

1998

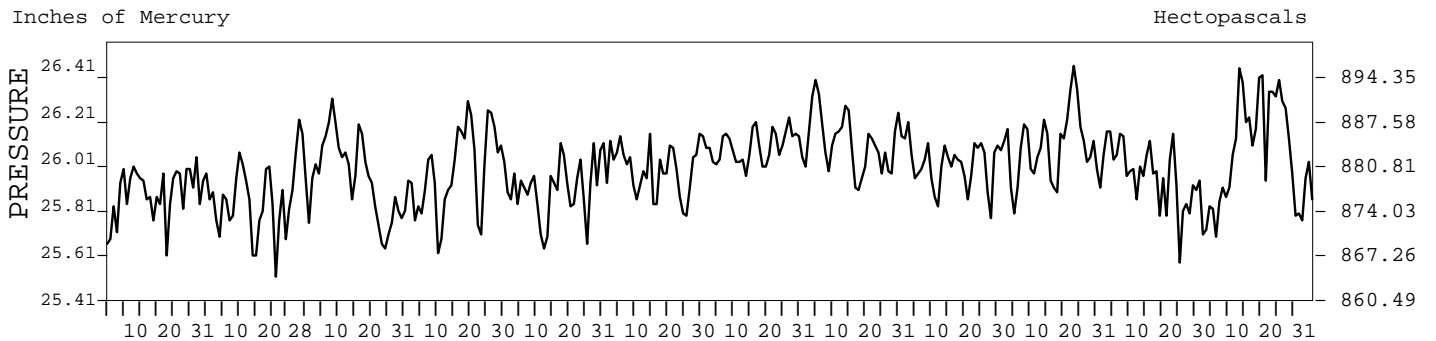
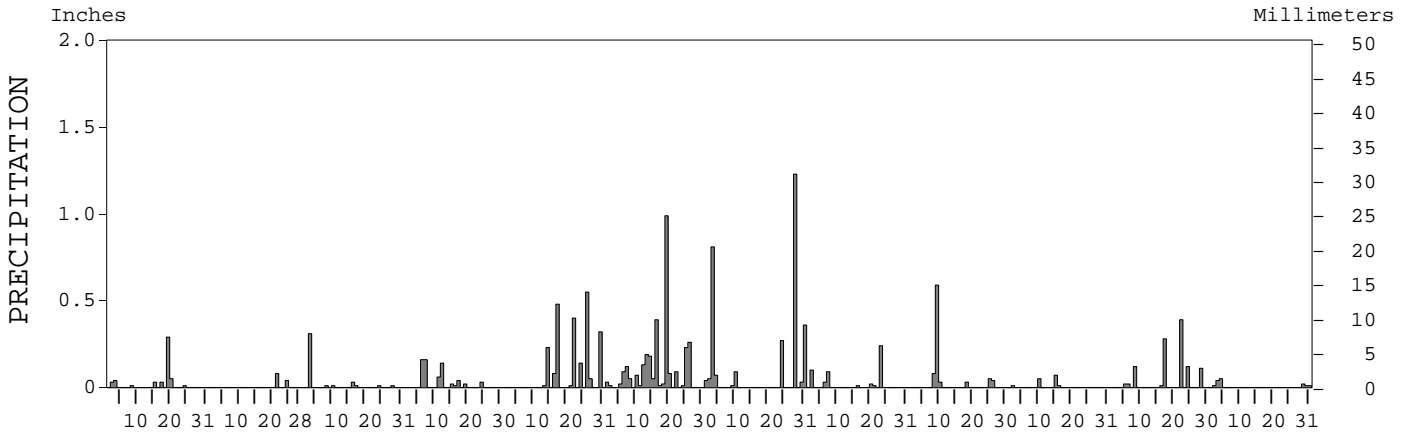
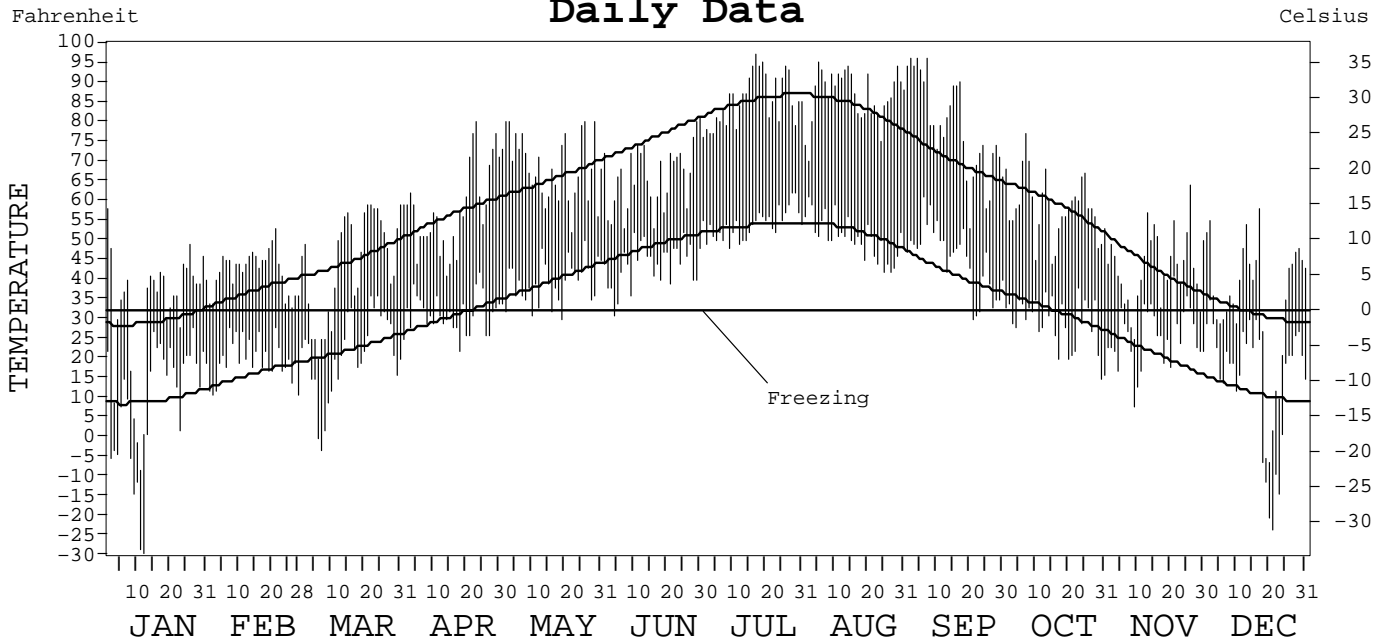
LOCAL CLIMATOLOGICAL DATA  
ANNUAL SUMMARY WITH COMPARATIVE DATA



