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PRECIPITATION FREQUENCY AND INTENSITY AT THE IDAHO NATIONAL ENGINEERING LABORATORY

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Abstract

Daily precipitation data was obtained from 18 measurement sites in the Upper Snake River plain. These stations had periods of record ranging from 13 to 81 years. This data was used to calculate the frequency with which various daily precipitation amounts might be expected in the INEL area. Hourly data was also available at 12 sites with periods of records ranging from five to 47 years. The hourly data was used to investigate the return years of storms of durations less than 24 hours. Storms were examined for frequency of occurrence for both the winter and convective seasons. Storms with the highest rate of rainfall were due to thunderstorms during the convective season. Return periods of convective season storms were compared with the isopluvial maps for the Upper Snake River Plain from the "Rainfall Frequency Atlas of the United States" published by the United States Weather Bureau in 1961. Comparisons of both the 24-hour storms and those of shorter durations were favorable. Equations were developed for calculating return periods of storms of various intensities for both the winter and convective seasons.

Introduction

Engineers are asked to design structures able to withstand precipitation events of a given intensity. To designate the intensities for which structures must be designed, the idea of a "design basis storm" has arisen. A design storm is the frequency of occurrence of a storm of a given intensity. Structures can then be designed to withstand a storm intensity, as defined by the design basis storm, that will be expected to occur only some specified number of years. The frequency of occurrence of storms of a specified intensity is also used in assessing flood potential. The concept is important at the Idaho National Engineering Laboratory (INEL) where facilities using, processing, or storing nuclear materials may be located.

In 1961 The United States Weather Bureau published a rainfall frequency atlas (Hershfield, 1961) containing isopluvial maps from which estimates of the return years of storms of could be made. Thirty five years of additional data has been added to the database since the publication of that document. This report examines storms based on this larger database and helps analytically to specify those INEL design basis storms.

Background

The INEL is located along the western edge of the Upper Snake River Plain in southeastern Idaho (Figure 1). To the west of the INEL are the Lost River, Lemhi, and Bitterroot-Centennial Mountain Ranges. Moist air masses coming from the Pacific Ocean lose much of their moisture as precipitation over these mountains. As a result, the Snake River Plain has a semi-arid climate. The type of precipitation occurring in the Snake River Plain is dependant upon the season. In the summer, precipitation most often falls as rain showers or thunderstorms. In the spring and autumn rain showers, or periods of rain, or snow may occur. Most precipitation in the winter comes as snow. Precipitation can occur in any month but the heaviest accumulations are generally in the spring or early summer. The most intense periods of rainfall are associated with thundershowers.

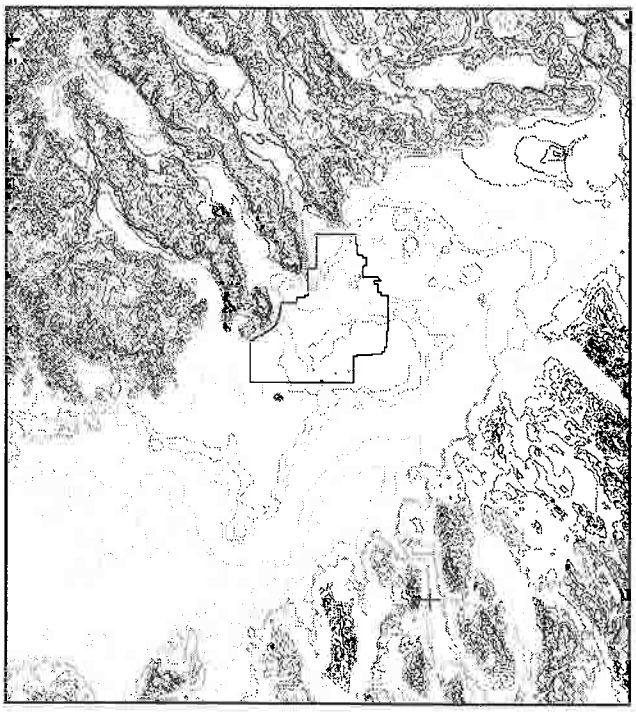

Figure 1. Setting of the INEL in the Snake River Plain.

Precipitation at the INEL

Daily precipitation has been measured continuously at the Central Facilities Area (CFA) of the INEL since January of 1950. CFA is listed in the National Climatic Data Center (NCDC) records as station Idaho Falls 46W. Meteorological data from CFA has been reported to the NCDC since January of 1952. Table 1 lists the monthly and annual average number of days as a percent of occurrence during which specified amounts of precipitation fell at CFA. The table follows a similar table contained in the "Climatography of the Idaho National Engineering Laboratory" and includes data measurements from 1950 through 1995. In the table it can be seen that less than a tenth of an inch of precipitation was recorded on most days when precipitation fell. During the months of July through October precipitation exceeding one hundredth of an inch was measured on only about 12% of the days. That amount was exceeded on about 20% or more of the days during the rest of the year. It can also be seen that days on which more than 1 inch of precipitation was recorded were rare. Storms of that intensity are usually of the thunderstorm variety and they usually occurred between the months of April and September.

Table 1. **Average percentage of days precipitation recorded at CFA exceed the following inches per day**

	> 0.01 (%)	> 0.10 (%)	> 0.50 (%)	> 1.00 (%)
January	22.4	6.9	0.7	0.0
February	19.4	7.3	0.7	0.0
March	19.8	6.9	0.2	0.0
April	20.3	8.0	0.7	0.1
May	25.1	12.9	1.3	0.0
June	23.1	11.2	1.9	0.3
July	11.9	4.4	0.7	0.1
August	12.3	4.9	1.0	0.0
September	12.5	6.4	0.9	0.2
October	12.0	5.6	0.6	0.0
November	18.7	7.5	0.4	0.0
December	21.6	8.1	0.4	0.1
ANNUAL	18.3	7.5	0.8	0.1

Figure 2 contains the precipitation amount versus return years computed from the complete duration precipitation data from the 43 years of daily data from CFA. The solid line represents data from the entire year while the dotted line represents only data measured between

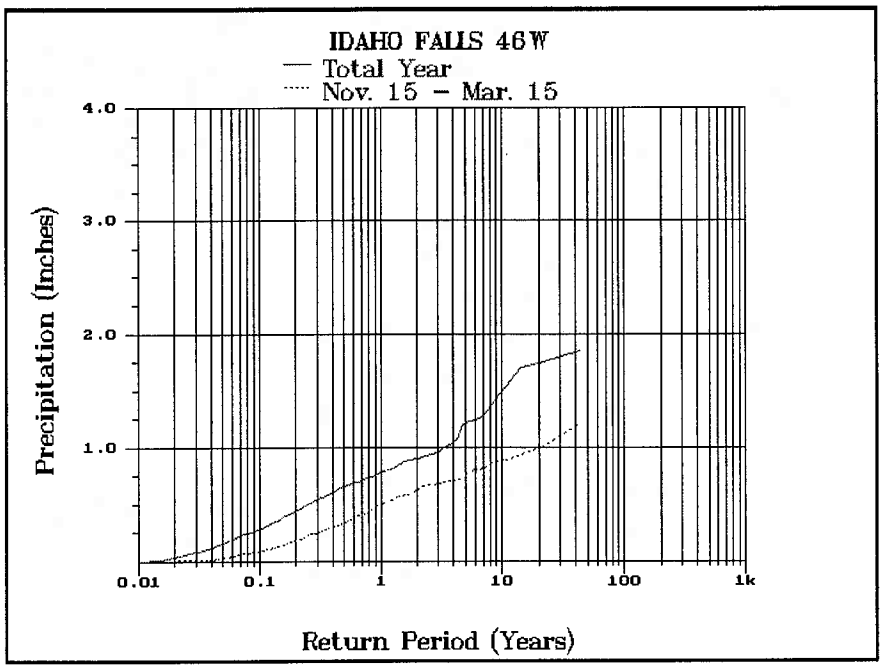

Figure 2. Idaho Falls 46W (CFA) precipitation amount versus return years.

November 15 and March 15. It should be noted that a factor of 1.13 was applied to the data correcting for the 24-hour observational times. This was the correction found necessary (Hershfield 1961) to equate observational day and 1440 minute rainfall.

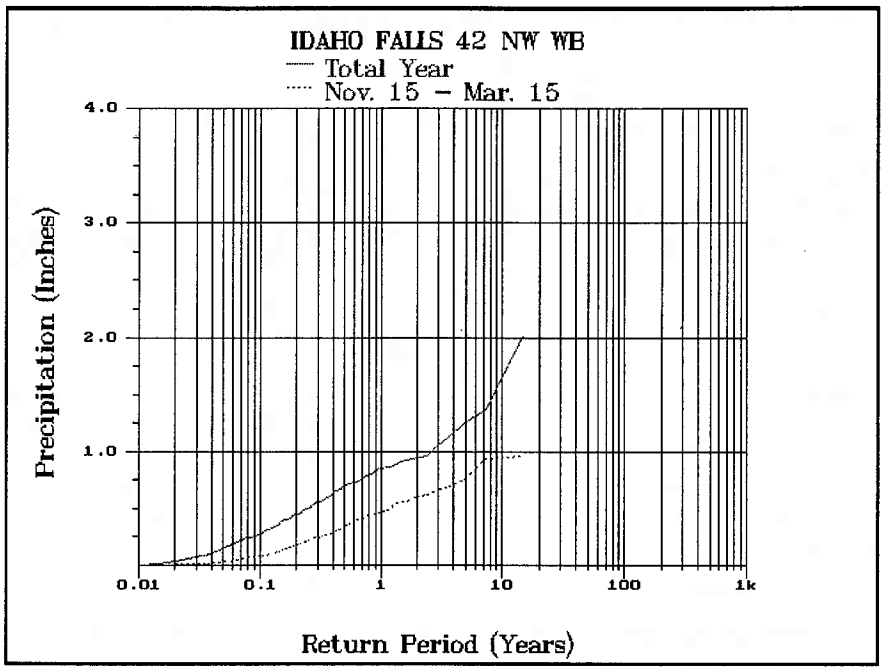

Figure 3. Idaho Falls 42 NW WB (TAN) precipitation amount versus return years.

