

2003

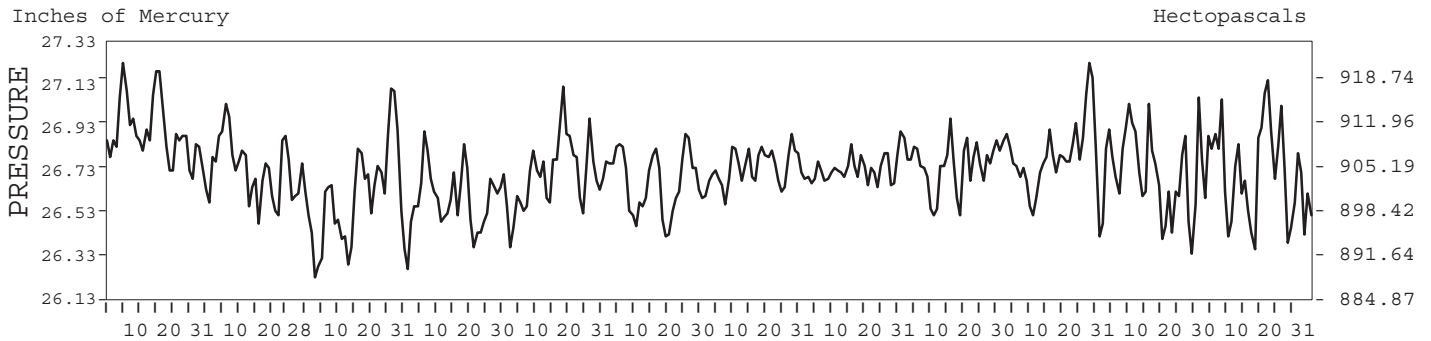
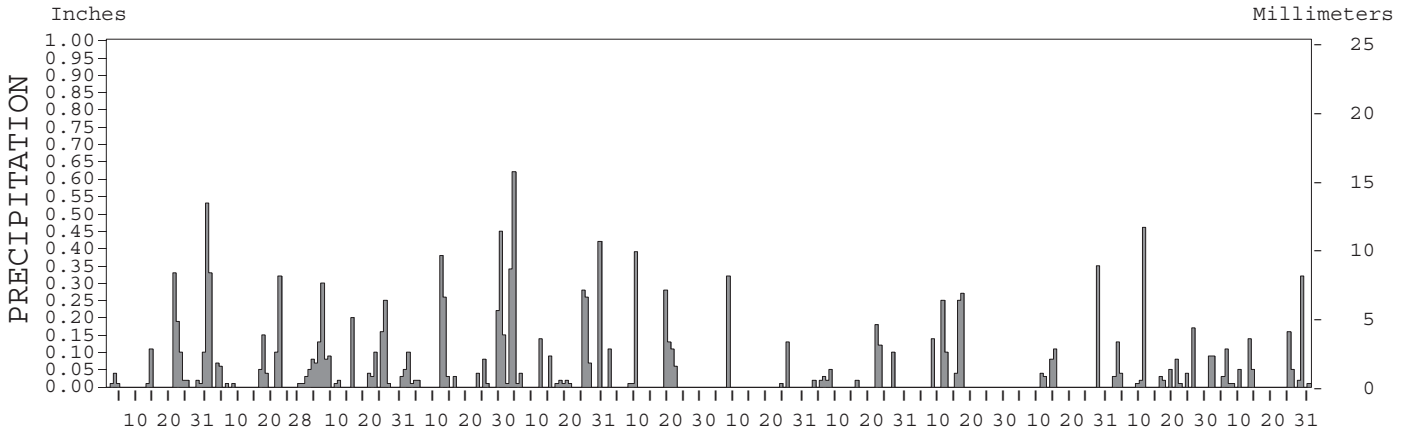
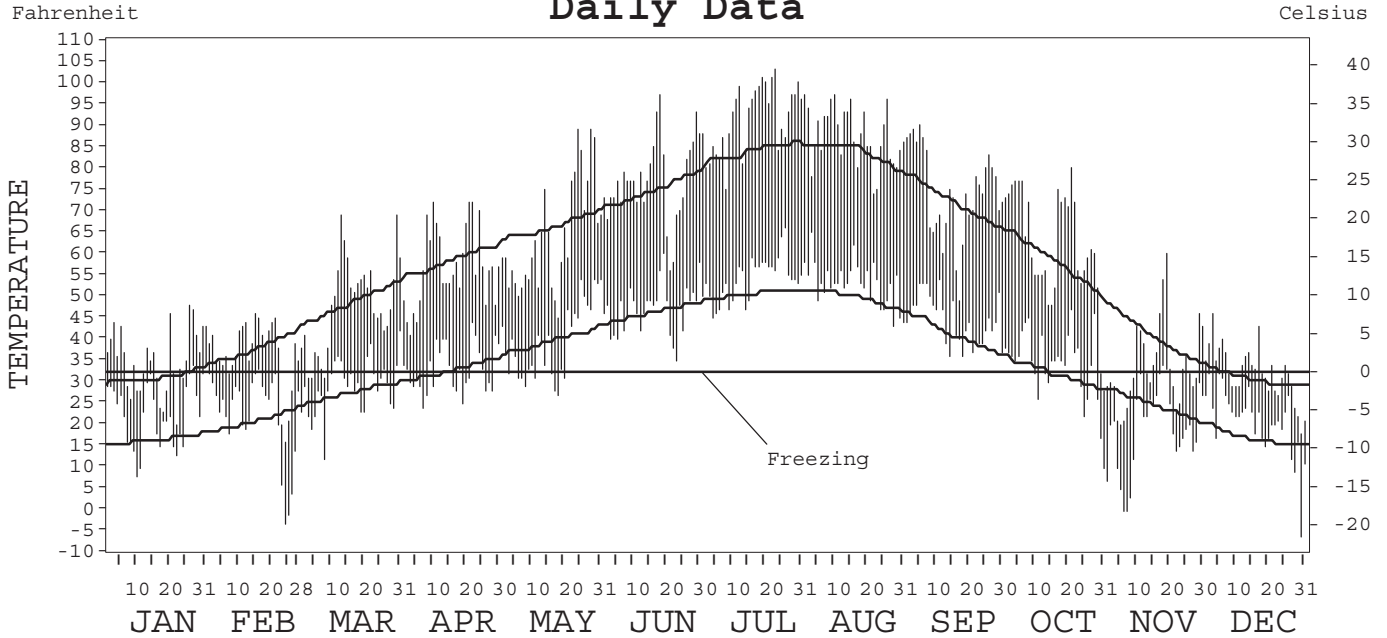
LOCAL CLIMATOLOGICAL DATA ANNUAL SUMMARY WITH COMPARATIVE DATA



