

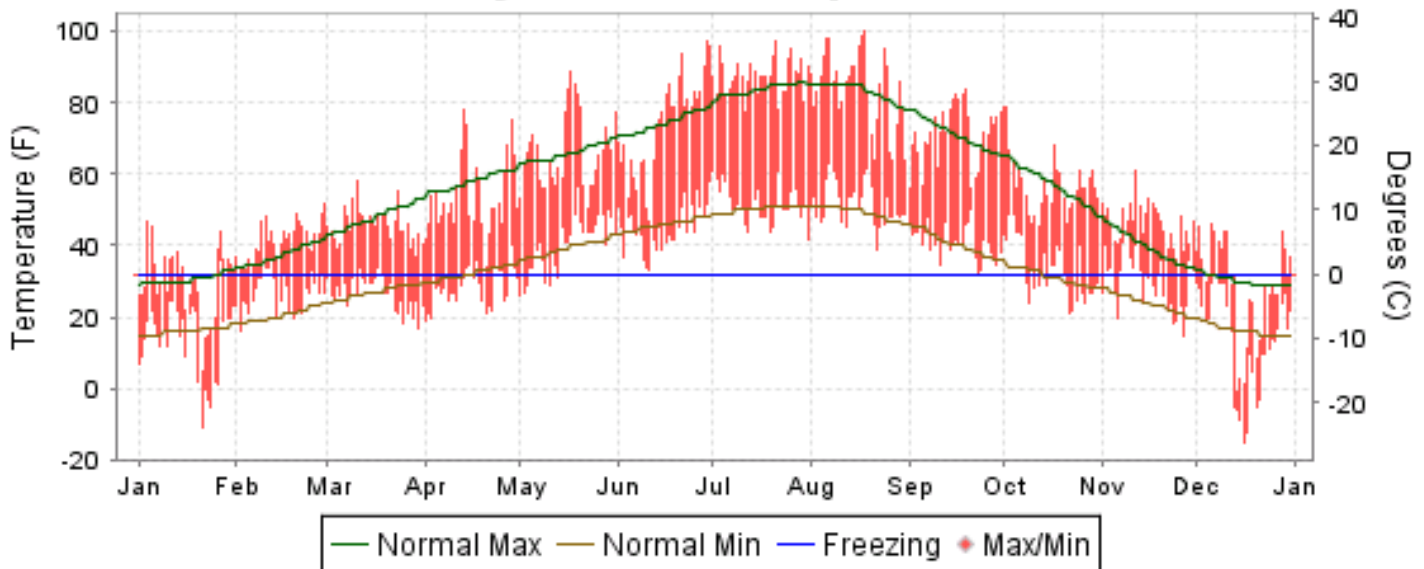


2008 LOCAL CLIMATOLOGICAL DATA ANNUAL SUMMARY WITH COMPARATIVE DATA

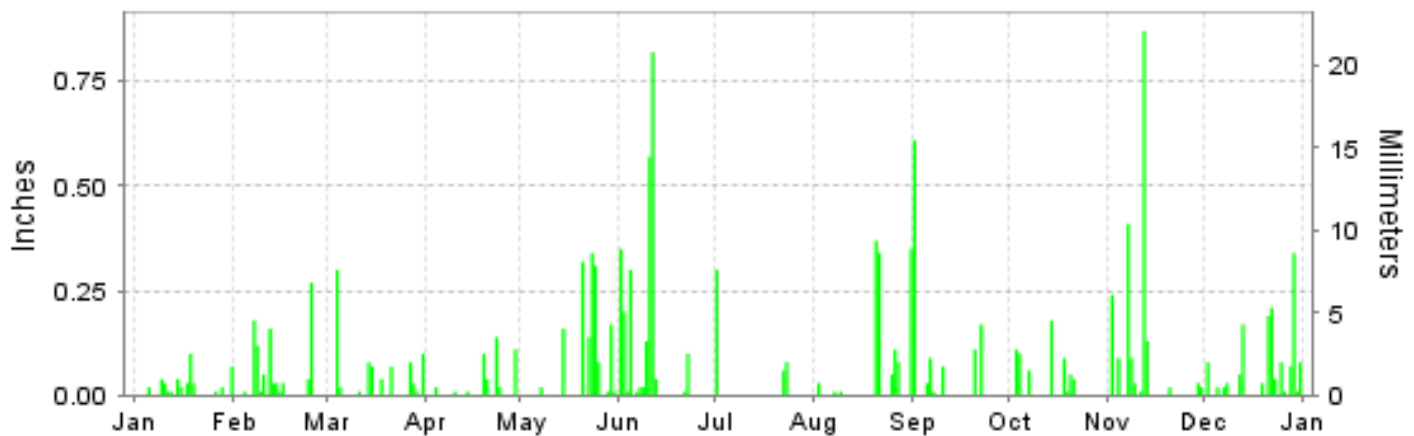
ISSN 0198-3083

MISSOULA, MONTANA (KMSO)

