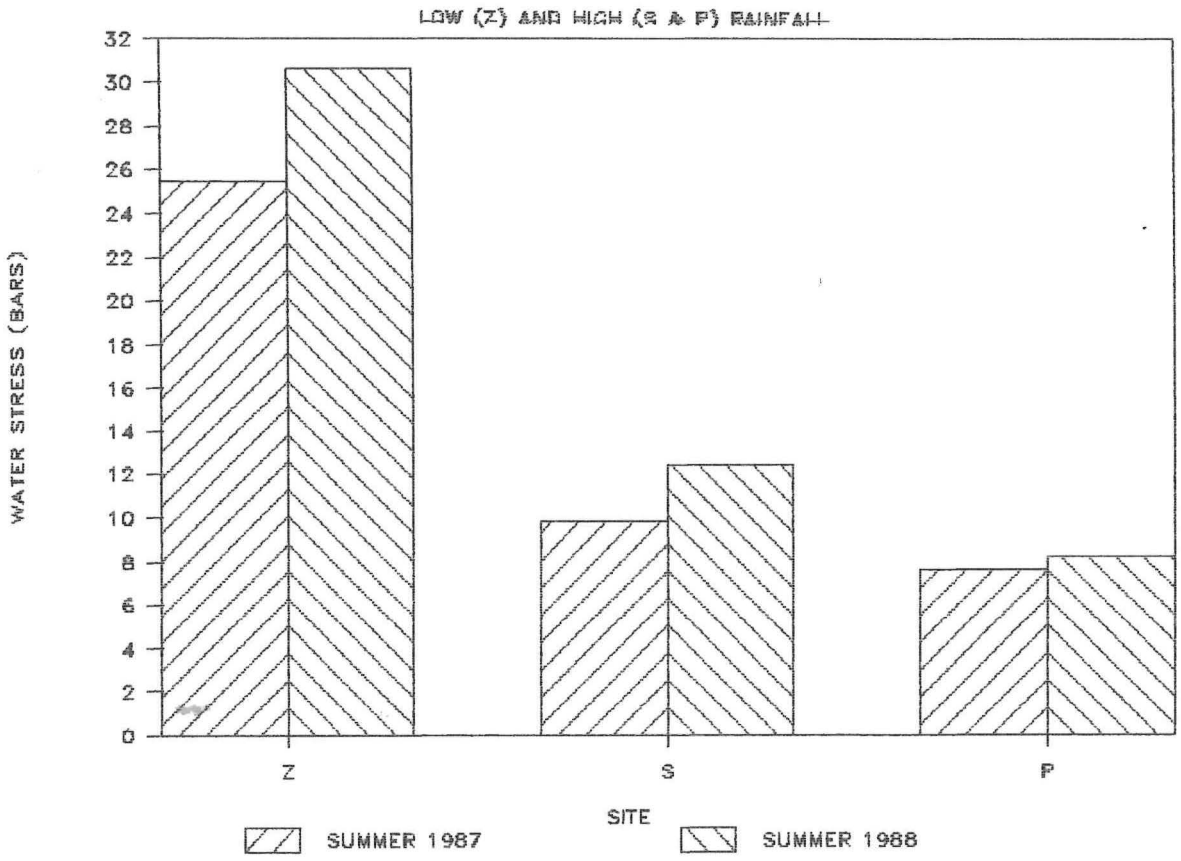
LOW (Z) AND HIGH (S & P) RAINFALL
WATER STRESS (BARS)
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
Z
S
P
SITE
SUMMER 1987
SUMMER 1988

GROWTH AND WATER STRESS IN JARRAH (*EUCALYPTUS MARGINATA* SMITH) DETERMINED USING ELECTROMECHANICAL DENDROMETERS.

CROMBIE, D. STUART AND TIPPETT, JOANNA T., DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT, COMO, PERTH.

The electromechanical dendrometer described by Davey and Mason (Aust. J. For. Res. In Press), when used with an automatic datalogger ("Starlog" by Unidata, Perth), enables continuous monitoring over long periods of changes of tree girth of as little as 2.5 microns. We are using the automatically logged dendrometers in the study of jarrah water relations as they relate to jarrah pathology and silviculture. A direct calibration of trunk girth against trunk water potential will enable more detailed study of the effects of jarrah water relations on the growth of *Phytophthora cinnamomi* in its tissues to be made as low phloem water potentials are known to slow the growth of *Phytophthora cinnamomi* in jarrah.

Diurnal shrinkage of the lower trunk of trees was found to vary substantially from day to day and the effects of particularly large variations often persisted for several days. Daily and longer term variations in girth were presumed to arise from differences in tree water stress and gave hope that dendrometer measurements could be adapted to estimate daily water stress in jarrah. Moreover, changes in girth of the lower trunk and high in the crown are almost synchronous, indicating that measurements made at the base of the tree or in the crown can be used equally well in such esitimations.

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Diurnal changes in girth in midsummer were least on the severely water stressed Z site (see below) and greatest on the the well-watered S site. These differences are unlikely to be entirely due to variations in the water status of the trees on each site however as other other factors, such as bark thickness and cambial activity can affect daily shrinkage also. The relationships between all these factors and stem shrinkage is likely to be complex and may differ between sites.

Shrinkage was greater on the dryer Z site than on the better watered S and P sites although exceeding growth since November on all sites. Net decreases in tree girth were recorded before significant falls in predawn leaf water potential became apparent suggesting that long delays exist between overnight recovery of leaf water potentials and rehydration of the overlying bark. Periodic calibration of changes in stem girth against leaf water potentials on each site, with corrections for growth and lags between water potentials and variations in girth, is to be used so that girth measurements can be used to estimate tree water status.

1 site Electronic Pendrometers.

Channel (Tree No)	Date. 11/3/87 Before Rain	11/3/87 (Afternoon)	4/87	19/5/87	19/6/87	/7/87	10/8/87	Before rain 10/9/87	Afternoon 10/9/87	17/10/87
1 (	106	106		136	159		177	92 (5.22)	94	
2	135	135		158	162		170	104	119	
3 (4)	99	103		161	228		240	180 (5.35)	181	
4 (5)	89	95		167	252		261	85 (4.6)	~~66~~ (5.0)	
5 (11)	47	65		82	80		95	120 (5.95)	137 (4.42)	
6 (9)	103	111		162	248		255	154 -	162	
7 (13)	60	49		124	204		222	127 (4.95)	125	
8 (	255.	—		—	—		~~272~~.	—	—	

Z site. Electronic Dendrometers.

Channel (Tree N°)	Date. 11/3/87 Before Rest	11/3/87 (Afternoon)	4/87	19/5/87	19/6/87	/7/87	10/8/87	Before rest 10/9/87	Afternoon 10/9/87	7/10/87
1	—			133	148		180	98	102	108
2 (Tree 1 high)	109 (?)	109 (?)		172	165		177	158	157	167
3 (Tree 1 low)	1 (2·87)	69 (4·56)		255	205		210	255 (7·25)	176	190
4 (2 high)	—	—		158	171		182	—	—	~~25~~ —
5 (2 low)	127 (4·54)	52 (4·35)		255	204		215	255	108	115
6 (4)	1 (2·92)	82 (4·47)		82	42		57	81	81	96
7 (3)	21 (4·15)	59 (4·44)		1	160		179	5	4	1
8				—	—		—	—	—	—

S site Electronic Dendrometers.

Channel (Tree №)	Date. 11/3/87 (Before reset) (kΩ)	11/3/87 (After Reset)	4/87	19/5/87	19/6/87	/7/87	10/8/87	10/9/87 Before reset	10/9/87 After Reset	7/10/87
1 (Tbole)	126			255	255		255	255	255	255
2 (Tair)	114			119	162		189	93	102	110
3 (1)	1 (3·68)	62 (4·47)		255	255		255	255	255	255
4 (2)	61 (4·54)	62 (4·45)		177	255		255	255 (6·45)	175 (5·31)	180
5 (11)	1 (3·86)	67 (4·50)		206	255		255	255 (7·43)	164 (5·24)	175
6 (5)	61 (4·44)	62 (4·44)		204	255		255	—	—	255
7 (3)	1 (3·79)	67 (4·5)		128	227		255	164 (5·21)	174	185
8 —	255 —	—		255	255		255.	—		255

	Z			P			S		
Date	Pre	Mid	gs	Pre	Mid	gs	Pre	Mid	gs
26/11/86	8·73	16·38	·44	6·27	17·38	·49	6·45	15·71	·60
5/12/86 S+P									
16/1/87	11·43	23·04	·31	6·83	17·48	·58	6·36	18·13	·65
10/2/87	20·40	27·17	·17	10·03	19·93	·42	8·87	19·00	·41
6/3/87	24·17	30·87	·18	8·63	16·60	·52	11·03	19·17	·41
20/3/87	25·53	31·30	·15	7·60	18·37	·48	9·83	19·43	·36
15/4/87	13·90	23·83	·18	8·33	16·00	·33	8·48	18·23	·23
15/9/87	7·68	16·53	·30	7·67	17·12	·28	8·57	16·73	·31
							7		
24/11/87	8·63	14·97	·38	7·07	14·64	·47	7·37	16·73	·54
8/4/88	30·6			8·2			12·4		
							S (Torres)		
2/89							7·92		
3/89	14·16								

Z site 26/11/86 11.42 am. 19.0 11.5
11.16 am. Dry = 19.4 Wet 12.0
70-90% cloud.

Tree N°	g_s					Bal P.
3	.42	.35	.13	.41	.33	15.6
1	.54	.58	.49	.36	.49	16.8
2	.55	.48	.55	.47	.51	17.4
4	.44	.60	.65	.66	.59	16.0
5	.43	.28	.30		.34	15.5
6	.45	.38	.46	.31	.40	17.0

$\bar{X}$	0.44 ± 0.10	16.38 ± 0.79

26/11/86

Z site

1	8·0
2	7·2
3	9·6
4	8·4
5	9·0
6	10·2
$\bar{X}$	8·73 ± 1·04

4·30am
wet 8·7 °C
Dry 12·0 °C

6·00am
wet 9·0 °C
Dry 12·5 °C

Site : Z

Date : 16/1/87

Sampling Time : 0335

Time	Dry T	Wet T	Rel. Hum.
0340	15.5	10.0	
0400	15.5	10.5	
0455	15.5	10.5	

Tree N°	Bal. P.	gs	Comments
1	10.2		
2	12.8		
3	11.5		
4	12.0		
5	13.1		
6	9.0		
$\bar{x}$	11.43 ± 1.58		

Site: Z site

Date: 16/1/87

Sampling Time: 11.00

Time	Dry T	Wet T	Rel. Hum.
10.55	20.0	13.0	
11.25	21.5	14.0	

Tree N°	Bal. P.	gs				Comments
1	28.6	0.26	0.31	0.36	0.38	.33
2	24.0	0.37	0.39	0.27	0.36	.35
3	22.8	0.50	0.30	0.35	0.41	.39
4	16.2	0.20	0.21	0.25	0.12	.20
5	—	0.30	0.34	0.40	0.21	.31
6	23.6	0.23	0.31	0.27	0.21	.26
$\bar{X}$	23.04 ± 4.44					0.31 ± 0.07

Site: Z site

Date: 10/2/87

Sampling Time:

Time	DRY T	Wet T	Rel. Hum.
Z 0400			
P 0450			
S 0500			

Predawn

Tree N°	Bal. P.	gs	Comments
1	17.8		
2	17.4		
3	18.8		
4	19.0		
5	24.6	leaky	
6	24.8	leaky	
$\bar{X}$	20.40 ± 3.38		

Site: Z site	Time	Dry T	Wet T	Rel Hum
Date: 10/2/87	1200	23.0	14.0	
Sampling Time: 1200				

Tree N°	Bal. P.	gs				Comments
1	25.4	.09	.26	.31	.22	.22
2	28.0	.19	.22	.16	.16	18
3	26.0	.09	.16	.15	.12	13
4	25.0	.17	.16	.24	.20	19
5	29.2	.15	.14	.07	.15	13
6	29.4	.17	.15	.09	.15	.14
A						
$\bar{X}$	27.17 ±	1.95				0.17 ± 0.04

Site: 2

Date: 6/3/87

Sampling Time: 0420

Time	Dry T	Wet T	Rel Hum
0420	16.5	13.0	

Tree N°	Bal P	gs	Comments
1	24.0		
2	21.2		
3	23.8		large
3	23.0		small with only 2 leaves
4	22.8		
5	27.4		
6	27.0		
$\bar{X}$	24.17 ± 2.26		

Site:	2	Time	Dry T	Wet T	Rel Hum
Date:	6/3/87	11:00	20.5	16.0	
Sampling Time:	11:00				

Sunny but windy

Tree N°	Bal P.	gs					Comments
1	27.4	.39	.07	.27	.20	.25	.24
2	27.4	.29	.18	.23	.30	25	
3	34.0	.15	.08	.12	.07	.11	
4	29.4	[illegible]	.22	.20	.30	.22	24
5	33.0	.08	.05	.11	.07	08	
6	34.0	.18	.13	.10	.15	14	
$\bar{X}$	30.87 ±	3.17			0.18 ± 0.08		

Site: Z site	Time	Dry T	Wet T	Rel Hum
Date: 20/3/87	04.15	14.5	12.0	
Sampling Time:				

Tree N°	Bal P.	gs	Comments
1	24.0		
2	23.8		
3	24.0		
4	22.6		
5	29.2		
6	29.6		
	25.53	I 3.04	

Site:	2	Time	Dry T	Wet T	Rel Hum
Date:	20/2/87	11.15	18.0	15.0	
Sampling Time:	11.15				

Tree N°	Bal P	gs	Comments
1	29.2	.20 .25 .25 .23 .23	
2	29.4	.23 .17 .23 .25 .22	
3	29.0	.09 .23 .12 .06 .13	
4	25.8	.20 .21 .20 .15 .19	
5	34.4	.12 .13 .15 .08 .12	
6	740	0.0 0.0 .04 .04 .02	
	31.30 ± 5.08	0.15 ± 0.08	

Site: Z

Date: 15/4/87

Sampling Time: 4:55

Time	Dry T	Wet T	Rel Hum
04·55	11·8	8·3	
05·15	11·5	8·0	

Tree N°	Bal P	gs	Comments
1	12·0		
2	12·8		
3	12·8		
4	16·2		
5	14·6		
6	15·0		
$\bar{X}$	13·90 ± 1·61		

Site: Z

Date: 15/4/87

Sampling Time: 11.35

Time	Dry T	Wet T	Rel Hum
11.35	22.1	13.8	

Tree N°	Bal P	gs	Comments
1	21.0	0.14, 0.30, 0.18, 0.18	20
2	24.0	0.27, 0.14, 0.20, 0.16	19
3	25.6	0.13, 0.20, 0.19, 0.18	18
4	25.6	0.08, 0.28, 0.22, 0.15	18
5	23.2	0.14, 0.27, 0.19, 0.15	19
6	23.6	0.18, 0.24, 0.12, 0.10	16
$\bar{X}$	23.83 ± 1.72	0.18 ± .01	

Stuart WANTS

regards Brett

5/12/86

0330 am
wet T = 11.5
dry T = 13.8

S site	
7	6.7
1	5.4
11	5.4
3	9.0
5	6.6
6	5.6
$\bar{X}$	6.45 ± 1.38

P site	
1	6.6
3	7.0
5	4.2
9	6.6
11	3.8
12	9.4
$\bar{X}$	6.27 ± 2.05

5/12/86.

S site.

1100 am. Dry T: W 22·2 Wet T: 15·3.

Tree N°.		gs					%
	1A	·60	·61	·69	67	·54 ·62	15·6
*11	1B	·66	62	·57		62	16·0
	2	·43	·36	·64	·60	51	14·4
	3	·53	·47	·48		49	11·4
	5	55	·73	·38	·70	59	18·0
	6	·84	·82	·72	·76	79	15·6
	7	·56	·40	·69	·58	56	19·0 (Red head)
		$\bar{X}$	0·60 ± 010				15·71 ± 2 47

Paite 5/12/86. 1 Dry T= Wet T=

P1		·43	·59	·57	·51	53	18·4
P5	SAWFLIES LARVAE ABOVE BAND	·39	·49	·47	·43	45	18·5
P9		·51	·36	37	·38	·41	15·0
P11	= KAES NO 5	·68	·50	·61	·69	62	18·2
P12	= KAES NO 4	·50	·79	·65	·44	60	21·6
P13		·27	·40	·31	·22	30	12·6
		$\bar{X}$	0·49 ± 012				1738 ± 3 14

Site: S + P sites

Date: 15/1/87

Sampling Time:

S ⇒ 4.00 am

P ⇒ 3.30 am

Time	Dry T	Wet T	Rel Hum
3.30	17.5	16	
4.00	16.5	15	

Tree N°	Bal. P.	gs	Comments
S1	5.2		
S2	7.2		
S3	5.6		
S4			
S5			
S6	6.2		
S7			
S8			
S9			
S10			
S11	7.6		
S12			
$\bar{X}$	6.36 ± 1.02		
P1	5.8		
P2			
P3			
P4	7.0		
P5	6.8		
P6			
P7			
P8			
P9	7.6		
P10	-		
P11	7.2		
P12			
P13	6.6		
$\bar{X}$	6.83 ± 0.61		

Site: P + S	Time	Dry T	Wet T	Rel. Hum.
Date: 15/1/87 P →	1235	25.5	18.0	
Sampling Time: S →	1300	27.0	19.5	

Varying quickly between 0 of 7/8 cloud.

Tree No°	Bal. P.	gs				Comments
P site						
P 1	13.8	.36	.35	.51	.31	.38
P 4	17.5	.68	.55	.78	.82	.78
P 11	14.2	.70	.49	.43	.84	.62
P 9	18.2	.66	.59	.61	.75	.65
P 13	21.0	.33	.48	.38	.64	.46
P 5	20.2	.61	.63	.55	.47	.57
$\bar{X}$	17.48 ± 2.99				0.58 ± 0.14	
S site						
S 1	14.4	.59	.66	.72	.55	.63
S 2	18.6	.67	.60	.87	.68	.71
S 3	19.4	.44	.69	.65	.74	.63
S 5	19.6	.42	.65	.65	.64	.59
S 6	18.0	.41	.72	.75	.67	.64
S 11	18.8	.66	.53	.86	.70	.69
$\bar{X}$	18.13 ± 1.92				0.65 ± 0.04	

Site: P site

Date: 10/12/87

Sampling Time: 4:50 am

Time	Dry T	Wet T	Rel. Hum

Predawn

Tree No	Bal. P.	gs	Comments
9	14.8		
4	10.0		
13	9.2		
5	9.6		
1	8.6		
11	8.0		
$\bar{x}$	10.03 ± 2.44		

Site: S site

Date: 10/2/87

Sampling Time: 5.00 am

Time	Dry T	Wet T	Rel. Hum

Predawn

Tree N°	Bal. P.	gs	Comments
1	9.4		
2	9.0		
3	8.4		
~~4~~			
5	10.0		
6	10.2		
11	6.2		
$\bar{X}$	8.87 ± 1.46		

Site: P 4 site

Date: 10/2/87

Sampling Time: 1300

Time	Dry T	Wet T	
1300	27.0	15.5	

Tree N°	Bal P	gs	Comments
1	18.8	.46 .57 .56 .34 .48	
3			
4	14.4	.32 .42 .57 .33 .41	
5	22.8	.31 .41 .42 .32 .37	
9	17.4	.55 .48 .57 .53	
11	27.4	.29 .31 .26 .56 .36	
13	18.8	.38 .38 .43 .37 .29 .37	
$\bar{X}$	19.93 ± 4.55	0.42 ± 0.07	

Site: S	Time	Dry T	Wet T	Rel Hum
Date: 10/2/87	1315	27·0	15·5	
Sampling Time: 1315.	1335	28·5	16·0	

Tree N°	Bal P.	gs					Comments
1	18·4	·34	·35	·44	·32	·36	
2	19·4	·71	·45	·56	·50	56	
[redacted]							
3	18·2	·46	·60	·45	·45	49	
5	21·2	·36	·37	·36	·47	39	
6	18·2	·33	·52	·54	·51	48	
11	18·6	·25	·20	·11	·05	15	
$\bar{X}$	19·00 ± 1·17	0·41 ± 0·14					

Site: S Albany

Date: 6/3/87

Sampling Time: 0525

Time	Dry T	Wet T	Rel Hum
0525	15.0	13.0	
0540	15.0	13.0	

A Very Very light mist of rain during sampling but not enough to wet leaves

Tree N°	Bal P	gs	Comments
1	9.6		
2	9.0		
3	12.6		
5	12.0		
6	10.2		
11	12.8		
$\bar{X}$	11.03 ± 1.64		

Site: P Albany Hwy	Time	Dry T	Wet T	Rel Hum
Date: 6/3/87	0510	15.5	13.0	
Sampling Time: 0510				

A Very Very light mist of rain at time of sampling but not enough to wet the leaves

Tree N°	Bal. P.	gs	Comments
9	7.2		
1	8.6		
5	9.2		
4	6.8		
11	8.0		
13	12.0		
$\bar{X}$	8.63 ± 1.87		

Site:	5	Time	Dry T	Wet T	Rel Hum
Date:	6/7/87	12.20	24.5	16.5	
Sampling Time:	12.20	12.40	23.5	16.0	

Tree N°	Bal P.	gs					Comments
11	21.4	.31	.23	.18	.17	.26	23
2	18.2	.39	.44	.39	.35		39
3	17.4	.65	.68	.51	.54		60
5	18.4	.43	.46	.51	.42		46
6	19.6	.40	.41	.33	.56		43
1	20.0	.28	.29	.48	.37		36
$\bar{X}$	19.17 ± 1.45				0.41 ± 0.12		

Site:	P	Time	Dry T	Wet T	Rel Hum
Date:	6/3/87	1200	22.0	16.0	
Sampling Time:	1200				

Tree N°	Bal P.	gs				Comments
1	17.4	.36	.70	.62	.60	57
4	14.8	.68	.64	.62	.65	65
9	14.6	.33	.46	.49	.51	45
11	17.8	.53	.48	.55	.33	.47
13	19.4	.45	.19	.36	.41	36
5	15.6	.61	.51	.73	.72	64
$\bar{X}$	16.60 ± 1.91				0.52 ± 0.12	

Site:	S site
Date:	20/3/87
Sampling Time:	05:30

Time	Dry T	Wet T	Rel Hum
0530	14.5	12.0	
0545	14.0	12.0	

Tree N°	Bal P.	gs	Comments
1	9.4		
2	8.8 shortened ↑ due to boggy slot		
3	8.6		
5	11.2		
6	10.4		
11	10.6		
	9.83 ±	1.05	

Site: NS

Date: 20/3/17

Sampling Time: 12:45

Time	Dry T	Wet T	Rel Hum
12·45	26·0	17·5	
13·00	27·0	17·0	

Tree N°	Bal F	gs	Comments
1	19·2	~~·25~~ ·30 ~~·32~~ ·33 ·30	
2	20·2	·35 ·41 ·15 ·50 ·35	
3	21·2	·39 ·53 ·48 ·22 ·41	
11	21·2	·26 ·34 ·21 ·30 ·28	
5	17·4	·41 ·43 ·37 ·37 ·40	
6	17·4	·38 ·48 ·38 ·45 ·42	
	19·43 ± 1·74	0·36 ± 0·06	

Site: P site	Time	Dry T	Wet T	Rel Hum
Date: 20/3/87	0510	14·5	12·0	
Sampling Time: 0510				

Tree N°	Bal P	gs	Comments
1	8·2		
4	7·8		
5	7·2		
9	6·8		
11	7·6		
13	8·0		
	7·60 ± 0·57		

Site:	P	Time	Dry T	Wet T	Rel Hum
Date:	20/3/87	1220	26.5	17.5	
Sampling Time:	12				

Tree N°	Bal P	gs				Comments
1	19.0	.60	.57	.47	.51	.54
5	18.6	.00	.00	.64	.66	.33
4	16.6	.60	.73	.55	.50	.60
~~4~~						
9	17.4	.51	.51	.45	.40	.47
11	19.4	.49	.72	.72	.51	.61
13	19.2	.29	.40	.31	.30	.33
	18.37 ± 1.12	0.48 ± 0.13				

2 site 8.0 mm

Site: S

Date: 15/4/87

Sampling Time: 6.10

Time	Dry T	Wet T	Rel Hum
06.10	12.0	9.0	

Tree N°	Bal P	gs	Comments
1	8.2		
2	10.6		
3	9.6		
5	9.1		
6	5.6		
11	7.8		
$\bar{X}$	8.48 ±	1.73	

Site: S

Date: 15/4/87

Sampling Time: 1320

Time	Dry T	Wet T	Rel Hum
13.20	26.1	15.6	
13.40	25.5	15.5	

Tree N°	Bal P	gs	Comments
6	~~17.0~~ 17.0	0.27, 0.17, 0.25, 0.11	20
5	18.8	0.26, 0.19, 0.22, 0.30	24
3	19.6	0.22, 0.33, 0.28, 0.37	30
11	24.6	0.18, 0.21, 0.08, 0.11	15
2	15.4	0.14, 0.28, 0.31, 0.19	23
1	14.0	0.18, 0.36, 0.24, 0.22	25
$\bar{X}$	18.23 ± 3.75	0.23 ± 0.05	

Site: P

Date: 15/4/87

Sampling Time: 5.45

Time	Dry T	Wet T	Rel Hum
5.45	12.0	9.5	

Tree N°	Bal P	gs	Comments
1	8.4		
11	9.8		
5	8.8		
4	7.0		
13	8.6		
9	7.4		
$\bar{x}$	8.33 ± 1.01		

Site: P

Date: 15/4/87

Sampling Time: 12:50

Time	Dry T	Wet T	Rel Hum
12·50	24·8	14·6	

Tree N°	Bal P	gs	Comments
1	15·6	0·35, 0·34, 0·27, ~~0·30~~ 0·50	·37
11	18·6	0·21, 0·42, ,0·32, 0·28	·32
5	15·0	0·28, 0·35, 0·29, 0·33	·36
4	·148	0·33, 0·30, 0·47, 0·38	·37
13	17·6	0·21, 0·14, 0·14, 0·18	·17
9	14·4	0·26, 0·28, 047, 0·50	·38
$\bar{X}$	16·00 ± 1·70	0·33 ± 0·08	

Site: P

Date: 15/9/87

Sampling Time: 1200

Time	Dry T	Wet T	Rel Hum
1200	27.5	14.0	

Tree N°	Bal P	gs	Comments
1	Wet in bag.	0.20, 0.29, 0.22, 0.26	0.2425
9	17.6	0.06, 0.20, 0.16, 0.1	0.13
11	18.8	0.34, 0.25, 0.27, 0.05, 0.34	0.25
4	19.2	0.44, 0.11, 0.48, 0.55, 0.54	0.424
13	17.0	0.36, 0.23, 0.26, 0.30, 0.20	0.27
5	13.0	0.33, 0.41, 0.28, 0.48	0.375
$\bar{x}$	17.12		
SE	1.10	No flush $\bar{x}$ = 0.2819	
SD	2.47	SE = .04	
		SD = .11	

Site: S

Date: 15/9/87

Sampling Time:

Time	Dry T	Wet T	Rel Hum
12.30	27.0	14.5	

Tree N°	Bal P	gs	Comments
6.	19.6	.36 .42 .50 .30	0.395
5	16.9	.09 .36. .31	0.253
3	16.2	.47 .38 .27 .29	0.3525
11	16.1	.16. .25 .23. .32	0.24
2	16.0	.32 .24 .24 .38	0.295
1	15.6	.32 .27 .37 .40 .27	0.326
		No growth flush.	
$\bar{x}$ =	16.733	$\bar{x}$ = 0.3103	
SE	0.60	.024	
SD.	1.47	.059	

Site:	Time	Dry T	Wet T	Rel Hum
Date: 15/9/87	11.10	24.5	14.0	
Sampling Time: 11.10.				

Tree N°	Bal P	gs	Comments
1	16.6	0.23 0.4 0.43 0.41	0.3675
2	16.2	0.43 0.16 0.14 0.38	0.2775
3	18.6	0.25 0.33 0.25 0.37	0.3
4	16.4	0.3 0.27 0.16 0.15 0.23 0.28	0.2316 ↑
5	17.0	0.31 0.32 0.31	0.3133
6.	16.4	0.34 0.33 0.12 0.35	0.295
$\bar{x}$	16.533		0.295
SE	0.55		
SD	1.35		

No new growth - fluid on any trees.

$\bar{x}$ = 0.295

SE = .018

SD = .045

Site: Z

Date: 15/9/87

Sampling Time: 0420

Time	Dry T	Wet T	Rel Hum
0420	10·2	8·5	

Tree N°	Bal P.	gs	Comments
4	7·1		
26	7·4		
5	9·2		
3	6·0		
1	8·0		
6	8·4		
$\bar{x}$	7.6833		
SE	0·45		
SD	1·11		

Site: S

Date: 15/9/87

Sampling Time: 0540

Time	Dry T	Wet T	Rel Hum
0540	15.0	10.5	

Tree N°	Bal P.	gs	Comments
1	7.8		
11	8.0		
2	9.6		
5	8.8		
3	9.2		
6	8.0		
$\bar{x}$	8.57		
SE	0.30		
SD	0.74		

Site: P

Date: 15/9/87

Sampling Time: 0517

Time	Dry T	Wet T	Rel Hum
0517	14.5	10.0	

Tree N°	Bal P	gs	Comments
5	9.2		
4			
4	4.8		
13	7.0		
11	7.4		
9	9.8		
1	7.8		
$\bar{x}$	7.67		
SE	0.72		
SD	1.77		

Site: Z

Date: 24/11/87

Sampling Time: 0340 0350

Time	Dry T	Wet T	Rel Hum
	9.0	5.5	
	8.0	5.5	

Tree N°	Bal P	gs	Comments
6	8.0		
1	8.6		
3	8.2		
4	7.4		
5	11.2		
2	8.4		
$\bar{x} \pm SD$	8.63 ± 1.32		

Site: Z
Date: 24/11/87
Sampling Time: 11·40

Time	Dry T	Wet T	Rel Hum
11·40	19.5	11.5	
12·00	19.5	11.5	

Tree N°	Bal P	gs				Comments
3	14·6	0.26	0.25	0.21	0.29	·25 ±·03
6	18·4	0.27	0.23	0.20		·23 ± ·04
5	16·0	0.32	0.31	0.27		·30 ± ·03
4	14·4	0.58	0.51	0.47	0.37	·48 ± ·09
1	12·6 (2cm broken [illegible])	0.46	0.53	0.40	0.58	·49 ± ·08
2	13·8	0.50	0.52	0.55	0.45	·51 ·04
$\bar{x}$ ±SD (n=6)	14·97 ± 2·01				$\bar{x}$ ±SD	·38 ± ·13

all trees except 3 have current leaf flush

Site: S

Date: 24/11/87

Sampling Time:

Time	Dry T	Wet T	Rel Hum
0440	8·5	6·0	
0452	8·5	6·0	

Tree N°	Bal P.	gs	Comments
1	6·6		
2	7·8		
5	7·0		
6	5·2		
11	9·6		
3	8·0		
$\bar{x} \pm SD$	7·37 ± 1·48		

Site: S

Date: 24/11/87

Sampling Time: 12.55

Time	Dry T	Wet T	Rel Hum
1255	21	12.5	
1325	22	12.5	

Tree N°	Bal P	gs					$\bar{x}$	SD
1	15.6	0.59	0.60	0.68			.62	.05
2	15.6	0.48	0.41	0.35	0.51		.44	.07
3	18.4	0.56	0.61	0.50	0.50	0.50	.53	.05
4	18.6	0.53	0.57	0.51	0.64		.56	.06
5	16.0	0.18	0.45	0.52	0.48		.48	.03
6.	16.7	0.68	0.53	0.57	0.59		.59	.06
$\bar{x}$ ± SD	16.73 ± 1.39						.54	± .06

Site: P

Date: 24/11/87

Sampling Time:

Time	Dry T	Wet T	Rel Hum
0425	9.0	6.5	

Tree N°	Bal P	gs	Comments
11	6.0		
13	6.8		
9	9.0		
5	6.2		
4	7.6		
1	6.8		
$\bar{x}$ ± S.D.	7.07 ± 1.10		

Site: P

Date: 24/11/87

Sampling Time: 1230

Time	Dry T	Wet T	Rel Hum
1230	19.5	10.5	

Tree N°	Bal P	gs				Comments
						$\bar{x}$ SD
1	16.0	0.52	0.46	0.38	0.38	.43 .07
9	[11.2] (Broken)	0.51	0.42	0.43		.45 .05
5	12.2	0.48	0.53	0.40		.47 .07
3	14.0	0.31	0.44	0.49		.41 .09
4	18.0	0.58	0.48	0.58	0.64	.57 .07
11	13.0	0.60	0.55	0.32		.49 .15
$\bar{x} \pm SD$ (n=5)	14.64 ± 2.36			$\bar{x} \pm SD$ (n=4)		.47 ± 5.66

Site: P

Date: ~~28/9/18~~ 8/4/18

Sampling Time:

Time	Dry T	Wet T	Rel Hum
0535			

Tree N°	Bal P	gs	Comments
1	26.8		
4	<10		
13	9.4		
11	7.3		
5	8.0		
1 or 14	8.2		
3	6.0		
	(8.2)		

Site: S Albany	Time	Dry T	Wet T	Rel Hum
Date: 8/4/88	0630	17.1	13.0	
Sampling Time: 0615				

Tree N°	Bal P	gs	Comments
2	13.0		
6	9.8		
11	18.6		
1	11.4		
3	12.4		
5	9.0		
	12.4 ± 3.41 (SD)	(1.39) (SE)	

Site: Z

Date: 8/4/88

Sampling Time:

Time	Dry T	Wet T	Rel Hum
05.40	15.0	14.0	

Tree N°	Bal P	gs	Comments
6	37.6		
2	28.0		
5	34.0		
4	27.8		
1	27.0		
3	29.2		
	30.6 ± 4.25 (SE)	(SE = 1.733)	

20/10/86.

Temp 4:30pm ⇒ 14.7 wet, 20.0 DRY

[redacted] cloud cover intermittent

DIURNAL AT Z site with cherry-picker

Branch	4.15 pm ψ	6.30 pm	8.15 pm.
1	11.0	-	7.4
2	11.5	8.8	7.4
3	12.2	-	7.8
4	11.5	8.2	7.0
5	13.1	8.6	7.0
6	11.4	8.8	
7	13.5	7.0	
	12.03 ± 0.36	8.28 ± 0.34	7.32 ± 0.15

Both uncovered sets of leaves.

Date	21/10/86	Dry Bulb T(°C)	11.1
Time	5.35	Wet Bulb T(°C)	8.5
Tree N°	1	Psy RH(%)	
Site	Z	Li Cor RH(%)	
		Li Cor Radiation ($\mu E.s^{-1}$)	
		Cloud Cover(%)	100

Porometer			Balance Pressures (Bars)	
	g_s ($cm.s^{-1}$)	Et	Uncovered	Covered leaves
Time		100% cloud and very light rain until 0830, then sunny.	5.6 5.8 7.0 6.0 6.6 6.20±0.26.	4.2 5.6 6.2 5.6 5.0 5.32±0.34
5.35 W = 8.5 Dry = 11.1				
7.45 WB Dry = 11.4		0840 - 0930 Mainly o'cast, occasional sunny patches.	7.2 7.2 6.2 8.2 7.2 7.20±0.32	5.2 5.4 6.2 5.8 5.6 5.64±0.17
0930 W = 11.0 D = 15.5			10.6 9.8 9.2 10.2 9.8 9.92±0.23	7.8 8.2 7.0 7.8 8.4 7.84±0.24
11.30 W = 10.5 DRY = 17.0		0% cloud Sunny	14.4 13.0 14.6 13.2 13.8 13.80±.32	9.6 10.2 8.6 10.2 9.65±0.38
1.40 = 12.0 = 20.2			16.6 16.4 16.2 17.0 17.2 16.68±0.19	11.6 12.0 11.4 12.0 10.8 11.56±0.22

Date	21/10/86	Dry Bulb T(°C)	11.1
Time	5 35	Wet Bulb T(°C)	8.5
Tree N°	2	Psy RH(%)	
Site	Z	Li Cor RH(%)	
		Li Cor Radiation ($\mu E.s^{-1}$)	
		Cloud Cover(%)	100

Porometer		Balance Pressures (Bars)	
Js ($cm.s^{-1}$)	Et	Uncovered	Covered leaves
5.35		6.6 6.4 6.0 6.33 ± 0.18	4.8 4.2 4.8 4.60 ± 0.20
7.45		6.8 6.6 7.0 6.80 ± 0.12	5.0 5.6 5.2 5.8 5.40 ± 0.18
9.30		10.0 11.2 10.4 10.53 ± 0.35	8.0 8.8 8.2 8.33 ± 0.24
11.30		14.0 ~~13.8~~ 13.8 ~~14.4~~ 14.07 ± 0.18	10.6 10.2 9.8 9.4 10.00 ± 0.26
13.40		17.0 15.8 (Shaded) 14.4 15.73 ± 0.75	12.0 10.0 10.4 (Shaded) 10.80 ± 0.61

Site | Z

Date | 21/10/86.

Time | 0530 -

Cooling Time |

Dry Bulb T(°C) |
Wet Bulb T(°C)
Psy RH(%) |

Cloud Cover(%) |

Tree N°	Bole Psy N°=11 T_{wood} (°C)	Dew Pt. (μV)	Psy (μV)	Crown Psy N°8 T_{wood} °C	Dew Pt. (μV)	Psy (μV)
~~0530~~	Psy N° 11	× π_V=62		Psy N° 1 π_V=61	×	
0520	14°C	6.0	1.8	—	—	1.6
1 0740	13.7°C	0.8	0.3		6.8	0.5
				Time 8.45	2.0	0.5
	Psy 9	✓	π_V=53	Psy 10	✓	π_V=60
0530	14.5°C	3.3	0.3	—	2.2	0.35
2 0735	14.0°C	3.2	0.3	—	1.3	0.30
~~0900~~ ~~0930~~	12.5°C	~~2.8~~	~~0.3~~	—	2.8	0.35
~~0940~~ 1000					2.3	0.2
1 1130	14.5°C	2.8	0.6		—	—
~~0930~~	14°C	~~2.0~~ 2.8	0.2	—	—	—
✓1130	14.8°C	2.2	0.2	~~N/A~~	1.8	0.5
2						
1330 1	14.6°C	2.9	0.8		2.1	0.4
1330 2	15.0°C	1.8	0.3		—	—

Jarrah 1 12·30-1600 20/10/86.

—•— Sun leaves. Open --•--
—×— Shade leaves Uncovered --×--

Cloud was intermittant during sampling

All sun leaves (uncovered) harvested in one sweep
" " " (covered) " " " " "
" shade " (uncovered) " " " "
" " " (covered)

+ Sun leaves ± se of branch averages

+ Shade leaves uncovered.

++ Covered sun leaves
Covered shade leaves

Bal P.

20
18
16
14
12
10
8
6
4
2
0

1 2 3 4 5 6 7 8 9

Branch Number

21/10/86 Tree 2. ψ_L, ψ_{pet}.

