NORTHEASTERN STORM BUSTER

Summer, 2016 - VOL. 21, NO. 3
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FEATURES

DEPARTMENTS

Northeastern StormBuster is a quarterly publication of the National Weather Service Forecast Office in Albany, New York, serving the weather spotter, emergency manager, cooperative observer, ham radio, scientific and academic communities, and weather enthusiasts, all of whom have a special interest or expertise in the fields of meteorology, hydrology and/or climatology.

NOAA'S 2016 ATLANTIC HURRICANE OUTLOOK

Kevin S. Lipton
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On May 27, 2016, NOAA's Climate Prediction Center issued the 2016 hurricane outlook for the Atlantic Basin, which includes the North Atlantic Ocean, the Caribbean Sea and Gulf of Mexico, and which expects a "near-normal" season. A "normal" hurricane season in the Atlantic Basin, based on seasonal averages during the 1981-2010 period, spawns 12 named storms (either tropical storms or hurricanes), 6 hurricanes, with 3 hurricanes potentially attaining "major" status – those reaching category 3 or higher on the Saffir-Simpson Scale which measures hurricane intensity. The Climate Prediction Center's forecast expects the number of named storms to range anywhere from 10 to 16 for 2016 (this includes Hurricane Alex which had already formed way back in January in the far eastern Atlantic Ocean), with the expectation for 4 to 8 of them to reach hurricane status, and 1 to 4 to reach major hurricane status (Figure 1). For reference, the 2015 Atlantic hurricane season witnessed a slightly below-normal season overall, with 11 named storms, 4 of them hurricanes, 2 of which reached major status.

There are conflicting atmospheric and oceanic indicators adding uncertainty to this year's forecast. One indicator involves cooling water temperatures across the equatorial eastern Pacific Ocean, with the expectation for the previous El Niño to potentially transition into a La Niña toward the middle and end of this hurricane season. El Niño refers to the presence of abnormally warm sea surface temperatures across the eastern and central tropical Pacific Ocean, while La Niña refers to the opposite situation – in which abnormally cool sea surface temperatures occur across the eastern and central tropical Pacific Ocean. What do Pacific Ocean water temperatures have to do with hurricanes in the Atlantic Ocean? Well, typical conditions across the tropical Pacific Ocean are warmer water across the far western Pacific Ocean along with associated thunderstorm development, while the waters in the eastern tropical Pacific normally remain relatively cool, with limited thunderstorm activity. The opposite is true when an El Niño is present – the warmer waters and associated thunderstorm development then shift much further eastward in the tropical Pacific Ocean. When this occurs, winds within the upper levels of the atmosphere strengthen across the eastern Pacific Ocean, and stretch across the tropical Atlantic Ocean. These strong upper-level winds tend to rip apart thunderstorms across the Atlantic Ocean, limiting the potential for them to organize into tropical cyclones. Therefore, when an El Niño is present, overall tropical cyclone activity in the Atlantic Basin is typically less than normal.

During a La Niña, on the other hand, the warmer waters and associated thunderstorm development remain across the far western Pacific Ocean, while the waters across the eastern Pacific Ocean become cool, which reduces overall thunderstorm activity. This reduced thunderstorm activity also allows winds in the upper levels of the atmosphere to weaken, which also tends to occur downstream as well into the tropical Atlantic Ocean. Lighter winds tend not to rip apart thunderstorms across the tropical Atlantic Ocean, and actually enhance the potential for them to organize into tropical cyclones. Thus, when a La Niña is present, overall tropical cyclone activity in the Atlantic Basin tends to be higher than normal.

Most current indicators, such as recent water temperatures, wind patterns, and computer forecast projections of these fields over the next several months across the equatorial eastern Pacific Ocean strongly suggest that the El Niño which developed last year has weakened, with water temperatures running about normal for this time of year. In fact, there is some suggestion that a La Niña could develop by the end of the summer. Assuming this occurs, conditions should also favor upper-level winds becoming weaker than normal across the tropical Atlantic Ocean, thereby enhancing the potential for tropical cyclones to develop this season.

A second major factor incorporated into this season's forecast includes the lack of anomalously warm water temperatures across much of the tropical Atlantic Ocean as of early June, as shown in Figure 2, where the seedlings to eventual tropical cyclones traverse during the season. Tropical cyclones need warm ocean temperatures to gather strength – normally, water temperatures above 80^0 F. The initial atmospheric disturbances that can eventually transform into tropical cyclones pass across this region of the Atlantic on their long journey toward the western Atlantic. If water temperatures reach or exceed 80^0 F, these initial disturbances can organize and develop a circulation, possibly reaching tropical storm, or even hurricane, strength. Sea surface temperatures as of early June were generally around or slightly above normal in this region, also known as the Main Development Region for Atlantic tropical cyclones, and they are expected to drop to slightly below normal levels during the summer months. The fact that these water temperatures are forecast to drop to slightly below normal levels through the summer months is a potential limiting factor for expected Atlantic tropical cyclone development this year.

