

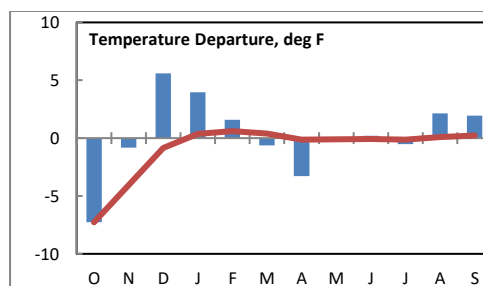
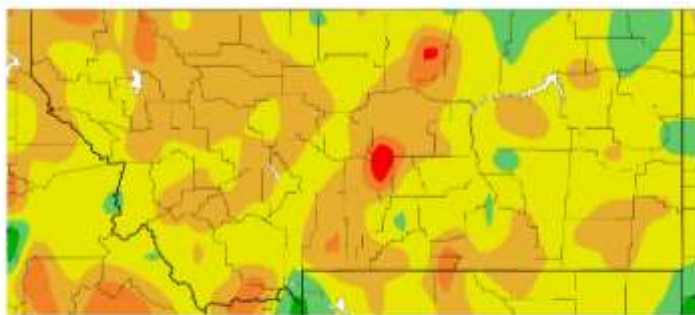
Montana Weather/Precipitation Summary

September 2020 NOAA's National Weather Service Great Falls Montana

Northwesterly aloft dominated Montana for much of September with a ridge over the west coast (Fig. 1). Normal is westerly flow with less ridging along the west coast. This produced above normal temperatures, except along the eastern border, and below normal precipitation for the month. Winds averaged near to above normal.

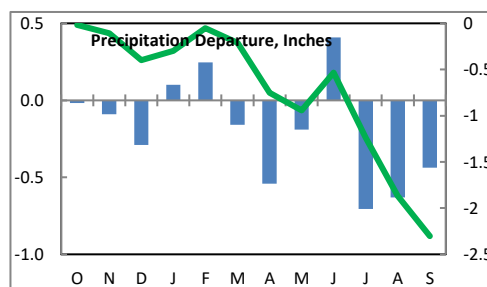
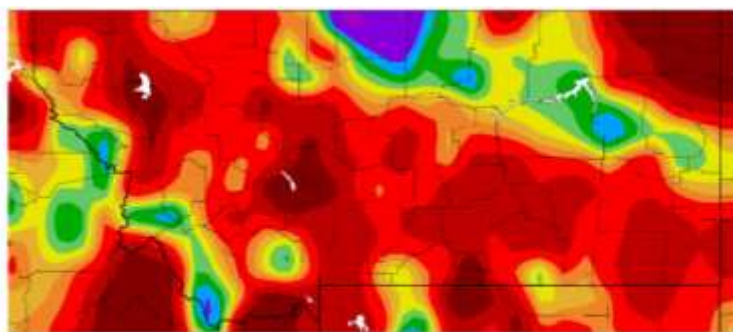
September temperature anomalies ranged from 2.0°F below normal at Glendive to 5.0°F above normal at Mullan Pass. The map below shows the variation in departures. The warmest average temperatures were in eastern Montana. The warmest average temperature was at Broadus, with an average of 75.6°F, while the coolest was 53.4°F at Placer Basin. The highest temperature was 106°F at Hardin on the 5th. The coldest temperature was 7°F at Placer Basin on the 9th. This range of 99°F is above normal for September's average of 89°F. The statewide temperature average of 58.1°F was 1.9°F above normal and the 39th warmest of record. The red line on the graph shows the cumulative 12-month departure from normal, which was 0.2°F above normal. See the state summary and temperature tables below for more details.