—o— Uncovered Sun leaves

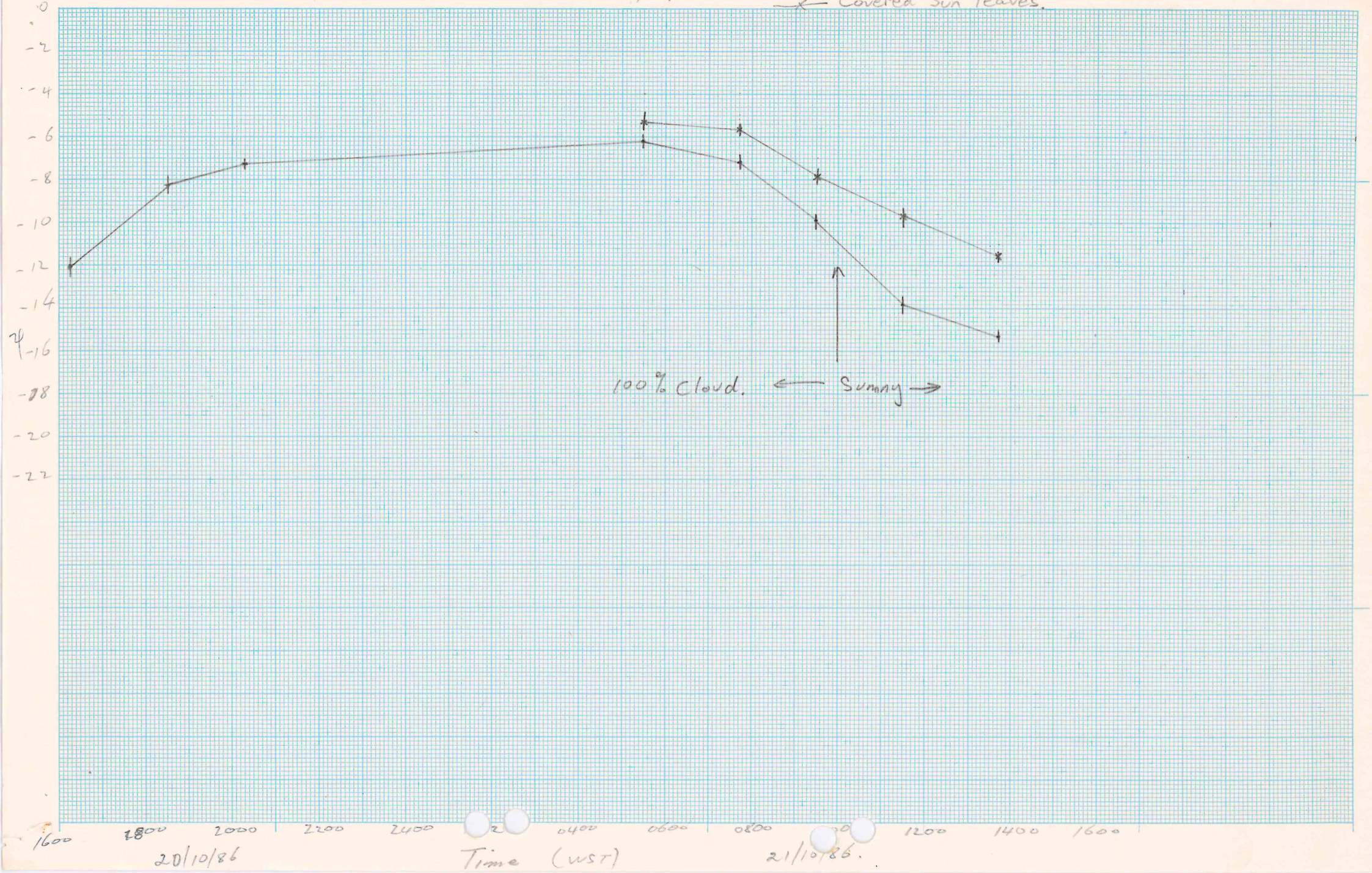
—x— Covered Sun leaves.

0
-2
-4
-6
-8
-10
-12
-14
-16
-18

0600 0800 1200 1400 1600

20/10/86 - 21/10/86. Tree I. ψ_l, ψ_{pet}.

— Sun leaves (Uncovered)
—x— Covered Sun leaves.



26/11/86

2 site

Time 6·20am		FSy	DP	Temp
Tree 1	N° 9	0·1	0·4	16·0
	N° 10	—	—	
Tree 2	N° 1	0·2	0·9	—
	N° 11	0·1	0·1	
Tree 3	N° 5	—	—	15·8
Tree 4	N° 8	0·1	1·1	16·5

Site: TPP sites Joanna

Date: 15/11/87

Sampling Time:

Predawn

	Time	Dry T	Wet T	Rel Hum
P	3·30 am	17·5	16	
S	4·00	16·5	15	
JP	4.30	16·5	15	
JT	5·18 / 5·25	13·5 / 14·0	12 / 12·5	

Tree N°	Bal P	gs	Comments
T1	5·2		
2	7·6		
3	5·4		
4	7·2		
5	7·0		
6	6·6		
7	5·0		
8	6·2		
9	7·8		
10	7·0		
11	5·0		
12	6·1		
13	7·4		
P 1	—		
2	5·2		
3	9·0		
4	8·2		
5	10·0		
6	4·6		
7	7·8		
8	8·0		
9	5·2		
10	6·4		
11	7·4		
12	8·0		
13	7·2		

Site: Joanna P+T	Time	Dry T	Wet T	Rel Hum.
Date: 15/1/87 ll T→	11-23	26·0	18·5	
Sampling Time: P→	12·05	25·0	18·0	

midday

Cloud increasing from 0 to 4/8 during T arts

Tree N°	Bal P.	gs				Comments
T1	-	·46	·53	·65	·47	
T2	21·8	·30	·39	·37	·38	
T3	20·2	·37	·67	·15	·38	
T4	19.4	·53	·54	·55	·56	
T5	17·8	·57	·39	·31	·48	
T6	18·2	·44	·43	·47	·42	
T7	21·6	·63	·72	·32	·62	
T8	20·0	·50	·55	·57	·51	
T9	-	·57	·39	·58	·56	
T10	17·9	·53	·66	·62	·52	
T11	20·2	·67	·66	·68	·68	
T12	~~17·9~~ -	·65	·70	·56	·63	
T13	14·6	·69	·90	·52	·76	
P1	20·0	·47	·68	·49	·76	
P2	18·8	·61	·60	·64	·57	
P3	20·0	·66	·60	·41	·46	
P4	18·0	·56	·73	·63	·77	
P5	17·4	·48	·54	·56	·58	
P6	17·0	·70	·68	·56	·53	
P7	17·6	·51	·52	·51	·64	
P8	20·0	·48	·55	·59	·70	
P9	17·8	·64	·97	·71	·25	
P10	20·6	·40	·53	·45	·27	
P11	19·6	·65	·54	·72	·62	
P12	17·8	·69	·36	·61	·52	
P13	16·2	·37	·37	·68	·61	

15/1/87

Predawn

Dieback Site Pumping Station Rd

Sampling Time 5.15am
5.25am wet 12.5 °C
Dry 14.0 °C

Tree		Bal P
Control	2	2.1
control	1	3.0
control	3	5.0
D/B	4	5.2
D/B	2	3.9
D/B	3	3.8
D/B	1	8.2

Site: Pumping Station Rd.	Time	Dry T	Wet T	Rel Hum
Date: 15/1/87	10.50	24.5	18.0	
Sampling Time: 10.50.				

Midday

Tree N°	Bal. P.	gs	Comments
C1	15.8	.68 .62 .67 .56	
C2	20.5	.64 .46 .75 .56	
C3	17.2	.41 .68 .57 .33	
C4			
D1	20.2	.24 .21 .20 .27	
D2	22.4	.47 .73 .36	
D3	17.5	.59 .64 .61 .53	
D4	18.0	.38 .39 .57 .62	

CASSETTE LOADING CANON.

CLOAD"<FNAME>

CLOAD? – Sees or checks whether the program is okay.
ie Re-run program on tape.
or if you have a backup use the backup.

FSET – Sets size of RAM used in Bytes ie 6k ⇒ 6000

FSET <#>

Then

SAVE"<FNAME>

****

'ROL TO SYSTEM'

****
****

****
THE**********
HANNEL**********
****

EW.11

I).EW.9.OR.
EN

STRUMENT CODE: '

Aerial Cromar

CROMB2PS.DAT – All together.

CROMB2.DAT
CROMBP.DAT
CROMBS.DAT
} for computer checked.

CROMB2P.DAT
CROMBPP.DAT
CROMBSP.DAT
} PROCESSED.

check with Brett on Instrument Codes.
& Thermistors for the
3 sites and their equations.
If they have a Code (15)

1. Check Cable
2. Cassettes – Volume.
   Do a test if possible ie
   record a bit then about
   and play it back and listen.
   do it ~~on the~~ (monitor. sw. on)

```
      READ(1,*)ANS, THE TIME
      IF(ANS.EQ.'Y')THEN
         WRITE(1,*)' ENTER THE NEW TIME AS "HR:MIN", (__:__)'
         READ(1,900)HR,MIN
900      FORMAT(I2,X,I2)
         YR=YEAR
         MN=MONTH
         DY=DAY
         GOTO 950
      END IF
      READ(5,150)
 150  FORMAT(///////)
      READ(5,300,END=400)((A(M,N),M=1,32),N=1,NNL)
 300        FORMAT(32A2)
 400     DO 350 N=1,NNL
            DO 350 M=1,32
               CALL DEC (A(M,N),B(M,N))
 350   CONTINUE
*****READ CONVERSION PARAMETERS*****************************************
      DO 555 M=1,5
         READ(6,550,END=554)PD(M),PE(M)
 554     READ(6,551,END=555)(PA(N,M),PB(N,M),PC(N,M),N=1,4)
 555   CONTINUE
 550   FORMAT(2F10.6)
 551   FORMAT(3F10.6)
      WRITE(1,*)' FINISHED READING IN DATA'
*****DETERMINE TYPE OUTPUT REQUIRED BY USER AND WRITE APPROPRIATE*****
*****HEADINGS TO OUTPUT FILE*******************************************
      WRITE(1,220)
 220  FORMAT(' DO YOU WANT 1. ACTUAL HEIGHT OF MERCURY, OR',/,
     /   ' 2. SOIL MATRIC POTENTIAL IN THE OUTPUT',/,' (1 OR 2)?')
      READ(1,*)QUES
      IF(QUES.EQ.1)THEN
         WRITE(4,200)SITE,YR,MN,DY,HR,MIN
 200     FORMAT(A8,2X,I2,'/',I2,'/',I2,5X,I2,':',I2,//,5X,' DATE  '
     /   ' TIME',3X,5('  Height of Hg  '),/,21X,5(5X,'(mm)',7X),//)
      ELSE
         WRITE(4,210)SITE,YR,MN,DY,HR,MIN
 210     FORMAT(A8,2X,I2,'/',I2,'/',I2,5X,I2,':',I2,//,5X,' DATE  '
     /   ' TIME',3X,5(' SOIL POTENTIAL '),/,21X,5(' (mmHg)  (kPa)  ')
     /   ,//)
      END IF
*****PROCESS DATA******************************************************
      J=0
      DO 522 I=1,NL
         DST=DST+AC
         CALL DT(DST,YR,MN,DY,HR,MIN)
         DO 520 K=1,5
            IF(D(8,K+15).EQ.25)THEN
               J=J+1
               IF(K.LE.2)THEN
                  RES=62.*V(J)/(501.-V(J))
               ELSE
                  RES=82.*V(J)/(500.-V(J))
               END IF
               DO 353 N=1,4
                  IF(RES.LE.PA(N,K))THEN
                     IF(QUES.EQ.1)THEN
                        MMHG(K)=(INT((PC(N,K)-(PB(N,K)*RES))*10.
     /                        *PB(N,K))/PB(N,K))+PD(K)
                     ELSE
                        MMHG(K)=(INT((PC(N,K)-(PB(N,K)*RES))*10.
     /                        *PB(N,K))/PB(N,K))+PD(K)-PE(K)
                        KPA(K)=MMHG(K)*.13332
                     END IF
                     GOTO 520
```

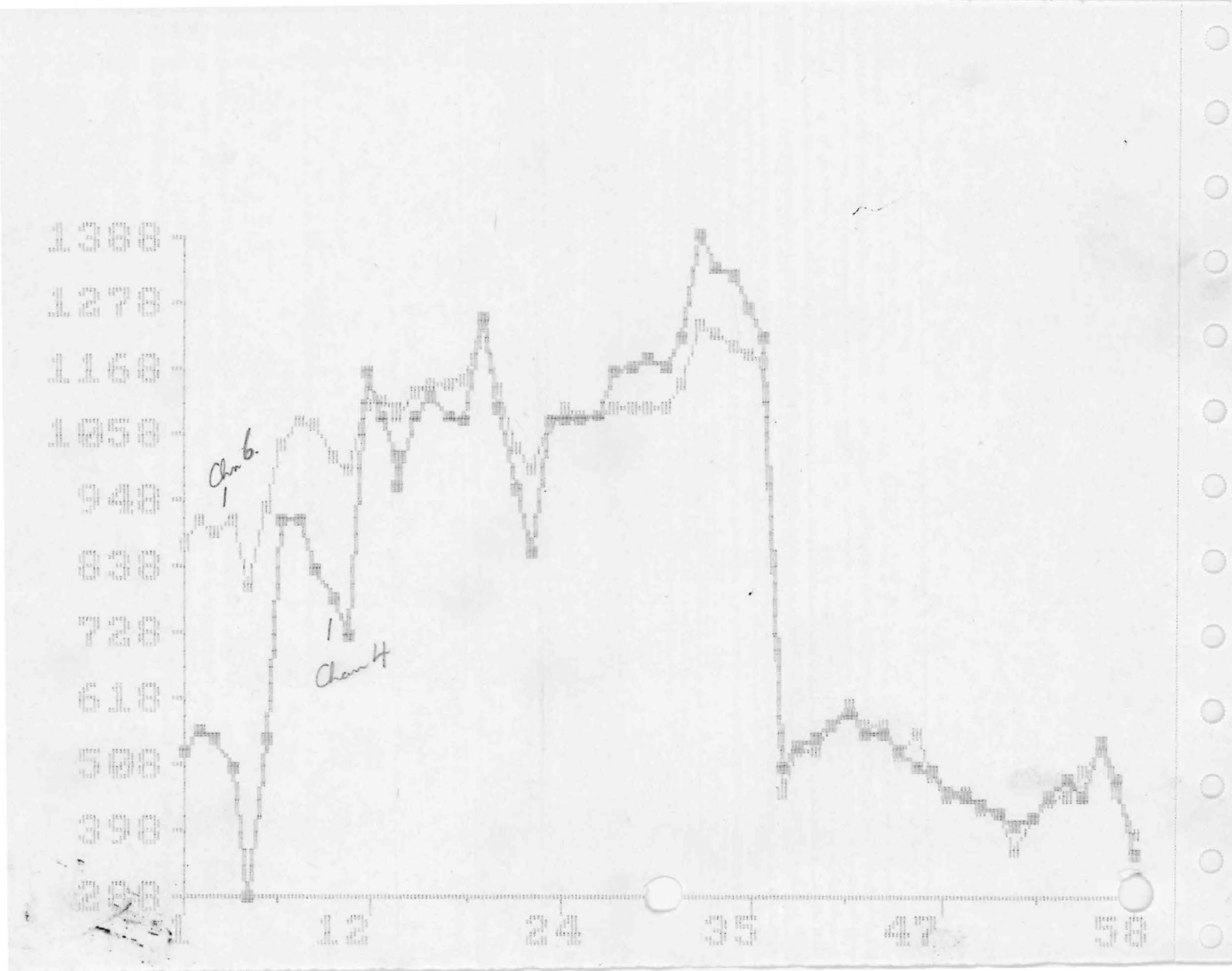
PE File Nos.	Information					Tape Line Nos.
	TAPE 1					
	PE FILE – ASHSAV-DAT.					Side 1
1-113	13 Blks	N112ϕϕ2	11/11/86	13:46:06		0-190
	Not Retrievable					200
114-202	10 Blks	N11Pϕϕ2	11/11/86	15:44:22		383-444
203-289	" "	N11Sϕϕ2	"	16:07:06		454-508
	[Two Lines Missing] –					
290-368	" "	N11Sϕϕ2	11/11/86	16:12:46		
	[10 Lines missing] –					518-
						Side 2
369-433	7 Blks	N242ϕϕ3	24/4/86	13:07:ϕ3		1-73
	Not Retrievable.					83
434-498	7 Blks	N24Pϕϕ3	24/4/86	14:57:20		158-214
500-563	" "	"	"	15:02:35		220-277
564-628	" "	N245ϕϕ3	"	15:13:01		277-323
	Not Retrievable					330.
	TAPE 2					Side 1
629-685	6 Blks	Dϕ42ϕϕ4	4/12/86	13:29:43		0-79
	[2 not Retrievable] –					90
						161
686-718	6 Blks.	Dϕ4Pϕϕ4.	4/12/86	14:48:10		225-271
	[Only 3 Blocks Retrievable] ←					~~282~~
	Not Retrievable					282.
						Side 2
	Not Retrievable			I		0
	Not Recorded.					~~828~~ ?
	Not ~~Recorded~~. Retrievable			P.		~~1~~ 155

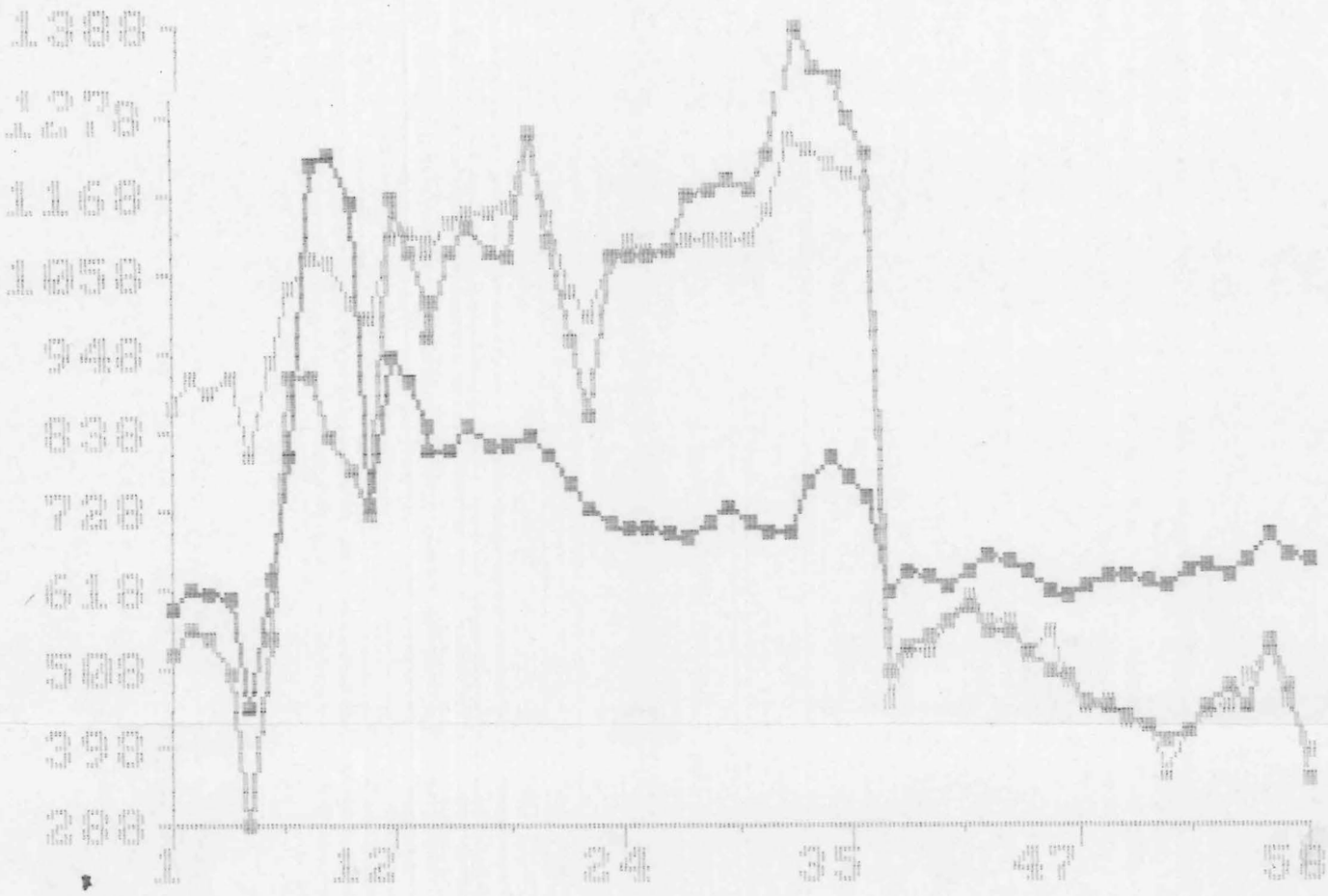
```
                    END IF
                    GOTO 520
                  END IF
353             CONTINUE
                ELSE
                  MMHG(K)=0
                  KPA(K)=0.0
                END IF
520         CONTINUE
            IF(QUES.EQ.1)THEN
              WRITE(4,523)N,YR,MN,DY,HR,MIN,(MMHG(K),K=1,5)
523           FORMAT(I3,2X,I2,'/',I2,'/',I2,2X,I2,':',I2,5(4X,I
            ELSE
              WRITE(4,521)N,YR,MN,DY,HR,MIN,(MMHG(K),KPA(K),K=1,
521           FORMAT(I3,2X,I2,'/',I2,'/',I2,2X,I2,':',I2,5(2X,I
     /        2X,F6.3))
            END IF
522     CONTINUE
        WRITE(1,*)'DO YOU WISH TO CONTINUE PROCESSING THIS FILE
        READ(1,'(A)')ANS
        IF(ANS.EQ.'Y')GOTO 850
450     STOP
        END
******FUNCTION TO CONVERT HEXIDECIMAL TO DECIMAL***************
        SUBROUTINE DEC(A,J)
        CHARACTER A*2,B(4)*2
       INTEGER J
          DO 50 N=1,2
        IF (A(N:N).EQ.'A')THEN
         B(N)='10'
        ELSE IF (A(N:N).EQ.'B')THEN
           B(N)='11'
        ELSE IF (A(N:N).EQ.'C') THEN
        B(N)='13'
```

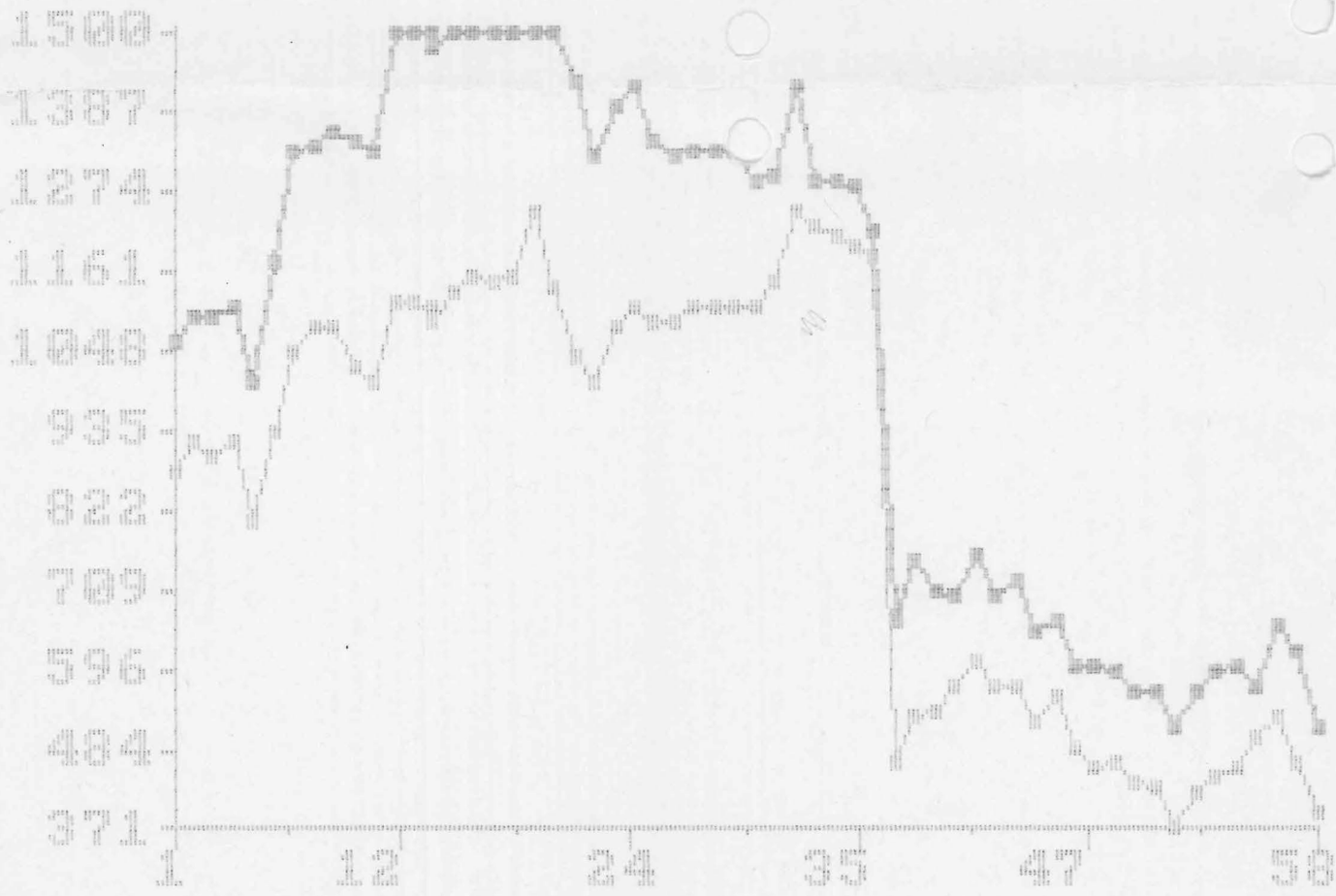
PE. FILE ASH SAV. DAT.

PE. File No.	Information	Tape Line No.
	Tape 2 Side 2 (cont.)	
	Not Recorded.	224?
719-783	65 Blks DL6 S005 16/12/86 15:14:29.	282 – 329
	Not recorded.	340?
	TAPE 3	Side 1
	Not Retrievable ←	0
	Not Recorded. 5/1/87	?
	= Not Retrievable.	206
	Not Recorded	?
	= Not Retrievable.	351.
	Not Recorded.	?
		Side 2
784-880	11 Blks J272S07 27/01/87 11:54:49	0 – 109
	Not Recorded.	?
881-977	11 Blks J27P007 27/1/87 13:37:31.	222-297
	Not Recorded.	?
978-1074	11 Blks J27S007 27/1/87 13:58:09	376-
	Not Recorded.	?
	TAPE 4	Side 1
~~1075~~	Nothing on Side A or B	

```
*********************************************************
*    PROGRAM "TENS.FTN"-TO CONVERT HEX LOGGED VALUES    *
*    TO DECIMAL VALUES ACCORDING TO CHANNELS AND TIMES  *
*    LOGGED IN STANDARD UNIDATA LOGGERS                 *
*    ASSIGN LOGICAL UNIT 4 TO OUTPUT FILE. LOGICAL UNIT *
*    5 TO INPUT FILE AND LOGICAL UNIT 6 TO CALCULATION  *
*    PARAMETER FILE                                     *
*********************************************************
      CHARACTER H(16,0:31)*2,SITE*8,A(32,488)*2
      INTEGER YR,MN,DY,HR,MIN,NL,DST,AC,B(32,488),NNL,NCH,QUES
      INTEGER V(15616),D(16,0:31),MMHG(5)
      REAL RES,KPA(5),PA(4,5),PB(4,5),PC(4,5),PD(5),PE(5)
       EQUIVALENCE(B(1,1),V(1))
******READ AND CONVERT HEADER BLOCK**********************************
      READ(5,20)SITE,YR,MN,DY,HR,MIN
   20 FORMAT(8X,A8,5X,3(I2,X),3X,2(X,I2))
      WRITE(1,*)' SITE: ',SITE,'  DATE: ',DY,'/',MN,'/',YR,
     /      '  TIME: ',HR,':',MIN
        READ(5,10)((H(M,N),N=0,31),M=1,16)
   10   FORMAT(32A2)
      DO 5 M=1,9
         DO 5 N=0,31
             CALL DEC (H(M,N),D(M,N))
    5 CONTINUE
      NNL=(D(9,1)-2)*8
       NCH=0
       DO 6 I=16,20
          IF(D(8,I).EQ.25)NCH=NCH+1
  6    CONTINUE
      NL=(D(9,0)+32*(NNL-8))/NCH
      AC=(256*D(2,22)+D(2,23))*5
      WRITE(1,15)NL,D(9,0),D(9,1),NNL,NCH,AC
  15   FORMAT(' NO. OF LOGS: ',I5,/,' LOG POINTER:  LOC. NO. - ',I3,
     /       ';   BLOCK NO. - ',I2,/,' NO. OF LINES OF DATA: ',I3,
     / /,' NO. OF CHANNELS: ',I3,/,' LOGGING INTERVAL: ',I5)
******READ AND CONVERT LOGGED DATA AND WRITE TO TABLE*****************
      WRITE(1,*)'DO YOU WISH TO CONTINUE? (Y OR N)'
      READ(1,'(A)')ANS
      IF(ANS.EQ.'N')GOTO 450
      WRITE(1,*)' THE DATE AND TIME OF DOWNLOAD ARE: ',DY,'/',MN,'/',
     /   YR,'    ',HR,':',MIN
      YEAR=YR
      MONTH=MN
      DAY=DY
  950   CALL FTIME(D,YR,MN,DY,HR,MIN,DST,NL,AC)
        CALL DT(DST,YR,MN,DY,HR,MIN)
      WRITE(1,*)' THE DATE AND TIME OF FIRST LOG ARE: ',DY,'/',MN,
     /    '/',YR,'    ',HR,':',MIN
      WRITE(1,*)' SHOULD THE TIME OF DOWNLOAD BE CHANGED (Y OR N)?'
```


1360
1270
1180
1090
948
858
768
678
588
498
408
318
228
138
48
Chan 6
Chan 4
12
24
35
47
58


1 12 24 35 47 58


1 12 24 35 47 58

Tree 1 : Z site : 31/10/86 - 3/11/86.

700
600
500
400
300
200

Ch3 low
Ch8 high
Ch2 ~~high~~ low Temp.

high is = 1 hour behind low

1400 31/10/86
0000 1/11/86.
1200
0000 2/11/86
1200
0000 3/11/86.

GORMAC GRAPH PAPER · CHRISTCHURCH N.Z. · No. 0230 · 19 × 30 cm., in mm.

Summary Table of Z, P, + S site data

	Date	Z	P	S
	26/11/86	8·73 ± 1·04		
	5/12/86		6·27 ± 2·05	6·45 ± 1·38
Predawn	15/1/87		6·83 ± 0·61	6·36 ± 1·02
Bal.	16/1/87	11·43 ± 1·58		
Press.				
	10/2/87	20·40 ± 3·38	10·03 ± 2·44	8·87 ± 1·46
	6/3/87	24·17 ± 2·26	8·63 ± 1·87	11·03 ± 1·64
	26/11/86	16·38 ± 0·79		
	5/12/86		17·38 ± 3·14	15·71 ± 2·47
Midday	15/1/87			18·13 ± 1·92
Bal.	16/1/87	23·04 ± 4·44	17·48 ± 2·99	
Press.				
	10/2/87	27·17 ± 1·95	19·93 ± 4·55	19·00 ± 1·17
	6/3/87	30·87 ± 3·17	16·60 ± 1·91	19·17 ± 1·45
	26/11/86	0·44 ± 0·10		
	5/12/86		0·49 ± 0·12	0·60 ± 0·10
	15/1/87		0·58 ± 0·14	0·65 ± 0·04
g_s	16/1/87	0·31 ± 0·07		
	10/2/87	0·17 ± 0·04	0·42 ± 0·07	0·41 ± 0·14
	6/3/87	0·18 ± 0·08	0·52 ± 0·12	0·41 ± 0·12

S site

	5/12	1.00	1.00	1.00	1.00
Pre dawn	15/1	.29	.73	.78	.69 .47
	10/2	.12	.61	.55	.50 .18
	3/3	.01	.46	.19	.36 .01
	5/12	1.00	1.00	1.00	1.00 1.00
MIDDAY	15/1	.10	.72	.78	.68 .36
	10/2	.01	.55	.47	.47 .01
	3/3	.01	.01	.01	.26 .01

$\bar{X}$

1.00
.59 ± .21
.39 ± .23
.2[illegible] ± .20

1.00

Z

freedown. 6/11/86	1.00	1.00	1.00	1.00
16/1	.88	.45 ~~.82~~	.40	.41
10/2	.82	.06	.02	.01
~~3~~/3	.91	.01	.01	.01

1+2 (.67) (.44) (.46)

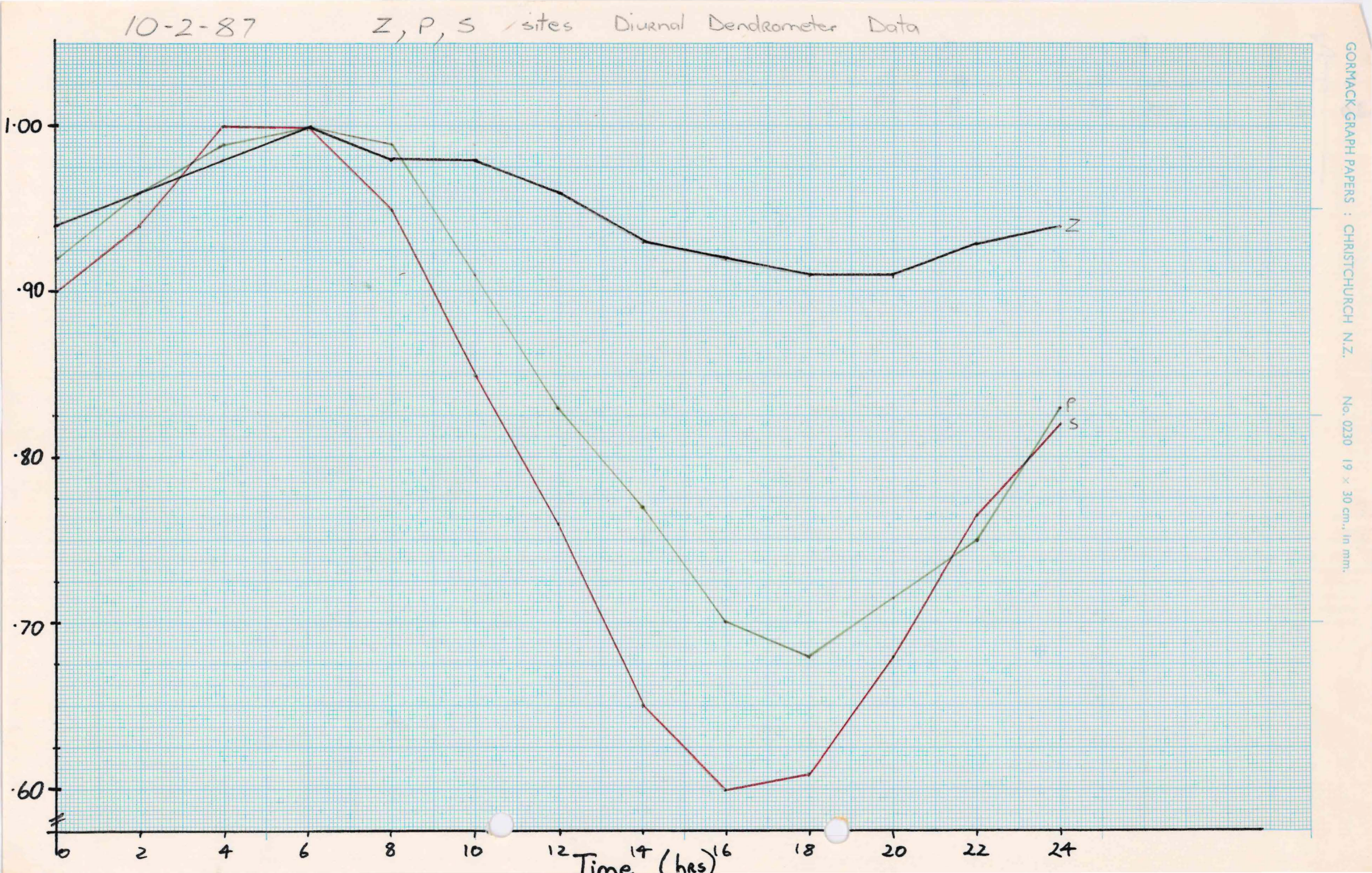
1-4 ~~.42 ± .27~~ ~~.54 ± .23~~ (.03) ~~.23 ± .39~~ (1-3) (.01)

P

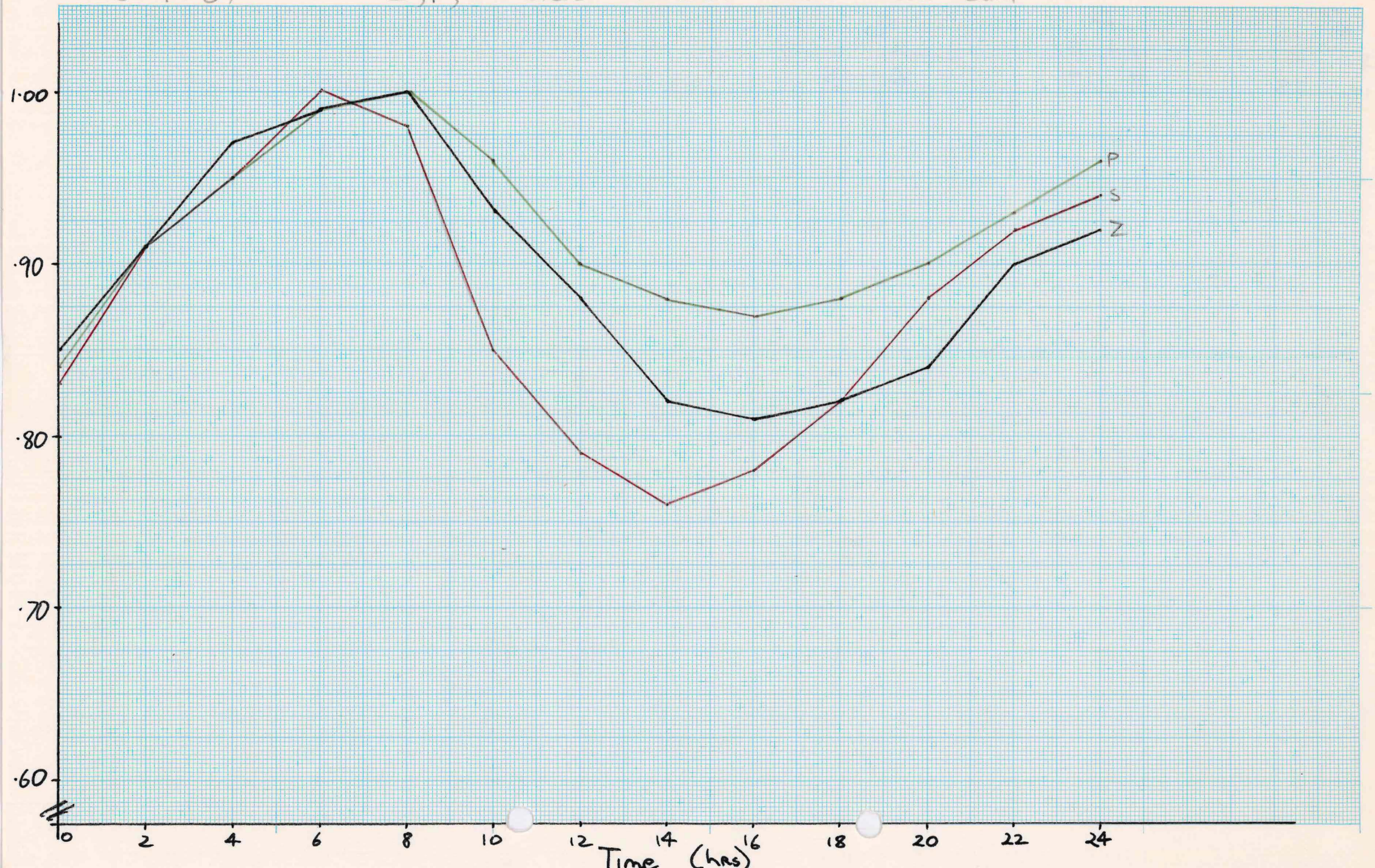
24/11	1.00	1.00	1.00	1.00
15/1	.83	.89	1.35	.91
10/2	.71	.77	.86	.81
3/3	.62	.65	.71	.71

