

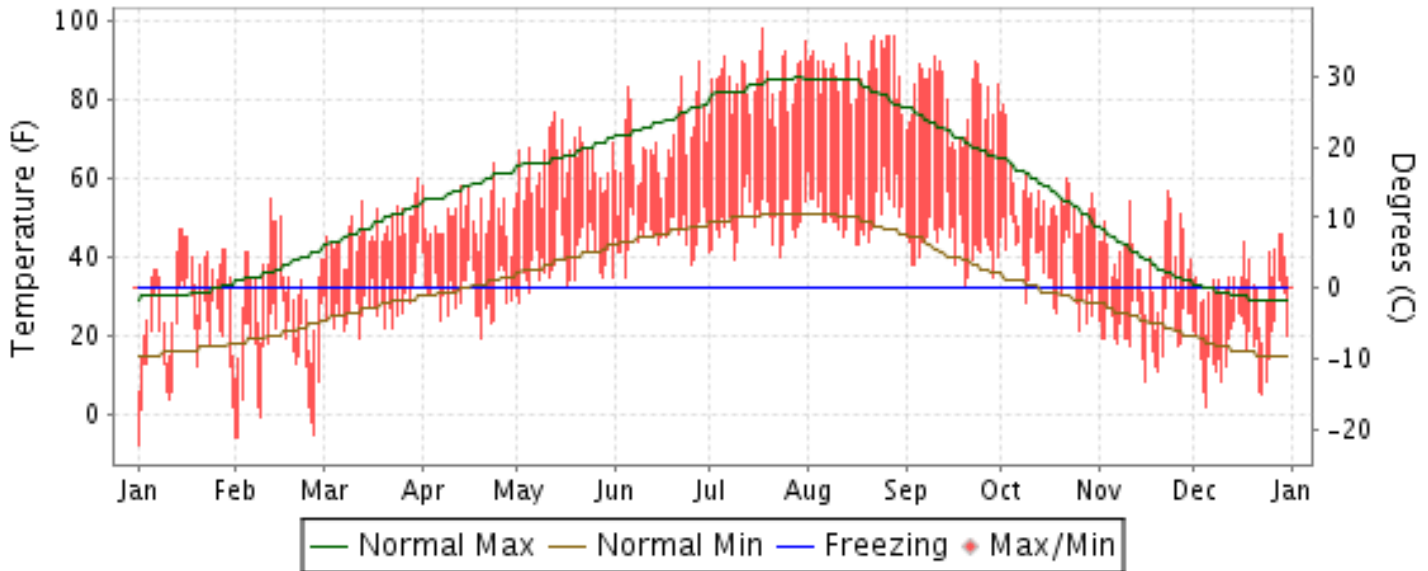


2011 LOCAL CLIMATOLOGICAL DATA ANNUAL SUMMARY WITH COMPARATIVE DATA

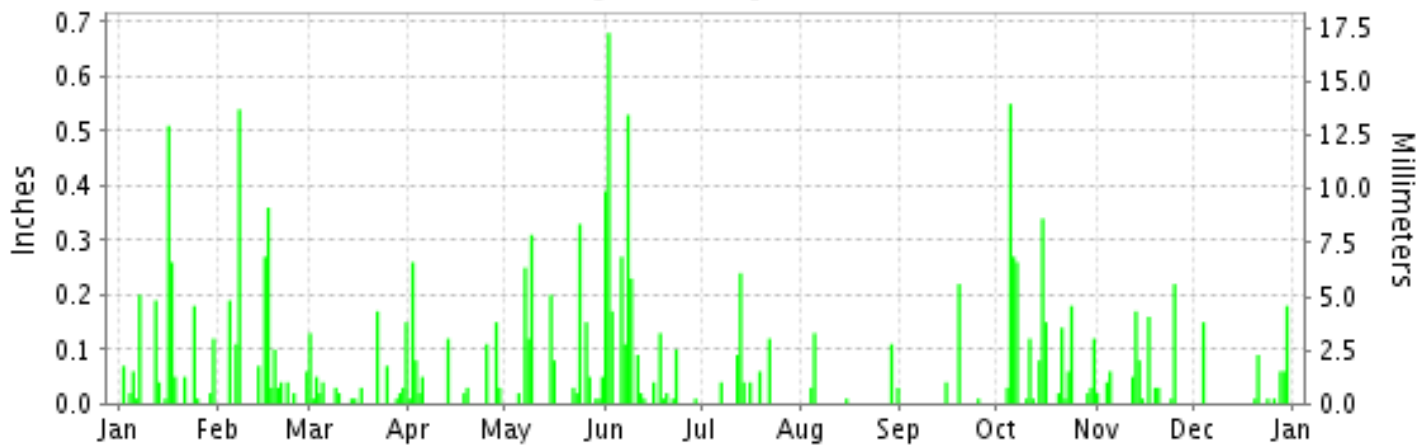
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MISSOULA, MONTANA (KMSO)

