

Publikasjoner fra  
DET NORSKE INSTITUTT FOR KOSMISK FYSIKK  
Nr. 45

THE AURORAL OBSERVATORY AT TROMSØ  
( $\varphi = 69^{\circ} 39'.8$  N,  $\lambda = 18^{\circ} 56'.9$  E Gr.)

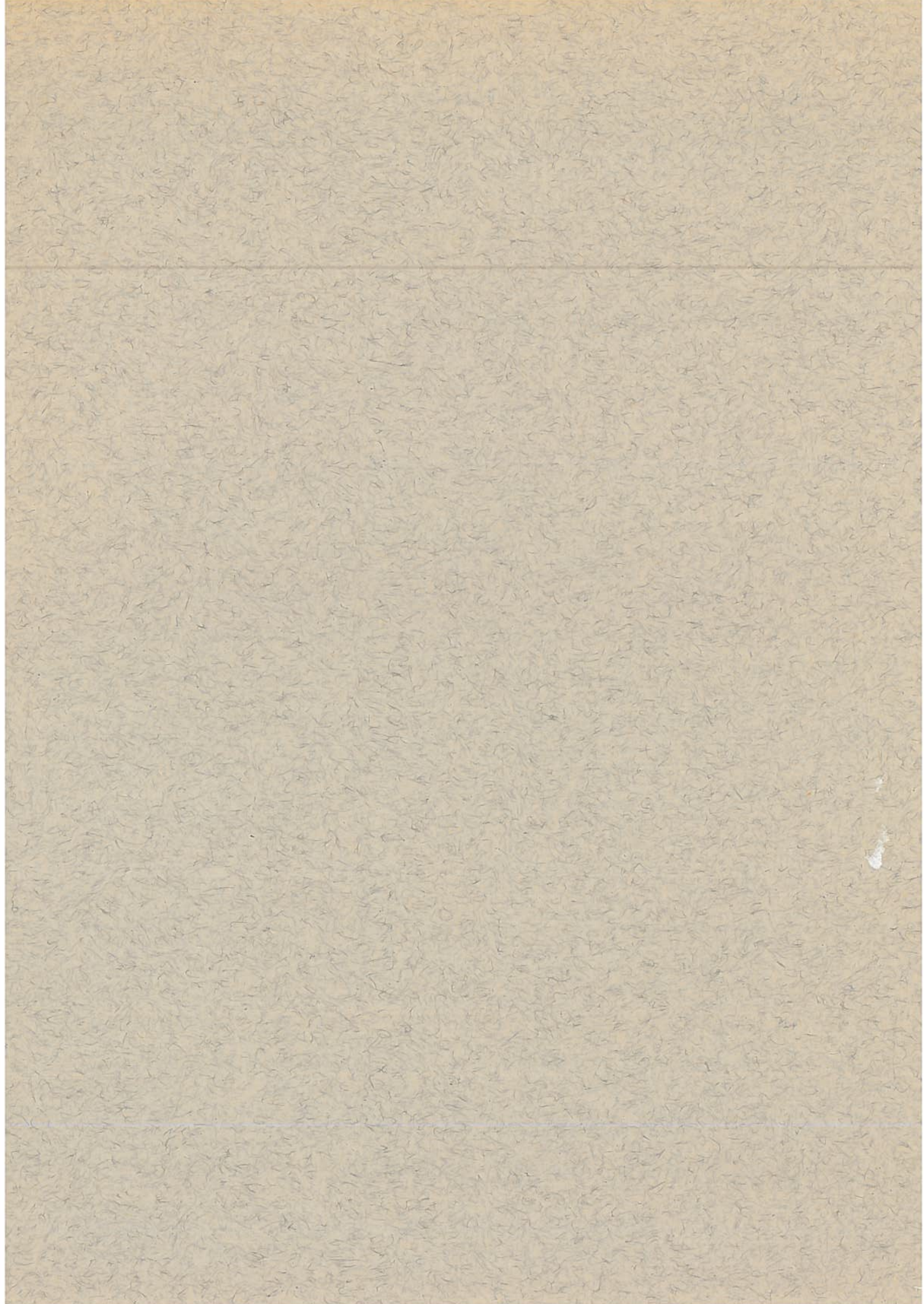
OBSERVATIONS 1957

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1959

A.S. JOHN GRIEGS BOKTRYKKERI, BERGEN





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## Aurorae

The spectral analysis of the auroral luminescence undertaken at Tromsø has been coordinated with that of Oslo and conducted by Vegard, who gives the following report for 1957

The results of spectrographic work obtained at Tromsø and Oslo during the two winters 1951/52 and 1952/53 were dealt with in a paper: "Composition, Variations and Excitation of the Auroral Luminescence Spectra". Work along similar lines was continued during the following four winterseasons 1953/54 till 1955/57.

Great interest was paid to the elucidation of the following problems:

1. The detection and interpretation of the spectral features appearing in the auroral luminescence.
2. The variability of the auroral spectrum, seen in relation to the properties of the solar bundles produced by photoelectrons, which are neutralized by positive ions preferably protons.
3. The velocity distribution of the protons in the bundle was determined by the Doppler effect of  $H\beta$ .
4. The separation of the electrons and positive ions, by the passage of the solar bundles down the atmosphere, was used for analysis of the luminescence produced by electrons and positive ions at various altitudes.
5. Between the height ( $h_p$ ) where the protons stop and the lower limit ( $h_e$ ) of the aurorae the luminescence is found to be mainly produced by electrons, and it is characterized by strong bands, a few and mostly weak lines and the red bands of the  $N_2/P$  group, which may be strong enough to produce a red band along the bottom part of the auroral bands. By electron excitation the red  $OI$  doublet 6300, 6364, is very weak compared with the green line (5577).
6. At the altitudes reached by the positive ions of the bundle (above  $h_p$ ) most line spectra in the auroral luminescence are enhanced. This enhancement is especially very marked in the case of the red forbidden  $OI$ -doublet, which is responsible for the red aurora of type  $A$ , for which the relative intensity of the red colour increases upwards. Thus the analysis of the auroral luminescence along the path of the solar bundles down the atmosphere has shown, that the protons (and perhaps other positive ions) have a special ability to transfer the neutral oxygen atom from the ground states  $P_{1,2}$  to the lowest metastable state  $^1D_2$ . A similar variable enhancement is found for the  $NI$  doublet with the mean wavelength 5199,5 Å, indicating that the positive ions of the bundle has a particular ability for transferring the  $NI$ -groundstate  $^4S_{3/2}$  to the lowest metastable states  $^2D_{5/2, 3/2}$ .



7. In accordance with previous results, we have found that during the present sunspot maximum, which is covered by the «International Geophysical Year» the red *OI*-doublet has been very strong and the red aurorae of type *A* unusually frequent. This indicates that the flux of protons and positive ions in the solar bundles increases with solar activity. This is also shown by the great enhancement of auroral lines observed at Oslo from rays of altitudes up to the order of 600 km.

More details will be found from the following two papers:

- I. L. Vegard: Recent progress relating to the study of Aurorae and kindred phenomena. Geophys. Publ. Vol. XX No 4, communicated May 1957.
- II. L. Vegard, S. Berger and A. Nundal: Results of auroral Observations at Tromsø and Oslo from the four winters 1953/54 to 1956/57. Geophys. Publ. XX No 9.

*L. Vegard*

Photometric studies of aurora was conducted by Harang and Omholt with a photoelectric filter photometer. Studies were made on the altitude distribution of various spectral components and on the rapid fluctuations in the intensity of some auroral forms. Particular attention was paid to the intensity of the green line 5577 compared to the First Negative  $N_2^+$  bands, in order to determine more accurately the lifetime of the excited  $O(^1S)$  atoms and the importance of various excitation and deactivation processes.

*A. Omholt*

## OZONE OBSERVATIONS

The table of ozone values of Tromsø covers 9 months and that of Longyear, Svalbard (78.2° N.) only 7 months.

Sky-observations are possible at Tromsø the whole year and at Longyear say 10 months, but the evaluation of values during the polar night period is too doubtful to be trusted in.

All observations were taken with Dobson Spectrophotometers, at Tromsø by Steinar Berger and at Longyear by H. Welde.

LONGYEAR, SVALBARD.                      TABLE OF OZONE VALUES 1957

Unit 0.001 cm.

M: diurnal mean.    N: number of observation.    R: diurnal range.

Day	Mar.			Apr.			May			June			July			Aug.			Sep.		
	M.	N.	R.	M.	N.	R.	M.	N.	R.	M.	N.	R.	M.	N.	R.	M.	N.	R.	M.	N.	R.
1.....	—			504	2	7	412	1		336	2	1	314	2	1	272	2	1	274	2	10
2.....	—			438	2	1	405	1		—			312	2	3	—			263	2	2
3.....	—			381	1		400	2	3	—			306	1		272	2	2	270	2	4
4.....	—			378	1		395	2	6	358	2	0	304	2	10	295	1		273	2	4
5.....	—			377	2	0	412	1		346	2	9	325	2	2	282	1		277	2	1
6.....	—			486	1		409	2	2	348	1		335	2	9	290	2	4	279	2	7
7.....	—			460	1		391	2	13	360	2	9	309	2	4	294	2	8	273	2	7
8.....	—			470	2	7	340	2	0	379	2	1	314	1		310	2	7	269		
9.....	—			418	1		369	2	10	385	2	0	317	2	2	—			272	1	
10.....	—			418	2	3	350	2	3	386	2	9	318	1		304	2	3	279	2	6
11.....	—			392	2	4	363	2	7	375	2	4	320	2	4	315	2	4	—		
12.....	—			430	1		—			367	2	1	303	2	1	301	2	4	—		
13.....	—			418	2	5	389	2	9	368	2	7	302	2	2	300	2	3	—		
14.....	—			403	1		394	1		376	2	2	—			—			279	1	
15.....	—			395	2	6	375	2	8	361	2	4	284	2	0	—			—		
16.....	—			377	2	4	—			349	2	3	303	1		—			291	2	9
17.....	—			358	2	5	369	2	4	343	2	5	316	2	5	—			276	1	
18.....	—			387	2	12	348	1		344	2	0	299	1		—			272	2	8
19.....	—			380	2	3	379	1		338	2	3	295	1		—			269	2	1
20.....	—			388	1		—			340	2	8	286	2	5	276	1		—		
21.....	—			—			381	2	7	336	2	1	303	2	1	268	1		283	2	0
22.....	—			385	1		367	2	0	315	1	12	—			265	2	6	286	1	
23.....	—			412	1		356	2	1	367	1		—			281	2	11	—		
24.....	—			396	1		—			—			—			269	2	8	242	1	
25.....	445	2	3	397	1		343	1		340	2	16	—			278	2	4	—		
26.....	—			386	2	9	345	1		329	2	1	—			283	2	2	—		
27.....	465	1		398	2	7	367	1		340	2	7	—			287	2	7	—		
28.....	453	2	6	388	1		354	2	4	358	2	8	—			284	2	4	—		
29.....	478	2	4	388	2	4	347	2	7	321	2	8	287	2	1	283	1		273	1	
30.....	472	1		406	2	4	351	2	1	322	1		268	2	0	288	2	0	276	2	7
31.....	484	2	7	—			343	2	8	—			269	1		302	2	7	—		
Mean .....	(466)			407			372			351			304			287			273		

## TROMSØ

## TABLE OF OZONE VALUES 1957

Unit 0.001 cm.

M: diurnal mean. N: number of observation. R: diurnal range.

Day	Feb.		Mar.		Apr.		May		June		July		Aug.		Sep.		Okt.	
	M.	N.	M.	N.	M.	N.	M.	N.	M.	N.	M.	N.	M.	N.	M.	N.	M.	N.
1	419	1	466	1	333	3 23	400	1	362	2 11	332	1	282	1	—	—	251	2 3
2	446	1	388	1	340	3 6	473	2 7	370	1	309	1	296	1	282	1	272	1
3	517	1	438	1	377	2 8	428	2 8	376	2 2	318	1	298	1	303	1	293	2 5
4	500	1	497	2 5	380	2 12	413	2 5	365	2 4	337	2 0	328	1	303	1	260	2 15
5	—	—	506	2 6	365	2 10	384	1	370	2 7	326	1	307	1	300	2 3	259	2 17
6	—	—	514	1	389	2 16	391	2 6	370	2 11	358	1	303	1	290	3 8	262	1
7	487	1	449	1	416	1	440	3 25	354	2 0	335	1	302	1	292	2 12	218	1
8	—	—	466	1	453	1	377	3 18	376	2 4	338	2 5	296	2 4	—	—	207	2 5
9	503	1	466	1	347	1	339	2 8	377	1	324	1	303	1	313	1	265	2 7
10	—	—	—	—	468	3 18	350	2 10	370	1	331	2 9	343	1	304	3 13	270	3 5
11	492	1	405	1	454	3 17	346	2 4	345	1	314	1	298	1	286	2 3	332	1
12	483	1	428	1	448	2 3	332	1	337	1	303	1	—	—	284	1	351	1
13	495	1	456	2 5	443	3 5	365	2 3	351	2 11	298	1	309	1	279	3 4	280	1
14	—	—	512	2 5	403	1	354	2 0	347	1	299	1	—	—	285	3 6	303	3 27
15	520	1	485	3 12	387	3 6	360	1	362	1	286	1	329	1	292	1	321	2 2
16	490	1	520	1	367	3 6	375	3 15	336	1	—	—	305	1	306	3 11	266	4 12
17	473	1	487	1	370	2 1	340	1	—	—	284	2 4	—	—	316	3 6	285	2 3
18	469	1	526	2 8	362	1	363	2 2	—	—	301	1	—	—	—	—	302	3 4
19	476	1	489	2 11	367	1	347	1	371	1	287	1	—	—	306	3 6	280	3 10
20	500	1	438	2 6	375	2 15	365	2 13	354	1	296	1	309	1	292	3 9	224	1
21	487	1	460	2 4	396	1	369	2 9	347	1	296	1	318	1	301	1	222	2 3
22	500	1	466	2 11	375	1	406	2 12	318	1	307	1	304	2 3	—	—	256	3 6
23	496	1	526	2 9	374	2 0	381	1	316	1	310	1	304	2 15	288	3 6	260	2 4
24	—	—	435	1	416	2 1	361	2 13	374	1	300	2 2	301	2 4	300	2 10	284	2 16
25	465	1	449	1	381	2 0	344	2 14	362	1	296	2 0	282	2 4	261	3 12	340	2 7
26	457	2 7	457	1	361	2 13	339	1	351	1	297	2 2	285	2 2	270	3 16	303	2 7
27	462	1	395	2 20	357	2 5	355	2 10	—	—	287	2 2	302	1	273	3 0	245	1
28	494	1	418	1	424	1	370	2 8	388	1	—	—	318	3 5	269	1	261	2 16
29	—	—	415	1	417	2 4	387	2 11	370	2 0	281	2 4	310	1	265	1	245	1
30	—	—	403	1	433	2 5	351	1	367	1	284	1	319	2 11	264	3 13	326	1
31	—	—	389	1	—	—	352	1	—	—	301	2 10	299	2 1	—	—	320	1
Mean	483		457		393		373		359		308		306		289		276	



# EARTH MAGNETISM 1957, TROMSØ

## GENERAL REMARKS

The instrumental equipment used for the magnetic measurements and registrations is the same as that previously used, a description of which is given in No. 1 and No. 33 of the present series of publications.

The observations were made by S. Berger and the calculation work by Liv Nestvold.

## SCALE-VALUES

The following scale-values were determined:

D — curves: 1'.45 or 4.73  $\gamma$  per mm.  
 H — curves: 5.27  $\gamma$  per mm.  
 V — curves: 7.25  $\gamma$  per mm.

## BASE-LINE VALUES

The determination of the base-line values resulted in the table given below.

The quiet mean Inclination value for 1957 was calculated to 77° 35'3.

The temperature coefficient for the H-variometer is 8.7 $\gamma$ , and for the V-variometer ÷ 2.3 $\gamma$  per degree Celcius.

OBSERVED AND ADOPTED BASE-LINE VALUES 1957

Date	Observ.	Adopt.	Date	Observ.	Adopt.	Date	Observ.	Adopt.
II 27.	1° 30'.5 W	1° 30'.5 W	I 26.	11228 $\gamma$	11227 $\gamma$	III 15.	50525 $\gamma$	50525 $\gamma$
III 13.	30.5	30.5	II 25.	27	27	III 27.	26	25
IV 15.	32.1	32.2	III 13.	27	27	III 30.	23	25
IV 25.	32.4	32.2	IV 1.	28	27	VI 14.	21	20
V 8.	32.2	32.2	IV 15.	28	27	IX 6.	08	10
V 22.	32.0	32.2	V 18.	25	27	X 29.	10	10
V 25.	32.2	32.2	V 20.	29	27	X 30.	11	10
VI 13.	32.4	32.5	VI 13.	20	23	XI 1.	10	10
VII 22.	32.7	32.8	VII 4.	22	23			
VII 24.	32.9	32.8	VII 11.	25	23			
X 3.	32.8	32.8	VIII 1.	24	23			
XII 4.	32.7	32.8	IX 7.	24	23			
			X 4.	21	20			
			X 28.	21	20			
			XII 3.	19	20			
			XII 4.	21	20			

## EXPLANATION OF THE TABLES

For each of the components  $D$ ,  $H$  and  $V$  two series of tables are given. One series gives, in the usual way, the hourly mean values centered at half hours Gr. M. T. In these tables the column headed  $M$  gives the ordinary diurnal means.  $R$  designates the range, i. e. the difference between the maximum and minimum value measured on the magnetogram. The horizontal line marked  $M$  gives the monthly means of the hourly values, and the line marked  $QM$  gives the monthly means of the *quiet* hourly values.