1.00
1.00 ± .24
.79 ± .06
.67 ± .04

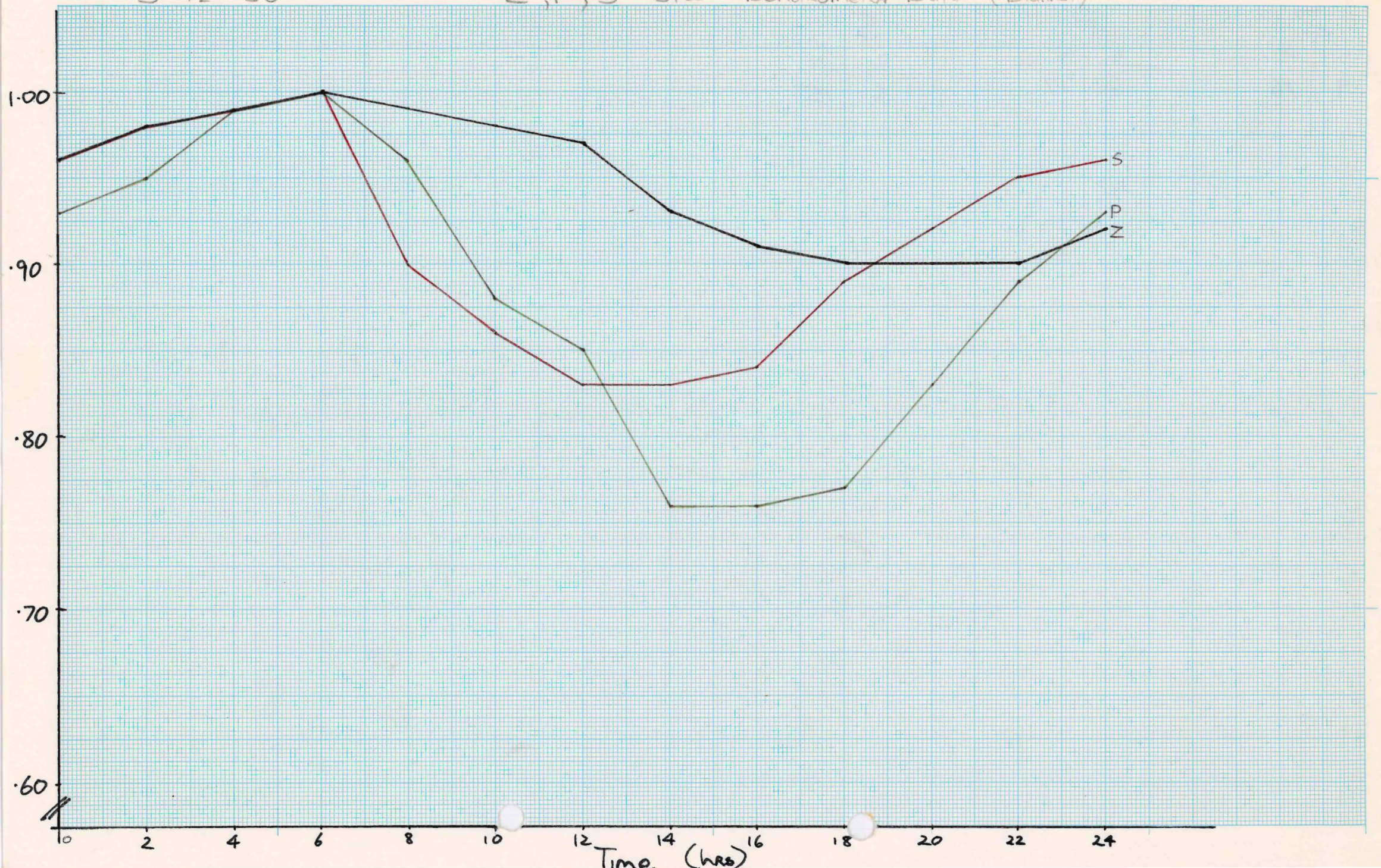
$\left(\frac{D}{D \text{ at beginning}}\right)$


10-2-87 Z, P, S sites Diurnal Dendrometer Data
1·00
·90
·80
·70
·60
Z
P
S
0
2
4
6
8
10
12
14
16
18
20
22
24
Time (hrs)
GORMACK GRAPH PAPERS : CHRISTCHURCH N.Z. No. 0230 19 x 30 cm., in mm.

15-1-87 Z, P, S sites Diurnal Dendrometer Data



5-12-86 Z, P, S site Dendrometer Data (Diurnal)



3-3-87 Z, P, S Diurnal Dendrometer Data

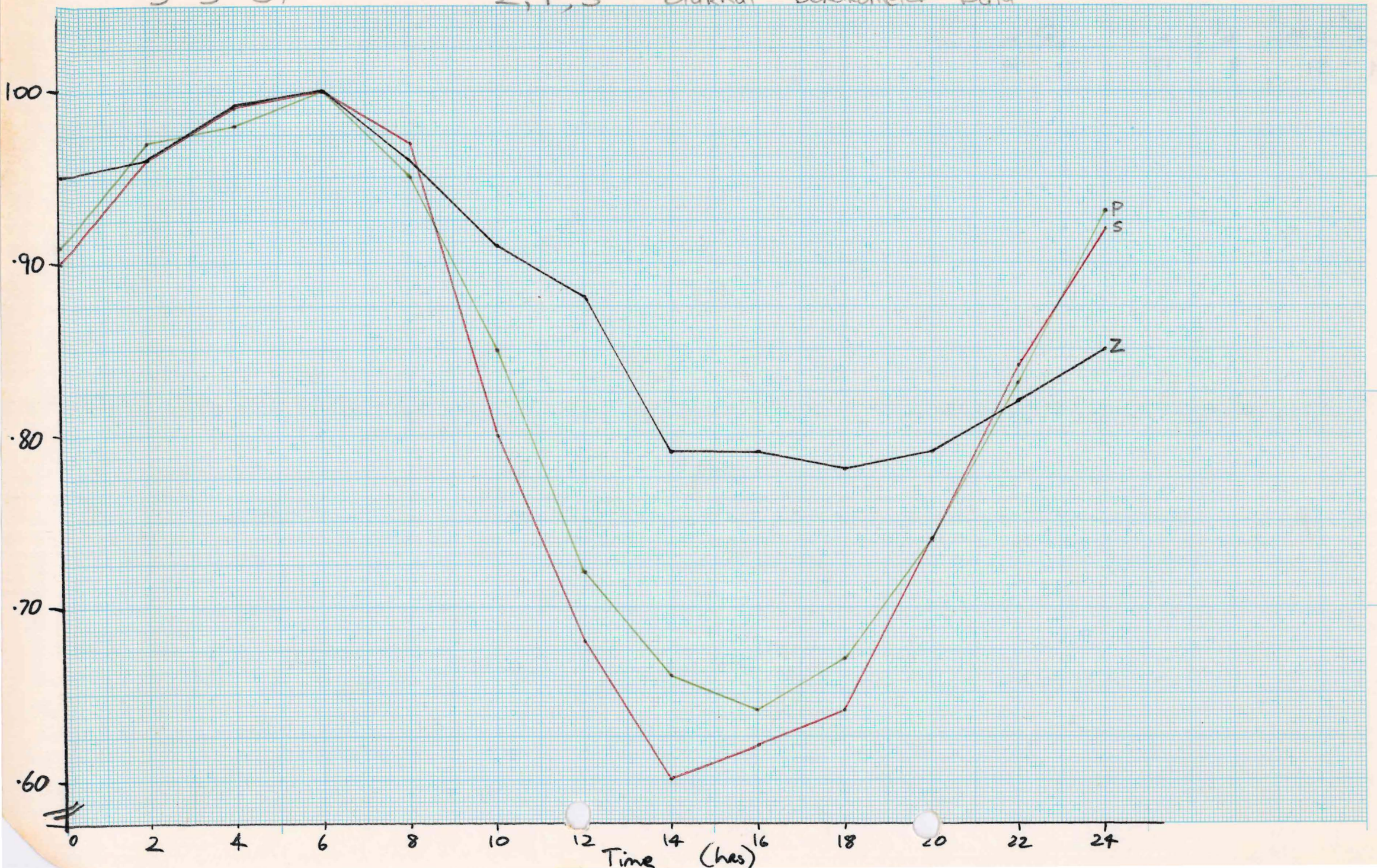


Figure 1 : Schematic diagram of a thermocouple psychrometer, with a working model (inset).

Figure 2: Thermocouple psychrometer calibration curve using NaCl solutions

Figure 3: Thermocouple psychrometer Temperature calibration curve using NaCl solutions in a laboratory incubator.

Figure 4: Laboratory evaluation of leaf water potential (pressure chamber) and trunk xylem water potential (psychrometer) in jarrah saplings.

Figure 5: Field evaluation of leaf water potential xylem water potential (pressure chamber) and trunk xylem water potential (psychrometer)

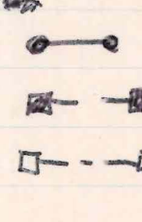
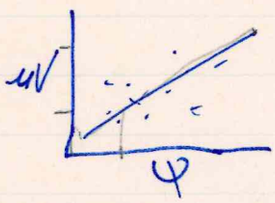


Fig 2: Thermocouple psychrometer calibration curves using NaCl solutions and a 10 second cooling time (all values corrected for temperature)

Ψ	Psy	Psy	Psy	Psy	Psy	$\bar{X}$
4·5	1·0	1·2	0·9	1·3	1·1	1·0
9·0	1·8	2·0	1·9	2·1	1·8	1·8
13·2	2·7	2·9	2·7	3·0	2·6	2·2
22·2	4·5	4·3	4·6	4·9	4·2	4·2
30·0	6·0	5·8	6·2	6·3	5·4	6·2

A = -0·0698
B = ·20049
R^2 ·98919

Range Ψ 0-30
Psy 0-6·5



$y = ax + b$

$Y = ·06x + 0·20$

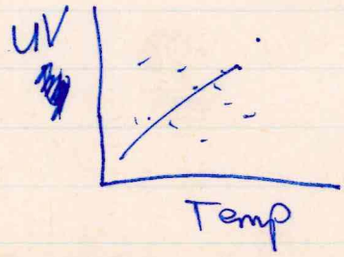
$uV = ·06\Psi + 0·20$

Fig 3: Temperature calibration curve using NaCl solutions and a 10 sec cooling time.

Temp						$\bar{X}$
10	2·5	2·4	2·0	2·6	2·2	2·0
15	2·8	2·6	2·9	2·3	2·7	2·4
20	3·0	3·2	3·3	3·4	3·5	3·0
25	3·5	3·6	3·7	3·8	3·9	3·5
30	3·9	3·7	3·9	4·2	4·3	3·9
35	4·2	4·0	4·2	4·3	4·5	4·2
40	4·5	4·3	4·7	4·5	4·8	4·7

$Y = ·558X + ·109$

Range temp 0-40
Psy 0-5



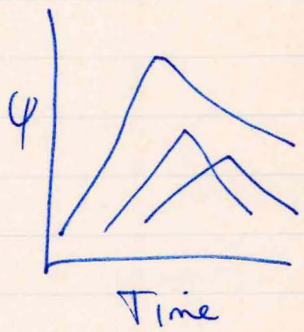
A = ·55789
B = 0·1099
R^2 = 0·95729

Fig 4. laboratory evaluation of leaf Balance pressure and trunk xylem & Bark water potentials in jarrah saplings. [illegible]

[illegible] (↑A sapling taken out of water)
(↑B Sapling placed back into water)

Δ X •

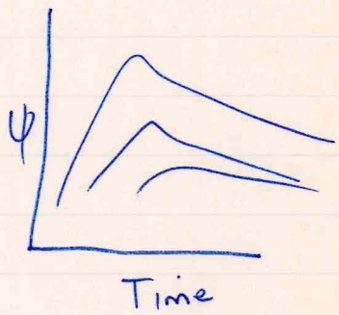
Time	Bal Pres leaf	Xylem Psy	Bark Psy
0900	3·2	0	0
0930	3·3	0	0·8
0950	3·9	0·8	1·2
1030	5·0	10·6	2·0
1100	10·3	4·8	8·2
1140	13·1	5·6	8·6
1210	15·0	10·9	11·0
1240	17·2	13·0	12·4
1320 [illegible]	19·3	14·2	13·2
1410	21·8	15·8	13·6
1445	23·9	16·0	14·6
1515	25·1	18·2	16·2
1545	25·8	18·6	17·2
1615	26·7	19·4	18·4
1645	26·8	23·8	19·6
#			
0915	29·2	27·0	18·6
1030	26·7	26·8	18·0
1130	11·7	7·5	8·2
1245	7·2	3·8	2·2

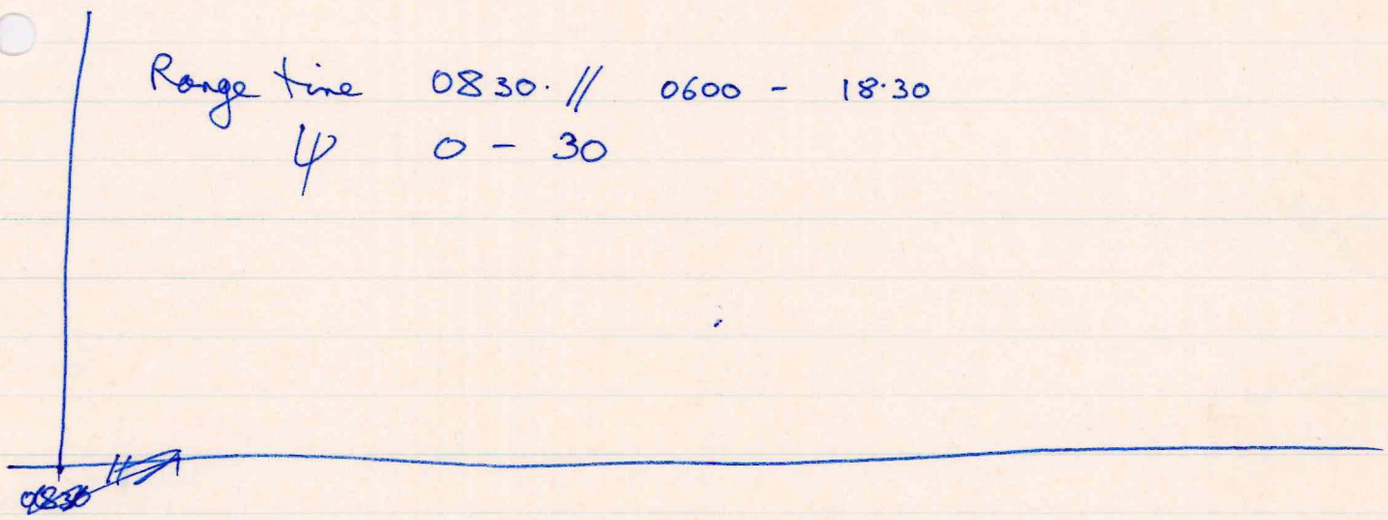


Range Time // 900 – 1700 // 900 – 1245
ψ 0 –30

Fig 4: Field evaluation of thermocouple psychrometers for monitoring trunk xylem water potential in comparison to leaf & xylem water potential measured in the pressure chamber, in a mature Eucalyptus tree.

Time	Leaf	Xylem	psy
0830	21·2	-	21·8
#			
0600	11·4	-	4·0
0800	17·6	10·4	7·6
0920	21·4	19·0	20·8
1100	22·8	20·4	21·0
1240	25·6	22·2	21·8
1430	26·0	24·0	29·8
1645	25·6	24·6	25·4
1830	21·4	21·4	25·0





		1500	1500
		5	7
Z site	20/3	858·9	152·9
		·57	·10
	14/4	1676·5	−223·6
		1·1	±0·15
		4	6
S site	20/3	358·8	511·8
	14/4	476·5	847.0

Corrected values

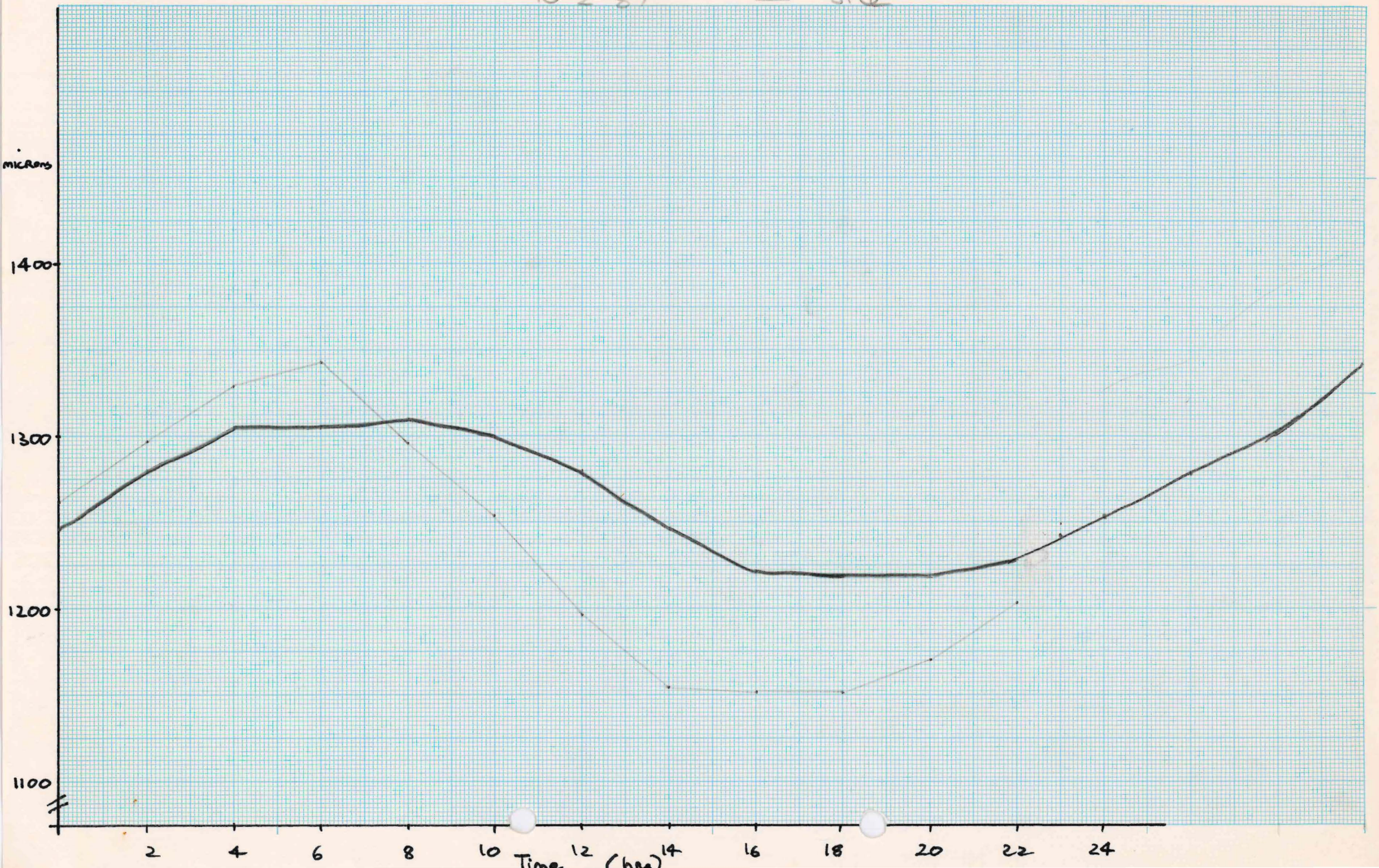
		3	4	5	6	7
P site	20/3	652·9	617·6	276·5	723·5	341·2
		0·71	·82	·87	·91	·53
	14/4	770·6	747·1	276·5	794·1	488·2
		·84	1·00	·87	1·00	·75

A strong correlation between leaf bal pressure as measured by the pressure chamber & trunk xylem water potential achieve from psychrometer measurements is evident from the laboratory results presented in Fig 1. trunk xylem water potentials are consistently higher than leaf water potentials, by approx 0.2 MPa, with larger differences perhaps due to temp gradients as the shoot supplying was insulated with aluminum foil only.

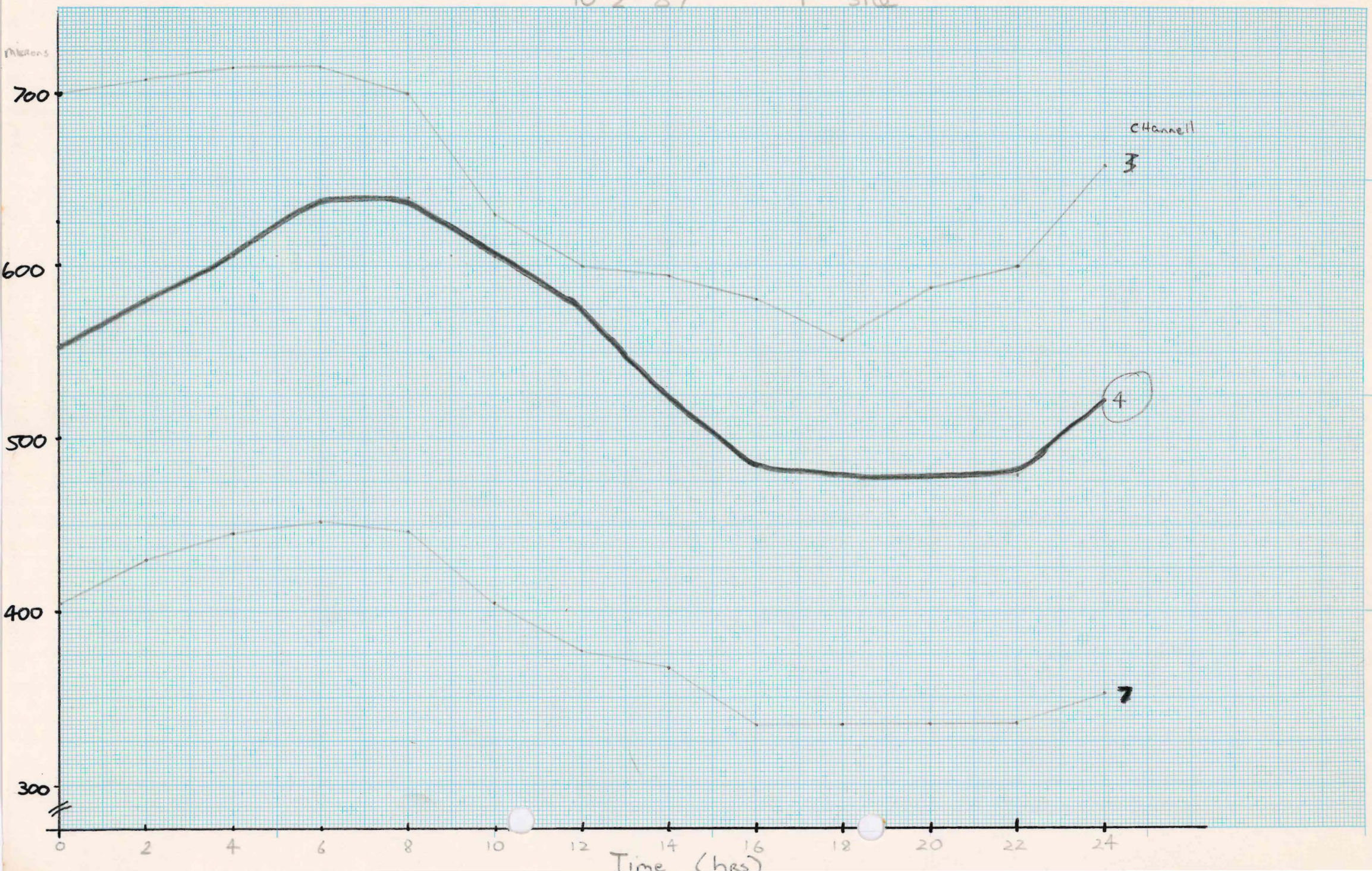
Field results (Fig X) show similar correlations between leaf water pot, and leaf xylem water potential and the trunk xylem water potentials. Again trunk xylem WP are generally higher over most of the diurnal measurement period, although early morning + the early afternoon aberrations may be due to temp gradients.

parallel

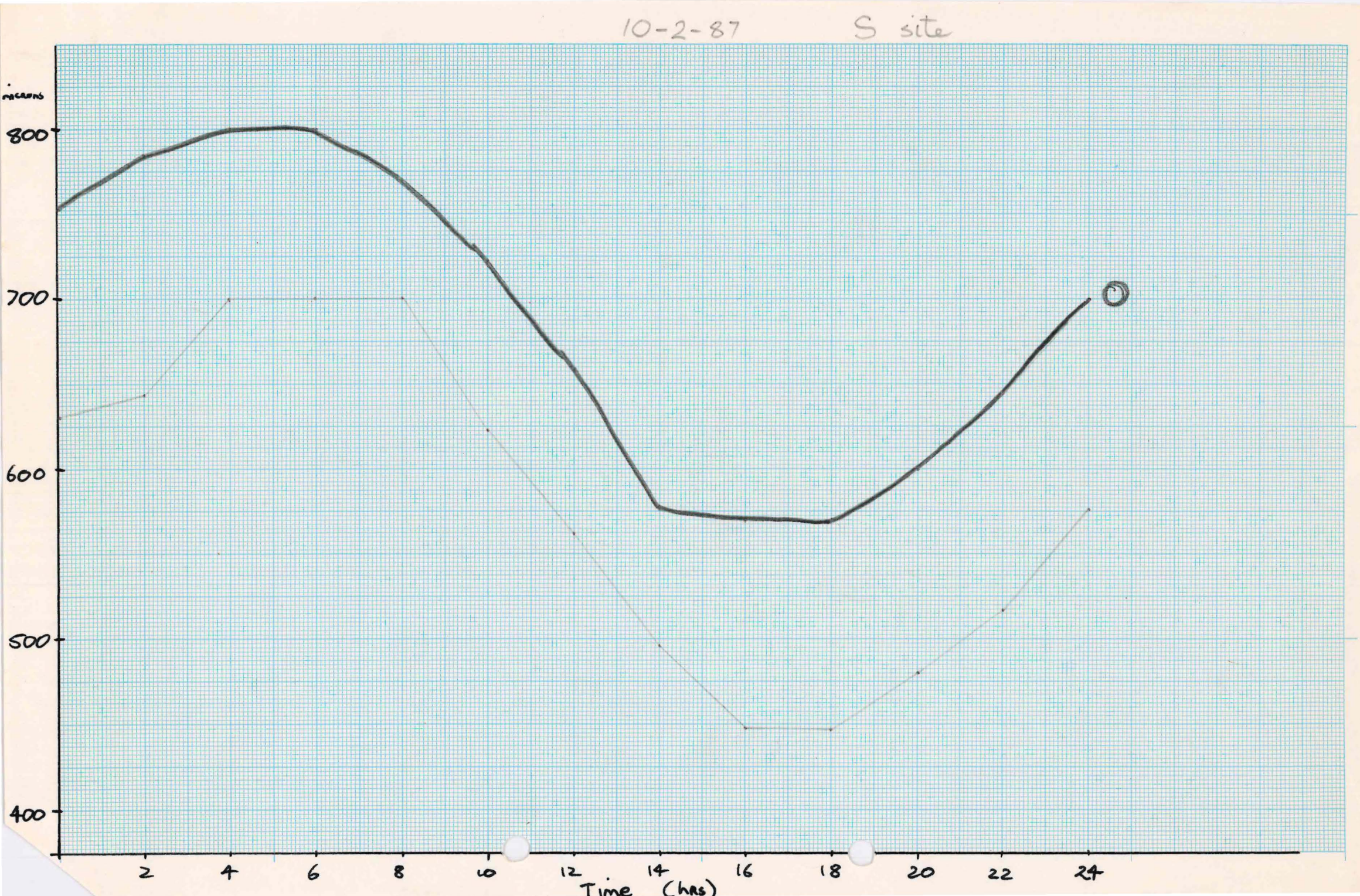
10-2-87 Z site



10-2-87 P site

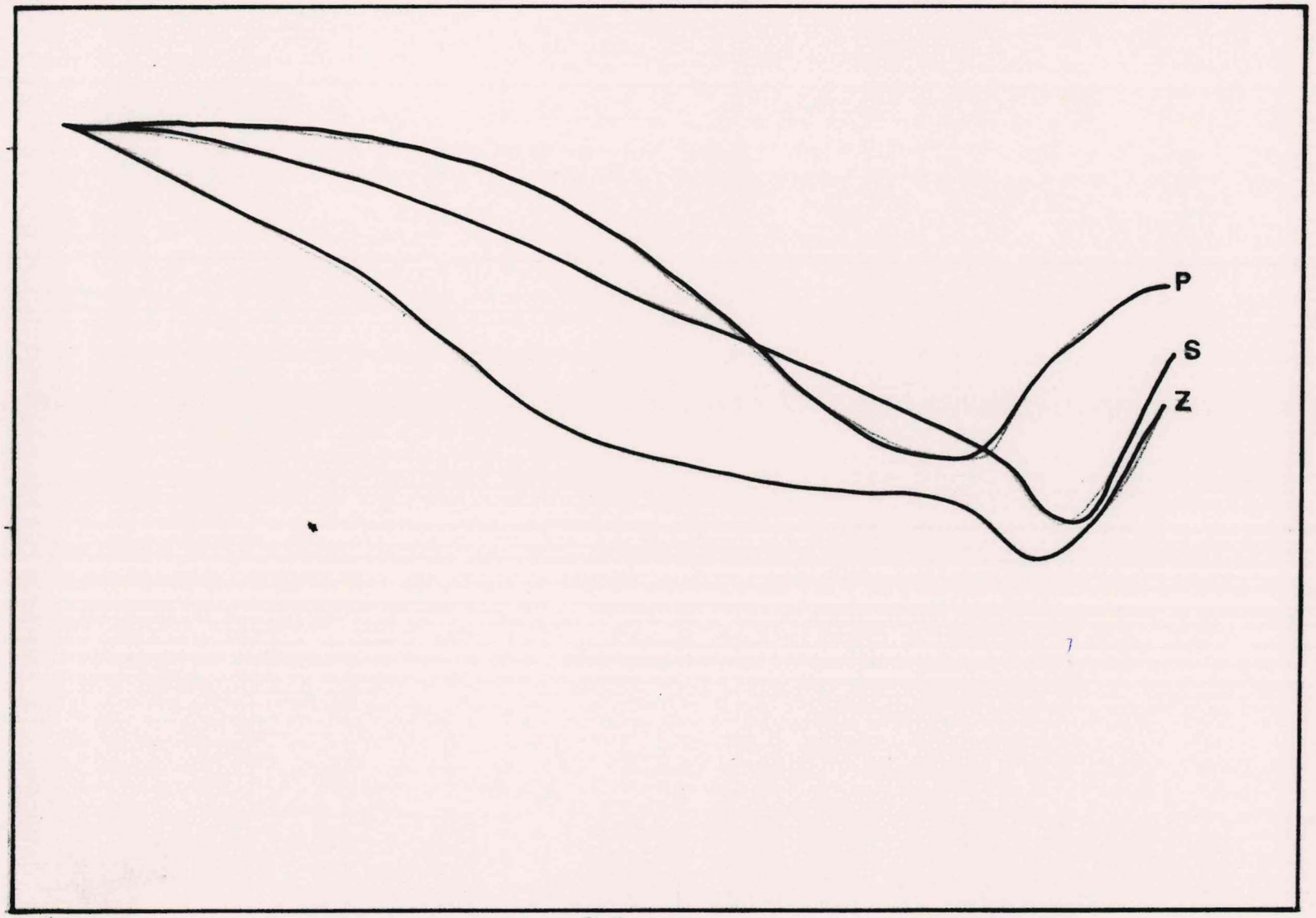


10-2-87 S site



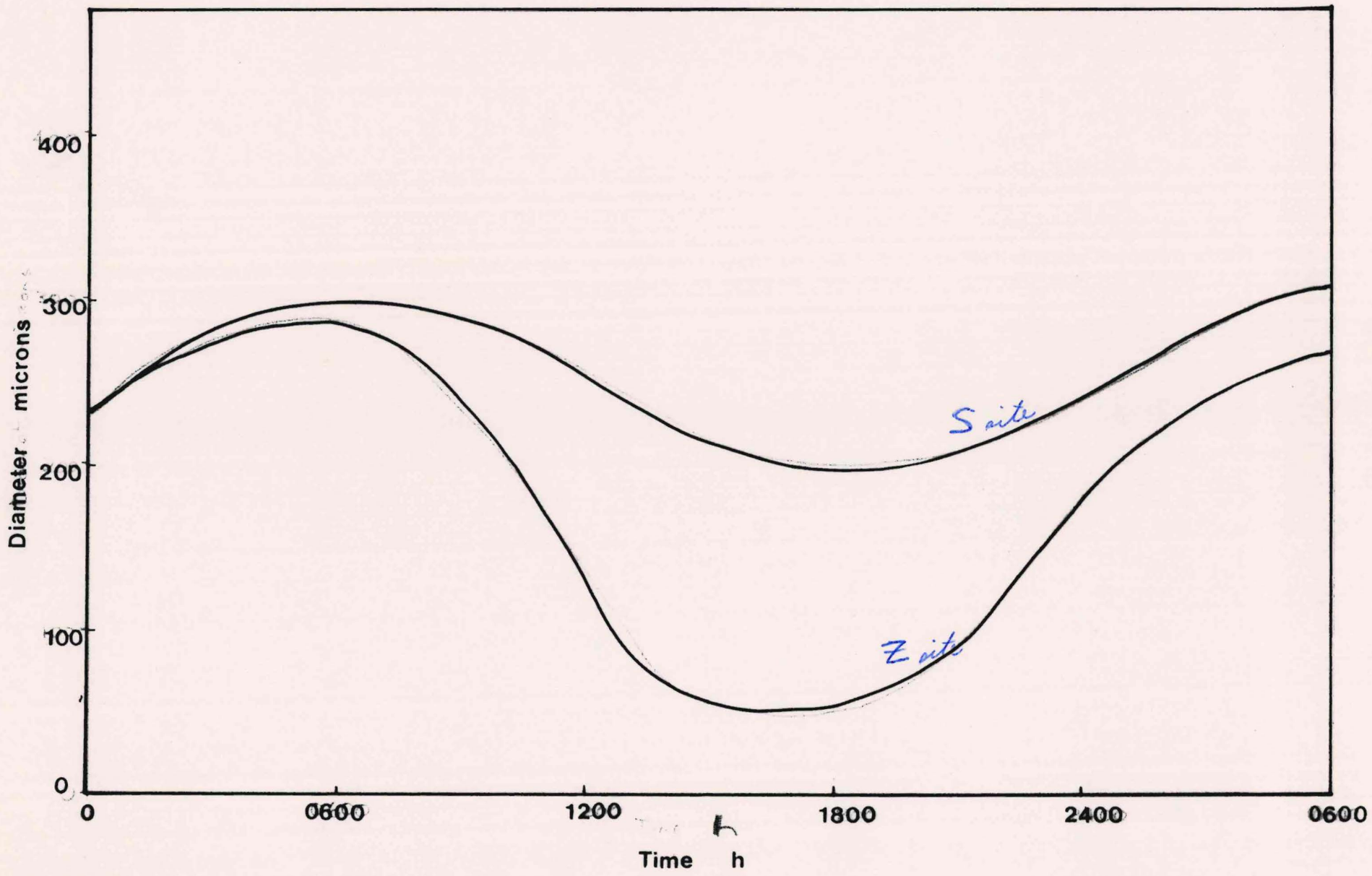

Water Potential (Column) - MPa
0
1
2
10
Z
SP
26/11
15/1
10/2
3/3
14/4
Time
Date.

Fig 4.

