

Supplementary Materials

Assessment of uncertainty associated with statistical modeling of precipitation extremes for hydrologic engineering applications in Amman, Jordan”

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Table S1 The results of 10000 bootstrap samples summary statistics characteristics (i.e., the average, standard deviation (SD), Coefficient of Variation (CV), skewness, and kurtosis) and their standard deviation for different record lengths for station 17.

Record length	Average		Standard Deviation (SD)		Coefficient of Variation (CV)		Skewness		Kurtosis	
	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD
10	72.291	8.749	26.696	6.901	0.369	0.084	0.373	0.578	2.484	0.891
15	72.259	7.130	26.968	5.603	0.373	0.068	0.480	0.518	2.742	1.015
20	72.227	6.254	27.085	4.851	0.375	0.059	0.537	0.464	2.884	1.017
30	72.191	5.074	27.277	3.959	0.378	0.048	0.610	0.386	3.064	0.942
40	72.147	4.411	27.348	3.409	0.379	0.041	0.645	0.340	3.168	0.878
50	72.121	3.936	27.400	3.047	0.380	0.037	0.666	0.305	3.230	0.795
75	72.095	3.213	27.473	2.503	0.381	0.031	0.692	0.245	3.296	0.654
80	72.098	3.097	27.485	2.403	0.381	0.029	0.696	0.236	3.306	0.636
90	72.096	2.918	27.486	2.272	0.381	0.028	0.701	0.221	3.318	0.593
100	72.098	2.761	27.498	2.141	0.381	0.026	0.705	0.208	3.330	0.561
150	72.101	2.263	27.527	1.753	0.382	0.021	0.718	0.169	3.360	0.453
200	72.113	1.951	27.546	1.508	0.382	0.018	0.724	0.145	3.376	0.394
500	72.074	1.234	27.557	0.954	0.382	0.012	0.736	0.092	3.407	0.247
Max	72.291	8.749	27.557	6.901	0.382	0.084	0.736	0.578	3.407	1.017
Min	72.074	1.234	26.696	0.954	0.369	0.012	0.373	0.092	2.484	0.247
Percent change	0.301	608.945	3.223	623.025	3.561	619.277	97.616	530.432	37.139	311.500

Observed data summary statistics characteristics for station 17 are: average = 72.086, SD = 27.779, CV = 0.385, skewness = 0.743, and kurtosis = 3.421.

Table S2 The results of 10000 bootstrap samples summary statistics characteristics (i.e., the average, standard deviation (SD), Coefficient of Variation (CV), skewness, and kurtosis) and their standard deviation for different record lengths for station 19.

Record length	Average		Standard Deviation (SD)		Coefficient of Variation (CV)		Skewness		Kurtosis	
	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD
10	38.094	4.650	14.141	4.267	0.369	0.093	0.583	0.621	2.797	1.079
15	38.122	3.801	14.393	3.452	0.376	0.075	0.736	0.575	3.221	1.323
20	38.110	3.288	14.509	2.987	0.379	0.065	0.822	0.522	3.479	1.374
30	38.079	2.700	14.609	2.409	0.383	0.052	0.914	0.434	3.764	1.277
40	38.077	2.352	14.654	2.089	0.384	0.045	0.958	0.372	3.899	1.159
50	38.060	2.086	14.683	1.860	0.385	0.040	0.984	0.322	3.978	1.029
75	38.082	1.699	14.723	1.507	0.386	0.033	1.011	0.252	4.057	0.829
80	38.079	1.657	14.722	1.462	0.386	0.032	1.014	0.245	4.061	0.801
90	38.078	1.555	14.732	1.370	0.387	0.030	1.021	0.226	4.080	0.747
100	38.076	1.471	14.744	1.305	0.387	0.028	1.026	0.213	4.090	0.704
150	38.072	1.201	14.764	1.069	0.388	0.023	1.039	0.172	4.122	0.571
200	38.074	1.048	14.766	0.928	0.388	0.020	1.045	0.147	4.134	0.485
500	38.069	0.667	14.780	0.584	0.388	0.013	1.055	0.091	4.157	0.303
Max	38.122	4.650	14.780	4.267	0.388	0.093	1.055	0.621	4.157	1.374
Min	38.060	0.667	14.141	0.584	0.369	0.013	0.583	0.091	2.797	0.303
Percent change	0.163	596.632	4.516	630.181	5.288	647.379	81.018	579.650	48.613	354.208

