SORD Technical Memorandum SORD 2006-3

Climatology of the Nevada Test Site

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Air Resources Laboratory
Silver Spring, Maryland
April 2006

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ATMOSPHERIC ADMINISTRATION

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Abstract

The Nevada Test Site (NTS), located in South-Central Nevada, has comprehensive meteorological data dating from the early 1960's. These data include mainly winds, temperatures, and precipitation, especially in the early records. The general climatology of the NTS is that of a high desert environment. The annual precipitation ranges from approximately 4.0 inches for the lowest elevations to nearly 12.0 inches over the highest terrain. The four seasons are well defined with a hot, mostly dry, summer, cool temperatures in the spring and late fall, and cool to cold temperatures in the winter. Precipitation occurs mostly in the winter and early spring, and in mid-summer. The precipitation on the NTS is mostly in the form of rain, except for the winter months, when both rain and snow occur. The prevailing winds on the NTS are a combination of seasonal and diurnal effects. Some of the valleys on the NTS have very pronounced night-time drainage winds that persist for most months of the year. Daytime winds are generally from the north in the cool season, and from the south in the warm season. The most persistent weather patterns that help define the overall climatology of the NTS are the Great Basin High that generally develops during fall and winter, and the Thermal Low over the desert southwest during most of the warm season.

I. INTRODUCTION

A. Description of the Nevada Test Site

The Nevada Test Site (NTS) resides in South-Central Nevada in Nye County. Figure 1 shows that the general shape of the NTS is roughly rectangular being approximately 25 miles wide (East-West) and 50 miles long (North-South). An extension on the South-East corner of the NTS includes Mercury(MCY) and Desert Rock(DRA). Mercury contains most of the personnel, and acts as the logistical center for the NTS. Figure 1 illustrates that the NTS is divided into Operational Areas which are identified by number, for example, Area 5 contains Well 5B (W5B). Terrain varies from dry lakes in two basins to mountains and mesas. Surface elevations on the NTS are generally lowest in the South and highest in the North. The lowest elevation on the NTS is in the Southwest corner at about 2700 feet above sea level (MSL). The highest terrain is in the north-central section on the Mesas at about 7500 feet MSL. There is a mountain range on the southwest side of the NTS with a deep canyon separating it from a north-south mountain range in the central part of the NTS. Two basins are located in the southeast (Frenchman Flat) and northeast (Yucca Flat) sections of the NTS. A gently sloping, mostly flat, area (Jackass Flats) comprises a good part of the southwestern NTS. The vegetation on the NTS varies from desert scrub and cactus in the lowest elevations to woodlands on the mesas.

B. Brief History of Meteorological Data Collection on the NTS

1. Overview

Meteorological data have been collected on the NTS since the early 1950's. During the 1950's data were sporadic and generally related to specific nuclear tests on the NTS. Some upper-air and surface observations were taken at Yucca Flat during the late 1950's in support of atmospheric tests. Due to the nature of the tests, these observations were intermittent. Some surface observations were also taken in the southwestern part of the NTS in the late 1950's. With the cessation of atmospheric testing in 1962, a permanent weather observation station was established in Yucca Flat on the western edge of the Yucca Dry Lake. Surface and upper-air observations were taken at this station from 1962 to 1978. In mid 1978 the observation program was moved from Yucca Flat to Desert Rock, in the extreme southern part of the NTS.

2. Upper-Air

The upper-air program at Yucca Flat consisted mainly of radiosonde and pilot balloon observations. The regularly scheduled upper air observations were at standard synoptic times: i.e., at 00Z, 06Z, 12Z, 18Z. The radiosonde observations were at 00Z and 12Z, the pilot balloon observations were at 06Z and 18Z. The full 24-hour observation period was not begun until 1967 when the Weather Bureau station at Las Vegas ceased taking upper-air observations.

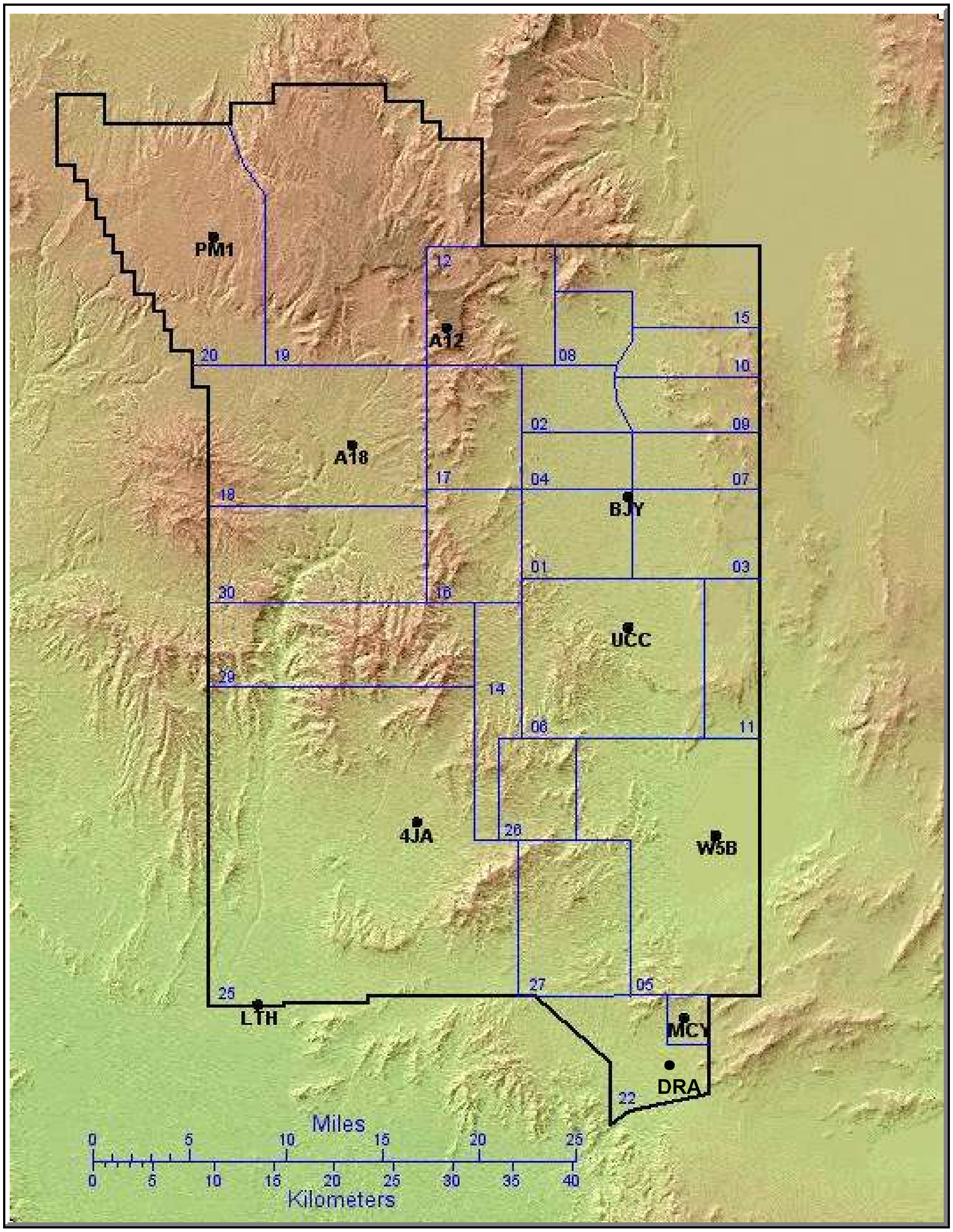

Figure. 1. NTS Map and Location of MEDA Climate Stations.

The upper-air observations taken at Yucca Flat and Desert Rock followed standard NOAA procedures until the mid 1990's. Starting in the mid-1990's the evening pilot balloon run was no longer taken due to a reduction in personnel.

3. Surface

The surface observation programs at both Yucca Flat and at Desert Rock were part of the first-order weather station network in the United States. Full surface observations, including clouds and weather phenomena, were reported around the clock on all days of the year. In the mid-1990's the surface observations program at Desert Rock was reduced from 24 hours to 16 hours - the late evening and early morning hours were no longer covered.

Meteorological data collected on the NTS include a comprehensive network of precipitation gauges. Many of these gauges have been in place for 40 or more years, providing an excellent data record for the NTS. This rain-gauge network is one of the most comprehensive available in the desert southwest.

4. Precipitation

The rain gauges are of the storage type with recording strip charts. These charts were set to record for one week at a time until the mid 1990's when they were adjusted to record for 30 days. The increased time between changing and analyzing these charts was due to a lack of available personnel. The decision to increase the length of time that was used for recording was based on the need to keep the existing rain-gauge network in place.

5. Mesoscale Meteorological Network

Other types of meteorological observations that have been taken on the NTS have consisted mainly of data collected from instrumented wind towers (Fig. 2) that usually included temperature measurements (and occasionally relative humidity) at the same location. Originally these data were recorded mostly on strip charts that were hand reduced. Some of observations were telemetered into specific locations via phone lines, instead of being recorded at the station itself.

These older meteorological recording stations are generally referred to as “climate” stations. These climate stations had varying lengths of record, with some being only in place for a few months for special projects. Other stations had significant periods of record that exceeded 10 years, and in a few cases 20 years. The total number of locations that had one of these climate stations exceeded 100 in the 1970's. A few of these stations were not directly on the NTS, but were at nearby locations, such as Amargosa Valley, Deer Creek, etc.

The first radio-telemetered meteorological data stations were installed in the early 1970's. These stations were referred to as “Systrac” stations. There were approximately 15 Systrac stations installed on the NTS. They were mostly installed in Yucca Flat to support the Underground Nuclear Testing Program. A few were located elsewhere such as Mercury, Frenchman Flat, and Rainier Mesa. Data from these towers included winds and temperatures, which were recorded every 15 minutes on magnetic tape. The tapes were subsequently processed by computer to extract and store the meteorological data.

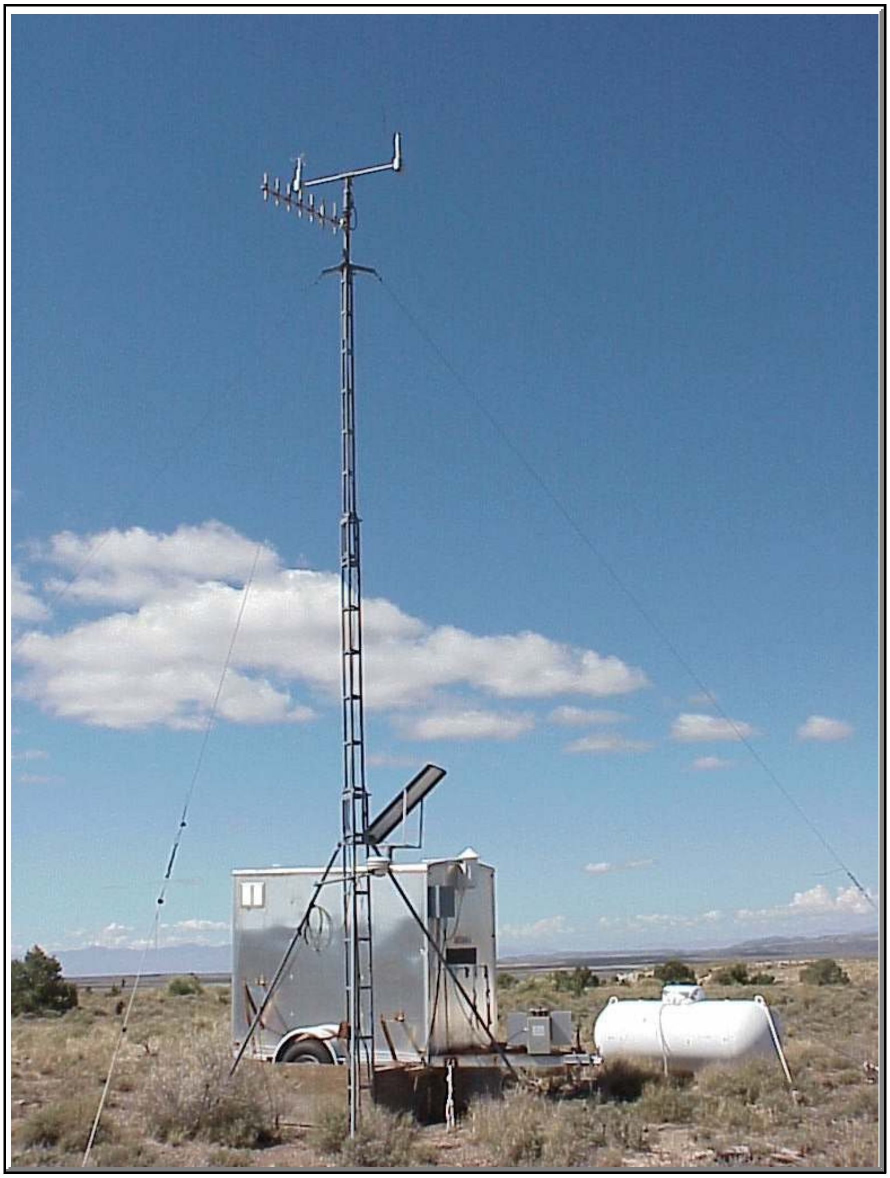

Figure 2. Picture of a typical MEDA station

In the late 1970's the Systrac System was replaced by the **ME**teorological **D**ata **A**cquisition System (MEDA) . Initially the data collected by the new MEDA systems were only recorded on teletype paper. The digitizing and computer processing of these data started in the early 1980's. These new stations, and their upgrades, were in place on the NTS until late 2005 when they were replaced by new equipment that included two-dimensional sonic anemometers. Originally the meteorological data consisted of only winds, and temperatures. In mid 1987 the stations were upgraded to include relative humidity, precipitation, and pressure readings. The stations are polled via radio-net every 15 minutes to collect and process their data. All climatological data used in this report were collected prior to the implementation of the 2005 MEDA system

The MEDA station network is much more extensive than its predecessor, Systrac. Figure 3 illustrates that most of the stations are located on the NTS, and give a much better coverage of the NTS than Systrac did. A few stations are located offsite at locations such as, the Tonopah Test Range, at the Air Force Range-63, and Yucca Mountain. Previous to the late 1990's, a number of MEDA stations were located offsite at Kawich Valley, Tonopah FAA, Ella Mountain, and Hayford Peak. The reduction in offsite MEDA stations was directly related to available personnel and resources.

Figure 2 contains a photograph of a standard MEDA station. A MEDA unit consists of an enclosed trailer, a portable 10-m tower, an electric generator (when needed), a microprocessor, and a microwave radio transmitter. All towers were sited in accordance with standards set by the Federal Meteorological Handbook No. 1 and the World Meteorological Organization so as not to be influenced by natural or man-made obstructions, or by heat dissipation and generation systems. Instrumentation is located on booms oriented into the prevailing wind direction and at a minimum distance of two tower widths from the tower. Wind direction and speed are measured at the 10-m level in accordance with ANS/ANSI 3.11 (2000). Ambient temperature, relative humidity, and atmospheric pressure measurements are taken at approximately the 2-m level so as to be within the surface boundary layer. The observations are collected and transmitted every 15 min on the quarter hours. The meteorological elements measured at each station are listed on the SORD website <www.sord.nv.doe.gov> along with other information.

Prior to 2005, wind data were recorded as 5-min averages (5 min prior to collection time) of speed and direction. Wind speeds are recorded in knots. The peak wind speed is the fastest instantaneous gust measured within the 15-min time interval. Temperature (^{0}C), relative humidity (%), and pressure (mb) are instantaneous measurements taken at the collection time. Precipitation is measured via a tipping bucket gauge near ground level, and the pressure instrument recording device is inside the trailer. Data are transmitted at 15 minute intervals on the quarter hour.

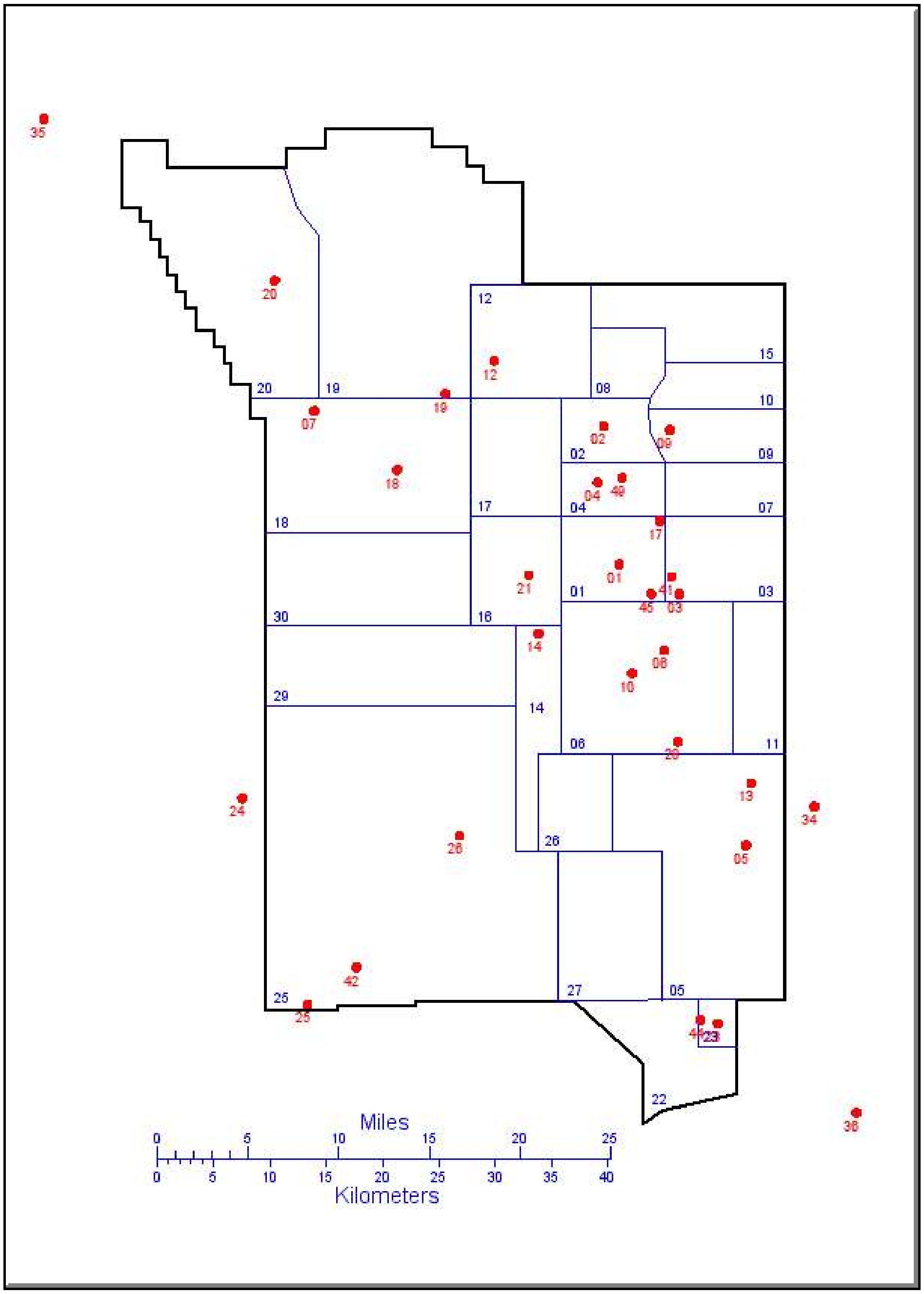

Figure 3. MEDA Stations (2002) on and near the NTS.

List of MEDA Station Locations(2002)

NUM	Station Name	Call Sign	Area	Lat(N)	Lon(W)	Elev(ft)	(Instruments at Stations) W	T	RH	Pr	Pcp
1	Area 1	A01	1	37.027	116.093	4157	Y	Y	Y	N	Y
2	Area 2	A02	2	37.139	116.107	4416	Y	Y	Y	N	Y
3	Area 3 South	A3s	3	37.002	116.029	3974	Y	Y	Y	N	Y
4	Area 4	A04	4	37.094	116.114	4419	Y	Y	Y	N	Y
5	Well 5B	W5B	5	36.802	115.966	3104	Y	Y	Y	Y	Y
6	Yucca Flat WS	UCC	6	36.956	116.049	3920	Y	Y	Y	Y	Y
7	Station 7	A18NW	18	37.151	116.396	5489	Y	Y	Y	N	N
9	Area 9	A09	9	37.135	116.042	4234	Y	Y	Y	N	Y
10	The Monastery	MON	6	37.040	116.081	5104	Y	Y	N	N	N
12	Area 12 Mesa	A12	12	37.191	116.216	7496	Y	Y	Y	Y	N
13	Area 5 North	A5N	5	36.852	115.960	3188	Y	Y	Y	N	Y
14	Mid Valley	A14MV	14	36.968	116.181	4726	Y	Y	Y	N	Y
16	BJY Tower	BJYT	1	37.063	116.054	4160	Y	Y	N	N	N
17	Buster Jangle “Y”	BJY	1	37.063	116.054	4060	Y	Y	Y	Y	Y
18	Area 18	A18AP	18	37.104	116.314	5061	Y	Y	N	N	Y
20	Pahute Mesa 1	PM1	20	37.270	116.435	6515	Y	Y	Y	Y	Y
21	Area 16	A16CS	16	37.019	116.182	4991	Y	Y	Y	Y	N
23	Mercury	A23MR	23	36.658	115.997	3766	Y	Y	Y	Y	Y
24	Yucca Mountain	YMT	OS	36.839	116.469	4967	Y	Y	Y	N	Y
25	Area 25 South	A25S	25	36.671	116.404	2758	Y	Y	Y	Y	Y
26	Area 25 East	A25E	25	36.812	116.248	3739	Y	Y	Y	N	Y
27	Area 27	A27	27	36.770	116.105	4523	Y	Y	Y	N	Y
28	Station 28	A06DA	6	36.894	116.039	3634	Y	Y	Y	N	Y
34	HSC NE	A05E	5	36,798	115.935	3070	Y	Y	Y	N	N
35	Tonopah Test Range	TTR	OS	37.794	116.756	5458	Y	Y	Y	Y	Y
36	Nellis Range 63	R63	OS	36.542	115.533	3065	Y	Y	Y	Y	Y
41	Rebound Angle Rd	A03AR	3	37.013	116.049	3987	Y	Y	N	N	N
42	Station 42	A25AG	25	36.703	116.355	2907	Y	Y	Y	N	N
44	Shooting Range	A25SR	23	36.660	117.017	3671	Y	Y	Y	N	N
45	Rebound South	A01SE	1	37.004	116.060	3993	Y	Y	Y	Y	N
49	Beef	A04B	4	37.096	116.088	4237	Y	Y	Y	N	N

(OS for the Area means “Off Site”)

For up-to-date information, visit the ARL/SORD webpage at <www.sord.nv.doe.gov>

II. TEMPERATURE

A. Averages and Extremes

1. Summaries

Temperature summaries for sites located on the NTS have been compiled utilizing data collected by the ARL/SORD MEDA system. The stations used for the summaries generally began operation in 1981 and continued through 2002. The summaries are comprised of elements similar to those being done for First-Order National Weather Service stations. The summaries include monthly averages, extremes, heating and cooling degree days, and number of occurrences of temperatures exceeding defined limits.

Daily weather conditions on the NTS exhibit the classic desert environment characteristics, such as large average diurnal temperature ranges, rapid heating and cooling at sunrise and sunset respectively, and large annual changes in temperature between winter and summer. The absolute ranges in surface temperature on the NTS are from -20°F in the winter to 115°F in the summer, which occur mainly in the basins on the NTS. Diurnal ranges in temperature can be 60°F or more in the basins. The large ranges of diurnal temperatures occur mostly in the warm seasons, but can occasionally occur in winter too.

Climatological summaries of NTS surface level (2 meters) temperatures are listed in Tables 1 through 9. Data from stations located in the basins are summarized in Tables 1 through 4, those on sloping terrain in Tables 5, 6, and 7, and those on the mesas in Tables 8 and 9.

1.1. Basins

Tables 1 through 4 demonstrate that the basin locations exhibit a large range in diurnal and annual temperatures. The summertime average diurnal ranges are nearly 40°F and the wintertime diurnal ranges are about 30°F. UCC and W5B show absolute ranges in temperature of about 120°F (-6°F to 115°F at W5B, -11°F to 109°F at UCC). W5B, in Frenchman Flat, is 816 feet lower than UCC in Yucca Flat, which corresponds fairly well with expected differences (about 4 to 5°F) in temperatures due to elevation differences, with the terrain being similar.

These lower elevation locations show that the annual totals of heating degree days far exceed the cooling degree days. W5B exhibits more than a two to one ratio of heating to cooling degree days, and UCC shows more than four to one for heating versus cooling degree days. This pronounced effect is primarily due to the large diurnal ranges of temperature at these two locations. The morning temperatures can be cool to chilly even in Summer in both basins.

Table 1: Yucca Flat MEDA Station (UCC) Temperature Climatology (F), (Lat: 36.96N Lon: 116.05W; Elev: 3920 ft), Years: 1983 to 2000.

	Ave	Ave		Extreme		Extreme		Degree Days		Maximum		Minimum	
										GE	LE	LE	LE
Mon	Max	Min	Ave	High	Yr	Low	Yr	Heat	Cool	90	32	32	0
01	52.1	23.0	37.6	73	1986	-6	1988	820	0	0	0	26	0
02	55.9	27.0	41.5	83	1986	4	1989	660	0	0	0	21	0
03	62.6	31.2	46.9	82	1986	13	1985	559	0	0	0	18	0
04	70.1	36.3	53.2	92	1989	17	1984	357	3	0	0	8	0
05	79.3	44.4	61.8	100	2000	27	1988	142	46	4	0	1	0
06	88.4	51.0	69.7	108	2000	31	1995	38	179	15	0	0	0
07	95.5	57.5	76.5	109	1989	40	1985	0	354	26	0	0	0
08	93.0	56.2	74.6	109	2000	39	1989	10	302	24	0	0	0
09	85.5	48.0	66.8	101	1996	26	1986	54	107	10	0	1	0
10	75.2	35.9	55.5	95	1987	13	1996	291	4	1	0	10	0
11	60.8	26.1	43.4	82	1999	4	1993	642	0	0	0	24	0
12	52.2	20.7	36.5	72	1988	-11	1990	876	0	0	0	28	0
All	72.5	38.1	55.3	109	2000	-11	1990	4454	998	80	0	137	0

Table 2: Frenchman Flat (W5B) Temperature Climatology (F), (Lat: 36.80N Lon: 115.97W, Elev: 3104 ft); Years: 1983 to 2000;

	Ave	Ave		Extreme		Extreme		Degree Days		Maximum		Minimum	
										GE	LE	LE	LE
Mon	Max	Min	Ave	High	Yr	Low	Yr	Heat	Cool	90	32	32	0
01	55.3	24.1	39.7	76	1994	-2	1991	776	0	0	0	25	0
02	61.3	28.1	44.7	84	1986	3	1989	561	0	0	0	19	0
03	68.0	33.5	50.7	88	1997	13	1985	440	0	0	0	14	0
04	75.7	38.7	57.2	98	1989	19	1999	247	13	2	0	5	0
05	85.2	47.8	66.5	105	2000	29	2000	69	115	10	0	1	0
06	94.6	55.2	74.9	112	1994	35	1995	11	304	23	0	0	0
07	101.4	61.9	81.7	115	1998	44	1993	0	511	29	0	0	0
08	98.8	61.3	80.0	113	1993	43	1987	6	472	29	0	0	0
09	90.9	52.1	71.5	108	1996	30	1986	21	217	20	0	0	0
10	80.1	39.9	60.0	99	1996	14	1989	178	26	5	0	5	0
11	65.2	28.0	46.6	86	1988	4	1993	547	0	0	0	22	0
12	55.7	22.1	38.9	74	1995	-6	1990	800	0	0	0	27	0
All	77.7	41.1	59.4	115	1998	-6	1990	3660	1661	118	0	118	0

Warm days with maximum temperatures greater than or equal to 90°F are numerous at these locations with an average of 92 days at UCC and 118 days at W5B. The number of days with freezing temperatures are equally large at these locations with 137 at (UCC) and 118 at (W5B).

The west-central section of the NTS is higher in elevation than the southern and eastern sections. Basins found at these elevations range from about 5000 to over 6000 feet msl. MEDA station 18 (A18), in Area 18 (See Fig. 1), is on relatively flat terrain at an elevation slightly above 5000 feet msl. The temperature summary for this station is given in Table 4. At this higher elevation, basin temperatures show decreases in the averages by month of about 6 to 9°F, depending on the season, compared to Jackass Flats (4JA) - the differences are greater in the summer than winter. The absolute range of temperature is 115°F, which is almost as great as those reported in the basins. The daily ranges are not as large with about 31°F in the Summer and about 25°F in the winter. These smaller ranges are due to the lack of a basin in Area 18.

In the low basins the heating degree days far outweigh the cooling degree days. The ratio is almost seven to one for heating versus cooling.

For the high basins, the warm days are limited with only an average of 35 per year equaling or exceeding 90°F. Conversely the number of days with freezing minimum temperatures is 128 on average for a year. Additionally one day in each of the winter months has a maximum temperature less than or equal to 32°F.

1.2. Sloping Terrain

Stations located on sloping terrain portray some interesting climatic differences. For example, Mercury (MCY) in the extreme Southeast corner of the NTS is on a southwest to northeast slope, which greatly influences the wind direction and speed. This pronounced effect reduces the diurnal temperature ranges at Mercury. Table 5 summarizes the temperature climatology for Mercury.

As can be seen in Table 5 for Mercury, the diurnal ranges of temperature are about 22°F in the summertime and 16°F in the wintertime. The absolute range is approximately 100°F, which is still fairly large, but distinctly less than the basin locations. The conditions at Mercury are not typical of most of the NTS.

The annual totals of heating and cooling degree days are almost the same at Mercury with the heating values being only slightly more than the cooling values.

Warm weather is pronounced at Mercury with an average of 84 days having a maximum of 90°F or more annually. Freezing temperatures only occur on an average of 20 days a year.

Table 3: Yucca Flat (BJY) Temperature Climatology (F); (Lat: 37.06N Lon: 116.05W Elev = 4060 ft); Years = 1983 to 2000.

										Maximum		Minimum	
	Ave	Ave		Extreme		Extreme		Degree Days		GE	LE	LE	LE
Mon	Max	Min	Ave	High	Yr	Low	Yr	Heat	Cool	90	32	32	0
01	52.2	25.2	38.7	74	1994	0	1988	811	0	0	1	26	0
02	57.2	28.9	43.1	81	1986	6	1989	597	0	0	0	18	0
03	63.4	33.0	48.2	84	1994	13	1985	513	0	0	0	14	0
04	71.0	37.7	54.4	95	1989	19	1999	320	6	1	0	6	0
05	80.0	45.3	62.7	103	2000	28	1988	127	57	4	0	1	0
06	89.5	52.5	71.0	107	2000	32	1995	32	210	17	0	0	0
07	96.8	58.9	77.9	110	1998	43	1993	0	394	28	0	0	0
08	94.2	58.4	76.3	109	1993	44	1993	6	350	26	0	0	0
09	86.9	50.9	68.9	103	1988	30	1986	35	153	13	0	0	0
10	76.5	40.6	58.6	98	1996	21	1996	220	22	3	0	4	0
11	61.9	29.8	45.9	83	1999	10	1985	568	0	0	0	19	0
12	53.4	24.4	38.9	75	1998	-4	1990	809	0	0	1	27	0
All	73.6	40.5	57.0	110	1998	-4	1990	4042	1196	92	2	115	0

Table 4: Area 18 Airstrip (A18); Temperature Climatology (F); (Lat: 37.10N Lon: 116.31W Elev: 5061 ft); Years: 1983 to 2000

										Maximum		Minimum	
	Ave	Ave		Extreme		Extreme		Degree Days		GE	LE	LE	LE
Mon	Max	Min	Ave	High	Yr	Low	Yr	Heat	Cool	90	32	32	0
01	48.8	24.2	36.5	68	1986	-2	1997	851	0	0	1	26	0
02	51.3	26.6	39.0	78	1986	-8	1989	728	0	0	1	21	0
03	57.2	31.2	44.2	77	1986	11	1985	639	0	0	0	18	0
04	64.6	36.2	50.4	88	1989	16	1984	428	0	0	0	9	0
05	73.2	43.9	58.6	98	2000	26	1988	218	23	1	0	2	0
06	82.2	51.4	66.8	102	2000	31	1995	67	119	6	0	0	0
07	89.5	58.2	73.9	106	1989	42	1995	1	263	15	0	0	0
08	87.4	57.4	72.4	100	1993	41	1990	6	230	11	0	0	0
09	80.1	50.1	65.1	96	1987	32	1988	70	74	2	0	0	0
10	70.0	39.9	54.9	92	1996	19	1989	300	5	0	0	4	0
11	56.6	28.6	42.6	76	1999	0	1985	664	0	0	0	20	0
12	48.9	22.9	35.9	70	1988	-9	1990	894	0	0	1	28	0
All	67.5	39.2	53.4	106	1989	-9	1990	4871	716	35	3	128	0

Table 5: Mercury (MCY), Temperature Climatology (F); (Lat: 36.66N Lon: 116.00W; Elev: 3766 ft); Years: 1983 to 2000

Mon	Ave Max	Ave Min	Ave	Extreme High	Yr	Extreme Low	Yr	Degree Days Heat	Degree Days Cool	Maximum GE 90	Maximum LE 32	Minimum LE 32	Minimum LE 0
01	52.8	36.7	44.8	70	1990	14	1997	614	0	0	0	6	0
02	57.4	39.5	48.5	80	1986	11	1989	459	0	0	0	4	0
03	63.7	44.4	54.0	84	1997	13	1985	343	5	0	0	1	0
04	70.9	50.1	60.5	92	1996	23	1997	185	50	0	0	0	0
05	80.0	58.3	69.2	100	2000	31	1998	57	185	4	0	0	0
06	89.3	67.5	78.4	108	1994	42	1995	9	409	16	0	0	0
07	95.7	74.3	85.0	110	1998	51	1997	0	616	26	0	0	0
08	94.0	73.9	84.0	108	1998	53	1985	0	583	25	0	0	0
09	86.6	66.5	76.6	102	1996	47	1986	6	352	11	0	0	0
10	75.8	56.2	66.0	96	1996	34	1996	90	120	2	0	0	0
11	61.9	43.9	52.9	83	1999	19	1996	364	4	0	0	2	0
12	53.4	37.1	45.3	71	1988	11	1990	603	0	0	0	7	0
All	73.5	54.0	63.8	110	1998	11	1990	2733	2328	84	0	20	0

Table 6: Jackass Flats (4JA); Temperature Climatology (F); (Lat: 36.67N Lon: 116.25W; Elev: 3739 ft); Years: 1983 to 2000

Mon	Ave Max	Ave Min	Ave	Extreme High	Yr	Extreme Low	Yr	Degree Days Heat	Degree Days Cool	Maximum GE 90	Maximum LE 32	Minimum LE 32	Minimum LE 0
01	54.6	34.7	44.6	73	1994	14	1989	625	0	0	0	10	0
02	58.4	37.3	47.9	82	1986	12	1989	478	0	0	0	6	0
03	64.2	41.1	52.7	84	1997	23	1990	382	1	0	0	3	0
04	71.8	46.2	59.0	92	1989	27	1984	211	32	1	0	1	0
05	80.7	54.0	67.4	102	2000	33	1988	68	140	4	0	0	0
06	90.3	62.4	76.4	108	2000	38	1995	11	350	17	0	0	0
07	96.9	69.2	83.1	112	1998	51	1987	0	542	27	0	0	0
08	95.2	68.6	81.9	109	1998	47	1987	0	499	25	0	0	0
09	87.4	61.9	74.7	104	1996	40	1986	9	276	12	0	0	0
10	77.2	51.7	64.5	96	1996	30	1991	107	90	3	0	0	0
11	62.9	40.2	51.6	84	1997	20	1994	402	2	0	0	4	0
12	54.9	34.2	44.5	73	1998	3	1990	634	0	0	0	11	0
All	74.5	50.1	62.3	112	1998	3	1990	2930	1936	89	0	35	0

Another location that is on a gently sloping plain is MEDA station 26 (4JA) in the southwestern part of the NTS (See Fig. 1 and Table 6). This table shows diurnal temperature ranges of about 28°F in the summer-time and 20°F in the wintertime. The absolute range of temperatures is slightly more than for Mercury at 109°F. Both stations are at about the same elevation (~3750 feet msl). The wintertime and summertime maximum temperatures at these locations are similar.

The heating and cooling degree days are more disproportionate than at Mercury with heating outweighing cooling by about three to two. This difference is mainly due to lighter night-time winds at 4JA. The number of warm days is similar to Mercury with an average of 89 being greater than or equal to 90°F. The number of freezing temperatures is nearly double those for Mercury at an average of 35 days per year.

The extreme Southwest section of the NTS has the lowest elevations. Temperature summaries for the station located at the southwest entrance to the NTS (Fig. 1) are tabulated in Table 7. This station (LTH), near Lathrop Wells, NV, is at 2758 feet msl. The temperatures at this location are influenced by a gentle north-south slope in the area, which contributes to night-time drainage winds.

The temperatures at this location show daily ranges of about 30°F in the Summer and about 24°F in the Winter. The absolute range is from 2°F to 114°F, a total range of 112°F. This absolute range is more than Mercury but less than those in the basins, with the daily ranges being similar to those at 4JA, farther to the North. The elevation difference accounts for the slightly higher (about 4°F) maximum temperatures in the Summer compared to those at Mercury and 4JA.

The heating and cooling degree days at this station are almost equal with heating only slightly greater. The number of warm days is substantial with 115 having maximum temperatures greater or equal to 90°F annually. The number of days with freezing temperatures is 39 on average for a year.

1.3. Elevated Stations

The highest meteorological stations on the NTS are located on the mesas in the northern sections of the NTS (Fig. 1). Two locations on the Mesas have long periods of record of temperatures. MEDA station 20 (PM1) is located in the northwest corner of the NTS (Pahute Mesa) at 6515 feet msl. The area is relatively flat in the vicinity of the station. The temperature summary is listed in Table 8.

This elevated location exhibits considerably cooler temperatures compared to the lower sections of the NTS. The average maximum temperatures in the summer are about 17°F

Table 7: Lathrop Gate (LTH), Temperature Climatology (F); (Lat: 36.67N Lon 116.40W; Elev: 2758 ft); Years: 1983 to 2000

Mon	Ave Max	Ave Min	Ave	Extreme High	Yr	Extreme Low	Yr	Degree Days Heat	Degree Days Cool	Maximum GE 90	Maximum LE 32	Minimum LE 32	Minimum LE 0
01	57.1	33.8	45.5	75	1986	13	1991	595	0	0	0	13	0
02	61.6	37.6	49.6	85	1986	8	1989	430	1	0	0	6	0
03	67.8	42.4	55.1	88	1986	23	1997	312	5	0	0	2	0
04	75.6	47.6	61.6	97	1996	27	1999	154	53	2	0	0	0
05	84.7	55.6	70.1	105	1983	32	1988	41	199	9	0	0	0
06	94.0	63.6	78.8	110	1985	38	1995	5	417	22	0	0	0
07	100.5	70.7	85.6	114	1998	47	1993	0	636	30	0	0	0
08	98.3	70.1	84.2	111	1998	47	1987	0	583	28	0	0	0
09	90.8	63.0	76.9	107	1996	40	1987	4	358	19	0	0	0
10	79.9	52.1	66.0	100	1996	14	1992	84	115	5	0	0	0
11	65.8	39.8	52.8	86	1997	9	1985	366	2	0	0	5	0
12	57.3	33.1	45.2	75	1998	2	1990	611	0	0	0	13	0
All	77.8	50.8	64.3	114	1998	2	1990	2606	2374	115	0	39	0

Table 8: Pahute Mesa (PM1); Temperature Climatology (F); (Lat: 37.26N Lon: 116.44W Elev = 6515 ft);Years = 1983 to 2000

Mon	Ave Max	Ave Min	Ave	Extreme High	Yr	Extreme Low	Yr	Degree Days Heat	Degree Days Cool	Maximum GE 90	Maximum LE 32	Minimum LE 32	Minimum LE 0
01	41.1	25.5	33.3	64	1990	-1	1997	968	0	0	5	24	0
02	44.4	27.4	35.9	68	1986	-5	1989	806	0	0	3	19	0
03	50.7	31.7	41.2	73	1997	11	1990	727	0	0	1	16	0
04	58.3	36.4	47.4	80	1989	13	1999	528	0	0	0	10	0
05	67.1	44.2	55.7	87	2000	23	1988	300	15	0	0	3	0
06	77.1	53.6	65.4	94	1994	29	1995	96	107	1	0	0	0
07	84.2	61.3	72.8	98	1998	40	1997	8	248	5	0	0	0
08	82.2	60.8	71.5	95	1993	40	1987	12	208	3	0	0	0
09	74.6	52.7	63.6	91	1996	21	1987	110	69	0	0	1	0
10	63.8	43.3	53.5	84	1996	17	1984	358	7	0	0	4	0
11	50.0	31.4	40.7	72	1988	6	1985	719	0	0	1	16	0
12	41.9	25.2	33.5	66	1995	-8	1990	975	0	0	5	25	0
All	61.3	41.1	51.2	98	1998	-8	1990	5613	657	9	15	118	0

lower than at W5B in Frenchman Flat. Again, elevation accounts for the difference, which should be about 18°F for a location 3400 feet higher. The absolute temperature range is only 106°F, which is less than in the basins, but similar to Mercury and 4JA.

The heating degree days completely dominate at this location being about nine times as great as the cooling degree days annually.

Warm days are very limited on Pahute Mesa with only an average of nine days a year being 90°F or greater. On average a total of 118 days have freezing temperatures, and additionally an average of 15 days have maximums less than or equal to 32°F ("ice" days).

The highest instrumented location on the NTS is MEDA 12 (A12), on Rainier Mesa, located in the north-central part of the NTS at 7490 feet msl (Fig. 1). The temperature summary for this location is documented in Table 9.

Table 9: Rainier Mesa (A12); Temperature Climatology (F); (Lat:37.19N Lon: 116.22W Elev = 7490 ft); Years = 1983 to 2000

										Maximum		Minimum	
	Ave	Ave		Extreme		Extreme		Degree Days		GE	LE	LE	LE
Mon	Max	Min	Ave	High	Yr	Low	Yr	Heat	Cool	90	32	32	0
01	38.2	24.5	31.4	59	1990	-3	1987	865	0	0	6	21	0
02	40.4	25.6	33.0	63	1986	-11	1989	764	0	0	5	18	0
03	45.4	28.5	37.0	66	1999	6	1989	706	0	0	2	17	0
04	54.8	35.1	45.0	79	1990	12	1999	485	0	0	0	9	0
05	62.9	42.4	52.7	83	1984	19	1988	345	6	0	0	5	0
06	72.4	51.5	61.9	90	1985	27	1995	140	52	0	0	1	0
07	79.4	58.7	69.1	93	1989	38	1994	22	138	1	0	0	0
08	76.9	57.9	67.4	90	1993	36	1994	33	100	0	0	0	0
09	69.7	50.9	60.3	86	1996	24	1994	160	29	0	0	1	0
10	59.0	41.4	50.2	78	1996	14	1996	433	1	0	0	5	0
11	45.8	29.9	37.9	67	1999	4	1985	783	0	0	3	16	0
12	38.9	24.6	31.8	63	1998	-4	1990	906	0	0	7	22	0
All	57.0	39.3	48.1	93	1989	-11	1989	5647	330	1	23	115	0

This location shows distinctly lower overall average temperatures than most other locations on the NTS. The absolute range in temperatures is 104°F, which is similar to PM1 on Pahute Mesa. The average maximum temperature in summer is about 22°F lower than at W5B in Frenchman Flat. The minimum temperatures are slightly lower in the summer and nearly the same as W5B in the winter. The diurnal temperature ranges are about 20°F in the summer and 14°F in winter. These diurnal temperature ranges are the smallest on the NTS. This fact is probably due to the open woodland environment on Rainier Mesa and the station being on the highest terrain on the NTS, which combines to limit night-time cooling.

The heating degree days are very predominate on Rainier Mesa being about seventeen times as great as the cooling degree days.

The number of days with a maximum temperature of 90°F or greater is only one per year on average. The average number of days with freezing temperatures is 115 per year, with 23 days having maximum temperatures less than or equal to 32°F.

2. Summary of Surface Temperature Climatology

The NTS exhibits a fairly large range of temperatures from winter to summer, and distinct daily differences in temperatures due to large elevation changes that approach 5000 feet from the lowest to highest locations. The most extreme ranges of temperature occur in the lower basins on the NTS in Yucca Flat and Frenchman Flat. The average summertime maximum temperatures range from above 100°F to slightly below 80°F. The average summertime minimums range from near 75°F to about 60°F. The average wintertime maximum temperatures range from near 58°F to 38°F and the wintertime minimums range from about 37°F to 22°F.
The maximum temperatures in the winter are more uniform at the lower elevations than in the summer. The minimum temperatures at the lower elevations in winter show the effects of the basins with about 15°F difference between Mercury and Yucca and Frenchman Flats.

The average annual temperatures on the NTS range from about 64°F at Lathrop Gate to 48°F at Rainier Mesa.

The heating degree days at the NTS exceed the cooling degree days at all locations. Most places on the NTS have significantly greater heating than cooling requirements on an annual basis.

B. NTS Temperature Trends

The temperatures at the NTS show a general upward trend for the years 1983 through 2002. This time period was chosen due to fairly complete coverage of the NTS by permanently located MEDA stations and Desert Rock. The MEDA stations chosen are 1, 2, 5, 6, 9, 12, 14, 17, 18, 20, 25, and 26. These stations include five in Yucca Flat (1, 2, 6, 9, 17), two on the Mesas (12, 20), two in the central NTS (14, 18), one in Frenchman Flat (5), and two in Jackass Flats (25, 26). Desert Rock covers the extreme southeast portion of the NTS.

The annual maximum temperature trend for all stations averaged almost +4°F for the 20-year period. In contrast, the annual minimum temperature trend for all stations is nearly +1°F, and the average temperature trend is slightly more than +2°F. Individual locations show considerable variation from the average trends. MEDA 6 (UCC) has a trend of +2.8°F for the maximum temperature, -2.0°F for the minimum temperature, and +0.5°F for the average temperature over the 20-year period. Another station in Yucca Flat, MEDA 17 (BJY), showed a solid upward trend of +4.9°F for the maximum temperatures. BJY showed almost no trend for the minimum temperatures (-0.1°F) and a trend of +2.4°F for the average temperature. Other stations in Yucca Flat showed upward trends in the maximum temperatures ranging from +5.0°F for MEDA 1, +5.4°F for MEDA 9, and +6.8°F for MEDA 2. The minimum temperature trends for these locations ranged from +1.5°F for MEDA 2, to +1.8°F for MEDA's 1 and 9. The average temperature trends for these three locations ranged from +3.5°F for MEDA's 1 and 9 to +4.1°F for MEDA 2.

Other locations on the NTS show general upward temperature trends with the maximums always larger than the minimums. MEDA 5 (Well-5B) in Frenchman Flat showed a maximum temperature trend of +4.7°F, a minimum temperature trend of +0.2°F, and an average temperature trend of +2.4°F. Desert Rock showed a maximum temperature trend of +2.6°F, a minimum temperature trend of +1.4°F, and an average temperature trend of +2.1°F. The Mesa locations (12, 20) show upward maximum temperature trends of +2.6°F and +3.2°F respectively. The minimum temperature trends for 12, 20 were +1.4°F and +1.8°F, with average temperature trends of +2.1°F and +2.4°F.

The MEDA stations centrally located on the NTS, MEDAs 14, 18, showed different temperature trends from each other. MEDA 18 was the most different from the other locations on the NTS with a maximum temperature trend +0.7°F, a minimum temperature trend of -1.3°F, and an average temperature trend of +0.2°F. MEDA 14 showed a maximum temperature trend +3.5°F, a minimum temperature trend of +3.3°F, and an average temperature trend of +3.4°F.

The MEDA stations in Jackass Flats (25, 26 in southwest NTS) showed upward trends in the maximum temperatures of +2.9°F and +4.8°F, minimum temperature trends of +0.2°F and +1.8°F, and average temperature trends of +1.5°F and +3.3°F.

There are fairly large differences in the temperature trends for these locations on the NTS. All locations indicate positive trends for the maximum temperatures, but almost half of the locations exhibit near neutral or negative trends for the minimum temperatures. The temperature trends for the averages are all positive with 2 locations (6, 18) showing only slight upward trends (+0.5°F, +0.2°F).

1. Summary of Temperature Trends

For the period 1983 through 2002, mean annual temperatures at selected locations show general upward trends on the NTS. The most pronounced trends have occurred with the maximum temperatures with one location showing nearly +7°F for the period. The overall average trend for the maximum temperatures was almost 4°F for all locations. The minimum temperatures did not exhibit as much of an upward trend with the average being about +1F with a range from -2°F to +3.3°F. The overall average temperature trend for the NTS was slightly more than +2°F with range from +0.2°F to +4.1°F.

Another facet of studying the temperature trends on the NTS is that the strong "El Nino" years

(1983, 1998) showed generally lower average temperatures for all locations. The maximum temperatures showed the larger departures from average with the minimums being near neutral or below average. These departures from normal are probably due to increased cloudiness and precipitation during strong "El Nino" years.

C. Temperatures Aloft

Temperatures aloft at the NTS have been measured at two locations. The first location, pictured in Fig. 4, was at the Yucca Flat Weather Station (UCC) starting in 1962 through May 15, 1978. The temperatures aloft were measured once a day starting in 1962 at 1200Z utilizing a standard radiosonde observation. Twice daily temperatures aloft were commenced in 1967 with the 0000Z radiosonde observation added. The current location is Desert Rock (DRA, Fig. 5). The Desert Rock Observatory was started on May 15, 1978, in conjunction with the closing of the Yucca Flat Weather Observatory.

The radiosonde observations at Yucca Flat and Desert Rock typically ran to about 15 millibars (mb), which is about 93,000-feet msl. Occasionally the runs got as high as 3 mb or about 130,000-feet msl.

The standard atmospheric pressure levels are the surface, 925 mb, 850 mb, 700 mb, 500 mb, 400 mb, 300 mb, 250 mb, 200 mb, 150 mb, and 100 mb for the first radiosonde message. Additionally significant levels, which are determined by the atmospheric conditions, are reported at intermediate levels in between the standard levels. These levels are reported in the second radiosonde message. Also included in the significant-level message are wind directions and speeds at specific 1000-foot msl levels.

The atmospheric conditions at the NTS reflect the high desert environment. The morning sounding at 1200Z (0400 or 0500 LT) typically shows very stable conditions with a pronounced near-surface temperature inversion present. The afternoon sounding at 0000Z (1600 or 1700 LT) usually exhibits unstable conditions with vertical mixing of the atmosphere being present in all months except December, which generally has neutral conditions.

Tables 10 and 11 summarize the temperatures at the standard pressure levels for the lower parts of the atmosphere (Troposphere). These tables also show the seasonal changes in the lower atmosphere at the NTS. As would be expected, the largest seasonal increases occur in the lower three levels (sfc, 850, 700) with the highest levels (150, 100) changing in reverse from the lower levels with decreases in temperature from winter to summer. The surface temperature changes about 20°C in the morning from winter to summer, but changes about 26°C from winter to summer in the afternoon, reflecting the dramatically greater heating in the summer during the day. The highest levels show a decrease in temperature of about 4 to 5°C from winter to summer with no difference between the morning and afternoon.

As would be expected, the morning and afternoon soundings again show the large diurnal changes in the lowest levels of the atmosphere, with seasonal differences at the surface level ranging from 12°C in winter to 18°C in summer. At 850 mb the winter change is 3°C from morning to afternoon and 6°C from morning to afternoon in summer. The diurnal change at 700 mb is 1°C in winter and 2°C in summer. The higher levels exhibit changes of 1°C or less in winter and in summer.

Originally, upper-air soundings were taken at the Yucca Flat Meteorological Observatory (UCC, Fig. 4) until May 15, 1978. Then the observatory was moved to Desert Rock (DRA, Fig. 5), where upper-air observations have been colleted twice daily since May 16, 1978.

Table 10: Yucca Flat (Radiosonde Obs), 0000Z Temperatures (°C)

	January			April			July			October		
	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Lvl												
Sfc	9	22	-5	18	29	1	35	42	99	22	32	99
850	6	18	-8	9	25	-1	30	37	99	18	28	2
700	-2	10	-19	-1	9	-12	14	20	8	4	11	-14
500	-19	-8	-34	-19	-11	-34	-7	-2	-12	-13	-5	-33
400	-31	-21	-45	-31	-21	-44	-19	-15	-25	-25	-16	-41
300	-46	-38	-55	-45	-37	-52	-34	-29	-41	-40	-33	-50
200	-58	-42	-68	-57	-43	-67	-53	-46	-59	-56	-43	-64
150	-58	-47	-75	-56	-45	-73	-63	-54	-68	-60	-48	-70
100	-62	-50	-76	-59	-50	-68	-66	-58	-73	-65	-54	-75

Table 11: Yucca Flat (Radiosonde Obs); 1200Z Temperatures (°C)

1200 Z

	January			April			July			October		
	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min
Lvl												
Sfc	-3	12	-21	4	18	-9	17	28	99	6	19	-10
850	3	14	-12	9	19	-2	24	31	99	14	23	-4
700	-3	10	-18	-2	8	-14	12	23	99	4	13	-15
500	-19	-8	-37	-20	-10	-34	-8	-2	-13	-13	-5	-34
400	-31	-21	-44	-32	-21	-47	-20	-15	-25	-25	-18	-42
300	-46	-37	-55	-46	-37	-56	-35	-30	-42	-41	-30	-48
200	-59	-44	-69	-58	-43	-67	-54	-47	-62	-56	-42	-64
150	-59	-48	-77	-57	-43	-73	-64	-54	-69	-62	-49	-72
100	-63	-51	-78	-60	-52	-71	-67	-60	-75	-66	-54	-78

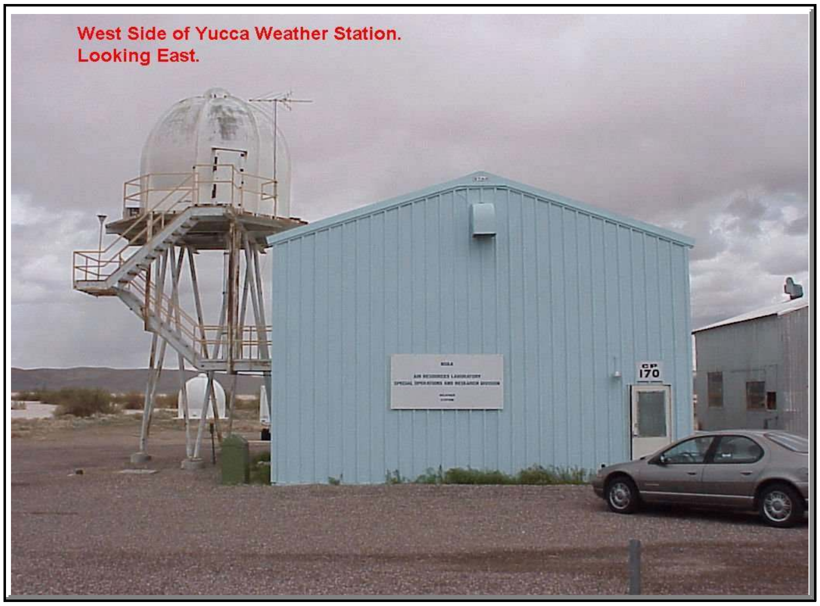

Figure 4. Yucca Flat Weather Observatory

Figure 5. Desert Rock Weather Observatory

III. WIND

A. Surface

1. Average Winds

The winds on the NTS exhibit strong diurnal effects near the surface during all seasons of the year. The nighttime winds are generally from the North on the lower elevations in all seasons. These nocturnal winds ("drainage winds") are only disturbed by the presence of extensive lower clouds or very strong winds aloft. The daytime winds are generally from the South during the warm seasons and from the North during the cool seasons. The basin in Frenchman Flat has mostly light and variable winds at night in all seasons. The Yucca Flat basin has the most pronounced nighttime drainage winds during all seasons.

The average wind speeds for locations on the NTS are effected by the local nighttime wind patterns. The average winds in Frenchman Flat are generally slower than the average winds in Yucca Flat or Jackass Flats. The average winds on the mesas are slightly faster due to less nighttime localized effects. The following table shows the average wind speeds for several locations on the NTS.

Table 12. Average Wind Speeds for Locations on the NTS (by Month in knots)

Month	W5B	UCC	A18	MCY	4JA	MVY	BJY	LTH	PM1	A12	YMR	A27
01	4.3	5.2	5.9	6.6	6.9	6.3	6.7	7.1	9.2	9.8	8.2	10.1
02	5.1	5.8	6.5	7.1	7.5	7.3	7.4	7.7	9.7	9.2	9.5	10.4
03	6.1	6.5	7.4	7.6	7.5	7.9	7.9	8.2	9.9	10.4	10.2	11.5
04	6.5	6.8	7.7	8.2	7.7	8.2	8.6	8.7	10.0	11.2	11.1	11.9
05	6.9	6.9	7.7	8.5	7.7	8.4	8.5	8.5	9.8	10.7	11.0	12.7
06	6.7	6.7	7.7	7.8	7.5	8.4	8.3	8.5	9.5	10.1	10.4	13.0
07	6.4	6.5	7.4	7.8	7.2	7.9	7.8	8.3	9.2	9.4	9.6	11.6
08	5.8	5.8	6.9	7.1	7.0	7.6	7.3	8.0	9.1	9.4	9.7	11.3
09	5.2	5.3	6.2	7.1	7.1	7.1	7.1	7.9	8.7	9.4	9.0	10.4
10	4.5	4.9	6.0	6.7	6.9	7.0	6.8	7.5	8.5	9.4	8.6	10.5
11	4.7	5.2	5.9	6.7	7.1	7.1	6.9	7.4	9.5	10.9	8.4	11.3
12	4.3	5.0	6.0	6.7	6.8	6.6	6.8	7.1	9.3	10.7	8.4	10.7

The two basin locations, W5B, UCC, have the lightest overall wind speeds. Both of these locations are nearby to dry lakes, which produce pooling of cool air at night, and consequently light winds. The A18 location is on relatively flat terrain with higher terrain surrounding it in all directions except south - these terrain features contribute to light nighttime winds. MCY and 4JA are locations on sloping terrain, which gives them higher nighttime wind speeds, and consequently higher average wind speeds. MVY (Mid Valley, Area 14) is in a relatively narrow valley on the NTS with much higher terrain to the west, which contributes to both the daytime and nighttime winds producing winds comparable to MCY. BJY is in the middle of Yucca Flat and experiences pronounced nighttime drainage winds, which increase the overall average wind speeds. LTH is on the south end of Jackass Flats and is in open terrain with no nearby mountains having an influence on the winds. The terrain is sloping which contributes to nighttime drainage winds and higher average winds than at more sheltered locations, or the basin locations on the NTS. PM1 and A12 are on the mesas, and are more exposed to the large scale winds that occur over the NTS. Neither mesa location is situated such that nighttime drainage winds are prevalent, consequently the nighttime wind speeds are significantly higher at these locations, giving overall higher averages. YMR and A27 are located on Yucca Mountain ridge top and on a hill in Area 27 on the NTS respectively. These two locations have no nighttime drainage effects and are strongly influenced by the winds aloft and their surrounding terrain. A27 exhibits the classic wind speed maximums observed on hill tops, having the greatest average wind speeds of all of the MEDA stations.

2. Extreme Winds

The NTS experiences high winds at times, mostly in the spring with strong cold fronts passing or associated with thunderstorms. Other occurrences of high winds can occur in the winter with high pressure over the Great Basin. These strong winds generally occur during daylight hours, although strong winds can occur at night too.

Most locations on the NTS have had wind gusts in excess of 60 mph during the last 40 years of observations taken at the NTS. Peak wind gusts as high as 84 mph were recorded at Mercury on April 15, 2002, with average wind speeds of 45 to 50 mph. Other locations on the NTS had higher average wind speeds during this event (50-55 mph), but did not have peak gusts as high (70-75 mph), except for a mountain location in Area 6 (Monastery) which had a peak gust of 92 mph. Summertime peak wind gusts are associated with thunderstorms and have been recorded as high as 50 to 60 mph.

3. Summary of Surface Winds

The surface winds on the NTS exhibit strong diurnal characteristics with pronounced nighttime drainage winds prevalent in the basins and slopes. Daytime heating during most seasons, except winter, helps to produce up-slope winds. These up-slope winds are mostly from south to north on the NTS. The nighttime drainage winds are generally from the north. The average annual wind speeds range from about 6 mph in Frenchman Flat, 9 mph in Yucca Flat, 11 mph on the mesas, to 13 mph in Area 27. The lightest average winds occur during fall on the NTS. The strongest average winds occur during spring.

The highest winds on the NTS occur mainly in spring with the passage of cold fronts. These high winds can be limiting to outdoor activities with occasional average speeds to 50 mph with gusts over 70 mph. Exposed higher elevations may experience higher average wind speeds and gusts than most locations on the NTS. Shoshone Mountain, in a central location of the NTS, has an average annual wind speed near 20 mph - much higher average speeds and gusts can be expected at this location compared to most of the NTS.

The NTS is situated in a desert region and exhibits classical diurnal wind regimes that are a product of the climate. Deserts tend to be breezy places and the NTS fits this pattern.

4. Wind Roses

The following graphics (Figures 6-11) depict wind roses for several location on the NTS. The first location (Figure 6) is BJY in central Yucca Flat. The monthly wind roses chosen are for January, April, July, and October, which are examples of the four seasons.

These wind roses portray the pronounced diurnal winds present at BJY in all seasons. The north quadrant depicts the nighttime drainage winds and some of the cool season daytime winds. The daytime up slope south winds are shown by the July wind rose, which occur in the warm season. Fall and winter do not exhibit much of the up slope effect as shown by the January and October wind roses. These wind roses show that east or west winds are unusual at BJY. Calm winds occur only about 1% of the time.

The next location shown (Figure 7) is in Frenchman Flat at Well-5B (W5B). These wind roses depict a different environment than at BJY. Well-5B is about one mile west of the dry lake in Frenchman Flat. The nearby surrounding terrain has little or no slope to it.

These wind roses show that the basin location of W5B greatly influences the frequencies of wind directions. The nighttime winds do not have any consistent direction and the speeds are very light. The wintertime winds show almost no direction preference and are mostly 5 knots or less. The spring and summer wind roses show the same nighttime wind regime but the daytime winds are well pronounced with a persistent southwest direction. The fall wind rose shows mostly light and variable winds except for a small amount of afternoon southwest winds (about 20% of the time). Calm winds occur about 2% of the time at W5B.

The next location (Figure 8) for wind roses is at Mercury (MCY). Mercury is on a pronounced southwest to northeast slope that influences the wind directions both at night and in the daytime.

These wind roses show the strong diurnal nature of the winds at MCY. The nocturnal winds are from the northeast in all seasons. The wintertime winds, as shown by the January wind rose, are almost all from the northeast. A small amount of the winds come from the southwest in winter.

Spring and summer wind directions are fairly evenly distributed between NE and SW. The daytime winds in spring and summer are considerably stronger than the nighttime winds. The winds in autumn are similar to winter, but have somewhat more SW directions in the daytime. Calm winds are extremely rare at Mercury.