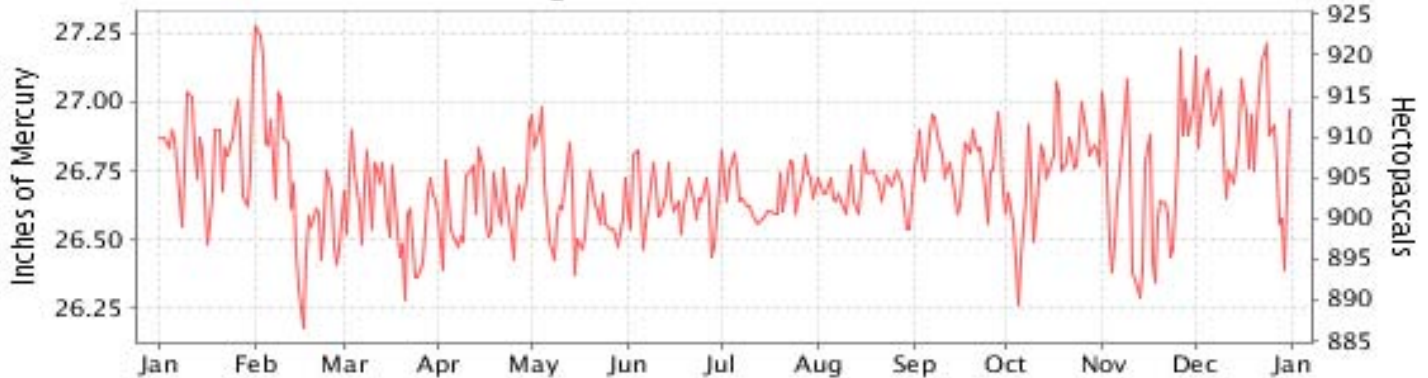
Daily Max/Min Temperature



Daily Precipitation



Daily Station Pressure



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NATIONAL
CLIMATIC DATA CENTER
ASHEVILLE, NORTH CAROLINA

Thomas R. Karl
DIRECTOR
NATIONAL CLIMATIC DATA CENTER

METEOROLOGICAL DATA FOR 2011

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	32.2	31.7	46.6	50.0	63.9	69.2	84.7	88.3	79.9	55.6	40.0	33.5	56.3	
	HIGHEST DAILY MAXIMUM	47	55	60	64	77	90	98	96	91	79	57	46	98	
	DATE OF OCCURRENCE	15+	12	31	24	13	28	18	28+	10	02	23	29+	JUL 18	
	MEAN DAILY MINIMUM	19.7	14.4	27.8	30.6	38.7	45.6	48.8	51.5	43.2	36.9	21.4	17.5	33.0	
	LOWEST DAILY MINIMUM	-8	-6	19	19	28	35	39	43	33	21	8	2	-8	
	DATE OF OCCURRENCE	01	02+	12	20	02	04	09	17+	20	26	16	05	JAN 01	
	AVERAGE DRY BULB	26.0	23.1	37.2	40.3	51.3	57.4	66.8	69.9	61.6	46.3	30.7	25.5	44.7	
	MEAN WET BULB	24.4	21.0	33.1	34.9	44.1	49.8	53.8	54.0	48.1	41.4	27.4	23.7	38.0	
	MEAN DEW POINT	21.3	16.4	28.1	27.5	36.3	43.6	42.8	40.8	35.8	36.4	22.2	19.6	30.9	
	NUMBER OF DAYS WITH:														
	MAXIMUM >= 90°	0	0	0	0	0	1	8	15	3	0	0	0	0	27
MAXIMUM <= 32°	11	13	0	0	0	0	0	0	0	0	6	13	43		
MINIMUM <= 32°	26	27	25	18	3	0	0	0	0	11	28	29	167		
MINIMUM <= 0°	1	5	0	0	0	0	0	0	0	0	0	0	6		
H/C	HEATING DEGREE DAYS	1202	1166	854	733	415	230	30	3	120	573	1022	1217	7565	
	COOLING DEGREE DAYS	0	0	0	0	0	10	93	164	23	0	0	0	290	
RH	MEAN (PERCENT)	84	76	73	64	61	65	48	40	44	73	73	78	65	
	HOUR 05 LST	86	80	88	81	83	85	74	66	67	84	81	83	80	
	HOUR 11 LST	83	73	64	52	45	56	32	30	32	65	67	74	56	
	HOUR 17 LST	84	71	57	52	45	48	29	20	26	62	67	75	53	
	HOUR 23 LST	84	78	81	72	71	75	58	46	51	78	76	82	71	
S	PERCENT POSSIBLE SUNSHINE														
W/O	NUMBER OF DAYS WITH:														
	HEAVY FOG(VISBY <= 1/4 MI)	9	4	2	0	0	0	0	0	1	6	3	5	30	
	THUNDERSTORMS	0	0	0	0	0	0	2	0	0	0	0	0	2	