The second series of tables gives the hourly values of the Storminess ("average perturbing force" or "activity"). As to definition of the storminess and the method for separating it, we refer to No. 2 and 4 in the present series of publications. In the storminess tables the column headed  $M$  gives the diurnal means. The columns headed  $PS$ ,  $NS$  and  $AS$  give the diurnal sum of the positive, negative and absolute storminess respectively. The column headed  $CH$  gives the magnetic character numbers. We consider the diurnal sum of the absolute storminess as the best expression for the magnetic activity during a day, and we will use that quantity for defining the character numbers. Only the strongest perturbed component, the Horizontal Intensity, is used in characterisation. Character number 0 comprises diurnal sum of absolute storminess ( $AS$ ) up to  $400\gamma$ , character number 1 from  $400\gamma$  to  $1200\gamma$  and character number 2 greater than  $1200\gamma$ . The horizontal line marked  $M$  contains the monthly means of the hourly values, and the two lines marked  $MPS$  and  $MNS$  give the monthly means of the positive and negative storminess respectively.

In  $D$  the storminess is reckoned positive towards magnetic west, in  $H$  positive towards magnetic north, and in  $V$  positive downwards.

In addition to the main tables, resuming tables, figures and vector diagrams are given at the end of the year-book.

## EARTH MAGNETISM 1957, BEAR ISLAND

$$(\varphi = 74.5^\circ \text{ N.}, \lambda = 19.2^\circ \text{ E})$$

Some measurements with  $QHM$  and  $BMZ$  were taken by S. Berger during an inspection period in June 1957. According to these measurements and the registrations we may give some approximate annual values for 1957

$$D = 2^\circ 25' \text{ E. } H = 9190\gamma. V = 52080\gamma.$$

For comparison we print the K-indices of Bear Island and Tromsø side by side.

## K-INDICES FOR THREE-HOUR INTERVAL 1957

## Tromsø

Range 2000 $\gamma$  for K = 9. Scale values: D = 4.73 $\gamma$ . H = 5.27 $\gamma$ . V = 7.25 $\gamma$ .

Date	Jan.	Feb.	Mar.	Apr.	May	June
1	1001 2332	4201 0242	2000 4545	5433 4755	5545 4323	1111 3301
2	3002 3376	2211 3455	6775 6677	5223 2355	4323 4124	1321 2232
3	4232 1213	3200 1365	5552 4555	5213 4566	4323 3445	2335 4455
4	2221 0012	4433 6665	5523 4036	5433 3455	3223 5434	5635 4566
5	1000 0021	6644 4466	4323 3454	6425 5536	5212 2335	6533 3444
6	1210 0000	4322 3311	6223 4443	6535 3332	5434 4225	6765 5466
7	1110 1012	0102 0334	3312 4544	2110 0003	5322 3451	7513 2015
8	4313 3355	3311 0223	5133 4356	4124 4455	0123 3336	4422 3433
9	3211 5556	3410 1344	4432 4644	4324 5556	5643 3343	3320 2230
10	4453 5576	4001 0001	5545 5576	7655 5642	3322 3136	1000 1134
11	5233 3124	2322 2354	5221 3101	4114 5225	4201 1346	3111 1023
12	4311 1004	2542 2334	1323 2111	2342 2453	5111 0203	3102 3415
13	3000 1101	4453 4573	0112 3554	4232 4343	5523 4343	4214 4235
14	0020 1011	3301 1120	2001 2001	1000 0111	4222 2224	4222 3143
15	2001 2335	1123 3446	3321 1345	0112 4256	4002 3324	4333 5545
16	4211 3232	1111 2433	6441 3466	6323 4535	2001 1343	4012 2203
17	3102 1032	3102 5444	4432 3435	5324 5335	3312 2443	3334 4414
18	0000 0000	4332 3465	3313 5145	5423 2565	3212 3234	6644 4355
19	0020 1343	5433 4356	4113 3364	5754 4555	4213 3365	6633 4535
20	3100 0310	5433 3335	6432 2335	4533 3334	5643 6453	3321 2353
21	2433 6776	6543 5666	3311 3656	4534 5555	4334 3233	4444 2363
22	7754 3443	4453 4466	6434 4565	2000 1333	3311 2100	4236 5435
23	3345 4655	6333 3567	5623 4455	5412 3235	5420 3443	5103 3243
24	5521 3376	7664 5343	4422 1266	5322 4435	1213 2331	6623 4123
25	6541 2256	4412 1000	5754 4220	4113 4433	3423 3335	6645 4356
26	4332 2334	3100 1002	2113 5556	2345 5565	4535 5555	7666 6756
27	3322 3333	4401 0131	6523 4566	5543 4134	4333 3223	5224 4434
28	2210 1333	0000 1113	8663 3433	2214 5645	3123 3315	4334 3332
29	2221 5655		3533 5766	5524 4522	4112 3413	1112 2213
30	6543 3444		6531 2235	3323 3455	5334 5435	4557 6777
31	3421 2345		5433 3565		4521 1122	
Date	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	7773 2354	3213 3101	6644 4345	3432 4254	1322 2233	6632 3336
2	1126 6553	5413 2235	5655 6577	4511 2225	2311 0025	4433 4535
3	7745 6354	6122 2543	7667 6854	4213 4565	5022 4343	3322 4355
4	3002 1257	6320 2201	4423 7658	5322 3555	2000 0343	5232 2104
5	6766 5246	1100 1456	8753 3357	5212 2454	1000 0233	5432 3556
6	4333 3455	6555 5565	5524 5643	4000 0000	1001 1355	6533 4664
7	3422 3334	4223 3343	3323 4201	1221 2022	5333 4543	4333 4335
8	4322 3344	1222 2225	0002 3314	2000 0000	2243 4456	6341 1224
9	6121 3434	6522 4345	3214 3442	0120 3445	5543 4466	5423 4546
10	4501 1101	5511 2223	0022 1333	4443 4465	6533 4445	5512 4754
11	2201 3132	1001 2211	2012 1344	5424 4554	4443 4344	5553 4355
12	2323 2233	4432 4334	4212 3236	3333 3445	5433 4535	5543 3555
13	4110 0000	3765 5355	8857 5555	6532 4365	5222 3343	5443 4532
14	0103 3334	1103 3334	3355 5536	3553 4546	4232 3454	4320 0134
15	4112 0213	5312 1124	5533 2355	4323 3555	4542 2354	3333 5643
16	2124 4445	3411 1222	5522 2244	3000 1121	3321 2343	4441 2465
17	5203 3325	2000 2200	3213 4531	2103 2002	3110 0006	4431 2456
18	3223 3454	2213 3234	4412 3253	1010 0124	5434 5533	5422 3324
19	5432 5445	4432 2111	2021 2111	0122 1244	2222 1034	4334 3366
20	4422 3446	1102 4345	2011 2334	3211 2455	2311 2355	5432 2246
21	5213 2213	5543 4531	3007 7755	4421 2466	1000 0025	4551 2333
22	3223 5464	0012 1001	5654 7656	5333 2445	4000 1330	3310 0010
23	4421 1222	1001 1000	8765 5766	6432 2355	0000 2333	0100 1012
24	5223 4344	0001 1000	5545 5363	3322 2251	3321 2244	1001 1243
25	5221 2222	0010 1344	4435 5223	4222 1255	3433 3445	2331 2245
26	2111 2200	3001 3443	4013 4531	5212 2134	5544 4777	3432 4443
27	0011 1229	5433 3366	1111 3343	2122 2423	6643 4456	2310 1134
28	2121 1223	3333 3345	1332 1032	5223 2333	5653 4455	2100 0011
29	2233 5443	5101 2256	4444 7777	4332 3344	4532 3435	0000 0135
30	2211 3125	6534 2332	5645 4557	4432 1253	4421 1011	4244 4222
31	4112 2225	4332 4666		1112 3122		4533 5656



K-INDICES FOR THREE-HOUR INTERVAL 1957

Bear Island

Range 2000 $\gamma$  for K = 9. Scale values: D = 5.7 $\gamma$ . H = 6.1 $\gamma$ . V = 21.3 $\gamma$ .

Date	Jan.	Feb.	Mar.	Apr.	May	June
1	1001 2322	2212 0141	1102 2533	5433 3244	4543 3211	1121 4211
2	3212 3355	1311 3253	5554 4355	5323 1254	0423 3123	1311 3221
3	2111 0121	3100 1355	3432 3343	2313 3444	3413 3344	1344 3455
4	1112 0013	2323 5554	5533 3215	5422 3333	2223 3213	4645 4456
5	1000 0042	5423 4325	4222 3345	3345 3424	3323 3222	6532 2333
6	0211 0010	2222 3311	5223 3542	5533 3120	4323 3312	5544 3334
7	1211 2000	0102 0142	1211 3515	0111 0001	3333 2251	4423 1115
8	4322 2442	2121 1112	5123 2224	3222 2222	1113 3212	5513 1222
9	1112 5525	1100 0243	4321 2143	2333 5333	3543 3233	1311 0220
10	3443 2555	2001 0001	4554 4355	5343 2540	2222 3145	1001 0123
11	5112 3033	1212 2633	4111 2211	2214 4121	3200 1215	1001 1033
12	2421 1000	3542 2332	1333 2200	2342 2542	3211 1212	3211 3331
13	1000 0100	1333 3351	0102 4531	2333 2221	5433 3334	2115 5113
14	0010 --	1111 2232	1102 2001	1000 0111	2313 2121	2213 3243
15	1211 1231	0123 3334	2301 1222	1112 4222	3001 3313	4444 5423
16	5222 3233	0202 2542	4251 2255	5213 3303	1000 1232	1013 3325
17	3102 2243	2001 3113	2333 3534	3323 3334	3312 1321	3445 4435
18	1000 2200	4232 3355	2213 4123	5322 2335	3111 2123	5654 4355
19	0010 2422	3334 2345	3103 2144	3653 3335	2124 3334	5644 4433
20	2100 0100	4322 2335	4442 1204	5332 3323	3243 2351	3423 3353
21	1323 4445	5433 3345	2300 4543	3543 2312	2323 3233	3 -- -3
22	5543 2333	2333 2553	2232 3454	1000 2332	2311 1100	5336 4332
23	2334 2334	5323 2355	4533 3325	1312 3113	4400 1120	4223 3244
24	5521 1155	5354 1313	-- 1145	4122 3324	0203 2210	5633 2234
25	5532 1125	3201 2100	2544 3100	4102 3122	3423 3221	4555 5344
26	1332 2334	2100 1101	0104 3335	3453 3353	3334 2334	6645 6445
27	2212 3203	3521 0044	5413 4254	2533 2113	2233 3323	4224 4433
28	1210 1254	1000 2114	5544 2300	2213 3232	3233 3215	3344 3343
29	1331 4526		1443 5665	4322 2310	3211 2221	2112 2333
30	3344 3444		5420 2214	0312 3345	5433 3333	4766 6554
31	3331 2344		5433 2635		2412 0123	
	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	5543 3354	3411 3232	5455 3343	3331 1112	1332 2233	3542 4335
2	2225 5566	3432 3332	4466 --6	3323 1112	3322 1112	4433 2433
3	4465 5354	2323 3443	6556 5544	3323 3443	5312 2113	2353 4433
4	--12 1246	4322 2311	3332 6545	5432 2233	2311 0134	3333 2324
5	5665 3235	1211 1333	4553 3355	4322 1332	1220 1122	3433 3444
6	4444 3444	3334 4443	4434 6443	3111 0000	2112 1045	4343 4433
7	4443 3332	3234 2433	2322 3311	2221 1111	4432 3442	2333 4233
8	3433 3333	3232 2443	1123 3321	2101 1103	1234 3433	5433 2113
9	4331 2434	3232 2234	1434 3343	2211 3442	6333 4444	3433 4435
10	3510 1121	4423 3433	2213 2333	2313 3323	5332 4433	3433 3523
11	3302 3233	3121 3332	2213 2233	2433 3333	3223 3433	4314 2355
12	5434 3343	2552 4432	2332 3433	3332 3434	4333 4423	5443 2634
13	3111 1221	3444 3334	3553 5644	4442 2334	4323 4431	4334 2523
14	1113 3233	1221 3334	3334 3433	4245 3424	1332 3433	1332 1125
15	4312 2322	3423 1232	3433 2344	3322 2433	4332 2534	3334 3543
16	2145 4443	2122 1123	4533 2253	3111 1111	3322 3143	2333 1335
17	4325 4325	3312 2331	3542 2432	1222 1112	2221 2112	3533 2343
18	4434 4443	2323 5332	4235 3223	2122 1111	5243 3331	5333 3442
19	3443 --	4344 3422	3122 222	1113 1223	3232 1113	4334 3463
20	-- --	2223 4454	2332 1114	1322 3143	2333 3433	5433 2233
21	-- 2233	5544 3221	3332 4333	3222 3434	2111 1113	4453 2444
22	2334 3434	1322 2111	4334 3444	5433 3434	4211 1331	3321 0111
23	3321 2332	2012 2111	4344 4543	4333 2225	1221 2232	1321 2113
24	4323 3332	1012 1243	3433 5433	3322 2242	3333 1233	2111 --
25	2323 2212	1012 1243	2334 4311	1332 2213	2434 3443	3343 4433
26	2211 1222	3211 4443	2323 3422	2222 2244	5434 3536	1231 2143
27	3322 2221	3323 3443	1112 3432	4232 3324	6332 2434	3211 1114
28	1322 33--	3323 3443	2552 1233	4433 1132	3432 3433	1111 1124
29	3423 3321	3333 3344	4444 7574	2332 3143	3432 3433	3534 3222
30	1343 2323	3212 3244	4544 3334	2333 1354	3332 2111	3332 3333
31	3333 3333	5354 2332		2211 3322		

DAILY SUM OF K-INDICES 1957

Tr. means Tromsø. B. I. means Bear Island.

Date	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sep.		Oct.		Nov.		Dec.	
	Tr.	B.I.	Tr.	B.I.	Tr.	B.I.	Tr.	B.I.	Tr.	B.I.	Tr.	B.I.	Tr.	B.I.	Tr.	B.I.	Tr.	B.I.	Tr.	B.I.	Tr.	B.I.	Tr.	B.I.
1	12	11	15	13	20	17	36	28	23	11	13	38	32	14	19	34	32	27	15	18	19	32	29	
2	24	24	23	19	51	36	27	25	18	16	14	29	32	25	22	46	26	22	16	14	15	31	26	
3	18	9	20	18	36	25	32	24	28	31	29	41	36	25	24	49	40	30	25	23	18	27	27	
4	10	9	37	29	28	27	32	25	26	40	38	20	16	16	18	39	31	30	24	12	15	19	23	
5	4	7	40	28	28	25	36	27	23	32	26	42	35	18	15	41	33	25	20	9	11	33	28	
6	5	5	19	16	28	26	30	22	29	21	45	30	31	42	28	34	32	4	6	16	19	37	28	
7	7	7	13	10	26	19	7	4	25	22	24	24	26	24	24	18	17	12	11	30	26	28	23	
8	27	24	15	11	30	21	29	17	21	14	25	25	25	18	23	13	16	4	9	30	23	22	22	
9	28	22	20	11	31	20	34	25	31	26	15	24	24	31	21	23	25	19	19	37	31	33	29	
10	39	31	6	4	42	33	40	26	23	21	10	8	13	15	21	14	19	34	20	34	27	33	26	
11	23	18	23	20	15	13	24	17	21	14	12	9	14	19	8	18	17	33	24	30	23	35	27	
12	14	10	25	24	14	14	25	24	13	13	19	20	29	27	27	23	23	28	25	32	26	35	31	
13	6	2	35	22	21	16	25	18	29	28	25	18	6	12	39	27	48	34	26	24	24	30	26	
14	5	1	11	13	6	7	4	4	20	15	21	17	17	18	19	35	26	35	28	27	22	17	18	
15	16	12	24	19	22	13	21	15	18	14	32	14	19	19	20	31	26	30	22	29	26	30	28	
16	18	22	16	17	34	26	31	20	14	9	14	26	27	16	10	26	27	8	10	21	21	30	23	
17	12	17	21	11	28	26	30	24	22	16	26	32	28	6	18	22	25	10	12	11	13	29	26	
18	0	5	30	27	25	18	32	26	20	14	37	26	30	20	23	24	24	9	11	32	24	25	27	
19	13	11	33	27	25	18	40	31	27	22	35	32	32	18	26	10	14	16	14	16	16	32	30	
20	8	4	29	25	28	21	28	24	36	23	22	29	29	20	26	16	17	23	19	22	14	28	25	
21	38	26	41	30	28	21	36	23	25	21	30	19	10	30	26	34	24	29	23	8	11	26	30	
22	37	28	36	26	37	25	12	11	11	9	32	29	25	5	13	44	29	29	29	11	16	8	12	
23	35	24	36	28	34	28	25	18	25	12	21	18	19	3	9	50	31	30	24	11	15	5	14	
24	32	25	39	25	27	11	28	21	16	10	27	27	23	2	14	36	28	20	20	21	21	12	5	
25	31	24	12	9	29	19	23	25	26	23	39	18	17	13	14	28	21	23	17	29	25	22	9	
26	24	21	7	6	28	19	35	29	37	25	49	9	13	18	22	21	21	20	20	41	33	27	27	
27	22	15	14	19	37	28	29	20	23	21	28	9	17	33	25	17	17	18	23	38	27	15	17	
28	16	16	6	9	36	23	29	18	21	20	25	14	14	27	26	15	23	23	21	37	25	5	14	
29	28	26	26	26	38	34	29	17	19	14	13	26	21	22	26	44	39	26	21	29	25	9	12	
30	33	29	27	20	27	20	28	21	32	27	48	17	21	28	21	41	30	24	24	14	16	24	24	
31	24	22	34	31	34	31	18	15	18	15	19	19	24	34	27	19	41	13	16	13	16	37	23	