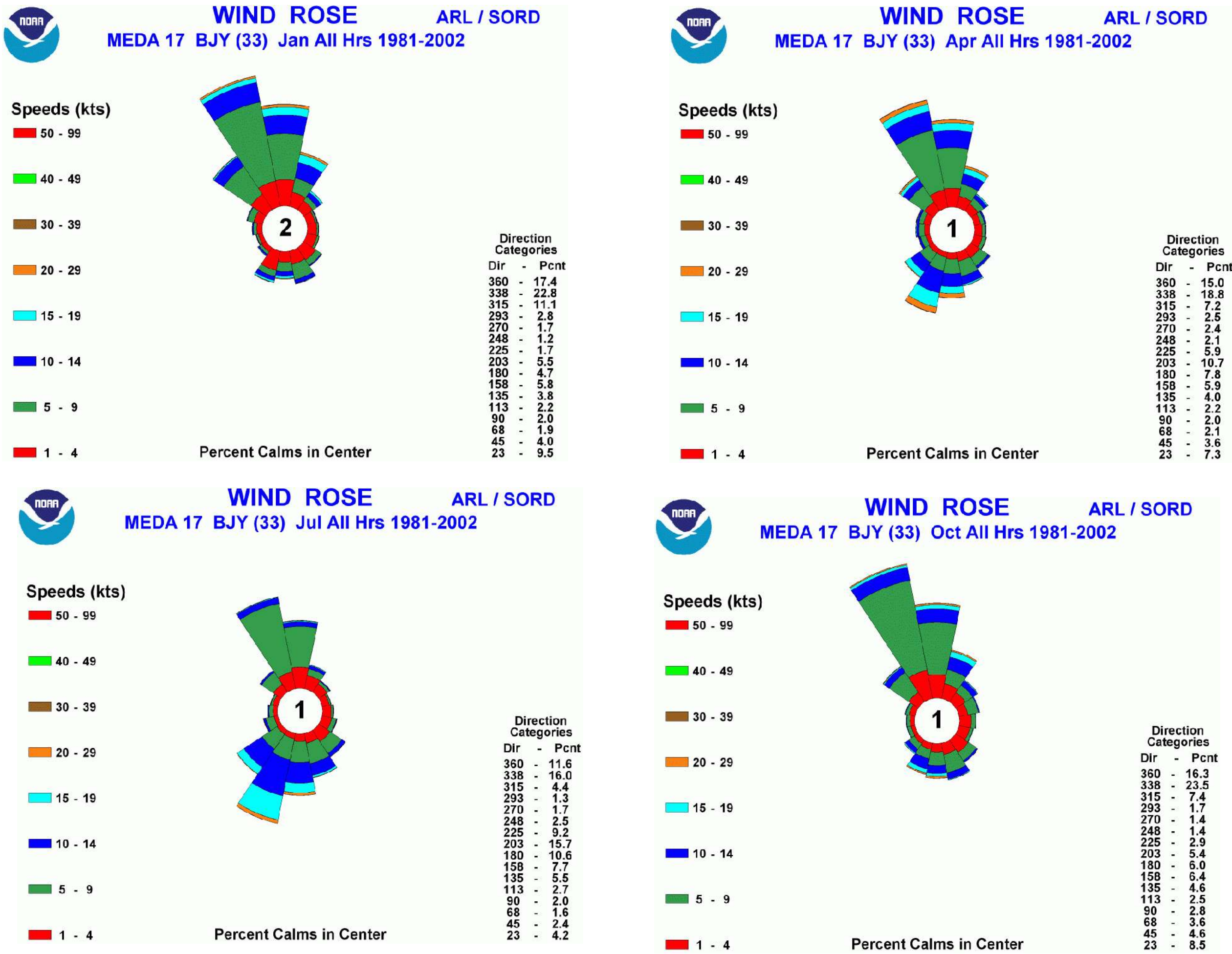

Figure 6. **Seasonal Wind Roses for MEDA 17 (BJY).**

The next location (Figure 9) for wind roses is Rainier Mesa (A12). This highest location on the NTS is not heavily influenced by local terrain. It does not have any pronounced nighttime regime. The wind roses show that the winds are from the NNE-NE the majority of the time. The summer season has about an equal amount of winds from the southwest. As mentioned above, the nighttime winds are almost always from the NNE, and the daytime winds are somewhat seasonal with mostly south to southwest in the summer. The spring shows slightly less south winds in the daytime and is influenced more by frontal passages. The winter winds are mostly north to northeast both day and night. Fall winds show the nighttime north to northeast winds and a mixture of wind directions in the daytime between south and mostly northeast. Calms are infrequent at A12.

The southwest area of the NTS is represented by MEDA 26 (4JA). This location (Figure 11) is on a gentle slope from the northeast to southwest. The local terrain influences both the daytime and nighttime winds.

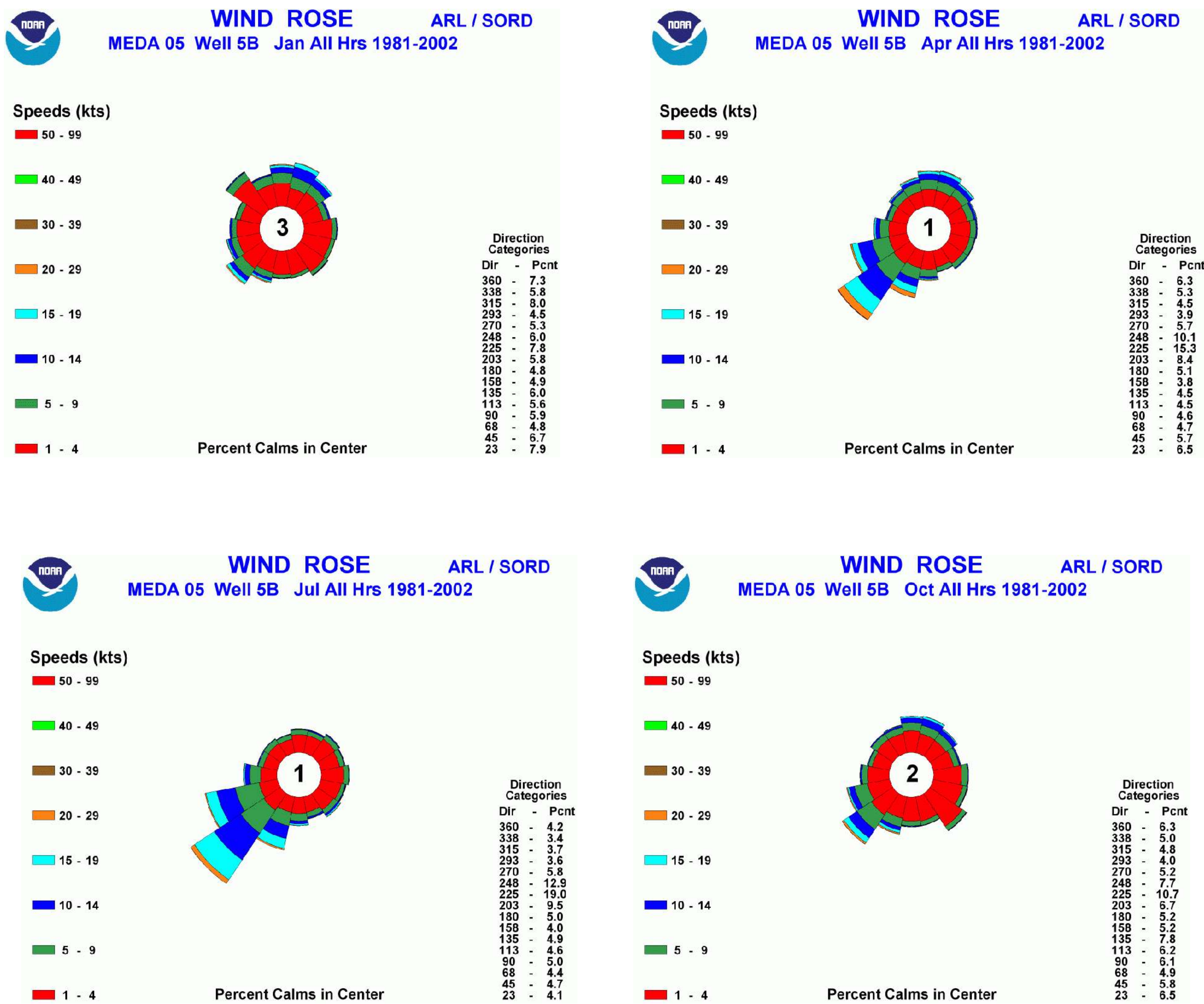

Figure 7. Seasonal Wind Roses For MEDA 5 (Well 5B).

These wind roses show the local terrain effects with the nighttime winds from the northeast through east. The winter nighttime winds are slightly more from the east with spring and summer from the northeast. Fall nighttime winds are similar to those in the winter. Daytime winds are also mostly from the northeast in winter with occasional south to southwest. Fall daytime winds are similar to winter. Spring daytime winds are mostly from the south to southwest with a few northeast. Summer daytime winds are almost all from the south to southwest. Calm winds are unusual at 4JA.

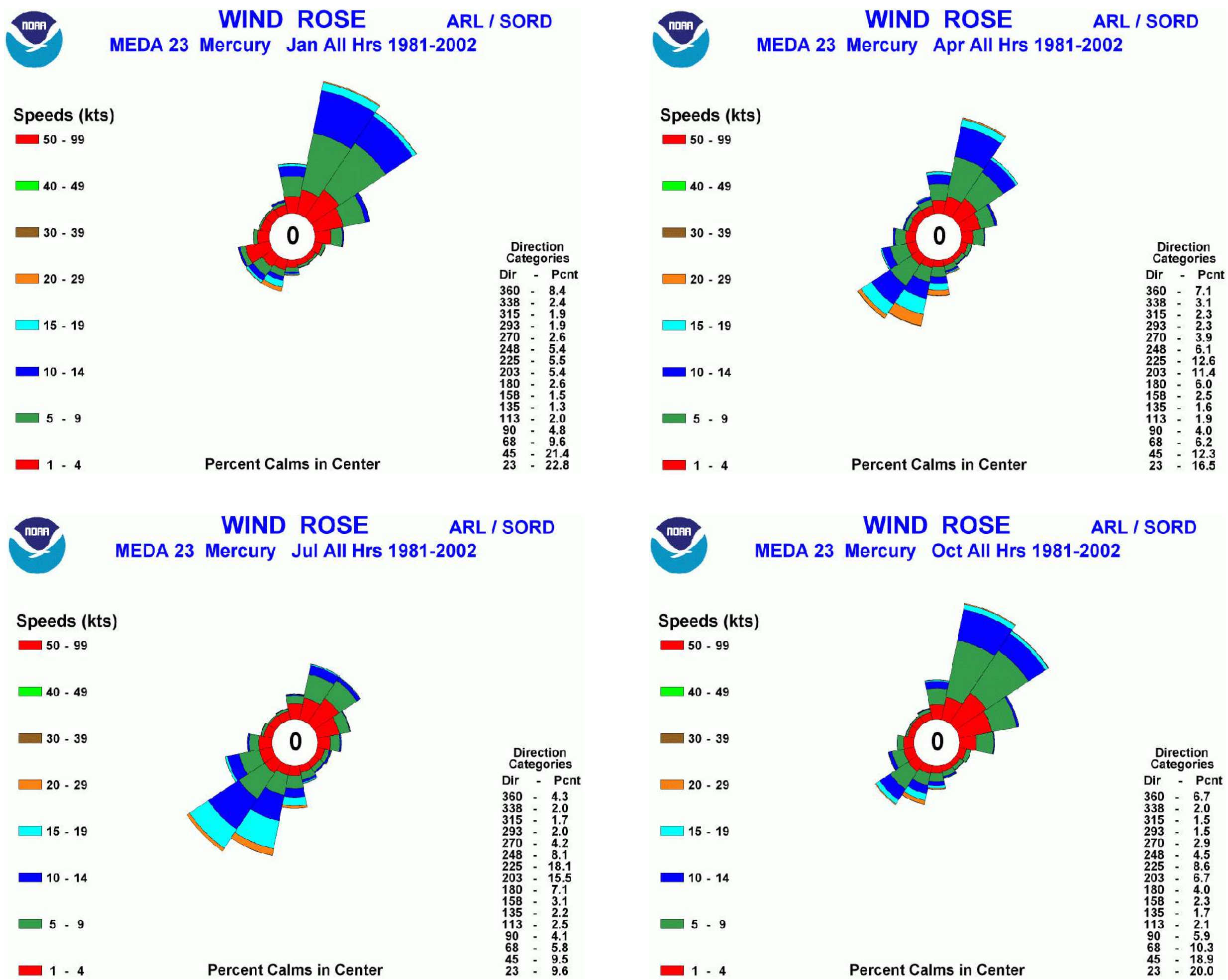

Figure 8. Seasonal Wind Roses for MEDA 23 (Mercury).

5. Summary of Wind Roses

The wind roses on the NTS exhibit pronounced differences between day and night for most locations. Exceptions to this dichotomy are the Mesa locations, which tend to depict more of the general wind flow than localized effects. In the winter the predominate wind direction is from the north with some up slope at lower elevations in the afternoon. Spring winds are effected by changing weather patterns in the daytime, and the nighttime winds are effected mostly by local terrain. Fall winds tend to be light and are somewhat influenced by local up slope in the daytime.

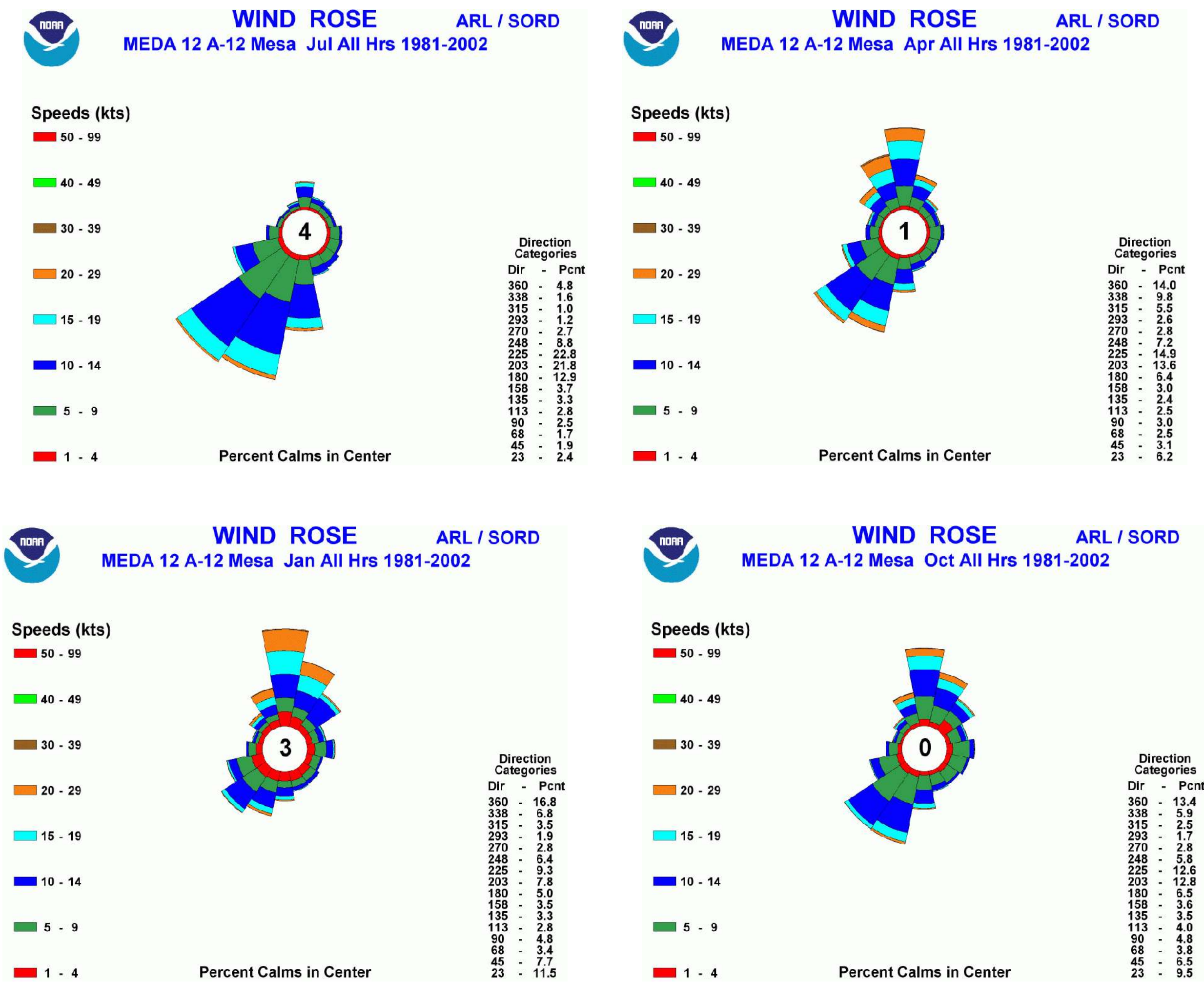

Figure 9. Seasonal wind roses for MEDA 12 (Rainier Mesa).

Nighttime winds in fall are influenced mostly by the local terrain and occasional high pressure to the northeast of the NTS. Summer winds show the nighttime local effects with drainage producing mostly north directions. Winds in the daytime during summer are from the south at all locations with some local terrain effects modifying some of the directions to produce winds that are southeast or southwest.

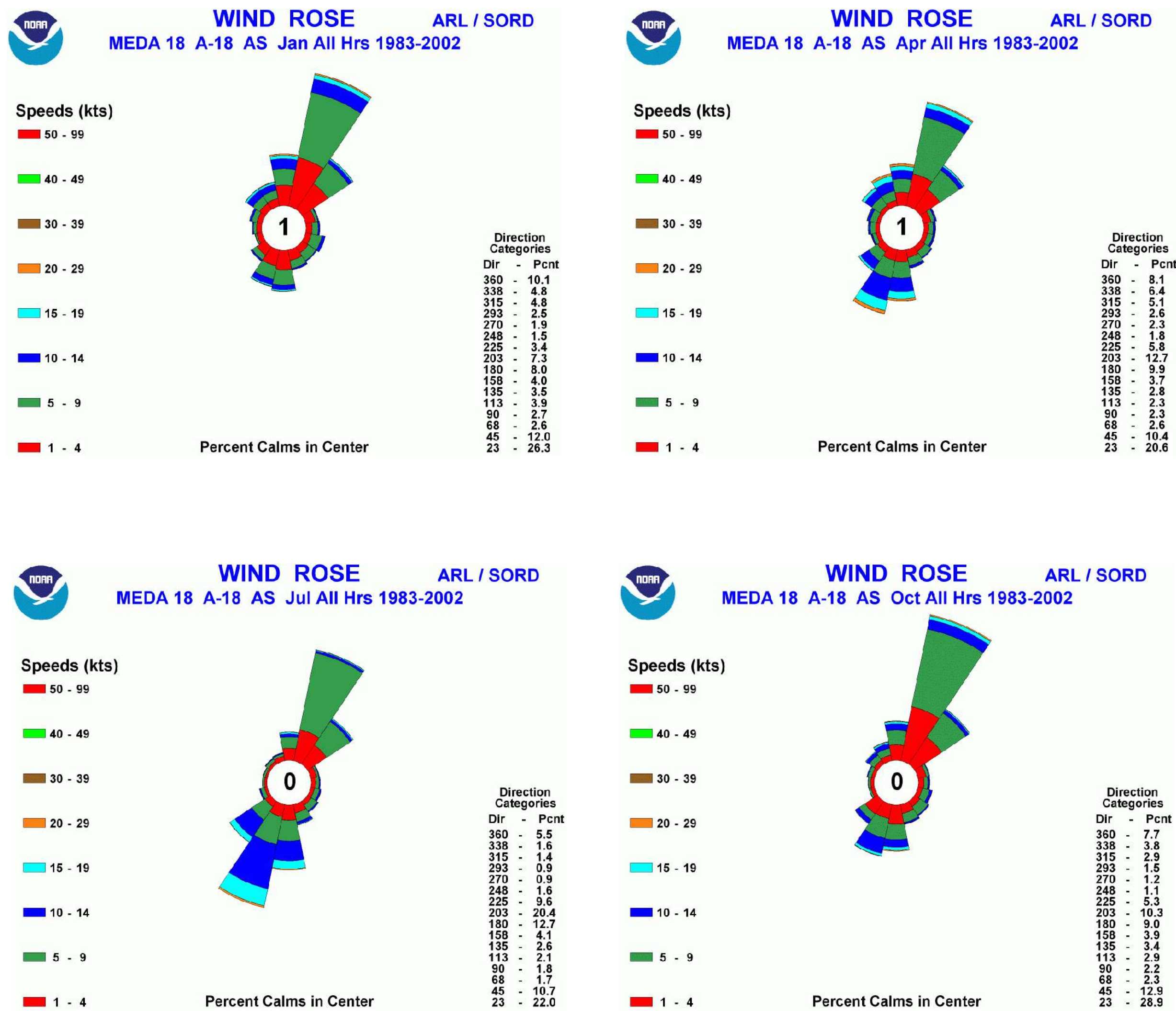

Figure 10. Seasonal Wind Roses for MEDA 18 (Area 18).

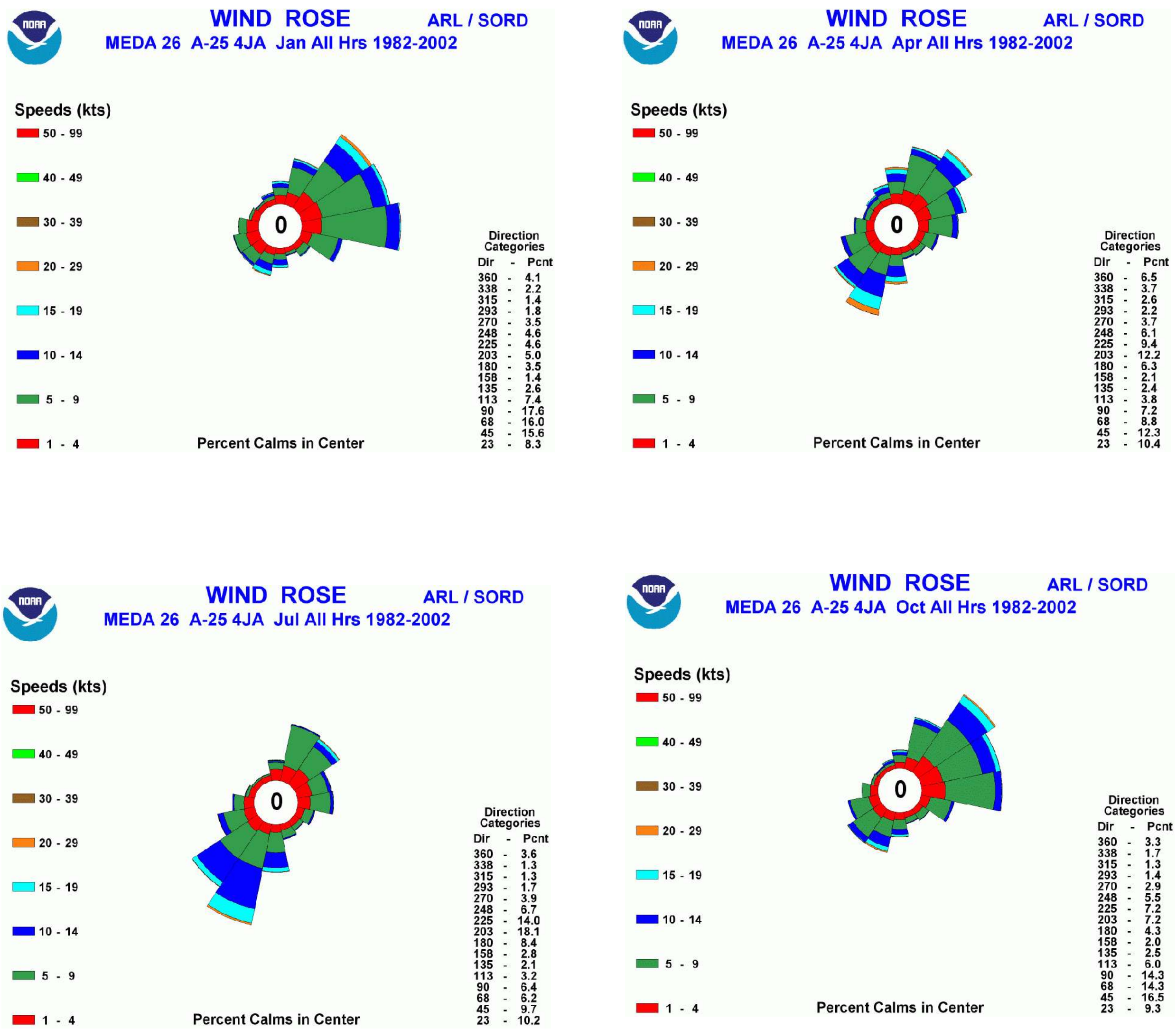

Figure 11. Seasonal Wind Roses for MEDA 26 (4JA).

B. Winds Aloft

Winds aloft have been consistently taken at two locations on the NTS. Beginning in 1962 at the Yucca Flat Weather Observatory (UCC) with 12Z soundings. These data were from the radiosonde releases that were collected daily. The 00Z radiosonde observations were started at UCC in 1967. The UCC office was closed on May 15, 1978, and the Desert Rock Observatory (DRA) opened on that date. Desert Rock has taken twice daily radiosonde observations from its opening until present.

The winds aloft are normally reported at 1000-foot levels (MSL) starting at the surface elevation and, normally rising to approximately 100,000 feet MSL. The intervals are every 1000 feet from the surface through 10,000 feet. Then every 2000 feet through 20,000 feet. The levels above 20,000 feet (20K ft) MSL are approximately at the standard pressure levels (400mb, 300mb, 250mb, 200mb,etc). The levels are 23K, 30K, 35K, 40K, 45K, 50K, 60K, 70K, 80K, 90K, 100K feet.

1. Yucca Flat

The surface winds at UCC are strongly influenced by the location of the weather station next to Yucca Dry Lake. These influences are localized and relatively shallow with strong nighttime inversions separating these winds from those at the first level above (5K feet) during the warmer seasons. Daytime mixing during most of the year lines up the winds at the surface more with those aloft. Table 13 shows the average wind directions and speeds for selected levels aloft. Sixteen point compass directions are used with speeds in knots (kt).

As can be seen from Table 13, the winds just above the surface at 5K feet are strongly influenced by the near surface conditions. The winds are from the southwest in the afternoon in all seasons. The morning winds are from the north in all seasons except summer, which has light southwesterly winds (**SW: letter system to be used henceforth to identify wind directions**). The wind speeds in the afternoon are generally higher than the morning speeds, except winter, which has equal speeds. The range of wind speeds is from 7 kt in the summer morning to 15 kt in the spring afternoon.

The next level, 7K feet, shows westerly winds in the winter in the afternoon and NW winds in the morning. Spring, summer, and fall show mostly SW and SSW winds in both the morning and afternoon. The wind speeds show little difference between morning and afternoon. The range of speeds is from 11 kt in the fall afternoon to 16 kt in the spring morning.

From 10K feet and up through 60K feet the winds in winter are from the WNW in both the morning and afternoon. The speeds range from 19 kt at 10K feet to 58 kt at 40K feet. The spring winds are mostly from the W and a few WSW for both the morning and afternoon. The speeds range from 16 kt at 10K feet to 54 kt at 40K feet. The summer winds are all SSW to SW from 10K to 50K. From 60K to 100K the summer winds are E.

Table 13. Yucca Flat Mean Winds Aloft

Altitude	Winter 00Z	Winter 12Z	Spring 00Z	Spring 12Z	Summer 00Z	Summer 12Z	Fall 00Z	Fall 12Z
5K Feet	SW/09	NNE/09	SW/15	NW/10	SSW/13	SW/07	SSW/11	N/09
7K Feet	W/12	NW/14	SW/15	WSW/16	SSW/13	SSW/13	SSW/11	SSW/13
10K Feet	WNW/20	WNW/19	WSW/16	WSW/17	SSW/12	SSW/12	W/14	SW/14
14K Feet	WNW/28	WNW/27	W/22	W/22	SSW/13	S/14	WNW/19	W/19
18K Feet	WNW/37	WNW/37	W/33	W/31	SW/15	SSW/16	W/26	W/26
23K Feet	WNW/46	WNW/45	W/44	W/41	SW/19	SW/21	W/34	W/33
30K Feet	WNW/56	WNW/55	W/54	W/51	SW/27	SW/30	W/45	W/42
40K Feet	WNW/58	WNW/58	W/54	W/53	SW/35	SW/40	W/48	W/46
50K Feet	WNW/45	WNW/45	W/39	W/36	SW/21	SW/24	W/35	W/33
60K Feet	WNW/22	WNW/22	WSW/17	WSW/16	ESE/09	E/11	W/14	WNW/13
80K Feet	NNW/18	NNE/19	W/10	W/12	E/26	E/25	W/12	W/11
100K Feet	**NW/32**	**NNW/34**	**W/21**	**W/26**	**E/35**	**E/37**	**W/28**	**W/25**

The summer wind speeds range from 12 kt at 10K feet to 40 kt at 40K feet. The high level E winds range from 9 kt at 60K feet to 37 kt at 100K feet.

The Fall winds from 10K to 50K are almost all W for both morning and afternoon. The speeds range from 14 kt at 10K to 48 kt at 40K. The high level winds also are from the W with speeds ranging from 11 kt at 80K to 28 kt at 100K.

2. Summary of Winds Aloft for UCC

The winds aloft over Yucca Flat show mostly westerly directions for levels well above the surface (10K and up), except for summer which exhibits mostly SSW directions. The very high level winds from 60K and up are also mostly westerly, except summer when they become easterly.

The low levels, 5K and 7K, show SW winds for most of the seasons in the afternoon, with winter being W. The morning winds at these levels exhibit seasonal differences with 5K having northerly winds in all seasons except summer. The 7K winds in the morning are only northerly in the winter, otherwise they are southerly.

Wind speeds vary from one season to the next. The speeds in winter range from 9 kt at 5K to 58 kt at 40K. The summer winds range from 7 kt at 5K to 40 kt at 40K. Spring winds vary from 10 kt at 5K to 54 kt at 40K. Fall winds range from 9 kt at 5K to 48 kt at 40K.

2. Desert Rock

Desert Rock began collecting radiosonde data in May of 1978 after the Yucca Flat Weather Office was closed. The Desert Rock location is different from the UCC location. It is located on a gentle slope (NE-SW) with nearby low mountains to the N and NE. The morning low level inversions at DRA are much less pronounced than those at UCC. Table 14 summarizes the average winds aloft at selected 1000-foot levels.

Table 14 shows that the low-level winds aloft over DRA are from the S-SW for all seasons and times of day. This fact is in contrast to UCC which exhibits winds from the N in the three cooler seasons in the morning. DRA is located such that the low mountains to the N and E may help shelter the lowest wind levels from any N component. The speeds at 5K vary from 10 kt to 14 kt from fall and winter to 14 kt in spring and summer. The speeds at 7K vary from 12 kt in Fall to 14 kt in the other seasons.

At DRA the 10K winds are very similar to those reported at UCC. The directions are mostly from the W, except summer when they are from the SSW. The speeds at DRA are almost the same as those at UCC varying from 19 kt in winter to 12 kt in summer.

The levels from 14K to 50K exhibit mostly W winds, except for summer which shows S-SW winds.

Table 14. Desert Rock Mean Winds Aloft

Altitude	Winter 00Z	Winter 12Z	Spring 00Z	Spring 12Z	Summer 00Z	Summer 12Z	Fall 00Z	Fall 12Z
5K Feet	S/10	N/10	SW/14	S/12	SSW/14	SSW/10	SSW/10	S/10
7K Feet	SSW/14	S/14	SW/14	SSW/14	SSW/14	SSW/12	SSW/12	S/12
10K Feet	WNW/19	WNW/19	WSW/16	W/16	SSW/14	SSW/12	WSW/14	WSW/14
14K Feet	WNW/25	WNW/25	W/21	W/23	SSW/14	S/14	WNW/17	W/17
18K Feet	WNW/33	WNW/33	WNW/31	W/31	SW/16	SW/17	WNW/23	W/23
23K Feet	WNW/43	WNW/43	W/41	W/41	SW/21	SW/23	WNW/31	W/31
30K Feet	WNW/50	WNW/50	W/50	W/50	SW/29	SW/31	W/41	W/39
40K Feet	WNW/52	WNW/52	W/50	W/50	SW/37	SW/39	W/43	W/43
50K Feet	WNW/41	WNW/39	W/37	W/37	SW/23	WSW/23	W/31	W/31
60K Feet	WNW/21	WNW/19	W/19	W/17	E/08	E/10	W/17	WNW/14
80K Feet	N/17	N/17	W/12	WNW/12	E/23	E/23	W/12	W/12
100K Feet	**NNW/35**	**N/37**	**W/27**	**W/25**	**E/33**	**E/37**	**W/31**	**W/29**

The speeds vary from 14 kt at 14K to 52 kt at 40K. The high level winds from 60K to 100K show more variation than the levels below them. The winter winds vary in direction from WNW to N, and the summer wind directions are E. The spring and fall winds are W. The wind speeds at the higher levels vary from 8 kt at 60K in the summer to 37 kt at 100K in both winter and summer.

3. Summary of Winds Aloft for DRA

The winds aloft over DRA are mostly westerly for the levels from 10K to 50K. The summer winds are the exception being southerly for all levels from the surface to 50K, and the high level winds from 60K to 100K are easterly during the summer.

The low level winds at 5K and 7K are southerly for all seasons in both the morning and afternoon. The speeds in the low levels vary from 10 kt to 14 kt.

The higher level winds (10K to 50K) have a much greater variation in speed with a range from 12 kt at 10K to 52 kt at 40K. The winter speeds are generally highest and the summer speeds the lowest. The highest level winds (60K to 100K) have maximums in both the winter and summer.

IV. PRECIPITATION

A. Introduction

Precipitation on the NTS has been monitored and collected for many years. The data base is not only lengthy (30 - 40 years) but is also of high density, with spatial separations of only 5 - 15 miles. The base climatological network used in this document is shown in Figure 12 which contains an array of 17 weighing gauges that have been in place for at least 35 years.

Mean annual precipitation totals on the NTS range from nearly 13 inches over the high terrain in the northwestern part of the NTS to less than 5 inches in Frenchman Flat. However, inter-annual variations can be great. For example, 9.67 inches fell in Frenchman Flat in 1998 and only 1.14 inches fell in 1989. Precipitation also varies with terrain elevation. On average, annually, only 4.8 inches of precipitation are measured at Well 5B in Area 5, elevation 3,080 ft, while an annual average of 12.82 inches occurs on Rainier Mesa, elevation 7490 ft. Annual totals of less than 1.0 inch have occurred over the lower elevations of the NTS. Daily precipitation totals can also be large and can range from 2.0 to over 3.5 inches. **The greatest daily precipitation event on the NTS was 3.63 inches, which was measured at Mercury on August 18, 1983. A storm-total precipitation amount of 3.5 inches is a 100-year, 24-hour, extreme precipitation event** (Randerson, 1997). Two to three-inch daily totals have been measured at several sites on the NTS.

B. Averages and Extremes

1. Rainfall

Average annual precipitation on the NTS is relatively small due to its location in a high desert environment (Upper Mojave). The times of the year that most precipitation falls on the NTS are winter and early spring, and summer. The wintertime precipitation is generally a mixture of rain and snow with the higher elevations experiencing mostly snow and the lower elevations rain. Occasional snow does fall on the lowest elevations of the NTS in the winter and early spring, but these events are relatively rare. The summertime precipitation on the NTS is due almost exclusively to thunderstorms. The summertime precipitation is mostly rain. Hail in the summer is relatively rare at the NTS.

Late spring and early summer are usually dry on the NTS. Occasional rain may fall due a frontal passage or early sub-tropical moisture being present. June is the driest month of the year on the NTS with most locations reporting 1/4 inch or less on average.

Fall is generally dry on the NTS. Occasionally a late-season tropical storm may come north and produce showers and thunderstorms. These events are unusual, and there may be many years between such occurrences. Late fall begins the cool season with occasional frontal passages and precipitation.

The wettest months of the year for virtually all locations on the NTS are January, February, and March. This pattern is similar to that experienced in the Southern California coastal region. The biggest difference between the southern California pattern and that on the NTS is the occurrence of a secondary maximum of precipitation in summer on the NTS.

The following table (Table 15) summarizes precipitation on the NTS. The NTS has had a network of storage rain gauges in place for 40 or more years. These rain gauges are located on the NTS covering most of the areas and terrain. A list of the stations and their i.d.'s, and elevations, are at the bottom of the table.

The Table 15 shows considerable variation of the average precipitation between different locations on the NTS. One of the major influences on the precipitation amounts is due to elevation differences. The rain gauges on the NTS vary in elevation from about 3100 feet msl to 7500 feet MSL. The lowest elevations are in the south parts of the NTS. RV (Rock Valley), DRA (Desert Rock), and W5B (Well 5B) are the lowest locations that have storage rain gauges. The elevation of W5B is about 3080 feet msl, DRA is about 3250 feet msl, and RV is near 3400 feet msl. The higher stations include PM1 (Pahute Mesa) and A12 (Rainier Mesa). Their elevations range from about 6550 feet msl to 7490 feet msl.

The average annual precipitation amounts range from 4.85 inches at W5B to 12.82 inches at A12. This variation is more than 2.6 times from the lowest to highest locations on the NTS. Elevation is not the only factor involved in determining the potential for precipitation. Some locations on the NTS get more precipitation due to the vicinity of higher terrain nearby (upwind barrier, up-slope enhancement, etc). PHS in the north end of Yucca Flat is on the south slope of much higher terrain to the north. The average annual precipitation for PHS is 7.40 inches. PM1 on Pahute Mesa in the northwest portion of the NTS only gets 7.74 inches of precipitation a year. The elevation of PM1 is about 6600 feet msl while PHS is about 4600 feet msl.

If you took the amounts of precipitation from W5B to A12 and developed a linear relation due to elevation, then you could "predict" how much precipitation you would get at specific elevations. Obviously this technique will not work for PM1. A test of this technique is presented in Table 16,

Another approach is to fit the precipitation data using linear least squares. This technique would yield the values listed in Table 17. The results are mixed with some predicted values too high and some too low. The linear least squares technique gave a correlation of .87 (76% of the variance), which is saying that the fit isn't too bad. Part of the problem is that there aren't enough locations with long precipitation records, and also the large elevation differences and complex terrain on the NTS make localized effects important.

The simple difference technique yielded an average absolute error of 0.58 inches. The linear least squares technique yielded an average absolute error of 0.66 inches. These techniques give "ball park" estimates for precipitation as a function of elevation. They could be used as a "first guess" for a particular location that didn't have any precipitation readings nearby.

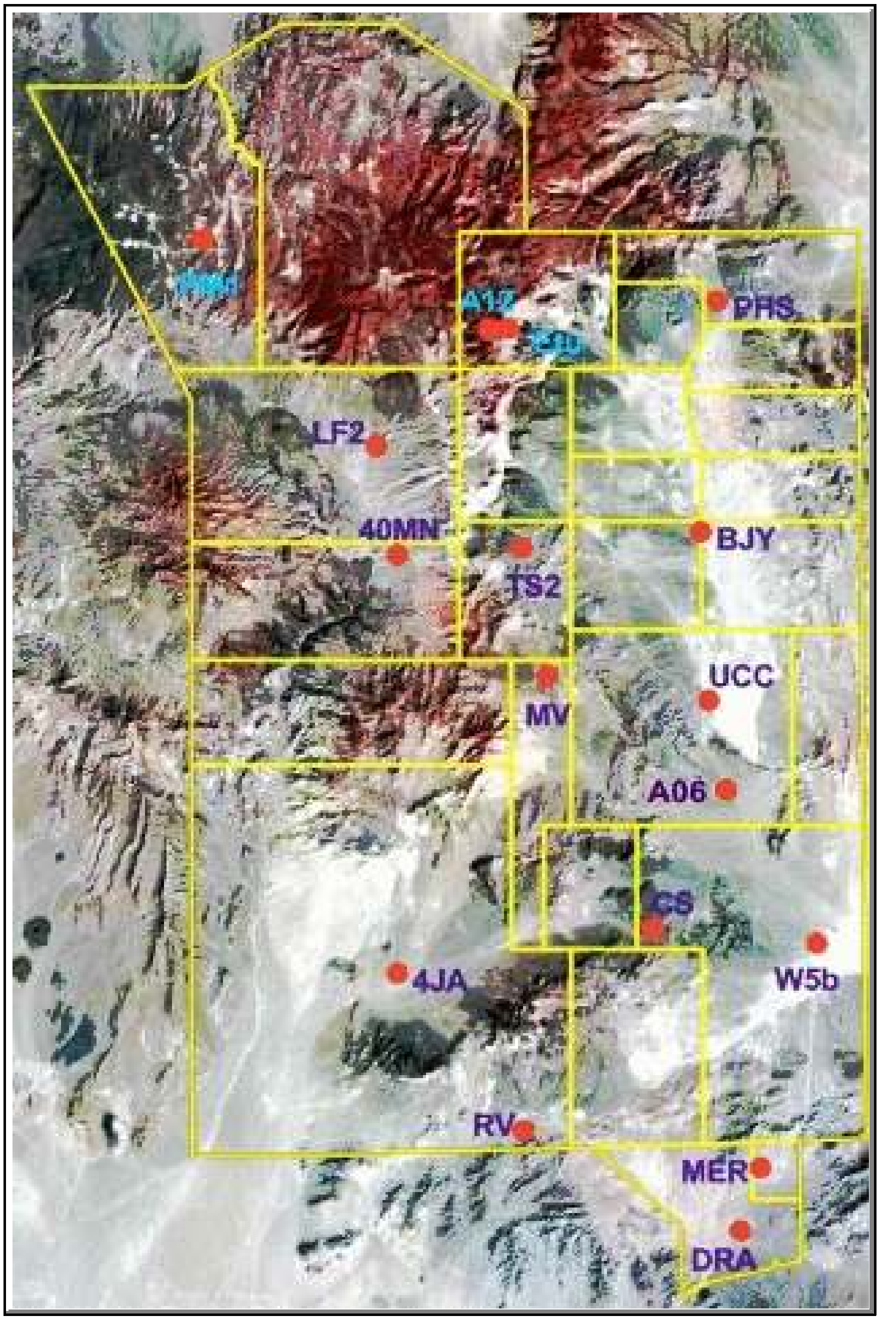

Figure 12. Locations of Recording Rain Gauges on the NTS .

Table 15. Average Monthly Precipitation (Inches)

Months

Stns	01	02	03	04	05	06	07	08	09	10	11	12	Ann
40M	.84	1.11	1.02	.52	.40	.28	.76	.79	.64	.42	.63	.62	8.02
BJY	.83	.94	.76	.36	.36	.24	.50	.62	.35	.32	.50	.56	6.32
CS	1.16	1.33	.97	.46	.36	.19	.58	.61	.44	.31	.56	.66	7.66
DRA	.67	.88	.66	.35	.29	.13	.51	.66	.36	.28	.46	.45	5.65
4JA	.71	.98	.75	.32	.28	.13	.42	.38	.36	.29	.41	.49	5.44
MV	1.39	1.59	1.11	.49	.39	.24	.59	.69	.46	.40	.74	.82	8.96
PHS	.94	1.12	.99	.49	.42	.29	.57	.61	.33	.41	.54	.63	7.40
PM1	.62	.81	.87	.62	.48	.34	.81	.96	.65	.44	.55	.55	7.74
A12	1.61	1.69	1.92	.88	.68	.33	.92	1.17	.76	.56	1.04	1.07	12.82
RV	.84	1.11	.87	.34	.30	.11	.43	.54	.32	.30	.43	.57	6.13
TS2	1.08	1.36	1.06	.52	.40	.23	.67	.69	.66	.42	.67	.77	8.51
W5B	.61	.68	.54	.32	.26	.16	.47	.47	.36	.23	.36	.45	4.85
UCC	.96	.99	.76	.36	.31	.23	.49	.60	.46	.31	.53	.63	6.62

Station i.d.'s are as follows,

40M	Forty Mile Canyon North - Area 30	(4820')
BJY	BJY - Central Yucca Flat	(4070')
CS	Cane Springs - Area 5 West	(4000')
DRA	Desert Rock - Area 22	(3250')
4JA	4JA - Area 25 Main camp	(3422')
MV	Mid Valley - Area 14	(4660')
PHS	PHS Farm - North Yucca Flat - Area 15	(4565')
PM1	Pahute Mesa 1 - Area 20	(6550')
A12	Rainier Mesa - Area 12	(7490')
RV	Rock Valley - Area 25	(3400')
TS2	Tippipah Springs - Area 16	(4980')
W5B	Well 5B - Area 5	(3080')
UCC	Yucca Dry Lake - Area 6	(3924')

Table 16. Predicted Precipitation versus Average due to Elevation
(Utilizing precipitation difference between W5B and A12)
(precipitation = 4.85 + .001807 x (elevation(ft) - 3080))

40M	Predicted = 7.99,	Actual = 8.02,	Diff = -0.03
BJY	Predicted = 6.66,	Actual = 6.32,	Diff = 0.34
CS	Predicted = 6.48,	Actual = 7.66,	Diff = -1.18
DRA	Predicted = 4.90,	Actual = 5.65,	Diff = -0.75
4JA	Predicted = 5.47,	Actual = 5.44,	Diff = 0.03
MV	Predicted = 7.71,	Actual = 8.96,	Diff = -1.25
PHS	Predicted = 7.53,	Actual = 7.40,	Diff = 0.13
PM1	Predicted = 11.13,	Actual = 7.74,	Diff = 3.39
A12	Predicted = 12.82,	Actual =12.82,	Diff = 0.00
RV	Predicted = 5.43,	Actual = 6.13,	Diff = -0.70
TS2	Predicted = 8.28,	Actual = 8.51,	Diff = -0.23
W5B	Predicted = 4.85,	Actual = 4.85,	Diff = 0.00
UCC	Predicted = 6.38,	Actual = 6.62,	Diff = -0.24

Table 17. Predicted Precipitation versus Average due to Elevation
(Utilizing linear least squares fit for elevation)
(precipitation = 1.21 + .001381 x elevation (ft))

40M	Predicted = 7.87	Diff = -0.15
BJY	Predicted = 6.83	Diff = 0.51
CS	Predicted = 6.73	Diff = 0.93
DRA	Predicted = 5.70	Diff = 0.05
4JA	Predicted = 5.94	Diff = 0.50
MV	Predicted = 7.65	Diff = -1.31
PHS	Predicted = 7.51	Diff = 0.11
PM1	Predicted = 10.26	Diff = 2.52
A12	Predicted = 11.55	Diff = -1.27
RV	Predicted = 5.94	Diff = -0.19
TS2	Predicted = 8.09	Diff = -0.42
W5B	Predicted = 5.46	Diff = 0.61
UCC	Predicted = 6.63	Diff = 0.02

Similar analyses were conducted by Quiring (1965, 1983) who documented the strong influence of terrain elevation on warm-season precipitation and substantially reduced correlation for the cool season.

2. Snowfall

Snowfall on the NTS is confined mostly to the higher elevations (above 6000 feet msl). Occasional snow falls at all locations on the NTS, but is relatively rare for locations below 4000 feet msl. The heaviest snowfalls occur on the highest terrain on the NTS. Rainier Mesa (A12) at 7490 feet msl gets the greatest amounts of snow on the NTS. The average cool season precipitation at A12 is about 6.0 inches, of which most will be in the form of snow. A rough estimate of the total snowfall would be to multiply the total precipitation by 10, which would be about 60 inches of snow per year. In contrast, Desert Rock (DRA) at 3250 feet msl, receives only 3.0 inches of snow per year, on average.

The greatest amounts of snowfall for the NTS occurred during the winters of 1977-78 and 1982-83. A12 recorded nearly 20.00 inches of precipitation during the cool season of both of the two-year periods. This precipitation amount would translate to roughly 200 inches of snow! Both of these years experienced strong “El Nino” conditions.

3. Extremes

Extreme precipitation events (see Randerson, 1997) on the NTS occur rarely, partly due to the desert climate, and to a general lack of frequent precipitation events. The wintertime extreme events are generally associated with strong “El Nino” years and the usual strong southern storm track in the Eastern Pacific. Summertime extreme precipitation events are closely tied to the “Southwest Monsoon” and Eastern Pacific hurricanes.

The heaviest rainfall that occurred on the NTS was during the summer of 1983 (Randerson, 1997). The summer weather pattern showed a strong “Southwest Monsoon” that year, and the tropical storms in the Eastern Pacific were frequent. The southern half of the NTS received nearly 4.0 inches of rain in a 24-hour period in July of that year. Some locations had more than half of their normal annual amounts of precipitation in one day!

C. Thunderstorms and Lightning

1. Thunderstorms

Thunderstorms and lightning occur on the NTS in all months of the year, but are infrequent in late fall and winter. Thunderstorms occasionally occur in the spring. These thunderstorms are generally associated with cold frontal passages, but may occur due to persistent low pressure aloft that transports moisture northward from the sub-tropics. There is a slight peak in thunderstorm/lightning activity in late May and early June that is a consequence of these two patterns. Summertime thunderstorms and lightning are frequent during July and August, and sometimes during September. These summer thunderstorms are generally of the “air mass” type that generate from residual moisture in the atmosphere and daytime heating. Thunderstorms can develop in an environment of northward moving moisture from dissipating tropical storms in the Eastern Pacific.

Thunderstorms on the NTS during the summer months have generally high bases. These high based thunderstorms can produce relatively strong surface wind gusts and intense cloud-to-ground lightning. This lightning is a serious hazard to personnel working on and around the NTS and can be responsible for starting range fires.

The majority of severe thunderstorms that occur on the NTS have strong winds, but not large hail (which occurs frequently east of the Rockies). These thunderstorms can occasionally have heavy rain and localized flooding, but most precipitation from these thunderstorms is much less than ½ inch.

Thunderstorms in the spring can also be severe with strong surface wind gusts. These thunderstorms are more likely to accompanied with hail. Generally the hail stones are not large, being mostly less than ½ inch in diameter.

The thunderstorm activity on the NTS during the summer season is denoted by differences in the surface elevations. The highest locations on the NTS are the Mesas. These locations experience more frequent thunderstorms than the lower elevations such as UCC and W5B. Additionally the thunderstorm activity begins earlier in the day on the Mesas (early afternoon), compared to the lower elevations. The lower elevations experience the onset of thunderstorm activity 2 to 3 hours later than the Mesas in general.

2. Cloud-to-Ground Lightning

SORD has in place on the NTS an automatic lightning detection system. This system was originally installed in the late 1980's using the LLP hardware and software (Scott, 1988). This original system was replaced during the Spring of 2001 with newer upgraded sensors and computers. The lightning data consists of a triangulated positions for cloud-to-ground (CG) flashes with date and time, and strength of the flash. These data have been accumulated since the early 1990's. For details see Randerson and Sanders (1999) and Randerson (2004).

The lightning data from the NTS and vicinity have been extensively studied (see Randerson and Sanders 2002). These studies show that the activity is highly variable from year to year. Additionally the data seem to indicate that a certain amount of randomness is associated with individual thunderstorm days as far as the location of storms. The data do show that in general the higher elevations do get more lightning strikes compared to the lower elevations, but the distribution of lightning strikes is uneven.

All the CG flashes detected on the NTS for the 1993 through 2000 warm seasons were summarized into 1.0 fl/km^2 areas. The results of this summary are shown in Fig. 13, the first high-resolution analysis of CG lightning on the NTS. Figure 13 is a contour analysis of total flash counts. For example, blue areas enclose those parts of the NTS where a total of 8 to 9 fl/km^2 were measured for the 8 warm seasons. The area enclosed by the gray shading includes a total of 4 to 5 fl/km^2 for the eight warm seasons. In other words, the blue shading encloses areas with average warm-season flash densities of 1.0 fl/km^2 to 1.1 fl/km^2 or simply 1.0 fl/km^2/warm season as an approximation.

Figure 13 shows that CG lightning occurs throughout the NTS; however, the extreme southwestern section (Area 25, see Fig. 2) has experienced the least number of flashes. The total flash count in this area are generally $\leq$ 4.0 fl/km^2 for the eight warm seasons, 1993 through 2000. Frenchman Flat, especially in the vicinity of the Non-Proliferation Testing and Evaluation Center (NPTEC) has also experienced few ($\leq$4 fl/km^2) CG flashes during the 8-yr period. By contrast, widespread thunderstorm and CG lightning flash activity has occurred in the northwest quarter of the NTS. Total flash counts of 10 to 13 fl/km^2 have been detected along the northern border of the NTS for the period of record. In addition, another active area appears in the northeastern part of the NTS, in Areas 8 and 15. The largest total flash count on the NTS was measured approximately 5 km south of Mercury where 13 fl/km^2 occurred. Another active area of 12 fl/km^2 is located nearly 10 km southwest of Mercury. These two areas appear to be associated with thunderstorms that develop over the Spring Mountain Range and move northeastward onto the NTS. A curiosity with these two areas is that the time of maximum occurrence is between 2300 and 0300 PDT with the peak in activity at midnight. The extreme southwestern part of the NTS exhibits the least number of lightning strikes. This part of the NTS has the lowest elevations.

The NTS warm-season summary of the hourly variation in CG lightning is presented as a bar graph in Figure 14. In this figure, time is plotted on the abscissa and flash count on the ordinate. Hourly summaries are for the hour beginning at the identified time and ending 60 min later. For example, the plot for 1100 PDT is for flashes that occurred between 11:00:00 and 11:59:59 PDT.

Figure 14 shows that diurnally driven CG lightning activity begins after 1100 PDT on the NTS. However, it increases more rapidly over the northern NTS than over the southern NTS. For example, by 1200 PDT less than 100 flashes have been measured over the southern NTS while slightly more than 350 flashes have been detected over the northern NTS. Furthermore, the diurnal pattern over the northern NTS shows a strong connection to the solar cycle, with CG flash activity reaching a maximum between 1400 and 1459 PDT and dissipating rapidly after 1659 PDT. However, over the southern NTS flash activity accelerates after 1200 PDT, reaches a peak between 1500 and 1559 PDT, dissipates rapidly after 1659 PDT, but remains somewhat elevated until after 2200 PDT when two secondary CG maximum of nearly 375 flashes appear between 2300 PDT and midnight and another for the hour beginning at 0300 PDT.

2. Thunderstorm Days

The average number of thunderstorm days per year for the two reporting locations (DRA and UCC) are 14 and 15 days, respectively. These reported average number of thunderstorm days cover two different time periods. UCC was in operation from 1962 to May 1978. DRA has been in operation from May 1978 to the present. Given the two different locations and time periods, there is remarkable agreement between the locations and the annual number of thunderstorm days. Additionally the locations have an average of 9 and 11 thunderstorm days during the summer months. Las Vegas, about 60 miles southeast of the NTS, experiences nearly the same average number of thunderstorm days per year as DRA and UCC.

Figure 13. Cloud-to-Ground Lightning Flash Density for the NTS (Randerson and Sanders, 2002).

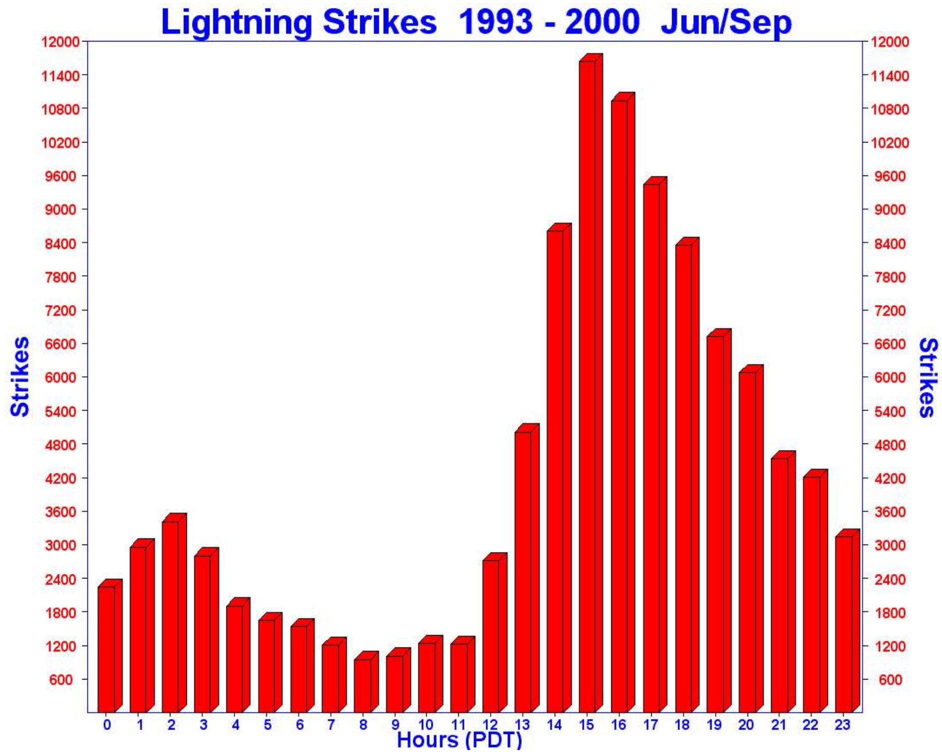

Figure 14. Hourly Diurnal Distribution of Cloud-to-Ground Lightning on the NTS. After Randerson and Sanders, 2002.

Figure 15, demonstrates that thunderstorm activity at DRA increases rapidly in early July. Mid-July tends to be quite active; however, the primary period of thunderstorm activity is centered on August 12. An obvious characteristic of the plot is the periodicities in thunderstorm activity. These fluctuations may be related to the northward flow of moist tropical air over the lower Colorado River valley and into Arizona, Nevada, and Utah. This seasonal event is referred to as the southwestern monsoon by many researchers and weather forecasters

Some of the surrounding higher elevations on and nearby the NTS undoubtedly experience a greater number per year of thunderstorm days, but no reported records exist for these locations. The lightning system's database could theoretically be used to produce the average number of annual/seasonal thunderstorm days for higher locations, but Figure 13 clearly shows the difficulties
in trying to get meaningful average numbers of days of thunderstorms for specific locations.

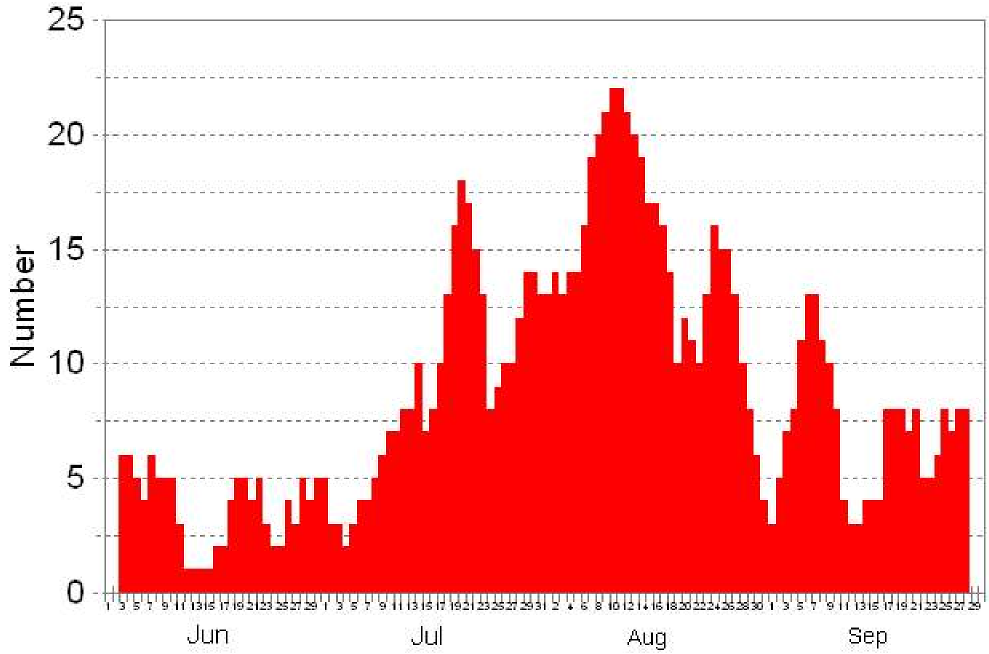

Figure 15. Five-Day Running Total of Thunderstorm Days for DRA for June Through September, 1978 through 2000.

3. Yucca Flat Summertime Thunderstorms

Table 18 shows the number of days during the summer that cumulonimbus clouds (Cb) were reported, lightning reported, and thunderstorms reported. The table shows each year for the months June, July, August, and September.

Data tabulated in Table 18 show that the number of thunderstorm days varied from only four in 1964 to 20 in 1967. Also the number of days with cumulonimbus present (CB) varied from 17 in 1964 to 62 in 1967. The average number of days for thunderstorms reported at UCC in summer was 11, and the number of days with CB present was 33. This difference clearly shows that the number of reported thunderstorms under represents the number of actual thunderstorms on and in the vicinity of the NTS.

Table 18. CB, Lightning, and Thunder Days for June through September 1963-1977 Yucca Flat Weather Station (UCC)

Year	Cb Days	Lightning Days	Thunder Days
1963	29	13	11
1964	17	11	4
1965	34	21	14
1966	19	8	9
1967	62	39	20
1968	24	15	10
1969	36	20	12
1970	44	16	10
1971	41	26	12
1972	39	19	16
1973	25	9	6
1974	27	18	10
1975	27	16	11
1976	30	20	11
1977	35	19	12
Average	33	18	11

4. Desert Rock Summertime Thunderstorms

The number of days during the summer months cumulonimbus clouds (CB) clouds, lightning, and thunderstorms were reported are listed in Table 19. The table shows each year for the months June, July, August, and September.

Table 19 shows similar results for Desert Rock as for UCC with an average of 31 CB days, 14 days with lightning, and 9 days with thunder during the summer months. These numbers for DRA are only slightly lower than those for UCC. The fact that they are for different time periods could explain the differences as much as the different locations.

The conclusion from the above tables and discussion would indicate that approximately 10 thunderstorm days occur during the summer for a locations of lower elevation, and about three times as many days with CB's present on or near the NTS. Also the average number of days that lightning is reported (16 days) during the summer months is half as many as the number of CB days.

5. Monthly Distribution of Thunderstorms in Summer

The occurrence of thunderstorms during the summer months is not evenly distributed among June, July, August, and September. The thunderstorms that occasionally occur in June are due to two

Table 19. CB, Lightning, and Thunder Days for June through September 1978-2003
Desert Rock Weather Station (DRA)

Year	Cb Days	Lightning Days	Thunder Days
1978	23	13	6
1979	19	11	7
1980	27	14	6
1981	28	20	13
1982	37	23	13
1983	34	21	12
1984	68	42	24
1985	30	16	7
1986	34	16	10
1987	41	21	10
1988	42	20	17
1989	28	12	6
1990	42	26	13
1991	40	18	14
1992	34	16	8
1993	15	11	7
1994	28	13	8
1995	22	13	4
1996	31	3	4
1997	28	4	3
1998	43	9	9
1999	34	10	8
2000	17	4	5
2001	25	7	6
2002	15	3	4
2003	25	7	7
Average	31	14	9

separate phenomena. The first situation is associated with cold troughs aloft before summer sets in. The second situation occurs when early tropical storms in the Eastern Pacific come northward and the associated moisture is transported into Nevada, which sets off thunderstorms. The majority of thunderstorms that occur in mid-summer are due to the "Southwest Monsoon" that sets up and brings tropical moisture into the Desert Southwest from the Eastern Pacific and Mexico. In September usually the summer monsoon has ceased or is weak and most of the tropical moisture that enters the southwestern United States is from dissipating tropical storms in the Eastern Pacific.

The thunderstorm records for the NTS from UCC and DRA show that about 65 to 70% of the summertime thunderstorm days occur in July and August. The percentages for June and September are somewhat different for UCC and DRA with UCC showing 20% in June and 16% in September. DRA shows about 11% in June and 20% in September. These differences probably are due to the separate time periods covered at the 2 locations (UCC 1963-1977, DRA 1978-2003). Generally the transition periods from spring to summer (June) and from summer to fall (September) have more variation in thunderstorm occurrence from year to year than do the mid-summer months July and August.

Tables of monthly and annual precipitation totals for 16 storage rain-gauges located on the NTS are presented in Appendix E.1. The annual distribution of CB days for DRA is presented graphically in Appendix E.3. Statistical analyses of extreme daily precipitation data are presented in graphical form in Appendix E.4.

V. ATMOSPHERIC PRESSURE

A. Surface

1. Averages

Surface pressure readings have been taken on the NTS at both of the surface observing locations (DRA and UCC), and at selected MEDA stations since June 1987. The surface pressure readings at UCC started in 1962 and continued to May 1978. The readings at DRA began in May 1978 and continue to the present. The MEDA locations where surface pressure readings have been, and are still currently being taken, are at numbers 2 (Area 2), 5 (W5B, Area 5), 6 (UCC, Area 6), 12 (A12, Area 12), 17 (BJY, Area 1), 20 (PM1, Area 20) 21 (Area 16), 23 (MCY, Area 23) 24 (YMR, Area 25) 25 (Area 25 south), 35 (TTR, Tonopah Test Range), 36 (R63, AF Range 63), and 45 (U1A, Area 1).

The station pressures have been recorded in 2 units. The observing locations (DRA and UCC) recorded their readings in inches of mercury. The MEDA stations recorded their readings in millibars (the conversion is 33.86 millibars = 1 inch).

The following table (20) shows the monthly and annual average station pressures for DRA, UCC, and selected MEDA locations that have pressure readings. Notice that the normal station pressures range from about 920 millibars (mb) at the lowest station on the NTS (LTH) to about 775 mb at the highest station (A12). LTH shows an annual average station pressure range of about 7 mb from July to December. A12 shows an annual average range of station pressure of 6.5 mb from February to August.

2. Extremes

Extreme surface pressures on the NTS are more difficult to measure for most of the MEDA stations due to occasional errors in the data that cause outliers. The outliers can only be partially screened out automatically, which makes utilizing these values suspect. Consequently only the extreme surface pressures for DRA and UCC are presented - they have been carefully screened and are tabulated in Table 21.

Table 21 shows that the extreme pressure changes for the two locations, DRA and UCC, are about 44 mb. These ranges are not large compared to many locations in the U.S. The relatively low latitude (about 37N) and the continental location of the NTS help to contribute to this modest range in surface pressures. Another fact from this table is that the extreme low pressures are larger departures from the averages than the extreme maximum pressures.

