

ADVANCED STATIONS - RESULTS FROM THE 2ND 45-DAYS  
PERIOD OF EXTENDED CHEMICAL ANALYSES PROGRAMME  
NOVEMBER 1 - DECEMBER 15, 1974

(A PRELIMINARY DISCUSSION)

BY  
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## INTRODUCTION

In accordance with what has been decided by the Steering Committee, a second 45-days period of 24-hourly advanced sampling of air and precipitation was carried out as from November 1st, 1974.

This is a preliminary report of the results from this second 45-days period. The two periods of advanced sampling will be subject to further discussion at a later stage, and comparison will be made with the results from the Nordforsk 100-days sampling programme from the summer 1973.

## RESULTS

Results have been reported from 8 countries (the United Kingdom, France, the Netherlands, Western Germany, Switzerland, Norway, Sweden, and Finland). The data received are listed in the Appendix. As the reports from Switzerland and Western Germany include a few parameters only, they have not be subject to further discussion. Some countries have reported results from an extended period of time, but only data from the actual 45-days period November 1st-December 15th are discussed below. However, the complete set of data can be found in the Appendix. Table I gives a summary of the data available and the sampling periods for the different stations.

## CHEMICAL COMPOSITION

The mean aerosol concentrations for the period November 1st-December 15th are presented in Figure 1, expressed in  $n \text{ eq/m}^3$ . The sulphate concentrations have been corrected for sea-spray

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at Cottered only. The aerosol concentrations are generally slightly lower than those reported from the OECD 45-days advanced stations programme during February and March 1974, particularly at Cottered. The number of cations exceeds the number of anions at most stations. At Birkenes, where chloride is measured, the number of equivalents of positive and negative ions is the same, and this is also the case at Jokioinen. Wageningen has the highest concentrations of ammonium, sulphate and nitrate, and La Crouzille has reported the highest strong acid concentration. The concentration of strong acid at Cottered has been computed with pH as basis. The highest concentrations of sodium were recorded at Råø and Wageningen, while Birkenes, which is also situated close to the sea, received much less. That the sum of the equivalents of anions and cations is not equal to zero is to be expected, as a number of important components have not been determined like chloride, except in Norway, and phosphate.

The ionic balance of the mean values of the precipitation samples is similar to that of the air samples, with an excess of cations except at N 01, where chloride is included but not sodium and the number of anions is larger, and at F 03, where the positive and negative charges are equal.

As at the first 45-days advanced sampling period, the mean concentrations of ammonium and nitrate are approximately equivalent at Birkenes. This is also true for La Crouzille, Råø, and Cottered.

#### COMPARISON OF AIR AND PRECIPITATION DATA

Days with high concentrations of one or more of the components strong acid, sulphate, ammonium and nitrate in air and precipitation have been selected from each station and are

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presented in figures 2-7 as "short periods". The sulphate concentrations have been corrected for sea spray. The units are  $\text{neq./m}^3$  and  $\mu\text{eq./l}$  for easy visual matching of air and precipitation data. The concentration of an aerosol component expressed in  $\text{neq./m}^3$  will be the same as the concentration of that component in precipitation expressed in  $\mu\text{eq./l}$ , assuming a cloud water concentration of  $1 \text{ g/m}^3$ , and nearly complete rainout. Although this is a simplification of the washout/rainout process, it still provides a basis for comparison of the concentration of ions found in aerosols and precipitation. There are, of course, many factors influencing the concentrations of elements in precipitation. The processes of rainout and washout are probably dependent on the amount and intensity of precipitation (1). The concentration varies with height for sulphur dioxide, sulphate and ammonia (2,3) and may be different at ground level and in the rainforming layers of the atmosphere. The concentration of pollutants in the raindrops may be increased by evaporation of the water as the drops are falling through the atmosphere. The concentration of sulphate and nitrate in the raindrops can increase by absorption of sulphur dioxide gas and nitrogen oxide gas respectively, and subsequent oxidation and hydration. Ammonia gas may be dissolved in acid rain forming ammonium.

The three periods presented from La Crouzille (fig. 2) are November 1st and 8th, and December 12th. There were only 9 days with precipitation during the whole 45-days period. The concentrations of all the elements shown are low, generally. On November 1st, the concentrations of strong acid, ammonium and sulphate are larger in air than in precipitation, which could be due to inefficient rainout/washout of those constituents. Although 11.2 mm of precipitation were recorded, the decrease in concentration does not seem to be a dilution effect as several other compounds show higher concentrations in precipitation than in air.

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The second and third of the days presented show higher concentrations of strong acid, ammonia and sulphate in precipitation than in air, the difference being most pronounced on November 8th. This can be caused by scavenging of gaseous sulphur dioxide.

~~The concentration of nitrate was higher in air than in precipitation on November 8th, indicating a lower concentration in the rainforming layers. 5  $\mu\text{g}$  of  $\text{NO}_2$  per  $\text{m}^3$  of air were measured at ground level, which was above the average concentration of this gas for November. The higher concentrations of nitrate in precipitation relative to air on November 1st and December 12th can be due to scavenging of gaseous nitrogen dioxide, at least in the last case where it is accompanied by a higher concentration of strong acid in precipitation than in air. It is noticeable that equivalent amounts of nitrate and ammonia were found in precipitation.~~

The three days presented from Wageningen are November 8th, and 27th, and December 14th (fig. 3). Common for those days were the high concentrations of ammonium in air and the low concentrations of strong acid. The concentrations of sulphate and nitrate are approximately the same in air and precipitation the first two days, whereas on December 14th, more sulphate was found in precipitation than in air and less nitrate. The large amounts of sodium found on November 27th and December 14th indicate large amounts of chloride from sea-spray on the filters, which react with acid particles forming hydrogen chloride gas. The gas escapes and thus only small amounts of strong acid are left on the filters. This explains the increase of the concentration of acid in precipitation as compared to air. As the concentration of sulphate was higher in precipitation than in air on December 14th, scavenging of sulphur dioxide probably accounts for some of the increase of acid for that day. The lower concentration

of ammonium in precipitation than in air could be due to lower concentrations in the rainforming layers.

The amounts of precipitation recorded for the days presented were 2.5 mm, 4.3 mm, and 2.8 mm, respectively, and thus concentrations of pollutants in rainwater were very much influenced by washout.

The periods chosen from Birkenes are November 8th, 19th and 24th (figure 4). The concentrations of pollutants in air were low for all these days, whereas some elements showed considerably higher concentrations in precipitation. The increase of the concentrations of strong acid and sulphate in precipitation as compared to air points to scavenging of sulphur dioxide as a source. The concentrations of nitrate were also greater in precipitation than in air and especially so on November 8th, when the concentration of nitrogen dioxide in air was found to be  $10 \mu\text{g per m}^3$ , which was maximum for that month. The high concentrations of nitrate in precipitation are probably due to washout/rainout of nitrogen oxides. This process would also increase the concentration of ammonium in precipitation as on November 8th, provided ammonia was present in the air. The number of equivalents of strong acid plus ammonium is nearly equal to the number of equivalents of sulphate plus nitrate in the precipitation samples for all three days presented. The concentrations of chloride were measured and were found to be 2, 1 and  $10 \text{ neq./m}^3$  of air and 73, 8, and  $93 \mu\text{eq./l}$  of precipitation, respectively. As sodium was not reported in precipitation, the number of anions exceeds the number of cations on the two days with high concentrations of chloride. However, on November 19th, when the concentrations of element originating from the sea (chloride and magnesium) were low, there are equal numbers of positive and negative ions in precipitation.

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The periods presented from Råø are November 18th and 19th, December 4th (figure 5). The extreme amounts of sodium in precipitation on the first and the third days probably originate from sea-spray. The trajectories show strong winds from the North Sea. The sodium concentrations in air are also large, suggesting large concentrations of chloride on the filters. ~~The sodium chloride particles on the filter react with~~ acid particles, forming hydrogen chloride gas, which escapes to the atmosphere. This explains the very low concentrations of strong acid found on the air sample filters. The same phenomenon was observed at this station during the Nordforsk 100-days sampling programme, and during the OECD 45-days advanced sampling programme from February 15th to March 31st, 1974.

On November 18th, the concentrations of ammonium, sulphate and nitrate are larger in air than in precipitation, possibly due to inefficient washout/rainout. The amount of precipitation was only 2.6 mm. On both the other days shown, the concentrations of the above mentioned compounds were somewhat larger in precipitation than in air, which may be the effect of washout of atmospheric gases. 4.9 and 5.2 mm of rain were recorded for these days, respectively.

The periods presented from Jokioinen are November 12th, 15th, and 27th (figure 6). On the first of these days, all elements measured in both air and precipitation show slightly higher concentrations in precipitation and the difference is considerable for strong acid. The concentration of sodium on the filter was large and the trajectories show strong south-westerly winds. It is possible that interaction between sodium chloride particles from sea-spray and acid particles on the filter has caused the low concentration of strong acid in the air sample, as seemed to be the case at Råø, although the position of the station about 80 km away from a sea with low salinity makes this theory uncertain.



The increases of the concentrations of strong acid in precipitation relative to air on November 15th and 27th were accompanied by increases of the nitrate concentration and may be due to washout of nitrogen oxides. The smaller amounts of ammonium and sulphate in precipitation than in air both days could be the effect of either lower concentrations in the rain-forming layers than at ground level, or inefficient washout/rainout. 2.8 and 3.6 mm of rain were recorded these two days.

The periods presented from Cottered, November 1st, 16th and 17th (figure 7), are characterised by very high concentrations of ammonium in air as compared to the concentrations in precipitation. This may be due to lower concentrations in the rainforming layers than at ground level. Strong acid has not been measured, but has been computed from pH.

There are considerably higher concentrations of acid in precipitation than in air for all three periods. The concentration of sulphate shows an increase in precipitation relative to air on November 1st and the high strong acid value may be explained as oxidation of sulphur dioxide and subsequent hydration. 10.5  $\mu\text{g}$  of sulphur dioxide per  $\text{m}^3$  of air was recorded. The other two days show lower concentrations of sulphate in precipitation than in air, making scavenging of sulphur dioxide unlikely. The concentrations of nitrate are very much the same in air and in precipitation for the three days, which excludes scavenging of nitrogen oxide as a source of strong acid. On November 1st, the amount of precipitation was 1.9 mm and on November 16th, 1.6 mm. At such small rainfalls washout and evaporation of the rain drops can cause large fluctuations of the concentration of pollutants.

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The washout ratios in units  $10^2$  are listed in Table II. The washout ratio is defined as the concentration of a component per kg rain to the concentration per kg air. The calculations are based upon mean concentrations for the whole period. There were 9 days with precipitation at the French station and between 20 and 34 days, and the other stations. Assuming a cloud water content of  $1 \text{ g/m}^3$  as for "short periods", the washout ratio would be  $13 \times 10^2$  with complete rainout. Consequently, a washout ratio much larger than this shows that other factors have contributed to the concentration of pollutant in precipitation. This is apparently the case for strong acid at all stations, except F 03, and also for other components at some stations, e.g. nitrate. A comparison between the stations shows that N 01 has the highest ratios for all elements measured there, apart from strong acid, for which S 02 has the maximum value. The washout ratios reported from the OECD 45-days programme in February and March are similar. Washout of gases of sulphur dioxide and nitrogen oxides followed by oxidation would explain the high ratios of strong acid, sulphate and nitrate.

#### RELATIONSHIP BETWEEN MEASUREMENTS AND METEOROLOGICAL CONDITIONS

The 850 mb trajectories for the days with the 10 highest sulphate concentrations and the 10 highest strong acid concentrations in air are presented in figures 8 - 18. The trajectories are given for every 6 hour with the position of the air masses each 12th hour indicated with dots. The numbers at the arrows show the positions of the stations. These are as follows:

- |              |                  |
|--------------|------------------|
| 1. Birkenes  | 5. Cottered      |
| 2. Råø       | 6. Vert-le-Petit |
| 3. Jokioinen | 8. Wageningen    |
| 4. Keldsnor  |                  |

The position of La Crouzille is shown by the number 7. Keldsnor is included because it was expected to take part in the programme. All the high strong acid concentrations but one were recorded at La Crouzille. The trajectories for the nearby station Vert-le-Petit show air masses from the NE some days and from SW to NW at other times, although the three highest concentrations were observed in connection with air from the central part of Western Germany. A high acid concentration was observed at Cottered with trajectories from the North Sea.

The 10 highest concentrations of sulphate are reported from four stations. On three of the five days of high measurements from Wageningen, the airmasses arrived via Western Germany, on one day via Midlands in England, and on one day from the North Sea. The observations from La Crouzille coincide with days with high strong acid concentrations in airmasses from the NE. Jokioinen has reported high sulphate concentrations two days, one with airmasses from Eastern Europe, the other with air from the Soviet Union. A high sulphate concentration was found at Cottered when the trajectories arrived from the Atlantic Ocean, south of Ireland.

It appears from this brief analysis of trajectories for 850 mb that some of the very high concentrations of sulphate and strong acid are due to local sources, e.g. when the trajectories arrive from the Atlantic Ocean, whereas long range transport of pollutants has contributed on other occasions, e.g. at Jokioinen.

#### REFERENCES

- (1) Junge, C.E., Air Chemistry and Radioactivity, p. 311, Academic Press, New York, 1963
- (2) Jost, D., Tellus, 26, pp 206-211, 1974
- (3) Georgii, H.W., Müller W.J., Tellus, 26, pp. 180-185, 1974

FIGURES:

1 Air samples, November 1st /December 15th, 1974,  
mean values in n eq./m<sup>3</sup>.

2-7 Short periods, mean concentrations in air and  
precipitation samples.

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8-18 Trajectories and concentrations on days with  
high sulphate concentration and high strong acid  
concentration in air.

TABLES:

I Data available.

II Washout ratios based on mean values for the  
period November 1st/December 15th, 1974.

AIR SAMPLES:

Country	Strong acid	NO <sub>3</sub> -N	NH <sub>4</sub> -N	SO <sub>4</sub>	Ca	Mg	Na	K	Fe	Cl	NO <sub>2</sub>	TPM
United Kingdom	-	x	x	x	x	x	-	-	-	-	x	-
France	x	x	x	x	x	x	x	x	x	-	x	x
W Germany	-	-	-	x	x	-	-	-	-	-	-	-
Netherlands	x	x	x	x	x	-	x	x	x	-	x <sup>1</sup>	-
Sweden	x	x	x	x	x	-	x	-	x	-	-	x
Finland	x	x	x	x	x	-	x	-	-	-	-	-
Norway	x	x	x	x	x	x	x	x	-	x	x	x

PRECIPITATION SAMPLES:

Country	Strong acid	NO <sub>3</sub> -N	NH <sub>4</sub> -N	SO <sub>4</sub>	Ca	Mg	Na	K	Fe	Cl	N.S.
United Kingdom	-	x	x	x	x	x	-	-	-	-	20
France	x	x	x	x	x	x	x	x	-	-	9
Switzerland	-	x	-	x	-	-	-	-	-	-	13
W Germany	x	-	-	x	x	-	-	x	-	x	24
Netherlands	x	x	x	x	x	-	x	x	x	-	34
Sweden	x	x	x	x	x	-	x	-	-	-	48
Finland	x	x	x	x	x	x	x	-	x	-	32
Norway	x	x	x	x	x	x	-	x	-	x	22

TABLE I: 45-days period November 1 - December 15, 1974.  
Data available.

<sup>1</sup>NO<sub>2</sub><sup>-</sup>-N

Sampling period:

United Kingdom	A 1/11 - 19/12	P 1/11 - 26/12
France	A 1/11 - 15/12	P 1/11 - 15/12
Switzerland	A -	P 1/11 - 30/11
W Germany	A 1/12 - 31/12	P 1/11 - 31/12
Netherlands	A 1/10 - 31/12	P 1/8 - 31/1 - 1975
Sweden	A 1/11 - 13/12	P 1/11 - 14/12
Finland	A 1/11 - 15/12	P 1/6 - 31/12
Norway	A 1/11 - 31/12	P 1/11 - 31/12

com- ponent \ st.	UK1	F03	NL1	SF2	S02	N01
H <sup>+</sup>	102	5.0	64	57	254	152
SO <sub>4</sub> <sup>2-</sup>	9.6 <sup>1</sup>	9.1	12	7.1	21	32
NH <sub>4</sub> <sup>+</sup>	3.1	3.5	5.4	7.3	8.5	40
NO <sub>3</sub> <sup>-</sup>	8.3	7.4	7.2	46	25	94
Cu <sup>2+</sup>	10	8.4	9.9	19	38	43
Mg <sup>2+</sup>	10	6.7				41
Na <sup>+</sup>		70	36	13	52	
K <sup>+</sup>		5.4	61			65
Cl <sup>-</sup>						69

TABLE II: Washout ratio in units 10<sup>2</sup>.

Period November 1 - December 15, 1974.

<sup>1</sup> corrected for sea-spray.