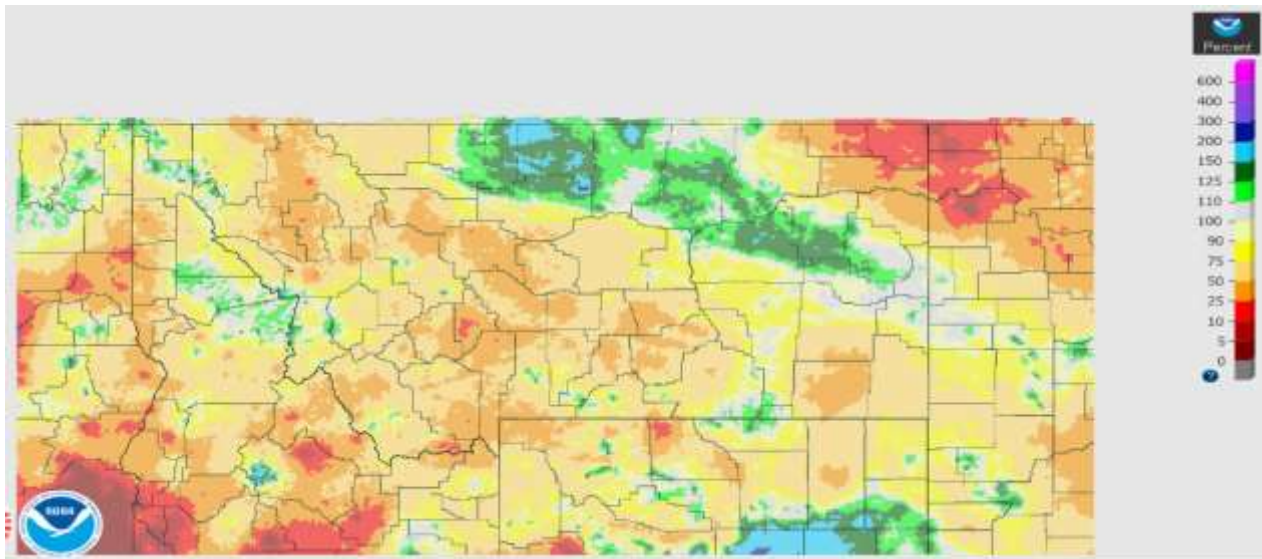
Temperature departure from normal



Precipitation was heaviest over the Bears Paws and along the Idaho border. The highest amount (3.30-inches) fell over the higher elevations in Lincoln County, with the highest amount at a lower elevation along the International border in Hill County. The second map below shows another depiction of the departure from normal over Montana. One can pick out storm tracks. The statewide composite of 0.70" for September was 0.44" below normal. This ranks as the 30th driest September of record for Montana. Some areas were even drier. Livingston (0.37") was 6th driest of record. The green line on the precipitation graph shows the cumulative 12-month departure from normal, which is now 2.30" below normal. See state summary and precipitation tables below for more details.

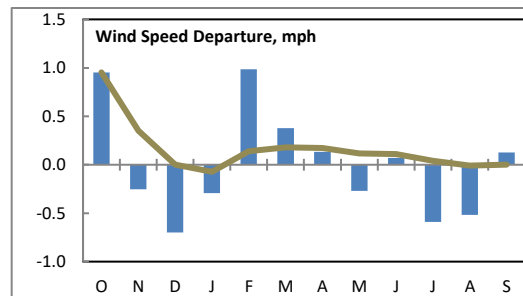
Precipitation departure from normal



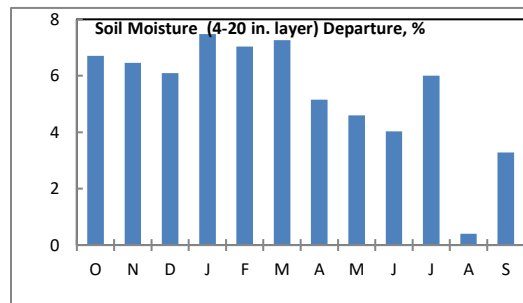


Percent of normal precipitation for August over Montana (radar and gauge-based)

Wind speed averages were near to slightly above normal. Statewide, the month ranked as the 41st calmest September, with an average speed of 8.4-mph. The strongest averages were along the Rocky Mountain Front and northeast Montana. The composite statewide average is near normal. The brown line of the wind graph to the right shows the 12-month cumulative statewide wind departure from normal.



Some areas had significant precipitation, while others were very dry. Statewide soil moisture departures from normal rebounded a bit, as they are typically dry. While still a bit above normal (right), September ranks as 4th wettest of 26 years. This data is from 33 NRCS SCAN and SNOTEL, NOAA CRN and MT Mesonet stations.



