551.557.32 (931)

N.Z.Met.S.Misc.Pub. 180
ISSN 0110-6937

MINISTRY OF TRANSPORT

NEW ZEALAND METEOROLOGICAL SERVICE

HOMOGENEOUS RAINFALL SERIES AT SELECTED NEW ZEALAND LOCATIONS

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Wellington, New Zealand—1984

Homogeneous Rainfall Series at Selected New Zealand Locations

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ERRATA

Homogeneous Rainfall Series at Selected New Zealand Locations

The following list of corrections are to be applied to the tables of monthly conversion factors.

Page	Location	Site	Month	Conversion Factor
10	Mangonui	Grey Street E	May	1.335
7,13	Albert Park	Barracks	April	1.126
16	Te Aroha	Te Aroha 2	December	1.186
32	Wanganui	Post Office	December	1.097
47	Christchurch	Heathcote	July	0.509
		Heathcote	August	0.385

Homogeneous Rainfall Series at Selected New Zealand Locations

Abstract.

The homogeneity of monthly rainfall is evaluated using a simple but realistic two parameter model of rainfall. The method used to homogenise long rainfall series compares derived maximum likelihood estimates between the long-term site, (usually the current site) and those from other neighbouring sites in the same location at different periods.

This publication presents tables of homogeneous rainfall totals for 19 New Zealand locations, the records of which extend back into the nineteenth century.

1. Introduction.

Daily observations of rainfall have been made at several New Zealand locations for more than a century. However as is common with most long records of rainfall, the data collected are from several different sites within the same named location making the series of questionable homogeneity. Data inhomogeneities can also be caused by changes in instrumental type, exposure, and by changes in observing practices. The type of inhomogeneity considered in this presentation is that caused by a change of site within a small area. Site changes in New Zealand have in most cases been well documented, this being especially true for rainfall observations since 1909.

A rainfall record is considered "homogeneous" when a sequence of monthly or annual rainfalls is "stationary" (Buishand, 1981) or "evolutionary" (Priestly, 1965). Any trends or cycles in the rainfall series, are not considered here, and therefore the homogeneity of the rainfall is usually investigated by testing the stationarity of some derived sequence.

In this publication, homogeneity of monthly rainfall totals is tested using a simple, but realistic two-parameter model of rainfall by comparing derived parameter estimates between a long-term site and those from neighbouring sites at other times. The data are usually adjusted to the current site.

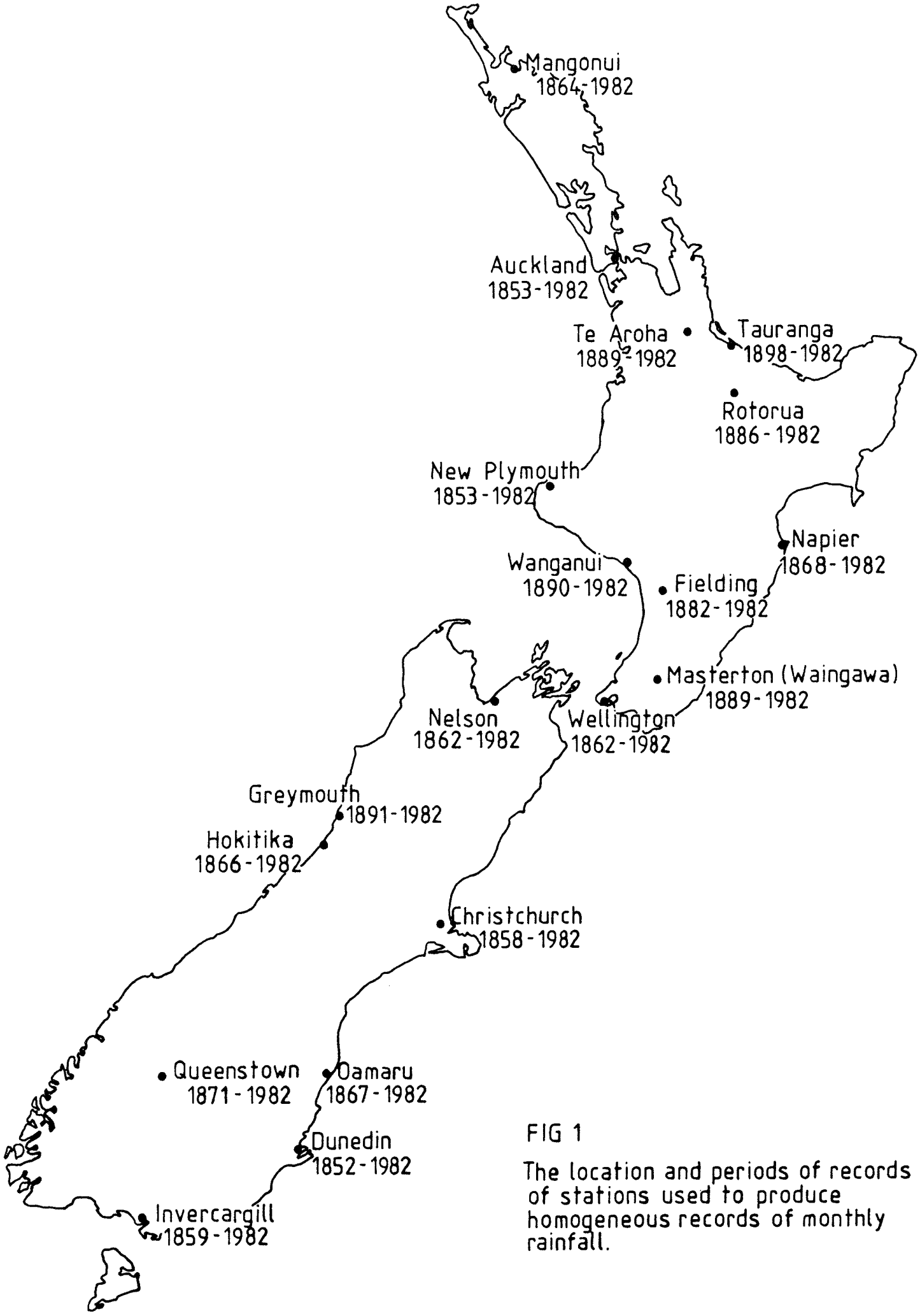

FIG 1

The location and periods of records of stations used to produce homogeneous records of monthly rainfall.

2. Data and Terminology.

Monthly rainfall data from 19 New Zealand locations (Fig.1) with observations extending back into the nineteenth century were tested for homogeneity by the method described in the next section. A search of the relevant New Zealand Meteorological Service station files and original meteorological records was conducted in order to find all possible site changes in the particular record. These have been recorded and are presented in the appendix.

The evidence for a change of site in a rainfall record is made by noting the following:

(i) At a site measuring only rainfall, when there was a change of observer, the raingauge was relocated at the new observer's residence.

(ii) Since 1909, the date of the earliest station files held by the Meteorological Service, there have been periodic inspections of sites. Reports often stated when a site change occurred, and how far the new location was from the previous one.

(iii) Where an observatory was sited on Government land, the Government department responsible took the observations. In most cases any site changes were minor, and were normally to improve the exposure of the observatory.

Each "station" in the record identifies rainfall data which may have been recorded at a single "site", or taken from two or more sites in close proximity ("neighbouring sites"). The distance between "neighbouring sites" can be in the order of one or two kilometres, (it is more usually hundreds of metres), whereas a "neighbouring station" identifies another set of rainfall data for a site several or tens of kilometres away.

The "current site" is the site at which the raingauge is presently situated. The "long-term site" is the location which has the longest rainfall record. In many cases, the current and long-term sites are the same.

Several of the data sets had missing data. Estimates were made using a least squares regression approach between the long-term station and an appropriate neighbouring station. Where monthly correlation values (Pearson's correlation coefficient, R) were high (i.e. greater than about 0.8), generally good estimates for missing data can be assumed. Such estimates were then inserted into the base data set. This occurred for Te Aroha (using Auckland), New Plymouth (Inglewood), Wanganui (Fordell and New Plymouth) Christchurch (Dunedin and Lincoln), Hokitika (Greymouth), and Invercargill (Dipton). Estimated data have been identified by an asterisk (*) in the homogeneous records.

3. Method Used for Analysing Rainfall Data for Homogeneity.

Monthly rainfall has been characterised by parameters of a Poisson point process of rainfall occurrence at rate ρ, and of an independent exponentially distributed event amount of mean μ (Revfeim, 1982). The frequency distribution for monthly rainfall totals (x) is given by

$$f(x : \rho,\mu) = \exp(-\rho - x/\mu) y I_1(y)/2x \qquad (1)$$

where $y = 2(\rho x/\mu)^{\frac{1}{2}}$ and $I_1(y)$ is a modified Bessel function of order 1.

In terms of the distribution's parameters ρ and μ, the mean and variance of the total monthly rainfall are

$$\bar{x} = \rho\mu \ , \ s^2 = 2\rho\mu^2 .$$

Starting from initial moment estimates of ρ and μ, maximum likelihood estimates are obtained by Newton-Raphson iteration. Arising from the independence assumptions underlying the model, the fact that $\bar{x}$ can be simply calculated from the product of ρ and μ places an essential constraint on the maximum likelihood estimation of the parameters.

The type of inhomogeneity being investigated is that which is induced by a change of site. For each change of site, maximum likelihood parameters have been derived. Since most site changes are within one or two kilometres, it has been shown that the spatial variation of the parameters are small (Thompson, 1984). The parameter estimates from the current or long term site ρ_o , μ_o are the reference population values, to which all sites whose data make up the series must be compared. The parameters ρ_i , μ_i where i = 1,2...n other sites are therefore related to ρ_o and μ_o by:

$$\rho_i = \rho_o + \delta\rho_i$$
$$\mu_i = \mu_o + \delta\mu_i .$$

Inhomogeneities in the rainfall record are evaluated and removed by looking at the possible differences in the parameter values at the various neighbouring sites from those at the current (or another long term) site. A likelihood ratio test determines whether rainfall data from the diferent sites belong to the same population. The likelihood ratio test is based on the statistic

$$\lambda = 2[\ L(\Omega_i) - L(\omega)\ ]$$

where $L(\cdot)$ is the log-likelihood function of (1). The null parameter space is given by

$$\omega = \{\rho_o, \mu_o\}$$

and the alternative parameter space is

$$\Omega_i = \{\rho_i, \mu_i\}.$$

The test statistic has, for large samples, a distribution approaching Chi-square with two degrees of freedom. The null hypothesis of no difference in the parameter estimates at the two sites was rejected only if λ exceeds a chosen threshold of Chi-square. The 0.05 probability level was the chosen criterion.

If the null hypothesis was rejected, new values for ρ_i and μ_i must be determined which approach the regional reference values. An iterative procedure was used (Thompson, 1984), whereby at each step the current value for ρ and μ was used to derive new site values, and were then inserted into the likelihood ratio test. This procedure was continued until the threshold value of Chi-square was attained.

A ratio of the monthly mean rainfall at site i after parameter adjustment, to that before adjustment was used to improve the original series. Full details of this method may be found in Thompson (1984).

In testing the parameters using small data sets (less than about 10 observations), the variance of the data may become unrepresentative. The initial moment estimates and subsequent maximum likelihood estimates can give anomalous rates of occurrence (ρ). If the variance is small, the recurrence rate can be large. The number of independent rainfall events should not greatly exceed the average number of raindays, since a single storm may produce rain on two or more consecutive days. If large variablity exists, ρ is small. Upper and lower limits of 25 and 2 have been set when the maximum likelihood estimate of ρ went outside these bounds. In either case the average number of rain days are substituted for ρ. Because of the constraint placed on the estimation of the parameters, a new amounts parameter (μ) must be calculated if substitution takes place.

The method described above can be applied to test the homogeneity of all New Zealand rainfall series, provided there has been at least one change of site.

4. Discussion

For each of the 19 rainfall series, tables of the following are presented in the appendix:

(i) site locations and length of record,
(ii) conversion factors for each month at each site,
(iii) homogeneous rainfall series.

By way of example, the Albert Park rainfall series will be briefly discussed.

Since the Royal Engineers began taking meteorological records in 1853 at the Albert Barracks, there have been three changes of site. Readings were made at the Albert Barracks until 1868 when the observatory was transferred to the Auckland Domain. Observations continued at this site until 1883. From 1883 until 1909 rainfall was measured from the Old Museum, on the corner of Princes and Shortland Streets. The raingauge was located on the roof of the Museum and the exposure of the raingauge was unsatisfactory. From September 1909, climatological records have been taken from the current site at Albert Park. Table 1 presents the essential features of the Albert Park rainfall series. There were no differences in the coordinates of the sites to 0.1 degrees resolution (11 km) but the separation is shown by the grid references in Table 1 where the resolution is 0.1 km on the metric scale.

Table 1: Site Locations at Albert Park, Auckland 1853-1982.
Lat 36.8 S Long 174.8 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Albert Barracks	43	N42 287603 R11 681818	Jan 1853- Aug 1868	Two raingauges-ground level one used
Auckland Domain	78	N42 296600 R11 689815	Sep 1868- Mar 1883	Observatory on highest point of Domain
Old Museum Roof	38	N42 289609 R11 683823	Apr 1883- Aug 1909	Exposure unsatisfactory
Albert Park	49	N42 286604 R11 680819	Sep 1909-	

Conversion factors, to be applied to the original series, have been computed for all months at the three separate sites using the method described in the previous section. At Albert Park, the likelihood ratio test statistic (λ) revealed that seven of the 36 site-months were statistically significant from the current site, and that in these months the parameters ρ and μ required adjustment. These conversion factors (Table 2) have been found to be appropriate when applied to the original Albert Park series (Thompson, 1984).

As a result of this method, the mean annual total at Auckland (1853-1982) increased overall by 1.7 percent from 1184 to 1204mm. Individual site values increased by 2.2 percent at Albert Barracks, 2.1 percent at the Auckland Domain, and 7.5 percent at the Old Museum roof.

Table 2: Monthly conversion factors at Albert Park

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Albert Barracks	1	1.223	1	1.216	1	1	1	1	1	1	1	1
Auckland Domain	1	1	1	1.316	1	1	1	1	1	1	1	1
Museum Roof	1	1	1	1.406	1	1.233	1	1.081	1	1	1	1.235

5. References.

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6. APPENDIX - Tables of Homogeneous Rainfall.

Mangonui 1863-1982 Lat 35.0 S Long 173.5 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Oruaiti, Mangonui *	6	N7 095831 O4 649885	Jun 1863- Dec 1865	Precise location unknown
Mangonui 1 *	2		Jan 1867- Dec 1867	
Mangonui 2	21		Jan 1869- Dec 1880	
Mangonui 3 **			Jan 1901- Oct 1902	
Mangonui P.O **		N7 038847 O4 597901	Nov 1902- Apr 1907	
Masonic Lodge		N7 036845 O4 595899	May 1907- Dec 1912	Location 200m from P.O.
Mangonui 4 #	30		Jan 1913- May 1916	
Mangonui 5 #			Jun 1916- Dec 1917	
Mangonui 6			Jan 1918- Feb 1921	
Houston's	21	N7 034847 O4 593901	Mar 1921- May 1970	Poor exposure until 1929. Long term site
Mangonui Motel	30	N7 039848 O4 598901	Jun 1970- Sep 1973	
Grey Street ##	46	N7 032841 O4 591895	Oct 1973- Mar 1975	
Grey Street East ##	30	N7 036840 O4 595894	Apr 1975- Mar 1982	Gauge shifted 20m in Nov 1979
Grey Street East ##	20	N7 036840 O4 595894	Apr 1982-	

*, **, #, ##: Data amalgamated due to short records.

Monthly conversion factors at Mangonui

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Oruaiti	1	1	1	1	1	1	1	1	1	1	1	1
Mangonui 2	1	1	1	1	1	1	1	1	1	1	1	1
Mangonui P.O.	0.847	1	1	1	1	1	1	1	1	1	1	1
Masonic Lodge	1	1	0.517	1	1	1	1	1	1	1	1	1
Mangonui 4	1	1	1	1	1	1	1	1	1	1	1	1
Mangonui 6	1	1	1	1	1	1	1	1	1	1	1.298	1.412
Mangonui Motel	1	1	1	1	1	1	1	1	1	1	1	1
Grey Street East	1	1	1	1	1.293	1	1	1	1	1	1	1

HOMOGENEOUS RAINFALL SERIES

STATION MANGONUI LAT 35 00S LONG 173 32E HT 66 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1863						174	99	278	148	132	144	218	
1864	84	151	17	38	117	276	230	248	189	166	87	123	1726
1865	66	71	136	70	140	110	190	152	136	77	150	12	1310
1866													
1867	131	145	92	107	96	280	158	165	208	106	122	65	1675
1868									160	51	106	30	
1869	95	244	5	78	202	179	93	69	47	70	76	67	1225
1870	195	158	7	62	130	85	132	199	110	13	180	73	1344
1871	190	230	110	168	160	200	152	120	49	46	22	17	1464
1872	34	165	81	160	68	115	168	93	48	79	141	40	1192
1873	75	150	55	554	130	24	110	89	54	176	76	124	1617
1874	17	114	247	50	136	152	112	247	147	76	116	33	1447
1875	73	9	22	111	178	197	154	88	170	156	55	121	1334
1876	231	27	82	153	108	142	204	115	130	42	106	141	1481
1877	61	89	314	39	392	64	96	102	42	102	47	36	1384
1878	63	24	2	80	70	236	104	117	52	162	20	90	1020
1879	37	49	125	146	182	193	235	145	110	68	55	153	1498
1880	84	46	98	26	140	131	174	325	92	172	93	28	1409
1881													
1882													
1883													
1884													
1885													
1886													
1887													
1888													
1889													
1890													
1891													
1892													
1893													
1894													
1895													
1896													
1897													
1898													
1899													
1900													
1901	115	149	35	60	83	417	268	176	163	147	104	218	1935
1902	157	28	125	218	275	167	129	102	154	94	50	126	1625
1903	99	22	9	61	153	113	146	123	144	77	129	52	1128
1904	37	217	236	46	34	176	152	125	169	86	170	53	1501
1905	90	32	25	34	45	100	132	154	115	152	71	59	1009
1906	90	47	171	52	116	75	146	39	153	46	105	64	1104
1907	298	187	68	187	79	145	218	216	122	116	53	268	1957
1908	3	14	255	181	147	129	156	84	150	44	104	34	1301
1909	124	4	69	46	142	53	263	303	115	26	116	22	1283
1910	76	81	47	49	226	156	233	86	98	152	87	110	1401
1911	71	83	55	235	245	226	156	56	69	139	78	130	1543
1912	22	35	70	119	78	115	261	209	181	42	67	6	1205
1913	87	46	39	100	103	117	136	294	54	105	131	101	1313
1914	27	21	60	98	79	53	85	86	64	34	45	25	677
1915	24	29	135	217	132	77	144	117	124	180	54	5	1238
1916	230	130	94	67	127	106	144	122	91	112	199	88	1510
1917	80	297	139	188	180	185	163	273	128	140	36	67	1876
1918	150	161	44	181	51	199	147	47	115	174	48	56	1374
1919	43	56	36	3	140	151	161	64	108	92	47	27	928
1920	81	98	97	136	160	113	62	235	109	93	57	72	1313
1921	76	239	28	47	32	129	113	67	100	110	82	54	1077
1922	120	97	114	91	169	78	127	53	127	86	56	56	1174
1923	78	37	24	118	119	191	163	129	122	118	31	13	1143
1924	134	60	60	79	252	80	35	80	75	79	44	112	1090
1925	42	57	15	46	304	197	96	200	109	61	70	45	1242
1926	75	18	54	27	234	146	71	175	69	166	112	34	1181
1927	140	55	98	199	248	176	260	138	141	53	36	26	1570
1928	23	36	122	134	184	159	185	80	117	116	72	75	1303
1929	26	11	57	135	246	139	124	86	71	93	109	58	1155
1930	74	89	20	168	13	266	84	177	92	89	41	13	1126
1931	118	25	37	95	137	126	207	70	87	53	49	152	1156
1932	70	66	156	191	162	95	98	146	57	112	17	50	1220
1933	19	148	40	108	151	98	173	69	160	81	109	33	1189
1934	25	98	42	58	128	182	133	205	175	66	69	266	1447
1935	13	155	212	132	160	132	118	148	279	93	94	177	1713
1936	271	173	97	55	23	89	133	205	86	118	189	127	1566
1937	184	34	112	143	160	172	88	109	94	23	126	66	1311
1938	50	131	28	89	136	110	248	245	123	26	76	82	1344

Inset 2*

CONTINUING RAINFALL SERIES AT MANGONUI

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1939	93	58	11	153	56	239	173	141	78	113	144	86	1345
1940	279	45	48	49	232	24	118	65	75	109	111	26	1181
1941	168	41	129	44	64	179	95	186	64	240	44	189	1443
1942	40	10	8	163	84	94	186	259	173	100	82	36	1235
1943	6	32	38	231	128	261	158	194	213	146	105	63	1575
1944	29	163	148	174	183	127	121	203	66	177	25	68	1484
1945	169	78	68	94	178	88	193	148	152	97	19	29	1313
1946	29	9	53	357	198	408	417	222	242	164	75	61	2235
1947	24	17	71	200	134	193	266	132	155	99	155	157	1603
1948	79	47	145	149	203	149	307	225	128	82	107	92	1713
1949	127	153	135	105	210	180	83	127	91	84	158	63	1516
1950	22	27	8	197	226	207	76	126	79	123	207	53	1351
1951	166	152	39	213	207	219	176	278	51	82	133	61	1777
1952	51	199	16	52	77	121	71	199	54	113	187	117	1257
1953	67	55	63	65	207	108	156	315	55	131	135	36	1393
1954	22	73	137	121	258	127	185	159	152	109	59	89	1491
1955	34	86	178	67	133	189	133	88	201	183	125	222	1639
1956	209	103	40	216	429	265	206	349	116	133	86	133	2285
1957	25	123	213	108	139	77	88	333	100	119	31	65	1421
1958	146	310	21	36	131	56	197	82	240	168	35	186	1608
1959	237	84	164	181	130	193	178	207	92	66	44	74	1650
1960	21	139	84	66	315	189	161	127	230	116	78	98	1624
1961	26	42	32	116	139	235	144	162	102	102	47	16	1163
1962	40	50	238	227	353	113	88	130	70	183	53	75	1620
1963	18	33	87	24	100	252	341	139	104	7	50	49	1204
1964	58	36	92	191	81	98	225	181	136	135	51	86	1370
1965	99	109	53	33	89	90	215	171	47	89	57	95	1147
1966	108	161	121	83	160	150	150	95	256	40	141	138	1603
1967	70	145	82	97	116	67	141	212	133	41	114	128	1346
1968	15	18	109	381	121	185	98	255	86	112	111	177	1668
1969	30	254	6	98	221	367	68	190	155	41	96	118	1644
1970	23	22	74	100	120	156	80	131	112	105	32	6	961
1971	65	281	97	102	125	146	195	279	137	127	105	71	1730
1972	51	69	231	113	123	69	109	124	54	115	62	104	1224
1973	59	37	34	116	54	173	197	113	99	54	60	24	1020
1974	13	81	59	141	159	146	124	123	118	76	127	54	1221
1975	65	35	90	126	51	257	46	130	170	224	116	52	1362
1976	197	27	29	187	45	142	102	187	141	116	133	104	1410
1977	32	13	112	52	140	235	182	61	112	79	87	63	1168
1978	106	101	19	121	250	247	188	166	128	39	44	83	1492
1979	41	134	128	71	113	332	192	132	95	202	81	157	1678
1980	184	257	81	56	83	190	129	72	139	113	36	80	1420
1981	89	35	124	84	211	183	157	163	109	60	178	60	1453
1982	41	113	115	115	115	130	151	26	109	91	13	54	1073
1863-1932													
MEAN	86.1	92.7	96.1	120.7	150.4	159.7	155.5	155.6	119.4	103.0	87.6	82.7	1396.6
ST DEV	67.0	73.4	64.8	81.3	76.8	74.4	63.4	73.3	50.1	47.5	45.5	56.7	262.7

Albert Park, Auckland 1853-1982 Lat 36.8 S Long 174.8 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Albert Barracks	43	N42 287603 R11 681818	Jan 1853- Aug 1868	Two raingauges-ground level one used
Auckland Domain	78	N42 296600 R11 689815	Sep 1868- Mar 1883	Observatory on highest point of Domain
Old Museum Roof	38	N42 289609 R11 683823	Apr 1883- Aug 1909	Exposure unsatisfactory
Albert Park	49	N42 286604 R11 680819	Sep 1909-	

Monthly conversion factors at Albert Park

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Albert Barracks	1	1.223	1	1.216	1	1	1	1	1	1	1	1
Auckland Domain	1	1	1	1.316	1	1	1	1	1	1	1	1
Museum Roof	1	1	1	1.406	1	1.233	1	1.081	1	1	1	1.235