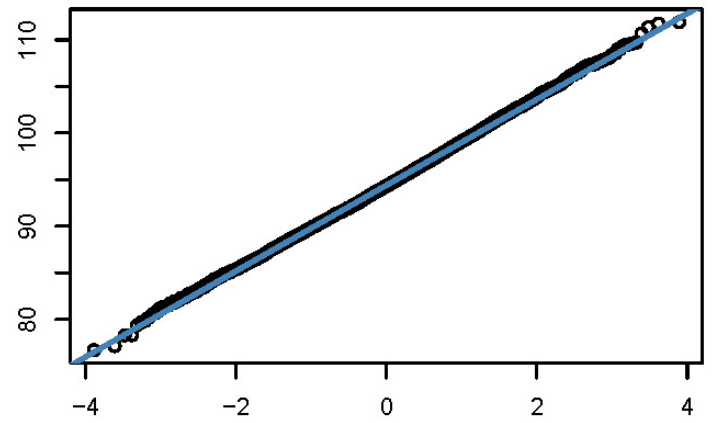
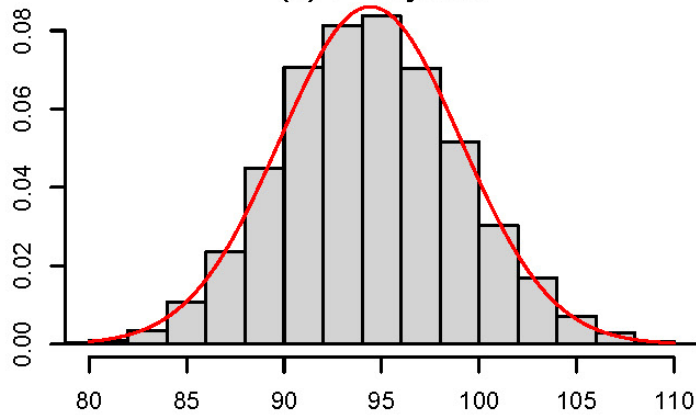
Observed data summary statistics characteristics for station 19 are: average = 38.062, SD = 14.884, CV = 0.391, skewness = 1.062, and kurtosis = 4.17.

Table S3 The results of 10000 bootstrap samples summary statistics characteristics (i.e., the average, standard deviation (SD), Coefficient of Variation (CV), skewness, and kurtosis) and their standard deviation for different record lengths for station 22.

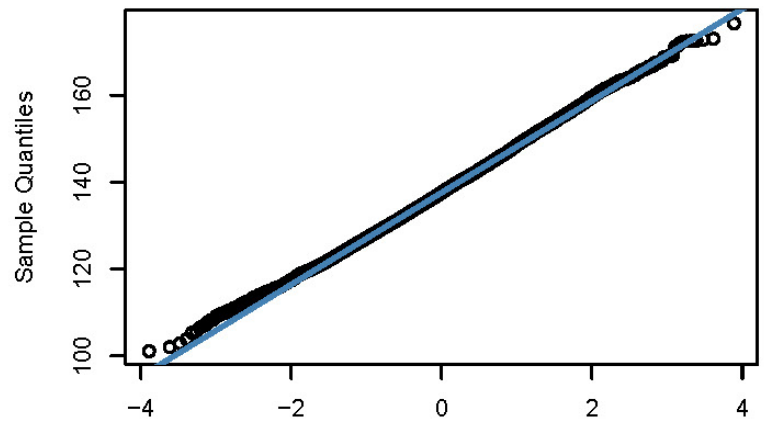
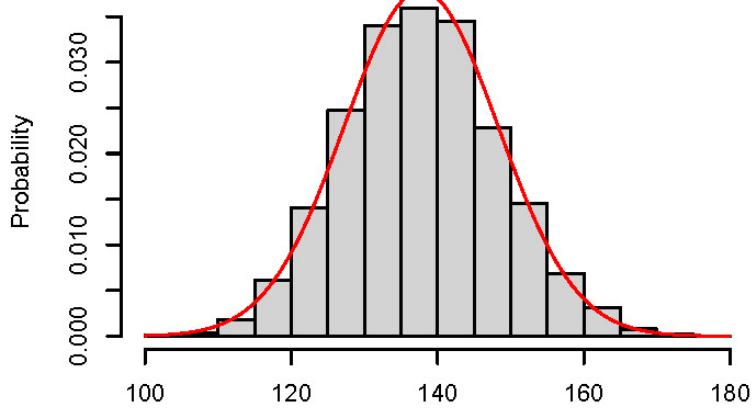
Record length	Average		Standard Deviation (SD)		Coefficient of Variation (CV)		Skewness		Kurtosis	
	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD
10	59.855	8.468	25.509	7.865	0.422	0.105	0.722	0.604	2.902	1.168
15	59.805	6.870	25.882	6.357	0.430	0.084	0.888	0.545	3.358	1.407
20	59.771	5.977	26.056	5.474	0.434	0.072	0.974	0.494	3.627	1.460
30	59.790	4.823	26.226	4.450	0.437	0.058	1.050	0.399	3.858	1.317
40	59.779	4.185	26.317	3.790	0.439	0.049	1.093	0.341	3.995	1.178
50	59.801	3.735	26.395	3.393	0.441	0.044	1.114	0.297	4.048	1.049
75	59.808	3.057	26.471	2.731	0.442	0.036	1.137	0.236	4.101	0.829
80	59.802	2.966	26.477	2.647	0.442	0.034	1.142	0.229	4.115	0.819
90	59.796	2.782	26.486	2.498	0.443	0.032	1.145	0.214	4.120	0.760
100	59.801	2.651	26.492	2.357	0.443	0.031	1.150	0.203	4.132	0.723
150	59.821	2.163	26.538	1.924	0.443	0.025	1.158	0.162	4.140	0.577
200	59.808	1.867	26.548	1.664	0.444	0.022	1.164	0.138	4.150	0.496
500	59.846	1.189	26.616	1.050	0.445	0.013	1.170	0.087	4.151	0.309
Max	59.855	8.468	26.616	7.865	0.445	0.105	1.170	0.604	4.151	1.460
Min	59.771	1.189	25.509	1.050	0.422	0.013	0.722	0.087	2.902	0.309
Percent change	0.141	612.346	4.341	648.785	5.339	676.415	62.024	597.680	43.057	372.110

