** 1961 - 1980 :DISCHARGE ** (YEAR 1970)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	44.97	26.57	11.05	22.43	24.15	38.01	23.55	11.22	31.55	166.05	105.33	45.98
2	45.19	24.00	11.05	19.89	21.74	33.59	32.39	10.65	26.25	129.25	89.87	43.26
3	44.17	23.58	10.90	17.91	20.12	33.00	28.24	10.53	28.89	82.04	96.81	42.30
4	43.31	22.21	10.89	16.93	18.03	31.05	32.01	43.73	64.69	73.22	69.27	41.40
5	48.62	22.37	10.81	23.77	22.83	40.33	29.99	35.59	54.26	81.74	93.97	41.14
	45.34	24.30	11.07	20.19	21.49	30.40	29.24	22.35	41.13	106.58	95.07	42.82
6	45.30	22.90	10.74	22.60	21.80	39.92	28.64	29.69	46.60	75.78	94.31	67.00
7	45.57	25.98	17.06	47.79	49.80	37.28	25.99	27.82	51.90	75.24	100.75	62.03
8	57.74	25.19	14.88	175.77	47.44	35.75	23.51	26.37	46.44	78.27	92.08	71.93
9	51.48	25.04	14.49	72.20	40.55	32.79	21.19	27.32	45.72	71.07	105.03	64.44
10	49.18	28.29	12.39	62.69	38.10	32.37	19.40	43.29	43.97	68.16	95.06	59.54
	49.87	25.58	13.91	76.21	39.56	35.62	23.75	30.90	46.92	73.82	97.45	65.05
11	47.24	27.49	10.73	57.94	36.79	30.04	17.34	37.27	40.78	78.62	87.98	57.82
12	56.93	27.25	106.13	54.53	35.91	28.01	16.21	38.02	37.15	73.50	84.20	55.27
13	72.64	26.75	50.56	63.80	33.09	25.55	15.49	35.22	33.76	72.55	84.08	51.94
14	60.64	24.35	42.54	63.23	30.05	23.24	14.79	33.58	30.00	69.50	79.93	53.46
15	59.96	22.70	37.12	58.80	27.80	20.43	14.11	30.52	29.53	66.76	70.07	50.36
	60.58	25.79	49.42	59.66	32.97	26.77	15.59	34.92	34.16	72.15	82.45	54.97
16	57.56	20.59	36.44	55.02	27.16	25.30	13.45	28.05	27.33	63.88	74.87	55.68
17	54.35	19.65	34.45	52.11	24.99	24.25	39.60	25.37	26.58	59.63	72.16	67.87
18	54.30	18.90	31.14	47.85	22.50	22.38	33.30	22.86	24.40	74.74	68.90	95.36
19	52.74	18.16	28.05	43.87	20.16	20.20	33.40	20.51	24.06	91.78	67.29	95.03
20	50.05	17.45	25.17	40.17	29.10	29.27	29.56	18.31	33.17	81.32	65.43	98.86
	53.90	18.97	31.05	47.92	24.78	24.30	29.87	23.02	27.13	74.27	69.73	82.56
21	46.73	16.75	27.49	39.45	33.67	25.17	28.03	16.26	28.50	73.22	66.33	90.05
22	43.62	16.07	22.34	38.04	28.72	25.14	26.50	14.34	57.12	72.00	63.47	82.29
23	40.71	15.40	23.52	39.74	39.81	23.74	23.87	13.24	53.27	68.75	60.88	78.41
24	39.24	14.75	22.65	38.06	34.80	21.51	21.41	12.66	45.99	73.44	57.02	74.97
25	36.50	14.11	26.48	35.63	33.32	19.81	19.11	12.05	42.57	67.05	53.40	79.85
	41.38	15.42	23.64	38.18	34.06	23.07	23.90	13.72	45.49	71.01	60.22	81.11
26	35.90	13.49	26.57	37.47	32.78	17.82	16.95	11.58	41.38	64.87	50.01	160.81
27	33.89	12.89	26.05	29.76	30.70	13.95	14.94	11.12	38.79	60.70	46.83	115.21
28	31.56	12.29	24.34	27.37	36.74	13.92	13.74	11.31	35.40	55.50	45.11	106.02
29	29.36		27.48	27.74	33.34	27.78	13.08	10.69	32.23	63.78	42.21	125.98
30	29.34		26.57	26.71	32.44	23.83	12.44	10.27	31.82	66.65	41.20	294.91
31	29.04		24.20		30.08		11.81	12.11		59.90		260.76
	31.36	12.89	26.04	28.81	32.68	21.40	13.83	11.18	35.92	62.07	45.07	178.28
TOTAL.	1444.	585.	802.	1355.	960.	838.	675.	692.	1154.	2362.	2250.	2702.
AVR.	46.58	21.02	25.86	45.16	30.98	27.94	22.41	22.31	38.46	76.18	75.00	87.18

ANNUAL TOTAL 15842.

ANNUAL AVR. 43.40

YEAR	MAX.	35DAY	95DAY	185DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1970	294.91	78.62	55.62	33.59	23.87	11.12	10.27	43.40	15841.5

** 1961 - 1980 :DISCHARGE ** (YEAR 1971)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	496.33	56.83	54.77	59.66	14.71	51.70	27.05	43.89	72.85	20.62	42.07	81.82
2	581.94	55.31	51.74	51.80	14.59	47.92	24.55	37.91	66.07	19.87	40.75	76.46
3	681.31	52.35	49.34	47.87	13.43	46.08	24.00	36.51	65.34	20.10	39.14	76.70
4	328.48	49.55	45.76	46.35	13.35	44.29	21.92	34.27	63.50	21.62	38.37	86.23
5	229.17	46.91	42.41	43.16	13.28	40.79	19.75	31.29	66.05	21.07	37.01	82.56
	(463.45)	(52.19)	(48.80)	(49.78)	(13.87)	(46.28)	(23.47)	(36.77)	(66.72)	(20.78)	(39.47)	(80.77)
6	212.75	44.53	39.28	39.74	13.20	37.53	17.72	28.49	62.77	20.22	34.19	80.10
7	199.49	43.25	36.34	36.55	18.67	34.48	16.58	25.86	60.50	30.40	31.51	77.21
8	188.10	41.99	33.58	33.56	16.95	31.64	15.91	41.20	56.83	28.19	35.62	184.97
9	179.32	40.77	31.00	30.76	16.31	28.98	15.24	36.60	55.51	26.75	38.09	337.84
10	170.16	39.57	28.57	29.20	16.50	26.50	15.27	36.99	58.66	25.74	35.39	435.00
	(190.06)	(42.02)	(33.75)	(33.97)	(16.36)	(31.83)	(16.14)	(33.83)	(58.85)	(26.26)	(34.96)	(223.02)
11	160.13	38.41	26.57	28.71	15.46	24.17	14.77	47.49	55.00	23.95	34.28	363.77
12	151.49	37.43	25.45	26.31	25.44	23.70	14.14	41.17	52.54	26.33	31.72	366.00
13	142.71	36.32	24.50	23.96	23.27	21.60	19.96	39.55	48.72	25.82	30.79	241.99
14	134.51	35.36	23.97	22.40	21.98	21.37	18.04	38.07	45.10	25.04	28.37	188.16
15	128.49	34.29	23.11	22.12	20.68	20.75	17.69	36.03	41.82	26.14	26.95	183.13
	(143.47)	(36.36)	(24.69)	(24.70)	(21.37)	(22.42)	(16.92)	(40.46)	(48.65)	(25.46)	(30.42)	(268.61)
16	121.45	33.58	23.42	21.28	18.32	18.75	15.06	78.87	38.70	26.09	24.75	174.16
17	114.55	32.56	22.66	20.46	19.94	17.70	14.99	66.40	36.74	25.03	22.68	170.70
18	108.29	31.37	30.04	19.66	19.77	17.02	13.76	60.43	33.93	37.10	20.74	160.02
19	102.34	30.40	32.92	18.88	18.00	17.94	13.14	55.34	31.29	35.44	21.55	189.31
20	96.77	29.45	29.82	18.12	19.04	17.03	12.63	57.57	28.81	34.51	22.60	179.01
	(108.70)	(31.39)	(27.51)	(19.68)	(18.99)	(17.31)	(14.04)	(63.72)	(33.89)	(31.59)	(22.46)	(174.64)
21	93.78	28.55	45.43	17.37	18.72	16.42	12.53	57.40	28.09	32.95	22.59	168.79
22	94.27	40.04	62.23	16.64	16.57	15.77	12.46	54.62	31.49	31.29	21.21	157.86
23	90.30	52.08	53.50	15.93	34.72	48.62	12.39	116.06	30.25	28.65	19.53	147.98
24	86.98	47.14	47.21	15.24	28.44	47.82	12.32	85.09	28.94	29.23	18.62	143.97
25	82.37	45.31	45.72	14.56	39.38	44.65	41.70	75.83	26.56	28.55	17.94	219.49
	(89.58)	(43.02)	(50.85)	(15.95)	(27.57)	(34.02)	(18.28)	(77.80)	(29.07)	(30.13)	(19.94)	(167.62)
26	78.01	50.94	42.87	13.89	33.18	38.67	34.03	69.58	24.57	32.97	20.61	169.80
27	74.29	50.54	39.51	13.66	40.60	37.18	28.47	66.51	23.54	34.19	20.40	157.21
28	70.40	61.96	36.37	13.62	55.47	35.06	27.46	63.45	22.67	34.05	21.02	146.25
29	66.74		44.10	13.57	47.68	32.50	38.98	60.72	21.82	36.99	90.70	138.98
30	63.29		40.78	13.49	43.42	29.71	33.13	79.26	20.99	40.91	213.82	132.41
31	60.04		39.94		59.09		33.70	70.51		47.32		125.05
	(68.79)	(54.48)	(40.59)	(13.65)	(47.60)	(34.62)	(32.63)	(68.34)	(22.72)	(37.74)	(73.31)	(144.95)
TOTAL	5389.	1191.	1173.	789.	776.	938.	640.	1673.	1300.	898.	1103.	5443.
										ANNUAL	TOTAL	21312.
AVR.	173.84	42.55	37.84	26.29	25.05	31.26	20.64	53.97	43.32	28.95	36.76	175.58
										ANNUAL	AVR.	58.39

YEAR	MAX.	35DAY	95DAY	185DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1971	681.31	142.71	55.34	35.39	23.11	13.49	12.32	58.39	21312.3

** 1961 - 1980 =DISCHARGE ** (YEAR 1972)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	120.47	31.74	19.79	11.15	32.12	10.75	10.10	6.90	19.71	20.87	36.82	60.61
2	109.42	30.23	17.47	11.19	32.38	25.09	9.97	6.68	73.07	25.53	34.03	47.18
3	100.37	30.17	16.70	13.71	47.70	24.53	9.65	7.23	39.93	23.34	32.77	36.29
4	97.77	29.04	17.04	13.81	47.10	22.59	9.38	10.78	18.81	19.91	24.91	31.44
5	86.99	27.96	16.47	22.42	34.20	18.40	9.35	9.90	15.17	16.14	27.99	30.25
	(102.00)	(29.83)	(17.49)	(14.36)	(38.72)	(19.87)	(9.69)	(8.30)	(33.34)	(21.96)	(31.70)	(42.35)
6	82.75	26.45	15.33	85.37	27.75	12.28	9.27	8.61	24.91	16.24	30.61	30.13
7	78.78	20.22	14.74	44.82	22.08	10.72	9.12	7.75	24.05	18.24	28.53	20.08
8	79.53	26.01	14.40	25.33	31.69	10.44	9.03	7.40	17.11	54.83	59.22	34.20
9	90.56	31.93	14.12	17.01	28.12	9.55	8.80	7.17	18.83	50.76	45.47	39.67
10	72.82	31.10	13.88	15.76	26.57	8.36	12.33	8.41	59.28	78.30	47.39	29.82
	(80.89)	(28.34)	(14.49)	(37.76)	(27.24)	(10.37)	(9.71)	(7.87)	(28.84)	(43.67)	(42.24)	(31.98)
11	66.55	35.01	13.22	18.41	45.33	12.38	10.45	7.95	62.64	58.72	43.76	28.74
12	62.81	26.75	12.76	19.12	56.12	12.02	10.37	9.14	29.14	38.58	30.63	27.02
13	57.65	24.44	12.45	30.34	37.91	11.69	9.20	11.30	23.49	28.40	31.57	25.12
14	56.68	23.16	12.22	24.29	25.26	12.08	8.58	14.92	19.49	41.72	45.01	31.99
15	54.19	21.87	11.89	30.85	21.30	13.07	8.40	12.94	16.92	34.09	30.68	280.29
	(59.98)	(26.25)	(12.51)	(25.80)	(37.18)	(12.24)	(9.40)	(11.27)	(30.44)	(40.30)	(36.33)	(78.63)
16	52.06	20.70	11.70	20.26	20.13	17.20	8.29	9.97	10.02	23.38	54.02	829.28
17	49.84	20.13	12.64	15.64	20.48	14.38	9.27	7.89	43.70	22.33	44.98	1118.10
18	47.84	19.63	12.24	10.55	14.24	13.09	9.43	7.02	46.40	25.29	53.87	813.65
19	48.72	20.01	12.15	15.85	30.52	17.40	9.33	8.24	22.89	20.58	49.34	451.70
20	40.24	20.83	11.91	14.01	29.36	26.55	8.20	11.03	135.71	17.41	78.21	373.97
	(48.94)	(20.27)	(12.13)	(16.46)	(22.95)	(17.76)	(8.90)	(8.85)	(53.94)	(21.80)	(56.10)	(717.34)
21	45.32	19.82	11.80	23.32	21.23	21.21	7.81	10.15	56.61	15.72	53.91	284.84
22	43.09	23.25	11.50	21.09	17.34	17.31	7.73	13.48	39.07	20.93	40.41	239.22
23	39.81	24.33	11.09	27.31	14.16	14.61	7.71	18.15	26.85	25.14	35.35	197.24
24	37.14	21.52	11.04	44.31	14.03	12.84	7.74	15.42	28.33	27.13	32.45	163.74
25	35.47	20.16	11.05	42.17	17.40	12.42	8.01	10.77	54.00	40.37	47.53	139.39
	(40.17)	(21.82)	(11.30)	(31.64)	(16.93)	(15.08)	(7.80)	(13.67)	(40.77)	(25.86)	(41.93)	(204.89)
26	35.64	23.99	11.00	29.25	14.38	14.34	7.84	9.78	34.17	49.70	47.50	181.46
27	36.74	30.08	11.21	44.62	13.96	11.45	9.94	8.64	36.44	41.23	38.13	289.12
28	35.00	32.99	12.13	35.65	20.04	10.69	9.58	10.35	40.10	34.58	35.48	218.22
29	35.80	23.84	11.96	76.69	14.18	10.25	8.32	23.45	35.34	25.79	50.18	169.52
30	33.50		11.01	38.79	13.04	10.12	7.50	12.49	29.43	21.56	45.38	135.94
31	31.89		11.03		12.83		7.11	9.61		27.05		116.39
	(34.76)	(27.87)	(11.49)	(45.00)	(14.74)	(11.37)	(8.38)	(13.42)	(35.10)	(33.32)	(44.61)	(185.11)
TOTAL	1868.	744.	409.	855.	804.	436.	279.	331.	1112.	967.	1265.	6487.
										ANNUAL	TOTAL	15596.
AVR.	60.27	25.66	13.18	28.50	25.92	14.55	8.99	10.68	37.07	31.18	42.15	209.25
										ANNUAL	AVR.	42.50

YEAR	MAX.	35DAY	95DAY	155DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1972	1118.10	66.55	36.82	23.29	12.76	7.75	6.08	42.50	15556.1

** 1961 - 1980 :DISCHARGE ** (YEAR 1973)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	105.50	39.92	20.35	18.66	28.58	37.36	40.86	32.16	16.61	26.26	82.72	97.47
2	96.05	38.51	19.55	14.74	17.55	27.51	25.19	21.46	22.28	26.85	62.60	166.42
3	96.33	37.36	19.31	15.99	11.60	18.80	19.77	16.22	14.12	24.38	80.41	99.71
4	121.82	36.30	19.71	11.38	9.60	17.25	15.30	14.03	26.80	20.89	91.96	62.94
5	102.26	35.26	17.97	21.10	12.25	16.36	13.56	12.83	37.52	20.47	53.00	72.64
	(104.39)	(37.47)	(19.18)	(16.37)	(15.92)	(23.46)	(22.94)	(19.35)	(23.46)	(23.71)	(74.14)	(99.84)
6	115.29	34.74	16.82	16.00	12.64	16.34	12.05	11.70	13.23	17.95	40.03	71.11
7	107.56	33.25	16.66	21.90	14.53	29.39	11.56	11.88	26.07	16.11	35.69	125.02
8	98.88	33.25	17.52	15.75	26.44	32.63	13.05	10.45	15.52	14.63	31.38	673.90
9	93.46	32.28	18.89	10.88	24.91	27.20	12.00	11.13	11.11	14.63	30.80	971.35
10	84.16	31.34	17.40	13.39	47.78	25.56	10.37	11.24	11.96	14.54	32.38	525.42
	(99.87)	(32.87)	(17.46)	(15.60)	(25.26)	(26.22)	(11.81)	(11.28)	(15.58)	(15.57)	(34.07)	(473.36)
11	77.10	30.41	17.36	13.93	35.04	20.85	9.91	10.14	11.90	19.66	31.67	379.60
12	70.30	29.51	17.52	15.67	34.69	16.20	9.76	8.98	14.45	36.98	40.57	214.04
13	66.13	29.08	16.09	20.74	26.51	16.84	9.93	9.38	14.78	29.54	32.96	163.95
14	61.03	28.21	15.52	14.84	20.35	15.70	11.59	12.17	14.94	19.35	29.45	156.80
15	58.33	27.26	15.44	8.96	16.49	15.16	16.75	10.52	15.22	16.47	27.62	192.30
	(66.58)	(28.39)	(16.39)	(14.83)	(26.62)	(16.96)	(11.59)	(10.24)	(14.26)	(24.40)	(32.45)	(221.34)
16	61.10	28.77	14.44	11.07	20.25	13.76	10.38	10.27	12.35	19.39	25.28	257.91
17	73.65	27.39	15.17	9.98	29.36	13.04	10.07	11.89	17.56	28.19	26.79	405.27
18	118.62	25.10	16.86	8.14	27.84	12.60	9.22	9.17	19.73	28.61	36.29	230.09
19	88.47	22.49	21.02	9.00	19.27	11.73	8.53	8.17	39.73	45.68	45.00	172.49
20	69.32	21.07	20.14	11.49	18.32	12.64	8.95	7.85	45.34	39.92	87.25	143.36
	(82.23)	(24.96)	(17.53)	(9.94)	(23.01)	(12.81)	(9.43)	(9.47)	(26.94)	(32.46)	(44.12)	(241.82)
21	58.30	20.19	19.05	13.21	23.49	13.20	9.00	9.82	35.41	60.86	59.43	125.21
22	54.91	20.02	16.18	11.88	16.67	13.64	8.66	11.81	35.72	45.58	35.13	148.39
23	50.92	20.38	15.25	9.99	17.07	15.14	13.24	9.32	32.50	22.16	27.89	171.31
24	48.40	20.85	14.77	14.48	26.68	13.86	12.98	15.61	24.52	39.67	40.81	130.14
25	46.02	21.60	16.26	12.96	34.21	16.16	8.82	12.98	54.15	40.80	57.37	110.50
	(51.61)	(20.61)	(16.30)	(12.50)	(23.66)	(14.40)	(10.54)	(11.91)	(36.46)	(41.81)	(44.13)	(137.11)
26	44.38	31.73	21.31	15.20	26.55	19.57	10.24	9.03	34.63	30.14	87.14	105.51
27	43.19	25.59	20.60	17.91	22.01	21.95	9.52	8.04	27.43	30.27	59.92	92.98
28	42.03	21.38	18.73	24.04	23.83	21.61	10.05	8.04	24.69	29.41	38.07	85.70
29	41.26		17.94	55.06	19.50	23.81	11.11	7.78	24.77	42.78	30.44	79.99
30	40.15		18.83	74.14	41.30	23.36	10.92	10.88	25.72	46.84	228.06	75.63
31	39.95		17.88		44.21		28.10	18.94		58.24		70.49
	(41.83)	(26.17)	(19.21)	(37.39)	(29.57)	(22.06)	(13.32)	(10.45)	(27.45)	(39.61)	(68.73)	(85.05)
TOTAL	2275.	802.	550.	533.	750.	580.	411.	374.	721.	927.	1588.	6378.
										ANNUAL	TOTAL	15889.
AVR.	73.40	28.66	17.73	17.77	24.18	19.32	13.27	12.06	24.02	29.92	52.94	205.73
										ANNUAL	AVR.	43.53

YEAR	MAX.	35DAY	95DAY	185DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1973	971.35	92.98	39.73	21.00	14.74	8.96	7.78	43.53	15889.2

1961 – 1980 :DISCHARGE (YEAR 1974)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	67.22	22.34	27.22	15.60	48.26	27.75	46.28	39.24	16.24	47.90	62.15	61.35
2	63.43	22.78	24.09	16.19	60.70	26.21	32.36	44.87	21.97	54.56	133.14	56.06
3	60.55	23.48	22.48	17.09	68.54	24.30	25.77	40.45	23.35	62.80	120.36	87.56
4	73.00	35.57	21.75	23.92	46.93	23.65	23.00	30.56	22.45	42.49	94.92	60.30
5	61.96	54.52	21.89	42.55	66.84	22.58	21.93	26.71	19.47	33.91	33.03	47.49
	(65.36)	(31.37)	(23.39)	(24.07)	(58.25)	(24.90)	(29.87)	(36.37)	(20.30)	(48.33)	(88.72)	(62.55)
6	55.01	33.45	32.13	85.03	57.42	25.64	20.83	25.48	18.64	30.35	27.68	42.57
7	52.16	25.32	27.87	75.23	90.00	29.13	19.25	23.46	22.38	46.30	25.46	40.90
8	49.59	24.08	24.90	42.47	59.08	23.52	18.38	22.73	18.72	48.57	39.19	38.75
9	46.81	26.50	25.70	52.58	45.25	22.87	17.94	22.50	18.55	29.58	53.32	36.35
10	44.07	27.17	25.35	55.98	45.23	22.09	56.70	21.98	32.14	24.03	82.47	34.63
	(49.65)	(27.40)	(27.21)	(62.26)	(59.40)	(24.65)	(26.62)	(23.24)	(22.09)	(35.77)	(45.62)	(38.65)
11	42.09	25.00	20.75	50.25	40.69	32.19	44.23	21.56	23.76	21.59	44.87	32.33
12	40.79	23.03	18.68	58.46	38.28	28.33	25.01	21.71	25.51	20.72	37.27	30.81
13	39.06	21.88	17.87	47.06	40.42	30.39	130.39	21.90	25.21	23.77	32.89	29.72
14	37.85	21.80	17.39	44.45	62.63	24.04	60.82	19.78	25.70	37.12	30.32	29.38
15	37.05	21.39	18.27	34.55	66.55	26.25	100.36	21.55	31.21	43.11	37.87	98.27
	(39.37)	(22.36)	(18.59)	(46.95)	(49.71)	(28.24)	(72.16)	(21.34)	(26.03)	(29.26)	(36.64)	(44.10)
16	35.64	24.19	20.41	31.20	60.65	30.98	48.95	20.90	43.06	55.36	38.60	102.01
17	35.47	39.75	20.46	67.47	48.00	24.30	44.54	19.72	38.26	80.26	32.17	62.20
18	28.82	87.78	17.85	164.83	35.97	22.47	33.32	19.63	30.78	63.13	27.40	38.80
19	28.46	54.15	17.70	96.20	40.38	23.38	33.19	12.03	28.10	41.22	38.59	33.50
20	28.04	59.42	16.26	54.55	28.40	31.28	31.89	12.05	39.17	32.91	68.93	29.23
	(31.29)	(49.06)	(18.44)	(82.85)	(40.78)	(25.46)	(38.38)	(16.88)	(35.87)	(54.58)	(41.14)	(53.15)
21	27.46	32.42	15.26	59.12	35.76	28.93	27.53	27.86	34.64	28.02	181.92	33.82
22	27.04	39.41	14.94	46.99	35.89	27.79	26.35	24.55	31.16	25.71	203.22	32.49
23	26.49	61.60	14.48	51.21	73.47	29.04	28.64	50.84	97.28	24.93	96.43	29.54
24	26.50	43.38	13.77	75.89	156.32	29.25	32.27	28.49	105.96	33.30	75.34	26.29
25	25.39	37.73	13.47	61.56	83.30	30.76	40.63	22.83	57.23	33.74	68.99	23.72
	(26.58)	(42.91)	(14.39)	(54.95)	(76.15)	(29.15)	(32.28)	(30.91)	(64.85)	(29.24)	(125.18)	(29.17)
26	26.03	34.30	12.94	52.43	53.40	25.88	37.95	20.63	38.92	35.38	80.95	22.75
27	26.09	32.08	12.73	58.40	40.15	22.38	33.34	18.40	34.78	30.77	59.64	22.58
28	26.74	32.38	12.78	48.69	34.29	26.40	27.33	18.23	33.91	35.60	69.98	36.95
29	26.68		13.94	61.15	30.37	31.94	27.01	17.52	43.90	34.59	65.32	75.48
30	24.51		13.04	55.54	29.47	49.14	33.85	19.33	48.57	33.68	66.09	43.23
31	23.48		15.95		28.03		34.34	16.44		36.19		38.31
	(25.62)	(33.09)	(15.23)	(55.24)	(36.05)	(31.15)	(32.49)	(18.50)	(40.02)	(34.37)	(68.40)	(39.85)
TOTAL	1215.	970.	601.	1632.	1638.	823.	1172.	755.	1059.	1192.	2029.	1377.
AVR.	39.19	34.63	19.40	54.39	52.83	27.43	38.44	24.34	35.28	38.45	67.62	44.43

ANNUAL TOTAL 14481.

