

State Climate Extremes Memorandum

FOR: Derek Arndt, Chief, Climate Monitoring, National Centers for Environmental Information
FROM: WV State Climate Extremes Committee (Darnley, Stachelski, Eggleston, Law, Gleason)
SUBJECT: West Virginia Inaugural Annual Precipitation record at Parsons 3SE

Table of Contents

State Climate Extremes Memorandum	1
Summary	1
About the SCEC	1
About the Station and Observation	2
Meteorological Plausibility of the Observation	4
Previous Record and Other Notable Observations.....	5
Finding of Committee	8
Composition of the Committee	8
Voting Members:	8
Other Participants:.....	8
Appendix 1: Geographical and Topographical Setting.....	9

Summary

2018 was a wet year across Virginia, West Virginia, Maryland, and Pennsylvania with numerous daily, seasonal, and annual precipitation records set. For this reason, a State Climate Extremes Committee was convened to evaluate the annual precipitation record documented by NWS Cooperative Observer Program site Parsons 3SE, West Virginia.

- Location: Parsons 3 SE (Hendricks, WV)
- Date: 1 January – 31 December 2018
- Value: 96.99 inches

About the SCEC

The State Climate Extremes Committee (SCEC) was created in response to the need for proper and comprehensive evaluation of meteorological observations which may have tied or exceeded existing statewide all-time record values. Beyond their intrinsic human-interest factor, climatic extremes are an important component of a location's climatology, used for, among other things, quality-controlling

meteorological observations, setting engineering limits, and helping authorities to develop climate-related safety plans.

While similar in function to the [National Climate Extremes Committee](#), the SCEC is an ad-hoc committee established to evaluate the climatological records of individual states. When a potential record meteorological value has been observed, it will be brought to the attention of the local [National Weather Service \(NWS\) Weather Forecast Office](#) or the state's [State Climatologist](#). If, after reviewing the observation, the WFO or State Climatologist feels it is legitimate, they will convene the SCEC for a review and vote on the value.

About the Station and Observation

The region around Parsons 3SE is a part of the Appalachian Plateau, characterized by a valley and ridge landscape (Fig. 1). The station is surrounded by steep elevation changes from 1680 to 3560 feet in all compass directions. This geography facilitates numerous microclimates that enhance the rainfall orographically as synoptic systems cross West Virginia and via post-frontal northwesterly flow events. The ridges and valleys are oriented along a SSW-NNE axis from Mississippi to Pennsylvania.

The station is clearly situated in a microclimate, as it sits in the valley along the confluence of the Blackwater and Dry Fork Rivers to form the Black Fork stretch of water leading into the Cheat River Basin. The local terrain is covered with a variety of northern hardwoods, white pine, red spruce, fauna, and flora, which contribute to evapotranspiration at the station.

