

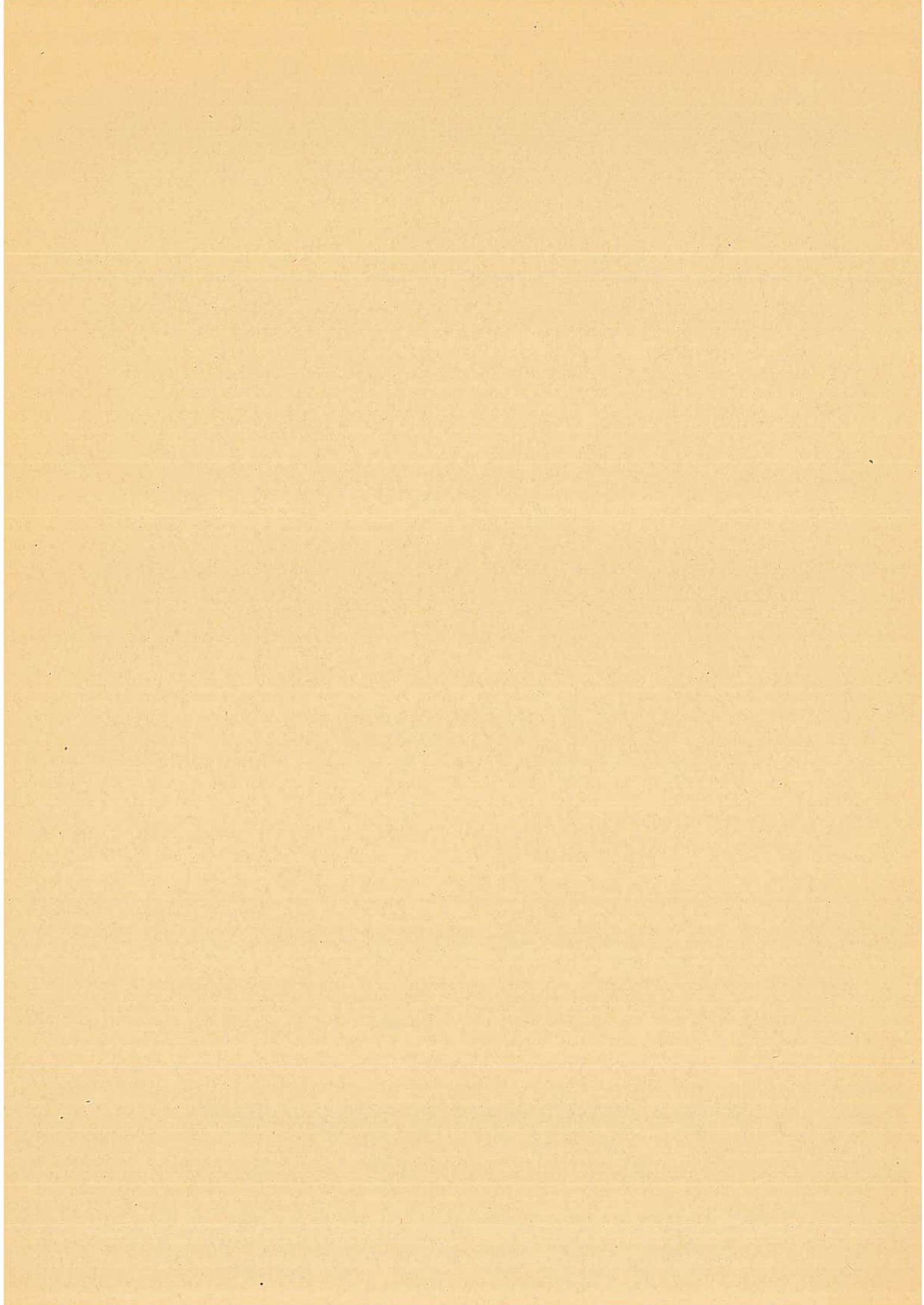
Publikasjoner fra  
DET NORSKE INSTITUTT FOR KOSMISK FYSIKK  
Nr. 25

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

RESULTS OF MAGNETIC OBSERVATIONS  
FOR THE YEAR 1943

BY  
LEIV HARANG and EINAR TØNSBERG

1946  
A.S JOHN GRIEGS BOKTRYKKERI, BERGEN



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THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY

REPORT OF THE  
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GENERAL REMARKS.