ANNUAL AVR. 39.67

YEAR	MAX.	35DAY	95DAY	185DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1974	203.22	67.22	46.30	32.19	24.30	15.60	12.03	39.67	14481.1

** 1961 – 1980 =DISCHARGE ** (YEAR 1975)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	88.12	44.13	69.14	25.06	36.12	32.16	18.61	16.01	35.11	21.67	31.15	185.39
2	103.15	44.11	64.57	24.44	29.47	37.01	15.32	22.77	36.87	20.76	27.01	143.10
3	166.50	61.68	65.23	25.84	30.04	30.16	14.44	21.41	27.14	20.21	31.66	116.34
4	99.73	52.31	89.69	31.15	40.44	27.30	14.32	20.88	21.99	20.28	34.32	109.09
5	154.00	51.76	83.08	30.79	32.04	26.97	14.19	20.86	24.01	19.10	33.70	103.45
	(122.30)	(50.84)	(74.46)	(27.46)	(33.62)	(30.73)	(15.38)	(20.39)	(29.02)	(20.40)	(31.57)	(131.47)
6	166.40	49.30	65.17	30.38	41.14	26.17	14.79	20.38	22.22	24.90	77.91	106.85
7	131.20	41.72	81.20	30.84	42.69	28.34	15.94	20.09	24.95	32.69	60.94	101.35
8	97.61	39.42	78.29	25.68	34.20	24.24	18.62	22.46	24.25	39.56	63.69	163.42
9	122.85	37.08	65.17	25.78	62.02	21.81	19.47	21.20	21.31	33.65	45.86	137.60
10	142.33	35.93	50.59	25.42	45.46	35.26	17.53	34.12	24.47	24.01	63.00	101.65
	(132.08)	(40.81)	(68.08)	(27.22)	(45.10)	(27.16)	(17.07)	(23.65)	(23.44)	(30.96)	(62.28)	(122.17)
11	117.81	34.18	45.03	22.00	38.05	32.76	15.36	26.29	21.72	50.44	85.81	99.54
12	95.18	32.63	42.86	26.71	31.42	27.17	13.33	20.11	30.45	76.63	72.81	108.68
13	82.08	31.41	50.64	25.81	28.04	24.74	14.23	18.58	23.25	60.94	55.59	86.31
14	111.14	30.31	41.31	26.86	36.17	24.84	28.80	17.54	24.91	69.93	49.29	93.70
15	178.68	29.33	38.48	26.41	131.39	31.16	26.89	18.29	35.61	54.23	42.36	115.56
	(116.99)	(31.57)	(43.06)	(25.56)	(53.41)	(28.13)	(19.72)	(20.16)	(29.19)	(62.43)	(61.17)	(100.76)
16	116.66	28.47	30.67	51.02	105.80	28.73	21.48	18.34	60.51	65.02	42.32	123.31
17	116.37	27.74	35.12	44.29	65.31	24.14	17.99	16.73	33.76	61.25	46.61	125.73
18	118.12	26.98	35.73	39.15	111.91	22.68	16.76	15.91	52.48	55.79	52.31	99.55
19	114.28	26.95	59.51	35.35	85.45	20.78	23.57	23.03	32.90	73.75	68.67	82.83
20	92.13	27.11	48.42	26.58	64.61	20.00	27.41	25.96	24.69	48.86	47.70	70.48
	(111.51)	(27.45)	(43.13)	(41.38)	(86.62)	(23.27)	(21.34)	(20.11)	(40.87)	(60.93)	(51.52)	(100.38)
21	80.41	25.15	43.15	34.97	79.23	19.87	22.12	22.68	23.52	38.35	40.40	71.32
22	73.19	24.19	39.27	25.30	55.44	20.03	20.19	20.11	24.28	34.02	60.58	65.07
23	69.20	70.45	37.42	33.93	39.14	18.09	16.60	17.30	21.58	30.23	66.88	61.40
24	65.74	337.70	34.41	31.42	35.97	17.94	15.25	16.71	28.65	27.90	331.58	102.99
25	61.18	127.03	33.79	30.40	32.45	17.82	14.52	16.59	56.35	26.40	1026.12	84.82
	(69.84)	(110.91)	(37.61)	(31.79)	(48.45)	(18.75)	(17.74)	(18.69)	(30.88)	(31.48)	(306.31)	(77.12)
26	56.90	114.36	31.32	26.81	36.96	17.17	14.95	16.39	41.46	34.14	248.33	71.64
27	53.97	116.26	37.03	30.12	38.41	16.81	34.33	17.42	40.04	40.66	335.00	62.50
28	51.03	83.22	29.84	26.78	34.98	16.35	43.63	19.93	32.57	33.31	1401.46	56.10
29	48.05		28.33	53.71	31.05	15.80	28.24	23.65	26.44	31.11	699.12	52.00
30	46.78		27.19	43.56	30.54	21.67	22.11	45.58	22.95	41.30	261.57	49.71
31	45.46		26.22		27.80		18.16	37.67		35.69		47.05
	(50.36)	(104.51)	(29.15)	(36.20)	(33.29)	(17.56)	(26.90)	(26.77)	(32.69)	(36.07)	(589.10)	(56.50)
TOTAL	3066.	1652.	1510.	948.	1536.	728.	618.	676.	930.	1247.	5510.	2999.
										ANNUAL	TOTAL	21418.
AVR.	98.90	58.99	48.70	31.60	49.54	24.27	19.92	21.80	31.01	40.24	183.66	96.73
										ANNUAL	AVR.	58.68

YEAR	MAX.	35DAY	95DAY	185DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1975	1401.46	109.09	61.25	34.33	24.84	15.36	13.33	58.68	21418.4

** 1961 - 1980 :DISCHARGE ** (YEAR 1976)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	44.71	19.26	13.04	8.56	17.17	17.52	13.13	10.65	25.11	22.83	32.84	31.44
2	42.65	18.90	13.34	8.37	13.35	15.75	12.17	10.25	24.74	20.45	34.06	29.19
3	40.62	18.38	12.23	8.33	14.22	18.81	11.41	9.34	38.38	25.48	33.17	27.51
4	39.15	17.39	12.29	8.17	24.73	15.59	10.80	9.03	43.76	23.56	44.88	26.29
5	37.26	17.80	11.37	7.83	30.34	12.94	11.37	8.75	28.24	22.82	38.31	24.91
	(40.92)	(18.45)	(12.45)	(8.25)	(19.96)	(16.12)	(11.78)	(9.60)	(32.05)	(23.03)	(36.77)	(27.87)
6	36.05	18.38	11.28	7.64	22.21	17.50	12.53	8.49	22.40	23.17	34.10	33.78
7	35.10	17.69	11.12	7.57	16.55	13.57	12.77	8.14	19.15	25.34	44.30	49.05
8	35.80	16.88	10.91	7.52	22.13	17.02	12.80	7.92	17.25	21.56	51.72	42.62
9	33.97	16.11	10.63	7.46	21.95	29.48	15.41	7.68	14.93	19.47	47.40	33.45
10	32.17	15.61	10.45	7.80	16.14	20.02	12.41	7.51	51.21	20.20	37.41	28.81
	(34.60)	(16.93)	(10.88)	(7.60)	(19.80)	(19.52)	(13.18)	(7.95)	(24.99)	(21.91)	(43.00)	(37.54)
11	30.85	15.39	10.79	16.24	40.54	14.15	30.75	7.44	59.86	25.44	32.95	26.58
12	29.70	15.26	10.79	16.80	28.92	14.51	26.30	7.40	29.09	30.59	31.68	25.74
13	28.75	14.67	11.20	12.73	21.15	14.23	16.09	9.33	26.34	63.19	31.57	24.65
14	27.20	14.55	12.14	15.40	28.08	13.30	15.59	10.29	21.51	50.93	32.00	25.36
15	26.58	14.55	20.73	13.63	30.98	14.65	13.69	9.21	17.39	93.54	34.45	70.15
	(28.67)	(14.88)	(13.13)	(14.96)	(29.93)	(15.17)	(20.60)	(8.73)	(30.84)	(52.74)	(32.53)	(34.50)
16	26.15	14.03	19.98	15.03	21.35	14.59	30.68	8.38	16.94	72.45	34.98	45.01
17	25.26	13.95	12.58	17.22	16.06	13.21	20.13	12.03	19.45	133.81	57.77	38.12
18	24.41	13.59	11.35	15.40	14.16	13.36	16.29	23.99	25.75	89.03	57.83	47.08
19	23.65	13.25	10.56	12.66	13.15	13.99	15.35	44.64	23.71	69.58	80.93	82.61
20	22.92	12.79	9.99	13.01	13.19	12.67	15.11	26.48	20.65	70.80	74.46	62.27
	(24.48)	(13.56)	(12.89)	(14.66)	(15.58)	(13.72)	(17.51)	(23.10)	(21.30)	(87.13)	(61.19)	(55.02)
21	22.72	12.55	9.66	14.27	12.41	11.27	15.71	44.39	20.82	55.75	52.95	46.65
22	22.17	12.14	9.31	11.12	12.17	10.45	26.06	32.28	25.38	49.38	44.52	69.54
23	21.79	12.08	9.70	11.69	12.37	10.59	21.16	53.13	21.37	46.97	45.53	131.57
24	21.39	11.80	10.13	16.79	11.20	18.32	17.03	52.97	27.11	39.82	59.23	185.09
25	20.83	11.53	10.35	16.26	10.71	20.56	15.24	37.14	35.00	35.50	48.00	139.00
	(21.78)	(12.02)	(9.83)	(14.03)	(11.77)	(14.24)	(19.04)	(43.98)	(26.16)	(45.48)	(50.05)	(114.37)
26	20.97	11.28	10.82	13.17	10.42	27.36	12.40	34.44	29.30	35.95	39.50	103.66
27	21.02	11.15	11.62	17.79	10.09	37.70	11.71	29.54	16.50	33.99	36.20	104.25
28	20.80	11.66	11.83	19.07	9.97	33.59	15.48	98.70	35.14	28.96	35.84	168.51
29	20.39	12.94	10.23	18.57	10.36	21.39	17.86	52.21	32.58	27.37	35.59	220.34
30	20.14		9.23	19.72	12.37	15.58	12.87	32.65	26.98	28.04	33.84	144.63
31	19.81		8.89		14.80		11.77	25.87		30.22		120.51
	(20.52)	(11.76)	(10.44)	(18.66)	(11.33)	(27.14)	(13.68)	(45.57)	(32.10)	(30.75)	(36.19)	(143.65)
TOTAL	875.	426.	359.	391.	553.	530.	503.	741.	837.	1335.	1299.	2208.
										ANNUAL	TOTAL	10057.
AVR.	28.23	14.70	11.57	13.03	17.85	17.65	16.22	23.90	27.90	43.10	43.29	71.24
										ANNUAL	AVR.	27.48

YEAR	MAX.	35DAY	95DAY	185DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1976	220.34	50.93	32.00	19.98	12.87	8.14	7.44	27.48	10057.1

** 1961 - 1980 :DISCHARGE **

(YEAR 1977)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	148.37	23.72	23.53	7.95	6.25	7.09	7.52	7.66	21.60	21.32	29.55	31.09
2	118.57	24.23	23.56	7.65	5.89	7.17	8.10	7.14	16.77	32.05	26.63	25.50
3	104.89	23.95	17.00	8.02	5.56	6.91	7.88	7.07	13.79	60.58	24.16	23.30
4	119.55	25.01	15.79	7.55	5.81	6.94	8.20	7.01	11.73	40.14	25.98	23.03
5	155.92	24.44	15.99	7.43	5.84	8.24	8.81	6.93	10.74	36.26	26.38	26.58
	(129.46)	(24.27)	(19.17)	(7.72)	(5.88)	(7.27)	(8.11)	(7.10)	(14.93)	(38.07)	(26.54)	(25.90)
6	138.34	22.15	16.45	7.67	7.09	13.38	10.12	7.02	16.50	39.86	42.41	26.77
7	95.26	21.06	14.40	7.68	8.58	10.73	13.82	6.59	17.62	51.24	30.13	29.31
8	78.82	20.88	13.16	7.35	8.78	11.98	9.82	6.24	12.60	53.96	25.20	25.32
9	67.74	32.58	12.42	7.18	10.06	11.34	11.98	5.96	11.73	41.88	24.49	22.10
10	59.55	55.09	11.67	7.11	7.85	12.31	11.86	5.77	12.61	28.33	31.94	21.12
	(88.04)	(30.35)	(13.62)	(7.40)	(8.47)	(11.95)	(11.52)	(6.32)	(14.21)	(43.05)	(30.83)	(24.92)
11	54.49	41.57	11.82	6.92	7.27	15.16	9.67	5.55	11.29	79.06	29.93	21.27
12	50.85	42.08	11.78	6.80	6.50	16.04	10.90	5.35	10.63	54.37	25.60	19.81
13	47.77	32.93	11.72	6.61	6.54	19.27	20.50	5.26	12.15	31.95	36.46	20.90
14	44.57	28.29	11.84	6.43	14.77	34.48	13.39	5.12	16.81	26.63	30.54	20.41
15	42.37	25.46	11.20	6.43	21.19	18.53	10.86	5.12	14.55	42.94	24.38	18.91
	(48.01)	(34.07)	(11.68)	(6.64)	(11.25)	(20.70)	(13.06)	(5.28)	(13.09)	(46.99)	(29.38)	(20.26)
16	40.30	23.72	10.87	6.55	23.45	14.05	9.73	9.06	11.78	136.27	21.58	17.90
17	38.35	22.98	10.52	7.86	14.13	13.22	9.06	8.16	11.27	76.01	19.92	17.32
18	36.52	21.30	10.33	8.18	11.49	13.93	8.87	9.97	10.79	76.24	19.65	17.78
19	34.96	20.63	9.87	6.95	12.02	15.61	8.23	10.52	10.53	83.06	25.10	22.21
20	33.74	20.97	9.62	6.55	9.71	15.67	8.11	34.40	10.41	48.78	40.76	18.44
	(36.77)	(21.80)	(10.24)	(7.22)	(14.16)	(14.54)	(8.80)	(15.62)	(10.96)	(84.07)	(25.40)	(18.73)
21	32.45	21.32	9.94	6.40	8.12	14.55	8.29	36.61	10.30	36.20	32.47	19.08
22	30.98	20.75	10.14	6.23	7.54	14.25	7.07	17.72	11.06	33.37	26.86	29.87
23	29.80	19.84	9.74	6.15	7.23	12.62	7.32	11.65	10.28	48.11	28.35	26.63
24	28.59	19.88	9.09	6.15	7.11	9.12	7.06	27.06	14.49	47.42	32.60	23.44
25	27.74	21.25	8.98	6.07	7.25	8.10	7.06	26.83	19.26	50.37	30.78	19.88
	(29.91)	(20.61)	(9.58)	(6.20)	(7.45)	(11.73)	(7.48)	(23.97)	(13.08)	(43.09)	(30.21)	(23.78)
26	27.01	23.10	11.31	5.89	9.73	7.67	7.35	15.58	14.65	40.97	31.89	17.65
27	26.27	23.38	10.12	5.75	8.09	13.79	38.79	35.07	54.59	37.59	28.34	17.42
28	25.61	21.16	9.30	5.61	9.76	9.54	23.85	63.00	48.54	32.37	24.86	17.66
29	24.87		8.75	5.74	9.35	8.34	30.52	30.05	35.75	30.17	23.94	17.00
30	23.64		8.44	5.97	9.43	7.78	19.23	65.19	29.14	31.51	44.62	16.28
31	22.70		8.18		7.49		10.40	37.44		36.35		15.97
	(25.03)	(22.55)	(9.35)	(5.79)	(9.07)	(9.42)	(21.69)	(41.15)	(36.53)	(34.83)	(30.73)	(17.00)
TOTAL	1811.	723.	378.	205.	291.	378.	375.	539.	514.	1485.	805.	670.
										ANNUAL	TOTAL	8234.
AVR.	58.42	25.83	12.18	6.83	9.37	12.60	12.10	17.38	17.13	47.91	28.85	21.61
										ANNUAL	AVR.	22.56

YEAR	MAX.	35DAY	95DAY	185DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1977	155.92	42.41	26.86	16.28	8.87	5.81	5.12	22.56	8233.7

** 1961 - 1980 :DISCHARGE ** (YEAR 1978)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	15.29	16.78	21.86	17.41	16.95	17.42	15.34	14.45	10.98	12.54	27.24	25.04
2	14.96	16.25	19.54	11.78	19.79	16.00	15.66	15.54	20.16	11.67	56.93	30.76
3	14.45	16.04	19.54	10.20	20.66	19.72	25.55	29.24	29.96	11.30	37.51	315.39
4	14.07	16.11	17.98	9.76	19.99	30.64	26.57	27.82	24.93	10.91	39.62	105.72
5	13.49	16.79	14.86	9.83	30.24	24.67	18.44	22.16	19.69	10.79	42.57	61.56
	(14.45)	(16.39)	(18.76)	(11.80)	(21.53)	(22.89)	(20.31)	(21.84)	(21.14)	(11.44)	(40.77)	(107.69)
6	13.28	16.85	13.53	11.39	22.80	20.61	16.63	17.38	17.89	13.63	34.50	48.27
7	14.64	16.23	12.87	11.43	28.38	18.34	21.44	16.97	16.07	16.17	44.81	177.95
8	18.31	15.91	12.11	9.94	25.27	24.05	35.14	15.50	15.97	18.28	104.28	259.80
9	89.75	15.69	11.86	12.69	25.18	23.54	32.02	19.85	15.04	18.07	53.37	145.01
10	89.40	15.06	11.66	9.80	32.21	43.00	27.03	18.18	13.56	13.93	36.88	144.43
	(45.08)	(15.95)	(12.41)	(11.05)	(26.37)	(25.91)	(26.45)	(17.57)	(15.71)	(16.02)	(54.77)	(155.09)
11	47.67	14.64	14.69	8.74	51.75	35.31	26.08	15.76	13.43	23.61	29.55	105.15
12	35.90	13.86	14.15	8.50	56.94	29.18	25.75	14.97	13.02	19.93	25.80	95.38
13	35.21	13.29	12.29	8.93	37.51	24.22	22.72	13.88	14.78	14.26	33.32	89.87
14	30.19	13.22	11.50	10.90	29.65	21.00	22.34	15.18	16.86	13.20	33.20	95.71
15	26.90	14.16	10.81	11.48	67.98	19.73	20.62	13.41	12.60	12.38	39.04	74.72
	(35.17)	(13.85)	(12.69)	(9.71)	(48.77)	(25.89)	(23.50)	(14.24)	(14.14)	(16.68)	(32.18)	(92.17)
16	27.04	17.72	10.61	12.85	39.40	17.85	22.64	24.16	23.71	12.50	29.99	63.24
17	45.28	15.53	10.93	13.89	26.98	16.81	19.81	16.52	22.63	16.90	54.89	54.76
18	43.99	14.21	10.14	12.49	29.07	15.97	18.94	14.20	14.79	23.58	76.07	48.85
19	40.32	15.31	11.76	22.31	26.22	15.21	19.41	13.17	12.30	18.10	303.39	44.90
20	30.40	20.63	11.48	20.22	22.78	75.36	21.10	12.96	11.00	17.36	109.90	42.53
	(37.41)	(16.68)	(10.98)	(16.35)	(28.89)	(28.24)	(20.38)	(16.20)	(16.89)	(17.69)	(114.97)	(50.86)
21	27.68	15.19	11.48	15.79	59.62	109.30	23.61	12.36	11.26	25.72	61.56	40.88
22	28.71	13.74	11.19	14.19	47.54	64.74	20.51	11.86	13.02	29.35	45.66	44.02
23	27.99	13.20	12.39	12.70	54.15	54.28	18.34	12.13	19.83	25.38	71.18	45.31
24	25.03	12.82	12.98	10.21	31.99	25.87	23.31	11.47	18.77	26.20	92.29	81.93
25	23.08	12.66	10.86	10.81	24.62	22.39	42.64	11.24	17.63	23.51	50.96	29.81
	(26.50)	(13.52)	(11.78)	(12.54)	(43.58)	(51.52)	(25.68)	(11.81)	(16.10)	(25.99)	(64.33)	(48.39)
26	22.20	13.36	10.35	24.00	21.04	19.79	27.73	12.37	19.85	25.52	39.10	39.06
27	21.06	17.11	10.24	24.19	25.76	18.76	24.47	12.70	14.14	20.62	33.35	62.13
28	20.08	27.59	10.54	20.75	26.99	18.31	20.13	11.47	12.77	17.28	29.74	43.47
29	19.29		10.40	16.58	21.19	18.79	16.98	11.96	13.08	19.59	26.99	42.51
30	19.56		14.98	16.20	14.01	17.11	16.17	11.96	15.59	19.87	25.18	35.47
31	18.13		17.16		15.33		15.34	11.15		34.32		27.47
	(20.05)	(19.35)	(12.28)	(20.34)	(20.72)	(18.55)	(20.14)	(11.93)	(15.09)	(22.87)	(30.87)	(41.78)
TOTAL	913.	440.	407.	409.	970.	865.	702.	480.	495.	576.	1689.	2522.
										ANNUAL	TOTAL	10469.
AVR.	29.46	15.72	13.12	13.63	31.29	28.83	22.66	15.48	16.51	18.59	56.32	81.35
										ANNUAL	AVR.	28.68

YEAR	MAX.	35DAY	95DAY	185DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1978	315.39	53.37	28.38	19.54	14.07	10.24	8.50	28.68	10469.2

** 1961 - 1980 DISCHARGE ** (YEAR 1979)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	33.86	17.47	12.17	13.07	22.61	15.48	13.39	14.59	17.44	23.48	45.46	294.83
2	34.67	17.25	11.63	14.35	21.75	16.69	10.56	14.30	20.40	21.64	62.92	226.69
3	49.90	16.84	14.65	12.54	21.91	13.04	9.29	13.31	16.81	19.78	45.27	168.53
4	39.28	17.01	19.01	14.92	25.18	18.62	8.82	13.80	25.51	19.48	43.91	127.94
5	76.27	17.16	17.57	13.28	24.88	14.08	8.61	13.34	29.13	17.61	38.81	111.89
	(46.80)	(17.14)	(15.01)	(13.63)	(23.27)	(15.58)	(10.13)	(14.03)	(21.86)	(20.40)	(47.27)	(185.98)
6	94.58	18.21	14.70	19.78	22.48	13.83	8.30	32.32	23.28	18.67	48.48	107.79
7	58.79	26.12	13.43	22.43	25.50	13.21	8.22	34.45	41.96	27.20	43.68	91.64
8	47.41	38.42	12.93	18.78	26.74	13.31	7.94	18.38	32.34	39.98	47.23	80.28
9	40.99	23.17	12.40	20.73	40.65	13.24	7.75	15.15	30.09	35.54	45.79	71.94
10	37.34	18.29	12.32	13.08	31.44	16.54	7.62	13.92	64.27	31.86	39.91	65.30
	(55.32)	(24.84)	(13.17)	(18.96)	(29.36)	(14.03)	(7.98)	(22.84)	(38.39)	(30.65)	(45.02)	(83.39)
11	34.32	16.98	13.22	13.26	25.15	15.65	7.70	13.21	42.00	41.57	38.64	60.74
12	32.30	16.24	23.81	15.32	23.81	14.36	10.00	12.46	31.13	81.06	34.92	58.27
13	30.01	15.75	33.31	12.11	25.52	19.48	11.66	12.02	33.00	76.02	47.86	53.48
14	29.38	15.47	30.76	11.49	43.00	20.67	12.08	11.56	31.90	38.89	50.82	50.66
15	26.91	15.19	21.80	11.51	41.88	15.49	12.23	11.21	28.67	28.48	50.43	47.17
	(30.38)	(15.93)	(24.58)	(12.74)	(31.87)	(17.33)	(10.73)	(12.09)	(33.34)	(53.20)	(44.53)	(54.06)
16	25.85	15.05	17.05	17.16	24.01	15.38	11.26	10.94	28.63	29.24	75.74	45.27
17	24.85	18.07	13.40	22.00	19.43	20.81	11.06	12.67	212.01	34.43	67.17	43.78
18	23.72	19.75	12.91	14.06	17.20	20.03	13.95	13.08	90.13	35.31	60.44	40.95
19	23.65	17.63	12.61	36.64	15.62	15.42	15.42	11.62	84.12	99.57	50.90	39.31
20	24.03	15.64	11.84	46.36	14.83	13.59	17.97	11.30	50.49	67.83	44.83	37.46
	(24.42)	(17.23)	(13.56)	(27.38)	(18.22)	(17.05)	(13.93)	(12.04)	(93.08)	(53.28)	(59.82)	(41.35)
21	23.85	14.65	11.45	50.60	14.19	13.78	19.05	11.11	39.89	67.59	42.48	35.13
22	24.58	13.95	11.05	40.06	14.53	13.43	29.07	27.12	33.22	45.49	40.80	33.80
23	25.45	13.51	10.58	35.19	13.05	11.66	40.25	23.61	35.15	45.10	46.15	32.23
24	26.99	13.33	11.48	31.01	12.31	10.73	29.78	24.85	154.30	60.51	361.30	31.05
25	24.69	15.32	11.03	30.06	11.72	11.98	44.70	27.28	125.91	47.64	329.43	29.85
	(25.11)	(14.15)	(11.12)	(37.38)	(13.16)	(12.32)	(32.57)	(22.79)	(77.69)	(53.27)	(164.03)	(32.41)
26	22.85	18.25	10.73	37.24	11.96	11.13	68.22	20.36	59.55	45.03	585.73	28.95
27	21.44	16.29	10.54	34.75	14.65	11.79	30.14	16.04	39.88	46.37	632.95	28.43
28	20.28	13.71	10.30	36.36	28.63	9.98	22.07	16.34	32.15	47.38	430.47	27.68
29	19.12		10.04	32.47	23.37	9.19	19.30	17.36	29.25	41.89	289.14	26.78
30	18.37		9.98	35.27	18.44	12.39	18.04	18.10	26.16	33.01	190.06	26.45
31	17.77		10.52		21.10		16.06	18.29		29.89		26.45
	(19.97)	(16.08)	(10.35)	(35.22)	(19.69)	(10.90)	(28.97)	(17.75)	(37.40)	(40.70)	(425.67)	(27.46)
TOTAL	1032.	495.	449.	727.	698.	441.	551.	525.	1509.	1298.	3932.	2151.
										ANNUAL	TOTAL	13807.
AVR.	33.31	17.67	14.49	24.22	22.50	14.70	17.76	16.95	50.29	41.88	131.06	69.38
										ANNUAL	AVR.	37.83

YEAR	MAX.	35DAY	95DAY	185DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1979	632.95	60.74	37.34	22.66	14.35	9.98	7.62	37.83	13806.9

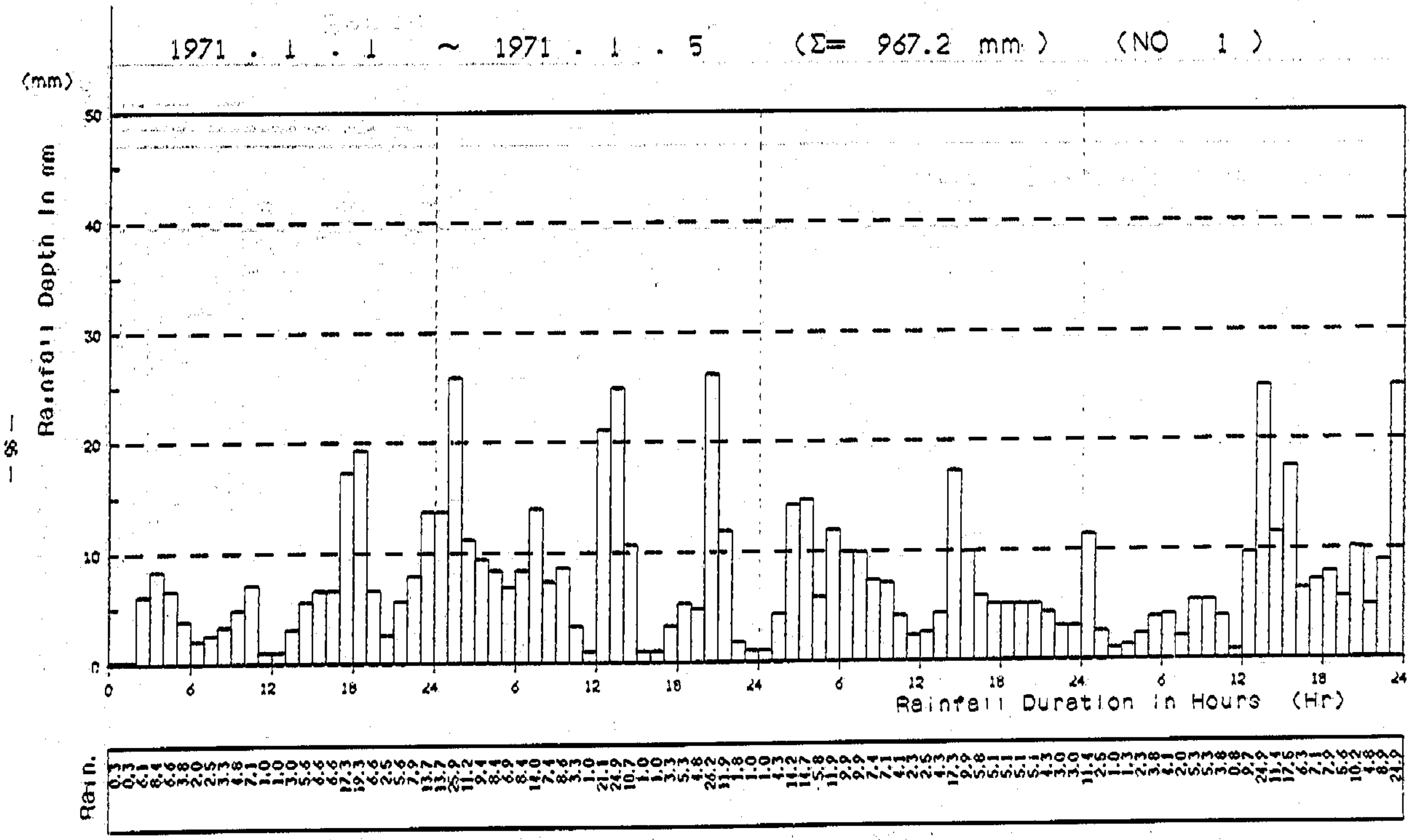
** 1961 - 1980 :DISCHARGE ** (YEAR 1980)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	26.33	33.30	22.34	15.56	27.41	14.11	13.46	37.93	13.26	30.82	53.87	36.83
2	25.33	34.16	16.52	13.59	21.10	25.72	19.43	35.34	12.75	30.77	49.90	151.56
3	23.69	23.96	24.22	14.65	20.06	28.41	17.24	19.22	12.34	33.09	49.45	95.57
4	22.83	21.02	19.76	15.75	24.23	23.08	13.29	16.62	14.95	31.10	63.16	77.96
5	22.12	16.40	16.26	15.41	24.20	25.18	12.58	15.26	22.79	57.13	82.46	53.87
	(24.06)	(25.78)	(19.82)	(14.99)	(23.40)	(24.30)	(15.20)	(24.87)	(15.22)	(36.58)	(59.77)	(83.16)
6	22.05	15.49	15.65	12.74	32.63	22.56	12.59	15.08	34.72	44.18	78.21	43.75
7	22.05	14.83	18.66	12.89	28.33	18.77	12.43	26.53	20.65	34.96	43.60	39.51
8	22.05	14.36	25.51	13.98	25.05	31.19	11.60	22.25	64.23	31.48	37.28	40.60
9	22.05	14.14	21.12	14.55	19.82	27.56	10.98	49.38	41.47	29.37	39.95	78.07
10	22.01	12.81	26.31	13.74	17.30	19.21	13.25	44.53	35.47	28.34	65.73	72.12
	(22.04)	(14.53)	(21.49)	(13.58)	(24.63)	(23.86)	(12.17)	(31.57)	(39.31)	(33.77)	(52.97)	(54.81)
11	21.43	13.71	37.04	18.89	40.54	16.48	13.45	28.98	27.09	30.77	42.91	66.50
12	21.12	13.45	23.50	18.20	34.94	15.18	10.97	50.32	22.11	39.04	44.08	53.62
13	21.12	13.26	16.83	20.81	25.19	14.83	10.75	34.54	20.09	80.84	41.73	44.77
14	20.40	13.14	14.84	23.44	21.01	17.06	16.28	26.73	17.03	39.74	45.47	38.69
15	19.28	12.93	14.08	18.50	21.48	32.62	18.10	22.30	15.43	30.72	40.59	34.27
	(20.67)	(13.30)	(21.26)	(19.97)	(28.63)	(19.23)	(13.91)	(32.57)	(20.35)	(44.22)	(42.96)	(47.57)
16	18.80	12.65	16.03	20.84	19.20	34.20	13.48	18.99	14.55	59.25	33.42	32.00
17	18.42	12.42	27.96	16.97	21.22	23.32	13.07	22.59	16.13	128.35	32.19	32.18
18	18.13	12.54	27.13	14.00	23.11	20.30	13.66	26.87	18.66	72.31	32.49	56.52
19	17.92	13.05	45.28	12.93	17.92	16.86	11.97	18.59	46.71	76.98	34.39	206.49
20	17.87	13.10	32.19	12.34	18.25	15.26	10.87	16.98	52.22	92.51	39.40	114.18
	(18.23)	(12.75)	(29.72)	(15.41)	(19.94)	(22.00)	(12.61)	(20.80)	(29.65)	(85.88)	(34.38)	(88.27)
21	17.87	13.50	28.45	13.69	16.44	13.95	9.91	16.82	38.11	78.85	35.53	70.38
22	17.87	16.31	22.32	18.63	15.16	13.56	9.47	17.24	31.95	111.49	37.14	58.22
23	17.78	21.11	17.38	28.25	14.97	22.46	22.26	18.53	34.48	93.06	49.93	56.85
24	17.29	20.47	15.55	32.37	14.04	21.04	17.17	18.12	31.65	65.33	40.14	49.02
25	16.92	14.81	14.36	30.44	13.86	16.20	12.97	19.32	70.00	119.09	44.34	44.42
	(17.55)	(17.24)	(19.61)	(24.68)	(15.01)	(17.56)	(14.36)	(18.02)	(41.24)	(93.56)	(41.42)	(55.78)
26	16.37	16.68	14.10	28.74	14.89	14.75	20.09	22.26	123.25	68.48	49.73	44.55
27	16.23	39.94	14.50	35.77	15.40	14.57	18.59	20.01	56.04	50.76	44.67	49.22
28	16.18	46.64	14.84	55.10	44.07	12.67	16.80	15.83	49.45	43.58	36.60	40.62
29	16.18	29.66	14.02	49.95	58.47	12.45	13.34	14.30	47.00	39.88	39.29	46.05
30	16.18		13.18	35.04	27.28	12.05	13.62	13.93	41.68	36.58	40.21	47.58
31	16.09		16.83		23.41		13.26	14.21		41.89		42.41
	(16.20)	(33.23)	(14.59)	(40.72)	(30.59)	(13.42)	(16.03)	(16.76)	(63.48)	(46.86)	(42.10)	(45.07)
TOTAL	610.	551.	647.	647.	742.	602.	437.	740.	1040.	1751.	1308.	1918.
										ANNUAL	TOTAL	11060.
AVR.	19.68	19.00	20.87	21.56	23.92	20.06	14.11	23.88	34.88	56.49	45.60	61.88
										ANNUAL	AVR.	30.22

