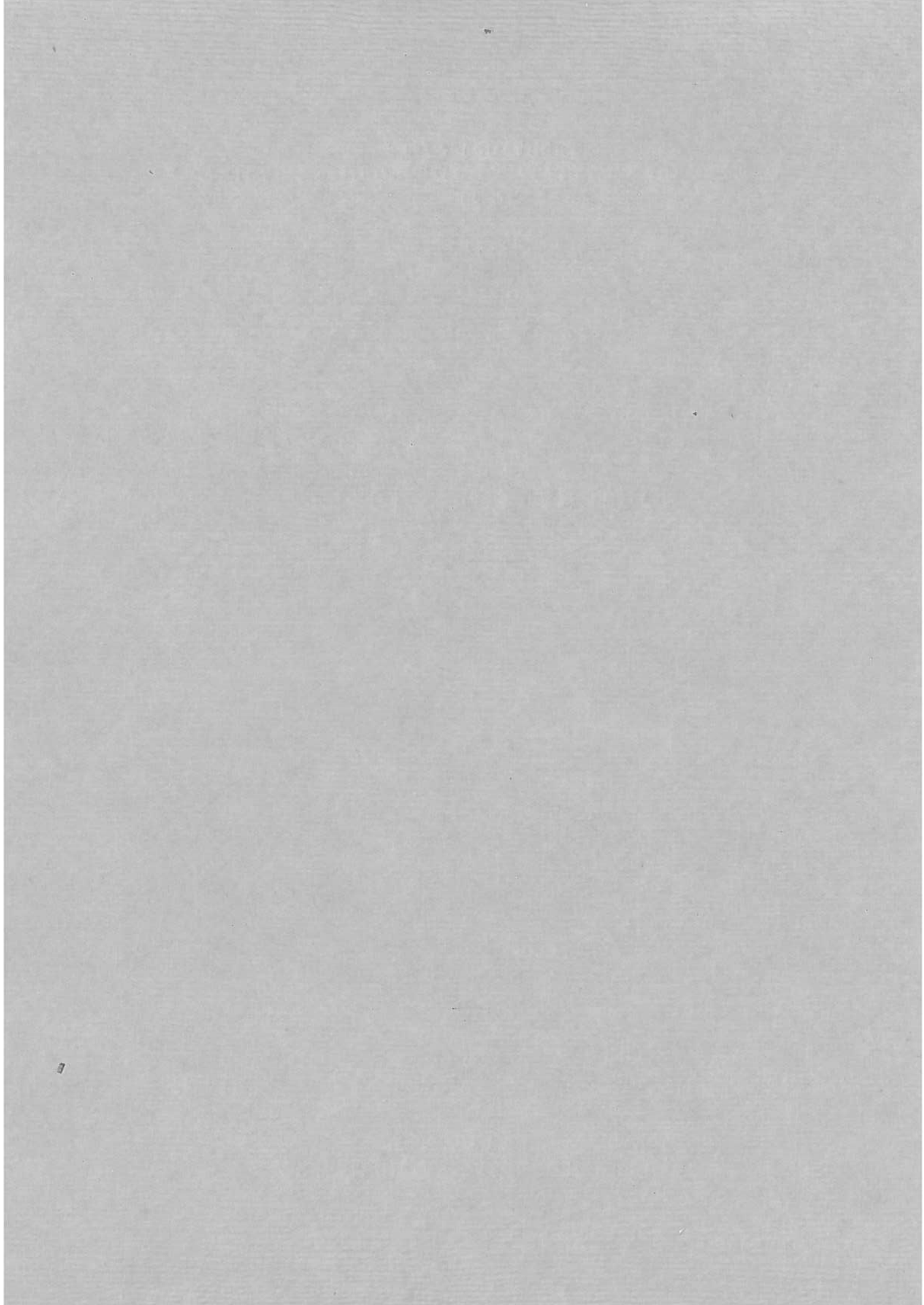


Publikasjoner fra
DET NORSKE INSTITUTT FOR KOSMISK FYSIKK
Nr. 34

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

OBSERVATIONS 1951

1953
A.S JOHN GRIEGS BOKTRYKKERI, BERGEN



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PREFACE

Up to the present the Norwegian Institute of Cosmical Physics has published two magnetic yearbooks, one for the station Dombås and one for the Auroral Observatory at Tromsø. The activity of the Auroral Observatory, however, also includes other branches of cosmical physics particularly the following three:

1. Auroral studies including analysis of its spectrum and the physics of the ionosphere.
2. Studies of the electric state of the ionosphere by means of electric waves (Radio-echo observations).
3. Investigation on the distribution of ozone in the atmosphere.

The results of investigations made within these three branches have been published in various journals or other publication series.

The executive committee of the Norwegian Institute of Cosmical Physics has decided, that from the year 1951 annual reports on the work within these three branches should be included in the yearbook. At the start it is intended to give a summary of previous work and publications.

AURORAL WORK

The auroral investigations at the Tromsø Observatory has mainly been directed on the auroral spectroscopy and its relation to the physics of the ionosphere and to the solar processes. Further observations have been made for the determination of the position and structure of aurorae and the distribution of light intensity along the auroral streamers.

The instrumental equipment for these investigations have e.g. consisted in photographic cameras of high light power for the determination of position and structure of aurorae and of a number of spectrographs constructed and built to meet the requirements of auroral spectrography.

From the start in 1928—30 up to 1950 we had the following 6 spectrographs at our disposal:

1. A spectrograph (A) with a Rutherford prisme and large dispersion particularly used for accurate wavelength determinations, and for measuring the ionospheric temperature by means of band spectra.
2. A spectrograph (B) with two 60° prisms which had a smaller dispersion but greater light power than spectrograph (A). By means of this spectrograph a considerable number of bands and lines were detected and identified.
3. A small spectrograph (α) with one Rutherford prism with a kamera lens of fairly high light power particularly designed for the study of variations of the intensity-distribution within the auroral spectrum.
4. A fairly large quartz spectrograph with two prisms for the ultraviolet region.
5. A grating spectrograph for the infrared region.
6. An interferometer for wavelength precession measurements.
7. In 1950 a very large two-prism spectrograph (V), combining a considerable dispersion with a high light power (camera lens F: 1.2), was put up at the Auroral Observatory. It was made by «Société General d'Optique in accordance with Vegards design and specifications.
8. In 1951 an equally large spectrograph (F), obtained from the same firm, was mounted at the Observatory. This spectrograph had the extremely high light power F: 0.65, but a smaller dispersion than the «V» spectrograph. With this spectrograph, which is particularly intended for the study of variability effects, strongly exposed auroral spectrograms of moderately strong aurorae may be obtained with exposures of a few minutes.

The results of the auroral investigations have been published in journals and proceedings in various countries. The most complete accounts will as a rule be found in the series «Geofysiske Publikasjoner» (G. P.) Oslo. We therefore consider it of value to give a complete list of papers on aurorae published in the G. P. series. In these papers references to most of the other published papers on auroral problems will be found.

For the sake of completeness also some auroral papers dealing with results obtained at Oslo and other places will be included in the list.

L. Vegard.

**Auroral Papers published in
GEOFYSISKE PUBLIKASJONER (G. P.)
Oslo**

No.	Authors	Title	Vol.	No.	Year
1.	VEGARD and O. KROGNES:	The Position in Space of the Aurora Palaris	I	1	1919
2.	CARL STØRMER:	Résultats des mesures photogrammetriques des aurores boréales observées dans la Norvège meridionale de 1911—1922 ..	IV	7	1926
3.	A. RØSTAD:	Über die Einwirkung der magnetischen Perturbationen auf die geographiscen Verbreitung des Nordlichts	V	5	1928
4.	LEIV HARANG og EINAR TØNSBERG:	Investigations on the aurora borealis at Nordlysobservatoriet, Tromsø 1929—30	IX	5	1932
5.	L. VEGARD:	Results of investigations of the auroral spectrum during the years 1921—26	IX	11	1932
6.	L. VEGARD:	Investigations of the Auroral Spectrum based on Observations from the Auroral Observatory, Tromsø	X	4	1933
7.	LEIV HARANG:	Filteraufnahmen von Polarlicht	X	8	1934
8.	A. RØSTAD:	Beziehung der Nordlichterscheinungen zu den Weltweiten magnetischen Störungen	X	10	1935
9.	L. VEGARD and L. HARANG:	The Wavelength of the Green Auroral Line Determined by an Inteferometer Method	XI	1	1934
10.	L. VEGARD and E. TØNSBERG:	Continued Investigations on the Temperature of the Upper Atmospher Determined by Means of Bands Appearing in the Auroral Spectrum	XI XII	2 3	1935 1938
11.	C. STØRMER:	Measuring of Aurorae with Very Long Base Lines	XI	3	1935
12.	C. STØRMER:	Remarkable Auroral Forms from Southern Norway I. Feeble Homogeneous Arcs of great Altitude	XI	5	1935
		II. Some Arcs and Bands with Ray Structure	XI	12	1936
13.	L. VEGARD and L. HARANG:	Recent Results regarding the Spectral Analysis of the auroral Luminescence	XI	15	1937
14.	L. VEGARD and E. TØNSBERG:	Variations of the Intensitydistribution within the Auroral Spectrum	XI	16	1937
15.	L. HARANG:	Height Measurements of Selected Auroral Forms	XII	1	1937
16.	L. VEGARD:	Vorgänge und Zustände in der Nordlichtregion	XII	5	1938
17.	C. STØRMER:	Some Results regarding Height and Spectra of Aurora in Southern Norway	XII	7	1938
18.	L. VEGARD:	Weak Bands and Atomic Lines in the Auroral Spectrum ...	XII	8	1938
19.	B. RYPDAL and L. VEGARD:	The Excitation Functions of Nitrogen Bands and their Bearing on Auroral Problems	XII	12	1940
20.	L. VEGARD:	Continued Investigations on the Auroral Luminescence and the Upper Atmosphere	XII	14	1940
21.	L. VEGARD and E. TØNSBERG:	Investigations on the Auroral and Twilight Luminescence including Temperature Measurements in the Ionosphere	XIII	1	1940
22.	L. VEGARD and E. TØNSBERG:	New Important Results Relating to the Auroral Spectrum and the state of the Upper Atmosphere	XIII	5	1951

No.	Authors	Title	Vol.	No.	Year
23.	C. STØRMER:	Remarkable Aurora-Forms from Southern Norway III—IX ..	XIII	7	1942
24.	C. STØRMER:	Results of Photogrammetric Measurements of the Aurora Borealis during the Norwegian—French Polar Expedition to North-East Greenland 1938—39	XIII	13	1944
25.	L. VEGARD:	Coronal Phenomena and their Relation to Solar and Terrestrial Processes	XVI	1	1944
26.	L. VEGARD and E. TØNSBERG:	Results of Auroral Spectrograms obtained at Tromsø Observatory during the Winters 1941/42 and 1942/43.....	XVI	2	1944
27.	L. HARANG:	The Luminosity Curve of the Aurorae	XVI	6	1945
28.	L. VEGARD and G. KVIFTE:	Spectral Investigations on Aurorae and Twilight	XVI	7	1945
29.	L. VEGARD and HANS RAASTAD:	The Intensity Distribution within the Nitrogen Spectrum from Canal Rays and Negative Glow, with Reference to the Auroral Luminescence	XVII	7	1950
30.	L. VEGARD and G. KVIFTE:	An Auroral Spectrogram and the Results Derived from it ..	XVIII	3	1951
31.	L. VEGARD, E. TØNSBERG and G. KVIFTE:	Continued Investigations of the Spectra of Aurora and Twilight and the Ionospheric Temperature	XVIII	4	1951
32.	L. VEGARD:	Doppler Displacement of Auroral Hydrogen Lines and its Bearing on the Theory of Aurora and Magnetic Disturbances	XVIII	5	1952
33.	L. VEGARD and E. TØNSBERG:	Results from Auroral Spectrograms obtained at Tromsø during the Winter 1950/51	XVIII	8	1952

REPORT FOR 1951

During the year 1951 we have taken spectrograms with the new large spectrograph («V») in order to obtain and measure lines and bands in the spectral region covered by the spectrograph, which means from $\lambda = 3880$ to infra red. Three spectrograms showing a great number of lines and bands were obtained on red sensitive plates (Kodak 103a E) and two successful spectrograms were taken on infra red sensitive plates (Kodak I—N) showing a great number of bands and lines in the infra red.

