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**Table 1: Gauge visits during the spring 2019 campaign. Comments: DD=gauge data download, MN=general gauge maintenance (cleaning, re-level), CA= rain gauge calibration, CV= vegetation clearing, and BR = data logger battery replacement.**

Date	Gauges Visited	Technicians	Comments
3/12/2019	11; 3**a	Doug	DD, MN, CV, CA
3/20/2019	106, 10	Doug, Alice	DD, MN, CV, CA
3/23/2019	111, 112	Doug, Alice	DD, MN, CV, CA
4/3/2019	101, 102, 103	Doug	DD, MN, CV, CA
4/6/2019	104, 110, 4	Doug, Zachary	DD, MN, CV, CA
4/13/2019	107, 109, 108	Doug, Andrew	DD, MN, CV, CA
4/15/2019	100T**b, 105, 311	Doug, Lisa	DD, MN, CV, CA
4/22/2019	304**c, 307**c, 100T, 303s	Doug, Zach M	DD, MN, CV, CA
4/27/2019	301, 302	Doug, Alex, Marlee, Lyn	DD, MN, CV, CA
5/1/2019	306, 3	Doug	DD, MN, CV, CA
5/6/2019	2; 5; 8	Doug, Roger	DD, MN, CV, CA
5/9/2019	305, 309, 310	Doug, Meredith	DD, MN, CV, CA
5/13/2019	300, 308	Doug	DD, MN, CV, CA
5/18/2019	304, 307	Doug	DD, MN, CV, CA

\*\*a => muddy road - visit later, \*\*b => wrong gate code - visit later, \*\*c => tree blocking Heintooga Loop – visit later

Gauge visitation in support of the Duke Great Smoky Mountain Rain Gauge Network (GSMRGN) during the spring 2019 campaign occurred over fourteen days spanning a period of ten weeks in March - May 2018. The primary purpose of the visits in the spring 2019 was [1] to perform downloads of gauge tip observations since the previous gauge visits in the autumn 2018, [2] to complete rain gauge and data logger maintenance tasks, [3] to clear vegetation and tree limbs and, [4] to calibrate ALL rain gauges since field calibrations were last completed in the spring 2018. Ten technicians and volunteers and (listed on the front page) made the visits and performed the required work. It is important to note that the volunteers were NOT directly involved in any critical gauge visit tasks, but were volunteering primarily to assist with personal safety should someone get injured during a particular series of gauge visits.

The general tasks completed at every gauge visit consist of (1) gauge data download from the data loggers [DD in Table 1], (2) general gauge maintenance and ML1 logger condition monitoring [MN in Table 1], (3) clear vegetation within a five foot radius of the rain gauge [CV in Table 1], and, (4) calibration of rain gauges using a single trial of the 50, 100, and 300 mm nozzles [CA in Table 1]. The primary specialized task was the necessary data logger lithium battery replacement at six rain gauge locations (as indicated using a multimeter to test logger battery voltage after a long winter), one of which occurred at Mt. Guyot (g #301). Gauge #301 hadn't been visited since July 2018 due to the impassible snow and ice conditions experienced on the 18 December 2018 trek. Task (1) merely required a serial port link between the field study laptop and the gauge data logger and consisted of pulling the data (often in files having raw [\* .txt] and CSV formats) onto a desktop folder on the laptop, checking for completeness of the data, and comparing the data logger time and date to the actual

GPS time and date (making a screen capture of the time comparison). The standard that has been chosen for this study is to maintain the clocks on Eastern Daylight Time, since most of the “warm” precipitation will be occurring during the season when EDT is in effect. Most ML1-FL data logger times have been adjusted (using “TA” command) during previous gauge visits to coincide with the EDT given by the GPS locator. The ML1 logger at g110 continued to show a poor response using the TA command and may require replacement during the summer 2019 visit if improvement isn’t noted after trying the TA “clear” command (“TA=<cr>”). The ML1 logger at g105 showed no registration of three test bucket tips during testing. Logger wires were changed from switch #1 to switch #2 (similar to problems found at g #109 in 2016 and at g #106 in 2018). Unfortunately, it is unknown when, during the winter season, this switching problem became significant such that g105 failed to register bucket tips forced by rainfall. The lithium battery voltage of the ML1-420 logger at g103 (which had been replaced during the autumn 2018 visit) was found to have dropped below **3.00V** during the spring 2019 visit. Comparing the g103 rain record to that of nearby g102 and g101, the low-voltage logger was able to detect all precipitation events through 15 March 2019. Another data logger will have to be installed at g103 if the logger battery voltage shows a significant drop between spring and autumn 2019. Also, an error message “3.6V Lithium Battery Needs Replacing” occurred during the visit to the rain gauge near the Mt. Sterling fire tower (g #310). No data record was retrievable from this logger during the 9 May 2019 visit. It is hypothesized that a significant voltage drop in the battery prevented the logger from recovering to recognize the “dur” command. Using the all-purpose “DUR/+” command will (hopefully) recover the full rainfall record at this location spanning the 10 November 2018 – 9 May 2019 pre-visit period. Preventative lithium battery replacements occurred at gauges #010 [ML1-420], #108 [ML1-420], #311 [ML1], and #300 [ML1-420] during the spring 2019 visit as a preventative measure to insure record continuity between spring and summer 2019. We have had significant problems with ML1-420 loggers draining the lithium batteries down in a very short period of time. Task (2) required the cleaning of debris from the funnel filter, cleaning the tipping buckets of debris (if necessary), cleaning the gauge drain ports and siphon, re-leveling the gauge if it has come unlevelled, and fixing or replacing the gauge mesh if it had been damaged. Liquid wrench is needed at g101, g103, and g108 in the summer 2019 visit as the nut in one of the bolt ports has become rusty and is in need of replacement. New stainless steel nuts are needed for replacing the rusty nuts during the summer 2019 visits to these gauges. Task (3) consisted of cutting briars and other emerging vegetation during the spring season within a five foot radius of the gauge using clippers or weeding by hand. One location (g311) will need tree limbs cleared using an extension saw and one location (g308) will need a rope saw to clean limbs from almost overhead during the summer 2019 visit. Task (4) was completed successfully in every data logger at each of the rain gauge locations, with the exception of needing the 100mm nozzle test at g301 (Mt. Guyot) during the summer 2019 visit. The spring 2019 visit to g301 was delayed enough that all three nozzle tests were impossible due to waning daylight conditions on the longest hike of the spring 2019 campaign.