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

The observations were taken by E. TØNSBERG. The reading of the hourly values and the calculation work were performed by the students HERMOD SKÅNLAND and JOFRED GRØTTLAND.

SCALE VALUES.

The following scale-values were determined:

D-curves:	1'.45 or	4.75 $\gamma$ per mm
H-curves:	.....	5.10 $\gamma$ per mm
V-curves:	.....	6.80 $\gamma$ per mm

BASE-LINE VALUES.

The absolute measurements of the Declination and Horizontal Intensity resulted in the table given below of observed and adopted base-line values. The Vertical Intensity base-line value — 50 220  $\gamma$  — from the preceding years is still employed, as we are trusting more to the stability of the V-variometer than to the accuracy of the Inclination measurements. The mean Inclination value throughout the year was  $77^{\circ} 26'.1$ .

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

OBSERVED AND ADOPTED BASE-LINE VALUES FOR  $D$  AND  $H$ 

Date	$D$ observed	$D$ adopted	$H$ observed	$H$ adopted
I 26	2° 16'.3 W	2° 16'.3 W	11 171	11 169
II 28	.3	.3	67	69
III 29	.3	.3	69	69
V 31	.7	.4	69	69
VI 28	.4	.4	70	69
XII 8	.4	.4	66	69

## EXPLANATION OF THE TABLES

For each of the components  $D$ ,  $H$  and  $V$  two series of tables are given. One series presents, in the usual way, the hourly mean values centered at half hours G. M. T. In these tables the column headed  $M$  presents 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  $M$  presents the monthly means of the hourly values, and the line marked  $O M$  presents the monthly means of the *quiet* hourly values.

The second series of tables presents the hourly values of the storminess («average 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 presents series of publications. In the storminess tables the column headed  $M$  presents the diurnal means. The columns headed  $PS$ ,  $NS$  and  $AS$  presents the diurnal sum of the positive, negative and absolute storminess respectively. The column headed  $CH$  presents 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  $MNS$  presents 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.

# TABLES

Tromsø.

Declination. D = 2° W + Tabular Quantities expressed in Tenths of Minutes.

Gr. M. T.

JANUARY 1943.

HOURLY MEAN VALUES

Table for January 1943 showing hourly mean values for declination. Columns include Day (1-31), hours (1-24), and values for M and R'.

FEBRUARY

Table for February showing hourly mean values for declination. Columns include Day (1-28), hours (1-24), and values for M and R'.

MARCH

Table for March showing hourly mean values for declination. Columns include Day (1-31), hours (1-24), and values for M and R'.



Tromsø.

Declination, Storminess (+ W). Unit Gamma.

Gr. M. T.

JANUARY 1943.

Table for January 1943 showing magnetic observations (DAY 1-31) with columns for declination, storminess, and other parameters (M, PS, NS, AS).

FEBRUARY

Table for February showing magnetic observations (DAY 1-28) with columns for declination, storminess, and other parameters (M, PS, NS, AS).

MARCH

Table for March showing magnetic observations (DAY 1-31) with columns for declination, storminess, and other parameters (M, PS, NS, AS).

Tromsø. Declination. D = 2° W + Tabular Quantities expressed in Tenths of Minutes.

Gr. M. T.

APRIL 1943.

HOURLY MEAN VALUES

Table for April 1943 showing hourly mean values for days 1 to 30. Columns include Day, 24 hourly values, M, and R.

MAY

Table for May showing hourly mean values for days 1 to 31. Columns include Day, 24 hourly values, M, and R.

JUNE

Table for June showing hourly mean values for days 1 to 30. Columns include Day, 24 hourly values, M, and R.

Tromsø.

Declination. Storminess (+ W). Unit Gamma.

Gr. M. T.

APRIL 1943.

HOURLY MEAN VALUES

Table for April 1943 showing hourly mean values for declination, storminess, and unit gamma. Columns include Day (1-30), M, PS, NS, AS, and summary rows for M, MPS, and MNS.

