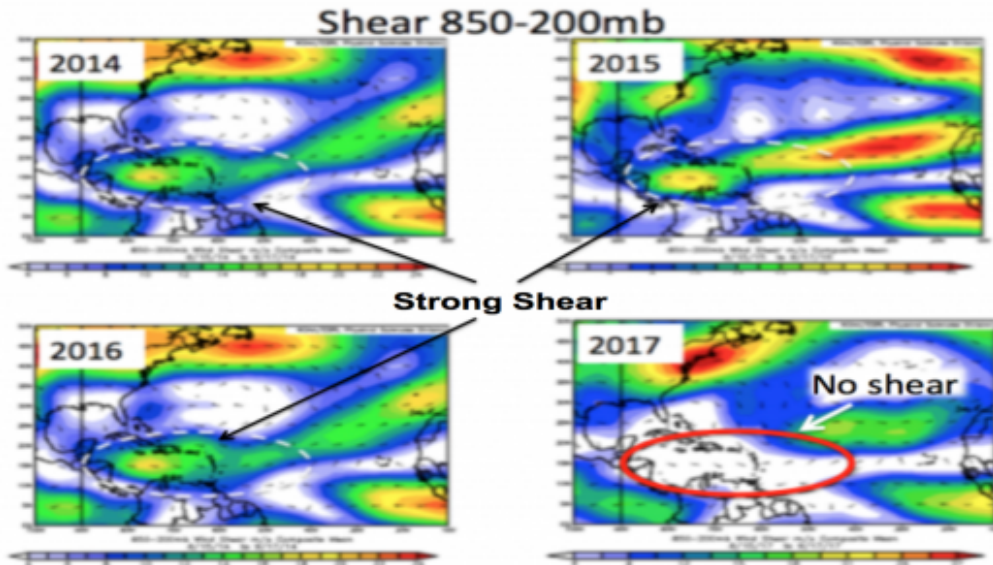


Image courtesy of climate.gov based on originals by Gerry Bell

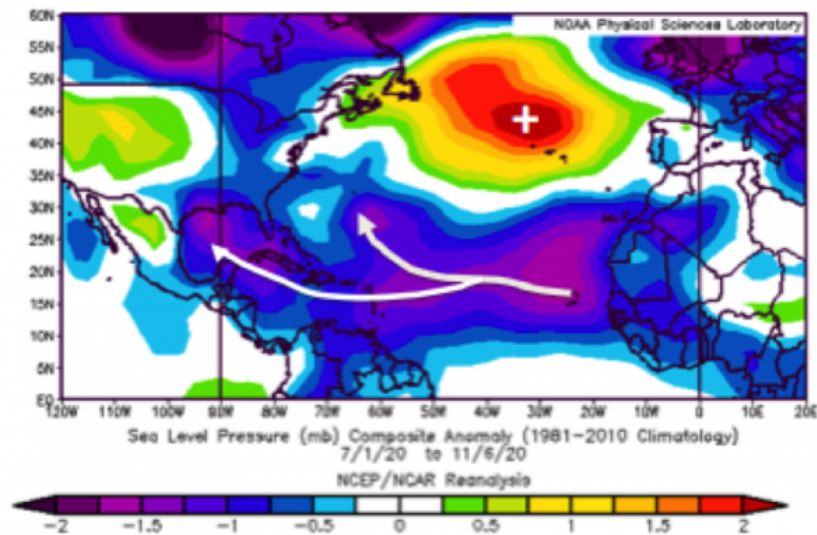
Weak easterly shear is seen in the Main Development region and Caribbean consistent with persistent La Nina Pacific suppression.



2017 was a no shear year with a much higher ACE (ranked 7th with 224.9 versus 179.8 so far in 2020). Westerly shear was seen from 2014 to 2016.

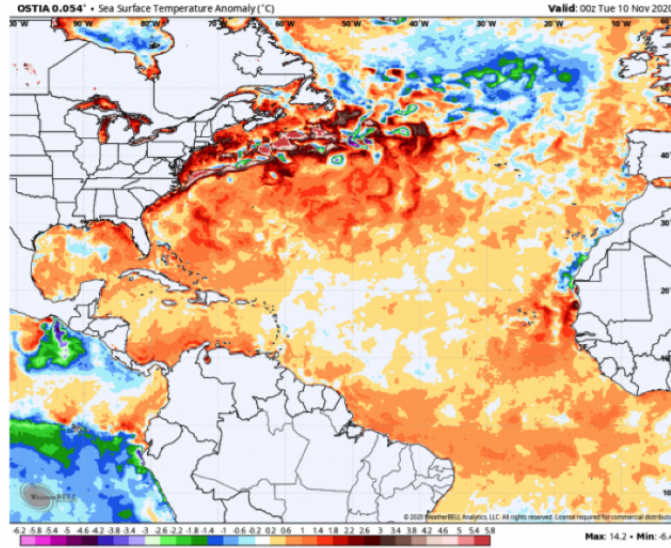


The pressure anomalies reflect the low pressure and storm tracks beneath the 40N ridge.