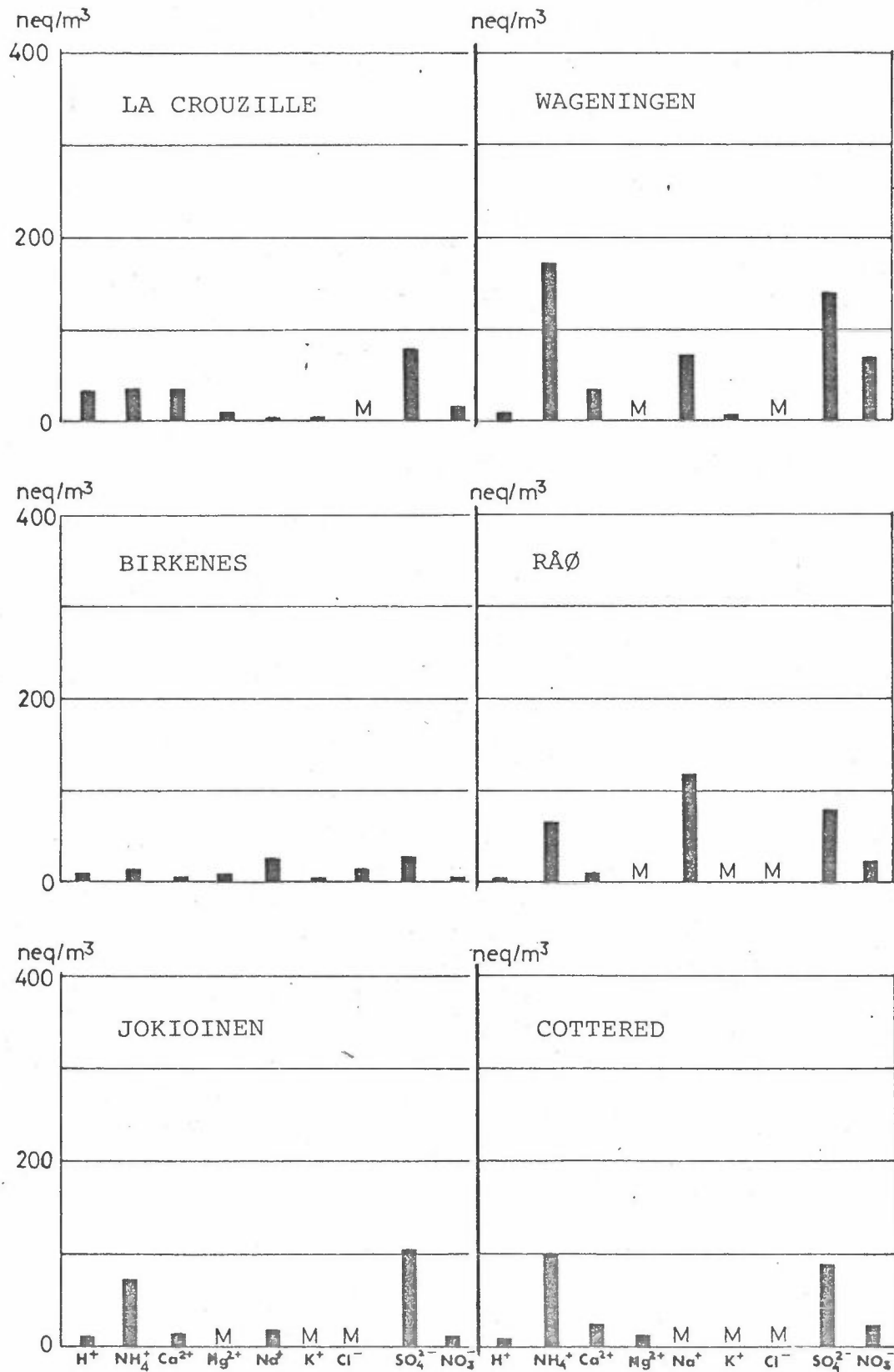


Figure 1: Air samples, November 1 - December 15, 1974. Mean values in  $\text{neq/m}^3$ .

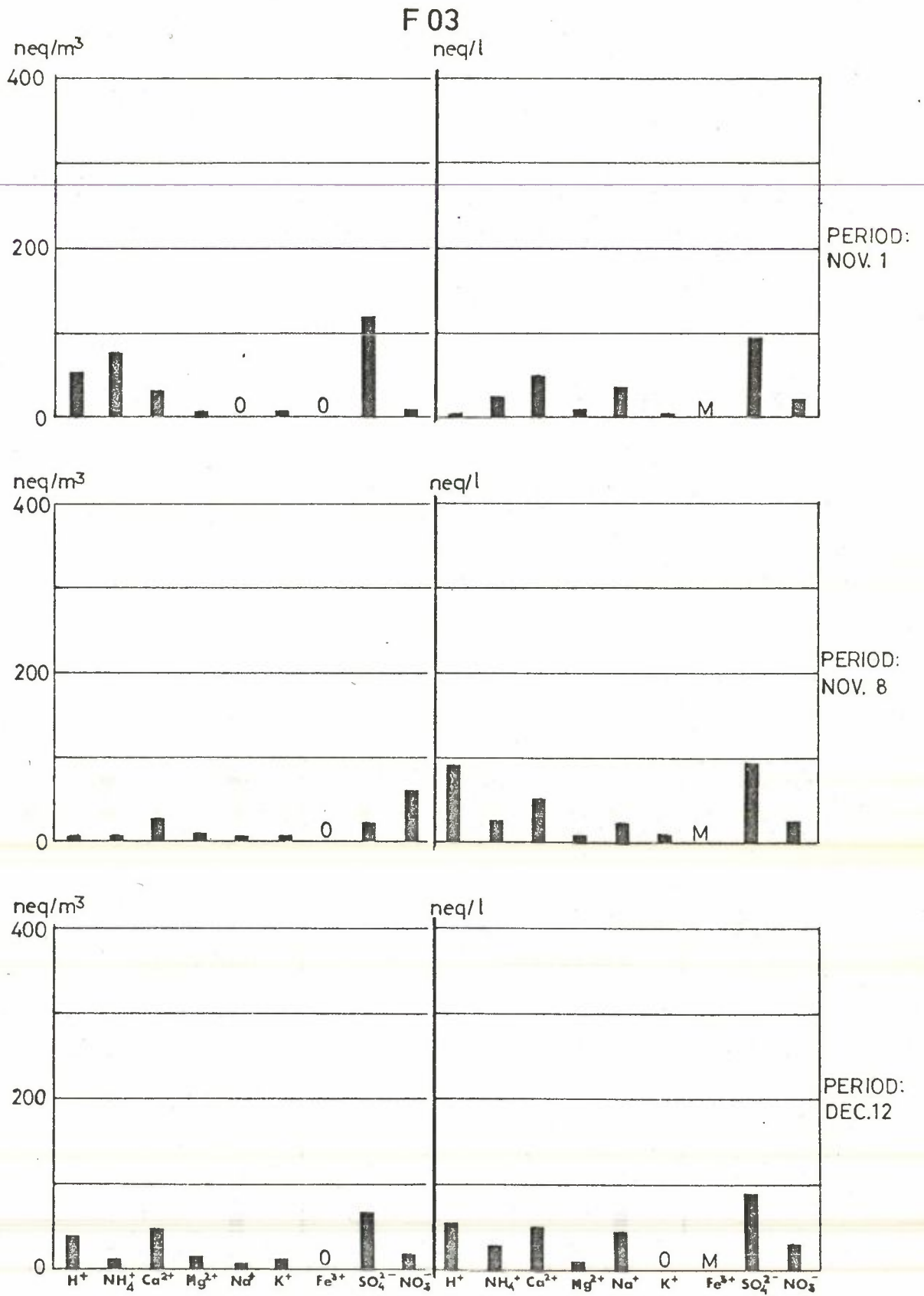


Figure 2: Station F03, La Crouzille. Short periods, mean concentrations in air and precipitation samples.



### NL 01

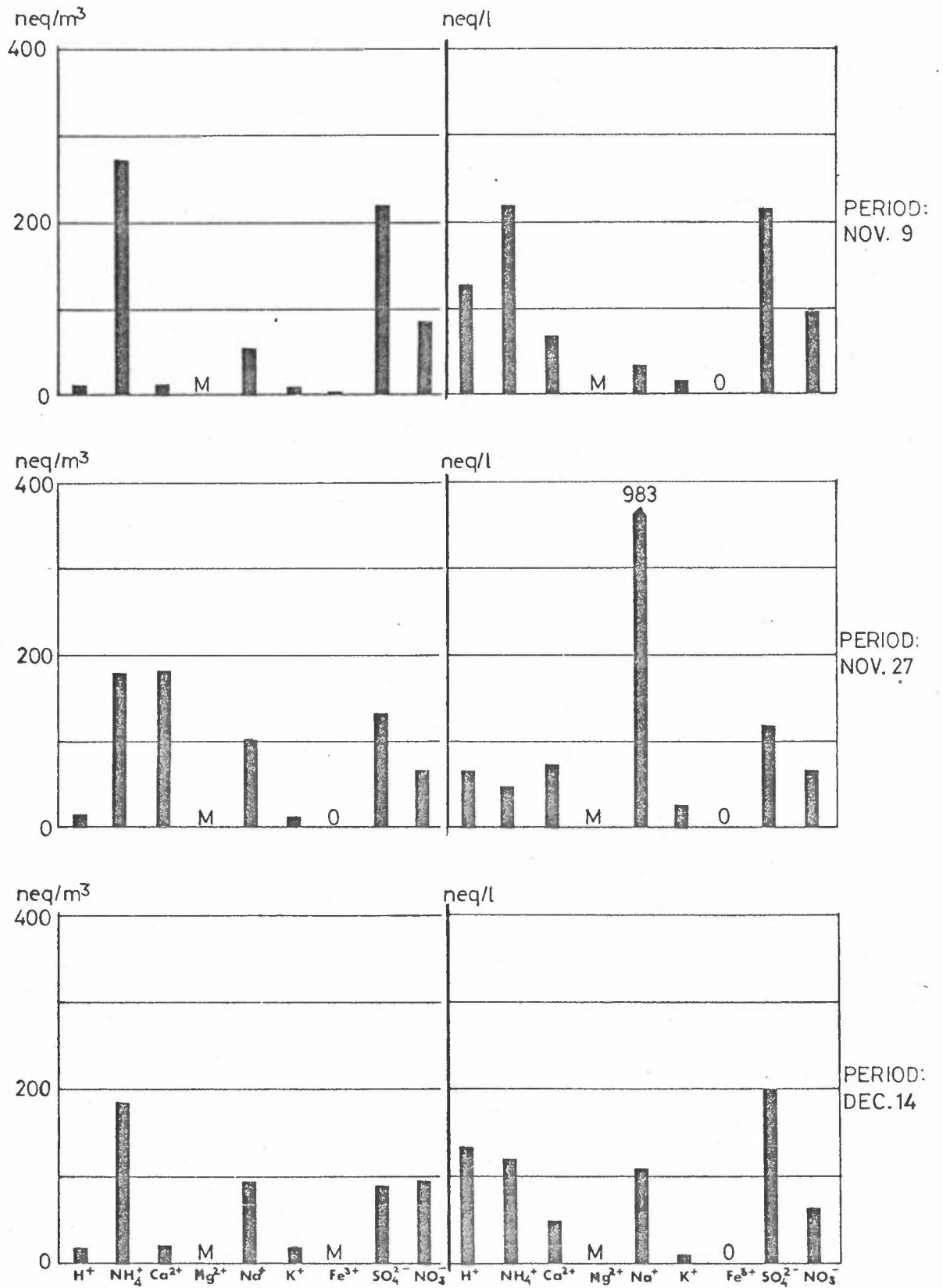


Figure 3: Station NL1, Wageningen. Short periods, mean concentrations in air and precipitation samples.

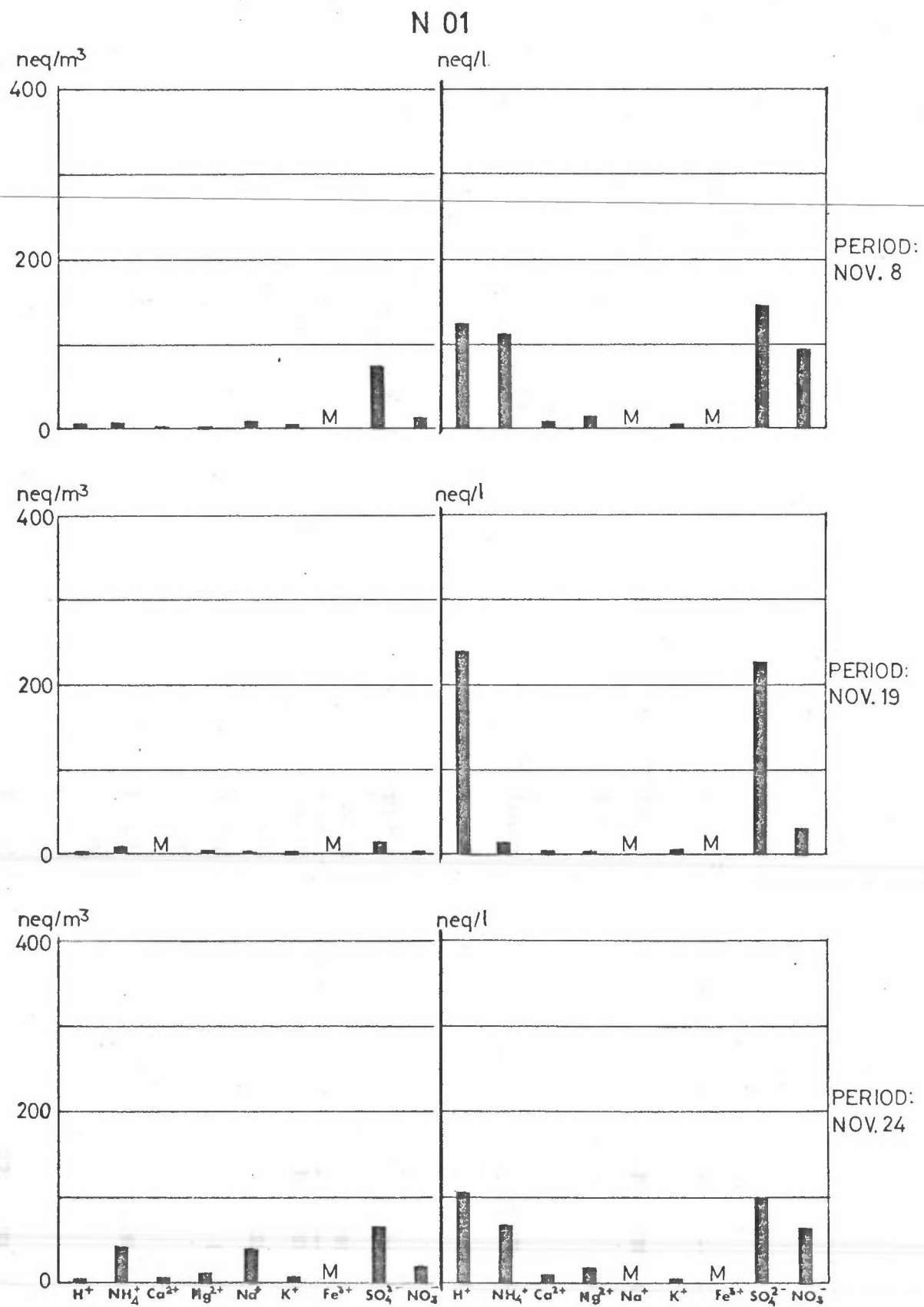


Figure 4: Station N01, Birkenes. Short periods, mean concentrations in air and precipitation samples.

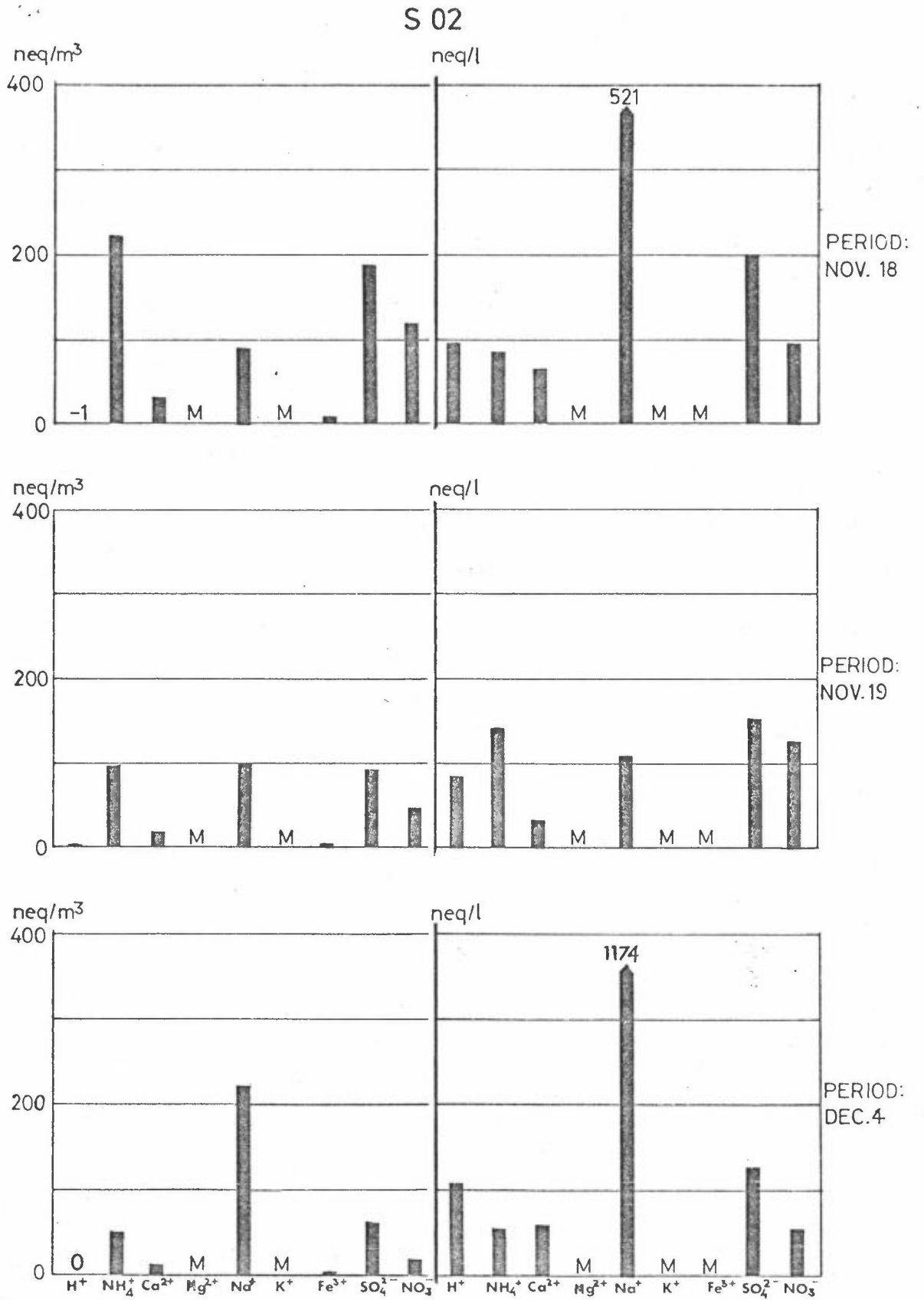


Figure 5: Station S02, Råö. Short periods, mean concentrations in air and precipitation samples.