Challenges encountered during some of the gauge visits in the spring 2019 were; (i) muddy and rainy conditions early in the campaign [resulting in gauge visit postponements and scheduling challenges, see description below] and (ii) surprisingly large voltage drops in the loggers at several rain gauge locations [see description above]. Otherwise, the gauge network was functioning as smoothly as is possible. It should be noted that a new Davis Pro weather station has been installed near the Mount Sterling fire tower, next to g310. The owner of the weather station (and data) at Duke Power has yet to respond to repeated inquiries about the sharing of weather data helpful in discerning the source of bucket tips (falling rain or melting ice/snow).

Details of every gauge visit along with raw precipitation text and CSV format files are found via Google Drive [https://drive.google.com/open?id=1YEYwf\\_ZKf4YxtfdRSPO\\_3UGnRTZPS5Ah](https://drive.google.com/open?id=1YEYwf_ZKf4YxtfdRSPO_3UGnRTZPS5Ah) which contains sub-folders for each gauge that consist of the individual data files (often having at least two different formats), pictures taken at the gauge site during the visit, screenshots of the GPS (laptop) and ML1 logger time comparison, and a MS Word document that mirrors the notes made in the field journal during each visit.

Noteworthy precipitation events of October 2018 – February 2019 as observed at KAVL are highlighted in yellow in **Appendix A**. The entire five month period was significantly above normal in precipitation to the point where travel to visit rain gauges early in March 2019 was not possible due to impassible roads and/or trees having been blown over and blocking back-country roadways. Interstate 40 experienced a minor rockslide on 22 February 2019 (<https://www.citizen-times.com/story/news/local/2019/04/12/40-rockslide-officials-aim-fully-reopen-highway-may/3448606002/>) requiring several months to clear the debris and skim other surface rocks to prevent future slides along the interstate. The remnants of Hurricane Michael (10-11 October 2018) registered significant precipitation in western North Carolina. Also, precipitation falling in western North Carolina on 27-28 December 2018 exceeded five inches at KAVL.

Plans for the summer months of 2019

**Table 2: Planned gauge visits during the summer 2019 campaign. DD=gauge data download, MN=general gauge maintenance (cleaning, re-level), CA= rain gauge calibration, CV= vegetation clearing, and BR = data logger battery replacement.**

<b>Date</b>	<b>Gauges Visited</b>	<b>Technicians</b>	<b>Comments</b>
7/??/2019	3; 11; 107; 109	Doug + 1 field technician	DD, MN, CV
7/??/2019	2; 5; 8; 106; 10	Doug + 1 field technician	DD, MN, CV
7/??/2019	4; 104, 110, 105	Doug + 1 field technician	DD, MN, CV
7/??/2019	111, 112, 311	Doug + 1 field technician	DD, MN, CV
7/??/2019	101, 102, 103, 100T, 108	Doug + 1 field technician	DD, MN, CV
7/??/2019	303s, 306, 308	Doug + 2 field technicians	DD, MN, CV
8/??/2019	304, 307, 305, 309, 310	Doug + 2 field technicians	DD, MN, CV
8/??/2019	301, 302, 300	Doug + 2 field technicians	DD, MN, CV

Gauge visitation in support of the Duke GSMRGN during the summer 2019 will occur over at least eight days spanning July and August 2019. The primary purpose of the visits will be to download precipitation observations that were made since the previous gauge visits in March - May 2019 [DD in Table 2], perform maintenance and check if the ML1 logger times have drifted between visits and make the corresponding needed adjustments [MN in Table 2], and clear vegetation (and tree branches) from overhanging gauges [CV in Table 2]. Gauge parts and loggers may have to be replaced during some of the visits if less-than-acceptable conditions show no signs of improvement, as noted in the previous section description.

Details of every gauge visit along with each gauge precipitation record will be posted online and shall contain sub-folders for each gauge that consist of the individual data files (often having at least two different formats), pictures taken at the gauge site during the visit, screenshots of the GPS (laptop) and ML1 logger time comparison, and a MS Word document that mirrors the notes made in the field journal during the visit.

