

1999

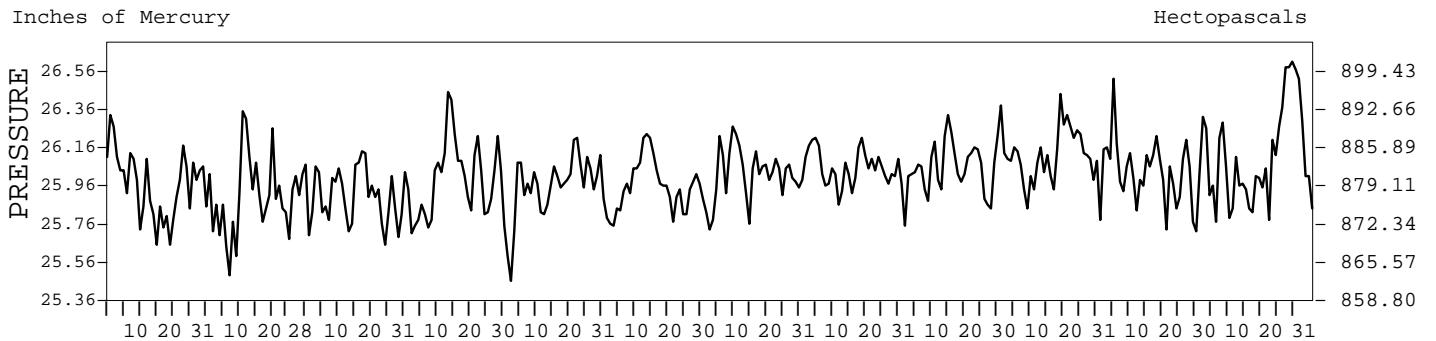
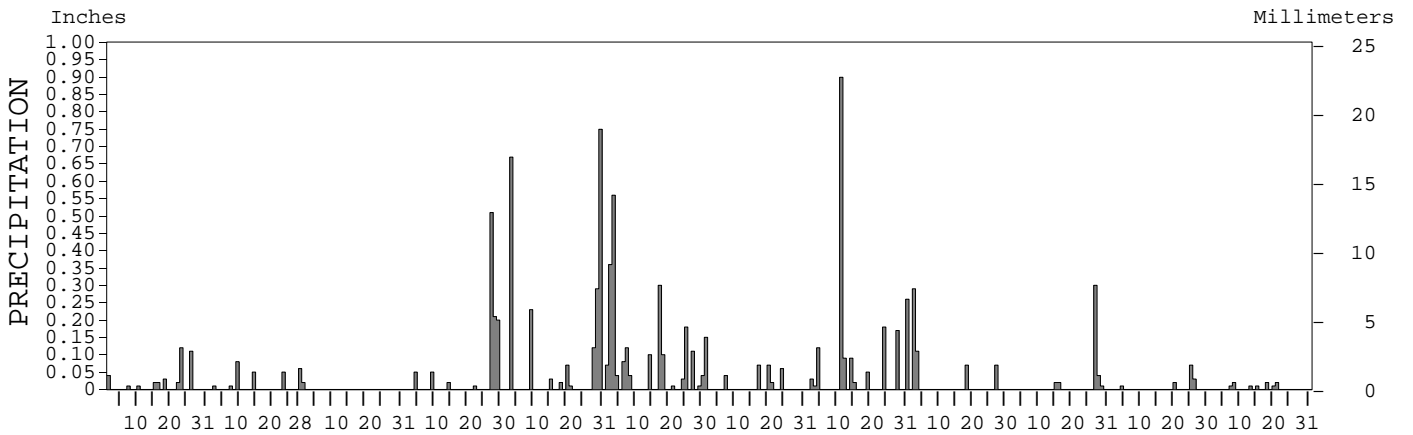
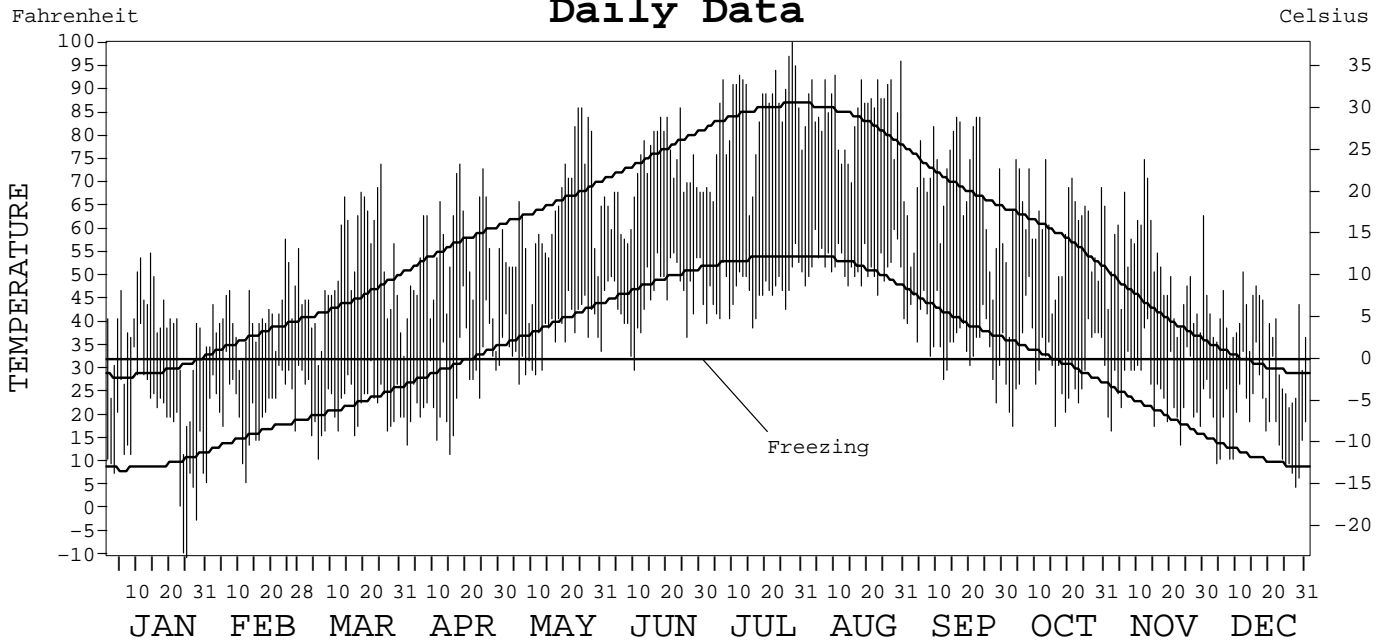
LOCAL CLIMATOLOGICAL DATA
ANNUAL SUMMARY WITH COMPARATIVE DATA