## MONTHLY AND ANNUAL MEAN VALUES OF THE MAGNETIC ELEMENTS 1957

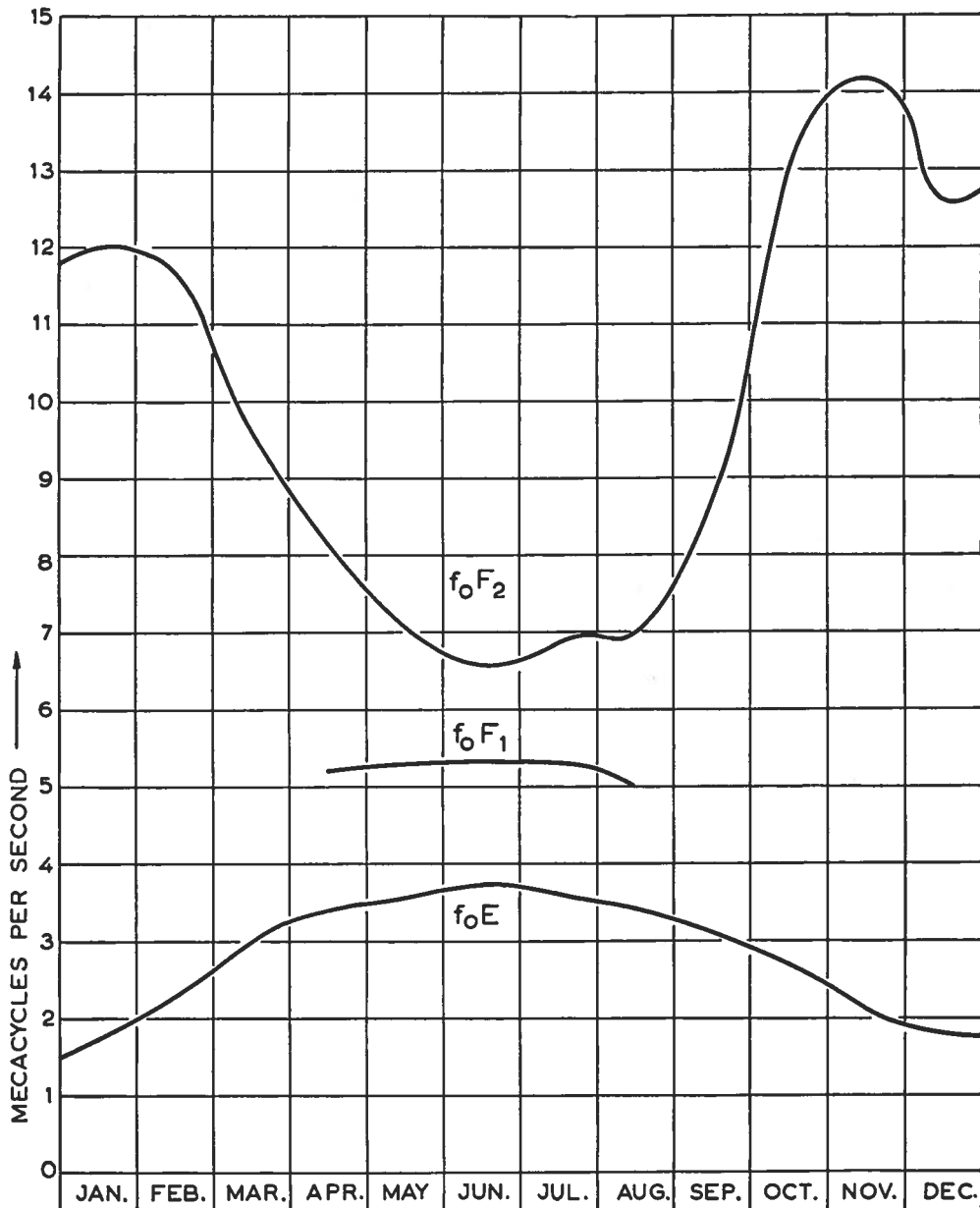
## Tromsø

Month	All days			Five Quiet			Five Disturbed		
	D	H	V	D	H	V	D	H	V
	0°W +	11100γ +	50800γ +	0°W +	11100γ +	50800γ +	0°W +	11100γ +	50800γ +
Jan.	15.6	79	37	17.2	92	39	13.6	58	32
Feb.	14.1	70	52	13.6	56	54	9.3	34	66
Mar.	14.1	59	69	14.7	82	71	10.1	45	78
Apr.	17.8	85	79	18.1	90	71	15.3	73	88
May	17.5	91	61	17.5	60	59	14.7	70	62
June	17.2	90	60	17.8	102	61	14.0	56	74
July	17.5	93	79	17.4	88	67	14.5	72	102
Aug.	17.2	87	72	17.9	99	64	15.2	62	83
Sep.	14.1	71	83	16.8	93	80	7.1	2	90
Oct.	15.9	87	80	17.1	100	69	14.8	66	102
Nov.	14.7	87	73	16.7	100	67	11.2	45	73
Dec.	15.0	87	70	15.3	101	76	11.4	42	76
Year	15.9	82	68	16.7	89	65	12.6	52	77

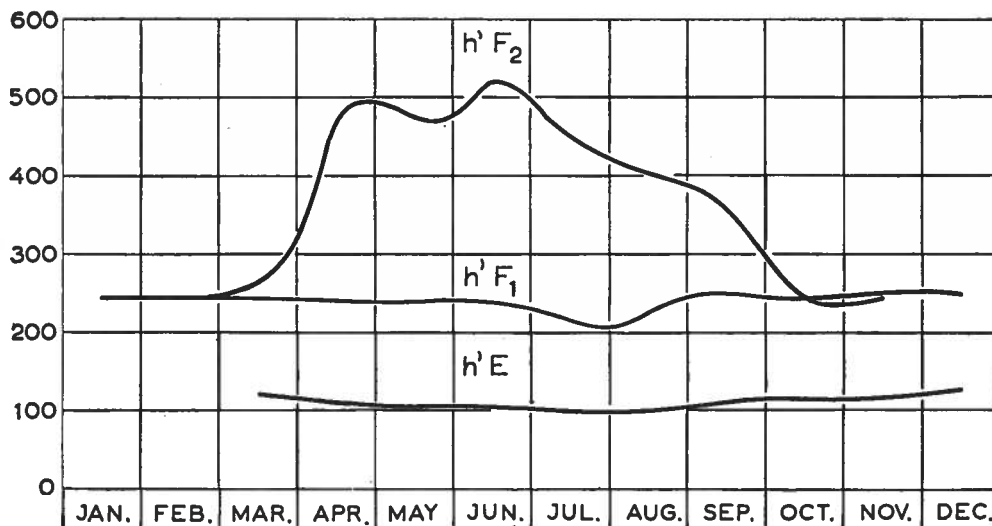
ANNUAL MEANS OF THE MAGNETIC ELEMENTS  
1930—1957.

Year	D	H	V
1930	4° 7'.7 W	115 67γ	—
31	3° 59.6	49	501 98γ
32	49.0	114 99	95
33	37.3	72	502 03
34	25.9	41	23
35	14.3	07	47
36	4.8	113 79	76
37	2° 53.7	50	503 08
38	44.1	25	40
39	35.0	112 97	62
40	26.6	78	81
41	16.6	56	504 17
42	10.6	44	24
43	2.5	22	49
44	1° 54.3	13	67
45	45.7	111 99	505 03
46	34.6	79	54
47	26.5	74	85
48	18.4	56	94
49	10.5	53	506 12
50	3.6	52	47
51	0° 54.1	43	93
52	43.9	44	507 11
53	36.0	53	24
54	29.1	65	44
55	24.0	72	76
56	18.1	73	508 25
1957	15.9	82	68





MONTHLY MEDIAN NOON-VALUES (12<sup>h</sup>MET) FOR THE CRITICAL FREQUENCIES AND THE VIRTUAL HEIGHTS FOR THE E-LAYER, F<sub>1</sub>-LAYER AND F<sub>2</sub>-LAYER



RADIO ECHO OBSERVATIONS



GENERAL REMARKS.													Critical Frequency for the E- layer, foE. Quantities Expressed in Mc/s. MONTHLY MEDIAN VALUES FOR EACH HOUR MET												
The instrumental equipment used for the measurements is the Mark II MPL-recorder described in the Proc. I E E, Vol. 98. Part III, p. 11, 1951													HOURLY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Assistant REIDOLF LARSEN was responsible for the maintenance and processing of the films. The reading of the hourly values and the calculation work has been performed by Mr. SIGBJØRN SKRIBELAND, head of the Radio Wave Propagation Bureau of the Norwegian Defence Research Establishment at Kjeller.													0	2.35					2.45	2.00					
EXPLANATION OF TABLES.													1	U2.05				2.40			2.35				
Monthly median values are given for the following quantities for each hour MET: foE, foF1, foF2 (critical penetration frequencies for the E-, F1- and F2-layers) h'E, h'F1, h'F2 (virtual heights for the E-, F1- and F2-layers) and (M3000) F2-factor.													2	1.50					2.30	2.40	2.30	1.60			
The interpretation and symbols are in conformity with the CCIR and URSI recommendations.													3	2.05											
Critical Frequency for the F1- layer, foF1. Quantities Expressed in Mc/s. MONTHLY MEDIAN VALUES FOR HOUR MET													4	2.10					2.55	2.70	2.60	1.90			
Critical Frequency for the F2- layer, foF2. Quantities Expressed in Mc/s. MONTHLY MEDIAN FOR EACH HOUR MET													5	U1.80				2.30	2.80	3.00	2.80	2.40	1.90		
Virtual Height for the E- layer, h'E. Quantities Expressed in Kilometers. MONTHLY MEDIAN VALUES FOR EACH MET													6	1.50			1.70	2.70	3.00	3.10	3.00	2.75	2.30	1.50	
Virtual Height for the F1- layer, h'F1. Quantities Expressed in Kilometers. MONTHLY MEDIAN VALUES FOR EACH HOUR MET													7	1.35	1.30	2.05	2.80	3.15	3.50	3.30	3.15	2.95	2.70	1.95	
Virtual Height for the F2- layer, h'F2. Quantities Expressed in Kilometers. MONTHLY MEDIAN VALUES FOR EACH MET													8	1.30	1.70	2.45	3.15	3.30	3.45	3.30	3.15	2.80	2.25	1.70	
M3000 F2- layer Transmission Factor. MONTHLY MEDIAN VALUES FOR EACH HOUR MET													9	1.20			2.70	3.20	3.40	3.60	3.40	3.20	3.00	2.60	2.00
													10	1.55	2.05	2.90	3.20	3.50	3.70	3.50	3.35	3.10	2.70	2.00	
													11	1.70	2.30	2.95	3.30	3.55	3.70	3.60	3.45	3.15	2.75	2.20	1.70
													12	1.75	2.25	3.00	3.40	3.55	3.70	3.60	3.40	3.20	2.70	2.10	1.80
													13	1.70	2.25	3.00	3.30	3.60	3.70	3.60	3.40	3.15	2.70	2.10	1.70
													14	1.75	2.15	2.80		3.50	3.60	3.55	3.35	3.00	2.55	1.75	
													15	1.60	2.00	2.75	3.15	3.40	3.55	3.40	3.20	3.00	2.80	1.25	
													16	1.60	1.90	2.40	3.00	3.30	3.45	3.30	3.10	2.70	1.90		
													17	1.45	2.15	2.75		3.05	3.20	3.10	2.90	2.50	1.75		
													18	U1.65	1.90	1.60	2.60	2.85	3.00	2.90	2.60	2.10			
													19	1.70		2.60	3.10	2.95	2.80	2.70	2.30				
													20	2.45		2.70	2.85	2.75	2.80	2.60	1.95				
													21	2.50				2.85	2.80	2.30	1.80				
													22	2.30				2.55		2.30					
													23							2.15					



Tromsø. Declination. D=0° W + Tabular Quantities expressed in Tenths of Minutes.

Gr. M. T.

JANUARY 1957

HOURLY MEAN VALUES

Table for January 1957 showing magnetic declination and tabular quantities for each hour of the month. Columns include Day, hours 1-24, M, and R.

FEBRUARY 1957

Table for February 1957 showing magnetic declination and tabular quantities for each hour of the month. Columns include Day, hours 1-24, M, and R.

MARCH 1957

Table for March 1957 showing magnetic declination and tabular quantities for each hour of the month. Columns include Day, hours 1-24, M, and R.





Tromsø. Declination. D = 0° W + Tabular Quantities expressed in Tenths of Minutes.

Gr. M. T.

APRIL 1957

HOURLY MEAN VALUES

Table for April 1957 showing hourly mean values for declination. Columns include Day (1-30), hours (1-24), and magnetic elements M and R. Values range from -307 to 553.

MAY 1957

Table for May 1957 showing hourly mean values for declination. Columns include Day (1-31), hours (1-24), and magnetic elements M and R. Values range from -153 to 300.

JUNE 1957

Table for June 1957 showing hourly mean values for declination. Columns include Day (1-30), hours (1-24), and magnetic elements M and R. Values range from 147 to 981.

Tromsø.

Declination. Storminess. (+ W). Unit Gamma.

Gr. M. T.

APRIL 1957

HOURLY MEAN VALUES

Table for April 1957 showing hourly mean values for declination and storminess. Columns include Day (1-30), 25 declination components, and four storminess indices (M, PS, NS, AS). Summary rows for M, PS, NS, AS and MPS, MNS are provided at the bottom.

MAY 1957

Table for May 1957 showing hourly mean values for declination and storminess. Columns include Day (1-31), 25 declination components, and four storminess indices (M, PS, NS, AS). Summary rows for M, PS, NS, AS and MPS, MNS are provided at the bottom.

JUNE 1957

Table for June 1957 showing hourly mean values for declination and storminess. Columns include Day (1-30), 25 declination components, and four storminess indices (M, PS, NS, AS). Summary rows for M, PS, NS, AS and MPS, MNS are provided at the bottom.



Tromsø. JULY 1957

Declination, D = 0° W + Tabular Quantities expressed in Tenths of Minutes.

Gr. M. T.

Table for July 1957 showing hourly mean values for days 1 to 31. Columns include Day, hours 1-24, M, and R. Values range from approximately -307 to 300.

AUGUST 1957

Table for August 1957 showing hourly mean values for days 1 to 31. Columns include Day, hours 1-24, M, and R. Values range from approximately -521 to 300.

SEPTEMBER 1957

Table for September 1957 showing hourly mean values for days 1 to 30. Columns include Day, hours 1-24, M, and R. Values range from approximately -107 to 300.



Tromsø.

Declination, Storminess. (+ W). Unit Gamma.

Gr. M. T.

JULY 1957

HOURLY MEAN VALUES

Table for July 1957 showing magnetic observations. Columns include Day (1-31), 25 numbered data columns (1-25), and summary columns M, PS, NS, AS. Data values range from -35 to 35.

AUGUST 1957

Table for August 1957 showing magnetic observations. Columns include Day (1-31), 25 numbered data columns (1-25), and summary columns M, PS, NS, AS. Data values range from -32 to 22.

SEPTEMBER 1957

Table for September 1957 showing magnetic observations. Columns include Day (1-30), 25 numbered data columns (1-25), and summary columns M, PS, NS, AS. Data values range from -40 to 25.

Tromsø. Declination. D = 0° W + Tabular Quantities expressed in Tenths of Minutes.

Gr. M. T.

Table for October 1957 showing hourly mean values for days 1-31. Columns include Day, hours 1-24, M, and R. Values range from approximately -107 to 352.

Table for November 1957 showing hourly mean values for days 1-30. Columns include Day, hours 1-24, M, and R. Values range from approximately -429 to 352.

Table for December 1957 showing hourly mean values for days 1-31. Columns include Day, hours 1-24, M, and R. Values range from approximately -92 to 352.

Tromsø.

Declination. Storminess. (+ W). Unit Gamma.

Gr. M. T.

