

Improving the Reporting of Liquid Precipitation in the TMY3 Weather Files

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Summary

The TMY3s are the first set of TMY files to contain Liquid Precipitation (rainfall). In the original TMY3 files, rainfall was taken directly from weather station reports with two numbers, one for the amount and the other for the period of time in hours over which the rainfall was recorded. The difficulties moving this reporting to hourly weather files are: (1) the rainfall needs to be apportioned to hourly values, and (2) there can be multiple or overlapping records that were ignored. Furthermore, by changing the precipitation units from 0.1mm to 1mm, the TMY3s contained significant round-off errors. In this revision, WBT went back to the raw weather reports from the National Climatic Data Center (NCDC) and applied a procedure developed for ASHRAE RP-1477 that checks for multiple records as well as disaggregate the rainfall to hourly values. To winnow out spurious reports, filters were added to limit the maximum amount of rainfall per hour, and to omit it if the dewpoint temperature dropped below freezing. Overall, the revised rainfall correlated much better to historical averages, although there probably remains significant undercounting in a number of locations. For example, 23 locations out of the 1,020 (2.3%) reported no rainfall throughout the year

Reporting of Liquid Precipitation in the Raw Data

The Liquid Precipitation data in the TMY3s are taken from the weather station reports that are archived in the Integrated Surface Hourly database (ISD) maintained by the US National Climatic Data Center (Lott and Baldwin 2001). Unfortunately, the standard method by which rainfall is recorded provides difficulties for transposition to hourly values as desired in processed weather files such as the TMY3. The ISD contains two fields for liquid precipitation, one indicating the depth in mm and the other the period of time in hours over which that liquid precipitation was measured. For example, a recording may have twinned values of 20 and 12, indicating there were 20 mm (0.79 in.) of rainfall over the past 12 hours. There can be also multiple recordings for different lengths of time, such as 20 mm over the past 12 hours concurrently with 30 mm over the past 24 hours, as well as for overlapping time periods, such as 20 mm from hours 1 to 12 and 20 mm from hours 6 to 18, etc.

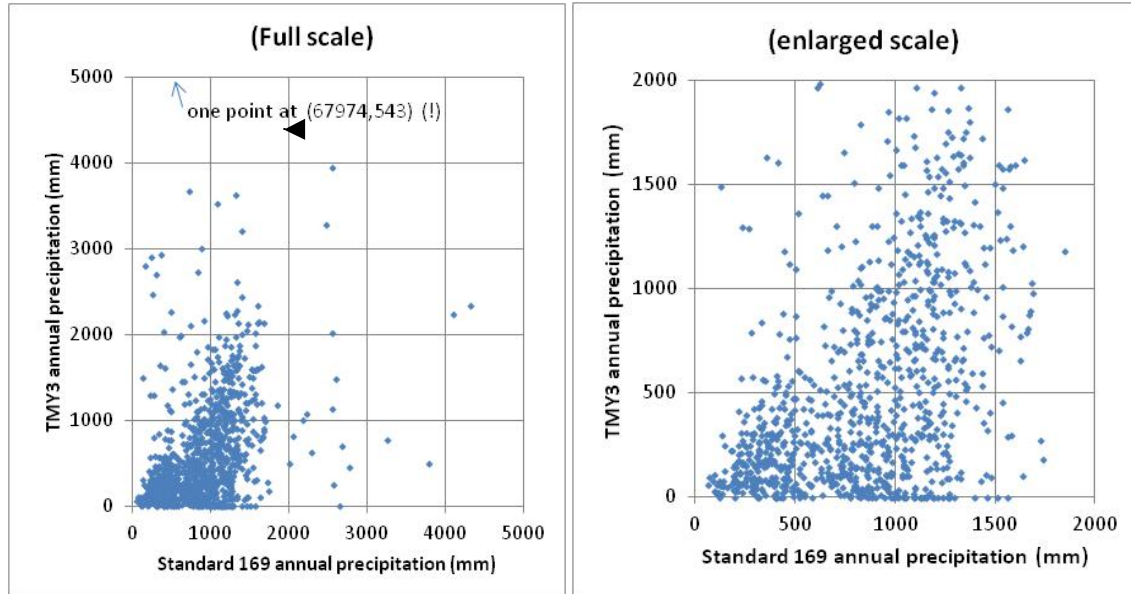
Reporting of Liquid Precipitation in the original TMY3 weather files

The liquid precipitation in the TMY3 weather files are taken directly from the raw data without modification, i.e., with two reserved fields, one (65) for “Liquid precipitation depth” and the other (66) for the duration over which the precipitation occurred, although for some unexplained reason the TMY3 documentation labeled it as “Liquid precipitation quantity” but with hours as the unit. Since there is only one set of these two fields in the TMY3 format, any additional concurrent records of liquid precipitation would be ignored.

To evaluate the reasonableness of this method of presenting the liquid precipitation data, the total annual liquid precipitation are compared to the average annual rainfall

reported in other data sources, principally ASHRAE Standard 169 (Zhang, Thevenard, and Cornick 2011), enhanced by other sources found on the Web (bestplaces 2014, currentresults 2014, average-rainfall 2014)

Fig. 1 Annual Precipitation in the original TMY3 files compared to Standard 169



As shown in Figure 1, the correlation is rather poor, with various outliers and major underreporting in many of the TMY3 weather files as compared to Standard 169.

Methodology used to reprocess the Liquid Precipitation data

In a previous weather data project for ASHRAE (Huang 2012), the author was faced with the same problem of extracting hourly liquid precipitation values from standard weather station reports, and developed an algorithm to do so using the following rules and assumptions:

- 1) forward marching, i.e., never adjust any previous reported value;
- 2) if a report is multi-hour, distribute rainfall equally for the preceding number of hours reported;
- 3) if reports are overlapping, subtract the amounts already reported, and apportion the remaining rainfall equally to the hours following the previous report;
- 4) for reports that are completely overlapping, i.e., multiple reports (this happens most often with a 24-hour report overlaying 6-hour reports), if the overlapping report is less than the sum of already reported amounts, ignore; if more, distribute the unaccounted rainfall equally to hours that are unreported; but if there are no unreported hours, ignore the excess;
- 5) if duration is unreported (99), assume duration is from last report, unless it's over 24 hours in which case assume 24 hours.

This algorithm was then used to calculate hourly liquid precipitation for all 3,012 IWEC2 weather files. Review of the results showed that a few isolated reports of

excessive rainfall were skewing the total annual precipitation in a quarter of the files. For example, in 263 files a single report of excessive liquid precipitation made up more than half of the total annual precipitation. After much trial-and-error, a 50mm/hour threshold was added to eliminate any reports above that threshold as spurious.

When this methodology is applied to the TMY3 data set, the correlation to the measured data is visibly improved, but a scattering of outliers showing much larger amounts of liquid precipitation than measured still remained. These were found to be almost entirely cold locations reporting large amounts of liquid precipitation during the winter, which might likely be snow rather than rain. To eliminate any such reports, another filter has been added to eliminate the liquid precipitation when the dewpoint temperature was below freezing (0 C or 32 F). Figure 2

Fig. 2 Annual Precipitation in the revised TMY3 files compared to Standard 169

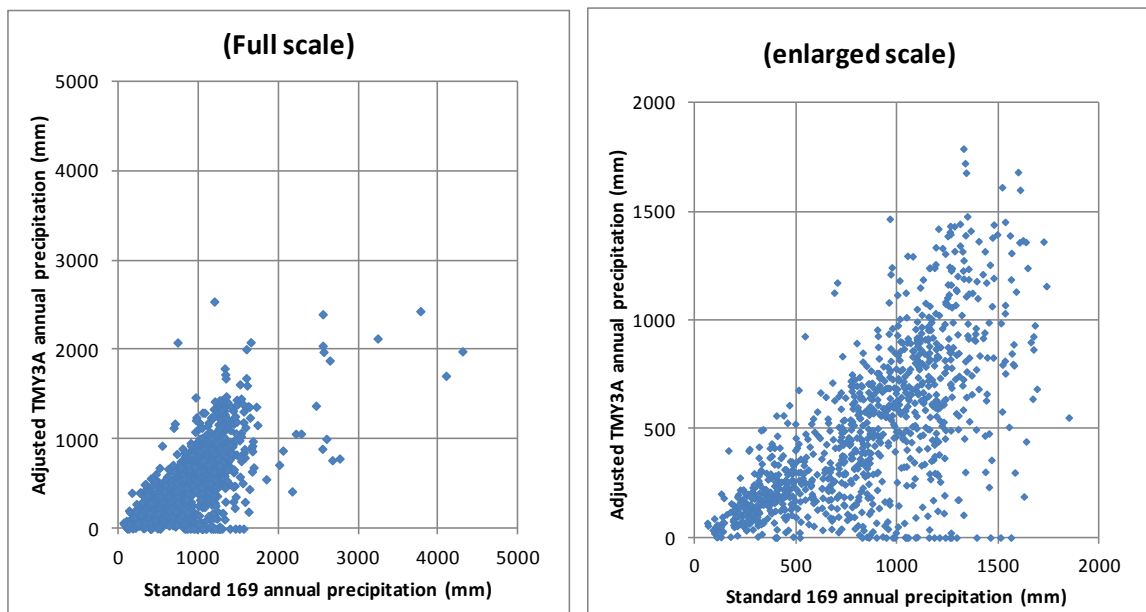


Figure 2 compares the total annual liquid precipitation in the revised TMY3A files to the average annual rainfall reported in other data sources, and is equivalent to what's shown for the original TMY3 files in Figure 1. There are now almost no outliers with the TMY3A files showing excessive liquid precipitation. However, there remain a small number of files showing no liquid precipitation, and a general bias of 25% less liquid precipitation as compared to the measured data sources. The explanation for this is that while it's possible to eliminate excessive reports as spurious, there is no way to correct for underreporting or missing reports of liquid precipitation. The scatter is judged acceptable because (1) liquid precipitation was not used as a criteria in selecting the typical months, and (2) there is much more year-to-year variation in liquid precipitation than other climate parameter such as temperature or solar radiation.

Liquid Precipitation Values in the Revised TMY3 weather files

The revised liquid precipitation values have been inserted as part of a revision of the TMY3 weather files completed in December 2014 and provided to NREL in January 2015. To avoid confusion with the preexisting TMY3 *TY.CSV files, the revised files are renamed as *TYA.CSV. Since the revised liquid precipitation are all hourly values, only

the first liquid precipitation element in the TMY3 file format (65) is needed, although to avoid any changes in the format the second liquid precipitation element for duration in hours (66) has been retained and set always to 1. Table 1 lists the annual liquid precipitation amounts in the original TMY3s, the revised TMY3s, and the annual average rainfall used as comparison.

Acknowledgments

I wish to thank Manajit Sengupta of NREL for allowing me to work with the TMY3 weather files, and Mary Anderberg of NREL for her help in putting the *TY3A files on the NREL web site.

References

Zhang, S., D. Thevenard, and S. Cornick 2011. "Calculation of Precipitation Data and Climate Zones for ASHRAE Standard 169" (unpublished paper), Numerical Logics, Inc., Waterloo ON Canada.

<http://www.bestplaces.net> accessed 2014

<http://www.currentresults.com> accessed 2014

<http://average-rainfall.findthebest.com> accessed 2014

Huang, Y.J. 2011. "ASHRAE Research Project 1477-RP Final Report", American Society of Heating, Refrigeration, and Air-Conditioning Engineers, Atlanta GA .