Refer to NCEI's State of the Climate report for the latest monthly discussion:

<http://www.ncdc.noaa.gov/sotc/>

Other than a warm and generally dry September, it was fairly typical with many sunny days and haze from wildfires in the sky. Thunderstorms occurred on the first in the southeast, with a few severe gusts reported. Temperatures averaged above normal for the first week. A strong cold front moved through the state on the 2nd. Several wildfires were affected by the resulting winds. Gusts reached the 60-70 mph range over much of eastern Montana. The highest gusts were 71 mph over western Wibaux County, and 72 mph in the Crazy Mountains. Blowing dust and smoke reduced visibility and air quality over much of the state. A wildfire near Jordan caused the town to be evacuated. The month's warmest values occurred on the 5th, when Hardin reached 106°F. This was the warmest September temperature since 2003. A brief cool spell brought the month's coldest temperatures and snow. Up to 15-inches of snow fell near Fishtail (Stillwater), while Red Lodge reported 10.5-inches. A point northeast of Helena reported 5.5-inches. Rain fell over much of the state as well. One-half to 1.5-inches of rain fell over much of the state. At many locations, measurable rain fell only on one day during the month, the seventh. While cool conditions and widespread rain were occurring east of the divide, strong north winds and rain were occurring west. Wind gusts reached 75-mph near Creston, with damage to trees and roofs over northwest Montana. A benign period of weather occurred from the 9th through 18th. Temperatures were mostly above normal. On the 19th, a cold front brought a few thunderstorms to southwest

Montana. Hail to one-half inch fell near Grant (Beaverhead). A weather system dropping out of Alberta brought heavy rain to north central Montana. One to 1.5-inches of rain fell over portions of Hill and Blaine Counties (look at the radar-derived precipitation map above for an outline of this event). Windy conditions dominated most of the rest of the month. Gusts reached 70-mph at Browning on the 24th. On the 25th, gusts of 56-mph were reported near East Glacier and Roy, with 59-mph gusts over western Dawson County.

Haze from smoke spread over much of the state between the 1st and 7th and again from the 14th through 25th. 23rd and 26th. Hazy skies were seen over eastern Montana on about 7 days, and western portions saw hazy conditions on up to 15 days. Some areas saw visibilities drop below 2 miles in low air quality conditions.

The highest daily temperatures in September occurred on four days at Hardin and Trout Creek. Elk Park and Gates Park had the state's lowest temperature on 7 days.

Precipitation/convection

Severe convective weather occurred on one day in September, which is one day less than normal. The cumulative number of days this season is 33, which is seven days below normal. This is the lowest cumulative number since 31 days in 2015, and the third lowest since 1990.

Water-year-to-Date (Oct-Sep)

The water-year average temperature for Montana was 43.5°F, which 0.3°F above normal. This was the 60th warmest of record.

This season's composite precipitation was 12.61-inches, 2.30-inches below normal. This was the driest such period since 2003 and the 25th driest of record. Very dry conditions prevail over southwest Montana. Dillon has seen its driest water-year of record. They received 5.49-inches. Winds averaged 8.9-mph, which was normal. This was the 27th calmest such period, but windiest since 2002.

Crop Season (Apr-Sep)

The average temperature for Montana was 57.8°F, which was 0.1°F above normal. This was the 61st warmest of record (of 139 years).

This year's composite precipitation was 7.85-inches, which was 2.10-inches below normal. This was the driest such period since 2017 and the 34th driest of record.

Winds averaged 8.6-mph, which was 0.2-mph below normal. This was the 20th calmest such period, but windiest since 2016.

September information:

| | | | |
|--|---|---|--|
| High Temperature | 106°F at Hardin (5 th) | Greatest Precip | 1.97" near Rudyard |
| Low Temperature | 9°F Placer Basin (9 th) | | 3.30" at Poorman Creek (Lincoln) |
| Warmest Ave Temp | 64.6°F at Soda Springs (Yellowstone) | Peak Wind Gust | 75 mph near Creston (7 th) |
| Coollest Ave Temp | 45.0°F at Placer Basin SNOTEL | | |
| Range of Temp departures | -2.0°F at Glendive to +5.0°F at Mullan Pass | Highest Ave Wind | 14.4 mph at Deep Creek RAWS 10.4 mph at Cut Bank & Glasgow |
| 21 city mean monthly Temperature/Normal | 58.1/56.1F normal. 39 th warmest of record (since 1880). 72 nd percentile. | 20 city mean monthly wind speed/Normal | 8.4 mph/8.2 mph; 41 th calmest of record (since 1936). 49 th percentile. |
| 22 city mean monthly precipitation/Normal | 0.70"/1.14" – 70% of normal. 30 th driest of record (since 1880). 22 nd percentile. | | |

