Heavy Precipitation

Measures in the relative amount of annual rainfall delivered by large, single-day precipitation events shows change over time. Extreme precipitation events are defined as days with precipitation in the top 1 percent of all days with precipitation.

Date Range: 1901 - 2016

Contributors:

- Cooperative Institute for Climate and Satellites – NC <http://www.cicsnc.org/>
- National Aeronautics and Space Administration <http://www.nasa.gov>
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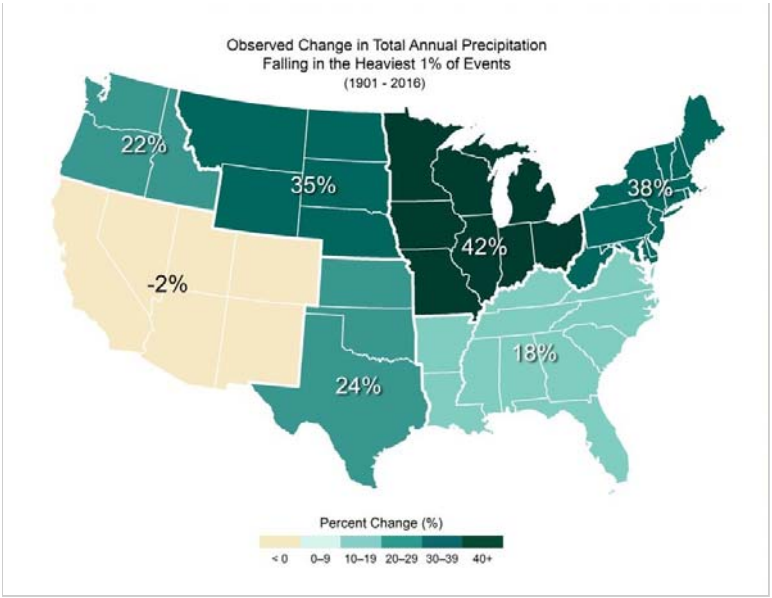
U.S. precipitation is becoming more intense

Heavy precipitation is becoming more intense and more frequent across most of the United States, particularly in the Northeast and Midwest.

This indicator provides valuable evidence of the expectation that heavy precipitation will increase in most parts of the United States.



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This graph shows the percent change in the precipitation amount occurring as very heavy precipitation. It does this by comparing two periods, a reference period of 1901–1960 and a more recent period of 1986–2016. A positive value indicates that more of the precipitation that falls each year is falling as part of a heavy precipitation event. The threshold used to define a heavy precipitation event is the top 1 percent of all days with precipitation during the reference period. The larger the percentage shown, the greater the relative change from the reference period to the more recent period.

About Heavy Precipitation

Just as water is fundamental to life, precipitation is integral to society and ecosystems. Ecosystems, human systems, and human practices have evolved to fit the expected patterns of precipitation intensity, amount, and timing. This indicator focuses on the observed changes in the intensity aspect of precipitation.

Runoff from heavy precipitation events literally shapes the landscape, as floods and flash floods carve out valleys and arroyos and deposit sediment on floodplains. Thus, ecosystems, even in relatively dry regions, often reflect the nature and historic patterns of flood events.

Extreme precipitation is related to climate change in that, all else being equal, a warmer atmosphere can "hold" more water vapor, and therefore deliver more rainfall when conditions for heavy precipitation events occur. On average, for the majority of the United States, the total amount of precipitation falling during heavy events is expected to increase.

Related Resources

- EPA Climate Change Indicators: Heavy Precipitation <https://www.epa.gov/climate-indicators/climate-change-indicators-heavy-precipitation>
- NCA4: Observed and Projected Change in Heavy Precipitation <https://nca2018.globalchange.gov/chapter/2#fig-2-6>

WHY IT'S IMPORTANT

- Increases in the intensity or frequency of heavy precipitation are key factors that affect the risk of floods and flash floods.
- The information presented here is relevant to decisions about retention of surface water for flood mitigation or human use.
- Crop selection and planting dates are influenced by the timing and frequency of heavy rains.
- The built environment, particularly culverts, dams, and reservoirs are designed specifically to accommodate the frequency and intensity of heavy precipitation.

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- USGCRP Indicators Fact Sheet <https://www.globalchange.gov/sites/globalchange/files/usgcrp%20indicators_march2018-final_newsletter%20version_23may18.pdf>
- Fourth National Climate Assessment <https://nca2018.globalchange.gov/>
- Climate Science Special Report <https://science2017.globalchange.gov/>

Indicator Announcements and Opportunities

- Upcoming Workshop on Social Indicators <https://www.sesync.org/project/propose-a-workshop/socio-environmental-systems-indicators-for-climate-change-adaptation>
- Arctic Observing Network <https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503222>
- NOAA Funding Opportunities for Developing Indicators (FY19 NOAA/CPO/MAPP) <https://cpo.noaa.gov/portals/0/grants/2019/mapp_fy19_programinformationsheet_projectionsjune26.pdf>

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