Part 2 AMBIENT AIR QUALITY

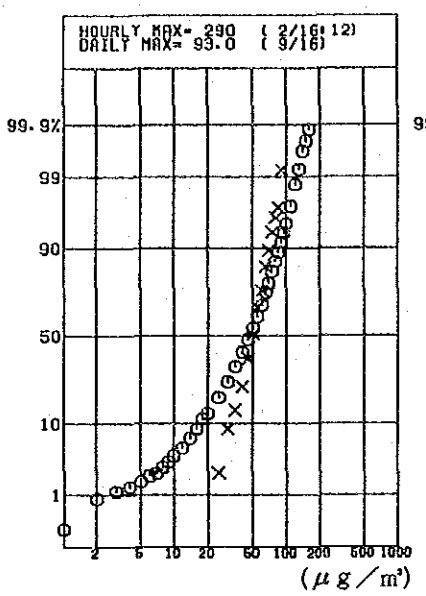
2.1 Monitoring of the Ambient Air Quality

2.1.1 Cumulative Distribution

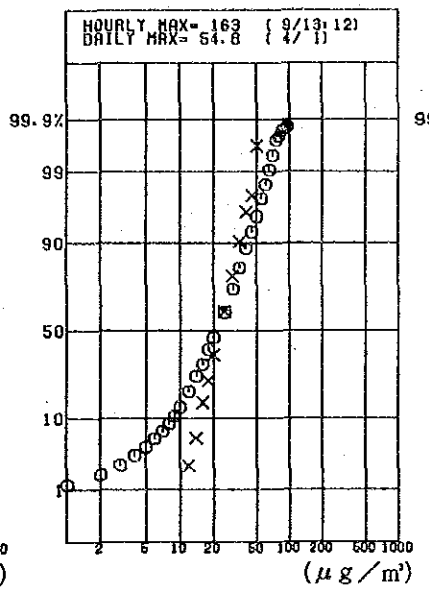
Cumulative Distribution of SPM

○; Hourly X; Daily

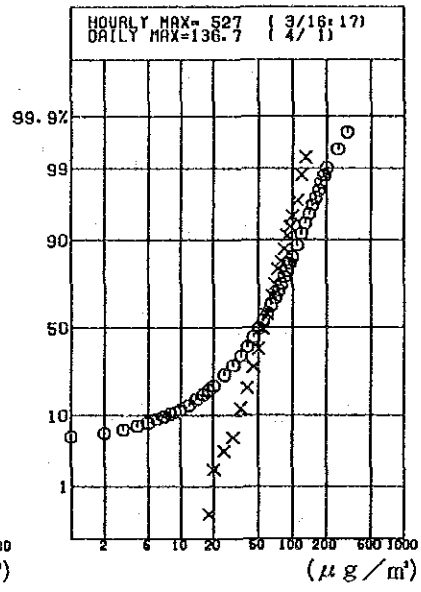
City Hall



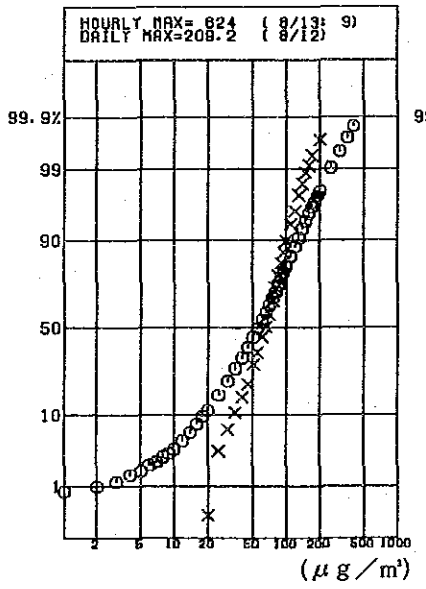
UPM



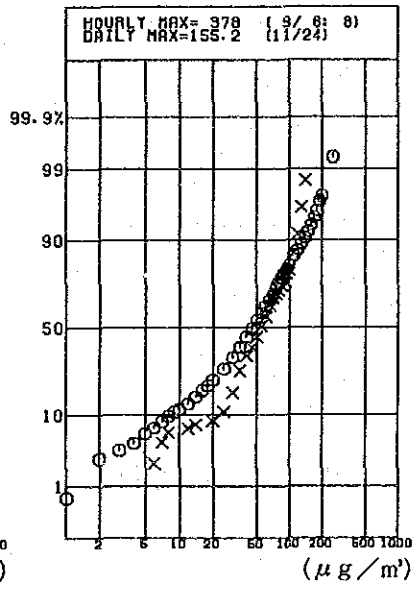
Petaling Jaya



Shah Alam



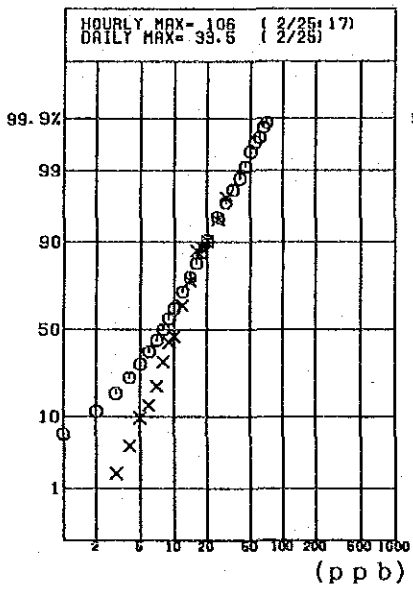
Klang



Cumulative Distribution of SO2

O;Hourly X;Daily

City Hall



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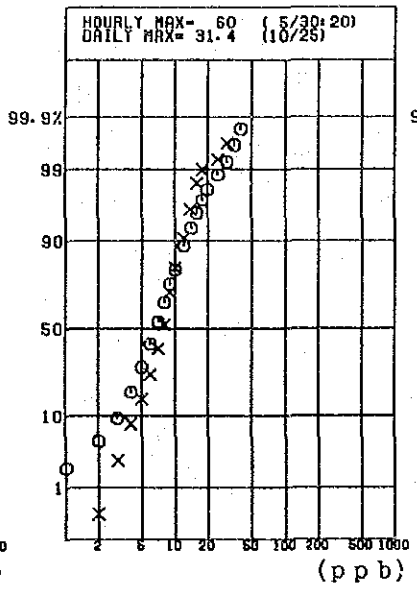
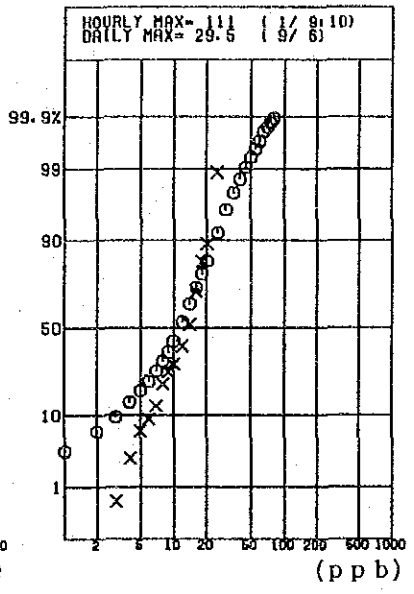


Petaling Jaya



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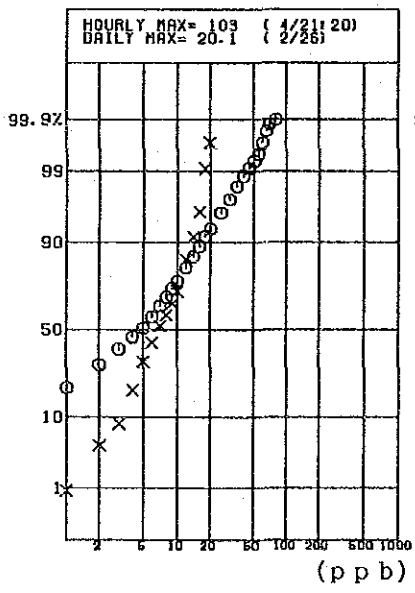
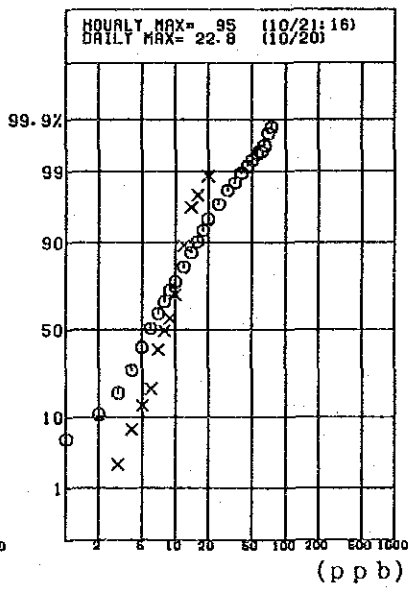