## SF 2

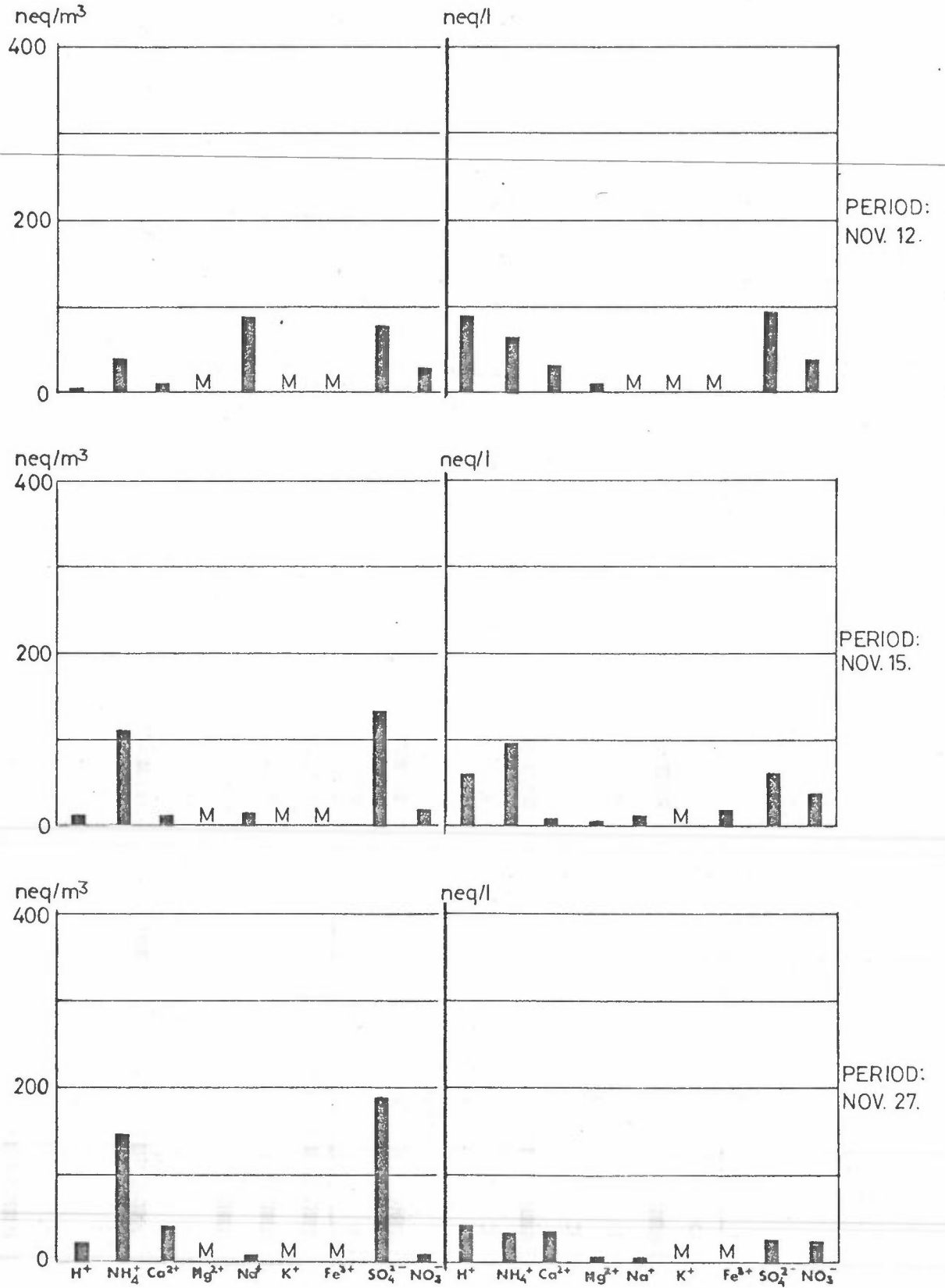


Figure 6: Station SF2, Jokiinen. Short periods, mean concentrations in air and precipitation samples.

# UK 1

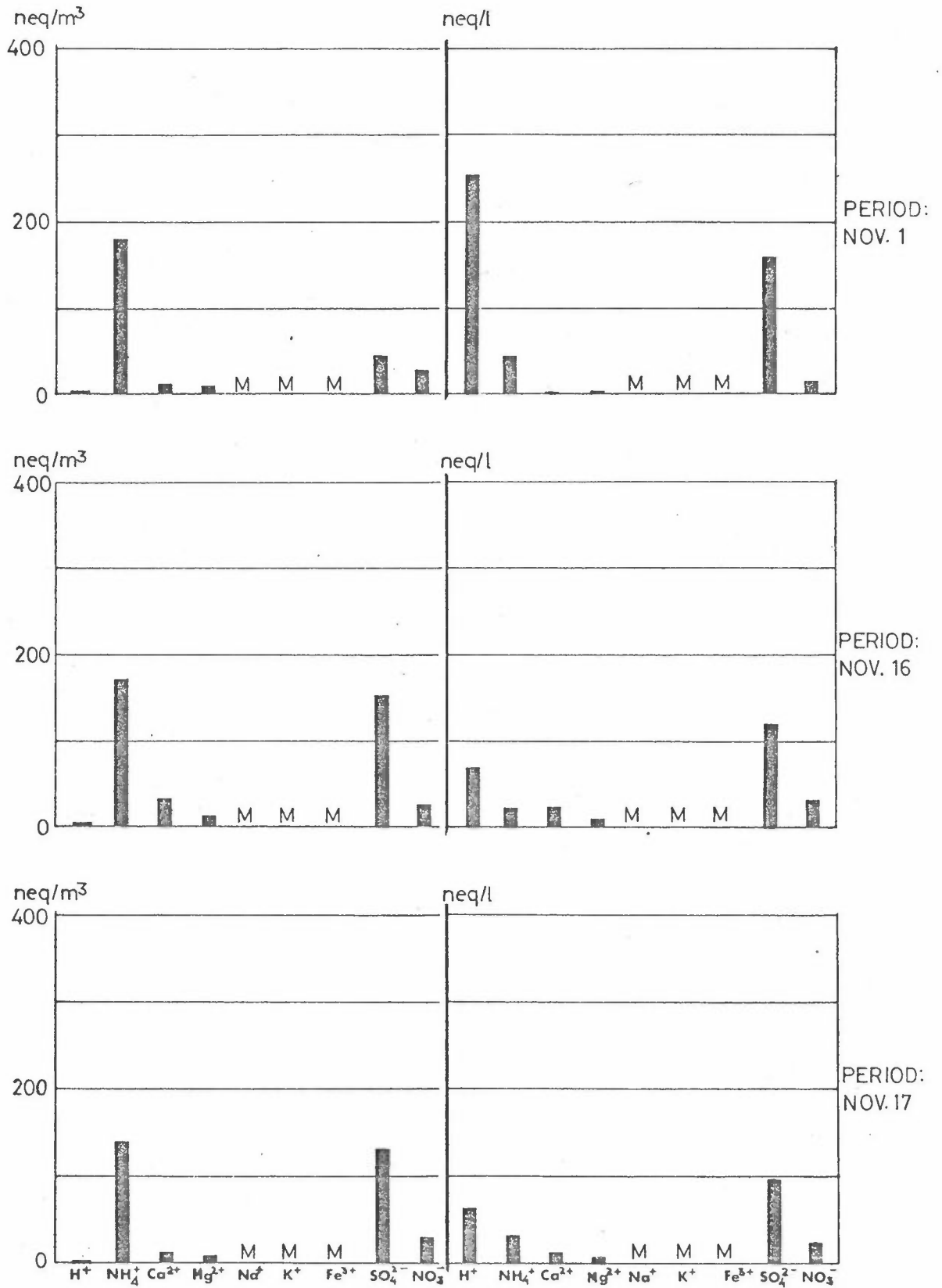
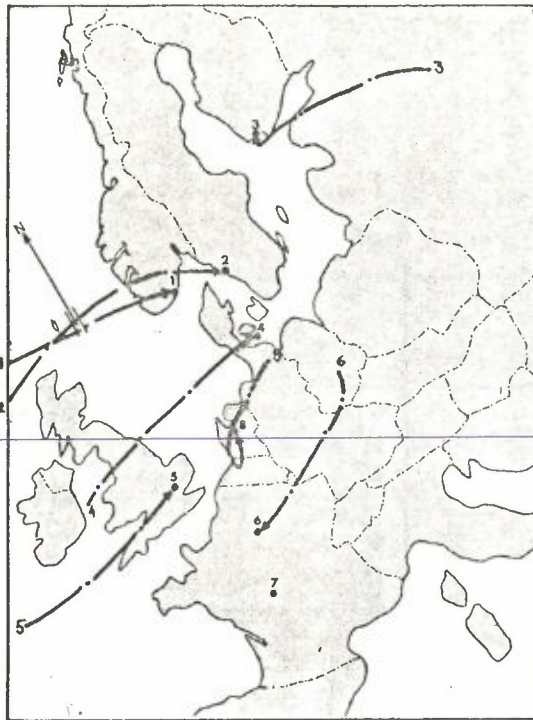
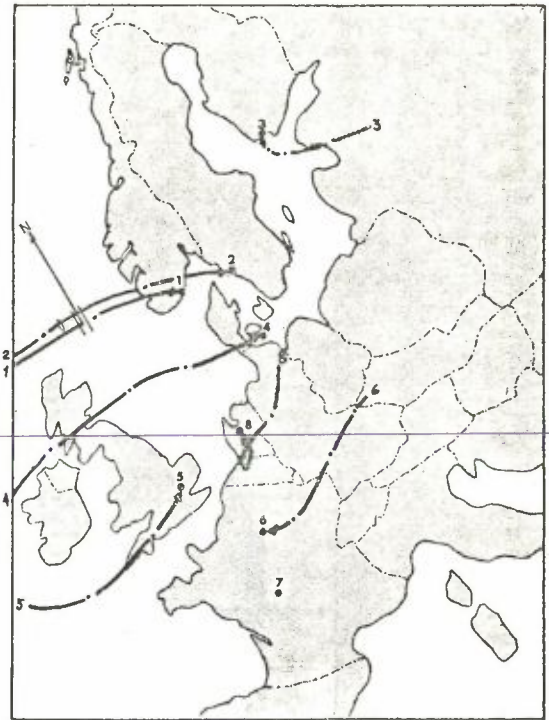


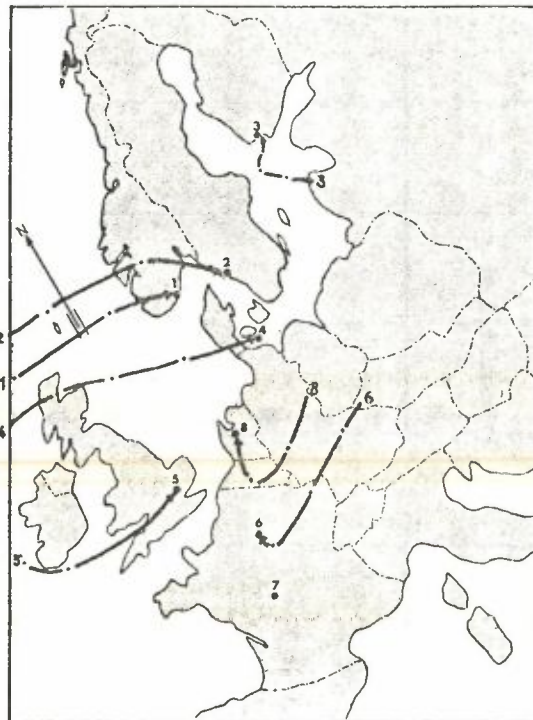
Figure 7: Station UK1, Cottered. Short periods, mean concentrations in air and precipitation samples.



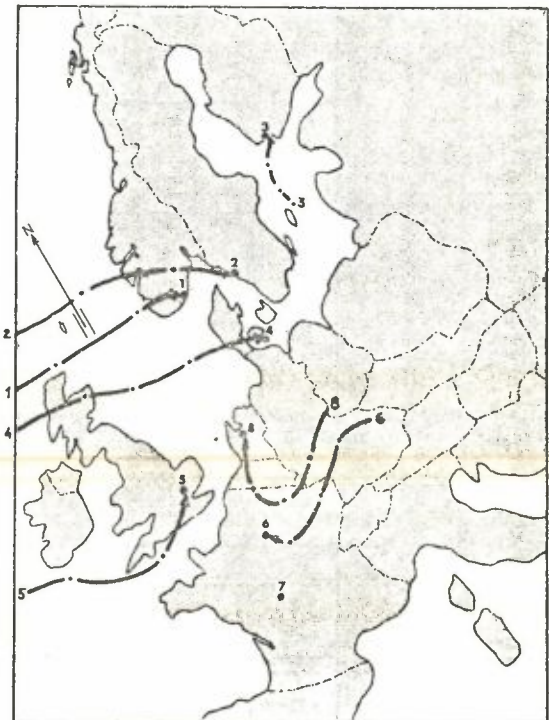
Trajectories arriving at  
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Trajectories arriving at  
741107, 06 GMT.



Trajectories arriving at  
741107, 12 GMT.



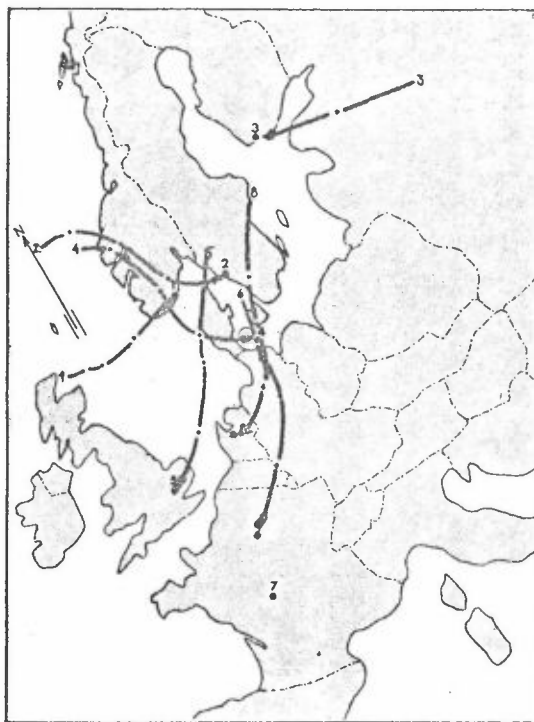
Trajectories arriving at  
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FIGURE 8

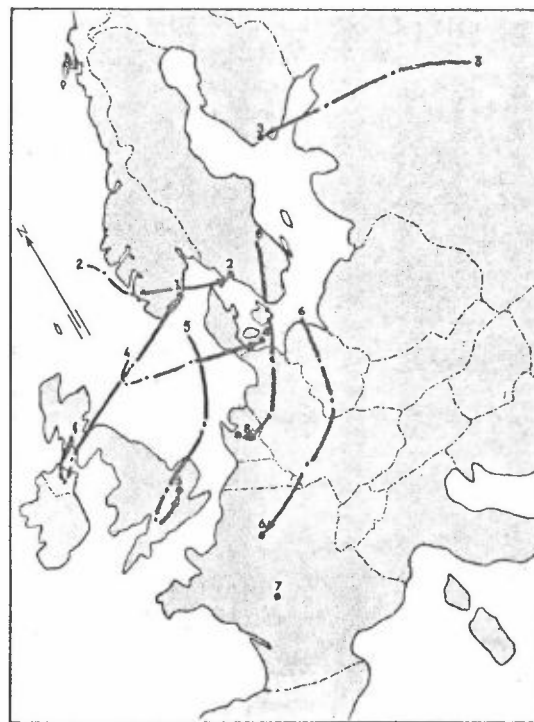
Day with high sulphate concentration and high strong acid concentration.