ISSN 0198-3083

MISSOULA, MONTANA (MSO)

Daily Data



I CERTIFY THAT THIS IS AN OFFICIAL PUBLICATION OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, AND IS COMPILED FROM RECORDS ON FILE AT THE NATIONAL CLIMATIC DATA CENTER.

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

METEOROLOGICAL DATA FOR 2003

MISSOULA, MT (MSO)

LATITUDE: 46° 55' 15" N LONGITUDE: 114° 05' 33" W ELEVATION (FT): GRND: 3199 BARO: 3202 TIME ZONE: MOUNTAIN (UTC + 7) WBAN: 24153

ELEMENT		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
TEMPERATURE °F	MEAN DAILY MAXIMUM	35.0	36.6	47.9	56.9	64.1	76.9	91.4	87.5	74.1	61.9	33.7	32.2	58.2	
	HIGHEST DAILY MAXIMUM	48	46	69	72	89	97	103	97	90	80	60	46	103	
	DATE OF OCCURRENCE	26	15	30+	22+	28+	18	23	10+	05	21	19	03	JUL 23	
	MEAN DAILY MINIMUM	22.7	22.4	29.0	33.0	39.5	47.0	53.9	53.0	44.4	34.1	19.1	20.7	34.9	
	LOWEST DAILY MINIMUM	8	-3	12	24	27	35	45	43	36	10	0	-6	-6	
	DATE OF OCCURRENCE	10	24	08	07	18	23	04	28	18+	31	07+	30	DEC 30	
	AVERAGE DRY BULB	28.9	29.5	38.5	45.0	51.8	62.0	72.7	70.3	59.3	48.0	26.4	26.5	46.6	
	MEAN WET BULB	27.5	26.8	34.2	39.4	45.7		56.8	56.3	48.9	40.5	24.6	25.5		
	MEAN DEW POINT	24.8	22.5	29.2	32.6	39.8		43.9	45.4	39.6	32.5	21.2	22.8		
	NUMBER OF DAYS WITH:														
	MAXIMUM ≥ 90°	0	0	0	0	0	3	17	14	1	0	0	0	0	35
MAXIMUM ≤ 32°	12	5	3	0	0	0	0	0	0	2	17	16	16	55	
MINIMUM ≤ 32°	29	27	23	15	9	0	0	0	0	10	28	31	31	172	
MINIMUM ≤ 0°	0	2	0	0	0	0	0	0	0	0	2	1	1	5	
H/C	HEATING DEGREE DAYS	1112	989	816	593	418	133	1	3	188	519	1152	1188	7112	
	COOLING DEGREE DAYS	0	0	0	0	15	49	248	175	25	0	0	0	512	
RH	MEAN (PERCENT)	86	77	74	66	68	56	39	46	53	60	81	85	66	
	HOUR 05 LST	90	85	86	84	88	81	64	68	74	75	86	90	81	
	HOUR 11 LST	86	78	68	58	57	45	35	41	46	54	82	85	61	
	HOUR 17 LST	79	64	59	47	49	36	20	25	32	43	75	81	51	
	HOUR 23 LST	89	81	80	72	74	60	41	47	59	65	84	86	70	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	13	3	2	0	1	0	0	0	0	3	8	8	38	
	THUNDERSTORMS	2	1	0	1	1	3	2	3	6	0	0	0	19	
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.)	26.90	26.73	26.62	26.58	26.71	26.68	26.74	26.74	26.76	26.79	26.72	26.72	26.72	
	MEAN SEA-LEVEL PRESS. (IN.)	30.32	30.13	29.96	29.90	30.01		29.97	29.98	30.04	30.12		30.12		
WINDS	RESULTANT SPEED (MPH)	0.3	0.5	1.0	0.9	1.4		0.8	1.4	1.4	1.1	1.1	0.5		
	RES. DIR. (TENS OF DEGS.)	12	12	28	34	32		33	32	31	29	26	31		
	MEAN SPEED (MPH)	1.3	2.4	5.0	5.7	5.0	5.7	5.2	5.1	5.3	4.8	4.0	3.3	4.4	
	PREVAIL. DIR. (TENS OF DEGS.)	10	12	12	33	33	36	32	32	30	12	29	31	32	
	MAXIMUM 2-MINUTE WIND:														
	SPEED (MPH)	20	18	35	31	38	36	37	46	30	37	33	29	46	
	DIR. (TENS OF DEGS.)	10	10	30	25	24	02	36	16	25	28	23	11	16	
	DATE OF OCCURRENCE	21	23	14	16	25	10	08	05	16	28	18	05	AUG 05	
	MAXIMUM 5-SECOND WIND:														
	SPEED (MPH)	24	21	40	36	47	47	44	52	35	52	43	33	52	
DIR. (TENS OF DEGS.)	10	36	23	25	24	01	36	17	25	29	26	13	29		
DATE OF OCCURRENCE	21	27+	14	16	25	08	08	05	16+	28	19	04	OCT 28		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	1.50	1.15	1.69	1.70	2.50	1.10	0.46	0.56	1.05	0.61	1.09	1.14	14.55	
	GREATEST 24-HOUR (IN.)	0.53	0.62	0.32	0.62	0.62	0.41	0.32	0.30	0.34	0.35	0.46	0.32	0.62	
	DATE OF OCCURRENCE	31	31-01	25-26	12-13	04	19-20	08	22-23	11-12	28	11	29	MAY 04	
	NUMBER OF DAYS WITH:														
	PRECIPITATION ≥ 0.01	14	11	19	14	17	8	3	9	6	5	13	14	133	
PRECIPITATION ≥ 0.10	6	4	6	5	7	5	2	3	5	2	3	4	52		
PRECIPITATION ≥ 1.00	0	0	0	0	0	0	0	0	0	0	0	0	0		
SNOWFALL	SNOW, ICE PELLETS, HAIL:														
	TOTAL (IN.)	9.5	7.2	13.4	0.5	T	0.0	0.0	T	0.0	T	10.3	10.8	51.7	
	GREATEST 24-HOUR (IN.)	6.0	2.3	2.8	0.2	T	0.0	0.0	T	0.0	T	2.7	5.3	6.0	
	DATE OF OCCURRENCE	21	22	07	05+	19+			06		29	26	29	JAN 21	
	MAXIMUM SNOW DEPTH (IN.)	5	2	6	0	0	0	0	0	0	0	5	6	6	
	DATE OF OCCURRENCE	25+	22+	08								26	31+	DEC 31+	
	NUMBER OF DAYS WITH:														
SNOWFALL ≥ 1.0	2	3	6	0	0	0	0	0	0	0	3	4	18		

