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INSTITUTE OF TERRESTRIAL ECOLOGY
(NATURAL ENVIRONMENT RESEARCH COUNCIL)

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Annual Report to the Dep. of the Environment

OZONE AND NO_2 MONITORING IN SOUTHERN SCOTLAND

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OZONE MONITORING

Introduction

Interest in photochemical oxidants has been increasing rapidly over the last decade with mounting evidence that they are involved in various processes which lead to adverse atmospheric and environmental effects.

UK records of ground level ozone and nitrogen oxides are available for between 2 and 12 years during the last 15 years but until a network of 17 rural monitoring sites was established in 1986 representative concentrations of these photochemical oxidants were spatially limited.

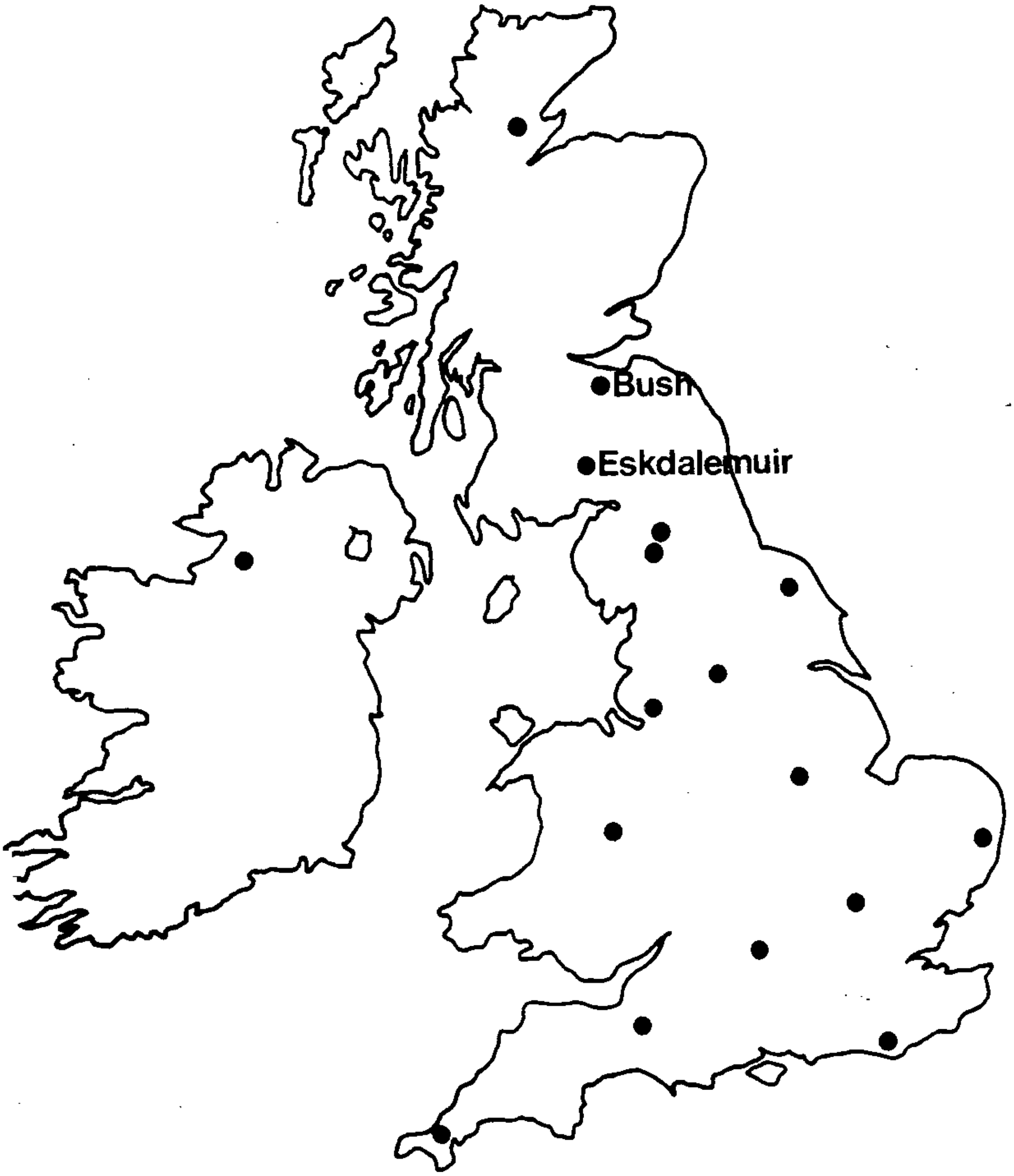
The Institute of Terrestrial Ecology has been running Bush and Eskdalemuir, two of the three Scottish sites in the network,for almost two years.Their locations are shown in Figure 1. Bush (165m asl) lies approximately 12kms to the south of Edinburgh and is surrounded by arable farmland. Eskdalemuir(259m asl) is a more remote site in Dumfriesshire and lies in an area of rough grazing land and forest.

MONITORING METHODS AND DATA STORAGE

Both sites monitor ozone at 2 to 3 metres above ground level using UV photometric analysers fitted with PTFE filters to eliminate particulate matter, and PTFE sample tubing to minimise ozone loss within the system. The ambient concentration is logged at 5 second intervals and later processed to hourly mean values. These are stored on Lotus 1-2-3 spreadsheets (Tables 1-4) following any necessary quality control.
Further processing of these hourly values into daily,monthly,seasonal and yearly statistics occurs as the data accumulates.

The Campbell Scientific data loggers at both sites are permanently linked to an IBM computer at ITE allowing real time checks on the monitoring.

Figure 1.



DoE OZONE MONITORING NETWORK

The Eskdalemuir site is linked to the computer by modem and although the transfer of large data sets is difficult due to line interference,checks on the latest arrays logged ensure that there are no major instrumental problems.

Hardcopy back-up of the logged data is provided by a printout at Bush and a chart recording at Eskdalemuir.

CALIBRATION

Since monitoring began at the two sites,the network's Monitor Labs analysers have been calibrated at approximately six monthly intervals by Warren Spring Laboratory's primary standard. At the same time WSL also calibrate ITE'S Monitor Labs generator and their Analysis Automation UV photometric ozone analyser which runs concurrently with the Bush network analyser. Weekly zero and span drift checks and a further fortnightly calibration of the two Bush analysers is carried out by ITE staff.

At present the Eskdalemuir analyser receives only the six monthly WSL calibration but ITE plan to carry out more frequent calibrations there from now on.

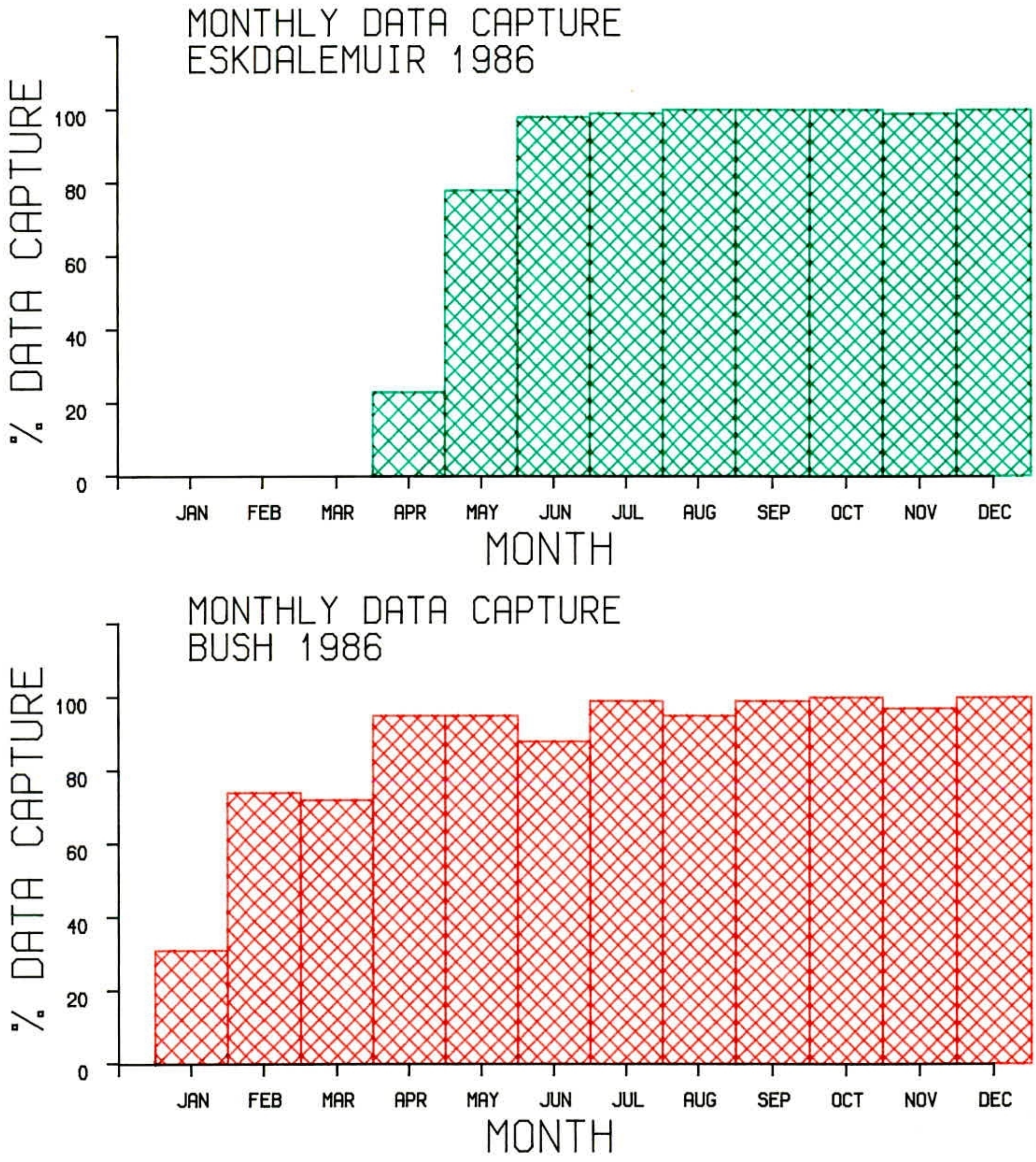
With these precautions it is reasonable to expect that the individual ozone measurements are accurate to $\pm$10%.

RESULTS

DATA CAPTURE

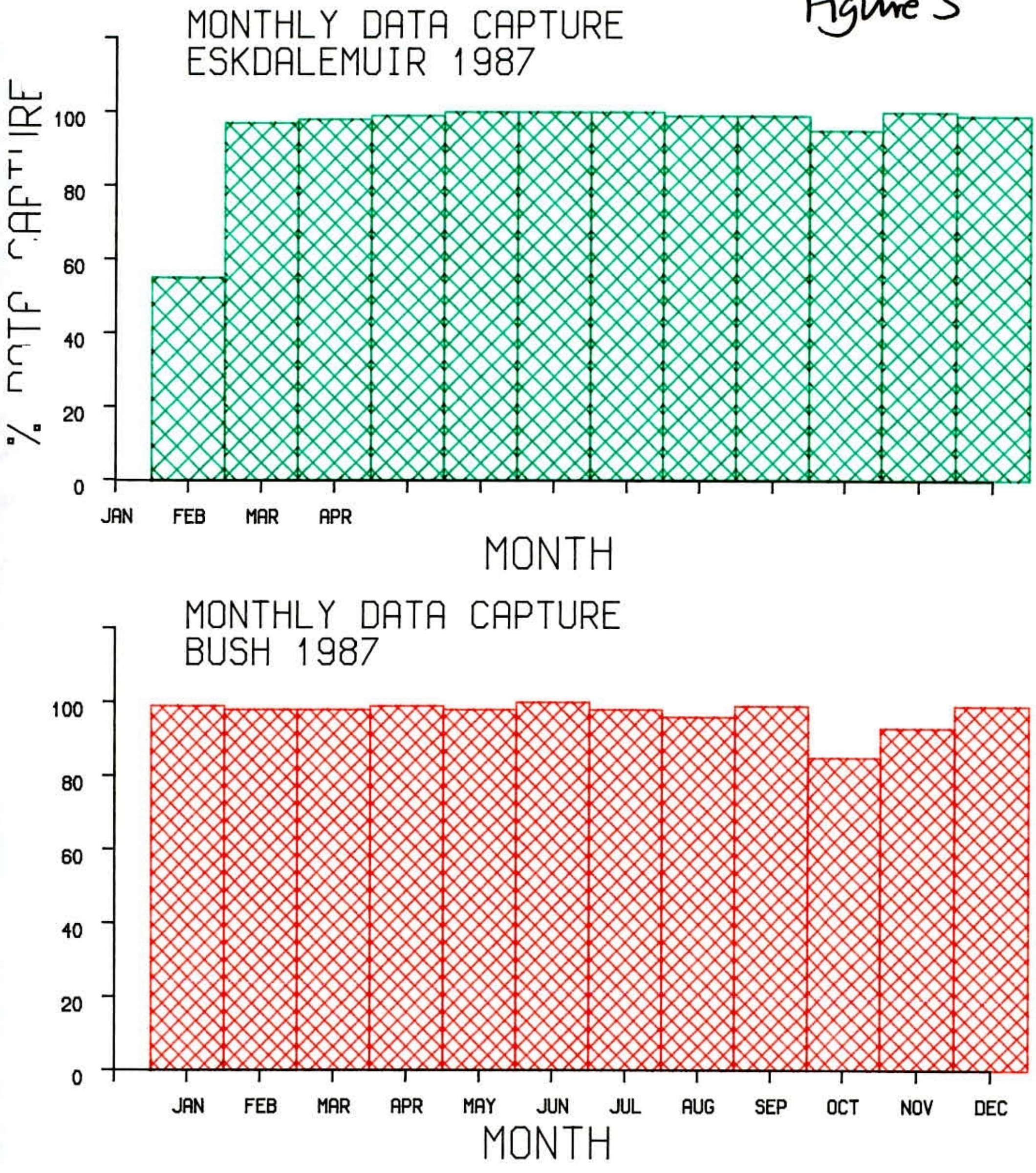
Bush began monitoring in January 1986 and Eskdalemuir in April 1986. The monthly % data capture for both sites and for 1986 and 1987 is illustrated in Figures 2 and 3. Summer and Calendar year % data capture is tabulated below.

Figure 2



MONTHLY DATA CAPTURE
ESKDALEMUIR 1986
% DATA CAPTURE
0
20
40
60
80
100
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
MONTH
MONTHLY DATA CAPTURE
BUSH 1986
% DATA CAPTURE
0
20
40
60
80
100
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
MONTH

Figure 3


MONTHLY DATA CAPTURE
ESKDALEMUIR 1987
100
80
60
40
20
0
JAN
FEB
MAR
APR
MONTH
MONTHLY DATA CAPTURE
BUSH 1987
100
80
60
40
20
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTH

	SUMMER		CALENDAR YEAR	
	1986	1987	1986	1987
BUSH	95	99	87	97
ESKDALEMUIR	83	98	67	95

Loss in data capture is due to an accumulation of short term problems with the analysers or loggers.

YEARLY TRENDS

Figures 4 and 5 show the maximum hourly mean ozone values for each day of the year for both Bush and Eskdalemuir in 1986 and 1987. A similiar and expected trend is observed in all four plots with the lowest concentrations occurring in winter (30 September -1 April) and the more elevated concentrations and episodes occurring during the summer months (1 April - 30 September). Except during some episoidal periods,Eskdalemuir appears to record slightly lower hourly mean values than Bush.

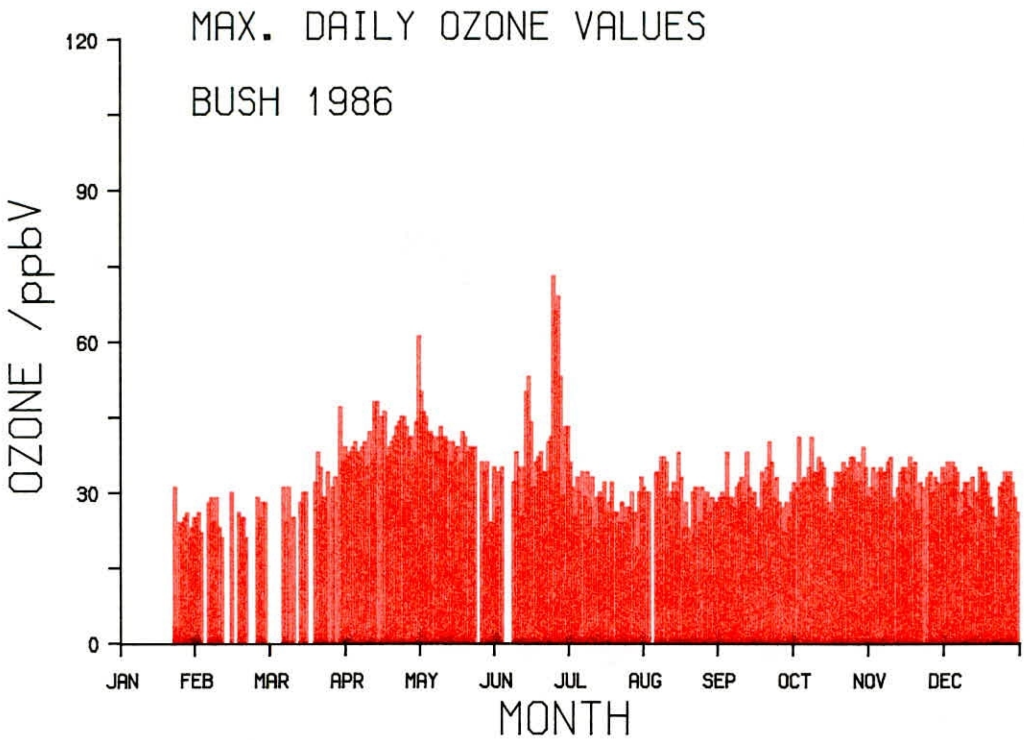
MONTHLY MEANS AND MAXIMA

Figures 6 and 7 compare the maximum monthly and mean monthly values for both sites and years. On average Eskdalmuir records monthly mean values 3-5ppb lower than Bush although in November 1986 Eskdalemuir's mean value was 11ppb lower than that at Bush. Summer and calendar year monthly means are shown below.

	SUMMER		CALENDAR YEAR	
	1986	1987	1986	1987
BUSH	26ppbV	26ppbV	25ppbV	23ppbV
ESKDALEMUIR	24ppbV	23ppbV	22ppbV	21ppbV

Monthly values peak in June 1986 and April 1987 at both sites. These are listed below.

Figure 4


MAX. DAILY OZONE VALUES
BUSH 1986
OZONE /ppbV
120
90
60
30
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTH

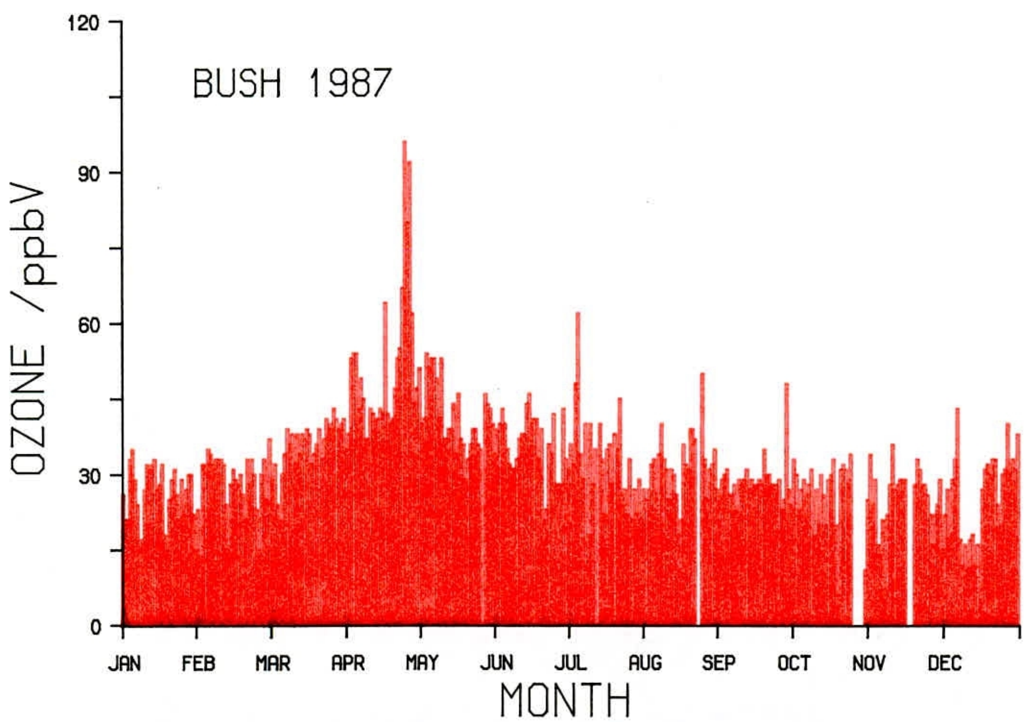
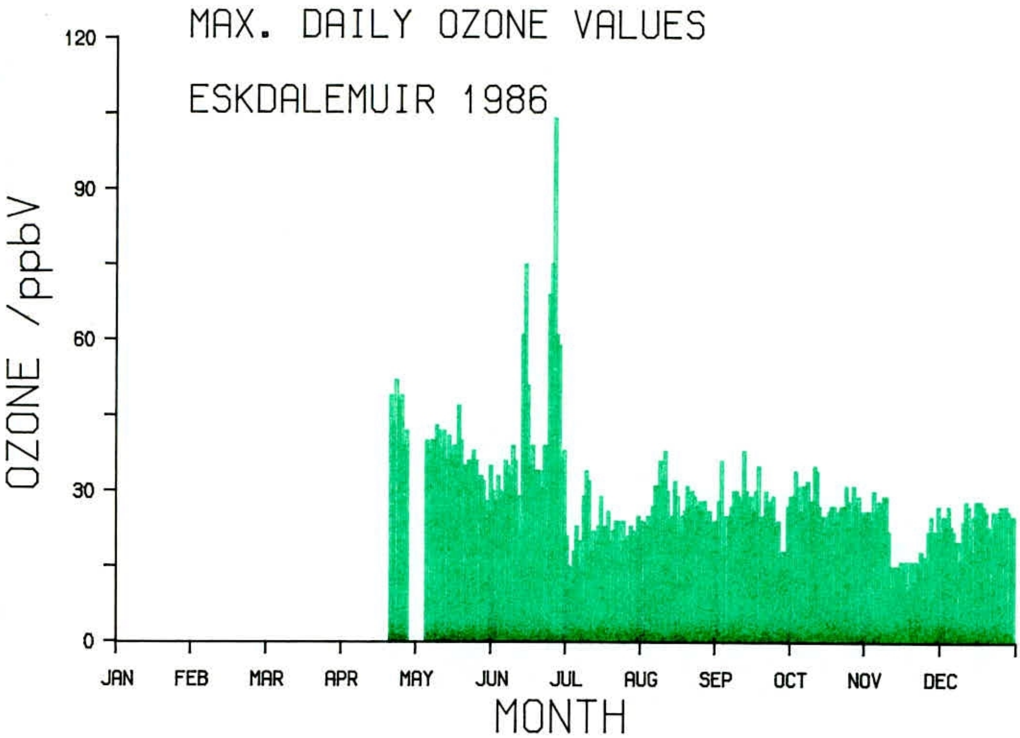

BUSH 1987
OZONE /ppbV
120
90
60
30
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTH

Figure 5


MAX. DAILY OZONE VALUES
ESKDALEMUIR 1986
OZONE /ppbV
120
90
60
30
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
MONTH

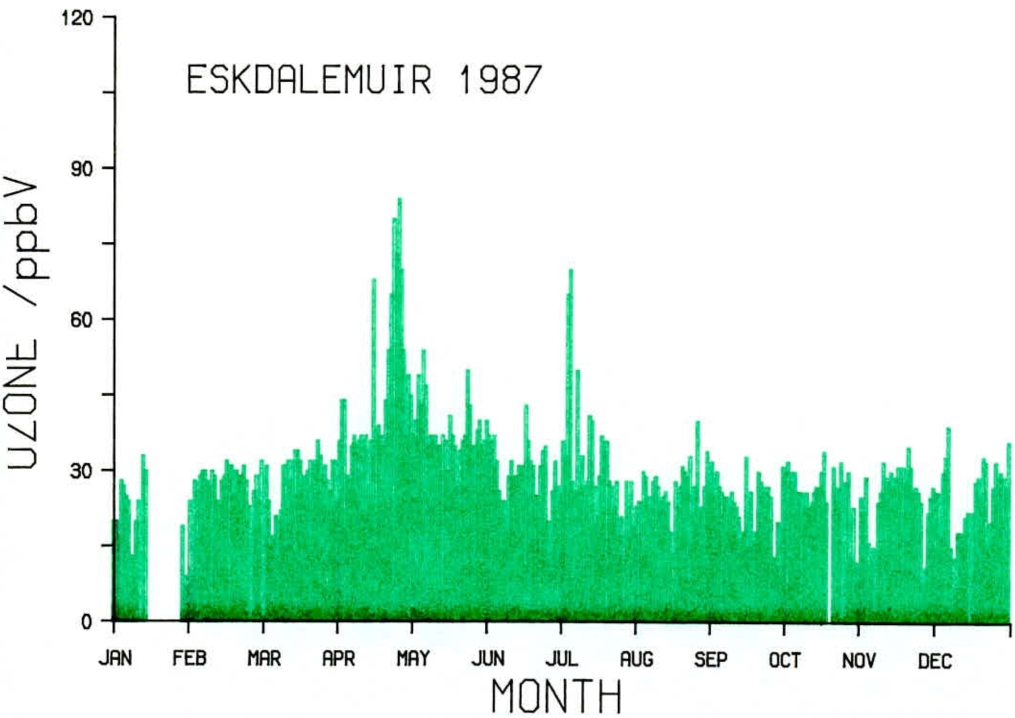

ESKDALEMUIR 1987
OZONE /ppbV
120
90
60
30
0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
MONTH

Figure 6

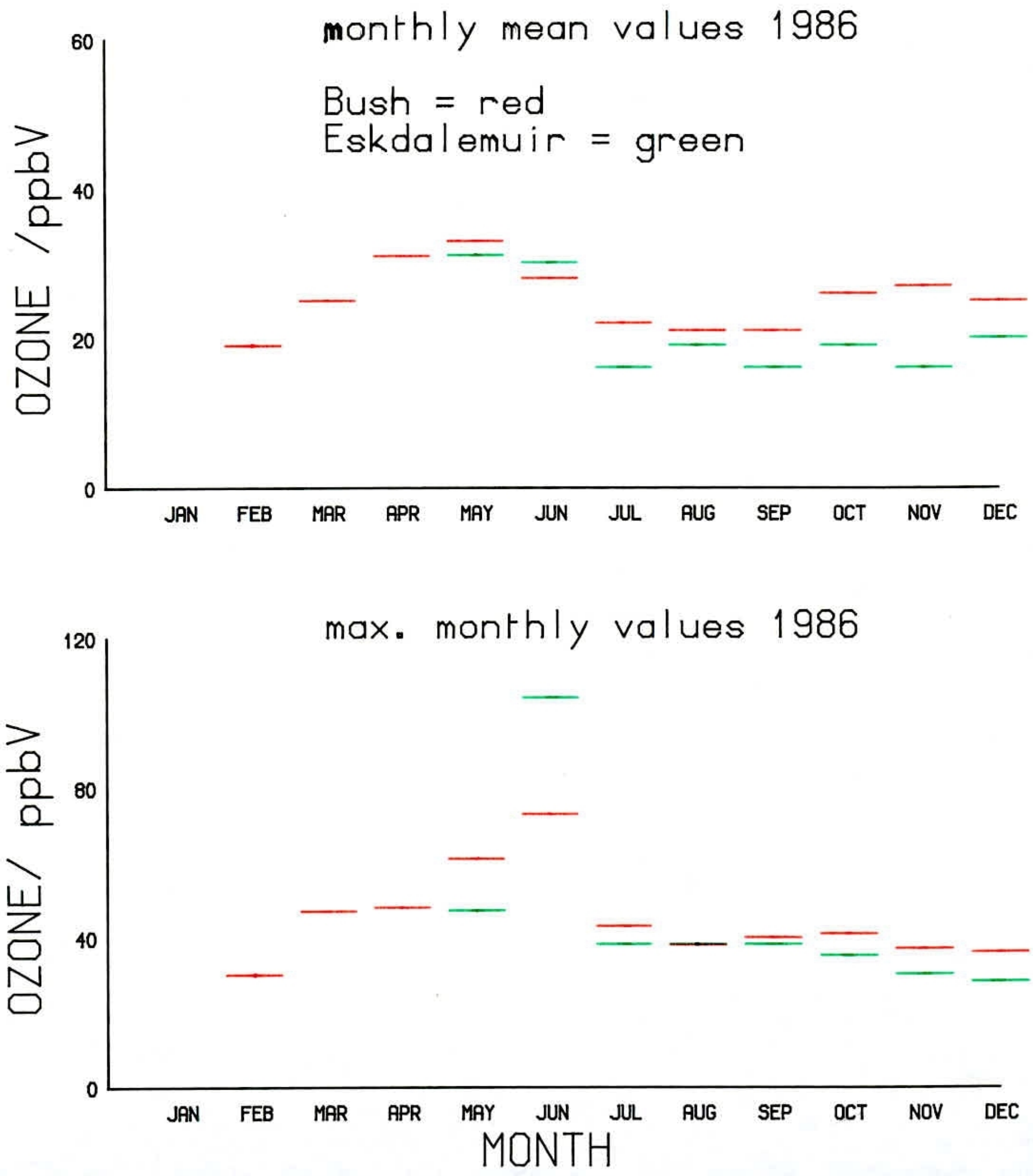
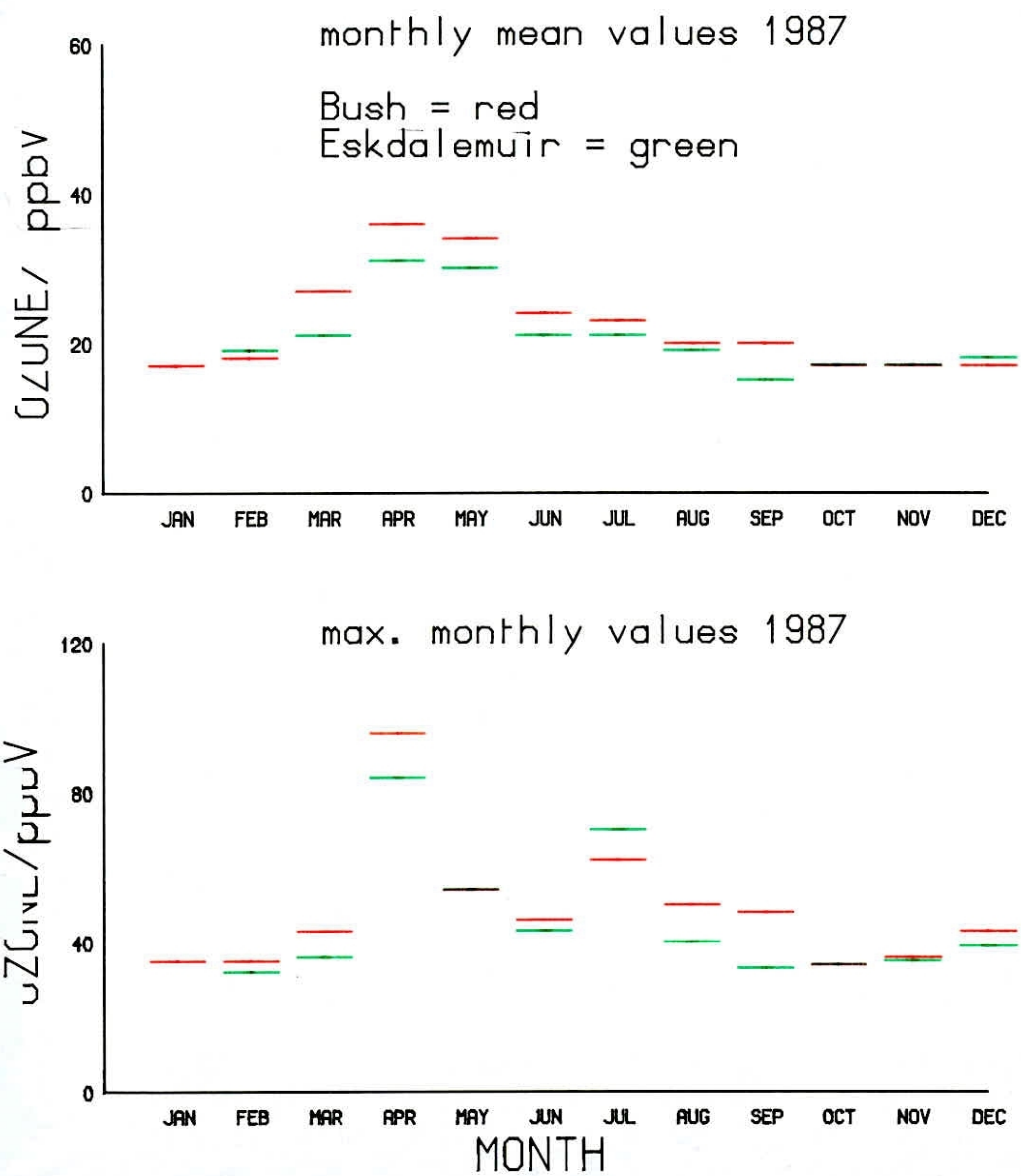

monthly mean values 1986
Bush = red
Eskdalemuir = green
OZONE /ppbV
0
20
40
60
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
max. monthly values 1986
OZONE/ ppbV
0
40
80
120
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
MONTH

Figure 7


monthly mean values 1987
Bush = red
Eskdalemuir = green
OZONE/ ppbV
60
40
20
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
max. monthly values 1987
OZONE/ppbV
120
80
40
0
MONTH

	JUNE 1986	APRIL 1987
BUSH	73ppbV	96ppbV (ML),101ppbV(AA)
ESKDALEMUIR	104ppbV	84ppbV

The maximum overall 1987 value for Bush recorded by the Monitor Labs analyser was 96ppb although the Analysis Automation analyser logged the slightly higher value of 101ppb on the same day and for the same hour.

In the abscence of episodes,the maximum monthly values at both sites averaged 40ppb.

It is interesting to note that the maximum monthly values recorded at both Bush and Eskdalemuir decreased uniformly during the last three months of 1986 whereas the opposite occurred in 1987. A comparison of nitrogen oxides and ozone data might have explained this trend but nitrogen oxides data is available for Bush only from September 1987 and no continuous NOx monitoring has taken place at Eskdalemuir yet.

DIURNAL DATA

The average diurnal data for both sites for 1986 and 1987 summers,calendar years and for winter 1986/1987 is plotted in Figures 8,9 and 10.
The Bush diurnal cycle is slightly weaker than that for Eskdalemuir and the latter site's values are lower than those recorded at Bush particularly between 0000-0800hrs GMT and 2000-2400hrs. This suggests that ozone is being destroye faster by dry deposition at Eskdalemuir than at Bush.

EPISODES

In the two year period,by far the most dramatic episode and that allowing greatest scope for analysis,occurred in April 1987.
Several minor episodes however were also recorded at both sites in 1986 and 1987.Time over limits and maximum values observed during the various episodes are described below.