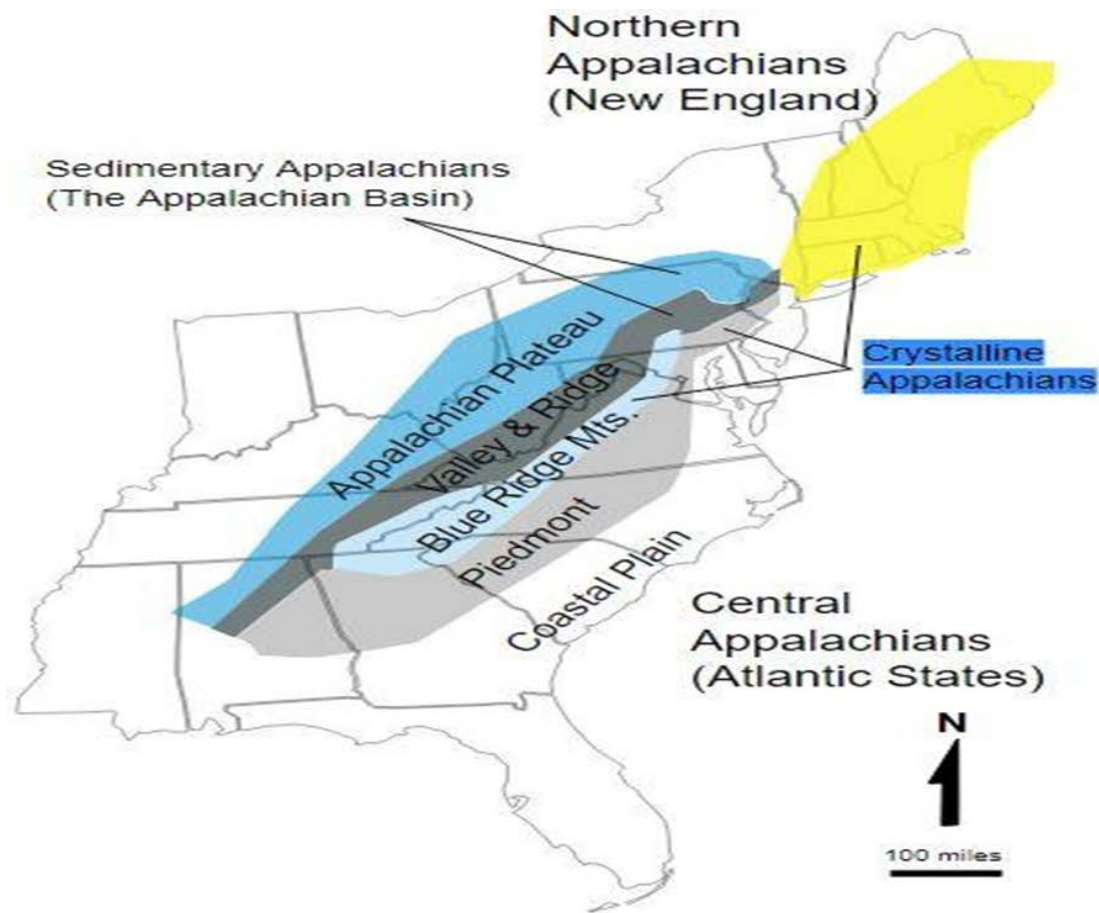


Fig. 1. A conceptual depiction of the Appalachian terrain¹. Of particular note is the ridge / valley structure and orientation in which Parsons 3SE is sited.

The Parsons 3SE weather station is located along the north bank of the Black Fork River. It is worth noting that, within the flow of the Black Fork River adjacent to the rain gauge, is a cut bank and minor oxbow lake with a depth to 65 feet as measured by the USGS. This stagnant water source locally contributes to atmospheric moisture pooling in the terrain valley around the station.

The rain gauge is in an open area with good exposure in all directions (Fig. 2). Parsons 3SE has been in operation since 2014 at its present location and has demonstrated excellent observation practices over the past four years. It is a rarity for this station to miss even one day, and in 2018 there were zero missing days.

¹ Image from USGS Appalachian Zones in the United States



Fig. 2. View of standard 8 inch rain gauge located at Parsons 3SE, WV.

Meteorological Plausibility of the Observation

The longwave pattern throughout 2018 frequently exhibited a western-CONUS trough and eastern-CONUS ridge, which favored low pressure moving from the Plains into the Tennessee Valley (example in Fig. 3). As a result, abundant moisture was drawn from the Gulf of Mexico and the western Atlantic into the Upper Ohio River basin. Such patterns are typical of cold-season heavy rain events in the region. In the wake of these systems, northwesterly flow patterns favor orographic precipitation in the western ridges of the Appalachian Plateau.

Early 2018 warmth limited Great Lakes ice cover that ordinarily would cut off orographic precipitation in northwesterly flow. In addition to the synoptically-driven Tennessee low pressure rain events, the warmth enabled northwesterly flow upslope events to contribute further to rainfall at the Parsons station.