Table 20. Average Station Pressure Readings
(Pressure in millibars)

Stations

Month	DRA	UCC	W5B	BJY	A12	PM1	YMR	LTH	TTR	R63
01	903.0	883.4	912.5	879.5	773.2	800.5	851.4	922.1	837.2	912.3
02	901.7	882.4	910.9	877.8	772.6	799.5	849.4	920.2	835.9	910.7
03	899.3	879.7	908.4	876.2	771.2	798.6	847.9	917.9	834.3	908.4
04	899.0	879.7	906.9	875.0	771.8	798.8	847.0	916.4	834.1	907.2
05	897.3	878.7	905.5	873.8	772.3	799.0	846.5	914.9	833.6	905.5
06	897.6	878.0	905.5	874.4	774.6	800.6	847.3	914.7	834.6	905.3
07	896.6	880.4	907.3	876.4	777.4	803.3	849.8	916.2	836.9	907.2
08	899.7	880.4	908.0	876.9	777.6	803.7	850.4	916.7	837.3	907.9
09	899.3	880.4	907.9	876.7	776.2	802.5	849.4	917.0	836.7	907.9
10	901.4	882.1	909.7	877.7	775.5	802.3	849.6	919.1	837.5	909.4
11	902.7	883.1	911.9	878.8	774.0	801.4	850.4	921.4	837.4	911.7
12	903.4	883.1	912.8	879.6	773.1	800.9	850.6	922.7	837.6	912.6
Ann	900.0	880.7	908.9	876.9	774.1	800.9	849.1	918.3	836.1	908.9

Table 21. Pressure Extremes for DRA and UCC
(Pressures in millibars)

	DRA		UCC	
Month	High	Low	High	Low
01	919.3	883.1	898.6	860.7
02	914.6	877.7	896.3	857.0
03	913.5	877.3	894.9	862.4
04	913.2	885.1	893.6	863.4
05	910.8	882.4	893.6	860.7
06	908.8	880.4	892.5	860.7
07	907.4	889.8	887.8	869.1
08	906.8	890.2	887.8	870.5
09	908.8	884.1	892.5	865.5
10	917.6	885.4	893.9	864.1
11	918.3	874.9	900.0	857.0
12	917.6	879.3	900.3	863.1
Ann	919.3	874.9	900.3	857.0

B. Aloft

The technique used for pressures aloft is to take constant pressure surfaces and measure the variation of the heights of these surfaces. The main purpose of this approach is that movement of air parcels in the atmosphere tend to follow constant pressure surfaces. The following table (22) depicts the average heights of the standard pressure surfaces by month for DRA at 12Z.

Table 22 shows that the near surface heights at 850 mb are highest in December and lowest in May. The pressure surfaces above the 700-mblevel show height minimums in March and height maximums in July or August. The average range of heights annually is from 40 meters at 850 mb to 529 meters at 200 mb.

Table 22. Average Heights of the Standard Pressure Surfaces
(Meters Above Sea Level)

Millibar Surfaces

Month	850	700	500	400	300	200	150	100
01	1508	3069	5659	7283	9260	11874	13691	16217
02	1496	3059	5645	7263	9235	11842	13665	16200
03	1479	3049	5638	7258	9230	11836	13655	16196
04	1477	3065	5673	7305	9295	11912	13714	16244
05	1472	3085	5728	7382	9396	12038	13842	16367
06	1480	3124	5813	7494	9540	12216	14015	16520
07	1503	3167	5882	7580	9653	12365	14135	16631
08	1507	3169	5879	7575	9647	12358	14127	16630
09	1498	3138	5824	7507	9559	12256	14057	16546
10	1504	3114	5767	7429	9453	12113	13918	16402
11	1506	3084	5702	7344	9348	11988	13791	16284
12	1512	3075	5672	7301	9288	11911	13718	16228

VI. CLOUDS

A. Average Conditions

Sky cover due to clouds varies with the seasons on the NTS. Clear conditions are more prevalent than those with any clouds. Clear skies range from approximately 36 percent of the time in February to 65 percent in September. Overcast sky conditions range from 6 percent in summer to 25 percent of the time in winter. Table 23 summarizes the cloud conditions prevalent at UCC.

Table 23. Cloud Cover for UCC (1963 to 05/1978)

	Sky Cover in Percent			
	Clear Days	0.1-0.5	0.6-0.9	Overcast Days
January	41	20	16	23
February	36	21	18	25
March	37	22	20	22
April	39	24	19	17
May	40	26	20	14
June	52	23	16	9
July	53	25	16	6
August	52	29	14	5
September	65	19	11	6
October	56	20	15	10
November	40	21	18	20
December	42	22	16	20

Additional cloud cover data for UCC indicates that the total sky cover reported is generally higher in the afternoon and the lowest late at night. This pattern fits well with the weather and types of clouds that are prevalent during summer - typical afternoon cumulus and thunderstorms. The greater daytime cloud cover in the winter can also be partially explained by the presence of afternoon cumulus, but some of the lack at night is due to the difficulty in detecting thin cirrus clouds in the dark.

B. Cloud Ceilings

Cloud ceilings, defined as having 0.6 tenths coverage or more, are generally high on the NTS. At UCC ceilings less than 1000 feet only occur 7 percent of the time in winter and 1 percent of the time in summer. Even cloud ceilings below 20000 feet above ground level only occur 21 percent of the time in February and 8 percent of the time in September. Most ceilings are from cirrus type clouds and are above 20000 feet. Table 24 summarizes the cloud ceiling conditions for UCC.

This table clearly depicts that cloud ceilings below 10000 feet are not common, even in winter.

Generally about 80 percent of the ceilings reported at UCC were greater or equal to 20000 feet. This means that 4 out of 5 ceiling conditions are probably due to cirrus clouds. Thus the general ceiling conditions would have little impact in terms of flying restrictions or for daylight visibility.

C. Cloud Types

The types of clouds that have been observed at UCC have mostly been of two main types, cirrus and cumulus. Stratus type clouds are rare on the NTS, and nimbus clouds are also unusual. The following table (25) gives the relative frequency of the types of clouds reported at UCC.

Table 25 shows that either cirrus type clouds are present when clouds are reported or cumulus type clouds are present. Stratus type clouds or fog are rare and only occur during the cool season months. Cirrus is more prevalent in winter and spring. Cumulus clouds are more prevalent in late winter and summer, and are least prevalent in the fall.

Table 24. Relative Frequency of Ceilings at UCC (1963 to 05/1978) (values in percent)

Ceiling (Feet above ground level)

Month	LT 1000	LT 2000	LT 3000	LT 4000	LT 5000	LT 10000	LT 15000	LT 20000	GE 20000
January	7	8	9	10	11	13	15	17	83
February	7	8	9	10	12	16	19	21	79
March	4	5	6	7	8	13	16	19	81
April	4	4	5	6	7	12	15	17	83
May	2	2	2	3	4	9	12	14	86
June	1	1	1	1	1	7	10	11	89
July	1	1	1	1	1	6	10	12	88
August	1	1	1	1	1	6	9	11	89
September	1	1	1	1	2	5	7	8	92
October	2	2	2	3	3	7	9	11	89
November	4	4	5	6	7	10	13	15	85
December	6	7	7	9	10	12	15	17	83

Table 25. Relative Frequency of Cloud Types
(Percent frequency of occurrence)

Month	Cirrus	Cumulus	Stratus	Nimbostratus	Fog
January	37	32	1	1	0
February	36	40	0	1	0
March	39	47	0	1	0
April	34	41	0	0	0
May	33	44	0	0	0
June	28	35	0	0	0
July	23	39	0	0	0
August	19	38	0	0	0
September	16	26	0	0	0
October	25	26	0	0	0
November	36	36	0	1	0
December	34	37	1	1	0

VII. SOLAR RADIATION

A. Average Monthly Values

1. Down-welling Global Solar

Table 26 lists the hourly average Down-welling Global Solar radiation by hour and month for Desert Rock. Down-welling Global Solar radiation is the amount of solar radiation reaching a flat surface on the ground. The values have been normalized to Watt-hours.

Table 26 shows that the average Down-welling Global Solar radiation varies by a factor of almost three from efficiency range from 50% in December to about 97% in June for a flat surface, or about two times as effective in June as in December.

Table 26. Desert Rock Solar Radiation, Downwelling Global Solar, Start Year = 1998, Stop Year = 2003,(W/m2),(Hourly Avgs)

	Months											
Hour (PDT)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0000	0	0	0	0	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0	0	0	0	0
0500	0	0	0	0	0	0	0	0	0	0	0	0
0600	0	0	0	12	38	49	34	12	3	0	0	0
0700	0	2	29	97	192	222	174	113	61	26	5	0
0800	19	46	158	291	404	428	374	307	243	154	65	24
0900	124	191	360	490	604	625	575	515	446	347	220	138
1000	275	353	546	684	782	806	738	699	632	515	375	287
1100	404	490	695	821	907	935	871	843	767	638	484	403
1200	483	574	772	916	973	1010	946	910	847	690	540	460
1300	498	597	782	914	991	1030	970	929	846	684	537	464
1400	453	558	743	850	934	973	924	881	798	623	464	413
1500	360	468	637	734	832	866	826	765	683	489	353	312
1600	231	322	479	564	658	714	685	610	509	335	204	176
1700	87	167	287	369	459	522	505	423	306	154	60	45
1800	11	39	102	172	252	316	306	233	109	33	4	0
1900	0	0	13	36	72	122	117	62	19	0	0	0
2000	0	0	0	0	6	16	16	5	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	0	0
2300	0	0	0	0	0	0	0	0	0	0	0	0
Totals	2946	3807	5603	6949	8103	8632	8059	7306	6269	4687	3310	2722

The peak hourly values range from 464 watts/m² in December to 1030 watts/m² in June, which ties in closely with the effect of the elevation angle of the Sun near solar noon for both months.

In summary, the Desert Rock location receives a large percentage of the possible solar radiation during a typical year due to many days with no clouds or with only high thin clouds.

2. Direct Solar

Direct Solar radiation is measured by a tracking device that follows the Sun during the day. This device receives only the amount of radiant energy coming from the Sun by utilizing an aperture. Table 27 shows the hourly average values of watts per square meter (W/m^2) for each month during the year.

This table shows distinct differences from Table 26. The values increase very rapidly after sunrise and plateau by midday. This fact is true for both December and June. The differences between December and June are effected by the number of hours of daylight more than the elevation angle of the Sun. The peak values range from near 750 watts/m² in December to slightly over 900 watts/m² in June. The main factor in this difference appears to be more cloudiness in December than June. July and August typically have more cloudy days with thunderstorms than either June or September, which probably explains the lower values at midday for those months. Additionally summertime has increased hazy conditions, which would help to decrease the Direct Solar values.

3. Global UVB Radiation

The Global UVB solar radiation is measured on a flat surface to include the total sky. This dangerous radiation from the Sun is highly influenced by the elevation angle of the Sun, which changes the mean length of the path that the radiation travels to reach the surface of the earth. UVB radiation is mostly absorbed by the ozone layer of the stratosphere before reaching the surface.

Table 28 shows the hourly average values of UVB by month. Table 28 shows that the peak values of UVB range from about 50 milli-watts/m² in December to about 255 milli-Watts/m² in June, or about a factor of five.

A companion Table 29 shows Table 28 values converted into an index that is used for protective actions to exposure from UVB. This table shows that little danger exists for individuals during the winter months with peak indices from 2 to 3. From March through October the peak values can be 5 or greater during the day with June values reaching 10+. These higher values can produce sunburn for individuals exposed outdoors during the middle of the day. The values from May through August can be 9+ during the middle of the day which can cause sunburn in a matter of minutes to exposed skin.

Table 27. Desert Rock Solar Radiation, Direct Solar (W/m2)

Start Year = 1998
Stop Year = 2003
(Hourly Avgs)
Months

Hour (PDT)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0000	0	0	0	0	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0	0	0	0	2
0400	0	0	0	0	0	0	0	0	0	0	0	0
0500	0	0	0	0	0	0	0	0	0	0	0	2
0600	0	0	0	13	202	282	195	35	0	0	0	2
0700	0	0	127	347	548	624	525	402	314	158	15	2
0800	130	217	487	594	715	774	687	622	639	521	358	169
0900	440	484	668	698	783	847	777	744	772	703	601	503
1000	614	592	749	760	830	893	800	799	847	792	704	655
1100	691	667	792	791	844	909	829	847	884	832	765	727
1200	732	709	797	828	847	902	842	850	911	815	783	744
1300	707	712	792	804	855	905	854	855	903	807	788	726
1400	687	694	793	773	834	884	854	834	879	788	734	698
1500	652	692	756	751	812	855	828	800	866	741	690	662
1600	596	630	691	715	778	826	780	764	807	671	593	558
1700	419	494	590	630	701	766	741	709	708	525	365	316
1800	132	256	391	495	589	675	665	589	481	287	17	0
1900	0	0	126	217	333	474	475	320	188	0	0	0
2000	0	0	0	0	77	172	177	59	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	0	0
2300	0	0	0	0	0	0	0	0	0	0	0	0
Totals	5798	6147	7758	8416	9747	10788	10028	9229	9201	7641	6413	5766

Table 28. Desert Rock Solar Radiation, Global UVB
Start Year = 1998
Stop Year = 2003
(mW/m2)
(Hourly Avgs)

	Months											
Hour (PDT)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0000	0	0	0	0	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0	0	0	0	0
0500	0	0	0	0	0	0	0	0	0	0	0	0
0600	0	0	0	0	0	2	0	0	0	0	0	0
0700	0	0	0	4	10	13	10	6	3	0	0	0
0800	0	2	8	19	35	41	35	26	17	9	3	0
0900	6	11	28	50	78	89	80	66	49	30	15	7
1000	19	30	62	97	134	150	138	122	97	63	35	20
1100	37	55	101	143	186	208	195	179	146	97	57	36
1200	53	76	129	177	219	246	234	216	179	117	71	47
1300	58	83	137	181	226	255	246	224	181	117	70	49
1400	50	74	122	158	200	229	222	201	158	96	55	40
1500	33	52	88	116	153	178	175	152	113	61	33	24
1600	16	27	50	69	96	117	117	95	63	30	14	10
1700	4	10	21	31	47	61	63	47	26	9	3	2
1800	0	0	5	9	16	24	25	16	6	0	0	0
1900	0	0	0	0	3	6	6	3	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	0	0
2300	0	0	0	0	0	0	0	0	0	0	0	0
Totals	276	418	751	1054	1404	1618	1545	1353	1038	627	355	233

Table 29. UVB Index*

Hour (PDT)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Months											
0000	0	0	0	0	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0	0	0	0	0
0500	0	0	0	0	0	0	0	0	0	0	0	0
0600	0	0	0	0	0	0	0	0	0	0	0	0
0700	0	0	0	0	0	1	0	0	0	0	0	0
0800	0	0	0	1	1	2	1	1	1	0	0	0
0900	0	0	1	2	3	4	3	3	2	1	1	0
1000	1	1	2	4	5	6	6	5	4	3	1	1
1100	1	2	4	6	7	8	8	7	6	4	2	1
1200	2	3	5	7	9	10	9	9	7	5	3	2
1300	2	3	5	7	9	10	10	9	7	5	3	2
1400	2	3	5	6	8	9	9	8	6	4	2	2
1500	1	2	4	5	6	7	7	6	5	2	1	1
1600	1	1	2	3	4	5	5	4	3	1	1	0
1700	0	0	1	1	2	2	3	2	1	0	0	0
1800	0	0	0	0	1	1	1	1	0	0	0	0
1900	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	0	0
2300	0	0	0	0	0	0	0	0	0	0	0	0

*The sunlight (UV) at the NTS is very intense during the summer months (see Collett and Randerson, 2002). Average hourly solar UV data collected daily at the Desert Rock Meteorological Observatory (DRA) have been converted to MED/hr. The data reveal that for June through August the UV flux can be between 3.0 **and 5.5 MED/hr between 10 a.m. and 2 p.m. PDT. During this 4-hr period, unprotected fair skin would begin to redden in approximately 10-20 min. Hourly plots of UV data from DRA can be viewed by accessing the Air Resources Laboratory (ARL) website at www.srrb.noaa.gov/surf/pick.html, entering the date, checking the "UVB Radiation" block, and "Plot Data". The UVB data in units of mW/m^2 can be converted to MED/hr by multiplying by 0.018.**

B. Plots of Daily Values

Figures 16 through 19 are plots of solar radiant fluxes for individual clear days at Desert Rock. Plots of daily values near the two solstices and equinoxes are chosen to show how the solar values change during the year.

The first graph (Figure 16) shows daily values for down-welling global solar, up-welling global solar, direct solar, and down-welling diffuse solar radiation for December 27, 2003. Figure 16 shows the large difference between the Direct Solar and the Down-welling Global Solar radiation during the daylight hours. The Direct Solar values are very high immediately after sunrise until near sunset. The Down-welling Global Solar radiation rises more slowly and peaks at about ½ of the value for the Direct Solar. With the elevation angle near 30 degrees in December, this would give an efficiency of about 50%, which fits in fairly well with the above noted differences. The other two measures, Up-welling Global Solar, Down-welling Diffuse Solar, have relatively small values compared to the first two measures. The Up-welling Global Solar values exceed the Down-welling Diffuse Solar by about twice.

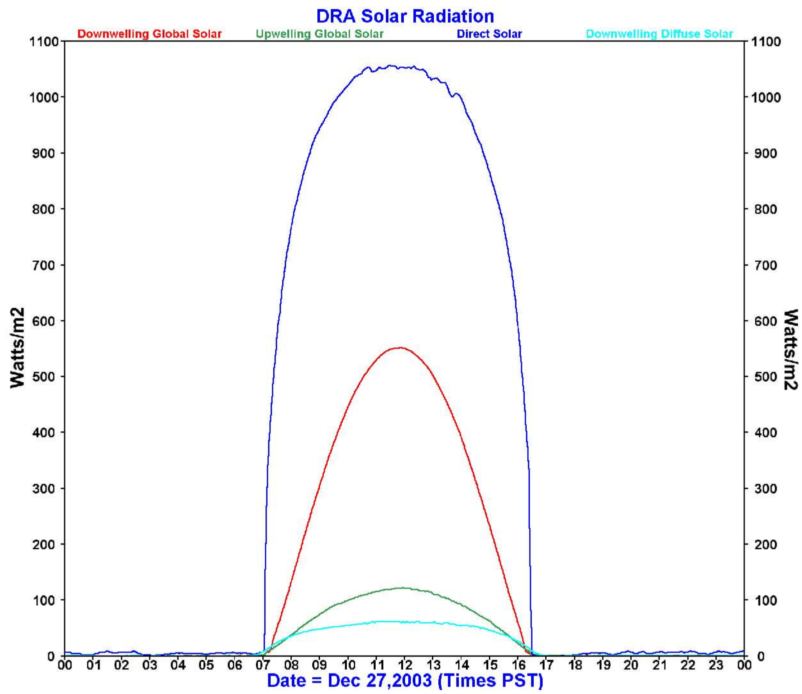

Figure 16. DRA Solar Radiation for December 27, 2003; a nearly cloud-free day.

Figure 17, for March 20, 2004, shows similar curves as the previous Fig. 16; but the down-welling global solar has increased dramatically from the previous graph compared to the direct solar. The direct solar has similar peak values to those depicted in Fig. 15, but has more hours of high values. The down-welling global solar values rise more rapidly that in the previous graph and peak at about 10% less than the direct solar. The up-welling global solar and down-welling diffuse solar are more pronounced than in the previous graph, but have about the same ratios as before with the reflective (up-welling) being about double the diffuse.

The next figure (18) is for June 20, 2004. Figure 18 shows similar curves to the previous figures, but now the down-welling global solar exceeds the direct solar near the middle of the day. Also the peak values of the direct solar are lower than in December and March. This effect is probably due to summer-time haze. The cool months generally have unrestricted visibilities.

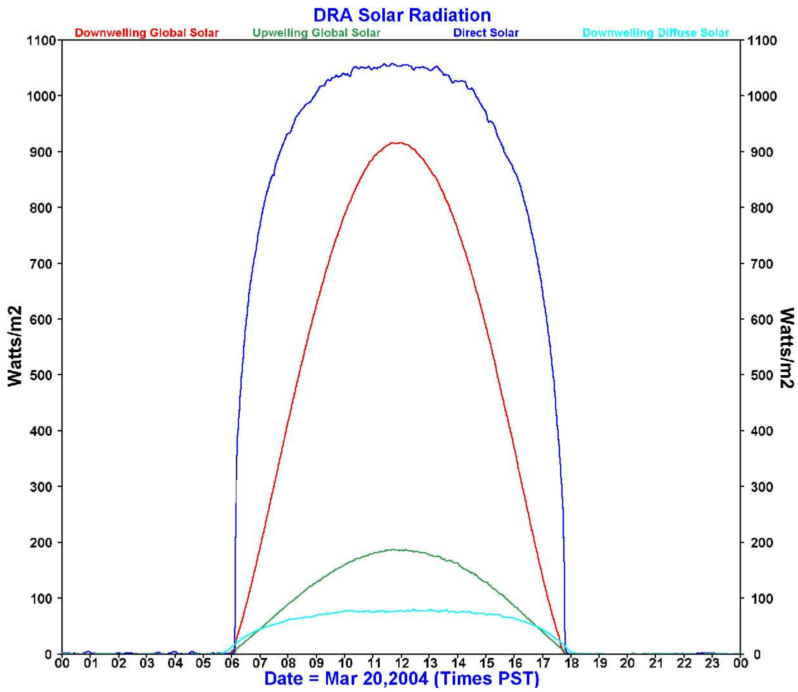

Figure 17. DRA Solar Radiation for March 20, 2004; a nearly cloud-free day.

Figure 19, for September 22, 2004. is very similar to Figure 17, which is expected since they both are near the equinoxes. Again the direct solar values rise abruptly after sunrise to relatively high values and they continue to near sunset. The down-welling global solar values show a more gradual rise and fall. They get to within 10% of the direct solar by midday. The up-welling global solar is slightly more than double the down-welling diffuse solar. Figures 16 through 19 demonstrate the intense sunshine that prevails in the desert southwest during a large part of the year.

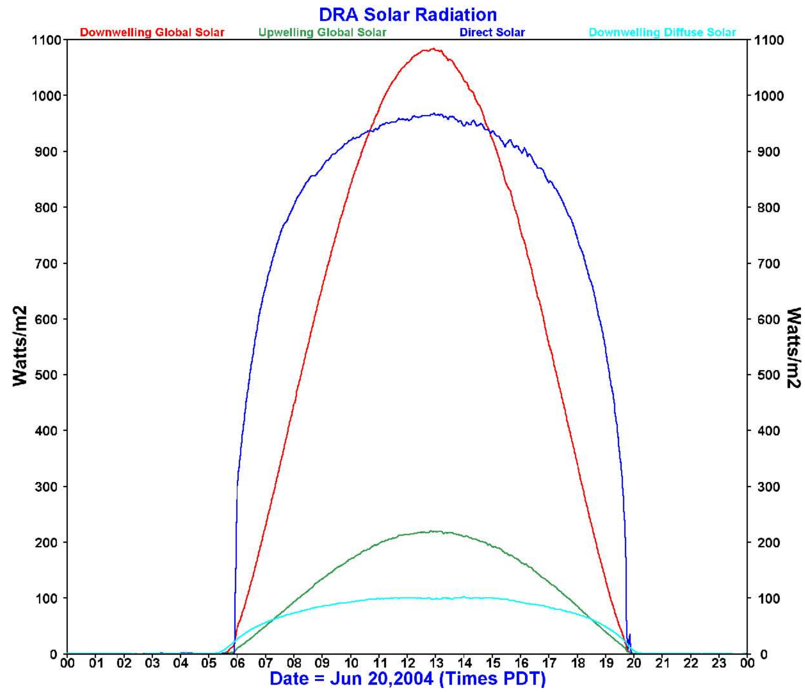

Figure 18. DRA Solar Radiation for June 20, 2004, a nearly cloud-free day.

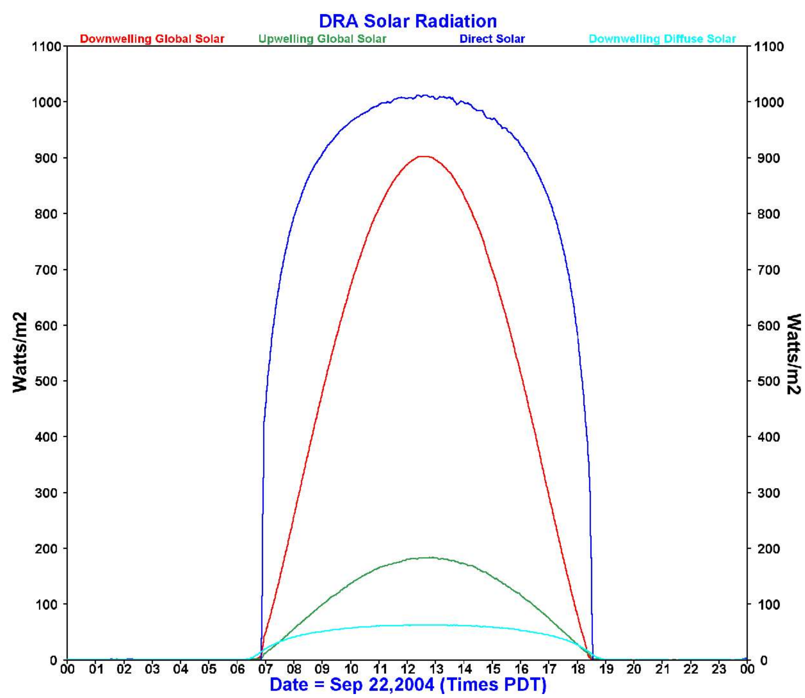

Figure 19. DRA Solar Radiation for September 22, 2004, a nearly cloud-free day.

VIII. ATMOSPHERIC BOUNDARY-LAYER STABILITY

A. Introduction

Determination of the stability of the atmosphere near the ground is a key input requirement for atmospheric dispersion models. Such models are used to estimate the impacts of hazardous materials that might be accidentally released into the atmosphere. The dispersion models commonly used for this purpose are Gaussian plume models that require the specification of atmospheric stability categories to account for effects of atmospheric turbulence on the dispersion process. The mountain-valley topography on the NTS makes it impossible to calculate a single set of values that characterizes atmospheric turbulent mixing on the NTS. Consequently, the stability categories for the NTS are calculated from the average hourly wind speeds for each MEDA station, the solar angle, and the hourly cloud-cover observations reported at the Desert Rock Meteorological Observatory (DRA). This procedure follows regulatory guidance provided by the U.S. Environmental Protection Agency (2000) and the American Nuclear Society (2000).

Stability categories or Pasquill-Gifford (PG) stability classes are commonly used to estimate the effects of atmospheric dispersion. The stability category concept makes use of the letters "A" through "F" to define different turbulence regimes. Category "A" specifies free convection in statistically unstable air, "D" represents neutral stability, and "F" is very stable (dispersion suppressed) with little turbulent mixing. In Yucca and Frenchman Flats, in winter, F-stability tends to persist from 4 p.m. PST until 8 a.m. PST the next morning with an abrupt transition to C- or B-stability near 9 a.m. PST, followed by C- or B-stability during the afternoon. In summer, E- or F-stabilities occur between 7 p.m. PST and 6 a.m. the next morning with a rapid change to B-stability at 7 a.m. PST and generally C- or B-stabilities and some D-stability in late afternoon.

B. Average Values by Month

Average values of Pasquill-Gifford Stability (A - F) are presented for DRA for the period 1978 through 2004. The technique employed for computing the atmospheric stabilities is based on the procedure outlined by Turner (1969). The stability category is estimated by utilizing standard surface observations, the time of year, and time of day, along with the wind speed. DRA weather observations were utilized to calculate the atmospheric stability for the years 1978 through 2004.

Table 30 depicts the average stability by hour and day of the month for January. The average values are well delineated between day and night with the night-time and early morning being "E", and the midday being mostly "C" and some"D". The "E" values indicate stable conditions, which is typical for night-time. The "C' values indicate a conditionally unstable atmosphere, while the "D" category is neutral stability.

Table 31 depicts the average stability conditions for April for DRA. These values are not far different from those depicted in Table 30. This table shows that the night-time is mostly "E" with the day-time mostly "C" and more "D" late in the day. The "C" and "D" are extended somewhat due to longer

Table 30. Stability Table for: Station = DRA, Month = January
Years = 1978 - 2004

Hour (LT)

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	E	E	E	E	E	E	E	E	E	E	C	C	C	C	D	C	E	E	E	E	E	E	E	E
02	E	E	E	E	E	E	E	E	E	E	D	C	D	C	D	D	D	D	D	E	E	E	E	E
03	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	D	D	E	E	E	E	E	E	E
04	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	E	E	E	E	E	E	E
05	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	E	E	E	E	E	E	E
06	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	E	E	E	E	E	E	E
07	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	E	E	E	E	E	E	E	E
08	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	E	E	E	E	E	E	E
09	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	E	E	E	E	E	E	E
10	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	D	D	D	E	E	E	E	E	E
12	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	D	D	E	E	E	E	E	E	E
13	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	E	E	E	E	E	E	E
14	E	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	E	E	E	E	E	E	E	E
15	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	E	E	E	E	E	E	E	E
16	E	E	E	E	E	E	E	E	E	C	C	D	C	D	C	C	D	E	E	E	E	E	E	E
17	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	E	E	E	E	E	E	E	E
18	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	E	E	E	E	E	E	E
19	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	E	E	E	E	E	E	E	E
20	E	E	E	E	E	E	E	E	E	C	C	C	D	C	D	D	D	E	E	E	E	E	E	E
21	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	E	E	E	E	E	E	E	E
22	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	D	E	E	E	E	E	E	E
23	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	E	E	E	E	E	E	E	E
24	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	E	E	C	C	C	C	C	D	D	D	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
29	E	E	E	E	E	E	E	E	E	C	D	C	C	C	D	D	C	E	E	E	E	E	E	E
30	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	E	E	E	E	E	E
31	E	E	E	E	E	E	E	E	E	C	C	C	C	C	D	C	C	E	E	E	E	E	E	E
Avg	E	E	E	E	E	E	E	E	E	D	C	C	C	C	C	C	D	E	E	E	E	E	E	E

daylight during April. The “D” category is usually present when the wind speed is stronger - increasing wind speed eventually points all stabilities towards “D”.

Table 32 is DRA for July. During the middle of summer atmospheric conditions become more unstable during the day-time, and the number of hours are extended. Again the night-time and early morning exhibits mostly “E” stabilities with the day-time showing mostly “C” with some “B” until about noon. The afternoon transitions towards “D” late in the day and early evening.

Table 33 is for October for DRA. This fall month shows many more hours with stable conditions (E). The “C” and “D” stabilities are confined more to the middle of the day and early evening. These results are mostly due to the shorter days in October.

Table 31: Stability Table for: Station = DRA, Month = April

Years = 1978 - 2004

Hour (LT)

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E	E
02	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
03	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	C	E	E	E	E	E	E
04	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
05	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
06	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E	E
07	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E	E
08	E	E	E	E	E	E	E	E	C	B	C	C	C	C	C	C	D	D	D	E	E	E	E	E
09	E	E	E	E	E	E	E	D	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E	E
10	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	D	D	D	D	D	E	E	E	E
11	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
12	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
13	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	C	E	E	E	E	E	E
14	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E	E
15	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E	E
16	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E	E
17	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	D	D	D	D	E	E	E	E	E
18	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
19	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	C	E	E	E	E	E	E
20	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	C	D	D	D	E	E	E	E	E
21	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
22	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
23	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
24	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
25	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E	E
26	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	C	D	D	D	E	E	E	E	E
27	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	C	D	E	E	E	E	E
28	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	D	D	D	D	E	E	E	E
29	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	C	C	D	E	E	E	E	E
30	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
Avg	E	E	E	E	E	E	E	D	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E

Table 32: Stability Table for: Station = DRA, Month = July

Years = 1978 - 2004

Hour (LT)

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	E	E	E	E	E	E	E	C	C	B	C	C	C	C	C	D	D	D	D	D	E	E	E	E
02	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	D	D	D	E	E	E	E	E
03	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	C	D	D	E	E	F	E	E
04	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E
05	E	E	E	E	E	E	F	C	C	C	C	C	C	C	C	D	C	D	D	D	E	E	E	E
06	E	E	E	E	E	E	F	C	C	C	C	C	C	C	C	D	D	D	D	D	E	E	E	E
07	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	D	D	D	D	E	E	E	E
08	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	D	C	D	D	E	E	E	E	F
09	E	E	E	E	E	E	F	C	C	C	C	C	C	C	C	C	D	D	D	D	E	E	E	E
10	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	D	E	E	E	E
11	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
12	E	E	E	E	E	E	E	C	C	C	C	B	C	C	C	D	D	D	D	D	E	E	E	E
13	E	E	E	E	F	E	E	C	C	C	C	B	C	C	C	C	C	D	D	E	E	E	E	E
14	E	E	E	E	E	E	F	C	C	C	C	C	C	C	C	D	C	D	D	D	E	E	E	E
15	E	E	E	E	E	E	F	C	C	C	C	C	C	C	C	D	D	D	D	E	E	E	E	E
16	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	D	E	E	E	E
17	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E
18	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	D	E	E	E	E
19	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	D	D	D	E	E	E	E	E
20	E	E	F	E	E	E	F	C	C	C	C	C	C	C	C	C	D	D	D	D	E	E	E	E
21	E	E	E	E	E	E	F	C	C	C	B	C	B	C	C	C	D	D	D	E	E	E	E	E
22	E	E	E	E	E	E	E	C	C	B	C	C	C	C	C	C	C	D	D	E	E	E	E	E
23	E	E	E	F	E	E	E	C	C	B	C	C	C	C	C	D	C	D	D	E	E	E	E	E
24	E	E	E	E	E	F	E	C	C	C	C	B	C	C	C	C	C	D	D	E	E	E	F	F
25	E	F	E	E	E	F	F	B	C	B	C	C	C	C	C	C	C	D	D	D	E	E	E	E
26	E	E	E	E	E	E	F	C	C	B	C	C	C	C	C	C	C	D	D	D	E	E	E	E
27	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E
28	E	E	E	E	E	F	F	B	C	B	C	C	C	C	C	C	C	D	D	D	E	E	E	E
29	E	E	E	E	E	E	E	B	C	C	C	B	C	C	C	C	C	D	D	E	E	E	E	E
30	E	E	E	E	E	E	E	C	C	B	C	C	C	C	C	D	C	D	D	E	E	E	E	E
31	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E
Avg	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	C	D	D	E	E	E	E	E

Table 33. Stability Table for: Station = DRA, Month = October

Years = 1978 - 2004

Hour

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	E	E	F	E	E	E	E	F	C	C	B	B	C	C	C	C	C	E	E	E	E	E	E	E
02	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
03	E	E	E	E	E	E	E	E	C	C	B	C	B	B	C	C	C	E	E	E	E	E	E	E
04	F	F	E	E	E	E	E	F	C	C	B	C	C	C	C	C	C	E	E	E	E	E	E	E
05	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	E	E	E	F	E	F	F
06	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	C	E	E	E	E	E	E	E
07	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	C	E	E	E	E	E	E	E
08	E	E	E	E	E	E	E	E	C	C	B	B	C	C	C	D	D	E	E	E	E	E	E	E
09	F	E	E	E	E	E	E	F	C	C	B	C	C	C	C	D	D	E	E	E	E	E	E	E
10	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	D	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
12	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	D	C	E	E	E	E	E	E	E
13	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
14	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	E	E	E	E	F	E	F
15	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	E	E	E	E	E	E	F
16	E	E	E	E	E	E	E	E	C	C	C	B	C	C	C	C	C	E	E	E	E	E	E	E
17	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	C	E	E	E	E	E	F	E
18	E	E	F	F	F	F	F	E	C	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
19	E	E	E	E	E	E	E	E	D	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
20	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
21	E	E	E	F	E	E	E	E	E	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
22	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	E	E	E	E	E	F	E
23	F	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
24	E	E	E	E	E	E	E	E	E	C	C	B	C	C	C	C	C	E	E	E	E	E	E	E
25	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E
26	E	E	E	E	E	E	E	E	E	C	C	C	C	C	D	C	C	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	C	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	D	D	E	E	E	E	E	E	E
29	E	E	E	E	E	E	E	E	E	C	C	C	C	C	D	C	E	E	E	E	E	E	E	E
30	E	E	E	E	E	E	E	E	E	C	C	C	C	C	D	D	D	E	E	E	E	E	E	E
31	E	E	E	E	E	E	E	E	E	C	C	C	C	C	C	C	E	E	E	E	E	E	E	E
Avg	E	E	E	E	E	E	E	E	D	C	C	C	C	C	C	C	C	E	E	E	E	E	E	E

C. Frequency Distribution by Month

Tables 36 - 38 depict the percent frequency of occurrence of each stability category (A - F) at DRA for four selected months (Jan, Apr, Jul, and Oct). These months were chosen as representative of the four seasons.

Table 36 is for January. This table clearly shows that the night-time and early morning hours are generally stable about 2/3 of the time with about 1/3 neutral conditions. The late morning through early afternoon times show stabilities ranging from neutral to unstable.

Table 36: Stability Frequency Table
Desert Rock
Years = 1978-2004
Month = 01

	Stability Category (percent)									
	A	B	C	D	E	F		Total	Avg	Mode
Hour										
00				32	31	36		752	E	F
01				34	29	37		750	E	F
02				34	33	33		752	E	D
03				35	31	34		778	E	D
04				33	33	33		787	E	D
05				34	35	31		775	E	E
06				36	32	32		767	E	D
07				35	36	28		775	E	E
08				37	36	27		763	E	D
09		15	21	37	17	10		770	D	D
10		26	34	40				769	C	D
11		19	41	40				770	C	C
12		16	43	41				763	C	C
13		12	47	41				775	C	C
14		9	43	48				776	C	D
15		6	46	48				789	C	D
16		1	10	57	26	5		784	D	D
17				50	35	16		787	E	D
18				44	35	21		753	E	D
19				42	32	26		759	E	D
20				40	32	27		757	E	D
21				37	33	30		752	E	D
22				34	29	37		760	E	F
23				32	34	35		742	E	F
All	4	800	2205	7235	4354	3807		18405		
Pcnt		4	12	39	24	21				
All					(# missing)		169	18574		

Table 37 shows the percent frequency of occurrence for the month of April. This spring month exhibits an increase in unstable conditions during the day-time with some “A” category showing up, which January did not have. The night-time hours are similar with about 2/3 of the conditions being stable and about 1/3 being neutral (D). The day-time hours also show that the categories are mostly unstable or conditionally unstable in the middle of the day. Predominately neutral conditions occur late in the day and into the early evening.

Table 37: Stability Frequency Table
Desert Rock
Years = 1978-2004
Month = 04

	Stability Category (percent)									
Hour	A	B	C	D	E	F		Total	Avg	Mode
00				35	28	38		744	E	F
01				35	31	35		742	E	F
02				34	27	38		738	E	F
03				35	28	37		762	E	F
04				33	31	36		746	E	F
05				35	30	35		764	E	F
06				36	30	34		764	E	D
07		22	22	38	8	10		765	D	D
08		25	31	44				765	C	D
09	9	30	24	37				754	C	D
10	5	29	25	40				753	C	D
11	8	26	34	31				753	C	C
12	8	22	42	28				753	C	C
13	7	23	38	32				751	C	C
14	1	20	22	56				748	C	D
15	2	21	22	56				755	C	D
16		3	29	67				743	D	D
17		4	32	64				770	D	D
18				64	27	9		743	D	D
19				49	30	21		740	E	D
20				41	30	29		744	E	D
21				40	30	30		742	E	D
22				37	30	32		729	E	D
23				36	28	36		740	E	F
All	307	1698	2435	7526	2895	3147		18008		
Pcnt	2	9	14	42	16	17				
All					(# missing)		126	18134		

Table 38 is for July and shows a similar pattern as that depicted for April with a further increase in unstable conditions for the day-time hours. The middle of the day experiences predominately "C" stabilities with some "A", "B", and "D". The "D" category occurs late in the day and early evening. The night-time hours exhibit even more stable conditions with about 3/4 being "E" or "F". The summer-time winds tend to be less than those experienced in the spring-time, which helps explain the lower percentage of "D", especially at night.

Table 38: Stability Frequency Table
Desert Rock
Years = 1978-2004
Month = 07

	Stability Category (percent)									
	A	B	C	D	E	F		Total	Avg	Mode
Hour										
00				24	35	41		808	E	F
01				23	33	44		803	E	F
02				20	35	45		797	E	F
03				19	36	44		803	E	F
04				17	36	47		815	E	F
05				17	35	48		799	E	F
06				15	28	57		804	E	F
07		47	34	19				797	C	B
08		33	42	25				802	C	C
09	10	45	18	27				782	C	B
10	6	38	20	36				798	C	B
11	11	22	57	10				805	C	C
12	8	21	60	11				799	C	C
13	7	17	64	12				810	C	C
14	7	15	65	12				805	C	C
15	1	20	17	62				795	C	D
16	1	16	18	64				816	C	D
17		2	22	76				815	D	D
18		2	25	73				806	D	D
19				60	31	9		816	D	D
20				38	38	24		810	E	D
21				31	33	37		802	E	F
22				28	34	39		805	E	F
23				26	33	41		803	E	F
All	411	2220	3560	5998	3292	3814		19295		
Pcnt	2	12	18	31	17	20				
All					(# missing)		216	19511		

Table 39 shows the DRA stabilities for the month of October. This month continues the day-time/night-time split of the stability categories with only the "D" category being present at all hours. The midday has unstable conditions with the "B" category predominating**,** and a few "A" category also showing. The "C" and "D" categories are about evenly split during the daylight hours. The night-time is similar to that shown for July with about 3/4 of the time being stable (E & F), and the rest of the time being neutral (D).

Table 39: Stability Frequency Table
Desert Rock
Years = 1978-2004
Month = 10

	Stability Category (percent)									
	A	B	C	D	E	F		Total	Avg	Mode
Hour										
00				21	27	52		794	E	F
01				22	29	48		790	E	F
02				25	26	50		801	E	F
03				26	27	48		802	E	F
04				25	25	50		819	E	F
05				26	26	49		804	E	F
06				26	29	46		806	E	F
07				26	25	49		794	E	F
08		24	16	35	10	16		793	D	D
09		31	32	37				791	C	D
10	6	33	31	29				798	C	B
11	7	42	22	28				787	C	B
12	4	39	24	32				789	C	B
13	4	40	25	32				786	C	B
14	3	26	31	39				804	C	D
15		6	47	48				807	C	D
16		5	43	47	3	1		823	D	D
17				45	39	16		809	E	D
18				28	40	32		805	E	E
19				26	38	36		809	E	E
20				22	37	41		808	E	F
21				22	31	46		802	E	F
22				21	31	48		807	E	F
23				23	27	50		796	E	F
All	194	1964	2168	5693	3769	5436		19224		
Pcnt	1	10	11	30	20	28				
All					(# missing)		287	19511		

D. Frequency Distributions by Month and Time of Day

Adequate data were available to graph the diurnal evolution of the PG stability categories as a function of time of day and season. Figure 20 shows the percent frequency of occurrence of stability category (A - F) for the month of January at DRA. Every 3 hours are chosen to delineate the progression from night to day to night.

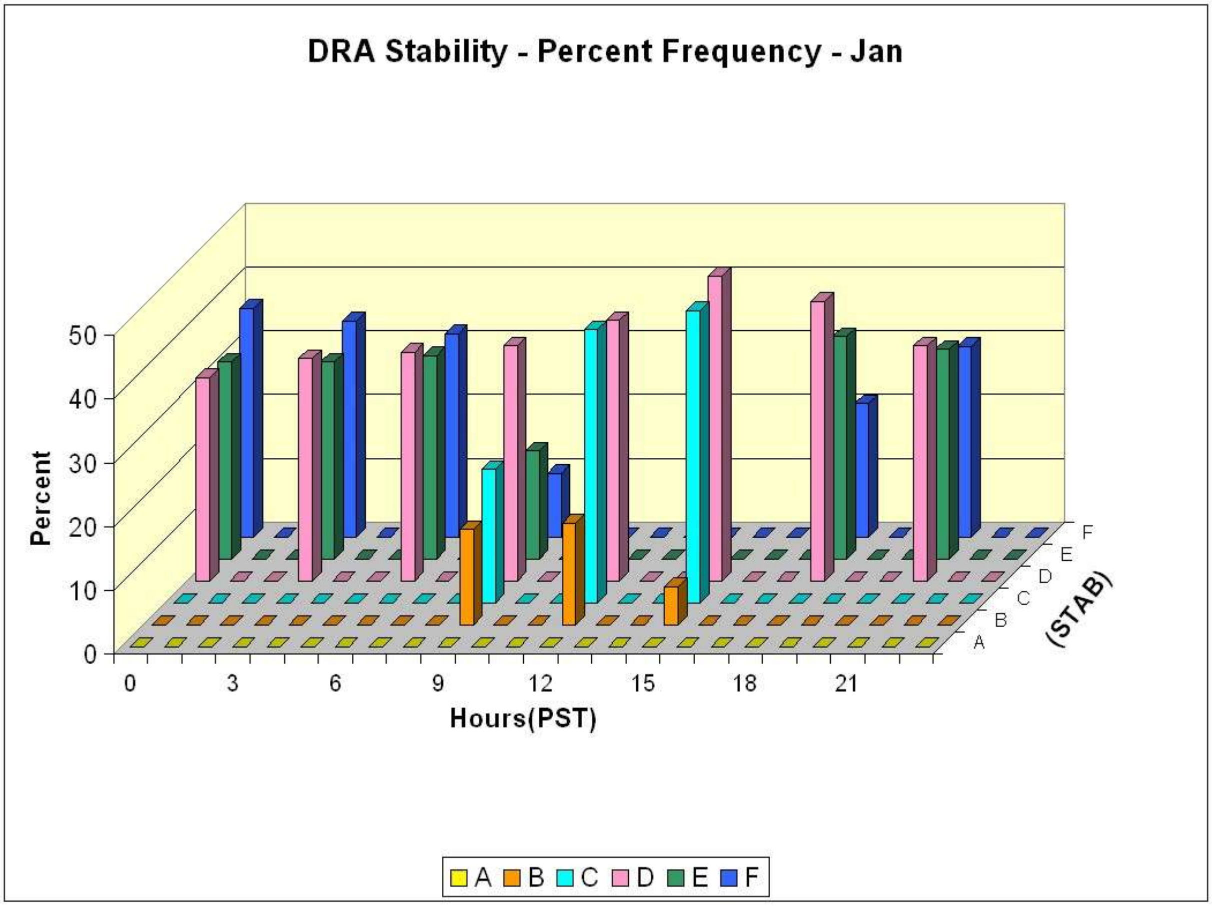

Figure 20: DRA PG Stability Category as a Function of Local Time in January.

Figure 20 shows that during the winter, the “D” category is quite prevalent at all hours with only a slightly higher percentage of the “F” category late at night. The “C” and “D” categories are nearly equal from the middle of the day into the afternoon.

Figure 21 depicts the percent frequencies of occurrence of PG stability category for the month of April. This month, which typifies spring conditions, exhibits a larger dominance of the “D” category than that for January (Figure 20). The only time of day that the “D” category does not dominate is near noon, when the “C” category percentage is greater. The late afternoon and early evening show that the “D” category is much more prevalent during those times.

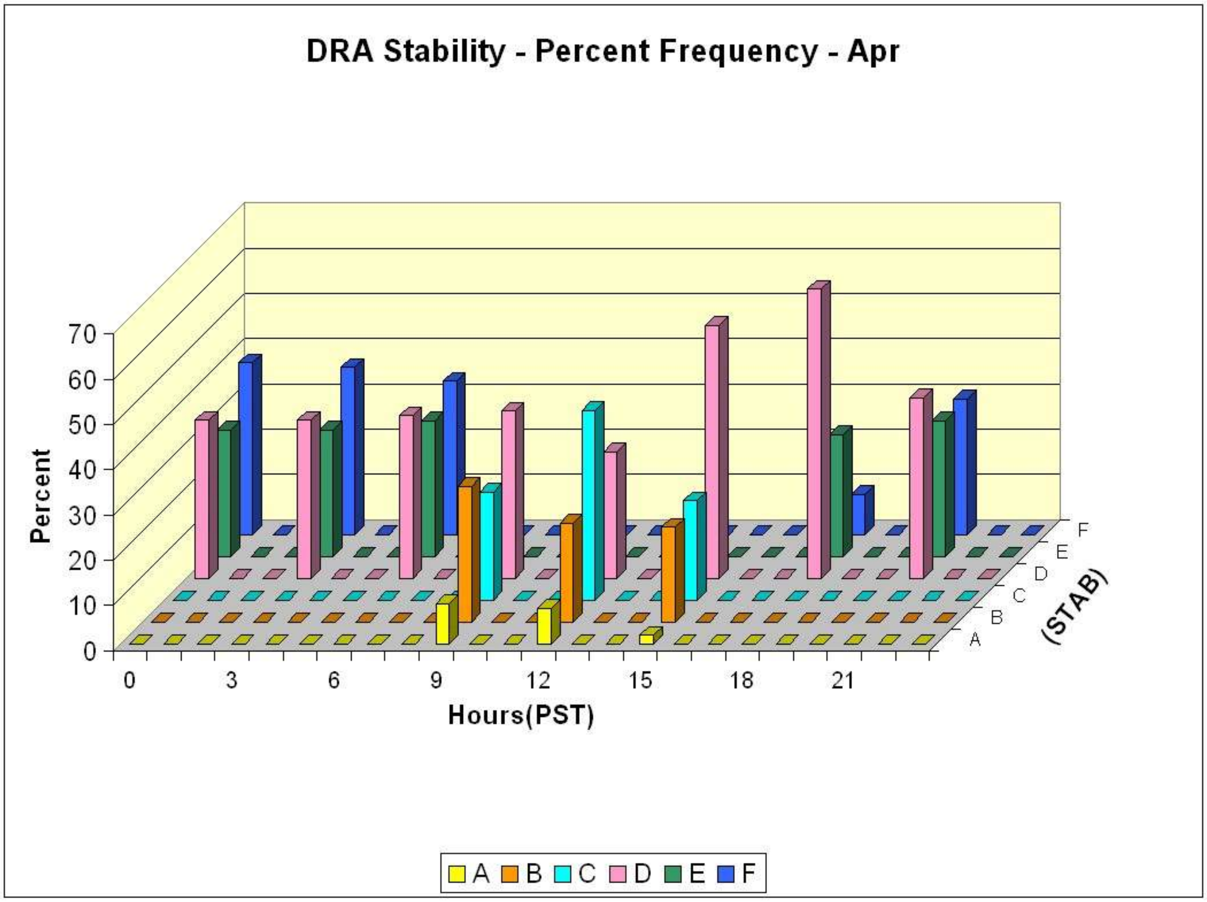

Figure 21: DRA PG Stability Category as a Function of Local Time in April.

Figure 22 is a representation of percent occurrence of PG stability for the month of July. This month shows a large change from April with the night-time being predominately categories "E" and "F". The "D" category is only predominating in the afternoon and early evening. Mid-morning shows the "B" category being the greatest, and by noon the "C" category is the greatest**.** Figures 21 and 22 clearly show that the biggest change in the distribution of PG stability categories (and their percentages) occurs between spring and summer.

Fall PG stability categories are portrayed in, Figure 23, for October, for DRA. for the frequency of occurrence of PG stabilities. This month shows distinct changes from the those exhibited during July. The October distributions of stability categories show the "D" category more prevalent with the highest values in the late morning and afternoon. The night-time exhibits strongly stable conditions from the late evening throughout the night, with the "F" category clearly dominating. The middle of the day shows unstable conditions with the "B" category being the largest.

Figures 20 through 23 help demonstrate that there are distinct seasonal variations of the predominating stability categories during the day. Spring stabilities are much different from summer stabilities. One of the contributing factors is that the average wind speeds are greater in the spring-time than in the summer-time. The higher speeds are a key factor in making the stabilities trend toward the "D" category. The winter-time also has generally windier conditions than the summer-time, which also gives more "D" stability categories. The most striking effect for the October stabilities is the predominance of the "F" category from late evening until morning. October is one of the months with relatively light winds overall, which would help explain the night-time very stable conditions.

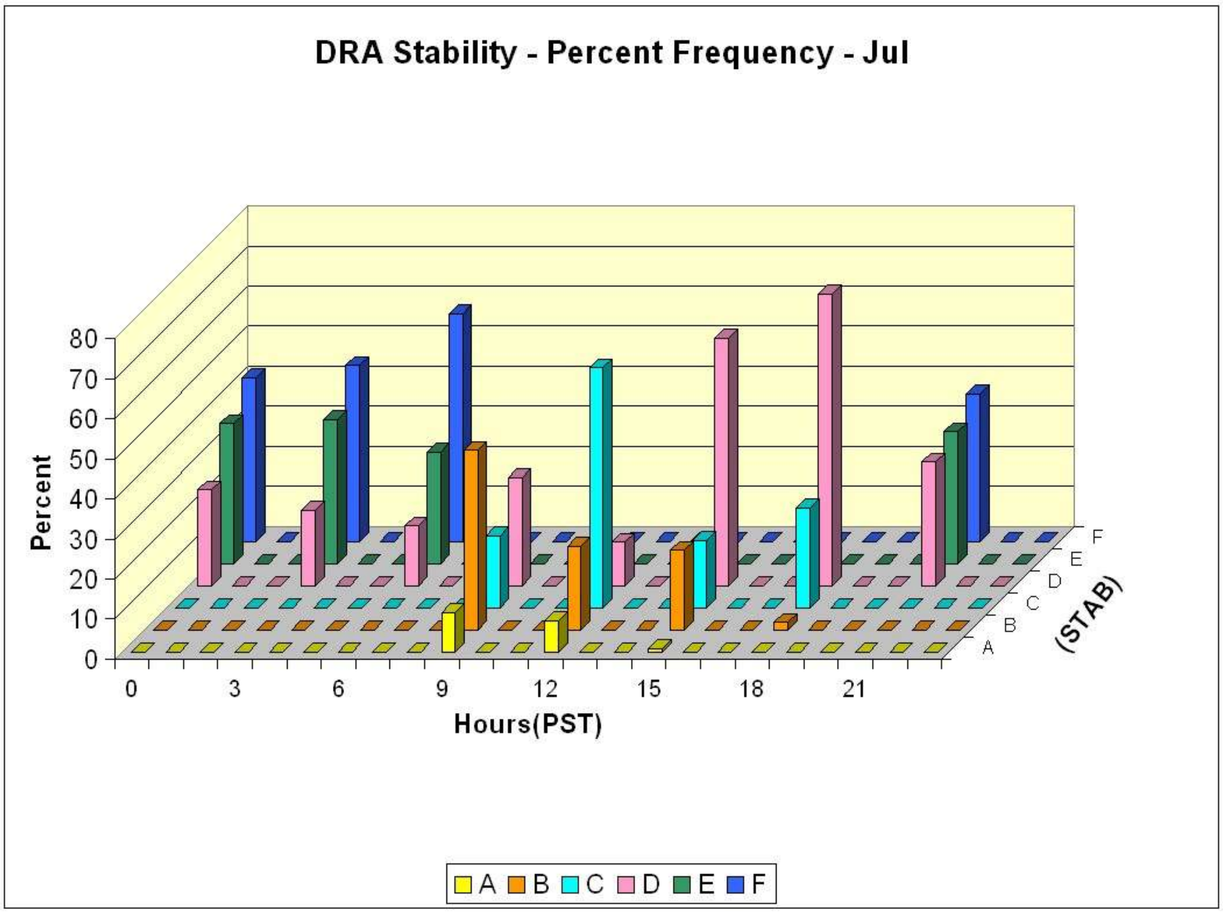

Figure 22: DRA PG Stability Category as a Function of Local Time in July.

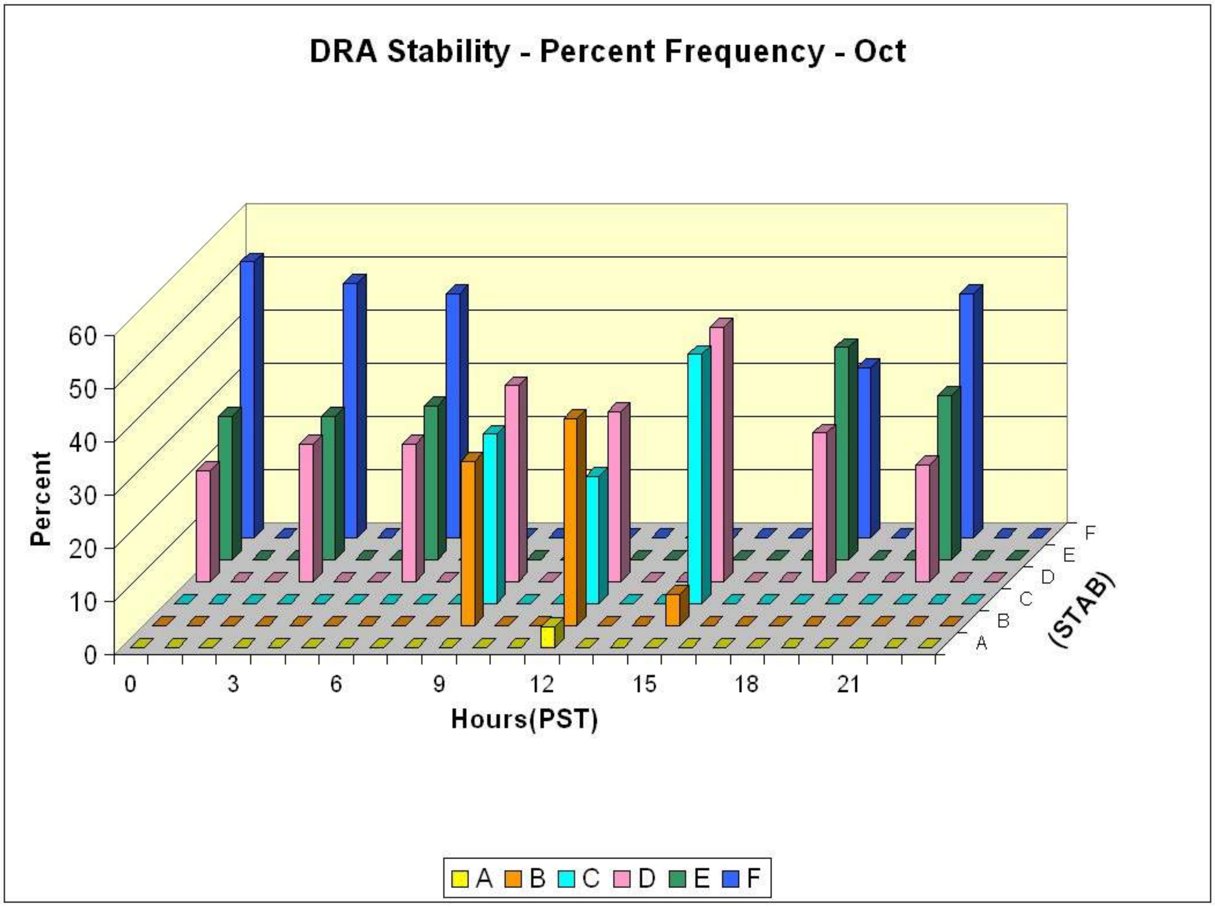

Figure 23: DRA PG Stability Category as a Function of Local Time in October.

XI. MIXING HEIGHTS

Table 40 lists the average mixing heights for the Yucca Flat Weather Station (UCC). The table indicates that the mixing heights are minimal in the early morning (4 AM PST, when the radiosonde observation was taken), and probably was influenced mostly by the wind speed at the time of the observation. In contrast, the afternoon mixing heights (4PM PST) are highly seasonally dependent. The afternoon values vary from about 1000 meters in the winter to more than 3500 meters in the summer. Along with the much greater values in the warm season, the variation is also greater as indicated by the standard deviations. For example, the spring months, April and May, show the greatest ranges of mixing heights. Several factors probably contribute to the greater variations in the spring, including more frequent frontal passages, and air mass changes, etc.

The mid-summer afternoon average mixing heights are nearly 3700 meters, which shows that the high desert has extremely deep thermally driven turbulence. Flying small aircraft in the afternoon in the desert can be unpleasant due to the deep turbulence.

Table 40: Yucca Flat Mixing Heights 1973 - 1977

	Heights in Meters			
	Morning		Afternoon	
	Average	Std Dev	Average	Std Dev
month				
01	186.	305.	985.	544.
02	225.	394.	1574.	694.
03	332.	474.	2078.	928.
04	273.	474.	2859.	1008.
05	195.	405.	3286.	1143.
06	148.	341.	3588.	839.
07	144.	270.	3689.	902.
08	108.	239.	3361.	853.
09	98.	192.	3000.	957.
10	124.	275.	2148.	786.
11	149.	363.	1295.	478.
12	107.	203.	1016.	501.

X. APPENDICES

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Appendix A. Climatological Summaries for Desert Rock and Yucca Flat.

LATITUDE 36°37.57'N
LONGITUDE 116°01.07'W
ELEVATION 3304 FEET (1007 METERS)

25-YEAR CLIMATOLOGICAL SUMMARY
(MAY 1978 - DECEMBER 2003)
DESERT ROCK, NEVADA - NEVADA TEST SITE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
AIR RESOURCES LABORATORY SPECIAL OPERATIONS AND RESEARCH DIVISION

NEVADA COORDINATE SYSTEM
(NAD-27 Central)
E690,298
N682,805

MONTH	TEMPERATURE (°F) AVERAGES DAILY MAXIMUM	DAILY MINIMUM	MONTHLY	EXTREMES HIGHEST	YEAR	LOWEST	YEAR	DEGREE DAYS (Base 65°) HEATING	COOLING	PRECIPITATION (Inches) AVERAGE	GREATEST MONTHLY	YEAR	LEAST MONTHLY	YEAR	GREATEST DAILY	YEAR	SNOW AVERAGE	GREATEST MONTHLY	YEAR	GREATEST DAILY	YEAR
JAN	55.7	33.5	44.6	79	2003	13	1979	600	0	0.67	3.37	1995	0	1976 #	0.90	1967	1.2	5.1	1988	4.3	1988
FEB	59.5	36.6	48.1	83	1986	11	1989	453	0	0.88	4.64	1998	0	1977 #	2.18	1998	0.7	6.0	1987	6.0	1987
MAR	65.8	40.8	53.3	86	1997	23	1995	342	2	0.66	3.07	1973	0	1997 #	0.86	1982	0.1	0.5	1983	T	1983
APR	73.6	47.2	60.4	96	1996	25	1999	164	38	0.35	2.15	1965	0	2002 #	0.89	1965	0	T	1983	T	1983
MAY	83.2	55.9	69.5	109	2003	33	1988	44	190	0.29	1.94	1987	0	2002 #	1.53	1981	0	0		0	
JUN	93.4	64.5	79.0	111	1994	40	1995	3	429	0.13	1.35	1998	0	2003 #	0.68	1998	0	0		0	
JUL	98.9	70.6	84.8	115	2002	51	1982	0	619	0.51	3.64	1984	0	1989 #	2.03	1984	0	0		0	
AUG	97.3	69.5	83.4	111	1981	56	1992	0	564	0.66	5.37	1983	0	2002 #	3.22	1983	0	0		0	
SEP	89.7	61.9	75.8	103	1993	39	1982	6	326	0.35	2.46	1997	0	2003 #	1.25	1985	0	0		0	
OCT	77.9	50.3	64.1	100	1980	32	1989	99	79	0.27	1.65	1987	0	1998 #	1.05	1976	0	0		0	
NOV	63.4	39.0	51.2	85	1999	19	1985	406	1	0.47	2.07	1965	0	1999 #	1.48	1984	0.4	3.0	1983	3.0	1983
DEC	55.3	32.6	44.0	73	1980	6	1990	643	0	0.47	2.45	1965	0	2002 #	1.21	1965	0.7	6.6	1984	4.0	1984
ANN	76.1	50.2	63.2	115	Jul 2002	6	Dec 1990	2767	2253	5.72	5.37	Aug 1983	0	Sep 2003 #	3.22	Aug 1983	3.1	6.6	Dec 1987	6.0	Feb 1987

MONTH	RELATIVE HUMIDITY (%) HOUR (Pacific Standard Time) 4	10	16	22	WIND (Speeds in MPH) AVERAGE SPEED	PEAK SPEED	YEAR	VECTOR WIND (Dir/Spd) 00-02 PST	12-14 PST	STATION PRESSURE (Inches) AVERAGES	HIGHEST	LOWEST	(a) AVERAGE SKY COVER SUNRISE TO SUNSET	AVERAGE NUMBER OF DAYS Sunrise-Sunset CLEAR	PARTLY CLOUDY	CLOUDY	PRECIPITATION .01 Inch or more	.10 Inch or more	.50 Inch or more	1.00 Inch or more	1.0 Inch or more of snow	THUNDERSTORMS	TEMPERATURE Maximum 90°F or more	32°F or less	Minimum 32°F or less	0°F or less	MONTH
JAN	58	44	35	54	8.9	58	1980	055/05	124/02	26.69	27.15	26.03	49	13	7	11	4	2	*	0	*	*	0	*	13	0	JAN
FEB	55	39	28	49	9.3	66	1983	058/03	170/02	26.65	27.06	25.92	54	11	7	10	3	2	*	0	*	*	0	*	7	0	FEB
MAR	57	38	30	47	9.3	66	1985	067/02	213/05	26.58	27.02	25.91	51	12	9	10	5	2	*	0	0	*	0	0	3	0	MAR
APR	43	27	20	33	10.0	58	1988 #	050/02	218/07	26.55	26.97	26.11	45	13	9	8	2	1	*	0	0	1	1	0	1	0	APR
MAY	39	23	17	29	10.0	67	1988 #	058/01	219/08	26.50	26.89	26.06	38	17	8	6	3	1	*	*	0	1	8	0	0	0	MAY
JUN	26	16	12	18	10.3	55	1989 #	068/01	215/10	26.51	26.84	26.09	24	21	6	3	1	*	0	*	0	2	22	0	0	0	JUN
JUL	33	21	15	25	9.7	53	1980	065/01	214/11	26.56	26.80	26.26	23	22	6	3	3	2	1	*	0	2	29	0	0	0	JUL
AUG	40	25	19	30	8.8	66	1988	085/02	211/11	26.57	26.83	26.28	24	23	4	4	4	2	*	*	0	4	28	0	0	0	AUG
SEP	39	25	19	37	8.7	72	1991	067/02	209/08	26.57	26.89	26.12	26	20	6	4	2	1	*	*	0	2	17	0	0	0	SEP
OCT	45	28	22	37	8.0	58	1984	061/03	201/03	26.62	27.10	26.06	30	19	7	5	2	1	*	0	0	*	3	0	*	0	OCT
NOV	54	36	29	47	8.6	62	1988	055/03	158/02	26.66	27.11	25.84	42	14	8	8	3	2	*	*	*	*	0	0	5	0	NOV
DEC	61	43	36	55	8.1	61	1988	055/05	114/03	26.69	27.13	25.97	46	14	6	10	3	2	*	0	*	*	0	*	16	0	DEC
ANN	46	30	24	38	9.1	72	Sep 1991	062/02	183/05	26.59	27.15	25.84	38	199	84	82	35	18	4	1	1	12	108	*	45	0	ANN

* ONE OR MORE OCCURRENCES DURING THE PERIOD OF RECORD BUT AVERAGE LESS THAN 0.5 DAY.
# MOST RECENT OF MULTIPLE OCCURRENCES.