NORMALS, MEANS, AND EXTREMES

MISSOULA, MT (MSO)

LATITUDE: 46° 55' 15" N LONGITUDE: 114° 05' 33" W ELEVATION (FT): GRND: 3199 BARO: 3202 TIME ZONE: MOUNTAIN (UTC + 7) WBAN: 24153

	ELEMENT	POR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
TEMPERATURE °F	NORMAL DAILY MAXIMUM	30	30.8	37.4	48.1	58.0	66.1	74.5	83.6	83.2	71.5	57.4	40.0	30.3	56.7
	MEAN DAILY MAXIMUM	56	30.0	36.7	46.0	57.0	66.0	73.8	84.2	83.1	71.5	57.1	40.3	31.0	56.4
	HIGHEST DAILY MAXIMUM	59	59	66	75	87	95	98	105	105	99	85	73	60	105
	YEAR OF OCCURRENCE		1953	1995	1978	1987	1986	1987	1973	1961	1967	1980	1999	1956	JUL 1973
	MEAN OF EXTREME MAXS.	56	47.1	51.1	63.4	75.5	84.5	90.9	97.0	95.7	88.4	75.1	57.5	47.5	72.8
	NORMAL DAILY MINIMUM	30	16.2	20.5	27.1	32.4	39.3	45.9	50.2	49.3	40.6	31.4	24.0	16.5	32.8
	MEAN DAILY MINIMUM	56	14.7	19.7	25.3	31.8	39.0	45.7	49.9	48.9	40.7	31.4	23.9	17.0	32.3
	LOWEST DAILY MINIMUM	59	-33	-27	-13	14	21	30	31	30	20	0	-23	-30	-33
	YEAR OF OCCURRENCE		1957	1996	1955	1951	1999	1999	1971	1992	2000	1971	1955	1983	JAN 1957
	MEAN OF EXTREME MINS.	56	-9.2	-1.2	8.3	21.1	27.5	34.6	39.4	38.9	28.9	19.0	6.2	-3.5	17.5
	NORMAL DRY BULB	30	23.5	29.0	37.6	45.2	52.7	60.2	66.9	66.3	56.1	44.4	32.0	23.4	44.8
	MEAN DRY BULB	56	22.4	28.3	35.8	44.3	52.4	59.8	67.1	66.0	56.2	44.2	32.2	23.9	44.4
	MEAN WET BULB	20	23.2	25.7	32.6	38.6	45.7	51.7	55.6	54.3	47.5	38.4	29.5	22.3	38.8
	MEAN DEW POINT	20	19.8	21.0	26.2	30.8	37.8	44.2	46.1	44.5	39.4	31.9	25.5	19.0	32.2
	NORMAL NO. DAYS WITH:														
MAXIMUM ≥ 90°	30	0.0	0.0	0.0	0.0	0.3	2.4	8.9	8.7	1.0	0.0	0.0	0.0	21.3	
MAXIMUM ≤ 32°	30	14.8	6.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.2	5.9	17.3	46.4	
MINIMUM ≤ 32°	30	29.3	26.2	25.3	15.7	4.6	0.2	*	0.1	3.6	17.4	25.8	29.3	177.5	
MINIMUM ≤ 0°	30	4.4	1.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	*	0.6	2.9	9.9	
H/C	NORMAL HEATING DEG. DAYS	30	1291	1019	852	596	384	178	55	62	276	637	985	1287	7622
	NORMAL COOLING DEG. DAYS	30	0	0	0	0	3	33	111	99	10	0	0	0	256
RH	NORMAL (PERCENT)	30	81	77	68	61	61	61	53	53	61	69	80	82	67
	HOUR 05 LST	30	85	85	83	80	82	83	78	77	82	84	86	86	83
	HOUR 11 LST	30	81	77	65	54	53	52	44	46	54	65	79	82	63
	HOUR 17 LST	30	76	65	50	41	42	42	32	31	38	48	70	79	51
	HOUR 23 LST	30	83	80	74	67	68	68	59	58	67	74	83	85	72
S	PERCENT POSSIBLE SUNSHINE	55	33	44	54	57	59	63	80	77	69	55	33	29	54
W/O	MEAN NO. DAYS WITH:														
	HEAVY FOG (VISBY ≤ 1/4 MI)	59	5.2	4.1	1.4	0.3	0.2	0.3	0.2	0.4	1.0	3.0	4.7	6.3	27.1
	THUNDERSTORMS	59	0.0	0.0	0.1	0.7	3.2	5.2	6.3	5.7	2.1	0.3	0.1	0.0	23.7
CLOUDINESS	MEAN:														
	SUNRISE-SUNSET (OKTAS)	52	6.7	6.4	6.2	6.0	5.6	5.1	3.1	3.6	4.2	5.3	6.5	6.7	5.4