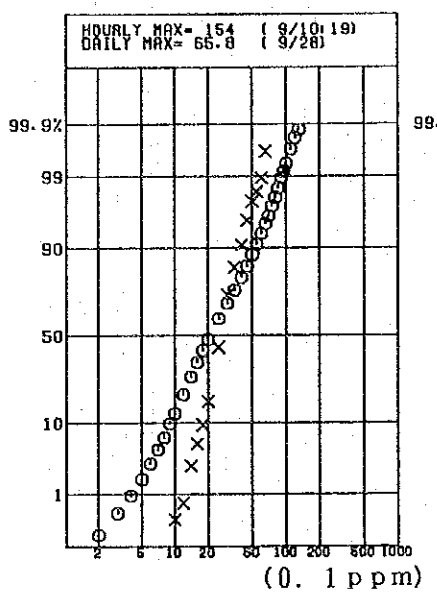
Klang



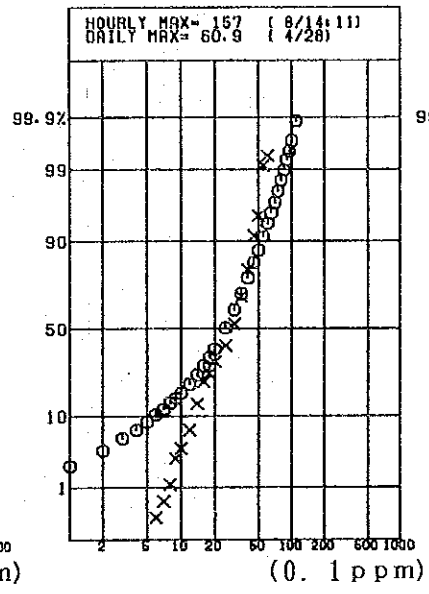
Cumulative Distribution of CO

○;Hourly　　X;Daily

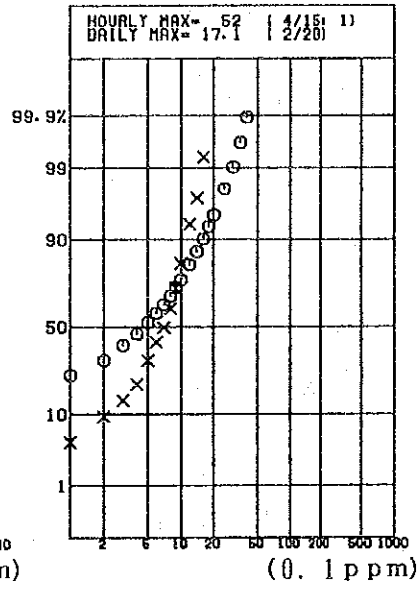
City Hall



Petaling Jaya



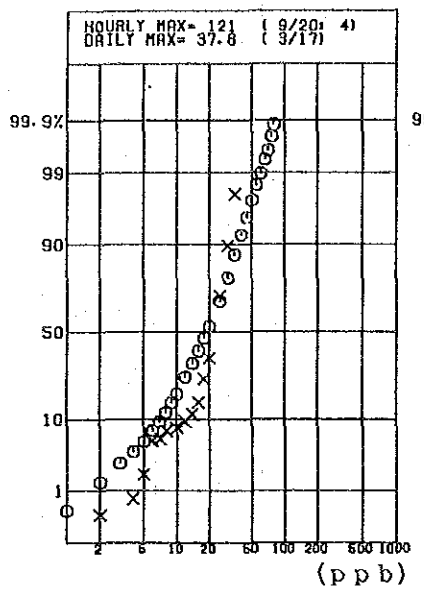
Shah Alam



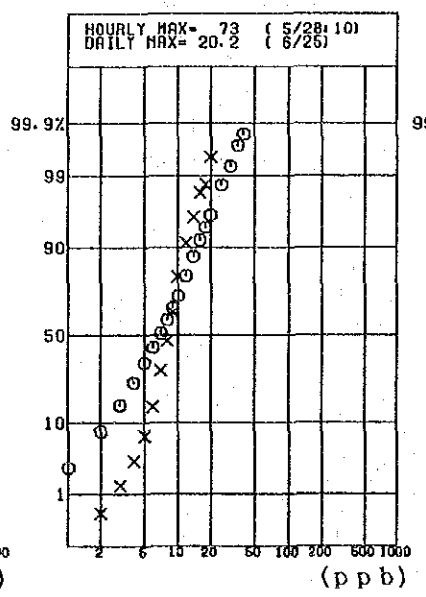
Cumulative Distribution of NO2

O; Hourly X; Daily

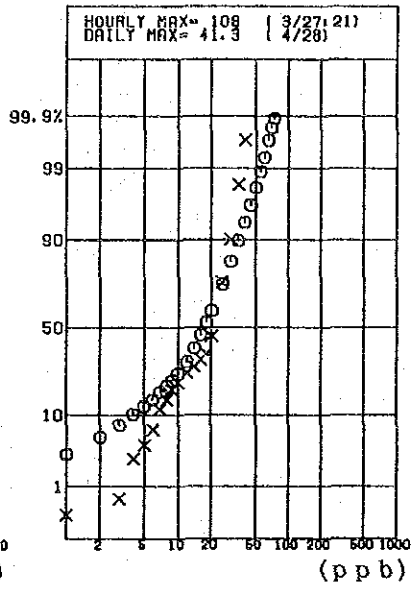
City Hall



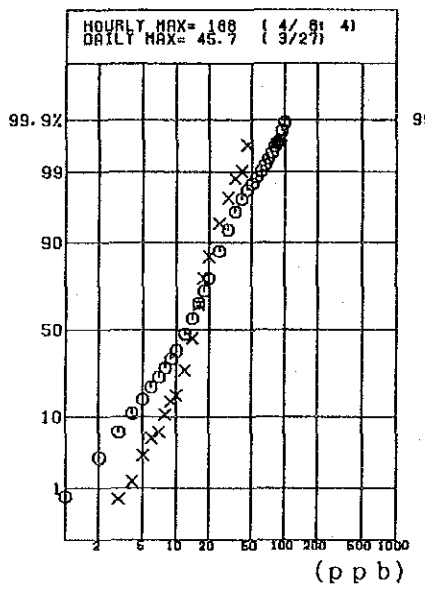
UPM



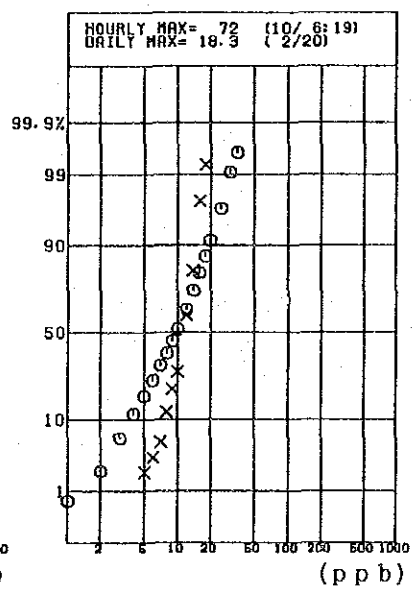
Petaling Jaya



Shah Alam



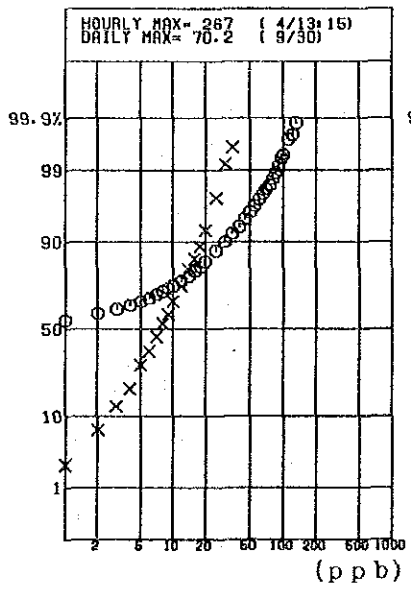
Klang



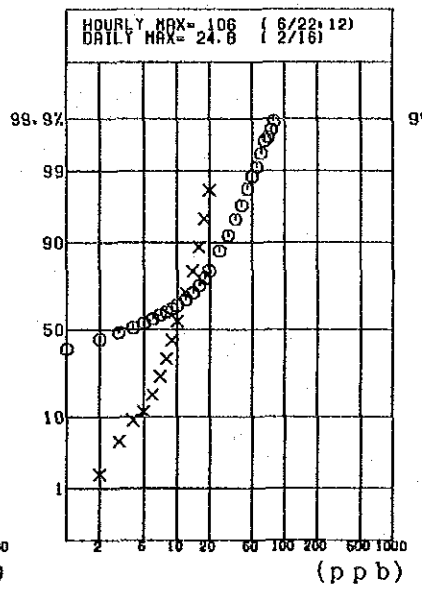
Cumulative Distribution of O3

O;Hourly X;Daily

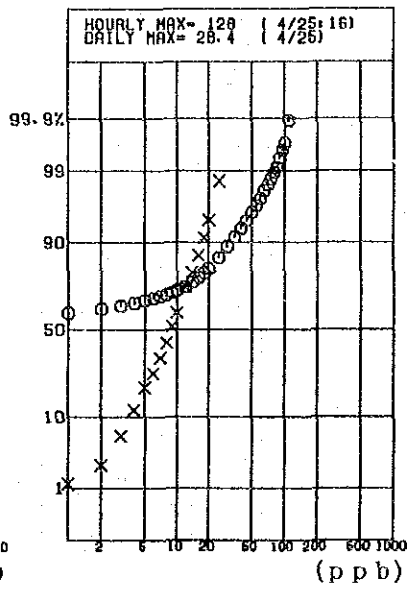
City Hall



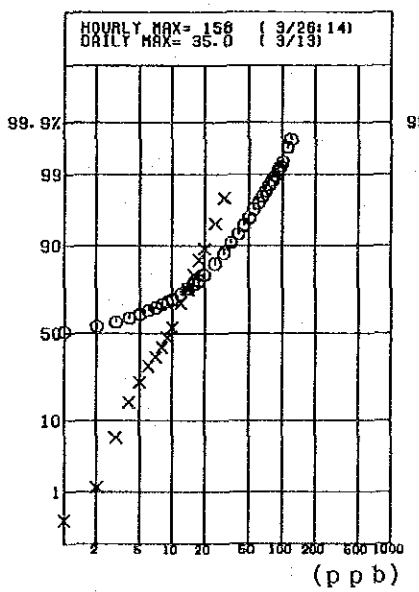
UPM



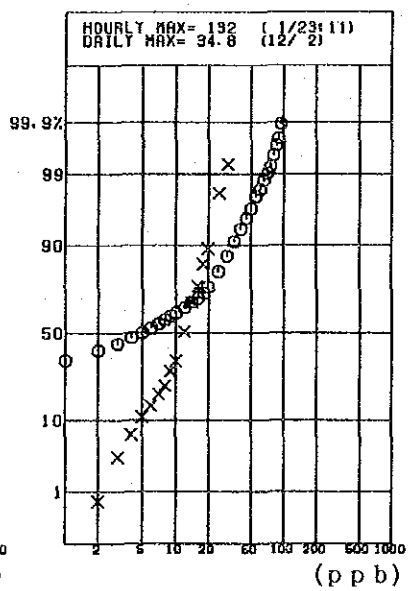
Petaling Jaya



Shah Alam



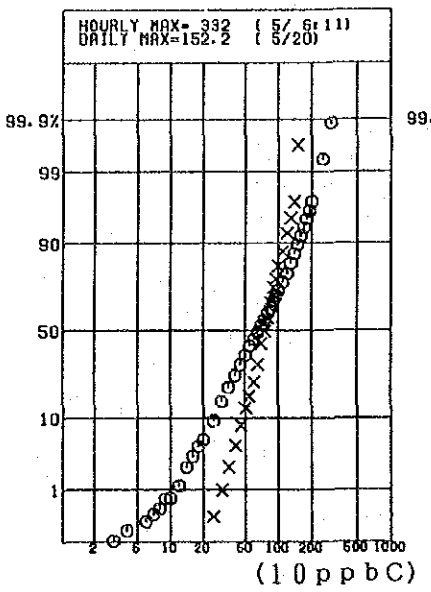
Klang



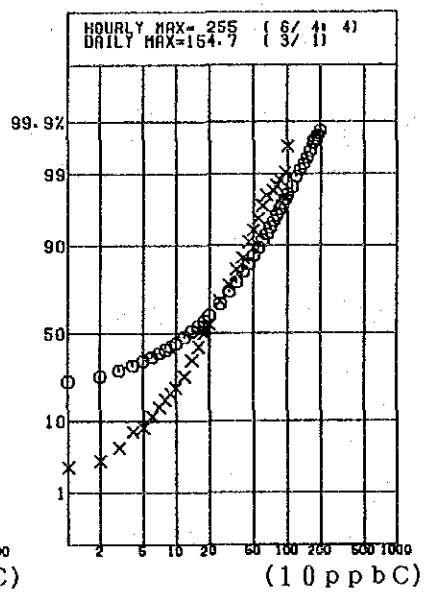
Cumulative Distribution of NMHC

○;Hourly　　X;Daily

Petaling Jaya

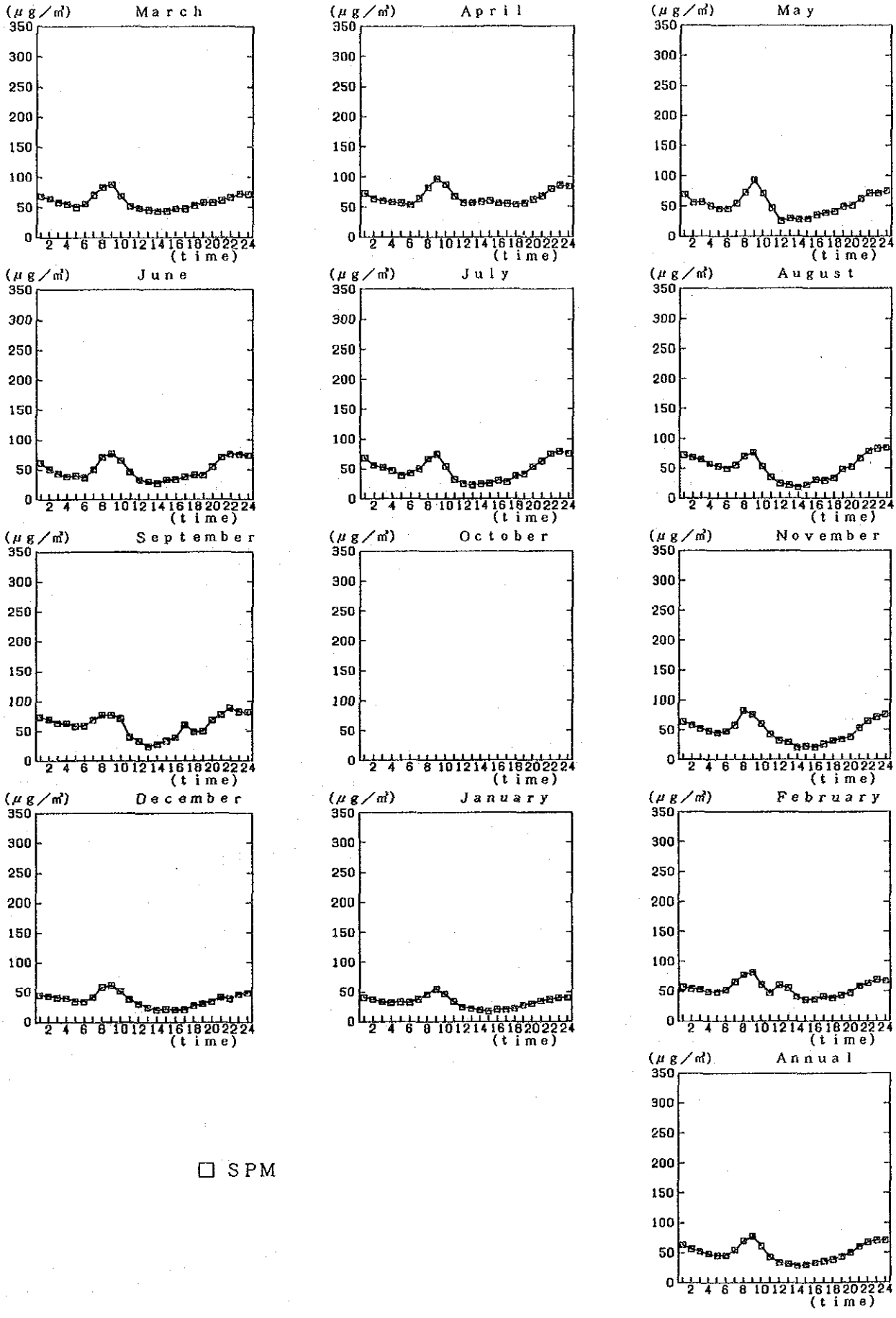


Shah Alam

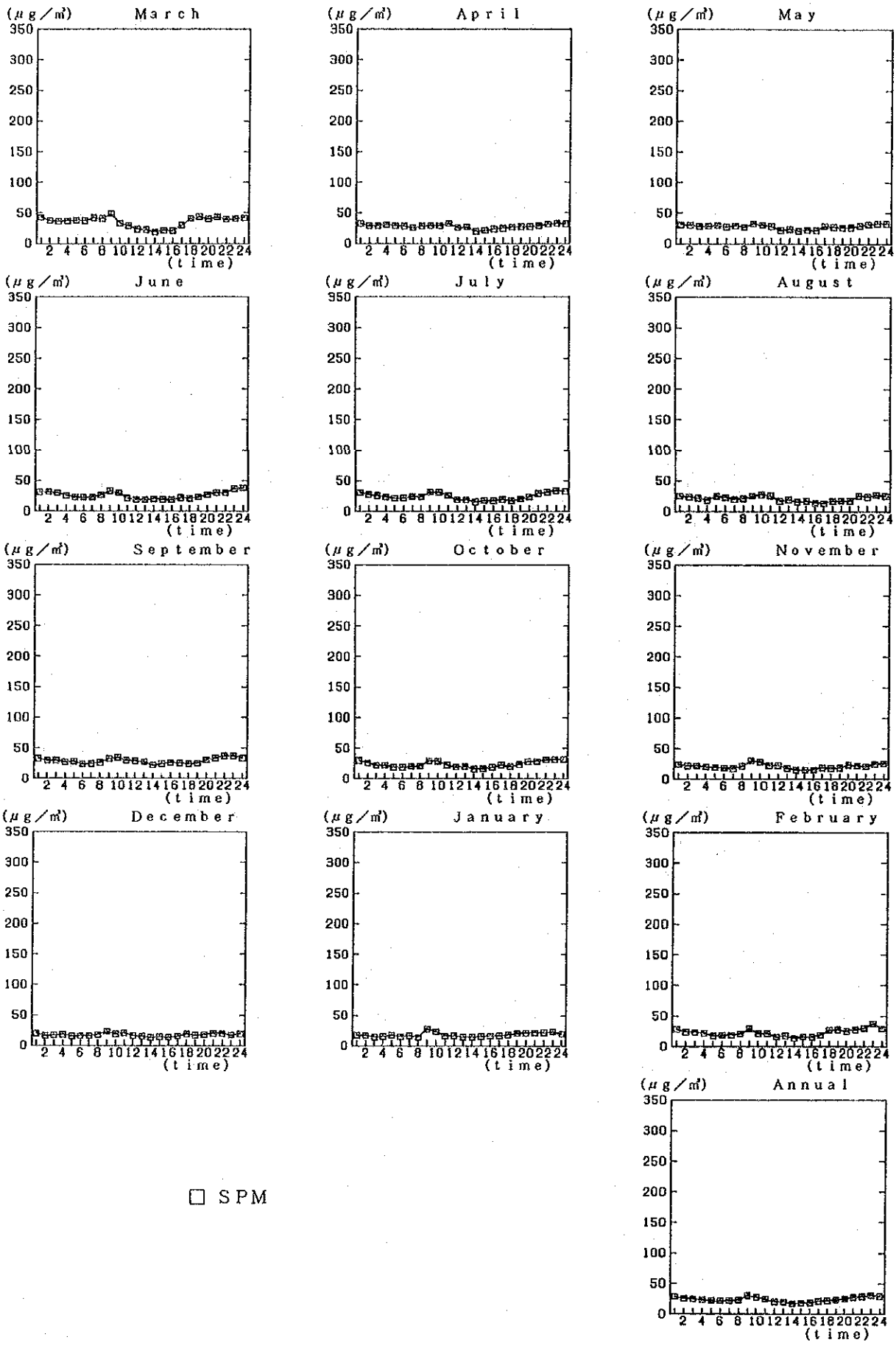


2.1.2 Diurnal Change of Pollutant Concentration

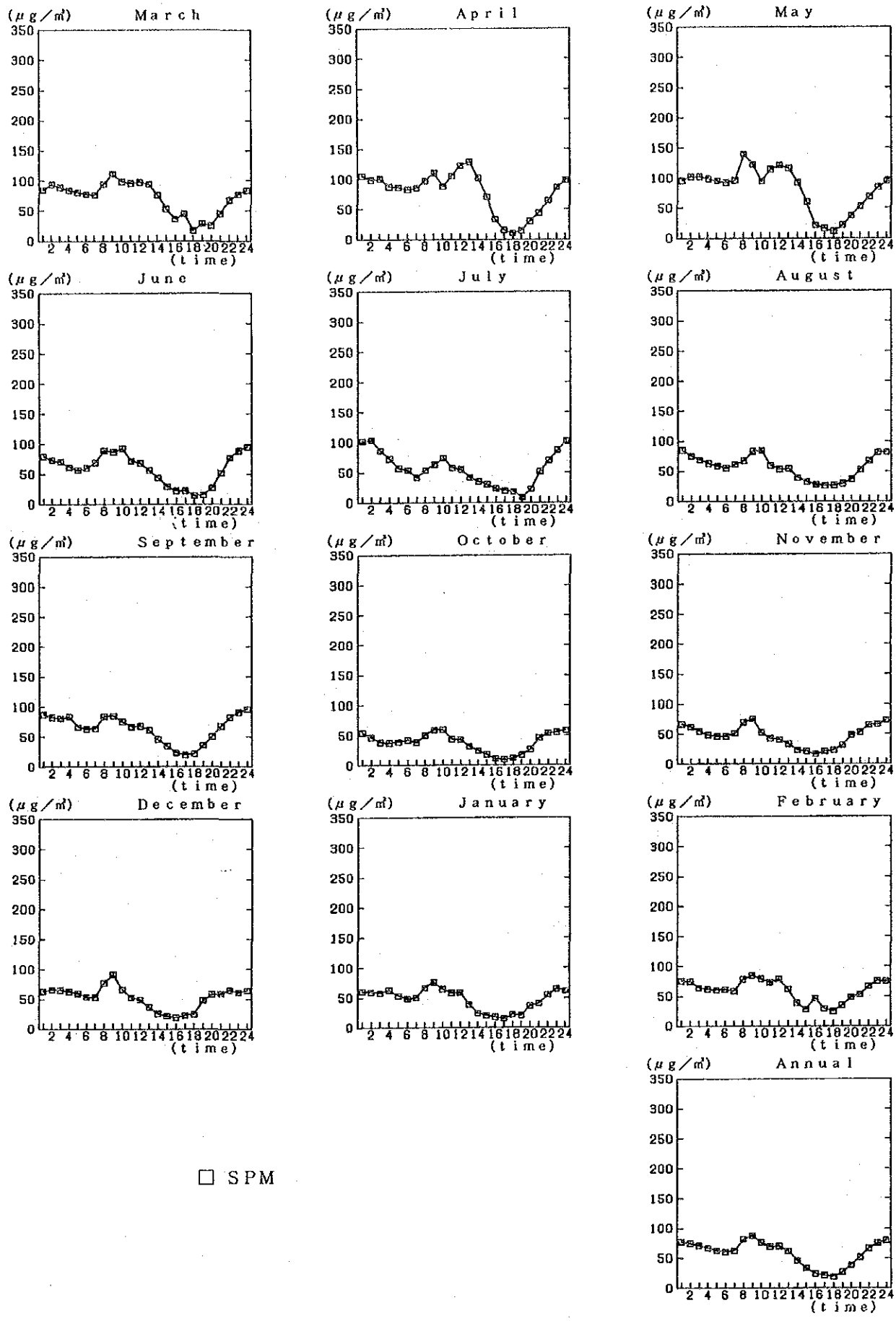
Diurnal Change of SPM at City Hall



Diurnal Change of SPM at UPM

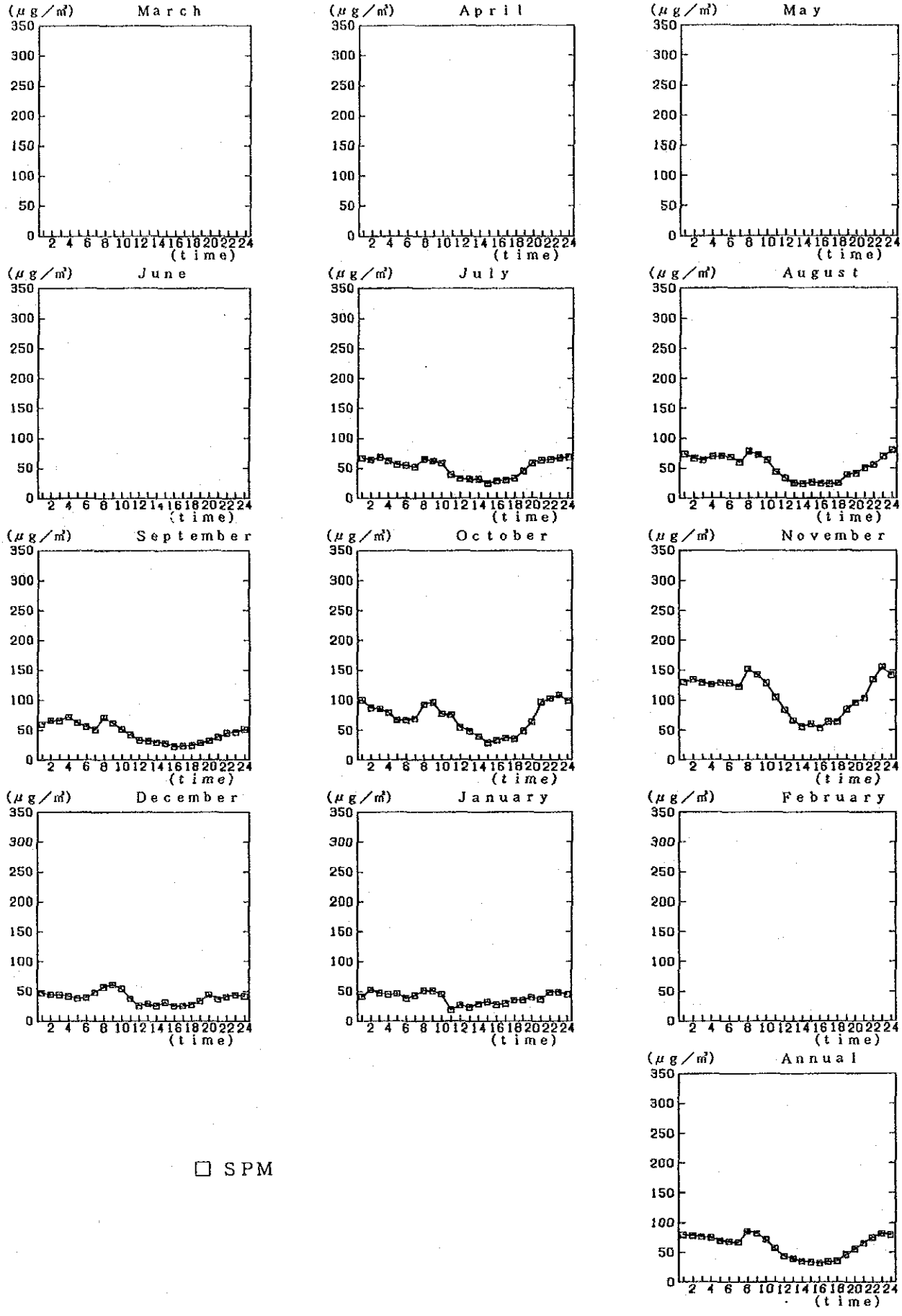


Diurnal Change of SPM at Petaling Jaya



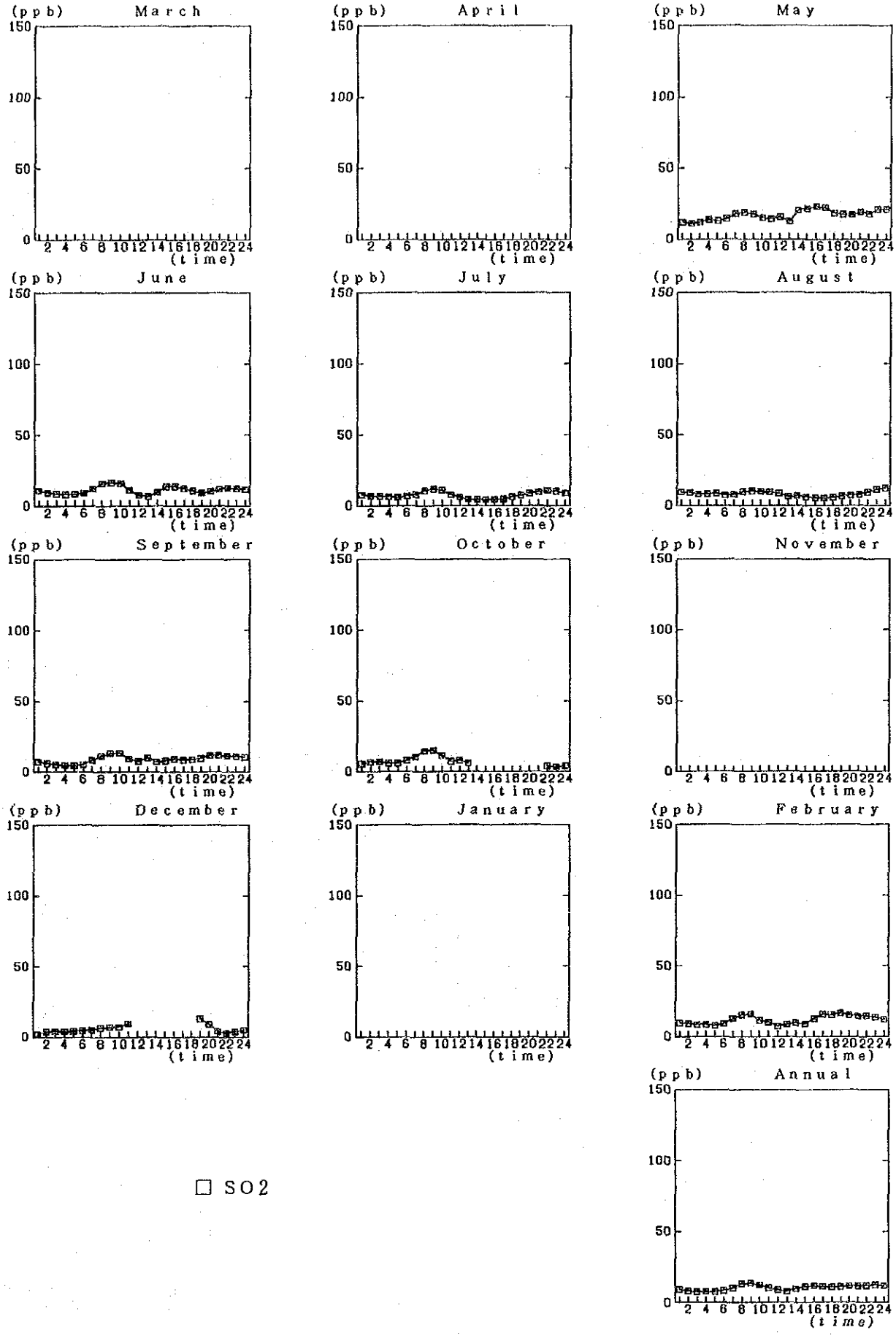
□ SPM

Diurnal Change of SPM at Klang

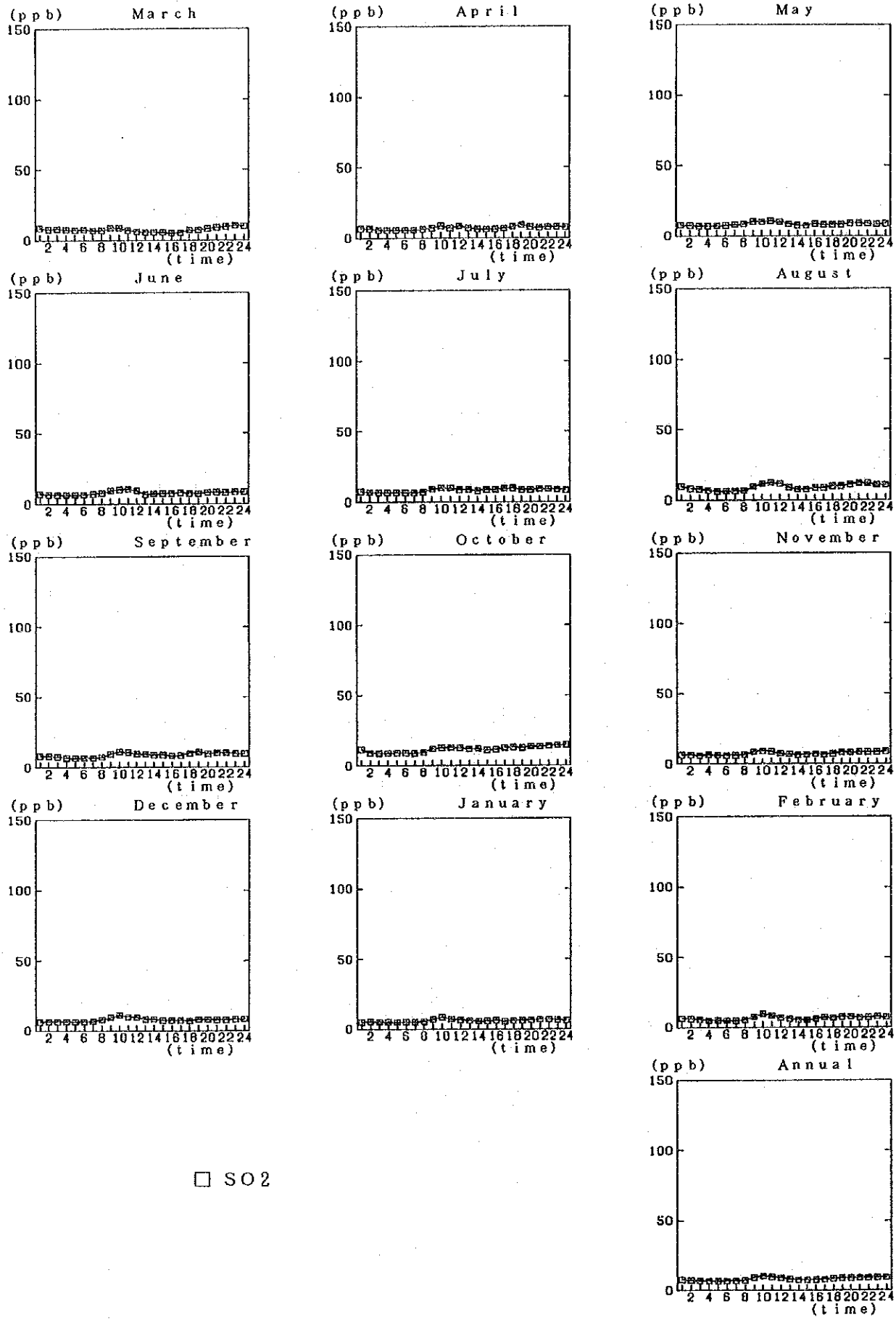


□ SPM

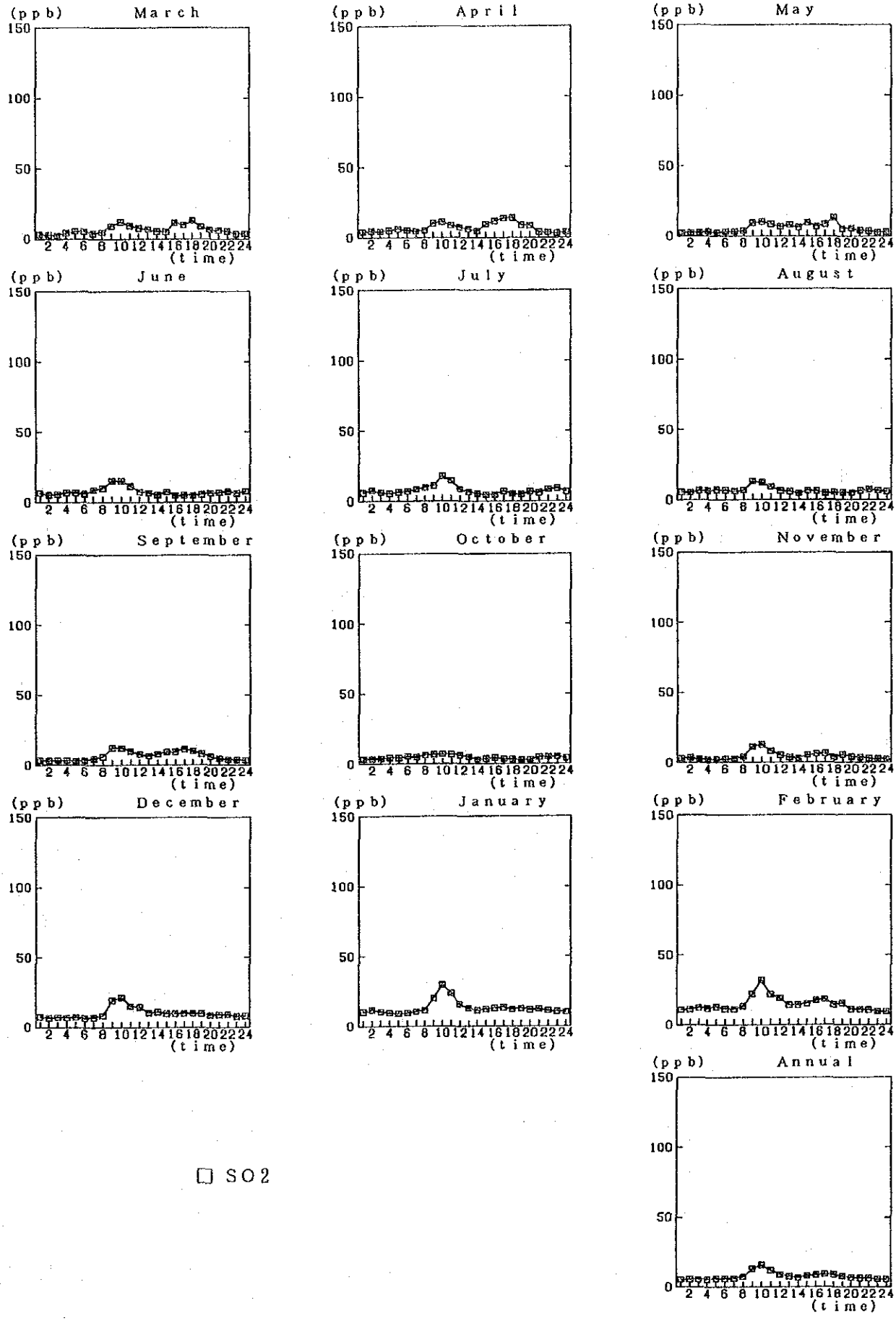
Diurnal Change of SO2 at City Hall



Diurnal Change of SO2 at UPM

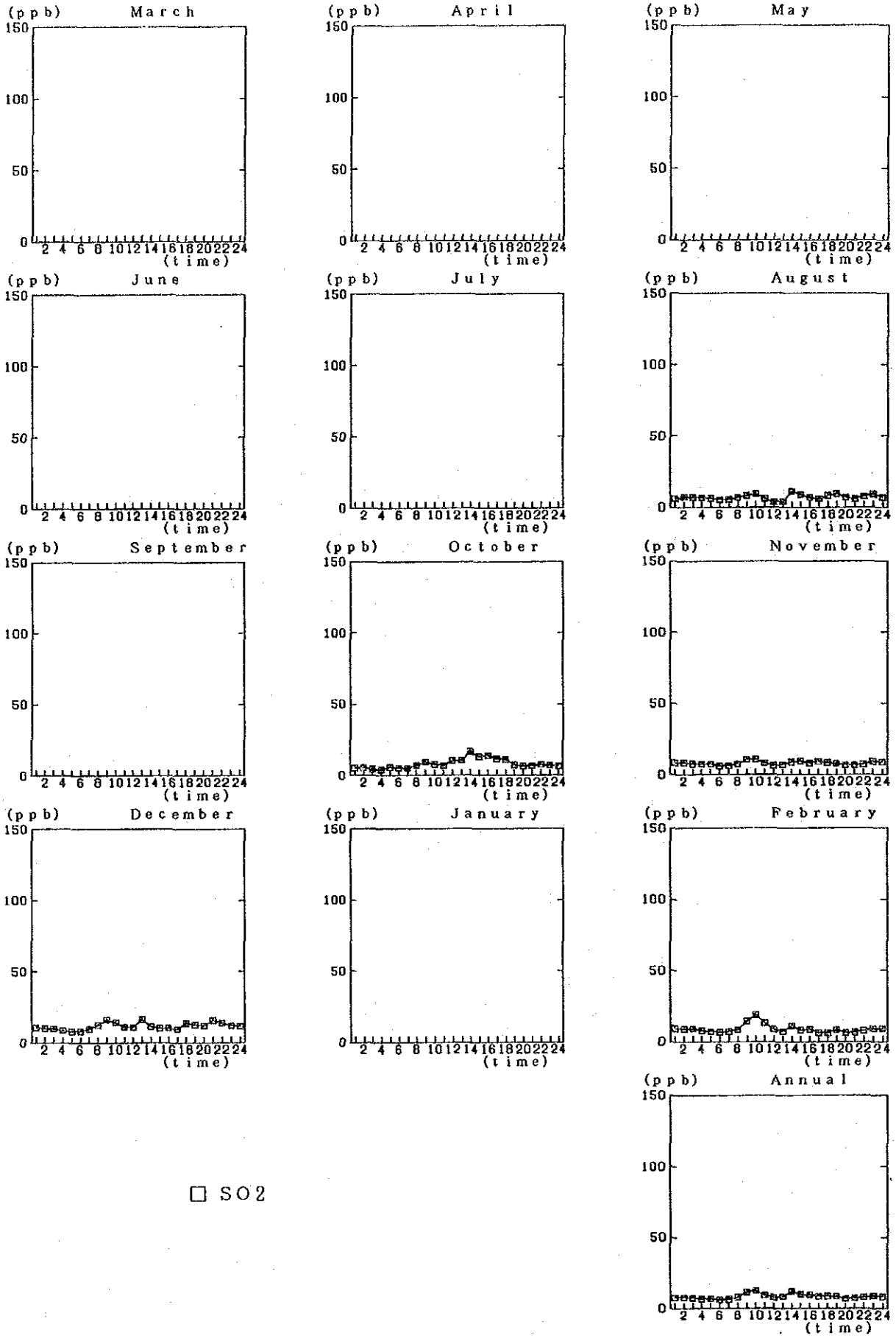


Diurnal Change of SO2 at Shah Alam



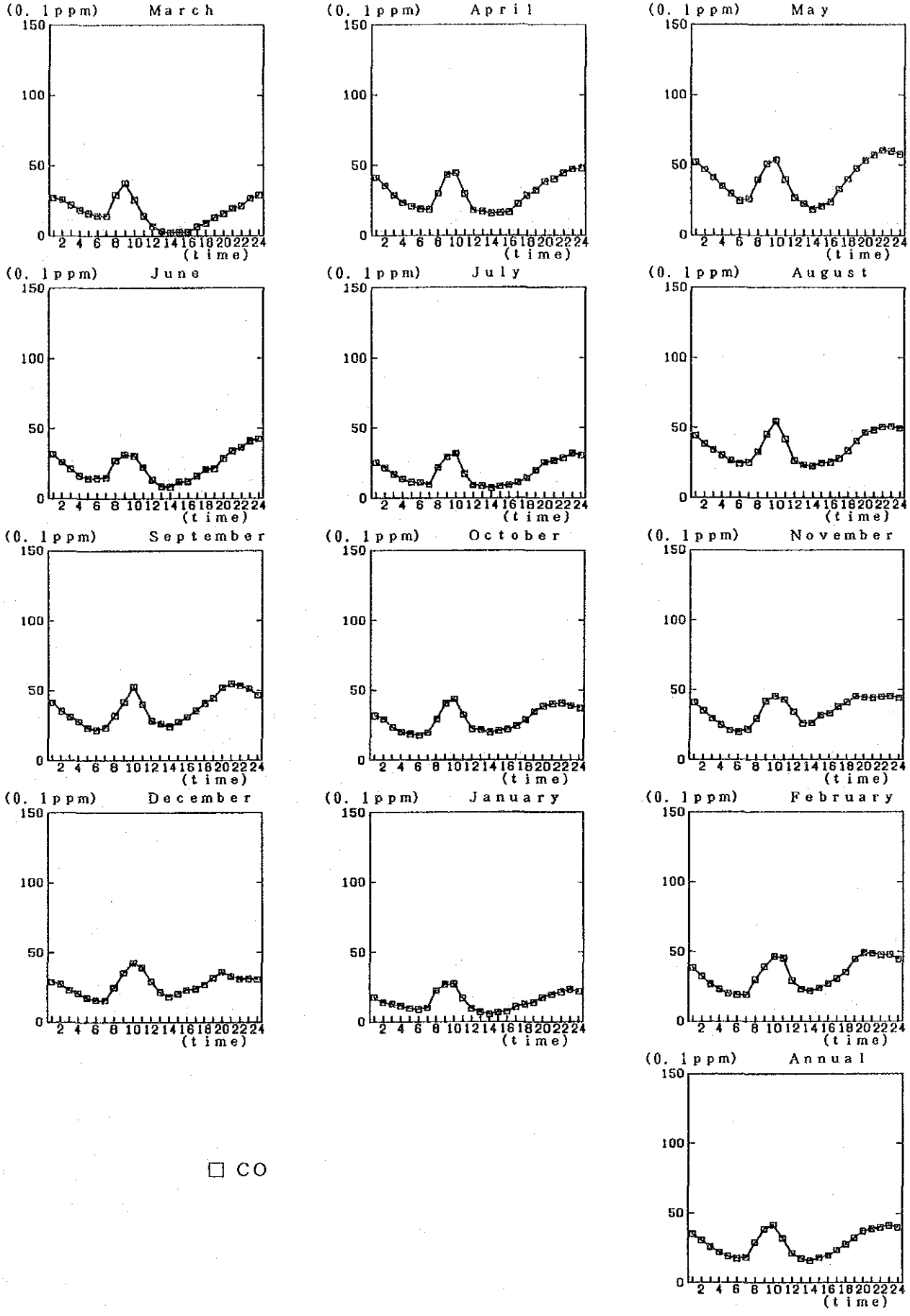
□ SO2

Diurnal Change of SO2 at Klang

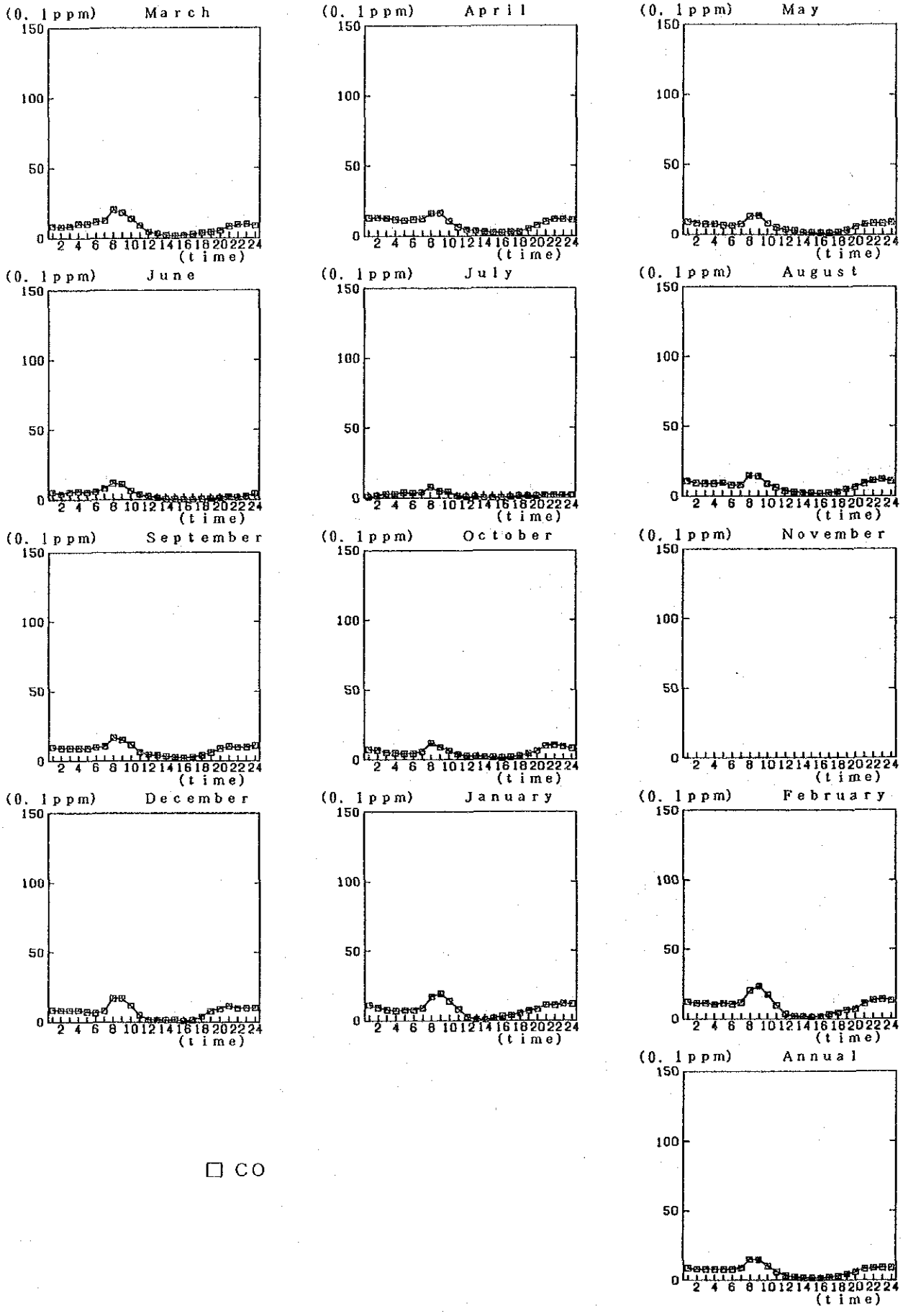


□ SO2

Diurnal Change of CO at Petaling Jaya

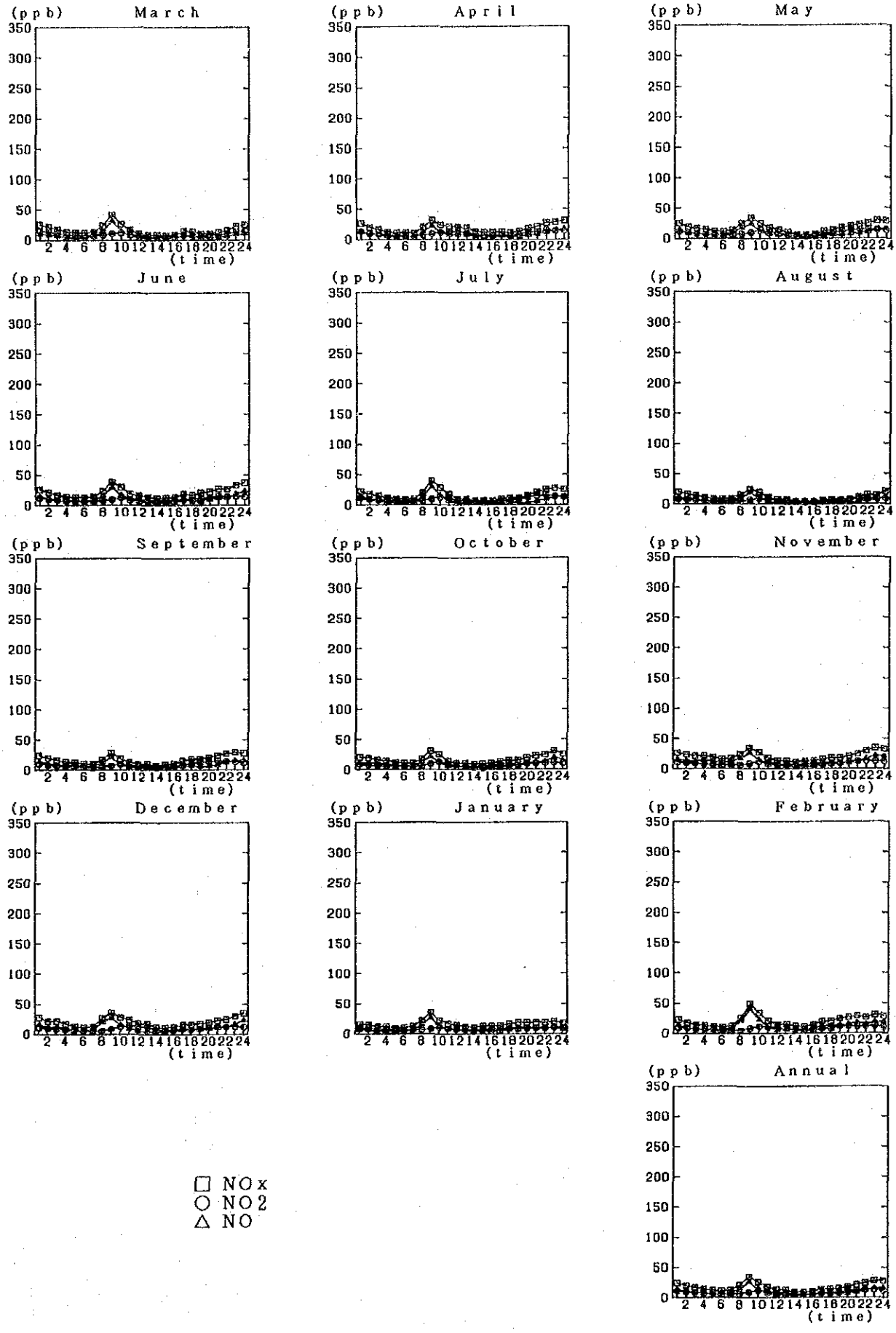


Diurnal Change of CO at Shah Alam

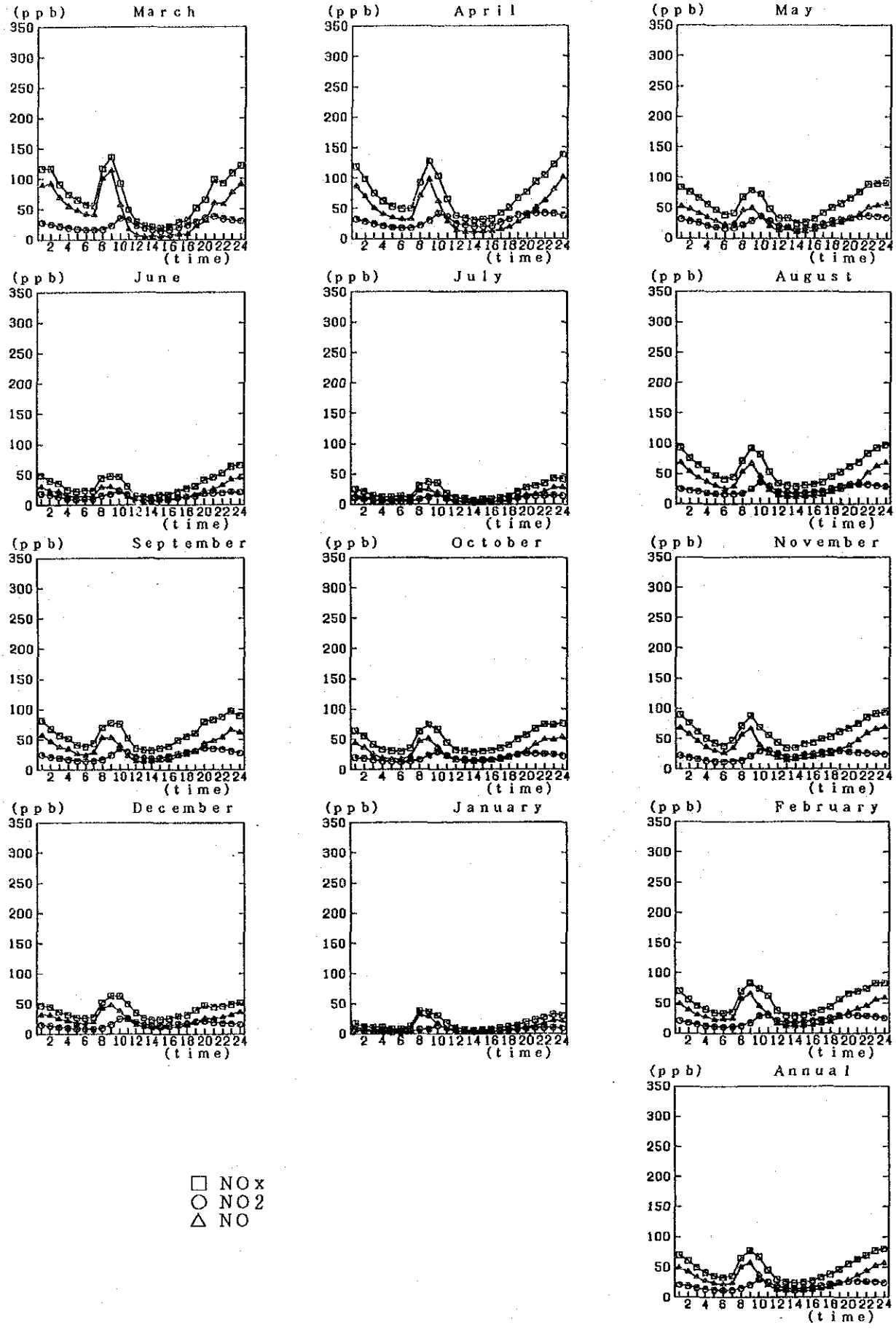


□ CO

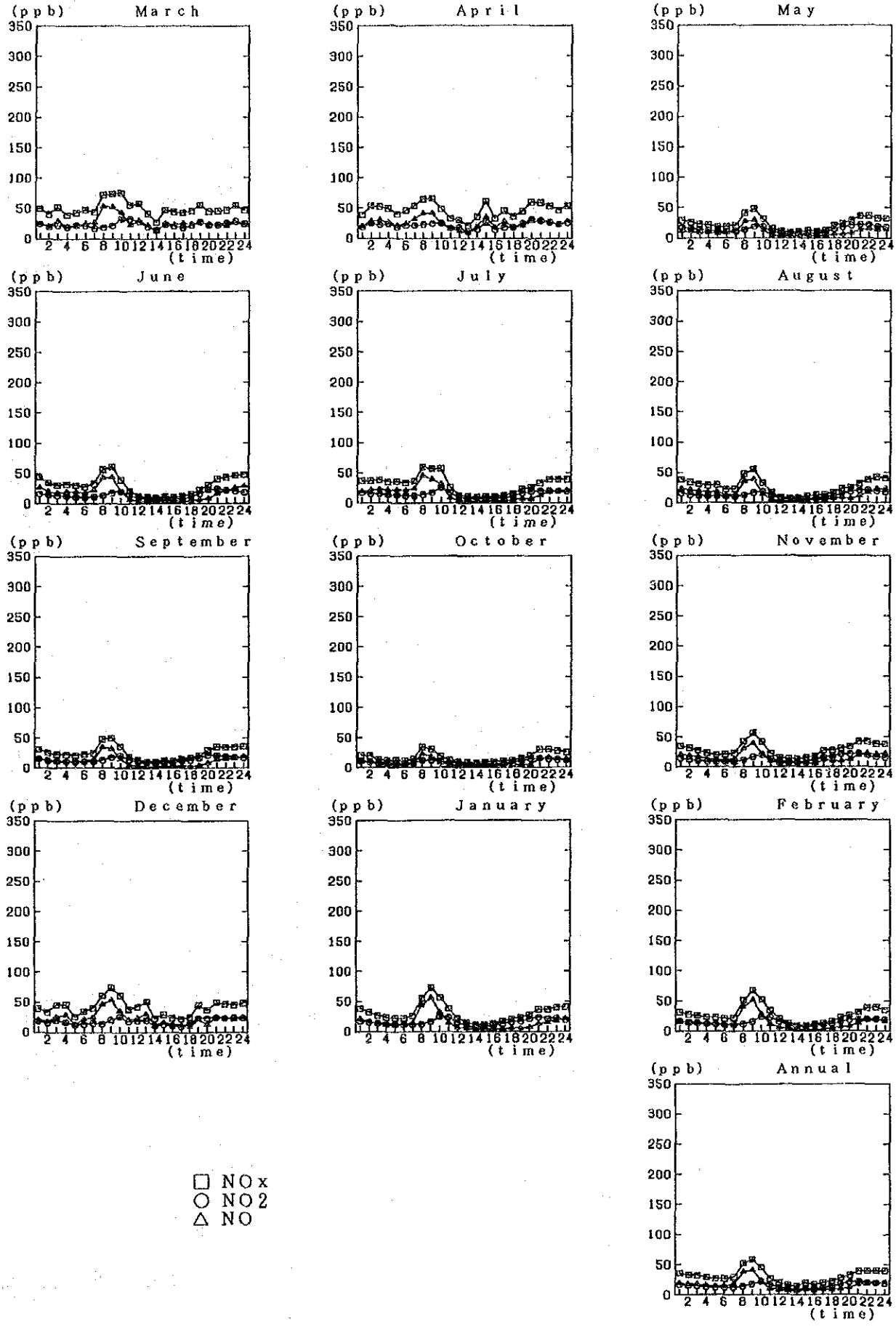
Diurnal Change of Nitrogen Oxides at UPM



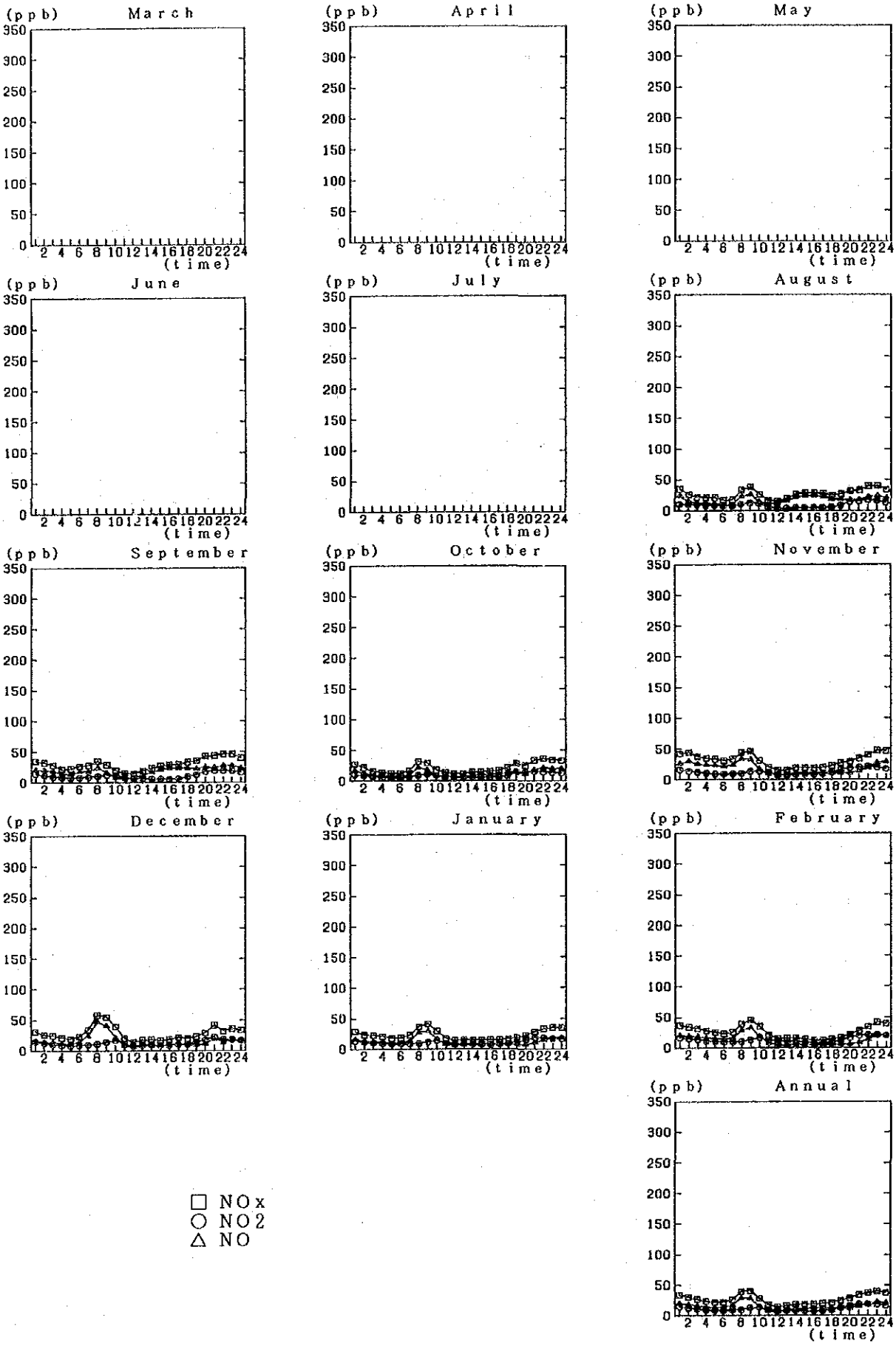
Diurnal Change of Nitrogen Oxides at Petaling Jaya



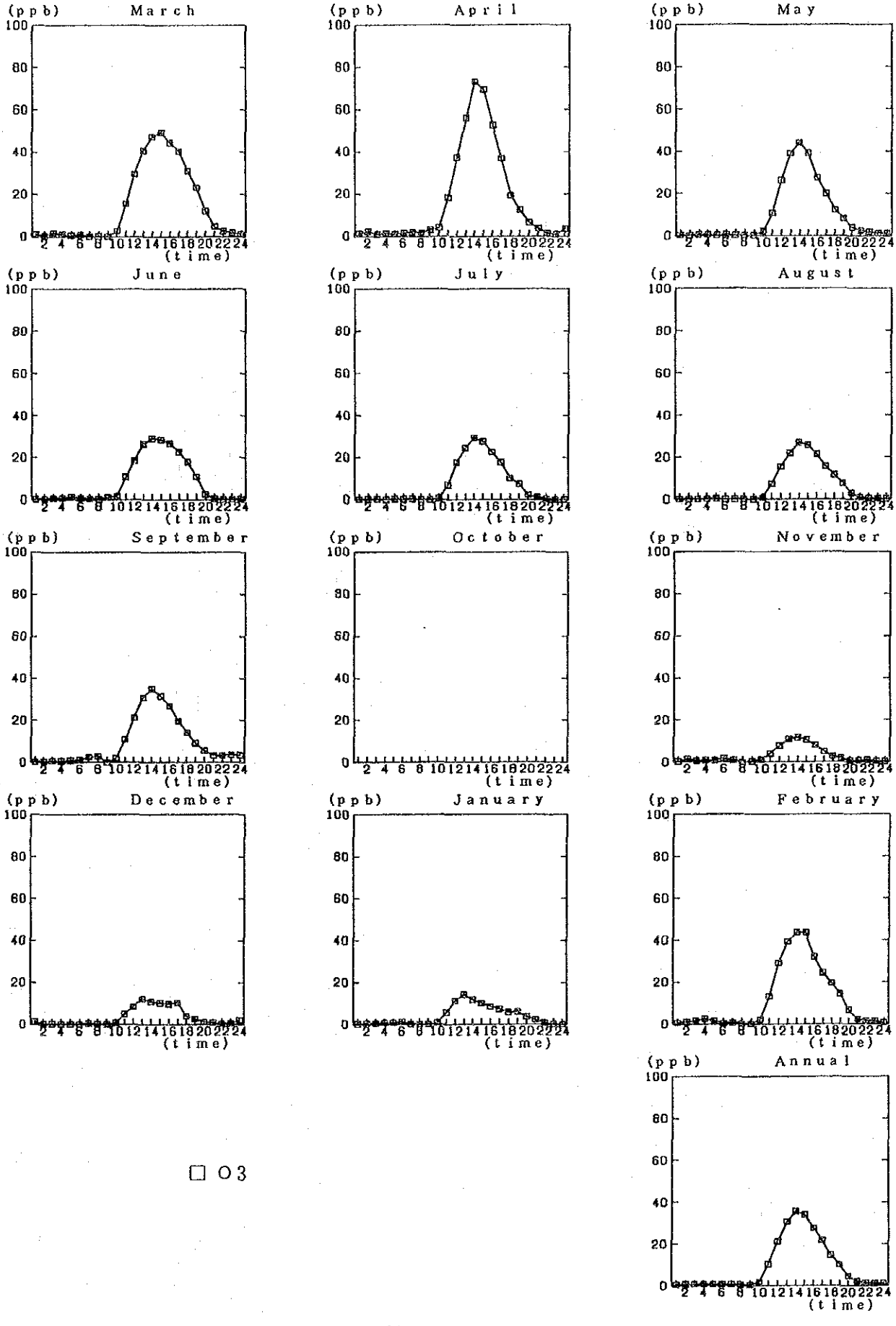
Diurnal Change of Nitrogen Oxides at Shah Alam