On the spectrograms from the V-spectrograph the rotational components of the R-branch of the bands 4278 and 3914 appeared separated and gave therefore good conditions for accurate determination of the ionospheric temperature. These spectrograms gave also good facilities for the study of the hydrogen lines and their Doppler displacement, detected in 1939—41 on Oslo and Tromsø spectrograms.

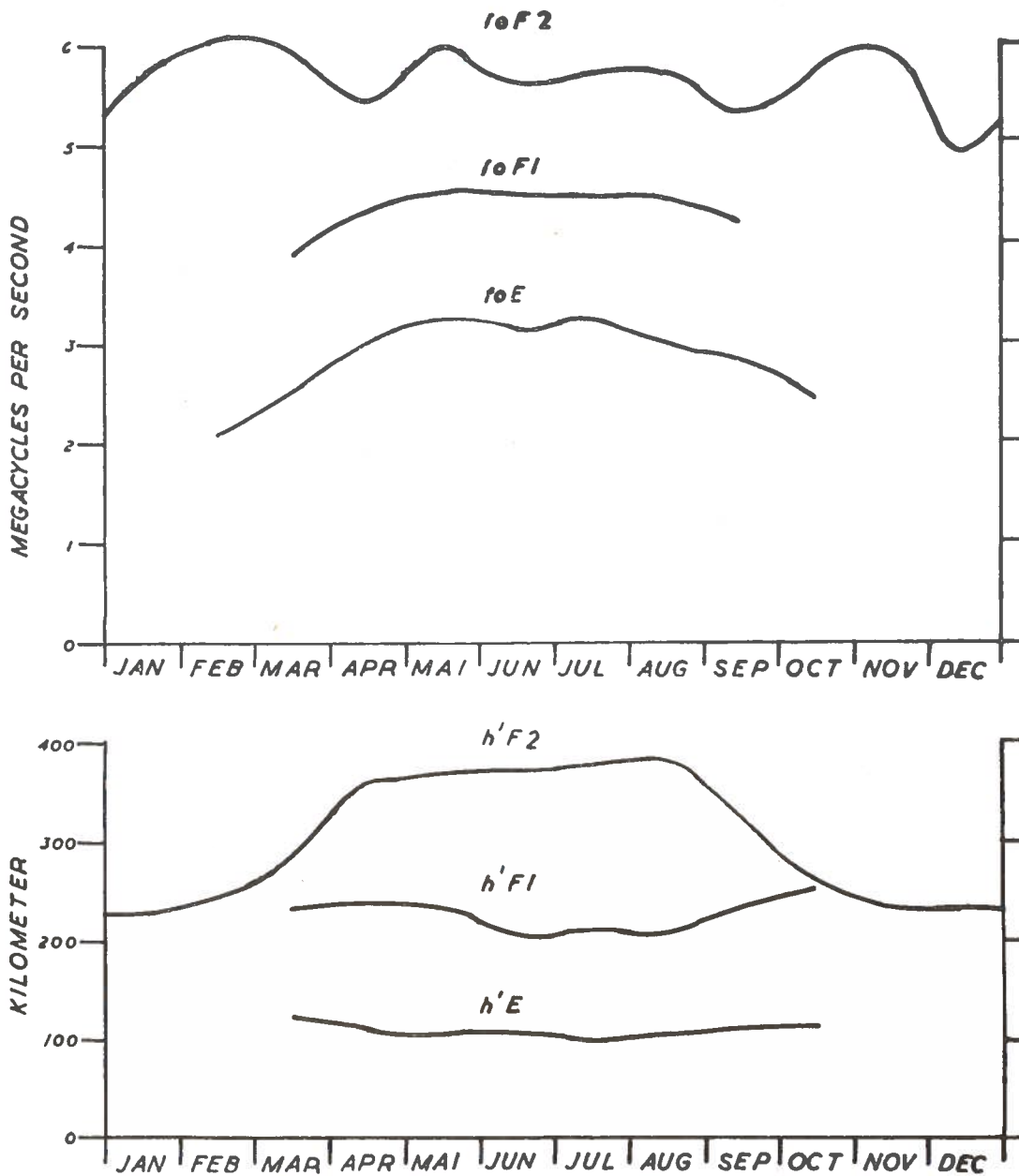
The results of the spectrograms taken with spectrograph (V) during the winter 1950/51 are given in paper (33) of the list.

On December 3, 1951 a series of auroral spectrograms were taken in rapid succession with the new spectrograph (F). They showed very remarkable variations with regard to intensity distribution, and very pronounced variability effects of the H_{β} -line were observed. A preliminary description of these spectrograms and the variability effects were given in a note to Nature (Vol. 170 p. 536).

L. Vegard.

RADIO ECHO OBSERVATIONS

Radio echo observations were started at The Auroral Observatory during The Second Polar Year 1932—33 by a British Expedition from The National Physical Laboratory under the supervision of sir Edward Appleton and simultaneously by a German Expedition from the Heinrich Herz Institute, Berlin. The main aim for these two expe-



Monthly Median Noon-Values (12 h Meet) 1931 for the Critical Frequencies and the Virtual Heights for the E-Layer, F1-Layer and F2-Layer.

ditions was to investigate the influence of earthmagnetic storms and aurorae on the conditions of the ionosphere. Tromsø, which is lying close to the auroral zone, and during stronger storms even below the zone, is especially suited for such studies. On account of the close relationships between disturbances within the appearance of aurorae and earthmagnetic storms The Norwegian Institute of Cosmical Physics decided that a recording station for radio echosounding should be maintained at the Auroral Observatory.

A recording instrumental equipment was put up in the spring 1935, and since then records have been made more or less regularly. During the war-time 1940—45 some periods are lacking. Up to 1950 a semi-automatic equipment was used and regular records of h'f-curves were limited to be taken at local noon. From 1950 a fullautomatic echo-recorder has been in use and hourly records of h'f-curves are now taken. Short notes giving the summary of the mean monthly values of the critical frequencies have been published in the *Journal of Terrestrial Magnetism and Atmospheric Electricity*. In future a detailed account of the hourly values recorded will be given in a form presented in the following report.

L. Harang.

EARTH MAGNETISM 1951, 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 J. Frøshaug. The reading of the hourly values was performed by S. Berger and the calculation work by Aashild Berger and Solfrid Sackariassen.

SCALE VALUES.

The following scale values were determined:

D-curves: 1.50 or 4.88 *y* per mm.

H-curves:5.38 *y* per mm.

V-curves:7.25 *y* per mm.

OBSERVED AND ADOPTED BASE-LINE VALUES. 1951

<i>D</i>			<i>H</i>			<i>V</i>		
Date	Observ.	Adopt.	Date	Observ.	Adopt.	Date	Observ.	Adopt.
I 9	1°49'.8W	1°49'.7W	I 4	11229	11230	I 12	50458	50450
19	49.2	.7	17	30	30	23	46	50
26	50.2	.7	25	30	30	27	55	50
II 16	49.2	.7	II 9	30	30	II 17	49	50
21	48.6	.7	20	30	30	23	57	50
III 5	50.8	.7	III 15	34	33	III 8	44	50
29	49.5	.7	28	33	33	21	55	50
IV 11	49.9	.7	IV 12	32	33	IV 7	46	50
30	49.1	.7	24	33	33	14	53	50
V 8	49.5	.7	V 9	38	35	25	47	50
VI 12	49.7	.7	21	31	35	V 2	47	50
25	50.8	.7	24	29	35	9	48	50
VII 30	49.2	.7	VI 4	34	35	19	49	50
VIII 10	49.2	.7	14	35	35	VI 6	50	43
31	48.7	.7	28	38	35	22	39	43
X 12	48.4	.7	VII 29	35	35	VII 25	38	43
26	50.1	.7	VIII 5	42	40	VIII 13	43	43
31	49.3	.7	25	41	40	28	43	43
XI 15	52.3	.7	X 10	40	40	IX 1	43	43
19	51.0	.7	24	39	40	X 12	43	43
30	49.1	.7	XI 1	39	35	23	40	43
XII 11	49.2	.7	13	36	35	XI 6	57	52
19	49.4	.7	26	36	35	17	43	52
			XII 14	34	35	22	54	52
			19	40	35	XII 18	52	52

BASE-LINE VALUES.

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

Control measurements in Rude Skov, Denmark, in may 1952 stated that we made a mistake in the yearbook of 1950 when trusting in the observations of BMZ 39 instead of those of BMZ 57. The difference $+ 18 \gamma$ should be added to every value of the Vertical Intensity for the year 1950.

The quiet mean Inclination value for 1951 was calculated to $77^{\circ} 34.6'$.

The temperature coefficient for the H-variometer is 7.3γ and for the V-variometer $\div 1.3 \gamma$ per degree Celsius.

EXPLANATION OF 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 quite hourly values.

The second series of tables gives the hourly values of the Storminess («averages perturbing force» or «activity»). As to the 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 400γ , character number 1 from 400γ to 1200γ and character number 2 greater than 1200γ . 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.

J. Frøshaug.

EARTH MAGNETISM BEAR ISLAND

A magnetic station has been established on Bear Island as a supplement to the meteorological station there.

$$\varphi = 74.5 \text{ N. } \lambda = 19.0 \text{ E.}$$

A variometer-house was built in 1948, and varimeters of the La — Cour pattern set up. Another small house for magnetic measurements could be taken in use in 1950.

Magnetic measurements have had to be limited to short inspection periods in summertime.

The crew of the meteorological station is responsible for the magnetic registrations the quality of which has differed rather much from year to year. On a polar station with a crew not trained in magnetic work one can hardly avoid irregularities.

The few and scanty measurements are far from being sufficient to fix base-line values on the records, but variations in the elements can be studied and character figures determined.

Measurements with QHM 123 and BMZ 39 have given the results below, to be regarded as approximate yearly values for 1951.

$$D = 1^{\circ} 30' 3 \text{ E. } H = 9211 \text{ } y \text{ } V = 51 \text{ } 878 \text{ } y$$

To the measured values have been added rather small corrections based on a method worked out by J. Frøshaug, taking into account the mean difference between the elements recorded on Bear Island and Tromsø.

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

J. Frøshaug. E. Tønsberg.

K — INDICES FOR THREE-HOUR INTERVAL 1951

Bear Island.

Range 2000 γ for K = 9. Scala values: D = 5.9 γ H = 6.35 γ V = 20.5 γ .