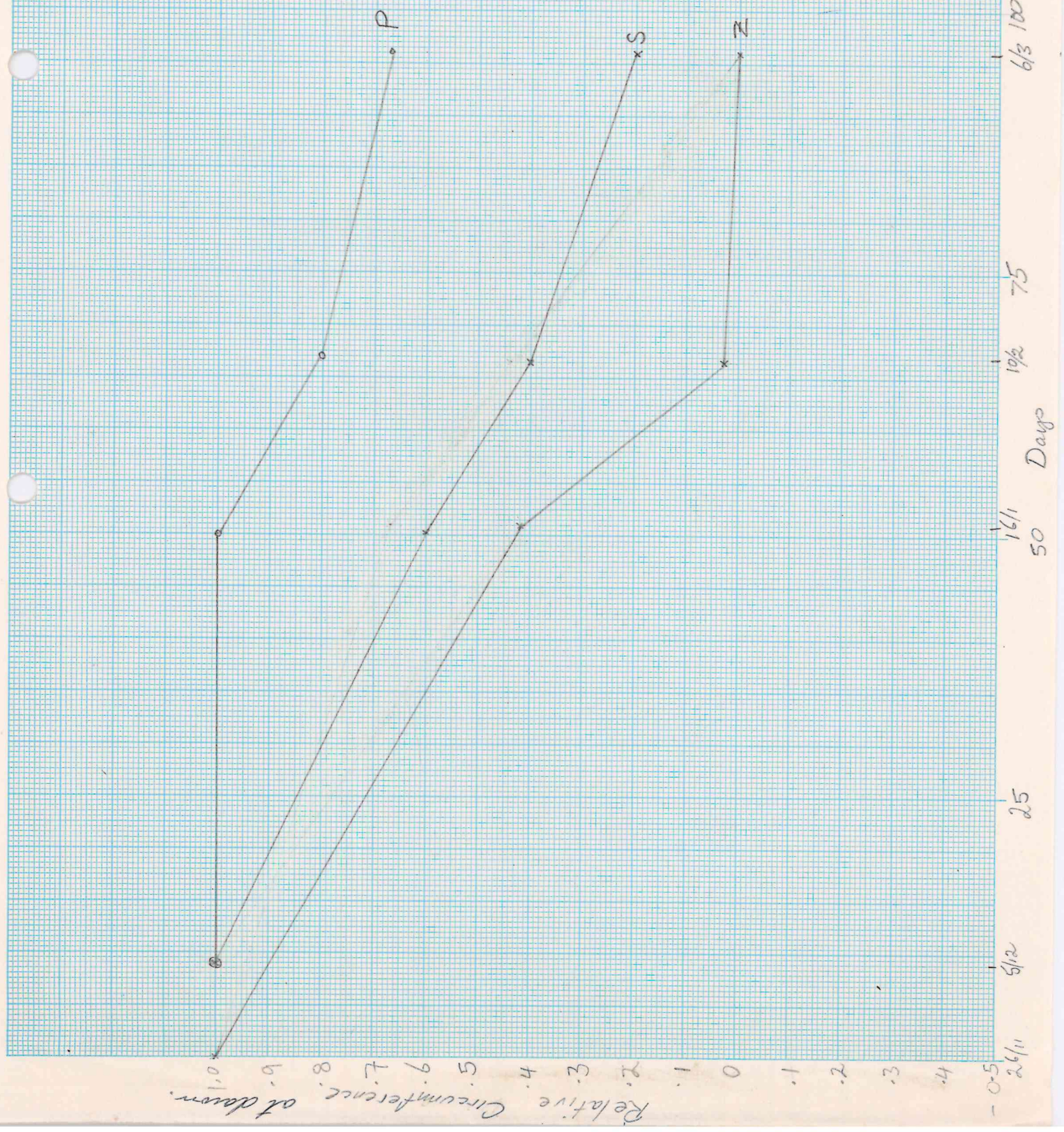


9. Girth at Dam (mm).

Fig 2.

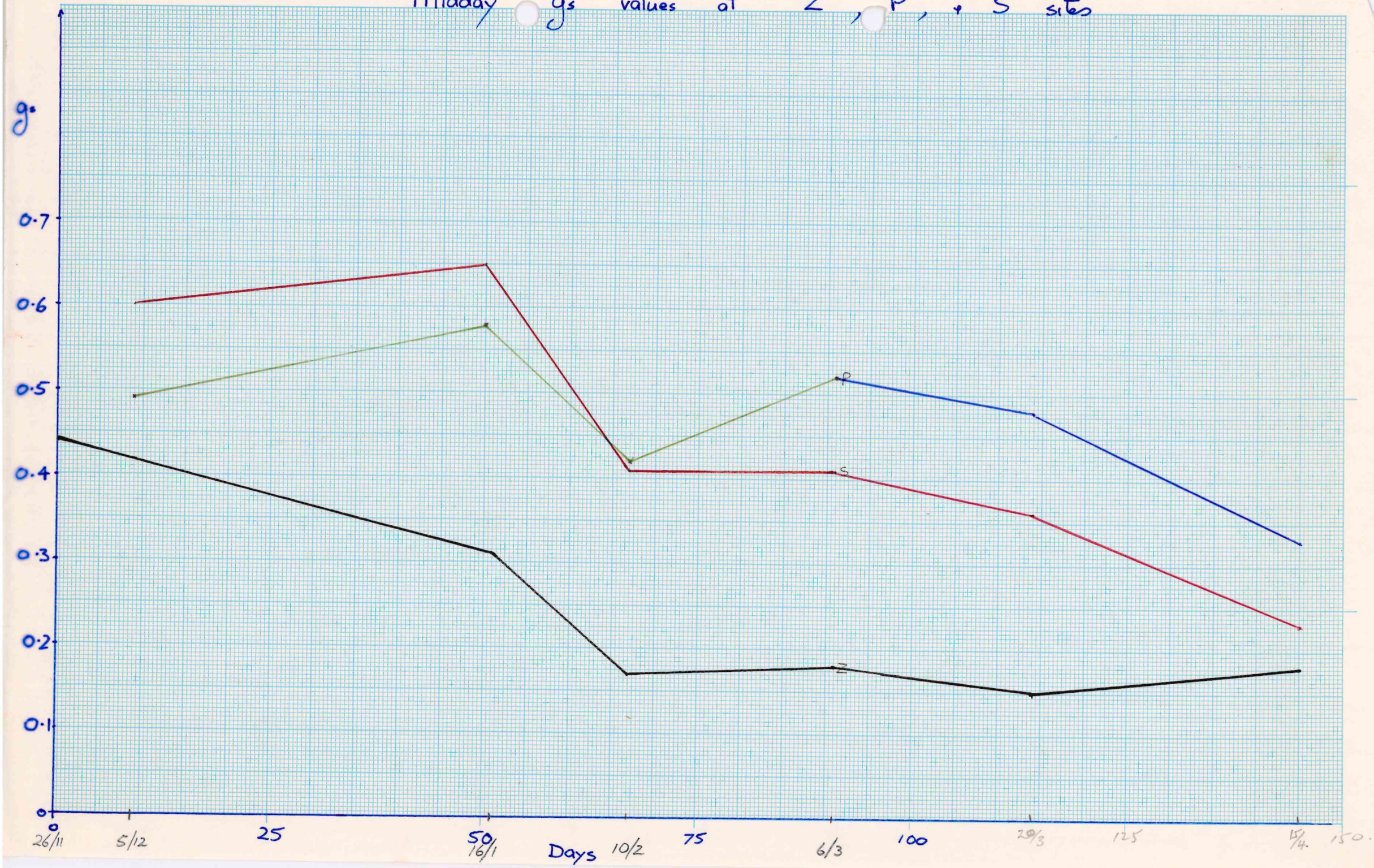

400
300
200
100
0
Diameter microns
S site
Z site
0
0600
1200
1800
2400
0600
Time h

Z site	Ch 5	Add 441.2 μm
	7	subtract 241.2
S site	4	subtract 5.9 μm
	6	subtract 5.9 μm.
P site	3	subtract 0 μm
	4	subtract 35.3
	5	subtract 105.9
	6	subtract 47.1
	7	add 64.7


P
S
N
6/3 100
75
1/12
16/1
50
Days
25
5/2
26/11
- 0·5
0·
0·1
0·2
0·3
0·4
0·5
0·6
0·7
0·8
0·9
1·0
Relative Circumference at dawn.

Predawn Balance Pressures at $\bar{Z}$, $\bar{P}$, & $\bar{S}$ sites

Midday g_s values at $\bar{Z}$, $\bar{P}$, & $\bar{S}$ sites



Z site Channel 3.

Kaw 8/11/87

Nov 19

Jan 24

Jan 23

Nov 20

Nov 21

Jan 26

Circum

1400 1300 1200 1500 1450 1400 1350 1300 1250 1200 1150

650 600 550 500 450 400

24/1 26/1

Days. 24/1 25/1 26/1

S site

5/12/86	5.00	1023.5	1305.9	982.4	1388.2	758.8
	13.00	823.5	1188.2	758.8	1194.1	635.3
15/1/87	6.00	294.1	952.9	764.7	964.7	352.9
	12.00	82.4	858.8	588.2	817.7	229.4
10/2/87	6.00	123.5	800	541.2	700	135.3
	12.00	5.9	658.8	358.8	564.7	5.9
3/3/87	6.00	5.9	600	188.2	494.1	5.9
	12.00	5.9	441.2	5.9	305.9	5.9

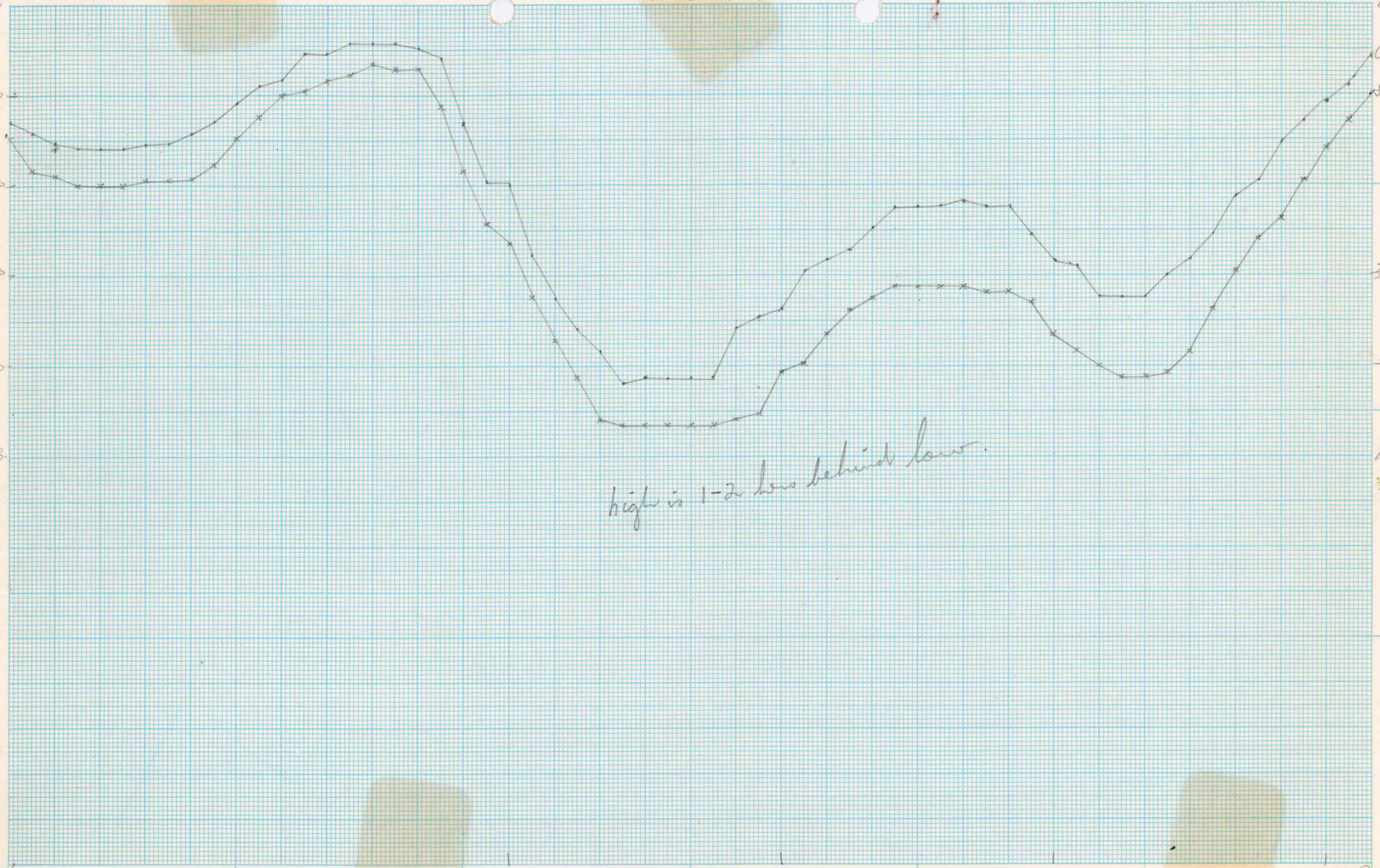
Z site

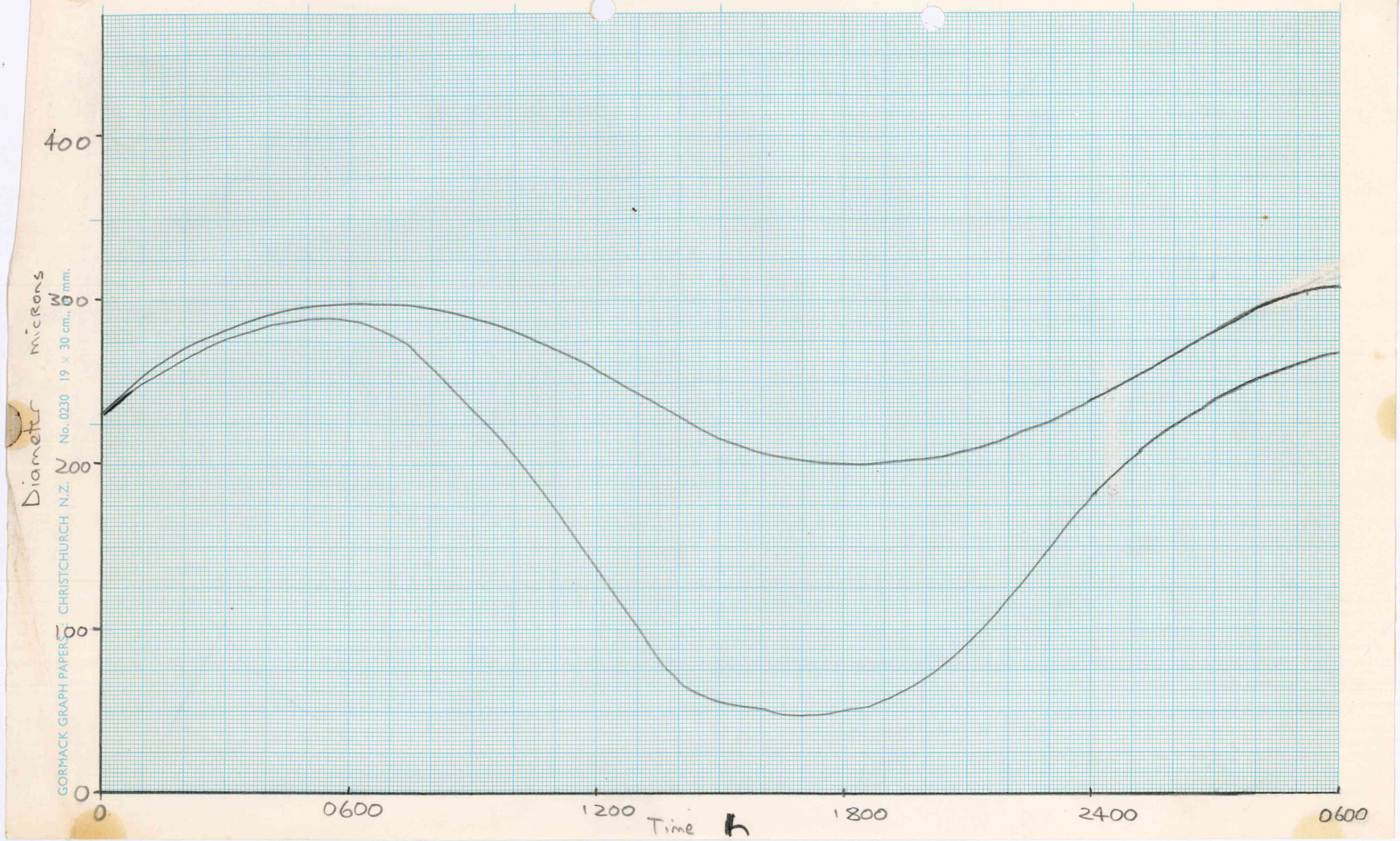
26/11/86	5.30	711.8	1329.4	1170.6	1105.9
	11.30	717.7	1247.1	1500	1088.2
16/1/87	6.00	623.5	600	764.7	458.8
	12.00	635.3	511.8	911.8	494.1
10/2/87	5.00	582.4	76.5	23.5	5.9
	13.00	605.9	5.9	5.9	5.9
3/3/87	5.00	647.1			—
	13.00	652.9			

P site

						$\bar{X}$
24/11/86	5:00	1017·7	835·3	500	852·9	729·4
	13:00	917·7	747·1	317·6	794·1	647·1
15/1/87	600	847·1	741·2	676·5	776·5	600
	1200	758·8	705·9	529·4	741·2	570·6
10/2/87	600	717·7	641·2	429·4	688·2	452·9
	1200	600	576·5	294·1	623·5	376·5
3/3/87	600	629·4	541·2	352·9	605·9	335·3
	1200	494·1	482·4	152·9	552·9	270·6

Tree 2 : Z site : 31/10/86 - 3/11/86.



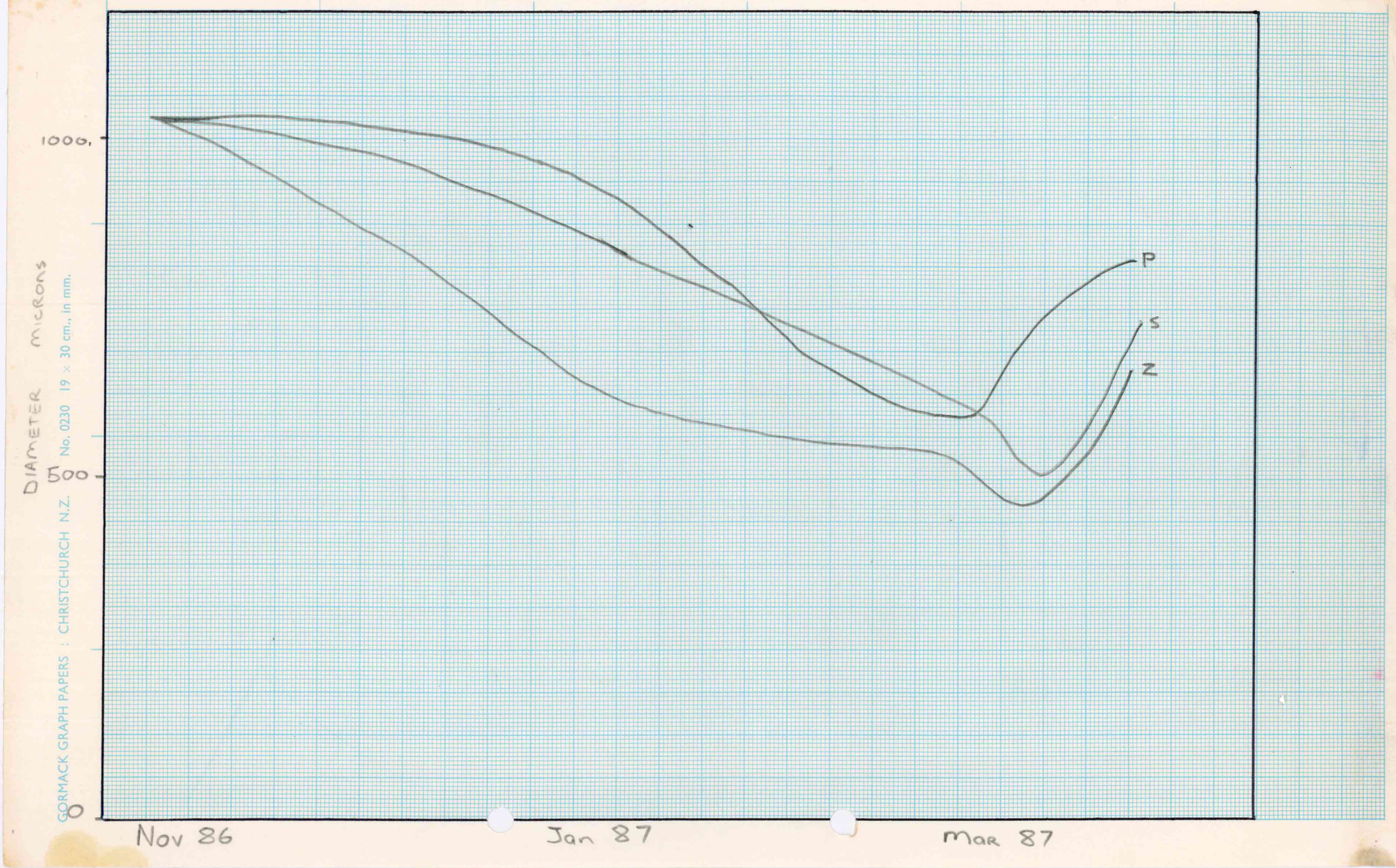

Diameter Microns
400
300
200
100
0
0
0600
1200
1800
2400
0600
Time h
GORMACK GRAPH PAPERS CHRISTCHURCH N.Z. No. 0230 19 × 30 cm., mm.

Nov 86 | Jan 87 | Feb 87 | Mar 87 | Apr 87

0
1
2
3

WATER POTENTIAL -MPa

P
S
Z



Ch	d_i	$k\Omega_i$	d_m	$k\Omega_m$	d_i/Ω_i
Z3	21	4·15	59	4·44	5.6602
S4	61	4·54	62	4·45	
S6	61	4·44	62	4·44	

		3	4	5	6	7
20/3	P	811·8	758·8	382·4	847·1	523·5
		652·9	652·9	382·4	770·6	405·9
14/4	P	870·6	864·7	388·2	894·1	623·5
		770·6	782·4	382·4	841·2	552·9
20/3	S	805·9	547·1	741·2	782·4	617·7
		476·5	364·7	405·9	517·7	405·9
14/4	S	1170·6	658·8	964·7	1000·0	700·0
		935·3	482·4	717·7	852·9	564·7

		2	3	4	5	6	7
20/3	Z	752·9	529·4	5·9	576·5	494·1	800·0
		700·0	347·1	5·9	417·7	482·2	394·1
14/4	Z	870·6	1482·4	511·8	1500	1288·2	35·3
		823·5	1353·0	147·1	1235·3	500·0	17·6

$(d_0 - d_d)$

11/3/87.

Z site

Ch.	13.00	1500.	Δd (μm) to be added to dendrometer
2	641.2 →	635.3	
3		405.9	
4.	Non-working		
5	747.1	305.9	Δ 441.2
6.	5.9	482.4	
7	105.9	347.1	Δ 241.2
8	T.		

S site

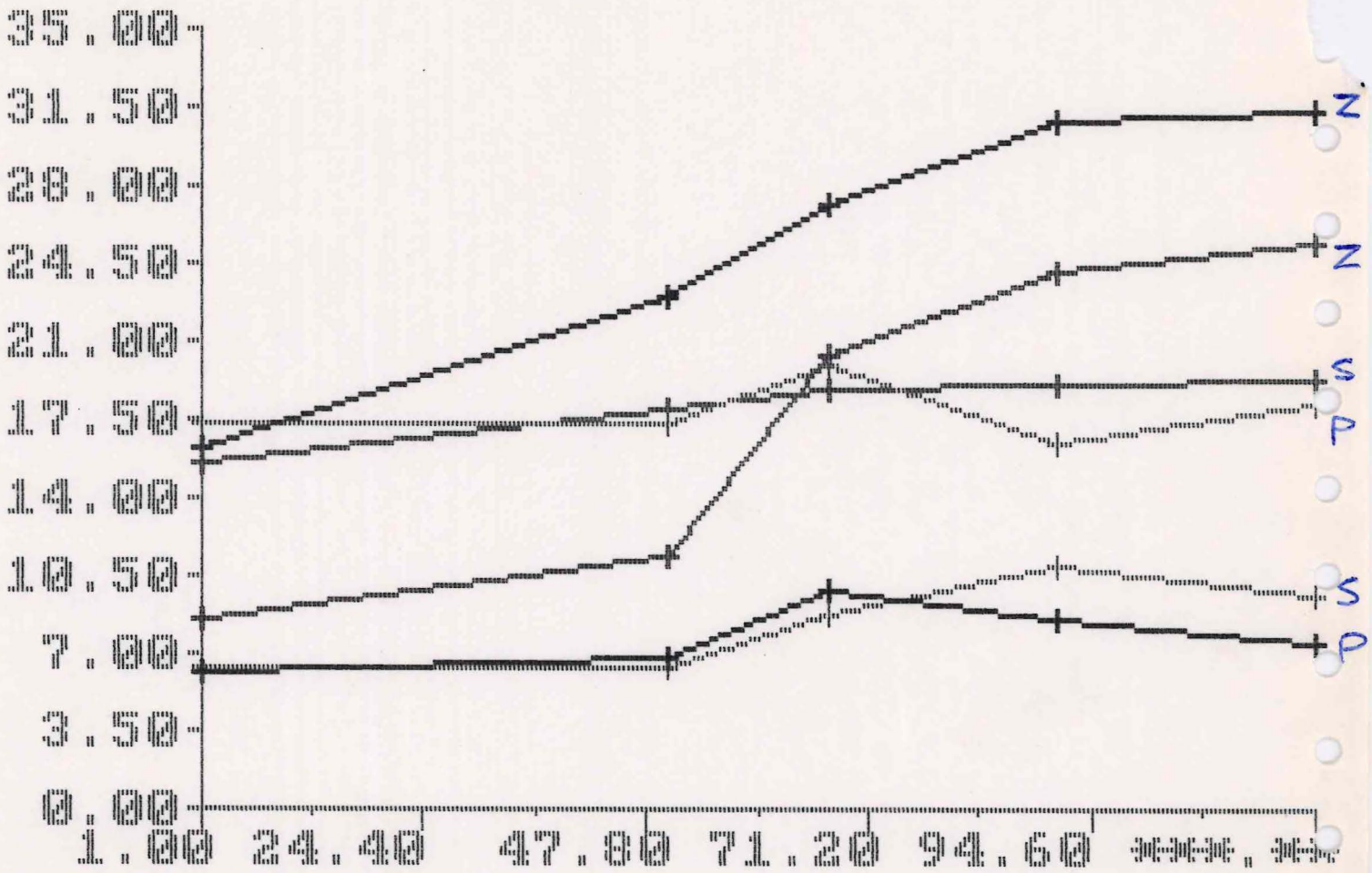
1400 – 1600 pm.

1	Temp.	
2	T	
3	5.9	382.4
4	352.9	364.7
5	5.9	394.1
6	358.8	364.7
7	5.9	394.1
8	—	

P site

Ch.	
1	T
2	T
3	All correct
4	"
5	"
6	"
7	"
8	"

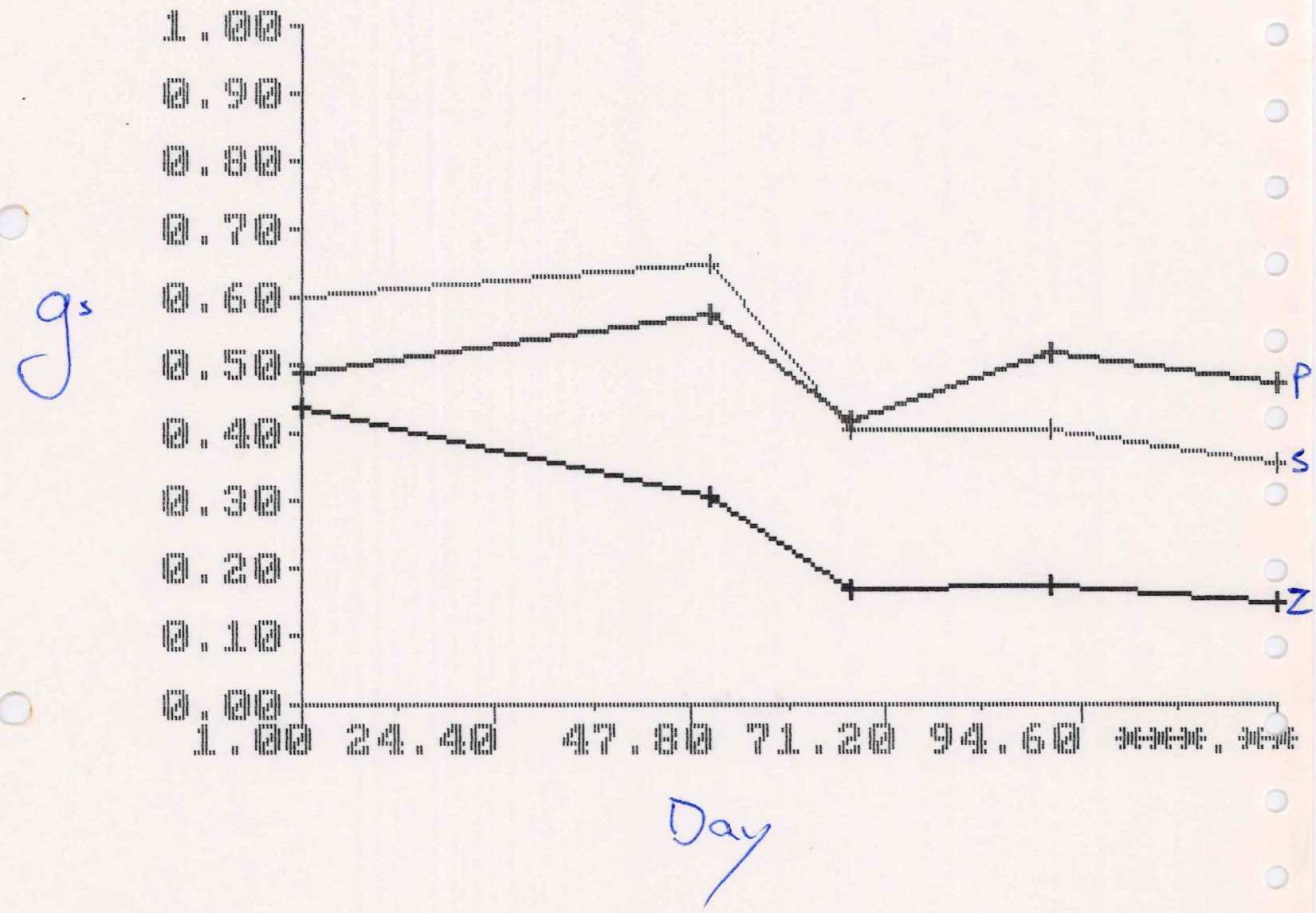
Z, P, S site Predawn, Midday



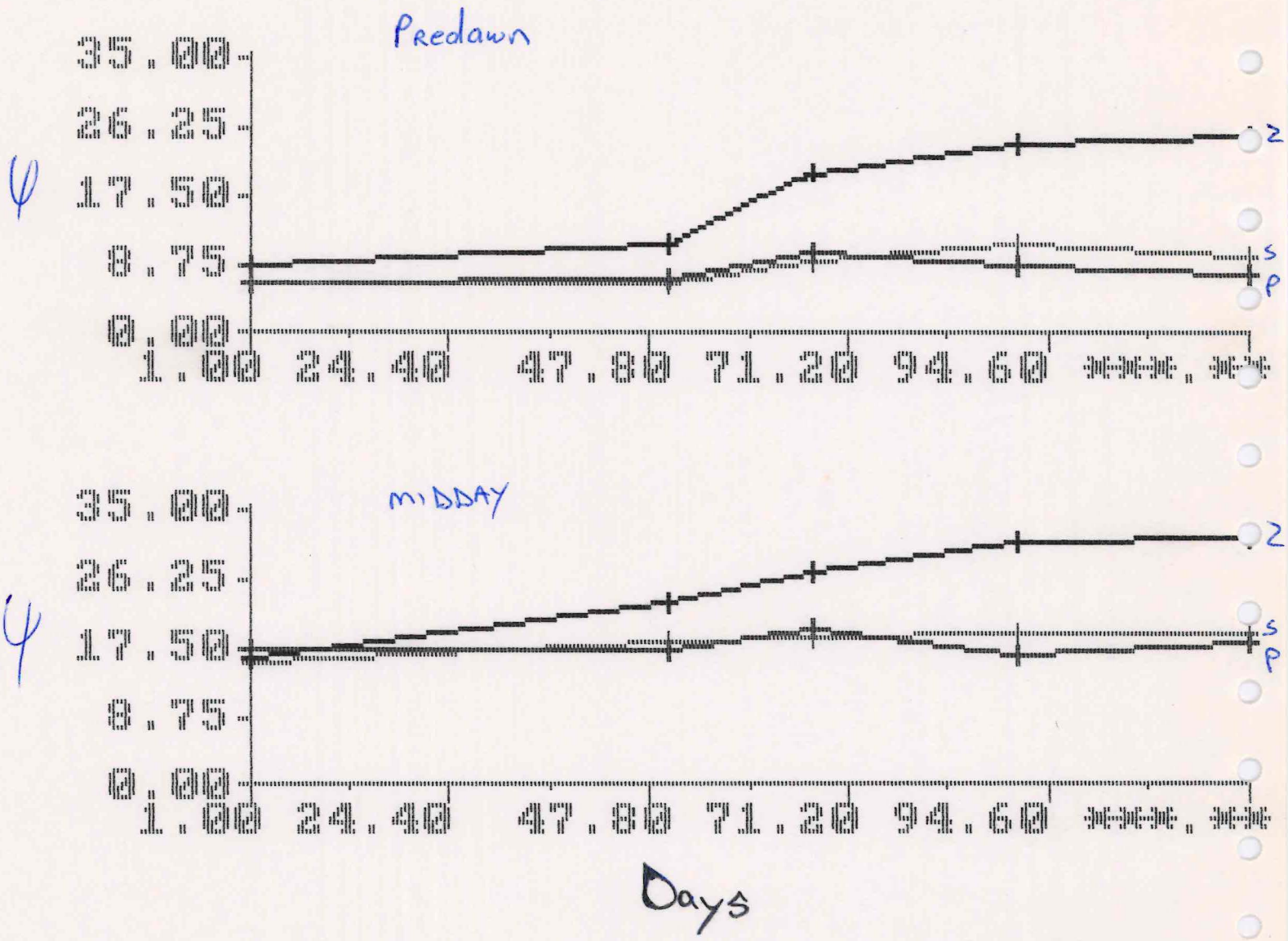
ψ

Days

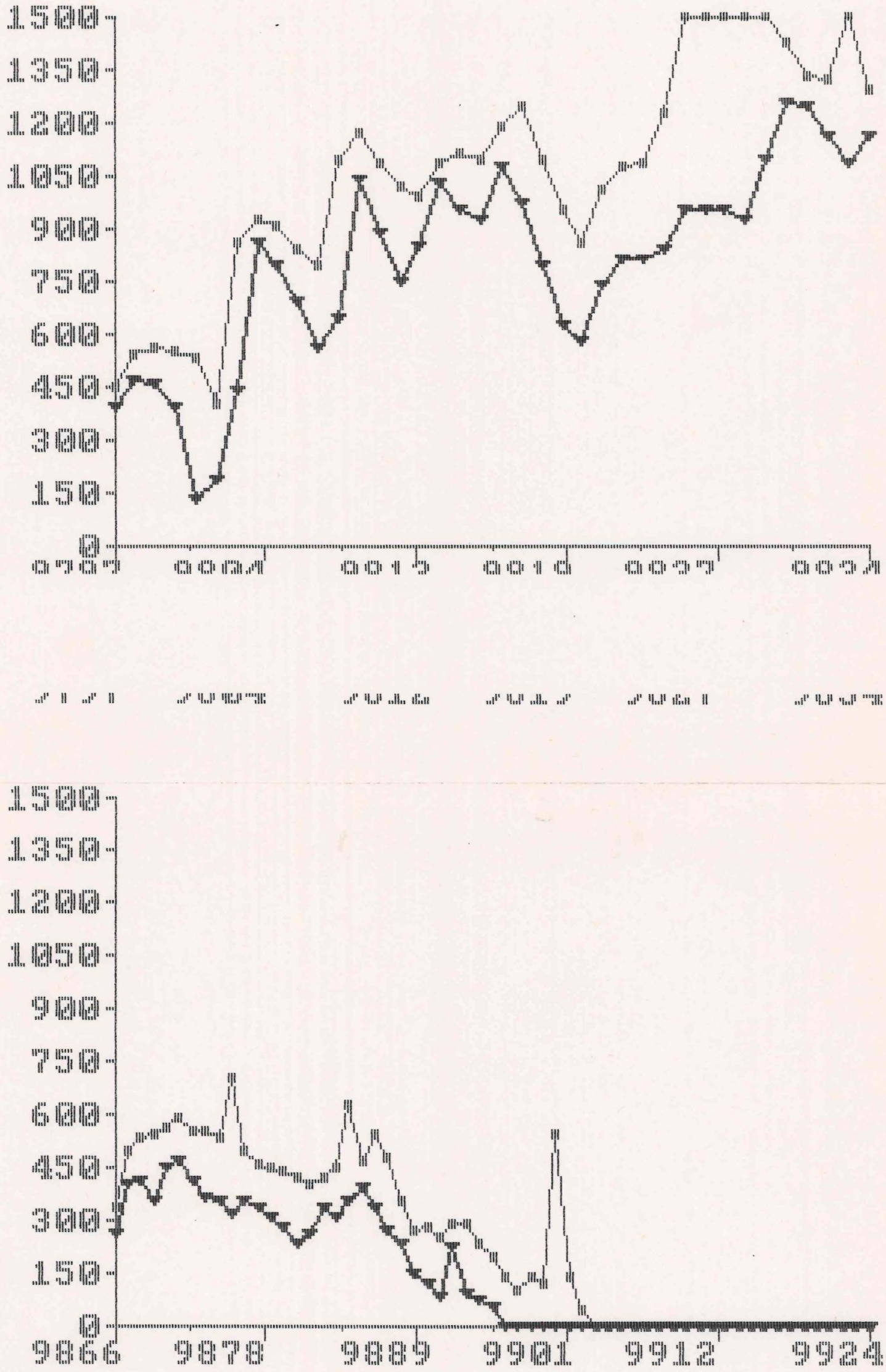
Z, P, S sites


gs
1.00
2.90
2.80
2.70
2.60
2.50
2.40
2.30
2.20
2.10
2.00
1.00
24.40
47.80
71.20
94.60
xxx.xx
P
S
Z
Day