Diurnal Change of Nitrogen Oxides at Klang

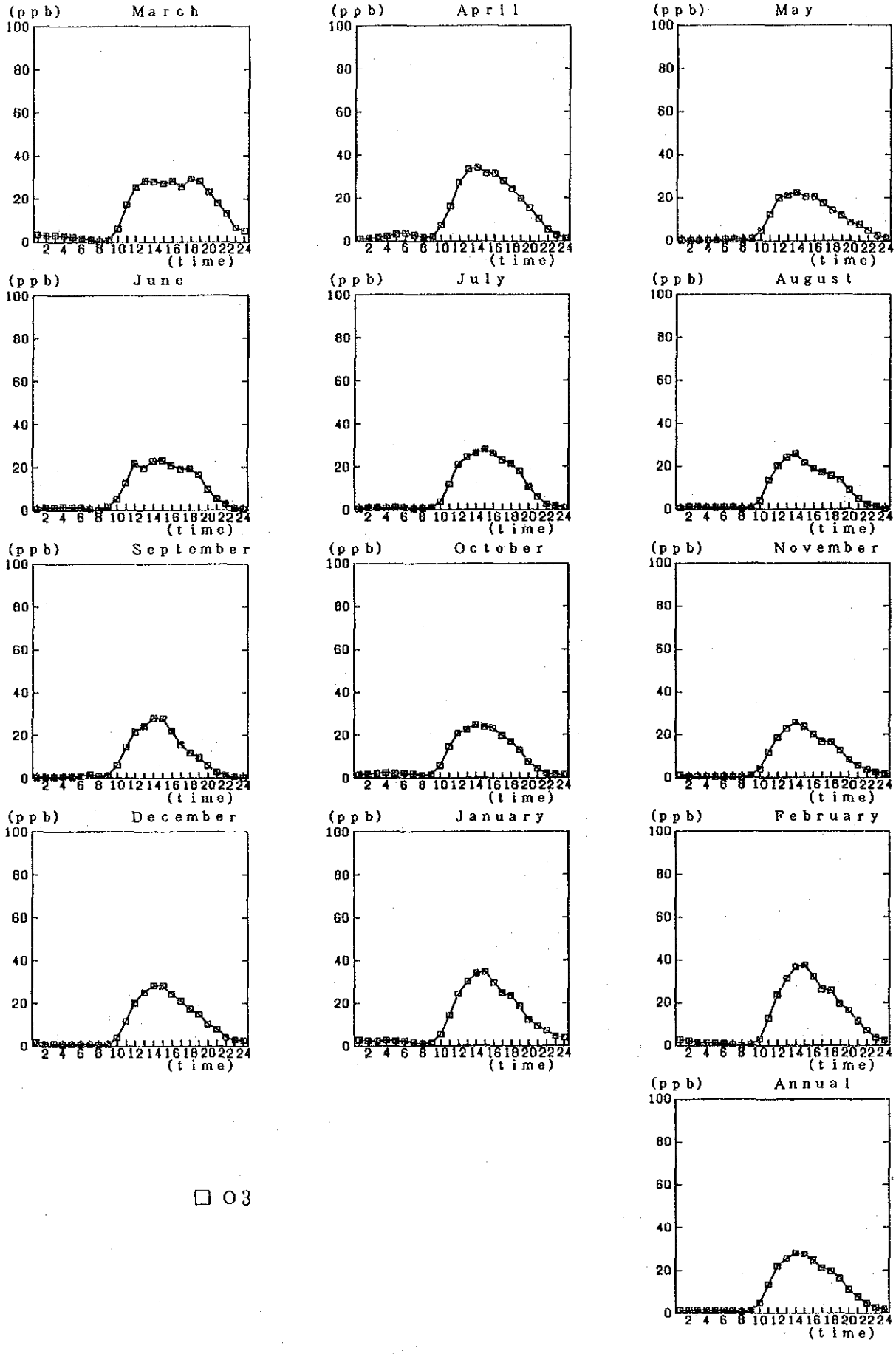


Diurnal Change of O3 at City Hall

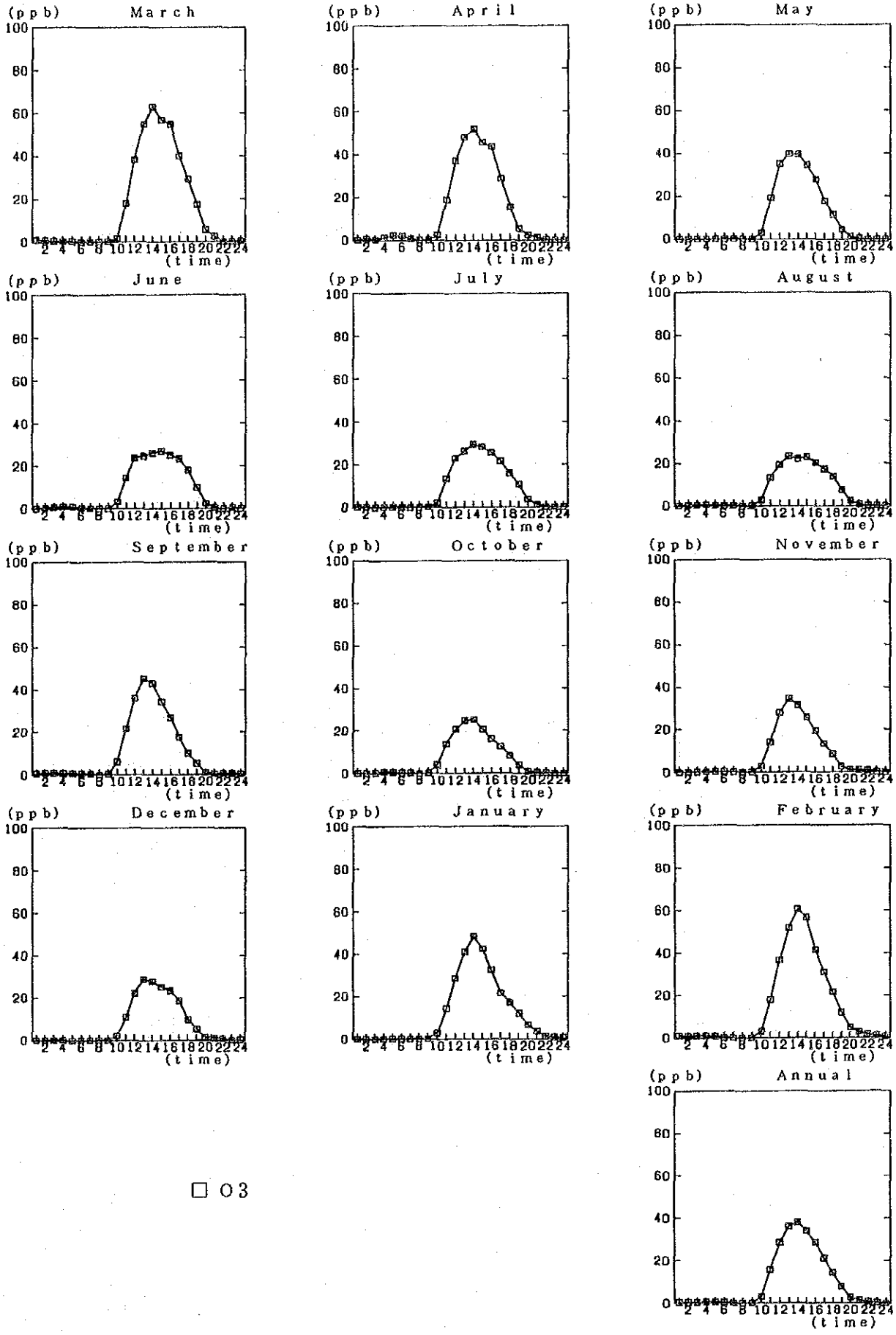


□ O3

Diurnal Change of O3 at UPM

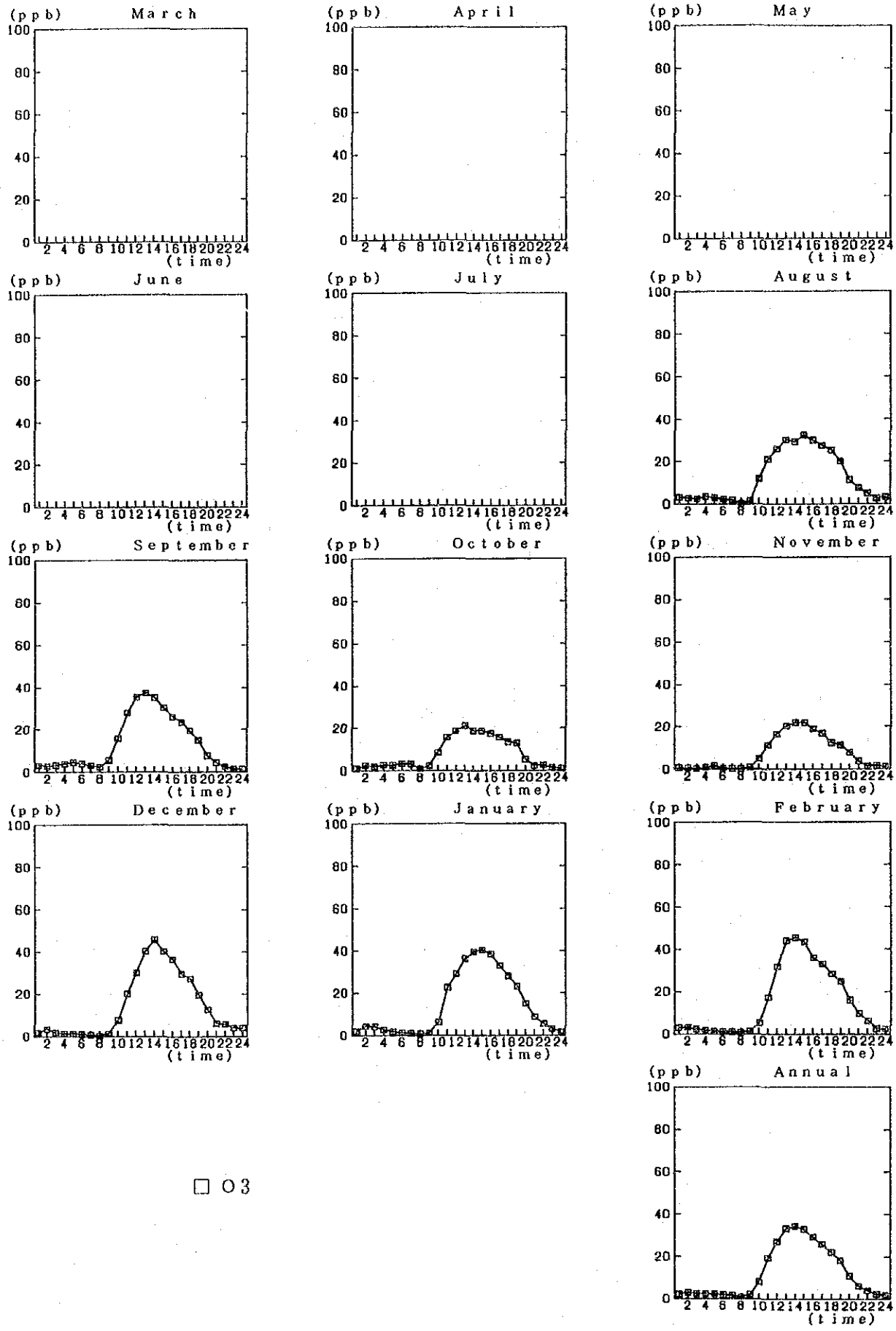


Diurnal Change of O3 at Petaling Jaya



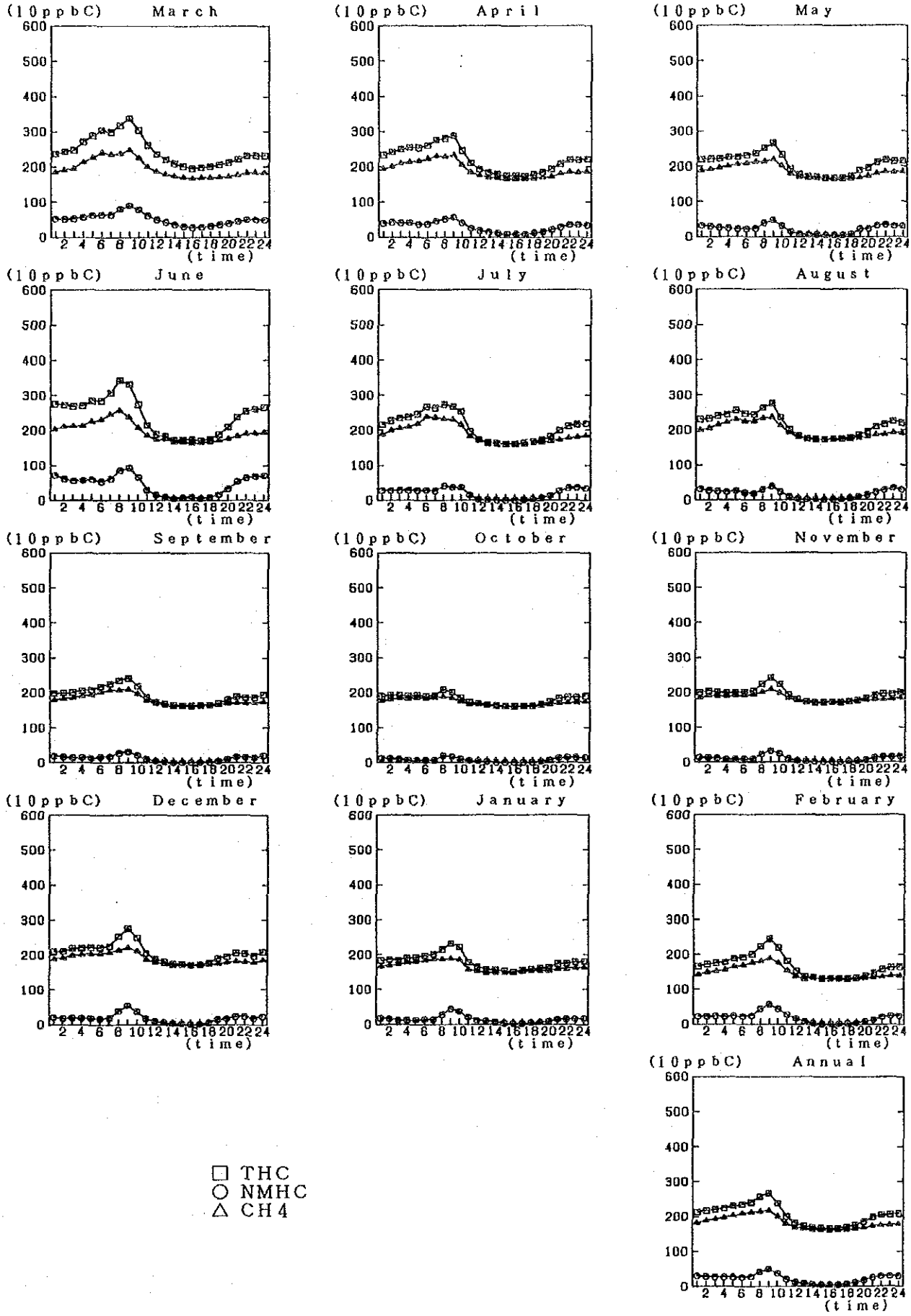
□ O3

Diurnal Change of O3 at Klang



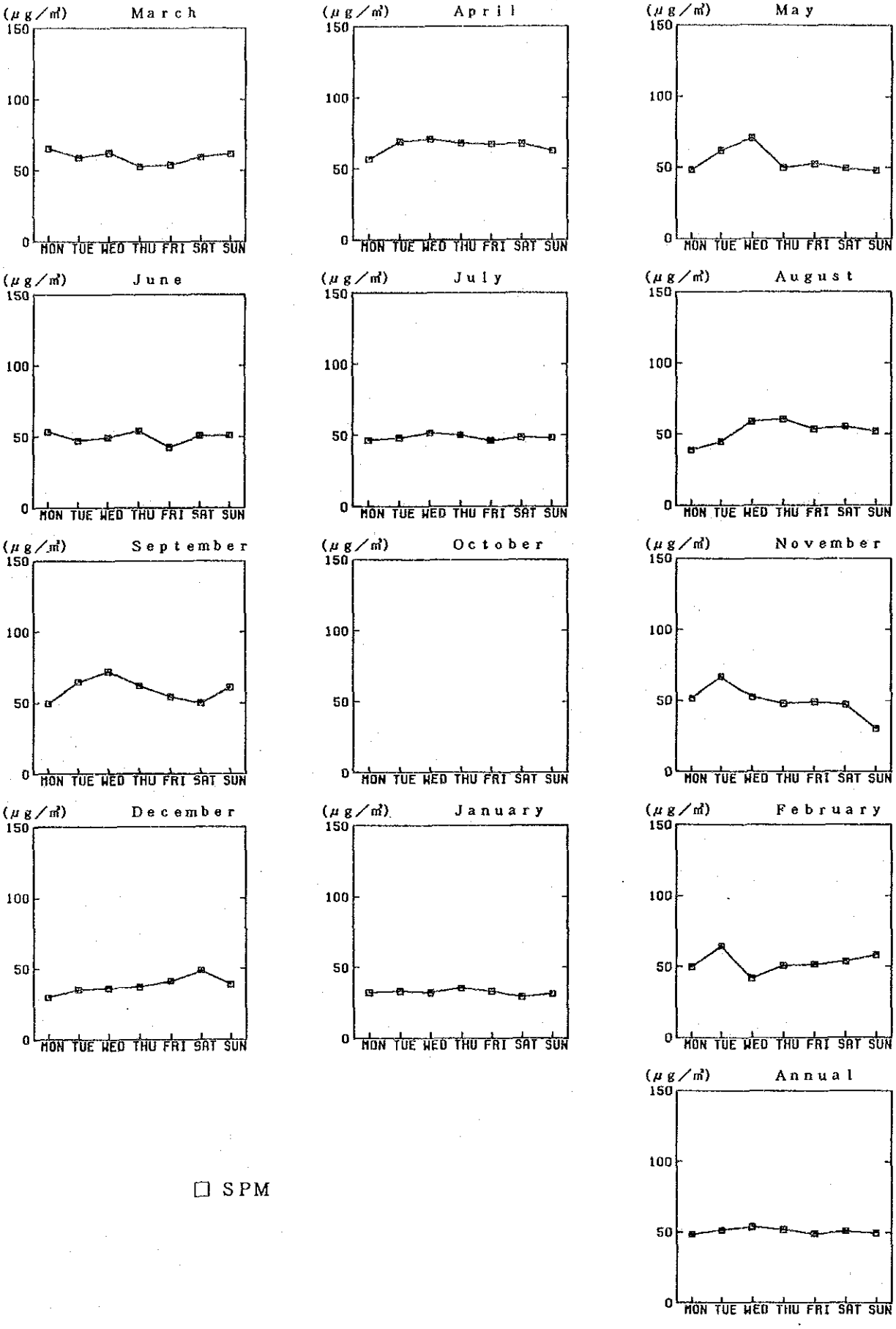
□ O3

Diurnal Change of Hydrocarbons at Shah Alam

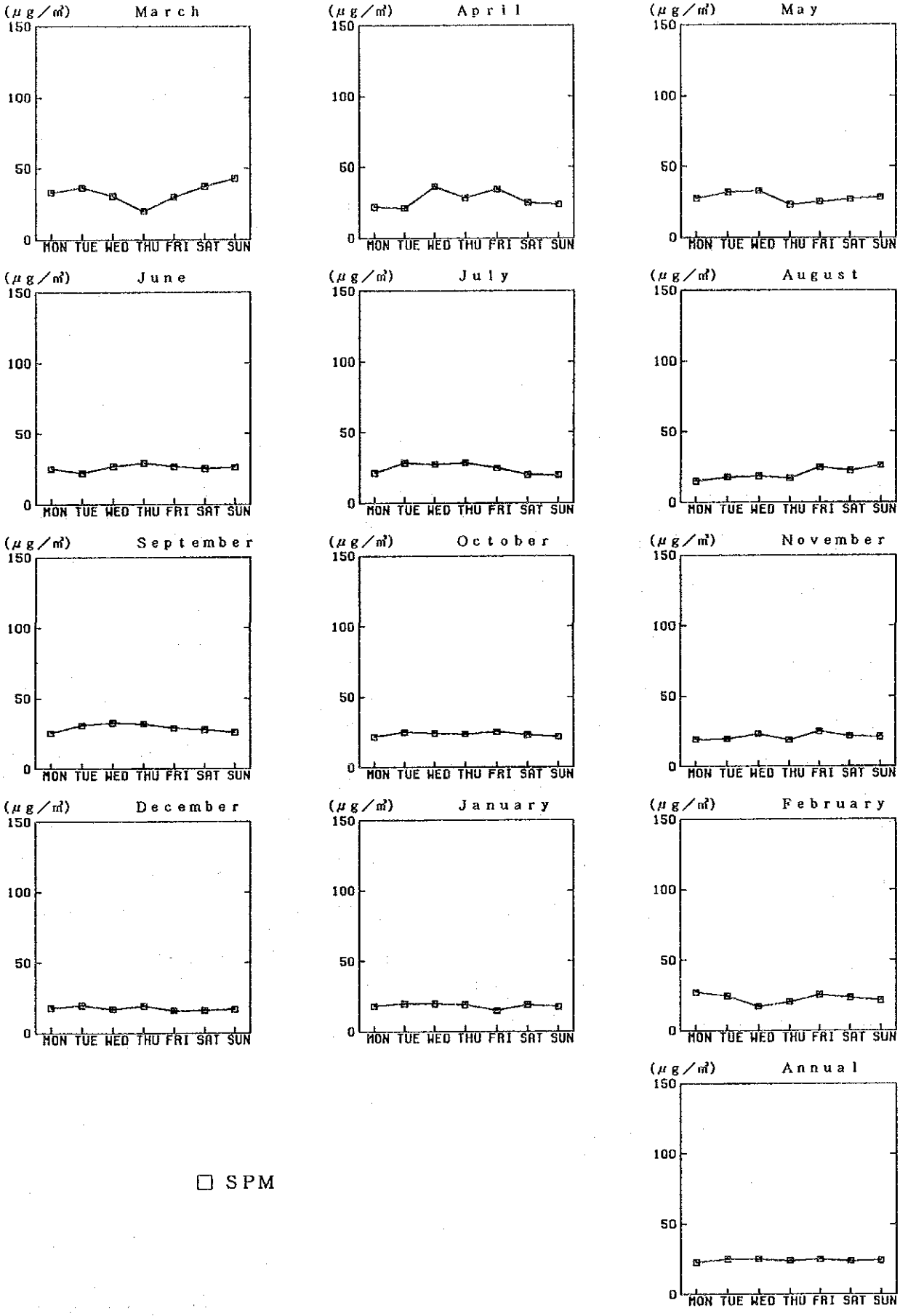


2.1.3 Weekly Change of Pollutant Concentration

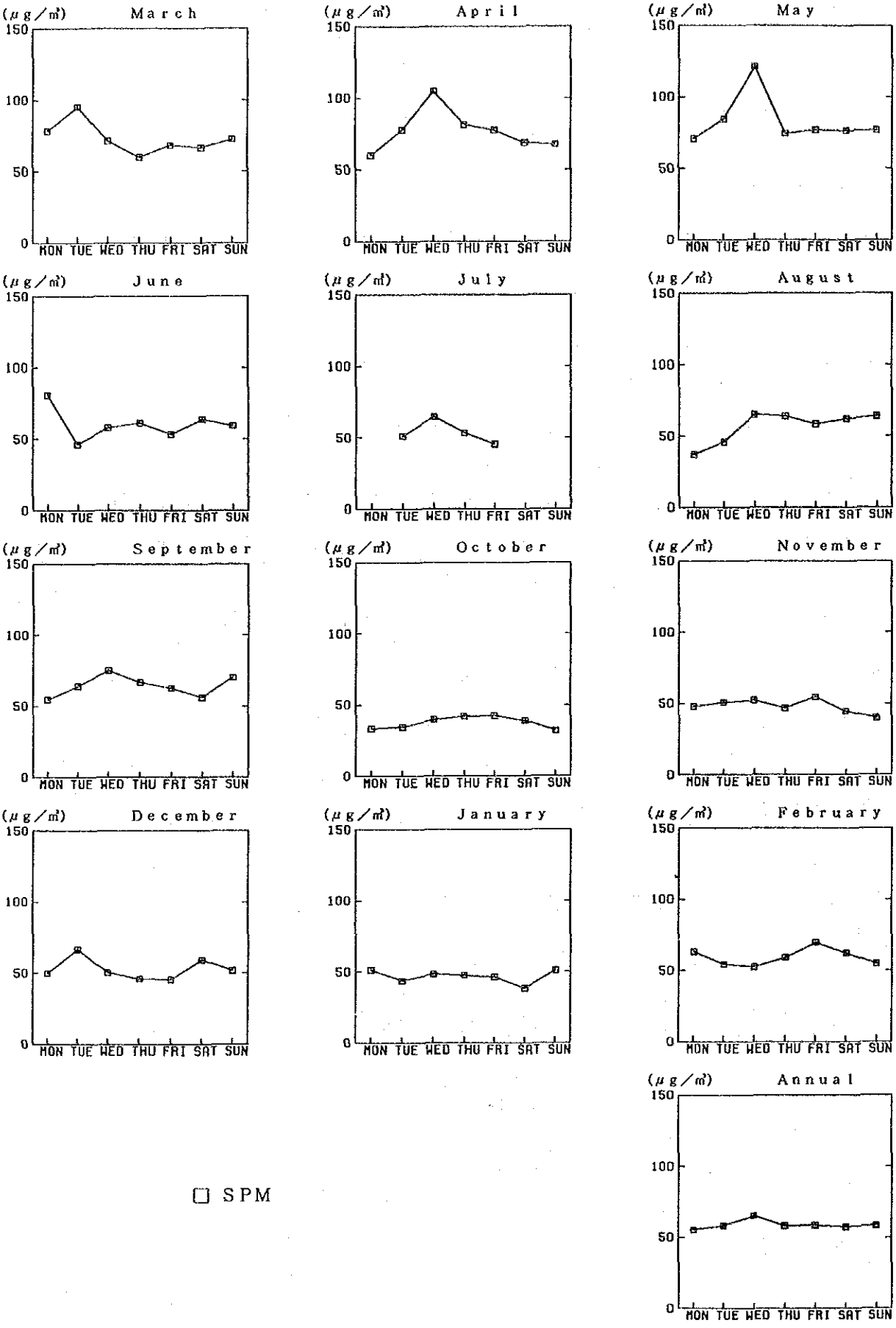
Weekly Change of SPM at City Hall



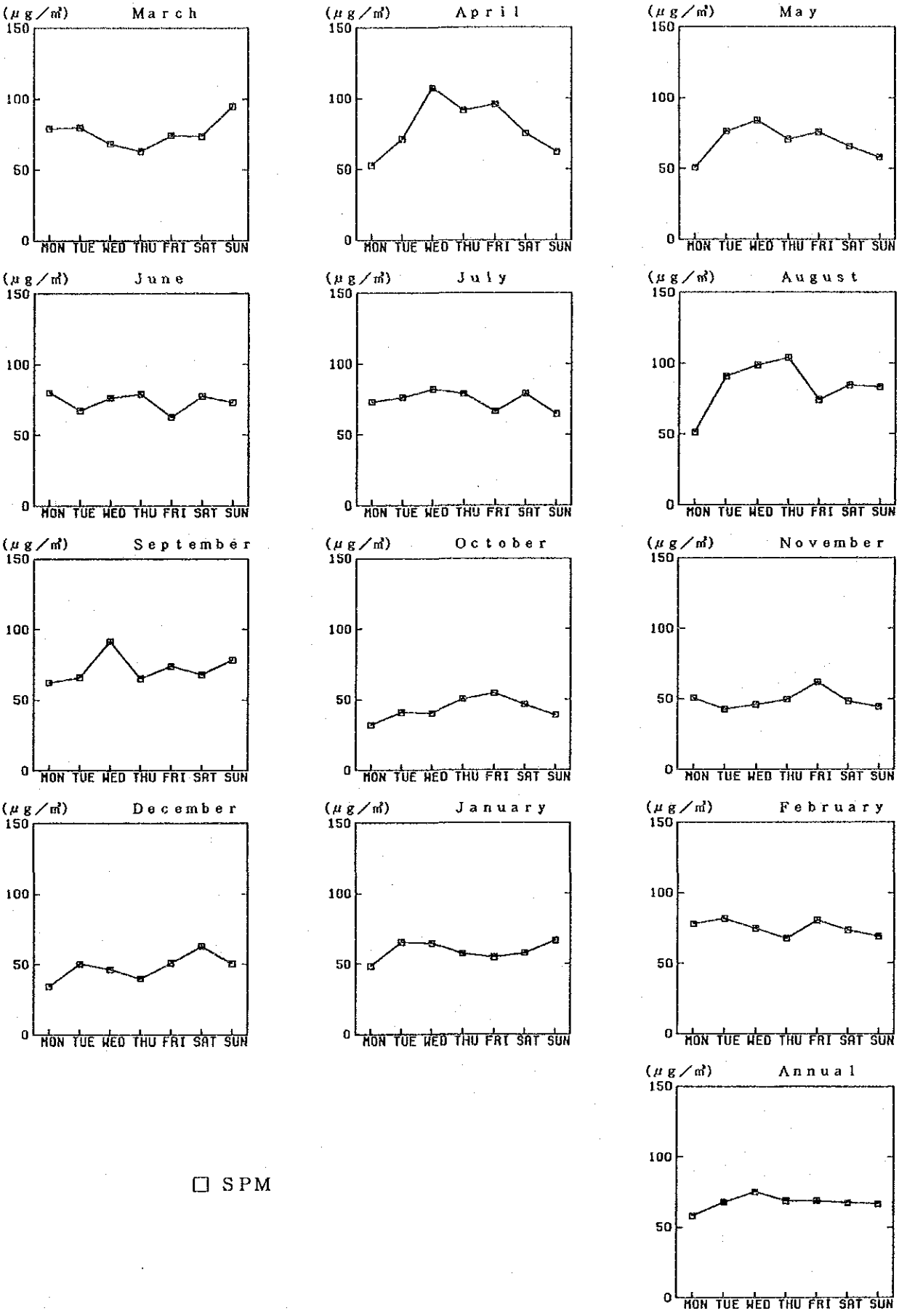
Weekly Change of SPM at UPM



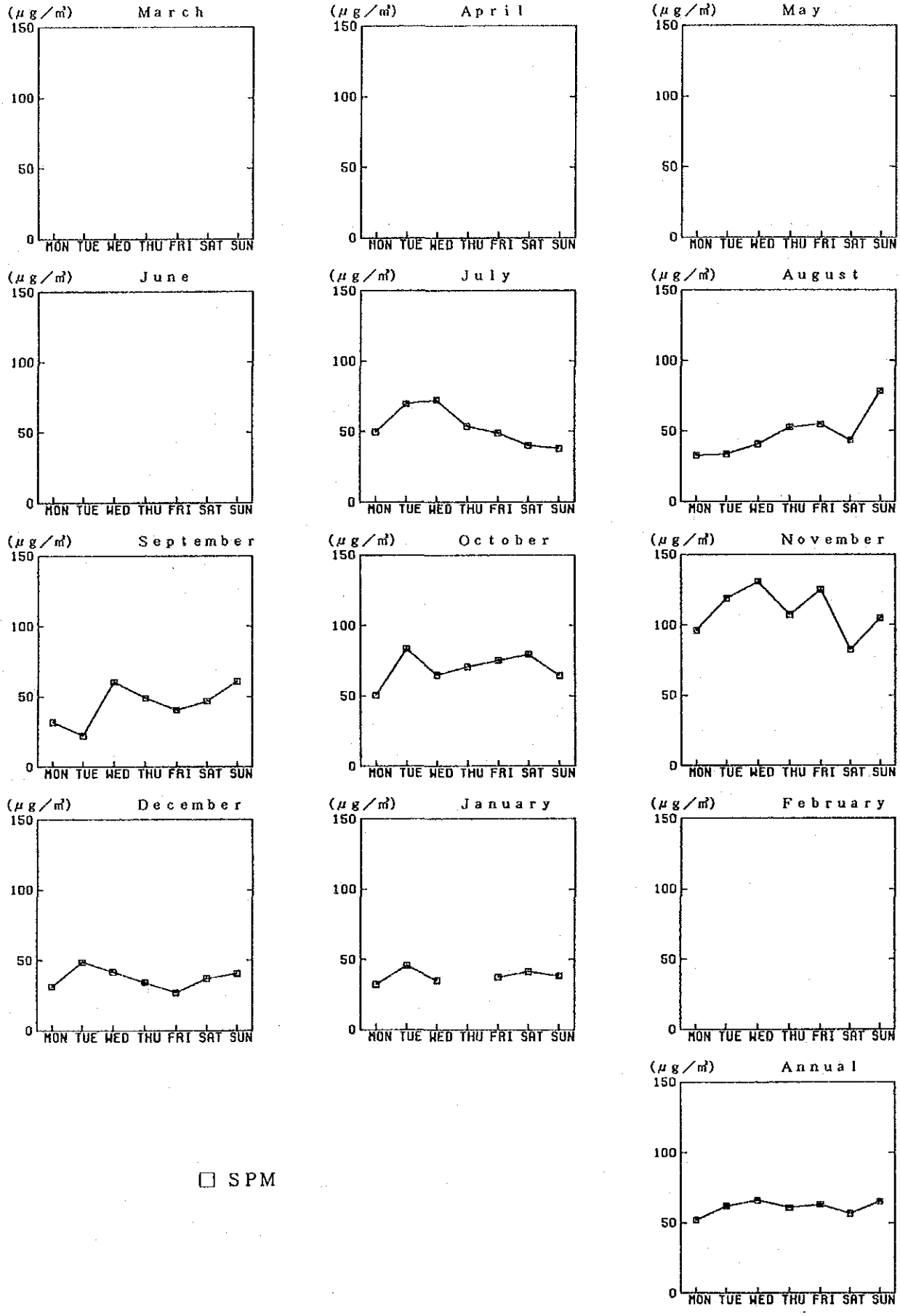
Weekly Change of SPM at Petaling Jaya



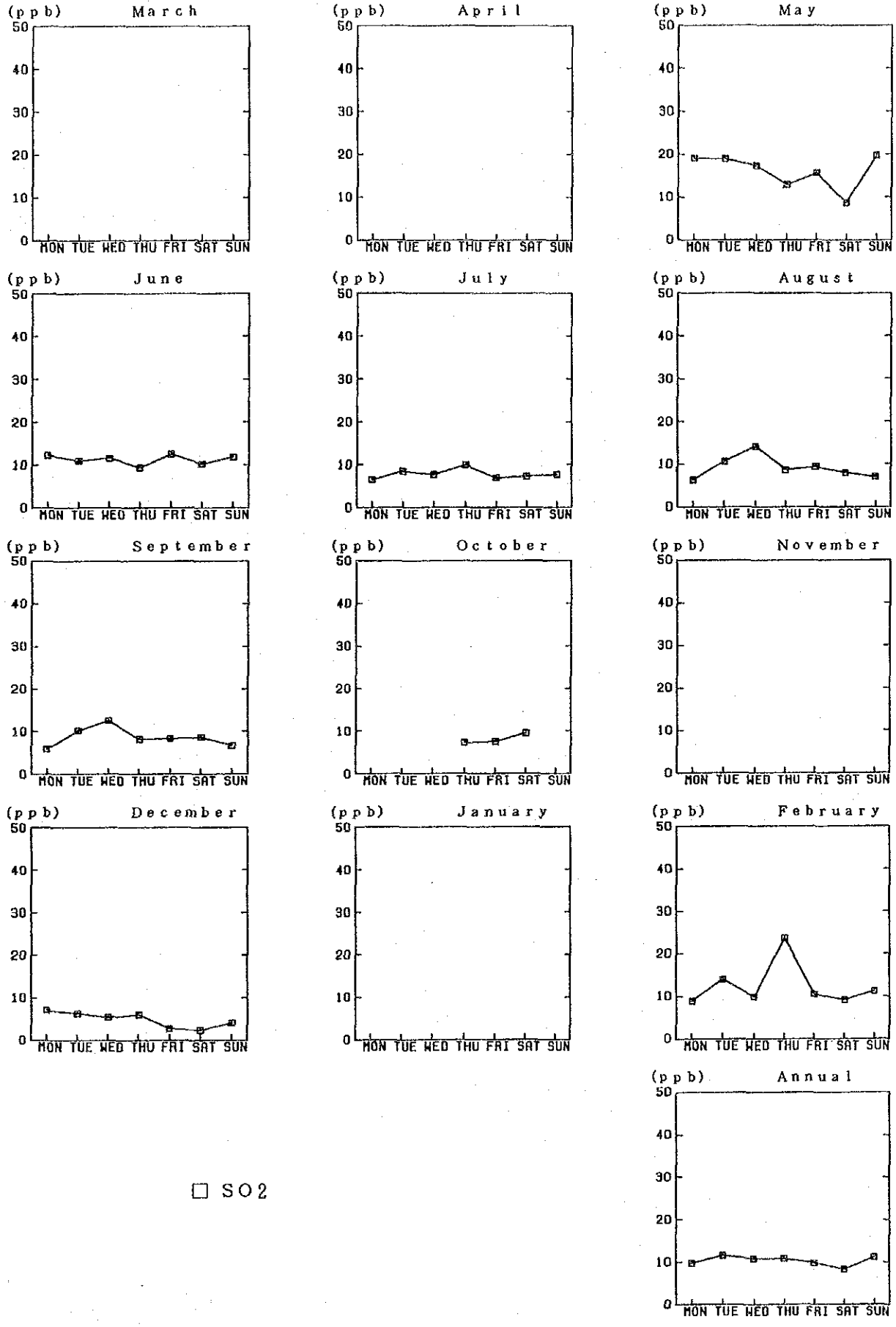
Weekly Change of SPM at Shah Alam



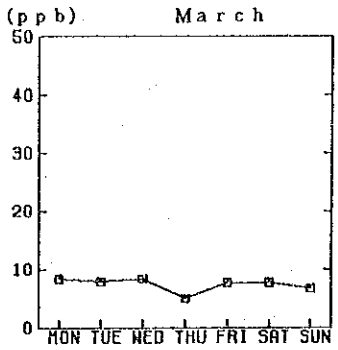
Weekly Change of SPM at Klang

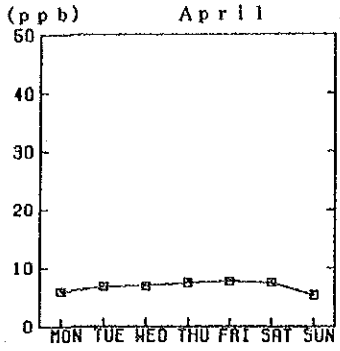


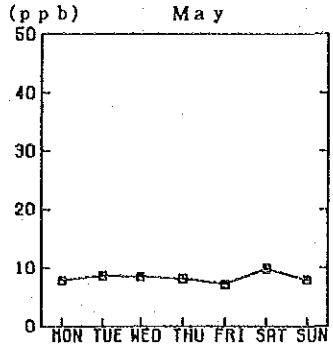
Weekly Change of SO2 at City Hall

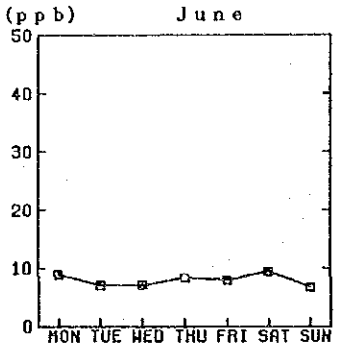


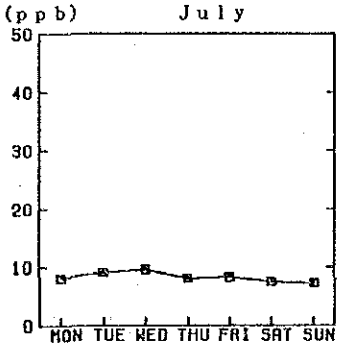
Weekly Change of SO2 at UPM

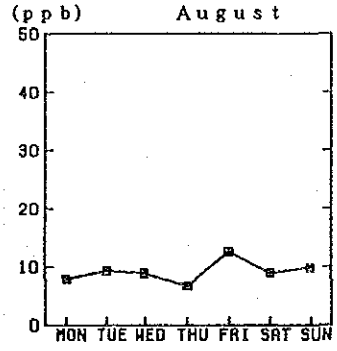


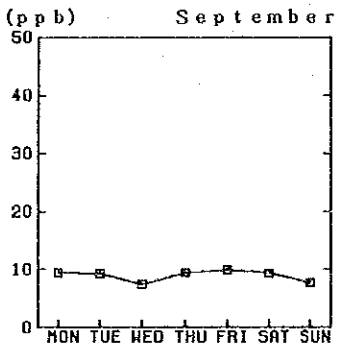


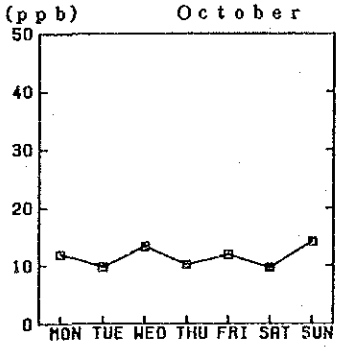


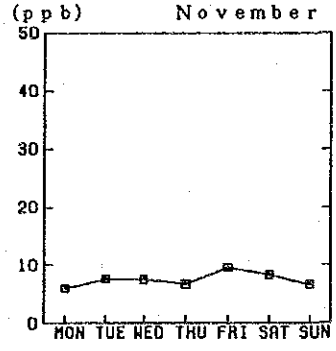


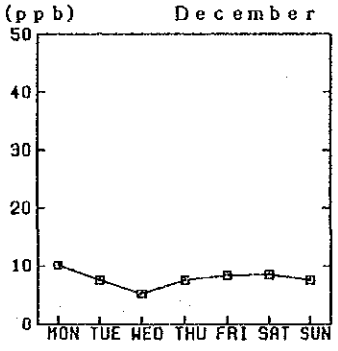


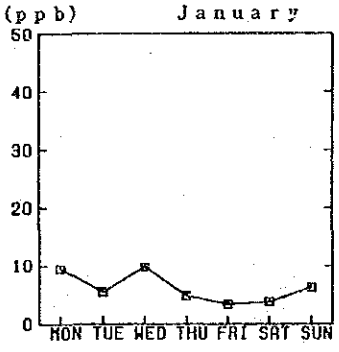


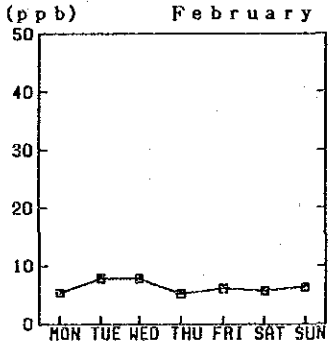


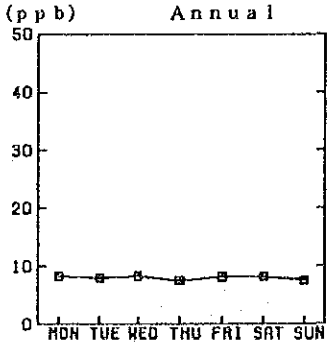






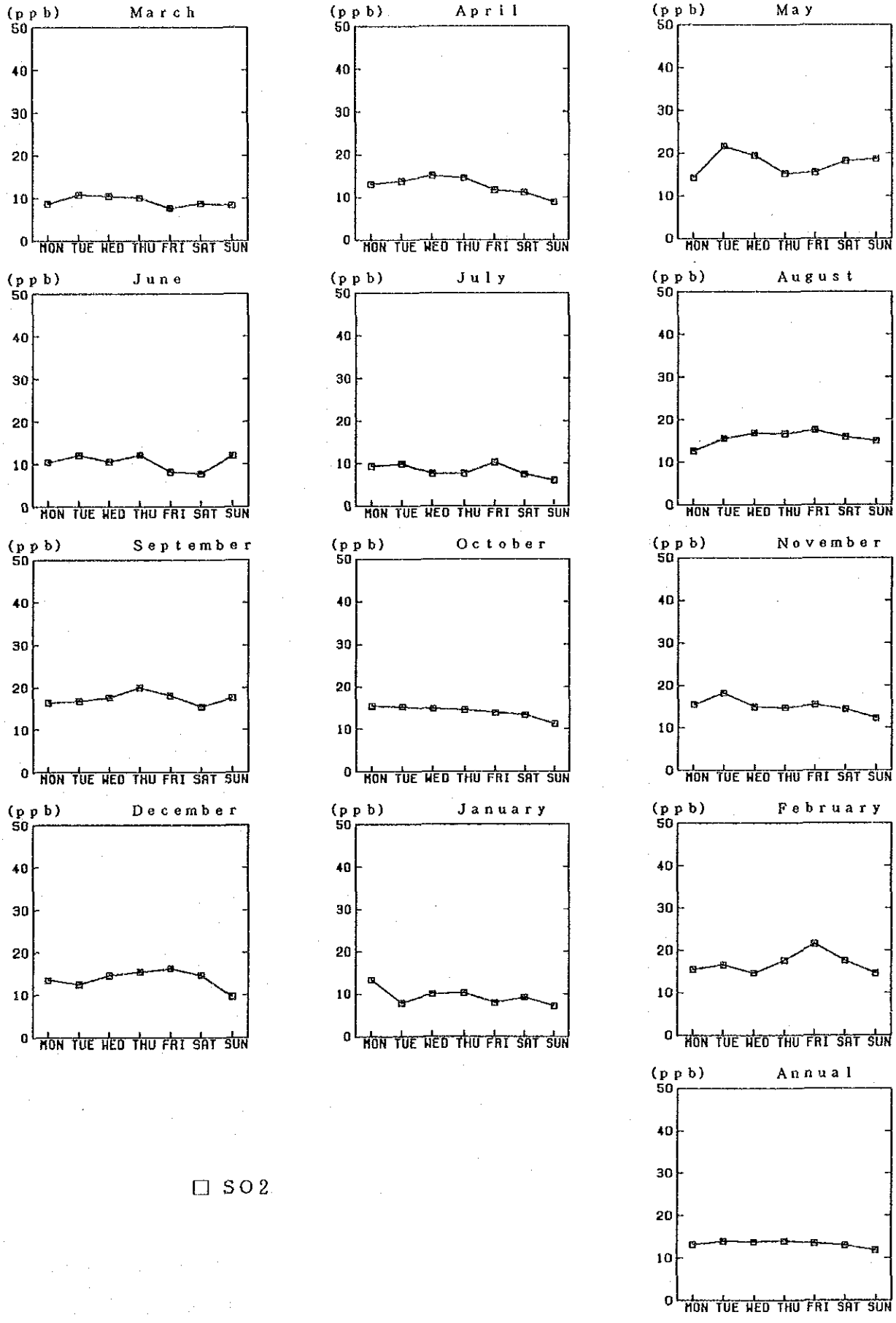






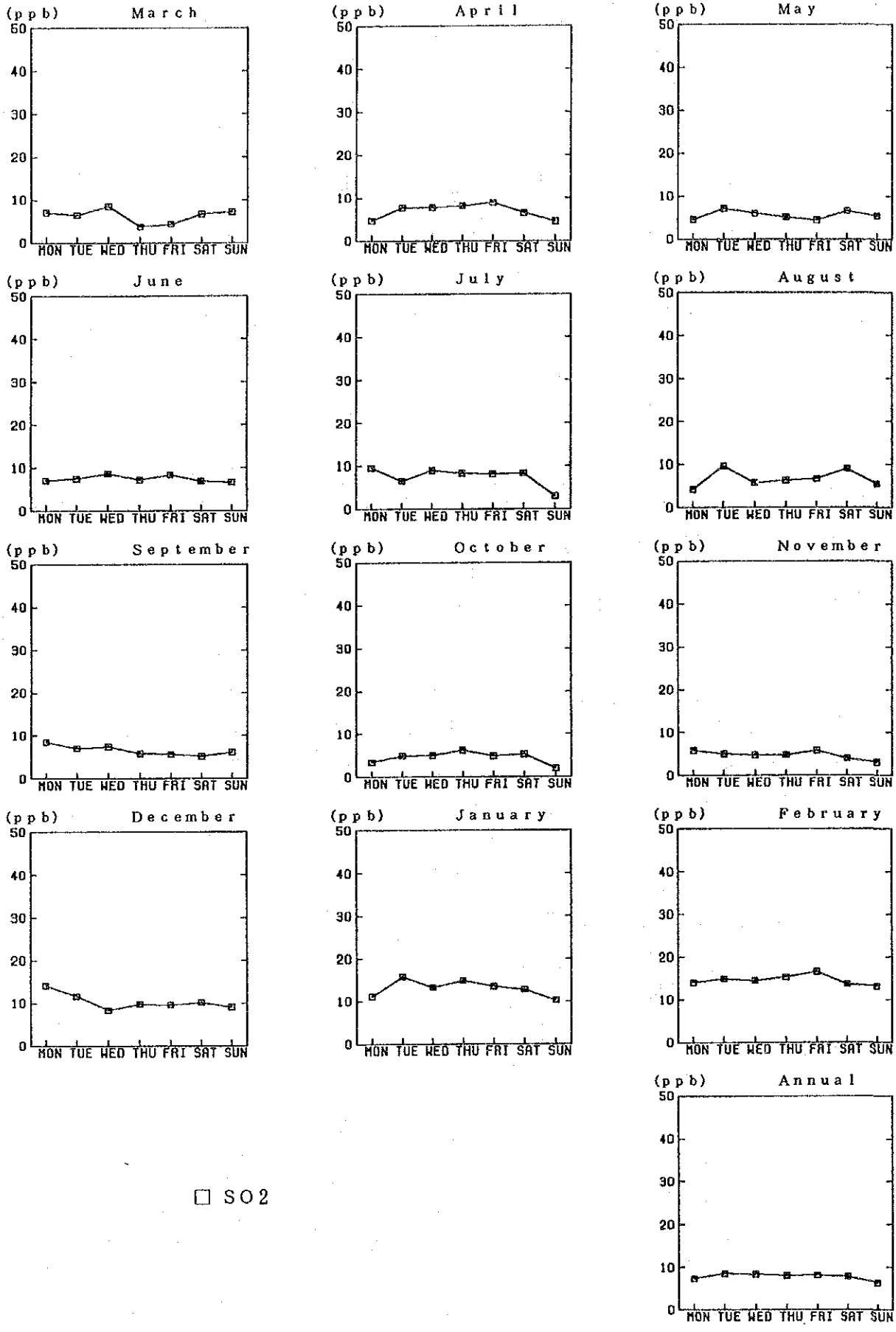
□ SO2

Weekly Change of SO2 at Petaling Jaya

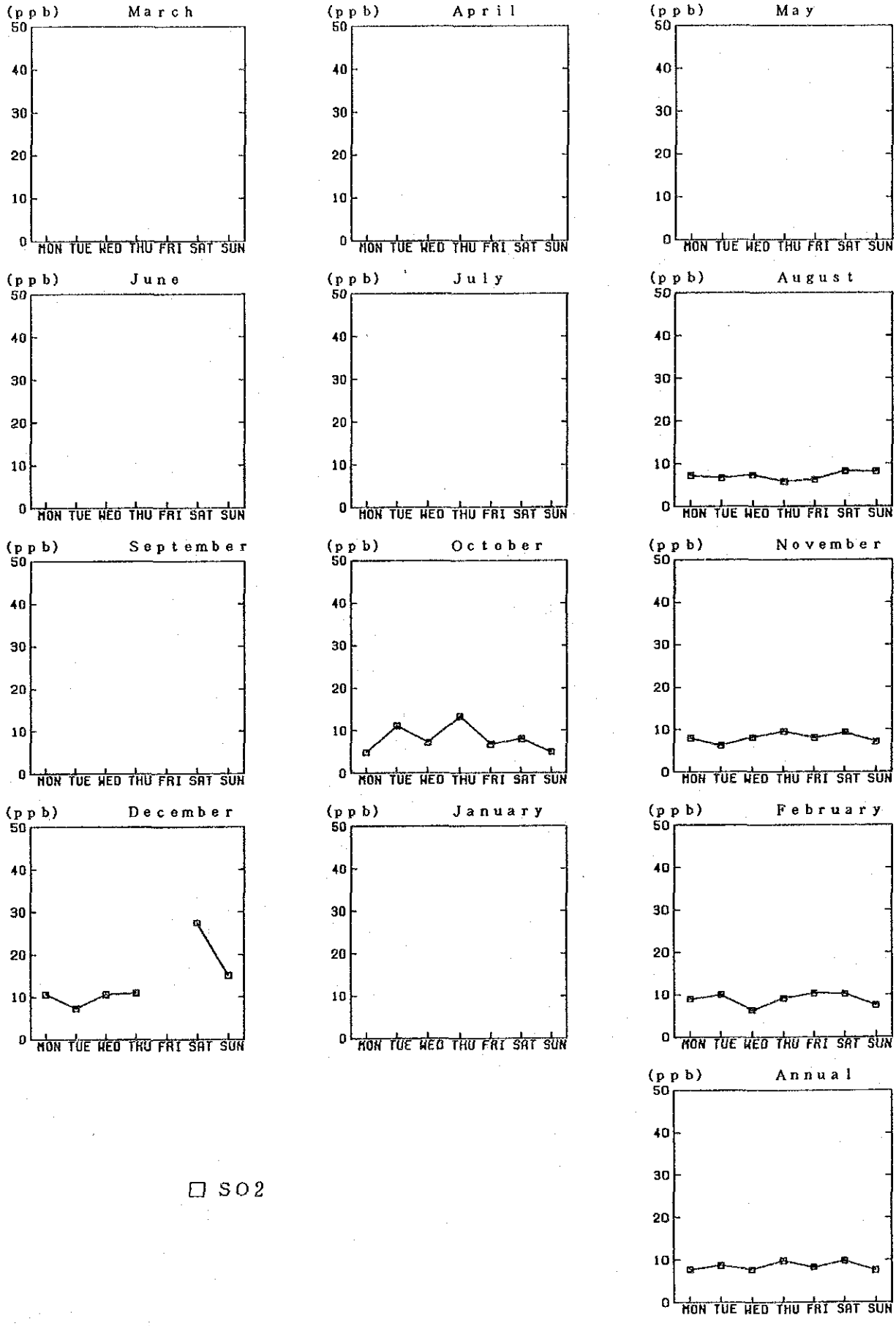


□ SO2

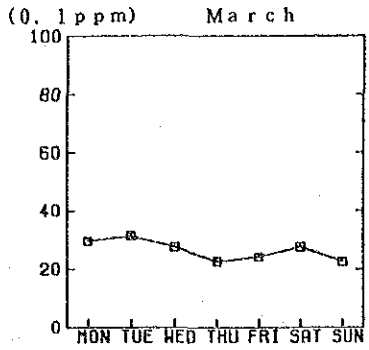
Weekly Change of SO2 at Shah Alam

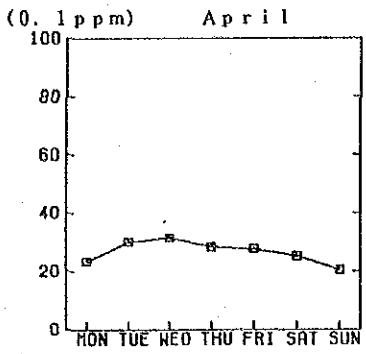


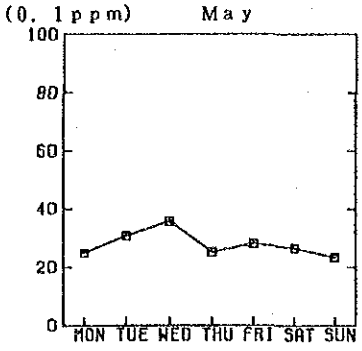
Weekly Change of SO2 at Klang

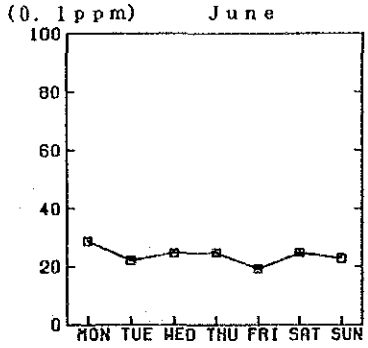


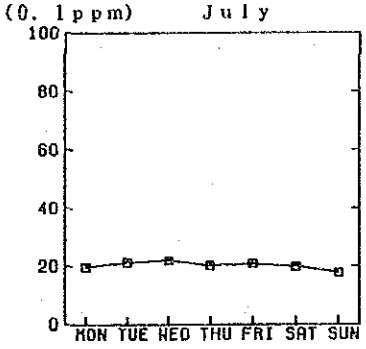
Weekly Change of CO at City Hall

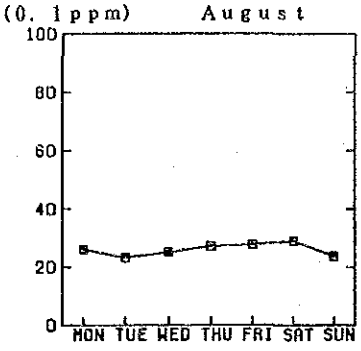


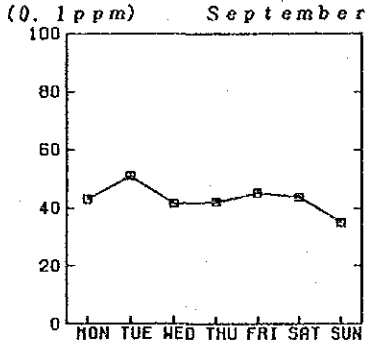