ISSN 0198-3024

HELENA,
MONTANA (HLN)

Daily Data



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Thomas R. Karl

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE	NATIONAL CLIMATIC DATA CENTER ASHEVILLE, NORTH CAROLINA	DIRECTOR NATIONAL CLIMATIC DATA CENTER
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METEOROLOGICAL DATA FOR 1999

HELENA, MT (HLN)

LATITUDE: 46° 36' 20" N LONGITUDE: 111° 57' 49" W ELEVATION (FT): GRND: 3895 BARO: 3895 TIME ZONE: MOUNTAIN (UTC + 7) WBAN: 24144

	ELEMENT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
TEMPERATURE °F	MEAN DAILY MAXIMUM	37.5	41.9	51.6	54.5	63.1	71.6	83.6	84.6	68.9	60.4	52.2	37.2	58.9	
	HIGHEST DAILY MAXIMUM	55	58	74	74	86	86	100	96	84	75	75	51	100	
	DATE OF OCCURRENCE	14	24	25	18	25+	24	28	30	23+	13+	12	12	JUL 28	
	MEAN DAILY MINIMUM	16.1	22.8	22.5	27.1	37.3	46.0	46.9	52.1	36.9	31.1	26.2	18.9	32.0	
	LOWEST DAILY MINIMUM	-10	6	11	12	27	30	39	41	23	18	14	5	-10	
	DATE OF OCCURRENCE	25	12	06	15	06	10	16	31	28	16+	23	28	JAN 25	
	AVERAGE DRY BULB	26.8	32.4	37.1	40.8	50.2	58.8	65.3	68.4	52.9	45.8	39.2	28.1	45.5	
	MEAN WET BULB	23.4	28.2		34.1	42.6	50.7	52.0			37.8	33.0	24.9		
	MEAN DEW POINT	17.3	20.9		23.5	33.7	43.3	40.2			27.9	24.2	18.7		
	NUMBER OF DAYS WITH:														
	MAXIMUM ≥ 90°	0	0	0	0	0	0	11	8	0	0	0	0	0	19
	MAXIMUM ≤ 32°	9	2	1	0	0	0	0	0	0	0	0	8	20	
	MINIMUM ≤ 32°	29	27	31	22	6	1	0	0	6	19	24	28	193	
MINIMUM ≤ 0°	3	0	0	0	0	0	0	0	0	0	0	0	3		
H/C	HEATING DEGREE DAYS	1176	905	859	718	451	188	79	20	354	590	767	1136	7243	
	COOLING DEGREE DAYS	0	0	0	0	0	10	93	132	0	0	0	0	235	
RH	MEAN (PERCENT)	70	65	56	54	57	60	43	55	54	54	59	69	58	
	HOUR 05 LST	76	73	74	74	76	84	65	77	74	70	70	74	74	
	HOUR 11 LST	66	62	48	46	47	48	34	47	45	48	57	67	51	
	HOUR 17 LST	64	55	34	36	43	43	28	34	35	38	48	63	43	
	HOUR 23 LST	73	71	61	58	64	67	46	61	60	57	61	73	63	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	1	2	1	2	1	0	0	0	1	0	0	7	15	
	THUNDERSTORMS	0	0	0	0	2	6	5	8	0	0	0	0	21	
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.)	25.96	25.90	25.91	26.00	25.95	25.95	26.02	26.04	26.08	26.11	26.04	26.11	26.01	
	MEAN SEA-LEVEL PRESS. (IN.)	30.11	30.00		30.07		29.93	29.98				30.12	30.26		
WINDS	RESULTANT SPEED (MPH)	4.2	6.0	3.6	5.3	5.0	4.4	5.1	2.5	3.6	4.4	3.5	4.6	4.2	
	RES. DIR. (TENS OF DEGS.)	26	24	26	29	28	29	27	28	28	27	25	25	27	
	MEAN SPEED (MPH)	7.2	9.3	7.1	8.9	8.5	8.3	8.0	6.6	6.3	7.1	5.6	7.3	7.5	
	PREVAIL. DIR. (TENS OF DEGS.)	27	27	28	26	26	27	28	27	27	26	27	27	27	
	MAXIMUM 2-MINUTE WIND:														
	SPEED (MPH)	36	51	43	32	34	52	38	46	52	51	39	40	52	
	DIR. (TENS OF DEGS.)	27	26	30	21	26	18	28	26	26	28	27	25	26	
	DATE OF OCCURRENCE	01	02	01	08	28+	24	24	24	25	31	20	16	SEP 25	
	MAXIMUM 5-SECOND WIND:														
	SPEED (MPH)	46	64	49	37	49	60	46	59	64	61	45	52	64	
DIR. (TENS OF DEGS.)	24	26	29	21	17	19	28	26	26	26	23	25	26		
DATE OF OCCURRENCE	11+	02	01	08	20	24	24	24	24	25	31	30	16	SEP 25	
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	0.38	0.26	0.02	1.05	2.19	2.15	0.41	1.92	0.54	0.39	0.13	0.10	9.54	
	GREATEST 24-HOUR (IN.)	0.14	0.08	0.02	0.71	0.91	0.68	0.15	0.96	0.40	0.30	0.10	0.03	0.96	
	DATE OF OCCURRENCE	22-23	09	01	27-28	29-30	02-03	01	11-12	02-03	27	25-26	20-21+	AUG 11-12	
	NUMBER OF DAYS WITH:														
	PRECIPITATION ≥ 0.01	9	6	1	7	9	16	6	11	4	5	4	7	85	
PRECIPITATION ≥ 0.10	2	0	0	3	5	8	1	5	2	1	0	0	27		
PRECIPITATION ≥ 1.00	0	0	0	0	0	0	0	0	0	0	0	0	0		
SNOWFALL	SNOW, ICE PELLETS, HAIL:														
	TOTAL (IN.)														
	GREATEST 24-HOUR (IN.)														
	DATE OF OCCURRENCE														
	MAXIMUM SNOW DEPTH (IN.)														
	DATE OF OCCURRENCE														
NUMBER OF DAYS WITH:															
SNOWFALL ≥ 1.0															

