

U. S. DEPARTMENT OF COMMERCE, WEATHER BUREAU  
 IN COOPERATION WITH ORGANIZING COMMITTEE, VIIIth OLYMPIC WINTER GAMES  
 CLIMATOGRAPHY OF THE UNITED STATES NO 20 - 4

LATITUDE 39° 12' N  
 LONGITUDE 120° 14' W  
 ELEV. (GROUND) 6226

STATION SQUAW VALLEY LODGE

INDEX NO. 04-8474-3

MEANS AND EXTREMES FOR PERIOD 1/ 1931 - 1957

Month	Temperature (°F)								** Mean degree days	Precipitation Totals (Inches)						Mean number of days						
	Means				Extremes					Mean	Greatest daily	Year	Snow, Sleet			Precip. 1/10 inch or more	Temperatures				Month	
	Daily maximum	Daily minimum	Monthly	Record highest	Year	Record lowest	Year	Mean					Maximum monthly	Year	Greatest daily		Year	90° and above	32° and below	32° and below		0° and below
(a)	19	19	19	24		24		19	22	27		22	27		27		22	16	16	16	16	
Jan.	38	15	27	64	1950	-28	1937	1180	7.12	3.79	1952	66.3	195.5	1952	42.0	1952	9	0	6	29	4	Jan.
Feb.	41	18	30	65	1950	-18	1949	980	6.30	3.87	1958	55.7	201.0	1938	37.0	1938	9	0	4	27	3	Feb.
Mar.	45	21	33	70	1934	-13	1951	990	5.16	3.55	1956	50.6	127.0	1952	28.0	1952	9	0	2	30	1	Mar.
Apr.	53	28	41	79	1946	7	1953	720	2.62	3.92	1958	19.2	72.0	1958	449.0	1958	5	0	*	24	0	Apr.
May	62	33	48	87	1954	10	1950	530	1.65	1.75	1957	6.7	26.0	1933	11.0	1933	5	0	0	14	0	May
June	70	38	54	94	1950	22	1955+	330	1.80	1.46	1936	.3	1.0	1954	.5	1950+	2	1	0	5	0	June
July	80	43	62	99	1941	26	1955	120	.32	0.78	1938	T	T	1952	0		1	3	0	1	0	July
Aug.	79	41	60	96	1951+	25	1957+	190	.11	0.74	1949	0	0		0		*	3	0	3	0	Aug.
Sep.	73	37	55	95	1937	16	1950	300	.41	0.93	1939	.7	8.0	1934	6.0	1934	1	1	0	8	0	Sep.
Oct.	61	31	46	83	1952	4	1956	590	2.55	3.15	1933	4.3	27.0	1956	12.0	1933	4	0	*	21	0	Oct.
Nov.	47	23	35	73	1956	-7	1935	900	4.47	4.56	1950	20.8	43.0	1931	19.0	1951	4	0	1	27	*	Nov.
Dec.	41	19	30	62	1938	-11	1956	1090	6.91	5.10	1955	45.4	114.0	1931	438.0	1955	2	0	4	29	2	Dec.
Year	58	29	44	99	July 1941	-28	Jan. 1937	7920	38.42	5.10	1955	270.0	201.0	1938	449.0	1958	60	8	17	216	10	Year

(a) Average length of record, years.

T Trace, an amount too small to measure.

\*\* Base 65°F

+ Also on earlier dates, months, or years.

\* Less than one half

δ Extreme from Squaw Valley Lodge record!

1/ Due to short Squaw Valley climatological record, means in table are based on comparison of Squaw Valley records with those of adjacent long record stations and adjusted to the 1931-1952 period (Bulletin W Supplement): Truckee Ranger Station data used for temperatures, and Soda Springs, Tahoe, and Truckee data for precipitation and snowfall. Temperature extremes are from the pooled records of Squaw Valley and Truckee RS, 1934-1957. Precipitation and snowfall extremes are from the pooled records of Squaw Valley and Tahoe, 1931-1957. Actual Squaw Valley extremes marked with δ.

CLIMATE OF SQUAW VALLEY, CALIFORNIA

Squaw Valley lies just east of the ridge of the Sierra-Nevada, is orientated west-southwest to east-northeast, is 1/4 to 3/8 mile wide and 2-1/2 miles long, terminating in the narrow north-south Truckee River Valley about 5 miles northwest of Lake Tahoe. Mountains rise abruptly from the valley floor, which is about 6200 feet above sea level, to ridges of 7000-8000 feet in all directions.

Although information on winds in the Valley is practically nil, the prevailing winds and the highest winds, governed by the orientation of the valley, probably are from the west-south-west through the year, although undoubtedly there are some west-northwest winds at the head of the Valley. All the reported high winds in Squaw Valley have occurred in the January-April period. Of course, much higher winds are encountered at the top of the lift, and considerable difficulty already has been encountered in making shelter construction on the ridges above Squaw Valley sufficiently strong to withstand the winter storms. The wind records for Donner Summit give an indication of the winds which may be experienced in or opposite channels in the ridges. A short period of summarized record (July 1950 - December 1951) at Donner Summit shows prevailing winds of west-southwest channeled through Donner Pass throughout the year with high wind speeds in the winter months. In the five-month period November-March there were an average of about 160 hours a month with winds 25 miles per hour or higher, and about 12 hours a month with winds above 46 miles per hour. New instrumentation this coming winter will make considerably more wind information available by the 1960 Olympics.