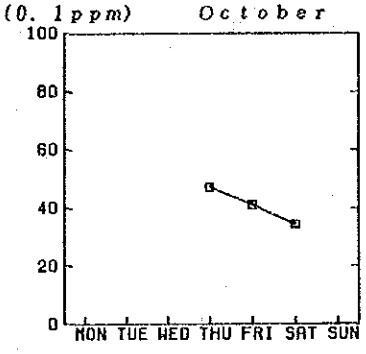


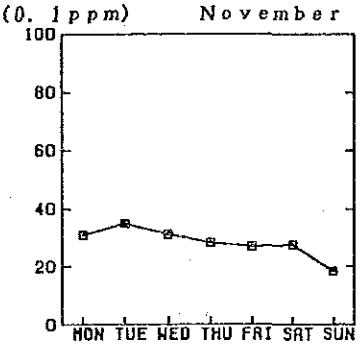


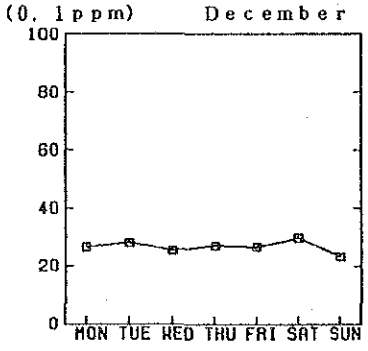


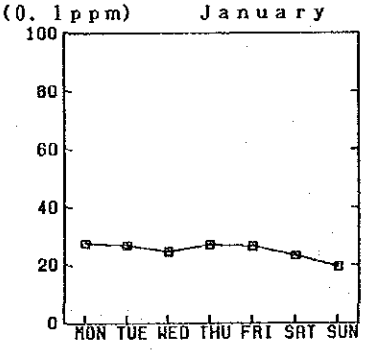


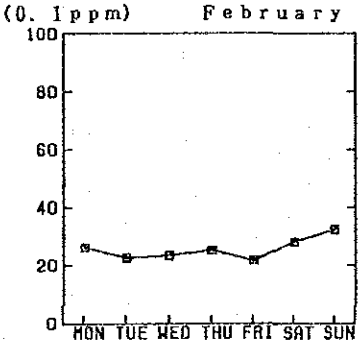


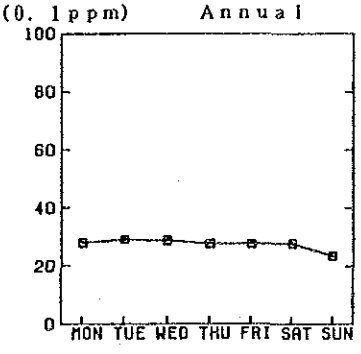






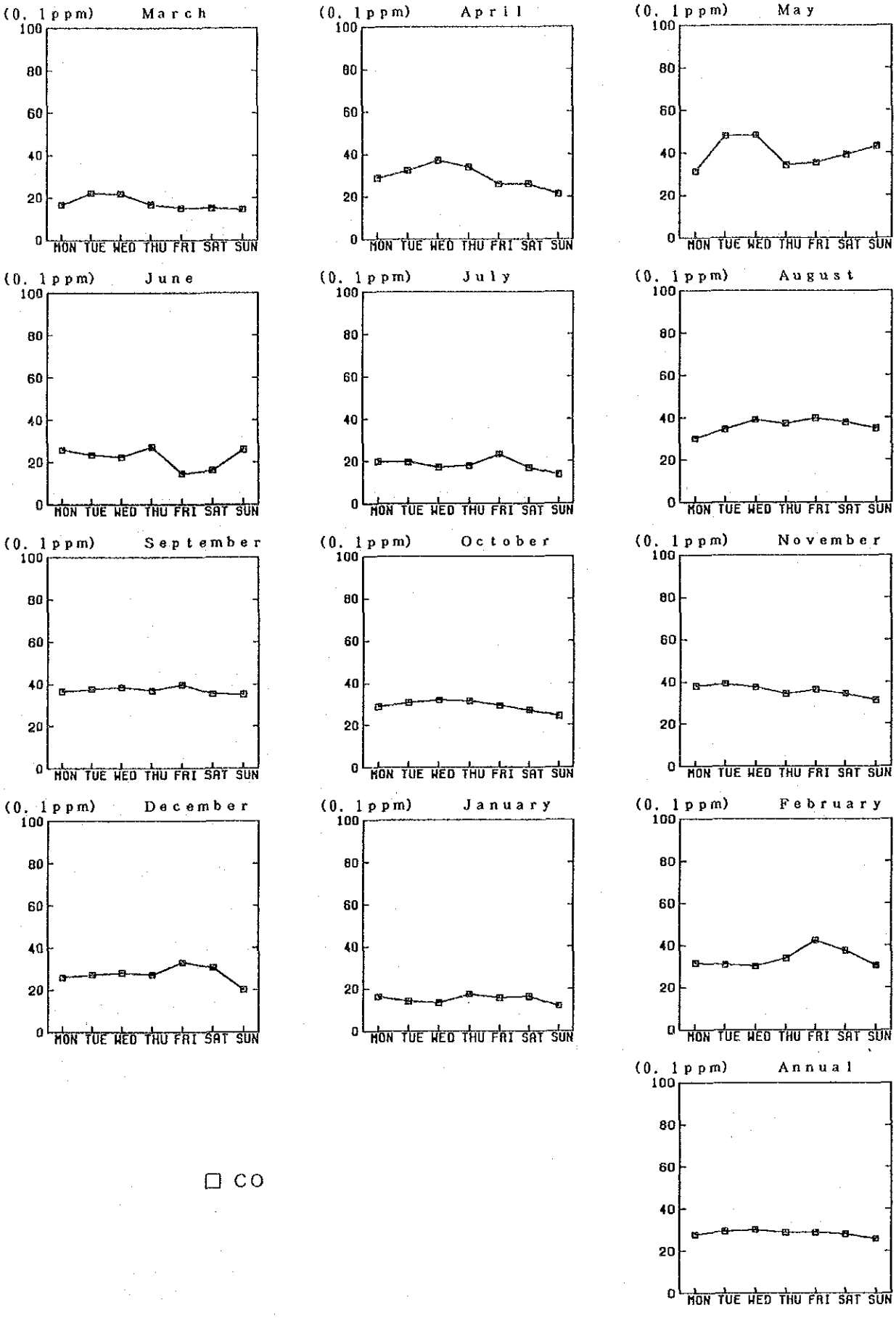




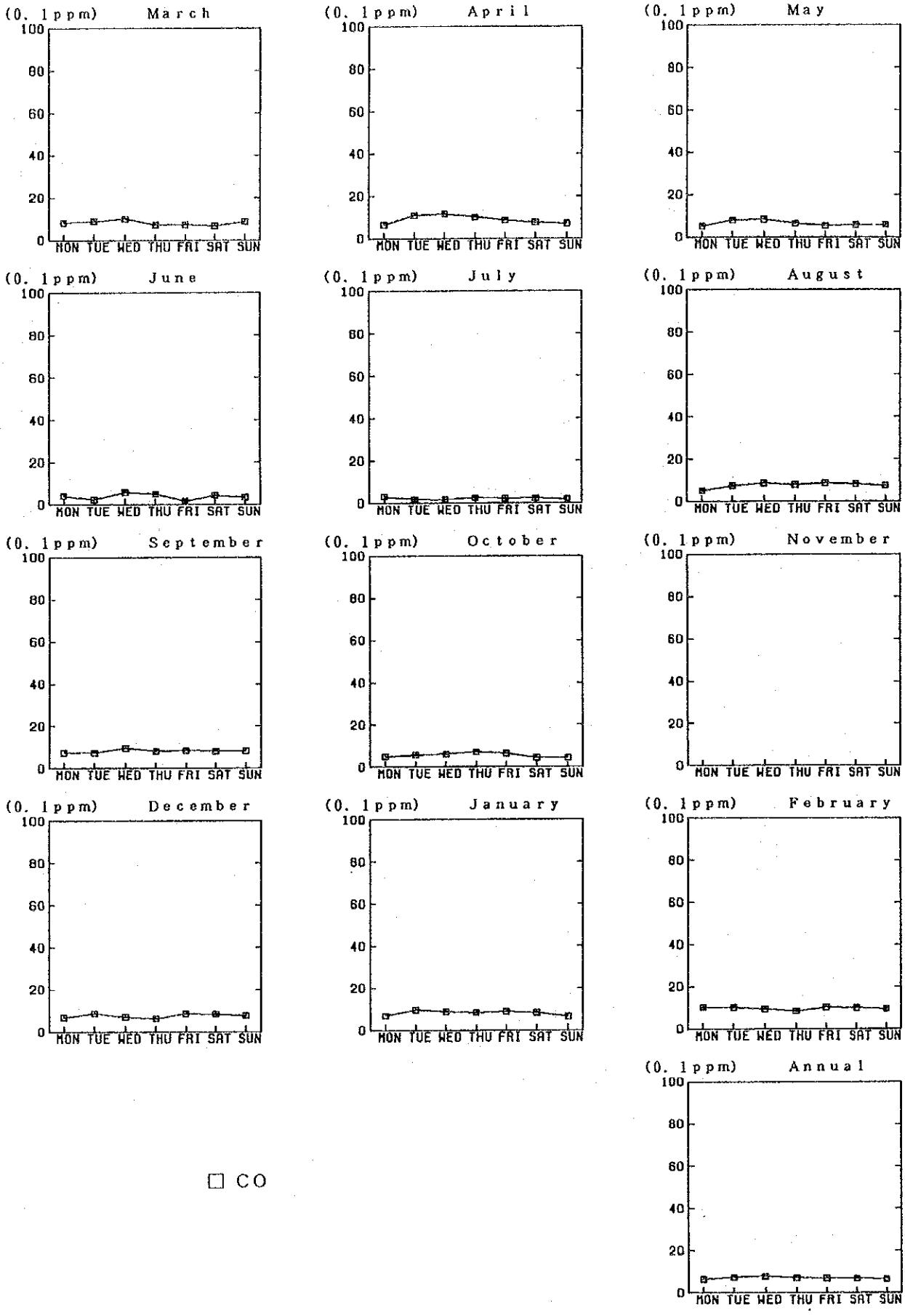


□ CO

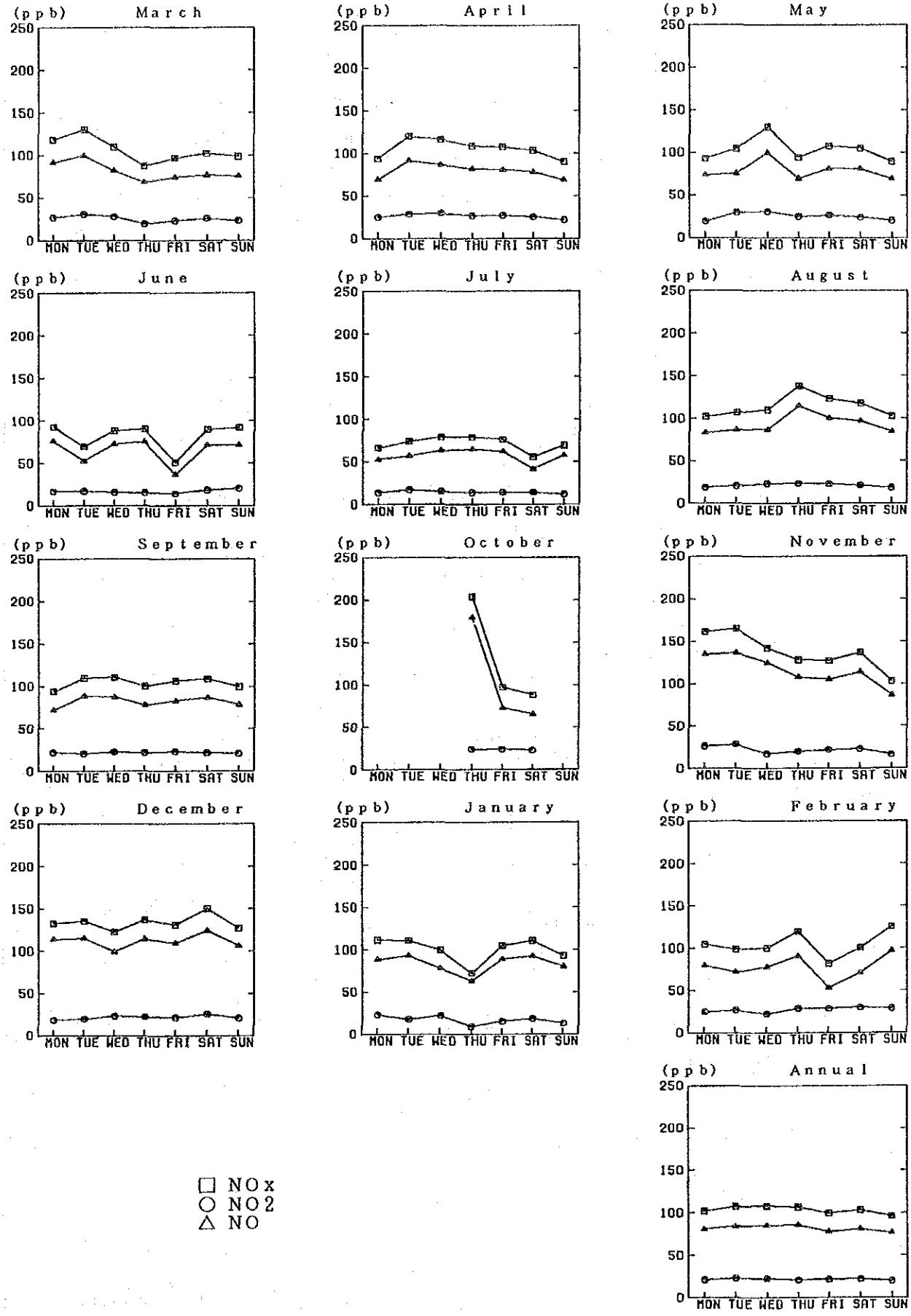
Weekly Change of CO at Petaling Jaya



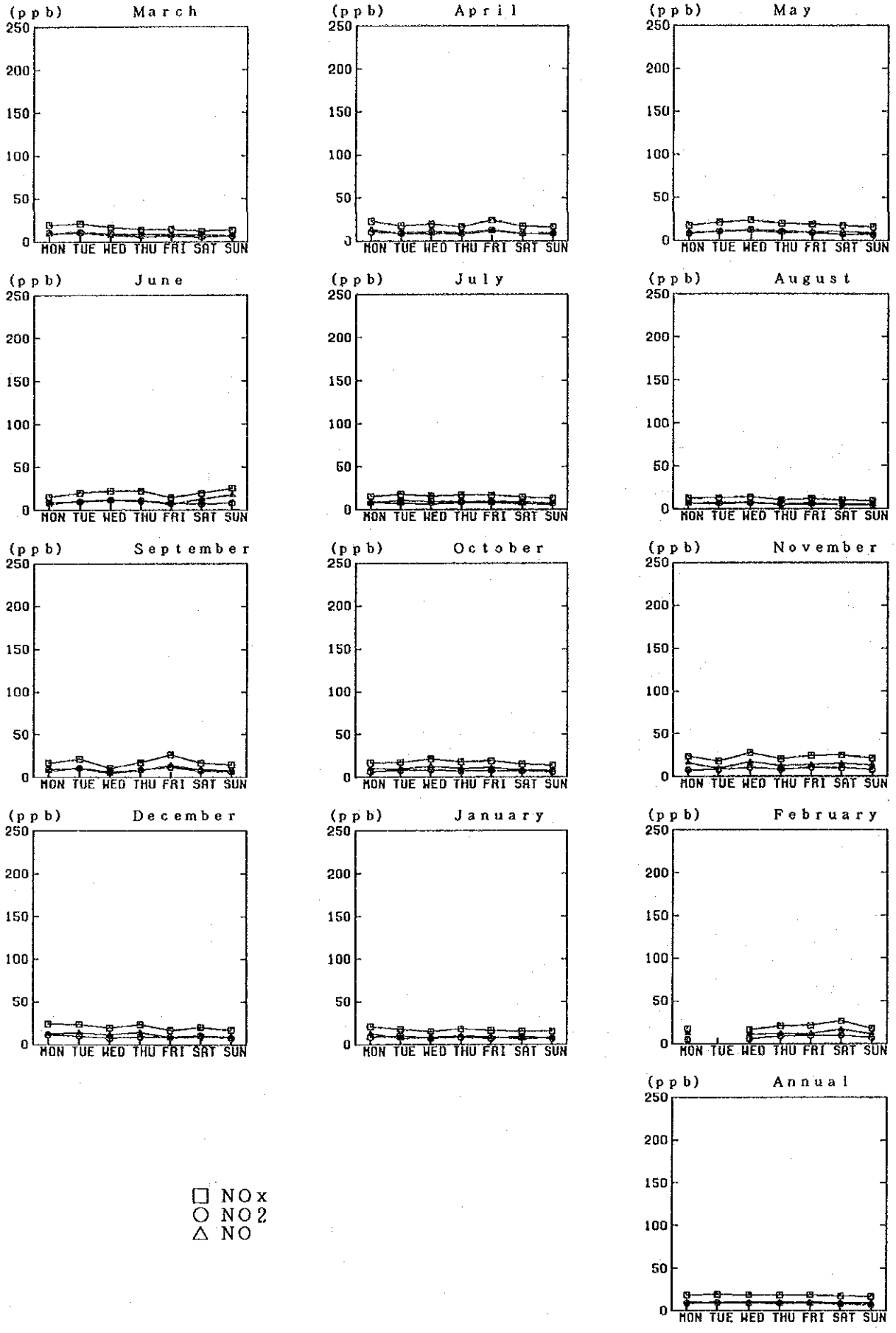
Weekly Change of CO at Shah Alam



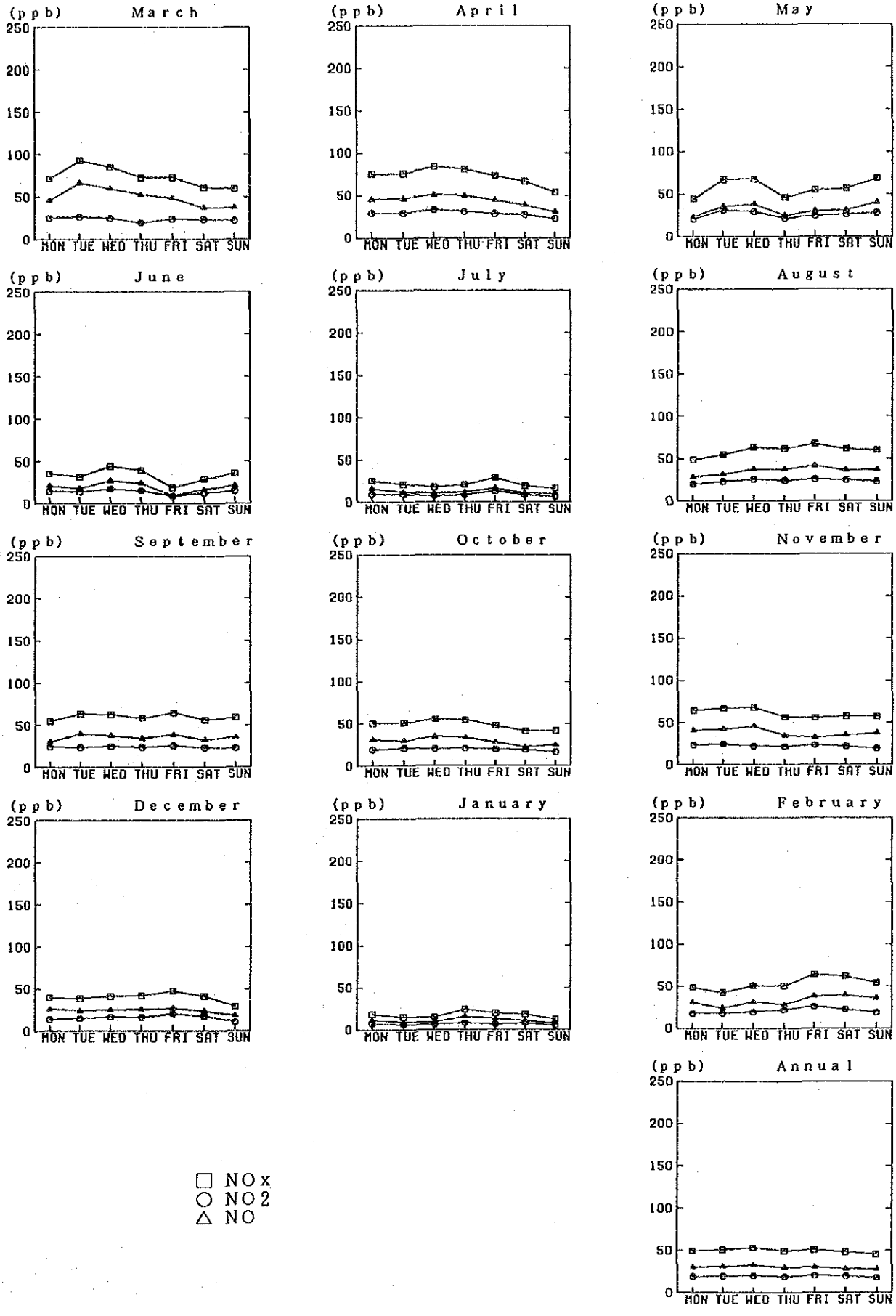
Weekly Change of Nitrogen Oxides at City Hall



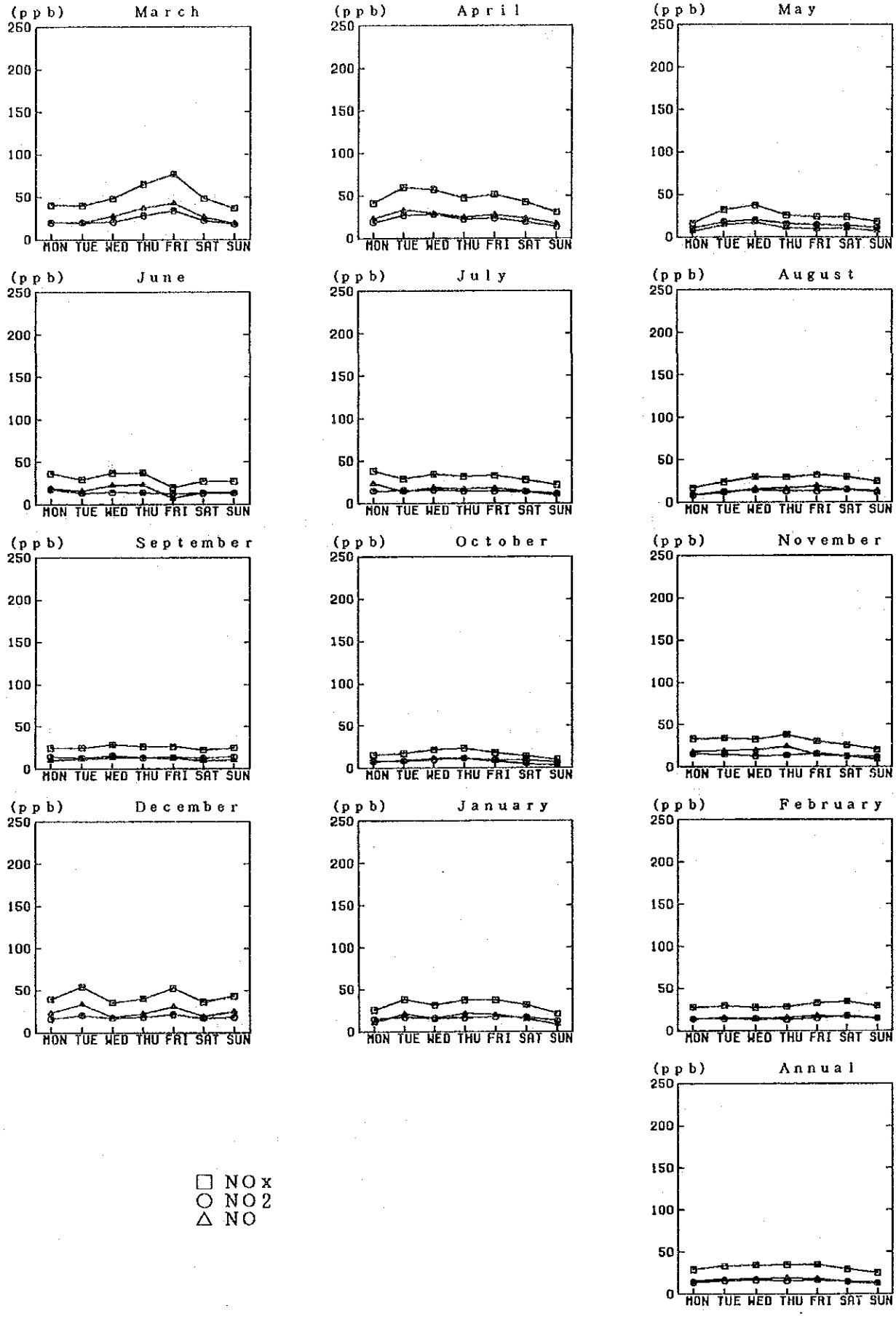
Weekly Change of Nitrogen Oxides at UPM



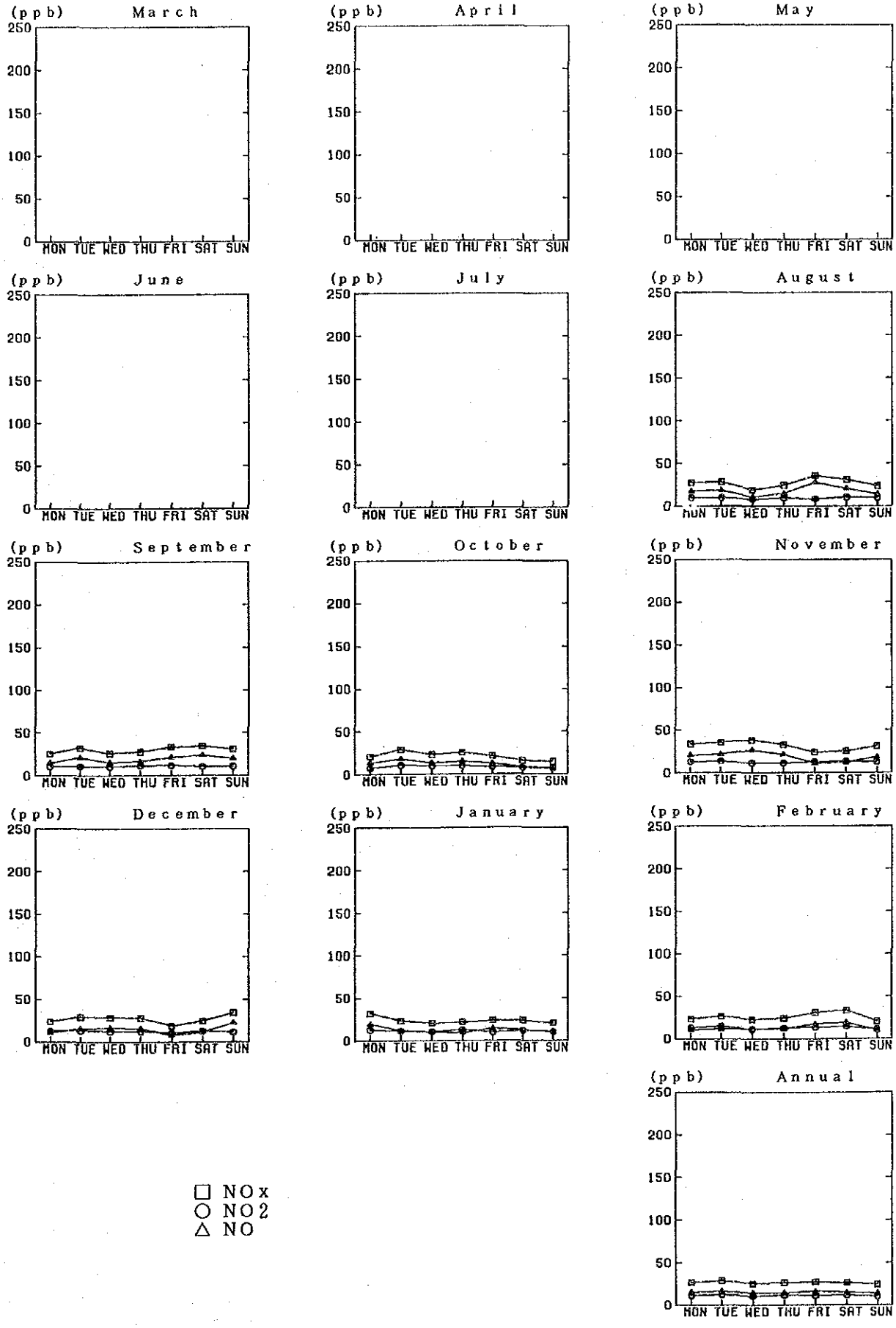
Weekly Change of Nitrogen Oxides at Petaling Jaya



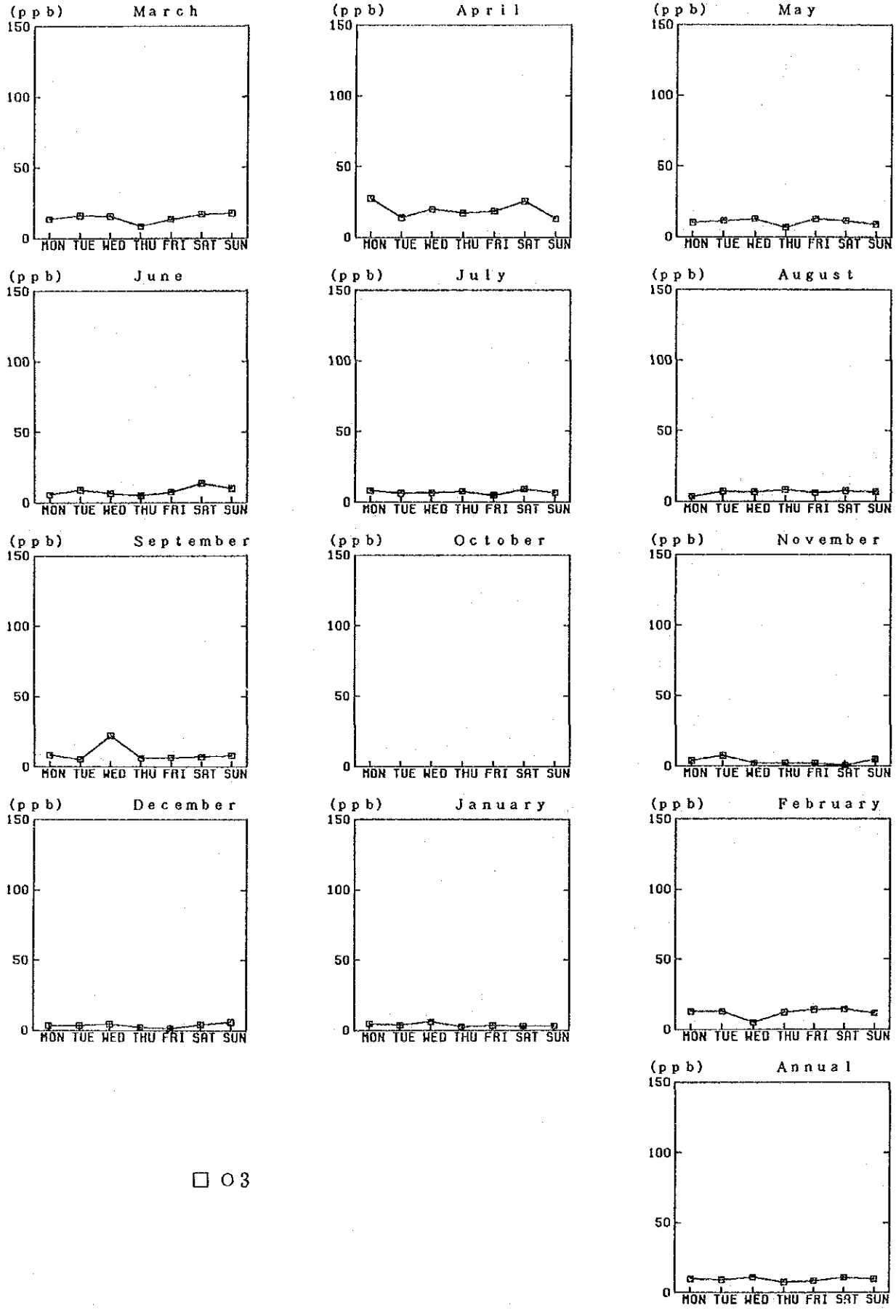
Weekly Change of Nitrogen Oxides at Shah Alam



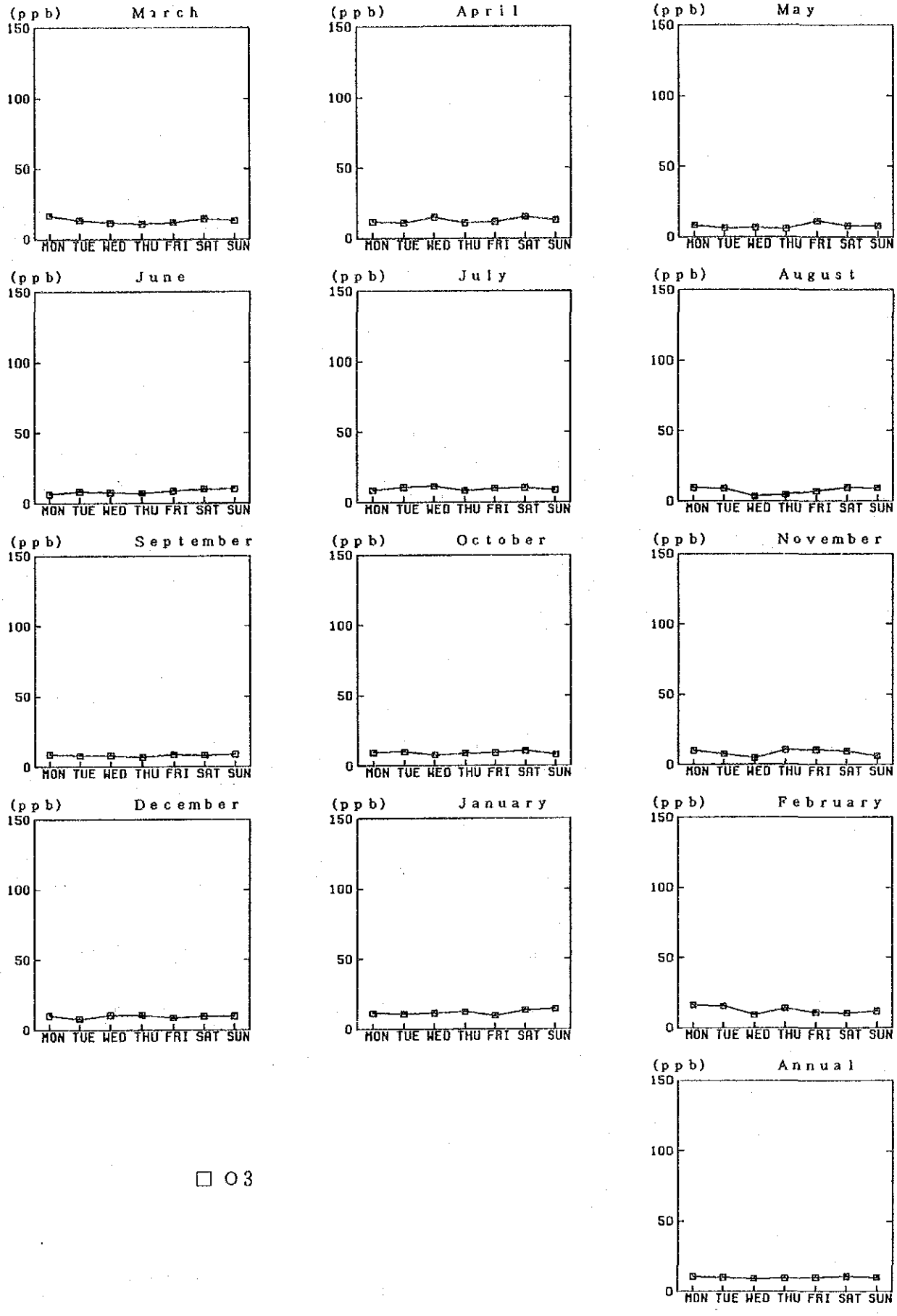
Weekly Change of Nitrogen Oxides at Klang



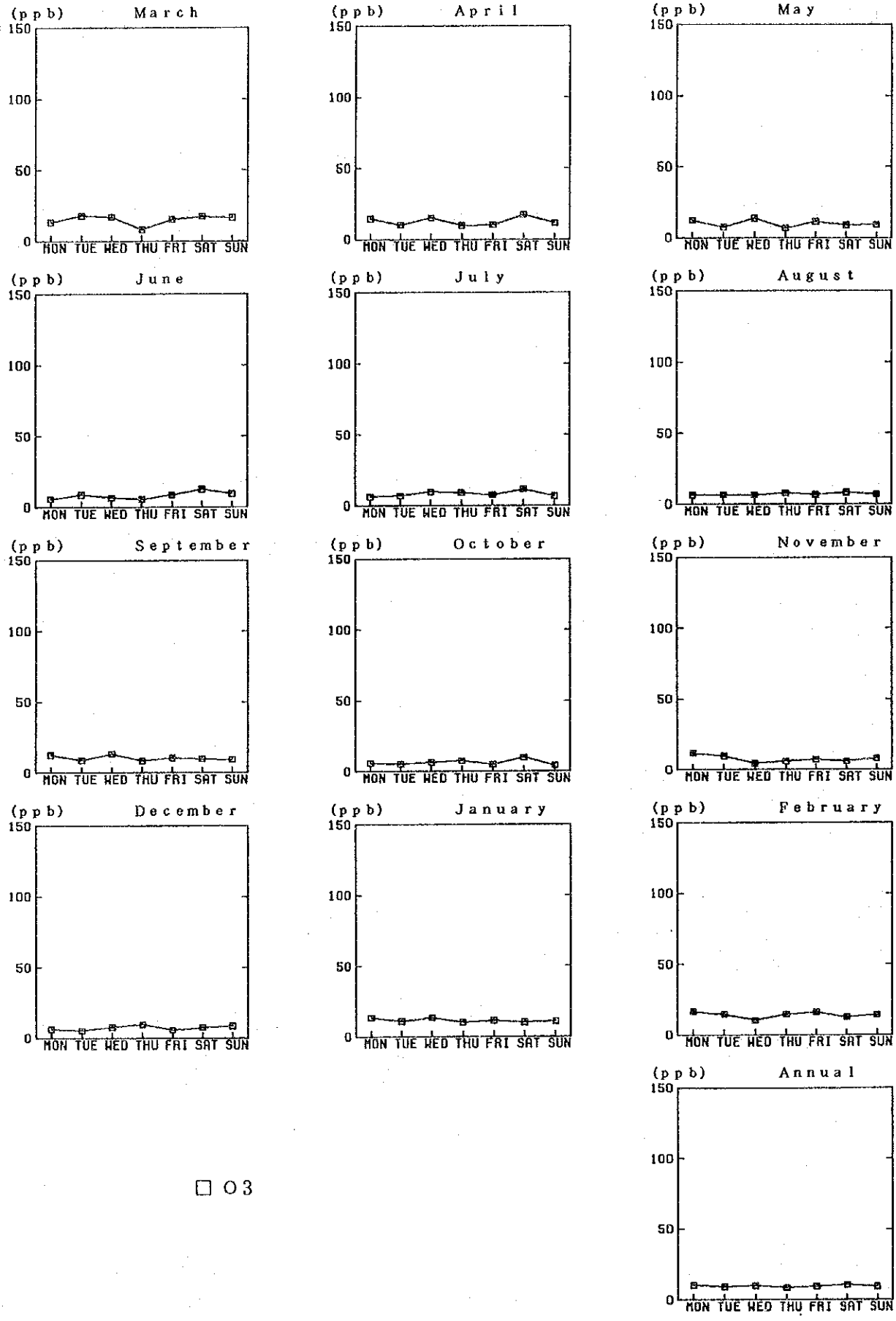
Weekly Change of O3 at City Hall



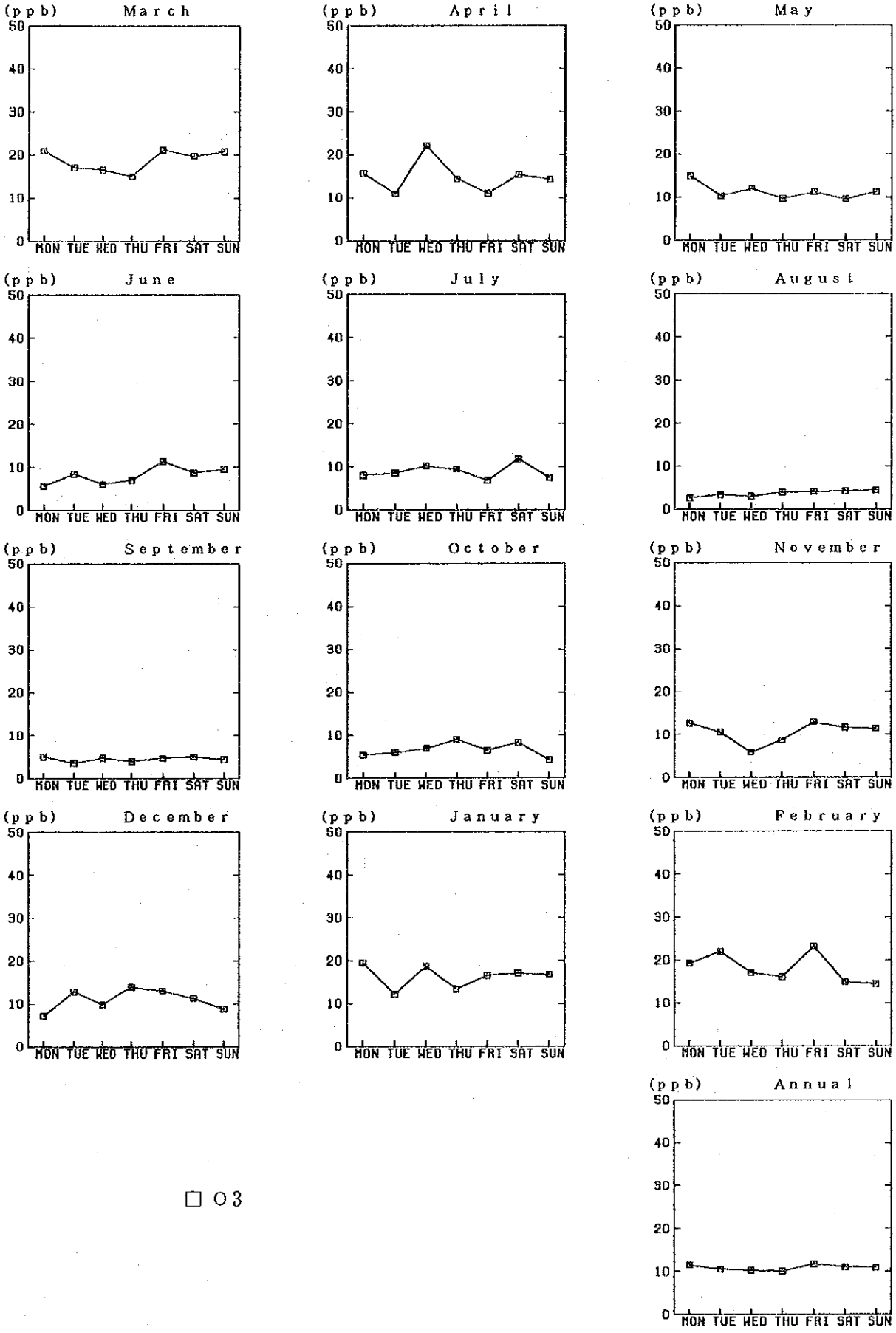
Weekly Change of O3 at UPM



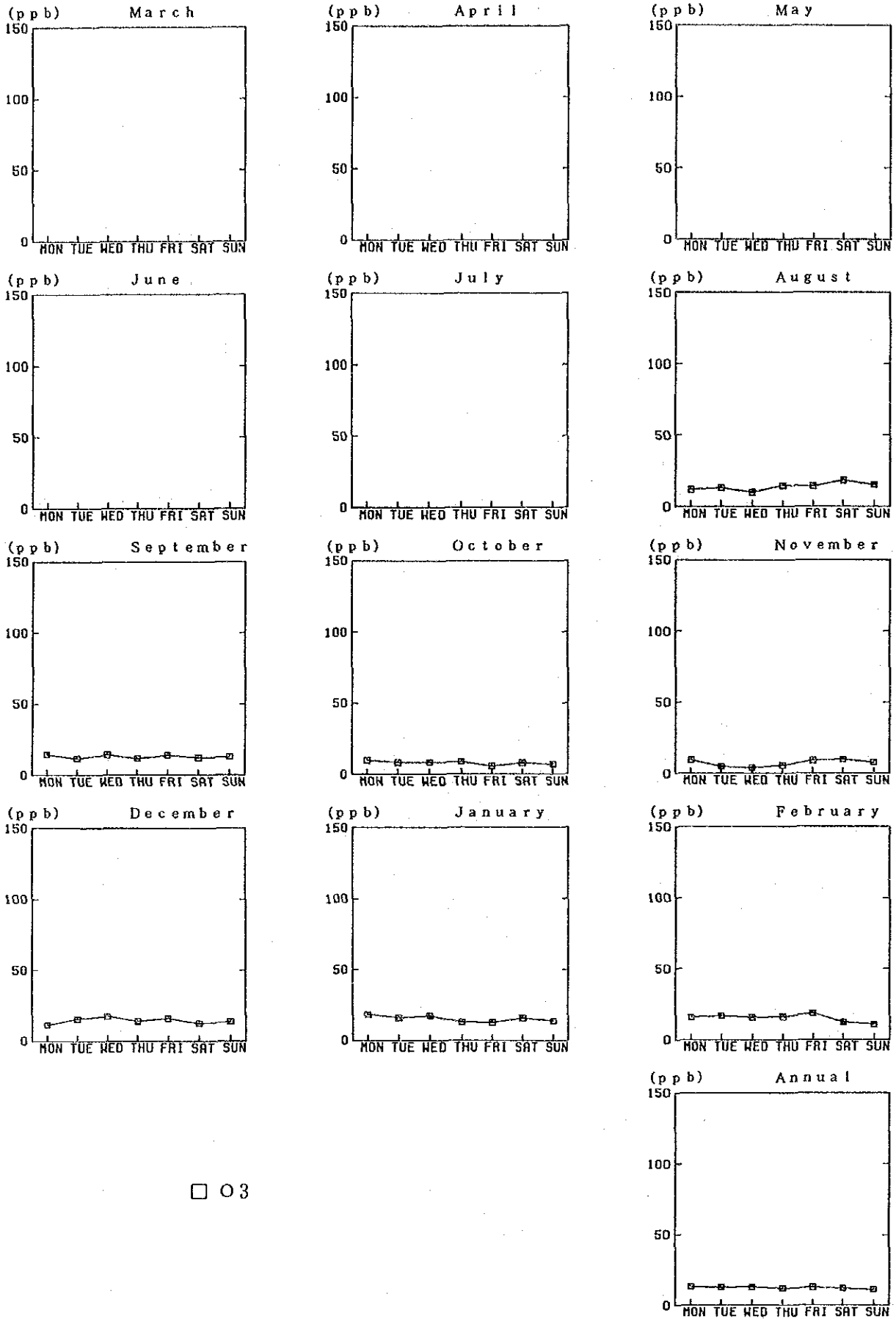
Weekly Change of O3 at Petaling Jaya



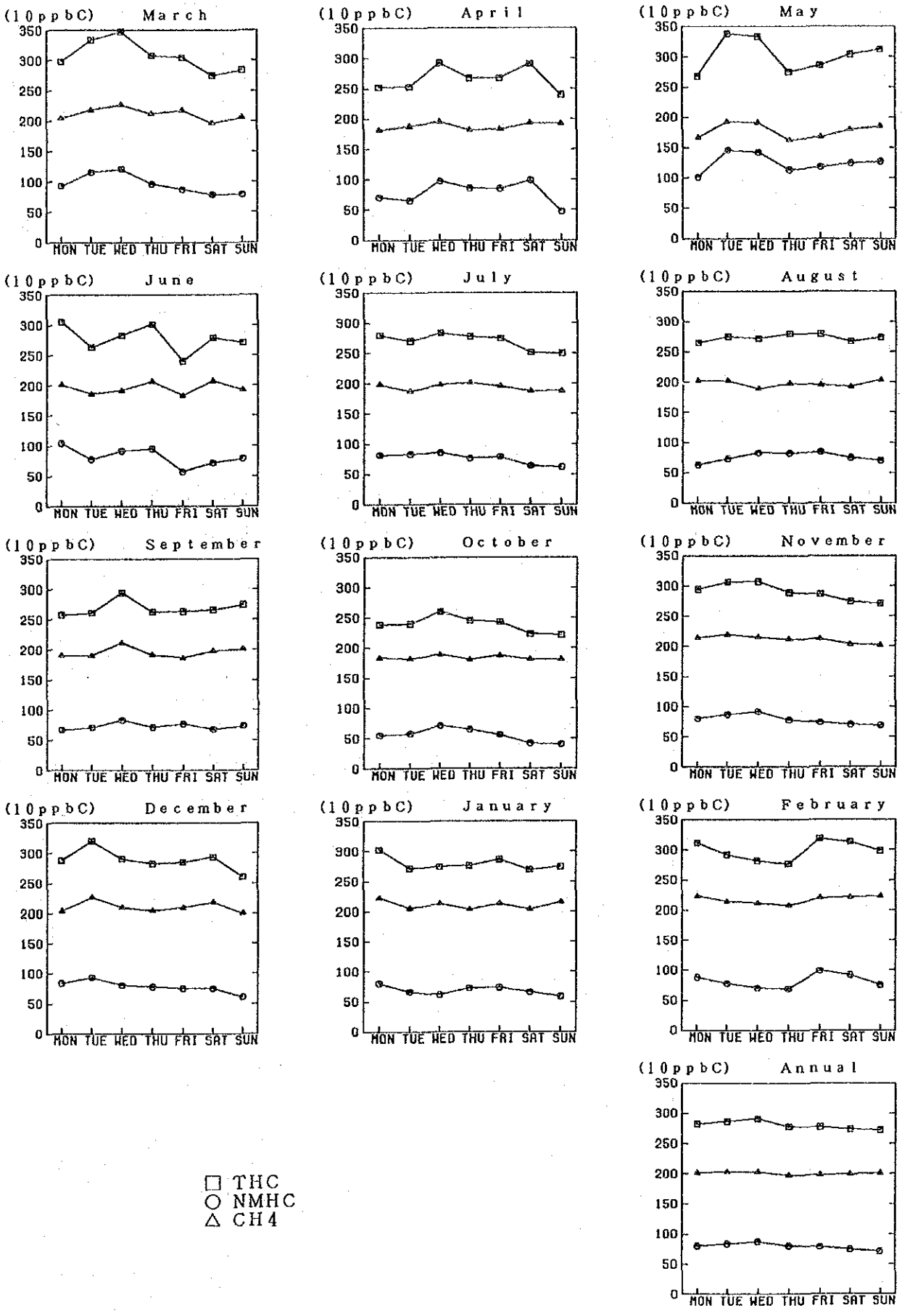
Weekly Change of O3 at Shah Alam



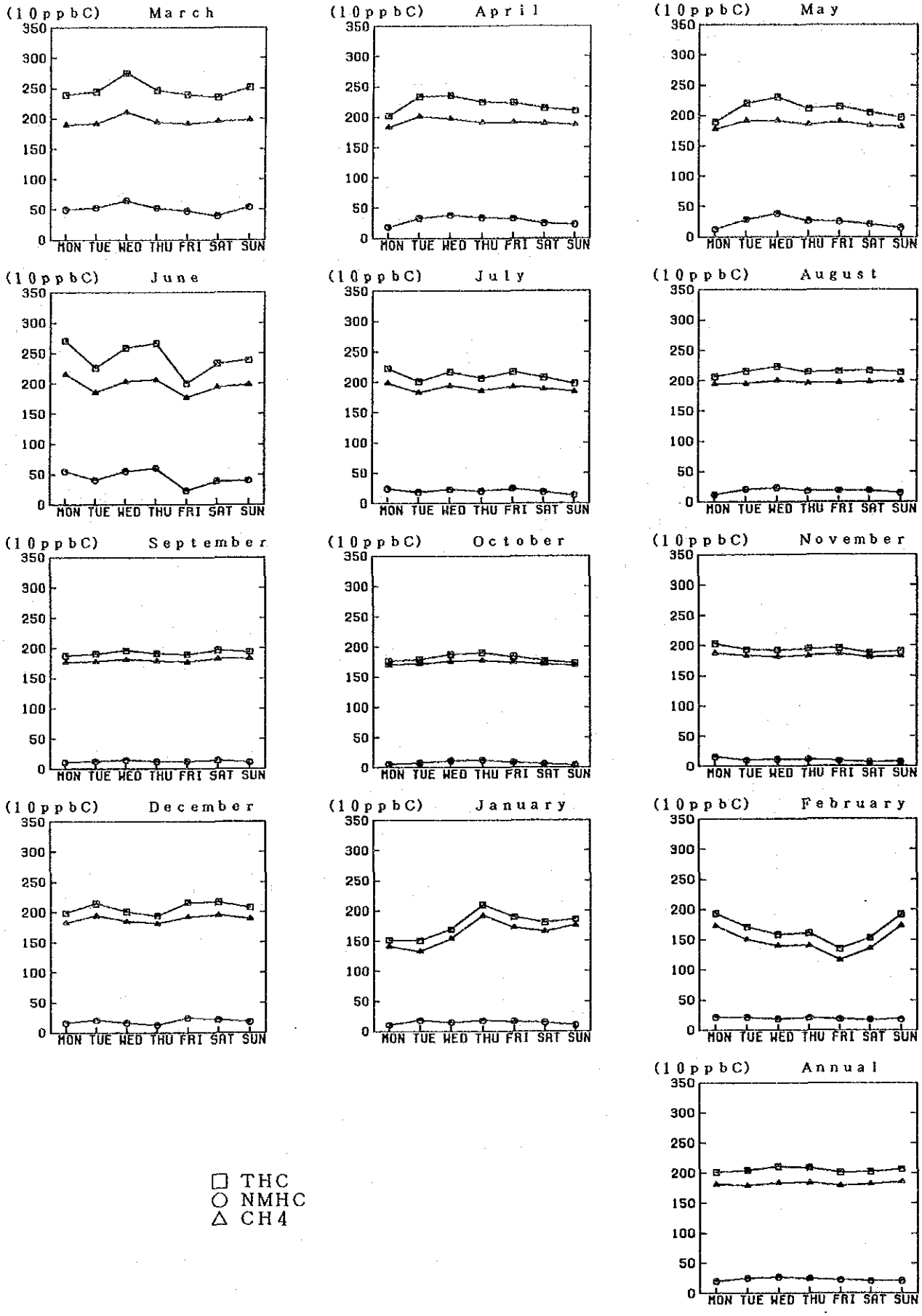
Weekly Change of O3 at Klang



Weekly Change of Hydrocarbons at Petaling Jaya



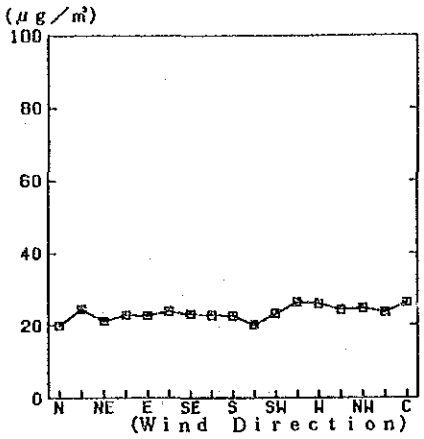
Weekly Change of Hydrocarbons at Shah Alam



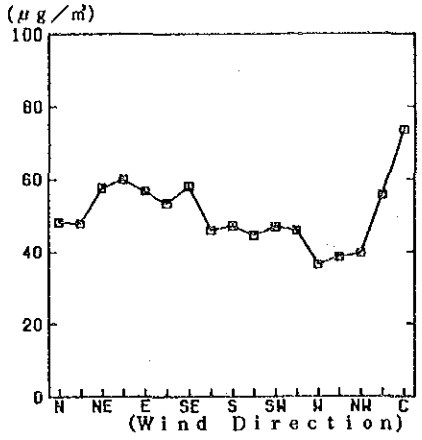
2.1.4 Relationship of Air Pollutant Concentration to Meteorological Parameters

SPM Concentration by Wind direction

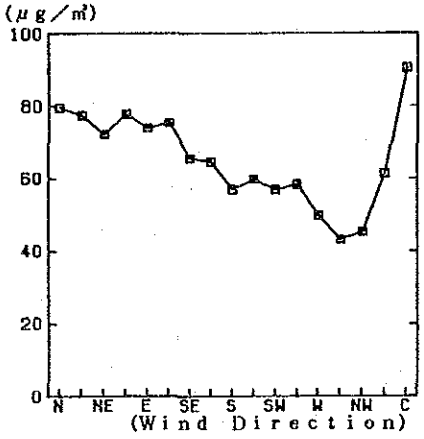
UPM



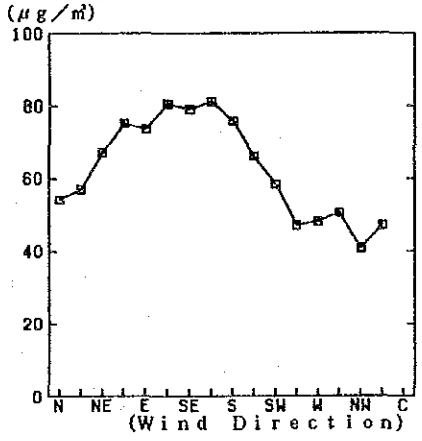
Petaling Jaya



Shah Alam



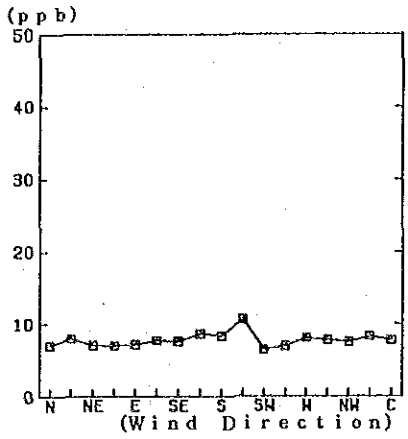
Klang



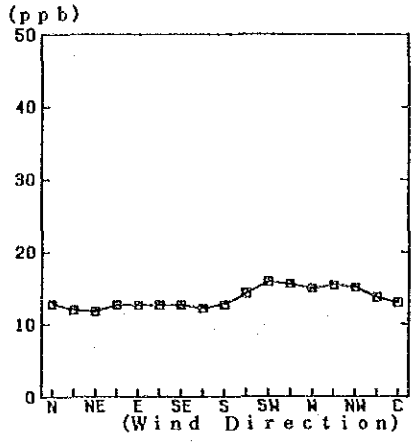
□ SPM

SO2 Concentration by Wind direction

UPM



Petaling Jaya



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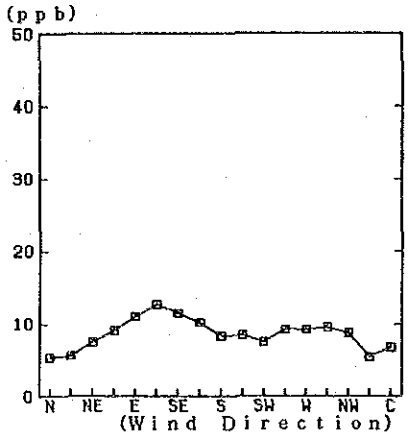
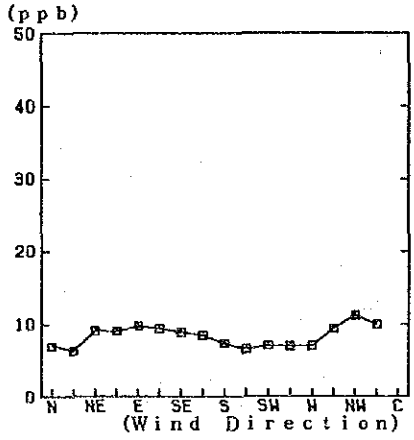