NORMALS, MEANS, AND EXTREMES

HELENA, MT (HLN)

LATITUDE: 46° 36' 20" N LONGITUDE: 111° 57' 49" W ELEVATION (FT): GRND: 3895 BARO: 3895 TIME ZONE: MOUNTAIN (UTC + 7) WBAN: 24144

ELEMENT		POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	NORMAL DAILY MAXIMUM	30	29.6	36.9	44.8	56.1	65.4	75.8	85.0	83.2	69.8	58.5	42.4	31.3	56.6
	MEAN DAILY MAXIMUM	48	29.8	36.8	44.7	55.7	65.6	74.0	83.3	82.3	70.8	58.5	42.1	32.5	56.3
	HIGHEST DAILY MAXIMUM	59	62	69	77	86	92	100	102	105	99	87	75	64	105
	YEAR OF OCCURRENCE		1992	1995	1978	1992	1986	1988	1981	1969	1967	1997	1999	1980	AUG 1969
	MEAN OF EXTREME MAXS.	52	51.9	55.5	64.2	75.2	83.4	90.5	95.7	95.3	88.6	77.6	61.9	53.1	74.4
	NORMAL DAILY MINIMUM	30	9.6	15.9	22.3	30.6	39.6	48.3	53.4	51.7	41.0	31.6	20.7	11.2	31.3
	MEAN DAILY MINIMUM	48	9.4	15.7	22.0	29.8	39.7	47.3	52.4	50.6	41.1	31.4	20.5	12.5	31.0
	LOWEST DAILY MINIMUM	59	-42	-42	-30	1	17	30	36	28	18	-8	-39	-38	-42
	YEAR OF OCCURRENCE		1957	1996	1955	1954	1954	1999	1971	1992	1970	1991	1959	1964	FEB 1996
	MEAN OF EXTREME MINS.	52	-19.1	-9.6	-7	16.7	27.7	36.5	42.5	40.2	27.6	15.5	-1.2	-13.9	13.5
	NORMAL DRY BULB	30	19.6	26.4	33.6	43.4	52.5	62.1	69.2	67.4	55.4	45.1	31.6	21.2	44.0
	MEAN DRY BULB	52	18.9	25.9	32.9	43.1	52.5	60.5	67.8	66.3	55.8	45.0	31.5	22.1	43.5
	MEAN WET BULB	47	16.5	22.5	27.1	35.6	43.6	50.2	54.4	53.3	45.9	37.5	27.6	19.6	36.1
	MEAN DEW POINT	47	9.3	15.3	19.0	25.9	34.4	41.6	44.4	42.9	36.8	29.2	20.6	13.2	27.7
	NORMAL NO. DAYS WITH:														
MAXIMUM ≥ 90°	30	0.0	0.0	0.0	0.0	0.2	2.4	7.6	6.6	1.1	0.0	0.0	0.0	17.9	
MAXIMUM ≤ 32°	30	14.4	7.9	4.1	0.5	0.0	0.0	0.0	0.0	0.0	0.5	5.3	14.8	47.5	
MINIMUM ≤ 32°	30	29.4	26.0	27.3	18.0	3.7	0.1	0.0	0.0	3.6	16.6	26.7	29.5	180.9	
MINIMUM ≤ 0°	30	8.9	4.5	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.6	6.2	23.0	
H/C	NORMAL HEATING DEG. DAYS	30	1407	1081	973	648	388	137	34	65	321	617	1002	1358	8031
	NORMAL COOLING DEG. DAYS	30	0	0	0	0	0	50	164	139	33	0	0	0	386
RH	NORMAL (PERCENT)	30	66	64	60	54	54	52	46	48	54	58	65	68	57
	HOUR 05 LST	30	70	72	72	70	72	71	66	66	73	73	73	72	71
	HOUR 11 LST	30	66	62	55	46	45	44	39	41	48	52	62	67	52
	HOUR 17 LST	30	62	54	46	38	38	36	29	30	36	42	57	66	44
	HOUR 23 LST	30	69	68	65	60	60	58	50	52	60	64	69	71	62
S	PERCENT POSSIBLE SUNSHINE	55	47	56	61	59	61	64	78	75	68	60	44	42	60
W/O	MEAN NO. DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	59	1.7	1.2	1.8	0.3	0.2	0.1	0.1	0.1	0.1	0.5	1.3	2.1	9.5
	THUNDERSTORMS	59	0.1	0.1	0.1	1.0	4.2	7.6	8.6	7.7	1.8	0.3	0.1	0.0	31.6
CLOUDINESS	MEAN:														
	SUNRISE-SUNSET (OKTAS)	1			9.6		8.8	4.8							
	MIDNIGHT-MIDNIGHT (OKTAS)	1		3.2			8.8	4.8							