YEAR	MAX.	35DAY	95DAY	185DAY	275DAY	355DAY	MIN.	AVR.	TOTAL
1980	206.49	55.10	37.04	22.05	16.03	12.43	9.47	30.22	11059.5

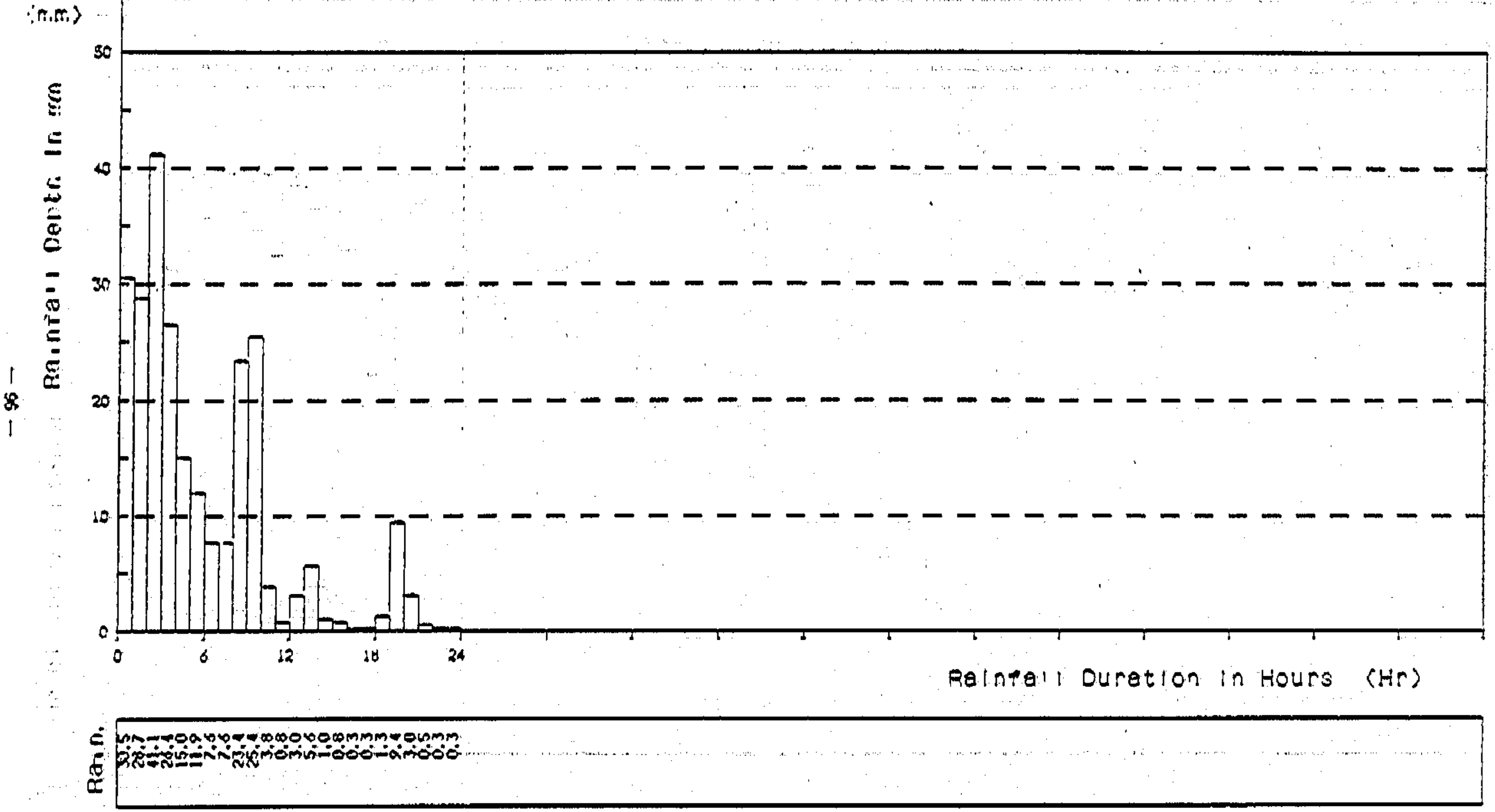
Appendix E

Rainfall Patterns at Stations


1971 . 1 . 1 ~ 1971 . 1 . 5 (Σ= 967.2 mm) (NO 1)
(mm)
Rainfall Depth in mm
Rainfall Duration in Hours (Hr)
Rain.

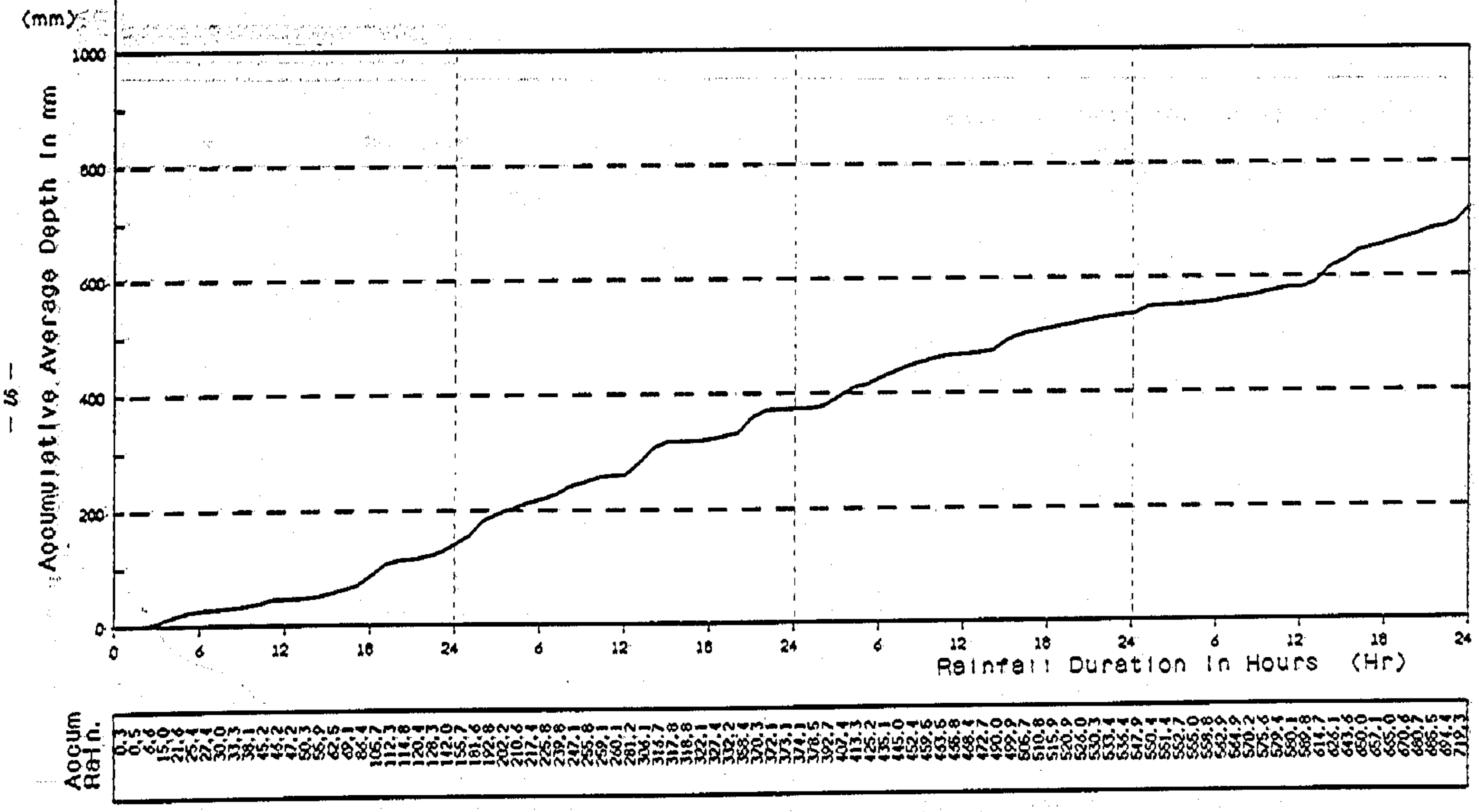
Benta

1971 . 1 . 1 ~ 1971 . 1 . 5 (Σ= 967.2 mm) (NO 2)



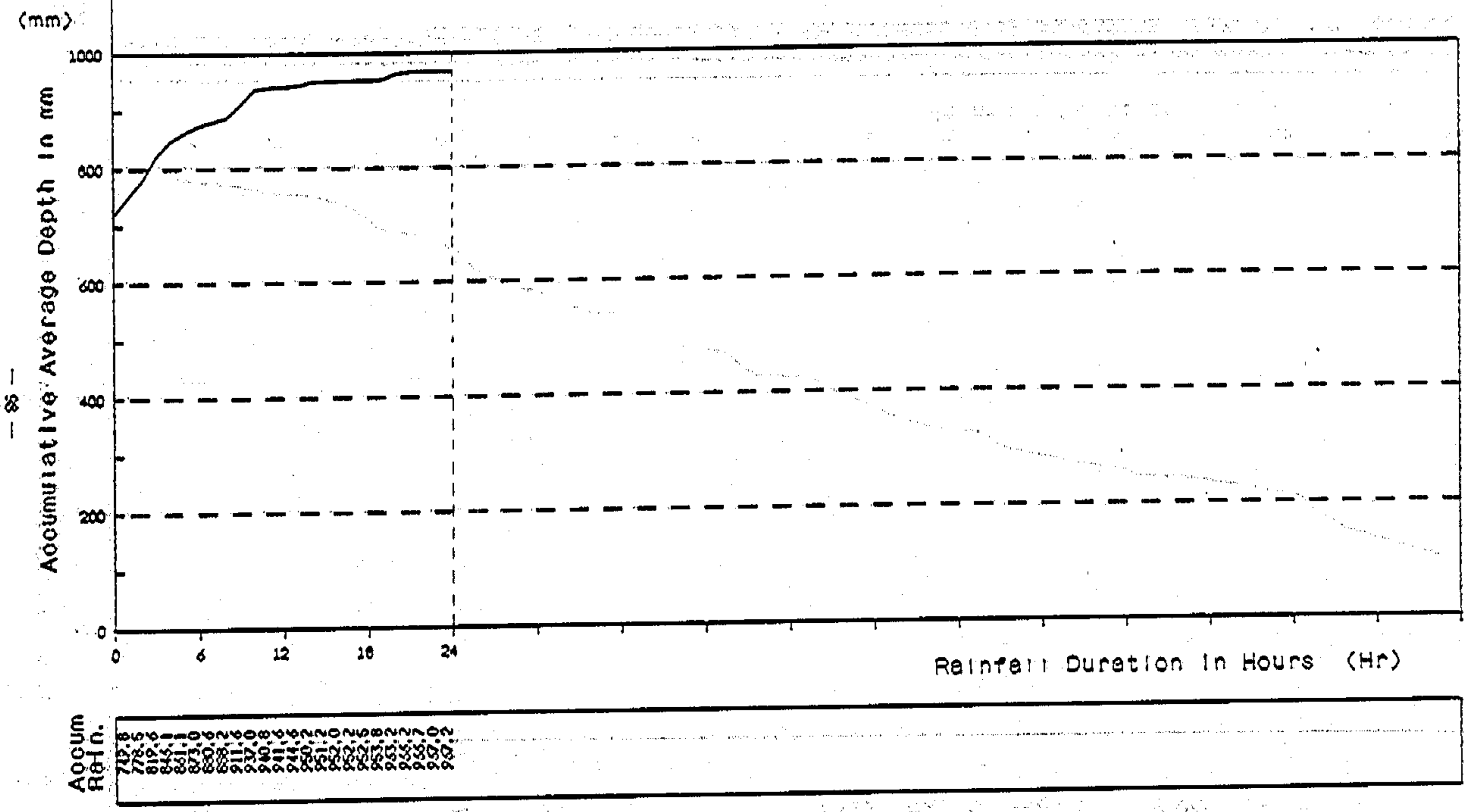
Benta

1971 . 1 . 1 ~ 1971 . 1 . 5 (Σ= 967.2 mm) (NO 1)

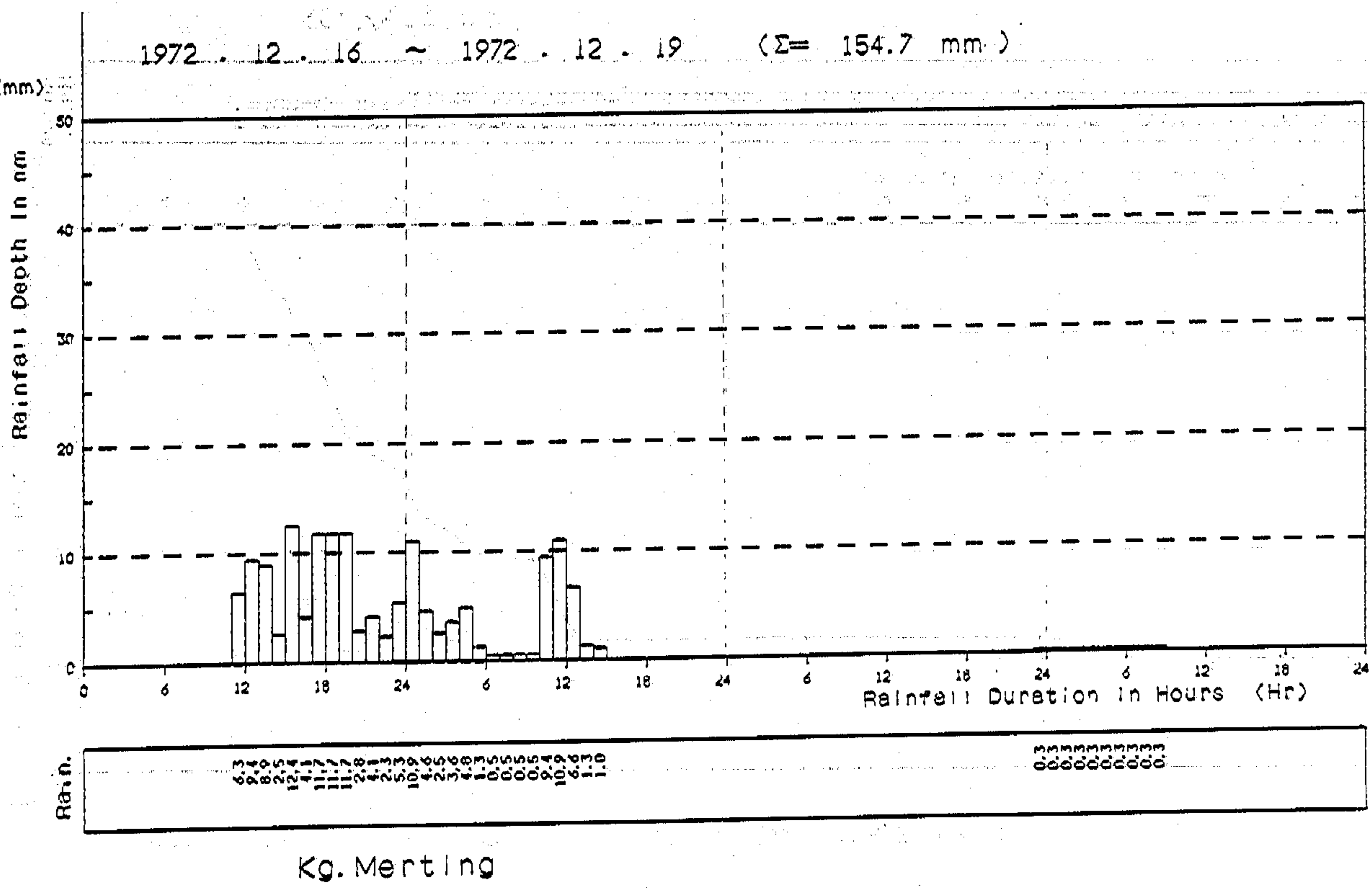


Benta

1971 . 1 . 1 ~ 1971 . 1 . 5 (Σ= 967.2 mm) (NO 2)

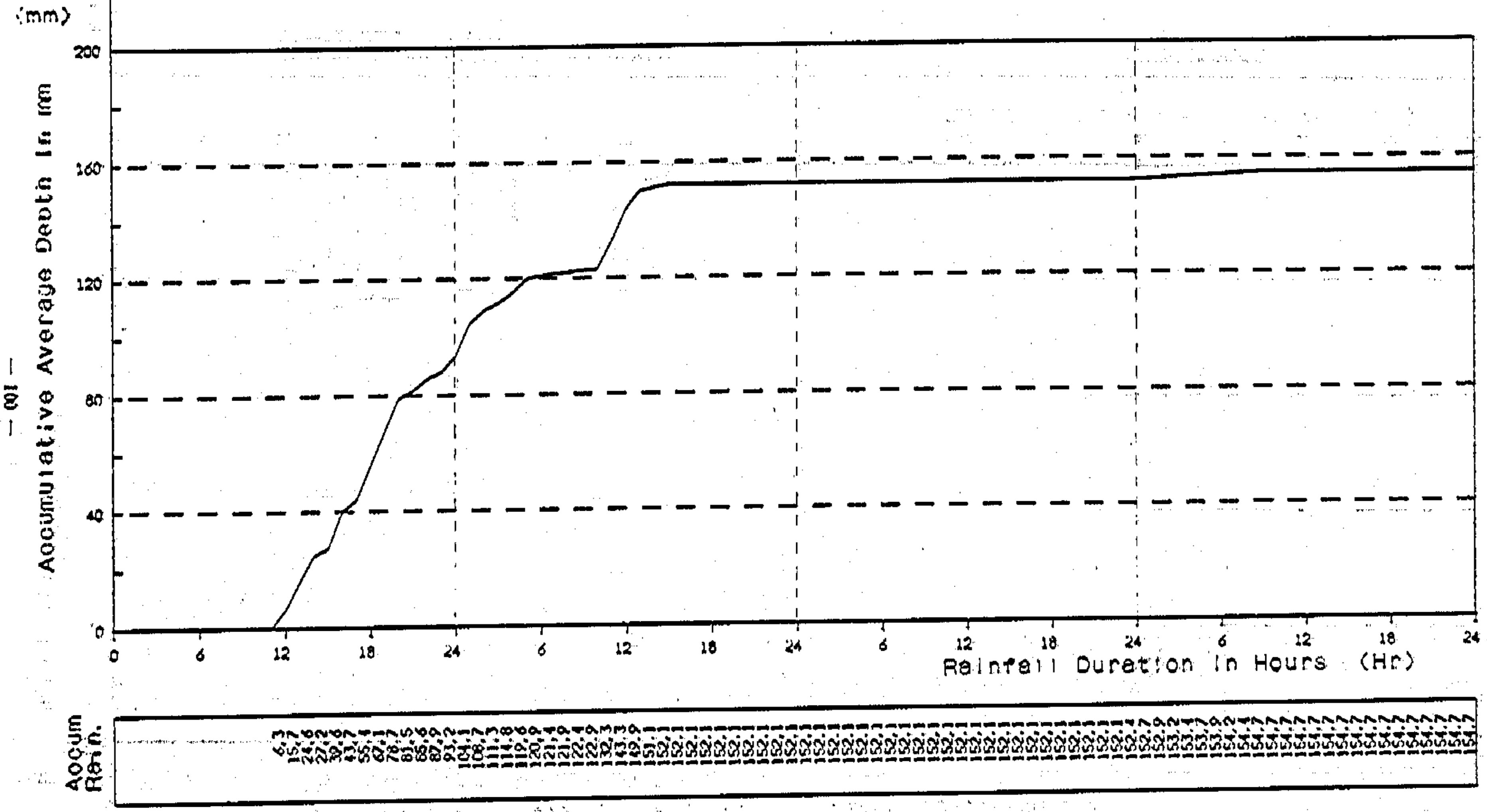


Benta



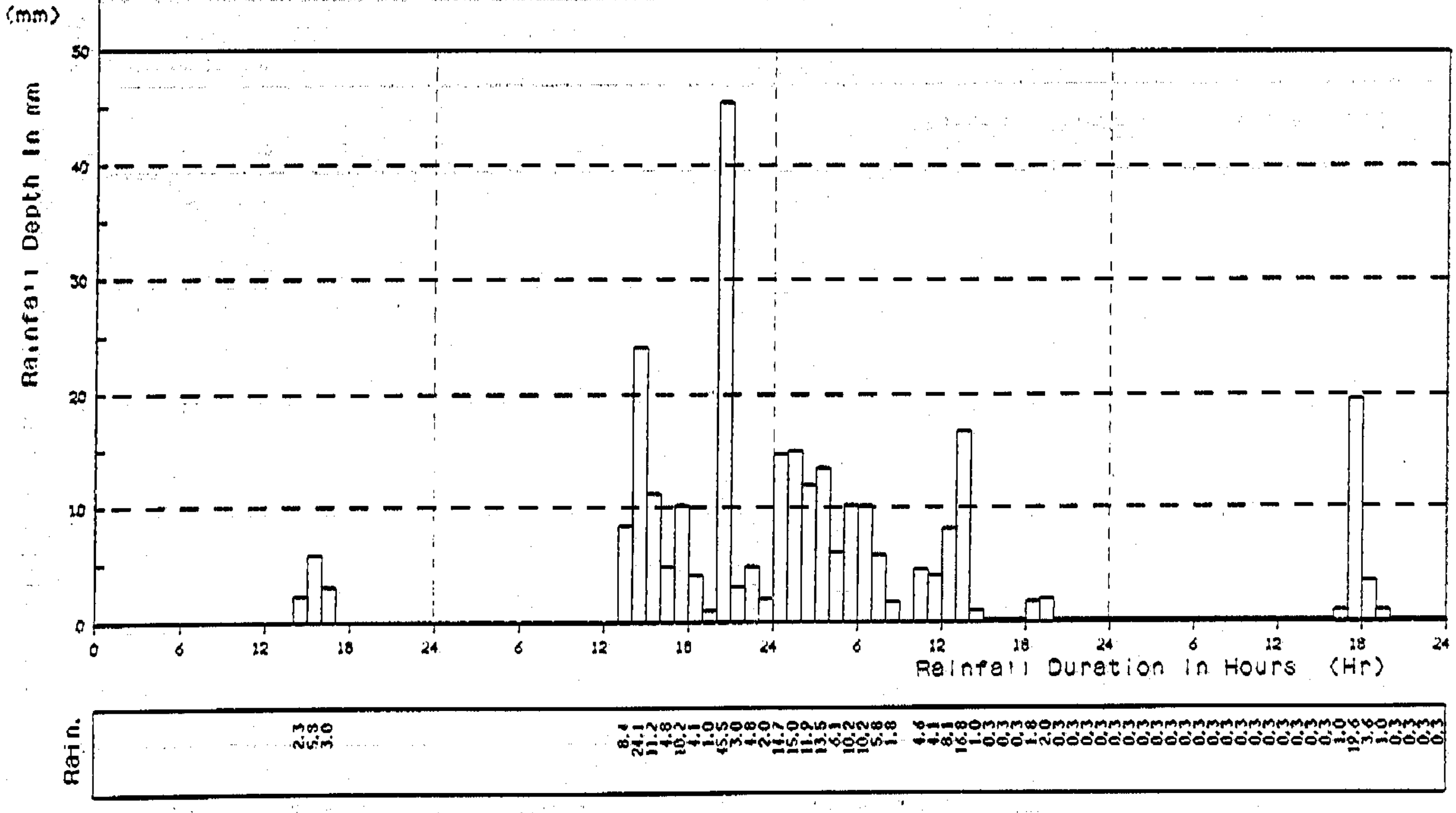
1972 . 12 . 16 ~ 1972 . 12 . 19 (Σ= 154.7 mm)
(mm)
Rainfall Depth in mm
Rainfall Duration in Hours (Hr)
Rain.
Kg. Merting

1972 . 12 . 16 ~ 1972 . 12 . 19 (Σ= 154.7 mm)