Yet another major factor which is included in the 2016 hurricane outlook is the role of the Atlantic Multi-decadal Oscillation (AMO). The AMO may exhibit a phase of a more active Atlantic hurricane season – also known as a "warm" phase (which has existed since 1995), or a more inactive, or "cold" phase, in which seasonal Atlantic hurricane activity is subdued. These phases tend to last over several decades, and are related to the West African monsoon system. The warm phase of the AMO is associated with enhanced African monsoon activity – which tends to allow for more frequent thunderstorm clusters to move off the west coast of Africa and into the Main Development Region of the Atlantic Ocean. These thunderstorm clusters can then develop into tropical cyclones assuming other conditions are favorable. However, during the cold phase of the AMO, there is reduced African monsoon activity, with fewer thunderstorm clusters moving off the West African coast. So – during these inactive phases, there are fewer initial atmospheric disturbances crossing the tropical Atlantic Ocean to potentially develop into tropical cyclones. As mentioned, the AMO has been in the active phase since 1995. However, there are some signals that this phase may be switching into the "cold" or inactive phase. Because of this uncertainty, confidence in the AMO this hurricane season is low.

It should be noted that in May 2015, NOAA's Climate Prediction Center forecasted a below-normal season for the Atlantic Basin, with a prediction of 6-11 named storms, with 3-6 reaching hurricane strength, and 0-2 attaining major hurricane status. As noted above, the actual result was 11 named storms - 4 of them hurricanes, 2 of which reached major status – well inside the 2015 forecast ranges.

So – the official forecast for the 2016 Atlantic hurricane season issued by NOAA's Climate Prediction Center favors a "near-normal" season, based on these three major factors. Any changes to these factors could easily alter this year's outcome. The Climate Prediction Center will issue an updated forecast in early August, taking into account changes in these and other factors, and will adjust the forecast accordingly. Also, the list of names of the Atlantic Basin tropical cyclones for the 2016 season is shown in Figure 3.

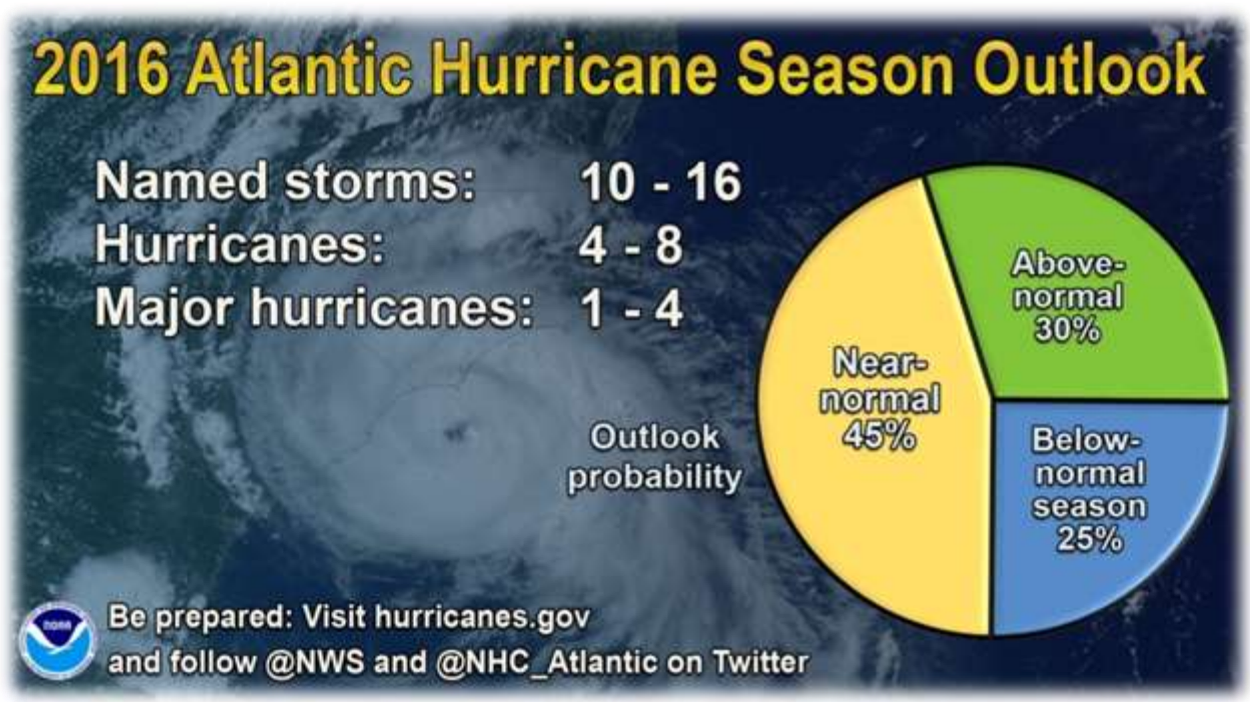

Figure 1. The official 2016 Atlantic Hurricane Outlook, issued by NOAA's Climate Prediction Center on May 27, 2016. The pie graph on the right indicates the overall probabilities favoring a below-normal, near-normal, or above-normal season for 2016.