ISSN 0198-3032

HELENA,  
MONTANA (HLN)

Daily Data



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
 NATIONAL ENVIRONMENTAL AND INFORMATION SERVICE  
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 ASHEVILLE, NORTH CAROLINA

# METEOROLOGICAL DATA FOR 1998

## HELENA, MT (HLN)

LATITUDE: 46° 36' 20" N      LONGITUDE: 111° 57' 49" W      ELEVATION (FT): GRND: 3828      BARO: 3898      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	32.7	42.2	44.3	58.1	68.5	66.2	85.5	86.6	78.4	58.4	43.3	34.1	58.2	
	HIGHEST DAILY MAXIMUM	58	53	59	80	80	81	97	95	96	77	64	58	97	
	DATE OF OCCURRENCE	01	21	31+	23	29+	30	17	05	07+	07	26	17	JUL 17	
	MEAN DAILY MINIMUM	9.7	19.8	21.3	31.4	39.2	43.9	54.0	50.5	45.4	29.1	25.7	14.8	32.1	
	LOWEST DAILY MINIMUM	-29	11	-3	22	30	31	48	42	30	15	8	-23	-29	
	DATE OF OCCURRENCE	12	28+	07	18	19	04	09	27+	21	30	09	21	JAN 12	
	AVERAGE DRY BULB	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	
	MEAN WET BULB	18.8	27.3	28.7	38.0		49.5	59.4	55.8		37.7	31.5	21.7		
	MEAN DEW POINT	13.6	22.5	22.7	29.4		44.3	52.3	46.3		30.5	26.4	15.5		
	NUMBER OF DAYS WITH:														
	MAXIMUM ≥ 90°	0	0	0	0	0	0	10	13	8	0	0	0	0	31
	MAXIMUM ≤ 32°	9	0	7	0	0	0	0	0	0	0	3	12	31	31
	MINIMUM ≤ 32°	31	28	27	18	4	1	0	0	3	18	24	30	184	184
MINIMUM ≤ 0°	8	0	2	0	0	0	0	0	0	0	0	6	16	16	
H/C	HEATING DEGREE DAYS	1352	942	990	600	336	293	2	8	158	650	909	1248	7488	
	COOLING DEGREE DAYS	0	0	0	0	0	0	161	124	72	0	0	0	357	
RH	MEAN (PERCENT)	74	75	70	60	57	69	58	50	57	64	74	70	65	
	HOUR 05 LST	80	88	85	79	76	87	83	76	78	84	82	75	81	
	HOUR 11 LST	73	70	63	52	46	60	47	40	49	55	70	67	58	
	HOUR 17 LST	67	57	53	40	40	55	40	29	34	42	69	66	49	
	HOUR 23 LST	76	81	76	66	65	77	65	56	63	71	76	74	70	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	5	1	1	1	0	1	0	0	0	1	1	2	13	
	THUNDERSTORMS	0	0	0	0	4	4	10	4	2	1	0	0	25	
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.)	25.87	25.83	25.94	25.96	25.89	25.97	26.06	26.09	25.99	26.06	25.91	26.06	25.97	
	MEAN SEA-LEVEL PRESS. (IN.)	30.03	29.94	30.05	30.00		29.97	30.01	30.05		30.13	30.00	30.24		
WINDS	RESULTANT SPEED (MPH)	3.7	2.4		3.1		4.1	1.8	1.9	2.1	3.2	4.4			
	RES. DIR. (TENS OF DEGS.)	26	24		29		28	30	27	27	27	24			
	MEAN SPEED (MPH)	6.3	4.9	5.2	7.1	7.6	7.6	6.2	5.8	5.5	5.4	6.9	8.2	6.4	
	PREVAIL. DIR. (TENS OF DEGS.)	27	26	27	27	26	27	29	27	26	28	27	26	27	
	MAXIMUM 2-MINUTE WIND:														
	SPEED (MPH)	37	33	38	32	44	32	40	34	45	30	36	43	45	
	DIR. (TENS OF DEGS.)	27	29	29	28	13	19	30	22	27	25	19	27	27	