HOMOGENEOUS RAINFALL SERIES

STATION ALBERT PARK, AUCKLAND LAT 36 51S LONG 174 46E HT 49 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1853	88	154	199	159	109	144	125	59	176	49	57	38	1357
1854	4	125	90	217	211	182	74	133	87	69	180	135	1507
1855	18	32	6	64	106	95	170	95	85	124	145	23	963
1856	33	49	2	25	93	149	150	164	78	57	85	42	927
1857	59	43	91	45	130	192	160	80	144	120	75	33	1172
1858	93	31	140	84	147	101	256	167	128	65	135	163	1510
1859	50	72	16	84	112	34	77	51	49	100	25	21	692
1860	31	102	52	33	122	286	91	82	91	186	99	81	1255
1861	20	117	47	108	273	209	231	99	94	74	121	90	1484
1862	51	48	131	212	109	147	118	137	71	86	14	55	1178
1863	9	29	18	82	47	102	117	109	154	123	123	225	1139
1864	80	18	32	12	85	94	119	139	88	98	55	135	956
1865	54	77	117	29	144	94	153	94	79	61	100	33	1035
1866	80	55	215	46	52	58	109	63	165	41	63	136	1083
1867	101	172	25	221	116	197	79	132	78	109	117	60	1407
1868	41	131	108	134	67	148	127	101	189	91	105	43	1285
1869	126	359	8	125	129	125	53	106	53	75	49	183	1391
1870	88	63	19	71	76	140	157	268	60	10	106	96	1154
1871	64	158	140	125	75	153	143	151	101	77	18	30	1235
1872	12	149	71	207	82	142	154	93	47	70	69	23	1119
1873	44	195	71	150	57	41	101	116	103	122	53	30	1083
1874	20	19	108	30	91	111	84	157	97	49	70	62	898
1875	59	19	17	72	176	139	117	118	99	216	103	188	1323
1876	108	29	52	113	79	103	159	85	92	56	155	115	1146
1877	152	122	87	66	169	82	35	78	65	51	62	75	1044
1878	97	43	13	45	85	159	120	114	73	127	29	49	954
1879	28	29	196	88	172	115	140	77	75	53	100	121	1194
1880	81	19	34	18	107	135	155	74	86	138	68	73	988
1881	82	35	18	55	24	170	70	109	55	55	118	92	883
1882	140	49	112	170	90	141	248	80	68	41	50	35	1224
1883	52	148	66	354	165	104	122	121	47	106	89	136	1510
1884	42	41	72	44	106	132	71	157	82	73	53	178	1050
1885	49	4	60	20	118	68	144	75	59	58	72	17	743
1886	55	128	29	101	61	95	57	156	77	87	36	7	889
1887	33	78	20	70	135	199	150	38	116	82	62	56	1038
1888	34	20	129	35	145	129	98	93	23	90	92	40	928
1889	16	103	18	37	137	326	111	71	148	81	28	83	1158
1890	25	2	67	197	110	117	132	122	90	260	88	62	1272
1891	55	233	40	129	87	46	133	66	50	67	37	30	973
1892	89	67	39	72	79	158	127	119	91	101	118	63	1122
1893	128	179	58	135	95	159	136	138	91	27	182	146	1474
1894	68	93	36	37	147	129	110	163	129	29	144	6	1091
1895	69	56	49	63	142	192	144	44	132	96	141	117	1246
1896	22	9	30	257	92	102	221	101	115	49	41	27	1066
1897	142	137	84	76	153	116	133	126	105	92	38	4	1206
1898	80	20	77	35	93	125	157	163	57	119	61	117	1104
1899	92	47	56	86	76	149	135	77	33	122	52	11	936
1900	21	41	39	69	203	97	93	107	132	129	50	73	1054
1901	82	101	130	39	25	86	232	89	22	79	37	112	1035
1902	40	11	85	224	160	101	54	64	158	70	22	89	1077
1903	181	53	35	96	155	100	88	93	61	83	173	103	1220
1904	21	94	186	190	26	190	57	98	100	97	110	111	1280
1905	71	14	65	114	58	187	96	83	114	149	56	93	1100
1906	30	57	46	111	117	48	173	49	110	25	143	56	964
1907	189	147	25	103	101	113	161	177	138	140	28	162	1484
1908	11	14	206	121	149	118	144	104	56	102	50	141	1216
1909	48	0	103	42	120	101	139	196	90	93	87	20	1039
1910	115	154	193	51	128	130	161	152	63	56	94	72	1369
1911	32	45	59	189	139	137	41	82	69	119	105	129	1146
1912	44	92	155	142	40	139	126	91	140	53	50	21	1093
1913	67	35	60	38	111	37	111	146	45	94	156	71	971
1914	34	42	56	107	120	84	104	29	36	29	36	45	722
1915	78	17	185	113	96	114	186	102	135	92	135	14	1267
1916	52	13	96	149	127	160	209	244	68	152	197	218	1685
1917	88	322	69	236	203	137	244	196	179	132	42	32	1880
1918	106	112	137	126	65	202	151	89	65	205	65	57	1380
1919	43	21	53	28	151	91	105	76	90	103	55	34	850
1920	116	117	106	155	142	217	95	152	129	75	93	81	1478
1921	78	60	35	74	34	174	87	66	94	154	51	101	1008
1922	99	159	157	106	102	76	43	64	77	103	93	142	1221
1923	164	98	45	146	105	227	71	81	102	95	62	51	1247
1924	98	121	92	293	270	168	75	94	106	144	119	112	1692
1925	54	86	33	33	133	199	106	93	117	52	62	28	996
1926	103	65	61	40	348	138	71	170	73	192	192	162	1615
1927	37	142	116	100	139	180	215	177	109	68	41	36	1360
1928	5	41	88	124	265	148	217	85	199	133	48	152	1505
1929	35	15	143	117	104	144	158	124	60	128	180	100	1308

CONTINUING RAINFALL SERIES AT ALBERT PARK, AUCKLAND

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1930	213	169	6	72	70	109	89	86	120	155	79	21	1189
1931	187	41	21	228	72	130	180	84	124	55	43	84	1249
1932	29	191	93	103	85	103	118	58	61	85	27	75	1028
1933	38	197	19	61	163	68	128	102	113	74	63	55	1081
1934	40	208	42	85	142	165	152	75	53	55	30	60	1107
1935	57	244	111	129	108	179	268	120	70	105	87	85	1563
1936	175	236	63	69	32	70	133	210	94	80	81	92	1335
1937	101	27	90	69	179	184	107	39	106	53	81	54	1090
1938	95	291	8	187	118	137	305	134	58	42	130	111	1616
1939	153	17	6	102	33	180	214	154	120	78	107	86	1250
1940	207	88	30	78	124	74	66	59	73	85	74	35	993
1941	107	42	124	23	26	166	197	129	80	216	87	54	1251
1942	34	15	56	56	122	24	171	161	116	112	74	59	1000
1943	40	42	21	63	42	233	107	127	181	64	58	33	1011
1944	48	128	144	119	70	133	85	95	46	196	32	136	1232
1945	124	173	64	78	209	75	105	93	105	72	12	49	1159
1946	19	11	143	145	146	102	170	211	161	119	132	75	1434
1947	66	40	114	207	53	169	230	110	119	109	63	60	1340
1948	81	39	121	76	191	129	172	84	88	174	145	58	1358
1949	49	76	47	138	144	123	97	76	52	57	78	99	1036
1950	15	51	33	129	52	180	40	88	59	119	83	71	920
1951	82	110	36	150	94	90	149	211	19	95	131	53	1220
1952	39	143	23	58	102	156	100	172	113	100	179	93	1278
1953	76	42	50	210	188	181	193	224	35	79	50	62	1390
1954	9	83	268	90	232	98	103	111	104	57	35	141	1331
1955	15	161	134	55	96	152	93	77	99	141	97	79	1199
1956	67	132	29	359	136	254	194	227	166	161	80	113	1918
1957	8	44	64	55	149	86	75	96	47	130	70	47	871
1958	34	284	77	34	131	42	185	97	80	138	59	182	1343
1959	118	48	105	227	127	59	163	127	41	98	40	108	1261
1960	13	185	88	123	127	146	133	75	229	98	102	96	1415
1961	130	81	53	97	137	275	198	184	121	139	47	21	1483
1962	41	40	130	137	191	148	165	129	94	200	110	77	1462
1963	67	65	100	90	77	131	115	104	71	21	74	48	963
1964	83	41	79	34	161	125	196	180	123	115	54	116	1307
1965	144	131	87	109	111	133	152	324	34	71	76	94	1466
1966	136	194	94	90	155	151	135	92	82	57	121	81	1388
1967	83	204	123	53	65	61	66	104	105	14	253	114	1245
1968	40	43	70	242	183	179	108	167	67	89	63	139	1390
1969	102	152	11	107	128	104	88	139	112	25	41	125	1134
1970	35	42	107	82	159	144	156	241	113	141	91	33	1344
1971	57	107	95	131	134	85	138	157	143	152	93	117	1409
1972	46	45	247	101	162	105	117	134	61	121	45	43	1227
1973	52	5	77	89	70	194	114	126	154	61	99	44	1085
1974	8	40	22	136	112	100	129	79	118	74	16	87	921
1975	57	37	108	80	108	206	73	80	117	130	119	50	1165
1976	237	34	26	153	73	123	189	117	203	69	137	103	1464
1977	39	35	83	67	154	200	162	70	94	91	70	101	1166
1978	38	29	23	149	38	144	164	96	98	47	80	69	975
1979	9	230	152	134	71	248	223	139	102	136	108	96	1648
1980	96	98	156	61	49	107	142	74	74	46	141	109	1153
1981	62	43	25	130	54	193	125	114	109	55	107	72	1089
1982	43	86	83	148	60	95	95	33	84	97	38	42	904
1853-1982													
MEAN	69.6	88.7	78.5	108.6	117.1	135.6	134.3	116.4	95.6	95.6	83.9	80.1	1203.9
ST DEV	48.0	72.7	54.5	66.4	54.6	52.8	51.9	50.2	39.9	45.5	44.6	46.4	224.7

Te Aroha 1888-1982 Lat 37.5 S Long 175.7 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Te Aroha 1	30		May 1888-May 1897	Location unknown
Te Aroha 2			Nov 1899-Apr 1904	Site may have been in Domain Height given as 107m
Te Aroha Domain 1	19	N57 208763 T13 501026	Nov 1907-Jan 1955	Poor exposure. Height given in records as 14m.
Te Aroha Domain 2	17	N57 208763 T13 501026	Feb 1955-	Site 20m NW of previous one Exposure slightly improved

Monthly conversion factors at Te Aroha

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Te Aroha 1	1	1	1.630	1	1	1	1	1	1	1	1	1
Te Aroha 2	1	1.456	1	1	1	1.346	1	1	1	1	1	1
Te Aroha Domain 1	1	1.217	1	1.062	1	1.170	1	1.056	1.285	1.136	1	1.269

HOMOGENEOUS RAINFALL SERIES

STATION TE AROHA LAT 37 33S LONG 175 43E HT 17M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1888	57*	28*	170*	44*	221	61	105	193	42	150	81	27	1179
1889	18	94	33	43	58	318	156	132	247	113	60	153	1425
1890	82	0	114	185	125	111	307	205	140	203	91	110	1673
1891	73	112	29	116	123	43	160	108	120	97	52	79	1112
1892	92	68	75	31	125	145	200	149	117	164	151	86	1403
1893	116	195	78	110	241	149	144	118	112	41	165	134	1603
1894	105	99	57	45	200	120	127	132	253	26	138	65	1367
1895	102	125	153	59	214	160	108	48	176	165	202	47	1559
1896	29	35	88	214	195	118	185	143	156	64	20	49	1296
1897	224	141	187*	55	170	141*	165*	141*	135*	112*	58*	47*	1577
1898	96*	41*	106*	44*	114*	149*	185*	164*	75*	139*	78*	130*	1322
1899	106*	76*	81*	79*	97*	172*	166*	110*	46*	141*	76	31	1181
1900	15	105	60*	68*	216	136	118	251	169*	149*	68*	97*	1452
1901	98*	146*	171*	47*	48*	114*	250*	117*	32*	99*	57*	127*	1306
1902	102	80	206	277	191	254	56	83	217	112	38	94	1710
1903	102	109	55	151	132	104	149	81	111	107	206	104	1411
1904	46*	137*	239*	54	49*	210*	99*	123*	129*	117*	121*	126*	1450
1905	89*	32*	92*	99*	80*	207*	133*	114*	146*	169*	74*	113*	1348
1906	54*	89*	69*	97*	137*	78*	199*	92*	141*	44*	150*	85*	1235
1907	188*	205*	43*	91*	121*	139*	189*	172*	176*	160*	58	140	1681
1908	10	12	288	115	218	146	167	111	105	115	43	165	1495
1909	117	21	254	49	124	117	244	436	182	111	139	42	1836
1910	97	235	214	40	139	117	224	127	75	117	54	159	1597
1911	31	54	31	175	113	121	247	75	78	105	116	142	1287
1912	43	86	210	170	28	156	119	80	382	120	70	33	1497
1913	75	39	106	27	105	67	142	181	73	84	209	187	1294
1914	34	40	149	162	94	70	93	45	45	28	35	76	873
1915	73	24	230	90	53	188	192	89	179	243	170	11	1543
1916	102	38	205	117	219	146	154	253	58	103	191	170	1757
1917	180	417	44	132	232	276	176	138	195	204	112	55	2162
1918	148	207	82	151	73	200	89	52	107	349	95	91	1643
1919	56	16	69	21	106	88	189	157	180	130	28	44	1084
1920	98	150	127	183	119	228	80	139	132	111	63	123	1554
1921	88	13	38	58	76	272	92	72	72	181	32	137	1131
1922	158	206	140	84	83	108	50	97	73	87	118	218	1422
1923	169	95	68	378	96	153	193	113	191	128	25	114	1724
1924	70	102	177	230	401	206	66	116	180	159	90	239	2036
1925	97	50	46	32	140	282	168	206	141	150	91	36	1439
1926	124	52	60	52	200	70	213	175	71	220	174	141	1553
1927	51	121	132	66	151	122	265	186	158	45	94	53	1444
1928	4	67	261	185	193	125	439	86	213	195	68	161	1997
1929	67	11	104	220	123	191	168	197	64	98	214	152	1609
1930	204	96	19	98	55	105	224	106	162	112	61	29	1271
1931	146	54	38	115	39	212	206	73	221	80	61	58	1302
1932	44	75	56	218	114	142	122	84	123	100	28	107	1213
1933	98	232	36	90	126	56	119	99	170	89	57	84	1256
1934	49	164	57	89	103	256	126	111	266	99	63	36	1419
1935	52	219	198	234	80	226	208	125	172	106	116	90	1825
1936	126	334	146	142	30	69	110	113	114	105	99	115	1503
1937	148	44	160	113	310	136	72	149	112	44	110	122	1519
1938	57	260	63	376	249	152	524	243	120	30	140	179	2392
1939	91	32	11	90	52	263	181	130	141	131	184	122	1428
1940	199	107	17	94	97	51	115	253	67	165	75	138	1379
1941	249	18	226	51	25	186	170	136	112	226	118	105	1623
1942	70	24	39	66	109	33	105	190	191	73	64	66	1030
1943	82	82	10	100	82	174	109	93	261	64	110	84	1250
1944	33	184	259	158	155	133	107	100	75	220	56	178	1658
1945	241	141	135	80	179	87	119	109	164	141	9	57	1462
1946	22	9	81	187	176	186	183	214	302	198	101	81	1740
1947	78	114	216	154	91	207	272	108	139	133	77	76	1665
1948	79	18	60	118	218	97	181	130	76	227	198	93	1495
1949	46	45	83	122	149	117	93	143	75	62	116	105	1156
1950	17	37	30	155	127	146	117	119	75	118	198	80	1219
1951	211	78	13	161	103	76	176	241	37	119	171	156	1543
1952	43	147	30	53	88	194	66	215	149	117	222	237	1562
1953	110	40	79	220	162	225	156	189	64	115	67	94	1521
1954	15	30	436	160	537	103	141	116	125	45	72	170	1951
1955	20	32	73	203	76	173	129	108	101	275	67	19	1276
1956	72	68	49	479	221	257	212	178	71	261	89	100	2057
1957	13	58	238	46	181	99	163	476	108	139	90	50	1661
1958	51	325	77	40	227	25	147	76	130	374	40	201	1713
1959	132	86	167	189	108	37	229	121	96	101	55	224	1545
1960	37	442	110	37	170	301	203	80	330	153	113	64	2040
1961	239	79	59	112	64	242	280	99	150	66	67	55	1512
1962	134	52	323	183	270	103	135	83	109	237	102	184	1915
1963	62	75	64	31	92	136	421	99	90	29	96	97	1292
1964	86	33	57	67	107	179	166	133	126	150	64	102	1270

CONTINUING RAINFALL SERIES AT TE AROHA

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1965	252	178	178	103	192	111	115	339	43	33	89	110	1743
1966	83	354	73	88	154	130	124	98	161	72	113	121	1571
1967	127	213	230	46	83	42	86	189	118	23	172	125	1454
1968	43	16	115	340	187	330	200	196	115	168	46	174	1930
1969	104	127	25	101	83	151	101	112	215	33	120	171	1343
1970	38	31	147	72	186	116	105	268	174	135	87	77	1436
1971	101	138	58	217	160	148	272	142	258	266	172	84	2016
1972	58	29	272	59	209	92	108	135	105	107	102	126	1402
1973	40	6	42	166	142	164	98	116	150	52	105	92	1173
1974	14	152	104	154	125	258	122	135	178	104	20	108	1474
1975	169	26	205	92	224	162	82	133	205	171	58	91	1618
1976	133	50	51	120	93	84	179	341	469	97	117	94	1828
1977	41	29	46	98	117	218	257	128	103	112	64	116	1329
1978	8	47	36	289	10	302	318	86	101	60	129	90	1476
1979	13	186	223	63	112	150	361	163	105	142	176	152	1846
1980	113	134	98	74	29	155	116	120	109	69	112	259	1388
1981	107	76	67	398	67	239	116	114	109	118	143	102	1656
1982	58	178	96	82	85	61	158	33	71	100	33	87	1042
1888-1982													
MEAN	89.9	102.9	115.0	126.7	138.7	152.4	168.2	144.2	140.1	126.5	98.8	108.7	1512.2
ST DEV	59.4	90.1	83.0	88.0	79.3	69.8	81.0	73.5	73.6	67.2	51.4	52.2	270.0

Tauranga Airport 1898-1982 Lat 37.7 S Long 176.2 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Tauranga Harbour		N58 659638 U14 910900	Jan 1898- Dec 1904	
Tauranga			Nov 1904- Apr 1907	
Waikareao (Otumoetai)	12	N58 634605 U14 886871	Jan 1910- Dec 1923	
Judea * (148 Waihi Road)	34	N58 620578 U14 873846	Jan 1924- Sep 1940	
Te Puna *			Oct 1940- Jan 1941	
Airport	4	N58 672608 U14 921873	Feb 1941-	Enclosure shifted 210m to SW of original site in Nov 1971

* Te Puna and Judea records amalgamated .

Monthly conversion factors at Tauranga Airport

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tauranga Harbour	1	1	1	1	1	1	1	1	1	1	1	1
Tauranga 1	0.435	1	1	1	1	1	1	1	1	1	1	1
Waikareao	1	1	1	1	1	1	1	1	1.202	1	1	1
Judea	1	1	1	1	1	1	1	1	1	1.091	1	1

Inset 3*

HOMOGENEOUS RAINFALL SERIES

STATION TAURANGA AIRPORT LAT 37 41S LONG 176 12E HT 4 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1898	123	29	81	25	123	90	163	63	44	114	60	132	1047
1899	137	121	161	64	223	178	126	59	67	178	101	32	1447
1900	8	73	47	116	258	141	96	215	256	235	47	75	1567
1901	85	102	87	46	13	99	177	109	81	75	14	123	1011
1902	47	120	207	192	83	110	2	53	76	109	26	27	1052
1903	170	58	19	110	166	59	107	81	172	132	65	151	1290
1904											58	88	
1905	18	29	25	46	192	120	245	75	121	202	89	39	1201
1906	23	88	73	65	120	19	139	93	154	15	116	45	950
1907	231	151	115	192									
1908													
1909													
1910	162	174	153	30	171	158	191	95	31	82	64	162	1473
1911	25	115	56	383	124	87	162	68	62	91	96	149	1418
1912	26	25	124	118	66	99	99	163	203	122	50	22	1117
1913	115	25	58	29	58	50	94	224	31	61	205	105	1055
1914	34	34	135	230	68	45	82	17	41	28	17	42	773
1915	82	23	176	101	86	213	125	94	164	147	113	44	1368
1916	76	29	176	115	166	132	86	263	92	357	285	164	1941
1917	132	199	84	152	247	247	180	173	148	94	80	149	1885
1918	161	187	203	129	24	193	49	59	89	235	72	57	1458
1919	26	43	71	17	111	65	78	215	192	99	23	22	962
1920	196	267	73	187	91	309	64	225	128	98	98	53	1789
1921	90	38	14	83	159	176	85	47	46	251	36	124	1149
1922	137	155	200	73	53	105	31	105	44	106	105	64	1178
1923	155	65	72	319	148	114	115	99	236	155	81	54	1613
1924	70	61	178	234	180	118	74	96	118	115	129	225	1598
1925	69	65	44	43	215	381	137	81	107	100	58	48	1348
1926	136	26	76	35	228	91	112	148	85	225	146	175	1483
1927	106	92	130	111	135	164	282	247	131	53	37	59	1547
1928	1	91	94	131	244	120	131	39	217	269	28	227	1592
1929	30	21	119	115	72	134	120	127	70	118	167	99	1192
1930	140	172	22	84	54	200	217	142	83	106	73	4	1297
1931	120	45	39	135	44	111	158	81	124	72	56	81	1066
1932	30	126	98	200	111	126	126	62	81	96	43	51	1150
1933	107	204	114	61	138	37	172	106	72	65	152	44	1272
1934	53	213	38	110	103	189	118	191	128	82	53	58	1336
1935	24	94	216	251	124	210	144	120	148	155	86	98	1670
1936	111	343	157	109	44	81	121	111	86	66	153	240	1622
1937	148	30	151	192	133	123	91	118	107	124	96	166	1479
1938	41	265	55	258	140	122	252	220	108	11	174	171	1817
1939	142	17	34	79	36	225	148	151	112	149	77	126	1296
1940	254	103	33	75	137	61	76	207	84	173	151	100	1454
1941	245	24	202	37	25	158	132	122	58	216	65	31	1315
1942	26	8	80	76	105	48	117	235	132	96	57	65	1045
1943	58	42	5	90	99	304	102	117	161	42	52	53	1125
1944	10	189	244	108	113	67	129	163	27	131	45	63	1289
1945	164	75	90	62	183	90	162	131	97	73	20	55	1202
1946	17	23	155	188	156	233	120	130	194	137	92	71	1516
1947	37	29	153	181	56	122	155	125	79	181	103	48	1269
1948	95	20	64	331	180	181	174	100	58	156	125	38	1522
1949	90	93	101	90	200	181	52	64	116	31	99	43	1160
1950	16	64	34	129	311	145	101	151	64	118	90	61	1284
1951	204	90	23	93	130	105	348	134	58	108	117	69	1479
1952	57	71	20	70	79	131	54	173	80	267	232	161	1395
1953	68	64	26	181	131	135	201	169	75	109	41	50	1250
1954	16	24	154	130	191	70	93	94	73	36	47	141	1069
1955	58	24	128	183	94	134	156	121	86	165	47	60	1256
1956	121	146	50	179	221	185	183	166	110	194	97	125	1777
1957	8	75	210	70	157	107	183	224	84	87	46	38	1289
1958	23	182	60	10	147	50	104	94	82	226	128	183	1289
1959	107	97	159	266	65	27	172	80	105	117	46	68	1309
1960	59	258	172	32	182	132	122	53	183	165	89	58	1505
1961	175	31	65	122	212	209	133	112	145	43	121	98	1466
1962	177	107	297	93	283	86	77	85	146	180	71	447	2049
1963	84	68	115	35	154	151	225	113	144	17	30	224	1360
1964	52	17	93	65	117	154	180	121	86	115	43	132	1175
1965	183	164	196	57	95	110	99	223	16	25	55	64	1287
1966	133	216	70	103	74	155	175	79	138	67	84	145	1439
1967	104	154	143	52	68	37	102	121	154	74	240	182	1431
1968	32	17	88	243	145	216	106	213	106	91	60	190	1507
1969	114	171	24	92	117	77	49	139	188	21	95	94	1181
1970	19	13	187	74	147	147	77	238	141	112	62	38	1255
1971	90	98	61	179	204	238	153	99	188	165	127	148	1750
1972	47	14	319	55	83	95	75	130	74	54	64	110	1120
1973	27	7	44	81	76	138	55	157	274	17	67	46	989

CONTINUING RAINFALL SERIES AT TAURANGA AIRPORT

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1974	28	152	101	228	155	198	138	122	157	114	33	73	1499
1975	98	48	168	74	177	169	47	117	106	162	108	34	1308
1976	137	64	75	129	78	75	89	253	136	124	72	78	1310
1977	34	44	124	57	141	195	197	67	74	124	44	77	1178
1978	14	58	137	142	33	137	221	71	73	67	63	80	1096
1979	13	167	504	27	113	107	245	121	109	90	111	133	1730
1980	82	61	185	86	45	132	54	121	89	52	104	149	1160
1981	138	58	54	195	81	202	135	113	88	93	191	78	1426
1982	42	148	110	78	71	98	88	31	65	50	24	37	842
1898-1982													
MEAN	87.1	92.6	113.4	119.7	128.2	136.2	130.3	127.6	110.6	116.9	86.4	98.0	1344.0
ST DEV	61.8	72.4	79.6	76.9	63.7	66.1	59.9	57.8	52.8	67.2	52.4	67.7	249.5

Rotorua 1886-1982 Lat 38.1 S Long 176.3 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Sanatorium 1	282	N76 728046 U16 958358	Jan 1886- Feb 1910	Precise location unknown
Sanatorium 2	282	N76 728046 U16 958358	Mar 1910- Jul 1934	Observatory was 15m from Sanatorium verandah
Fenton Street	284	N76 722044 U16 952358	Aug 1934- Sep 1947	Enclosure sheltered by buildings
Whakarewarewa Forest Nursery 1 *	299	N76 735014 U16 963328	Oct 1947- Dec 1951	Observations started in 1899 Enclosure sheltered by trees
Forest Nursery 2 *	307	N76 735015 U16 963329	Jan 1952- Nov 1963	Observations ceased Jan 1982
Rotorua Airport	287	N76 784076 U16 010384	Dec 1963-	Site shifted Oct 1972 160m S

* See Note 1.