Precipitation was also measured at Test Area North (TAN) on the INEL. Measurements from that station were reported to the NCDC from March 1954 through June 1969. The station is listed in the NCDC records as Idaho Falls 42 NW WB. Figure 3 contains the precipitation amount versus return year plot computed from the 16 years of data from TAN. The two stations are only about 25 miles apart so one would expect the plots to be similar. Curves from both stations are fairly straight lines for return periods up to several years. For this portion of the plot both stations are quite similar. For longer return periods they began to deviate from one another. The long return periods are generated by extreme precipitation events, and it may take a long history for extreme events to order themselves properly for return year calculations. A 100-year storm may occur, for example, at a station that has only been recording data for a few years. Data from any measuring station is a random sample from an unknown population. If the data histories from the two stations were long enough to represent the true populations, the plots would be suspected to be similar for their entire length.

Return year plots from other measuring sites in the Upper Snake River Plain were also usually straight lines for the first five or ten return years. Return year plots at some stations, such as the National Weather Service station at Pocatello Municipal, were close to a straight line for the entire length of the plot. Figure 4 depicts the plots for the Pocatello station. That station and the ones at CFA and TAN are, or were in the case of TAN, maintained by professional meteorologists. Quality control at those stations should be especially good.

The dotted winter time curves appear quite straight, at all three sites. It appears that a shorter data collection history is required for making return year calculations for winter data than for the total year. This may be because the extreme events that cause the deviations from a straight line are mostly due to convective season thunderstorms. Understanding winter time precipitation is important because three flooding episodes have occurred since the early 1950's when meteorological data began to be recorded at the INEL. Each of these episodes was associated with winter time thaws, where rain was combined with melting snow on a frozen surface. Equation (1) describes a straight line derived from the winter time precipitation at CFA. Using the equation the winter season precipitation amounts may be calculated as a function of return years.

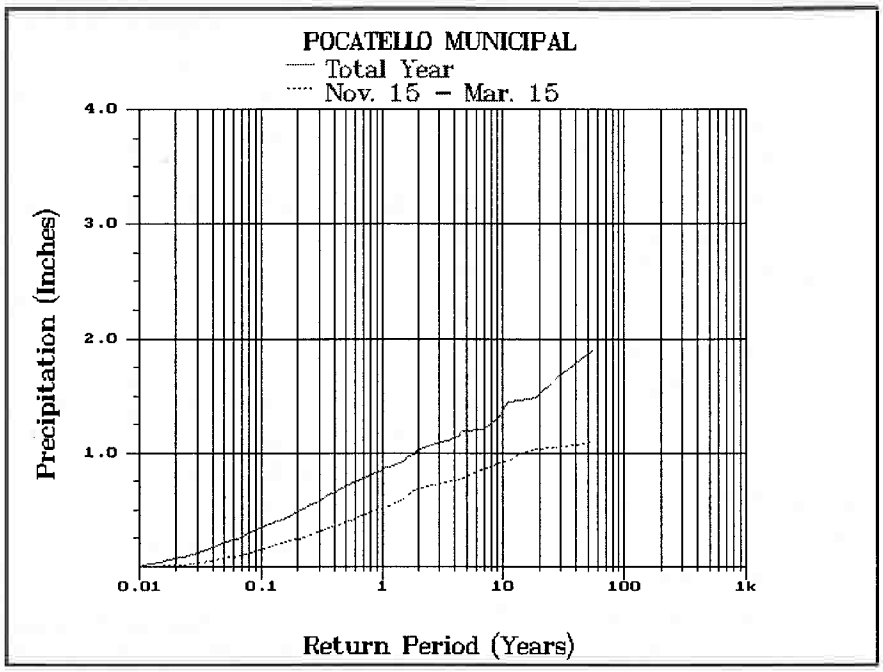

Figure 4. Pocatello Municipal precipitation amount versus return years.

$$Precip = 0.478 + 0.394 \times \log(ReturnYears) \quad \textbf{(1)}$$

The slopes of the winter season curves at CFA and TAN are similar and equation (1) works well for either INEL site. It also fits the Pocatello data quite nicely since the winter time slope there is also similar. This does not mean that it would work well anywhere in the Snake River Plain. Some sites had winter time return year plots with quite different slopes.

Regional Frequency Analysis

One way to obtain a long data history is to do a regional analysis where data from a number of stations is grouped together. By grouping the data it is hoped that the extreme precipitation events will fall into their proper positions in the data string and form a well-behaved line. To combine data records from multiple stations, the assumption is made that the precipitation events are independent. In the winter time most storms are due to synoptic conditions and may cover a wide area. The same storm may affect two or more stations so the assumption of independence

may not be valid. Consequently a convective season extending from April 15 though September 30 was defined. During this season most of the precipitation that results in accumulations of more than 0.5 inches per day comes as scattered showers. These storms cover a small area and do not generally last very long. The distance between stations is great enough that these events are usually independent.

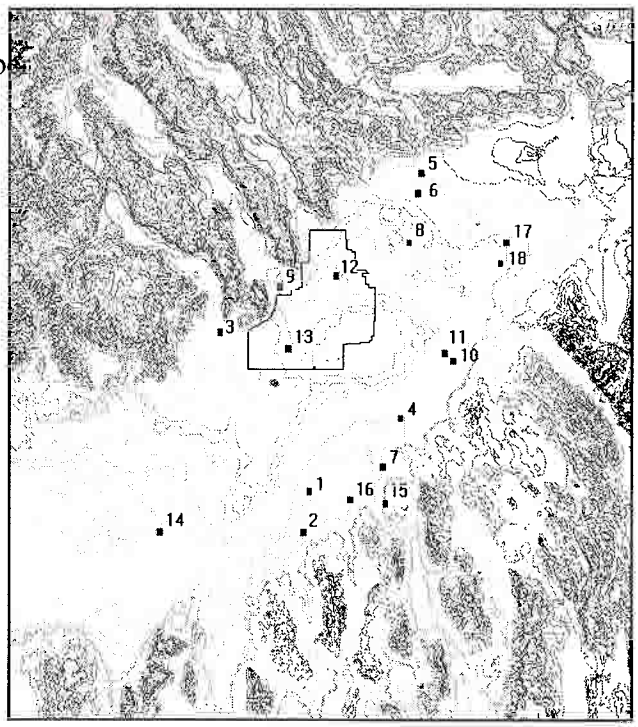

Figure 5. Upper Snake River NCDC daily precipitation stations.

Convective season precipitation events greater than 0.5 inches per day from 18 NCDC reporting stations in the South East Idaho setting were combined to yield a partial duration record of about 765 years. The stations used in this study are all in the Upper Snake River Plain. Station elevations range from 1307 meters above mean sea level at Minidoka in the south, to 1661 meters at the Dubois Experiment Station in the north. The stations are listed in Table 2 and displayed in figure 5. A summary of the daily data for each station describing annual and monthly maximum, minimum, and average precipitation is included in the data appendix.

Table 2. Upper Snake River NCDC stations reporting Daily Precipitation Data.

Nbr	Station Name	Begin Date	End Date	Rec Years	% Cov	Latitude	Longitude	Elevation
1	ABERDEEN EXPRMNT STN	04/01/1914	12/31/1994	81	99	N42:57:00	W112:50:00	1342.6
2	AMERICAN FALLS 1 SW	08/01/1948	08/31/1994	47	99	N42:47:00	W112:52:00	1316.1
3	ARCO 3 SW	08/01/1948	11/30/1994	47	92	N43:36:00	W113:20:00	1624.0
4	BLACKFOOT 4 NNE	08/01/1948	11/28/1994	47	86	N43:15:00	W112:19:00	1374.5
5	DUBOIS EXPERIMENT ST	01/01/1925	12/31/1994	70	100	N44:15:00	W112:12:00	1660.9
6	DUBOIS FAA AIRPORT	08/01/1948	04/17/1962	15	100	N44:10:00	W112:13:00	1564.0
7	FORT HALL 1 NNE	08/01/1948	12/31/1994	47	99	N43:03:00	W112:25:00	1360.9
8	HAMER 4 NW	10/01/1948	12/31/1994	47	99	N43:58:00	W112:16:00	1460.0
9	HOWE	09/01/1948	12/31/1994	47	95	N43:47:00	W113:00:00	1469.1
10	IDAHO FALLS 2 ESE	05/01/1952	12/31/1994	42	91	N43:29:00	W112:01:00	1452.4
11	IDAHO FALLS FANNING	08/01/1948	02/28/1994	47	100	N43:31:00	W112:04:00	1441.4
12	IDAHO FALLS 42 NW WB	03/01/1954	06/30/1969	16	94	N43:50:00	W112:41:00	1461.0
13	IDAHO FALLS 46 W	01/01/1952	12/31/1994	43	100	N43:32:00	W112:57:00	1505.1
14	MINIDOKA 10WNW	10/01/1966	04/30/1988	22	81	N42:47:00	W113:40:00	1307.5
15	POCATELLO 2 NE	05/30/1899	12/31/1994	13	11	N42:54:00	W112:24:00	1472.7
16	POCATELLO MUNICIPAL	01/01/1939	12/31/1994	56	100	N42:55:00	W112:36:00	1357.6
17	SAINT ANTHONY 1 WNW	08/01/1948	12/31/1994	47	97	N43:58:00	W111:43:00	1508.8
18	SUGAR	08/01/1948	05/31/1976	29	98	N43:53:00	W111:45:00	1491.0

Annual averages vary from a low of 8.26 inches at Howe, with a standard deviation of 2.33 inches, to a high of 13.94 inches at Saint Anthony 1 WNW, with a standard deviation of 2.86 inches. Annual average precipitation is generally within a standard deviation at all stations. The highest recorded annual precipitation was 23.09 inches measured in 1963 at Blackfoot 4 NNE and the lowest was 4.37 inches recorded in 1956 at Idaho Falls 42 NW. Averages and standard deviations are related to the first and second moments of a distribution. Two other measures of a distribution are its skewness, a measure of the asymmetry of a distribution, and kurtosis, a measure of the distributions peakedness. Skewness and kurtosis are the third and forth moments respectively, of the distribution. Higher moments are usually less robust than lower moments so values of skewness and kurtosis should be used with caution. Annual kurtosis values are usually less than three at all stations. This suggests that the distribution about the mean be flatter than a Gaussian distribution. The annual skewness numbers are usually small positive numbers showing some skewness toward values higher than the mean. Monthly kurtosis and skewness numbers are variable and likely have limited useful interpretations. The wettest months at all stations are April, May, and June, with May usually contributing the most precipitation, and June contributing the second most amounts.