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.)	26.81	26.70	26.61	26.63	26.63	26.64	26.67	26.68	26.79	26.75	26.69	26.89	26.71	
	MEAN SEA-LEVEL PRESS. (IN.)	30.23	30.12	29.96	29.96	29.93	29.91	29.92	29.92	30.07	30.08	30.07	30.32	30.04	
WINDS	RESULTANT SPEED (MPH)	1.0	1.3	0.9	3.4	2.0	2.8	3.1	2.5	1.3	1.1	0.3	0.4	1.4	
	RES. DIR. (TENS OF DEGS.)	34	10	28	29	35	31	31	31	31	29	28	29	32	
	MEAN SPEED (MPH)	3.6	5.5	4.4	6.3	7.7	4.8	5.1	4.8	4.0	3.8	4.2	2.4	4.7	
	PREVAIL.DIR.(TENS OF DEGS.)	11	12	30	33	33	32	32	31	31	32	32	33	33	
	MAXIMUM 2-MINUTE WIND														
	SPEED (MPH)	32	38	32	32	36	31	39	36	31	33	36	33	39	
	DIR. (TENS OF DEGS.)	29	26	27	28	12	22	20	17	26	25	30	28	20	
	DATE OF OCCURRENCE	21	13	31	05	14	29	16	04	19	31	25	29	JUL 16	
	MAXIMUM 3-SECOND WIND:														
	SPEED (MPH)	40	48	43	44	46	38	47	41	37	45	46	44	48	
DIR. (TENS OF DEGS.)	29	26	27	28	09	21	21	17	25	26	31	28	26		
DATE OF OCCURRENCE	21	13	31	05	15	29	16	04	19	31	25	29	FEB 13		
PRECIPITATION	WATER EQUIVALENT:														
	TOTAL (IN.)	1.80	1.86	0.80	0.88	1.63	2.82	0.63	0.31	0.27	2.40	0.88	0.57	14.85	
	GREATEST 24-HOUR (IN.)	0.51	0.65	0.17	0.26	0.33	0.91	0.28	0.16	0.22	0.76	0.23	0.18	0.91	
	DATE OF OCCURRENCE	16	06-07	22	02	08-09	01-02	12-13	04-05	19	05-06	24-25	30	JUN 01-02	
	NUMBER OF DAYS WITH:														
	PRECIPITATION 0.01	16	13	16	11	14	17	7	5	3	18	12	8	140	
PRECIPITATION 0.10	6	6	3	4	6	9	2	2	1	9	3	2	53		
PRECIPITATION 1.00	0	0	0	0	0	0	0	0	0	0	0	0	0		
SNOWFALL	SNOW,ICE PELLETS,HAIL														
	TOTAL (IN.)	13.6	21.6	5.7	2.0	T	0.0	0.0	0.0	0.0	T	5.5	5.4	53.8	
	GREATEST 24-HOUR (IN.)	3.2	9.7	3.3	1.8	T	0.0	0.0	0.0	0.0	T	1.4	2.7	9.7	
	DATE OF OCCURRENCE	02	07	01	03	03					27+	13	04	FEB 07	
	MAXIMUM SNOW DEPTH (IN.)	7	12	5	0	0	0	0	0	0	0	1	2	12	
	DATE OF OCCURRENCE	06	08	01								21+	23+	FEB 08	
	NUMBER OF DAYS WITH:														
SNOWFALL >= 1.0	5	6	2	1	0	0	0	0	0	0	3	2	19		

