



<http://www.jhuapl.edu/weather/education/ACONdata.html>

ATLANTIC COAST OBSERVER NETWORK, MD / DE / DC CHAPTER WITH DATA FROM NEARBY AREAS

EARLY MORNING THUNDERSTORMS ON THE 17TH BROUGHT AN EF-1 TORNADO TO BALTIMORE

Temperatures averaged above normal for the ninth consecutive month but the departure was the narrowest of the streak. This was the first year since 1997 that the maximum temperature failed to reach 70° at the NWS stations in Baltimore / Washington region.

The month began with sub freezing minimum temperatures north and west of Washington except for the Baltimore urban areas. Maximum temperatures generally remained below 60° for the first eleven days of the month.

The warmest portion of the month occurred from the 12th to the 23rd. Maximum temperatures were in the 60's on a majority of the days during this period. Dry air from the 12th to the 14th created a diurnal temperature range of 30 to 40 degrees.

The warmest temperatures of the month occurred on the 23rd. **John Zyla of Ridge** reported 72° while 71° was reported by **Jug Bay Wetlands at Lothian, Marty Brumback of Bryans Road 2 ESE** and **Wes Gleason of Hollywood 3 ENE**.

The coldest period occurred from the 24th to the 29th. Clear calm air under the highest pressure of the month created ideal conditions for a heavy frost and cold temperatures on the morning of the 29th. Temperatures generally fell into the low to mid 20's in colder locations. **Greg Latta of Frostburg** reported 17°, **Nate Mullins of LaVale, Eric Glass of Emmitsburg 2 SE** and **Greg Keefer of Hagerstown 1 E** each 21°.

Precipitation this month was below normal. No measurable snow fell east of the mountains.

Only four precipitation events occurred this month. The event around the 4th saw over an inch of rain over most of the region except for Central Delaware southwards. The heaviest rains fell in Northern Delaware. **Newark DE Ag Farm DEOS** reported 1.74" and **Gary Gallaher of Bear 2 SW DE** reported 1.72".

Conditions remained dry after the rains ended early on the 5th to the 15th.

Maximum temperatures were in the upper 50's to mid 60's minimums were in the 30's and 40's. Freezing temperatures occurred from the 11th to the 14th at many stations.

Rain, some heavy, strong winds peaking over 50 MPH along with some thunder occurred the night of the 16th and pre-dawn hours of the 17th. A tornado was confirmed in Baltimore (see pages 3 & 4 for more details). **Rich Giannola of JHU/APL** reported 57 MPH, **Jim Vaughn of Smithsburg 2 NE** 56 MPH, **Gary Gallaher of Bear 2 SW DE** 51 MPH and **Bobby Miller of Millers 4 NE** 51 MPH.

Moderate temperature returned and remained till Thanksgiving.

Light rains began on Thanksgiv-

EXTREMES REPORTED BY

ACON OBSERVERS

MAXIMUM TEMPERATURE

Ridge	72
Lothian	71
Bryans Road 2 ESE	71
Hollywood 3 ESE	71

MINIMUM TEMPERATURE

Davis 3 SE WV	17
Frostburg	17
Smithsburg 1.5 SW	20
LaVale	21
Emmitsburg 3 SE	21
Hagerstown 1 E	21

WARMEST AVG. TEMP.

Baltimore 2 SE	51.2
Hollywood 3 ENE	50.5
Ridge	50.5

COLDEST AVG. TEMP.