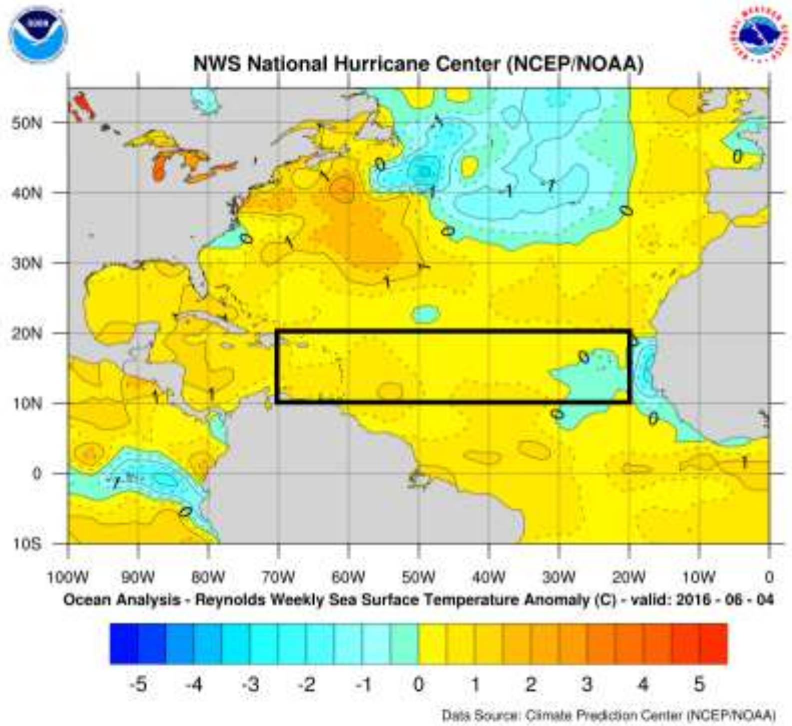

Figure 2. Anomalies of weekly averaged sea surface temperatures (degrees Celsius) in the Atlantic Ocean, centered on June 4 2016. The black rectangle denotes the Main Development Region, where Atlantic tropical cyclones are most likely to develop. Image from NOAA's National Hurricane Center and the Climate Prediction Center/NCEP.

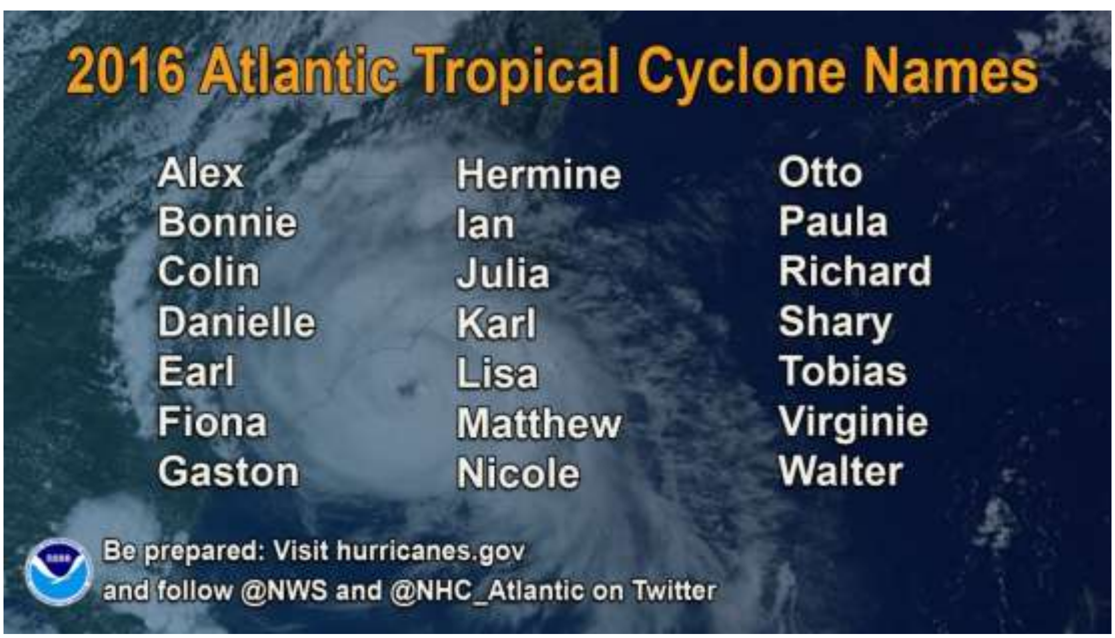

Figure 3. Names of the Atlantic Basin tropical cyclones for the 2016 season. Image from the NOAA's National Hurricane Center and the Climate Prediction Center/NCEP.