(a) SKY COVER IS EXPRESSED IN THE RANGE FROM 0 FOR NO CLOUDS TO 10 WHEN THE SKY IS COMPLETELY COVERED WITH CLOUDS. CLEAR, PARTLY CLOUDY AND CLOUDY ARE DEFINED AS AVERAGE DAYTIME CLOUDINESS OF 0-3, 4-7 AND 8-10 TENTHS, RESPECTIVELY

LATITUDE 36°57'N
LONGITUDE 116°03'W
ELEVATION 3924 FEET
(1196 METERS)

17-YEAR CLIMATOLOGICAL SUMMARY
(JANUARY 1962 - APRIL 1978)
YUCCA FLAT, NEVADA - NEVEDA TEST SITE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
AIR RESOURCES LABORATORY SPECIAL OPERATIONS AND RESEARCH DIVISION

NEVADA COORDINATE SYSTEM
(Central)
E680,875
N803,600

MONTH	TEMPERATURE (°F) AVERAGES: DAILY MAXIMUM	DAILY MINIMUM	MONTHLY	EXTREMES: HIGHEST	YEAR	LOWEST	YEAR	DEGREE DAYS (Base 65°): HEATING	COOLING	PRECIPITATION (Inches): AVERAGE	GREATEST MONTHLY	YEAR	LEAST MONTHLY	YEAR	GREATEST DAILY	YEAR	SNOW: AVERAGE	GREATEST MONTHLY	YEAR	GREATEST DAILY	YEAR
JAN	66.0	20.7	35.9	73	1971 1976	-10	1973	893	0	0.87	4.02	1969	0	1972 1976	1.25	1969	2.9	29.1	1974	10.0	1974
FEB	56.9	25.6	41.3	77	1963	5	1965 1971	704	0	1.05	3.60	1978	0	1972 1977	1.51	1976	1.3	17.4	1969	6.2	1969
MAR	60.9	28.3	44.6	87	1966	9	1969 1977	664	0	0.65	3.50	1978	0	1972	0.99	1978	1.9	9.0	1969	7.5	1969 1973
APR	67.7	34.0	50.9	89	1962	13	1966	422	1	0.41	2.57	1965	T	1962 1977	1.08	1965	0.4	3.0	1964	3.0	1964
MAY	79.2	43.3	61.3	98	1974	26	1962	156	39	0.33	1.62	1971	0	1976	0.86	1971	*	0.2	1976	0.2	1975
JUN	88.9	50.4	69.6	107	1970	29	1967 1971	27	170	0.31	2.66	1972	0	1974 1976	1.03	1972	0	0		0	
JUL	96.3	57.2	76.8	108	1972	40	1962 1964	0	371	0.53	1.87	1976	0	1963	1.10	1976	0	0		0	
AUG	94.3	56.5	75.4	108	1972	39	1968 1975	1	332	0.45	2.52	1977	0	1962	2.18	1977	0	0		0	
SEP	86.3	47.1	66.7	105	1971	25	1971	45	104	0.61	2.38	1969	0	1968	2.13	1969	0	0		0	
OCT	75.1	36.7	55.9	94	1963 1964	12	1971	284	6	0.40	1.69	1976	0	1967	1.65	1976	*	T	1971	T	1971
NOV	61.6	26.9	44.3	83	1976	5	1975	616	0	0.59	3.02	1965	0	1962 1976	1.10	1970	0.7	6.6	1972	6.6	1972
DEC	51.8	20.1	35.9	71	1975	-14	1967	894	0	0.68	2.66	1965	T	1969 1972	1.31	1965	2.1	9.9	1971	7.4	1971
ANN	72.5	37.1	54.9	108	JUL AUG 1972	-14	DEC 1967	4658	1023	6.88	4.02	JAN 1969	0	FEB 1977#	2.18	AUG 1977	9.3	29.1	JAN 1974	10.0	JAN 1974

MONTH	RELATIVE HUMIDITY (%) HOUR (Pacific Standard Time): 4	10	16	22	WIND (Speeds in MPH): AVERAGE SPEED	PEAK SPEED	YEAR	VECTOR† WIND (Dir/Spd): 23-02 PST	11-14 PST	STATION PRESSURE (Inches): AVERAGES	HIGHEST	LOWEST	(a) AVERAGE SKY COVER SUNRISE TO SUNSET	AVERAGE NUMBER OF DAYS Sunrise-Sunset: CLEAR	PARTLY CLOUDY	CLOUDY	PRECIPITATION: .01 Inch or more	.10 Inch or more	.50 Inch or more	1.00 Inch or more	1.0 Inch or more of snow	THUNDERSTORMS	TEMPERATURE Maximum: 90°F or more	32°F or less	Minimum: 32°F or less	0°F or less	MONTH
JAN	71	53	39	65	6.0	58	1965	233/01	135/03	26.09	26.54	25.42	4.9	13	8	10	3	2	1	*	1	*	0	1	29	1	JAN
FEB	69	45	32	57	6.8	60+	1976	275/01	118/03	26.06	26.47	25.31	5.2	11	7	10	4	2	1	*	1	0	0	0	24	0	FEB
MAR	61	34	25	47	8.6	56+	1975	240/02	186/05	26.06	26.43	25.47	5.1	12	8	11	4	2	*	0	1	1	0	0	23	0	MAR
APR	53	27	19	38	9.1	60+	1967 1970	250/02	198/05	25.95	26.39	25.50	4.4	13	9	8	3	1	*	*	*	1	0	0	13	0	APR
MAY	48	22	15	32	8.0	60+	1967	260/02	179/07	25.93	26.39	25.42	4.2	15	9	7	2	1	*	0	0	2	4	0	2	0	MAY
JUN	39	18	13	25	7.9	60	1967	272/02	185/08	25.93	26.26	25.42	3.0	18	8	4	2	1	*	*	0	2	15	0	0	0	JUN
JUL	39	19	14	27	7.5	55	1971	278/01	185/12	26.00	26.22	25.67	2.7	20	8	3	3	1	*	*	0	3	29	0	0	0	JUL
AUG	43	22	15	29	6.8	60+	1968	222/02	182/12	26.00	26.22	25.71	2.7	21	7	3	3	1	*	*	0	3	25	0	0	0	AUG
SEP	45	22	18	33	6.7	60	1976	281/01	163/06	26.00	26.36	25.56	2.3	21	6	3	2	1	*	*	0	2	11	0	1	0	SEP
OCT	52	27	21	41	6.5	60	1971	286/01	138/04	26.05	26.40	25.52	3.1	20	7	4	2	1	*	*	0	1	1	0	9	0	OCT
NOV	62	39	30	53	6.0	60+	1973	234/01	152/04	26.08	26.58	25.31	4.7	13	8	9	3	2	*	*	*	*	0	0	24	0	NOV
DEC	68	48	39	63	6.2	53	1970	288/02	109/01	26.08	26.59	25.49	4.5	15	7	9	3	1	1	*	1	*	0	1	30	0	DEC
ANN	54	31	23	42	7.2	60+	FEB 1976#	261/01	174/06	26.01	26.59	25.31	3.9	192	92	81	34	16	3	1	4	15	85	2	155	1	ANN

* ONE OR MORE OCCURRENCES DURING THE PERIOD OF RECORD BUT AVERAGE LESS THAN 0.5 DAY.
\# MOST RECENT OF MULTIPLE OCCURRENCES.
† DATA PERIOD FROM JANUARY 1962 TO DECEMBER 1971

(a) SKY COVER IS EXPRESSED IN THE RANGE FROM 0 FOR NO CLOUDS TO 10 WHEN THE SKY IS COMPLETELY COVERED WITH CLOUDS. CLEAR, PARTLY CLOUDY AND CLOUDY ARE DEFINED AS AVERAGE DAYTIME CLOUDINESS OF 0-3, 4-7 AND 8-10 TENTHS, RESPECTIVELY

B. NTS Weather Extremes

OBSERVED NTS WEATHER EXTREMES (1957 - 2005)

Temperature

NTS Maximum:	**115°F**	**Areas 5, 25, 22**	**July 98, 02**
NTS Minimum:	**-14°F**	**Area 6 (UCC)**	**Dec. 1967**
	-20°F	**Area 19 (Pahute Mesa)**	**Jan. 1970**

Extreme Ranges

Frenchman Flat: 115°F; -8°F
Yucca Flat: 112°F; -14°F
Desert Rock: 115°F; 6°F

Max T≥100°F: 52 days (Area 5)
Max T≥ 90°F: 117 days (Area 5)

Extreme Ranges

Jackass Flats: 115°F; 2°F
Mercury: 113°F; 11°F
Rainier Mesa: 94°F; -11°F

Min T≤ 32°F: 22 days (MER)
Min T≤ 32°F: 155 days (UCC)

Max T≤ 32°F: 24 days (Rainier Mesa)

Precipitation

Maximum Daily Rainfall:	**3.63 inches**	**Mercury**	**08/18/1983**
Maximum 24hour Rainfall:	**3.67 inches**	**Mid Valley**	**10/19-20/2004**
Maximum Annual Rainfall:	**26.87 inches**	**Rainier Mesa**	**1978**

Maximum Daily Snowfall: **10 inches UCC 1974; 6 inches DRA, 1987**
Maximum Monthly Snowfall: **29.1 inch UCC, 1974**

Total Number of Hail Days (UCC): **24 events (1957- June 1978)**
Total Number of Hail Days (DRA): **3 events (June 1978-2002)**

Maximum Number TRW Days (UCC): **20 days, 1967, (1963-June 1978)**
Maximum Number TRW Days (DRA): **23 days, 1984, (June 1978-2002)**

Total Number Ice/Snow Pellets Days (DRA): **11 days (June 1978-2002)**
Total Number Ice/Snow Pellets Days (UCC): **36 days (1957- June 1978)**

Freezing Rain was observed once at DRA; in Feb. 1982

Wind Speed

Maximum Wind Gust:	**94 mph gust**	**February 14, 1984**
Maximum 5-min Average:	**64 mph**	**February 14, 1984**
Duststorm/Sandstorm Days:	**DRA: 0**	**UCC: 1 (Feb/64)**

Fog

Desert Rock (DRA, 1970 through 2002):

Fog is rare at the NTS; however, in January 1995, 12 fog days were observed at DRA.

In January 1993, there were eight fog days at DRA. The average number of fog days at DRA, for 1978 through 2002 is five days/yr. During the 25-yr record, there have been only three fog days that reduced visibility to 1/4 mile or less at DRA.

Fog between April 1 through October 31 is very rare at DRA; having been reported on only 10 days in 25 yrs.

Yucca Flat (UCC), 1957-1978)

Six fog days, Feb. 1969
Six fog days, Jan. 1974

No fog events have reduced visibility to 1/4 mile or less at UCC.

Average number of fog days at UCC for 1957 to June 1978 is 3 to 4 days/yr.

Fog is rare between May 1 through September 30 having been reported on only 4 days in 16 yrs of continuous observations.

Cloud-to-Ground (CG) Lightning (within boundary of NTS)

Maximum: **2532 total flashes in 1999 warm season**
Minimum: **409 total flashes in 1995 warm season**

Maximum Positive: 58 in 1998

Minimum CG flashes occur between 0800 and 0900 PDT

Maximum CG activity tends to occur between 1300 and 1600 PDT

Most active CG Areas are 12, 19 20, and 22.

Average separation distance between each CG flashes is 3.4 mi

Peak CG flash current detected has been -167,000 amps.

Based on eight warm seasons, the mean annual (warm season) cloud-to-ground flash density for the NTS is 0.35 fl/sq. km. ***For safety analyses - recommend that the flash density be rounded up to 0.40 fl/sq. km to account for limits on detectability.***

C. NTS Temperatures

C.1 Tables of Extremes for Desert Rock

The following tables show the extreme daily temperatures for Desert Rock (DRA) for the period May 1978 through December 2005. Data from 1978 through 2002 are during the period when surface observations were based on data from a Hygro-Thermometer (HO-83). On September 22, 2003 the Radiosonde Surface Observing Instrumentation System (RSOIS) became the official system for measuring ambient and dew point temperature, as well as wind direction and speed. On December 17, 2003 the Vaisala Surface Observation System (MEDA) became the official ambient and dew point temperature and wind direction and speed measurement equipment. Temperatures marked in red are the extreme temperatures for the month.

Desert Rock Temperature Extremes 1978-2005

MONTH = JANUARY

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	71	1981	19	1991	37	1979	45	1997
2	67	1981	20	1979	39	1979	49	1997
3	66	2001	17	1982	38	1993	45	1997
4	70	2001	21	1993	36	1993	48	1984
5	74	2003	24	2000	39	1988	43	1986
6	69	1984	22	1982	36	1993	42	2003
7	70	2002	18	1982	39	1982	48	2003
8	70	2002	16	1989	43	1989	43	2003
9	69	1990	22	1989	43	1987	48	2005
10	70	1986	24	1989	41	1998	49	2005
11	69	1990	25	1994	43	1989	44	1996
12	68	1996	26	1989	43	1985	47	1980
13	68	2002	22	1997	39	1997	46	1990
14	67	1983	17	1997	36	1997	47	1994
15	67	1996	26	1987	33	1997	44	1994
16	68	2003	22	1987	32	1987	49	2000
17	71	2003	18	1987	38	1990	46	2000
18	73	1994	20	1988	37	1988	48	2000
19	72	1994	19	1988	35	1988	46	2005
20	71	1994	21	1988	42	1988	44	2005
21	70	1994	21	1988	42	1982	47	2000
22	70	1994	23	1982	43	1982	41	1994
23	66	2005	17	1996	46	1996	44	1981
24	71	2003	21	1996	44	1979	48	1999
25	70	2003	25	1991	40	1979	49	2000
26	70	2003	25	1981	42	1979	46	2005
27	69	2003	19	1979	44	1979	54	2002
28	70	2003	21	1979	32	1979	47	1987
29	69	2003	13	1979	35	1979	45	1992
30	77	2003	18	1979	34	1979	47	1986
31	79	2003	19	1985	34	1979	47	2003

Desert Rock Temperature Extremes 1978-2005

MONTH = FEBRUARY

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	78	2003	14	1985	35	1985	45	1995
2	76	1995	22	1979	37	1985	48	1995
3	72	2001	19	1979	37	1985	47	1995
4	75	1995	15	1979	41	1994	47	1984
5	73	1995	14	1985	31	1989	48	1996
6	73	1995	11	1989	30	1989	47	1991
7	74	1996	14	1989	34	1989	48	1990
8	75	1996	25	1985	32	1989	45	2000
9	75	1996	23	2003	45	1989	46	1987
10	70	1996	23	1986	42	1982	45	2000
11	73	1996	24	1999	45	1986	51	1996
12	71	2002	26	1989	45	2001	47	1996
13	73	1991	26	1989	47	2001	46	2003
14	74	1996	25	1990	35	1990	50	1991
15	74	1996	15	1990	40	1990	49	1980
16	73	1997	19	1990	50	1992	56	1991
17	76	1981	29	1984	42	1998	52	2002
18	77	1981	29	1988	45	1990	52	1980
19	78	1981	28	1990	46	1998	51	1995
20	79	1995	32	1979	50	1998	50	1996
21	76	1982	28	1994	47	2005	49	2002
22	76	2002	28	1997	47	2004	45	1982
23	76	2002	27	1996	47	2004	48	1995
24	78	1989	26	1996	44	1987	51	1986
25	81	1986	28	1996	35	1987	51	1989
26	83	1986	24	1996	37	1996	52	1989
27	80	1986	24	1996	42	1996	58	1986
28	80	1986	28	1984	40	1993	51	1986
29	69	1992	29	1996	52	1996	44	1980

Desert Rock Temperature Extremes 1978-2005

MONTH = MARCH

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	80	1986	28	1997	48	2004	50	1992
2	76	1999	29	1979	50	2002	54	1990
3	77	1994	24	2002	48	1989	52	1999
4	79	1986	23	2002	51	2003	52	1986
5	78	1986	26	1985	51	1981	53	1991
6	78	1986	28	1984	48	2000	52	1994
7	75	1979	29	2000	46	1992	49	1989
8	79	1989	30	1999	50	2000	62	1989
9	80	2005	31	2002	53	2000	51	1979
10	83	1997	33	2000	51	2001	56	1982
11	82	1997	26	1988	50	1990	61	1989
12	79	1997	29	1990	48	1990	57	1989
13	80	2003	23	1990	50	1990	54	1989
14	81	1994	28	1990	53	2002	57	2003
15	83	1994	31	2002	47	1991	51	1980
16	77	1994	26	1991	48	1982	61	1997
17	80	1996	28	2002	46	1982	58	1993
18	83	1997	31	1979	46	1982	56	1994
19	85	1997	32	1987	48	1987	58	1994
20	86	2004	27	1987	46	1991	54	1990
21	87	2004	32	1987	45	1991	54	2004
22	86	2004	32	1987	55	1983	57	1994
23	83	1990	26	1995	50	1995	56	2004
24	82	1990	23	1995	51	1995	61	1993
25	80	1990	30	1995	53	1991	55	1993
26	83	1988	33	1983	53	1991	55	1988
27	84	1986	33	1991	43	1991	49	2001
28	84	1986	30	1991	48	1998	52	1986
29	82	2002	26	1985	48	1998	58	1986
30	84	2004	30	1998	55	1998	55	1994
31	84	2002	30	1999	54	1999	58	2002

Desert Rock Temperature Extremes 1978-2005

MONTH = APRIL

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	87	2002	25	1999	51	1998	58	1986
2	89	2002	30	1982	47	1997	52	2001
3	86	2002	29	1999	52	1983	55	1994
4	86	2002	32	1999	54	1998	54	2002
5	86	1989	34	1998	55	1983	57	1989
6	92	1989	34	2003	55	1998	60	1991
7	93	1989	32	1982	51	2001	53	1989
8	93	1989	33	2001	55	2001	63	1989
9	91	1989	30	1999	53	1999	60	1989
10	91	1989	34	1999	56	1979	65	2002
11	86	2002	34	1979	55	1991	64	1989
12	88	2002	34	1991	48	1983	60	1989
13	92	2002	30	1983	58	1998	64	2002
14	92	2002	36	1983	54	1998	57	1984
15	87	1984	35	1998	51	1988	60	1989
16	90	1984	32	1998	52	1995	58	1996
17	90	1994	35	1995	63	1995	62	1989
18	92	1989	39	1979	51	1995	61	2001
19	92	1994	35	1987	58	1981	61	1989
20	93	1994	35	1984	58	1988	66	1989
21	90	1986	35	1995	57	1988	73	1989
22	86	1986	37	2001	56	2003	60	1993
23	87	1996	37	1980	55	1980	62	1994
24	90	1996	36	1980	53	1999	60	1986
25	91	1996	39	1984	53	1984	67	1996
26	96	1996	30	1984	56	1984	60	1996
27	92	2000	31	1984	57	1984	62	1996
28	91	1992	39	1984	64	1999	61	1990
29	92	1981	36	1984	48	1999	62	1981
30	95	1981	39	1999	58	1999	61	1992

Desert Rock Temperature Extremes 1978-2005

MONTH = MAY

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	95	1981	41	2002	54	1983	60	1981
2	92	1996	37	1983	65	1991	67	1981
3	92	2000	41	1983	63	2003	62	1985
4	93	2000	40	1991	67	1993	67	1989
5	95	1989	42	1993	63	1995	69	2000
6	96	1989	33	1988	56	1986	67	1987
7	96	1989	37	1986	63	1995	69	2004
8	96	2001	43	1998	58	1979	65	1997
9	95	2001	38	1979	64	1991	71	1989
10	94	2001	40	1979	61	1982	66	1997
11	100	1996	39	1983	54	1989	65	1997
12	102	1996	40	1989	60	1998	63	1996
13	99	1996	43	1998	57	1998	73	1988
14	97	1997	37	1998	64	1998	69	1997
15	95	1997	44	1998	68	1989	74	1994
16	95	1997	46	1995	67	2000	69	1996
17	95	2002	44	1995	69	1994	66	1988
18	95	1997	47	1998	67	1994	70	1997
19	94	1986	44	1994	68	1981	69	1979
20	96	2001	46	1991	67	1981	66	1986
21	98	2003	46	2002	68	2002	68	2001
22	101	2000	45	2002	74	1998	66	1990
23	102	2000	40	1980	67	1980	72	1989
24	101	2001	38	1980	60	1996	74	2000
25	101	2001	43	1980	66	1980	69	1981
26	98	1986	41	1980	68	1998	70	1992
27	105	2003	44	1998	70	1981	71	2005
28	109	2003	47	1998	64	1990	74	2000
29	105	2003	48	1980	65	1988	82	2003
30	103	2002	40	1988	68	1988	79	2003
31	100	2002	46	1988	62	1991	77	1997

Desert Rock Temperature Extremes 1978-2005

MONTH = JUNE

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	102	2001	51	1988	69	1991	75	2002
2	104	2003	51	1982	69	1999	80	2001
3	105	1996	50	1999	68	1999	78	2003
4	106	1996	48	1999	69	1999	78	2003
5	106	1996	47	1999	67	1993	74	1990
6	105	2002	46	1993	63	1993	71	1981
7	105	1996	46	1995	62	1995	83	2002
8	104	2003	47	1995	69	1995	71	2002
9	104	1996	45	1995	71	2004	73	1990
10	104	1996	51	2004	78	1998	70	1981
11	104	1994	56	2004	76	1998	73	1996
12	105	1985	51	1998	66	1998	74	1994
13	105	1985	49	1998	70	1997	74	1991
14	106	2000	52	1997	67	1997	78	1994
15	110	2000	50	1992	76	1995	74	1989
16	103	2002	46	1995	62	1995	79	2000
17	106	1985	40	1995	72	1995	74	1988
18	108	1985	49	1995	76	1979	78	2000
19	109	1985	52	1979	84	1979	81	1989
20	104	1981	55	1979	85	1995	81	1996
21	106	1981	56	1993	84	1995	75	1988
22	105	1981	56	1991	86	1998	78	2001
23	105	1994	56	1998	86	1998	77	2001
24	107	1994	56	1998	83	1991	81	2001
25	107	1994	59	1991	83	1991	74	1999
26	109	1994	56	2005	79	1996	89	1994
27	109	1994	53	1996	77	1991	80	1994
28	110	1994	54	1996	81	1991	81	1993
29	111	1994	56	1978	73	1982	81	1984
30	111	1994	57	1985	74	1982	77	1994

Desert Rock Temperature Extremes 1978-2005

MONTH = JULY

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	108	1999	56	1982	84	1992	82	1994
2	112	2001	51	1982	89	1980	85	2002
3	109	1985	60	1979	86	1978	86	1996
4	112	1985	59	2000	90	2000	84	2001
5	111	1985	61	1978	87	1982	80	1981
6	109	1989	60	1979	88	2001	83	1992
7	110	1989	60	1979	87	2001	82	1981
8	109	2002	65	2001	83	1999	79	1996
9	115	2002	60	1978	86	1999	86	1985
10	111	2002	61	1983	90	1983	82	2002
11	109	2003	63	2000	90	1989	81	1996
12	110	2003	62	1978	86	1999	81	2003
13	109	2002	62	1995	89	1999	81	1990
14	111	2005	63	1992	93	1999	83	2002
15	109	2005	64	1998	82	1986	83	2003
16	110	2005	59	1993	89	1993	82	1996
17	110	2005	60	1993	83	1987	84	1997
18	111	2005	55	1987	80	1987	82	2005
19	110	2005	53	1987	87	1987	83	1998
20	107	2005	58	1987	76	1979	84	2005
21	107	1996	58	1995	81	1987	78	1989
22	109	2003	59	1987	70	1984	83	2003
23	110	1996	58	1987	84	1984	84	2003
24	109	1996	60	1987	81	1982	81	2002
25	108	1996	62	1997	90	1982	79	1996
26	107	1994	65	2001	83	1982	84	1996
27	108	1994	64	1986	78	1984	80	1980
28	108	1995	61	1986	82	1984	84	2003
29	110	1995	64	1984	91	1984	88	1994
30	109	2002	61	1986	89	1983	80	2001
31	109	1996	63	1987	87	2003	81	1989

Desert Rock Temperature Extremes 1978-2005

MONTH = AUGUST

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	109	1993	64	2001	83	2003	83	2000
2	109	1993	63	1985	91	2003	86	2000
3	108	1979	60	1985	92	1982	80	2001
4	105	1998	62	1985	93	1982	79	1992
5	107	1994	62	1991	91	1992	80	1979
6	109	1994	59	1979	89	1999	82	1994
7	111	1981	61	1988	90	1999	81	1997
8	109	1978	60	1999	93	1999	87	1994
9	108	1996	63	1999	84	1983	81	1994
10	107	1996	63	1985	77	1983	81	1995
11	108	2001	61	1999	89	1991	79	1995
12	109	2002	60	1999	72	1979	83	2003
13	110	2002	58	1993	82	1979	77	1992
14	110	2002	60	1993	87	1981	77	2002
15	110	2002	56	1987	78	1984	80	2000
16	109	2002	58	1987	81	1983	82	1997
17	109	2002	59	1993	72	1983	82	1994
18	108	2001	59	1993	69	1983	80	2002
19	105	1992	57	1978	75	1984	82	2002
20	102	1994	59	1990	81	1983	81	1992
21	100	1997	57	1990	82	1983	84	1992
22	103	1996	58	1990	84	1983	76	1999
23	102	1998	57	1983	87	1983	78	2000
24	106	1985	57	1992	76	1982	82	1991
25	107	1985	55	1989	79	1982	85	1991
26	107	2001	56	1978	86	1984	78	1985
27	107	2001	58	1990	85	1986	78	1995
28	108	2001	59	1990	89	1991	74	1995
29	106	1996	60	1991	78	2000	78	1981
30	107	1996	62	1997	83	2000	76	1999
31	106	1996	56	1992	81	2000	77	1991

Desert Rock Temperature Extremes 1978-2005

MONTH = SEPTEMBER

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	102	1996	55	1989	77	2000	75	1996
2	102	1982	57	2000	80	2000	76	2003
3	102	1995	56	1989	72	1997	75	1995
4	101	1991	56	1992	75	1998	79	1996
5	101	1986	53	1985	75	1985	81	2002
6	99	1994	54	1985	74	1991	80	1989
7	102	1979	49	1985	80	1978	73	1989
8	102	1979	54	1989	82	1980	75	1986
9	102	1993	53	2002	79	1985	73	1983
10	103	1993	49	1994	77	1985	71	1999
11	102	1979	52	1985	70	1985	76	2002
12	101	1990	46	1985	80	1978	73	2001
13	101	1979	48	2005	77	1996	72	1979
14	101	2000	51	2005	77	1978	73	1979
15	100	2000	51	2005	77	1986	77	1990
16	101	2000	50	1986	69	1982	74	2002
17	100	2000	49	1982	76	1993	71	1992
18	98	1991	45	1978	67	1978	74	2000
19	99	2000	46	1978	67	1985	72	2000
20	99	2000	45	1989	72	1986	77	2000
21	98	2002	44	1986	77	1986	70	2000
22	99	2002	45	1986	77	1986	68	1991
23	99	2002	50	1986	71	1986	73	1992
24	101	2001	48	1986	65	1986	72	1992
25	98	2001	52	1993	67	1986	74	2002
26	98	1999	40	1986	69	1986	69	2002
27	99	2003	48	1982	63	1986	70	1989
28	98	2003	42	1982	66	1982	67	2001
29	97	1992	44	1982	64	1982	71	1994
30	98	1980	39	1982	63	1982	67	2001

Desert Rock Temperature Extremes 1978-2005

MONTH = OCTOBER

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	100	1980	42	1982	64	1984	65	2001
2	95	2001	45	2002	54	1986	72	2005
3	96	2001	40	2002	70	1986	67	1994
4	96	1980	46	1984	70	1994	64	1991
5	97	1980	46	1981	68	1994	62	1993
6	97	1996	42	1995	74	1994	70	1990
7	97	1996	43	1995	68	1997	65	1980
8	98	1996	42	1997	60	1985	63	1996
9	97	1996	43	1998	63	1985	65	1991
10	94	1996	43	1990	66	2000	69	1991
11	92	1999	42	2005	61	1997	70	1980
12	91	1999	37	1997	59	1981	66	1991
13	92	1991	38	1981	59	1981	64	1978
14	92	1991	40	1986	63	1981	62	1991
15	93	1991	40	1981	56	1981	65	1991
16	91	1991	34	1981	60	1980	54	2001
17	89	1991	37	1980	64	1984	60	1991
18	91	1991	38	1984	58	2005	56	1991
19	89	1991	42	1994	61	1986	61	1978
20	89	2003	41	1990	58	1996	63	1991
21	93	2003	37	1996	59	1996	60	1989
22	91	2003	33	1996	60	1984	61	1992
23	86	2003	35	1996	61	1984	60	1992
24	84	1990	35	1995	59	1997	61	1989
25	85	2001	37	1995	61	1996	60	2003
26	84	2001	32	1989	57	1996	56	1979
27	85	1990	35	1997	53	2004	59	1987
28	89	2003	32	1991	49	1996	62	1999
29	82	2003	32	1996	55	1996	58	1995
30	80	1990	37	1991	50	1991	58	1986
31	81	1999	32	1989	52	1996	58	1990

Desert Rock Temperature Extremes 1978-2005

MONTH = NOVEMBER

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	82	1999	36	1991	55	2003	58	1997
2	80	1999	35	1984	55	1990	58	1994
3	84	1980	37	1994	50	1994	49	1986
4	85	1988	30	2003	54	1994	59	2001
5	83	1980	30	1995	62	1994	55	1988
6	83	1980	33	1982	54	1990	54	1988
7	82	1980	29	1986	55	2000	55	1988
8	80	1991	32	2000	58	1986	59	2002
9	78	1991	30	1998	54	2000	55	2001
10	80	1980	29	2000	47	1982	55	1991
11	79	1989	27	2000	48	2000	60	1983
12	80	1999	26	2000	37	1985	58	1983
13	85	1999	23	2000	40	1985	58	1981
14	80	1999	25	2000	47	1985	53	1995
15	79	1999	25	2000	49	1991	55	1995
16	77	1999	28	1996	50	2000	51	1990
17	77	1995	29	1994	51	1985	52	1981
18	75	1995	27	1985	38	1994	50	1986
19	75	2002	20	1994	42	1985	49	1986
20	75	2002	19	1985	46	1985	51	2002
21	75	2002	24	1985	44	1983	49	1996
22	74	2002	25	1983	46	1984	46	1996
23	76	1995	23	1983	48	1983	44	1993
24	75	1995	29	1994	47	1993	45	2002
25	71	1998	27	2003	45	1983	44	1985
26	70	1998	25	1981	44	1984	57	1995
27	71	1991	26	2005	44	1984	42	2002
28	71	1980	23	1994	44	2001	40	2002
29	70	1999	26	1991	43	1991	43	2002
30	70	1999	27	1984	46	1991	43	1993

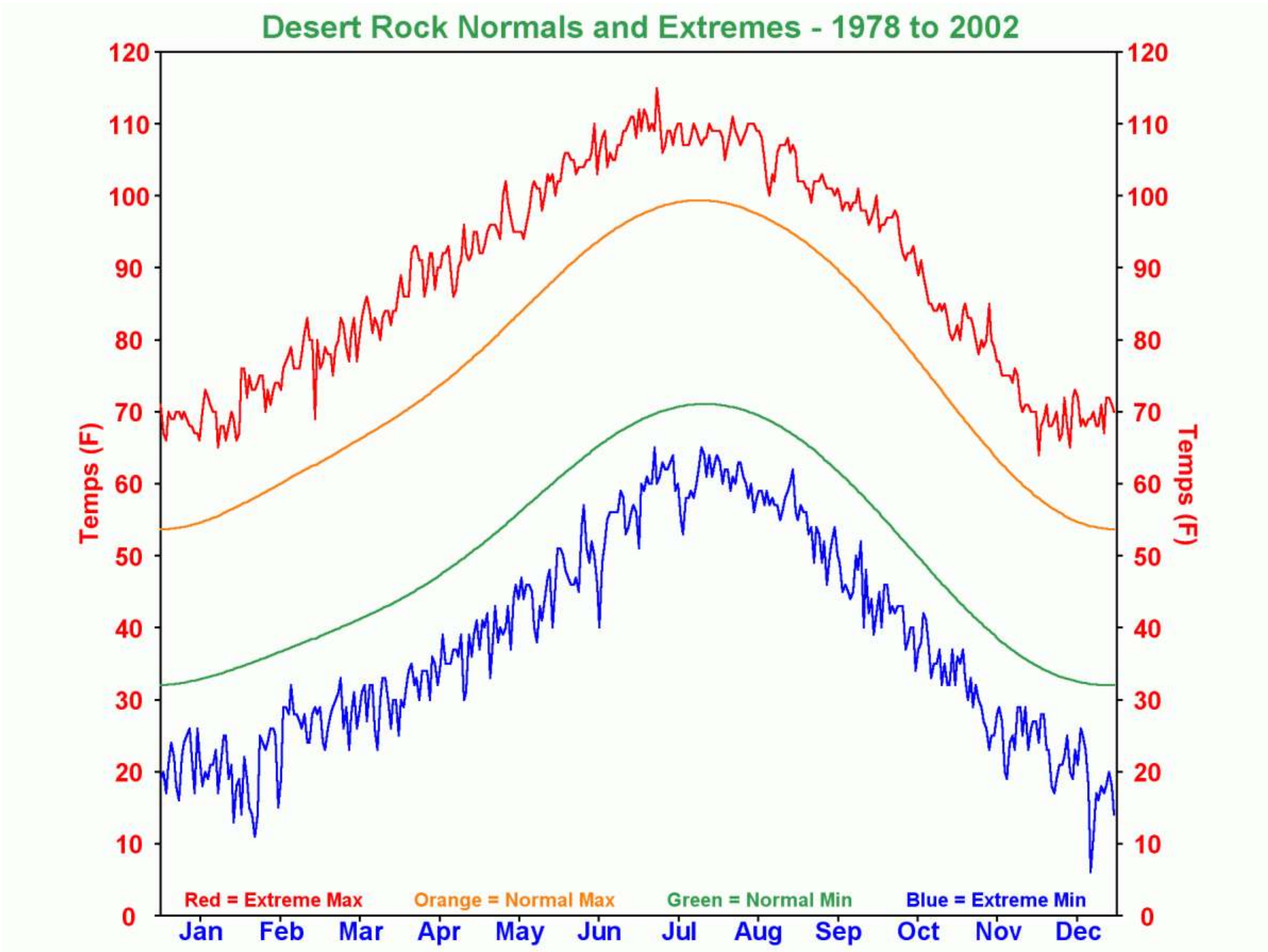
Desert Rock Temperature Extremes 1978-2005

MONTH = DECEMBER

	HI MAX	YR	LO MIN	YR	LO MAX	YR	HI MIN	YR
1	70	1995	24	2004	46	1991	43	2000
2	65	2003	24	1991	48	1978	46	2005
3	68	2000	28	1996	49	1999	51	2001
4	69	1989	28	2004	47	1992	50	1980
5	71	1979	23	1999	46	1983	41	1987
6	68	1979	23	1983	36	1978	46	1979
7	68	1979	18	1978	33	1978	46	2003
8	69	1979	17	1978	37	1978	41	1988
9	70	1979	19	1978	46	1992	43	2004
10	68	2004	21	1994	40	1985	51	1996
11	69	2004	21	1994	42	1985	47	1996
12	72	1988	22	1989	43	1987	53	1995
13	68	2004	25	1985	40	1987	50	1995
14	69	2004	20	1987	38	1987	38	1995
15	72	1980	19	1987	37	1987	47	1998
16	73	1980	22	2005	42	1992	49	1998
17	72	1998	20	2005	38	1984	41	1985
18	68	1979	26	1992	35	1984	44	1985
19	69	1985	25	2002	39	1992	43	1994
20	68	1981	23	1992	34	1990	41	1999
21	69	1985	18	1990	31	1990	42	1981
22	69	1985	6	1990	28	1990	44	1994
23	73	2005	11	1990	30	1990	48	1994
24	70	2005	17	1998	35	1987	48	1994
25	68	1980	16	1990	39	1987	45	1994
26	71	1980	18	1990	38	1988	46	1980
27	67	1980	17	1988	36	1988	43	1996
28	72	1980	18	1990	37	1988	43	1980
29	72	1998	20	1990	40	1988	48	1980
30	71	1998	18	1990	39	1990	44	2001
31	70	1995	14	1990	43	1988	43	1996

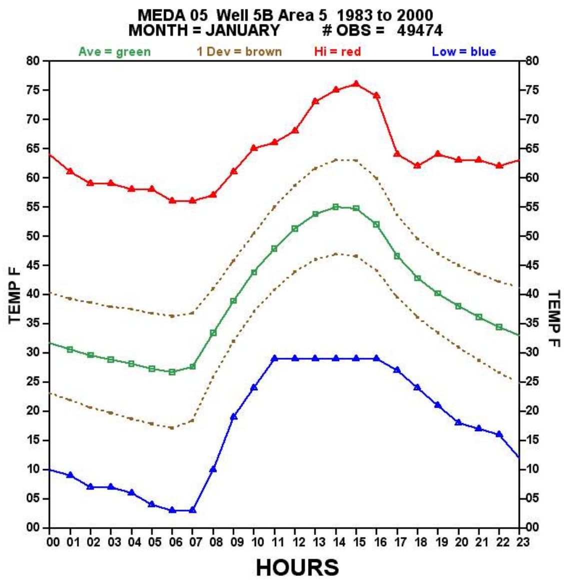
C.2. Graphical Representation of Normals and Extremes for Desert Rock

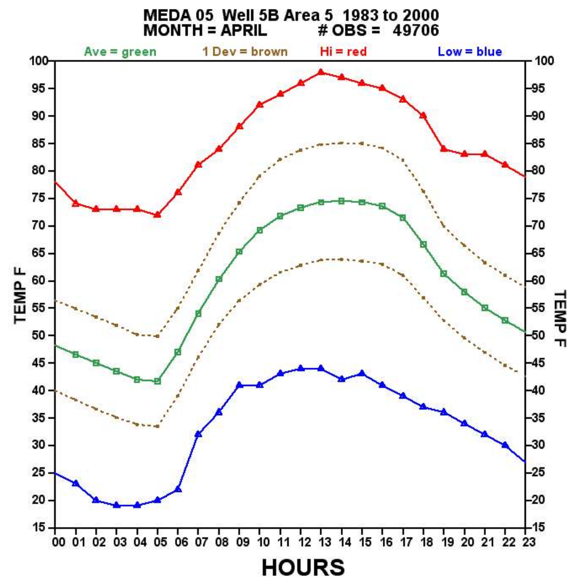
The following graph depicts the temperature normals and extremes for the Desert Rock Meteorological Observatory (DRA), for May 1978 through December 2002.

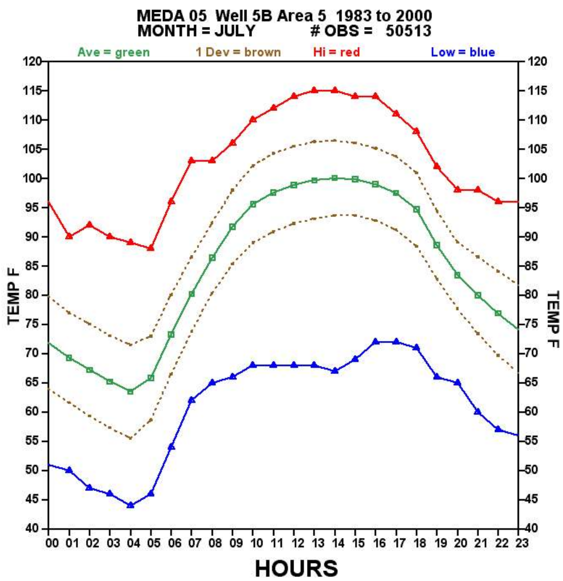

Desert Rock Normals and Extremes - 1978 to 2002
Temps (F)
Temps (F)
120
110
100
90
80
70
60
50
40
30
20
10
0
Red = Extreme Max
Orange = Normal Max
Green = Normal Min
Blue = Extreme Min
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

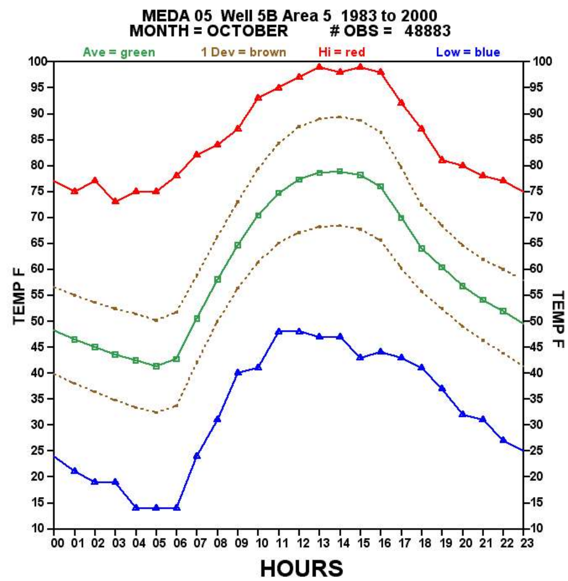
C.3. Graphical Temperature Climatology for Selected MEDA Stations

C.3.1. Frenchman Flat, Area 5, Well 5b

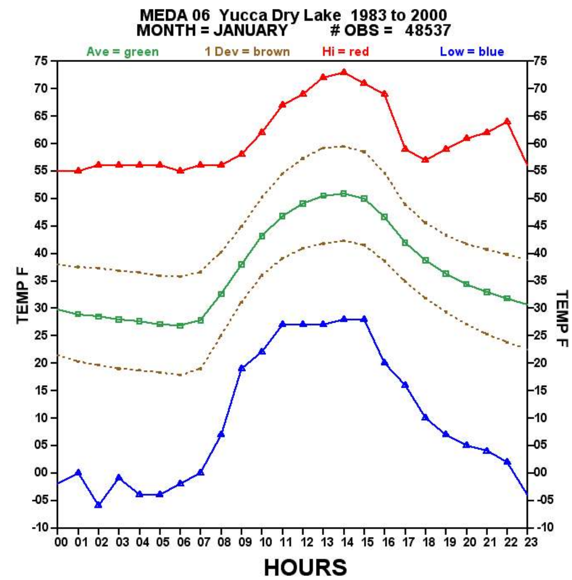


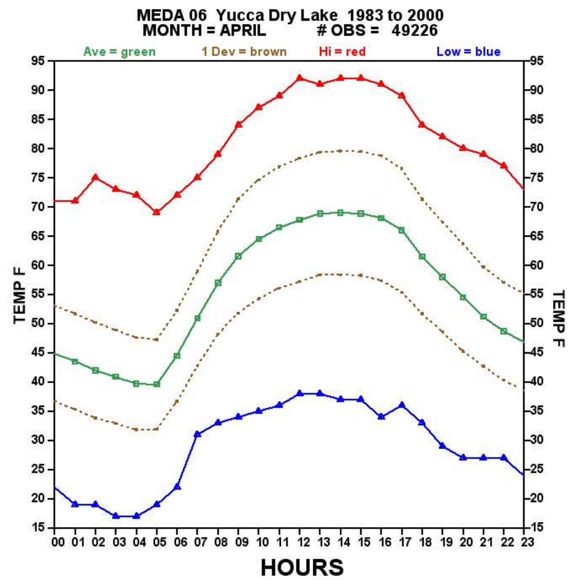


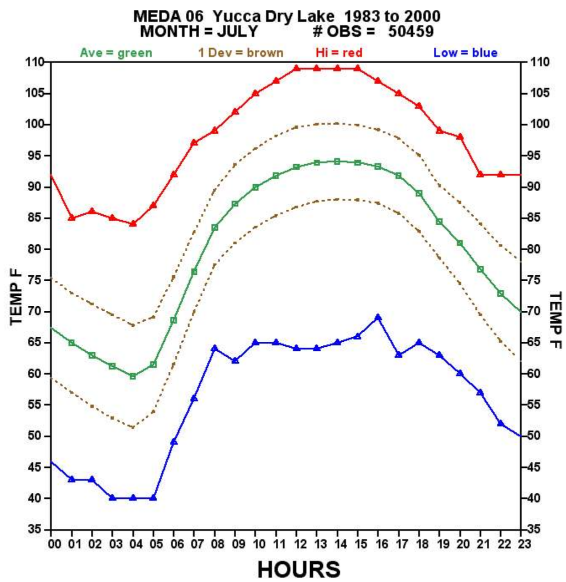


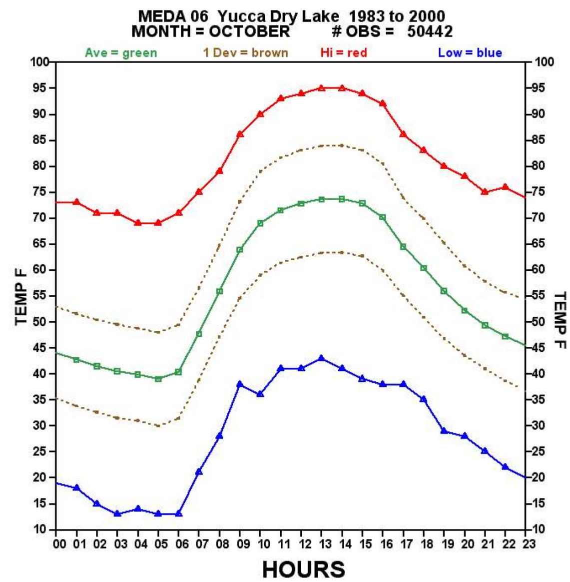


C.3.2. Yucca Dry Lake, Area 6, MEDA 6

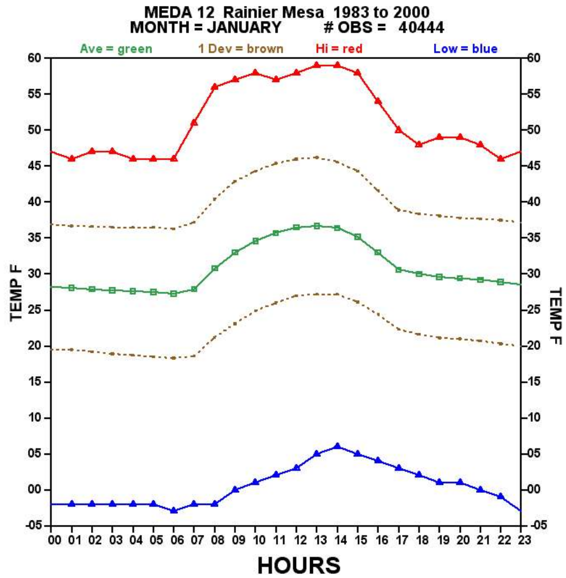


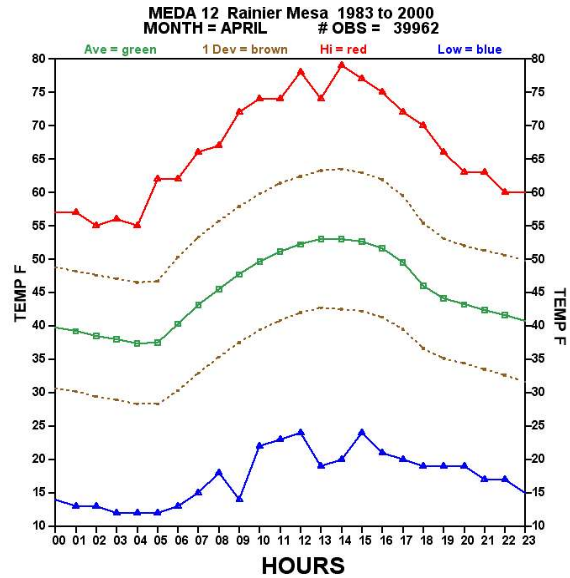


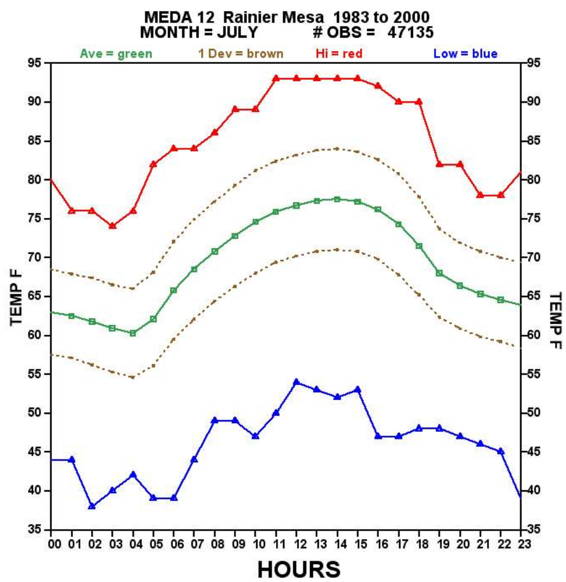


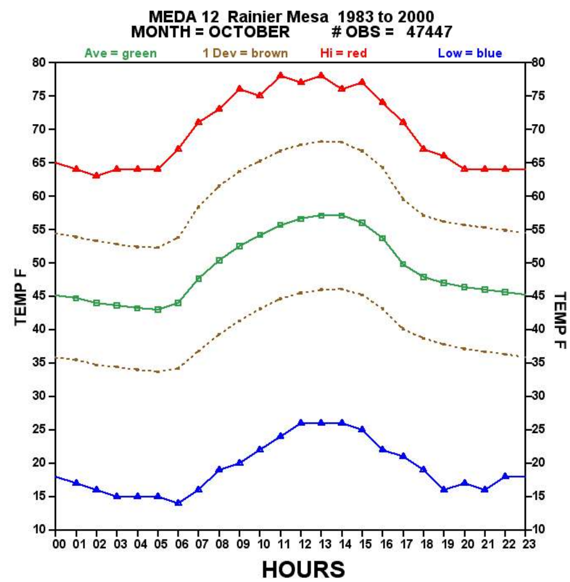


C.3.3. Rainier Mesa, Area 12, MEDA 12,

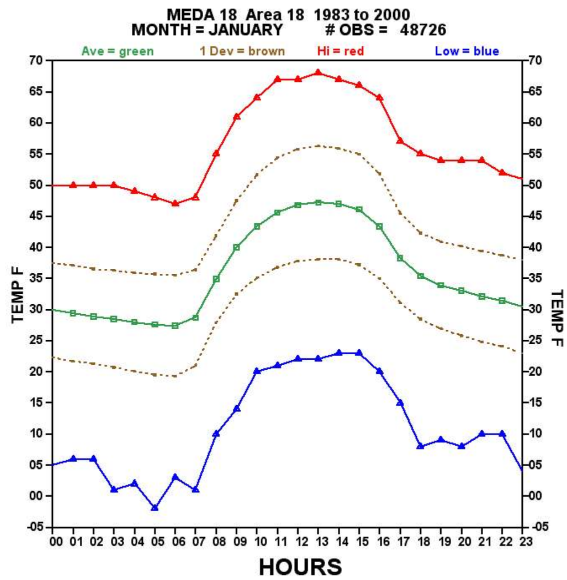


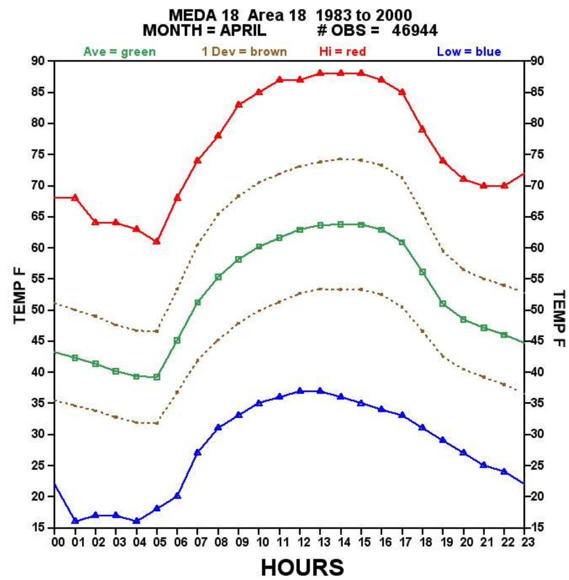


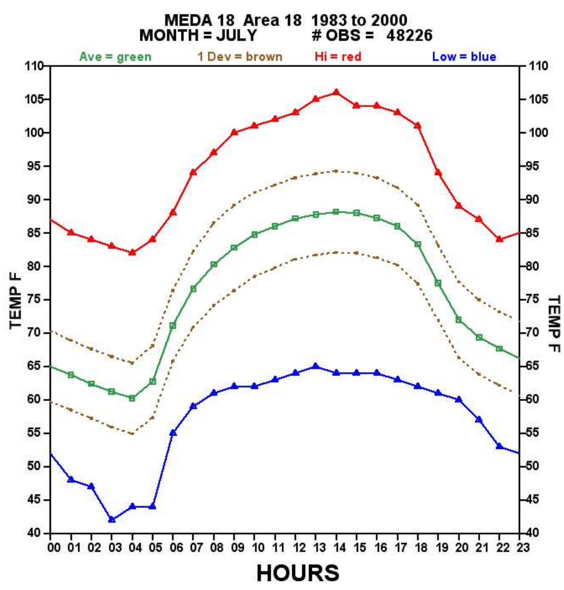


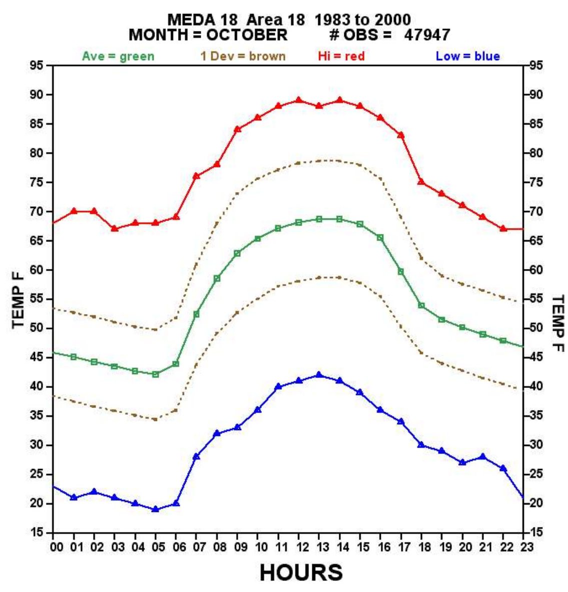


C.3.4. Pahute Airport, Area 18, MEDA 18

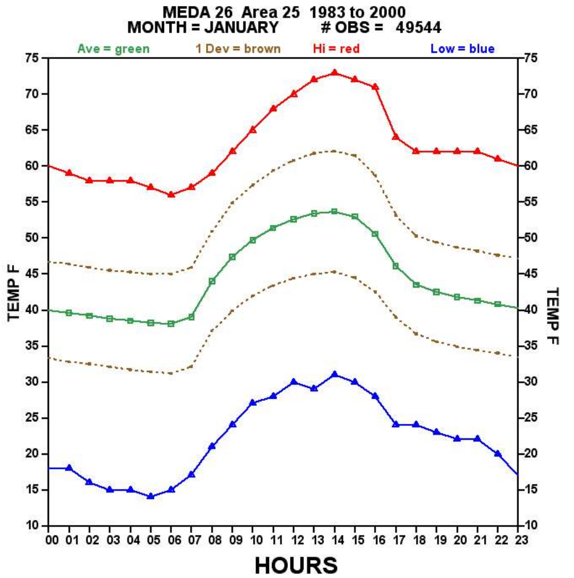


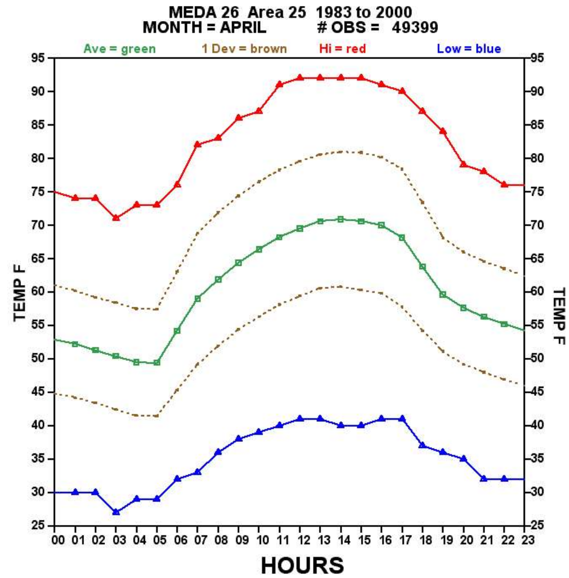


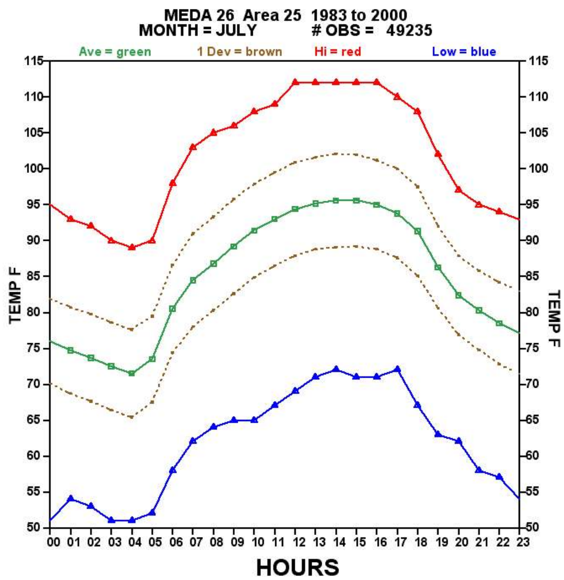


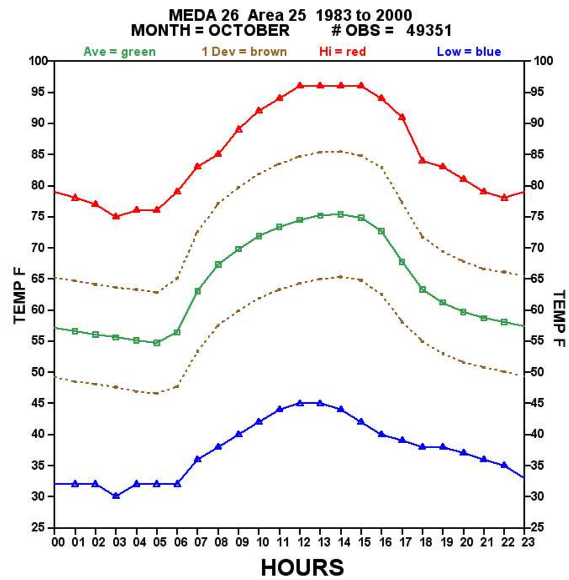


C.3.5. Jackass Flats, Area 25, MEDA 26







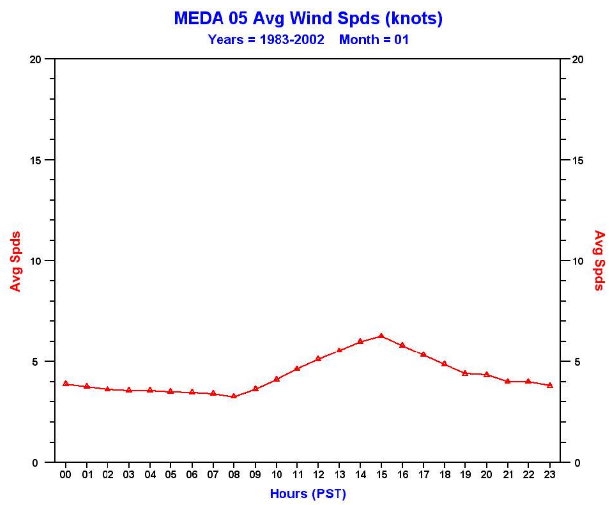


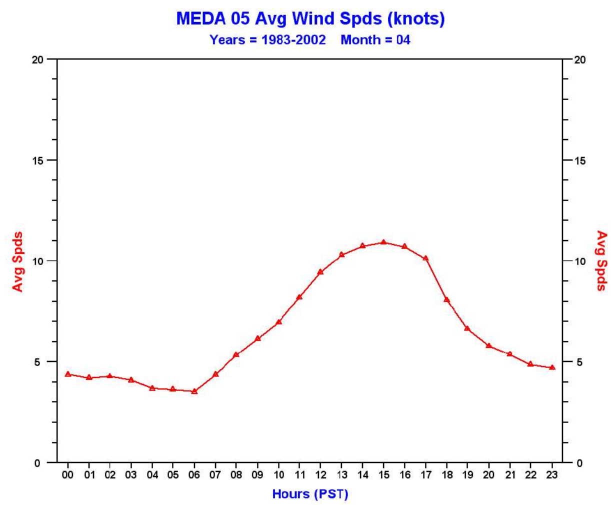
D. Wind

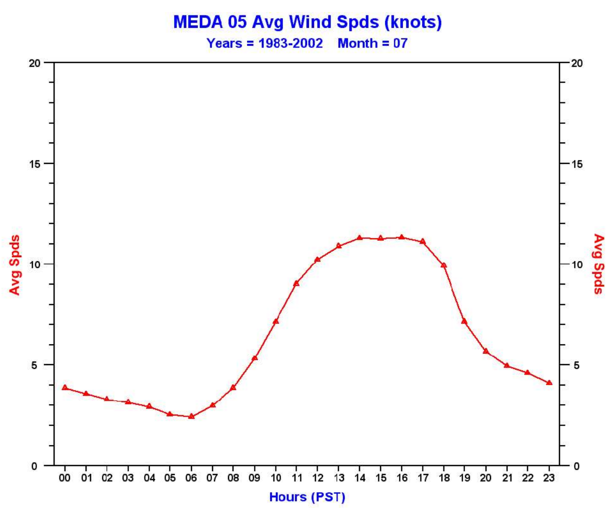
D.1. Average Wind Speeds

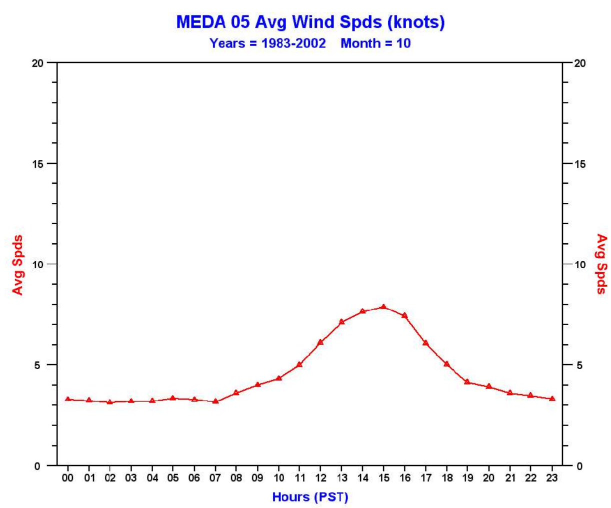
The following graphs depict the average hourly wind speeds for the four seasons.

D.1.1. Well-5B (W5B), Area 5.