Figure 8

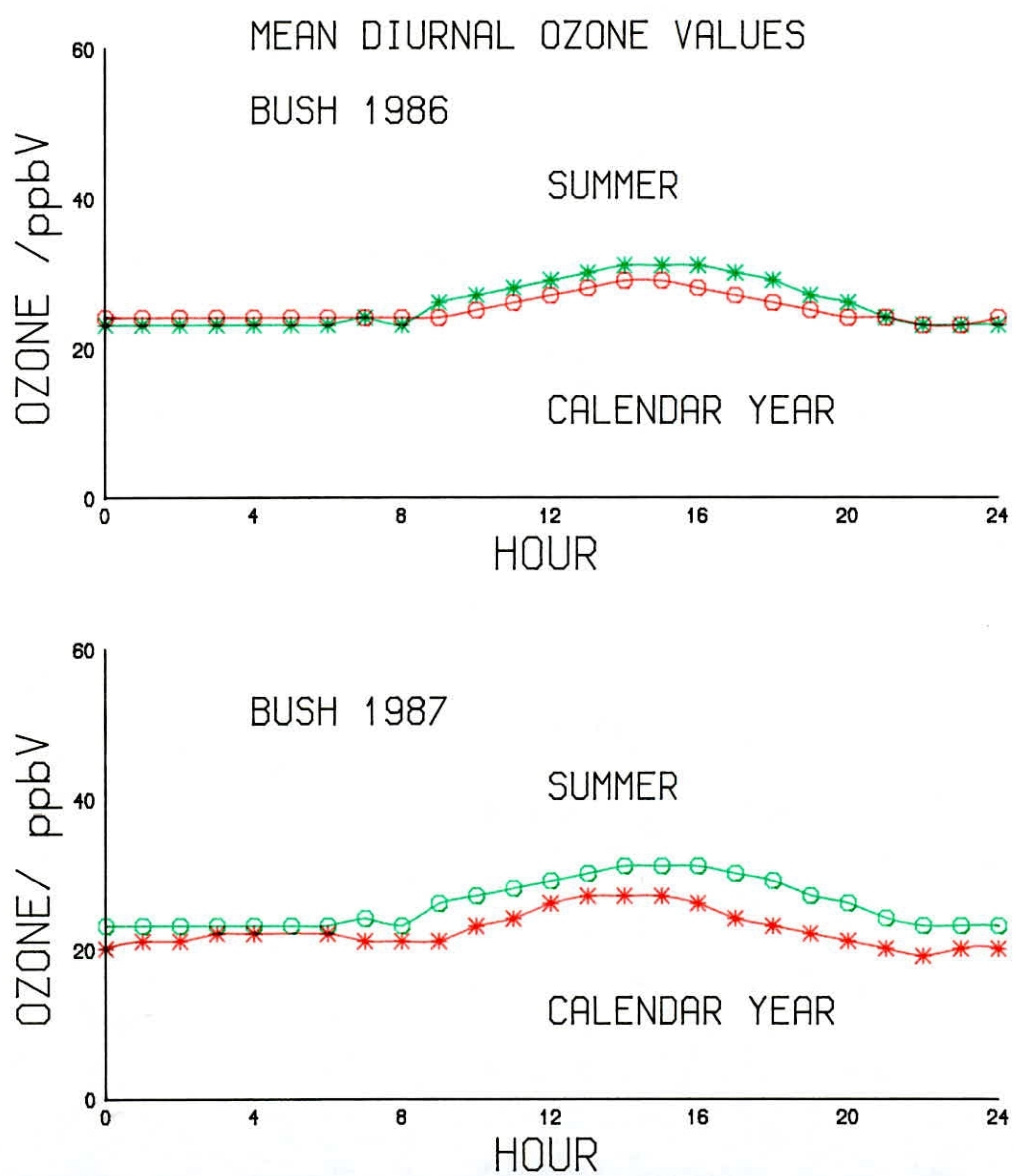


Figure 9

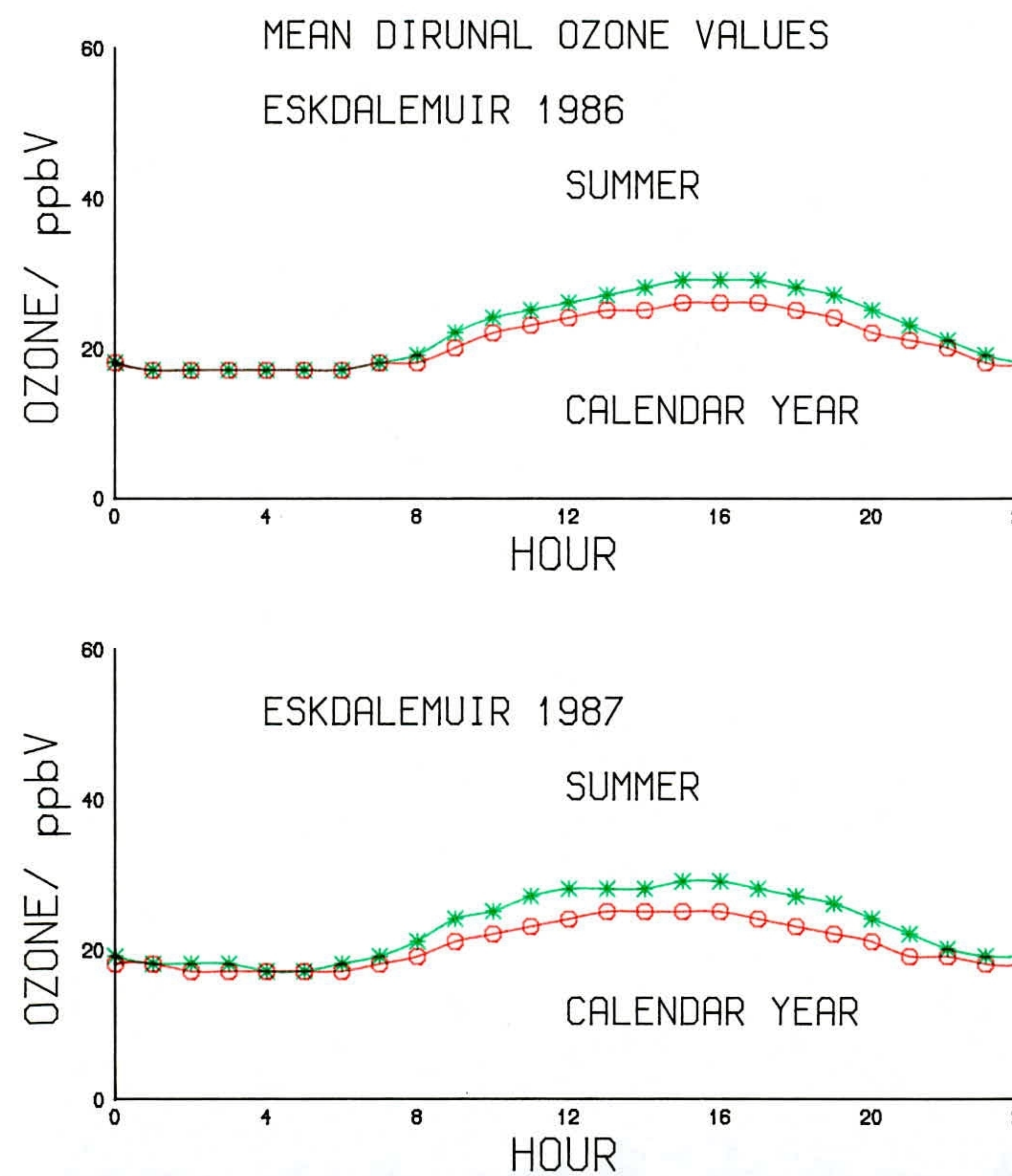
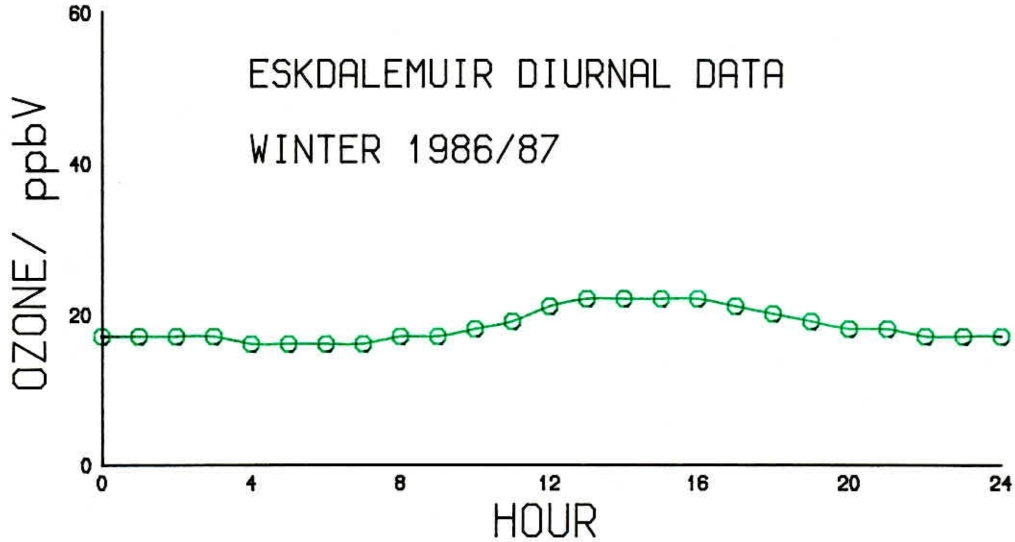
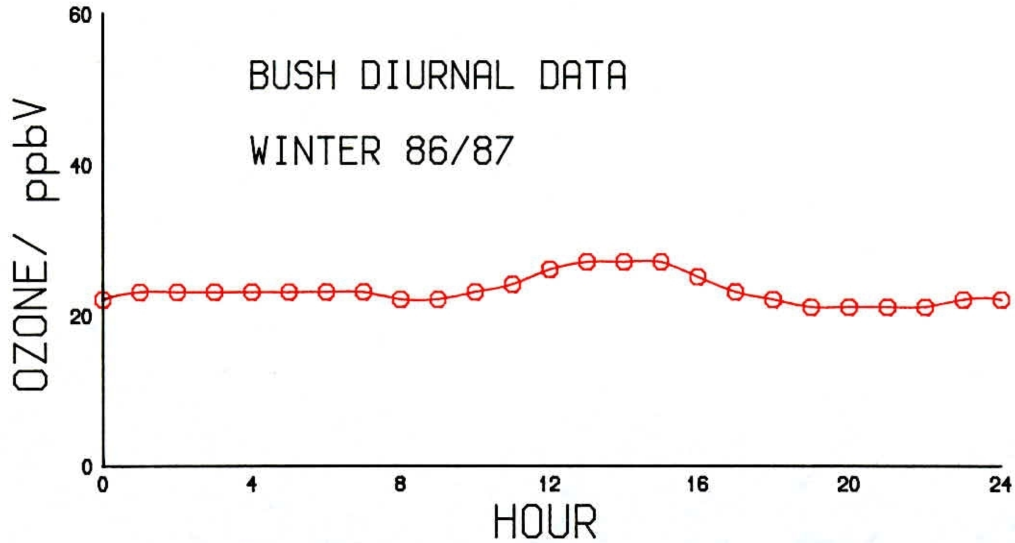


Figure 10.



ESKDALEMUIR DIURNAL DATA
WINTER 1986/87
OZONE/ ppbV
HOUR
0
4
8
12
16
20
24
0
20
40
60



BUSH DIURNAL DATA
WINTER 86/87
OZONE/ ppbV
HOUR
0
4
8
12
16
20
24
0
20
40
60

14-17 June 1986 (Figure 11)

Eskdalemuir recorded 8 hours>60ppbV and a peak hourly mean value of 75ppbV on 16 June at 2000GMT.

In contrast,Bush logged 0 hours>60ppb and a maximum hourly mean of only 53ppbV on the same day at 1600GMT.

24-30 June 1986 (Figure 12)

Both sites recorded values in excess of 60ppbV.Eskdalemuir observed 24 hours>60ppb,8 hours>80ppb and 2 hours>100ppb. and recorded a maximum hourly mean of 104ppbV on 28 June at 1500GMT. Bush however recorded an overall maximum hourly mean of only 73ppbV on 28 June at 1600 GMT. and only 11 hours>60ppbV in the entire period.

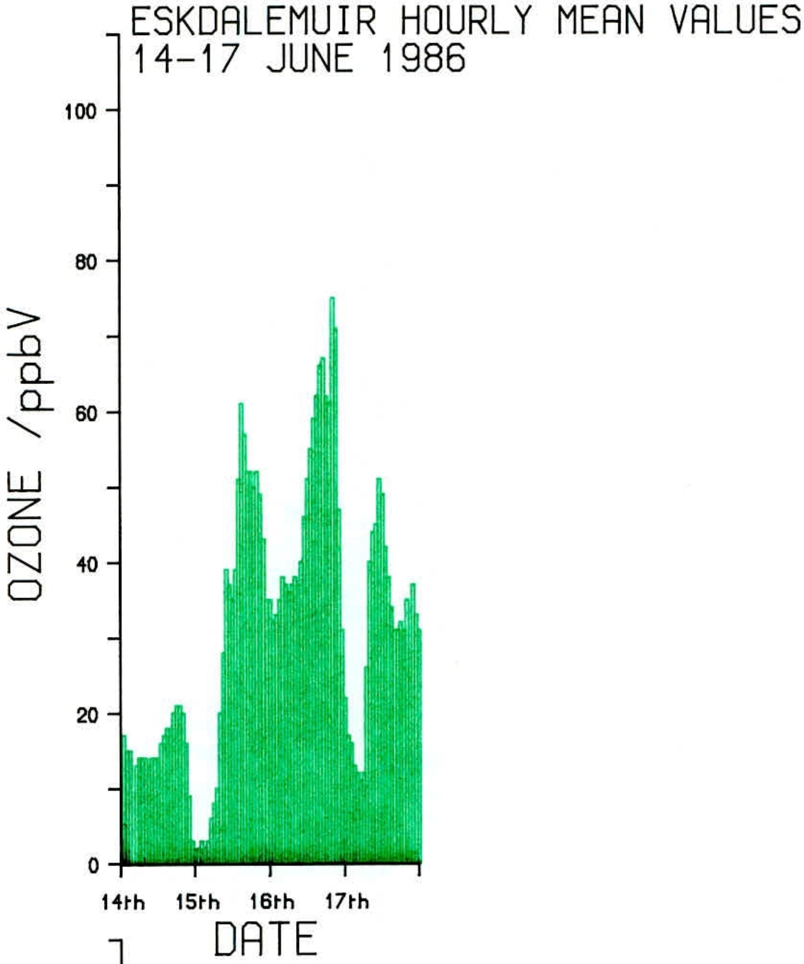
16-30 April 1987(Figure 13)

Ozone concentrations were elevated around 16-17 April 1987 at both sites but by far the major photochemical episode occurring since monitoring began at the sites was observed from 24-30 April.

Both the Analysis Automation analyser and the Monitor Labs analyser, operational at Bush during the entire period,recorded very similiar values as Figure 14 shows. Overall however,slightly higher values were logged by the Analysis Automation instrument. Since it was known to be extremely well calibrated at the time,its hourly mean values are plotted out in Figure 13 and were used in the analysis of the episode (Weston etal,to be published).

At Bush a total of 62 hours exceeding 60ppb,26 hours exceeding 80ppb and 1 hour >100ppb were noted for the period with the maximum hourly value of 101ppb occurring on 26 April at 1500GMT.

Figure 11


ESKDALEMUIR HOURLY MEAN VALUES
14-17 JUNE 1986
OZONE /ppbV
100
80
60
40
20
0
14th
15th
16th
17th
DATE

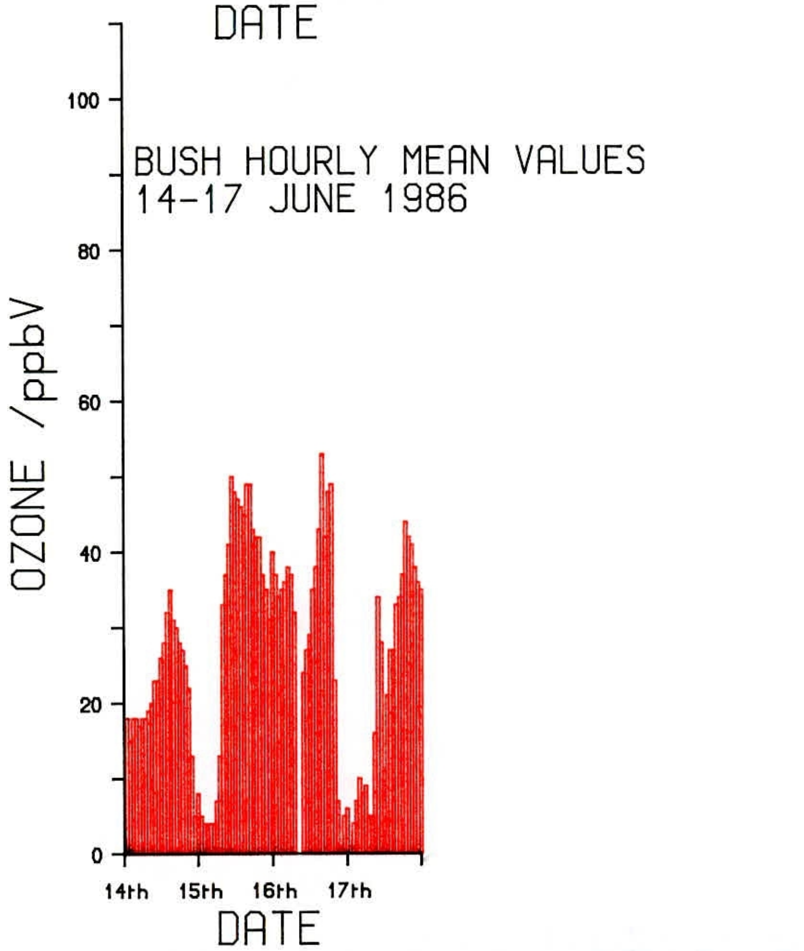

BUSH HOURLY MEAN VALUES
14-17 JUNE 1986
OZONE /ppbV
100
80
60
40
20
0
14th
15th
16th
17th
DATE

Figure 12

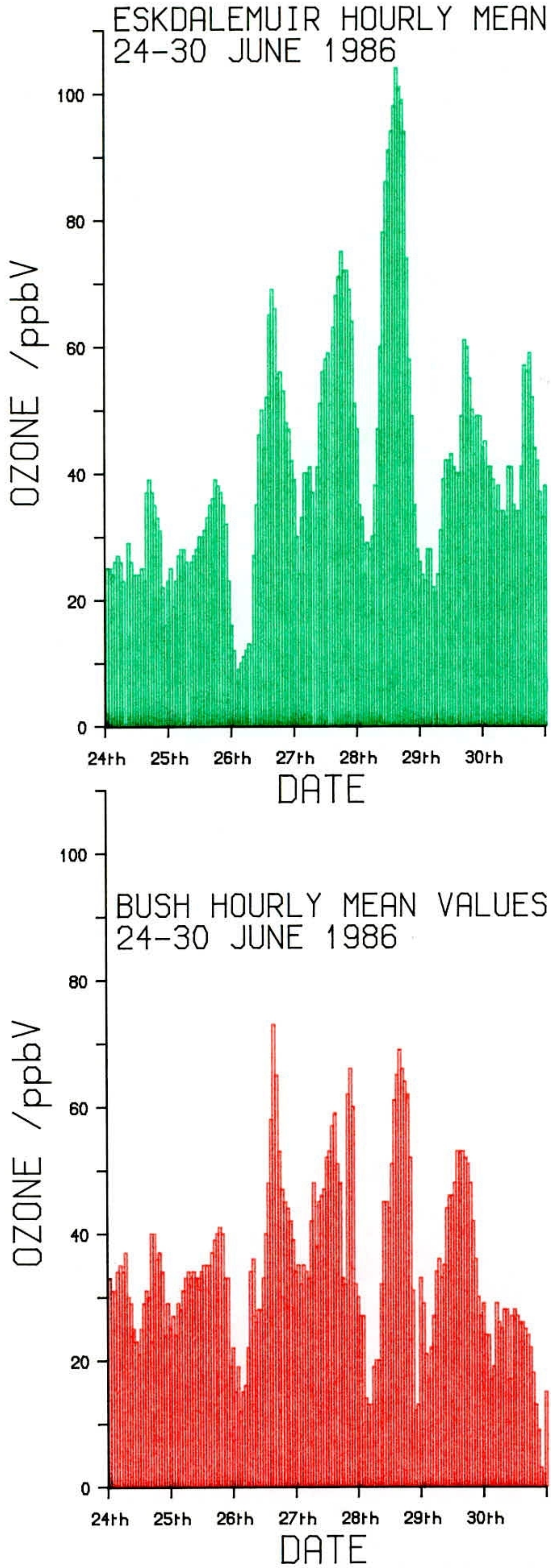
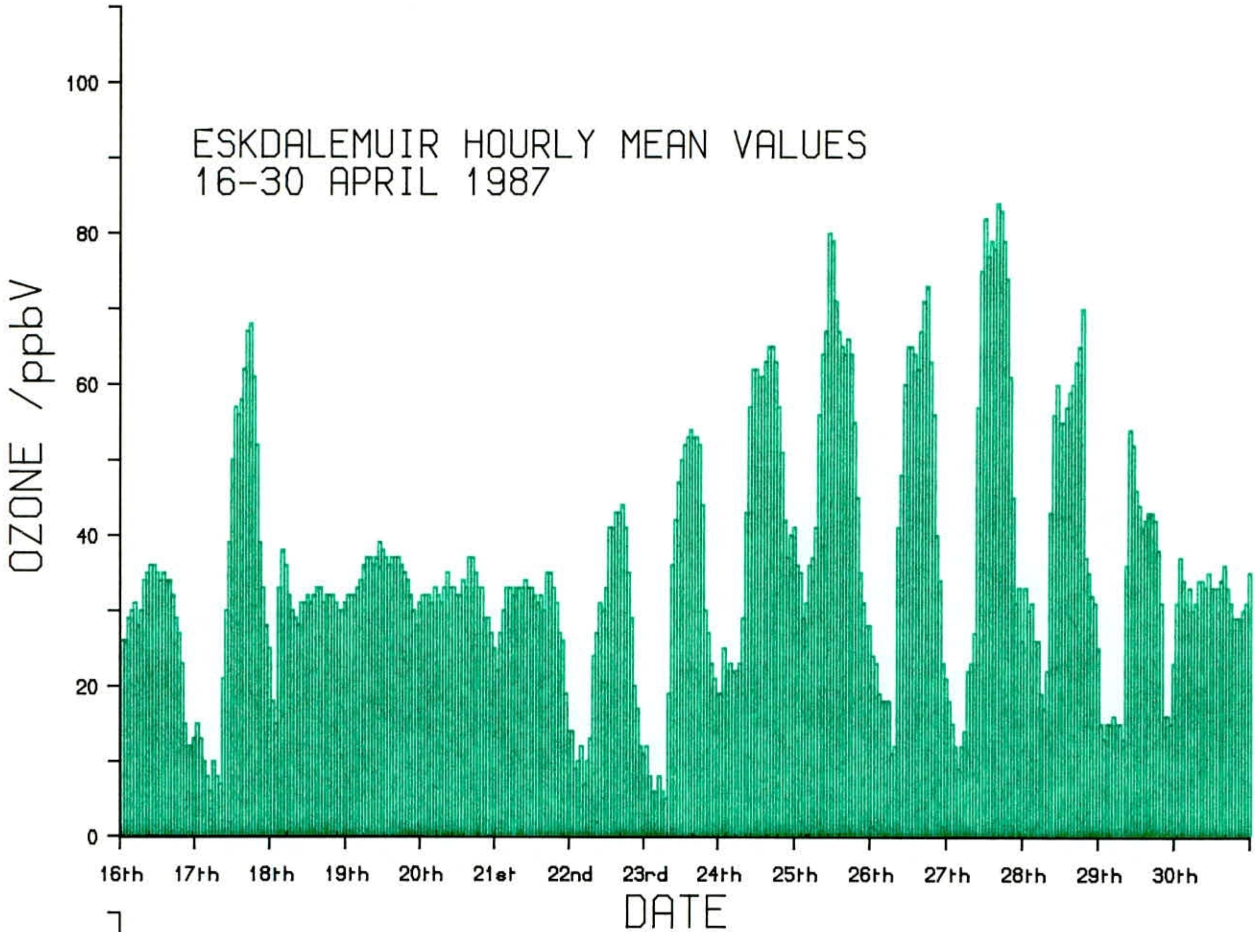

ESKDALEMUIR HOURLY MEAN VALUES
24-30 JUNE 1986
OZONE /ppbV
0
20
40
60
80
100
24th
25th
26th
27th
28th
29th
30th
DATE
BUSH HOURLY MEAN VALUES
24-30 JUNE 1986
OZONE /ppbV
0
20
40
60
80
100
24th
25th
26th
27th
28th
29th
30th
DATE

Figure 13


ESKDALEMUIR HOURLY MEAN VALUES
16-30 APRIL 1987
OZONE /ppbV
100
80
60
40
20
0
16th
17th
18th
19th
20th
21st
22nd
23rd
24th
25th
26th
27th
28th
29th
30th
DATE

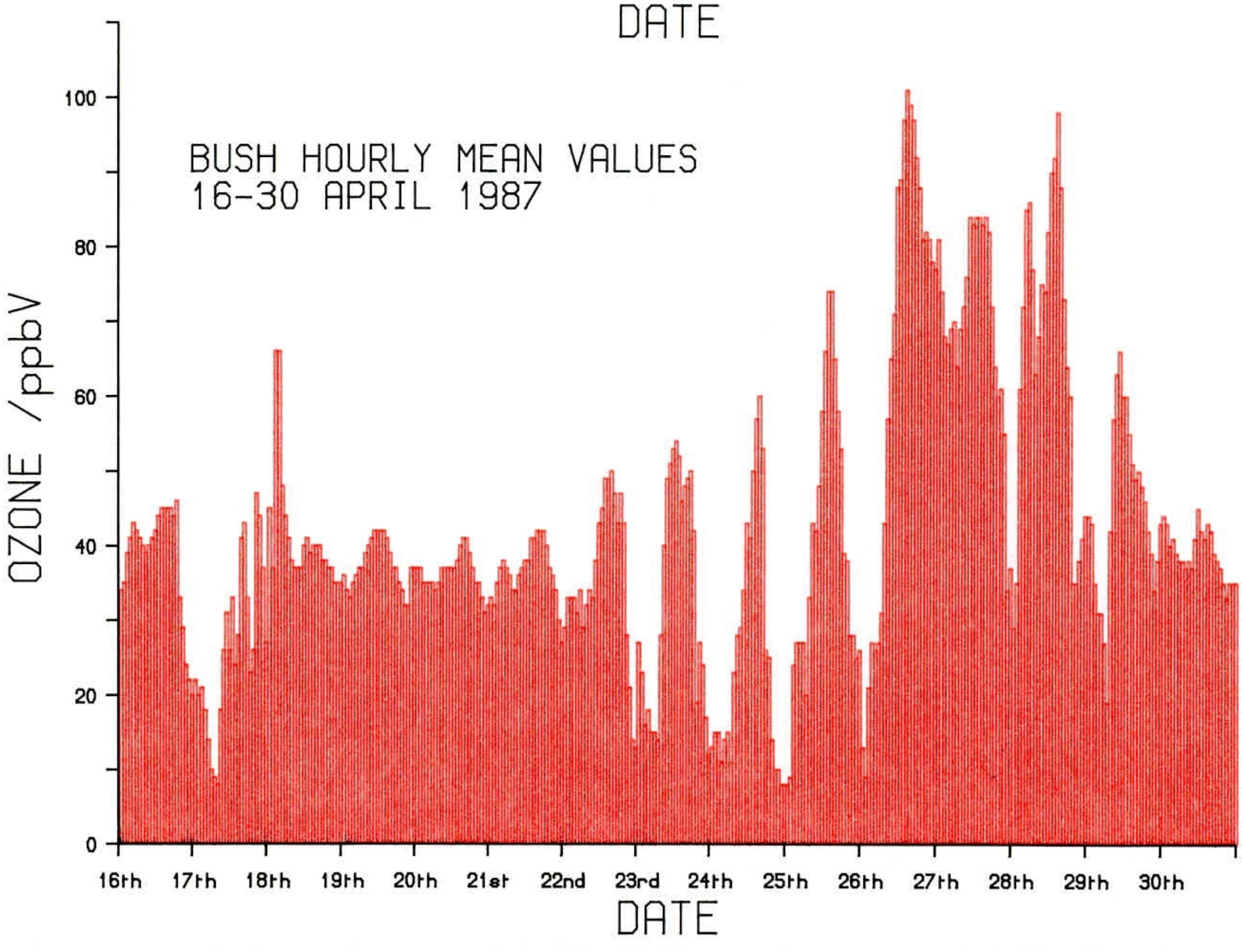
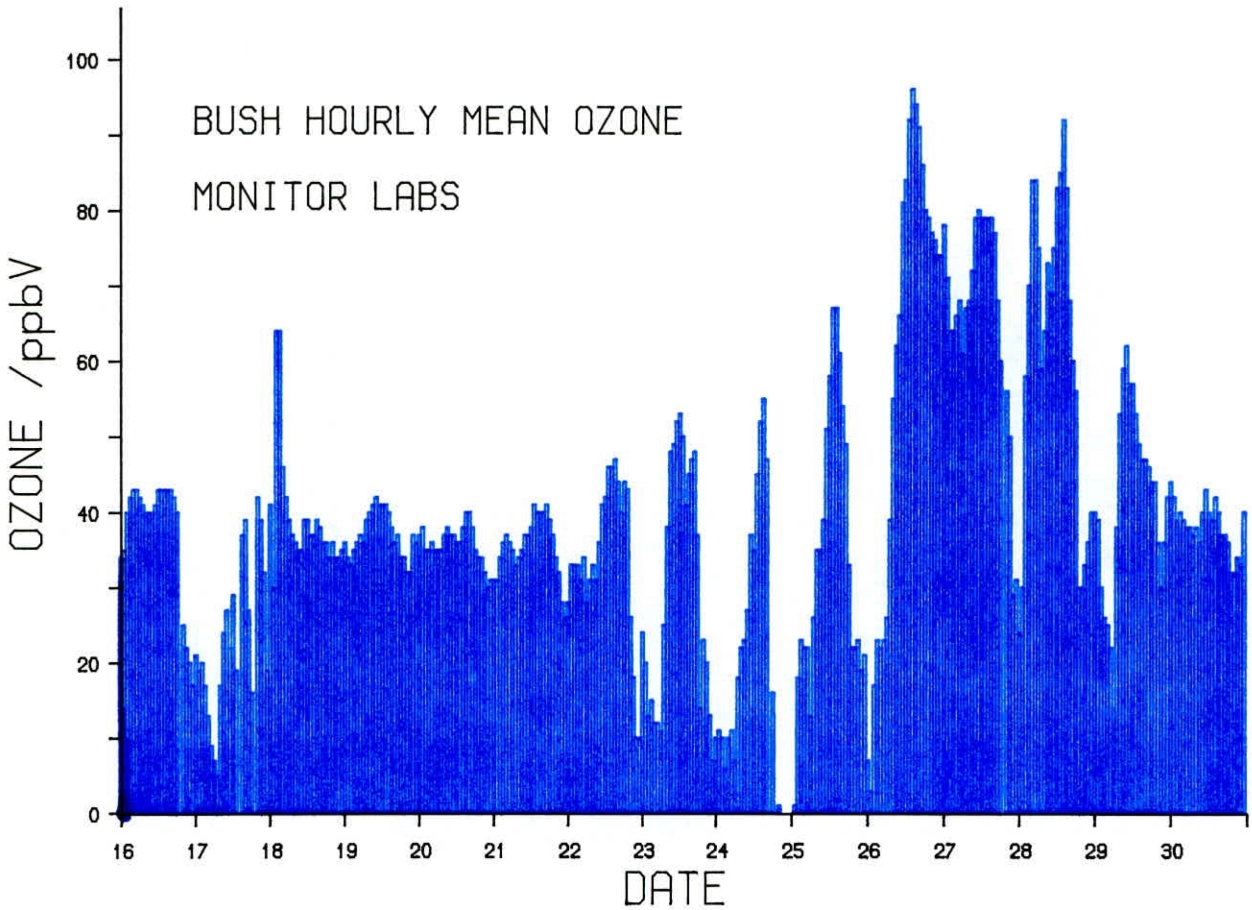
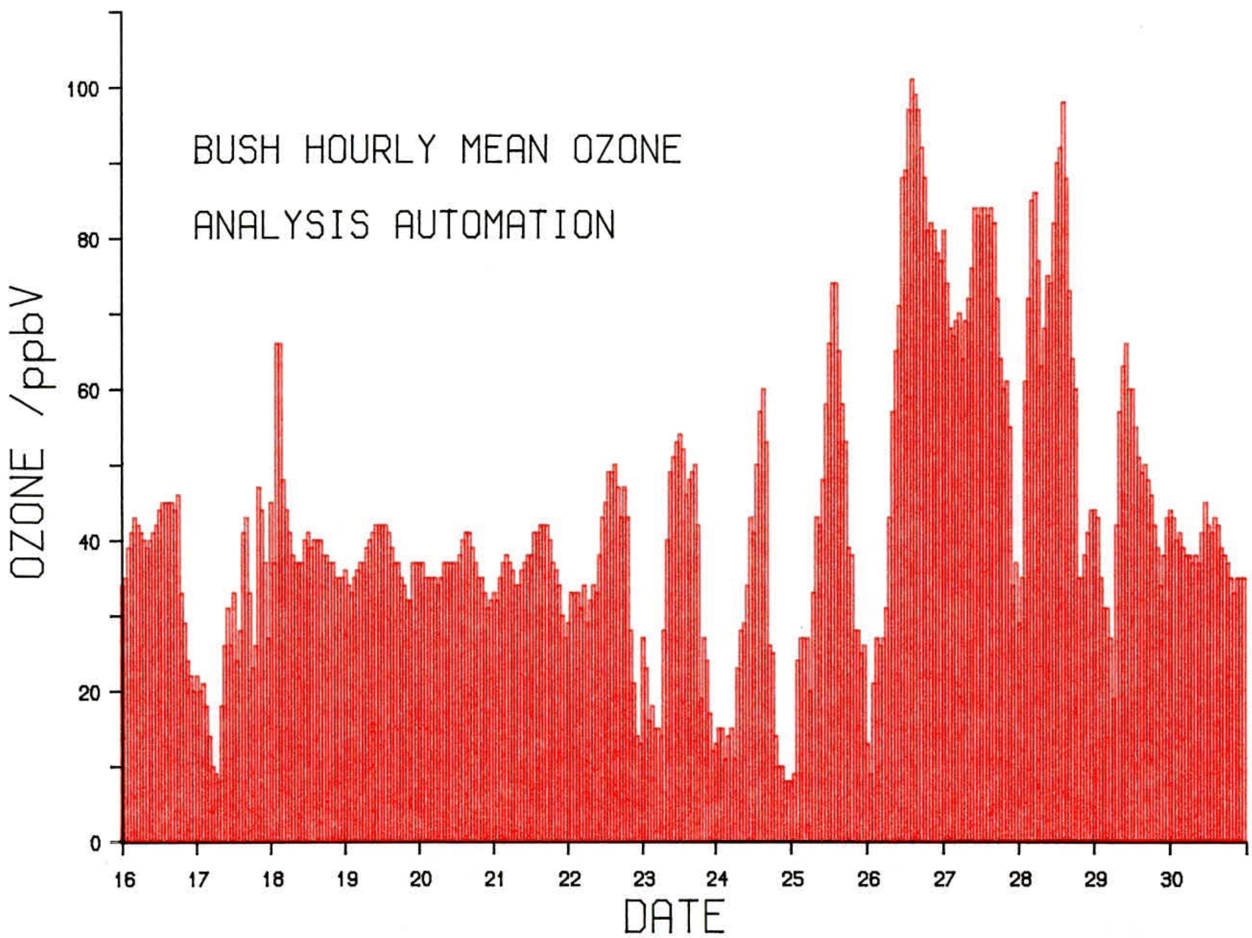

BUSH HOURLY MEAN VALUES
16-30 APRIL 1987
OZONE /ppbV
100
80
60
40
20
0
16th
17th
18th
19th
20th
21st
22nd
23rd
24th
25th
26th
27th
28th
29th
30th
DATE

Figure 14


BUSH HOURLY MEAN OZONE
MONITOR LABS
OZONE /ppbV
0
20
40
60
80
100
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
DATE


BUSH HOURLY MEAN OZONE
ANALYSIS AUTOMATION
OZONE /ppbV
0
20
40
60
80
100
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
DATE

Eskdalemuir recorded lower overall values;only 42 hours>60ppb, 4hours>80ppb and a maximum of 84ppb occurring on 27 April at 1800GMT. Nevertheless,this range of values at the two sites are amongst the highest recorded in rural Scotland since monitoring began there in 1978.

3-8 July 1987(Figure 15)

Bush observed only 1 hour>60ppbV,62ppbV on the 6 July at 0500GMT.Eskdalemuir logged at total of 6 hours >60ppbV in the period and recorded a maximum hourly mean of 70ppbV on 6 July at 1000GMT.

Only the episode from 24-30 April 1987 has been analysed in detail using data from all of the UK network sites in operation at the time.Data was also used in the analysis from CEGB Mid. sites which are not part of the network. A description of the analysis is outlined below.

APRIL 1987 EPISODE ANALYSIS

UK DATA AVAILABLE FOR ANALYSIS

The various UK network sites which were operational from 24-30 April are plotted in Figure 16. Figures 17 and 18 illustrate the variability in peak daily ozone values and time over limits from site to site.

Although the overall peak hourly mean ozone value was recorded at Bush on the 26 April,maximum hourly concentrations were recorded at 7 sites on 27 April and at 4 sites on 28 April.

On each of the days of this ozone episode,the smallest maximum hourly values were monitored at central London. Its greatest overall value was 35ppbV on 26 April.

Figure 15

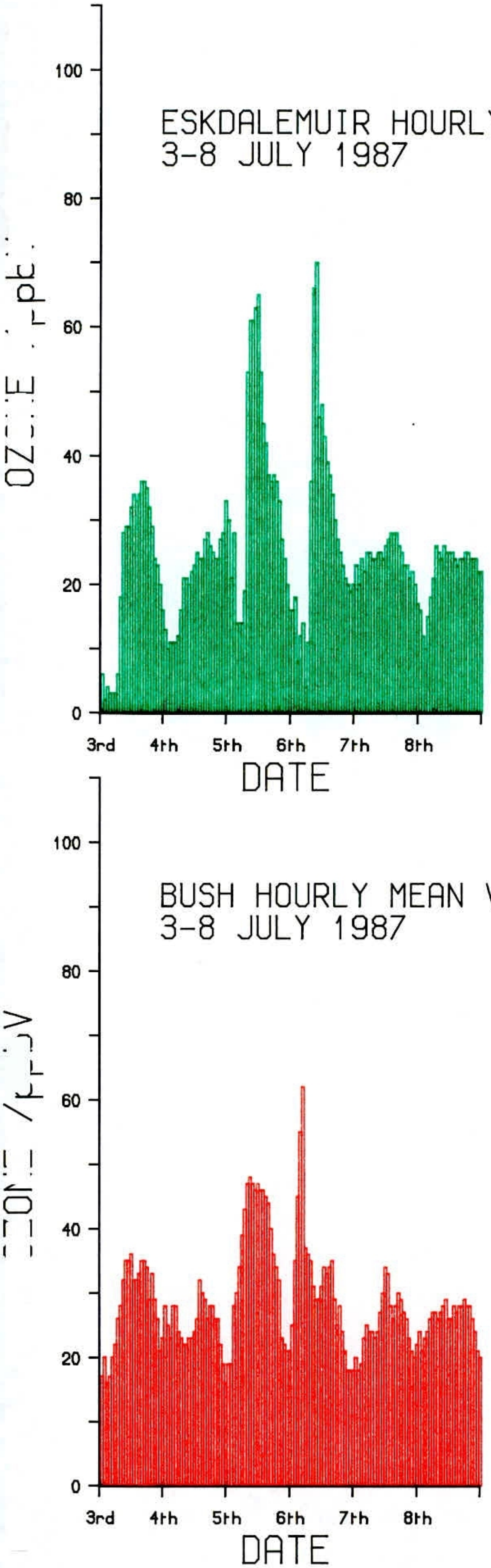

ESKDALEMUIR HOURLY MEAN VALUES
3-8 JULY 1987
0
20
40
60
80
100
3rd
4th
5th
6th
7th
8th
DATE
BUSH HOURLY MEAN VALUES
3-8 JULY 1987
0
20
40
60
80
100
3rd
4th
5th
6th
7th
8th
DATE

Figure 16

data recorded during the April 1987 episode at the sites plotted below is illustrated in the two figures to follow.

