

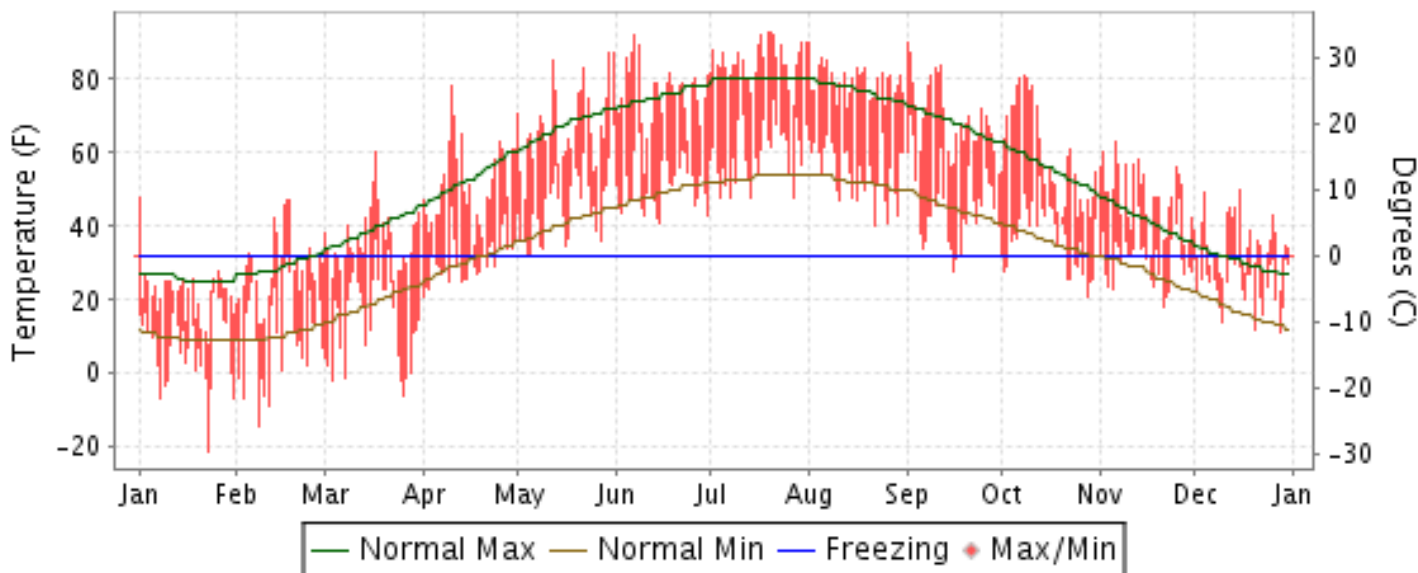


2011 LOCAL CLIMATOLOGICAL DATA ANNUAL SUMMARY WITH COMPARATIVE DATA

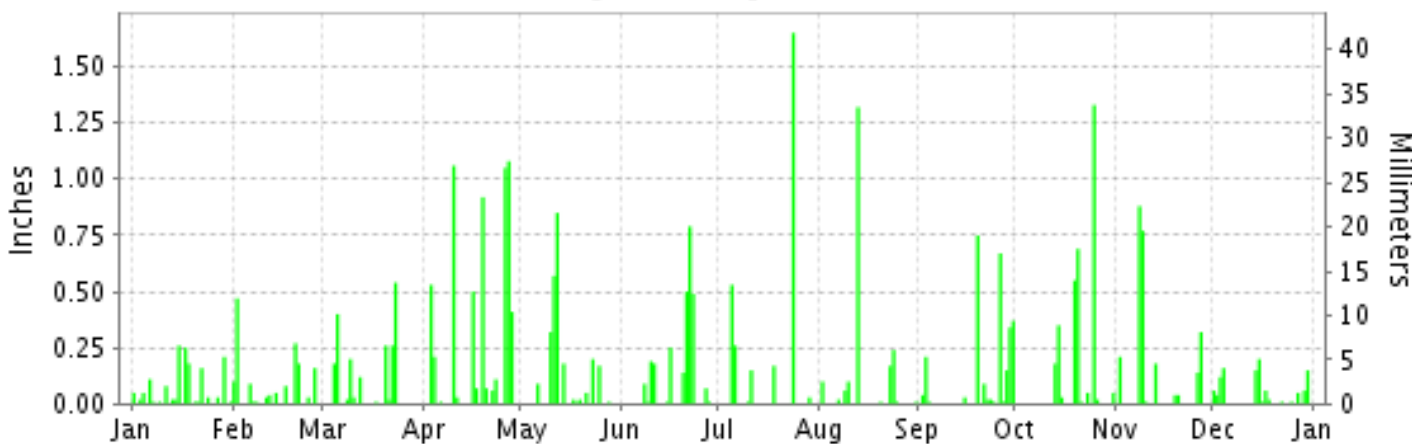
ISSN 0198-2591

HOUGHTON LAKE, MICHIGAN (KHTL)

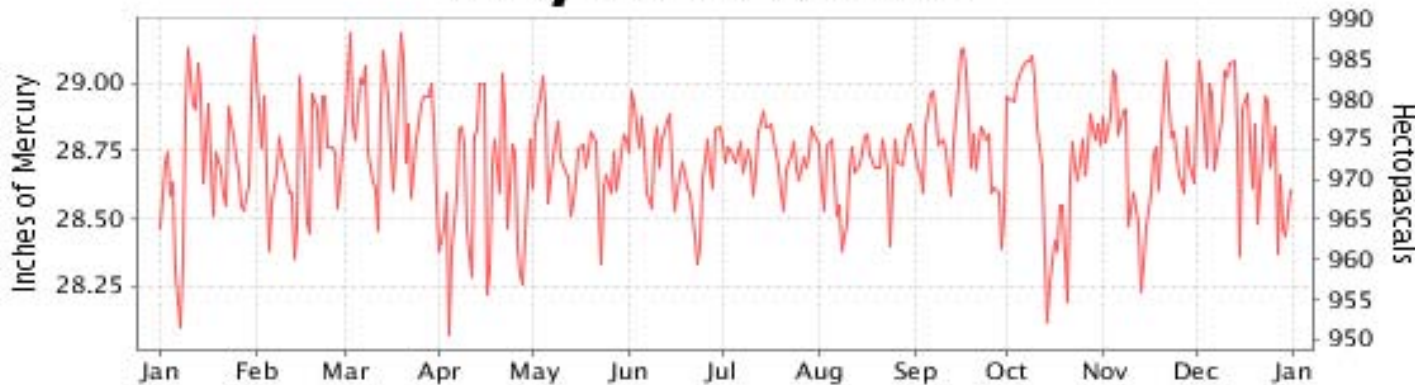
Daily Max/Min Temperature



Daily Precipitation



Daily Station Pressure



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NATIONAL
CLIMATIC DATA CENTER
ASHEVILLE, NORTH CAROLINA

Thomas R. Karl
DIRECTOR
NATIONAL CLIMATIC DATA CENTER

METEOROLOGICAL DATA FOR 2011

HOUGHTON LAKE (KHTL)