Monthly conversion factors at Rotorua

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sanatorium 1	1	1	1.255	1	0.855	1	1	1	1	1	1	1.331
Sanatorium 2	1	1.218	1.334	1	1	1	1	1.169	1	0.877	1	1.462
Fenton Street	1	1	1	1	1	1	1	1	1	1	1	1
Forest Nursery	1	1	1	1	0.733	1	1	1.200	1	1	1	1

Note 1.

A likelihood ratio test was conducted between the two sites at Whakarewarewa, to test this rainfall data for homogeneity. Results of this test revealed that the two sets of data are homogeneous and have therefore been amalgamated into one set. Whakarewarewa data were included to fill a gap between the closure of the observatory at Fenton Street in 1947, and the opening of the airport in its present location in 1963.

HOMOGENEOUS RAINFALL SERIES

STATION ROTORUA LAT 38 07S LONG 176 19E HT 288 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1886	169	126	28	102	99	120	90	206	154	208	52	20	1374
1887	69	80	23	82	219	253	107	58	182	133	51	95	1351
1888	52	20	128	61	144	120	141	160	42	133	93	28	1122
1889	46	92	58	15	53	226	116	70	306	87	87	178	1334
1890	42	19	105	168	39	86	132	113	124	219	140	144	1332
1891	68	237	24	126	95	77	152	81	97	101	85	120	1263
1892	106	122	128	74	142	189	250	245	147	74	138	95	1709
1893	226	133	122	311	235	151	232	139	132	69	291	433	2474
1894	100	116	67	67	102	69	145	158	157	51	216	69	1317
1895	147	173	61	53	336	163	74	41	220	101	199	93	1662
1896	55	141	123	176	128	100	153	128	182	19	60	44	1309
1897	296	308	198	149	155	60	181	106	137	135	77	15	1817
1898	52	67	83	67	165	88	186	98	56	155	83	212	1312
1899	117	114	89	51	175	104	144	81	69	126	125	53	1249
1900	47	57	38	106	210	70	75	207	348	243	55	161	1616
1901	92	142	120	31	15	134	176	209	78	76	32	272	1377
1902	68	78	181	228	93	166	11	104	132	135	23	49	1268
1903	228	84	60	103	170	66	123	110	56	99	170	154	1424
1904	65	128	419	116	38	175	126	155	179	221	100	201	1923
1905	39	19	14	58	77	262	189	82	139	187	79	81	1226
1906	45	72	56	96	111	66	196	86	182	46	112	107	1175
1907	309	215	144	194	96	69	65	100	131	214	115	222	1874
1908	0	23	198	115	166	123	105	120	106	137	57	216	1366
1909	88	137	212	73	119	92	228	327	107	101	88	128	1700
1910	227	192	200	28	107	114	155	134	41	73	54	118	1444
1911	10	83	68	268	203	96	29	86	138	85	138	199	1403
1912	36	56	223	137	98	152	156	153	207	124	71	20	1433
1913	134	10	108	22	79	42	139	174	46	86	173	151	1164
1914	23	73	83	163	76	77	96	28	61	31	25	78	813
1915	73	28	176	62	63	195	142	134	140	113	163	53	1342
1916	51	44	157	86	147	95	65	250	64	154	213	234	1560
1917	86	162	81	114	173	152	173	146	108	72	94	82	1443
1918	117	110	188	160	48	156	84	74	55	154	126	99	1371
1919	78	54	111	18	61	86	125	155	116	120	39	48	1011
1920	135	263	131	185	76	279	41	172	177	75	87	104	1725
1921	103	54	39	47	81	155	90	118	79	218	52	238	1274
1922	108	112	139	61	48	104	39	116	93	90	101	154	1164
1923	255	85	88	182	190	168	55	68	184	159	124	19	1577
1924	116	82	84	237	364	151	86	152	178	154	125	279	2008
1925	172	105	85	65	183	321	137	122	157	148	61	70	1626
1926	226	43	79	72	240	87	81	221	67	249	188	379	1931
1927	51	108	179	66	209	166	261	226	106	43	75	127	1617
1928	7	104	127	144	333	74	157	69	242	264	62	192	1774
1929	9	48	199	160	75	217	175	172	56	100	248	208	1666
1930	252	71	36	150	68	129	72	187	75	66	104	22	1231
1931	120	55	43	181	40	84	140	104	147	105	76	56	1150
1932	72	101	95	104	137	133	55	68	55	147	23	86	1075
1933	141	228	184	90	152	42	129	150	66	53	125	48	1407
1934	75	230	28	66	103	227	133	116	64	112	125	75	1354
1935	47	151	274	148	102	258	133	198	82	133	159	85	1770
1936	275	309	102	104	35	100	151	130	92	65	203	149	1715
1937	168	48	131	80	228	67	62	54	88	107	112	88	1233
1938	108	315	18	463	125	147	140	195	73	22	157	142	1905
1939	107	15	16	94	56	229	133	150	101	73	59	99	1132
1940	267	133	12	61	107	55	51	200	73	97	108	112	1276
1941	182	29	218	31	36	248	137	198	80	201	100	97	1557
1942	48	25	77	79	212	26	167	202	256	104	109	210	1515
1943	54	62	2	134	85	221	97	74	214	73	64	98	1178
1944	12	319	203	122	68	88	185	186	63	176	52	99	1573
1945	198	170	57	68	195	114	126	182	155	106	44	40	1455
1946	15	3	88	222	141	159	146	183	225	124	87	66	1459
1947	41	38	98	132	51	211	130	114	103	206	91	94	1309
1948	135	37	74	170	241	165	243	120	122	189	165	73	1734
1949	100	104	121	157	208	211	118	86	137	43	82	80	1447
1950	34	185	22	114	127	212	64	200	54	144	154	139	1449
1951	123	119	46	91	62	79	294	74	23	152	181	78	1322
1952	74	142	29	70	62	265	72	170	47	151	267	184	1533
1953	146	87	42	131	136	219	271	196	77	99	51	75	1529
1954	35	68	198	147	103	92	128	180	65	41	38	183	1278
1955	26	87	53	199	59	102	146	148	86	120	55	134	1214
1956	160	45	35	225	213	305	156	182	123	180	119	157	1901
1957	16	70	189	52	123	137	140	128	71	111	86	61	1185
1958	43	255	57	20	90	53	135	203	60	195	129	321	1561
1959	163	124	132	267	75	45	75	80	109	160	74	75	1379
1960	74	259	122	25	104	145	193	80	195	87	84	32	1401
1961	115	32	161	120	71	150	143	108	140	96	79	106	1321

CONTINUING RAINFALL SERIES AT ROTORUA

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1962	135	82	400	245	340	150	93	161	162	244	132	340	2484
1963	76	136	53	22	75	161	241	109	161	25	78	156	1293
1964	44	85	114	29	91	150	200	97	171	168	53	200	1402
1965	197	210	161	76	144	112	138	128	28	58	102	116	1470
1966	239	233	127	142	116	157	210	121	171	62	144	175	1897
1967	63	267	212	38	99	38	85	261	146	64	249	144	1666
1968	30	29	121	183	216	174	89	248	99	106	46	106	1447
1969	194	114	21	137	102	66	50	82	314	31	90	186	1387
1970	17	33	227	89	148	173	94	299	209	173	73	107	1642
1971	175	169	59	175	321	232	96	181	219	108	152	160	2047
1972	76	37	295	83	69	59	138	175	88	88	53	94	1255
1973	55	13	94	128	94	129	65	146	200	27	131	41	1123
1974	8	186	71	260	96	161	147	131	139	137	41	265	1642
1975	192	88	151	75	164	194	76	215	45	226	67	63	1556
1976	143	108	64	170	90	103	163	177	82	146	93	132	1471
1977	56	104	57	55	150	179	244	129	75	77	52	132	1310
1978	9	50	43	150	28	99	234	48	140	80	71	106	1058
1979	4	188	323	47	129	92	197	196	144	193	138	94	1745
1980	101	54	80	122	33	178	53	111	87	80	112	148	1159
1981	104	30	89	151	111	196	121	151	60	106	270	76	1465
1982	43	173	163	79	56	135	129	24	72	76	54	43	1047
1886-1982													
MEAN	102.4	111.6	114.6	118.3	127.0	139.9	133.1	142.2	122.8	119.5	106.3	126.7	1464.3
ST DEV	74.5	77.5	80.2	73.5	74.3	65.1	58.3	58.7	64.5	57.8	57.9	79.3	283.8

Brooklands, New Plymouth 1853-1982 Lat 39.1 S Long 174.1 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
New Plymouth 1	21	N109 658916 P19 037378	Jan 1853- Dec 1869	Site 400m from sea in sand dunes. Precise location unknown
New Plymouth 2	13		Jan 1870- Jul 1886	Location unknown, but site was free from sand drift
Vogeltown	61	N109 655895 P19 034359	Aug 1886- Dec 1893	Precise location unknown No data from 1891-1893
New Plymouth 3	33		Jan 1894- Feb 1899	
New Plymouth 4	61		Mar 1899- Feb 1909	
Mt. Byran Reserve	19	N109 657925 P19 036387	Mar 1909- Apr 1915	Site located at foot of Eliot Street.
Pukekura Park	49	N109 654908 P19 033371	May 1915- Jul 1921	Situated on hilltop on western margin of park
Kawaroa Park			Aug 1921- Apr 1922	Data not used in this series
263 Courtney Street	18	N109 666922 P19 044384	Aug 1921- Jun 1938	
Brooklands Park 1 *	58	N109 657903 P19 036367	Jul 1938- Aug 1942	Site 47m E of "The Gables"
Marsland Hill *	49	N108 650912 P19 030375	Sep 1942- Dec 1973	Located near astronomical observatory
Brooklands Park *	55	N109 658903 P19 037367	Jan 1974-	Site near the original Brooklands Park one

* See note 2.

Monthly conversion factors at New Plymouth

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
New Plymouth 1	1	1	1.227	1	1	1	1	1	1	1	1	1
New Plymouth 2	1	1	1	1	1	1	1	1	1	1	1	1
Vogeltown	1	1	1	1	1	1	0.858	1	1	1	1	1
New Plymouth 3	0.907	1	1	1	1	1	1	1	1	1	1	1.764
New Plymouth 4	1	1	1	1	1	1	1	1	1	1	1	1
Mt Byran Reserve	1	1.579	1	1	1	1	1	1.308	1	1	1	1
Pukekura Park	1	1	1	1	1	1	1	1	1	1	1	1
Courtney Street	1	1	1	1	1	1	1	1	1	1	1	1

Note 2.

Since July 1938, there have been three nearby sites where rainfall has been measured. Likelihood ratio tests were performed firstly between Marsland Hill and Brooklands Park, and secondly between a Marsland Hill/Brooklands Park (MB) composition and Brooklands Park 1. Results of these tests reveal that the Marsland Hill and Brooklands Park rainfalls were not statistically different in any month. Although the May data at Brooklands Park 1 appear as being significantly different when compared with the MB data, this difference is due to chance as there are only four observations from which the recurrence and amounts parameters are estimated. Further, adjacent rainfall stations show a constant relation to New Plymouth's rainfall in the period 1938 to 1982.

HOMOGENEOUS RAINFALL SERIES

STATION BROOKLANDS, NEW PLYMOUTH LAT 39 4S LONG 174 5E HT 55 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1853	110	154	80	123	144	152	141	85	236	126	85	89	1525
1854	17	96	231	256	371	247	86	136	195	105	146	99	1985
1855	67	109	18	129	117	125	126	130	70	120	137	65	1213
1856	86	158	28	84	37	173	120	187	121	101	160	103	1358
1857													
1858													
1859													
1860	97	75	32	90	286	152	87						
1861	56	81	130	187	422	205	278	93	183	128	298	150	2211
1862	112	82	139	158	146	310	224	229	185	112	68	94	1859
1863	17	37	114	68	196	135	222	165	181	214	176	115	1640
1864	57	39	44	46	178	108	102	120	162	199	59	43	1157
1865	49	153	193	38	177	150	154	90	141	128	114	53	1440
1866	85	170	118	53	110	72	126	119	141	178	91	177	1440
1867	196	24	11	80	146	91	211	186	69	184	223	128	1549
1868	114	152	44	122	128	86	129	117	108	104	75	102	1281
1869	74	196	39	121	114	191	68	144	31	143	23	263	1407
1870	63	40	76	106	183	149	139	234	53	54	102	192	1391
1871	63	172	159	74	223	194	245	234	116	234	69	46	1829
1872	74	173	24	204	195	179	280	154	82	123	34	95	1617
1873	62	64	77	56	119	82	152	275	192	119	83	68	1349
1874	60	70	104	25	108	148	238	193	223	52	97	126	1444
1875	77	31	62	26	202	269	222	183	86	224	179	136	1697
1876	16	100	69	177	98	185	130	136	123	53	62	81	1230
1877	103	174	53	90	216	82	73	98	123	113	98	94	1317
1878	54	57	67	68	97	310	176	158	102	129	167	55	1440
1879	6	73	112	70	152	189	165	112	225	90	110	224	1528
1880	121	41	33	22	199	183	189	144	92	97	85	109	1315
1881													
1882	201*	79*	232*	167*	211	99	250	49	106	125	53	67	1639
1883	42	328	100	179	232	120	187	110	129	171	137	171	1906
1884	117	140	83	58	149	142	150	95	152	143	90	297	1616
1885	83	37	156	67	172	134	87	78	55	64	65	19	1017
1886	88	121	40	177	124	225	69	245	160	186	128	68	1631
1887	36	66	162*	92*	144*	114*	164*	75	97*	100	114	240	1404
1888	163	60*	126*	107*	169*	128*	187*	142	20	91	43*	131*	1367
1889	86*	84*	79*	45*	104*	340*	140*	122*	167*	108*	5*	113*	1393
1890	117	6	103	151	105	234	212	123	99	183	150	166	1649
1891	218*	203*	80*	205*	106*	86*	126*	96*	87*	102*	207*	104*	1620
1892	143*	114*	119*	247*	167*	287*	282*	203*	171*	175*	115*	181*	2204
1893	176*	285*	135*	129*	164*	258*	326*	347*	151*	96*	78*	89*	2234
1894	249	70	67	74	202	118	199	114	191	50	225	56	1616
1895	156	238	43	95	108	273	104	63	213	102	276	69	1740
1896	145	75	120	329	108	181	212	164	150	65	85	76	1710
1897	109	309	163	78	241	63	196	116	140	258	132	41	1845
1898	61	78	120	85	101	77	121	94	68	132	188	201	1326
1899	230	100	93	165	239	98	166	101	72	149	132	74	1619
1900	26	81	59	147	220	126	149	176	179	168	114	59	1504
1901	95	116	72	89	87	189	213	97	123	100	85	219	1485
1902	91	66	67	161	145	128	38	97	148	142	90	144	1317
1903	154	94	69	105	452	96	137	177	96	97	186	96	1759
1904	131	127	321	132	231	234	170	146	201	146	106	166	2111
1905	71	44	32	109	112	377	132	94	170	237	168	93	1639
1906	88	82	114	164	223	125	167	105	88	106	101	119	1482
1907	183	128	350	110	177	131	128	182	193	186	85	112	1965
1908	11	105	146	159	193	323	92	104	116	135	79	96	1559
1909	137	6	141	145	83	199	321	232	135	121	91	38	1649
1910	204	183	94	42	83	123	127	215	67	145	89	172	1544
1911	67	90	26	196	138	79	116	48	77	94	101	196	1228
1912	53	123	102	149	130	114	148	123	135	79	197	51	1404
1913	170	99	146	34	121	65	126	177	82	150	143	93	1406
1914	86	125	41	138	122	55	80	54	39	62	135	133	1069
1915	104	88	117	86	163	242	253	115	117	150	197	58	1690
1916	70	65	37	192	176	107	139	252	155	155	210	29	1587
1917	20	125	58	187	181	125	391	186	146	188	35	91	1733
1918	110	123	153	230	126	192	185	113	133	245	141	180	1931
1919	178	49	87	89	59	133	127	128	130	110	64	41	1195
1920	339	279	101	155	99	119	111	128	164	309	90	117	2011
1921	45	83	67	97	62	180	155	92	101	167	95	209	1353
1922	99	57	205	83	98	91	41	150	116	183	215	100	1438
1923	312	78	109	83	154	228	144	81	105	132	87	77	1590
1924	98	113	167	211	176	131	177	72	137	177	132	244	1835
1925	38	74	99	46	181	169	191	129	220	112	63	77	1399
1926	129	88	88	74	257	78	165	183	72	308	175	105	1722
1927	67	103	163	115	168	161	190	220	138	75	182	42	1624
1928	0	36	29	106	180	94	186	168	230	152	67	206	1454
1929	42	27	119	147	110	265	233	80	106	68	156	174	1527

CONTINUING RAINFALL SERIES AT BROOKLANDS, NEW PLYMOUTH

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1930	130	76	28	130	118	87	152	242	102	134	140	30	1369
1931	152	53	38	191	59	134	227	123	133	66	139	113	1428
1932	88	77	54	188	117	156	59	141	50	154	40	47	1171
1933	61	104	58	95	238	72	189	166	72	66	85	105	1311
1934	156	46	61	135	94	178	126	157	52	176	63	81	1325
1935	117	241	151	165	192	200	175	208	88	182	118	126	1963
1936	214	160	52	158	52	83	161	174	161	73	199	113	1600
1937	108	285	46	105	120	150	165	39	122	80	74	132	1426
1938	208	134	39	173	82	328	137	175	116	170	178	211	1951
1939	68	15	38	141	31	216	148	181	115	59	100	111	1223
1940	241	311	36	103	123	95	77	66	137	143	170	54	1556
1941	256	52	199	45	80	172	122	207	147	225	138	107	1750
1942	130	83	195	110	157	37	228	116	180	123	86	133	1578
1943	94	268	40	79	90	326	177	127	168	167	118	50	1704
1944	58	98	107	129	56	195	163	173	67	179	116	151	1492
1945	291	106	91	220	153	119	119	187	88	173	45	164	1756
1946	113	35	227	229	136	156	162	251	139	180	84	142	1854
1947	90	24	44	88	119	272	184	160	177	190	64	88	1500
1948	105	42	105	166	407	114	208	172	94	239	98	108	1858
1949	73	120	139	105	146	198	187	154	83	130	152	134	1621
1950	23	128	33	77	66	237	69	99	158	137	86	235	1347
1951	76	132	79	145	107	63	236	123	52	143	156	99	1411
1952	111	115	25	108	151	209	98	116	44	134	204	126	1431
1953	125	103	61	78	142	183	151	198	117	148	125	72	1503
1954	45	71	109	70	78	141	148	213	54	80	83	121	1213
1955	25	81	38	111	257	199	121	155	91	230	87	112	1507
1956	230	142	41	278	200	323	171	191	90	138	258	115	2177
1957	14	64	163	123	233	100	107	91	77	176	207	202	1557
1958	113	130	61	76	275	134	245	126	21	98	136	592	2007
1959	129	139	173	167	193	62	90	58	127	96	98	65	1397
1960	56	118	147	23	168	188	237	116	249	79	65	20	1466
1961	116	116	97	100	190	168	273	47	94	46	84	24	1355
1962	153	69	136	141	222	152	157	246	57	268	223	80	1904
1963	76	164	72	31	205	125	125	116	84	9	66	53	1126
1964	125	135	120	26	121	83	284	152	232	89	51	177	1595
1965	136	134	136	43	126	122	174	124	37	74	203	121	1430
1966	120	87	100	157	119	211	218	82	166	71	153	145	1629
1967	100	71	80	85	147	128	150	199	74	52	227	146	1459
1968	77	38	81	300	188	172	62	123	83	162	142	183	1611
1969	236	223	28	117	150	193	91	221	167	70	48	106	1650
1970	67	37	179	103	197	276	250	166	246	126	53	56	1756
1971	116	381	53	109	199	209	48	188	155	203	185	149	1995
1972	94	93	215	114	176	100	141	159	103	78	57	85	1415
1973	108	7	221	83	191	157	118	178	172	81	154	80	1550
1974	25	93	16	170	126	34	358	193	120	186	79	56	1456
1975	114	39	175	131	164	168	156	220	107	191	73	109	1647
1976	152	100	93	162	150	277	147	133	93	144	150	150	1751
1977	65	124	59	124	250	309	223	140	130	127	162	92	1805
1978	26	12	146	209	104	126	277	123	138	136	128	104	1529
1979	32	78	130	183	232	82	161	144	94	162	141	110	1549
1980	151	98	179	131	88	284	178	149	106	128	191	122	1805
1981	39	75	154	124	125	229	209	208	130	114	112	120	1639
1982	29	102	170	96	143	224	113	79	175	141	81	199	1552
1853-1982													
MEAN	105.8	107.9	101.4	122.7	158.5	164.9	165.4	146.2	124.2	135.6	120.9	118.7	1573.0
ST DEV	65.9	70.3	61.9	59.2	70.4	73.8	65.0	54.8	50.9	55.5	56.3	70.0	245.8

* DATA ESTIMATED FROM INGELWOOD (PIVERSIDE) RAINFALLS.

Nelson Park, Napier 1868-1982 Lat 39.5 S Long 176.9 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Napier Barracks	74		1862 - 1866	These records have not been used
Napier Harbour *	4	N127 338408 Y21 387819	Aug 1868- Dec 1869	Located on harbour spit
Napier 1 *	2	N134 337398 V21 472836	Jan 1870- Dec 1880	Site was possibly at the harbour
Napier 2			Jan 1881- Jan 1905	Only annual totals exist for period 1881-1889 #
Napier 3	79		Feb 1905- Dec 1923	Readings may have been made from Bluff Hill
Nelson Park	2	N134 328382 V21 463821	Jan 1924-	Site shifted 260m SE Nov 1963

* These sites have been amalgamated
# See Note 3.

Monthly conversion factors at Napier

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Napier 1	0.629	1	1	1	1	1	1	1	1	1	0.656	1
Napier 2	1	1	1	1	1	1	1	1	0.770	1	1	1
Napier 3	1	1	1	1	0.809	1	1	1	1.154	1	1	1

Note 3.

Annual rainfall amounts are available only for the period 1881 to 1889. The New Zealand Meteorological Service does not hold the original records; these were extracted from Hill (1923). It appears that rainfall measurements were made by a Mr E. Lyndon from 1881 until January 1905. The annual conversion factor (calculated as the ratio of the sum of the monthly rainfalls after pararmeter ajustment to that before adjustment) for the period 1881 to 1905 is 0.98. It was derived from the monthly rainfall data between 1889 and 1905. The annual totals have therefore been adjusted downwards by 2 percent. These totals have not been included in calculating the mean and standard deviation of the annual values. A new mean and standard deviation including all annual values appears in brackets at the foot of the table.