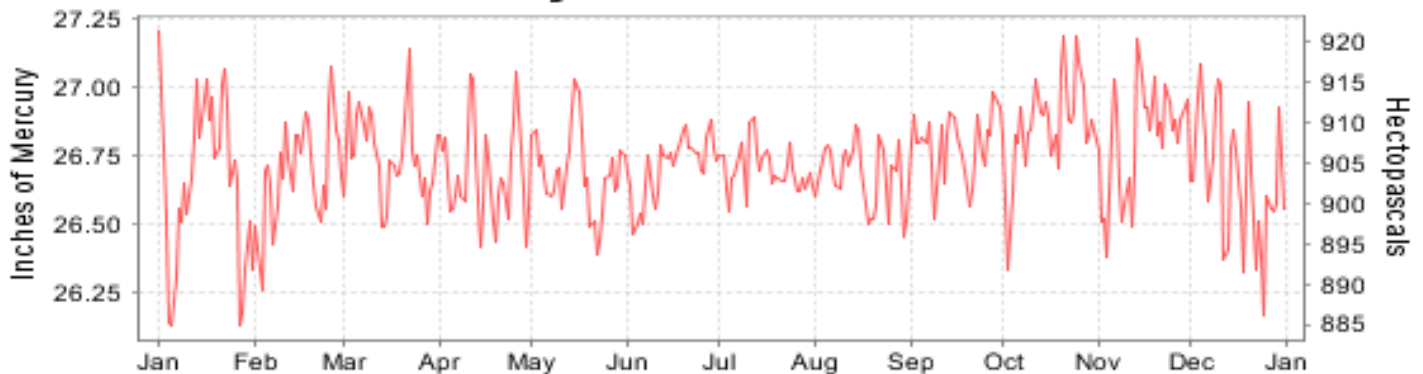
Daily Max/Min Temperature



Daily Precipitation



Daily Station Pressure



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ENVIRONMENTAL SATELLITE, DATA
AND INFORMATION SERVICE

NATIONAL
CLIMATIC DATA CENTER
ASHEVILLE, NORTH CAROLINA

Thomas R. Karl
DIRECTOR
NATIONAL CLIMATIC DATA CENTER

METEOROLOGICAL DATA FOR 2008

MISSOULA (KMSO)