LATITUDE: 44° 21'N LONGITUDE: -84° 40'W ELEVATION (FT): GRND: 1151 BARO: 1151 TIME ZONE: EASTERN (UTC -5) WBAN: 94814

ELEMENT		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
TEMPERATURE °F	MEAN DAILY MAXIMUM	22.1	28.9	36.6	51.8	67.4	75.8	85.0	79.5	69.8	59.5	48.1	35.5	55.0	
	HIGHEST DAILY MAXIMUM	48	47	60	78	87	92	93	90	90	81	63	50	93	
	DATE OF OCCURRENCE	01	18+	17	10	30+	07	20+	01	01	08	06	15	JUL 20+	
	MEAN DAILY MINIMUM	7.0	10.7	14.6	31.0	45.7	51.0	59.9	54.9	45.9	36.7	31.3	24.6	34.4	
	LOWEST DAILY MINIMUM	-21	-14	-6	21	32	41	48	40	28	21	18	11	-21	
	DATE OF OCCURRENCE	23	08	26	01	04+	15	27+	22	16	28	21	28	JAN 23	
	AVERAGE DRY BULB	14.6	19.8	25.6	41.4	56.6	63.4	72.5	67.2	57.9	48.1	39.7	30.1	44.7	
	MEAN WET BULB	14.3	19.3	23.9	37.0	50.3	57.2	66.1	61.7	53.0	43.7	36.5	28.3	40.9	
	MEAN DEW POINT	10.6	14.1	17.5	31.2	43.9	52.2	61.8	57.5	49.2	39.4	31.6	24.1	36.1	
	NUMBER OF DAYS WITH:														
	MAXIMUM >= 90°	0	0	0	0	0	1	6	1	1	0	0	0	0	9
MAXIMUM <= 32°	30	21	9	0	0	0	0	0	0	0	1	11	72		
MINIMUM <= 32°	31	27	29	20	2	0	0	0	2	11	18	30	170		
MINIMUM <= 0°	8	6	6	0	0	0	0	0	0	0	0	0	20		
H/C	HEATING DEGREE DAYS	1555	1256	1212	702	287	89	7	29	249	514	751	1077	7728	
	COOLING DEGREE DAYS	0	0	0	0	34	49	246	106	40	0	0	0	475	
RH	MEAN (PERCENT)	80	75	70	71	66	70	70	73	76	75	74	78	73	
	HOUR 01 LST	85	82	82	83	79	86	88	86	89	88	81	79	84	
	HOUR 07 LST	85	83	81	81	73	75	76	83	88	88	81	84	82	
	HOUR 13 LST	72	60	56	59	52	54	50	53	58	55	62	72	59	
	HOUR 19 LST	79	71	67	65	61	62	64	69	76	73	75	79	70	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG(VISBY <= 1/4 MI)	2	4	3	3	1	2	7	6	7	4	1	2	42	
	THUNDERSTORMS	0	1	1	5	4	5	9	6	3	0	1	0	35	
CLOUDINESS	SUNRISE-SUNSET: (OKTAS)														
	CEILOMETER (<= 12,000 FT.)														
	SATELLITE (> 12,000 FT.)														
	MIDNIGHT-MIDNIGHT: (OKTAS)														
	CEILOMETER (<= 12,000 FT.)														
SATELLITE (> 12,000 FT.)															
NUMBER OF DAYS WITH:															
CLEAR															
PARTLY CLOUDY															
CLOUDY															
PR	MEAN STATION PRESS. (IN.)	28.71	28.71	28.86	28.61	28.71	28.70	28.73	28.68	28.77	28.74	28.71	28.79	28.73	
	MEAN SEA-LEVEL PRESS. (IN.)	30.02	30.00	30.15	29.85	29.95	29.93	29.95	29.91	30.01	29.98	29.98	30.06	29.98	
WINDS	RESULTANT SPEED (MPH)	2.1	3.2	1.4	0.0	1.4	0.9	3.2	2.3	0.7	2.0	3.5	3.8	1.6	
	RES. DIR. (TENS OF DEGS.)	27	28	34	24	06	27	27	28	31	29	23	24	27	
	MEAN SPEED (MPH)	6.3	9.0	7.1	9.2	8.6	7.4	5.7	5.8	6.6	6.8	8.4	7.8	7.4	
	PREVAIL.DIR.(TENS OF DEGS.)	16	23	32	09	04	30	26	24	07	26	21	21	04	
	MAXIMUM 2-MINUTE WIND														
	SPEED (MPH)	26	35	25	32	29	29	37	23	30	30	28	29	37	
	DIR. (TENS OF DEGS.)	25	29	06	28	02	28	34	27	36	03	27	33	34	
	DATE OF OCCURRENCE	01	18	23	17	11	01	24	09	30	20	09	27	JUL 24	
	MAXIMUM 3-SECOND WIND:														
	SPEED (MPH)	38	47	36	46	38	41	49	29	38	40	37	38	49	
DIR. (TENS OF DEGS.)	23	29	07	28	22	26	35	33	35	03	21	32	35		
DATE OF OCCURRENCE	01	18	23	17	01	01	24	10	30	19	18	27	JUL 24		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	1.52	1.52	2.04	6.11	2.49	2.73	2.80	2.04	2.72	3.26	2.59	1.10	30.92	
	GREATEST 24-HOUR (IN.)	0.43	0.48	0.80	1.33	0.85	1.14	1.65	1.32	0.75	1.35	1.34	0.34	1.65	
	DATE OF OCCURRENCE	17-18	01-02	22-23	27-28	12	21-22	24	13	19	25-26	08-09	14-15	JUL 24	
	NUMBER OF DAYS WITH:														
	PRECIPITATION 0.01	19	13	11	14	12	12	7	10	14	10	9	14	145	
PRECIPITATION 0.10	6	5	7	9	6	7	5	5	6	5	6	5	72		
PRECIPITATION 1.00	0	0	0	3	0	0	1	1	0	1	0	0	6		
SNOWFALL	SNOW,ICE PELLETS,HAIL														
	TOTAL (IN.)	22.6	18.5	20.0	8.1	0.0	0.0	0.0	0.0	0.0	0.0	T	3.9	73.1	
	GREATEST 24-HOUR (IN.)	4.3	7.0	6.4	4.0	0.0	0.0	0.0	0.0	0.0	0.0	T	1.3	7.0	
	DATE OF OCCURRENCE	29	02	23	19							29+	30	FEB 02	
	MAXIMUM SNOW DEPTH (IN.)	16	19	17	8	0	0	0	0	0	0	T	1	19	
	DATE OF OCCURRENCE	29	03+	07+	05+							17+	31+	FEB 03+	
	NUMBER OF DAYS WITH:														
SNOWFALL >= 1.0	8	5	4	3	0	0	0	0	0	0	0	2	22		