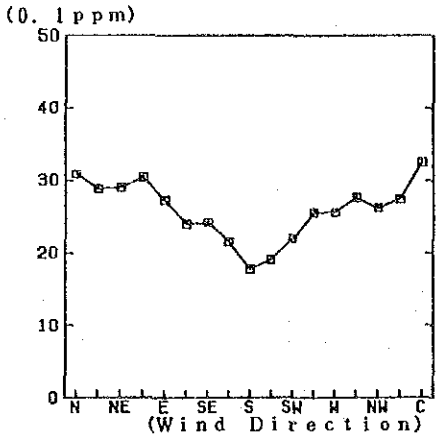
Klang



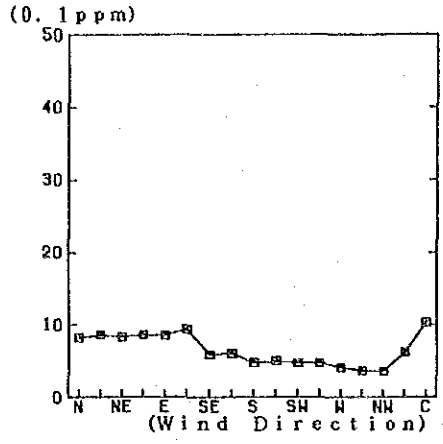
□ SO2

CO Concentration by Wind direction

Petaling Jaya



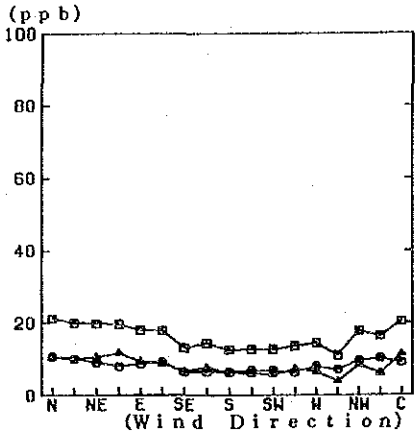
Shah Alam



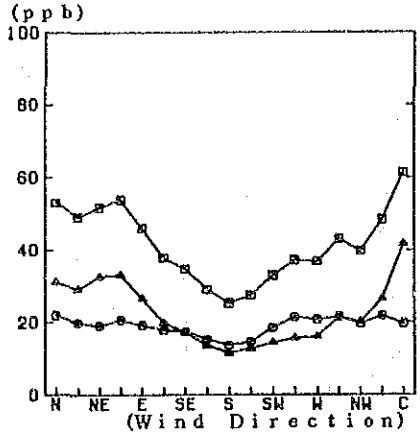
□ CO

Nitrogen Oxide Concentration by Wind direction

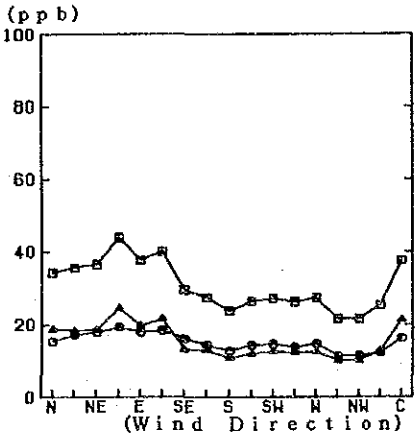
UPM



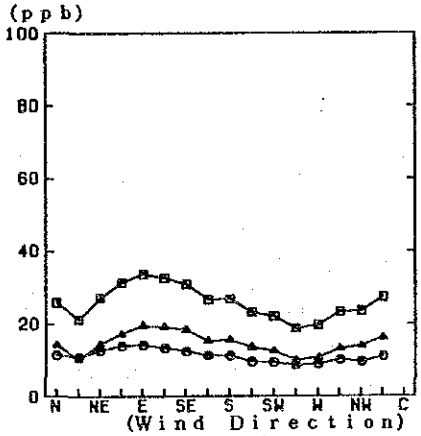
Petaling Jaya



Shah Alam



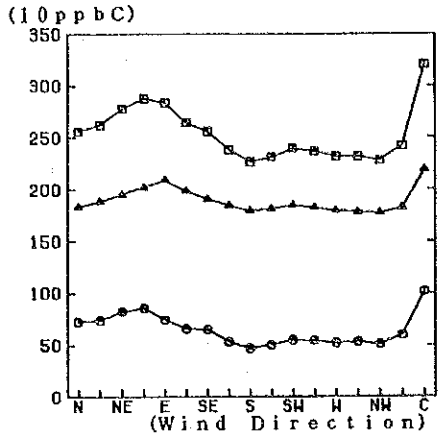
Klang



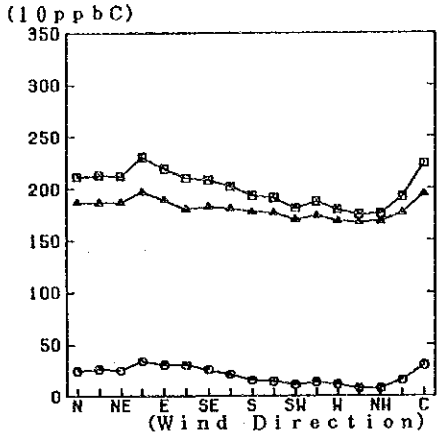
□ NOx
○ NO2
△ NO

Hydrocarbon Concentration by Wind direction

Petaling Jaya



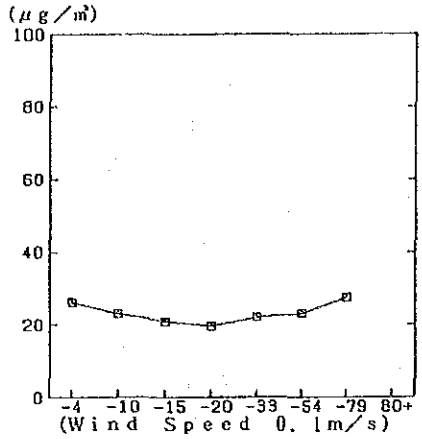
Shah Alam



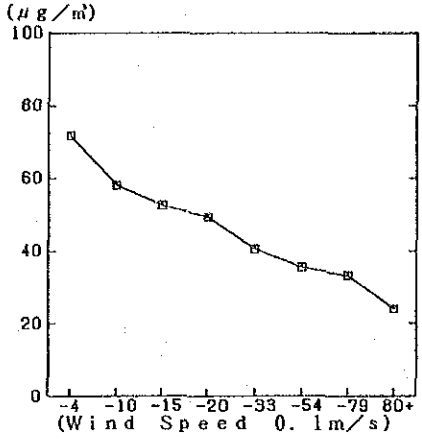
□ THC
○ NMHC
△ CH_4

SPM Concentration by Wind Speed

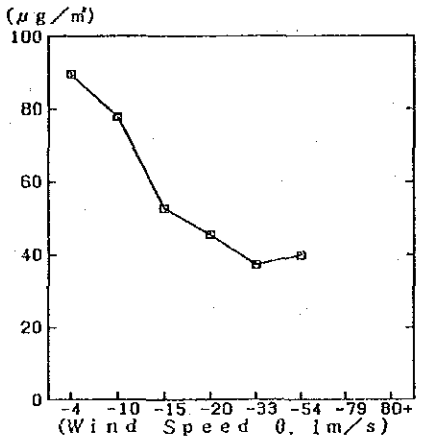
UPM



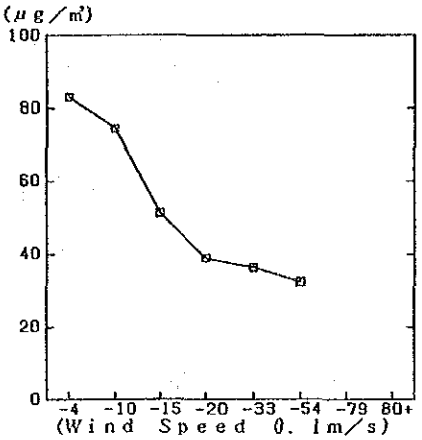
Petaling Jaya



Shah Alam



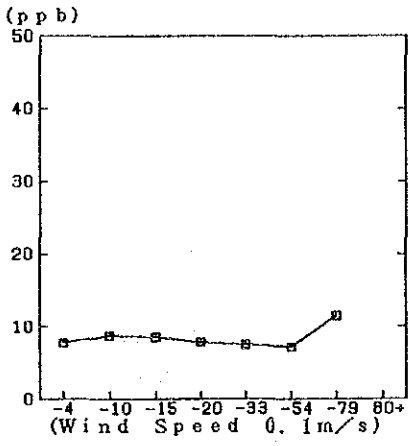
Klang



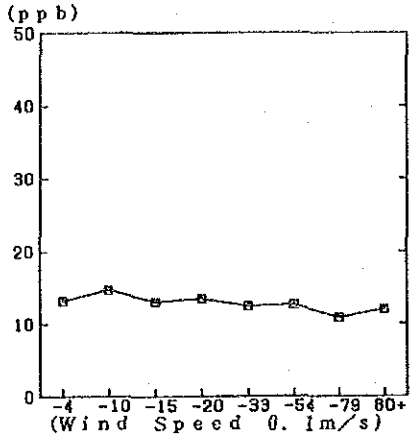
□ SPM

SO2 Concentration by Wind Speed

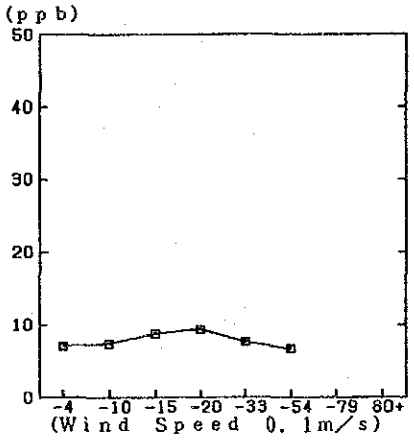
UPM



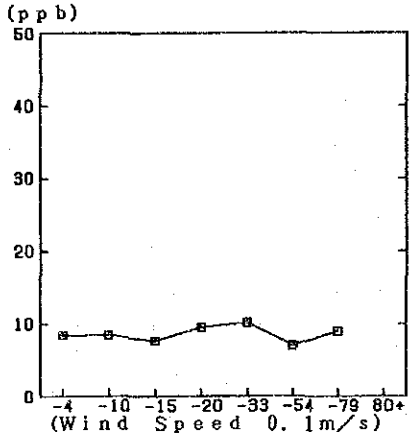
Petaling Jaya



Shah Alam



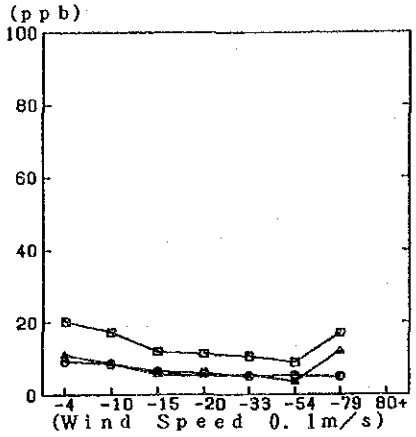
Klang



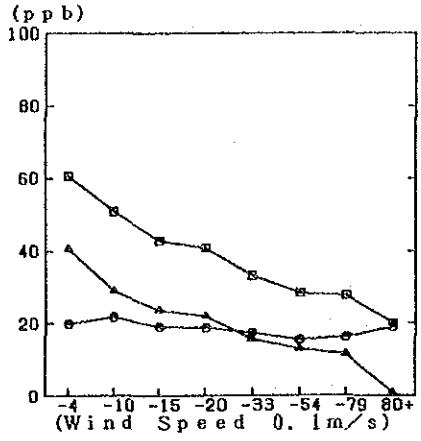
□ SO2

Nitrogen Oxides Concentration by Wind Speed

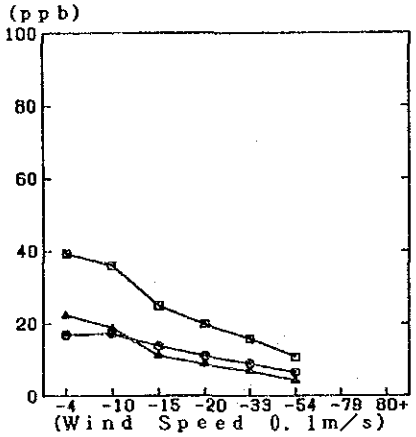
UPM



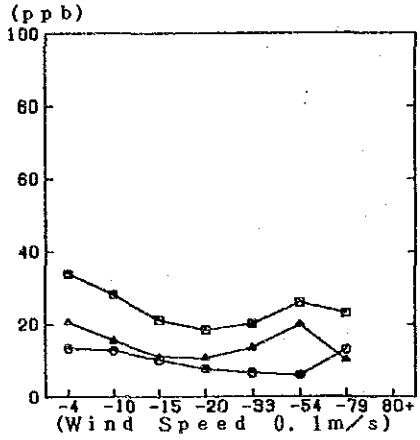
Petaling Jaya



Shah Alam



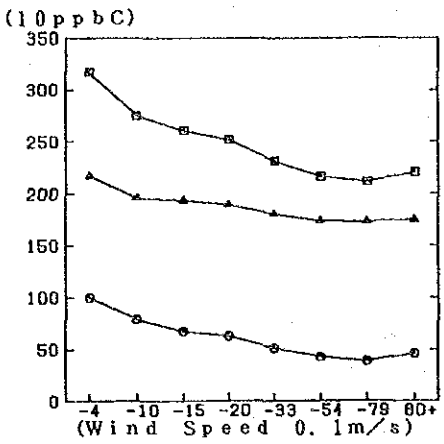
Klang



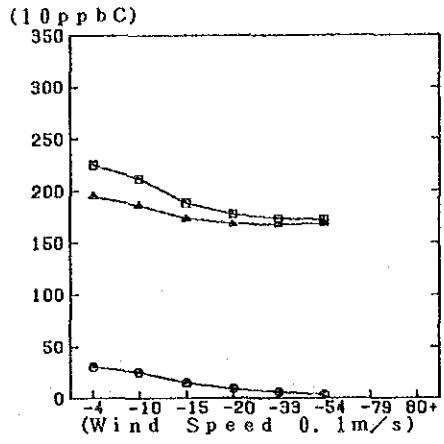
□ NOx
○ NO2
△ NO

Hydrocarbons Concentration by Wind Speed

Petaling Jaya



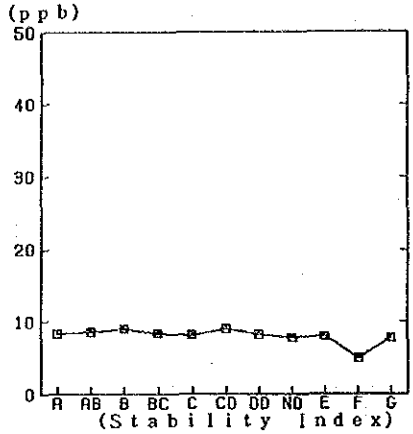
Shah Alam



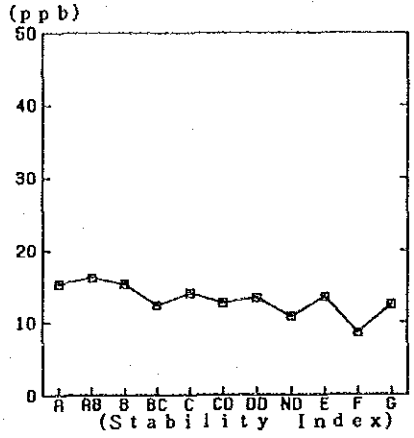
□ THC
○ NMHC
△ CH4

SO2 Concentration by Stability Index

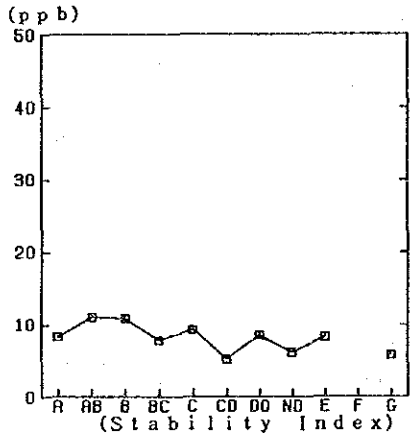
UPM



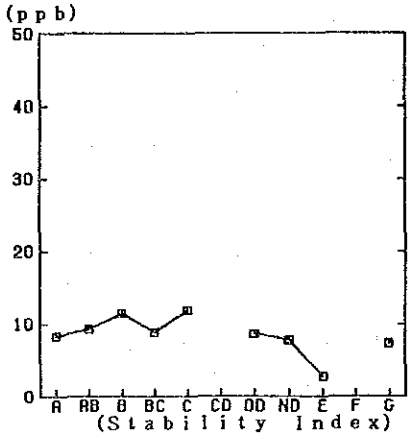
Petaling Jaya



Shah Alam



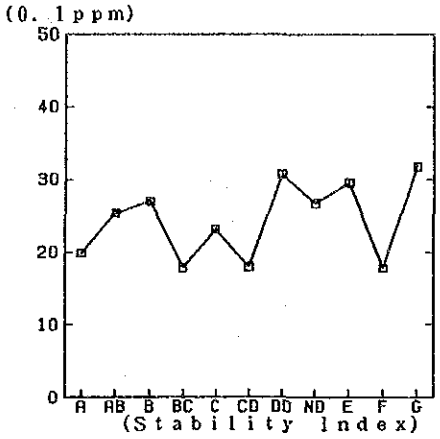
Klang



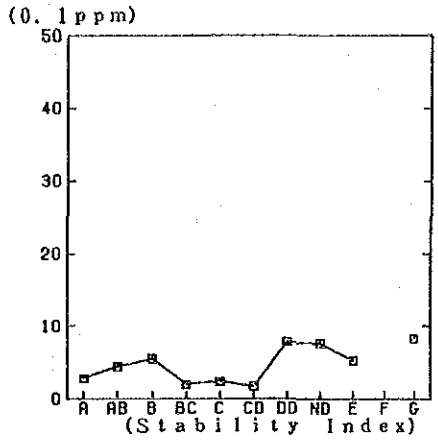
□ SO2

CO Concentration by Stability Index

Petaling Jaya



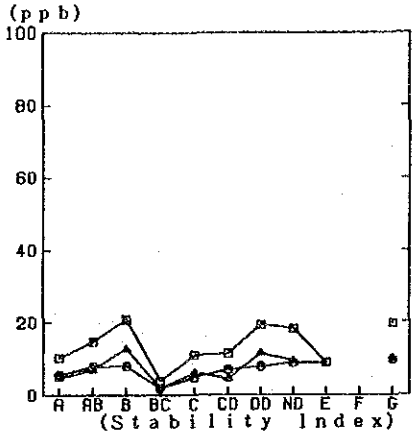
Shah Alam



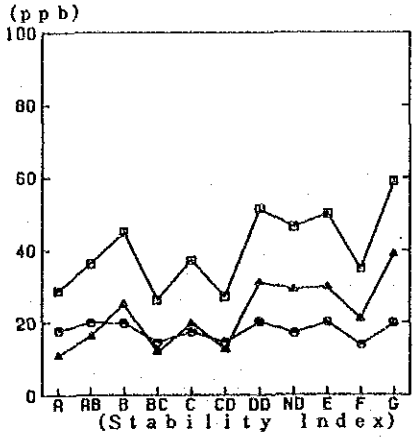
□ CO

Nitrogen Oxides Concentration by Stability Index

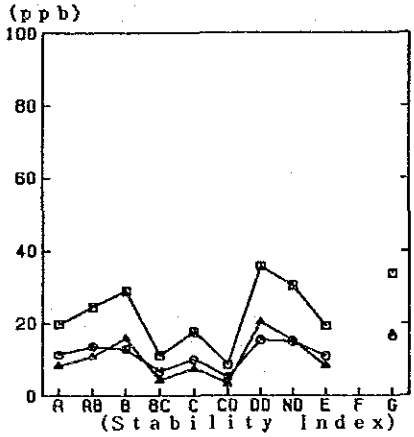
UPM



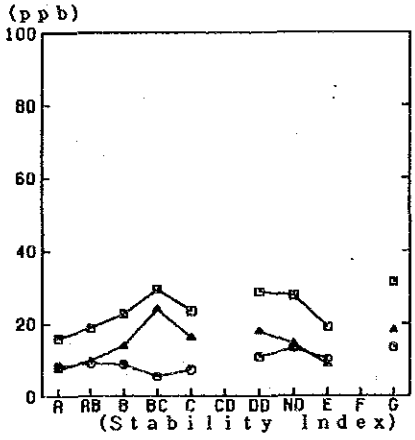
Petaling Jaya



Shah Alam



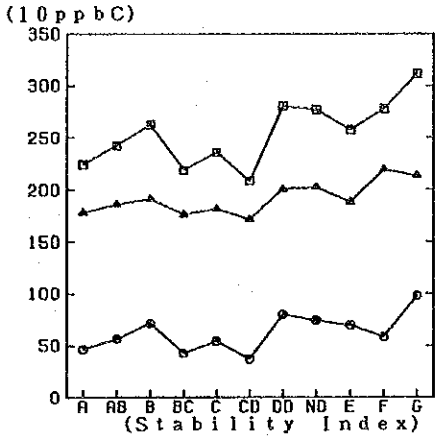
Klang



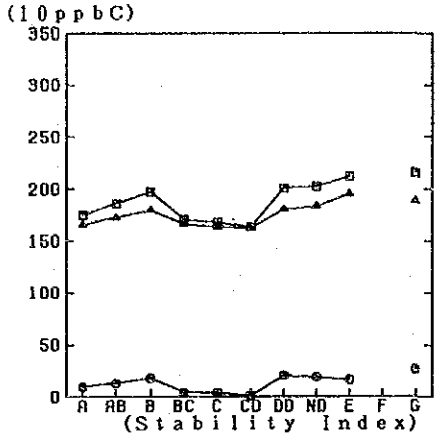
□ NOx
○ NO2
△ NO

Hydrocarbons Concentration by Stability Index

Petaling Jaya



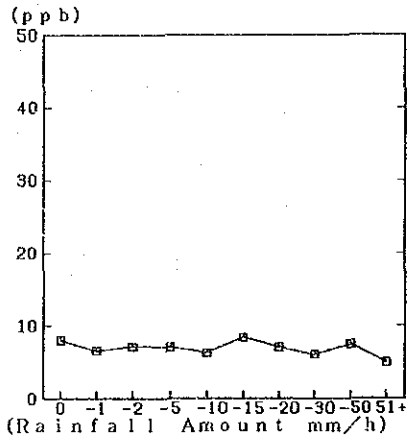
Shah Alam



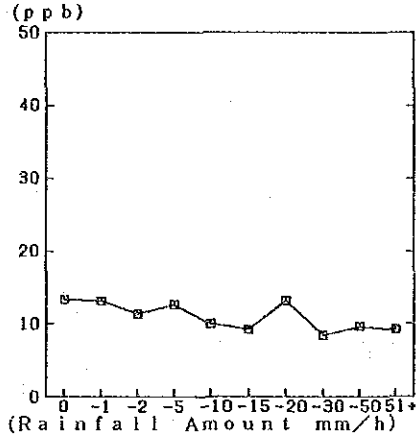
□ THC
○ NMHC
△ CH4

SO2 Concentration by Rainfall Amount

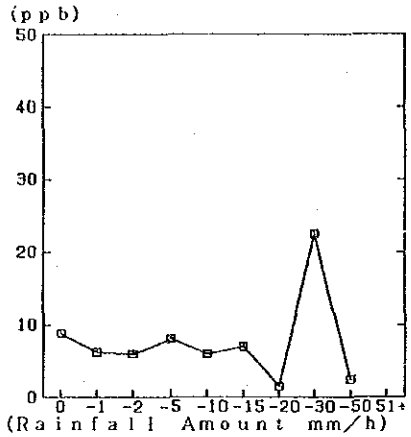
UPM



Petaling Jaya



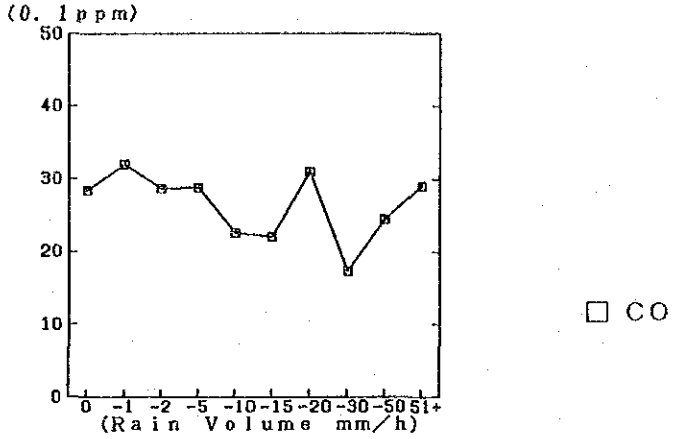
Klang



□ SO2

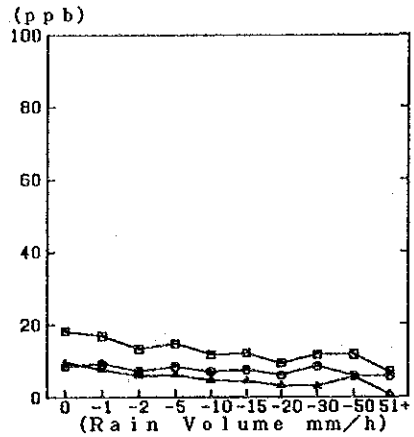
CO Concentration by Rain Volume

Petaling Jaya

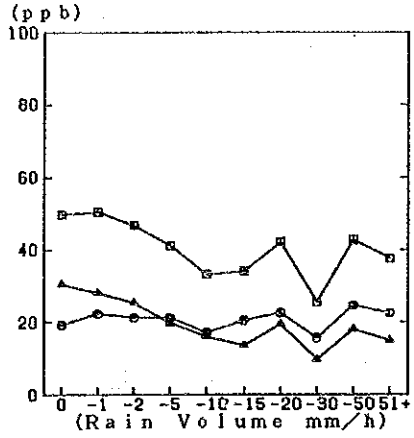


Nitrogen Oxides Concentration by Rain Volume

UPM



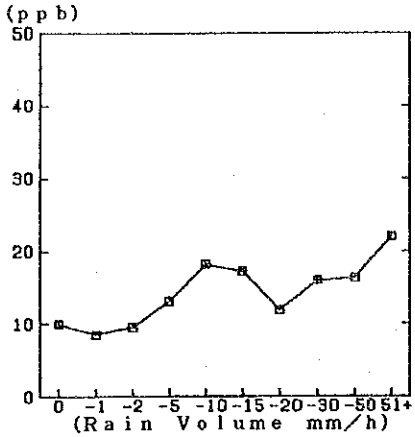
Petaling Jaya



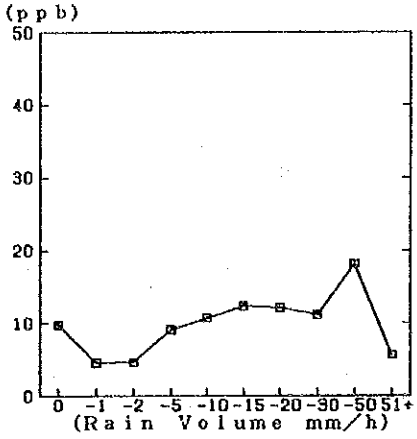
□ NOx
○ NO2
△ NO

O3 Concentration by Rain Volume

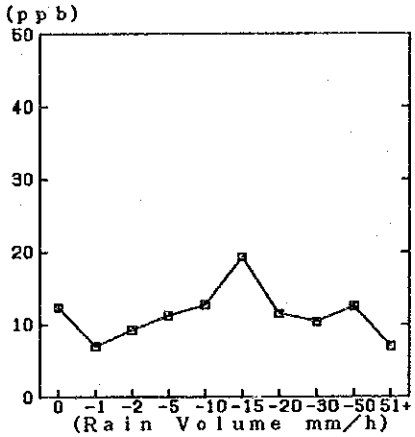
UPM



Petaling Jaya

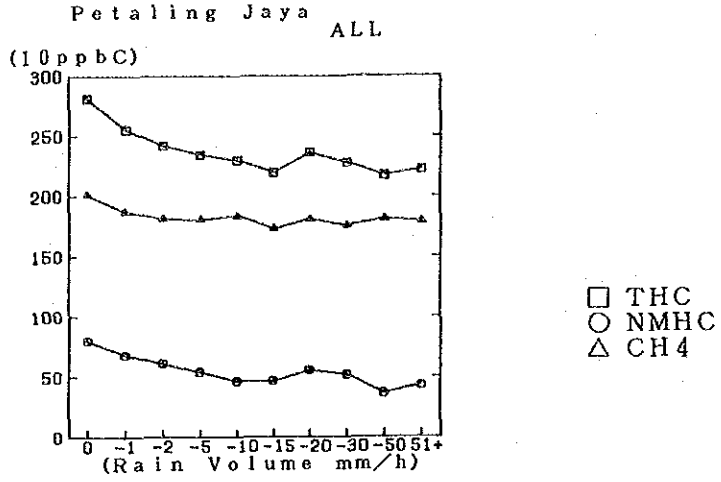


Klang



□ O3

Hydrocarbons Concentration by Rain Volume

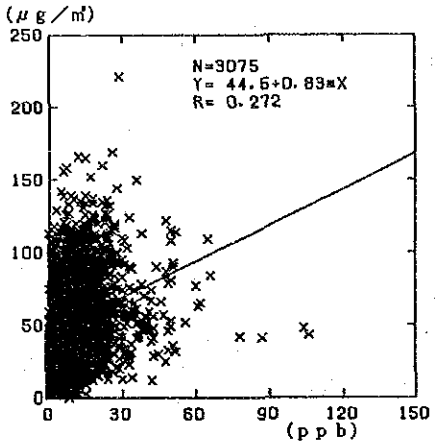


2.1.5 Analysis of High SPM Concentration

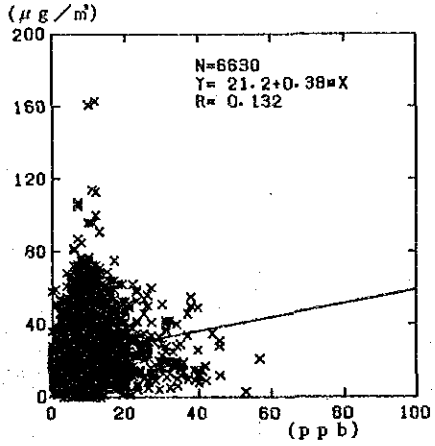
Correlation Analysis

Y-axis : SPM
(Hourly Data)
X-axis : SO2
(Hourly Data)

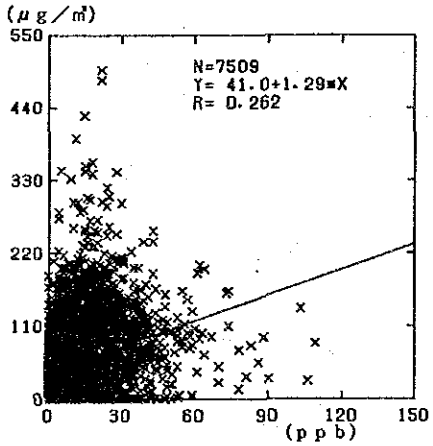
City Hall



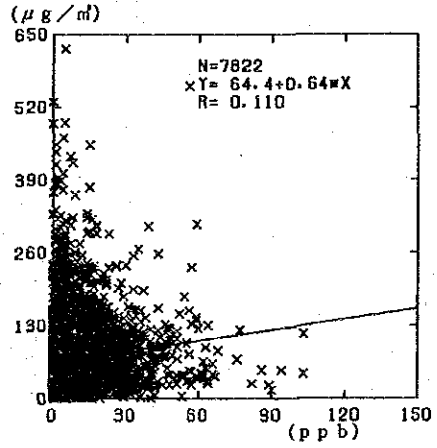
UPM



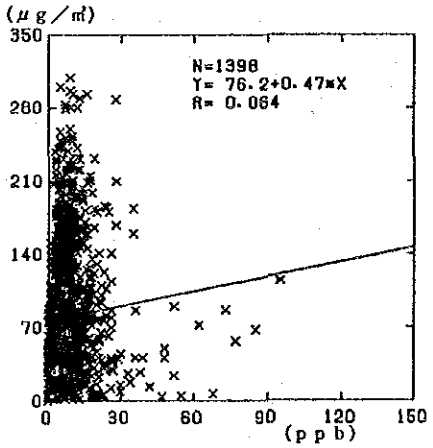
Petaling Jaya



Shah Alam



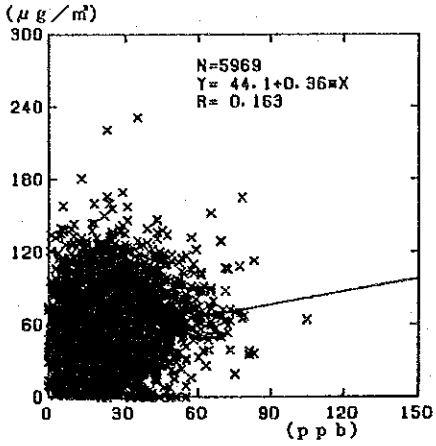
Klang



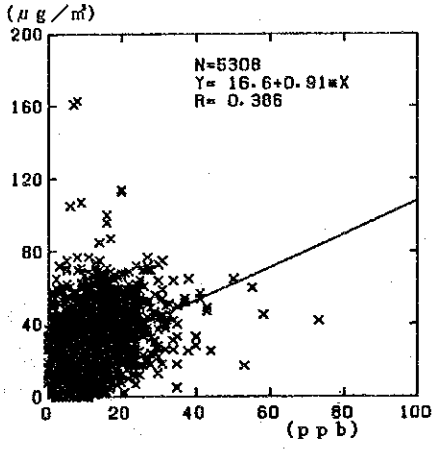
Correlation Analysis

Y-axis : SPM
(Hourly Data)
X-axis : NO2
(Hourly Data)

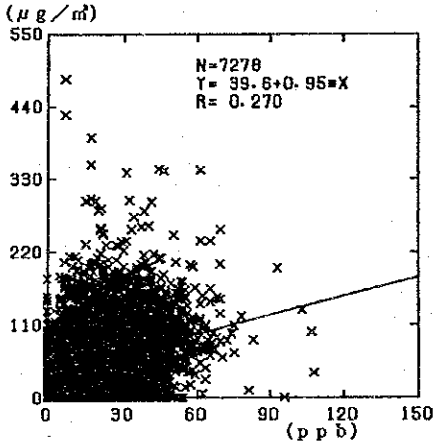
City Hall



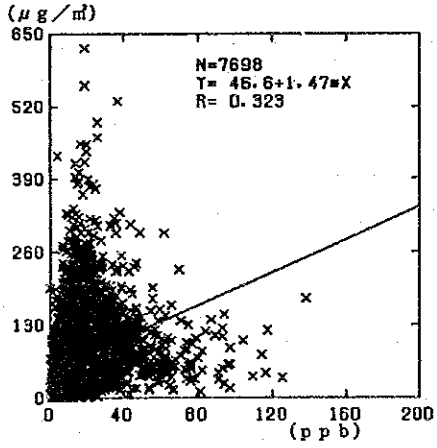
UPM



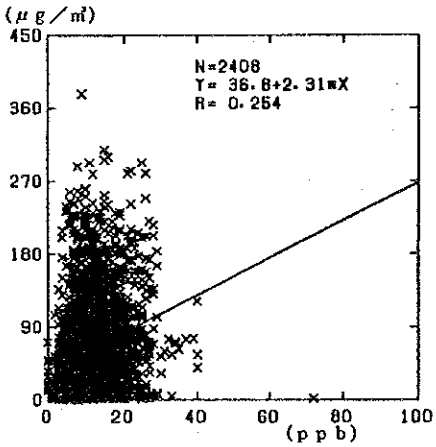
Petaling Jaya



Shah Alam



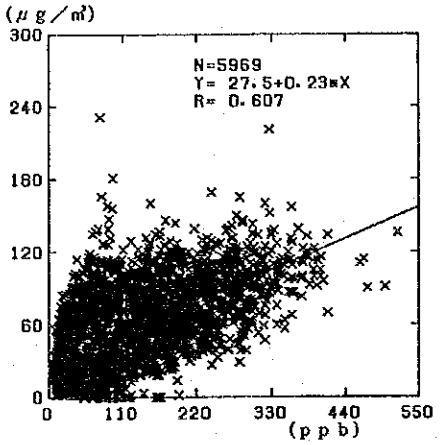
Klang



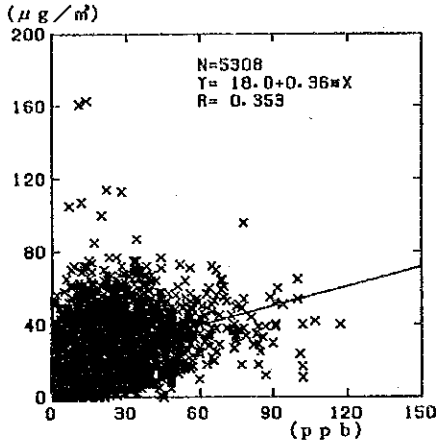
Correlation Analysis

Y-axis : SPM
(Hourly Data)
X-axis : NOx
(Hourly Data)

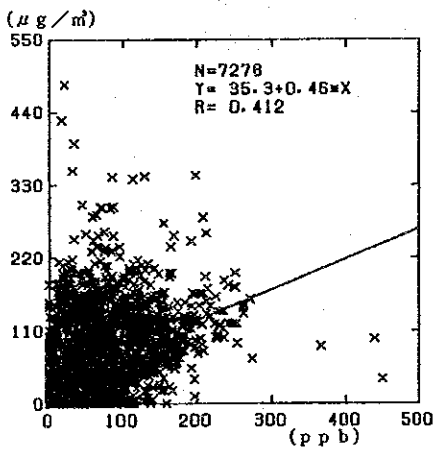
City Hall



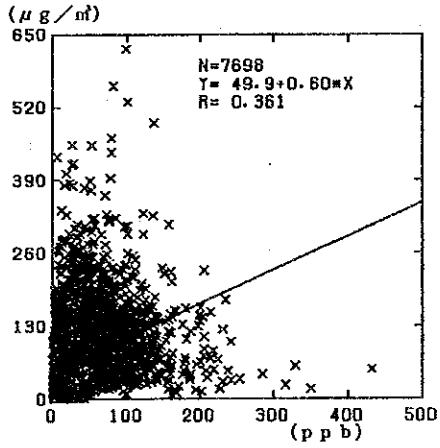
UPM



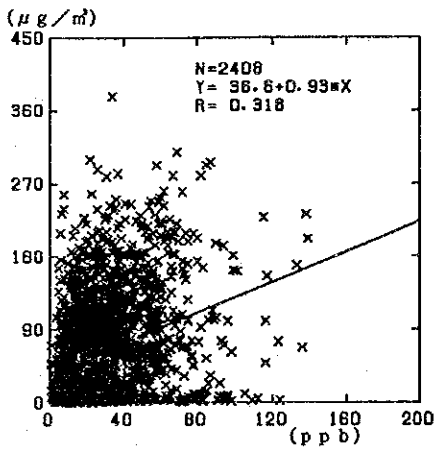
Petaling Jaya



Shah Alam



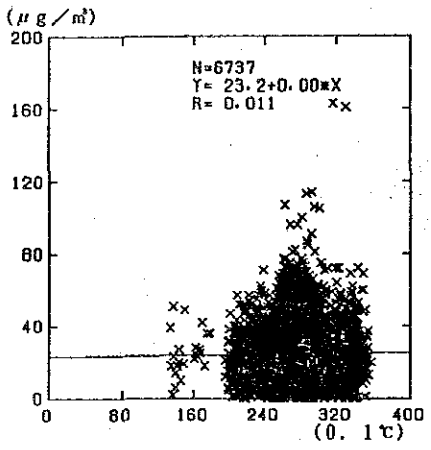
Klang



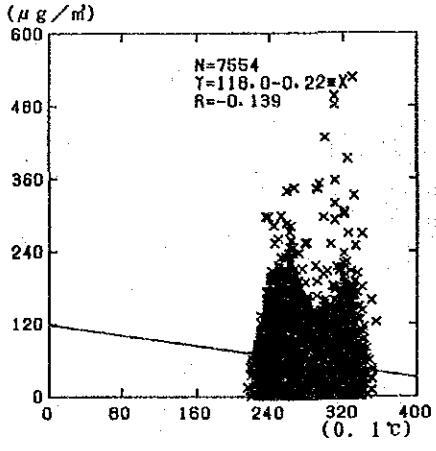
Correlation Analysis

Y-axis: SPM
(Hourly Data)
X-axis: Temperature
(Hourly Data)

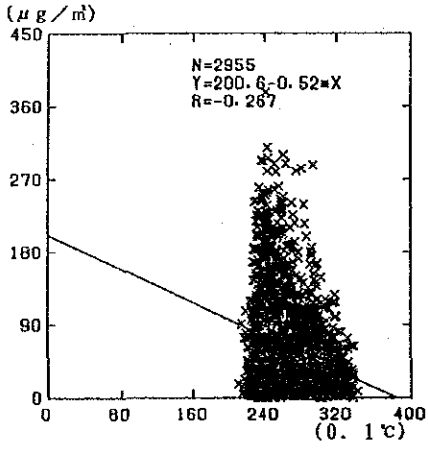
UPM



Petaling Jaya



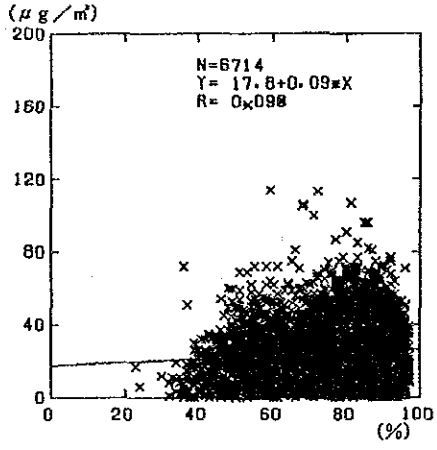
Klang



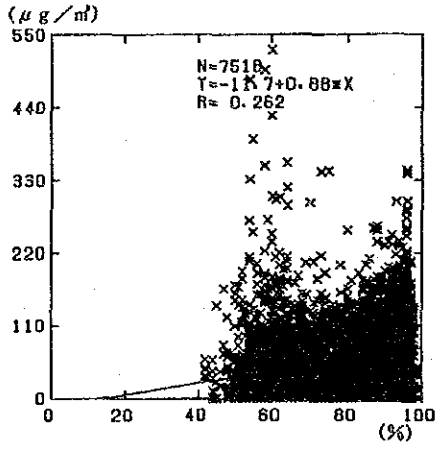
Correlation Analysis

Y-axis: SPM
(Hourly Data)
X-axis: Relative Humidity
(Hourly Data)

UPM



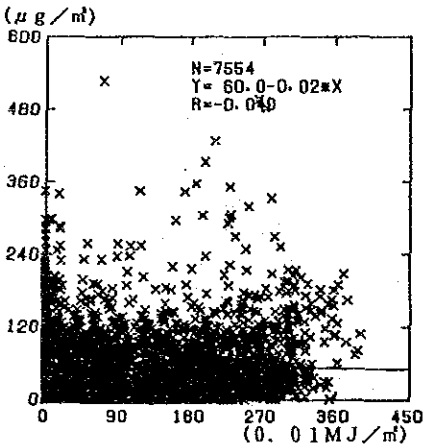
Petaling Jaya



Correlation Analysis

Y-axis: SPM
(Hourly Data)
X-axis: Solar Radiation
(Hourly Data)

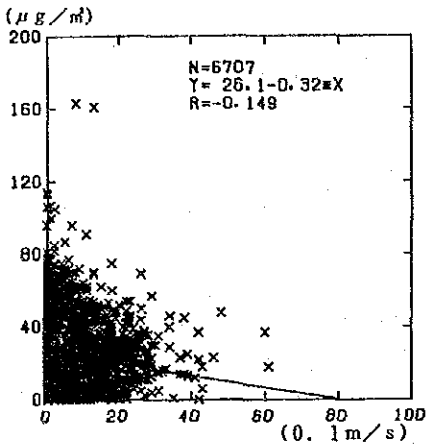
Petaling Jaya



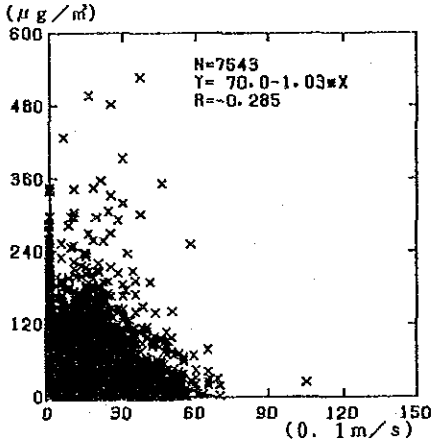
Correlation Analysis

Y-axis: SPM
(Hourly Data)
X-axis: Wind Speed
(Hourly Data)

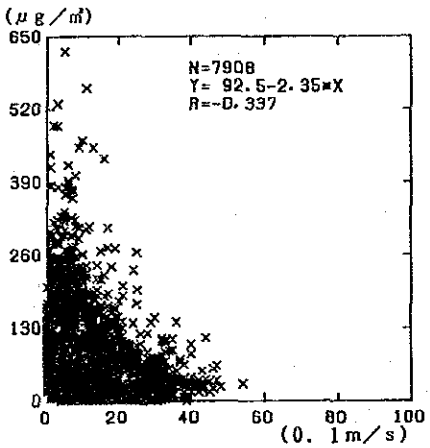
UPM



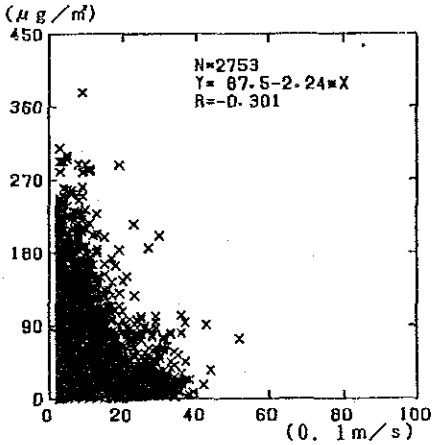
Petaling Jaya



Shah Alam



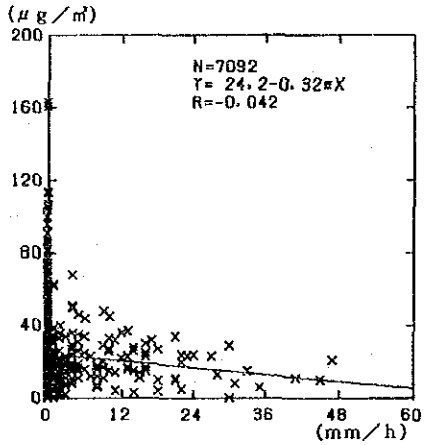
Klang



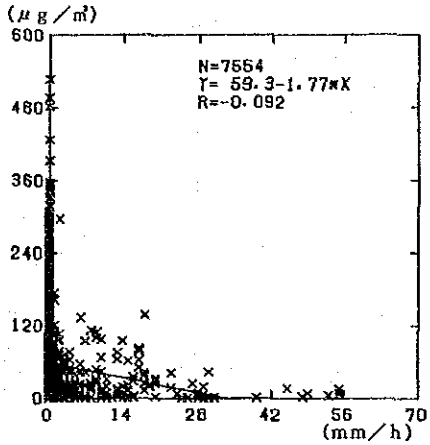
Correlation Analysis

Y-axis : SPM
(Hourly Data)
X-axis : Rain Volume
(Hourly Data)

UPM



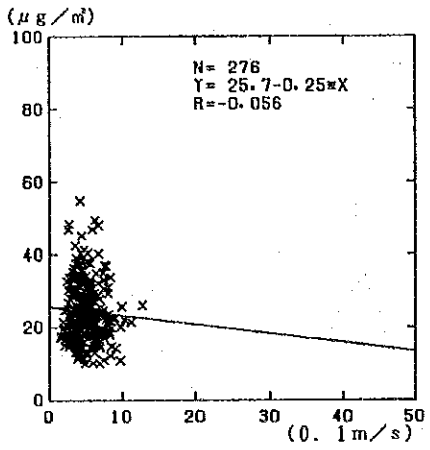
Petaling Jaya



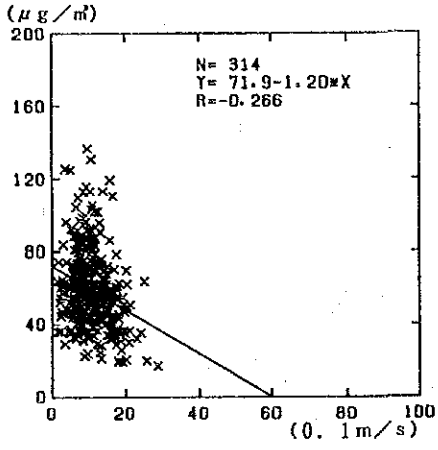
Correlation Analysis

Y-axis: SPM
(Daily Average)
X-axis: Wind Speed
(Daily Average)

