



BRITISH GEOLOGICAL SURVEY

Geomagnetic Bulletin 17

Magnetic Results 1985

Eskdalemuir, Hartland and Lerwick observatories

Natural Environment Research Council
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Magnetic Results for 1985: Eskdalemuir, Hartland and Lerwick observatories

INTRODUCTION

The volume for 1983–84 (Geomagnetic Bulletin 16) described the changeover from La Cour photomagnetographs to digitally recording fluxgate and proton magnetometers. During 1985 a new ‘automatic’ magnetometer system was installed at each observatory, and this necessitated changes to the instrument accommodation and offered opportunities to renovate the buildings. These operations and a reduction in the local staff combined to make 1985 a very difficult year for the observatories. At the end of June serious consideration was given to the possibility of closing Lerwick for several months because of impending simultaneous reconstruction of the absolute hut, and modification and rewiring of the variometer house. In the event recording was continued at Lerwick with, for the period June 22 to October 7, minimal absolute baseline control.

Similar but less dramatic circumstances affected the quality of the data recorded at Eskdalemuir and Hartland. At Eskdalemuir the underground variometer chamber was closed from August until the end of the year, during which period the digitally recording fluxgate magnetometers were operated in the non-magnetic laboratory. A particular problem at Eskdalemuir was to continue with the normal recording and to test new instrumentation in the limited confines of the laboratory. It is probable that the data from August onwards were slightly contaminated by field changes arising from movement of adjacent equipment.

At Hartland the digitally recording fluxgates were transferred to the non-magnetic laboratory at the end of November in anticipation of building works in and near to the variometer house. The Hartland data were those least affected by the year’s events.

The 150th anniversary of the start of the British Geological Survey was celebrated with public open days at Hartland (June 25–27) and Eskdalemuir (July 16–17). Hartland Observatory received a Group Achievement Award from NASA for work on the pre-flight testing of the AMPTE-UKS satellite.

Plans showing the layout of the observatories were given in Geomagnetic Bulletin 9. A brief history and bibliography of these observatories and their predecessors has been published by Robinson (1982).

OBSERVATORY CONSTANTS

	<i>Lerwick</i>	<i>Eskdalemuir</i>	<i>Hartland</i>
Code	LER	ESK	HAD
Geographic latitude	60°03' N	55°19' N	51°00' N
longitude	358°49' E	356°48' E	355°31' E
Height above msl	85 m	245 m	95 m
Start of operation	1922	1908	1956
Hourly values from	1926	1911	1957
Previous sites		Kew	Abinger Greenwich
Lower limit for K = 9	1000nT	750nT	500nT
Index contributions	Kp	Kp	Kp,Kn,Km,aa

ABSOLUTE OBSERVATIONS

Lerwick

Absolute measurements of horizontal and vertical intensity are made by proton vector magnetometer (Elsec type 592, bias coils type 5920) using Nelson's method (Hurwitz and Nelson, 1960). A standard pattern Kew declinometer is used for declination measurements.

The schedule of observations was disrupted by the resignation of the resident observer, Mr J. S. McNab, just as work was to start on reconstruction of the Absolute hut. Following measurements to determine baseline values for the digitally recording fluxgate systems the proton magnetometer and declinometer were removed to the main building. At the same time the site differences between the Absolute hut and the West hut were measured.

During the period June 22 to October 7 measurements of F and quasi-absolute Z were made by proton magnetometer, in the West hut, by Meteorological Office staff. The H baselines calculated from these measurements were subsequently adjudged to be less reliable than values derived from linear interpolation between the proton vector magnetometer derived values before and after reconstruction of the Absolute hut. Similar interpolated Z baseline values were found to be in reasonable accord with baselines calculated from the quasi-absolute Z measurements and with values calculated from F (corrected to the PVM pillar in the Absolute hut) and digitally recorded H values (using the interpolated H baseline).

The site differences between the Absolute hut and the West hut were remeasured on October 8 and were found to be sensibly constant in F , Z and (calculated) H . The reason for a discontinuity of approximately 1.5 minutes found in D is not presently understood and will be investigated during the next visit to the observatory in 1986.

From mid-October until the end of the year absolute measurements at Lerwick were made by the senior meteorologist, Mr A. Gair, and his deputy, Mr R. J. Johnson.

Eskdalemuir

As at Lerwick absolute measurements are made by proton vector magnetometer and Kew-pattern declinometer. The resident observer, Mr K. Walmsley, resigned at the end of May. From June onwards absolute observations were made by Mr A. C. Greenwood in the course of a weekly visit to the observatory from Edinburgh. In consequence observations were made less frequently, and with less regard to the level of magnetic activity at the time of the measurement, than previously.

Hartland

The horizontal and vertical intensities are measured by proton vector magnetometer. The declinometer is a hybrid employing a separate theodolite to view a suspended Kew pattern magnet.

The table shows the rms values of observed minus allocated baselines. The effect of the inferior temperature control in the temporary accomodation can be seen.

Observatory	Period	Instrument	Recording site	H (nT)	D (')	Z (nT)
Lerwick	1/1 to 6/20	fluxgate	variometer house	0.89	0.29	0.70
	6/21 10/7	fluxgate	BAS hut	—	—	—
	10/8 12/31	fluxgate	variometer house	1.31	0.49	2.61
Eskdalemuir	1/1 7/31	fluxgate	variometer vault	1.23	0.18	0.97
	8/1 12/31	fluxgate	non-magnetic lab	(2.08)	0.29	(1.85)
Hartland	1/1 12/31	La Cour	variometer house	0.73	0.11	1.67
	1/1 11/26	fluxgate	variometer house	0.62	0.13	0.90
	11/27 12/31	fluxgate	non-magnetic lab	1.26	0.14	2.94

Note: values in parenthesis for H and Z at Eskdalemuir are derived from a baseline temperature adjusted to 15°C.

RAPID VARIATIONS

At the beginning of 1985 a three-component (H , D , Z) fluxgate magnetometer system, recording at 5 second intervals, was in operation at each observatory. Recording was discontinued at Lerwick in June when the digitally recording fluxgates were moved into the BAS hut. At Eskdalemuir and Hartland recording of rapid variations stopped at the end of the year. In future recording at this resolution will only be made for special experiments or during international campaigns. Rapid variation analogue records and magnetic tapes containing transcribed high time-resolution data are retained in Edinburgh.

DIGITAL RECORDING

Two separate digitally recording magnetometer systems are operated at each observatory. Each system uses an EDA pattern FM100B triaxial fluxgate magnetometer to monitor the magnetic elements H , D , and Z . In the primary system (Figure 1) the three voltage outputs from the FM100B are converted to frequencies by the V/F unit. A low-power data logger (Riddick *et al.*, 1981) samples the frequencies at 5 second intervals. The half-minute H , D and Z values are recorded on compact cassette tape. A chart record of the magnetic variation, equivalent to a real-time magnetogram, is recorded on a three-channel potentiometric recorder operated directly from the fluxgate magnetometer output.

As the values written to tape can only be accessed after processing the magnetometer is equipped with a printer to provide a hard copy of the recorded values during baseline observations.

In the secondary system (Figure 1) the data logger performs direct analogue-to-digital conversion of the FM100B output voltages. The secondary logger provides an insurance against data loss from instrument failure or over-ranging of the primary system.

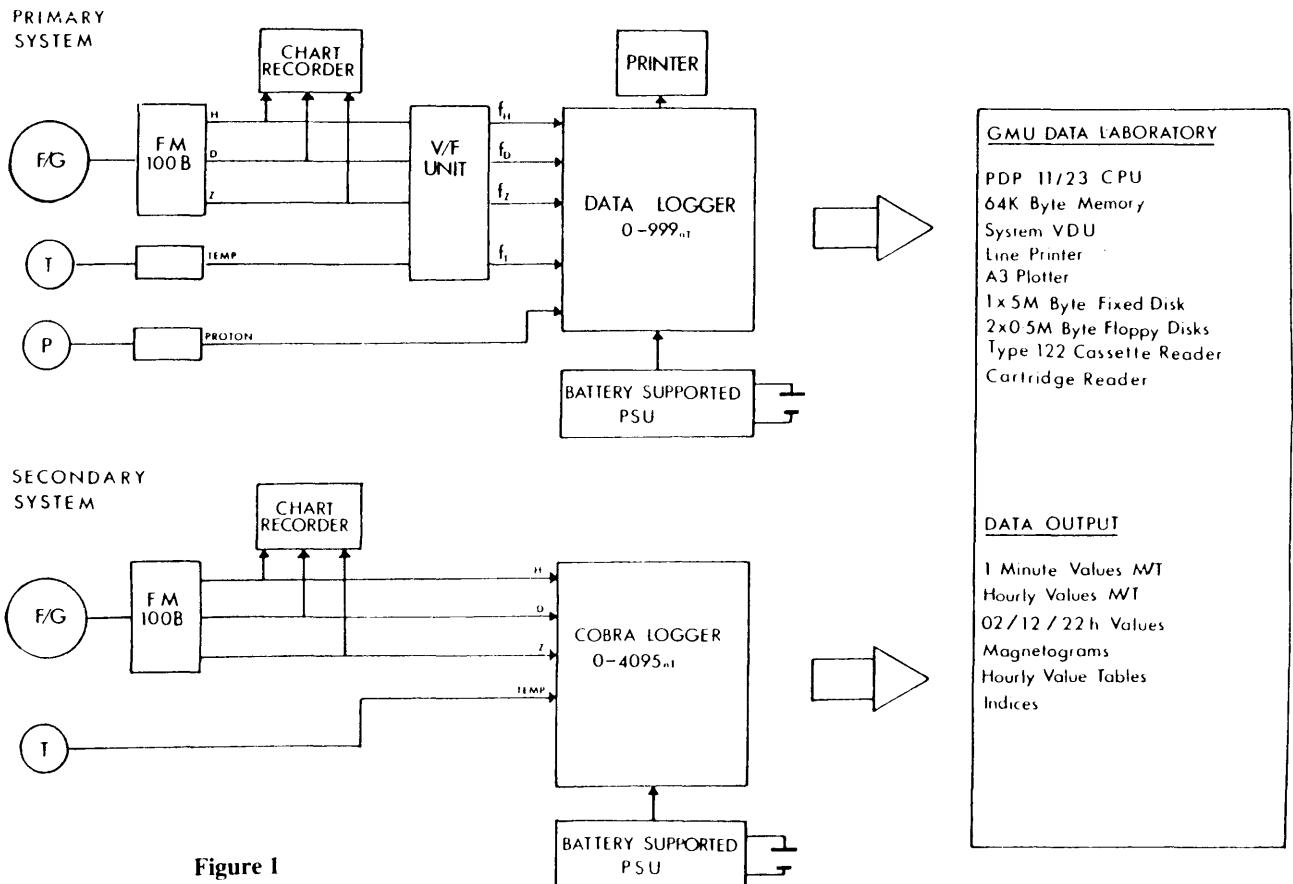


Figure 1

Calibration of the fluxgates of either system was not possible by conventional scale tests as suitable coils for generating orthogonal fields were not available. Each individual magnetometer amplifier was checked in conjunction with the associated fluxgate Z sensor using coil-generated fields.

Prior to the start of the building works the fluxgate magnetometers were housed in the variometer accommodation at each observatory. This provided a good temperature regime with a typical daily range of $\pm 0.5^{\circ}\text{C}$, and worst-case annual variation (at Lerwick) of 5°C . During 1985 it was necessary to move the magnetometers to allow for alterations to the variometer buildings. Alternative accommodation was limited, particularly at Lerwick, where the fluxgate magnetometers were moved to the only remaining hut, the BAS hut, on June 21. During the period June 22 to October 7 the digital fluxgate magnetometers were operated in sub-standard accommodation with poor temperature stabilization and minimal absolute control. Although the Lerwick data have been reduced in the normal way they have not been corrected for temperature fluctuations and it should be recognized that they are not of usual observatory quality.

At Eskdalemuir and Hartland the digital fluxgates were transferred into the non-magnetic laboratories. Difficulties were encountered in maintaining controlled temperatures at both sites, a problem not fully appreciated at Eskdalemuir until a particularly cold spell occurred in early November. Temperature coefficients determined at this time have been used to apply corrections (to 15°C) to all hourly values of H and Z , from August to the end of the year. As mentioned above the laboratory at Eskdalemuir is also used for testing new instruments and the movement of equipment, at weekly intervals, may have affected the fluxgate records.

