

## **2013: A Review of the Year's Weather across Central Kentucky and South-Central Indiana**

2013 featured less extreme weather compared with 2012. Temperatures, averaged over the whole year, were much closer to normal as compared with our record warm 2012. We had a cold March in 2013, as compared with the record warm March in 2012. Also our summer was wet and somewhat cool, as opposed to our hot and dry summer in 2012. 2013 was a wet year, with adequate rainfall spread throughout the year with no extended dry periods.

### **2013 Monthly Temperature Statistics for Louisville, Lexington, Bowling Green & Frankfort:**

<b>Average Monthly Temperature (Departure from Normal )</b>	<b>Louisville</b>	<b>Lexington</b>	<b>Bowling Green</b>	<b>Frankfort</b>
January	38.0 (+3.1)	35.6 (+2.7)	39.8 (+4.1)	35.7 (+3.2)
February	37.7 (-1.1)	35.2 (-1.9)	40.0 (-0.2)	35.0 (-1.4)
March	41.1 (-6.7)	39.5 (-6.0)	42.9 (-5.5)	38.4 (-6.5)
April	58.4 (+0.4)	56.0 (-0.7)	58.4 (+0.7)	54.1 (-1.1)
May	68.6 (+1.6)	66.2 (+2.0)	68.0 (+1.6)	65.1 (+1.2)
June	75.9 (+0.3)	73.7 (+1.0)	75.9 (+0.9)	72.7 (+0.1)
July	76.9 (-2.4)	74.5 (-1.7)	76.3 (-2.4)	73.9 (-2.4)
August	77.7 (-0.7)	74.9 (-0.4)	76.2 (-1.3)	74.1 (-1.1)
September	72.4 (+1.4)	69.7 (+1.6)	70.8 (+0.7)	68.8 (+1.2)
October	59.1 (-0.4)	57.6 (+0.6)	58.7 (-0.1)	56.1 (-0.3)
November	44.8 (-3.9)	43.4 (-2.9)	43.8 (-4.7)	41.2 (-4.8)
December	38.6 (+0.7)	38.0 (+2.0)	38.8 (+0.2)	36.1 (+0.8)
<b>2013 Total</b>	<b>57.4 (-0.8)</b>	<b>55.4 (-0.2)</b>	<b>57.5 (-0.5)</b>	<b>54.3 (-1.0)</b>

### **Monthly Precipitation:**

<b>Monthly Precipitation (Departure from Normal )</b>	<b>Louisville</b>	<b>Lexington</b>	<b>Bowling Green</b>	<b>Frankfort</b>
January	5.10 (+1.86)	4.46 (+1.26)	5.49 (+1.88)	5.00 (+1.74)
February	1.92 (-1.26)	1.52 (-1.68)	2.20 (-1.76)	1.64 (-1.65)
March	4.25 (+0.08)	5.35 (+1.28)	5.21 (+0.80)	4.19 (-0.19)
April	3.75 (-0.26)	4.87 (+1.27)	6.70 (+2.36)	3.18 (-0.51)
May	4.03 (-1.24)	5.66 (+0.40)	4.93 (-0.68)	4.66 (-0.19)
June	4.30 (+0.51)	7.54 (+3.10)	2.37 (-1.83)	6.51 (+2.42)
July	5.26 (+1.03)	9.10 (+4.45) *6	9.67 (+5.57) *5	7.72 (+3.33)
August	3.20 (-0.13)	5.14 (+1.89)	6.13 (+2.80)	2.16 (-1.20)
September	2.70 (-0.35)	1.63 (-1.28)	5.09 (+1.16)	1.72 (-1.61)
October	9.94 (+6.72) *1	6.23 (+3.10) *7	4.04 (+0.66)	5.77 (+2.53)
November	3.72 (+0.13)	2.45 (-1.08)	2.82 (-1.40)	2.67 (-1.06)
December	5.43 (+1.60)	5.58 (+1.65)	5.01 (+0.21)	4.94 (+0.93)
<b>2013 Total</b>	<b>53.60 (+8.80)</b>	<b>59.53 (+14.47)</b> *7	<b>59.66 (+9.9)</b>	<b>50.16 (+4.65)</b>

Above, blue indicates the month's rank in the top 10 wettest months (years) on record for that location.