OCTOBER 1957

HOURLY MEAN VALUES

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	M	PS	NS	AS	
1	-46	-45	-40	-32	0	-2	-10	-12	-8	-11	-16	-11	2	34	4	8	0	5	48	45	36	2	27	-10	-1	211	243	454
2	-53	-65	-85	-24	-7	0	0	0	0	0	0	0	-5	6	7	7	15	117	63	-17	-65	-63	-120	-13	225	356	564	
3	-53	-7	-13	-12	-8	-5	0	0	0	0	7	12	17	25	20	52	97	15	17	43	35	-72	-20	0	-6	425	363	798
4	-139	-85	-5	-20	6	4	2	0	2	7	8	5	4	6	4	17	27	45	43	35	-72	-20	0	-12	-6	812	562	564
5	-35	-15	-6	-10	0	0	0	0	0	0	12	20	7	6	4	15	22	33	15	-7	3	-16	0	-5	2	141	92	233
6	-35	-18	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	0	58	58
7	0	0	0	0	0	0	0	0	0	0	0	7	10	12	12	5	12	9	11	5	12	4	-7	5	4	104	7	111
8	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	11
9	0	0	0	0	-13	-12	-10	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	144	262
10	-83	-63	-32	-57	-30	-44	-25	-17	4	17	25	17	22	28	42	45	15	-2	-2	-20	-50	-76	-35	-20	-14	215	556	771
11	-26	-67	-65	-32	-58	-20	2	15	19	17	32	30	22	45	20	65	17	15	35	-2	-10	-20	-65	-55	-4	332	418	750
12	-30	-20	-25	-20	-10	-2	10	12	7	0	8	25	20	8	6	10	25	95	31	30	20	-8	-28	-60	2	307	263	570
13	-61	-165	-230	-147	-60	-40	10	2	-10	-7	-3	7	10	2	15	23	23	13	19	13	-28	-33	-48	-29	137	640	977	
14	-58	-93	-70	-74	-72	-63	-40	3	-10	-20	-15	15	10	28	47	98	115	53	30	35	8	2	-27	-50	-7	442	812	1054
15	-80	-65	-35	-20	-6	-5	-4	-11	-2	-5	7	13	22	25	59	65	13	40	35	33	26	0	-75	-20	0	338	328	666
16	-18	7	0	0	0	0	0	0	0	0	0	-7	-2	0	0	7	12	5	0	0	0	0	0	0	0	35	27	62
17	-10	-7	0	3	-2	-2	-3	-10	-7	15	25	0	0	11	-3	0	0	0	0	0	0	0	0	0	0	54	46	100
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	30	2	-5	-33	-5	0	47	43	90
19	0	0	0	0	0	0	-5	-5	-2	19	10	0	-2	-3	0	9	8	7	5	15	8	-6	-25	-10	1	83	56	159
20	-8	-3	-23	-18	-18	-4	-3	-7	2	0	8	-2	20	-17	9	12	20	55	73	55	35	17	11	-40	9	334	126	460
21	-60	-7	-5	3	3	0	5	3	4	7	8	17	15	18	4	53	33	27	13	15	38	-40	-18	-10	5	265	140	405
22	14	-17	-17	-15	-8	-10	-5	-13	-16	-15	-10	0	0	6	0	5	15	13	18	12	0	-56	-65	-18	-8	85	265	348
23	-45	-50	-37	-4	-5	0	0	-13	-8	0	0	0	0	-12	-7	0	0	-10	-35	-77	-130	-55	-28	-20	-8	16	493	609
24	10	5	-13	-2	-2	0	-2	-3	0	-10	-8	9	5	-2	0	3	-8	0	3	-85	-15	-6	-8	-7	-8	37	169	206
25	-8	-18	-30	-8	-3	-5	-5	-7	-8	-3	5	2	7	5	2	0	3	10	3	-33	-14	5	-7	-62	-7	42	201	243
26	-90	-55	-17	-2	-12	3	3	7	14	17	12	13	12	0	0	0	0	0	8	-7	-12	-46	-43	-25	-9	89	309	398
27	-15	-19	3	3	0	2	5	2	0	18	33	28	16	22	48	10	12	0	15	-16	-13	2	2	6	217	63	280	
28	-18	-85	-47	-12	-5	-12	-10	0	17	13	12	13	2	5	0	8	7	15	5	13	10	14	3	-5	-2	137	194	351
29	-8	-55	-27	-2	0	-2	2	-2	-8	0	6	0	22	10	4	7	15	25	25	-5	20	12	-13	8	1	156	122	278
30	-3	-8	-40	-20	0	5	-8	-25	0	5	0	12	-5	-5	-7	-16	-7	-15	-40	-32	-38	-15	-2	-11	22	220	312	
31	-2	-3	-7	-3	0	0	0	-5	-5	-2	20	12	10	4	0	0	0	0	0	-7	-10	-20	-13	-6	-1	28	80	128
M	-28	-33	-28	-17	-10	-8	-2	-2	0	1	4	9	8	10	10	19	13	21	15	3	-4	-17	-22	-22	-3	151	233	385
MPS	1	1	0	0	0	0	2	1	2	3	6	10	9	10	10	19	14	21	16	12	8	2	2	0				
MNS	29	34	28	17	11	8	4	4	3	5	2	1	1	1	1	1	1	0	1	8	12	19	24	23				

NOVEMBER 1957

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	M	PS	NS	AS	
1	-2	-3	-7	-12	0	-10	-5	-7	-2	3	-6	-2	0	0	7	6	12	22	17	22	8	7	-5	-22	-1	104	83	187
2	-2	-10	0	-3	-5	0	0	-2	-4	9	-2	-3	0	0	0	0	0	8	6	-15	-3	-25	-130	-8	8	23	204	227
3	-68	-84	-57	-8	0	0	0	0	0	7	22	23	13	2	15	8	22	51	50	-10	0	-3	-11	-22	-2	213	263	476
4	-4	-17	-20	0	0	0	0	0	-4	0	0	0	0	0	0	0	7	12	12	8	25	3	-11	-3	0	67	64	131
5	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	17	22	31	30	19	15	6	141	7	148	
6	8	0	0	0	0	0	0	0	0	0	0	0	0	7	12	14	29	52	68	48	15	-15	-60	7	253	75	328	
7	-155	-130	-72	-20	-3	-7	0	-11	-8	-23	-12	-2	-10	-12	-13	20	5	-11	12	7	-9	-23	-18	-3	-21	44	542	586
8	-4	-3	-4	0	3	0	-3	0	-10	-15	10	13	15	0	30	18	-15	-6	-20	-10	13	-25	-35	-250	-12	102	400	502
9	-72	-126	-147	-105	-57	-6	15	0	0	-10	-5	-2	15	-29	-13	6	7	22	12	-30	-29	-27	-19	-55	-27	77	730	807
10	-145	-61	-33	-17	-70	-25	3	-5	-12	-10	-2	16	23	-17	25	-2	35	5	17	22	-15	-21	-31	-110	-18	146	676	722
11	-110	-58	-79	-17	-23	7	7	-7	-5	-2	-10	18	-17	-37	17	18	5	22	-2	-30	-15	-7	-45	-33	-15	111	480	591
12	-43	-65	-27	-3	-3	-2	5	13	6	-5	22	20	-5	-8	19	46	-23	0	15	-12	-7	-11	-23	-130	-9	146	567	513
13	-96	-10	-9	5	5	2	3	0	5	-8	-6	4	-13	25	9	3	22	25	30	7	3	-7	-19	-10	-1	149	178	326
14	-23	-51	-42	0	-10	-3	2	0	0	5	2	3	23	8	12	35	37	39	18	10	-7	-3	-5	-60	0	194	204	398
15	-20	-16	-47	-65	5	3	5	-5	-2	-3	-5	6	10	13	14	18	12	7	42	20	-5	7	-23	-12	-3	162	223	375
16	-14	-8	-5	0	3	0	0	-2	-5	-7	-4	5	5	21	22	5	2	25	-30	0	-2	2	5	-6	1	95	83	178
17	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-10	0	0	-1	0	24	24
18	-106	-223	-107	-65	-43	-13	-15	25	8	5	13	16	13	-17	-47	13	9	0	22	25	3	0	-11	-27	-23	152	696	848
19	-18	-36	-27	-12	-17	-22	-7	-7	-4	-5	-3	3	2	0	-6	0	0	0	0	0	-10	-58	-25	-4	-11	5	261	266
20	-14	-18	-5	-13	0	2	5	0	0	0	-2	3	12	5	25	16	0	5	10	-2	-15	-57	-33	-2	-3	85	169	244
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	-7	-71	-80	-6	7	158	165	
22	-60	0	0	0	0	0	0	0	0	0	0	0	0	0	2	25	10	20	22	8	3	0	0	0	2	90	50	140
23	0	0	0	0	0	0	0	0	0	0	0	0	0	13	2	8	12	29	25	18	17	10	-14	6	155	14	169	
24	-30	-30	0	-8	-7	11	10	9	8	13	10	15	12	10	35	34	32	24	25	38	13	-5	-3	-5	9	299	88	387
25	0	-6	-27	-5	15	-5	-3	-9	-2	7	10	13	7	-3	2	30	67	39	42	8	5	17	15	-12	9	277	72	349
26	-150	-103	-137	-47	-7	5	-5	-2																				



Tromsø.

Horizontal Intensity. H=11100 + Tabular Quantities expressed in Gamma.

Gr. M. T.

JANUARY 1957

HOURLY MEAN VALUES

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	M	R		
1	103	98	93	97	93	93	97	93	88	87	85	87	93	93	117	168	193	157	193	112	108	102	80	90	109	169	
2	38	-5	75	92	82	93	90	88	90	100	85	90	120	150	187	167	152	210	200	40	-320	-150	20	25	71	1154	
3	108	85	67	68	88	92	80	78	73	70	75	78	73	78	80	88	105	107	97	93	100	107	62	67	84	179	
4	68	90	97	100	103	107	97	88	75	90	83	77	80	88	92	93	102	103	102	103	108	107	107	103	94	111	
5	97	98	93	90	88	88	87	82	80	77	77	78	80	83	87	88	88	96	103	112	100	107	107	103	91	63	
6	97	90	88	87	83	107	108	102	92	87	83	82	82	88	97	98	105	108	115	108	117	110	108	100	98	74	
7	93	88	85	82	87	103	100	100	98	93	92	93	105	103	102	107	107	105	113	112	105	105	100	67	98	79	
8	35	-90	-8	33	75	85	103	103	98	90	90	100	160	145	122	110	160	192	153	100	-10	-30	-18	45	77	401	
9	80	50	90	80	77	92	100	107	100	98	87	92	98	185	205	260	220	100	82	-55	2	-140	-110	-210	28	727	
10	-90	-110	-130	-40	80	30	-100	20	60	120	150	138	182	302	302	180	80	110	162	70	-230	-430	-50	-50	32	1012	
11	-120	65	95	82	88	87	82	78	78	160	172	175	128	140	180	83	83	77	92	103	120	103	77	67	96	501	
12	30	125	108	60	90	115	100	82	83	77	83	88	90	98	92	92	97	98	102	100	102	93	50	8	86	242	
13	8	86	100	100	100	95	93	90	85	85	85	80	80	83	97	107	120	117	113	112	113	102	92	87	93	179	
14	82	87	98	100	102	102	103	100	90	87	87	87	82	87	93	98	102	100	100	108	98	88	80	73	93	63	
15	88	75	80	97	93	100	98	95	90	83	85	87	108	102	105	145	155	110	135	128	98	85	47	-130	90	543	
16	-35	88	90	98	82	93	100	92	82	78	88	93	120	160	168	120	103	100	107	105	60	85	85	77	93	327	
17	20	17	40	83	92	92	95	97	93	83	80	78	83	98	98	97	97	98	97	100	43	100	107	95	83	148	
18	93	98	98	98	102	102	100	97	90	83	82	82	86	97	100	95	92	95	97	93	95	93	93	92	94	26	
19	95	97	98	100	100	102	102	100	100	97	88	88	90	97	107	150	180	230	213	160	100	60	62	57	113	289	
20	-10	-10	32	102	98	98	97	93	90	87	82	80	85	90	95	108	180	172	110	107	102	102	98	100	91	221	
21	100	88	63	40	2	70	105	105	63	2	130	130	130	180	360	170	115	-90	-350	-190	-450	-245	-80	-80	16	1370	
22	30	-2	-52	-290	-240	-10	60	70	100	85	70	70	60	65	68	115	68	130	130	127	112	78	40	1133			
23	65	48	55	70	72	75	70	65	50	10	90	260	98	58	225	240	308	160	20	35	75	80	-110	48	88	590	
24	40	-30	-135	-70	-30	127	83	83	67	60	68	72	77	92	98	105	145	142	60	-200	80	112	10	-280	32	1191	
25	-160	50	-120	-120	-40	90	28	70	120	100	95	83	87	83	90	87	90	105	100	93	77	-170	-22	83	37	617	
26	83	72	-7	80	87	68	88	65	80	73	88	73	77	90	102	137	172	137	193	150	117	40	-32	-30	83	343	
27	43	85	92	65	58	107	102	87	77	80	82	78	155	112	87	125	158	120	140	153	80	50	32	67	93	227	
28	98	98	77	82	78	93	102	93	98	80	80	78	87	87	97	93	107	150	170	200	192	100	35	77	102	242	
29	72	98	98	82	80	82	77	82	87	78	83	78	87	160	270	330	110	30	-150	7	20	-50	-80	-215	63	795	
30	-160	-70	-250	-120	-135	-90	7	70	108	165	118	152	173	200	202	222	222	200	80	128	135	107	112	-40	65	675	
31	45	50	40	12	33	80	1-7	100	73	63	87	88	98	98	125	108	170	220	180	80	80	55	-120	-30	78	553	
M	36	52	40	46	57	83	86	87	85	86	91	97	102	118	136	133	135	122	97	81	50	31	34	17	79	459	
QM	93	94	96	97	98	96	97	94	90	86	83	83	86	90	94	97	99	101	103	103	102	100	96	93	95		

FEBRUARY 1957

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	M	R	
1	18	70	60	103	92	92	88	90	88	82	96	78	78	80	83	100	87	107	135	100	70	113	98	72	87	253
2	98	103	100	70	67	97	87	88	85	80	93	132	87	115	88	120	135	150	157	142	85	-70	-40	90	464	
3	-8	57	95	88	97	108	90	88	85	80	82	82	87	85	87	102	125	135	173	120	-150	-170	10	-35	63	812
4	-40	-40	20	75	20	75	110	100	90	88	92	140	222	188	300	230	76	40	110	-180	-250	-140	-140	-20	49	959
5	-35	-300	-420	-320	-150	-160	-55	2	87	145	195	210	150	140	145	140	190	160	152	110	0	-340	-50	23	1	885
6	20	-50	75	60	60	47	50	67	72	80	95	97	83	107	122	185	180	142	103	88	68	78	82	83	379	
7	82	80	82	83	83	82	80	73	65	82	92	107	88	90	97	98	112	153	172	162	137	60	30	33	93	242
8	-10	3	38	62	88	93	90	82	87	100	87	88	78	82	78	83	100	118	147	150	123	113	65	-8	81	190
9	12	38	22	3	90	103	107	93	87	77	75	78	80	85	88	93	112	210	212	172	115	25	103	70	90	422
10	-58	40	95	100	100	98	102	98	97	98	90	72	73	80	83	87	85	88	92	90	95	103	112	98	42	184
11	77	77	75	42	83	93	97	93	88	80	73	88	83	92	112	165	190	192	165	75	5	20	80	87	93	374
12	88	88	67	-50	-155	-10	85	150	107	82	83	113	123	122	138	137	107	123	130	120	108	120	90	45	84	427
13	-95	22	82	70	-72	-82	-10	98	63	155	140	167	280	365	360	280	130	110	-60	-450	-90	50	48	30	66	1397
14	2	32	80	82	82	80	78	80	80	77	65	72	80	87	92	102	102	85	68	78	67	78	73	78	76	153
15	82	85	83	82	83	85	88	93	98	77	57	122	110	152	122	160	190	100	118	128	55	-170	-120	87	82	669
16	87	88	77	72	87	85	98	95	98	80	78	83	93	78	85	108	102	162	175	168	112	96	93	88	40	232
17	43	18	62	95	97	95	92	90	88	80	85	83	90	140	130	260	330	230	110	120	90	80	2	40	106	443
18	-50	-52	-30	2	0	28	77	100	107	107	102	117	118	170	202	250	155	115	-30	-130	0	-85	-220	-150	38	690
19	2	95	120	90	90	40	25	60	95	145	110	93	12	98	97	123	162	100	58	-100	-65	-30	-220	-230	40	696
20	40	-45	-130	50	95	50	42	78	165	102	108	130	160	118	128	140	120	160	158	152	112	-10	-50	13	79	448
21	-10	-125	-270	-220	20	105	73	-5	30	120	152	105	93	210	280	208	210	170	188	-20	-140	-120	-300	-70	29	912
22	8	50	-2	138	70	85	110	140	110	110	108	132	102	132	172	185	160	215	140	-160	-130	-2	-130	-240	21	696
23	-220	-50	60	110	98	107	95	107	100	85	97	120	123	148	133	200	335	200	-20	-120	110	130	-100	-380	61	912
24	-195	-400	-480	-250	-80	-35	-140	-80	125	170	200	230	255	290	117	150	150	100	125	90	-10	100	85			

Tromsø.

Horizontal Intensity. Storminess (+ N). Unit Gamma.

Gr. M. T.

JANUARY 1957

HOURLY MEAN VALUES

Table for January 1957 showing magnetic observations. Columns include DAY (1-31), 23 hourly values (1-23), M, PS, NS, AS, and CH. Data points range from -182 to 94.

FEBRUARY 1957

Table for February 1957 showing magnetic observations. Columns include DAY (1-28), 23 hourly values (1-23), M, PS, NS, AS, and CH. Data points range from -140 to 110.

MARCH 1957

Table for March 1957 showing magnetic observations. Columns include DAY (1-31), 23 hourly values (1-23), M, PS, NS, AS, and CH. Data points range from -182 to 310.



Tromsø. Horizontal Intensity. H=11100 + Tabular Quantities expressed in Gamma.

Gr. M. T.

APRIL 1957

HOURLY MEAN VALUES

Table with columns DAY, 1-23, M, R for April 1957. Includes handwritten number 311 next to the M and R rows.

MAY 1957

Table with columns DAY, 1-23, M, R for May 1957. Includes handwritten number 242 next to the M and R rows.

JUNE 1957

Table with columns DAY, 1-23, M, R for June 1957. Includes handwritten number 273 next to the M and R rows.

Tromsø.

Horizontal Intensity. Storminess (+ N). Unit Gamma.

Gr. M. T.