**Historical Rank of Precipitation (inches)
for the Current Month and Water Year to Date**

| Location | Sep | % of Norm | Rank | Pcntl | Oct 1 – Sep 30 | % of norm | Rank | Pcntl | Years |
|---------------|------|-----------|------|-------|----------------|------------|-----------|------------|-----------|
| Baker | 1.06 | 82% | 47 | 53 | 11.18 | 76% | 73 | 22 | 93 |
| Billings | 0.54 | 42% | 87 | 72 | 12.22 | 89% | 64 | 55 | 116 |
| Belgrade | 0.44 | 41% | 70 | 83 | 10.22 | 73% | 77 | 93 | 83 |
| Butte | 0.49 | 49% | 96 | 75 | 9.44 | 74% | 95 | 75 | 126 |
| Cut Bank | 0.65 | 53% | 72 | 63 | 9.45 | 87% | 85 | 76 | 112 |
| Dillon | 0.40 | 48% | 57 | 70 | 5.49 | 52% | 80 | 100 | 80 |
| Glasgow | 1.04 | 111% | 37 | 29 | 12.14 | 104% | 63 | 52 | 120 |
| Great Falls | 0.49 | 35% | 104 | 80 | 14.06 | 95% | 76 | 59 | 128 |
| Havre | 1.62 | 145% | 35 | 24 | 9.95 | 89% | 100 | 71 | 140 |
| Helena | 0.25 | 23% | 119 | 84 | 9.12 | 81% | 116 | 82 | 141 |
| Jordan | 1.18 | 98% | 28 | 28 | 11.27 | 89% | 54 | 58 | 92 |
| Kalispell | 0.37 | 27% | 109 | 86 | 15.26 | 90% | 71 | 56 | 126 |
| Lewistown | 0.63 | 47% | 101 | 81 | 14.81 | 88% | 89 | 72 | 124 |
| Livingston | 0.37 | 31% | 107 | 90 | 10.88 | 73% | 97 | 86 | 113 |
| Miles City | 0.63 | 58% | 88 | 61 | 10.09 | 81% | 115 | 80 | 143 |
| Missoula | 0.30 | 26% | 123 | 87 | 12.15 | 85% | 93 | 69 | 134 |
| Mullan Pass | 1.70 | 106% | 38 | 46 | 38.22 | 100% | 43 | 55 | 78 |
| Wolf Point | 0.53 | 52% | 42 | 47 | 8.36 | 69% | 65 | 93 | 70 |
| Glendive | 1.30 | 102% | 47 | 37 | 11.48 | 84% | 88 | 74 | 118 |
| Sidney | 0.31 | 25% | 71 | 88 | 7.18 | 50% | 79 | 99 | 80 |
| BZN-MSU | 0.63 | 45% | 119 | 83 | 15.39 | 78% | 116 | 83 | 139 |
| W Yellowstone | 0.47 | 43% | 94 | 80 | 18.99 | 89% | 68 | 70 | 97 |

Rankings and Percentiles are 1=wettest, higher numbers=drier.