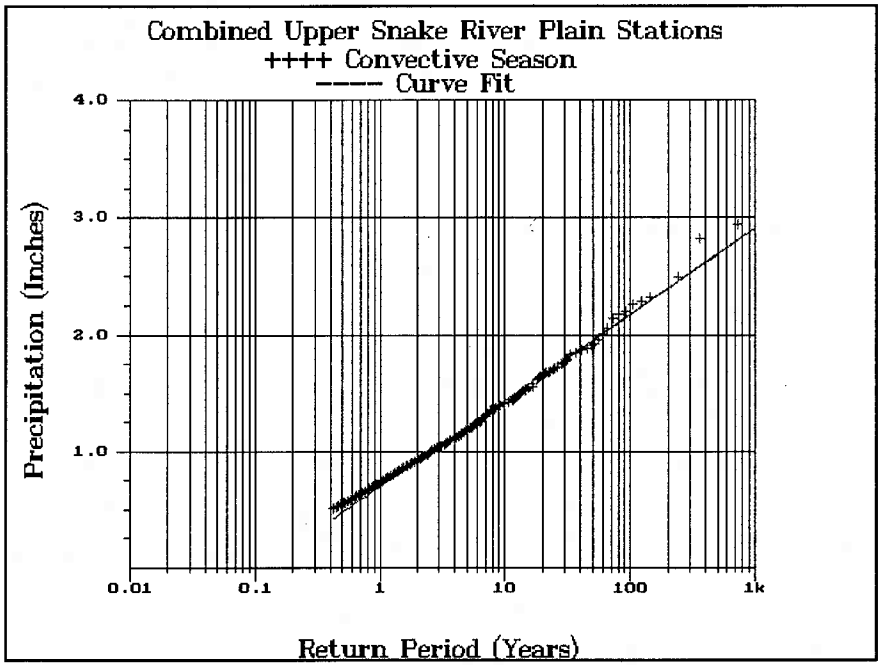

Figure 6. Combined Upper Snake River Plain Stations for daily (24 hour) precipitation.

Figure 6 contains the plot of the convective season precipitation amount versus return years for the combined Upper Valley stations. Equation (2) describes the straight line fitting the data points.

$$Precip = 0.700 + 0.737 \times \log(ReturnYears) \qquad \textbf{(2)}$$

The above equation can be used to calculate precipitation amounts as a function of return years for other than winter season cases.

Comparisons of 24-hour storms with the Rainfall Frequency Atlas

Hershfield (1961) used the long term precipitation records from more than sixteen hundred stations to develop return periods for 24 hour duration storms. He also used short term records from about five thousand stations to define short return period storms. From these results he constructed isopluvial maps for the continental United States for storms with return periods of two and 100 years. He then interpolated isopleth maps for other storm durations and return periods. Figures 7 through 9 are sections displaying the Northwest United States taken from Hershfield's 24-hour rainfall maps for 10, 50, and 100 year return periods. From figure 7 for example, one can estimate for the INEL area, a 10-year 24-hour rainfall of about 1.5 inches. Using equation (2) to calculate a 10-year 24-hour storm returns a result of 1.4 inches. In the same manner estimates of a 50-year 24-hour rainfall from figure 8 would be a little more than 2 inches, and a 100-year 24-hour rainfall from figure 9 is between 2.0 and 2.5 inches. Equation (2) results for the 50-year and 100-year 24-hour storms are 2.0 and 2.2 inches respectively. Equation (2) results are in good agreement with the Hershfield isopluvial maps for 24-hour storms.

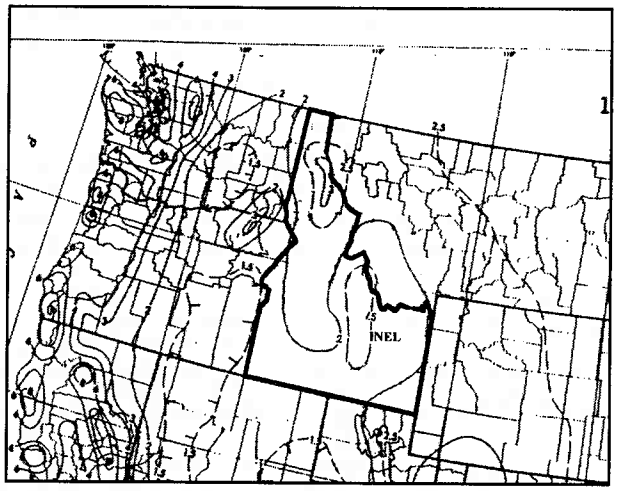

Figure 7. 10-yr 24-hr precipitation (inches).

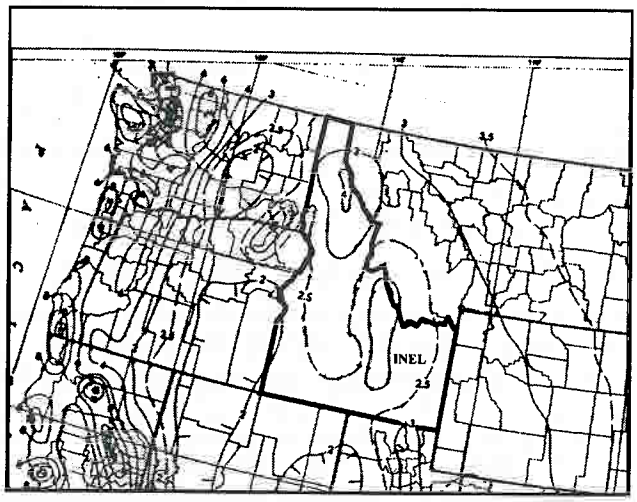

Figure 8. 50 year 24-hr precipitation (inches).

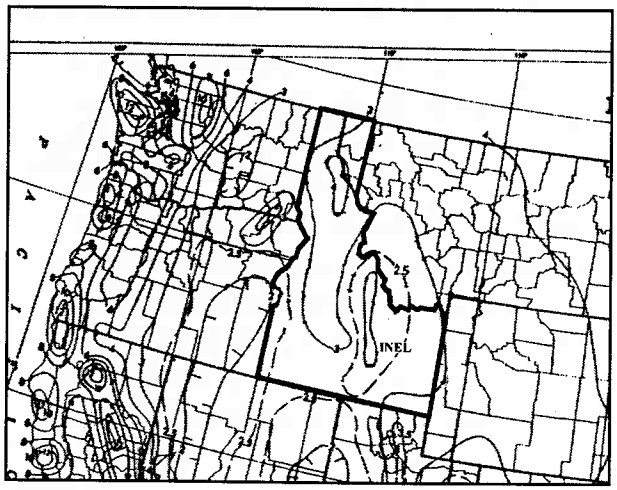

Figure 9. 100-yr 24-hr precipitation (inches).

Storm durations less than 24 hours

Engineers and hydrologists are sometimes required to estimate the potential precipitation that may occur in intervals shorter than one day. Hourly precipitation data permits calculation of precipitation return periods for storms less than 24 hours in duration. Table 3 is a listing of 12 stations existing in the region surrounding the Upper Snake River Plain that report hourly precipitation data to the NCDC.

The station locations are displayed on a topographical map with the INEL site boundaries in figure 10.

Table 3. Upper Snake River NCDC stations reporting Hourly Precipitation Data.

Nbr	Station Name	Begin Date	End Date	Rec Years	% Cov	Latitude	Longitude	Elevation
1	BLACKFOOT DAM	07/01/1948	09/30/1971	24	56	N43:00:00	W111:43:00	1891.0
2	CAREY 3 NNW	10/01/1962	09/30/1968	6	33	N43:21:00	W113:57:00	1476.0
3	CAREY	09/01/1968	11/30/1984	17	95	N43:17:00	W113:56:00	1458.0
4	DUBOIS EXPERIMENT ST	07/01/1948	12/28/1994	40	81	N44:15:00	W112:12:00	1660.9
5	DUBOIS FAA AIRPORT	08/01/1948	04/30/1956	9	99	N44:10:00	W112:13:00	1564.0
6	IDAHO FALLS 2 ESE	05/01/1952	04/30/1960	9	96	N43:29:00	W112:01:00	1452.4
7	IDAHO FALLS 16 SE	04/01/1960	12/29/1994	35	93	N43:21:00	W111:47:00	1783.0
8	IDAHO FALLS FANNING	07/01/1948	05/31/1952	5	96	N43:31:00	W112:04:00	1441.4
9	IDAHO FALLS 42 NW WB	03/01/1954	07/07/1969	15	92	N43:50:00	W112:41:00	1461.0
10	IDAHO FALLS 46 W	03/01/1954	03/31/1982	27	81	N43:32:00	W112:57:00	1505.1
11	MACKAY RANGER STN	07/01/1948	12/28/1994	47	91	N43:55:00	W113:37:00	1797.4
12	POCATELLO MUNICIPAL	07/01/1948	12/28/1994	47	100	N42:55:00	W112:36:00	1357.6

Two of these stations (IDAHO FALLS 46 W and IDAHO FALLS 42 NW WB) are within the boundaries of the INEL. Though the period of record of hourly data collection for the stations is relatively short, it is interesting that at both stations the largest 24-hour storm accumulation occurred in less than three hours. This is not surprising in the desert climate of the Snake River Plain. Storms of heaviest intensity are of the thunderstorm variety and they seldom last more than a few hours.