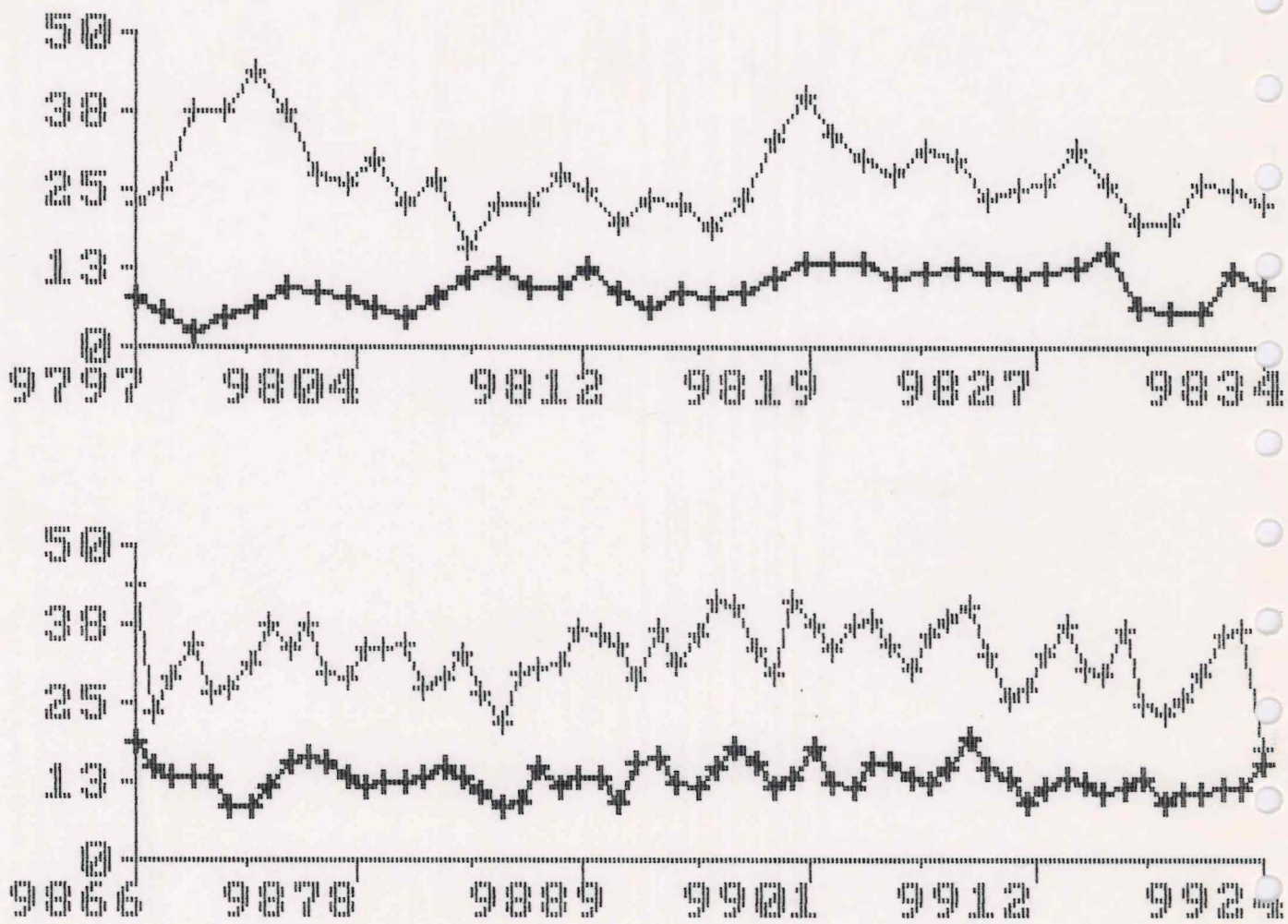
Z, P, S site


Predawn
35.00
26.25
17.50
8.75
0.00
ψ
Z
S
P
1.20
24.40
47.60
71.20
94.60
MIDDAY
35.00
26.25
17.50
8.75
0.00
ψ
Z
S
P
1.20
24.40
47.60
71.20
94.60
Days

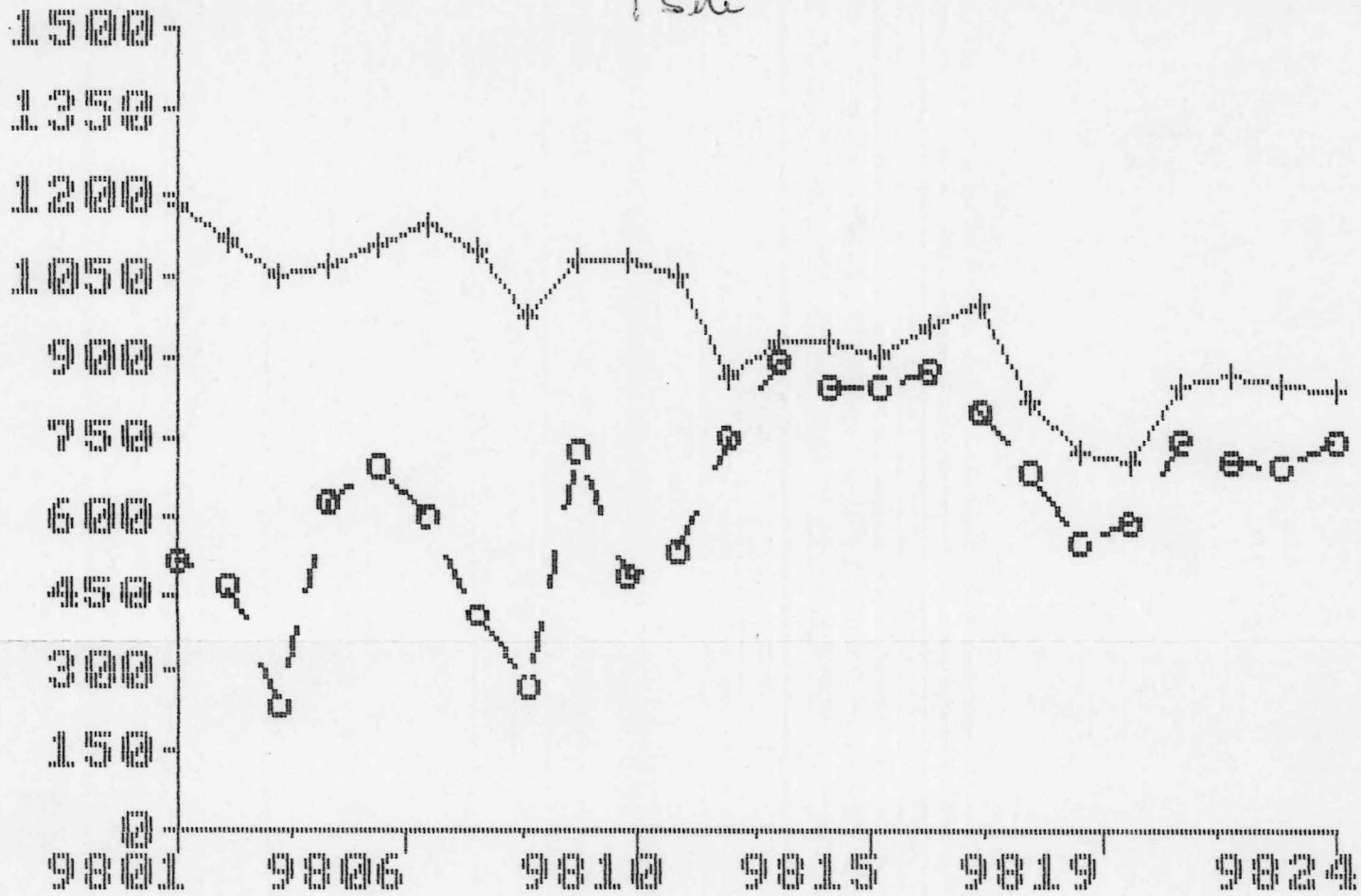
2 site CH4

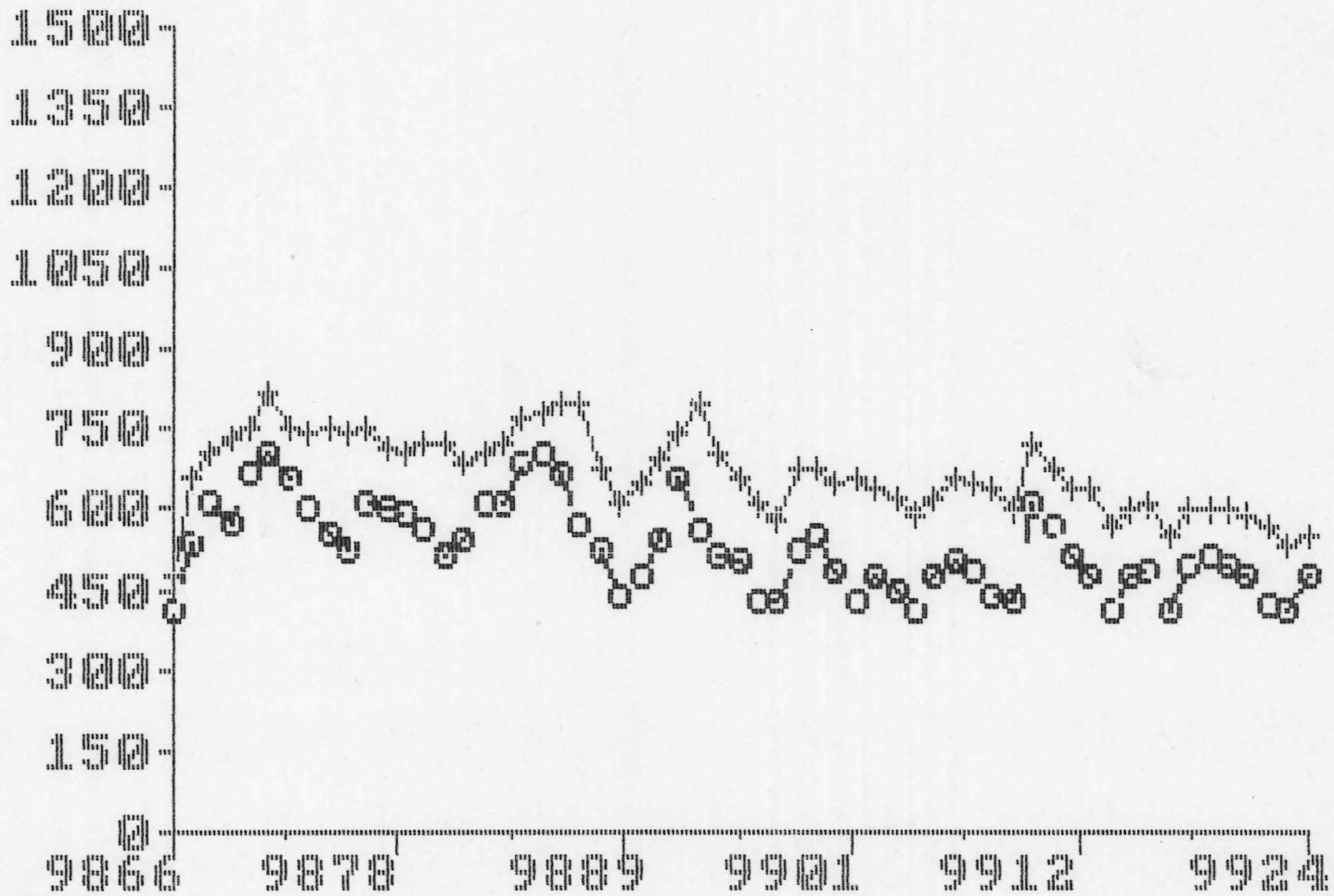

1500
1350
1200
1050
900
750
600
450
300
150
0
9866
9878
9889
9901
9912
9924

Z KMDAT CIMX CIMN

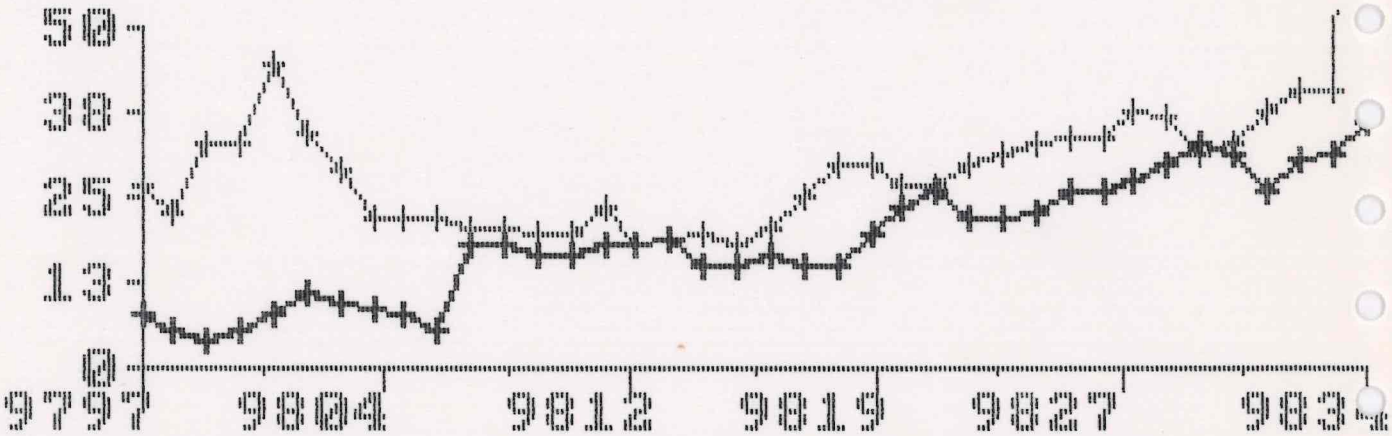


Psite

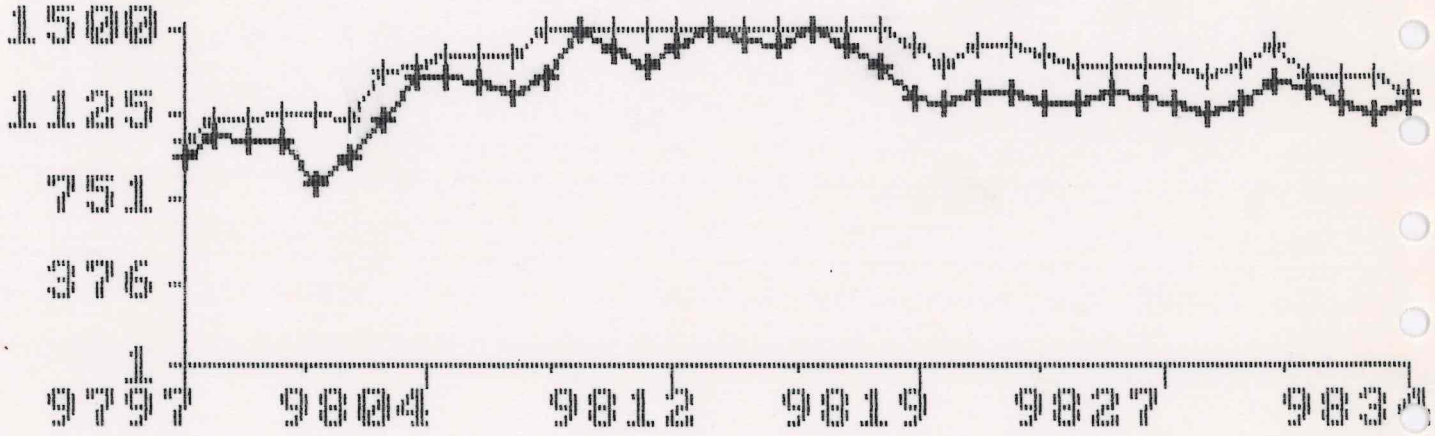

1500
1350
1200
1050
900
750
600
450
300
150
900
9801
9806
9810
9815
9819
9824

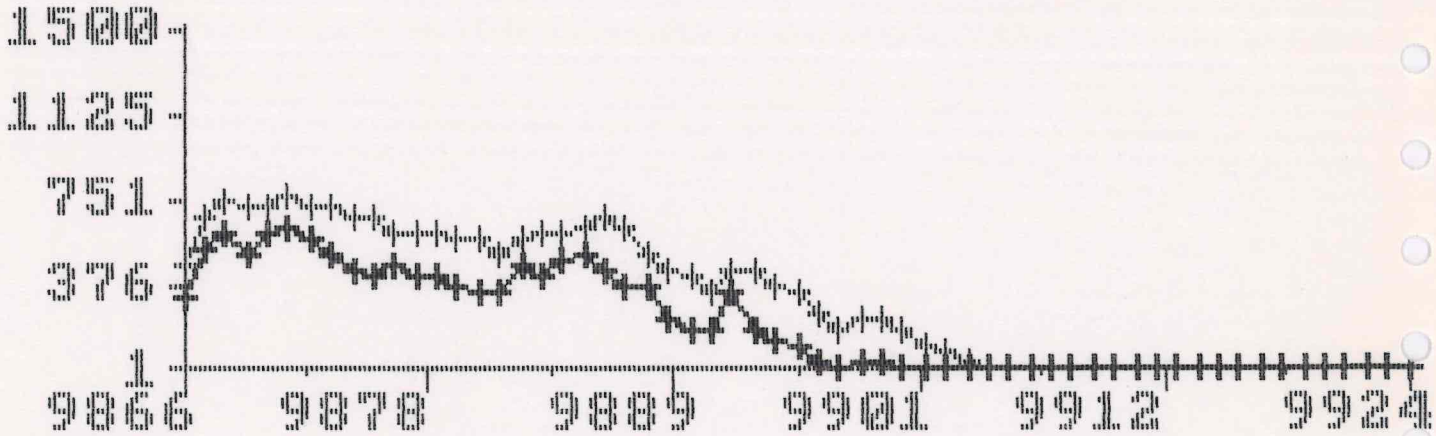

1500
1350
1200
1050
900
750
600
450
300
150
900
9866
9870
9889
9901
9912
9924

ZKMDAT C2MX, C2MN

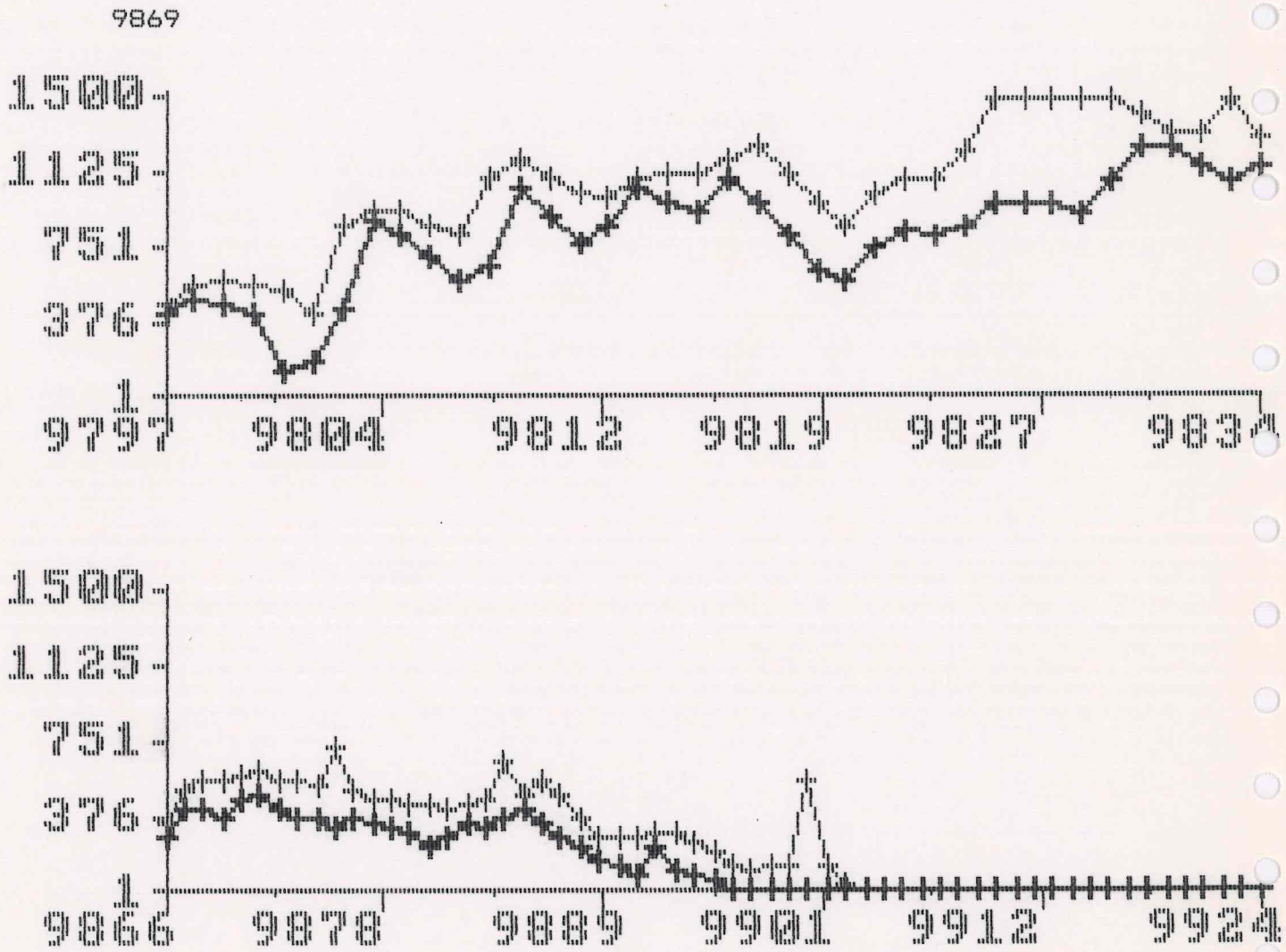


Z KMDAT C3MX, C3MN





ZKMDAT C4MX C4MN



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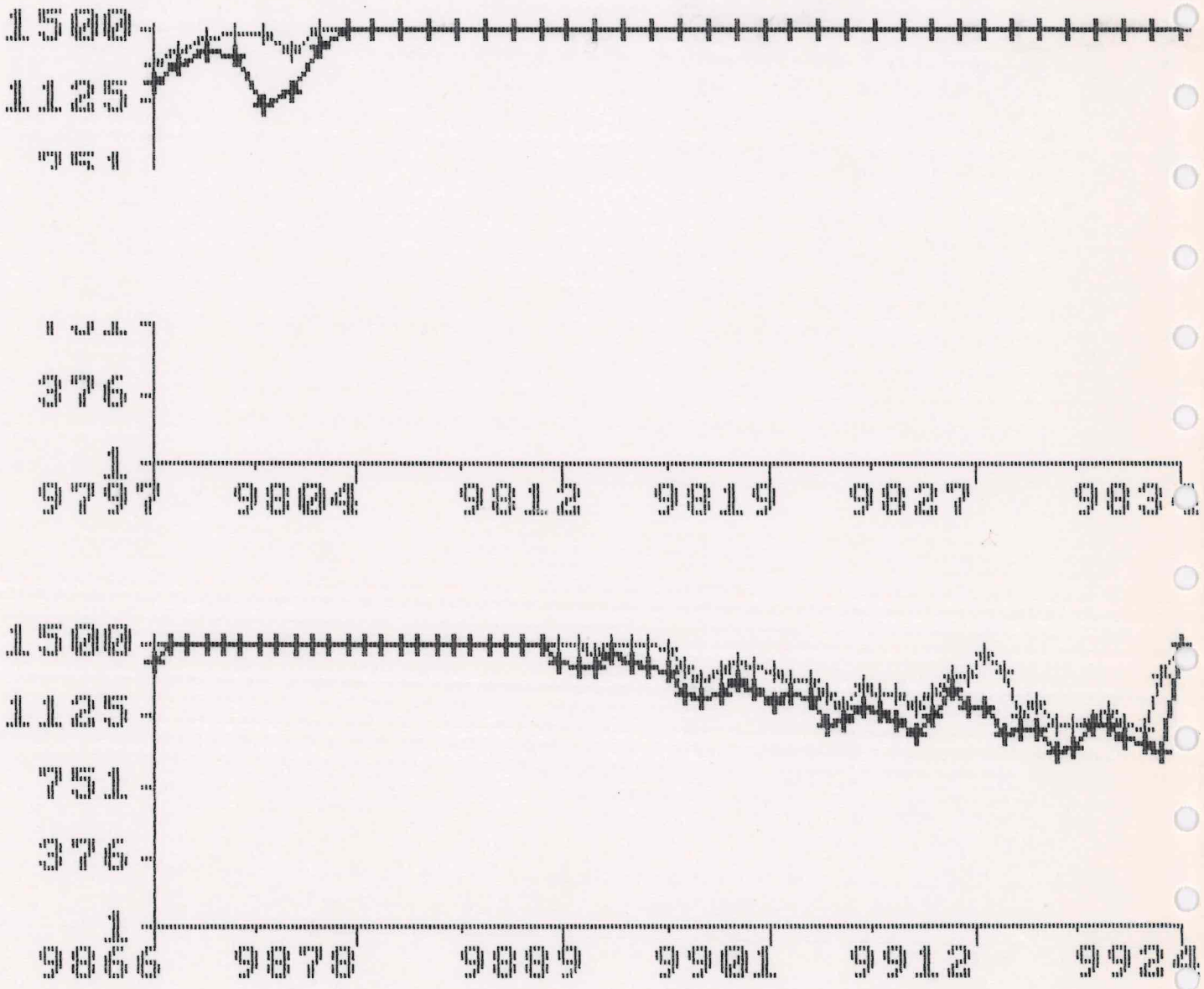
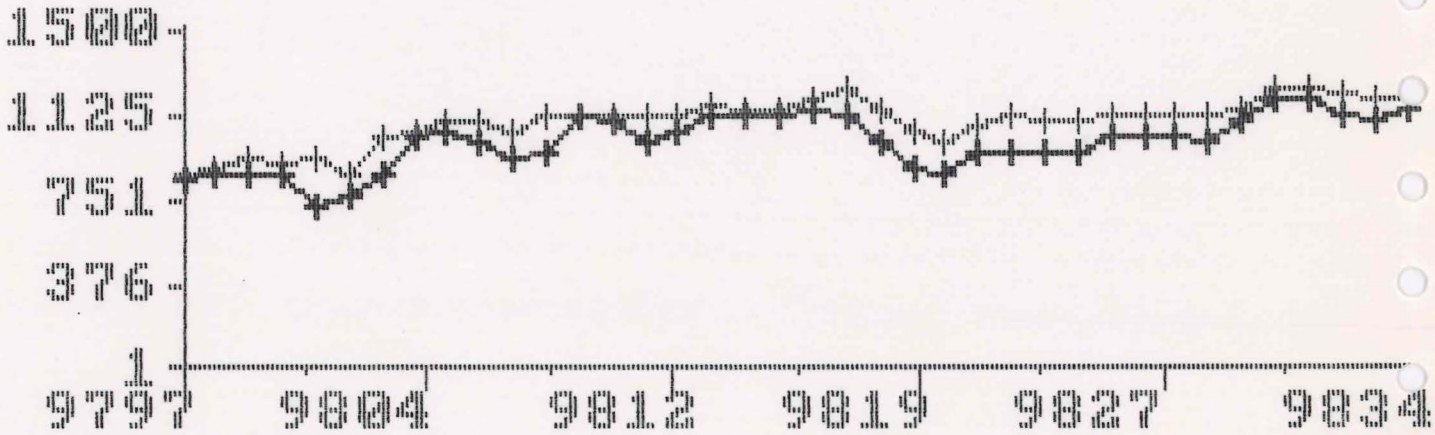
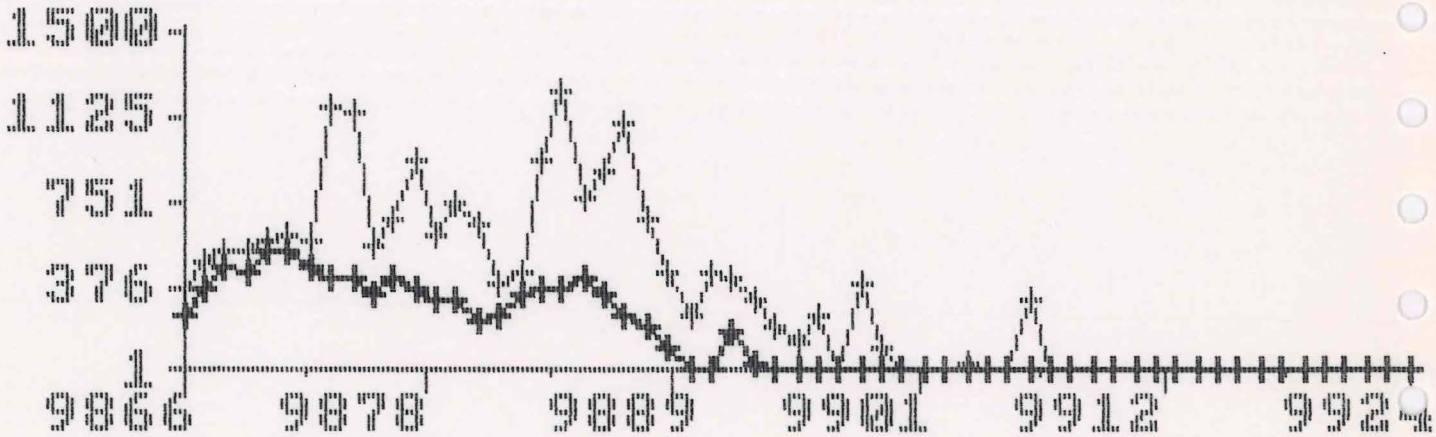
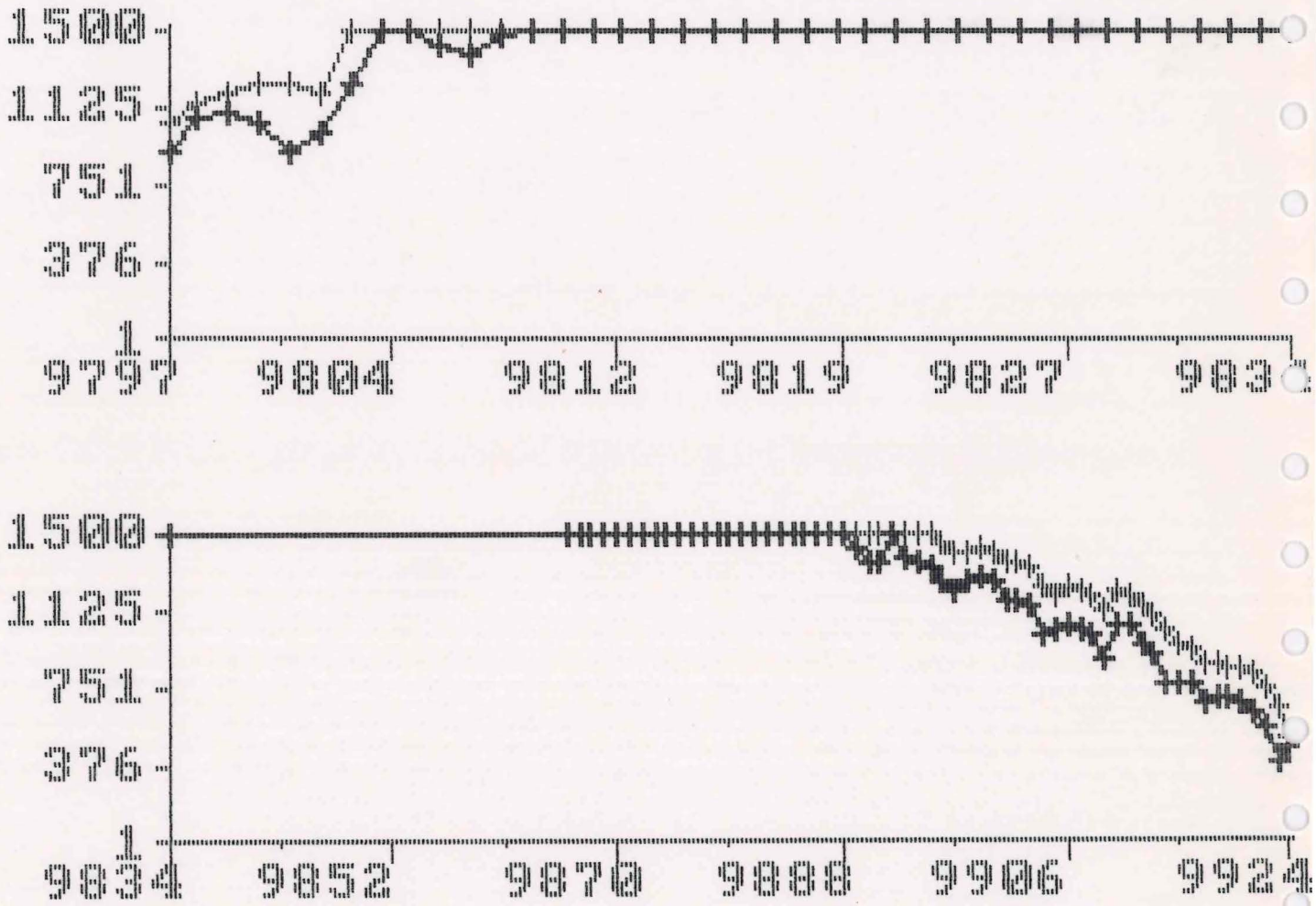