	MIDNIGHT-MIDNIGHT (OKTAS)	32	6.7	6.0	5.9	5.6	5.2	4.8	3.1	3.3	3.8	4.7	6.0	6.4	5.1
	MEAN NO. DAYS WITH:														
CLEAR	52	2.5	2.9	3.3	3.6	5.3	6.4	15.1	13.3	10.3	6.7	2.4	2.0	73.8	
PARTLY CLOUDY	52	4.2	4.6	6.1	6.8	8.5	9.3	9.8	9.3	8.2	7.3	4.6	4.2	82.9	
CLOUDY	52	24.3	20.8	21.6	19.6	17.2	14.2	5.6	7.8	11.5	16.9	23.0	24.8	207.3	
PR	MEAN STATION PRESSURE (IN)	31	26.76	26.73	26.66	26.69	26.67	26.69	26.73	26.73	26.76	26.78	26.75	26.78	26.73
	MEAN SEA-LEVEL PRES. (IN)	19	30.21	30.15	30.06	30.00	29.96	29.97	29.99	29.99	30.04	30.12	30.14	30.21	30.07
WINDS	MEAN SPEED (MPH)	39	4.7	5.4	6.6	7.4	7.2	7.1	6.7	6.4	5.9	5.0	4.9	4.6	6.0
	PREVAIL. DIR (TENS OF DEGS)	24	11	30	30	31	30	31	31	32	30	31	30	11	31
	MAXIMUM 2-MINUTE:														
	SPEED (MPH)	7	40	32	43	41	38	37	52	46	48	37	33	49	52
	DIR. (TENS OF DEGS)		27	27	31	28	24	23	23	16	16	28	23	26	23
	YEAR OF OCCURRENCE		2000	2002	1999	2000	2003	1999	1998	2003	2000	2003	2003	2000	JUL 1998
	MAXIMUM 5-SECOND:														
SPEED (MPH)	7	46	43	52	49	47	47	61	52	54	52	43	49	61	
DIR. (TENS OF DEGS)		26	27	29	20	24	01	22	17	16	29	26	26	22	
YEAR OF OCCURRENCE		2000	2002	2001	2001	2003	2003	1998	2003	2000	2003	2003	2000	JUL 1998	
PRECIPITATION	NORMAL (IN)	30	1.06	0.77	0.96	1.09	1.95	1.73	1.09	1.15	1.08	0.83	0.96	1.15	13.82
	MAXIMUM MONTHLY (IN)	59	2.94	2.18	2.10	3.01	7.38	4.23	3.16	3.29	3.60	3.51	3.00	4.65	7.38
	YEAR OF OCCURRENCE		1969	1986	1989	1994	1980	1998	1998	1985	1985	1975	1998	1996	MAY 1980
	MINIMUM MONTHLY (IN)	59	0.16	0.17	0.20	0.08	0.25	0.35	0.09	T	0.05	0.01	0.22	0.25	T
	YEAR OF OCCURRENCE		1981	1973	1953	1977	1963	1961	1985	1967	1979	1978	1976	1976	AUG 1967
	MAXIMUM IN 24 HOURS (IN)	59	0.88	1.03	0.80	1.65	1.92	1.96	1.80	1.43	1.34	1.49	0.96	0.94	1.96
	YEAR OF OCCURRENCE		1948	1975	1992	1951	1980	2001	1987	1947	1954	1946	1996	1964	JUN 2001
	NORMAL NO. DAYS WITH:														
PRECIPITATION ≥ 0.01	30	13.3	10.1	11.7	10.7	11.9	11.3	8.0	7.9	7.8	7.6	11.6	12.8	124.7	
PRECIPITATION ≥ 1.00	30	0.0	*	0.0	0.1	0.1	0.1	0.1	*	*	0.1	0.0	0.0	0.5	
SNOWFALL	NORMAL (IN)	30	11.3	7.0	5.4	1.4	0.4	0.*	0.0	0.0	0.*	0.9	6.2	11.2	43.8
	MAXIMUM MONTHLY (IN)	59	42.5	20.1	16.7	8.2	8.1	0.7	T	T	0.4	5.4	17.7	54.1	54.1
	YEAR OF OCCURRENCE		1963	1975	1997	1970	1978	2001	1994	1996	1983	1973	1947	1996	DEC 1996
	MAXIMUM IN 24 HOURS (IN)	59	11.3	14.4	9.4	6.9	8.1	0.7	T	T	0.4	5.4	6.2	10.3	14.4
	YEAR OF OCCURRENCE		1980	1975	1997	1950	1978	2001	1994	1991	1983	1973	1961	1996	FEB 1975
	MAXIMUM SNOW DEPTH (IN)	55	19	23	13	4	4	0	0	0	0	3	10	13	23
	YEAR OF OCCURRENCE		1982	1979	1969	1951	1961					1985	1961	1983	FEB 1979
NORMAL NO. DAYS WITH:															
SNOWFALL ≥ 1.0	30	3.8	2.1	1.8	0.4	0.1	0.0	0.0	0.0	0.0	0.2	2.2	4.0	14.6	