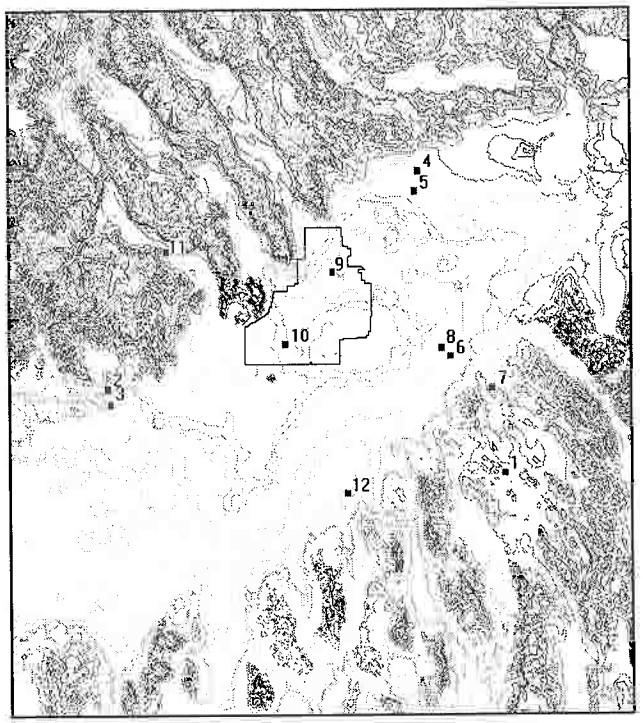

Figure 10. Stations reporting hourly precipitation data to NCDC.

Some stations listed in Table 3 are not in the Snake River Plain. Blackfoot Dam, Idaho Falls 16 SE, and Mackay Ranger Station are mountain stations. The Dubois Experiment Station is in the Snake River Plain, but its precipitation is believed to be enhanced due to the nearness of mountains that face the direction of the prevailing winds. Yet, the ratio of precipitation for any given duration to the daily precipitation is similar at all stations. The similarity is shown in Table 4, where the average and standard deviation of ratios for 1, 3, 6, and 12 hour precipitation accumulations to the daily total are contained. Statistics in Table 4 were computed from the partial duration series

of events greater than 0.5 inches per 24 hours.

Table 4. Average Ratios and Standard Deviations of short intervals to daily total

STATION	1 hr ave	1 hr sigma	3 hr ave	3 hr sigma	6 hr ave	6 hr sigma	12 hr ave	12 hr sigma
BLACKFOOT DAM	0.246	0.114	0.412	0.139	0.559	0.155	0.459	0.137
CAREY 3 NNW	0.228	0.121	0.420	0.108	0.584	0.115	0.779	0.119
CAREY	0.175	0.073	0.349	0.105	0.503	0.113	0.712	0.117
DUBOIS EXPERIMENT ST	0.249	0.152	0.433	0.169	0.584	0.164	0.779	0.145
DUBOIS FAA AIRPORT	0.248	0.127	0.416	0.144	0.548	0.141	0.745	0.134
IDAHO FALLS 2 ESE	0.248	0.151	0.389	0.150	0.538	0.149	0.722	0.131
IDAHO FALLS 16 SE	0.221	0.113	0.407	0.130	0.560	0.143	0.765	0.136
IDAHO FALLS FANNING	0.226	0.124	0.397	0.143	0.529	0.158	0.741	0.143
IDAHO FALLS 42 NW WB	0.269	0.144	0.441	0.173	0.597	0.180	0.785	0.143
IDAHO FALLS 46 W	0.241	0.130	0.423	0.147	0.580	0.152	0.769	0.137
MACKAY RANGER STN	0.233	0.130	0.415	0.146	0.569	0.150	0.771	0.138
POCATELLO MUNICIPAL	0.227	0.117	0.408	0.143	0.557	0.147	0.743	0.129
COMBINED	0.233	0.128	0.413	0.147	0.564	0.152	0.761	0.137

Using the combined statistics from the last row of Table 4, it can be seen 41% (0.413) of the daily precipitation is accumulated in three hours. Of course this is only an average. Assuming the distribution of these ratios is normal, 95% of the time the percent of the daily precipitation that occurs in three hours is within two standard deviations of the average, or between 12% and 71% of the daily total. If we only consider the upper half of the distribution, we can assume 98% of the time not more than 71% of the daily accumulation will occur in three hours.

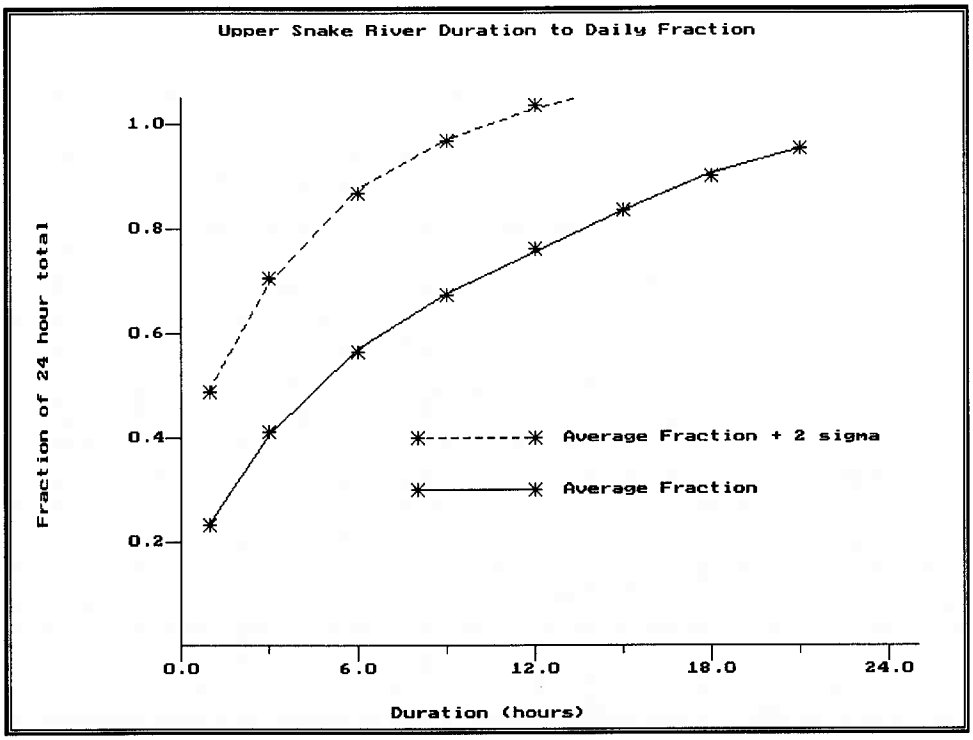

Figure 11. Adjustment factor for durations less than 24 hours.

Figure 11 is a graphical depiction of the last line in table 4. The solid curve is the average fraction of the daily precipitation accumulation as a function of duration period. The dashed line is the average fraction plus two standard deviations. Equation (3) is a 4th order polynomial fitting the dashed curve in figure 11. F is the multiplication factor to apply to 24-hour storm results and D is the desired storm duration in hours.

$$F = 0.358 + 0.149 \times D - 0.014 \times D^2 + 6.857 \times 10^{-4} \times D^3 - 1.309 \times 10^{-5} \times D^4 \qquad \textbf{(3)}$$

Using equation (3) one can compute the factor for adjusting the 24 hour precipitation totals without estimating the factor from the graph.

Comparisons of shorter duration storms with the Rainfall Frequency Atlas

To compare the ratio technique described above for estimating return years for storms of durations less than 24 hours, sections of Hershfield's isopluvial maps for 6-hour storms are presented in figures 12 through 14. These map sections depict storms of 10-year, 50-year, and 100-year return periods for the Northwestern United States.

Equation (3) yields a factor of 0.88 for the 6-hour Upper Snake River Plain storm. Applying this factor to the 10-year 24-hour storm yields a 6-hour storm result of 1.2 inches. The 6-hour storm results for return years of 50 and 100 years are 1.7 inches and 1.9 inches respectively. These values may be compared with results of between 1 and 1.5 inches from figure 12, about 1.5 inches from figure 13, and between 1.5 and 2 inches from figure 14.

The ratio technique results, are also in the range of the results from the Hershfield maps.

Future Considerations

In this paper data from stations scattered across the Upper Snake River Plain were used to do a regional analysis. No attempt has been made to see how precipitation patterns might vary throughout the region. New data sources are becoming available that might make such a work feasible in the future. The INEL meteorological measuring network operated by the Air Resources Laboratory at Idaho Falls (MESONET) has been collecting 5-minute precipitation data at 12 locations in the Upper Snake River Plain for about three years. Two new stations, Kettle Butte and Monteview, were added in late 1995 with

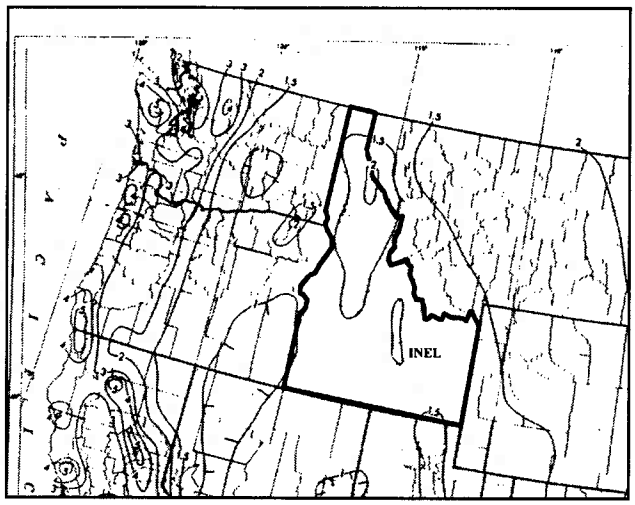

Figure 12. 10-yr 6-hr precipitation (inches).