ZKMDAT CGMX, CGMN

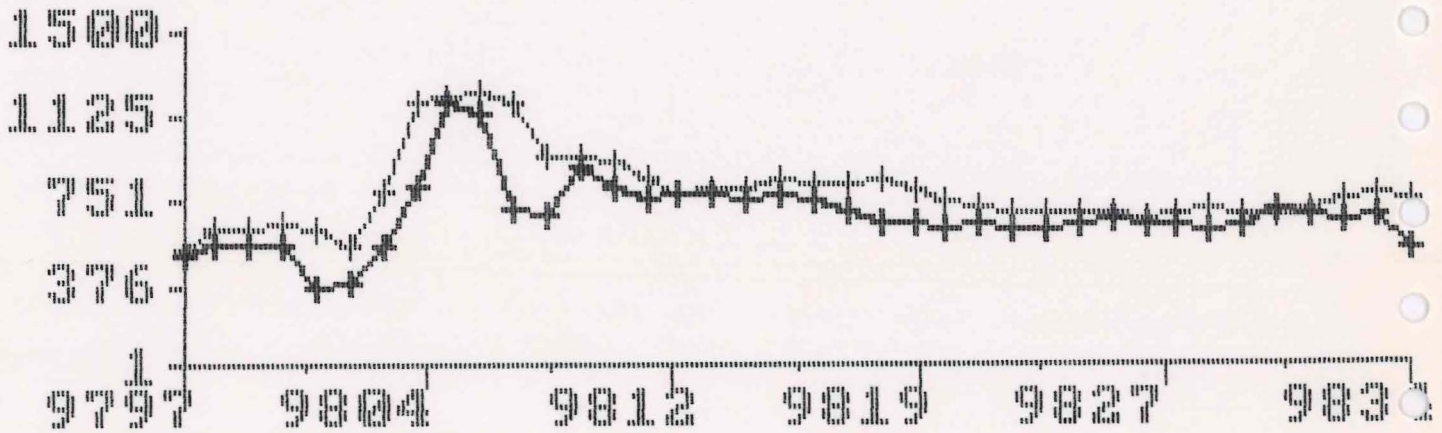




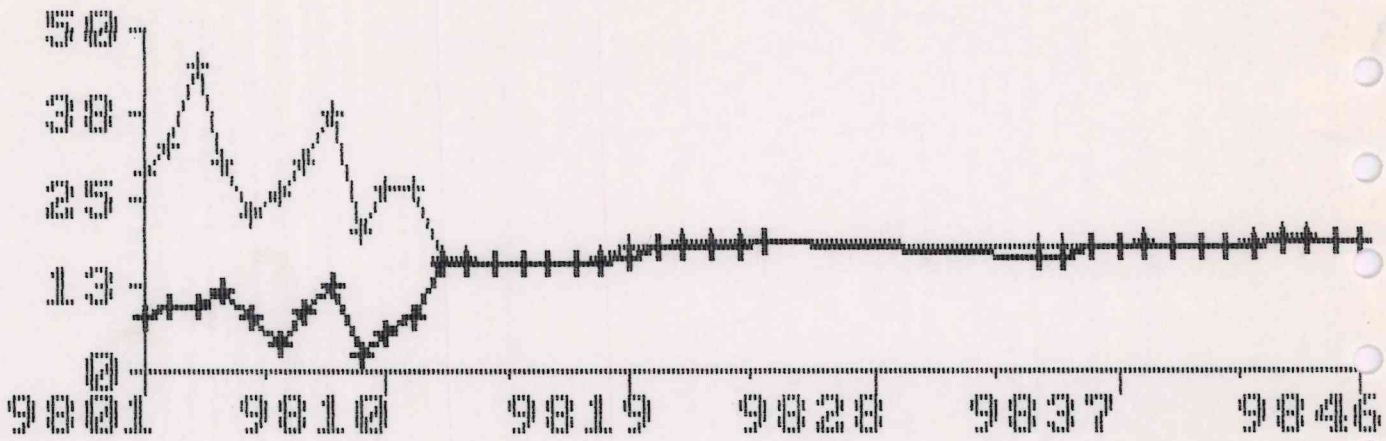
ZKMDAT C7MX, C7MN



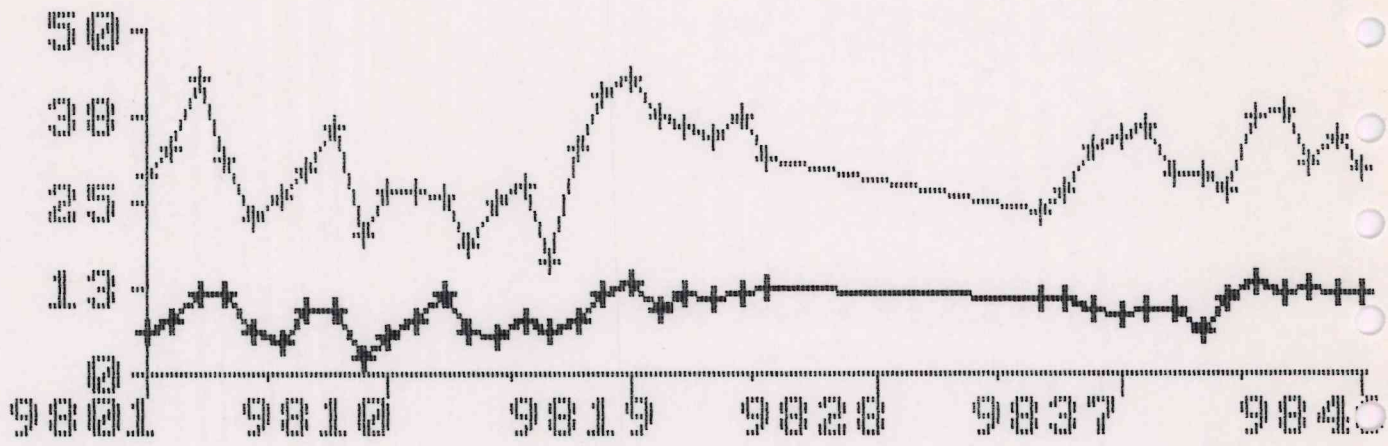
ZKMDAT c8mx, c8mn

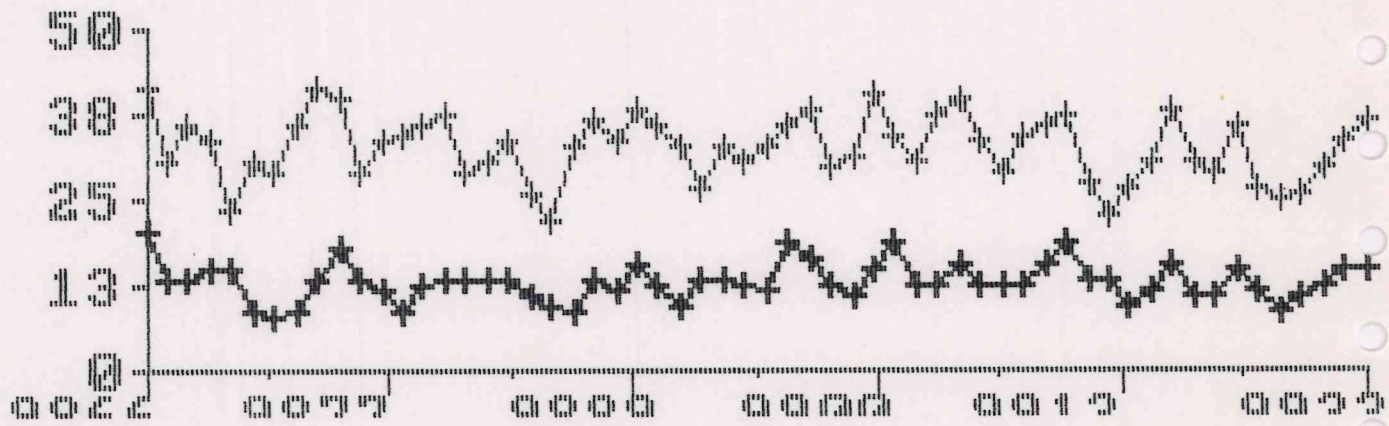


S KMDAT CIMX, CIMN

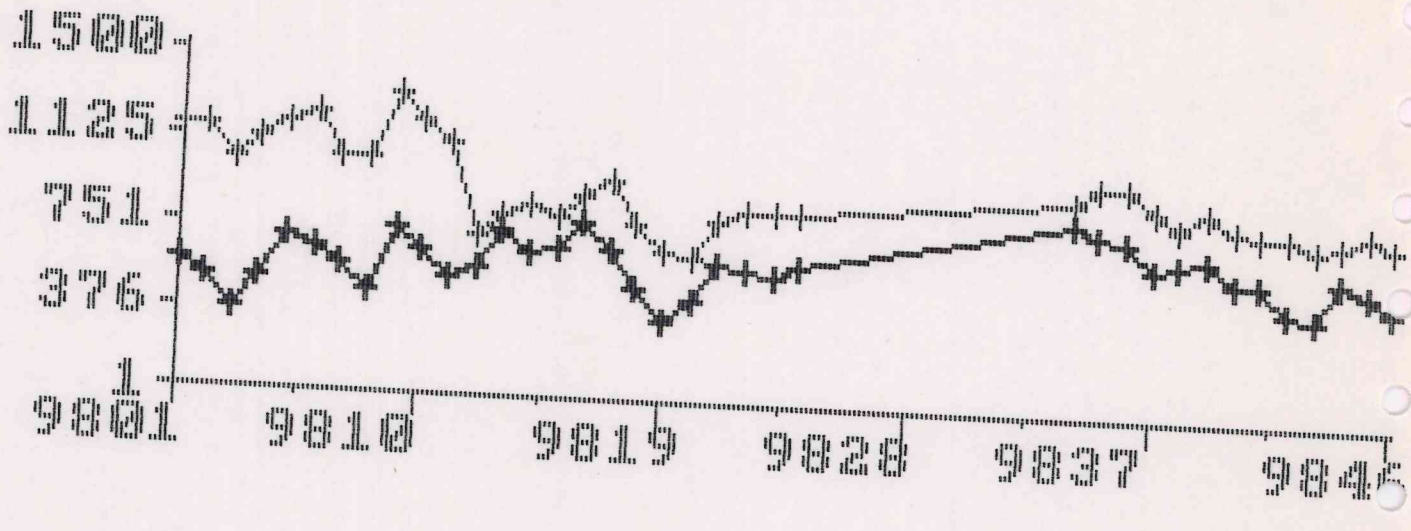


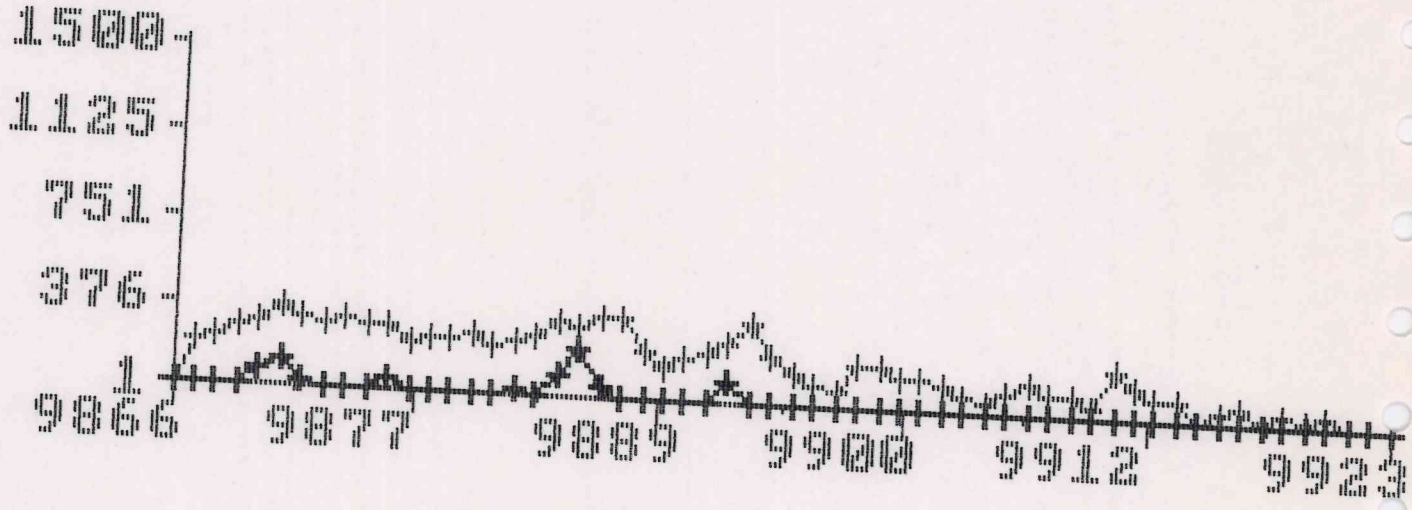
S KMDAT C2MX, C2MN



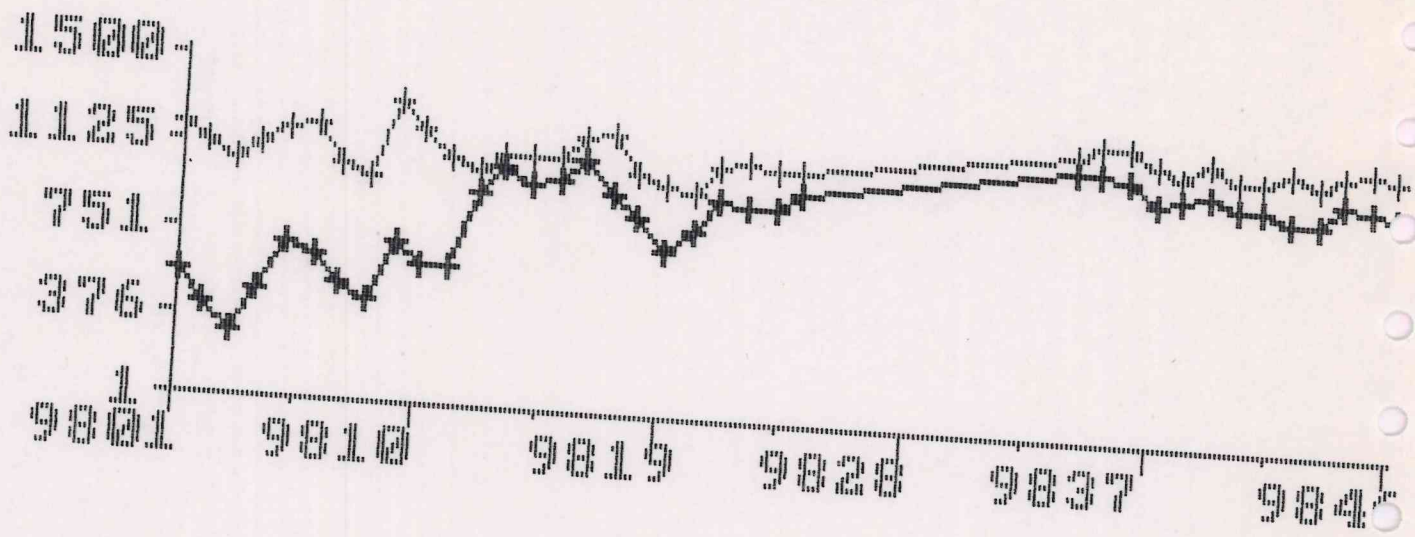


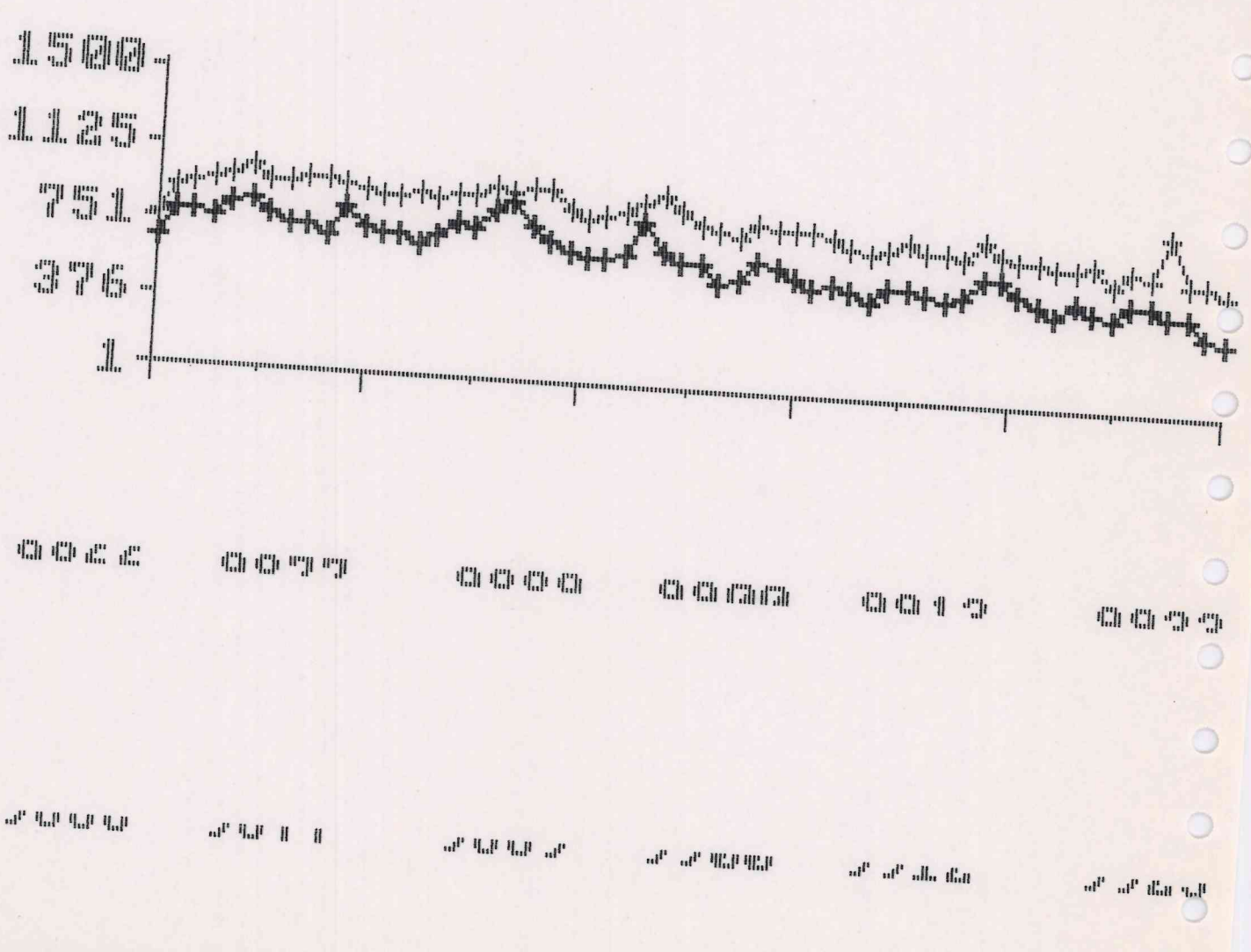
SKMDAT C3MX, C3MN



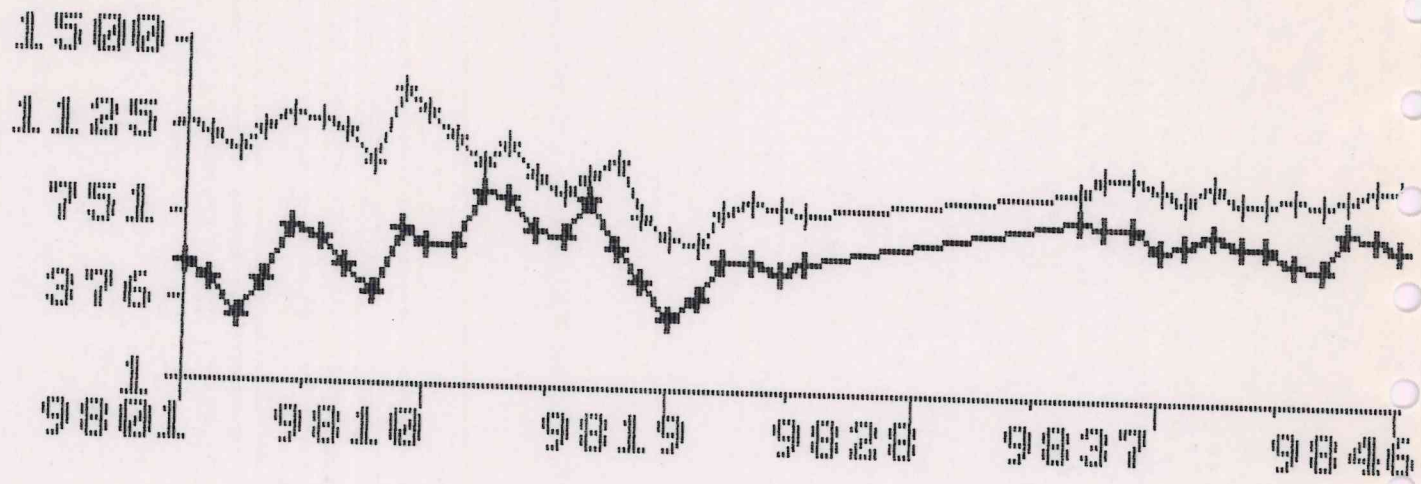


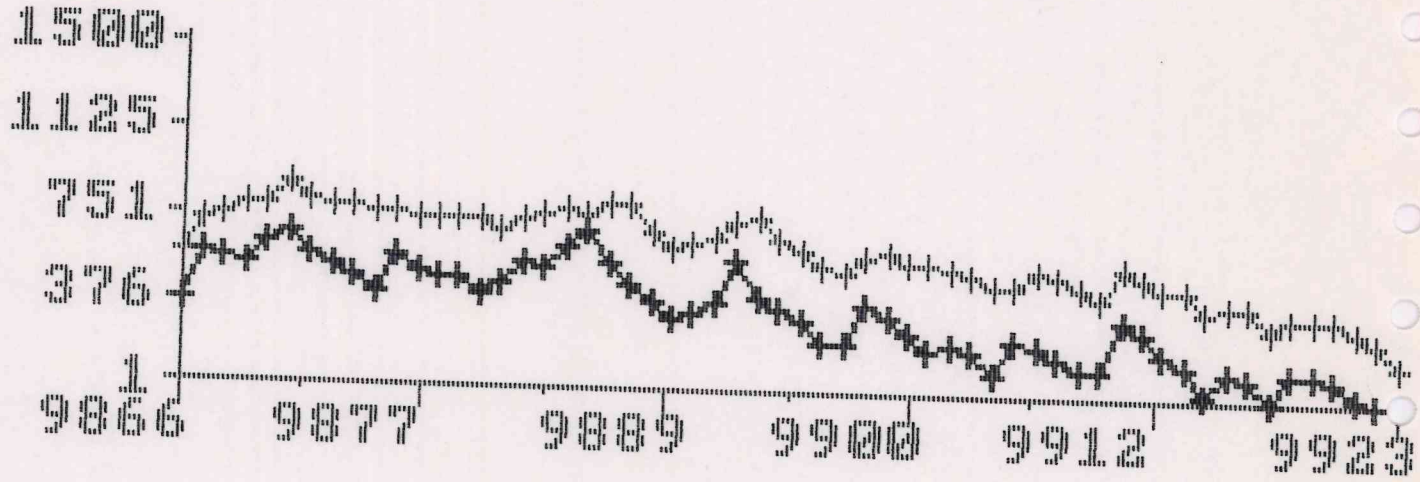
S KMDAT C4MX, C4MN



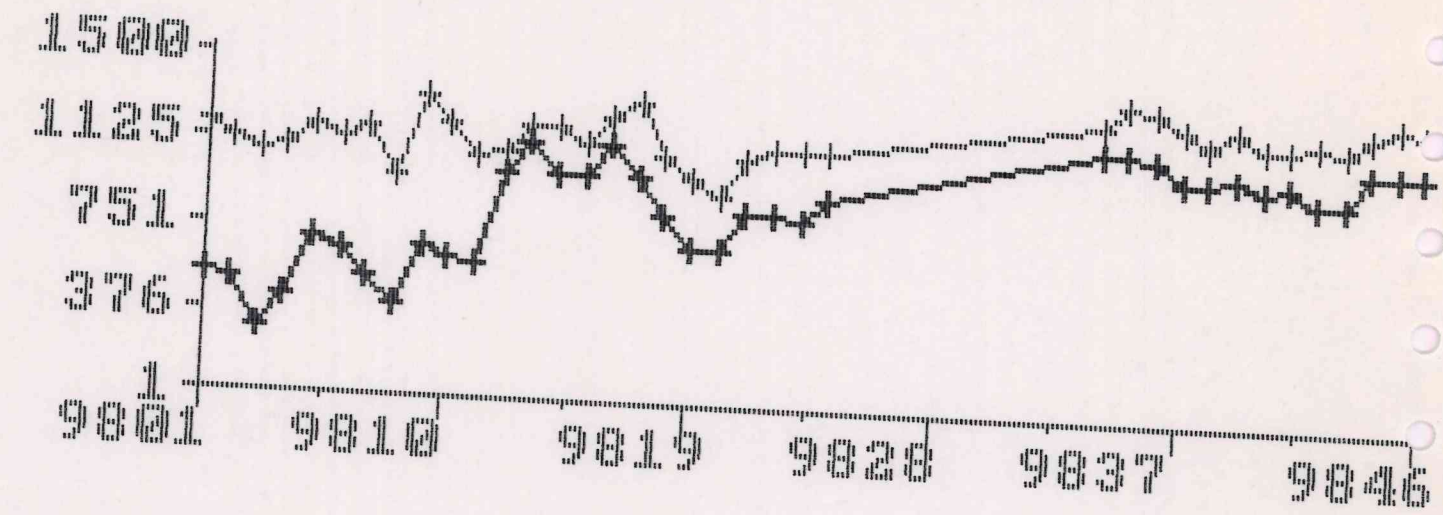


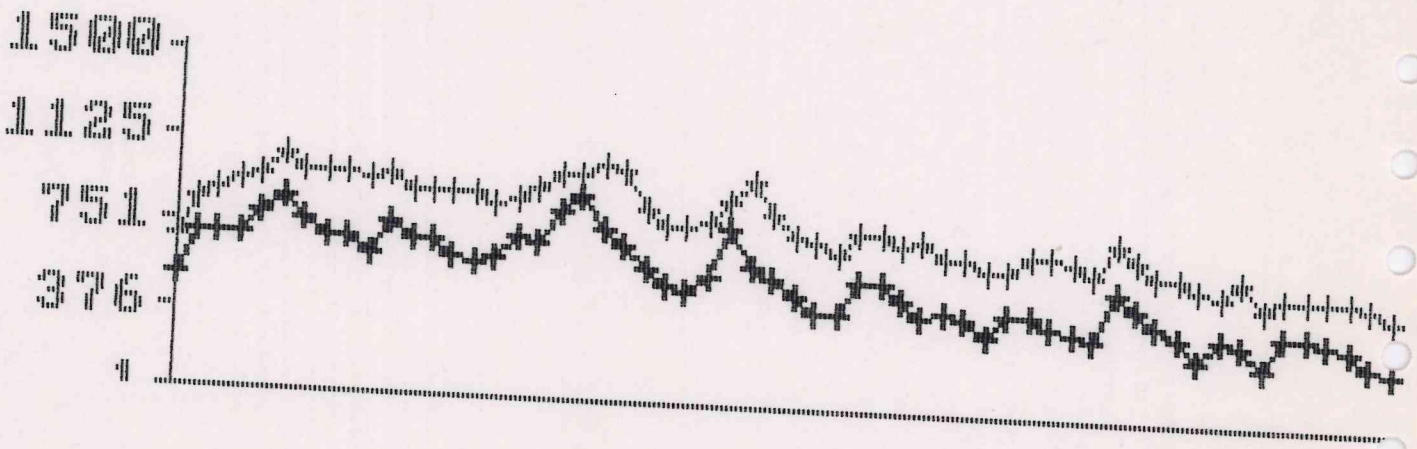
SKMDAT C5MX, C5MN



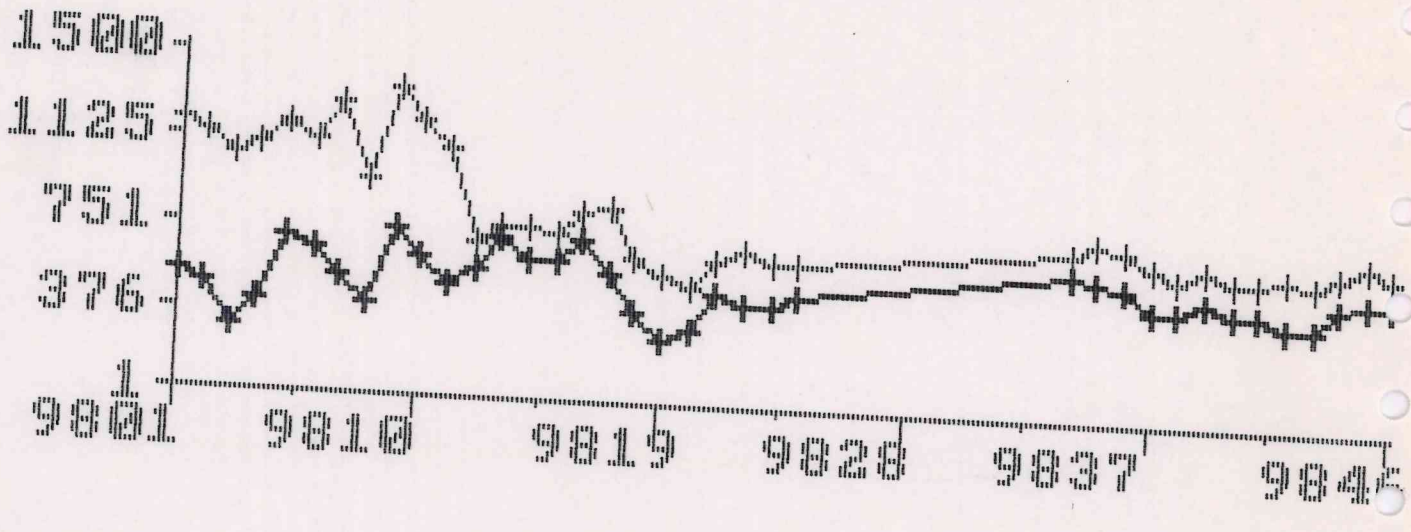


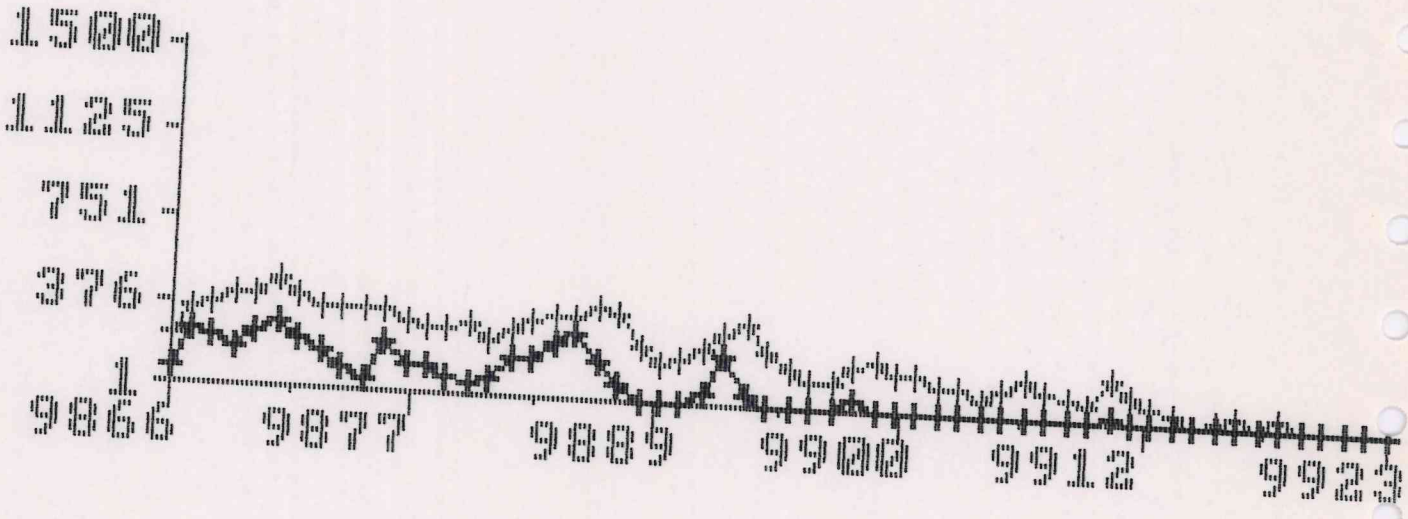
SKMDAT CGMx, CGMa



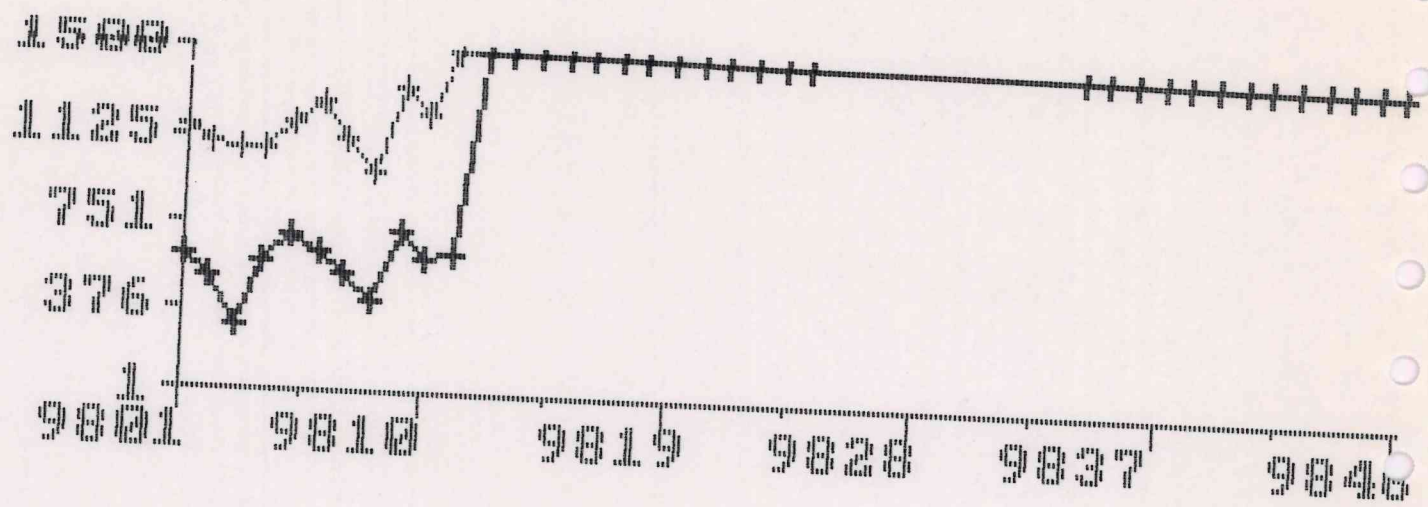


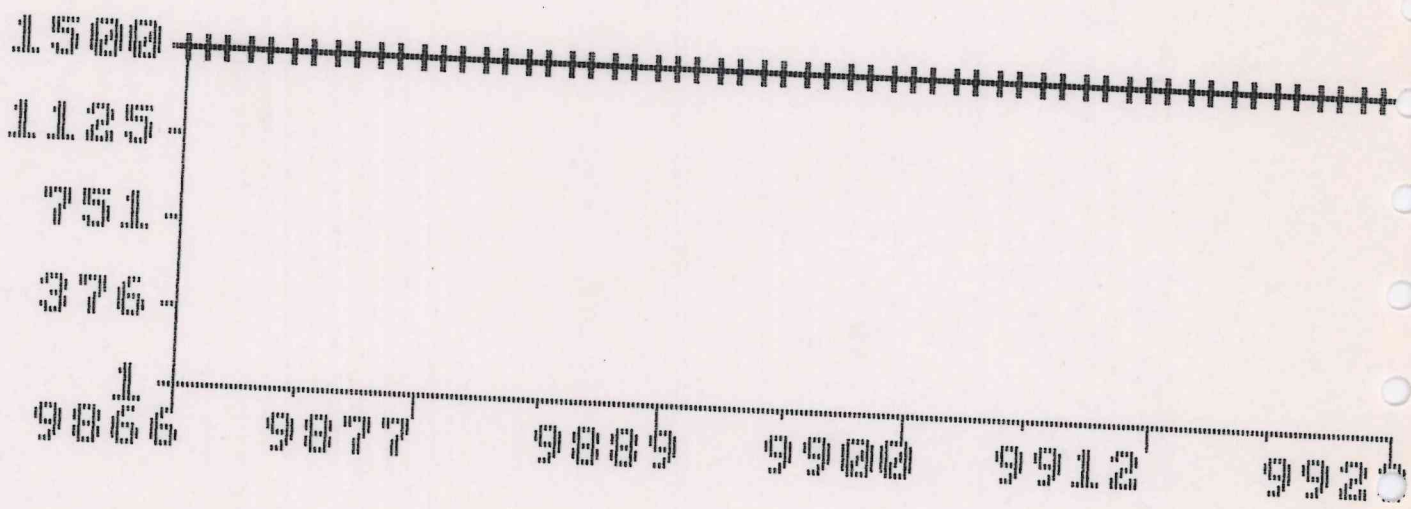
S KMAT c7mx, c7mn

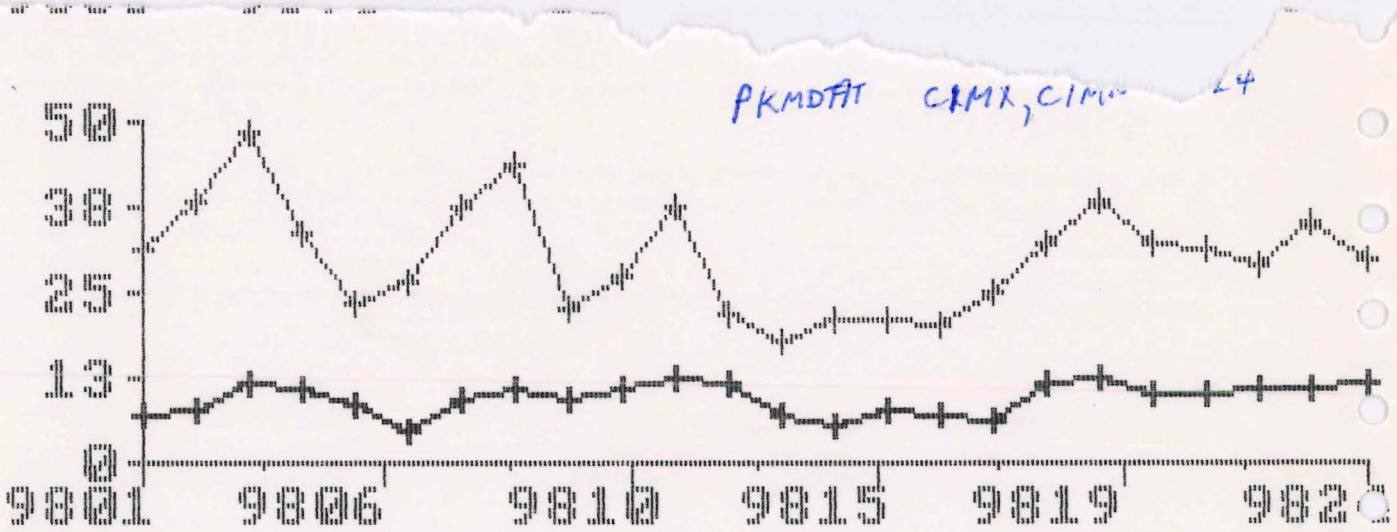


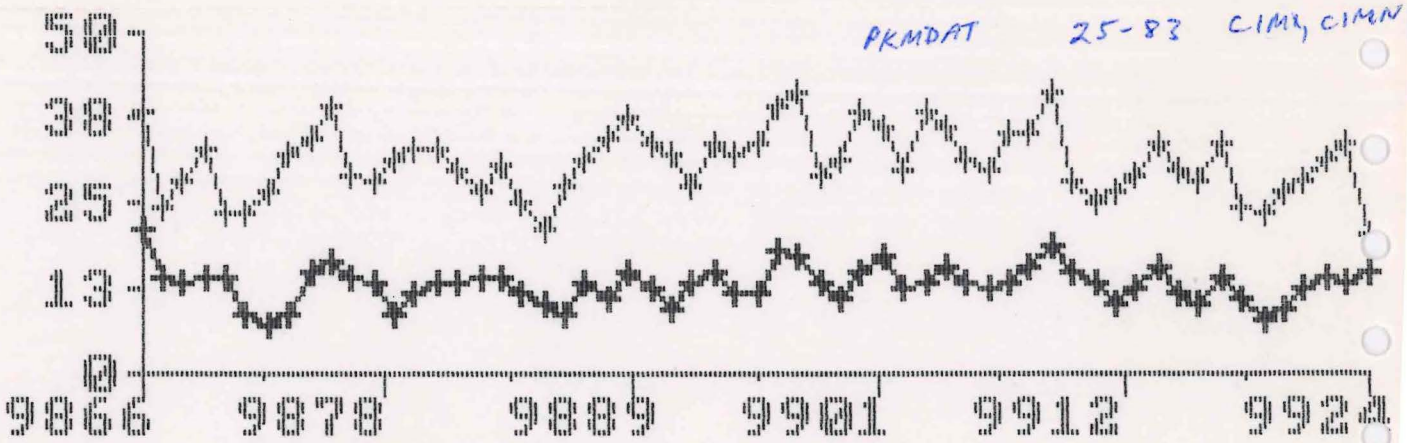


SKMDAT C8mx/C8mn

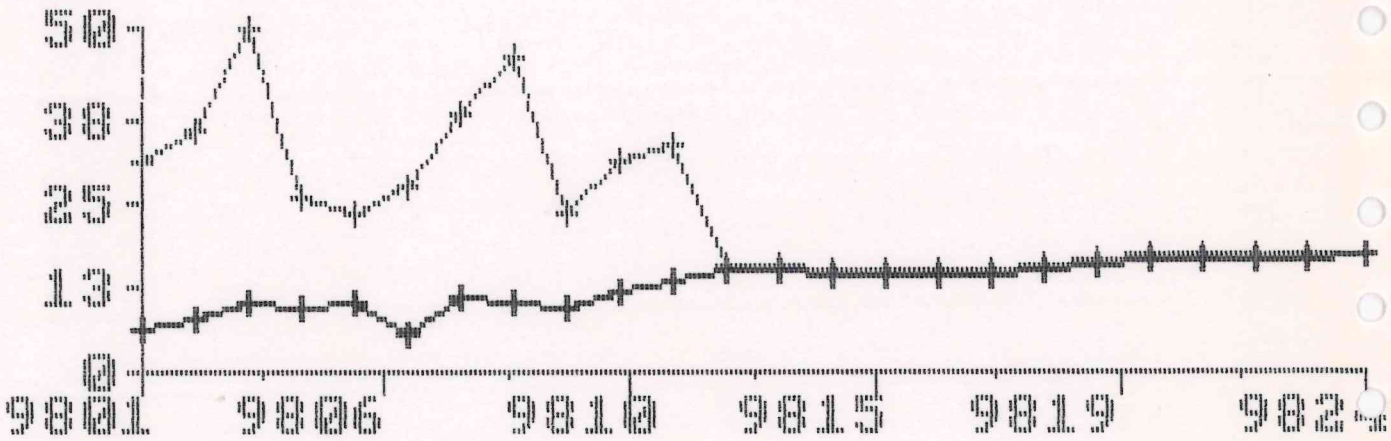


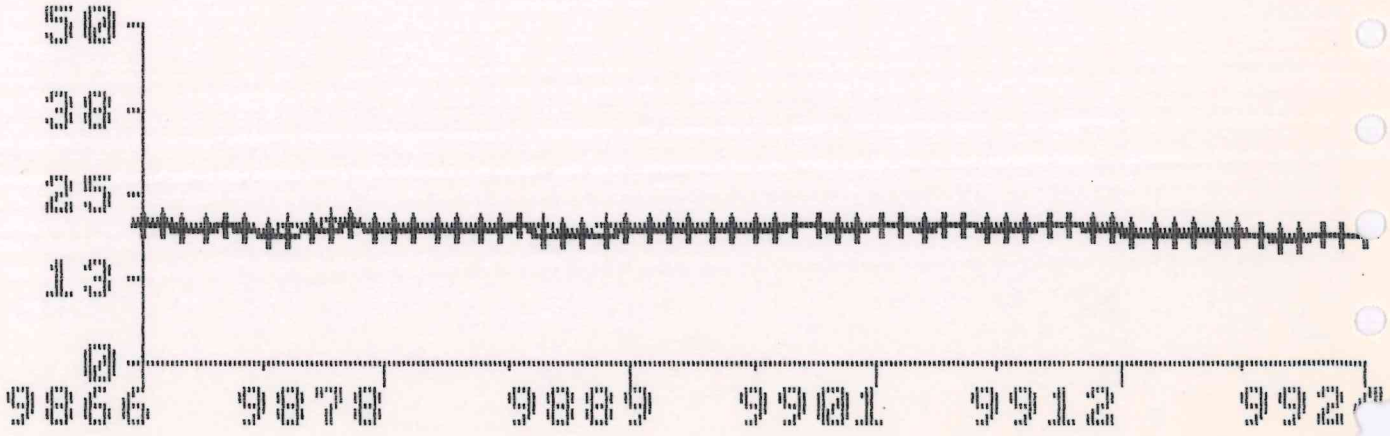



PKMDAT CIMX, CIMN 24
50
38
25
13
0
9801
9806
9810
9815
9819
9824

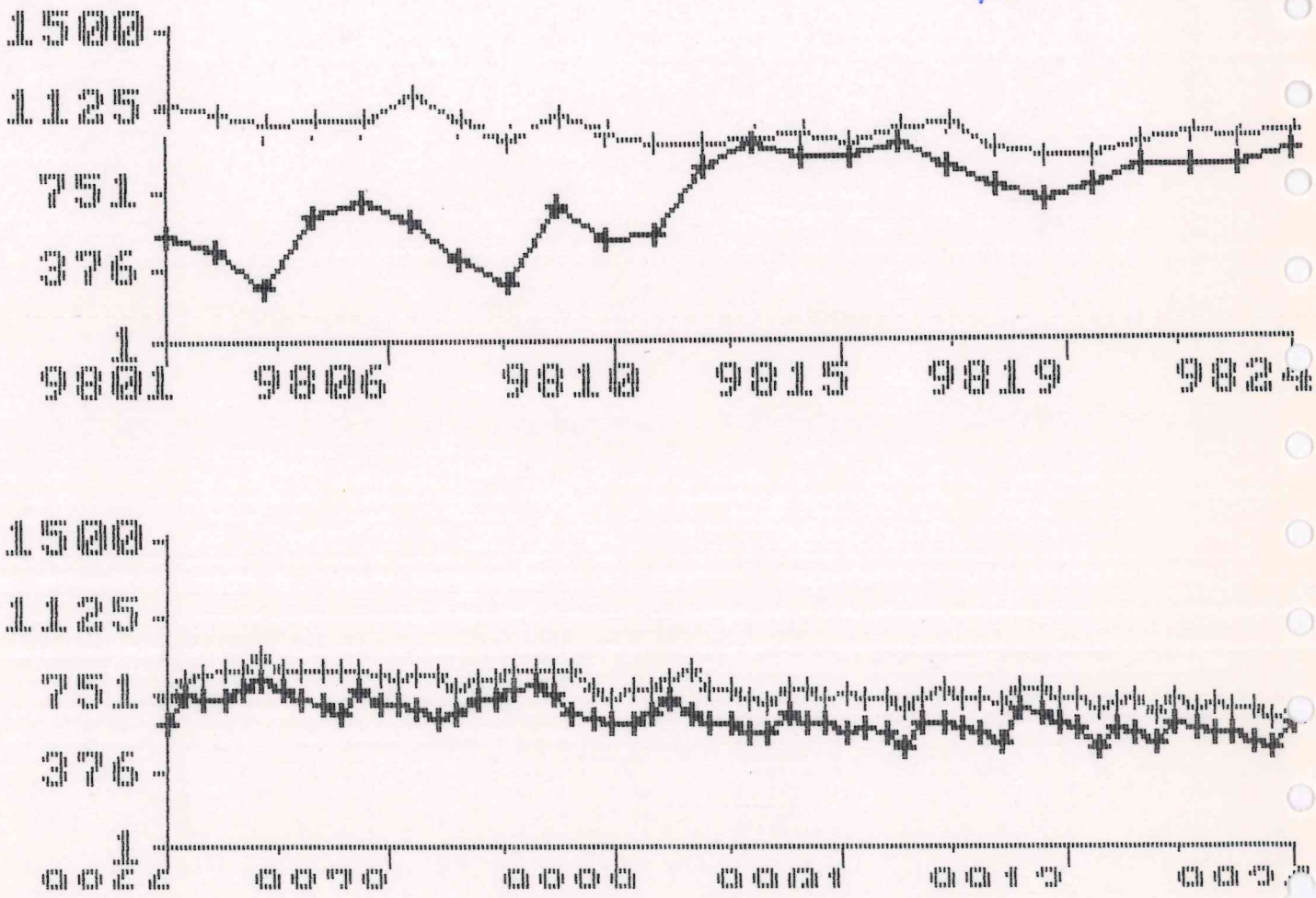

PKMDAT 25-83 CIMX, CIMN
50
38
25
13
0
9866
9876
9889
9901
9912
9924

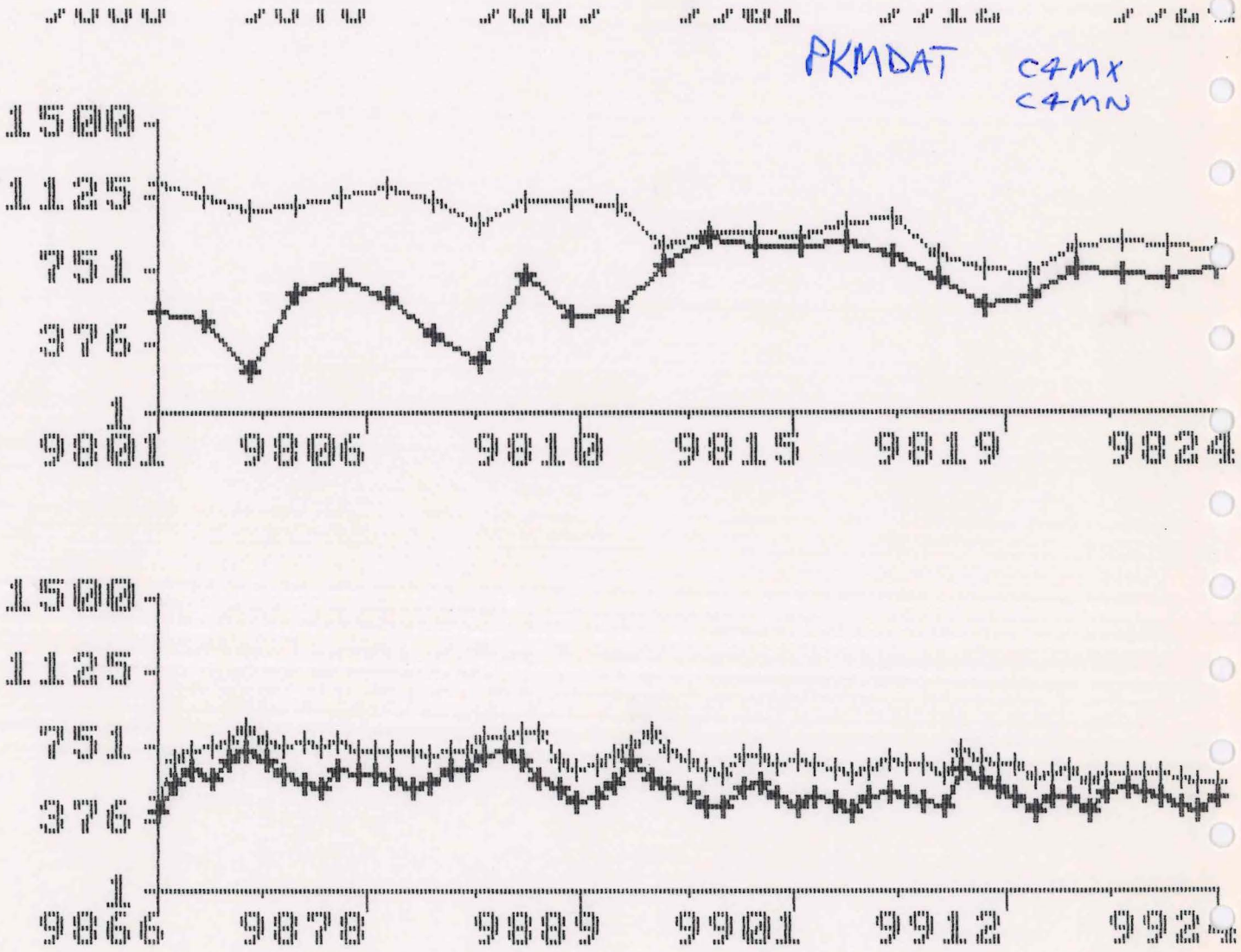
PKMNDAT C2MX, C2MN



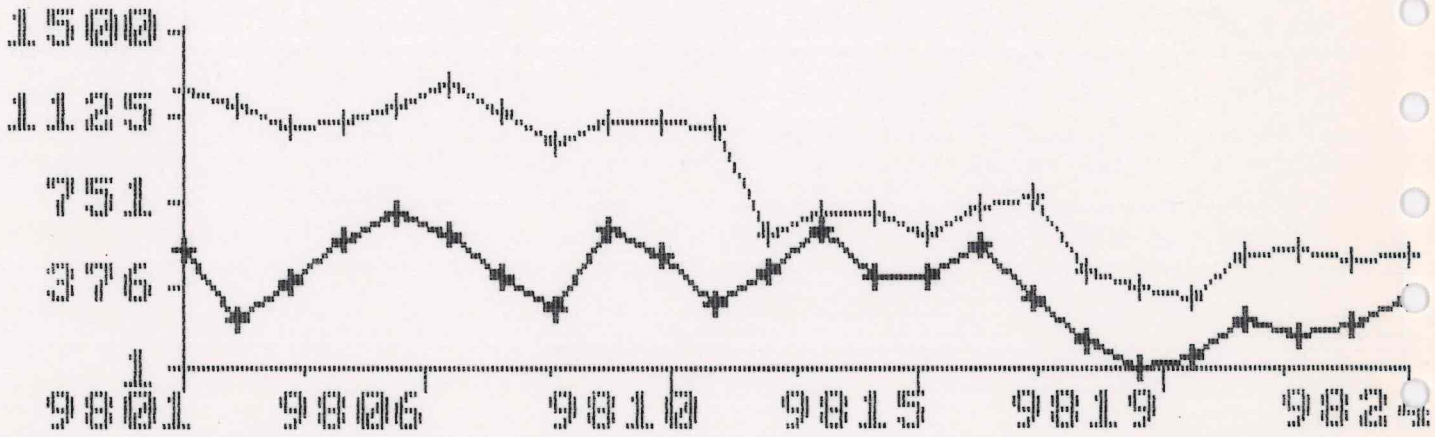


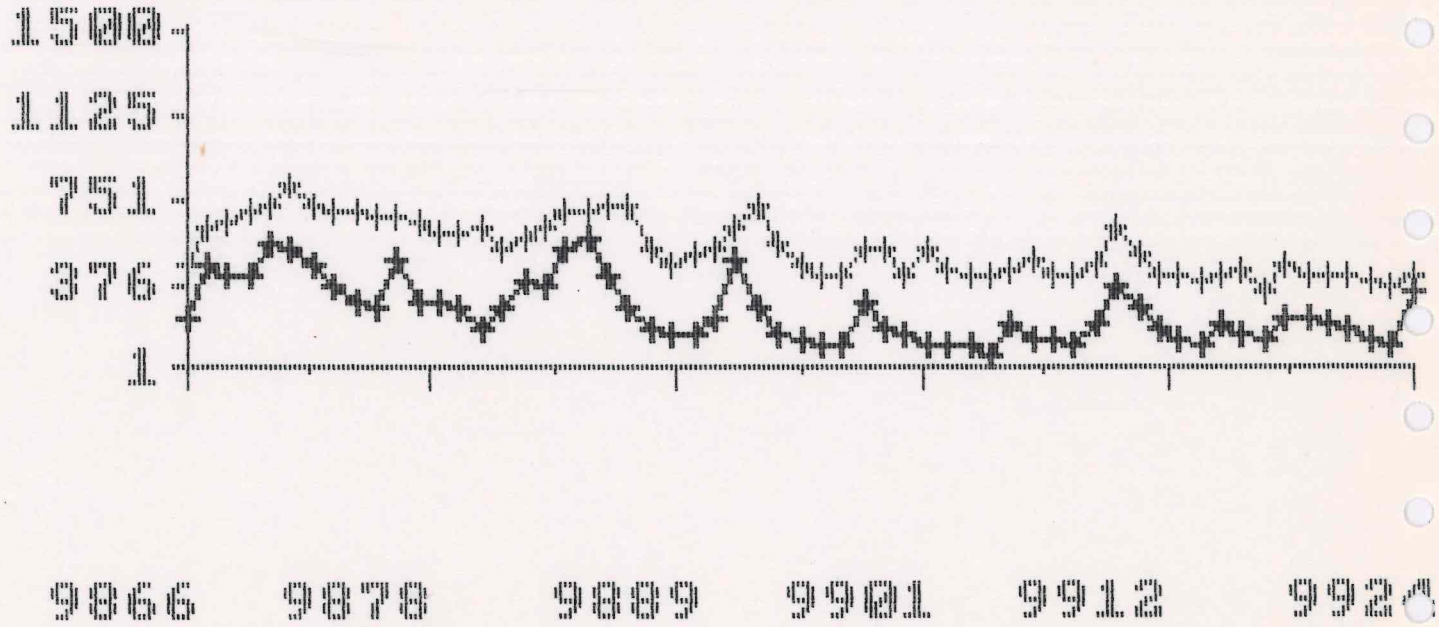
PKMNDAT C3MX, C3MN



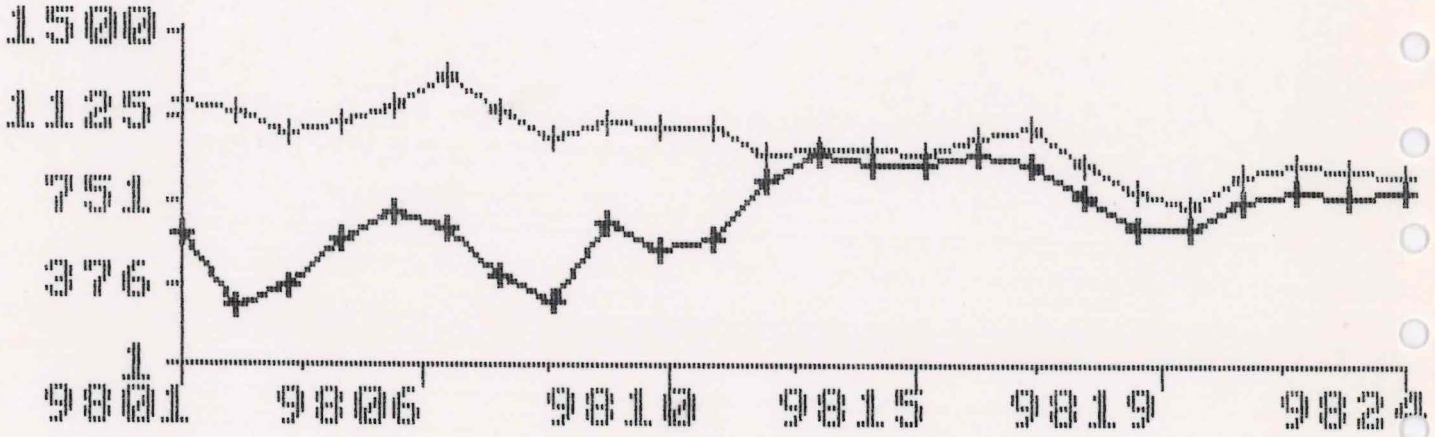

PKMDAT
C4MX
C4MN
1500
1125
751
376
1
9801
9806
9810
9815
9819
9824
1500
1125
751
376
1
9866
9878
9889
9901
9912
9924

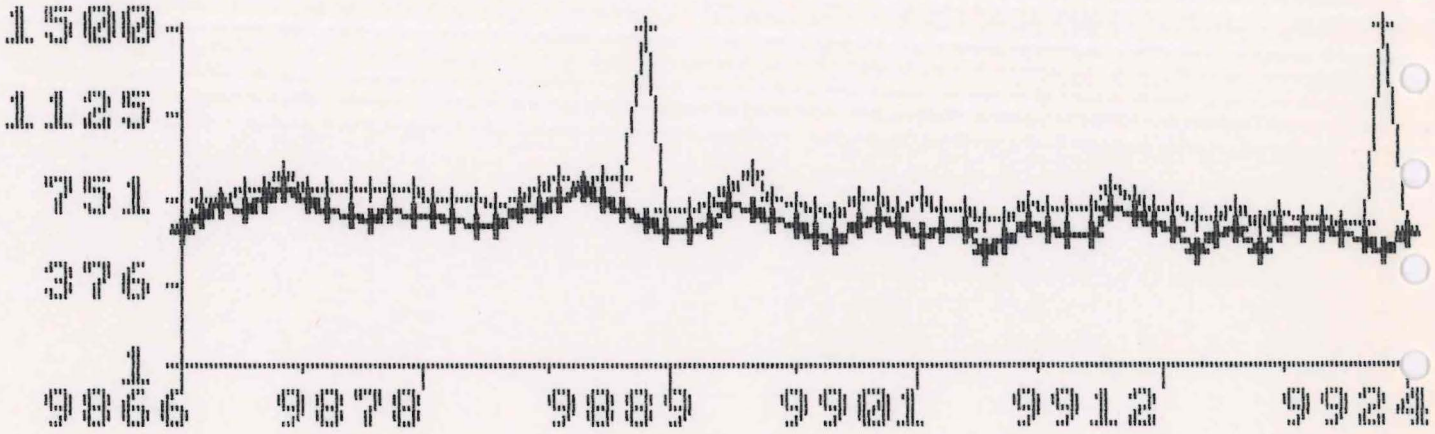
PKMDAT C5MX C5MN





PKMDAT C6Mx, C6Mn





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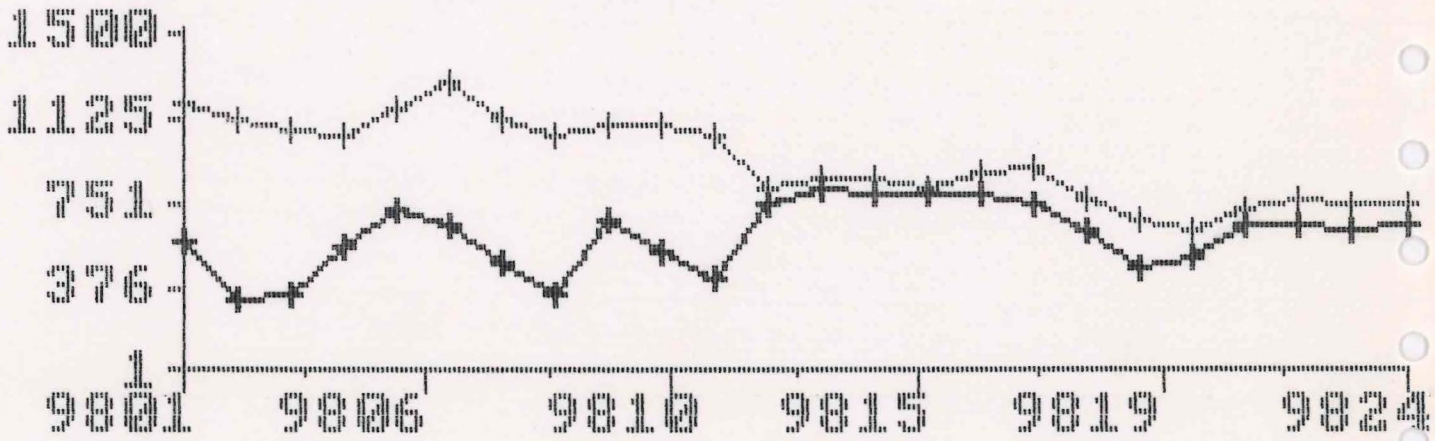
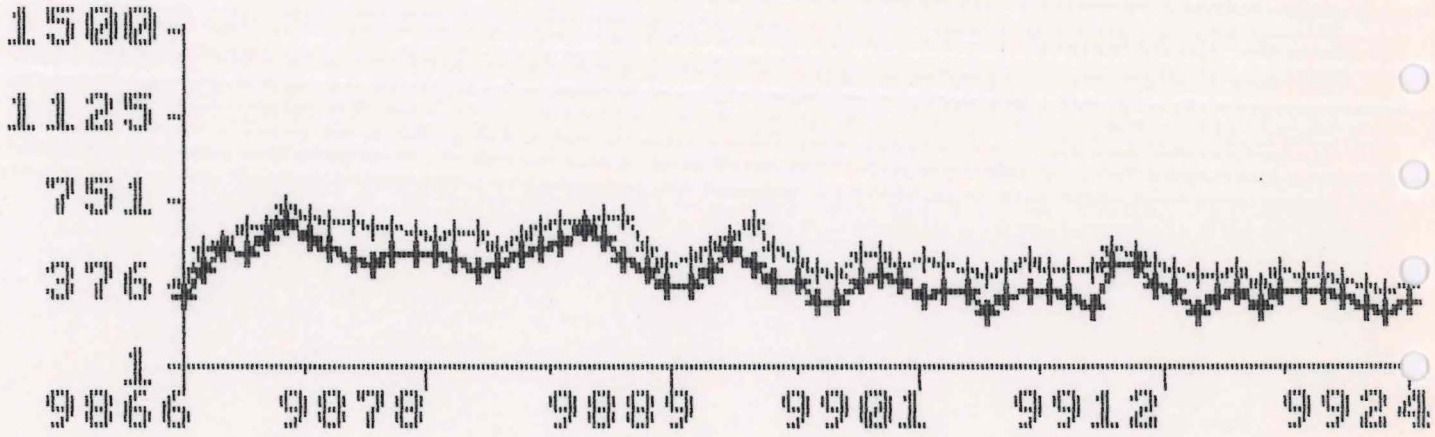
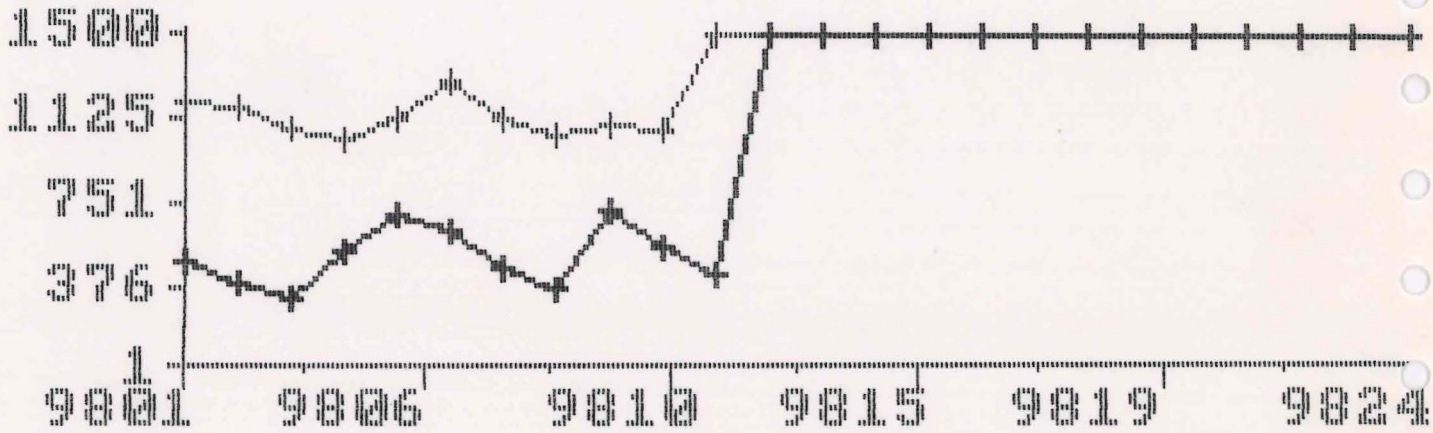
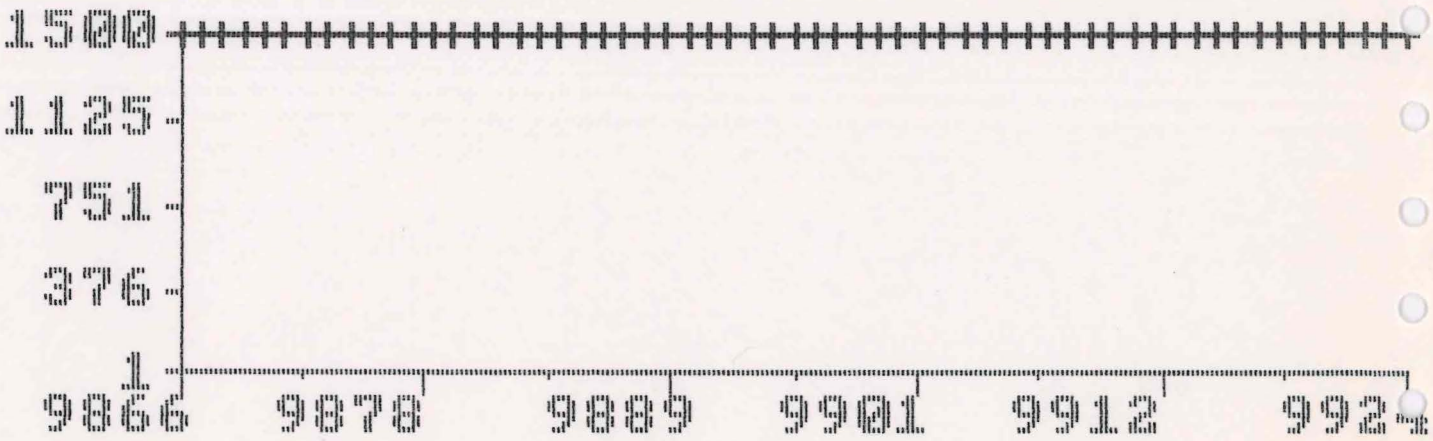


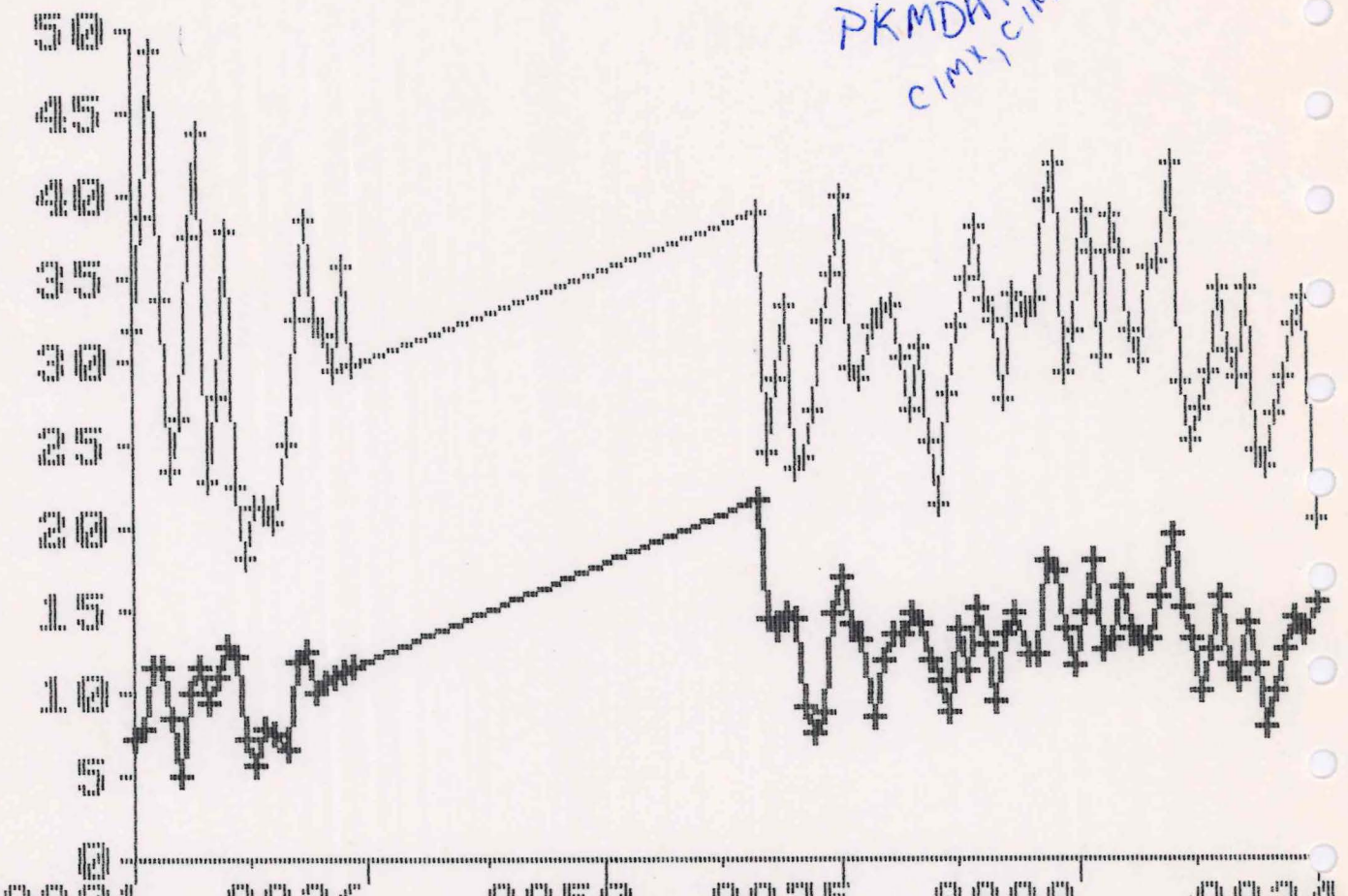


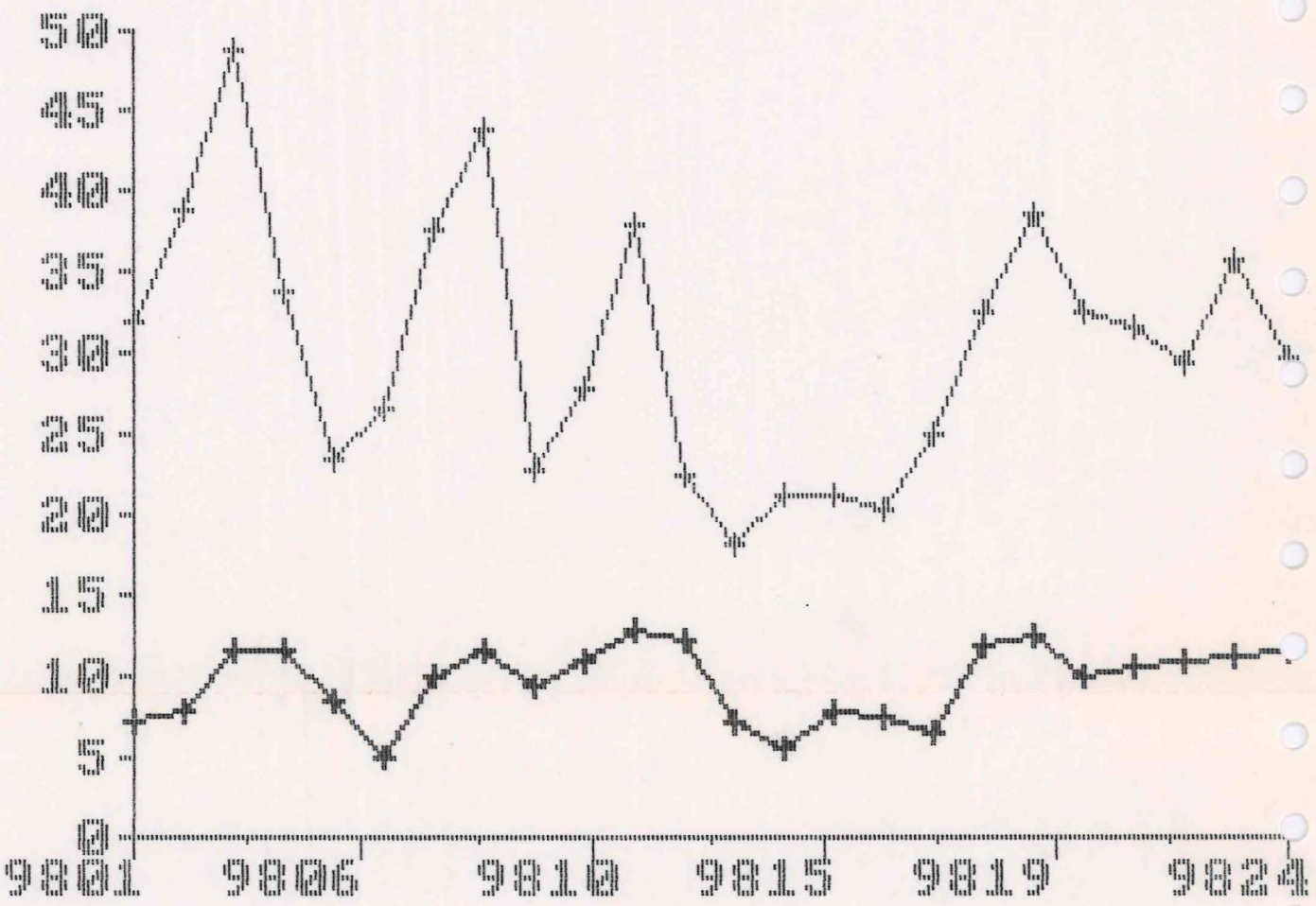
PRMDAT C8MX C8MN

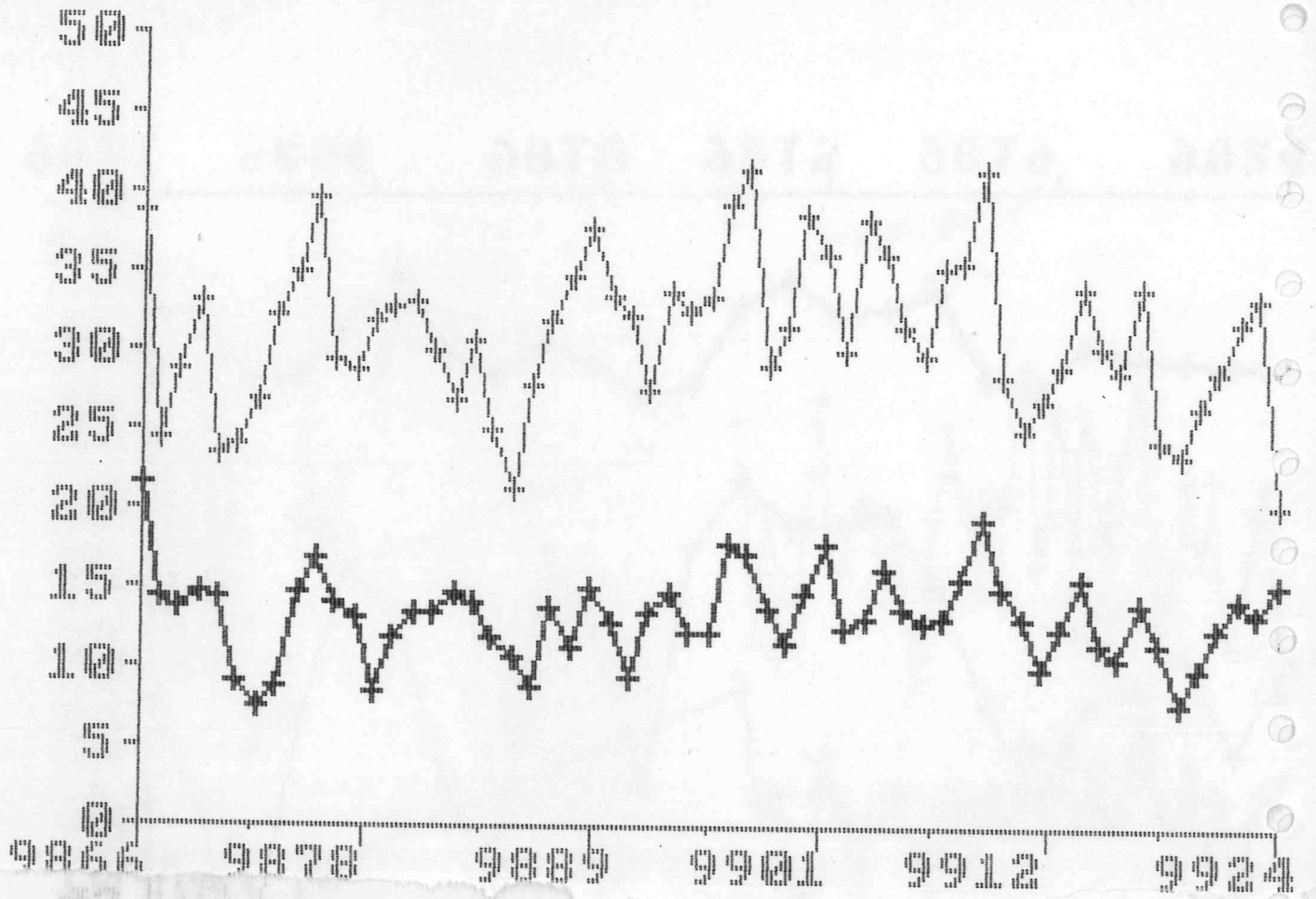




PKMDAT
CIMX, CIMN

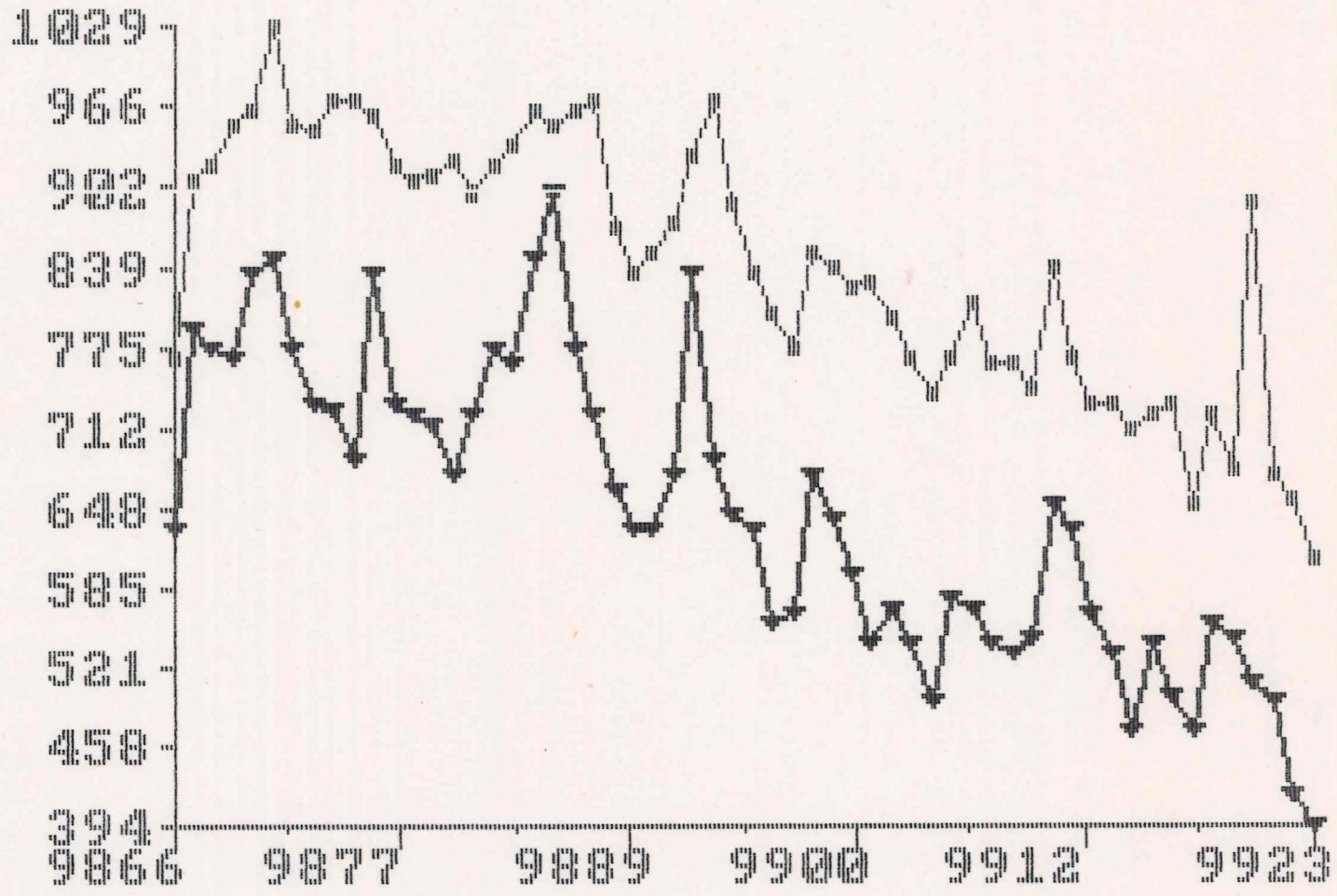





50
45
40
35
30
25
20
15
10
5
0
9867
9878
9889
9901
9912
9924

site

CH4


1029
966
903
839
775
712
648
585
521
458
394
331
9877
9889
9900
9912
9923

Z site

10/2

				$\bar{X}$
1	.95	.94	.94	94
3	.98	.96	.95	96
5	.99	99	.96	98
7	.99	1.00	99	1.00
9	1.00	.96	99	98
11	.99	.94	1.00	98
13	.98	.89	1.00	96
15	.95	.86	.98	93
17	.93	.86	.96	92
19	.93	.86	.95	91
21	.93	.87	.94	91
23	.94	.90	.95	93
	.095	94	99	.94

S site

10/2

				$\bar{X}$
0	94	85	90	90
2	99	92	92	94
4	100	100	100	100
6	100	100	100	100
8	96	90	100	95
10	90	76	89	85
12	82	66	81	76
14	72	51	71	65
16	71	43	64	50
18	71	49	64	61
20	75	59	69	68
22	81	67	74	74