Date	Jan.		Feb.		Mar.		Apr.		May		Jun.	
1	2201	3435	7634	2226	5544	4321	3211	1224	5555	3557	3333	442-
2	4553	3365	2210	1104	1113	3433	3442	3546	5345	5456	—4	5444
3	5642	2355	2100	1044	4243	2340	6664	4656	4433	4464	5333	3244
4	4320	0435	1003	3433	0332	2235	5554	5745	5434	4544	4323	3434
5	2211	2224	1333	4366	1132	3332	4-5	5466	2323	2223	3331	3324
6	3211	—	6543	3313	2445	4333	4664	4564	6552	4353	3455	5442
7	—	4300	2433	1354	3434	5434	5454	4544	3423	3244	3542	5424
8	2222	2134	2343	3645	3344	5566	5553	3465	3110	2243	5452	4433
9	3123	2122	5563	4565	5554	4466	3344	3454	2224	3446	3533	3411
10	3211	2555	6553	4456	6664	4464	5533	3353	3465	4454	2104	4243
11	5343	2245	6543	3556	6554	4562	4432	3304	3344	5345	4524	4454
12	3444	3354	6655	5356	3564	4464	6333	4346	3433	2452	3445	4344
13	3543	3164	44—	4465	4454	4465	6433	5544	3322	1233	2245	5335
14	3453	3545	3432	3355	5432	4465	3344	4343	3532	5435	3213	2157
15	3444	3366	2212	2345	5432	3100	3324	3442	5433	3445	6565	5554
16	6334	3566	2112	1143	0424	4366	2221	3224	6534	3344	5335	4434
17	4443	1154	2000	2333	3234	4635	5334	4221	5554	5443	3332	2445
18	2231	312-	5233	3353	4434	3335	1234	6355	4433	2223	7565	4443
19	—	4236	1223	3345	5433	2343	5334	4235	4432	4343	5533	4454
20	5321	3201	3312	2101	3112	4344	4444	3555	3433	3333	3312	2015
21	0001	3546	2442	3354	1012	2323	6654	44—	2322	3333	3343	4333
22	5554	5667	5454	4555	3443	4656	—5	6644	3402	4333	3323	4434
23	5553	3565	5565	5567	5554	4566	2632	3404	3425	4356	5432	2224
24	3433	2364	4555	4433	4434	3456	2444	6444	6344	4434	2213	4243
25	2223	3266	3456	3343	4534	3425	6554	3433	3233	4323	2455	6454
26	2221	3545	4665	4665	5534	3465	5242	2222	4424	4655	4453	4433
27	4443	3445	6463	5423	5433	2434	1122	4424	6534	2224	3443	4432
28	4443	3565	4563	3365	2201	3212	4322	3332	3322	3221	3333	3333
29	2424	3335			2654	4334	2413	4422	2334	3424	3422	4354
30	4333	1345			5323	3112	1120	1001	3324	4324	4444	3253
31	4634	3446			2221	3332			3333	1144		
Date	Jul.		Aug.		Sept.		Oct.		Nov.		Dec.	
1	5415	5545	5424	3446	4222	3214	3222	2224	1020	1024	3333	3445
2	6466	—	5633	—	3221	1123	5553	3224	4543	4544	3443	4434
3	—5	5345	—	4233	4322	3124	3213	3254	3533	4356	4333	—35
4	4553	3454	3523	4334	4321	3233	2201	1153	5433	4525	3433	4666
5	4443	3333	5432	3435	3314	3233	2010	1242	4333	2256	4433	3444
6	3333	4344	2222	4424	5343	2255	3200	0002	4343	4553	2211	2054
7	4322	2355	3434	2345	3312	2253	2333	4643	6633	3544	2323	3354
8	5321	—	4422	3043	2431	3344	5654	5536	5322	—	6444	5464
9	—3	3343	4224	3432	432-	5333	5-3	5347	—	3433	5544	5664
10	4331	2134	5423	3124	—	5544	3554	3655	3211	1000	3444	4664
11	2333	4443	3333	4334	—	445	5454	4540	0000	2335	—	4565
12	4422	4333	4344	5445	3544	5454	2534	3312	6343	5523	4343	3345
13	5342	2133	3454	4445	4442	4555	2534	4234	2443	4565	3312	2225
14	3223	3334	2243	3324	4543	3552	5432	3565	6554	5655	3220	0036
15	3432	3345	4433	3543	5444	5454	3532	2356	5553	5443	5433	3463
16	3524	4343	3355	2212	5544	6657	5453	—	4443	4553	4433	3425
17	3442	3543	3221	3432	6454	6545	—	5565	2233	3265	343-	5455
18	3444	6445	23—	1111	6643	3653	4544	5655	3222	1055	6544	—
19	3333	2333	2224	5332	3233	4543	5544	4555	3422	2436	—	6566
20	3533	3322	6553	3346	4555	7554	5333	4346	3311	3465	4534	1234
21	2333	1232	4554	4554	6554	—	3544	3354	3321	1054	4212	2205
22	3544	3434	6554	4343	—	5655	3433	5553	6422	2255	4534	4655
23	5533	1234	3234	—	5654	—	4433	3545	4433	—	5434	3430
24	3332	3231	—	3344	—	5454	3222	0033	—	-633	2110	1044
25	2333	—	4444	4553	4455	—	3100	0000	4434	4445	3301	0204
26	—	3433	3454	4355	—	—	1234	3226	4432	4463	1001	1231
27	5543	3334	4444	4545	—	4334	4533	3323	4322	1024	0432	3027
28	5544	5543	4333	3453	5322	3203	2334	7664	3452	5364	5555	4455
29	4433	3334	4334	4524	3332	4554	3344	3212	3544	4666	5212	3222
30	4334	4444	4203	3334	3443	3331	2233	2001	5344	4534	0031	3125
31	5554	4546	2333	5325			1200	0001			4455	4566

K-INDICES FOR THREE-HOUR INTERVAL 1951

Tromsø.

Range 2000 γ for K = 9. Scala values: D = 4.88 γ H = 5.38 γ V = 7.25 γ .

Date	Jan. 1		Feb. 7		Mar. 12		Apr. 10		May 6		Jun. 1	
1	4211	3334	6534	3266	5543	4312	3310	1246	5443	3557	2223	4544
2	4443	4465	3210	2024	1012	3225	4423	5565	6245	5576	4544	5456
3	4531	2234	3010	0033	4132	2230	6664	5666	5334	5566	6212	4233
4	1200	0334	1013	4532	0231	2216	5644	5557	7535	5463	3212	3445
5	2201	2366	1212	5356	1021	2231	7644	4466	1222	1216	3222	3433
6	3100	0032	6632	2213	1333	4453	5554	5467	6332	3263	4344	4443
7	0100	0013	3321	1244	4523	5466	7634	4456	2323	3245	4531	4325
8	3012	3300	4212	2666	4334	5776	6533	4466	4001	3232	6632	4455
9	1110	1012	5543	5566	5544	3556	3334	3444	3213	3456	6523	3300
10	3100	1554	5553	3356	7654	4466	6632	4353	4454	6554	1014	3234
11	6332	1346	6532	2557	7444	5574	4531	3225	3334	4455	4313	3444
12	5443	3344	6643	4556	5444	5464	6423	4447	4442	2542	5324	3254
13	5543	2154	5544	4465	5434	5776	7435	6446	3211	1134	3133	5334
14	5332	4465	4322	2255	5544	5675	5444	4244	4522	3145	2102	1456
15	5432	3256	1111	1134	6422	3100	4003	3443	5522	2245	6444	5564
16	4223	3467	1110	0043	1223	3365	4000	2216	6634	3335	5325	4434
17	5331	1133	1000	1364	4144	3435	5322	3223	6545	5555	4221	1446
18	2111	2225	5212	4453	4323	3354	1235	6677	5523	1225	7654	4333
19	5321	2155	2212	2236	5322	1223	7223	3336	4322	3224	4644	4533
20	5311	2213	5211	1001	2003	4321	6532	5666	2432	2233	3212	2015
21	0002	4666	2322	2343	0001	2235	6645	5436	2102	2244	3221	3423
22	6554	5566	6444	6677	5424	3756	5634	4664	3312	4423	4213	4344
23	6343	4466	6555	5677	6444	4576	6622	3203	4315	5376	5411	2123
24	2322	3234	5554	4565	5424	3575	1335	5666	5323	4434	2113	2233
25	3111	2144	5433	2357	5624	3346	7655	3554	2222	3226	4334	5654
26	2010	1564	2332	4564	6523	4375	5321	2330	6223	4555	4333	3233
27	4433	2345	7453	5434	6523	2324	0121	3445	7723	1113	3322	3332
28	4532	3465	5664	3355	3201	1202	4212	2222	2312	2110	4232	2244
29	3323	2336			1334	5546	5512	3500	1233	3426	4212	3344
30	5321	1345			5213	2113	0001	1002	4024	4234	4333	2243
31	6665	3566			2011	2433			3313	1123		
Date	Jul. 2		Aug. 8		Sep. 19		Oct. 16		Nov. 4		Dec. 6	
1	5302	5766	5313	3457	4221	2113	—1	1344	3010	1124	3332	3355
2	7564	4534	5633	3335	4100	1103	5542	2235	3331	3544	4322	3443
3	5543	5446	4213	3024	3012	4115	2112	2144	4533	4476	5312	3346
4	5543	3356	5522	4446	4311	3223	1000	0054	5642	4455	4323	5556
5	6333	4334	5412	3343	3113	2244	3000	0243	5522	1346	4322	2335
6	3222	4344	4121	4433	5232	2245	4100	0012	4122	5575	2100	1143
7	4222	2355	3313	2345	4102	1354	2211	5555	6623	3444	2201	3455
8	4211	2145	4312	2023	1220	3344	7754	5557	5301	1242	6545	5565
9	5622	3343	4123	4324	4313	5545	5534	4457	2233	5445	5636	6674
10	5221	1133	3233	4125	6454	5542	5544	4776	3200	0100	3544	4567
11	222—	—	3223	5454	522—	—	5343	3542	0000	1255	5444	4456
12	—2	3335	5334	5456	—4	5556	2323	3353	6444	4434	3232	4255
13	6222	2122	4654	5663	6553	5555	3434	4356	3323	4655	2221	1124
14	3112	3214	2213	3355	6643	3353	6322	2464	6443	4565	3110	0046
15	4311	2346	4332	3454	5443	5554	4322	1166	5534	4554	6332	4464
16	3513	4443	3335	2213	6655	6677	5433	3456	5332	3443	5331	2234
17	4334	4433	2121	3454	7545	5547	7755	4667	3122	2376	3412	5556
18	3423	5534	3231	0003	6633	3563	6663	4677	4322	1145	4543	3546
19	3322	2454	2223	4543	3222	5766	6754	3767	2311	1325	4433	4555
20	5512	3242	6653	4466	6755	5776	6433	3375	4201	1456	5523	3334
21	2222	2323	7544	6656	7656	5677	5422	3364	4211	0045	3100	1206
22	3543	4455	7754	4364	6654	5565	6423	4665	5211	2344	5523	5777
23	6433	3244	5223	3467	6654	5477	5223	3435	5323	4455	5423	3332
24	3222	3231	6644	4356	7664	5465	3110	0024	5431	3554	2000	0033
25	1223	4445	5645	4464	5435	6777	2000	0000	5323	4456	3100	0213
26	5454	4656	5554	4477	7732	2434	0113	2136	4311	4453	0000	0020
27	6522	3356	5433	5576	6644	4235	4432	3111	4111	1134	0221	2116
28	5644	4564	4324	3366	6221	2103	1233	7775	3332	4457	6665	6674
29	4433	3345	5423	3444	4121	4765	4233	3111	4433	4556	5101	3323
30	5223	3445	3102	2444	5432	2223	1232	2010	6122	4354	0022	1115
31	5535	5656	3133	6546			0100	1003			4334	4566

DAYLY SUM OF K-INDICES 1951
Tr. means Tromsø. B. I. means Bear Island.

Date	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.	
	Tr.	Bl.	Tr.	Bl.	Tr.	Bl.	Tr.	Bl.	Tr.	Bl.	Tr.	Bl.	Tr.	Bl.	Tr.	Bl.	Tr.	Bl.	Tr.	Bl.	Tr.	Bl.	Tr.	Bl.
1	21	20	35	32	27	28	20	16	36	40	26	24	34	34	31	32	16	20	13	19	12	10	27	28
2	34	34	14	11	16	19	34	31	40	37	37	—	38	—	31	—	10	15	28	29	26	33	25	29
3	24	32	10	12	17	22	45	43	37	32	23	27	36	—	19	—	16	20	17	23	36	32	27	—
4	13	21	19	17	17	20	41	40	38	33	24	26	34	33	32	27	19	21	10	15	35	31	33	35
5	22	16	25	29	12	18	41	—	17	19	22	22	29	27	25	29	20	22	12	12	28	28	24	29
6	9	—	25	28	24	28	41	39	28	33	30	32	24	27	22	22	25	29	8	7	31	31	12	17
7	5	—	20	25	35	30	39	35	24	25	27	29	25	26	24	31	20	21	26	28	32	34	22	17
8	12	18	29	30	39	36	37	36	15	16	35	30	20	—	17	22	19	24	45	39	18	—	41	37
9	7	16	39	39	37	39	28	30	27	27	22	23	28	—	23	24	30	26	37	—	28	—	43	39
10	19	24	35	38	42	40	32	30	37	35	18	20	18	21	23	24	35	—	42	36	6	8	38	35
11	28	28	35	37	40	37	40	25	31	31	26	32	—	26	28	26	—	—	29	31	13	13	36	—
12	30	30	39	41	36	36	34	32	27	26	28	31	—	25	35	33	—	34	24	23	33	31	26	29
13	29	29	37	—	41	36	39	34	16	19	25	29	19	23	39	33	39	33	32	27	31	33	15	20
14	32	32	25	28	41	33	31	28	26	29	21	24	17	23	25	23	33	31	29	33	37	41	15	16
15	30	33	13	21	18	18	21	25	27	31	38	41	24	27	28	29	35	35	25	29	35	34	32	31
16	31	36	15	15	25	29	15	18	33	32	30	31	27	28	22	23	48	41	33	—	27	27	23	28
17	20	26	15	10	28	30	22	24	40	35	24	26	28	28	22	20	42	39	47	—	26	26	31	33
18	16	16	26	27	27	29	36	29	25	23	35	38	29	34	12	—	35	36	45	38	22	20	34	—
19	24	—	20	23	20	27	29	29	22	27	33	33	25	23	25	23	33	27	45	37	18	26	33	—
20	18	17	11	13	15	22	39	30	21	25	16	17	24	24	40	34	48	40	34	31	23	26	28	26
21	24	19	21	25	13	14	39	—	17	21	20	26	18	19	43	36	49	—	29	31	17	19	13	18
22	42	43	44	37	36	35	38	—	22	22	25	26	33	30	40	34	42	—	36	31	20	28	41	36
23	36	37	46	44	40	40	24	23	34	32	19	24	29	26	32	—	44	—	27	31	31	—	25	26
24	21	28	39	33	35	33	35	32	28	32	17	21	18	20	38	—	43	—	11	15	30	—	8	13
25	17	26	32	31	33	30	40	33	21	23	34	35	25	—	—	38	44	—	2	4	32	32	10	13
26	19	24	29	42	35	35	19	21	32	34	24	30	39	—	41	33	32	—	17	23	25	30	2	9
27	28	31	35	33	27	28	20	20	25	28	21	27	32	30	38	34	34	—	19	26	16	18	15	21
28	32	32	37	35	11	13	17	22	12	18	23	24	38	35	31	28	17	20	35	35	31	32	46	38
29	25	26	—	—	31	31	21	22	24	25	23	27	29	27	29	29	30	29	18	22	34	38	18	19
30	24	26	—	—	18	20	4	6	23	25	24	29	28	30	20	22	23	24	11	13	27	32	12	15
31	43	34	—	—	16	18	—	—	17	22	40	40	40	38	31	26	—	—	5	4	—	—	35	39

OZONE OBSERVATIONS

The first observations on atmospheric ozone at The Auroral Observatory, Tromsø, were undertaken by Dr. Dobson and Dr. Meetham in the summer of 1934.