LATITUDE: 46° 55'N LONGITUDE: -114° 5'W ELEVATION (FT): GRND: 3192 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	30.0	41.5	45.6	54.0	66.3	74.0	87.3	83.9	71.3	57.1	46.2	28.5	57.1	
	HIGHEST DAILY MAXIMUM	47	52	58	78	89	97	97	100	84	79	61	46	100	
	DATE OF OCCURRENCE	04	29	10	13	17	29	21	18	19	02+	12	06	AUG 18	
	MEAN DAILY MINIMUM	13.9	26.7	26.7	28.3	40.4	45.1	51.6	51.8	41.1	33.5	29.7	14.1	33.6	
	LOWEST DAILY MINIMUM	-11	16	17	19	26	33	42	39	32	21	15	-15	-15	
	DATE OF OCCURRENCE	21	02	30	01	01	11	31	22	23	22	27	16	DEC 16	
	AVERAGE DRY BULB	22.0	34.1	36.2	41.2	53.4	59.6	69.5	67.9	56.2	45.3	38.0	21.3	45.4	
	MEAN WET BULB	20.0	30.4	30.8	33.7	44.8	48.9	54.1	54.0	47.3	38.4	34.4	19.5	38.0	
	MEAN DEW POINT	15.3	25.4	23.3	24.2	35.4	38.7	40.1	42.5	39.4	31.2	29.6	15.1	30.0	
	NUMBER OF DAYS WITH:														
	MAXIMUM >= 90°	0	0	0	0	0	4	10	10	0	0	0	0	0	24
MAXIMUM <= 32°	17	0	0	0	0	0	0	0	0	3	0	19	39		
MINIMUM <= 32°	30	25	29	22	6	0	0	0	1	17	17	31	178		
MINIMUM <= 0°	4	0	0	0	0	0	0	0	0	0	0	7	11		
H/C	HEATING DEGREE DAYS	1326	888	888	706	360	202	3	49	257	604	801	1347	7431	
	COOLING DEGREE DAYS	0	0	0	0	8	45	149	146	0	0	0	0	348	
RH	MEAN (PERCENT)	76	73	64	57	55	52	39	46	59	64	74	77	61	
	HOUR 05 LST	80	81	79	76	75	74	63	69	80	76	80	79	76	
	HOUR 11 LST	73	69	52	44	41	39	27	34	46	55	67	76	52	
	HOUR 17 LST	72	64	51	39	40	35	23	28	40	53	70	74	49	
	HOUR 23 LST	79	78	74	66	65	62	46	54	68	70	77	80	68	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG(VISBY <= 1/4 MI)	6	4	3	0	1	0	0	1	2	2	4	5	28	
	THUNDERSTORMS	0	0	0	0	0	1	1	1	0	0	0	0	3	
CLOUDNESS	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.)	26.65	26.70	26.75	26.70	26.69	26.71	26.70	26.68	26.80	26.88	26.81	26.67	26.73	
	MEAN SEA-LEVEL PRESS. (IN.)	30.08	30.07	30.12	30.04	29.99	29.98	29.94	29.92	30.09	30.23	30.18	30.09	30.06	
WINDS	RESULTANT SPEED (MPH)	1.1	1.2	1.7	3.2	2.9	3.2	3.6	2.2	0.1	1.1	0.4	1.5	1.4	
	RES. DIR. (TENS OF DEGS.)	17	30	29	30	31	31	31	32	15	29	30	09	31	
	MEAN SPEED (MPH)	4.4	4.3	4.8	5.7	6.1	5.1	5.8	5.6	2.8	3.6	3.3	5.2	4.7	
	PREVAIL.DIR.(TENS OF DEGS.)	12	28	30	30	31	32	32	32	14	33	27	11	31	
	MAXIMUM 2-MINUTE WIND														
	SPEED (MPH)	37	29	28	33	35	33	36	36	38	30	32	44	44	
	DIR. (TENS OF DEGS.)	08	30	26	31	17	31	28	31	27	29	32	27	27	
	DATE OF OCCURRENCE	19	10	27	29	28	22	10	25	22	25	13	29	DEC 29	
	MAXIMUM 3-SECOND WIND:														
	SPEED (MPH)	47	38	35	45	44	44	46	48	44	39	43	49	49	
DIR. (TENS OF DEGS.)	29	31	25	31	16	33	23	31	27	26	27	27	27		
DATE OF OCCURRENCE	15	10	27	25	28	11	10	25	22	07	13	29	DEC 29		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	0.43	0.94	0.81	0.45	1.56	2.58	0.44	1.35	1.09	0.64	1.94	1.43	13.66	
	GREATEST 24-HOUR (IN.)	0.10	0.31	0.31	0.14	0.96	0.96	0.30	0.63	0.61	0.18	1.00	0.34	1.00	
	DATE OF OCCURRENCE	18	24-25	04-05	23	16-17	10-11	01	20-21	01	14	12-13	29	NOV 12-13	
	NUMBER OF DAYS WITH:														
	PRECIPITATION 0.01	13	12	11	8	10	13	3	9	7	8	11	16	121	
PRECIPITATION 0.10	1	4	2	3	6	7	1	4	3	1	4	4	40		
PRECIPITATION 1.00	0	0	0	0	0	0	0	0	0	0	0	0	0		
SNOWFALL	SNOW,ICE PELLETS,HAIL														
	TOTAL (IN.)	8.8	8.5	12.8	2.1	0.0	0.2	0.0	0.0	0.0	T	T	20.6	53.0	
	GREATEST 24-HOUR (IN.)	3.7	2.4	5.5	1.5	0.0	0.2	0.0	0.0	0.0	T	T	4.8	5.5	
	DATE OF OCCURRENCE	18	25+	04	19		11				12	26+	29	MAR 04	
	MAXIMUM SNOW DEPTH (IN.)	4	2	5	2	0	0	0	0	0	0	0	8	8	
	DATE OF OCCURRENCE	19	09	05	20								31+	DEC 31+	
NUMBER OF DAYS WITH:															
SNOWFALL >= 1.0	2	3	3	1	0	0	0	0	0	0	0	6	15		

NORMALS, MEANS, AND EXTREMES MISSOULA (KMSO)