NORMALS, MEANS, AND EXTREMES HOUGHTON LAKE (KHTL)

LATITUDE: 44° 21'N LONGITUDE: -84° 40'W ELEVATION (FT): GRND: 1151 BARO: 1151 TIME ZONE: EASTERN (UTC -5) WBAN: 94814

	ELEMENT	POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	NORMAL DAILY MAXIMUM	30	25.9	29.3	39.4	53.0	67.2	75.5	80.0	77.1	68.3	56.0	41.9	30.5	53.7
	MEAN DAILY MAXIMUM	47	25.8	28.8	39.1	53.4	66.2	75.2	79.8	77.0	68.7	55.9	42.4	30.6	53.6
	HIGHEST DAILY MAXIMUM	47	54	59	76	86	90	103	98	96	92	85	70	64	103
	YEAR OF OCCURRENCE		1996	2000	1990	2002	2006	1995	1995	2001	1985	2007	2008	2001	JUN 1995
	MEAN OF EXTREME MAXS.	47	43.0	45.6	60.5	75.3	83.0	88.1	89.8	88.2	83.2	74.6	60.6	46.6	69.9
	NORMAL DAILY MINIMUM	30	9.7	10.5	19.2	30.6	40.7	48.9	53.4	52.2	45.3	36.2	27.6	16.8	32.6
	MEAN DAILY MINIMUM	47	10.1	10.1	18.8	31.6	42.2	51.0	55.4	53.7	46.5	37.0	28.4	17.5	33.5
	LOWEST DAILY MINIMUM	47	-26	-34	-23	2	21	29	33	29	21	16	-5	-21	-34
	YEAR OF OCCURRENCE		1981	1979	1967	2003	1966	1998	1965	1982	1989	1969	1995	1976	FEB 1979
	MEAN OF EXTREME MINS.	47	-12.8	-13.6	-5.8	16.0	27.8	36.1	40.7	38.5	29.7	22.4	12.5	-3.9	15.6
	NORMAL DRY BULB	30	17.8	19.9	29.3	41.8	53.9	62.2	66.7	64.6	56.8	46.1	34.8	23.7	43.1
	MEAN DRY BULB	47	18.0	19.5	29.0	42.5	54.2	63.2	67.6	65.4	57.6	46.5	35.4	24.1	43.6
	MEAN WET BULB	28	18.1	19.2	26.0	37.0	47.6	57.5	61.6	60.7	53.7	42.7	32.8	23.2	40.0
	MEAN DEW POINT	28	15.7	16.3	22.3	31.9	43.2	54.0	58.6	58.3	51.3	40.1	30.5	21.1	36.9
	NORMAL NO. DAYS WITH: MAXIMUM >= 90	30	0.0	0.0	0.0	0.0	0.1	0.9	2.0	0.5	*	0.0	0.0	0.0	3.5
	MAXIMUM <= 32	30	23.5	17.9	8.3	1.1	0.0	0.0	0.0	0.0	0.0	*	5.2	18.2	74.2
MINIMUM <= 32	30	30.6	27.5	27.4	16.9	4.3	0.2	0.0	*	1.6	9.2	21.9	29.6	169.2	
MINIMUM <= 0	30	8.0	7.3	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.8	20.8	
H/C	NORMAL HEATING DEG. DAYS	30	1468	1278	1115	685	348	131	56	82	254	577	901	1271	8166
	NORMAL COOLING DEG. DAYS	30	0	0	0	3	20	61	124	85	24	1	0	0	318
RH	NORMAL (PERCENT)	30				64		67							
	HOUR 01 LST	30				77		85							
	HOUR 07 LST	30				80		82							85
	HOUR 13 LST	30				53		54							63
	HOUR 19 LST	30				57		57							68
S	PERCENT POSSIBLE SUNSHINE														
W/O	MEAN NO. DAYS WITH: HEAVY FOG(VISBY <= 1/4 MI)	47	2.5	2.3	3.2	1.7	1.6	2.5	3.2	4.7	4.9	3.2	2.9	2.9	35.6
	THUNDERSTORMS	47	0.1	0.2	0.9	2.1	4.1	5.7	6.0	5.5	3.6	1.3	0.7	0.2	30.4
CLOUDINESS	MEAN: SUNRISE-SUNSET (OKTAS)	31	6.4	5.9	5.6	5.5	5.1	4.8	4.5	4.6	5.0	5.6	6.5	6.4	5.5
	MIDNIGHT-MIDNIGHT (OKTAS)	16	5.9	5.2	5.1	4.7	4.4	4.4	3.9	3.9	4.7	5.0	6.1	6.2	5.0
	MEAN NO. DAYS WITH: CLEAR	31	2.9	4.2	5.9	6.2	7.0	7.0	7.3	7.8	6.3	5.3	2.4	2.4	64.7
	PARTLY CLOUDY	31	6.3	6.7	7.2	7.2	9.3	11.2	13.2	11.1	9.3	7.7	5.0	5.9	100.1
	CLOUDY	31	21.8	17.4	17.8	16.6	14.1	11.8	10.1	12.1	14.4	18.0	22.6	22.8	199.5
PR	MEAN STATION PRESSURE(IN)	28	28.73	28.76	28.77	28.71	28.73	28.73	28.75	28.79	28.80	28.78	28.75	28.74	28.75
	MEAN SEA-LEVEL PRES. (IN)	28	30.03	30.05	30.06	29.97	29.97	29.96	29.98	30.03	30.04	30.03	30.02	30.03	30.01
WINDS	MEAN SPEED (MPH)	28	8.7	8.6	8.6	9.4	8.7	7.6	7.0	6.8	7.3	8.3	9.1	8.9	8.3
	PREVAIL.DIR(TENS OF DEGS)	22	28	25	33	32	32	28	24	24	24	28	28	25	28
	MAXIMUM 2-MINUTE: SPEED (MPH)	15	37	37	37	37	40	51	37	35	33	38	39	39	51
	DIR. (TENS OF DEGS)		28	24	22	26	26	19	34	26	27	23	22	23	19
	YEAR OF OCCURRENCE		2008	2001	2006	2004	1998	1999	2011	2006	2007	2010	1998	2008	JUN 1999
	MAXIMUM 3-SECOND SPEED (MPH)	15	51	48	46	52	54	61	49	51	45	56	53	53	61
	DIR. (TENS OF DEGS)		27	23	27	22	23	19	35	09	25	21	23	23	19
YEAR OF OCCURRENCE		2008	1999	2009	1997	1998	1999	2011	2010	2010	2010	2010	2007	2008	JUN 1999
PRECIPITATION	NORMAL (IN)	30	1.61	1.25	2.05	2.29	2.57	2.93	2.75	3.72	3.11	2.26	2.14	1.75	28.43
	MAXIMUM MONTHLY (IN)	47	3.13	3.36	5.67	6.11	7.40	9.20	6.14	7.18	9.49	8.08	5.10	4.60	9.49
	YEAR OF OCCURRENCE		1974	1971	1976	2011	2004	2008	2010	1975	1986	1991	1988	2008	SEP 1986
	MINIMUM MONTHLY (IN)	47	0.20	0.15	0.19	.74	0.40	0.85	0.55	0.85	0.01	0.47	0.45	0.34	0.01
	YEAR OF OCCURRENCE		2003	2003	2001	2005	1966	1988	1989	1969	1979	1971	1986	1997	SEP 1979
	MAXIMUM IN 24 HOURS (IN)	47	1.39	1.52	2.18	1.81	1.94	3.28	3.83	3.12	2.55	3.47	1.82	1.70	3.83
	YEAR OF OCCURRENCE		1974	1997	1976	1991	1973	1996	1984	1981	1985	1998	1988	1971	JUL 1984
	NORMAL NO. DAYS WITH: PRECIPITATION >= 0.01	30	14.9	11.2	12.1	11.7	10.1	10.4	9.7	10.4	11.5	11.2	13.0	14.3	140.5
PRECIPITATION >= 1.00	30	0.0	0.1	0.1	0.3	0.3	0.7	0.6	0.9	0.8	0.3	0.1	0.2	4.4	
SNOWFALL	NORMAL (IN)	30	18.3	12.3	10.1	4.3	0.3	0.0	0.0	0.0	0.*	0.6	8.8	15.9	70.6
	MAXIMUM MONTHLY (IN)	39	38.0	23.6	28.7	17.3	2.3	0.0	T	T	0.1	4.4	41.9	45.8	45.8
	YEAR OF OCCURRENCE		1982	1971	1971	2007	1979		1996	1993	1967	1980	1995	2008	DEC 2008
	MAXIMUM IN 24 HOURS (IN)	39	15.4	8.5	11.7	7.6	3.2	0.0	T	T	0.1	3.5	14.4	13.2	15.4
	YEAR OF OCCURRENCE'		1978	1974	1970	1979	1994		1970	1993	1967	1980	1981	1980	JAN 1978
	MAXIMUM SNOW DEPTH (IN)	38	24	21	22	8	3	0	0	0	0	1	17	22	24
	YEAR OF OCCURRENCE		1979	1979	1978	2011	1994					1992	1995	2008	JAN 1979
NORMAL NO. DAYS WITH: SNOWFALL >= 1.0	30	5.6	4.6	3.3	1.5	0.1	0.0	0.0	0.0	0.0	0.2	2.8	5.0	23.1	