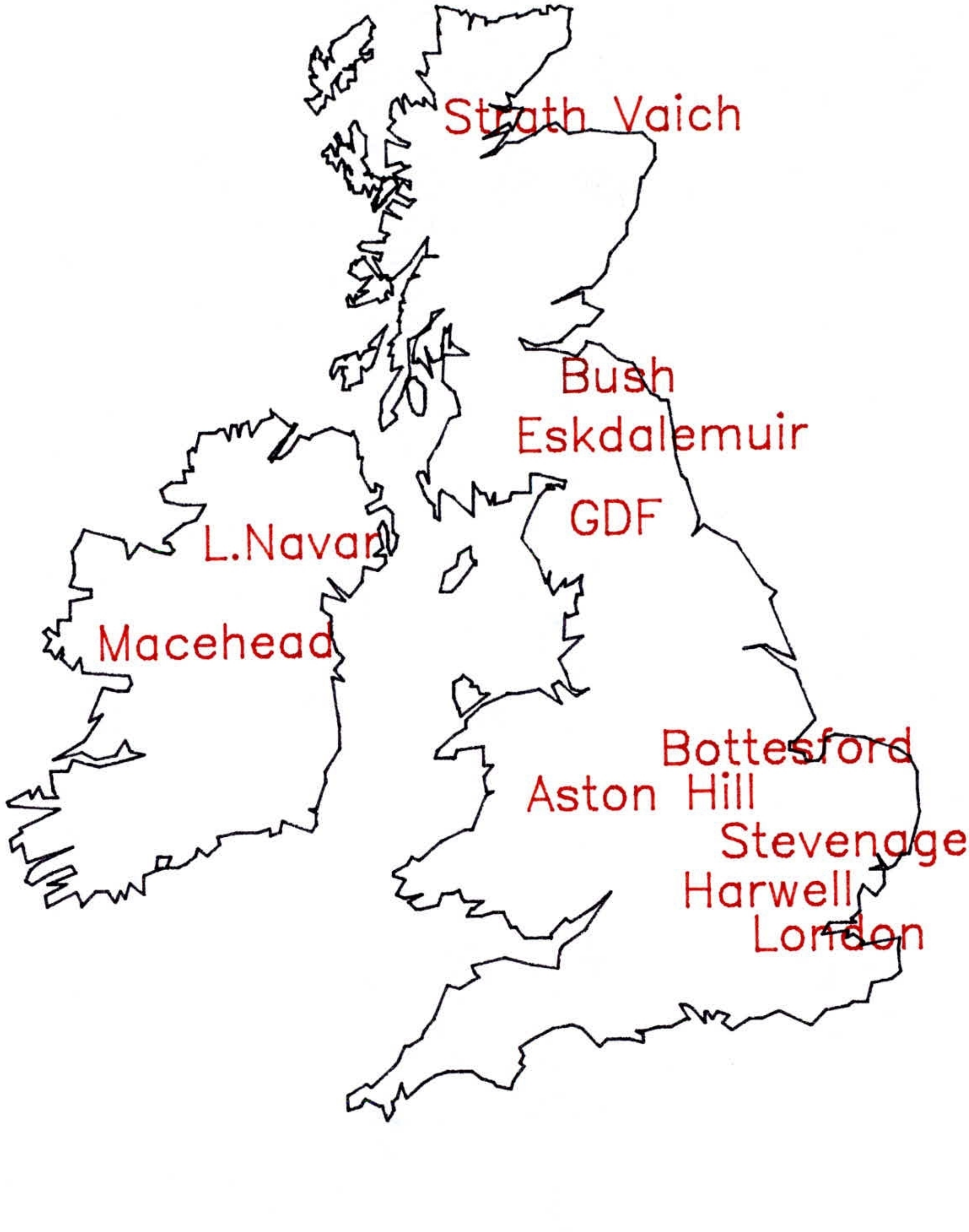


Figure 17

APRIL EPISODE 1987
variability in max. hourly ozone values (ppb)
for UK sites from 24–30 April

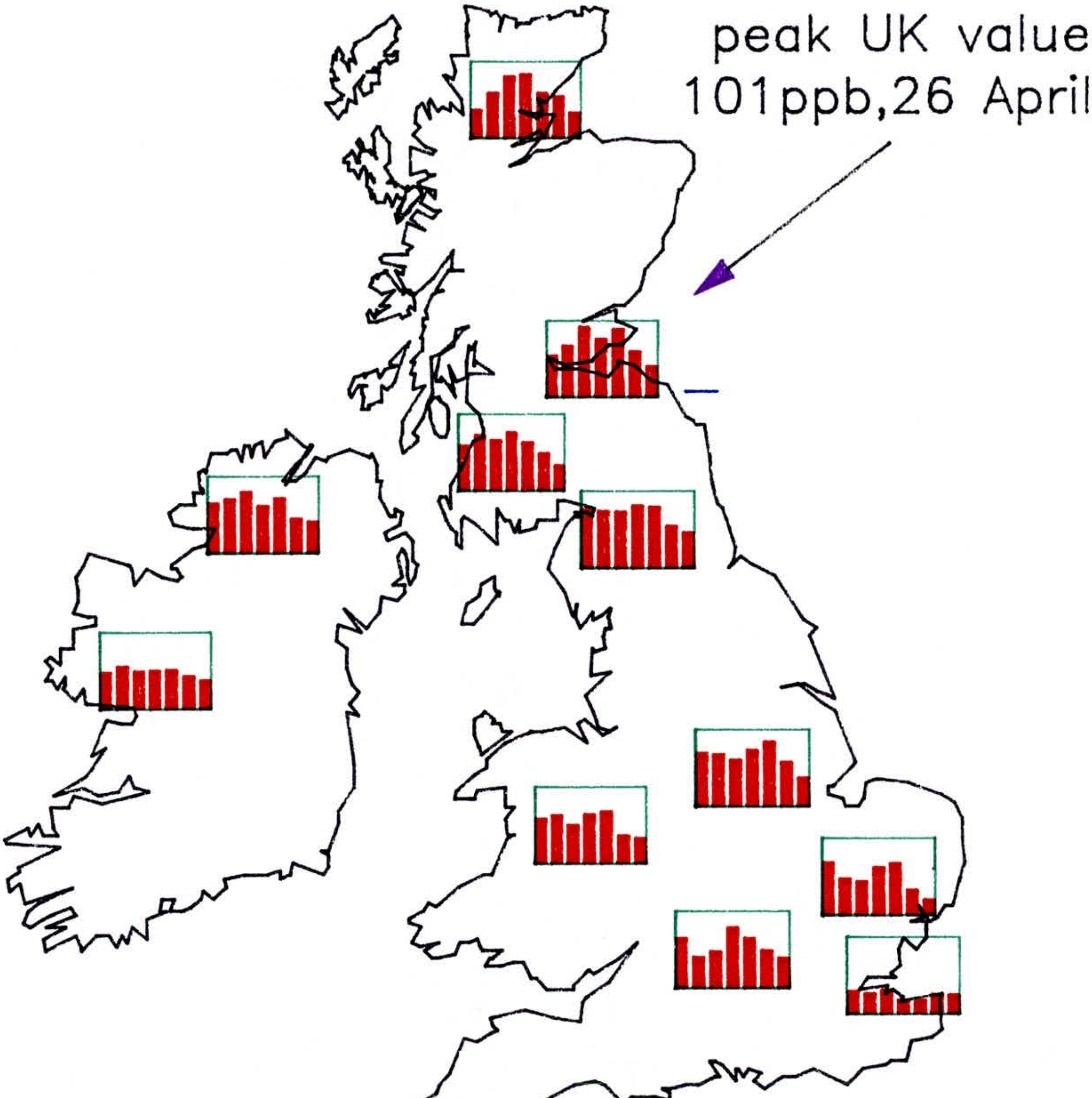
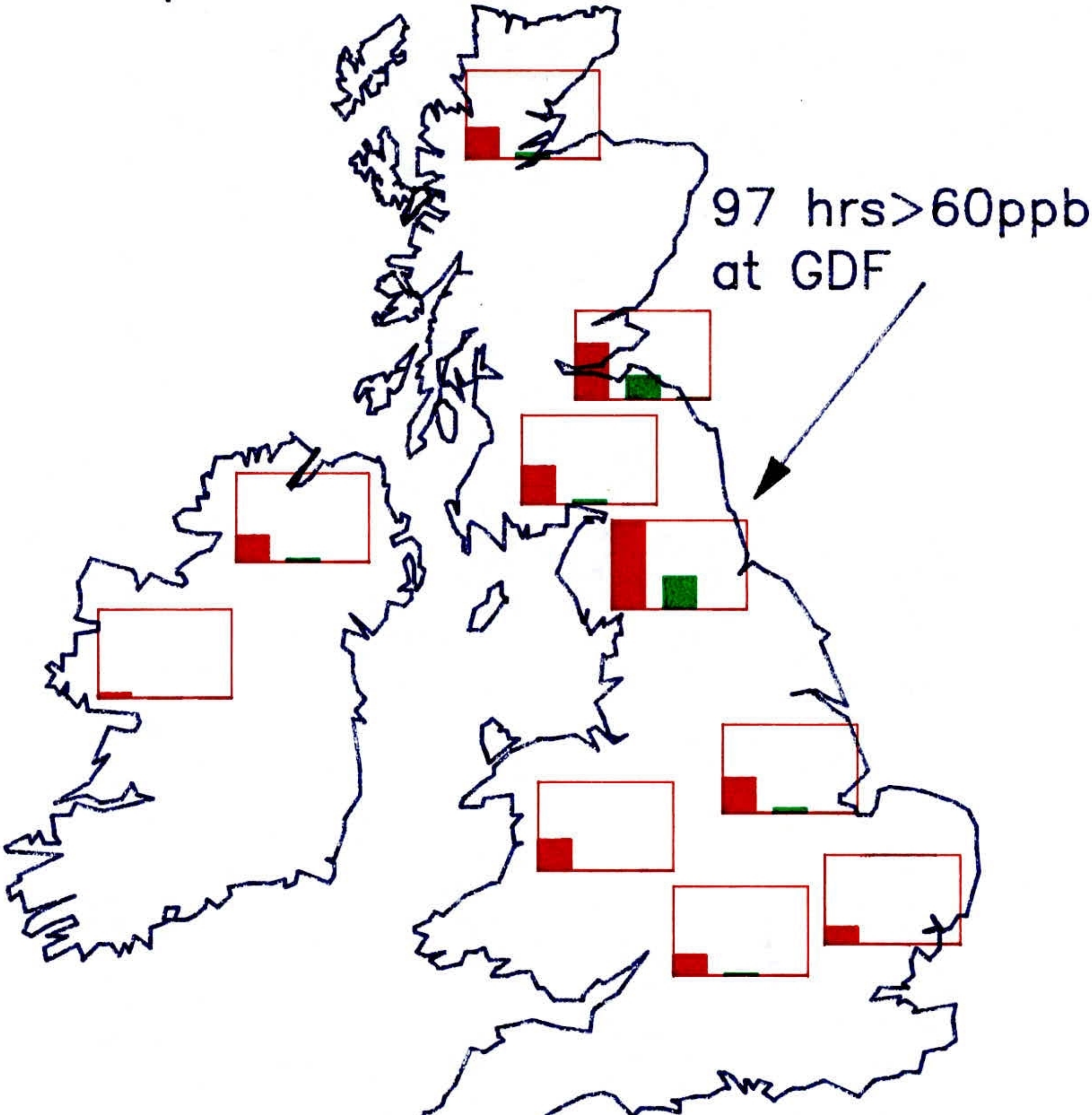


Figure 18

variability in hours>60ppb and 80ppb
at various sites during the April episode
one hour >100ppb was recorded at Bush
on 26 April.



COMPARISON OF GDF,BUSH AND ESKDALEMUIR DATA

Great Dun Fell (847m asl),the highest altitude site in the network, was the only site to record time over limits in excess of those logged at Bush. It monitored a total of 97hours>60ppbV almost continuously and 36hours>80ppbV from 24-30 April.

During photochemical episodes such high altitude stations would be expected to experience only small nocturnal decreases in ozone,relative to lower altitude sites,since they remain above the shallow,thermally stable layer which develops over lower ground in the meteorological conditions typical in photochemical episodes.Hence they observe very minor ozone loss via dry depostion.This is clearly observed in Figure 19 which shows the averaged diurnal data for Eskdalemuir and Great Dun Fell from 24-30 April. A rapid decrease in ozone concentration occurs at Eskdalemuir beginning mid-afternoon and reaching a minimum around dawn,but there is no marked diurnal cycle at GDF.

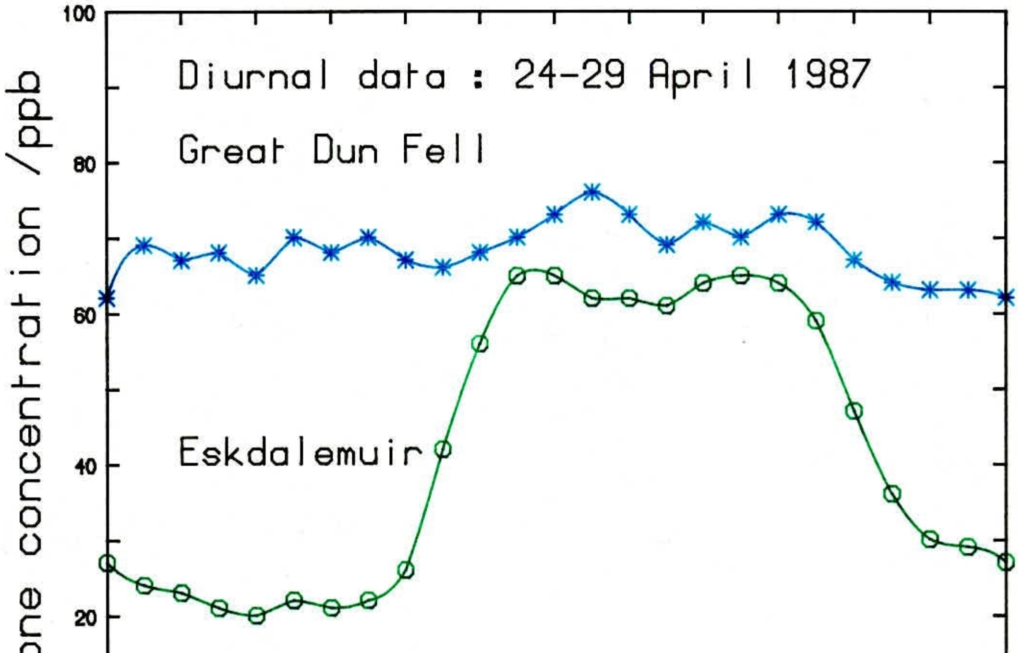
SYNOPTIC SITUATION

The meteorological conditions leading to the production of the photochemical ozone monitored at the UK sites inititated by an anticyclone moving eastwards from Biscay on 20 April to eastern europe on 22 April. It became slow moving and was reinforced by an anticyclone moving southwards from Scandanavia on the 26th April giving predominately south easterly flow over the UK between the 24-28 April. The long continental trajectories combined with cloudless skies for much of the period led to high daytime temperatures.In Edinburgh the Blackford Hill observatory broke a daytime temperature record extending back to 1896.

METHOD OF ANALYSIS

The analysis involved calculating 300m and 900m trajectories over 24 hour periods for various sites which were monitoring from 23-30 April.

Figure 19.


Diurnal data : 24-29 April 1987
Great Dun Fell
Eskdalemuir
Ozone concentration /ppb
Hour
0
20
40
60
80
100
0
4
8
12
16
20
24

Using the method outlined below ozone hourly mean data logged by sites along the various trajectory paths was used to estimate the extent of local photochemical ozone generation at Bush in particular,assuming dry depostion to be the major ozone sink.The equation used to determine this quantity is:

conc.change due to net generation = final conc.- initial conc.+ decrease in conc. due to surface deposition

300m and 900m TRAJECTORIES

Figure 20 illustrates the basic idea of the analysis with the arrowed lines AC and BC portraying the 300m and 900m trajectories over a 24 hour period. Trajectories at these levels are representative,in simplified form, of the lower and upper portions of an air column during meteorologocal condtions prevalent in a photochemical episode.

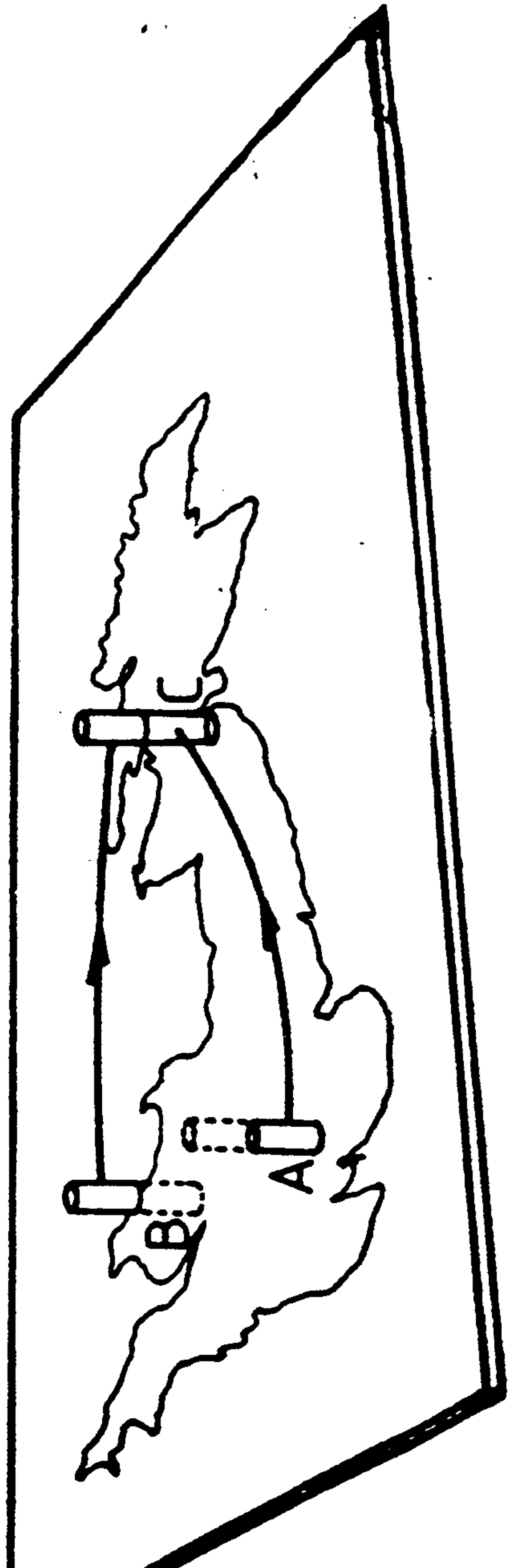
The air column at site C,the endpoint of the two trajectories,represents the mixed layer when convection is at its maximum and corresponds with the hour of the day when ground level site C logs its peak ozone value (final conc. in equation 1).

Similiarly 24 hours earlier,at the time of the previous well mixed period, the ozone concentration at a hypothetical ground level site at point A should correllate well with that at a higher altitude station at point B ; there being very little variation in ozone concentration gradient throughout the boundary layer when mixing is at its maximum.

Averaging ozone values at A and B then gives 'initial conc.' in the above equation.

During this episode however,unusually high turbidity of the lower

Figure 20



atmosphere and the relatively low sun angle in the month of April,ensured a relatvely short period of deep convection;in general only from 1200-1600GMT. The analysis assumed then,that for the period between initial and final trajectory points,the upper portion of the air column was decoupled from that of the surface air by low level stability.Hence only the lower levels,following the 300m trajectory path would experience depletion due to surface deposition.Hourly mean ozone values at sites along the 300m trajectory are used for the most part for the calculation of 'decrease in conc. due to surface deposition.'

TRAJECTORY EXAMPLE : BUSH,24 APRIL

Figure 21 shows the paths of the 300m and 900m trajectories arriving at Bush (Point C) on the 24 April at 1600GMT when the peak daily ozone value of 60ppb (final conc.) was recorded. Value of 'initial conc' was calculated by averaging the hourly mean values of five east midland sites (Bottesford, Syda,Lincoln,Thorney and Jenny Hurn) at 1500GMT giving an 'initial conc'. on 23 April of 75ppb. The hourly ozone values from 23 April at 1600GMT to 24 April at 1500GMT,also used to calculate ozone depletion by dry deposition were those monitored individually by Jenny Hurn Eskdalemuir and Bush or averages of various combinations of data from these sites depending on their distance from the 300m trajectory.

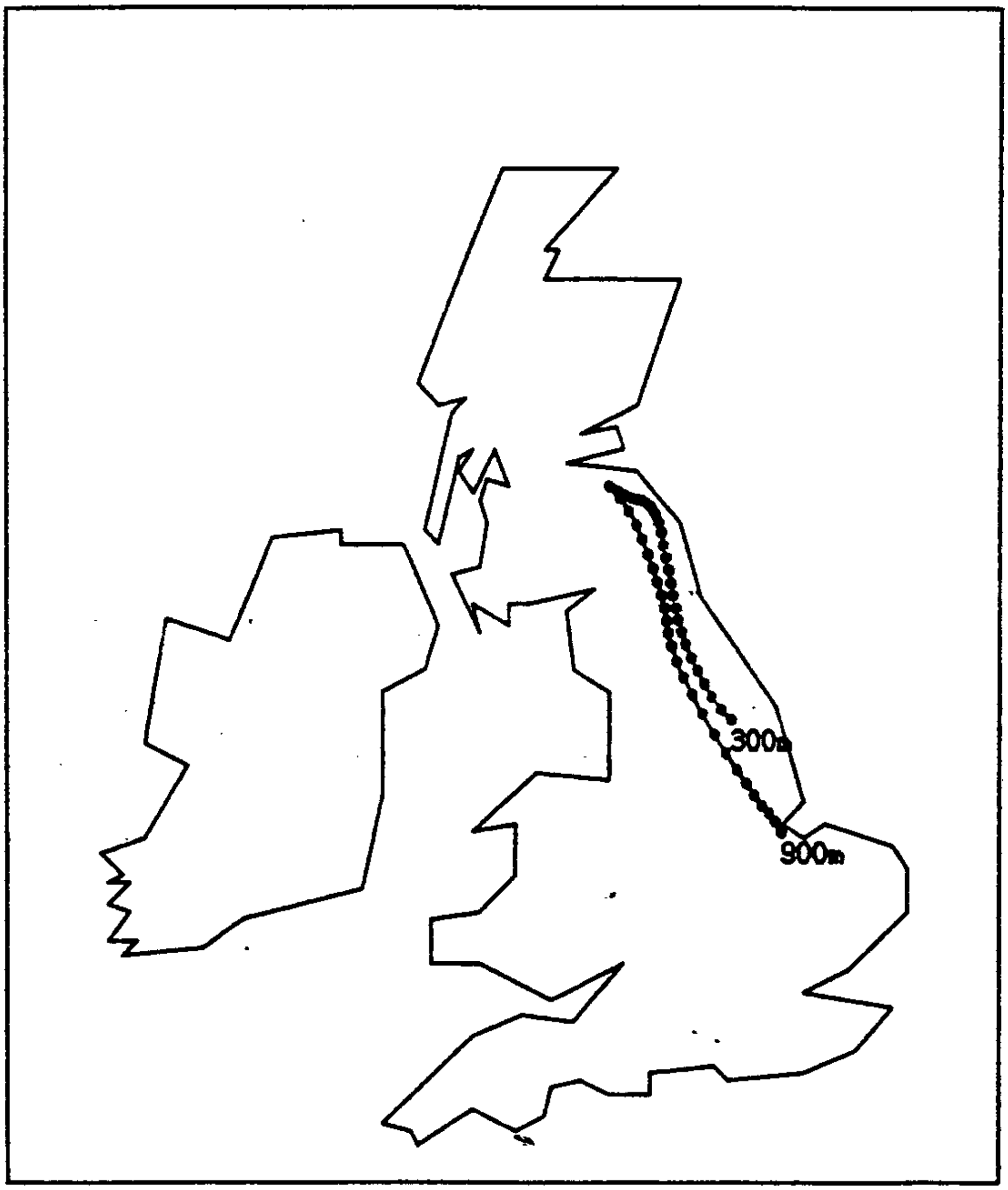
Figure 22 illustrates the variation of hourly ozone values with time along the 300m trajectory.Also shown are GDF hourly mean ozone values for the period when the 300m trajectory was not to distant from Cumbria.

DEPOSITION VELOCITY VALUES

The various trajectories calculated for the analysis cross mainly lowland, agricultural districts of Britain with some areas of moorland at higher elevations.During late April,measurements have shown that grassland and cereal crops show large diurnal cycles in deposition rates;daytime maxima

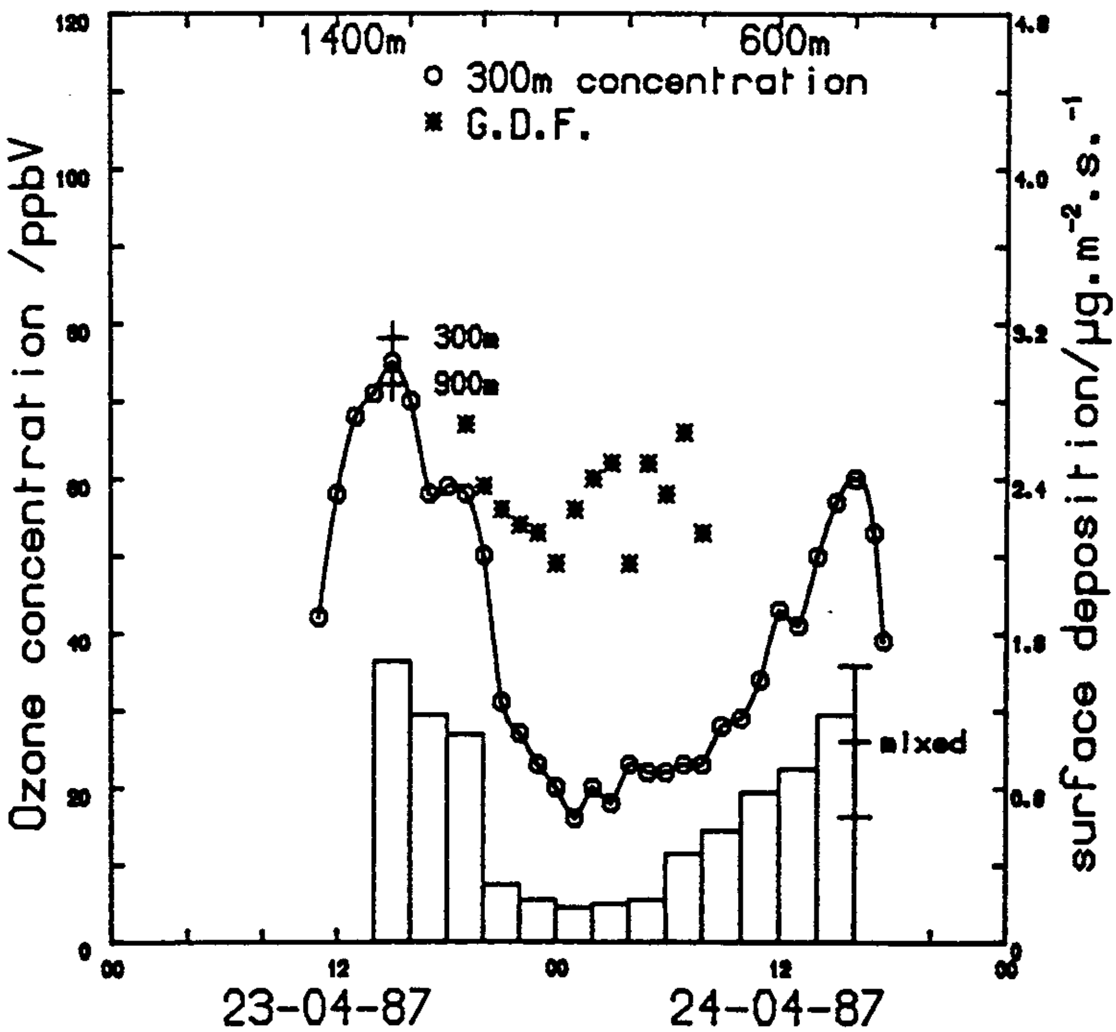
Figure 21

24/ 4/ 87



L

Figure 22


1400m
600m
○ 300m concentration
* G.D.F.
300m
900m
mixed
Ozone concentration /ppbV
surface deposition/µg.m⁻².s⁻¹
23-04-87
24-04-87

and nocturnal minima being due to the opening and closing of the stomata.

Consistent with the appropriate experimental data,the daytime(0600-2000hrs) and nighttime(2000-0600) deposition velocity values over land were chosen to be 1cm/sec and 0.5cm/sec respectively.A value of zero was asssumed over water.

Figure 22 also shows the calculated values of surface deposition (hourly mean ozone conc. multiplied by deposition velocity) at two hourly intervals These were integrated over the 25 hour period and the total flux divided by the mixed layer depth at Bush on 24 April.This was relatively shallow at 600m compared to 1400m the previous day but a substantial decrease in ozone concentration in the boundary layer,as a result of dry deposition, would be expected, since the boundary layer had not extended far into the layer of the ozone rich air of the previous day's boundary layer above.

The decrease in ozone conc. due to surface depletion over this 25 hour period amounted to 26ppb,resulting in a net generation of 34ppb.Varying deposition velocity values by 20% resulted in 10ppb variation in the net generation value.

Errors in individual measurements used in equation were also taken into account.For the 24 April an uncertainty of 11ppb on the net generation value of 34ppb was estimated.

SUMMARY OF RESULTS

Table 5 shows the results obtained for the various sites and episoidal days.The production of photochemical ozone between the various monitoring stations over the 24 hour periods is shown to range from 10-50ppbV. These production estimates are superimposed on the natural background concentration and or any photochemical ozone advected across the region. The low level air reaching the east coast during most of the episode

Table 5

Date	End Point	Mixed Layer Depth of Column (m)		Average ozone concentration /ppbV					Sunshine hours
		at 12 Z	at 12 Z prev day	Initial	Surface depletion	Depleted value	Observed value	Apparent Generation	
24.04.87	Busn	600	1400	75	49	26	60	34 ± 10	9
25.04.87	Lough Navar	1100	1650	74	27	47	78	31 ± 6	7
26.04.87	Busn	1325	1150	82	24	58	99	41 ± 5	12.5
27.04.87	Busn 12GMT	1150	1200	85	13	72	83	11 ± 3	4.5
	16GMT			85	24	61	84	23 ± 5	8
27.04.87	Aston Hill	1300	1150	56	20	36	71	35 ± 4	6.5
28.04.87	Lough Navar	1500	1500	76	19	57	79	22 ± 4	8
28.04.87	Strath Vaich	1350	1750	68	12	56	63	7 ± 2	3
28.04.87	Bush	1825	1450	77	20	57	98	41 ± 4	9.5
29.04.87	Bush	[illegible]	[illegible]	77	22	55	66	11 ± 4	3
30.04.87	Bush	1050	900	44	11	33	43	10 ± 2	1.5

had earlier been over continental europe where the anticyclonic conditions were also suitable for photochemical ozone formation. Hourly mean ozone data obtained from four Dutch coastal stations exhibited similiar elevated concentrations from 24-30 April,with peak hourly values in the 80-100ppb range occurring principally between 24-26 April.

It is possible therefore that some of the UK ozone concentrations were supplemented by long-range transport from the continent of both ozone and its precursors; in particular nitric oxide data for two of the Dutch stations showed a 100% increase in their value prior to 25 April.

VARIATION WITH SUNSHINE HOURS

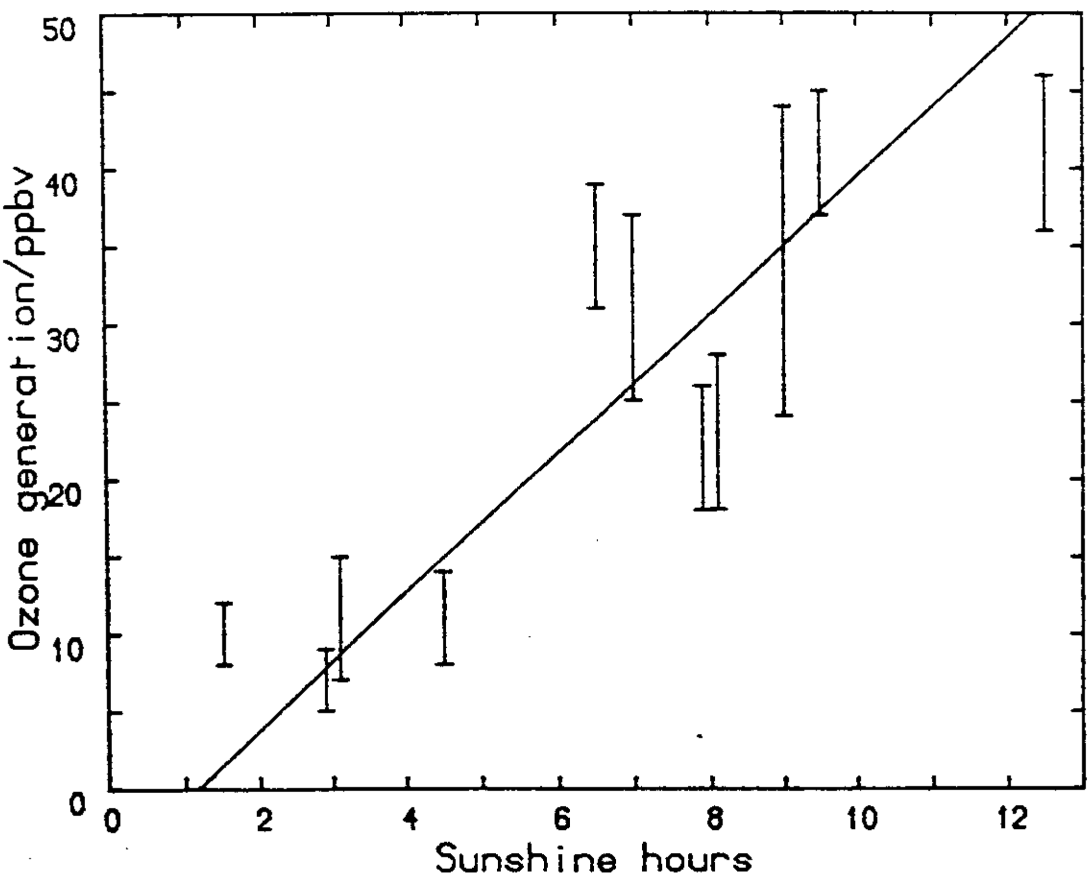
The estimates of ozone production show variability with observed insolation along the trajectories,the extent of production increasing with sunshine hours as shown in Figure 23. The slope of the line of best fit to the data implies an ozone production of 4ppbV per hour of sunshine. The regression line is not constrained to pass through zero,since net generation includes chemical as well as photochemical processes. These changes may be non-zero even in the abscence of sunshine. The maximum daily ozone production appears to be limited to about 45ppb in April and about 60ppbV in midsummer, consistent with other UK results to date.

The average length of trajectories in the boundary layer for a 24 hour period was about 500km and this would be typical of anticyclonic conditions during ozone episodes. The value of 45-60ppbV is then reasonable for ozone generation over the UK,under cloudless conditions in the summer half of the year and with adequate precursor concentrations.

FREQUENCY DISTRIBUTIONS FOR OZONE : 1986 AND 1987.

The shape of the frequency distribution for ozone can be readily shown to

Figure 23



Ozone generation/ppbv
0
10
20
30
40
50
0
2
4
6
8
10
12
Sunshine hours

be poorly described by either normal or log-normal distributions (Figures 24-27a).

The large numbers of small concentrations exhibited in these figures are due mainly to surface ozone depletion beneath shallow,nocturnal inversion layers. If data for a high altitude site are examined,the small values are absent due to lack of nocturnal depletion. The data distributions for most low level sites then contain subsets of information appropriate for different atmospheric conditions.

For the purpose of studying the effect of ozone concentration on plants, the distribution of 'night time' ozone concentration is of little significance. These concentrations tend to be small and occur at the time when the plants' stomata,the sites of ozone uptake are closed. During the day when the stomata are open,the surface air is well mixed and daily ozone maxima are observed. The distribution of Bush and Eskdalemuir 1986 and 1987 data for the summer period (April-September) between the hours 1000-1800GMT are plotted in Figures 24-27b and show that the sample data can be closely approximated by a symmetric distribution.

If this procedure can be applied to data for other monitoring sites,the local effects could be removed to allow examination of the data for regional patterns.

NITROGEN OXIDES MONITORING

MONITORING METHODS AND DATA STORAGE

Nitrogen oxides monitoring began at Bush in September 1987 where continous NO,NOx and NO_2 measurements are made at 2-3metres. To data no continous NOx data has been recorded at Eskdalemuir although diffusion tubes

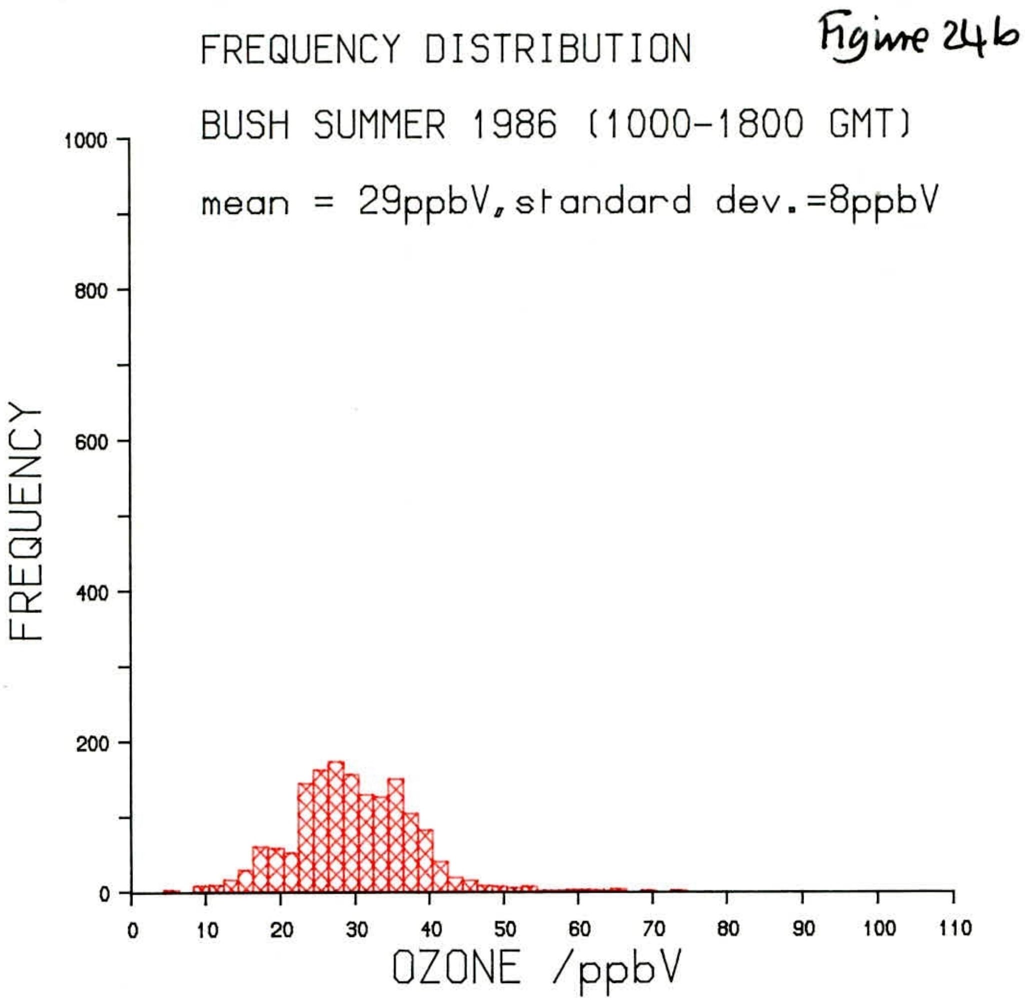


Figure 24b
FREQUENCY DISTRIBUTION
BUSH SUMMER 1986 (1000-1800 GMT)
mean = 29ppbV, standard dev.=8ppbV
FREQUENCY
0
200
400
600
800
1000
0 10 20 30 40 50 60 70 80 90 100 110
OZONE /ppbV

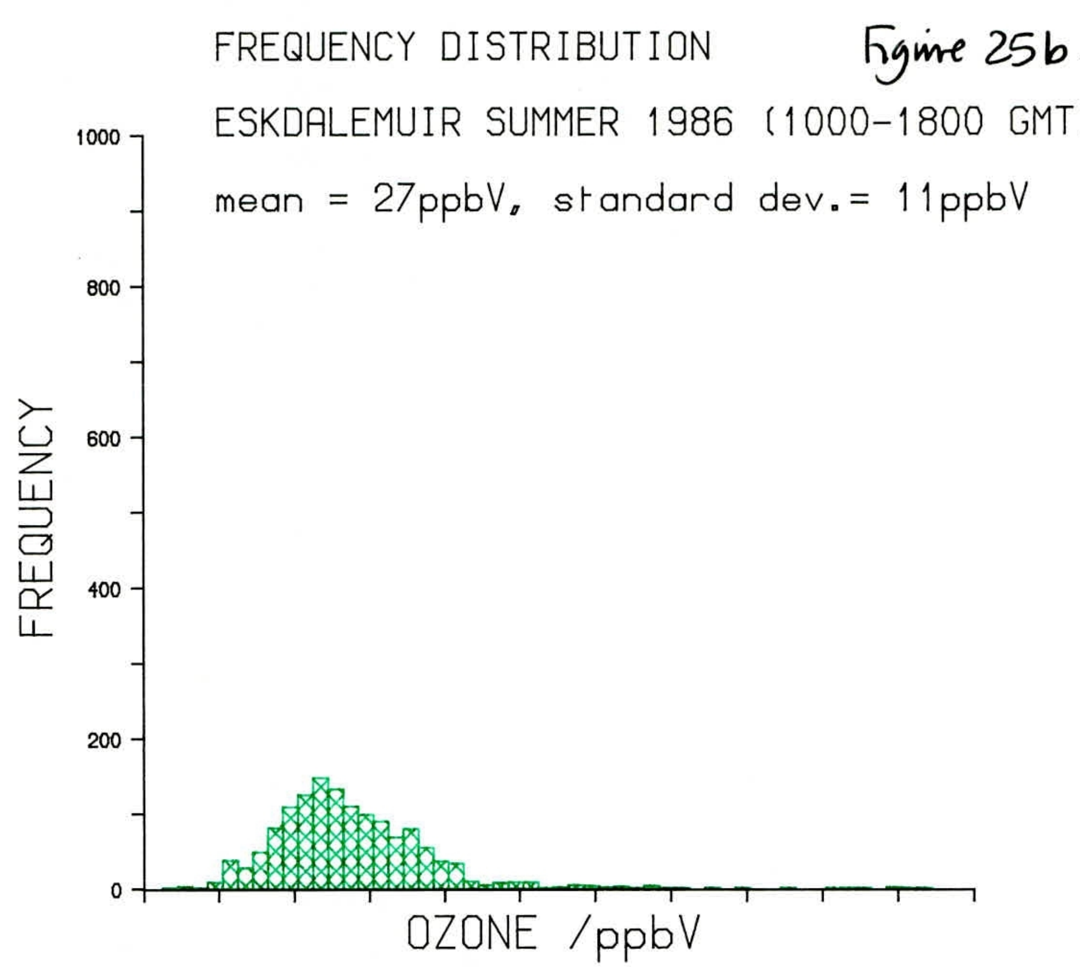


Figure 25b.
FREQUENCY DISTRIBUTION
ESKDALEMUIR SUMMER 1986 (1000-1800 GMT)
mean = 27ppbV, standard dev.= 11ppbV
FREQUENCY
0
200
400
600
800
1000
OZONE /ppbV