PHOTO-MAGNETOGRAPHS

The normal-run La Cour photo-magnetograph was continued in operation at Hartland to enable prompt despatch of the K index as a contribution to aa . The K indices for Eskdalemuir and Lerwick were hand-scaled in Edinburgh from computer plotted magnetograms.

NEW INSTRUMENTATION

The problems described above are almost entirely attributable to a decision of the British Geological Survey to automate the three geomagnetic observatories as soon as possible. The implementation of this has not been conducive to good observatory practice. It was unfortunate too that Eskdalemuir and Lerwick became effectively unmanned before the introduction of the new automatic instrumentation. In future, the geomagnetic operation at Eskdalemuir and Lerwick will remain unmanned by BGS staff, though the Meteorological Office will retain staff at both places. Lerwick will be visited by BGS staff from Edinburgh every three months. Eskdalemuir, only 95 km from Edinburgh, can be serviced regularly. Early in 1987 the technical staff at Hartland will be reduced to one person.

The installation of the new computer-based logging system was completed at each observatory by November 1985. This system sends the data in batches, on demand, by the public telephone network. The data are received and processed by a PDP 11/23 in the Geomagnetism Research Group's data laboratory in Edinburgh. Quasi-absolute measurements of Z at Lerwick were made under computer control from Edinburgh from mid-October onwards. The results show that, given stable instrument piers, it should be possible to make satisfactory absolute observations by remote control. The new system should be in full operation by the summer of 1986. A description of this system and of the recent changes to the instrument accommodation will be given in the volume for 1986.

REDUCTION OF RESULTS

The recorded data are processed on a PDP 11/23 minicomputer in the Geomagnetism Research Group's data laboratory (Riddick *et al.*, 1981; Forbes and Riddick, 1984). The data are transcribed from cassette to disk as day-length ASCII files. Each file is displayed on a VDU as a conventional magnetogram, and erroneous values, which show on the screen as transient spikes, are replaced by visually interpolated values. The mean of the zero and 30 second values are then added to the allocated baseline to make minute means. It is these minute means that are used to generate the hourly (Green, 1985), monthly and annual means given in this bulletin. Missing data are made good from the record of the secondary system. The changing of the cassettes on the two systems is staggered to avoid gaps in the data.

In addition to visual inspection of the VDU and computer plotted magnetograms the data are subject to several stages of quality control. Comparisons are made with daily 02 h values measured by proton magnetometer and, for Hartland, with the La Cour magnetogram. The daily means and monthly means are plotted to detect otherwise unnoticed trends.

THE TABLES

SI units are used in this volume, with the hourly means of horizontal and vertical intensity expressed in nanotesla (nT). Declination hourly means are in units of 0.1 minutes and should be added to the tabular base, which is expressed in degrees. The declination is shown as positive when west of true north. Missing hourly values and days containing such missing values are indicated by 999. The values are centered on the UT half-hour. The five international quiet days and five disturbed days are denoted by Q and D.

The K index is a indication of the three-hour range of magnetic variation expressed on a near-logarithmic scale. For an explanation of K and its derivatives see Mayaud (1980).

In the tables of monthly and annual values the magnetic elements are denoted as follows:

<i>D</i>	declination	<i>I</i>	inclination	<i>H</i>	horizontal intensity
<i>X</i>	north intensity	<i>Y</i>	east intensity	<i>Z</i>	vertical intensity
<i>F</i>	total intensity				

Abbreviations employed in the baseline charts:

H_0, D_0, Z_0 baseline values S_H, S_D, S_Z scale values.

DATA AVAILABILITY

The data in this volume, and those for previous years, are available in machine-readable form. Higher-density machine data such as minute-means are retained for about three years. Photo-magnetograms or machine-plotted magnetograms are retained in the archives and are distributed in microfilm to the World Data Centres at Boulder, Moscow, Copenhagen and Kyoto. A monthly booklet is issued for each observatory containing preliminary hourly values, machine-plotted magnetograms and K indices.

In addition to UK data the annual and hourly means (a large part on magnetic tape) from some 200 observatories world-wide are kept in Edinburgh. Models developed from ground and satellite data are available for generating mean field component values for anywhere on the Earth's surface.

Requests for data should be addressed to:

Data Services (WDDC-C1)
Geomagnetism Research Group
British Geological Survey
Murchison House
West Mains Road
Edinburgh EH9 3LA, UK
Telephone 031-667 1000
Telex 727343 SEISED G

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GEOMAGNETISM RESEARCH GROUP 1985

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ESKDALEMUIR 1985

ESKDALEMUIR

DECLINATION WEST

1985 MARCH

7.0 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE, UT, 0-24, MEAN. Rows include dates 1-30 and summary rows for MEAN, MEAN Q, and MEAN D.

ESKDALEMUIR

DECLINATION WEST

1985 APRIL

7.0 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE, UT, 0-24, MEAN. Rows include dates 1-30 and summary rows for MEAN, MEAN Q, and MEAN D.

ESKDALEMUIR

DECLINATION WEST

1985 SEPTEMBER

7.0 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns DATE UT 0-24 and MEAN, containing numerical data for September 1985.

ESKDALEMUIR

DECLINATION WEST

1985 OCTOBER

7.0 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns DATE UT 0-24 and MEAN, containing numerical data for October 1985.

ESKDALEMUIR

HORIZONTAL INTENSITY

1985 JANUARY

17000. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns DATE, UT, 0-24, and MEAN. Rows include data for January 1-31 and summary rows for MEAN, MEAN Q, and MEAN D.

ESKDALEMUIR

HORIZONTAL INTENSITY

1985 FEBRUARY

17000. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns DATE, UT, 0-24, and MEAN. Rows include data for February 1-28 and summary rows for MEAN, MEAN Q, and MEAN D.

ESKDALEMUIR

HORIZONTAL INTENSITY

1985 MARCH

17000. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE, UT, 0-24, MEAN. Rows for days 1-30 and summary rows (MEAN, MEAN Q, MEAN D). Data values range from 300 to 350.

ESKDALEMUIR

HORIZONTAL INTENSITY

1985 APRIL

17000. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE, UT, 0-24, MEAN. Rows for days 1-30 and summary rows (MEAN, MEAN Q, MEAN D). Data values range from 250 to 350.

ESKDALEMUIR

VERTICAL INTENSITY

1985 MAY

45500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE UT 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 MEAN. Rows 1-30, 31, and MEAN. Includes sub-labels D, Q, and MEAN Q/D.

ESKDALEMUIR

VERTICAL INTENSITY

1985 JUNE

45500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE UT 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 MEAN. Rows 1-30, 31, and MEAN. Includes sub-labels Q, D, and MEAN Q/D.

ESKDALEMUIR

VERTICAL INTENSITY

1985 NOVEMBER

45500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns DATE UT 0-24 MEAN and rows 1-30. Data values range from approximately 312 to 373. Includes sub-labels D and Q.

ESKDALEMUIR

VERTICAL INTENSITY

1985 DECEMBER

45500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns DATE UT 0-24 MEAN and rows 1-31. Data values range from approximately 344 to 377. Includes sub-labels D and Q.

Eskdalemuir K INDICES FOR THE YEAR 1985 From D and H combined

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3333 2366	3222 2432	2432 0113	1123 4432	2122 3312	4433 3323	4222 2322	4323 4423	1101 1233	1000 0101	2123 3353	1212 2254
2	3222 2125	0322 2232	2223 3444	1232 3343	4544 2311	1212 2231	1001 2221	2222 2332	0111 2211	2011 0112	0222 4465	4322 2242
3	3212 1134	1100 3330	330 1223	4222 2343	1012 3222	0001 2221	1211 2223	2212 2322	0112 1102	1212 2322	5324 3433	2221 2312
4	3112 1113	1000 0001	2111 1223	2222 3343	2222 2321	2000 2222	2233 5454	2212 3221	0101 0110	3211 2133	4322 2433	1212 1343
5	1111 1112	1232 4344	3333 3456	2212 2010	1122 2332	1111 2221	3323 4333	1221 1211	0001 1112	2443 3464	1012 2234	3112 2221
6	2101 1122	4343 5553	4333 2343	0012 2133	3221 2213	2323 5425	3332 3344	1011 0220	1111 2334	4344 4334	3321 2322	2122 2111
7	1200 1022	3223 3324	3232 3343	0121 2210	3111 2123	3333 4442	4322 3223	2001 1122	3221 1223	4333 2544	2221 1022	1111 1121
8	2011 2454	3213 2444	4433 3333	0011 2334	2122 2323	4433 3322	1223 3443	2111 2222	1111 3333	3322 2343	2010 2132	1000 0120
9	4543 5434	3233 3323	1100 1003	3333 4531	3332 2120	1221 2345	2311 2221	3100 1132	2212 2333	1221 1131	1102 2441	2100 0121
10	4433 3443	3332 3452	2112 2223	0113 2333	0001 2223	4443 2332	2221 2332	1222 2221	1232 1233	1111 1122	3323 3135	2223 3312
11	2223 2343	2222 2333	2001 3120	3222 2301	1221 2220	2312 2332	2322 3332	3212 2010	2222 2141	2222 2333	2212 2222	4211 1223
12	2322 2334	1221 2321	0001 2243	1112 2220	0122 3332	3222 2332	4433 4463	1002 3354	1012 2321	4211 2233	0111 0011	1110 1123
13	2222 3332	0001 2243	0011 1100	0012 2213	3212 2323	0010 1222	2213 4443	4443 3345	0112 1103	2322 3433	3212 3364	3424 4324
14	1212 2311	2122 2334	0011 3232	3321 3222	3211 2221	1011 2202	3432 3311	2232 2222	3233 5323	1213 2221	4312 2233	3221 2224
15	1112 1332	2220 0023	3233 2111	1101 1112	3222 2323	2200 1121	1322 2211	3222 2222	1202 2253	1342 2223	3212 3233	3221 1133
16	2222 1111	0011 2232	2111 3334	1112 3223	0111 2333	0011 1111	1111 2222	2222 2333	4424 4324	3332 2213	2212 2123	3010 0022
17	0012 2332	2222 3231	3011 0043	2021 2013	2112 3323	2111 3422	3324 4321	0332 2223	2212 2233	3212 3433	1121 3542	4111 1211
18	2101 1132	0111 0110	3221 2043	3011 2201	2121 3333	1111 2210	3222 3223	2222 2334	1012 2200	3123 4344	2321 2333	0022 3213
19	1012 1310	1001 2133	1111 2242	2232 3334	2221 2322	0111 2210	2212 3210	2411 3123	2134 3454	4223 2111	3311 1121	2443 3543
20	2000 1331	3222 2121	1012 2200	5453 3245	2011 2331	0111 3523	1311 3321	2321 3323	3333 3334	1122 1121	0001 0001	3222 2101
21	1321 2111	0111 1233	1200 1112	9664 3443	2202 2332	1222 3222	2122 1111	2222 2223	3233 3443	1122 2433	1001 0011	2211 0111
22	1111 1224	2111 2113	3121 1002	2123 2322	2212 1221	1312 1210	1100 2122	3344 2443	3222 3222	2222 2243	2211 2120	1211 2111
23	3544 4334	2111 2333	2201 1122	3122 3331	2301 2221	2202 3210	2323 2333	4323 3333	1123 1210	2222 2224	0111 1001	1010 1122
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26	1012 1222	3211 0122	2112 2132	4433 2444	3102 2421	3223 4343	3322 2334	3222 3334	2234 0234	1012 1001	2222 1012	3201 1021
27	2210 0134	2111 1126	2012 2232	3432 4435	0212 3211	3221 2433	3223 3323	3212 2322	1223 2135	1011 1023	1332 3432	1221 1143
28	5454 4555	5544 4342	4331 2232	5465 4322	0111 2222	4333 3333	4212 3332	2212 2433	1112 2111	2122 1000	2211 0121	3443 3443
29	4312 2245		1011 2232	3521 2221	1120 1211	2123 3332	1101 1221	3222 3342	1101 1111	2223 2110	0022 2366	2221 1012
30	4222 2423		4102 2221	1014 6443	0001 2202	3101 2333	2323 4312	3201 1332	2001 1023	0001 1020	6443 5342	4443 3534
31	3213 3224		2232 2120		3211 1123		1234 4445	3333 3433		0102 1330		3233 3443