Observed data summary statistics characteristics for station 22 are: average = 59.841, SD = 26.816, CV = 0.448, skewness = 1.175, and kurtosis = 4.158.

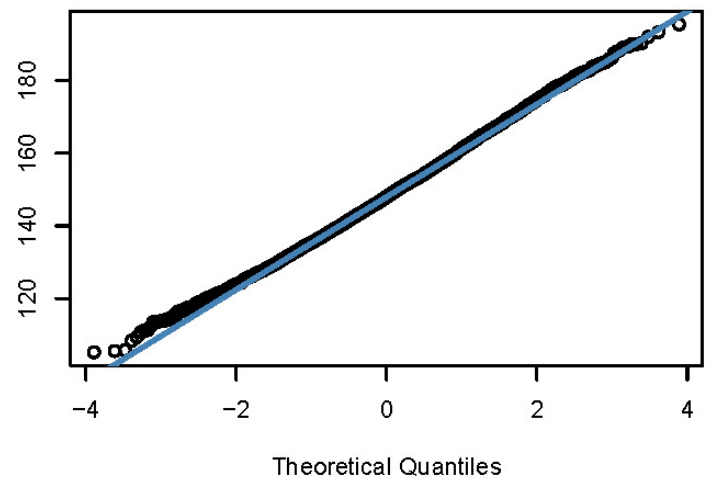
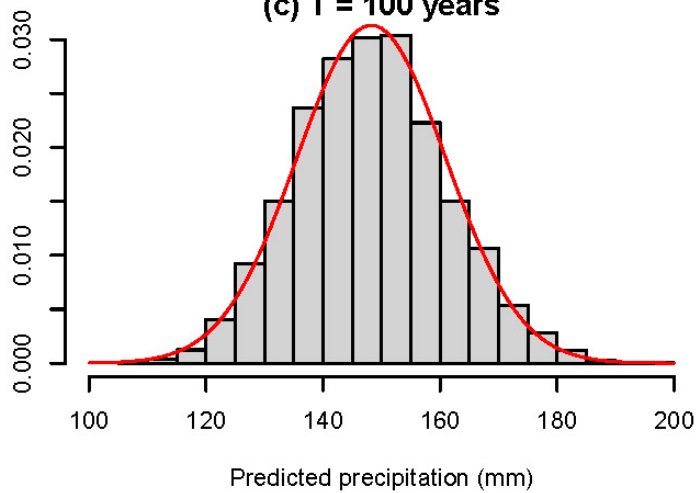
(a) $T = 5$ years