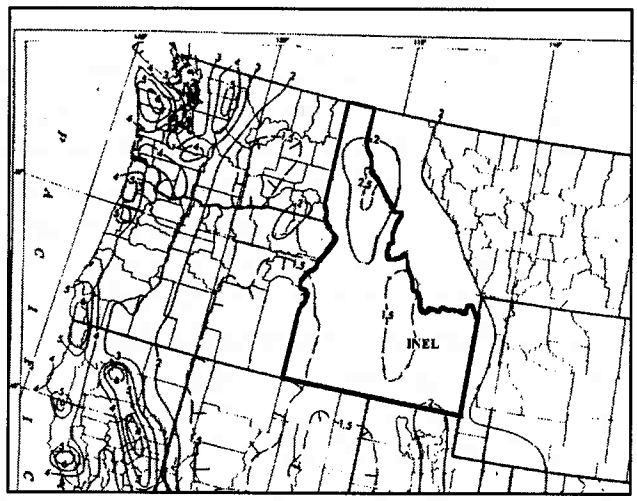

Figure 13. 50-yr 6-hr precipitation (inches).

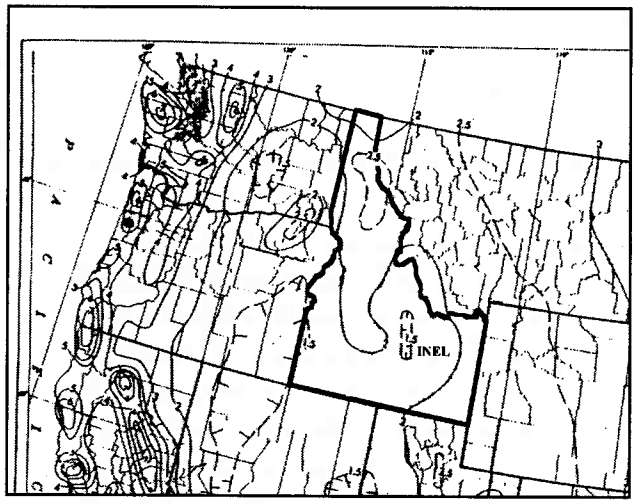

Figure 14. 100-yr 6-hr precipitation (inches).

Table 5. MESONET Stations with 5-minute precipitation data.

Nbr	Station Name	Begin Date	End Date	Rec Years	% Cov	Latitude	Longitude	Elevation
1	CFA 690 (690)	01/01/1993	12/31/1995	3	96	N43:32:11	W112:57:12	1505.7
2	ABERDEEN (ABE)	01/01/1993	12/31/1995	3	94	N43:02:02	W112:48:31	1336.5
3	ARCO (ARC)	01/01/1993	12/31/1995	3	92	N43:37:27	W113:17:52	1636.8
4	DUBOIS (DUB)	01/01/1993	12/31/1995	3	86	N44:14:33	W112:12:06	1671.8
5	EBR II (EBR)	01/01/1993	12/31/1995	3	96	N43:35:39	W112:37:31	1560.6
6	GRID III (GRI)	01/01/1993	12/31/1995	3	96	N43:35:23	W112:56:23	1487.4
7	LOFT (LOF)	01/01/1993	12/31/1995	3	96	N43:51:35	W112:43:50	1490.5
8	SUGAR CITY (SUG)	01/01/1993	12/31/1995	3	96	N43:53:47	W111:44:17	1492.0
9	RICHFIELD (RIC)	01/01/1993	12/31/1995	3	96	N43:03:29	W114:08:05	1327.4
10	ROBERTS (ROB)	01/01/1993	12/31/1995	3	96	N43:44:33	W112:07:32	1496.6
11	RWMC (RWM)	01/01/1993	12/31/1995	3	96	N43:30:04	W113:02:25	1542.3
12	TABOR (TAB)	01/01/1993	12/31/1995	3	96	N43:19:09	W112:41:29	1429.5
13	Kettle Butte (KET)	12/12/1995	12/31/1995	0	New	N43:32:55	W112:19:32	5135.0
14	Monteview (MON)	12/12/1995	12/31/1995	0	New	N44:00:54	W112:32:08	4855.0

Bureau of Reclamation funding. These stations are listed in table 5 and displayed in figure 15. Four more stations are planned to be installed in 1996 with funding from the Department of Energy. They will be at Terreton, Fort Hall, the Lost River rest station, and Idaho Falls. In addition, The National Weather Service has installed a Doppler radar to monitor above the Snake River Plain in the Pocatello and Idaho Falls areas. The radar went into service in February of 1996. These new data sources will make it possible to study storm events in much finer resolution than ever before possible. The radar data, in conjunction with the MESONET precipitation data for example, will allow estimates of total moisture deposited in key areas per storm. Determining preferred storm tracks may be possible.

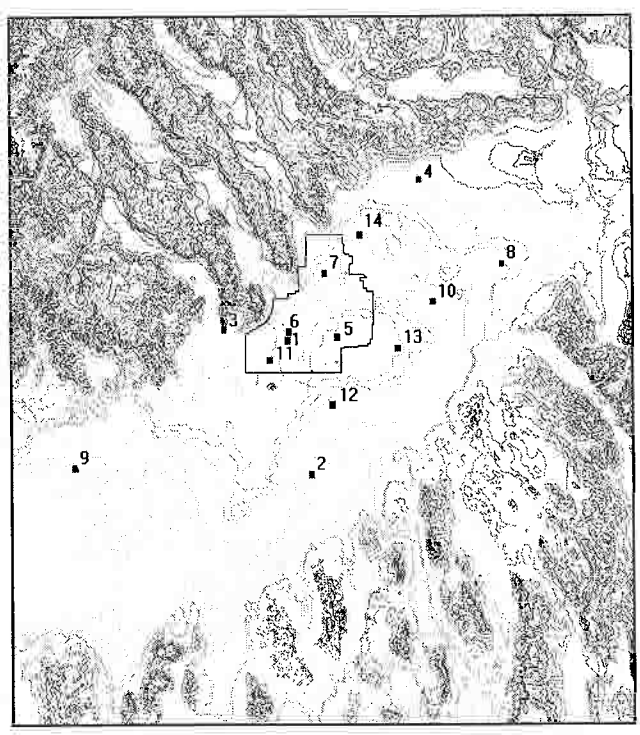

Figure 15. Current INEL meteorological stations measuring precipitation.

Conclusions

Equations and graphs have been developed to calculate return years for storms of varying durations. Systematic differences were found between winter and warm season storms. If winter time situations are the concern, the daily precipitation amount as a function of return years can be computed from equation (1). For storms from periods other than the winter season equation (2) should be used. Return periods of storm durations of less than

24 hours can be computed by applying an empirically determined factor to the daily results obtained from equations (1) or (2). The factor can either be read from the dashed curve in figure 11, or computed with equation (3).

Results of the regional analyses for the convective season were compared with Hershfield's "Rainfall Frequency Analysis" published in 1961. The comparison was very good though different techniques were used and more than 30 years of data has been added since the publication of Hershfield's paper. The comparability gives credence to both methods. Convective season results of this paper are based on data collected in the Upper Snake River Plain and should only be used in that area. Winter time results were based on CFA data and should not be applied beyond the INEL area

Acknowledgments

The author would like to thank David George and Gene Start for fruitful discussions and for materials used in connection with this study.

References

Hershfield, D. M. 1961. Rainfall Frequency Atlas of the United States. U.S. Weather Bureau Technical Paper 40. U.S. Department of Commerce, Washington D.C.

Clawson, K. L., G. E. Start, N. R. Ricks. 1989. Climatography of the Idaho National Engineering Laboratory, 2nd Edition. DOE/ID-12118. U.S. Department of Energy Idaho Operations Office.

APPENDIX
Daily NCDC Data Summaries

The following tables contain monthly and annual statistics for the period of record for each station. The NCDC database and the software used to generate these tables as was provided by EarthInfo, Inc. Of Boulder, Colorado. The following data descriptions were taken from the EarthInfo, Inc. users manual for their Summary of the Day software. A column exists for each of the 12 months of the year and a 13th column for the annual values. Row headings label the computed statistics as follows:

 # Days - total number of days with an observed value.

Avg Day - average daily precipitation for each month, and for the year.

 # Valid - the number of valid months or years used in making the calculations. To be valid a month must have fewer than nine missing days. A year is not valid unless it has 12 valid months. Statistics are calculated using only the valid months or years.

Maximum - maximum monthly or annual precipitation during the period of record.

Max Yr - year in which the maximum occurred.

Minimum - minimum monthly or annual precipitation during the period of record.

Min Yr - year in which the minimum occurred.

Std Dev - standard deviation of the monthly precipitation totals. A minimum of two monthly or annual values is required for this calculation.

Skew - skewness of the monthly or annual precipitation totals. Skewness characterizes asymmetry of a distribution around its mean. A perfectly symmetrical distribution has a skewness of zero. A positive skewness suggests the distribution is biased toward values higher than the mean and a negative skewness indicates the bias is toward values less than the mean. A minimum of three values is needed to make skewness calculations.

Kurt - kurtosis of the monthly or annual precipitation totals. Kurtosis measures the relative peakedness or flatness of a distribution. A value of three describes a normal or Gaussian distribution. A distribution having a kurtosis value less than or greater than three is flatter or more peaked respectively, than a normal distribution. Kurtosis calculations are made only when there at least four valid data points.