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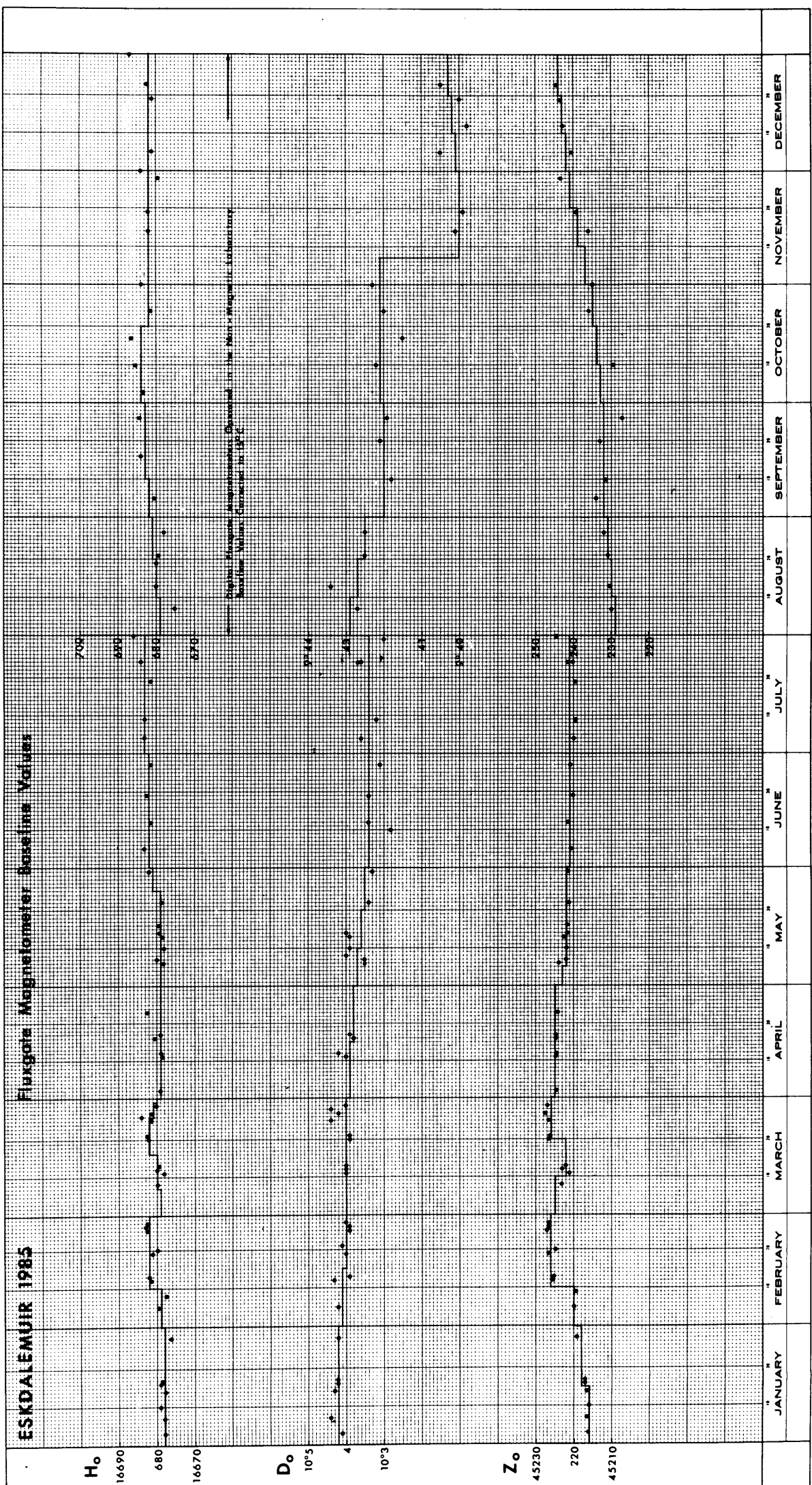
MEAN MONTHLY AND ANNUAL VALUES OF GEOMAGNETIC ELEMENTS

ALL DAYS

	D	I	H	X	Y	Z	F
January	-7° 37.6	69° 19.2	17303	17150	-2296	45841	48998
February	-7° 37.2	69° 19.0	17306	17153	-2295	45839	48997
March	-7° 36.9	69° 18.4	17314	17161	-2294	45835	48996
April	-7° 36.0	69° 18.9	17305	17153	-2294	45834	48992
May	-7° 34.9	69° 18.5	17313	17161	-2284	45836	48997
June	-7° 34.1	69° 18.3	17315	17164	-2281	45834	48996
July	-7° 33.6	69° 18.6	17312	17162	-2278	45838	48998
August	-7° 33.1	69° 18.9	17307	17157	-2274	45839	48997
September	-7° 31.9	69° 19.0	17307	17158	-2268	45843	49001
October	-7° 31.1	69° 19.5	17301	17152	-2264	45847	49003
November	-7° 29.9	69° 19.2	17304	17156	-2258	45841	48998
December	-7° 29.6	69° 19.8	17299	17151	-2256	45851	49006
Year	-7° 33.8	69° 18.9	17307	17156	-2278	45840	48998

INTERNATIONAL QUIET DAYS

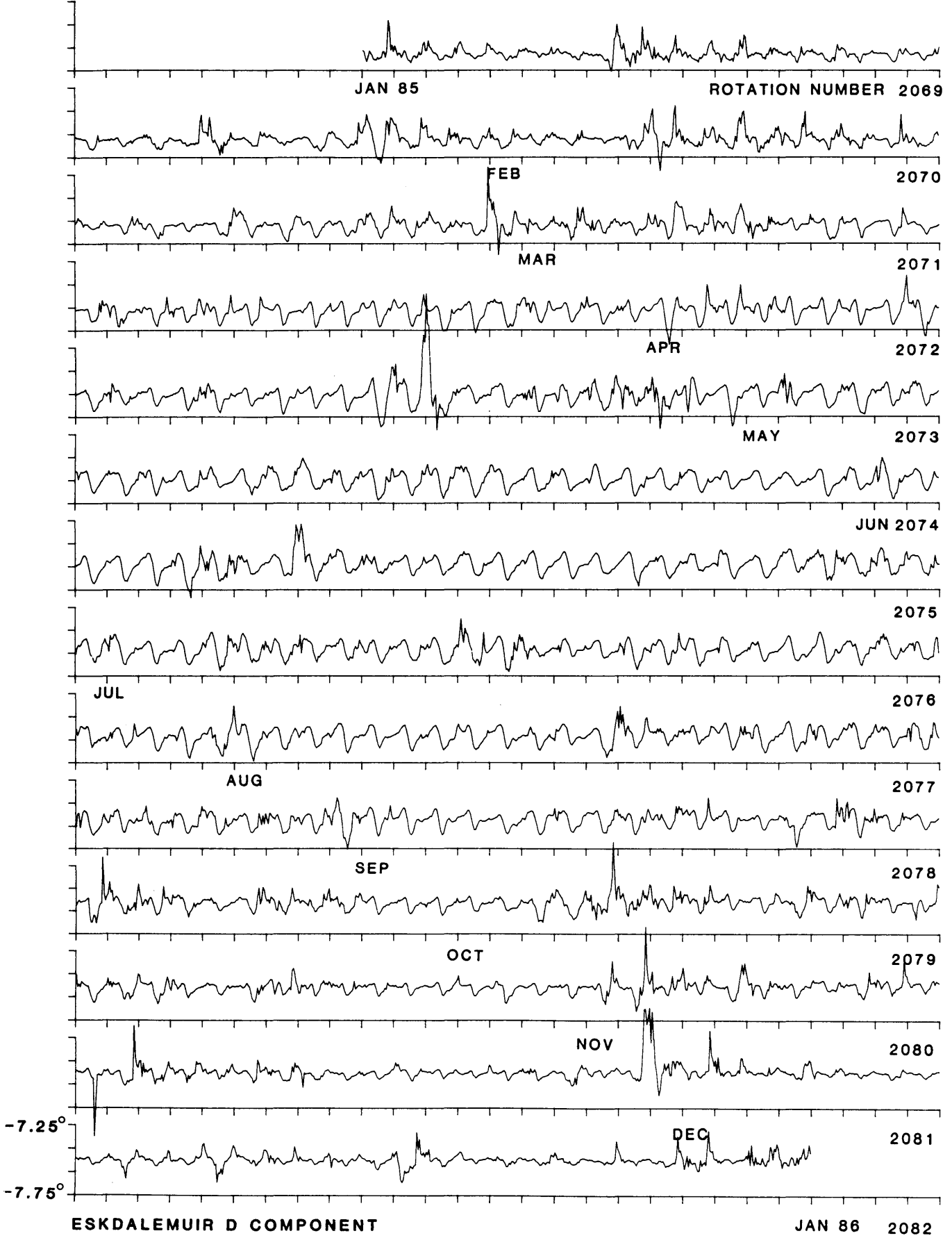
	D	I	H	X	Y	Z	F
January	-7° 37.9	69° 18.7	17310	17157	-2299	45838	48998
February	-7° 37.1	69° 18.6	17311	17158	-2295	45838	48998
March	-7° 37.1	69° 18.1	17318	17156	-2296	45833	48996
April	-7° 36.1	69° 18.3	17314	17162	-2290	45833	48994
May	-7° 35.0	69° 18.0	17319	17168	-2286	45833	48996
June	-7° 34.6	69° 18.4	17315	17164	-2283	45838	48999
July	-7° 33.9	69° 18.5	17314	17163	-2279	45839	49000
August	-7° 33.3	69° 18.6	17311	17161	-2276	45838	48998
September	-7° 32.5	69° 18.7	17311	17161	-2272	45841	49001
October	-7° 31.2	69° 19.0	17308	17159	-2265	45844	49002
November	-7° 30.6	69° 18.7	17310	17162	-2262	45837	48997
December	-7° 29.9	69° 19.2	17307	17159	-2259	45848	49006
Year	-7° 34.1	69° 18.6	17312	17162	-2280	45838	48999



Eskdalemuir 1985 Observed and allocated baseline values D_0 , H_0 and Z_0

DAYS IN SOLAR ROTATION INTERVAL

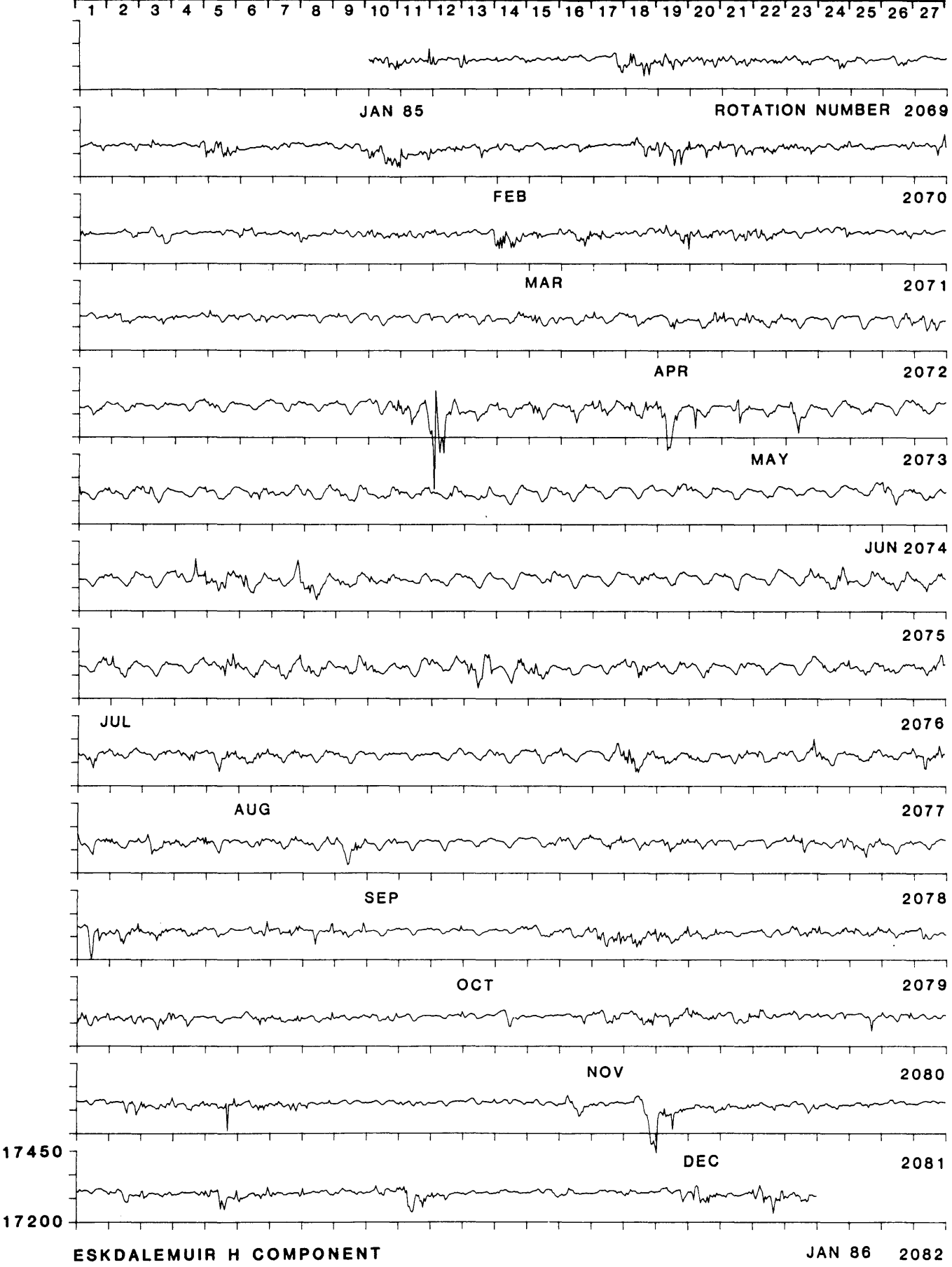
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