PRECIPITATION (inches) 2011 HOUGHTON LAKE (KHTL)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1982	2.43	0.29	2.41	2.46	2.98	3.21	3.31	3.25	3.58	1.86	2.52	3.47	31.77
1983	1.20	0.79	3.11	1.86	5.99	0.95	1.40	3.89	4.63	3.66	1.60	1.69	30.77
1984	1.06	0.88	2.28	1.96	2.60	3.01	4.30	2.95	2.74	2.17	1.99	2.93	28.87
1985	1.64	1.99	3.55	2.42	1.87	1.71	2.28	4.76	6.14	1.63	3.56	2.14	33.69
1986	1.06	1.73	2.20	1.73	3.20	5.43	4.38	1.76	9.49	1.75	0.45	0.85	34.03
1987	1.06	0.61	0.78	0.97	1.56	1.04	1.62	6.69	4.35	2.21	2.63	2.45	25.97
1988	2.09	0.75	2.39	2.37	0.56	0.85	2.49	4.50	3.63	3.38	5.10	1.86	29.97
1989	0.97	0.70	2.99	0.98	3.19	2.90	0.55	2.62	1.03	1.30	2.08	0.92	20.23
1990	2.43	1.09	1.47	1.77	4.15	2.57	3.82	3.28	3.00	2.94	2.90	1.55	30.97
1991	1.22	0.62	3.02	4.73	5.03	1.48	4.43	2.36	3.05	8.08	1.88	1.76	37.66
1992	1.29	1.35	1.84	3.13	0.49	1.91	2.86	3.45	3.63	2.75	4.65	1.98	29.33
1993	1.73	0.89	0.62	2.96	2.50	4.84	1.28	5.67	2.10	1.78	1.58	0.74	26.69
1994	1.88	1.44	1.57	2.72	1.45	1.72	5.33	5.52	1.56	1.04	2.86	0.53	27.62
1995	2.10	0.65	1.61	2.96	1.51	3.83	2.52	5.64	1.67	2.20	4.82	1.38	30.89
1996	1.71	1.46	0.96	2.99	1.59	5.84	2.76	3.56	4.41	2.84	.72	2.29	31.13
1997	2.46	2.60	1.51	1.30	3.33	1.26	2.63	3.58	3.45	1.85	1.40	0.34	25.71
1998	2.12	0.89	4.40	0.86	2.31	2.24	0.65	1.30	2.10	4.00	2.53	1.04	24.44
1999	1.86	1.29	0.40	2.04	2.06	6.31	4.48	2.21	3.19	1.77	0.58	1.63	27.82
2000	1.38	1.45	1.17	1.39	5.15	2.79	4.98	2.15	2.00	0.64	2.32	0.60	26.02
2001	0.59	1.60	0.19	3.22	5.31	2.53	0.81	3.15	3.61	4.61	1.91	0.59	28.12
2002	0.34	1.90	1.99	2.87	2.30	1.93	1.60	1.97	1.91	1.83	0.97	0.41	20.02
2003	0.20	0.15	0.83	3.36	2.58	1.93	2.96	2.44	1.83	2.13	4.95	1.20	24.56
2004	1.26	0.63	2.36	3.26	7.40	1.51	1.49	1.79	0.77	4.42	1.58	1.78	28.25
2005	2.92	1.58	1.30	0.74	1.74	2.61	3.17	1.81	3.74	0.54	4.13	1.50	25.78
2006	2.72	1.31	2.27	2.15	3.99	3.87	1.48	3.46	3.99	3.89	2.05	2.61	33.79
2007	0.90	0.67	2.78	4.23	1.95	3.53	2.15	2.82	1.17	1.79	1.17	2.39	25.55
2008	2.23	2.03	1.66	2.57	1.10	9.20	2.31	3.18	2.81	1.54	1.80	4.60	35.03
2009	1.12	2.46	1.81	4.25	2.64	3.02	2.54	3.35	2.68	4.11	1.20	1.91	31.09
2010	0.47	0.38	0.65	2.05	2.32	4.86	6.14	1.79	2.87	1.38	1.41	1.12	25.44
2011	1.52	1.52	2.04	6.11	2.49	2.73	2.80	2.04	2.72	3.26	2.59	1.10	30.92
POR= 47 YRS	1.54	1.22	1.88	2.52	2.67	3.21	2.64	3.21	3.05	2.42	2.28	1.81	28.45