Davis 3 SE WV	38.1
Frostburg	39.3
LaVale	42.8
Smithsburg 1.5 SW	43.1

MAXIMUM PRECIPITATION

LaVale	4.06
Davis 3 SE WV	4.03
Smithsburg 1.5 SW	3.38

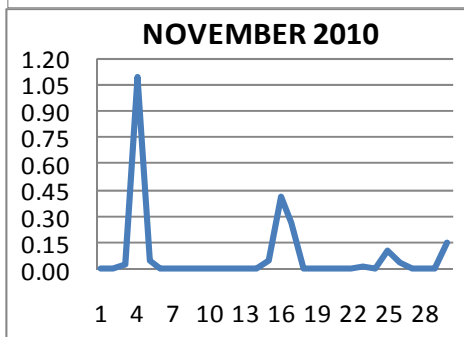
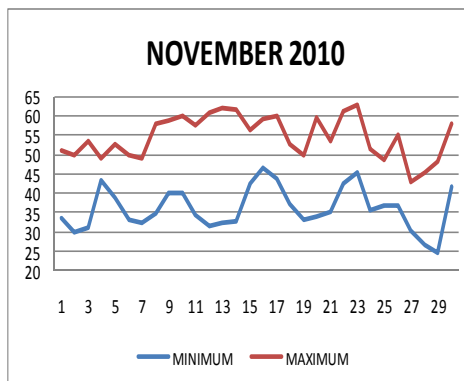
MINIMUM PRECIPITATION

Georgetown 5 SW DE	1.24
Ridge	1.31
Hollywood 3 ENE	1.37

MAXIMUM SNOWFALL

Davis 3 SE WV	5.7
9 Stations	T

ing, the 25th, as a very brief period of sleet at some locations, ended on the 26th. Liquid amounts from this



ACON MD/DE Network

Daily average temperatures and precipitation based on observation times, not calendar days.

Continued on Page 3

OBSERVER COMMENTS FOR NOVEMBER 2010

Gary Gallaher of Bear 2 SW, DE

Temperatures averaged slightly above normal. Month max temp of 66° was one degree shy of the lowest Nov max temp of 65 set in 1997.

17th - Squall line with 51 MPH wind gust @ 2:28AM caused some tree damage in the neighborhood.

29th - Clear sky and calm winds under high pressure allowed temps to fall to 22° and created a very heavy frost.

Greg Latta of Frostburg

25th - Sleet & glaze during the previous 24 hour period ending at obs time (7 AM).

Nate Mullins of LaVale

Temperatures were slightly above normal making it the ninth consecutive month with above temperatures.

9th - 14th - Mostly fair and mild weather with little wind.

25th - Showery and chilly day. Snow, sleet, freezing rain was observed at higher elevations.

30th - Dec 1 - 2.73" of rain of which 1.42" which fell on the 30th broke the old daily record of 0.90" set in 1967.

Jeff Stoudt of Laurel 2 E

2nd - First freeze or heavy frost of the fall.

4th - Rain tapered off mid PM.

22nd - Heavy fog and -DZ during morning rush period.

Marty Sharrow of Owings Mills

15th - AM fog then clouds and cooler.

17th - Thunderstorm 0120 to 0130.

29th - Frosty start then sunny and chilly.

Joe Manfre of Baltimore 2SE

16th - Cloudy, cool, rain till late evening.

30th - Occasional rain, windy in evening.

Ralph Hartsock of Westminster 4 SSE

4th - All day soaking rain, 1.11".

16th - 17th - Very intense rain overnight, high winds.

27th - Colder, 1st flurries, partly cloudy, windy.

Bobby Miller of Millers 4 NE

2nd - Heavy frost, killing freeze, few cirrus clouds.

12th - Clear deep blue sky 100% sunshine, minimum relative humidity 19%.

17th - Thunderstorm with 51 MPH PWG at 1 AM.

25th - Rain sleet mix at 8:15 AM.

Ray Muller of Westminster City

25th - Ice pellets 0730 - 0735.

Eric Glass of Emmitsburg 2 SE

22nd - Heavy fog at 0700.

23rd - Low ground fog, clear sky at 0700.

Rich Giannola of JHU/APL

17th - 57 MPH SSW @ 1:09 AM.

Rob Cohen of Potomac 4 N

17th - Thunderstorm 12:30 AM, very windy day.