DIURNAL VARIATION Vs SOLAR ROTATION

DAYS IN SOLAR ROTATION INTERVAL

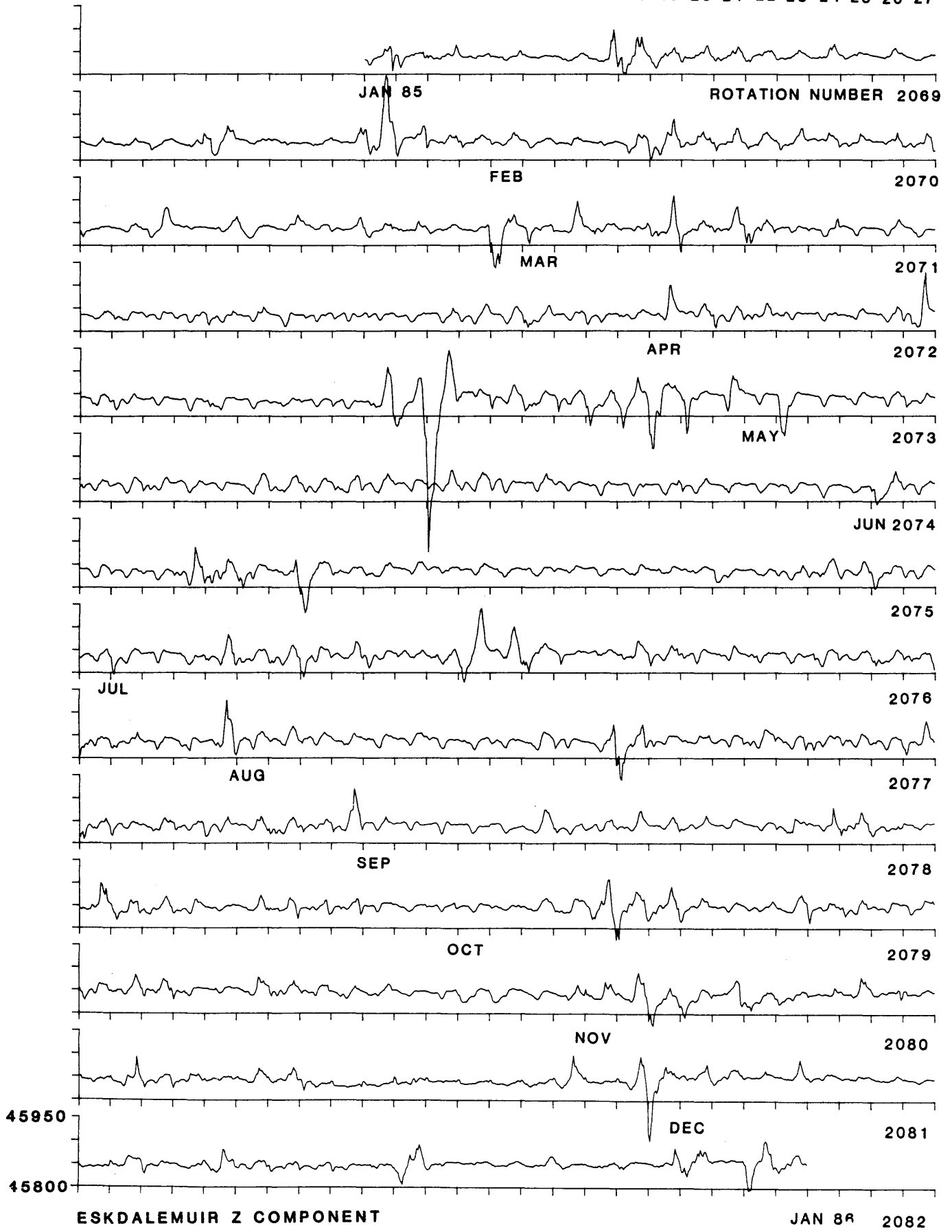
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



DIURNAL VARIATION Vs SOLAR ROTATION

DAYS IN SOLAR ROTATION INTERVAL

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



DIURNAL VARIATION Vs SOLAR ROTATION

ANNUAL VALUES OF GEOMAGNETIC ELEMENTS

ESKDALEMUIR

Year	<i>D</i>	<i>I</i>	<i>H</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>F</i>
1908	- 18 33.3	69 37.3	16821	15947	- 5353	45283	48306
1909	- 18 30.1	69 38.8	16826	15956	- 5339	45360	48380
1910	- 18 23.3	69 37.8	16826	15967	- 5307	45317	48340
1911	- 18 12.4	69 37.1	16836	15993	- 5260	45317	48343
1912	- 18 3.9	69 37.2	16836	16006	- 5221	45318	48344
1913	- 17 54.9	69 37.3	16811	15996	- 5171	45254	48276
1914	- 17 45.3	69 36.1	16793	15993	- 5121	45159	48180
1915	- 17 35.9	69 36.9	16774	15990	- 5072	45142	48158
1916	- 17 26.1	69 37.6	16744	15975	- 5017	45088	48097
1917	- 17 17.1	69 38.6	16720	15965	- 4968	45061	48063
1918	- 17 8.1	69 39.0	16703	15962	- 4921	45034	48032
1919	- 16 58.7	69 39.6	16700	15972	- 4877	45049	48045
1920	- 16 49.6	69 39.5	16693	15978	- 4832	45026	48021
1921	- 16 37.3	69 40.3	16681	15984	- 4771	45025	48016
1922	- 16 25.8	69 40.0	16666	15985	- 4714	44974	47963
1923	- 16 13.8	69 38.8	16661	15997	- 4657	44915	47906
1924	- 16 1.2	69 38.7	16657	16010	- 4597	44898	47889
1925	- 15 48.4	69 39.3	16650	16020	- 4535	44902	47890
1926	- 15 35.3	69 40.3	16632	16020	- 4469	44896	47878
1927	- 15 22.7	69 40.2	16615	16020	- 4406	44843	47822
1928	- 15 10.5	69 41.2	16602	16024	- 4346	44849	47823
1929	- 14 58.9	69 41.9	16586	16022	- 4287	44832	47802
1930	- 14 47.1	69 43.2	16568	16019	- 4228	44834	47797
1931	- 14 34.8	69 43.7	16565	16032	- 4170	44850	47812
1932	- 14 23.7	69 45.0	16553	16033	- 4115	44867	47823
1933	- 14 12.1	69 45.2	16539	16033	- 4058	44839	47792
1934	- 14 0.6	69 45.9	16531	16039	- 4002	44845	47795
1935	- 13 48.8	69 47.0	16520	16042	- 3944	44861	47806
1936	- 13 37.4	69 48.4	16512	16047	- 3889	44894	47834
1937	- 13 26.9	69 49.8	16501	16049	- 3837	44920	47855
1938	- 13 17.1	69 50.7	16499	16057	- 3791	44953	47885
1939	- 13 7.3	69 51.1	16502	16071	- 3746	44977	47909
1940	- 12 57.9	69 51.8	16503	16082	- 3703	45008	47938
1941	- 12 48.2	69 52.5	16503	16093	- 3657	45037	47965
1942	- 12 39.8	69 51.9	16513	16111	- 3620	45039	47971
1943	- 12 31.2	69 52.7	16511	16118	- 3579	45064	47994
1944	- 12 23.0	69 52.5	16518	16134	- 3542	45076	48007
1945	- 12 14.5	69 52.6	16522	16146	- 3503	45093	48025
1946	- 12 5.9	69 54.0	16512	16145	- 3461	45120	48046
1947	- 11 57.1	69 53.9	16520	16162	- 3421	45140	48068
1948	- 11 48.9	69 53.2	16532	16182	- 3385	45144	48076
1949	- 11 40.9	69 52.8	16544	16201	- 3350	45158	48093
1950	- 11 33.2	69 52.0	16564	16228	- 3317	45180	48121
1951	- 11 25.5	69 51.1	16581	16252	- 3284	45193	48139
1952	- 11 18.0	69 50.0	16601	16279	- 3253	45203	48155
1953	- 11 11.0	69 48.7	16625	16309	- 3224	45213	48173
1954	- 11 3.4	69 47.6	16647	16338	- 3193	45228	48194
1955	- 10 56.3	69 46.9	16665	16362	- 3162	45250	48221
1956	- 10 49.7	69 47.0	16674	16377	- 3133	45277	48250
1957	- 10 43.6	69 46.0	16695	16403	- 3107	45296	48275
1958	- 10 38.0	69 45.0	16719	16432	- 3085	45320	48306
1959	- 10 32.1	69 44.1	16742	16460	- 3061	45344	48336
1960	- 10 26.3	69 43.4	16761	16484	- 3037	45370	48367
1961	- 10 20.9	69 41.8	16792	16519	- 3016	45385	48392
1962	- 10 15.7	69 39.8	16825	16556	- 2997	45396	48414
1963	- 10 10.2	69 38.6	16850	16585	- 2975	45413	48438
1964	- 10 5.3	69 36.9	16880	16619	- 2957	45427	48462
1965	- 10 0.8	69 35.4	16907	16649	- 2940	45440	48483
1966	- 9 56.4	69 34.5	16928	16674	- 2922	45460	48509
1967	- 9 52.1	69 33.8	16949	16698	- 2905	45486	48541
1968	- 9 48.6	69 32.5	16979	16731	- 2893	45514	48578
1969	- 9 45.4	60 30.9	17013	16767	- 2883	45542	48616
1970	- 9 41.6	69 29.6	17046	16803	- 2870	45576	48659
1971	- 9 36.8	69 27.8	17084	16844	- 2853	45604	48699
1972	- 9 31.5	69 26.7	17112	16876	- 2832	45635	48738
1973	- 9 25.2	69 25.5	17141	16910	- 2805	45664	48775
1974	- 9 17.4	69 24.5	17169	16944	- 2772	45696	48815
1975	- 9 9.8	69 23.0	17200	16981	- 2739	45719	48847
1976	- 9 1.1	69 21.8	17227	17014	- 2700	45741	48877
1977	- 8 51.2	69 20.6	17249	17044	- 2655	45755	48899
1978	- 8 40.5	69 20.5	17260	17063	- 2603	45780	48926
1979	- 8 30.5	69 19.6	17277	17087	- 2556	45788	48939
1980	- 8 21.3	69 18.5	17294	17110	- 2513	45788	48945
1981	- 8 11.2	69 19.2	17291	17114	- 2462	45806	48961
1982	- 8 1.3	69 19.4	17292	17123	- 2413	45820	48975
1983	- 7 51.7	69 18.9	17301	17139	- 2366	45824	48981
1984	- 7 42.5	69 18.9	17304	17147	- 2321	45830	48988
1985	- 7 33.8	69 18.9	17307	17156	- 2278	45840	48998

HARTLAND 1985

HARTLAND

DECLINATION WEST

1985 MARCH

6.5 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE, UT, 0-24, MEAN. Rows 1-30 with various data points and labels (D, Q) indicating declination changes.