HOMOGENEOUS RAINFALL SERIES

STATION NELSON PARK, NAPIER LAT 39 30S LONG 176 55E HT 2 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1868								29	34	50	10	5	
1869	30	274	2	41	61								
1870	75	13	41	80	34	79	114	111	84	42	45	35	754
1871	66	116	182	75	57	98	49	79	8	30	70	5	835
1872	12	96	25	106	41	77	39	11	24	73	43	31	578
1873	87	252	48	130	17	15	144	93	38	84	72	6	987
1874	38	70	104	25	108	148	248	193	222	52	64	126	1397
1875	65	69	4	66	103	218	36	92	59	81	56	54	903
1876	190	62	21	85	33	79	124	30	23	29	68	83	827
1877	65	174	53	90	216	82	73	101	123	113	64	94	1248
1878	57	30	6	9	72	78	106	45	35	33	18	6	495
1879	43	15	116	96	343	230	88	78	17	33	129	70	1257
1880	21	21	424	34	44	116	104	58	18	76	23	12	951
1881													601+
1882													921+
1883													1049+
1884													999+
1885													583+
1886													539+
1887													653+
1888				27				52	50	54	20		538+
1889					88	169	123	32	102	47	60	44	890+
1890	45	46	23	30	46	145	158	23	99	8	32	16	671
1891	61	205	17	73	44	43	69	78	46	36	38	30	740
1892	172	120	45	141	140	42	166	68	32	29	58	9	1022
1893	156	62	190	94	114	146	157	43	61	4	252	169	1448
1894	125	91	65	158	90	211	60	81	82	13	21	11	1008
1895	67	88	66	107	166	28	52	32	61	26	128	24	845
1896	11	40	54	93	41	171	97	115	151	36	34	23	866
1897	78	181	97	186	38	96	67	109	82	39	12	43	1028
1898	33	12	54	51	53	73	41	172	5	118	46	97	755
1899	75	89	99	106	36	32	161	122	22	146	39	21	948
1900	65	26	31	110	193	185	37	126	110	124	31	82	1120
1901	47	66	115	44	18	34	184	59	40	2	32	31	672
1902	85	102	35	116	63	202	29	153	43	42	23	35	928
1903	110	12	12	54	48	41	141	83	44	57	111	100	813
1904	26	91	119	136	12	15	71	29	44	150	10	102	805
1905	76	17	48	72	260	161	127	152	46	93	74	40	1166
1906	69	136	77	45	45	8	188	30	74	22	121	7	822
1907	100	85	115	151	78	46	112	44	67	37	14	38	887
1908	3	16	208	104	53	23	91	74	24	52	31	147	826
1909	16	98	213	44	116	9	119	57	78	77	85	90	1002
1910	77	87	242	43	36	25	267	32	52	3	40	48	952
1911	23	84	50	107	241	90	115	82	42	28	24	38	924
1912	27	72	80	66	27	64	58	80	77	141	105	0	797
1913	30	15	56	79	22	19	25	100	15	104	60	79	604
1914	7	56	133	69	177	12	6	34	16	7	28	15	560
1915	32	9	129	5	19	114	69	56	38	37	91	50	649
1916	21	12	62	75	134	74	93	211	46	76	32	64	900
1917	134	112	9	60	113	280	58	125	59	42	77	37	1106
1918	109	123	53	47	23	22	84	60	35	135	42	94	826
1919	37	74	25	17	65	65	65	93	75	26	11	16	569
1920	55	44	54	45	34	90	78	102	70	69	18	28	687
1921	19	30	1	21	22	76	57	67	38	91	82	42	546
1922	206	87	29	4	68	32	85	17	40	27	36	118	749
1923	169	44	17	76	168	104	93	143	51	96	13	4	978
1924	42	28	274	77	122	44	32	110	23	76	45	58	931
1925	73	18	13	5	91	167	131	104	9	30	7	0	648
1926	32	38	27	9	81	24	58	77	19	44	35	88	532
1927	39	25	27	37	74	203	131	55	88	12	35	67	793
1928	9	79	103	23	169	52	37	118	61	77	73	122	923
1929	22	5	97	94	141	22	51	71	26	71	98	28	726
1930	125	36	5	41	20	51	109	109	92	35	35	10	668
1931	27	9	54	54	41	80	102	12	92	16	5	54	546
1932	11	157	122	75	66	11	90	23	94	10	27	17	703
1933	22	56	52	34	183	6	110	54	30	51	60	87	745
1934	74	177	24	33	33	73	61	56	49	42	35	21	678
1935	10	149	32	237	65	196	266	53	81	90	85	41	1305
1936	130	303	156	67	48	149	103	30	42	31	79	95	1233
1937	119	18	31	26	34	76	83	50	67	69	32	40	645
1938	155	157	21	357	20	87	182	68	38	32	52	115	1284
1939	21	23	24	139	36	41	102	24	61	17	31	39	558
1940	59	73	5	71	158	9	129	103	49	56	125	26	863
1941	87	11	75	35	76	151	160	79	11	38	7	65	795
1942	64	116	49	12	53	25	78	110	33	9	23	72	644
1943	100	37	2	47	76	87	71	72	134	59	27	84	796
1944	63	116	238	13	142	48	66	107	24	43	61	66	987

CONTINUING RAINFALL SERIES AT NELSON PARK, NAPIER

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1945	86	78	13	13	112	34	21	65	60	64	1	24	571
1946	4	0	65	123	222	107	46	41	36	52	41	26	763
1947	21	118	36	121	151	90	46	28	36	60	5	23	735
1948	33	19	38	66	163	84	47	37	22	58	71	16	654
1949	156	30	52	34	119	97	34	137	26	15	93	8	801
1950	32	107	4	75	62	105	78	114	50	76	162	39	904
1951	74	73	71	104	97	48	66	104	1	38	71	49	796
1952	48	56	30	52	12	35	14	177	116	69	116	49	774
1953	98	39	8	105	56	175	32	24	23	34	14	13	621
1954	6	13	115	99	37	27	106	73	30	27	42	119	694
1955	20	41	153	144	18	67	211	148	106	40	15	39	1002
1956	53	48	35	34	166	90	121	55	42	125	40	114	923
1957	22	3	37	14	56	192	135	72	65	50	20	30	696
1958	12	75	48	5	103	11	49	38	29	100	32	161	663
1959	42	90	68	36	158	18	83	70	56	239	41	24	925
1960	54	91	102	80	64	136	27	58	59	20	65	124	880
1961	108	49	33	63	74	167	105	160	110	14	6	13	902
1962	53	15	96	106	54	64	158	38	50	63	25	142	864
1963	92	7	52	30	12	297	134	22	64	19	32	48	809
1964	17	58	32	15	55	117	76	25	27	31	37	71	561
1965	30	71	163	27	28	63	64	165	33	66	45	85	840
1966	64	91	36	53	80	18	112	117	27	43	73	165	879
1967	30	124	67	56	31	78	55	61	43	47	54	71	717
1968	34	9	9	82	69	172	77	83	42	50	22	80	729
1969	52	62	18	81	42	48	39	59	56	35	47	50	588
1970	10	99	214	72	145	30	34	88	80	21	33	33	859
1971	125	87	71	98	192	24	107	90	134	165	100	79	1272
1972	29	33	143	49	89	83	36	26	23	29	40	24	604
1973	67	32	31	43	51	89	42	133	120	36	84	59	787
1974	21	38	140	123	43	238	110	134	85	99	22	43	1096
1975	102	21	67	28	119	88	37	41	74	54	104	122	857
1976	100	230	41	71	7	28	49	75	99	104	42	109	955
1977	57	76	60	136	47	147	92	137	93	45	30	78	998
1978	17	90	40	159	48	90	107	34	39	53	13	44	734
1979	37	111	273	36	39	52	69	110	76	58	23	55	939
1980	25	40	184	109	25	122	49	78	24	48	28	228	960
1981	41	66	55	73	38	103	66	176	21	69	64	47	819
1982	12	44	76	130	27	101	62	16	48	29	42	10	597
1868-1982													
MEAN	59.8	72.3	74.8	72.9	81.7	88.6	90.2	79.0	55.6	55.5	50.1	56.9	838.7 (831.8)+
ST DEV	44.7	59.1	71.4	52.0	62.5	64.8	51.7	44.3	35.4	38.9	37.9	43.7	193.9 (200.0)+

+ SEE NOTE 3.

Cook Gardens, Wanganui 1863-1982 Lat 39.9 S Long 175.1 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Wanganui 1			Jan 1863- Dec 1870	
Wanganui 2 (St Johns Hill)	33		Jan 1872- Dec 1879	Site on rising ground over-looking the Town.
Post Office Roof	9	N138 580860 R22 852390	Jan 1880- Apr 1937	Site very sheltered. Shifted mid 1927 to another P.O. roof
Cook Gardens	22	N138 579863 R22 851392	May 1937-	Original site 10m SE of pre-sent one. Relocated Aug 1939

Monthly conversion factors at Wanganui

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wanganui 1	1	1	1	1	1	1	1	1	1	1	1	1
Wanganui 2	1	1	1	1.379	1	1	1	0.661	1	1	1	1
Post Office Roof	1	0.948	1	1	1	1	1	1	0.907	0.900	0.954	1.057

HOMOGENEOUS RAINFALL SERIES

STATION COOK GARDENS, WANGANUI LAT 39 56S LONG 175 03E HT 22 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1863	15	51	33	89	111	144	129	93	97	131	135	66	1094
1864	57	47	5	24	110	30	57	115	74	139	48	66	772
1865	50	89	94*	44*	108*	93*	84*	81*	96*	94*	100*	56*	989
1866	67	93	155	51	40	92	33	72	93	58	64	112	930
1867	197	43	31	20	119	57	61	79	41	146	122	56	972
1868	56	87	16	81	65	68	91	47	60	131	89	76	867
1869	48	263	56	80	118	77	55	83	43	78	25	150	1076
1870	98	28	41	63	76	96	47	152	45	52	139	77	914
1871	66	110	149	106	121	133	156	132	57	115	80	36	1261
1872	72	112	21	102	136	161	114	55	32	90	14	58	967
1873	117	39	38	65	113	34	119	69	143	96	54	77	964
1874	24	42	49	28	57	103	142	79	151	50	90	91	905
1875	89	41	31	0	136	153	101	109	59	154	179	108	1160
1876	48	67	100	137	85	96	90	42	99	19	63	210	1056
1877	107	87	76	135	195	83	59	97	75	54	53	77	1098
1878	86	34	50	34	60	215	105	92	40	93	122	71	1002
1879	24	40	115	47	52	146	134	65	108*	63*	104*	107*	1005
1880	49	16	106	21	173	46	132	131	25*	66	76*	149*	991
1881	49*	24*	42*	12*	53*	107*	115*	114*	95*	63*	75*	106*	856
1882	76*	44*	42*	76*	96	64	45	40	67*	105	22	27	704
1883	57	219	65	99	130	65	109	64	64	108	68	132	1179
1884	122	15	44	18	54	86	93	96	184	71	118	202	1104
1885	58	28	93	57	73	45	67	52	31	60	39	14	618
1886	64	69	58	114	103	105	13	130	85	122	98	29	991
1887	20	61	70	53*	103*	62*	123*	55*	139*	107*	71*	66*	929
1888	38*	42*	111*	57*	49*	59*	71*	59	29	82	62	71*	730
1889	79*	55*	69*	26*	68*	139*	62*	73*	134*	64*	27*	132*	927
1890	47	22	33	98	37	36	113	44	36	116	51	63	695
1891	84	148	87	100	46	58	54	49	26	35	65	42	794
1892	71	49	97	79	56	90	116	93	105	62	41	91	951
1893	70	40	67	74	64	110	144	138	124	75	58	113	1077
1894	80	86	44	45	148	74	102	70	75	11	90	20	845
1895	84	131	81	179	51	99	128	50	100	84	146	15	1148
1896	112	9	70	237	86	118	109	85	44	43	80	50	1045
1897	99	128	94	82	83	24	209	20	26	137	91	18	1010
1898	23	29	62	54	107	59	76	54	65	93	105	56	783
1899	135	129	62	134	89	28	131	71	41	69	105	72	1066
1900	47	36	32	97	194	34	80	79	118	111	96	76	1000
1901	73	109	75	102	62	74	133	55	42	40	64	105	934
1902	78	19	49	116	134	39	15	40	79	76	67	66	777
1903	99	39	36	67	218	82	74	106	39	46	128	70	1004
1904	61	31	140	49	112	88	71	119	80	115	60	98	1024
1905	26	9	57	92	81	240	29	32	104	145	102	116	1033
1906	118	117	46	97	92	52	81	77	27	41	63	50	863
1907	107	92	142	101	94	116	87	82	113	121	80	81	1216
1908	3	37	153	86	61	71	62	80	38	80	50	80	801
1909	80	11	84	83	54	96	106	186	103	96	63	74	1037
1910	109	53	103	62	77	84	80	60	56	84	49	104	921
1911	36	60	7	114	76	87	126	32	73	101	125	160	996
1912	49	123	76	116	67	114	88	17	107	78	110	15	961
1913	102	34	76	35	123	36	96	50	56	115	93	188	1004
1914	85	57	25	121	88	70	41	33	21	68	52	87	748
1915	34	26	77	44	61	86	144	51	83	112	161	139	1018
1916	75	40	40	84	101	100	58	147	62	87	103	11	908
1917	23	63	16	103	71	23	76	70	59	72	74	66	717
1918	73	40	46	126	85	155	133	58	106	109	47	89	1066
1919	68	27	36	15	31	113	79	50	49	46	73	37	624
1920	94	106	54	88	70	96	67	84	97	117	73	18	963
1921	61	22	42	40	71	69	93	92	49	115	66	78	798
1922	74	24	130	13	52	36	75	97	38	61	79	87	766
1923	121	77	63	37	70	99	34	38	44	79	20	31	713
1924	48	78	56	166	75	94	62	50	65	77	59	145	975
1925	55	38	57	15	90	56	62	52	113	51	21	29	638
1926	105	106	52	22	163	36	119	61	32	168	103	79	1046
1927	93	15	92	51	80	98	37	98	32	27	141	36	800
1928	0	70	31	67	115	77	28	73	72	82	90	156	860
1929	45	18	55	42	77	203	69	70	47	9	75	126	837
1930	99	20	16	81	38	74	51	103	40	100	85	25	732
1931	109	66	24	84	57	107	128	74	81	31	83	108	952
1932	43	69	13	69	65	120	21	65	24	79	52	57	677
1933	82	139	81	99	98	52	76	57	92	55	40	101	972
1934	116	117	56	65	62	52	59	70	44	78	30	15	765
1935	68	176	68	69	108	111	43	119	40	145	73	70	1091
1936	94	205	71	92	41	52	116	56	69	49	46	95	985
1937	82	126	42	85	96	38	27	17	78	34	46	74	745
1938	118	43	21	185	42	102	71	56	81	50	108	162	1039
1939	27	9	20	86	8	136	133	147	86	33	44	78	807

CONTINUING RAINFALL SERIES AT COOK GARDENS, WANGANUI

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1940	108	129	28	42	96	42	24	45	39	71	98	7	729
1941	87	42	98	50	89	108	76	94	66	122	92	131	1055
1942	42	51	91	31	82	8	132	66	105	32	43	32	715
1943	45	132	15	52	46	141	106	60	113	56	59	49	874
1944	32	35	90	95	59	116	71	37	48	112	65	113	873
1945	123	67	57	89	110	50	52	65	68	115	28	83	907
1946	38	8	99	74	67	82	53	157	66	104	81	45	874
1947	49	46	33	96	59	163	58	80	62	166	18	66	896
1948	61	19	36	71	243	58	106	51	52	122	88	10	917
1949	71	62	74	121	94	104	139	99	41	31	74	90	1000
1950	24	178	26	50	25	97	99	96	60	64	39	113	871
1951	*68	46	56	104	104	59	74	52	12	112	126	131	944
1952	69	53	30	68	62	250	39	50	28	41	178	68	936
1953	170	53	79	91	76	83	77	42	82	135	55	114	1057
1954	24	20	100	42	31	93	97	105	21	58	65	73	729
1955	18	62	40	82	153	137	104	101	39	139	40	59	974
1956	80	109	17	154	62	107	107	79	73	89	108	143	1128
1957	57	43	49	39	187	92	122	46	36	130	107	131	1039
1958	83	91	54	68	165	54	54	93	12	45	22	185	926
1959	189	154	71	83	180	20	48	26	66	98	40	58	1033
1960	31	114	93	25	57	44	97	61	91	56	52	45	766
1961	129	60	60	98	33	94	89	115	87	13	39	48	965
1962	100	56	64	69	27	100	66	87	70	126	70	59	894
1963	45	49	50	57	79	81	41	36	56	10	99	58	661
1964	77	31	60	20	46	69	131	96	90	76	28	169	893
1965	61	53	159	64	41	62	80	59	42	61	128	89	899
1966	80	23	51	106	59	124	139	56	32	34	136	115	955
1967	78	116	24	78	56	57	44	133	42	61	82	111	882
1968	50	26	33	124	95	107	31	68	56	112	46	98	846
1969	51	42	11	55	66	73	46	82	32	39	45	145	687
1970	47	37	128	26	122	95	84	93	141	67	27	46	913
1971	143	100	19	5	105	91	34	71	111	120	90	78	967
1972	66	60	107	83	74	40	41	39	72	51	36	25	694
1973	53	1	120	44	71	65	33	68	84	30	44	43	656
1974	12	55	37	93	64	23	225	48	71	93	25	58	804
1975	60	14	24	76	99	72	143	121	45	93	58	44	849
1976	81	95	46	88	78	209	100	107	47	105	86	103	1145
1977	81	90	47	95	144	135	88	71	113	33	52	77	1026
1978	14	30	15	100	43	83	161	67	66	93	45	76	793
1979	28	57	91	56	142	33	63	107	53	71	52	142	895
1980	57	34	141	51	37	65	75	90	112	52	125	40	879
1981	41	50	55	48	110	97	89	59	82	51	79	72	833
1982	37	47	46	47	82	97	40	47	36	66	86	103	734
1863-1982													
MEAN	69.8	65.0	62.0	74.1	87.1	87.5	85.0	75.6	68.1	80.6	74.3	81.6	910.8
ST DEV	35.8	47.0	35.4	39.1	41.9	44.0	39.2	31.7	32.9	36.2	34.9	43.8	138.0

* RAINFALL ESTIMATED FROM FORDELL DATA EXCEPT FOR 1865 WHICH USED NEW PLYMOUTH RAINFALL DATA.

Fielding 1882-1982 Lat 40.2 S Long 175.6 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
West Street 1		N144 052511 S23 274058	Jul 1882- Dec 1909	Site thought to be at West Street
West Street 2 *		N144 052512 S23 274059	Jan 1910- Oct 1921	Site 100m from former site
Sandon Road	87	N144 046517 S23 269064	Nov 1921-	Site shifted 50m NE mid 1970 to improve exposure

* From Apr 1911 to Jan 1912 readings were taken from South Street

Monthly conversion factors at Fielding

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
West Street 1	1	1	1.119	1	1	1	1	1	1	1	1	1
West Street 2	1	1	1	1	1.185	1	1	1	1	0.966	0.904	1

HOMOGENEOUS RAINFALL SERIES

STATION FIELDING LAT 40 13S LONG 175 33E HT 87 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1882							152	44	87	95	76	42	
1883	10	237	55	98	129	86	91	78	65	103	115	147	1214
1884	148	22	74	30	32	68	88	64	193	133	108	192	1152
1885	56	46	75	35	89	50	65	68	57	66	50	39	696
1886	84	63	37	152	118	115	25	178	95	147	104	41	1159
1887	5	36	109										
1888								62	30	98	61		
1889					37	108	40	70	139	66	24	105	
1890	101	28	68	61	40	56	142	58	51	125	38	67	835
1891	79	128	72	62	45	50	46	55	37	51	107	49	781
1892	75	44	46	44	58	83	108	92	117	39	56	76	838
1893	70	57	81	81	48	90	136	140	127	112	45	87	1074
1894	45	67	49	42	177	50	110	70	54	10	67	34	775
1895	68	109	64	162	50	100	78	52	89	73	146	38	1029
1896	101	13	38	146	79	76	83	63	72	57	52	41	821
1897	102	103	79	74	54	30	152	41	46	163	94	13	951
1898	32	35	57	45	58	45	118	40	48	82	158	64	782
1899	115	68	51	54	44	23	121	47	46	73	83	87	812
1900	60	73	38	52	129	46	62	64	110	117	89	50	890
1901	61	101	56	76	58	49	110	72	40	35	57	62	777
1902	67	23	47	83	87	90	34	37	69	100	81	56	774
1903	97	46	37	65	120	69	57	70	56	33	121	50	821
1904	43	35	117	22	122	87	62	69	61	140	58	109	925
1905	14	7	29	63	52	200	29	36	129	92	75	113	839
1906	68	123	41	79	87	54	75	52	43	44	70	34	770
1907	94	71	153	93	50	110	45	86	173	130	60	73	1138
1908	5	8	105	82	57	93	74	81	66	116	50	83	820
1909	117	15	65	107	61	104	78	155	158	110	64	49	1083
1910	122	72	105	48	72	99	87	60	67	94	41	101	967
1911	22	63	1	68	67	87	126	45	63	128	112	160	943
1912	43	78	97	99	55	119	117	35	120	111	138	10	1022
1913	96	30	85	33	101	37	117	37	55	145	93	148	977
1914	75	69	43	117	94	59	59	25	26	48	70	87	772
1915	46	35	79	45	66	96	155	38	54	111	109	74	908
1916	53	23	58	58	70	87	58	99	70	64	94	9	743
1917	26	81	22	97	107	22	116	77	92	96	44	48	828
1918	81	53	89	108	107	114	86	72	86	152	127	97	1171
1919	60	28	32	27	42	60	101	78	56	50	70	36	641
1920	131	100	48	102	67	137	38	76	93	182	127	51	1151
1921	50	27	47	22	56	88	119	115	76	131	87	142	960
1922	39	24	145	66	45	57	86	117	44	78	149	59	909
1923	182	116	56	47	122	92	44	41	38	99	31	65	933
1924	66	116	51	178	81	101	73	45	84	87	62	192	1136
1925	62	49	33	33	162	111	61	76	150	43	57	51	888
1926	87	85	51	56	148	38	191	75	90	217	123	66	1227
1927	40	56	102	72	102	109	77	99	38	72	133	50	950
1928	5	60	24	108	127	53	29	94	98	172	93	124	987
1929	48	16	51	57	81	199	108	74	67	37	90	132	960
1930	108	17	18	79	53	45	36	102	51	122	98	22	751
1931	122	46	44	138	43	114	104	70	105	34	73	67	960
1932	41	73	26	60	67	140	30	78	31	83	57	54	740
1933	51	117	56	102	118	37	91	56	67	42	49	79	865
1934	83	88	85	69	59	69	72	76	20	74	30	22	747
1935	88	154	77	56	149	133	38	138	50	145	125	44	1197
1936	103	178	69	70	40	54	107	81	83	65	108	83	1041
1937	105	131	74	86	133	52	41	38	76	46	37	49	868
1938	84	66	27	207	41	115	62	73	142	54	92	181	1144
1939	18	9	22	109	19	119	151	170	61	56	39	84	857
1940	125	130	45	60	110	37	27	26	40	67	147	22	836
1941	86	55	126	53	81	132	55	112	82	128	86	125	1121
1942	71	66	118	41	87	14	131	53	122	24	73	43	843
1943	50	145	22	50	53	182	114	70	166	64	66	51	1033
1944	41	25	102	154	46	90	76	48	80	117	77	146	1002
1945	137	50	103	80	142	51	60	87	42	113	32	92	989
1946	59	21	144	92	91	97	56	175	59	99	85	44	1022
1947	54	64	26	71	47	207	57	91	53	132	18	70	890
1948	48	23	27	77	220	66	80	67	55	115	84	27	889
1949	78	88	97	85	66	96	148	69	40	48	64	91	970
1950	43	133	44	50	16	121	62	115	44	61	39	124	852
1951	82	60	62	125	51	54	96	68	7	152	152	98	1007
1952	57	65	46	78	60	163	50	49	20	90	155	114	947
1953	166	117	52	81	86	71	66	36	87	148	87	139	1136
1954	28	22	76	66	43	88	80	107	22	32	67	62	693
1955	13	78	30	106	119	117	92	104	29	95	72	62	917
1956	91	68	16	84	86	123	113	70	64	83	86	217	1101
1957	59	44	41	48	152	88	88	48	73	139	162	128	1070