SUMMARY

Station ABERDEEN EXPRMNT STN
PO Code ID
Stn ID 10
County BINGHAM
Years 1915-27 29-83 85-94

Parameter Prcp
Latitude N42:57:00
Longitude W112:50:00
Elevation 1342.6

% Coverage 99
Begin M/Yr 04/1914
End M/Yr 12/1994
Record Years 81

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	2467	2228	2448	2390	2477	2398	2477	2509	2428	2510	2427	2503	29262
Avg Day	0.02	0.02	0.02	0.03	0.04	0.03	0.01	0.02	0.02	0.03	0.02	0.02	0.02
# Valid	80	79	79	80	80	80	80	81	81	81	81	81	78
Maximum	2.37	2.64	2.84	2.26	3.19	5.32	2.64	3.63	3.25	3.44	2.82	3.56	14.07
Max Yr	1969	1986	1946	1963	1917	1967	1984	1968	1940	1938	1942	1964	1980
Minimum	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	4.87
Min Yr	1920	1990	1994	1987	1940	1919	1990	1992	1987	1988	1976	1991	1939
Average	0.68	0.64	0.70	0.85	1.10	0.86	0.45	0.50	0.64	0.82	0.74	0.74	8.71
Std Dev	0.48	0.47	0.54	0.58	0.77	0.79	0.51	0.60	0.65	0.69	0.56	0.59	2.39
Skew	1.35	1.42	1.64	0.61	0.81	2.69	1.68	2.50	1.49	1.07	1.11	1.99	0.34
Kurt	4.80	5.78	5.96	2.47	3.08	14.11	6.22	11.40	5.59	4.27	4.25	9.22	2.03

SUMMARY

Station AMERICAN FALLS 1 SW
PO Code ID
Stn ID 227
County POWER
Years 1949-53 55-72 74-93

Parameter Prcp
Latitude N42:47:00
Longitude W112:52:00
Elevation 1316.1

% Coverage 99
Begin M/Yr 08/1948
End M/Yr 08/1994
Record Years 47

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	1419	1298	1426	1350	1426	1350	1426	1457	1380	1395	1379	1426	16732
Avg Day	0.03	0.03	0.03	0.04	0.05	0.03	0.02	0.02	0.02	0.03	0.04	0.03	0.03
# Valid	46	46	46	45	46	45	46	47	46	45	46	46	43
Maximum	3.54	3.58	3.35	3.13	4.17	3.39	3.33	4.05	3.22	2.53	3.29	4.60	21.88
Max Yr	1980	1986	1989	1971	1980	1967	1984	1968	1982	1974	1983	1983	1983
Minimum	0.13	0.07	0.11	0.13	0.13	0.08	0.00	0.03	0.00	0.00	0.00	0.11	4.64
Min Yr	1961	1988	1965	1959	1992	1974	1988	1956	1987	1988	1976	1989	1966
Average	1.00	0.84	1.06	1.13	1.54	0.98	0.56	0.64	0.73	0.86	1.08	0.92	11.40
Std Dev	0.71	0.59	0.72	0.80	1.05	0.76	0.61	0.70	0.74	0.66	0.71	0.86	3.63
Skew	1.47	2.09	1.00	0.72	0.92	1.67	2.24	2.56	1.29	0.87	0.99	2.57	0.80
Kurt	5.13	10.44	3.79	2.45	3.01	5.67	9.96	12.41	4.27	3.10	4.01	10.41	3.27

SUMMARY

Station ARCO 3 SW
PO Code ID
Stn ID 375
County BUTTE
Years 1952 54-72 77-78 82 87-91

Parameter Prcp
Latitude N43:36:00
Longitude W113:20:00
Elevation 1624.0

% Coverage 92
Begin M/Yr 08/1948
End M/Yr 11/1994
Record Years 47

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	1186	1183	1314	1285	1366	1333	1378	1424	1329	1321	1213	1306	15638
Avg Day	0.03	0.03	0.02	0.02	0.04	0.04	0.02	0.02	0.02	0.02	0.03	0.03	0.03
# Valid	38	42	42	43	44	44	45	46	44	43	41	42	28
Maximum	4.79	3.55	2.58	2.40	4.15	4.08	3.39	3.86	2.32	1.84	2.59	4.31	15.33
Max Yr	1969	1986	1982	1975	1957	1963	1985	1968	1961	1956	1983	1964	1968
Minimum	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.31
Min Yr	1991	1991	1993	1992	1950	1994	1994	1992	1994	1988	1989	1960	1956
Average	0.90	0.89	0.73	0.72	1.23	1.25	0.67	0.73	0.65	0.50	0.75	0.96	9.88
Std Dev	0.86	0.81	0.67	0.64	0.89	0.98	0.73	0.85	0.68	0.50	0.59	0.85	2.69
Skew	2.45	1.20	1.01	0.98	1.15	0.92	1.78	1.60	1.02	0.85	0.85	1.67	0.35
Kurt	11.47	4.07	3.13	3.08	4.33	3.14	6.28	5.28	2.82	2.78	3.50	6.95	1.83

SUMMARY

Station BLACKFOOT 4 NNE
PO Code ID
Stn ID 915
County BINGHAM
Years 1949-56 62-63 67-74 84 86 93

Parameter Prcp
Latitude N43:15:00
Longitude W112:19:00
Elevation 1374.5

% Coverage 86
Begin M/Yr 08/1948
End M/Yr 11/1994
Record Years 47

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	1243	1110	1199	1227	1292	1224	1270	1333	1178	1266	1113	1179	14634
Avg Day	0.03	0.03	0.03	0.03	0.04	0.04	0.01	0.02	0.02	0.02	0.03	0.03	0.03
# Valid	41	39	39	41	42	41	41	43	39	41	38	39	21
Maximum	3.01	2.73	1.77	4.10	3.92	5.14	2.51	2.98	2.33	2.65	2.16	2.45	23.09
Max Yr	1969	1963	1968	1963	1981	1963	1973	1968	1948	1961	1983	1971	1963
Minimum	0.00	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.78
Min Yr	1993	1991	1988	1985	1989	1994	1994	1992	1993	1988	1993	1993	1956
Average	0.88	0.81	0.84	0.91	1.17	1.06	0.46	0.48	0.59	0.73	0.90	0.91	11.08
Std Dev	0.70	0.65	0.52	0.82	0.97	1.08	0.53	0.57	0.63	0.65	0.63	0.69	4.11
Skew	1.05	0.97	0.09	1.64	0.82	1.43	1.71	2.21	1.15	1.00	0.36	0.44	1.23
Kurt	3.68	3.16	1.77	6.52	2.85	5.75	6.41	9.74	3.53	3.57	1.99	1.98	4.18

SUMMARY

Station DUBOIS EXPERIMENT ST
PO Code ID
Stn ID 2707
County CLARK
Years 1925-94

Parameter Prcp
Latitude N44:15:00
Longitude W112:12:00
Elevation 1660.9

% Coverage 100
Begin M/Yr 01/1925
End M/Yr 12/1994
Record Years 70

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	2168	1971	2170	2099	2156	2100	2170	2164	2100	2161	2100	2166	25525
Avg Day	0.02	0.03	0.02	0.03	0.05	0.06	0.03	0.03	0.03	0.03	0.03	0.03	0.03
# Valid	70	70	70	70	70	70	70	70	70	70	70	70	70
Maximum	2.74	2.71	2.61	3.23	4.88	8.26	3.67	3.53	3.91	3.67	3.09	2.50	20.58
Max Yr	1969	1959	1938	1978	1957	1944	1977	1945	1940	1938	1983	1931	1983
Minimum	0.09	0.03	0.00	0.02	0.16	0.03	0.00	0.02	0.00	0.00	0.00	0.00	5.62
Min Yr	1992	1965	1965	1987	1992	1974	1934	1942	1987	1988	1976	1976	1926
Average	0.75	0.73	0.74	0.92	1.55	1.75	0.87	0.95	0.90	0.84	0.91	0.88	11.81
Std Dev	0.48	0.51	0.56	0.69	1.08	1.20	0.75	0.83	0.79	0.71	0.69	0.54	2.91
Skew	1.37	1.14	1.13	0.95	1.08	2.28	1.72	1.17	1.15	1.11	1.00	0.65	0.50
Kurt	5.84	4.83	4.14	3.45	3.52	13.38	5.74	3.75	4.42	4.87	3.55	3.04	2.90

SUMMARY

Station DUBOIS FAA AIRPORT
PO Code ID
Stn ID 2717
County
Years 1949-60

Parameter Prcp
Latitude N44:10:00
Longitude W112:13:00
Elevation 1564.0

% Coverage 100
Begin M/Yr 08/1948
End M/Yr 04/1962
Record Years 15

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	424	395	434	407	403	390	403	434	420	434	420	434	4998
Avg Day	0.02	0.03	0.02	0.02	0.05	0.05	0.02	0.02	0.02	0.02	0.01	0.02	0.03
# Valid	13	14	14	13	13	13	13	14	14	14	14	14	12
Maximum	1.64	1.91	1.22	1.06	3.78	2.36	1.10	2.39	2.73	1.71	0.88	1.46	11.71
Max Yr	1952	1962	1958	1954	1957	1954	1952	1951	1961	1956	1952	1955	1952
Minimum	0.40	0.30	0.07	0.05	0.68	0.50	0.01	0.06	0.00	0.00	0.03	0.11	6.28
Min Yr	1953	1956	1956	1959	1950	1961	1960	1956	1951	1958	1959	1956	1956
Average	0.76	0.87	0.58	0.54	1.57	1.46	0.55	0.66	0.73	0.62	0.41	0.75	9.33
Std Dev	0.38	0.54	0.43	0.29	0.93	0.60	0.35	0.63	0.77	0.56	0.26	0.38	1.56
Skew	1.22	0.79	0.26	0.04	0.98	-0.17	0.12	1.55	1.23	0.49	0.31	0.31	-0.39
Kurt	3.16	2.08	1.38	1.89	2.87	1.50	1.65	4.60	3.65	1.88	1.87	2.01	2.28

SUMMARY

Station FORT HALL 1 NNE
PO Code ID
Stn ID 3297
County BINGHAM
Years 1949-72 75 77-94