HARTLAND

DECLINATION WEST

1985 APRIL

6.5 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE, UT, 0-24, MEAN. Rows 1-30 with various data points and labels (Q, D) indicating declination changes.

HARTLAND

DECLINATION WEST

1985 SEPTEMBER

6.5 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE, UT, 0-24, MEAN. Rows 1-30 showing values for Q and D phases.

HARTLAND

DECLINATION WEST

1985 OCTOBER

6.5 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE, UT, 0-24, MEAN. Rows 1-31 showing values for Q and D phases.

HARTLAND

HORIZONTAL INTENSITY

1985 JULY

19000. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE, UT, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, MEAN. Rows 1-30 show data points with UT markers (Q, D). Rows 31-35 show MEAN, MEAN Q, and MEAN D values.

HARTLAND

HORIZONTAL INTENSITY

1985 AUGUST

19000. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE, UT, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, MEAN. Rows 1-30 show data points with UT markers (Q, D). Rows 31-35 show MEAN, MEAN Q, and MEAN D values.

HARTLAND

VERTICAL INTENSITY

1985 MARCH 43500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with 28 columns (DATE, UT, 0-24, MEAN) and 33 rows of data for March 1985, including values for each hour and summary statistics like MEAN, MEAN Q, and MEAN D.

HARTLAND

VERTICAL INTENSITY

1985 APRIL 43500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with 28 columns (DATE, UT, 0-24, MEAN) and 33 rows of data for April 1985, including values for each hour and summary statistics like MEAN, MEAN Q, and MEAN D.

HARTLAND

VERTICAL INTENSITY

1985 MAY

43500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE UT, 0-24, MEAN. Rows 1-30 show daily vertical intensity data for May 1985, including specific values for each hour and a mean value for each day.

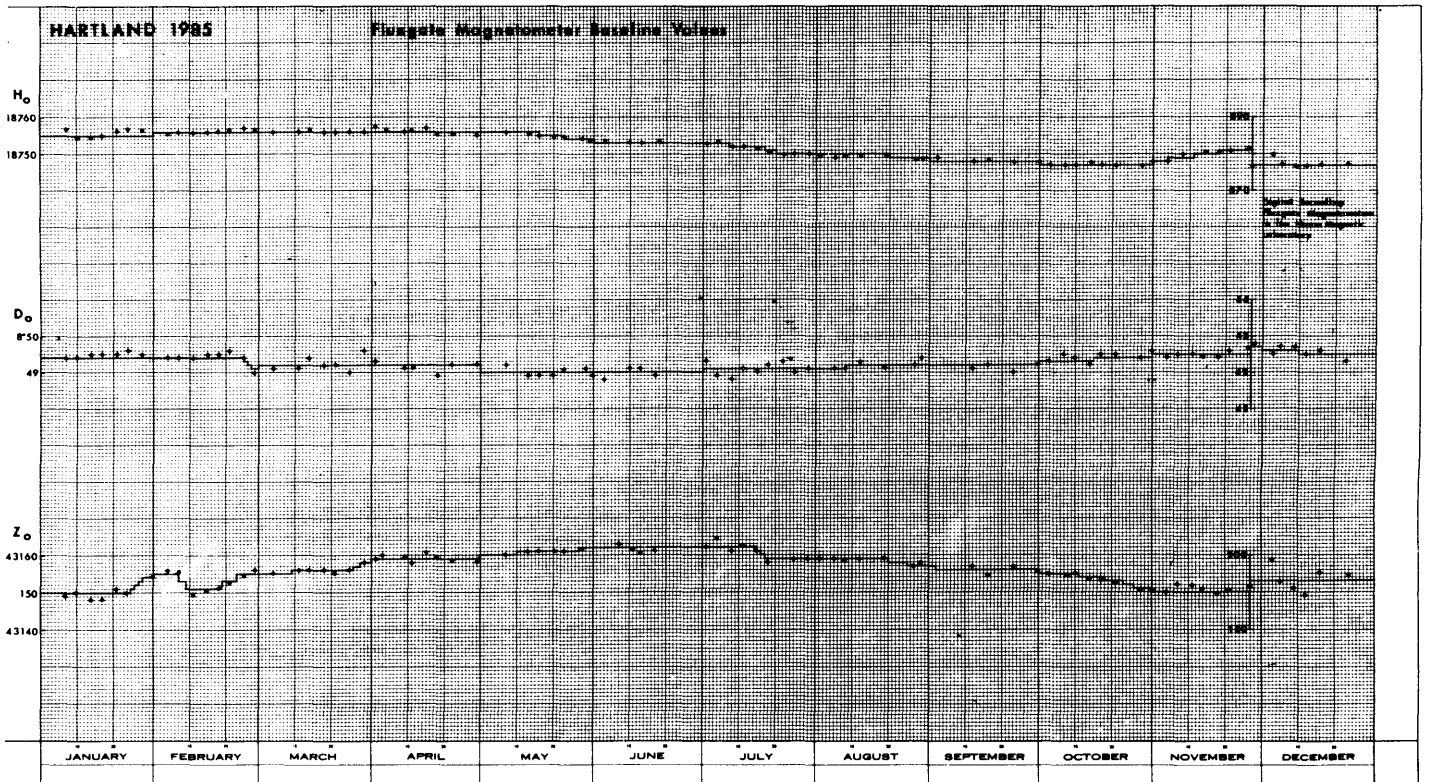
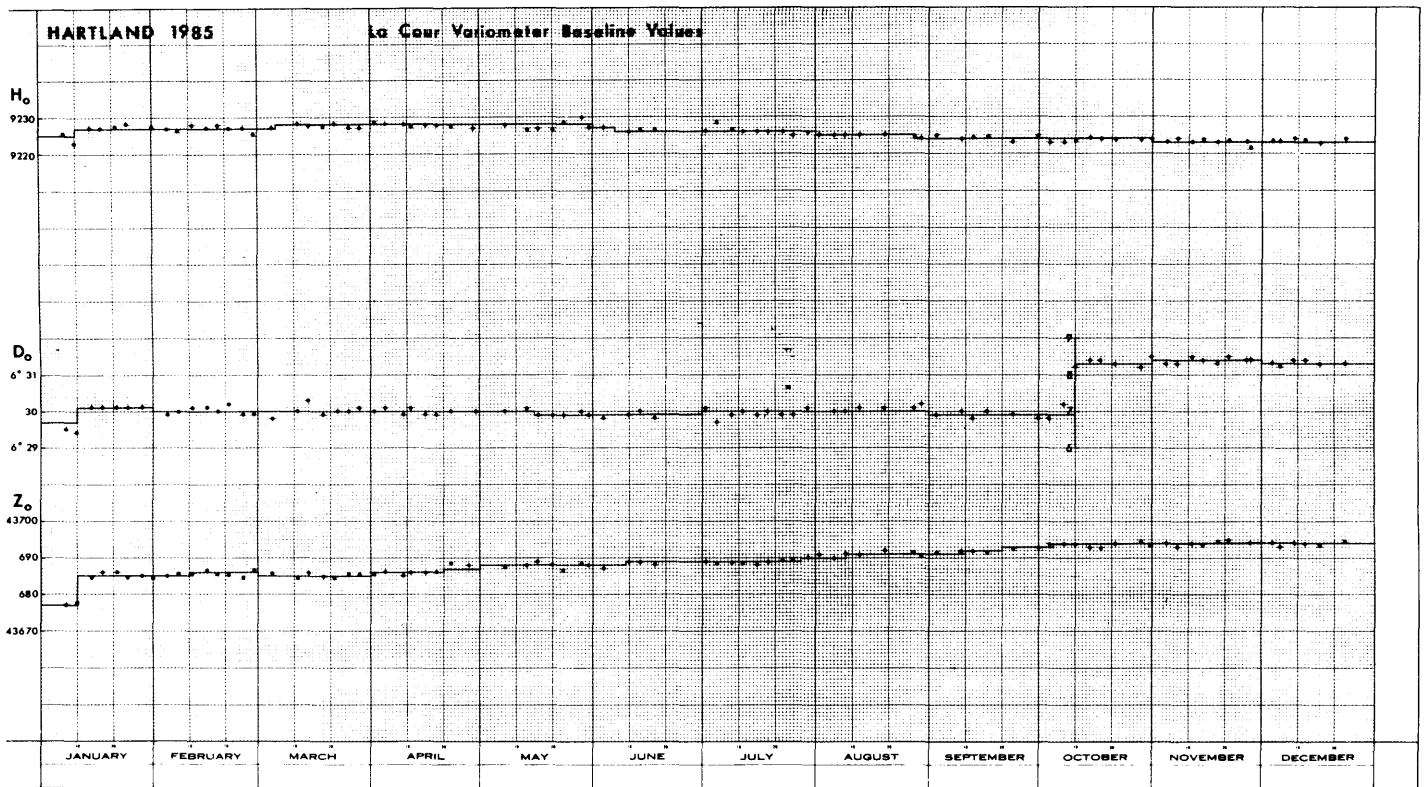
HARTLAND

VERTICAL INTENSITY

1985 JUNE

43500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

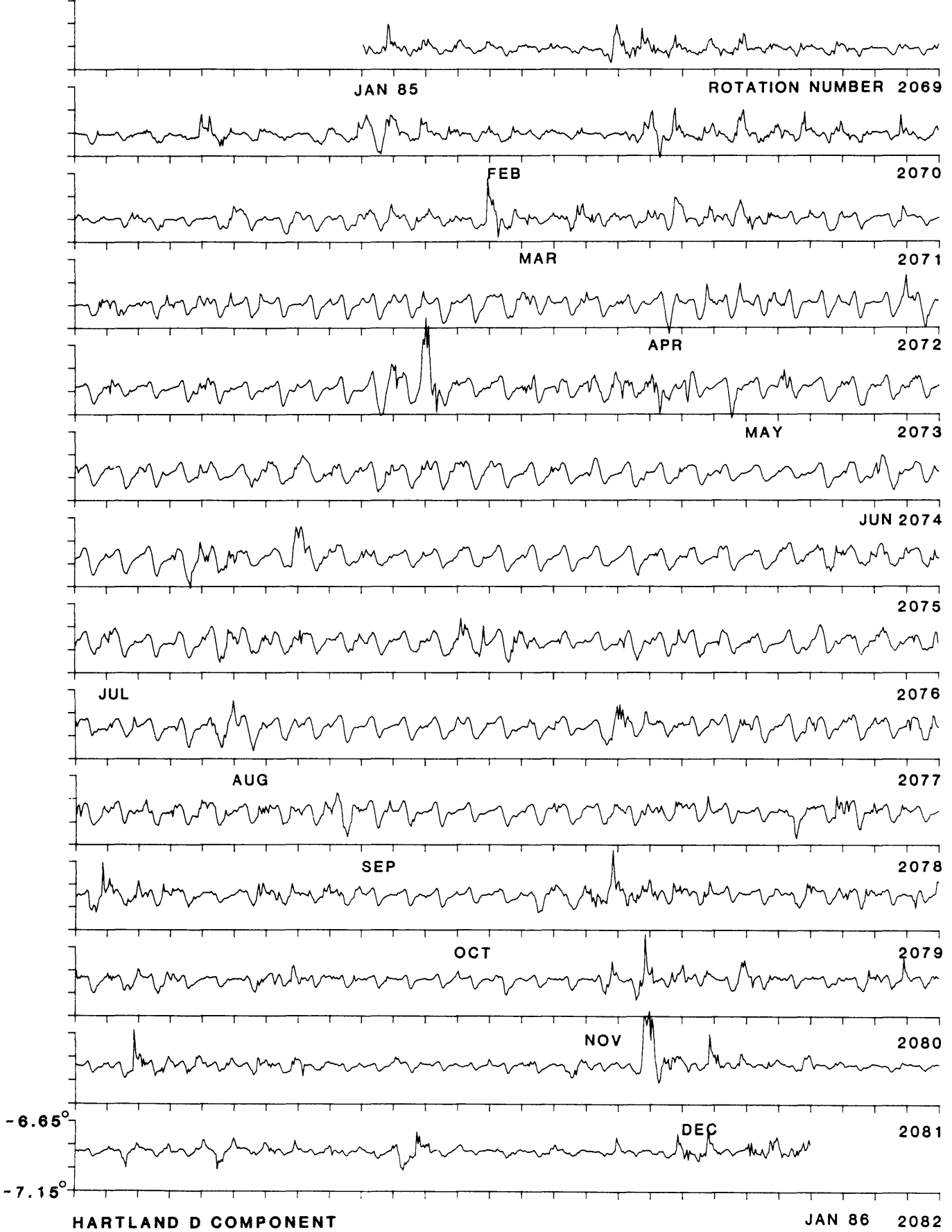
Table with columns: DATE UT, 0-24, MEAN. Rows 1-30 show daily vertical intensity data for June 1985, including specific values for each hour and a mean value for each day.



