APPENDIX B

B.NERRIGUNDAH CATCHMENT EXPERIMENTAL DATA

B.1 JULIAN DAY OF YEAR CALENDER

Table B.1: Julian day of year calender.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1	32	60	91	121	152	182	213	244	274	305	335
2	2	33	61	92	122	153	183	214	245	275	306	336
3	3	34	62	93	123	154	184	215	246	276	307	37
4	4	35	63	94	124	155	185	216	247	277	308	338
5	5	36	64	95	125	156	186	217	248	278	309	339
6	6	37	65	96	126	157	187	218	249	279	310	340
7	7	38	66	97	127	158	188	219	250	280	311	341
8	8	39	67	98	128	159	189	220	251	281	312	342
9	9	40	68	99	129	160	190	221	252	282	313	343
10	10	41	69	100	130	161	191	222	253	283	314	344
11	11	42	70	101	131	162	192	223	254	284	315	345
12	12	43	71	102	132	163	193	224	255	285	316	346
13	13	44	72	103	133	164	194	225	256	286	317	347
14	14	45	73	104	134	165	195	226	257	287	318	348
15	15	46	74	105	135	166	196	227	258	288	319	349
16	16	47	75	106	136	167	197	228	259	289	320	350
17	17	48	76	107	137	168	198	229	260	290	321	351
18	18	49	77	108	138	169	199	230	261	291	322	352
19	19	50	78	109	139	170	200	231	262	292	323	353
20	20	51	79	110	140	171	201	232	263	293	324	354
21	21	52	80	111	141	172	202	233	264	294	325	355
22	22	53	81	112	142	173	203	234	265	295	326	356
23	23	54	82	113	143	174	204	235	266	296	327	357
24	24	55	83	114	144	175	205	236	267	297	328	358
25	25	56	84	115	145	176	206	237	268	298	329	359
26	26	57	85	116	146	177	207	238	269	299	330	360
27	27	58	86	117	147	178	208	239	270	300	331	361
28	28	59	87	118	148	179	209	240	271	301	332	362
29	29	60	88	119	149	180	210	241	272	302	333	363
30	30		89	120	150	181	211	242	273	303	334	364
31	31		90		151		212	243		304		365

Add 1 to unshaded values during leap years.

B.2 METEOROLOGICAL DATA

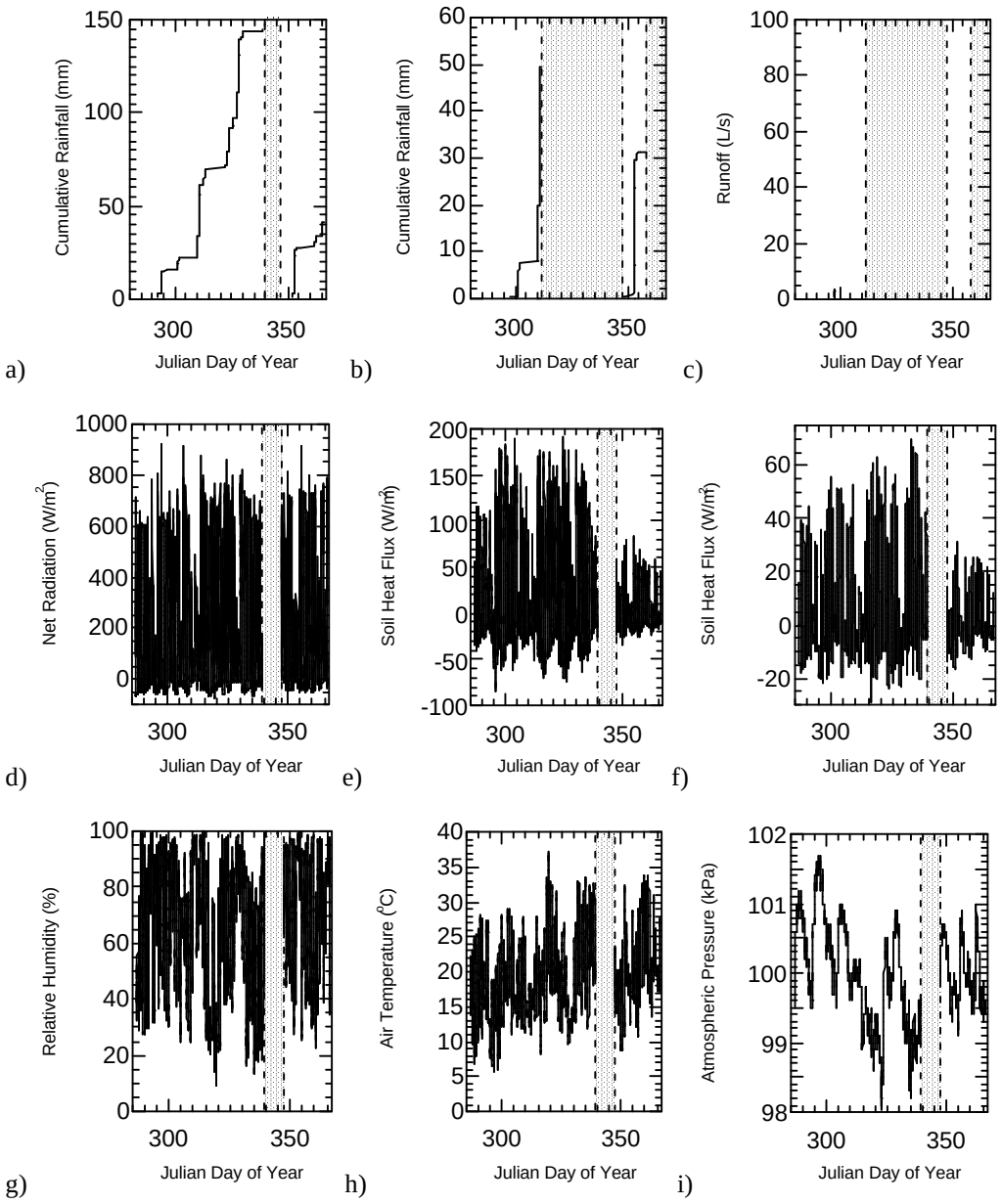


Figure B.1: Meteorological data collected in the Nerrigundah experimental catchment during 1996. a) Pluviometer 1; b) pluviometer 2; c) runoff; d) net radiation; e) soil heat flux at 2 cm; f) soil heat flux at 12 cm; g) relative humidity; h) air temperature; and i) atmospheric pressure. Shaded regions between dashed vertical lines indicate periods where data are missing.

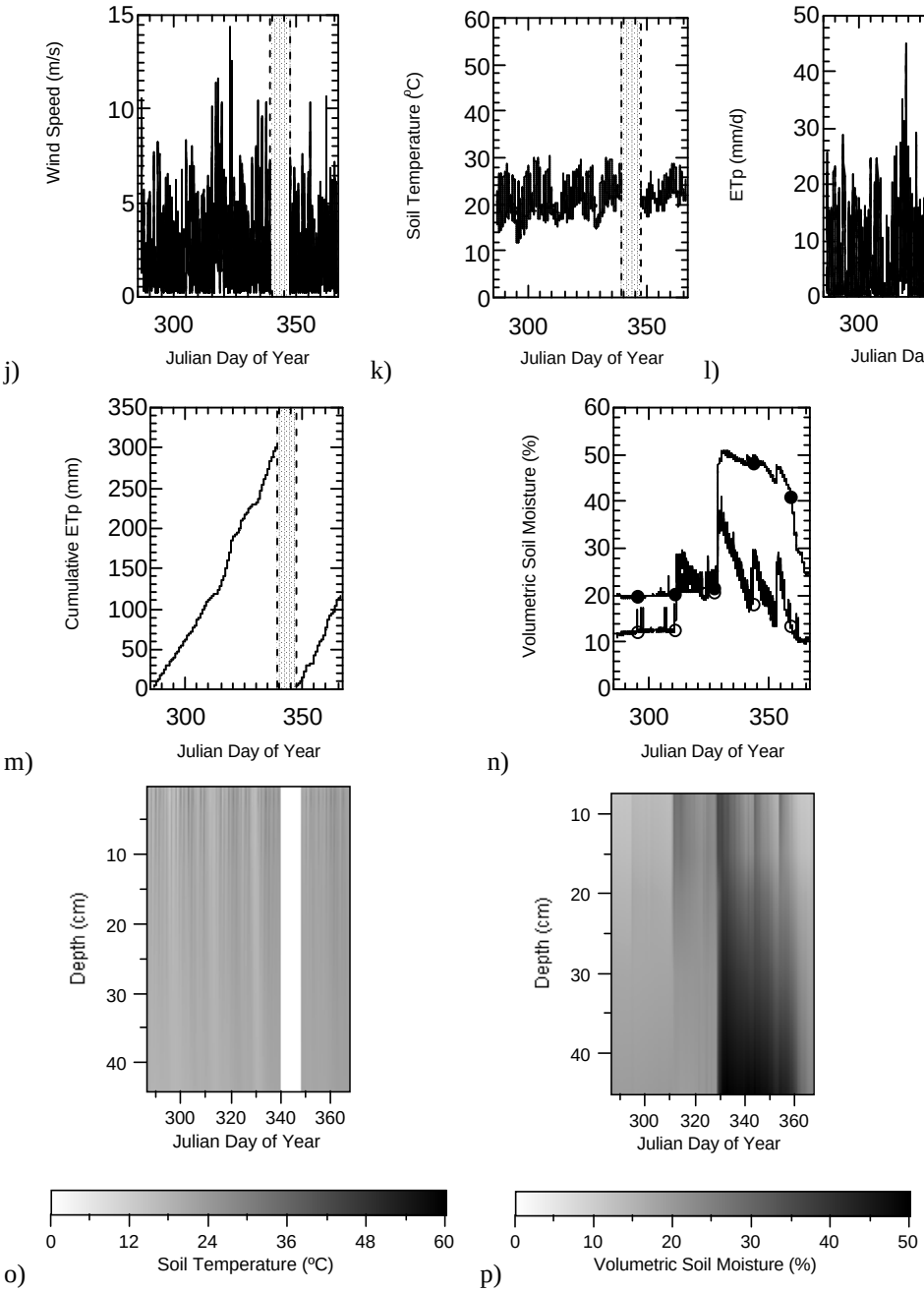
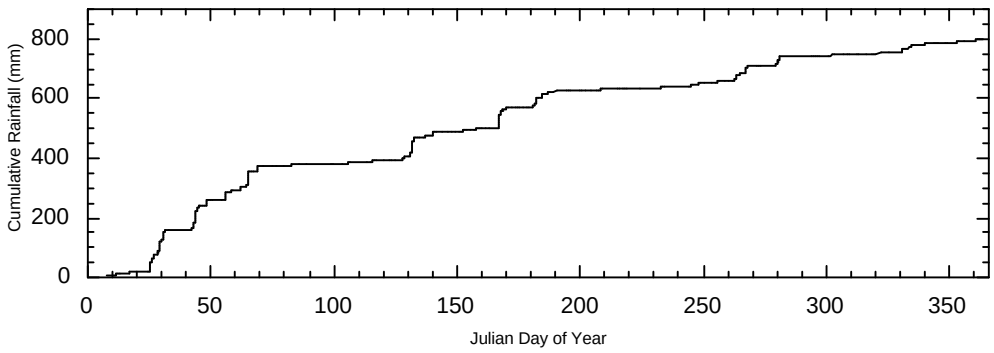
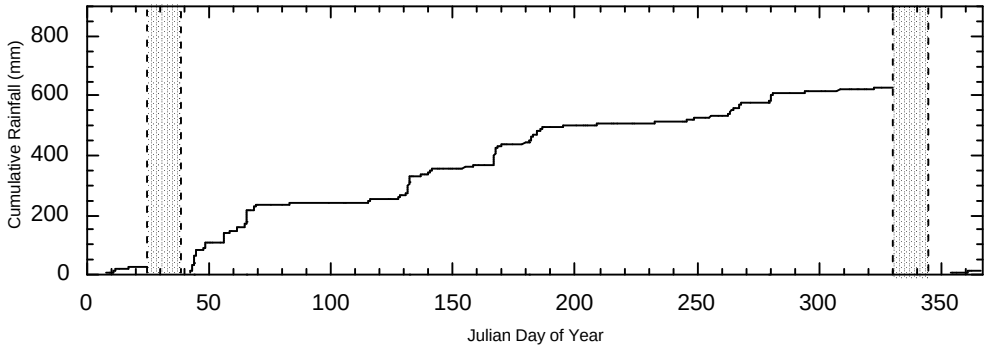


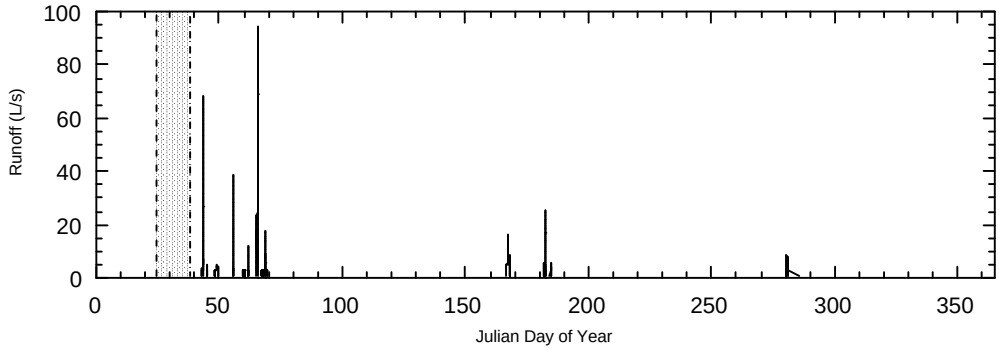
Figure B.1 (con't): Meteorological data collected in the Nerrigundah experimental catchment during 1996. j) Wind speed; k) soil temperature at 1 cm (solid line) and 40 cm (dashed line); l) Penman-Monteith potential evapotranspiration; m) cumulative Penman-Monteith potential evapotrans-piration; n) Virrib soil moisture at 10 cm (open symbol) and 40 cm (closed symbol); o) soil temperature profile; and p) soil moisture profile from Virrib. Shaded regions between dashed vertical lines in line graphs and white regions in intensity plots indicate periods where data are missing.



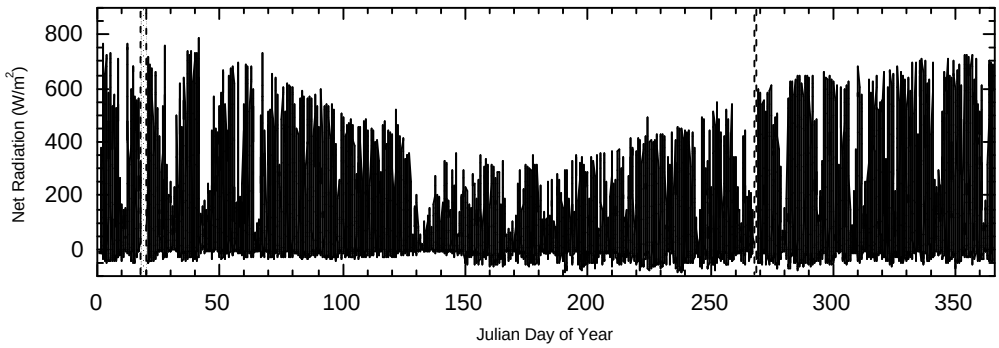
a)



b)

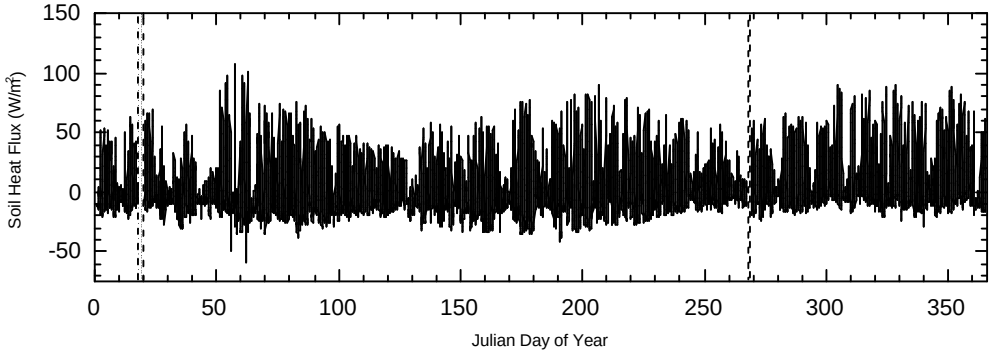


c)

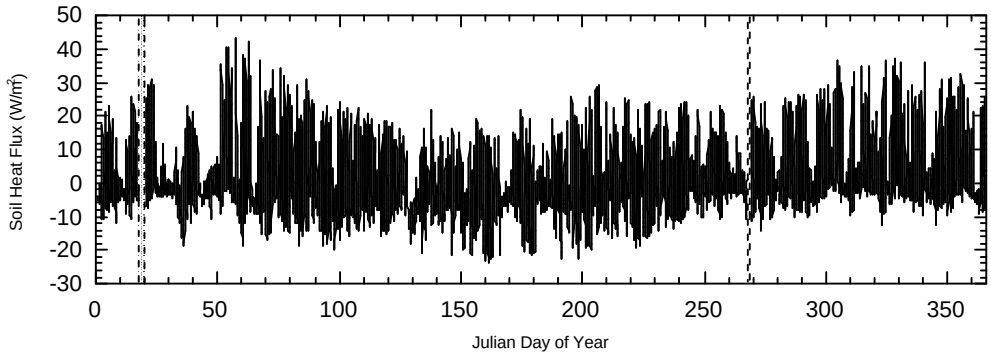


d)

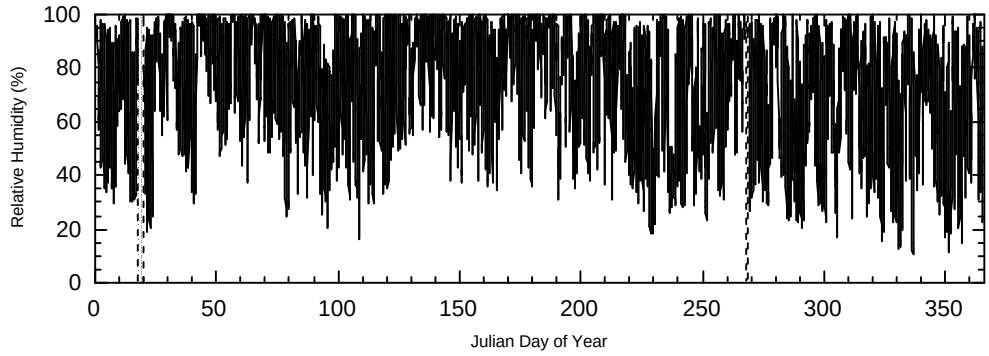
Figure B.2: Meteorological data collected in the Nerrigundah experimental catchment during 1997. a) Pluviometer 1; b) pluviometer 2; c) runoff; and d) net radiation. Shaded regions between dashed vertical lines indicate periods where data are missing.