	DATE OF OCCURRENCE	15	21	16	24	26	22+	03	06	09	02	25+	17	SEP 09	
	MAXIMUM 5-SECOND WIND:														
	SPEED (MPH)	48	39	44	44	53	46	49	46	52	35	44	52	53	
DIR. (TENS OF DEGS.)	27	29	29	28	13	29	30	23	27	08	19	27	13		
DATE OF OCCURRENCE	15	21	16	24	26	15	03	06	09	21	25	17	MAY 26		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	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	
	GREATEST 24-HOUR (IN.)	0.34	0.08	0.31	0.16	0.56	0.99	1.23	0.24	0.62	0.08	0.39	0.05	1.23	
	DATE OF OCCURRENCE	19-20	21	03	07+	26-27	19	28	23-24	09-10	15-16	22	04	JUL 28	
	NUMBER OF DAYS WITH:														
	PRECIPITATION ≥ 0.01	8	2	7	9	10	21	10	7	6	4	8	6	98	
PRECIPITATION ≥ 0.10	1	0	1	3	6	8	4	2	1	0	5	0	31		
PRECIPITATION ≥ 1.00	0	0	0	0	0	0	1	0	0	0	0	0	1		
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															



PRECIPITATION (inches) 1998 HELENA, MT (HLN)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1969	2.78	0.22	0.57	0.60	1.13	3.50	1.77	0.38	0.33	1.06	0.04	0.31	12.69
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
POR= 117 YRS	0.69	0.51	0.72	0.97	1.87	2.17	1.15	0.96	1.12	0.74	0.61	0.61	12.12

WBAN : 24144

AVERAGE TEMPERATURE (°F) 1998 HELENA, MT (HLN)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1969	7.2	14.5	21.3	46.7	55.2	57.8	67.9	70.1	58.0	38.1	33.5	25.9	41.4
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
POR= 118 YRS	19.7	24.7	32.6	43.6	52.3	60.0	67.8	66.3	55.8	45.4	32.2	23.7	43.7

HEATING DEGREE DAYS (base 65°F) 1998 HELENA, MT (HLN)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1969-70	35	14	219	826	938	1207	1427	904	1132	849	409	153	8113
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	127	7845
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-	2	8	158	650	909	1248							

WBAN : 24144

COOLING DEGREE DAYS (base 65°F) 1998 HELENA, MT (HLN)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1969	0	0	0	0	1	18	128	178	20	0	0	0	345
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	178
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

SNOWFALL (inches) 1998 HELENA, MT (HLN)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1969-70	0.0	0.0	0.0	11.0	0.1	6.1	7.0	9.5	9.0	7.9	1.4	0.0	52.0
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-													
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

WBAN : 24144

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 EIGHTHS(OKTAS) FOR REPORTING THE AMOUNT OF SKY COVER.</p>
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1998  
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.