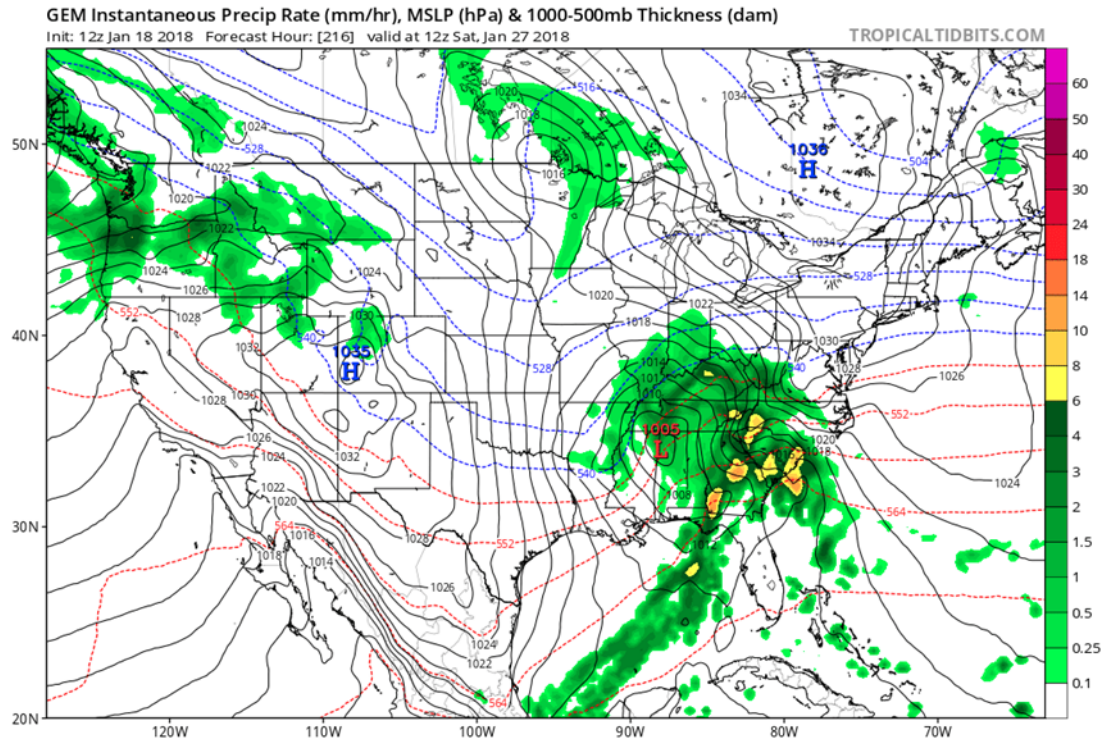


Fig. 3. An example of a cold-season synoptic pattern typical of heavy rain events in the Upper Ohio Valley.

An unusual eastward position of the summertime Bermuda High enabled a continued active weather pattern throughout the summer, with prolonged presence of Gulf moisture in the region supporting frequent heavy rain events.

Previous Record and Other Notable Observations

During 2018, numerous annual precipitation records were documented throughout the region, including nearby Davis 3SE precipitation total in (Fig 4). From a historical perspective, both Snowshoe and Terra Alta had annual values in 1996 which were greater than what these stations reported in 2018, but less than what was reported for Parsons 3SE during 2018 (Figs. 5 & 6). All three sites recorded at or near record precipitation. A previously recognized annual precipitation state record at Bayard (89.01 inches), set back in 1926, has been referenced in the past by the National Weather Service office in Charleston, WV, prior to the formation of the SCEC process. Previous observations for Parsons 3SE may appear inconsistent with more recent observations as this station relocated in 2014. The new location and the commitment and dedication of an outstanding observer played pivotal roles in establishing this new record.

Data for January 1, 2018 through December 31, 2018

[Click column heading to sort ascending](#), [click again to sort descending](#).

State	Name	Station Type	County	Climate Division	Total Precipitation
WV	PARSONS 1 NE	COOP	Tucker	WV01	96.99
PA	LAUREL SUMMIT	COOP	Somerset	PA09	82.90
WV	DAVIS 3SE	COOP	Tucker	WV04	80.28
MD	MC HENRY 4.8 SSE	CoCoRaHS	Garrett	MD08	77.93
WV	CANAAN VALLEY #2	COOP	Tucker	WV04	77.11
WV	ELKINS 21 ENE	WBAN	Tucker	WV04	72.35
PA	SALINA 3 W	COOP	Westmoreland	PA09	71.28
OH	HANNIBAL LOCKS AND DAM	COOP	Monroe	OH10	70.51
MD	OAKLAND 1 SE	COOP	Garrett	MD08	70.40
WV	NEW MARTINSVILLE 6.5 E	CoCoRaHS	Wetzel	WV01	68.56
PA	INDIANA 3 SE	COOP	Indiana	PA09	68.56
MD	MOUNTAIN LAKE PARK 0.4 E	CoCoRaHS	Garrett	MD08	68.15
WV	MOUNDSVILLE	COOP	Marshall	WV01	67.11
PA	PITTSBURGH ALLEGHENY COUNTY AP	WBAN	Allegheny	PA09	66.71
PA	BRIDGEVILLE 1.4 SW	CoCoRaHS	Allegheny	PA09	66.60
PA	SCHENLEY LOCK 5	COOP	Armstrong	PA09	65.97
PA	MURRYSVILLE 2 SW	COOP	Westmoreland	PA09	65.24
WV	PIKE ISLAND (LOCK AND DAM)	COOP	Ohio	WV01	63.66
PA	GRAYS LANDING	COOP	Fayette	PA09	62.53
PA	MOON TOWNSHIP	COOP	Allegheny	PA09	61.21
PA	POINT MARION 1.0 SE	CoCoRaHS	Fayette	PA09	60.88
PA	WAYNESBURG 1 E	COOP	Greene	PA09	60.03
PA	POINT MARION LOCK 8	COOP	Greene	PA09	58.69
PA	DUBOIS JEFFERSON COUNTY AP	WBAN	Jefferson	PA10	58.61
OH	COSHOCTON 5.5 WSW	CoCoRaHS	Coshocton	OH06	57.83
PA	PITTSBURGH ASOS	WBAN	Allegheny	PA09	57.83

Fig. 4. Annual 2018 precipitation totals for stations surrounding Parsons 3SE. Note: "Parsons 1NE" was subsequently and officially changed to "Parsons 3SE" to match the station's actual location since records began here in 2014.