Table 1. Annual Liquid Precipitation from TMY3, TMY3A, and measured sources

WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall		WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall	
				Amount (mm)	Src					Amount (mm)	Src
704540	AK_ADAK-NAS	605	302	1435	(a)	703610	AK_YAKUTAT-STATE-AP	491	2431	3778	(a)
701718	AK_AMBLER	464	212	282	(a)	722287	AL_ANNISTON-METRO-AP	1319	1229	1325	(a)
701625	AK_ANAKTUVUK-PASS	0	56	310	(a)	722284	AL_AUBURN-OPELIKA-APT	800	828	1355	(a)
702720	AK_ANCHORAGE-ELMENDORF	299	168	403	(a)	722280	AL_BIRMINGHAM-MUNI-AP	593	907	1385	(a)
702730	AK_ANCHORAGE-IAP	69	203	403	(a)	722269	AL_CAIRNS-AAF	1634	1126	1371	(a)
702725	AK_ANCHORAGE-LAKE-HOOD	132	124	421	(c)	722268	AL_DOTHAN-RGNL	1088	747	1367	(a)
702735	AK_ANCHORAGE-MERRILL-FIELD	229	193	403	(a)	722285	AL_GADSDEN-MUNI(AWOS)	3204	1102	1397	(a)
702320	AK_ANIAK-AP	561	104	478	(b)	723230	AL_HUNTSVILLE-INTL-JONES-FIELD	77	918	1424	(a)
703980	AK_ANNETTE-ISLAND-AP	0	1879	2643	(a)	722265	AL_MAXWELL-APB	1646	1276	1328	(a)
702075	AK_ANVIK	370	95	452	(a)	722235	AL_MOBILE-DOWNTOWN-AP	1027	977	1680	(c)
700260	AK_BARROW-W-POST-W-ROGERS-AP	0	37	117	(a)	722220	AL_MOBILE-RGNL-AP	794	2083	1653	(a)
702190	AK_BETHEL-AP	50	256	426	(a)	722260	AL_MONTGOMERY-DANNELLY-FIELD	122	1192	1328	(a)
701740	AK_BETTLES-FIELD	62	196	364	(a)	723235	AL_MUSCLE-SHOALS-RGNL-AP	1008	912	1378	(a)
702670	AK_BIG-DELTA-ALLEN-AAF	98	201	292	(a)	722267	AL_TROY-AF	1970	1317	1322	(c)
702986	AK_BIG-RIVER-LAKE	67	62	561	(a)	722286	AL_TUSCALOOSA-MUNI-AP	1607	1392	1337	(a)
702746	AK_BIRCHWOOD	881	196	437	(b)	723448	AR_BATESVILLE(AWOS)	1249	660	1191	(b)
702606	AK_CHULITNA-AP	299	96	709	(a)	723444	AR_BENTONVILLE(AWOS)	596	469	1433	(c)
703160	AK_COLD-BAY-AP	0	665	993	(a)	723419	AR_EL-DORADO-GOODWIN-FIELD	1452	1332	1223	(a)
702960	AK_CORDOVA	1477	1004	2601	(a)	723445	AR_FAYETTEVILLE-DRAKE-FIELD	800	822	1097	(a)
700637	AK_DEADHORSE	15	4	111	(a)	723447	AR_FLIPPIN(AWOS)	1025	514	1220	(c)
703210	AK_DILLINGHAM-MUNI	283	273	656	(a)	723440	AR_FORT-SMITH-RGNL-AP	294	956	1165	(a)
704890	AK_DUTCH-HARBOR	1240	509	1552	(a)	723446	AR_HARRISON-FAA-AP	1466	1241	1158	(a)
704140	AK_EARECKSON-AS	565	499	1300	(a)	723407	AR_JONESBORO-MUNI	947	706	1182	(a)
702084	AK_EMMONAK	1122	352	470	(b)	723403	AR_LITTLE-ROCK-ADAMS-FIELD	215	1165	1250	(a)
702650	AK_FAIRBANKS-EIELSON-A	330	231	329	(a)	723405	AR_LITTLE-ROCK-APB	1059	708	1263	(a)
702610	AK_FAIRBANKS-IAP	0	125	308	(a)	723415	AR_MEMORIAL-FLD	1302	1212	1422	(a)
701940	AK_FORT-YUKON	2793	401	165	(a)	723417	AR_PINE-BLUFF-FAA-AP	932	842	1292	(a)
702040	AK_GAMBELL	66	83	447	(b)	723449	AR_ROGERS(AWOS)	711	411	1148	(a)
702710	AK_GULKANA-INTERM-FLD	52	181	279	(a)	723443	AR_SILOAM-SPRING(AWOS)	552	556	1161	(a)
703670	AK_GUSTAVUS	886	498	1389	(b)	723434	AR_SPRINGDALE-MUNI	0	0	1156	(c)
702495	AK_HAYES-RIVER-AP	52	39	675	(a)	723416	AR_STUTTGART(AWOS)	1498	764	1343	(c)
702647	AK_HEALY-RIVER-AP	237	194	376	(a)	723418	AR_TEXARKANA-WEBB-FIELD	1329	1068	1253	(a)
703410	AK_HOMER-AP	260	111	645	(a)	723406	AR_WALNUT-RIDGE(AWOS)	1065	1024	1206	(a)
702607	AK_HOONAH-SEAPLANE-BASE	870	814	1532	(b)	722748	AZ_CASA-GRANDA(AWOS)	114	108	222	(a)
702186	AK_HOOPER-BAY	227	91	668	(a)	722745	AZ_DAVIS-MONTHAN-APB	300	194	292	(a)
702225	AK_HUSLIA	567	74	335	(b)	722735	AZ_DOUGLAS-BISBEE-DOUGLAS-IAP	383	418	316	(a)
703884	AK_HYDABURG-SEAPLANE-BA	701	765	2675	(b)	723755	AZ_FLAGSTAFF-PULLIAM-AP	51	184	573	(a)
703400	AK_ILIAMNA-AP	698	294	711	(a)	723783	AZ_GRAND-CANYON-NATL-P	219	220	347	(a)
703810	AK_JUNEAU-IAP	962	479	1453	(a)	723700	AZ_KINGMAN(AMOS)	411	197	213	(c)
703855	AK_KAKE-SEAPLANE-BASE	454	784	2766	(a)	722785	AZ_LUKE-APB	310	220	223	(a)
702590	AK_KENAI-MUNI-AP	321	139	482	(a)	723710	AZ_PAGE-MUNI(AMOS)	222	157	179	(a)
703950	AK_KETCHIKAN-IAP	2239	1708	4099	(a)	722784	AZ_PHOENIX-DEER-VALLEY	73	53	208	(c)
703260	AK_KING-SALMON-AP	36	413	504	(a)	722780	AZ_PHOENIX-SKY-HARBOR-IAP	73	114	192	(a)
703500	AK_KODIAK-AP	271	1362	1723	(a)	723723	AZ_PRESCOTT-LOVE-FIELD	145	196	463	(a)
701330	AK_KOTZEBUE-RALPH-WEIN-MEM	73	184	245	(a)	722747	AZ_SAFFORD(AMOS)	213	170	226	(a)
702310	AK_MCGRATH-AP	0	182	422	(a)	722789	AZ_SCOTSDALE-MUNI	26	10	208	(c)
702185	AK_MEKORYUK	0	0	403	(a)	723747	AZ_SHOW-LOW-MUNI-AP	151	96	439	(a)
703430	AK_MIDDLETON-ISLAND	485	174	1299	(a)	722740	AZ_TUCSON-IAP	39	228	292	(a)
702460	AK_MINCHUMINA	357	69	338	(a)	723740	AZ_WINSLOW-MUNI-AP	89	49	193	(a)
702600	AK_NENANA-MUNI-AP	92	63	316	(a)	722800	AZ_YUMA-IAP	26	21	95	(a)
702000	AK_NOME-MUNI-AP	54	337	392	(a)	699604	AZ_YUMA-MCAS	108	88	95	(a)
702910	AK_NORTHWAY-AP	156	59	244	(a)	725958	CA_ALTURAS	232	184	318	(b)
702740	AK_PALMER-MUNI-AP	346	190	446	(a)	725945	CA_ARCATA-AP	294	452	1192	(a)
703860	AK_PETERSBURG	1135	893	2550	(a)	723840	CA_BAKERSFIELD-MEADOWS-FLD	47	107	156	(a)
701043	AK_POINT-HOPE(AWOS)	25	73	522	(a)	724837	CA_BEALE-APB	403	319	710	(a)
703330	AK_PORT-HEIDEN	382	169	401	(a)	724800	CA_BISHOP-AP	53	29	138	(a)
703165	AK_SAND-POINT	7592	264	768	(a)	725845	CA_BLUE-CANYON-AP	1181	553	1848	(a)
702035	AK_SAVOONGA	32	25	447	(b)	747188	CA_BLYTHE-RIVERSIDE-CO-AP	80	35	88	(a)
700197	AK_SELAWIK	252	53	587	(b)	722904	CA_BROWN-FLD-MUNI	209	201	259	(a)
702770	AK_SEWARD	812	900	1660	(a)	722880	CA_BURBANK-GLNDLE-PASAD-AP	262	193	433	(a)
701195	AK_SHISHMAREF(AWOS)	2897	112	246	(b)	723926	CA_CAMARILLO(AWOS)	141	247	452	(b)
703710	AK_SITKA-JAPONSKI-AP	1076	1060	2218	(a)	722926	CA_CAMP-PENDLETON-MCAS	434	367	315	(a)
703620	AK_SKAGWAY-AP	512	322	1018	(a)	722927	CA_CARLSBAD-PALOMAR	164	133	285	(a)
703407	AK_SLEETMUTE	392	129	605	(b)	746120	CA_CHINA-LAKE-NAF	58	12	104	(b)
702595	AK_SOLDOTNA	402	155	474	(a)	722899	CA_CHINO-AP	143	156	432	(b)
702005	AK_ST-MARYS(AWOS)	1096	458	498	(a)	724936	CA_CONCORD-BUCHANAN-FIELD	533	35	460	(c)
703080	AK_ST-PAUL-ISLAND-AP	0	386	582	(a)	725946	CA_CRESCENT-CITY-FAA-AP	817	872	2056	(a)
702510	AK_TALKEETNA-STATE-AP	139	378	727	(a)	723815	CA_DAGGETT-BARSTOW-DAGGETT-A	24	48	100	(a)
701780	AK_TANANA-RALPH-CALHOUN-AP	264	114	318	(a)	723810	CA_EDWARDS-APB	298	202	129	(a)
703606	AK_TOGIAC-VILLAGE-AWOS	258	447	717	(a)	745160	CA_FAIRFIELD-TRAVIS-AF	426	351	539	(a)
702070	AK_UNALAKLEET-FIELD	444	303	327	(a)	723890	CA_FRESNO-YOSEMITE-IAP	27	185	279	(a)
702756	AK_VALDEZ-PIONEER-FLD	898	926	1673	(a)	722976	CA_FULLERTON-MUNI-AP	337	498	336	(a)
702750	AK_VALDEZ-WSO	2128	866	1673	(a)	724935	CA_HAYWARD-AIR-TERM	136	204	517	(a)
702757	AK_WHITTIER	2341	1981	4305	(a)	747185	CA_IMPERIAL	58	67	61	(a)
703870	AK_WRANGELL	493	714	2010	(a)	722956	CA_JACK-NORTHROP-FLD-H	205	205	317	(a)

Sources: (a) Standard 169, (b) www.bestplaces.net, (c) www.currentresults.com, (d) http://average-rainfall.findthebest.com

Table 1. Annual Liquid Precipitation from TMY3, TMY3A, and measured sources
(continued)

WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall		WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall	
				Amount (mm)	Src					Amount (mm)	Src
725847	CA_LAKE-TAHOE	158	5	310	(a)	725086	CT_DANBURY-MUNI-AP	547	647	1341	(c)
723816	CA_LANCASTER-GEN-WM-FOX-FIELD	146	58	190	(a)	725046	CT_GROTON-NEW-LONDON-AP	623	821	1262	(c)
747020	CA_LEMOORE-REEVES-NAS	58	4	175	(a)	725080	CT_HARTFORD-BRADLEY-IAP	195	698	1153	(a)
724927	CA_LIVERMORE-MUNI-AP	161	169	378	(a)	725087	CT_HARTFORD-BRAINARD-FD	787	560	1095	(a)
722895	CA_LOMPOC(AWOS)	309	275	376	(b)	725045	CT_NEW-HAVEN-TWEED-AP	284	294	1196	(c)
722970	CA_LONG-BEACH-DAUGHERTY-FLD	28	163	331	(a)	725029	CT_oxford(AWOS)	2233	1204	1298	(a)
722950	CA_LOS-ANGELES-IAP	0	249	317	(a)	724088	DE_DOVER-afb	1264	841	1147	(a)
724815	CA_MERCED-MUNI-MACREADY	294	310	325	(a)	724089	DE_WILMINGTON-NEWCASTLE-CO-A	102	605	1050	(a)
724926	CA_MODESTO-CITY-CO-AP	224	120	314	(a)	722215	FL_CRESTVIEW-BOB-SIKES-AP	2132	2005	1598	(c)
725955	CA_MONTAGUE-SISKIYOU-CO-AP	179	131	472	(a)	722056	FL_DAYTONA-BEACH-IAP	214	983	1234	(a)
724915	CA_MONTEREY-PENINSULA	245	222	438	(a)	722210	FL_EGLIN-afb-VALPARAIS	2152	1600	1607	(a)
745090	CA_MOUNTAIN-VIEW-MOFFETT-FLD	152	185	354	(a)	722039	FL_FORT-LAUDERDALE	981	684	1690	(c)
724955	CA_NAPA-CO	333	176	671	(a)	722106	FL_FORT-MYERS-PAGE-FIELD	1038	774	1390	(a)
723805	CA_NEEDLES-AP	75	47	117	(a)	722205	FL_FT-LAUDERDALE-HOLLYWOOD-IAP	772	189	1626	(a)
724930	CA_OAKLAND-METRO-AP	210	237	454	(a)	722146	FL_GAINESVILLE-RGNL-AP	1279	1104	1247	(a)
723927	CA_OXNARD-AP	24	38	404	(c)	722206	FL_HOMESTEAD-afb	1507	1395	1494	(a)
722868	CA_PALM-SPRINGS-IAP	55	34	125	(a)	722068	FL_JACKSONVILLE-CRAIG	990	854	1265	(a)
747187	CA_PALM-SPRINGS-THERMAL-AP	97	55	64	(a)	722060	FL_JACKSONVILLE-IAP	498	1164	1265	(a)
723820	CA_PALMDALE-AP	75	75	188	(c)	722065	FL_JACKSONVILLE-NAS	1868	359	1178	(a)
723965	CA_PASO-ROBLES-MUNI-AP	95	112	377	(a)	722010	FL_KEY-WEST-IAP	305	570	1015	(a)
723910	CA_POINT-MUGU-NF	577	37	285	(a)	722015	FL_KEY-WEST-NAS	1821	903	1015	(a)
723895	CA_PORTERVILLE(AWOS)	305	77	279	(a)	722119	FL_LAKELAND-LINDER-RGN	0	0	1392	(c)
725910	CA_RED-BLUFF-MUNI-AP	421	524	575	(a)	722016	FL_MARATHON-AP	616	640	1132	(a)
725920	CA_REDDING-MUNI-AP	1856	1467	963	(a)	722066	FL_MAYPORT-NS	1341	141	1123	(a)
722860	CA_RIVERSIDE-MARCH-afb	216	142	313	(a)	722040	FL_MELBOURNE-RGNL-AP	1086	853	1259	(a)
722869	CA_RIVERSIDE-MUNI	155	177	313	(a)	722020	FL_MIAMI-IAP	724	1440	1477	(a)
724830	CA_SACRAMENTO-EXECUTIVE-AP	14	223	544	(a)	722029	FL_MIAMI-KENDALL-TAMIA	1599	1682	1597	(a)
724839	CA_SACRAMENTO-METRO-AP	299	302	491	(a)	722024	FL_MIAMI-OPA-LOCKA	1307	799	1572	(c)
724917	CA_SALINAS-MUNI-AP	260	262	314	(a)	722038	FL_NAPLES-MUNI-AP	715	302	1336	(a)
722900	CA_SAN-DIEGO-LINDBERGH-FIELD	96	161	251	(a)	747946	FL_NASA-SHUTTLE-LANDING	2436	1364	1402	(a)
722930	CA_SAN-DIEGO-MIRAMAR-NAS	87	65	269	(a)	722055	FL_OCALA-MUNI(AWOS)	3619	701	1322	(a)
722903	CA_SAN-DIEGO-MONTGOMER	245	407	269	(a)	722053	FL_ORLANDO-EXECUTIVE-AP	559	493	1264	(a)
722906	CA_SAN-DIEGO-NORTH-ISLAND-NAS	153	41	251	(a)	722050	FL_ORLANDO-IAP	1323	1307	1237	(a)
724940	CA_SAN-FRANCISCO-IAP	205	96	555	(a)	722057	FL_ORLANDO-SANFORD-AP	994	935	1298	(a)
724945	CA_SAN-JOSE-IAP	259	187	357	(a)	722245	FL_PANAMA-CITY-BAY-CO	1578	1453	1533	(a)
722897	CA_SAN-LUIS-CO-RGNL	120	173	659	(a)	722225	FL_PENSACOLA-FOREST-SHERMAN	1201	828	1474	(a)
723830	CA_SANDBERG	362	238	392	(a)	722223	FL_PENSACOLA-RGNL-AP	1190	1132	1587	(a)
722977	CA_SANTA-ANA-JOHN-WAYNE-AP	162	165	346	(c)	722115	FL_SARASOTA-BRADENTON	1421	1180	1392	(a)
723925	CA_SANTA-BARBARA-MUNI-AP	586	468	406	(a)	722108	FL_SOUTHWEST-FLORIDA-I	905	589	1325	(a)
723940	CA_SANTA-MARIA-PUBLIC-AP	41	494	326	(a)	722103	FL_ST-LUCIE-CO-IAP	1123	829	1444	(c)
722885	CA_SANTA-MONICA-MUNI	278	376	379	(c)	722104	FL_ST-PETERSBURG-ALB-WHITTED	659	572	1291	(c)
724957	CA_SANTA-ROSA(AWOS)	577	339	1134	(a)	722116	FL_ST-PETERSBURG-CLEAR	1651	1444	1310	(a)
724920	CA_STOCKTON-METRO-AP	302	180	355	(a)	722140	FL_TALLAHASSEE-RGNL-AP	654	1368	1621	(a)
725846	CA_TRUCKEE-TAHOE	1514	625	788	(a)	722110	FL_TAMPA-IAP	371	851	1158	(a)
690150	CA_TWENTYNINE-PALMS	13	2	107	(a)	747880	FL_TAMPA-MACDILL-afb	1581	1344	1310	(a)
725905	CA_UKIAH-MUNI-AP	582	660	1068	(a)	747750	FL_TYNDALL-afb	1489	1070	1533	(a)
722886	CA_VAN-NUYS-AP	426	433	379	(c)	747770	FL_VALPARAISO-HURLBURT-FLD	1869	1412	1363	(a)
723896	CA_VISALIA-MUNI(AWOS)	396	33	253	(a)	722045	FL_VERO-BEACH-MUNI-AP	2271	1790	1327	(a)
724838	CA_YUBA-CO	303	477	546	(a)	722030	FL_WEST-PALM-BEACH-IAP	293	1391	1557	(a)
724698	CO_AKRON-WASHINGTON-CO-AP	359	275	399	(a)	722226	FL_WHITING-FLD-NAAS	1208	442	1637	(a)
724620	CO_ALAMOSA-SAN-LUIS-VAL-RGNL	0	85	191	(a)	722160	GA_ALBANY-DOUGHERTY-CO-AP	966	895	1192	(a)
724676	CO_ASPEN-PITKIN-CO-SAR	323	200	578	(a)	722135	GA_ALMA-BACON-CO-AP	885	821	1188	(c)
724695	CO_AURORA-BUCKLEY-afb	558	292	411	(a)	723110	GA_ATHENS-BEN-EPPS-AP	413	1085	1238	(a)
724699	CO_BROOMFIELD-JEFFCO	0	123	396	(c)	722190	GA_ATLANTA-HARTSFIELD-IAP	90	648	1269	(a)
724660	CO_COLORADO-SPRINGS-MUNI-AP	87	265	447	(a)	722180	GA_AUGUSTA-BUSH-FIELD	288	624	1128	(a)
724767	CO_CORTEZ-MONTEZUMA-CO	216	195	408	(a)	722136	GA_BRUNSWICK-GOLDEN-IS	0	0	1260	(c)
725700	CO_CRAIG-MOFFAT	269	128	442	(a)	722137	GA_BRUNSWICK-M-MCKINNON-AP	1080	1135	1293	(a)
724666	CO_DENVER-CENTENNIAL	305	229	414	(a)	722255	GA_COLUMBUS-METRO-AP	147	1246	1258	(a)
725650	CO_DENVER-IAP	292	191	382	(a)	722196	GA_DEKALB-PEACHTREE	606	728	1326	(a)
724625	CO_DURANGO-LA-PLATA-CO	363	257	455	(a)	722250	GA_FORT-BENNING	1857	1407	1260	(a)
724675	CO_EAGLE-CO-AP	1291	400	265	(a)	722195	GA_FULTON-CO-AP-BROW	1273	1478	1346	(a)
724769	CO_FORT-COLLINS(AWOS)	2032	561	402	(a)	747804	GA_HUNTER-AAF	1698	1388	1249	(a)
724760	CO_GRAND-JUNCTION-WALKER-FLD	58	161	223	(a)	722170	GA_MACON-MIDDLE-GA-RGNL-AP	412	910	1150	(a)
724768	CO_GREELEY-WELD(AWOS)	838	16	330	(a)	722270	GA_MARIETTA-DOBBS-afb	1753	1396	1263	(c)
724677	CO_GUNNISON-CO(AWOS)	2461	123	260	(a)	747810	GA_MOODY-afb-VALDOSTA	1517	1240	1270	(a)
725715	CO_HAYDEN-YAMPA(AWOS)	1364	264	513	(a)	722175	GA_ROBINS-afb	1366	1066	1160	(c)
724635	CO_LA-JUNTA-MUNI-AP	276	231	285	(a)	723200	GA_ROME-R-B-RUSSELL-AP	1728	1110	1340	(a)
724636	CO_LAMAR-MUNI-AP	497	413	392	(a)	722070	GA_SAVANNAH-IAP	91	916	1253	(a)
724673	CO_LEADVILLE-LAKE-CO	431	72	318	(c)	722166	GA_VALDOSTA-WB-AP	1729	1433	1282	(a)
724665	CO_LIMON	303	274	368	(a)	912180	GUM_ANDERSEN-afb	2015	2043	2555	(d)
724765	CO_MONTROSE-RGNL	242	204	248	(a)	912120	GUM_GUAM-WFO	3943	2396	2555	(d)
724640	CO_PUEBLO-MEM-AP	41	179	293	(a)	912850	HI_HILO-IAP	764	2125	3243	(a)
725717	CO_RIFLE-GARFIELD-RGNL	192	193	302	(a)	911820	HI_HONOLULU-IAP	210	235	485	(a)
724645	CO_TRINIDAD-LAS-ANIMAS-CO-AP	182	158	344	(a)	911900	HI_KAHULUI-AP	0	562	437	(a)
725040	CT_BRIDGEPORT-SIKORSKY-MEM	130	634	1056	(a)	911780	HI_KALAELOA-AP	221	227	627	(c)

Sources: (a) Standard 169, (b) www.bestplaces.net, (c) www.currentresults.com, (d) http://average-rainfall.findthebest.com

Table 1. Annual Liquid Precipitation from TMY3, TMY3A, and measured sources
(continued)

WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall		WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall	
				Amount (mm)	Src					Amount (mm)	Src
911760	HI_KANEHOE-BAY-MCAS_911760	459	518	828	(a)	725315	IL_UNIV-OF-ILLINOIS-WI_725315	985	976	1003	(a)
911904	HI_KAPALUA_911904	2109	2080	737	(c)	725305	IL_W-CHICAGO-DU-PAGE_725305	415	572	908	(a)
911975	HI_KONA-INTL-AT-KEAHOL_911975	23	23	993	(a)	725336	IN_DELAWARE-CO-JOHNSON_725336	479	647	1019	(c)
911905	HI_LANAI_911905	0	0	396	(c)	724320	IN_EVANSVILLE-RGNL-AP_724320	506	942	1118	(a)
911650	HI_LIHUE-AP_911650	171	620	982	(a)	725330	IN_FORT-WAYNE-IAP_725330	92	561	918	(a)
911860	HI_MOLOKAI(AMOS)_911860	135	137	627	(c)	725335	IN_GRISSOM-ARB_725335	1099	702	1030	(a)
725457	IA_ALGONA_725457	112	81	752	(a)	724365	IN_HUNTINGBURG_724365	926	295	1159	(a)
725453	IA_ATLANTIC_725453	254	188	808	(a)	724380	IN_INDIANAPOLIS-IAP_724380	157	688	1036	(a)
725486	IA_BOONE-MUNI_725486	356	343	863	(a)	724386	IN_LAFAYETTE-PURDUE-UNIV-AP_724386	1013	878	905	(a)
725455	IA_BURLINGTON-MUNI-AP_725455	919	462	879	(a)	724375	IN_MONROE-CO_724375	1000	1025	1121	(a)
725468	IA_CARROLL_725468	40	42	790	(a)	725350	IN_SOUTH-BEND-MICHIANA-RGNL-AP_725350	303	599	981	(a)
725450	IA_CEDAR-RAPIDS-MUNI-AP_725450	967	594	873	(a)	724373	IN_TERRE-HAUTE-INTL-HU_724373	623	580	1012	(a)
725469	IA_CHARITON_725469	76	68	896	(a)	724507	KS_CHANUTE-MARTIN-JOHNSON-AP_724507	1247	851	987	(a)
725463	IA_CHARLES-CITY_725463	480	390	868	(a)	724580	KS_CONCORDIA-BLOSSER-MUNI-AP_724580	406	359	723	(a)
725479	IA_CLARINDA_725479	147	109	861	(a)	724510	KS_DODGE-CITY-RGNL-AP_724510	4	251	546	(a)
725473	IA_CLINTON-MUNI(AWOS)_725473	792	572	881	(a)	724510	KS_EMPORIA-MUNI-AP_724510	929	711	874	(a)
725497	IA_COUNCIL-BLUFFS_725497	114	96	770	(a)	724550	KS_FT-RILEY-MARSHALL-AAF_724550	689	432	830	(a)
725474	IA_CRESTON_725474	157	123	870	(a)	724515	KS_GARDEN-CITY-MUNI-AP_724515	473	349	500	(a)
725476	IA_DECORAH-MUNI-AP_725476	266	118	823	(a)	724650	KS_GOODLAND-RENNER-FIELD_724650	84	219	466	(a)
725477	IA_DENISON-MUNI-AP_725477	234	244	742	(a)	724517	KS_GREAT-BEND(AWOS)_724517	1988	668	620	(a)
725460	IA_DES-MOINES-IAP_725460	96	366	863	(a)	724518	KS_HAYS-MUNI(AWOS)_724518	470	268	577	(a)
725470	IA_DUBUQUE-RGNL-AP_725470	991	739	961	(a)	724655	KS_HILL-CITY-MUNI-AP_724655	471	312	560	(a)
726499	IA_ESTHERVILLE-MUNI_726499	382	414	710	(a)	724506	KS_HUTCHINSON-MUNI-AP_724506	410	366	777	(c)
726498	IA_FAIRFIELD-MUNI-AP_726498	62	74	951	(a)	724516	KS_LIBERAL-MUNI_724516	66	93	499	(a)
725490	IA_FORT-DODGE(AWOS)_725490	603	669	857	(a)	724555	KS_MANHATTAN-RGNL_724555	961	790	847	(a)
725483	IA_FORT-MADISON_725483	225	170	960	(a)	724505	KS_MC-CONNELL-AFB_724505	1100	701	821	(a)
725456	IA_KEOKUK-MUNI_725456	205	166	937	(a)	724509	KS_NEWTON(AWOS)_724509	1108	229	829	(c)
725493	IA_KNOXVILLE_725493	4	3	848	(a)	724475	KS_OLATHE-JOHNSON-CO-INDUSTRIL_724475	617	482	1063	(c)
725484	IA_LE-MARS_725484	73	79	676	(a)	724468	KS_OLATHE-JOHNSON-CO_724468	1075	1006	1012	(a)
725485	IA_MASON-CITY-MUNI-AP_725485	285	479	864	(a)	724585	KS_RUSSELL-MUNI-AP_724585	960	345	667	(a)
725475	IA_MONTICELLO-MUNI_725475	0	0	897	(a)	724586	KS_SALINA-MUNI-AP_724586	762	338	806	(a)
725487	IA_MUSCATINE_725487	137	136	909	(a)	724565	KS_TOPEKA-FORBES-FIELD_724565	921	757	899	(a)
725464	IA_NEWTON-MUNI_725464	35	34	833	(a)	724560	KS_TOPEKA-MUNI-AP_724560	313	636	901	(a)
725488	IA_OELWEN_725488	267	260	923	(d)	724504	KS_WICHITA-COL-JABARA_724504	754	565	860	(a)
725489	IA_ORANGE-CITY_725489	110	88	681	(a)	724500	KS_WICHITA-MID-CONTINENT-AP_724500	136	398	795	(a)
725465	IA_OTTUMWA-INDUSTRIAL-AP_725465	921	957	901	(a)	746716	KY_BOWLING-GREEN-WARREN-CO-AP_746716	1436	1060	1269	(a)
725494	IA_RED-OAK_725494	219	156	876	(a)	724210	KY_CINCINNATI-NORTHERN-KY-AP_724210	282	839	1003	(a)
725495	IA_SHELDON_725495	30	25	709	(a)	746710	KY_FORT-CAMPBELL(AAF)_746710	1561	877	1250	(a)
725467	IA_SHENANDOAH-MUNI_725467	254	203	848	(a)	724240	KY_FORT-KNOX-GODMAN-AAF_724240	1614	955	1153	(a)
725570	IA_SIOUX-CITY-SIOUX-GATEWAY-AP_725570	58	453	682	(a)	724238	KY_HENDERSON-CITY_724238	305	473	1126	(a)
726500	IA_SPENCER_726500	521	461	759	(a)	724236	KY_JACKSON-JULIAN-CARROLL-AP_724236	1091	831	1203	(a)
725496	IA_STORM-LAKE_725496	6	13	812	(a)	724220	KY_LEXINGTON-BLUEGRASS-AP_724220	344	1242	1161	(a)
725454	IA_WASHINGTON_725454	218	152	962	(a)	724243	KY_LONDON-CORBIN-AP_724243	1076	498	1158	(a)
725480	IA_WATERLOO-MUNI-AP_725480	254	636	874	(a)	724235	KY_LOUISVILLE-BOWMAN-FIELD_724235	385	508	1139	(a)
725478	IA_WEBSTER-CITY-MUNI_725478	29	12	864	(a)	724230	KY_LOUISVILLE-STANDIFORD-FIELD_724230	0	1080	1139	(a)
726810	ID_BOISE-AIR-TERMINAL_726810	58	234	294	(a)	724350	KY_PADUCAH-BARKLEY-RGNL-AP_724350	888	816	1235	(a)
725867	ID_BURLEY-MUNI-AP_725867	119	62	251	(a)	724354	KY_SOMERSET(AWOS)_724354	16	22	1265	(a)
726813	ID_CALDWELL(AWOS)_726813	144	98	298	(c)	722487	LA_ALEXANDRIA-ESLER-RGNL-AP_722487	1756	985	1348	(a)
727834	ID_COEUR-D-ALENE(AWOS)_727834	1452	547	656	(a)	747540	LA_ALEXANDRIA-IAP_747540	707	580	1518	(a)
725865	ID_HAILEY-FRIEDMAN-MEM_725865	0	0	404	(a)	722485	LA_BARKSDALE-AFB_722485	1637	1071	1288	(a)
725785	ID_IDAHO-FALLS-FANNING-FIELD_725785	121	102	269	(a)	722317	LA_BATON-ROUGE-RYAN-AP_722317	456	1032	1532	(a)
725866	ID JOSLIN-FLD-MAGIC-VA_725866	180	148	263	(a)	722390	LA_FORT-POLK-AAF_722390	1373	987	1512	(a)
727830	ID_LEWISTON-NEZ-PERCE-CNTY-AP_727830	128	192	308	(a)	722406	LA_HOUMA-TERREBONNE_722406	299	299	1581	(c)
725786	ID_MALAD-CITY_725786	171	151	336	(c)	722405	LA_LAFAYETTE-RGNL-AP_722405	1864	1188	1562	(a)
726815	ID MOUNTAIN-HOME-AFB_726815	272	158	229	(a)	722400	LA LAKE-CHARLES-RGNL-AP_722400	360	1174	1440	(a)
725780	ID_POCATELLO-RGNL-AP_725780	42	149	304	(a)	722404	LA LAKE-CHARLES-WB-AP_722404	0	0	1460	(c)
726865	ID_SALMON-LEMHI(AWOS)_726865	308	105	253	(a)	722486	LA_MONROE-RGNL-AP_722486	1127	930	1347	(a)
725868	ID_SODA-SPRINGS-TIGERT_725868	279	237	401	(a)	722314	LA_NEW-IBERIA-ACADIANA_722314	1009	755	1534	(c)
744655	IL_AURORA-MUNI-AP_744655	388	438	915	(a)	722316	LA_NEW-ORLEANS-CALLENDER-FIELD_722316	1578	847	1566	(a)
724338	IL BELLEVILLE-SCOTT-AFB_724338	900	578	1085	(c)	722310	LA_NEW-ORLEANS-IAP_722310	820	793	1577	(a)
725314	IL_CAHOKIA-ST-LOUIS_725314	1119	1244	973	(a)	722315	LA_NEW-ORLEANS-LAKEFRONT-AP_722315	2020	1310	1564	(a)
724397	IL_CENTRAL-ILLINOIS-RG_724397	12	5	927	(c)	722329	LA_PATTERSON-MEM_722329	2341	1359	1604	(a)
725340	IL_CHICAGO-MIDWAY-AP_725340	597	757	908	(a)	722484	LA_SHREVEPORT-DOWNTOWN_722484	666	759	1234	(a)
725300	IL_CHICAGO-OHARE-IAP_725300	46	611	904	(a)	722480	LA_SHREVEPORT-RGNL-AP_722480	301	759	1234	(a)
725347	IL_CHICAGO-WAUKEGAN_725347	513	503	904	(c)	725067	MA_BARNSTABLE-MUNI-BOA_725067	1164	1151	1113	(a)
725316	IL_DECATUR_725316	361	397	988	(a)	725088	MA_BEVERLY-MUNI_725088	404	269	1163	(a)
725320	IL_GREATER-PEORIA-AP_725320	120	461	913	(a)	725090	MA_BOSTON-LOGAN-IAP_725090	166	861	1075	(a)
725430	IL_GREATER-ROCKFORD-AP_725430	80	595	929	(a)	744910	MA_CHICOPPEE-FALLS-WEST_744910	1681	994	1097	(a)
724339	IL_MARIION-RGNL_724339	135	195	1233	(c)	744904	MA_LAWRENCE-MUNI_744904	441	346	1083	(a)
725440	IL MOLINE-QUAD-CITY-IAP_725440	118	563	974	(a)	725066	MA_MARTHAS-VINEYARD_725066	762	917	1151	(a)
724335	IL_MOUNT-VERNON(AWOS)_724335	855	898	1047	(a)	725063	MA_NANTUCKET-MEM-AP_725063	735	620	1128	(c)
724396	IL_QUINCY-MUNI-BALDWIN-FLD_724396	622	465	993	(a)	725065	MA_NEW-BEDFORD-RGNL_725065	569	632	1191	(a)
724336	IL_SOUTHERN-ILLINOIS_724336	450	468	1112	(a)	725075	MA_NORTH-ADAMS_725075	1213	898	1110	(a)
724390	IL_SPRINGFIELD-CAPITAL-AP_724390	356	472	900	(a)	725098	MA_NORWOOD-MEM_725098	905	792	1182	(a)
725326	IL_STERLING-ROCKFALLS_725326	1488	378	914	(a)	725060	MA_OTIS-ANGB_725060	1574	967	1154	(a)