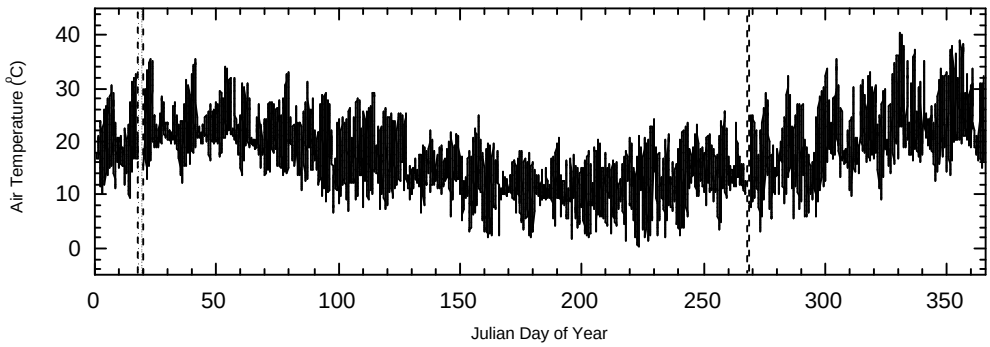
e)



f)

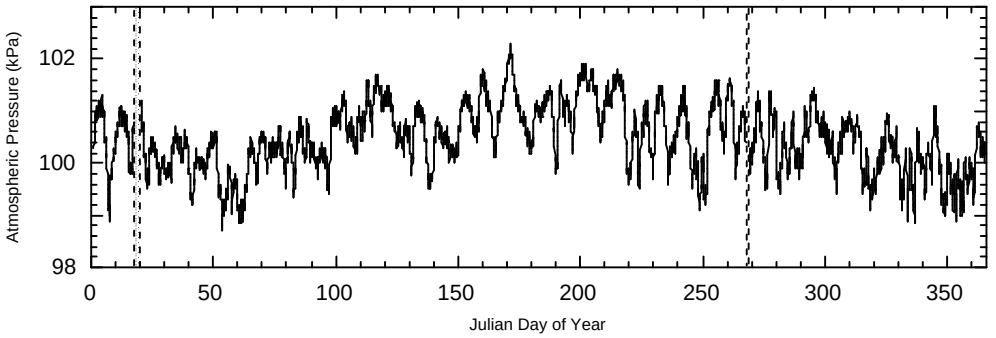


g)

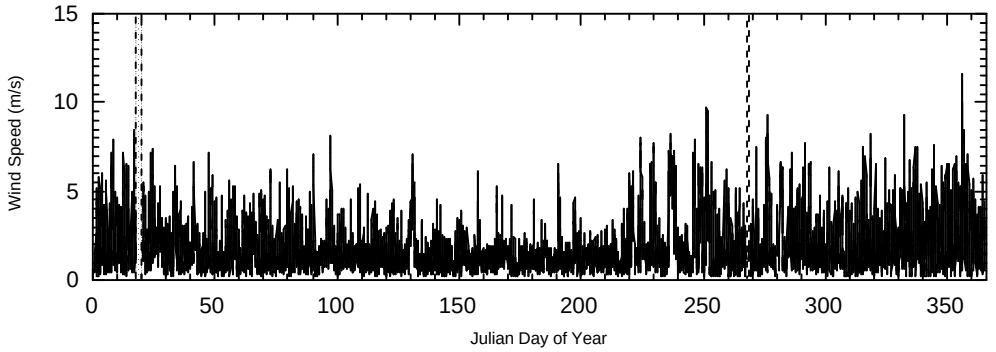


h)

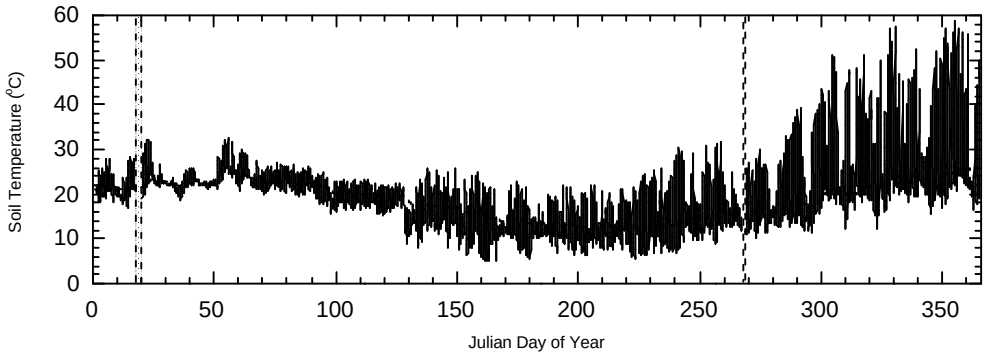
Figure B.2 (con't): Meteorological data collected in the Nerrigundah experimental catchment during 1997. e) Soil heat flux at 2 cm; f) soil heat flux at 12 cm; g) relative humidity; and h) air temperature. Shaded regions between dashed vertical lines indicate periods where data are missing.



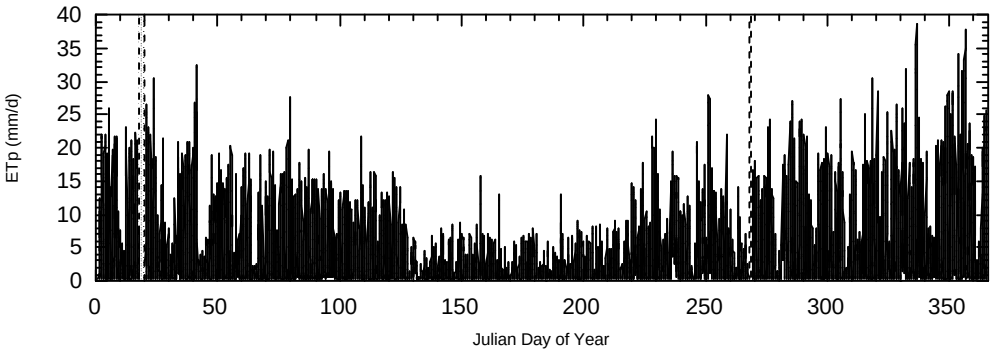
i)



j)

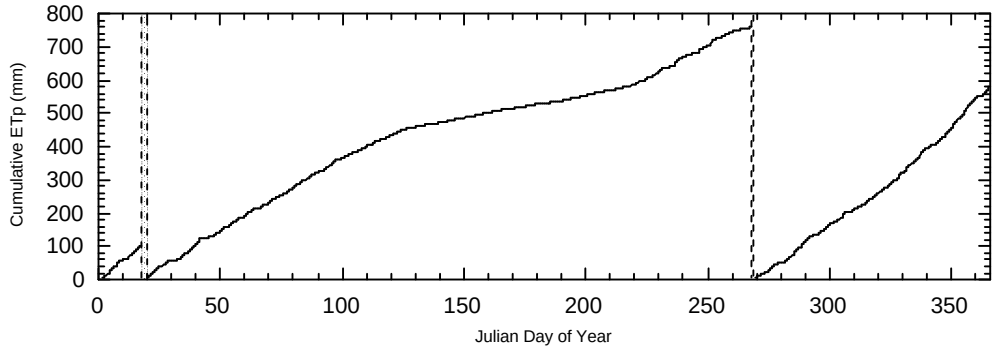


k)

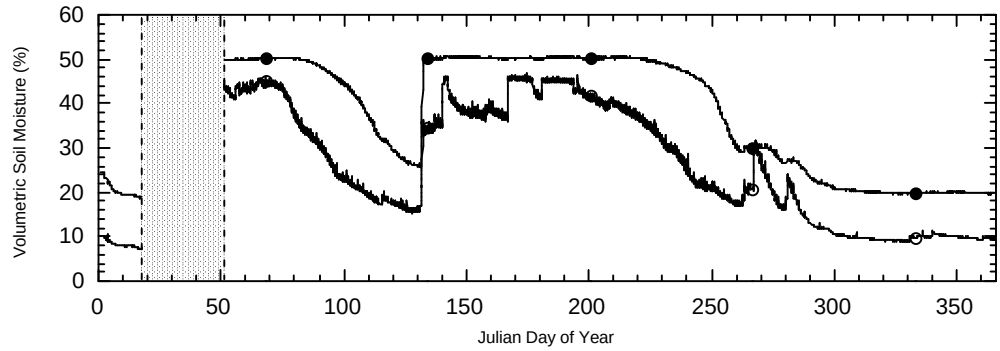


l)

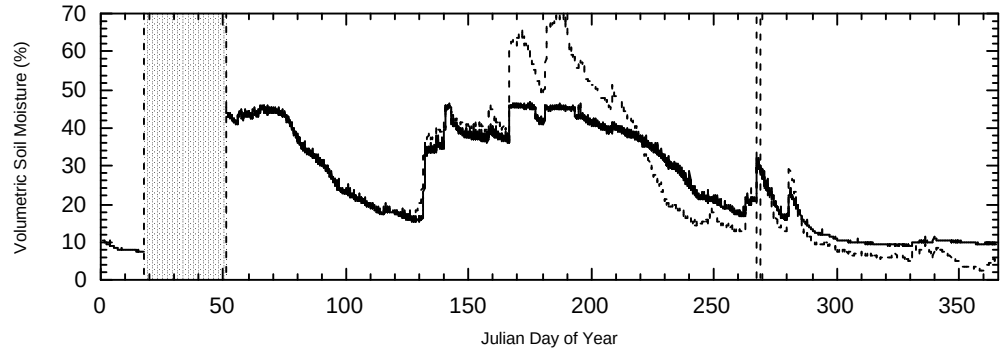
Figure B.2 (con't): Meteorological data collected in the Nerrigundah experimental catchment during 1997. i) Atmospheric pressure; j) wind speed; k) soil temperature at 1 cm (solid line) and 40 cm (dashed line); and l) Penman-Monteith potential evapotranspiration. Shaded regions between dashed vertical lines indicate periods where data are missing.



m)

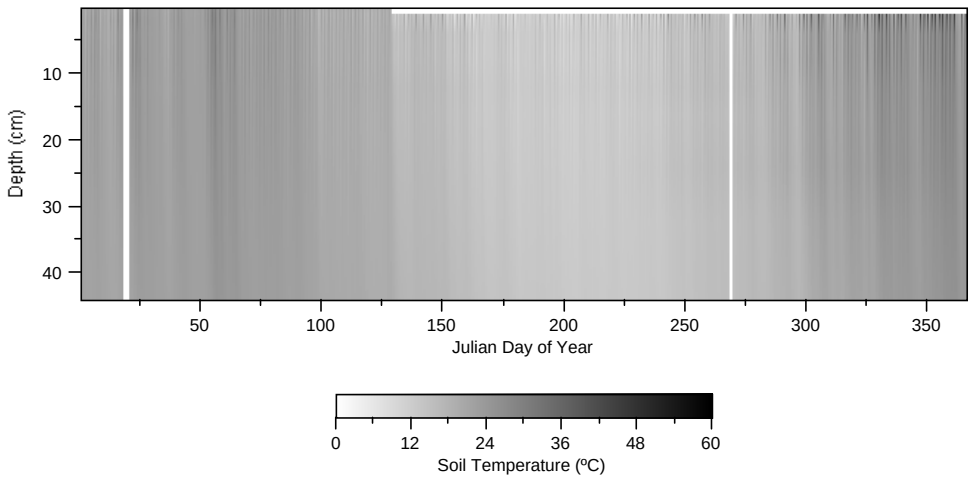


n)

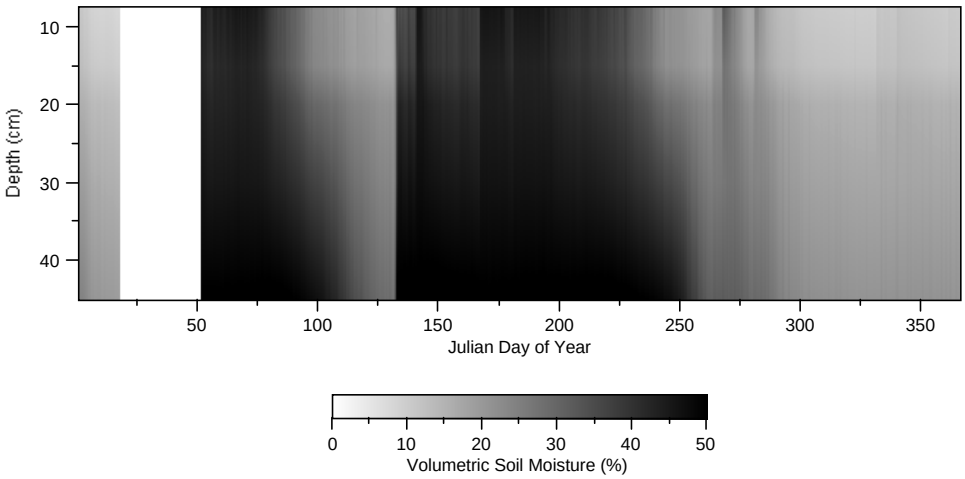


o)

Figure B.2 (con't): Meteorological data collected in the Nerrigundah experimental catchment during 1997. m) Cumulative Penman-Monteith potential evapotranspiration; n) Virrib soil moisture at 10 cm (open symbol) and 40 cm (closed symbol); and o) Virrib soil moisture at 10 cm (solid line) and CS615 soil moisture at 5 cm (dashed line). Shaded regions between dashed vertical lines indicate periods where data are missing.



p)



q)

Figure B.2 (con't): Meteorological data collected in the Nerrigundah experimental catchment during 1997. p) Soil temperature profile; and q) soil moisture profile from Virrib. White regions indicate periods where data are missing.

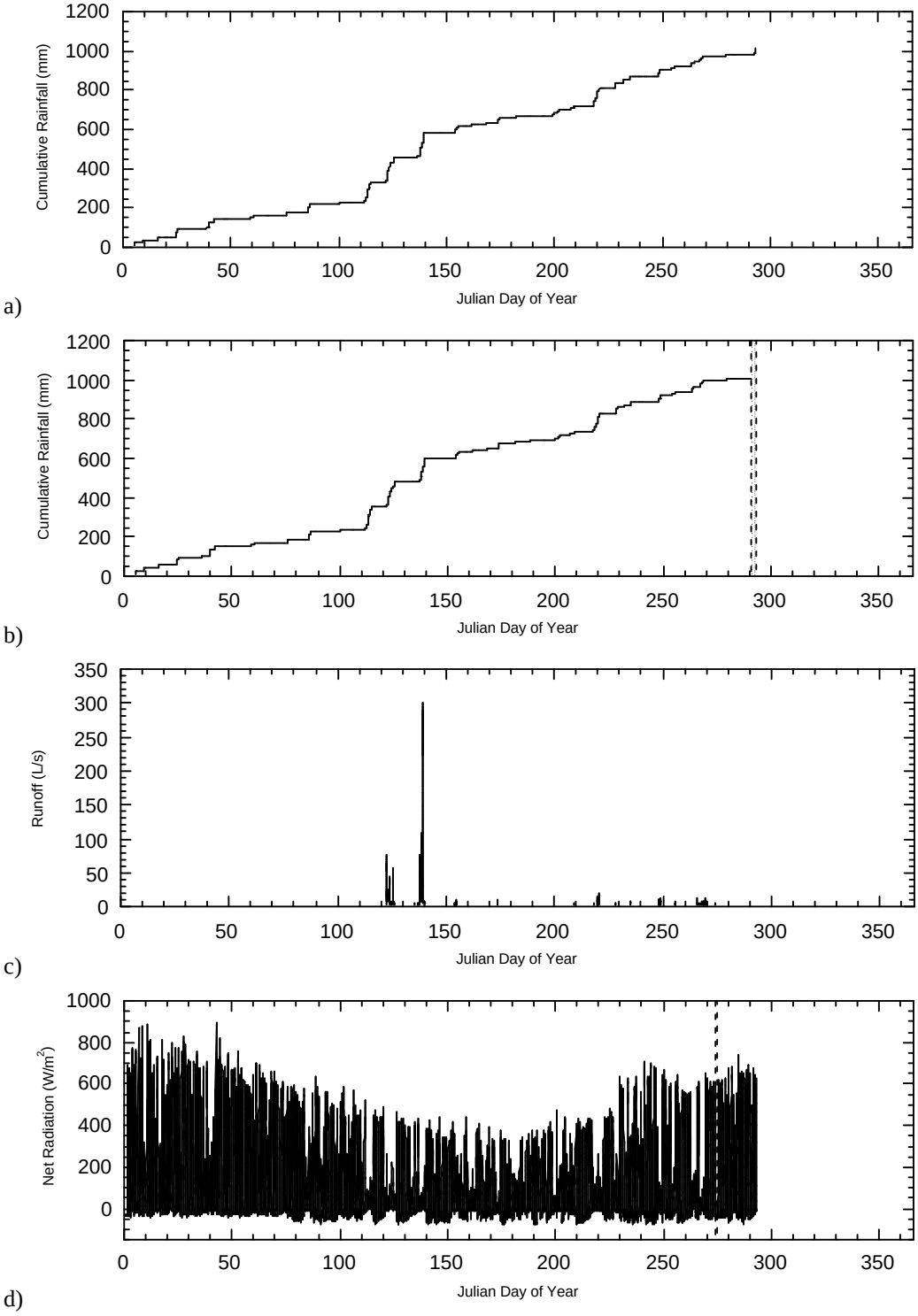
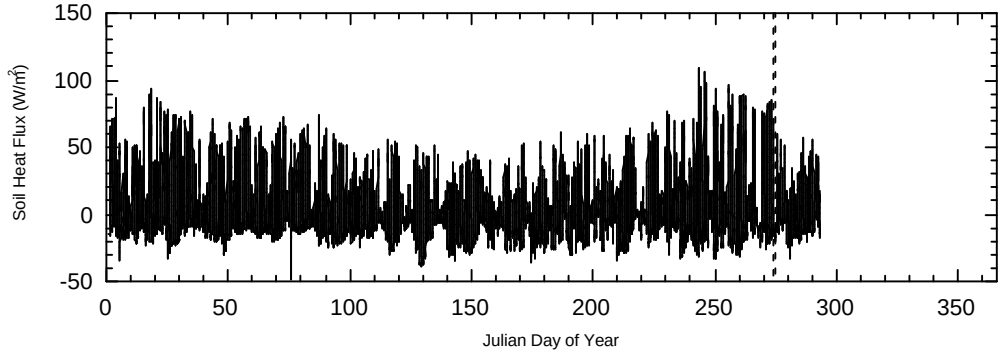
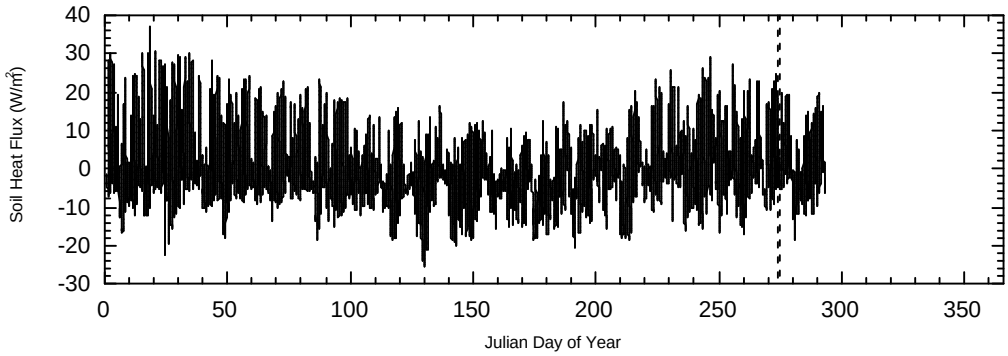