CONTINUING RAINFALL SERIES AT FIELDING

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1958	120	68	79	56	137	56	65	118	18	60	26	187	990
1959	159	64	64	87	175	28	37	27	50	81	60	33	865
1960	37	96	83	23	68	36	103	91	80	50	68	68	803
1961	149	50	70	82	49	86	113	94	167	15	48	21	944
1962	94	45	68	94	24	121	101	124	62	142	94	61	1030
1963	57	61	44	80	67	69	37	48	79	20	87	73	722
1964	100	38	95	32	76	95	146	105	106	66	35	136	1030
1965	68	70	192	52	41	62	96	56	37	70	96	129	969
1966	93	84	50	133	70	99	145	64	67	55	95	198	1153
1967	55	116	66	60	66	43	37	139	27	70	83	98	860
1968	52	39	14	146	136	164	92	76	86	151	52	110	1118
1969	100	77	27	52	87	80	47	71	25	27	40	103	736
1970	24	11	133	13	123	129	152	84	199	82	61	77	1088
1971	177	108	23	17	149	102	61	93	101	122	79	51	1083
1972	65	45	155	87	85	40	94	54	68	62	17	32	804
1973	46	4	112	42	146	86	32	46	109	36	65	55	779
1974	21	50	27	82	73	31	255	93	128	106	47	72	985
1975	89	25	45	61	119	124	142	155	42	67	71	72	1012
1976	102	52	61	82	85	228	122	109	56	89	58	76	1120
1977	101	38	35	81	129	112	63	45	106	50	51	128	939
1978	15	4	19	125	48	50	166	68	60	94	70	89	808
1979	31	75	114	54	126	26	37	120	79	97	74	120	953
1980	65	29	136	88	31	58	69	92	129	125	114	43	979
1981	12	62	47	47	121	108	105	75	122	44	31	87	861
1982	49	68	84	25	91	57	78	51	44	99	55	157	858
1882-1982													
MEAN	71.7	63.8	65.1	75.5	84.2	86.3	96.9	77.0	75.4	88.3	78.0	82.0	936.2
ST DEV	39.3	41.0	36.6	36.4	40.2	42.7	41.3	33.2	40.1	41.2	34.0	46.0	137.3

Masterton 1884-1982 Lat 40.9 S Long 175.6 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Masterton Railway	123	N158 142641 T26 334261	Jan 1884- Dec 1897	
Masterton 1	119	N158 145630 T26 337251	Jan 1899- Oct 1905	Site probably at Wairarapa Daily Times Office
Masterton 2 *			Nov 1905- Jan 1911	Location unknown. Readings taken at observers house
Masterton 3 *	116	N158 145626 T26 336247	Feb 1911- Jan 1912	Site probably near St Lukes Presbyterian Church
33 Worksop Road	116	N158 149624 T26 340245	Feb 1912- Apr 1920	
66 Essex Street	125	N158 139633 T26 331254	May 1920- Jan 1926	Observations continued until Nov 1942
Waingawa 1	114	N162 102596 S26 296221	Feb 1926- Sep 1942	
Waingawa 2	114	N162 103596 S26 297221	Oct 1942-	

* Data from sites amalgamated due short records

Monthly conversion factors at Masterton

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Masterton Railway	1	1	1	1	1	1	1	1	1	1	1	1.509
Masterton 1	1	1	1	1	1	1	1	1	1	0.924	1	1
Masteron 2	1	0.775	1	1	1	1	1	1	1	1	1	1
Worksop Road	1	1	1	1	1	1.260	1	1	1	1	1	1
Essex Street	1	1	1	1	1	1	1	1	1	1	1	0.884
Waingawa 1	1	1	1.340	1	1	1	1	1	1	1	1	1

HOMOGENEOUS RAINFALL SERIES

STATION WAINGAWA, MASTERTON LAT 40 59S LONG 175 37E HT 114 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1884	165	27	55	27	63	114	92	76	135	67	115	138	1074
1885	30	59	124	86	89	42	74	70	64	40	29	30	737
1886	97	53	34	115	166	132	29	162	94	60	91	17	1050
1887	3	27	31										
1888								128	46	60	181		
1889					42	122	113	44	116	83	59	67	
1890	91	24	52	46	74	56	178	33	51	123	39	87	854
1891	49	108	63	76	46	70	64	42	49	52	68	117	804
1892	61	207	55	74	135	79	83	86	92	77	78	47	1074
1893	91	64	180	99	101	63	167	123	97	12	53	135	1185
1894	88	20	27	54	137	77	104	57	95	16	70	47	792
1895	115	68	71	224	65	76	58	84	84	40	194	43	1122
1896	59	45	103	106	109	131	248	65	157	56	79	11	1169
1897	97	166	34	147	57	31	90	104	90	124	33	37	1010
1898													
1899	43	233	186	53	158	49	98	87	41	40	46	42	1076
1900	38	36	43	143	138	56	84	122	110	181	52	92	1095
1901	83	64	74	56	39	72	206	96	33	30	50	71	874
1902	103	13	73	125	123	215	54	99	77	67	46	133	1128
1903	112	25	26	76	93	89	101	194	49	14	99	50	928
1904	42	55	145	66	84	128	72	121	79	235	69	146	1242
1905	39	21	99	67	131	249	62	54	238	151	93	114	1318
1906	43	105	97	70	140	66	137	37	77	36	97	28	933
1907	114	78	166	102	185	157	86	80	114	85	40	14	1221
1908	15	2	174	62	32	46	146	59	41	99	51	69	796
1909	79	34	111	47	114	34	85	122	88	69	73	54	910
1910	133	38	63	58	57	145	183	82	46	41	53	83	982
1911	64	155	6	73	70	84	189	36	56	50	92	103	978
1912	12	106	62	87	70	132	297	39	93	119	115	14	1146
1913	102	28	60	60	209	36	38	52	24	152	98	126	985
1914	40	68	63	119	155	92	29	29	36	15	43	48	737
1915	9	15	171	23	45	107	106	57	12	57	97	50	749
1916	57	26	77	65	129	75	90	149	127	98	30	8	931
1917	46	101	13	85	159	109	133	103	56	60	58	83	1006
1918	53	55	107	61	92	89	158	94	96	104	55	111	1075
1919	43	53	14	33	74	89	68	100	93	48	66	59	740
1920	80	87	39	105	107	105	30	94	133	126	80	30	1016
1921	59	42	14	43	48	82	91	105	39	173	105	128	929
1922	50	35	148	34	28	44	64	55	64	23	65	75	685
1923	166	90	16	68	228	77	139	92	36	117	10	20	1059
1924	42	100	85	53	107	102	43	110	64	138	59	296	1199
1925	73	40	11	41	138	188	106	140	109	43	36	12	937
1926	32	101	76	35	167	40	67	140	62	114	84	103	1021
1927	42	42	93	72	102	190	125	115	33	57	175	121	1167
1928	9	64	74	162	132	116	31	147	98	132	107	185	1257
1929	70	12	56	109	88	186	75	105	75	58	40	107	981
1930	167	36	26	73	51	72	121	146	90	80	64	59	985
1931	60	35	31	110	63	112	153	53	96	40	45	48	846
1932	40	96	23	46	96	80	68	225	33	67	45	63	882
1933	30	73	72	115	115	89	116	45	54	75	38	35	857
1934	70	132	53	32	122	81	98	111	49	70	33	2	853
1935	17	106	37	28	169	106	170	94	180	95	86	21	1109
1936	75	149	54	44	47	66	118	94	34	64	86	33	864
1937	102	51	34	34	94	57	112	39	103	45	47	34	752
1938	106	137	50	243	30	60	68	81	146	4	56	112	1093
1939	25	10	26	106	25	78	213	111	49	22	32	81	778
1940	54	47	74	70	122	35	90	96	86	89	122	31	916
1941	90	98	173	44	92	111	77	182	70	133	24	72	1166
1942	97	67	118	23	211	38	163	85	98	50	54	56	1060
1943	61	51	0	23	50	218	67	136	265	81	37	27	1016
1944	62	33	175	71	71	31	107	78	71	60	52	82	893
1945	43	79	57	36	184	67	56	81	75	137	8	70	893
1946	23	12	157	61	141	164	36	136	85	77	185	50	1127
1947	44	160	53	94	64	237	48	110	68	134	4	39	1055
1948	40	21	53	85	212	71	130	42	40	62	128	21	905
1949	76	87	68	66	59	132	99	110	39	26	97	36	895
1950	57	87	38	46	55	130	85	95	70	97	48	106	914
1951	60	64	73	126	66	64	126	93	13	177	77	93	1032
1952	81	24	78	66	69	123	50	146	54	74	247	126	1138
1953	124	109	86	125	111	277	82	64	93	99	80	86	1336
1954	19	14	146	70	37	67	115	101	49	44	63	69	794
1955	23	72	56	133	93	130	246	107	69	86	26	60	1101
1956	80	70	62	60	79	126	206	47	49	100	97	107	1083
1957	51	23	103	52	114	109	113	50	100	65	96	50	926
1958	32	124	103	56	174	52	40	55	28	53	49	157	923
1959	58	67	55	51	230	48	73	33	97	119	30	14	875

CONTINUING RAINFALL SERIES AT WAINGAWA, MASTERTON

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1960	33	56	60	22	69	89	107	74	93	62	65	124	854
1961	202	46	68	92	146	97	132	185	178	6	62	31	1245
1962	125	51	100	129	56	107	74	74	34	44	65	60	919
1963	76	40	32	40	35	87	164	108	73	7	96	42	800
1964	50	10	46	25	51	135	98	71	89	112	51	64	802
1965	54	45	163	39	80	108	97	133	44	36	70	74	943
1966	60	39	49	111	141	81	149	72	57	43	49	210	1061
1967	50	93	53	55	57	27	22	145	58	31	107	185	883
1968	38	20	13	210	79	109	117	43	28	113	28	75	873
1969	40	35	23	81	75	67	67	46	20	67	40	98	659
1970	18	35	92	32	125	102	87	76	146	62	20	22	817
1971	138	36	14	44	97	62	90	100	71	169	98	77	996
1972	46	65	69	66	132	67	81	51	43	70	41	35	766
1973	23	6	68	50	146	48	59	72	67	39	93	71	742
1974	25	49	62	163	119	100	168	138	164	136	19	50	1193
1975	106	44	50	57	118	140	116	107	24	50	110	48	970
1976	125	117	42	42	44	125	186	116	106	86	69	108	1166
1977	63	36	56	91	130	159	139	124	203	39	65	65	1170
1978	10	31	36	190	81	114	160	52	62	55	64	69	924
1979	26	73	228	27	108	72	73	156	131	183	71	99	1247
1980	102	34	205	124	29	91	110	134	47	66	131	113	1186
1981	38	29	42	57	168	236	124	145	61	128	78	57	1163
1982	38	102	72	60	84	109	78	43	55	77	52	89	859
1884-1982													
MEAN	64.5	62.7	73.4	76.9	101.5	100.0	106.6	93.8	79.1	77.8	70.9	73.5	981.9
ST DEV	39.1	43.8	49.3	44.5	49.0	51.0	52.2	40.4	45.6	45.4	40.7	48.1	155.7

Kelburn, Wellington 1862-1982 Lat 41.3 S Long 174.8 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Sydney Street	27	N164 334229 R27 585905	Feb 1862- Oct 1868	Located between shoreline and Tinakori Hill
Museum Street *	18	N164 336228 R27 587904	Nov 1868- Oct 1869	Site on Old Museum grounds
Bolton Street *	43	N164 333227 R27 584904	Nov 1869- May 1906	Monument to the Hon. R. Seddon was erected on climat site
Buckle Street	34	N164 338204 R27 588882	Jun 1906- Jun 1912	Site either at Dominion Museim or Mt Cook School
Thorndon Esplanade	3	N164 346234 R27 596910	Jul 1912- Dec 1927	NZ Railways Goods Building is now erected on site
Kelburn	125	N164 329221 R27 580898	Jan 1928-	

*Museum Street data amalgamated with Bolton Street data

Monthly conversion factors at Kelburn, Wellington

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sydney Street	1	1	1	1	1	1	1	1	1	1	1	1
Bolton Street	1	1	1	1	1	1	1	1	1	1	1	1
Buckle Street	1	1	1	1	1	1	1	1	1.247	1	1	1
Thorndon	1	1	1	1.039	1	1	1.028	1.140	1	1	1	1

HOMOGENEOUS RAINFALL SERIES

STATION KELBURN, WELLINGTON LAT 41 17S LONG 174 46E HT 125 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1862	111*	53	127	148	165	185	129	104	53	100	68	92	1335
1863	3	70	256	79	173	152	241	165	263	179	89	125	1795
1864	25	81	27	89	135	114	151	133	117	69	136	55	1132
1865	81	169	148	32	143	157	189	83	121	45	81	38	1287
1866	91	79	110	76	18	46	72	98	109	107	67	172	1045
1867	257	6	5	19	115	89	178	95	19	96	99	87	1065
1868	125	223	58	92	107	152	122	97	82	145	125	82	1410
1869	105	226	37	131	67	163	69	107	42	283	52	161	1443
1870	99	29	92	99	122	120	124	182	103	73	84	99	1226
1871	32	138	206	106	167	153	149	207	109	138	193	30	1628
1872	70	58	36	296	98	217	117	128	111	123	35	6	1295
1873	91	27	45	76	41	161	217	230	202	141	73	94	1398
1874	24	92	75	22	94	210	223	143	281	64	49	82	1359
1875	90	55	32	50	204	124	278	150	106	165	253	165	1672
1876	36	40	64	170	74	110	203	104	81	37	123	60	1102
1877	54	188	76	132	243	78	130	130	55	49	74	112	1321
1878	94	129	30	43	90	165	155	110	175	175	112	108	1386
1879	59	46	43	101	95	172	169	142	209	69	185	170	1460
1880	77	3	147	59	157	65	168	150	65	86	123	88	1188
1881	72	44	20	32	88	185	286	172	99	89	49	138	1274
1882	102	41	93	167	143	152	220	198	76	68	110	45	1415
1883	51	133	141	111	204	41	160	92	94	120	86	90	1323
1884	244	33	62	53	133	119	103	83	149	186	109	316	1590
1885	47	49	87	70	132	98	110	72	61	127	56	26	935
1886	125	45	35	126	275	164	74	161	91	143	108	37	1384
1887	5	36	48	51	244	174	140	235	94	184	131	80	1422
1888	43	67	75	103	73	60	113	134	46	86	180	61	1041
1889	57	38	101	34	23	102	80	66	121	81	24	69	796
1890	83	6	57	94	98	58	227	106	100	119	73	129	1150
1891	121	112	37	136	53	73	133	44	33	64	64	24	894
1892	180	107	162	145	120	151	309	149	127	117	42	111	1720
1893	86	105	183	99	81	82	186	209	151	59	33	74	1348
1894	174	133	103	54	110	151	165	142	128	11	105	21	1297
1895	153	135	61	285	119	242	110	83	75	103	152	41	1559
1896	53	85	211	309	77	153	148	92	116	81	72	66	1463
1897	204	128	53	176	50	62	84	102	156	140	60	19	1234
1898	24	47	63	143	151	83	122	146	77	72	68	69	1065
1899	123	214	116	92	175	68	164	62	92	64	57	114	1341
1900	61	49	90	140	144	62	205	117	155	112	46	114	1295
1901	105	68	52	60	49	114	140	90	135	88	55	100	1056
1902	58	35	79	119	132	123	59	52	79	78	75	95	984
1903	98	48	50	115	227	77	190	251	111	17	137	46	1367
1904	38	57	252	71	117	177	109	89	133	329	27	137	1536
1905	54	37	137	108	147	223	56	70	153	157	84	73	1299
1906	125	190	94	65	157	61	68	71	96	18	119	29	1093
1907	85	100	139	69	162	109	95	105	95	71	77	35	1142
1908	16	1	124	60	45	123	160	86	35	129	42	73	894
1909	78	76	96	105	55	64	164	139	82	70	31	45	1005
1910	152	108	61	48	85	205	70	118	19	100	99	91	1156
1911	76	193	9	64	56	122	188	35	95	50	54	114	1056
1912	25	90	73	106	86	161	263	46	147	89	149	20	1255
1913	128	43	72	78	300	51	82	124	43	123	105	191	1340
1914	66	49	59	68	202	98	65	33	39	39	50	51	818
1915	44	32	117	18	28	60	102	40	41	64	140	31	716
1916	15	47	36	98	91	34	168	125	74	133	152	0	973
1917	45	42	37	128	135	164	174	114	116	64	45	73	1137
1918	44	128	89	94	105	180	131	101	89	165	85	69	1280
1919	95	51	28	51	49	62	79	99	50	50	65	61	740
1920	150	150	54	232	58	146	63	137	91	87	69	42	1278
1921	80	18	33	37	67	85	120	95	146	165	90	169	1105
1922	17	27	173	29	31	84	44	66	64	59	138	19	751
1923	147	37	51	81	241	86	99	100	56	97	19	46	1060
1924	57	108	121	72	93	75	77	125	62	116	74	289	1269
1925	95	99	53	70	160	212	114	237	84	144	40	54	1362
1926	78	67	113	38	121	73	75	86	49	171	123	96	1090
1927	17	46	86	41	147	138	90	213	78	49	145	81	1131
1928	5	91	35	148	111	115	89	250	84	135	131	208	1402
1929	55	20	125	172	88	141	176	137	84	57	84	68	1207
1930	138	42	10	98	66	72	94	115	122	34	102	76	969
1931	98	41	16	142	65	145	137	57	96	71	66	69	1003
1932	55	170	9	68	198	55	38	169	27	98	34	66	987
1933	53	95	53	103	148	70	152	113	75	55	40	23	980
1934	52	89	62	89	115	122	155	131	56	174	55	1	1101
1935	47	86	96	45	89	71	110	87	122	130	72	78	1033
1936	85	251	118	85	73	85	214	119	62	85	155	113	1445
1937	81	107	56	58	87	85	100	26	89	24	74	81	868
1938	131	161	24	181	22	191	119	178	151	83	51	188	1480

CONTINUING RAINFALL SERIES AT KELBURN, WELLINGTON

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1939	23	17	27	75	58	87	153	150	73	71	60	386	1180
1940	136	83	36	142	156	50	64	85	105	107	99	68	1131
1941	104	163	115	65	90	100	168	259	119	260	78	89	1610
1942	54	67	159	70	301	13	258	59	85	66	80	75	1287
1943	73	110	14	38	82	255	141	173	245	205	50	79	1465
1944	50	119	121	101	96	100	140	168	127	164	71	165	1422
1945	74	155	143	61	118	119	85	143	83	143	15	86	1225
1946	38	41	140	124	153	141	57	135	100	137	102	66	1234
1947	49	146	51	128	60	280	75	124	139	193	27	41	1313
1948	87	64	73	92	201	77	188	58	35	113	108	36	1132
1949	57	33	65	123	81	148	142	112	51	71	115	100	1098
1950	26	50	35	123	36	110	159	137	86	174	42	157	1135
1951	85	48	137	92	119	63	90	91	16	195	147	75	1158
1952	48	74	70	76	167	205	61	95	44	120	166	91	1217
1953	161	127	109	119	159	251	105	71	84	140	62	92	1480
1954	41	51	131	98	93	110	189	158	86	51	94	143	1245
1955	10	184	72	68	216	200	231	173	104	108	65	55	1486
1956	225	45	155	124	189	137	253	96	41	86	134	68	1553
1957	32	90	60	96	136	123	96	75	115	106	197	109	1235
1958	138	169	79	46	174	92	54	53	49	71	22	130	1077
1959	87	52	69	66	257	43	67	47	149	99	53	50	1039
1960	36	131	108	16	86	157	193	125	156	93	39	59	1199
1961	99	68	130	51	59	77	191	91	169	20	53	29	1037
1962	250	52	105	212	128	161	136	154	58	176	73	84	1589
1963	62	88	67	59	89	138	99	240	74	8	85	34	1043
1964	75	25	92	41	102	157	228	55	205	34	64	90	1168
1965	58	66	233	61	69	208	154	174	73	67	226	95	1484
1966	132	75	47	198	193	95	164	121	105	41	78	198	1447
1967	66	91	67	130	76	54	89	269	89	38	165	116	1250
1968	72	46	25	252	106	161	150	86	106	199	48	113	1364
1969	116	26	23	120	166	76	89	70	70	62	47	68	933
1970	73	28	131	41	153	198	145	135	204	85	28	25	1246
1971	102	60	29	44	154	134	117	188	93	149	105	56	1231
1972	77	43	102	59	139	99	131	127	49	120	43	40	1029
1973	54	6	93	50	100	107	88	137	73	97	120	114	1039
1974	21	108	71	328	175	99	282	102	189	255	31	45	1706
1975	69	65	118	82	68	210	149	246	39	116	124	86	1372
1976	131	66	53	104	75	150	186	147	113	62	53	321	1461
1977	130	166	52	134	154	207	159	180	171	82	177	132	1744
1978	22	45	32	200	158	155	150	104	186	94	59	116	1321
1979	21	88	222	85	228	107	148	203	122	185	96	138	1643
1980	96	43	183	144	97	199	84	112	75	72	128	84	1317
1981	26	3	70	57	209	181	181	138	64	156	108	52	1245
1982	11	49	37	72	63	199	86	67	102	46	83	110	925
1862-1982													
MEAN	80.3	80.5	84.8	99.3	122.3	125.7	139.1	123.9	100.0	105.6	87.8	90.4	1239.5
ST DEV	51.4	53.5	53.3	59.4	60.3	54.8	58.1	53.6	49.8	56.9	46.0	62.3	225.2

Nelson 1862-1982 Lat 41.3 S Long 173.2 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Nelson Institute	5		Jul 1862-Dec 1880	Location in centre of town. Observations of poor quality.
Nile Street East		S20 646290 O27 348922	Jan 1883-Jan 1907	Precise location unknown
Nile Street	10	S20 637291 O27 340923	Feb 1907-Nov 1920	Corner of Collingwood and Nile Streets
Cawthron Institute	7	S20 646294 O27 348926	Dec 1920-May 1941	Observations continued until Dec 1951
Nelson Airport	4	S20 579262 N27 287895	Jun 1941-	

Monthly conversion factors at Nelson Airport

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nelson Institute	1	0.503	1	1	0.715	0.685	0.633	0.545	0.456	0.588	0.764	0.747
Nile Street East	1	1	1	1	1	1	1	1.038	0.771	1	1	1
Nile Street	1	1	1	1	1	1	1	1	1	1	1	1
Cawthron Institute	1	1	1	1	1	1	1	1	1	1	1	0.824

HOMOGENEOUS RAINFALL SERIES

STATION NELSON LAT 41 18S LONG 173 14E HT 4 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1862							105	72	19	16	25	41	
1863	0	90	119	43	70	34	129	188	144	190	50	40	1098
1864	19	8	5	65	80	120	130	28	184	75	199	130	1043
1865	88	110	97	162	265	104	63	43	84	16	143	61	1236
1866	85	210	121	37	4	17	52	105	54	50	140	60	935
1867	420	8	12	78	39	52	66	20	9	28	64	171	967
1868	296	260	71	56	33	97	221	70	50	86	19	102	1362
1869	45	75	14	140	176	122	41	165	41	133	108	50	1109
1870	38	28	74	118	184	156	52	58	35	25	24	96	887
1871	38	84	152	49	119	58	88	69	77	128	80	7	948
1872	49	92	57	267	171	122	251	140	38	123	21	40	1371
1873	155	13	146	105	54	103	50	196	121	54	99	62	1157
1874	5	18	128	16	109	98	93	275	178	41	100	73	1133
1875	138	60	188	57	113	109	78	70	88	86	127	136	1249
1876	6	50	98	408	35	186	22	57	83	59	44	99	1148
1877	46	88	44	110	279	42	59	50	31	329	44	35	1156
1878	58	31	29	38	82	80	151	76	52	110	103	66	876
1879	27	17	103	119	32	77	63	156	95	89	107	161	1047
1880	101	3	20	20	156	35	46	39	41	73	110	23	667
1881													
1882													
1883	73	156	140	32	105	83	92	10	54	70	83	102	1000
1884	80	25	60	57	48	67	76	83	120	38	38	226	918
1885	6	6	23	13	92	168	60	33	10	51	53	35	550
1886	69	76	76	70	57	25	48	112	113	143	57	21	867
1887	4	52	12	55	57	55	76	51	96	86	118	43	705
1888	45	20	102	45	51	57	91	91	24	82	50	49	707
1889	123	19	42	37	14	56	16	39	113	86	43	70	658
1890	11	2	51	211	21	44	172	116	62	116	35	117	958
1891	48	105	18	75	75	36	85	27	72	112	73	42	768
1892	85	175	72	219	50	194	152	151	93	39	68	87	1385
1893	89	44	77	113	79	159	228	125	189	128	76	56	1362
1894	195	184	134	7	100	110	129	168	56	67	67	37	1254
1895	149	88	86	51	125	195	19	92	31	70	194	72	1172
1896	50	29	154	131	21	112	105	66	59	43	35	52	857
1897	180	101	124	34	84	41	115	47	43	130	40	6	945
1898	20	64	49	97	145	51	87	53	8	53	105	69	801
1899	110	76	114	118	136	81	38	42	54	45	80	61	955
1900	52	34	36	127	128	77	68	97	115	96	49	38	916
1901	55	83	61	43	19	179	78	92	136	76	27	179	1028
1902	45	132	72	82	35	68	16	25	58	69	75	152	829
1903	174	36	44	59	256	52	92	71	111	11	101	122	1129
1904	42	72	219	27	87	89	87	76	104	67	66	96	1032
1905	45	69	62	38	54	122	126	56	101	200	97	99	1069
1906	66	41	70	38	97	85	62	57	97	23	82	13	731
1907	100	69	219	112	58	56	40	97	85	91	32	68	1027
1908	2	0	67	82	89	149	30	85	130	101	54	44	833
1909	109	2	106	49	134	110	189	178	108	130	30	43	1188
1910	116	97	66	15	74	209	60	136	25	134	51	57	1040
1911	24	58	0	96	65	125	86	42	136	67	124	149	972
1912	40	56	33	59	42	148	106	82	93	38	67	13	777
1913	84	61	44	41	40	49	74	134	59	100	145	116	947
1914	26	73	43	123	87	75	80	14	9	14	69	47	660
1915	37	92	71	33	57	55	97	41	65	79	102	42	771
1916	29	42	67	129	181	63	201	79	33	85	233	1	1143
1917	2	131	14	83	179	83	197	84	94	103	6	50	1026
1918	72	141	144	111	37	183	51	103	73	161	57	42	1175
1919	77	7	23	13	41	78	56	57	53	43	46	26	520
1920	184	195	77	167	37	97	43	135	107	89	57	46	1234
1921	54	44	23	82	46	57	72	63	129	242	30	90	932
1922	20	77	133	25	89	76	25	78	91	158	102	27	901
1923	210	29	82	30	262	28	65	50	115	42	80	25	1018
1924	36	83	183	150	80	85	89	67	84	170	170	143	1340
1925	80	89	55	48	94	93	125	83	91	168	32	16	974
1926	104	35	90	40	137	50	28	72	62	123	95	86	922
1927	55	35	56	51	93	76	137	137	95	27	110	43	915
1928	0	40	6	186	105	40	81	74	140	116	38	182	1008
1929	26	18	138	231	14	130	234	30	96	41	176	83	1217
1930	146	16	11	120	64	16	4	72	38	52	81	14	634
1931	70	58	19	63	38	70	92	87	62	70	14	230	873
1932	86	118	19	48	130	74	9	64	29	117	30	37	761
1933	188	71	32	77	70	19	107	87	71	11	30	50	813
1934	19	60	80	74	50	140	97	116	40	157	69	71	973
1935	83	75	192	99	93	89	59	168	19	169	80	77	1203
1936	78	93	37	78	26	101	77	225	86	104	123	63	1091
1937	53	138	56	56	138	32	86	48	28	12	67	65	779
1938	84	187	104	136	18	96	87	105	97	62	63	172	1211