SPRING 2016: CLOSER TO NORMAL AFTER AN UNUSUALLY MILD AND DRY START

Evan L. Heller
Climatologist, NWS Albany, NY

Spring of 2016 averaged out to be nothing that out of the ordinary, but the first month started out way above normal. March kicked off climatological spring almost 8 degrees above normal. The average temperature was 42.7° (Table 1). This makes it tied for the 7th-warmest March on record in Albany. The average high and low for the month were also well above normal, and this placed it in ties within the top 10 of both Warmest Mean Maximum and Warmest Mean Minimum Marches, also (Table 3a). Three daily temperature records were established… focused mainly on what were…by far…the warmest two days of the month…the 9th and 10th. One was a record high on the 9th and two were record high means on the successive days.

March was relatively dry, but especially in regards to snowfall. Only 0.2" of the icy stuff fell during the month, placing it in a tie for 5th least snowiest March. The 1.18" precipitation total for March placed it in a 3-way tie at #172 amongst the 200 Driest Months of all-time in Albany. On top of all this, March was a notably windy month, as well. There were 4 daily record wind gusts established. In addition…an average wind speed of 20.6 mph on the 29th placed it in a 3-way tie for #109 for 200 Windiest Dates. Albany recorded its first thunderstorms of the season early…on March 16th and 17th (Table 4a), but thunderstorms did not occur again until late May (Table 4c).

April was far closer to normal. The mean temperature for the month was only less than 2 degrees below normal (Table 1). There was a very brief, very cold and blustery period from the 3rd through the 6th which resulted in 3 daily temperature records being broken from the 4th to the 5th…a record low, a record low maximum, and a record low mean (Table 3b). The last freeze of the season occurred on the 21st (Table 2b). The 4th also recorded a record daily snowfall (Table 3b) despite the unusually low amount for the entire snow season, and this was part of the only significant snowfall of the entire snow season, which began with 2.1" falling on the 3rd. Only a trace more fell over the remainder of the month (or season)…and this was on the 8th (Table 2b). The one daily wind speed record for the month occurred on the 3rd (Table 3b). Other than this, April was pretty normal. There were no records other than the 5 dailies.

Finally, May was closer to normal still, with it being only about a degree above normal. The month had only 3 records, again all dailies (Table 3c). The one 90+ degree date of spring, the 28th, produced the one daily maximum temperature record for the month, 93°, breaking the old record from way back in 1911 by 2 degrees. The daily high mean temperature for the same date was 80.0°, breaking the 1977 record by 3.0 degrees.

The only other record was a wind speed record on the 16th. For the season as a whole, the temperature wound up being only 2.4 degrees above normal (Table 1), and there were no seasonal records. Precipitation was about four and a half inches shy of normal, and snowfall for the March to May period was about half of normal for Albany.

STATS

	MAR	APR	MAY	SEASON
Average High Temperature/Departure from Normal	52.9°/+8.5°	57.2°/-1.1°	70.2°/+0.8°	60.1°/+2.7°
Average Low Temperature/Departure from Normal	32.5°/+6.8°	34.7°/-2.6°	48.7°/+1.6°	38.6°/+1.9°
Mean Temperature/ Departure From Normal	42.7°/+7.7°	46.0°/-1.8°	59.5°/+1.2°	49.4°/+2.4°
High Daily Mean Temperature/Date	64.5°/9th	67.0°/22nd	80.0°/28th	
Low Daily Mean Temperature /Date	23.0°/3rd	22.0°/4th	45.5°/15th	
Highest Temperature reading/Date	81°/9th	78°/18th	93°/28th	
Lowest Temperature reading/Date	17°/3rd & 5th	14°/5th	34°/10th	
Lowest Maximum Temperature reading/Date	29°/3rd	26°/4th	52°/4th & 15th	
Highest Minimum Temperature reading/Date	55°/10th	58°/22nd	71°/27th	
Total Precipitation/Departure from Normal	1.18"/-2.03"	1.84"/-1.33"	2.43"/-1.18"	5.45"/-4.54"
Total Snowfall/Departure from Normal	0.2"/-10.0"	6.4/+4.1"	0.0"/-0.1"	6.6"/-6.0"
Maximum Precipitation/Date	0.36"/28th	0.51"/26th	0.61"/30th	
Maximum Snowfall/Date	0.2"/21st	4.3"/4th	0.0"/-	

Table 1

NORMALS, OBSERVED DAYS & DATES

NORMALS & OBS. DAYS	MAR	APR	MAY	SEASON
NORMALS				
High	44.4°	58.3°	69.4°	57.4°
Low	25.7°	37.3°	47.1°	36.7°
Mean	**35.0°**	**47.8°**	**58.3°**	**47.0°**
Precipitation	**3.21"**	**3.17"**	**3.61"**	**9.99"**
Snow	**10.2"**	**2.3"**	**0.1"**	**12.6"**
OBS TEMP. DAYS				
High 90° or above	0	0	1	1/92
Low 70° or above	0	0	1	1/92
High 32° or below	1	1	0	2/92
Low 32° or below	15	11	0	26/92
Low 0° or below	0	0	0	0/92
OBS. PRECIP DAYS				
Days T+	19	16	18	53/92/58%
Days 0.01"+	9	9	10	28/92/30%
Days 0.10"+	4	4	7	15/92/16%
Days 0.25"+	2	3	4	9/92/10%
Days 0.50"+	0	1	1	2/92/2%
Days 1.00"+	0	0	0	0/92/0%