APRIL 1957

HOURLY MEAN VALUES

Table with columns: DAY, 1-23, M, PS, NS, AS, CH. Rows for April 1957 showing hourly magnetic intensity and storminess data.

MAY 1957

Table with columns: DAY, 1-23, M, PS, NS, AS, CH. Rows for May 1957 showing hourly magnetic intensity and storminess data.

JUNE 1957

Table with columns: DAY, 1-23, M, PS, NS, AS, CH. Rows for June 1957 showing hourly magnetic intensity and storminess data.

Tromsø.

Horizontal Intensity. H=11100 + Tabular Quantities expressed in Gamma.

Gr. M. T.

JULY 1957

HOURLY MEAN VALUES

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	M	R	
1	20	-400	-600	98	-500	-200	170	-140	0	170	170	90	80	90	108	98	113	135	190	110	30 <sup>v</sup>	65	40	72	0	1381
2	83	78	97	87	85	78	72	68	45	140	120	290	540	210	350	340	340	220	110	20	-50	150	132	86	154	885
3	90	-40	-440	-350	-140	-140	100	145	115	130	145	330	340	170	220	105	142	188	172	130	60	8	30	-40	80	1349
4	80	107	108	102	95	88	83	70	67	62	70	75	72	82	88	90	90	102	148	152	30	-120	-170	-300	53	949
5	-200	-20	90	-100	80	-450	70	210	80	210	350	560	280	165	138	147	143	167	145	140	50	-310	-380	-225	56	1723
6	-80	-20	-70	22	38	85	92	110	103	100	175	160	160	130	118	250	200	138	132	80	-100	-160	-120	-130	59	638
7	60	30	75	-5	-20	100	120	118	107	95	77	95	140	163	147	133	122	187	182	118	110	82	10	-40	91	395
8	-95	-20	13	52	62	92	88	87	88	77	90	67	145	123	163	208	187	180	175	132	70	2	62	20	85	416
9	-160	-150	98	120	117	118	103	78	70	68	72	87	107	167	172	205	260	170	67	105	60	50	60	-80	83	685
10	-18	-13	-80	-40	-100	115	98	97	88	60	55	57	70	82	100	108	128	122	122	118	108	98	100	90	65	332
11	70	47	57	100	110	107	92	80	73	63	48	57	107	95	92	105	127	132	137	122	100	68	72	62	88	163
12	40	40	77	82	102	102	87	72	73	75	107	132	108	115	143	120	120	169	180	132	98	65	37	-10	94	242
13	-20	22	108	120	110	102	83	63	57	60	67	75	88	95	105	117	120	133	127	128	127	120	117	107	93	200
14	115	123	123	123	113	103	90	80	72	77	60	67	88	133	172	162	142	138	140	140	80	5	-13	-100	93	216
15	-42	-2	38	130	128	112	100	83	67	65	60	70	78	85	97	122	140	148	140	143	123	110	97	38	88	237
16	60	97	118	123	112	103	95	78	68	80	155	232	340	378	450	460	420	335	215	145	128	115	120	-35	183	685
17	-92	40	120	132	130	107	98	87	83	62	87	112	175	212	180	173	143	117	107	138	130	-50	40	38	99	458
18	7	10	97	105	88	70	68	65	100	90	130	105	170	142	153	180	325	225	190	140	30	5	-40	-65	100	485
19	-110	-190	-20	60	105	135	90	80	85	100	35	68	70	68	120	320	420	380	275	180	52	20	-100	-110	89	733
20	-122	-150	-210	-40	95	107	78	88	78	70	70	62	85	175	207	180	210	220	180	110	120	50	-50	-250	57	748
21	0	123	128	127	112	103	87	80	88	72	60	100	148	160	158	100	92	103	117	122	130	85	50	-8	96	316
22	35	83	120	118	102	87	85	92	98	83	155	152	110	195	305	403	380	270	160	-90	70	110	82	87	137	785
23	110	0	-50	-12	30	108	128	108	83	68	70	88	103	107	132	137	162	183	118	147	128	68	88	85	92	327
24	-40	12	107	123	110	113	102	100	77	80	83	168	205	170	213	230	275	325	230	180	120	107	20	-50	128	553
25	-50	40	117	102	90	100	90	95	80	52	55	70	95	120	138	150	127	138	142	148	128	133	120	100	98	369
26	83	95	117	118	112	103	97	83	68	60	80	113	120	133	138	125	122	120	118	112	110	110	110	110	104	111
27	108	110	112	113	108	102	93	78	63	57	62	80	95	113	130	128	135	133	127	118	132	128	113	128	107	121
28	123	133	132	127	122	118	103	92	83	53	48	62	87	98	102	108	122	148	105	143	108	72	93	113	104	121
29	108	88	82	97	87	105	102	90	96	112	102	118	160	290	342	320	250	192	200	110	90	-2	-12	50	132	448
30	90	117	115	92	88	90	92	97	88	53	65	67	83	103	130	167	162	160	160	140	108	87	33	-100	95	406
31	-20	118	128	125	110	103	92	80	73	63	65	95	105	130	128	145	157	177	172	142	128	-50	-160	-23	89	464
M	8	16	30	66	61	67	95	84	78	84	96	125	147	145	169	182	190	178	154	121	85	39	19	-13	93	553
QM	112	114	115	115	108	100	90	80	70	62	58	63	76	88	98	107	117	123	123	120	115	109	108	110	99	203

AUGUST 1957

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	M	R	
1	3	70	110	100	102	67	80	92	73	52	55	98	120	60	92	103	112	117	120	128	125	113	107	112	93	174
2	60	2	-110	-30	75	85	78	95	83	68	58	90	148	125	118	167	152	158	170	153	105	78	-20	-60	77	501
3	-250	47	120	122	115	103	80	23	55	70	57	67	77	117	100	98	180	235	105	90	60	120	90	67	81	748
4	-280	-40	-20	100	80	128	100	107	97	97	90	100	110	118	117	108	113	113	117	107	87	93	102	79	632	
5	105	108	105	103	98	85	90	80	72	77	80	80	90	87	88	110	170	277	210	-25	-5	-200	-120	-280	62	922
6	-400	-330	-250	-190	-60	-30	-60	40	167	155	202	370	320	290	420	360	270	218	190	-10	-150	-10	-60	-130	55	1196
7	60	50	68	70	97	92	82	85	88	85	72	132	175	250	190	212	210	200	225	160	107	80	10	70	120	306
8	100	107	93	92	82	62	65	88	87	90	82	70	97	108	150	118	107	93	100	123	115	107	75	-40	90	538
9	-180	-330	-250	90	117	112	100	85	82	78	78	83	93	107	127	135	148	200	210	150	115	25	-50	-190	89	690
10	-70	-40	-140	-80	80	112	100	108	95	97	108	113	113	155	182	188	192	217	200	173	155	90	100	117	98	485
11	115	117	118	117	113	110	100	82	70	63	67	77	100	108	123	132	122	123	118	117	122	122	113	117	107	100
12	98	30	-115	-80	-90	20	72	87	93	80	72	95	120	180	265	242	318	230	180	200	130	150	70	92	106	564
13	107	100	-80	-450	-500	-250	0	150	130	180	200	370	400	190	120	130	205	220	138	175	100	30	-18	50	71	1296
14	112	117	110	117	103	93	73	68	62	50	62	110	130	105	168	207	185	163	148	125	90	30	-20	-85	97	364
15	-15	-80	-130	92	107	98	85	78	63	67	83	67	85	107	93	90	97	110	117	122	130	12	40	-125	58	453
16	-75	-60	-70	100	138	123	102	88	77	68	77	85	85	90	90	112	118	135	150	157	152	117	100	83	85	300
17	50	77	98	102	100	98	92	80	70	58	60	62	67	90	128	148	150	140	110	107	108	113	112	103	97	148
18	92	90	62	97	108	108	100	87	77	70	72	120	190	140	150	158	137	122	177	137	90	70	65	-35	104	353
19	-18	-47	-115	-40	70	110	110	110	130	110	118	113	122	110	137	123	132	122	135	122	132	112	100	92	87	416
20	73	83	102	90	78	82	80	83	78	80	67	87	120	210	260	245	282	238	185	80	38	-40	-250	-50	96	690
21	-220	-410	-340	-170	-270	-45	15	60	73	105	170	203	270	313	400	435	360	240	150	125	110	87	90	97	78	970
22	92	93	93	77	67	72	73	73	67	72	98	95	87	97	92	88	97	103	108	112	113	108	103	85	90	63
23	87	103	108	102	97	92	90	87	75	75	75	90	107	95	93	102	11									



Tromsø.

Horizontal Intensity, Storminess (+ N). Unit Gamma.

Gr. M. T.

JULY 1957

HOURLY MEAN VALUES

Table with columns for Day (1-25), M, PS, NS, AS, CH. Rows contain hourly magnetic intensity and storminess data for July 1957.

AUGUST 1957

Table with columns for Day (1-31), M, PS, NS, AS, CH. Rows contain hourly magnetic intensity and storminess data for August 1957.

SEPTEMBER 1957

Table with columns for Day (1-30), M, PS, NS, AS, CH. Rows contain hourly magnetic intensity and storminess data for September 1957.

Tromsø. Horizontal Intensity. H=11100 + Tabular Quantities expressed in Gamma.

Gr. M. T.

OCTOBER 1957

HOURLY MEAN VALUES

Table with columns DAY, 1-23, M, R for October 1957. Includes handwritten number 139.

NOVEMBER 1957

Table with columns DAY, 1-23, M, R for November 1957. Includes handwritten number 171.

DECEMBER 1957

Table with columns DAY, 1-23, M, R for December 1957. Includes handwritten number 147.



Tromsø.

Horizontal Intensity. Storminess (+ N). Unit Gamma.

Gr. M. T.

OCTOBER 1957

HOURLY MEAN VALUES

Table for October 1957 showing magnetic observations. Columns include DAY (1-31), M, PS, NS, AS, CH, and summary rows for M, MPS, and MNS.

NOVEMBER 1957

Table for November 1957 showing magnetic observations. Columns include DAY (1-30), M, PS, NS, AS, CH, and summary rows for M, MPS, and MNS.

DECEMBER 1957

Table for December 1957 showing magnetic observations. Columns include DAY (1-31), M, PS, NS, AS, CH, and summary rows for M, MPS, and MNS.

Tromsø. Vertical Intensity. V = 50800 + Tabular Quantities expressed in Gamma.

Gr. M. T.

JANUARY 1957

HOURLY MEAN VALUES

Table for January 1957 showing hourly mean values for vertical intensity. Columns include Day (1-31), hours (1-24), and summary statistics (M, R).

FEBRUARY 1957

Table for February 1957 showing hourly mean values for vertical intensity. Columns include Day (1-28), hours (1-24), and summary statistics (M, R).

MARCH 1957

Table for March 1957 showing hourly mean values for vertical intensity. Columns include Day (1-31), hours (1-24), and summary statistics (M, R).

Tromsø.

Vertical Intensity. Storminess (+ Down). Unit Gamma.

Gr. M. T.

JANUARY 1957

HOURLY MEAN VALUES

Table with columns DAY, 1-23, M, PS, NS, AS for January 1957. Data includes hourly magnetic intensity and storminess values.

FEBRUARY 1957

Table with columns DAY, 1-23, M, PS, NS, AS for February 1957. Data includes hourly magnetic intensity and storminess values.

MARCH 1957

Table with columns DAY, 1-23, M, PS, NS, AS for March 1957. Data includes hourly magnetic intensity and storminess values.



Tromsø. Vertical Intensity.  $V = 50800 +$  Tabular Quantities expressed in Gamma.

Gr. M. T.

APRIL 1957

HOURLY MEAN VALUES

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	M	R	
1	210	30	85	73	55	40	50	60	48	52	80	78	117	95	98	18	-75	20	155	150	130	120	160	110	82	609
2	110	180	40	48	70	82	72	58	38	72	97	78	63	90	86	75	90	70	20	0	63	160	190	130	83	435
3	113	40	50	75	70	62	63	70	80	72	72	58	53	52	88	88	90	15	82	250	150	170	190	265	97	638
4	100	210	190	15	0	10	28	60	80	72	77	86	94	150	103	80	-25	-40	-15	5	170	100	52	210	76	370
5	178	180	-90	0	-10	55	63	70	87	78	67	97	-30	55	50	-150	72	53	18	3	70	50	45	260	53	667
6	-5	175	175	53	-50	70	55	50	78	77	60	75	130	140	112	77	82	73	68	63	77	108	97	102	81	544
7	62	63	70	73	72	78	73	72	77	80	76	74	65	67	68	63	68	66	67	66	67	65	65	78	70	51
8	74	37	45	58	66	64	62	60	75	97	118	98	97	50	40	100	97	77	38	45	88	195	240	158	87	413
9	103	138	100	13	10	50	88	80	98	108	120	118	110	125	-120	-40	62	78	40	75	190	265	290	290	100	783
10	350	400	450	470	420	310	100	170	110	74	82	77	-150	-245	-268	-130	-180	80	115	138	80	97	93	87	114	1305
11	135	56	58	73	67	68	67	70	67	70	74	105	97	98	145	118	98	80	74	50	53	110	140	70	85	161
12	50	77	76	76	74	80	50	57	64	72	80	80	92	75	82	73	74	20	-5	62	138	160	170	137	80	341
13	118	125	100	58	62	60	70	78	108	105	83	87	85	123	142	140	115	58	40	58	58	38	47	83	196	93
14	70	70	68	68	62	58	58	58	62	64	70	66	65	62	67	65	66	60	50	60	58	54	52	56	62	36
15	60	60	67	72	60	47	40	43	52	62	68	80	110	95	98	116	90	72	58	72	150	325	235	215	98	522
16	240	195	165	68	42	78	68	55	68	70	73	122	92	77	106	70	18	22	0	62	90	150	140	150	93	355
17	148	62	48	68	34	52	47	48	60	65	70	50	32	28	108	96	75	60	45	20	40	60	200	190	71	587
18	30	-5	55	65	60	60	50	70	85	78	78	93	88	96	93	62	-15	-15	110	75	180	248	305	248	92	515
19	290	330	420	390	150	-15	65	25	-25	37	50	75	-8	8	-72	-50	-130	-6	72	87	200	270	305	188	111	798
20	-15	92	138	100	46	23	42	80	92	93	85	92	100	93	78	82	67	74	114	88	102	78	50	110	79	275
21	170	160	78	72	78	-80	-50	0	43	105	132	118	110	-13	-20	-100	14	48	38	50	75	130	245	120	63	456
22	68	70	82	77	75	73	72	70	70	73	68	70	74	80	80	82	97	68	42	48	67	75	77	76	72	109
23	98	160	40	-16	16	28	38	50	54	60	76	60	65	68	110	116	86	73	64	36	38	100	48	150	67	319
24	195	125	105	10	57	63	64	66	68	80	83	77	72	80	53	75	0	-28	40	72	72	100	145	110	74	486
25	42	58	70	75	75	65	64	58	57	70	78	77	82	97	100	90	93	58	52	38	42	72	58	47	67	94
26	48	47	57	26	-15	-15	0	-18	48	33	37	40	-170	-160	-68	-80	100	40	46	68	125	150	168	225	31	587
27	295	305	170	48	86	62	-10	60	62	60	68	90	110	103	112	80	82	68	78	70	80	50	72	140	98	500
28	60	72	77	78	80	70	75	76	67	52	78	60	56	-35	-85	-115	-65	-85	60	53	120	245	220	180	58	653
29	75	255	70	175	30	40	77	78	68	74	88	68	50	28	0	-20	60	85	78	100	90	102	94	70	76	435
30	68	78	88	57	48	25	40	53	68	58	50	60	98	95	96	43	52	30	30	80	95	240	285	100	81	392
M	118	128	105	84	63	55	53	61	67	72	78	80	62	55	50	37	42	42	56	68	99	136	149	144	79	455
QM	66	68	70	70	68	66	65	66	68	71	71	70	69	67	66	65	64	63	62	62	62	63	64	65	66	66

MAY 1957

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	M	R	
1	160	140	30	-120	-60	8	-38	32	58	82	76	17	55	92	116	127	127	112	78	78	72	80	93	78	62	442
2	72	73	63	-5	13	6	54	38	57	50	47	54	77	110	85	67	60	58	35	45	50	98	40	57	167	167
3	23	-25	-35	-34	-50	-12	10	27	50	70	85	75	97	98	88	97	62	-4	28	95	77	125	220	68	51	392
4	33	38	30	13	10	22	33	44	52	74	82	110	110	128	70	70	22	-20	60	68	73	96	95	58	210	210
5	178	20	18	-5	17	12	8	30	52	50	58	73	48	52	54	70	72	50	58	62	63	60	66	162	55	319
6	145	63	48	50	-10	0	35	40	56	75	90	120	110	122	88	128	100	95	92	80	72	77	130	128	81	341
7	265	70	34	68	73	48	40	54	73	77	92	90	80	87	108	85	28	-33	0	93	84	83	74	70	72	573
8	78	70	66	63	60	58	58	58	60	72	80	88	122	125	137	110	102	85	65	38	50	250	245	330	103	486
9	135	127	290	310	25	-40	-10	20	47	50	78	115	80	83	108	98	88	88	80	30	48	22	108	90	86	580
10	76	40	30	37	37	45	46	63	65	65	70	72	100	88	90	92	82	65	60	25	0	53	200	90	66	377
11	10	38	7	8	35	50	48	47	45	43	40	48	49	55	67	70	77	80	68	50	70	140	182	30	57	312
12	122	20	3	58	60	68	60	58	63	70	60	56	63	66	70	70	73	65	60	50	52	50	58	50	59	189
13	147	0	-62	-65	-92	-54	-13	28	40	60	85	117	100	105	115	120	70	50	38	44	70	88	52	70	46	348
14	40	30	62	70	67	42	55	60	55	50	48	66	74	88	78	75	62	62	73	53	42	52	54	60	58	65
15	40	-8	-5	37	52	60	63	63	58	53	48	68	74	78	95	117	85	58	48	32	42	57	28	27	53	167
16	36	35	36	46	58	56	56	52	50	58	60	48	50	72	77	77	74	68	45	35	50	48	22	40	52	94
17	28	-5	-17	0	5	18	22	30	42	42	40	42	70	60	60	58	76	44	50	58	47	50	75	77	41	116
18	30	-12	0	12	30	46	50	60	62	60	66	60	70	85	77	100	97	97	62	60	38	52	62	52	55	160
19	70	8	-25	-12	12	32	40	58	63	60	50	38	75	138	88	75	112	60	43	70	92	40	-20	150	210	60
20	138	210	130	70	64	30	10	34	52	77	112	108	128	90	-70	55	60	5	20	38	38	60	82	114	69	435
21	150	72	37	38	77	52	22	25	50	50	72	102	90	100	70	70	100	62	45	38	20	40	68	98	65	261
22	75	47	50	44	45	60	50	50	53	55	57	60	55	65	70	73	48	57	52	55	57	52	55	58	55	66
23	55	62	43	-22	18	38	50	58	55	65	68	80	90	95	72	57	45	72	62	53	43	110	103	72	60	174
24	68	60	58	62	52	50	50	57	52	83	105	128	108	122	137	122	118	95	75	48	42	53	58	42	78	109
25	44	38	34	-5	-15	13	25	38	42	40	80	87	80	54	68	105	73	55	45	38	52	88	165	135	57	247
26	130	205	140	120	-5	67	46	58	97	40	-30	-110	-5	57	92	30	-105	-30	25	40	88	180	175	120	59	522
27	100	92	48	60	60	72	78	66	65	68	80	-110														

Tromsø.