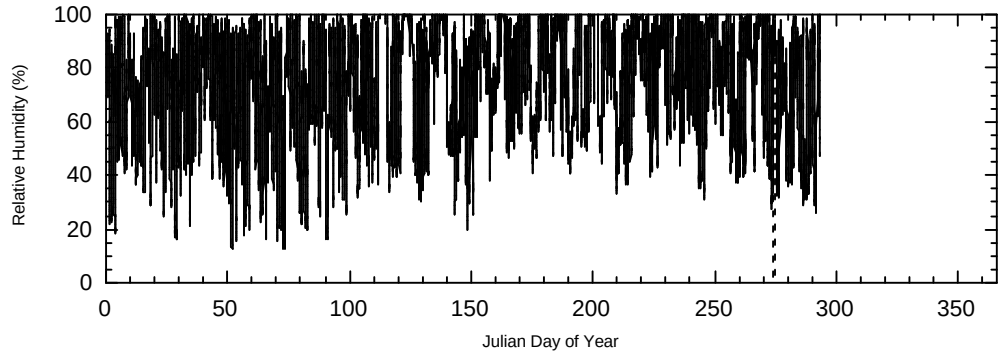
Figure B.3: Meteorological data collected in the Nerrigundah experimental catchment during 1998. a) Pluviometer 1; b) pluviometer 2; c) runoff; and d) net radiation. Shaded regions between dashed vertical lines indicate periods where data are missing.



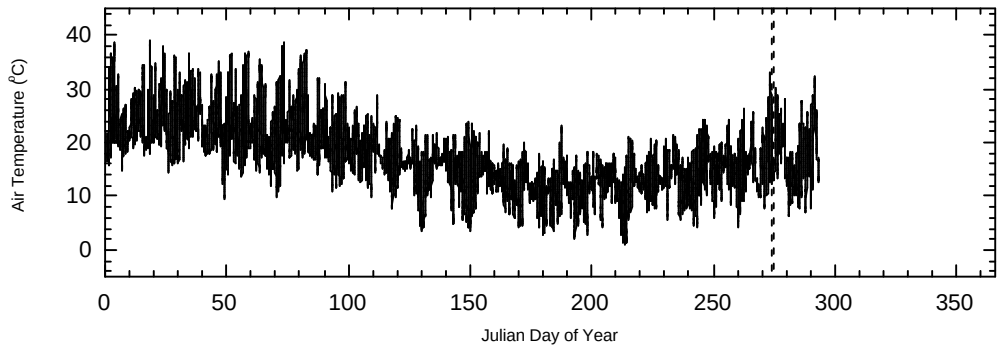
e)



f)

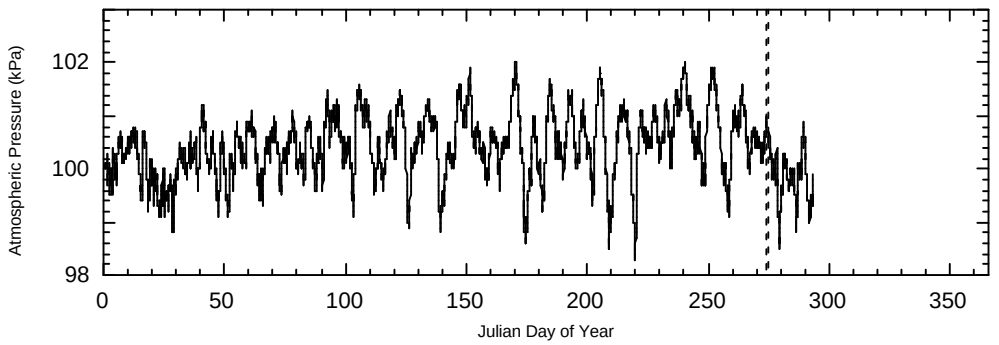


g)

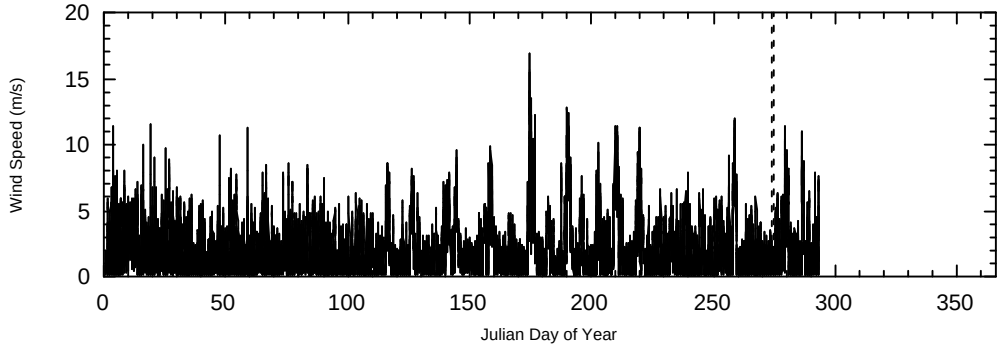


h)

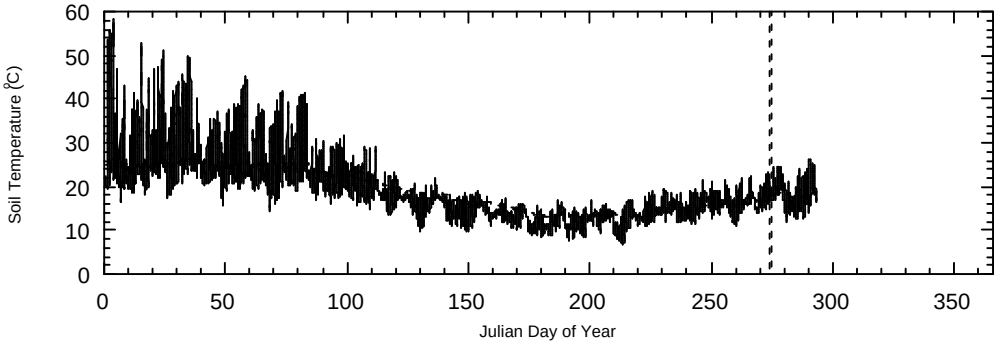
Figure B.3 (con't): Meteorological data collected in the Nerrigundah experimental catchment during 1998. e) Soil heat flux at 2 cm; f) soil heat flux at 12 cm; g) relative humidity; and h) air temperature. Shaded regions between dashed vertical lines indicate periods where data are missing.



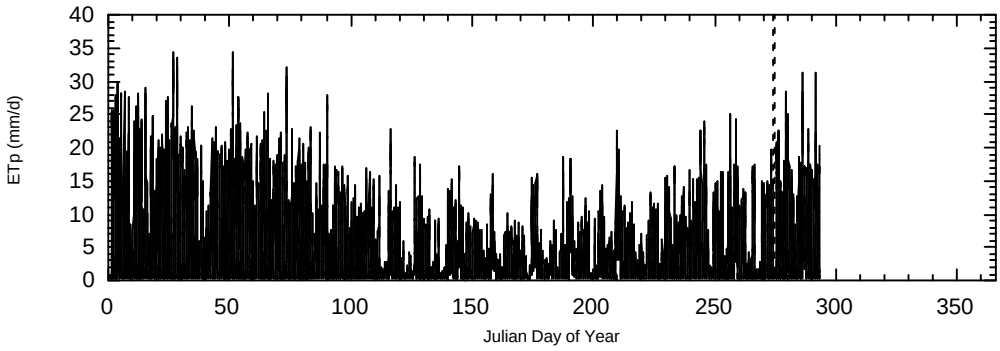
i)



j)

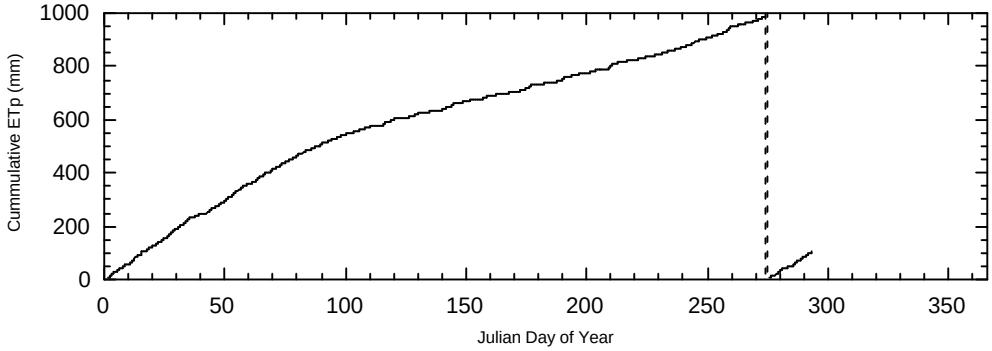


k)

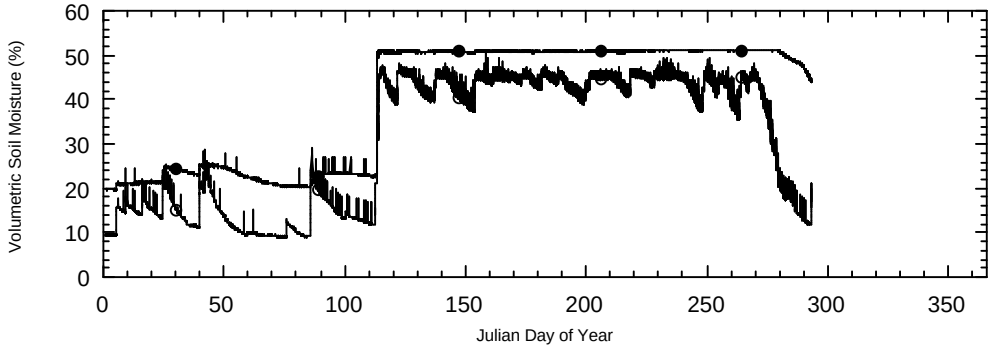


l)

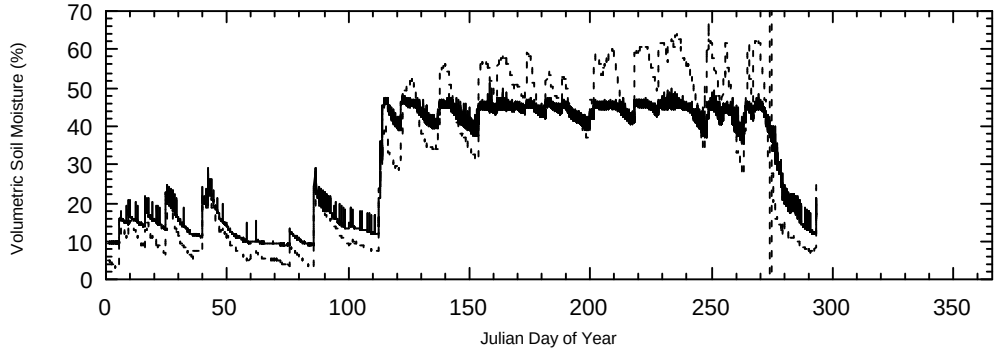
Figure B.3 (con't): Meteorological data collected in the Nerrigundah experimental catchment during 1998. i) Atmospheric pressure; j) wind speed; k) soil temperature at 1 cm (solid line) and 40 cm (dashed line); and l) Penman-Monteith potential evapotranspiration. Shaded regions between dashed vertical lines indicate periods where data are missing.



m)

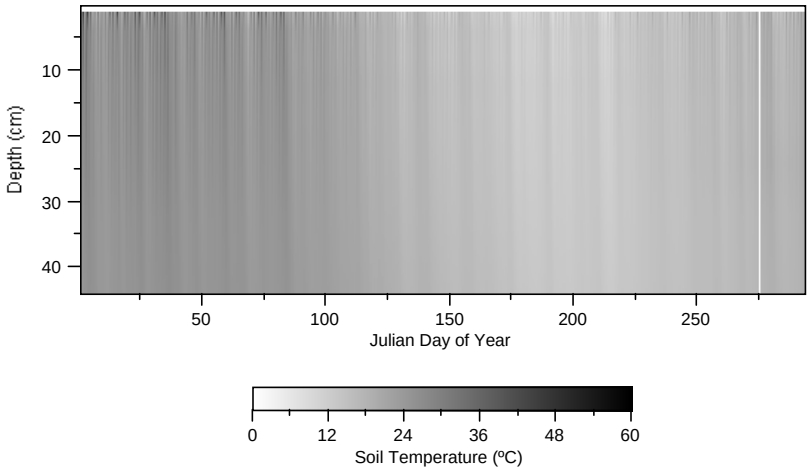


n)

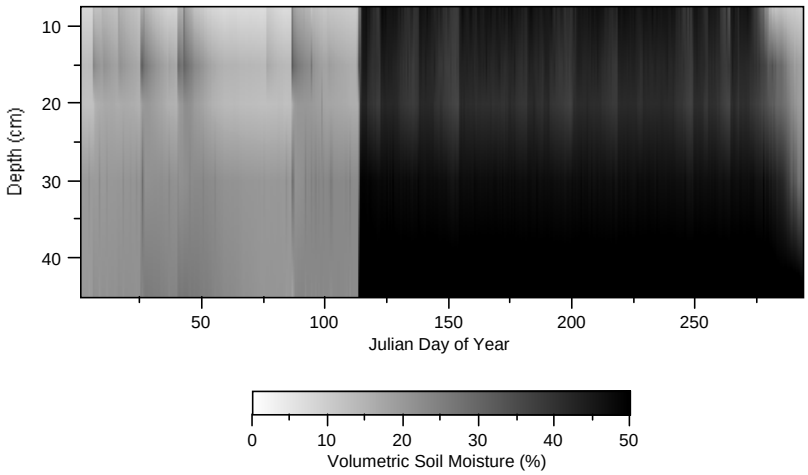


o)

Figure B.3 (con't): Meteorological data collected in the Nerrigundah experimental catchment during 1998. m) Cumulative Penman-Monteith potential evapotranspiration; n) Virrib soil moisture at 10 cm (open symbol) and 40 cm (closed symbol); and o) Virrib soil moisture at 10 cm (solid line) and CS615 soil moisture at 5 cm (dashed line). Shaded regions between dashed vertical lines indicate periods where data are missing.



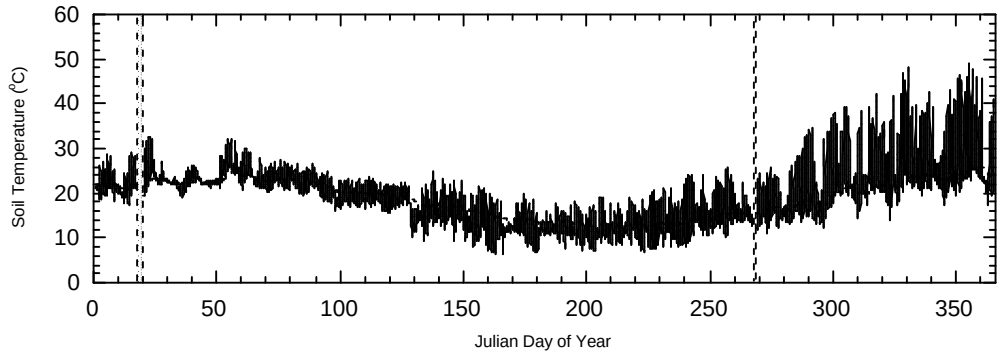
p)



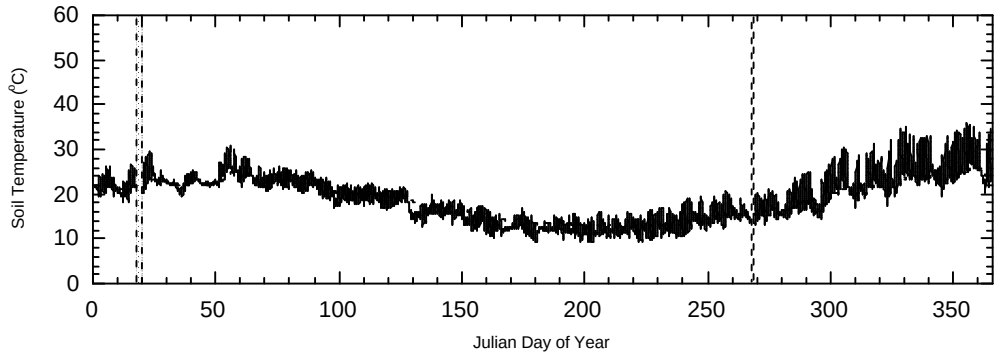
q)

Figure B.3 (con't): Meteorological data collected in the Nerrigundah experimental catchment during 1998. p) Soil temperature profile; and q) soil moisture profile from Virrib. White regions indicate periods where data are missing.