Observed concentrations, neq/m<sup>3</sup>:

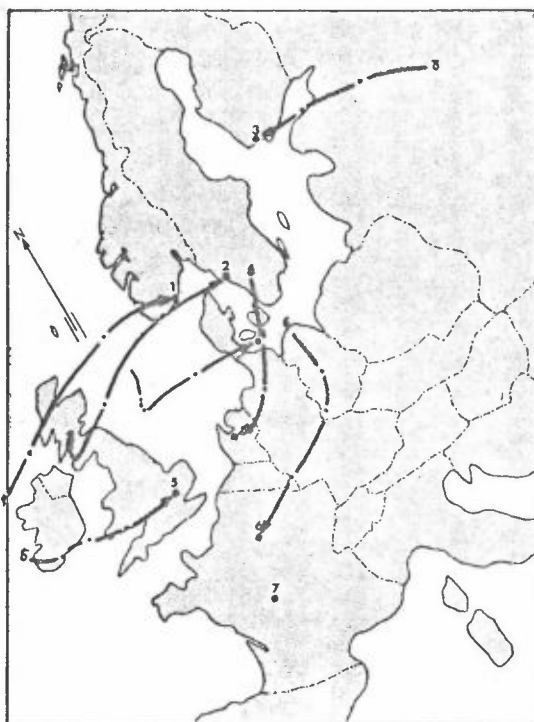
<ul style="list-style-type: none"> <li>sulphate: N01 - 0.3</li> <li>S02 - 2.9</li> <li>SF2 - 6.0</li> <li>UK1 - 11.1</li> <li>F03 - 16.6</li> <li>NL1 - 22.3</li> </ul>	<ul style="list-style-type: none"> <li>strong acid: N01 - 2</li> <li>S02 - 3</li> <li>SF2 - 13</li> <li>UK1 - 7</li> <li>F03 - 169</li> <li>NL1 - 23</li> </ul>
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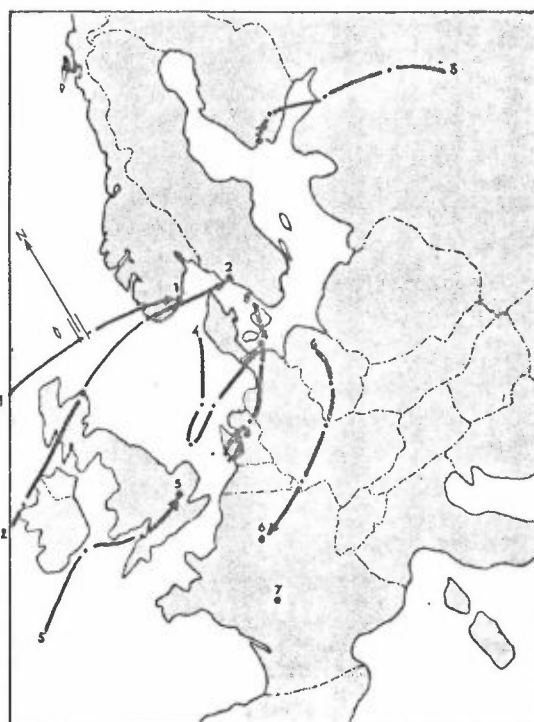
Trajectories arriving at  
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Trajectories arriving at  
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Trajectories arriving at  
741106, 12 GMT.



Trajectories arriving at  
741106, 18 GMT.

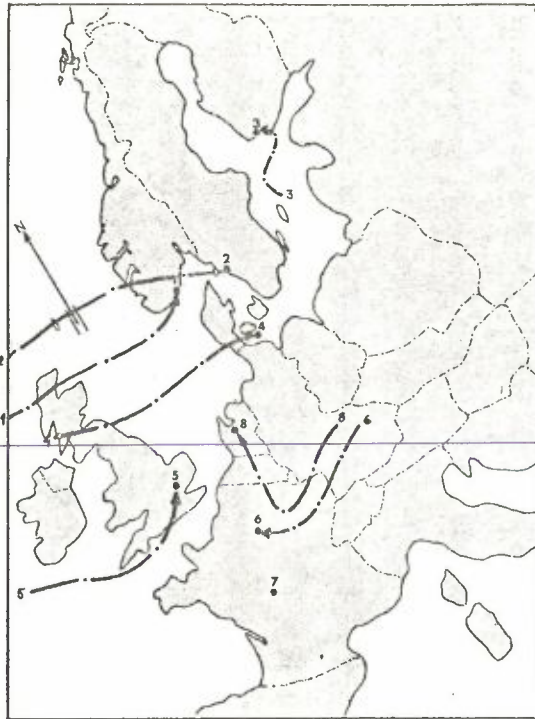
FIGURE 9

Day with high sulphate concentration and high strong acid concentration.

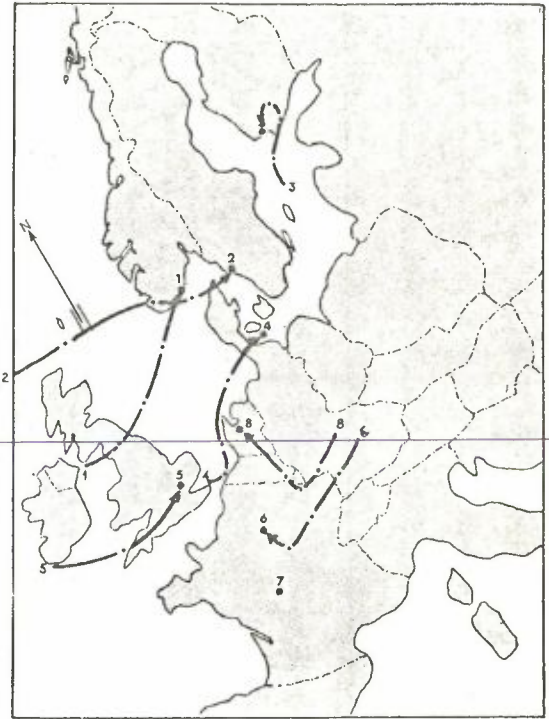
Observed concentrations, neq/m<sup>3</sup>:

sulphate:	N01	-	1.6
	S02	-	3.5
	SF2	-	5.8
	UK1	-	-
	F03	-	13.1
	NL1	-	<u>18.6</u>

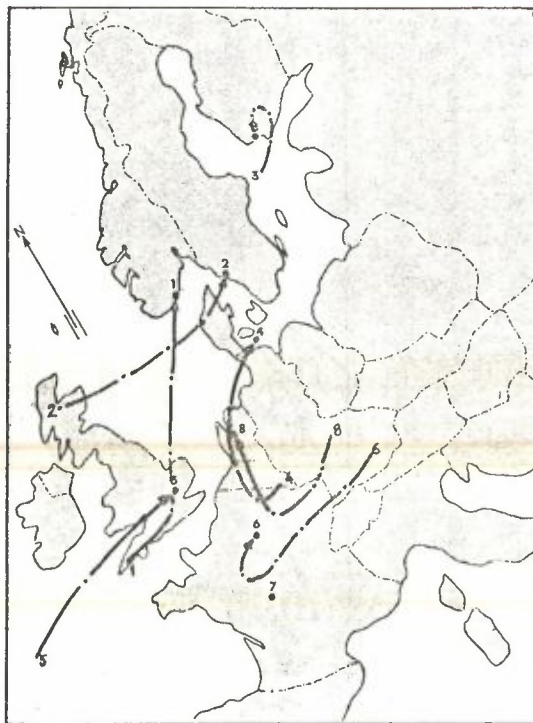
strong acid:	N01	-	3
	S02	-	2
	SF2	-	13
	UK1	-	-
	F03	-	<u>162</u>
	NL1	-	<u>21</u>



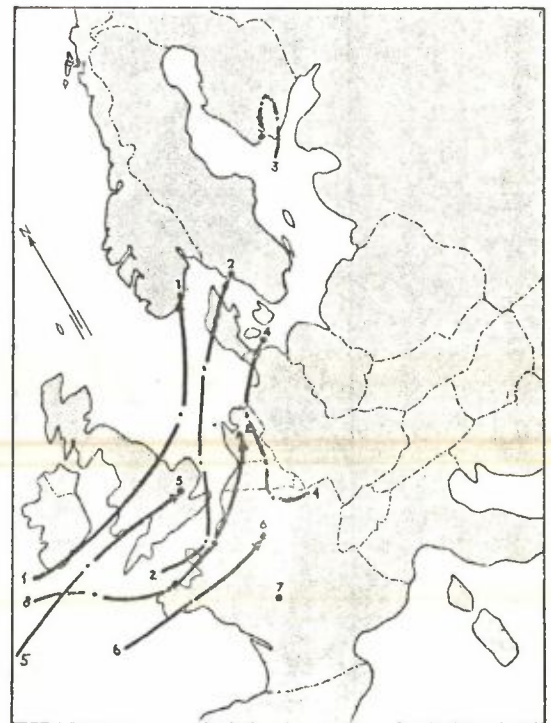
Trajectories arriving at  
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Trajectories arriving at  
741108, 06 GMT.



Trajectories arriving at  
741108, 12 GMT.



Trajectories arriving at  
741108, 18 GMT.

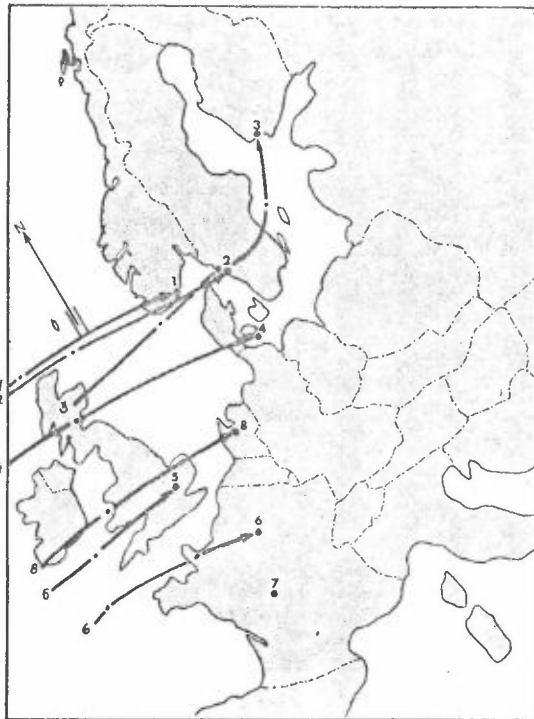
FIGURE 10

Day with high sulphate concentration.

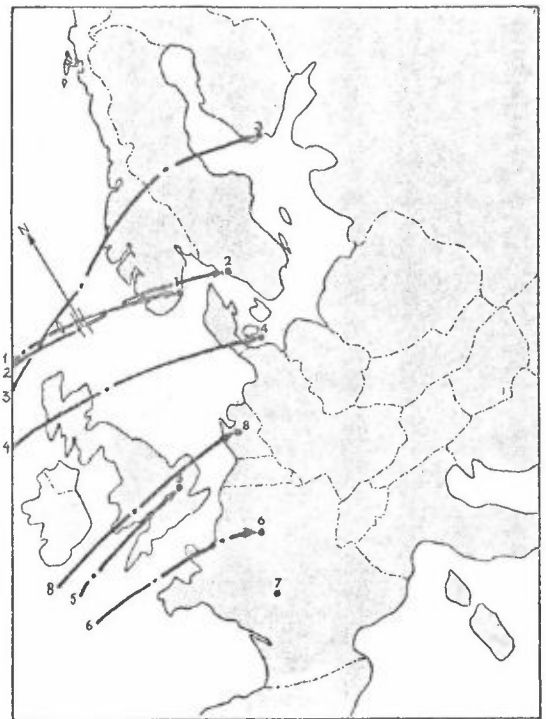
Observed sulphate concentrations,  $\text{neq/m}^3$ :

N01	-	3.5
S02	-	3.6
SF2	-	5.4
UK1	-	3.2
F03	-	1.0
NL1	-	<u>16.5</u>

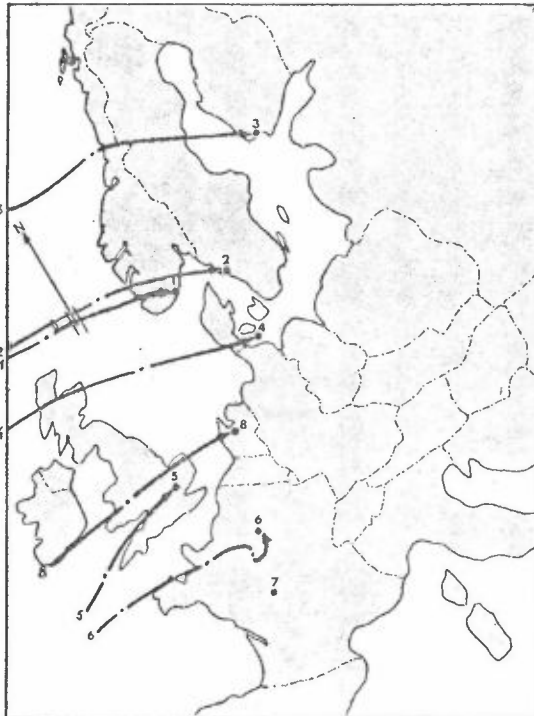




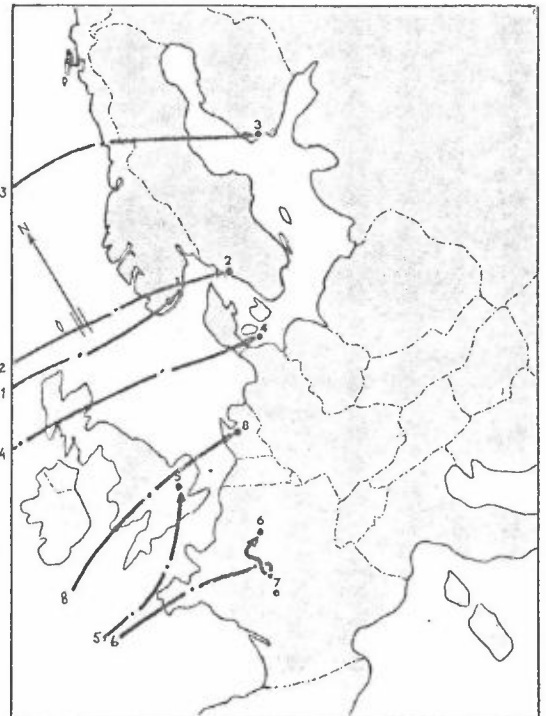
Trajectories arriving at  
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Trajectories arriving at  
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Trajectories arriving at  
741203, 12 GMT.



Trajectories arriving at  
741203, 18 GMT.

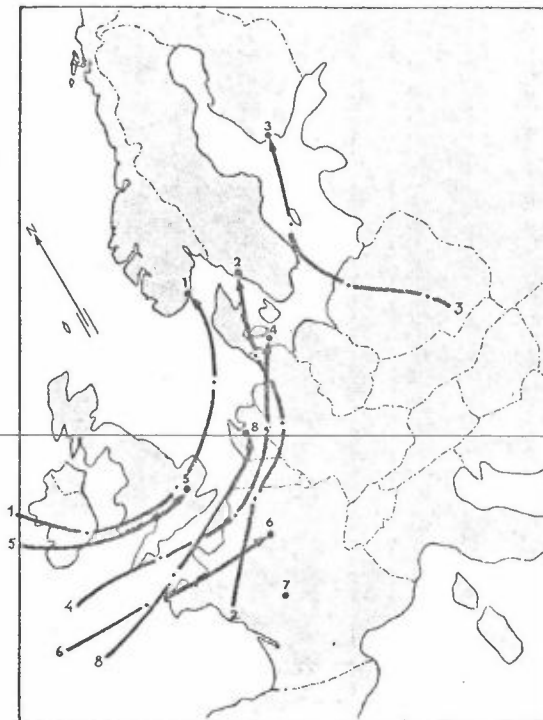
FIGURE 11

Day with high sulphate concentration and high strong acid concentration.

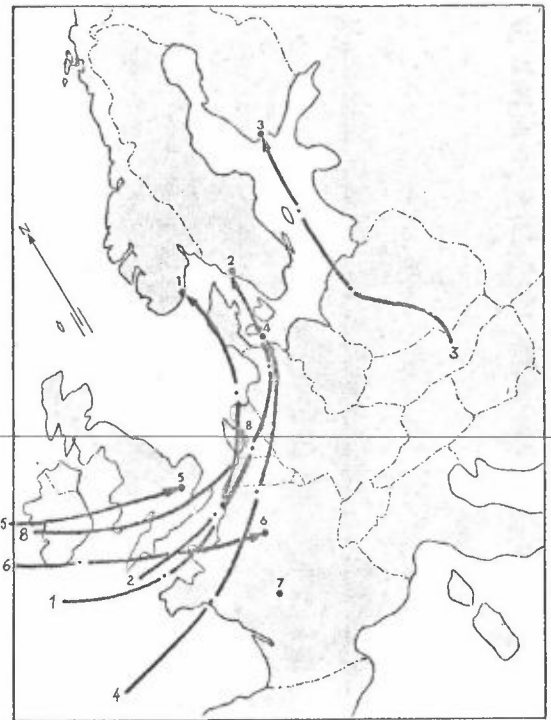
Observed concentrations, neq/m<sup>3</sup>:

sulphate:	N01	-	1.1
	S02	-	2.5
	SF2	-	1.5
	UK1	-	-
	F03	-	6.6
	NL1	-	<u>15.4</u>

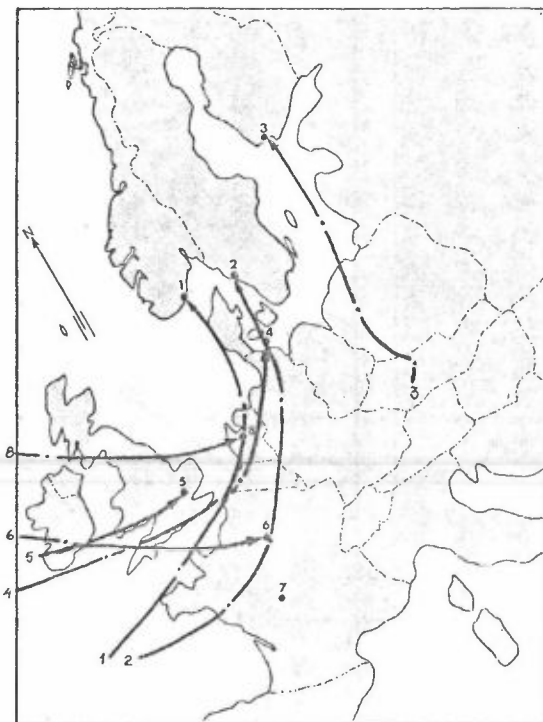
strong acid:	N01	-	2
	S02	-	÷1
	SF2	-	0
	UK1	-	-
	F03	-	<u>71</u>
	NL1	-	<u>10</u>



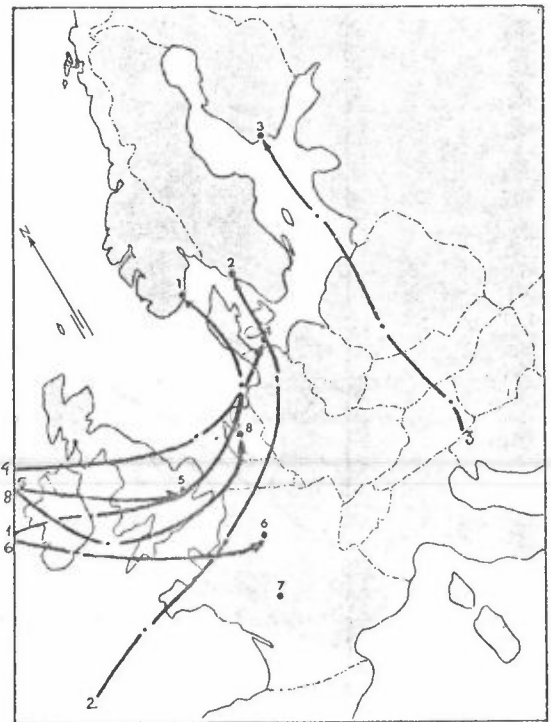
Trajectories arriving at  
741125, 00 GMT.