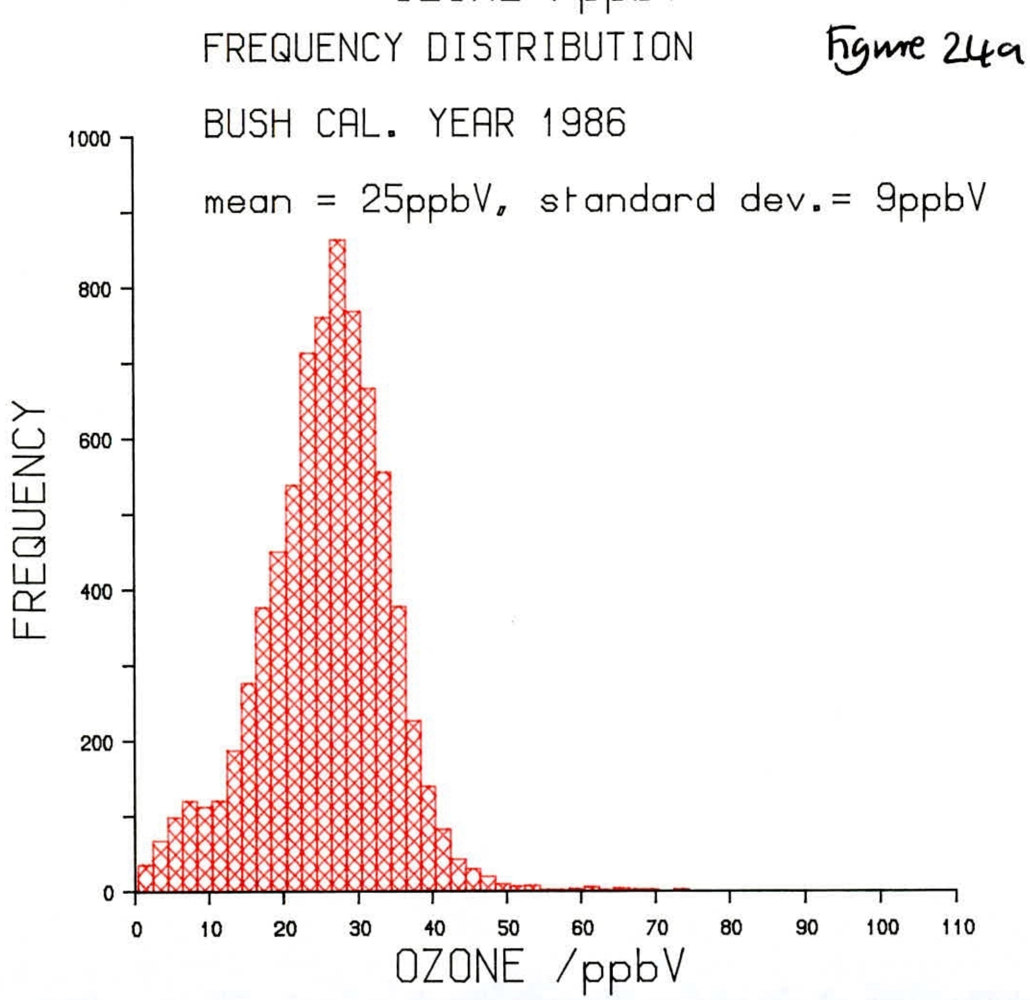


Figure 24a
FREQUENCY DISTRIBUTION
BUSH CAL. YEAR 1986
mean = 25ppbV, standard dev.= 9ppbV
FREQUENCY
0
200
400
600
800
1000
0 10 20 30 40 50 60 70 80 90 100 110
OZONE /ppbV

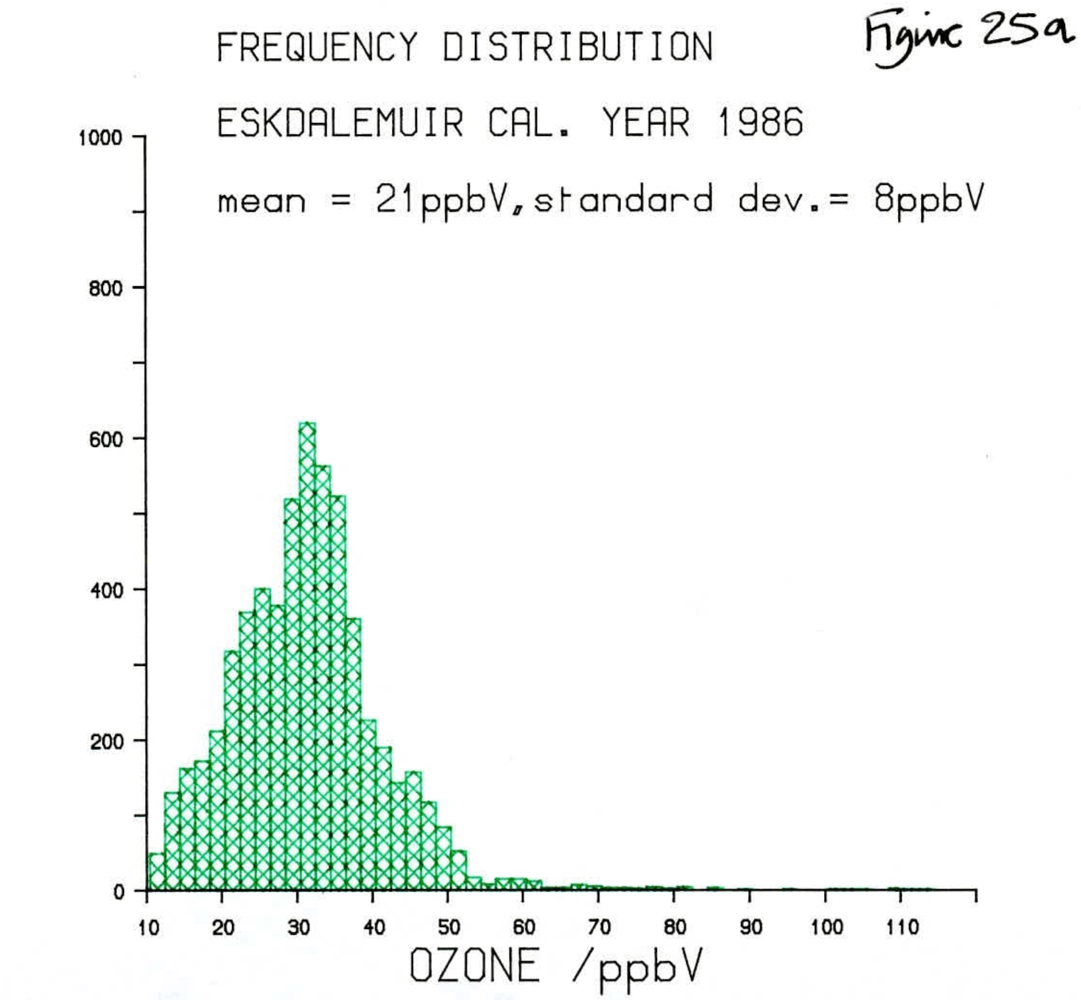


Figure 25a
FREQUENCY DISTRIBUTION
ESKDALEMUIR CAL. YEAR 1986
mean = 21ppbV, standard dev.= 8ppbV
0
200
400
600
800
1000
10 20 30 40 50 60 70 80 90 100 110
OZONE /ppbV

Figure 26b

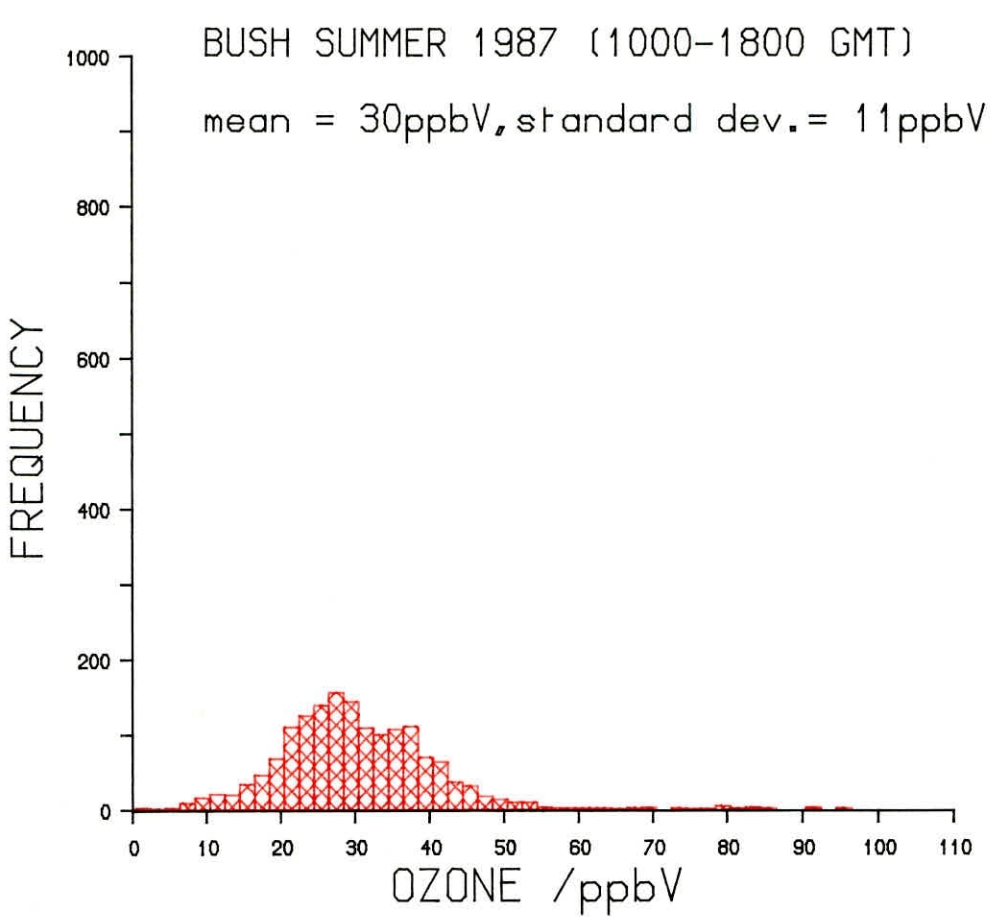


Figure 27b

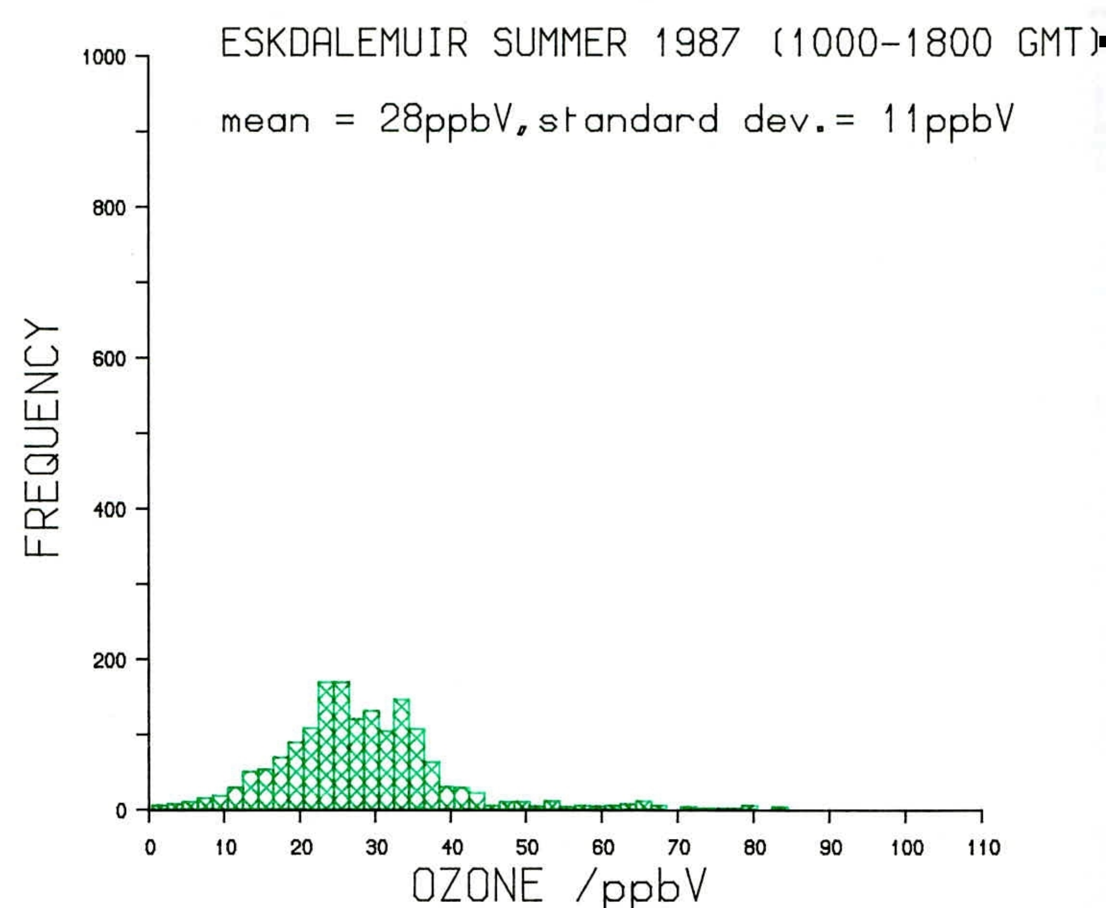


Figure 26a

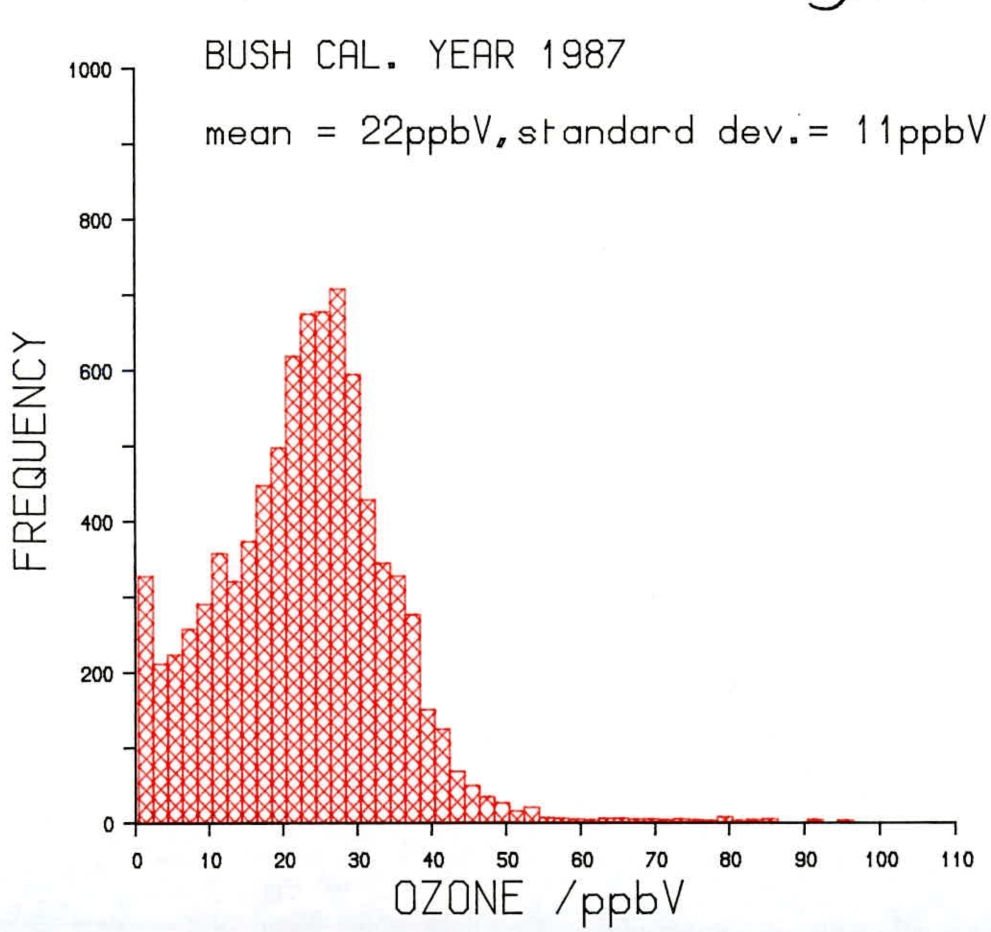
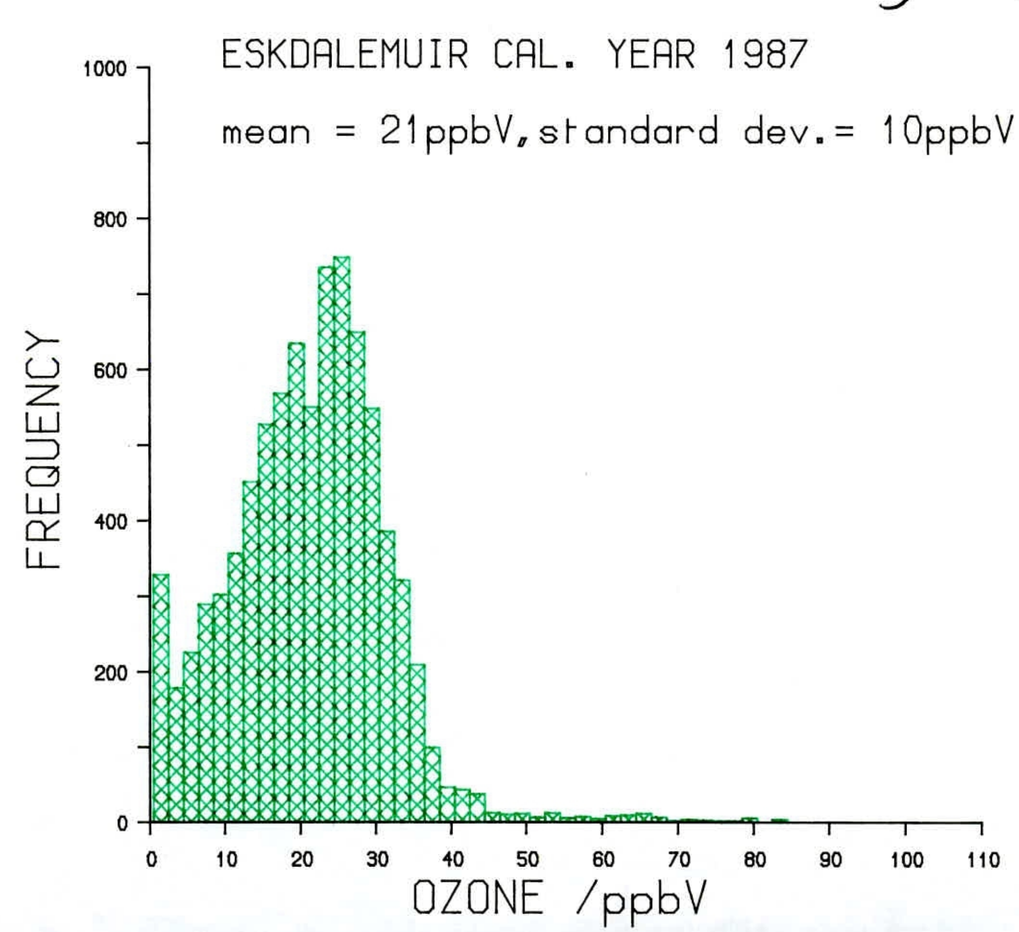


Figure 27a



for NO_2, are operated there by other monitoring groups.

Over the past eight months,two analysers have been running almost continuously at Bush. NO and NOx data from a Monitor Labs analyser,with a response time of 10 seconds and a detection limit of 1ppbV, has been logged at 5 second intervals by a Campbell Scientific data logger and processed in the same way as the ozone data.Using the same data logging facilities,a Scintrex Luminox analyser has measured NO_2 directly. Its response time of 2 seconds is considerably shorter than the Monitor Labs instrument and it can also detect NO_2 concentrations down to approximately 0.1ppbV.

CALIBRATION

The above instruments are calibrated at fortnightly intervals using gas phase titration (GPT) with permeation tubes and NO/NO_2 cylinders as back-up procedures.

Absolute calibration for NO is provided by weight loss of the NO_2permeation tube.

DIFFUSION TUBES

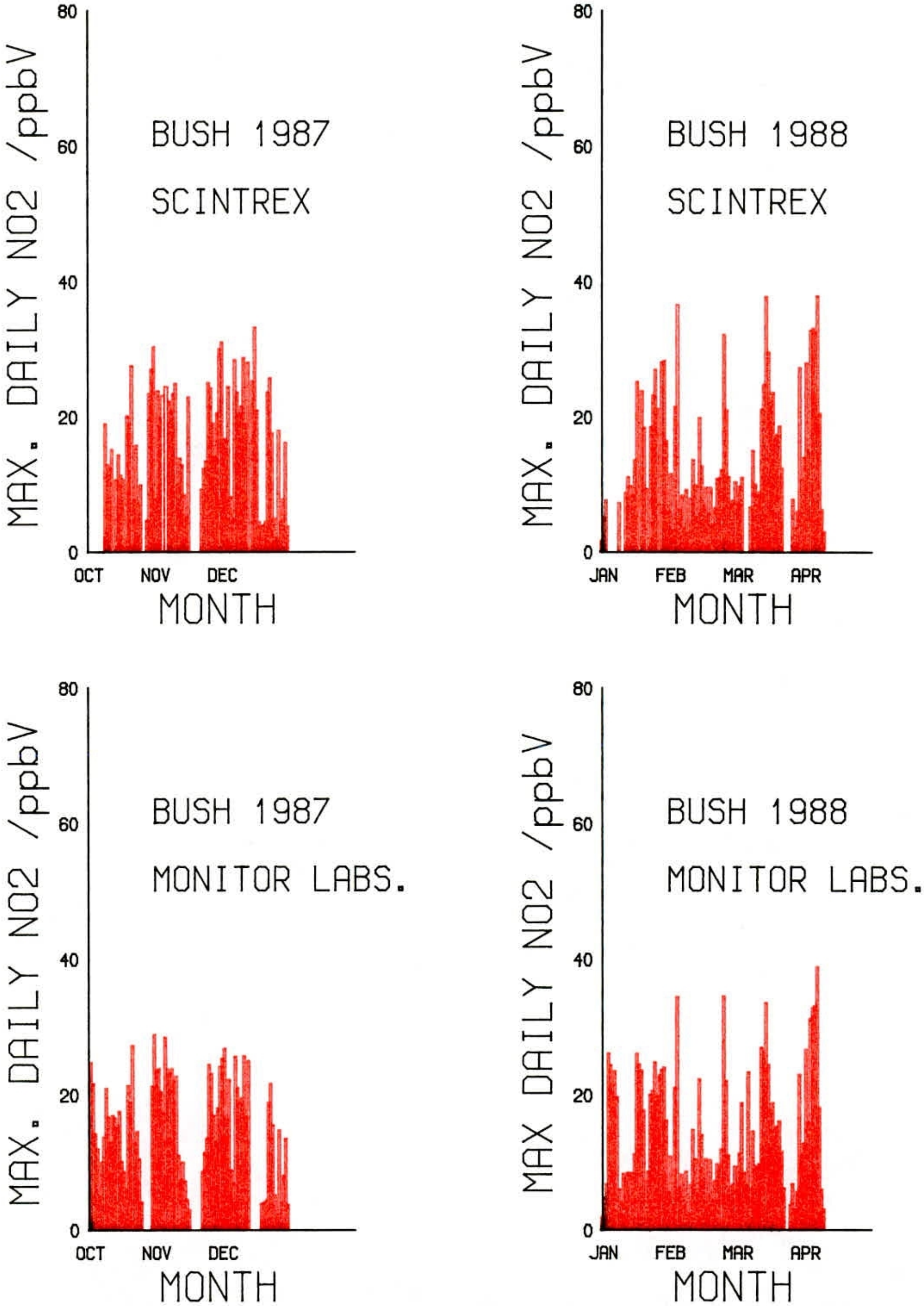
NO_2 diffusion tube analysis has also been carried out at Bush from September-December 1987 using the WSL procedure (Measurements of nitrogen dioxide at rural sites using passive diffusion samplers, A.Goldsmith). Two weekly averaged data was produced.

RESULTS

COMPARISON OF MONITOR LABS AND SCINTREX ANALYSERS

Figure 28 shows the maximum hourly values for each day from October 1987 until April 1988 monitored by the Scintrex and Monitor Labs analysers when both were monitoring continuously.The two analysers are in good agreement.

Figure 28.



MAX. DAILY NO2 /ppbV
BUSH 1987
SCINTREX
MONTH
OCT NOV DEC
BUSH 1988
SCINTREX
JAN FEB MAR APR
BUSH 1987
MONITOR LABS.
BUSH 1988
MONITOR LABS.
MAX DAILY NO2 /ppbV
0 20 40 60 80

In general NOx concentrations at Bush average 2-10ppbV and NO_2 concentrations 5ppbV. Over the period graphed in Figure 28, the NO_2 concentration averaged 6.5ppbV.

CUMULATIVE FREQUENCY DISTRIBUTIONS

Figure 29 shows the cumulative frequency distributions of the hourly data for both analysers for a total of 77 days, from September-November 1987. Figure 30 shows the distribution for 102 days, from January- April 1988. The geometric means and standard deviations are very similiar for both periods. The standard deviations are large due to very small NO_2 concentrations being monitored for the bulk of the periods.

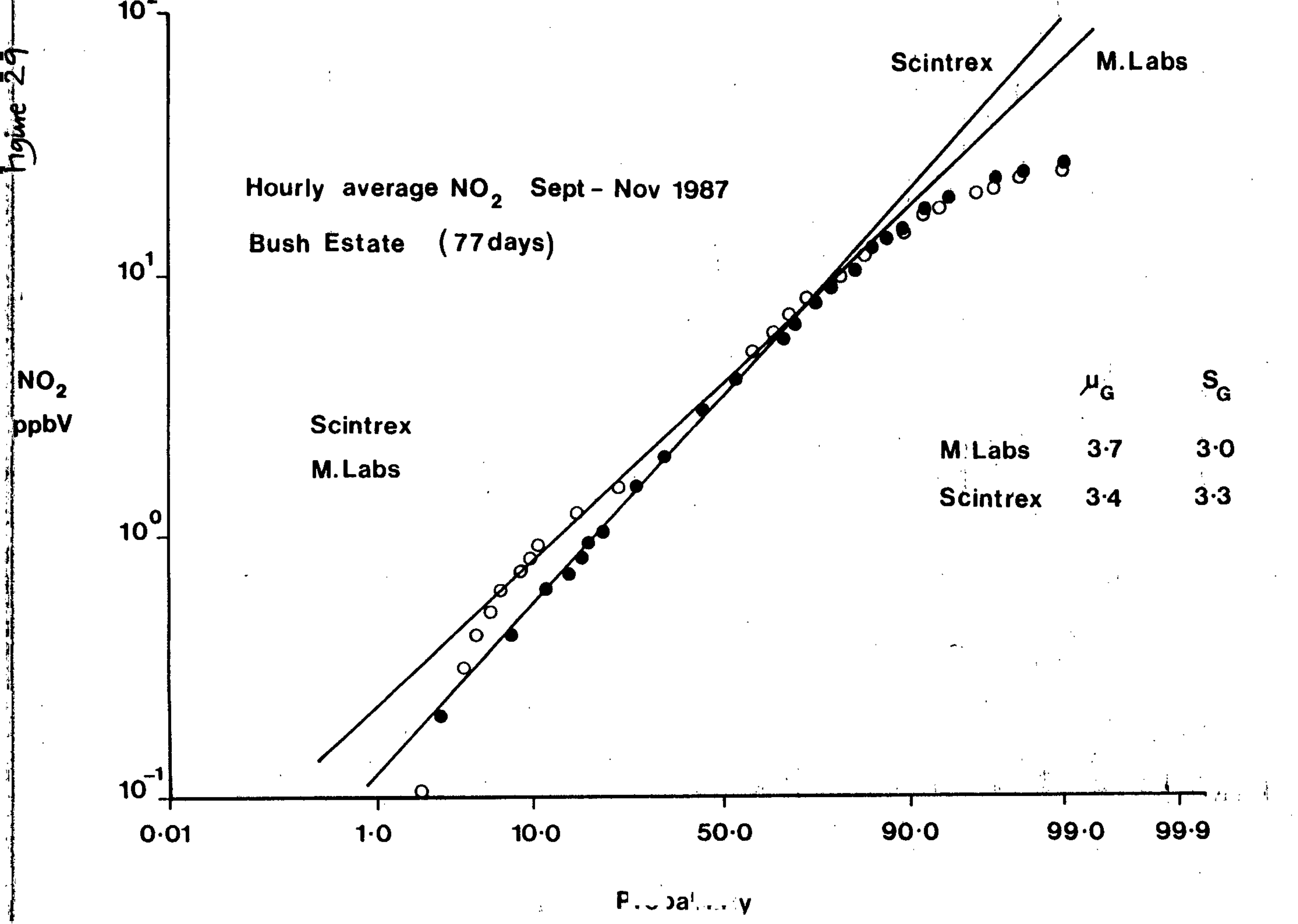
Also observable from the plots is the improved detection limit of the Scintrex analyser compared with that of the Monitor Labs analyser. The plot for the Scintrex in Figure 30 especially does not deviate from log-normality until the NO_2 concentration falls below 0.2ppbV whilst the Monitor Labs imstrument deviates at <1 ppbV.

Although Figures 29 and 30 show that the bulk of the data may be approximated by a log-normal distribution, there are problems with this fit particularly at large concentrations where the log-normal distribution overestimates peak concentrations. If this were generally true then such a fit would provide safe estimates of peak concentrations from a known geometric standard deviation and mean; valuable for effects studies.

If it were known that the geometric standard deviation was fairly constant at rural sites then diffusion tube measurements could be used to obtain the most important properties of NO_2 concentrations.

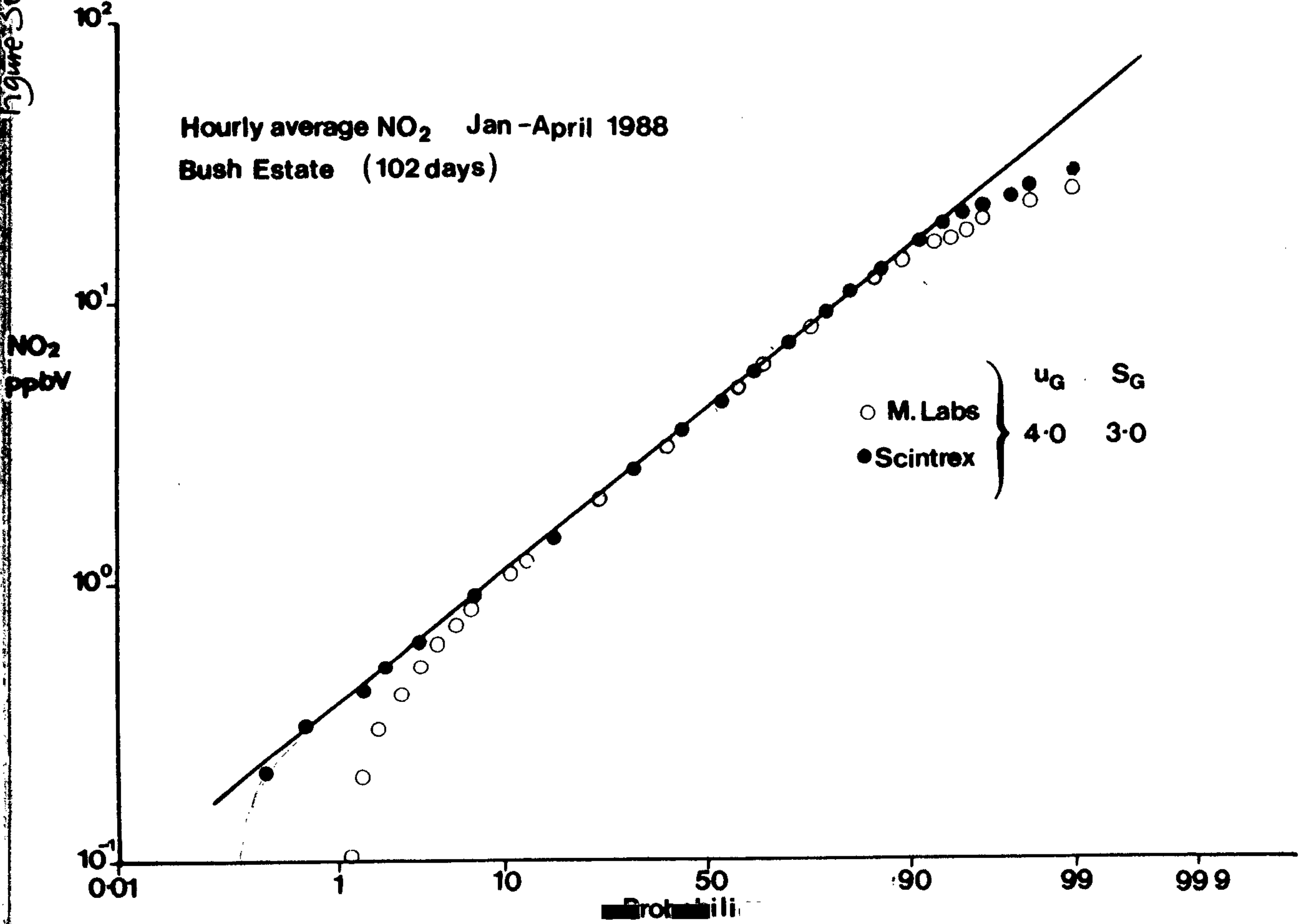
In order to use the diffusion tube data to provide the concentration fields and estimates of peak values, it would be necessary to show that the two

Figure 29



Hourly average NO2 Sept - Nov 1987
Bush Estate (77days)
Scintrex
M.Labs
Scintrex
M.Labs
μG
SG
M.Labs 3·7 3·0
Scintrex 3·4 3·3
NO2
ppbV
10^2
10^1
10^0
10^-1
0·01
1·0
10·0
50·0
90·0
99·0
99·9

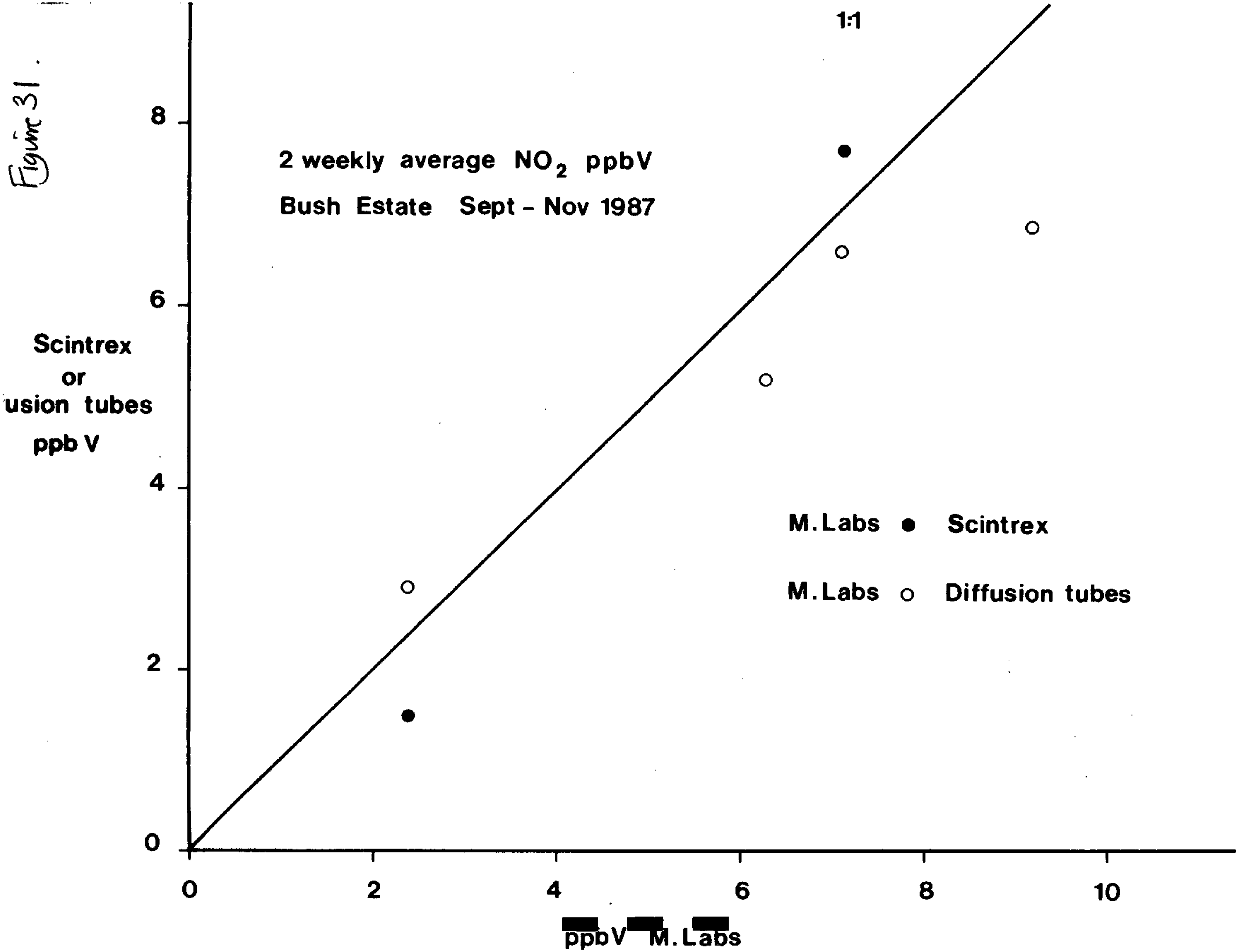
Figure 30



Hourly average NO2 Jan -April 1988
Bush Estate (102 days)
NO2
ppbV
10^2
10^1
10^0
10^-1
0·01
1
10
50
·90
99
99 9
[redacted]rob[redacted]ili
○ M. Labs
● Scintrex
uG
SG
4·0
3·0

weekly averaged diffusion tube data correlated well with that obtained from the continuous monitors.Figure 31 shows this comparison from September-November 1987. A larger diffusion tube data set is required for a definite answer. This should be available later in 1988.

Figure 31.