**Temperature/Wind:**

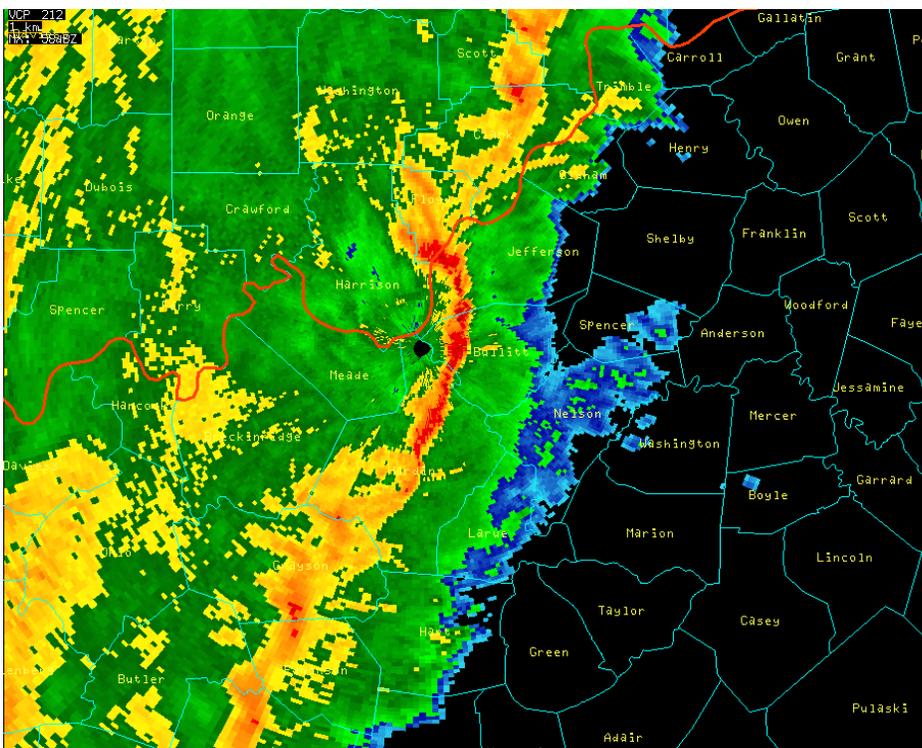
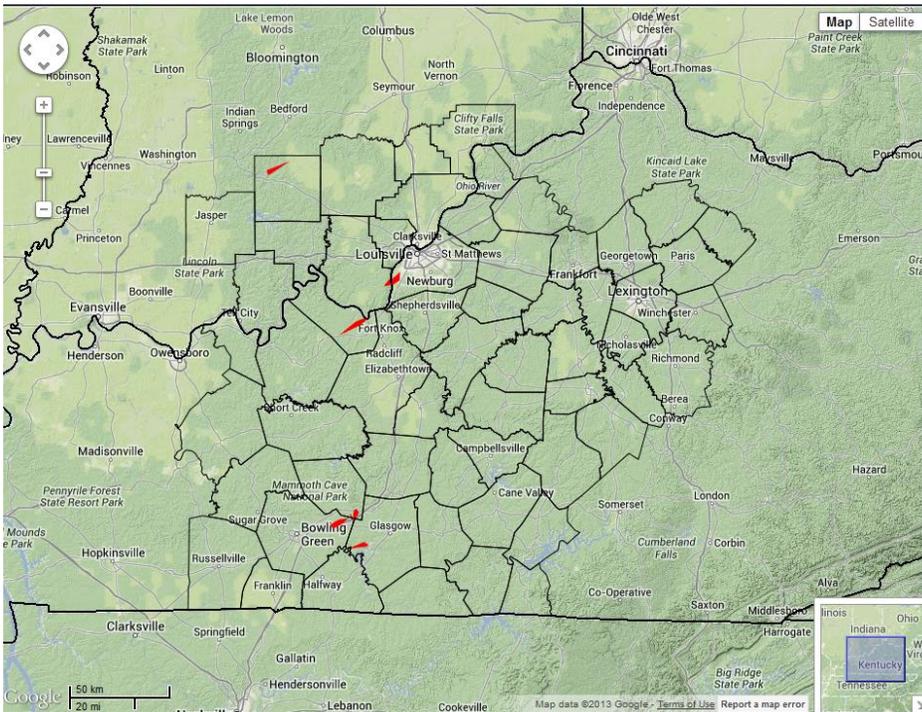
Category	Louisville	Lexington	Bowling Green	Frankfort
Highest temperature	96 Aug 28 <sup>th</sup>	95 July 17 <sup>th</sup>	95 June 12 <sup>th</sup>	94 July 17 <sup>th</sup> and Aug 31 <sup>st</sup>
Lowest temperature	9 Feb 1 <sup>st</sup>	5 Feb 1 <sup>st</sup>	14 Feb 1 <sup>st</sup>	6 Feb 1 <sup>st</sup>
Yearly max sustained winds	43 July 10 <sup>th</sup>	47 Dec 21 <sup>st</sup>	45 Dec 21 <sup>st</sup>	37 Dec 21 <sup>st</sup>
Yearly max wind gust	64 July 10 <sup>th</sup>	65 Dec 21 <sup>st</sup>	62 Dec 21 <sup>st</sup>	58 Dec 21 <sup>st</sup>