WBAN : 94814

AVERAGE TEMPERATURE (°F) 2011 HOUGHTON LAKE (KHTL)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1982	11.4	17.9	25.8	37.3	60.9	57.4	68.6	61.9	57.2	48.9	36.2	31.2	42.9
1983	21.8	25.9	32.4	40.3	48.5	63.3	71.5	68.6	59.7	46.4	36.6	16.8	44.3
1984	12.4	28.2	24.1	44.8	50.1	65.2	66.4	68.8	56.1	49.2	35.4	27.0	44.0
1985	14.9	17.9	30.3	46.5	57.0	59.5	66.1	63.9	59.8	47.5	34.5	18.0	43.0
1986	17.3	18.4	30.9	47.3	56.9	60.5	69.7	62.8	58.1	46.8	32.3	26.8	44.0
1987	21.6	23.4	33.6	47.3	58.1	67.1	71.4	65.6	59.5	43.9	37.7	28.7	46.5
1988	17.3	16.3	28.0	43.7	58.6	64.8	71.4	68.8	57.9	42.4	36.6	23.7	44.1
1989	24.9	15.5	25.0	41.1	54.5	62.2	69.5	64.8	56.2	47.9	30.7	12.9	42.1
1990	26.2	21.3	32.1	44.9	51.9	63.4	66.8	65.0	57.9	45.3	38.9	25.8	45.0
1991	16.1	24.5	33.1	46.9	61.1	67.7	68.6	68.0	55.8	47.9	33.4	25.4	45.7
1992	22.8	24.1	28.6	39.4	54.3	60.4	63.0	62.0	56.8	44.8	33.6	26.1	43.0
1993	21.0	16.2	28.7	40.2	54.6	61.9	70.2	68.8	52.9	44.6	34.7	25.9	43.3
1994	9.3	12.9	30.1	43.2	55.0	65.3	68.1	64.4	61.9	50.9	39.3	30.7	44.3
1995	23.1	18.2	34.3	40.1	54.5	68.9	70.7	72.3	56.9	50.1	29.1	19.5	44.8
1996	15.9	19.8	25.7	36.8	50.8	64.0	64.0	66.3	58.6	47.0	30.6	24.8	42.0
1997	17.0	20.4	27.2	40.3	46.6	64.8	65.8	61.6	57.0	46.0	32.3	28.2	42.3
1998	24.1	30.2	31.2	45.2	60.3	63.0	66.7	66.7	60.4	48.8	37.9	28.7	46.9
1999	17.1	26.1	29.1	44.7	56.1	64.9	69.8	63.1	56.8	44.9	39.7	26.2	44.9
2000	17.8	25.0	38.1	41.4	55.9	62.7	64.7	64.7	57.6	49.6	35.8	16.0	44.1
2001	22.8	20.1	27.7	46.1	56.8	63.4	67.0	67.0	55.5	46.5	42.2	31.4	45.5
2002	26.5	25.7	25.7	41.6	49.6	64.5	71.3	65.1	61.3	41.4	32.3	24.8	44.2
2003	15.5	13.6	28.2	40.1	52.3	60.5	65.6	66.8	57.2	45.2	37.0	27.7	42.5
2004	12.1	19.3	32.1	44.1	52.8	62.2	64.9	61.9	61.3	47.7	36.4	23.1	43.2
2005	16.1	23.5	24.4	45.4	51.1	69.0	68.3	66.2	61.3	48.9	37.3	23.2	44.6
2006	28.0	19.9	31.3	46.2	56.1	62.8	70.1	64.6	55.4	43.0	38.1	31.3	45.6
2007	22.4	14.0	32.9	40.1	57.5	64.6	66.0	66.5	60.2	52.6	32.7	23.2	44.4
2008	22.3	16.9	25.1	46.2	50.6	64.6	67.6	64.7	58.3	44.7	33.9	20.2	42.9
2009	10.4	20.6	30.5	42.8	53.1	60.9	62.1	63.3	57.5	43.7	39.7	22.5	42.3
2010	21.2	22.2	37.2	48.2	57.7	64.0	70.3	70.0	56.2	47.7	37.3	21.9	46.2
2011	14.6	19.8	25.6	41.4	56.6	63.4	72.5	67.2	57.9	48.1	39.7	30.1	44.7
POR= 47 YRS	18.0	19.5	29.0	42.5	54.2	63.2	67.6	65.4	57.6	46.5	35.4	24.1	43.6