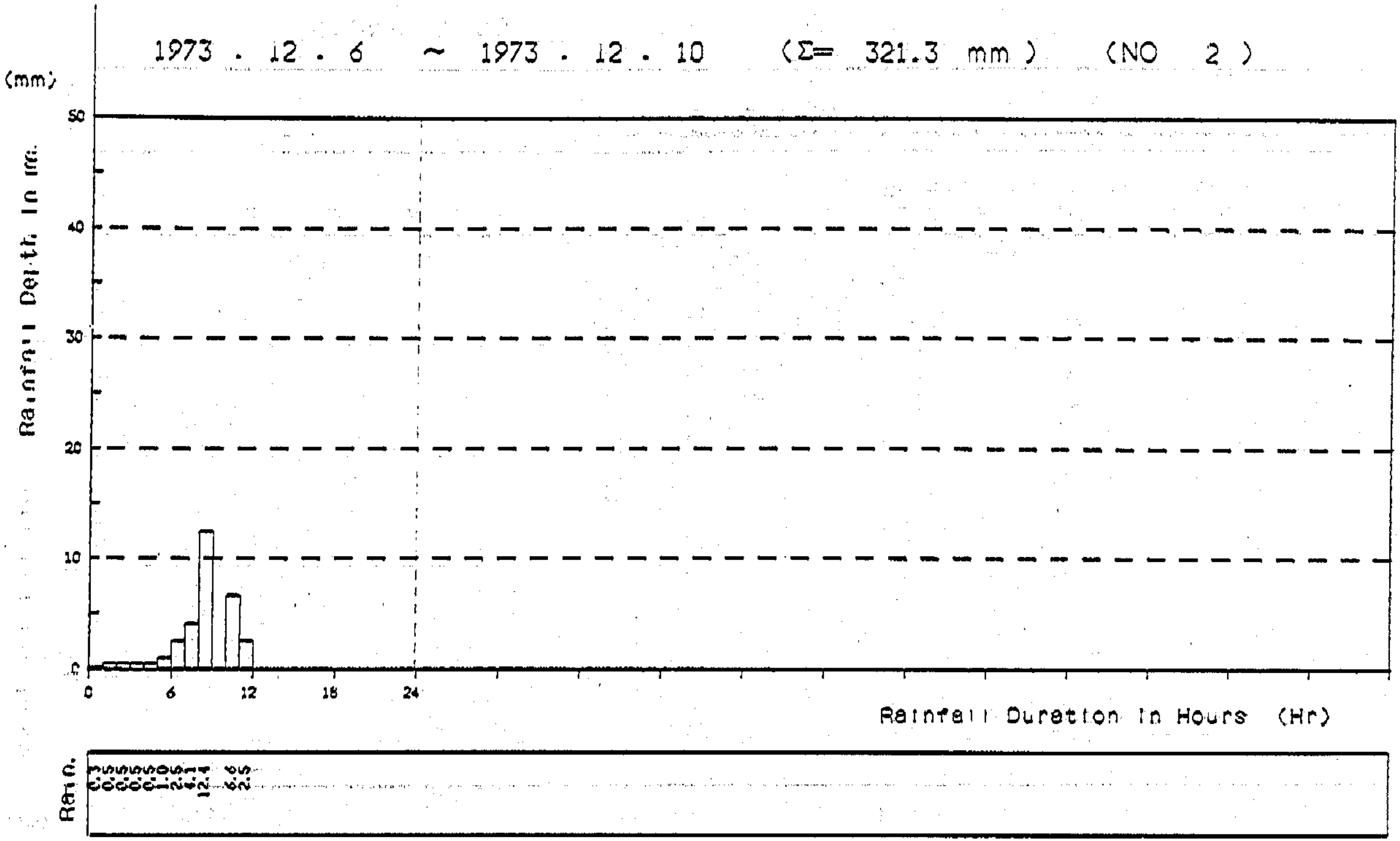
Kg. Merting

1973 . 12 . 6 ~ 1973 . 12 . 10 (Σ= 321.3 mm) (NO 1)



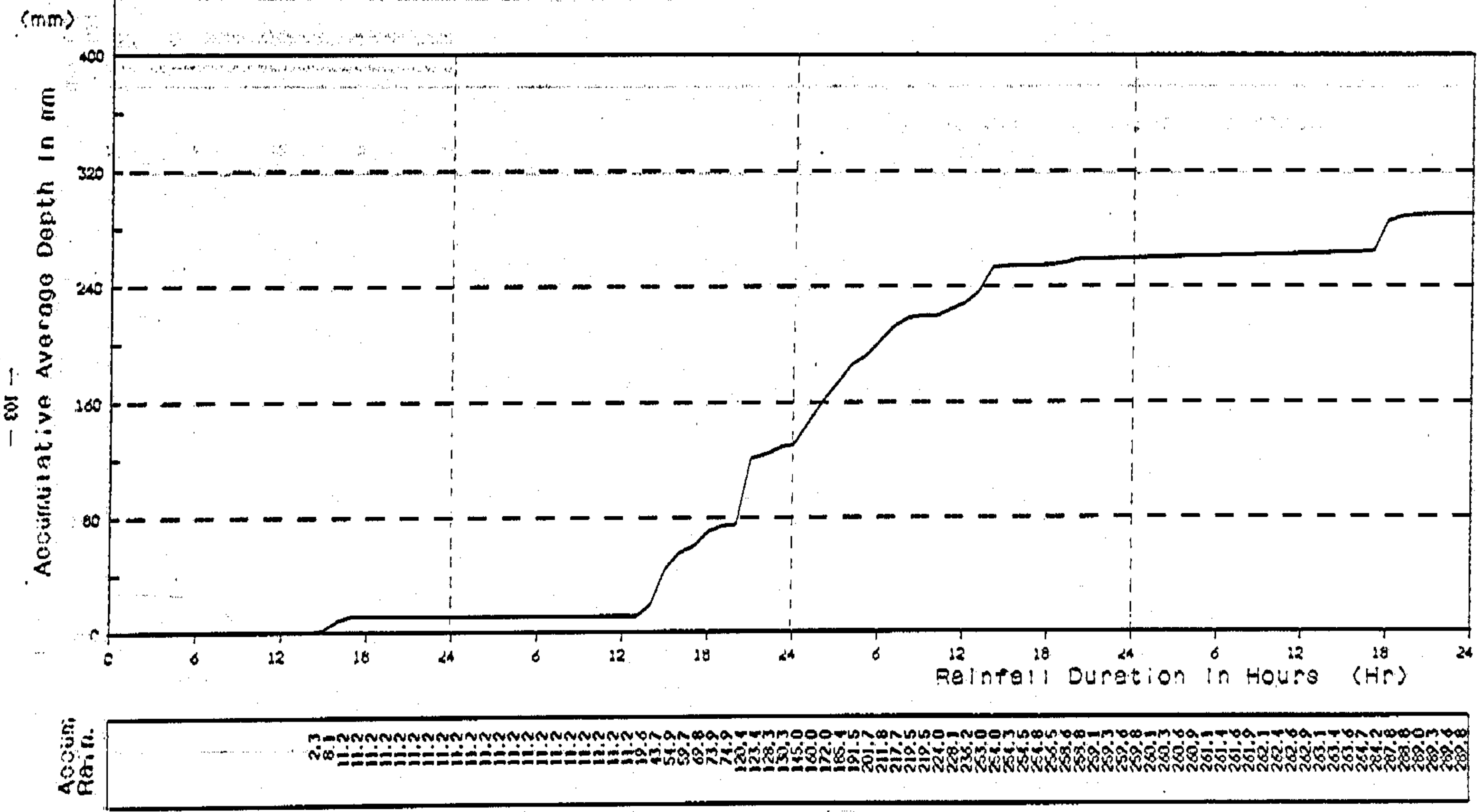
Kg. Merting

1973 . 12 . 6 ~ 1973 . 12 . 10 (Σ= 321.3 mm) (NO 2)



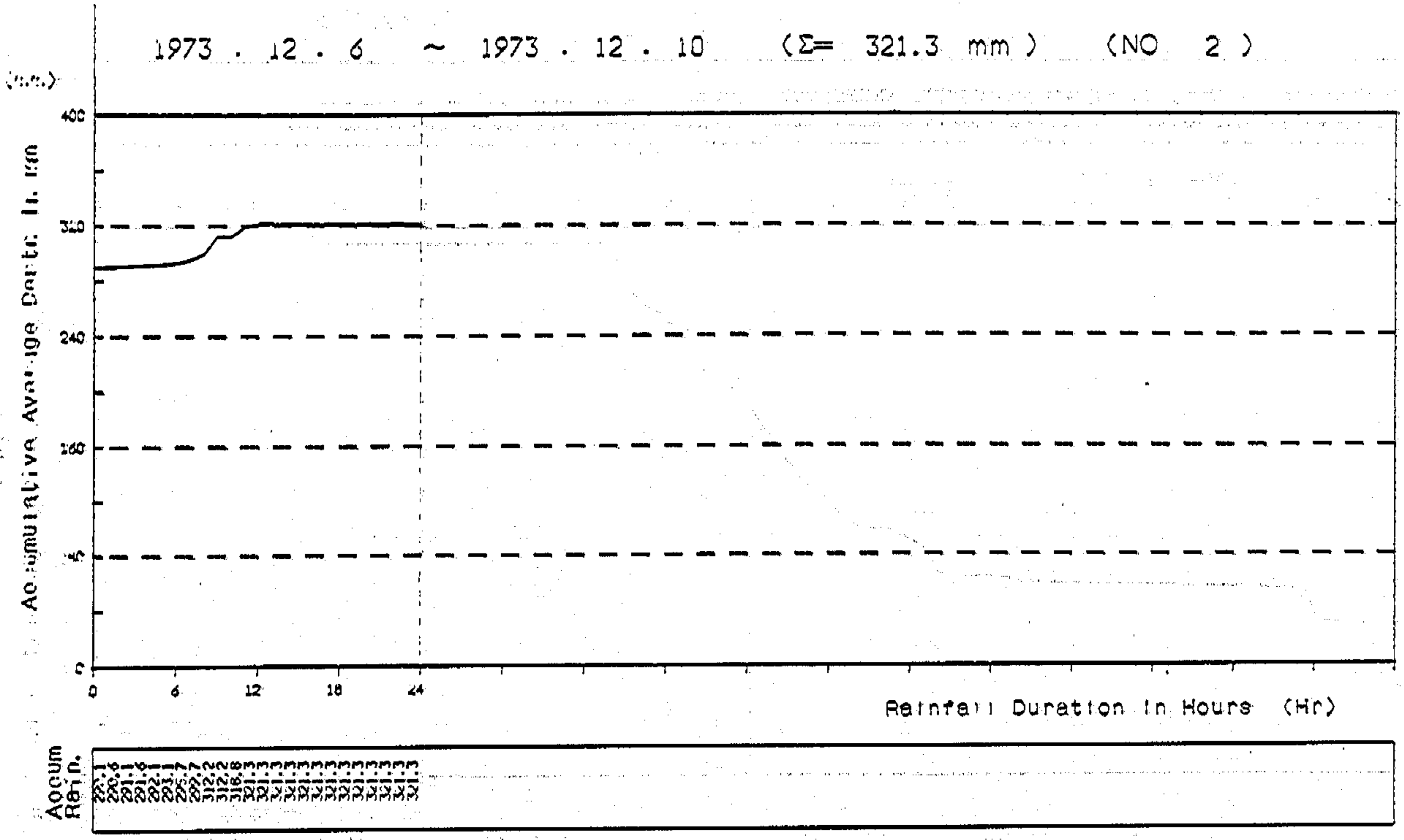
Kg. Merting

1973 . 12 . 6 ~ 1973 . 12 . 10 (Σ= 321.3 mm) (NO 1)



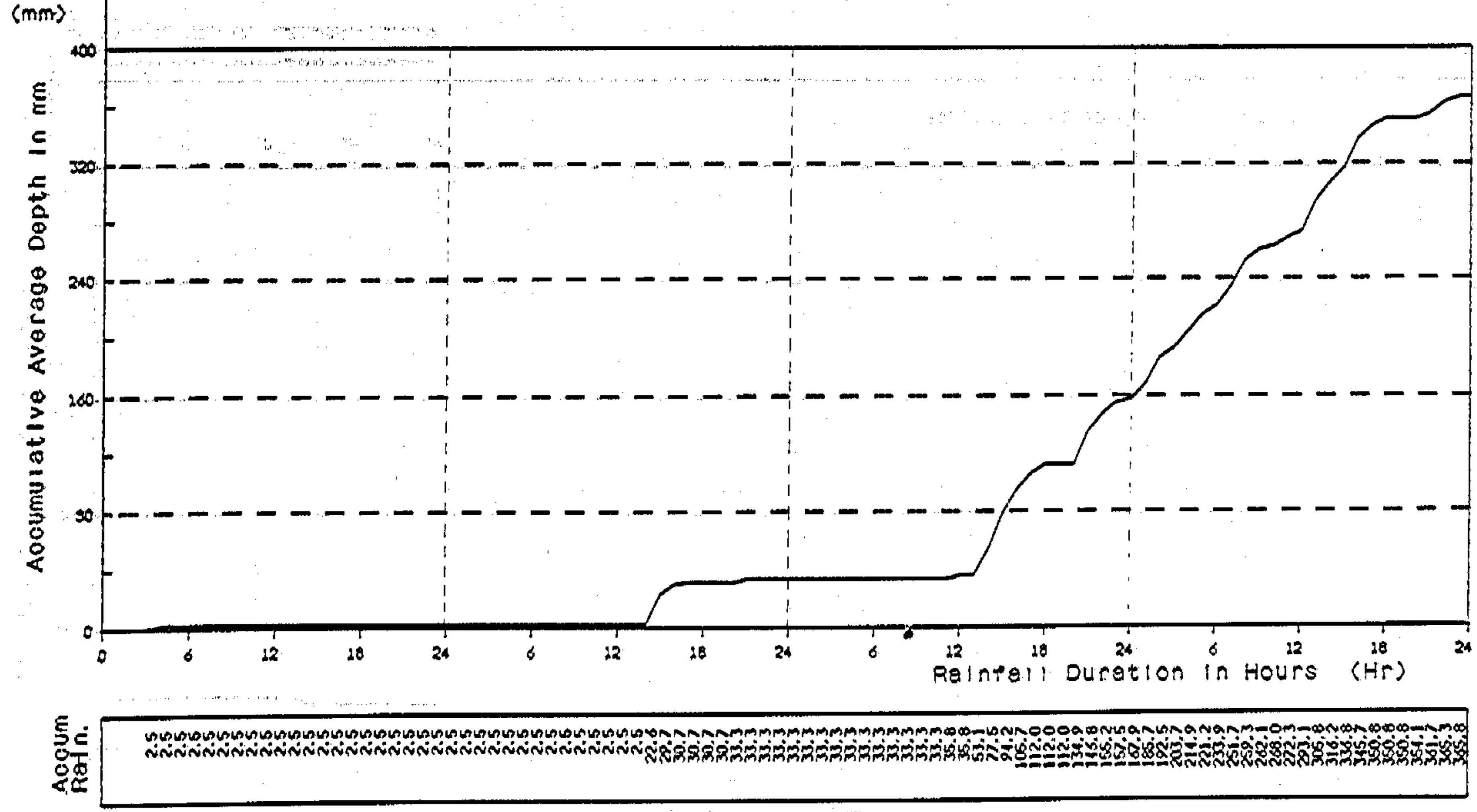
Kg. Merting

1973 . 12 . 6 ~ 1973 . 12 . 10 (Σ= 321.3 mm) (NO 2)



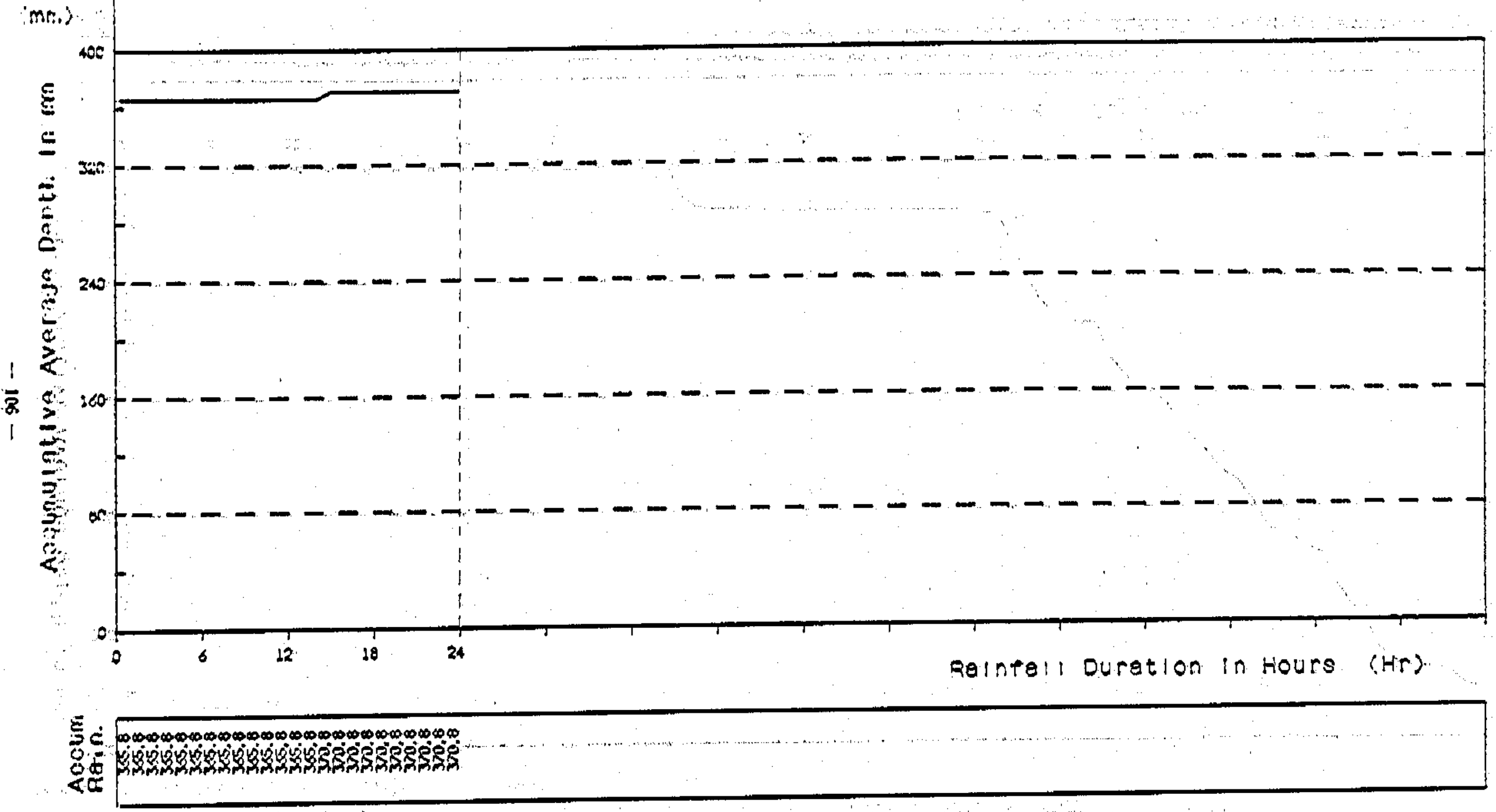
Kg. Merting

1973 . 12 . 5 ~ 1973 . 12 . 9 (Σ= 370.8 mm) (NO 1)

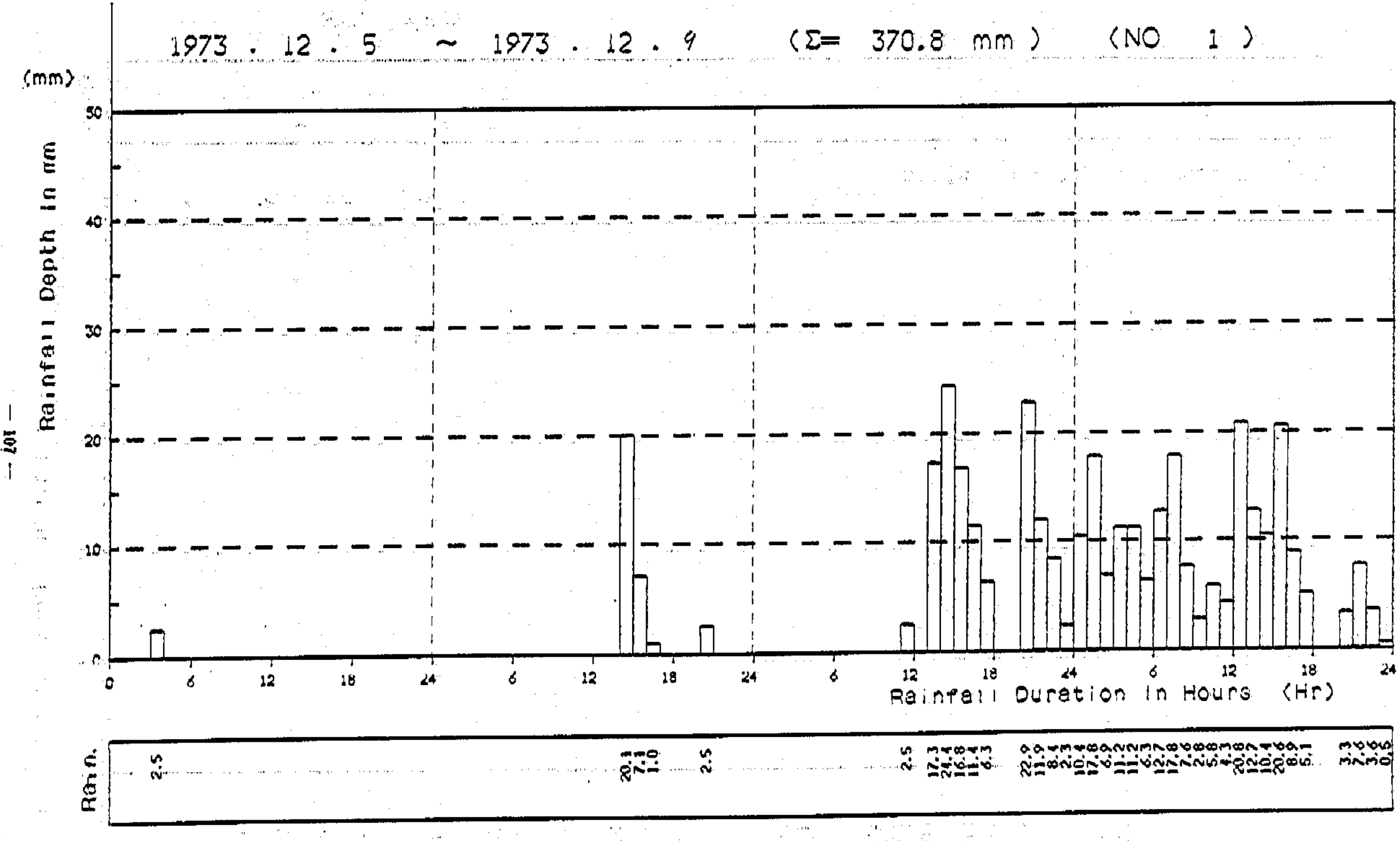


Sg. Yap

1973 . 12 . 5 ~ 1973 . 12 . 9 (Σ= 370.8 mm) (NO 2)

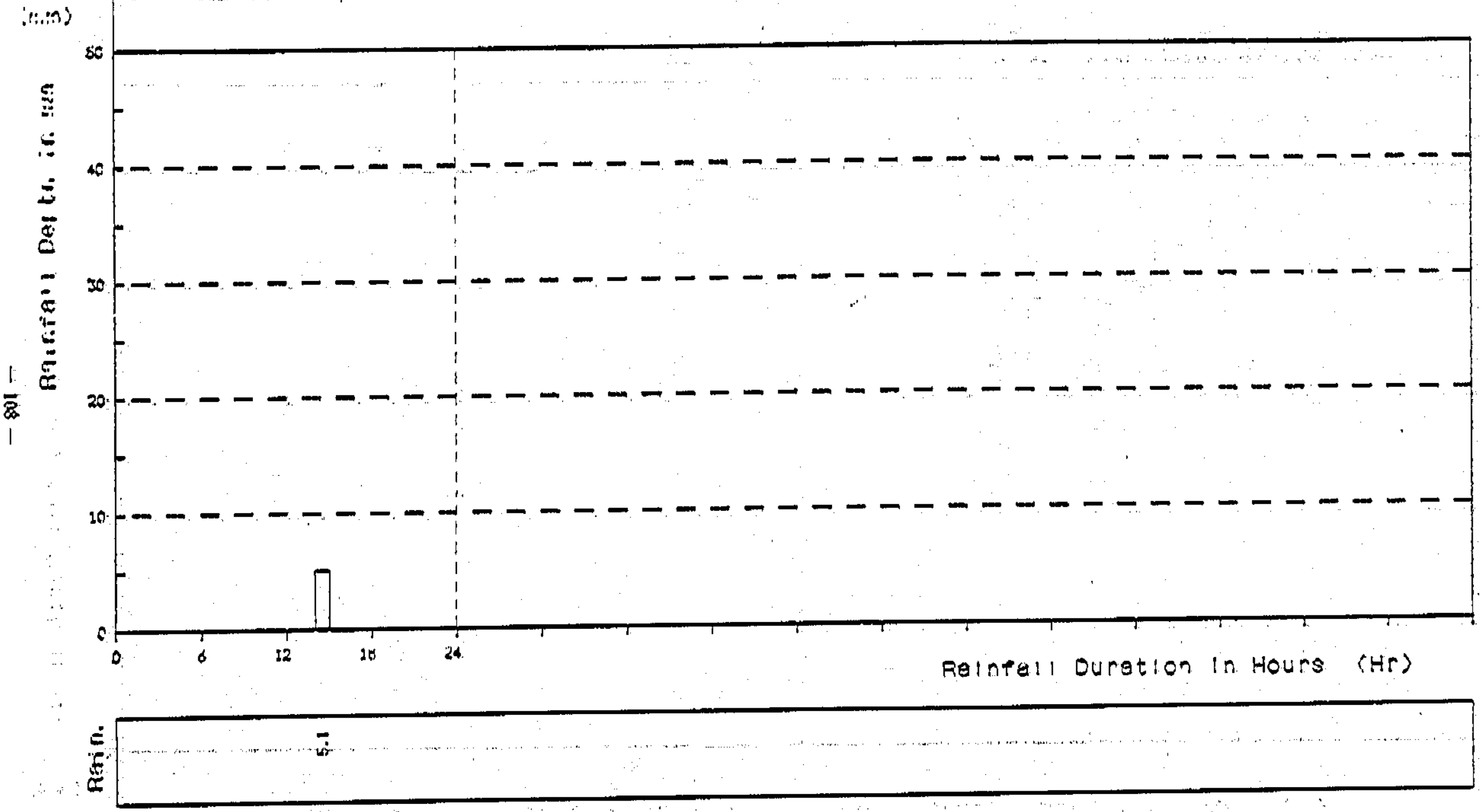


Sg. Yap

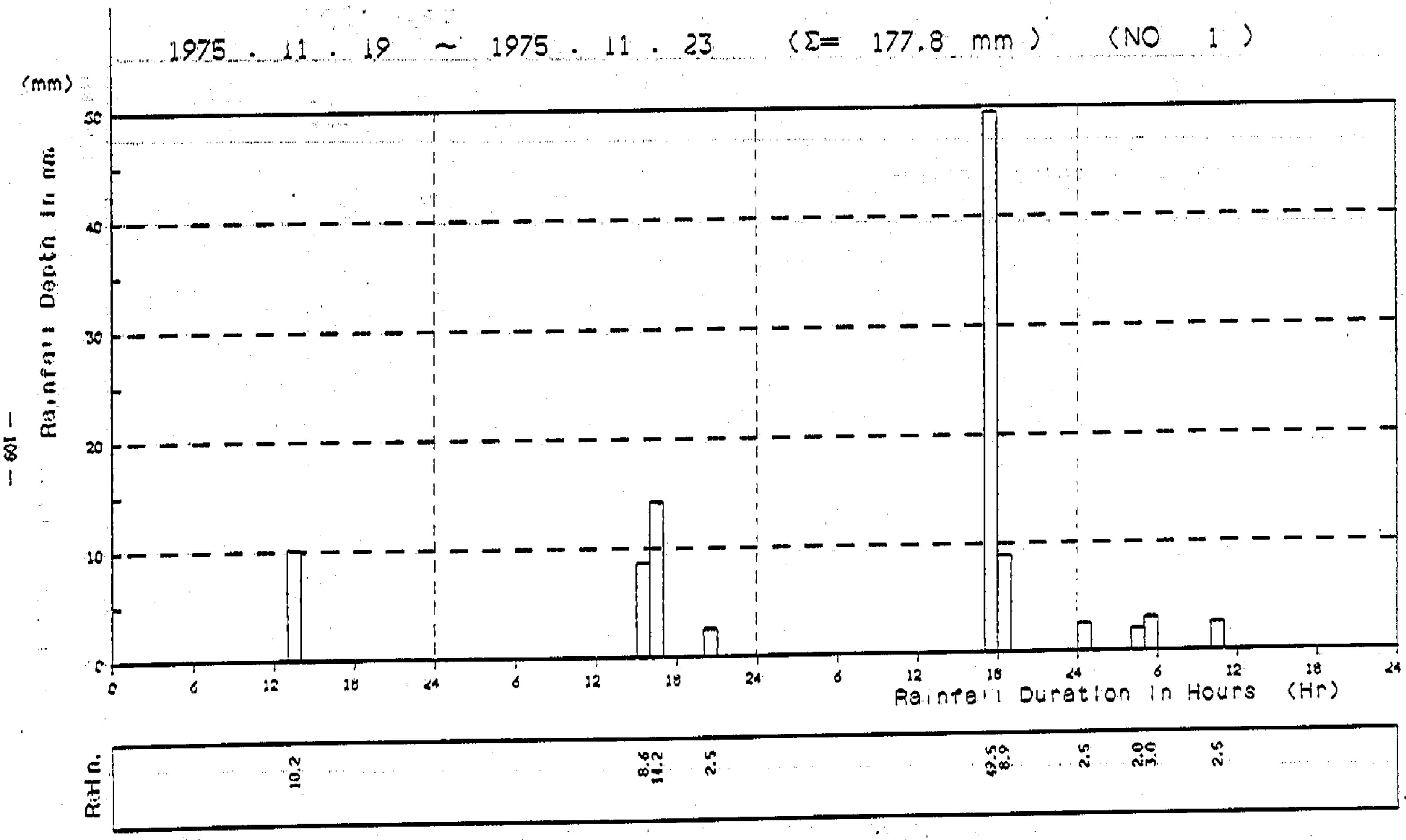

1973 . 12 . 5 ~ 1973 . 12 . 9 (Σ= 370.8 mm) (NO 1)
(mm)
Rainfall Depth in mm
50
40
30
20
10
0
0 6 12 18 24 6 12 18 24 6 12 18 24 6 12 18 24
Rainfall Duration in Hours (Hr)
Rain.
2.5
20.1 7.1 1.0
2.5
2.5 17.3 24.4 16.8 11.4 6.3
22.9 11.9 8.4 2.3 10.4 17.8 6.9 11.2 11.2 6.3 12.7 17.8 7.6 2.8 5.8 4.3 20.8 12.7 10.4 20.6 8.9 5.1
3.3 7.6 3.6 0.5