**Monthly Snowfall:**

Monthly Snow Total (inches)	Louisville	Lexington	Bowling Green
January	2.2	2.5	0.3
February	3.2	2.6	1.0
March	1.7	4.0	2.5
October	T	T	0.0
November	0.5	1.4	1.1
December	5.3	0.6	0.1
<b>2013 Total</b>	<b>12.9</b>	<b>11.1</b>	<b>5.0</b>

## January 2013 Tornado outbreak...

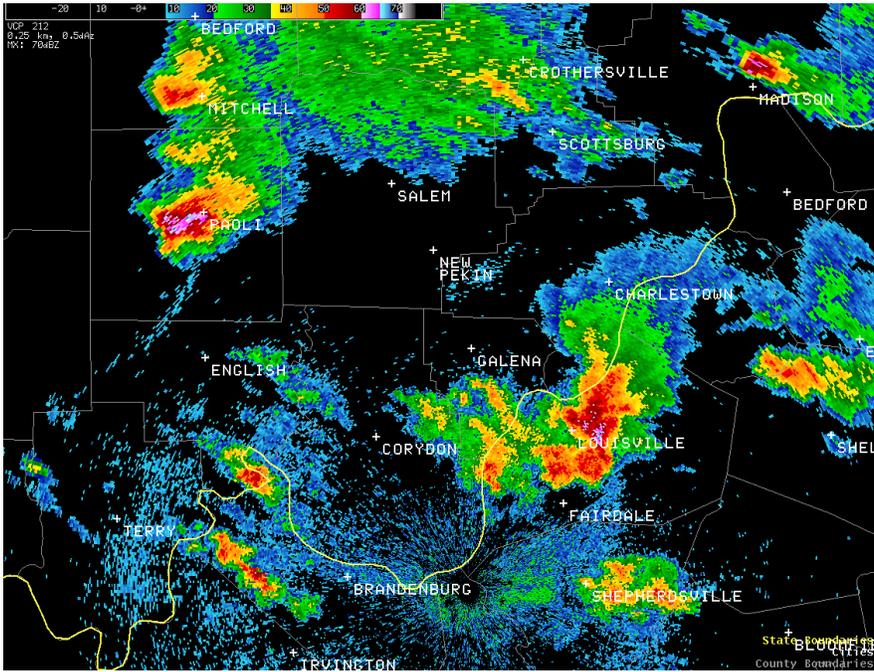
In what seems to have become a common occurrence recently, we experienced another in a string of mid-winter severe weather outbreaks. A squall line developed during the early morning hours on Jan 30<sup>th</sup>, and brought several tornadoes to the Commonwealth and southern Indiana. The image below shows the location of each of the 7 tornadoes that developed that day. Another image shows radar reflectivity right when this squall line was approaching the Ohio River west of Louisville. Near this time the line was producing tornadoes in eastern Meade and western Jefferson County.



## Hail...

March 2013 featured a hail storm near Bowling Green. On the 24<sup>th</sup>, small hail around the size of pennies fell like snow across Bowling Green and the rest of Warren County. This picture below, courtesy of Billy Carder, shows a street and an adjoining parking lot whitened by hail.