The technician roster during the 2018-2019 academic year consisted of Meredith Avison, Marlee Burgess, Lyn Comer, Alex Flynt, Andrew Hill, Alice Monroe, Tyler Moore, Carly Narotsky, Zachary Tuggle. New undergraduate research students at UNC Asheville will be recruited as field technicians for the Duke GSMRGN project in the fall 2019 as Alex, Tyler, Carly, and Zachary have graduated from UNC Asheville.

**Table 3: The Duke Great Smoky Mountain Rain Gauge Network is currently (valid as of 20 May 2019) composed of 32 tipping bucket rain gauges.**

Gauge #	Location	Latitude	Longitude	Altitude
RG002	Lickstone Bald	35°25.5' N	82°58.2' W	5680 ft.
RG003	High Top	35°23.0' N	82°54.9' W	5280 ft.
RG004	Lickstone Ridge S	35°22.0' N	82°59.4' W	6305 ft.
RG005	Deep Gap	35°24.5' N	82°57.8' W	4986 ft.
RG008	Double Summer Gap	35°22.9' N	82°58.4' W	5700 ft.
RG010	Beaty Summer Gap	35°27.3' N	82°56.8' W	4849 ft.
RG011	near Deep Gap	35°23.7' N	82°54.9' W	4081 ft.
RG100T	Purchase Knob	35°35.1' N	83°04.3' W	4905 ft.
RG101	The Swag	35°34.5' N	83°05.2' W	4986 ft.
RG102	Hemphill Bald	35°33.8' N	83°06.2' W	5365 ft.
RG103	JR Property	35°33.2' N	83°07.0' W	5539 ft.
RG104	Cat. Ski Area	35°33.2' N	83°05.2' W	5208 ft.
RG105	KH Property	35°38.0' N	83°02.4' W	4412 ft
RG106	Pinnacle Ridge	35°25.9' N	83°01.7' W	3969 ft
RG107	Lookout Point	35°34.0' N	82°54.4' W	4459 ft
RG108	Utah Mountain	35°33.2' N	82°59.3' W	4188 ft
RG109	Eaglesnest Ridge	35°29.7' N	83°02.4' W	4922 ft
RG110	JH Property	35°32.8' N	83°08.8' W	5128 ft
RG111	Hurricane Ridge	35°43.7' N	82°56.8' W	4573 ft
RG112	Ore Knob	35°45.0' N	82°57.8' W	3884 ft
RG300	Camel Hump Knob	35°43.5' N	83°13.0'W	5110 ft
RG301	Mt Guyot	35°42.3'N	83°15.3'W	6570 ft
RG302	Snake Den Ridge	35°43.2'N	83°14.8'W	6104 ft
RG303s	Mt Cammerer	35°45.7'N	83°09.7'W	4887 ft
RG304	Big Cataloochee	35°40.2'N	83°10.9'W	5971 ft

RG305	Mt Sterling 1	35°41.4'N	83°07.9'W	5349 ft
RG306	Sunup Knob	35°44.7'N	83°10.2'W	5039 ft
RG307	Balsam Mountain	35°39.0'N	83°11.9'W	5327 ft
RG308	Cosby Knob	35°43.8' N	83°10.9'W	4826 ft
RG309	Mt Sterling 2	35°40.9'N	83°09.0'W	5262 ft
RG310	Mt Sterling 3	35°42.1'N	83°07.3'W	5761 ft
RG311	Big Creek	35°45.9'N	83°08.4'W	3398 ft

**Appendix A**

These data are preliminary and have not undergone final quality control by the National Climatic Data Center (NCDC). Therefore, these data are subject to revision. Final and certified climate data can be accessed at the NCDC - <http://www.ncdc.noaa.gov>.

**WFO Monthly/Daily Climate Data**

708  
 CXUS52 KGSP 012035  
 CF6AVL

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: ASHEVILLE NC  
 MONTH: OCTOBER  
 YEAR: 2018  
 LATITUDE: 35 25 N  
 LONGITUDE: 82 33 W