Sources: (a) Standard 169, (b) www.bestplaces.net, (c) www.currentresults.com, (d) http://average-rainfall.findthebest.com

Table 1. Annual Liquid Precipitation from TMY3, TMY3A, and measured sources
(continued)

WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall		WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall	
				Amount (mm)	Src					Amount (mm)	Src
725064	MA_PLYMOUTH-MUNI-AP	1330	1142	1290	(a)	726547	MN_GLENWOOD(ASOS)	398	311	659	(a)
725073	MA_PROVINCETOWN(AWOS)	3525	859	1080	(a)	727458	MN_GRAND-RAPIDS(AWOS)	328	336	709	(a)
744915	MA_WESTFIELD-BARNES-MUNI-AP	1253	1242	1184	(a)	727478	MN_HALLOCK	31	266	479	(a)
725095	MA_WORCHESTER-RGNL-AP	0	559	1193	(a)	727455	MN_HIBBING-CHISHOLM-AP	732	648	646	(a)
745940	MD_ANDREWS-AFB-CAMP-SP	1273	684	1072	(a)	726569	MN_HUTCHINSON(AWOS)	81	275	668	(a)
724060	MD_BALTIMORE-BLT-WASHNGTN-IAF	142	917	1052	(a)	727470	MN_INTERNATIONAL-FALLS-IAP	441	644	743	(a)
724066	MD_HAGERSTOWN-RGNL-RIC	238	255	998	(c)	726583	MN_LITCHFIELD-MUNI	47	292	732	(a)
724040	MD_PATUXENT-RIVER-NAS	1969	660	1102	(a)	726578	MN_LITTLE-FALLS(AWOS)	68	260	689	(a)
724045	MD_SALISBURY-WICOMICO-CO-AP	1248	811	1155	(a)	726585	MN_MANKATO(AWOS)	1022	345	820	(c)
726184	ME_AUBURN-LEWISTON	781	638	1135	(a)	726559	MN_MARSHALL-RYAN(AWOS)	1188	528	658	(a)
726185	ME_AUGUSTA-AP	1821	1297	1050	(a)	726575	MN_MINNEAPOLIS-CRYSTAL	426	322	788	(a)
726088	ME_BANGOR-IAP	1363	932	1000	(a)	726580	MN_MINNEAPOLIS-ST-PAUL-IAP	105	492	738	(a)
726077	ME_BAR-HARBOR(AWOS)	1490	495	1238	(a)	727475	MN_MORA-MUNI(AWOS)	93	668	721	(a)
743920	ME_BRUNSWICK-NAS	1034	428	1183	(a)	726565	MN_MORRIS-MUNI(AWOS)	9	35	630	(a)
727120	ME_CARIBOU-MUNI-AP	239	595	954	(a)	726567	MN_NEW-ULM-MUNI(AWOS)	186	444	750	(a)
727033	ME_HOULTON-IAP	882	460	982	(a)	726544	MN_ORR	99	189	703	(a)
726196	ME_MILLINOCKET-MUNI-AP	1118	866	1116	(c)	726568	MN_OWATONNA(AWOS)	142	405	790	(a)
726083	ME_NORTHERN-AROSTOOK	671	614	1008	(a)	727453	MN_PARK-RAPIDS-MUNI-AP	448	314	642	(a)
726060	ME_PORTLAND-INTL-JETPORT	331	787	1140	(a)	726560	MN_PIERRE-RGNL	241	469	607	(a)
727130	ME_PRESQUE-ISLE-MUNI-AP	265	297	898	(a)	726566	MN_PIPESTONE(AWOS)	62	134	701	(c)
726079	ME_ROCKLAND-KNOX(AWOS)	630	1434	1262	(a)	726564	MN_RED-WING	364	577	815	(a)
726064	ME_SANFORD-MUNI(AWOS)	697	613	1229	(a)	726556	MN_REDWOOD-FALLS-MUNI	993	713	679	(a)
726073	ME_WATERVILLE(AWOS)	971	272	1086	(c)	726440	MN_ROCHESTER-IAP	258	517	785	(a)
727135	ME_WISCASSET	1489	1336	1190	(a)	727477	MN_ROSEAU-MUNI(AWOS)	18	274	532	(a)
726390	MI_ALPENA-CO-RGNL-AP	108	345	733	(a)	727556	MN_SILVER-BAY	139	251	773	(a)
725374	MI_ANN-ARBOR-MUNI-AP	553	438	954	(c)	726603	MN_SOUTH-ST-PAUL-MUNI	9	148	738	(a)
725396	MI_BATTLE-CREEK-KELLOGG-AP	453	350	842	(c)	726550	MN_ST-CLOUD-RGNL-AP	225	651	710	(a)
726355	MI_BENTON-HARBOR-ROSS	747	692	879	(a)	726584	MN_ST-PAUL-DOWNTOWN-AP	228	151	786	(a)
726384	MI_CADILLAC-WEXFORD-CO-AP	26	56	805	(a)	727555	MN_THIEF-RIVER(AWOS)	1969	580	604	(a)
727344	MI_CHIPPEWA-CO-IAP	1791	649	820	(a)	727444	MN_TWO-HARBORS	93	426	763	(a)
725375	MI_DETROIT-CITY-AP	390	390	823	(a)	727533	MN_WHEATON-NDB(AWOS)	223	548	584	(a)
725370	MI_DETROIT-METRO-AP	39	667	812	(a)	726576	MN_WILLMAR-RICE(AWOS)	123	187	736	(a)
725376	MI_DETROIT-WILLOW-RUN-AP	536	363	815	(a)	726588	MN_WINONA-MUNI(AWOS)	110	290	854	(a)
726480	MI_ESCANABA(AWOS)	3673	375	728	(c)	726587	MN_WORTHINGTON(AWOS)	1658	299	741	(c)
726370	MI_FLINT-BISHOP-IAP	82	523	770	(a)	723489	MO_CAPE-GIRARDEAU-MUNI-AP	995	608	1174	(a)
726350	MI_GRAND-RAPIDS-KENT-CO-IAP	256	788	931	(a)	724450	MO_COLUMBIA-RGNL-AP	8	631	1004	(a)
727440	MI_HANCOCK-HOUGHTON-CO-AP	745	172	806	(a)	724454	MO_FARMINGTON	1169	439	1069	(a)
726380	MI_HOUGHTON-LAKE-ROSCOMMON	159	593	721	(a)	724458	MO_JEFFERSON-CITY-MEM	1023	1183	1011	(a)
725378	MI_HOWELL	272	449	822	(a)	723495	MO_JOPLIN-MUNI-AP	1351	775	1108	(a)
727437	MI_IRON-MOUNTAIN-FORD	530	509	710	(a)	724459	MO_KAISER-MEM(AWOS)	1595	587	1036	(a)
727445	MI_IRONWOOD(AWOS)	3003	423	887	(c)	724463	MO_KANSAS-CITY-DOWNTOWN-AP	1232	770	964	(a)
725395	MI_JACKSON-REYNOLDS-FIELD	499	141	776	(a)	724460	MO_KANSAS-CITY-IAP	298	763	961	(a)
726357	MI_KALAMAZOO-BATTLE-CR	634	566	924	(a)	724455	MO_KIRKSVILLE-RGNL-AP	954	722	935	(a)
725390	MI_LANSING-CAPITAL-CITY-AP	234	751	776	(a)	723300	MO_POPLAR-BLUFF(AMOS)	870	618	1206	(a)
726385	MI_MANISTEE(AWOS)	2161	737	919	(c)	724345	MO_SPIRIT-OF-ST-LOUIS-AP	1330	775	1025	(a)
726487	MI_MENOMINEE(AWOS)	1041	738	813	(a)	724400	MO_SPRINGFIELD-RGNL-AP	277	911	1097	(a)
725377	MI_MT-CLEMENS-SELFRIDGE-FLD	1209	835	728	(c)	724490	MO_ST-JOSEPH-ROSECRANS-MEM	373	389	904	(c)
726360	MI_MUSKEGON-CO-AP	254	590	851	(a)	724340	MO_ST-LOUIS-LAMBERT-IAP	531	777	994	(a)
726375	MI_OAKLAND-CO-IAP	198	295	831	(a)	724456	MO_VICHY-ROLLA-NATL-AP	1715	1082	958	(a)
726395	MI_OSCODA-WURTSMITH-AFB	152	152	734	(a)	724457	MO_WAYNESVILLE-RGNL-AP	1739	960	1090	(a)
727347	MI_PELLSTON-EMMET-CO-AP	628	488	815	(a)	724467	MO_WHITEMAN-AFB	948	658	1058	(a)
726379	MI_SAGINAW-TRI-CITY-IAP	806	727	789	(a)	723306	MS_COLUMBUS-AFB	2114	1381	1470	(a)
727340	MI_SAULT-STE-MARIE-SNDRSN-FLD	180	428	851	(a)	723307	MS_GOLDEN-TRI(AWOS)	105	232	1453	(a)
725384	MI_ST-CLAIR-CO-IAP	35	95	787	(a)	722356	MS_GREENVILLE-MUNI-AP	655	456	1331	(c)
726387	MI_TRAVERSE-CITY-CHERRY-CAP	10	384	772	(a)	722359	MS_GREENWOOD-LEFLORE-AP	1112	916	1352	(a)
727504	MN_AITKIN-NDB(AWOS)	173	374	736	(a)	747685	MS_GULFPORT-BILOXI-IAP	875	639	1669	(c)
726589	MN_ALBERT-LEA(AWOS)	144	319	803	(a)	722348	MS_HATTIESBURG-LAUREL	1596	1613	1518	(a)
726557	MN_ALEXANDRIA-MUNI-AP	513	430	649	(a)	722350	MS_JACKSON-IAP	434	684	1402	(a)
727566	MN_AUSTIN-MUNI	309	641	816	(a)	747686	MS_KEESLER-AFB	1620	1241	1644	(a)
727476	MN_BAUDETTE-IAP	315	237	572	(a)	722358	MS_MCCOMB-PIKE-CO-AP	1590	890	1575	(a)
727550	MN_BEMIDJI-MUNI-AP	1453	273	631	(a)	722340	MS_MERIDIAN-KEY-FIELD	533	1318	1433	(a)
727507	MN_BENSON-MUNI	87	217	676	(a)	722345	MS_MERIDIAN-NAAS	1728	943	1431	(a)
726555	MN_BRAINERD-WIELAND	397	244	671	(a)	722357	MS_NATCHEZ-HARDY(AWOS)	2051	990	1452	(a)
727503	MN_CAMBRIDGE-MUNI	98	187	767	(a)	723320	MS_TUPELO-C-D-LEMONS-AP	1202	631	1439	(a)
726558	MN_CLOQUET(AWOS)	350	651	786	(c)	726770	MT_BILLINGS-LOGAN-IAP	71	89	357	(a)
727473	MN_CRANE-LAKE-SEAPLANE	54	279	794	(a)	726977	MT_BOZEMAN-GALLATIN-FLD	179	152	368	(a)
727452	MN_CROOKSTON-MUNI-FLD	0	0	518	(a)	726785	MT_BUTTE-BERT-MOONEY-AP	199	291	311	(a)
727457	MN_DETROIT-LAKES(AWOS)	101	231	664	(a)	727796	MT_CUT-BANK-MUNI-AP	73	126	298	(a)
727450	MN_DULUTH-IAP	313	721	770	(a)	727680	MT_GLASGOW-IAP	17	117	287	(a)
727459	MN_ELY-MUNI	107	254	723	(a)	726676	MT_GLENDIVE(AWOS)	559	219	344	(c)
727474	MN_EVELETH-MUNI(AWOS)	485	1127	688	(a)	727750	MT_GREAT-FALLS-IAP	70	143	363	(a)
726586	MN_FAIRMONT-MUNI(AWOS)	2729	636	831	(a)	727770	MT_HAVRE-CITY-CO-AP	173	285	314	(a)
726563	MN_FARIBAULT-MUNI-AWOS	364	699	770	(a)	727720	MT_HELENA-RGNL-AP	73	111	289	(a)
726579	MN_FLYING-CLOUD	545	433	767	(a)	727790	MT_KALISPELL-GLACIER-PK-IAP	20	185	437	(a)
727505	MN_FOSTON(AWOS)	88	291	602	(a)	726776	MT_LEWISTOWN-MUNI-AP	117	219	456	(a)