# STATION LOCATION

HELENA, MONTANA

LOCATION	OCCUPIED FROM	OCCUPIED TO	AIRLINE DISTANCES AND DIRECTIONS FROM PREVIOUS LOCATION	LATITUDE NORTH	LONGITUDE WEST	ELEVATION ABOVE										AUCI T O P A T I O N H E I G H T I N F E E T * *	* Type M = AMOS T = AUTOB S = ASOS W = AWOS	REMARKS	
						SEA LEVEL	GROUND												
							G R O U N D L E V E L	W I N D I N S T R U M E N T	E M P T Y R E C O R D	P R E S E N T R E C O R D	S U R F A C E T E M P E R A T U R E	T H E R M O M E T E R S I T E	R A I N G A G E	W E I G H T I N G R A I N G A G E	8 I N C H R A N G E				H I G H W I N D S P E E D
CITY Parthen Building Broadway & Main	9/16/79	5/01/81		46° 35'	112°02'	4089		a6	a6									a - Above roof.	
Brown Block, Corner Breckenridge & Warren	5/01/81	1/01/84	.1 mi. NE	46° 35'	112°02'	4120		21	21									b - 29 feet to 1883.	
Murphy Building Price & Main Street (Price, later 6th Ave.)	1/01/84	5/01/91	.2 mi. NW	46° 35'	112°02'	4069	e91	c64	c64									c - 21 feet to 1886 and 66 feet to 1887. d - 57 feet to 1887 and 53 feet to 1888. e - Added 1887. 53 feet to 1889; 51 feet to 1891.	
Montana Nat. Bank Bldg. SW Cor. Main & Edwards	5/01/91	4/01/94	.1 mi. SSW	46° 35'	112°02'	4080	91	85	85									f - 93 feet to 1901. g - Added 2/18/03.	
Power Block SW Corner 6th & Main	4/01/94	9/28/04	.1 mi. N	46° 35'	112°02'	4066	f94	88	88	g80								g - Added 2/18/03.	
Dwelling 200 7th Avenue	9/28/04	2/26/12	.4 mi. ENE	46° 35'	112°02'	?4105	56	8	8		3							? - Estimated.	
Power Block SW Corner 6th & Main	2/26/12	6/21/33	.4 mi. WSW	46° 35'	112°02'	4066	j113	h89	h89	i82								h - 87 feet to 5/13/29. i - 80 feet to 5/13/29. j - 114 feet to 11/1/16 and 112 feet to 5/13/29.	
Federal Office Bldg. Sixth & Park	6/21/33	4/30/40	.1 mi. W	46° 35'	112°02'	4090	111	85	85		78							No records.	
AIRPORT Radio Range Station CAA	3/27/36	11/20/36		46° 36'	111°56'	3820	12		5										
Administration Bldg. Helena Municipal AP	11/20/36	5/24/79	4.0 mi. W	46° 36'	112°00'	e3828	a20	s5 fs5	s5 fs4	%42	c3 f3	b4 f5	f3	d4	NA			CAA to 4/30/40. a - 35 feet to 10/28/43 and 44 feet to 9/20/61. b - Added 11/1/40. c - Removed prior to 1954. Re-commissioned 5/13/64. d - Commissioned 3350 feet NE of thermometer site 8/21/63. e - 3893 feet to 8/21/63. s - Standby after 8/21/63. f - Relocated 6/18/71. g - Commissioned 12/15/62.	
NWS Building Helena Airport + +Helena Regional AP eff. 8/1985.	5/24/79	Present	50' W	46° 36'	112°00'	3828	h20	g5	g4	h42	g5	g5	g4	h4 i4	NA			g - Relocated 5/16/79. h - Not relocated. i - Type change 11/27/84. S ASOS commissioned 11/01/94.	

SUBSCRIPTION: Price and ordering information available through: National Climatic Data Center, Federal Building, Asheville, North Carolina 28801.  
INQUIRIES/COMMENTS CALL: (828) 271-4800

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