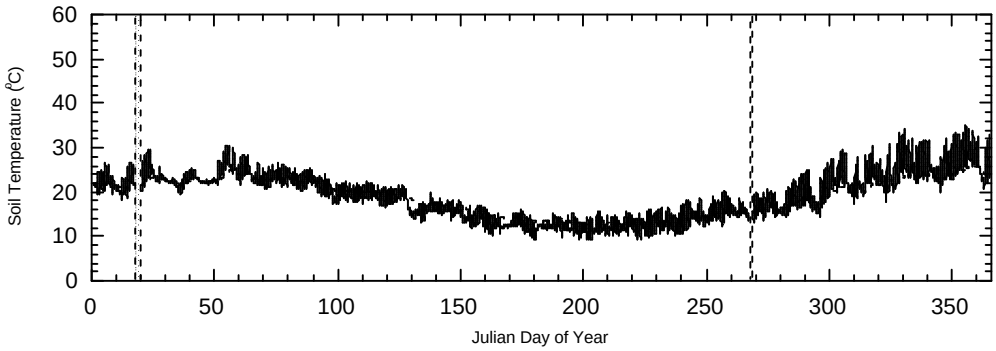
B.3 SOIL TEMPERATURE PROFILE DATA



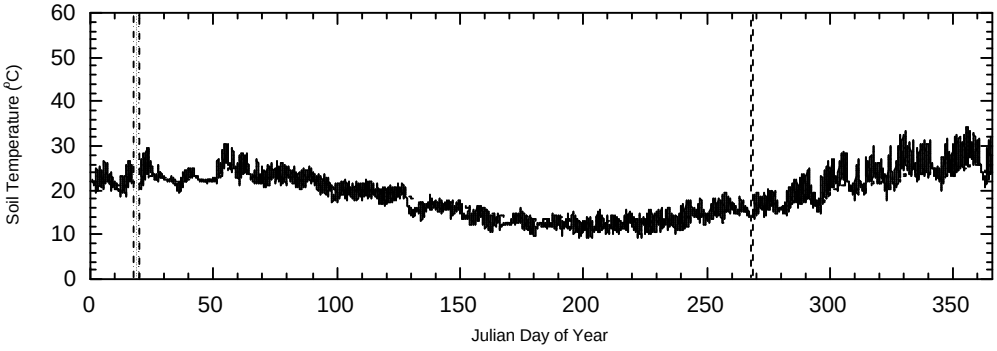
a)



b)

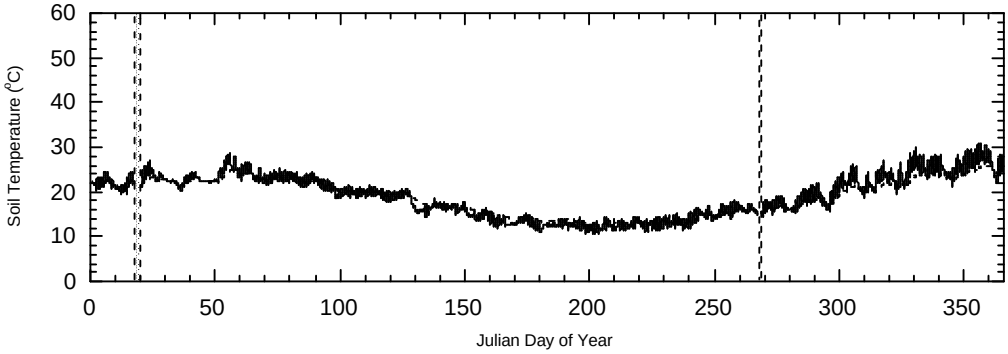


c)

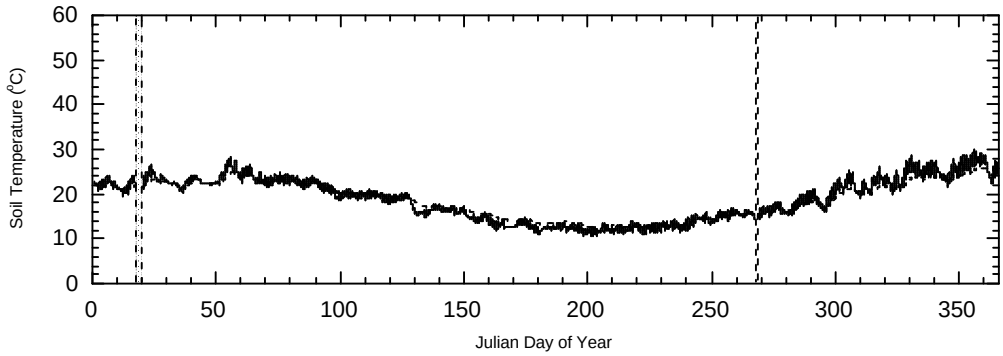


d)

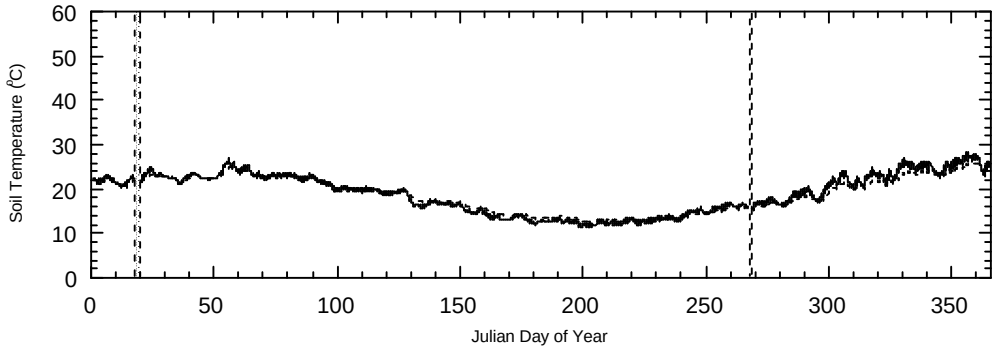
Figure B.4: Comparison of soil temperature at 40 cm (dashed line) with soil temperature at various depths (solid line) for 1997. a) 2 cm; b) 4 cm; c) 6 cm; and d) 8 cm. Shaded regions between dashed vertical lines indicate periods where data are missing.



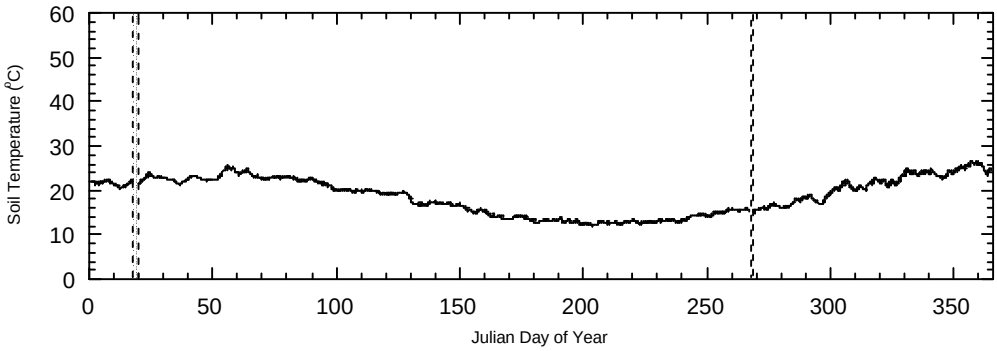
e)



f)

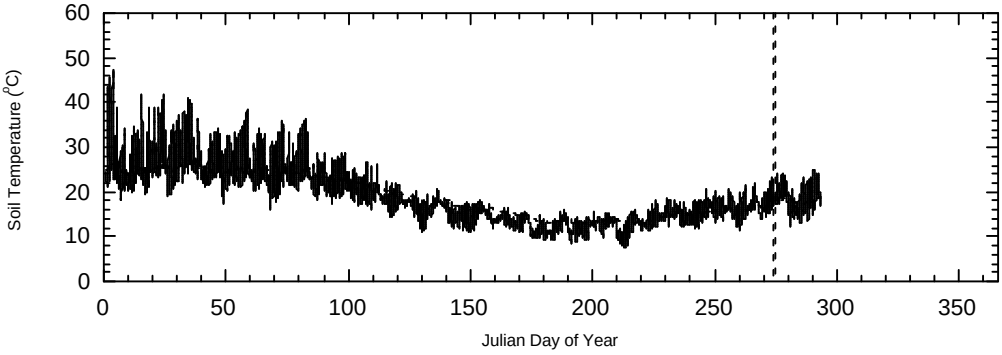


g)

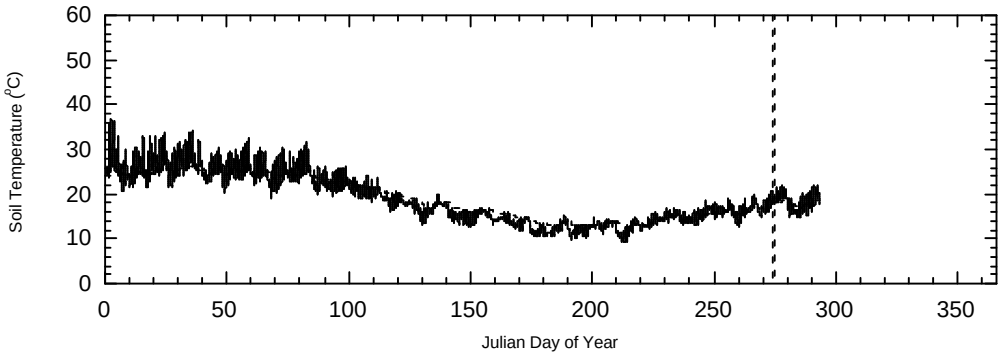


h)

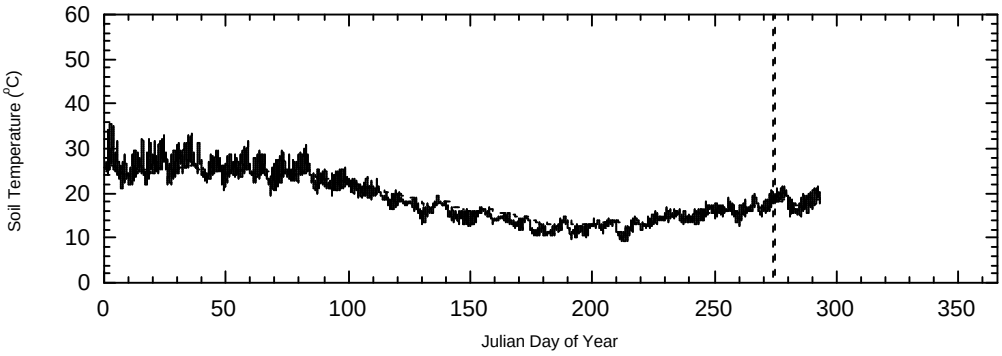
Figure B.4 (con't): Comparison of soil temperature at 40 cm (dashed line) with soil temperature at various depths (solid line) for 1997. e) 12 cm; f) 16 cm; g) 24 cm; and h) 32 cm. Shaded regions between dashed vertical lines indicate periods where data are missing.



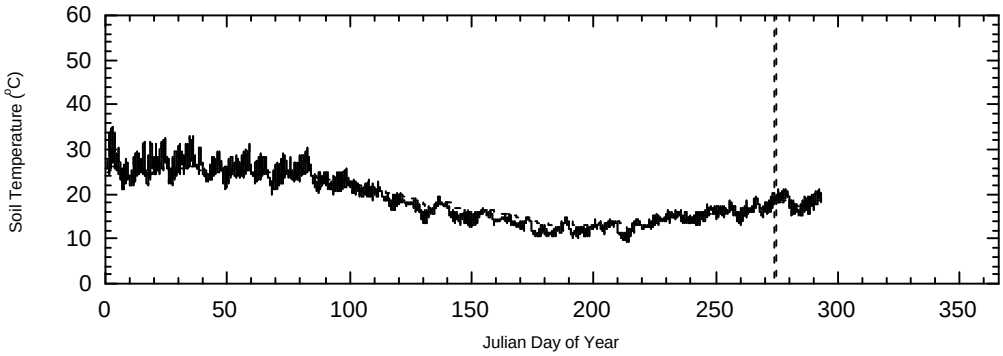
a)



b)

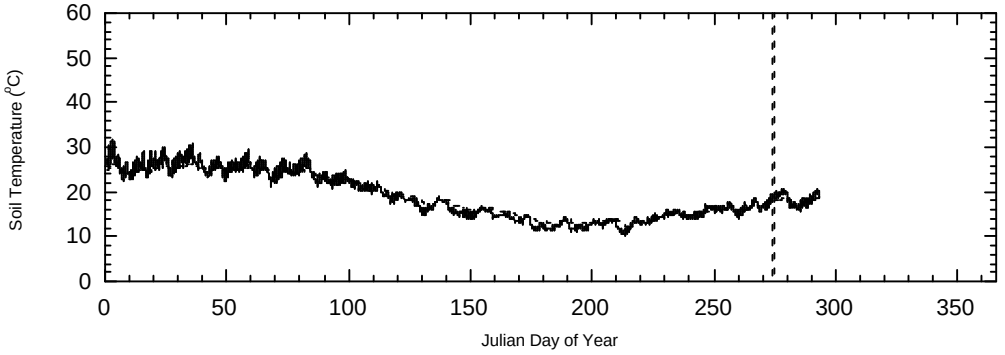


c)

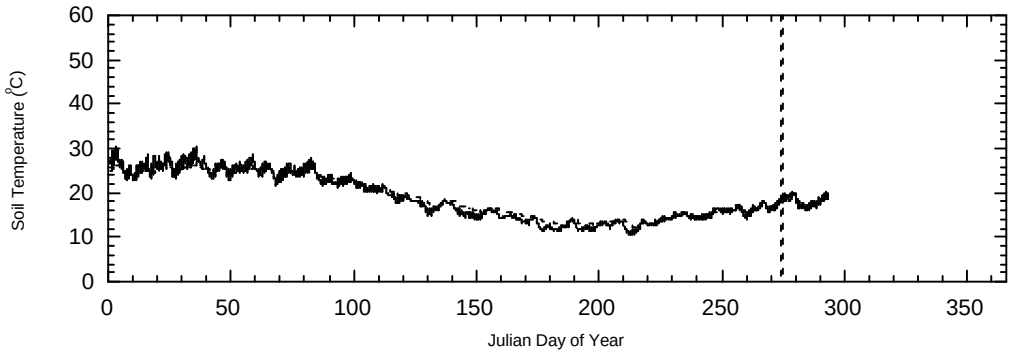


d)

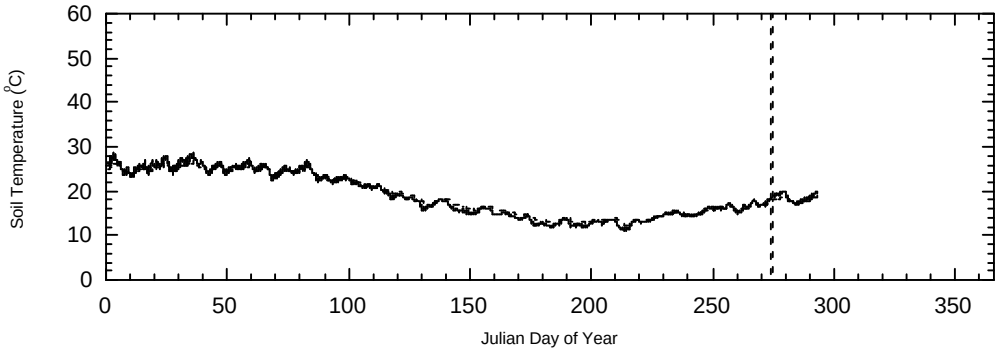
Figure B.5: Comparison of soil temperature at 40 cm (dashed line) with soil temperature at various depths (solid line) for 1998. a) 2 cm; b) 4 cm; c) 6 cm; and d) 8 cm. Shaded regions between dashed vertical lines indicate periods where data are missing.



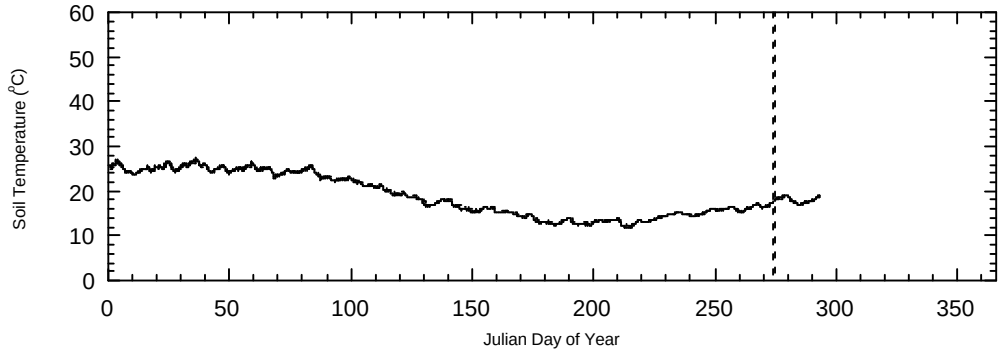
e)



f)



g)



h)

Figure B.5 (con't): Comparison of soil temperature at 40 cm (dashed line) with soil temperature at various depths (solid line) for 1998. e) 12 cm; f) 16 cm; g) 24 cm; and h) 32 cm. Shaded regions between dashed vertical lines indicate periods where data are missing.