MAY

Table for May 1943 showing hourly mean values for declination, storminess, and unit gamma. Columns include Day (1-31), M, PS, NS, AS, and summary rows for M, MPS, and MNS.

JUNE

Table for June 1943 showing hourly mean values for declination, storminess, and unit gamma. Columns include Day (1-30), M, PS, NS, AS, and summary rows for M, MPS, and MNS.



Tromsø.

Declination, Storminess (+ W). Unit Gamma.

Gr. M. T.

JULY 1943.

HOURLY MEAN VALUES

Table for July 1943 showing hourly mean values for declination, storminess, and other magnetic parameters. Columns include Day (1-31), 24 hours of values, and summary statistics (M, PS, NS, AS).

AUGUST

Table for August 1943 showing hourly mean values for declination, storminess, and other magnetic parameters. Columns include Day (1-31), 24 hours of values, and summary statistics (M, PS, NS, AS).

SEPTEMBER

Table for September 1943 showing hourly mean values for declination, storminess, and other magnetic parameters. Columns include Day (1-30), 24 hours of values, and summary statistics (M, PS, NS, AS).

Tromsø.

Declination. D = 2° W + Tabular Quantities expressed in Tenths of Minutes.

Gr. M. T.

OCTOBER 1943.

HOURLY MEAN VALUES

Table for October 1943 showing hourly mean values for declination. Columns include Day (1-31), hours (1-23), and values (M, R').

NOVEMBER

Table for November showing hourly mean values for declination. Columns include Day (1-30), hours (1-23), and values (M, R').

DECEMBER

Table for December showing hourly mean values for declination. Columns include Day (1-31), hours (1-23), and values (M, R').

Tromsø.

Declination. Storminess (+ W). Unit Gamma.

Gr. M. T.

OCTOBER 1943.

HOURLY MEAN VALUES

Table for October 1943 showing hourly mean values for declination, storminess, and other magnetic parameters (M, PS, NS, AS) across 31 days.

NOVEMBER

Table for November 1943 showing hourly mean values for declination, storminess, and other magnetic parameters (M, PS, NS, AS) across 30 days.

DECEMBER

Table for December 1943 showing hourly mean values for declination, storminess, and other magnetic parameters (M, PS, NS, AS) across 31 days.

Tromsø. Horizontal Intensity. H = 11200 + Tabular Quantities expressed in Gamma.

Gr. M. T.

JANUARY 1945. Table with columns DAY (1-31), 1-25, M, R. Contains numerical data for January 1945.

FEBRUARY Table with columns DAY (1-28), 1-23, M, R. Contains numerical data for February 1945.

MARCH Table with columns DAY (1-31), 1-23, M, R. Contains numerical data for March 1945.



Tromsø.

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

Gr. M. T.

Table for JANUARY 1943. Columns: DAY (1-31), 1-25, M, PS, NS, AS, CH. Rows: Daily magnetic intensity data and summary statistics (M, MPS, MWS).

Table for FEBRUARY. Columns: DAY (1-28), 1-23, M, PS, NS, AS, CH. Rows: Daily magnetic intensity data and summary statistics (M, MPS, MWS).

Table for MARCH. Columns: DAY (1-31), 1-23, M, PS, NS, AS, CH. Rows: Daily magnetic intensity data and summary statistics (M, MPS, MWS).

Tromsø. Horizontal Intensity. H = 11200 + Tabular Quantities expressed in Gamma.

Gr. M. T.

HOURLY MEAN VALUES

Table for APRIL 1943. Columns: DAY, 1-25, M, R. Rows: 1-30. Values range from -43 to 587.

Table for MAY. Columns: DAY, 1-25, M, R. Rows: 1-31. Values range from -66 to 1010.

Table for JUNE. Columns: DAY, 1-25, M, R. Rows: 1-30. Values range from -82 to 1607.

Tromsö.

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

Gr. M. T.

APRIL 1943.

HOURLY MEAN VALUES

Table for April 1943 showing hourly mean values for days 1-30. Columns include day, 25 hourly values, and summary statistics (M, PS, NS, AS, CH).

MAY

Table for May 1943 showing hourly mean values for days 1-31. Columns include day, 25 hourly values, and summary statistics (M, PS, NS, AS, CH).