24	88	77	82	82

P site

10/2

						X
0	98	87	88	95	90	92
2	99	91	96	99	95	96
4	100	95	99	100	99	99
6	100	100	100	100	100	100
8	98	100	97	100	99	99
10	88	95	82	98	90	91
12	84	90	68	91	83	83
14	83	82	49	89	81	77
16	81	76	30	88	74	70
18	79	75	24	88	74	68
20	82	75	41	88	74	72
22	84	75	52	88	74	75
24	92	88	68	89	78	83

Z site

16/1

					X	X
0	94	83	79	85	X	85
2	96	91	87	91		91
4	97	99	95	100		97
6	98	100	100	100		99
8	99	100	99	100		100
10	100	92	86	90		93
12	100	83	81	89		88
14	98	75	73	83		82
16	95	75	72	100		81
18	94	80	72	87		82
20	94	84	75			84
22	95	92	83			90
24	96	94	85			92

15/1

S site

					$\bar{X}$
0	90	85	84	70	83
2	95	92	90	85	91
4	98	97	95	88	95
6	99	100	100	100	100
8	100	94	99	97	98
10	95	82	90	72	85
12	89	77	85	65	79
14	87	74	80	63	76
16	87	78	80	65	78
18	89	83	82	72	82
20	93	88	88	82	88
22	95	92	92	85	92
24	96	97	94	87	94

15/1

P site

						$\bar{X}$
0	91	82	77	89	82	84
2	96	89	86	94	89	91
4	99	95	94	96	93	95
6	100	99	100	99	97	99
8	100	100	100	100	100	100
10	93	100	88	99	99	96
12	89	94	78	95	92	90
14	89	91	74	95	91	88
16	89	89	71	95	91	87
18	90	89	77	95	91	88
20	92	90	83	95	91	90
22	95	94	91	95	92	93
24	99	95	93	99	96	96

Z site

3/12/86

					$\bar{X}$
0	95	95	88	98	96
2	97	98	89	99	98
4	98	99	99	99	99
6	99	100	100	100	100
8	100	98	99	99	99
10	100	95	89	99	98
12	98	94	100	98	97
14	96	90	99	94	93
16	92	88	81	92	91
18	90	88		91	90
20	90	88		91	90
22	91	88		92	90
24	92	91		94	92

S site

3/12/86

						$\bar{X}$
0	95	97	96	97	95	96
2	98	98	98	99	97	98
4	100	99	100	100	98	99
6	100	100	98	99	100	100
8	88	97	84	93	90	90
10	84	94	80	90	83	86
12	80	91	77	86	82	83
14	80	91	77	86	81	83
16	81	91	80	86	82	84
18	86	94	87	90	88	89
20	90	95	92	93	90	92
22	93	96	95	95	94	95
24	94	97	96	96	95	96

24/11/86

P site

						$\bar{X}$
0	96	93	84	95	95	93
2	97	96	87	97	97	95
4	98	99	100	100	98	99
6	100	100	100	100	100	100
8	97	100	84	100	98	96
10	91	95	66	97	90	88
12	90	90	60	94	89	85
14	85	83	42	88	84	76
16	85	82	40	88	89	76
18	85	82	48	88	89	77
20	91	84	66	88	86	83
22	96	88	80	90	90	89
24	97	93	87	95	94	93

3/3

P site

					$\bar{X}$
0	96	89	87	91	91
2	100	93	99	96	97
4	100	98	99	98	98
6	100	100	100	100	100
8	95	100	85	98	95
10	86	97	63	95	85
12	79	89	43	80	72
14	78	78	35	72	66
16	77	77	30	72	64
18	78	77	40	72	67
20	86	77	62	72	74
22	93	80	82	77	83
24	95	89	98	90	93

S site

3/3

			$\bar{x}$
0	96	84	90
2	97	94	96
4	100	99	99
6	100	100	100
8	96	98	97
10	84	76	80
12	73	62	68
14	66	55	60
16	70	53	62
18	72	55	64
20	83	64	74
22	92	75	84
24	96	88	92

Z site

3/3

			$\bar{x}$
0	96	94	95
2	97	95	96
4	98	99	99
6	99	100	100
8	100	92	96
10	100	82	91
12	99	77	88
14	96	61	79
16	95	62	79
18	94	63	78
20	94	63	79
22	95	69	82
24	96	73	85

11/3/87

Resetting dendrometers into range.