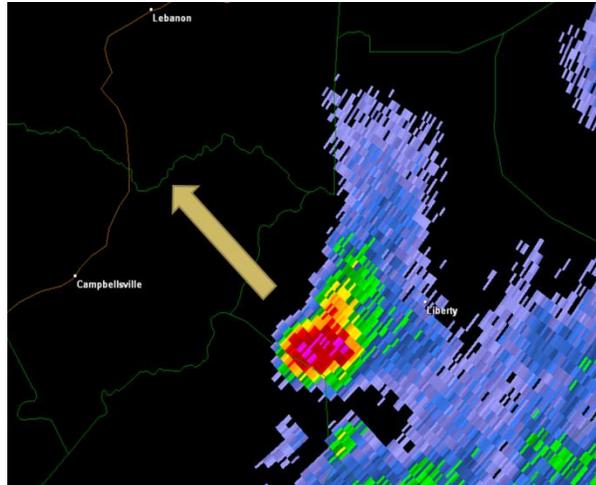
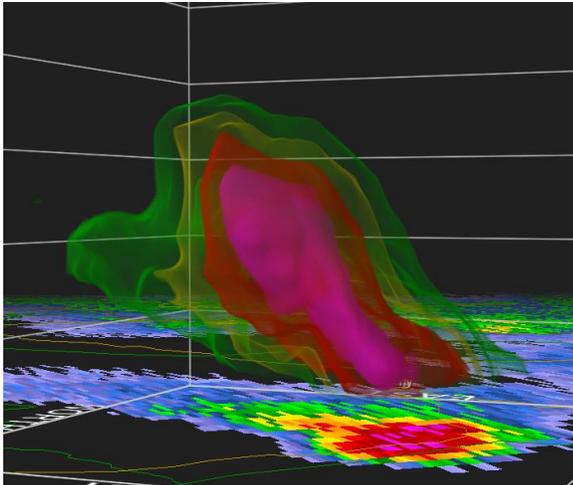
Large hail also developed during the evening hours on April 16<sup>th</sup>. Two supercells are apparent in the image to the left. One, over Paoli, Indiana, brought golf-ball sized hail. The other storm, shown over Louisville, dumped one inch hail at Bowman Airport.

The season's largest hail fell May 18<sup>th</sup> in LaRue County. Hail up to 2 inches in diameter was collected by David Mather, as shown below.



## *Hail from a rare left-moving supercell...*

On July 13<sup>th</sup> an area of mostly weak thunderstorms developed across the Lake Cumberland Region. A 500mb trough to our west brought southerly flow, so these thunderstorms moved north. One acquired supercell characteristics and developed a clockwise rotation. This rotation is opposite from the counterclockwise rotation that most supercells exhibit. This storm moved northwest and brought golf-ball sized hail to Casey County. Below are two images of this storm. The first is a vertical cross section that shows a large hail core in purple. The second shows the storm over Casey County and the direction of its movement.



## *Tornadoes...*

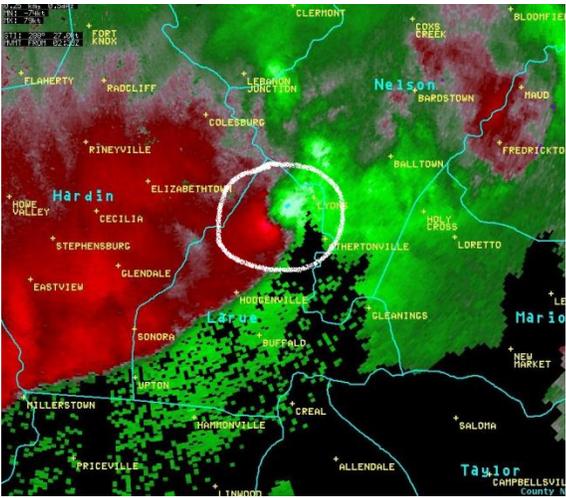
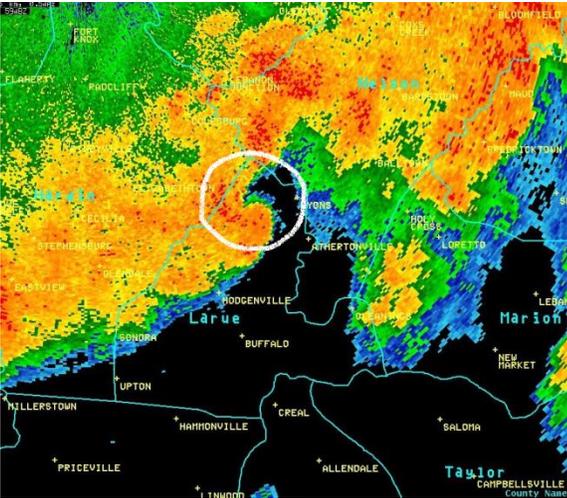
Overall, central Kentucky and southern Indiana had 14 tornadoes in 2013. Our strongest of the year, and also the one with the longest tracks, moved over southeastern Logan and western Simpson Counties during the afternoon on June 10<sup>th</sup>. This relatively slow moving supercell produced a strong EF-2 twister that stayed on the ground for 29 minutes and covered 14 miles. This twister also proved quite photogenic, as the two pictures below attest.