JUNE

Table for June 1943 showing hourly mean values for days 1-30. Columns include day, 25 hourly values, and summary statistics (M, PS, NS, AS, CH).

Tromsø.

Horizontal Intensity. H = 11200 + Tabular Quantities expressed in Gamma.

Gr. M. T.

JULY 1943.

HOURLY MEAN VALUES

Table for July 1943 showing hourly mean values for horizontal intensity. Columns include Day (1-31), hours (1-24), and monthly totals (M, R).

AUGUST

Table for August showing hourly mean values for horizontal intensity. Columns include Day (1-31), hours (1-24), and monthly totals (M, R).

SEPTEMBER

Table for September showing hourly mean values for horizontal intensity. Columns include Day (1-30), hours (1-24), and monthly totals (M, R).

Tromsø.

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

Gr. M. T.

JULY 1943.

HOURLY MEAN VALUES

Table for July 1943 showing hourly magnetic intensity and storminess data. Columns include Day (1-31), hours (1-24), and summary statistics (M, PS, NS, AS, CH).

AUGUST

Table for August 1943 showing hourly magnetic intensity and storminess data. Columns include Day (1-31), hours (1-24), and summary statistics (M, PS, NS, AS, CH).

SEPTEMBER

Table for September 1943 showing hourly magnetic intensity and storminess data. Columns include Day (1-30), hours (1-24), and summary statistics (M, PS, NS, AS, CH).

Tromsø.

Horizontal Intensity. H = 11200 + Tabular Quantities expressed in Gamma.

Gr. M. T.

OCTOBER 1943.

HOURLY MEAN VALUES

Table for October 1943 showing hourly mean values for horizontal intensity. Columns include Day (1-31), hours (1-24), and monthly totals (M, R). Values range from -555 to 320.

NOVEMBER

Table for November showing hourly mean values for horizontal intensity. Columns include Day (1-30), hours (1-24), and monthly totals (M, R). Values range from -150 to 105.

DECEMBER

Table for December showing hourly mean values for horizontal intensity. Columns include Day (1-31), hours (1-24), and monthly totals (M, R). Values range from -210 to 220.

Tromsø.

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

Gr. M. T.

HOURLY MEAN VALUES

Table for October 1943. Columns: DAY (1-31), 1-23, M, PS, NS, AS, CH. Rows: Daily magnetic intensity and storminess data for October.

Table for November 1943. Columns: DAY (1-30), 1-23, M, PS, NS, AS, CH. Rows: Daily magnetic intensity and storminess data for November.

Table for December 1943. Columns: DAY (1-31), 1-23, M, PS, NS, AS, CH. Rows: Daily magnetic intensity and storminess data for December.





Tromsø.

Vertical Intensity. Storminess. Unit Gamma.

Gr. M. T.

JANUARY 1943. HOURLY MEAN VALUES

Table for January 1943 showing hourly mean values for Vertical Intensity, Storminess, and Unit Gamma. Columns include Day (1-31), hours (1-24), and summary statistics (M, PS, NS, AS).

FEBRUARY

Table for February 1943 showing hourly mean values for Vertical Intensity, Storminess, and Unit Gamma. Columns include Day (1-28), hours (1-24), and summary statistics (M, PS, NS, AS).

MARCH

Table for March 1943 showing hourly mean values for Vertical Intensity, Storminess, and Unit Gamma. Columns include Day (1-31), hours (1-24), and summary statistics (M, PS, NS, AS).



Tromsø.

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

Gr. M. T.

Table for APRIL 1943. Columns: DAY (1-30), 1-23, M, PS, NS, AS. Rows: Daily magnetic intensity data and monthly means.

Table for MAY. Columns: DAY (1-31), 1-23, M, PS, NS, AS. Rows: Daily magnetic intensity data and monthly means.

Table for JUNE. Columns: DAY (1-30), 1-23, M, PS, NS, AS. Rows: Daily magnetic intensity data and monthly means.



Tromsø.

Vertical Intensity. Storminess ( $\pm$  Down). Unit Gamma.

Gr. M. T.

JULY 1943.

HOURLY MEAN VALUES

Table for July 1943 showing hourly mean values for vertical intensity and storminess. Columns include Day (1-31), M, PS, NS, AS, and sub-rows for MP and MS.