Hartland 1985 Observed and allocated baseline values D_0 , H_0 and Z_0

DAYS IN SOLAR ROTATION INTERVAL

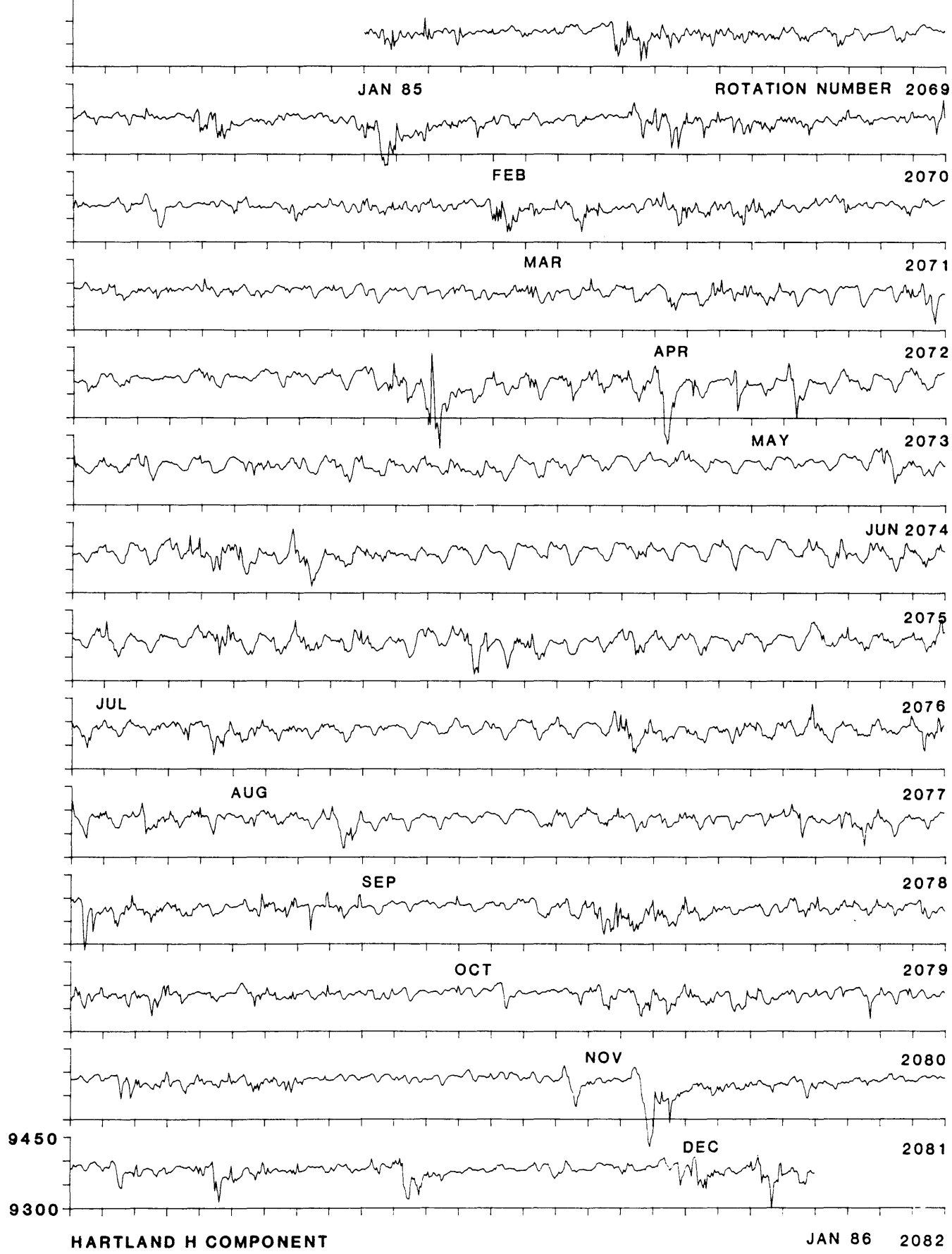
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



DIURNAL VARIATION Vs SOLAR ROTATION

DAYS IN SOLAR ROTATION INTERVAL

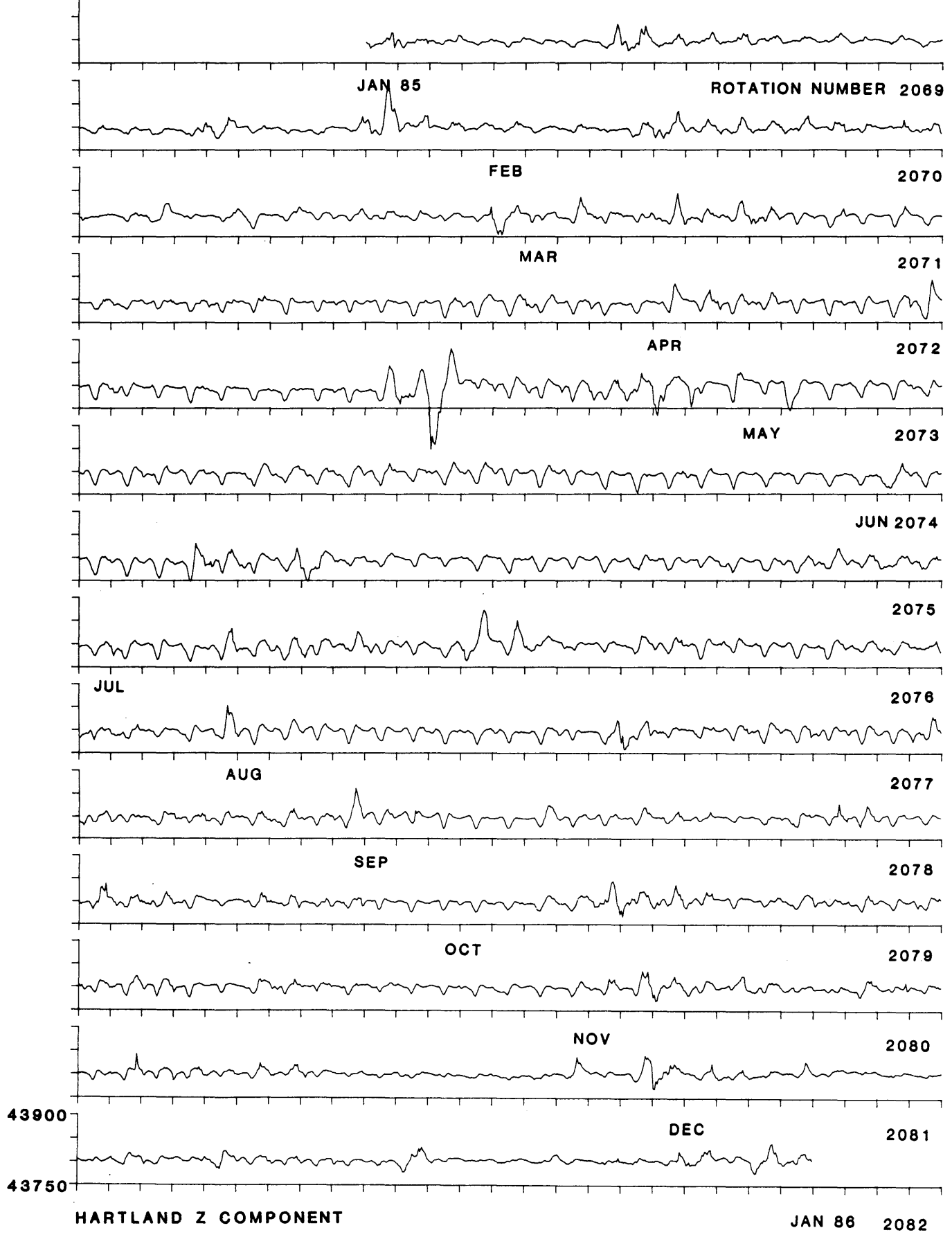
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



DIURNAL VARIATION Vs SOLAR ROTATION

DAYS IN SOLAR ROTATION INTERVAL

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



DIURNAL VARIATION Vs SOLAR ROTATION

ANNUAL VALUES OF GEOMAGNETIC ELEMENTS

ABINGER

Year	D	I	H	X	Y	Z	F
1925	- 13 22.7	66 35.1	18597	18092	- 4303	42946	46801
1926	- 13 10.4	66 36.3	18581	18092	- 4234	42947	46794
1927	- 12 58.4	66 36.2	18575	18101	- 4170	42932	46777
1928	- 12 47.0	66 37.2	18564	18104	- 4108	42941	46782
1929	- 12 35.8	66 37.2	18555	18108	- 4047	42918	46758
1930	- 12 24.6	66 38.2	18542	18109	- 3985	42924	46757
1931	- 12 13.7	66 38.1	18543	18122	- 3928	42923	46756
1932	- 12 2.6	66 39.1	18536	18128	- 3868	42940	46770
1933	- 11 51.7	66 39.4	18532	18136	- 3809	42942	46770
1934	- 11 41.1	66 39.7	18533	18149	- 3754	42955	46782
1935	- 11 30.3	66 40.9	18527	18155	- 3695	42981	46805
1936	- 11 20.0	66 41.8	18524	18163	- 3640	43007	46827
1937	- 11 10.4	66 42.7	18522	18171	- 3589	43031	46848
1938	- 11 1.4	66 43.2	18522	18180	- 3542	43050	46865
1939	- 10 51.9	66 43.5	18528	18196	- 3492	43074	46890
1940	- 10 43.0	66 43.9	18533	18210	- 3446	43099	46915
1941	- 10 33.8	66 44.3	18539	18225	- 3399	43128	46944
1942	- 10 24.8	66 43.9	18554	18248	- 3354	43146	46966
1943	- 10 16.2	66 44.5	18556	18259	- 3308	43172	46991
1944	- 10 7.8	66 44.3	18566	18277	- 3265	43189	47010
1945	- 9 59.5	66 44.3	18573	18291	- 3223	43207	47030
1946	- 9 51.1	66 45.4	18569	18295	- 3177	43235	47054
1947	- 9 43.1	66 45.2	18577	18310	- 3136	43246	47067
1948	- 9 35.4	66 44.4	18593	18333	- 3098	43255	47082
1949	- 9 27.5	66 44.0	18607	18354	- 3058	43273	47104
1950	- 9 19.7	66 43.0	18628	18382	- 3019	43288	47126
1951	- 9 12.2	66 42.1	18648	18408	- 2983	43305	47149
1952	- 9 4.7	66 41.0	18670	18436	- 2946	43316	47168
1953	- 8 57.5	66 39.5	18695	18467	- 2911	43321	47183
1954	- 8 50.9	66 38.1	18720	18497	- 2879	43332	47203
1955	- 8 43.6	66 37.3	18738	18521	- 2843	43348	47225
1956	- 8 36.8	66 37.4	18750	18539	- 2808	43376	47255

HARTLAND

1957	- 10 17.2	66 47.8	18627	18328	- 3326	43451	47275
1958	- 10 11.0	66 46.3	18655	18361	- 3298	43465	47299
1959	- 10 5.0	66 45.1	18681	18392	- 3271	43484	47327
1960	- 9 58.8	66 43.9	18707	18424	- 3242	43504	47356
1961	- 9 53.0	66 41.7	18744	18466	- 3217	43512	47378
1962	- 9 46.9	66 39.5	18779	18506	- 3190	43517	47396
1963	- 9 40.6	66 37.9	18807	18539	- 3161	43528	47417
1964	- 9 35.2	66 35.9	18840	18577	- 3138	43535	47437
1965	- 9 30.1	66 33.9	18872	18613	- 3115	43540	47454
1966	- 9 25.1	66 32.7	18897	18642	- 3092	43554	47477
1967	- 9 20.3	66 31.6	18923	18672	- 3071	43573	47505
1968	- 9 15.5	66 29.9	18956	18709	- 3050	43592	47535
1969	- 9 11.1	66 27.9	18994	18750	- 3032	43611	47568
1970	- 9 6.5	66 26.1	19033	18793	- 3013	43636	47606
1971	- 9 1.1	66 23.8	19075	18839	- 2990	43655	47640
1972	- 8 55.3	66 22.1	19110	18879	- 2964	43676	47674
1973	- 8 48.2	66 20.5	19144	18918	- 2930	43697	47707
1974	- 8 40.4	66 19.1	19175	18956	- 2892	43719	47739
1975	- 8 32.3	66 17.0	19212	18999	- 2852	43733	47767
1976	- 8 23.1	66 15.7	19240	19034	- 2806	43749	47793
1977	- 8 13.7	66 13.9	19271	19073	- 2758	43758	47813
1978	- 8 3.6	66 13.3	19286	19095	- 2704	43773	47833
1979	- 7 53.5	66 12.0	19309	19127	- 2651	43778	47847
*							
1980	- 7 43.8	66 10.3	19330	19154	- 2600	43768	47848
1981	- 7 33.9	66 10.2	19335	19167	- 2546	43777	47857
1982	- 7 24.7	66 10.1	19342	19180	- 2495	43787	47869
1983	- 7 15.1	66 09.0	19358	19203	- 2443	43787	47876
1984	- 7 5.5	66 08.6	19366	19218	- 2391	43791	47882
1985	- 6 56.1	66 07.9	19379	19237	- 2340	43796	47892

* When Hartland adopted the proton magnetometer as the observatory standard on 1 January 1980, this involved a change in the point of observation. The measured site differences are (new pillar minus old pillar):

H - 0.5 nT; Z + 6.0 nT.