22nd - Morning fog.

26th - Colder thru the day.

Rich Giannola of Olney 1 S

1st - Morning scattered frost.

3rd - Morning frost, rain began late in evening.

Richard Holden of Clarksburg 2 ENE

16th - Heavy rain.

27th - Light snow.

Stan Rossen of Glenmont 1 NNE

29th - Early morning visibility 1/3 mile.

Kevin Shaw of Gaithersburg 2 WNW

7th driest November in 32 years of records. Temperatures averaged above normal due to the above average minimum temperatures. The monthly maximum temperature of 63° was the lowest since 1997 when it was 61°.

27th - Variable clouds, cold, blustery.

30th - Cloudy, mostly AM light rain, fog.

Joe Terry of Forest Glen

4th - Cold, wet, and dreary with 100% RH all day.

12th - Large 40° temperature range (69/29). Minimum RH only 14%.

17th - Rather significant thunderstorm around 0100, unusual for November. It produced 0.25" of rain in 4 minutes and wind gusts to 25 MPH.

Brian Smith of Oxon Hill

2nd - Widespread frost.

28th - The growing season ends at Oxon Hill.

John Zyla of Ridge

14th - Beautiful day, spectacular fall color.

29th - First frost this season in AM.

Max Hutto of Smithsburg 1.5 SW

8th - Sunny, warmer, windy.

17th - Overnight thunderstorms, mild, very windy.

Greg Keefer of Hagerstown 1 E

3rd - Hard freeze & heavy frost. Sunny, rain began just before midnight.

16th - Rain overnight and all day, moderate at times. Gusty ESE winds to 32 MPH.

17th - Fast moving thunderstorm just after midnight with brief heavy rain and gusty winds to 25 MPH.

Jim Vaughn of Smithsburg 2 NE

November was drier and slightly cooler than normal.

2nd - Min temperature of 24° tied daily low set in 1993.

16th - Wind gust of 56 MPH.

17th - Wind gust of 47 MPH.

30th - Wind gust of 60 MPH.

Lance Shaffer of Sterling 4 N VA

1st - Very nice cool day.

20th - Quick warm-up.

27th - Winter like weather today, but no snow.

Dave Leshner of Davis 3 SE WV

6th - Snow ending shortly after midnight with partial clearing at daybreak, then clouding over again with periods of very light snow from mid afternoon through the evening.

Compiled by Gary Gallaher, MD/DE ACON Data Collector and Report Writer, from data received from dedicated observers. Without your observations each month this report will not be possible.

Continued from Page 1

event were generally less than a quarter of an inch.

The final storm of the month, which began on the 30th, brought with it maximum temperatures in the 50's and 60's. **Nate Mullins** of **LaVale** reported 1.42" of

rain. Precipitation amounts east of Washington County for the 30th were less than a quarter of an inch. A majority of rain from this event fell on December 1st.

Baltimore City / County EF1 Tornado of November 17th.

PUBLIC INFORMATION STATEMENT
NATIONAL WEATHER SERVICE BALTIMORE MD/WASHINGTON DC
601 PM EST THU NOV 18 2010

...NATIONAL WEATHER SERVICE CONFIRMS EF-1 TORNADO IN BALTIMORE CITY AND BALTIMORE COUNTY ON WEDNESDAY MORNING NOVEMBER 17 2010...

LOCATION...HAMILTON IN BALTIMORE CITY AND PARKVILLE IN BALTIMORE COUNTY MARYLAND

DATE...NOVEMBER 17 2010

ESTIMATED TIME...1:35 AM EST

MAXIMUM EF-SCALE RATING...EF1

ESTIMATED MAXIMUM WIND SPEED...100 MPH

MAXIMUM PATH WIDTH...250 YARDS

PATH LENGTH...0.4 MILES

BEGINNING LAT/LON...39.3665N / 76.5705W

ENDING LAT/LON...39.3772N / 76.5601W

* FATALITIES...NONE

* INJURIES...3 MINOR

* THE INFORMATION IN THIS STATEMENT IS PRELIMINARY AND SUBJECT TO CHANGE PENDING FINAL REVIEW OF THE EVENT(S) AND PUBLICATION IN NWS STORM DATA.