TEMPERATURE IN F:					:PCPN:			SNOW:			WIND			:SUNSHINE:			SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18		
				DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR		
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18		
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18		
1	79	62	71	10	0	6	0.00	0.0	0	3.5	13	160	M	M	5	12	16	140		
2	81	61	71	10	0	6	0.00	0.0	0	1.7	12	340	M	M	6	12	13	340		
3	83	62	73	13	0	8	0.00	0.0	0	3.0	13	340	M	M	4	12	17	340		
4	85	64	75	15	0	10	0.00	0.0	0	4.9	15	340	M	M	3	18	20	340		
5	86	62	74	14	0	9	0.00	0.0	0	3.3	13	330	M	M	0	1	16	340		
6	85	63	74	15	0	9	0.00	0.0	0	2.2	12	180	M	M	5	12	15	180		
7	84	66	75	16	0	10	0.00	0.0	0	2.5	13	160	M	M	4	1	17	190		
8	79	66	73	14	0	8	0.06	0.0	0	2.5	16	160	M	M	7	13	21	170		
9	74	67	71	13	0	6	0.01	0.0	0	6.5	13	150	M	M	8	1	18	130		
10	75	67	71	13	0	6	1.09	0.0	0	4.7	13	150	M	M	9	1	17	130		
11	75	55	65	7	0	0	2.10	0.0	0	17.2	33	330	M	M	5	1	45	330		
12	68	50	59	1	6	0	0.00	0.0	0	11.7	24	360	M	M	2		33	350		
13	65	51	58	1	7	0	0.00	0.0	0	8.6	22	350	M	M	5		29	350		
14	68	51	60	3	5	0	0.01	0.0	0	5.7	13	130	M	M	7		17	160		
15	79	58	69	12	0	4	0.00	0.0	0	6.8	18	180	M	M	5		25	180		
16	72	61	67	11	0	2	0.65	0.0	0	5.8	20	340	M	M	7	1	23	340		
17	67	52	60	4	5	0	0.02	0.0	0	11.1	20	350	M	M	3		26	350		
18	68	47	58	2	7	0	0.00	0.0	0	6.1	23	340	M	M	0		27	350		
19	69	42	56	1	9	0	0.00	0.0	0	4.1	13	190	M	M	4	12	16	190		
20	67	52	60	5	5	0	T	0.0	0	10.4	30	320	M	M	3	8	48	320		
21	56	35	46	-9	19	0	0.00	0.0	0	14.7	38	330	M	M	0	8	49	340		
22	63	32	48	-6	17	0	0.00	0.0	0	3.2	14	190	M	M	0	12	19	180		
23	65	38	52	-2	13	0	0.00	0.0	0	5.8	16	340	M	M	0		19	340		
24	67	38	53	-1	12	0	0.00	0.0	0	5.4	15	340	M	M	0		18	340		
25	54	39	47	-7	18	0	0.09	0.0	0	4.2	10	140	M	M	3	1	15	150		
26	51	41	46	-7	19	0	1.82	0.0	0	3.8	9	170	M	M	10	1	12	170		
27	57	46	52	-1	13	0	T	0.0	0	7.8	21	330	M	M	9	1	25	310		
28	68	41	55	2	10	0	T	0.0	0	7.8	22	200	M	M	4		27	200		
29	62	39	51	-1	14	0	0.00	0.0	0	6.0	16	20	M	M	0		22	360		
30	66	34	50	-2	15	0	0.00	0.0	0	3.4	9	150	M	M	0		14	170		
31	74	38	56	4	9	0	0.00	0.0	0	4.0	15	180	M	M	1		21	190		
SM	2192	1580			203	84	5.85		0.0	188.4			M		119					
AV	70.7	51.0								6.1	FASTST		M	M	4		MAX (MPH)			
										MISC	---->	# 38 330					# 49	340		

NOTES:

# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: ASHEVILLE NC
MONTH: OCTOBER
YEAR: 2018
LATITUDE: 35 25 N
LONGITUDE: 82 33 W

[TEMPERATURE DATA] [PRECIPITATION DATA] SYMBOLS USED IN COLUMN 16
AVERAGE MONTHLY: 60.8 TOTAL FOR MONTH: 5.85 1 = FOG OR MIST
DPTR FM NORMAL: 4.4 DPTR FM NORMAL: 2.94 2 = FOG REDUCING VISIBILITY
HIGHEST: 86 ON 5 GRTST 24HR 2.68 ON 10-11 TO 1/4 MILE OR LESS
LOWEST: 32 ON 22 SNOW, ICE PELLETS, HAIL 3 = THUNDER
TOTAL MONTH: 0.0 INCH 4 = ICE PELLETS
GRTST 24HR 0.0 5 = HAIL
GRTST DEPTH: 0 6 = FREEZING RAIN OR DRIZZLE
7 = DUSTSTORM OR SANDSTORM:
VSBY 1/2 MILE OR LESS
8 = SMOKE OR HAZE
9 = BLOWING SNOW
X = TORNADO

[NO. OF DAYS WITH] [WEATHER - DAYS WITH]
MAX 32 OR BELOW: 0 0.01 INCH OR MORE: 9
MAX 90 OR ABOVE: 0 0.10 INCH OR MORE: 4
MIN 32 OR BELOW: 1 0.50 INCH OR MORE: 4
MIN 0 OR BELOW: 0 1.00 INCH OR MORE: 3

[HDD (BASE 65) ]
TOTAL THIS MO. 203 CLEAR (SCALE 0-3) 13
DPTR FM NORMAL -75 PTCLDY (SCALE 4-7) 15
TOTAL FM JUL 1 203 CLOUDY (SCALE 8-10) 3
DPTR FM NORMAL -132

[CDD (BASE 65) ]
TOTAL THIS MO. 84
DPTR FM NORMAL 74 [PRESSURE DATA]
TOTAL FM JAN 1 1425 HIGHEST SLP 30.40 ON 18
DPTR FM NORMAL 563 LOWEST SLP 29.51 ON 11

[REMARKS]
#FINAL-10-18#

000
CXUS52 KGSP 012249
CF6AVL

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: ASHEVILLE NC
MONTH: NOVEMBER
YEAR: 2018
LATITUDE: 35 25 N
LONGITUDE: 82 33 W

TEMPERATURE IN F: :PCPN: SNOW: WIND :SUNSHINE: SKY :PK WND
1 2 3 4 5 6A 6B 7 8 9 10 11 12 13 14 15 16 17 18
12Z AVG MX 2MIN
DY MAX MIN AVG DEP HDD CDD WTR SNW DPTH SPD SPD DIR MIN PSBL S-S WX SPD DR