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	64	30.2	36.9	46.4	56.9	65.9	73.8	84.6	83.2	71.8	56.9	40.5	31.1	56.5
	HIGHEST DAILY MAXIMUM	67	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.	64	47.0	51.3	63.5	75.4	84.5	91.2	97.3	96.0	88.6	75.1	57.8	47.4	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	64	15.4	20.0	25.6	31.9	39.0	45.7	50.3	49.2	40.9	31.8	24.0	17.2	32.6
	LOWEST DAILY MINIMUM	67	-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.	64	-8.4	-0.1	9.4	21.3	27.4	34.8	39.8	39.2	29.4	18.9	6.6	-3.0	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	64	22.9	28.5	36.0	44.4	52.5	59.8	67.5	66.2	56.4	44.3	32.3	24.1	44.6
	MEAN WET BULB	28	22.5	25.0	31.2	36.6	43.4	49.7	52.8	51.5	45.7	37.5	28.6	21.4	37.2
	MEAN DEW POINT	28	20.6	22.4	27.6	32.1	39.3	45.7	47.9	46.3	41.4	33.8	26.6	19.7	33.6
	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(VISBY <= 1/4 MI)	48	5.8	4.0	1.7	0.4	0.3	0.3	0.2	0.4	0.9	2.8	4.8	6.5	28.1
	THUNDERSTORMS	64	0.1	0.0	0.1	0.6	3.0	4.8	5.6	5.2	1.8	0.2	0.1	0.0	21.5
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	5.5
	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)	28	26.77	26.74	26.69	26.69	26.68	26.69	26.73	26.73	26.75	26.77	26.75	26.78	26.73
	MEAN SEA-LEVEL PRES. (IN)	28	30.20	30.15	30.05	30.01	29.98	29.96	29.98	29.98	30.04	30.11	30.14	30.21	30.07
WINDS	MEAN SPEED (MPH)	28	4.1	4.8	6.0	6.9	6.8	6.7	6.5	6.0	5.2	4.7	4.5	4.2	5.5
	PREVAIL.DIR.(TENS OF DEGS)	32	12	12	31	32	31	32	32	33	31	32	31	12	32
	MAXIMUM 2-MINUTE: SPEED (MPH)	15	47	41	43	41	38	43	52	46	48	37	45	49	52
	DIR. (TENS OF DEGS)		27	29	31	27	22	25	23	16	16	28	28	26	23
	YEAR OF OCCURRENCE		2004	2007	1999	2010	2006	2007	1998	2003	2000	2003	2009	2000	JUL 1998
	MAXIMUM 3-SECOND SPEED (MPH)	15	60	49	52	63	49	55	61	58	55	52	54	53	63
	DIR. (TENS OF DEGS)		27	28	29	33	28	24	22	24	23	29	26	29	33
YEAR OF OCCURRENCE		2004	2007	2001	2009	2007	2007	1998	2007	2004	2003	2009	2006	APR 2009	
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)	67	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)	67	0.16	.14	0.20	0.08	0.25	0.35	0.03	T	0.05	0.01	0.21	0.25	0.01
	YEAR OF OCCURRENCE		1981	2005	1953	1977	1963	1961	2007	1967	1979	1978	2004	1976	OCT 1978
	MAXIMUM IN 24 HOURS (IN)	67	0.88	1.03	0.80	1.87	1.92	1.96	1.80	2.03	1.34	1.49	1.00	0.94	2.03
	YEAR OF OCCURRENCE		1948	1975	1992	2006	1980	2001	1987	2009	1954	1946	2008	1964	AUG 2009
	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)	67	42.5	21.6	16.7	8.2	8.1	0.7	T	T	0.4	5.4	17.7	54.1	54.1
	YEAR OF OCCURRENCE		1963	2011	1997	1970	1978	2001	1994	1996	1983	1973	1947	1996	DEC 1996
	MAXIMUM IN 24 HOURS (IN)	67	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)	63	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) 2011 MISSOULA (KMSO)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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
2009	0.62	0.70	1.47	0.47	0.78	1.37	1.05	3.08	0.27	0.62	0.29	0.59	11.31
2010	0.73	0.20	1.02	1.18	1.66	4.11	0.57	1.22	1.56	1.08	1.50	1.28	16.11
2011	1.80	1.86	0.80	0.88	1.63	2.82	0.63	0.31	0.27	2.40	0.88	0.57	14.85
POR= 64 YRS	1.14	0.77	0.89	1.08	1.83	1.98	0.92	1.02	1.06	0.88	0.95	1.10	13.62