...SUMMARY...

AFTER AN EXTENSIVE REVIEW OF NATIONAL WEATHER SERVICE AND FEDERAL AVIATION ADMINISTRATION WEATHER RADARS...GROUND OBSERVATIONS... AN AERIAL SURVEY...AND EYEWITNESS ACCOUNTS...THE BALTIMORE/WASHINGTON WEATHER FORECAST OFFICE OF THE NATIONAL WEATHER SERVICE HAS DETERMINED THAT A TORNADO ESTIMATED AT A CATEGORY 1 ON THE ENHANCED FUJITA SCALE STRUCK NORTHEAST BALTIMORE DURING THE EARLY MORNING HOURS OF WEDNESDAY NOVEMBER 17TH...WITH ESTIMATED WIND SPEEDS FROM 85 TO 100 MPH.

THE TORNADO WAS FORMED WITHIN A LINE OF THUNDERSTORMS WHICH SPANNED FROM PENNSYLVANIA TO NORTH CAROLINA ON WEDNESDAY MORNING NOVEMBER 17TH. THIS LINE OF THUNDERSTORMS WAS RACING TOWARDS THE NORTHEAST AT 70 MPH AS IT CROSSED THE BALTIMORE/WASHINGTON REGION. IT IS HYPOTHESIZED THAT A STRONG DOWNBURST OF WIND...ALSO KNOWN AS A REAR-INFLOW JET...DESCENDED FROM APPROXIMATELY ONE MILE HIGH IN THE ATMOSPHERE DOWN TO THE GROUND...AND BECAME COINCIDENT WITH THE LINE OF THUNDERSTORMS AS IT MOVED ACROSS THE CITY OF BALTIMORE.

THIS STRONG DOWNBURST OF WIND CAUSED A BREAK IN THE LONG LINE OF THUNDERSTORMS AND CREATED TWO SEPARATE THUNDERSTORM LINE SEGMENTS. THE STRONG DOWNBURST OF WIND CONTINUED TO MODIFY THE THUNDERSTORMS...CREATING A SWIRLING WIND AT THE SOUTH END OF THE NEWLY FORMED NORTHERN SEGMENT. THE SWIRLING WIND IN THIS TYPE OF THUNDERSTORM SYSTEM IS OFTEN REFERRED TO AS A BOOKEND VORTEX...AND IT RESULTED IN THE GENERATION OF A BRIEF EF-1 TORNADO.

THE PATH OF WIND DAMAGE FROM THE THUNDERSTORMS THAT ALSO PRODUCED THE BRIEF TORNADO STARTED ON THE WESTERN EDGE OF MORGAN STATE UNIVERSITY IN NORTHEAST BALTIMORE CITY AND THEN CONTINUED FOR APPROXIMATELY 5 MILES TO THE NORTHEAST TO GUNPOWDER STATE PARK IN BALTIMORE COUNTY. IT SHOULD BE NOTED THAT THE VAST MAJORITY OF WIND DAMAGE ALONG THE 5 MILE LONG PATH WAS DUE TO STRAIGHT LINE WINDS FROM THE DESCENDING REAR-INFLOW JET AS IT HIT THE GROUND...REFERRED TO AS A MACROBURST. EMBEDDED WITHIN THE DAMAGE PATH OF THIS MACROBURST WERE TWO AREAS OF DAMAGE THAT ARE ASSOCIATED WITH THE EF-1 TORNADO.