CONTINUING RAINFALL SERIES AT NELSON

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1939	26	2	4	22	115	148	75	103	48	75	198	59	875
1940	185	90	13	70	71	82	53	46	67	56	91	40	864
1941	154	79	134	17	30	101	111	138	104	219	26	43	1156
1942	84	33	123	26	132	15	149	62	77	62	41	52	856
1943	68	124	6	75	21	144	32	64	163	87	49	42	875
1944	10	109	112	115	32	66	105	123	69	123	50	92	1006
1945	120	141	56	56	51	33	51	201	58	47	45	42	901
1946	57	20	81	142	110	57	83	80	64	108	34	39	875
1947	54	28	44	119	17	122	83	137	132	129	45	64	974
1948	129	26	30	80	155	109	144	51	32	52	73	11	892
1949	74	38	28	84	159	112	43	32	28	71	124	109	902
1950	36	60	4	78	83	44	34	128	32	42	6	160	707
1951	117	72	178	212	110	36	162	27	30	122	170	84	1320
1952	69	104	25	58	142	144	33	42	13	61	224	99	1014
1953	55	135	80	50	127	133	83	149	64	68	76	66	1086
1954	35	69	151	44	215	110	91	129	53	14	60	154	1125
1955	12	168	132	43	213	94	91	151	38	84	65	88	1179
1956	126	30	82	163	188	125	32	41	56	134	107	81	1165
1957	27	50	60	189	137	6	107	53	40	92	106	55	922
1958	33	148	30	24	65	66	81	65	53	47	11	147	770
1959	30	10	140	114	99	17	62	83	92	41	25	41	754
1960	30	165	120	6	137	104	131	19	103	59	21	45	940
1961	145	49	94	39	61	47	147	49	105	35	26	41	838
1962	158	21	175	201	218	71	105	87	112	230	103	61	1542
1963	32	161	137	27	101	80	95	134	99	10	45	38	959
1964	83	122	80	35	87	51	130	103	46	96	122	104	1059
1965	190	16	44	43	84	97	92	108	27	23	113	53	890
1966	114	69	67	123	66	88	73	28	86	59	160	95	1028
1967	46	17	32	97	101	26	75	180	61	85	148	54	922
1968	20	19	42	119	166	106	120	97	75	99	58	99	1020
1969	98	77	7	101	103	29	25	22	228	37	36	107	870
1970	14	44	187	52	185	167	151	252	138	67	16	52	1325
1971	81	76	47	82	116	134	25	79	43	102	103	35	923
1972	27	24	153	70	99	64	87	103	21	110	52	17	827
1973	21	3	40	68	33	34	46	185	52	32	72	73	659
1974	19	87	16	247	135	10	141	88	114	187	41	29	1114
1975	146	78	130	88	43	86	68	193	19	84	98	55	1088
1976	186	8	80	80	64	62	140	135	72	103	148	181	1259
1977	41	113	36	89	56	64	74	91	33	104	56	102	859
1978	4	24	35	126	59	98	141	59	92	78	26	79	821
1979	25	42	114	79	52	71	88	88	42	179	101	66	947
1980	77	30	69	101	54	151	56	51	121	94	75	28	907
1981	44	6	159	33	101	103	120	47	48	109	106	48	924
1982	21	66	28	87	91	147	35	23	120	26	31	35	710
1862-1982													
MEAN	75.0	68.4	76.9	86.0	94.0	86.6	88.5	89.7	75.2	87.7	77.0	72.1	978.9
ST DEV	64.4	52.1	52.9	61.8	58.4	45.3	49.0	52.1	42.1	54.0	47.7	46.7	191.7

Christchurch Botanical Gardens 1858-1982 Lat 43.5 S Long 172.6 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Heathcote Valley	21		Jan 1858- Dec 1861	
Provincial Bldgs.	6	S84 002562 M35 803418	Dec 1863- Apr 1876	Site shifted within buildings precint Oct 1864
Hagley Park	6	S84 995565 M35 797421	May 1876- Jan 1881	Located between a footbridge and a plantation
Botanic Gardens	6		May 1881- Jan 1902	No readings Jul 1883-Apr 1984 Observations ceased Jul 1905
Botanical Gardens	6	S84 990563 M35 792419	Feb 1902-	Minor site shifts to improve exposure Jul 1927 & May 1950

Monthly conversion factors at Christchurch

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heathcote	1	1	1	1	1	1	0.436	0.327	1	1	1	1
Provincial Buildings	1	1	1	1	1	1	1	1	1	1	1	1
Hagley Park	1	1	1	1	1	1	1	1.440	1	1.372	1	1
Botanic Gardens	1	1	1	1	1	1	1	1	1	1	1	1

HOMOGENEOUS RAINFALL SERIES

STATION CHRISTCHURCH BOTANICAL GARDENS LAT 43 32S LONG 172 37E HT 6 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1858	87	107	71	94	126	111	43	106	7	9	55	52	868
1859	154	40	22	25	94	23	26	3	27	28	65	98	605
1860	42	13	30	72	51	170	127	78	58	56	26	145	869
1861	82	65	68	174	258	102	164	91	46	35+	117	94	1296
1862	60+	28+	46+	42+	83+	45+	31+	18+	21+	29+	38+	44+	485
1863	42+	37+	51+	45+	25+	50+	65+	47+	42+	62+	64+	123+	653
1864	35	52	7	6	45	95	19	106	31	65	62	37	560
1865	25	22	72	57	107	68	87	21	59	56	26	17	617
1866	104	42	29	19	31	32	55	16	18	51	17	79	493
1867	27	12	97	19	58	154	89	99	21	27	112	48	763
1868	132	144	37	16	54	100	40	82	34	29	72	23	763
1869	29	89	26	158	52	37	84	30	14	97	35	43	694
1870	94	36	42	81	103	77	57	113	31	31	19	44	728
1871	1	109	136	57	22	138	43	52	58	28	57	9	710
1872	10	35	11	178	25	69	53	41	16	33	12	20	503
1873	122	16	47	43	63	26	146	69	52	27	44	14	669
1874	19	43	52	3	39	56	41	41	130	45	20	90	579
1875	45	53	49	28	165	113	47	65	40	20	173	24	822
1876	20	33	58	130	13	49	51	68	59	16	79	58	634
1877	89	101	21	57	88	42	48	65	17	15	29	53	625
1878	63	16	17	9	26	82	28	30	30	38	4	19	363
1879	69	17	11	29	28	174	74	37	24	37	52	56	608
1880	53	4	44	18	68	38	54	43	8	43	62	41	476
1881	45	18*	9*	31*	39	141	123	105	43	39	6	34	633
1882	127	24	7	65	29	48	48	76	35	36	74	74	643
1883	28	23	68	119	56	24*	102*	49*	146*	24*	49*	95*	783
1884	107*	40*	32*	44*	32*	41*	105*	45*	55*	59*	67*	82*	709
1885	39*	31*	130*	19*	38*	41*	84*	68*	15*	35*	47*	15*	562
1886	13*	32*	62*	99*	184*	116*	17*	182*	56*	59*	24*	47*	891
1887	32*	40*	20*	44*	76*	135*	134*	61*	42*	102*	85*	27*	798
1888	46*	49*	49*	76*	101*	25*	66*	133*	36*	19*	81*	24*	705
1889	8*	11*	106*	41*	34*	70*	50*	28*	99*	7*	40*	39*	533
1890	25*	11*	47*	15*	21*	43*	93*	19*	33*	37*	40*	14*	398
1891	49*	75*	8*	44*	43*	38*	43*	35*	31*	48*	38*	58*	510
1892	48*	50*	72*	46*	93*	71*	96*	57*	76*	28*	25*	55*	717
1893	38*	30*	50*	84*	24*	46*	72*	27*	71*	12*	43*	54*	551
1894	75	62	129	19	204	47	53	64	88	10	65	8	824
1895	57	31	62	43	34	142	160	60	8	32	71	75	775
1896	45	25	152	108	10	83	167	30	35	42	42	16	755
1897	5	9	34	6	56	5	11	43	31	41	25	38	304
1898	21	62	23	7	95	68	47	42	9	54	69	38	535
1899	32	43	86	81	165	11	108	27	51	8	47	50	709
1900	50	15	21	85	66	15	31	33	69	71	83	98	637
1901	75	53	37	40	32	22	141	17	19	19	14	79	548
1902	12	21	136	63	58	47	32	39	66	30	25	202	731
1903	63	36	26	66	85	33	39	40	36	10	42	8	484
1904	44	50	72	11	77	72	56	65	104	158	35	103	847
1905	42	61	45	35	25	127	47	26	140	82	58	34	722
1906	65	101	110	57	72	88	100	47	33	6	59	20	758
1907	24	28	46	35	38	23	44	73	105	42	25	14	497
1908	14	1	85	46	23	64	200	18	42	56	19	89	657
1909	131	14	164	59	39	46	44	60	30	157	56	92	892
1910	107	20	92	6	35	78	153	48	7	5	14	75	640
1911	44	60	4	45	17	191	81	2	73	25	63	155	760
1912	36	47	56	133	39	62	111	18	55	74	55	12	698
1913	99	56	15	29	76	27	66	86	12	41	51	141	699
1914	35	26	26	64	98	70	13	21	17	26	53	59	508
1915	44	29	52	20	70	33	6	29	4	40	33	44	404
1916	35	91	39	43	121	48	90	67	40	21	12	17	624
1917	49	42	39	67	164	17	68	22	66	50	25	106	715
1918	60	102	54	22	40	83	174	36	24	33	58	28	714
1919	78	5	18	46	32	66	68	40	77	36	53	31	550
1920	70	88	3	55	112	26	36	54	93	30	44	37	648
1921	117	25	31	52	58	79	22	30	58	77	29	6	584
1922	49	26	68	15	25	69	33	27	64	11	82	56	525
1923	139	52	10	75	173	56	99	39	36	44	13	58	794
1924	49	11	40	19	122	50	38	31	25	96	63	100	644
1925	55	7	29	159	54	110	76	152	78	42	61	26	849
1926	42	71	31	20	80	23	29	29	16	72	101	90	604
1927	16	20	29	29	13	92	62	69	12	70	78	52	542
1928	12	24	28	31	58	123	12	46	24	56	36	152	602
1929	103	3	89	38	13	78	94	31	36	1	27	86	599
1930	129	19	13	13	52	33	74	93	57	26	30	45	584
1931	25	51	25	23	18	90	53	38	55	44	17	13	452
1932	22	75	12	39	33	29	42	53	26	126	26	53	536
1933	55	4	11	19	83	51	39	23	36	42	41	75	479
1934	87	39	45	29	186	34	32	79	74	24	40	1	670

CONTINUING RAINFALL SERIES AT CHRISTCHURCH BOTANICAL GARDENS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1935	20	26	31	36	102	82	27	31	46	74	73	13	561
1936	32	176	154	73	35	21	102	58	54	25	122	67	919
1937	53	56	50	38	75	54	49	44	46	7	22	129	623
1938	74	31	34	126	17	179	113	24	60	51	57	84	850
1939	18	13	18	22	19	62	221	125	16	22	43	54	633
1940	113	24	15	61	182	21	49	37	116	28	38	13	697
1941	33	56	157	70	24	86	23	197	48	27	14	71	806
1942	43	41	40	19	201	4	83	21	47	33	36	40	608
1943	72	70	40	11	34	106	57	48	123	51	12	6	630
1944	19	77	61	109	101	52	38	29	51	41	94	148	820
1945	33	149	47	26	233	57	77	146	23	64	8	97	960
1946	37	23	41	58	145	89	59	65	156	85	115	94	967
1947	52	53	30	57	35	131	9	40	79	122	14	16	638
1948	65	45	18	50	76	19	66	12	49	19	60	13	492
1949	88	4	50	33	44	61	51	28	7	16	36	94	512
1950	64	85	70	44	26	73	67	112	9	96	35	97	778
1951	121	127	102	204	83	55	43	34	8	93	32	106	1008
1952	44	13	17	21	71	41	29	96	42	81	137	57	649
1953	72	41	96	72	56	35	58	93	36	89	24	71	743
1954	6	31	38	37	44	36	95	68	31	9	27	66	488
1955	26	91	8	21	84	121	88	27	23	30	36	13	568
1956	28	35	69	31	65	29	79	31	80	66	71	71	655
1957	47	14	142	57	209	28	98	13	101	27	51	70	857
1958	58	27	24	81	69	47	17	27	9	38	10	37	444
1959	42	41	60	80	219	4	54	14	6	30	14	30	594
1960	40	26	78	23	12	125	37	32	29	38	46	94	580
1961	89	49	36	17	97	26	118	79	67	2	19	14	613
1962	43	64	51	108	88	64	47	52	17	27	49	26	636
1963	37	72	37	82	19	66	129	58	39	16	51	122	728
1964	19	11	51	32	52	13	59	49	22	37	49	26	420
1965	66	18	172	50	55	52	80	69	38	39	83	18	740
1966	45	48	66	52	48	36	20	34	21	36	100	42	548
1967	76	30	33	34	86	27	6	78	67	28	119	27	611
1968	81	46	37	226	71	99	83	21	25	23	38	40	790
1969	41	7	6	54	75	33	25	18	24	43	13	40	379
1970	42	17	85	26	115	55	76	42	61	57	21	26	623
1971	21	29	9	17	79	72	66	22	32	49	29	16	441
1972	51	22	26	61	82	51	87	31	11	73	18	39	552
1973	27	14	49	15	65	44	51	102	35	17	50	25	494
1974	29	61	48	210	66	52	69	87	90	89	9	18	828
1975	56	55	139	58	27	124	80	179	19	50	51	43	881
1976	89	37	15	53	32	86	78	112	49	53	45	115	764
1977	69	31	4	33	99	96	209	65	119	19	27	68	839
1978	37	18	16	185	41	106	148	52	102	62	27	138	932
1979	15	45	187	11	99	9	81	83	26	117	85	21	779
1980	139	66	119	83	14	94	38	63	2	14	67	32	731
1981	17	11	41	40	29	95	81	120	17	71	34	30	586
1982	17	29	20	46	21	29	58	15	23	79	38	86	461
1858-1982													
MEAN	53.8	42.5	52.2	55.1	70.9	65.2	69.9	55.5	45.7	44.6	47.6	56.0	659.0
ST DEV	33.6	31.6	40.7	44.7	52.3	40.1	42.9	37.0	32.4	30.0	29.7	39.2	152.4

+ RAINFALL ESTIMATED FROM DUNEDIN DATA.
* RAINFALL ESTIMATED FROM LINCOLN COLLEGE DATA.

Greymouth Harbour 1891-1982 Lat 42.5 S Long 171.2 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Harbour Board Office Roof	9	S44 735885 J31 623607	Mar 1891- Jul 1921	
Gresson Street * (Northside)	3	S44 735884 J31 623606	Aug 1929- Jun 1969	Site 90m E of former one. Further shift of 9m Oct 1943
Harbour Board Offices	3	S44 735885 J31 623607	Jul 1969- Sep 1972	Poor exposure
Gresson Street (Southside)	3	S44 735883 J31 623605	Oct 1972-	Site 90m S of H.B.Offices. Gauge shifted 5m Dec 1973

* Long term site for homogeneity testing

Monthly conversion factors at Greymouth Harbour

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Harbour Board Roof	1	1.294	0.904	1	1	1	1	1	1	1	1	1
Harbour Board	1	1.507	1	1	1	1	1	1	0.762	1	1.632	1
Gresson Street (S)	1	1	1	1	1	1	1	1	1	1	1	1

HOMOGENEOUS RAINFALL SERIES

STATION GREYMOUTH HARBOUR LAT 42 27S LONG 171 12E HT 3 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1891			184	213	50	137	53	224	142	181	293	295	
1892	140	370	496	230	188	375	114	144	198	278	153	368	3054
1893	322	192	81	143	263	284	431	332	305	217	253	80	2903
1894	191	252	373	196	209	166	332	227	208	59	235	368	2816
1895	271	120	192	103	149	292	130	239	179	178	194	276	2323
1896	354	145	405	402	161	112	254	219	104	283	90	178	2707
1897	148	307	332	223	247	164	258	96	181	495	368	111	2930
1898	282	226	224	284	167	214	345	77	256	314	171	205	2766
1899	441	145	128	290	215	81	187	95	135	268	170	399	2554
1900	120	162	173	353	205	124	247	176	153	301	221	50	2284
1901	229	241	146	251	361	321	123	193	186	254	215	330	2849
1902	288	357	82	104	220	211	111	126	169	287	299	344	2598
1903	260	250	185	109	203	120	218	207	147	208	84	181	2172
1904	207	115	492	113	360	310	187	272	230	168	373	315	3142
1905	166	177	142	200	131	291	253	154	173	197	274	285	2443
1906	227	197	69	265	277	271	330	198	128	286	205	171	2623
1907	58	122	312	199	198	72	151	135	184	329	251	214	2225
1908	63	118	350	288	351	177	137	175	326	182	115	282	2564
1909	360	14	76	272	135	534	213	218	138	376	127	196	2659
1910	242	188	249	202	348	241	134	410	240	459	283	229	3224
1911	214	39	87	227	116	180	87	140	244	426	387	286	2433
1912	290	330	132	193	96	388	70	205	459	256	192	97	2708
1913	346	154	184	148	231	225	230	151	254	147	260	157	2487
1914	324	189	61	204	126	166	183	118	123	103	258	237	2092
1915	267	355	82	99	157	110	145	81	145	164	300	228	2133
1916	192	127	203	337	240	164	251	251	180	215	262	40	2461
1917	89	364	187	172	300	240	299	168	347	435	39	287	2927
1918	87	202	167	236	191	249	157	247	252	318	337	217	2660
1919	376	123	138	184	60	220	286	161	242	238	249	168	2445
1920	289	167	153	349	203	161	194	200	109	195	358	182	2550
1921	47	110	202	150	242	251	322	357	159	331	220	217	2608
1922	314	118	283	274	107	98	87	300	109	274	273	198	2435
1923	150	239	165	48	200	200	80	183	236	118	120	169	1908
1924	325	168	153	233	242	163	224	142	137	282	219	186	2474
1925	86	290	141	134	79	117	250	143	341	187	287	309	2364
1926	265	225	169	238	299	134	111	124	163	185	241	142	2296
1927	236	89	282	238	269	134	187	143	133	230	246	87	2274
1928	71	197	146	362	221	127	108	204	303	222	170	171	2301
1929	174	177	299	71	101	248	182	134	156	162	369	345	2419
1930	174	84	94	114	162	119	114	125	183	338	277	73	1857
1931	386	402	146	208	222	191	294	247	163	252	212	183	2906
1932	247	170	66	212	118	232	65	141	157	246	193	184	2031
1933	244	234	171	260	242	99	305	180	109	262	156	357	2619
1934	222	57	216	262	184	343	148	259	118	286	51	41	2187
1935	364	185	162	193	299	217	100	258	44	232	157	108	2319
1936	142	91	239	192	96	135	196	383	209	288	225	257	2453
1937	389	279	233	141	282	101	209	61	161	108	215	156	2335
1938	243	153	455	341	167	171	172	258	239	216	247	428	3090
1939	157	88	112	88	249	284	129	240	203	141	257	155	2103
1940	389	442	77	166	183	273	56	113	218	253	189	167	2526
1941	209	268	108	116	259	247	188	87	159	237	251	232	2361
1942	158	140	222	354	342	104	332	167	250	337	319	358	3083
1943	136	378	195	205	131	319	143	164	337	161	91	117	2377
1944	150	500	193	373	138	299	288	141	248	187	305	293	3115
1945	239	332	262	331	115	181	167	335	265	232	276	287	3022
1946	312	203	105	94	147	166	310	375	190	399	164	371	2836
1947	149	86	39	138	152	335	177	236	278	221	108	98	2017
1948	162	125	185	180	313	144	140	169	175	332	218	181	2324
1949	163	186	207	174	201	264	342	162	98	367	102	257	2523
1950	271	74	108	138	343	137	197	244	84	74	140	275	2085
1951	101	192	99	275	189	79	327	188	157	257	356	283	2503
1952	207	237	168	138	419	241	88	26	98	191	202	110	2125
1953	122	136	175	278	265	174	212	176	217	181	297	465	2698
1954	169	245	332	111	152	303	325	198	76	114	325	139	2489
1955	168	462	122	157	434	181	143	297	137	240	189	67	2597
1956	227	110	305	336	115	230	282	185	92	164	268	241	2555
1957	142	121	191	548	318	232	93	157	98	332	307	382	2921
1958	377	373	367	232	415	94	166	289	73	193	117	267	2963
1959	87	162	184	152	140	204	141	126	299	109	273	199	2076
1960	189	189	191	109	308	229	211	104	241	241	144	67	2223
1961	72	223	249	150	104	279	221	98	189	130	240	104	2059
1962	245	94	119	124	396	243	247	226	223	377	178	122	2594
1963	161	281	192	85	335	261	83	231	145	128	299	132	2333
1964	326	85	246	189	315	64	321	335	261	215	280	171	2808
1965	268	174	148	167	225	220	210	137	260	272	352	246	2679
1966	198	264	139	412	59	192	126	129	158	138	236	160	2211
1967	242	94	348	344	173	80	110	365	103	142	447	166	2614

CONTINUING RAINFALL SERIES AT GREYMOUTH HARBOUR

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1968	175	216	250	365	300	235	140	268	278	354	306	125	3012
1969	246	187	180	275	141	147	74	125	252	165	100	179	2070
1970	223	116	211	194	116	239	256	267	302	257	176	198	2555
1971	179	197	106	172	243	332	108	253	178	348	204	141	2461
1972	124	35	240	280	231	92	240	191	172	438	256	197	2495
1973	111	49	138	247	348	181	22	216	168	135	367	89	2071
1974	68	277	123	436	139	88	314	67	143	311	166	224	2356
1975	67	237	382	270	284	179	340	399	160	151	171	204	2844
1976	280	82	165	131	249	243	211	147	142	269	146	450	2515
1977	270	124	209	308	151	201	168	63	150	162	193	186	2185
1978	171	23	139	274	211	97	283	251	233	264	179	285	2410
1979	175	132	212	267	400	178	218	225	257	274	255	349	2942
1980	408	170	249	158	242	174	215	289	378	161	329	55	2828
1981	116	161	345	315	143	339	286	73	345	279	230	302	2934
1982	298	156	78	148	291	84	192	221	207	195	272	303	2445
1891-1982													
MEAN	215.7	191.7	197.0	220.3	218.6	201.6	196.7	196.0	195.1	240.9	230.2	215.1	2522.6
ST DEV	93.5	101.0	96.7	93.4	90.2	84.8	85.7	82.4	76.1	89.3	81.6	98.3	314.7

Hokitika 1866-1982 Lat 42.7 S Long 171.0 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Government Buildings	4	S50 520552 J33 432299	Jan 1866- Jan 1946	No readings Jan 1881-Dec 1893 Minor site changes occurred
Hokitika Southside	4	S50 515542 J33 428290	Feb 1946- Oct 1963	
Hokitika Airport	37	S50 538561 J32 449307	Nov 1963-	

See Note 4.