Sg. Yap

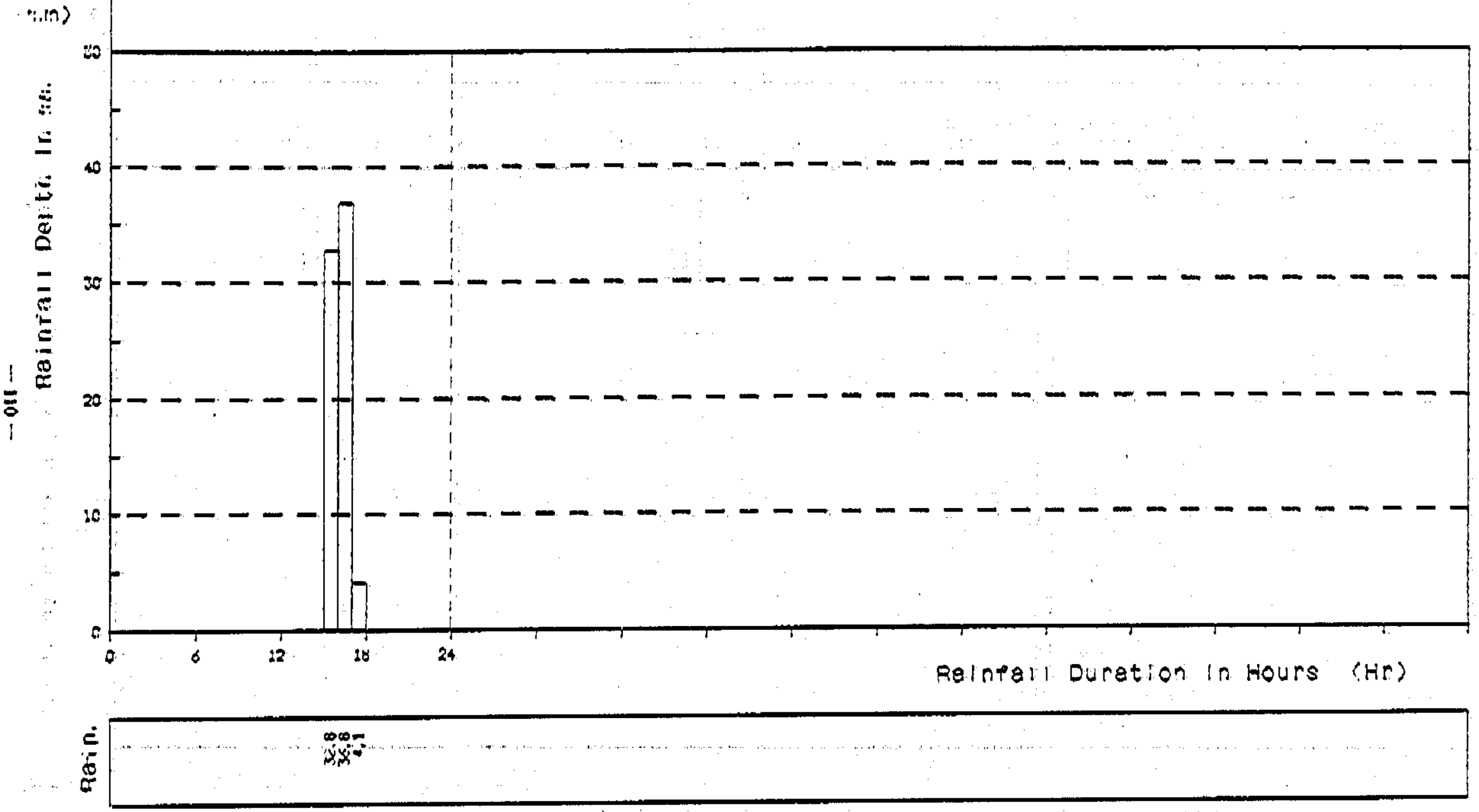
1973 . 12 . 5 ~ 1973 . 12 . 9 (Σ= 370.8 mm) (NO 2)



Sg. Yap

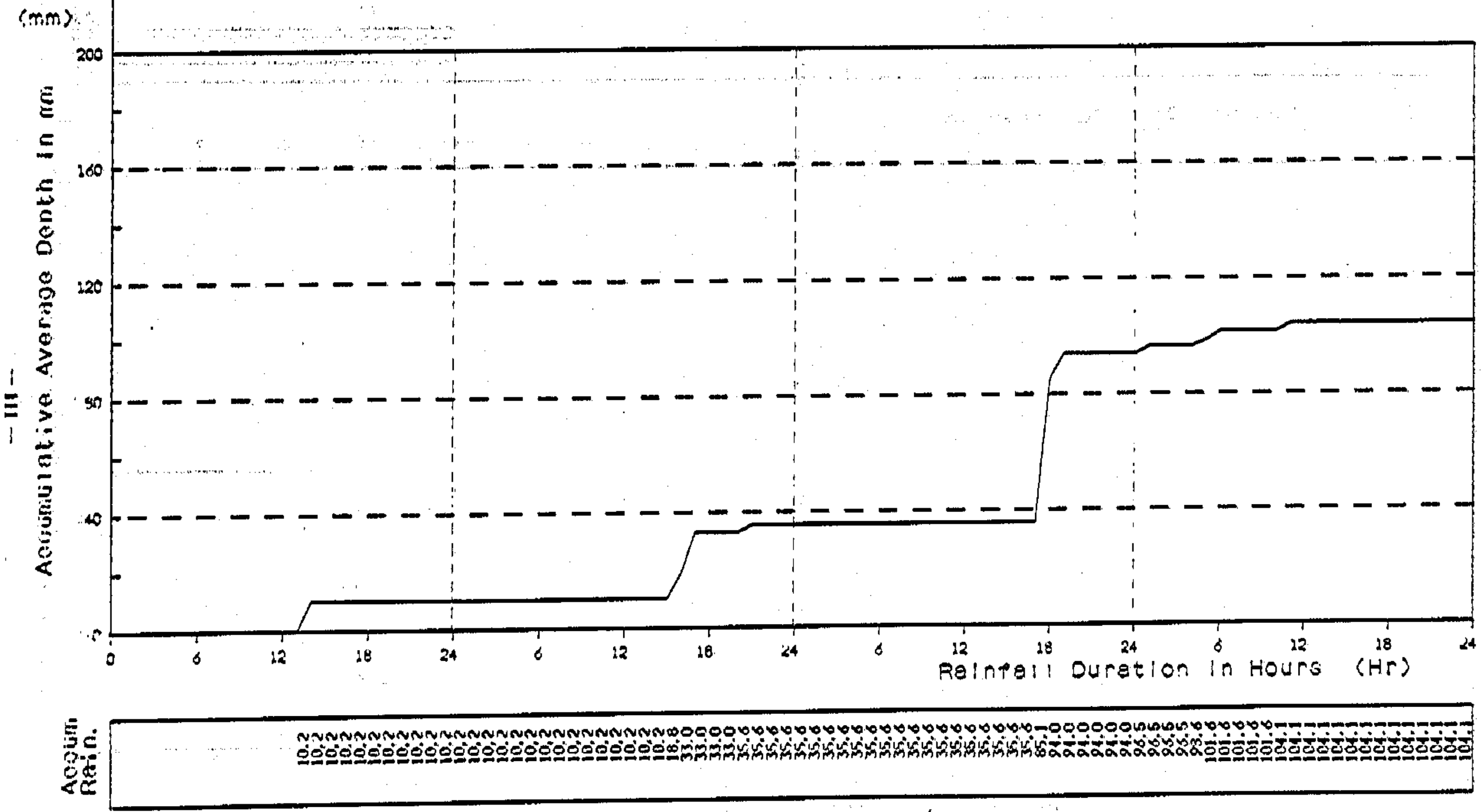

1975 . 11 . 19 ~ 1975 . 11 . 23 (Σ= 177.8 mm) (NO 1)
(mm)
Rainfall Depth in mm
50
40
30
20
10
0
0
6
12
18
24
Rainfall Duration in Hours (Hr)
Rain.
10.2
8.6
14.2
2.5
49.5
8.9
2.5
2.0
3.0
2.5
Sg. Yap

1975 . 11 . 19 ~ 1975 . 11 . 23 (Σ= 177.4 mm) (NO 2)



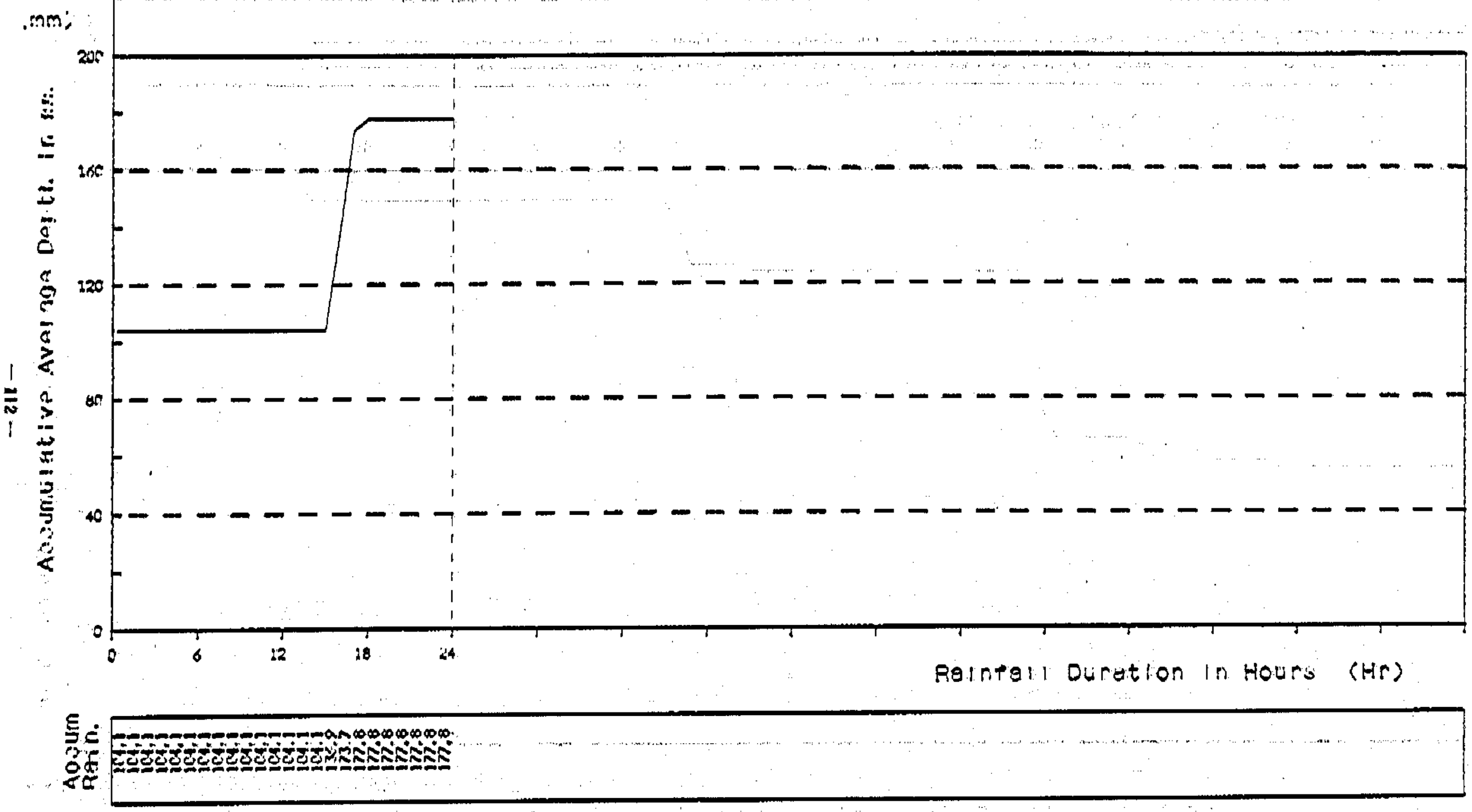
Sg. Yap

1975 . 11 . 19 ~ 1975 . 11 . 23 (Σ= 177.4 mm) (NO 1)

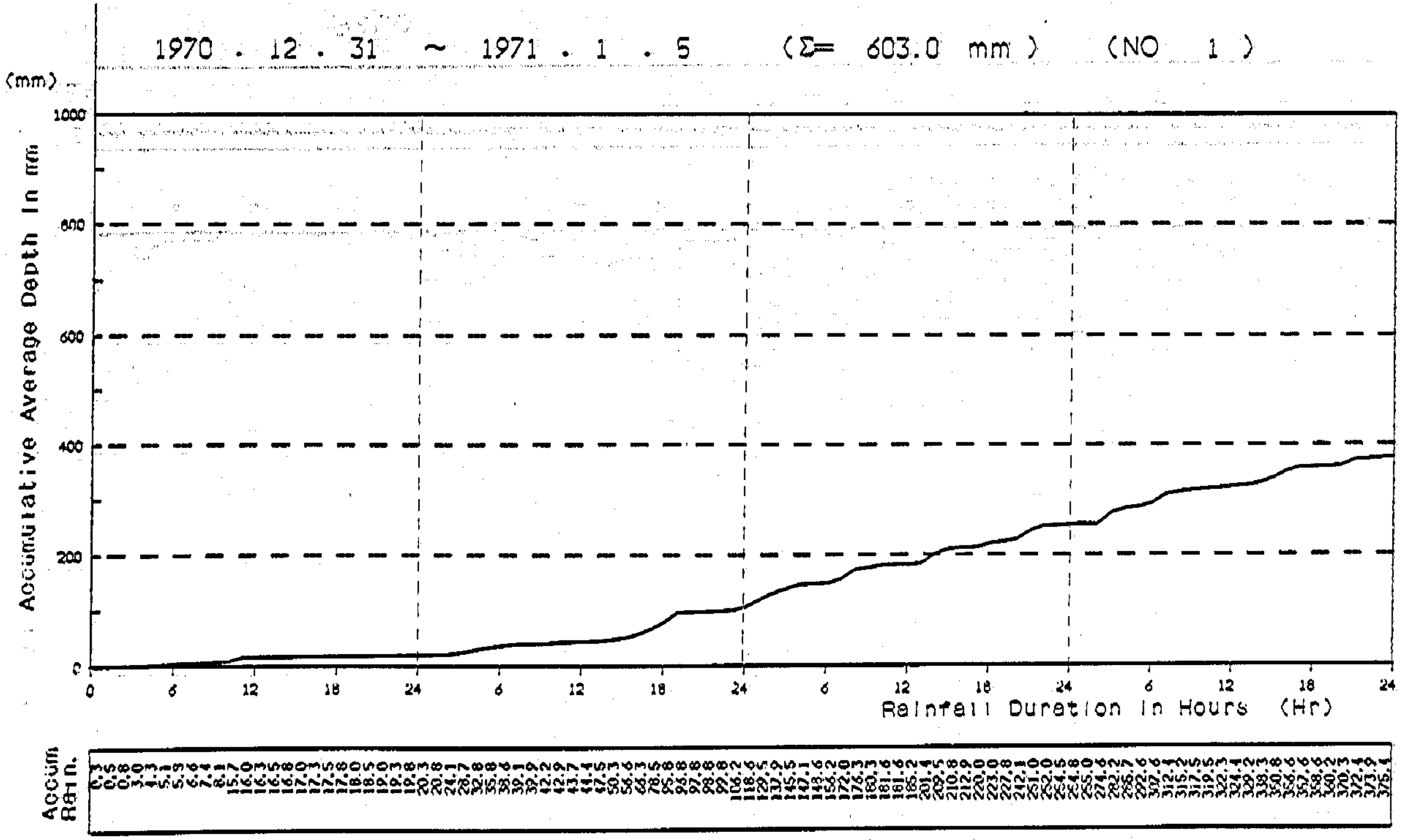


Sg. Yap

1975 . 11 . 19 ~ 1975 . 11 . 23 (Σ= 177.4 mm) (NO 2)

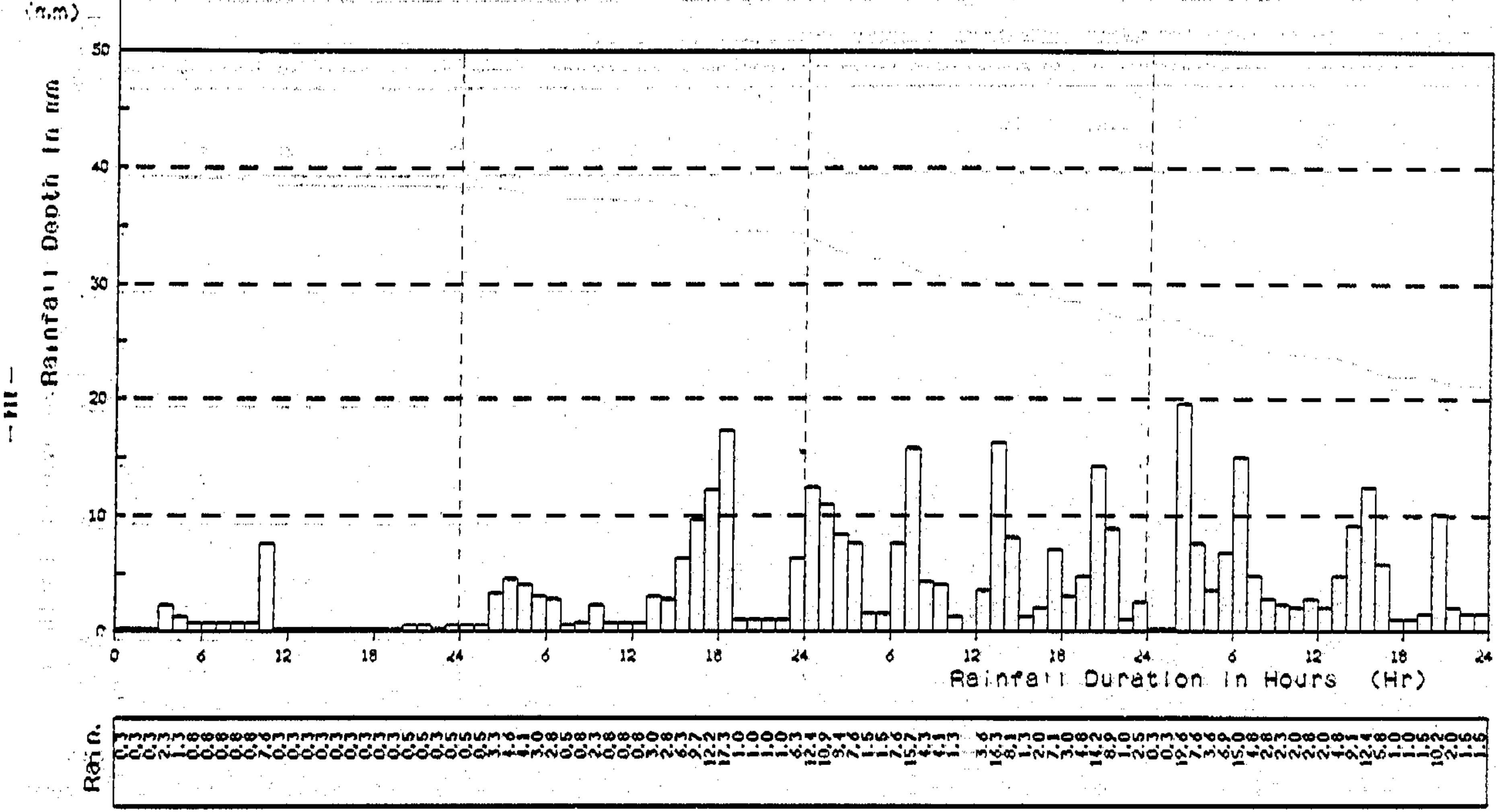


Sg. Yap

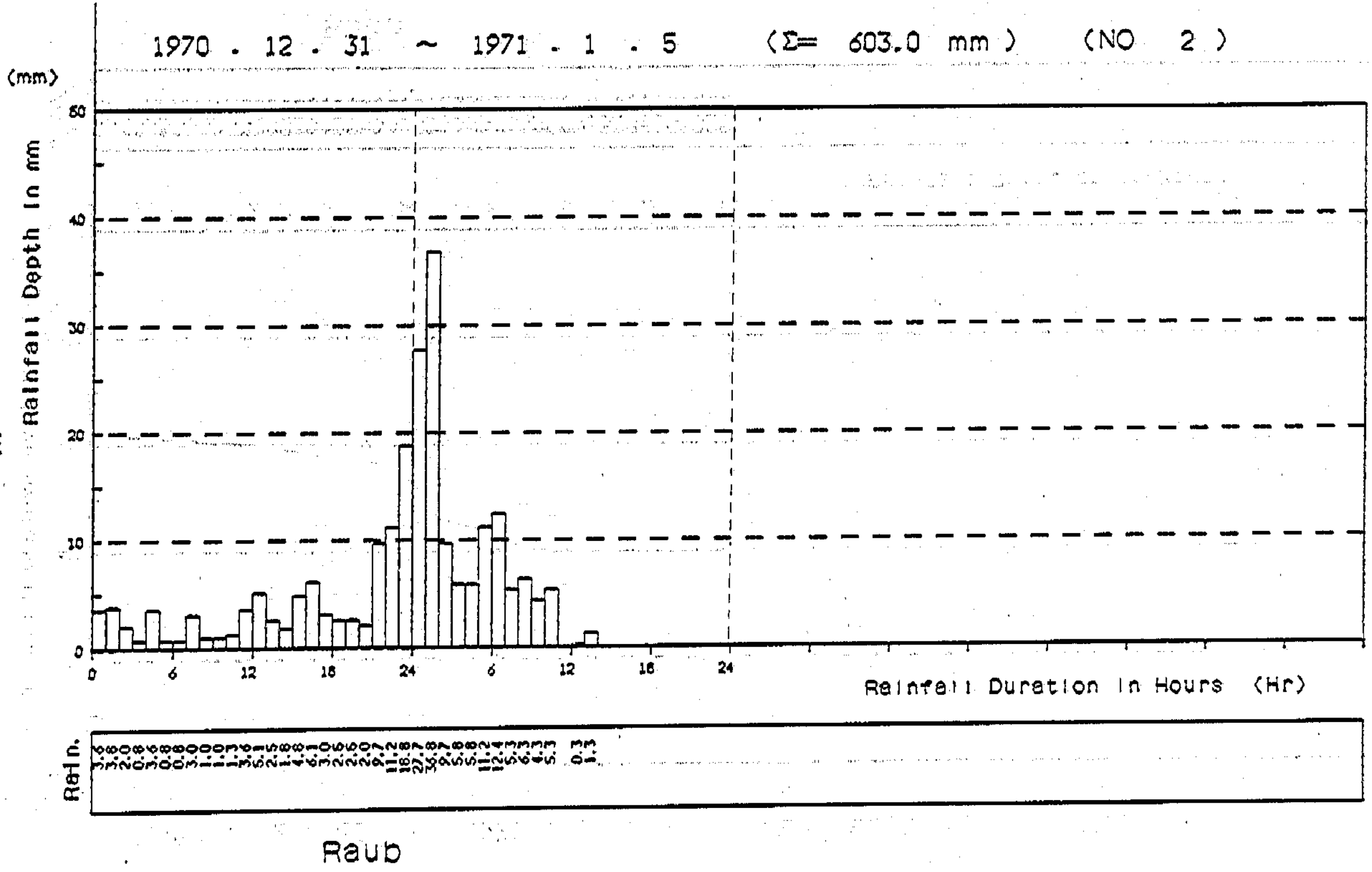

1970 . 12 . 31 ~ 1971 . 1 . 5 (Σ= 603.0 mm) (NO 1)
(mm)
Accumulative Average Depth in mm
1000
800
600
400
200
0
0 6 12 18 24 6 12 18 24 6 12 18 24 6 12 18 24
Rainfall Duration in Hours (Hr)
Accum Rain.
0.3 0.5 0.8 3.0 4.3 5.1 5.3 6.6 7.4 8.1 15.7 16.0 16.3 16.5 16.8 17.0 17.3 17.5 17.8 18.0 18.5 19.0 19.3 19.8 20.3 20.8 24.1 28.7 32.8 35.8 38.6 39.1 39.9 42.2 42.9 43.7 44.4 47.5 50.3 56.6 66.3 78.5 95.8 96.8 97.8 98.8 99.8 106.2 118.6 129.5 137.9 145.5 147.1 148.6 156.2 172.0 176.3 180.3 181.6 181.6 185.2 201.4 209.5 210.8 212.9 220.0 223.0 227.8 242.1 251.0 252.0 254.5 254.8 255.0 274.6 282.2 286.7 292.6 302.6 312.4 315.2 317.5 319.5 322.3 324.4 329.2 338.3 350.8 356.6 357.6 358.6 360.2 370.3 372.4 373.9 375.4

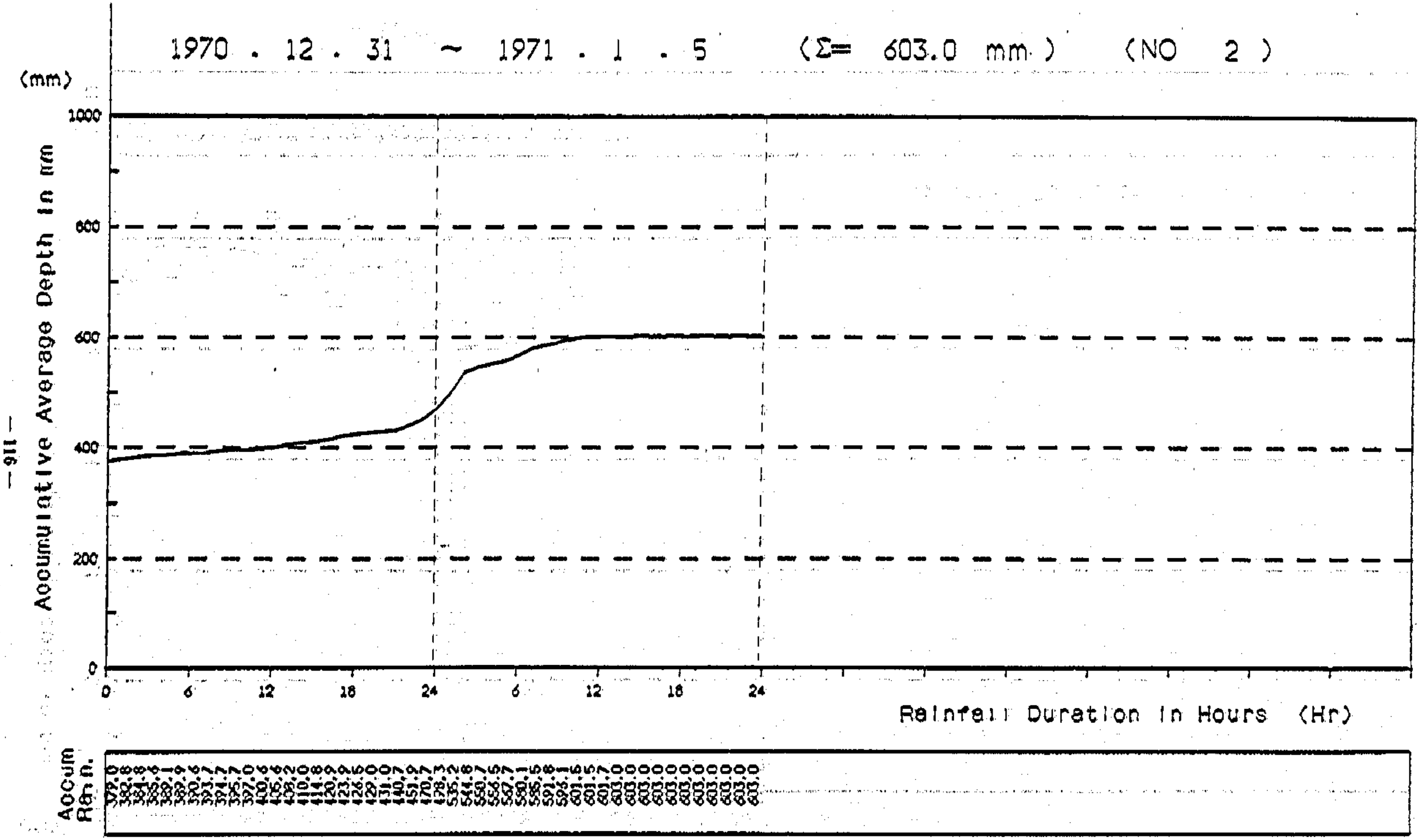
Raub

1970 . 12 . 31 ~ 1971 . 1 . 5 (Σ= 603.0 mm) (NO 1)



Raub


1970 . 12 . 31 ~ 1971 . 1 . 5 (Σ= 603.0 mm) (NO 2)
(mm)
Rainfall Depth in mm
60
40
30
20
10
0
0
6
12
18
24
6
12
18
24
Rainfall Duration in Hours (Hr)
Rain.
Raub


1970 . 12 . 31 ~ 1971 . 1 . 5 (Σ= 603.0 mm) (NO 2)
(mm)
1000
800
600
400
200
0
Accumulative Average Depth in mm
0
6
12
18
24
6
12
18
24
Rainfall Duration in Hours (Hr)
Accum Rain.