(b) $T = 50$ years



(c) $T = 100$ years



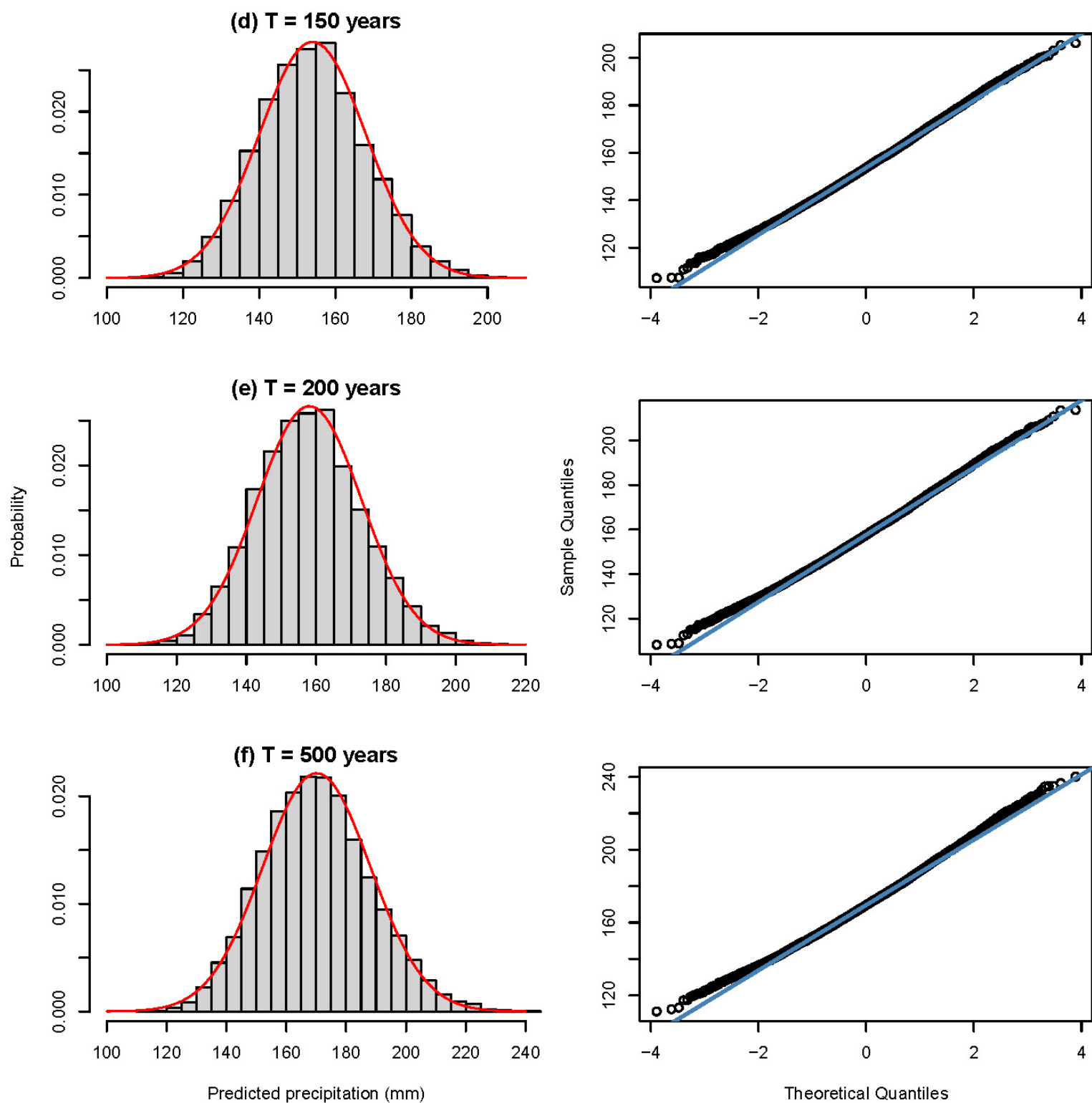
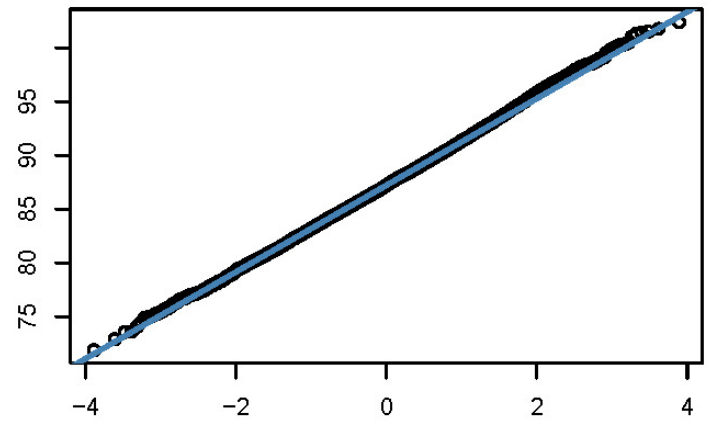
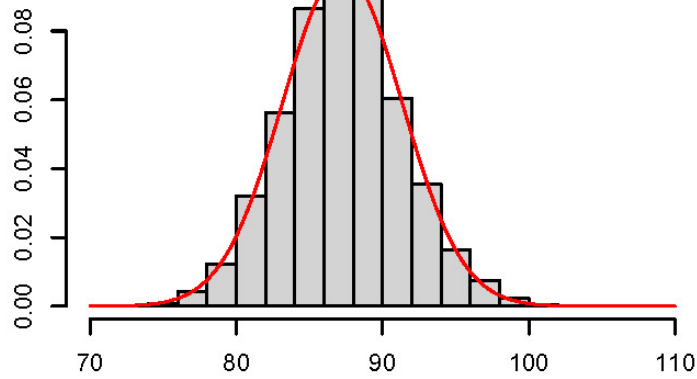
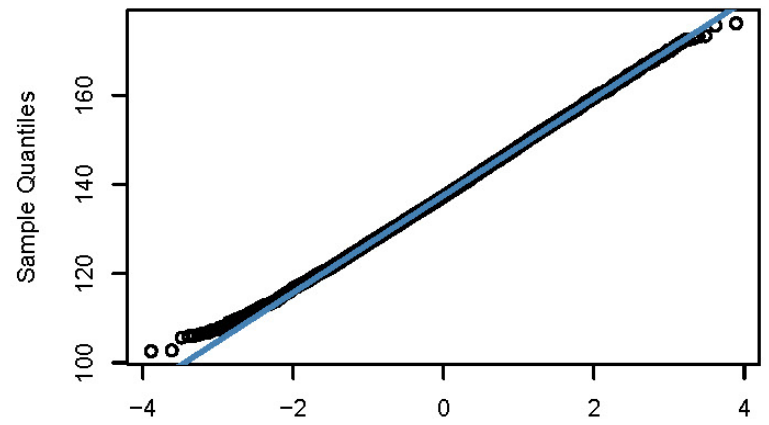
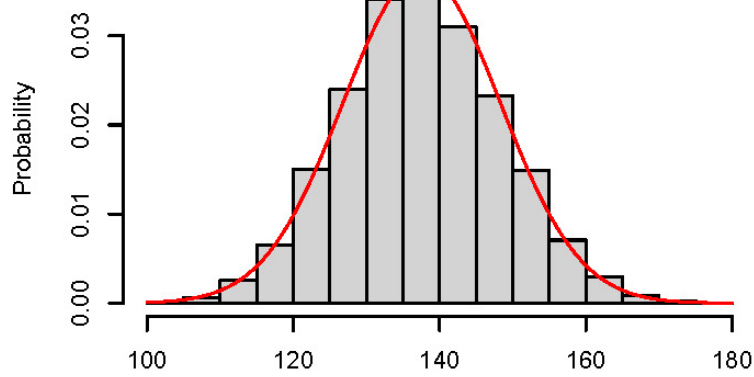