Trajectories arriving at  
741125, 06 GMT.



Trajectories arriving at  
741125, 12 GMT.

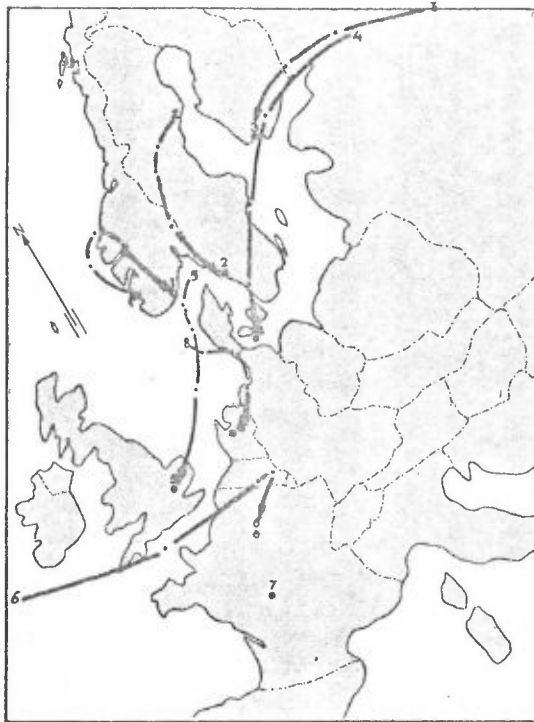


Trajectories arriving at  
741125, 18 GMT.

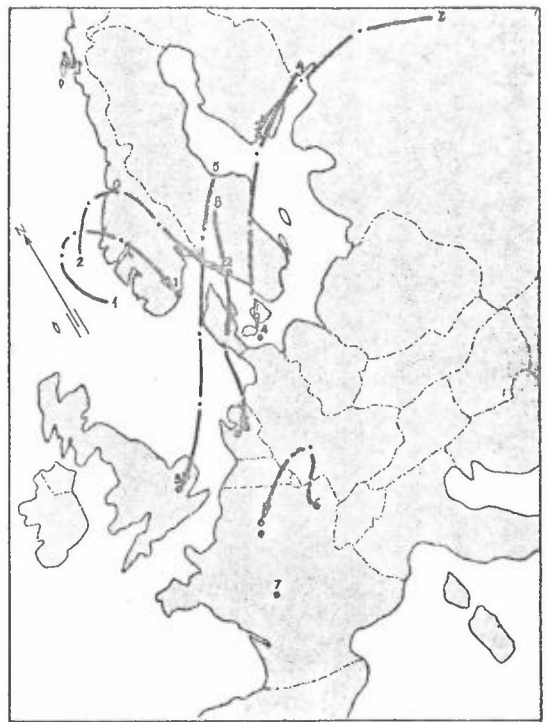
FIGURE 12

Day with high sulphate concentration.

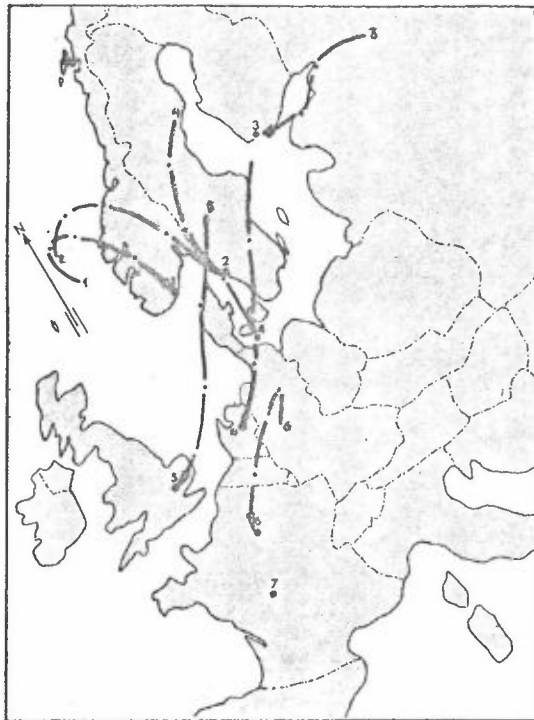
Observed sulphate concentrations, neq/m <sup>3</sup> :	N01	-	1.5
	S02	-	3.7
	SF2	-	<u>12.2</u>
	UK1	-	-
	F03	-	2.0
	NL1	-	2.4



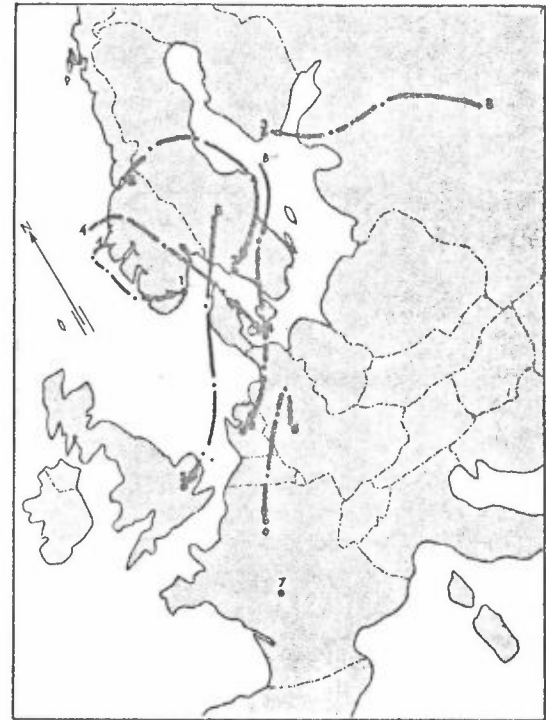
Trajectories arriving at  
741105, 00 GMT.



Trajectories arriving at  
741105, 06 GMT.



Trajectories arriving at  
741105, 12 GMT.



Trajectories arriving at  
741105, 18 GMT.

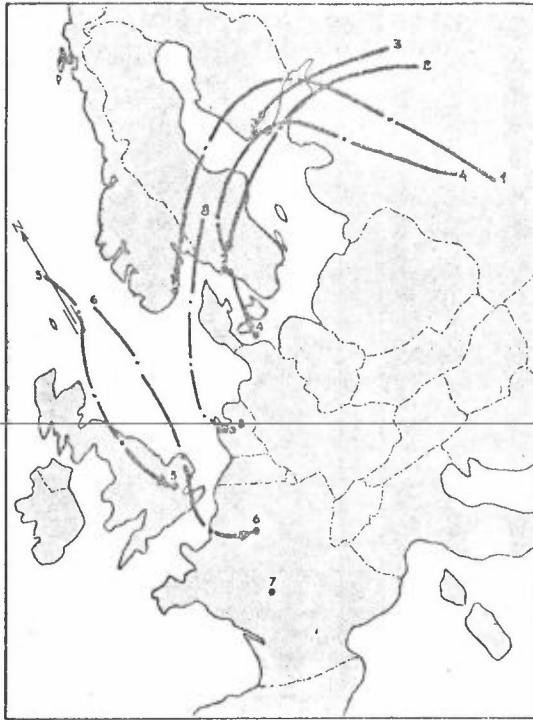
FIGURE 13

Day with high sulphate concentration and high strong acid concentration.

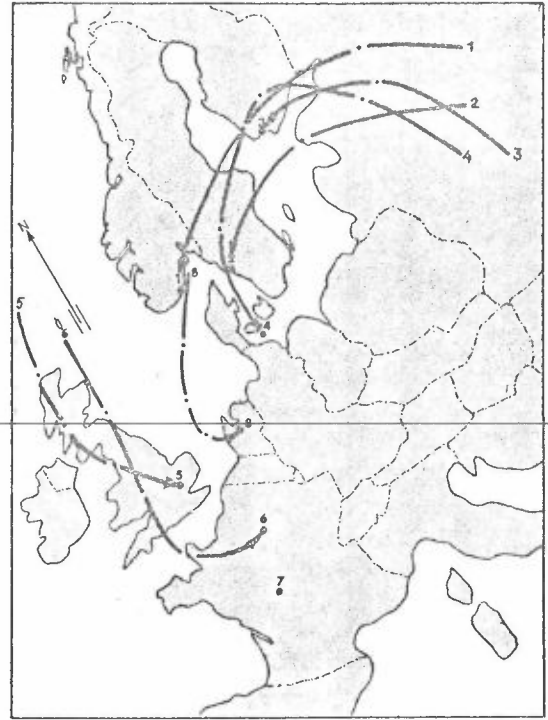
Observed concentrations, neq/m<sup>3</sup>:

sulphate:	N01	-	2.3
	S02	-	6.2
	SF2	-	<u>11.1</u>
	UK1	-	<u>5.1</u>
	F03	-	10.8
	NL1	-	6.0

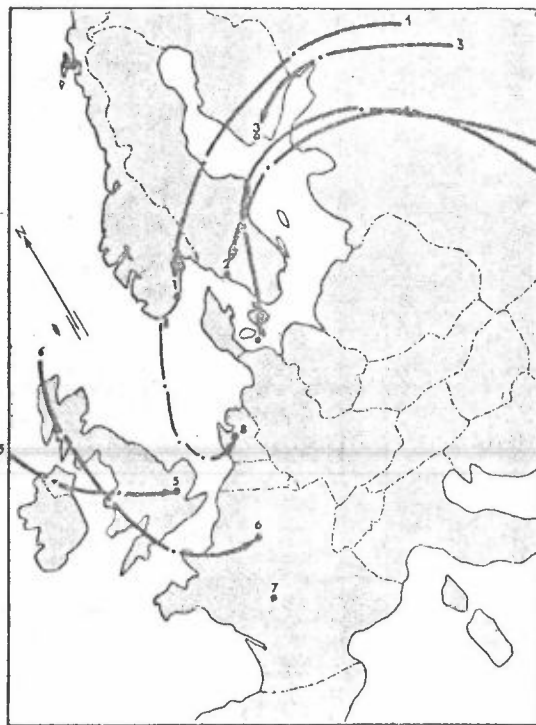
strong acid:	N01	-	8
	S02	-	1
	SF2	-	23
	UK1	-	<u>45</u>
	F03	-	<u>128</u>
	NL1	-	<u>13</u>



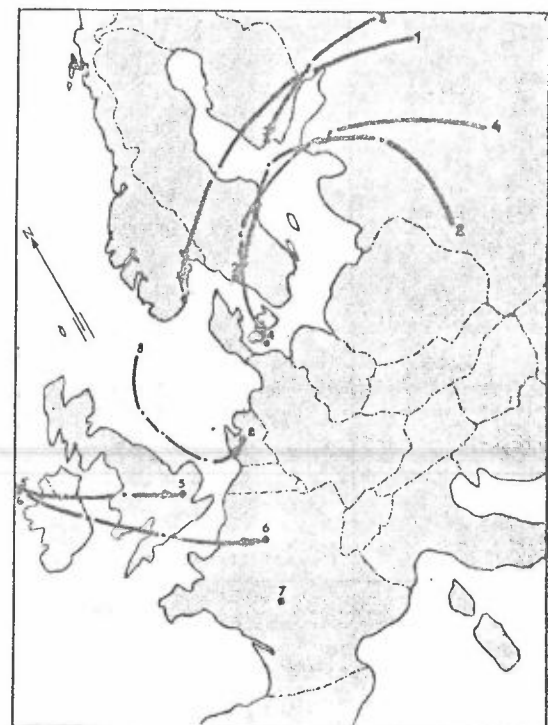
Trajectories arriving at  
741101, 00 GMT.



Trajectories arriving at  
741101, 06 GMT.



Trajectories arriving at  
741101, 12 GMT.



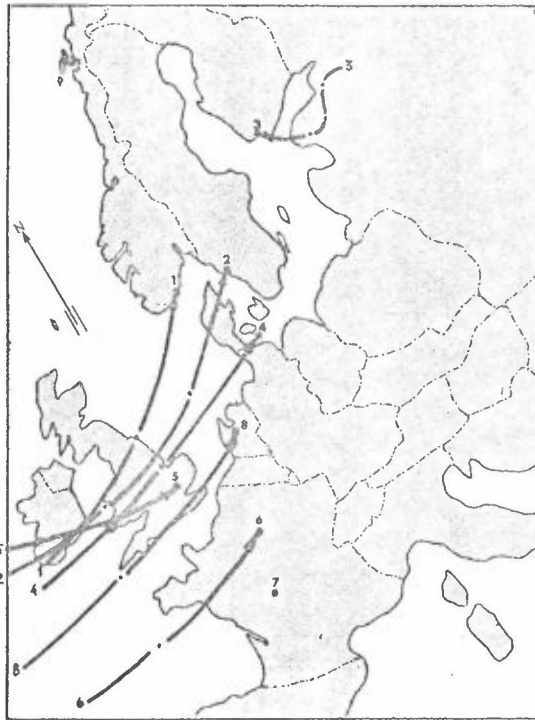
Trajectories arriving at  
741101, 18 GMT.

FIGURE 14

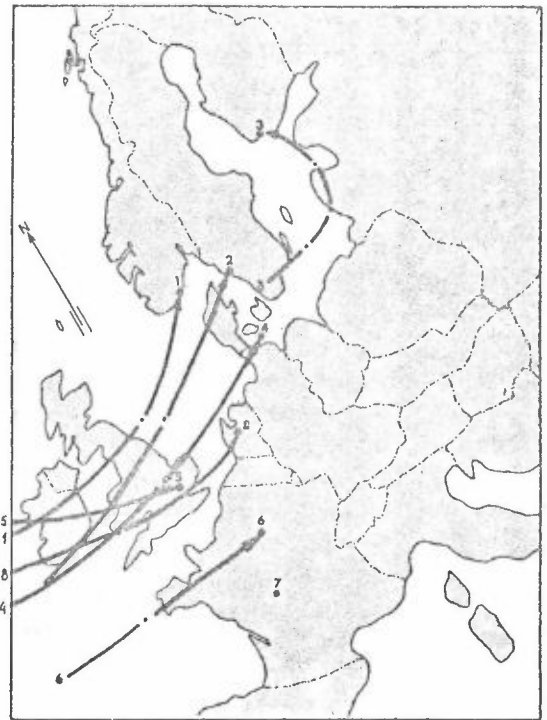
Day with high sulphate concentration and high strong acid concentration.