Vertical Intensity. Storminess (+ Down). Unit Gamma.

Gr. M. T.

APRIL 1957

HOURLY MEAN VALUES

Table for April 1957 showing hourly mean values for vertical intensity, storminess, and unit gamma. Columns include Day, 24 hours, M, PS, NS, AS.

MAY 1957

Table for May 1957 showing hourly mean values for vertical intensity, storminess, and unit gamma. Columns include Day, 24 hours, M, PS, NS, AS.

JUNE 1957

Table for June 1957 showing hourly mean values for vertical intensity, storminess, and unit gamma. Columns include Day, 24 hours, M, PS, NS, AS.



Tromsø.  
JULY 1957

Vertical Intensity.  $V = 50800 +$  Tabular Quantities expressed in Gamma.

Gr. M. T.

HOURLY MEAN VALUES

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	M	R		
1	370	700	550	190	600	480	450	550	195	83	95	115	108	95	110	130	117	100	50	50	40	52	73	74	224	906	
2	70	78	77	86	88	87	85	82	82	50	88	52	-220	-370	-310	-130	-100	-13	2	23	70	35	77	28	1	522	
3	100	162	380	0	-155	12	77	48	75	78	98	77	104	125	125	87	105	105	70	50	58	6	63	80	81	892	
4	48	73	75	77	78	80	78	73	70	73	73	75	70	63	62	68	70	70	48	68	28	100	240	305	86	732	
5	250	-10	0	90	305	400	-25	32	190	120	28	-100	60	100	122	118	94	82	75	70	120	300	100	120	110	1327	
6	70	53	90	15	25	13	40	40	74	75	72	98	98	118	96	83	97	112	68	50	147	200	295	250	95	544	
7	60	27	40	50	30	30	68	68	87	86	88	80	85	110	127	98	94	76	44	45	67	75	98	103	72	152	
8	124	50	36	50	35	58	58	74	77	70	72	78	88	120	115	98	68	75	72	63	80	48	70	102	74	196	
9	222	112	107	50	70	75	80	80	74	77	88	72	74	95	134	110	100	82	85	90	74	60	50	-18	85	319	
10	25	62	130	-5	0	50	66	77	84	76	75	72	70	75	75	80	83	85	80	72	70	80	62	62	66	312	
11	56	48	40	38	58	68	60	60	62	60	62	60	53	33	80	86	66	68	70	60	54	47	28	30	55	87	
12	0	-18	-8	-20	37	50	52	55	50	52	50	73	110	95	70	78	68	62	72	45	38	40	45	20	47	160	
13	20	22	35	62	73	70	75	80	78	73	68	70	73	88	90	87	78	75	75	64	60	58	63	60	67	109	
14	68	72	75	77	75	68	65	60	58	65	80	80	108	98	112	150	122	100	78	60	68	110	150	235	93	276	
15	152	80	58	48	68	76	73	72	72	78	83	73	65	60	60	58	72	87	78	77	65	66	64	48	72	181	
16	38	48	53	60	68	72	74	82	100	100	108	160	192	172	125	50	-20	-5	45	65	130	110	220	270	97	399	
17	23C	95	42	44	50	58	58	63	63	70	85	112	138	163	147	108	117	90	88	60	87	45	55	110	91	399	
18	60	105	62	60	73	65	57	67	78	72	85	140	120	127	64	70	-5	10	42	75	110	165	140	205	85	348	
19	235	255	105	57	40	68	80	70	60	95	56	55	70	65	50	32	-85	-90	65	4	90	260	285	340	94	609	
20	160	215	150	-65	-30	42	60	66	80	90	88	90	88	82	112	122	90	28	70	65	66	155	300	330	102	529	
21	87	48	66	60	67	70	65	65	68	72	60	60	108	125	112	88	75	68	57	52	65	65	65	-10	70	232	
22	20	36	42	54	70	50	40	42	46	50	50	122	178	150	78	60	20	33	50	270	140	182	230	190	92	573	
23	145	280	50	-20	-35	-30	40	80	82	85	86	85	100	100	96	98	106	94	80	62	56	67	76	118	79	464	
24	180	33	37	52	60	60	55	70	77	76	82	88	143	133	95	100	100	50	68	92	100	112	200	205	85	297	
25	180	66	60	72	68	62	60	70	76	74	68	66	72	77	82	98	108	95	88	70	78	75	68	80	90	239	
26	67	55	64	65	65	60	58	65	72	82	82	85	82	88	90	93	92	85	78	70	67	67	68	62	73	36	
27	62	62	68	72	70	63	58	52	48	47	44	50	52	60	52	60	72	65	70	65	60	45	47	45	48	57	80
28	60	60	60	62	60	55	50	50	47	48	43	44	44	56	68	68	70	70	65	44	20	50	48	54	54	145	
29	50	48	40	40	34	30	40	50	48	50	58	118	100	87	58	48	92	73	42	52	42	62	67	38	58	131	
30	44	50	55	60	55	58	50	55	65	65	55	58	55	60	66	80	94	88	75	54	58	58	60	10	60	123	
31	3	22	44	57	60	60	60	60	58	55	47	62	77	100	83	45	73	78	70	58	50	38	-30	-55	49	181	
M	105	96	86	50	70	79	71	79	77	73	72	76	81	83	80	79	69	65	65	66	72	91	109	112	79	371	
QM	64	66	68	69	69	68	67	66	66	68	71	72	70	67	66	68	70	72	72	71	69	67	65	64	68		

AUGUST 1957

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	M	R	
1	-27	10	52	45	47	40	40	55	58	72	60	52	100	110	95	77	72	53	58	40	57	57	60	57	56	167
2	70	40	75	-30	-35	15	30	33	50	53	50	47	80	125	95	62	82	70	48	37	13	75	78	180	56	370
3	50	-25	42	58	58	62	70	67	50	68	60	67	65	62	80	58	-15	-20	24	65	100	100	78	140	57	508
4	350	135	110	32	60	30	52	50	58	68	72	72	72	77	87	80	70	67	70	64	65	67	70	68	81	624
5	68	70	70	70	70	62	50	56	60	56	50	57	62	77	70	60	57	25	-48	50	95	115	213	270	74	602
6	150	150	55	-45	-32	-17	-22	55	28	75	80	60	47	80	62	-15	-15	-15	18	135	200	110	330	245	72	624
7	100	130	83	56	38	36	47	57	77	84	80	78	116	72	100	115	118	52	20	20	33	62	58	76	71	210
8	74	76	70	70	60	63	38	48	64	70	80	82	66	67	70	118	108	83	76	60	73	82	92	108	75	145
9	52	60	120	0	25	25	44	50	55	60	60	58	60	60	68	92	90	78	54	30	28	132	340	170	75	616
10	10	80	255	55	-20	42	58	65	74	80	100	108	118	120	142	146	135	108	100	100	80	80	130	72	93	435
11	65	67	65	64	62	63	65	63	62	70	68	58	54	60	70	73	67	70	67	58	62	65	64	66	69	89
12	70	75	90	-30	-95	-58	-15	30	65	70	84	62	58	77	128	115	20	-20	-38	-52	120	92	125	80	44	305
13	66	60	172	130	50	28	30	70	100	92	82	40	83	132	122	95	83	48	52	68	145	160	185	90	91	653
14	70	78	80	77	80	72	74	63	72	60	68	100	102	95	120	92	88	70	40	10	50	80	170	80	283	
15	158	210	130	10	60	70	77	75	82	72	63	70	52	60	78	77	75	64	70	68	62	97	105	135	84	326
16	128	150	110	5	40	60	70	65	67	62	58	58	63	60	62	68	84	82	70	63	50	53	62	62	69	210
17	56	46	53	67	70	73	74	70	63	60	57	63	68	55	53	72	98	100	82	70	64	60	63	60	67	73
18	58	55	47	47	58	65	68	62	57	54	58	80	138	180	128	130	148	110	67	58	65	82	78	100	83	152
19	45	95	190	-10	10	70	70	78	92	120	135	93	78	108	110	112	84	75	70	70	70	70	64	82	377	77
20	52	48	58	62	54	47	46	52	72	94	88	82	92	94	130	100	42	60	22	88	160	240	250	185	92	537
21	300	170	150	200	90	8	12	45	68	90	108	130	145	154	90	20	-15	92	98	94	82	87	83	80	99	580
22	80	78	80	82	68	52	55	58	60	62	60	70	78	62	60	60	58	58	60	60	60	63	62	58	64	36
23	50	60	65	68	65	57	50	50	53	48	48	47	52	70	72	70	70	60	62	60	57	54	57	60	59	22
24	65	65	68	67	63	58	58	58	60	60	57	50	65	80	74	68	65	60	58	56	58	58	60	63	62	36
25	66	66	68	70	70	64	53	54	55	60	55	53	60	60	55	70	54	75	35	52	70	118	170	88	68	225
26	60	62	70	70	70	68	64	60																		

Tromsø.

Vertical Intensity. Storminess (+ Down). Unit Gamma.

Gr. M. T.

JULY 1957

HOURLY MEAN VALUES

Table with columns DAY (1-31), 1-25, M, PS, NS, AS. Contains hourly magnetic data for July 1957.

AUGUST 1957

Table with columns DAY (1-31), 1-25, M, PS, NS, AS. Contains hourly magnetic data for August 1957.

SEPTEMBER 1957

Table with columns DAY (1-30), 1-25, M, PS, NS, AS. Contains hourly magnetic data for September 1957.

Tromsø. Vertical Intensity. V = 50800 + Tabular Quantities expressed in Gamma.

Gr. M. T.

Table for OCTOBER 1957 showing hourly mean values for days 1-31. Columns include Day, hours 1-24, M, and R. Values range from approximately 60 to 326.

Table for NOVEMBER 1957 showing hourly mean values for days 1-30. Columns include Day, hours 1-24, M, and R. Values range from approximately 40 to 689.

Table for DECEMBER 1957 showing hourly mean values for days 1-31. Columns include Day, hours 1-24, M, and R. Values range from approximately 40 to 689.



Tromsø.

Vertical Intensity. Storminess (+ Down). Unit Gamma.

Gr. M. T.

OCTOBER 1957

HOURLY MEAN VALUES

Table with columns: DAY, 1-25, M, PS, NS, AS. Contains hourly magnetic intensity data for October 1957.

NOVEMBER 1957

Table with columns: DAY, 1-25, M, PS, NS, AS. Contains hourly magnetic intensity data for November 1957.

DECEMBER 1957

Table with columns: DAY, 1-25, M, PS, NS, AS. Contains hourly magnetic intensity data for December 1957.



Resuming Tables.

Diurnal Variation.  
QUIET VALUES.

Tromsø.

Declination. Unit Gamma. + West.

1957	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
JANUARY	-4	-5	-6	-7	-8	-7	-6	-4	-2	0	2	4	7	8	8	7	6	5	4	3	2	0	-1	-3
FEBRUARY	-5	-6	-7	-8	-8	-8	-7	-6	-4	-1	3	7	9	8	6	6	7	8	6	4	2	0	-2	-4
MARCH	-2	-4	-7	-9	-11	-13	-15	-15	-10	-3	3	10	14	14	11	8	5	2	2	3	4	4	2	0
APRIL	-8	-14	-19	-23	-25	-26	-24	-20	-14	-4	8	17	19	19	17	15	14	16	16	14	11	8	4	-1
MAY	-19	-23	-25	-28	-29	-30	-29	-22	-10	7	21	28	28	25	21	18	19	21	20	15	9	1	-7	-14
JUNE	-11	-19	-26	-31	-34	-34	-30	-24	-14	1	18	28	31	27	20	15	14	17	19	19	14	8	2	-5
JULY	-14	-21	-28	-32	-33	-31	-27	-21	-11	2	13	23	28	29	25	18	14	14	17	17	12	5	-1	-8
AUGUST	-17	-22	-25	-29	-31	-31	-27	-18	-9	2	15	28	36	34	25	15	12	14	15	12	8	2	-4	-13
SEPTEMBER	-10	-14	-17	-20	-22	-22	-21	-16	-8	3	13	21	24	22	18	12	11	12	10	7	4	1	-3	-6
OCTOBER	-8	-10	-12	-14	-15	-16	-15	-12	-8	-2	4	9	13	14	12	9	9	10	11	9	6	2	-2	-5
NOVEMBER	-6	-7	-8	-9	-10	-10	-9	-8	-5	-1	4	7	9	10	8	7	8	8	6	4	2	0	-2	-4
DECEMBER	-6	-7	-8	-9	-9	-9	-8	-7	-5	-2	1	5	7	8	7	7	8	9	9	7	4	0	-3	-5
MEAN	-9	-13	-16	-18	-19	-19	-18	-14	-8	0	9	16	19	18	15	11	11	11	11	10	7	3	-1	-6

Horizontal Intensity. Unit Gamma.

JANUARY	-2	-1	1	2	3	3	2	-1	-5	-9	-12	-12	-9	-5	-1	2	4	6	8	8	7	5	1	-2
FEBRUARY	-1	0	2	4	6	7	6	3	-2	-7	-10	-10	-8	-5	-2	0	2	4	5	5	3	1	-1	-1
MARCH	2	6	9	11	11	9	5	-3	-12	-18	-20	-18	-12	-4	4	9	11	11	8	3	-3	-5	-3	0
APRIL	7	8	9	9	8	5	-1	-9	-18	-25	-26	-21	-14	-8	-2	4	8	12	13	11	8	6	5	6
MAY	3	5	8	9	8	3	-5	-15	-25	-32	-34	-29	-20	-10	0	10	17	20	21	20	16	12	7	4
JUNE	8	10	11	11	9	3	-2	-10	-21	-33	-36	-32	-20	-8	3	10	16	20	22	20	12	6	4	5
JULY	13	15	16	16	9	1	-9	-19	-29	-37	-41	-36	-23	-11	-1	8	18	24	24	21	16	10	9	11
AUGUST	10	11	11	9	6	1	-6	-13	-24	-31	-28	-22	-15	-9	-3	2	8	13	18	19	17	13	9	9
SEPTEMBER	6	7	9	10	8	2	-6	-14	-22	-26	-26	-22	-15	-6	1	8	13	17	19	18	14	11	8	7
OCTOBER	9	9	9	9	8	6	1	-5	-14	-22	-27	-26	-21	-14	-7	0	5	9	12	13	14	14	12	10
NOVEMBER	1	5	7	8	8	6	3	-1	-6	-10	-12	-12	-8	-5	-3	-2	1	4	6	6	3	1	-4	-4
DECEMBER	5	2	0	0	3	3	0	-5	-10	-14	-15	-15	-11	-7	-3	0	4	6	8	9	10	10	9	7

Vertical Intensity. Unit Gamma.