B.4 SOIL MOISTURE PROFILE DATA

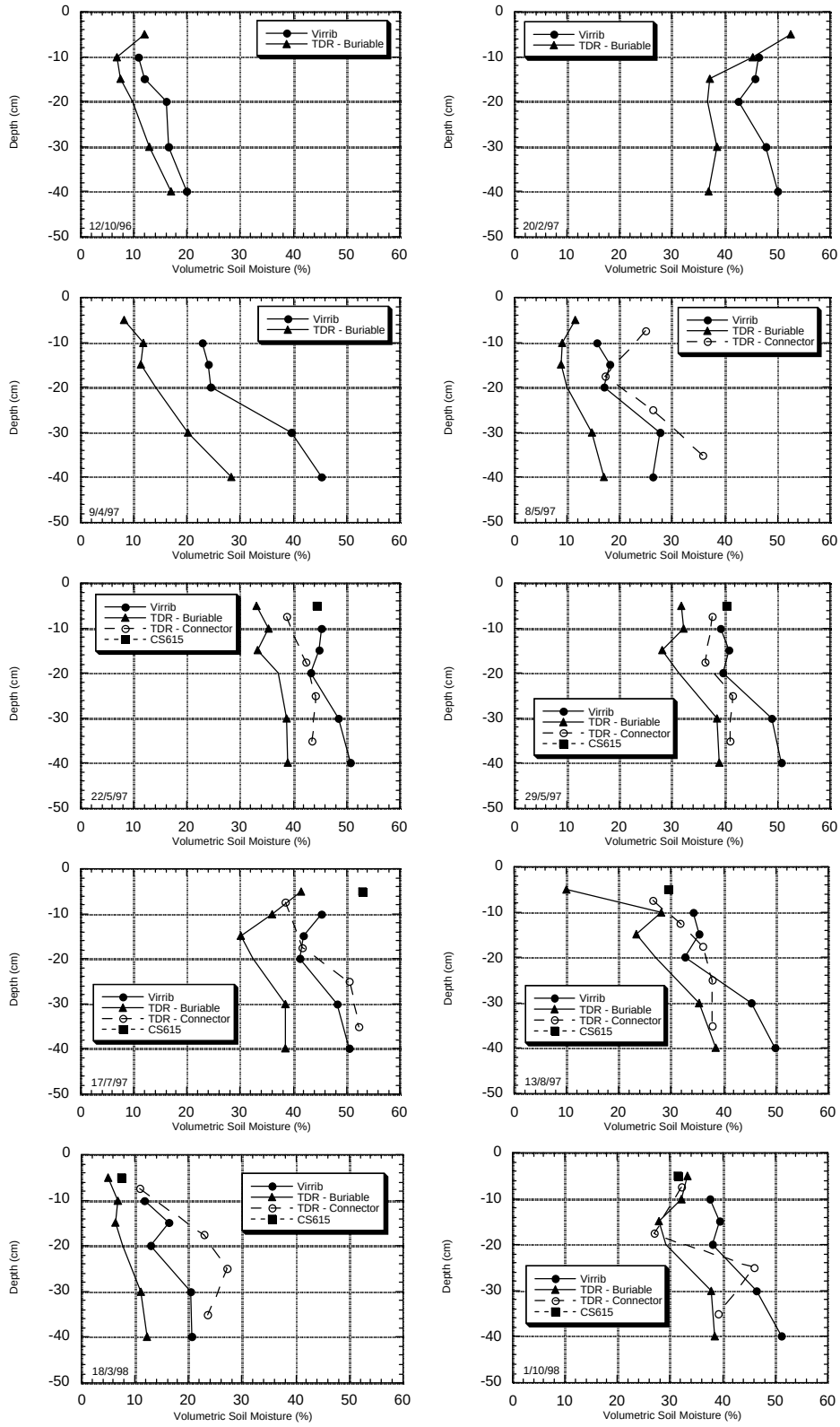


Figure B.6: Comparisons of Virrib, connector TDR, buriable TDR and CS615 reflectometer soil moisture measurements on various days.

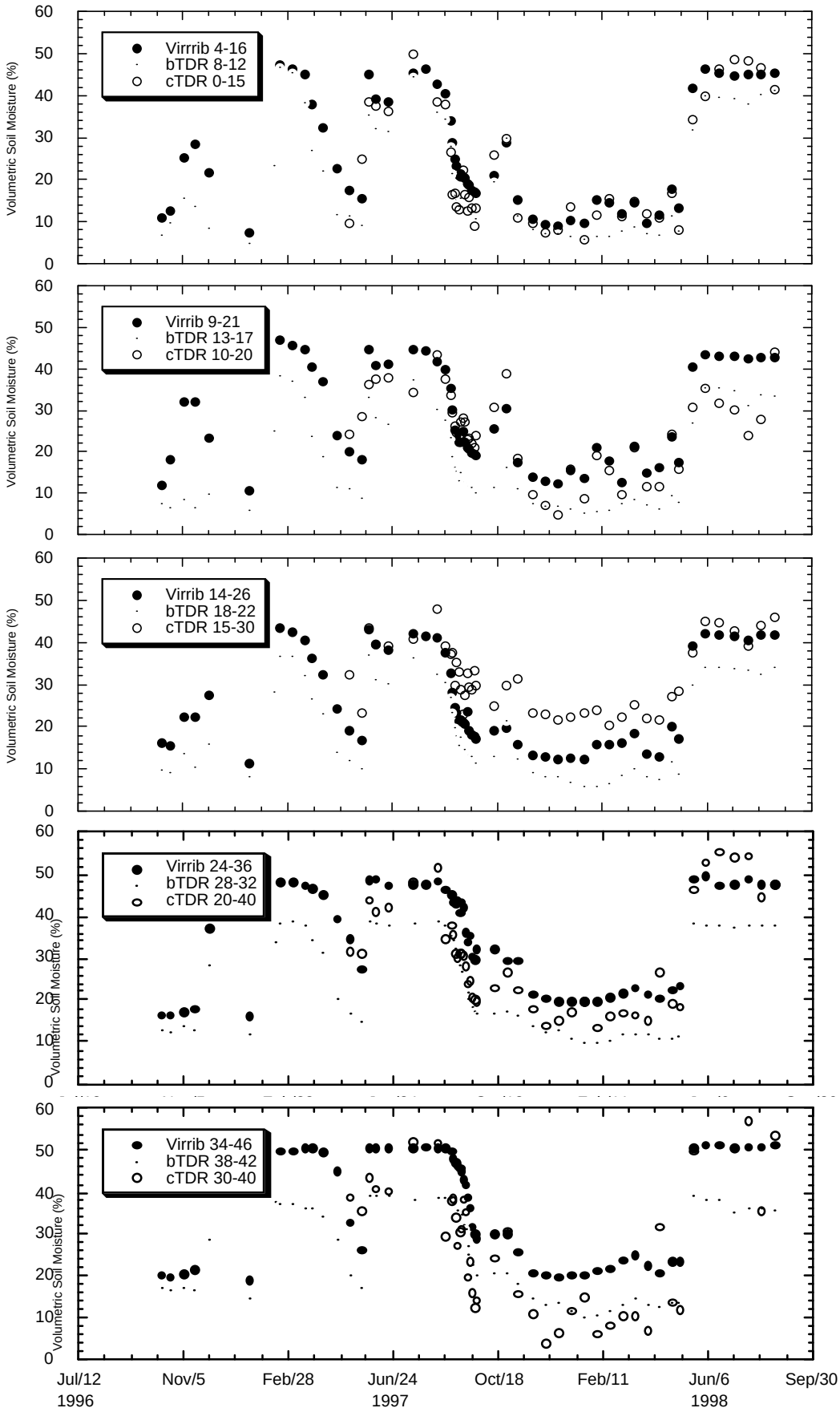


Figure B.7: Comparisons of soil moisture measurements for Virrib, buriable TDR and connector TDR, for soil layer depths indicated (cm).

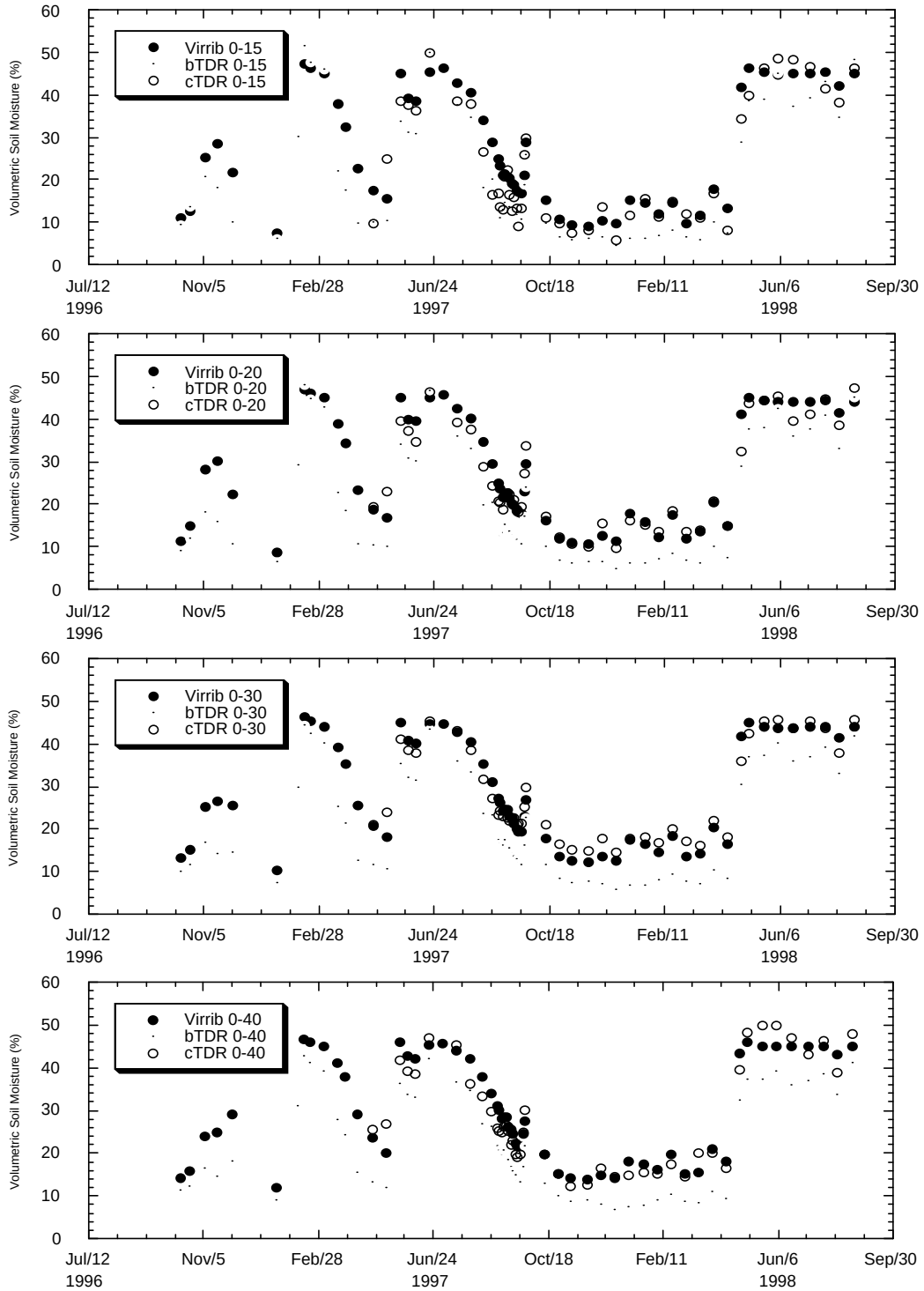


Figure B.8: Comparisons of soil moisture measurements for Virrib, buriable TDR and connector TDR, for soil depths indicated (cm).

B.5 METEOROLOGICAL DATA FOR INTENSIVE FIELD CAMPAIGN

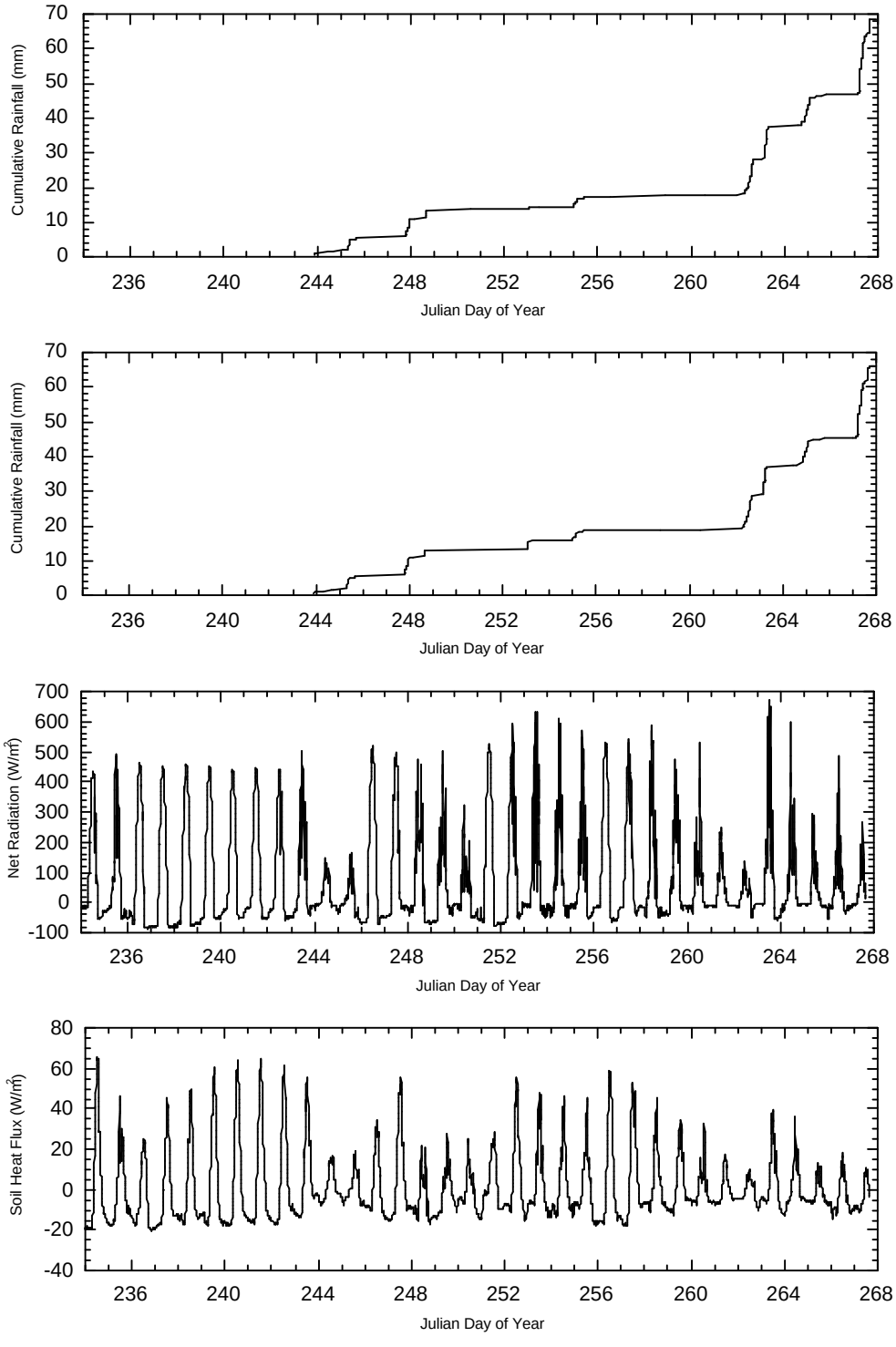
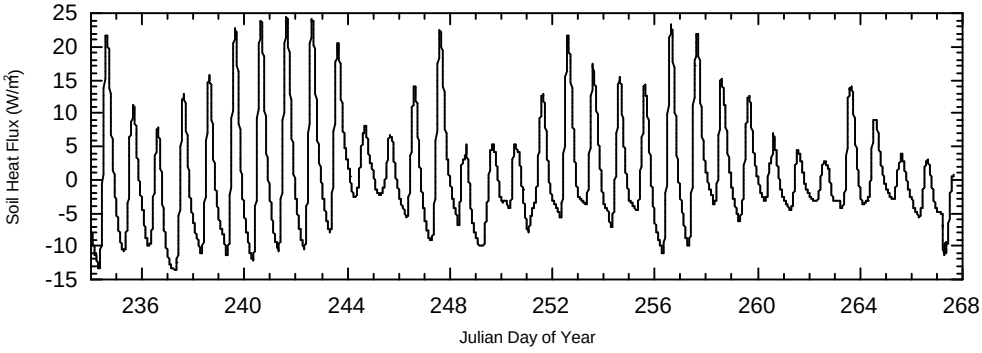
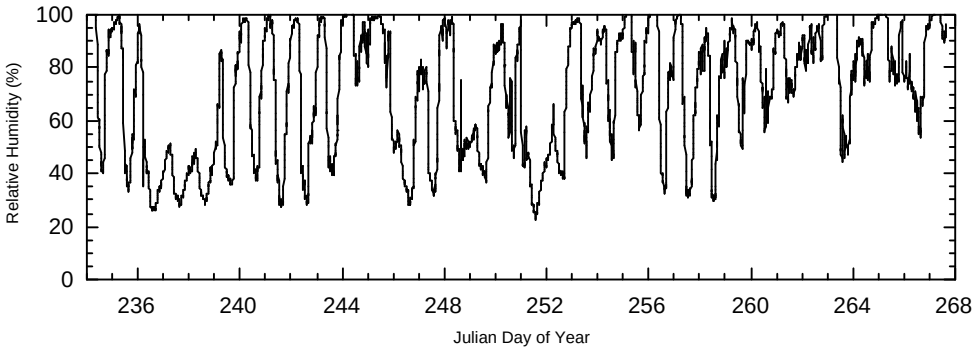


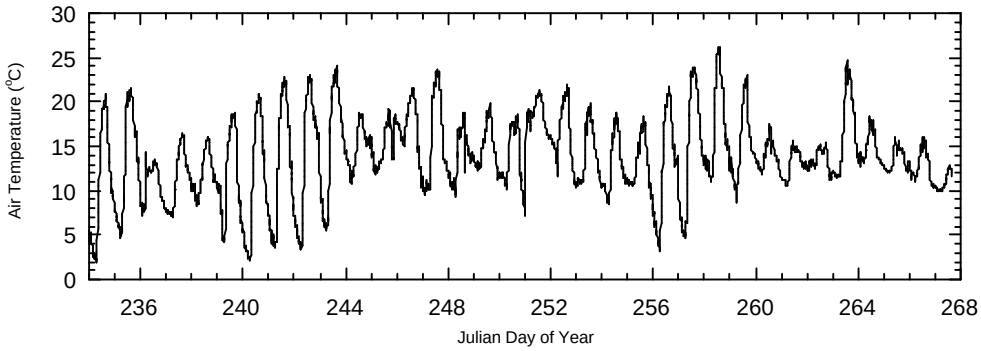
Figure B.9: Meteorological data collected in the Nerrigundah experimental catchment during the intensive field campaign in 1997. a) Pluviometer 1; b) pluviometer 2; c) net radiation; and d) soil heat flux at 2 cm.