WBAN : 24153

AVERAGE TEMPERATURE (°F) 2011 MISSOULA (KMSO)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
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
2009	24.6	30.3	33.7	43.8	53.4	60.8	69.3	67.2	62.1	39.7	34.6	19.5	44.9
2010	28.0	32.9	39.7	44.3	49.4	59.0	66.9	66.5	57.9	47.9	29.3	21.1	45.2
2011	26.0	23.1	37.2	40.3	51.3	57.4	66.8	69.9	61.6	46.3	30.7	25.5	44.7
POR= 64 YRS	22.9	28.5	36.0	44.4	52.5	59.8	67.5	66.2	56.4	44.3	32.3	24.1	44.6

HEATING DEGREE DAYS (base 65°F) 2011 MISSOULA (KMSO)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
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
2008-09	3	49	257	604	801	1347	1244	963	964	630	359	139	7360
2009-10	22	53	118	778	905	1405	1140	890	777	617	476	190	7371
2010-11	48	50	212	527	1063	1354	1202	1166	854	733	415	230	7854
2011-	30	3	120	573	1022	1217							

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COOLING DEGREE DAYS (base 65°F) 2011 MISSOULA (KMSO)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
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
2009	0	0	0	0	8	20	161	125	39	0	0	0	353
2010	0	0	0	1	0	19	116	103	2	3	0	0	244
2011	0	0	0	0	0	10	93	164	23	0	0	0	290

SNOWFALL (inches) 2011 MISSOULA (KMSO)

YEAR	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
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
2008-09	0.0	0.0	0.0	T	T	20.6	9.6	3.9	9.3	1.5	0.0	0.0	44.9
2009-10	0.0	0.0	0.0	1.4	0.9	6.5	5.0	2.4	0.8	0.6	T	0.0	17.6
2010-11	0.0	0.0	0.0	T	10.0	13.3	13.6	21.6	5.7	2.0	T	0.0	66.2
2011-	0.0	0.0	0.0	T	5.5	5.4							
POR= 64 YRS	T	T	T	0.7	5.7	10.8	12.1	7.4	6.0	1.9	0.6	T	45.2

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. CLEAR INDICATES 0 - 2 OKTAS, PARTLY CLOUDY INDICATES 3 - 6 OKTAS, AND CLOUDY INDICATES 7 OR 8 OKTAS. WHEN AT LEAST ONE OF THE ELEMENTS (CEILOMETER OR SATELLITE) IS MISSING, THE DAILY CLOUDINESS IS NOT COMPUTED.</p>	<p>GENERAL CONTINUED: WIND DIRECTION IS RECORDED IN TENS OF DEGREES (2 DIGITS) CLOCKWISE FROM TRUE NORTH. "00" INDICATES CALM. "36" INDICATES TRUE NORTH. RESULTANT WIND IS THE VECTOR AVERAGE OF THE SPEED AND DIRECTION. AVERAGE TEMPERATURE IS THE SUM OF THE MEAN DAILY MAXIMUM AND MINIMUM TEMPERATURE DIVIDED BY 2. SNOWFALL DATA COMPRISE ALL FORMS OF FROZEN PRECIPITATION, INCLUDING HAIL. A HEATING (COOLING) DEGREE DAY IS THE DIFFERENCE BETWEEN THE AVERAGE DAILY TEMPERATURE AND 65 F. DRY BULB IS THE TEMPERATURE OF THE AMBIENT AIR. DEW POINT IS THE TEMPERATURE TO WHICH THE AIR MUST BE COOLED TO ACHIEVE 100 PERCENT RELATIVE HUMIDITY. WET BULB IS THE TEMPERATURE THE AIR WOULD HAVE IF THE MOISTURE CONTENT WAS INCREASED TO 100 PERCENT RELATIVE HUMIDITY. ON JULY 1, 1996, THE NATIONAL WEATHER SERVICE BEGAN USING THE "METAR" OBSERVATION CODE THAT WAS ALREADY EMPLOYED BY MOST OTHER NATIONS OF THE WORLD. THE MOST NOTICEABLE DIFFERENCE IN THIS ANNUAL PUBLICATION WILL BE THE CHANGE IN UNITS FROM TENTHS TO EIGHTS(OKTAS) FOR REPORTING THE AMOUNT OF SKY COVER. STATION HISTORY STOPPED WITH THE 2009 ANNUAL. IF YOU NEED HISTORY GO TO "MULTI-NETWORK MEDADATA SYSTEM", URL IS: https://mi3.ncdc.noaa.gov/mi3qry/login.cfm SNOWFALL STOPPED MONTH & YEAR INDICATED ABOVE. NO FURTHER YEARS INCLUDED UNLESS RESTARTED.</p> <p>NOTE: The "Period of Record:(POR) for all "averages" is based on the "Summary of the Day First Order Station" and "Cooperative Summary of the Day" archives.</p>
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2011 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 History