1	69	57	63	11	2	0	0.48	0.0	0	11.5	23	170	M	M	7	1	31	190
2	61	42	52	1	13	0	0.30	0.0	0	10.9	22	340	M	M	8	1	29	350
3	57	38	48	-3	17	0	0.00	0.0	0	8.1	22	340	M	M	0		28	350
4	59	31	45	-6	20	0	T	0.0	0	5.8	18	160	M	M	3	1	26	160
5	63	50	57	7	8	0	0.10	0.0	0	5.2	13	150	M	M	9	18	18	140
6	69	44	57	7	8	0	0.55	0.0	0	6.0	18	10	M	M	7	1	26	360
7	70	39	55	5	10	0	0.00	0.0	0	3.3	14	340	M	M	2	1	17	340
8	60	46	53	3	12	0	T	0.0	0	3.2	9	130	M	M	8		13	110
9	53	42	48	-1	17	0	0.55	0.0	0	8.3	26	350	M	M	10	1	36	340
10	44	28	36	-13	29	0	0.00	0.0	0	14.2	32	340	M	M	1		42	340
11	49	24	37	-12	28	0	T	0.0	0	3.8	10	140	M	M	2		14	150
12	46	35	41	-7	24	0	1.73	0.0	0	3.7	14	330	M	M	9	1	16	340
13	52	43	48	0	17	0	0.10	0.0	0	9.4	24	340	M	M	10	18	29	330
14	45	37	41	-7	24	0	0.30	0.0	0	4.9	14	360	M	M	10	18	21	360
15	43	31	37	-11	28	0	1.26	0.0	0	5.4	20	360	M	M	10	18	28	350
16	52	29	41	-6	24	0	0.00	0.0	0	12.0	25	340	M	M	3		35	340
17	61	29	45	-2	20	0	0.00	0.0	0	2.4	9	140	M	M	0		13	150
18	59	29	44	-2	21	0	0.00	0.0	0	1.9	10	140	M	M	1	12	15	160
19	64	34	49	3	16	0	T	0.0	0	2.3	13	200	M	M	5	12	17	200
20	53	36	45	-1	20	0	T	0.0	0	10.5	26	340	M	M	3		31	350
21	53	32	43	-3	22	0	0.00	0.0	0	9.8	22	340	M	M	0		25	330
22	61	31	46	1	19	0	0.00	0.0	0	5.7	12	130	M	M	0		17	150
23	37	30	34	-11	31	0	0.51	0.0	0	5.8	12	180	M	M	6	18	16	220
24	56	33	45	0	20	0	1.02	0.0	0	6.4	14	340	M	M	6	1	20	350
25	60	32	46	2	19	0	T	0.0	0	5.4	13	160	M	M	4	128	19	150
26	54	34	44	0	21	0	T	0.0	0	13.7	29	350	M	M	6	1	37	360
27	35	22	29	-15	36	0	T	T	0	15.0	25	340	M	M	6		34	330
28	34	21	28	-16	37	0	0.00	0.0	0	15.2	24	340	M	M	0		31	350
29	53	25	39	-4	26	0	0.00	0.0	0	6.9	20	350	M	M	5		24	340
30	61	45	53	10	12	0	0.26	0.0	0	6.0	14	210	M	M	9	1	19	220

```

=====
SM 1633 1049          601  0  7.16    T    222.7          M    150
=====
AV 54.4 35.0          7.4 FASTST  M    M    5    MAX(MPH)
MISC ----> # 32 340          # 42 340
=====

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NOTES:  
# LAST OF SEVERAL OCCURRENCES  
COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: ASHEVILLE NC  
MONTH: NOVEMBER  
YEAR: 2018  
LATITUDE: 35 25 N  
LONGITUDE: 82 33 W

[TEMPERATURE DATA]	[PRECIPITATION DATA]	SYMBOLS USED IN COLUMN 16
AVERAGE MONTHLY: 44.7	TOTAL FOR MONTH: 7.16	1 = FOG OR MIST
DPTR FM NORMAL: -2.6	DPTR FM NORMAL: 3.51	2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS
HIGHEST: 70 ON 7	GRTST 24HR 1.79 ON 12-13	3 = THUNDER
LOWEST: 21 ON 28		4 = ICE PELLETS
	SNOW, ICE PELLETS, HAIL	5 = HAIL
	TOTAL MONTH: T	6 = FREEZING RAIN OR DRIZZLE
	GRTST 24HR T ON 27-27	7 = DUSTSTORM OR SANDSTORM: VSBY 1/2 MILE OR LESS
	GRTST DEPTH: 0	8 = SMOKE OR HAZE
		9 = BLOWING SNOW
[NO. OF DAYS WITH]	[WEATHER - DAYS WITH]	X = TORNADO
MAX 32 OR BELOW: 0	0.01 INCH OR MORE: 12	
MAX 90 OR ABOVE: 0	0.10 INCH OR MORE: 12	
MIN 32 OR BELOW: 14	0.50 INCH OR MORE: 6	

MIN 0 OR BELOW: 0 1.00 INCH OR MORE: 3

[HDD (BASE 65) ]
TOTAL THIS MO. 601 CLEAR (SCALE 0-3) 11
DPTR FM NORMAL 69 PTCLDY (SCALE 4-7) 12
TOTAL FM JUL 1 804 CLOUDY (SCALE 8-10) 7
DPTR FM NORMAL -63

[CDD (BASE 65) ]
TOTAL THIS MO. 0
DPTR FM NORMAL -1 [PRESSURE DATA]
TOTAL FM JAN 1 1425 HIGHEST SLP 30.43 ON 4
DPTR FM NORMAL 562 LOWEST SLP 29.61 ON 26

[REMARKS]
#FINAL-11-18#

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000
CXUS52 KGSP 010855
CF6AVL

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: ASHEVILLE NC
MONTH: DECEMBER
YEAR: 2018
LATITUDE: 35 25 N
LONGITUDE: 82 33 W

Table with columns: TEMPERATURE IN F, PCPN, SNOW, WIND, SUNSHINE, SKY, PK WND. Rows 1-29 showing daily weather data for Asheville NC in December 2018.