	MEAN NO. DAYS WITH:														
	CLEAR	1	1.5	2.0	2.0			8.0	2.0	11.0	7.0	1.0		6.0	
PARTLY CLOUDY	1	1.0	5.0	1.0		6.0	5.0	1.0	3.0	5.0	7.0		2.0		
CLOUDY	1	3.0	3.0	12.0		23.0	6.0			4.0	7.0		3.0		
PR	MEAN STATION PRESSURE (IN)	27	26.02	26.00	25.94	25.97	25.96	25.99	26.04	26.05	26.07	26.06	26.02	26.02	26.01
	MEAN SEA-LEVEL PRES. (IN)	48	30.17	30.12	30.03	29.98	29.95	29.93	29.96	29.96	30.03	30.09	30.12	30.15	30.04
WINDS	MEAN SPEED (MPH)	36	9.2	9.6	10.8	11.2	11.3	12.2	12.2	12.0	10.7	9.9	10.2	9.8	10.8
	PREVAIL. DIR (TENS OF DEGS)	19	27	27	27	27	28	27	27	27	27	28	27	27	27
	MAXIMUM 2-MINUTE:														
	SPEED (MPH)	5	46	51	44	41	44	52	40	46	52	51	39	44	52
	DIR. (TENS OF DEGS)		29	26	27	28	29	18	27	26	26	28	27	28	26
	YEAR OF OCCURRENCE		1997	1999	1997	1997	1996	1999	1995	1999	1999	1999	1995	1995	SEP 1999
	MAXIMUM 5-SECOND:														
SPEED (MPH)	5	54	64	49	49	53	60	53	59	64	61	47	57	64	
DIR. (TENS OF DEGS)		29	26	26	27	13	19	19	26	26	26	27	29	26	
YEAR OF OCCURRENCE		1997	1999	1997	1997	1998	1999	1996	1999	1999	1999	1995	1995	SEP 1999	
PRECIPITATION	NORMAL (IN)	30	0.63	0.41	0.73	0.97	1.78	1.87	1.10	1.29	1.15	0.60	0.48	0.59	11.60
	MAXIMUM MONTHLY (IN)	59	2.78	1.20	1.62	3.00	6.09	4.74	4.70	4.23	3.37	2.68	1.50	1.48	6.09
	YEAR OF OCCURRENCE		1969	1986	1982	1975	1981	1944	1993	1974	1965	1975	1950	1977	MAY 1981
	MINIMUM MONTHLY (IN)	59	T	0.02	0.02	0.10	0.29	0.08	0.08	0.02	0.08	0.02	0.04	0.01	T
	YEAR OF OCCURRENCE		1987	1991	1959	1977	1979	1985	1973	1988	1972	1978	1969	1997	JAN 1987
	MAXIMUM IN 24 HOURS (IN)	59	0.77	0.58	1.01	1.25	2.31	1.78	2.26	1.86	1.61	0.85	0.82	0.51	2.31
	YEAR OF OCCURRENCE		1969	1953	1957	1951	1981	1979	1983	1974	1980	1954	1959	1982	MAY 1981
	NORMAL NO. DAYS WITH:														
PRECIPITATION ≥ 0.01	30	8.2	6.5	8.6	8.1	11.1	10.1	7.1	7.6	7.1	5.2	6.9	8.2	94.7	
PRECIPITATION ≥ 1.00	30	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.7	
SNOWFALL	NORMAL (IN)	30	9.1	5.6	7.4	5.5	1.7	0.1	T	0.0	1.6	2.2	5.0	8.5	46.7
	MAXIMUM MONTHLY (IN)	56	35.6	19.7	21.6	20.6	12.7	2.7	T	6.2	13.7	11.0	32.9	22.8	35.6
	YEAR OF OCCURRENCE		1969	1959	1955	1967	1967	1969	1993	1992	1965	1969	1959	1967	JAN 1969
	MAXIMUM IN 24 HOURS (IN)	56	11.5	11.7	8.7	12.9	12.5	2.7	T	6.2	13.3	7.4	21.5	10.7	21.5
	YEAR OF OCCURRENCE		1969	1993	1955	1960	1967	1969	1993	1992	1957	1969	1959	1991	NOV 1959
	MAXIMUM SNOW DEPTH (IN)	45	23	15	15	8	8	T	0	0	10	6	19	14	23
	YEAR OF OCCURRENCE		1969	1975	1969	1986	1967	1969			1965	1969	1978	1985	JAN 1969
NORMAL NO. DAYS WITH:															
SNOWFALL ≥ 1.0	30	3.0	1.8	2.3	1.5	0.4	0.*	0.0	0.0	0.5	0.7	1.5	2.3	14.0	