Sources: (a) Standard 169, (b) www.bestplaces.net, (c) www.currentresults.com, (d) <http://average-rainfall.findthebest.com>

Table 1. Annual Liquid Precipitation from TMY3, TMY3A, and measured sources
(continued)

WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall		WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall	
				Amount (mm)	Src					Amount (mm)	Src
726798	MT_LIVINGSTON-MISSION-FLD	208	211	371	(a)	724096	NJ_MCGUIRE-AFB	1121	821	1161	(a)
742300	MT_MILES-CITY-MUNI-AP	85	200	344	(a)	724075	NJ_MILLVILLE-MUNI-AP	869	696	1056	(a)
727730	MT_MISSOULA-IAP	9	207	345	(a)	725020	NJ_NEWARK-IAP	380	919	1110	(a)
727687	MT_SIDNEY-RICHLAND-MUNI	1632	298	352	(a)	725025	NJ_TETERBORO-AP	663	593	1199	(a)
727686	MT_WOLF-POINT-IAP	337	183	315	(a)	724095	NJ_TRENTON-MERCER-CO-AP	592	512	1074	(a)
723150	NC_ASHEVILLE-RGNL-AP	406	1065	1468	(a)	723650	NM_ALBUQUERQUE-IAP	23	99	231	(a)
723040	NC_CAPE-HATTERAS	321	1256	1458	(a)	722687	NM_CARLSBAD-CAVERN-CITY-AP	460	340	330	(a)
723140	NC_CHARLOTTE-DOUGLAS-IAP	357	921	1175	(a)	723600	NM_CLAYTON-MUNI-AIRPARK	174	69	390	(a)
723090	NC_CHERRY-POINT-MCAS	2002	964	1388	(a)	722686	NM_CLOVIS-CANNON-AFB	432	255	416	(a)
723046	NC_DARE-CO-RGNL	94	175	1303	(a)	722689	NM_CLOVIS-MUNI(AWOS)	457	137	436	(a)
746943	NC_ELIZ-CITY-COAST-GUARD-AP	449	366	1233	(c)	722725	NM_DEMING-MUNI	156	105	239	(a)
723030	NC_FAYETTEVILLE-POPE-AFB	1244	1016	1154	(c)	723658	NM_FARMINGTON-4-CORNERS-RGNL	169	105	233	(a)
723035	NC_FAYETTEVILLE-RGNL-G	330	284	1203	(a)	723627	NM_GALLUP-SEN-CLARKE-FLD	424	244	291	(a)
746930	NC_FORT-BRAGG-SIMMONS	1944	1258	1189	(a)	747320	NM_HOLLOMAN-AFB	211	144	272	(a)
723066	NC_GOLDSBORO-S-JOHNSON-AFB	1343	1075	1239	(c)	722695	NM_LAS-CRUCES-IAP	176	97	213	(a)
723170	NC_GREENSBORO-PIEDMONT-IAP	288	833	1075	(a)	723677	NM_LAS-VEGAS-MUNI-AP	123	100	458	(c)
723145	NC_HICKORY-RGNL-AP	768	456	1236	(a)	722680	NM_ROSWELL-INDUSTRIAL-AP	81	62	314	(a)
723069	NC_JACKSONVILLE(AWOS)	778	357	1466	(a)	723656	NM_SANTA-FE-CO-MUNI-AP	252	184	360	(c)
723067	NC_KINSTON-STALLINGS-AFB	0	0	1293	(a)	722683	NM_SIERRA-BLANCA-RGNL	8	23	517	(a)
723095	NC_NEW-BERN-CRAVEN-CO-RGNL-A	1313	938	1386	(a)	723663	NM_TAOS-MUNI-APT(AWOS)	2702	74	310	(a)
723096	NC_NEW-RIVER-MCAF	1807	660	1368	(a)	722710	NM_TRUTH-OR-CONSEQ-MUNI-AP	366	221	238	(a)
723065	NC_PITT-GREENVILLE-AP	72	112	1230	(a)	723676	NM_TUCUMCARI-FAA-AP	91	378	434	(c)
723060	NC_RALEIGH-DURHAM-IAP	275	675	1095	(a)	725825	NV_ELKO-MUNI-AP	50	74	253	(a)
723068	NC_ROCKY-MOUNT-WILSON	1034	1033	1189	(a)	724860	NV_ELY-YELLAND-FIELD	74	107	244	(a)
723143	NC_SOUTHERN-PINES(AWOS)	1579	532	1229	(a)	724885	NV_FALLON-NAAS	17	2	128	(a)
723013	NC_WILMINGTON-IAP	998	838	1407	(a)	723860	NV_LAS-VEGAS-MCCARRAN-IAP	21	60	109	(a)
723193	NC_WINSTON-SALEM-REYNOLDS-AP	801	588	1137	(a)	725805	NV_LOVELOCK-DERBY-FIELD	79	68	134	(a)
727640	ND_BISMARCK-MUNI-AP	148	366	424	(a)	723870	NV_MERCURY-DESERT-ROCK-AP	124	69	143	(a)
727573	ND_DEVILS-LAKE(AWOS)	1180	314	442	(a)	723865	NV_NELLIS-AFB	245	182	142	(a)
727645	ND_DICKINSON-MUNI-AP	535	335	410	(a)	724880	NV_RENO-TAHOE-IAP	34	83	189	(a)
727530	ND_FARGO-HECTOR-IAP	162	333	538	(a)	724855	NV_TONOPAH-AP	53	95	135	(a)
727575	ND_GRAND-FORKS-AFB	868	523	496	(a)	725830	NV_WINNEMUCCA-MUNI-AP	45	62	208	(a)
727576	ND_GRAND-FORKS-IAP	329	135	506	(a)	726228	NY_ADIRONDACK-RGNL	350	558	1042	(c)
727535	ND_JAMESTOWN-MUNI-AP	762	609	466	(a)	725180	NY_ALBANY-CO-AP	109	588	949	(a)
727675	ND_MINOT-AFB	492	314	449	(a)	725150	NY_BINGHAMTON-EDWIN-A-LINK-FL	199	642	963	(a)
727676	ND_MINOT-FAA-AP	99	292	457	(a)	725280	NY_BUFFALO-NIAGARA-IAP	111	690	984	(a)
727670	ND_WILLISTON-SLOULIN-IAP	240	268	360	(a)	725156	NY_ELMIRA-CORNING-RGNL-AP	1135	769	869	(a)
725556	NE_AINSWORTH-MUNI-AP	259	454	556	(a)	743700	NY_FORT-DRUM-WHEELER-S	1190	723	1007	(a)
725635	NE_ALLIANCE-MUNI-AP	362	341	390	(a)	725185	NY_GLENS-FALLS-AP	952	736	911	(a)
725515	NE_BEATRICE-MUNI-AP	163	497	771	(a)	725290	NY_GREATER-ROCHESTER-IAP	98	460	799	(a)
725540	NE_BELLEVUE-OFFUTT-AFB	910	616	778	(c)	725035	NY_ISLIP-LONG-IS-MACARTHUR-AP	1168	383	1206	(a)
725628	NE_BREWSTER-FLD-AP	256	227	656	(a)	725235	NY_JAMESTOWN(AWOS)	38	100	1149	(c)
725555	NE_BROKEN-BOW-MUNI	243	259	574	(a)	726223	NY_MASSENA-AP	0	494	877	(a)
725636	NE_CHADRON-MUNI-AP	353	293	458	(c)	725145	NY_MONTICELLO(AWOS)	2223	599	1209	(a)
725565	NE_COLUMBUS-MUNI	1306	1174	703	(a)	744860	NY_NEW-YORK-J-F-KENNEDY-IAP	722	406	1106	(a)
725533	NE_FALLS-CITY-BRENNER	1305	588	883	(c)	725030	NY_NEW-YORK-LAGUARDIA-AP	789	638	1238	(a)
725564	NE_FREMONT-MUNI-AP	401	317	786	(a)	725287	NY_NIAGARA-FALLS-AF	1002	678	899	(a)
725520	NE_GRAND-ISLAND-CENTRAL-NE-RGNL	175	313	649	(a)	725033	NY_NY-CENTRAL-PRK-OBS-BELV	0	690	1268	(c)
725525	NE_HASTINGS-MUNI-AP	462	483	724	(a)	725036	NY_POUGHKEEPSIE-DUTCHESS-CO	440	333	1119	(a)
725626	NE_IMPERIAL-FAA-AP	476	333	485	(a)	744864	NY_REPUBLIC	999	1007	1169	(a)
725526	NE_KEARNEY-MUNI(AWOS)	823	390	637	(a)	725038	NY_STEWART-FIELD	0	0	1182	(c)
725510	NE_LINCOLN-MUNI-AP	804	538	731	(a)	725190	NY_SYRACUSE-HANCOCK-IAP	103	610	957	(a)
725625	NE_MCCOOK-RGNL	603	301	521	(a)	725197	NY_UTILITY-ONEIDA-CO-AP	1369	803	1121	(a)
725560	NE_NORFOLK-KARL-STEFAN-MEM-AP	90	302	666	(a)	726227	NY_WATERTOWN-AP	876	460	815	(a)
725620	NE_NORTH-PLATTE-RGNL-AP	26	300	511	(a)	744865	NY_WESTHAMPTON-GABRESKI-AP	974	991	1274	(c)
725500	NE_OMAHA-EPPLBY-AIRFLD	791	566	804	(a)	725037	NY_WHITE-PLAINS-WSTCHSTR-CO	888	781	1268	(a)
725530	NE_OMAHA	0	365	770	(a)	725210	OH_AKRON-AKRON-CANTON-RGNL	55	688	961	(a)
725566	NE_ONEILL-BAKER-FIELD	97	226	627	(a)	725245	OH_BURKE-LAKEFRONT	470	489	994	(c)
725524	NE_ORD-SHARP-FIELD	170	169	597	(a)	724297	OH_CINCINNATI-MUNI-AP-LUNKI	798	327	1045	(a)
725660	NE_SCOTTSBLUFF-HEILIG-FIELD	8	160	392	(a)	725240	OH_CLEVELAND-HOPKINS-IAP	273	564	937	(a)
725610	NE_SIDNEY-MUNI-AP	427	217	443	(a)	724280	OH_COLUMBUS-PORT-COLUMBUS-IA	418	964	975	(a)
725527	NE_TEKAMAH(ASOS)	710	500	721	(a)	724290	OH_DAYTON-IAP	20	870	967	(a)
725670	NE_VALENTINE-MILLER-FIELD	377	309	476	(a)	745700	OH_DAYTON-WRIGHT-PATTERSON	1668	1117	1000	(a)
726160	NH_BERLIN-MUNI-AP	867	786	951	(a)	725366	OH_FINDLAY-AP	991	468	915	(a)
726050	NH_CONCORD-MUNI-AP	101	729	976	(a)	725246	OH_MANSFIELD-LAHM-MUNI-AP	0	817	1011	(a)
726165	NH_DILLANT-HOPKINS	837	733	1004	(a)	724288	OH_OHIO-STATE-UNIVERSI	626	594	935	(a)
726155	NH_LACONIA-MUNI(AWOS)	700	366	1062	(a)	725360	OH_TOLEDO-EXPRESS-AP	127	500	857	(a)
726116	NH_LEBANON-MUNI-AP	436	446	908	(a)	725250	OH_YOUNGSTOWN-RGNL-AP	43	938	958	(a)
743945	NH_MANCHESTER-AP	737	815	1098	(a)	724286	OH_ZANESVILLE-MUNI-AP	940	513	985	(a)
726130	NH_MOUNT-WASHINGTON	3277	1374	2470	(a)	723520	OK_ALTUS-AFB	238	141	672	(a)
726055	NH_PEAISE-INTL-TRADEPOR	1545	991	1168	(a)	723565	OK_BARTLESVILLE-PHILLI	333	454	1027	(c)
724070	NJ_ATLANTIC-CITY-IAP	200	897	1025	(a)	723526	OK_CLINTON-SHERMAN	580	413	692	(a)
724084	NJ_BELMAR-FARMDALE	504	297	1185	(a)	723550	OK_FORT-SILL	539	352	738	(a)
724094	NJ_CALDWELL-ESSEX-CO	1093	974	1153	(a)	723527	OK_GAGE-AP	269	260	487	(a)
745966	NJ_CAPE-MAY-CO	665	697	1098	(a)	723525	OK_HOBART-MUNI-AP	657	318	674	(a)