Table 2a

NOTABLE TEMP, PRECIP & SNOW DATES	MAR	APR	MAY
Last Snowfall	-	8th (T)	-
Last Freeze	-	21st (32°)	-
90+ Degree Date	-	-	93°/28th

Table 2b

RECORDS

ELEMENT	MARCH	
Daily Maximum Temperature Value/Date | Previous Record/Year	81°/9th	68°/2000
Daily High Mean Temperature/Date | Previous Record/Year	64.5°/9th	56.5°/2000
Daily High Mean Temperature/Date | Previous Record/Year	60.5°/10th	54.5°/1977
Daily Maximum Wind Speed Value/Direction/Date | Previous Record/Direction/Year	49 mph/W/1st	40 mph/W/1989
Daily Maximum Wind Speed Value/Direction/Date | Previous Record/Direction/Year	49 mph/W/17th	47 mph/NW/2015
Daily Maximum Wind Speed Value/Direction/Date | Previous Record/Direction/Year	44 mph/W/29th	40 mph/S/2003
Daily Maximum Wind Speed Value/Direction/Date | Previous Record/Direction/Year	44 mph/S/31st	41 mph/SE/1987
Top 10 Warmest Marches Value/Rank | Remarks	42.7°/#7	tie
Top 10 Warmest Mean Maximum Marches Value/Rank | Remarks	52.9°/#4	tie
Top 10 Warmest Mean Minimum Marches Value/Rank | Remarks	32.5°/#7	tie
Top 10 Least Snowiest Marches Value/ Rank | Remarks	0.2"/#5	tie
Top 200 Driest Months Value/Rank | Remarks	1.18"/#172	3-way tie
Top 200 Windiest Dates Value/Date/Rank | Remarks	20.6 mph/29th/#109	3-way tie

Table 3a

ELEMENT	APRIL	
Daily Minimum Temperature Value/Date | Previous Record/Year	14°/5th	15°/1982
Daily Low Maximum Temperature Value/Date | Previous Record/Year	26°/4th	29°/2003
Daily Low Mean Temperature Value/ Date | Previous Record/Remarks	22.0°/4th	22.0°/1874
Daily Maximum Snowfall Value/Date | Previous Record/Remarks	4.3"/4th	1.8"/1955
Daily Maximum Wind Speed Value/Direction/Date | Previous Record/Direction/Year	47 mph/SW/3rd	46 mph/S/2013

Table 3b

ELEMENT	MAY	
Daily Maximum Temperature Value/Date | Previous Record/Year	93°/28th	91°/1911
Daily High Mean Temperature/Date | Previous Record/Year	80.0°/28th	77.0°/1939
Daily Maximum Wind Speed Value/Direction/Date | Previous Record/Direction/Year	47 mph/S/16th	45 mph/NW/2012

Table 3c

ELEMENT	SPRING	
none	-	-

Table 3d

MISCELLANEOUS
MARCH

Average Wind Speed/Departure from Normal	9.4 mph/-0.2 mph
Peak Wind/Direction/Date	50 mph/W/2nd
Windiest Day Average Value/Date	20.6 mph/29th
Calmest Day Average Value/Date	2.2 mph/6th
# Clear Days	1
# Partly Cloudy Days	20
# Cloudy Days	10
Dense Fog Dates (code 2)	None
Thunder Dates (code 3)	16th & 17th
Sleet Dates (code 4)	None
Hail Dates (code 5)	None
Freezing Rain Dates (code 6)	None

Table 4a

APRIL

Average Wind Speed/Departure from Normal	8.4 mph/-0.9 mph
Peak Wind/Direction/Date	52 mph/W/3rd
Windiest Day Average Value/Date	16.3 mph/3rd
Calmest Day Average Value/Date	2.1 mph/17th
# Clear Days	5
# Partly Cloudy Days	17
# Cloudy Days	8
Dense Fog Dates (code 2)	4th
Thunder Dates (code 3)	None
Sleet Dates (code 4)	None
Hail Dates (code 5)	None
Freezing Rain Dates (code 6)	4th

Table 4b

MAY

Average Wind Speed/Departure from Normal	7.0 mph/-1.0 mph
Peak Wind/Direction/Date	47 mph/W/16th
Windiest Day Average Value/Date	17.3 mph/15th
Calmest Day Average Value/Date	2.5 mph/20th
# Clear Days	3
# Partly Cloudy Days	19
# Cloudy Days	9
Dense Fog Dates (code 2)	None
Thunder Dates (code 3)	27th, 29th & 30th
Sleet Dates (code 4)	None
Hail Dates (code 5)	None
Freezing Rain Dates (code 6)	None