LERWICK 1985

LERWICK

DECLINATION WEST

1985 MAY

6.5 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE UT, 0-24, MEAN. Rows for days 1-30 and summary rows (MEAN, MEAN Q, MEAN D). Values range from 276 to 426.

LERWICK

DECLINATION WEST

1985 JUNE

6.5 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE UT, 0-24, MEAN. Rows for days 1-30 and summary rows (MEAN, MEAN Q, MEAN D). Values range from 212 to 426.

LERWICK

DECLINATION WEST

1985 SEPTEMBER

6.5 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE UT, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, MEAN. Rows include dates 1-30 and summary rows (MEAN, MEAN Q, MEAN D).

LERWICK

DECLINATION WEST

1985 OCTOBER

6.5 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE UT, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, MEAN. Rows include dates 1-31 and summary rows (MEAN, MEAN Q, MEAN D).

LERWICK

DECLINATION WEST

1985 NOVEMBER

6.5 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE, UT, 0-24, MEAN. Rows 1-30 showing declination values for November 1985. Includes sub-rows for Q and D observations.

LERWICK

DECLINATION WEST

1985 DECEMBER

6.5 DEGREES PLUS TABULAR QUANTITIES (UNIT 0.1 MINUTES)

Table with columns: DATE, UT, 0-24, MEAN. Rows 1-31 showing declination values for December 1985. Includes sub-rows for Q and D observations.

LERWICK

HORIZONTAL INTENSITY

1985 MARCH

14500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns DATE UT, 0-24, MEAN. Rows include data for dates 1-15, 16-25, 26-30, 31, MEAN, MEAN Q, MEAN D. Values are numerical intensity readings.

LERWICK

HORIZONTAL INTENSITY

1985 APRIL

14500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns DATE UT, 0-24, MEAN. Rows include data for dates 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, MEAN, MEAN Q, MEAN D. Values are numerical intensity readings.

LERWICK

HORIZONTAL INTENSITY

1985 MAY

14500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE UT 0-24, MEAN, and rows 1-31. Each row contains 25 data points and a mean value. Rows 1-5 are labeled 'D', rows 11-15 'D', rows 16-20 'D', rows 21-25 'Q', rows 26-30 'Q', and row 31 'Q'.

LERWICK

HORIZONTAL INTENSITY

1985 JUNE

14500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE UT 0-24, MEAN, and rows 1-31. Each row contains 25 data points and a mean value. Rows 1-5 are labeled 'Q', rows 6-10 'D', rows 11-15 'Q', rows 16-20 'Q', rows 21-25 'Q', rows 26-30 'D', and row 31 'D'.

LERWICK

HORIZONTAL INTENSITY

1985 JULY

14500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

DATE	UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1		438	436	428	442	439	441	442	422	417	411	405	407	423	434	437	450	456	463	465	468	459	456	450	446	439	
2	Q	440	441	444	445	443	438	434	429	420	410	401	402	415	425	442	449	452	460	460	454	455	450	449	449	438	
3		449	447	444	439	442	441	435	429	423	415	412	414	418	428	439	443	445	447	455	463	464	470	457	444	440	
4	D	441	439	437	446	456	458	450	442	439	436	421	436	448	410	438	488	487	480	466	497	460	423	410	448	448	
5		441	440	422	399	425	434	433	426	415	409	400	401	421	419	427	440	451	445	461	463	461	452	441	425	431	
6	D	409	430	415	405	428	443	418	401	400	397	386	397	410	421	423	445	463	471	473	474	480	478	454	417	431	
7		356	403	379	442	451	424	431	429	423	420	416	412	424	448	457	461	448	453	464	471	470	461	446	433	434	
8		445	446	450	447	439	438	430	445	439	430	413	417	411	424	428	426	450	494	495	483	465	447	442	429	443	
9		432	435	432	419	398	423	419	424	424	417	415	414	416	423	425	432	443	451	454	458	460	448	441	440	431	
10		435	436	442	444	450	451	449	443	430	419	411	410	417	426	432	446	467	471	478	480	481	461	450	462	446	
11		466	462	451	453	456	451	442	442	430	426	431	421	418	424	435	441	453	466	476	475	469	462	450	449	448	
12	D	443	429	444	358	379	448	427	426	430	401	382	399	425	440	500	592	642	577	544	476	431	444	440	442	455	
13	D	446	448	454	456	455	449	441	434	422	413	402	387	397	429	453	458	516	513	519	474	470	437	416	383	445	
14		401	426	418	415	372	421	430	402	411	417	405	405	412	434	426	437	457	463	459	452	450	446	444	444	427	
15		439	435	432	433	418	421	445	442	426	419	420	422	431	431	431	436	442	449	452	452	450	449	446	444	436	
16	Q	439	438	438	443	444	449	449	441	427	419	416	417	429	441	444	452	441	445	454	456	452	458	455	458	442	
17		464	449	442	437	420	457	463	461	445	434	404	421	406	447	471	460	443	451	448	446	448	446	448	445	444	
18		442	439	448	439	444	450	447	439	427	418	412	412	418	435	430	446	459	477	456	457	462	443	431	442	441	
19		446	444	452	454	457	454	445	438	432	422	410	402	423	435	421	445	449	457	462	455	454	451	449	447	442	
20		449	450	452	438	444	446	446	439	434	430	421	412	427	443	462	468	463	445	448	455	458	455	454	457	446	
21	Q	455	454	443	447	455	449	438	435	424	418	418	423	425	437	441	444	449	454	457	462	461	460	459	458	444	
22	Q	457	455	457	456	455	454	451	441	428	421	414	411	415	424	434	442	451	455	461	463	477	478	478	472	448	
23		472	468	465	459	436	449	443	434	428	421	418	426	443	434	445	449	453	465	467	469	456	453	451	464	449	
24		441	442	443	445	448	446	438	429	427	425	420	412	405	419	416	419	435	444	451	454	455	452	436	434	435	
25		423	439	412	405	426	432	422	411	422	423	413	419	417	421	431	438	446	447	458	455	454	447	442	443	431	
26		444	437	435	437	433	415	437	435	425	412	406	421	424	429	444	450	433	445	457	462	485	476	440	421	438	
27		431	435	421	438	443	433	416	419	432	420	406	385	415	415	431	440	446	447	449	442	466	448	448	445	431	
28		437	438	429	410	426	440	435	429	428	425	417	417	427	437	439	443	448	451	462	462	447	447	442	441	436	
29	Q	438	442	440	440	442	440	440	434	426	419	416	424	437	441	447	448	454	445	456	457	458	452	447	445	441	
30		447	449	453	454	434	422	446	443	435	428	421	412	436	456	429	449	458	452	449	450	453	453	456	460	443	
31	D	460	450	450	450	450	443	421	390	392	376	380	411	435	448	509	570	553	467	482	474	456	430	368	386	444	
MEAN		440	441	438	435	436	441	438	431	425	418	410	412	421	431	441	455	463	463	465	463	460	453	443	441	440	
MEAN Q		446	446	444	446	448	446	442	436	425	417	413	415	424	434	442	447	449	452	458	458	461	460	458	456	443	
MEAN D		440	439	440	423	434	448	431	419	417	405	394	406	423	430	465	511	532	502	497	479	459	442	418	415	445	

LERWICK

HORIZONTAL INTENSITY

1985 AUGUST

14500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

DATE	UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1		413	430	433	425	426	415	409	415	414	415	413	425	421	438	464	438	446	452	456	454	454	467	447	441	434	
2		436	438	435	440	443	433	429	428	414	409	417	428	434	440	448	460	454	472	461	458	454	431	423	441	439	
3		434	439	441	442	442	444	438	432	422	414	413	418	420	433	434	443	452	460	458	459	458	455	453	443	440	
4		446	442	446	434	441	435	429	435	429	421	411	411	413	425	431	443	449	453	452	454	449	447	438	442	436	
5	Q	441	442	442	445	444	442	436	428	420	415	417	423	430	439	442	442	448	449	447	451	448	447	447	447	439	
6	Q	445	449	449	449	448	446	444	441	433	426	420	413	416	427	432	437	446	456	459	463	459	451	450	449	442	
7	Q	447	448	451	451	453	450	442	436	431	424	419	419	420	425	434	444	446	445	447	454	462	463	458	451	442	
8		439	437	442	445	444	437	435	430	426	421	416	414	410	417	424	425	427	438	444	452	450	445	438	430	433	
9	Q	443	442	436	440	443	441	435	424	410	401	400	404	417	425	432	437	434	437	446	451	451	451	456	453	434	
10		454	449	446	447	448	454	444	429	432	417	400	395	400	416	431	442	440	435	442	443	445	440	444	448	435	
11	Q	451	443	434	442	444	442	437	428	420	412	406	405	410	422	428	431	436	439	443	446	446	446	446	446	433	
12	D	444	444	443	444	445	443	440	438	432	421	417	412	405	419	430	438	444	449	474	486	457	470	399	244	431	
13	D	358	383	274	400	419	377	425	417	381	389	376	392	403	412	431	434	434	457	467	465	439	447	439	433	410	
14		435	422	421	418	427	437	406	412	411	403	406	405	411	421	415	430	434	436	446	442	446	442	442	434	425	
15		422	430	421	420	417	409	427	423	413	416	413	414	416	412	414	422	436	438	441	440	444	436	431	422	424	
16		415	421	423	427	430	433	433	428	418	408	403	409	418	436	436	426	428	437	441	455	441	440	439	431	428	
17		440	441	437	421	439	448	444	432	407	397	402	408	410	417	428	434	432	423	435	440	443	441	432	438	429	
18		436	436	442	447	443	448	442	433	424	411	409	410	413	417	425	438	453	453	457	468	459	485	458	432	439	
19		436	442	442	400	413	426	421	421	418	409	401	396	399	416	432	445	446	448	447	446	452	442	440	440	428	
20		436	425																								

LERWICK

HORIZONTAL INTENSITY

1985 SEPTEMBER

14500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE, UT, 0-24, MEAN. Rows 1-30 showing intensity data for September. Includes sub-headers Q, D and a final MEAN row.

LERWICK

HORIZONTAL INTENSITY

1985 OCTOBER

14500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE, UT, 0-24, MEAN. Rows 1-31 showing intensity data for October. Includes sub-headers Q, D and a final MEAN row.

LERWICK

HORIZONTAL INTENSITY

1985 NOVEMBER

14500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with 26 columns (DATE, UT, 0-24) and 1 Mean column. Rows contain numerical data points for dates 1 through 30, with UT values and a Mean value.

LERWICK

HORIZONTAL INTENSITY

1985 DECEMBER

14500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with 26 columns (DATE, UT, 0-24) and 1 Mean column. Rows contain numerical data points for dates 1 through 31, with UT values and a Mean value.