AUGUST

Table for August 1943 showing hourly mean values for vertical intensity and storminess. Columns include Day (1-31), M, PS, NS, AS, and sub-rows for MP and MS.

SEPTEMBER

Table for September 1943 showing hourly mean values for vertical intensity and storminess. Columns include Day (1-30), M, PS, NS, AS, and sub-rows for MP and MS.



Tromsø.

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

Gr. M. T.

OCTOBER 1943.

HOURLY MEAN VALUES

Table for October 1943 showing hourly mean values for vertical intensity, storminess, and unit gamma. Columns include Day (1-31), hours (1-25), M, PS, NS, and AS.

NOVEMBER

Table for November showing hourly mean values for vertical intensity, storminess, and unit gamma. Columns include Day (1-30), hours (1-25), M, PS, NS, and AS.

DECEMBER

Table for December showing hourly mean values for vertical intensity, storminess, and unit gamma. Columns include Day (1-31), hours (1-25), M, PS, NS, and AS.

Resuming Tables

Diurnal Variation.  
QUIET VALUES.

Tromsø.

Declination. Unit Gamma. + West.

Table with 24 columns (1-23) and 13 rows (1943 JANUARY to DECEMBER, MEAN). Values range from -13 to 13.

Horizontal Intensity. Unit Gamma.

Table with 24 columns (1-23) and 13 rows (1943 JANUARY to DECEMBER, MEAN). Values range from -7 to 18.

Vertical Intensity. Unit Gamma.

Table with 24 columns (23-24) and 13 rows (1943 JANUARY to DECEMBER, MEAN). Values range from 23 to 66.

Monthly Means.

Summary table with 13 columns (JAN to DEC, MEAN) and 3 main sections: DECLINATION, HORIZONTAL INTENSITY, and VERTICAL INTENSITY. Includes sub-headers for DIRECT VALUES, QUIET VALUES, RANGE, QUIET RANGE, and STORMINESS, MEAN.