2 weekly average NO_2 ppbV
Bush Estate Sept - Nov 1987
1:1
Scintrex
or
usion tubes
ppb V
M.Labs ● Scintrex
M.Labs ○ Diffusion tubes
0
2
4
6
8
10
ppbV M.Labs

FILENAME ESD3CYB6.WK1

ESKDALEMUIR HOURLY MEAN OZONE DATA FOR CALENDAR YEAR 1986(remote,rural,269m asl,NT235028,UV absorption)

Table 1

WEEK DAY	JULIAN DAY	DAY	MONTH	HOUR NO.(GMT) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	max hrly daily	max hrly monthly	mean daily	mean monthly
W	1	1	JANUARY																												
Th	2	2	JANUARY																												
F	3	3	JANUARY																												
Sa	4	4	JANUARY																												
Su	5	5	JANUARY																												
M	6	6	JANUARY																												
Tu	7	7	JANUARY																												
W	8	8	JANUARY																												
Th	9	9	JANUARY																												
F	10	10	JANUARY																												
Sa	11	11	JANUARY																												
Su	12	12	JANUARY																												
M	13	13	JANUARY																												
Tu	14	14	JANUARY																												
W	15	15	JANUARY																												
Th	16	16	JANUARY																												
F	17	17	JANUARY																												
Sa	18	18	JANUARY																												
Su	19	19	JANUARY																												
M	20	20	JANUARY																												
Tu	21	21	JANUARY																												
W	22	22	JANUARY																												
Th	23	23	JANUARY																												
F	24	24	JANUARY																												
Sa	25	25	JANUARY																												
Su	26	26	JANUARY																												
M	27	27	JANUARY																												
Tu	28	28	JANUARY																												
W	29	29	JANUARY																												
Th	30	30	JANUARY																												
F	31	31	JANUARY																												
Sa	32	1	FEBRUARY																												
Su	33	2	FEBRUARY																												
M	34	3	FEBRUARY																												
Tu	35	4	FEBRUARY																												
W	36	5	FEBRUARY																												
Th	37	6	FEBRUARY																												
F	38	7	FEBRUARY																												
Sa	39	8	FEBRUARY																												
Su	40	9	FEBRUARY																												
M	41	10	FEBRUARY																												
Tu	42	11	FEBRUARY																												
W	43	12	FEBRUARY																												
Th	44	13	FEBRUARY																												
F	45	14	FEBRUARY																												
Sa	46	15	FEBRUARY																												
Su	47	16	FEBRUARY																												
M	48	17	FEBRUARY																												
Tu	49	18	FEBRUARY																												
W	50	19	FEBRUARY																												
Th	51	20	FEBRUARY																												

F	52	21	FEBRUARY																										
Sa	53	22	FEBRUARY																										
Su	54	23	FEBRUARY																										
M	55	24	FEBRUARY																										
Tu	56	25	FEBRUARY																										
W	57	26	FEBRUARY																										
Th	58	27	FEBRUARY																										
F	59	28	FEBRUARY																										
Sa	60	1	MARCH																										
Su	61	2	MARCH																										
M	62	3	MARCH																										
Tu	63	4	MARCH																										
W	64	5	MARCH																										
Th	65	6	MARCH																										
F	66	7	MARCH																										
Sa	67	8	MARCH																										
Su	68	9	MARCH																										
M	69	10	MARCH																										
Tu	70	11	MARCH																										
W	71	12	MARCH																										
Th	72	13	MARCH																										
F	73	14	MARCH																										
Sa	74	15	MARCH																										
Su	75	16	MARCH																										
M	76	17	MARCH																										
Tu	77	18	MARCH																										
W	78	19	MARCH																										
Th	79	20	MARCH																										
F	80	21	MARCH																										
Sa	81	22	MARCH																										
Su	82	23	MARCH																										
M	83	24	MARCH																										
Tu	84	25	MARCH																										
W	85	26	MARCH																										
Th	86	27	MARCH																										
F	87	28	MARCH																										
Sa	88	29	MARCH																										
Su	89	30	MARCH																										
M	90	31	MARCH																										
Tu	91	1	APRIL																										
W	92	2	APRIL																										
Th	93	3	APRIL																										
F	94	4	APRIL																										
Sa	95	5	APRIL																										
Su	96	6	APRIL																										
M	97	7	APRIL																										
Tu	98	8	APRIL																										
W	99	9	APRIL																										
Th	100	10	APRIL																										
F	101	11	APRIL																										
Sa	102	12	APRIL																										
Su	103	13	APRIL																										
M	104	14	APRIL																										
Tu	105	15	APRIL																										
W	106	16	APRIL																										
Th	107	17	APRIL																										
F	108	18	APRIL																										
Sa	109	19	APRIL																										
Su	110	20	APRIL																										
M	111	21	APRIL																										
Tu	112	22	APRIL																										
W	113	23	APRIL								27	33	35	37	41	44	46	47	49	49	48	45	39	31	30	28	21	49	38
Th	114	24	APRIL	15	12	13	19	21	21	23	24	24	25	29	32	34	36	33	35	37	41	43	40	36	28	20	21	43	28
F	115	25	APRIL	21	31	39	31	31	29	32	35	35	34	38	39	41	47	52	51	44	43	40	28	20	19	17	11	52	34
Sa	116	26	APRIL	11	14	21	23	20	21	28	28	34	34	35	38	38	38	41	44	46	48	47	43	37	29	20	18	48	31
Su	117	27	APRIL	14	12	15	17	14	13	25	31	38	41	44	46	47	49	47	49	49	49	47	40	34	27	31	23	49	33

M	118	28	APRIL	22	31	29	27	30	31	31	33	36	35	36	36	36	35	35	36	38	39	39	37	36	34	33	25	39		33	
Tu	119	29	APRIL	20	28	32	31	33	33	32	36	37	38	40	40	40	41	41	41	42	42	42	39	36	36	36	32	42		36	
W	120	30	APRIL	32	32	31	32	34	36	40																					
Th	121	1	MAY																												
F	122	2	MAY																												
Sa	123	3	MAY																												
Su	124	4	MAY																												
M	125	5	MAY																												
Tu	126	6	MAY																												
W	127	7	MAY									33	32	33	35	39	39	39	37	39	39	40	40	39	38	35	35	40		37	
Th	128	8	MAY	30	38	38	38	38	37	37	31	30	31	32	32	32	36	37	36	36	36	37	37	33	28	23	20	38		33	
F	129	9	MAY	25	32	32	30	28	32	32	32	34	38	40	36	32	29	28	32	34	34	33	34	32	32	30	29	40		32	
Sa	130	10	MAY	28	29	31	33	30	27	26	25	23	23	27	33	34	35	37	38	39	40	39	39	39	38	38	38	40		33	
Su	131	11	MAY	39	39	39	39	39	38	39	40	40	39	39	41	42	43	43	43	42	41	40	34	32	32	34	33	43		39	
M	132	12	MAY	38	40	39	37	34	32	33	32	33	36	37	39	39	40	41	42	41	41	40	40	40	40	39	37	42		38	
Tu	133	13	MAY	36	35	35	35	35	36	36	35	34	34	34	34	33	35	37	38	38	38	37	36	34	28	28	30	38		35	
W	134	14	MAY	29	33	34	38	36	37	37	38	39	37	37	39	39	40	41	42	40	40	39	40	38	34	26	23	42		37	
Th	135	15	MAY	20	12	13	15	13	13	11	19	33	33	33	31	30	31	31	30	30	33	29	31	34	36	35	35	36		26	
F	136	16	MAY	35	35	35	35	34	35	28	27	34	37	37	38	37	38	38	38	38	40	41	38	29	18	11	9	41		33	
Sa	137	17	MAY	9	11	15	17	16	14	14	22	34	36	37	28	28	28	25	21	18	20	22	20	21	30	33	34	37		23	
Su	138	18	MAY	36	37	38	39	39	39	39	38	38	36	34	33	34	35	34	35	37	37	38	36	34	32	31	30	39		36	
M	139	19	MAY	28	25	27	28	28	27	29	30	28	28	31	32	32	32	33	35	37	36	36	36	32	20	10	8	37		29	
Tu	140	20	MAY	12	10	12	21	25	26	24	23	25	32	32	33	37	37	32	29	24	40	47	44	37	38	37	37	47		30	
W	141	21	MAY	37	38	39	39	39	38	38	34	33	35	33	37	38	38	36	40	40	39	35	35	36	38	34	34	40		37	
Th	142	22	MAY	34	33	34	34	35	35	34	29	29	30	31	32	33	34	34	35	34	35	33	31	30	31	30	30	35		32	
F	143	23	MAY	31	30	31	30	30	31	31	32	32	32	32	33	35	35	35	35	35	35	34	33	32	31	29	27	35		32	
Sa	144	24	MAY	27	25	25	24	24	25	25	27	26									33	35	36	35	32	31	30	36		29	
Su	145	25	MAY	30	29	28	26	26	25	26	28	30	30	30	31	35	34	35	35	35	35	36	34	27	26	28	28	36		30	
M	146	26	MAY	28	28	29	29	38	38	36	35	34	36	35	34	35	34	33	33	35	35	34	34	32	31	23	16	38		32	
Tu	147	27	MAY	13	13	24	28	29	28	25	27	29	32	32	31	31	31	33	33	35	36	36	33	33	32	28	25	36		29	
W	148	28	MAY	23	20	19	20	18	19	19	21	22	23	26	27	28	32	32	32	32	32	31	28	26	25	24	20	32		25	
Th	149	29	MAY	22	22	23	25	23	27	27	27	29	29	30	31	32	32	32	33	32	32	31	28	30	29	30	30	33		28	
F	150	30	MAY	29	28	27	24	21	25	17	21	26	27	27	28	31	31	31	31	32	32	31	30	30	30	30	31	32		28	
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Su	152	1	JUNE	15	20	16	13	9	6	8	12	14	22	26	20	19	17	17	20	19	19	19	21	21	23	21	22	26		17	
M	153	2	JUNE	23	22	22	20	17	12	10	17	26	28	31	33	34	35	34	30	29	28	29	29	29	25	23	22	35		25	
Tu	154	3	JUNE	20	19	22	25	23	24	24	26	27	30	27	25	22	23	26	27	28	27	25	25	27	26	23	22	30		25	
W	155	4	JUNE	22	22	22	21	21	23	24	26	27	20	26	26	26	26	27	27	26	28	28	26	24	28	24	20	28		25	
Th	156	5	JUNE	21	19	19	21	24	23	24	27	28	29	29	29	31	32	33	33	33	33	33	29	27	21	19	15	33		26	
F	157	6	JUNE	17	15	17	16	20	20	23	26	26	25	25	25	25	25	27	29	27	29	30	28	26	24	20	8	30		23	
Sa	158	7	JUNE	6	6	4	3	3	2	3	9	28	29	26	25	25	25	25	26	28	29	27	27	25	26	25	25	29		19	
Su	159	8	JUNE	20	24	27	25	27	31	28	27	26	30	33	34	35	36	35	35	34	34	34	34	34	34	33	33	36		31	
M	160	9	JUNE	35	33	31	29	25	21	19	17	15	14	13	13	14	18	23	25	29	30	31	32	31	25	15	11	35		23	
Tu	161	10	JUNE	12	15	17	22	23	22	22	21	22	21	22	25	28	31	32	33	32	31	30	29	26	28	24	23	33		25	
W	162	11	JUNE	25	16	17	17	18	23	24	28	29	31	31	32	35	36	37	37	37	39	37	36	32	22	20	13	39		28	
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F	164	13	JUNE	29	28	28	26	26	26	24	24	22	22	24	22	20	18	18	19	19	19	18	18	17	16	16	17	29		21	
Sa	165	14	JUNE	17	15	15		13	14	14	14	13	14	14	14	16	17	18	18	20	21	21	20	16	9	3	2	21		15	
Su	166	15	JUNE	2	3	2	3	6	8	10	20	28	39	37	35	39	51	61	57	52	52	50	52	49	43	35	35	61		32	
M	167	16	JUNE	32	33	35	38	37	36	37	38	37	40	46	51	55	59	62	66	67	62	61	75	71	47	31	22	75		47	
Tu	168	17	JUNE	17	16	13	12	11	12	26	40	44	45	51	49	42	38	34	31	31	32	31	35	28	37	33	31	51		31	
W	169	18	JUNE	35	25	25	21	21	22	17		17	18	18	18	19	22	26	27	28	29	31	29	27	26	18		35		24	
Th	170	19	JUNE	4	5	4	11	11	14	13		25	27	30	30	31	30	35	37	39	37	37	36	35	31	29	30	39		25	
F	171	20	JUNE	30	32		33	34	34	28		32	32	31	33	33	33	31	29	29	29	29	30	30	29	30	32	34		31	
Sa	172	21	JUNE	32	33	33	34	32	30	24			25	25	27	30	29	28	29	29	31	30	29	28	27	28	28	34		29	
Su	173	22	JUNE	29	28	27	29	30	29	25		32	30	31	30	32	32	31	31	32	34	31	25	24	25	25	23	34		29	
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F	178	27	JUNE	30	24	33	40	40	41	37		41	51	56	58	59		63	68	71	75	72	72	69	64	51	47	75		53	
Sa	179	28	JUNE	35	33	24	29	28	30	38	47	60	78	86	91	94	98	104	101	99	94	74	58	49	35	28	26	104		60	
Su	180	29	JUNE	24	23	28	28	22	21	24	31	39	42	42	43	41	40	40	49	61	60	55	50	43	49	49	44	61		39	
M	181	30	JUNE	45	41	41	39	34	38	34	34	33	41	41	35	34	34	41	57	56	59	52	44	42	37	33	38	59	104	41	30
Tu	182	1	JULY	35	36	34	31	25	20	24	24	25	25	26	27	28	31	30	31	31	29	30	27	25	14	12	9	36		26	
W	183	2	JULY	6	7	5	5	4	4	16	19	24	30	33	36	38	38	38	35	29	28	25	25	23	18	16	17	38		22	

Th	184	3	JULY	18	17	19	18	21	18	16	14	14	16	19	18	14	16	18	16	19	18	18	18	17	15	14	15 :	21	:	17	
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Sa	186	5	JULY	7	8	12	11	10	8	10	10	10	10	11	11	12	11	10	10	10	11	10	10	7	7	4	3 :	12	:	9	
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Th	191	10	JULY	9	8	9	12	10	9	10	11	12	15	23	29	22	23	24	23	23	22	21	20	17	13	8	5 :	29	:	16	
F	192	11	JULY	3	3	2	2	4	5	15	18	20	20	25	26	30	32	33	34	34	27	27	26	22	19	16	17 :	34	:	19	
Sa	193	12	JULY	17	14	11	11	11	12	13	13	15	21	23	25	25	27	30	32	32	32	29	24	20	20	17	12 :	32	:	20	
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M	251	8	SEPTEMBER	20	20	16	17	14	16	16	18	23	24	26	26	27	27	24	22	22	22	15	10	9	7	6	5	27		18	
Tu	252	9	SEPTEMBER	9	6	3	2	3	2	2	2	7	15	20	22	27	27	29	30	28	24	21	21	21	22	21	18	30		16	
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Su	257	14	SEPTEMBER	10	8	15	17	17	17	15	18	21	23	24	25	26	29	30	29	27	24	17	18	13	8	7	7	30		19	
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Sa	263	20	SEPTEMBER	15	15	12	15	12	12	15	15	15	17	17	17	23	22	24	21	20	22	20	20	20	20	20	22	24		18	
Su	264	21	SEPTEMBER	20	20	21	22	20	21	20	20	19	21	22	25	23	21	19	21	20	18	17	16	16	18	18	18	25		20	
M	265	22	SEPTEMBER	16	16	16	18	20	20	19	21	17	17	20	23	24	24	27	29	30	30	29	27	27	27	30	23	30		23	
Tu	266	23	SEPTEMBER	24	23	22	21	24	24	21	22	22	22	24	25	25	26	28	27	27	26	23	21	20	17	14	11	28		22	
W	267	24	SEPTEMBER	8	12	11	13	12	9	7	11	14	16	17	20	25	24	26	27	27	19	10	5	4	3	3	2	27		13	
Th	268	25	SEPTEMBER	1	2	1	1	1	1	1	2	6	14	19	25	25	28	29	29	28	18	13	9	4	3	2	3	29		11	
F	269	26	SEPTEMBER	5	4	5	4	2	2	2	2	3	4	6	10	21	23	21	17	9	10	11	11	11	11	9	6	23		9	
Sa	270	27	SEPTEMBER	4	4	3	3	2	2	1	5	9	11	12	13	17	19	22	24	23	22	20	17	17	18	18	17	24		13	
Su	271	28	SEPTEMBER	17	15	15	14	14	13	13	12	12	12	12	11	10	11	13	13	12	13	12	12	13	14	15	13	17		13	
M	272	29	SEPTEMBER	12	11	10	10	10	10	10	10	10	10	10	10	11	11	12	16	18	17	17	16	14	14	14	16	18		12	
Tu	273	30	SEPTEMBER	16	16	15	17	17	18	16	15	15	15	16	16	16	16	15	15	16	15	15	14	12	13	18	18	18	38	16	16
W	274	1	OCTOBER	16	14	14	15	21	20	19	24	25	24	22	23	25	25	24	26	26	24	26	27	26	22	22	20	27		22	
Th	275	2	OCTOBER	17	21	21	19	16	16	16	15	15	18	18	21	24	27	29	28	26	22	12	10	5	4	5	5	29		17	
F	276	3	OCTOBER	6	3	3	3	4	3	4	4	12	22	27	29	29	27	25	25	20	14	9	5	6	7	5	4	29		12	
Sa	277	4	OCTOBER	6	7	6	7	7	8	7	7	11	17	24	29	32	34	34	29	23	15	7	5	5	4	4	4	34		14	
Su	278	5	OCTOBER	5	7	7	9	9	8	7	10	12	15	16	22	31	30	28	24	23	22	20	20	18	17	17	20	31		16	
M	279	6	OCTOBER	22	25	26	21	20	24	23	22	22	18	16	15	16	18	21	25	23	23	24	19	16	15	16	18	26		20	
Tu	280	7	OCTOBER	17	18	19	19	20	20	20	20	23	26	27	27	30	30	29	31	29	27	27	25	22	22	17	12	31		23	
W	281	8	OCTOBER	7	5	5	4	4	3	2	4	4	6	8	12	12	10	13	22	27	26	26	24	25	25	29	31	31		14	
Th	282	9	OCTOBER	30	31	32	32	32	30	28	26	26	26	25	23	23	22	23	21	18	18	19	18	20	19	18	18	32		24	
F	283	10	OCTOBER	20	21	20	18	15	14	13	18	16	17	19	21	25	25	27	28	27	23	20	12	12	7	7	9	28		18	
Sa	284	11	OCTOBER	7	9	6	9	7	7	11	7	12	13	16	23	24	25	28	28	26	20	19	14	9	7	5	9	28		14	
Su	285	12	OCTOBER	12	14	14	15	14	14	12	8	11	15	21	26	31	34	35	34	32	31	25	18	14	14	10	6	35		19	
M	286	13	OCTOBER	5	3	2	3	2	1	1	1	3	8	21	29	33	34	34	32	25	21	16	9	8	10	15	19	34		14	
Tu	287	14	OCTOBER	22	27	27	27	24	24	24	21	21	24	23	24	26	22	25	26	23	18	12	13	9	8	11	9	27		20.	
W	288	15	OCTOBER	7	4	4	4	5	4	3	3	3	7	14	25	21	22	23	22	19	17	15	11	11	8	7	8	25		11	
Th	289	16	OCTOBER	7	10	10	14	16	15	14	13	9	11	14	15	17	19	22	25	22	13	9	6	4	3	2	2	25		12	
F	290	17	OCTOBER	2	3	5	4	4	13	14	14	14	16	17	18	23	22	21	22	20	15	14	13	9	6	6	7	23		13	
Sa	291	18	OCTOBER	9	12	13	12	14	16	14	16	15	15	20	20	22	22	23	21	22	23	23	25	23	24	26	22	26		19	
Su	292	19	OCTOBER	26	24	23	25	24	24	23	22	23	23	23	26	25	24	26	26	27	26	26	24	24	23	20	19	27		24	
M	293	20	OCTOBER	20	19	18	17	15	11	9	9	12	17	18	20	24	27	25	26	25	24	26	24	23	22	24	22	27		20	
Tu	294	21	OCTOBER	24	22	20	23	21	22	21	21	20	20	20	21	21	20	20	19	19	20	20	20	19	20	14	17	24		20	
W	295	22	OCTOBER	18	21	24	26	26	26	24	24	24	21	23	26	24	24	25	25	26	25	24	22	22	19	20	23	26		23	
Th	296	23	OCTOBER	23	23	24	26	26	26	27	26	25	26	26	25	26	27	26	26	24	22	15	13	13	13	13	14	27		22	
F	297	24	OCTOBER	16	16	17	17	20	21	21	22	22	19	18	19	15	15	13	14	13	14	18	25	25	26	27	27	27		19	
Sa	298	25	OCTOBER	27	27	28	26	25	24	24	23	27	22	22	21	21	22	25	28	27	28	29	31	29	28	28	29	31		26	
Su	299	26	OCTOBER	28	28	28	27	26	26	26	25	24	25	24	25	23	25	22	19	18	17	19	19	21	23	23	23	28		23	
M	300	27	OCTOBER	22	22	22	23	22	22	22	22	21	20	20	18	15	13	12	13	14	13	12	12	13	13	13	12	23		17	
Tu	301	28	OCTOBER	15	19	16	12	12	11	12	14	13	15	22	20	22	29	28	28	24	27	31	29	28	25	25	25	31		21	
W	302	29	OCTOBER	21	21	21	21	22	22	24	24	25	25	26	27	27	26	25	25	23	22	21	21	20	20	22	24	27		23	
Th	303	30	OCTOBER	26	27	27	26	26	26	28	29	28	26	25	25	24	25	26	27	25	27	27	26	25	25	25	26	29		26	
F	304	31	OCTOBER	25	24	24	24	24	20	20	20	15	19	21	23	24	25	26	21	12	7	7	5	10	11	16	14	26	35	18	19
Sa	305	1	NOVEMBER	15	19	21	22	21	22	22	23	22	22	23	24	25	25	25	25	24	22	20	21	20	19	19	20	25		22	
Su	306	2	NOVEMBER	21	20	17	14	10	11	8	7	7	8	14	22	26	23	22	23	21	22	23	21	21	22	22	21	26		18	
M	307	3	NOVEMBER	21	20	20	20	25	26	24	22	19	22	21	23	25	25	24	23	21	19	20	19	17	19	19	13	26		21	
Tu	308	4	NOVEMBER	21	20	19	14	14	14	14	12	11	13	12	14	16	17	15	16	18	20	18	20	21	22	23	24	24		17	
W	309	5	NOVEMBER	24	23	24	24	24	24	24	24	24	23	23	22	29	30	28	29	29	29	29	29	28	27	27	27	30		26	
Th	310	6	NOVEMBER	22	25	24	24	25	24	18	15	16	19	18	19	19	21	21	23	23	21	22	23	25	25	25	26	26		22	
F	311	7	NOVEMBER	27	25	25	24	22	20	19	19	19	18	18	17	18	19	19	19	20	21	27	28	26	26	27	26	28		22	

Sa	312	8	NOVEMBER	27	25	26	27	25	26	25	23	24	22	24	25	25	25	25	24	23	25	26	26	27	25	24	25	:	27	:	25	
Su	313	9	NOVEMBER	24	25	26	26	27	28	29	27	26	25	25	25	25	25	25	25	25	26	26	26	28	27	28	28	:	29	:	26	
M	314	10	NOVEMBER	28	28	29	28	27	26	26	27	26	25	24	24	23	23	23	23	22	21	21	21	21	21	21	19	:	29	:	24	
Tu	315	11	NOVEMBER	18	19	16	18	15	16	14	13	11	11	19	19	19	19	20	22	22	19	16	20	18	17	15	12	:	22	:	17	
W	316	12	NOVEMBER	11	8	5	4	5	4	7	7	6	7	10	12	15	15	13	14	15	14	11	10	10	9	10	12	:	15	:	10	
Th	317	13	NOVEMBER	15	13	12	11	10	11	13	12	9	10	11	13	13	14	13	13	13	12	12	13	13	12	8	6	:	15	:	12	
F	318	14	NOVEMBER	5	4	4	5	5	7	9	10	8	9	11				10	6	6	5	4	5	9	15	15	14	:	15	:	8	
Sa	319	15	NOVEMBER	14	14	14	13	12	11	11	11	13	12	11	12	12	13	13	13	13	13	14	13	14	15	15	15	:	15	:	13	
Su	320	16	NOVEMBER	15	16	16	16	16	16	16	15	16	15	16	16	16	16	16	16	16	15	14	11	9	7	9	12	:	16	:	14	
M	321	17	NOVEMBER	9	7	8	8	7	7	6	8	11	9	9	12	13	13	13	13	14	13	13	12	12	13	14	12	:	14	:	11	
Tu	322	18	NOVEMBER	10	10	12	15	15	13	12	11	12	11	13	13	14	16	14	13	14	12	11	14	14	13	12	11	:	16	:	13	
W	323	19	NOVEMBER	10	9	9	9	10	10	8	7	7	6	6	7	7	9	9	8	8	5	4	4	5	5	7	7	:	10	:	7	
Th	324	20	NOVEMBER	9	12	13	12	16	14	15	14	15	15	14	13	14	15	13	12	11	9	5	5	5	4	4	5	:	16	:	11	
F	325	21	NOVEMBER	7	8	8	9	9	7	6	5	7	6	6	8	11	12	11	10	9	8	12	12	12	11	12	9	:	12	:	9	
Sa	326	22	NOVEMBER	7	4	5	14	16	15	15	15	16	15	15	15	16	16	15	16	16	16	16	15	15	16	15	15	:	16	:	14	
Su	327	23	NOVEMBER	15	15	15	14	13	13	13	12	13	12	12	12	13	13	13	15	14	14	14	13	13	13	13	13	:	15	:	13	
M	328	24	NOVEMBER	14	14	18	17	14	13	13	13	13	12	12	12	12	12	11	12	12	11	11	11	12	12	12	12	:	18	:	13	
Tu	329	25	NOVEMBER	11	12	13	13	14	14	14	14	17	15	14	13	14	14	14	14	13	13	12	13	12	9	10	9	:	17	:	13	
W	330	26	NOVEMBER	8	7	13	13	14	13	13	12	14	13	13	14	13	14	15	16	15	14	14	14	12	12	10	10	:	16	:	13	
Th	331	27	NOVEMBER	10	9	10	10	12	12	12	12	16	21	21	22	22	21	22	22	22	22	22	22	22	21	22	22	:	22	:	18	
F	332	28	NOVEMBER	22	22	22	22	22	22	23	23	23	24	24	25	25	25	25	24	24	24	24	24	24	23	23	22	:	25	:	23	
Sa	333	29	NOVEMBER	22	22	21	20	19	17	18	17	17	17	17	17	18	18	19	20	20	22	22	22	22	22	22	21	:	22	:	20	
Su	334	30	NOVEMBER	21	22	22	21	21	22	22	21	22	22	21	22	21	21	21	21	20	20	17	17	17	18	19	19	:	22	30 :	20	16
M	335	1	DECEMBER	22	22	22	23	23	23	24	23	23	22	22	27	25	23	24	25	25	24	24	23	23	24	23	18	:	27	:	23	
Tu	336	2	DECEMBER	15	14	13	13	13	14	14	16	17	15	15	17	20	21	20	20	20	20	20	20	20	21	21	22	:	22	:	18	
W	337	3	DECEMBER	22	22	23	23	23	23	24	23	23	23	23	24	24	23	25	24	23	23	23	21	21	21	21	21	:	25	:	23	
Th	338	4	DECEMBER	20	20	23	21	21	21	21	21	21	21	21	21	20	19	19	22	21	19	18	20	19	16	20	21	:	23	:	20	
F	339	5	DECEMBER	21	22	22	22	22	22	22	22	22	24	27	26	25	25	23	21	24	23	25	25	24	24	23	23	:	27	:	23	
Sa	340	6	DECEMBER	21	23	20	18	16	14	16	17	16	15	14	15	15	18	18	18	20	19	17	19	19	15	13	14	:	23	:	17	
Su	341	7	DECEMBER	13	13	13	14	15	17	17	17	18	17	18	18	18	17	17	15	14	14	19	22	20	21	21	20	:	22	:	17	
M	342	8	DECEMBER	18	17	16	13	11	11	12	16	15	16	20	20	20	16	13	13	11	11	11	11	9	11	12	11	:	20	:	14	
Tu	343	9	DECEMBER	11	12	12	12	15	16	18	20	20	20	20	20	20	19	19	17	16	14	15	17	13	12	13	13	:	20	:	16	
W	344	10	DECEMBER	11	10	12	10	10	9	8	7	8	8	10	11	13	13	16	11	10	6	6	7	7	8	7	9	:	16	:	9	
Th	345	11	DECEMBER	10	10	11	13	13	15	16	17	16	14	17	21	23	24	23	22	22	23	16	14	14	18	21	21	:	24	:	17	
F	346	12	DECEMBER	19	18	18	18	19	14	13	12	11	12	14	14	15		16	11	28	13	15	13	17	17	18	18	:	28	:	16	
Sa	347	13	DECEMBER	19	18	18	17	23	26	27	26	22	19	19	22	22	22	24	23	25	23	23	23	23	25	21	20	:	27	:	22	
Su	348	14	DECEMBER	18	15	14	14	11	10	8	8	8	9	10	11	11	11	11	11	10	11	12	10	11	11	11	13	:	18	:	11	
M	349	15	DECEMBER	13	16	13	16	18	18	20	20	20	18	23	25	23	23	22	23	21	19	15	15	13	11	10	18	:	25	:	18	
Tu	350	16	DECEMBER	22	27	27	26	27	28	24	23	20	19	20	19	20	20	20	21	21	19	19	19	19	20	20	21	:	28	:	22	
W	351	17	DECEMBER	23	24	22	22	21	23	24	25	25	24	24	21	20	18	22	23	25	26	27	28	28	26	24	28	:	28	:	24	
Th	352	18	DECEMBER	28	27	27	27	27	27	27	26	24	23	22	23	22	21	21	21	21	20	22	12	22	24	24	25	:	28	:	23	
F	353	19	DECEMBER	26	26	26	27	26	26	27	27	26	25	23	22	24	22	21	23	25	25	25	24	22	23	22	22	:	27	:	24	
Sa	354	20	DECEMBER	22	26	26	25	24	24	23	23	24	25	25	26	26	26	25	26	24	24	24	23	23	23	22	23	:	26	:	24	
Su	355	21	DECEMBER	23	23	22	21	20	20	19	16	17	17	18	19	19	17	20	21	20	19	20	20	18	19	18	20	:	23	:	19	
M	356	22	DECEMBER	20	20	20	20	20	19	17	18	19	21	20	19	19	19	17	17	16	15	16	15	14	15	11	14	:	21	:	18	
Tu	357	23	DECEMBER	16	21	23	23	23	23	24	23	23	23	23	23	26	26	25	25	24	24	24	24	22	16	15	13	:	26	:	22	
W	358	24	DECEMBER	13	12	11	10	10	11	11	12	12	13	13	12	14	15	15	16	17	20	22	23	23	22	23	24	:	24	:	16	
Th	359	25	DECEMBER	24	22	20	19	19	25	25	24	24	23	20	20	23	26	25	25	24	21	19	15	13	13	14	16	:	26	:	21	
F	360	26	DECEMBER	22	20	21	19	19	21	18	19	18	20	21	21	22	24	25	25	27	27	26	26	26	26	25	25	:	27	:	23	
Sa	361	27	DECEMBER	25	23	23	23	22	22	22	20	23	25	24	26	26	26	26	26	26	26	26	26	27	27	27	27	:	27	:	25	
Su	362	28	DECEMBER	27	26	27	27	25	23	22	22	21	20	20	20	22	24	26	27	25	24	25	24	24	25	26	25	:	27	:	24	
M	363	29	DECEMBER	25	25	25	26	26	26	25	25	25	25	24	22	22	19	21	23	25	24	24	24	25	24	22	20	:	26	:	24	
Tu	364	30	DECEMBER	21	19	19	19	18	18	19	19	19	20	20	19	18	17	16	15	15	21	25	25	24	25	25	25	:	25	:	20	
W	365	31	DECEMBER	24	24	25	21	19	20	21	19	20	20	20	21	21	20	20	20	20	20	19	18	17	16	17	17	:	25	28 :	20	20

diurnal data

cy 1986	17	17	17	17	17	17	18	18	20	22	23	24	25	25	26	26	26	25	24	22	21	20	18	18	:sum max= 104 :sum mean= 24
sum 1986	17	17	17	17	17	17	18	19	22	24	25	26	27	28	29	29	29	28	27	25	23	21	19	18	:cy max= 104 :cy mean= 22

data capture .

monthly hourly values %

January	0	0
February	0	0
March	0	0
April	168	23
May	584	78
June	705	98
July	739	99
August	743	100
September	720	100
October	744	100
November	717	99
December	743	100

summer data capture
hourly values 3659 83.3

calendar year data capture
hourly values 5863 66.9

date(hours)or = 60,80,100,120)max value(hour of day)

15	JUNE	(1, 0, 0, 0)	61(15)
16	JUNE	(7, 0, 0, 0)	75(20)
26	JUNE	(3, 0, 0, 0)	69(16)
27	JUNE	(8, 0, 0, 0)	75(18)
28	JUNE	(11, 8, 2, 0)	104(15)
29	JUNE	(2, 0, 0, 0)	61(17)

numbers in the right hand columns below,represent the frequency of values (or = to
the adjacent value in the left hand columns,but) than the preceding value in those columns.

cy		sum	
freq dist		freq dist	
5	269	5	203
10	456	10	267
15	893	15	442
20	1094	20	653
25	1460	25	732
30	833	30	528
35	430	35	406
40	261	40	261
45	74	45	74
50	33	50	33
55	17	55	17
60	13	60	13
65	8	65	8
70	6	70	6
75	5	75	5
80	3	80	3
85	0	85	0
90	1	90	1
95	3	95	3
100	2	100	2
105	2	105	2
110	0	110	0
115	0	115	0
120	0	120	0
125	0	125	0
130	0	130	0
135	0	135	0
140	0	140	0
145	0	145	0
150	0	150	0
155	0	155	0
160	0	160	0

FILENAME ES03CY87.WK1

ESKDALEMUIR HOURLY MEAN OZONE DATA FOR CALENDAR YEAR 1987(remote,rural,269m asl,NT235028,UV absorption)

Table 2

WEEK DAY	JULIAN DAY	DAY	MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	max hrly daily	max hrly monthly	mean daily	mean monthly
				HOUR NO.(GMT)																											
Th	1	1	JANUARY	17	16	17	15	15	16	16	17	18	20	20	20	19	19	20	15	14	15	15	13	13	13	13	12	20		16	
F	2	2	JANUARY	12	12	13	13	13	12	14	15	16	18	18	18	19	20	19	19	18	17	17	18	17	17	17	12	20		16	
Sa	3	3	JANUARY	15	16	16	14	14	13	12	13	12	11	9	10	10	11	13	12	13	12	10	9	10	12	14	17	17		12	
Su	4	4	JANUARY	14	14	15	16	18	20	20	22	22	22	21	20	22	25	28	26	26	27	27	27	27	27	27	15	28		22	
M	5	5	JANUARY	25	26	26	27	26	26	27	27	26	26	26	25	24	25	25	25	24	23	24	23	23	23	23	26	27		25	
Tu	6	6	JANUARY	24	25	24	23	23	23	23	23	23	22	22	20	21	20	20	18	18	18	19	19	18	18	18	23	25		21	
W	7	7	JANUARY	17	17	17	18	18	18	18	18	19	17	17	16	21	23	24	22	19	19	17	16	14	13	15	17	24		18	
Th	8	8	JANUARY	12	11	11	11	9	9	10	10	8	9	9	10	10	9	9	9	9	8	8	6	9	8	8	13	13		9	
F	9	9	JANUARY	9	10	8	9	9	9	9	9	10	9	11	13	13	12	12	11	9	8	8	4	2	1	1	8	13		9	
Sa	10	10	JANUARY	1	1	0	0	1	2	4	12	15	16	17	16	18	20	20	20	19	19	20	19	19	18	19	1	20		12	
Su	11	11	JANUARY	17	19	19	22	23	24	21	19	18	17	18	20	19	20	22	21	20	19	18	21	19	19	21	20	24		20	
M	12	12	JANUARY	22	23	23	23	23	23	13											30	30	31	30	30	30	22				
Tu	13	13	JANUARY	28	29	29	29	28	29	30	31	31	31	32	32	32	33	33	33	32	32	31	30	30	31	30	29	33		31	
W	14	14	JANUARY	30	30	29	29	29	29	28	26	24	23	23	22	22	21	28	19	21	20	20	21	20	21	21	30	30		24	
Th	15	15	JANUARY																												
F	16	16	JANUARY																												
Sa	17	17	JANUARY																												
Su	18	18	JANUARY																												
M	19	19	JANUARY																												
Tu	20	20	JANUARY																												
W	21	21	JANUARY																												
Th	22	22	JANUARY																												
F	23	23	JANUARY																												
Sa	24	24	JANUARY																												
Su	25	25	JANUARY																												
M	26	26	JANUARY																												
Tu	27	27	JANUARY																												
W	28	28	JANUARY													16	24	18	15	12	8	3	1	1	3	4	6				
Th	29	29	JANUARY	11	11	12	11	8	5	5	7	7	5	7	13	19	19	15	14	14	15	15	15	13	10	10	8	19		11	
F	30	30	JANUARY	5	4	4	2	0	0	0	0	1	1	2	5	8	9	7	6	3	2	3	8	7	6	6	5	9		4	
Sa	31	31	JANUARY	6	5	4	3	2	1	1	1	0	2	3	4	4	5	7	5	1	0	0	1	3	6	2	5	7		3	
Su	32	1	FEBRUARY	5	5	4	6	8	7	7	7	8	6	9	13	15	19	22	24	23	21	18	15	11	8	7	7	24		11	
M	33	2	FEBRUARY	8	8	9	8	5	3	3	3	2	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	9		2	
Tu	34	3	FEBRUARY	0	0	0	0	0	0	17	26	26	25	27	28	27	28	28	26	26	22	17	11	11	10	8	7	28		15	
W	35	4	FEBRUARY	7	8	7	6	7	13	14	14	14	17	17	14	13	17	20	21	19	18	22	24	26	26	26	26	26		17	
Th	36	5	FEBRUARY	28	28	28	29	28	29	28	28	26	25	24	25	26	25	25	24	23	23	23	23	24	25	27	28	29		26	
F	37	6	FEBRUARY	28	27	27	27	29	28	28	29	29	29	30	29	29	29	28	28	27	27	26	27	27	28	28	29	30		28	
Sa	38	7	FEBRUARY	30	29	30	29	29	27	27	21	16	15	14	16	18	22	22	20	24	24	24	19	21	24	26	23	30		23	
Su	39	8	FEBRUARY	21	17	14	12	12	11	11	12	10	9	10	12	22	25	27	28	27	22	22	22	27	28	26	18	28		19	
M	40	9	FEBRUARY	15	15	11	10	10	9	9	12	13	17	17	20	18	9	13	11	11	11	10	8	8	17	22	27	27		13	
Tu	41	10	FEBRUARY	28	27	29	30	11	18	22	23	26	27	29	30	30	30	29	29	29	29	28	28	24	21	22	20	30		26	
W	42	11	FEBRUARY	18	18	18	19	15	17	15	15	18	21	23	22	25	29	29	26	21	18	15	13	11	10	12	11	29		18	
Th	43	12	FEBRUARY	10	8	8	8	8	10	12	16	18	13	18	22	24	24	23	22	21	17	9	8	9	7	8	9	24		14	
F	44	13	FEBRUARY	8	9	6	8	7	8	11	9	8	11	16	18	21	23	20	17	18	16	19	20	20	22	21	21	23		15	
Sa	45	14	FEBRUARY	21	20	20	19	18	18	19	19	19	20	23	25	26	28	27	25	23	20	16	16	15	16	14	13	28		20	
Su	46	15	FEBRUARY	12	10	9	9	11	11	12	13	17	10	11	18	25	28	29	27	25	26	22	19	17	19	16	14	29		17	
M	47	16	FEBRUARY	15	13	18	20	22	23	23	21	21	24	31	32	32	31	31	26	22	19	16	15	21	21	18	17	32		22	
Tu	48	17	FEBRUARY	15	18	19	24	25	26	25	25	25	28	30	31	31	30	29	26	25	24	22	25	24	18	27	26	31		25	
W	49	18	FEBRUARY	26	23	21	18	15	20	25	24	22	25	27	31	30				20	20	19	17	16	12	8	7	31		20	
Th	50	19	FEBRUARY	9	10	10	9	10	9	8	8	9	11	11	12	12	12	20	20	17	15	16	12	16	24	25	24	25		14	
F	51	20	FEBRUARY	22	20	20	22	20	19	20	22	22	22	23	26	30	30	30	29	28	22	21	22	22	23	21	19	30		23	
Sa	52	21	FEBRUARY	17	18	15	20	19	19	20	21	24	27	24	25	28	28	28	29	29	29	28	26	24	22	23	22	29		23	
Su	53	22	FEBRUARY	22	18	17	19	20	21	26	25	23	28	27	29	28	27	27	24	19	21	24	25	24	20	23	23	29		23	
M	54	23	FEBRUARY	24	25	25	26	24	24	19	20	22	25	28	29	31	30	30	31	30	28	27	27	25	23	19	19	31		25	
Tu	55	24	FEBRUARY	18	18	17	14	14	13	13	12	13	13	17	21	26	28	28	23	16	16	15	14	11	7	5	6	28		16	
W	56	25	FEBRUARY	6	6	6	8	9	8	9	12	6	10	15	15	16	17	23	15	13	12	12	11	8	6	6	4	23		11	
Th	57	26	FEBRUARY								3	5	6	9	9	13	11	11	9												
F	58	27	FEBRUARY		23	26	26	25	23	24	23	23	23	24	24	24	24	24	24	25	24	24	24	24	24	24	21	26		24	
Sa	59	28	FEBRUARY	21	20	20	19	19	18	18	28	28	28	28	28	29	29	29	29	28	28	23	18	14	11	13	15	29	32	23	19