Continued on Page 4

NOVEMBER 2010 MD/DE ACON

CONTINUED FROM PAGE 3

THE DAMAGE FROM THE EF-1 TORNADO WAS IN TWO SEPARATE AREAS A HALF MILE APART. THE FIRST AREA WAS ONE-TENTH OF A MILE LONG AND 175 YARDS WIDE THAT INCLUDED THE DUTCH VILLAGE APARTMENT COMPLEX. THREE OF THE UNITS HAD THEIR ROOFS BLOWN OFF. THE ROOFS WERE NOT CLIPPED TO THE STRUCTURES. THERE WAS EXTENSIVE TREE DAMAGE. SEVERAL CARS WERE SHIFTED BY THE FORCE OF THE WIND. THE TORNADO LIFTED BRIEFLY. THEN THE SECOND AREA... APPROXIMATELY A HALF MILE NORTH OF THE FIRST AREA...WAS ONE-THIRD OF A MILE LONG AND 250 YARDS WIDE...CENTERED ON THE PERRING PARKWAY SHOPPING CENTER IN PARKVILLE. EVIDENCE OF THE TORNADO INCLUDED RETAIL PROPERTY SURVEILLANCE CAMERAS WHICH SHOWED DEBRIS BLOWING IN DIFFERENT DIRECTIONS...TREES AND LIGHT POLES FALLING IN A CONVERGENT PATTERN...EYEWITNESS REPORTS...AND LEAF SPATTER ON ALL FOUR SIDES OF AUTOMOBILES AND STRUCTURES.

WITH THE SPEED OF THE STORMS MEASURED AT 70 MPH...ALONG WITH A DAMAGE PATH OF 5 MILES FROM THE THUNDERSTORM...IT IS DETERMINED THAT IT TOOK ONLY 4 MINUTES FOR THE MACROBURST TO ACCOMPLISH ITS 5 MILE PATH OF DAMAGE. WITHIN THIS 4 MINUTE TIMEFRAME...THE EF-1 TORNADO WAS ON THE GROUND FOR LESS THAN 1 MINUTE.

THE STORM PREDICTION CENTER IN NORMAN OKLAHOMA...IN CONJUNCTION WITH THE BALTIMORE/WASHINGTON WEATHER FORECAST OFFICE...ISSUED A SEVERE THUNDERSTORM WATCH FOR THE REGION AT 12:06 AM EST WEDNESDAY. A SEVERE THUNDERSTORM WATCH IS ISSUED WHEN CONDITIONS ARE FAVORABLE FOR DAMAGING THUNDERSTORMS. THIS ADVANCE NOTIFICATION WAS APPROXIMATELY 90 MINUTES PRIOR TO WHEN DAMAGE OCCURRED IN BALTIMORE CITY AND BALTIMORE COUNTY.

THE BALTIMORE/WASHINGTON WEATHER FORECAST OFFICE ISSUED A SEVERE THUNDERSTORM WARNING FOR BALTIMORE CITY AND COUNTY AT 1:04 AM EST WEDNESDAY MORNING. A SEVERE THUNDERSTORM WARNING IS ISSUED WHEN WINDS OF GREATER THAN 58 MPH ARE EXPECTED. THIS WARNING PROVIDED APPROXIMATELY 32 MINUTES OF LEAD TIME PRIOR TO WHEN THE DAMAGE OCCURRED IN BALTIMORE CITY AND BALTIMORE COUNTY.

THE NATIONAL WEATHER SERVICE BALTIMORE/WASHINGTON WEATHER FORECAST OFFICE WOULD LIKE TO THANK THE BALTIMORE COUNTY OFFICE OF HOMELAND SECURITY AND EMERGENCY MANAGEMENT...THE BALTIMORE CITY MAYORS OFFICE OF EMERGENCY MANAGEMENT...THE BALTIMORE COUNTY POLICE DEPARTMENT... THE BALTIMORE CITY POLICE DEPARTMENT...AND THE MARYLAND EMERGENCY MANAGEMENT AGENCY FOR THEIR ASSISTANCE IN THE SURVEY.

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