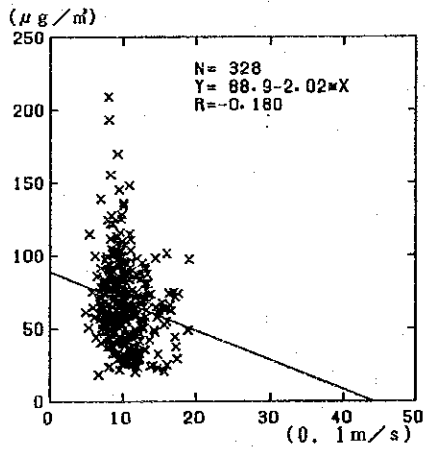
UPM



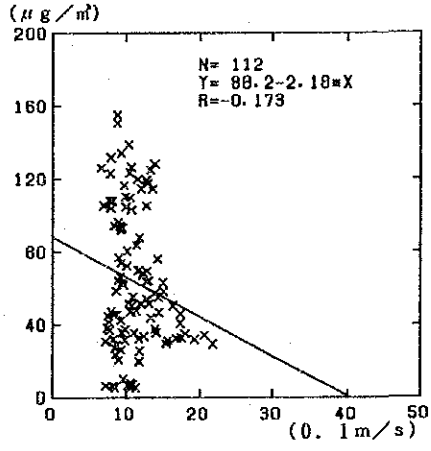
Petaling Jaya



Shah Alam



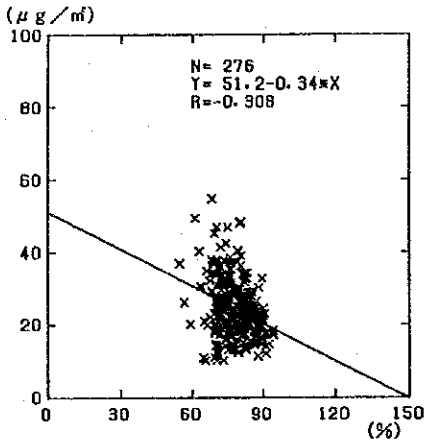
Klang



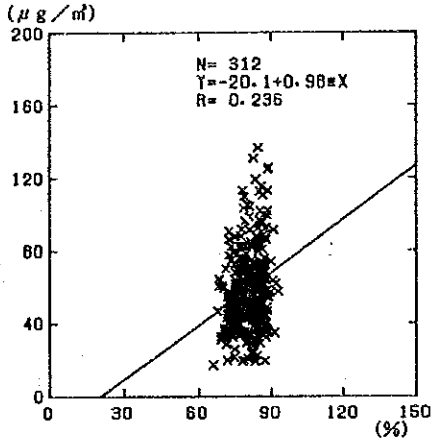
Correlation Analysis

Y-axis: SPM
(Daily Average)
X-axis: Relative Humidity
(Daily Average)

UPM



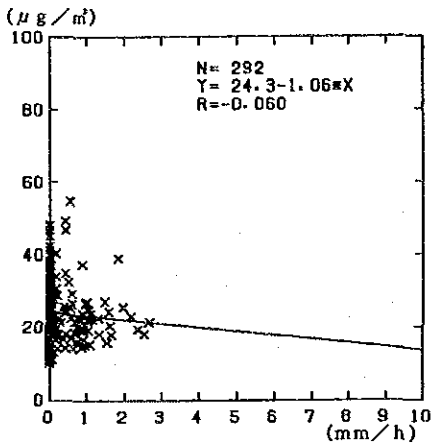
Petaling Jaya



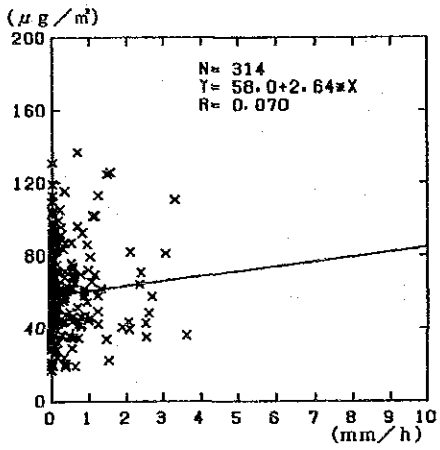
Correlation Analysis

Y-axis : SPM
(Daily Average)
X-axis : Rain Volume
(Daily Average)

UPM



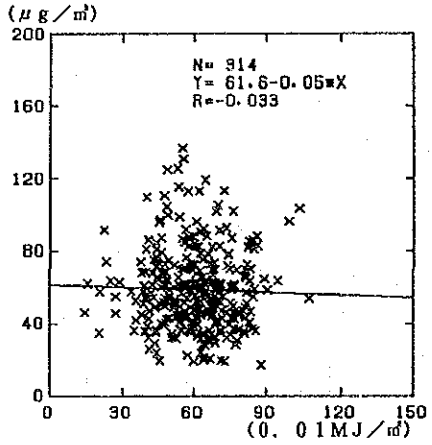
Petaling Jaya



Correlation Analysis

Y-axis: SPM
(Daily Average)
X-axis: Solar Radiation
(Daily Average)

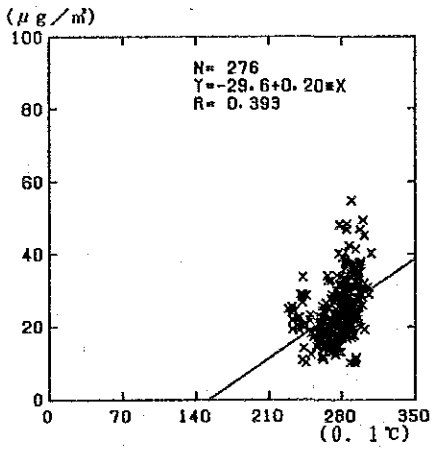
Petaling Jaya



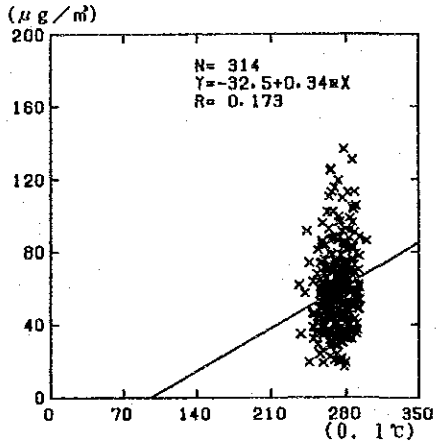
Correlation Analysis

Y-axis : SPM
(Daily Average)
X-axis : Temperature
(Daily Average)

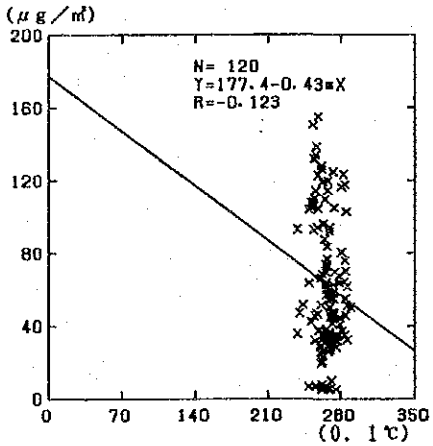
UPM



Petaling Jaya



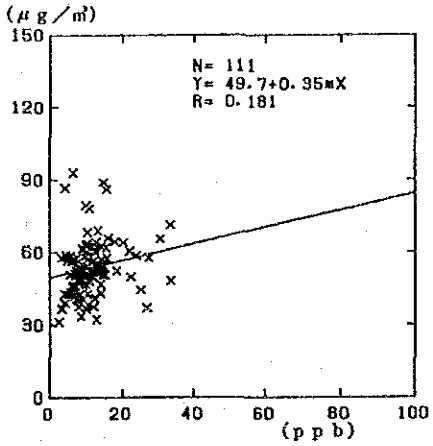
Klang



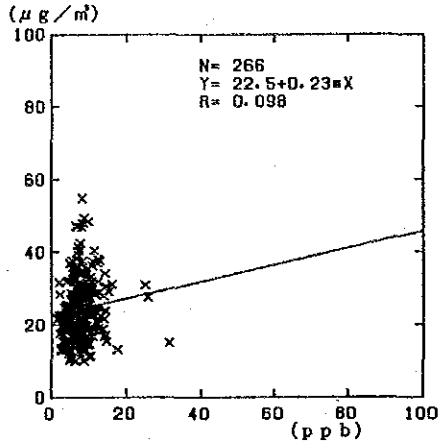
Correlation Analysis

Y-axis: SPM
(Daily Data)
X-axis: SO2
(daily Data)

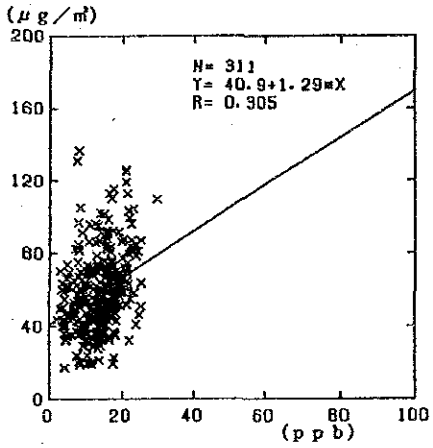
City Hall



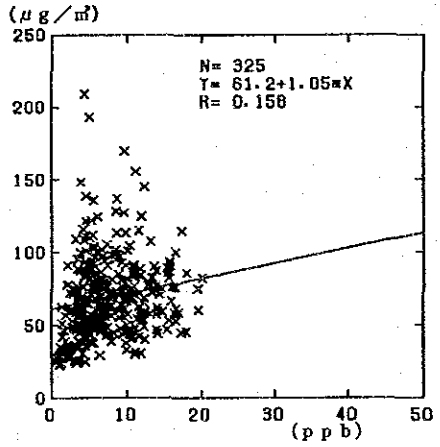
UPM



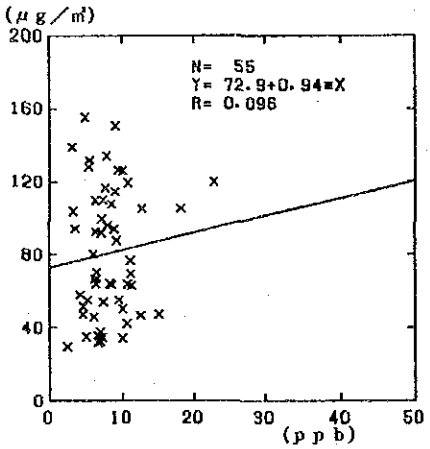
Petaling Jaya



Shah Alam



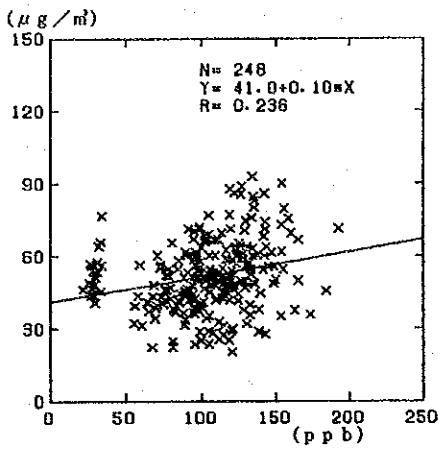
Klang



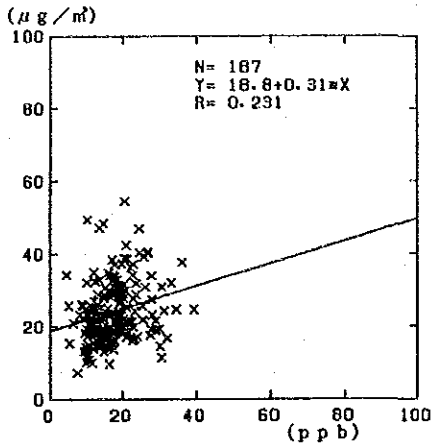
Correlation Analysis

Y-axis : SPM
(Daily Data)
X-axis : NOx
(daily Data)

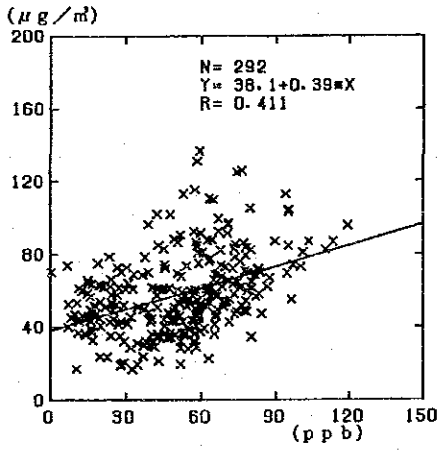
City Hall



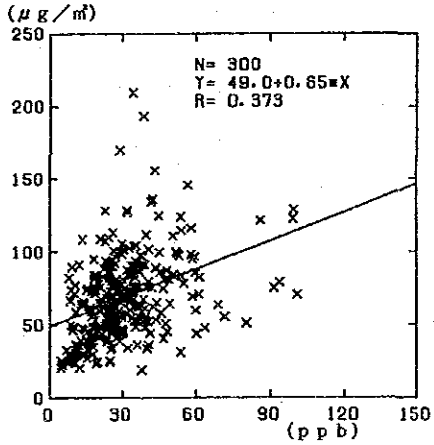
UPM



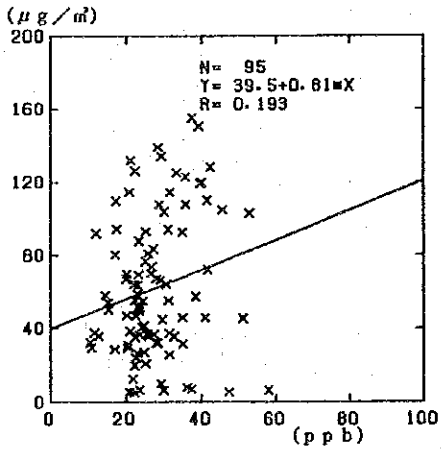
Petaling Jaya



Shah Alam

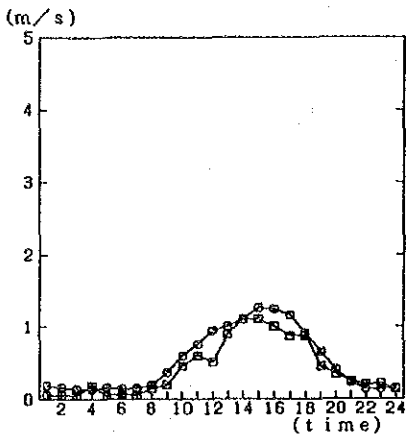


Klang

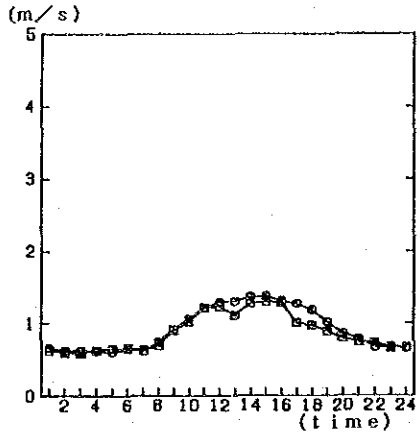


Diurnal Change of Wind Speed

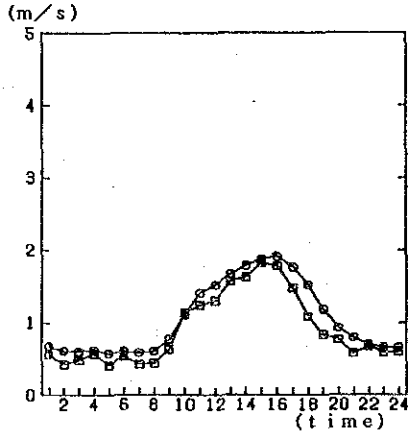
UPM



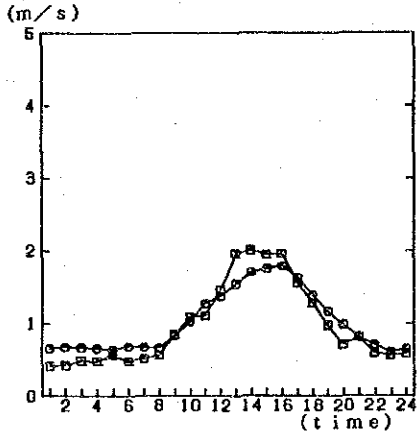
Petaling Jaya



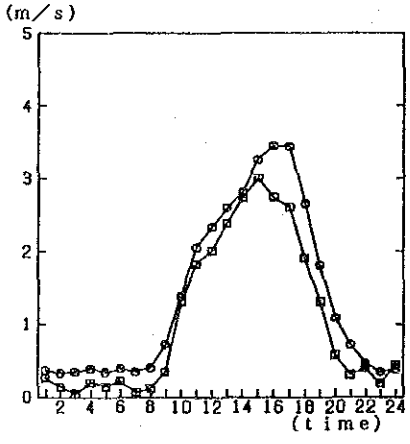
Shah Alam



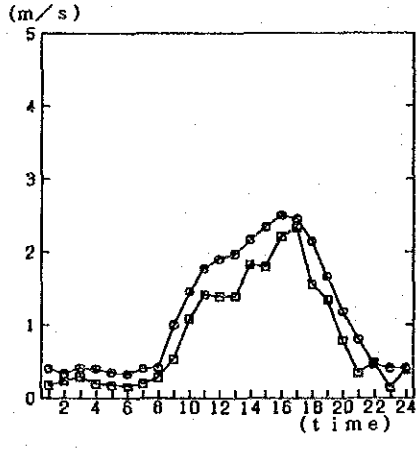
Klang



Subang (MMS)



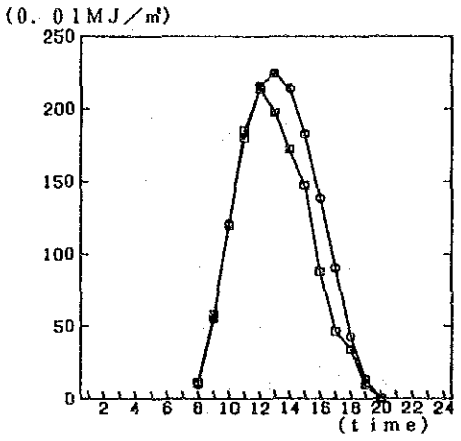
Petaling Jaya (MMS)



□ Wind Speed (High SPM)
○ Wind Speed (Low SPM)

Diurnal Change of Solar Radiation

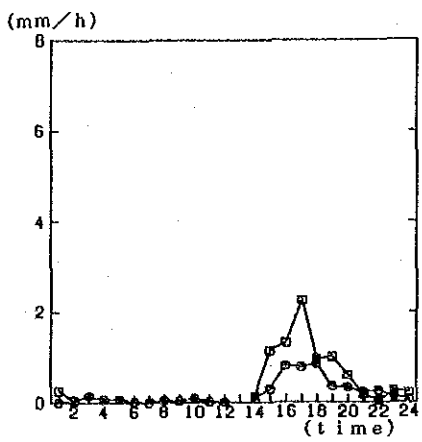
Petaling Jaya



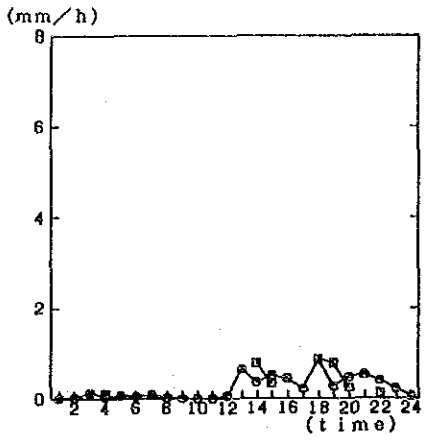
□ Solar Radiation (High SPM)
○ Solar Radiation (Low SPM)

Diurnal Change of Rain Volume

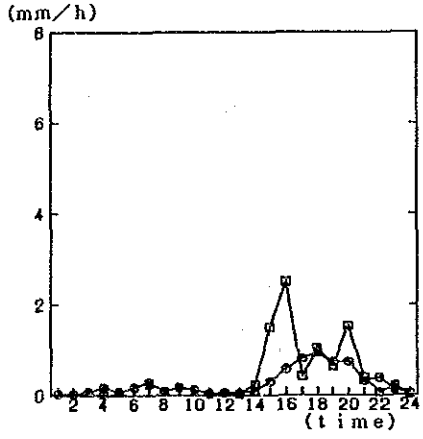
UPM



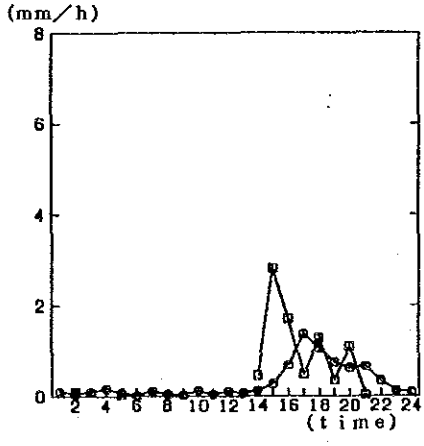
Klang



Subang (MMS)



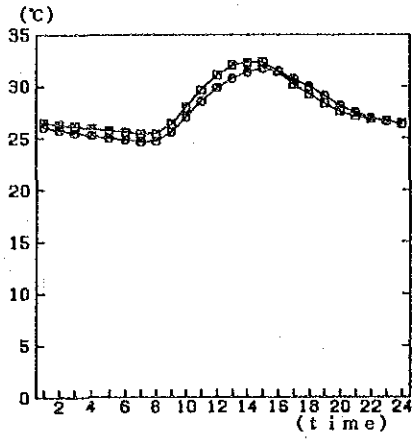
Petaling Jaya (MMS)



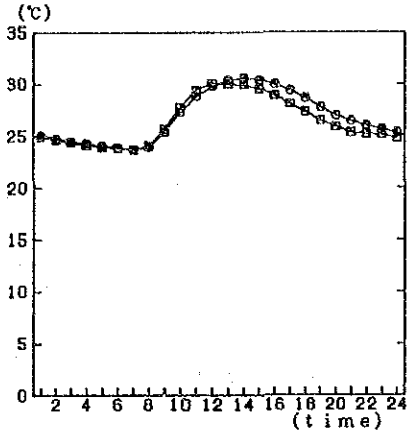
□ Rain Volume (High SPM)
○ Rain Volume (Low SPM)

Diurnal Change of Temperature

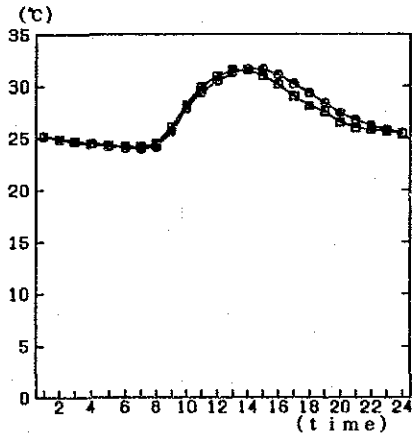
UPM



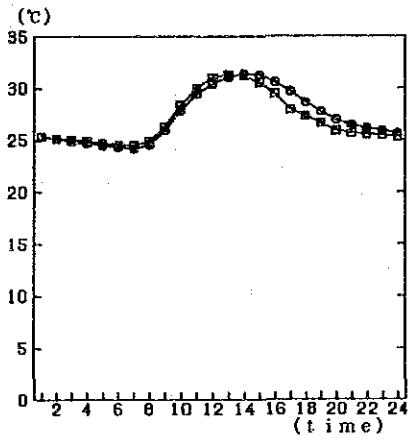
Klang



Subang (MMS)



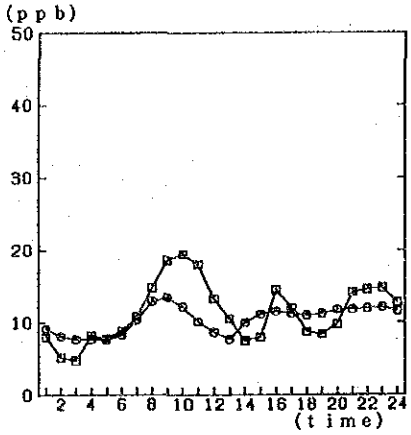
Petaling Jaya (MMS)



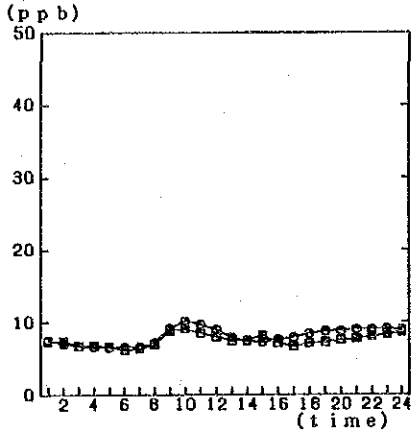
□ Temperature (High SPM)
○ Temperature (Low SPM)

Diurnal Change of SO2

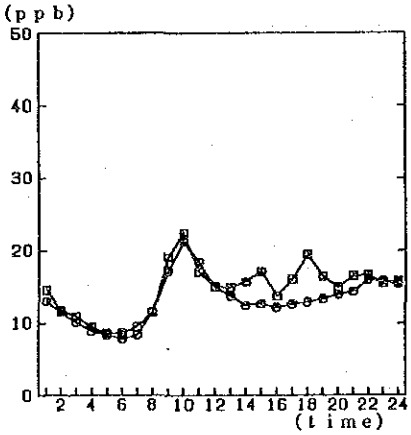
City Hall



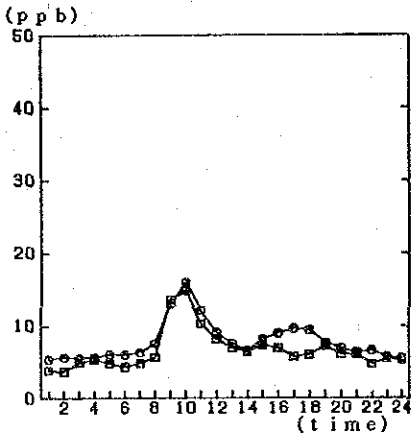
UPM



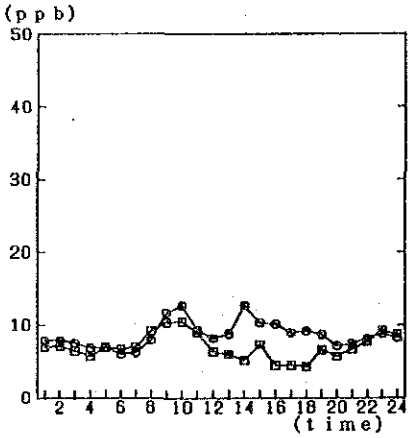
Petaling Jaya



Shah Alam



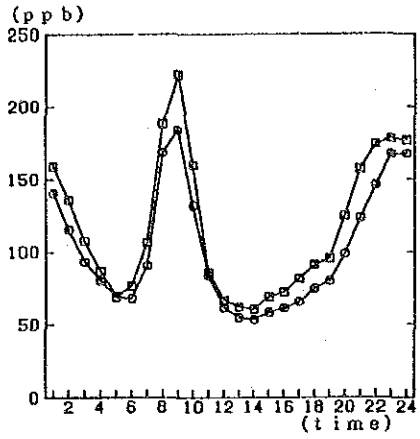
Klang



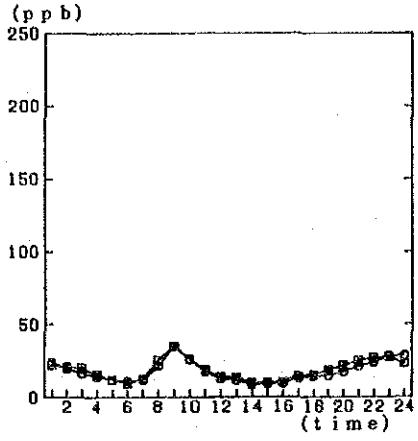
□ SO2 (High SPM)
○ SO2 (Low SPM)

Diurnal Change of NOx

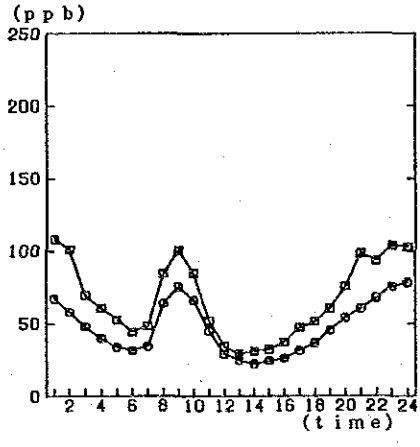
City Hall



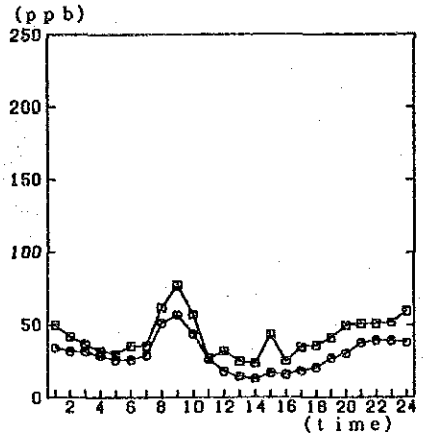
UPM



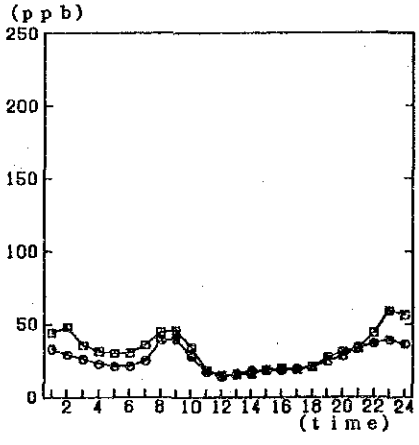
Petaling Jaya



Shah Alam



Klang



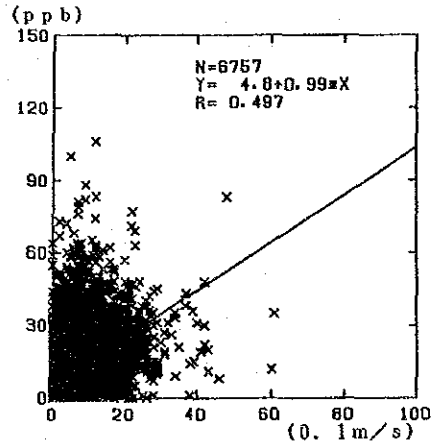
□ NOx (High SPM)
○ NOx (Low SPM)

2.1.6 Analysis of High O3 Concentration

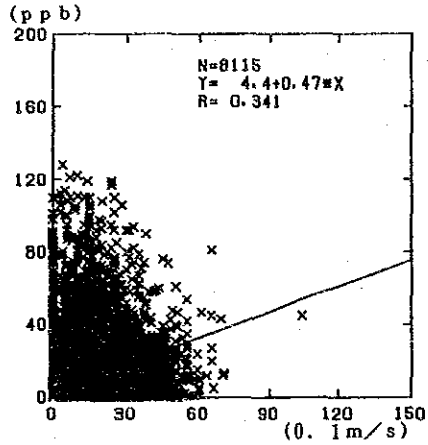
Correlation Analysis

Y-axis: O3
(Hourly Data)
X-axis: Wind Speed
(Hourly Data)

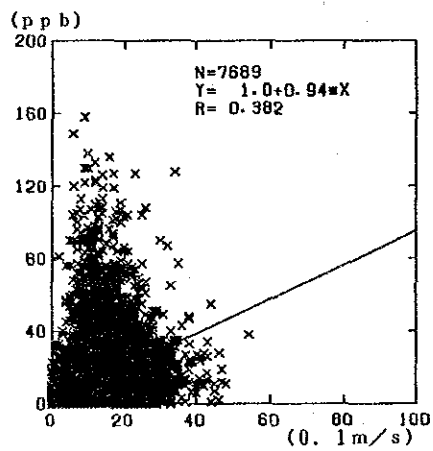
UPM



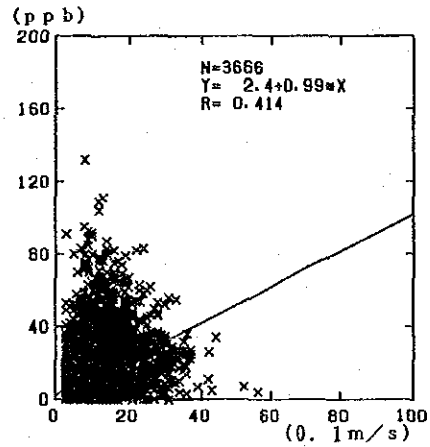
Petaling Jaya



Shah Alam



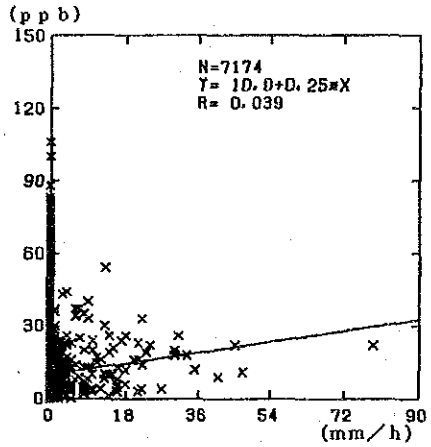
Klang



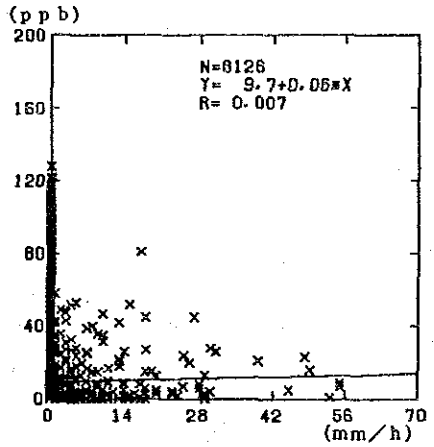
Correlation Analysis

Y-axis: O3
(Hourly Data)
X-axis: Rain Volume
(Hourly Data)

UPM



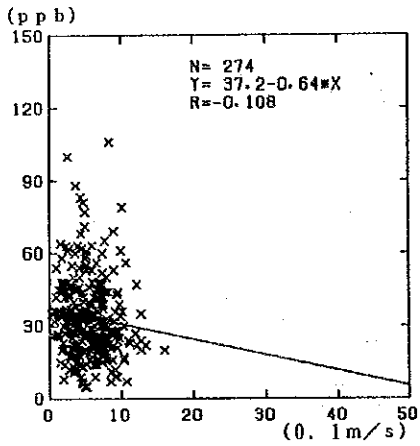
Petaling Jaya



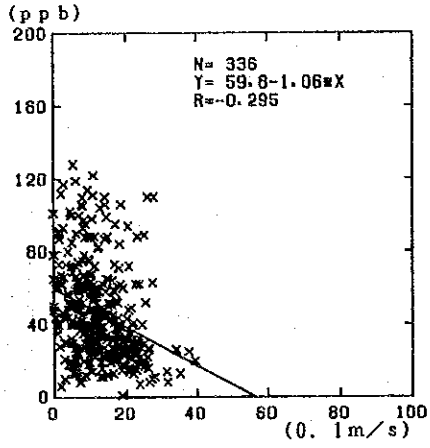
Correlation Analysis

Y-axis: O3
(Daily Maximum)
X-axis: Wind Speed
(Morning Average)

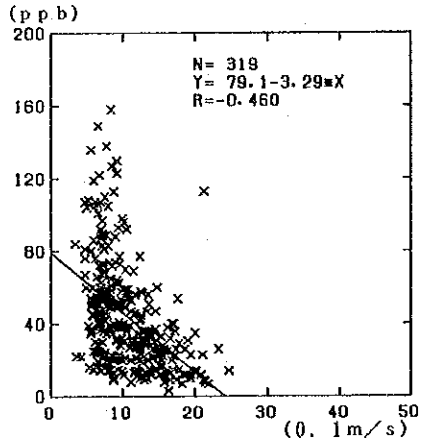
UPM



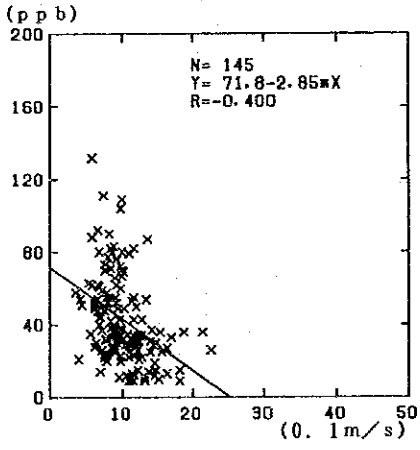
Petaling Jaya



Shah Alam



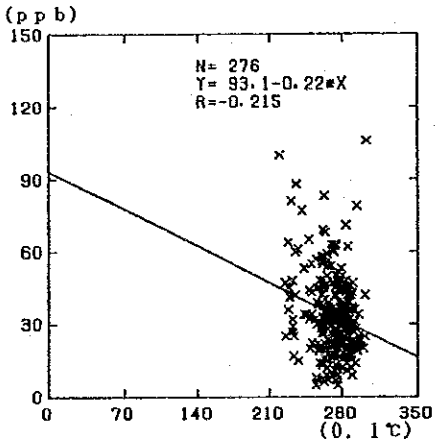
Klang



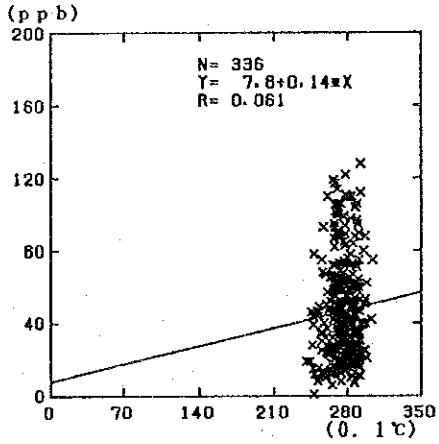
Correlation Analysis

Y-axis: O3
(Daily Maximum)
X-axis: Temperature
(Morning Average)

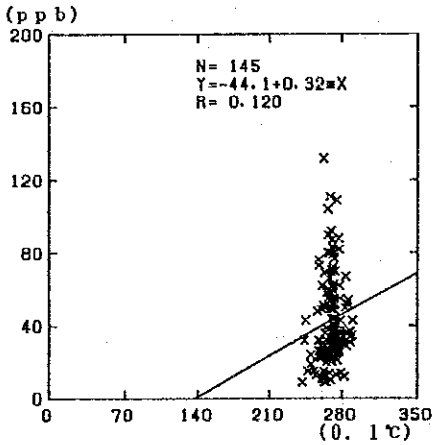
UPM



Petaling Jaya



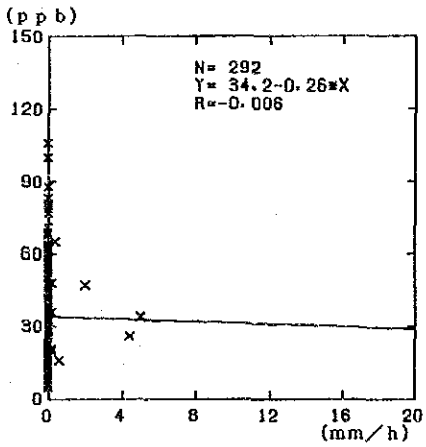
Klang



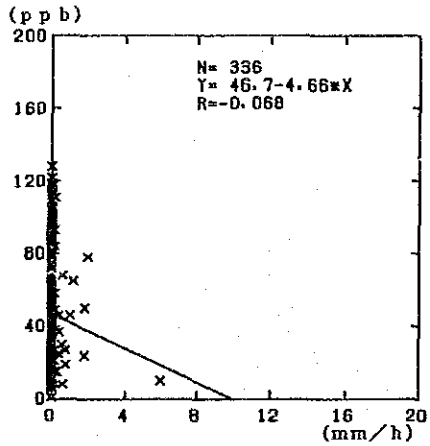
Correlation Analysis

Y-axis: O3
(Daily Maximum)
X-axis: Rain Volume
(Morning Average)

UPM



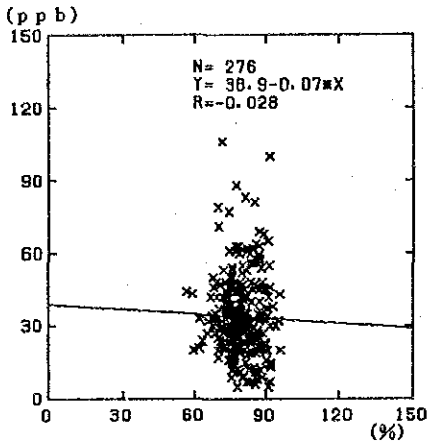
Petaling Jaya



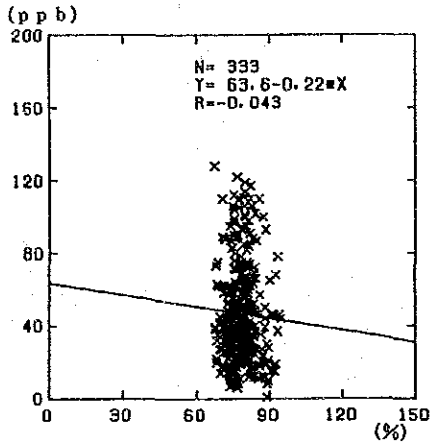
Correlation Analysis

Y-axis: O3
(Daily Maximum)
X-axis: Relative Humidity
(Morning Average)

UPM



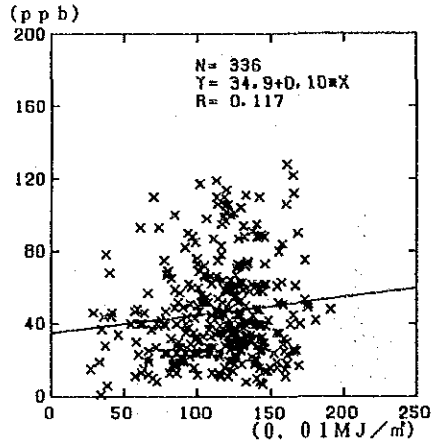
Petaling Jaya



Correlation Analysis

Y-axis: O3
(Daily Maximum)
X-axis: Solar Radiation
(Morning Average)

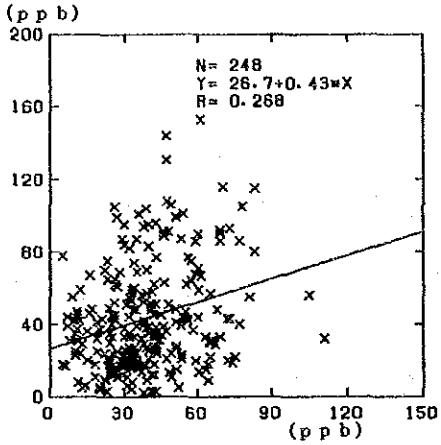
Petaling Jaya



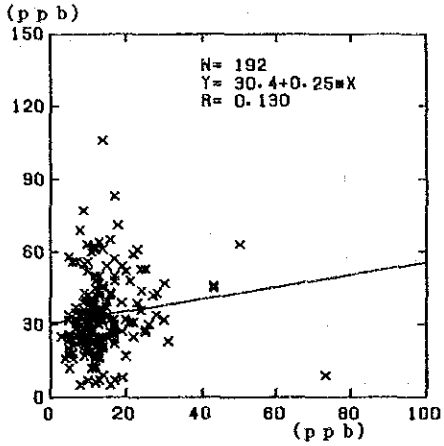
Correlation Analysis

Y-axis : O3
(Daily Maximum)
X-axis : NO2
(Morning Maximum)

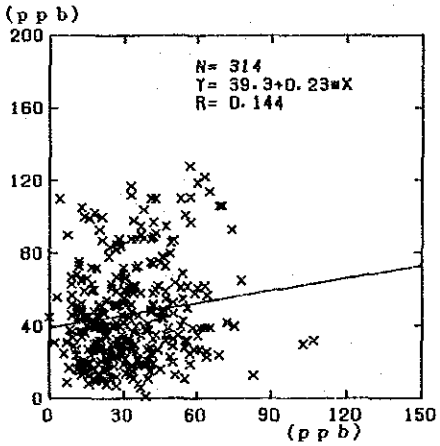
City Hall



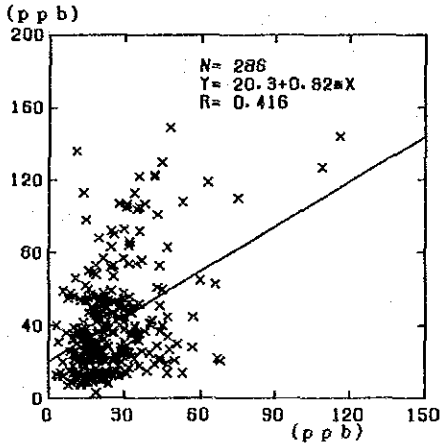
UPM



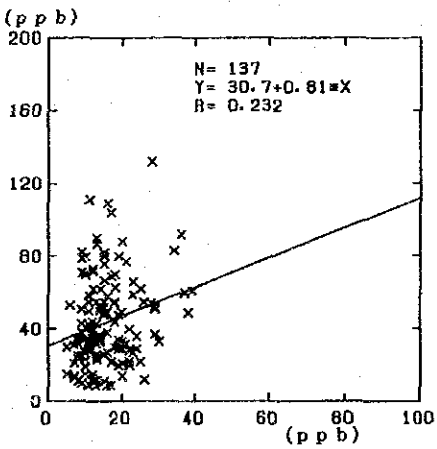
Petaling Jaya



Shah Alam



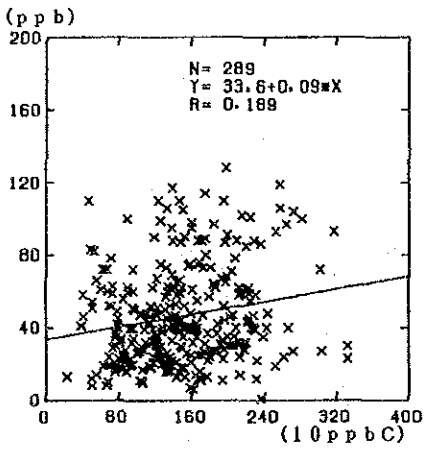
Klang



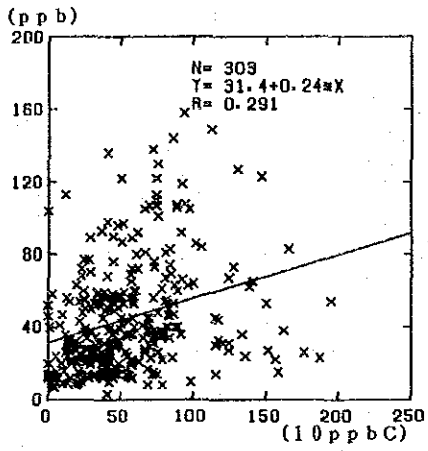
Correlation Analysis

Y-axis: O3
(Daily Maximum)
X-axis: NMHC
(Morning Maximum)