Parameter Prcp
Latitude N43:03:00
Longitude W112:25:00
Elevation 1360.9

% Coverage 99
Begin M/Yr 08/1948
End M/Yr 12/1994
Record Years 47

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	1412	1281	1407	1359	1395	1378	1418	1423	1380	1451	1403	1435	16742
Avg Day	0.03	0.03	0.03	0.03	0.05	0.04	0.02	0.03	0.02	0.03	0.03	0.03	0.03
# Valid	46	46	46	46	45	46	46	46	46	47	47	47	43
Maximum	2.84	1.97	2.80	2.56	4.95	3.09	2.68	4.04	2.75	2.98	2.53	2.37	17.45
Max Yr	1956	1986	1983	1963	1957	1984	1984	1968	1961	1971	1988	1964	1980
Minimum	0.08	0.04	0.03	0.00	0.10	0.11	0.00	0.00	0.00	0.00	0.00	0.03	6.89
Min Yr	1961	1977	1994	1969	1958	1956	1990	1992	1987	1988	1976	1962	1966
Average	0.87	0.82	0.95	0.99	1.50	1.17	0.59	0.78	0.74	0.93	0.97	0.88	11.23
Std Dev	0.55	0.49	0.66	0.69	1.18	0.92	0.66	0.84	0.72	0.78	0.57	0.57	2.98
Skew	1.56	0.25	0.85	0.54	1.28	0.91	1.35	1.70	1.00	0.77	0.31	0.68	0.53
Kurt	5.76	2.13	3.17	2.20	4.19	2.48	4.32	6.30	3.03	2.79	2.62	2.88	2.16

SUMMARY

Station HAMER 4 NW
PO Code ID
Stn ID 3964
County JEFFERSON
Years 1949-72 74 76-77 79-91 93-94

Parameter Prcp
Latitude N43:58:00
Longitude W112:16:00
Elevation 1460.0

% Coverage 99
Begin M/Yr 10/1948
End M/Yr 12/1994
Record Years 47

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	1415	1286	1414	1374	1422	1371	1419	1354	1362	1399	1396	1444	16656
Avg Day	0.02	0.02	0.02	0.02	0.04	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02
# Valid	46	46	46	46	46	46	46	44	46	45	46	47	42
Maximum	1.93	1.71	2.23	2.29	4.21	2.72	2.98	4.22	2.24	2.20	1.69	1.57	14.53
Max Yr	1973	1962	1963	1978	1980	1984	1984	1951	1963	1994	1983	1970	1983
Minimum	0.01	0.00	0.00	0.00	0.13	0.25	0.00	0.00	0.00	0.00	0.00	0.00	4.66
Min Yr	1992	1970	1965	1952	1992	1981	1974	1967	1987	1988	1976	1976	1953
Average	0.57	0.48	0.60	0.71	1.30	1.20	0.74	0.76	0.58	0.62	0.67	0.62	8.77
Std Dev	0.42	0.42	0.49	0.58	0.87	0.65	0.67	0.75	0.55	0.59	0.47	0.39	2.41
Skew	1.19	1.12	1.10	0.99	1.16	0.26	1.21	2.48	1.31	0.90	0.48	0.50	0.46
Kurt	4.21	3.77	4.20	3.16	4.23	2.16	4.10	11.38	4.53	2.94	2.13	2.58	2.40

SUMMARY

Station	HOWE	Parameter	Prcp	% Coverage	95
PO Code	ID	Latitude	N43:47:00	Begin M/Yr	09/1948
Stn ID	4384	Longitude	W113:00:00	End M/Yr	12/1994
County	BUTTE	Elevation	1469.1	# Record Years	47
Years	1950-73 76-79 81-82 86-94				

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	1351	1228	1356	1311	1352	1293	1324	1366	1341	1403	1365	1351	16041
Avg Day	0.02	0.02	0.02	0.02	0.03	0.04	0.02	0.03	0.02	0.02	0.02	0.02	0.02
# Valid	44	44	44	44	44	43	43	44	45	45	46	43	39
Maximum	3.28	2.27	1.86	3.01	3.24	3.42	3.55	3.67	2.66	1.40	2.32	2.77	12.13
Max Yr	1969	1986	1982	1978	1980	1993	1984	1983	1980	1991	1983	1964	1968
Minimum	0.00	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	4.47
Min Yr	1991	1991	1956	1987	1969	1986	1988	1985	1993	1988	1986	1986	1956
Average	0.60	0.57	0.51	0.63	1.07	1.27	0.64	0.85	0.58	0.50	0.62	0.72	8.26
Std Dev	0.58	0.54	0.43	0.68	0.74	0.93	0.68	0.98	0.65	0.45	0.52	0.69	2.33
Skew	2.35	1.45	1.02	1.51	0.84	0.67	2.04	1.54	1.73	0.56	1.02	1.28	0.08
Kurt	11.06	4.84	3.53	4.95	3.17	2.48	8.52	4.20	5.62	1.90	3.69	3.99	1.72

SUMMARY

Station	IDAHO FALLS 2 ESE	Parameter	Prcp	% Coverage	91
PO Code	ID	Latitude	N43:29:00	Begin M/Yr	05/1952
Stn ID	4455	Longitude	W112:01:00	End M/Yr	12/1994
County	BONNEVILLE	Elevation	1452.4	# Record Years	43
Years	1953-55 59-63 66 70-72 79 82-83 86-90 92-94				

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	983	906	1107	1102	1279	1230	1240	1332	1260	1267	1251	1147	14104
Avg Day	0.03	0.03	0.03	0.03	0.05	0.04	0.02	0.02	0.03	0.03	0.03	0.03	0.03
# Valid	32	32	36	35	41	41	40	43	42	41	42	37	23
Maximum	2.38	3.13	2.27	2.82	4.56	3.09	2.13	2.66	2.76	2.49	3.20	3.18	19.63
Max Yr	1986	1986	1989	1978	1993	1984	1983	1972	1961	1974	1988	1983	1983
Minimum	0.00	0.00	0.00	0.05	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.60
Min Yr	1963	1991	1969	1959	1961	1961	1988	1966	1987	1988	1976	1989	1966
Average	0.89	0.91	0.91	1.04	1.51	1.27	0.54	0.76	0.78	0.93	0.98	0.96	11.66
Std Dev	0.62	0.76	0.62	0.76	1.06	0.82	0.55	0.71	0.69	0.68	0.67	0.71	4.00
Skew	0.66	0.83	0.04	0.77	1.15	0.51	0.98	0.88	0.80	0.53	1.27	0.92	0.43
Kurt	2.63	3.22	1.97	2.66	4.10	2.20	2.97	3.03	2.98	2.44	4.78	3.74	2.29

SUMMARY

Station IDAHO FALLS FANNING
PO Code ID
Stn ID 4457
County BONNEVILLE
Years 1949-93

Parameter Prcp
Latitude N43:31:00
Longitude W112:04:00
Elevation 1441.4

% Coverage 100
Begin M/Yr 08/1948
End M/Yr 02/1994
Record Years 47

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	1424	1296	1395	1349	1395	1350	1395	1425	1380	1426	1379	1424	16638
Avg Day	0.02	0.03	0.02	0.03	0.04	0.04	0.02	0.02	0.02	0.02	0.03	0.03	0.03
# Valid	46	46	45	45	45	45	45	46	46	46	46	46	45
Maximum	2.73	2.37	1.76	2.52	4.33	3.09	1.89	2.59	2.70	2.77	2.46	2.03	15.83
Max Yr	1949	1986	1991	1975	1981	1968	1987	1968	1961	1974	1988	1983	1980
Minimum	0.03	0.07	0.00	0.01	0.10	0.07	0.00	0.00	0.00	0.00	0.00	0.04	5.53
Min Yr	1961	1970	1965	1959	1969	1956	1988	1964	1987	1988	1976	1976	1959
Average	0.77	0.75	0.76	0.86	1.38	1.23	0.56	0.70	0.73	0.74	0.84	0.81	10.15
Std Dev	0.53	0.55	0.46	0.68	0.94	0.78	0.49	0.59	0.67	0.60	0.59	0.49	2.71
Skew	1.76	1.09	0.24	1.03	1.23	0.60	1.07	1.26	0.89	1.00	0.91	0.55	0.20
Kurt	6.89	4.01	2.15	2.99	4.15	2.43	3.39	4.66	2.99	4.16	2.96	2.92	2.01

SUMMARY

Station IDAHO FALLS 42 NW WB
PO Code ID
Stn ID 4459
County BUTTE
Years 1955-56 58-66 68

Parameter Prcp
Latitude N43:50:00
Longitude W112:41:00
Elevation 1461.0

% Coverage 94
Begin M/Yr 03/1954
End M/Yr 06/1969
Record Years 16

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	434	396	465	450	465	450	434	434	410	434	450	465	5287
Avg Day	0.02	0.02	0.01	0.02	0.04	0.04	0.01	0.02	0.02	0.01	0.02	0.02	0.02
# Valid	14	14	15	15	15	15	14	14	13	14	15	15	12
Maximum	2.92	1.83	1.07	1.85	5.04	3.35	1.23	2.64	2.51	1.14	1.43	2.43	15.60
Max Yr	1969	1962	1962	1963	1963	1964	1962	1968	1961	1964	1964	1964	1963
Minimum	0.00	0.07	0.00	0.01	0.27	0.09	0.00	0.06	0.06	0.00	0.00	0.07	4.37
Min Yr	1961	1965	1956	1959	1960	1956	1959	1956	1964	1965	1959	1960	1956
Average	0.72	0.56	0.36	0.65	1.38	1.34	0.37	0.67	0.77	0.35	0.56	0.77	8.39
Std Dev	0.69	0.57	0.33	0.62	1.27	0.88	0.33	0.65	0.68	0.39	0.44	0.67	3.21
Skew	2.18	1.37	0.93	0.73	1.60	0.75	1.11	1.78	1.10	0.90	0.46	1.07	0.78
Kurt	7.45	3.49	2.81	2.16	4.87	2.78	3.81	5.99	3.56	2.23	1.78	3.13	2.69

SUMMARY

Station	IDAHO FALLS 46 W	Parameter	Prcp	% Coverage	100
PO Code	ID	Latitude	N43:32:00	Begin M/Yr	01/1952
Stn ID	4460	Longitude	W112:57:00	End M/Yr	12/1994
County	BUTTE	Elevation	1505.1	# Record Years	43
Years	1952-94				