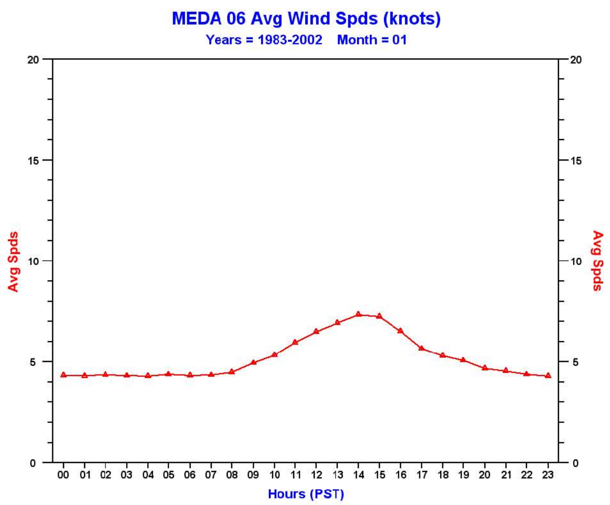


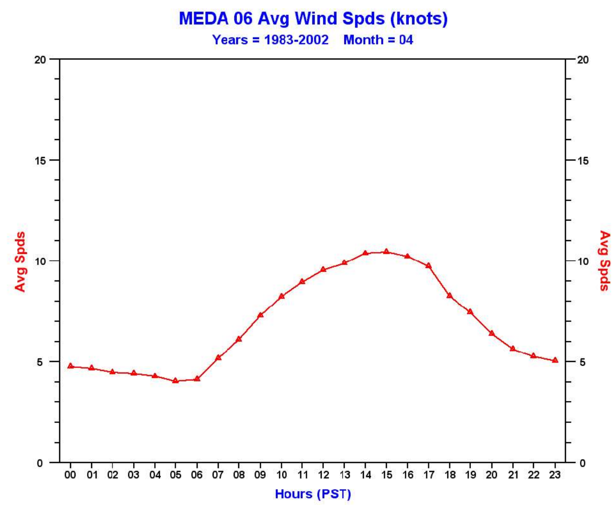


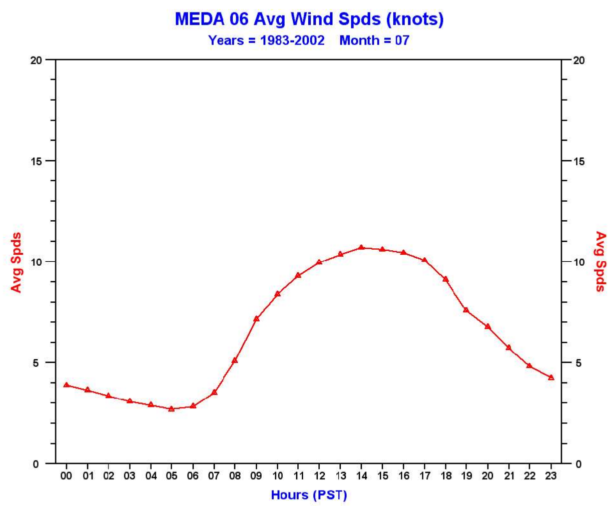


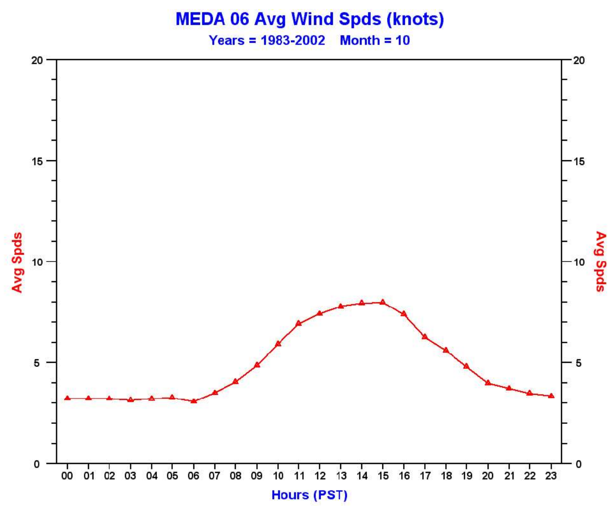


D.1.2. Yucca Flat Dry Lake, MEDA 6

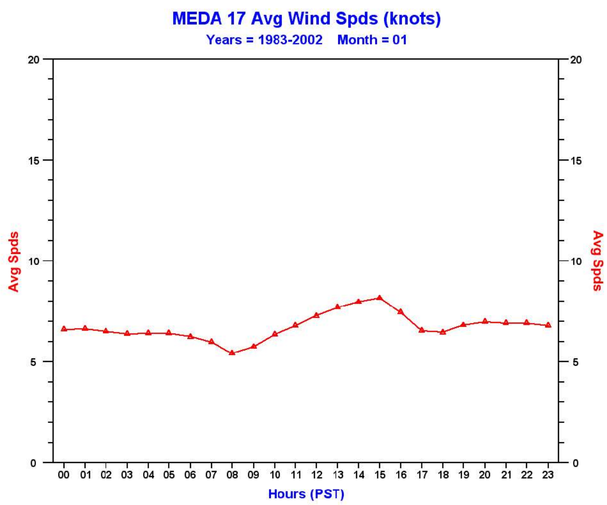


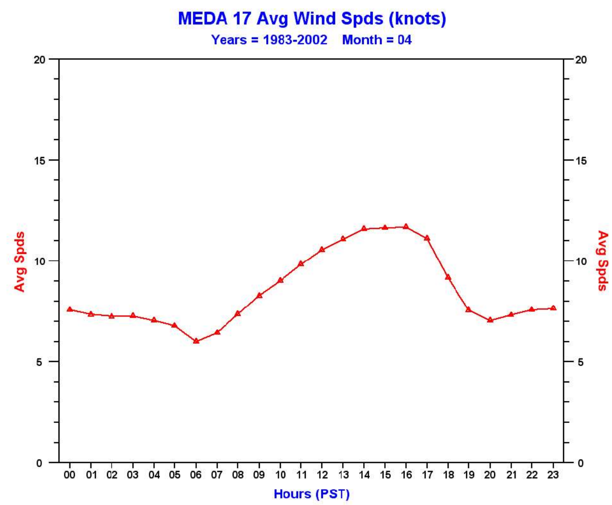


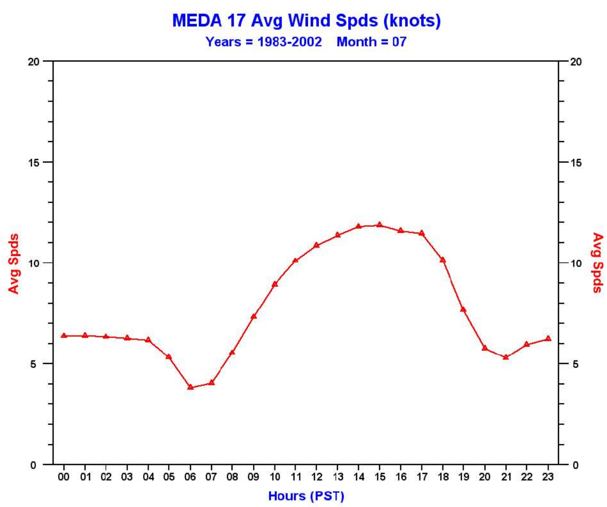


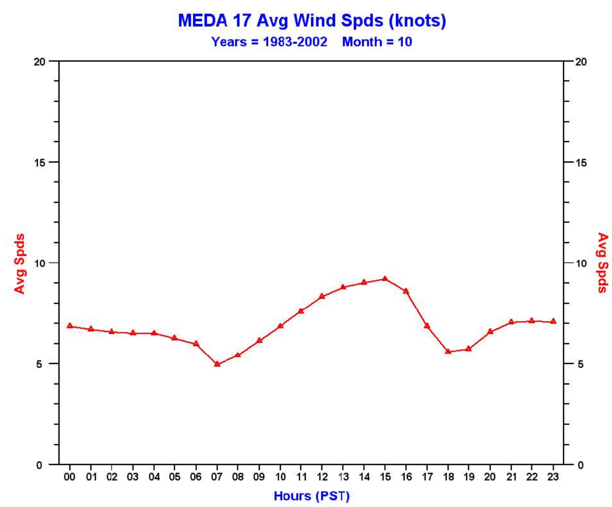


D.1.3. Yucca Flat, BJY, MEDA 17

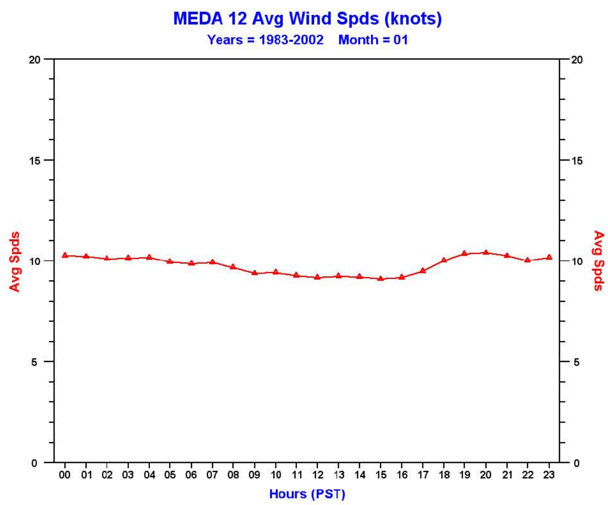


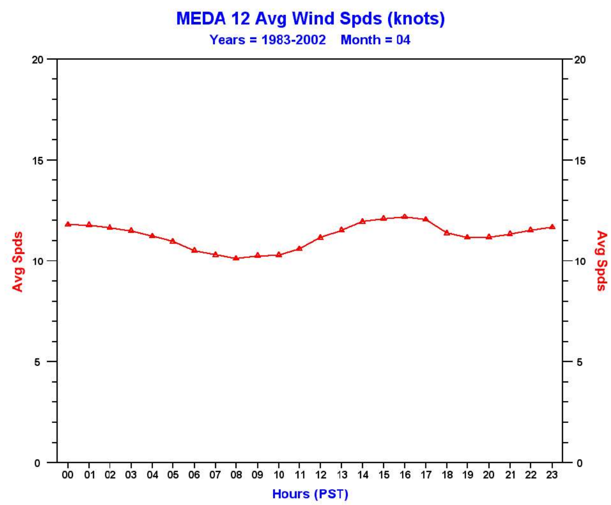


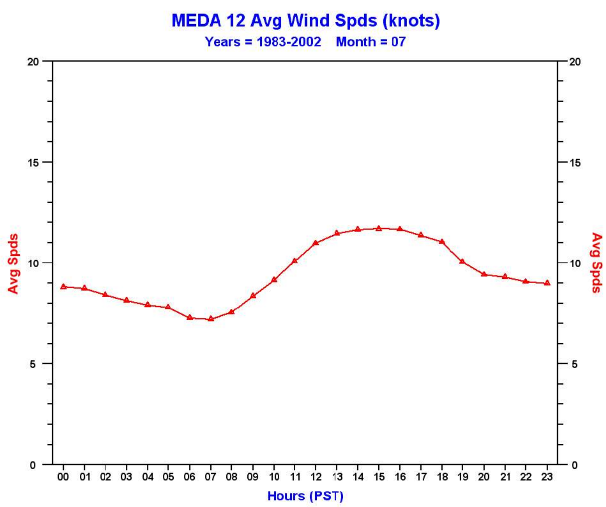


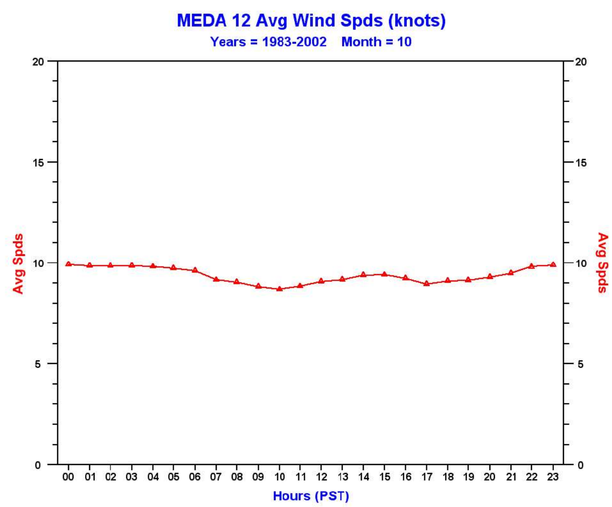


D.1.4. Rainier Mesa, MEDA 12, Area 12

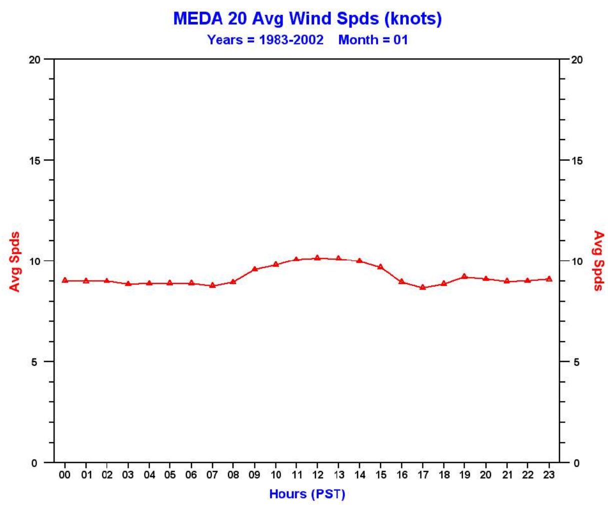


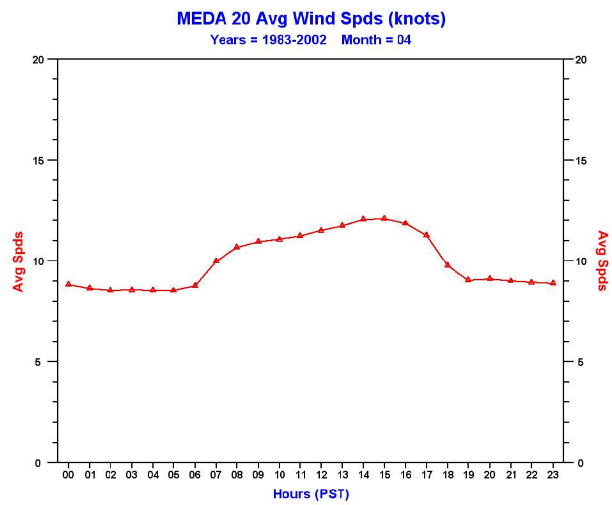


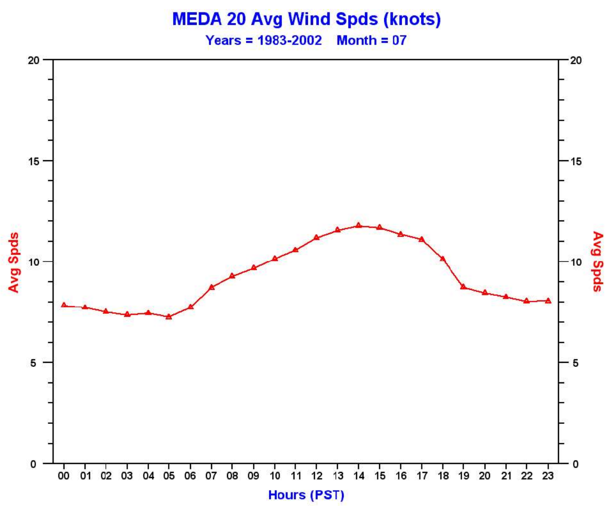


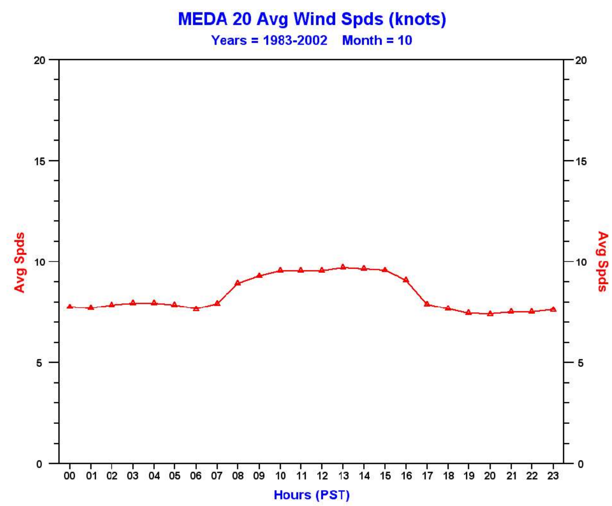


D.1.5. Pahute Mesa, MEDA 20, Area 20

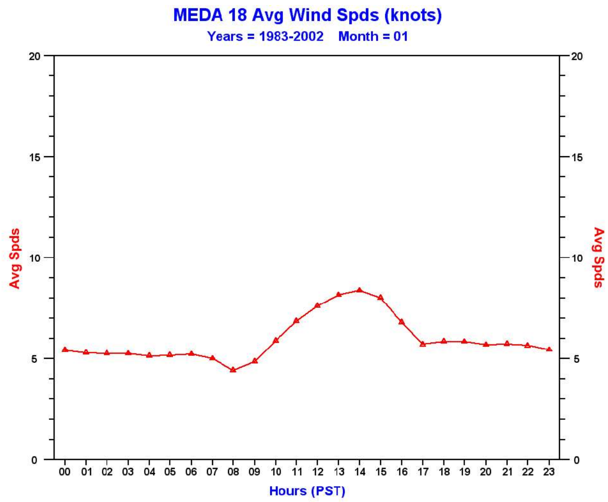


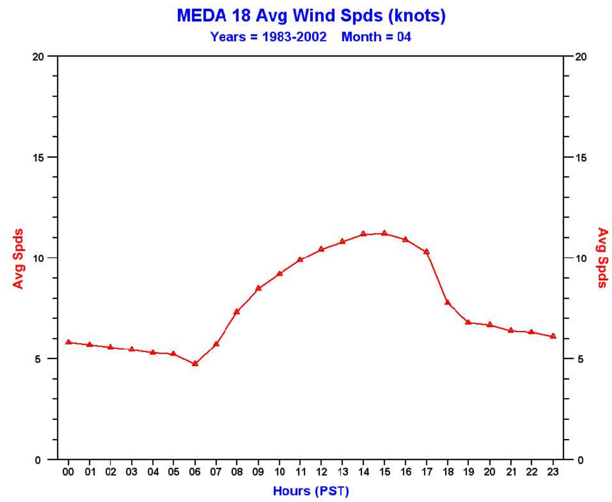


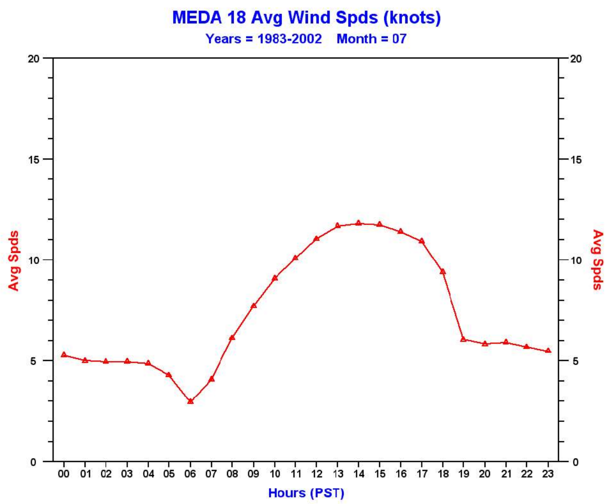


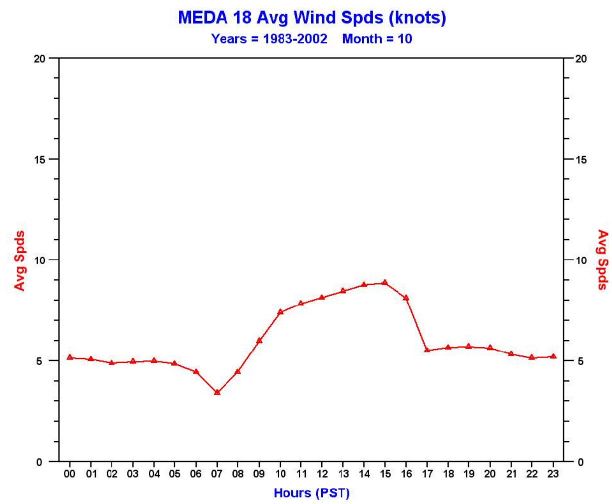


D.1.6. Airport, MEDA 18, Area 18

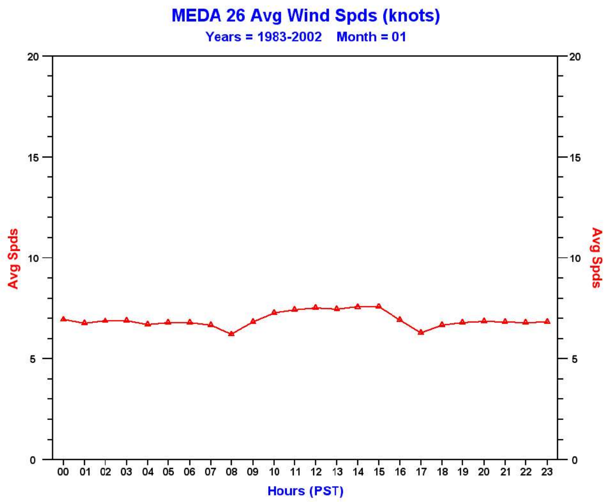


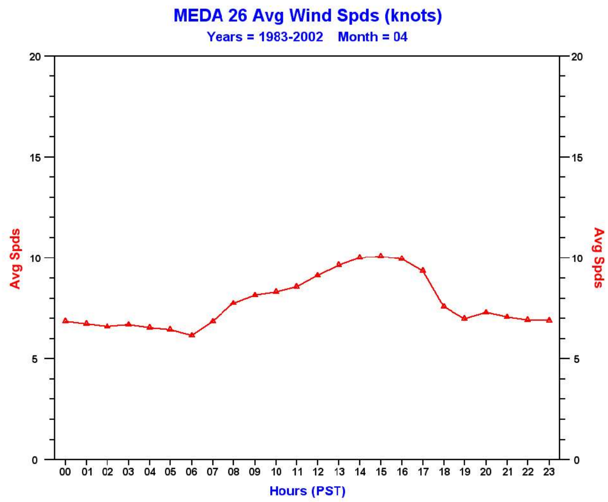


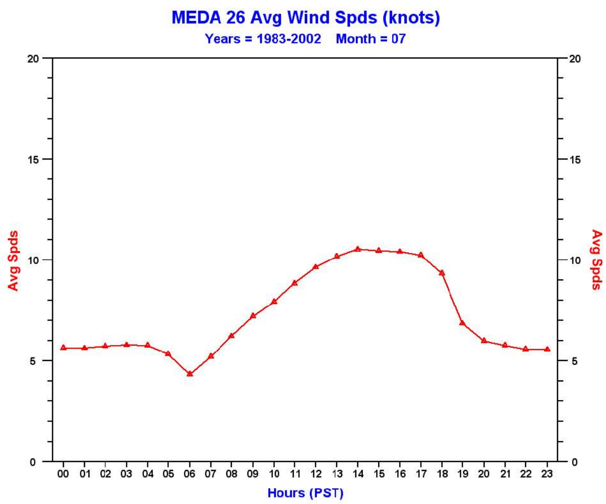


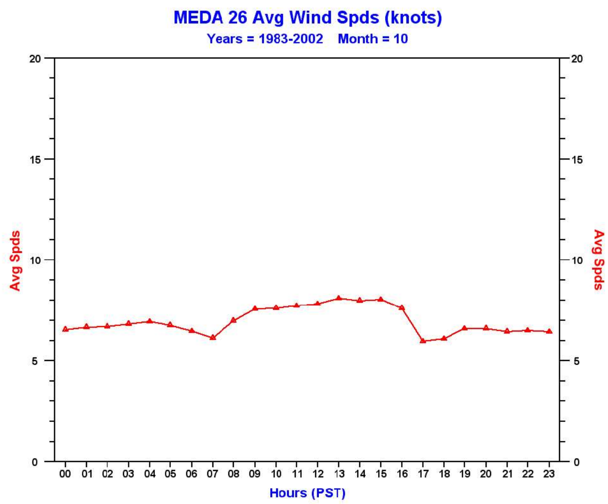


D.1.7. Jackass Flats, 4JA, Area 25

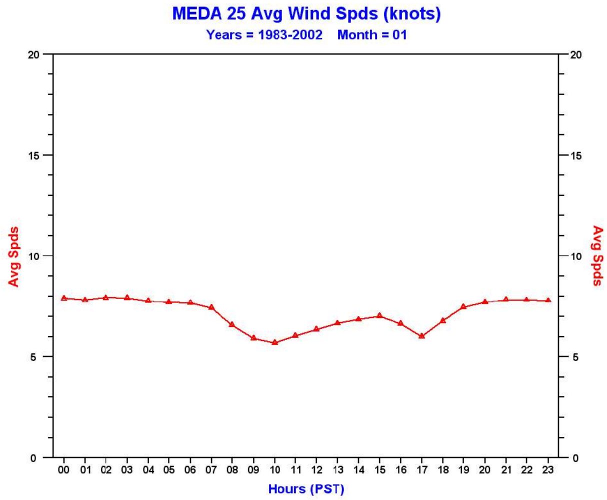


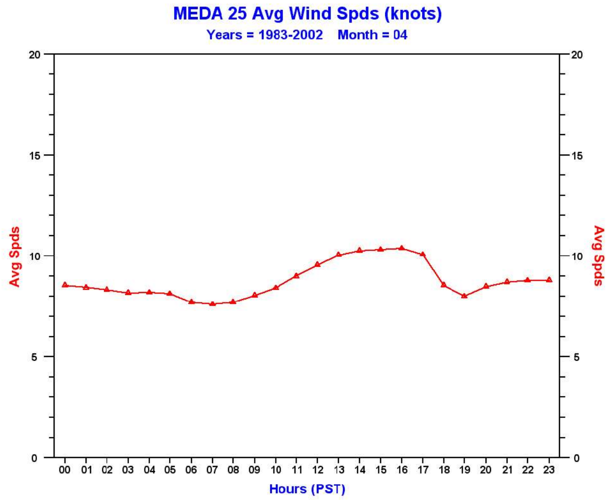


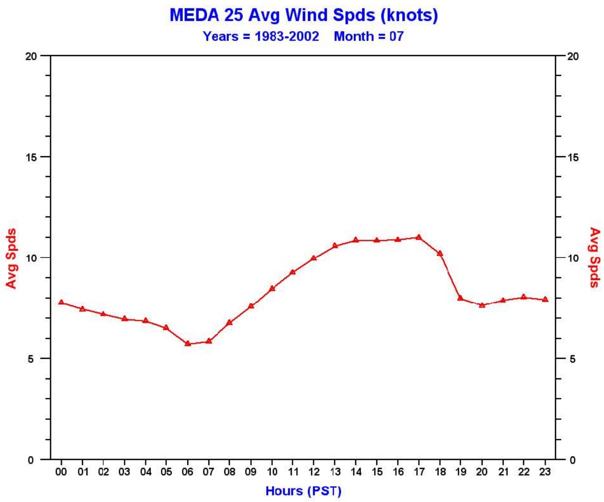


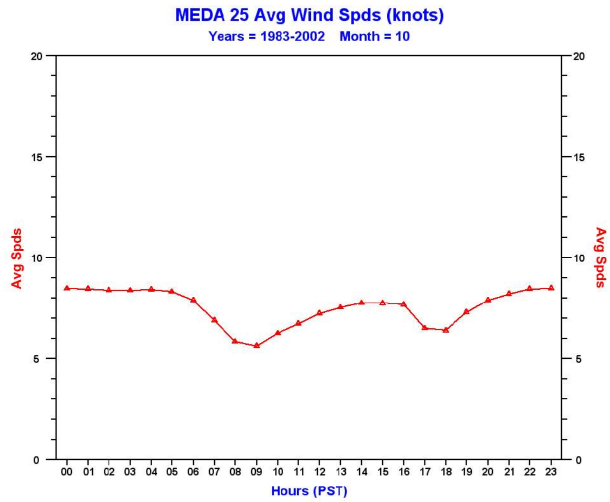


D.1.8. Lathrop Wells Gate 510, Area 25, MEDA 25

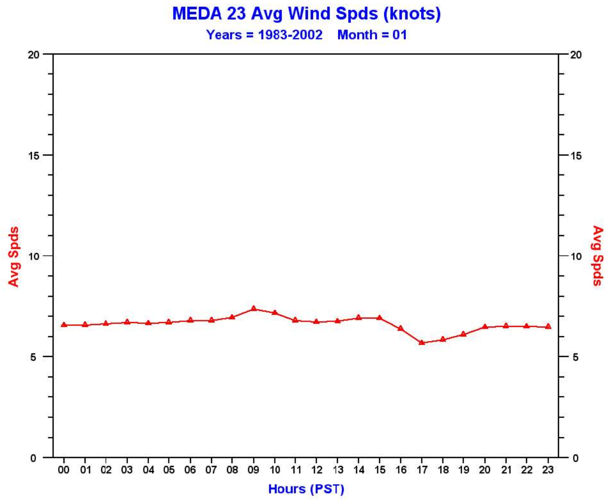


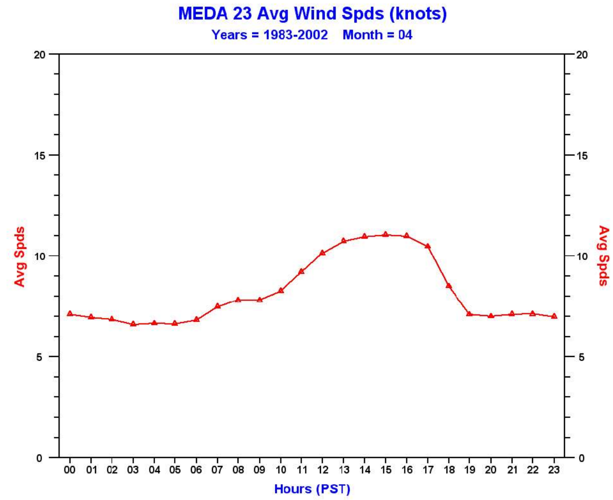


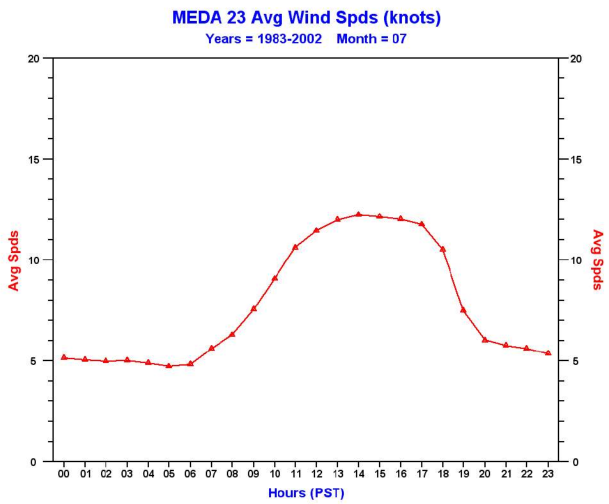


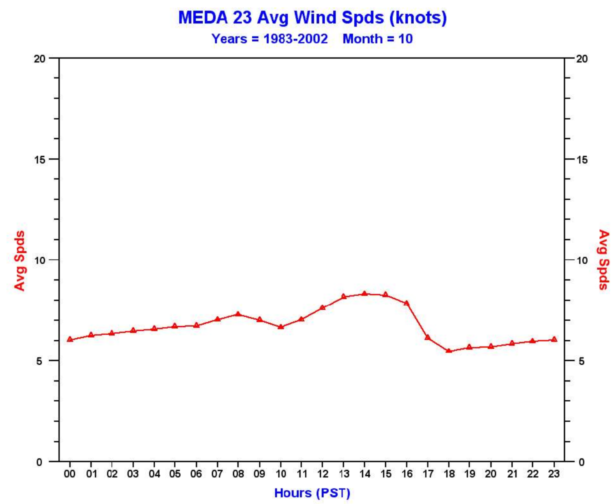


D.1.9. Mercury, Area 22, MEDA 23





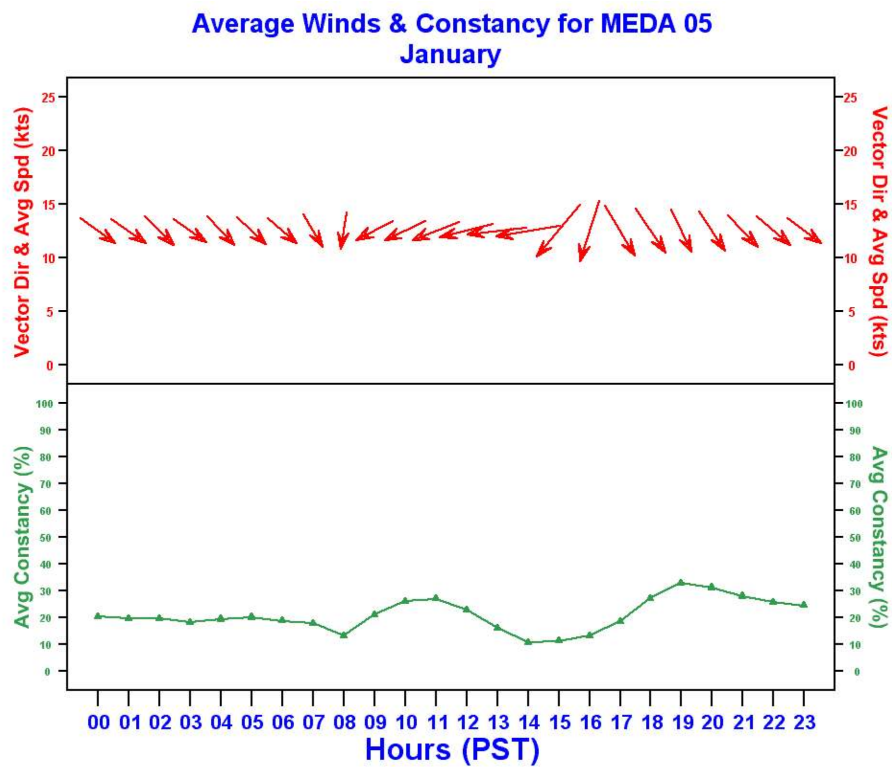


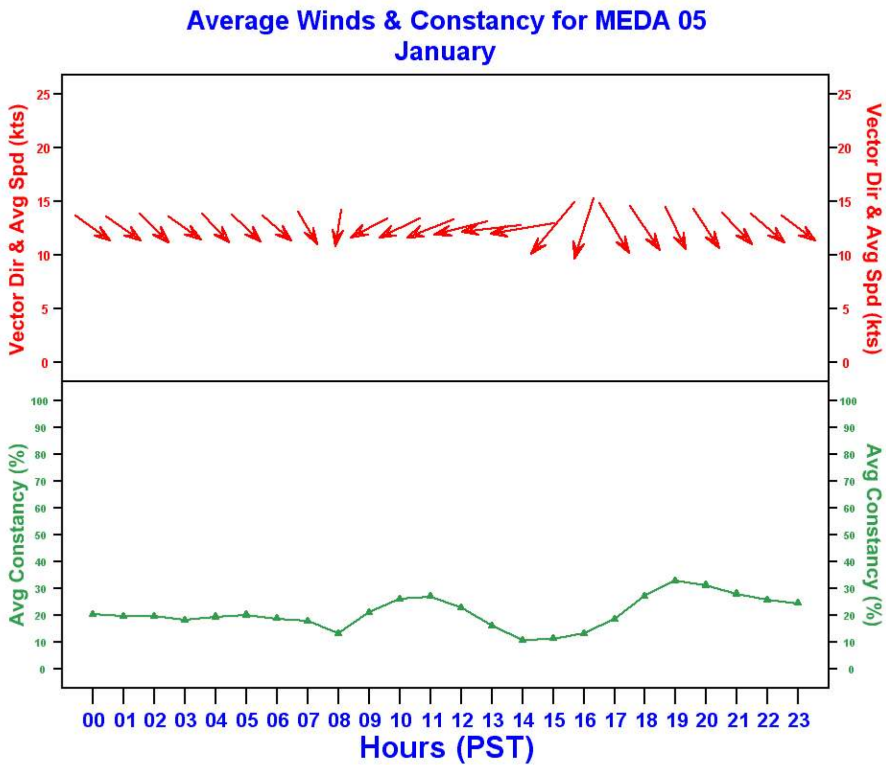


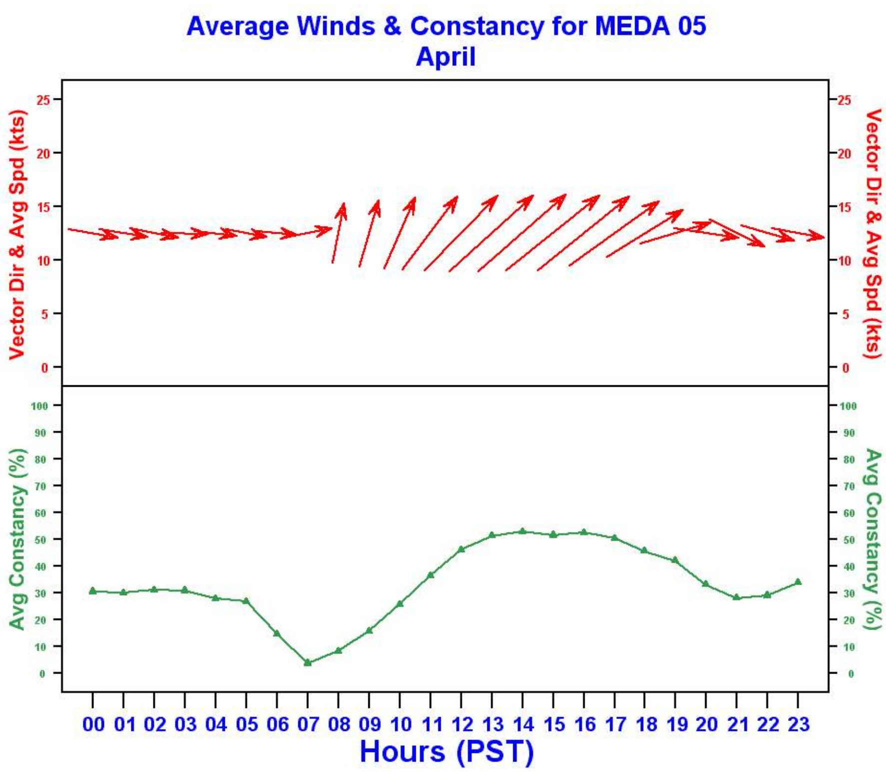
______D.2. Wind Vector Direction and Scalar Speed with Constancy

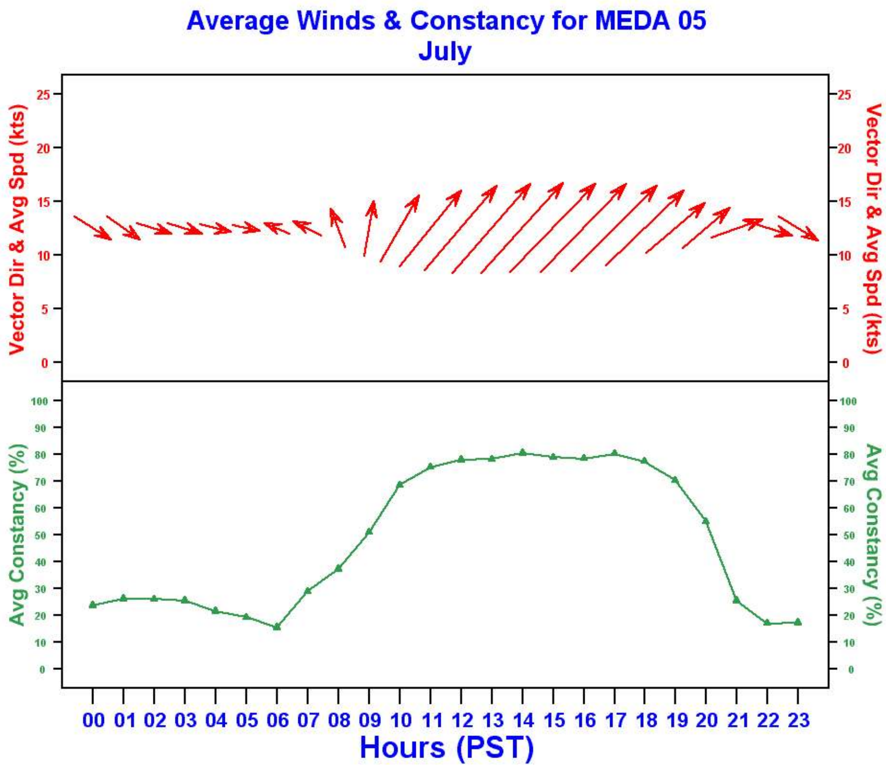
The following graphs depict the average vector wind directions and scalar speeds with constancy for four representative months at selected locations.

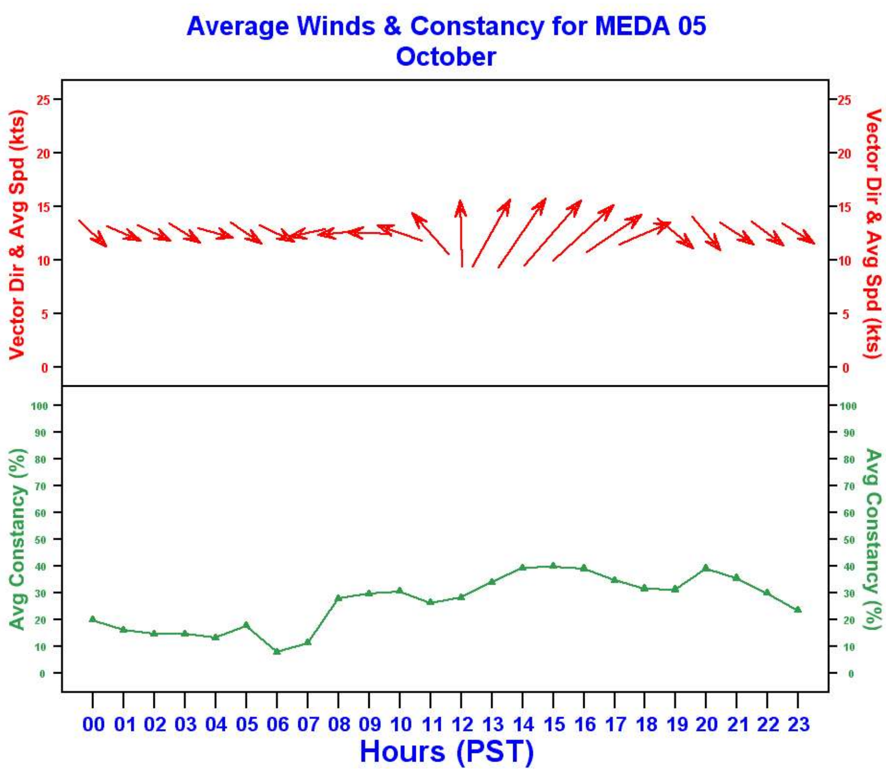
D.2.1. Frenchman Flat, Well 5B, MEDA 5, Area 5



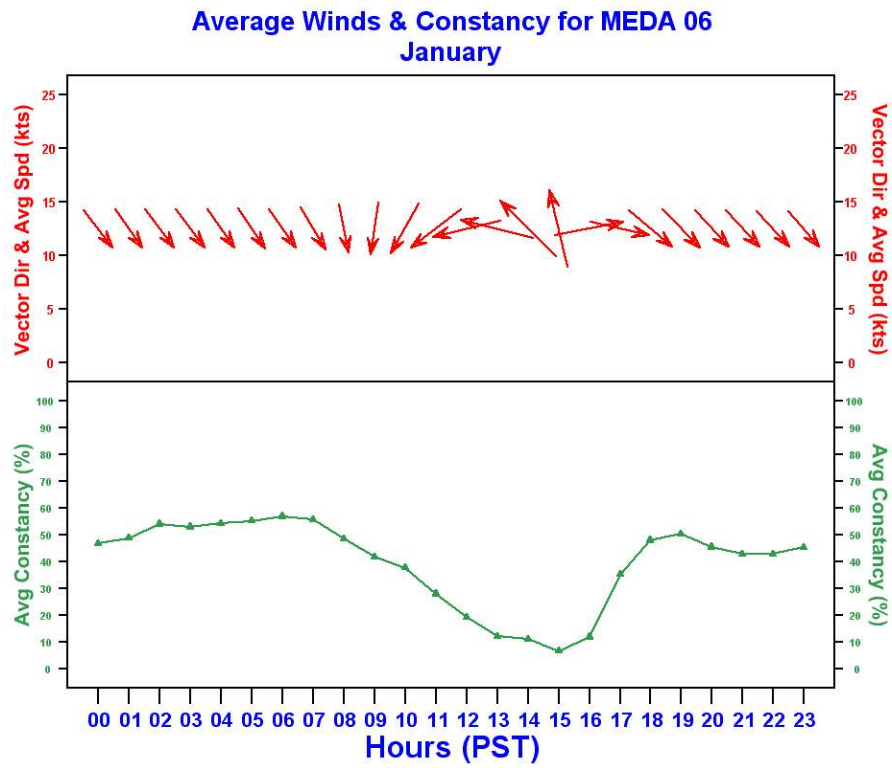

Average Winds & Constancy for MEDA 05
January
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

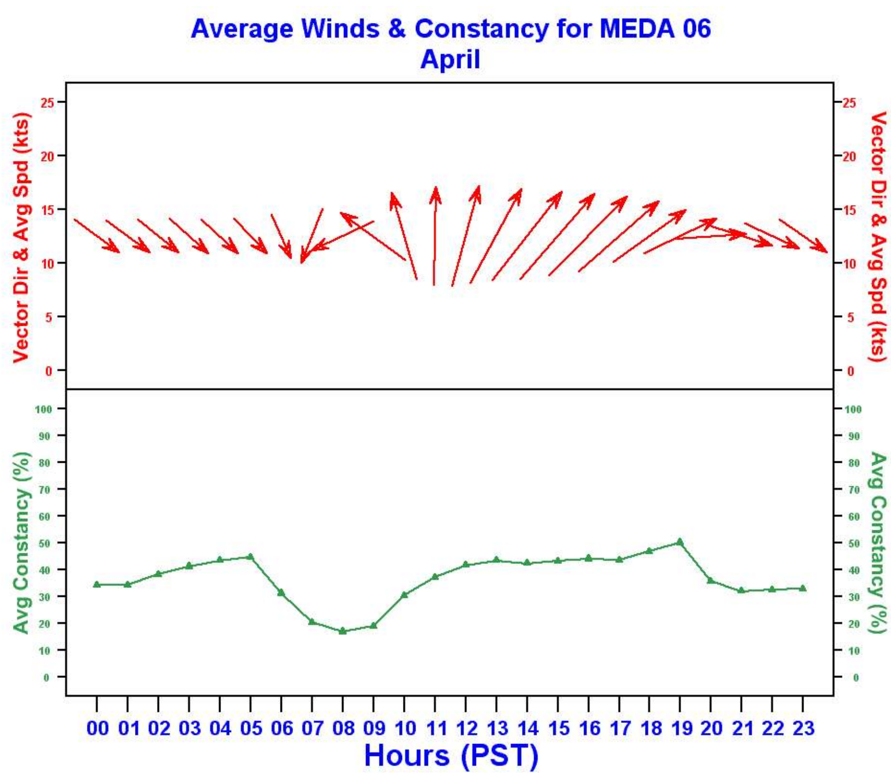

Average Winds & Constancy for MEDA 05
April
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)


Average Winds & Constancy for MEDA 05
July
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

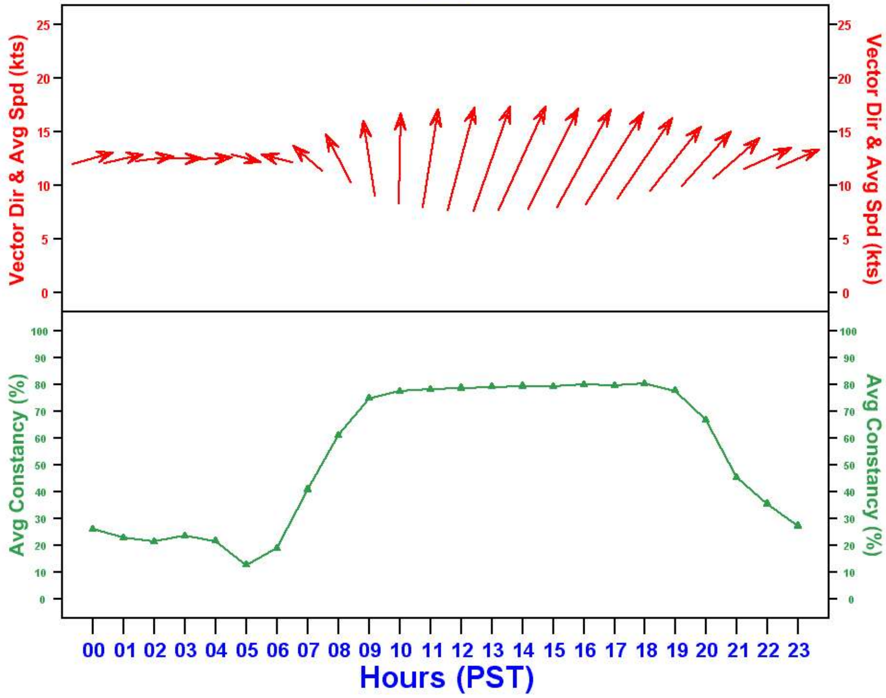

Average Winds & Constancy for MEDA 05
October
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

D.2.2. Yucca Dry Lake Bed, Area 6, MEDA

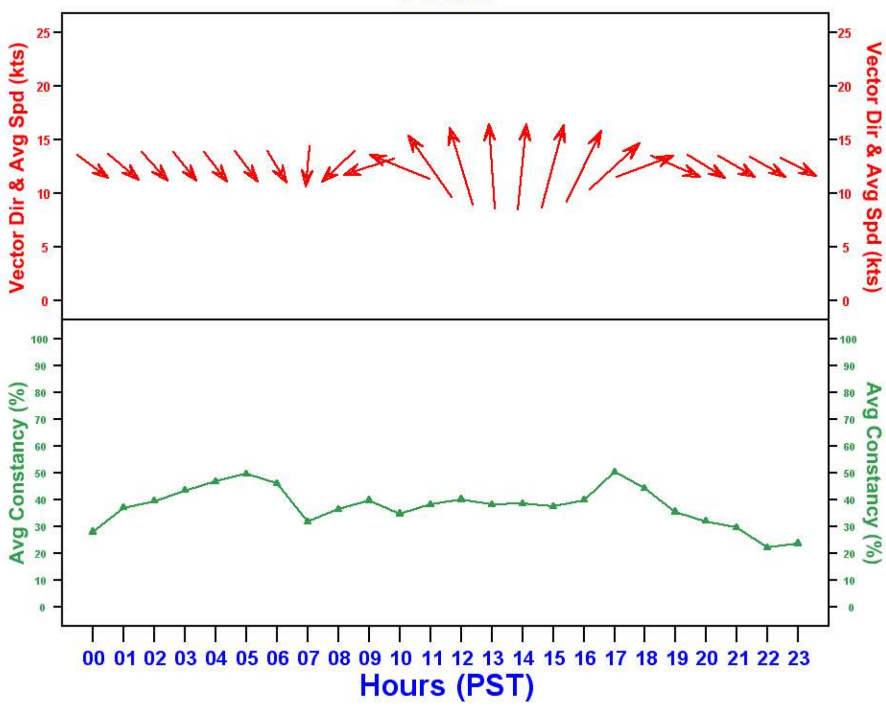




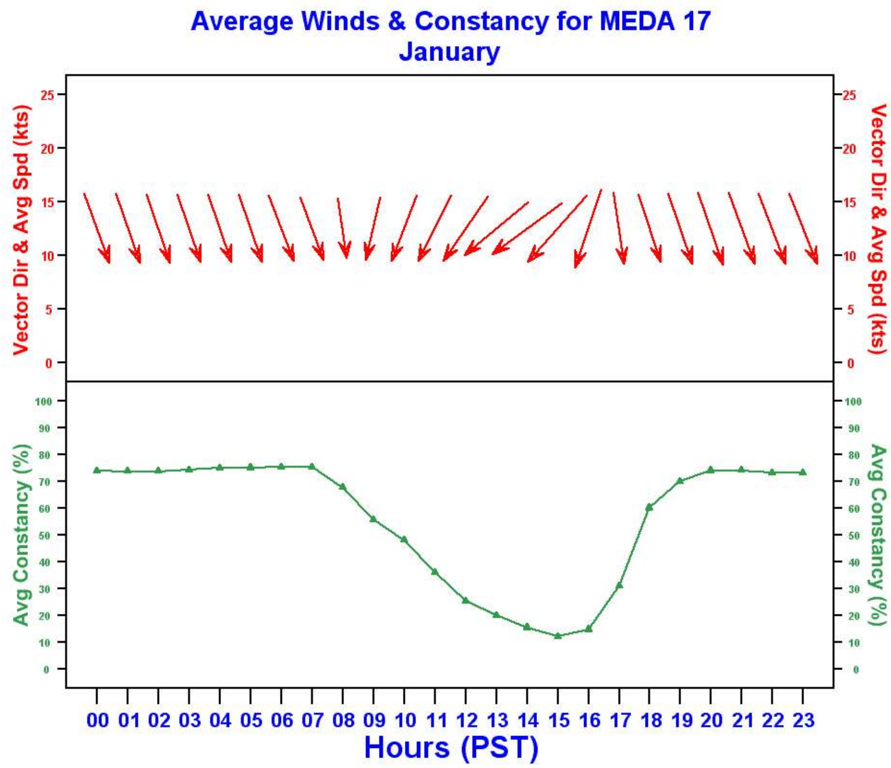
Average Winds & Constancy for MEDA 06
July

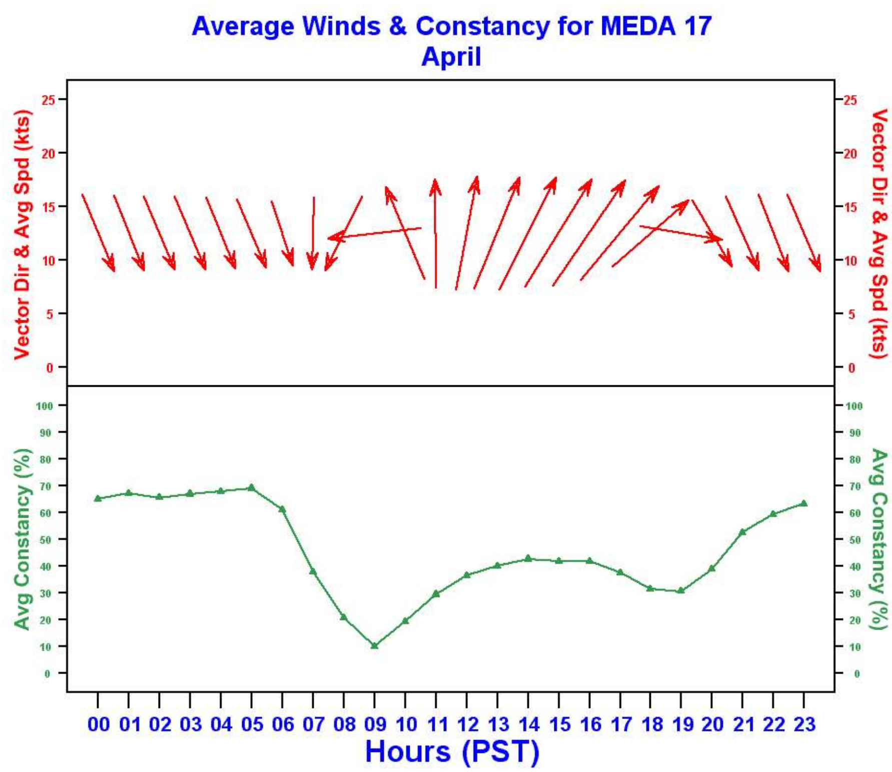


Average Winds & Constancy for MEDA 06
October

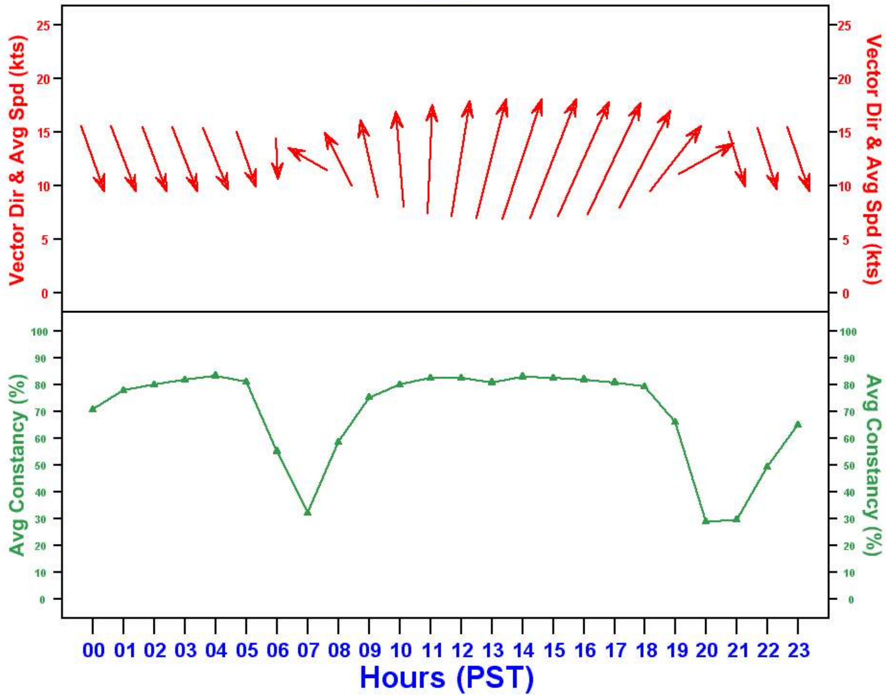


D.2.3. Yucca Flat, BJY, MEDA 17

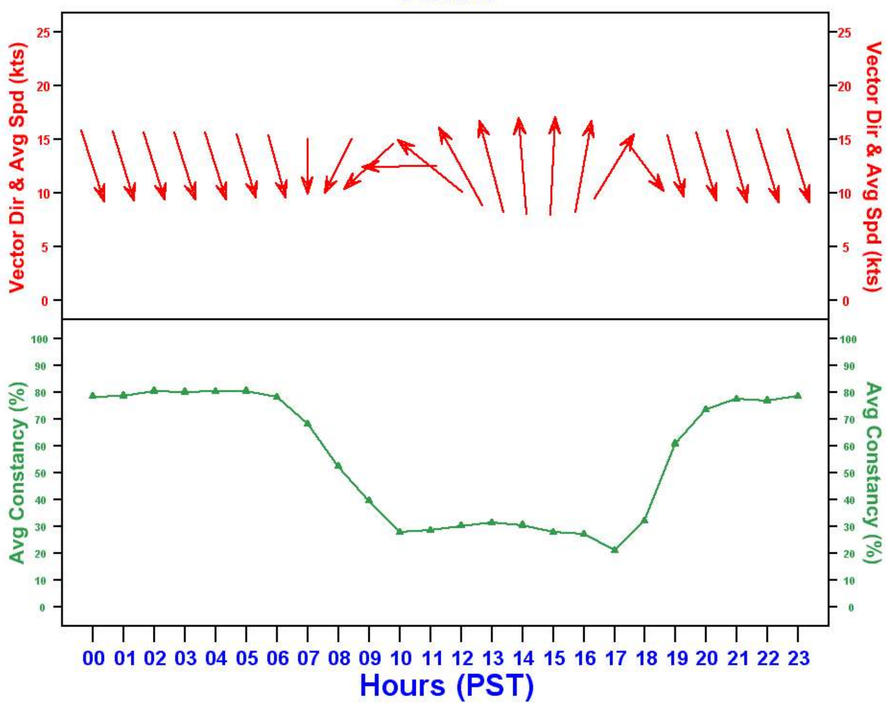




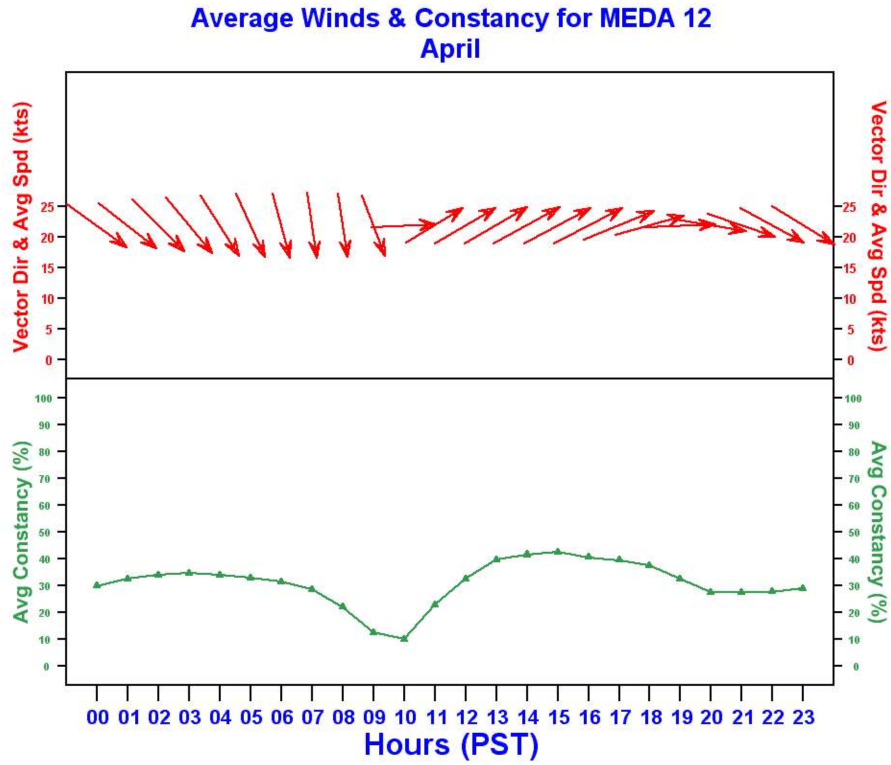
Average Winds & Constancy for MEDA 17
July

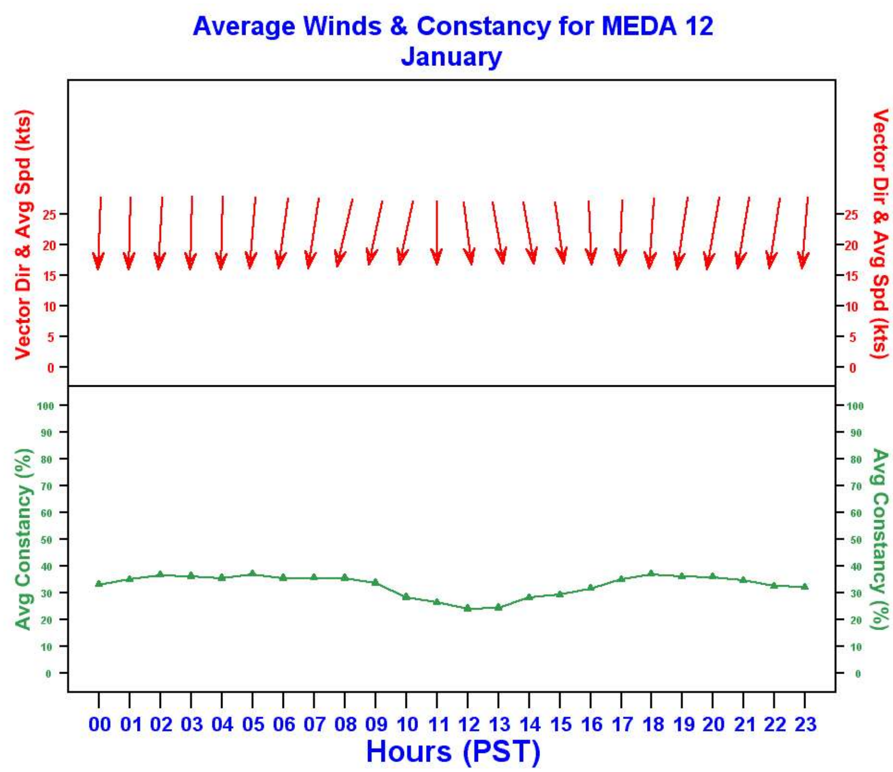


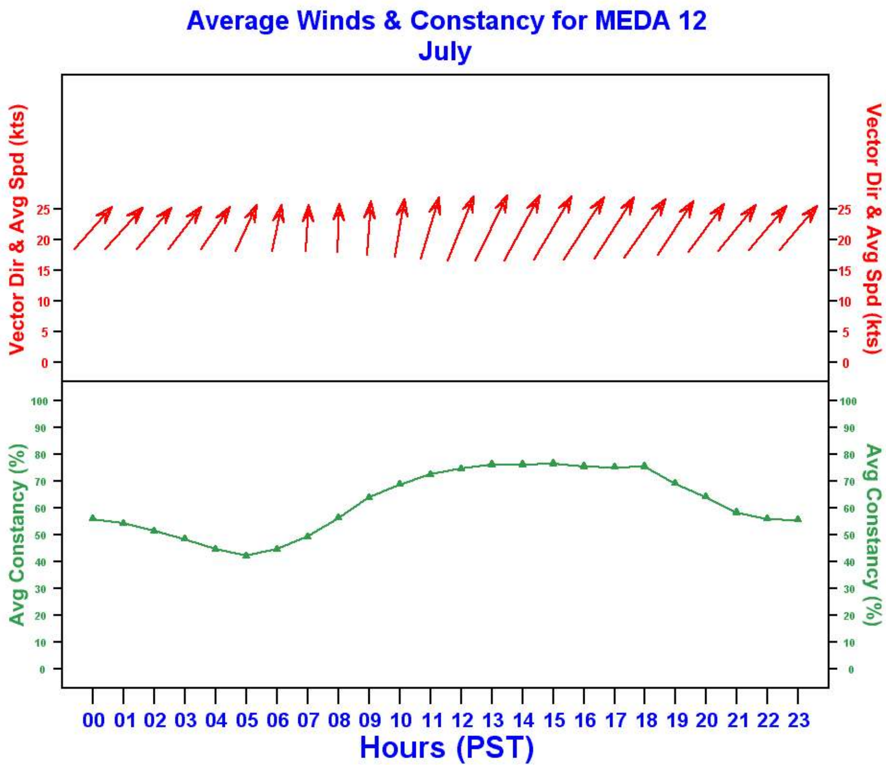
Average Winds & Constancy for MEDA 17
October