PRECIPITATION (inches) 2003 MISSOULA, MT (MSO)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	2.07	0.68	1.26	0.61	0.44	1.36	1.03	1.18	0.70	0.25	0.50	0.68	10.76
1975	2.03	1.77	0.74	1.01	1.35	2.02	1.51	2.03	0.51	3.51	1.15	0.85	18.48
1976	0.90	1.04	0.40	0.94	0.79	1.52	1.20	0.88	0.58	0.33	0.22	0.25	9.05
1977	0.66	0.18	0.98	0.08	2.13	0.66	0.72	1.28	1.67	0.72	1.02	2.88	12.98
1978	1.15	0.66	0.67	1.08	1.98	0.77	0.57	1.11	1.78	0.01	1.00	0.99	11.77
1979	1.25	1.04	1.22	1.04	0.74	0.67	0.77	1.31	0.05	0.97	0.50	0.81	10.37
1980	1.80	0.60	0.88	0.96	7.38	2.04	1.58	0.62	0.77	0.75	0.63	1.34	19.35
1981	0.16	0.77	1.43	0.74	4.19	2.70	1.07	1.61	1.01	0.62	1.07	1.98	17.35
1982	2.07	1.31	1.52	1.34	2.03	1.83	0.94	0.38	2.09	0.43	0.37	1.07	15.38
1983	0.62	0.95	1.10	0.72	2.65	2.26	2.44	1.27	1.37	0.37	1.17	1.79	16.71
1984	0.86	0.44	1.32	2.04	2.02	1.47	0.38	1.47	0.79	0.96	0.89	0.66	13.30
1985	0.19	0.70	0.44	0.55	1.57	0.38	0.09	3.29	3.60	0.80	0.51	0.38	12.50
1986	0.93	2.18	0.54	0.51	1.69	2.66	0.84	1.68	3.54	0.44	1.07	0.50	16.58
1987	0.28	0.37	1.23	0.41	1.31	1.52	2.47	1.05	0.09	0.02	0.26	1.12	10.13
1988	0.74	0.57	1.04	0.69	3.12	1.68	0.50	0.29	0.51	0.51	0.67	0.75	11.07
1989	0.75	0.46	2.10	1.01	1.35	1.44	1.58	2.08	0.88	0.46	0.84	0.61	13.56
1990	0.92	0.29	0.72	1.37	3.56	0.42	0.75	2.64	0.06	0.81	0.87	1.11	13.52
1991	0.62	0.19	1.22	0.30	2.27	2.92	0.27	0.62	0.31	0.29	1.66	0.95	11.62
1992	0.40	0.18	1.19	1.67	0.68	2.13	1.75	0.60	0.73	0.53	0.96	0.78	11.60
1993	0.86	0.67	0.66	1.83	1.99	1.45	2.02	1.32	0.35	2.00	0.46	0.40	14.01
1994	0.35	0.49	0.49	3.01	1.78	1.45	0.94	0.29	0.31	1.52	0.42	0.59	11.64
1995	0.86	0.37	0.63	0.75	1.09	2.33	1.84	1.19	2.56	1.14	1.85	1.61	16.22
1996	2.06	0.84	0.77	2.37	2.23	1.92	0.36	1.15	0.70	0.64	1.86	4.65	19.55
1997	1.69	0.80	1.79	1.49	1.73	2.25	1.52	0.95	0.65	1.19	0.36	0.33	14.75
1998	1.44	0.33	0.99	1.68	3.79	4.23	3.16	0.39	1.17	0.36	3.00	1.27	21.81
1999	0.70	1.35	0.46	0.23	0.68	2.52	0.43	2.10	0.42	1.46	1.11	0.48	11.94
2000	1.13	1.33	0.32	0.90	1.28	0.73	0.62	0.17	2.51	2.14	0.23	1.02	12.38
2001	0.70	0.66	0.80	1.15	0.40	3.91	1.57	0.09	0.31	2.12	0.44	1.12	13.27
2002	0.63	0.63	1.01	0.70	1.76	3.04	0.31	0.51	0.54	0.20	0.30	0.55	10.18
2003	1.50	1.15	1.69	1.70	2.50	1.10	0.46	0.56	1.05	0.61	1.09	1.14	14.55
POR= 117 YRS	1.08	0.84	0.92	1.06	1.82	1.99	0.94	0.91	1.11	0.94	1.03	1.13	13.77