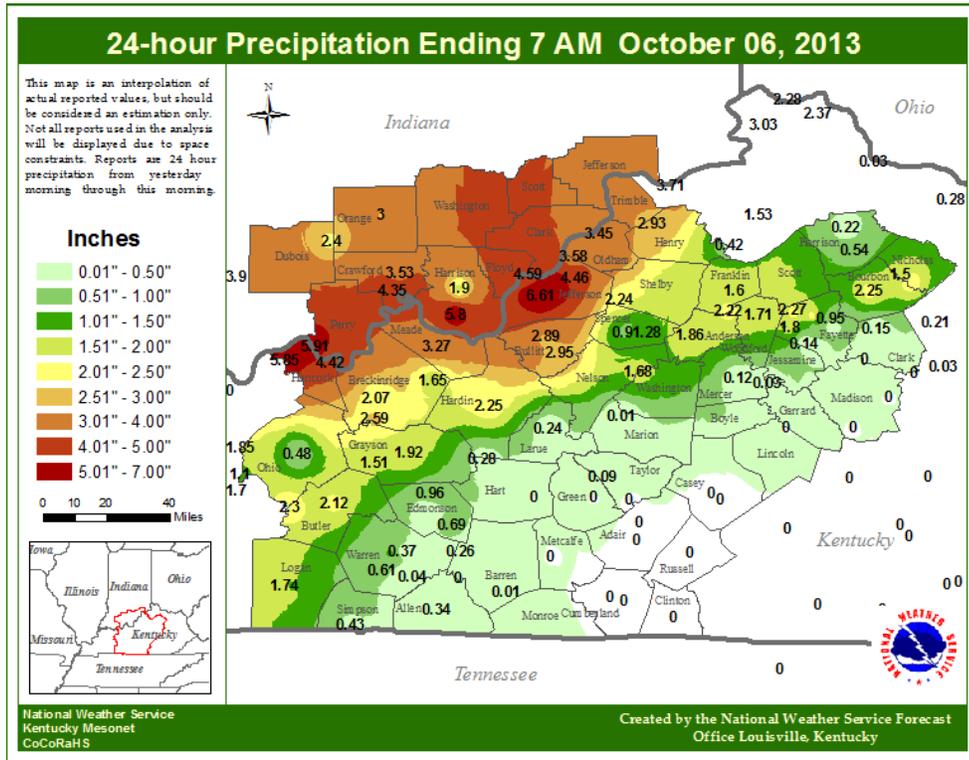
The image to the left was taken from a video from Chad Jackson. He was able to capture several minutes of the tornado as it churned up debris in an adjoining field.

Another notable tornado developed across LaRue County. The two images below show radar signatures of the circulation that spawned this EF-2 twister during the evening of June 26th north of Hodgenville. The left image shows reflectivity while the right one shows storm relative velocities. Earlier that evening, an EF-1 tornado damaged Tell City, Indiana.



## The extreme rainfall event in Louisville on October 5<sup>th</sup>-6<sup>th</sup> ...

Moist air ahead of a slow moving boundary led to the development of slow moving thunderstorms that brought several rounds of rain to Louisville and a few counties to the west along Interstate 64 in southern Indiana. The official site at Louisville International Airport received 5.91 inches of rain on October 5<sup>th</sup>, with another 1.2 inches the next day.



The 5.91 inches recorded at Louisville International Airport was the 3<sup>rd</sup> highest 1-day total on record for the city, with 10.48 inches on March 1<sup>st</sup> of 1997 still standing as Louisville's wettest day ever.

Over two days, ending October 6<sup>th</sup>, the airport received 7.11 inches, which ranks as the 5<sup>th</sup> wettest two day period.

**Snowfall...** during the early portion of 2013 was, in general, light. However in December, southern Indiana's heaviest snow since December of 2012 developed as moist air overrode an arctic boundary pushing south towards the Ohio River. During the early morning hours on December 6<sup>th</sup>, freezing rain changed to snow and brought 4 to 9 inch accumulations across southern Indiana.



Wintry weather continued during the second week in December; central Kentucky experienced two consecutive freezing rain events over a 3 day period ending the 8<sup>th</sup> of December. This picture below, courtesy of Angela Grimes, who lives in LaRue County, shows a forlorn Cardinal perched on almost one half inch of ice.



## The December 21<sup>st</sup> Squall line...

The January 30<sup>th</sup> 2013 squall line notwithstanding, perhaps our most damaging bow echo of the entire year waited until late December. During the evening hours on December 21<sup>st</sup>, a strong squall line brought damaging winds to much of central Kentucky and especially the Bluegrass Region. Many sites from the Kentucky Mesonet measured winds over 60 mph. Prior to this year, December has been remarkably tornado free, with only 5 on record. With 3 tornadoes confirmed, the December 21<sup>st</sup> squall line became the only documented December weather event that produced more than 1 tornado. Two of these tornadoes touched down across the Bluegrass, with one each in Harrison and Bourbon Counties. Below is a radar image showing the squall line at its strongest, just as it was crossing the Bluegrass.