LATITUDE:
46° 55'N

LONGITUDE:
-114° 5 'W

ELEVATION (FT):
GRND: 3192 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	61	30.1	36.9	46.3	57.0	66.0	73.9	84.6	83.2	71.5	57.0	40.5	31.2	56.5
	HIGHEST DAILY MAXIMUM	64	59	66	78	87	95	98	107	105	99	85	73	60	107
	YEAR OF OCCURRENCE		1953	1995	2004	1987	1986	2007	2007	1961	1967	1980	1999	1956	JUL 2007
	MEAN OF EXTREME MAXS.	61	47.0	51.2	63.5	75.4	84.5	91.2	97.3	96.0	88.5	75.1	57.6	47.5	72.9
	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	61	15.2	20.0	25.5	31.9	39.1	45.7	50.3	49.0	40.8	31.6	24.1	17.3	32.5
	LOWEST DAILY MINIMUM	64	-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.	61	-8.5	-0.4	9.2	21.3	27.5	34.7	39.8	39.0	29.1	19.0	6.7	-2.9	17.9
	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	61	22.7	28.5	35.9	44.5	52.5	59.9	67.4	66.1	56.2	44.3	32.3	24.2	44.5
	MEAN WET BULB	25	22.6	25.4	31.9	37.6	44.4	50.5	54.0	52.5	46.5	37.9	29.2	21.9	37.9
	MEAN DEW POINT	25	20.2	22.0	27.0	31.6	38.8	45.2	47.1	45.4	40.5	33.1	26.3	19.5	33.1
	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	69	61	61	61	53	53	61	69	80	83	67
	HOURLY 05 LST	30	85	85	83	80	82	83	78	77	82	84	86	86	83
	HOURLY 11 LST	30	81	77	65	54	53	52	44	46	54	65	79	82	63
	HOURLY 17 LST	30	76	65	50	41	42	42	32	31	38	48	70	79	51
	HOURLY 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 (VISIB <= 1/4 MI)	45	5.6	4.0	1.7	0.4	0.4	0.3	0.2	0.4	0.9	2.8	5.0	6.4	28.1
	THUNDERSTORMS	61	0.1	0.0	0.1	0.6	3.1	5.0	5.8	5.4	1.9	0.2	0.1	0.0	22.3
CLOUDNESS	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	5.5
	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)	25	26.77	26.75	26.70	26.69	26.68	26.70	26.73	26.73	26.75	26.77	26.76	26.78	26.73
	MEAN SEA-LEVEL PRES. (IN)	25	30.19	30.15	30.06	30.02	29.98	29.97	29.98	29.99	30.04	30.11	30.15	30.21	30.07
WINDS	MEAN SPEED (MPH)	25	4.2	5.0	6.1	6.9	6.8	6.9	6.6	6.1	5.3	4.8	4.6	4.3	5.6
	PREVAIL. DIR. (TENS OF DEGS)	29	12	31	31	32	31	32	32	33	31	32	31	12	32
	MAXIMUM 2-MINUTE: SPEED (MPH)	12	47	41	43	41	38	43	52	46	48	37	33	49	52
	DIR. (TENS OF DEGS)		27	29	31	28	22	25	23	16	16	28	17	26	23
	YEAR OF OCCURRENCE		2004	2007	1999	2000	2006	2007	1998	2003	2000	2003	2006	2000	JUL 1998
	MAXIMUM 3-SECOND SPEED (MPH)	12	60	49	52	49	49	55	61	58	55	52	43	53	61
	DIR. (TENS OF DEGS)		27	28	29	20	28	24	22	24	23	29	27	29	22
YEAR OF OCCURRENCE		2004	2007	2001	2001	2007	2007	1998	2007	2004	2003	2008	2006	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)	64	2.94	2.18	2.10	3.10	7.38	4.23	3.16	3.29	3.60	3.51	3.00	4.65	7.38
	YEAR OF OCCURRENCE		1969	1986	1989	2006	1980	1998	1998	1985	1985	1975	1998	1996	MAY 1980
	MINIMUM MONTHLY (IN)	64	0.16	.14	0.20	0.08	0.25	0.35	0.03	T	0.05	0.01	0.21	0.25	T
	YEAR OF OCCURRENCE		1981	2005	1953	1977	1963	1961	2007	1967	1979	1978	2004	1976	AUG 1967
	MAXIMUM IN 24 HOURS (IN)	64	0.88	1.03	0.80	1.87	1.92	1.96	1.80	1.43	1.34	1.49	1.00	0.94	1.96
	YEAR OF OCCURRENCE		1948	1975	1992	2006	1980	2001	1987	1947	1954	1946	2008	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)	64	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)	64	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)	60	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) 2008 MISSOULA (KMSO)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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	.36	1.15	.70	.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
2004	0.92	0.57	0.60	1.07	3.93	1.17	0.70	2.96	1.96	0.55	0.21	0.54	15.18
2005	0.63	0.14	0.99	2.12	2.43	2.93	0.14	0.39	1.56	1.43	1.68	1.17	15.61
2006	1.23	0.37	1.15	3.10	1.66	2.08	0.33	0.74	1.63	1.60	2.05	0.70	16.64
2007	0.32	1.03	0.31	0.92	2.38	1.49	0.03	0.31	1.51	0.63	1.03	0.51	10.47
2008	0.43	0.94	0.81	0.45	1.56	2.58	0.44	1.35	1.09	0.64	1.94	1.43	13.66
POR= 61 YRS	1.14	0.77	0.88	1.09	1.85	1.95	0.93	1.00	1.08	0.86	0.95	1.12	13.62