Table 4c

LONG-TIME NWS ALBANY FORECASTER HUGH W. JOHNSON IV RETIRES

Evan L. Heller, with information provided by Ray O'Keefe, MIC

Hugh W. Johnson IV, General Forecaster at the National Weather Service in Albany, retired May 31st with nearly 32 years of government service, including over 20 years at the National Weather Service here in Albany. To our readers, he is best known for his many contributions to Northeastern StormBuster since its inception, dealing mostly with topics in climatology and El Niño, and severe weather. I am honored to have co-authored several of these articles with him. Hugh earned his Bachelor of Science degree in Meteorology from Millersville University in Pennsylvania in May of 1982, and then began his government service on March 21, 1983 with the Department of Defense, in mapping. June 27, 1983 marked the beginning of his career with NOAA, where he did aeronautical charting in Silver Spring, Maryland for 5 years. He left the government for a couple of years in March of 1988, to work in the private sector. His return to Federal service at the beginning of 1990 was the beginning of his quarter-century-long career with the National Weather Service, when he was selected for a Meteorologist Intern position at the Weather Service Office in Scranton, Pennsylvania. He was promoted to General Forecaster with his move to Albany on April 4, 1995.

Hugh made significant contributions to the NWS at Albany, including as the focal point for both its fire weather and aviation programs. He was involved in numerous outreach events, as well as operational research including collaborative work with the University at Albany. Hugh's main passion has always been the weather. In Scranton, he worked 33 hours during the Blizzard of March 13-14, 1993, issuing several dozen severe weather statements. He also worked during an unexpected severe weather event on July 10, 1993, where a squall line impacted central and eastern Pennsylvania with significant wind damage. His first day at the NWS at Albany was marked by a memorable severe weather event. He worked during the cool season severe weather and high wind event of February 17, 2006, and, most recently, the nocturnal February 23-24, 2016 cool season high wind, severe weather and flooding event. Finally, Hugh worked several hours during the catastrophic flooding of Irene in late August of 2011.

A retirement dinner was held for Huge on June 11th at a local golf course, where he was "roasted" by approximately 50 friends and family members. It was a joyous evening of laughter and reminiscing. Shortly thereafter, he and his wife, Rose, left for a much-needed vacation in the Great Lakes. Hugh will spend his retirement continuing his other passions of biking, writing and hiking, and has lots more travel planned with his wife. Being a long-time good friend of mine, he and I will continue to enjoy our walks, hikes and dining in fine restaurants together. Being one of the nicest and most genuine guys most of us here have ever known, his presence in the office will be surely be missed...although he has promised to visit We congratulate Hugh on his illustrious career and a retirement well-earned!

WEATHER *ESSENTIALS*

With Kevin S. Lipton

TYPICAL SUMMER WEATHER PATTERNS IN THE NORTHEASTERN U.S.

In a previous Weather Essentials article, we described typical storm tracks which affect our weather in the northeastern U.S., mainly during the "cold" season – autumn through early spring. Typically during these colder months of the year, the jet stream, or main upper level ribbon of air which tends to steer weather systems, is stronger, and dips farther south into the U.S. compared to the summer months.

The setting up of the jet stream is tied to the temperature variances that develop in the low- to mid-levels of the atmosphere – with colder air to the north or west, and warmer air to the south or east. The strength of the winds within the jet stream are related to these temperature variances across it – with stronger winds and faster-moving weather systems occurring when there is a large temperature gradient across it. Again, larger temperature variances tend to occur most often during the colder months. During the summer, the temperature gradient tends to become weak, as colder air to the north modifies with longer daylight time and a higher daytime sun elevation. Also, the jet stream tends to retreat farther north in summer, with a typical orientation being generally west to east along the U.S.-Canadian border (Figure 1).

During the summer months, a high pressure system off the eastern seaboard, known as a "Bermuda High," develops and often expands north and west, further shifting the jet stream north. In addition, when the Bermuda High sets up and strengthens, the clockwise flow around it tends to steer warm and humid air northward, contributing to those muggy days and nights we occasionally experience during summer.

Occasionally, disturbances riding along the jet stream will allow low pressure systems to track across southern Canada and into northern New England. Cold fronts associated with these systems then pass through, and as cooler air behind these fronts clashes with warm and humid air masses ahead of them, showers and thunderstorms can develop, some possibly strong or severe if winds in the upper levels of the atmosphere, and instability, are sufficient.

There are times during summer when the jet stream lifts so far north and west of the region that no fronts pass through. There may be several days of very warm or hot temperatures, along with high humidity levels. If temperatures reach or exceed 90 °F for three or more consecutive days, this is referred to as a "heat wave". During these times, there could be isolated to scattered slow-moving showers and thunderstorms which develop with the heat of the day, but they tend to be less severe compared to thunderstorms accompanying a cold front.

Although rare, there are times when tropical systems, or their weakening remnants, may also track around the western periphery of the Bermuda High and into the northeast states. One recent example was Irene in August 2011. These systems, although weaker than when making landfall on the coast, can still bring torrential rainfall and extensive flooding to the region, along with gusty winds.