WBAN : 24153

AVERAGE TEMPERATURE (°F) 2003 MISSOULA, MT (MSO)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	21.2	31.9	35.4	45.9	48.5	65.0	68.1	65.1	57.1	46.3	34.7	27.8	45.6
1975	22.7	22.4	33.0	39.3	49.2	55.4	71.8	62.1	56.1	43.6	30.4	25.7	42.6
1976	28.0	31.7	34.8	46.3	55.0	56.8	66.8	63.2	57.4	43.9	32.3	24.4	45.1
1977	18.6	31.9	34.2	46.9	50.3	63.4	65.8	67.6	54.6	44.2	31.3	24.5	44.4
1978	24.2	27.3	39.8	46.1	48.3	59.6	65.3	63.5	55.1	45.3	26.7	15.9	43.1
1979	5.6	25.5	35.9	43.9	52.2	62.3	69.2	69.1	61.4	48.1	27.2	31.2	44.3
1980	16.3	29.6	34.6	49.8	54.7	58.6	65.5	61.8	57.0	45.3	34.2	30.5	44.8
1981	29.5	31.4	40.0	46.7	53.4	57.5	65.0	69.4	56.7	41.7	32.7	24.0	45.7
1982	21.2	22.7	38.3	41.6	51.0	63.0	64.6	66.0	56.2	45.0	29.0	22.7	43.4
1983	30.0	34.5	39.9	44.6	51.8	58.6	62.1	68.9	51.1	43.8	34.3	11.8	44.3
1984	25.4	32.1	39.7	43.8	49.3	56.8	67.2	68.4	52.8	42.5	33.9	20.1	44.3
1985	19.2	23.7	36.2	47.7	55.4	62.0	74.8	62.2	50.5	40.3	21.7	14.7	42.4
1986	26.0	28.6	41.7	43.5	54.3	65.5	62.5	69.5	53.0	44.7	31.7	21.4	45.2
1987	20.5	30.6	38.0	50.1	55.9	62.9	64.7	62.2	59.3	45.2	34.2	24.2	45.7
1988	20.5	32.5	38.3	47.7	52.1	64.0	67.0	66.3	56.4	50.3	34.3	22.9	46.0
1989	26.7	15.8	32.6	44.7	52.2	61.6	71.2	63.3	55.9	44.9	37.2	24.1	44.2
1990	31.5	29.6	38.0	47.8	50.4	59.8	68.1	66.0	62.6	42.7	36.1	15.6	45.7
1991	21.5	34.9	35.8	43.9	51.1	56.8	68.4	69.6	58.3	44.4	30.4	26.6	45.1
1992	26.6	36.4	43.3	46.9	56.4	64.4	64.2	65.9	54.7	47.2	31.1	19.4	46.4
1993	15.3	18.4	38.5	44.7	58.8	58.3	59.4	63.2	55.5	46.1	27.0	27.6	42.7
1994	33.8	26.3	40.3	48.1	55.6	59.9	70.1	70.8	60.5	45.2	31.6	24.0	47.2
1995	25.0	34.5	38.0	45.0	53.4	59.0	66.7	64.1	58.0	42.2	36.6	27.2	45.8
1996	22.4	25.3	34.6	45.5	48.2	60.4	69.0	64.9	54.1	44.3	30.6	23.9	43.6
1997	21.4	26.7	35.9	40.8	55.0	59.1	64.9	66.8	58.3	44.9	33.8	25.7	44.4
1998	25.8	31.1	38.2	46.6	55.2	57.4	70.2	68.1	61.6	43.2	36.1	25.0	46.5
1999	30.7	32.0	38.4	41.7	49.4	57.4	64.5	67.7	54.1	44.6	37.5	29.8	45.7
2000	25.8	31.2	39.8	46.4	52.1	60.2	68.1	67.2	54.1	43.0	26.7	20.4	44.6
2001	22.1	22.9	37.2	42.8	54.7	58.2	66.6	70.1	61.4	44.2	35.9	25.8	45.2
2002	27.6	29.2	29.7	42.2	49.7	59.4	70.8	63.4	57.4	40.6	33.0	29.3	44.4
2003	28.9	29.5	38.5	45.0	51.8	62.0	72.7	70.3	59.3	48.0	26.4	26.5	46.6
POR= 101 YRS	22.4	27.7	35.7	44.9	52.8	59.9	67.6	66.0	56.3	45.0	32.6	24.8	44.6

HEATING DEGREE DAYS (base 65°F) 2003 MISSOULA, MT (MSO)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1974-75	27	60	230	575	903	1147	1302	1184	985	765	483	281	7942
1975-76	9	116	263	657	1032	1213	1141	959	929	554	302	258	7433
1976-77	25	89	231	647	974	1253	1431	918	950	536	450	76	7580
1977-78	59	76	310	637	1001	1245	1259	1050	771	564	511	171	7654
1978-79	67	110	308	604	1141	1515	1841	1099	893	625	389	126	8718
1979-80	37	13	121	517	1130	1043	1506	1018	935	448	318	198	7284
1980-81	53	119	243	603	917	1063	1092	934	768	542	353	228	6915
1981-82	39	16	256	718	963	1266	1351	1182	824	698	425	104	7842
1982-83	71	48	267	611	1072	1304	1079	845	772	607	402	189	7267
1983-84	126	10	413	652	913	1647	1222	947	779	631	479	259	8078
1984-85	37	18	370	692	926	1383	1413	1154	885	513	304	130	7825
1985-86	0	121	429	755	1294	1554	1205	1014	716	637	370	53	8148
1986-87	102	7	358	622	993	1346	1371	956	828	439	273	126	7421
1987-88	87	110	171	604	918	1258	1374	938	820	514	398	118	7310
1988-89	48	36	285	451	915	1300	1180	1377	1000	602	386	124	7704
1989-90	9	114	268	618	828	1262	1035	988	832	511	443	207	7115
1990-91	31	71	92	682	862	1525	1341	839	898	628	419	241	7629
1991-92	12	8	202	628	1031	1187	1185	823	667	536	261	103	6643
1992-93	75	105	304	543	1011	1405	1537	1298	812	603	209	213	8115
1993-94	181	105	285	577	1133	1153	961	1077	758	501	285	184	7200
1994-95	34	7	131	608	996	1263	1233	848	831	593	354	186	7084
1995-96	36	90	228	697	845	1165	1316	1146	938	578	513	155	7707
1996-97	28	76	333	634	1027	1268	1344	1063	895	719	302	175	7864
1997-98	59	28	210	617	930	1210	1208	944	825	546	296	225	7098
1998-99	0	23	148	669	860	1234	1058	917	815	694	474	243	7135
1999-00	79	34	320	627	822	1086	1209	974	773	555	392	147	7018
2000-01	45	37	331	673	1143	1375	1323	1169	854	656	326	222	8154
2001-02	49	6	116	636	866	1209	1152	996	1087	678	473	200	7468
2002-03	22	69	229	750	953	1100	1112	989	816	593	418	133	7184
2003-	1	3	188	519	1152	1188							