Raub

Appendix F

Estimation of Plotting-position, Iwai Method and Curve Fitting.

Estimation of return period by Hazen plotting

Plotting of data and return period

When a probability paper is chosen for use, the plotting of data on the paper requires the knowledge of plotting positions. Numerous methods have been proposed for the determination of the plotting position, for example, Hazen method, Weibull (or Thomas) method, Gringorton method and Chegodayev method.

Many kinds of probability graph papers are used in order to plot the data, such as normal curve paper, log normal curve paper, extream curve paper.

If observed data are plotted by these method in log normal paper, the probability can be estimated from the plotting. When variable N hydrological data are obtained such as annual maximum rainfall or flood, they are arranged in order of magnitude.

The maximum data is named as x_1, the second is x_2, and the i-th is x_i in general.

If there are same value data among them, each order must be given to each data, as the total number sums up N. Taking x_1, x_2 ... x_N on the axis of abscissa, the rectangles which area is 1/N respectively can be drawn with the centers of x_1, x_2, ... x_N on the axis of abscissa, as shown fig.-1. If the area of all rectangles is sumed up, it becomes as unit area 1.0.

A probability density curve is obtained by smothing each rectangle. The probability on specimen beyond x_1 is $W_1=1/(2N)$, it is $W_2=3/(2N)$ beyond x_2, and it is $W_i=(2i-1/(2N)$ beyond x_i, in general.

The probability W_i of being equaled or exceeded in i-th data is given as the total area of right side rectangles from x_i, as shown in fig.-1 Therefore Hazen plot is obtained.

$$W_i = \frac{i-1}{N} + \frac{1}{2N} = \frac{2i-1}{2N}$$

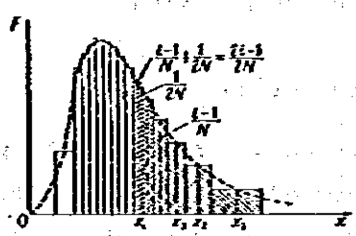


fig.-1

Where,

W_i : probability of being equalled or exceeded in i-th data

i : the rank of the event in order of magnitude (The largest event has i=1)

N . The number of recorded years.

In stead of probability W_i, return period T_i, is frequently used to define the design rainfall or the design flood.

Return period and probability are resiprocals.

$T_i = 1/W_i$

The probability of non-exceedance is one minus the probability of exceedance.

$F_i = 1-W_i$

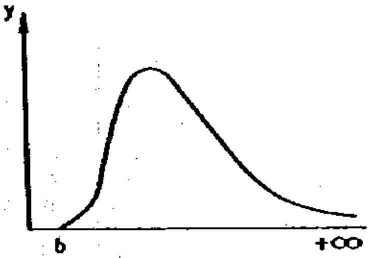
There are other various formulas for plotting positions shown as follows.

Weibull (or Thomas)	$W_i = i/(N+1)$
California	$W_i = i/N$
Gringorten	$W_i = (i-0.44)/(N+0.12)$
Chengodayev	$W_i = (i-0.3)/(N+0.4)$

Iwai method

This method is derived from lognormal distribution by applying the experimental distribution.

$$F(x) = \frac{1}{\sqrt{\pi}} \int_{-\infty}^{\xi} e^{-\xi^2} d\xi$$



$$\xi = a \log 10 \frac{x + b}{x_o + b} \quad , \quad (-b<x<\infty)$$

∘ Foundamental equation;

$$\log_{10}(x+b) = \log_{10}(x_0+b) + \frac{1}{a}\xi$$

where, a, b, x_0 : constants

∘ Estimation of the constants;

$$\cdot \; b = \frac{1}{m} \sum_{i=1}^{N} b_S \quad , \quad (m = \frac{N}{10})$$

$$b_S = \frac{x_\ell x_S - x_g^2}{2x - (x_\ell + x_S)} \quad , \quad (\ell + s = N + 1)$$

$$\log_{10} x_g = \frac{1}{N} \sum_{i=1}^{N} \log_{10} x_i$$

$$\cdot \; \log_{10}(x_0 + b) = \frac{1}{N} \sum_{i=1}^{N} \log_{10}(x_i + b) = \overline{Y}$$

$$\cdot \; \frac{1}{a} = \sqrt{\frac{2}{N-1} \sum_{i=1}^{N} (\log_{10}\frac{x_i + b}{x_0 + b})^2} = \sqrt{\frac{2N}{N-1}} \cdot S_x$$

$$S_x = \sqrt{\frac{1}{N} \sum_{i=1}^{N} \{\log_{10}(x_i + b)\}^2 - \{\log_{10}(x_0 + b)\}^2} = \sqrt{\overline{Y^2} - (\overline{Y})^2}$$

Relation between N and ξ

$$\frac{100}{W(\%)} = N \rightarrow \xi$$

N (年)	ξ	N (年)	ξ	N (年)	ξ	N (年)	ξ	N (年)	ξ
2	0.0000	37	1.3622	72	1.5560	107	1.6629	260	1.8847
3	0.3045	38	1.3702	73	1.5597	108	1.6654	270	1.8936
4	0.4769	39	1.3782	74	1.5635	109	1.6678	280	1.9022
5	0.5951	40	1.3850	75	1.5672	110	1.6701	290	1.9105
6	0.6858	41	1.3932	76	1.5709	111	1.6725	300	1.9184
7	0.7547	42	1.4008	77	1.5745	112	1.6749	310	1.9260
8	0.8134	43	1.4079	78	1.5780	113	1.6772	320	1.9335
9	0.8634	44	1.4145	79	1.5815	114	1.6795	330	1.9407
10	0.9062	45	1.4213	80	1.5849	115	1.6818	340	1.9476
11	0.9442	46	1.4276	81	1.5883	116	1.6841	350	1.9542
12	0.9780	47	1.4342	82	1.5917	117	1.6863	360	1.9606
13	1.0084	48	1.4404	83	1.5950	118	1.6885	370	1.9672
14	1.0361	49	1.4454	84	1.5982	119	1.6907	380	1.9733
15	1.0614	50	1.4520	85	1.6014	120	1.6929	390	1.9792
16	1.0843	51	1.4578	86	1.6045	125	1.7034	400	1.9850
17	1.1065	52	1.4534	87	1.6077	130	1.7135	410	1.9906
18	1.1263	53	1.4593	88	1.6108	135	1.7232	420	1.9961
19	1.1455	54	1.4746	89	1.6138	140	1.7324	430	2.0014
20	1.1630	55	1.4758	90	1.6168	145	1.7414	440	2.0067
21	1.1793	56	1.4849	91	1.6193	150	1.7499	450	2.0118
22	1.1955	57	1.4901	92	1.6223	155	1.7582	460	2.0166
23	1.2102	58	1.4952	93	1.6257	160	1.7662	470	2.0213
24	1.2245	59	1.4999	94	1.6285	165	1.7739	480	2.0260
25	1.2380	60	1.5047	95	1.6314	170	1.7814	490	2.0305
26	1.2509	61	1.5094	96	1.6342	175	1.7885	500	2.0350
27	1.2639	62	1.5141	97	1.6369	180	1.7955	550	2.0565
28	1.2743	63	1.5180	98	1.6395	185	1.8023	600	2.0757
29	1.2851	64	1.5231	99	1.6423	190	1.8089	650	2.0931
30	1.2967	65	1.5274	100	1.6450	195	1.8153	700	2.1094
31	1.3069	66	1.5317	101	1.6476	200	1.8215	750	2.1242
32	1.3170	67	1.5359	102	1.6502	210	1.8332	800	2.1375
33	1.3270	68	1.5400	103	1.6528	220	1.8445	850	2.1506
34	1.3359	69	1.5441	104	1.6554	230	1.8554	900	2.1630
35	1.3453	70	1.5481	105	1.6579	240	1.8656	950	2.1750
36	1.3537	71	1.5521	106	1.6604	250	1.8753	1000	2.1850

Curve Fitting

After the hydrologic data are plotted on a probability paper, a curve may be fitted to the plotted points. The curve is a straight line if linearization of the distribution is attempted. The straight line can be essentially represented by Eq. (1). Curve fitting may be done either mathematically or graphically. In general, a mathematical curve fitting can be achieved by three methods: the method of moments, the method of least squares, and the method of likelihood. Of course, the mathematical fitting does not necessarily require data plotting on a probability paper. By graphical fitting, a straight line is simply drawn to fit the plotted data by eye-fit, and this method is the simplest but involves human error.

$$x = \bar{x} + \sigma k \quad \ldots\ldots \quad (1)$$

x : variaty
$\bar{x}$: the mean
σ : standard deviation
k : frequency factor

Method of Moments

By this method, the statistical parameters or moments are computed from the data and then substituted in the probability function of the given distribution. This method gives a theoretically exact fitting but the accuracy can be substantially affected by any errors involved in the data at the tails of the distribution where the moment arms are long and the errors are thus magnified. The method originally proposed by Gumbel to fit Type I extremal distirubtion is a method of moments. Liebelin modified this method by order statistics and developed a procedure which maintains the original time order of the extreme-value series, divides the values into subgroups, and then weighs each observation according to its ordered rank in the subgroup which in turn is a function of the sample size. Hershfield made a comparison of the two procedures and concluded that the Gumbel procedure gives a better estimate beyond the range of data for the really independent data tests, but overestimates the longer recurrence-intervals in the dependent data tests.

Method of Least Squares

By this method, a regression line is computed to fit the plotted data. The curve so obtained may not represent the exact theoretical distribution but it gives a better overall fit than the method of moments. For extremal distributions, Gumbel introduced a modified least-squares method by minimizing both vertical and horizontal deviations and taking the geometric mean of the parameters obtained from the two minimizations. Based on the general equation for hydrologic frequency analysis, Eq. (1), proposed by Chow, a least-squares procedure for fitting a normal, lognormal, or extremal distribution was developed by Brakensiek.

Method of Maximum Likelihood

By this method, the value of a parameter is determined to make the probability of obtaining the observed outcome as high as possible. Mathematically, $\partial \log p(x)/\partial u = 0$, where $p(x)$ is probability density and u is a statistical parameter. This method provides the best estimate of the parameters but it is usually very complicated for practical application. Kimball has suggested this method for fitting extremal distributions, and a practical procedure was later developed by Panchang and Aggarwal.

Appendix G

Tank Model

TANK MODEL METHOD

Explanation

The tank model is intended for calculation of a run-off with the catchment area of a river substituted by a combination of a number of storage type model vessels (or called tanks in the following). It was proposed by Dr. Masami Sugawara. For example, let's consider a model of four tanks arranged in series as illustrated in Fig. 2.1. The outlets on the right hand side of the respective tanks represent run-offs and that at the bottom represents an infiltration.

A precipitation at a given time R(t) is added to the uppermost tank V_1. The water reserved in the tank V_1 runs off through the outlets on the right hand side or infiltrates through the outlet at the bottom into the tank V_2 in the second stage. The storage water in the tank V_2 supplied from the tank V_1 then runs-off through the outlets on the right hand side or infiltrates through the outlet at the bottom into the tank V_3 in the third stage. The process is repeated to the last tank.

The model may be readily understood when it is considered in reference to the mechanism of run-off in a basin shown schematically in Fig. 2.2.

Rain wets the soil layer on the surface of the ground. When the surface layer contains water more or less, the rain water flows over the ground usrface. In the model of Fig. 2.1, the outlet provided slightly above the bottom on the right hand side of the tank V_1 corresponds to such run-off.

When the rainfall continues so that the surface layer contains water sufficiently, the surface run-off increases. This corresponds to the upper ooutlet on the right hand side of the tank V_1.

The water contained in the surface layer continues to infiltrate into the lower side, and this is represented by the outlet provided at the bottom of the tank V_1.

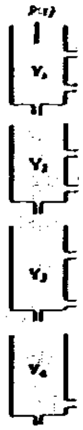


Fig. 1 Tank model in serial four stages

Fig. 2 Schematic representation of the mechanism of run-off in a catchment area

The water infiltrating from the surface layer stays in a first aquifer. When such water accumulates in excess of a certain limit, it begins to runs-off from the aquifer. Water seeping out of a mountain-side is an example. This corresponds to the run-off from the tank V_2.

The water infiltrating further from the first aquifer to the lower side stays in a second aquifer and presents a similar behavior to that in the first aquifer. Water seeping out of a mountain foot is a typical example. This is represented by the run-off from the tank V_3.

Water infiltrating further below is stabilized as underground water and runs off gently at the time of a low or droughty water level of river. This is represneted by the run-off from the tank V_4.

The total of the run-offs from the outlets on the right hand side of the respective tanks is given as a value of calculation for the run-off of the catchment area.

Thus, seeing the tanks in the model against the run-off components, the tank V_1 in the uppermost stage corresponds approximately to the surface run-off, the tank V_2 in the second stage to the intermediate run-off, and the tanks V_3 and V_4 in the third stage and after to the base flow discharge.

In the tank model, three to four tanks are arranged in series generally, as illustrated in the foregoing. However, various arrangements of tanks can be considered according to the characteristics of the basin.

Appendix H

Storage Function Method

STORAGE FUNCTION METHOD

I. Outline of storage function method

The storage function method is a run-off calculation to obtain flood discharge from the rainfall which has fallen into the river basin or the inflow discharge to a river channel. This method was proposed by Dr. T. Kimura and it has been widely applied in Japan for flood routing.

As the flood run-off is non-linear feature it has an advantage to express a storage characteristic between rainfall and run-off like tank model method. And it can show the actual feature of flood run-off flow which changes slowly as unsteady flow, if its coefficients are determined properly by water level records.

1. Basic equation

If flood run-off is assumed by Manning's formula, the storage amount (S_1) of a river basin or a river channel is expressed as an exponential function of run-off discharge (Q_L).

$$S_1 = K \cdot Q_1^P$$

where, K. P : Constants for a basin or a channel

This equation of motion is combined with the following continuous equation for a river basin or a river channel.

(1) for river basin

$$\frac{1}{3.6} f \cdot R_{ave} \cdot A - Q_1 = \frac{d}{dt} S_1$$

where, f : Inflow coefficient

R_{ave}: Average rainfall in the basin (mm/hr)

A : Catchment area at the calculated point (km^2)

T_1 : Lag time (hr)

$Q_1(t) = Q(t+T_1)$ (m^3/sec)

Run-off discharge subtracting a certain base flow from the river basin after lag time considered

S_1 : Apparent storage amount in the basin

(2) for river channel

$$\sum_{j=1}^{n} f_j I_j - Q_1 = \frac{d}{dt} S_1$$

where, I_j : Inflow discharge into the channel from the basin, tributaries and/or upper boundary of the channel (m^3)

f_j : Inflow coeeficient

T_1 : Lag time (hr)

$Q_1(t) = Q(t+T_1)$ (m^3/sec)

Discharge at lower boundary of channel after lag time

S_1 : Apparent storage in channel

2. Division and layout of river basins and river channels

A river basin is divided into smaller basins when its catchment area is extremely large or when the discharge from such smaller basin as tributary, upstream of water level gauging station or upstream of dam is needed.

The application range of storage function is 10 ∿ 1,000 km^2 in basin area, however, a basin is usually divided into smaller basin than 500 km^2. For the storage function in river channel, 10 ∿ 100 km is preferable in the length of river channel.

Appendix I

Monthly rainfall data used in analysis

Daily rainfall data at Kg. Merting

Recorded hydrograph in 1972 Flood

STATION NC. 3629098

	1	2	3	4	5	6	7	8	9	10	11	12
1970	231.60	19.30	142.50	263.70	274.80	66.00	110.70	179.30	279.90	294.60	283.50	617.20
1971	664.20	162.60	169.90	12.90	236.70	66.00	161.80	209.00	223.30	297.70	148.80	0.0
1972	39.90	29.50	6.60	184.90	115.00	132.30	58.10	178.80	395.70	61.40	165.60	701.50
1973	113.70	85.50	152.90	277.60	144.00	258.60	83.80	127.50	274.50	177.30	193.00	539.20
1974	5.60	278.20	54.90	256.00	158.40	178.50	208.70	198.60	292.10	261.10	295.10	136.90
1975	229.50	107.00	148.50	234.50	199.50	174.50	107.00	154.00	209.50	208.00	589.50	121.00
1976	12.00	0.0	74.00	169.00	180.50	170.00	115.00	323.00	154.00	291.50	169.50	426.00
1977	99.00	131.00	30.50	131.50	252.50	157.50	42.50	194.00	266.50	276.50	273.00	44.00
1978	148.50	86.00	49.00	231.50	261.50	99.00	85.50	62.00	265.50	159.00	295.50	0.0
1979	111.00	111.50	190.50	184.00	68.50	94.00	167.00	129.50	237.00	304.00	438.00	60.00
1980	78.00	79.00	200.00	80.50	260.50	251.00	129.50	169.60	268.50	371.50	179.00	257.00

STATION NC. 3726089

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	257.80	418.60	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971	668.50	85.60	103.90	21.60	117.00	86.70	218.90	271.50	233.40	288.80	294.60	659.60
1972	626.70	155.70	14.70	226.30	117.10	142.50	0.0	199.50	303.50	157.90	186.10	462.20
1973	0.0	53.10	162.30	295.60	207.70	222.80	39.30	305.30	242.80	301.80	150.60	267.40
1974	10.90	191.00	69.30	281.90	111.50	82.60	200.70	79.00	173.00	170.90	285.60	153.90
1975	131.50	209.20	162.30	214.90	212.30	248.10	167.50	80.00	222.50	109.00	381.00	168.00
1976	9.50	4.00	127.00	170.00	64.00	133.00	137.00	214.50	189.00	269.00	170.50	315.50
1977	55.50	102.50	10.00	61.50	107.00	90.50	23.50	174.50	81.50	307.00	201.00	130.50
1978	146.50	123.50	88.00	220.00	135.50	82.50	98.50	51.00	107.50	162.00	219.50	0.0
1979	92.00	65.50	23.00	163.00	93.50	26.00	309.50	77.50	207.50	231.00	321.50	65.50
1980	95.50	78.50	137.00	127.00	75.00	90.50	89.00	153.50	79.50	101.00	167.00	0.0

DAYA KAMGSAR
STATION NO. 3924072

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	96.00	133.60	238.30	373.60	244.30	518.90
1971	0.0	114.30	137.90	56.10	234.20	99.80	121.60	318.00	92.90	203.20	224.00	674.90
1972	122.20	184.40	50.10	164.30	134.10	162.20	17.90	268.50	325.90	224.00	145.00	340.10
1973	91.70	49.20	213.60	357.10	194.30	196.00	123.70	279.70	171.20	288.80	296.20	338.60
1974	12.20	182.10	91.90	256.00	119.60	115.80	181.10	141.50	168.10	198.10	343.90	176.00
1975	162.50	201.50	248.00	144.50	224.50	184.50	195.00	120.50	237.00	173.00	390.50	232.50
1976	0.0	15.50	62.50	220.00	88.00	141.50	48.00	79.40	136.50	235.00	185.50	292.00
1977	25.00	169.00	28.00	83.50	117.50	180.00	39.50	247.00	174.00	254.50	212.00	167.50
1978	198.00	69.00	141.50	137.00	308.00	75.00	190.50	65.00	136.50	170.00	253.50	260.00
1979	91.50	49.00	85.00	92.00	79.00	167.50	179.00	71.00	195.00	455.50	339.50	39.00
1980	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SEK.KEB.TEMBELING
STATION NO. 4023117

	1	2	3	4	5	6	7	8	9	10	11	12
1970	119.90	35.80	148.80	158.40	71.60	267.90	47.50	90.40	334.00	180.80	170.40	619.30
1971	228.10	18.50	25.10	3.00	58.10	96.50	180.80	139.40	155.70	0.0	203.90	0.0
1972	42.60	140.40	48.80	105.90	29.50	20.80	1.30	70.10	51.80	73.60	145.50	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	3.80	52.80	108.20	283.50	168.70	172.20	214.30	97.50	150.60	261.40	323.60	170.10
1975	215.90	196.90	90.40	597.10	157.20	70.60	80.00	73.00	144.00	263.00	438.50	132.50
1976	8.00	15.00	62.50	188.00	118.00	187.50	180.00	210.00	248.00	131.50	99.50	256.00
1977	30.50	115.00	0.0	40.00	41.50	194.00	131.50	0.0	143.00	334.00	202.00	77.00
1978	66.50	46.50	96.00	196.00	116.00	180.50	59.00	40.00	130.50	141.50	257.50	230.00
1979	72.00	22.50	37.00	303.00	81.00	95.50	71.50	89.50	124.50	234.00	383.00	0.0
1980	53.50	200.50	139.50	184.00	211.00	76.50	165.50	182.50	61.50	165.00	137.50	256.00

KG.CHEBONG
STATION NO. 4123116

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	30.70	81.50	271.00	199.80	123.40	31.00
1971	321.30	25.40	166.80	86.20	253.20	183.90	227.60	187.60	69.90	286.00	112.00	699.80
1972	56.30	180.30	66.00	140.20	153.10	98.60	25.40	146.00	436.60	118.90	186.40	281.10
1973	44.70	42.90	77.70	156.70	208.00	309.60	53.00	114.80	283.20	221.40	235.40	288.00
1974	184.50	171.70	0.0	170.80	83.10	98.00	360.90	110.90	220.50	225.00	350.00	171.90
1975	366.50	235.70	119.40	170.20	328.40	105.10	113.00	110.50	143.00	209.00	581.00	175.00
1976	0.0	11.50	88.50	152.00	101.00	200.00	20.50	212.50	76.00	173.00	63.50	269.00
1977	41.50	49.50	2.50	40.00	77.00	100.50	22.50	60.00	5.00	0.0	167.00	121.50
1978	89.00	0.0	43.00	94.00	145.00	80.00	108.00	69.00	84.00	101.00	289.00	72.00
1979	22.00	51.00	120.00	304.00	77.00	50.00	65.50	33.50	145.50	220.00	298.50	13.00
1980	6.00	39.00	102.00	145.50	139.50	80.00	174.00	129.00	174.00	209.00	297.50	183.00

ULU TEKAI "B"
STATION NO. 4127001

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	0.0	0.0	30.00	246.00	250.00	184.00	56.00	0.0	0.0	29.00	306.00	123.00
1975	195.00	212.00	156.00	150.00	105.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1976	0.0	17.00	66.00	113.00	96.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1977	0.0	0.0	16.00	100.00	90.00	64.00	168.00	196.00	176.00	138.00	0.0	0.0
1978	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	156.00	257.00
1979	79.00	0.0	0.0	68.00	142.00	61.00	30.00	0.0	0.0	0.0	0.0	0.0
1980	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

KG. MERTING
STATION NC. 4223115

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971	0.0	0.0	0.0	0.0	0.0	0.0	112.30	232.40	0.0	137.20	63.80	0.0
1972	22.80	113.50	14.70	65.30	3.30	77.50	55.90	285.60	190.50	0.0	122.10	368.30
1973	81.00	0.0	97.20	222.70	331.70	296.60	141.40	97.80	265.40	271.50	197.80	383.80
1974	27.40	145.30	25.10	356.40	164.10	115.60	132.30	213.90	184.70	81.00	336.80	186.40
1975	196.00	224.00	69.50	249.00	259.50	26.50	166.00	131.00	223.50	125.00	431.50	224.50
1976	54.60	39.70	274.30	184.20	317.50	481.30	104.10	567.70	534.70	741.70	185.40	541.00
1977	82.60	114.30	120.70	76.20	326.40	447.00	297.20	497.80	336.60	868.70	0.0	596.70
1978	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ULU TEKAI "A"
STATION NC. 4227001

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1975	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.00	160.00	434.00	0.0
1976	1.00	12.00	71.00	127.00	19.00	220.00	136.00	49.00	257.00	249.00	294.00	0.0
1977	0.0	0.0	24.00	26.00	3.00	0.0	176.00	287.00	0.0	57.00	247.00	71.00
1978	0.0	59.00	166.00	201.00	301.00	209.00	76.00	73.00	114.00	243.00	226.00	513.00
1979	165.00	92.00	116.00	242.00	162.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	37.00	120.00	220.00	122.00	0.0	0.0	0.0	0.0	183.00	262.00	266.00	79.00

AIR PUTIH
STATION NO. 4231103

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	163.80	272.00	260.00	578.60	457.40	988.30
1971	614.80	346.20	230.90	54.30	166.90	203.90	195.30	273.30	176.50	396.40	192.20	1081.20
1972	52.00	33.00	40.30	125.20	192.70	152.70	111.30	195.80	431.50	186.90	324.60	1324.80
1973	243.70	65.00	173.70	161.30	129.20	139.20	166.60	347.90	374.90	232.90	401.30	1009.10
1974	51.40	284.20	126.40	260.00	92.70	337.50	247.70	396.40	301.40	517.90	612.90	424.90
1975	567.50	348.50	166.00	290.50	260.00	180.00	254.50	74.50	339.50	421.00	753.50	312.00
1976	16.50	52.00	26.00	139.00	326.50	0.0	216.50	385.00	309.50	341.50	261.50	503.50
1977	155.00	231.00	36.50	20.00	235.50	133.00	302.50	376.50	252.50	270.00	170.50	254.50
1978	155.50	92.50	69.00	0.0	0.0	0.0	303.50	198.00	368.00	335.50	352.50	356.50
1979	113.50	147.50	145.50	368.50	241.50	179.00	189.50	253.50	355.50	306.50	752.50	181.50
1980	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

STN. TELEK TAHAN
STATION NO. 4324001

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	109.00	371.00
1974	15.00	130.00	52.00	285.00	64.00	108.00	163.00	45.00	194.00	232.00	334.00	91.00
1975	227.00	146.00	138.00	162.00	212.00	34.00	179.00	133.00	179.00	234.00	207.00	91.00
1976	10.00	1.00	39.00	208.00	279.00	153.00	108.00	149.00	232.00	158.00	101.00	195.00
1977	48.00	3.00	25.00	31.00	110.00	111.00	83.00	1.00	22.00	182.00	242.00	30.00
1978	121.00	0.0	42.00	183.00	217.00	82.00	240.00	18.00	34.00	107.00	164.00	164.00
1979	103.00	0.0	5.00	39.00	109.00	80.00	150.00	5.00	238.00	195.00	470.00	25.00
1980	90.00	54.00	0.0	179.00	181.00	15.00	152.00	312.00	101.00	0.0	0.0	67.00

KG. PAGI
STATION NO. 4424112

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	71.20	125.70	130.80	247.40	325.90	300.50
1971	497.30	172.50	156.70	109.70	209.20	98.20	71.90	220.90	255.80	132.00	103.10	0.0
1972	22.80	57.60	17.80	81.20	43.70	50.10	47.50	43.20	92.70	76.90	81.30	370.60
1973	64.80	30.90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	0.0	0.0	0.0	240.30	112.50	107.50	163.30	206.20	184.90	220.90	286.00	217.20
1975	329.50	206.50	110.50	232.00	283.50	58.50	158.00	99.00	173.00	229.00	630.00	261.00
1976	0.0	5.00	20.00	158.50	271.50	187.50	152.00	190.00	377.00	105.00	118.50	448.50
1977	27.00	73.50	46.50	0.0	117.00	184.00	170.50	292.00	108.00	354.50	196.50	158.50
1978	133.00	0.0	43.50	0.0	204.50	197.00	247.50	94.00	132.50	290.00	296.50	235.00
1979	114.50	130.00	91.00	271.50	212.00	199.00	104.00	110.00	194.00	353.50	441.00	75.00
1980	193.00	172.00	72.00	149.50	279.00	203.00	297.50	354.50	495.00	569.50	221.00	135.50