Note 4.

The long-term site has been taken as being at the Government Buildings, as there are 81 years of observations. Consequently the likelihood ratio test of the parameters reveals there is no difference in the rainfall at the three locations. Therefore, the record as it stands is homogeneous.

HOMOGENEOUS RAINFALL SERIES

STATION HOKITIKA LAT 42 43S LONG 170 59E HT 37 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1866	268	454	210	225	109	312	190	294	207	212	511	250	3242
1867	180	126	104	197	161	102	317	244	48	563	397	357	2796
1868	337	241	172	228	176	265	348	104	164	359	288	372	3054
1869	119	181	189	226	198	157	126	287	178	227	94	257	2239
1870	211	231	257	272	208	548	217	144	93	287	244	267	2979
1871	39	111	390	120	432	167	441	345	147	339	317	264	3112
1872	361	297	85	185	366	241	385	294	146	272	84	419	3135
1873	321	25	136	82	293	293	167	228	285	161	250	106	2347
1874	174	137	219	289	176	152	182	368	395	228	225	204	2749
1875	274	187	292	155	450	359	275	289	203	254	264	322	3324
1876	68	155	221	461	260	437	42	204	444	140	268	255	2955
1877	347	403	101	151	561	348	67	262	191	326	412	302	3471
1878	219	138	300	288	223	384	364	298	404	314	424	570	3926
1879	181	428	338	173	218	209	227	242	309	250	234	443	3252
1880	257	136	218	228	446	139	279	231	345	269	244	329	3121
1881													
1882													
1883													
1884													
1885													
1886													
1887													
1888													
1889													
1890													
1891			234*	221*	77*	158*	61*	254*	167*	205*	320*	303*	
1892	167*	310*	552*	234*	206*	373*	126*	168*	223*	298*	180*	368*	3205
1893	359*	175*	129*	167*	276*	291*	464*	370*	330*	239*	280*	113*	3193
1894	299	407	311	198	267	243	315	267	118	74	247	198	2944
1895	226	72	262	138	169	238	120	262	162	181	214	301	2345
1896	495	150	453	357	131	147	207	285	114	330	81	192	2942
1897	207	169	437	180	276	204	263	98	189	555	475	96	3149
1898	305	197	274	272	192	301	304	126	286	396	234	262	3149
1899	522	86	224	116	269	113	219	35	172	302	264	340	2662
1900	207	161	173	430	214	111	295	219	152	278	209	70	2519
1901	266	221	241	309	362	401	101	241	285	321	232	421	3401
1902	409	232	126	91	181	228	105	161	160	233	253	266	2445
1903	350	290	220	142	213	91	244	220	147	363	82	251	2613
1904	135	162	495	120	286	356	189	302	277	163	292	364	3141
1905	97	122	189	145	167	284	312	168	203	207	268	220	2382
1906	269	143	96	295	353	351	385	270	222	265	219	113	2981
1907	54	211	740	272	215	58	164	122	259	389	304	288	3076
1908	67	129	370	225	311	313	151	170	336	237	188	310	2807
1909	437	30	110	289	199	486	343	311	182	350	91	247	3075
1910	309	138	237	313	351	314	87	454	296	416	198	259	3372
1911	358	26	212	202	176	160	61	144	254	358	377	337	2665
1912	276	209	203	301	165	365	113	232	474	282	241	75	2936
1913	225	125	271	109	194	232	323	190	292	244	255	108	2568
1914	349	152	84	296	249	146	203	152	194	167	487	374	2853
1915	354	396	169	160	252	191	358	198	322	303	386	323	3412
1916	198	160	278	343	229	152	255	286	183	263	333	52	2732
1917	56	239	319	282	260	216	230	194	457	470	36	268	3027
1918	238	177	225	261	246	197	203	343	262	394	356	261	3163
1919	362	67	158	200	66	307	250	220	196	232	335	159	2552
1920	235	131	195	542	219	140	265	340	177	345	436	276	3301
1921	91	115	223	183	342	286	364	399	171	390	323	343	3230
1922	274	95	327	357	128	125	117	319	128	447	335	366	3018
1923	213	245	233	56	284	197	64	168	292	205	129	292	2378
1924	425	139	160	539	238	242	266	168	272	387	320	241	3397
1925	120	285	297	196	125	154	351	249	356	268	364	380	3145
1926	315	257	328	256	382	189	121	161	222	262	330	192	3015
1927	262	77	395	248	355	110	217	185	192	321	288	92	2742
1928	126	182	209	425	279	113	159	316	360	386	170	225	2950
1929	230	113	302	73	101	351	198	166	167	192	392	502	2787
1930	178	83	103	115	178	122	124	219	204	337	306	77	2046
1931	414	174	220	188	188	181	277	277	114	284	147	212	2676
1932	498	246	101	296	111	260	45	130	168	347	209	273	2684
1933	352	322	174	282	273	126	552	233	145	274	159	281	3173
1934	208	91	156	370	165	206	211	301	116	270	57	133	2284
1935	419	283	249	208	352	222	82	242	43	217	242	106	2665
1936	96	113	242	182	116	207	171	500	286	290	353	239	2795
1937	365	352	197	227	274	101	185	134	156	130	231	208	2560
1938	300	230	407	353	173	183	139	289	205	283	275	432	3269
1939	226	110	109	115	262	337	102	276	268	159	347	189	2500
1940	404	491	95	150	264	236	105	147	195	254	195	249	2785
1941	251	208	142	96	263	272	231	114	160	253	348	203	2541
1942	211	133	283	266	402	203	344	246	315	315	339	362	3419

CONTINUING RAINFALL SERIES AT HOKITIKA

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1943	144	457	256	188	105	299	132	193	324	227	125	111	2561
1944	122	541	180	413	142	266	415	149	252	182	303	367	3332
1945	302	425	257	330	111	137	161	378	322	227	311	215	3176
1946	268	312	221	73	150	151	323	492	220	322	150	375	3057
1947	126	91	51	175	97	374	198	215	280	237	151	183	2178
1948	193	163	283	178	362	192	169	184	169	382	206	191	2672
1949	253	264	202	212	341	242	325	159	155	458	117	321	3049
1950	297	77	118	154	394	144	279	229	189	113	151	333	2478
1951	85	198	153	272	174	81	398	198	219	208	405	259	2650
1952	262	327	132	205	378	315	125	19	107	230	160	89	2349
1953	134	181	164	280	325	162	236	242	245	195	448	409	3021
1954	168	409	357	78	190	300	230	215	76	131	354	153	2661
1955	193	480	128	180	411	185	136	268	186	298	257	74	2796
1956	238	69	201	396	168	356	246	136	70	221	376	209	2686
1957	163	108	212	475	310	245	92	175	131	369	324	447	3051
1958	518	308	453	289	450	94	202	280	140	230	153	224	3341
1959	139	138	237	192	147	141	135	165	298	123	312	205	2232
1960	182	239	277	117	305	253	408	85	276	246	111	50	2549
1961	82	206	305	201	95	252	282	123	174	187	326	138	2371
1962	210	114	156	199	385	238	288	248	274	427	155	141	2835
1963	171	370	283	121	337	288	68	258	182	107	266	159	2610
1964	478	135	286	132	319	78	350	343	272	197	333	155	3080
1965	352	170	157	157	241	255	190	153	265	255	309	336	2840
1966	247	319	214	242	79	240	137	161	226	148	316	307	2636
1967	237	92	399	367	248	90	171	430	167	185	482	166	3034
1968	91	213	258	188	502	209	161	385	255	364	362	105	3093
1969	218	267	147	266	156	139	118	191	480	141	94	261	2478
1970	290	120	266	250	116	264	308	311	421	342	120	145	2953
1971	143	119	118	101	251	374	65	234	270	383	145	163	2366
1972	141	39	332	211	232	112	266	337	298	492	343	204	3007
1973	145	77	166	280	370	236	46	311	176	154	383	182	2526
1974	102	304	98	376	124	135	365	75	158	348	200	274	2559
1975	71	324	329	279	351	138	358	367	140	213	236	193	2999
1976	300	92	145	140	300	235	245	151	121	265	153	458	2605
1977	335	174	150	233	200	227	119	82	177	201	260	291	2449
1978	360	77	200	275	180	117	318	253	354	213	233	243	2823
1979	223	163	298	342	333	160	169	247	292	378	316	360	3281
1980	331	183	250	215	167	190	194	244	385	142	283	89	2673
1981	100	241	430	335	185	363	358	62	332	284	248	359	3297
1982	296	142	120	170	306	119	185	189	282	216	302	297	2624
1866-1982													
MEAN	244.1	202.0	235.2	233.3	246.2	225.2	221.9	231.9	229.4	274.5	264.2	250.2	2861.8
ST DEV	112.4	113.3	109.7	100.0	102.0	95.8	106.9	92.5	92.4	95.5	102.6	107.7	347.4

* RAINFALL ESTIMATED FROM GREYMOUTH DATA.

Oamaru District 1866-1982 Lat 45.0 S Long 171.1 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Oamaru 1			Jul 1866- Jan 1893	Readings made by Resident Magistrate
Winsor Park Oamaru	67	S136 435761 J41 400746	Feb 1893- Aug 1907	
Oamaru 2			Sep 1907- Apr 1915	
Oamaru 3 *			May 1915- Mar 1917	
Oamaru 4 *			Apr 1917- May 1919	
Oamaru 5			Jun 1919- Dec 1924	
27 Reed Street	24	S136 542665 J41 500660	Jan 1925- Jan 1928	
7 Coquet Street	12	S136 545662 J41 502657	Feb 1928- Dec 1940	Observations continued until Feb 1946
18 Till Street	46	S136 535658 J41 493653	Mar 1946- Jan 1966	These observations were not used in the analysis
Oamaru Airport	30	S128 639818 J41 586801	Jan 1941-	

* Data amalgamated due to short records

Monthly conversion factors at Oamaru District

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Oamaru 1	1	1	1.202	1	1	1	1	1	0.854	1	1	1
Windsor Park	1	1	1	1.250	1	1	1	1.102	0.740	1	1	1
Oamaru 2	1	1	1	1	1.434	1	1	1	1	1	1	1
Oamaru 3	1	1	1	1	1	1	1	1	1	1	1	1
Oamaru 5	1	1	1.497	1	1	1	1	1	1	1	1	1
Reed Street	1.111	1	1	1	1	1	1	1	1	1	1	1
Coquet Street	1	1	1	1	1	1	1	1	1	1	1	1

HOMOGENEOUS RAINFALL SERIES

STATION OAMARU DISTRICT LAT 44 58S LONG 171 05E HT 30 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1866							41	11	16	11	25	121	
1867	47	36	25	9	16	19	95	58	20	62	129	110	626
1868	114	108	42	23	75	92	4	38	25	61	40	35	657
1869	65	32	47	43	62	24	13	23	13	73	31	44	470
1870	112	28	24	120	131	76	37	89	20	36	24	116	813
1871	20	59	75	12	8	35	13	70	21	30	37	40	420
1872	8	50	16	146	12	29	93	56	18	55	8	16	507
1873	61	10	112	68	52	56	73	47	74	50	86	28	717
1874	45	71	70	7	19	18	44	13	121	21	26	90	545
1875	69	37	57	38	77	30	30	24	22	42	98	80	604
1876	42	19	14	32	0	58	19	25	73	8	49	36	376
1877	99	132	57	38	126	61	12	57	10	35	13	48	688
1878	42	18	78	9	19	174	8	13	41	61	13	43	519
1879	45	61	40	11	40	143	19	58	25	34	102	74	651
1880	65	10	30	43	53	109	52	28	26	29	16	56	518
1881	34	16	30	59	15	67	15	30	12	16	9	44	347
1882	62	54	54	143	37	100	20	16	28	15	31	96	656
1883	28	117	54	88	71	5	42	6	85	39	102	75	712
1884	75	109	52	53	5	33	28	37	102	36	38	107	674
1885	78	24	55	26	17	14	59	35	11	40	60	14	433
1886	32	5	59	148	69	27	3	205	41	42	19	22	672
1887	35	47	24	40	92	79	88	18	46	81	73	41	664
1888	44	29	64	52	60	4	160	170	9	47	52	57	747
1889	18	6	76	7	27	53	14	14	40	29	34	49	367
1890	31	15	72	27	19	8	82	6	24	31	30	20	365
1891	52	67	17	25	7	8	15	37	33	23	88	46	418
1892	45	154	69	30	30	12	21	61	59	30	26	51	587
1893	129	15	16	71	44	19	80	24	60	28	97	49	632
1894	175	56	80	37	44	27	23	25	25	12	43	29	577
1895	38	29	45	14	62	99	47	10	6	34	165	68	617
1896	45	68	38	77	16	49	138	29	44	50	23	28	606
1897	39	19	47	7	21	2	9	28	24	96	36	27	355
1898	25	19	24	30	10	55	24	41	39	41	47	46	401
1899	91	54	99	64	34	17	84	14	43	19	74	103	696
1900	31	68	18	40	56	7	36	50	10	88	75	45	523
1901	89	38	12	26	33	7	40	8	18	21	50	135	477
1902	56	57	262	59	22	60	8	11	51	18	29	111	744
1903	73	50	36	40	41	7	64	8	18	39	54	37	467
1904	31	47	47	24	26	61	17	21	45	53	20	98	490
1905	68	43	18	49	34	22	46	4	126	39	46	61	556
1906	78	32	13	36	19	36	15	17	27	16	24	62	375
1907	11	35	36	19	18	6	14	116	86	38	42	34	454
1908	28	13	76	28	42	74	141	22	13	60	19	81	597
1909	78	10	153	49	40	81	43	52	20	44	82	14	666
1910	68	25	13	24	26	57	49	11	27	18	37	32	387
1911	76	17	33	48	22	86	51	7	47	21	44	104	556
1912	76	28	66	20	17	69	123	15	51	123	37	20	645
1913	67	37	58	78	49	18	61	111	16	29	102	90	716
1914	61	60	79	57	49	18	13	11	5	18	41	47	459
1915	57	84	11	13	27	35	10	7	4	43	46	35	372
1916	15	22	75	58	47	147	49	58	20	13	47	10	561
1917	50	31	34	45	155	29	73	18	125	123	12	79	774
1918	37	54	64	15	13	42	37	61	14	26	104	35	502
1919	128	7	5	58	7	50	38	98	78	22	66	54	611
1920	45	65	37	12	20	38	45	74	136	23	51	55	601
1921	67	13	61	11	3	63	40	22	42	104	35	20	481
1922	70	14	73	11	17	26	9	21	17	50	65	118	491
1923	43	81	33	125	77	14	24	14	37	17	18	31	514
1924	35	21	58	31	35	25	7	17	23	92	52	109	505
1925	27	22	27	42	67	39	94	61	40	31	50	49	549
1926	38	134	21	29	106	32	14	50	44	97	67	119	751
1927	24	48	40	41	21	78	101	44	49	60	67	63	636
1928	19	34	62	99	36	29	16	40	7	74	15	92	523
1929	58	15	190	39	11	113	108	32	13	1	41	81	702
1930	57	28	4	24	22	10	13	85	71	63	46	38	461
1931	52	63	40	11	24	39	10	68	33	23	26	49	438
1932	45	110	18	91	59	14	17	22	30	77	58	76	617
1933	49	36	25	34	25	56	62	41	12	38	106	59	543
1934	94	56	33	31	74	40	50	41	83	67	24	37	630
1935	39	44	94	30	34	56	22	21	16	45	54	30	485
1936	65	173	81	26	13	24	65	30	19	24	53	51	624
1937	58	54	27	41	53	19	14	19	41	9	12	120	467
1938	92	52	51	133	23	194	49	13	66	41	67	108	889
1939	38	11	34	29	13	47	68	63	51	17	25	34	430
1940	85	72	36	56	87	8	27	6	55	9	66	38	545
1941	34	23	226	26	23	23	33	93	31	19	33	93	657

CONTINUING RAINFALL SERIES AT OAMARU DISTRICT

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1942	43	67	18	13	73	5	25	16	22	128	44	60	514
1943	57	39	49	37	14	75	26	41	78	79	53	35	583
1944	22	137	40	123	25	75	37	17	12	39	61	127	715
1945	106	234	47	52	55	31	25	67	56	30	42	128	873
1946	101	21	46	60	65	68	42	39	181	66	30	73	792
1947	105	40	24	54	17	155	1	62	30	115	25	35	663
1948	26	58	39	35	33	20	98	14	34	19	80	13	469
1949	24	37	37	62	22	112	20	21	9	30	24	101	499
1950	60	75	46	27	19	43	59	52	7	45	31	37	501
1951	116	18	68	26	26	34	11	21	12	42	66	54	494
1952	51	15	5	7	21	33	11	35	43	91	130	44	486
1953	54	22	96	46	35	20	19	66	7	32	59	50	506
1954	24	43	45	42	63	16	75	55	7	11	68	60	509
1955	33	59	37	6	23	52	86	34	33	39	34	2	438
1956	62	34	1	65	87	24	46	26	65	40	45	76	571
1957	23	55	86	91	130	22	30	10	41	41	76	107	712
1958	130	72	56	57	22	9	19	7	2	25	21	69	489
1959	29	34	38	32	95	7	17	10	10	33	57	85	447
1960	19	31	94	16	19	116	14	29	44	42	58	24	506
1961	56	49	67	39	61	24	70	46	49	15	44	10	530
1962	31	39	73	37	42	26	54	37	16	52	83	14	504
1963	43	59	37	76	18	44	108	44	56	10	45	67	607
1964	31	8	89	13	24	4	36	5	15	16	66	39	346
1965	55	34	64	43	50	39	25	22	16	32	39	31	450
1966	75	24	55	16	36	4	45	39	6	56	61	40	457
1967	36	29	41	41	26	12	2	61	11	40	112	14	425
1968	33	26	160	195	51	122	28	44	25	20	36	26	766
1969	44	14	36	13	65	3	3	6	16	35	24	118	377
1970	79	26	52	21	43	23	36	20	61	20	17	42	440
1971	33	28	35	12	71	111	54	45	17	33	39	45	523
1972	49	10	42	37	80	48	43	19	35	86	22	27	498
1973	12	10	32	63	23	4	5	124	20	37	48	24	402
1974	13	41	30	124	28	23	121	32	21	79	14	31	557
1975	34	87	57	33	17	19	48	114	12	38	77	49	585
1976	45	28	10	17	35	18	19	69	30	39	30	105	445
1977	66	14	20	24	58	75	102	17	62	10	50	37	535
1978	38	21	12	86	39	36	114	77	54	40	18	135	670
1979	25	20	82	15	82	8	39	36	21	51	30	32	441
1980	48	38	82	108	21	68	18	23	10	24	56	13	509
1981	16	24	59	39	11	57	70	30	10	66	11	50	443
1982	41	17	28	38	38	10	4	8	9	49	22	74	338
1866-1982													
MEAN	53.5	45.2	52.4	45.7	40.7	44.8	43.0	38.8	36.2	42.3	48.7	57.8	549.3
ST DEV	29.4	36.7	39.9	35.3	29.2	38.7	34.2	32.8	30.6	26.6	28.7	33.2	120.4

Queenstown 1871-1982 Lat 45.0 S Long 168.7 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Shoreline	326		Sep 1871-Feb 1881	
Queenstown P.O.	312	S132 555701 E41 683661	Jan 1890-Sep 1929	Obs. may have been made at another site prior to Oct 1904
Corner Brisbane and Park Streets	329	S132 556697 E41 684657	Oct 1929-	Enclosure reduced in size late 1965. Gauge shifted.

Monthly conversion factors at Queenstown

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Shoreline	1	1	1	1	1	1	1	1	1	1	0.849	0.802
Post Office	1.095	1	1	1	1.150	1	1	1	1	1	1	1

HOMOGENEOUS RAINFALL SERIES

STATION QUEENSTOWN LAT 45 02S LONG 168 40E HT 329 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1871									23	77	38	46	
1872	69	96	9	62	109	55	34	68	66	90	29	33	720
1873	60	2	61	17	182	68	40	108	91	30	47	85	791
1874	75	35	74	65	30	27	114	22	102	49	114	33	740
1875	126	53	52	78	77	43	94	26	75	79	82	80	865
1876	28	45	56	141	73	98	10	28	154	6	47	73	759
1877	101	69	43	56	37	82	10	74	60	77	167	79	855
1878	71	19	80	82	196	67	131	110	298	177	113	127	1471
1879	28	62	57	38	19	99	42	9	30	46	37	75	543
1880	66	16	69	132	178	23	68	86	56	45	207	109	1055
1881	68	33											
1882													
1883													
1884													
1885													
1886													
1887													
1888													
1889													
1890	13	25	42	56	74	37	13	20	72	178	150	79	759
1891	85	46	65	92	105	18	28	30	53	125	90	92	829
1892	35	106	29	23	75	98	12	31	25	39	26	43	542
1893	95	38	11	3	60	111	56	78	83	40	72	23	670
1894	79	103	45	77	53	23	33	34	13	56	66	29	611
1895	62	15	83	52	67	44	42	44	36	110	42	74	671
1896	96	72	64	66	29	47	56	38	27	90	11	25	621
1897	111	18	78	65	110	32	40	50	64	138	156	17	879
1898	128	17	58	77	147	49	137	15	117	75	114	53	987
1899	114	53	37	86	51	19	80	8	105	46	61	151	810
1900	36	60	37	84	83	8	85	55	20	231	70	44	813
1901	97	85	42	89	156	32	33	41	72	76	98	99	921
1902	138	55	74	38	74	34	32	66	83	83	100	63	840
1903	83	38	108	38	39	89	57	30	17	99	42	65	705
1904	42	53	64	56	101	81	15	99	40	38	119	66	774
1905	115	12	38	53	48	116	31	25	56	39	111	102	746
1906	21	45	23	176	129	79	57	37	27	157	29	87	867
1907	28	40	115	82	48	26	42	14	81	141	43	91	752
1908	13	62	105	135	89	105	85	24	93	19	36	44	810
1909	140	3	27	154	41	86	23	102	28	48	37	30	720
1910	35	89	56	75	67	83	8	43	106	106	32	89	789
1911	63	6	56	135	46	43	21	18	60	51	72	61	633
1912	44	46	104	55	52	72	9	64	83	170	47	33	779
1913	100	81	154	109	78	91	54	74	80	62	33	49	965
1914	107	18	28	130	94	35	21	70	87	56	86	95	828
1915	90	88	65	26	52	84	52	36	100	108	98	79	878
1916	43	24	75	90	75	119	78	83	111	34	72	23	826
1917	57	19	132	66	153	30	46	48	103	151	23	47	875
1918	70	71	80	29	94	22	83	70	92	56	95	70	832
1919	206	3	51	71	21	57	107	69	45	124	64	43	861
1920	24	28	33	66	130	76	104	3	18	35	140	99	756
1921	36	16	160	53	99	60	89	70	58	76	29	115	861
1922	79	39	94	136	40	9	59	33	14	41	64	50	658
1923	49	100	65	40	118	116	35	92	14	54	59	89	832
1924	189	34	26	143	38	116	102	24	78	68	59	50	927
1925	7	140	92	57	24	29	42	145	86	88	57	107	874
1926	65	116	29	66	93	78	56	52	80	101	78	59	873
1927	109	44	171	92	62	13	61	19	40	71	33	11	727
1928	21	47	64	154	54	14	47	58	141	173	86	52	911
1929	122	30	101	33	18	72	51	87	89	25	90	107	825
1930	94	30	34	15	70	29	26	34	68	44	99	31	574
1931	202	79	19	61	77	67	102	62	76	95	42	61	943
1932	102	31	18	76	33	23	2	40	37	37	108	59	566
1933	60	84	55	171	73	17	54	99	9	41	53	86	802
1934	30	50	86	94	118	31	63	106	123	60	10	32	803
1935	110	49	141	51	87	68	7	49	35	52	51	34	734
1936	66	35	82	107	80	12	87	114	101	122	69	25	900
1937	98	96	56	77	85	28	35	27	32	10	8	44	596
1938	85	37	48	71	43	121	29	39	35	111	58	68	745
1939	63	31	21	62	48	101	70	35	99	37	62	43	672
1940	90	173	77	46	88	70	23	22	70	152	53	37	901
1941	94	76	64	69	74	27	41	30	34	26	102	30	667
1942	115	75	70	79	118	26	84	44	125	158	86	58	1038
1943	55	81	108	102	78	83	42	20	59	26	63	20	737
1944	76	183	68	94	29	116	47	50	50	125	38	63	939
1945	68	144	110	66	89	25	59	109	80	44	120	72	986
1946	119	81	29	24	43	49	54	187	74	147	65	52	924