For an automated version of this chart, updated daily, go to

<http://www.wrh.noaa.gov/tfx/dx.php?wfo=tfx&type=&loc=products&fx=PCPNTOTALS>

**Historical Rank of Average Temperature (°F)
for the Current Month and Water Year to Date**

| Location | Sep | Normal | Rank | Pcntl | Oct 1 – Sep 30 | Normal | Rank | Pcntl | Years |
|---------------|------|--------|------|-------|----------------|--------|------|-------|-------|
| Baker | 58.6 | 55.5 | 46 | 42 | 43.7 | 42.5 | 48 | 45 | 106 |
| Billings | 62.9 | 60.3 | 27 | 21 | 48.2 | 48.1 | 37 | 31 | 116 |
| Belgrade | 57.2 | 55.5 | 24 | 27 | 43.1 | 42.8 | 32 | 37 | 85 |
| Butte | 54.8 | 51.9 | 27 | 21 | 40.3 | 39.9 | 55 | 43 | 126 |
| Cut Bank | 56.5 | 53.9 | 21 | 18 | 41.3 | 42.0 | 51 | 45 | 111 |
| Dillon | 56.8 | 54.9 | 23 | 29 | 41.8 | 42.7 | 54 | 71 | 76 |
| Glasgow | 60.1 | 58.2 | 32 | 25 | 44.4 | 43.2 | 27 | 21 | 124 |
| Great Falls | 58.9 | 56.1 | 37 | 29 | 44.4 | 44.5 | 85 | 69 | 123 |
| Havre | 58.6 | 56.5 | 36 | 25 | 43.3 | 43.4 | 62 | 44 | 140 |
| Helena | 61.3 | 57.8 | 13 | 9 | 46.6 | 45.3 | 12 | 8 | 140 |
| Jordan | 59.9 | 57.2 | 33 | 33 | 46.0 | 43.4 | 24 | 25 | 94 |
| Kalispell | 56.2 | 54.2 | 28 | 22 | 44.0 | 43.3 | 46 | 38 | 119 |
| Lewistown | 57.8 | 54.9 | 24 | 19 | 42.7 | 43.0 | 60 | 52 | 115 |
| Livingston | 59.2 | 55.8 | 34 | 28 | 46.0 | 44.7 | 44 | 38 | 113 |
| Miles City | 61.2 | 60.1 | 57 | 40 | 46.2 | 46.0 | 56 | 40 | 138 |
| Missoula | 59.2 | 57.4 | 28 | 21 | 46.0 | 45.9 | 30 | 23 | 125 |
| Mullan Pass | 55.5 | 50.5 | 6 | 12 | 38.3 | 37.9 | 15 | 33 | 43 |
| Wolf Point | 57.9 | 57.1 | 34 | 45 | 43.0 | 42.1 | 23 | 33 | 68 |
| Glendive | 59.3 | 61.3 | 80 | 65 | 45.6 | 46.5 | 58 | 50 | 116 |
| Sidney | 58.1 | 60.0 | 45 | 46 | 43.4 | 45.5 | 43 | 45 | 96 |
| W Yellowstone | 49.7 | 48.0 | 26 | 23 | 34.4 | 34.3 | 72 | 65 | 110 |

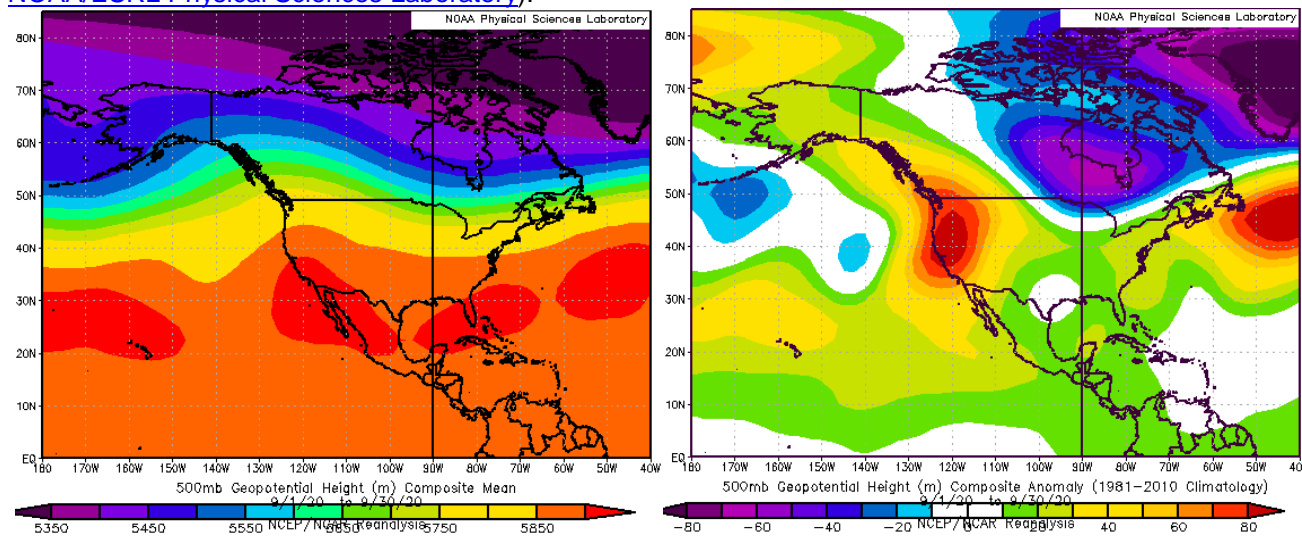
Rankings and Percentiles are 1=coldest, higher numbers=warmer.

