Frequency of Extreme Wet and Prolonged Dry Periods in Illinois, 1851-2014

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Regional Climate Centers

Past Weather Data Climate Products and Services for your Region and State
New on MRCC:

- **Cool and Wet Week to Kick Off October**
  A majority of the Midwest received above normal precipitation and below normal temperatures during the first week of October. The first measurable snowfalls of the season were also recorded in the upper Midwest, which is earlier than normal for this area. Read more in the October 7th Midwest Climate Watch.

- **NEW!** See the **2014/2015 Regional El Niño Impacts and Outlooks** for the Great Lakes, Midwest, and Missouri Basin Regions.

- See the most recent Drought Update Webinar

- See most recent *The Climate Observer*

- Subscribe to our eNewsletter, *The Climate Observer* here!

- Looking for CDMP or *West Nile Virus* pages? They can now be found in the Research section!

- The Silver Jackets' "Great Flood of 1913" can be found under Resources > Climate Links > Notable Events.
Announcing cli-MATE: the MRCC’s Application Tools Environment for accessing climate data and value-added tools. cli-MATE is replacing our previous subscription data tool, MACS. The best part of cli-MATE is that it is now FREE!

If you are a new user, register for free access to cli-MATE using the registration button near the top of the page. For users that would like to download and access large amounts of climate data, the MRCC is still offering services to help you with those needs.

Use cli-MATE to look up such information as raw climate data, rankings of climate information, thresholds, growing season tools, maps, graphs, and much, much more.

HIGHLIGHTED PRODUCTS
(mouse over to pause scrolling)
How has the frequency changed over time?

Midwest, 1900-2010

[Graph showing extreme precipitation index over time]
How spatially coherent and statistically robust are temporal changes in extreme precipitation in the contiguous USA? Pryor, Howe, and Kunkel, 2009, RJ Met Soc.

b) Increase in amount of precip. from 10 wettest rainfall events per year

d) increase in fraction from annual rain from those 10-days.
Data

• Most Heavy Rain analysis begin, 1895 or later.

• Here, quality-controlled 19c weather data base used to extend daily precipitation from NWS cooperative network to mid-1800s (30-50 years). Chicago, Peoria, and St Louis Areas. (not rigorously homogenized)

• Also, Look at recent 24-year changes in the Cook County region using dense raingage network
The CDMP “Forts” project is extending daily data records from the beginning of the Weather Bureau era (~1892) as far back as the 1780’s.

450 stations digitized. 350 stations quality controlled.
Mount Tamboura Eruption 1815; Year Without a Summer 1816.
Chicago Area
Annual Precipitation, 1893-2013

Precipitation, inches

Chicago Area
Annual Precipitation
1867-2013
Chicago Area Heavy Rain Events
1867-2014
48-hr, ≥3", ≥4"≥6" events

Frequency

≥ 3"
≥ 4"
≥ 6"
Chicago Heavy Rain Events
1867-2014
48-hr 1-, 5-, 25-yr return period events

Frequency

≥ 2.7"
≥ 4.09"
≥ 5.88"
Chicago Area, 1867-2014
runs of 3 or more months of +/- 1.5" above or below average precipitation
(using 5-yr running average)

Frequency

#wet runs
#dry runs
Chicago Area
Wet and Dry 1-month Periods
1867-2014

Frequency


wet_1
dry_1
Chicago Area
Wet and Dry 2-4 month Periods
1867-2014

Frequency

wet_sum23

dry_sum24
Chicago Area

>1 month Wet Periods (≥2" of normal)

45 months in 148 years

- pre-1943
- post-1942

Month

Number of Months
Chicago Area

>1 month Dry Periods (≤2" of normal)

76 months in 148 years

Number of Months

<table>
<thead>
<tr>
<th>Month</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
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</table>
Chicago Area

1 month Dry Periods (<2" of normal)

146 months in 148 years

Through time, August often dry
Hourly Precipitation for Thursday, October 9, 2014

Choose a station from the map or menu, at left. Map stations are hourly data.

Stations in the text list that are not linked (N/A) are temporarily not available.

If a station is shown on the map but is not linked, then data are temporarily unavailable.

Station locations

Rain totals for the previous day 0.10" and above are displayed on the map.

Real-time precipitation data are provisional, and may be subject to change after review. By using this website you agree to our Data Disclaimer. Data are checked and revised during the first week of every month and again at the end of the Water Year.

Archived daily data are also available for the Cook County Precipitation Network site.
<table>
<thead>
<tr>
<th>Period</th>
<th>RP-1</th>
<th>RP-2</th>
<th>RP-5</th>
<th>RP-10</th>
<th>RP-25</th>
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<td>3.18</td>
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Difference in CCPN Return Period Thresholds (1990-2013) from Huff-Angel Threshold (1900-1980)

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<th>Period</th>
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<tr>
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Percent Difference in CCPN Return Period Thresholds (1990-2013) from Huff-Angel Threshold

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<th>RP-5</th>
<th>RP-10</th>
<th>RP-25</th>
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</thead>
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<td>5.43</td>
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How spatially coherent and statistically robust are temporal changes in extreme precipitation in the contiguous USA? Pryor, Howe, and Kunkel, 2009, RJ Met Soc.

b) Increase in amount of precip. from 10 wettest rainfall events per year

d) increase in fraction from annual rain from those 10-days.
Chicago Area
1867-2013

Precipitation from top 10 days

- top_10_tot
- 5yr run mean
- avg top10tot
St Louis Area
1867-2013

Precipitation from Top 10 Days / Year

- tot_10
- 5yr_top10
- avg_top10
Precipitation from Top 10 Days / Year

St Louis Area
1851-2013

- tot_10
- 5yr_top10
- avg_top10

Precipitation from Top 10 Days / Year

Summary

• Temporal increase in rainfall, more northern locations (Chicago Area).
• Increase of 5-8%, 18-hr and 24-hr, 2-25-year Return Periods events over Huff and Angel Bulletin 70. (1990-2014 vs 1900-1984), Chicago Area.
• Seasonality changes in wet and dry periods, pre-1943 and post-1942 (Chicago Area).
• Not as clear increase in more southern locations (Peoria and St Louis Areas).
Peoria Area
Annual Precipitation
1857-2013