In July 1935 we started regular observations on direct sun by means of a Dobson spectrograph kindly lent out to the observatory. Since August 1939 a Dobson spectrophotometer has been used.

The observational data up to the end of 1942 were published in *Geofysiske Publikasjoner* Vol. XIII No. 12, Oslo 1944. The observations of the years 1943 to 1949 will probably soon be printed.

In August 1950 we had the spectrophotometer back from Dr. Dobson furnished with a photomultiplier, and thus much more sensitive than earlier. In spite of that we have omitted printing of values of November, December and January on account of mistrusting to the method of evaluation of sky-observations, it may not be usable for those months.

E. Tønsberg.

TABLE OF OZONE VALUES

Unit 0.001 cm.

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

Day	Aug. 1950	Sep. 1950	Oct. 1950	Feb. 1951	Mar. 1951	Apr. 1951
	M. N. R.	M. N. R.	M. N. R.	M. N. R.	M. N. R.	M. N. R.
1	—	184 1	183 2 6	232 3 5	298 3 11	350 1
2	—	200 6 6	183 1	317 2 37	261 2 15	320 6 11
3	—	202 2 3	199 1	295 1	305 2 11	314 5 5
4	—	202 1	235 1	280 1	300 1	317 5 4
5	—	198 4 4	235 1	358 2 5	305 3 23	331 6 11
6	—	202 3 4	217 2 8	293 2 4	292 5 9	333 5 4
7	—	210 4 3	219 2 10	335 3 27	296 4 8	323 6 11
8	—	211 4 5	216 2 9	296 3 15	326 3 5	338 1
9	—	212 3 1	212 2 5	313 3 10	353 4 25	351 3 2
10	—	209 2 0	213 1	330 1	305 3 16	331 6 3
11	—	205 1	246 2 12	333 1	339 1	329 5 7
12	—	213 2 14	235 1	331 3 25	368 5 7	331 3 2
13	206 5 2	221 1	226 2 2	316 3 21	376 10 21	316 4 8
14	206 1	216 1	188 2 5	318 3 7	358 2 3	317 3 3
15	222 7 9	213 2 2	170 1	335 3 28	368 6 12	307 1
16	209 2 0	214 1	160 1	365 1	357 3 11	337 5 6
17	204 1	228 2 12	178 1	357 3 3	380 3 0	322 5 13
18	—	204 2 5	162 1	346 1	388 1	343 2 1
19	201 2 2	206 3 4	170 1	332 5 6	383 4 19	345 3 11
20	203 3 5	207 2 1	170 1	342 5 3	365 6 11	352 1
21	210 2 0	205 1	193 1	332 6 7	362 5 12	368 3 18
22	214 2 2	188 2 4	240 1	323 5 11	363 2 10	366 1
23	—	199 2 0	215 1	332 6 15	395 1	313 3 19
24	—	202 1	214 2 12	345 4 13	380 1	306 5 7
25	—	201 2 4	209 2 8	316 1	367 1	312 4 5
26	—	216 1	193 1	318 3 6	358 1	291 4 8
27	—	218 2 4	205 2 6	347 3 23	393 4 6	285 7 5
28	—	204 1	191 2 22	327 2 2	360 10 13	265 3 5
29	—	211 1	182 1	—	362 6 3	290 1
30	—	190 2 11	165 2 6	—	329 8 10	275 2 9
31	204 2 4	—	155 2 10	—	346 6 2	—
Mean	208	206	199	324	346	323

TABLE OF OZONE VALUES

Unit 0.001 cm.

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

Day	May 1951	Jun. 1951	Jul. 1951	Aug. 1951	Sep. 1951	Oct. 1951
	M. N. R.	M. N. R.	M. N. R.	M. N. R.	M. N. R.	M. N. R.
1	309 1	290 1	255 1	223 8 17	191 1	204 1
2	314 2 3	271 2 1	250 1	214 4 4	195 2 26	201 2 4
3	324 1	263 2 5	255 3 6	240 2 3	199 3 6	203 1
4	300 4 4	276 2 11	248 2 6	222 2 5	211 2 1	204 1
5	314 2 2	292 2 8	251 1	188 2 2	211 3 2	169 2 1
6	323 15 11	296 2 12	249 2 18	198 6 7	224 2 8	194 1
7	315 17 11	283 1	255 3 4	208 2 3	224 1	176 1
8	316 9 7	290 3 12	247 3 6	190 3 5	222 2 4	172 2 10
9	330 4 17	295 2 8	251 1	196 3 6	228 1	158 1
10	275 6 12	291 2 4	249 2 5	206 4 12	214 2 8	162 2 3
11	311 2 10	292 3 4	246 5 5	205 2 2	206 1	185 1
12	302 4 8	312 1	248 2 4	199 2 11	201 2 0	167 1
13	281 1	283 7 19	264 2 6	202 2 1	194 2 2	174 3 12
14	292 1	288 2 36	235 2 28	199 5 7	196 1	174 1
15	297 1	308 2 6	239 2 1	220 1	215 1	163 2 7
16	304 2 6	278 2 15	241 3 8	221 3 6	221 1	212 1
17	280 1	261 2 8	222 2 12	219 3 10	226 3 4	222 1
18	—	262 8 8	222 3 3	226 3 4	233 1	208 1
19	293 1	262 3 4	236 2 4	216 1	231 1	221 2 4
20	—	257 3 5	243 3 4	209 4 6	—	234 2 9
21	293 2 6	253 3 4	243 4 5	217 3 1	201 1	249 2 2
22	276 3 13	247 4 7	239 2 12	217 6 4	196 2 10	267 1
23	294 3 2	249 7 5	237 13 17	217 6 6	186 1	271 2 18
24	276 3 4	248 2 3	226 5 15	231 2 18	184 2 5	263 2 1
25	278 3 2	239 3 10	226 6 7	202 2 2	181 1	256 2 7
26	292 4 17	240 5 8	218 2 2	222 1	184 2 1	242 2 0
27	300 1	233 8 7	222 2 3	202 4 6	189 2 6	213 2 8
28	285 4 2	265 3 9	230 1	198 2 2	167 2 4	172 1
29	270 11 11	256 2 7	244 3 4	—	174 1	—
30	254 2 4	250 2 2	251 2 13	188 1	201 1	182 2 13
31	270 2 6	—	247 3 5	192 2 18	—	187 2 11
Mean	295	271	242	210	204	204

Tromsø. Declination. D = 1° W + Tabular Quantities expressed in Tenths of Minutes. Gr. M. T.

JANUARY 1951. HOURLY MEAN VALUES. Table with columns for DAY (1-31), M, R, and 25 numbered columns of magnetic data.

FEBRUARY. Table with columns for DAY (1-28), M, R, and 25 numbered columns of magnetic data.

MARCH. Table with columns for DAY (1-31), M, R, and 25 numbered columns of magnetic data.

Tromsø.

Declination. Storminess. (+ W) Unit Gamma.

Gr. M. T.

JANUARY 1951.

HOURLY MEAN VALUES

Table for January 1951 showing hourly mean values for declination, storminess, and unit gamma. Columns include Day (1-31), M, PS, NS, AS, MPS, and MNS.

FEBRUARY.

Table for February showing hourly mean values for declination, storminess, and unit gamma. Columns include Day (1-28), M, PS, NS, AS, MPS, and MNS.

MARCH.

Table for March showing hourly mean values for declination, storminess, and unit gamma. Columns include Day (1-31), M, PS, NS, AS, MPS, and MNS.

Tromsø. Declination, D = 1° W + Tabular Quantities expressed in Tenths of Minutes. Gr. M. T.

APRIL 1951.

HOURLY MEAN VALUES

Table with columns DAY, 1-25, M, R. Rows 1-30 and summary rows M, QM.

MAY.

Table with columns DAY, 1-25, M, R. Rows 1-30 and summary rows M, QM.

JUNE.

Table with columns DAY, 1-25, M, R. Rows 1-30 and summary rows M, QM.

Tromsø. APRIL 1951.

Declination. Storminess. (+ W) Unit Gamma. HOURLY MEAN VALUES

Gr. M. T.

Table for April 1951 showing magnetic observations (Declination, Storminess, Unit Gamma) for each day from 1 to 30. Includes summary rows for M, MPS, and MNS.

MAY.

Table for May 1951 showing magnetic observations (Declination, Storminess, Unit Gamma) for each day from 1 to 31. Includes summary rows for M, MPS, and MNS.

JUNE.

Table for June 1951 showing magnetic observations (Declination, Storminess, Unit Gamma) for each day from 1 to 30. Includes summary rows for M, MPS, and MNS.

Tromsø. Declination. D = 1° W + Tabular Quantities expressed in Tenths of Minutes. Gr. M. T.

Table for July 1951 showing magnetic declination data. Columns include DAY (1-31), HOURLY MEAN VALUES (1-23), M, and R. Data rows include values for days 1 through 31, with summary rows M and QM.

Table for August 1951 showing magnetic declination data. Columns include DAY (1-31), HOURLY MEAN VALUES (1-23), M, and R. Data rows include values for days 1 through 31, with summary rows M and QM.

Table for September 1951 showing magnetic declination data. Columns include DAY (1-30), HOURLY MEAN VALUES (1-23), M, and R. Data rows include values for days 1 through 30, with summary rows M and QM.

Tromsø.

Declination. Storminess. (+ W) Unit Gamma.

Gr. M. T.

JULY 1951.

HOURLY MEAN VALUES

Table with columns DAY, 1-23, M, PS, NS, AS. Contains hourly magnetic observation data for July 1951 at Tromsø.

AUGUST.

Table with columns DAY, 1-23, M, PS, NS, AS. Contains hourly magnetic observation data for August 1951 at Tromsø.

SEPTEMBER.

Table with columns DAY, 1-23, M, PS, NS, AS. Contains hourly magnetic observation data for September 1951 at Tromsø.

Tromsø. Declination. D = 1° W + Tabular Quantities expressed in Tenths of Minutes. Gr. M. T.

Table for October 1951 showing hourly mean values for declination. Columns include Day (1-31), hours (1-24), and monthly totals (M, R). Values range from -185 to 163.

Table for November 1951 showing hourly mean values for declination. Columns include Day (1-30), hours (1-24), and monthly totals (M, R). Values range from -123 to 392.

Table for December 1951 showing hourly mean values for declination. Columns include Day (1-31), hours (1-24), and monthly totals (M, R). Values range from -117 to 813.

Tromsø.

Declination, Storminess, (+ W) Unit Gamma.

Gr. M. T.

OCTOBER 1951.

HOURLY MEAN VALUES

Table for October 1951 showing hourly mean values for Declination, Storminess, and Unit Gamma. Columns include Day (1-31), M, PS, NS, AS.

NOVEMBER.

Table for November 1951 showing hourly mean values for Declination, Storminess, and Unit Gamma. Columns include Day (1-30), M, PS, NS, AS.

DECEMBER.

Table for December 1951 showing hourly mean values for Declination, Storminess, and Unit Gamma. Columns include Day (1-31), M, PS, NS, AS.