STATION NO. 4525111

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	191.00	138.10	262.30	165.10	778.20
1972	35.00	57.90	14.40	224.20	54.60	159.00	134.10	144.20	243.80	278.30	167.80	549.70
1973	100.30	43.90	163.30	135.60	76.50	58.10	154.70	97.60	155.40	207.50	270.50	0.0
1974	24.80	251.90	51.80	256.20	190.70	166.50	144.00	260.00	159.50	222.30	201.60	156.70
1975	258.30	260.30	141.70	193.80	215.10	145.00	94.70	140.90	240.80	156.40	476.60	234.40
1976	28.10	10.90	46.90	236.20	308.10	128.50	167.80	291.80	194.30	302.00	185.40	322.60
1977	51.50	12.70	59.90	28.90	85.30	209.60	129.80	311.70	105.10	173.20	135.40	152.10
1978	192.50	100.30	77.70	0.0	182.30	172.40	189.90	101.80	241.30	246.30	135.40	289.10
1979	135.30	92.70	77.80	197.60	141.90	130.30	80.50	93.90	269.40	272.00	461.70	65.50
1980	95.60	105.10	121.40	168.60	223.50	123.60	135.60	224.50	298.70	286.20	211.80	165.60

STATION NO. 4529071

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	6.30	53.80	138.40	463.00	0.0	0.0
1971	26.90	92.40	514.60	19.30	0.0	1.50	5.50	184.20	204.70	375.90	380.50	591.30
1972	85.30	13.90	103.10	23.80	13.20	16.00	15.40	169.40	231.40	164.80	0.0	0.0
1973	0.0	0.0	0.0	78.50	170.40	221.90	142.40	133.80	226.00	423.50	512.80	623.30
1974	7.60	430.50	172.20	121.40	134.30	214.10	101.60	102.40	296.40	272.50	315.20	391.70
1975	206.00	203.00	49.00	90.60	111.50	97.50	149.50	81.00	115.50	134.50	195.50	138.00
1976	6.50	4.50	10.50	103.00	76.00	108.00	94.50	90.00	105.50	122.30	207.00	304.00
1977	12.50	158.00	41.00	20.00	121.00	146.00	142.00	368.00	145.00	441.00	318.00	166.00
1978	448.00	128.50	64.50	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

STATION NO. 4923001

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	113.00	31.00
1975	0.0	194.00	60.00	240.00	383.00	203.00	99.00	0.0	0.0	301.00	374.00	303.00
1976	23.00	53.00	51.00	195.00	503.00	165.00	167.00	256.00	132.00	185.00	417.00	445.00
1977	135.00	148.00	51.00	0.0	150.00	147.00	222.00	370.00	74.00	15.00	278.00	202.00
1978	180.00	86.00	44.00	77.00	224.00	202.00	213.00	213.00	256.00	284.00	153.00	341.00
1979	131.00	107.00	73.00	140.00	167.00	208.00	130.00	137.00	237.00	98.00	651.00	101.00
1980	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

STATICN NC. 4930038

	1	2	3	4	5	6	7	8	9	10	11	12
1970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1973	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1974	30.10	0.0	0.0	0.0	0.0	330.20	275.90	273.70	285.70	371.40	58.80	679.60
1975	555.00	258.00	181.00	393.00	283.00	320.00	98.00	17.00	0.0	0.0	838.00	554.00
1976	36.00	8.00	14.00	180.00	478.00	0.0	222.00	207.00	445.00	338.00	1113.00	744.00
1977	0.0	0.0	75.00	27.00	210.00	77.00	281.00	389.00	308.50	359.00	515.00	434.00
1978	237.00	119.00	44.00	87.00	235.00	321.00	311.00	191.00	256.00	630.00	331.00	122.00
1979	193.00	192.00	111.00	89.00	206.00	41.00	50.00	39.00	75.00	395.00	994.00	355.00
1980	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

KG. MERTING

Daily Rainfall Table

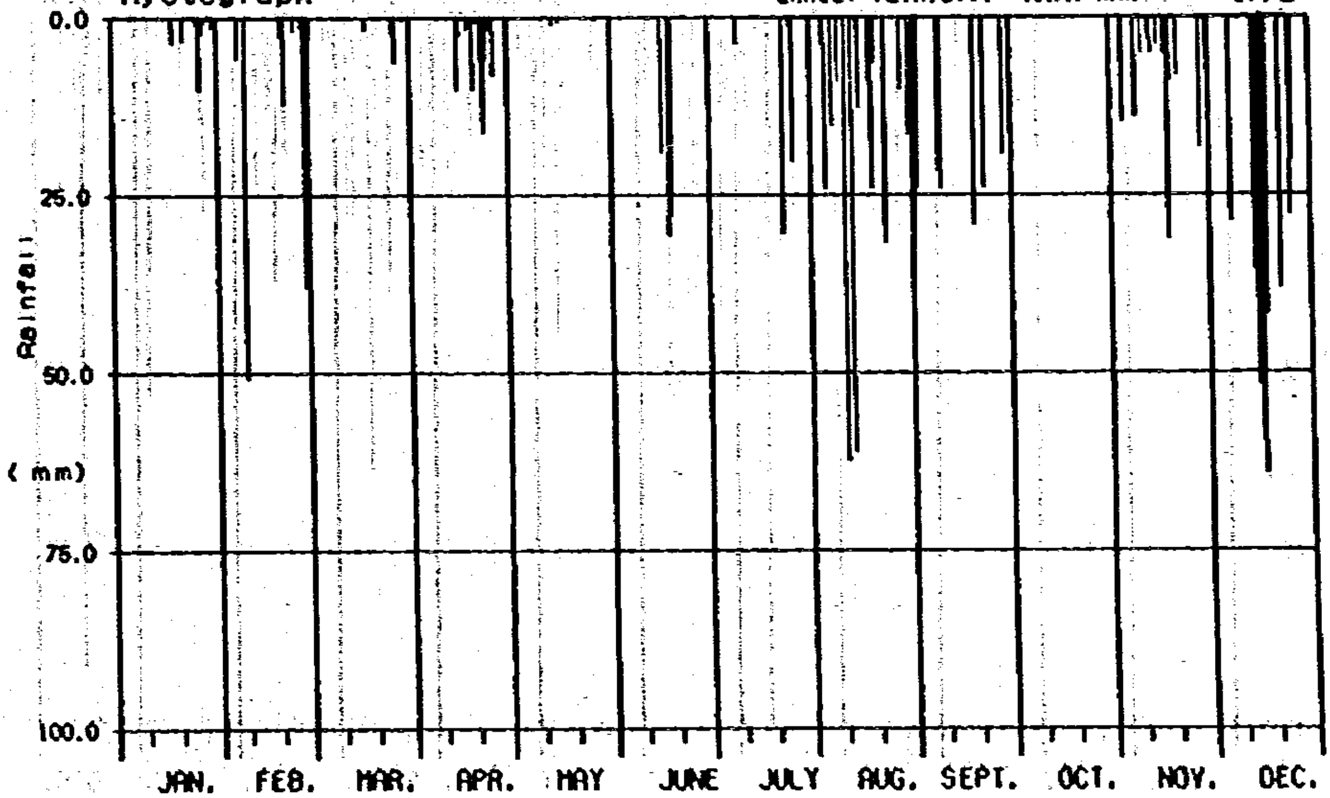
(Unit: mm) 1972

day	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1			3.0						31.8			
2									24.1			
3												
4								3.8			14.7	
5								24.1				
			(3.0)					(27.9)	(55.9)		(14.7)	
6												
7								15.2				28.7
8		5.8							21.6		14.0	
9							3.6	8.9	24.1			
10		50.8									5.1	
		(56.6)					(3.8)	(24.1)	(45.7)		(19.1)	(28.7)
11					0.5			62.2				
12											2.5	
13								61.0			5.1	
14					1.0							35.6
15				10.2				12.7			3.8	51.8
				(10.2)	(1.5)			(135.9)			(11.4)	(87.4)
16				2.5	0.8	19.1						59.7
17											5.1	64.3
18			1.8	1.8		30.5		8.9			31.2	41.9
19	3.6			1.5		27.9		24.1	29.2		9.1	
20				10.2				6.4				
	(3.6)		(1.8)	(16.0)	(0.8)	(77.5)		(39.4)	(29.2)		(45.4)	(165.9)
21		3.0		0.8							8.1	
22	3.3	12.2		6.1					24.1			38.1
23				16.3	0.3		30.5	31.8				
24				6.1								
25		2.0		1.8			1.3					27.9
	(3.3)	(17.2)		(31.1)	(0.3)		(31.8)	(31.8)	(24.1)		(8.1)	(66.0)
26	1.0		2.5	8.1			20.3					20.3
27	10.2	1.5	6.4		0.5							
28	2.5	38.1			0.3			10.2	19.1		18.3	
29	0.8		0.5									
30			0.5					16.5	16.5		5.1	
31	1.5											
	(16.0)	(39.6)	(9.9)	(8.1)	(0.8)		(20.3)	(26.7)	(35.6)		(23.4)	(20.3)
Total	22.9	113.4	14.7	65.4	3.4	77.5	55.9	285.8	190.5		122.1	368.3
Mean	0.7	3.9	0.5	2.2	0.1	2.6	1.8	9.2	6.3		4.1	11.9
Max.	10.2	50.8	6.4	16.3	1.0	30.5	30.5	62.2	31.8		31.2	64.3
Min.												

Max.	Mean	Total
64.3	3.6	1319.9

Hyetograph

annual rainfall: 1319.9 mm 1972



KG. MERTING

Daily Rainfall Table

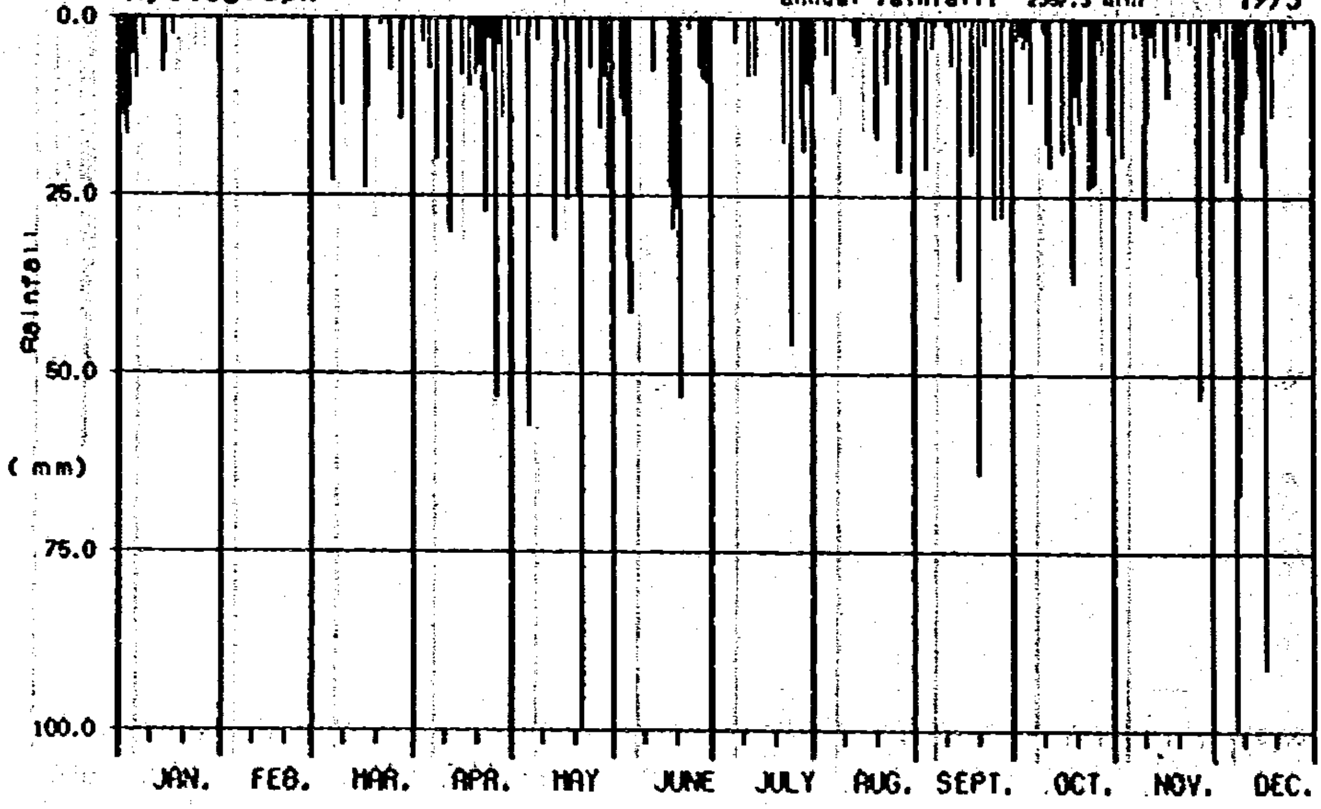
(Unit: mm) 1973

day	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1								5.8	13.5			4.8
2	14.0								2.8	3.0		1.5
3	16.5				2.5	11.2				2.3	19.3	2.5
4	12.7			3.3		13.7			21.1	4.1	0.5	
5	5.1					34.0		5.1	0.5	3.0		22.6
	(48.3)			(3.3)	(2.5)	(58.9)		(10.9)	(37.9)	(12.4)	(19.8)	(31.4)
6	8.6			7.1	57.4	41.4			4.1	11.7		
7			22.9		1.3			10.4	1.0		2.5	5.3
8	2.5			19.6			3.3					103.1
9					3.0						2.0	66.8
10			12.2						1.0	2.0	27.9	16.0
	(11.1)		(35.1)	(26.7)	(61.7)	(41.4)	(3.3)	(10.4)	(6.1)	(13.7)	(32.4)	(191.2)
11									1.8	17.5	14.5	10.9
12				30.0			8.1		6.6	20.8	2.5	0.8
13						7.6		2.5		0.3	5.1	0.3
14	7.6				31.2		7.9	3.8	36.6			3.8
15	5.1				6.1			3.6				7.6
	(12.7)			(30.0)	(37.3)	(7.6)	(16.0)	(9.9)	(45.0)	(38.6)	(22.1)	(23.4)
16				7.9					1.0	18.8	5.1	20.6
17	2.5		23.9		3.0						10.9	91.2
18			12.7	9.4	25.4	23.6			19.1	17.3		0.3
19				1.0		29.7			0.3	37.1		13.7
20				7.9		26.7		16.8	64.0	10.7	2.8	
	(2.5)		(36.6)	(26.2)	(28.4)	(80.0)		(16.8)	(84.4)	(83.9)	(18.8)	(125.8)
21				6.6	24.9	53.3	1.0	0.8		14.7		1.5
22			1.0	10.4	122.4				3.6	8.6		4.6
23				27.2			17.5	9.1	0.3	0.8	0.3	3.8
24			1.0	3.0		1.5		4.1		23.6	3.3	
25			7.4	7.6	6.9		45.7		27.9	23.6		
			(9.4)	(54.8)	(154.2)	(54.8)	(64.2)	(14.0)	(31.8)	(71.3)	(3.6)	(9.9)
26				53.3						23.1	35.8	1.0
27				3.6		6.9		21.6	27.7	2.8	53.3	
28			14.2	14.0	15.5	8.6	14.0	0.8	0.8	4.8		
29			2.0		8.1	9.1	18.8					0.5
30				10.9	23.9		9.4	1.0	34.3	16.0	9.7	
31	6.4						15.7	12.4		4.8		
	(6.4)		(16.2)	(81.8)	(47.5)	(24.6)	(57.9)	(35.8)	(62.8)	(51.5)	(98.8)	(1.5)
Total	81.0		97.3	222.8	331.6	267.3	141.4	97.8	268.0	271.4	195.5	383.2
Mean	2.6		3.1	7.4	10.7	8.9	4.6	3.2	8.9	8.8	6.5	12.4
Max.	16.5		23.9	53.3	122.4	53.3	45.7	21.6	64.0	37.1	53.3	103.1
Min.												

Max. 122.4 Mean 6.5 Total 2357.3

Hyetograph

annual rainfall: 2357.3 mm 1973



KG. MERTING

Daily Rainfall Table

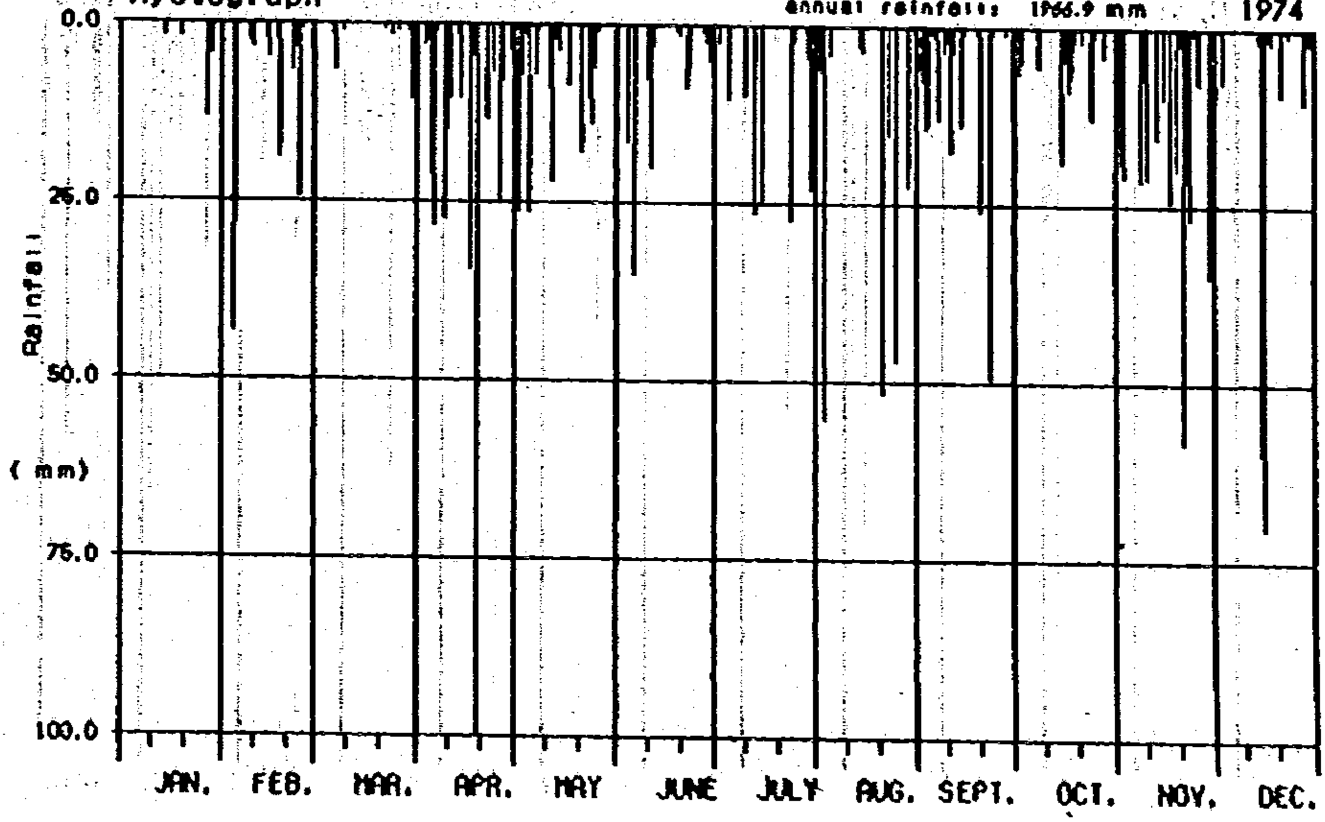
(Unit: mm) 1974

day	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1				13.0				2.5		1.5	16.0	10.4
2					26.4		2.5	6.6	7.6	6.6	19.1	
3		0.3		3.0	7.1			55.4	14.5	5.1	21.1	
4		43.4		2.5	1.5	16.5			14.0			7.6
5		28.4		21.1	26.4		10.4	4.1	1.0			
		(72.1)		(39.6)	(61.4)	(16.5)	(12.9)	(68.6)	(37.1)	(13.2)	(56.2)	(18.0)
6			1.8	28.4		35.1			1.5			
7			6.6	1.0	7.1				13.0			
8					1.0					5.6	21.6	
9		2.5	1.0	27.4					3.6		7.1	
10		3.3		15.0		7.6	9.9		2.0		21.1	
		(5.8)	(9.4)	(71.8)	(8.1)	(42.7)	(9.9)		(20.1)	(5.6)	(49.8)	
11	0.3			10.4	8.9	20.1			17.5			
12	0.3				22.1	3.0			3.6			
13				1.5	2.0		26.4					
14	2.0	2.3		10.4	3.6			3.0	14.0		15.5	2.0
15	0.3	4.8					24.4	3.6	1.0	19.1	9.9	59.9
	(2.9)	(7.1)		(22.3)	(36.6)	(23.1)	(50.8)	(6.6)	(36.1)	(19.1)	(25.4)	(61.9)
16	0.3									4.6		70.4
17		2.3		34.5	8.4					8.9	24.4	1.5
18		18.8		4.6						7.1		2.0
19	2.0			127.5		1.0			1.0	2.0	20.1	
20	0.3					1.5			25.9		2.5	
	(2.6)	(21.1)		(166.6)	(8.4)	(2.5)			(26.9)	(22.6)	(47.0)	(73.9)
21					18.0			51.6		2.0	58.4	9.4
22		6.6	0.8	13.5		8.9					21.6	
23		3.6			10.4	6.1		15.5	49.5		26.9	1.0
24		24.4	1.5	6.6	14.0		27.4		1.0	13.0	1.0	
25		1.0			6.1		2.5	47.0		1.5	7.6	
		(35.6)	(2.3)	(20.1)	(48.5)	(15.0)	(29.9)	(114.1)	(50.5)	(16.5)	(115.5)	(10.4)
26			1.0	24.4	1.0						7.9	
27	13.2			7.9		1.0						
28	4.6	3.6				2.5			1.0	4.1	35.1	10.4
29	4.3		1.0	3.6		5.1	4.6	22.6				2.0
30			10.7			7.1	23.1		13.0			2.0
31			0.8				1.0					7.6
	(22.1)	(3.6)	(13.5)	(35.9)	(1.0)	(15.7)	(28.7)	(22.6)	(14.0)	(4.1)	(43.0)	(22.0)
Total	27.6	145.3	25.2	356.3	164.0	115.5	132.2	211.9	184.7	81.1	336.9	186.2
Mean	0.9	5.2	0.8	11.9	5.3	3.8	4.3	6.8	6.2	2.6	11.2	6.0
Max.	13.2	43.4	10.7	127.5	26.4	35.1	27.4	55.4	49.5	19.1	58.4	70.4
Min.												

Max. 127.5 Mean 5.4 Total 1966.9

Hyetograph

annual rainfall: 1966.9 mm 1974



KG. MERTING

Daily Rainfall Table

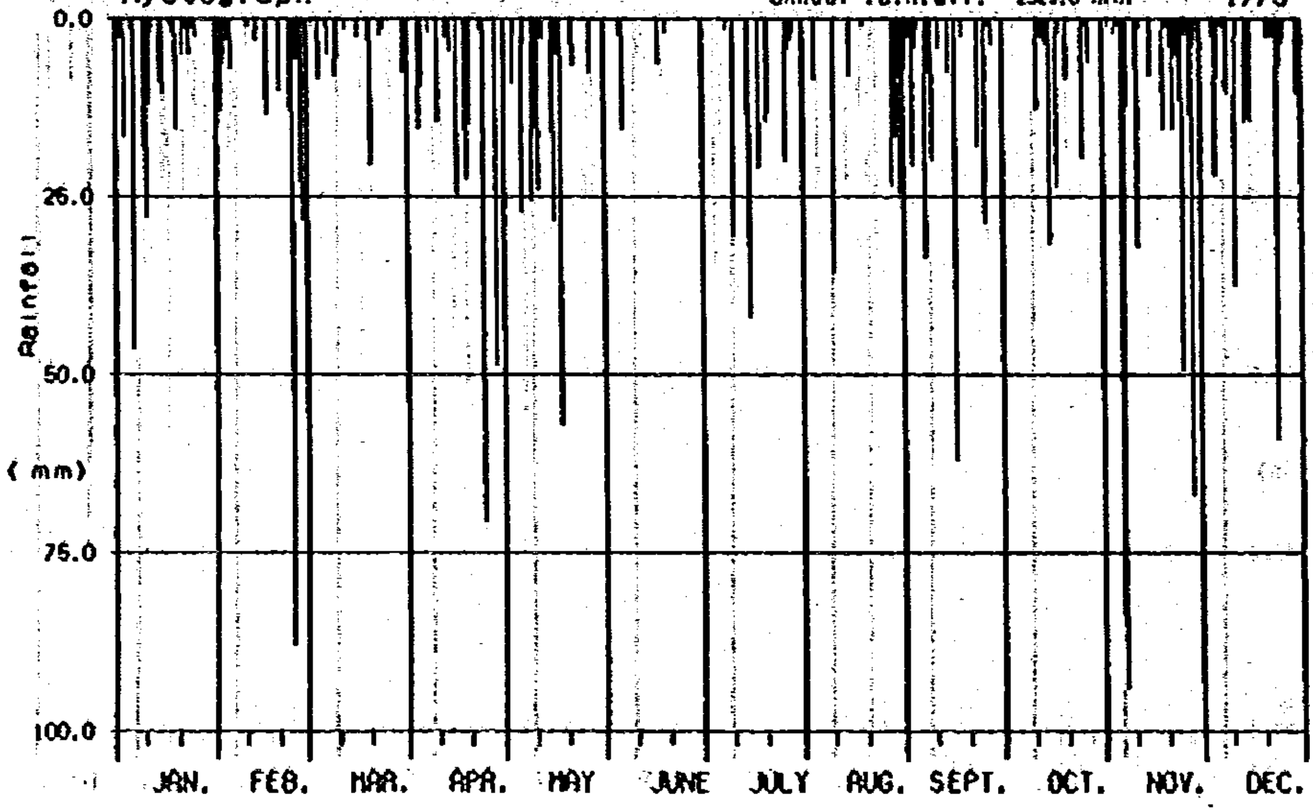
(Unit: mm) 1975

day	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	10.0	7.5			11.0				7.0			
2	3.0	13.0	1.0						2.5		1.0	
3	16.5	6.5			9.0				20.5			
4		3.0	8.5	15.5	2.5			8.5	4.0		2.0	2.5
5	1.5	7.0		9.5		2.5			1.5		1.0	22.0
	(31.0)	(37.0)	(9.5)	(25.0)	(22.5)	(2.5)		(8.5)	(35.0)		(4.0)	(24.5)
6	46.5		1.0		27.0	15.5					83.5	8.5
7			5.0	2.0	3.5				33.5		94.0	1.0
8							1.5		7.5		12.5	10.
9	18.0		8.0		25.5				20.0			10.5
10	28.0	1.0	5.5	14.5	15.5		30.5	35.5			7.0	
	(92.5)	(1.0)	(19.5)	(16.5)	(71.5)	(15.5)	(32.0)	(35.5)	(61.0)		(197.0)	(30.0)
11	12.0	1.0			24.0				4.0	12.5	32.0	37.5
12	2.0		1.5	2.5	3.0					2.5	1.5	2.5
13		3.0		2.5	3.0					3.0		
14	9.0			4.5			13.5		7.5	3.5		14.5
15	10.5				16.0		42.0	8.0		31.5	8.0	14.0
	(33.5)	(4.0)	(1.5)	(9.5)	(46.0)		(55.5)	(8.0)	(11.5)	(53.0)	(41.5)	(68.5)
16		13.5	2.5	24.5	28.5				62.0			14.5
17	1.0				5.0	6.5				23.5		
18	2.0			15.5	57.0		21.0		2.5	2.0		
19	15.5		3.0	22.5		2.0		1.0			15.5	
20		10.0	20.5	15.0			14.5			8.5	1.5	
	(18.5)	(23.5)	(26.0)	(77.5)	(90.5)	(8.5)	(35.5)	(1.0)	(64.5)	(34.0)	(17.0)	(14.5)
21	5.0				3.5		13.5				4.0	2.5
22	1.5				6.5						15.5	2.5
23	5.0	13.0	2.5	1.5					18.0		5.0	2.5
24	1.5	88.0	1.5	70.5							11.5	59.0
25	2.5	6.0							28.5	19.5	49.5	6.5
	(15.5)	(107.0)	(4.0)	(72.0)	(10.0)		(13.5)		(46.5)	(19.5)	(85.5)	(73.0)
26		23.0					20.0		1.0	1.0	2.5	3.5
27		28.5			7.5		4.5		3.5	6.0	13.5	
28				48.5			3.0	23.5			67.0	
29							2.0	16.5			3.5	
30			7.5					24.5				10.5
31	5.0				11.5			13.5		11.5		
	(5.0)	(51.5)	(7.5)	(48.5)	(19.0)		(29.5)	(78.0)	(4.5)	(18.5)	(86.5)	(14.0)
Total	196.0	223.9	68.0	249.1	259.6	26.5	166.0	131.0	223.6	125.0	431.6	224.6
Mean	6.3	8.0	2.2	8.3	8.4	0.9	5.4	4.2	7.5	4.0	14.4	7.2
Max.	46.5	88.0	20.5	70.5	57.0	15.5	42.0	35.5	62.0	31.5	94.0	59.0
Min.												