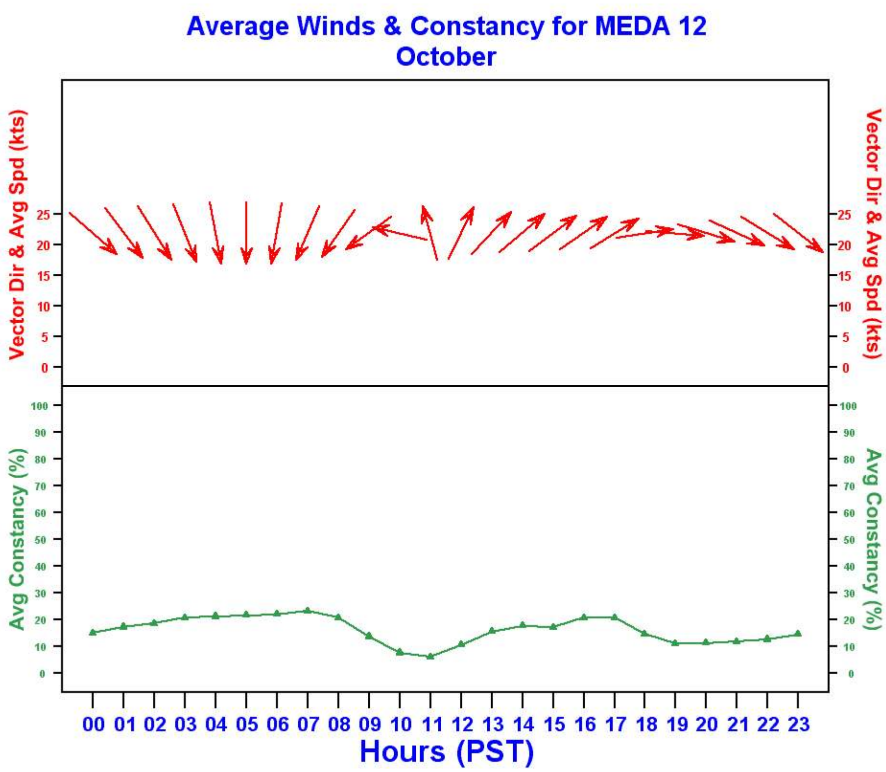


D.2.4. Rainier Mesa, MEDA 12

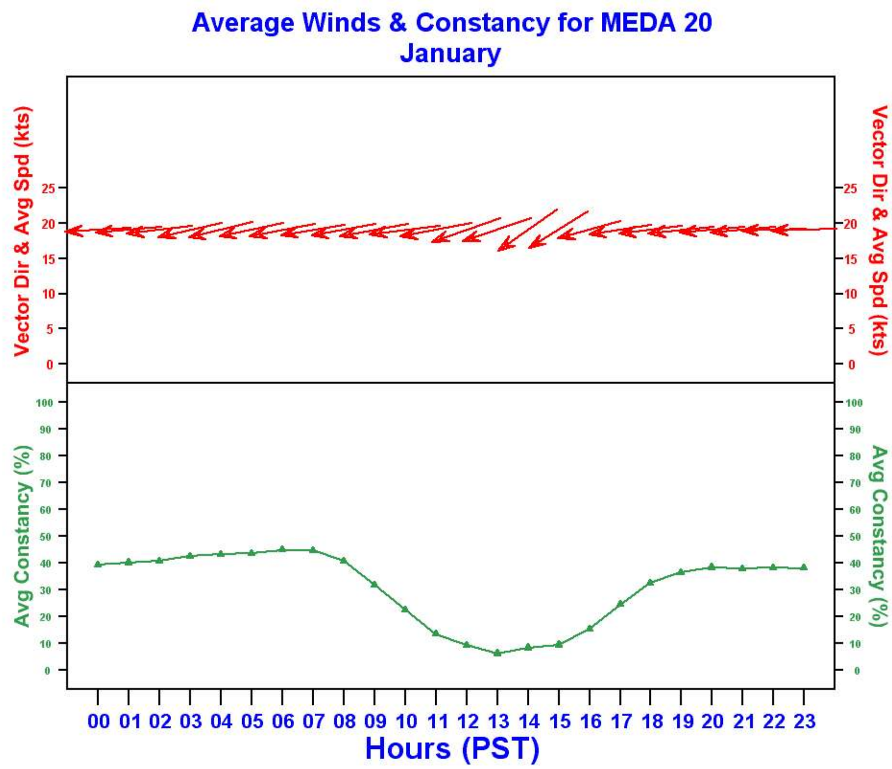


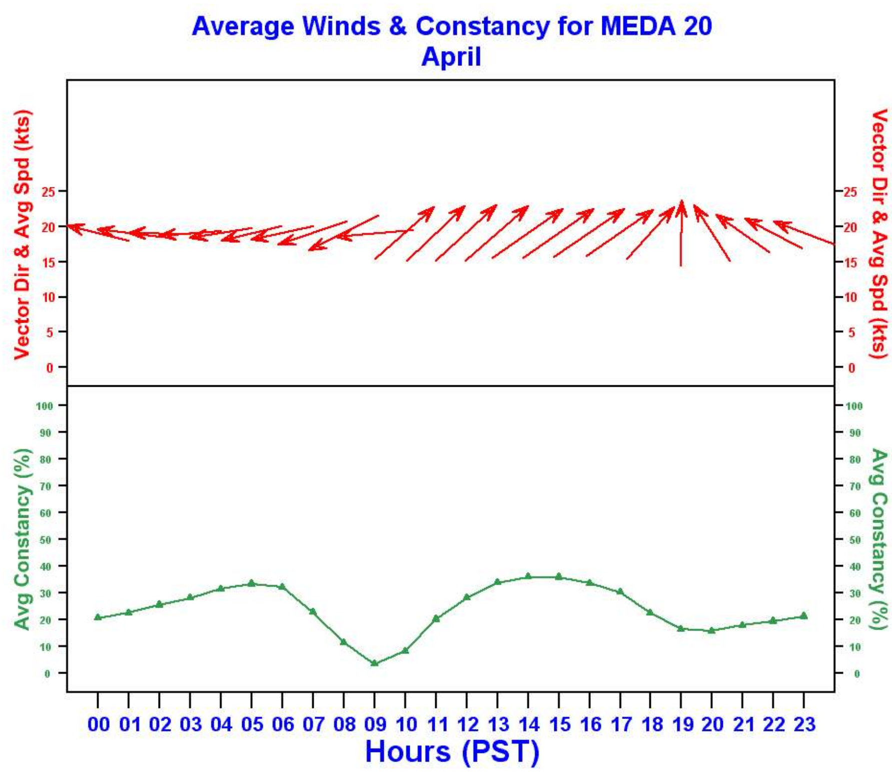


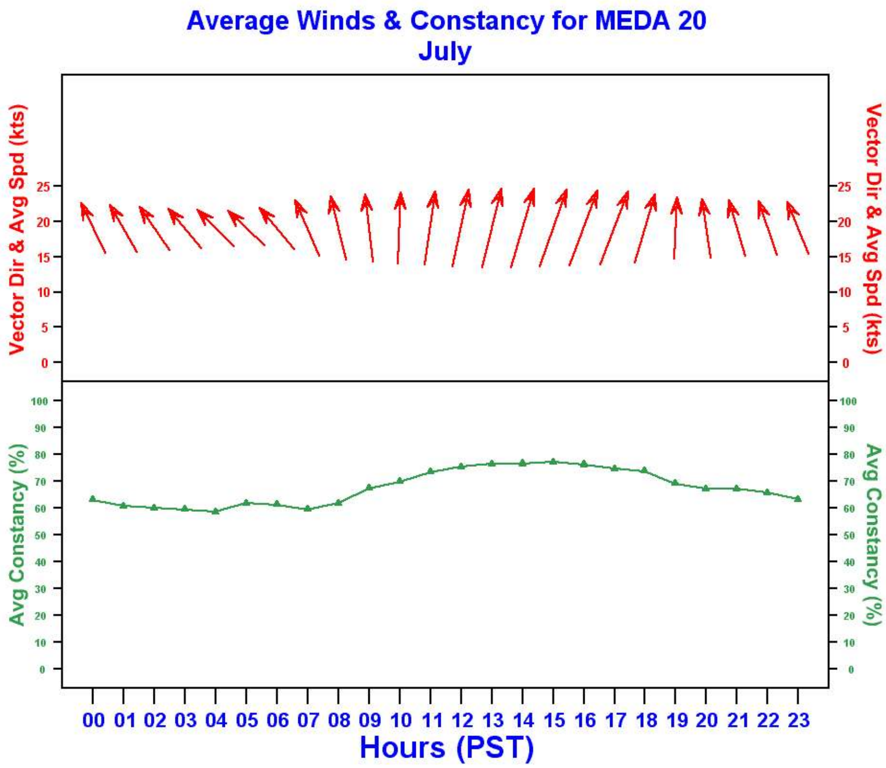

Average Winds & Constancy for MEDA 12
July
Vector Dir & Avg Spd (kts)
25
20
15
10
5
0
Avg Constancy (%)
100
90
80
70
60
50
40
30
20
10
0
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)


Average Winds & Constancy for MEDA 12
October
Vector Dir & Avg Spd (kts)
25
20
15
10
5
0
Avg Constancy (%)
100
90
80
70
60
50
40
30
20
10
0
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

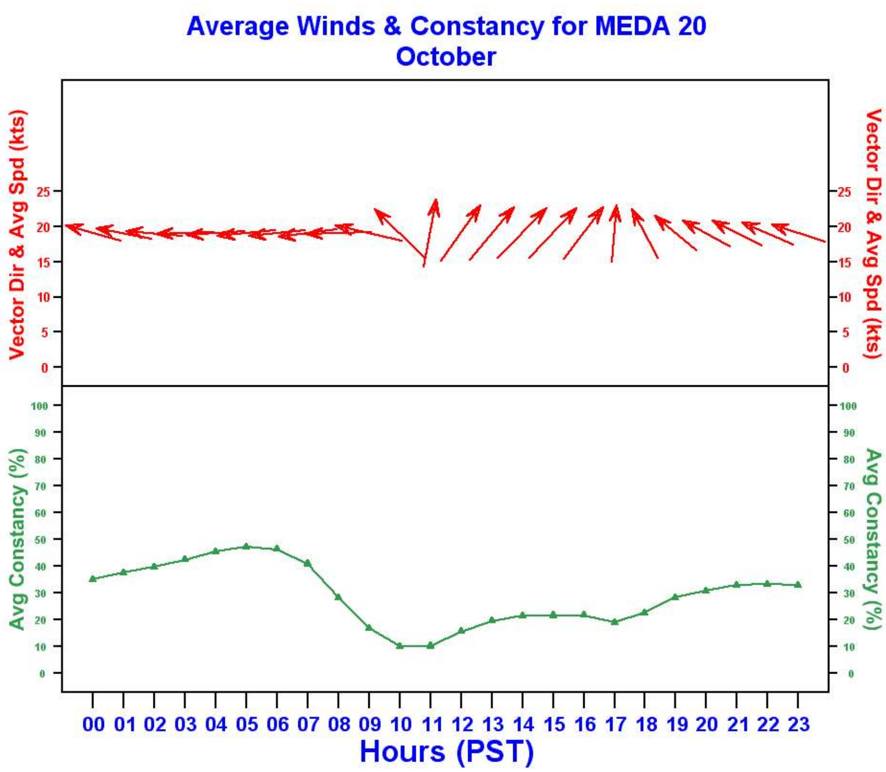
D.2.5. Pahute Mesa (PM1), MEDA 20





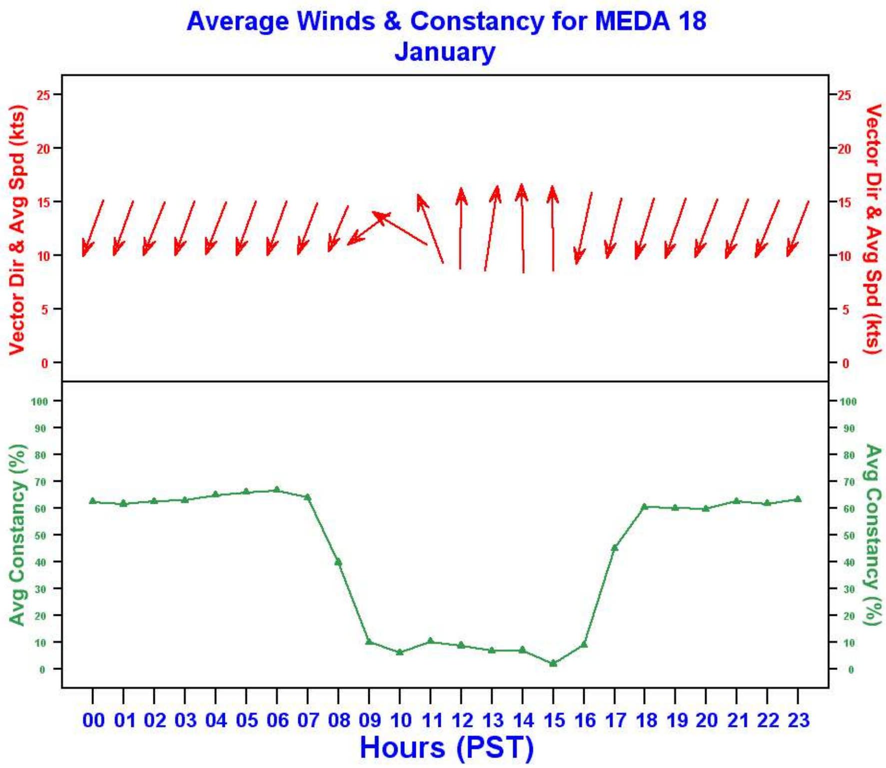


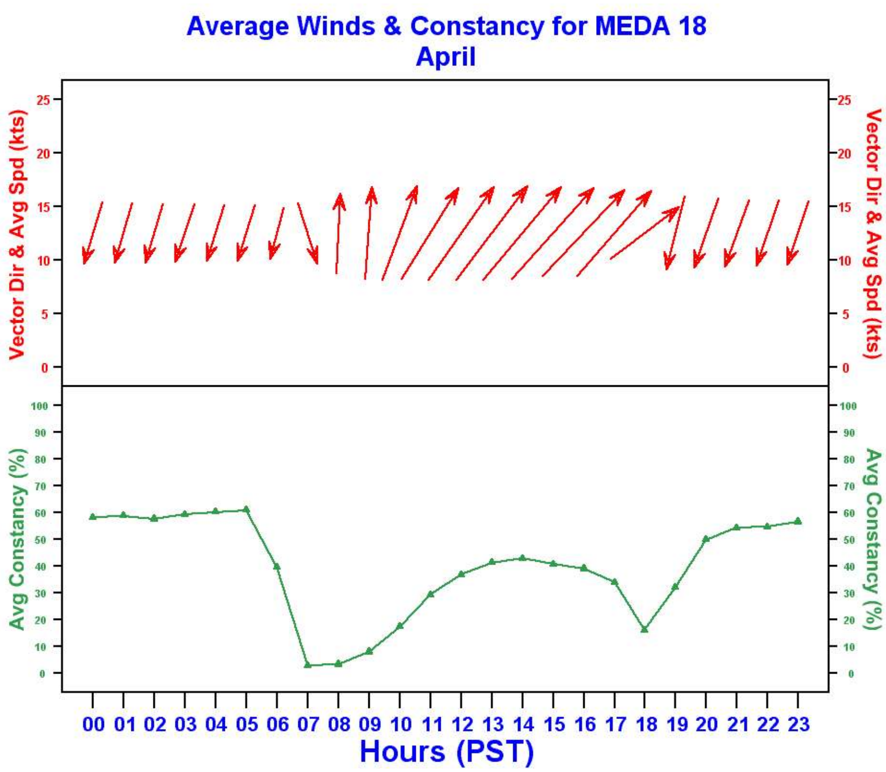
Average Winds & Constancy for MEDA 20
July
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

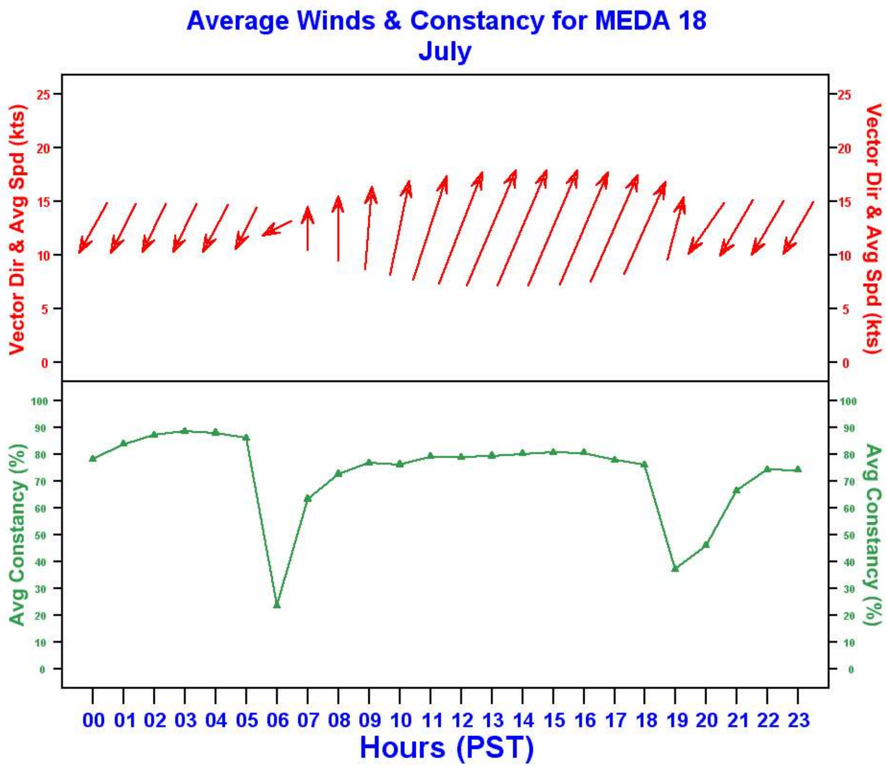


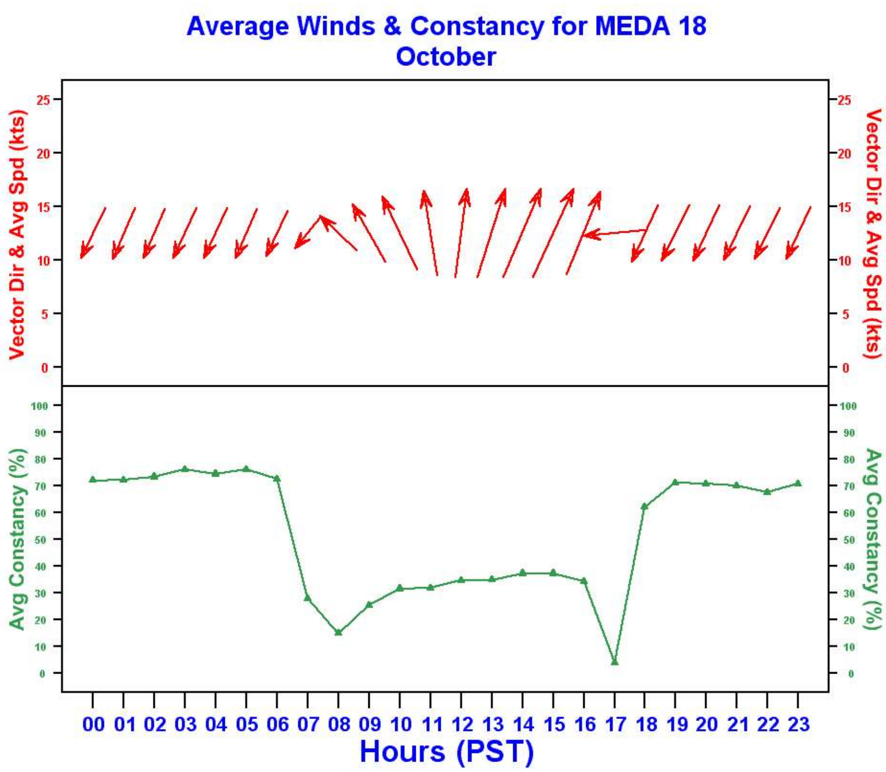
Average Winds & Constancy for MEDA 20
October
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

D.2.6. Area 18 Airstrip

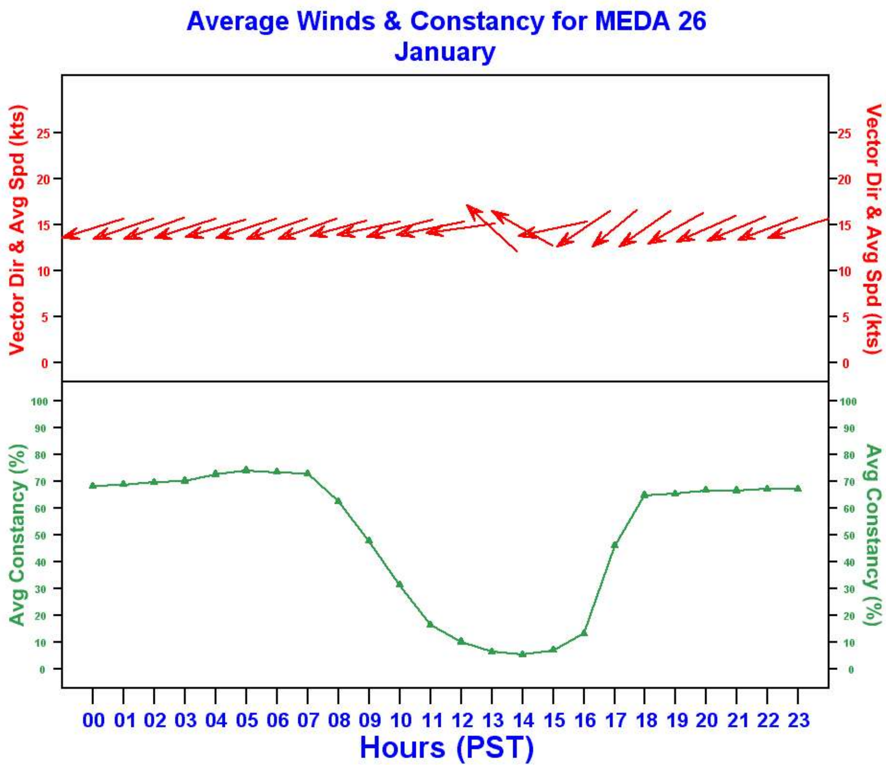


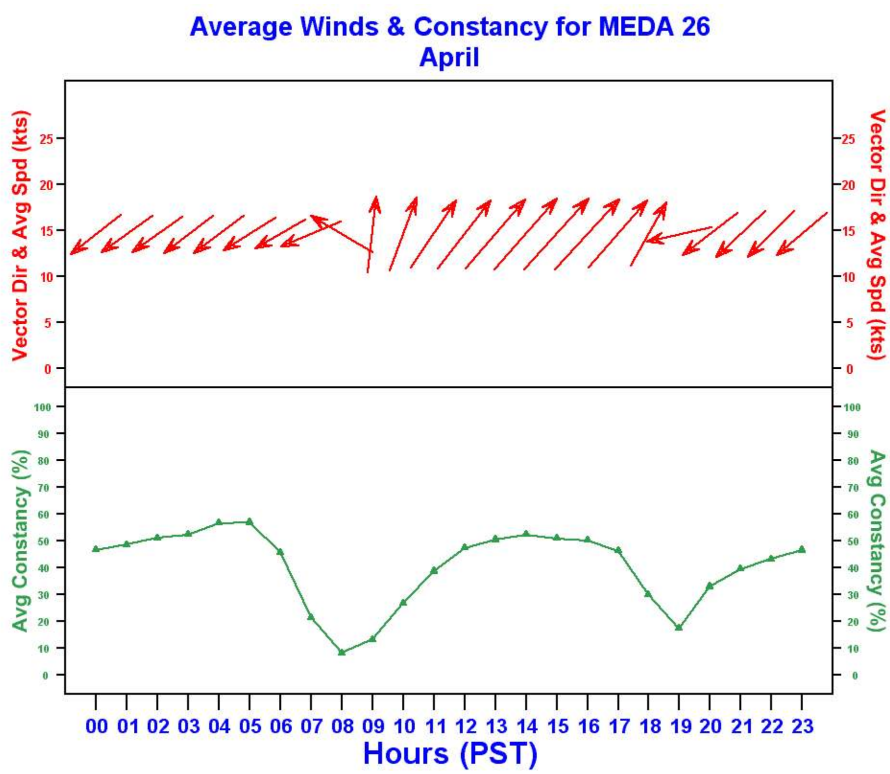


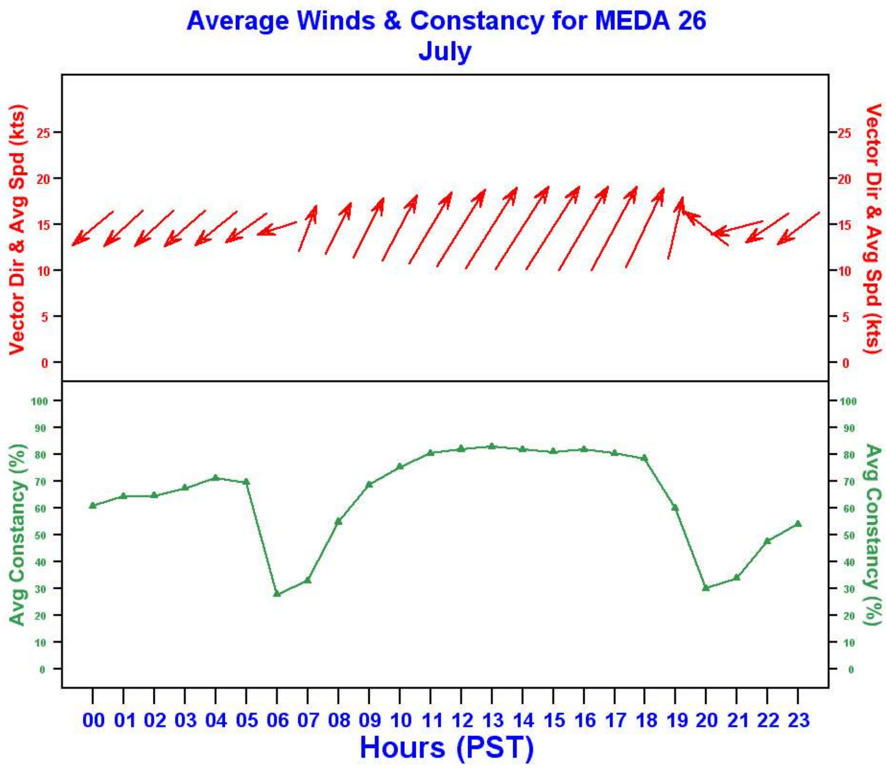

Average Winds & Constancy for MEDA 18
July
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)


Average Winds & Constancy for MEDA 18
October
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

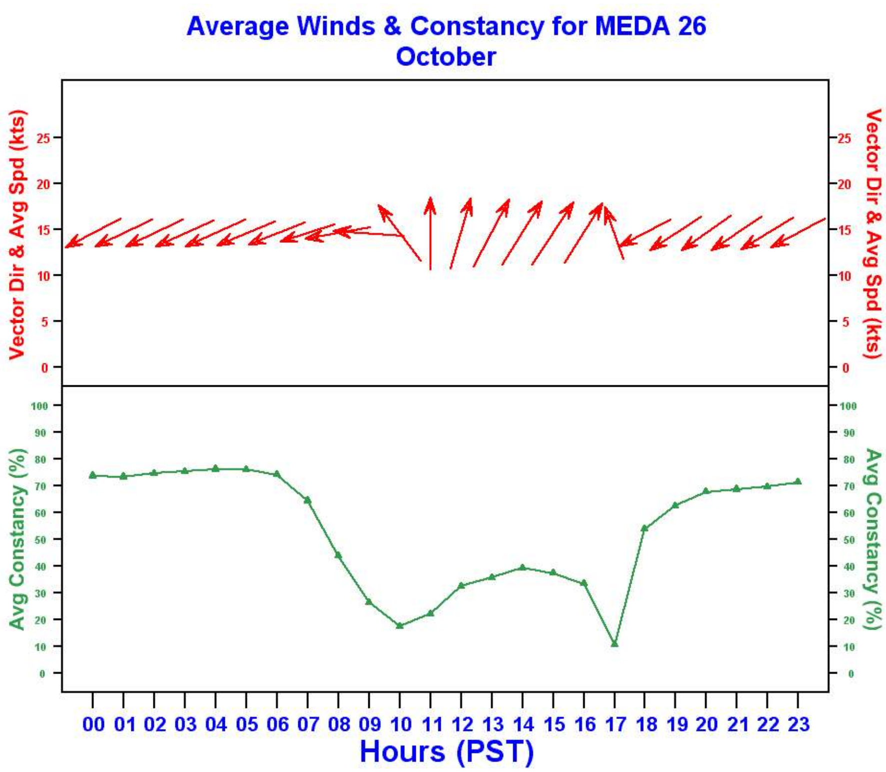
D.2.7. Jackass Flats (4JA), Area 25, MEDA 26





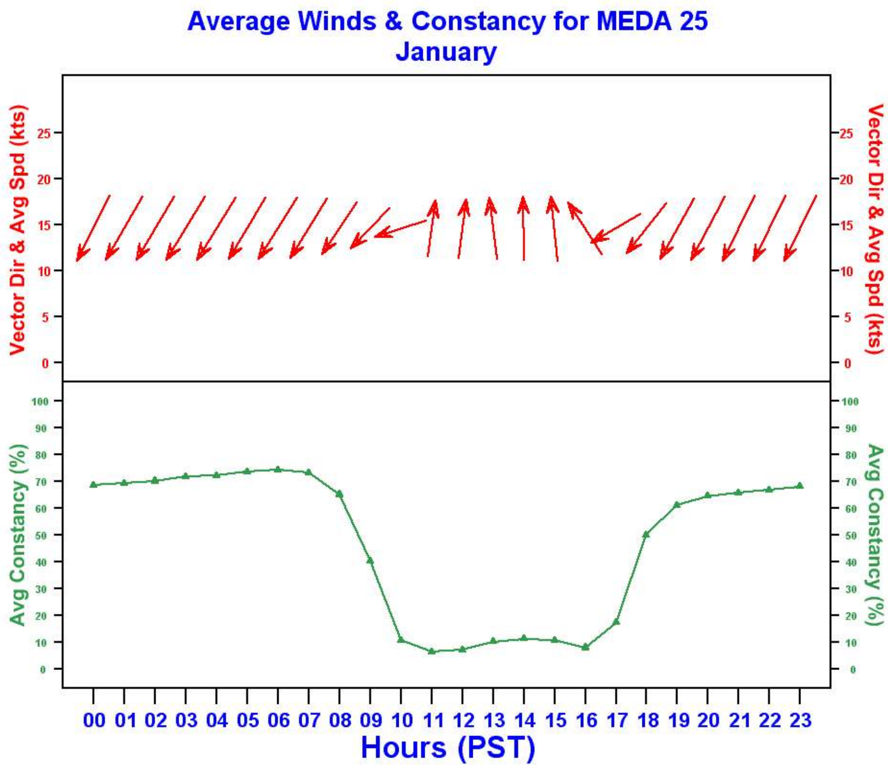


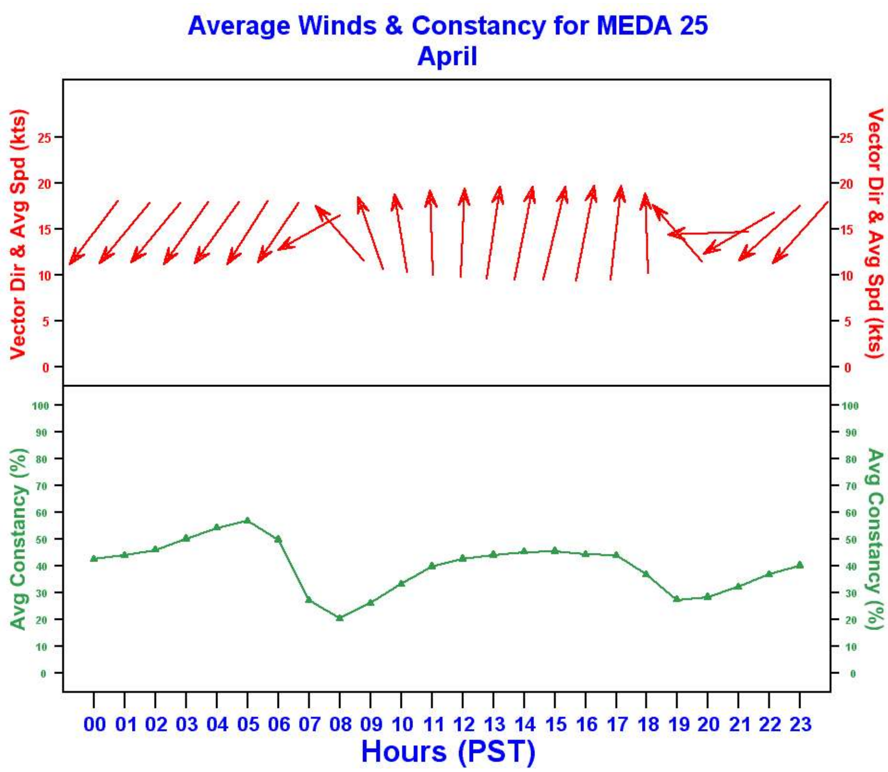
Average Winds & Constancy for MEDA 26
July
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

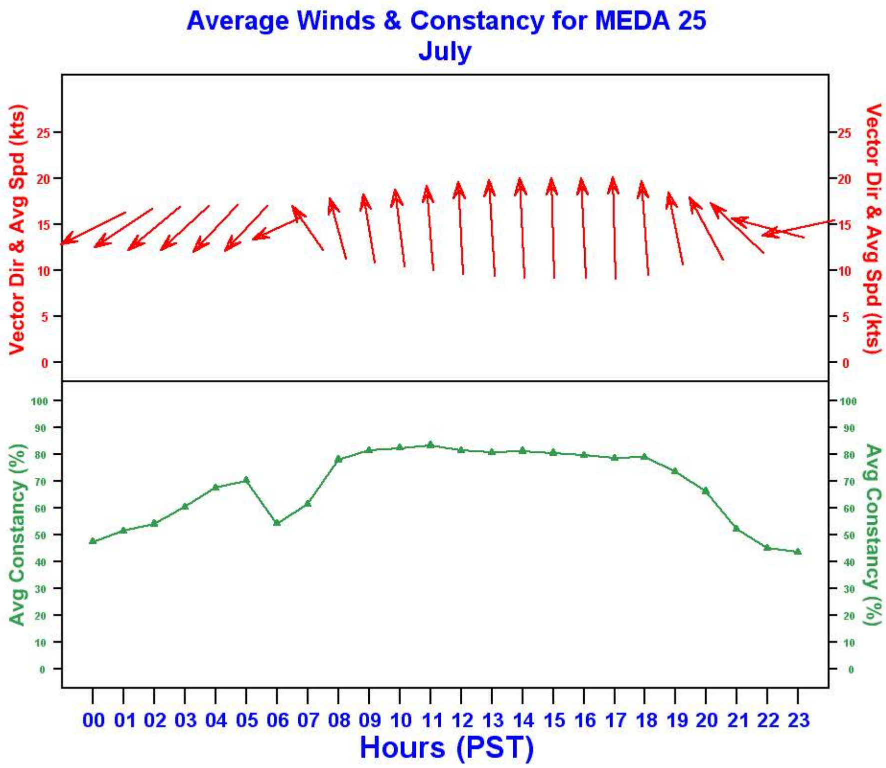


Average Winds & Constancy for MEDA 26
October
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

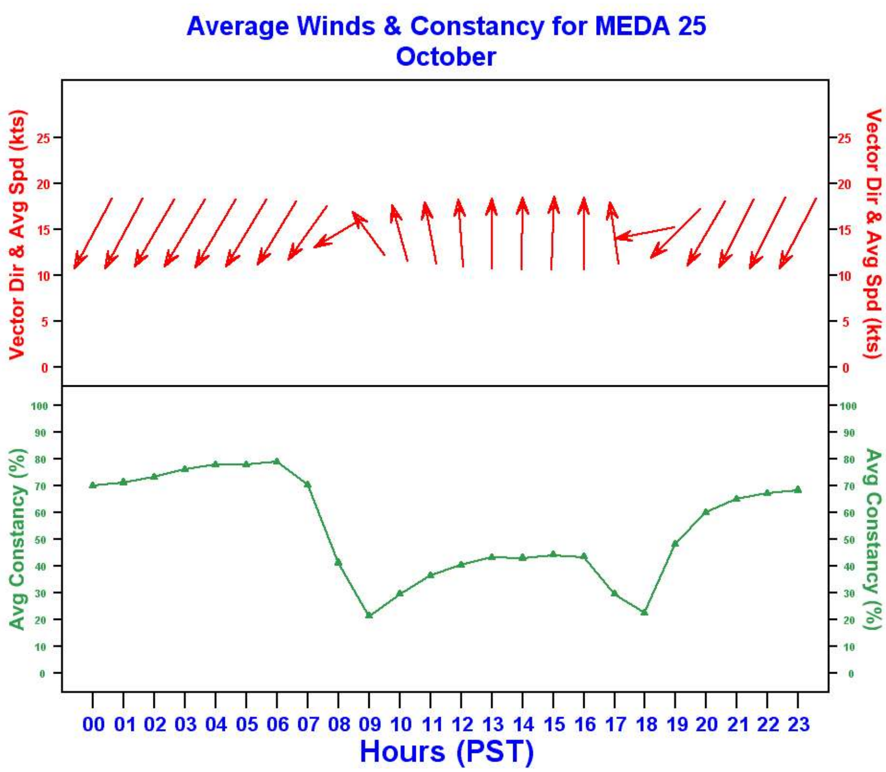
D.2.8. Lathrop Wells Gate. Area 25. MEDA 25





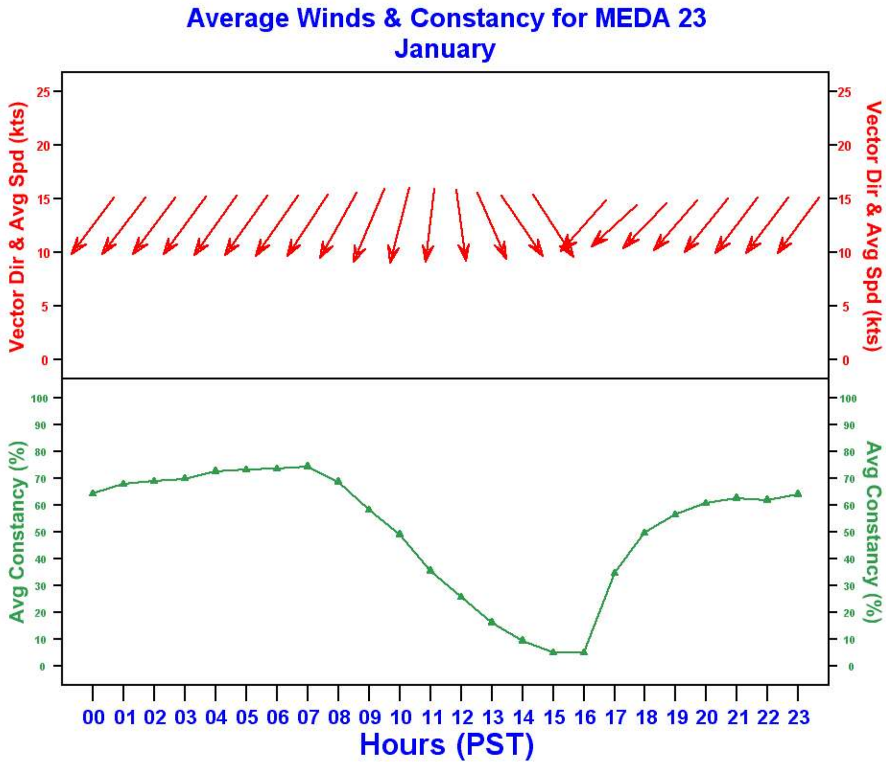


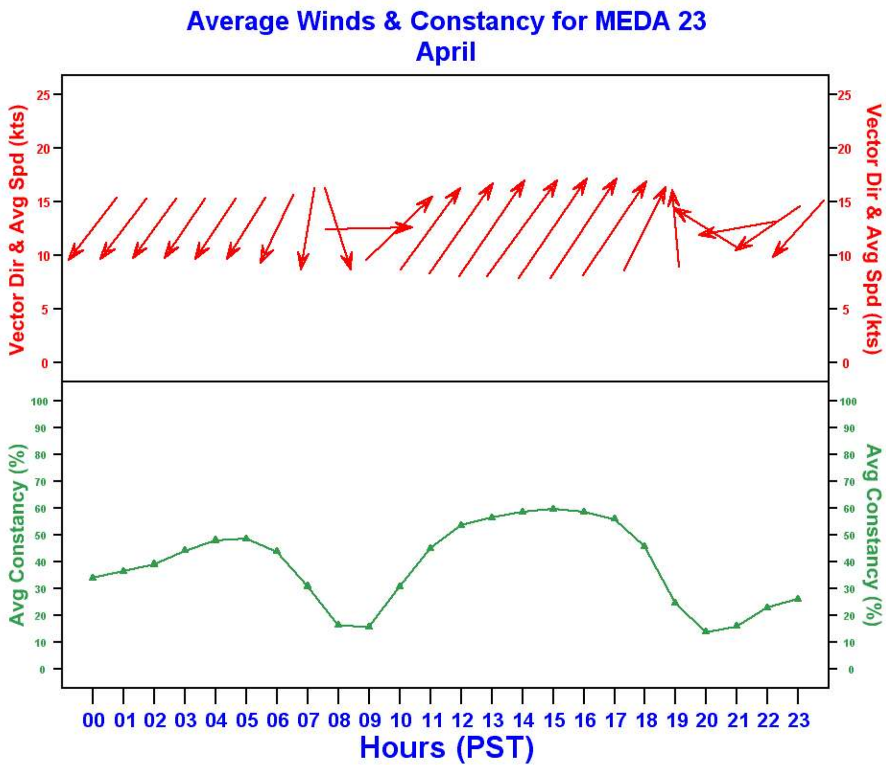
Average Winds & Constancy for MEDA 25
July
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

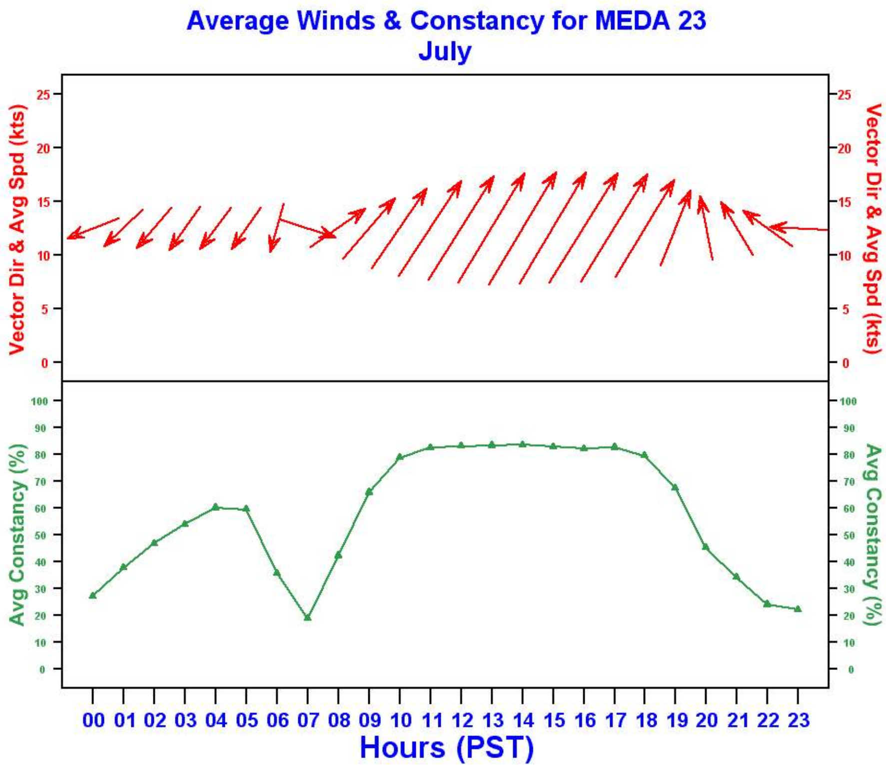


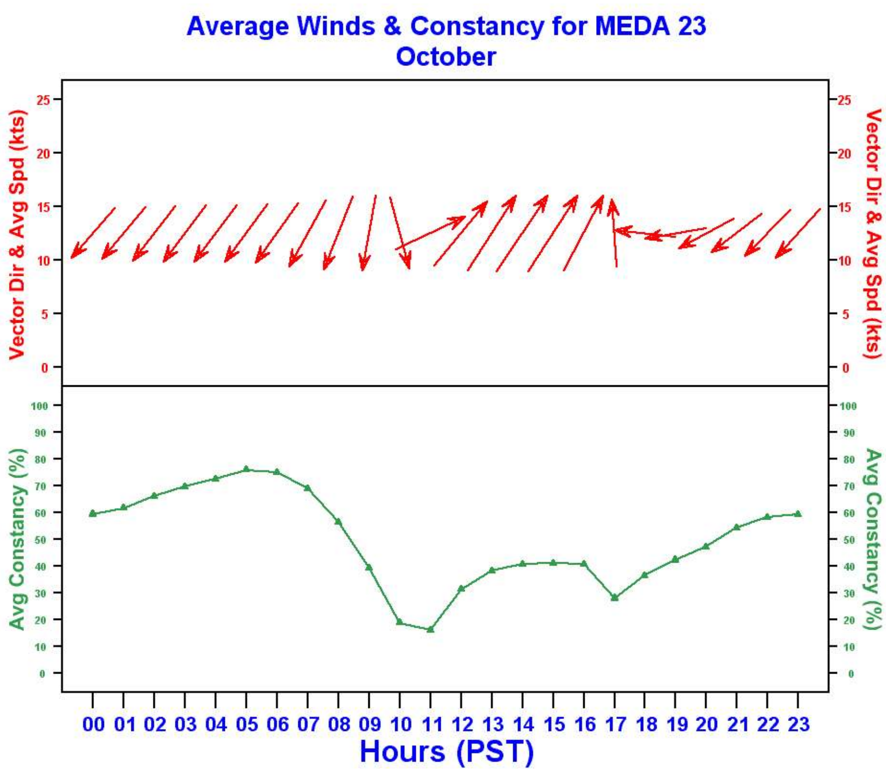
Average Winds & Constancy for MEDA 25
October
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

D.2.9. Mercury, Area 22, MEDA 23






Average Winds & Constancy for MEDA 23
July
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)


Average Winds & Constancy for MEDA 23
October
Vector Dir & Avg Spd (kts)
Avg Constancy (%)
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Hours (PST)

E. NTS Precipitation Climatology

E.1. Tables of the monthly and annual precipitation for the storage rain-gauge network on the NTS.

LITTLE FELLER 2 (LF2)
37 07 05 N 116 18 14 W
5120 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1976	****	****	****	****	****	****	****	0.01	2.00	1.27	0.00	0.27	3.55
1977	1.08	0.00	0.78	0.03	1.63	0.39	0.01	2.94	1.24	0.39	0.13	0.69	9.31
1978	3.30	2.77	3.70	1.69	0.01	0.00	0.06	0.17	1.28	0.48	0.93	0.79	15.18
1979	0.94	0.37	1.69	0.00	0.00	0.01	1.53	0.45	0.07	0.00	0.10	0.22	5.38
1980	2.25	1.71	1.75	0.86	0.52	0.28	0.17	0.00	1.20	0.01	0.04	0.00	8.79
1981	0.87	0.05	2.10	0.11	0.65	0.00	0.00	0.25	0.43	0.29	0.70	0.00	5.45
1982	0.50	0.03	2.42	0.80	1.04	0.31	0.84	0.52	1.39	0.14	1.37	0.38	9.74
1983	1.76	1.17	3.71	0.65	0.22	0.00	0.00	3.62	1.13	0.50	0.46	1.39	14.61
1984	0.00	0.15	0.00	0.17	0.00	0.01	4.04	2.19	0.04	0.33	1.42	0.00	10.35
1985	0.57	0.07	0.27	0.01	0.26	0.18	0.64	0.00	0.30	0.19	1.81	0.29	4.59
1986	1.11	0.71	1.24	0.51	0.03	0.00	0.96	0.99	0.10	0.52	0.60	1.25	8.02
1987	0.95	0.40	1.38	0.50	2.40	0.57	1.54	0.02	0.00	1.08	1.33	0.58	10.75
1988	0.78	0.66	0.37	1.61	0.36	0.30	0.39	1.62	0.18	0.00	0.07	0.48	6.82
1989	0.16	0.61	0.26	0.00	1.06	0.47	0.00	0.83	0.00	0.15	0.00	0.00	3.54
1990	0.72	0.27	0.27	0.90	0.52	0.07	1.08	0.47	0.77	0.04	0.05	0.02	5.18
1991	0.14	0.85	1.44	0.00	0.43	0.15	0.37	0.87	0.75	0.57	0.00	0.60	6.17
1992	0.83	2.28	3.60	0.00	0.33	0.00	0.20	0.30	0.00	0.78	0.00	2.01	10.33
1993	3.65	3.29	0.89	0.00	0.00	0.81	0.00	0.58	0.09	0.45	0.58	0.43	10.77
1994	0.14	0.82	0.64	0.61	0.29	0.00	0.00	0.04	0.36	0.07	0.35	1.64	4.96
1995	2.02	1.61	3.04	0.68	0.62	0.09	0.13	0.52	0.00	0.03	0.00	0.05	8.79
1996	0.13	0.68	0.74	0.00	0.19	0.09	0.11	0.06	0.00	0.78	2.49	1.02	6.29
1997	1.02	0.10	0.00	0.11	0.08	1.40	0.43	0.07	1.65	0.00	1.18	1.07	7.11
1998	0.36	5.08	1.83	0.66	0.99	1.76	0.50	1.08	0.89	0.24	0.07	0.01	13.47
1999	0.48	0.15	0.04	2.04	0.36	0.06	1.16	0.20	1.04	0.00	0.00	0.00	5.53
2000	0.62	3.74	0.99	0.35	0.02	0.14	0.00	1.11	0.00	0.70	0.10	0.00	7.77
2001	1.91	1.43	0.40	0.82	0.08	0.00	0.85	0.05	1.24	0.32	0.33	0.39	7.82
2002	0.24	0.24	0.35	0.18	0.01	0.00	0.02	0.00	0.01	0.07	0.38	0.22	1.72
2003	0.07	1.22	0.38	1.18	0.00	0.00	0.43	0.60	0.03	0.05	0.90	0.71	5.57
AVG	0.99	1.13	1.27	0.54	0.45	0.26	0.57	0.70	0.58	0.34	0.55	0.59	7.93

Notes: Averages do not include columns with ** in them.**
Total column does not include data prior to 1977.

BUSTER JANGLE (BJY)
37 03 46 N 116 03 09 W
4070 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1960	****	0.15	0.28	0.18	0.02	0.42	0.02	0.01	0.97	0.87	1.48	0.00	4.40
1961	0.38	0.00	0.53	0.38	0.29	0.02	0.94	2.64	0.00	0.17	0.86	1.05	7.26
1962	0.11	1.22	0.18	0.02	0.08	0.11	0.45	0.00	0.52	0.16	0.01	0.29	3.15
1963	0.04	0.46	0.38	0.15	0.46	0.64	0.01	0.43	1.89	0.12	0.32	0.02	4.92
1964	0.00	0.00	0.06	0.20	0.17	0.09	0.64	0.18	0.00	0.04	0.15	0.00	1.53
1965	0.27	0.03	0.49	2.40	0.25	0.14	1.54	0.82	0.02	0.11	2.37	2.45	10.89
1966	0.16	0.09	0.01	0.00	0.00	0.00	0.94	0.62	0.21	0.00	0.01	1.16	3.20
1967	0.51	0.22	0.06	0.63	0.23	0.12	0.68	0.25	0.41	0.00	0.58	0.39	4.08
1968	0.01	1.16	0.16	0.15	0.00	0.25	0.66	0.24	0.00	0.15	0.11	0.01	2.90
1969	3.41	3.17	0.55	0.19	0.07	0.78	0.72	0.03	1.21	0.24	0.33	0.02	10.72
1970	0.08	0.80	0.41	0.28	0.00	0.09	0.09	1.20	0.02	0.00	1.29	0.09	4.35
1971	0.00	0.33	0.02	0.41	1.69	0.00	0.39	0.67	0.05	0.01	0.01	2.61	6.19
1972	0.00	0.00	0.00	0.01	0.08	1.22	0.02	0.69	0.82	1.49	1.85	0.01	6.19
1973	1.11	2.06	3.58	0.21	0.20	0.14	0.00	0.05	0.01	0.37	0.32	0.22	8.27
1974	2.29	0.00	0.66	0.03	0.00	0.00	1.10	0.40	0.00	1.36	0.04	1.57	7.45
1975	0.05	0.10	1.36	0.61	0.82	0.00	0.08	0.05	0.21	0.75	0.02	0.02	4.07
1976	0.00	3.10	0.23	0.47	0.38	0.00	0.74	0.00	1.60	1.41	0.00	0.35	8.28
1977	1.06	0.00	0.04	0.00	2.02	0.41	0.07	2.38	0.00	0.07	0.10	0.48	6.63
1978	2.44	3.42	2.83	0.49	0.05	0.00	0.48	0.00	0.68	0.30	0.88	0.56	12.13
1979	1.08	0.44	0.98	0.00	0.08	0.01	0.76	0.40	0.02	0.00	0.00	0.25	4.02
1980	2.60	1.75	1.92	0.40	0.23	0.15	0.77	0.13	0.37	0.00	0.00	0.04	8.36
1981	0.32	0.06	1.46	0.42	0.15	0.00	0.00	0.10	0.46	0.23	0.45	0.00	3.65
1982	0.61	0.16	2.22	0.42	0.61	0.08	0.44	1.08	1.02	0.10	1.22	0.35	8.31
1983	1.72	0.58	2.75	0.48	0.36	0.00	0.00	4.93	0.99	0.06	0.71	1.18	13.76
1984	0.00	0.10	0.00	0.02	0.00	0.75	3.42	3.04	0.03	0.21	0.90	2.43	10.90
1985	0.88	0.15	0.21	0.01	0.19	0.36	0.84	0.00	0.09	0.21	1.09	0.14	4.17
1986	1.28	0.51	1.10	0.16	0.10	0.02	0.55	0.33	0.02	0.46	0.59	0.93	6.05
1987	1.25	0.30	0.37	0.64	1.56	0.27	1.41	0.00	0.00	0.87	0.86	0.64	8.17
1988	1.30	0.27	0.02	1.31	0.29	0.13	0.06	0.73	0.01	0.00	0.15	0.23	4.50
1989	0.27	0.48	0.02	0.00	0.96	0.15	0.00	0.55	0.00	0.05	0.00	0.00	2.48
1990	0.52	0.13	0.22	0.20	0.12	0.00	0.36	0.29	0.15	0.00	0.07	0.05	2.11
1991	0.12	0.76	1.08	0.01	0.19	0.10	0.06	0.31	0.34	0.26	0.00	0.92	4.15
1992	0.42	1.53	1.86	0.00	1.36	0.20	0.41	0.00	0.00	0.81	0.00	2.07	8.66
1993	3.44	3.36	0.70	0.00	0.00	0.36	0.00	0.41	0.04	0.39	0.49	0.47	9.66
1994	0.36	0.69	0.71	0.26	0.39	0.00	0.15	0.13	0.08	0.02	0.57	1.63	4.99
1995	3.09	1.25	2.55	0.56	0.71	0.16	0.13	0.16	0.00	0.03	0.00	0.00	8.64
1996	0.11	0.38	0.21	0.00	0.26	0.33	0.36	0.05	0.00	0.67	2.48	0.58	5.43
1997	1.00	0.09	0.00	0.00	0.06	0.55	0.15	0.12	1.34	0.00	0.44	0.61	4.36
1998	0.43	5.68	1.67	0.66	0.56	2.16	1.42	0.81	0.61	0.59	0.11	0.01	14.71
1999	0.13	0.03	0.03	2.22	0.54	0.03	0.44	0.03	0.58	0.00	0.00	0.00	4.03
2000	1.28	2.75	1.04	0.23	0.02	0.11	0.00	0.49	0.07	0.52	0.12	0.00	6.63
2001	1.62	1.45	0.27	0.23	0.06	0.00	0.17	1.21	0.22	0.32	0.25	0.30	6.10
2002	0.04	0.02	0.13	0.05	0.00	0.27	0.10	0.00	0.11	0.28	0.35	0.15	1.50
2003	0.04	1.53	0.25	0.69	0.02	0.01	0.30	1.19	0.15	0.03	0.66	0.88	5.75
AVG	0.83	0.94	0.76	0.36	0.36	0.24	0.50	0.62	0.35	0.31	0.51	0.57	6.31

Notes: Averages do not include columns with ** in them.**
Total column includes 1960 data.

YUCCA DRY LAKE (UCC)
36 57 23 N   116 02 51 W
3924 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1958	****	****	****	****	0.12	0.00	0.00	0.02	0.18	0.40	0.78	0.00	1.50
1959	0.46	0.42	0.00	0.00	0.00	0.03	1.39	0.81	0.10	0.00	0.08	1.00	4.29
1960	0.75	0.62	0.23	0.09	0.03	0.20	0.01	0.00	0.52	1.00	1.77	0.00	5.22
1961	0.46	0.00	0.28	0.12	0.20	0.38	0.45	1.18	0.00	0.14	0.87	1.19	5.27
1962	0.19	1.20	0.24	0.00	0.01	0.10	0.38	0.00	0.75	0.13	0.00	0.39	3.39
1963	0.01	0.76	0.47	0.21	0.20	0.20	0.00	0.41	2.30	0.29	0.57	0.01	5.43
1964	0.04	0.00	0.30	0.49	0.15	0.23	0.34	0.25	0.00	0.08	0.31	0.05	2.24
1965	0.19	0.00	0.30	2.70	0.21	0.10	0.58	1.04	0.04	0.16	3.02	2.66	0.00
1966	0.17	0.41	0.02	0.04	0.03	0.02	1.34	0.15	0.23	0.00	0.07	1.08	3.56
1967	0.65	0.00	0.08	0.64	0.12	0.02	0.28	0.44	1.04	0.00	0.86	0.75	4.88
1968	0.00	1.08	0.19	0.09	0.00	0.21	0.33	0.25	0.00	0.14	0.19	0.00	2.48
1969	4.02	3.55	0.60	0.05	0.07	1.13	1.12	0.00	2.38	0.45	0.68	0.00	14.05
1970	0.06	1.24	0.38	0.28	0.00	0.18	0.16	0.40	0.00	0.00	1.19	0.70	4.59
1971	0.00	0.19	0.09	0.14	1.62	0.00	0.82	0.46	0.09	0.00	0.03	2.28	5.72
1972	0.00	0.00	0.00	0.03	0.02	2.66	0.00	0.60	1.07	1.44	1.77	0.00	7.59
1973	1.65	2.24	2.70	0.28	0.53	0.10	0.07	0.25	0.00	0.54	0.46	0.43	9.25
1974	3.40	0.00	0.40	0.01	0.00	0.00	1.03	0.38	0.00	1.23	0.05	1.69	8.19
1975	0.11	0.10	1.25	0.62	0.47	0.00	0.13	0.08	0.12	0.14	0.00	0.01	3.03
1976	0.00	3.41	0.31	0.50	0.45	0.00	1.87	0.00	1.70	1.69	0.00	0.27	10.20
1977	1.02	0.00	0.00	0.00	1.39	0.06	0.06	2.52	0.00	0.15	0.00	0.60	5.80
1978	3.26	3.60	3.50	1.08	0.07	0.00	0.20	0.15	0.51	0.31	0.68	0.69	14.05
1979	1.36	0.48	1.27	0.00	0.07	0.00	0.47	0.35	0.02	0.04	0.12	0.38	4.56
1980	2.61	1.77	1.63	0.25	0.43	0.02	0.39	0.00	0.12	0.01	0.05	0.02	7.30
1981	0.55	0.06	1.49	0.38	0.27	0.02	0.00	0.11	0.47	0.09	0.68	0.00	4.12
1982	0.75	0.26	2.55	0.62	0.64	0.06	1.34	0.88	0.81	0.15	1.24	0.33	9.63
1983	1.83	0.57	2.54	0.56	0.28	0.03	0.00	3.51	0.99	0.09	0.73	1.02	12.15
1984	0.00	0.09	0.01	0.05	0.00	0.19	3.07	3.31	0.05	0.21	1.17	2.74	10.89
1985	1.16	0.03	0.19	0.01	0.12	0.17	0.53	0.00	0.20	0.12	1.23	0.29	4.05
1986	1.33	0.57	1.42	0.27	0.28	0.00	0.46	0.45	0.03	0.56	0.67	0.75	6.79
1987	1.46	0.42	0.32	0.46	1.70	0.07	1.39	0.39	0.00	1.16	0.82	1.02	9.21
1988	1.56	0.35	0.00	1.20	0.18	0.39	0.05	0.69	0.16	0.00	0.18	0.21	4.97
1989	0.24	0.34	0.04	0.05	0.44	0.14	0.00	0.46	0.01	0.01	0.00	0.00	1.73
1990	0.66	0.20	0.23	0.42	0.20	0.10	0.61	0.91	0.04	0.01	0.08	0.02	3.48
1991	0.26	1.03	1.12	0.00	0.49	0.09	0.03	2.57	1.12	0.22	0.00	0.99	7.92
1992	0.59	1.83	2.49	0.00	0.31	0.00	0.07	0.10	0.00	0.48	0.00	2.27	8.14
1993	3.52	3.72	0.64	0.00	0.00	0.40	0.00	0.12	0.01	0.15	0.44	0.53	9.53
1994	0.36	0.89	0.51	0.15	0.52	0.00	0.06	0.22	0.07	0.17	0.43	1.57	4.95
1995	3.31	0.94	2.45	0.19	1.16	0.04	0.08	0.17	0.00	0.00	0.00	0.05	8.39
1996	0.15	0.34	0.22	0.00	0.13	0.35	0.05	0.17	0.00	0.00	1.15	0.57	4.13
1997	1.47	0.07	0.00	0.00	0.00	0.72	0.13	0.00	1.77	0.00	0.70	0.57	5.43
1998	0.66	5.57	1.50	1.09	0.49	2.00	1.14	0.76	2.65	0.14	0.21	0.00	16.21
1999	0.19	0.07	0.09	1.83	0.34	0.03	0.68	0.00	0.54	0.00	0.00	0.00	3.77
2000	0.37	2.65	1.34	0.07	0.00	0.00	0.00	1.08	0.09	0.44	0.28	0.00	6.32
2001	2.11	1.48	0.25	0.50	0.05	0.00	0.34	0.25	0.23	0.53	0.17	0.17	6.08
2002	0.13	0.02	0.18	0.00	0.05	0.03	0.00	0.00	0.04	0.20	0.26	0.23	1.14
2003	0.03	1.96	0.20	0.67	0.02	0.04	0.46	1.19	0.17	0.01	0.66	1.49	6.90
AVG	0.96	0.99	0.76	0.36	0.31	0.23	0.49	0.60	0.45	0.31	0.54	0.63	6.62

Notes: Averages do not include columns with ***** in them.
Total column does not include 1958 data.