Sources: (a) Standard 169, (b) www.bestplaces.net, (c) www.currentresults.com, (d) http://average-rainfall.findthebest.com

Table 1. Annual Liquid Precipitation from TMY3, TMY3A, and measured sources
(continued)

WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall		WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall	
				Amount (mm)	Src					Amount (mm)	Src
723575	OK_LAWTON-MUNI-AP	698	542	738	(a)	726686	SD_PIERRE-MUNI-AP	155	192	481	(a)
723566	OK_MCALESTER-MUNI-AP	845	632	1116	(a)	726620	SD_RAPID-CITY-RGNL-AP	51	236	451	(a)
723540	OK_OKLA-CITY-TINKER-AFB	1141	700	912	(a)	726510	SD_SIOUX-FALLS-FOSS-FIELD	78	300	640	(a)
723544	OK_OKLAHOMA-CITY-WILEY	685	696	824	(a)	726546	SD_WATERTOWN-MUNI-AP	208	189	581	(a)
723530	OK_OKLAHOMA-CITY-WILL-ROGERS-A	223	604	865	(a)	723183	TN_BRISTOL-TRI-CITY-AP	109	718	1031	(a)
723546	OK_PONCA-CITY-MUNI-AP	579	302	903	(a)	723240	TN_CHATTANOOGA-LOVELL-FIELD-AP	518	1123	1353	(a)
723545	OK_STILLWATER-RGNL	381	293	879	(a)	723265	TN_CROSSVILLE-MEM-AP	1238	796	1520	(a)
723560	OK_TULSA-IAP	281	443	1044	(a)	723347	TN_DYERSBURG-MUNI-AP	672	562	1302	(a)
723535	OK_VANCE-AFB	891	535	777	(a)	723346	TN_JACKSON-MCKELLAR-RGNL-AP	1594	812	1336	(a)
727910	OR_ASTORIA-RGNL-AP	179	1157	1737	(a)	723260	TN_KNOXVILLE-MCGHEE-TYSON-AP	394	963	1222	(a)
726959	OR_AURORA-STATE	610	737	1102	(a)	723340	TN_MEMPHIS-IAP	406	849	1303	(a)
726886	OR_BAKER-MUNI-AP	117	91	267	(a)	723270	TN_NASHVILLE-IAP	360	785	1243	(a)
726830	OR_BURNS-MUNI-AP	50	86	297	(a)	690190	TX_ABILENE-DYESS-AFB	396	183	631	(a)
726945	OR_CORVALLIS-MUNI	662	1723	1335	(a)	722660	TX_ABILENE-RGNL-AP	122	363	625	(a)
726930	OR_EUGENE-MAHLON-SWEET-AP	247	877	1213	(a)	722517	TX_ALICE-IAP	723	632	689	(a)
725895	OR_KLAMATH-FALLS-IAP	275	223	349	(a)	723630	TX_AMARILLO-IAP	36	432	512	(a)
726884	OR_LA-GRANDE-MUNI-AP	59	243	573	(a)	722544	TX_AUSTIN-CAMP-MABRY	54	644	864	(a)
725976	OR_LAKEVIEW(AWOS)	2922	294	373	(c)	722540	TX_AUSTIN-MUELLER-MUNI	901	585	870	(c)
725970	OR_MEDFORD-ROGUE-VALLEY-IAP	45	293	479	(a)	722500	TX_BROWNSVILLE-IAP	143	493	665	(a)
726917	OR_NORTH-BEND-MUNI-AP	103	1361	1635	(a)	723604	TX_CHILDRESS-MUNI-AP	606	679	512	(a)
726880	OR_PENDLETON-E-OR-RGNL-AP	74	199	311	(a)	722445	TX_COLLEGE-STATION-ESTRWD-FLD	1035	669	1040	(a)
726986	OR_PORTLAND-HILLSBORO	537	787	1103	(a)	722510	TX_CORPUS-CHRISTI-IAP	77	698	800	(a)
726980	OR_PORTLAND-IAP	135	615	1170	(a)	722515	TX_CORPUS-CHRISTI-NAS	1228	895	799	(a)
726985	OR_PORTLAND-TROUTDALE	726	842	1104	(c)	722526	TX_COTULLA-FAA-AP	565	418	567	(a)
726835	OR_REDMOND-ROBERTS-FIELD	65	109	219	(a)	722587	TX_COX-FLD	139	442	1202	(a)
726904	OR_ROSEBURG-RGNL-AP	655	579	838	(a)	722636	TX_DALHART-MUNI-AP	677	528	456	(a)
726940	OR_SALEM-MCNARY-FIELD	397	685	999	(a)	722598	TX_DALLAS-ADDISON-AP	42	40	954	(c)
725975	OR_SEXTON-SUMMIT	347	55	937	(a)	722590	TX_DALLAS-FORT-WORTH-IAP	133	475	886	(a)
725170	PA_ALLENTOWN-LEHIGH-VAL-IAP	0	706	1119	(a)	722583	TX_DALLAS-LOVE-FIELD	746	678	927	(a)
725126	PA_ALTOONA-BLAIR-CO-AP	990	672	925	(a)	722599	TX_DALLAS-REDBIRD-AP	580	478	928	(a)
725266	PA_BRADFORD-RGNL-AP	0	668	1127	(a)	722610	TX_DEL-RIO-IAP	203	253	483	(a)
725124	PA_BUTLER-CO(AWOS)	230	241	1045	(a)	722615	TX_DEL-RIO-LAUGHLIN-AFB	766	402	496	(c)
725125	PA_DUBOIS-FAA-AP	1156	804	1088	(a)	722577	TX_DRAUGHON-MILLER-CEN	337	219	900	(a)
725260	PA_ERIE-IAP	44	899	1095	(a)	722700	TX_EL-PASO-IAP	122	276	222	(a)
725267	PA_FRANKLIN	232	242	1075	(a)	722570	TX_FORT-HOOD	505	413	826	(a)
725118	PA_HARRISBURG-CAPITAL-CITY-AP	94	67	1034	(a)	722594	TX_FORT-WORTH-ALLIANCE	740	709	858	(a)
725127	PA_JOHNSTOWN-CAMBRIA-CO-AP	293	450	1172	(a)	722596	TX_FORT-WORTH-MEACHAM	774	708	858	(a)
725116	PA_LANCASTER	654	517	1087	(c)	722595	TX_FORT-WORTH-NAS	735	247	858	(a)
725115	PA_MIDDLETOWN-HARRISBURG-IAP	797	692	1034	(a)	722420	TX_GALVESTON-SCHOLES	1343	1295	1076	(a)
724080	PA_PHILADELPHIA-IAP	298	847	1134	(a)	722547	TX_GEORGETOWN(AWOS)	852	184	853	(a)
724085	PA_PHILADELPHIA-NE-PHILLY	280	354	1168	(a)	722588	TX_GREENVILLE-MAJORS	5	2	1039	(a)
725205	PA_PITTSBURGH-ALLEGHENY-CO-AP	442	489	1008	(a)	722505	TX_HARLINGEN-RIO-GRANDE-VALLY	193	184	702	(a)
725200	PA_PITTSBURGH-IAP	68	555	942	(a)	722533	TX_HONDO-MUNI-AP	930	464	723	(a)
725103	PA_READING-SPAATZ-FIELD	815	621	1085	(a)	722430	TX_HOUSTON-BUSH-INTERCONTNL	197	704	1262	(a)
725128	PA_STATE-COLLEGE	2	147	1006	(c)	722429	TX_HOUSTON-D-W-HOOKS	669	599	1187	(a)
725117	PA_WASHINGTON(AWOS)	1454	405	1046	(a)	722436	TX_HOUSTON-ELLINGTON-AFB	529	535	1356	(a)
725130	PA_WILKES-BARRE-SCRANTON-IAP	53	570	940	(a)	722435	TX_HOUSTON-WILLIAM-P-HOBBY-AP	2616	1679	1340	(a)
725140	PA_WILLIAMSPORT-RGNL-AP	176	585	1040	(a)	722575	TX_KILLEEN-MUNI(AWOS)	19	28	878	(a)
724086	PA_WILLOW-GROVE-NAS	709	257	1212	(a)	722516	TX_KINGSVILLE	271	198	712	(a)
785140	PRI_AQUADILLA-BORINQUEN	0	0	1562	(a)	722535	TX_LACKLAND-AFB-KELLY	258	213	820	(c)
785145	PRI_EUGENIO-MARIA-DE-HO	0	0	1510	(c)	722520	TX_LAREDO-IAP	6	4	485	(a)
785203	PRI_MERCEDITA	0	0	977	(c)	722470	TX_LONGVIEW-GREGG-CO-AP	1094	633	1232	(a)
785350	PRI_ROOSEVELT-ROADS	769	662	1442	(a)	722670	TX_LUBBOCK-IAP	183	350	479	(a)
785260	PRI_SAN-JUAN-IAP	463	1189	1352	(a)	722446	TX_LUFKIN-ANGELINA-CO	719	912	1137	(a)
785263	PRI_SAN-JUAN-MARIN-IAP	2124	1237	1352	(a)	722640	TX_MARFA-AP	1608	177	412	(a)
725058	RI_BLOCK-ISLAND-STATE-AP	1594	477	1024	(a)	722563	TX_MC-GREGOR(AWOS)	242	184	869	(a)
725054	RI_PAWTUCKET(AWOS)	1541	735	1212	(a)	722506	TX_MCALLEN-MILLER-IAP	235	159	585	(a)
725070	RI_PROVIDENCE-GREEN-STATE-AP	124	652	1154	(a)	722650	TX_MIDLAND-IAP	167	412	370	(a)
723125	SC_ANDERSON-CO-AP	1325	1024	1318	(a)	722597	TX_MINERAL-WELLS-MUNI-AP	1020	699	782	(a)
722085	SC_BEAUFORT-MCAS	1296	730	1286	(a)	722499	TX_NACOGDOCHES(AWOS)	528	481	1191	(a)
722080	SC_CHARLESTON-IAP	344	1318	1283	(a)	722555	TX_PALACIOS-MUNI-AP	1051	869	1192	(a)
723100	SC_COLUMBIA-METRO-AP	175	1229	1266	(a)	722410	TX_PORT-ARTHUR-JEFFERSON-CO	96	1195	1476	(a)
723106	SC_FLORENCE-RGNL-AP	968	1052	1097	(a)	722536	TX_RANDOLPH-AFB	437	389	840	(a)
723119	SC_GREENVILLE-DOWNTOWN-AP	164	123	1199	(c)	722576	TX_ROBERT-GRAY-AAF	455	282	840	(c)
723120	SC_GREENVILLE-SPARTANBRG-AP	296	876	1275	(a)	722524	TX_ROCKPORT-ARANSAS-CO	859	687	942	(a)
747910	SC_MYRTLE-BEACH-AFB	88	104	1327	(a)	722630	TX_SAN-ANGELO-MATHIS-FIELD	116	362	521	(a)
747915	SC_N-MYRTLE-BEACH-GRAND-STR	771	744	1305	(c)	722530	TX_SAN-ANTONIO-IAP	35	581	808	(a)
747900	SC_SUMTER-SHAW-AFB	1633	1422	1203	(a)	722523	TX_SAN-ANTONIO-STINSON	485	450	770	(a)
726590	SD_ABERDEEN-RGNL-AP	360	371	548	(a)	722448	TX_TYLER-POUNDS-FLD	807	374	1184	(c)
726515	SD_BROOKINGS(AWOS)	516	458	617	(c)	722550	TX_VICTORIA-RGNL-AP	32	768	1014	(a)
726525	SD_CHAN-GURNEY-MUNI	539	487	590	(a)	722560	TX_WACO-RGNL-AP	191	531	848	(a)
726625	SD_ELLSWORTH-AFB	506	226	451	(a)	723510	TX_WICHITA-FALLS-MUNI-AP	100	508	724	(a)
726540	SD_HURON-RGNL-AP	97	298	539	(a)	722656	TX_WINK-WINKLER-CO-AP	311	296	292	(a)
726545	SD_MITCHELL(AWOS)	279	215	658	(c)	724723	UT_BLANDING-MUNI	146	178	338	(a)
726685	SD_MOBRIDGE-MUNI	788	414	418	(a)	724756	UT_BRYCE-CNYN-FAA-AP	313	256	424	(c)