WBAN : 24153

COOLING DEGREE DAYS (base 65°F) 2003 MISSOULA, MT (MSO)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	0	0	0	0	0	106	128	68	1	0	0	0	303
1975	0	0	0	0	0	0	227	31	0	0	0	0	258
1976	0	0	0	0	0	21	89	41	7	0	0	0	158
1977	0	0	0	0	1	36	92	163	3	0	0	0	295
1978	0	0	0	0	0	14	83	69	19	0	0	0	185
1979	0	0	0	0	0	50	177	146	17	0	0	0	390
1980	0	0	0	0	4	13	74	26	8	0	0	0	125
1981	0	0	0	0	0	10	48	158	10	0	0	0	226
1982	0	0	0	0	0	51	66	83	7	0	0	0	207
1983	0	0	0	0	0	4	43	138	5	0	0	0	190
1984	0	0	0	0	0	16	114	129	12	0	0	0	271
1985	0	0	0	0	11	47	311	39	0	0	0	0	408
1986	0	0	0	0	46	78	32	154	4	0	0	0	314
1987	0	0	0	0	0	69	85	31	7	0	0	0	192
1988	0	0	0	0	5	92	115	85	32	0	0	0	329
1989	0	0	0	0	0	27	209	71	1	0	0	0	308
1990	0	0	0	0	0	58	135	109	26	0	0	0	328
1991	0	0	0	0	0	1	125	157	6	0	0	0	289
1992	0	0	0	0	0	92	55	140	1	0	0	0	288
1993	0	0	0	0	24	18	15	57	4	0	0	0	118
1994	0	0	0	0	0	39	198	194	6	0	0	0	437
1995	0	0	0	0	1	16	96	69	25	0	0	0	207
1996	0	0	0	0	0	23	157	77	12	0	0	0	269
1997	0	0	0	0	1	3	63	95	16	0	0	0	178
1998	0	0	0	0	0	4	167	128	53	0	0	0	352
1999	0	0	0	0	1	22	67	125	1	0	0	0	216
2000	0	0	0	0	0	9	151	111	9	0	0	0	280
2001	0	0	0	0	14	26	104	169	14	0	0	0	327
2002	0	0	0	0	5	39	210	26	7	0	0	0	287
2003	0	0	0	0	15	49	248	175	25	0	0	0	512

SNOWFALL (inches) 2003 MISSOULA, MT (MSO)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1974-75	0.0	0.0	0.0	0.2	2.7	7.5	16.9	20.1	7.1	3.0	T	0.0	57.5
1975-76	0.0	0.0	0.0	5.0	10.4	6.1	8.9	9.9	2.5	2.0	0.0	0.0	44.8
1976-77	0.0	0.0	0.0	0.4	1.2	3.0	10.3	1.8	12.5	1.0	T	0.0	30.2
1977-78	0.0	0.0	T	0.1	9.6	20.6	16.1	6.6	5.2	T	8.1	0.0	66.3
1978-79	0.0	0.0	0.0	0.0	12.3	14.1	20.0	7.1	7.3	1.9	0.0	0.0	62.7
1979-80	0.0	0.0	0.0	T	7.4	3.1	25.5	3.7	11.8	2.2	1.0	0.0	54.7
1980-81	0.0	0.0	0.0	T	0.9	2.1	1.4	8.0	2.0	T	0.0	0.0	14.4
1981-82	0.0	0.0	0.0	1.4	1.2	14.4	27.0	9.7	9.0	6.6	T	0.0	69.3
1982-83	0.0	0.0	0.0	0.5	2.8	10.4	4.8	5.2	0.5	T	T	0.0	24.2
1983-84	0.0	0.0	0.4	0.0	5.6	27.0	4.1	3.6	1.7	T	T	0.0	42.4
1984-85	0.0	0.0	T	3.9	3.3	10.0	2.5	11.8	3.3	0.1	T	0.0	34.9
1985-86	0.0	0.0	0.0	3.5	6.1	6.2	6.2	18.3	0.1	0.1	0.4	0.0	40.9
1986-87	0.0	0.0	0.0	0.0	7.2	7.0	3.9	2.3	7.8	0.2	T	0.0	28.4
1987-88	0.0	0.0	0.0	0.0	2.4	7.5	13.3	3.1	5.6	0.5	0.4	0.0	32.8
1988-89	0.0	0.0	0.0	0.0	7.4	9.0	9.0	9.4	16.3	5.2	0.0	0.0	56.3
1989-90	T	T	T	0.1	1.9	8.8	3.9	6.7	2.7	0.3	T	0.0	24.4
1990-91	0.0	T	0.0	0.4	8.3	17.3	9.4	0.2	7.6	1.9	T	0.0	45.1
1991-92	0.0	T	0.0	3.4	9.7	6.5	6.3	T	0.2	0.1	T	0.0	26.2
1992-93	T	0.0	T	T	4.7	11.4	13.5	12.2	1.1	1.2	T	0.0	44.1
1993-94	T	0.0	0.0	0.0	7.2	5.5	3.4	8.6	0.3	T	0.0	0.0	25.0
1994-95	T	0.0	0.0	0.3	3.4	8.6	4.3	0.9	5.3	T	0.0	0.0	22.8
1995-96	0.0	0.0	0.0	T	9.5	5.9	28.3	1.4	4.6	0.1	0.4	0.4	50.6
1996-97	0.0	T	T	0.7	16.1	54.1	8.6	9.0	16.7	6.0	0.0	0.0	111.2
1997-98	0.0	T	0.0	0.0	2.1	4.0	18.6	2.0	5.5	2.0	T	0.0	34.2
1998-99	T	T	0.0	T	9.9	7.6	7.0	9.3	3.8	T	0.4	T	38.0
1999-00	0.0	T	T	0.3	T	3.9	14.7	9.4	0.7	0.6	T	0.0	29.6
2000-01	0.0	0.0	0.0	0.0	1.7	14.7	11.7	9.5	1.1	4.0	T	0.7	43.4
2001-02	0.0	0.0	0.0	0.2	3.8	15.4	7.2	6.0		1.3	4.1	0.0	
2002-03	0.0	0.0	0.0	0.0	T	2.8	9.5	7.2	13.4	0.5	T	0.0	33.4
2003-	0.0	T	0.0	T	10.3	10.8							
POR= 58 YRS	T	T	0.0	0.8	5.8	10.5	11.9	7.3	5.9	2.1	1.1	T	45.4