MISSOULA, MT

NAME	Begin Date	End Date	Latitude	Longitude	Elevation Feet	Relocation	Platform
MISSOULA JOHNSON BELL FIELD	1981-12-31	1982-06-24	46° 55'	-114° 4'	3190		COOP
MISSOULA INTL AP	1996-09-01	1997-07-20	46° 55'	-114° 5'	3197		ASOS, COOP
MISSOULA COUNTY AP	1968-01-01	1968-06-01	46° 55'	-114° 4'	3190		COOP, WXSVC
MISSOULA JOHNSON BELL FIELD	1993-11-15	1996-09-01	46° 55'	-114° 6'	3197		COOP
MISSOULA JOHNSON BELL FIELD	1982-06-24	1993-11-15	46° 55'	-114° 6'	3197	.5 MI NW	COOP
MISSOULA COUNTY AP	1941-01-01	1948-01-01	46° 55'	-114° 4'			AIRWAYS
MISSOULA COUNTY AP	1948-01-01	1950-01-01	46° 55'	-114° 4'	3205		AIRWAYS, COOP
MISSOULA JOHNSON BELL FIELD	1968-06-01	1981-12-31	46° 55'	-114° 4'	3190		COOP, WXSVC
MISSOULA INTL AP	2001-05-22	2004-10-06	46° 55'	-114° 5'	3192		ASOS, COOP
MISSOULA COUNTY AP	1950-01-01	1968-01-01	46° 55'	-114° 4'	3190		AIRWAYS, COOP
MISSOULA COUNTY AP	1936-01-01	1941-01-01	46° 52'	-114° 00'			AIRWAYS
MISSOULA INTL AP	1997-07-20	2001-05-22	46° 55'	-114° 5'	3192	.3 MI S	ASOS, COOP
MISSOULA INTL AP	2004-10-06	Present	46° 55'	-114° 5'	3192		ASOS, COOP

Element History

Element	Begin Date	End Date	Frequency	Time Of Observation	Equipment *	Equipment * Modifications	Equipment Exposure
PRECIP	1993-05-01	1995-07-01	DAILY	2400	UNIV	RCRD	
TEMP	1997-07-20	2001-05-22	DAILY	2400	HYGR		
PRECIP	2004-10-06	Present	HOURLY	2400	AWPAG	SHLD; RCRD; HTD	
PRECIP	1995-07-01	1997-07-20	HOURLY	2400	UNIV	RCRD	
TEMP	2002-10-01	2004-10-06	DAILY	2400	HYGR		
PRECIP	2004-10-06	Present	DAILY	2400	PCPNX		
TEMP	1935-11-01	1982-01-01	DAILY	2400			
PRECIP	1982-01-01	1993-05-01	HOURLY	2400			
PRECIP	1982-01-01	1993-05-01	DAILY	2400	UNIV	RCRD	
TEMP	1982-01-01	1993-05-01	DAILY	2400			
PRECIP	2001-05-22	2002-10-01	DAILY	2400			
PRECIP	2001-05-22	2002-10-01	HOURLY	2400			
PRECIP	2002-10-01	2004-10-06	HOURLY	2400			
TEMP	2004-10-06	Present	DAILY	2400	HYGR		
PRECIP	1935-11-01	1982-01-01	DAILY	2400	UNIV	RCRD	
PRECIP	1993-05-01	1995-07-01	HOURLY	2400			
TEMP	1995-07-01	1997-07-20	DAILY	2400	HYGR		
TEMP	1993-05-01	1995-07-01	DAILY	2400	HYGR		
TEMP	2001-05-22	2002-10-01	DAILY	2400	HYGR		
PRECIP	1997-07-20	2001-05-22	HOURLY	2400	TB	RCRD	
PRECIP	1995-07-01	1997-07-20	DAILY	2400	UNIV	RCRD	
PRECIP	1997-07-20	2001-05-22	DAILY	2400	TB	RCRD	
PRECIP	2002-10-01	2004-10-06	DAILY	2400	PCPNX		

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

Other Station Information can be found at:

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

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

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Email : ncdc.info@noaa.gov

NOAA/National Climatic Data Center

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