Petaling Jaya

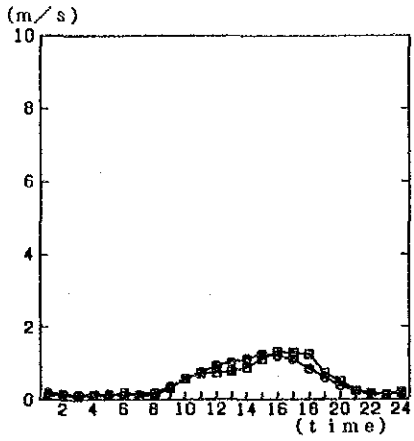


Shah Alam

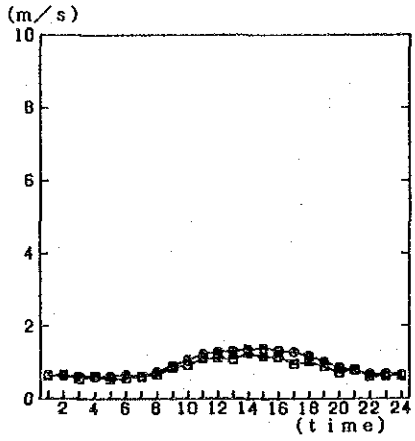


Diurnal Change of Wind Speed

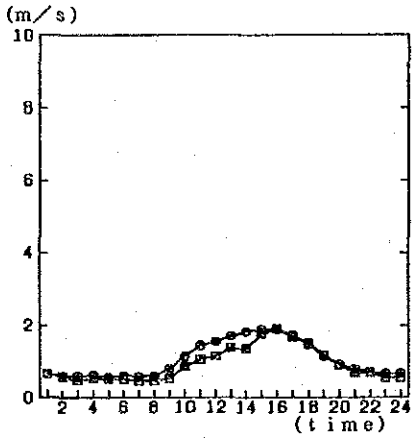
UPM



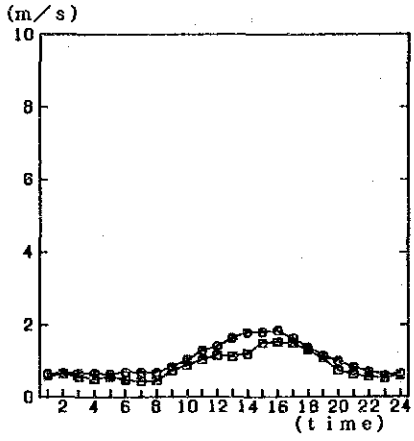
Petaling Jaya



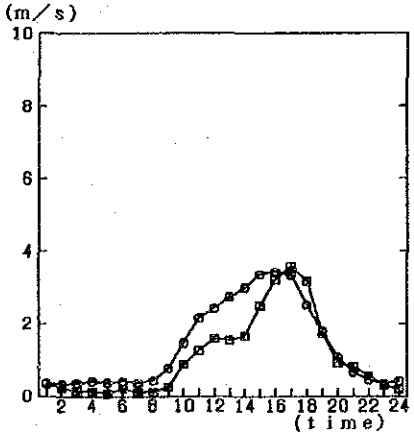
Shah Alam



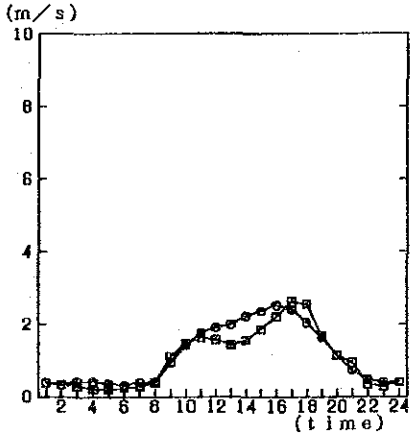
Klang



Subang (MMS)



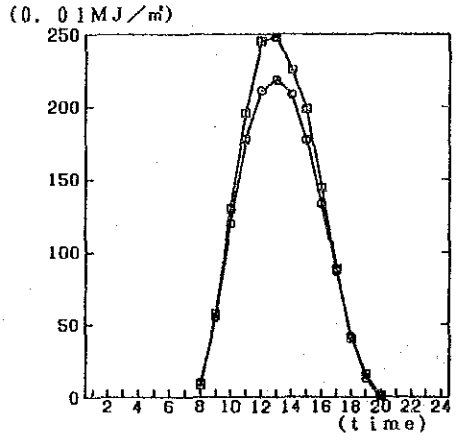
Petaling Jaya (MMS)



□ Wind Speed (High O3)
○ Wind Speed (Low O3)

Diurnal Change of Solar Radiation

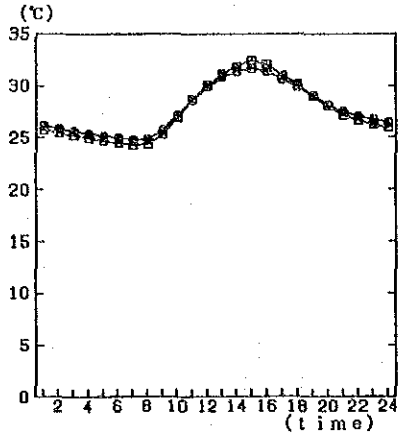
Petaling Jaya



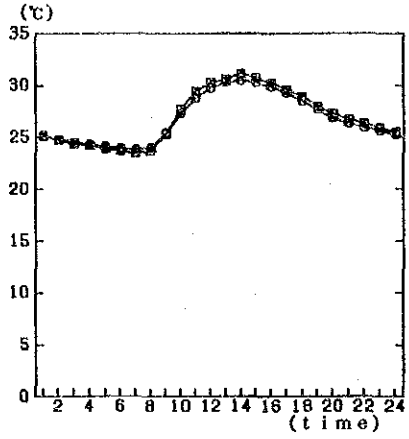
□ Solar Radiation (High O3)
○ Solar Radiation (Low O3)

Diurnal Change of Temperature

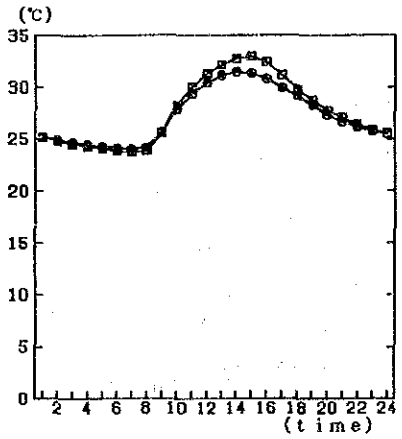
UPM



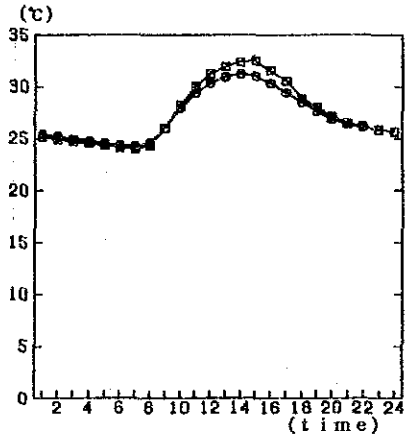
Klang



Subang (MMS)



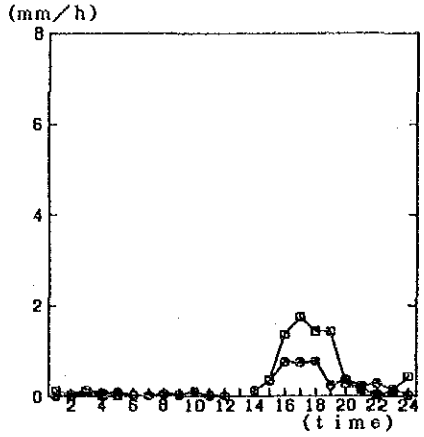
Petaling Jaya (MMS)



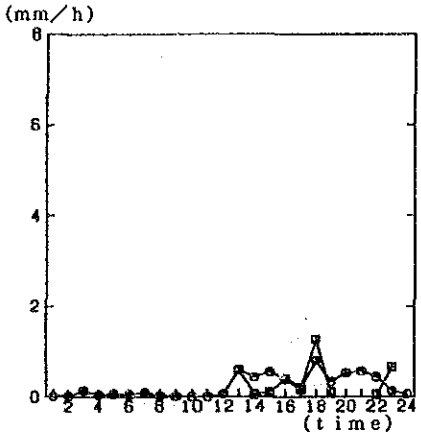
□ Temperature (High O3)
○ Temperature (Low O3)

Diurnal Change of Rainfall Amount

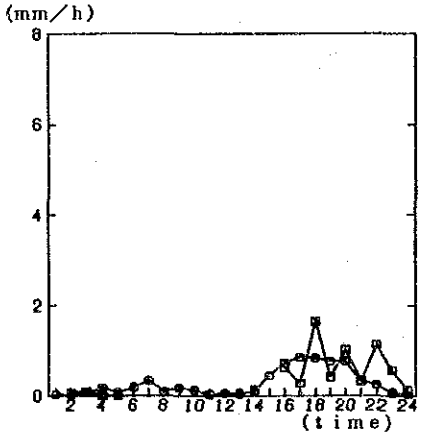
UPM



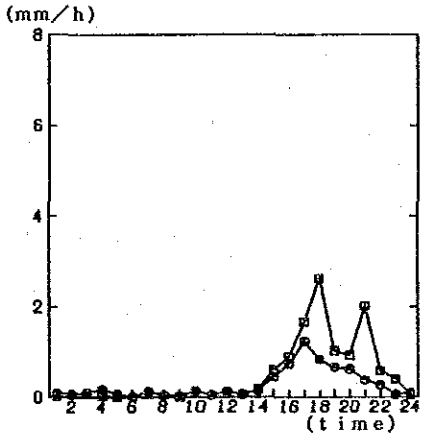
Klang



Subang (MMS)



Petaling Jaya (MMS)



□ Rainfall Amount (High O3)
○ Rainfall Amonut (Low O3)

2.2 Simplified Measurement

2.2.1 Results of Simplified Measurement in Wide Area

Result of Simplified Measurement

1st time 1992

No.	(PPb)			(mg/day/100cm² PbO_2)	Period
	NO	NO_2	NOx	SO_3	
01	*	13.0	*	(0.13)	2/27 13:12～3/24 11:25
02	N.D.	6.9	6.9	(0.01)	2/27 13:44～3/24 11:59
03	4.9	18.1	23.0	(0.01)	2/27 12:23～3/24 12:59
04	N.D.	9.1	9.1	(0.01)	3/10 11:10～3/25 12:45
05	11.2	19.9	31.1	(0.17)	2/27 11:25～3/24 10:45
11	26.2	20.5	46.7	0.21	2/27 10:21～3/24 13:55
12	*	*	*	(0.00)	2/27 10:50～3/24 13:30
21	N.D.	8.5	8.5	(0.01)	3/13 12:00～3/26 10:40
22	N.D.	10.1	10.1	(0.00)	3/13 11:30～3/26 10:10
23	N.D.	8.1	8.1	(0.11)	2/27 13:59～3/24 11:45
31	N.D.	7.4	7.4	(0.11)	3/10 12:33～3/25 10:05
32	14.1	17.5	31.6	(0.00)	3/10 12:13～3/25 10:20
33	22.7	23.4	46.1	(0.02)	3/ 5 14:30～3/25 12:00
34	*	14.9	*	(0.01)	3/ 5 11:30～3/25 11:45
35*1	—	—	—	———	———
41	*	*	*	(0.00)	3/10 10:40～3/25 11:15
42	N.D.	7.6	7.6	(0.02)	3/10 10:00～3/25 12:00
43	*	6.3	*	(0.00)	3/10 9:30～3/25 13:30
51	*	*	*	(0.00)	2/28 10:00～3/25 11:45
52	N.D.	22.1	22.1	(0.04)	3/13 9:00～3/24 13:35
53	9.9	17.2	27.1	(0.01)	2/28 15:15～3/24 13:15
54	N.D.	13.9	13.9	(0.02)	2/28 13:30～3/25 10:20
55	N.D.	11.0	11.0	0.39	2/28 14:55～3/25 10:45
61	20.5	17.9	38.4	(0.01)	2/28 10:25～3/25 12:00
62	29.6	23.2	52.8	(0.10)	2/28 10:40～3/25 10:00
63	29.3	23.7	53.0	(0.01)	2/28 12:50～3/24 14:00
64*2	—	—	—	———	———
65	N.D.	11.3	11.3	(0.01)	2/24 12:58～3/26 11:45
71	25.2	25.8	51.0	(0.02)	3/13 9:20～3/24 11:30
72	40.1	21.0	61.1	(0.00)	2/28 11:15～3/24 14:30
73	111	26.0	137	(0.16)	2/24 14:40～3/24 12:00
74	*	*	*	(0.01)	2/24 12:35～3/24 12:45
75	*	12.4	*	(0.00)	3/13 11:00～3/26 11:10
81	*	*	*	(0.01)	3/10 11:45～3/26 12:10
82	N.D.	17.3	17.3	(0.01)	3/10 10:00～3/26 9:25
83*2	—	—	—	———	———
84	*	*	*	(0.11)	2/24 13:30～3/26 9:30
85	N.D.	19.2	19.2	(0.13)	3/13 10:00～3/26 9:50
91	N.D.	22.0	22.0	(0.00)	3/17 11:40～3/26 9:10
92	*	*	*	(0.00)	3/10 11:37～3/25 12:25
93	N.D.	12.4	12.4	(0.01)	3/ 5 11:30～3/25 11:00
95*2	—	—	—	———	———
101	*	*	*	(0.00)	3/13 11:45～3/26 10:20
102	N.D.	7.4	7.4	(0.04)	3/17 10:25～3/26 10:30
103	N.D.	6.2	6.2	(0.02)	3/17 10:38～3/26 10:20
104	N.D.	10.9	10.9	(0.03)	3/17 11:00～3/26 10:03
105*2	—	—	—	———	———
106*2	—	—	—	———	———
107*2	—	—	—	———	———
108	13.7	22.1	35.8	0.28	3/13 8:30～3/24 12:20

*: Lost Sample, #1 : Pole broken, #2 : No Pole

Result of Simplified Measurement

2nd time 1992

No.	(PPb)			(mg/day/100cm² PbO_2)	Period
	NO	NO_2	NOx	SO_3	
01	13.8	11.4	25.2	(0.17)	3/24 11:25～4/20 11:25
02	1.6	6.9	8.5	(0.09)	3/24 11:59～4/20 10:55
03	16.2	16.8	33.0	(0.15)	3/24 12:59～4/20 10:05
04	10.5	7.2	17.7	(0.07)	3/25 12:45～4/17 12:10
05	19.7	16.9	36.6	(0.06)	3/24 10:45～4/20 9:40
11	32.9	18.0	50.9	(0.13)	3/24 13:55～4/20 13:55
12	46.1	20.3	66.4	(0.18)	3/24 13:30～4/20 12:30
21	18.3	8.3	26.6	(0.17)	3/26 10:40～4/17 11:40
22	20.7	10.1	30.8	(0.07)	3/26 10:10～4/17 12:07
23	5.7	8.6	14.3	(0.17)	3/24 11:45～4/20 10:45
31	11.6	5.8	17.4	(0.18)	3/25 10:05～4/20 11:00
32	21.7	12.7	34.4	0.27	3/25 10:20～4/20 12:45
33	39.4	18.8	58.2	0.24	3/25 12:00～4/17 10:25
34	37.9	13.1	51.0	(0.14)	3/25 11:45～4/17 10:10
35*1	—	—	—	———	———
41	9.8	10.5	20.3	(0.02)	3/25 11:15～4/18 10:25
42	3.4	7.1	10.5	(0.07)	3/25 12:30～4/20 9:00
43	*	6.6	*	(0.10)	3/25 13:30～4/20 9:30
51	22.1	2.8	24.9	(0.07)	3/25 11:45～4/18 10:55
52	27.9	17.5	45.4	(0.11)	3/24 13:40～4/18 9:55
53	25.5	15.3	40.8	(0.04)	3/24 13:15～4/18 11:25
54	10.2	11.7	21.9	(0.03)	3/25 10:25～4/18 11:40
55	13.2	10.1	23.3	(0.01)	3/25 10:45～4/18 11:55
61	31.5	16.4	47.9	(0.06)	3/25 12:00～4/18 9:30
62	38.1	22.2	60.3	(0.15)	3/25 10:00～4/18 9:40
63	36.9	21.2	58.1	(0.03)	3/24 14:00～4/20 10:30
64*2	—	—	—	———	———
65	9.6	12.6	22.2	(0.07)	3/26 11:45～4/18 12:15
71	*	*	*	0.21	3/24 11:30～4/18 9:00
72	*	*	*	(0.03)	3/24 14:30～4/17 15:10
73	106	23.8	130	(0.12)	3/24 12:00～4/17 9:45
74	18.4	12.8	31.2	0.44	3/24 12:45～4/17 10:45
75	N.D.	45.1	45.1	(0.12)	3/26 11:10～4/17 12:30
81	34.9	19.5	54.4	(0.05)	3/26 12:00～4/17 15:25
82	14.8	17.9	32.7	(0.04)	3/26 9:25～4/20 12:18
83*2	—	—	—	———	———
84	*	*	*	———	———
85	22.6	16.8	39.4	(0.12)	3/26 9:50～4/17 11:15
91	33.3	24.3	57.6	(0.14)	3/26 9:10～4/20 13:10
92	*	*	*	(0.16)	3/25 12:25～4/17 12:30
93	13.7	11.7	25.4	0.30	3/25 11:00～4/17 9:45
95*2	—	—	—	———	———
101	43.5	8.6	52.1	(0.10)	3/26 10:20～4/17 11:57
102	7.9	8.1	16.0	(0.08)	3/26 10:30～4/20 16:55
103	5.6	6.9	12.5	(0.08)	3/26 10:20～4/20 15:06
104	14.7	12.8	27.5	(0.17)	3/26 10:03～4/20 14:33
105*2	—	—	—	———	———
106*2	—	—	—	———	———
107*2	—	—	—	———	———
108	42.4	17.0	59.4	(0.03)	3/24 12:20～4/17 10:00

*: Lost Sample, #1 : Pole broken, #2 : No Pole

Result of Simplified Measurement

3rd time 1992

No.	(PPb)			(mg/day/100cm² PbO_2)	Period
	NO	NO_2	NOx	SO_3	
01*1	—	—	—	———	———
02	26.8	9.1	35.9	(0.07)	7/21 11:35～8/25 12:45
03	39.6	17.9	57.5	(0.16)	7/21 10:40～8/25 13:25
04	21.8	8.5	30.3	(0.08)	7/22 11:05～8/26 10:30
05	37.7	15.2	52.9	0.20	7/21 10:15～8/25 13:50
11	55.0	16.3	71.3	(0.18)	7/23 10:00～8/26 11:25
12*1	—	—	—	———	———
21	28.5	9.5	38.0	(0.09)	7/23 12:30～8/26 11:40
22	36.5	14.1	50.6	(0.10)	7/23 11:50～8/26 12:15
23	27.5	11.5	39.0	(0.11)	7/21 11:25～8/25 12:55
31	23.8	9.1	32.9	(0.11)	7/21 12:55～8/25 11:45
32	38.8	12.9	51.7	(0.18)	7/21 13:15～8/25 11:00
33	57.8	21.2	79.0	0.27	7/22 10:25～8/25 10:45
34	26.9	14.0	40.9	0.22	7/22 10:00～8/25 10:30
35*1	—	—	—	———	———
41	*	10.3	*	(0.05)	7/21 11:50～8/27 12:35
42	*	*	*	(0.08)	7/22 11:10～8/27 13:35
43*1	—	—	—	———	———
51	31.6	12.0	43.6	(0.05)	7/21 11:30～8/27 12:50
52	47.6	18.7	66.3	(0.10)	7/21 10:30～8/27 11:20
53	37.1	17.2	54.3	(0.01)	7/21 12:15～8/26 15:20
54	*	4.0	*	(0.03)	7/22 13:00～8/26 15:00
55	22.9	11.2	34.1	(0.02)	7/22 13:50～8/26 14:45
61	72.8	17.8	90.6	(0.08)	7/21 10:55～8/27 13:56
62	56.9	20.4	77.3	(0.11)	7/21 10:40～8/27 11:35
63	60.8	23.9	84.7	(0.09)	7/21 10:10～8/27 12:05
64	29.4	15.2	44.6	(0.11)	7/23 10:35～8/27 10:57
65	20.9	12.3	33.2	(0.00)	7/22 14:20～8/26 14:20
71	*	*	*	(0.12)	7/22 10:15～8/27 14:30
72*1	—	—	—	———	———
73	132	25.8	158	(0.15)	7/21 9:50～8/26 10:24
74	107	16.2	123	(0.00)	7/23 11:00～8/26 13:35
75	24.5	11.4	35.9	(0.05)	7/23 11:10～8/27 9:30
81	41.2	15.5	56.7	(0.12)	7/23 9:40～8/27 15:05
82	42.4	16.1	58.5	(0.12)	7/23 9:35～8/26 11:05
83	95.0	20.8	116	(0.04)	7/22 9:50～8/26 13:10
84*1	—	—	—	———	———
85	*	*	*	(0.06)	7/23 13:00～8/26 11:10
91	53.0	20.0	73.0	(0.15)	7/23 9:50～8/26 11:35
92	*	*	*	(0.18)	7/22 10:45～8/26 10:15
93	*	*	*	(0.19)	7/22 9:45～8/25 10:15
95	18.9	10.7	29.6	(0.09)	7/21 14:30～8/26 8:30
101	*	*	*	(0.06)	7/23 12:10～8/26 12:00
102	25.6	7.7	33.3	(0.09)	7/24 9:05～8/25 9:10
103	18.5	7.6	26.1	(0.07)	7/23 11:05～8/25 9:25
104	40.6	11.3	51.9	(0.12)	7/23 10:30～8/25 9:35
105	22.4	8.8	31.2	(0.12)	7/24 10:05～8/25 11:40
106	31.0	12.0	43.0	(0.18)	7/22 12:00～8/25 9:45
107	18.1	5.4	23.5	(0.02)	7/23 11:25～8/26 9:25
108	63.6	17.5	81.1	(0.07)	7/21 9:40～8/26 10:10

*: Lost Sample, #1 : Pole broken

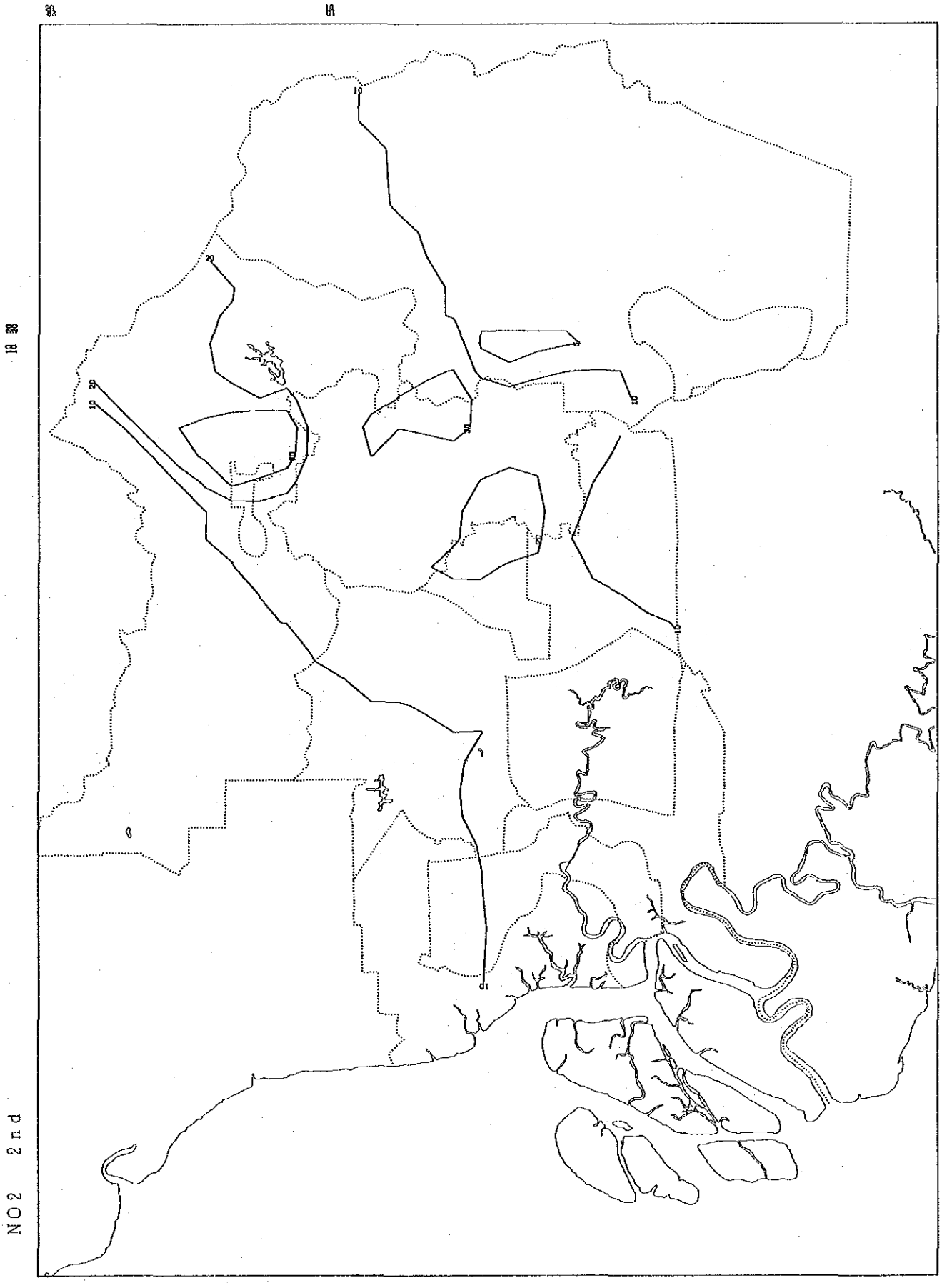
Result of Simplified Measurement

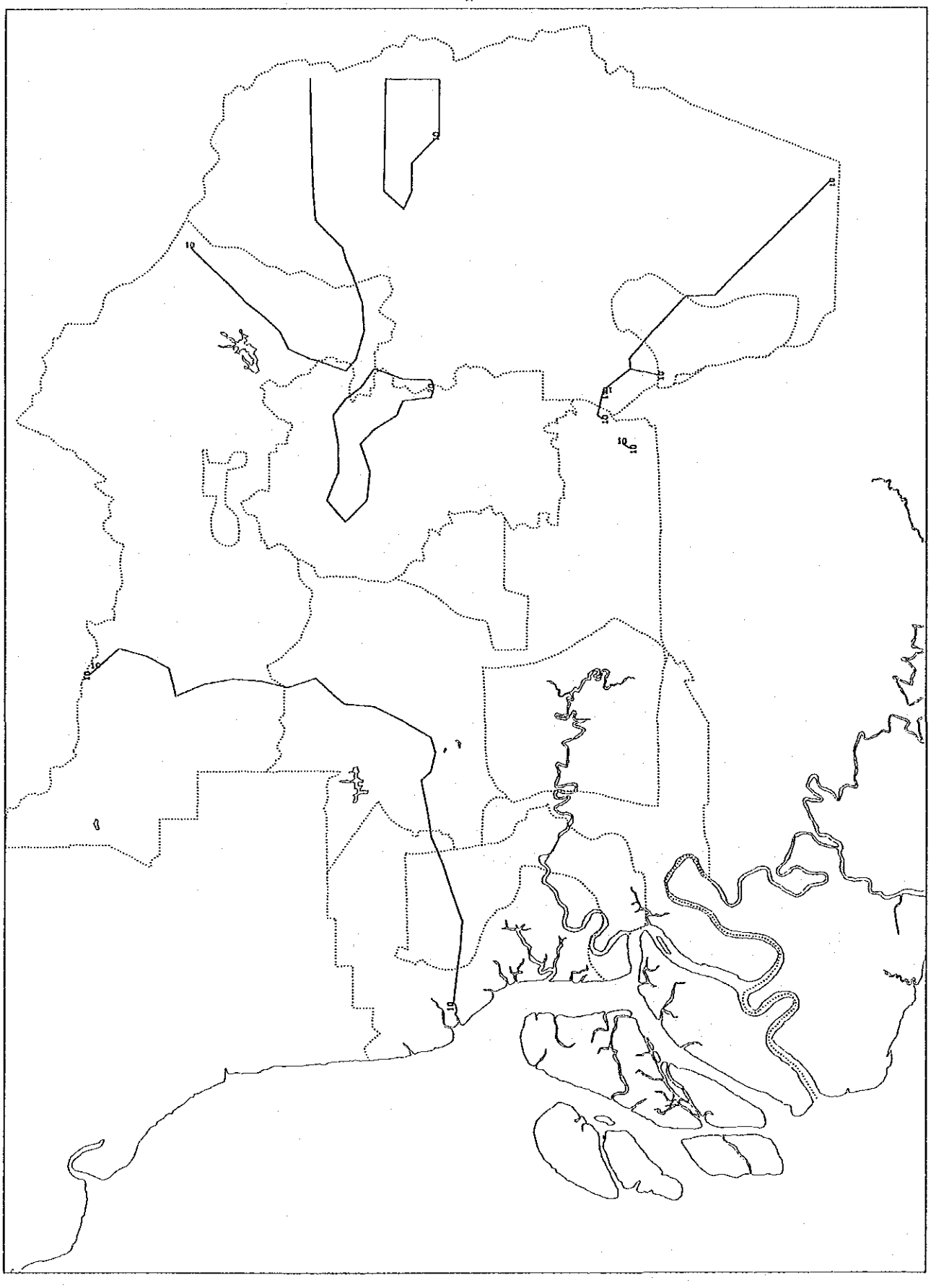
4th time 1992

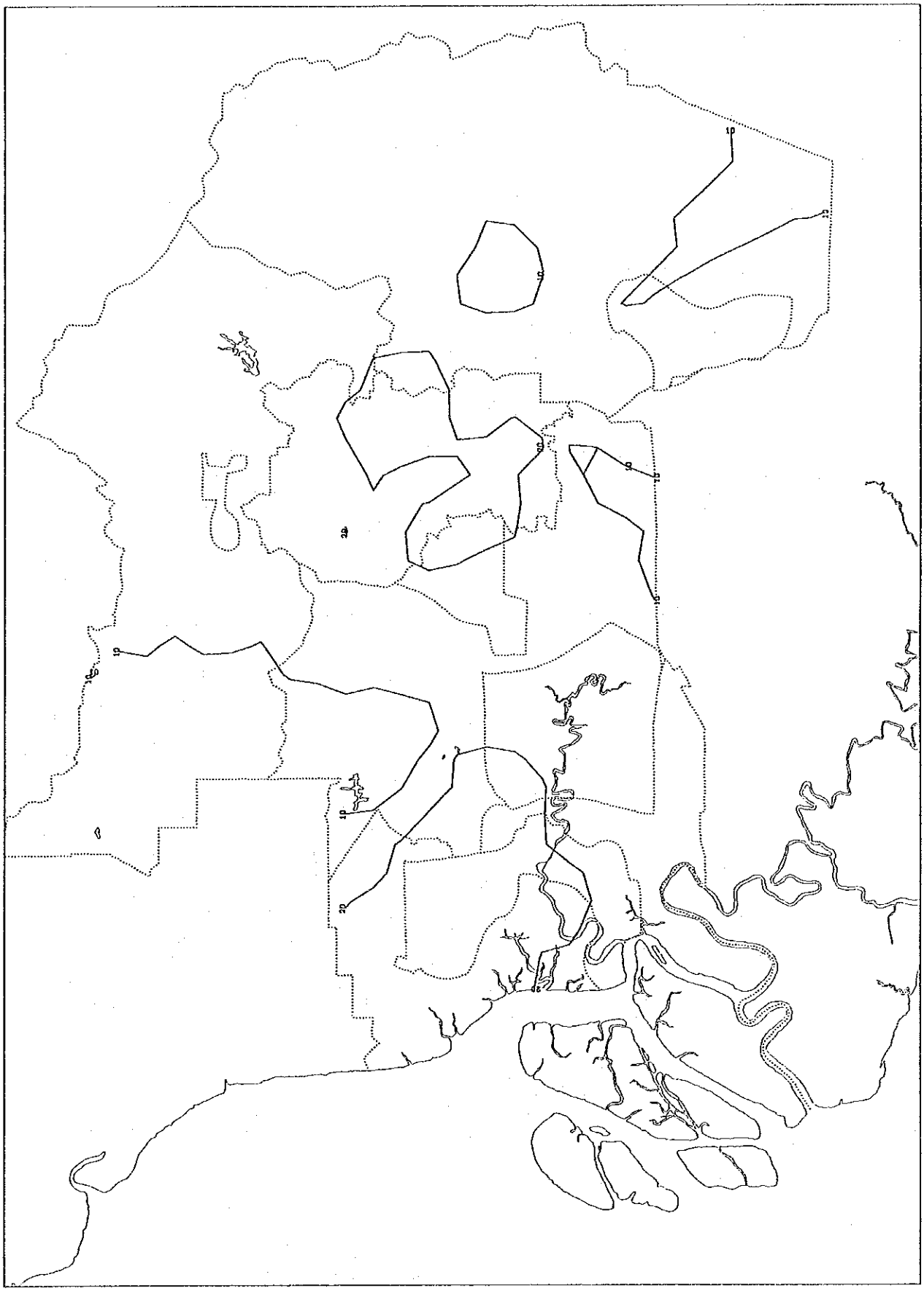
No.	(PPb)			(mg/day/100cm² PbO_2)	Period
	NO	NO_2	NOx	SO_3	
01	7.0	15.7	22.7	(0.10)	10/14 10:50～11/23 13:35
02	N.D.	6.1	6.1	(0.02)	10/14 11:35～11/23 13:10
03	15.8	14.5	30.3	(0.11)	10/14 10:30～11/23 14:00
04	N.D.	5.9	5.9	(0.00)	10/14 12:45～11/24 11:15
05	16.7	17.2	33.9	(0.11)	10/14 10:05～11/24 10:35
11	*	*	*	(0.12)	10/15 10:15～11/24 10:05
12	*	21.9	*	(0.18)	10/15 11:00～11/24 9:40
21	2.8	9.4	12.2	(0.04)	10/14 12:05～11/24 11:10
22	4.3	14.8	19.1	(0.01)	10/14 12:55～11/24 12:00
23	1.0	8.1	9.1	(0.06)	10/14 11:25～11/23 13:20
31	*	*	*	(0.09)	10/13 11:50～11/23 12:45
32	9.0	22.0	31.0	(0.08)	10/13 12:15～11/23 11:45
33	32.3	20.2	52.5	(0.19)	10/13 11:06～11/23 11:30
34	3.7	22.4	26.1	(0.17)	10/13 10:55～11/23 11:00
35	*	13.9	*	*	11/ 7 11:15～11/23 11:05
41	N.D.	13.2	13.2	(0.19)	11/ 6 10:00～11/25 11:05
42	4.0	8.4	12.4	(0.02)	10/15 12:35～11/25 12:10
43*1	—	—	—	———	———
51	3.8	13.6	17.4	(0.09)	10/15 11:55～11/25 11:40
52	34.1	20.9	55.0	(0.11)	10/16 10:50～11/25 9:40
53	27.4	18.0	45.4	(0.05)	10/16 10:00～11/24 16:00
54	9.7	9.6	19.3	(0.05)	10/15 10:40～11/24 15:45
55	7.7	10.8	18.5	(N.D.)	10/14 15:15～11/24 15:15
61	27.3	16.3	43.6	(0.05)	10/15 13:30～11/25 12:35
62	43.9	22.2	66.1	(0.12)	10/16 11:05～11/25 9:55
63	50.2	22.6	72.8	(0.09)	10/16 10:30～11/25 9:20
64	16.7	17.5	34.2	(N.D.)	10/15 10:05～11/25 15:15
65	5.4	13.7	19.1	(0.00)	10/14 14:55～11/24 14:55
71	*	20.4	*	(0.11)	10/15 14:35～11/25 14:20
72	124	26.5	150	(0.14)	10/16 11:30～11/25 12:50
73	127	23.0	150	(0.10)	10/14 11:10～11/24 10:00
74	21.9	12.1	34.0	(0.02)	10/14 14:30～11/24 14:30
75	*	13.4	*	(0.07)	10/15 9:20～11/24 12:40
81	26.2	20.6	46.8	(0.10)	10/15 14:50～11/25 13:45
82	18.5	15.4	33.9	(0.03)	10/15 10:45～10/24 9:45
83	*	*	*	(0.06)	10/15 14:00～11/25 8:40
84	56.7	18.6	75.3	(0.12)	10/16 9:30～11/24 14:15
85	*	*	*	(0.05)	10/14 11:35～11/24 10:40
91	34.4	22.5	56.9	(0.07)	10/15 10:30～11/24 10:10
92	*	*	*	(0.02)	10/14 12:35～11/24 11:30
93	8.4	10.6	19.0	0.23	10/13 10:25～11/23 10:40
95	N.D.	11.2	11.2	(0.07)	10/15 8:40～11/24 8:45
101	*	*	*	(0.05)	10/14 12:35～11/24 11:45
102	12.9	9.0	21.9	(0.04)	10/16 9:15～11/23 14:40
103	N.D.	13.4	13.4	(0.06)	10/16 9:30～11/23 9:50
104	5.9	12.9	18.8	(0.15)	10/16 9:45～11/23 10:10
105	N.D.	21.2	21.2	(0.06)	10/13 11:40～11/23 12:30
106	7.7	15.8	23.5	(0.18)	10/16 9:55～11/23 10:15
107	N.D.	8.8	8.8	(0.02)	10/15 9:30～11/23 9:35
108*1	—	—	—	———	———

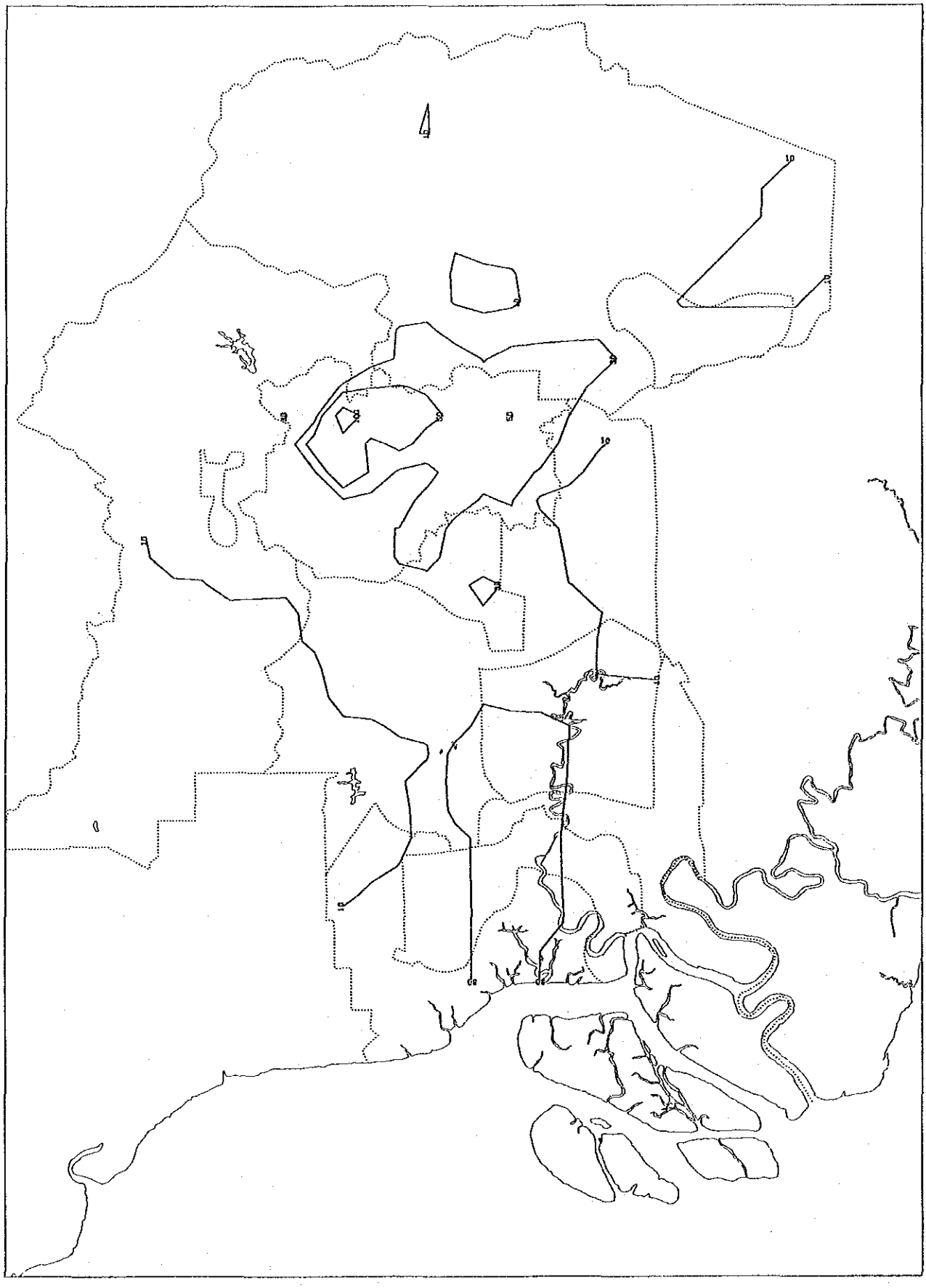
* : Lost Sample *1 : Pole broken

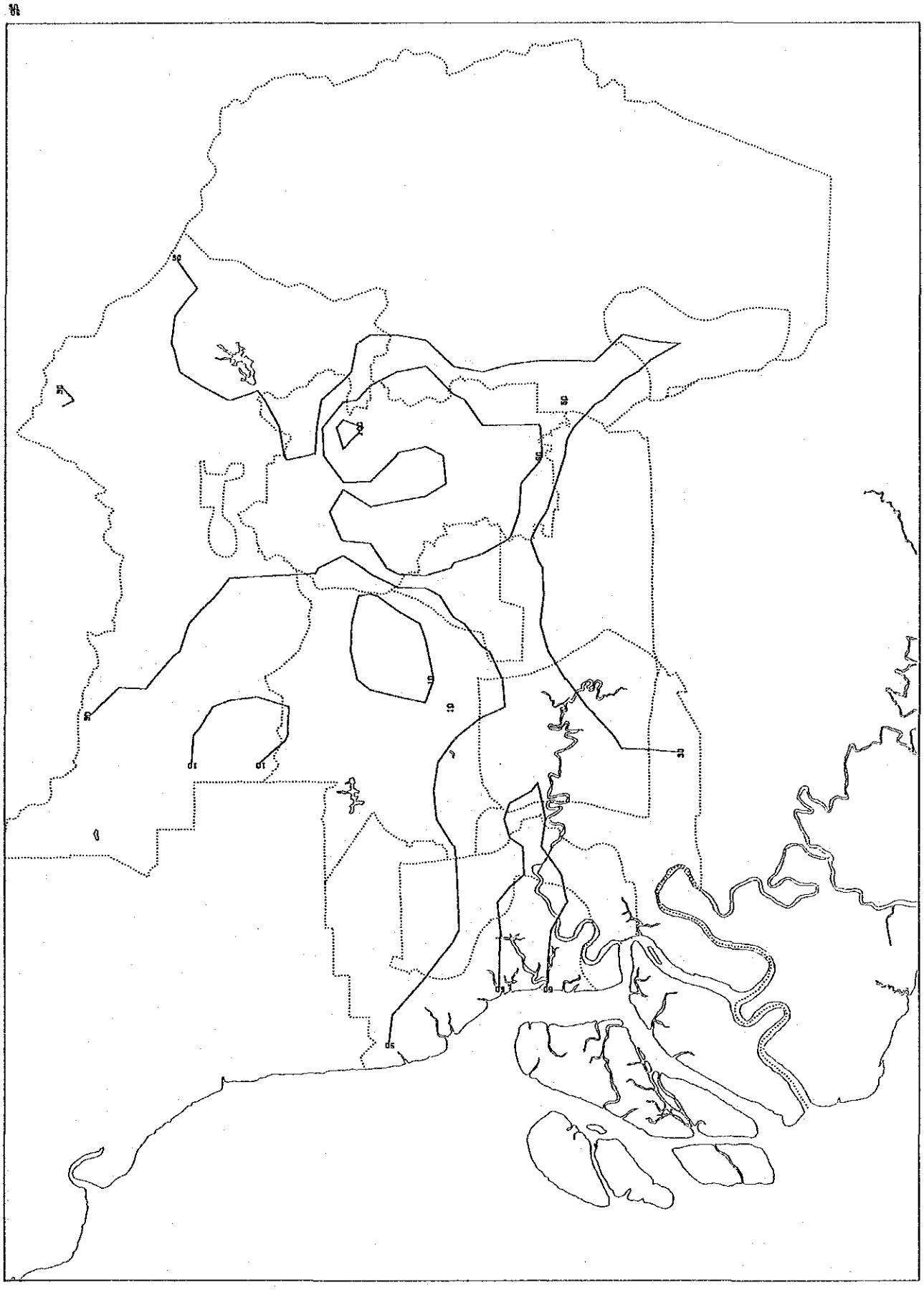
2.2.2 Contour Map of Simplified Measurement in Wide Area