Figure S1 histogram and normal Q-Q plots for of the bootstrap sampling distribution of extreme precipitation quantile for (a) 5- years, (b) 50- years, (c) 100- years, (d) 150- years, (e) 200- years and (f) 500-years return periods for station 17.

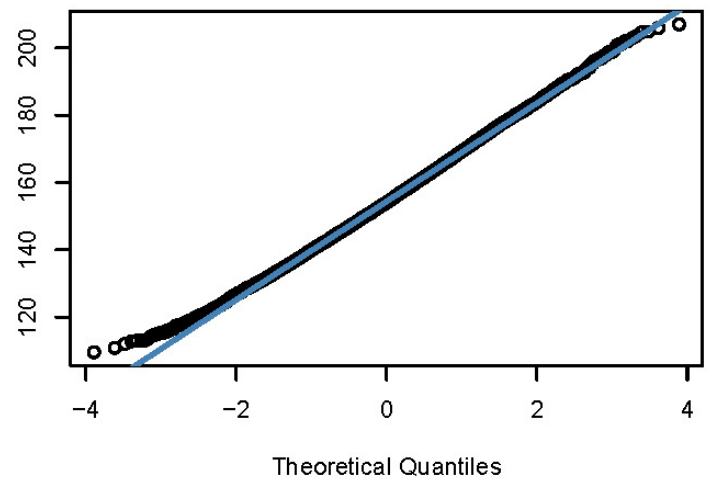
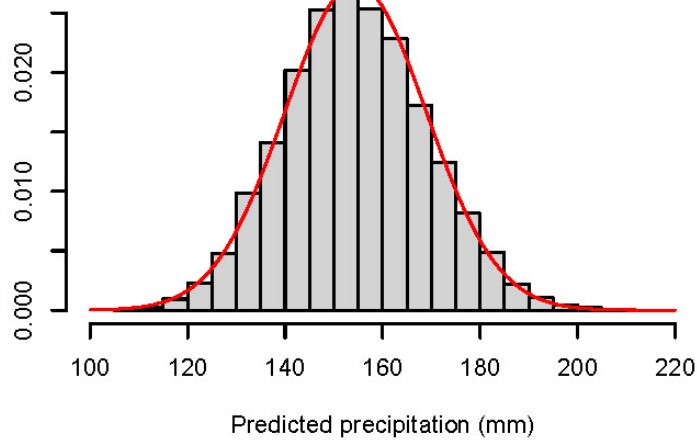
(a) T = 5 years