Observed concentrations,  $\text{neq}/\text{m}^3$ :

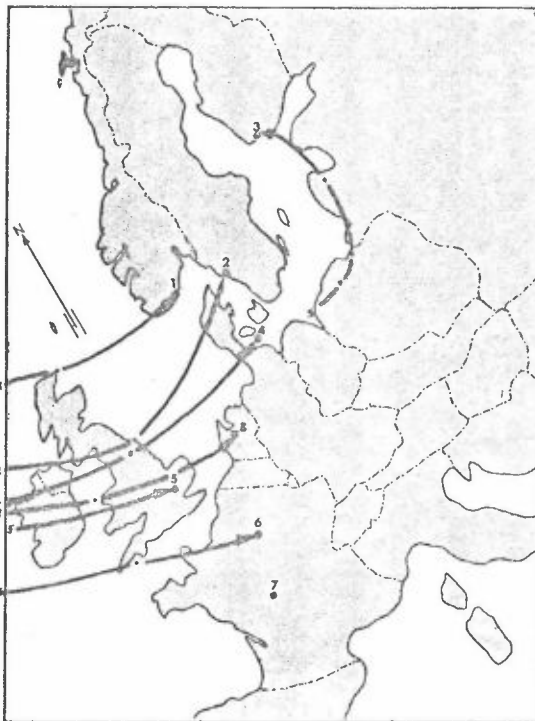
sulphate:	N01 - 2.9	strong acid:	N01 - 40
	S02 - 3.2		S02 - 14
	SF2 - 0.9		SF2 - 4
	UK1 - 2.2		UK1 - -
	F03 - 5.6		F03 - 54
	NL1 - <u>10.9</u>		NL1 - <u>18</u>



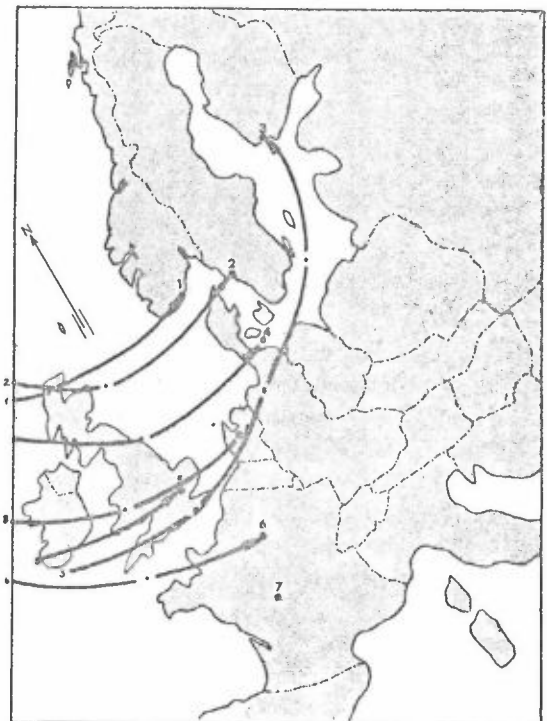
Trajectories arriving at  
741110, 00 GMT.



Trajectories arriving at  
741110, 06 GMT.



Trajectories arriving at  
741110, 12 GMT.



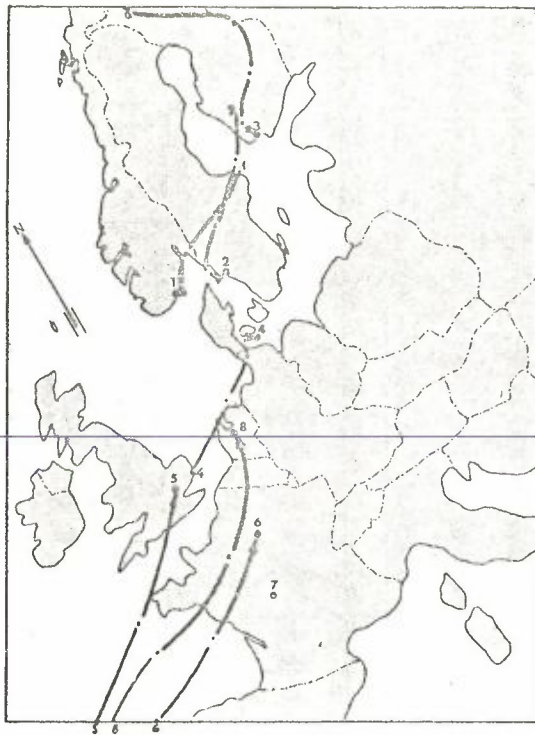
Trajectories arriving at  
741110, 18 GMT.

FIGURE 15

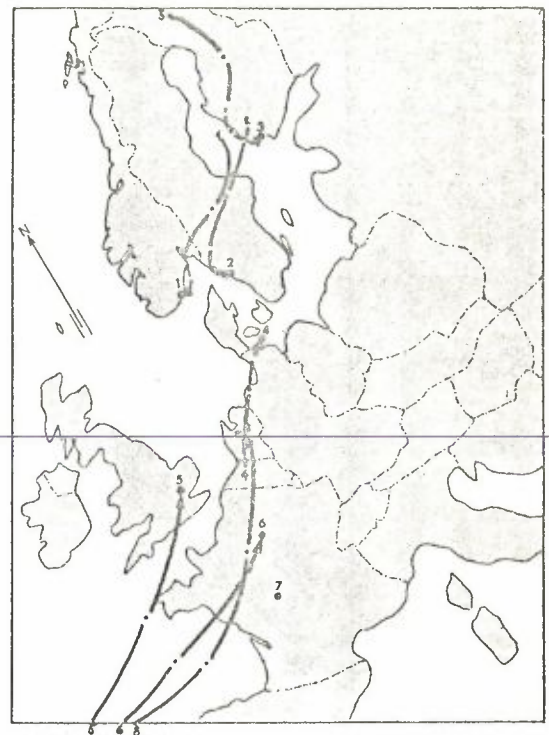
Day with high strong acid concentration.

Observed strong acid concentrations, neq/m<sup>3</sup>:

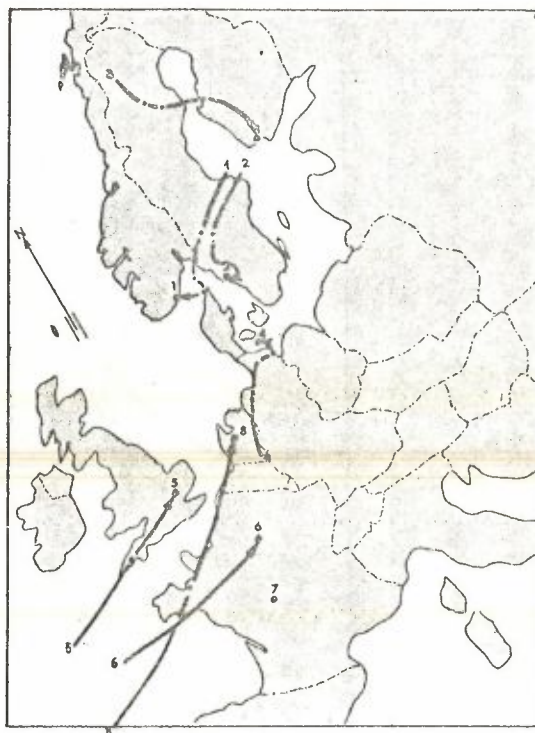
N01	-	3
S02	-	-
SF2	-	6
UK1	-	-
F03	-	86
NL1	-	<u>12</u>



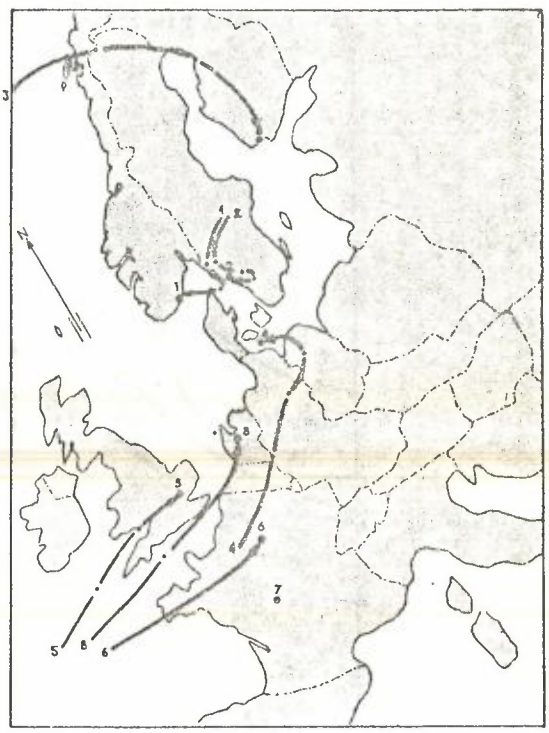
Trajectories arriving at  
741122, 00 GMT.



Trajectories arriving at  
741122, 06 GMT.



Trajectories arriving at  
741122, 12 GMT.



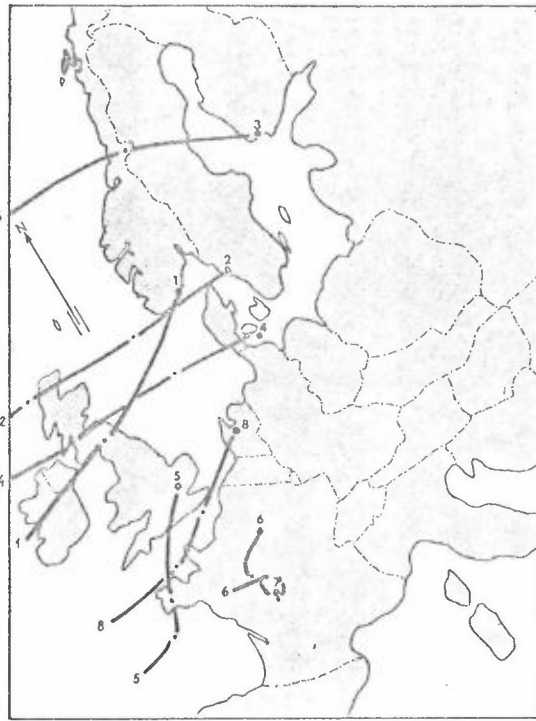
Trajectories arriving at  
741122, 18 GMT.

FIGURE 16

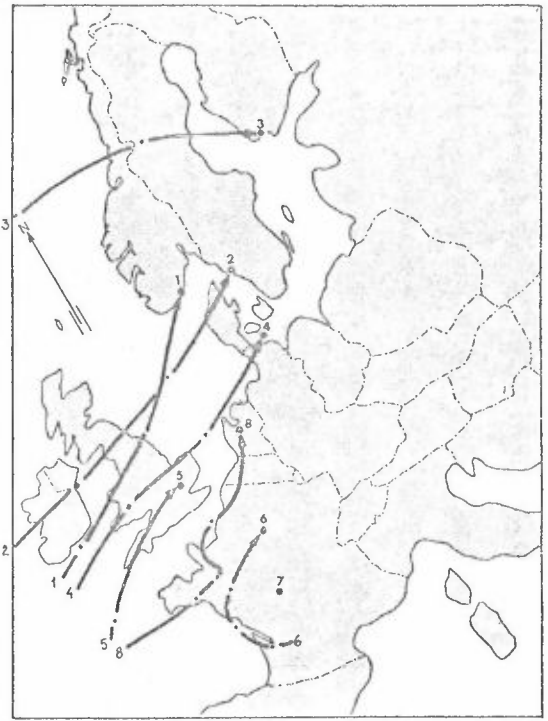
Day with high strong acid concentration.

Observed strong acid concentrations, neq/m<sup>3</sup>:

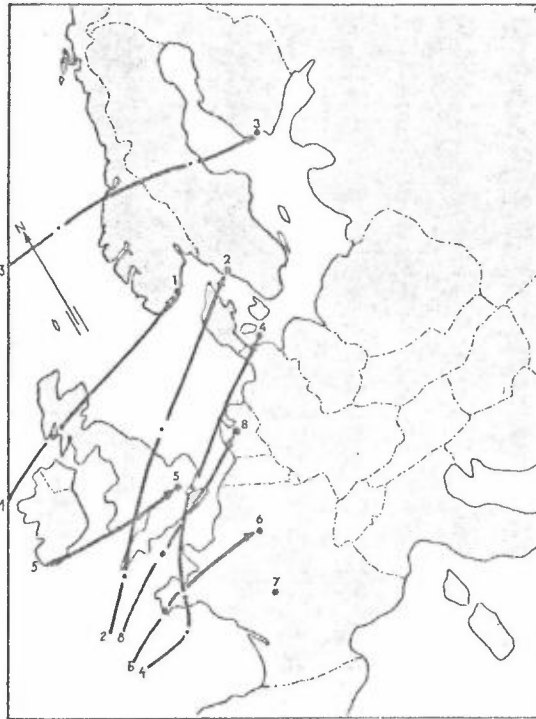
N01	-	35
S02	-	÷1
SF2	-	22
UK1	-	2
F03	-	55
NL1	-	11



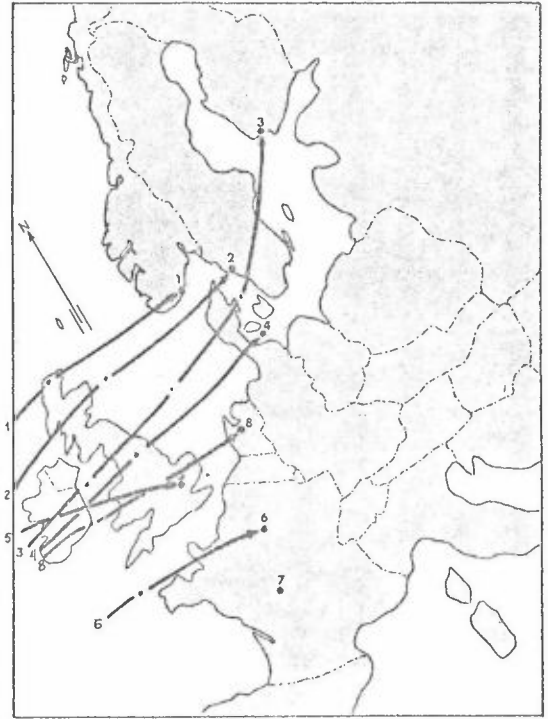
Trajectories arriving at  
741204, 00 GMT.



Trajectories arriving at  
741204, 06 GMT.



Trajectories arriving at  
741204, 12 GMT.



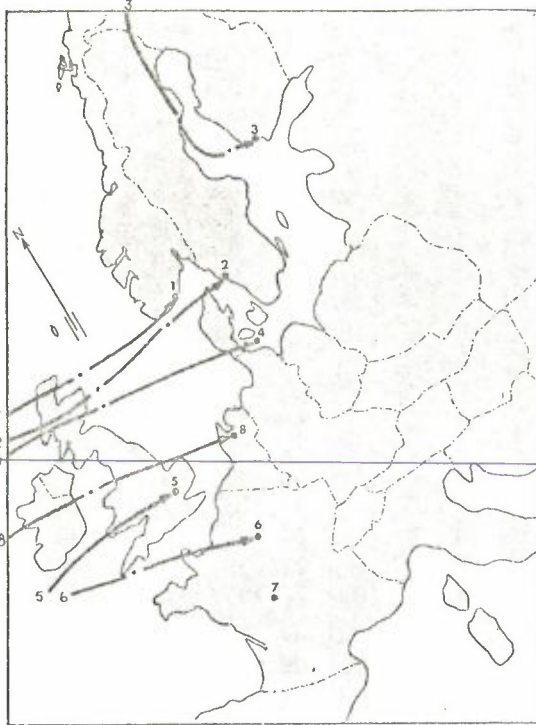
Trajectories arriving at  
741204, 18 GMT.

FIGURE 17

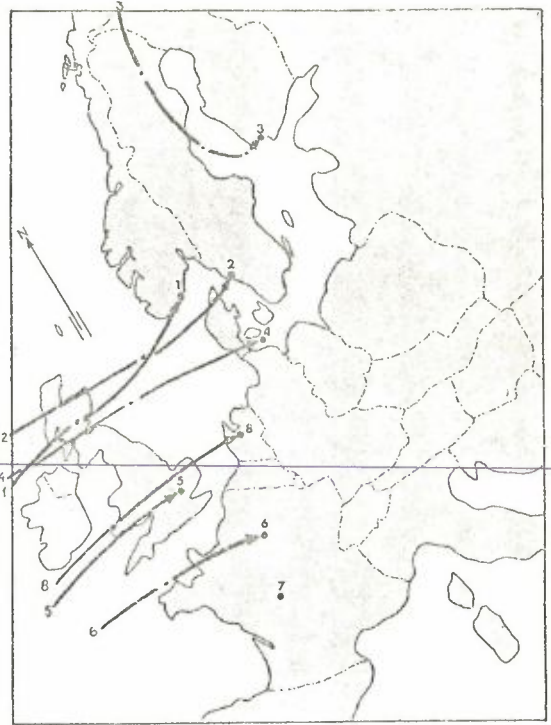
Day with high strong acid concentration.

Observed strong acid concentrations, neq/m<sup>3</sup>:

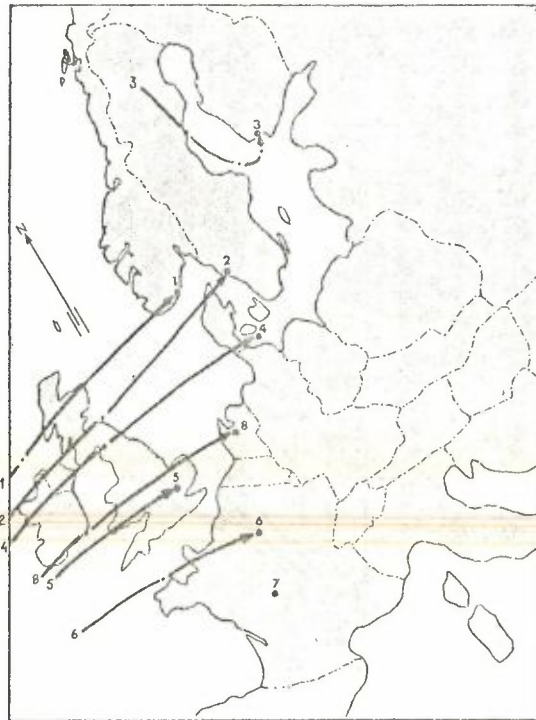
N01	-	1
S02	-	0
SF2	-	1
UK1	-	1
F03	-	47
NL1	-	<u>7</u>



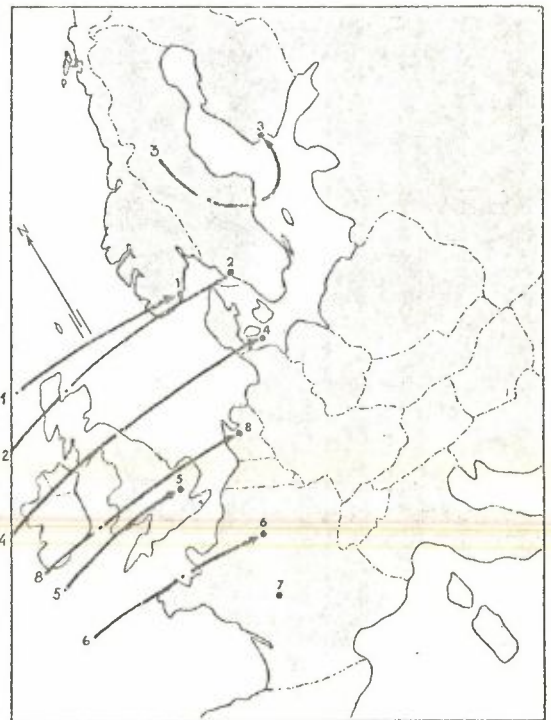
Trajectories arriving at  
741202, 00 GMT.