WBAN : 24153

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.</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>
---	--

2003
MISSOULA,
MONTANA (MSO)

Missoula is situated in the heart of the Montana Rocky Mountains in the extreme north portion of the Bitterroot Valley, and about 5 miles east of the confluence of the Bitterroot and Clark Fork Rivers. The Clark Fork Valley begins at Missoula and extends about 20 miles west-northwestward. The Bitterroot Valley extends about 70 miles due southward from Missoula. The Continental Divide is 60 to 80 miles east of Missoula, and the Bitterroot Range is only about 20 miles away to the southwest. These two mountain ranges have a marked effect on the climate of Missoula.

The prevailing flow of air aloft over western Montana is from the west and southwest during spring and summer months, and from the west and northwest during the winter months. Since this air must pass over the Bitterroot Range, it loses much of its moisture on the western slopes of these mountains. As a result, Missoula receives only between 12 inches and 15 inches of precipitation annually. This small amount of precipitation makes for a semi-arid climate. There is sufficient irrigation water, however, from the nearby mountains. The heaviest precipitation, of about 2 inches, is received in each month of May and June.

Generally the spring months are cool and a little damp, with almost daily shower activity during May and June. There are about 137 growing days each year. The summer months are dry with moderate temperatures and cool nights. Seldom does the temperature reach 100 degrees. Oppressively warm nighttime temperatures are unknown.

In the winter, the Continental Divide shields the Missoula area from much of the severely cold air which moves down the continent from arctic regions. Because of this shielding effect, many of the cold waves which sweep down over eastern Montana miss the Missoula area entirely. Under certain conditions, however, the cold Arctic air does break over the Continental Divide, and moves with force into the Bitterroot and Clark Fork Valleys. When this happens, Missoula experiences severe blizzard conditions. The cold air is funnelled to the city through Hell Gate which is the mouth of the Clark Fork River canyon at Missoula. Locally these blizzards are referred to as Hell Gate Blizzards. After the valleys of western Montana are filled with the cold air, prolonged cold spells may occur. January is the coldest month, although periods of sub-zero weather occur occasionally in December and February. Rarely, there are brief periods of sub-zero weather in November and March. During the winter months the sunshine is limited to about 30 percent of the possible amount.

STATION LOCATION

MISSOULA, MONTANA

LOCATION	Occupied From	Occupied To	Airline Distances and Directions from previous Location	LATITUDE NORTH	LONGITUDE WEST	ELEVATION ABOVE										AUTOMATIC OBSERVING EQUIPMENT *	* TYPE M = AMOS T = AUTOB S = ASOS W = AWOS REMARKS
						GROUND											
						SEA LEVEL	GROUND	WIND INSTRUMENT	EXTREME THERMOMETERS	PSYCHROMETER	SUNSHINE SWITCH	TIPPING BUCKET	RAIN GAUGE	WINDHOLE GAUGE	8 INCH RAIN GAUGE		
*NOTE:																	
<u>AIRPORT</u>																	
NWSO, Johnson-Bell Field	6/24/82	09/01/96	0.5 mi. NW	46°56'	114°06'	3197	32	6	5	23	3	4	4	5 f5	f. Type change 9/13/85.		
Missoula Int'l Airport	09/01/96	Present	NA	46°55'	114°06'	g3199								S	ASOS Commissioned 09/01/96 g. Ground elevation.		

For Hard Copy Subscription:

Price and ordering information: NCDC Subscribing Service Center, 310 State Route 956, Building 300, Rocket Center, WV 26726.

INQUIRIES/COMMENTS CALL: Toll Free (866) 742-3322

Visit our Web Site for other weather data: www.ncdc.noaa.gov

Non-Subscription Request:

NCDC Customer Services;
Phone: 828-271-4800
Fax: 828-271-4876
Email: ncdc.orders@noaa.gov

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300
CHANGE SERVICE REQUESTED

**FIRST CLASS
POSTAGE & FEES PAID
United States Department of Commerce
NOAA Permit No. G - 19**

* NOTES: For earlier station history see previous edition.