(b) T = 50 years



(c) T = 100 years



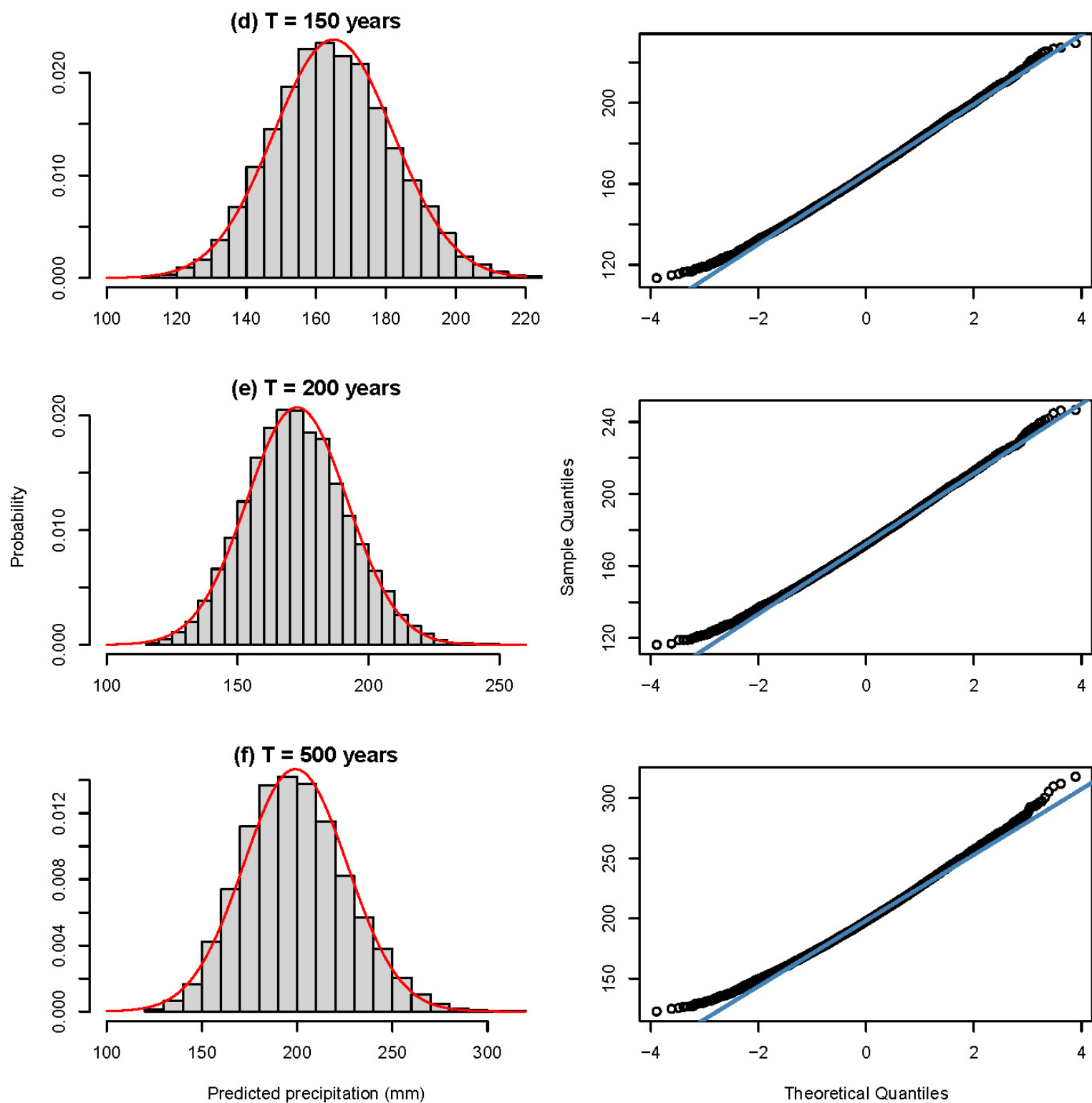
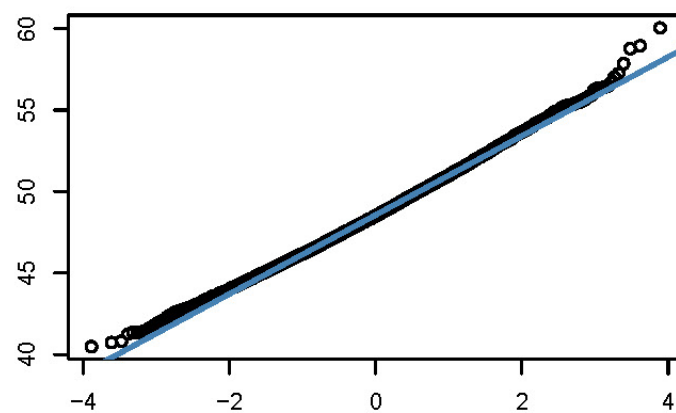
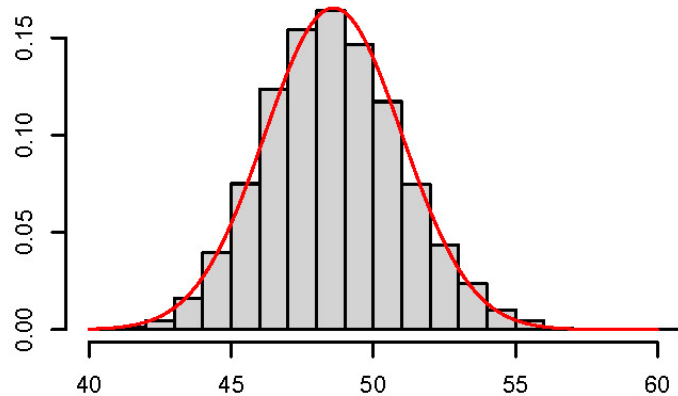
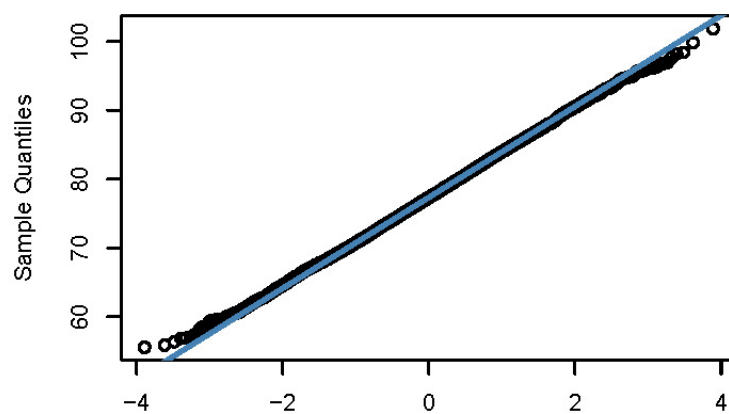
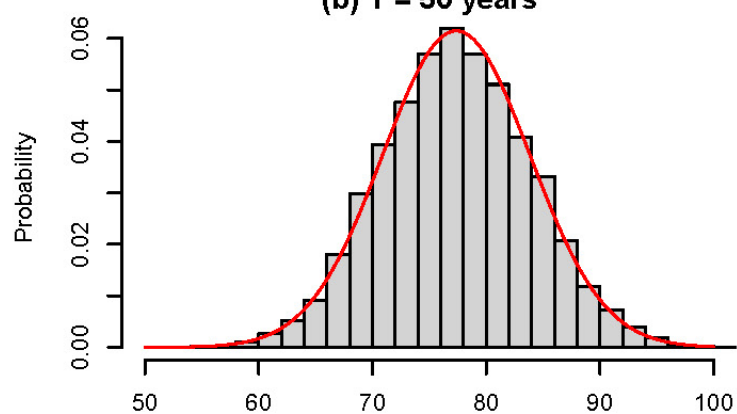