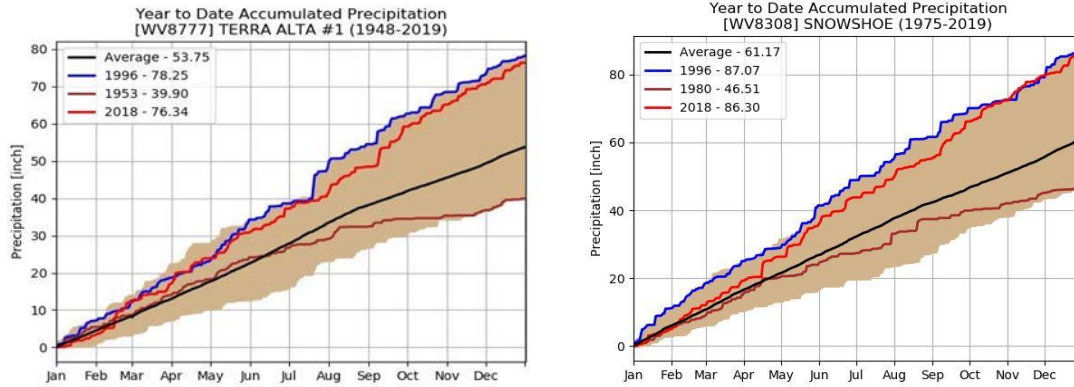


Fig. 5. Annual precipitation plots for nearby stations Terra Alta and Snowshoe, which indicate that near-record rainfall was observed at surrounding stations to Parsons 3SE.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2018	3.65	9.65	4.71	6.42	10.60	13.18	6.70	8.70	11.65	8.72	7.51	5.50	96.99
Mean	4.11	3.49	4.31	4.21	4.81	5.18	5.52	4.48	3.59	3.42	3.18	3.81	47.80
Max	13.38 1911	9.65 2018	9.53 1967	10.07 2011	10.87 1996	13.18 2018	14.02 1912	8.85 1935	11.65 2018	9.44 1925	11.87 1985	8.13 1972	96.99 2018
Min	1.06 1967	0.89 1968	0.90 1901	0.60 1902	1.05 1914	0.15 1899	T 1938	T 1915	0.25 1921	0.07 1952	0.00 1990	0.64 1925	11.29 2012

Fig. 6. Monthly 2018 precipitation for Parsons 3SE with number of observations missing. Also shown are monthly mean, and monthly max and min totals with year of occurrence.

Finding of Committee

All of the evidence above was reviewed by the SCEC leading to a teleconference call on 25 April 2019.

Based upon the documented evidence, the SCEC agreed unanimously (by a vote of 5-0) that the annual precipitation value for the Parsons 3SE station in 2018 is valid and recommends the NCEI Climate Monitoring Chief approve the SCEC action to **acknowledge the 96.99" annual precipitation accumulation for 2018 in Parsons 3SE, WV as the inaugural state record annual precipitation value for West Virginia.**

NCEI Climate Monitoring Chief Decision Approved (as recommended in boldface above):

Signed _____ Date: _____

Not approved (will be returned to SCEC with no action taken): Signed

_____ Date: _____

Composition of the Committee

Voting Members:

John Darnley - Regional Coordinator, NWS WFO Pittsburgh (PBZ)
Chris Stachelski - NWS Climate Service Program Manager - Eastern Region
Keith Eggleston - Regional Climatologist - Northeast Regional Climate Center
Kevin Law - West Virginia State Climatologist
Karin Gleason - Meteorologist, National Centers for Environmental Information (NCEI)

Other Participants:

Bryant Korzeniewski - Meteorologist/Datzilla Programmer, NCEI
Matthew Kramar - Science & Operations Officer, NWS PBZ

Appendix 1: Geographical and Topographical Setting

Maps of varying views and topography of Parsons 3SE located in the northeastern part of West Virginia. Google Earth Maps, topography and street view for Parsons 3 SE.