Tromsø. Horizontal Intensity. $H = 11100 + \text{Tabular Quantities expressed in Gamma.}$ Gr. M. T.

JANUARY 1951. HOURLY MEAN VALUES

Table for January 1951 showing magnetic intensity data. Columns include Day (1-31), Hourly values (1-23), M, and R. Includes summary rows for M and QM.

FEBRUARY.

Table for February showing magnetic intensity data. Columns include Day (1-28), Hourly values (1-23), M, and R. Includes summary rows for M and QM.

MARCH.

Table for March showing magnetic intensity data. Columns include Day (1-31), Hourly values (1-23), M, and R. Includes summary rows for M and QM.

Tromsø.

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

Gr. M. T.

JANUARY 1951.

HOURLY MEAN VALUES

Table with columns DAY, 1-23, M, PS, NS, AS, CH. Rows 1-31 for January 1951, showing magnetic intensity and storminess data.

FEBRUARY.

Table with columns DAY, 1-23, M, PS, NS, AS, CH. Rows 1-28 for February 1951, showing magnetic intensity and storminess data.

MARCH.

Table with columns DAY, 1-23, M, PS, NS, AS, CH. Rows 1-31 for March 1951, showing magnetic intensity and storminess data.

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

Table for APRIL 1951. Columns: DAY (1-30), 1-25, M, R. Rows: Daily magnetic intensity values and monthly totals (M, QM).

Table for MAY 1951. Columns: DAY (1-31), 1-25, M, R. Rows: Daily magnetic intensity values and monthly totals (M, QM).

Table for JUNE 1951. Columns: DAY (1-30), 1-25, M, R. Rows: Daily magnetic intensity values and monthly totals (M, QM).

Tromsø.

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

Gr. M. T.

APRIL 1951.

HOURLY MEAN VALUES

Table for April 1951 showing hourly mean values for horizontal intensity and storminess. Columns include Day (1-30), hours (1-24), and summary statistics (M, PS, NS, AS, CH). Summary values: M -218, PS 908, NS 1685, AS 2593, CH 1.8.

MAY.

Table for May 1951 showing hourly mean values for horizontal intensity and storminess. Columns include Day (1-31), hours (1-24), and summary statistics (M, PS, NS, AS, CH). Summary values: M -169, PS 692, NS 1224, AS 1916, CH 1.7.

JUNE.

Table for June 1951 showing hourly mean values for horizontal intensity and storminess. Columns include Day (1-30), hours (1-24), and summary statistics (M, PS, NS, AS, CH). Summary values: M -127, PS 729, NS 821, AS 1550, CH 1.6.

Tromsø.
JULY 1951.

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

Gr. M. T.

HOURLY MEAN VALUES

Table with columns DAY, 1-25, M, R for July 1951. Contains hourly magnetic intensity data for Tromsø.

AUGUST.

Table with columns DAY, 1-25, M, R for August 1951. Contains hourly magnetic intensity data for Tromsø.

SEPTEMBER.

Table with columns DAY, 1-25, M, R for September 1951. Contains hourly magnetic intensity data for Tromsø.

Tromsø.

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

Gr. M. T.

Table for July 1951 showing hourly mean values for magnetic intensity and storminess. Columns include Day (1-31), M, PS, NS, AS, CH, and summary rows for M, MPS, and MNS.

AUGUST.

Table for August 1951 showing hourly mean values for magnetic intensity and storminess. Columns include Day (1-31), M, PS, NS, AS, CH, and summary rows for M, MPS, and MNS.

SEPTEMBER.

Table for September 1951 showing hourly mean values for magnetic intensity and storminess. Columns include Day (1-30), M, PS, NS, AS, CH, and summary rows for M, MPS, and MNS.

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

OCTOBER 1951.

HOURLY MEAN VALUES

Table for October 1951 showing hourly mean values for horizontal intensity. Columns include Day (1-31), hours (1-23), and monthly totals (M, QM) for M and R.

NOVEMBER.

Table for November 1951 showing hourly mean values for horizontal intensity. Columns include Day (1-30), hours (1-23), and monthly totals (M, QM) for M and R.

DECEMBER.

Table for December 1951 showing hourly mean values for horizontal intensity. Columns include Day (1-31), hours (1-23), and monthly totals (M, QM) for M and R.

Tromsø.

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

Gr. M. T.

OCTOBER 1951.

HOURLY MEAN VALUES

Table with columns DAY, 1-23, M, PS, NS, AS, CH. Contains hourly magnetic intensity data for October 1951.

NOVEMBER.

Table with columns DAY, 1-23, M, PS, NS, AS, CH. Contains hourly magnetic intensity data for November 1951.

DECEMBER.

Table with columns DAY, 1-23, M, PS, NS, AS, CH. Contains hourly magnetic intensity data for December 1951.

Tromsø.

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

Gr. M. T.

JANUARY 1951.

HOURLY MEAN VALUES

Table for January 1951 showing magnetic observations. Columns include Day (1-31), hours (1-24), and values for M, PS, NS, AS. Includes summary rows for M, PS, NS, AS and MPS/MNS.

FEBRUARY.

Table for February 1951 showing magnetic observations. Columns include Day (1-28), hours (1-24), and values for M, PS, NS, AS. Includes summary rows for M, PS, NS, AS and MPS/MNS.

MARCH.

Table for March 1951 showing magnetic observations. Columns include Day (1-31), hours (1-24), and values for M, PS, NS, AS. Includes summary rows for M, PS, NS, AS and MPS/MNS.

Tromsø. APRIL 1951.

Vertical Intensity. V = 50618 + Tabular Quantities expressed in Gamma. HOURLY MEAN VALUES

Gr. M. T.

Table for April 1951 showing hourly mean values for vertical intensity. Columns include Day (1-30), hours (1-24), and magnetic intensity (M, R).

MAY.

Table for May 1951 showing hourly mean values for vertical intensity. Columns include Day (1-31), hours (1-24), and magnetic intensity (M, R).

JUNE.

Table for June 1951 showing hourly mean values for vertical intensity. Columns include Day (1-30), hours (1-24), and magnetic intensity (M, R).

Tromsø.

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

Gr. M. T.

APRIL 1951.

HOURLY MEAN VALUES

Table with columns DAY, 1-23, M, PS, NS, AS. Contains magnetic observation data for April 1951.

MAY.

Table with columns DAY, 1-23, M, PS, NS, AS. Contains magnetic observation data for May 1951.

JUNE.

Table with columns DAY, 1-23, M, PS, NS, AS. Contains magnetic observation data for June 1951.

Tromsø. Vertical Intensity. V = 50618 + Tabular Quantities expressed in Gamma.

Gr. M. T.

JULY 1951.

HOURLY MEAN VALUES

Table for July 1951 showing hourly mean values for vertical intensity. Columns include Day (1-31), hours (1-24), and monthly totals (M, R). Values range from approximately -100 to 450 Gamma.

AUGUST.

Table for August showing hourly mean values for vertical intensity. Columns include Day (1-31), hours (1-24), and monthly totals (M, R). Values range from approximately -100 to 450 Gamma.

SEPTEMBER.

Table for September showing hourly mean values for vertical intensity. Columns include Day (1-30), hours (1-24), and monthly totals (M, R). Values range from approximately -100 to 450 Gamma.

Tromsø.
JULY 1951.

Vertical Intensity, Storminess (+ Down). Unit Gamma.
HOURLY MEAN VALUES

Gr. M. T.

Table with columns DAY (1-23), 1-23, M, PS, NS, AS. Rows 1-31 for July 1951. Includes summary rows M, MPS, MNS.

AUGUST.

Table with columns DAY (1-23), 1-23, M, PS, NS, AS. Rows 1-31 for August 1951. Includes summary rows M, MPS, MNS.

SEPTEMBER.

Table with columns DAY (1-23), 1-23, M, PS, NS, AS. Rows 1-30 for September 1951. Includes summary rows M, MPS, MNS.

Tromsø. Vertical Intensity. V = 50618 + Tabular Quantities expressed in Gamma. Gr. M. T.

Table for October 1951 showing hourly mean values for vertical intensity. Columns include Day (1-31), hours (1-24), and monthly totals (M, R). Values range from approximately 60 to 380 Gamma.

Table for November showing hourly mean values for vertical intensity. Columns include Day (1-30), hours (1-24), and monthly totals (M, R). Values range from approximately 60 to 310 Gamma.

Table for December showing hourly mean values for vertical intensity. Columns include Day (1-31), hours (1-24), and monthly totals (M, R). Values range from approximately 60 to 380 Gamma.

Tromsø.

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

Gr. M. I.

OCTOBER 1951.

HOURLY MEAN VALUES

Table for October 1951 showing hourly magnetic intensity values (DAY 1-31) and monthly totals (M, PS, NS, AS) for Tromsø.

NOVEMBER.

Table for November 1951 showing hourly magnetic intensity values (DAY 1-30) and monthly totals (M, PS, NS, AS) for Tromsø.

DECEMBER.

Table for December 1951 showing hourly magnetic intensity values (DAY 1-31) and monthly totals (M, PS, NS, AS) for Tromsø.

Resuming Tables.

Diurnal Variation.
QUIET VALUES.

Tromsø.

Declination. Unit Gamma. + West.

1951.	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	-5	-4	-3	-2	-1	0	1	3	5	6	7	7	6	4	3	1	0	-1	-2	-2	-2	-3
FEBRUARY	-5	-6	-7	-7	-6	-5	-3	0	3	5	7	8	7	5	4	3	3	3	3	2	0	-2	-3	-4
MARCH	-7	-8	-9	-10	-10	-9	-6	-3	1	5	9	12	14	13	10	6	4	3	3	2	1	-1	-3	-5
APRIL	-9	-12	-15	-18	-21	-23	-22	-16	-6	3	12	18	22	22	18	14	12	10	9	7	4	1	-2	-6
MAY	-16	-19	-23	-28	-30	-28	-23	-14	-3	9	19	24	25	23	20	18	16	15	14	12	9	4	-4	-11
JUNE	-11	-19	-31	-36	-36	-33	-26	-18	-9	1	12	21	27	29	28	25	22	20	18	15	10	5	0	-6
JULY	-21	-28	-32	-34	-33	-30	-25	-17	-10	-1	10	19	26	30	31	29	26	23	21	18	14	6	-5	-14
AUGUST	-23	-29	-32	-32	-30	-27	-23	-17	-8	2	14	23	26	25	23	21	21	22	21	19	15	7	-4	-14
SEPTEMBER	-22	-27	-29	-28	-25	-21	-16	-8	3	15	22	24	23	19	14	11	10	10	11	11	9	5	-3	-12
OCTOBER	-8	-9	-10	-10	-9	-7	-4	-1	3	7	10	12	12	10	8	6	5	5	4	2	0	-3	-5	-7
NOVEMBER	-2	-3	-4	-5	-5	-4	-3	-1	0	2	4	5	6	5	4	4	5	4	3	2	1	0	-1	
DECEMBER	-5	-5	-5	-5	-5	-4	-3	-2	-1	1	3	5	6	7	7	6	5	3	1	-1	-2	-3	-4	-5
MEAN	-11	-14	-17	-18	-18	-16	-13	-8	-2	4	10	15	17	16	15	12	11	10	9	8	5	2	-3	-7

Horizontal Intensity. Unit Gamma.

JANUARY	-3	-2	-1	0	2	2	1	0	-1	-2	-2	-1	0	0	0	1	2	3	3	2	1	0	-1	-3
FEBRUARY	-1	1	4	4	3	2	0	-2	-3	-2	0	2	3	4	4	3	2	1	0	-1	-2	-3	-4	-4
MARCH	2	3	3	2	1	-1	-4	-8	-9	-9	-8	-6	-4	-2	0	1	3	5	6	6	5	3	2	1
APRIL	5	7	8	7	5	1	-4	-9	-15	-20	-20	-17	-14	-10	-5	0	6	10	14	17	17	14	9	5
MAY	7	10	11	12	9	2	-7	-16	-24	-33	-32	-23	-15	-7	1	6	11	14	17	18	14	4	-1	2
JUNE	2	4	6	7	7	3	-6	-15	-23	-20	-16	-11	-6	2	10	15	14	12	9	4	0	-3	-2	0
JULY	8	7	5	3	0	-3	-6	-10	-14	-16	-16	-12	-6	-1	4	10	12	10	5	1	-1	0	3	7
AUGUST	2	4	6	4	2	-1	-4	-8	-15	-21	-17	-13	-8	-4	0	5	6	9	11	13	11	8	4	2
SEPTEMBER	9	11	13	13	11	8	2	-6	-14	-23	-26	-24	-20	-15	-10	-5	0	5	9	11	12	11	9	8
OCTOBER	0	0	2	4	5	5	2	-3	-8	-11	-12	-11	-8	-5	-2	1	3	5	7	8	8	7	5	2
NOVEMBER	-4	-3	-2	-1	0	1	1	0	-1	-2	-3	-3	-2	-1	1	3	4	5	4	2	0	-2	-3	-4
DECEMBER	-4	-2	-1	0	1	2	2	1	0	-1	-2	-1	0	1	3	4	5	5	3	1	-1	-2	-3	-4
MEAN	2	3	5	5	4	2	-2	-6	-11	-13	-13	-10	-7	-3	1	4	6	7	7	7	5	3	2	1

Vertical Intensity. Unit Gamma.