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	1332	1215	1331	1290	1332	1290	1328	1330	1290	1332	1287	1333	15690
Avg Day	0.02	0.02	0.02	0.02	0.04	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02
# Valid	43	43	43	43	43	43	43	43	43	43	43	43	43
Maximum	2.56	2.40	1.44	2.50	4.42	3.89	2.29	3.27	3.52	1.67	1.74	3.43	14.40
Max Yr	1969	1962	1974	1963	1957	1968	1985	1968	1961	1983	1988	1964	1963
Minimum	0.00	0.00	0.00	0.00	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	4.50
Min Yr	1961	1991	1994	1977	1969	1994	1963	1969	1987	1977	1976	1991	1966
Average	0.67	0.63	0.58	0.75	1.23	1.22	0.51	0.51	0.68	0.51	0.67	0.72	8.69
Std Dev	0.46	0.54	0.38	0.63	0.75	0.90	0.59	0.57	0.73	0.43	0.46	0.66	2.32
Skew	1.53	1.47	0.42	0.79	1.77	0.93	1.76	2.71	1.61	0.87	0.56	1.84	0.36
Kurt	7.34	5.63	2.21	2.72	8.37	3.25	5.29	13.18	6.33	3.00	2.31	7.51	2.44

SUMMARY

Station	MINIDOKA 10WNW	Parameter	Prcp	% Coverage	81
PO Code	ID	Latitude	N42:47:00	Begin M/Yr	10/1966
Stn ID	5972	Longitude	W113:40:00	End M/Yr	04/1988
County	MINIDOKA	Elevation	1307.5	# Record Years	22
Years	1967 72-81 85-86				

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	559	533	574	534	536	514	539	526	492	558	506	533	6404
Avg Day	0.03	0.03	0.03	0.03	0.03	0.03	0.01	0.01	0.02	0.02	0.03	0.03	0.03
# Valid	18	19	19	18	18	17	17	17	16	18	17	16	13
Maximum	3.14	3.24	1.93	2.19	2.59	2.41	2.55	0.86	1.93	1.82	2.07	2.63	13.07
Max Yr	1980	1986	1974	1971	1980	1967	1985	1976	1978	1975	1973	1981	1980
Minimum	0.23	0.10	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.02	0.00	0.00	6.35
Min Yr	1986	1988	1969	1969	1969	1974	1986	1969	1974	1978	1986	1986	1979
Average	1.04	0.84	0.89	0.86	1.03	0.90	0.42	0.29	0.68	0.69	0.93	0.80	9.48
Std Dev	0.81	0.71	0.53	0.66	0.77	0.64	0.64	0.28	0.48	0.45	0.68	0.77	1.72
Skew	1.40	1.87	0.40	0.56	0.71	1.19	2.21	0.55	0.72	0.61	0.17	0.87	0.13
Kurt	4.06	7.22	2.39	2.10	2.37	3.49	7.61	1.69	3.49	3.02	1.62	2.74	2.57

SUMMARY

Station POCATELLO 2 NE
PO Code ID
Stn ID 7208
County BANNOCK
Years 1957-63 92-94

Parameter Prcp
Latitude N42:54:00
Longitude W112:24:00
Elevation 1472.7

% Coverage 11
Begin M/Yr 05/1899
End M/Yr 12/1994
Record Years 13

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	340	311	341	330	342	323	341	341	330	341	330	341	4011
Avg Day	0.02	0.04	0.03	0.04	0.06	0.04	0.02	0.02	0.03	0.03	0.03	0.03	0.03
# Valid	11	11	11	11	11	11	11	11	11	11	11	11	10
Maximum	1.36	1.57	2.16	2.84	4.35	2.94	1.16	1.90	2.72	2.61	2.11	1.59	17.22
Max Yr	1993	1958	1957	1957	1957	1963	1962	1993	1961	1956	1958	1992	1957
Minimum	0.12	0.61	0.13	0.26	0.21	0.09	0.00	0.01	0.06	0.00	0.07	0.43	7.86
Min Yr	1961	1956	1994	1959	1992	1956	1959	1958	1957	1958	1959	1960	1960
Average	0.73	1.17	0.88	1.19	1.78	1.06	0.55	0.70	0.85	0.93	0.95	0.82	11.99
Std Dev	0.40	0.31	0.58	0.90	1.23	0.87	0.43	0.55	0.84	0.76	0.61	0.37	3.36
Skew	0.00	-0.33	0.71	0.65	0.52	0.85	0.17	0.68	0.94	0.78	0.18	0.89	0.26
Kurt	1.80	1.87	2.73	1.70	2.34	2.43	1.30	2.54	2.55	2.61	1.95	2.26	1.34

SUMMARY

Station POCATELLO MUNICIPAL
PO Code ID
Stn ID 7211
County POWER
Years 1939-94

Parameter Prcp
Latitude N42:55:00
Longitude W112:36:00
Elevation 1357.6

% Coverage 100
Begin M/Yr 01/1939
End M/Yr 12/1994
Record Years 56

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	1734	1582	1736	1680	1736	1680	1734	1736	1680	1736	1680	1735	20449
Avg Day	0.03	0.03	0.04	0.04	0.04	0.04	0.02	0.02	0.03	0.03	0.04	0.03	0.03
# Valid	56	56	56	56	56	56	56	56	56	56	56	56	56
Maximum	3.24	2.63	2.95	3.30	3.29	3.39	2.28	3.98	3.80	2.56	2.84	3.39	20.33
Max Yr	1980	1986	1983	1963	1980	1944	1984	1968	1940	1956	1983	1983	1983
Minimum	0.20	0.12	0.10	0.06	0.05	0.02	0.00	0.00	0.00	0.00	0.01	0.07	5.34
Min Yr	1945	1970	1965	1977	1940	1974	1988	1958	1987	1988	1976	1989	1966
Average	1.06	0.92	1.13	1.12	1.31	1.06	0.52	0.63	0.76	0.89	1.10	1.03	11.55
Std Dev	0.68	0.52	0.66	0.73	0.80	0.79	0.53	0.67	0.81	0.67	0.64	0.65	3.12
Skew	1.31	0.83	0.81	0.87	0.66	1.20	1.37	2.50	1.71	0.80	0.58	1.35	0.61
Kurt	4.31	3.91	3.41	3.20	2.81	4.14	4.36	11.92	6.25	2.82	2.86	5.33	2.90

SUMMARY

Station SAINT ANTHONY 1 WNW
PO Code ID
Stn ID 8022
County FREMONT
Years 1949-67 69-74 76 81 83-94

Parameter Prcp
Latitude N43:58:00
Longitude W111:43:00
Elevation 1508.8

% Coverage 97
Begin M/Yr 08/1948
End M/Yr 12/1994
Record Years 47

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	1356	1204	1324	1348	1417	1318	1420	1423	1395	1451	1396	1424	16476
Avg Day	0.04	0.04	0.03	0.04	0.05	0.05	0.03	0.03	0.03	0.03	0.04	0.05	0.04
# Valid	44	43	43	45	46	44	46	46	46	47	47	46	39
Maximum	2.98	2.90	2.62	3.49	4.66	3.78	3.11	4.69	2.72	3.92	3.52	3.23	19.72
Max Yr	1956	1952	1954	1965	1980	1969	1984	1968	1961	1994	1988	1955	1964
Minimum	0.17	0.06	0.05	0.00	0.11	0.21	0.00	0.08	0.00	0.00	0.00	0.00	8.19
Min Yr	1992	1982	1965	1979	1977	1988	1988	1953	1993	1978	1977	1986	1976
Average	1.29	1.03	1.05	1.14	1.64	1.55	0.79	0.79	0.91	0.98	1.28	1.41	13.94
Std Dev	0.65	0.71	0.66	0.78	1.17	0.93	0.73	0.91	0.72	0.88	0.78	0.76	2.86
Skew	0.66	0.61	0.50	0.73	1.02	0.58	1.21	3.34	0.52	0.97	0.49	-0.06	-0.06
Kurt	2.78	2.45	2.53	3.27	3.18	2.49	4.10	14.70	2.18	3.74	2.96	2.33	2.08

SUMMARY

Station SUGAR
PO Code ID
Stn ID 8818
County MADISON
Years 1949 51-53 55 57-75

Parameter Prcp
Latitude N43:53:00
Longitude W111:45:00
Elevation 1491.0

% Coverage 98
Begin M/Yr 08/1948
End M/Yr 05/1976
Record Years 29

Prcp (in)

	Jan's	Feb's	Mar's	Apr's	May's	Jun's	Jul's	Aug's	Sep's	Oct's	Nov's	Dec's	Year's
# Days	834	763	834	808	868	810	837	868	840	861	840	836	9999
Avg Day	0.03	0.04	0.03	0.04	0.05	0.06	0.02	0.03	0.03	0.03	0.04	0.04	0.04
# Valid	27	27	27	27	28	27	27	28	28	28	28	27	24
Maximum	2.06	3.18	1.39	3.38	3.70	3.61	1.51	3.79	2.51	2.16	3.02	3.34	17.83
Max Yr	1976	1949	1958	1965	1957	1959	1962	1968	1961	1975	1956	1948	1968
Minimum	0.01	0.07	0.00	0.10	0.57	0.31	0.00	0.00	0.00	0.00	0.17	0.09	7.43
Min Yr	1954	1972	1965	1959	1974	1974	1974	1952	1975	1952	1954	1962	1953
Average	0.98	1.00	0.82	1.07	1.53	1.78	0.68	0.83	0.89	1.00	1.09	1.29	12.95
Std Dev	0.61	0.74	0.37	0.79	0.85	1.04	0.54	0.93	0.77	0.73	0.65	0.64	2.80
Skew	0.16	1.01	-0.42	1.01	0.93	0.33	0.09	2.15	0.52	0.20	0.86	0.95	-0.16
Kurt	1.91	3.98	2.25	3.63	3.05	1.69	1.28	7.07	1.97	1.51	3.79	5.03	2.30

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