Trajectories arriving at  
741202, 06 GMT.



Trajectories arriving at  
741202, 12 GMT.



Trajectories arriving at  
741202, 18 GMT.

FIGURE 18

Day with high strong acid concentration.

Observed strong acid concentrations, neq/m<sup>3</sup>:

N01	-	0
S02	-	÷1
SF2	-	5
UK1	-	-
F03	-	46
NL1	-	9





















STATION SF 2, 45-DAYS PROGRAM.

PRECIPITATION SAMPLE

JUNE ,1974

SAMPLING PERIOD

COMPONENTS

FROM DAY GMT	TO DAY GMT	DURATION MIN	AMOUNT MM	PH	H+	SO4 MG/L	NH4-N MG/L	NO3-N MG/L	CA MG/L	MG MG/L	NA MG/L	K MG/L	CL MG/L	FE MG/L
2 051G	2 0550	40	.3	-0.00	-0	3.2	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
10 060G	10 0800	120	5.1	4.47	51	2.9	.48	.15	.90	.02	.1	.00	.00	.41
11 143G	11 1500	30	.3	4.23	77	6.6	-0.00	-0.00	-0.00	.12	-0.00	-0.00	-0.00	-0.00
12 113G	12 1430	180	3.1	4.40	52	3.8	.75	.16	-0.00	.02	.1	-0.00	-0.00	-0.00
21 105G	21 1130	40	5.2	6.12	-0	4.2	4.60	.22	1.30	.17	5.5	-0.00	-0.00	.24
22 140G	22 1410	10	.8	-0.00	-0	3.4	-0.00	-0.00	-0.00	.12	-0.00	-0.00	-0.00	-0.00
23 153G	23 1620	50	1.2	5.98	8	2.5	-0.00	-0.00	-0.00	.07	-0.00	-0.00	-0.00	-0.00
25 083G	25 0920	50	.8	4.76	28	1.1	.07	.10	.80	.05	-0.00	-0.00	-0.00	-0.00
29 222G	29 0120	180	1.7	4.89	25	.8	2.00	.06	.80	.00	.1	-0.00	-0.00	.43
30 073G	30 0910	130	1.2	4.71	31	2.0	-0.00	-0.00	-0.00	.02	-0.00	-0.00	-0.00	.35

STATION SF 2, 45-DAYS PROGRAM.

PRECIPITATION SAMPLE

JULY ,1974

SAMPLING PERIOD

COMPONENTS

FROM DAY GMT	TO DAY GMT	DURATION MIN	AMOUNT MM	PH	H+	SO4 MG/L	NH4-N MG/L	NO3-N MG/L	CA MG/L	MG MG/L	NA MG/L	K MG/L	CL MG/L	FE MG/L
1 105G	1 1110	20	.4	4.51	58	2.8	-0.00	-0.00	-0.00	.05	-0.00	-0.00	-0.00	-0.00
4 154G	4 1630	50	.5	-0.00	-0	3.5	-0.00	-0.00	-0.00	2.09	-0.00	-0.00	-0.00	-0.00
5 073G	5 0850	80	1.6	-0.00	-0	7.4	-0.00	-0.00	-0.00	.17	-0.00	-0.00	-0.00	.05
6 131G	6 1350	40	.9	-0.00	-0	5.6	-0.00	-0.00	-0.00	.15	-0.00	-0.00	-0.00	.00
8 113G	8 1150	20	.5	-0.00	-0	8.1	-0.00	-0.00	-0.00	.13	-0.00	-0.00	-0.00	.00
9 071G	9 0830	80	1.6	-0.00	-0	15.7	-0.00	-0.00	-0.00	.20	-0.00	-0.00	-0.00	.00
10 120G	10 1220	20	.4	4.97	36	4.3	1.30	.31	.90	.03	1.3	-0.00	-0.00	.12
11 060G	11 0630	30	.5	5.28	19	1.0	-0.00	-0.00	-0.00	.03	-0.00	-0.00	-0.00	.00
13 064G	13 0720	40	.9	6.92	-44	3.1	-0.00	-0.00	-0.00	.07	-0.00	-0.00	-0.00	.00
14 221G	14 2220	10	.3	-0.00	-0	17.5	-0.00	-0.00	-0.00	.28	-0.00	-0.00	-0.00	.00
16 015G	16 0420	150	1.5	4.17	117	6.9	-0.00	-0.00	-0.00	.13	-0.00	-0.00	-0.00	.00
17 232G	17 2340	20	1.2	4.33	67	7.4	.97	.60	1.60	.17	.8	-0.00	-0.00	.16
18 060G	18 0610	10	.3	5.00	35	1.2	.23	.15	.40	.00	.7	-0.00	-0.00	.07
19 060G	19 0650	50	.4	5.35	15	5.4	.11	.50	1.40	.17	.8	-0.00	-0.00	.17
20 062G	20 0640	20	.7	-0.00	-0	5.0	-0.00	-0.00	-0.00	.50	-0.00	-0.00	-0.00	.17
25 033G	25 0500	120	.7	4.76	33	19.3	-0.00	-0.00	-0.00	.13	-0.00	-0.00	-0.00	.00
26 142G	26 1430	10	.4	6.73	-23	1.9	-0.00	-0.00	-0.00	.07	-0.00	-0.00	-0.00	.00
27 100G	27 1050	50	1.6	4.90	23	2.5	.64	.00	.00	.10	-0.00	-0.00	-0.00	.00
28 093G	28 1000	30	1.1	7.19	-0	1.6	-0.00	-0.00	-0.00	.07	-0.00	-0.00	-0.00	.00
29 115G	29 1200	10	.3	5.64	-0	2.2	-0.00	-0.00	-0.00	.07	-0.00	-0.00	-0.00	.00
30 191G	30 0210	420	6.2	5.54	8	.6	.27	.12	.60	.00	1.0	-0.00	-0.00	.00
31 135G	31 1440	50	4.2	4.93	21	.9	.21	.11	.40	.00	.6	-0.00	-0.00	.21



STATION SF 2, 45-DAYS PROGRAM.

PRECIPITATION SAMPLE

AUGUST 1974

SAMPLING PERIOD

FROM DAY GMT	TO DAY GMT	DURATION MIN	AMOUNT MM	PH	H+	SO4 MG/L	NH4-N MG/L	NO3-N MG/L	CA MG/L	MG MG/L	NA MG/L	K MG/L	CL MG/L	FE MG/L
1 0950	1 1050	60	1.2	5.27	20	1.9	-0.00	-0.00	-0.00	0.03	-0.00	-0.00	-0.10	-0.00
4 0600	4 0610	10	1.3	5.72	10	1.7	-0.00	-0.00	-0.00	0.05	-0.00	-0.00	-0.00	-0.00
5 1210	5 1300	50	1.0	4.41	75	6.9	-0.00	-0.00	-0.00	0.15	-0.00	-0.00	-0.00	-0.00
6 0820	6 0830	10	1.0	5.35	10	0.7	0.26	0.34	0.46	0.03	0.01	0.00	0.00	0.21
7 1740	7 1800	20	1.2	5.38	10	1.4	0.48	0.08	-0.00	0.03	-0.00	-0.00	-0.00	0.00
10 0150	10 0600	250	10.2	5.02	20	1.7	0.36	0.11	0.40	0.03	0.01	0.00	0.00	0.22
11 0600	11 0640	40	2.3	4.50	57	2.6	0.34	0.13	0.40	0.07	0.00	0.00	0.00	0.23
12 2220	12 0030	130	5.3	4.36	66	5.5	1.18	0.41	0.90	0.03	0.00	0.00	0.00	0.19
14 1140	14 1220	40	9.1	4.45	53	2.9	0.55	0.21	0.90	0.07	0.00	0.00	0.00	0.19
16 0350	16 0400	10	0.2	-0.00	-0	6.1	-0.00	-0.00	-0.00	0.21	-0.00	-0.00	-0.00	-0.00
18 1410	18 1530	80	0.4	-0.00	-0	2.5	-0.00	-0.00	-0.00	0.19	-0.00	-0.00	-0.00	-0.00
19 1030	19 1120	50	1.0	-0.00	-0	3.2	0.99	0.18	-0.00	0.05	-0.00	-0.00	-0.00	-0.00
20 1330	20 1410	40	2.6	5.86	2	1.0	-0.00	-0.00	-0.00	0.03	-0.00	-0.00	-0.00	-0.00
24 0700	24 0720	20	0.3	5.88	14	9.3	-0.00	-0.00	-0.00	0.24	-0.00	-0.00	-0.00	-0.00
29 1720	29 1740	20	1.0	4.77	40	5.1	0.94	0.37	0.90	0.10	0.00	-0.00	-0.00	0.25

COMPONENTS

STATION SF 2, 45-DAYS PROGRAM.

PRECIPITATION SAMPLE

SEPTEMBER 1974

SAMPLING PERIOD

FROM DAY GMT	TO DAY GMT	DURATION MIN	AMOUNT MM	PH	H+	SO4 MG/L	NH4-N MG/L	NO3-N MG/L	CA MG/L	MG MG/L	NA MG/L	K MG/L	CL MG/L	FE MG/L
2 0310	2 0350	40	1.3	6.40	26	4.2	1.70	0.38	3.00	0.14	0.02	0.00	0.00	0.00
4 2110	4 2130	10	0.2	6.71	-33	6.9	6.60	-0.00	0.00	0.28	0.00	0.00	0.00	0.00
5 1520	5 1710	110	1.0	4.25	92	3.4	0.43	0.50	2.50	0.12	0.00	0.00	0.00	0.11
5 1150	6 1210	20	0.9	4.10	114	8.2	2.10	1.15	0.00	0.12	0.00	0.00	0.00	0.00
7 1010	7 1720	430	32.2	4.61	54	3.5	0.85	0.27	2.00	0.05	0.00	0.00	0.00	0.16
8 1510	8 1640	90	3.9	4.57	47	2.0	0.38	0.14	0.90	0.05	0.00	0.00	0.00	0.10
10 0830	10 1010	100	0.4	4.42	61	3.0	0.47	0.22	1.30	0.08	0.00	0.00	0.00	0.10
11 0020	11 0130	70	0.9	4.45	52	1.9	-0.00	-0.00	0.00	0.08	0.00	0.00	0.00	0.00
12 0830	12 0840	10	0.2	6.00	-0	0.0	-0.00	-0.00	-0.00	0.71	-0.00	-0.00	-0.00	-0.00
19 1330	19 1350	20	1.0	6.14	-0	3.0	-0.00	-0.00	-0.00	0.10	-0.00	-0.00	-0.00	-0.00
20 1000	20 1030	30	1.4	4.38	64	8.7	0.85	0.50	0.00	0.19	0.00	0.00	0.00	0.00
22 1100	22 1120	20	0.9	-0.00	-0	4.0	-0.00	-0.00	-0.00	0.31	-0.00	-0.00	-0.00	-0.00
23 1120	23 1130	10	1.0	-0.00	-0	0.0	-0.00	-0.00	-0.00	0.19	-0.00	-0.00	-0.00	-0.00
25 0610	25 0710	60	0.2	4.35	65	3.1	0.52	0.30	0.80	0.03	0.00	0.00	0.00	0.21
26 1000	26 1010	10	0.2	4.72	37	2.0	0.55	0.13	0.80	0.05	0.00	0.00	0.00	0.10
29 0620	29 0730	70	0.3	-0.00	-0	13.6	-0.00	-0.00	-0.00	0.36	-0.00	-0.00	-0.00	-0.00
30 0600	30 0830	150	3.2	4.38	65	4.6	1.20	0.38	1.80	0.07	0.00	0.00	0.00	0.00

COMPONENTS



STATION SF 2, 45-DAYS PROGRAM.

PRECIPITATION SAMPLE

OCTOBER 1974

9

FROM DAY GMT		TO DAY GMT		DURATION		AMOUNT		PH		H+		SO4		NH4-N		NO3-N		CA		MG		NA		K		CL		FE	
DAY	GMT	DAY	GMT	MIN	MM	MM	MM	MM	MM	UEQ/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
1	1250	1	0350	900	10.7	5.31	-0.00	14	1.0	14	1.0	0.57	0.15	0.38	0.05	0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
2	1730	2	1810	40	1.1	4.69	0.60	32	10.5	0	10.5	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15
4	0730	4	0930	140	5.3	4.62	4.62	42	2.7	42	2.7	4.60	0.36	0.38	0.02	0.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	1240	5	1400	80	1.6	4.71	0.00	37	2.3	37	2.3	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	1510	9	1730	140	3.4	3.87	0.00	23	1.2	23	1.2	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0630	10	0810	130	0.2	4.92	0.00	178	2.6	178	2.6	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0600	11	0710	50	0.7	4.47	0.00	58	6.4	58	6.4	1.90	0.43	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0310	19	0330	20	0.2	-0.00	0.00	0	10.3	0	10.3	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	1500	20	1700	120	0.7	4.65	0.00	38	5.2	38	5.2	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	1830	21	1920	50	0.4	4.57	0.00	52	5.3	52	5.3	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	1440	22	1540	120	1.3	4.84	0.00	129	7.7	129	7.7	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0920	23	1050	90	0.5	4.83	0.00	26	1.3	26	1.3	0.45	0.09	0.13	0.03	0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
25	0810	25	1250	280	4.1	5.38	0.00	10	3.5	10	3.5	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0400	26	0450	50	0.7	4.88	0.00	22	1.0	22	1.0	0.33	0.13	0.00	0.03	0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	1720	27	1810	50	1.0	4.65	0.00	35	4.4	35	4.4	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	1040	28	1110	30	0.3	6.99	0.00	19	5.1	19	5.1	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	1300	30	1400	60	0.3	5.34	0.00	19	5.7	19	5.7	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0840	31	1320	280	1.4	5.34	0.00	19	5.7	19	5.7	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COMPONENTS



STATION SF 2, 45-DAYS PROGRAM.

HIGH VOLUME SAMPLER

NOVEMBER, 1974

SAMPLING PERIOD

COMPONENTS

FROM DAY GMT	TO DAY GMT	T.P.M. UG/M3	PH	H+ NEP/M3	SO4 UG/M3	NH4-N UG/M3	NO3-N UG/M3	TA UG/M3	MG UG/M3	NA UG/M3	K UG/M3	CL UG/M3	FE UG/M3	NO2 UG/M3	SO2 UG/M3
1 0530	2 0530	-0.00	-0.00	4	.90	.39	6.00	.08	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00
2 0530	3 0530	-0.00	-0.00	19	4.30	1.00	.02	.08	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00
3 0530	4 0530	-0.00	-0.00	5	2.70	.67	.01	0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00
4 0530	5 0530	-0.00	-0.00	8	1.30	.24	.01	.08	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00
5 0530	6 0530	-0.00	-0.00	23	11.20	1.78	.13	.64	-0.00	.50	-0.00	-0.00	-0.00	-0.00	-0.00
6 0530	7 0530	-0.00	-0.00	13	6.00	1.39	.09	.08	-0.00	.50	-0.00	-0.00	-0.00	-0.00	-0.00
7 0530	8 0530	-0.00	-0.00	13	5.10	1.75	.17	.08	-0.00	.30	-0.00	-0.00	-0.00	-0.00	-0.00
8 0530	9 0530	-0.00	-0.00	14	5.40	1.45	.05	.09	-0.00	.30	-0.00	-0.00	-0.00	-0.00	-0.00
9 0530	10 0530	-0.00	-0.00	40	8.60	1.65	.05	.29	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00
10 0530	11 0530	-0.00	-0.00	6	4.20	.86	.04	.08	-0.00	.10	-0.00	-0.00	-0.00	-0.00	-0.00
11 0530	12 0530	-0.00	-0.00	5	4.40	.55	.23	.25	-0.00	1.10	-0.00	-0.00	-0.00	-0.00	-0.00
12 0530	13 0530	-0.00	-0.00	4	4.20	.54	.00	.24	-0.00	2.00	-0.00	-0.00	-0.00	-0.00	-0.00
13 0530	14 0530	-0.00	-0.00	5	4.50	.67	.17	.08	-0.00	.50	-0.00	-0.00	-0.00	-0.00	-0.00
14 0530	15 0530	-0.00	-0.00	5	4.10	.92	.07	.08	-0.00	.30	-0.00	-0.00	-0.00	-0.00	-0.00
15 0530	16 0530	-0.00	-0.00	12	6.40	1.51	.24	.24	-0.00	.30	-0.00	-0.00	-0.00	-0.00	-0.00
16 0530	17 0530	-0.00	-0.00	12	4.90	.67	.20	.08	-0.00	.80	-0.00	-0.00	-0.00	-0.00	-0.00
17 0530	18 0530	-0.00	-0.00	11	5.20	.67	.17	.25	-0.00	.30	-0.00	-0.00	-0.00	-0.00	-0.00
18 0530	19 0530	-0.00	-0.00	11	5.20	.74	.32	.27	-0.00	1.00	-0.00	-0.00	-0.00	-0.00	-0.00
19 0530	20 0530	-0.00	-0.00	9	5.80	.67	.18	.27	-0.00	.30	-0.00	-0.00	-0.00	-0.00	-0.00
20 0530	21 0530	-0.00	-0.00	30	5.40	.64	.04	.25	-0.00	.10	-0.00	-0.00	-0.00	-0.00	-0.00
21 0530	22 0530	-0.00	-0.00	5	5.80	1.25	.07	.25	-0.00	.30	-0.00	-0.00	-0.00	-0.00	-0.00
22 0530	23 0530	-0.00	-0.00	22	5.40	1.14	.07	.28	-0.00	.10	-0.00	-0.00	-0.00	-0.00	-0.00
23 0530	24 0530	-0.00	-0.00	3	5.70	1.55	.11	.25	-0.00	.10	-0.00	-0.00	-0.00	-0.00	-0.00
24 0530	25 0530	-0.00	-0.00	8	6.40	2.02	.10	.25	-0.00	.70	-0.00	-0.00	-0.00	-0.00	-0.00
25 0530	26 0530	-0.00	-0.00	8	12.30	2.75	.08	.85	-0.00	.20	-0.00	-0.00	-0.00	-0.00	-0.00
26 0530	27 0530	-0.00	-0.00	10	5.80	1.54	.10	.72	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00
27 0530	28 0530	-0.00	-0.00	20	9.00	2.01	.08	.74	-0.00	.10	-0.00	-0.00	-0.00	-0.00	-0.00
28 0530	29 0530	-0.00	-0.00	22	10.90	2.22	.08	.86	-0.00	.30	-0.00	-0.00	-0.00	-0.00	-0.00
29 0530	30 0530	-0.00	-0.00	3	.80	.05	.00	.86	-0.00	.00	-0.00	-0.00	-0.00	-0.00	-0.00
30 0530	1 0530	-0.00	-0.00	4	6.80	1.58	.05	.22	-0.00	.25	-0.00	-0.00	-0.00	-0.00	-0.00























STATION NL01, 45-DAYS PROGRAM.