JANUARY	-6	-5	-5	-6	-7	-8	-8	-7	-5	-3	0	3	5	7	8	9	9	8	6	4	1	-2	-4	-5
FEBRUARY	-6	-5	-5	-6	-7	-8	-8	-7	-5	-2	2	6	9	10	10	9	7	4	2	0	-2	-2	-3	-5
MARCH	-3	-2	-2	-3	-5	-6	-6	-5	-3	0	2	4	6	7	8	7	5	4	3	3	0	-2	-2	-3
APRIL	-3	-2	-1	-1	-3	-5	-6	-6	-4	-3	-2	0	1	2	3	4	5	5	4	3	2	0	-1	-2
MAY	-2	-1	0	0	-1	-3	-4	-5	-4	-3	-2	0	1	2	4	5	6	6	5	3	1	-1	-2	-2
JUNE	-4	-3	-2	-1	0	1	1	0	-1	-2	-3	-2	-1	0	1	3	4	4	3	1	0	-1	-2	-3
JULY	-5	-6	-5	-3	-1	1	2	3	2	1	1	3	5	7	7	6	4	1	-1	-2	-3	-3	-3	-4
AUGUST	-3	-2	0	1	2	1	0	-1	-2	-3	-4	-3	1	6	7	6	3	2	2	3	2	0	-2	-3
SEPTEMBER	-3	-4	-5	-6	-7	-6	-5	-4	-3	-1	1	2	4	6	7	7	5	3	2	3	2	1	-1	-2
OCTOBER	-3	-4	-5	-6	-5	-4	-3	-2	-1	0	1	2	3	4	4	3	2	1	1	2	2	1	-1	-2
NOVEMBER	-2	-3	-5	-6	-7	-6	-5	-4	-2	-1	1	2	3	4	5	6	7	6	5	4	2	1	-1	
DECEMBER	0	-2	-3	-4	-5	-6	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	4	3	2	3	3	1
MEAN	-3	-3	-3	-3	-4	-4	-4	-4	-3	-2	-1	1	3	5	5	6	5	4	3	2	1	0	-1	-3

Monthly Means.

DECLINATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
DIRECT VALUES D 1 W+	-1.2	-3.4	-3.1	-4.6	-4.6	-3.7	-4.9	-6.2	-9.9	-9.6	-9.2	-10.2	-6.9
QUIET VALUES D 1 W+	0.3	-0.6	-1.2	-2.5	-3.4	-2.8	-4.0	-3.7	-6.2	-7.4	-6.5	-8.6	-3.9
RANGE (UNIT MINUTES)	84	116	113	158	119	91	104	113	147	118	117	105	115
QUIET RANGE (UNIT)	12	15	24	45	55	65	65	58	53	22	11	12	36
STORMINESS. MEAN (UNIT)	-6	-9	-7	-7	-4	-4	-3	-8	-12	-8	-9	-5	-7
DIURNAL SUM PS (UNIT)	118	154	195	277	231	177	189	144	216	148	151	131	178
NS	253	362	359	440	323	265	265	534	514	332	378	255	340
AS	371	516	554	717	554	442	454	478	729	480	529	386	518
HORIZONTAL INTENSITY													
DIRECT VALUES H 11100+	55	36	38	31	44	58	50	41	12	34	54	61	43
QUIET VALUES H 11100+	71	69	68	64	68	63	55	61	59	65	74	76	66
RANGE (UNIT)	513	751	677	812	680	609	650	746	840	640	654	638	683
QUIET RANGE	6	8	15	37	51	38	28	33	39	20	9	9	24
STORMINESS. MEAN (UNIT)	-16	-33	-29	-32	-22	-4	-5	-18	-46	-31	-20	-18	26
DIURNAL SUM PS (UNIT)	391	480	621	908	692	729	833	819	847	509	541	512	657
NS	765	1283	1325	1685	1224	821	947	1257	1953	1229	1015	736	1203
AS	1156	1763	1946	2593	1916	1550	1780	2076	2800	1738	1556	1448	1860
VERTICAL INTENSITY													
DIRECT VALUES V 50618+	43	51	71	77	80	75	82	79	88	94	84	75	75
QUIET VALUES V 50618+	56	59	69	74	74	65	67	67	79	88	89	88	75
RANGE (UNIT)	374	513	495	585	432	383	401	473	635	492	443	433	471
QUIET RANGE	17	18	14	11	11	8	13	11	14	9	14	11	13
STORMINESS. MEAN (UNIT)	-14	-6	3	4	6	10	14	11	9	7	-5	-12	2
DIURNAL SUM PS (UNIT)	201	388	523	653	527	532	632	623	851	548	376	275	509
NS	541	523	458	566	389	281	309	352	611	391	487	561	569
AS	742	911	981	1219	916	813	941	975	1442	939	863	856	965

Resuming Tables.

Storminess.

Tromsø.

Declination. Unit Gamma. + West.

1951.		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	0	0	0	1	1	2	1	4	3	2	2	4	4	7	6	8	13	10	17	15	9	4	2	2
FEB	MPS	2	5	1	1	0	3	2	5	6	3	4	5	8	14	14	12	12	12	16	9	8	7	5	2
MAR	MPS	1	0	0	0	0	1	5	4	4	2	6	8	10	14	24	24	23	24	16	17	6	3	2	0
APR	MPS	0	1	0	1	1	8	7	7	4	2	4	8	11	20	27	32	35	38	28	23	11	2	5	3
MAY	MPS	2	1	1	1	1	4	3	3	4	3	4	8	10	15	17	20	23	23	25	29	23	7	3	0
JUN	MPS	0	0	1	2	3	4	2	3	4	1	3	4	8	10	17	16	14	21	25	20	9	5	2	
JUL	MPS	7	1	0	1	2	2	2	1	2	3	3	4	3	3	8	20	21	24	31	22	18	9	4	3
AUG	MPS	1	1	1	0	2	3	3	6	5	3	2	2	3	4	10	13	17	18	20	17	6	3	5	0
SEP	MPS	1	2	3	4	3	4	6	4	2	1	1	2	5	8	16	24	30	34	32	15	10	4	3	3
OCT	MPS	0	0	0	0	1	3	4	3	0	1	3	5	9	11	12	12	13	21	20	15	7	5	0	0
NOV	MPS	0	0	0	1	1	4	5	4	2	2	5	5	7	8	13	18	21	16	13	10	8	6	2	1
DEC	MPS	2	1	2	0	2	5	7	5	5	3	3	6	9	10	9	8	5	12	14	9	6	3	2	1
MEAN		1	1	1	1	1	4	4	4	4	2	3	5	7	10	14	17	18	21	21	17	11	5	3	1
JAN	MNS	25	26	24	16	12	7	5	3	2	1	2	0	2	2	3	3	4	6	9	8	4	34	33	22
FEB	MNS	32	44	54	44	55	18	9	4	1	2	1	1	1	0	0	4	5	7	12	18	10	14	22	24
MAR	MNS	47	43	47	35	24	9	4	6	5	4	2	1	1	1	1	2	3	3	3	7	10	18	36	47
APR	MNS	63	68	72	61	25	7	5	4	4	5	5	5	4	1	0	0	1	1	8	11	19	25	47	
MAY	MNS	55	55	53	30	14	6	6	4	6	10	4	2	1	1	1	1	2	0	1	3	12	21	35	
JUN	MNS	42	37	28	24	16	14	17	7	5	6	5	5	4	3	3	2	3	1	1	1	4	4	12	24
JUL	MNS	29	39	43	30	17	11	12	5	5	6	4	4	5	2	3	5	3	0	0	1	10	12	15	
AUG	MNS	42	39	36	27	22	9	4	2	7	5	6	5	6	4	5	6	3	7	3	2	16	14	24	40
SEP	MNS	55	61	57	62	38	12	3	4	12	24	21	17	9	13	5	4	2	0	7	9	7	20	33	37
OCT	MNS	58	41	36	21	12	2	1	3	6	6	4	2	1	4	2	7	6	0	1	6	18	26	34	32
NOV	MNS	46	50	43	25	11	3	1	1	2	3	2	2	3	3	5	3	6	3	7	25	25	31	36	44
DEC	MNS	25	26	17	14	7	3	6	3	3	1	2	2	2	2	4	3	9	4	17	12	15	21	29	29
MEAN		43	44	43	32	19	8	6	4	5	6	5	4	3	3	3	3	4	3	5	8	10	19	26	33
JAN	MPS + MNS	-25	-26	-24	-15	-11	-6	-4	1	2	1	1	3	2	5	3	5	9	4	7	5	-30	-30	-20	
FEB	MPS + MNS	-30	-39	-54	-44	-34	-16	-7	1	6	0	3	4	6	13	14	9	7	5	5	-8	-2	-7	-17	-22
MAR	MPS + MNS	-46	-44	-46	-35	-23	-8	1	-2	-2	-1	4	8	9	13	23	22	20	21	14	11	-4	-15	-35	-47
APR	MPS + MNS	-63	-67	-71	-60	-23	2	1	2	0	-3	-1	3	7	19	27	32	34	37	27	15	0	-18	-20	-44
MAY	MPS + MNS	-53	-54	-52	-29	-12	-2	-3	-1	-2	-8	0	6	10	14	16	18	22	21	25	29	20	-5	-17	-35
JUN	MPS + MNS	-41	-37	-26	-21	-13	-10	-15	-4	-1	-5	-4	-2	1	5	7	15	14	13	20	25	16	5	-7	-21
JUL	MPS + MNS	-23	-39	-43	-29	-15	-9	-10	-4	-3	-3	-1	0	-2	0	4	17	19	24	31	22	17	1	-8	-12
AUG	MPS + MNS	-42	-39	-35	-27	-20	-6	-1	4	-2	-2	-4	-3	-3	0	5	7	14	12	17	15	-10	-11	-19	-39
SEP	MPS + MNS	-54	-59	-55	-59	-36	-8	3	0	-11	-23	-19	-15	-4	-5	11	20	27	33	25	6	2	-16	-30	-34
OCT	MPS + MNS	-58	-42	-37	-21	-12	0	3	-1	-6	-6	-1	2	7	7	9	6	7	21	19	9	-11	-22	-33	-32
NOV	MPS + MNS	-45	-50	-43	-24	-9	0	4	2	-2	3	3	4	5	8	16	15	13	6	-15	-17	-25	-34	-45	
DEC	MPS + MNS	-23	-25	-16	-13	-5	3	1	3	2	2	1	4	7	8	5	5	-4	8	-3	-3	-8	-10	-27	-28
MEAN		-42	-45	-42	-31	-18	-5	-2	0	-1	-5	-1	1	4	7	11	14	15	18	16	9	0	-14	-23	-31

Horizontal Intensity. Unit Gamma.