As we head toward the end of summer, in late August and September, the jet stream tends to gradually strengthen yet again, and begins to settle back south, as daylight decreases and areas across Canada and the Polar regions cool down more rapidly. Frontal systems begin to pass through more frequently, although thunderstorm activity may decrease due to lowering instability with the decreasing daylight and gradually cooling temperatures. Also, large high pressure areas from Canada begin to extend south into the region, allowing for several days of cool and refreshing air. At this point, we are on our way toward autumn.

So, these are some of the typical weather patterns we experience across eastern New York and adjacent western New England during summertime. See if you can identify these patterns as we delve into summer!

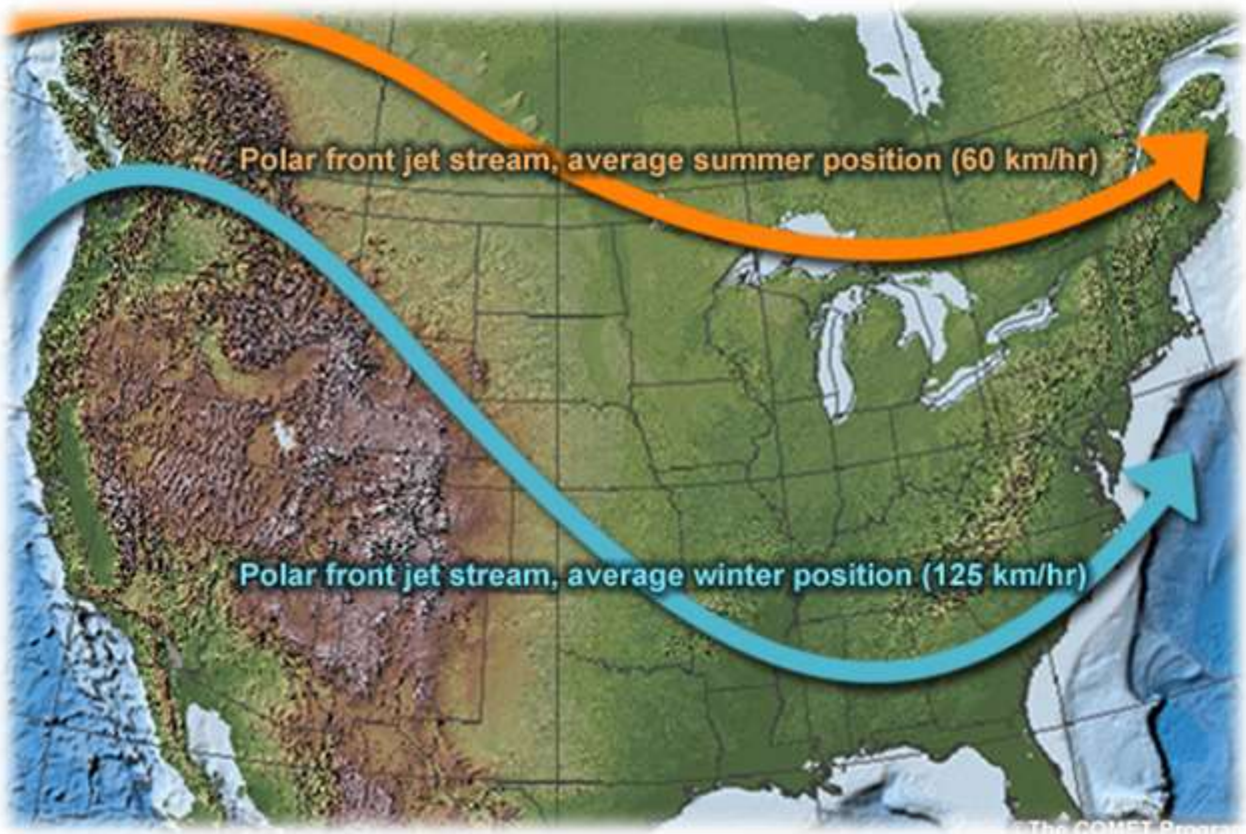

Figure 1. Typical jet stream patterns in winter and summer across the United States. **From the COMET program module "Forecasters' Overview of the Gulf of Mexico and Caribbean Sea".**

WEATHER WORD FIND

by Tom Wasula

Each word will be found in any one of 8 directions (vertical, horizontal or diagonals/forwards or backwards)

The solution to this puzzle will be provided in the Fall issue.