JANUARY	-1	0	0	-1	-3	-5	-6	-6	-5	-2	0	2	4	5	6	5	4	3	4	4	3	1	-1	-2
FEBRUARY	0	-1	-2	-3	-4	-5	-5	-3	-1	1	3	5	6	5	4	3	2	1	0	-1	-1	1	2	1
MARCH	-8	-7	-6	-5	-4	-3	-1	1	3	5	7	8	9	9	8	7	5	3	1	-2	-5	-7	-8	-9
APRIL	0	2	4	4	2	0	-1	0	2	5	5	4	3	1	0	-1	-2	-3	-4	-4	-4	-3	-2	-1
MAY	0	2	2	1	-2	-4	-5	-4	-4	-5	-5	-1	4	8	11	11	7	0	-4	-5	-5	-4	-2	-2
JUNE	0	1	1	0	0	0	1	2	2	1	0	-1	0	1	3	5	5	3	0	-4	-6	-6	-4	-2
JULY	-4	-2	0	1	1	0	-1	-2	-2	0	3	4	2	-1	-2	0	2	4	4	3	1	-1	-3	-4
AUGUST	-1	1	3	4	4	2	0	-2	-4	-6	-6	-5	-2	1	4	4	2	-1	-2	-1	-1	-2	-2	-2
SEPTEMBER	-6	-4	-3	-2	-1	-2	-4	-6	-7	-5	-2	3	7	11	13	12	9	6	3	-2	-5	-7	-9	-7
OCTOBER	-3	-2	-2	-3	-3	-3	-2	0	2	4	6	7	7	6	4	2	0	-2	-3	-3	-3	-4	-5	-4
NOVEMBER	0	-1	-2	-4	-5	-6	-6	-4	-2	0	2	3	4	5	5	3	1	0	0	2	3	3	2	1
DECEMBER	4	5	4	2	-1	-3	-4	-5	-5	-5	-3	-1	1	0	-1	-2	-3	-3	0	3	5	5	3	2
MEAN	-2	-1	0	-1	-1	-2	-3	-3	-2	-1	1	2	3	4	4	4	3	1	0	-1	-2	-2	-3	-2

Monthly Means.

DECLINATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
DIRECT VALUES D = 0° W + .....	15'.6	14.1	14.1	17.8	17.5	17.2	17.5	17.2	14.1	15.9	14.7	15.0	15'.9
QUIET VALUES D = 0° W + .....	17'.2	15.6	14.4	17.2	17.5	18.1	18.1	17.5	16.6	17.2	16.9	15.9	16'.9
RANGE ( UNIT MINUTES )	72	93	139	122	77	109	88	99	133	76	94	90	99
QUIET RANGE ( UNIT ° )	16	17	29	44	58	65	62	66	46	30	18	18	39
STORMINESS. MEAN ( UNIT ° )	-5	-5	-1	2	1	-4	-2	0	-8	-3	-6	-3	-3
DIURNAL SUM PS ( UNIT ° )	131	153	347	348	251	323	223	207	335	151	137	168	231
NS	245	278	368	300	231	411	262	213	519	233	290	241	299
AS	375	431	716	648	482	734	484	420	854	365	427	409	530
HORIZONTAL INTENSITY													
DIRECT VALUES H = 11100 + .....	79	70	59	85	91	90	93	87	71	87	87	87	82
QUIET VALUES H = 11100 + .....	95	83	80	81	102	100	99	98	90	99	102	105	95
RANGE ( UNIT ° )	459	526	687	685	497	639	553	516	815	425	464	476	562
QUIET RANGE ( UNIT ° )	20	17	31	39	55	58	65	50	45	41	18	15	38
STORMINESS. MEAN ( UNIT ° )	-15	-12	-21	4	-10	-12	-7	-11	-21	-13	-14	-19	-13
DIURNAL SUM PS ( UNIT ° )	295	530	652	1139	665	903	638	536	806	390	436	363	613
NS	659	814	1153	1049	903	1183	796	807	1310	698	781	809	914
AS	954	1344	1802	2187	1567	2086	1433	1343	2116	1088	1218	1172	1526
VERTICAL INTENSITY													
DIRECT VALUES V = 50800 + .....	37	52	69	79	61	60	79	72	83	80	73	70	68
QUIET VALUES V = 50800 + .....	41	55	58	66	60	59	68	62	77	68	71	77	64
RANGE ( UNIT ° )	305	384	523	455	280	420	371	346	606	305	504	527	419
QUIET RANGE ( UNIT ° )	12	11	18	9	16	9	8	10	20	12	11	10	12
STORMINESS. MEAN ( UNIT ° )	-4	-3	11	13	2	1	11	11	7	13	2	-7	5
DIURNAL SUM PS ( UNIT ° )	257	329	632	679	368	548	567	477	923	461	380	262	492
NS	352	410	361	358	312	532	295	209	755	160	343	450	378
AS	609	739	994	1037	680	1080	862	686	1678	621	724	732	870

Resuming Tables.

Storminess.

Tromsø.

Declination. Unit Gamma. + West.

1957		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
JAN	MPS	1	1	0	1	0	1	0	2	1	1	3	4	7	10	9	10	12	15	20	12	11	9	3	1
FEB	MPS	0	0	0	1	0	1	1	3	4	3	4	7	6	10	12	11	12	18	21	13	14	9	3	0
MAR	MPS	1	1	0	1	2	1	5	5	6	7	12	17	18	28	29	35	39	40	44	27	21	7	1	0
APR	MPS	0	0	0	1	1	2	6	6	5	7	10	13	17	28	32	43	40	35	36	31	22	11	1	0
MAY	MPS	3	1	1	0	1	1	6	6	4	2	4	7	15	16	17	18	22	23	23	21	24	21	8	5
JUN	MPS	1	2	0	1	0	1	2	1	6	4	3	5	10	22	29	34	39	42	37	29	25	22	9	1
JUL	MPS	1	0	1	1	1	1	1	2	4	3	3	4	7	13	18	22	28	29	28	27	17	7	3	
AUG	MPS	7	2	1	1	2	2	3	5	5	3	4	3	3	4	8	12	20	24	22	26	30	12	4	4
SEP	MPS	0	1	1	1	1	0	1	3	3	3	3	5	8	21	31	32	48	54	42	34	21	15	4	4
OCT	MPS	1	1	0	0	0	0	2	1	2	3	6	10	9	10	10	19	14	21	16	12	8	2	2	0
NOV	MPS	0	0	0	1	1	1	2	2	1	2	3	6	6	4	10	13	18	17	20	12	9	5	2	1
DEC	MPS	1	1	2	2	4	5	3	5	4	2	3	6	5	9	18	21	17	18	13	9	5	5	1	
MEAN		1	1	1	1	1	1	3	3	4	3	5	7	9	14	17	22	26	28	27	22	18	11	4	2
JAN	MNS	25	16	23	28	18	9	9	7	10	7	4	3	1	1	1	7	5	4	5	10	4	5	20	20
FEB	MNS	28	43	51	23	18	14	10	5	3	5	3	1	1	1	0	1	2	2	4	7	4	10	19	24
MAR	MNS	57	34	48	33	22	25	14	13	9	3	1	6	4	5	1	1	1	1	0	5	2	19	30	41
APR	MNS	38	40	42	35	31	17	9	6	6	4	2	3	2	0	0	0	0	1	0	0	0	6	21	36
MAY	MNS	25	44	40	35	22	7	3	4	5	9	8	3	1	1	0	0	1	1	1	0	0	0	7	14
JUN	MNS	37	59	59	48	43	30	18	15	12	11	12	17	9	3	0	1	1	0	0	1	0	2	8	26
JUL	MNS	28	38	33	22	14	16	12	16	10	7	7	7	12	3	2	2	2	0	0	1	4	9	14	
AUG	MNS	21	29	33	26	23	15	7	2	0	1	2	7	3	2	2	1	1	1	1	1	0	10	9	18
SEP	MNS	38	57	37	50	39	43	35	27	32	36	19	17	13	2	6	2	1	1	4	1	3	8	23	25
OCT	MNS	29	34	28	17	11	8	4	4	3	3	2	1	1	1	1	1	1	0	1	8	12	19	24	23
NOV	MNS	47	44	37	24	15	7	4	4	3	5	3	1	1	5	3	0	1	1	2	3	4	18	21	39
DEC	MNS	28	29	38	30	12	8	5	5	4	4	1	1	1	1	1	1	0	1	4	1	3	12	24	24
MEAN		33	39	39	31	22	17	11	9	8	8	5	6	4	2	1	1	1	1	2	3	3	9	18	25
JAN	MPS + MNS	-25	-15	-23	-27	-18	-9	-9	-6	-9	-6	-1	1	6	8	7	3	7	11	15	1	7	3	-17	-19
FEB	MPS + MNS	-28	-43	-51	-23	-17	-12	-9	-1	1	-2	1	6	5	9	11	10	11	16	17	6	10	-1	-16	-24
MAR	MPS + MNS	-57	-33	-48	-32	-21	-24	-9	-9	-2	4	11	11	14	24	28	34	38	39	44	22	19	-12	-29	-40
APR	MPS + MNS	-38	-40	-42	-35	-30	-16	-3	0	0	4	8	10	14	28	32	43	40	35	36	31	21	5	-20	-36
MAY	MPS + MNS	-22	-43	-39	-35	-21	-6	4	3	-1	-7	-4	4	15	15	16	18	21	22	22	21	24	21	1	-9
JUN	MPS + MNS	-36	-57	-59	-48	-42	-29	-17	-14	-6	-7	-9	-12	1	19	29	33	38	41	37	28	25	20	1	-25
JUL	MPS + MNS	-27	-37	-32	-21	-13	-15	-11	-16	-8	-3	-4	-4	-8	4	11	16	20	26	29	29	26	13	-2	-11
AUG	MPS + MNS	-14	-27	-32	-25	-21	-12	-4	3	5	2	1	-4	-1	2	6	11	19	23	21	25	30	2	-5	-14
SEP	MPS + MNS	-38	-56	-36	-49	-38	-43	-35	-24	-28	-33	-16	-12	-6	19	25	30	48	53	38	33	18	7	-19	-21
OCT	MPS + MNS	-28	-33	-28	-17	-10	-8	-2	0	1	4	9	8	10	10	19	13	21	15	3	4	-17	-22	-22	
NOV	MPS + MNS	-47	-44	-37	-23	-11	-5	-1	-3	-2	-3	0	5	5	-1	8	13	17	16	18	9	4	-14	-19	-39
DEC	MPS + MNS	-27	-28	-36	-28	-8	-2	-2	0	0	-2	2	5	4	9	7	16	21	16	14	11	6	-7	-19	-26
MEAN		-34	-38	-39	-30	-21	-15	-8	-6	-4	-4	-1	2	5	12	16	21	24	27	26	18	16	1	-14	-24

Horizontal Intensity. Unit Gamma.

1957		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
JAN	MPS	1	1	0	2	0	2	2	2	3	9	8	15	18	30	44	39	39	34	21	12	7	2	2	0
FEB	MPS	1	2	3	4	2	4	3	8	11	0	0	0	42	53	58	66	66	55	35	19	9	8	2	1
MAR	MPS	2	0	1	1	4	4	7	10	14	20	32	50	58	81	80	86	94	55	30	12	5	2	1	1
APR	MPS	2	2	3	6	4	3	5	5	19	36	57	92	132	144	157	157	131	97	49	23	8	4	3	1
MAY	MPS	0	0	2	2	1	2	3	8	11	24	43	58	69	74	76	80	84	67	36	16	7	1	3	0
JUN	MPS	0	1	2	2	1	1	1	5	20	49	72	96	116	99	106	109	88	59	41	22	9	2	2	0
JUL	MPS	0	1	2	3	2	5	7	12	11	23	40	62	72	57	71	76	79	57	35	14	4	3	2	1
AUG	MPS	0	1	1	1	2	3	4	7	13	16	22	40	49	49	66	65	72	60	39	16	5	3	2	1
SEP	MPS	1	4	2	1	1	4	7	9	20	23	60	111	124	119	104	77	60	46	23	6	2	1	1	2
OCT	MPS	1	1	0	1	2	2	3	3	7	14	27	28	36	43	44	56	48	36	19	9	1	1	1	3
NOV	MPS	3	3	2	4	6	4	3	3	6	14	16	26	36	38	50	61	46	43	27	13	10	9	9	7
DEC	MPS	0	1	1	2	9	8	6	6	6	8	12	17	27	44	45	49	44	35	15	12	10	5	3	0
MEAN		1	1	2	2	3	4	4	7	12	20	32	50	65	69	76	77	71	54	31	15	6	3	3	1
JAN	MNS	58	42	56	53	40	17	16	8	7	8	1	2	2	2	2	2	9	32	35	59	72	61	76	
FEB	MNS	78	83	91	61	40	31	24	14	4	0	27	34	2	0	0	0	2	15	64	63	71	90	83	
MAR	MNS	144	98	107	87	74	60	28	18	9	2	1	0	1	7	3	8	1	4	16	51	55	123	130	125
APR	MNS	135	122	114	89	76	38	20	9	4	0	2	0	0	1	0	0	3	0	8	24	42	80	133	152
MAY	MNS	144	144	107	84	46	32	14	4	2	3	1	1	1	1	0	0	1	0	2	8	25	59	111	111
JUN	MNS	123	165	162	144	111	70	31	11	4	3	1	0	1	3	1	0	5	6	4	38	42	65	80	115

JUL	MNS	105	98	90	51	50	38	3	8	3	1	2	0	0	1	1	1	1	2	4	13	34	73	91	124
AUG	MNS	105	106	108	69	63	34	17	5	2	2	2	1	1	0	0	0	0	1	6	16	33	62	73	101
SEP	MNS	138	126	96	110	84	52	24	11	3	4	2	2	1	2	13	25	22	54	29	52	62	105	152	150
OCT	MNS	74	71	42	34	23	18	11	3	1	0	0	0	0	0	0	0	0	0	34	57	79	95	83	73
NOV	MNS	116	89	72	43	33	19	14	14	5	2	2	1	0	0	0	0	3	11	23	40	53	89	71	81
DEC	MNS	91	74	79	59	32	28	18	11	4	2	0	1	0	1	4	6	9	4	23	33	38	78	97	115
MEAN		109	102	94	74	56	36	18	10	4	2	3	4	1	2	2	4	4	8	16	36	49	81	98	109
JAN	MPS + MNS	-57	-40	-55	-51	-40	-15	-14	-6	-4	1	7	14	16	28	42	37	37	25	-10	-22	-52	-70	-59	-75
FEB	MPS + MNS	-77	-81	-88	-57	-38	-27	-20	-7	7	19	27	34	40	53	58	66	65	53	21	-45	-53	-62	-88	-82
MAR	MPS + MNS	-142	-98	-106	-86	-70	-55	-21	-8	5	18	31	49	58	74	77	79	93	51	14	-39	-61	-122	-129	-124
APR	MPS + MNS	-133	-120	-111	-83	-71	-34	-14	-4	15	36	55	92	132	143	157	157	128	97	41	-2	-34	-77	-130	-151
MAY	MPS + MNS	-144	-143	-106	-82	-45	-31	-10	4	8	21	42	57	68	73	76	79	82	66	34	8	-18	-58	-108	-111
JUN	MPS + MNS	-123	-163	-160	-143	-110	-69	-30	-6	16	46	71	96	116	96	105	109	83	54	38	-16	-33	-63	-79	-115
JUL	MPS + MNS	-104	-98	-88	-49	-48	-33	5	4	8	22	38	62	72	56	71	75	76	55	31	1	-30	-71	-90	-124
AUG	MPS + MNS	-105	-105	-108	-68	-61	-31	-13	2	11	14	20	39	49	49	66	65	72	59	33	-1	-28	-59	-72	-100
SEP	MPS + MNS	-137	-122	-94	-109	-83	-48	-16	-2	16	19	58	109	122	118	91	52	38	-8	-6	-36	-61	-104	-150	-148
OCT	MPS + MNS	-73	-70	-42	-33	-21	-16	-8	1	6	14	27	28	36	43	44	56	48	36	-14	-48	-77	-94	-82	-70
NOV	MPS + MNS	-113	-87	-71	-39	-27	-15	-11	-11	1	12	14	26	36	38	50	61	43	32	4	-27	-44	-80	-63	-74
DEC	MPS + MNS	-91	-72	-78	-57	-24	-21	-12	-5	2	6	12	17	27	43	41	43	34	31	-8	-22	-28	-73	-93	-115
MEAN		-108	-100	-92	-71	-53	-33	-14	-3	8	19	34	52	64	68	73	73	67	46	15	-21	-42	-78	-95	-107

Vertical Intensity. Unit Gamma.