PRECIPITATION (inches) 1999 HELENA, MT (HLN)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1970	0.51	0.67	0.96	0.81	1.20	2.11	0.93	0.63	0.36	0.58	0.44	0.54	9.74
1971	1.38	0.63	0.41	0.58	1.77	0.93	0.56	1.22	0.89	0.39	0.34	1.02	10.12
1972	1.12	0.54	0.63	0.41	0.77	1.12	0.56	1.63	0.08	0.57	0.33	0.46	8.22
1973	0.22	0.13	0.05	0.66	1.08	0.73	0.08	0.56	0.43	0.66	1.03	0.63	6.26
1974	0.66	0.23	0.38	0.76	2.07	0.34	0.49	4.23	0.22	0.51	0.30	0.26	10.45
1975	1.26	0.72	0.88	3.00	1.95	2.83	3.89	2.47	0.47	2.68	0.48	0.31	20.94
1976	0.26	0.38	0.41	1.34	0.87	2.74	0.29	1.58	1.82	0.04	0.30	0.04	10.07
1977	0.65	0.13	1.11	0.10	1.82	1.37	1.37	0.72	1.93	0.17	0.48	1.48	11.33
1978	0.96	0.61	0.31	0.94	1.20	0.44	2.83	0.59	1.11	0.02	1.19	0.76	10.96
1979	0.77	0.72	1.34	2.26	0.29	2.75	0.32	0.79	0.12	0.38	0.06	0.59	10.39
1980	0.62	0.74	0.88	0.63	4.32	3.16	1.92	0.28	2.57	1.21	0.32	0.40	17.05
1981	0.15	0.10	1.10	0.75	6.09	1.15	1.78	0.10	0.90	0.82	0.54	0.33	13.81
1982	0.80	0.58	1.62	0.54	1.77	2.99	0.49	0.74	2.74	0.35	0.31	1.05	13.98
1983	0.24	0.07	0.36	0.29	1.79	2.20	3.48	2.67	1.56	0.35	0.26	0.76	14.03
1984	0.17	0.15	0.49	1.45	1.03	2.14	0.11	1.11	0.73	0.74	0.47	0.41	9.00
1985	0.16	0.38	0.32	0.46	0.75	0.08	0.10	2.64	2.11	0.76	0.84	0.35	8.95
1986	0.32	1.20	0.49	1.08	0.83	1.56	1.37	1.84	2.45	0.03	0.54	0.38	12.09
1987	T	0.03	1.19	0.76	1.90	1.50	2.88	0.38	0.80	0.05	0.12	0.42	10.03
1988	0.27	0.50	0.45	1.32	1.82	1.50	0.36	0.02	2.09	0.69	0.69	0.32	10.03
1989	1.42	0.82	1.35	0.72	1.00	1.43	1.55	1.61	1.31	0.54	0.26	0.48	12.49
1990	0.47	0.14	0.91	0.43	1.54	0.92	0.40	2.57	0.11	0.11	0.36	0.47	8.43
1991	0.27	0.02	0.90	0.75	1.71	3.27	0.72	0.70	1.26	0.65	0.88	0.79	11.92
1992	0.29	0.10	0.60	0.55	0.64	2.36	1.06	1.01	0.09	1.87	0.19	0.57	9.33
1993	0.80	1.03	0.56	1.63	1.71	3.14	4.70	2.79	1.25	0.71	0.36	0.13	18.81
1994	0.20	0.40	0.32	1.45	1.23	0.84	0.71	0.47	0.09	1.14	0.55	0.07	7.47
1995	0.20	0.08	0.49	1.15	3.09	2.93	1.51	0.33	1.59	0.10	0.62	0.28	12.37
1996	0.55	0.11	0.58	0.70	2.42	1.20	1.27	0.89	0.51	0.04	0.84	0.61	9.72
1997	0.28	0.10	0.10	0.20	2.35	2.43	1.25	1.79	0.31	1.62	0.13	0.01	10.57
1998	0.49	0.12	0.39	0.64	2.27	3.03	2.96	0.50	0.82	0.14	1.07	0.14	12.57
1999	0.38	0.26	0.02	1.05	2.19	2.15	0.41	1.92	0.54	0.39	0.13	0.10	9.54
POR= 118 YRS	0.69	0.51	0.71	0.97	1.87	2.17	1.14	0.97	1.12	0.74	0.61	0.61	12.11