Severe Weather

U	L	A	Y	Y	Q	R	D	K	T	I	L	D	H	Q	R	F	Z	B	I	B	I	D	O	T
J	V	V	A	Q	D	O	V	P	U	K	N	I	O	P	Y	P	N	L	M	Y	U	Y	H	F
L	P	S	R	B	W	V	T	J	O	A	D	N	G	O	C	X	E	O	L	O	L	O	C	Z
U	T	P	Q	N	A	L	R	H	P	R	E	O	X	H	M	J	O	E	L	D	A	U	E	D
D	L	E	P	U	R	W	I	F	S	M	V	R	A	Z	T	Y	L	C	J	A	F	Q	R	T
T	K	O	H	E	A	E	W	A	R	N	I	N	G	L	B	N	F	U	L	M	M	D	E	Q
Z	U	Z	M	Q	I	L	A	K	E	Y	G	D	Y	A	I	L	I	H	H	A	S	D	D	V
R	J	Q	Y	X	Z	N	L	K	T	R	M	Y	X	A	E	A	B	N	P	G	T	F	O	T
O	H	B	T	N	Y	V	E	C	A	P	U	A	W	H	V	V	H	Z	G	E	V	Q	T	K
J	U	C	B	N	T	I	Q	I	W	H	K	Q	S	W	F	J	W	B	I	D	K	D	I	S
B	H	Y	B	T	D	S	W	A	L	L	C	L	O	U	D	N	D	M	N	Z	F	C	I	X
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C	F	F	Z	I	N	U	F	U	A	O	M	Q	J	V	W	F	V	D	H	H	R	R	V	N
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Z	V	X	V	C	B	Z	X	J	X	M	M	S	O	W	H	C	V	W	Z	A	F	L	I	C

CUMULONIMBUS
DOWNPOUR
LIGHTNING
MICROBURST
SHELFCLOUD
TORNADO
WATERSPOUT

DAMAGE
FLOOD
MAMMATUS
RADAR
SQUALL
WALLCLOUD
WIND

DERECHO
HAIL
MESOCYCLONE
SATELLITE
THUNDER
WARNING

Tropical Weather Jumble

Please unscramble the words below

1. eahcrurin	______	Winds of at least 74 mph.
2. eey wlal	______	Intense Winds
3. dianrbna	______	Heavy rain, tornadoes, and winds
4. strmo sreug	______	Most significant damage
5. ogoidfnl	______	Costliest Presidential Disaster Declarations

From the Editor's Desk

It is already a week into astronomical summer and we have a small issue for you this time around. We kick things off with the annual hurricane prediction, followed by the spring climate wrap-up. Then we pay tribute to a long-time colleague and frequent Northeastern StormBuster contributor who is calling it a career.

In our Departments section, Kevin Lipton talks about summer weather patterns in his Weather Essentials section. Plus…we have a new section by Tom Wasula that contains weather-related puzzles. We're not exactly sure how this will evolve yet…but our first offerings are a word find and a weather jumble. We will provide the solution to each issue's puzzle in the issue that follows. See how many you can find in this issue!

It wasn't a very active spring regarding weather and I know that's a big disappointment for a lot of you, but we have an entire summer to make up ground. In the meantime, the 4th of July is right around the corner, and explosions of fireworks will be quite common now that the sale of fireworks is legal in the State of New York. Good weather provides opportunities for picnics, pool parties, outdoor concerts and other warm-weather fun. Take time to partake and relax, and enjoy our articles, too, and we'll see you in the fall.

WCM Words

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"Summer time and the livin' is easy". A line from an Ella Fitzgerald song. While most people relish summer and with it the warm weather, barbecues, swimming and vacations, summer brings about a large variety of hazardous weather. Heat, tropical storms, and lightning are a few.

The first article above explains the 2016 Atlantic Basin Hurricane Outlook from the National Oceanic and Atmospheric Administration (NOAA)… http://www.cpc.ncep.noaa.gov/products/outlooks/hurricane.shtml. Hurricanes can have destructive winds, devastating storm surge, and their heavy rain can cause widespread flooding. The forecast is for a normal year as far as Atlantic tropical storm activity is concerned, but it is important to remember that it takes only one storm to hit your area in order to make it an active year for you.

On average, over the past 30 years, the number one cause of weather related fatalities is heat, with about 130 fatalities per year…http://www.nws.noaa.gov/os/hazstats.shtml. When the temperature and heat index rise, we need to limit our exposure to heat. To help prevent heat illness, limit time in the heat, drink plenty of fluids, rest periodically and stay out of the sun. Also, keep kids…and pets…out of hot cars. "Look before you lock."

Another summertime hazard is lightning. In 2015, lightning claimed 48 lives in the United States. All thunderstorms contain dangerous lightning. There is no safe place outdoors during a thunderstorm. If you can hear thunder you can be struck by lightning. Lightning safety recommendations from the Occupational Safety and Health Administration (OSHA) and NOAA for those working outside can be found at:
http://www.weather.gov/media/aly/Safety/Lightning_Safety.pdf

Enjoy the "easy livin" while summer is here. Relax with cool lemonade or iced tea and take time to do the Weather Word Find or the Tropical Word Jumble. Have a great summer, and remember, have a plan to protect your safety should severe weather threaten.

Here at the National Weather Service, we strive to be the source of unbiased, reliable and consistent weather information. We're here to answer your weather and water questions 24 hours a day, 7 days a week. If you have concerns, please call us. If you have comments on Northeastern StormBuster, or any of the operations of the National Weather Service, please let me know at Stephen.Dirienzo@noaa.gov.