Figure S2 histogram and normal Q-Q plots for of the bootstrap sampling distribution of extreme precipitation quantile for (a) 5- years, (b) 50- years, (c) 100- years, (d) 150- years, (e) 200- years and (f) 500-years return periods for station 18.

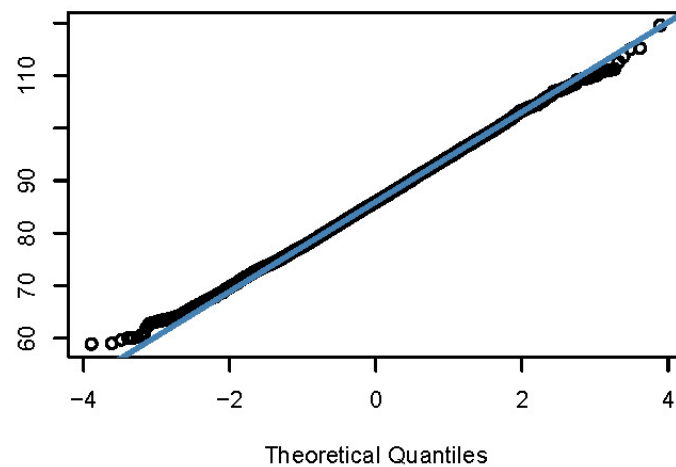
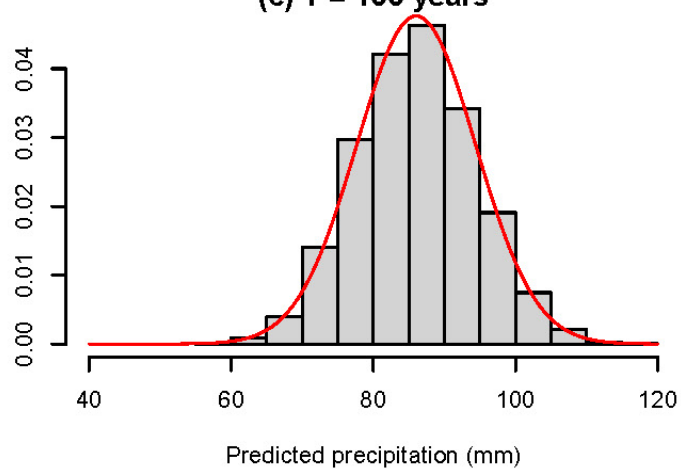
(a) $T = 5$ years