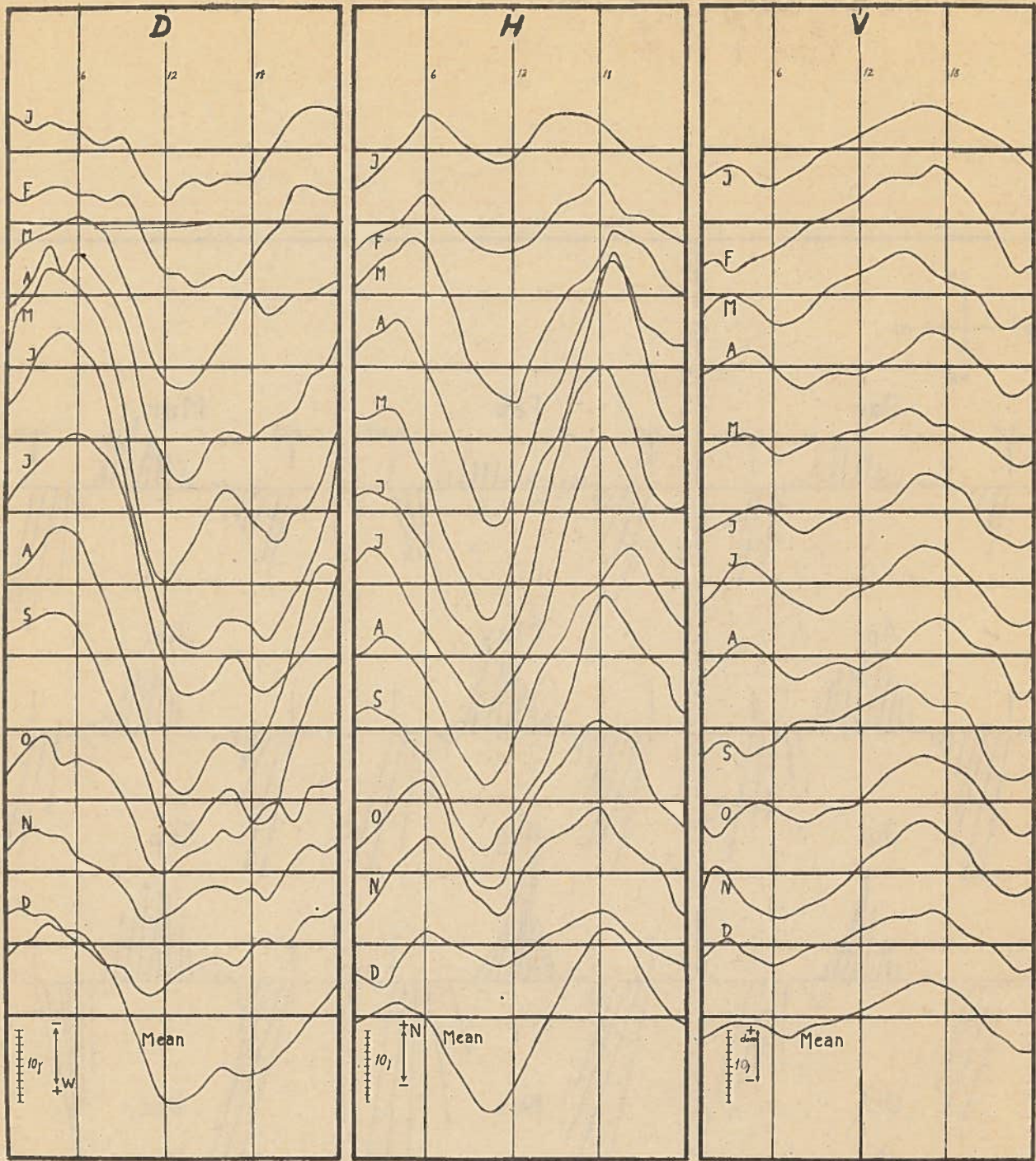


Fig. 1 The Quiet Diurnal Variation, smoothed Values.

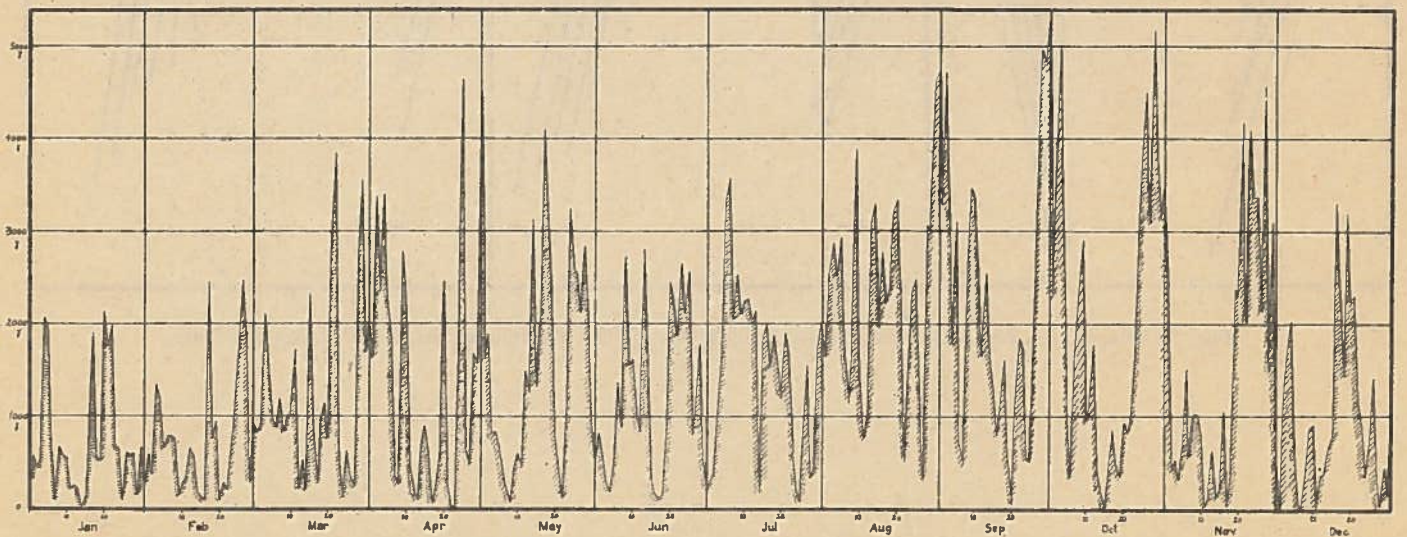


Fig. 2. The Diurnal Sum of the Absolute Storminess of H.