Su	60	1	MARCH	13	13	13	13	18	18	17	19	15	15	14	12	11	12	14	16	18	19	20	21	22	23	24	24	24		17	
M	61	2	MARCH	22	19	31	31	30	31	31	32	31	30	30	29	31	31	31	29	29	30	28	25	23	21	20	19	32		28	
Tu	62	3	MARCH	15	12	12	13	9	7	8	8	11	16	24	27																
W	63	4	MARCH	8	7	6	5	3	2	1	3	6	9	11	13	18	27	31	29	28	27	28	27	26	24	19	14	31		16	
Th	64	5	MARCH	12	10	12	7	8	5	3	4	5	13	16	18	18	17	17	16	13	14	11	10	12	20	24	19	24		13	
F	65	6	MARCH	15	12	6	4	7	8	10	13	13	12	4	1	0	0	1	1	0	0	0	0	0	0	0	0	15		5	
Sa	66	7	MARCH	1	2	2	1	3	2	0	0	2	7	10	9	10	9	7	6	7	6	7	10	13	17	17	16	17		7	
Su	67	8	MARCH	14	9	7	4	4	4	4	2	2	3	5	10	14	15	19	17	16	13	15	18	20	20	20	21	21		11	
M	68	9	MARCH	20	19	18	17	15	16	19	20	19	17	16	16	18	17	18	17	18	18	19	18	17	20	19	20	20		18	
Tu	69	10	MARCH	20	20	20	20	21	20	20	19	19	20	21	21	22	21	20	21	20	19	18	20	20	20	20	19	22		20	
W	70	11	MARCH	21	20	20	19	17	17	17	19	19	20	20	20	19	20	20	23	31	27	22	20	20	17	17	17	31		20	
Th	71	12	MARCH	17	16	16	18	18	17	18	19	19	20	24	27	29	27	27	28	31	28	25	21	18	16	13	13	31		21	
F	72	13	MARCH	14	12	15	14	14	14	13	13	14	18	23	31	30	32	31	31	30	26	21	19	17	13	17	27	32		20	
Sa	73	14	MARCH	27	22	13	2	6	2	0	4	8	14	17	16	15	13	12	13	13	14	15	24	27	26	26	28	28		15	
Su	74	15	MARCH	31	30	30	31	31	32	32	32	32	32	32	31	30	29	29	28	27	27	26	24	23	23	22	21	32		28	
M	75	16	MARCH	22	21	21	16	14	17	22	23	23	24	24	24	23	22	23	24	28	31	33	34	34	33	33	33	34		25	
Tu	76	17	MARCH	34	32	32	31	32	33	34	33	33	34	33	33	30	29	29	31	32	31	32	31	31	32	31	30	34		32	
W	77	18	MARCH	30	31	32	31	29	28	27	27	28	28	27	28	28	29	27	29	28	27	25	22	19	22	27	24	32		27	
Th	78	19	MARCH	23	21	25	25	24	22	22	22	25	26	27	28	28	27	27	28	27	25	23	24	25	25	26	26	28		25	
F	79	20	MARCH	25	24	24	24	25	26	25	25	24	25	27	27	28	29	29	29	28	28	27	23	26	23	19	18	29		25	
Sa	80	21	MARCH	18	18	19	18	16	16	22	23	22	21	22	28	28	28	29	30	30	28	27	25	23	22	17	15	30		23	
Su	81	22	MARCH	14	13	19	21	21	20	20	19	25	28	29	29	31	30	31	31	32	32	32	31	31	27	23	19	32		25	
M	82	23	MARCH	17	14	16	12	12	12	17	27	28	26	28	30	30	28	31	31	31	25	24	25	28	28	24	25	31		24	
Tu	83	24	MARCH	26	27	27	28	28	30	30	30	30	30	31	31	32	30	28	31	30	28	25	23	21	19	19	20	32		27	
W	84	25	MARCH	20	18	15	14	13	10	7	7	4	11	26	32	33	33	35	36	35	33	30	25	20	30	29	32	36		23	
Th	85	26	MARCH	30	31	31	30	29	30	29	30	30	33	30	31	32	31	32	33	25	21	21	25	29	30	30	30	33		29	
F	86	27	MARCH	27	26	27	29	29	29	28	27	27	27	27	27	26	24	23	22	21	22	23	24	22	21	27	28	29		26	
Sa	87	28	MARCH	29	30	29	28	29	30	31	31	31	30	29	28	29	28	27	27	26	26	26	27	27	24	25	23	31		28	
Su	88	29	MARCH	22	23	22	22	21	21	22	24	25	26	27	28	28	28	28	28	26	25	23	21	19	18	24	26	28		24	
M	89	30	MARCH	25	24	25	25	25	25	24	22	21	23	25	25	25	26	26	25	23	19	18	19	17	18	19	19	26		23	
Tu	90	31	MARCH	17	18	19	20	23	25	26	27	26	27	26	25	25	23	20	22	20	18	17	16	15	14	23	32	32	36	22	21
W	91	1	APRIL	32	31	30	31	29	29	24	20	21	22	23	22	23	23	23	23	20	19	17	15	13	14	14	13	32		27	
Th	92	2	APRIL	14	14	18	17	18	17	15	15	20	24	24	22	21	20	21	23	18	16	16	13	13	15	17	11	24		18	
F	93	3	APRIL	8	12	17	17	18	18	15	25	25	22	24	25	24	24	26	26	25	22	28	32	36	30	28	28	36		23	
Sa	94	4	APRIL	31	32	33	34	34	32	30	29	28	28	30	31	33	35	36	39	39	38	37	36	37	38	40	44	44		34	
Su	95	5	APRIL	44	44	42	42	41	38	36	35	35	35	35	34	33	33	32	31	31	30	29	29	30	28	28	28	44		34	
M	96	6	APRIL	28	29	28	28	28	28	28	27	26	25	24	22	19	18	18	19	18	18	17	17	20	18	20	21	29		23	
Tu	97	7	APRIL	18	16	15	15	14	14	14	15	15	11	13	16	17	17	19	16	16	17	17	23	28	28	26	26	28		18	
W	98	8	APRIL	27	27	28	29	35	35	34	33	30	30	29	30	27			31	30	28	25	22	13	12	15	12	35		26	
Th	99	9	APRIL	11	20	20	18	19	21	24	20	20	24	28	28	30	34	35	37	35	35	33	32	33	34	31	29	37		27	
F	100	10	APRIL	29	28	28	25	20	21	23	25	25	26	29	30	33	33	32	34	34	33	29	28	31	31	31	35	35		29	
Sa	101	11	APRIL	36	36	36	36	35	35	34	34	33	33	35	34	33	33	34	34	34	32	29	28	26	25	25	28	36		32	
Su	102	12	APRIL	28	25	21	20	20	22	17	16	22	31	35	35	35	37	36	36	35	34	32	28	31	31	28	32	37		29	
M	103	13	APRIL	32	32	31	32	32	31	31	29	27	25	21	21				36	34	32	30	23	15	16	16	19	36		27	
Tu	104	14	APRIL	18	19	15	14	13	11	17	19	28	32	27	30	33	36	35	37	36	34	31	29	26	27	29	24	37		26	
W	105	15	APRIL	24	23	22	20	24	21	24	22	22	25	24	25	27	26	27	26	25	23	23	24	26	25	27	27	27		24	
Th	106	16	APRIL	26	26	29	30	31	28	30	34	35	36	36	35	34	35	34	34	32	29	27	23	15	12	12	13	36		28	
F	107	17	APRIL	15	13	10	8	6	10	8	7	21	30	39	50	57	56	58	62	67	68	61	52	39	33	28	25	68		34	
Sa	108	18	APRIL	18	15	33	38	36	32	30	29	28	31	31	32	31	32	33	33	31	32	32	32	31	30	30	31	38		30	
Su	109	19	APRIL	32	32	32	33	34	36	37	37	36	37	39	38	37	36	37	37	37	36	35	34	32	30	28	31	39		35	
M	110	20	APRIL	32	32	32	31	33	32	31	33	35	33	33	32	32	34	33	37	37	35	33	33	29	29	27	25	37		32	
Tu	111	21	APRIL	22	27	30	33	33	32	33	33	33	34	33	33	32	31	32	30	35	35	33	31	27	26	19	14	35		30	
W	112	22	APRIL	14	9	10	12	7	10	13	24	27	31	30	33	41	41	43	43	44	41	35	29	20	17	12	11	44		25	
Th	113	23	APRIL	12	8	6	6	8	6	5	19	36	42	47	50	52	53	54	53	53	52	44	30	27	23	21	19	54		30	
F	114	24	APRIL	19	25	22	23	22	22	23	29	43	57	62	62	61	61	63	65	65	63	57	51	42	37	40	41	65		44	
Sa	115	25	APRIL	36	35	29	31	36	37	41	56	64	67	80	79	71	67	65	64	66	64	55	45	35	31	28	28	80		50	
Su	116	26	APRIL	24	23	19	18	18	18	11	12	41	48	60	65	65	64	62	67	71	73	63	56	40	34	23	21	73		41	
M	117	27	APRIL	18	15	12	9	12	14	22	23	27	57	75	82	77	79	78	84	83	79	74	61	45	31	33	26	84		47	
Tu	118	28	APRIL	33	30	31	26	26	19	17	22	43	56	60	55	55	57	59	60	63	65	70	37	35	32	31	25	70		42	
W	119	29	APRIL	15	13	15	15	16	15	15	13	36	54	52	46	44	41	42	43	43	42	38	31	16	16	15	23	54		29	
Th	120	30	APRIL	31	37	34	31	33	30	31	34	34	33	35	33	33	33	34	36	33	31	29	29	29	30	31	35	37	84	33	31
F	121	1	MAY	35	34	27	31	29	34	33	31	31	35	39	38	42	42	41	44	41	40	38	40	39	36	36	49	49		37	
Sa	122	2	MAY	45	44	44	43	42	44	44	42	42	41	42	44	45	44	42	44	40	37	39	41	40	39	38	37	45		42	
Su	123	3	MAY	37	36	35	34	30	27	26	23	22	25	31	32	82	38	33	32	31	30	28	23	21	20	20	18	37		28	
M	124	4	MAY	17	14	11	9	8	16	30	30	33	35	36	37	37	39	38	38	38	38	37	39	39	40	35	33	40		30	

Tu	125	5	MAY	24	28	19	15	14	12	16	30	45	47	48	49	49	49	48	47	46	44	42	39	35	27	23	18 :	49	:	34	
W	126	6	MAY	15	15	16	15	12	15	19	35	38	39	39	41	43	43	42	42	41	43	42	37	23	16	11	9 :	43	:	29	
Th	127	7	MAY	10	6	6	4	4	3	11	21	27	29	32	39	46	50	53	54	53	49	43	39	36	31	22	19 :	54	:	29	
F	128	8	MAY	18	16	9	9	11	18	22	21	28	33	35	36	40	43	46	46	47	45	42	35	29	25	21	17 :	47	:	29	
Sa	129	9	MAY	22	29	28	25	20	21	26	35	34	35	35	34	33	35	34	33	33	32	31	29	29	28	28	27 :	35	:	30	
Su	130	10	MAY	27	27	26	23	23	24	29	30	30	33	35	36	37	36	35	34	34	33	31	31	31	32	32	31 :	37	:	31	
M	131	11	MAY	30	28	27	27	26	24	26	28	31	32	31	31	32	30	31	34	36	35	35	35	34	33	35	35 :	36	:	31	
Tu	132	12	MAY	35	34	34	37	36	29	33	34	35	34	34	34	35	35	36	34	32	33	31	28	29	29	28	25 :	37	:	33	
W	133	13	MAY	24	27	22	26	26	23	25	29	32	31	31	34	35	33	32	33	33	33	32	31	29	30	32	28 :	35	:	30	
Th	134	14	MAY	29	28	26	26	25	23	23	25	28	30	31	35	33	34	33	34	33	33	34	34	31	33	32	32 :	35	:	30	
F	135	15	MAY	28	27	27	27	28	29	28	31	34	34	35	37	37	37	36	36	36	36	33	31	23	24	21	16 :	37	:	30	
Sa	136	16	MAY	17	13	9	9	7	7	8	27	33	35	36	36	35	34	34	32	31	30	30	28	28	28	25	24 :	36	:	25	
Su	137	17	MAY	24	26	28	24	23	24	22	24	30	30	30	29	26	26	29	29	27	25	25	24	28	28	28	28 :	30	:	27	
M	138	18	MAY	30	30	26	24	28	34	37	36	37	36	38	40	40	40	41	40	39	38	37	30	20	23	25	25 :	41	:	33	
Tu	139	19	MAY	26	29	29	29	26	22	24	27	29	28	28	25	29	31	34	36	37	35	34	30	25	23	20	17 :	37	:	28	
W	140	20	MAY	13	12	15	22	23	25	26	33	33	35	34	30	32	33	33	30	30	30	28	26	24	24	25	25 :	35	:	27	
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Th	260	17	SEPTEMBER	0	0	0	1	1	1	0	0	1	7	12	12	14	15	13	13	11	9	2	0	1	7	4	8	15		6	
F	261	18	SEPTEMBER	11	10	13	14	15	14	15	14	15	16	17	17	18	19	26	26	25	24	24	23	19	14	11	3	26		17	
Sa	262	19	SEPTEMBER	2	2	1	0	0	0	0	0	5	12	15	16	14	11	8	7	7	3	0	0	0	0	0	0	16		4	
Su	263	20	SEPTEMBER	0	0	0	0	0	13	17	16	17	18	16	15	15	13	13	9	6	5	7	5	4	5	10	15	18		9	
M	264	21	SEPTEMBER	10	12	14	13	13	14	14	11	10	10	9	8	10	12	22	22	23	22	19	20	26	30	29	28	30		17	
Tu	265	22	SEPTEMBER	28	27	27	26	24	21	21	21	20	23	24	26	26	27	28	27	27	27	26	26	26	26	26	25	28		25	
W	266	23	SEPTEMBER	25	25	25	25	26	25	25	25	25	24	25	25	26	26	27	27	25	23	22	20	18	17	17	15	27		23	
Th	267	24	SEPTEMBER	14	15	16	17	17	17	18	18	19	22	24	24	24	24	25	25	26	23	18	15	18	20	17	18	26		20	
F	268	25	SEPTEMBER	16	18	19	14	13	13	9	7	15	22	25	27	26	27	25	24	20	18	14	17	17	14	13	12	27		18	
Sa	269	26	SEPTEMBER	8	10	16	15	19	19	19	21	23	24	23	24	20	23	24	25	25	21	17	13	12	13	11	9	25		18	
Su	270	27	SEPTEMBER	8	5	0	0	0	0	0	0	0	0	4	11	12	10	9	13	3	0	0	0	0	0	0	0	13		3	
M	271	28	SEPTEMBER	0	0	0	0	0	0	0	0	0	3	9	9	7	8	9	11	7	2	1	2	2	2	2	1	11		3	
Tu	272	29	SEPTEMBER	0	0	0	0	0	0	0	0	0	3	20	18	14	14	15	18	18	11	5	1	1	1	0	0	20		6	
W	273	30	SEPTEMBER	0	0	0	0	0	2	3	3	0	0	4	7	7	5	2	4	2	9	8	8	6	5	2	2	9	33	3	15
Th	274	1	OCTOBER	0	0	0	0	0	0	0	0	0	1	4	3	1	4	6	31	22	14	15	13	12	11	12	13	31		7	
F	275	2	OCTOBER	12	12	9	11	8	8	11	11	11	13	17	21	22	23	24	25	27	30	26	25	25	23	23	23	30		18	
Sa	276	3	OCTOBER	22	21	22	19	18	18	17	17	18	17	18	20	23	29	32	32	27	22	19	24	26	27	25	28	32		22	
Su	277	4	OCTOBER	28	26	26	25	24	20	22	24	24	20	16	15	18	18	19	19	17	16	10	8	6	11	13	13	28		18	
M	278	5	OCTOBER	15	14	12	12	7	10	13	13	17	19	21	23	20	18	21	19	16	13	24	27	26	28	30	27	30		19	
Tu	279	6	OCTOBER	24	21	23	22	23	23	23	24	27	28	29	30	27	27	28	27	26	25	24	20	19	23	20	16	30		24	
W	280	7	OCTOBER	17	19	19	19	19	20	23	20	20	20	19	17	15	16	15	16	22	26	25	23	23	21	20	19	26		20	
Th	281	8	OCTOBER	17	15	19	21	19	17	18	19	22	24	25	25	26	26	24	24	25	24	23	23	21	16	16	16	26		21	
F	282	9	OCTOBER	15	17	24	23	23	26	25	18	19	24	25	24	21	22	23	24	23	20	16	23	22	19	14	11	26		21	
Sa	283	10	OCTOBER	8	6	5	5	3	2	1	2	5	11	19	23	23	23	22	14	17	12	11	11	11	16	15	14	23		12	
Su	284	11	OCTOBER	16	14	13	13	13	9	7	4	7	8	20	25	26	26	25	23	22	18	13	12	13	11	12	11	26		15	
M	285	12	OCTOBER	8	8	6	7	9	10	12	9	7	7	12	18	21	22	23	23	20	15	11	5	5	5	7	7	23		12	
Tu	286	13	OCTOBER	8	9	10	18	22	18	16	14	18	21	21	23	24	24	21	20	19	14	12	12	11	8	7	10	24		16	
W	287	14	OCTOBER	16	19	19	21	19	19	22	22	22	22	22	22	24	24	24	26	23	15	10	10	10	13	14	15	26		19	
Th	288	15	OCTOBER	15	14	10	10	12	18	22	25	24	23	24	25	27	27	26	24	17	16	13	9	12	14	14	17	27		18	
F	289	16	OCTOBER	18	18	20	21	19	20	23	20	16	20	20	24	24	25	26	27	25	22	23	24	25	24	20	21	27		22	
Sa	290	17	OCTOBER	24	24	25	25	27	26	25	23	23	24	25	27	28	29	30	29	28	24	23	19	21	20	21	23	30		25	
Su	291	18	OCTOBER	25	25	24	26	27	27	28	27	27	28	33	34	34	32	31	28	28	28	27	25	25	22	20	18	34		27	
M	292	19	OCTOBER	13	15	13	12	17	18	15	13	14	16	19	18	18	18	22	24	23	13	5	1	2	2	6	6	24		14	
Tu	293	20	OCTOBER	3	2	3	5	6	9	10	8	7	9	7																	
W	294	21	OCTOBER												26	29	29	25	25	25	28	31	31	31	29	29	31				
Th	295	22	OCTOBER	31	30	29	29	29	28	28	27	26	26	25	25	26	26	24	23	19	12	10	7	4	4	3	3	31		21	
F	296	23	OCTOBER	4	5	3	3	2	3	3	5	5	5	11	17	27	24	27	24	20	10	10	4	4	2	2	3	27		9	
Sa	297	24	OCTOBER	3	2	4	5	3	1	1	3	3	4	9	19	24	23	23	19	13	11	14	13	15	16	19	17	24		11	
Su	298	25	OCTOBER	20	18	19	19	22	24	24	24	26	30	31	31	32	32	30	29	29	30	31	30	27	22	16	16	32		25	
M	299	26	OCTOBER	18	19	18	19	18	17	16	17	18	17	17	19	20															
Tu	300	27	OCTOBER	8	7	6	6	6	1	2	1	0	0	1	0	2	1	1	1	0	3	11	2	11	28	27	25	28		6	
W	301	28	OCTOBER	26	29	25	19	16	17	14	14	15	23	28	29	29	30	29	26	21	11	9	6	8	10	9	7	30		19	
Th	302	29	OCTOBER	10	8	7	7	7	8	7	7	7	8	12	6	3	2	4	4	5	11	13	9	3	4	8	9	13		7	
F	303	30	OCTOBER	8	10	11	11	10	10	10	10	11	13	20	22	23	23	18	14	13	9	8	6	5	6	5	4	23		12	
Sa	304	31	OCTOBER	5	6	8	7	7	7	8	7	8	9	7	8	10	10	12	11	12	11	12	7	5	6	5	3	12	34	8	17
Su	305	1	NOVEMBER	4	4	4	4	4	2	3	4	2	3	5	6	8	11	10	9	9	5	8	10	9	9	10	11	11		6	
M	306	2	NOVEMBER	8	7	11	12	15	20	13	8	8	10	14	23	24	25	23	17	15	12	9	7	5	5	8	12	25		13	
Tu	307	3	NOVEMBER	10	13	6	6	6	9	9	7	6	7	10	18	22	20	15	16	16	16	19	19	21	22	19	9	22		13	
W	308	4	NOVEMBER	11	18	21	15	21	24	25	23	22	22	24	27	29	28	26	23	17	14	10	10	8	6	8	9	29		18	
Th	309	5	NOVEMBER	11	13	10	9	8	10	8	9	5	6	9	16	14	13	12	9	4	2	1	1	0	0	0	2	16		7	
F	310	6	NOVEMBER	12	9	5	4	4	0	0	0	0	1	2	5	9	8	3	3	2	0	0	4	10	9	8	7	12		4	
Sa	311	7	NOVEMBER	3	2	2	3	5	13	15	11	11	12	12	12	12	11	6	7	5	5	4	3	3	3	3	0	15		7	
Su	312	8	NOVEMBER	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	1		0	
M	313	9	NOVEMBER	2	8	9	12	12	14	17	19	20	21	22	24	24	24	23	19	16	14	15	15	16	17	13	7	24		16	
Tu	314	10	NOVEMBER	5	3	4	1	0	0	0	0	0	2	1	4	23	25	25	25	22	15	16	18	26	26	26	24	26		12	
W	315	11	NOVEMBER	23	22	23	22	21	20	18	14	13	13	19	20	23	26	21	26	28	32	29	26	26	26	26	25	32		23	
Th	316	12	NOVEMBER	26	23	25	26	23	23	24	26	27	29	29	29	28	28	28	28	28	28	27	24	24	25	25	24	29		26	
F	317	13	NOVEMBER	25	25	25	24	24	23	25	25	25	25	25	26	27	27	27	26	27	27	28	26	24	21	20	25	28		25	
Sa	318	14	NOVEMBER	30	29	29	29	28	27	26	25	26	27	28	28	28	28	27	24	23	21	20	15	12	9	7	8	30		23	
Su	319	15	NOVEMBER	6	6	13	22	21	22	24	25	24	22	20	18	16	16	12	12	18	24	25	27	25	26	26	26	27		20	
M	320	16	NOVEMBER	26	25	24	25	25	27	27	27	27	27	26	25	24	24	23	23	25	28	29	29	28	28	27	28	29		26	

Tu	321	17	NOVEMBER	28	29	30	31	28	24	25	22	20	19	20	21	22	22	21	23	21	20	23	20	20	19	20	21	:	31		:	23	
W	322	18	NOVEMBER	22	23	22	23	22	23	25	27	27	27	28	27	29	29	29	28	25	24	22	21	23	24	24	24	:	29		:	25	
Th	323	19	NOVEMBER	24	23	25	26	26	26	25	24	23	23	22	25	26	27	29	29	30	31	29	27	29	29	29	29	:	31		:	26	
F	324	20	NOVEMBER	28	27	26	26	27	27	28	27	27	26	26	27	27	27	27	26	25	25	25	24	24	25	25	26	:	28		:	26	
Sa	325	21	NOVEMBER	30	32	30	32	33	34	33	33	33	33	33	34	34	35	34	33	31	29	28	30	28	27	26	27	:	35		:	31	
Su	326	22	NOVEMBER	30	28	27	26	28	29	29	30	30	30	30	30	31	30	30	29	27	23	24	26	25	24	24	25	:	31		:	28	
M	327	23	NOVEMBER	18	23	25	26	23	22	25	25	24	24	23	21	19	18	17	18	16	16	16	17	21	23	24	25	:	26		:	21	
Tu	328	24	NOVEMBER	23	23	24	24	25	26	25	25	26	25	25	26	25	26	27	24	22	26	26	25	25	24	24	24	:	27		:	25	
W	329	25	NOVEMBER	25	24	23	21	20	17	19	21	21	22	22	21	23	24	26	26	26	24	21	17	16	20	17	18	:	26		:	21	
Th	330	26	NOVEMBER	20	19	18	16	18	16	17	18	20	20	18	21	23	24	23	11	7	6	6	8	6	7	8	11	:	24		:	15	
F	331	27	NOVEMBER	4	5	3	3	4	4	2	3	2	2	1	3	5	8	5	5	3	1	1	0	1	0	0	0	:	8		:	3	
Sa	332	28	NOVEMBER	0	0	0	0	4	4	4	6	1	2	4	8	7	6	3	3	5	6	7	10	10	11	7	8	:	11		:	5	
Su	333	29	NOVEMBER	8	11	10	9	7	7	6	7	5	6	6	7	10	10	10	10	6	6	5	5	17	22	21	20	:	22		:	10	
M	334	30	NOVEMBER	19	23	23	23	23	23	23	24	23	22	22	23	24	25	24	21	19	16	9	6	4	5	6	8	:	25	35	:	18	17
Tu	335	1	DECEMBER	8	13	17	18	18	19	18	18	17	21	24	24	27	27	27	26	25	25	25	24	22	21	20	19	:	27		:	21	
W	336	2	DECEMBER	22	21	21	22	20	20	23	23	22	22	23	25	26	24	25	25	23	21	21	19	19	20	20	20	:	26		:	22	
Th	337	3	DECEMBER	21	20	24	24	22	25	26	24	25	24	25	26	24	25	23	22	19	18	17	18	20	20	17	15	:	26		:	22	
F	338	4	DECEMBER	16	16	15	14	14	14	14	14	12	13	14	17	14	13	15	14	14	15	15	15	15	15	14	14	:	17		:	14	
Sa	339	5	DECEMBER	14	14	16	20	21	19	17	17	17	18	24	24	24	24	25	26	25	25	26	28	30	30	29	28	:	30		:	23	
Su	340	6	DECEMBER	28	28	28	28	30	30	29	28	27.	27	27	27	29	31	33	32	29	29	30	29	27	26	25	26	:	33		:	28	
M	341	7	DECEMBER	26	35	38	39	34	30	27	28	22	23	22	24	25	27	26	21	17	14	15	16	16	15	16	16	:	39		:	24	
Tu	342	8	DECEMBER	15	14	13	10	9	9	10	7	9	7	6	7	8	13	13	12	8	10	9	6	5	7	7	10	:	15		:	9	
W	343	9	DECEMBER	11	9	10	8	8	9	8	10	7	5	6	13		10	11	9	9	6	6	4	4	3	3	5	:	13		:	8	
Th	344	10	DECEMBER	4	3	2	1	3	2	1	1	2	1	0	3	6	6	6	4	3	4	4	5	6	5	7	6	:	7		:	4	
F	345	11	DECEMBER	5	4	4	5	5	9	7	4	7	12	16	14	16	18	17	16	17	18	18	17	16	15	14	17	:	18		:	12	
Sa	346	12	DECEMBER	18	13	13	14	14	13	12	12	13	12	13	10	12	15	14	11	8	7	6	6	5	4	5	6	:	18		:	11	
Su	347	13	DECEMBER	8	10	10	9	7	6	4	3	3	5	4	5	6	7	8	9	9	9	11	17	13	13	13	14	:	17		:	8	
M	348	14	DECEMBER	14	13	13	11	10	9	9	11	16	15	18	19	20	21	20	16	15	14	13	11	14	16	15	15	:	21		:	15	
Tu	349	15	DECEMBER	16	20	22	22	21	20	20	20	20	19	18	18	17	15	12	10	10	11	11	9	5	0	0	0	:	22		:	14	
W	350	16	DECEMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	:	0		:	0	
Th	351	17	DECEMBER	0	0	0	0	8	16	18	22	21	20	13	17	19	16	15	20	21	20	22	22	21	20	20	20	:	22		:	15	
F	352	18	DECEMBER	16	15	13	14	15	16	19	21	22	21	21	22	22	22	22	21	22	24	28	28	27	27	25	27	:	28		:	21	
Sa	353	19	DECEMBER	29	23	24	24	24	24	20	19	18	17	18	19	21	23	24	25	22	21	20	20	20	20	20	20	:	29		:	22	
Su	354	20	DECEMBER	21	21	22	22	23	24	23	24	24	24	24	23	23	25	24	25	23	23	23	19	17	17	14	15	:	25		:	22	
M	355	21	DECEMBER	15	15	17	23	26	27	29	29	28	29	30	30	30	28	28	27	25	24	31	33	33	31	32	31	:	33		:	27	
Tu	356	22	DECEMBER	31	31	29	29	31	32	30	27	24	27	29	21	18	22	19	16	17	18	20	22	18	15	10	12	:	32		:	23	
W	357	23	DECEMBER	11	14	13	8	5	8	6	3	0	0	0	0	0	0	0	0	1	2	1	2	3	1	0	0	:	14		:	3	
Th	358	24	DECEMBER	0	0	0	0	0	1	1	1	0	0	2	5	4	3	3	1	1	2	1	2	3	3	13	20	:	20		:	3	
F	359	25	DECEMBER	24	26	27	26	26	26	26	27	26	26	24	24	25	25	24	24	24	24	23	23	24	23	22	26	:	27		:	25	
Sa	360	26	DECEMBER	27	27	29	30	31	31	31	32	32	31	29	28	27	26	26	26	25	24	25	25	24	25	25	24	:	32		:	28	
Su	361	27	DECEMBER	24	23	25	25	24	22	21	22	25	24	25	28	26	28	28	27	27	28	27	28	29	29	29	29	:	29		:	26	
M	362	28	DECEMBER	27	25	23	25	27	26	26	27	27	27	27	27	27	28	29	29	30	30	29	29	29	29	28	28	:	30		:	28	
Tu	363	29	DECEMBER	27	27	28	27	26	26	25	24	24	26	26	27	26	27	28	29	27	27	25	24	24	25	25	25	:	29		:	26	
W	364	30	DECEMBER	25	24	24	26	25	25	26	24	27	27	26	24	25	24	25	26	25	24	18	11	8	12	14	17	:	27		:	22	
Th	365	31	DECEMBER	18	22	23	32	36	36	35	35	34	34	33	34	34	33	34	33	31	29	28	27	26	26	26	26	:	36	39	:	30	18
		diurnal data																										:			:		
		cy 1987		18	17	17	17	17	17	18	19	21	22	23	24	25	25	25	25	24	23	22	21	19	19	18	18	:sum max=		84	:sum mean=	23	
		sum 1987		18	18	18	17	17	18	19	21	24	25	27	28	28	28	29	29	28	27	26	24	22	20	19	19	:cy max=		84	:cy mean=	21	

data capture

monthly hourly values %

January	410	55
February	653	97
March	732	98
April	715	99
May	744	100
June	720	100
July	744	100
August	743	99
September	713	99
October	709	95
November	720	100
December	743	99

summer data capture
hourly values 4379 99.7

calendar year data capture
hourly values 8346 95.2

date(hours)or = 60,80,100,120)max value(hour of day)

17	APRIL	(4, 0, 0, 0)	68(18)
24	APRIL	(8, 0, 0, 0)	65(16,17)
25	APRIL	(10, 1, 0, 0)	80(11)
26	APRIL	(9, 0, 0, 0)	73(18)
27	APRIL	(10, 3, 0, 0)	84(16)
28	APRIL	(5, 0, 0, 0)	70(19)
5	JULY	(4, 0, 0, 0)	65(12)
6	JULY	(2, 0, 0, 0)	70(10)

numbers in the right hand columns below,represent the frequency of values < or = to
the adjacent value in the left hand columns,but > than the preceding value in those columns.

cy		sum	
freq dist		freq dist	
5	618	5	177
10	704	10	273
15	1066	15	574
20	1470	20	806
25	1694	25	818
30	1536	30	708
35	833	35	605
40	228	40	221
45	86	45	86
50	27	50	27
55	18	55	18
60	16	60	16
65	25	65	25
70	10	70	10
75	5	75	5
80	7	80	7
85	3	85	3
90	0	90	0
95	0	95	0
100	0	100	0
105	0	105	0
110	0	110	0
115	0	115	0
120	0	120	0
125	0	125	0
130	0	130	0
135	0	135	0
140	0	140	0
145	0	145	0
150	0	150	0
155	0	155	0
160	0	160	0
165	0	165	0
170	0	170	0
175	0	175	0

Table 3

FILENAME BUU3CYB6.WK1

BUSH HOURLY MEAN OZONE DATA FOR CALENDAR YEAR 1986(rural,180m asl,NT245635,UV absorption)

WEEK DAY	JULIAN DAY	DAY	MONTH	HOUR NO.(GMT) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Max [illegible] Daily [illegible]	Mean Daily [illegible]
W	1	1	JANUARY																										
Th	2	2	JANUARY																										
F	3	3	JANUARY																22	18	15	14	16	18					
Sa	4	4	JANUARY																										
Su	5	5	JANUARY																										
M	6	6	JANUARY																										
Tu	7	7	JANUARY										1[illegible]	11							7	17	2[illegible]	21					
W	8	8	JANUARY																										
Th	9	9	JANUARY																										
F	10	10	JANUARY																										
Sa	11	11	JANUARY																										
Su	12	12	JANUARY																										
M	13	13	JANUARY																										
Tu	14	14	JANUARY																										
W	15	15	JANUARY																										
Th	16	16	JANUARY																										
F	17	17	JANUARY																										
Sa	18	18	JANUARY																										
Su	19	19	JANUARY																										
M	20	20	JANUARY																		27	28	28	28	26	28	28		
Tu	21	21	JANUARY										24	25	27	2[illegible]	2[illegible]	27	2[illegible]	28	2[illegible]	27	28						
W	22	22	JANUARY																[illegible]	29	29	29	29	30	31	30	30		
Th	23	23	JANUARY	31	[illegible]	31	[illegible]	30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	22	23	23	23	22	21	17	21	23	24	26	25	25	[illegible]	[illegible]
F	24	24	JANUARY																		13	11	15	20	20	2[illegible]	22		
Sa	25	25	JANUARY	18	19	19	[illegible]	21	22	2[illegible]	2[illegible]	21	[illegible]	[illegible]	19	22	17	15	15	9	7	9	7	16	16	22	24	24	[illegible]
Su	26	26	JANUARY	24	24	18	2[illegible]	2[illegible]	23	[illegible]	[illegible]	26	[illegible]	[illegible]	23	20	20	20	21	21	21	23	20	29	24	15	14	24	21
M	27	27	JANUARY	14	15	15	15	14	13	13	17	14	15	13	18	25	17	20	21	17	18	22	23	13	23	22	22	2[illegible]	[illegible]
Tu	28	28	JANUARY	24	24	24	26	26	25	24	[illegible]	21	22	25	25	25	24	23	17	15	15	16	15	12	17	16	17	26	21
W	29	29	JANUARY	17	21	2[illegible]	16	21	18	15	16	8	5	16	13	9	8	8	5	5	6	2	3	6	10	18	21	21	[illegible]
Th	30	30	JANUARY	21	21	18	13	13	10	11	11	1[illegible]	16	15	18	17	17	16	16	16	9	12	17	13	20	21	23	23	1[illegible]
F	31	31	JANUARY	24	23	25	25	25	23	19	18	20	19	16	18	[illegible]	17	18	20	20	21	20	20	21	21	20	21	25	[illegible]
Sa	32	1	FEBRUARY	[illegible]	21	[illegible]	[illegible]	20	[illegible]	[illegible]		16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	18	19	25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