WELL 5 B (W5B)
36 48 07 N 115 57 55 W
3080 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1962	****	****	****	****	****	****	****	****	****	0.15	0.00	0.40	0.55
1963	0.03	0.71	0.15	0.14	0.24	0.26	0.00	0.35	2.16	0.20	0.66	0.02	4.92
1964	0.00	0.00	0.30	0.49	0.09	0.27	0.12	0.66	0.00	0.07	0.14	0.00	2.14
1965	0.18	0.00	0.39	1.66	0.21	0.27	0.30	0.72	0.01	0.01	1.39	2.28	7.42
1966	0.16	0.31	0.06	0.07	0.16	0.03	0.57	0.01	0.21	0.00	0.01	0.66	2.25
1967	0.95	0.00	0.25	0.71	0.15	0.22	0.25	0.31	0.71	0.00	1.14	0.23	4.92
1968	0.09	0.49	0.03	0.22	0.00	0.17	0.86	0.04	0.00	0.28	0.14	0.08	2.40
1969	1.82	2.79	0.44	0.11	0.16	0.88	0.22	0.00	0.40	0.41	0.21	0.03	7.47
1970	0.02	0.80	0.28	0.30	0.00	0.02	0.00	0.53	0.00	0.00	0.61	0.28	2.84
1971	0.00	0.12	0.08	0.03	0.83	0.00	0.06	0.85	0.02	0.01	0.00	1.27	3.27
1972	0.00	0.00	0.00	0.07	0.03	0.90	0.01	0.39	0.60	0.76	1.03	0.00	3.79
1973	0.65	1.28	2.40	0.12	0.55	0.05	0.01	0.03	0.02	0.14	0.54	0.94	6.73
1974	1.32	0.02	0.09	0.00	0.00	0.00	1.63	0.00	0.00	0.76	0.08	1.30	5.20
1975	0.07	0.13	0.57	0.58	0.18	0.00	0.15	0.04	0.50	0.24	0.00	0.02	2.48
1976	0.00	1.31	0.04	0.26	0.41	0.00	0.69	0.00	1.01	1.13	0.00	0.01	4.86
1977	0.62	0.00	0.00	0.00	1.03	0.22	0.08	1.51	0.67	0.03	0.00	0.47	4.63
1978	1.93	2.22	1.93	0.50	0.05	0.00	0.00	0.00	0.02	0.21	1.27	0.59	8.72
1979	0.96	0.30	0.87	0.00	0.11	0.00	0.75	0.78	0.00	0.01	0.01	0.44	4.23
1980	1.35	1.10	1.44	0.15	0.23	0.06	0.85	0.00	0.19	0.02	0.00	0.00	5.39
1981	0.23	0.09	0.90	0.35	0.34	0.00	0.00	0.16	1.29	0.02	0.32	0.00	3.70
1982	0.31	0.40	1.69	0.38	0.81	0.12	0.66	0.84	1.01	0.21	0.62	0.31	7.36
1983	0.96	0.13	0.89	0.44	0.11	0.02	0.03	3.74	1.22	0.15	0.54	0.56	8.79
1984	0.00	0.16	0.00	0.05	0.05	0.00	2.62	2.53	0.10	0.27	1.25	2.24	9.27
1985	0.54	0.05	0.10	0.01	0.07	0.11	1.07	0.00	0.23	0.24	0.67	0.19	3.28
1986	1.20	0.34	0.87	0.10	0.32	0.00	0.55	1.01	0.03	0.48	0.65	0.42	5.97
1987	0.82	0.22	0.24	0.45	1.97	0.07	0.71	0.32	0.00	0.98	0.54	0.69	7.01
1988	1.34	0.26	0.00	1.52	0.20	0.10	0.03	0.58	0.07	0.02	0.11	0.13	4.36
1989	0.24	0.24	0.12	0.00	0.16	0.02	0.00	0.30	0.02	0.04	0.00	0.00	1.14
1990	0.59	0.14	0.10	0.22	0.38	0.09	0.49	0.34	0.33	0.01	0.45	0.02	3.16
1991	0.22	0.55	1.20	0.00	0.09	0.08	0.10	0.16	0.55	0.17	0.02	0.53	3.67
1992	0.32	1.31	1.51	0.02	0.30	0.00	0.23	0.04	0.00	0.74	0.00	1.08	5.55
1993	1.98	2.68	0.55	0.01	0.00	0.10	0.00	0.25	0.00	0.20	0.36	0.45	6.58
1994	0.24	0.70	0.41	0.43	0.10	0.00	0.25	0.17	0.15	0.00	0.27	1.52	4.24
1995	2.41	0.64	1.54	0.46	0.73	0.05	0.13	0.17	0.00	0.00	0.00	0.03	6.16
1996	0.12	0.37	0.16	0.10	0.07	0.12	0.07	0.10	0.00	0.60	0.58	0.47	2.76
1997	0.55	0.06	0.00	0.00	0.00	0.75	0.18	0.00	1.30	0.04	0.54	0.29	3.71
1998	0.29	3.79	1.01	0.57	0.20	1.58	0.70	0.57	0.53	0.16	0.27	0.00	9.67
1999	0.24	0.07	0.12	1.57	0.26	0.14	0.61	0.00	0.77	0.00	0.00	0.00	3.78
2000	0.41	1.56	0.61	0.14	0.00	0.00	0.00	0.97	0.03	0.31	0.00	0.00	4.03
2001	1.59	0.97	0.22	0.24	0.05	0.00	0.27	0.04	0.14	0.47	0.11	0.22	4.32
2002	0.24	0.02	0.40	0.00	0.00	0.04	0.70	0.00	0.11	0.06	0.14	0.20	1.91
2003	0.12	1.47	0.34	0.85	0.21	0.00	0.68	0.78	0.18	0.08	0.48	0.92	6.11
AVG	0.60	0.69	0.54	0.33	0.26	0.17	0.40	0.48	0.36	0.23	0.36	0.46	4.88

Notes: Averages do not include columns with ** in them.**
Total column does not include data prior to 1963.

PHS FARM (PHS), 37 12 32 N 116 02 19 W, 4565 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1964	****	****	****	****	****	****	****	****	****	0.09	0.51	0.09	0.69
1965	0.18	0.01	1.18	3.15	0.16	0.14	0.39	0.98	0.00	0.00	2.80	2.68	11.67
1966	0.28	0.27	0.01	0.00	0.00	0.06	0.43	1.05	0.02	0.00	0.12	1.11	3.35
1967	0.42	0.00	0.10	0.73	0.62	0.09	0.47	0.16	0.20	0.00	0.50	0.29	3.58
1968	0.00	1.47	0.76	0.17	0.05	0.33	1.66	0.31	0.00	0.70	0.09	0.03	5.57
1969	3.69	2.76	0.35	0.37	0.19	0.82	1.15	0.56	0.14	0.09	0.60	0.02	10.74
1970	0.03	0.98	0.47	0.18	0.00	0.06	0.44	2.18	0.00	0.00	0.77	1.67	6.78
1971	0.00	0.36	0.05	0.10	1.66	0.00	0.19	2.44	0.06	0.02	0.08	1.90	6.86
1972	0.00	0.00	0.00	0.00	0.04	1.14	0.37	0.96	0.24	1.67	1.73	0.01	6.16
1973	1.12	2.39	2.86	0.06	0.56	0.38	0.05	0.11	0.11	0.24	0.23	0.10	8.21
1974	2.39	0.00	0.55	0.15	0.00	0.00	0.50	0.30	0.00	1.60	0.15	0.75	6.39
1975	0.10	0.24	1.19	0.37	0.44	0.07	0.08	0.44	0.48	1.33	0.20	0.01	4.95
1976	0.00	2.56	0.15	0.36	0.10	0.00	1.01	0.00	1.95	1.04	0.02	0.09	7.28
1977	0.89	0.00	0.50	0.05	2.10	0.54	0.02	2.19	0.14	0.29	0.13	0.75	7.60
1978	3.26	3.52	3.70	1.02	0.02	0.00	0.14	0.03	0.62	0.48	1.22	0.00	15.01
1979	1.10	0.26	1.21	0.01	0.23	0.00	1.02	0.87	0.16	0.01	0.05	0.09	5.01
1980	2.22	1.72	1.43	0.53	0.51	0.67	0.43	0.09	0.37	0.00	0.05	0.13	8.15
1981	0.68	0.05	1.70	0.51	0.22	0.00	0.00	0.37	0.32	0.48	0.37	0.00	4.70
1982	0.66	0.15	2.52	0.21	0.36	0.31	0.58	0.55	1.27	0.16	1.14	0.42	8.33
1983	1.49	1.25	3.10	0.47	0.19	0.05	0.09	2.83	0.62	0.16	0.50	1.19	11.94
1984	0.04	0.16	0.00	0.14	0.00	0.04	4.08	1.05	0.25	0.36	0.95	1.73	8.80
1985	0.39	0.24	0.29	0.01	0.25	0.38	0.29	0.00	0.28	0.35	1.30	0.30	4.08
1986	1.09	0.94	1.04	0.20	0.03	0.00	1.61	0.91	0.06	0.60	0.68	0.79	7.95
1987	0.00	0.80	0.70	0.62	1.13	0.01	1.78	0.06	0.00	0.88	2.20	0.90	10.08
1988	0.57	0.40	0.23	1.85	0.27	0.37	0.02	0.15	0.01	0.13	0.06	0.40	4.46
1989	0.20	0.40	0.17	0.00	1.21	0.88	0.00	0.40	0.01	0.46	0.00	0.00	3.73
1990	0.80	0.20	0.33	0.50	0.74	0.06	1.09	1.02	0.74	0.07	0.11	0.03	5.69
1991	0.12	0.95	1.30	0.00	0.59	0.06	0.05	0.47	0.59	0.70	0.01	0.79	5.63
1992	0.56	1.78	2.75	0.03	0.64	0.03	0.18	0.31	0.00	0.54	0.00	2.17	8.99
1993	3.66	2.93	0.69	0.00	0.00	0.85	0.00	0.27	0.00	0.46	0.56	0.60	10.02
1994	0.15	1.21	0.57	0.54	0.35	0.00	0.40	0.15	0.49	0.10	0.26	1.52	5.74
1995	4.02	1.55	3.70	1.02	0.95	0.72	0.38	0.14	0.16	0.03	0.00	0.09	12.76
1996	0.12	0.58	0.53	0.00	0.73	0.23	0.03	0.00	0.00	0.25	1.20	1.19	4.86
1997	1.80	0.05	0.00	0.00	0.00	0.75	0.25	0.00	1.45	0.04	0.84	0.95	6.13
1998	0.43	5.92	2.35	0.88	1.18	1.92	1.25	0.34	0.53	0.63	0.21	0.02	15.66
1999	0.12	0.04	0.06	3.22	0.69	0.17	0.81	0.13	0.60	0.00	0.00	0.00	5.84
2000	1.06	4.12	1.10	0.34	0.06	0.00	0.00	1.50	0.02	1.44	0.24	0.09	9.97
2001	1.98	1.84	0.28	0.37	0.08	0.00	0.28	0.05	0.40	0.35	0.35	0.27	6.25
2002	0.06	0.08	0.36	0.28	0.00	0.02	0.06	0.00	0.07	0.21	0.67	0.41	2.22
2003	0.07	1.63	0.14	0.57	0.02	0.24	0.54	0.55	0.11	0.09	1.06	1.07	6.09
AVG	0.94	1.12	0.99	0.49	0.42	0.29	0.57	0.61	0.32	0.40	0.55	0.64	7.36

Notes: Averages do not include columns with **** in them.
Total column does not include data prior to 1965.

MID VALLEY (MV)
36 58 21 N 116 10 19 W
4660 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1964	****	****	****	****	****	****	****	****	0.00	0.22	0.52	0.07	0.81
1965	0.37	0.00	0.47	2.97	0.25	0.13	0.31	1.84	0.00	0.14	5.24	3.54	15.26
1966	0.28	0.22	0.02	0.00	0.01	0.02	1.65	0.25	0.00	0.00	0.00	0.79	3.24
1967	0.84	0.02	0.06	0.79	0.30	0.26	0.44	0.32	0.41	0.00	1.08	0.24	4.76
1968	0.02	1.37	0.37	0.13	0.05	0.48	1.07	0.22	0.00	0.28	0.05	0.04	4.08
1969	7.38	5.05	0.41	0.10	0.11	1.22	0.42	0.01	0.52	0.26	0.48	0.01	15.97
1970	0.02	1.13	0.27	0.24	0.00	0.09	0.11	0.86	0.01	0.00	0.75	0.05	3.53
1971	0.00	0.19	0.06	0.03	1.12	0.00	0.45	0.94	0.08	0.00	0.07	3.58	6.52
1972	0.00	0.00	0.00	0.20	0.03	1.60	0.03	1.42	0.22	2.02	1.65	0.03	7.20
1973	1.53	3.09	3.47	0.09	0.50	0.05	0.10	0.16	0.00	0.44	0.65	0.54	10.62
1974	3.85	0.00	0.77	0.11	0.02	0.00	0.73	0.05	0.10	1.12	0.08	2.00	8.83
1975	0.05	0.33	1.52	0.69	0.34	0.00	0.10	0.37	0.58	0.36	0.04	0.12	4.50
1976	0.00	4.96	0.15	0.45	0.41	0.00	1.46	0.00	3.19	1.74	0.00	0.47	12.83
1977	1.48	0.00	0.08	0.06	1.28	0.29	0.22	2.44	0.69	0.39	0.03	0.80	7.76
1978	4.47	4.21	4.70	1.12	0.05	0.00	0.18	0.07	0.63	0.66	1.29	1.07	18.45
1979	2.39	1.15	1.64	0.00	0.09	0.01	0.95	1.32	0.04	0.02	0.02	0.23	7.86
1980	3.46	2.82	1.92	0.37	0.39	0.16	1.41	0.27	1.28	0.04	0.05	0.03	12.20
1981	0.66	0.10	2.34	0.15	0.38	0.00	0.00	0.33	0.64	0.17	1.12	0.00	5.89
1982	0.91	0.23	3.05	1.26	0.53	0.18	0.88	0.45	1.32	0.17	2.32	0.90	12.20
1983	2.34	1.67	3.99	0.31	0.11	0.00	0.00	4.65	1.03	0.06	1.04	1.86	17.06
1984	0.00	0.14	0.01	0.19	0.00	0.00	2.86	3.03	0.00	0.27	1.53	3.52	11.55
1985	1.15	0.22	0.24	0.00	0.32	0.08	1.10	0.00	0.43	0.21	2.26	0.30	6.31
1986	1.36	1.05	1.26	0.24	0.10	0.00	0.86	0.52	0.10	0.49	0.60	1.30	7.88
1987	1.53	0.71	0.73	0.33	2.48	0.06	1.93	0.04	0.00	1.54	0.81	0.88	11.04
1988	1.62	0.33	0.04	2.09	0.33	0.62	1.21	0.64	0.33	0.09	0.07	0.30	7.67
1989	0.19	0.53	0.14	0.00	0.96	0.21	0.00	0.11	0.05	0.05	0.00	0.00	2.24
1990	1.09	0.22	0.20	0.63	0.34	0.05	1.09	0.60	0.65	0.01	0.12	0.03	5.03
1991	0.22	1.02	2.07	0.03	0.31	0.10	0.04	0.41	0.80	0.83	0.00	0.95	6.78
1992	0.87	3.32	2.52	0.00	1.04	0.00	0.40	0.00	0.00	0.72	0.00	2.57	11.44
1993	4.93	5.54	0.57	0.00	0.02	0.47	0.00	0.50	0.23	0.30	0.45	0.59	13.60
1994	0.33	1.63	0.49	0.29	0.19	0.00	0.14	0.15	0.39	0.13	1.05	1.80	6.59
1995	5.05	2.09	4.56	0.69	0.62	0.26	0.06	0.34	0.00	0.02	0.00	0.02	13.71
1996	0.20	1.04	0.23	0.27	0.33	0.17	0.25	0.20	0.00	0.96	2.32	1.38	7.35
1997	0.81	0.07	0.00	0.15	0.25	0.90	0.19	0.00	2.45	0.07	0.89	1.17	6.95
1998	0.70	7.96	2.32	0.78	0.87	1.68	0.48	0.67	0.54	0.19	0.28	0.00	16.47
1999	0.23	0.24	0.06	2.48	0.90	0.03	0.66	1.06	0.40	0.00	0.00	0.00	6.06
2000	1.03	4.36	1.27	0.19	0.03	0.00	0.00	1.18	0.05	0.89	0.25	0.00	9.25
2001	2.54	2.48	0.40	0.84	0.06	0.00	0.53	0.29	0.49	0.65	0.64	0.20	9.12
2002	0.24	0.05	0.43	0.00	0.02	0.22	0.11	0.00	0.19	0.03	1.05	0.46	2.80
2003	0.10	2.58	0.65	0.76	0.06	0.00	0.67	1.13	0.39	0.19	1.17	2.17	9.87
AVG	1.39	1.59	1.11	0.49	0.39	0.24	0.59	0.69	0.46	0.39	0.75	0.85	8.99

Notes: Averages do not include columns with ** in them.**
Total column does not include data prior to 1965.

TIPPIPAH SPRINGS (TS2), 37 03 11 N 116 11 29 W, 4980 FT
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1960	****	****	****	****	0.04	0.40	0.20	0.34	0.97	0.78	2.13	0.00	4.86
1961	0.48	0.07	0.26	0.15	0.20	0.30	0.45	1.52	0.00	0.14	0.66	1.60	5.83
1962	0.19	1.96	0.75	0.02	0.12	0.08	0.54	0.00	1.24	0.16	0.00	0.53	5.59
1963	0.05	0.71	0.62	0.46	0.20	0.21	0.01	1.18	1.73	0.50	0.58	0.02	6.27
1964	0.35	0.00	0.60	0.32	0.11	0.02	1.31	0.85	0.00	0.22	0.59	0.01	4.38
1965	0.12	0.01	0.60	2.88	0.23	0.23	0.14	1.15	0.00	0.07	3.61	2.92	11.96
1966	0.24	0.14	0.01	0.00	0.04	0.06	1.16	0.53	0.29	0.00	0.02	1.24	3.73
1967	0.56	0.03	0.07	1.27	0.53	0.59	0.18	0.49	0.74	0.00	1.18	0.73	6.37
1968	0.03	1.79	0.56	0.17	0.00	0.38	2.03	0.83	0.00	0.25	0.04	0.06	6.14
1969	4.96	6.09	1.08	0.30	0.12	1.15	3.67	0.96	0.06	0.17	0.47	0.01	19.04
1970	0.03	1.53	0.70	0.44	0.00	0.13	0.50	0.36	0.01	0.00	2.00	1.38	7.08
1971	0.00	0.10	0.06	0.02	0.76	0.00	0.76	0.58	0.06	0.06	0.19	2.79	5.38
1972	0.00	0.00	0.00	0.08	0.01	1.08	0.00	1.65	0.14	2.51	1.92	0.02	7.41
1973	0.97	2.57	3.08	0.10	0.56	0.07	0.02	0.05	0.00	0.34	0.78	0.32	8.86
1974	2.55	0.00	0.89	0.14	0.03	0.00	0.66	0.67	0.12	2.25	0.07	1.62	9.00
1975	0.02	0.29	1.17	0.72	0.29	0.00	0.16	0.30	8.55	0.34	0.01	0.08	11.93
1976	0.00	4.68	0.44	0.41	0.63	0.00	0.93	0.00	3.16	1.80	0.00	0.37	12.42
1977	1.24	0.03	0.17	0.02	1.44	0.04	0.03	2.74	0.89	0.36	0.12	0.69	7.77
1978	3.60	4.79	4.04	1.32	0.01	0.00	0.03	0.13	1.18	0.56	0.75	0.97	17.38
1979	1.87	0.79	1.64	0.01	0.14	0.04	0.95	0.79	0.06	0.01	0.02	0.14	6.46
1980	2.42	2.30	1.91	0.49	0.34	0.54	0.60	0.06	1.29	0.00	0.09	0.05	10.09
1981	1.07	0.08	2.40	0.31	0.43	0.00	0.00	0.49	0.29	0.44	1.12	0.00	6.63
1982	1.15	0.19	3.15	0.61	0.89	0.28	1.09	1.01	0.90	0.34	2.05	0.67	12.33
1983	2.49	1.24	4.62	0.88	0.30	0.08	0.00	1.87	0.99	0.12	0.85	1.37	14.81
1984	0.00	0.09	0.01	0.24	0.00	0.00	3.46	2.40	0.06	0.25	1.24	3.39	11.14
1985	0.96	0.20	0.16	0.00	0.29	0.16	0.58	0.00	0.25	0.39	2.22	0.14	5.35
1986	1.30	0.96	1.03	0.43	0.08	0.00	0.71	0.94	0.16	0.46	0.63	1.26	7.96
1987	1.25	0.78	1.11	0.68	3.71	0.08	2.69	0.14	0.00	1.09	1.23	1.02	13.78
1988	1.54	0.49	0.03	2.52	0.44	0.60	0.71	1.18	0.04	0.00	0.05	0.45	8.05
1989	0.15	0.61	0.17	0.00	0.61	0.41	0.00	0.30	0.00	0.10	0.00	0.00	2.35
1990	1.03	0.21	0.25	0.68	0.48	0.03	0.80	0.60	0.63	0.02	0.04	0.09	4.86
1991	0.21	1.06	2.15	0.00	0.43	0.19	0.03	2.05	0.46	0.50	0.00	1.47	8.55
1992	0.55	3.06	2.77	0.00	1.25	0.00	1.56	0.00	0.00	0.70	0.00	2.81	12.70
1993	4.34	4.14	0.67	0.00	0.00	0.59	0.00	0.40	0.23	0.31	0.35	0.76	11.79
1994	0.35	1.39	0.80	0.48	0.26	0.00	0.01	0.03	0.41	0.09	0.60	1.77	6.19
1995	5.16	1.86	3.80	0.73	1.29	0.12	0.11	0.35	0.00	0.02	0.00	0.06	13.50
1996	0.17	0.69	0.41	0.10	0.24	0.24	0.52	0.00	0.00	0.92	1.44	0.97	5.70
1997	0.73	0.07	0.00	0.07	0.00	0.75	0.24	0.22	1.62	0.03	0.63	0.49	4.85
1998	0.45	4.43	1.60	0.62	0.42	1.29	1.18	0.18	0.74	0.41	0.09	0.00	11.41
1999	0.13	0.13	0.01	2.11	0.44	0.00	0.47	0.00	0.33	0.00	0.00	0.00	3.62
2000	0.70	4.25	0.89	0.19	0.08	0.00	0.00	1.75	0.06	1.18	0.14	0.00	9.24
2001	2.62	1.99	0.43	0.94	0.08	0.00	0.04	0.03	0.48	0.35	0.28	0.41	7.65
2002	0.23	0.14	0.27	0.05	0.00	0.00	0.32	0.00	0.11	0.03	0.44	0.30	1.89
2003	0.08	2.34	0.29	1.24	0.10	0.00	0.42	1.14	0.58	0.10	0.93	1.52	8.74
AVG	1.08	1.36	1.06	0.52	0.40	0.23	0.67	0.69	0.66	0.42	0.67	0.78	8.52

Notes: Averages do not include columns with **** in them. Red = estimated.
Total column does not include data prior to 1961.

E TUNNEL (ETU)
37 11 30 N   116 12 04 W
6250 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1996	****	****	****	****	****	****	****	****	****	****	****	1.98	1.98
1997	1.73	0.09	0.00	0.11	0.03	1.18	0.20	0.25	2.09	0.04	1.34	1.53	8.59
1998	0.72	6.88	2.45	1.07	0.87	3.70	1.55	0.68	1.33	1.49	0.25	0.06	21.05
1999	0.51	0.31	0.15	3.21	0.39	0.08	0.69	0.56	0.41	0.00	0.00	0.00	6.31
2000	1.25	5.05	1.27	0.37	0.03	0.11	0.00	3.18	0.05	1.60	0.30	0.00	13.21
2001	3.06	2.45	0.52	1.21	0.15	0.00	0.59	1.30	0.40	0.35	0.75	0.61	11.39
2002	0.27	0.36	0.58	0.63	0.11	0.14	0.41	0.00	0.18	0.09	0.60	0.41	3.78
2003	0.09	2.31	0.70	1.14	0.01	0.03	0.64	0.54	0.55	0.07	0.87	1.74	8.69
AVG	1.09	2.49	0.81	1.11	0.23	0.75	0.58	0.93	0.72	0.52	0.59	0.79	10.43

Notes: Averages do not include columns with ** in them.**
Total column does not include data prior to 1997.

AREA 06 (SOUTH)
36 53 58 N   116 02 04 W
3710 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1997	****	0.04	0.00	0.02	0.00	0.67	0.17	0.00	1.13	0.00	0.37	0.29	2.69
1998	0.48	4.71	0.87	0.71	0.25	1.32	1.10	0.75	0.43	0.13	0.20	0.00	10.95
1999	0.22	0.09	0.03	1.66	0.37	0.02	1.08	0.16	0.55	0.00	0.00	0.00	4.18
2000	0.31	2.11	0.86	0.07	0.00	0.00	0.00	0.81	0.00	0.32	0.13	0.00	4.61
2001	1.53	1.29	0.29	0.54	0.05	0.00	0.09	0.09	0.11	0.52	0.12	0.15	4.78
2002	0.07	0.04	0.15	0.00	0.00	0.02	0.03	0.00	0.13	0.15	0.20	0.21	1.00
2003	0.08	1.86	0.33	0.67	0.06	0.00	0.94	1.80	0.27	0.09	0.86	1.56	8.52
AVG	0.45	1.45	0.36	0.52	0.10	0.29	0.49	0.52	0.37	0.17	0.27	0.32	5.25

Notes: Averages do not include columns with ** in them.**
Total column does not include data prior to 1997.

RAINIER MESA (A12), 37 11 28 N 116 12 55 W, 7490 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1959	****	****	0.00	0.00	0.00	0.00	0.10	1.05	0.20	0.00	0.00	0.10	1.45
1960	2.38	0.87	0.05	0.50	0.06	0.50	0.05	0.28	1.40	1.00	3.49	0.00	10.58
1961	0.85	0.00	0.53	0.38	0.29	0.02	0.94	2.64	0.00	0.17	0.86	1.05	7.73
1962	0.85	3.01	0.88	0.02	0.41	0.22	0.46	0.00	0.96	0.35	0.05	0.25	7.46
1963	0.25	0.53	0.68	0.62	0.40	0.95	0.02	1.10	2.30	0.46	0.50	0.04	7.85
1964	0.36	0.08	1.12	0.75	0.71	0.24	1.02	1.07	0.00	0.19	1.21	0.27	7.02
1965	0.30	0.11	2.51	5.76	0.45	0.25	1.79	1.58	0.03	0.02	4.67	3.59	21.06
1966	1.70	0.64	0.03	0.04	0.00	0.30	1.31	1.73	0.53	0.01	0.19	2.02	8.50
1967	0.93	0.22	0.52	2.47	0.84	0.23	1.08	0.93	0.85	0.00	2.05	1.00	11.12
1968	0.02	3.01	1.46	0.43	0.35	0.73	3.23	1.06	0.00	0.75	0.13	0.29	11.46
1969	6.21	3.45	0.80	0.66	0.24	1.35	2.99	0.35	1.14	0.25	1.39	0.05	18.88
1970	0.12	2.09	1.21	0.68	0.00	0.55	1.08	1.42	0.08	0.00	1.58	1.85	10.66
1971	0.00	0.69	0.17	0.38	2.52	0.00	1.63	1.05	0.14	0.09	0.34	3.25	10.26
1972	0.00	0.00	0.00	0.23	0.15	1.33	0.02	1.03	0.37	2.69	3.02	0.26	9.10
1973	2.44	3.59	4.18	0.40	1.35	0.35	0.23	1.05	0.19	0.52	0.90	0.41	15.61
1974	2.85	0.04	2.10	0.35	0.02	0.00	1.06	1.43	0.14	2.90	0.29	1.40	12.58
1975	0.15	0.95	2.33	1.01	0.74	0.17	0.55	0.18	2.45	0.83	0.77	0.26	10.39
1976	0.00	6.85	0.99	1.10	1.34	0.00	2.16	0.01	3.82	2.04	0.05	0.16	18.52
1977	1.51	0.07	0.93	0.07	2.60	0.44	0.05	3.85	0.96	0.54	0.51	1.35	12.88
1978	4.43	5.86	7.82	2.31	0.03	0.00	0.02	0.27	2.35	0.62	1.66	1.42	26.79
1979	2.04	0.60	3.05	0.00	0.11	0.05	1.10	0.65	0.13	0.03	0.06	0.32	8.14
1980	3.64	2.64	2.13	1.35	1.06	0.32	0.22	0.00	1.72	0.04	0.11	0.03	13.26
1981	1.59	0.30	3.49	1.09	0.60	0.00	0.00	1.56	0.79	0.61	1.38	0.00	11.41
1982	1.34	0.23	4.96	1.08	1.08	0.35	0.86	0.80	1.98	0.54	2.31	1.30	16.83
1983	2.94	2.80	7.70	1.53	0.48	0.00	0.00	7.00	1.42	0.53	0.90	1.57	26.87
1984	0.05	0.46	0.12	0.41	0.00	0.06	3.77	1.81	0.66	0.35	1.91	3.16	12.76
1985	1.49	0.41	0.66	0.02	0.19	0.47	2.00	0.00	0.58	0.44	2.47	0.59	9.32
1986	1.34	1.47	1.80	0.61	0.14	0.00	1.21	1.62	0.10	0.81	0.84	1.96	11.90
1987	1.27	1.03	1.78	1.01	2.21	0.77	2.20	0.05	0.15	1.13	2.44	1.26	15.30
1988	1.57	0.73	0.53	3.57	0.68	0.52	0.19	1.12	0.20	0.00	0.32	0.93	10.36
1989	0.29	1.26	0.56	0.11	1.70	0.28	0.00	1.13	0.02	0.18	0.00	0.00	5.53
1990	2.21	0.71	0.84	0.82	0.61	0.03	0.79	0.36	0.46	0.10	0.24	0.22	7.39
1991	0.26	1.86	3.49	0.00	1.10	0.33	0.81	3.05	0.82	0.65	0.06	1.42	13.85
1992	1.54	4.61	4.59	0.00	0.50	0.12	0.49	0.39	0.00	1.15	0.00	3.13	16.52
1993	5.00	4.27	1.10	0.00	0.03	0.90	0.00	0.44	0.27	0.56	0.82	0.88	14.27
1994	0.46	1.84	1.14	0.99	0.63	0.00	0.27	0.29	0.74	0.23	0.94	2.62	10.15
1995	5.72	3.38	4.76	1.63	1.69	0.41	0.39	0.95	0.03	0.07	0.00	****	19.03
1996	****	****	****	****	****	****	****	****	****	****	****	****	0.00
1997	****	****	0.13	0.00	0.03	1.35	0.25	0.22	2.33	0.04	1.36	1.62	7.33
1998	0.76	7.77	1.44	1.09	1.33	3.66	1.92	0.45	1.94	1.08	0.23	0.04	21.71
1999	0.32	0.27	0.19	3.52	0.43	0.07	1.14	0.34	0.59	0.00	0.00	0.00	6.87
2000	1.02	4.79	1.47	0.28	0.08	0.13	0.00	3.09	0.08	1.52	0.47	0.00	12.93
2001	3.05	2.33	0.85	1.25	0.19	0.00	0.91	0.84	0.52	0.43	0.57	0.82	11.76
2002	0.25	0.30	0.75	0.55	0.06	0.07	0.23	0.00	0.18	0.06	0.59	0.34	3.38
2003	0.06	2.14	1.06	1.37	0.05	0.02	1.06	0.87	1.10	0.12	1.25	1.00	10.10
AVG	1.61	1.69	1.92	0.88	0.68	0.33	0.92	1.17	0.76	0.56	1.04	1.07	12.82

Notes: Averages do not include columns with 0 in them or data after 1995. Total column does not include data prior to 1960 or data after 1995 data.

CANE SPRINGS (CS)
36 48 44 N   116 06 29 W
4000 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1964	****	****	****	****	****	****	****	****	0.00	0.10	0.29	0.02	0.41
1965	0.34	0.02	0.78	2.94	0.17	0.08	0.10	1.50	0.00	0.15	2.26	2.38	10.72
1966	0.19	0.95	0.08	0.03	0.17	0.00	0.85	0.20	0.16	0.00	0.03	1.45	4.11
1967	1.72	0.00	0.02	1.18	0.22	0.15	0.12	0.35	0.39	0.00	1.32	0.58	6.05
1968	0.00	1.46	0.15	0.03	0.00	0.50	3.16	0.34	0.00	0.36	0.15	0.04	6.19
1969	4.31	4.79	0.83	0.16	0.05	1.82	0.74	0.09	0.28	0.74	0.60	0.04	14.45
1970	0.07	0.88	0.52	0.35	0.00	0.15	0.17	0.73	0.04	0.00	1.13	0.12	4.16
1971	0.00	0.31	0.07	0.06	1.62	0.00	0.01	0.29	0.12	0.01	0.09	2.31	4.89
1972	0.00	0.00	0.00	0.17	0.21	0.65	0.00	1.93	0.65	1.39	1.61	0.05	6.66
1973	1.45	2.75	3.59	0.24	0.34	0.04	0.00	0.12	0.00	0.11	0.80	0.50	9.94
1974	2.22	0.27	0.42	0.02	0.01	0.00	1.04	0.07	0.00	1.46	0.12	1.65	7.28
1975	0.03	0.11	1.16	0.72	0.32	0.00	0.09	0.00	0.15	0.13	0.16	0.01	2.88
1976	0.00	3.55	0.08	0.50	0.63	0.00	1.31	0.00	3.54	1.17	0.00	0.10	10.88
1977	1.05	0.00	0.05	0.04	1.22	0.21	0.01	1.05	0.76	0.13	0.01	0.69	5.22
1978	3.55	4.54	3.89	1.03	0.12	0.00	0.00	0.08	0.43	0.45	1.00	1.22	16.31
1979	1.90	0.72	1.80	0.00	0.14	0.00	0.56	0.22	0.00	0.02	0.11	0.49	5.96
1980	2.87	1.76	1.95	0.22	0.27	0.12	1.20	0.00	0.17	0.02	0.17	0.00	8.75
1981	0.84	0.17	2.27	0.17	0.45	0.00	0.00	0.39	0.81	0.05	0.85	0.00	6.00
1982	0.82	0.35	3.31	0.95	0.36	0.03	0.43	1.02	1.10	0.13	1.39	0.68	10.57
1983	2.20	0.83	3.25	0.40	0.07	0.03	0.00	5.81	0.49	0.06	0.70	0.86	14.70
1984	0.00	0.23	0.01	0.31	0.00	0.00	3.34	1.93	0.10	0.17	1.53	3.13	10.75
1985	0.78	0.03	0.21	0.00	0.34	0.06	1.25	0.00	0.16	0.22	1.50	0.43	4.98
1986	1.62	0.81	1.78	0.32	0.47	0.00	0.39	1.17	0.00	0.67	0.78	0.59	8.60
1987	2.02	0.92	0.53	0.32	2.88	0.10	1.29	0.02	0.00	1.67	0.73	0.96	11.44
1988	1.79	0.42	0.00	2.90	0.27	0.26	0.34	1.18	0.22	0.00	0.22	0.16	7.76
1989	0.16	0.49	0.38	0.00	0.38	0.06	0.00	1.15	0.24	0.08	0.00	0.00	2.94
1990	1.08	0.22	0.13	0.28	0.31	0.01	1.26	0.32	1.17	0.01	0.35	0.04	5.18
1991	0.34	0.94	1.01	0.00	0.37	0.06	0.23	0.80	2.33	0.21	0.03	0.81	7.13
1992	1.22	3.16	0.00	0.03	0.30	0.00	0.47	0.00	0.00	0.18	0.00	2.01	9.37
1993	3.78	4.13	0.65	0.00	0.00	0.63	0.00	0.37	0.01	0.20	0.43	0.64	10.84
1994	0.34	1.09	0.52	0.48	0.15	0.00	0.05	0.02	0.06	0.00	0.59	1.68	4.98
1995	3.86	0.91	2.63	0.37	0.49	0.00	0.15	0.15	0.00	0.01	0.00	0.04	8.61
1996	0.09	0.97	0.15	0.07	0.35	0.10	0.54	0.00	0.00	0.97	1.45	0.75	5.44
1997	0.97	0.03	0.00	0.03	0.00	0.97	0.14	0.27	1.90	0.00	0.62	0.58	5.51
1998	0.41	6.04	1.44	0.55	0.75	1.12	0.47	0.80	0.82	0.10	0.22	0.01	12.73
1999	0.32	0.05	0.03	1.64	0.49	0.07	1.01	0.13	0.73	0.00	0.00	0.00	4.47
2000	0.31	3.86	1.09	0.25	0.02	0.00	0.00	0.78	0.09	0.30	0.06	0.00	6.76
2001	2.20	1.50	0.43	0.33	0.03	0.00	0.66	0.05	0.13	0.69	0.20	0.20	6.42
2002	0.11	0.05	0.27	0.00	0.01	0.01	0.13	0.00	0.06	0.06	0.51	0.35	1.56
2003	0.09	2.50	0.52	0.94	0.15	0.00	0.92	0.40	0.11	0.02	0.75	1.99	8.39
AVG	1.16	1.33	0.97	0.46	0.36	0.19	0.58	0.61	0.43	0.30	0.57	0.69	7.68

Notes: Averages do not include columns with **** in them.
Total column does not include data prior to 1965.

JACKASS FLATS (4JA), 36 47 05 N 116 17 20 W, 3422 FT (MSL)

PRECIPITATION

(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1957	****	****	****	****	****	****	****	****	****	****	****	0.30	0.30
1958	0.07	0.42	0.00	0.68	0.17	0.00	0.00	0.00	0.11	0.63	0.17	0.00	2.25
1959	0.23	0.19	0.00	0.00	0.00	0.00	0.06	0.33	0.03	0.00	0.00	0.14	0.98
1960	0.50	0.24	0.21	0.08	0.02	0.11	0.07	0.01	0.78	0.58	1.38	0.00	3.98
1961	0.52	0.02	0.18	0.05	0.27	0.06	0.18	0.71	0.00	0.11	0.71	0.87	3.68
1962	0.28	0.88	0.13	0.00	0.21	0.11	0.38	0.00	1.06	0.09	0.00	0.25	3.39
1963	0.01	1.01	0.35	0.13	0.28	0.09	0.00	0.25	1.65	0.15	0.45	0.05	4.42
1964	0.00	0.00	0.30	0.25	0.04	0.26	0.33	0.36	0.00	0.10	0.31	0.00	1.95
1965	0.23	0.00	0.27	1.91	0.07	0.10	0.25	0.28	0.00	0.25	1.67	3.02	8.05
1966	0.28	0.26	0.01	0.00	0.00	0.00	0.48	0.10	0.19	0.00	0.07	0.58	1.97
1967	0.69	0.02	0.02	0.63	0.33	0.22	0.44	0.51	0.21	0.00	0.64	0.39	4.10
1968	0.00	1.32	0.11	0.25	0.00	0.29	1.50	0.02	0.00	0.26	0.07	0.06	3.88
1969	1.70	3.45	0.58	0.07	0.04	0.67	0.71	0.22	0.03	0.27	0.56	0.00	8.30
1970	0.03	1.68	0.31	0.10	0.00	0.06	0.27	0.37	0.00	0.00	0.78	0.49	4.09
1971	0.00	0.22	0.01	0.08	0.60	0.00	0.18	0.20	0.09	0.00	0.18	1.74	3.30
1972	0.00	0.00	0.00	0.11	0.01	0.58	0.00	0.94	0.08	1.42	1.22	0.01	4.37
1973	0.61	1.63	2.59	0.06	0.28	0.02	0.04	0.01	0.00	0.26	0.36	0.17	6.03
1974	0.68	0.02	0.32	0.03	0.00	0.00	0.55	0.05	0.00	0.74	0.04	0.86	3.29
1975	0.03	0.18	0.63	0.16	0.18	0.00	0.02	0.01	0.16	0.17	0.00	0.00	1.54
1976	0.00	3.20	0.05	0.60	0.25	0.00	0.74	0.00	2.13	0.96	0.00	0.01	7.94
1977	0.59	0.00	0.03	0.00	1.41	0.03	0.00	1.97	0.01	0.06	0.00	0.40	4.50
1978	2.29	2.91	0.00	0.53	0.01	0.00	0.10	0.04	0.90	0.69	0.75	0.40	11.62
1979	1.10	0.52	1.35	0.01	0.41	0.00	0.55	0.35	0.00	0.00	0.01	0.35	4.65
1980	1.51	1.01	1.77	0.10	0.41	0.07	0.20	0.00	0.23	0.00	0.00	0.00	5.30
1981	0.23	0.10	1.64	0.01	0.71	0.00	0.00	0.02	0.33	0.00	0.35	0.00	3.39
1982	0.21	0.24	1.68	0.28	0.31	0.00	0.06	0.45	0.40	0.02	0.66	0.25	4.56
1983	1.23	0.36	3.00	0.32	0.04	0.00	0.00	3.89	0.54	0.08	0.55	0.85	10.86
1984	0.00	0.15	0.00	0.01	0.00	0.00	4.50	1.74	0.30	0.01	0.99	2.43	10.13
1985	0.56	0.02	0.11	0.00	0.21	0.03	0.37	0.00	0.67	0.06	1.08	0.17	3.28
1986	1.54	0.35	0.95	0.27	0.34	0.00	0.32	0.78	0.07	0.99	0.63	0.40	6.64
1987	0.85	0.44	1.13	0.22	0.82	0.08	2.57	0.00	0.00	1.79	0.84	0.62	9.36
1988	1.50	0.48	0.00	1.53	0.17	0.00	0.41	0.40	0.21	0.00	0.08	0.02	4.80
1989	0.07	0.08	0.14	0.00	0.75	0.48	0.00	0.25	0.10	0.12	0.00	0.00	1.99
1990	0.44	0.17	0.02	0.29	0.33	0.01	0.42	0.43	0.75	0.01	0.26	0.04	3.17
1991	0.15	0.96	1.68	0.00	0.48	0.01	0.02	0.38	0.35	0.23	0.16	0.97	5.39
1992	1.18	2.87	2.97	0.00	0.04	0.00	0.02	0.00	0.00	0.73	0.00	2.19	10.00
1993	3.36	3.33	0.95	0.01	0.02	1.24	0.00	0.05	0.02	0.44	0.33	0.74	10.49
1994	0.60	0.65	0.34	0.49	0.25	0.00	0.00	0.00	0.21	0.00	0.45	1.61	4.60
1995	4.55	0.83	2.48	0.29	0.89	0.10	0.15	0.98	0.00	0.02	0.00	0.02	10.31
1996	0.07	0.59	0.27	0.00	0.18	0.00	0.00	0.00	0.00	0.21	1.19	0.84	3.35
1997	0.41	0.00	0.00	0.02	0.03	0.03	0.05	0.00	1.25	0.03	0.70	0.74	3.26
1998	0.46	6.26	2.26	0.81	0.95	1.34	0.55	0.47	0.72	0.31	0.25	0.02	14.40
1999	0.56	0.04	0.07	2.06	1.04	0.04	0.70	0.13	1.09	0.00	0.00	0.00	5.73
2000	0.51	3.98	0.90	0.31	0.00	0.05	0.00	0.19	0.33	0.67	0.06	0.00	7.00
2001	2.68	1.47	0.40	0.26	0.10	0.00	0.71	0.00	0.96	0.52	0.32	0.16	7.58
2002	0.06	0.04	0.09	0.00	0.00	0.00	0.05	0.00	0.03	0.11	0.32	0.31	1.01
2003	0.04	2.58	0.99	1.70	0.14	0.00	1.49	0.80	0.57	0.02	1.19	1.52	11.04
AVG	0.71	0.98	0.75	0.32	0.28	0.13	0.42	0.38	0.36	0.29	0.43	0.51	5.56

Notes: Averages do not include columns with **** in them.
Total column does not include data prior to 1958.

ROCK VALLEY (RV)
36 41 07 N   116 11 32 W
3400 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1963	****	****	0.48	0.11	0.10	0.10	0.00	0.77	1.35	0.13	0.73	0.03	3.80
1964	0.05	0.03	0.23	0.42	0.02	0.20	0.79	0.32	0.00	0.16	0.33	0.00	2.55
1965	0.42	0.00	0.49	2.37	0.09	0.02	0.39	0.19	0.00	0.03	1.94	2.46	8.40
1966	0.35	0.64	0.05	0.03	0.34	0.07	0.27	0.15	0.00	0.00	0.00	0.79	2.69
1967	0.24	0.00	0.00	0.42	0.21	0.02	0.28	1.12	0.19	0.00	1.10	0.28	3.86
1968	0.06	1.23	0.29	0.23	0.01	0.12	2.01	0.16	0.00	0.46	0.05	0.17	4.79
1969	2.67	3.99	0.75	0.12	0.07	0.48	0.24	0.04	0.05	0.28	0.40	0.00	9.09
1970	0.01	1.10	0.39	0.07	0.00	0.03	0.01	0.89	0.00	0.00	0.77	0.69	3.96
1971	0.00	0.39	0.06	0.02	0.76	0.00	0.18	1.29	0.01	0.00	0.02	1.60	4.33
1972	0.00	0.00	0.00	0.07	0.00	0.44	0.00	0.79	0.33	1.26	1.16	0.00	4.05
1973	0.92	1.90	3.02	0.09	0.25	0.03	0.00	0.09	0.00	0.15	0.28	0.43	7.16
1974	1.24	0.02	0.45	0.00	0.01	0.00	1.01	0.06	0.00	1.05	0.10	1.29	5.23
1975	0.04	0.16	1.06	0.39	0.32	0.00	0.00	0.07	0.21	0.02	0.08	0.00	2.35
1976	0.00	3.86	0.06	0.61	0.28	0.00	0.53	0.00	2.01	1.37	0.00	0.05	8.77
1977	0.69	0.00	0.00	0.00	1.80	0.13	0.00	2.34	0.10	0.09	0.00	0.48	5.63
1978	2.65	3.64	3.41	0.98	0.04	0.00	0.03	0.00	0.88	0.75	0.57	0.83	13.78
1979	1.46	0.50	1.37	0.00	0.03	0.00	0.45	0.07	0.01	0.00	0.10	0.34	4.33
1980	2.06	1.61	1.91	0.21	0.55	0.01	0.50	0.00	0.25	0.05	0.04	0.00	7.19
1981	0.54	0.23	2.31	0.21	1.22	0.00	0.00	0.10	0.56	0.04	0.45	0.00	5.66
1982	0.41	0.35	2.79	0.01	0.48	0.00	0.42	0.24	0.74	0.14	0.97	0.41	6.96
1983	1.16	0.46	2.86	0.10	0.07	0.00	0.00	4.43	0.35	0.07	0.73	0.75	10.98
1984	0.00	0.07	0.00	0.01	0.00	0.00	3.12	2.10	0.13	0.16	1.09	2.35	9.03
1985	0.50	0.02	0.07	0.01	0.27	0.02	0.94	0.00	0.80	0.35	0.98	0.49	4.45
1986	0.96	0.50	1.00	0.18	0.04	0.00	0.40	1.27	0.03	0.81	0.89	0.70	6.78
1987	1.39	0.43	0.77	0.32	1.36	0.09	0.90	0.18	0.00	1.91	0.91	1.07	9.33
1988	1.88	0.25	0.50	1.92	0.16	0.10	0.23	1.72	0.14	0.04	0.05	0.11	7.10
1989	0.18	0.14	0.04	0.00	0.30	0.03	0.00	0.39	0.09	0.07	0.00	0.00	1.24
1990	0.58	0.28	0.07	0.15	0.66	0.04	1.48	0.15	0.41	0.05	0.32	0.05	4.24
1991	0.20	0.73	1.52	0.00	0.50	0.02	0.01	1.00	0.42	0.14	0.02	0.82	5.38
1992	0.85	3.27	2.32	0.05	0.08	0.01	0.14	0.00	0.00	0.58	0.00	2.21	9.51
1993	3.26	3.64	0.50	0.01	0.00	1.01	0.00	0.43	0.01	0.30	0.28	0.56	0.00
1994	0.32	0.66	0.24	0.16	0.14	0.00	0.02	0.00	0.01	0.00	0.26	1.80	3.61
1995	4.35	0.52	2.61	0.31	0.58	0.02	0.10	0.08	0.00	0.02	0.00	0.04	8.63
1996	0.09	0.55	0.20	0.00	0.20	0.04	0.00	0.00	0.00	0.00	1.05	1.10	3.23
1997	0.55	0.04	0.00	0.05	0.00	0.65	0.07	0.00	2.19	0.00	0.78	0.50	4.83
1998	0.55	5.97	1.98	0.53	0.67	0.95	0.03	0.39	0.44	0.15	0.11	0.02	11.79
1999	0.20	0.04	0.06	1.48	0.35	0.00	1.20	0.09	0.85	0.00	0.00	0.00	4.27
2000	0.49	3.33	0.89	0.27	0.11	0.00	0.00	0.13	0.07	0.41	0.00	0.00	5.70
2001	2.18	1.45	0.39	0.38	0.06	0.00	0.54	0.00	0.26	0.52	0.42	0.16	6.36
2002	0.20	0.05	0.14	0.00	0.00	0.00	0.23	0.00	0.00	0.28	0.41	0.38	1.69
2003	0.09	2.20	0.37	1.48	0.15	0.00	1.24	0.93	0.86	0.02	0.91	1.54	9.79
AVG	0.84	1.11	0.87	0.34	0.30	0.11	0.43	0.54	0.34	0.29	0.45	0.60	6.22

Notes: Averages do not include columns with **** in them.
Total column does not include data prior to 1964.

MERCURY (MER)
36 39 59 N 116 00 66 W
3770 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1962	****	****	****	****	****	****	****	****	0.57	0.32	0.00	0.50	1.39
1963	0.05	0.62	0.40	0.11	0.08	0.19	0.00	0.28	2.28	0.13	****	****	4.14
1964	****	****	****	****	****	****	****	****	****	****	****	****	0.00
1965	****	****	****	****	****	****	****	****	****	****	****	****	0.00
1966	****	****	****	****	****	****	****	****	****	****	****	****	0.00
1967	****	****	****	****	****	****	****	****	****	****	****	****	0.00
1968	****	****	****	****	****	****	****	****	****	****	****	****	0.00
1969	****	****	****	****	****	****	****	****	****	****	****	****	0.00
1970	****	****	****	****	****	****	****	****	****	****	****	****	0.00
1971	****	****	0.11	0.02	0.75	0.00	0.14	0.22	0.01	0.03	0.04	1.42	2.74
1972	0.00	0.00	0.00	0.29	0.07	1.19	0.02	1.83	1.05	1.07	1.00	0.05	6.57
1973	0.67	1.38	2.30	0.25	0.67	0.06	0.10	0.24	0.00	0.12	0.51	0.56	6.86
1974	1.24	0.01	0.06	0.00	0.00	0.00	1.03	0.11	0.00	0.10	0.08	1.40	4.03
1975	0.02	0.84	0.70	0.60	0.30	0.00	0.00	0.00	0.30	0.16	0.01	0.01	2.94
1976	0.00	1.94	0.03	0.41	0.27	0.00	0.96	0.00	1.67	0.84	0.00	0.07	6.19
1977	0.66	0.00	0.00	0.01	1.18	0.10	0.05	1.10	0.03	0.19	0.01	0.59	3.92
1978	1.80	2.03	1.88	0.79	0.14	0.00	0.03	0.01	0.07	0.33	1.67	0.87	9.62
1979	1.11	0.36	1.30	0.02	0.00	0.00	0.93	0.39	0.02	0.00	0.04	0.40	4.57
1980	2.07	1.48	1.05	0.12	0.66	0.09	0.65	0.00	0.21	0.02	0.00	0.00	6.35
1981	0.20	0.15	1.61	0.24	1.10	0.00	0.00	0.07	0.85	0.05	0.42	0.00	4.69
1982	0.39	0.44	1.18	0.26	0.85	0.00	0.94	1.19	0.63	0.26	1.08	0.27	7.49
1983	0.64	0.50	1.33	0.10	0.08	0.00	0.00	5.04	1.14	0.14	0.79	0.70	10.46
1984	0.00	0.12	0.05	0.31	0.00	0.02	4.40	2.48	0.00	0.14	1.59	1.76	10.87
1985	0.51	0.02	0.17	0.02	0.10	0.00	0.33	0.00	1.29	0.28	1.17	0.22	4.11
1986	0.84	0.39	1.08	0.23	0.20	0.00	1.54	0.54	0.00	1.07	0.83	0.29	7.01
1987	0.71	0.37	0.28	0.49	2.69	0.16	0.47	0.00	0.00	1.52	0.65	0.77	8.11
1988	1.48	0.28	0.02	1.46	0.26	0.12	0.02	0.97	0.00	0.00	0.41	0.21	5.23
1989	0.22	0.15	0.10	0.00	0.01	0.02	0.00	0.36	0.05	0.04	0.00	0.00	0.95
1990	0.90	0.15	0.20	0.08	0.21	0.01	1.30	0.25	0.66	0.07	0.26	0.05	4.14
1991	0.26	0.76	0.85	0.00	0.48	0.03	0.26	0.71	0.92	0.26	0.20	0.99	5.72
1992	0.56	1.22	1.95	0.00	0.03	0.02	0.31	0.02	0.00	0.70	0.00	1.47	6.28
1993	2.26	2.95	0.51	0.01	0.02	0.22	0.00	0.53	0.00	0.21	0.17	0.49	7.37
1994	0.16	0.72	0.27	0.32	0.05	0.00	0.33	0.02	0.01	0.02	0.32	1.21	3.43
1995	2.74	0.40	1.60	0.31	0.36	0.15	0.09	0.33	0.00	0.02	0.00	0.02	6.02
1996	0.22	0.67	0.31	0.02	0.05	0.11	0.00	0.03	0.00	0.34	0.56	0.47	2.78
1997	0.39	0.08	0.00	0.00	0.00	0.99	0.26	0.07	2.30	0.04	0.78	0.41	5.32
1998	0.50	4.10	1.12	0.96	0.34	1.83	0.51	1.18	0.24	0.11	0.22	0.01	11.12
1999	0.08	0.08	0.04	1.64	0.04	0.04	0.68	0.00	1.39	0.00	0.00	0.00	3.99
2000	0.62	2.21	0.40	0.17	0.00	0.00	0.00	0.28	0.16	0.27	0.00	0.00	4.11
2001	0.95	1.03	0.46	0.13	0.22	0.00	0.65	0.00	0.06	0.80	0.12	0.07	4.49
2002	0.40	0.02	0.45	0.00	0.00	0.00	0.60	0.00	0.07	0.60	0.46	0.35	2.95
2003	0.10	1.69	0.47	1.06	0.23	0.00	1.48	1.22	0.03	0.03	0.53	1.27	8.11
AVG	0.77	0.83	0.69	0.32	0.34	0.14	0.59	0.62	0.38	0.30	0.42	0.50	5.90

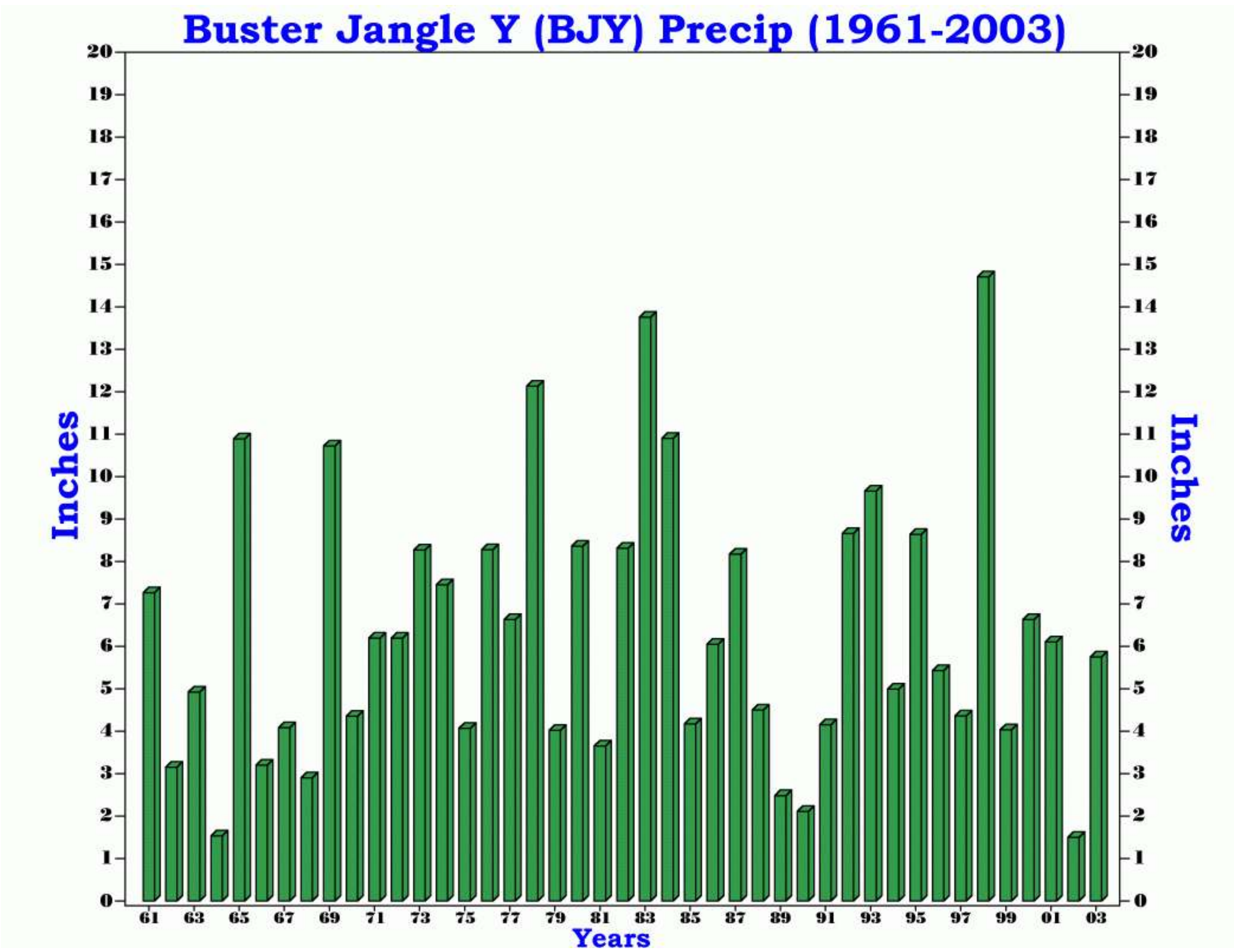
Notes: Averages do not include columns with **** in them.
Total column does not include data prior to 1972.