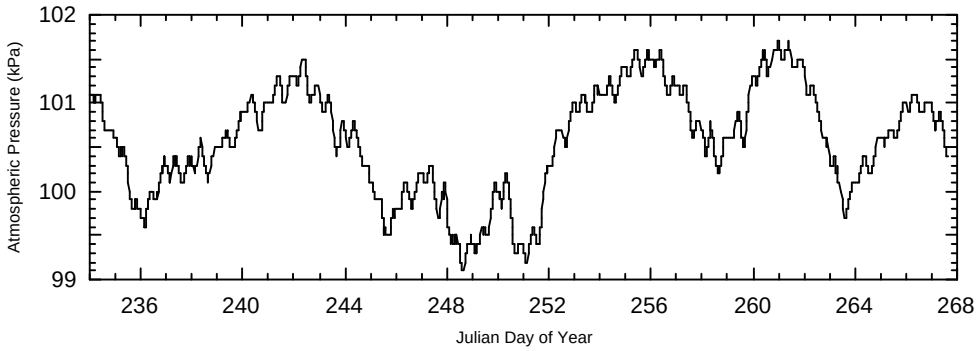
e)



f)

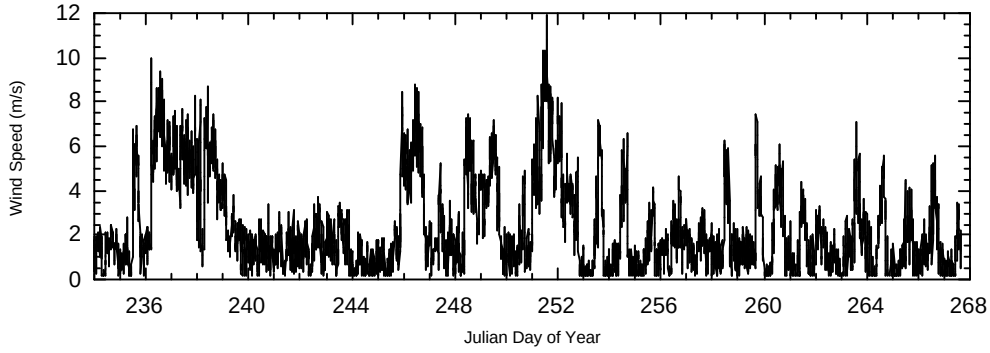


g)

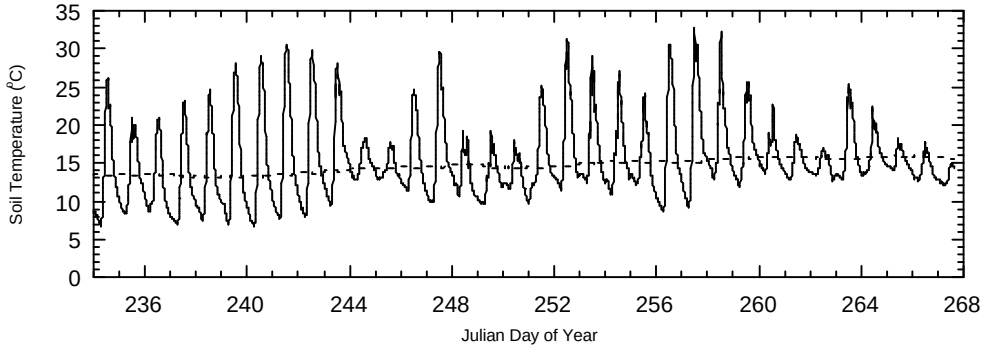


h)

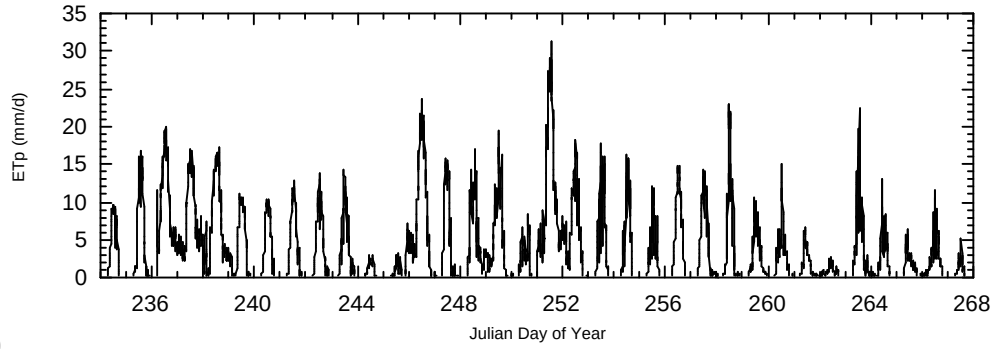
Figure B.9 (con't): Meteorological data collected in the Nerrigundah experimental catchment during the intensive field campaign in 1997. e) Soil heat flux at 12 cm; f) relative humidity; g) air temperature; and h) atmospheric pressure.



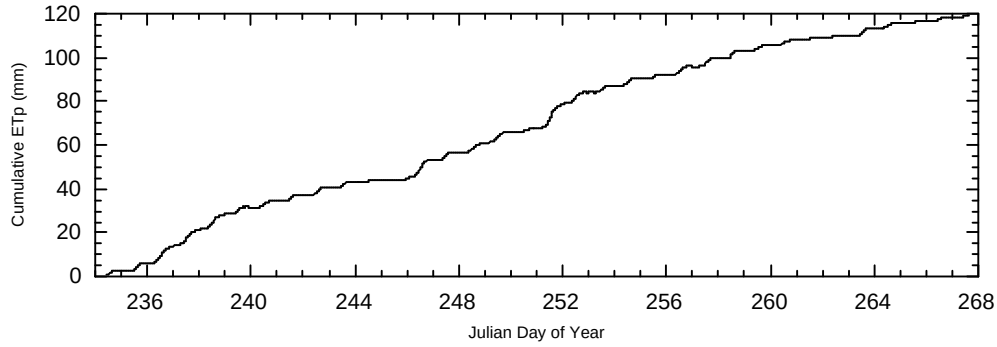
i)



j)

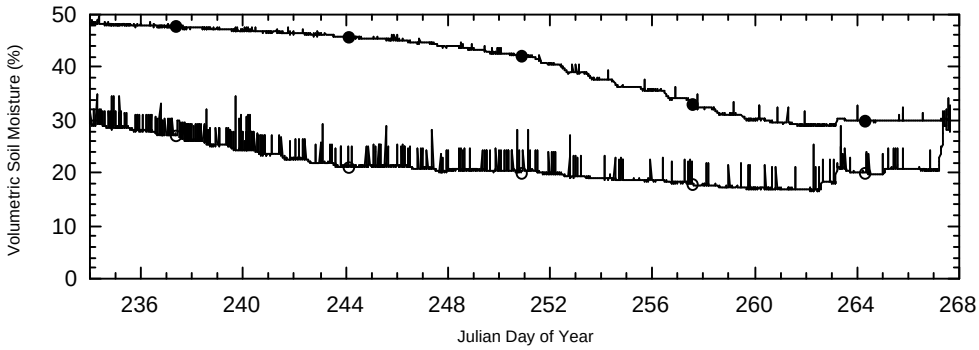


k)

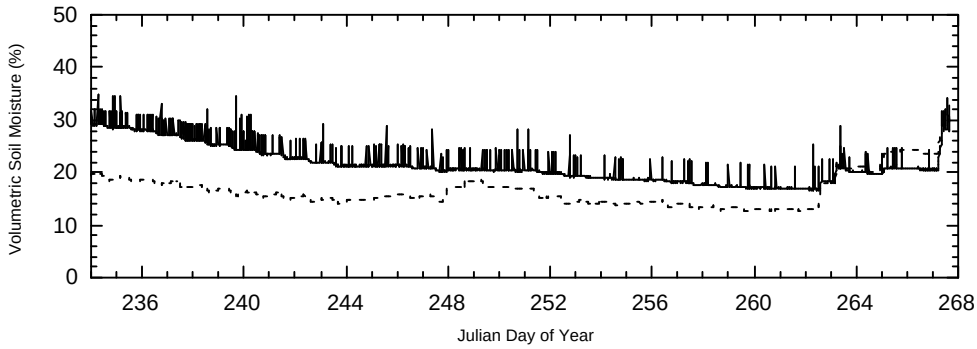


l)

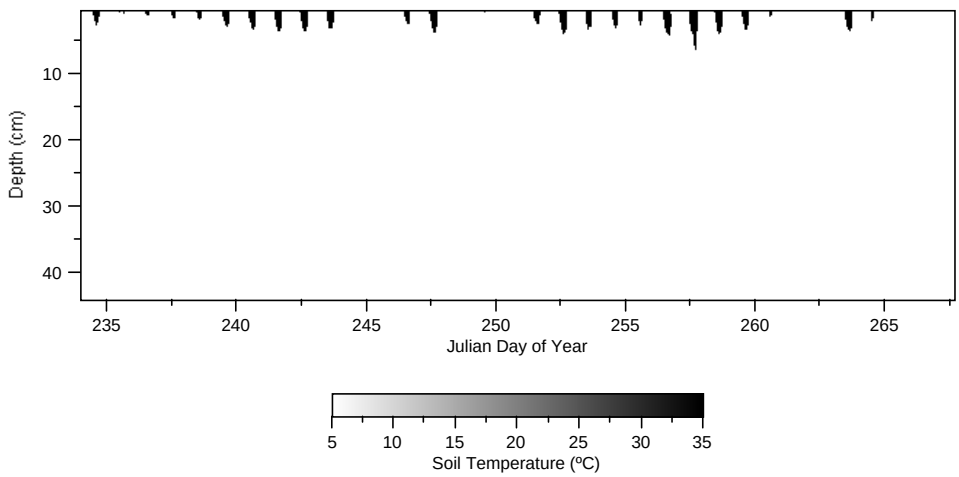
Figure B.9 (con't): Meteorological data collected in the Nerrigundah experimental catchment during the intensive field campaign in 1997. i) Wind speed; j) soil temperature at 1 cm (solid line) and 40 cm (dashed line); k) Penman-Monteith potential evapotranspiration; and l) cumulative Penman-Monteith potential evapotranspiration.



m)

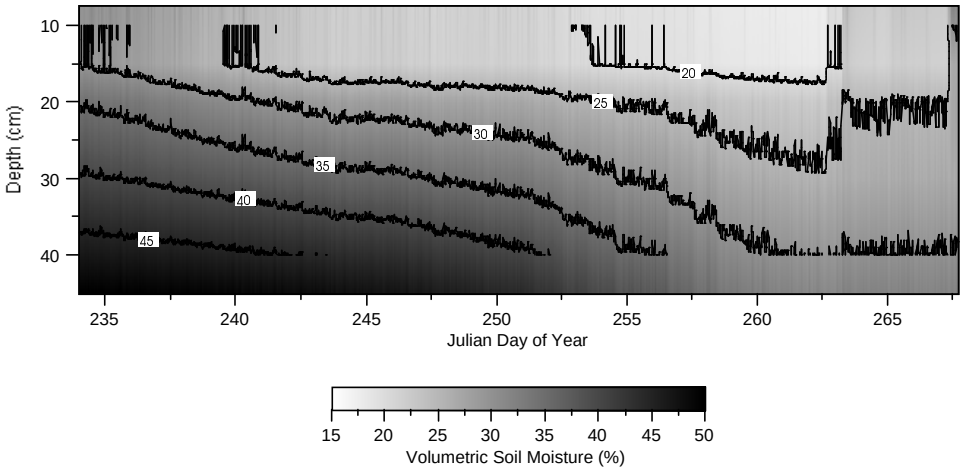


n)

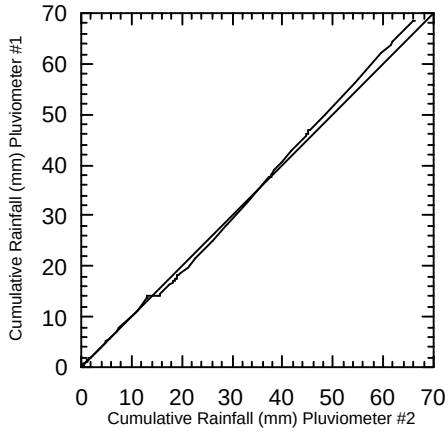


o)

Figure B.9 (con't): Meteorological data collected in the Nerrigundah experimental catchment during the intensive field campaign in 1997. m) Virrib soil moisture at 10 cm (open symbol) and 40 cm (closed symbol); n) Virrib soil moisture at 10 cm (solid line) and CS615 soil moisture at 5 cm (dashed line); and o) soil temperature profile.



p)



q)

Figure B.9 (con't): Meteorological data collected in the Nerrigundah experimental catchment during the intensive field campaign in 1997. p) Soil moisture profile from Virrib; and q) double mass curve for pluviometer 1 and 2.

B.6 SPATIAL DISTRIBUTION OF SOIL MOISTURE PROFILES

Table B.2: Australian Map Grid (AMG) coordinates of soil moisture profile measurement sites and total depth of soil.

Profile	***Total Depth (mm)***	***AMG Easting (m)***	***AMG Northing (m)***	***AHD Elevation (m)***
1	450	378 931.6	6 423 427.1	124.81
2	450	378 942.2	6 423 483.1	124.33
3	320	379 005.4	6 423 471.0	119.92
4	450	379 023.1	6 423 513.6	121.32
5	350	379 115.1	6 423 538.5	115.61
6	320	379 004.8	6 423 390.8	119.20
7	520	379 110.6	6 423 347.2	108.03
8	1300	379 164.7	6 423 405.9	97.74
9	850	379 267.9	6 423 321.1	88.30
10	400	379 230.3	6 423 435.9	102.50
11	520	379 181.5	6 423 443.6	104.49
12	320	379 131.4	6 423 451.4	105.96
13	340	379 069.6	6 423 461.1	112.62

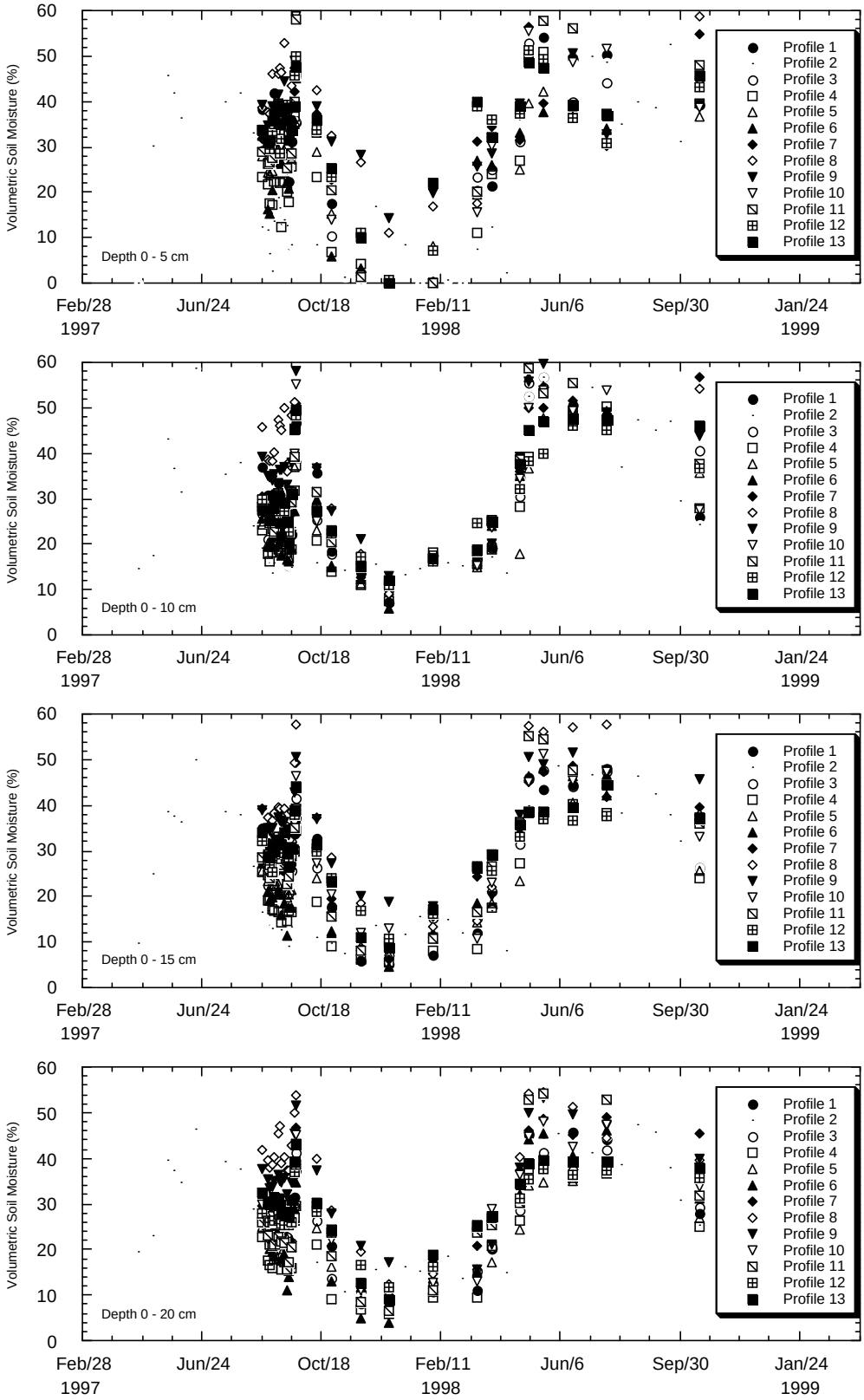


Figure B.10: Soil moisture profile measurements made across the catchment at soil moisture profile locations using connector TDR probes of length 5, 10, 15 and 20 cm.