33 7 22 21 21 2 23 18 17 1 7 11 19

M	34	3	FEBRUARY	15	15	21	21	22	22	19	16	13	12	12	11	13	12	11	12	12	13	16	18	22	20	19	18	22		16	
Tu	35	4	FEBRUARY																												
W	36	5	FEBRUARY										18	20	22	22	21	14	17	16	16	14	16	16	16	15					
Th	37	6	FEBRUARY	17	16	17	19	20	23		19	17	18	21	21	19	21	22	21	18	19	20	21	23	23	25	28	28		20	
F	38	7	FEBRUARY	29	29	29	28	27	29	24	20	18	22	21	25	22	20	22	24	7	4	9	13	16	15	15	17	29		20	
Sa	39	8	FEBRUARY	18	17	19	21	19	21	24	24	19	18	17	18	17	17	17	16	17	19	24	21	17	19	20	23	24		19	
Su	40	9	FEBRUARY	24	20	21	28	28	27	27	28	23	25	24	27	28	29	29	29	19	15	22	20	22	25	25	23	29		24	
M	41	10	FEBRUARY	22	22	23	22	18	20	22	19	16	15	14	16	18	18		17	13	12	17	16	19	17	20	20	23		16	
Tu	42	11	FEBRUARY	13	14	17	13	11	8	13	6	1	2	8		17	21	20	19		2	4	9	14	9	4	1	21		10	
W	43	12	FEBRUARY	5	9	5	7	8	7						22	21	21	22	22	21											
Th	44	13	FEBRUARY										16		24			26	25	22	23	26	27	26	27	26	25				
F	45	14	FEBRUARY										20	23	22	22	22	22	22	22	21	23	25	26	26	25	26				
Sa	46	15	FEBRUARY	28	28	30	29	28	28	28	26	24	23	20	19	20	19	20	21	21	22	23	25	25	25	25	27	30		24	
Su	47	16	FEBRUARY																												
M	48	17	FEBRUARY										21	20	30	23	22	21	21	21	21	22	21	24	25	25	25				
Tu	49	18	FEBRUARY	25	24	23	25	26	26	24	22	16	20	21	21	21	20	18	18	16	4	6	14	4	8	11	14	26		18	
W	50	19	FEBRUARY									9	18	8	17	23	25	25	25	23	10	19	23	24	24	22	20	25		20	
Th	51	20	FEBRUARY									20	21	23	21	21	23	24	25	23	18	20	19	20	18	20	20	25		21	
F	52	21	FEBRUARY	21	19	19	20	17	17	16	16	7	7	16	19	19	20	16	21	19	15	19	18	18				21		17	
Sa	53	22	FEBRUARY															22	26	25	24	21	18	15	17	17	17				
Su	54	23	FEBRUARY	18	18	18	19	18	18	17	17	13	13	21																	
M	55	24	FEBRUARY										12	16	24	20	19	21	17	13	2	1	1	1	2	8	4				
Tu	56	25	FEBRUARY										14	12		19	21	22	25	25	24	21	25	23	17	13	18				
W	57	26	FEBRUARY	16	15	14	20	20	21	20	11	4	19	26	27	29	29	29	29	27	14	8	8	7	3	6	10	29		17	
Th	58	27	FEBRUARY	10	14	13	16	15	18	15	11	4	9	7	10	18	19	20							22	25	25	25		15	
F	59	28	FEBRUARY	18	19	25	27	28	26	21	24	15	19	23	26	26	23	25	27	23	16	15	20	18	28	28	28	28	30	23	19
Sa	60	1	MARCH	27	26	25	26	27	27	26	20	21	21	25	26	27	28	27	28	28	26	22	20	25	24	17		28		[illegible]	
Su	61	2	MARCH											28	30	30	29	30	30	29	25	12	22	24							
M	62	3	MARCH										16	17	18						27	28	29	28	26	24	23				
Tu	63	4	MARCH	24	25	26									21	22					20	19	19								
W	64	5	MARCH										26	26	26	26	27	27	27	26	26	25	25	26	24	26	24				
Th	65	6	MARCH	25	24	25						24	25	26	27			27	27	28	27	28	29								
F	66	7	MARCH									19			27	28	29	28	28	30	27	26	20	20	19	19	21				
Sa	67	8	MARCH	21	24	25	26	25	28	29	27	27	28	27	29	30	30	31	30	30	30	30	30	30	28	25	25	31		28	
Su	68	9	MARCH	22	21	21	21	22	24	23	19	17	19	21	21	22	24	24	24	23	19	16	15	16	17	17	17	24		[illegible]	
M	69	10	MARCH									25	26	28	27	27	27	30	31	29	26	20	18	10	17	13	12	31		23	
Tu	70	11	MARCH											25	27	29	28	28	27	26	22	21	20	22	25	24	16				
W	71	12	MARCH	17	15	10	7	5	5	6	8	9	13	15	19	23	24	24	25	21	12	14	14	11	7	7	9	25		13	
Th	72	13	MARCH										16	20	23	23	29	32	30	29	29	28	23	22	15	12	13				
F	73	14	MARCH												23	22	22	23	23	24	24	27	28	27	27	27	28				
Sa	74	15	MARCH	28	28	28	27	27	28	28	27	25	24	24	26	26	27	27	27	28	28	28	25	21	20	19	18	28		26	
Su	75	16	MARCH	19	21	22	24	26	25	22	25	26	30	28	27	28	29	30	29	26	24	24	25	23	25	22	25	30		25	
M	76	17	MARCH	25	24	25	27	25	23	24	24	25	27	26	28	28	29	29	29	30	25	22	20	15	15	19	14	30		24	
Tu	77	18	MARCH																												
W	78	19	MARCH																												
Th	79	20	MARCH											32	32	31	30	30	31	31	29	29	29	30	31	31	29				
F	80	21	MARCH	30	29	29	31	31	31	32	32	31	31	31	31	31	30	30	30	27	26	24	27	28	27	28	30	32		29	
Sa	81	22	MARCH	32	32	31	31	28	27	27	30	29	28	30	29	29	28	26	25	25	24	26	35	37	38	37	35	38		30	
Su	82	23	MARCH	35	31	31	31	32	32	32	31	30	31	31	32	32	32	32	32	32	32	32	32	32	32	32	30	35		32	
M	83	24	MARCH	29	28	26	25	22	23	14	13	9	15	19	22	25	27	28	25	27	27	25	24	25	27	28	28	29		23	
Tu	84	25	MARCH	28	29	27	27	26	26	25	24	24	25	25	26	25	26	27	27	22	24	23	21	18	19	21	22	29		24	
W	85	26	MARCH	23	27	27	28	28	29	29	30		31	31	32	34	33	32	32	30	29	27	24	27	26	22	22	34		28	
Th	86	27	MARCH										30	30	30	34	35	35	35	34	31	30	30	24	23	23	22				
F	87	28	MARCH	26	28	24	22	25	23	24	25	27	28	28	30	30	31	30	30	28	26	27	27	25	23	21	13	31		25	
Sa	88	29	MARCH	13	20	24	22	26	27	29	29	29	29	29	30	31	31	32	33	32	29	26	27	28	30	31	33	33		28	
Su	89	30	MARCH																												
M	90	31	MARCH	21	25	23	17	18	12	9	12	12	16	30	34	37	47	44	40	28	29	26	16	15	25	26	24	47	47	24	25
Tu	91	1	APRIL	18	16	12	15	24	26	26	16	19	25	31	32	32	34	36	33	36	29	24	9	21	22	23	21	36		24	
W	92	2	APRIL	11	14	19	15	13	11	10	7	5	16	20	25	32	36	39	30	32	30	28	7	5	16	31	33	37		20	
Th	93	3	APRIL	33	28	29	25	30	27	27	24	23	23	28	37	36	35	37	37	37	36	34	26	9	7	10	14	37		27	
F	94	4	APRIL	19	23	24	19	22	23	23	27	28	30	30	32	38	38	37	36	36	32	30	28	28	27	20	21	38		28	
Sa	95	5	APRIL	20	24	30	32	31	31	30	28	28	30	32	31	38	39	39	38	38	36	34	34	30	36	30	26	39		32	
Su	96	6	APRIL	30	31	33	32	33	34	34	31	36	35	38	39	40	40	40	38	38	38	37	35	27	24	19	23	40		33	
M	97	7	APRIL	28	28	31	35	37	38	36	29	24	31	32							29	28	29	25	30	34	34	38		31	
Tu	98	8	APRIL	34	34	34	34	34	34	33	31	30	33	34	34	34	35	36	36	36	36	37	36	35	34	32	32	37		34	
W	99	9	APRIL	36	39	38	37	35	34	32	30	26	27	31	31	34	36	35	36	34	34	34	34	34	34	37	38	39		34	
Th	100	10	APRIL	[illegible]																											

F	101	11	APRIL	27	26	22	25	20	23	27	20	28	21	34	29	26	28	30	35	33	33	31	29	31	28	28	28	35		27	
Sa	102	12	APRIL	28	26	26	29	31	32	31	26	31	35	38	40	42	41	39	38	37	35	31	26	16	21	22	17	42		31	
Su	103	13	APRIL	17	23	23	21	20	18	29	34	35	34	34	34	36	36	35	35	33	35	35	35	32	33	32	31	36		30	
M	104	14	APRIL	27	22	20	16	18	20	22	18	21	28	25	17	24	30	34	37	36	35	38	41	48	48	47	47	48		[illegible]	
Tu	105	15	APRIL	48	47	46	45	44	40	37	34	31	25	23	26	30	34	35	36	35	37	39						48		37	
W	106	16	APRIL																							37	40				
Th	107	17	APRIL	41	42	45	45	43	41	39	38	36	38	38	37	38	39	30	32	31	34	34	33	36	38	38	37	45		28	
F	108	18	APRIL	34	31	34	32	34	36	29	30	25	32	36	39	44	45	46	45	46	36	36	28	27	33	32	27	46		[illegible]	
Sa	109	19	APRIL	27	26	25	24	19	21	20	26	27	31	35	37	36	36	35	35	34	33	31	33	34	33	32	32	37		30	
Su	110	20	APRIL	32	29	28	27	27	26	26	26	33	39	37	38	38	37	35	35	35	33	33	32	31	32	34	31	39		[illegible]	
M	111	21	APRIL	32	26	22	26	23	26	21	14	25	29	31	33	35	29	34	34	33	33	38	39	33	27	28	40	40		[illegible]	
Tu	112	22	APRIL	41	37	33	32	31	26	25	27	24	22	21	31	33	35	35	36	35	35	33	25	29	35	33	32	41		31	
W	113	23	APRIL	26	16	15	14	11	10	19	20	21	27	33	36	38	43	27	36	36	35	32	26	5	4	8	12	43		[illegible]	
Th	114	24	APRIL	12	4	6	4	8	15	6	3	12	14	16	18	23	24	18	26	23	25	36	37	40	44	42	42	44		21	
F	115	25	APRIL	42	42	43	33	35	37	39	36	38	40	39	34	33	33	41	44	45	45	44	43	43	38	32	34	45		39	
Sa	116	26	APRIL	31	33	45	41	35	29	29	25	30	35	36	37	38	41	43	43	42	43	43	43	39	36	39	35	45		37	
Su	117	27	APRIL	37	34	36	37	36	31	31	34	39	40	40	43	35	39	41	42	43	42	39	30	12	23	28	27	43		35	
M	118	28	APRIL	28	33	31	28	26	33	35	36	35	36	35	33	33	31	35	38	37	37	41	33	35	39	36	32	41		34	
Tu	119	29	APRIL	26	21	22	27	27	32	34	33	36	37	39	40	41	40	38	39	41	39	38	38	36	30	29	33	41		34	
W	120	30	APRIL	34	34	33	33	35	38	37	37	36	35	34	32	32	31	30	28	29	29	30	29	29	29	31	30	38	48	[illegible]	31
Th	121	1	MAY	30	29	31	33	32	33	33	32	37	41	41	41	41	42	42	43	44	41	41	41	40	36	26	26	44		36	
F	122	2	MAY	23	24	19	18	16	15	16	9	19	29	37	38	36	48	61	56	48	35	38	41	28	22	20	25	61		[illegible]	
Sa	123	3	MAY	23	26	32	33	34	34	32	29	26	22	23	26	28	37	41	43	49	50	46	46	44	43	46	48	50		36	
Su	124	4	MAY	46	44	44	40	32	25	16	24	30	26	27	33	39	40	38	37	34	34	34	32	27	21	20	20	46		32	
M	125	5	MAY	20	21	14	15	20	24	17	18	19	28	30	28	37	40	45	43	40	37	33	27	25	23	21	15	45		27	
Tu	126	6	MAY	20	25	22	23	28	24	27	29	27	32	36	37	38	38	37	35	34	31	28	28	28	27	35	42	42		30	
W	127	7	MAY	39	32	25	24	25	28	36	37	30	31	32	34	26	32	36	37	35	36	36	36	36	38	40	42	42		32	
Th	128	8	MAY	40	41	39	41	38	38	33	36	33	33	35	35	37	37	38	38	37	38	37	33	28	32	35	27	41		36	
F	129	9	MAY	22	24	27	33	32	31	33	31	30	29	35	38	36	34	28	30	32	35	35	35	33	31	31	30	38		31	
Sa	130	10	MAY	28	28	28	33	34	29	26	25	25	25	30	37	39	40	39	39	39	39	39	38	37	36	37	41	41		34	
Su	131	11	MAY	42	42	42	43	43	43	42	42	41	39	40	41	41	41	42	40	40	41	31	43	37	30	16	20	43		39	
M	132	12	MAY	27	30	32	36	36	32	30	31	34	34	36	37	39	40	40	40	41	41	41	40	39	39	38	37	41		[illegible]	
Tu	133	13	MAY	37	36	35	36	37	36	35	35	35	35	35	36	36	39	40	41	40	38	37	36	32	32	34	32	41		[illegible]	
W	134	14	MAY	29	25	24	27	33	34	35	34	36	38	38	39	40	40	40	39	40	40	40	38	37	37	37	37	40		[illegible]	
Th	135	15	MAY	35	25	25	29	34	32	29	28	25	29	36	35	31	32	31	29	26	25	28	32	35	34	31	30	36		[illegible]	
F	136	16	MAY	32	12	23	33	34	34	35	34	34	35	36	36	35	38	39	40	40	38	37	36	26	20	14	18	40		[illegible]	
Sa	137	17	MAY	13	14	32	22	21	30	26	28	33	37	38	33	37	36	32	28	25	22	20	19	16	23	33	35	38		[illegible]	
Su	138	18	MAY	34	36	37	37	38	38	36	35	35	34	35	35	34	34	34	34	34	35	37	39	37	35	32	32	39		35	
M	139	19	MAY	31	31	30	29	29	28	28	29	30	29	30	28	34	35	35	36	36	36	34	34	35	30	28	29	36		31	
Tu	140	20	MAY	26	30	29	16	12	10	10	23	25	32	31	30	31	34	32	28	30	33	33	40	39	42	40	35	42		29	
W	141	21	MAY	33	34	37	40	41	39	40	38	33	33	34	40	40	37	36	39	40	38	38	38	36	34	36	34	41		37	
Th	142	22	MAY	34	34	33	34	34	35	35	34	34	36	36	36	37	38	39	38	38	38	38	37	36	34	35	33	38		36	
F	143	23	MAY	33	33	33	33	34	33	35	36	35	37	37	37	37	36	36	38	39	38	39	36	33	34	33	33	39		35	
Sa	144	24	MAY	32	32	31	20	29	20	30	32	33	34	36	37	38	39	37	34	33	34	36	36	38	39	35	34	39		34	
Su	145	25	MAY	32	32	29	30	33	34	34	34	35	35	37	38	39	39	38	39	39	38	37	36	35	29	27	29	39		35	
M	146	26	MAY																												
Tu	147	27	MAY																34	35	34	34	35	34	32	30	30				
W	148	28	MAY	29	29	29	28	28	26	25	25	26	28	31	32	33	34	34	36	35	33	29	27	26	27	25	25	36		29	
Th	149	29	MAY	23	24	27	27	27	28	27	28	30	31	33	34	34	34	33	33	33	31	30	29	30	29	27	25	34		29	
F	150	30	MAY	26	29	31	33	33	33	31	32	36	35	35	34	32	32	32	33	33	32	31	30	29	29	28	27	36		32	
Sa	151	31	MAY	24	23	21	22	17	19	19	18	18	18	17	15	17	18	17	19	18	18	17	17	15	16	17	17	24	61	19	32
Su	152	1	JUNE	18	20	21	17	13	18	20	22	22	23	21	20	20	21	19	19	17	19	20	18	17	17	18	21	23		19	
M	153	2	JUNE	21	23	23	26	27	25	25	27	29	32	30	31	33	33	32	35	34	33	35	33	33	31	27	23	35		29	
Tu	154	3	JUNE	22	24	26	25	26	25	27	22		23	24	25	26	26	26	26	27	26	24	26	23	20	20	21	27		24	
W	155	4	JUNE	22	21	21	22	25	23	25	28	31	31	32	34	32	31	31	29	27	29	27	28	25	22	21	23	34		27	
Th	156	5	JUNE	26	28	30	30	30	29	27	26	28	28	30	32	33	35	34	33	29	28	27	23	23	26	25	19	35		28	
F	157	6	JUNE	23	24	25	23	23	24	24	19	17	23	19																	
Sa	158	7	JUNE																												
Su	159	8	JUNE																												
M	160	9	JUNE												19	26	33	33		30	31	29	31	32	29	21	18				
Tu	161	10	JUNE	16	14	9	13	17	16	18	17	22	26	29	30	32	31	31	31	30	25	29	29	27	24	26	24	32		23	
W	162	11	JUNE	24	25	27	29	28	28	27	26	29	30	32	35	38	38	38	38	38	36	33	29	26	27	25	24	38		30	
Th	163	12	JUNE	23	22	19	15	15	27	29	24	25	27	33	34	35	35	34	32	32	30	29	28	28	25	22	22	35		27	
F	164	13	JUNE	21	19	15	14	13	12	17	14	19	22	21	24	25	24	20	20	18	18	20	19	17	17	16	17	25		19	

Sa	165	14	JUNE	18	15	18	18	17	18	18	19	20	23	23	[illegible]	28	32	35	31	30	28	27	25	22	13	9	8	35		22	
Su	166	15	JUNE	5	4	4	4	4	7	13	33	37	41	50	48	47	46	45	49	49	43	42	42	37	35	31	40	50		31	
M	167	16	JUNE	37	34	35	36	38	37	32			24	27	29	35	38	43	53	42	48	49	23	7	1	5	6	53		31	
Tu	168	17	JUNE	1	4	7	10	8	9	5	5	16	34	28	11	21	27	27	33	34	37	44	42	41	38	36	35	44		23	
W	169	18	JUNE	31	29	26	23	23	25	24	22	13	13	19	23	24	23	16	14	12	15	17	13	6	2	6	17	31		18	
Th	170	19	JUNE	15	12	14	6	6	20	23	24	23	21	29	33	36	31	35	23	26	32	32	31	27	26	23	20	36		24	
F	171	20	JUNE	31	33	35	37	37	35	33	29	34	34	34	32	32	30	30	31	30	31	31	33	33	33	34	36	37		33	
Sa	172	21	JUNE	38	37	35	34	32	32	31	29	27	27	29	31	33	34	35	34	33	32	30	31	32	32	31	30	38		22	
Su	173	22	JUNE	30	39	32	31	31	33	34	33	32	30	26	26	27	27	25	23	23								34		25	
M	174	23	JUNE	19	23	24	23	28	34	33	26	27		29	33	34	32	28	23	27	26	28	29	28	28	28	30	34		28	
Tu	175	24	JUNE	33	31	31	34	35	34	37	30	29	25	23	21	25	29	31	30	40	40	36	37	34	24	29	25	40		31	
W	176	25	JUNE	27	24	29	28	31	33	34	33	34	[illegible]	33	34	35	35	35	37	39	40	41	40	33	33	19	22	41		32	
Th	177	26	JUNE	15	19	12	15	16	22	34	36	26	20	28	33	40	48	58	73	65	53	47	45	44	42	39	34	73		[illegible]	
F	178	27	JUNE	35	32	35	34	33	42	48	38	45	46	47	52	53	57	59	51	48	33	52	62	66	60	32	30	66		45	
Sa	179	28	JUNE	27	27	14	13	13	19	20	20	32	45	45	44	51	61	65	67	66	64	62	52	31	12	13	33	69		[illegible]	
Su	180	29	JUNE	29	21	17	22	27	34	36	33	35	44	46	46	40	53	53	53	52	51	48	42	36	30	27	29	53		38	
M	181	30	JUNE	24	24	17	19	29	26	25	28	28	17	27	28	27	25	26	25	24	22	18	13	9	3	2	15	29	73	21	28
Tu	182	1	JULY	22	37	38	39	37	35	26	31	31	30	31	34	35	37	39	41	42	43	43	35	22	20	20	18	43		33	
W	183	2	JULY	13	11	14	15	13	21	22	27	31	32	30	36	36	39	43	43	39	32	28	27	28	27	26	25	43		27	
Th	184	3	JULY	27	27	24	20	17	20	19	22	21	22	26	27	30	32	35	36	35	33	30	29	29	30	27	25	36		27	
F	185	4	JULY	22	23	20	23	27	29	29	28	27	28	29	31	31	31	31	31	31	29	27	26	24	23	24	23	31		27	
Sa	186	5	JULY	22	19	19	22	23	22	23	24	24	23	23	23	25	25	25	25	24	24	23	21	18	18	17	16	25		22	
Su	187	6	JULY	15	15	13	15	17	20	20	21	22	27	31	33	33	33	31	31	30	29	26	26	25	25	24	25	33		24	
M	188	7	JULY	25	26	26	26	26	26	26	26	25	26	28	29	29	29	30	30	30	30	30	28	26	23	24	26	30		27	
Tu	189	8	JULY	24	21	24	24	24	25	25	26	28	29	28	30	31	32	34	34	32	31	27	27	25	21	21	22	34		27	
W	190	9	JULY	20	20	18	16	19	21	24	24	24	24	28	29	28	27	26	24	22	21	20	19	19	18	17	16	29		22	
Th	191	10	JULY	16	16	17	16	17	17	17	19	24	29	34	28	28	28	23	24	24	19	15	16	11	5	3	4	34		19	
F	192	11	JULY	6	6	5	4	4	5	12	14	23	23	20	22	24	26	27	26	26	26	24	23	22	19	14	7	27		17	
Sa	193	12	JULY	5	6	14	10	5	5	6	11	19	21	24	26	27	30	26	31	32	33	32	29	24	8	6	2	33		18	
Su	194	13	JULY	4	6	8	8	16	21	23	22	21	21	20	18	18	20	21	21	21	18	19	19	17	15	14	13	23		17	
M	195	14	JULY	11	11	10	11	13	17	17	27	27		29	27	26	22	18	15	17	15	14	14	13	11	9	16	29		17	
Tu	196	15	JULY	27	28	28	22	24	23	22	22	22	21	20	14	20	22	21	25	28	30	27	25	19	18	22	14	30		27	
W	197	16	JULY	14	18	15	15	13	13	14	14	15	17	19	20	20	22	24	29	29	27	25	24	24	25	25	25	29		23	
Th	198	17	JULY	27	27	26	27	29	29	27	25	24	26	25	25	25	25	28	28	29	31	31	32	31	30	29	27	32		[illegible]	
F	199	18	JULY	25	25	25	22	22	19	18	18	21	21	20	21	20	23	26	23	24	24	23	20	19	16	15	16	26		21	
Sa	200	19	JULY	18	17	20	23	23	22	23	23	23	22	20	24	25	27	28	26	25	23	23	24	24	22	21	18	28		23	
Su	201	20	JULY	16	19	22	22	24	23	23	23	23	23	27	29	29	32	32	31	30	30	28	28	27	22	25	25	32		26	
M	202	21	JULY	23	23	23	25	26	26	25	25	25	24	23	23	22	24	24	24	24	24	25	24	22	20	20	20	26		23	
Tu	203	22	JULY	20	22	23	23	22	21	22	22	22	24	25	26	25	25	26	25	23	23	23	23	24	24	22	21	26		23	
W	204	23	JULY	23	22	22	23	21	20	20	20	23	20	22	24	23	23	23	21	23	23	17	14	3	3	4	7	24		18	
Th	205	24	JULY	5	6	7	7	8	9	11	16	22	25	27	28	27	25	23	26	24	22	21	20	18	16	14	18	28		18	
F	206	25	JULY	24	23	22	20	17	16	15	15	21	15	17	16	15	17	16	14	15	16	16	15	16	17	16	13	24		17	
Sa	207	26	JULY	13	13	12	14	11	19	25	23	19	23	27	27	26	25	27	26	24	23	21	23	24	24	23	20	27		21	
Su	208	27	JULY	19	19	17	19	19	18	17	16	20	22	23	24	24	25	24	25	27	23	24	24	23	22	20	22	27		21	
M	209	28	JULY	21	22	19	19	17	21	19	17	17	23	26	28	28	30	29	23	19	21	22	20	17	17	19	21	30		21	
Tu	210	29	JULY	21	19	25	25	23	20	18	16	16	17	21	18	17	18	19	23	25	26	23	19	18	16	15	14	26		20	
W	211	30	JULY		14	13	13	14	12	13	13	16	16	16	19	15	9	9	10	13	10	5	4	3	2	1	1	19		10	
Th	212	31	JULY		14	21	18	18	21	21	22	30	18	15	17	17	18	18	18	14	11	13	18	19	21	21	22	30	43	18	12
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Sa	214	2	AUGUST		23	19	16	16	21	26	25	24	23	23	24	25	24	28	30	31	29	30	30	30	30	30	28	31		25	
Su	215	3	AUGUST		29	29	29	28	27	26	26	27	27	28	30	30	30	29	28	24	21	25	22	17	11	7	3	30		24	
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W	218	6	AUGUST											13	17	12	22	19	16	18	19	19	21	18	15	16	20				
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F	220	8	AUGUST		33	33	34	32	30	28	23	21	22	21	20	23	27	30	29	28	23	22	22	20	20	19	19	34		25	
Sa	221	9	AUGUST		17	20	20	17	15	16	17	20	23	28	28	28	34	34	37	34	30	22	21	21	21	10	5	37		22	
Su	222	10	AUGUST	3	4	4	5	5	12	14	17	22	30	29	31	32	36	36	37	35	33	31	26	22	17	9	6	37		21	
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Th	226	14	AUGUST	16	28	29	32	29	28	28	25	25	31	25	27	30	31	30	27	19	17	17	26	24	22	19	20	32		25	
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Sa	228	16	AUGUST	19	25	25	27	30	30	31	36	38	36	36	38	37	38	37	36	33	30	28	27	25	27	25	22	38		31	
Su	229	17	AUGUST	21	19	20	22	23	23	24	24	26	24	24	29	31	31	33	29	25	26	23	19	17	16	16	14	33		27	
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Tu	231	19	AUGUST	11	10	8	9	8	8	6	5	12	15	15	19	20	23	22	28	27	25	20	14	10	11	13	11	28		15	

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F	248	5	SEPTEMBER	26	28	27	27	28	26	26	25	38	26	26	25	25	26	26	25	25	25	25	25	26	27	28	27 :	38	:	27	
Sa	249	6	SEPTEMBER	26	25	28	27	25	26	26	25	26	27	28	29	28	27	28	28	27	25	23	23	22	19	20	21 :	29	:	25	
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Th	275	2	OCTOBER	29	28	28	27	28	29	28	28	29	30	31	30	29	32	30	31	29	24	22	17	19	22	20	29 :	32	:	27	
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Sa	277	4	OCTOBER	9	17	19	18	21	18	15	6	7	15	22	30	32	36	37	41	37	21	13	4	10	11	12	14 :	41	:	19	
Su	278	5	OCTOBER	15	18	16	17	21	25	24	26	24	25	29	30	30	31	30	29	28	25	25	22	23	28	29	32 :	32	:	25	
M	279	6	OCTOBER	33	32	33	33	32	31	32	30	27	24	22	24	23	24	23	23	22	17	21	23	24	22	22	21 :	33	:	26	
Tu	280	7	OCTOBER	22	22	21	21	22	25	26	28	29	28	29	31	31	31	29	32	26	23	22	24	24	22	23	24 :	32	:	26	
W	281	8	OCTOBER	23	16	15	16	14	14	9	13	17	22	22	21	21	21	20	19	22	31	34	34	33	33	32	35 :	35	:	22	
Th	282	9	OCTOBER	38	41	41	38	35	35	34	30	28	27	28	30	30	29	28	26	25	16	2	6	4	11	20	21 :	41	:	26	
F	283	10	OCTOBER	25	26	26	26	26	17	20	20	22	23	27	30	31	33	34	33	31	29	30	27	29	23	27	29 :	34	:	27	
Sa	284	11	OCTOBER	27	25	27	30	28	32	26	25	26	29	22	33	34	34	34	33	33	30	17	20	26	28	24	26 :	34	:	28	
Su	285	12	OCTOBER	27	29	28	27	27	28	28	27	26	28	29	29	32	35	36	37	36	32	16	9	12	8	17	20 :	37	:	26	
M	286	13	OCTOBER	15	11	10	9	8	4	5	5	3	10	16	27	36	36	36	35	28	26	24	22	26	26	16	15 :	36	:	19	
Tu	287	14	OCTOBER	19	28	28	22	32	34	34	32	30	34	35	33	30	28	29	31	29	28	25	19	22	27	32	32 :	35	:	29	
W	288	15	OCTOBER	31	25	24	25	24	21	15	17	17	19	22	27	29	31	30	20	26	25	29	19	22	22	21	21 :	31	:	23	
Th	289	16	OCTOBER	25	24	24	23	26	23	22	20	23	25	26	26	27	28	28	26	24	23	20	22	19	17	17	18 :	28	:	23	
F	290	17	OCTOBER	17	17	14	19	21	20	11	12	16	21	24	24	25	26	26	24	23	23	23	24	21	20	20	22 :	26	:	20	
Sa	291	18	OCTOBER	23	28	30	29	29	29	27	26	24	27	26	26	24	28	29	29	27	27	25	29	31	29	30	31 :	31	:	27	
Su	292	19	OCTOBER	32	31	32	29	33	34	34	32	32	31	29	33	33	33	33	31	31	30	31	33	31	34	33	30 :	34	:	32	
M	293	20	OCTOBER	30	30	27	26	24	23	22	17	17	21	26	25	27	30	26	27	27	28	30	34	34	34	33	34 :	34	:	27	
Tu	294	21	OCTOBER	32	34	33	34	33	29	29	30	30	31	30	29	30	27	26	25	24	25	25	28	26	31	28	31 :	34	:	29	
W	295	22	OCTOBER	33	31	34	34	34	36	34	32	31	32	31	36	32	32	33	33	33	31	30	30	30	34	33	32 :	36	:	32	
Th	296	23	OCTOBER	34	34	34	32	31	31	29	27	26	27	27	28	31	32	32	30	27	23	25	26	27	26	23	26 :	34	:	28	

F	297	24	OCTOBER	24	24	25	26	27	26	27	23	23	25	27	27	27	25	24	23	23	22	21	26	33	34	34	35	35		26	
Sa	298	25	OCTOBER	34	32	33	31	30	27	25	23	24	23	23	23	23	25	26	31	33	34	34	36	37	37	37	37	37		30	
Su	299	26	OCTOBER	37	36	37	35	34	34	32	31	31	31	31	32	32	32	31	28	24	21	23	24	26	27	28	31	37		30	
M	300	27	OCTOBER	31	32	31	30	29	28	27	27	26	23	24	20	18	17	17	16	16	18	22	24	23	22	25	28	32		24	
Tu	301	28	OCTOBER	29	28	27	29	29	23	19	22	6	13	17	32	24	36	34	33	31	31	33	31	33	32	33	31	36		27	
W	302	29	OCTOBER	30	30	30	31	30	29	30	30	30	31	31	32	32	32	31	29	28	27	27	27	27	27	28	29	32		30	
Th	303	30	OCTOBER	32	34	35	35	34	34	39	37	35	33	33	33	35	35	35	34	33	31	32	32	35	33	32	33	39		34	
F	304	31	OCTOBER	35	33	32	31	31	33	33	32	31	31	31	34	31	30	25	20	17	17	12	6	3	2	2	2	35	41	23	26
Sa	305	1	NOVEMBER	5	13	24	25	25	26	25	25	24	25	25	27	28	28	27	26	22	18	18	19	22	26	29	26	29		23	
Su	306	2	NOVEMBER	26	26	26	22	18	17	18	17	18	19	22	26	27	28	27	25	23	25	27	29	27	28	30	31	31		24	
M	307	3	NOVEMBER	29	29	27	32	35	34	30	28	26	26	23	25	26	26	26	26	21	14	16	17	19	20	24	25	35		25	
Tu	308	4	NOVEMBER	23	29	29	29	28	27	28	26	23	26	24	23	27	29	30	27	27	24	24	24	27	29	28	28	30		27	
W	309	5	NOVEMBER	30	29	28	29	29	29	28	29	29	30	29	27	33	34	30	31	28	26	29	25	27	30	32	32	34		29	
Th	310	6	NOVEMBER	31	30	30	30	31	32	31	31	30	29	29	28	29	30	29	29	25	19	25	27	28	30	31	35	35		29	
F	311	7	NOVEMBER	34	33	33	33	31	28	25	23	23	22	22	22	22	23	23	28	31	32	33	31	30	31	29	30	34		28	
Sa	312	8	NOVEMBER	29	30	32	32	31	31	31	32	32	32	32	32	32	32	33	32	33	33	34	32	34	31	29	29	34		32	
Su	313	9	NOVEMBER	30	30	30	31	31	33	34	35	34	34	34	34	35	35	34	34	34	34	35	36	35	35	35	35	36		34	
M	314	10	NOVEMBER	35	37	36	36	36	36	36	35	33	32	32	32	32	32	30	29	29	29	28	28	28	28	29	28	37		32	
Tu	315	11	NOVEMBER	28	28	29	26	25	18	15	21	12	7	16	22	26	26	26	26	27	27	29	26	25	29	26	27	29		24	
W	316	12	NOVEMBER	25	22	21	25	24	20	23	22	15	16	16	20	21	27	28	26	22	22	20	19	17	17	17	18	28		21	
Th	317	13	NOVEMBER	22	19	10	8	12	13	15	21	22	25	26	24	25	31	28	22	14	4	9	20	24	21	24	23	31		19	
F	318	14	NOVEMBER	16	14	19	20	17	17	24	23	13	18	11	19	21	20	22	7		7	12	16	28	34	32	30	34		17	
Sa	319	15	NOVEMBER	32	30	30	31	30	28	29	31	30	31	32	30	29	29	29	28	25	28	29	31	29	30	33	35	35		29	
Su	320	16	NOVEMBER	35	34	34	33	33	33	34	33	33	34	35	35	34	33	33	33	31	33	28	27	25	26	27	28	35		22	
M	321	17	NOVEMBER	22	25	25	25	24	26	28	22	10	17	25	29	27	26	30	29	25	25	28	28	27	29	29	28	30		25	
Tu	322	18	NOVEMBER	28	29	32	30	30	31	26	28	24	27	34	37	36	36	31	33	23	22	18	16	20	27	26	24	37		28	
W	323	19	NOVEMBER	23	23	22	21	22	14	14	14	19	22	27	34	32	29	29	32	27	23	25	27	32	35	33	34	35		26	
Th	324	20	NOVEMBER	35	32	32	33	33	36	36	35	31	32	34	31	31	30	29	28	21	20	23	23	23	11	9	11	36		27	
F	325	21	NOVEMBER	7	7	13	16	20	16	8	4	4	6	8	12	16	18	8	9			26	24	22	24	26	21	26		14	
Sa	326	22	NOVEMBER	16	12	13	29	32	31	32	32	32	31	31	31	32	32	32	31	31	30	30	30	30	30	31	31	32		28	
Su	327	23	NOVEMBER	30	29	29	28	30	29	30	28	26	25	24	25	25	25	26	26	25	26	27	28	29	29	30	31	31		27	
M	328	24	NOVEMBER	32	36	37	36	31	29	31	31	30																			
Tu	329	25	NOVEMBER			26	26	27	28	29	28	28	28	27	32	32	32	30	32	33	33	31	29	29	26	26	28	33		29	
W	330	26	NOVEMBER	34	29	27	28	33	30	25	27	28	29	29	29	30	30	29	26	22	25	27	31	34	33	30	27	34		29	
Th	331	27	NOVEMBER	26	28	26	26	27	27	28	28	27	26	26	27	29	28	27	27	27	27	27	29	30	29	29	29	30		27	
F	332	28	NOVEMBER	28	29	29	29	29	29	29	27	28	29	30	30	32	32	33		32	32	33	33	32	33	33	32	33		31	
Sa	333	29	NOVEMBER	32	32	32	31	31	28	28	25	22	24	25	22	26	26	25	25	28	27	26	28	29	29	29	28	32		27	
Su	334	30	NOVEMBER	30	30	30	30	29	29	29	28	28	27	27	28	29	28	28	28	29	26	28	28	29	30	31	30	31	37	23	27
M	335	1	DECEMBER	30	31	31	32	31	31	30	29	30	33	35	34	33	32	34	29	27	25	24	24	23	24	28	28	35		29	
Tu	336	2	DECEMBER	29	31	29	26	25	25	25	24	18	20	26	25	26	27	28	27	27	28	28	28	30	31	32	32	32		27	
W	337	3	DECEMBER	31	32	33	34	34	35	35	34	34	34	33	31	36	36	34	34	32	32	29	30	30	29	30	30	36		33	
Th	338	4	DECEMBER	30	31	30	30	31	32	32	31	31	31	31	30	30	29	28	30	32	27	24	20	21	20	20	24	32		28	
F	339	5	DECEMBER	30	31	30	30	30	31	31	31	33	33	32	32	33	35	35	35	36	35	32	33	33	33	34	32	36		33	
Sa	340	6	DECEMBER	32	33	34	34	35	34	32	33	34	28	24	27	29	30	31	27	29	27	31	28	29	28	26	26	35		30	
Su	341	7	DECEMBER	25	25	27	31	30	32	31	33	34	30	31	30	29	27	27	24	25	32	30	30	27	29	27	26	34		29	
M	342	8	DECEMBER	22	23	24	19	14	10	8	3	3	2	2	2	6	17	25	25	19	15	23	20	20	23	20	19	25		15	
Tu	343	9	DECEMBER	21	27	28	25	27	30	26	28	25	21	30	27	27	30	26	21	30	30	28	25	27	27	28	30	30		27	
W	344	10	DECEMBER	30	32	26	25	25	23	22	14	5	5	5	17	25	26	27	21	16	17	18	25	23	18	17	16	32		20	
Th	345	11	DECEMBER	15	17	19	21	22	23	23	21	20	15	28	29	29	28	30	32	32	25	20	20	23	28	25	26	32		24	
F	346	12	DECEMBER	26	26	27	27	26	25	24	24	10	18	23	27	27	24	23	21	22	21	22	21	21	23	24	23	27		23	
Sa	347	13	DECEMBER	24	24	23	22	22	26	27	23	22	25	28	28	26	25	26	28	28	29	27	30	31	33	31	31	33		27	
Su	348	14	DECEMBER	28	30	30	27	29	29	24	21	20	22	23	24	24	25	23	15	9	10	23	19	22	21	23	27	30		22	
M	349	15	DECEMBER	25	24	22	25	24	26	27	26	24	24	29	23	24	27	28	23	19	17	7	13	17	13	24	17	29		22	
Tu	350	16	DECEMBER	24	29	31	33	33	35	34	33	31	30	29	29	30	29	30	30	29	29	28	27	28	27	29	30	35		30	
W	351	17	DECEMBER	33	32	33	32	29	31	31	31	30	24	27	26	27	26	27	27	30	32	34	33	33	31	33	34	34		31	
Th	352	18	DECEMBER	33	33	34	34	34	33	32	33	30	31	29	29	28	25	26	19	4	10	7	17	20	26	30	32	34		26	
F	353	19	DECEMBER	30	30	21	25	30	29	30	30	27	31	32	29	30	27	30	26	22	23	24	24	24	25	25	26	32		27	
Sa	354	20	DECEMBER	26	29	28	28	28	28	29	28	27	26	27	25	26	23	22	21	22	23	21	20	21	19	22	24	29		25	
Su	355	21	DECEMBER	24	27	25	20	21	22	21	20	20	21	20	19	19	21	21	21	20	22	24	25	24	24	25	24	27		22	
M	356	22	DECEMBER	24	24	24	24	24	24	25	24	22	14	20	15	16	17	21	15	14	19	19	14	13	7	13	19	25		19	
Tu	357	23	DECEMBER	21	20	21	21	23	23	22	22	23	19	19	19	19	11	8	9	9	13	12	16	11	11	13	19	23		17	
W	358	24	DECEMBER	23	31	27	26	25	24	22	21	21	21	20	21	24	19	19	21	22	23	24	24	24	25	24	25	31		23	
Th	359	25	DECEMBER	25	25	25	27	30	30	28	26	27	27	30	32	32	28	23	16	18	23	11	15	16	27	28	31	32		25	

F	360	26	DECEMBER	32	33	34	33	31	32	33	30	30	30	29	[illegible]	31	29	29	29	31	20	29	31	32	30	28	31	34		30	
	361	27			30			31	!		32	32			31			29			30	31		!	32						
Su	362	28	DECEMBER	33	33	34	33	33	33	32	32	32	31	32	32	33	33	32	33	33	33	33	32	33	33	33	33	34		..	
M	363	29	DECEMBER	32	32	31	31	32	32	31	32	32	32	30	28	23	22	18	16	4	4	6	7	15	16	14	14	32		22	
Tu	364	30	DECEMBER	23	29	29	27	25	26	27	26	27	26	28	27	27	25	23	14	18	24	14	8	9	7	24	26	29		22	
W	365	31	DECEMBER	26	26	25	25	25	26	23	19	16	18	16	19	18	13	14	8	8	8	9	10	12	12	18	22	26	36	17	25

diurnal data

cy 1986	24	24	24	24	24	24	24	24	24	25	26	27	28	29	29	28	27	26	25	24	24	23	23	24	sum max=	73	sum mean=	26
sum 1986	23	23	23	23	23	23	24	23	26	27	28	29	30	31	31	31	30	29	27	26	24	23	23	23	cy max=	73	cy mean=	25

data capture

monthly hourly values %

January	238	31
February	497	74
March	540	72
April	687	95
May	705	95
June	636	88
July	741	99
August	708	95
September	717	99
October	744	100
November	699	97
December	744	100

summer data capture
hourly values 4194 95.4

calendar year data capture
hourly values 7656 97.3

date(hours)or = 60,80,100,120)max value(hour of day)