WBAN : 24144

AVERAGE TEMPERATURE (°F) 1999 HELENA, MT (HLN)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1970	18.8	32.5	28.2	36.5	51.5	62.3	68.2	67.9	51.1	40.2	29.3	20.6	42.3
1971	19.0	28.5	31.9	41.5	51.4	57.0	63.2	69.0	49.7	42.0	33.6	15.6	41.9
1972	12.4	26.8	39.1	39.8	50.9	61.8	61.7	66.0	50.9	39.0	31.1	13.6	41.1
1973	17.7	22.8	36.0	40.3	52.9	61.2	68.9	66.8	54.4	45.8	24.5	28.2	43.3
1974	18.1	32.8	33.9	46.0	48.6	64.9	70.4	61.5	53.5	45.8	34.7	27.7	44.8
1975	21.1	13.7	28.8	32.9	48.6	56.9	69.2	61.2	54.1	43.3	29.9	26.0	40.5
1976	24.9	29.5	30.4	43.2	54.1	56.6	67.6	64.8	57.9	44.9	33.8	28.7	44.7
1977	18.0	34.1	32.4	46.9	50.4	63.6	66.3	63.6	56.3	45.6	31.2	20.7	44.1
1978	16.9	22.8	38.8	47.7	53.2	63.2	67.2	65.5	57.9	46.5	22.7	15.2	43.1
1979	1.1	20.1	34.7	42.7	53.2	62.0	69.2	67.7	61.3	47.8	29.0	28.2	43.1
1980	14.3	25.3	31.3	49.0	55.4	59.8	67.3	62.9	56.8	45.4	34.9	26.9	44.1
1981	28.4	29.7	38.0	46.4	52.8	58.9	67.7	69.5	58.8	43.8	36.4	25.3	46.3
1982	16.5	23.7	33.9	40.5	50.9	61.2	68.6	69.1	55.5	44.9	27.4	22.7	42.9
1983	30.6	35.3	38.3	43.1	51.5	60.2	66.0	70.8	53.5	46.0	34.7	5.5	44.6
1984	27.3	32.4	37.2	43.5	52.8	60.0	70.0	69.8	52.3	41.7	33.1	11.6	44.3
1985	12.3	18.8	33.4	46.9	56.2	63.3	75.0	63.1	49.6	42.3	12.6	15.0	40.7
1986	25.5	21.8	42.9	43.3	53.6	66.4	64.2	68.0	51.2	45.3	29.0	18.6	44.2
1987	23.3	31.9	37.0	50.2	55.9	64.4	66.2	62.8	59.9	46.8	34.7	24.7	46.5
1988	18.8	29.1	36.1	47.1	55.5	68.4	71.3	68.6	56.4	50.3	33.8	23.1	46.5
1989	24.5	6.1	27.6	44.5	51.7	62.2	72.0	64.3	55.6	45.1	36.8	23.8	42.9
1990	28.8	26.9	34.9	45.8	51.0	61.5	69.4	68.4	63.6	45.3	37.4	14.0	45.6
1991	19.0	37.5	35.3	43.8	52.8	59.5	70.8	72.8	58.4	43.3	29.8	22.9	45.5
1992	23.7	34.2	42.7	47.7	57.5	64.9	64.3	64.7	56.7	46.7	32.8	14.7	45.9
1993	12.3	15.0	36.4	44.3	57.3	58.5	59.5	61.5	54.0	43.8	26.8	30.0	41.6
1994	29.8	20.7	39.4	45.6	56.2	62.7	69.0	69.9	61.6	44.3	28.3	23.6	45.9
1995	22.7	30.5	30.7	42.0	49.7	57.4	65.8	65.2	55.7	42.8	34.3	22.7	43.3
1996	9.9	21.1	25.7	48.2	48.2	61.3	68.3	66.6	55.5	43.8	23.1	16.6	43.3
1997	13.3	28.2	36.9	38.4	53.2	60.1	65.8	65.4	58.8	44.1	31.2	24.4	43.3
1998	21.2	31.0	32.8	44.8	53.9	55.1	69.8	68.6	61.9	43.8	34.5	24.5	45.2
1999	26.8	32.4	37.1	40.8	50.2	58.8	65.3	68.4	52.9	45.8	39.2	28.1	45.5
POR= 119 YRS	19.8	24.8	32.6	43.6	52.3	60.0	67.8	66.3	55.8	45.4	32.3	23.7	43.7