HEATING DEGREE DAYS (base 65°F) 2011 HOUGHTON LAKE (KHTL)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1982-83	12	139	255	494	855	1040	1331	1087	1003	733	505	116	7570
1983-84	25	29	209	569	846	1487	1628	1062	1262	599	458	53	8227
1984-85	42	28	270	481	881	1168	1547	1313	1071	571	248	172	7792
1985-86	46	88	209	535	908	1451	1474	1297	1048	532	274	148	8010
1986-87	23	109	212	557	975	1179	1335	1159	963	523	271	57	7363
1987-88	41	60	169	649	813	1117	1473	1406	1140	636	225	106	7835
1988-89	7	75	218	692	847	1276	1236	1381	1234	711	333	126	8136
1989-90	19	79	277	520	1025	1607	1196	1217	1009	627	398	97	8071
1990-91	32	51	248	604	773	1208	1509	1127	985	540	219	33	7329
1991-92	37	30	295	525	939	1219	1298	1178	1123	763	341	161	7909
1992-93	83	132	257	619	934	1196	1359	1358	1119	737	331	123	8248
1993-94	4	37	358	627	904	1205	1722	1457	1073	649	320	79	8435
1994-95	26	75	132	431	763	1059	1293	1307	947	741	320	35	7129
1995-96	22	2	260	461	1072	1403	1515	1307	1214	840	440	91	8627
1996-97	65	37	212	552	1021	1240	1481	1246	1162	737	561	64	8378
1997-98	79	134	239	582	972	1135	1260	968	1041	592	175	146	7323
1998-99	34	48	176	499	805	1118	1477	1083	1105	602	282	100	7329
1999-00	17	91	249	617	754	1193	1456	1154	826	701	299	114	7471
2000-01	83	69	256	473	867	1512	1303	1250	1149	558	262	127	7909
2001-02	62	62	296	567	677	1032	1188	1094	1213	703	471	112	7477
2002-03	22	65	157	730	973	1238	1526	1433	1132	741	387	155	8559
2003-04	36	42	235	606	834	1150	1633	1320	1013	620	378	110	7977
2004-05	58	136	155	529	851	1293	1510	1155	1253	582	431	47	8000
2005-06	33	41	148	517	823	1290	1140	1258	1038	557	299	106	7250
2006-07	16	76	289	674	798	1038	1315	1423	986	737	258	85	7695
2007-08	60	62	177	397	959	1290	1316	1387	1233	560	437	71	7949
2008-09	19	68	201	623	927	1384	1684	1238	1061	656	364	176	8401
2009-10	115	108	219	656	754	1311	1350	1192	857	501	272	79	7414
2010-11	10	29	273	532	825	1327	1555	1256	1212	702	287	89	8097
2011-	7	29	249	514	751	1077							

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COOLING DEGREE DAYS (base 65°F) 2011 HOUGHTON LAKE (KHTL)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1982	0	0	0	0	27	3	132	52	29	3	0	0	246
1983	0	0	0	0	0	73	235	148	56	0	0	0	512
1984	0	0	0	1	2	65	90	151	11	0	0	0	320
1985	0	0	0	22	8	11	86	61	60	0	0	0	248
1986	0	0	0	8	29	22	175	46	15	0	0	0	295
1987	0	0	0	1	64	125	250	86	12	0	0	0	538
1988	0	0	0	0	35	108	213	199	11	0	0	0	566
1989	0	0	0	0	10	49	164	83	19	0	0	0	325
1990	0	0	0	29	0	55	94	56	41	0	0	0	275
1991	0	0	0	2	104	120	157	130	26	0	0	0	539
1992	0	0	0	0	15	31	28	46	19	0	0	0	139
1993	0	0	0	0	16	34	175	161	4	0	0	0	390
1994	0	0	0	0	19	97	130	64	45	0	0	0	355
1995	0	0	0	0	4	160	202	233	24	5	0	0	628
1996	0	0	0	0	10	67	41	85	25	0	0	0	228
1997	0	0	0	0	0	63	112	39	7	0	0	0	221
1998	0	0	0	0	34	93	98	110	45	0	0	0	380
1999	0	0	0	0	15	107	174	41	10	0	0	0	347
2000	0	0	0	0	24	51	79	65	42	1	0	0	262
2001	0	0	0	0	12	87	132	130	19	0	0	0	380
2002	0	0	0	10	4	105	223	73	55	6	0	0	476
2003	0	0	0	0	0	28	60	106	10	0	0	0	204
2004	0	0	0	0	8	35	60	48	50	0	0	0	201
2005	0	0	0	0	5	171	143	83	46	24	0	0	472
2006	0	0	0	0	30	47	179	68	6	0	0	0	330
2007	0	0	0	0	33	76	101	115	39	20	0	0	384
2008	0	0	0	0	0	65	104	66	9	0	0	0	244
2009	0	0	0	0	2	59	30	64	4	0	0	0	159
2010	0	0	0	2	53	58	182	188	16	0	0	0	499
2011	0	0	0	0	34	49	246	106	40	0	0	0	475

SNOWFALL (inches) 2011 HOUGHTON LAKE (KHTL)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1982-83	0.0	0.0	0.0	0.2	7.7	4.8	15.4	6.4	13.3	2.7	1.0	0.0	51.5
1983-84	0.0	0.0	0.0	0.0	5.0	19.8	17.0	6.3	6.5	5.1	0.4	0.0	60.1
1984-85	0.0	0.0	0.0	0.0	0.6	11.7	25.3	18.7	14.1	10.0	0.0	0.0	80.4
1985-86	0.0	0.0	0.0	0.0	12.6	23.1	12.7	14.0	8.9	0.3	0.0	0.0	71.6
1986-87	0.0	0.0	0.0	T	3.4	10.3	14.1	6.4	2.3	2.0	0.0	0.0	38.5
1987-88	0.0	0.0	0.0	2.4	8.7	18.6	13.4	12.9	10.3	1.4	0.0	0.0	67.7
1988-89	0.0	0.0	0.0		7.8	12.3	9.3	13.5	18.7	3.1	T	0.0	
1989-90	0.0	0.0	T	0.6	12.2	15.0	21.7	11.0	2.4	2.1	0.9	0.0	65.9
1990-91	0.0	0.0	0.0	T	9.1	15.3	22.6	8.5	4.5	1.8	0.0	0.0	61.8
1991-92	0.0	0.0	T	T	4.9	17.5	15.0	15.8	9.5	3.6	0.0	0.0	66.3
1992-93	0.0	0.0	0.0	3.2	11.8	14.3	14.7	13.1	8.1	2.9	0.0	0.0	68.1
1993-94	0.0	T	0.0	0.1	2.3	9.0	26.2	12.7	9.0	3.9	0.1	0.0	63.3
1994-95	0.0	0.0	0.0	0.0	6.6	7.6	12.2	10.2	7.4	1.9	0.0	0.0	45.9
1995-96	0.0	0.0	T	T	41.9	16.4	26.0	8.7	13.4	10.6		0.0	
1996-97	T	0.0	T	T	8.9								
1997-98													
1998-99													
1999-00					1.6	3.7	16.1	10.4	T				
2000-01													
2001-02													
2002-03													
2003-04													
2004-05													
2005-06		0.0	0.0	0.0	19.5	15.6	16.8	12.1	4.9	1.6	T	0.0	
2006-07	0.0	0.0	0.0	0.4	3.7	11.9	13.9	12.5	14.3	17.3	0.0	0.0	74.0
2007-08	0.0	0.0	0.0	0.0	6.0	25.3	15.2	22.9	6.4	T	0.0	0.0	75.8
2008-09	0.0	0.0	0.0	T	18.3	45.8	16.4	13.2	5.2	0.2	0.0	0.0	99.1
2009-10	0.0	0.0	0.0	T	0.7	20.4	4.4	5.2	T	T	T	0.0	30.7
2010-11	0.0	0.0	0.0	T	1.4	17.5	22.6	18.5	20.0	8.1	0.0	0.0	88.1
2011-	0.0	0.0	0.0	0.0	T	3.9							
POR= 48 YRS	T	T	T	0.6	8.1	14.2	15.7	10.9	9.0	3.5	0.2	0.0	62.2