2	MAY	(1, 0, 0, 0)	61(15)
26	JUNE	(2, 0, 0, 0)	73(16)
27	JUNE	(3, 0, 0, 0)	66(21)
28	JUNE	(6, 0, 0, 0)	69(15)

numbers in the right hand columns below,represent the frequency of values < or = to the adjacent value in the left hand columns,but > than the preceding value in those columns.

cy		sum	
freq dist		freq dist	
5	146	5	96
10	286	10	178
15	434	15	249
20	975	20	520
25	1603	25	807
30	2039	30	752
35	1444	35	733
40	519	40	455
45	141	45	136
50	40	50	39
55	13	55	13
60	4	60	4
65	7	65	7
70	4	70	4
75	1	75	1
80	0	80	0
85	0	85	0
90	0	90	0
95	0	95	0
100	0	100	0
105	0	105	0
110	0	110	0
115	0	115	0
120	0	120	0
125	0	125	0
130	0	130	0
135	0	135	0
140	0	140	0
145	0	145	0
150	0	150	0

FILENAME BHO3CY87.WK1

BUSH HOURLY MEAN OZONE DATA FOR CALENDAR YEAR 1987(rural,180m asl,NT245635,UV absorption)

Table 4

WEEK DAY	JULIAN DAY	DAY	MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	max hrly daily	max hrly monthly	mean daily	mean monthly
				HOUR NO.(GMT)																											
Th	1	1	JANUARY	23	22	22	24	23	23	23	23	24	24	24	24	24	24	23	25	26	24	22	21	18	17	14	16	26		22	
F	2	2	JANUARY	17	17	15	17	17	20	20	20	20	20	19	17	21	20	21	16	5	5	9	6	3	2	4	8	21		14	
Sa	3	3	JANUARY	6	11	16	10	8	7	5	5	8	11	14	21	20	17	19	17	17	16	18	17	18	18	15	17	21		14	
Su	4	4	JANUARY	21	20	19	20	22	24	26	26	27	28	29	29	30	32	32	30	29	30	32	31	31	32	32	33	33		28	
M	5	5	JANUARY	33	33	34	35	34	34	33	32	31	28	31	28	28	29	29	28	28	27	26	26	25	26	25	23	35		29	
Tu	6	6	JANUARY	24	28	25	29	26	26	28	28	24	24	24	24	23	23	22	22	22	21	17	21	22	22	22	21	29		24	
W	7	7	JANUARY	21	23	23	22	23	23	24	23	22	23	15	10	24	24	18	11	10	11	6	5	6	7	10	7	24		16	
Th	8	8	JANUARY	10	9	7	8	8	10	12	8	5	6	11	17	17	14	10	5	4	3	3	4	5	8	12	15	17		9	
F	9	9	JANUARY	14	16	12	5	5	4	3	2	2	3	3	11	13	6	6	8	2	3	4	4	3	2	2	2	16		6	
Sa	10	10	JANUARY	2	1	1	2	2	3	6	11	18	20	22	22	24	25	25	24	23	23	24	23	24	27	26	26	27		17	
Su	11	11	JANUARY	28	29	30	32	32	32	30	28	26	19	23	25	26	27	27	25	19	12	9	18	15	16	16	24	32		24	
M	12	12	JANUARY	25	29	30	27	27	29	31	29	19	17	25	25	25	25	25	25	25	25	30	30	28	22	30	30	31		26	
Tu	13	13	JANUARY	30	25	27	27	25	25	27	30	30	30	30	30	30	30	30	30	30	30	27	30	30	31	32	30	32		29	
W	14	14	JANUARY	30	33	33	33	32	33	32	31	27	23	22	20	21	20	19	20	19	18	18	18	19	20	23	25	33		25	
Th	15	15	JANUARY	27	22	20	20	19	24	21	21	12	12	14	18	18	15	12	13	10	8	16	24	21	24	23	24	27		18	
F	16	16	JANUARY	22	20	20	20	22	21	19	15	9	16	21	26	23	22	15	20	16	24	28	24	26	25	25	24	28		21	
Sa	17	17	JANUARY	26	27	29	32	32	31	24	10	10	13	17	21	21	20	23	21	17	10	14	22	22	21	20	18	32		21	
Su	18	18	JANUARY	15	11	13	12	17	17	15	14	12	14	15	17	17	18	17	15	13	14	14	13	11	8	5	6	18		13	
M	19	19	JANUARY	7	9	7	6	4	3	3	3	4	7	11			15	14	12	8	5	5	5	5	4	4	3	15		7	
Tu	20	20	JANUARY	2	2	4	6	9	13	15	13	11	13	15	17	17	25	24	20	12	10	12	13	17	18	9	17	25		13	
W	21	21	JANUARY	19	19	19	19	18	22	23	23	21	29	23	25	23	23	22	18	18	24	24	25	25	25	25	22	29		22	
Th	22	22	JANUARY	22	23	24	25	25	25	25	23	22	22	23	31	23	23	20	17	12	10	7	9	6	3	4	5	31		18	
F	23	23	JANUARY	12	16	21	14	13	9	9	9	3	4	24	26	24	23	21	20	15	15	20	7	6	3	3	3	26		13	
Sa	24	24	JANUARY	4	3	4	4	14	15	5	4	7	6	3	3	4	5	6	4	3	3	5	7	19	20	20	21	21		8	
Su	25	25	JANUARY	22	23	21	24	19	19	21	20	22	12	23	23	21	29	25	21	17	14	15	15	21	21	11	11	29		20	
M	26	26	JANUARY	19	16	13	8	10	14	19	17	3	1	7	15	22	22	20	16	2	2	2	3	4	3	4	7	22		10	
Tu	27	27	JANUARY	11	12	12	6	2	9	14	11	11	15	19	22	18	15	27	10	5	3	5	2	8	6	5	2	27		10	
W	28	28	JANUARY	7	14	23	29	30	27	28	24	23	21	23	21	17	19	15	14	7	5	1	1	1	1	3	13	30		15	
Th	29	29	JANUARY	14	11	7	7	7	10	11	11	4	2	6	13	18	26	30	4	7	4	10	8	5	8	6	12	30		10	
F	30	30	JANUARY	16	10	14	17	11	13	8	4	4	5	9	16	19	22	22	16	9	7	4	3	4	4	4	5	22		10	
Sa	31	31	JANUARY	9	13	10	8	7	7	6	3	3	4	7	10	13	15	15	14	6	7	5	3	6	3	5	4	15	35	8	17
Su	32	1	FEBRUARY	3	4	4	5	5	8	10	10	5	8	20	23	21	9	10	6	4	4	5	8	13	10	11	14	23		9	
M	33	2	FEBRUARY	13	11	11	13	14	12	9	6	5	5	6	6	8	7	10	13	11	10	4	7	8	7	8	8	14		9	
Tu	34	3	FEBRUARY	8	5	3	6	10	21	28	28	21	25	23	24	30	32	30	27	25	27	26	26	19	16	19	18	32		21	
W	35	4	FEBRUARY	24	25	23	23	24	23	23	26	24	24	27	28	32	32	28	27	28	28	26	29	30	29	29	28	32		27	
Th	36	5	FEBRUARY	29	30	31	31	30	30	29	28	29	29	35	31	31	31	30	29	29	29	27	28	28	28	28	28	35		30	
F	37	6	FEBRUARY	29	31	32	34	33	33	34	34	31	28	28	31	32	32	31	29	26	26	26	26	26	28	27	27	34		30	
Sa	38	7	FEBRUARY	30	30	29	29	30	27	23	25	20	23	21	26	23	26	27	29	26	26	30	32	27	30	30	30	32		27	
Su	39	8	FEBRUARY	27	23	21	20	20	23	27	30	30	32	31	31	31	31	31	30	31	31	30	32	33	32	33	33	33		29	
M	40	9	FEBRUARY	33	33	30	23	25	18	19	11	2	3	12	21	16	18	11	9	8	5	7	9	7	5	3	2	33		14	
Tu	41	10	FEBRUARY	2	2	1	6	20	23	20	22	24	25	22	25	30	33		31	27	24	26	26	27	27	27	27	33		22	
W	42	11	FEBRUARY	28	31	32	31	32	30	28	26	27	27	27	27	28	24	25	23	17	10	7	8	12	11	18	21	32		23	
Th	43	12	FEBRUARY	21	23	24	21	20	20	15	13	7	7	16	20	20	18	12	11	11	9	4	4	4	4	3	2	24		13	
F	44	13	FEBRUARY	1	1	2	1	1	1	1	1	3	3	9	4	5	7	14	7	14	11	8	4	2	11	11	11	14		6	
Sa	45	14	FEBRUARY	9	10	9	11	11	14	16	14	11	10	17	21	20	19	28	25	13	8	7	4	3	7	4	2	28		12	
Su	46	15	FEBRUARY	2	2	2	2	3	3	2	2	4	9	16	21	23	28	31	29	19	3	6	4	3	2	4	4	31		9	
M	47	16	FEBRUARY	11	21	28	26	27	27	27	27	20	24	29	24	27	24	24	21	18	16	13	13	13	14	19	22	29		21	
Tu	48	17	FEBRUARY	24	26	27	26	24	24	25	28	24	24	28										17	19	24	25	28		24	
W	49	18	FEBRUARY	26	30	18	10	12	15	23	19	12			12	17	22	15	21	15	2	9	12	6	4	12	19	30		15	
Th	50	19	FEBRUARY	18	22	23	23	25	26	22	19	11	19	15	19	15	11	13	14	12	13	2	14	3	1	1	4	26		14	
F	51	20	FEBRUARY	4	12	11	19	18	21	20	6	4	6	12	14	15	17	20	18	12	8	2	5	1	1	3	3	21		10	
Sa	52	21	FEBRUARY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				

Su	53	22	FEBRUARY	21	20	24	22	22	19	23	22	22	27	25	24	28	28	26	23	23	15	17	19	20	24	26	25	28		23	
M	54	23	FEBRUARY	27	25	25	26	23	21	20	17	6	17	26	31	26	33	29	27	26	21	18	15	12	12	14	17	33		21	
Tu	55	24	FEBRUARY	25	20	25	25	25	22	22	13	11	21	22	25	29	29	29	30	27	15	5	21	16	7	14	9	30		20	
W	56	25	FEBRUARY	7	8	8	10	12	12	7	10	13	18	18	23	22	21	20	16	14	12	12	13	13	11	7	7	23		13	
Th	57	26	FEBRUARY	8	8	6	5	4	3	2	2	3	7	11	15	11	8	4	5	5	3	1	1	1	2	2	1	15		5	
F	58	27	FEBRUARY	1	1	10	16	15	21	22	20	21	23	24	26	26	29	28	27	25	25	22	27	30	28	23	25	30		21	
Sa	59	28	FEBRUARY	26	25	26	26	25	26	27	31	30	30	29	29	33	32	30	28	28	26	21	20	16	15	17	15	33	35	25	18
Su	60	1	MARCH	11	11	16	23	25	25	22	23	22	20	20	17	16	16	17	18	17	17	17	18	17	20	20	14	25		18	
M	61	2	MARCH	7	32	35	36	36	37	34	34	31	32	34	35	35	34	33	31			21	23	20	26	27	29	37		30	
Tu	62	3	MARCH	22	18	15	14	13	15	7	7	17	24	28	28	29	29	29	29	27	27	27	20	8	14	15	15	29		20	
W	63	4	MARCH	17	14	12	11	11	9	9	9	12	25	22	26	28	29	32	27	22	19	22	25	21	11	14	15	32		18	
Th	64	5	MARCH	20	19	21	19	18	21	23	22	19	20	22	22	22	23	19	19	18	13	14	16	15	17	23	24	24		20	
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Sa	66	7	MARCH	7	12	12	12	15	21	18	11	17	25	25	26	28	29	28	23	20	22	26	28	28	29	30	29	30		22	
Su	67	8	MARCH	28	25	24	21	22	20	20	16	16	18	21	26	31	32	33	32	29	28	27	30	31	31	33	34	34		26	
M	68	9	MARCH	34	33	33	31	30	28	31	32	25	39	23	26	24	28	28	27	27	26	27	28	31	32	30	32	39		29	
Tu	69	10	MARCH	34	32	31	33	36	33	32	27	27	32	35	36	36	35	34	30	29	28	28	22	24	21	26	26	36		30	
W	70	11	MARCH	26	27	28	31	22	20	19	15	17	29	34	35	38	36	27	35	32	24		12	10	9	10	9	38		24	
Th	71	12	MARCH	15	15	12	7	6	10	5	6	9	15	20	27	28	32	32	30						9	12	10	32		16	
F	72	13	MARCH	10	8	13	10	7	6	1	1	0	1	11	22	33	37	38	37	34	29	21	20	19	19	25	29	38		18	
Sa	73	14	MARCH	33	32	29	20	10	9	12	19	14	17	20	19	19	19	24	31	32	31	31	27	28	32	33	34	34		24	
Su	74	15	MARCH	34	33	35	35	36	36	37	38	38	38	38	35	34	35	35	33	33	30	28	26	25	29	27	27	38		33	
M	75	16	MARCH	28	29	29	28	25	24	27	25	24	29	28	25	28	31	33	37	36	35	35	35	37	36	37	36	37		31	
Tu	76	17	MARCH	37	36	36	37	37	37	37	36	36	36	38	37	35	33	35	39	35	34	34	32	33	33	36	34	39		35	
W	77	18	MARCH	34	35	34	34	32	30	30	27	26	38	32	34	34	33	33	30	29	26	29	32	30	24	27	28	38		31	
Th	78	19	MARCH	31	29	28	26	27	26	26	27	25	27	29	30	28	26	31	32	30	19	19	23	29	25	26	24	32		27	
F	79	20	MARCH	25	26	27	29	28	28	27	26	26	26	26	30	32	34	33	33	30	30	24	25	27	28	25	23	34		28	
Sa	80	21	MARCH	18	19	20	22	23	21	22	23	23	27	32	35	36	36	34	36	35	34	30	28	30	29	30	31	36		28	
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Tu	83	24	MARCH	29	27	29	25	22	18	23	26	27	32	35	36	37	36	36	34	34	34	33	26	31	30	29	27	37		30	
W	84	25	MARCH	25	26	27	22	17	15	14	8	10	11	13	30	37	40	40	41	39	37	36	29	23	28	34	33	41		27	
Th	85	26	MARCH	33	31	32	32	30	30	31	33	34	37	38	39	39	36	37	38	36	36	30	27	24	33	40	40	40		34	
F	86	27	MARCH	39	38	38	39	39	38	37	35	33	34	36	35	36	36	35	34	29	24	24	27	31	33	35	37	39		34	
Sa	87	28	MARCH	37	38	37	36	39	43	42	41	41	41	41	41	39	40	38	40	39	38	36	38	39	37	31	30	43		38	
Su	88	29	MARCH	27	29	29	27	24	24	29	34	36	38	40	41	41	41	40	39	37	36	37	36	35	34	35	35	41		34	
M	89	30	MARCH	36	37	38	37	37	36	34	32	33	35	34	35	36	36	35	39	39	39	36	37	31	31	32	32	39		35	
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W	91	1	APRIL	38	41	41	38	36	32	27	25	32	35	25	27	26	25	24	25	24	24	25	26	21	14	14	17	41		28	
Th	92	2	APRIL	29	35	34	30	32	32	33	28	26	28	33	34	34	33	28	23	18	18	13	13	7	20	23	28	35		26	
F	93	3	APRIL	28	23	22	23	25	17	16	23	18	21	20	18	18	17	15	12	8		28	31	37	37	37	38	38		23	
Sa	94	4	APRIL	39	40	42	41	39	39	37	35	35	34	34	36	39	42	44	46	45	44	44	43	43	45	48	53	53		41	
Su	95	5	APRIL	54	54	54	53	51	51	50	47	46	45	43	43	43	41	39	39	38	39	42	42	42	44	44	46	54		45	
M	96	6	APRIL	49	52	54	52	52	49	40	34	31	31	31	30	27	25	22	38	21	23	20	20	21	27	30	33	54		34	
Tu	97	7	APRIL	35	32	31	29	28	26	18	13	8	8	8	18	17	15	20	22	22	24	28	29	35	36	40	43	43		24	
W	98	8	APRIL	47	49	48	44	44	42	42	39	34	40	42	40	39	35	33	27	24	27	30	29	27	29	34	31	49		36	
Th	99	9	APRIL	33	36	38	34	31	31	30	32	33	34	42	39	38	40	45	42	41	43	42	40	34	33	36	35	45		37	
F	100	10	APRIL	37	37	37	36	35	35	31	31	32	35	35	36	37	37	35	34	33	35	34	34	30	25	27	30	37		34	
Sa	101	11	APRIL	35	36	30	33	35	35	36	37	36	36	36	35	35	36	37	36	34	34	29		31	37	35	33	37		35	
Su	102	12	APRIL	32	30	24	20	18	16	15	20	26	33	37	40	40	43	43	43	41	40	39	35	32	35	37	38	43		32	
M	103	13	APRIL	36	33	33	30	30	30	29	27	27	28	33	33	34	39	42	40	38	37	36	30	27	26	22	23	42		32	
Tu	104	14	APRIL	27	27	18	16	24	25	22	31	32	39	41	40	41	41	39	37	37	37	35	33	31	28	27	25	41		31	
W	105	15	APRIL	27	34	37	39	40	38	37	35	34	36	39	41	33	31	34	34	32	33	31	30	29	28	30	31	41		34	
Th	106	16	APRIL	34	35	40	42	43	43	42	41	40	40	40	41	43	43	43	43	43	42	40	34	25	22	20	17	43		37	
F	107	17	APRIL	21	19	20	17	13	9	7	5	17	24	27	22	29	19		37	39	27	16		42	39	32	19	42		23	
Sa	108	18	APRIL	41	30	64	64	46	42	39	37	36	35	35	39	39	37	37	39	38	36	36	34	36	34	34	35	64		39	
Su	109	19	APRIL	36	34	33	35	36	37	36	39	40	41	42	41	41	41	40	38	36	37	34	33	32	32	37	36	42		37	
M	110	20	APRIL	37	38	35	35	36	35	35	35	37	38	37	37	36	36	38	40	40	38	35	36	34	32	30	31	40		36	
Tu	111	21	APRIL	31	31	34	36	37	36	35	33	34	35	37	37	38	41	40	40	40	41	39	37	34	32	28	26	41		36	
W	112	22	APRIL	28	33	33	33	31	34	28	31	33	31	36	41	42	46	46	47	44	40	44	43	26	18	10	10	47		34	
Th	113	23	APRIL	24	20	13	15	12	12	11	25	38	48	49	52	53	50	41	45	47	48	37		23	20	13	7	53		31	
F	114	24	APRIL	10	11	10	6	10	11	7	18	22	23	27	37	35	45	52	55	47		16		1	0	0	0	55		20	
Sa	115	25	APRIL	0	1	18	23	22	22	13	26	35	35	39	51	58	67	67	61	54	49	33	24	22	23	19	21	67		33	
Su	116	26	APRIL	7	3	17	23	22	23	26	39	55	62	66	81	84	92	96	94	91	86	80	72	77	76	74	74	96		59	
M	117	27	APRIL	78	71	64	64	66	68	61	67	68	72	79	80	79	79	79	79	77	68	60	54	56	50	29	31	80		66	
Tu	118	28	APRIL	24	30	58	70	84	84	75	59	64	73	69	75	83	85	92	83	68	60	56	30	30	33	36	40	92		61	

W	119	29	APRIL	40	39	30	26	25	22	14	38	53	59	62	57	57	53	49	47	47	46	44	40	36	30	36	42 :	62	:	41	
Th	120	30	APRIL	44	42	39	40	39	38	38	37	38	36	40	43	40	39	42	40	37	37	36	34	32	34	33	40 :	44	96 :	38	36
F	121	1	MAY	30			42	38	35	34	33	33	36	41	44	44	45	44	44	44	43	41	41	41	40	41	47 :	47	:	40	
Sa	122	2	MAY	50	50	51	50	50	50	48	45	46	46	45	46	46	46	49	45	41	42	44	43	44	42	42	41 :	51	:	46	
Su	123	3	MAY	40	40	40	36	32	29	26	23	27	32	34	35	35	34	33	32	33	33	33	27	29	27	28	22 :	40	:	32	
M	124	4	MAY	16	19	25	31	24	28	32	31	32	34	36	38	41	41	40	40	39	39	37	38	39	40	41	41 :	41	:	34	
Tu	125	5	MAY	42	46	48	47	47	45	46	44	44	45	50	54	54	54	53	53	48	44	42	43	35	34	34	33 :	54	:	45	
W	126	6	MAY	31	33	35	31	27	24	28	31	35	38	38	42	45	48	51	47	39	42	43	36	19	11	28	28 :	51	:	35	
Th	127	7	MAY	32	23	22	26	20	17	31	33	38	39	41	44	47	49	50	51	53	49	46	46	37	41	37	34 :	53	:	38	
F	128	8	MAY	31	36	35	37	31	36	45	46	47	49	48	49	50	50	53	51	51	48	45	40	39	34	36	40 :	53	:	43	
Sa	129	9	MAY	44	43	48	49	49	45	40	38	39	38	38	35	36	37	37	37	37	35	34	32	30	28	25	25 :	49	:	38	
Su	130	10	MAY	25	23	29	28	29	33	32	32	29	31	36	40	41	38	37	38	38	36	35	33	34	35	35	38 :	41	:	34	
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Th	134	14	MAY	32	29	28	26	27	28	26	23	22	34	30	34	35	30	26	29	32	38	39	37	34	33	28	33 :	39	:	30	
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Sa	136	16	MAY	12	13	11	10	11	11	19	31	34	30	30	35	36	41	44	38	37	40	37	36	35	31	26	24 :	44	:	28	
Su	137	17	MAY	29	31	32	32	31	28	27	29	33	34	33	32	29	22	23	25	24	27	28	28	26	25	29	30 :	34	:	29	
M	138	18	MAY	30	28	36	43	44	40	37	37	36	41	46	43	44	44	34	32	39	38	28	27	26	23	24	27 :	46	:	35	
Tu	139	19	MAY	27	25	27	28	26	25	25	27	22	21	25	28	32	30	36	35	30	36	37	31	20	11	14	17 :	37	:	26	
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F	142	22	MAY	27	26	26	26	29	30	30	29	30	31	28	31	32	33	33	33	33	32	31	29	22	22	19	23 :	33	:	29	
Sa	143	23	MAY	23	20	24	21	20	21	20	21	26	25	25	26	28	30	31	34	34	34	32	32	36	34	34	36 :	36	:	28	
Su	144	24	MAY	33	31	35	36	36	38	37	37	37	37	37	36	37	38	39	38	37	36	37	37	38	38	38	36 :	39	:	37	
M	145	25	MAY	38	37	38	39	38	38	38	33	35	35	33	33	35	31	34	33	28	23	27	28	31	31	31	30 :	39	:	33	
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Sa	269	26	SEPTEMBER	21	19	20	18	19	16	17	22	21	16	20	23	28	29	29	28	24	21	19	18	18	22	24	18 :	29	:	21	
Su	270	27	SEPTEMBER	15	14	17	14	21	20	19	19	17	20	21	22	23	21	17	20	13	2	0	0	0	0	2	3 :	23	:	13	
M	271	28	SEPTEMBER	4	4	5	6	6	5	4	1	7	9	10	9	18	25	23	17	15	12	10	7	12	7	9	10 :	25	:	10	
Tu	272	29	SEPTEMBER	10	9	13	14	13	11	6	12	19	22	30	42	42	48	19	14	7	2	1	1	3	1	7	11 :	48	:	15	
W	273	30	SEPTEMBER	5	9	11	5	8	4	2	1			10	25	27	25	21	24	23	20	16	16	15	16	15	17 :	27	48 :	14	20
Th	274	1	OCTOBER	16	16	13	11	6	3	0	2	10	15	18	24	21	17	19	22	18	12	2	4	10	6	9	11 :	24	:	12	
F	275	2	OCTOBER	12	11	13	12	13	13	13	11	13	14	13	14	19	27	33	28	27	20	7	6	11	13	17	20 :	33	:	16	
Sa	276	3	OCTOBER	16	17	17	19	20	18	16	11	9	12	13	18	23	29	30	28	17	7	11	16	9	13	18	14 :	30	:	17	
Su	277	4	OCTOBER	16	18	14	23	23	19	16	9	16	17	19	18	16	18	22	21	17	16	14	16	13	6	9	9 :	23	:	16	
M	278	5	OCTOBER	15	20	20	21	17	16	19	20	19	20	21	22	22	18	19	20	17	18	20	23	19	23	22	27 :	27	:	20	
Tu	279	6	OCTOBER	25	22	24	27	26	22	21	24	24	28	29	28	28	27	28	27	24	26	25	27	27	25	25	23 :	29	:	26	
W	280	7	OCTOBER	22	21	22	23	24	23	20	14	18	25	25	21	18	15	16	14	14	13	26	22	17	19	10	12 :	26	:	19	
Th	281	8	OCTOBER	12	15	17	16	19	17	12	7	11	15	28	24	26	26	26	27	25	22	22	20	23	26	22	23 :	28	:	20	
F	282	9	OCTOBER	22	23	22	26	31	30	24	26	27	27	30	31	31	25	19	20	14	4	2	1	15	15	9	15 :	31	:	20	
Sa	283	10	OCTOBER	11	18	15	15	12	7	6	3	6	14	16	18	13	13	12	13	10	13	14	7	10	11	6	10 :	18	:	11	
Su	284	11	OCTOBER	21	19	17	16	15	16	14	7	10	16	22	25	27	27	27	24	20	7	2	1	6	14	17	19 :	27	:	16	
M	285	12	OCTOBER	15	15	10	9	12	8	1	2	2	4	3	9	14	20	18	14	11	6	6	6	7	16	19	12 :	20	:	10	
Tu	286	13	OCTOBER	12	7	18	19	16	22	16	18	20	22	23	28	30	29	11			5	4	9	10	9	17	17 :	30	:	16	
W	287	14	OCTOBER	18	17	17	9	13	13	6	1	6	20	23	26	25	26	25	24	22	12	4	2	3	1	0	5 :	26	:	13	
Th	288	15	OCTOBER	9	13	16	14	14	13	10	11	16	13	12	12	15	17	15	17	15	15	14	12	15	20	20	20 :	20	:	15	
F	289	16	OCTOBER	21	22	21	21	22	18	16	11	14	16	21	24	25	28	29	29	29	26	24	23	22	22	23	23 :	29	:	22	
Sa	290	17	OCTOBER	21	25	28	30	28	27	26	24	25	26	28	28	29	29	30	29	27	15	20	24	25	24	21	21 :	30	:	25	
Su	291	18	OCTOBER	20	19	17	24	27	28	28	29	27	26	33	33	32	28	25	29	29	28	28	26	25	17	23	23 :	33	:	26	
M	292.	19	OCTOBER	20	14	10	13	14	12	9	4	10	19	7	3	2	1	1	1	13	20	9	3	1	4	4	3 :	20	:	8	
Tu	293	20	OCTOBER	4	6	3	4	3	5	3	1	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1 :	6	:	2	
W	294	21	OCTOBER	1	0	0	0	0	0	0	0	8	1	1	0	16	28	29	26	24	26	27	30	31	30	30	31 :	31	:	14	
Th	295	22	OCTOBER	32	31	31	30	30	30	29	28	28	27	27	29	27	30	28	28	23	24	24	18	9	20	12	17 :	32	:	26	
F	296	23	OCTOBER	24	26	18	16	14	11	7	7	13	19	23	28	31	30	27	25	13	13	13	7	5	6	8	10 :	31	:	16	
Sa	297	24	OCTOBER	18	11	7	12	12	10	5	9	15	20	21	25	29	29	29	25	18	11	19	19	20	24	22	23 :	29	:	18	
Su	298	25	OCTOBER	24	24	24	25	25	24	24	26	28	29	30	30	31	31	32	32	30	31	31	32	34	34	33	31 :	34	:	29	
M	299	26	OCTOBER	27	28	28	27	27	24	22	24	26	27														:		:		
Tu	300	27	OCTOBER																								:		:		
W	301	28	OCTOBER																								:		:		
Th	302	29	OCTOBER																								:		:		
F	303	30	OCTOBER																								:		:		
Sa	304	31	OCTOBER	1	0	0	0	0	0	0	0	0	0	1	1	1	4	11	1	0	4	8	3	5	1	2	5 :	11	34 :	2	17
Su	305	1	NOVEMBER	12	10	8	6	6	9	17	20	18	18	20	19	25	23	24	20	14	22	23	21	20	23	25	25 :	25	:	18	
M	306	2	NOVEMBER	24	25	26	26	26	26	25	23	24	34	28	26	23	20	17	12	5	6	0	2	9	12	16	15 :	34	:	19	
Tu	307	3	NOVEMBER	14	9	10	10	9	5	3	1	8	1	4	23	21	23	23	20	12	8	18	24	15	17	17	22 :	24	:	13	
W	308	4	NOVEMBER	19	14	12	10	8	10	2	1	2	22	27	29	27	27	23	15	2	0	0	0	0	0	5	4 :	29	:	11	
Th	309	5	NOVEMBER	7	6	6	3	1	3	1	1	0	0	9	16	6	1	1	0	0	0	0	1	0	0	1	0 :	16	:	3	
F	310	6	NOVEMBER	5	14	14	11	8	2	0	1	4	5	7	9	9	7	8	5	0	1	0	0	0	0	1	4 :	14	:	5	
Sa	311	7	NOVEMBER	1	11	17	8	14	14	14	18	18	16	20	21	20	18	18	17	12	12	8	9	8	6	4	6 :	21	:	13	
Su	312	8	NOVEMBER	7	4	3	0	0	0	1	3	3	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0 :	7	:	1	
M	313	9	NOVEMBER	0	2	6	10	12	11	9	7	1	5	11	15	17	18	8	12	15	8	9	15	22	14	14	16 :	22	:	10	
Tu	314	10	NOVEMBER	14	9	12	8	3	1	0	0	1	9	4	5	26	25	28	26	21	16	13	17	21	20	24	24 :	28	:	14	

W	315	11	NOVEMBER	24	24	28	29	28	23	20	15	12	14	18	21	36	29	20	15	19	25	27	27	28	28	25	26	36		23	
Th	316	12	NOVEMBER	26	25	25	24	25	24	25	24	25	26	26	27	27	27	26	26	27	27	22	14	16	17	22	25	27		24	
F	317	13	NOVEMBER	27	28	28	28	26	25	23	22	21	17	16	20	24	26	23	24	19	20	23	25	26	27	28	27	28		24	
Sa	318	14	NOVEMBER	28	27	27	27	28	27	26	25	23	25	26	29	27	26	26	21	19	17	19	20	15	17	19	17	29		23	
Su	319	15	NOVEMBER	17	20	20	21	23	26	24	24	24	24	22	22	21	21	22	24	21	21	21	17	18	23	29	28	29		22	
M	320	16	NOVEMBER	27	28	29	27	27	29	28	27	24	24	25	26	27	28	28	27	26	25	24	24	26	26	27	27	29		27	
Tu	321	17	NOVEMBER	27	28	29	29	30	30	29	28	27	29	29	30	28	27														
W	322	18	NOVEMBER																												
Th	323	19	NOVEMBER														27	27	28	27	27	27	27	29	30	28	28				
F	324	20	NOVEMBER	28	28	28	28	28	28	28	26	25	21	21	25	28	26	25	24	27	27	21	22	20	17	18	20	28		25	
Sa	325	21	NOVEMBER	28	31	32	31	33	33	32	33	33	32	32	33	32	32	33	31	29	27	28	28	29	29	29	30	33		31	
Su	326	22	NOVEMBER	28	27	26	26	28	28	29	31	30	30	28	31	30	30	27	23	26	27	24	22	21	23	25	26	31		27	
M	327	23	NOVEMBER	28	21	18	16	25	28	25	22	19	19	20	19	25	18	17	14	13	13	15	20	22	21	21	22	28		20	
Tu	328	24	NOVEMBER	24	27	28	27	27	27	26	21	18	20	22	23	25	24	22	19	18	18	17	20	23	24	23	25	28		23	
W	329	25	NOVEMBER	26	26	25	24	22	24	25	23	22	22	20	20	21	22	22		9	8	12	18	21	21	23	23	26		21	
Th	330	26	NOVEMBER	17	17	15	15	11	8	4	3	2	2	8	12	13	22	21	12	4	3	2	1	1	2	5	5	22		9	
F	331	27	NOVEMBER	6	8	13	14	12	10	16	9	8	7	9	11	11	15	14	12	9	6	4	5	7	9	9	11	16		10	
Sa	332	28	NOVEMBER	9	11	14	13	13	11	11	9	12	7	11	14	17	18	21	18	18	21	22	21	20	18	18	18	22		15	
Su	333	29	NOVEMBER	21	20	20	21	18	15	14	12	12	12	11	12	16	14	12	10	2	4	17	20	20	21	22	24	24		15	
M	334	30	NOVEMBER	23	25	27	27	29	28	28	23	5	3	12	23	25	22	17	11	11	9	4	2	2	1	8	9	29	36	16	17
Tu	335	1	DECEMBER	7	6	12	12	11	13	15	15	2	1	1	3	11	14	11	10	10	6	7	5	13	12	11	14	15		9	
W	336	2	DECEMBER	15	16	17	18	19	17	15	14	5	4	13	16	19	18	21	12	5	2	6	8	9	14	16	22	22		13	
Th	337	3	DECEMBER	25	23	22	24	27	24	23	18	15	12	16	23	21	24		20	18	14	12	17	19	16	16	16	27		19	
F	338	4	DECEMBER	17	16	18	17	16	14	12	7	2	3	6	6	6	12	15	7	2	2	2	4	2	2	7	12	18		9	
Sa	339	5	DECEMBER	11	9	15	16	19	21	19	16	18	18	21	22	23	25	23	24	24	23	27	26	26	29	26	23	29		21	
Su	340	6	DECEMBER	27	29	29	26	29	30	29	26	25	27	25	25	26	26	23	26	29	30	27	24	24	26	28	33	33		27	
M	341	7	DECEMBER	36	42	43	35	29	23	23	17	3	3	15	13	21	12	5	2	1	1	1	2	1	1	1	2	43		14	
Tu	342	8	DECEMBER	4	8	10	12	14	12	9	14	9	17	9	14	17	14	13	10	8	4	7	7	5	6	4	5	17		10	
W	343	9	DECEMBER	5	7	9	10	10	8	9	5	3	5	8	12	10	7	10	10	12	8	6	4	5	6	7	10	12		8	
Th	344	10	DECEMBER	11	13	13	13	15	16	13	12	8	7	14	14	13	11	8	11	9	6	4	6	5	6	5	4	16		10	
F	345	11	DECEMBER	6	7	9	7	6	2	2	2	2	2	2	11	7	2	2	1	1	2	2	1	4	5	4	5	11		4	
Sa	346	12	DECEMBER	3	3	4	5	8	17	16	9	2	2	2	4	5	7	5	2	4	8	6	5	10	11	12	12	17		7	
Su	347	13	DECEMBER	14	15	17	18	12	8	8	2	1	1	6	14	14	1	1	1	1	1	1	1	1	1	1	2	18		6	
M	348	14	DECEMBER	2	1	1	1	1	1	1	1	1	1	3	3	3	3	8	1	2	5	3	11	9	12	8	8	12		4	
Tu	349	15	DECEMBER	7	5	5	10	16	14	13	5	2	3	6	14	15	9	5	2	2	2	2	2	2	2	1	1	16		6	
W	350	16	DECEMBER	1	2	1	1	1	2	1	2	2	2	2	2	2	2	5	1	2	1	1	2	2	1	1	1	5		2	
Th	351	17	DECEMBER	1	2	4	5	11	12	13	7	4	2	3	1	3	15	14	11	12	14	23	25	27	27	27	27	27		12	
F	352	18	DECEMBER	18	16	18	17	22	22	23	27	24	24	23	21	22	23	23	23	24	24	31	25	25	27	28	28	31		23	
Sa	353	19	DECEMBER	29	29	30	31	31	31	32	30	26	22	22	20	21	23	22	23	22	22	23	24	27	26	27	28	32		26	
Su	354	20	DECEMBER	27	25	26	26	26	25	25	25	26	28	29	30	29	28	29	28	29	28	28	28	27	26	23	20	30		27	
M	355	21	DECEMBER	19	17	19	17	18	24	23	24	24	26	29	28	28	27	28	24	27	30	31	33	32	32	32	32	33		26	
Tu	356	22	DECEMBER	32	32	32	33	31	30	30	29	24	24	31	31	22	24	24	18	10	14	18	21	24	24	26	23	33		25	
W	357	23	DECEMBER	24	23	23	20	18	15	14	15	16	17	13	11	8	6	6	5	4	6	7	9	11	11	8	8	24		12	
Th	358	24	DECEMBER	9	7	9	8	7	7	6	11	12	17	15	15	18	19	18	20	19	16	13	10	7	7	8	12	20		12	
F	359	25	DECEMBER	16	21	28	27	29	28	28	28	29	29	30	28	29	30	29	30	29	29	28	28	27	26	26	29	30		28	
Sa	360	26	DECEMBER	31	30	30	31	30	31	30	30	30	30	29	30	26	27	28	28	28	30	30	28	30	29	30	30	31		29	
Su	361	27	DECEMBER	30	31	27	26	24	23	18	18	16	8	17	20	23	23	23	29	32	34	32	35	34	40	32	32	40		26	
M	362	28	DECEMBER	32	28	26	25	22	20	20	24	26	27	28	28	29	29	29	30	30	31	31	31	30	30	30	29	32		28	
Tu	363	29	DECEMBER	29	29	29	30	31	32	31	26	25	24	21	25	27	30	33	33	31	32	32	31	28	28	30	29	33		29	
W	364	30	DECEMBER	29	30	30	30	30	31	30	27	25	24	25	14	15	21	27	23	21	21	19	16	10	10	14	15	31		22	
Th	365	31	DECEMBER	19	22	24	29	37	36	36	35	35	38	34	32	33	32	33	33	31	31	31	31	31	31	31	32	38	43	32	17

diurnal data

cy 1987	21	21	22	22	22	22	21	21	21	23	24	26	27	27	27	26	24	23	22	21	20	19	20	20	:sum max= 96	:sum mean=	26
sum 1987	23	23	24	24	24	24	24	24	26	28	29	30	31	32	32	31	30	29	27	25	23	22	22	22	:cy max= 96	:cy mean=	23

data capture

monthly hourly values %

January	742	99
February	660	98
March	732	98
April	713	99
May	729	98
June	720	100
July	726	98
August	716	96
September	717	99
October	632	85
November	672	93
December	743	99

summer data capture
hourly values 4321 98.3

calendar year data capture
hourly values 8502 97.0

date(hours)		or = 60,80,100,120)	max value(hour of day)
18	APRIL	(2, 0, 0, 0)	64(03,04)
25	APRIL	(3, 0, 0, 0)	67(14,15)
26	APRIL	(15, 8, 0, 0)	96(15)
27	APRIL	(19, 1, 0, 0)	80(12)
28	APRIL	(14, 6, 0, 0)	92(15)
29	APRIL	(1, 0, 0, 0)	62(11)
6	JULY	(1, 0, 0, 0)	62(05)

numbers in the right hand columns below,represent the frequency of values (or = to
the adjacent value in the left hand columns,but) than the preceding value in those columns.

cy		sum	
freq	dist	freq	dist
5	653	5	82
10	655	10	221
15	859	15	338
20	1135	20	586
25	1629	25	882
30	1641	30	805
35	950	35	593
40	575	40	427
45	220	45	202
50	81	50	81
55	40	55	40
60	10	60	10
65	11	65	11
70	10	70	10
75	8	75	8
80	11	80	11
85	7	85	7
90	2	90	2
95	4	95	4
100	1	100	1
105	0	105	0
110	0	110	0
115	0	115	0
120	0	120	0
125	0	125	0
130	0	130	0
135	0	135	0
140	0	140	0
145	0	145	0
150	0	150	0
155	0	155	0
160	0	160	0
165	0	165	0
170	0	170	0