Temperatures show the wide variations typical of a high mountain valley with the range between the mean temperature of the warmest month, July, and the coldest month, January, 35°; and a range of 37° between the average daily July maximum and minimum. In the short period of record the highest temperature which has been recorded at Squaw Valley is 90 on June 28, July 6, and 16, 1956, and the lowest temperature is -15 on February 3, 1956. Although minimums have averaged slightly lower at Truckee and maximums higher than at Squaw Valley, it is believed the extremes will reach those for Truckee. Accordingly the Truckee extreme temperatures were used in the above table to represent those probable at Squaw Valley.

The weather station located near the Bull Wheel of the chair lift is fairly representative of the Olympic site and the southern edge of

the valley. It is also representative of most of the valley floor during the long summer days and on cloudy days in the winter months. Under clear to partly cloudy skies during the short winter days, however, the south side of the valley gets less sunshine than the north side (about 2 hours less at winter solstice), and a station operated at the Atwater residence on the north side concurrently with the official weather station during the 1957-58 season showed afternoon air temperatures consistently above those at the weather station, averaging about 4° to 5° with the differences increasing to more than 10° on several days. Minimum temperatures in the summer months were slightly higher at the official station, but were about the same in the winter months with only occasional wide differences.

Freezing temperatures can occur in every month of the year restricting any local gardening efforts to the most hardy vegetables and flowers. Maximum temperatures, however, usually rise above 32° even on winter days, and with the protective winter snow cover the ground usually does not freeze below the immediate surface.

Most of the precipitation falls as snowfall in the winter months. More than 3/4 of the annual average precipitation occurs in the 5 months November - March. In the short period of record the precipitation has averaged about 20 percent greater than that at Truckee and Tahoe and about 75 percent of that at Soda Springs. Measurable rain or snow falls on about 1/3 of the days during the November-March period, but precipitation amounts of 1 inch or more occur only about 12 days a year or on an average of about 2 days a month during the winter and spring. The heaviest observational day precipitation at Squaw Valley was 5.10 inches on December 23, 1955. Hourly precipitation intensities of .40 inch or more and 24-hour amounts of 4.00 inches or more recur about every 2 years. Thunderstorms are fairly frequent in the summer months occurring on an average of 2 days a month from May through August and about 10 days a year, rarely happening in the winter months.

The first snow generally falls in the valley in the last half of October and by the first of December the floor of the valley is usually covered with snow. The snow cover increases to a median depth (depth equalled or exceeded in about half of the years) of 2 feet on January 1, 4 feet on February 1, a winter seasonal peak of 5 feet the first half of March, then decreases rapidly to disappear on the valley floor on the average by May 1. At higher elevations snow continues much later, of course, starts earlier in the fall, and accumulates to greater depths. Monty

CLIMATE OF SQUAW VALLEY (CONTINUED)

Atwater's observations showed on February 22, 1958, 40 inches of snow on the ground in the Valley, 78 inches at 7500 feet and 113 inches at 8500 feet. On April 16 with 75 inches in the Valley there were 150 inches at 7500 feet and 160 inches at 8500 feet, and when snow had disappeared in the Valley on May 18, there were still 90 inches at 7500 feet.

The greatest monthly snowfall in the short Squaw Valley climatological record was 72.0 inches in March, 1958. The greatest daily fall was 49.0 inches on April 3, 1958 and the greatest depth on the ground was 130 inches also on April 3, 1958. Precipitation and snowfall extremes for Tahoe have been used in the above table as the most representative of the three control stations although all extremes at Squaw Valley will probably exceed those for Tahoe as the length of record increases. A snowfall station at Deer Park in the next valley south of Squaw Valley from 1909 - 1914 showed an average snowfall of about 310 inches when adjusted to the Tahoe record and a greatest depth on the ground of 192 inches on March 8, 1911.

Although there are no cloudiness or sunshine records available for either Squaw Valley or the nearby control stations, it is believed that the Valley is so close to the ridge of the Sierra that the cloudiness is only slightly overestimated by the record at Blue Canyon, Emigrant Gap. The Blue Canyon record shows a total of 173 clear, 67 partly cloudy, and 125 cloudy days a year. Most of the cloudiness occurs in the winter season when there are an average of only 8 or 9 clear days and 5 or 6 partly cloudy days each month. Thus, at least 1/3 of the days are sunny even during the winter precipitation season.