WBAN : 94814

REFERENCE NOTES :

<p>PAGE 1: THE TEMPERATURE GRAPH SHOWS NORMAL MAXIMUM AND NORMAL MINIMUM DAILY TEMPERATURES (SOLID CURVES) AND THE ACTUAL DAILY HIGH AND LOW TEMPERATURES (VERTICAL BARS).</p> <p>PAGE 2 AND 3: H/C INDICATES HEATING AND COOLING DEGREE DAYS. RH INDICATES RELATIVE HUMIDITY W/O INDICATES WEATHER AND OBSTRUCTIONS S INDICATES SUNSHINE. PR INDICATES PRESSURE. CLOUDINESS ON PAGE 3 IS THE SUM OF THE CEILOMETER AND SATELLITE DATA NOT TO EXCEED EIGHT EIGHTHS(OKTAS).</p> <p>GENERAL: T INDICATES TRACE PRECIPITATION, AN AMOUNT GREATER THAN ZERO BUT LESS THAN THE LOWEST REPORTABLE VALUE. + INDICATES THE VALUE ALSO OCCURS ON EARLIER DATES. BLANK ENTRIES DENOTE MISSING OR UNREPORTED DATA. NORMALS ARE 30-YEAR AVERAGES (1971 - 2000). ASOS INDICATES AUTOMATED SURFACE OBSERVING SYSTEM. PM INDICATES THE LAST DAY OF THE PREVIOUS MONTH. POR (PERIOD OF RECORD) BEGINS WITH THE JANUARY DATA MONTH AND IS THE NUMBER OF YEARS USED TO COMPUTE THE MEAN. INDIVIDUAL MONTHS WITHIN THE POR MAY BE MISSING. WHEN THE POR FOR A NORMAL IS LESS THAN 30 YEARS, THE NORMAL IS PROVISIONAL AND IS BASED ON THE NUMBER OF YEARS INDICATED. 0.* OR * INDICATES THE VALUE OR MEAN-DAYS-WITH IS BETWEEN 0.00 AND 0.05. CLOUDINESS FOR ASOS STATIONS DIFFERS FROM THE NON-ASOS OBSERVATION TAKEN BY A HUMAN OBSERVER. ASOS STATION CLOUDINESS IS BASED ON TIME-AVERAGED CEILOMETER DATA FOR CLOUDS AT OR BELOW 12,000 FEET AND ON SATELLITE DATA FOR CLOUDS ABOVE 12,000 FEET. THE NUMBER OF DAYS WITH CLEAR, PARTLY CLOUDY, AND CLOUDY CONDITIONS FOR ASOS STATIONS IS THE SUM OF THE CEILOMETER AND SATELLITE DATA FOR THE SUNRISE TO SUNSET PERIOD. CLEAR INDICATES 0 - 2 OKTAS, PARTLY CLOUDY INDICATES 3 - 6 OKTAS, AND CLOUDY INDICATES 7 OR 8 OKTAS. WHEN AT LEAST ONE OF THE ELEMENTS (CEILOMETER OR SATELLITE) IS MISSING, THE DAILY CLOUDINESS IS NOT COMPUTED.</p>	<p>GENERAL CONTINUED: WIND DIRECTION IS RECORDED IN TENS OF DEGREES (2 DIGITS) CLOCKWISE FROM TRUE NORTH. "00" INDICATES CALM. "36" INDICATES TRUE NORTH. RESULTANT WIND IS THE VECTOR AVERAGE OF THE SPEED AND DIRECTION. AVERAGE TEMPERATURE IS THE SUM OF THE MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE DIVIDED BY 2. SNOWFALL DATA COMPRISE ALL FORMS OF FROZEN PRECIPITATION, INCLUDING HAIL. A HEATING (COOLING) DEGREE DAY IS THE DIFFERENCE BETWEEN THE AVERAGE DAILY TEMPERATURE AND 65 F. DRY BULB IS THE TEMPERATURE OF THE AMBIENT AIR. DEW POINT IS THE TEMPERATURE TO WHICH THE AIR MUST BE COOLED TO ACHIEVE 100 PERCENT RELATIVE HUMIDITY. WET BULB IS THE TEMPERATURE THE AIR WOULD HAVE IF THE MOISTURE CONTENT WAS INCREASED TO 100 PERCENT RELATIVE HUMIDITY. ON JULY 1, 1996, THE NATIONAL WEATHER SERVICE BEGAN USING THE "METAR" OBSERVATION CODE THAT WAS ALREADY EMPLOYED BY MOST OTHER NATIONS OF THE WORLD. THE MOST NOTICEABLE DIFFERENCE IN THIS ANNUAL PUBLICATION WILL BE THE CHANGE IN UNITS FROM TENTHS TO EIGHTS(OKTAS) FOR REPORTING THE AMOUNT OF SKY COVER. STATION HISTORY STOPPED WITH THE 2009 ANNUAL. IF YOU NEED HISTORY GO TO "MULTI-NETWORK MEDADATA SYSTEM", URL IS: https://mi3.ncdc.noaa.gov/mi3qry/login.cfm SNOWFALL STOPPED MONTH & YEAR INDICATED ABOVE. NO FURTHER YEARS INCLUDED UNLESS RESTARTED.</p> <p>NOTE: The "Period of Record:(POR) for all "averages" is based on the "Summary of the Day First Order Station" and "Cooperative Summary of the Day" archives.</p>
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2011