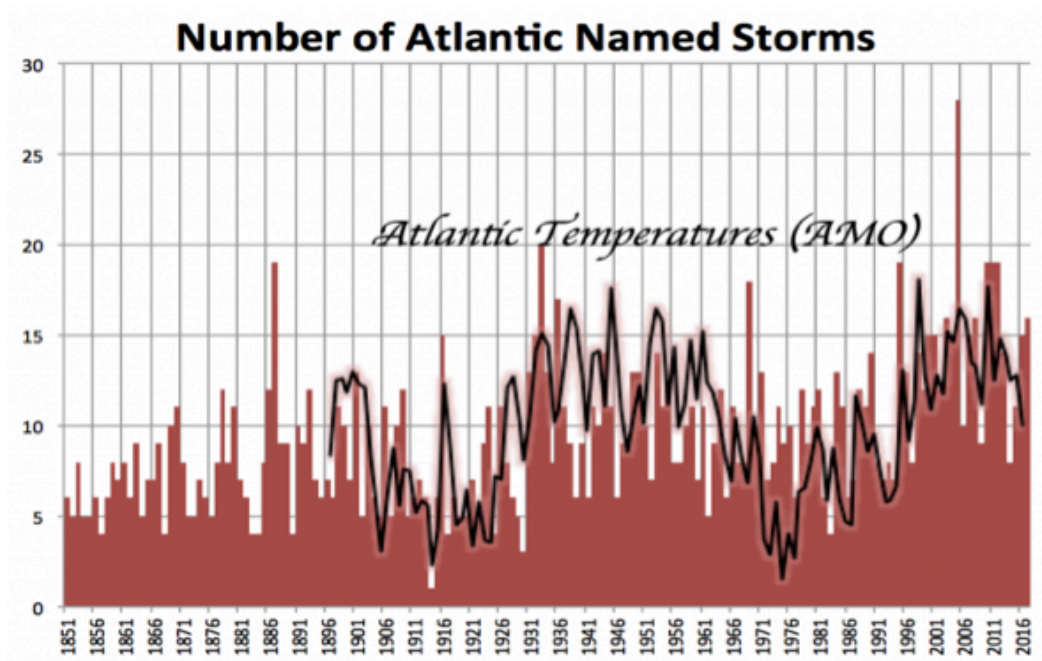


WARM ATLANTIC MODE OF THE AMO

The Atlantic is warm.



The warm Atlantic not surprisingly generates more storms.



LOW SOLAR AND COLD HIGH ATMOSPHERE

Hodges and Elsner (FSU) found low solar led to colder high atmosphere favoring more instability and perhaps stronger storms.

Hurricanes and the sunspot theory

Increased solar activity such as sunspots can warm upper layers of Earth's atmosphere, making the atmosphere more stable and decreasing hurricanes. Sunspot activity varies on an 11-year cycle. Researchers at Florida State University theorize that hurricane activity may increase as sunspots decrease. **Here's how:**

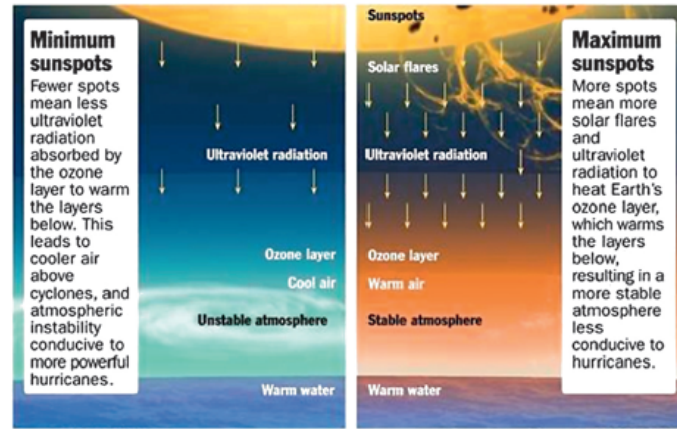
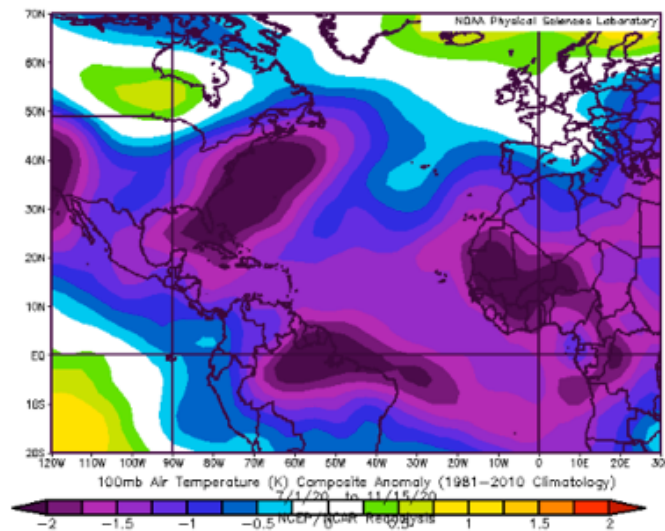