```

30 56 44 50 13 15 0 0.04 0.0 0 3.0 12 360 M M 7 16 350
31 63 49 56 19 9 0 0.27 0.0 0 10.0 25 200 M M 9 1 35 180
=====
SM 1539 1066 706 0 10.87 11.4 193.7 M 161
=====
AV 49.7 34.4 6.2 FASTST M M 5 MAX(MPH)
MISC ----> # 28 330 # 37 340
=====

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NOTES:  
# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: ASHEVILLE NC  
MONTH: DECEMBER  
YEAR: 2018  
LATITUDE: 35 25 N  
LONGITUDE: 82 33 W

[TEMPERATURE DATA]	[PRECIPITATION DATA]	SYMBOLS USED IN COLUMN 16
AVERAGE MONTHLY: 42.0	TOTAL FOR MONTH: 10.87	1 = FOG OR MIST
DPTR FM NORMAL: 2.6	DPTR FM NORMAL: 7.28	2 = FOG REDUCING VISIBILITY
HIGHEST: 69 ON 2	GRTST 24HR 5.19 ON 27-28	TO 1/4 MILE OR LESS
LOWEST: 24 ON 6		3 = THUNDER
	SNOW, ICE PELLETS, HAIL	4 = ICE PELLETS
	TOTAL MONTH: 11.4 INCHES	5 = HAIL
	GRTST 24HR 11.1 ON 8- 9	6 = FREEZING RAIN OR DRIZZLE
	GRTST DEPTH: 9 ON 9	7 = DUSTSTORM OR SANDSTORM:
		VSBY 1/2 MILE OR LESS
		8 = SMOKE OR HAZE
		9 = BLOWING SNOW
		X = TORNADO
[NO. OF DAYS WITH]	[WEATHER - DAYS WITH]	
MAX 32 OR BELOW: 0	0.01 INCH OR MORE: 14	
MAX 90 OR ABOVE: 0	0.10 INCH OR MORE: 11	
MIN 32 OR BELOW: 13	0.50 INCH OR MORE: 6	
MIN 0 OR BELOW: 0	1.00 INCH OR MORE: 5	
[HDD (BASE 65) ]		
TOTAL THIS MO. 706	CLEAR (SCALE 0-3) 11	
DPTR FM NORMAL -88	PTCLDY (SCALE 4-7) 13	
TOTAL FM JUL 1 1510	CLOUDY (SCALE 8-10) 7	
DPTR FM NORMAL -151		
[CDD (BASE 65) ]		
TOTAL THIS MO. 0		
DPTR FM NORMAL 0	[PRESSURE DATA]	
TOTAL FM JAN 1 1425	HIGHEST SLP 30.51 ON 26	
DPTR FM NORMAL 562	LOWEST SLP 29.13 ON 21	

[REMARKS]  
#FINAL-12-18#

000  
CXUS52 KGSP 012244  
CF6AVL  
PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: ASHEVILLE NC  
MONTH: JANUARY  
YEAR: 2019  
LATITUDE: 35 25 N  
LONGITUDE: 82 33 W