1951.		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	0	2	4	5	6	5	10	10	11	4	12	14	20	34	43	41	52	48	50	21	9	5	2	3
FEB	MPS	2	2	2	2	4	5	9	8	10	11	14	27	38	46	81	63	55	44	29	12	9	4	1	2
MAR	MPS	1	1	1	6	1	4	5	10	7	14	30	43	66	85	101	106	66	44	18	9	3	0	1	0
APR	MPS	0	0	0	0	0	4	6	11	26	31	53	92	110	111	127	129	106	64	33	12	2	2	0	1
MAY	MPS	0	0	1	0	2	3	6	9	16	34	46	55	77	87	86	90	74	46	37	15	5	3	1	0
JUN	MPS	1	1	1	6	2	3	3	5	11	14	20	45	71	91	100	95	85	66	56	35	12	4	2	1
JUL	MPS	0	0	2	3	7	5	5	7	14	19	28	48	69	102	106	114	101	99	73	37	14	4	0	0
AUG	MPS	1	1	1	2	3	3	5	6	9	16	38	51	84	109	110	102	112	87	48	18	7	2	0	6
SEP	MPS	3	1	0	0	2	5	7	13	19	43	66	90	112	130	156	93	62	37	14	7	1	0	0	0
OCT	MPS	1	2	1	3	2	7	5	16	22	19	36	43	55	67	78	61	40	24	19	6	3	1	0	0
NOV	MPS	1	4	2	12	10	8	11	10	11	7	11	18	35	57	85	83	74	46	29	12	6	6	3	1
DEC	MPS	1	2	1	1	10	12	15	13	15	17	19	29	41	59	70	53	39	56	19	22	22	3	2	1
MEAN		1	1	1	3	4	5	7	10	14	19	31	45	65	81	94	86	72	53	34	17	8	3	1	1
JAN	MNS	72	93	59	37	35	24	16	7	4	1	0	0	0	0	0	0	1	6	13	32	64	109	120	72
FEB	MNS	131	168	130	79	52	36	32	15	5	4	1	2	3	1	0	1	0	7	29	88	84	127	148	140
MAR	MNS	150	125	104	62	46	30	16	5	4	6	3	2	1	1	0	1	0	16	67	72	126	137	181	172
APR	MNS	218	210	202	143	74	48	23	10	5	2	2	0	0	1	0	0	0	9	16	59	109	156	184	214
MAY	MNS	169	163	144	89	41	20	17	9	3	1	1	2	1	0	1	0	6	18	35	72	108	140	182	
JUN	MNS	128	104	90	59	46	35	23	10	7	1	2	3	0	1	0	1	3	2	3	6	37	67	87	108

JUL	MNS	147	145	114	67	48	34	22	5	1	2	1	2	1	0	0	0	0	11	15	36	62	100	165	
AUG	MNS	142	135	120	85	71	54	16	7	3	3	2	1	0	2	1	0	0	4	3	53	81	130	199	164
SEP	MNS	224	221	181	133	111	59	24	10	3	1	1	0	0	0	2	5	29	30	101	106	131	183	203	207
OCT	MNS	140	110	90	75	26	8	6	1	1	0	0	0	0	0	4	2	3	47	49	79	138	150	156	157
NOV	MNS	134	110	75	44	18	6	1	1	2	2	1	0	0	0	2	1	14	21	76	117	121	126	139	
DEC	MNS	86	76	36	21	20	21	9	6	9	16	9	13	0	0	0	0	7	21	53	45	98	109	136	144
MEAN		145	138	112	75	49	30	17	7	4	3	2	2	1	1	1	1	4	14	32	56	90	122	148	155
JAN	MPS + MNS	-72	-92	-55	-33	-29	-19	-6	3	7	3	12	14	20	34	43	41	51	43	17	-11	-55	-104	-118	-69
FEB	MPS + MNS	-129	-167	-128	-77	-48	-31	-23	-8	6	7	14	25	35	45	81	63	55	36	0	-76	-76	-123	-147	-138
MAR	MPS + MNS	-148	-124	-103	-56	-45	-26	-11	5	3	8	27	41	64	82	100	106	66	29	-49	-63	-124	-137	-180	-172
APR	MPS + MNS	-218	-210	-201	-142	-74	-44	-18	1	20	29	51	81	110	110	127	129	106	56	17	-47	-107	-154	-183	-213
MAY	MPS + MNS	-169	-163	-142	-89	-39	-17	-12	0	13	33	45	53	76	87	85	89	73	41	18	-20	-68	-105	-140	-182
JUN	MPS + MNS	-127	-103	-89	-53	-43	-32	-20	-5	4	13	18	42	70	91	100	94	83	64	53	29	-25	-63	-86	-107
JUL	MPS + MNS	-147	-145	-112	-64	-42	-29	-18	2	12	16	26	47	68	102	106	114	101	99	62	23	-22	-58	-100	-165
AUG	MPS + MNS	-142	-135	-119	-63	-68	-31	-11	-2	6	12	36	50	84	107	109	102	112	83	45	-36	-73	-128	-199	-158
SEP	MPS + MNS	-220	-221	-181	-133	-108	-54	-17	3	16	43	65	90	111	130	134	87	33	7	-87	-99	-130	-182	-203	-206
OCT	MPS + MNS	-139	-108	-91	-71	-24	1	0	14	22	18	36	43	55	67	75	59	37	-23	-31	-72	-135	-148	-156	-157
NOV	MPS + MNS	-133	-106	-73	-32	-7	1	10	9	8	5	9	16	35	57	65	81	72	32	8	-64	-111	-115	-123	-138
DEC	MPS + MNS	-85	-75	-34	-20	-10	-9	5	7	6	2	9	17	41	59	70	53	32	15	-34	-24	-67	-106	-134	-143
MEAN		-144	-137	-111	-71	-45	-24	-10	2	10	16	29	43	64	81	93	85	68	40	2	-38	-83	-119	-147	-154

Vertical Intensity. Unit Gamma.

1951.		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	28	17	7	3	1	2	3	4	5	8	9	8	13	11	14	12	7	4	3	3	6	12	10	11
FEB	MPS	42	65	30	5	7	1	1	3	4	4	9	11	12	11	7	11	8	5	4	6	25	40	43	35
MAR	MPS	56	26	7	12	1	0	2	3	5	9	17	16	19	18	16	20	19	12	15	35	48	44	57	67
APR	MPS	83	84	56	9	4	3	2	4	8	8	10	12	13	17	12	13	9	4	9	21	45	52	78	95
MAY	MPS	71	36	19	6	1	2	4	4	8	11	17	14	14	17	24	21	15	8	2	12	24	56	63	78
JUN	MPS	58	39	23	17	15	12	7	5	6	8	12	19	27	30	27	20	14	7	6	25	39	49	53	
JUL	MPS	61	63	32	16	10	15	14	5	9	16	22	24	28	18	18	14	8	6	9	16	26	45	74	110
AUG	MPS	51	43	17	8	14	4	4	6	17	23	25	30	29	25	26	17	10	5	15	34	37	4	76	66
SEP	MPS	127	89	44	9	5	8	3	10	20	14	11	19	9	6	8	7	8	4	31	32	41	93	107	126
OCT	MPS	57	32	15	3	1	1	5	9	11	9	8	12	16	16	13	9	7	2	14	35	57	67	82	70
NOV	MPS	44	28	6	2	1	0	1	3	7	11	11	9	12	8	8	4	4	5	3	21	23	56	50	55
DEC	MPS	11	24	4	2	5	10	6	4	8	11	11	8	9	16	7	7	4	2	9	17	14	25	36	24
MEAN		57	45	22	8	5	5	4	5	9	11	14	15	17	16	15	13	9	6	10	20	31	44	61	66
JAN	MNS	15	16	19	26	29	19	12	6	3	0	2	1	1	3	8	13	28	40	64	53	41	42	36	64
FEB	MNS	13	6	15	39	33	31	29	22	13	4	1	1	5	5	23	20	28	32	45	43	30	19	31	37
MAR	MNS	12	22	24	27	28	31	25	13	3	3	3	2	5	17	28	43	37	30	16	19	26	19	13	12
APR	MNS	3	8	20	38	54	42	23	10	4	3	6	20	24	49	39	40	82	59	18	12	8	2	6	7
MAY	MNS	15	17	25	44	40	24	14	9	4	4	4	5	22	11	11	8	25	24	25	22	13	10	8	10
JUN	MNS	5	14	27	28	25	18	15	10	3	5	5	3	1	6	11	20	15	11	16	9	14	7	7	7
JUL	MNS	13	20	23	33	35	25	17	6	3	1	1	2	4	6	17	31	22	23	14	11	6	1	3	3
AUG	MNS	14	18	25	44	26	20	8	3	1	0	0	1	8	24	24	25	25	29	9	6	18	10	13	10
SEP	MNS	14	19	27	29	50	30	20	9	3	10	11	11	20	51	65	79	55	39	23	14	5	10	8	10
OCT	MNS	10	18	24	30	24	23	10	2	1	0	2	3	3	13	29	38	48	46	18	11	15	8	8	6
NOV	MNS	23	21	28	33	35	20	8	2	0	0	0	0	0	5	24	40	41	45	32	43	28	27	18	14
DEC	MNS	33	25	25	25	22	19	8	7	5	7	1	11	8	21	36	44	37	45	37	38	26	22	24	37
MEAN		14	17	24	33	35	25	16	8	4	3	3	5	8	16	26	33	36	35	28	24	18	15	14	18
JAN	MPS + MNS	14	2	-12	-23	-28	-17	-9	-3	2	8	7	7	12	8	6	-1	-21	-36	-61	-50	-55	-30	-25	-53
FEB	MPS + MNS	29	59	15	-34	-26	-30	-27	-19	-9	0	7	11	7	6	-15	-9	-20	-26	-42	-37	-5	21	13	-2
MAR	MPS + MNS	44	3	-17	-16	-26	-30	-23	-9	2	6	14	14	14	1	-12	-23	-18	-18	-1	16	22	25	44	55
APR	MPS + MNS	80	76	37	-29	-50	-39	-21	-6	4	5	4	-8	-11	-31	-28	-27	-63	-55	-10	9	37	50	72	89
MAY	MPS + MNS	56	20	-6	-38	-39	-22	-9	-4	3	7	12	9	-8	6	12	13	-10	-16	-25	-10	12	46	55	69
JUN	MPS + MNS	55	26	-4	-11	-10	-6	-7	-5	3	3	7	16	27	25	16	0	-1	-1	-8	-3	11	33	42	46
JUL	MPS + MNS	49	43	9	-16	-25	-10	-2	-1	6	15	21	21	24	12	0	-16	-13	-17	-5	5	20	45	71	107
AUG	MPS + MNS	36	25	-8	-36	-12	-16	-4	4	16	25	25	30	28	18	2	-7	-15	-20	-14	26	31	23	66	53
SEP	MPS + MNS	113	70	17	-21	-45	-22	-17	1	18	4	0	8	-11	-45	-57	-72	-47	-34	8	18	35	83	100	116
OCT	MPS + MNS	47	14	-10	-28	-24	-21	-5	6	10	8	8	13	3	-16	-29	-41	-44	-4	24	42	59	74	64	
NOV	MPS + MNS	21	8	-20	-31	-34	-20	-7	2	7	11	11	9	12	3	-16	-35	-37	-39	-30	-22	-5	30	32	41
DEC	MPS + MNS	-22	-2	-20	-23	-17	-8	-2	-3	3	5	10	-4	1	-5	-28	-37	-32	-45	-29	-21	-12	3	12	-14
MEAN		43	29	-2	-26	-28	-20	-11	-3	5	8	10	10	9	0	-11	-20	-27	-29	-18	-4	13	32	46	48