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PRECIPITATION SAMPLE

JULY, 1974

FROM DAY GMT		TO DAY GMT		DURATION		AMOUNT		PH		H+		SO4		NH4-N		NO3-N		CA		MG		NA		K		CL		FE	
DAY GMT	DAY GMT	MIN	MIN	MM	MM	MM	MM	UEN/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
1	0700	2	0700	132		.8		3.97		-0		9.8		-0.00		-0.00		.50		.17		-0.0		-0.0		-0.00		0.00	
2	0700	3	0700	324		17.2		4.41		64		2.2		-0.00		-0.00		.20		.07		-0.0		-0.0		-0.00		0.00	
3	0700	4	0700	72		2.5		4.53		51		3.9		-0.00		-0.00		.30		.11		-0.0		-0.0		-0.00		0.00	
4	0700	5	0700	948		14.9		4.13		100		5.5		-0.00		-0.00		.36		.13		-0.0		-0.0		-0.00		0.00	
5	0700	6	0700	72		.6		3.78		-0		-0.0		-0.00		-0.00		-0.00		-0.00		-0.0		-0.0		-0.00		-0.00	
12	0700	13	0700	312		2.4		4.23		73		17.9		-0.00		-0.00		1.90		.40		-0.0		-0.0		-0.00		0.00	
13	0700	14	0700	276		5.4		4.53		41		7.9		-0.00		-0.00		.40		.13		-0.0		-0.0		-0.00		0.00	
14	0700	15	0700	102		1.4		3.87		41		11.3		-0.00		-0.00		.30		.08		-0.0		-0.0		-0.00		0.00	
16	0700	17	0700	36		2.5		4.34		63		57.9		-0.00		-0.00		8.10		.20		-0.0		-0.0		-0.00		0.00	
17	0700	18	0700	144		4.7		4.28		95		7.3		-0.00		-0.00		.40		.14		-0.0		-0.0		-0.00		0.00	
19	0700	20	0700	150		.8		3.85		-0		6.9		-0.00		-0.00		.50		.17		-0.0		-0.0		-0.00		0.00	
22	0700	23	0700	222		6.7		4.37		116		3.6		-0.00		-0.00		.20		.05		-0.0		-0.0		-0.00		0.00	
23	0700	24	0700	114		1.9		4.34		115		4.5		-0.00		-0.00		.36		.08		-0.0		-0.0		-0.00		0.00	
26	0700	27	0700	156		1.4		4.17		-0		9.4		-0.00		-0.00		.60		.20		-0.0		-0.0		-0.00		0.00	

STATION NL01, 45-DAYS PROGRAM.

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PRECIPITATION SAMPLE

AUGUST, 1974

FROM DAY GMT		TO DAY GMT		DURATION		AMOUNT		PH		H+		SO4		NH4-N		NO3-N		CA		MG		NA		K		CL		FE	
DAY GMT	DAY GMT	MIN	MIN	MM	MM	MM	MM	UEN/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
3	0700	4	0700	1440		3.9		4.22		74		6.3		-0.00		-0.00		1.00		-0.00		-0.00		-0.00		-0.00		0.00	
4	0700	5	0700	1440		4.8		4.09		178		7.4		-0.00		-0.00		.40		-0.00		-0.00		-0.00		-0.00		0.00	
8	0700	9	0700	1440		7.6		4.71		32		8.0		-0.00		-0.00		.70		-0.00		-0.00		-0.00		-0.00		0.00	
9	0700	10	0700	1440		16.2		4.19		100		4.1		-0.00		-0.00		.20		-0.00		-0.00		-0.00		-0.00		0.00	
10	0700	11	0700	1440		6.0		4.37		86		3.6		-0.00		-0.00		.20		-0.00		-0.00		-0.00		-0.00		0.00	
11	0700	12	0700	1440		11.0		4.11		115		2.7		-0.00		-0.00		.10		-0.00		-0.00		-0.00		-0.00		0.00	
12	0700	13	0700	1440		14.2		4.34		90		2.6		-0.00		-0.00		.10		-0.00		-0.00		-0.00		-0.00		0.00	
16	0700	17	0700	1440		1.7		4.80		-0		16.4		-0.00		-0.00		4.99		-0.00		-0.00		-0.00		-0.00		0.00	
18	0700	19	0700	1440		2.3		4.14		-0		13.8		-0.00		-0.00		1.60		-0.00		-0.00		-0.00		-0.00		0.00	
26	0700	27	0700	1440		9.6		4.55		-0		13.4		-0.00		-0.00		1.80		-0.00		-0.00		-0.00		-0.00		0.00	
31	0700	1	0700	1440		1.6		4.08		-0		25.5		-0.00		-0.00		4.30		-0.00		-0.00		-0.00		-0.00		0.00	



STATION NL01, 45-DAYS PROGRAM.

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PRECIPITATION SAMPLE

SEPTEMBER, 1974

SAMPLING PERIOD			COMPONENTS														
FROM DAY GMT	TO DAY GMT	DURATION MIN	AMOUNT MM	PH	H+	SO4 MG/L	NH4-N MG/L	NO3-N MG/L	CA MG/L	MG	NA MG/L	K MG/L	CL MG/L	FE MG/L			
1 0700	2 0700	1440	4.2	4.64	82	6.5	1.96	3.34	.46	-0.00	.6	.1	-0.00	6.00			
2 0700	3 0700	1440	6.3	4.82	33	5.3	1.85	4.20	.46	-0.00	.3	.1	-0.00	1.00			
4 0700	5 0700	1440	19.9	4.77	19	4.2	.96	.23	.20	-0.00	.3	.1	-0.00	6.00			
5 0700	6 0700	1440	15.6	4.71	24	3.3	.65	.21	.10	-0.00	.1	.1	-0.00	6.00			
6 0700	7 0700	1440	2.1	4.56	32	7.3	-0.00	-0.00	.30	-0.00	1.8	.2	-0.00	6.00			
7 0700	8 0700	1440	1.5	4.48	27	6.1	-0.00	-0.00	.40	-0.00	1.5	.2	-0.00	6.00			
9 0700	10 0700	1440	11.5	4.65	14	3.3	.37	.16	.20	-0.00	1.1	.1	-0.00	6.00			
12 0700	13 0700	1440	2.6	4.93	18	7.3	-0.00	-0.00	1.00	-0.00	.5	.4	-0.00	6.00			
13 0700	14 0700	1440	1.3	4.51	-0	7.4	-0.00	-0.00	.40	-0.00	.5	.3	-0.00	6.00			
15 0700	16 0700	1440	.7	7.33	48	21.5	-0.00	-0.00	1.00	-0.00	3.8	7.4	-0.00	6.00			
17 0700	18 0700	1440	3.9	4.46	48	7.8	1.99	8.97	.50	-0.00	.6	.4	-0.00	6.00			
21 0700	22 0700	1440	6.5	4.34	46	6.5	.91	.31	.30	-0.00	.9	.2	-0.00	6.00			
22 0700	23 0700	1440	3.6	4.27	54	5.2	.82	.31	.20	-0.00	1.3	.2	-0.00	6.00			
23 0700	24 0700	1440	9.4	4.52	29	4.1	.90	.21	.20	-0.00	.5	.1	-0.00	6.00			
24 0700	25 0700	1440	6.8	4.60	30	4.9	.75	.23	.50	-0.00	6.9	.3	-0.00	6.00			
25 0700	26 0700	1440	8.1	4.63	45	3.3	.56	.14	.10	-0.00	.4	.1	-0.00	6.00			
26 0700	27 0700	1440	4.0	4.52	40	4.4	1.12	.29	.30	-0.00	1.2	.1	-0.00	6.00			
27 0700	28 0700	1440	9.6	4.60	86	3.1	.58	.14	.10	-0.00	.2	.1	-0.00	6.00			
28 0700	29 0700	1440	.4	4.04	86	3.1	.58	.14	.10	-0.00	.2	.1	-0.00	6.00			
29 0700	30 0700	1440	1.7	4.19	92	9.0	-0.00	-0.00	.70	-0.00	1.6	.6	-0.00	6.00			
30 0700	1 0700	1440	3.1	4.18	91	7.9	2.84	1.17	.50	-0.00	1.5	.4	-0.00	6.00			



STATION NLD1, 45-DAYS PROGRAM.

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HIGH VOLUME SAMPLER

OCTOBER 1974

SAMPLING PERIOD

COMPONENTS

FROM DAY GMT	TO DAY GMT	T.P.M.	PH	NEG/M3	H+	SO4 UG/M3	NH4-N UG/M3	NO3-N UG/M3	CA UG/M3	MG UG/M3	NA UG/M3	K UG/M3	CL UG/M3	FE UG/M3	NO2-N UG/M3	SO2 UG/M3
9 0700	10 0700	-0.00	6.33	12	4.46	1.44	1.50	.15	.70	.20	.02	.20	-0.00	.02	0	0
11 0700	12 0700	-0.00	6.13	6	5.70	1.99	3.05	.39	.50	.30	.14	.20	-0.00	.14	0	0
12 0700	13 0700	-0.00	5.62	23	1.60	.59	1.00	.13	.80	.20	.05	.20	-0.00	.05	0	0
13 0700	14 0700	-0.00	6.60	7	2.50	.76	1.15	.13	.30	.10	.02	.10	-0.00	.02	0	0
14 0700	15 0700	-0.00	5.89	8	5.30	2.19	3.15	.18	.50	.20	.05	.20	-0.00	.05	0	0
15 0700	16 0700	-0.00	5.23	12	5.60	5.03	3.40	.77	.50	.20	.05	.20	-0.00	.05	0	0
16 0700	17 0700	-0.00	5.25	24	16.80	6.52	3.35	.56	.50	.20	.05	.20	-0.00	.05	0	0
17 0700	18 0700	-0.00	5.31	22	12.20	4.28	1.90	.45	.40	.20	.05	.20	-0.00	.05	0	0
18 0700	19 0700	-0.00	5.56	17	11.40	3.99	2.10	.47	.60	.30	.10	.20	-0.00	.10	0	0
19 0700	20 0700	-0.00	6.23	14	2.70	.90	.65	.21	.40	.20	.05	.20	-0.00	.05	0	0
20 0700	21 0700	-0.00	5.92	18	8.30	2.07	1.10	.17	.10	.20	.05	.20	-0.00	.05	0	0
21 0700	22 0700	-0.00	6.23	15	4.22	1.59	.90	.19	.20	.20	.05	.20	-0.00	.05	0	0
22 0700	23 0700	-0.00	6.46	12	2.90	1.00	.65	.10	.70	.20	.05	.20	-0.00	.05	0	0
23 0700	24 0700	-0.00	6.02	14	6.80	2.09	.45	.18	.10	.20	.05	.20	-0.00	.05	0	0
24 0700	25 0700	-0.00	5.85	15	6.80	2.44	.80	.44	.20	.20	.05	.20	-0.00	.05	0	0
25 0700	26 0700	-0.00	6.36	10	2.99	.86	.40	.23	.20	.20	.05	.20	-0.00	.05	0	0
27 0700	28 0700	-0.00	6.76	9	2.10	.34	.15	.17	.10	.20	.05	.20	-0.00	.05	0	0
28 0700	29 0700	-0.00	6.79	7	1.10	.14	.10	.09	.10	.20	.05	.20	-0.00	.05	0	0
29 0700	30 0700	-0.00	6.01	5	1.30	.33	.10	.10	.10	.20	.05	.20	-0.00	.05	0	0
30 0700	31 0700	-0.00	6.69	14	2.20	.78	.15	.06	.10	.20	.05	.20	-0.00	.05	0	0
31 0700	1 0700	-0.00	5.63	19	12.30	4.29	1.30	.05	.70	.20	.05	.20	-0.00	.05	0	0



STATION NL01, 45-DAYS PROGRAM.

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PRECIPITATION SAMPLE

OCTOBER 1974

SAMPLING PERIOD

COMPONENTS

FROM DAY GMT	TO DAY GMT	DURATION MIN	AMOUNT MM	PH	H+ UEN/L	SO4 MG/L	NH4-N MG/L	NO3-N MG/L	CA MG/L	MG MG/L	NA MG/L	K MG/L	CL MG/L	FE MG/L
1 0700	2 0700	1440	.4	4.20	-0	-0.0	-0.00	-0.00	-0.00	-0.00	-0.0	-0.0	-0.00	-0.00
3 0700	4 0700	1440	5.3	4.23	89	4.4	.93	.38	4.0	-0.00	9	.3	-0.00	0.00
4 0700	5 0700	1440	1.4	4.09	-0	6.0	-0.00	-0.00	-0.00	-0.00	-0.0	-0.0	-0.00	-0.00
5 0700	6 0700	1440	3.5	4.40	63	3.2	.92	.23	4.0	-0.00	7.3	.5	-0.00	0.00
6 0700	7 0700	1440	8.4	4.55	50	1.6	.50	.22	.20	-0.00	.9	.2	-0.00	0.00
7 0700	8 0700	1440	5.6	4.23	116	4.7	1.40	.77	.80	-0.00	.7	.2	-0.00	0.00
9 0700	10 0700	1440	2.6	4.45	92	4.9	-0.00	-0.00	.30	-0.00	.8	.4	-0.00	0.00
11 0700	12 0700	1440	.6	4.24	-0	-0.0	-0.00	-0.00	-0.00	-0.00	-0.0	-0.0	-0.00	-0.00
12 0700	13 0700	1440	2.9	4.48	68	4.3	1.24	.00	0.00	-0.00	1.4	.4	-0.00	0.00
13 0700	14 0700	1440	.5	4.20	-0	-0.0	-0.00	-0.00	-0.00	-0.00	-0.0	-0.0	-0.00	-0.00
16 0700	17 0700	1440	.5	3.92	-0	-0.0	-0.00	-0.00	-0.00	-0.00	-0.0	-0.0	-0.00	-0.00
18 0700	19 0700	1440	11.8	4.44	105	2.8	.44	.14	.40	-0.00	.1	.1	-0.00	0.00
19 0700	20 0700	1440	.4	3.94	-0	-0.0	-0.00	-0.00	-0.00	-0.00	-0.0	-0.0	-0.00	-0.00
20 0700	21 0700	1440	1.7	4.17	151	6.6	-0.00	-0.00	.50	-0.00	3.9	.2	-0.00	0.00
21 0700	22 0700	1440	.4	4.04	-0	-0.0	-0.00	-0.00	-0.00	-0.00	-0.0	-0.0	-0.00	-0.00
22 0700	23 0700	1440	19.7	4.70	59	1.9	.54	.24	0.00	-0.00	.5	.1	-0.00	0.00
24 0700	25 0700	1440	.9	4.21	-0	10.1	-0.00	-0.00	.80	-0.00	4.1	.2	-0.00	0.00
25 0700	26 0700	1440	4.2	5.21	15	6.5	1.77	.39	.70	-0.00	6.7	1.5	-0.00	0.00
26 0700	27 0700	1440	2.7	4.33	68	6.6	1.70	.65	.60	-0.00	5.7	.5	-0.00	0.00
27 0700	28 0700	1440	18.9	4.40	60	5.6	.48	.18	.60	-0.00	14.4	.7	-0.00	0.00
28 0700	29 0700	1440	12.6	4.54	43	2.4	.40	.08	.20	-0.00	5.2	.3	-0.00	0.00























