Historical Rank of Average Wind Speed (mph) for the Current Month and Water Year to Date

| Location | Sep | Normal | Rank | Pcntl | Oct 1 – Sep 30 | Normal | Rank | Pcntl | Years |
|---------------|------|--------|------|-------|-------------------|--------|------|-------|-------|
| Baker | 10.6 | 11.3 | | | 10.8 | 11.2 | | | 23 |
| Billings | 10.9 | 9.3 | 12 | 13 | 11.1 | 10.6 | 33 | 39 | 84 |
| Belgrade | 5.8 | 5.6 | 31 | 56 | 5.8 | 5.6 | 31 | 56 | 55 |
| Butte | 5.7 | 6.9 | 40 | 70 | 5.5 | 6.7 | 42 | 75 | 56 |
| Cut Bank | 12.1 | 10.9 | 22 | 28 | 13.7 | 12.6 | 17 | 21 | 78 |
| Dillon | 8.6 | 8.1 | 28 | 41 | 9.6 | 9.0 | 18 | 26 | 66 |
| Glasgow | 10.7 | 10.2 | 16 | 20 | 10.4 | 10.4 | 44 | 58 | 75 |
| Great Falls | 10.8 | 10.6 | 36 | 43 | 11.9 | 12.1 | 46 | 56 | 82 |
| Havre | 9.7 | 8.3 | 18 | 13 | 10.6 | 9.1 | 8 | 5 | 131 |
| Helena | 6.5 | 6.6 | 107 | 76 | 7.0 | 7.0 | 105 | 75 | 140 |
| Jordan | 8.3 | 7.8 | 9 | 22 | 8.6 | 8.0 | 7 | 17 | 37 |
| Kalispell | 5.1 | 5.3 | 95 | 78 | 5.7 | 5.5 | 107 | 88 | 121 |
| Lewistown | 8.8 | 8.3 | 29 | 36 | 9.4 | 9.2 | 36 | 45 | 78 |
| Livingston | 12.6 | 12.3 | 17 | 29 | 15.0 | 15.2 | 23 | 42 | 53 |
| Miles City | 9.8 | 10.1 | 36 | 27 | 9.7 | 10.2 | 53 | 41 | 129 |
| Missoula | 3.6 | 5.4 | 82 | 96 | 4.8 | 5.6 | 73 | 86 | 85 |
| Mullan Pass | 4.3 | 5.4 | 26 | 83 | 4.8 | 5.6 | 26 | 89 | 29 |
| Wolf Point | 7.8 | 7.4 | | | 7.9 | 8.1 | | | 22 |
| Glendive | 9.9 | 9.8 | 11 | 41 | 9.8 | 10.3 | 21 | 75 | 28 |
| Sidney | 9.4 | 8.3 | 3 | 10 | 8.8 | 9.1 | 21 | 68 | 31 |
| W Yellowstone | 6.1 | 5.3 | | | 6.2 | 6.3 | | | 6 |

Rankings and Percentiles are 1=windiest, higher numbers=calmer.

Figure 1. Mean flow at 500 millibars (~18,000 ft) for this month (left) and climatology for the month (right) (from [NOAA/ESRL Physical Sciences Laboratory](http://www.noaa.gov)).



For the latest information on mountain snowpack from the NRCS, go to: <https://www.wcc.nrcs.usda.gov/gis/snow.html>

For the latest U.S. Drought Monitor, issued weekly by the National Drought Mitigation Center, USDA and NOAA, go to: <http://droughtmonitor.unl.edu/>

These data are preliminary and have not undergone final QC by NEIC. Therefore, these data are subject to revision. Final and certified climate data can be access at the National Environmental Information Center (NEIC) <http://www.ncei.noaa.gov>. Many more links are on the Drought Information Page of the NWS Great Falls web site at <http://www.wrh.noaa.gov/tfx/main/drought.php?wfo=txf>. The climatological record for normals is 1981-2010. The ranking period for temperature, precipitation and snowfall is since 1880. The ranking period for wind speeds is since 1936. The ranking period for soil moisture is since 1995.