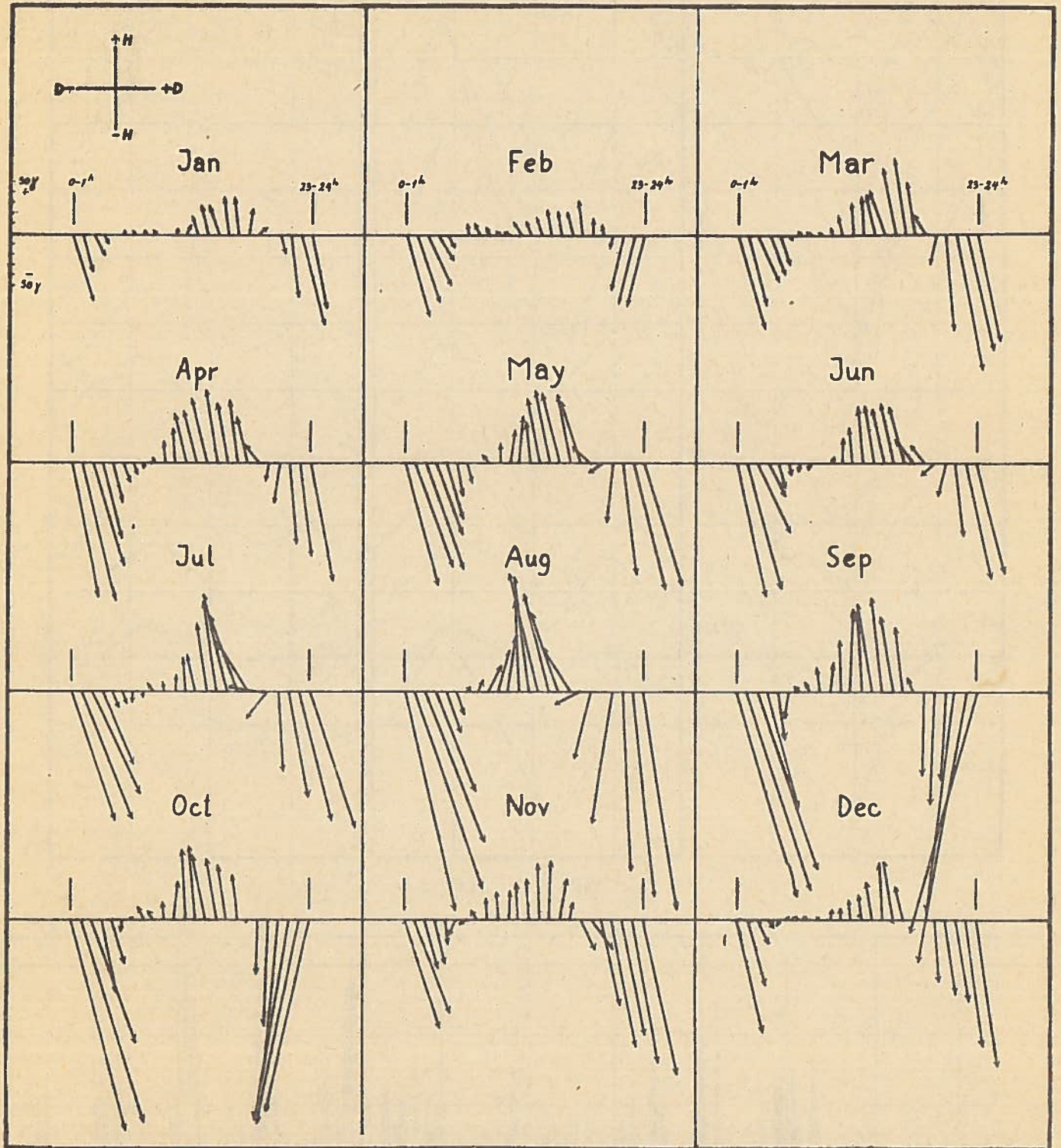


Fig. 3. Diagrams of the Monthly Mean Values ( $M$ ) of the Storminess in the Horizontal Plane.