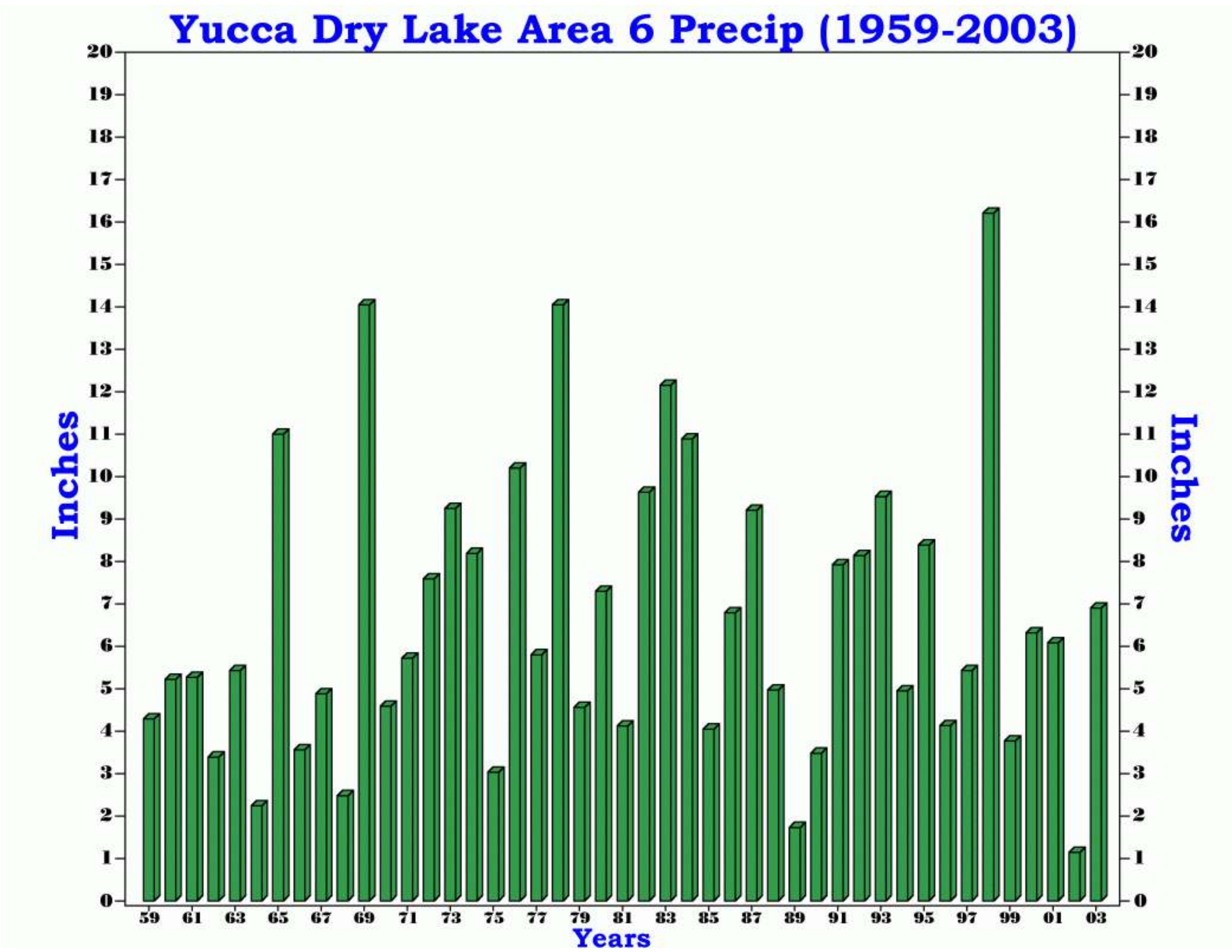
DESERT ROCK (DRA)
36 37 16 N   116 01 33 W
3250 FT (MSL)
PRECIPITATION SUMMARY
(INCHES)

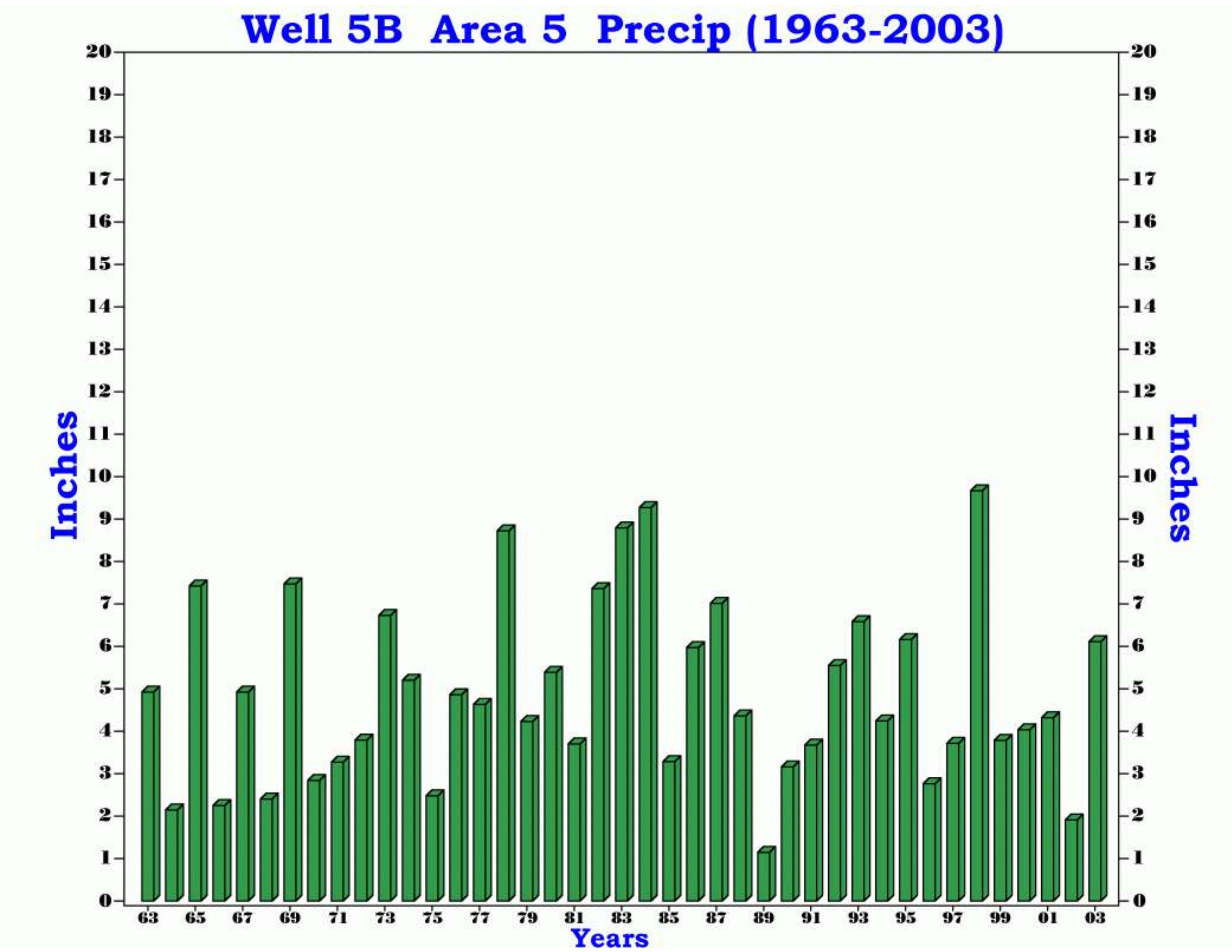
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1963	****	****	****	****	****	****	****	****	****	0.11	0.90	0.03	1.04
1964	0.00	0.00	0.32	0.46	0.07	0.12	0.12	0.04	0.00	0.05	0.24	0.04	1.46
1965	0.19	0.02	0.46	2.15	0.16	0.02	0.42	0.73	0.00	0.01	2.07	2.45	8.68
1966	0.17	0.62	0.03	0.00	0.00	0.00	0.47	0.40	0.20	0.00	0.00	0.26	2.15
1967	1.23	0.00	0.00	0.86	0.09	0.02	0.77	1.20	0.05	0.00	1.52	0.00	5.74
1968	0.10	0.87	0.10	0.05	0.00	0.41	0.76	0.77	0.00	0.28	0.08	0.02	3.44
1969	1.77	2.29	0.48	0.16	0.03	0.68	0.66	0.02	0.19	0.03	0.04	0.00	6.35
1970	0.02	0.64	0.03	0.09	0.00	0.04	0.01	0.83	0.01	0.00	0.57	0.13	2.37
1971	0.00	0.55	0.10	0.02	0.91	0.00	0.02	0.72	0.01	0.00	0.14	1.48	3.95
1972	0.00	0.00	0.00	0.20	0.02	0.15	0.00	0.96	0.60	0.79	1.11	0.02	3.85
1973	0.79	1.84	3.07	0.00	0.42	0.03	0.00	0.09	0.00	0.05	0.03	0.00	6.32
1974	0.91	0.07	0.18	0.00	0.03	0.00	0.37	0.01	0.00	1.00	0.17	1.57	4.31
1975	0.05	0.63	1.05	0.10	0.16	0.00	0.00	0.00	0.53	0.07	0.03	0.01	2.63
1976	0.00	2.25	0.00	0.78	0.21	0.01	0.70	0.00	1.71	1.05	0.00	0.05	6.76
1977	0.60	0.00	0.00	0.00	1.45	0.24	0.20	1.57	0.02	0.13	0.02	0.79	5.02
1978	1.67	2.25	1.92	0.93	0.04	0.00	0.00	0.00	0.17	0.58	1.59	0.88	10.03
1979	1.60	0.48	1.45	0.03	0.02	0.00	0.73	1.43	0.00	0.00	0.05	0.27	6.06
1980	1.79	1.89	1.08	0.15	0.69	0.17	0.54	0.00	0.43	0.01	0.00	0.00	6.75
1981	0.30	0.21	2.18	0.14	1.57	0.02	0.00	0.06	0.49	0.05	0.49	0.00	5.51
1982	0.37	0.58	1.40	0.28	0.56	0.00	1.72	0.60	1.18	0.35	0.90	0.32	8.26
1983	0.76	0.95	2.19	0.15	0.04	0.00	0.00	5.37	1.01	0.19	0.84	0.82	12.32
1984	0.02	0.14	0.09	0.04	0.00	0.00	3.64	3.14	0.01	0.15	1.76	1.91	10.90
1985	0.79	0.02	0.08	0.02	0.20	0.00	0.38	0.00	1.43	0.37	1.21	0.27	4.77
1986	0.57	0.51	0.92	0.34	0.17	0.00	1.63	0.48	0.00	1.02	0.87	0.15	6.66
1987	0.83	0.77	0.29	0.51	1.94	0.20	0.63	0.00	0.04	1.65	0.71	0.98	8.55
1988	1.25	0.21	0.02	1.50	0.30	0.05	0.09	1.87	0.00	0.01	0.33	0.21	5.84
1989	0.24	0.15	0.09	0.01	0.02	0.08	0.00	0.29	0.34	0.03	0.00	0.00	1.25
1990	0.67	0.09	0.07	0.18	0.27	0.02	2.05	1.06	0.15	0.08	0.29	0.02	4.95
1991	0.24	0.95	0.84	0.00	0.51	0.02	0.35	0.47	0.99	0.12	0.12	0.81	5.42
1992	0.66	1.21	1.97	0.01	0.05	0.08	0.15	0.01	0.00	0.73	0.00	1.54	6.41
1993	2.51	3.29	0.36	0.03	0.02	0.41	0.00	0.09	0.04	0.26	0.16	0.38	7.55
1994	0.12	0.58	0.29	0.16	0.11	0.00	0.21	0.20	0.00	0.02	0.27	1.27	3.23
1995	3.37	0.32	2.39	0.48	0.52	0.08	0.02	0.72	0.00	0.00	0.00	0.00	7.90
1996	0.30	0.81	0.34	0.00	0.10	0.05	0.13	0.16	0.00	0.32	0.53	0.48	3.22
1997	0.49	0.06	0.00	0.02	0.09	0.78	0.45	0.00	2.46	0.00	0.64	0.36	5.35
1998	0.47	4.64	1.10	0.93	0.44	1.35	0.26	1.51	0.18	0.11	0.26	0.01	11.26
1999	0.06	0.07	0.03	1.55	0.00	0.05	1.10	0.03	1.37	0.00	0.00	0.00	4.26
2000	0.51	1.86	0.40	0.25	0.00	0.13	0.01	0.34	0.17	0.33	0.01	0.00	4.01
2001	1.17	1.12	0.46	0.12	0.12	0.00	0.32	0.06	0.08	0.66	0.09	0.19	4.39
2002	0.30	0.06	0.35	0.00	0.00	0.00	0.25	0.00	0.08	0.49	0.55	0.27	2.35
2003	0.06	2.26	0.44	1.12	0.23	0.00	1.13	1.18	0.00	0.01	0.69	1.48	8.60
AVG	0.67	0.88	0.66	0.35	0.29	0.13	0.51	0.66	0.35	0.27	0.47	0.47	5.72

Notes: Averages do not include columns with **** in them.
Total column does not include data prior to 1964.

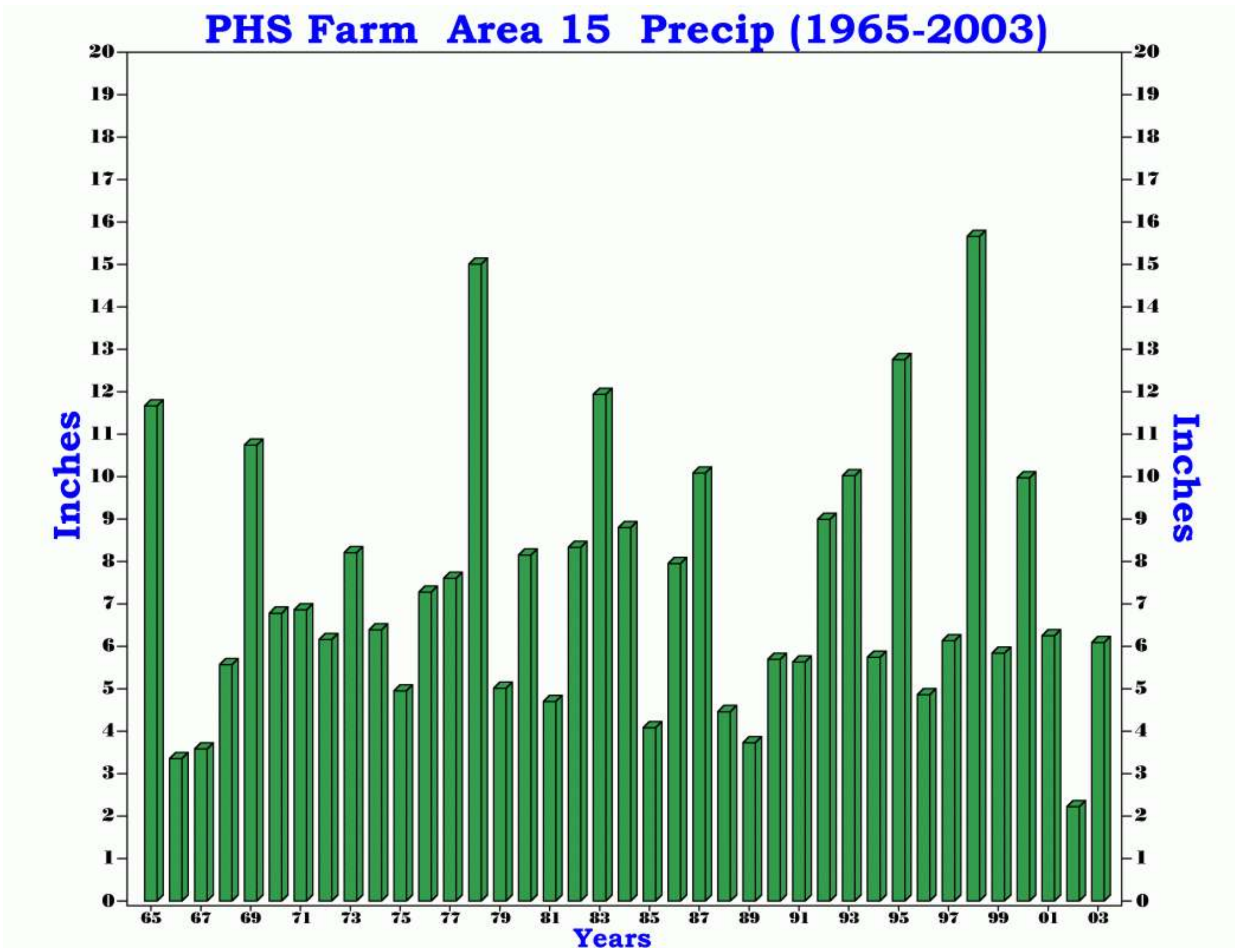
E.2. Graphs of annual totals for precipitation for the identified locations.

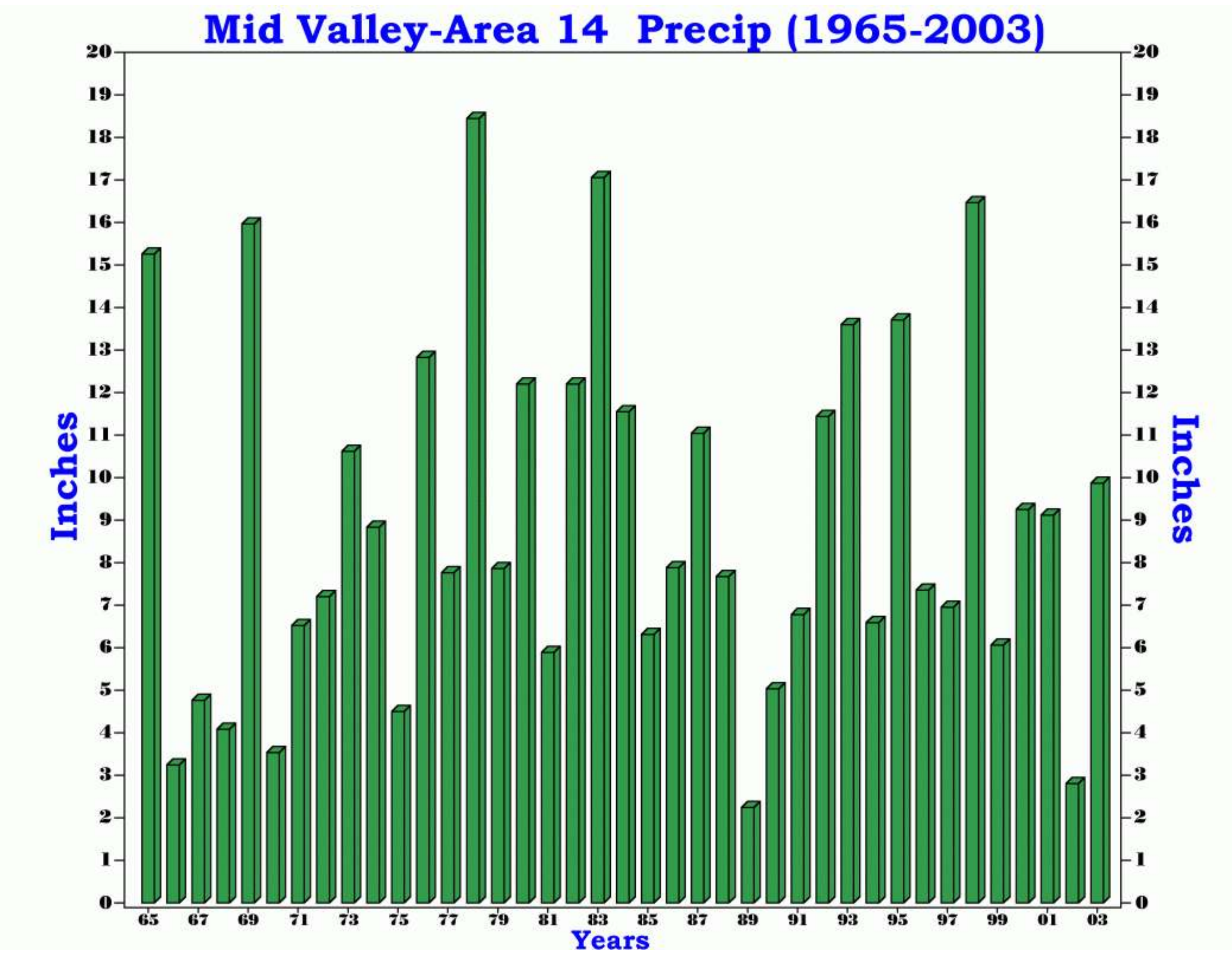


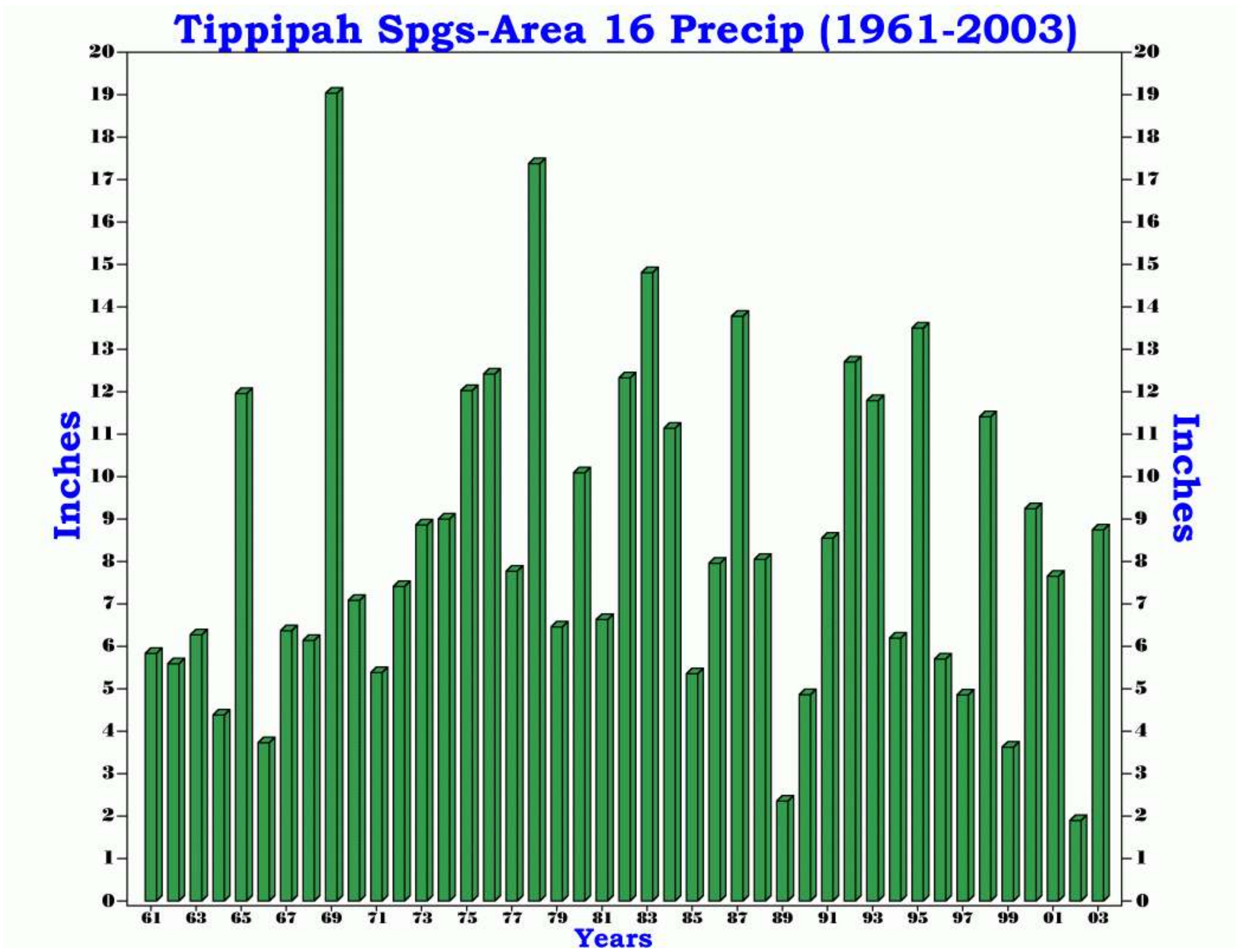

Yucca Dry Lake Area 6 Precip (1959-2003)
Inches
Years
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
59
61
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95
97
99
01
03



Well 5B Area 5 Precip (1963-2003)
Inches
Inches
Years
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95
97
99
01
03


PHS Farm Area 15 Precip (1965-2003)
Inches
Years
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95
97
99
01
03


Mid Valley-Area 14 Precip (1965-2003)
Inches
Inches
Years
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95
97
99
01
03



Tippipah Spgs-Area 16 Precip (1961-2003)
Inches
Inches
Years
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
61
63
65
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73
75
77
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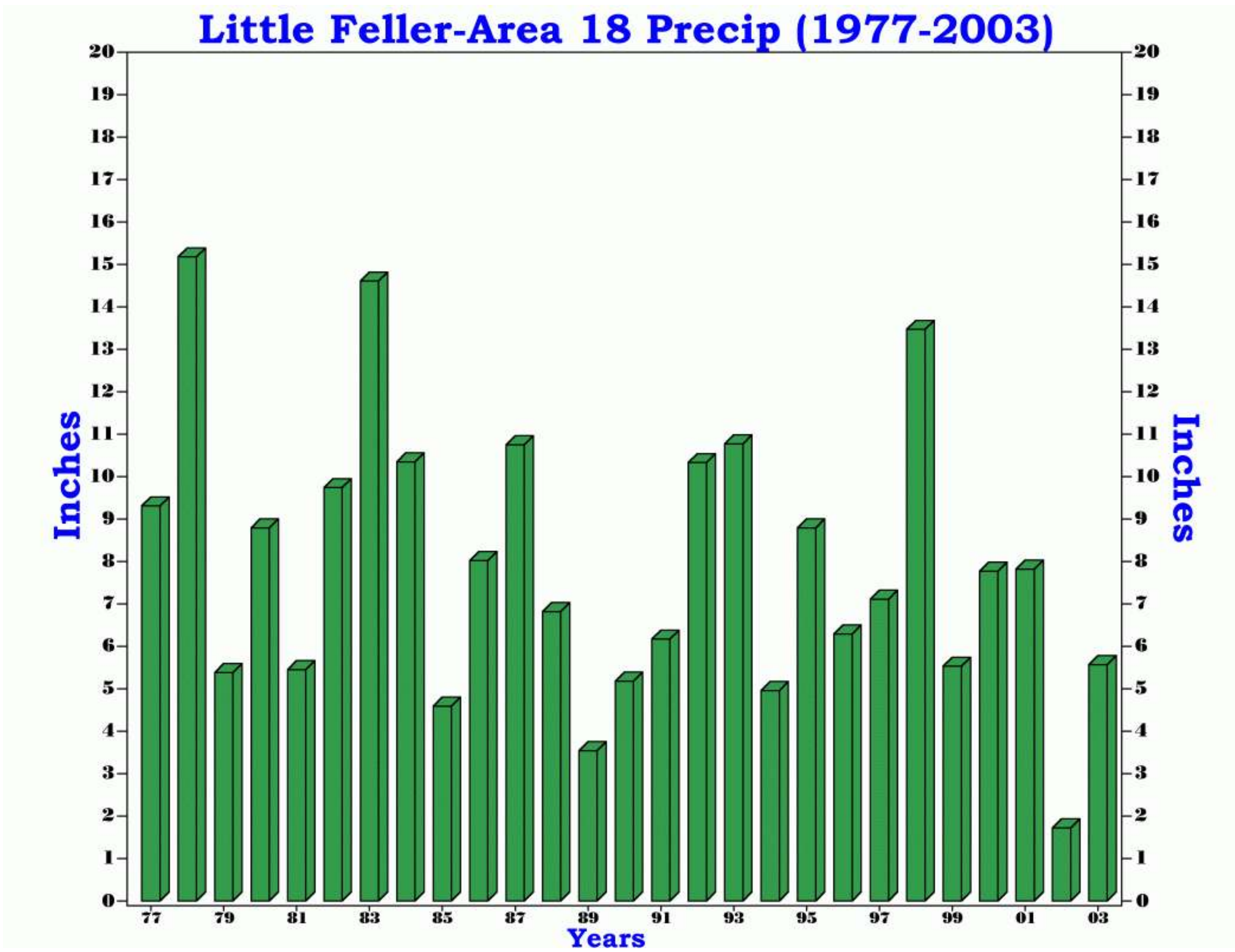
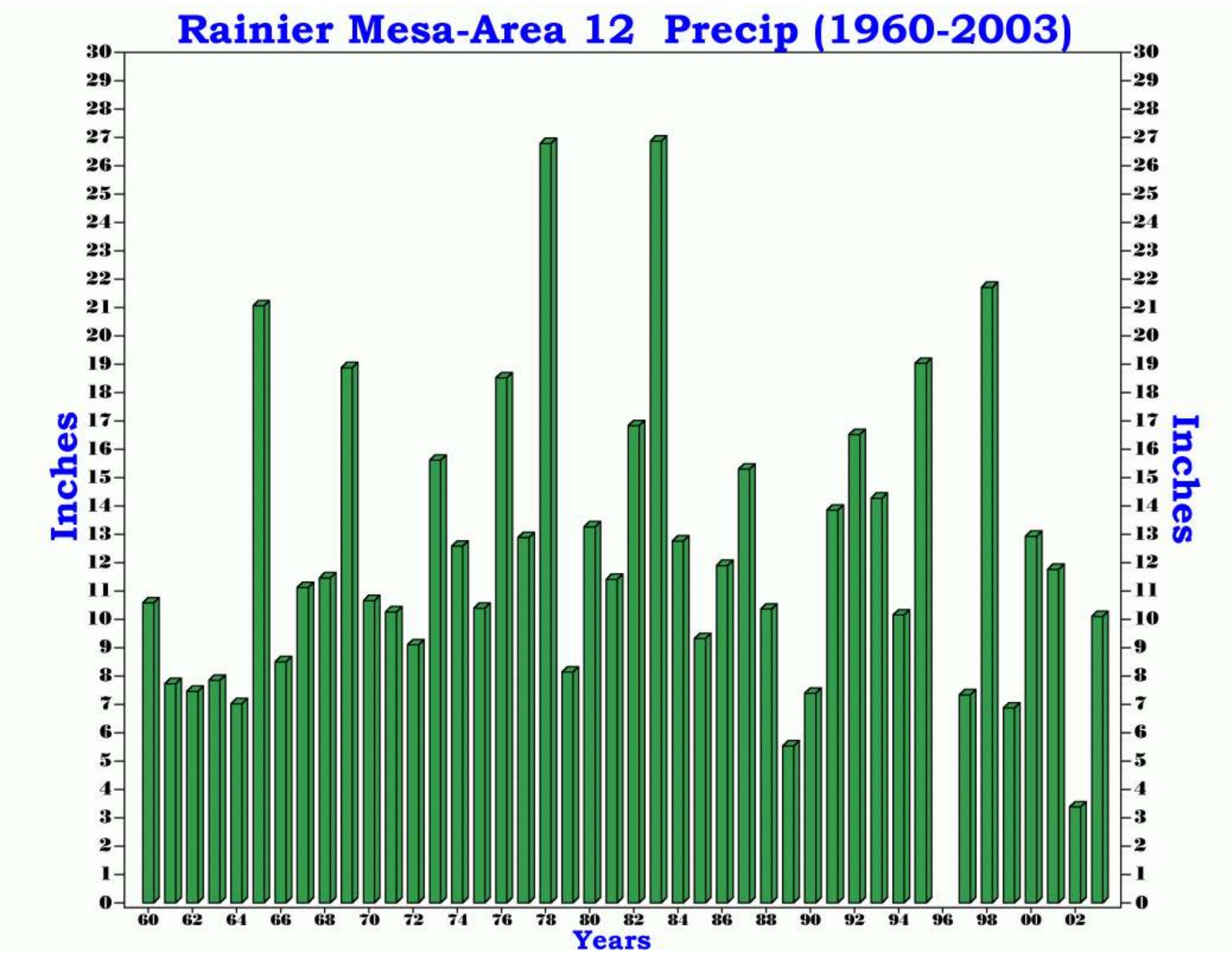
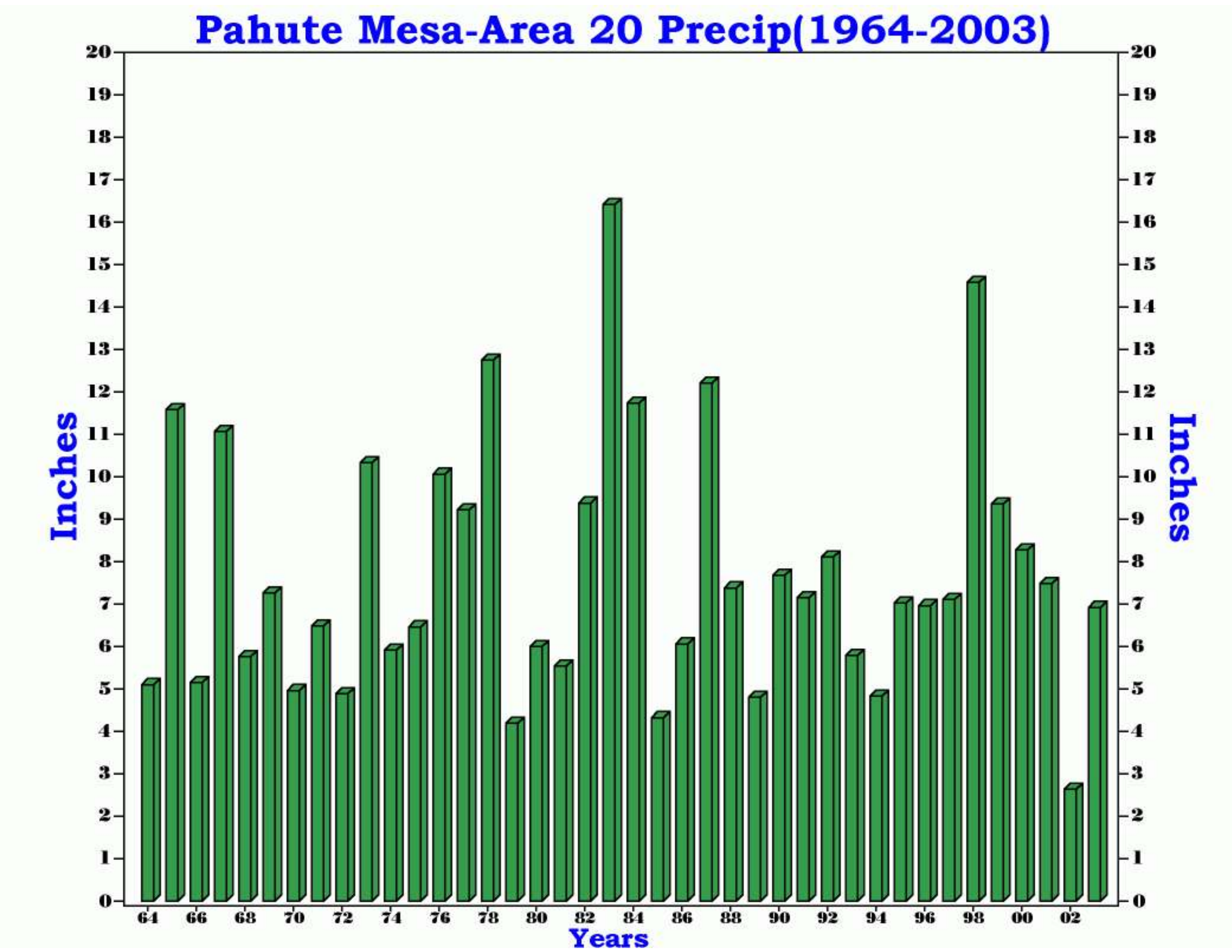
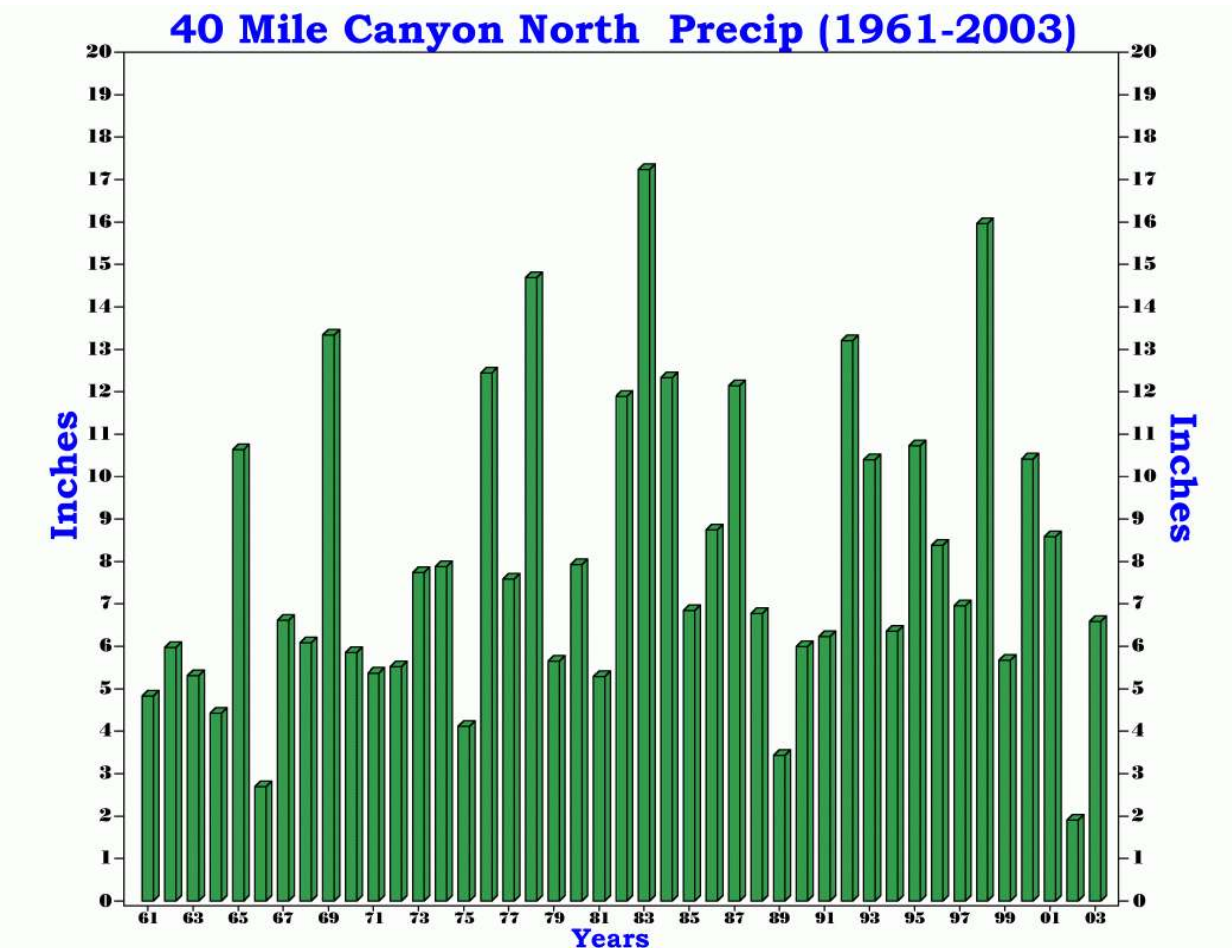
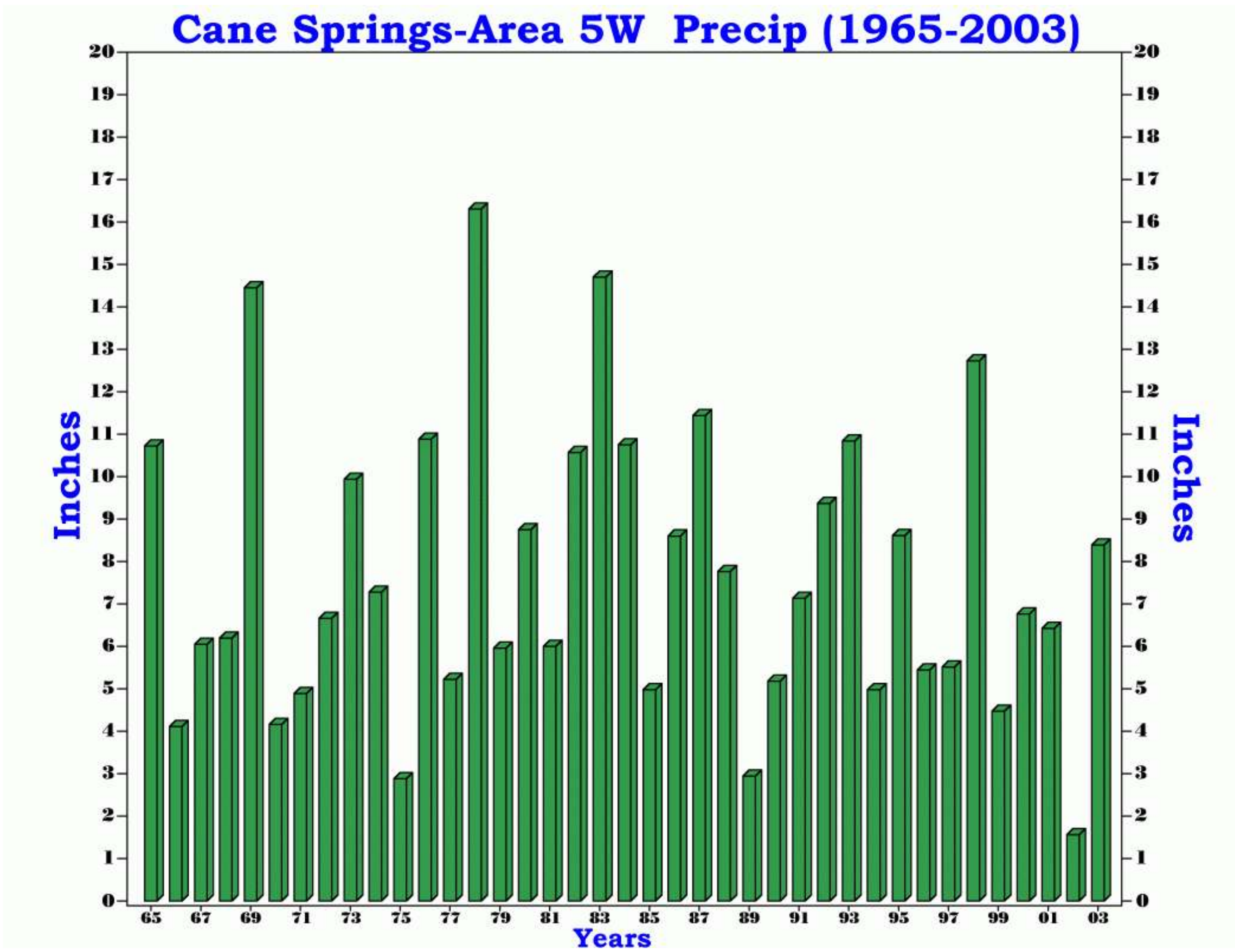
81
83
85
87
89
91
93
95
97
99
01
03

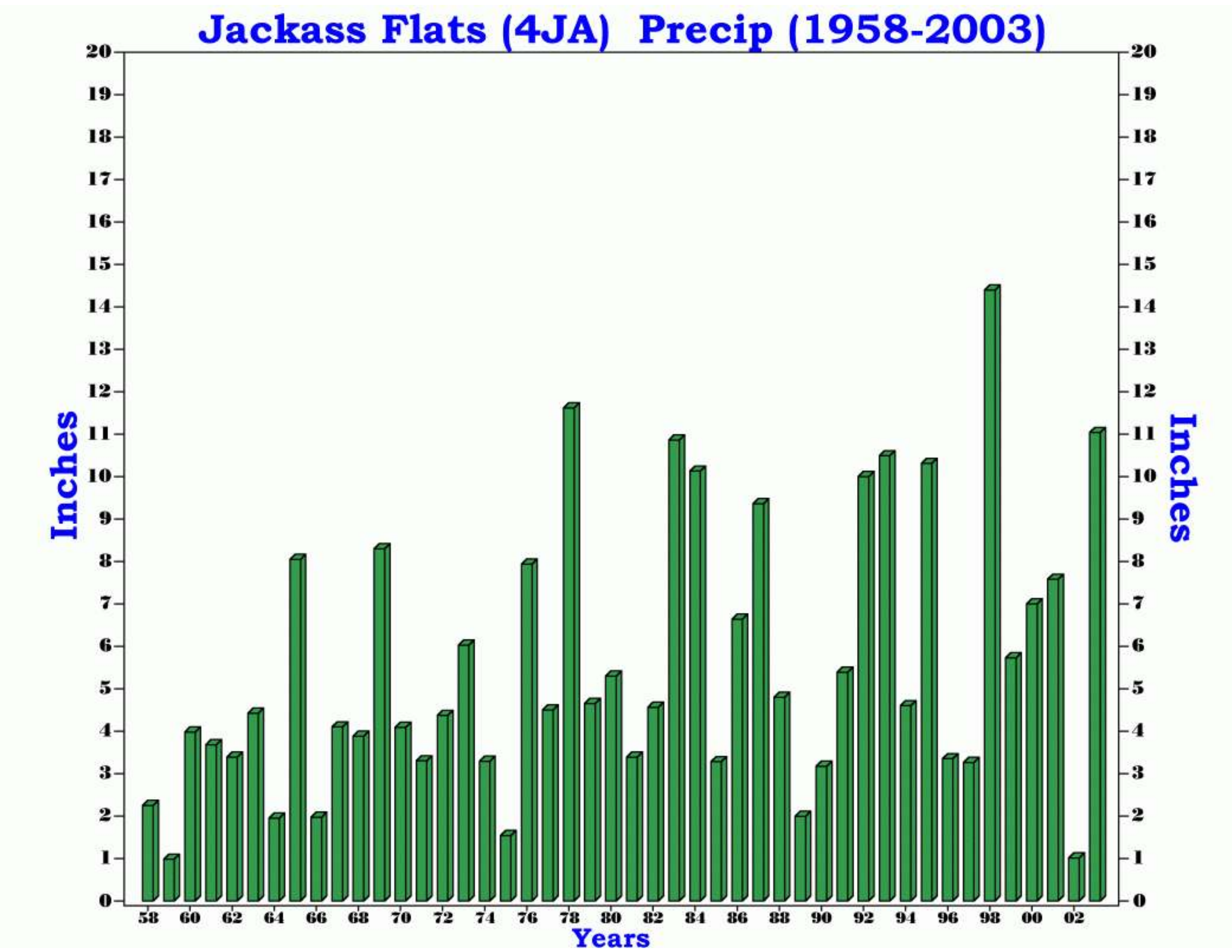

Little Feller-Area 18 Precip (1977-2003)
Inches
Inches
Years
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
77
79
81
83
85
87
89
91
93
95
97
99
01
03


Rainier Mesa-Area 12 Precip (1960-2003)
Inches
Years
60
62
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94
96
98
00
02
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30

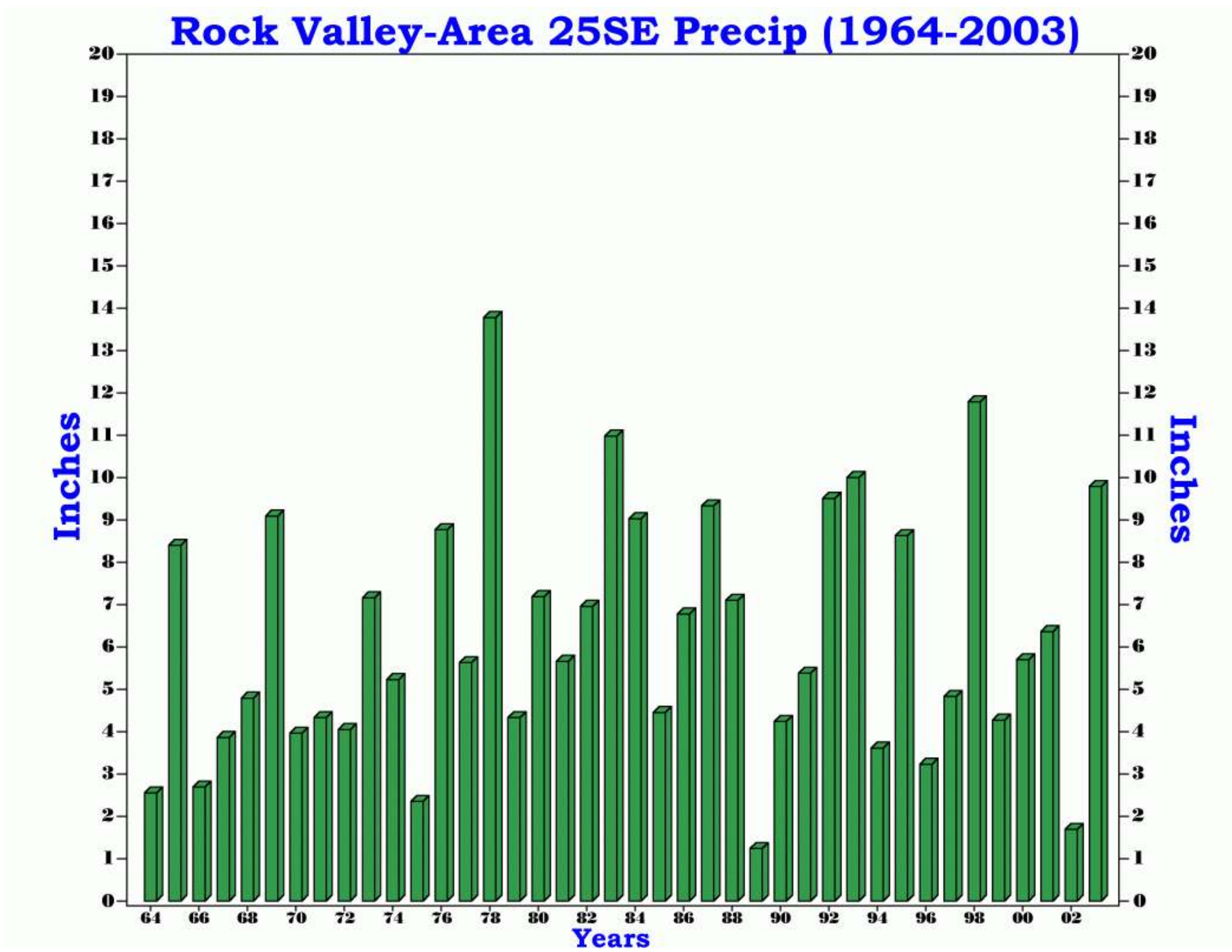

Pahute Mesa-Area 20 Precip(1964-2003)
Inches
Inches
Years
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94
96
98
00
02

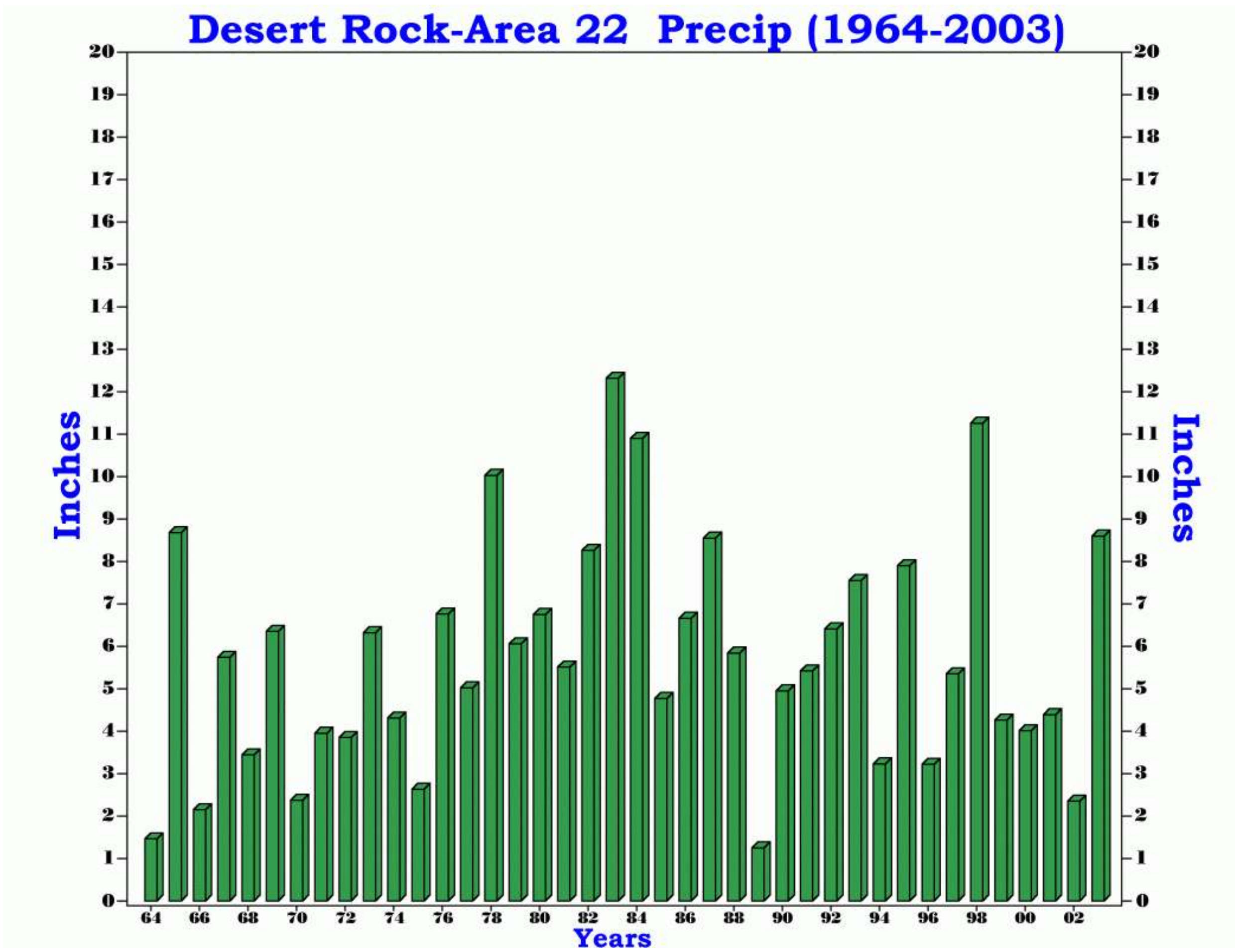

40 Mile Canyon North Precip (1961-2003)
Inches
Inches
Years
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
61
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95
97
99
01
03


Cane Springs-Area 5W Precip (1965-2003)
Inches
Inches
Years
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95
97
99
01
03



Jackass Flats (4JA) Precip (1958-2003)
Inches
Years
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
58
60
62
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94
96
98
00
02


Rock Valley-Area 25SE Precip (1964-2003)
Inches
Inches
Years
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94
96
98
00
02


Desert Rock-Area 22 Precip (1964-2003)
Inches
Inches
Years
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
64
66
68
70
72
74
76
78
80
82
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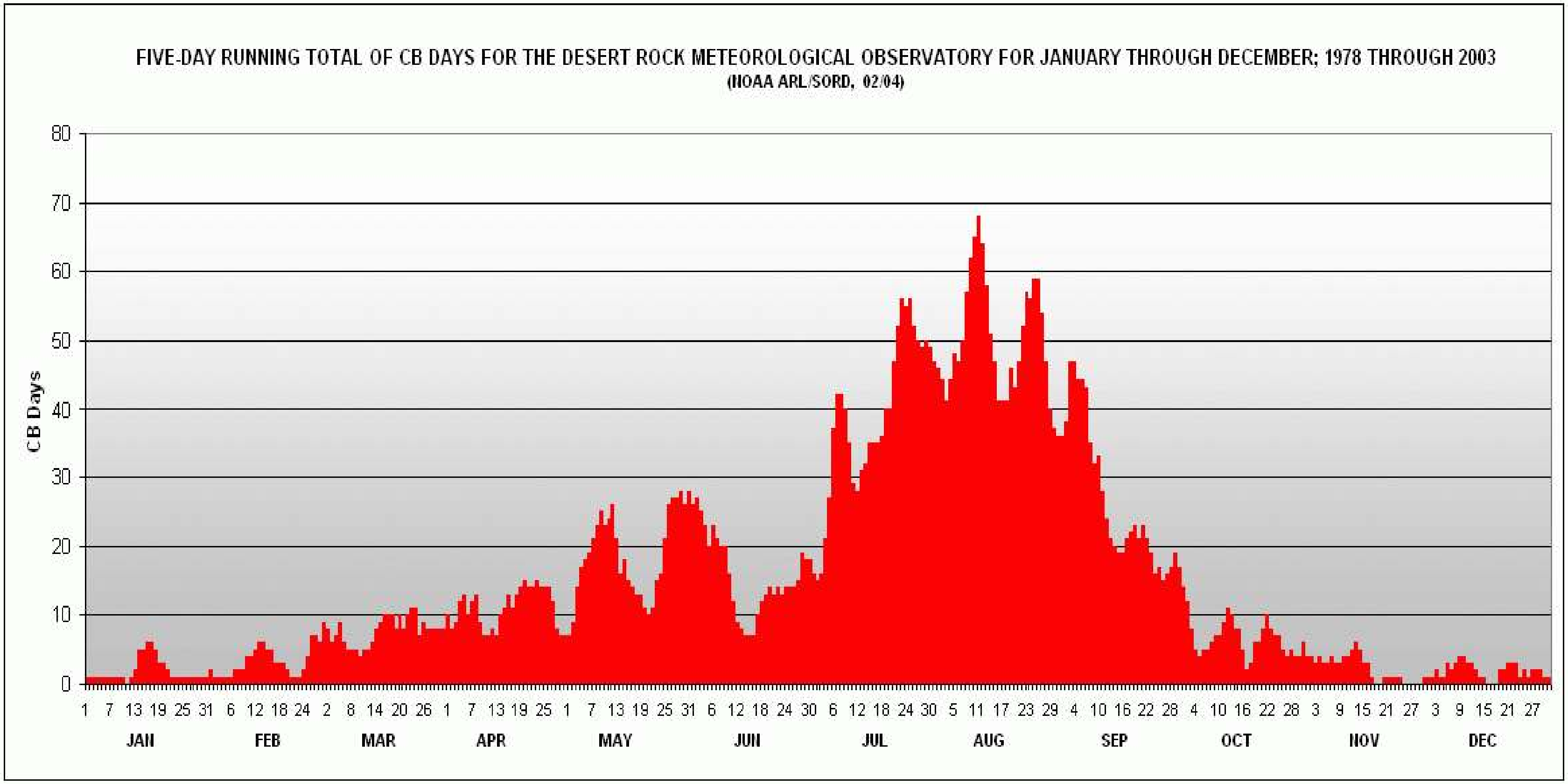
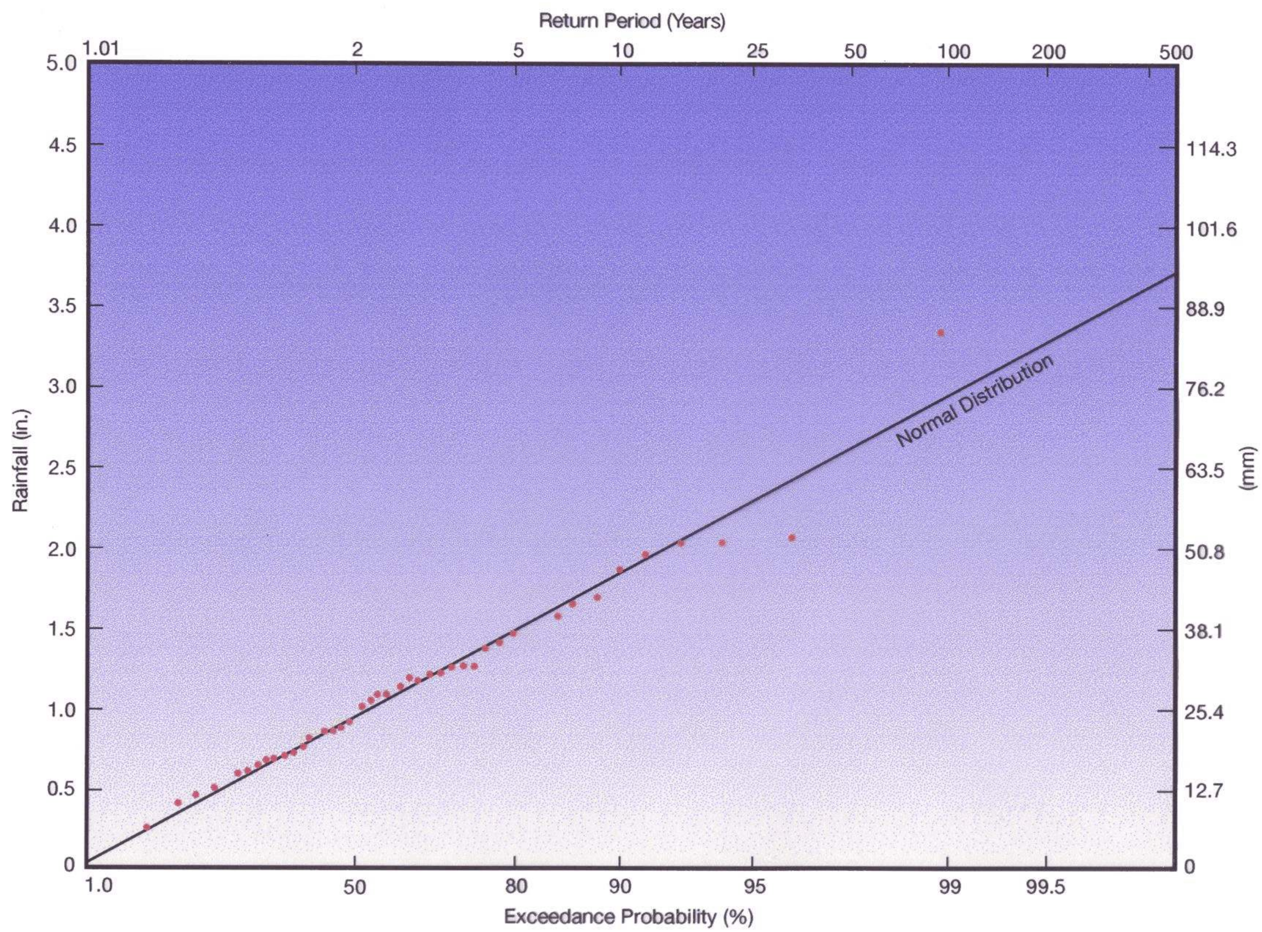
90
92
94
96
98
00
02

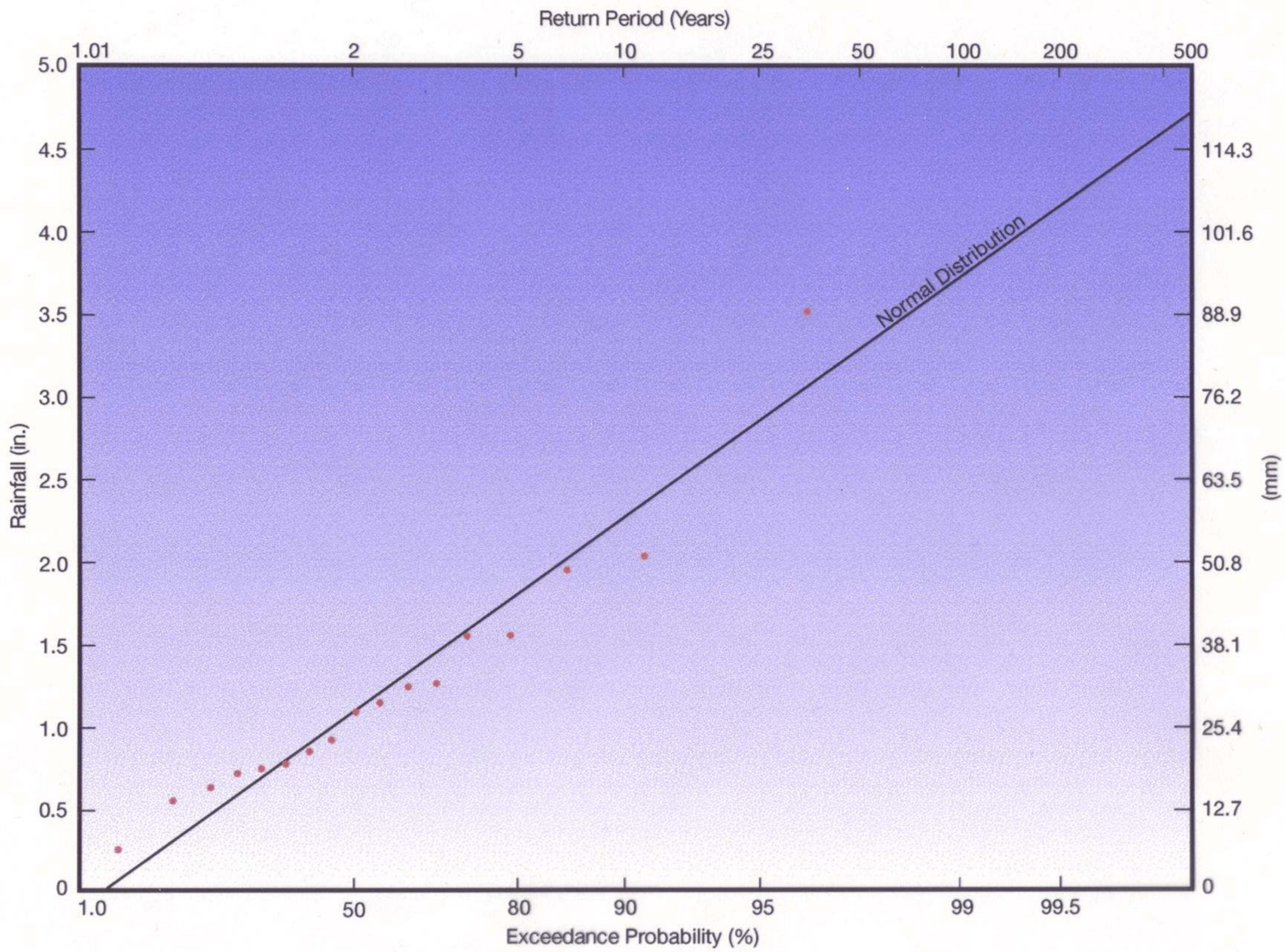
E.3. Annual Distribution of Cb Days for Desert Rock, NV



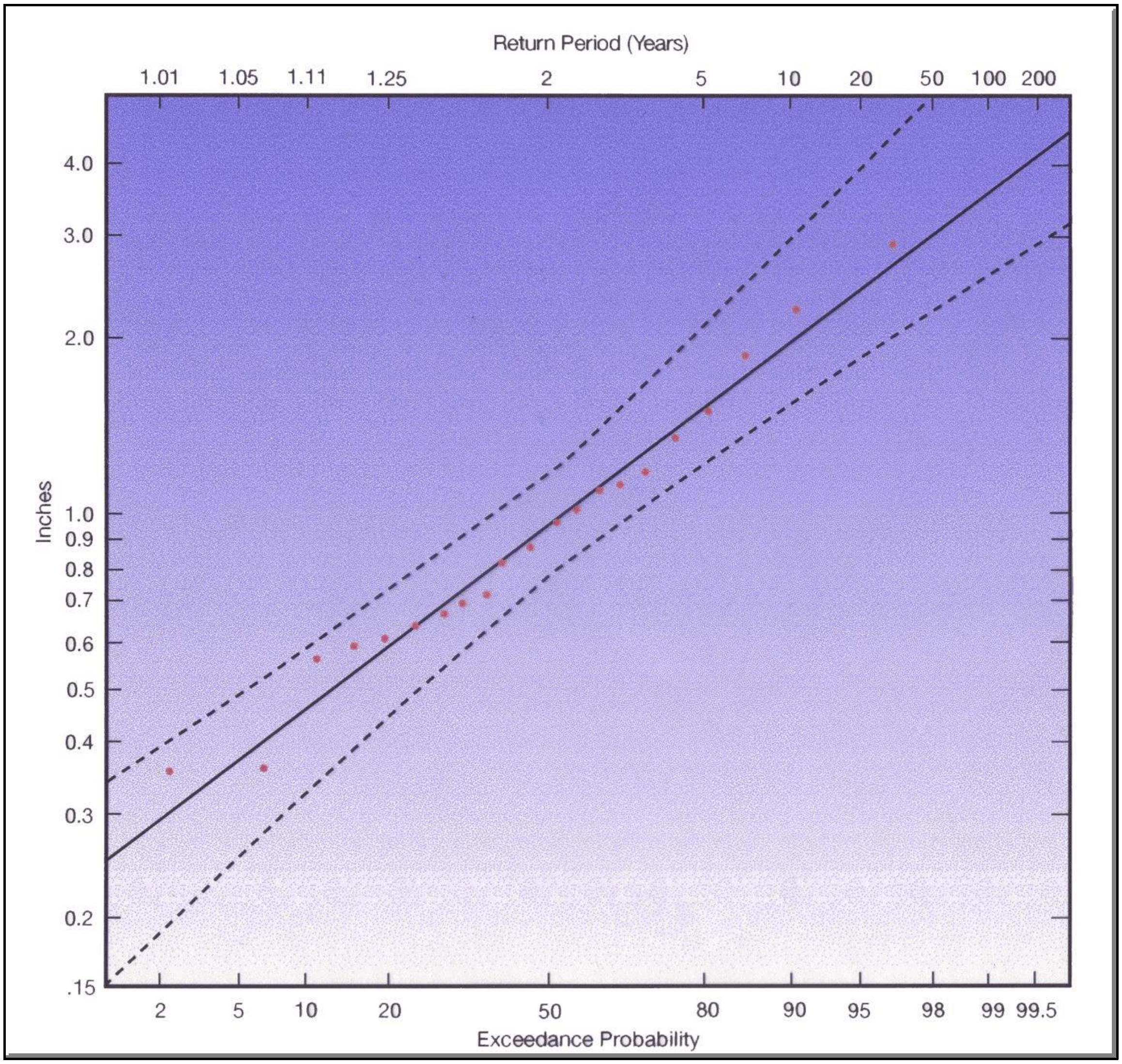
E.4. "Return Period" graphs for extreme precipitation events on the NTS



Normal fit to the annual maximum dailily precipitation data mix for Yucca Flat, Desert Rock, and Beatty, Nevada, for the period 1948 through 1995. After Randerson, 1997.



Annual maximum daily precipitation versus return period for Desert Rock, Nevada, for 1979 through 1995 with a fit to a normal distribution. After Randerson, 1997.



Log Pearson Type III fit to the annual maximum daily precipitation totals for Jackass Flat for 1976 through 1995. Dashed lines enclose 95% confidence limits. After Randerson, 1997.

XI. ACKNOWLEDGMENTS

Work on this project was funded by the U.S. Department of Energy, National Nuclear Security Administration, Nevada Site Office, through an Interagency Agreement (DE-A108-97NV13209) with NOAA/ARL.

The author thanks Dr. Darryl Randerson for his many suggestions and comments, and for his encouragement in writing this document. Additional thanks goes to Raymond Dennis for his analysis and compilation of the precipitation data used in the report, and for his report on the thunderstorm and lightning occurrences at both UCC and DRA. Also thanks to our former Systems Programmer, Rick Holmes, for making possible the graphics used in the report, and for compiling and maintaining the MEDA data base and its accessibility routines. Lastly, my sincere thanks to both Darryl Randerson and Jim Sanders for their input of analyses and graphics associated with the NTS Lightning Detection System and for their dedicated efforts in assembling this document into final form following my retirement in December 2005.

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