All dendrometers re-zeroed to read 400 μm as daily range on Z site is about 150 μm.

Z site

① Before resetting inputs to approp levels.

Datalogger levels 89, 109, 1, 1, 127, 1, 21, 1

Dataloggers disconnected at 1:55 pm. Reconnected 1:58.

~~Ch 1~~ 2 3 4 5 6 7 7

Tree 1 2.87 k ohm = logger level 60, Ch 3

Tree 2 low = 4.54 = logger level

high Dead.

3 = 4.15

4 = 2.92 k.

			Init logger reading	Init k Ω	New logger reading	New k Ω
Tree 1 low	Ch 3		1 ~~84~~ ~~(64.)~~	2.87	69	4.56
1 high	2		109 109	?	109	?
2 low	Ch ~~5~~		127 ~~120~~	4.54	52 ~~46~~ ~~62~~ ~~55~~	4.35
2 high	(Dead) 4		1			
3	~~7~~		21	4.15	59 ~~66~~ ~~65~~	4.44
4	6		1	2.92	~~62~~ 82	4.47

Resetting finished at ~~0~~ 1425 pm without resetting data.

11/3/87

P site

Tree N°	Chan	Init Read.	Init KΩ.	Final KΩ.	Final Read.
11	5	47			65.
9	6	103			111
5	4	89			95
13	7	60			49
4	3	103			103

Chan 1 = 106 135 99 89 47 103 60 255

All ~~was~~ within range. Init changed slightly when tested for channel assignations at 1515 pm.

11/3/87

S site.

Tree N°	Chan	Init Read	Init K	Final Reading	Final K
1	3	1	3-68	62	4·47
2	4	61	4·54	62	4·45
3	7	1	3·79	67	4·51
[redacted]					
5	6	61	4·44	62	4·44
11	5	1	3·86	67	4·50

Out of range dendrometers reset at 1530 11/3/87

Channel	Init Reading	
1	126	- Tsoil.
2	114	- Tair
3	1	
4	61	
5	1	
6	61	
7	1	
8	255	

10/9/87 S P + Z sites.

Manual reading of electronic bands.

S

Band N°	Tree	X-07 reading	Ohmmeter before	Ohmmeter when reset	X-07 when reset.
1	~~9~~	~~255~~ 255	~~521~~ Ksr.	soil/air thermistor	255
2	5.	93			102
3	1	255 - Broken spring			255
4	~~9~~ 2	255	6.45	5.31	~~115~~ 175
5	11	255	7.43	5.24	164
6		~~255~~			255
7	~~9~~ 3	164	5.21		174
		255	soil/air thermistor		

Tree 1. Broken spiral spring

P site Albany Hwy 10/9/87

Tree	Channel	X-07 reading	KΩ before reset	KΩ after reset	X-07 after reset.
	1	~~100~~ 92	5.22		94
	2	~~120~~ 104			119
4	3	180	5.35		181
~~6~~ 9	5	~~211~~ 85	4.6.	5.00	66
~~5~~ 5	4	~~255~~ 120	5.95.	4.42.	137 ~~86~~
11	6	154			162
13	7	127	4.95.		125
	8	255			

~~Tree 11 — 46.~~

1 Z site Rainfall = 59·5 mm 10/9/87.

Tree	Cham	X-07 reading	hrs.	reset hrs.	X-07 new
	1	98			102
1 high	2	158			157
1 low	3	255	7.25		176
2 high	4	255	Not working		255
2 low	5	255			108
Tree 4	6	81			81
Tree 3	7	5			4
	8	1			1

Z site

19/6/87

Z site.

Electronic dendrometer readings. 12 midday

showers & o'cast.

Ch.	
1.	148
2.	165
3.	205
4.	171
5.	204
6.	42
7	160
8.	1

89 mm of rain.

S site

26/6/87

1	2	3	4	5	6	7	8
265	162	255	255	255	255	227	255

P site

26/6/87

1	2	3	4	5	6	7	8
159	162	228	252	80	248	204	255

19/5/87

P site

Channel 1	2	3	4	5	6	7	8
136	158	161	167	82	162	124	255

S site

255	119	255	177	206	204	128	255

Z site

133	172	255	158	255	82	1	1

Reading ~~taken~~ taken at approx

Z 12.00 pm
P 1.30 pm
S 1.50 pm

10/8/87

Z site 12:30 pm

1	2	3	4	5	6	7	8
180	177	210	182	215	57	179	1

S Site 11:30 am

1	2	3	4	5	6	7	8
255	189	255	255	255	255	255	255

P site 11:20 am

1	2	3	4	5	6	7	8
177	170	240	261	95	255	222	272

Rainfall
Z site 10/8/87
195 mm

7/10/87

Z

1	2	3	4	5	6	7	8
108	167	190	255	115	96	1	1

S

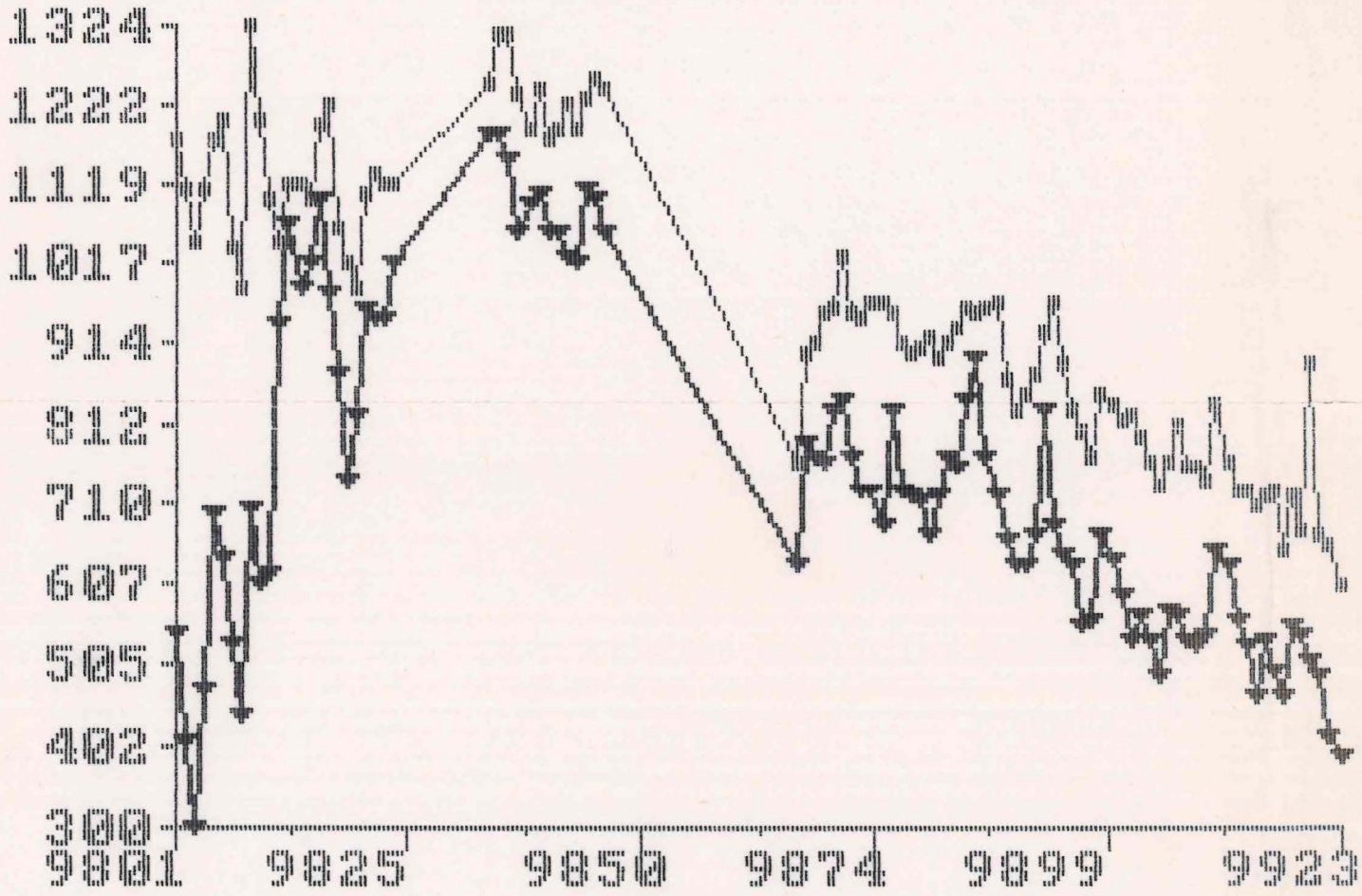
1	2	3	4	5	6	7	8
255	110	255	180	175	255	185	255

P

1	2	3	4	5	6	7	8
100	131	193	147	181	176	133	255

5 site

ch4


1324
1222
1119
1017
914
812
710
607
505
402
300
9801
9825
9850
9874
9899
9923

Mean Tree Predawn water potential.

Site →	Brookton Hwy		Dwellingup	
Z_1	24.11 ± 1.62	(7)	S_{irrig}	5.45 ± 0.23 (4)
Z_2	26.30 ± 2.65	(5)	$S_{non-irrig}$	7.91 ± 0.62 (4)
T	12.58 ± 1.73	(9)	$T\text{-}S$	14.29 ± 0.46 (8)
P	6.34 ± 0.44	(7)	$P\text{-}S$	21.99 ± 2.51 (8)
Z_{tot}	25.02 ± 1.42	(12)		

t-test.

Z_1/Z_2	$t = 0.75$	$n = 12$	NSD	S_{irrig}/S_{non}	$t = 3.72$	$n = 8.00$	$p < .005$
Z_{tot}/T	$= 5.60$	21	$p < .005$	$S_{non}/T\text{-}S$	$= 8.12$	12.00	$p < .005$
Z_{tot}/P	$= 9.78$	19	$p < .005$	$S_{non}/P\text{-}S$	$= 3.85$	12.00	$p < .005$
T/P	$= 3.10$	16	$p < .005$	$T\text{-}S/P\text{-}S$	3.01	16	$p < .005$

All values except Z_1 & Z_2 significantly different at $p < 0.5\%$

Brookton Hwy. 29/3/85.

Z site (group 1)

Tree N°	16	11	13	15	12	1	2
Bal. l.s.	16·8	27·2	27·0	25·4	29·6	21·4	20·0
	17·4	27·4	26·8	25·6	30·0	19·4	19·4
	23·3						
$\bar{x}$/tree	19·17	27·3	26·9	25·5	29·8	20·4	19·7.

$\bar{x}_{Z_1} \pm SE. = 24·11 \pm 1·62$ bas.

P site

	17	20	22	19	21	26	28
	7·2	6·0	6·0	5·8	4·8	7·6	8·2
	7·2	5·4	5·0	5·6	5·0	7·2	7·8
$\bar{x}$/tree	7·2	5·7	5·5	5·7	4·9	7·4	8·0

$\bar{x}_{tot} \pm SE$ $6·34 \pm 0·44$

T site

	1	2	4	7	6	8	9	13	14
	19·6	22·4	12·0	8·4	8·4	13·8	14·8	8·0	7·2
	20·4	19·6	11·6	8·8	8·4	13·6	14·2	8·0	7·2.
$\bar{x}$/tree.	20·0	21·0	11·8	8·6	8·4	13·7	14·5	8·0	7·2

$\bar{x}_{T_{tot}} \pm SE.$ $12·58 \pm 1·73$

Z site (group 2)

	6	8	9	4	5
	25·6	33·0	32·2	23·2	20·4
	25·4	32·8	30·8	22·0	17·4
$\bar{x}$/tree	25·5	32·9	31·6	22·6	18·9

$\bar{x}_{Z_{tot}}$ $26·30 \pm 2·65$

$(Z_1 + Z_2) = 25·02 \pm 1·42.$

Dwellingup 2/4/85

PS. site

Tree	1	2	3	4	13	15	12	10
Bol P.	11.8	25.0	29.0	20.2	31.6	11.6	22.4	26.8
	14.2	24.5	27.2	20.2	31.4	11.2	20.0	26.4.
	12.0							
$\bar{x}$/tree	12.67	24.75	27.6	20.2	31.5	11.4	21.2	26.6.

$\bar{x}$

$\bar{x}_{tot} \pm SE = 21.99 \pm 2.51$

T-S site

	12	10	6	15	4	1	8	7
	16.0	15.0	14.8	13.4	11.8	15.0	15.8	14.2
	16.0	13.4	14.4	13.8	11.6	14.4	15.0	14.0
$\bar{x}$/tree	16.0	14.2	14.6	13.6	11.7	14.7	15.4	14.1

$\bar{x}_{tot.} = 14.29 \pm 0.46.$

S site. Irrig

	26	28	27	24
	5.0	5.0	3.8	6.0
	4.8	6.2	4.8	6.0
$\bar{x}$/tree	4.9	5.6	5.3	6.0

$\bar{x}_{tot} \pm SE = 5.45 \pm 0.23$

Non-irrig

	1	10	11	6
	10.0	8.4	6.3	7.2
	9.2	7.4	7.0	7.8
$\bar{x}$/tree	9.6	7.9	6.65	7.5

$\bar{x}_{tot} \pm SE = 7.91 \pm 0.62$

$6.68 \pm 0.56.$

RWC's. Dwellingup 20/2/85.

Site	P-S	S-T	S	
1	88	12 91	orig 26 85	89.00 ± 1.58
2	83	10 90	orig 28 92	
3	79	6 89	orig 27 91	
4	84	15 90	orig 24 88	
13	78	4 88		
15	87	1 92	non-orig 1 91	89.75 ± 0.48
12	79	8 88	non-orig 10 90	
10	74	7 89	non-orig 11 89	
	81.50 ± 1.70	88.63 ± 0.50	non-orig 6 89	89.38 ± 0.78

Lesion lengths.

Brockton Hwy

			P		T		Dwellingup. Swing 26	P-S	T-S
Z_1	16	11	17	37	1	39.7			
	11	13.5	21	29	2	22.7	28	1	12
	15	10	20	45	4	40	27	2	10
	13	4.6	26	40	7	29.2	24	3	6
	12	12.5	22	43	6	47.9		4	15
	1	6.8	28	46	8	48.7	Swamp	13	4
	2	20.2	19	53	9	33.7	10	15	1
					13	28.6	11	12	8
Z_2	6				14	50.5	6	10	7
	1								
	8								
	9								
	5								
	4								

Mean Tree RWC.

Brookton Hwy		Dwellingup.	
Z_1	87·29 ± 0·75 (7)	S_{wirig}	89·00 ± 1·58 (4)
Z_2	83·20 ± 0·86 (5)	$S_{non\ wirig}$	89·75 ± 0·48 (4)
T	87·78 ± 0·70 (9)	T-S	88·63 ± 0·50 (8)
P	91·14 ± ·46 (7)	P-S.	81·50 ± 1·70 (8)
Z_{tot}	83·83 ± 0·56 (12)		

t-test

Z_1/Z_2	·95	12	N.S.	S_{wirig}/S_{non}	·45	8	N.S.
Z_{tot}/T	4·46	21	$p<·005$	$S_{non}/T-S$	1·41	12	$p<·10$
Z_{tot}/P	8·94	19	$p<·005$	$S_{non}/P-S$	3·32	12	$p<·005$
T/P.	3·75	16	$p<·005$	$T-S/P-S$.	4·02	16	$p<·005$

Z_1 & Z_2 & $S_{wirig}/S_{non\ wirig}$ not significantly different
$S_{non\ wirig}$ / T-S significantly different at 10%
Remainder significantly different at 0·5%.

① What areas develop ψ likely to inhibit P_c? When?

② What are soil temperatures at these times?

③ What is rel^n leaf ψ to bark ψ
leaf ψ to g_s & vpd
leaf ψ, g_s, recharge & bark ψ

④ Where do roots go in each area?

⑤ How much root can be lost without killing tree?

⑥ Do indicator species show a) level of water table?
b) when soil surface dries out?

Best = Z, P, T on Brookton Hwy

①

3 days/month field + 3 lab days — Jarrah, + Marri + 3 shrubs — Diurnal Ψ_L, g_s, RH, T; Ψ_s + bark RWC + soil T + soil water @ 40 cm

② Dwellingup — Ψ_{dawn}, Ψ_s, $\Psi_{L\,midday}$, g_s, RH + soil T, air T.

1 Dawn + 1 lab day — T + P

③ Manjimup — Ψ_{dawn}, dawn bark RWC, Ψ_s, soil T.
3 days.

NEXT.

Monthly — Dawn { Ψ_L, Midday Ψ_L, g_s on three B'ton Hwy sites. Ψ_s, soil T

1 week — 1 site for diurnal measurements on all ops (probably T site)

1 wk. { Dwgup — Dawn Ψ_L, Ψ_s, bark RWC, soil T 10am–12pm, midday Ψ_L, g_s of 5 ops.

Manjimup — Dawn Ψ_L, Ψ_s, bark RWC, soil T 10am–2pm
Midday Ψ_L, g_s of 5 ops.

Remaining 2 wks. Recover.

RWC bark.

Monthly
jarrah
7 trees/site

- Dawn — 3 sites/dawn for ψ_l, ψ_s (RWC bark.) — v.p.d, T., RH.
- Midday — ψ_l, g_s, [illegible] — soil H_2O @ 40 cm, soil T

Bi-Monthly. Diurnal ψ_l, g_s of — RH, T — Midday soil T

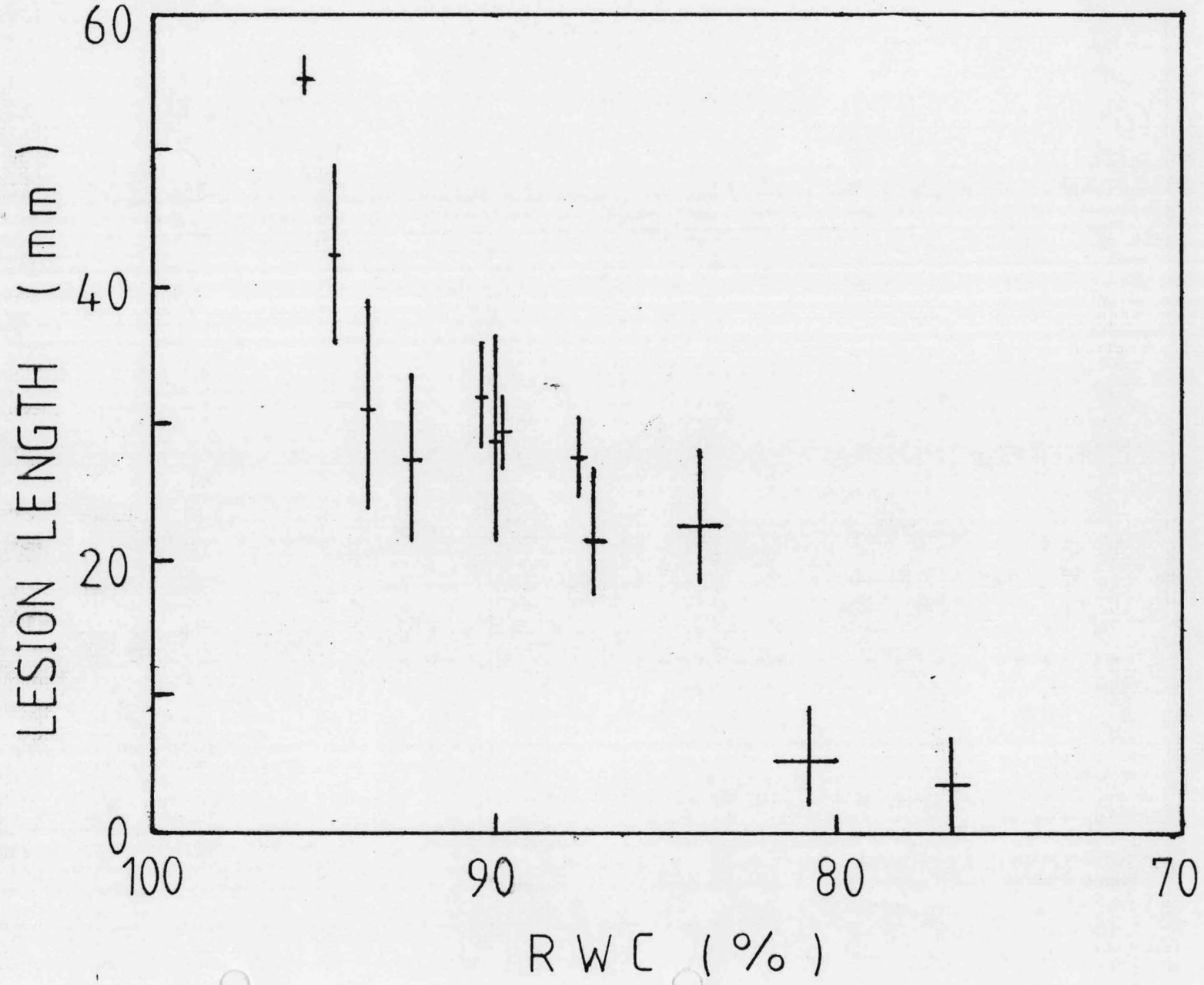
- *E. marginata* — soil ψ_{40cm}
- *E. calophylla* — soil T
- *Hypocalymma*
- *Macrozamia*
- *Banksia?*

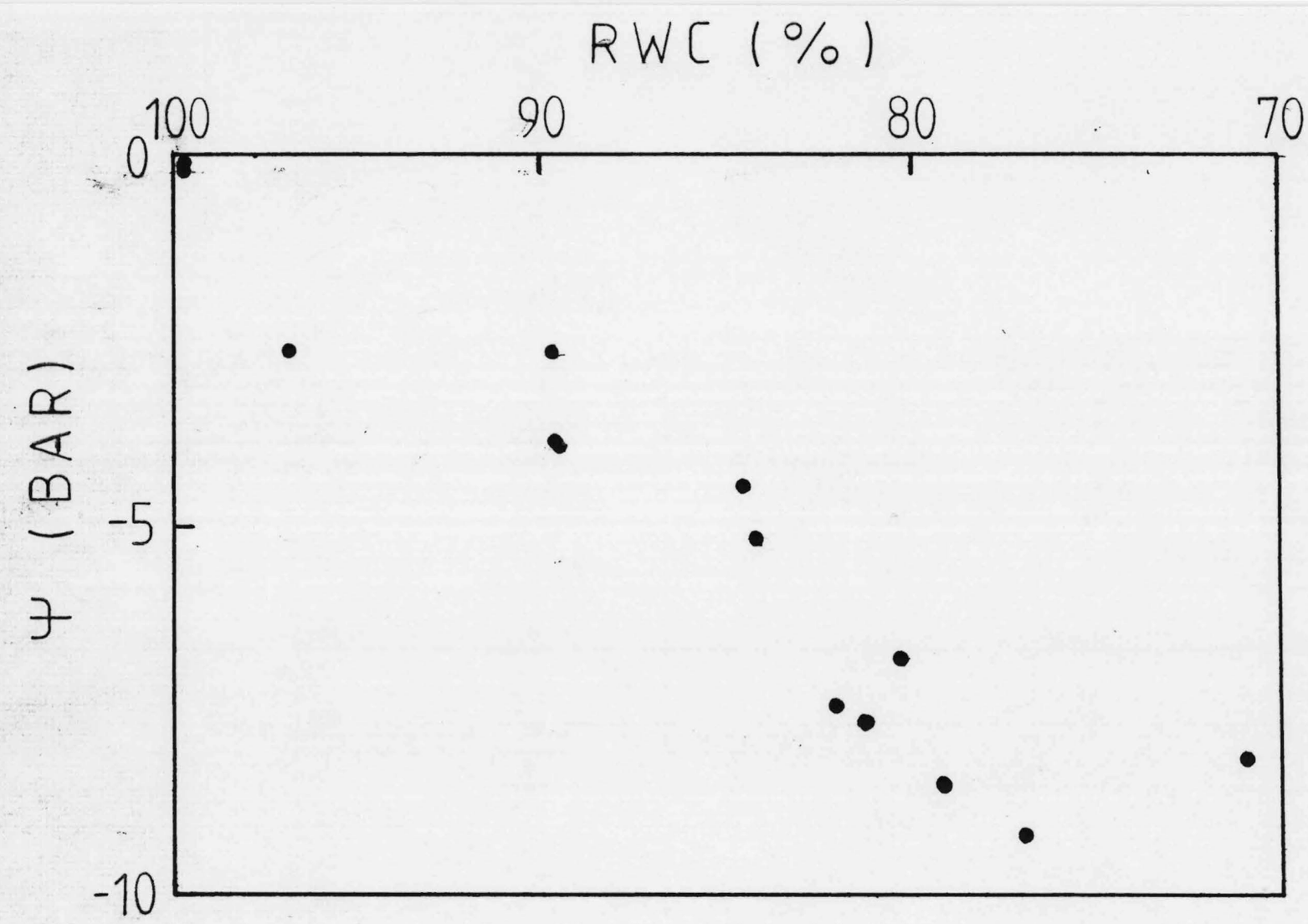
Monthly → Race out → Dawn ψ_l, push bark for RWC bark, ψ_s
Midday ψ_l, g_s, soil water

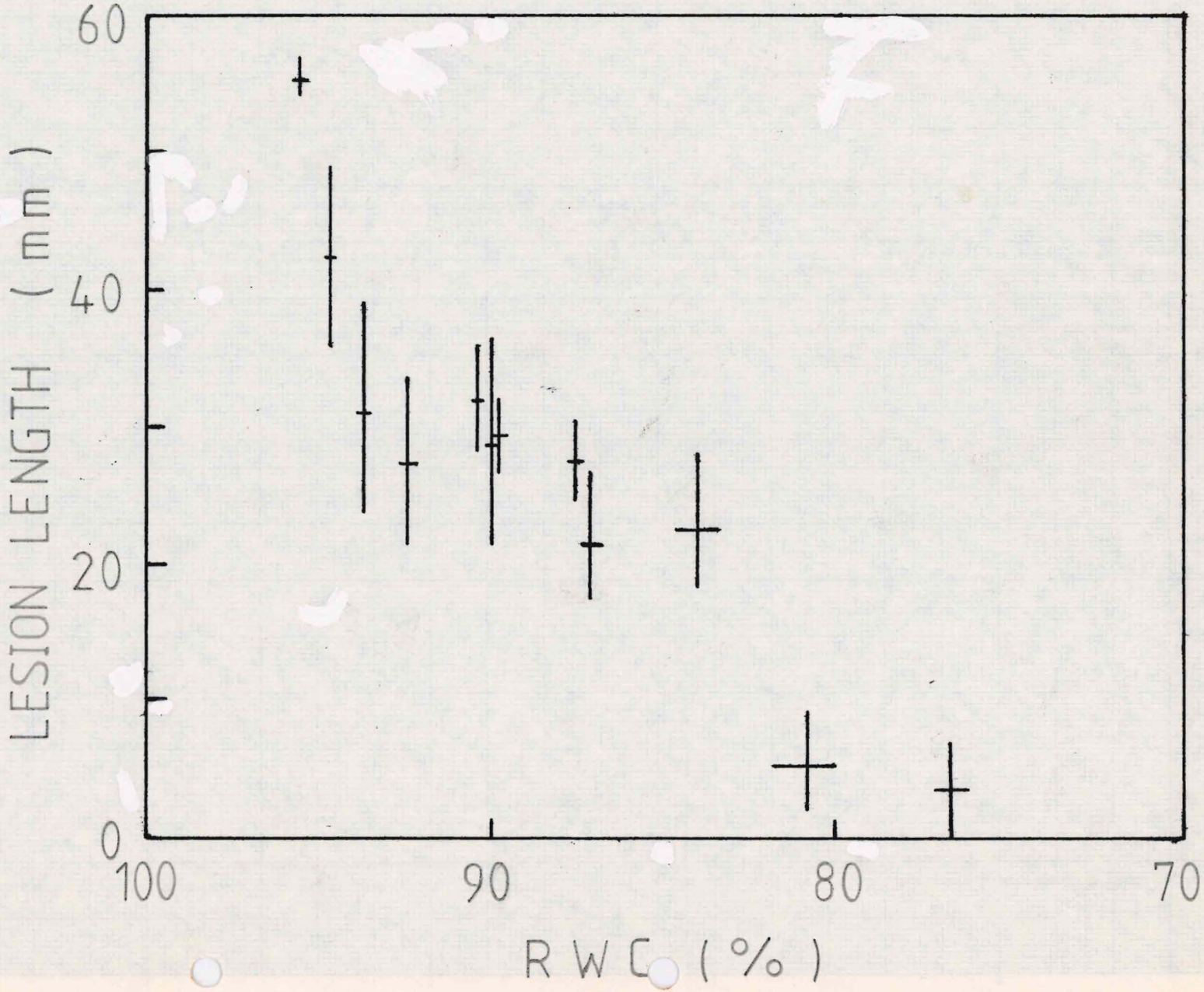
Monthly — 3 Brookton Hwy sites, all spp.
① ψ instrument with soil T – Grants.
② Monthly x (daily ψ_l, g_s), mw ψ_s
③ soil water. 40 cm.

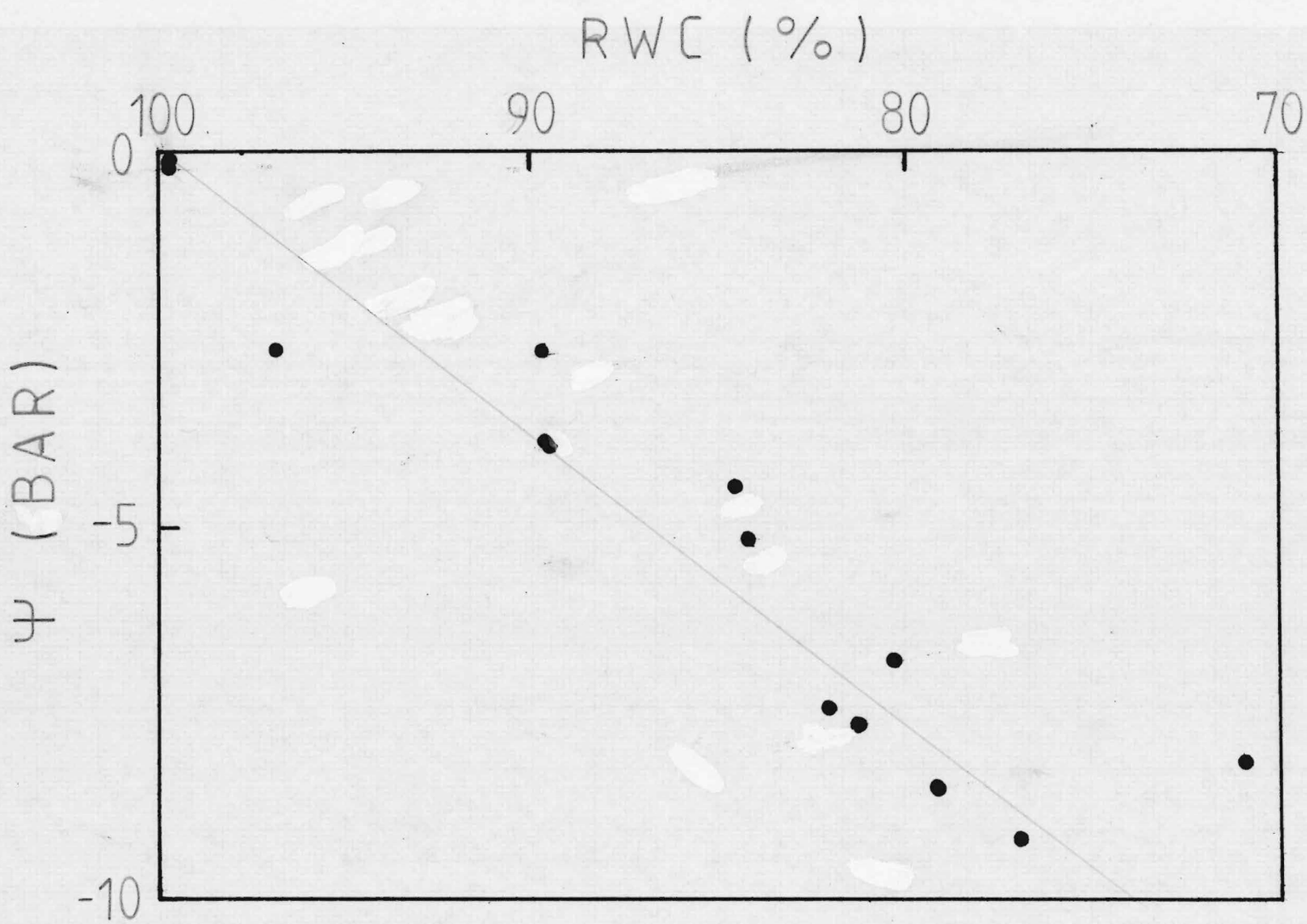
Bimonthly — 3 Dwellingup
Dawn ψ_l, midday ψ_l, g_s,
Dawn bark RWC, leaf ψ_s
soil T, [illegible]

Quadrimonthly 2 Manjimup
Dawn ψ_l, midday ψ_l, g_s
Soil T, leaf ψ_s


60
40
20
0
LESION LENGTH (mm)
100
90
80
70
RWC (%)


RWC (%)
100
90
80
70
0
-5
-10
Ψ (BAR)


60
40
20
0
LESION LENGTH (mm)
100
90
80
70
RWC (%)


RWC (%)
100
90
80
70
0
-5
-10
Ψ (BAR)