Max. 94.0 Mean 6.4 Total 2325.0

Hyetograph

annual rainfall: 2325.0 mm 1975



Daily Rainfall Table

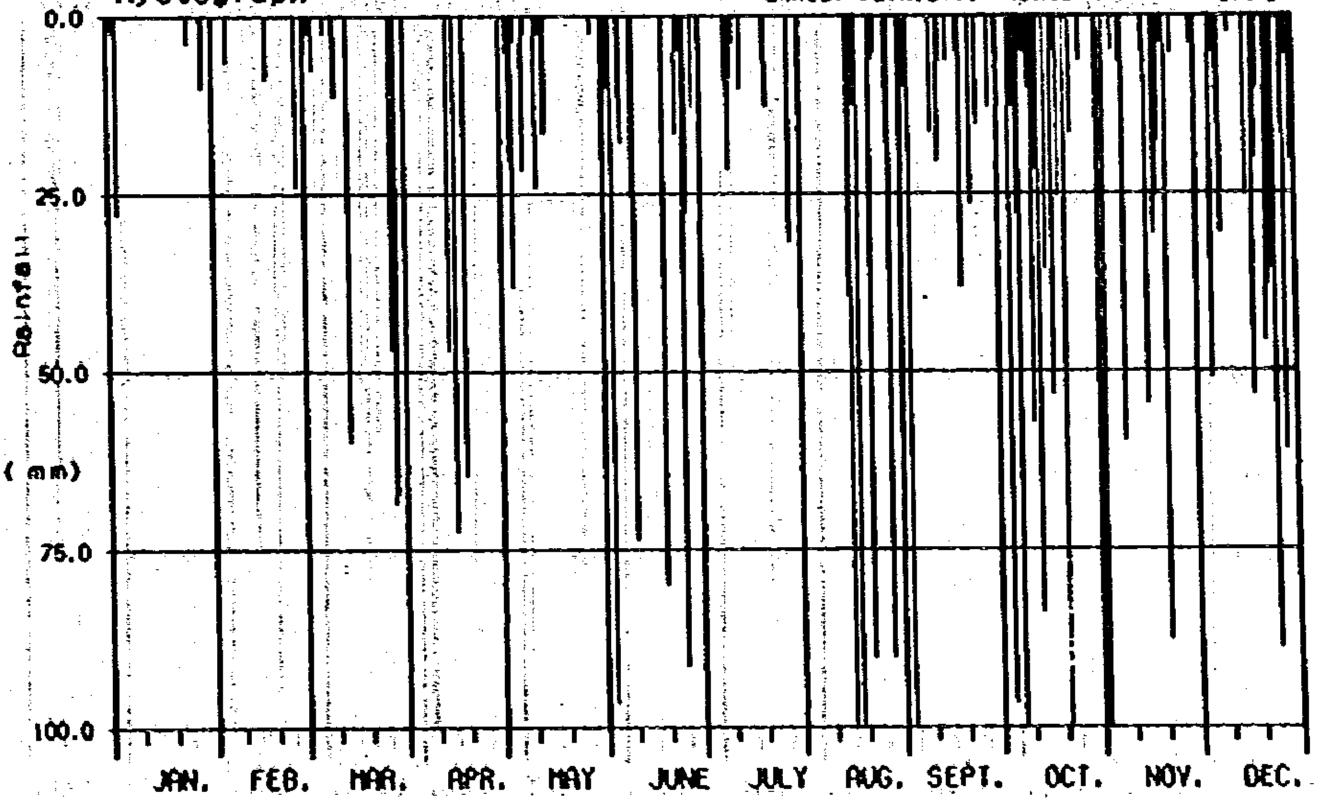
(Unit: mm) 1976

day	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1			5.1			12.7			199.4			
2	2.5		2.5		5.1	10.2			10.2		109.2	
3	27.9		7.6		20.3	96.5			127.0			
4					39.1					96.5		
5					3.8	11.4				12.7	5.1	50.8
	(30.4)		(15.2)		(67.3)	(130.8)			(336.6)	(109.2)	(114.3)	(50.8)
6		6.4				17.8				27.9		5.1
7			2.5		21.6					114.3	6.4	15.2
8					2.5		8.9			5.1	59.7	30.5
9			2.5			25.4	21.6			5.1		
10			11.4			73.7	8.9		16.5	10.2		
		(6.4)	(16.4)		(24.1)	(116.9)	(39.4)		(16.5)	(162.6)	(66.1)	(50.8)
11					24.1		3.8			57.2		2.5
12					2.5				20.3	21.6		
13					16.5		10.2		6.4	83.8		
14			59.7	47.0	16.5						5.1	
15								39.4	6.4	35.6	54.6	
			(59.7)	(47.0)	(59.6)		(14.0)	(39.4)	(33.1)	(198.2)	(59.7)	(2.5)
16				72.4				160.0				25.4
17								12.7		53.3	30.5	
18		8.9						146.1	5.1	5.1	25.4	53.3
19				64.8		80.0			38.1	25.4	17.8	20.3
20							6.4				3.8	10.2
		(8.9)		(137.2)		(80.0)	(6.4)	(318.8)	(43.2)	(83.8)	(77.5)	(109.2)
21							12.7			105.4	87.6	
22								90.2	26.7			45.7
23						16.5		6.4		16.5	5.1	38.1
24						5.1		5.1	15.2			35.6
25	3.8					91.4						88.9
	(3.8)					(113.0)	(12.7)	(101.7)	(41.9)	(121.9)	(92.7)	(208.3)
26						27.9				6.4		
27		24.1	47.0					17.8				15.2
28			68.6		2.5	12.7	31.8	90.2	12.7			61.0
29	10.2		67.3								3.8	5.1
30	10.2								5.1			20.3
31					163.8					59.7		17.8
	(20.4)	(24.1)	(182.9)		(166.3)	(40.6)	(31.8)	(108.0)	(17.8)	(66.1)	(3.8)	(119.4)
Total	54.6	39.4	274.2	184,2	317,3	481.3	104.3	567.9	489.1	741.8	414.1	541.0
Mean	1.8	1.4	8.8	6.1	10.2	16.0	3.4	18.3	16.3	23.9	13.8	17.5
Max.	27.9	24.1	68.6	72.4	163.8	96.5	31.8	160.0	199.4	114.3	109.2	88.9
Min.												

Max. 199.4 — Mean 11.5 — Total 4209.2

Hyetograph

annual rainfall 4209.2 mm 1976



KG. MERTING

Daily Rainfall Table

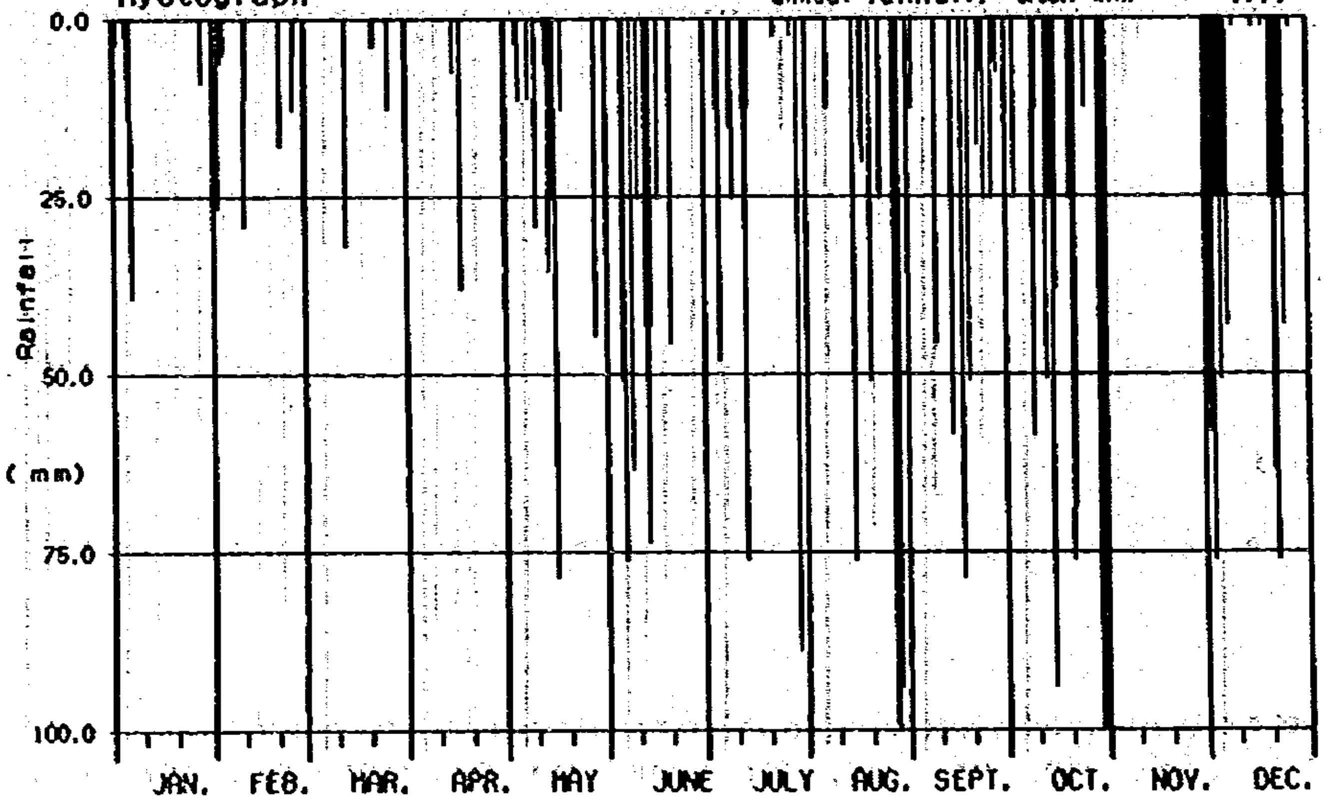
(Unit: mm) 1977

day	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	14.0		68.6		67.3							50.8
2	3.8	26.7							12.7			58.4
3		6.4								25.4		76.2
4	2.5	5.1			3.8		12.7					25.4
5	14.0				11.4	50.8	48.3					50.8
	(34.3)	(38.2)	(68.6)	-	(82.5)	(50.8)	(61.0)		(12.7)	(25.4)		(261.6)
6	39.4					76.2						25.4
7								12.7				43.2
8					11.4	63.5	15.2					
9							25.4		45.7	58.4		1.3
10		29.2			29.2	25.4				12.7		
	(39.4)	(29.2)		-	(40.6)	(165.1)	(40.6)	(12.7)	(45.7)	(71.1)		(69.9)
11		11.4										
12						43.2	12.7					
13			31.8		6.4	73.7	76.2			50.8		
14					35.6	43.2	12.7		58.4	25.4		
15				7.6	25.4			76.2		94.0		1.3
		(11.4)	(31.8)	(7.6)	(67.4)	(160.1)	(101.6)	(76.2)	(58.4)	(170.2)		(1.3)
16					78.7	25.4				38.1		
17				38.1				17.8	78.7			
18					12.7			20.3				1.3
19									50.8			
20						45.7		50.8		25.4		25.4
				(38.1)	(91.4)	(71.1)		(88.9)	(129.5)	(63.5)		(26.7)
21		17.8	3.8							76.2		63.5
22			3.8				2.5		17.8	68.6		76.2
23								25.4	7.6			25.4
24									25.4			43.2
25		12.7								12.7		
		(30.5)	(7.6)				(2.5)	(25.4)	(50.8)	(157.5)		(208.3)
26		5.1	12.7						25.4			1.3
27							2.5	99.1	6.4			
28	8.9				44.5			101.6	7.6			
29							88.9	94.0		177.8		
30				30.5						127.0		
31										76.2		
	(8.9)	(5.1)	(12.7)	(30.5)	(44.5)		(91.4)	(294.7)	(39.4)	(381.0)		(1.3)
Total	82.6	114.4	120.7	76.2	326.4	447.1	297.1	497.9	336.5	868.7		569.1
Mean	2.7	4.1	3.9	2.5	10.5	14.9	9.6	16.1	11.2	28.0		18.4
Max.	39.4	29.2	68.6	38.1	78.7	76.2	88.9	101.6	78.7	177.8		76.2
Min.												

Max. 177.8 | Mean 10.2 | Total 3736.7

Hyetograph

annual rainfall: 3736.7 mm 1977



1972.12.14-12.20 (FLOOD) OBSERVATION

HOUR DAY	14	15	16	17	18	19	20
1	25.33	51.75	1038.88	2303.72	1824.31	787.02	473.49
2	25.33	54.80	1125.74	2390.73	1820.34	738.76	466.40
3	25.57	57.29	1146.21	2427.37	1790.83	707.82	465.39
4	25.82	59.79	1166.68	2464.01	1761.32	676.89	464.39
5	25.82	64.31	1124.58	2436.47	1718.92	655.45	467.41
6	25.82	68.83	1082.48	2408.94	1676.52	634.01	470.43
7	25.82	85.68	993.17	2352.57	1618.54	624.71	484.77
8	25.82	102.52	903.85	2296.21	1560.56	615.41	499.12
9	26.07	118.79	850.96	2239.02	1504.66	607.38	506.46
10	26.31	135.06	798.07	2181.84	1448.76	599.35	513.79
11	26.55	146.35	811.31	2143.10	1410.35	586.95	501.28
12	26.80	157.65	824.56	2104.36	1371.94	574.55	488.78
13	27.04	171.07	885.42	2076.82	1332.90	552.68	468.63
14	27.29	184.49	946.28	2049.28	1293.85	530.80	448.48
15	28.05	213.01	1069.25	2011.75	1249.48	510.82	432.98
16	28.81	241.54	1192.23	1974.22	1205.11	490.84	417.49
17	29.85	289.75	1336.51	1937.39	1157.66	482.66	405.30
18	30.89	337.96	1480.79	1900.55	1110.20	474.48	393.12
19	32.51	425.87	1605.51	1874.39	1066.17	478.55	384.00
20	34.14	513.79	1730.24	1848.22	1022.14	482.62	374.87
21	37.32	633.90	1872.99	1838.25	975.66	484.67	367.73
22	40.51	754.01	2015.74	1828.29	929.19	486.72	360.59
23	44.60	853.01	2116.23	1828.29	882.23	483.65	353.58
24	48.70	952.02	2216.72	1828.29	835.28	480.58	346.58

Appendix J

Adjusted Rainfall for the Daily Runoff Model form Kamgsar

** RAINFALL 1961-1979 ** (YEAR 1961)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	13.5	0.0	0.0	6.2	2.9	0.0	0.0	0.0	17.9	19.5	12.2	16.9
2	0.0	0.0	0.0	23.9	0.0	9.1	0.0	0.0	0.0	48.6	9.6	6.5
3	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	44.2	7.5	0.0
4	0.0	0.0	0.0	0.0	13.8	0.0	0.0	0.0	3.9	0.0	2.9	23.4
5	3.1	0.0	0.0	14.3	14.8	5.5	0.0	0.0	49.4	0.0	0.0	15.6
	(16.6)	(0.0)	(0.0)	(48.6)	(31.5)	(14.6)	(0.0)	(0.0)	(71.2)	(112.3)	(32.2)	(62.4)
6	59.2	0.0	3.1	0.0	10.7	0.0	0.0	0.0	15.6	0.0	12.0	4.7
7	9.9	0.0	5.5	0.0	0.0	0.0	0.0	28.3	3.4	0.0	1.0	7.8
8	3.6	3.4	6.8	0.0	10.7	13.8	0.0	0.0	0.0	0.0	0.0	11.7
9	11.4	0.0	8.8	4.4	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0
10	10.9	0.0	1.8	7.0	12.7	0.0	0.0	0.0	81.3	0.0	11.4	23.4
	(95.0)	(3.4)	(26.0)	(11.4)	(34.1)	(13.8)	(7.3)	(28.3)	(100.3)	(0.0)	(24.4)	(47.6)
11	55.9	3.4	5.2	1.0	39.0	0.0	0.0	0.0	0.0	27.3	0.0	23.4
12	50.7	23.6	2.3	24.2	1.8	13.0	0.0	2.3	6.5	53.8	0.0	18.2
13	1.8	14.5	0.0	46.8	0.0	24.4	0.0	33.8	0.0	20.0	0.0	1.3
14	0.0	17.4	29.6	3.1	0.0	64.2	0.0	3.1	0.0	0.0	0.0	0.3
15	0.0	0.0	3.4	10.1	33.5	24.4	0.0	6.2	31.2	0.0	0.8	11.7
	(108.4)	(58.9)	(40.5)	(85.2)	(74.3)	(126.0)	(0.0)	(45.4)	(37.7)	(101.1)	(0.8)	(54.9)
16	8.6	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	13.8	2.3	0.0	5.5	0.0	0.0	16.9	0.0	32.5	3.4	0.0
18	3.4	0.0	0.0	24.7	0.0	13.8	0.0	3.4	0.0	0.0	2.3	0.5
19	0.0	21.3	0.0	80.3	0.0	0.0	0.0	8.6	0.0	0.0	24.9	3.9
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
	(12.0)	(35.1)	(5.4)	(105.0)	(5.5)	(13.8)	(0.0)	(28.9)	(0.0)	(32.5)	(30.6)	(4.9)
21	29.4	0.8	0.0	0.0	0.0	0.0	22.9	0.0	0.0	0.0	0.0	0.5
22	0.0	0.0	2.3	0.0	0.0	0.0	45.7	0.0	1.6	0.0	22.1	5.2
23	0.0	0.0	0.0	19.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0
24	0.0	0.0	0.8	17.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	17.9	0.0	0.0	0.0	0.0	0.0	14.3	0.0	14.3	7.3
	(29.4)	(0.8)	(21.0)	(36.7)	(0.0)	(0.0)	(68.6)	(1.8)	(15.9)	(0.0)	(36.4)	(13.0)
26	0.0	0.0	5.2	10.1	0.0	0.0	20.8	0.0	0.0	144.7	4.9	39.0
27	3.1	0.0	0.0	4.7	0.0	0.0	0.0	0.8	3.9	10.1	0.0	6.5
28	0.0	0.0	0.0	9.1	30.1	0.0	0.0	0.0	0.0	0.0	13.3	0.0
29	0.0		6.0	0.0	10.9	0.0	0.0	0.0	25.2	7.0	13.8	3.9
30	0.0		3.1	6.2	0.0	0.0	0.0	0.0	5.7	5.5	13.8	7.8
31	0.0		0.0		0.0		0.0	0.0		0.0		5.5
	(3.1)	(0.0)	(14.3)	(30.1)	(41.0)	(0.0)	(20.8)	(0.8)	(34.8)	(167.3)	(45.8)	(62.7)
TOTAL	264.	98.	107.	317.	186.	168.	97.	105.	260.	413.	170.	245.

ANNUAL TOTAL 2432.

** RAINFALL 1961-1979 ** (YEAR 1962)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	5.4	0.0	19.5	0.0	0.0	0.0	0.0	0.0	14.6	9.5	2.7	0.0
2	54.2	3.8	1.6	0.0	17.6	0.0	0.0	4.3	0.0	0.0	0.0	5.4
3	13.6	0.0	16.0	0.0	0.0	36.9	0.0	0.0	4.9	0.0	0.0	2.4
4	0.0	0.0	6.0	0.0	0.0	2.4	14.9	0.0	13.6	0.0	0.0	31.7
5	0.0	0.0	1.6	5.4	1.4	0.0	12.5	3.3	30.1	0.0	3.0	31.7
	(73.2)	(3.8)	(44.7)	(5.4)	(19.0)	(39.3)	(27.4)	(7.6)	(63.2)	(9.5)	(5.7)	(71.2)
6	0.0	0.0	0.8	21.4	0.0	16.0	1.4	0.0	16.3	17.1	4.1	0.5
7	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	3.0	25.8	1.6
8	0.0	0.0	2.7	4.1	4.1	0.0	0.0	18.7	2.2	4.3	2.2	0.0
9	0.0	0.0	0.0	1.4	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	8.4	0.0	1.4	2.7
	(0.0)	(0.0)	(4.9)	(26.9)	(8.8)	(16.0)	(1.4)	(18.7)	(26.9)	(24.4)	(33.5)	(4.8)
11	0.0	0.0	0.0	0.0	24.9	0.0	0.0	3.0	1.9	8.1	31.2	29.0
12	0.0	0.0	0.0	1.6	1.6	0.0	0.0	2.7	0.0	6.8	2.2	5.4
13	0.0	27.1	0.0	0.0	4.3	0.0	0.0	53.4	14.1	3.3	24.4	2.4
14	10.8	5.2	0.0	1.4	1.4	12.7	0.0	2.2	3.5	0.0	22.2	0.0
15	39.3	0.0	0.0	11.1	22.5	2.2	1.6	87.9	0.0	4.1	0.0	0.0
	(50.1)	(32.3)	(0.0)	(14.1)	(54.7)	(14.9)	(1.6)	(149.2)	(19.5)	(22.3)	(80.0)	(36.8)
16	15.5	1.1	0.0	0.0	11.4	0.0	54.8	3.3	45.6	0.0	33.1	20.3
17	22.0	0.0	0.0	2.7	2.7	0.0	0.0	2.7	0.0	6.2	1.4	8.4
18	0.0	0.0	0.0	0.0	27.1	0.0	0.0	0.0	0.0	10.8	3.5	0.5
19	32.5	5.7	0.0	44.7	0.0	4.6	0.0	0.0	0.0	1.6	16.3	18.4
20	16.8	0.8	0.0	0.0	0.0	0.0	0.0	0.8	0.0	2.7	7.0	4.3
	(86.8)	(7.6)	(0.0)	(47.4)	(41.2)	(4.6)	(54.8)	(6.8)	(45.6)	(21.3)	(61.3)	(51.9)
21	5.7	0.0	66.4	0.0	0.0	15.2	0.0	0.0	0.0	0.0	5.4	4.6
22	1.9	0.0	0.8	0.0	0.0	19.8	0.0	65.6	0.0	7.0	1.9	5.2
23	0.0	2.2	11.7	0.0	0.0	0.0	3.3	0.0	0.0	17.4	30.9	1.4
24	0.0	44.5	1.4	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0
25	0.0	1.9	4.3	0.0	0.0	0.0	0.0	18.4	0.0	0.0	0.0	0.0
	(7.6)	(48.6)	(84.6)	(0.0)	(0.0)	(35.0)	(3.3)	(85.6)	(0.0)	(24.4)	(38.2)	(11.2)
26	0.0	0.0	0.0	0.0	0.0	1.1	0.0	30.1	0.0	0.0	21.4	0.0
27	0.0	2.2	1.9	0.0	0.0	0.0	0.0	0.0	0.0	14.9	0.0	0.0
28	0.0	27.1	16.3	17.4	0.0	8.9	0.0	1.1	0.0	3.5	21.7	17.6
29	0.0		8.1	0.0	0.0	0.0	2.2	0.0	0.0	3.5	14.4	0.0
30	0.0		1.4	0.0	0.0	42.8	4.3	0.0	16.8	0.8	24.4	0.0
31	1.1		2.2		0.0		0.0	2.7		1.4		12.7
	(1.1)	(29.3)	(29.9)	(17.4)	(0.0)	(52.8)	(6.5)	(33.9)	(16.8)	(24.1)	(81.9)	(30.3)
TOTAL	219.	122.	164.	111.	124.	163.	95.	302.	172.	126.	301.	206.

ANNUAL TOTAL 2104.

** RAINFALL 1961-1979 ** (YEAR 1963)

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1	1.7	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
2	3.1	0.0	4.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	35.9
3	5.9	0.0	0.0	0.0	0.0	0.8	1.4	0.0	29.7	11.3	52.6	0.0
4	10.5	0.6	0.0	0.0	22.6	3.4	0.0	0.0	0.8	14.1	25.5	24.0
5	0.0	2.8	0.0	0.0	0.0	2.8	0.0	14.4	0.0	17.0	0.0	9.9
	(21.2)	(7.4)	(4.0)	(0.0)	(22.6)	(7.0)	(1.4)	(14.4)	(34.2)	(42.4)	(78.1)	(71.8)
6	11.6	3.4	5.1	0.0	0.0	1.7	2.5	67.9	0.0	0.0	0.0	17.8
7	11.3	0.0	0.0	0.0	4.5	0.0	0.0	0.0	0.0	18.4	10.2	2.0
8	0.0	9.9	11.3	0.0	0.0	0.8	2.5	0.0	0.0	0.0	0.0	0.0
9	0.0	3.7	5.4	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.4	12.7
10	0.0	0.0	2.3	9.1	0.0	21.2	0.0	0.0	0.0	58.0	25.7	0.0
	(22.9)	(17.0)	(24.1)	(9.1)	(4.5)	(23.7)	(5.0)	(67.9)	(0.0)	(78.4)	(37.3)	(32.5)
11	0.0	0.6	0.0	0.0	0.0	8.3	0.0	1.4	0.0	0.0	2.3	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	23.5	3.4	43.3	0.0
13	0.0	5.7	0.0	15.6	1.4	0.0	0.0	0.0	0.0	2.0	44.4	0.0
14	0.0	0.0	4.2	0.0	0.0	0.0	2.5	0.0	0.0	9.3	29.1	53.5
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.6	5.9	0.0	0.0
	(0.0)	(6.3)	(4.2)	(15.6)	(1.4)	(8.8)	(4.8)	(1.4)	(63.1)	(20.6)	(119.1)	(53.5)
16	0.0	0.0	2.0	15.0	8.2	0.0	2.5	0.0	0.0	1.1	0.8	0.0
17	0.0	8.2	0.0	0.0	8.5	0.0	0.0	0.0	0.0	9.9	24.3	0.0
18	4.0	2.8	0.0	0.0	1.4	0.0	0.0	0.0	2.3	4.2	0.0	0.0
19	0.0	4.2	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	34.2	15.6
20	0.0	1.7	8.5	0.0	0.0	0.0	0.0	0.0	16.1	11.3	9.9	16.4
	(4.0)	(16.9)	(10.5)	(15.0)	(18.1)	(0.0)	(2.5)	(1.7)	(18.4)	(26.5)	(69.2)	(32.0)
21	0.0	12.7	0.0	1.4	17.0	0.0	0.0	0.0	0.0	16.1	1.1	12.2
22	12.2	0.0	0.0	0.0	9.9	0.0	0.0	0.0	0.0	0.0	0.6	0.0
23	4.2	0.0	0.0	0.0	19.8	0.0	0.0	7.9	4.8	0.0	9.1	20.9
24	5.4	1.7	1.4	0.0	0.0	30.8	4.5	5.7	0.0	1.4	0.0	13.6
25	1.1	21.2	3.4	0.0	9.9	0.0	0.0	0.0	0.0	0.0	0.8	24.0
	(22.9)	(35.6)	(4.8)	(1.4)	(56.6)	(30.8)	(4.5)	(13.6)	(4.8)	(17.5)	(11.6)	(70.7)
26	0.0	10.2	18.4	1.4	0.0	21.8	74.4	12.2	0.0	4.2	0.0	18.1
27	0.0	0.8	0.0	0.0	0.0	0.0	22.6	0.0	0.0	4.5	21.8	16.7
28	0.0	0.0	0.0	0.0	10.7	0.0	2.3	0.0	93.6	2.8	4.2	3.7
29	0.8		0.0	0.0	2.5	0.0	10.5	0.0	3.7	2.0	0.0	20.4
30	0.0		0.0	0.0	0.0	0.0	0.0	0.0	4.5	2.0	21.2	0.0
31	1.4		0.0		0.0		0.0	0.0		0.0		22.1
	(2.2)	(11.0)	(18.4)	(1.4)	(13.2)	(21.8)	(109.8)	(12.2)	(101.8)	(15.5)	(47.2)	(81.0)
TOTAL	73.	94.	66.	42.	116.	92.	128.	111.	222.	201.	362.	341.

ANNUAL TOTAL 1851.