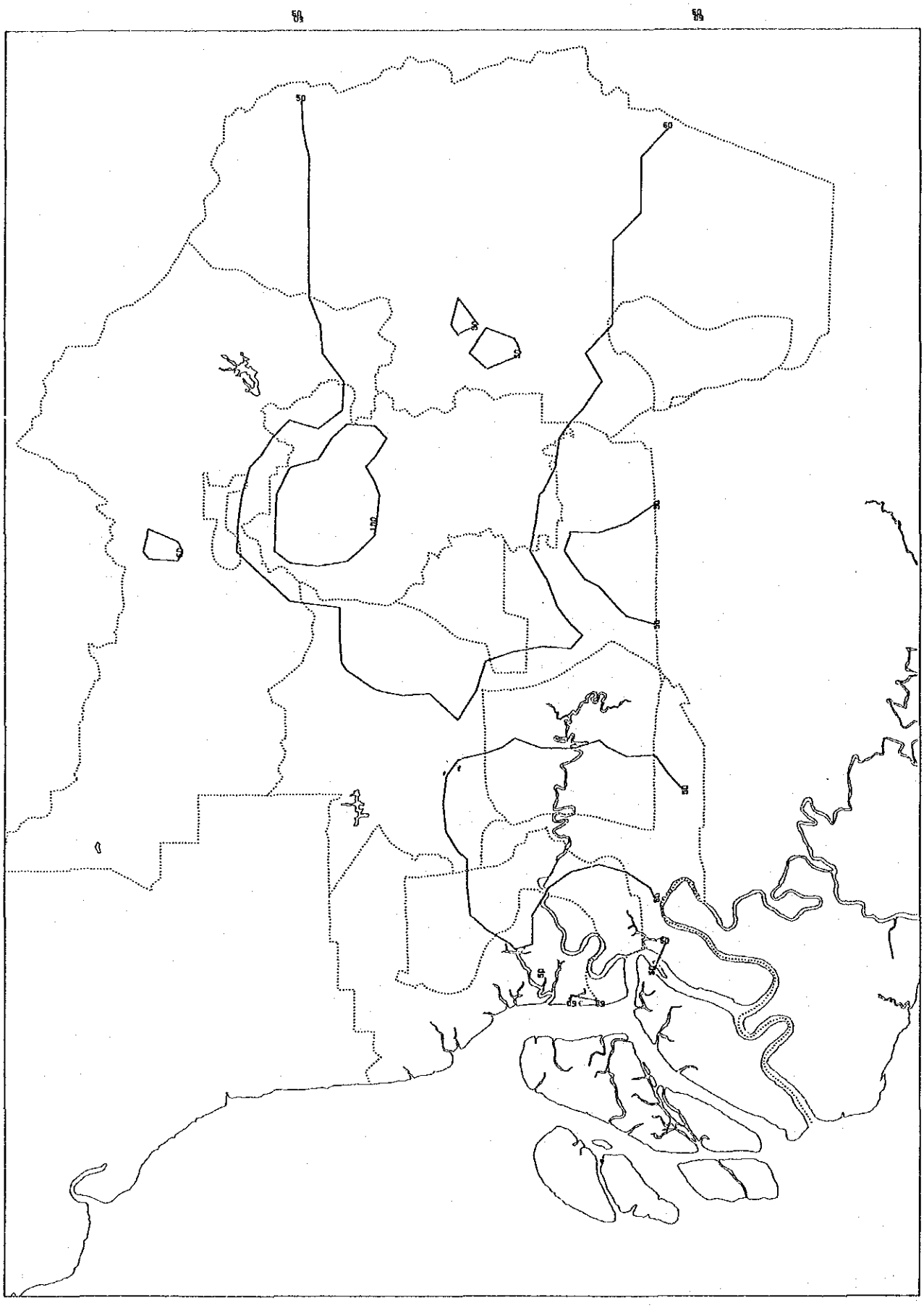



NO2 3rd

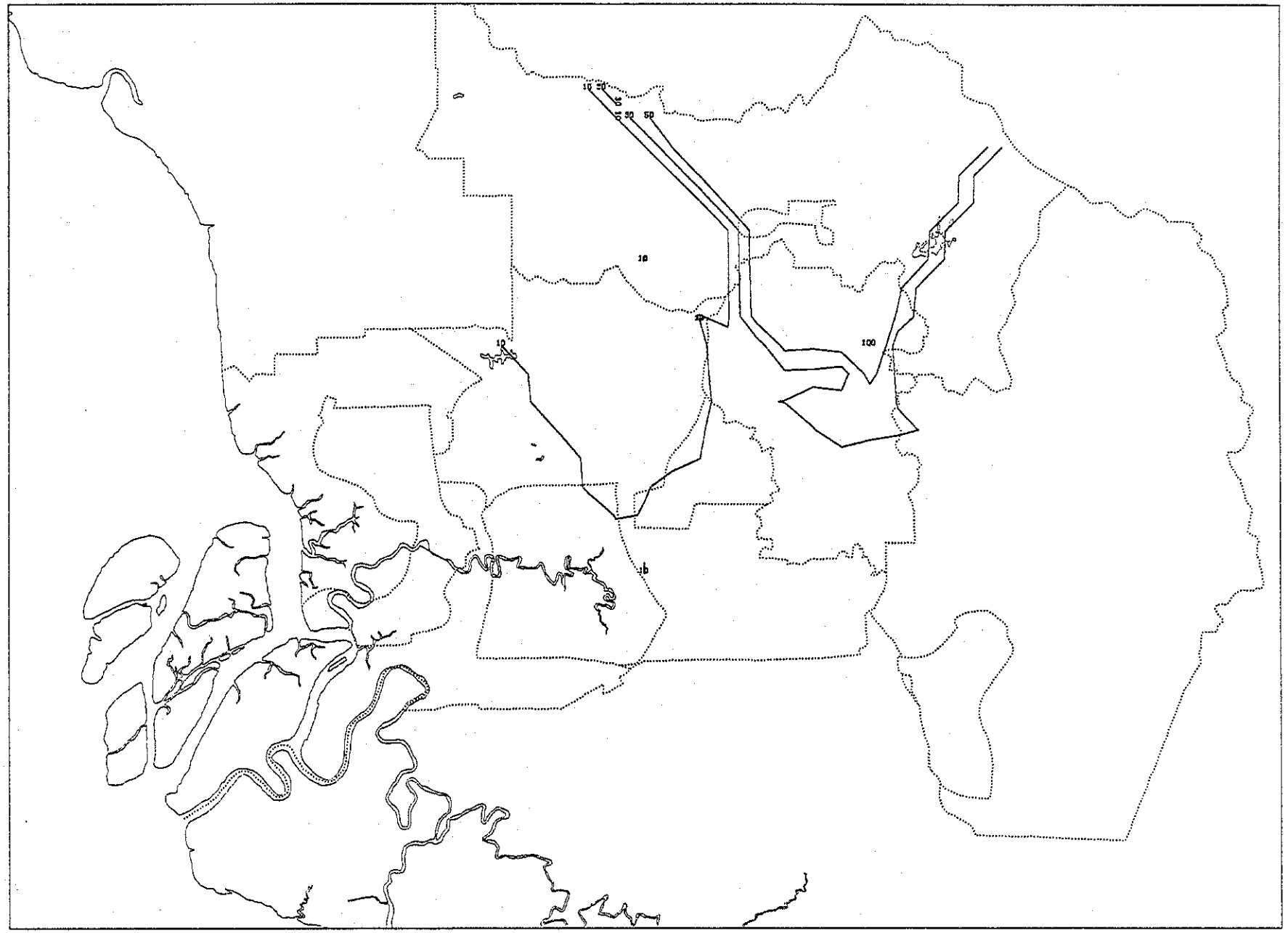

NO2 4th

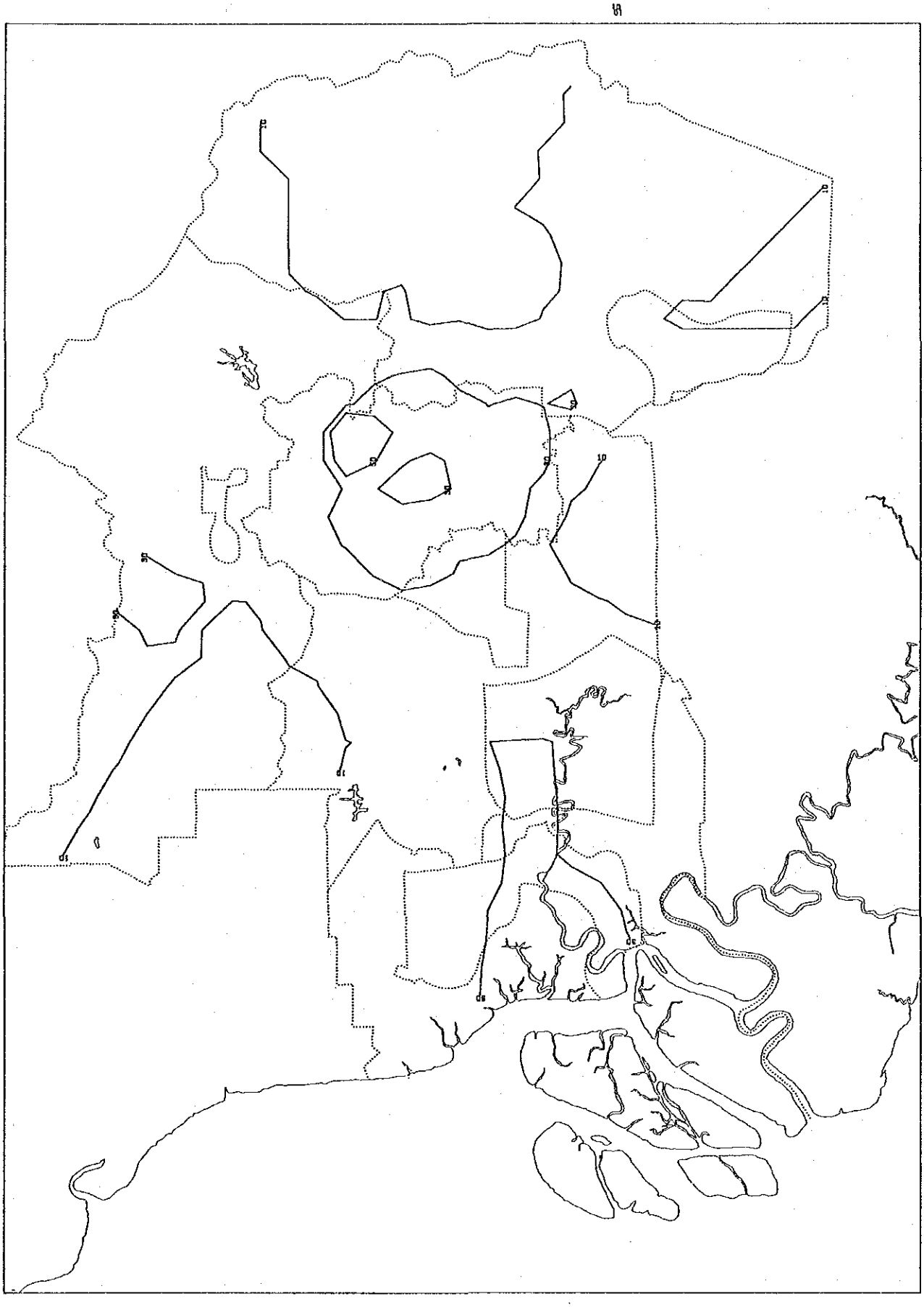

NOx 1st

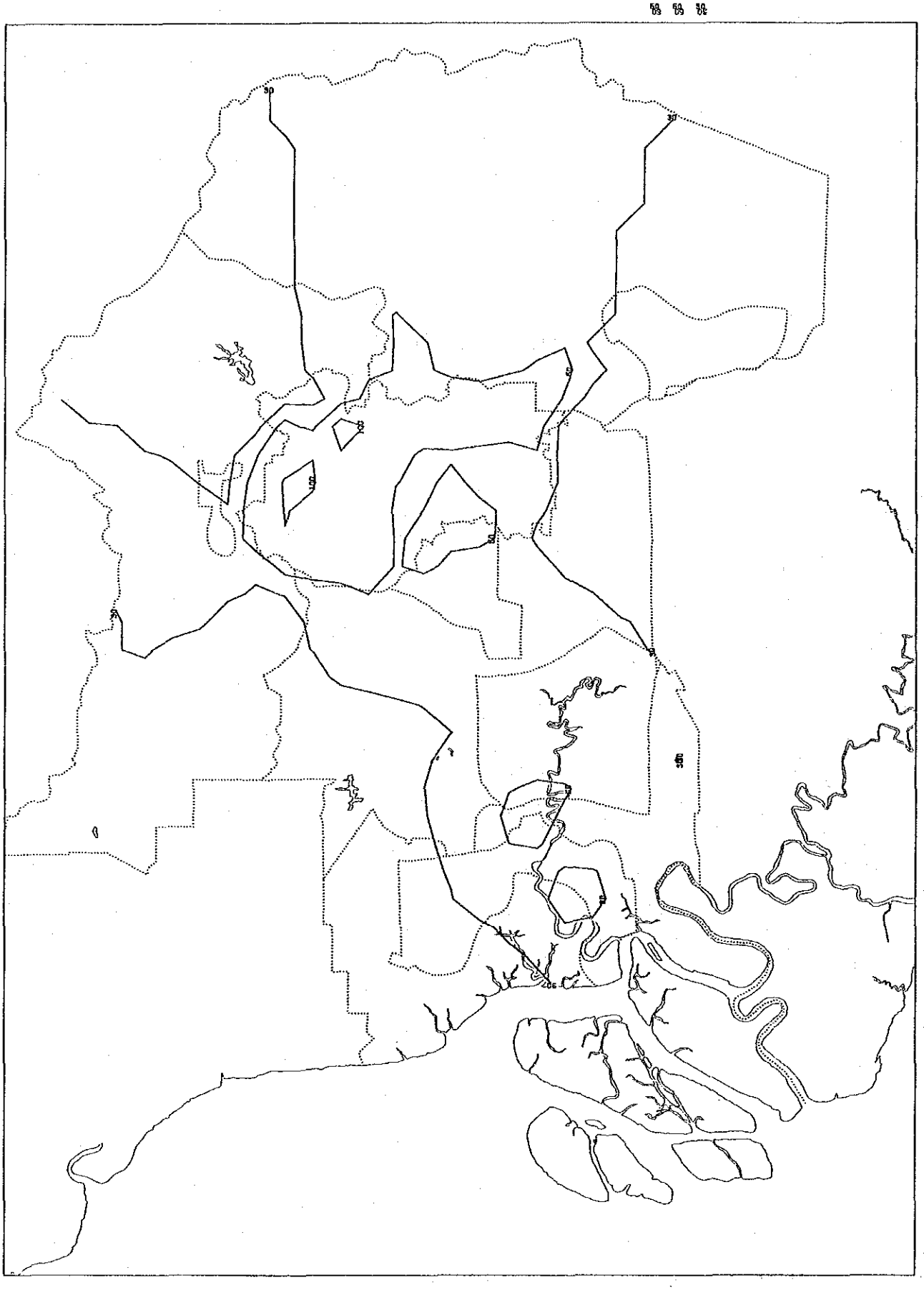

NOx 2nd

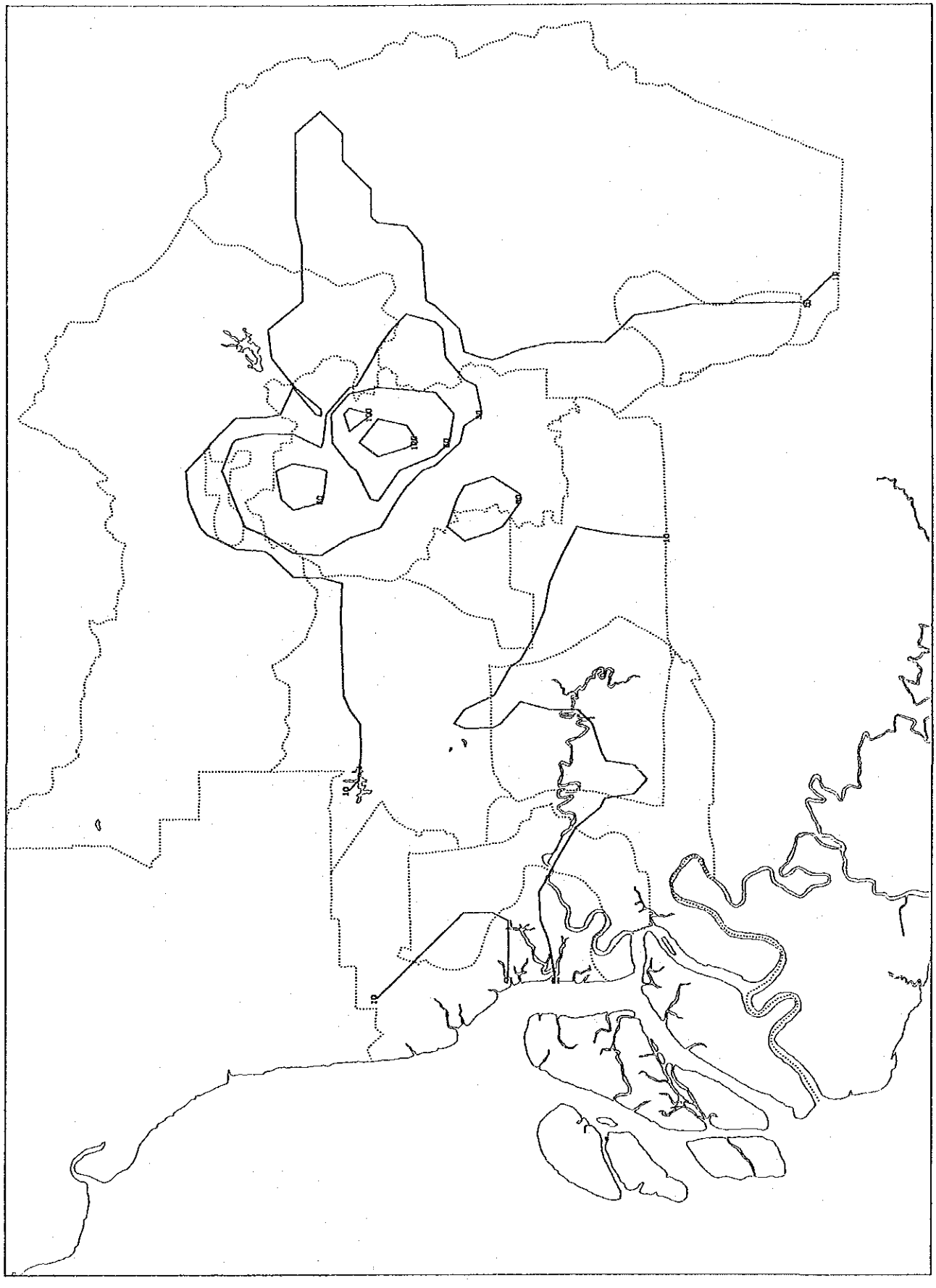

NOx 3rd

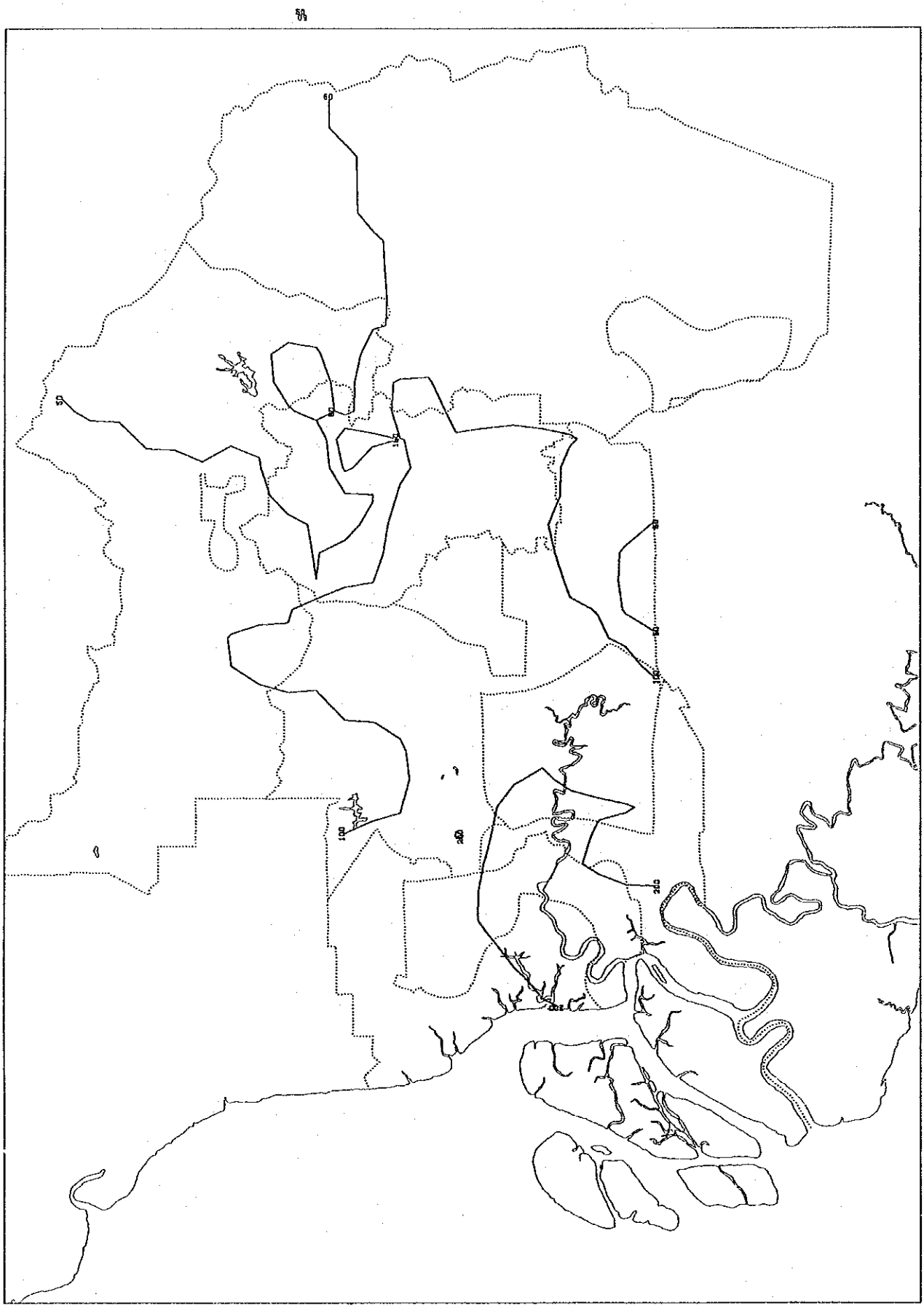

1050
200
5000
100
50
SO3 1st 69

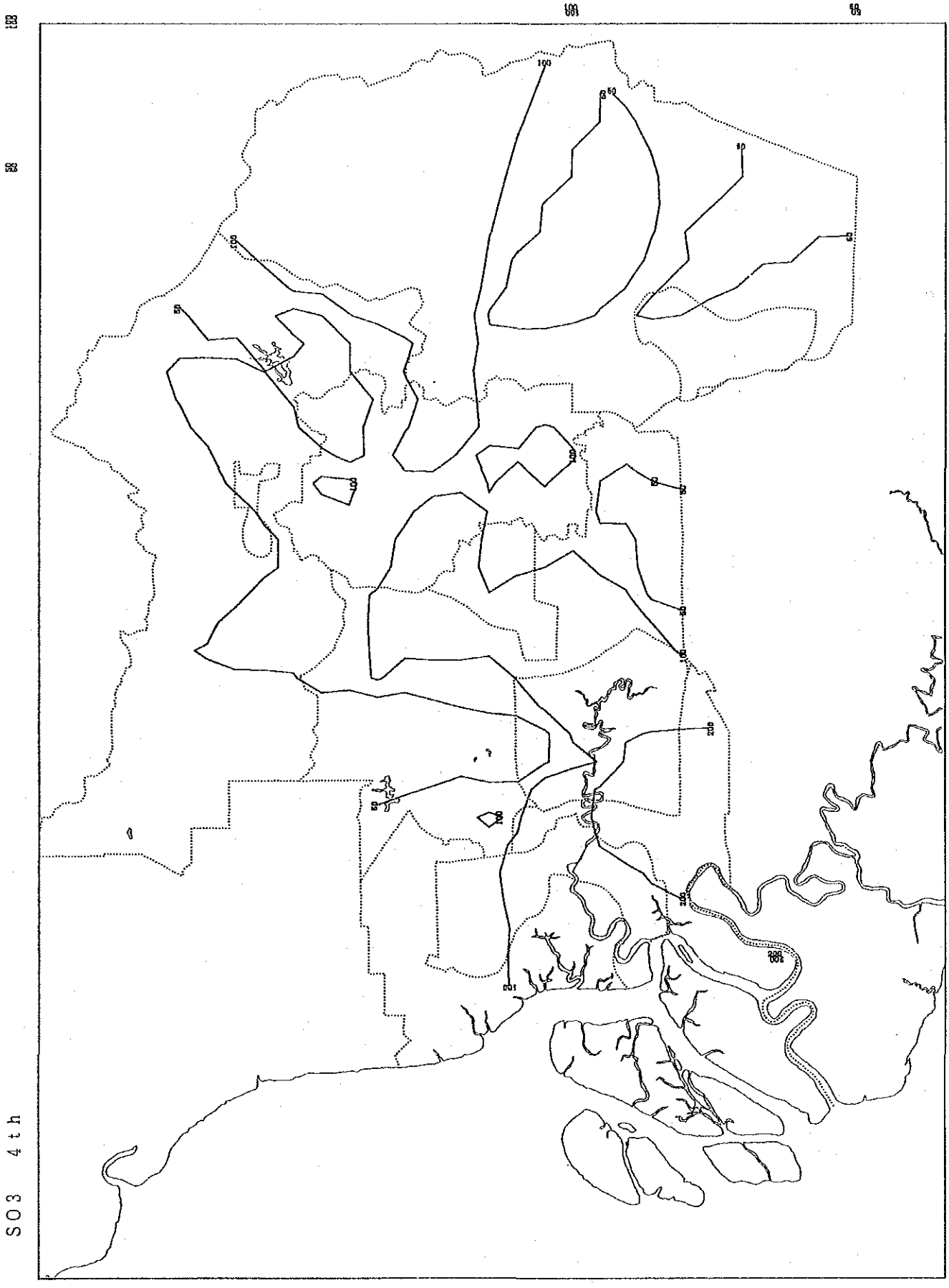

10 50
50 50 50
10
30
100
10
1b


NO 2nd




NO 4th


SO3 3rd


SO3 4th

2.3 Analysis of Other Related Data

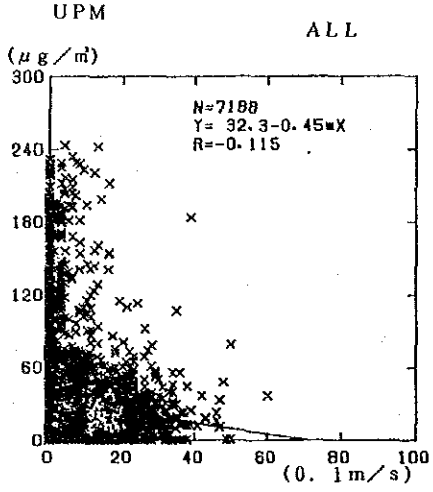
Analysis of Existing Data at UPM

Correlation Analysis

Y-axis:SPM
X-axis:Wind Speed

1991 Oct ~1992 Sep

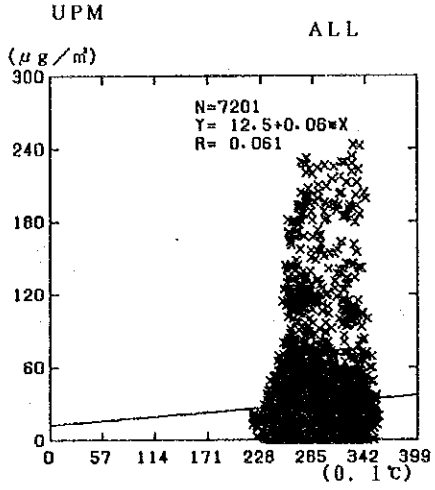
UPM



Correlation Analysis

Y-axis : SPM
X-axis : Temperature

1991 Oct ~1992 Sep



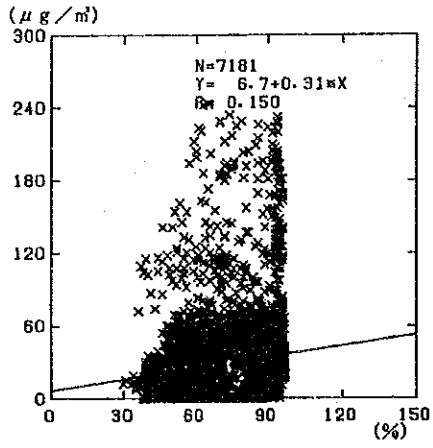
Correlation Analysis

Y-axis: SPM
X-axis: Relative Humidity

1991 Oct ~1992 Sep

UPM

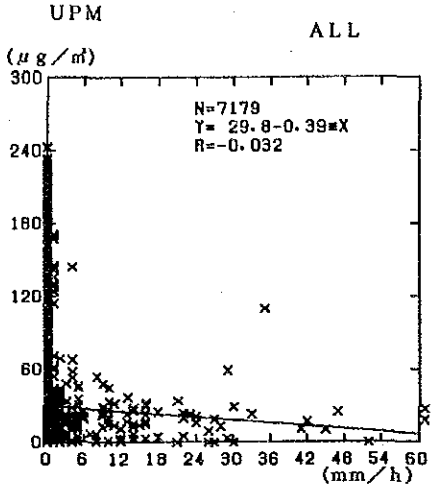
ALL



Correlation Analysis

Y-axis:SPM
X-axis:Rain Volume

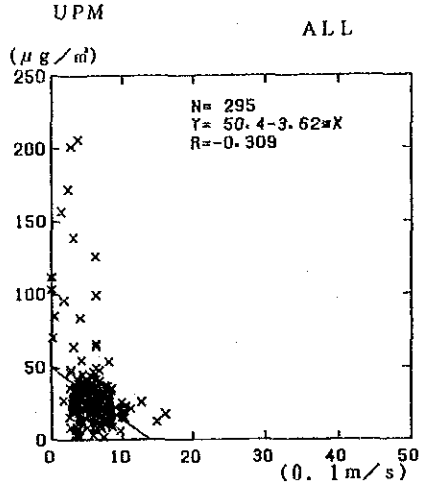
1991 Oct ~1992 Sep



Correlation Analysis

Y-axis:SPM
X-axis:Wind Speed

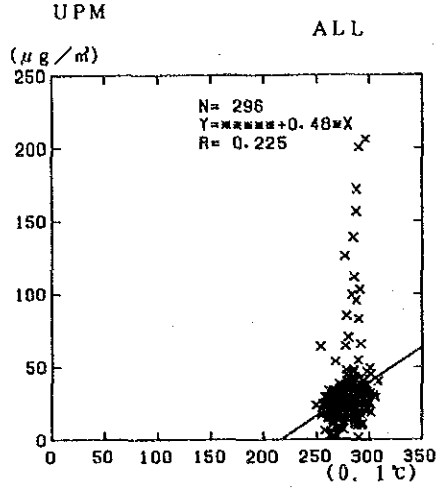
1991 Oct ~1992 Sep



Correlation Analysis

Y-axis: SPM
X-axis: Temperature

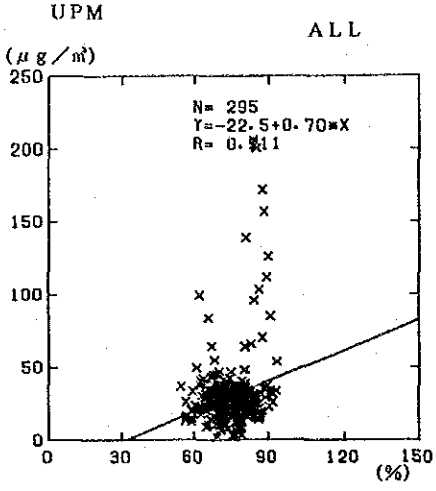
1991 Oct ~1992 Sep



Correlation Analysis

Y-axis:SPM
X-axis:Relative Humidity

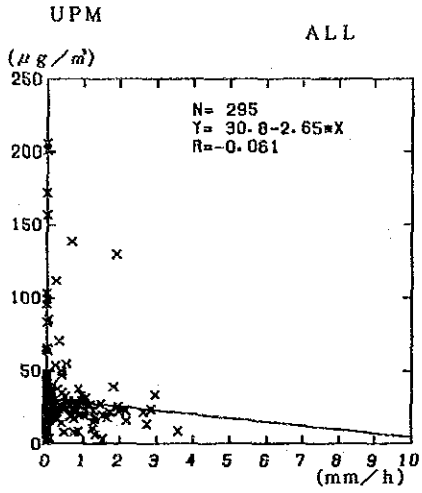
1991 Oct ~1992 Sep



Correlation Analysis

Y-axis:SPM
X-axis:Rain Volume

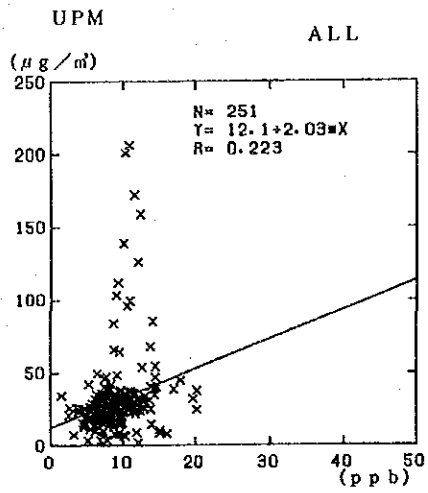
1991 Oct ~1992 Sep



Correlation Analysis

Y-axis : SPM
X-axis : NO2

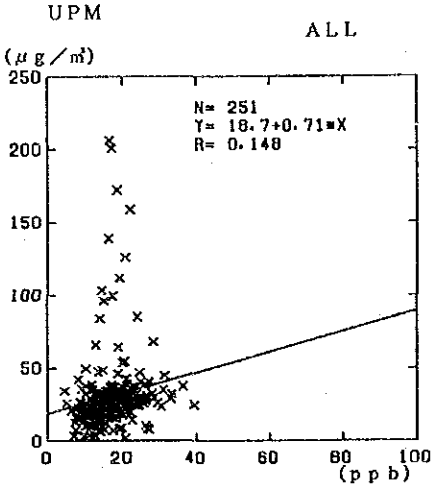
1991 Oct ~1992 Sep



Correlation Analysis

Y-axis:SPM
X-axis:NOx

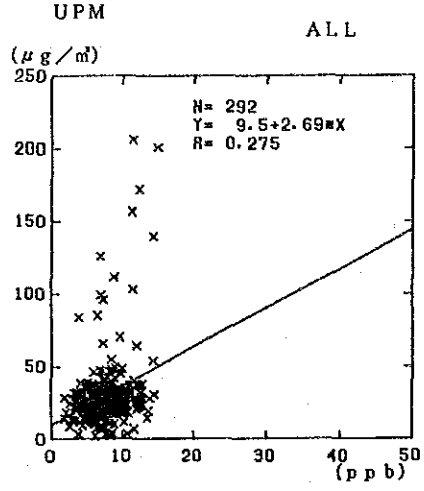
1991 Oct ~1992 Sep



Correlation Analysis

Y-axis : SPM
X-axis : SO2

1991 Oct ~1992 Sep



2.4 Effects of Pollutants on Human Health

Air pollutant	Effect on human health
SO_x	1) Contained about 0.35 pphm in clean ambient air. 2) Detectable by nose at 3 ppm and acutely irritable to nose and throat at 6 - 12 ppm 3) Causes bronchitis with a possibility of death when the concentration is high. 4) SO_2 turns into sulfuric acid mist through photochemical reactions, etc. This mist is irritable about 4 to 20 times more than SO_2.
CO	1) Substantial physiological harm 2) CO has considerably high affinity to hemoglobin in blood (about 210 times that of oxygen), thereby preventig respiratory gas exchange of erythrocytes. As a result, the function of oxygen supply to the body is weakened. 3) It is reported that 5% of CO hemoglobin in erythrocytes (resulting from breathing air of 30 ppm CO for 4 to 6 hours) causes functional disease. 4) More than 500 ppm of CO in air is said to cause intoxication (central and peripheral nerve paralysis), and 5,000 ppm (0.5%) of CO causes death.
NO_2	1) 500 - 100 ppm: Local pneumonia and recovery in a few weeks 150 - 200 ppm: Pneumonia with a principal symptom of blockage of extremely thin bronchi (fibrous blocked fine bronchitis), and death in a few weeks 500 ppm: Acute poisoning, edema of lungs associated with bronchopheumonia, and death in a few days 2) Produces various reaction products (PAN, etc.) through photochemical reaction in air
Suspended particulate matter	1) Effect of suspended particulate matter on human health varies widely depending on the size, quantity, and chemical characteristics. 2) Deterioration of visubility 3) Silicon/fine coal dust cause pneumoconiosis. Cadmium and lead cause paralysis. Tar is a carcinogen. 4) Other damages such as allergic reaction, mucosa disease, etc.

Air pollutant	Effect on human health
Lead compound	1) These are ingested an average rate of 0.14 - 0.15 mg per day through foods and drinks. Large quantities of lead (6 - 10 mg/day), if ingested, may cause intoxication. 2) Lead intoxication begins with disorder in the digestive system, then proceeds to affect muscle and brain.
HC	1) Aromatic hydrocarbons are said to be responsible for cancer. 2) High hydrocarbon concentration causes irritation to mucosa, resulting in central nerve disorder. In particular, benzene and toluene are harmful. 3) Activated hydrocarbons (olefinic, aromatic) cause photochemical smog.

Part 3 AIR POLLUTION SOURCES

3.1 Factories

3.1.1 Factory Questionnaire

QUESTIONNAIRE

1. INQUIRER'S NAME: _____ DATE: _____
2. FACTORY NAME: _____
3. FACTORY ADDRESS: _____
4. TYPE OF INDUSTRY: _____
5. DETAILS ON BUSINESS: _____
6. AREA OF SITE: _____ m^2 AREA OF FACILITIES: _____ m^2
7. NUMBER OF FACTORY WORKERS: _____
8. HOURS OF WORK IN ADMINISTRATIVE SECTION: _____ hr(s) FREQUENCY OF SHIFT: _____
   HOURS OF WORK IN OPERATING SECTION: _____ hr(s) FREQUENCY OF SHIFT: _____
9. RESPONDENT'S NAME: _____ POSITION: _____ TEL: _____

10. STACKS

STACK No.	AXIS X	AXIS Y	HEIGHT (m)	DIAMETER (m)	EXHAUST GAS TEMP. (t)	WET GAS VOLUME Nm^3/hr

11. SKETCH DRAWING OF STACK LOCATION

12. PRESENCE OF MEASURING HOLE: YES / NO (COMMENTS: _____)

13. POLLUTANT SOURCE FACILITIES

FACILITY No.	TYPE OF FACILITY :CODE	YEAR OF INSTALLATION	FUEL				RAW MATERIAL			OPERATION STATE														STACK No. in TABLE 10	COMMENTS
										DAILY		MONTHLY OPERATION												ANNUAL	
			TYPE :CODE	SULFUR CONTENT (%)	SPECIFIC GRAVITY	ANNUAL CONSUMPTION	TYPE :CODE	SULFUR CONTENT (%)	ANNUAL CONSUMPTION	TIME TO START	TOTAL HOURS (hr)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL HOURS (hr)		
										:															
										:															
										:															
										:															
										:															
										:															
										:															
										:															
										:															
										:															

14. FLUE GAS TREATMENT EQUIPMENT

CONTROL EQUIPMENT No.	CONTROL EQUIPMENT TYPE :CODE	CONCENTRATION BEFORE TREATMENT SO_x (ppm)	CONCENTRATION BEFORE TREATMENT NO_x (ppm)	CONCENTRATION BEFORE TREATMENT DUST mg/Nm³	CONCENTRATION AFTER TREATMENT SO_x (ppm)	CONCENTRATION AFTER TREATMENT NO_x (ppm)	CONCENTRATION AFTER TREATMENT DUST mg/Nm³	FACILITY No. in TABLE 13	DESIGNED TREATMENT EFFICIENCY (%)	COMMENTS

15. FACTORY PLAN (EXPANSION OF PRODUCTION, MOVING etc.)

16. COMPLAINTS ABOUT AIR POLLUTION

17. AIR POLLUTION CONTROL MEASURES (PRESENT & FUTURE)

18. REQUESTS ON AIR POLLUTION PROBLEMS TO NATIONAL AND LOCAL GOVERNMENTS

INSTRUCTION FOR FILLING QUESTIONNAIRES

Jan.1992

In order to fill questionnaire forms, please read the following instruction. Should you find any questions on filling the forms, please consult the inquirer in charge.

ALL ITEMS:
Use 1 set of forms for 1 factory. Write in block letters, if necessary with appropriate units. Do not use abbreviation.

ITEM 4:
As to TYPE OF INDUSTRY, fill code numbers according to the classification by the attached table 1.

ITEM 5:
If the TYPE OF INDUSTRY belongs to manufacture, describe the products in ITEM 5.

ITEM 10:
Number all the stacks in sequence in the site. In case they are grouped stacks, illustrate the state of connection on a separate sheet of paper as shown in Figure 1. In case of a group of more than 2 stacks, as shown in Figure 2.
As to the HEIGHT of stacks, round the first place of the decimal in meter.
As to the DIAMETER of stacks, round the third place of the decimal in meter.

ITEM 11:
In case there are 2 or more stacks in the site, draw a figure as follows.
Define the stack of the southern-western end in the site as the origin of the X and Y axes. Then, show the points of other stacks and the distances from the origin as illustrated in the attached Figure 3. The boundary of the site has to be included in the above Figure 3.
In case of group stacks, show the state of the connection as an attached Figure 2 shows.

ITEM 13:
As to TYPE OF FACILITY, choose the appropriate code from an attached table 2. For FUEL and RAW MATERIAL, refer to an attached table 3.
As to SULFUR CONTENT, round the third place of the decimal in percentage of weight ratio.
Refer to the attached table 3 for the units of ANNUAL CONSUMPTION.
As to OPERATION STATE, fill the TIME TO START the work, TOTAL HOURS for daily work, MONTHLY OPERATION DAYS, and ANNUAL HOURS as follows.

DAILY		MONTHLY OPERATION (days)												
TIME TO START	TOTAL HOURS (hr)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL HOURS (hr)
9:00	8	31	28	31	30	31	30	31	31	30	31	30	31	2920

As to special cases which each sequential work lasts for over 24 hours such as brick baking, fill the form as follows.

DAILY		MONTHLY OPERATION (times)												
TIME TO START	TOTAL HOURS (hr)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL HOURS (hr)
9:00	72	1	1	2	1	2	2	2	2	2	2	2	2	1512

ITEM 14:
As to TYPE OF CONTROL EQUIPMENT, fill code numbers according to the classification by the attached table 3.
As to DESIGNED TREATMENT EFFICIENCY, it refers to the efficiency under the designed conditions or efficiency manufactures guarantee.

* All the data obtained through this inquiry survey will be kept confidential. Thank you for your cooperation.

Fig. 1

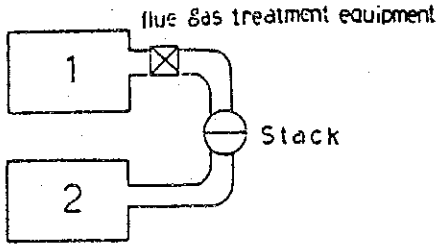


Fig. 2

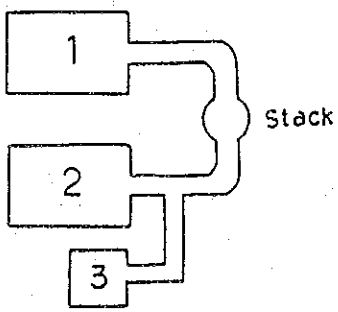


Fig. 3

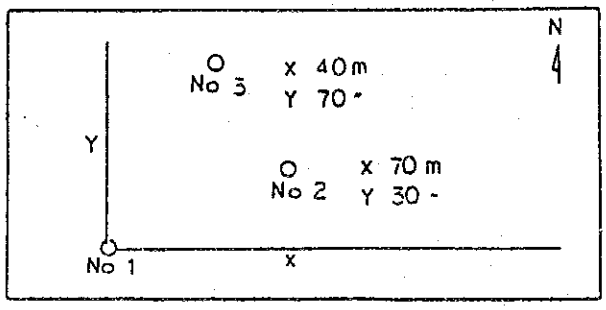


Table 1 Classification of Industry

Code	Classification of Industry
101	Food and kindred products
102	Drink feed
103	Tobaccos
104	Textile
105	Apparel and related products
106	Leather, leather products and furs
107	Footgear products
108	Lumber and wood products
109	Furniture and fixtures
110	Pulp, paper and allied products
111	Publishing, printing and allied industries
112	Chemical and allied products
113	Palm Oil Mill
114	Petroleum refinery
115	Petroleum, coal and products
116	Rubber products
117	Plastic products
118	Ceramic, stone and clay products
119	Glass products
120	Non-ferrous metals and products
121	Iron and steel
122	Fabricated metal products
123	Metal products
124	General machinery and equipment
125	Electrical machinery, equipment and supplies
126	Transportation equipment
127	Precision instruments
128	Other manufacturing industries
129	Electricity supply
130	Gas supply
131	Hospitals
132	Hotels
133	Educational services
134	Medical and other health services
135	Quarry
136	Other establishments

Table 2 Classification of the equipment

NO. 1

Code	Classification	Process
0101	boiler	for electric power
0102	〃	for heating
0103	〃	exclusive of 0101 and 0102
0201	gas producer	
0202	gas furnace	
0301	roasting furnace (roaster, calciner)	production of multi hearth type for sulfur acid
0302	〃	production of fluidized type for sulficric acid
0303	〃	multi hear hearth type exclusive of 0301
0304	〃	fluidized type exclusive of 0302
0305	〃	exclusive of 0301～0304
0306	sintering furnace	for iron and steel
0307	〃	for nonferrous metal
0308	〃	for inorganic chemical products
0309	calcination furnace (calciner)	for iron and steel
0310	〃	for nonferrous metal
0311	〃	for inorganic chemical products
0312	pelletizing furnace (heating furnace of briquett)	for iron and steel
0313	〃	for nonferrous metal
0314	〃	for inorganic chemical products
0401	blast furnace	for iron and steel
0402	〃	for nonferrous metal
0403	converter	for iron and steel
0404	〃	for nonferrous metal
0405	open hearth furnace	for iron and steel
0406	〃	for nonferrous metal
0501	melting furnace	for refining of iron and steel
0502	〃	for refining of alminium
0503	〃	for refining exclusive of 0501 and 0502
0504	〃	for casting of iron and steel
0505	metal melting furnace	for casting of alminium
0506	〃	for casting exclusive of 0504 and 0505
0601	heating furnace (reheating furnace) for rolling of metal	for iron and steel, continuous type
0602	〃	for iron and steel, batch type
0603	〃	for alminium, continuous type
0604	〃	for alminium, batch type
0605	〃	continuous type exclusive of 0601 and 0603
0606	〃	batch type exclusive of 0602 and 0604
0607	metal heat treating furnace	for iron and steel, continuous type
0608	〃	for iron and steel, batch type
0609	〃	for alminium, continuous type

Code	Classification	Process
0610	metal heat treating furnace	for alminium. batch type
0611	〃	continuous type exclusive of 0607 and 0609
0612	〃	batch type exclusive of 0608 and 0610
0613	metal forge furnace	for iron and steel. continuous type
0614	〃	for iron and steel. batch type
0615	〃	for alminium. continuous type
0616	〃	for alminium. batch type
0617	〃	continuous type exclusive of 0613 and 0615
0618	〃	batch type exclusive of 0614 and 0616
0701	petroleum refinery heater	isoflow type
0702	〃	updraft type
0703	〃	exclusive of 0701 and 0702
0801	catalyst regeneration tower	
0821	combustion furnace	
0901	cement kiln	dry and suspension preheater type
0902	〃	dry and non suspension preheter type
0903	〃	dry type exclusive of 0901 and 0902
0904	〃	wet type
0905	cement kiln	lepol type
0906	brick kiln	tunnel kiln
0907	〃	downdraft round kiln
0908	dolomite kiln	
0909	lime kiln	
0910	carbon burning kiln (carbon baking furnace)	downdraft rectangular kiln
0911	〃	other kiln exclusive of 0910
0912	ceramic firing kiln	tunnel kiln
0913	〃	other kiln exclusive of 0912
0914	other burning kiln (baking furnace)	exclusive of 0905~0913
0915	glass melting furnace	tank furnace
0916	〃	pot furnace
1001	reacting furnace	for inorganic chemical products
1002	〃	for foodstuff
1003	direct heating furnace	for inorganic chemical prducts
1004	〃	for foodstuff
1101	drying over kiln (drier)	for bone carbonization
1102	〃	for raw materials of cement
1103	〃	for raw materials of brick
1104	〃	for mold
1105	〃	for detergent
1106	〃	exclusive of 1101~1105
1201	electric furnace	for pig iron. arc furnace
1202	〃	for pig iron. three phase electric resistance heating furnace

Code	Classification	Process
1203	electric furnace	for pig iron, low frequency induction furnace
1204	〃	for steel, arc furance
1205	electric faunace	for steel, three phase electric resistance heating furnace
1206	〃	for steel, low frequency induction furnace
1207	〃	for ferroalloy, arc furnace
1208	〃	for ferroalloy, three phase electric resistance heating furnace
1209	〃	for ferroalloy, low frequency induction furnace
1210	〃	for carbide, arc furnace
1211	〃	for carbide, three phase electric resistance heating furnace
1212	〃	for carbide, low frequency induction furnace
1301	incinerator	for domestic waste, continuous type
1302	〃	for domestic waste, batch type
1303	〃	for industrial waste, continuous type
1304	〃	for industrial waste, batch type
1401	roasting furnace (roaster, calciner)	for copper
1402	〃	for lead
1403	〃	for zinc
1404	sintering furnace	for copper
1405	〃	for lead
1406	〃	for zinc
1407	blast furnace	for copper
1408	〃	for lead
1409	〃	for zinc
1410	converter	for copper
1411	〃	for lead
1412	〃	for zinc
1413	melting furnace	for copper, crucible furnace (pot furnace)
1414	〃	for copper, reverberatory furnace
1415	〃	for copper, exclusive of 1413 and 1414
1416	〃	for lead, crucible furnace (pot furnace)
1417	〃	for fead, reverberatory furnace
1418	〃	for lead, exclusive of 1416 and 1417
1419	〃	for zinc, crucible furnace (pot furnace)
1420	〃	for zinc, reverberatory furnace
1421	〃	for zinc, exclusive of 1419 and 1420
1422	drying oven (drier)	for copper
1423	〃	for lead

Code	Classification	Procrss
1424	〃	for zinc
1501	drying facility	for production of cadmium pigment and cadmium carbonate
1601	chlorine quick cooling facility	
1701	melting vessel	for production of iron dichloride
1801	reacting furnace for production of active carbon	rotary kiln
1802	〃	exclusive of 1801
1901	chlorine reacting facility	
1902	hydrogen chloride reacting facility	
1903	hydrogen chloride absorbing facility	
2001	electric furnace for refining of aluminium	soderberg (self-baking) type
2002	〃	prebake type
2101	reacting facility	for phosphatic fertilizer and others
2102	concentrating facility	
2103	burning kiln (baking furnace)	
2104	melting furnace	
2201	condensing facility	for production of hydrofluoric acid
2202	absorbing facility	
2203	distilling facility	
2301	reacting facility	for production of tripoly phosphatic sodium
2302	drying over (drier)	
2303	burning kiln (baking furnace)	
2401	melting furnace	for secondary refining of lead
2501	melting furnace	for production of lead storage battery
2601	melting furnace	for production of lead pigment
2602	reverberatory furnace	
2603	reacting furnace	
2604	drying facility	
2701	absorbing facility	for production fo nitric acid
2702	bleaching facility	
2703	concentrating facility	
2801	cook over	
0001	diesel generator	
0002	gas turbine	
0003	baby cupola	for refining of cast steel
0004	〃	for refining of plutnium
0005	〃	exclusive of 0003 and 0004
0006	glass annealing furnace	
0007	titanium reduction furnace	
0008	other furnace	exclusive of above all

Table 3 Fuel and material

	unit	
11	heavy fuel oil(HFO)	kℓ
12	medium fuel oil(MFO)	〃
13	light fuel oil(LFO)	〃
14A	〃	〃
14B	high speed diesel(HSD)	〃
15	kerosene	〃
16A	crude oil	〃
16B	industrial fuel oil(IFO)	〃
17	mixed oil	〃
18	naphtha	〃
19	other liguid fuel	〃
20	coal	ton
21	coke	〃
22A	palm waste	〃
22B	rubber wood	〃
22C	other woods	〃
23	char	〃
24	other solid fuel	〃
25	town gas	m^3N
26	coke oven gas	〃
27	blast furnace gas	〃
28	liquefied natural gas(LNG)	ton
29	liquefied petroleum gas(LPG)	〃
30	oxygen converter gas	m^3N
31	refinary gas	〃
32	other gas fuel	〃
33	iron・iron ore	ton
34	sulfide ore	〃
35	nonferrous metal ores	ton
36	other material	〃
37	electricity	kw
38	general waste (non industrial waste)	ton
39	industrial waste	〃
40	other	〃

Table 4 Flue gas treatment eqipment

1.	Particulate control
51	gravitation dust collector
52	inertial dust collector
53	centrifugal dust collector
54	scrubbing dust collector
55	filter dust collector
56	electrostatic precipitator
57	combstion control
58	oteher
2.	SO_x control
61	fuel conversion
62	use of low sulfur fuel
63	flue gas desulfurization (wet process)
64	flue gas desulfurization (dry process)
65	other
3.	NO_x control
71	low excess air combustion
72	low NO_x burner
73	load regultior
74	flue gas recirculatior
75	other