Sources: (a) Standard 169, (b) www.bestplaces.net, (c) www.currentresults.com, (d) <http://average-rainfall.findthebest.com>

Table 1. Annual Liquid Precipitation from TMY3, TMY3A, and measured sources
(continued)

WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall		WMO Station #	TMY3 Filename*	TMY3 Annual Liquid Precip (mm)	TMY3A Annual Liquid Precip (mm)	Measured annual avg rainfall	
				Amount (mm)	Src					Amount (mm)	Src
724755	UT_CEDAR-CITY-MUNI-AP	72	115	286	(a)	727810	WA_YAKIMA-AIR-TERMINAL	30	128	197	(a)
724795	UT_DELTA	111	106	219	(c)	726626	WI_ANTIGO-LANG(AWOS)	12	41	723	(a)
724735	UT_HANKSVILLE	102	150	191	(a)	726457	WI_APPLETON-OUTAGAMIE	18	109	753	(a)
724776	UT_MOAB-CANYONLANDS	257	138	240	(c)	726435	WI_EAU-CLAIRE-CO-AP	227	594	780	(a)
725755	UT_OGDEN-HILL-AFB	576	175	544	(a)	726450	WI_GREEN-BAY-AUSTIN-IAP	201	428	732	(a)
725750	UT_OGDEN-HINKLEY-AP	181	187	466	(c)	726415	WI_JANESVILLE-ROCK-CO	15	52	828	(a)
725724	UT_PROVO-MUNI(AWOS)	2255	147	483	(a)	726430	WI_LA-CROSSE-MUNI-AP	371	585	858	(a)
725720	UT_SALT-LAKE-CITY-IAP	149	218	405	(a)	726416	WI_LONE-ROCK-FAA-AP	737	675	775	(a)
724754	UT_ST-GEORGE(AWOS)	249	130	210	(a)	726410	WI_MADISON-DANE-CO-RGNL-AP	135	810	829	(a)
725705	UT_VERNAL-AP	204	151	216	(a)	726455	WI_MANITOWAC-MUNI(AWOS)	250	293	742	(a)
725810	UT_WENDOVER-USAF-AUX-FIELD	1493	49	127	(a)	726574	WI_MARSHFIELD-MUNI	543	457	851	(a)
724058	VA_ABINGTON	8	37	1158	(a)	726400	WI_MILWAUKEE-MITCHELL-IAP	11	851	829	(a)
724016	VA_CHARLOTTESVILLE-FAA	540	539	1211	(c)	726404	WI_MINOCQUA-WOODRUFF	61	152	795	(a)
724106	VA_DANVILLE-FAA-AP	1041	503	1095	(a)	726465	WI_MOSINEE-CENTRAL-WI	0	0	826	(a)
724037	VA_DAVISON-AAF	1302	928	904	(a)	726468	WI_PHILLIPS-PRICE-CO	0	0	859	(a)
724014	VA_DINWIDDIE-CO	21	727	1171	(a)	727415	WI_RHINELANDER-ONEIDA	483	549	816	(a)
724017	VA_FARMVILLE	0	3	1098	(a)	726467	WI_RICE-LAKE-MUNI-AP	43	339	831	(a)
723083	VA_FRANKLIN-NAAS	0	0	1237	(a)	726458	WI_STURGEON-BAY	608	543	768	(a)
724107	VA_HILLSVILLE	0	0	1040	(a)	726464	WI_WATERTOWN	35	320	850	(a)
724115	VA_HOT-SPRINGS-INGALLS	0	0	986	(a)	726463	WI_WAUSAU-MUNI-AP	894	600	804	(a)
745980	VA_LANGLEY-APB	1210	868	1191	(a)	726456	WI_WITTMAN-RGNL	657	550	813	(a)
724055	VA_LEESBURG-GODFREY	0	0	1054	(a)	724120	WV_BECKLEY-RALEIGH-CO-MEM-AP	711	643	1052	(a)
724100	VA_LYNCHBURG-RGNL-AP	143	742	1036	(a)	724125	WV_BLUEFIELD-MERCER-CO	760	522	980	(a)
724036	VA_MANASSAS-MUNI(AWOS)	305	326	1032	(a)	724140	WV_CHARLESTON-YEAGER-AP	39	921	1097	(a)
724056	VA_MARION-WYTHEVILLE	0	0	1089	(a)	724170	WV_ELKINS-RANDOLPH-CO-AP	0	1188	1127	(a)
745985	VA_MARTINSVILLE	0	0	1267	(a)	724127	WV_GREENBRIER-VALLEY	733	631	998	(a)
724026	VA_MELFA-ACCOMACK-AP	17	92	1090	(a)	724175	WV_HARRISON-MARION-RGN	463	500	1149	(a)
723086	VA_NEWPORT-NEWS-WILLIA	1262	633	1191	(a)	724250	WV_HUNTINGTON-TRI-STATE-AP	100	895	1064	(a)
723080	VA_NORFOLK-IAP	0	723	1153	(a)	724177	WV_MARTINSBURG-E-WV-RGNL-AP	1549	1212	967	(a)
723085	VA_NORFOLK-NAS	1134	744	1153	(a)	724176	WV_MORGANTOWN-HART-FIELD	1146	1014	1045	(a)
723075	VA_OCEANA-NAS	1306	716	1123	(a)	724273	WV_PARKERSBURG-WOOD-CO-AP	1184	762	1055	(a)
724116	VA_PULASKI	0	0	945	(a)	724275	WV_WHEELING-OHIO-CO-AP	579	462	1026	(c)
724035	VA_QUANTICO-MCAS	855	543	968	(a)	725690	WY_CASPER-NATRONA-CO-IAP	3	95	308	(a)
724010	VA_RICHMOND-IAP	308	909	1107	(a)	725640	WY_CHEYENNE-MUNI-AP	70	369	369	(a)
724110	VA_ROANOKE-RGNL-AP	191	869	1033	(a)	726700	WY_CODY-MUNI(AWOS)	1296	75	232	(a)
724033	VA_SHANNON-AP	0	0	1047	(a)	725775	WY_EVANSTON-BURNS-FLD	150	66	310	(c)
724105	VA_STAUNTON-SHENANDOAH	28	552	960	(a)	726650	WY_GILLETTE-GILLETTE-C	169	183	383	(a)
724113	VA_VIRGINIA-TECH-AP	25	495	1043	(a)	725776	WY_JACKSON-HOLE	67914	927	543	(a)
724030	VA_WASHINGTON-DC-DULLES-IAP	425	1127	1042	(a)	725760	WY_LANDER-HUNT-FIELD	75	62	326	(a)
724050	VA_WASHINGTON-DC-REAGAN-AP	685	590	1002	(a)	725645	WY_LARAMIE-GENERAL-BREES-FIELD	791	153	274	(a)
724053	VA_WINCHESTER-RGNL	1	50	1003	(a)	725745	WY_RAWLINS-MUNI-AP	157	55	235	(c)
724117	VA_WISE-LONESOME-PINE	0	0	1208	(a)	725765	WY_RIVERTON-RGNL	176	118	214	(c)
785430	VIR_CHARLOTTE-AMALIE-KING-AP	1237	288			725744	WY_ROCK-SPRINGS-AP	71	187	209	(a)
726170	VT_BURLINGTON-IAP	38	659	882	(a)	726660	WY_SHERIDAN-CO-AP	76	177	387	(a)
726145	VT_MONTPELIER-AP	750	712	875	(a)	726665	WY_WORLAND-MUNI	158	130	193	(a)
725165	VT_RUTLAND-STATE	719	880	1099	(a)						
726115	VT_SPRINGFIELD-HARTNES	1133	969	1120	(a)						
727976	WA_BELLINGHAM-IAP	380	396	855	(a)						
727928	WA_BREMERTON-NATIONAL	2248	2538	1197	(a)						
727826	WA_EPHRATA-AP-FCWOS	54	40		(a)						
727855	WA_FAIRCHILD-AFB	529	258	397	(a)						
727856	WA_FELTS-FLD	263	247	525	(a)						
742070	WA_FORT-LEWIS-GRAY-AAF	1223	1010	1163	(a)						
727840	WA_HANFORD	223	118	174	(a)						
727923	WA_HOQUIAM-AP	617	1062	2284	(a)						
727924	WA_KELSO-WB-AP	79	172	1177	(a)						
727827	WA_MOSES-LAKE-GRANT-CO-AP	113	99	201	(a)						
727920	WA_OLYMPIA-AP	250	1119	1255	(a)						
727825	WA_PANGBORN-MEM	573	63	224	(a)						
727845	WA_PASCO	145	127	198	(a)						
727857	WA_PULLMAN-MOSCOW-RGNL	267	166	519	(a)						
727970	WA_QUILLAYUTE-STATE-AP	253	1975	2566	(a)						
727934	WA_RENTON-MUNI	649	813	968	(a)						
727935	WA_SEATTLE-BOEING-FIELD	851	860	1015	(a)						
727930	WA_SEATTLE-TACOMA-IAP	180	689	952	(a)						
727937	WA_SNOHOMISH-CO	655	825	909	(a)						
727850	WA_SPOKANE-IAP	95	286	397	(a)						
727815	WA_STAMPEDE-PASS	999	417	2171	(a)						
742060	WA_TACOMA-MCCHORD-AFB	1123	776	1063	(a)						
727938	WA_TACOMA-NARROWS	691	838	1197	(a)						
726988	WA_THE-DALLES-MUNI-AP	188	126	370	(a)						
727926	WA_TOLEDO-WINLOCK-MEM	945	881	1158	(a)						
727846	WA_WALLA-WALLA-CITY-CO-AP	238	223	501	(a)						
690230	WA_WHIDBEY-ISLAND-NAS	416	170	495	(a)						
727885	WA_WILLIAM-R-FAIRCHILD	329	425	954	(a)						

Sources: (a) Standard 169, (b) www.bestplaces.net, (c) www.currentresults.com, (d) http://average-rainfall.findthebest.com