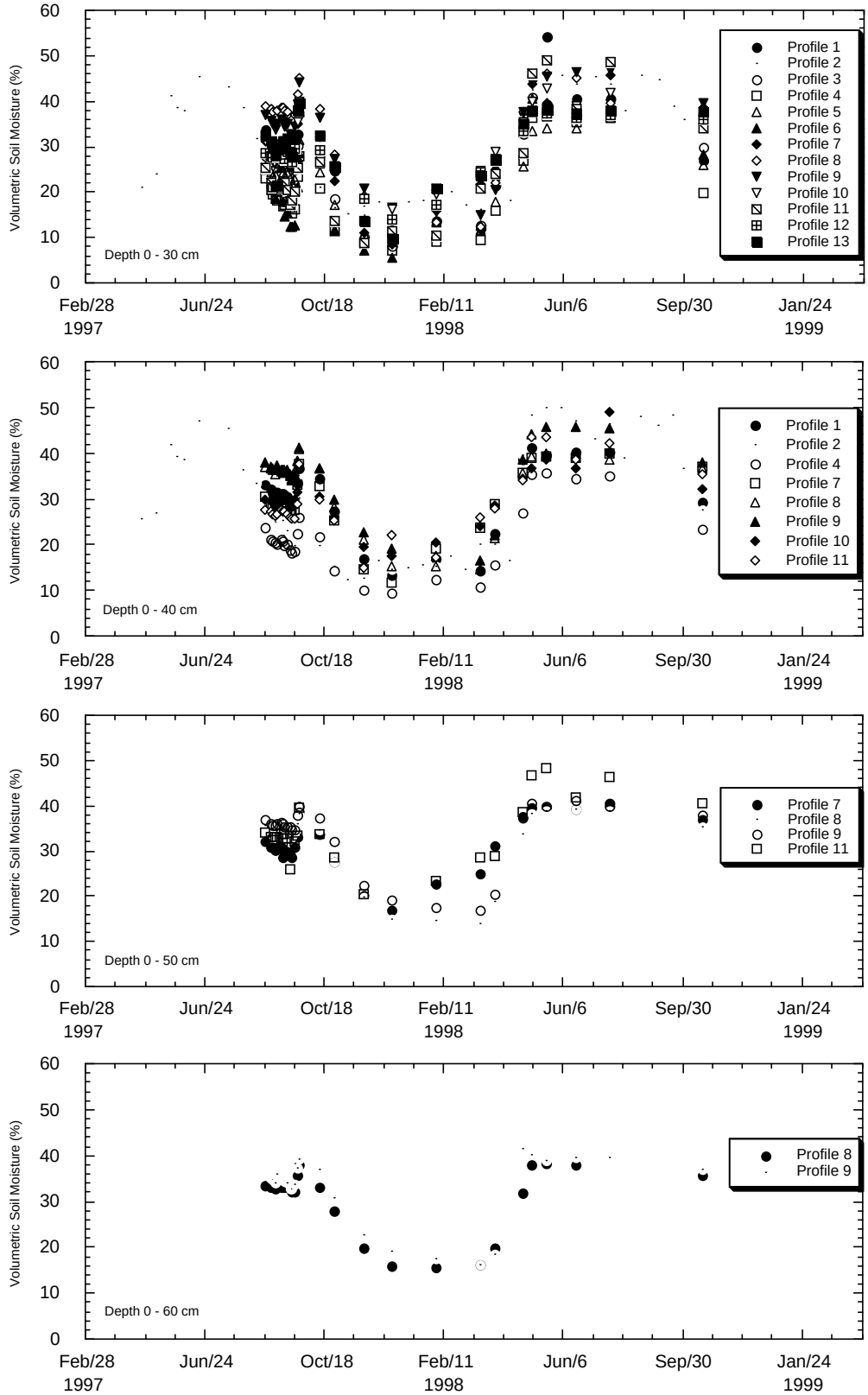


Figure B.10 (con't): Soil moisture profile measurements made across the catchment at soil moisture profile locations using connector TDR probes of length 30, 40, 50 and 60 cm.

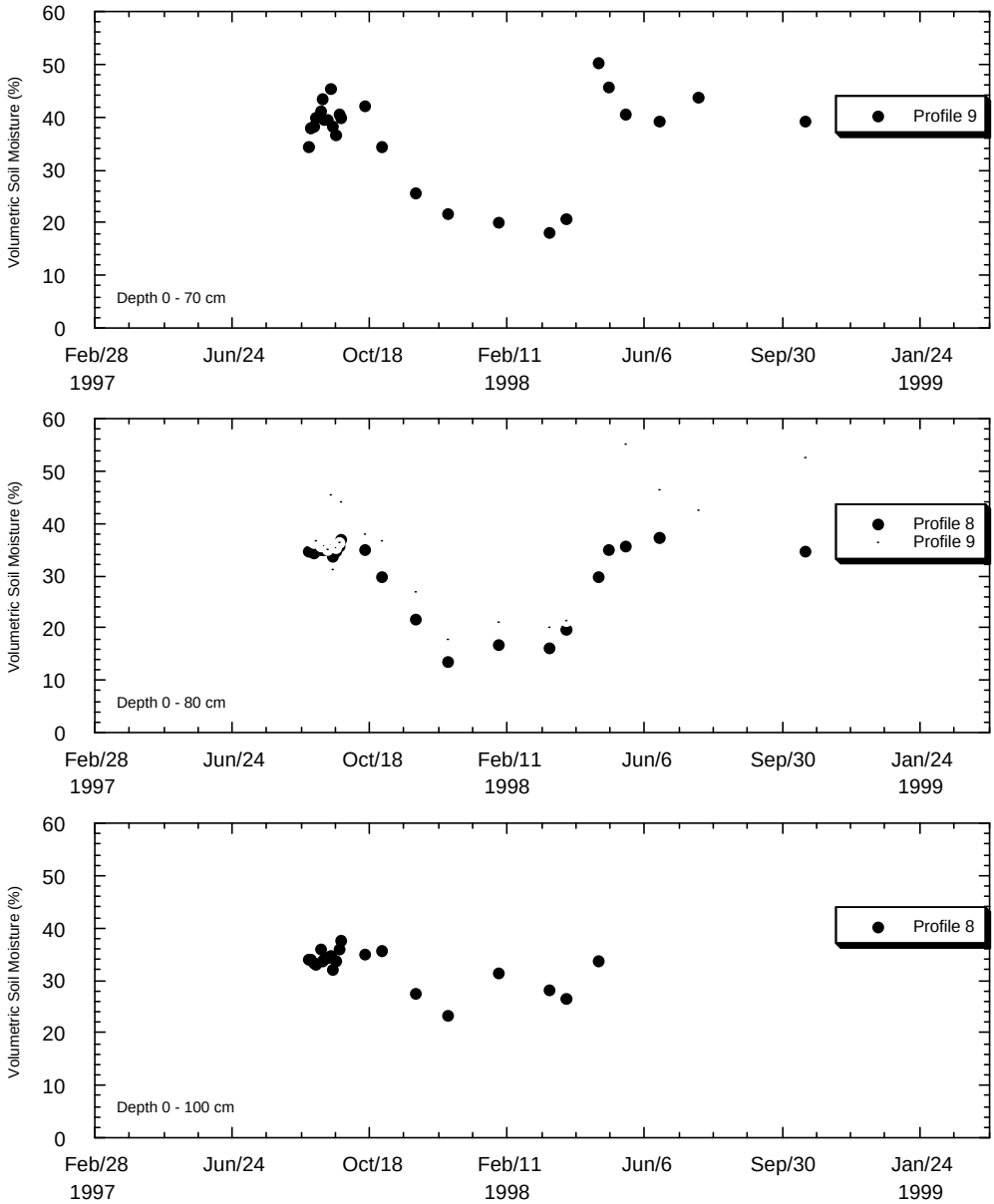


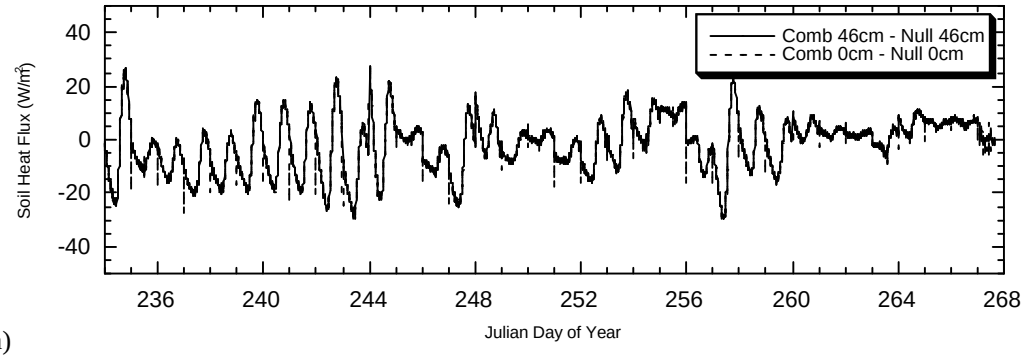
Figure B.10 (con't): Soil moisture profile measurements made across the catchment at soil moisture profile locations using connector TDR probes of length 70, 80 and 100 cm.

B.7 ERS-2 DATA

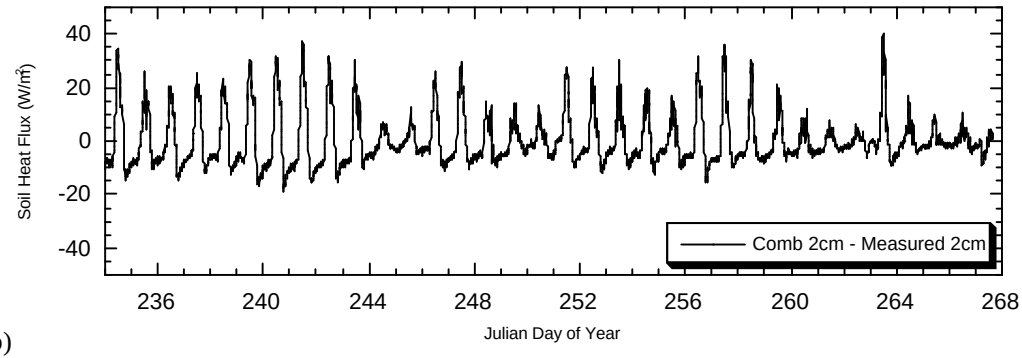
Figure B.11: Quick-look image of ERS-2 data collected on Julian day 249.

Figure B.12: Quick-look image of ERS-2 data collected on Julian day 265.

B.8 SOIL HEAT FLUX



a)



b)

Figure B.13: a) Difference between soil heat flux estimates at surface and base of soil column; b) Difference between soil heat flux plate measurement and combination method soil heat flux estimate at 2 cm.

B.9 SOIL CHARACTERISATION

Table B.3: Australian Map Grid (AMG) Coordinates of soil cores obtained for laboratory analysis and total depth of soil.

Profile	***Total Depth (mm)***	***AMG Easting (m)***	***AMG Northing (m)***	***AHD Elevation (m)***
1	422	378 936.6	6 423 420.9	124.39
2	450	378 941.5	6 423 486.5	124.26
3	303	378 973.5	6 423 432.6	122.43
4	290	378 989.3	6 423 477.7	121.86
5	200	379 012.1	6 423 370.1	117.78
6	360	379 015.5	6 423 446.3	117.15
7	200	379 080.8	6 423 534.7	117.64
8	570	379 080.0	6 423 327.3	109.96
9	370	379 085.3	6 423 393.9	110.48
10	485	379 123.3	6 423 472.9	109.87
11	550	379 174.7	6 423 496.0	109.79
12	420	379 178.2	6 423 304.0	100.40
13	370	379 144.4	6 423 408.0	100.30
14	880	379 151.7	6 423 411.5	99.08
15	850	379 144.2	6 423 421.7	100.46
16	430	379 244.0	6 423 420.7	100.70
17	>1000	379 263.9	6 423 320.9	88.77
18	1090	379 266.6	6 423 322.8	88.18
19	550	379 268.0	6 423 330.0	89.70

Table B.4: Australian Map Grid (AMG) coordinates of total soil depth by probing on a grid.

Total Depth (mm)	***AMG Easting (m)***	***AMG Northing (m)***
440	378 982.3	6 423 444.2
430	378 942.8	6 423 450.3
450	378 976.3	6 423 404.7
260	378 988.4	6 423 483.7
580	378 948.9	6 423 489.8
340	378 994.5	6 423 523.3
290	379 028.0	6 423 477.7
350	379 067.5	6 423 471.6
440	379 107.0	6 423 465.5
490	379 146.6	6 423 459.4
600	379 186.1	6 423 453.4
590	379 225.6	6 423 447.3
400	379 034.0	6 423 517.2
660	379 073.6	6 423 511.1
400	379 113.1	6 423 505.1
660	379 152.6	6 423 499.0
480	379 192.2	6 423 492.9
270	379 021.9	6 423 438.1
170	379 061.4	6 423 432.1
300	379 101.0	6 423 426.0
1040	379 140.5	6 423 419.9
780	379 180.0	6 423 413.8
600	379 219.6	6 423 407.8
470	379 259.1	6 423 401.7
420	379 015.8	6 423 398.6
300	379 055.3	6 423 392.5
330	379 094.9	6 423 386.4
610	379 134.4	6 423 380.4
480	379 173.9	6 423 374.3
570	379 213.5	6 423 368.2
490	379 253.0	6 423 362.2
260	379 049.3	6 423 353.0
430	379 088.8	6 423 346.9
380	379 128.3	6 423 340.8
430	379 167.9	6 423 334.8
450	379 207.4	6 423 328.7
690	379 246.9	6 423 322.6
380	379 024.9	6 423 457.9
360	378 985.4	6 423 464.0
360	379 041.6	6 423 435.1
600	379 081.2	6 423 429.0
670	379 196.8	6 423 391.0
990	379 230.2	6 423 345.4
790	379 266.7	6 423 319.6

Table B.5: Horizon thickness, bulk density, porosity and organic matter content of soil horizons of soil profile samples.

Profile	***Horizon***	***Thickness (mm)***	***Bulk Density (g cm^{-3})***	***Porosity (% v/v)***	***Organic Matter (% v/v)***
1	A1	58	1.00	62.1	6.7
	A2	104	1.32	50.3	4.7
	B1	100	1.42	46.5	2.3
	B2	160	1.61	39.2	3.4
2	A1	40	0.94	64.4	7.8
	A2	55	1.56	41.1	4.7
	B1	95	1.40	47.1	2.1
	B2	260	1.79	32.3	3.3
3	A1	28	1.13	57.3	5.7
	A2	50			
	B1	105	1.39	47.5	3.3
	B2	120	1.60	39.7	3.7
4	A1	22	1.06	60.0	8.5
	A2	26			
	B1	60	1.27	51.9	8.1
	B2	180	1.38	48.0	4.9
5	A1	25	1.24	53.3	6.7
	A2	50			
	B	125	1.39	47.7	2.6
6	A1	50	0.75	71.8	6.3
	A2	60	1.40	47.0	5.7
	B1	90	1.46	45.0	5.7
	B2	160	1.30	51.1	5.1
7	A	50	0.77	71.1	7.2
	B	150	1.31	50.5	3.8
8	A1	80	1.23	53.5	7.5
	A2	115	1.57	40.8	2.9
	B1	160	1.72	35.0	3.5
	B2	215	1.65	37.8	2.4
9	A1	35	1.28	51.9	4.9
	A2	40	1.42	46.5	5.1
	B1	80	1.64	38.2	4.7
	B2	215	1.58	40.3	3.3
10	A1	30	1.08	59.4	6.4
	A2	130			
	B1	110	1.67	37.0	4.3
	B2	215	1.69	36.3	3.5

Table B.5 (con't): Horizon thickness, bulk density, porosity and organic matter content of soil horizons of soil profile samples.

Profile	***Horizon***	***Thickness (mm)***	***Bulk Density (g cm^{-3})***	***Porosity (% v/v)***	***Organic Matter (% v/v)***
11	A1	90	1.03	61.2	6.0
	A2	120	1.36	48.6	4.5
	B1	160	1.34	49.3	5.8
	B2	180	1.36	48.7	5.0
12	A1	15	1.23	53.6	6.0
	A2	115			
	B1	130	1.28	51.5	2.7
	B2	160	1.43	45.9	3.2
13	A1	25	1.09	58.8	6.5
	A2	35			
	B1	100	1.31	50.4	3.7
	B2	210	1.37	48.2	3.7
14	A1	50	0.67	75.0	6.0
	A2	110	1.18	55.5	5.5
	B1	273	1.38	46.2	4.3
	B2	447	1.73	34.8	3.6
15	A1	100	1.04	60.6	6.9
	A2	140	1.40	47.3	5.2
	B1	120	1.54	41.9	4.1
	B2	490	1.62	39.0	3.5
16	A1	55	1.01	62.1	5.5
	A2	50	1.60	39.5	5.7
	B1	75	1.43	45.9	4.5
	B2	250	1.45	45.3	6.3
17	A1	30	1.00	62.4	4.8
	A2	40			
	B1	170	1.65	37.8	4.8
	B2	>760	1.63	38.5	3.7
18	A1	25	0.92	65.4	6.3
	A2	45			
	B1	220	1.43	46.3	4.6
	B2	710	1.56	41.1	4.0
19	A1	40	0.80	69.6	6.4
	A2	80	1.54	42.1	4.4
	B1	140	1.50	43.4	3.3
	B2	290	1.62	38.8	4.7

Table B.6: Soil texture assessment using proportions of clay, silt, sand and gravel.

Profile	Horizon	Thickness (mm)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Soil Texture
1	A1	58	6.4	60.0	31.7	1.9	Silt Loam
	A2	104	11.2	47.0	32.9	8.9	Loam
	B1	100	11.9	40.6	35.3	12.2	Loam
	B2	160	17.6	45.8	28.3	8.3	Loam
2	A1	40	5.8	59.0	34.5	0.7	Silt Loam
	A2	55	9.5	46.2	37.3	7.0	Loam
	B1	95	10.3	43.2	36.4	10.1	Loam
	B2	260	21.4	52.0	22.2	4.4	Silt Loam
3	A1	28	10.1	59.0	27.9	3.0	Silt Loam
	A2	50					
	B1	105	11.4	44.4	27.4	16.8	Loam
	B2	120	29.4	45.6	20.7	4.3	Clay Loam
4	A1	22	12.1	60.0	24.8	3.1	Silt Loam
	A2	26					
	B1	60	17.2	55.5	24.2	3.1	Silt Loam
	B2	182	22.2	34.8	17.4	35.6	Loam
5	A1	25	13.4	59.8	24.0	2.8	Silt Loam
	A2	50					
	B	125	12.6	38.5	22.1	26.8	Loam
6	A1	50	7.1	55.3	36.4	1.2	Silt Loam
	A2	60	8.0	43.6	39.6	8.8	Loam
	B1	90	9.3	39.3	35.1	16.3	Loam
	B2	160	11.8	55.1	27.6	5.5	Silt Loam
7	A	50	8.8	60.0	29.2	2.0	Silt Loam
	B	150	22.2	47.6	26.4	3.8	Loam
8	A1	80	5.7	48.0	45.3	1.0	Sandy Loam
	A2	115	12.3	39.9	41.8	6.0	Loam
	B1	160	15.7	50.4	32.0	1.9	Silt Loam
	B2	215	13.3	39.4	46.8	0.5	Loam
9	A1	35	10.4	51.8	34.8	3.0	Silt Loam
	A2	40	4.7	33.7	27.6	34.0	Sandy Loam
	B1	80	4.8	21.8	19.8	53.6	Loamy Sand
	B2	215	9.5	25.7	24.7	40.1	Sandy Loam
10	A1	30	10.4	53.0	30.2	6.4	Silt Loam
	A2	130					
	B1	110	8.1	29.5	20.7	41.7	Sandy Loam
	B2	215	26.9	47.3	24.2	1.6	Loam

Table B.6 (con't): Soil texture assessment using proportions of clay, silt, sand and gravel.