CONTINUING RAINFALL SERIES AT QUEENSTOWN

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1947	22	29	7	30	61	149	31	62	87	71	30	53	632
1948	57	30	101	34	115	33	74	23	150	120	131	108	976
1949	78	159	276	82	35	18	136	105	39	71	33	83	1115
1950	119	54	37	40	92	62	109	73	42	35	47	93	803
1951	45	35	30	112	89	25	182	60	81	80	99	59	897
1952	136	63	46	65	88	115	29	1	74	80	36	33	766
1953	43	15	71	153	59	54	60	51	68	2	84	64	724
1954	51	50	112	76	23	144	96	100	20	93	27	39	831
1955	86	84	55	53	153	103	33	48	92	27	40	19	793
1956	58	11	20	76	106	120	70	54	43	41	125	96	820
1957	66	45	55	86	94	99	48	42	40	133	197	136	1041
1958	87	178	76	163	279	34	20	38	8	108	45	105	1141
1959	30	28	19	84	108	86	37	28	85	52	102	56	715
1960	80	56	67	16	43	50	59	55	81	34	77	21	639
1961	31	68	86	85	24	106	92	42	75	72	99	46	826
1962	92	54	44	47	55	74	114	72	44	110	44	33	783
1963	73	73	42	48	131	45	18	63	85	53	58	38	727
1964	62	13	132	39	111	11	46	101	111	47	113	67	853
1965	113	61	94	36	83	90	61	16	73	126	70	52	875
1966	94	38	53	78	14	66	7	39	44	25	73	17	548
1967	100	72	94	153	40	13	36	101	34	106	167	120	1036
1968	48	67	147	35	69	69	23	55	117	163	78	42	913
1969	67	13	104	67	40	62	27	57	119	67	29	145	797
1970	76	30	67	22	11	28	149	118	221	28	44	59	853
1971	24	40	81	48	101	68	22	56	106	152	57	43	798
1972	82	12	159	95	86	75	87	47	175	88	25	64	995
1973	38	4	71	126	104	87	11	60	49	81	83	21	735
1974	24	71	44	36	29	96	92	8	15	93	20	51	579
1975	33	84	104	117	131	74	89	48	55	89	39	57	920
1976	36	4	29	51	117	85	60	29	12	37	27	122	609
1977	70	45	27	116	69	60	12	7	83	97	52	49	687
1978	35	18	105	30	128	23	52	124	58	141	129	40	883
1979	138	94	37	73	111	37	49	63	100	99	34	159	994
1980	140	84	114	54	85	113	77	178	135	76	72	25	1153
1981	30	43	131	105	54	58	39	12	99	74	28	96	769
1982	94	106	68	32	186	30	54	100	12	94	191	73	1040
1871-1982													
MEAN	75.0	55.2	70.3	74.8	80.8	61.5	55.4	56.2	71.8	80.6	71.5	63.5	817.9
ST DEV	39.7	38.6	41.9	38.6	44.9	34.7	35.0	36.0	44.8	45.4	41.9	32.3	148.3

Dunedin Botanical Gardens 1852-1982 Lat 45.9 S Long 170.5 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Dunedin	15	S164 152708 I44 158779	Nov 1852- Dec 1862	Site on corner of Jetty and Princes Street.
Rockyside Observatory	152	S164 145718 I44 152788	Jan 1863- Apr 1886	Beverly-Begg Observatory now occupies climat site
Woodhaugh - Leith Valley	108	S164 150758 I44 156824	May 1886- Dec 1912	Site 2.4km from junction of George and Duke Streets
Botanical Gardens	73	S164 167736 I44 172804	Jan 1913-	Gauge shifted several times to improve exposure

Monthly conversion factors at Dunedin

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Dunedin	1	1	1.267	1	1	1	1	1	1	1	1	1
Rockyside	1	1	1	1	1	1	1.166	1	1	1	1	1
Leith Valley	1	1	1	1	1	1	1	0.796	0.912	1	0.886	1

HOMOGENEOUS RAINFALL SERIES

STATION DUNEDIN BOTANICAL GARDENS LAT 45 52S LONG 170 31E HT 73 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1852											108	143	
1853	169	33	99	82	67	161	47	22	74	41	38	76	909
1854	23	16	6	43	81	112	28	18	52	110	26	41	556
1855	29	61	44	70	32	61	37	32	26	102	52	40	586
1856	102	96	68	21	55	25	98	93	78	21	81	44	782
1857	64	41	38	33	78	45	70	30	20	77	78	19	593
1858	57	31	41	67	102	39	41	97	54	53	52	60	694
1859	121	125	84	34	20	20	33	20	46	31	56	68	658
1860	62	23	60	18	62	87	124	98	42	53	42	64	735
1861	48	27	86	148	157	58	71	52	32	41	77	88	885
1862	103	27	77	50	103	16	46	41	7	17	49	64	600
1863	51	54	77	57	9	35	69	43	58	144	135	118	850
1864	67	66	44	24	45	63	12	55	51	65	80	44	616
1865	132	31	113	80	257	82	78	91	112	91	70	60	1197
1866	125	100	45	18	25	43	84	46	60	34	50	121	751
1867	107	42	61	17	85	54	96	80	23	128	153	161	1007
1868	205	129	30	53	123	88	34	31	34	31	49	57	864
1869	89	55	73	77	161	86	64	38	33	49	36	84	845
1870	188	85	41	78	151	118	92	97	28	15	38	78	1009
1871	45	56	60	42	42	26	36	93	34	54	36	44	568
1872	6	79	21	132	20	85	132	92	41	57	20	29	714
1873	127	12	86	100	67	53	90	89	115	62	88	33	922
1874	51	66	106	33	40	23	61	33	138	74	33	81	739
1875	96	33	49	49	172	46	56	180	56	78	140	137	1092
1876	31	42	66	130	21	179	42	60	93	14	154	146	978
1877	100	158	49	89	180	54	56	66	53	58	26	70	959
1878	106	43	123	45	86	315	12	95	100	88	56	81	1150
1879	110	78	158	29	28	170	41	74	110	103	104	71	1076
1880	78	24	37	72	130	118	38	41	21	51	53	183	846
1881	65	38	62	113	53	72	49	35	19	48	38	87	679
1882	87	92	62	165	117	103	157	28	46	43	35	149	1084
1883	16	140	30	138	53	42	157	49	87	52	127	105	996
1884	126	119	73	36	30	41	44	54	95	69	75	104	866
1885	72	71	32	75	41	15	69	83	33	47	72	25	635
1886	29	32	103	116	189	87	18	396	43	60	65	87	1224
1887	49	58	50	53	124	165	72	63	100	121	58	48	962
1888	60	36	134	32	110	25	354	217	8	49	50	91	1165
1889	11	5	61	47	23	49	39	37	41	42	109	103	567
1890	65	15	83	32	53	13	136	18	35	69	72	103	693
1891	65	71	56	56	48	27	53	90	26	85	99	116	793
1892	98	228	66	97	60	96	93	60	99	103	43	144	1178
1893	133	59	84	77	62	141	111	40	190	143	172	123	1334
1894	128	103	101	101	107	101	36	61	72	44	98	12	965
1895	88	102	186	46	118	175	122	72	36	82	128	112	1268
1896	66	116	67	106	41	54	335	80	57	120	114	34	1190
1897	68	41	106	35	80	11	33	102	93	227	82	44	922
1898	53	84	40	47	64	130	93	55	57	82	59	75	839
1899	140	82	131	86	89	21	96	37	51	46	81	98	957
1900	93	97	57	75	136	4	149	68	59	106	175	102	1121
1901	194	118	45	56	112	37	92	60	28	35	59	95	931
1902	91	163	365	107	69	109	38	28	119	56	51	146	1343
1903	144	37	65	91	151	118	67	39	38	106	116	86	1058
1904	80	93	130	61	90	133	33	103	164	91	58	150	1187
1905	150	66	59	112	89	60	56	17	256	182	134	139	1320
1906	101	119	65	85	74	63	67	33	84	40	17	56	804
1907	21	97	59	26	76	43	26	110	65	100	58	76	756
1908	91	45	86	73	49	149	228	104	24	173	36	134	1192
1909	109	44	122	111	25	106	67	80	64	95	65	50	937
1910	218	44	52	50	52	58	83	18	47	45	66	102	834
1911	79	12	29	108	25	160	47	14	59	59	145	235	973
1912	82	124	130	45	40	166	128	35	61	145	126	89	1171
1913	90	46	98	74	92	23	114	196	65	92	127	122	1139
1914	93	81	45	88	67	71	54	19	43	46	88	100	795
1915	47	116	52	36	62	55	19	20	25	106	76	67	681
1916	25	55	57	32	56	142	66	101	44	36	71	46	731
1917	79	61	54	26	220	28	105	39	182	131	39	114	1078
1918	51	47	101	52	22	165	78	79	70	48	119	105	937
1919	181	19	35	141	42	86	68	190	91	59	98	78	1088
1920	35	24	21	37	99	31	38	107	134	40	108	47	721
1921	63	26	79	52	27	62	42	60	45	171	44	83	754
1922	121	58	176	60	46	94	35	62	48	46	126	96	968
1923	75	132	88	269	114	128	54	40	53	85	49	48	1135
1924	63	35	29	50	109	72	54	15	65	183	43	118	836
1925	33	56	102	62	71	75	152	150	82	56	115	57	1011
1926	61	177	35	32	134	72	31	76	86	154	103	181	1142
1927	81	81	129	53	58	66	191	102	124	127	76	96	1184
1928	40	66	56	110	34	42	35	37	49	147	51	99	766

CONTINUING RAINFALL SERIES AT DUNEDIN BOTANCIAL GARDENS

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1929	112	36	190	49	13	176	158	25	51	10	95	151	1066
1930	108	42	19	36	45	42	53	88	101	125	122	74	855
1931	145	125	33	50	38	43	49	118	73	37	59	67	837
1932	100	109	77	118	56	72	70	45	30	50	39	52	818
1933	73	50	26	103	98	87	56	62	56	100	126	47	884
1934	129	70	64	55	183	49	75	117	153	46	36	44	1021
1935	77	61	146	40	102	150	33	47	35	70	96	39	896
1936	40	217	155	43	53	31	171	89	74	73	129	147	1222
1937	84	182	74	142	110	83	40	48	56	20	29	105	973
1938	73	26	37	107	70	167	60	23	73	71	93	277	1077
1939	57	41	39	35	24	96	260	95	48	60	41	34	830
1940	146	123	80	56	198	39	41	26	33	18	98	46	904
1941	82	36	259	92	51	70	52	119	48	61	155	86	1111
1942	147	50	49	36	128	25	85	17	32	83	62	76	790
1943	29	62	62	33	29	89	42	74	117	94	63	41	735
1944	50	150	39	229	44	134	68	56	42	58	72	144	1086
1945	125	149	92	116	252	64	43	29	40	72	63	149	1194
1946	94	51	52	99	96	76	73	73	202	78	70	54	1018
1947	161	49	22	37	39	172	9	79	46	117	35	49	815
1948	62	54	55	76	34	73	171	41	76	94	106	58	900
1949	51	45	108	64	67	221	77	34	30	87	60	81	925
1950	100	65	23	71	39	72	62	58	23	34	51	86	684
1951	104	83	84	109	65	66	56	40	35	44	154	121	961
1952	100	28	56	29	27	61	59	88	57	77	140	67	789
1953	81	38	129	108	46	60	29	86	40	45	64	90	816
1954	32	32	119	61	83	97	99	48	13	37	88	139	848
1955	86	180	55	55	79	170	148	60	46	85	78	20	1062
1956	59	35	39	58	237	58	66	45	85	46	72	87	887
1957	81	67	172	73	206	72	85	16	49	80	105	88	1094
1958	152	84	76	123	79	30	69	18	8	31	70	73	813
1959	46	75	42	98	121	20	42	21	20	54	109	177	825
1960	26	78	102	47	33	181	40	96	45	25	119	93	885
1961	75	84	65	108	52	39	129	59	83	41	60	40	835
1962	74	75	102	49	55	58	88	77	37	89	105	33	842
1963	53	87	65	42	53	130	198	80	121	46	52	76	1003
1964	109	31	119	32	48	13	62	31	38	53	78	64	678
1965	115	70	64	73	57	86	36	32	51	65	97	79	825
1966	160	46	80	53	54	46	48	41	17	71	66	72	754
1967	59	45	45	73	125	21	15	88	97	56	96	33	753
1968	31	57	229	296	67	112	68	42	52	96	74	50	1174
1969	84	44	67	78	133	66	25	63	63	71	30	162	886
1970	159	77	118	46	60	52	76	22	74	43	36	89	852
1971	34	22	93	50	110	241	40	86	104	55	124	50	1009
1972	113	54	52	76	184	175	101	89	159	41	22	82	1148
1973	19	19	78	72	90	14	31	105	40	79	121	32	700
1974	70	65	81	174	68	51	220	79	28	173	51	69	1129
1975	51	102	168	39	40	39	89	201	47	77	86	90	1029
1976	86	45	21	41	100	149	78	182	42	110	64	138	1056
1977	120	27	33	75	165	79	158	30	124	87	72	130	1100
1978	44	24	42	144	88	104	211	126	105	126	47	174	1235
1979	71	47	105	54	131	23	86	88	71	80	42	98	896
1980	131	86	111	92	131	215	98	96	39	67	129	71	1266
1981	21	61	105	51	25	153	245	72	63	75	30	89	990
1982	104	51	45	73	116	53	39	61	42	193	52	155	984
1852-1982													
MEAN	85.4	69.0	78.9	73.6	83.1	83.2	81.1	69.4	64.5	75.5	78.1	88.7	929.7
ST DEV	43.2	42.8	50.2	44.9	52.5	55.6	60.0	49.9	41.6	41.1	36.4	44.3	184.9

Invercargill 1859-1982 Lat 46.4 S Long 168.3 E

Location	Height (m)	Grid Refs. NZMS 1/260	Dates of Record	Remarks
Martendale *	24	S177 337171 E46 508260	Jan 1859- Dec 1872	Location 16km (NE) from Foveaux Strait
Wallacetown	9	S176 296109 E46 472202	Jan 1873- Dec 1880	Precise location unknown
Invercargill 1			Jan 1889- Jul 1900	
Invercargill 2			Aug 1900- May 1910	Location(s) unknown
Waikiwi	5	S177 346051 E46 518150	Jun 1910- Aug 1925	Located on North Road (4.8 km N of Janet Street) Waikiwi
68 Janet Street	4	S182 356994 E47 528098	Sep 1925- Dec 1939	OBservations ceased Feb 1942
Invercargill Airport	0	S177 335007 E46 509110	Jan 1940-	

* See Note 5.

Monthly conversion factors at Invercargill

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Martendale	0.755	1	1	1	1	1	0.793	0.709	1	1	1	1
Wallacetown	1	1	1	1	1	1	1	1	1	1	1.137	1
Invercargill 1	1	1	1	1	1	1	0.803	1	1	0.683	0.674	0.780
Invercargill 2	1	1.148	1	1	1	1.091	1	1	1	1	1	1
Waikiwi	1	1.135	1	1	1	1	1	1	1	1	1	1
Janet Street	1	1	1	1	1	1	1	1	1	1	1	1

Note 5.

Annual rainfall amounts exist only for the period 1854 to 1864, these being published by C.R. Marten (Marten, 1866). The annual conversion factors for the period 1865 to 1872 is 0.926. A new mean and standard deviation appearing in brackets at the foot of the table includes all annual rainfall totals.

HOMOGENEOUS RAINFALL SERIES

STATION INVERCARGILL LAT 46 25S LONG 168 20E HT 0 M

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1859													534+
1860													690+
1861													674+
1862													1112+
1863													1247+
1864													1203+
1865	193	69	93	129	153	149	62	121	104	157	215	46	1490
1866	131	142	112	115	55	140	50	81	39	75	73	98	1111
1867	97	88	35	39	119	42	70	101	44	122	157	50	965
1868	102	90	78	103	101	93	89	76	20	89	123	128	1092
1869	62	60	144	72	181	84	87	54	78	71	86	40	1019
1870	212	167	75	156	102	159	90	35	36	74	82	76	1264
1871	26	73	78	24	197	39	127	62	70	82	71	74	923
1872	39	135	15	81	134	166	77	97	93	87	23	71	1018
1873	165	22	77	87	148	80	56	69	87	54	66	49	960
1874	121	112	109	109	51	68	107	69	80	179	75	62	1142
1875	157	69	86	32	116	93	143	85	64	104	78	104	1131
1876	19	81	161	123	135	108	52	68	98	23	59	112	1039
1877	170	83	70	82	69	116	87	92	82	135	40	75	1101
1878	124	42	123	118	160	185	92	174	109	58	98	101	1384
1879	110	79	112	58	31	84	66	72	52	57	75	57	853
1880	70	19	47	94	189	98	103	68	59	56	58	139	1000
1881													
1882													
1883													
1884													
1885													
1886													
1887													
1888													
1889					117*	61*	68*	82*	73*	53*	130*	80*	
1890	72*	56*	85*	64	121	114	46	127	25	100	129	168	1107
1891	140	102	222	222	159	210	71	191	127	65	38	109	1657
1892	76	76	32	102	133	88	49	80	57	59	33	119	904
1893	39	68	42	38	87	107	31	99	84	41	65	68	769
1894	75	116	48	95	99	62	96	44	25	9	124	17	810
1895	120	84	194	103	127	144	93	70	111	176	133	98	1453
1896	125	54	19	105	120	47	83	85	38	97	30	46	849
1897	50	14	110	150	119	69	35	67	83	175	185	83	1139
1898	252	113	27	47	89	103	161	74	167	178	69	33	1313
1899	66	20	48	149	38	44	79	73	39	74	94	233	956
1900	64	71	78	104	186	8	119	24	53	113	76	75	971
1901	127	84	87	115	180	10	85	89	77	116	152	105	1227
1902	128	95	73	97	148	29	78*	95*	178*	92*	97*	184*	1295
1903	106	78	97	77	100	97	68	108	25	120	54	154	1084
1904	102	104	143	97	78	119	76	91	56	54	144	121	1185
1905	156	38	57	124	100	69	31	56	43	73	108	86	941
1906	74	45	55	188	89	71	92	65	35	38	49	72	873
1907	60*	52	122*	85*	113*	71*	99*	78*	56*	86*	72*	99*	993
1908	64*	85*	96*	120*	110*	108*	97*	84*	56*	111*	80*	135*	1146
1909	126*	61*	54*	130*	103*	96*	51*	107*	58*	72*	101*	89*	1048
1910	62*	84*	93*	108*	107*	111	78	65	102	108	28	61	1007
1911	86	23	83	77	66	57	75	86	65	119	187	163	1087
1912	40	99	152	110	91	167	51	91	139	127	54	93	1214
1913	114	137	188	129	200	99	129	85	99	156	81	75	1492
1914	137	62	14	141	100	112	87	117	103	120	139	132	1264
1915	164	125	84	106	122	113	82	21	65	137	126	127	1272
1916	112	135	135	72	105	78	62	72	160	57	121	35	1144
1917	77	202	125	72	128	65	51	112	74	132	58	107	1203
1918	92	45	75	123	147	135	123	110	104	63	125	110	1252
1919	197	11	80	180	103	90	104	136	87	176	105	97	1366
1920	75	14	109	118	160	25	103	60	51	53	175	98	1041
1921	66	52	137	103	109	149	85	93	64	89	133	146	1226
1922	86	33	231	150	47	52	60	88	56	90	139	96	1128
1923	80	242	189	92	61	161	41	105	45	79	69	78	1242
1924	109	72	25	75	149	106	75	27	86	78	22	118	942
1925	26	76	118	120	63	52	34	82	184	82	102	67	1006
1926	67	171	52	95	141	82	57	138	135	110	97	55	1200
1927	84	88	220	106	69	27	73	42	99	111	135	60	1114
1928	44	47	67	127	90	128	91	55	136	169	69	87	1110
1929	140	112	111	42	62	112	51	68	102	17	112	133	1062
1930	99	51	87	31	127	125	70	52	72	115	170	69	1068
1931	128	133	42	47	72	107	161	91	80	57	93	66	1077
1932	145	95	83	106	87	179	89	52	26	39	94	90	1085
1933	94	170	103	202	124	43	44	83	119	111	65	84	1242
1934	99	54	116	87	145	62	115	62	80	45	49	62	976
1935	183	39	144	139	120	195	37	78	28	51	79	38	1131

CONTINUING RAINFALL SERIES AT INVERCARGILL

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1936	99	54	132	71	108	73	121	111	134	113	117	103	1236
1937	113	150	136	85	86	67	88	51	55	33	65	88	1017
1938	95	56	114	18	123	109	67	74	51	124	82	195	1108
1939	197	100	43	98	101	50	123	99	89	55	107	97	1159
1940	135	299	112	66	107	93	27	60	66	84	47	64	1160
1941	106	80	58	120	141	124	38	55	58	76	166	77	1099
1942	116	68	90	112	106	36	64	91	77	69	139	75	1043
1943	43	106	150	99	90	80	38	58	46	38	69	65	882
1944	79	91	42	127	65	164	54	89	123	102	93	94	1123
1945	32	68	233	185	99	35	101	35	54	64	67	118	1091
1946	115	81	39	76	56	53	67	176	93	175	96	174	1201
1947	34	50	21	39	83	109	58	93	56	72	63	102	780
1948	50	89	99	67	61	104	81	31	127	127	63	123	1022
1949	84	93	184	117	37	104	107	110	75	119	45	87	1162
1950	120	87	72	72	37	210	63	49	37	62	91	88	988
1951	54	49	84	62	96	68	74	92	88	69	94	107	937
1952	165	55	185	77	72	90	36	7	118	137	84	65	1091
1953	62	54	119	140	75	47	57	60	113	33	69	92	921
1954	64	83	138	56	44	141	126	80	49	82	48	61	972
1955	142	72	57	113	88	178	66	42	86	110	101	29	1084
1956	55	122	60	47	49	105	77	53	44	43	121	110	886
1957	144	51	66	95	218	173	90	38	14	158	185	83	1315
1958	53	107	69	228	168	100	44	85	68	49	59	84	1114
1959	68	116	37	120	173	54	63	60	49	80	108	78	1006
1960	105	135	58	67	90	168	66	69	55	40	86	51	990
1961	61	112	95	170	99	128	75	57	74	77	125	48	1121
1962	78	102	70	52	56	118	90	67	90	60	131	54	968
1963	126	76	73	53	130	113	29	62	57	105	94	77	995
1964	124	13	187	101	113	71	47	129	49	31	132	70	1067
1965	108	137	52	108	112	201	76	48	76	124	69	127	1238
1966	81	32	88	134	71	134	61	30	26	42	99	75	873
1967	48	59	60	149	127	50	50	102	56	90	113	114	1018
1968	88	94	120	117	81	82	96	30	131	108	95	50	1092
1969	113	44	127	111	79	119	51	65	72	137	37	133	1088
1970	118	79	67	120	57	29	84	47	141	90	70	139	1041
1971	71	30	145	37	77	92	61	52	142	80	71	96	954
1972	183	28	202	182	139	133	59	76	171	120	61	94	1448
1973	61	72	67	143	162	66	35	46	55	118	130	33	988
1974	50	97	37	62	103	102	135	36	17	56	23	94	812
1975	37	84	110	155	104	77	128	72	67	67	53	154	1108
1976	95	29	57	62	142	163	116	40	19	73	64	79	939
1977	132	76	28	180	105	103	30	25	118	145	86	78	1106
1978	52	43	93	30	89	44	89	84	35	124	118	69	870
1979	183	57	36	138	147	55	73	53	132	49	22	112	1057
1980	151	57	91	20	138	92	90	162	98	49	130	51	1119
1981	59	56	74	132	60	88	78	60	173	99	47	152	1078
1982	215	83	83	39	189	59	104	97	52	146	120	128	1315
1865-1982													
MEAN	100.8	81.6	94.7	101.3	108.2	97.4	76.7	76.3	78.3	90.2	92.0	92.2	1090.3 (1080.9)+
ST DEV	46.9	45.5	50.0	43.6	40.1	45.0	28.9	32.5	38.6	39.9	40.1	37.4	158.2 (171.8)+

* OBSERVATIONS ESTIMATED FROM DIPTON.
\+ SEE NOTE 5.

P. D. HASSELBERG, GOVERNMENT PRINTER, WELLINGTON, NEW ZEALAND—1984

13038B—84PT