HEATING DEGREE DAYS (base 65°F) 1999 HELENA, MT (HLN)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1970-71	22	12	413	763	1063	1372	1422	1013	1020	699	414	251	8464
1971-72	91	22	454	707	936	1524	1628	1102	796	747	430	120	8557
1972-73	136	49	418	798	1010	1588	1465	1174	892	732	374	155	8791
1973-74	23	47	317	588	1208	1136	1452	897	956	564	500	99	7787
1974-75	16	130	338	588	905	1149	1355	1429	1114	954	501	235	8714
1975-76	14	119	322	666	1045	1199	1236	1023	1064	649	331	257	7925
1976-77	15	45	219	615	928	1120	1449	862	1005	535	443	90	7326
1977-78	52	92	270	593	1008	1367	1485	1175	806	512	361	87	7808
1978-79	32	60	244	564	1263	1540	1979	1250	930	665	359	128	9014
1979-80	11	15	127	528	1072	1138	1566	1148	1039	473	304	164	7585
1980-81	25	81	242	602	899	1175	1127	986	832	552	371	191	7083
1981-82	21	16	195	650	853	1227	1497	1153	959	726	428	136	7861
1982-83	30	16	304	618	1120	1306	1059	828	823	649	417	152	7322
1983-84	76	0	351	584	901	1842	1164	941	856	640	380	174	7909
1984-85	2	7	377	716	954	1654	1625	1291	973	538	266	97	8500
1985-86	3	105	455	696	1571	1545	1218	1202	677	645	380	42	8539
1986-87	66	23	409	602	1077	1432	1288	923	862	437	276	77	7472
1987-88	75	104	163	556	901	1241	1426	1034	889	529	297	63	7278
1988-89	10	13	282	449	934	1292	1251	1650	1156	610	407	107	8161
1989-90	0	92	274	611	839	1268	1116	1058	925	573	426	177	7359
1990-91	15	31	78	604	823	1579	1420	767	914	630	373	159	7393
1991-92	2	0	220	666	1053	1297	1273	884	687	513	237	94	6926
1992-93	68	141	246	564	960	1552	1631	1397	879	617	228	214	8497
1993-94	179	122	323	652	1139	1080	1080	1236	783	576	268	128	7566
1994-95	18	17	110	633	1095	1275	1307	963	1059	681	465	222	7845
1995-96	37	61	293	683	912	1303	1703	1268	1210		510	127	
1996-97	15	53	286	651	1251	1494	1596	1026	865	793	361	152	8543
1997-98	49	53	189	642	1006	1252	1352	942	990	600	336	293	7704
1998-99	2	8	158	650	909	1248	1176	905	859	718	451	188	7272
1999-	79	20	354	590	767	1136							

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COOLING DEGREE DAYS (base 65°F) 1999 HELENA, MT (HLN)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1970	0	0	0	0	0	76	130	109	5	0	0	0	320
1971	0	0	0	0	0	14	42	154	0	0	0	0	210
1972	0	0	0	0	2	30	42	89	0	0	0	0	163
1973	0	0	0	0	4	45	151	108	3	0	0	0	311
1974	0	0	0	0	0	102	190	31	0	0	0	0	323
1975	0	0	0	0	0	1	154	12	0	0	0	0	167
1976	0	0	0	0	0	14	102	45	10	0	0	0	171
1977	0	0	0	0	0	57	101	54	13	0	0	0	225
1978	0	0	0	0	3	37	109	85	37	0	0	0	271
1979	0	0	0	0	1	45	152	103	21	0	0	0	322
1980	0	0	0	0	14	14	104	25	4	0	0	0	161
1981	0	0	0	0	0	15	109	165	16	0	0	0	305
1982	0	0	0	0	0	30	147	151	25	0	0	0	353
1983	0	0	0	0	4	16	115	186	12	0	0	0	333
1984	0	0	0	0	10	31	165	163	4	0	0	0	373
1985	0	0	0	0	2	55	318	54	0	0	0	0	429
1986	0	0	0	0	35	91	45	123	1	0	0	0	295
1987	0	0	0	0	3	66	122	41	15	0	0	0	247
1988	0	0	0	0	8	170	211	132	30	0	0	0	551
1989	0	0	0	0	0	30	222	82	0	0	0	0	334
1990	0	0	0	0	0	77	159	142	42	0	0	0	420
1991	0	0	0	0	0	2	188	250	29	0	0	0	469
1992	0	0	0	0	10	96	55	140	3	0	0	0	304
1993	0	0	0	0	2	24	15	23	0	0	0	0	64
1994	0	0	0	0	1	67	146	176	16	0	0	0	406
1995	0	0	0	0	0	5	71	73	24	0	0	0	173
1996	0	0	0	0	0	25	125	109	9	0	0	0	
1997	0	0	0	0	1	13	81	71	12	0	0	0	178
1998	0	0	0	0	0	0	161	124	72	0	0	0	357
1999	0	0	0	0	0	10	93	132	0	0	0	0	235