TEMPERATURE IN F:					:PCPN:			SNOW:		WIND			:SUNSHINE:			SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18	
				12Z		AVG MX		2MIN											
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR	
1	62	44	53	16	12	0	T	0.0	0	6.7	18	200	M	M	4		26	200	
2	51	41	46	9	19	0	0.13	0.0	0	2.3	10	180	M	M	7	12	13	140	
3	53	47	50	13	15	0	0.71	0.0	0	5.3	21	340	M	M	6	18	24	330	
4	54	44	49	12	16	0	0.81	0.0	0	6.3	18	320	M	M	9	1	25	310	
5	53	40	47	10	18	0	0.00	0.0	0	11.5	25	350	M	M	2		35	350	
6	64	36	50	13	15	0	0.00	0.0	0	7.1	22	340	M	M	0		25	340	
7	58	37	48	11	17	0	0.00	0.0	0	5.7	16	160	M	M	0		22	160	
8	68	41	55	18	10	0	0.00	0.0	0	6.2	29	340	M	M	M		41	350	
9	48	30	39	2	26	0	0.00	0.0	0	19.0	32	340	M	M	0		46	340	
10	39	25	32	-5	33	0	0.00	0.0	0	17.7	32	340	M	M	0		45	350	
11	51	22	37	0	28	0	0.00	0.0	0	5.4	16	350	M	M	1		22	350	
12	38	31	35	-2	30	0	0.60	T	0	7.4	14	170	M	M	10	146	17	160	
13	39	32	36	-1	29	0	0.31	0.0	0	2.3	12	170	M	M	10	16	14	180	
14	42	34	38	1	27	0	0.00	0.0	0	10.7	16	330	M	M	10	1	20	330	
15	44	28	36	-1	29	0	0.00	0.0	0	10.8	21	340	M	M	6		25	330	
16	49	26	38	1	27	0	0.00	0.0	0	10.4	24	350	M	M	2		30	340	
17	40	29	35	-2	30	0	0.10	T	0	4.2	14	170	M	M	8	14	17	180	
18	53	36	45	8	20	0	0.00	0.0	0	4.6	14	340	M	M	9	12	17	330	
19	53	43	48	11	17	0	1.29	0.0	0	8.3	16	170	M	M	10	1	26	100	
20	50	18	34	-3	31	0	T	T	0	17.3	33	340	M	M	4	18	42	350	
21	31	11	21	-16	44	0	0.00	0.0	0	11.6	30	350	M	M	0		39	350	
22	39	20	30	-7	35	0	0.00	0.0	0	6.8	16	130	M	M	4		21	150	
23	55	31	43	6	22	0	0.82	T	0	5.8	18	170	M	M	10	1246	24	170	
24	54	27	41	4	24	0	0.44	0.0	0	15.3	32	340	M	M	6	1	40	340	
25	39	25	32	-5	33	0	0.00	0.0	0	10.3	23	330	M	M	1		31	340	
26	46	22	34	-3	31	0	0.00	0.0	0	5.8	18	330	M	M	0		23	320	
27	47	22	35	-3	30	0	0.00	0.0	0	0.8	8	330	M	M	0		10	330	
28	51	25	38	0	27	0	0.00	0.0	0	4.3	20	210	M	M	2		26	220	
29	45	21	33	-5	32	0	0.07	T	0	13.0	25	340	M	M	6	1	34	340	
30	39	17	28	-10	37	0	0.00	0.0	0	8.4	29	300	M	M	1		40	320	
31	42	18	30	-8	35	0	0.00	0.0	0	6.6	20	340	M	M	0		25	330	
SM	1497	923			799	0	5.28	T		257.9			M		128				
AV	48.3	29.8								8.3	FASTST		M	M	4	MAX(MPH)			
								MISC	---->	#	33	340				#	46	340	

NOTES:

# LAST OF SEVERAL OCCURRENCES

COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: ASHEVILLE NC  
 MONTH: JANUARY  
 YEAR: 2019  
 LATITUDE: 35 25 N  
 LONGITUDE: 82 33 W

[TEMPERATURE DATA]

[PRECIPITATION DATA]

SYMBOLS USED IN COLUMN 16

AVERAGE MONTHLY: 39.0  
 DPTR FM NORMAL: 1.9  
 HIGHEST: 68 ON 8  
 LOWEST: 11 ON 21

TOTAL FOR MONTH: 5.28  
 DPTR FM NORMAL: 1.61  
 GRTST 24HR 1.29 ON 19-19  
 SNOW, ICE PELLETS, HAIL  
 TOTAL MONTH: T  
 GRTST 24HR T ON 29-29

1 = FOG OR MIST  
 2 = FOG REDUCING VISIBILITY TO 1/4 MILE OR LESS  
 3 = THUNDER  
 4 = ICE PELLETS  
 5 = HAIL  
 6 = FREEZING RAIN OR DRIZZLE

GRTST DEPTH: 0 7 = DUSTSTORM OR SANDSTORM:  
 VSBY 1/2 MILE OR LESS  
 8 = SMOKE OR HAZE  
 9 = BLOWING SNOW  
 X = TORNADO

[NO. OF DAYS WITH] [WEATHER - DAYS WITH]  
 MAX 32 OR BELOW: 1 0.01 INCH OR MORE: 10  
 MAX 90 OR ABOVE: 0 0.10 INCH OR MORE: 9  
 MIN 32 OR BELOW: 20 0.50 INCH OR MORE: 5  
 MIN 0 OR BELOW: 0 1.00 INCH OR MORE: 1

[HDD (BASE 65) ]  
 TOTAL THIS MO. 799 CLEAR (SCALE 0-3) 14  
 DPTR FM NORMAL -67 PTCLDY (SCALE 4-7) 9  
 TOTAL FM JUL 1 2309 CLOUDY (SCALE 8-10) 7  
 DPTR FM NORMAL -218

[CDD (BASE 65) ]  
 TOTAL THIS MO. 0  
 DPTR FM NORMAL 0 [PRESSURE DATA]  
 TOTAL FM JAN 1 0 HIGHEST SLP 30.63 ON 22  
 DPTR FM NORMAL 0 LOWEST SLP 29.44 ON 20

[REMARKS]  
 #FINAL-01-19#

000  
 CXUS52 KGSP 081252  
 CF6AVL  
 PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: ASHEVILLE NC  
 MONTH: FEBRUARY  
 YEAR: 2019  
 LATITUDE: 35 25 N  
 LONGITUDE: 82 33 W