1957		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
JAN	MPS	18	21	33	9	7	3	5	6	10	8	8	8	8	10	8	9	8	5	2	1	4	19	25	24
FEB	MPS	28	38	12	16	12	12	9	1	3	7	5	6	12	10	11	10	6	7	5	12	17	18	36	34
MAR	MPS	61	36	35	13	15	18	16	10	5	7	7	10	14	21	28	20	10	10	16	24	41	76	69	70
APR	MPS	61	68	46	30	16	10	3	6	7	11	13	17	19	22	15	12	5	11	17	39	75	88	80	
MAY	MPS	41	21	17	13	2	1	2	1	5	8	17	24	20	21	20	17	15	13	5	5	7	21	48	30
JUN	MPS	42	52	46	23	14	15	12	11	7	6	12	18	20	17	17	15	12	9	5	23	21	33	52	65
JUL	MPS	52	46	34	5	25	25	14	19	14	8	8	14	24	32	28	20	17	9	2	8	12	34	51	64
AUG	MPS	35	28	31	12	8	1	2	2	7	15	17	15	20	24	24	24	16	12	7	8	24	37	60	50
SEP	MPS	78	79	68	86	55	40	31	24	14	16	8	9	11	8	12	11	5	12	8	20	50	100	95	82
OCT	MPS	49	40	19	12	5	11	9	7	8	8	9	11	15	17	17	11	9	6	16	20	28	44	39	49
NOV	MPS	44	32	23	17	6	4	6	5	5	7	6	6	8	9	7	8	4	3	3	11	27	41	43	56
DEC	MPS	24	20	10	4	5	1	3	6	5	6	7	5	6	7	11	5	4	2	3	12	24	32	35	48
MEAN		44	40	31	20	14	12	9	8	8	9	10	12	14	16	17	14	10	8	7	14	25	44	53	54
JAN	MNS	11	9	12	21	18	17	6	5	2	1	2	6	3	6	24	37	33	32	26	23	17	19	14	7
FEB	MNS	12	18	26	23	28	22	15	15	9	2	10	6	6	9	18	12	26	32	37	27	22	14	11	8
MAR	MNS	4	16	12	22	22	19	18	8	7	4	4	13	12	13	30	25	41	39	21	7	3	6	10	3
APR	MNS	8	7	11	16	21	20	15	10	8	5	3	3	25	27	38	43	35	25	17	11	3	2	4	1
MAY	MNS	11	27	37	37	34	21	19	9	3	3	5	8	5	2	5	3	11	21	12	10	9	6	5	9
JUN	MNS	10	14	25	41	41	28	26	16	8	7	9	26	37	27	35	38	28	22	17	20	15	9	18	14
JUL	MNS	12	15	15	25	25	13	10	5	3	4	7	10	13	15	12	10	18	16	9	12	10	10	7	17
AUG	MNS	8	8	6	23	24	23	18	6	2	1	0	1	1	1	1	4	13	16	18	14	10	6	2	4
SEP	MNS	13	12	7	11	21	18	13	7	4	20	36	46	64	95	85	82	81	46	40	25	12	7	4	7
OCT	MNS	4	7	12	7	11	4	3	2	2	2	1	3	2	2	18	12	13	11	12	13	7	7	6	
NOV	MNS	14	9	11	17	12	13	7	6	6	2	4	4	5	10	22	38	30	31	35	22	15	10	11	8
DEC	MNS	12	18	21	35	31	21	21	11	8	5	4	4	6	8	23	45	27	26	32	33	21	11	15	12
MEAN		10	13	16	23	24	18	14	8	5	5	7	11	15	18	25	30	30	27	23	18	13	9	9	8
JAN	MPS + MNS	7	12	20	-13	-12	-14	-1	1	7	7	6	2	6	4	-16	-28	-25	-27	-24	-22	-13	0	11	17
FEB	MPS + MNS	16	20	-14	-7	-15	-10	-6	-14	-6	4	-5	0	6	1	-7	-2	-19	-25	-32	-15	-5	5	26	27
MAR	MPS + MNS	57	20	23	-10	-7	-1	-2	1	-2	3	3	-3	2	8	-1	-6	-32	-29	-5	17	38	70	59	67
APR	MPS + MNS	53	60	35	14	-5	-10	-12	-4	-1	2	9	10	-8	-8	-16	-27	-23	-21	-6	6	36	73	84	79
MAY	MPS + MNS	30	-6	-21	-24	-33	-20	-17	-8	2	6	12	15	15	20	15	14	5	-8	-7	-4	-3	15	36	21
JUN	MPS + MNS	32	37	22	-18	-26	-13	-14	-6	-1	-1	3	-8	-17	-10	-18	-22	-16	-12	-12	2	6	23	34	52
JUL	MPS + MNS	40	31	18	-20	0	11	4	14	11	4	1	4	11	16	15	10	-1	-7	-7	-4	2	24	44	48
AUG	MPS + MNS	27	20	25	-12	-16	-23	-16	-3	5	14	16	13	19	23	23	20	3	-4	-11	-6	15	31	58	46
SEP	MPS + MNS	65	67	61	75	34	21	18	17	10	-4	-27	-38	-53	-86	-74	-71	-76	-33	-31	-5	37	94	92	75
OCT	MPS + MNS	46	34	7	5	-6	7	4	6	6	7	10	12	15	15	-6	-3	-6	5	9	14	37	32	14	
NOV	MPS + MNS	30	23	12	0	-6	-9	-1	-1	5	2	2	3	-1	-14	-30	-26	-28	-32	-11	12	31	31	47	
DEC	MPS + MNS	12	2	-11	-31	-26	-20	-18	-6	-3															

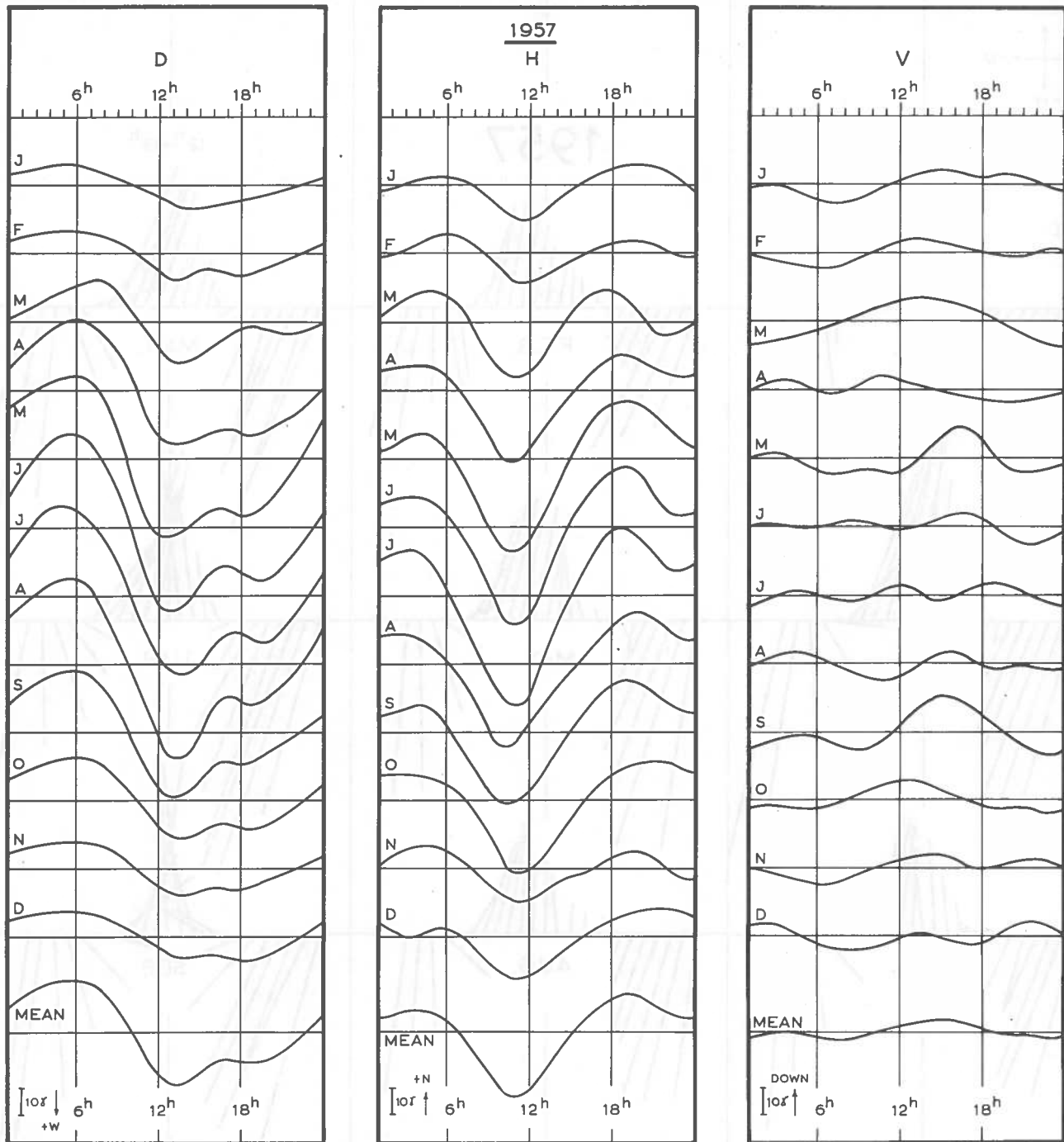


Fig. 1. The Quiet Diurnal Variation, smoothed Values.

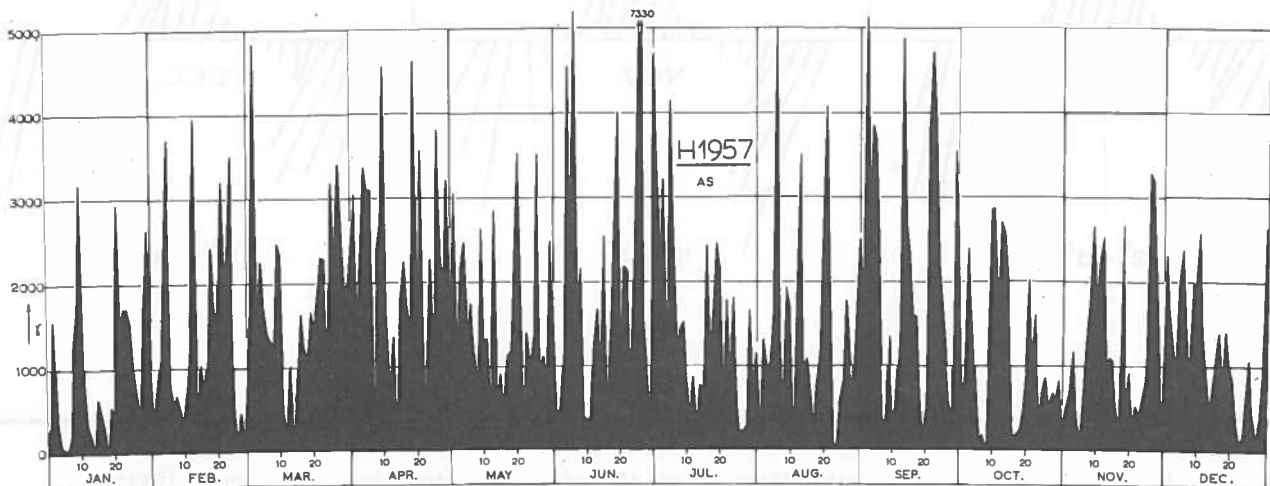


Fig. 2. The Diurnal Sum of the Absolute Storminess of H.



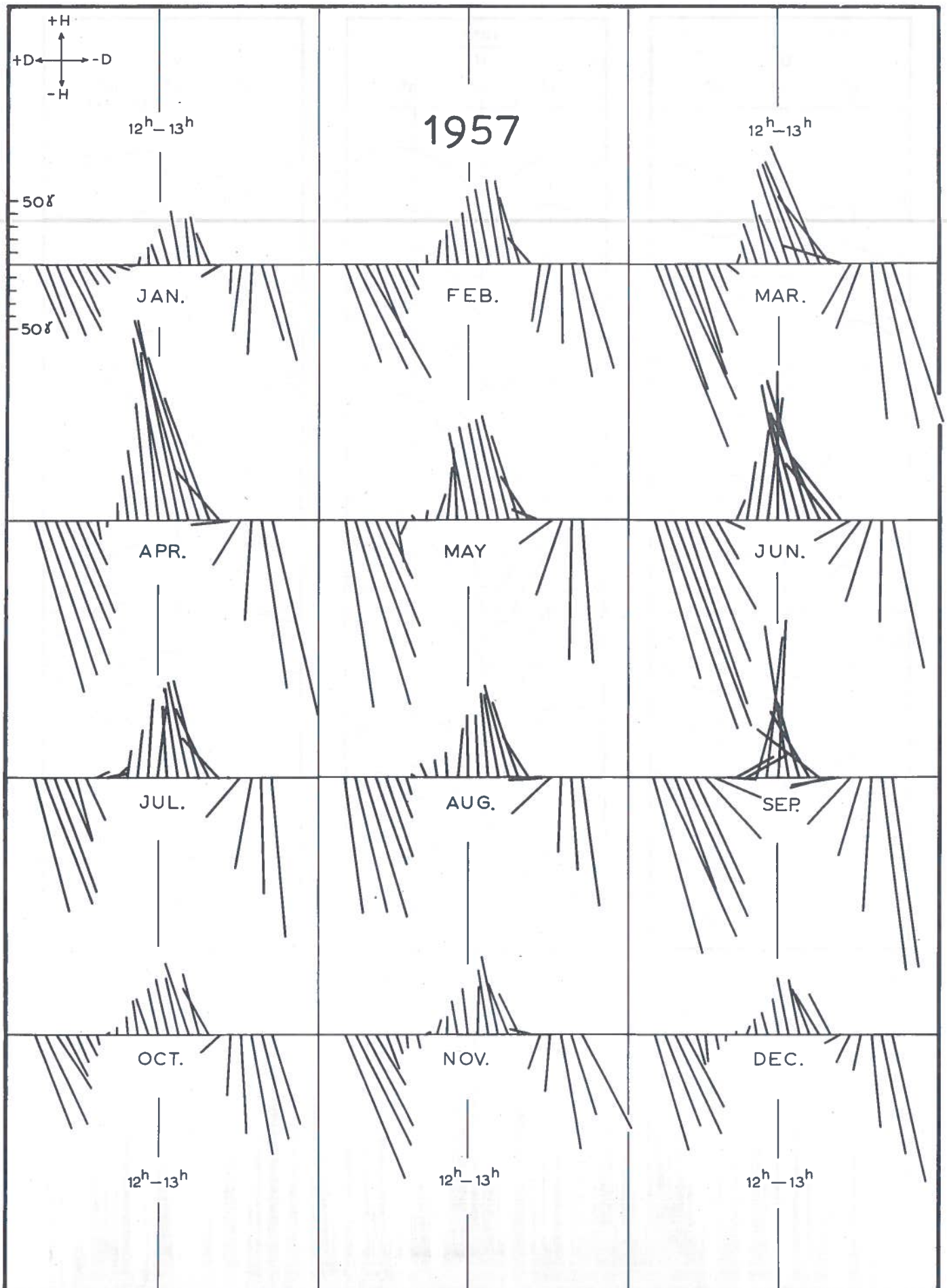


Fig. 3. Diagrams of the Monthly Mean Values ( $M$ ) of the Storminess in the Horizontal Plane.

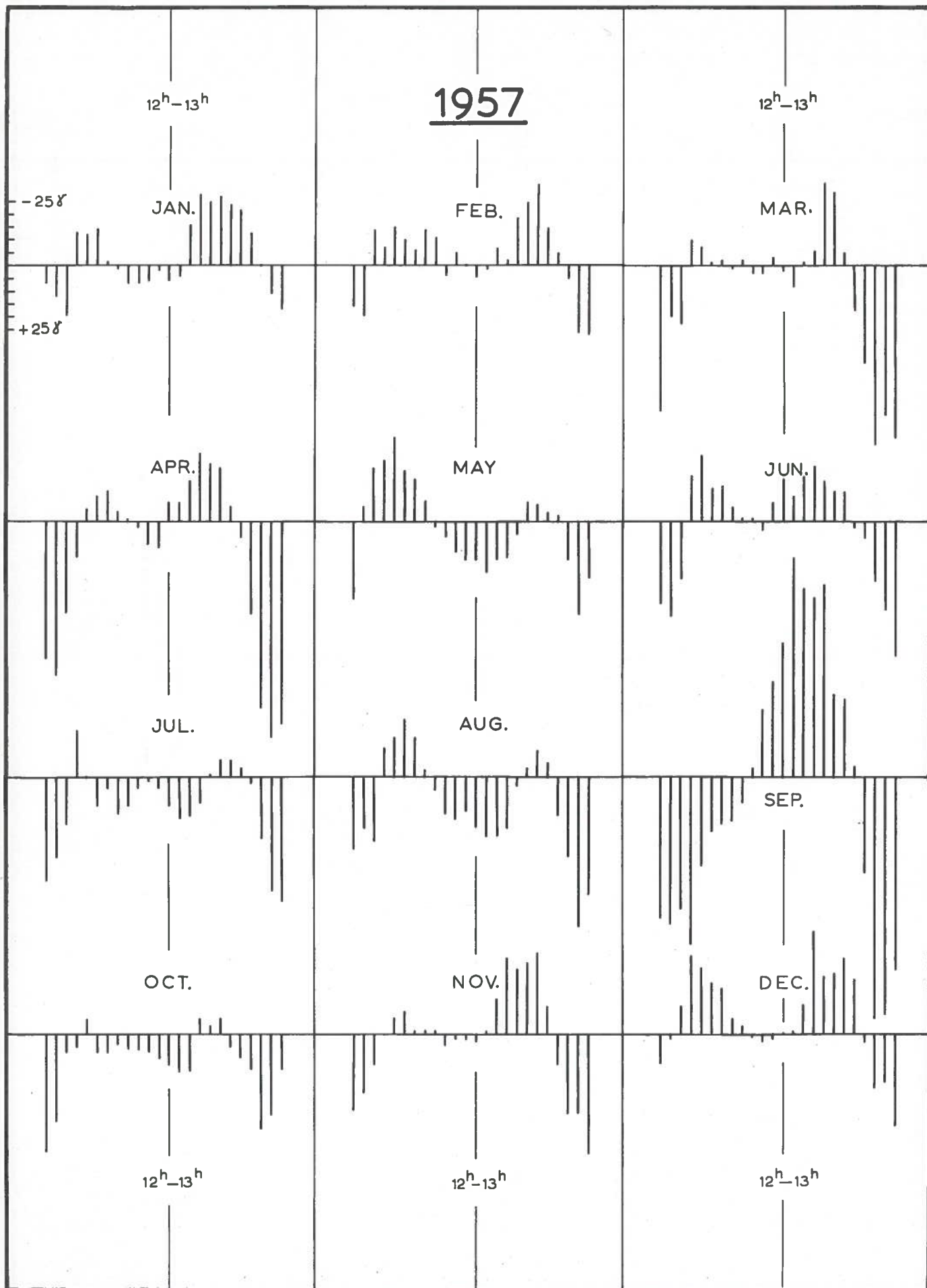


Fig. 4. Diagrams of the Monthly Mean Values ( $M$ ) of the Storminess of the Vertical Intensity.