Profile	Horizon	Thickness (mm)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Soil Texture
11	A1	90	12.1	54.3	30.9	2.7	Silt Loam
	A2	120	27.2	45.7	22.3	4.8	Clay Loam
	B1	160	33.2	51.1	11.0	4.7	Silty Clay Loam
	B2	180	12.8	27.8	48.8	10.6	Sandy Loam
12	A1	15	15.2	62.2	21.3	1.3	Silt Loam
	A2	115					
	B1	130	14.8	55.2	21.9	8.1	Silt Loam
	B2	160	19.1	51.0	18.7	11.2	Silt Loam
13	A1	25	6.5	53.7	37.1	2.7	Silt Loam
	A2	35					
	B1	100	10.8	46.7	40.4	2.1	Loam
	B2	210	11.3	39.1	34.8	14.8	Loam
14	A1	50	11.3	73.8	14.7	0.2	Silt Loam
	A2	110	12.2	59.7	23.1	5.0	Silt Loam
	B1	273	11.6	47.1	32.5	8.8	Loam
	B2	447	14.9	29.3	24.6	31.2	Sandy Loam
15	A1	100	9.9	73.2	16.8	0.1	Silt Loam
	A2	140	15.1	44.5	35.4	5.0	Loam
	B1	120	15.8	45.8	31.8	6.6	Loam
	B2	490	22.6	48.0	27.4	7.0	Loam
16	A1	55	12.0	61.5	24.5	2.0	Silt Loam
	A2	50	15.7	57.7	24.4	2.2	Silt Loam
	B1	75	27.9	58.4	13.1	0.6	Silty Clay Loam
	B2	250	22.7	58.3	7.1	11.9	Silt Loam
17	A1	30	9.8	58.9	29.1	2.2	Silt Loam
	A2	40					
	B1	170	17.3	53.0	28.0	1.7	Silt Loam
	B2	>760	24.3	49.8	25.1	0.8	Loam
18	A1	25	13.0	58.3	22.0	6.7	Silt Loam
	A2	45					
	B1	220	15.7	52.5	29.7	2.1	Silt Loam
	B2	800	19.0	44.7	29.1	7.2	Loam
19	A1	40	4.8	54.9	39.6	0.7	Silt Loam
	A2	80	7.6	36.8	26.3	29.3	Sandy Loam
	B1	140	14.6	39.7	37.0	8.7	Loam
	B2	290	17.6	55.7	22.8	3.9	Silt Loam

Table B.7: Saturated hydraulic conductivity at soil profile sample sites.

Profile	Kozeny - Carmen			Literature	Guelph Permeameter		Double Ring Infiltrometer
	Horizon	Depth (mm)	K_s (mm/h)	K_s (mm/h)	Depth (mm)	K_s (mm/h)	K_s (mm/h)
1	A1	0 - 58	543	6 - 26	150	3.4	60.0
	A2	58 - 162	196	13 - 25			
	B1	162 - 262	287	13 - 25	300	1.4	
	B2	262 - 422	21	13 - 25			
2	A1	0 - 40	576	6 - 26	150	3.0	15.0
	A2	40 - 95	108	13 - 25	300	0.4	
	B1	95 - 190	287	13 - 25	450	0.3	
	B2	190 - 450	4	6 - 26			
3	A1	0 - 28	165	6 - 26			3.9
	A2	28 - 78					
	B1	78 - 183	103	13 - 25			
	B2	183 - 303	3	2 - 9			
4	A1	0 - 22	241	6 - 26			30.0
	A2	22 - 48					
	B1	48 - 108	43	6 - 26			
	B2	108 - 290	1961	13 - 25			
5	A1	0 - 25	96	6 - 26	150	11.2	55.8
	A2	25 - 75					
	B	75 - 200	401	13 - 25			
6	A1	0 - 50	2513	6 - 26	150	5.9	13.8
	A2	50 - 110	207	13 - 25			
	B1	110 - 200	466	13 - 25	300	3.2	
	B2	200 - 360	77	6 - 26			
7	A	0 - 50	1386	6 - 26	150	0.8	60.0
	B	50 - 200	36	13 - 25			
8	A1	0 - 80	678	25 - 125	150	3.0	16.8
	A2	80 - 195	192	13 - 25	300	1.4	
	B1	195 - 355	16	6 - 26	450	0.09	
	B2	355 - 570	138	13 - 25			
9	A1	0 - 35	206	6 - 26			33.6
	A2	35 - 75	4060	25 - 125			
	B1	75 - 155	555666	60 - 563			
	B2	155 - 370	4868	25 - 125			
10	A1	0 - 30	266	6 - 26			15.0
	A2	30 - 160					
	B1	160 - 270	6397	25 - 125			
	B2	270 - 485	5	13 - 25			

Table B.7 (con't): Saturated hydraulic conductivity at soil profile sample sites.

Profile	Kozeny - Carmen			Literature	Guelph Permeameter		Double Ring Infiltrometer
	Horizon	Depth (mm)	K_s (mm/h)	K_s (mm/h)	Depth (mm)	K_s (mm/h)	K_s (mm/h)
11	A1	0 - 90	362	6 - 26	150	3.0	108.0
	A2	90 - 210	9	2 - 9	300	0.9	
	B1	210 - 370	3	1 - 6	450	0.5	
	B2	370 - 550	7080	25 - 125			
12	A1	0 - 15	52	6 - 26			78.0
	A2	15 - 130					
	B1	130 - 260	43	13 - 25			
	B2	260 - 420	17	13 - 25			
13	A1	0 - 25	798	6 - 26			17.4
	A2	25 - 60					
	B1	60 - 160	276	13 - 25			
	B2	160 - 370	322	13 - 25			
14	A1	0 - 50	557	6 - 26	150	3.0	6.0
	A2	50 - 160	52	6 - 26	300	1.3	
	B1	160 - 433	106	13 - 25	450	0.2	
	B2	433 - 880	544	25 - 125	600	0.03	
					750	0.2	
15	A1	0 - 100	132	6 - 26			1.5
	A2	100 - 240	95	13 - 25			
	B1	240 - 360	41	13 - 25			
	B2	360 - 850	9	13 - 25			
16	A1	0 - 55	194	6 - 26			19.1
	A2	55 - 105	14	6 - 26			
	B1	105 - 180	4	1 - 6			
	B2	180 - 430	10	6 - 26			
17	A1	0 - 30	383	6 - 26			12.6
	A2	30 - 70					
	B1	70 - 240	16	6 - 26			
	B2	240 -?	2	13 - 25			
18	A1	0 - 25	203	6 - 26	150	2.8	66.0
	A2	25 - 70			300	0.2	
	B1	70 - 290	23	6 - 26	450	0.3	
	B2	290-1090	18	13 - 25	600	0.07	
					750	0.05	
19	A1	0 - 40	1184	6 - 26			6.0
	A2	40 - 120	646	25 - 125			
	B1	120 - 260	55	13 - 25			
	B2	260 - 550	18	6 - 26			

B.10 PUBLISHED SOILS DATA

Table B.8: Typical porosity values of natural sedimentary materials (Bear, 1972).

Sedimentary Material	***Porosity (%)***
Peat Soils	60 - 80
Soils	50 - 60
Clay	45 - 55
Silt	40 - 50
Medium-to-Coarse Mixed Sand	35 - 40
Uniform Sand	30 - 40
Fine-to-Medium Mixed Sand	30 - 35

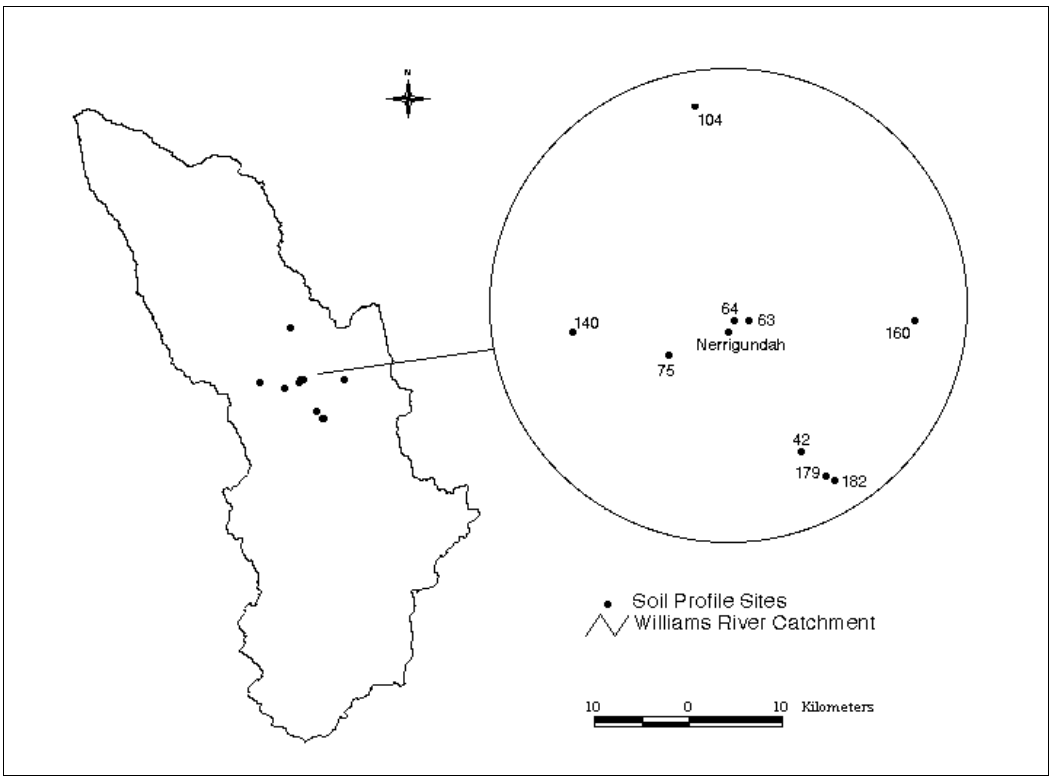


Figure B.14: Locality of published soil profile data given in Table B.9 with respect to the Nerrigundah experimental catchment.

Table B.9: Published soils data for profiles near the Nerrigundah experimental catchment (Linda Henderson, NSW Soils Data System, Department of Land and Water Conservation).

Profile	AMG Easting	AMG Northing	Horizon	Depth (cm)	Texture[1]	K_s (mm/h)	% Clay	% Silt	% Fine Sand	% Coarse Sand	% Gravel	USCS Class.	Field Capacity % v/v	Wilting Point % v/v	Organic Matter % v/v
42	380 850	6 420 350	A1	0 - 5	SCL	Low									
			A2	5 - 35	SCL										
			B	35 - 110	MC										
63	379 500	6 423 800	A1	0 - 15	SCL	42	12	42	38	8	0	OL	71	15	13.1
			A2	15 - 35	SCL	4	19	39	26	9	7	MH	45	11	4.7
64	379 100	6 425 100	A	0 - 100	SL	Moderate									
			B	100 - 150	FSC										
75	377 400	6 422 900	A	0 - 10	SCL	V. Low									
			B	10 - 60	HC										
104	378 100	6 429 400	A11	0 - 70		83	17	30	35	17	1	OL	52	16	12.4
			A12	70 - 120		12	15	24	32	25	4	ML	35	11	2.4
			A2	120 - 160		12	37	24	27	12		CL	48	20	2.0
			B	160 - 300											
140	374 900	6 423 500	A	0 - 50			20	26	33	20	1	ML	45	14	8.2
160	383 800	6 423 800	A	0 - 25		83	21	38	23	14	4	OL	51	17	12.5
179	381 500	6 419 700	A	0 - 30		12	8	18	66	8	0	ML	47	14	9.5
			B	30 - 150		12	10	12	53	25	0	SM-SC	29	7	2.2
182	381 700	6 419 600	A1	0 - 20		83	11	21	46	22	0	ML	39	8	5.1
			A2	20 - 50		12	11	21	43	23	2	ML	33	7	3.2

1. SCL = Sandy Clay Loam MC = Medium Clay SL = Sandy Loam FSC = Fine Sandy Clay HC = Heavy Clay

Table B.10: Suggested interpretation of saturated hydraulic conductivity rating (Hazelton and Murphy, 1992).

Saturated Hydraulic Conductivity (mm/h)	***Rating***
< 0.5	Extremely Low
10	Very Low
10 - 20	Low
20 - 60	Moderate
60 -120	High
> 120	Very High

Table B.11: Typical values of saturated hydraulic conductivity based on texture and degree of structure (Hazelton and Murphy, 1992).

Texture	***Structure***	***Saturated Hydraulic Conductivity (mm/h)***
Sand	Apedal	> 120
Sandy Loam	Weakly Pedal	> 120
	Apedal	60 - 120
Loam	Peds Evident	60 - 120
	Weakly Pedal	20 - 60
	Apedal	20 - 60
Clay Loam	Peds Evident	20 - 60
	Weakly Pedal	5 - 20
	Apedal	2.5 - 5
Light Clay	Highly Pedal	5 - 20
	Peds Evident	2.5 - 5
	Weakly Pedal	< 2.5
Medium to Heavy Clay	Highly Pedal	2.5 - 20
	Peds Evident	< 2.5
	Weakly Pedal	< 2.5
Clay	Sodic and Saline	8
	Sodic	2.5
	Highly Sodic	< 1

Table B.12: Typical values of water-holding capacity (Hazelton and Murphy, 1992).

Texture	***Field Capacity (10 kPa) (% g/g)***	***Wilting Point (% g/g)***
Coarse Sand	8	4
Sand	14	4
Loamy Sand	18	7
Sandy Loam	26	9
Loam	30	13
Silty Loam	34	10
Sandy Clay Loam	26	15
Clay Loam	34	18
Silty Clay Loam	43	20
Sandy Clay	29	19
Clay	42	25

Table B.13: Representative values for hydrologic soil properties used in the Clapp and Hornberger (1978) relationships based on soil texture, standard deviations are given in parenthesis (Clapp and Hornberger, 1978).

Soil Texture	***b***	ψ_s ***(cm)***	ϕ ***(cm^3/cm^3)***	K_s ***(mm/h)***
Sand	4.05 (1.78)	-12.1 (14.3)	0.395 (0.056)	634
Loamy Sand	4.38 (1.47)	-9.0 (12.4)	0.410 (0.068)	563
Sandy Loam	4.90 (1.75)	-21.8 (31.0)	0.435 (0.086)	125
Silt Loam	5.30 (1.96)	-78.6 (51.2)	0.485 (0.059)	25.9
Loam	5.39 (1.87)	-47.8 (51.2)	0.451 (0.078)	25.0
Sandy Clay Loam	7.12 (2.43)	-29.9 (37.8)	0.420 (0.059)	22.7
Silty Clay Loam	7.75 (2.77)	-35.6 (37.8)	0.477 (0.057)	6.12
Clay Loam	8.52 (3.44)	-63.0 (51.0)	0.476 (0.053)	8.82
Sandy Clay	10.4 (1.64)	-15.3 (17.3)	0.426 (0.057)	7.80
Silty Clay	10.4 (4.45)	-49.0 (62.1)	0.492 (0.064)	3.72
Clay	11.4 (3.70)	-40.5 (39.7)	0.482 (0.050)	4.62

Table B.14: Representative values for hydrologic soil properties used in the Brooks and Corey (1966) relationships based on soil texture. Arithmetic mean (A) with standard deviations in parenthesis and geometric mean (G) with plus and minus one standard deviations in parenthesis (Rawls *et al*., 1982).

Texture Class	ϕ ***(cm^3/cm^3)***	θ_r ***(cm^3/cm^3)***	$-\psi_s$ ***(cm)*** ***A***	***G***	φ ***A***	***G***	K_S ***(mm/h)***
Sand	0.437 (0.063)	0.020 (0.019)	15.98 (15.74)	7.26 (1.36-38.74)	0.694 (0.396)	0.592 (0.334-1.051)	210
Loamy Sand	0.437 (0.069)	0.035 (0.032)	20.58 (24.62)	8.69 (1.80-41.85)	0.553 (0.319)	0.474 (0.271-0.827)	61.1
Sandy Loam	0.453 (0.102)	0.041 (0065)	30.20 (33.81)	14.66 (3.45-62.24)	0.378 (0.238)	0.322 (0.186-0.558)	25.9
Loam	0.463 (0.088)	0.027 (0.047)	40.12 (60.18)	11.15 (1.63-76.40)	0.252 (0.166)	0.220 (0.137-0.355)	13.2
Silt Loam	0.501 (0.081)	0.015 (0.043)	50.87 (58.53)	20.76 (3.58-120.4)	0.234 (0.129)	0.211 (0.136-0.326)	6.8
Sandy Clay Loam	0.398 (0.066)	0.068 (0.069)	59.41 (63.99)	28.08 (5.57-141.5)	0.319 (0.240)	0.250 (0.125-0.502)	4.3
Clay Loam	0.464 (0.055)	0.075 (0.099)	56.43 (67.87)	25.89 (5.80-115.7)	0.242 (0.172)	0.194 (0.100-0.377)	2.3
Silty Clay Loam	0.471 (0.053)	0.040 (0.078)	70.33 (73.57)	32.56 (6.68-158.7)	0.177 (0.138)	0.151 (0.090-0.253)	1.5
Sandy Clay	0.430 (0.060)	0.109 (0.096)	79.48 (99.62)	29.17 (4.96-171.6)	0.223 (0.175)	0.168 (0.078-0.364)	1.2
Silty Clay	0.479 (0.054)	0.056 (0.080)	76.54 (83.06)	34.19 (7.04-166.2)	0.150 (0.110)	0.127 (0.074-0.219)	0.9
Clay	0.475 (0.048)	0.090 (0.105)	85.60 (90.50)	37.30 (7.43-187.2)	0.165 (0.128)	0.131 (0.068-0.253)	0.6