Due to special interest in the weather during and immediately preceding the 1960 Winter Olympic Games special snowfall summaries for Truckee and Soda Springs have been included with this summary which provide an idea of the snowfall expectancy along the highway and in Squaw Valley, the conditions in the Valley probably reported by values about midway between the respective frequencies for Soda Springs and Truckee, perhaps slightly closer to Soda Springs. The data were grouped into decades to reduce the variability found in daily frequencies. Even then there are sampling differences between decades, and due to the small differences between -- 37 years for Truckee and 26 for Soda Springs -- it is recommended that the small differences between decades be allowed little planning significance. For example, at Truckee we may expect about 2 or 3 days, and at Soda Springs 3 or 4 days, with snowfall of 1 inch or more to occur within each decade with corresponding probabilities of 1 inch or more of snowfall occurring on any particular day in the January to March period about 20-30 percent at Truckee and 30-40 percent at Soda Springs. Similarly we can expect an average of 1 day with snowfall 6 inches or more to occur within each decade at Truckee, and the frequency of having 1 inch or more of snowfall is also shown: Given a day with snowfall at Truckee, the frequency of having the first two decades in March and decreases to 14 percent the last decade. The probability of having 4 consecutive snowfall days following one of snowfall in the January to March period is about 10 percent, and the probability of having snowfall on 6 following days about 3 to 5 percent, except that there were no occurrences of 4 or 6 additional days in the last decade of March. The frequency of having 2 consecutive snowfall days following a day with snowfall at Soda Springs averaged about 31 percent, reaching a high of 53 percent in the January 21-30 period and a low of 24 percent in the last decade of March. The frequency of snowfall on each of 6 consecutive days following one of snowfall at Soda Springs ranges from 12 percent in the first and last decades of January to 0 the last decade in March.

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SNOWFALL SUMMARY BY DECADES - SODA SPRINGS  
(Period of Record - 1911-1955)

	JANUARY			FEBRUARY			MARCH		
	1-10	11-20	21-30	1-9	10-19	20-29	1-10	11-20	21-30
Average no. of days with 6 inches or more	2	2	2	3	1	1	2	1	1
Average no. of days with 1 inch or more	4	3	3	4	3	3	3	3	3
Percentage occurrence of 1 inch or more continuous snowfall for 2 days following day of snow	33	38	53	35	30	32	40	35	24
Percentage occurrence of 1 inch or more continuous snowfall for 4 days following day of snow	19	16	30	15	18	13	15	21	3
Percentage occurrence of 1 inch or more continuous snowfall for 6 days following day of snow	12	5	12	6	5	1	6	8	0

SNOWFALL SUMMARY BY DECADES - TRUCKEE, CALIFORNIA  
(Period 1906-1920, 1934-1955)

	JANUARY			FEBRUARY			MARCH		
	1-10	11-20	21-30	1-9	10-19	20-29	1-10	11-20	21-30
Average no. of days with 6 inches or more	1	2	1	1	1	1	1	1	1
Average no. of days with 1 inch or more	2	3	3	3	2	3	3	2	2
Percentage frequency of 2 or more consecutive days with snowfall following day with snowfall (1 inch or more)	27	34	25	30	24	26	35	26	14
Percentage frequency of 4 or more consecutive days with snowfall following day with snowfall (1 inch or more)	11	11	6	12	11	2	11	10	0
Percentage frequency of 6 or more consecutive days with snowfall following day with snowfall (1 inch or more)	6	2	2	4	2	0	3	3	0

STATION HISTORY

The station at Squaw Valley was established October 12, 1955, when it became apparent that the Valley would become the site of the 1960 Winter Olympics, and that the existing closest weather stations at Tahoe, Truckee, and Soda Springs were not sufficiently representative of weather conditions in Squaw Valley. At least six different employees of the Squaw Valley Development Company took the observations from October, 1955 through April, 1957 in which time there were several periods of missing record. In May, 1957 the U.S. Forest Service, having been charged with providing technical advice on snow safety in the Valley during the Olympics and the preceding construction period, detailed Mr. Montgomery Atwater, snow avalanche research worker, to the Valley. Monty Atwater took over the observational program in May, 1957 and fairly complete records have resulted from that date to the present.

Maximum and minimum thermometers were installed in a Standard Cotton Region Shelter on a tower support, about 7 feet above ground, about 25 feet east of the Bull Wheel of the Chair Lift. A standard eight-inch non-recording rain gage was located on a post about 25 feet southeast of the shelter, top 8.5 feet above ground, and a 144 inch snow stake about 20 feet southeast. The instruments have remained in the original position although an avalanche covered them from March 17 to April 10, 1958, during which time observations were taken at an auxiliary weather station which Monty Atwater had established at his residence about 1-1/4 miles northeast of the official station. Moreover, rather than use snow depths as shown by the snow stake near the shelter and precipitation gage, Mr. Atwater used several measurements in the vicinity of his residence considered more sheltered and representative of the snow pack on the floor of the Valley. The supplementary station at the Atwater residence was established about July 1, 1957 and was attached to a porch support about 10 feet from the west side of the house. A precipitation gage was located about 40 feet west of the shelter. Other weather instruments, including several sets of wind equipment, recording precipitation gages, and hygrometers have been installed this summer, but records for these are just beginning and are not now available.