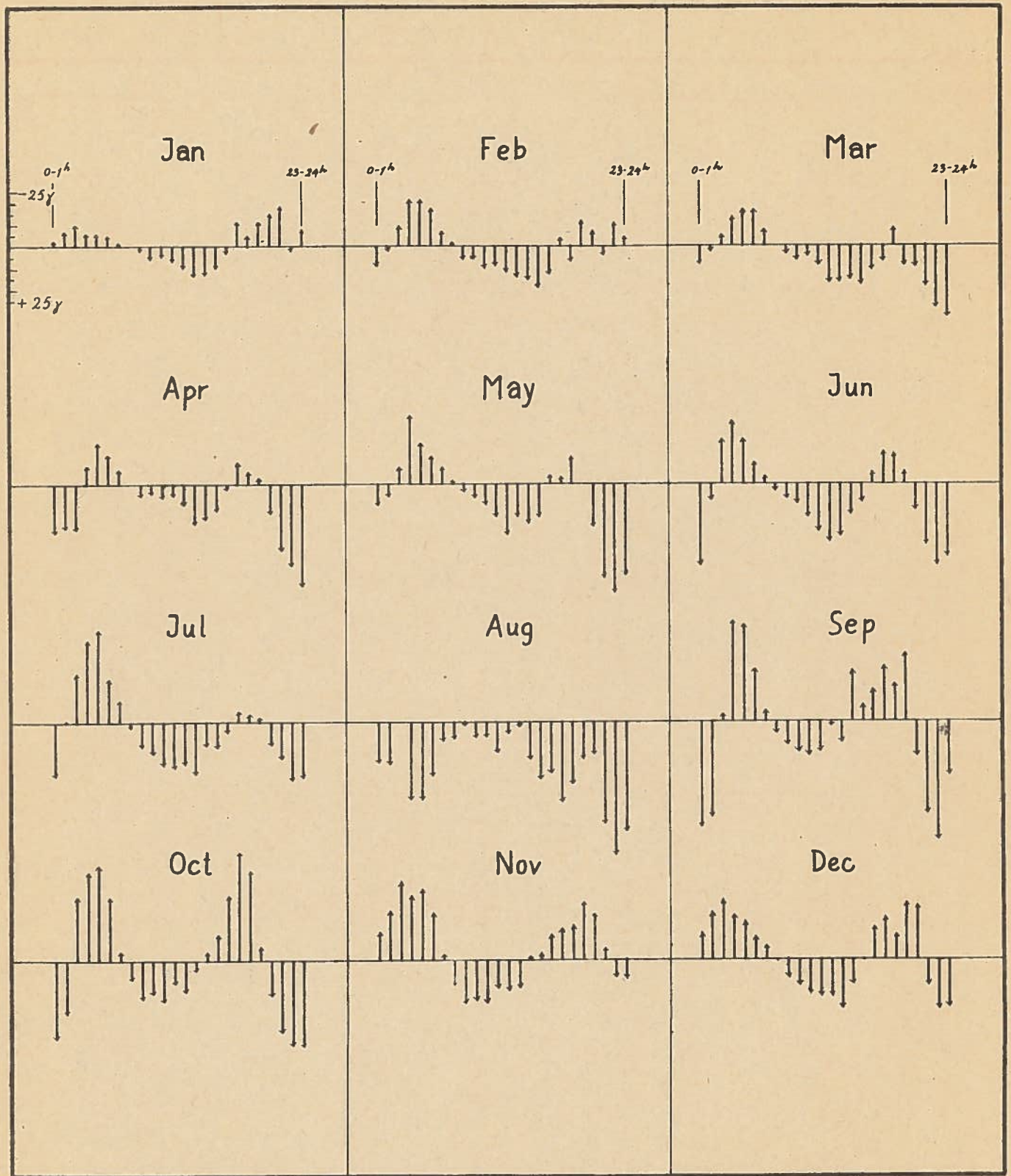


Fig. 4. Diagrams of the Monthly Mean Values ( $M$ ) of the Storminess of the Vertical Intensity.