WBAN : 24153

AVERAGE TEMPERATURE (°F) 2008 MISSOULA (KMSO)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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
2004	20.9	29.4	41.8	46.8	51.1	60.6	70.2	67.8	54.2	45.0	33.5	29.8	45.9
2005	22.0	30.9	39.8	44.3	52.4	57.2	69.1	67.6	56.5	46.7	31.6	19.6	44.8
2006	34.0	27.9	36.7	46.4	54.8	64.0	73.2	66.6	58.2	44.6	35.4	25.8	47.3
2007	25.2	32.7	42.8	46.1	55.0	63.0	78.2	68.0	57.7	45.8	32.3	27.7	47.9
2008	22.0	34.1	36.2	41.2	53.4	59.6	69.5	67.9	56.2	45.3	38.0	21.3	45.4
POR= 61 YRS	22.7	28.5	35.9	44.5	52.5	59.9	67.4	66.1	56.2	44.3	32.3	24.2	44.5

HEATING DEGREE DAYS (base 65°F) 2008 MISSOULA (KMSO)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
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
2003-04	1	3	188	519	1152	1188	1359	1031	712	537	420	170	7280
2004-05	19	55	324	615	938	1086	1325	948	774	615	381	245	7325
2005-06	23	44	256	561	993	1403	955	1025	869	550	323	86	7088
2006-07	4	37	221	625	883	1207	1226	897	684	561	308	123	6776
2007-08	0	25	247	589	976	1151	1326	888	888	706	360	202	7358
2008-	3	49	257	604	801	1347							

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COOLING DEGREE DAYS (base 65°F) 2008 MISSOULA (KMSO)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
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
2004	0	0	0	0	0	42	187	149	4	0	0	0	382
2005	0	0	0	0	0	16	157	131	7	0	0	0	311
2006	0	0	0	0	15	63	266	94	25	0	0	0	463
2007	0	0	0	0	4	68	413	125	34	0	0	0	644
2008	0	0	0	0	8	45	149	146	0	0	0	0	348

SNOWFALL (inches) 2008 MISSOULA (KMSO)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
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
2003-04	0.0	T	0.0	T	10.3	10.8	13.1	2.6	5.3	T	T	0.0	42.1
2004-05	0.0	0.0	0.0	0.0	1.4	7.7	8.9	2.9	5.9	1.3	0.0	0.0	28.1
2005-06	0.0	0.0	0.0	0.0	7.3	4.2	2.5	2.3	5.0	0.5	T	0.0	21.8
2006-07	0.0	0.0	0.0	0.6	6.9	1.6	3.9	6.3	0.5	T	0.1	0.0	19.9
2007-08	0.0	0.0	0.0	T	10.4	7.2	8.8	8.5	12.8	2.1	0.0	0.2	50.0
2008-	0.0	0.0	0.0	T	T	20.6							
POR= 61 YRS	T	T	T	0.7	5.7	10.9	12.2	7.3	6.0	2.0	0.7	T	45.5

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> <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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2008 MISSOULA MONTANA (KMSO)

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

LOCATION	Occupied From	Occupied To	Airline Distances and Directions from previous Location	Latitude		Longitude		ELEVATION ABOVE								REMARKS
				NORTH	WEST	GROUND TEMPERATURE SITE	WIND INSTRUMENT	EXTREME THERMOMETERS	PSYCHROMETER	SUNSHINE SWITCH	TIPPING BUCKET RAIN GAUGE	WEIGHING RAIN GAUGE	8 INCH RAIN GAUGE	HYGROTHERMOMETER	AUTOMATIC OBSERVING EQUIPMENT *	
*NOTE:																
AIRPORT																
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.	

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* NOTES: For earlier station history see previous edition.