HOUGHTON LAKE

MICHIGAN (KHTL)

Houghton Lake is located in north-central lower Michigan. The present station is on the northeast shore of Houghton Lake, the largest inland lake in Michigan, with a circumference of about 32 miles. The Muskegon River source is Higgins Lake, 8 miles to the north. It flows through Houghton Lake, then southwestward to Lake Michigan. The station lies within an elongated bowl shaped 1,000-foot plateau, which extends roughly 50 miles north, 75 miles southwest, and about 20 miles southeast of Houghton Lake. In the immediate area, the land is level to rolling, but there are hills and ridges from 100 to 300 feet higher in elevation surrounding the station. Soils are generally sand, or sandy loam supporting little agricultural production, but the area is rich in natural resources of forests, lakes, and streams.

The interior location diminishes the influence of the larger Great Lakes, which lie 70 to 80 miles east and west of Houghton Lake. Hence, the daily temperature range is larger, especially in summer, and temperature extremes are greater than are found nearer the shores of either Lake Michigan or Lake Huron. Temperatures reach the 100 degree mark about one summer out of ten, and at the other extreme, fall below zero an average of twenty-two times during the winter season.

Precipitation is normally a little heavier during the summer season. About 60 percent of the annual total falls in the six-month period from April through September. The heaviest precipitation occurs with summertime thunderstorms.

Snowfall averages above 80 inches per year at Houghton Lake, with considerable variation from year to year. Much heavier snows, averaging over 100 inches a season, fall within a 30- to 60-mile radius to the north and west of Houghton Lake. Seasonal totals have ranged from 24 inches to over 124 inches. Measurable amounts of snow have occurred in nine of the twelve months, and the average number of months with measurable snowfall is six.

Cloudiness is greatest in the late fall and early winter, while sunshine percentage is highest in the spring and summer. Cloudiness is increased in the late fall due to the moisture and warmth picked up by the westerly and northwesterly winds while crossing Lake Michigan.

The growing season is normally quite short, averaging about 90 days between spring and fall freezes.

Station History

HOUGHTON LAKE, MI

NAME	Begin Date	End Date	Latitude	Longitude	Elevation Feet	Relocation	Platform
ROSCOMMON	1964-04-01	1964-04-16	44° 22'	-84° 40'			AIRWAYS
HOUGHTON LAKE	1936-09-01	1937-12-31	44° 18'	-84° 46'			AIRWAYS
HOUGHTON LAKE ROSCOMMON COUNTY AP	1996-04-01	2006-11-01	44° 21'	-84° 40'	1151	900 FT E	ASOS, COOP, WXSVC
HOUGHTON LAKE ROSCOMMON COUNTY AP	1964-04-20	1964-06-01	44° 22'	-84° 40'	1150		AIRWAYS
HOUGHTON LAKE ROSCOMMON COUNTY AP	1982-01-01	1996-04-01	44° 22'	-84° 40'	1150		COOP, WXSVC
ROSCOMMON	1964-04-16	1964-04-20	44° 22'	-84° 40'	1150		AIRWAYS
HOUGHTON LAKE ROSCOMMON COUNTY AP	1964-06-01	1965-01-01	44° 22'	-84° 40'	1155		AIRWAYS, COOP
HOUGHTON LAKE	1938-07-01	1941-04-30	44° 18'	-84° 46'			AIRWAYS
HOUGHTON LAKE ROSCOMMON COUNTY AP	2006-11-01	Present	44° 21'	-84° 40'	1151		ASOS, COOP, WXSVC
HOUGHTON LAKE ROSCOMMON COUNTY AP	1965-01-01	1973-01-01	44° 22'	-84° 40'	1158		AIRWAYS, COOP
HOUGHTON LAKE ROSCOMMON COUNTY AP	1973-01-01	1982-01-01	44° 22'	-84° 40'	1158		COOP, WXSVC

Element History

Element	Begin Date	End Date	Frequency	Time Of Observation	Equipment *	Equipment * Modifications	Equipment Exposure
PRECIP	1995-07-01	1996-04-01	DAILY	2400	SRG		
PRECIP	1996-04-01	2006-11-01	HOURLY	2400	AHTB	RCRD;HTD	
TEMP	1996-04-01	2006-11-01	DAILY	2400	ATEMP		
PRECIP	1982-01-01	1989-01-01	HOURLY	2400			
PRECIP	1996-04-01	2006-11-01	DAILY	2400	PCPNX		
TEMP	2006-11-01	2010-09-30	DAILY	2400	ATEMP		
PRECIP	2010-09-30	Present	HOURLY	2400	AWPAG	SHLD;RCRD;HTD	
PRECIP	2010-09-30	Present	DAILY	2400	PCPNX	SHLD	
PRECIP	1989-01-01	1995-07-01	HOURLY	2400			
TEMP	1995-07-01	1996-04-01	DAILY	2400	MXMN		
PRECIP	2006-11-01	2010-09-30	HOURLY	2400	AWPAG	RCRD;HTD	
PRECIP	1964-04-01	1982-01-01	DAILY	2400			
TEMP	1989-01-01	1995-07-01	DAILY	2400	MXMN		
PRECIP	1995-07-01	1996-04-01	HOURLY	2400	UNIV	RCRD	
TEMP	1964-04-01	1982-01-01	DAILY	2400			
PRECIP	2006-11-01	2010-09-30	DAILY	2400	PCPNX		
PRECIP	1982-01-01	1989-01-01	DAILY	2400			
TEMP	1982-01-01	1989-01-01	DAILY	2400			
PRECIP	1989-01-01	1995-07-01	DAILY	2400	SRG		
TEMP	2010-09-30	Present	DAILY	2400	ATEMP		

* For explanation of codes and abbreviations see Station Metadata link below.

Other Station Information can be found at:

ASOS Implementation by NWS: <http://www.nws.noaa.gov/ops2/Surface/asosimplementation.htm>

Station Metadata website: <http://www.ncdc.noaa.gov/homr>

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Email : ncdc.info@noaa.gov

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151 Patton Avenue

Asheville, NC 28801-5001

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