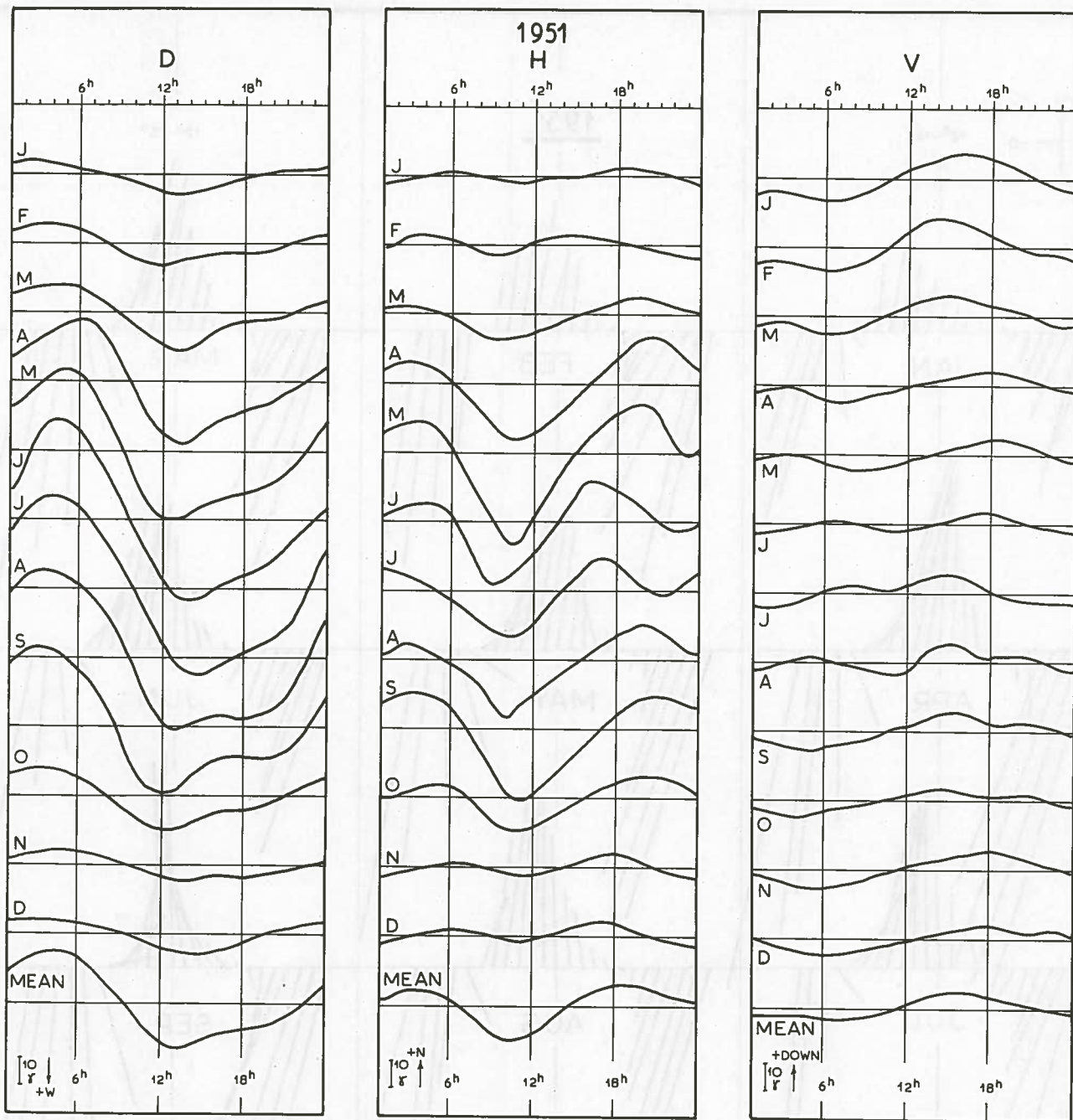


Fig. 1. The Quiet Diurnal Variation, smoothed Values.

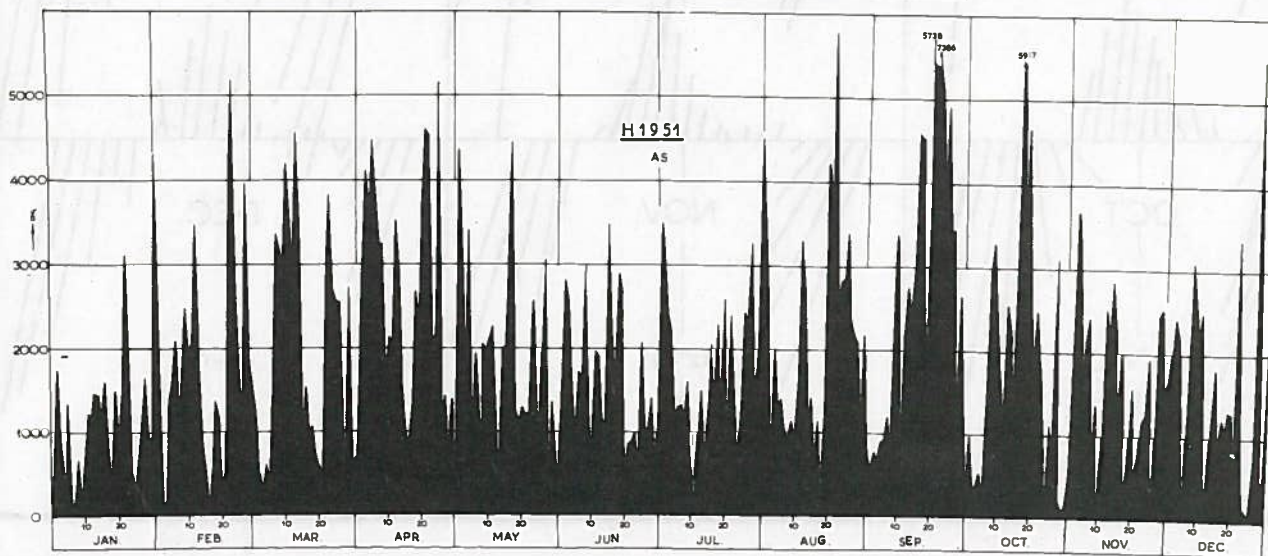


Fig. 2. The Diurnal Sum of the Absolute Storminess of H.

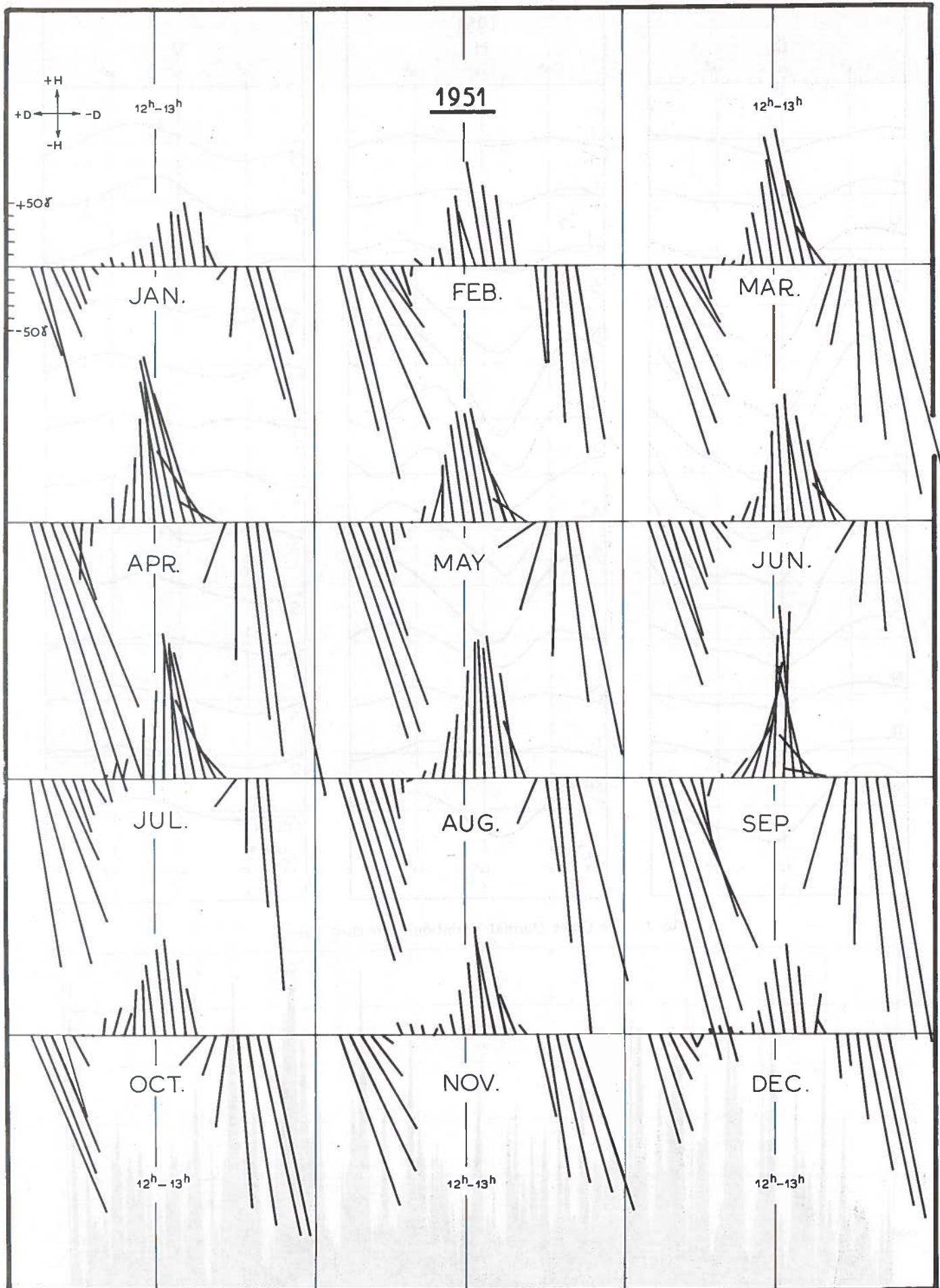


Fig. 3. Diagrams of the Monthly Mean Values (M) of the Storminess in the Horizontal Plane.

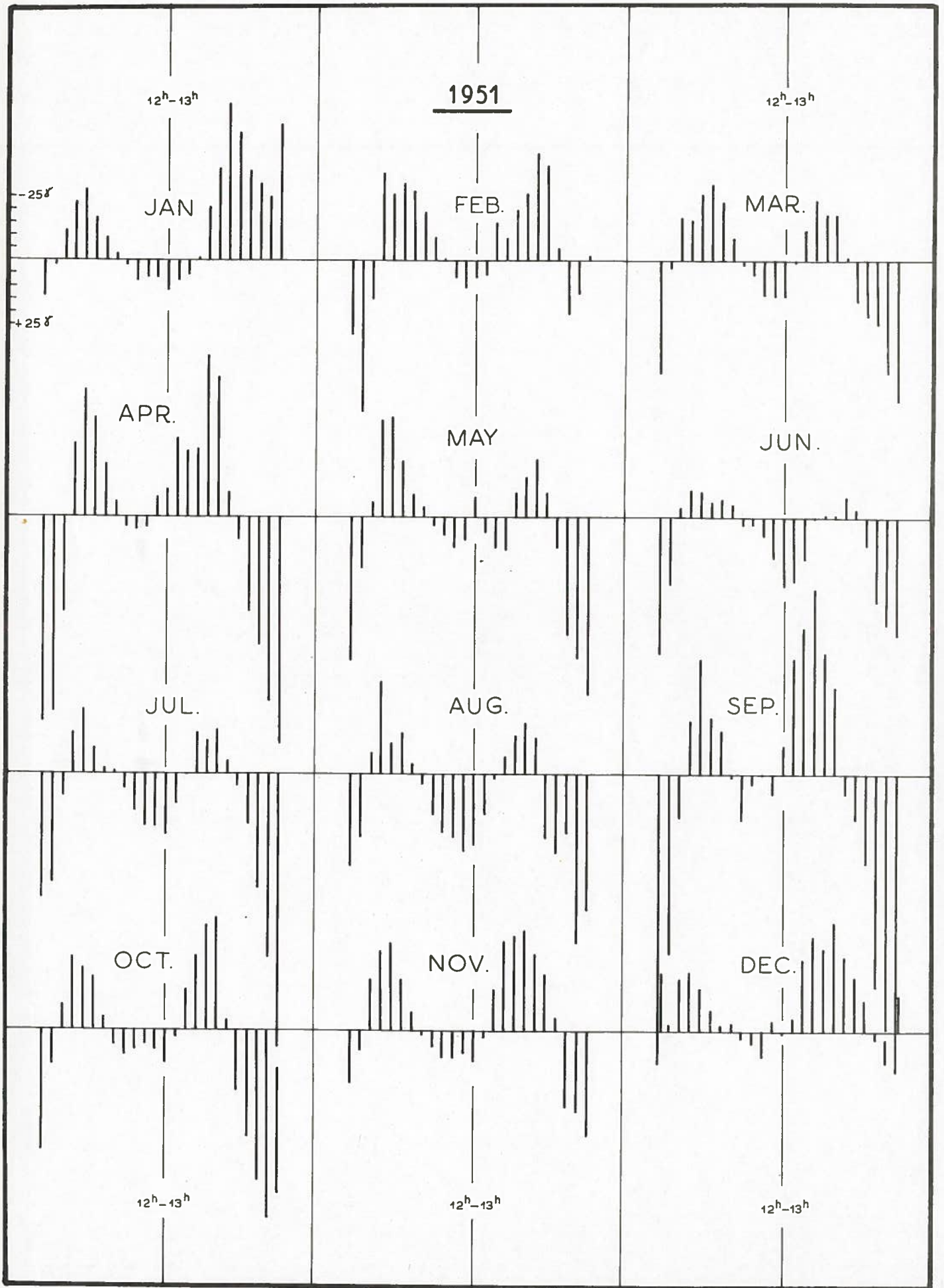


Fig. 4. Diagrams of the Monthly Mean Values (*M*) of the Storminess of the Vertical Intensity.