SNOWFALL (inches) 1999 HELENA, MT (HLN)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1970-71	0.0	0.0	T	1.4	5.4	7.5	16.2	3.5	2.5	0.7	T	0.0	37.2
1971-72	0.0	0.0	T	0.8	4.6	14.5	14.9	3.3	4.5	3.8	T	0.0	46.4
1972-73	T	0.0	0.3	4.7	0.7	7.8	3.2	1.8	0.1	6.5	T	0.0	25.1
1973-74	0.0	0.0	1.3	7.2	12.5	7.2	9.9	5.9	2.2	1.5	0.2	0.0	47.9
1974-75	0.0	0.0	T	1.5	0.8	2.7	15.2	10.7	12.3	15.4	0.2	0.0	58.8
1975-76	0.0	0.0	0.0	6.3	4.9	3.9	3.3	4.4	6.7	10.9	0.0	0.0	40.4
1976-77	0.0	0.0	0.0	T	2.9	0.9	13.8	0.8	14.1	0.5	1.0	0.0	34.0
1977-78	0.0	0.0	0.0	0.4	6.8	19.5	15.7	13.3	2.6	0.9	T	0.0	59.2
1978-79	0.0	0.0	T	T	22.1	13.8	11.7	7.2	12.4	9.3	T	T	76.5
1979-80	0.0	0.0	0.0	0.2	0.6	6.5	9.3	10.5	10.1	3.1	0.0	0.0	40.3
1980-81	0.0	0.0	0.0	3.7	1.2	3.8	2.7	2.1	3.3	0.1	T	0.0	16.9
1981-82	0.0	0.0	0.0	5.2	3.4	6.1	18.4	4.8	13.9	4.1	0.8	0.0	56.7
1982-83	0.0	0.0	6.5	0.5	4.1	11.3	3.2	0.2	2.2	1.1	9.9	0.0	39.0
1983-84	0.0	0.0	6.4	0.0	1.3	13.0	1.3	1.5	5.7	2.3	0.8	0.0	32.3
1984-85	0.0	0.0	6.3	9.0	5.7	7.5	3.9	6.2	4.0	0.8	0.0	0.0	43.4
1985-86	0.0	0.0	2.9	8.8	10.4	8.5	4.2	15.6	1.2	11.6	0.2	0.0	63.4
1986-87	0.0	0.0	0.0	T	7.6	5.0	0.2	0.2	9.1	4.3	3.8	0.0	30.2
1987-88	0.0	0.0	0.0	0.3	0.9	1.2	4.4	8.0	5.2	2.9	0.0	0.0	22.9
1988-89	0.0	0.0	5.9	1.5	6.0	5.0	23.0	13.0	20.7	7.9	3.5	T	86.5
1989-90	0.0	T	T	2.6	1.8	9.4	4.3	1.8	14.0	0.8	0.1	0.0	34.8
1990-91	0.0	0.5	0.0	0.5	8.6	11.6	5.9	0.8	12.2	5.6	0.4	0.5	46.6
1991-92	0.0	T	0.0	7.3	8.8	15.7	4.7	1.3	T	2.2	T	0.0	40.0
1992-93	T	6.2	T	8.6	1.5	11.8	10.2	17.9	2.3	2.5	T	0.2	61.2
1993-94	T	0.0	T	4.6	7.3	1.1	4.4	5.0	4.4	8.0	T	0.0	34.8
1994-95	0.0	T	0.0	T	8.6	2.0	0.3	1.6	8.1	0.0	0.0		
1995-96	T	0.0	T		7.4	2.7	14.2						
1996-97													
1997-98													
1998-99													
1999-				T									
POR= 56 YRS	T	0.1	1.5	2.3	6.3	8.2	8.6	6.0	7.3	4.8	1.4	0.1	46.6

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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 (1961 - 1990). 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.</p>	<p>GENERAL CONTINUED: 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. 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.</p> <p>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.</p>
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1999
HELENA,
MONTANA (HLN)

Helena is located on the south side of an intermountain valley bounded on the west and south by the main chain of the Continental Divide. The valley is approximately 25 miles in width from north to south and 35 miles long from east to west. The average height of the mountains above the valley floor is about 3,000 feet.

The climate of Helena may be described as modified continental. Several factors enter into modifying the continental climate characteristics. Some of these are invasion by Pacific Ocean air masses, drainage of cool air into the valley from the surrounding mountains, and the protecting mountain shield in all directions.

The mountains to the north and east sometimes deflect shallow masses of invading cold Arctic air to the east. Following periods of extreme cold, when the return circulation of maritime air has brought warming to most of the eastern part of the state, cold air may remain trapped in the valley for several days before being replaced by warmer air. During these periods of transition from cold-to-warm temperatures, inversions are often quite pronounced.

As may be expected in a northern latitude, cold waves may occur from November through February, with temperatures occasionally dropping to zero or lower.

Summertime temperatures are moderate, with maximum readings generally under 90 degrees and very seldom reaching 100 degrees. Like all mountain stations, there is usually a marked change in temperature from day to night. During the summer this tends to produce an agreeable combination of fairly warm days and cool nights.

Most of the precipitation falls from April through July from frequent showers or thunderstorms, but usually with some steady rains in June, the wettest month of the year. Like summer, fall and winter months are relatively dry. During the April to September growing season, precipitation varies considerably.

Thunderstorms are rather frequent from May through August. Snow can be expected from September through May, but amounts during the spring and fall are usually light, and snow on the ground ordinarily lasts only a day or two. During the winter months snow may remain on the ground for several weeks at a time. There is little drifting of snow in the valley, and blizzard conditions are very infrequent.

Severe ice, sleet, and hailstorms are very seldom observed. Since 1880, only a few hailstorms have caused extensive damage in the city of Helena.

In winter, hours of sunshine are more than would be expected at a mountain location.

Due to the sheltering influence of the mountains, Foehn (Chinook) winds are not as pronounced as might be expected for a location on the eastern slopes of the Rocky Mountains. Strong winds can occur at any time throughout the year, but generally do not last more than a few hours at a time.

Based on the 1951-1980 period, the average first occurrence of 32 degrees Fahrenheit in the fall is September 18 and the average last occurrence in the spring is May 18.