TEMPERATURE IN F:					:PCPN:	SNOW:	WIND	:SUNSHINE:	SKY	:PK WND								
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
										12Z AVG MX 2MIN								
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	57	23	40	2	25	0	0.00	0.0	0	2.8	16	340	M	M	6		20	340
2	62	28	45	7	20	0	0.00	0.0	0	2.0	12	180	M	M	2		14	170
3	60	31	46	8	19	0	0.00	0.0	0	2.3	13	210	M	M	4		15	210
4	66	30	48	10	17	0	T	0.0	0	2.3	9	200	M	M	2	12	13	150
5	71	38	55	16	10	0	0.00	0.0	0	4.1	10	340	M	M	2		14	360
6	70	42	56	17	9	0	T	0.0	0	7.1	20	210	M	M	4		27	200
7	74	60	67	28	0	2	T	0.0	0	9.0	21	190	M	M	4		27	200
8	64	34	49	10	16	0	T	0.0	0	16.1	35	340	M	M	3		42	340
9	52	31	42	3	23	0	0.00	0.0	0	9.1	25	340	M	M	0		35	340
10	45	30	38	-1	27	0	0.13	0.0	0	6.1	12	170	M	M	8	1	13	160
11	68	40	54	14	11	0	0.13	0.0	0	7.6	23	200	M	M	8	12	33	200
12	51	43	47	7	18	0	0.83	0.0	0	7.8	33	340	M	M	9	1	43	340
13	53	32	43	3	22	0	0.00	0.0	0	11.5	30	350	M	M	0		37	340
14	56	26	41	1	24	0	0.00	0.0	0	5.5	17	180	M	M	1		22	180
15	61	41	51	11	14	0	0.04	0.0	0	5.0	14	300	M	M	7	1	21	240
16	58	44	51	11	14	0	0.21	0.0	0	7.3	17	340	M	M	7	1	21	340
17	44	36	40	-1	25	0	1.12	0.0	0	8.0	16	150	M	M	10	1	20	150
18	53	36	45	4	20	0	0.16	0.0	0	12.8	31	340	M	M	3	1	37	330
19	37	31	34	-7	31	0	0.93	T	0	6.9	16	340	M	M	6	14	20	360
20	41	33	37	-4	28	0	0.95	T	0	7.5	15	180	M	M	10	134	21	180
21	65	40	53	11	12	0	0.42	0.0	0	7.7	18	330	M	M	7	13	24	340
22	51	47	49	7	16	0	1.04	0.0	0	3.8	20	340	M	M	10	1	22	340

23	47	41	44	2	21	0	0.39	0.0	0	6.9	13	180	M	M	10	1	16	180
24	65	41	53	11	12	0	0.38	0.0	0	13.5	33	320	M	M	3	1	46	300
25	53	33	43	1	22	0	0.00	0.0	0	9.3	26	340	M	M	0		34	340
26	63	32	48	5	17	0	0.00	0.0	0	3.5	17	200	M	M	4		24	210
27	65	47	56	13	9	0	0.04	0.0	0	3.5	14	180	M	M	7	1	17	180
28	57	43	50	7	15	0	0.14	0.0	0	2.2	10	190	M	M	6	12	13	210

```

=====
SM 1609 1033      497  2  6.91    T    191.2      M      143
=====
AV 57.5 36.9      6.8 FASTST M    M    5      MAX(MPH)
MISC ----> # 35 340      # 46 300
=====

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NOTES:  
# LAST OF SEVERAL OCCURRENCES  
COLUMN 17 PEAK WIND IN M.P.H.

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6) , PAGE 2

STATION: ASHEVILLE NC  
MONTH: FEBRUARY  
YEAR: 2019  
LATITUDE: 35 25 N  
LONGITUDE: 82 33 W

[TEMPERATURE DATA]	[PRECIPITATION DATA]	SYMBOLS USED IN COLUMN 16
AVERAGE MONTHLY: 47.2	TOTAL FOR MONTH: 6.91	1 = FOG OR MIST
DPTR FM NORMAL: 6.9	DPTR FM NORMAL: 3.15	2 = FOG REDUCING VISIBILITY
HIGHEST: 74 ON 7	GRTST 24HR 1.12 ON 17-17	TO 1/4 MILE OR LESS
LOWEST: 23 ON 1	SNOW, ICE PELLETS, HAIL	3 = THUNDER
	TOTAL MONTH: T	4 = ICE PELLETS
	GRTST 24HR T ON 20-20	5 = HAIL
	GRTST DEPTH: 0	6 = FREEZING RAIN OR DRIZZLE
		7 = DUSTSTORM OR SANDSTORM:
		VSBY 1/2 MILE OR LESS
		8 = SMOKE OR HAZE
[NO. OF DAYS WITH]	[WEATHER - DAYS WITH]	9 = BLOWING SNOW
		X = TORNADO

MAX 32 OR BELOW: 0	0.01 INCH OR MORE: 15
MAX 90 OR ABOVE: 0	0.10 INCH OR MORE: 13
MIN 32 OR BELOW: 10	0.50 INCH OR MORE: 5
MIN 0 OR BELOW: 0	1.00 INCH OR MORE: 2

[HDD (BASE 65) ]  
TOTAL THIS MO. 497 CLEAR (SCALE 0-3) 9  
DPTR FM NORMAL -193 PTCLDY (SCALE 4-7) 13  
TOTAL FM JUL 1 2806 CLOUDY (SCALE 8-10) 6  
DPTR FM NORMAL -411

[CDD (BASE 65) ]  
TOTAL THIS MO. 2  
DPTR FM NORMAL 2 [PRESSURE DATA]  
TOTAL FM JAN 1 2 HIGHEST SLP 30.66 ON 9  
DPTR FM NORMAL 2 LOWEST SLP 29.64 ON 16

[REMARKS]  
#FINAL-02-19#