FIGURE 10 Research by Robert Hodges and Jim Elsner of Florida State University found the probability of three or more hurricanes hitting the United States goes up drastically during low points of the 11-year sunspot cycle, such as we're in now. Years with few sunspots and above-normal ocean temperatures spawn a less stable atmosphere and, consequently, more hurricanes, according to the researchers. Years with more sunspots and above-normal ocean temperatures yield a more stable atmosphere and thus fewer hurricanes.

Indeed check out the 100mb temperature anomalies since July in the Atlantic Basin including the Caribbean.



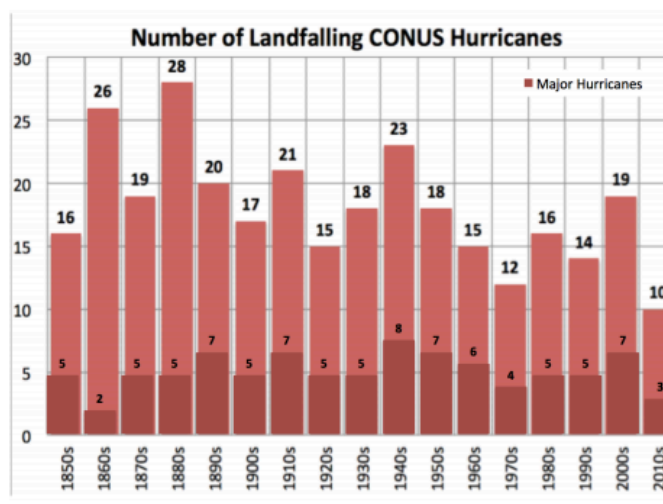
So we had the 'perfect storm' in the Atlantic Basin with a La Nina leading to low vertical shear, the warm mode of the AMO providing more heat energy and low solar leading to a colder high atmosphere and greater instability. Even with the large number of storms and 6 majors, the ACE index still trails years like 2017 and 2005 and 10 others. We might climb a but more with any further action.

NOT UNPRECEDENTED

Not every meteorologist believes 2020 holds the record for most named storms. Due to advances in technology, forecasters are able to identify smaller subtropical storms that may have gone unnoticed in the past.

"When one wants to do a fair comparison of storms now versus storms in the past, you really have to be careful about how to interpret the raw number," Christopher Landsea, chief of the tropical analysis and forecast branch at the National Hurricane Center, said, according to the New York Times. "There has been a lot of hype about the record number of storms and, yes, it's been a busy year. There have been horrific impacts. But is this really a record? The answer is no."

The ACE supports that. And the decadal trend for landfalling hurricanes and major hurricanes has been down.



Source: AOML

Weatherbell's hurricane lead Guru Joe Bastardi commented on the season.

Summing Up the N Hemisphere Tropical Season

- 1) Yes most named storms in the Atlantic. Weatherbell underdone on total names*
- 2) Yes highest impact year on the US coast (no surprise as we made a huge deal about that from April)*
- 3) ACE at 180 within our ACE range from March! 13th highest on record*

BTW another abysmal year by the Euro models. We put out that ACE in March. At that time the Euro was forecasting 80% of average

4) Here is where it gets interesting: ACE/Storm was 6 ranking DEAD LAST. How bad was it? The AVERAGE ACE/STORM in the other 21 seasons was 12! The closest to this year was another mega named year 2005 but that was a respectable 9

The obvious conclusion is 2 fold,

1) Some of these should not have been named or would not have been in previous years. Now if you don't want to accept that fine, but it means more storms, but weaker. It is absolutely astounding to see the ace/storm HALF the average of the all the other samples.

But it gets worse as far as the hype:

2) The total ignoring of the lack of activity in the Pacific Basin and globally.

I keep hearing global this and global that which of course applies only if one is going to ignore the fact that the number one area for ACE (Pacific) was so far below normal - Western Pacific was 50%, the eastern Pacific 58%.

The total ACE between the two is normally 428.6. This year, so far, ACE there was 225. So the basin with 4 times the normal of Atlantic, is only 52% of its normal! The ACE for the northern hemisphere was 78% of normal. So even with the hyper Atlantic season. GLOBALLY we were significantly BELOW average.

So there is no question the impact of the western hemisphere is a huge record breaking deal, and should be talked about, But if you want perspective and the whole picture, there is plenty to counter the idea that this is an example of some kind of atmospheric apocalypse, But you have to look and if you do, you will see that there is plenty to talk about on the other side of the coin.

Of course the coin that is flipped when it comes to pushing ideas today always seem to come up one way.