(b) $T = 50$ years



(c) $T = 100$ years



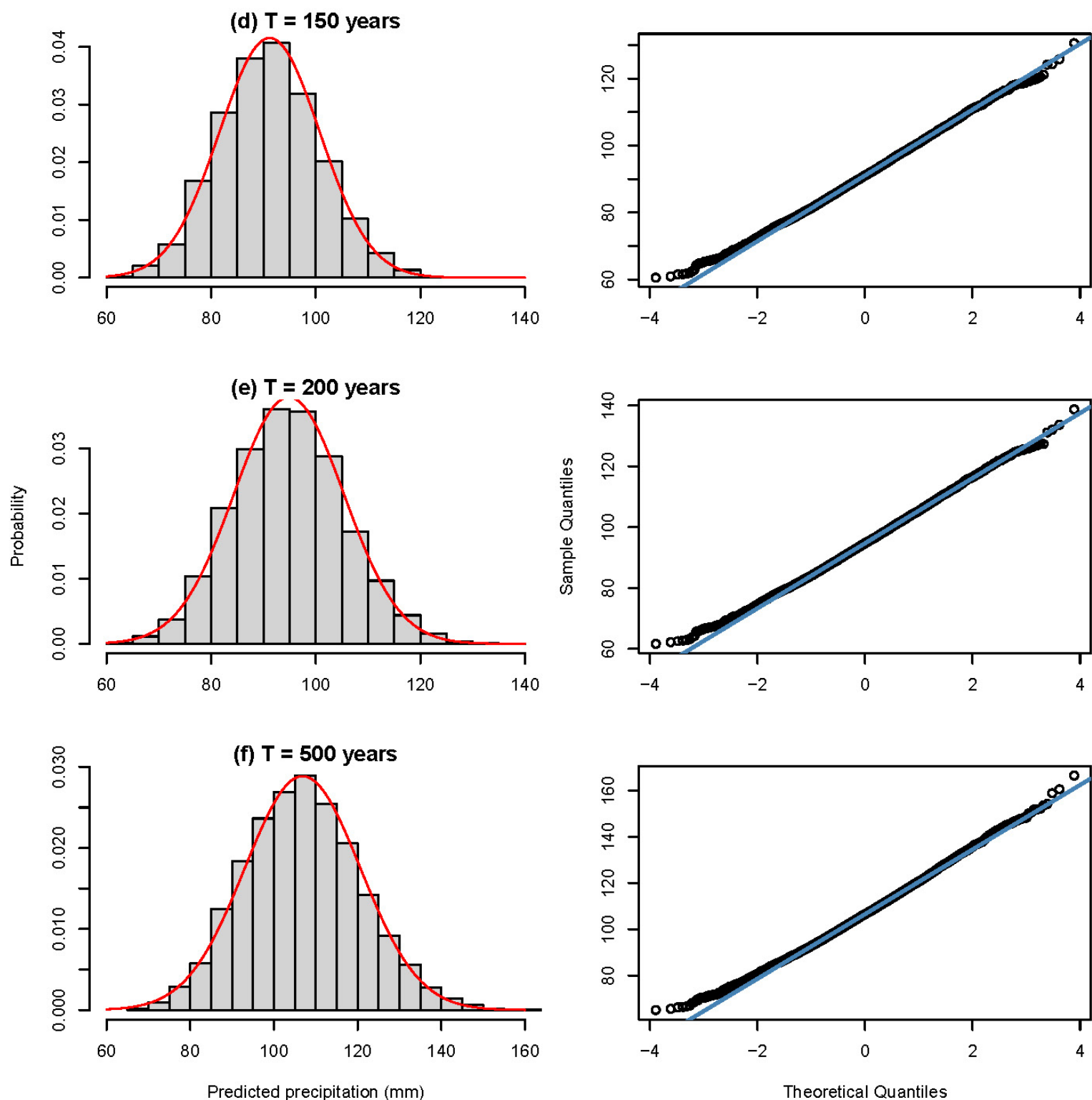


Figure S3 histogram and normal Q-Q plots for of the bootstrap sampling distribution of extreme precipitation quantile for (a) 5- years, (b) 50- years, (c) 100- years, (d) 150- years, (e) 200- years and (f) 500-years return periods for station 19.