LERWICK

VERTICAL INTENSITY

1985 JANUARY

47500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

DATE	UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	D	393	392	392	371	373	386	400	407	410	412	419	422	420	419	421	442	439	433	441	434	419	292	379	415	415	406
2		413	410	376	350	375	395	407	409	410	411	414	421	424	424	425	421	423	427	428	425	432	394	399	415	415	410
3		402	412	413	404	401	407	408	408	409	410	413	417	419	420	421	423	421	418	418	421	443	469	447	421	418	418
4		407	405	404	408	409	411	411	412	414	414	413	412	414	418	419	418	416	416	416	416	416	418	421	420	417	405
5	Q	413	413	413	414	415	412	411	411	412	413	412	409	408	410	413	415	416	418	420	417	418	425	437	430	409	415
6	Q	414	424	414	416	415	413	412	412	413	414	414	414	414	414	417	418	418	421	420	419	416	416	409	411	416	416
7	Q	416	411	414	414	411	407	405	407	407	405	404	406	408	409	412	415	417	420	427	431	429	427	419	417	417	414
8		415	407	409	409	409	409	410	407	403	404	405	405	407	410	409	412	442	526	501	521	429	351	321	418	418	
9	D	360	403	401	308	330	330	377	393	391	401	431	426	435	503	488	445	448	497	460	437	427	410	406	406	413	
10	D	394	372	370	358	352	370	392	405	415	415	420	432	423	419	419	429	430	444	448	426	422	419	398	379	406	
11		379	400	409	406	405	409	410	410	413	416	425	417	418	424	427	428	425	439	457	464	429	413	410	405	418	
12		394	386	400	408	404	394	402	410	413	415	420	423	420	427	439	430	425	441	453	446	434	423	401	404	417	
13		388	390	397	382	400	413	417	419	422	425	423	419	418	419	429	426	433	438	431	439	431	423	415	398	416	
14		399	406	409	408	408	404	404	409	414	415	416	423	420	422	425	425	439	438	429	428	426	421	418	416	418	
15		410	409	409	408	407	407	408	409	413	411	413	418	416	416	420	445	454	441	456	466	445	429	417	414	423	
16		414	413	410	401	400	406	409	411	415	416	419	422	416	421	423	421	420	418	418	418	417	418	416	415	415	
17		416	416	415	412	410	409	408	407	408	410	416	420	420	421	426	444	446	450	435	424	420	421	421	414	420	
18	Q	413	414	412	412	409	407	406	403	404	404	406	407	408	411	413	415	414	414	415	417	417	416	418	413	411	
19		416	417	416	414	411	409	406	405	404	404	406	405	410	414	415	419	425	436	420	413	411	410	411	412	413	
20	Q	410	406	407	406	408	407	406	405	403	402	405	406	408	410	414	412	417	419	427	433	421	413	411	411	412	
21		412	413	414	413	411	400	378	385	392	395	397	404	410	414	417	418	425	427	425	426	422	428	424	418	411	
22		415	413	413	412	411	410	409	408	407	405	405	409	405	407	411	415	421	431	419	413	409	412	448	414	413	
23	D	419	420	418	423	349	346	350	363	375	386	404	413	418	448	446	447	484	468	454	458	460	429	413	417	417	
24		419	416	418	419	420	419	418	416	414	412	411	410	409	413	416	419	418	422	425	423	422	417	420	421	417	
25		417	409	418	424	425	423	419	417	413	413	413	415	414	409	407	410	413	414	414	412	413	412	409	408	414	
26		410	410	411	411	412	412	410	410	407	405	407	408	406	407	409	410	410	420	426	428	429	429	432	430	414	
27		416	416	416	416	418	416	415	415	415	416	415	415	416	417	411	412	414	418	436	457	461	485	452	444	425	
28	D	467	451	394	358	329	364	391	402	393	386	401	408	449	524	543	519	527	573	555	461	461	436	418	393	442	
29		282	305	355	382	400	414	422	424	427	427	428	428	429	425	422	431	440	436	441	456	474	479	460	335	413	
30		368	411	418	416	413	412	409	410	413	416	416	417	416	419	424	426	434	436	427	429	429	438	422	401	417	
31		417	408	376	397	408	410	411	411	415	418	415	424	438	432	432	433	441	444	436	431	424	422	419	415	420	
MEAN		403	406	405	399	398	401	405	407	409	409	413	415	417	424	426	427	431	438	439	434	432	422	417	407	416	
MEAN Q		413	414	412	412	412	409	408	408	408	407	408	408	410	412	414	416	418	420	422	421	420	420	418	413	413	
MEAN D		407	408	395	364	347	359	382	394	397	400	415	420	429	463	463	456	466	483	472	443	438	397	403	402	417	

LERWICK

VERTICAL INTENSITY

1985 FEBRUARY

47500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

DATE	UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1		392	398	407	412	410	407	406	405	404	405	410	412	420	427	425	426	440	444	432	434	427	417	414	416	416	
2		417	417	416	410	397	381	381	390	395	404	408	415	416	416	420	420	421	424	425	421	424	416	411	407	410	
3		399	400	405	411	410	408	407	406	406	406	409	410	420	428	425	422	429	418	420	410	411	411	412	412	412	
4	Q	414	413	414	413	412	411	410	408	406	408	411	412	410	408	410	411	412	413	412	411	412	416	414	413	411	
5	D	415	412	412	414	409	405	402	380	376	385	395	401	407	414	443	458	443	436	433	445	435	412	357	413	413	
6	D	302	313	361	390	399	389	392	370	366	389	406	416	463	476	451	435	434	505	511	450	431	407	408	362	409	
7		375	385	394	410	414	410	402	408	404	406	411	416	445	436	433	442	448	430	424	422	422	429	395	398	415	
8	D	408	385	357	390	401	407	409	409	406	409	423	415	413	415	416	442	441	465	458	444	412	380	388	397	412	
9		391	376	367	386	388	393	394	403	410	400	405	416	421	441	441	448	448	436	433	423	420	409	405	404	411	
10	D	400	403	368	376	392	401	406	406	410	412	412	415	424	431	435	438	446	485	459	439	421	419	412	418	418	
11		404	408	408	413	414	413	410	409	412	413	416	415	417	419	428	448	434	429	436	426	422	423	401	377	416	
12		393	402	404	406	406	403	389	399	405	410	411	413	415	417	423	444	433	432	426	420	421	419	416	414		
13		413	409	412	412	412	412	413	413	413	412	410	411	417	418	415	4										

LERWICK

VERTICAL INTENSITY

1985 MARCH

47500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

DATE	UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1		416	408	409	389	345	324	382	401	407	415	418	415	413	412	416	417	418	417	418	420	422	425	411	385	404	
2	D	398	399	400	397	396	395	398	405	403	405	407	413	420	425	450	478	489	531	483	451	443	403	407	412	425	
3		409	408	403	387	384	396	379	398	410	413	412	410	413	414	419	424	422	419	420	420	424	420	411	410	410	
4		399	402	399	410	411	410	407	410	412	413	414	414	410	414	418	418	414	409	408	409	410	412	428	417	411	
5	D	406	367	374	390	400	402	381	391	396	403	407	407	408	411	420	426	466	540	521	467	381	369	343	240	405	
6	D	318	373	382	388	392	399	397	404	415	413	418	416	420	433	434	431	447	437	424	420	416	403	415	410	409	
7	D	394	382	404	412	413	405	404	404	409	413	418	410	416	419	433	454	465	490	496	432	404	404	411	401	421	
8	D	338	322	380	380	328	350	380	403	410	417	417	414	420	433	432	429	444	433	431	422	418	402	375	397	399	
9	Q	401	407	410	413	416	416	415	415	415	415	413	410	407	407	410	416	420	421	419	417	415	412	411	394	412	
10		393	405	411	412	413	413	412	409	409	408	403	398	393	394	398	408	412	420	421	419	422	449	448	396	411	
11		408	416	417	416	417	416	416	415	415	411	405	399	396	399	411	412	415	418	418	417	415	414	412	411	412	
12		411	410	410	412	411	411	410	410	408	406	404	401	401	402	411	418	415	418	427	446	445	422	417	419	414	
13	Q	417	414	414	413	413	413	410	406	403	407	401	399	400	401	406	410	410	410	411	411	411	411	410	410	409	
14		411	410	409	409	409	408	407	406	404	403	402	402	407	406	406	410	411	412	421	417	423	417	408	402	409	
15		400	404	390	394	402	403	400	403	397	398	400	408	411	416	420	421	418	416	415	414	413	414	416	416	408	
16		400	399	391	395	403	406	406	408	408	408	404	406	405	408	424	425	419	415	413	414	414	409	411	408	408	
17		388	391	393	400	405	407	407	408	409	410	404	401	400	402	406	409	410	408	407	407	416	413	410	408	405	
18		405	361	357	385	393	400	399	404	406	408	406	404	401	401	405	406	409	408	408	408	425	405	410	404	401	
19		406	410	411	409	406	406	404	404	404	404	404	399	400	403	407	416	423	418	418	423	439	424	415	408	407	
20	Q	404	407	411	412	411	408	407	405	404	402	398	396	394	405	400	403	413	420	417	412	410	409	408	407	407	
21	Q	408	410	407	398	402	406	407	407	406	408	406	401	400	404	409	412	413	413	410	412	418	417	414	407	408	
22	Q	397	384	393	404	410	411	411	411	413	412	408	401	397	401	407	414	416	413	410	409	408	406	408	410	406	
23		406	406	405	393	397	405	406	406	408	406	404	403	402	403	405	409	410	411	410	410	413	410	406	396	405	
24		387	389	392	400	403	406	407	408	408	405	399	394	396	398	398	402	404	408	408	409	411	414	405	397	406	
25		404	406	410	412	413	413	413	412	409	406	402	399	400	402	405	409	413	414	419	442	425	419	418	409	412	
26		393	378	378	391	402	408	410	412	410	408	403	396	394	399	407	407	414	421	431	447	458	448	432	415	411	
27		400	400	399	404	408	407	409	409	408	411	405	402	401	400	405	404	412	429	442	446	429	419	414	400	411	
28		370	342	375	358	335	367	376	380	392	400	400	398	400	403	407	409	409	413	424	443	442	424	403	398	395	
29		399	408	408	408	408	409	409	408	406	409	407	405	403	405	407	413	418	416	412	415	421	417	409	394	409	
30		349	356	375	391	400	401	404	407	408	406	404	400	400	402	403	404	405	407	408	406	408	409	408	405	399	
31		408	395	402	402	397	402	404	403	406	407	403	408	406	409	411	413	413	414	422	425	419	414	412	412	409	
MEAN		395	393	397	400	398	401	402	406	407	408	406	404	405	407	413	418	422	426	426	423	420	413	409	400	408	
MEAN Q		405	404	407	408	410	411	410	409	408	408	405	401	400	403	407	413	416	415	412	412	412	411	410	406	408	
MEAN D		371	369	388	393	386	390	392	401	407	410	413	412	417	424	434	444	462	486	471	438	412	396	390	372	412	

LERWICK

VERTICAL INTENSITY

1985 APRIL

47500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

DATE	UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1		405	402	401	400	402	402	405	405	402	405	402	395	408	425	452	539	515	473	453	440	419	415	408	404	424	
2		411	411	408	405	402	405	406	410	411	414	409	409	413	415	420	429	430	443	425	405	415	408	386	394	412	
3		399	338	337	381	395	400	402	400	399	400	402	396	399	407	414	419	434	420	410	415	413	389	369	398	398	
4		387	398	407	405	401	384	396	408	411	411	411	415	416	414	418	427	449	450	432	427	387	388	399	406	410	
5		409	409	407	402	409	404	412	414	414	412	410	406	405	410	414	414	417	415	413	411	411	411	408	407	410	
6	Q	410	413	414	415	415	415	416	415	411	408	406	404	404	405	408	412	414	413	413	417	417	408	399	402	411	
7		406	409	410	411	412	408	403	407	405	409	407	403	403	407	415	420	423	433	428	419	417	412	410	409	412	
8		409	410	411	412	410	412	413	411	411	411	408	404	401	399	403	410	417	416	421	443	425	406	388	330	407	
9	D	355	393	408	413	410	405	366	375	388	395	385	395	397	408	485	549	613	495	449	427	423	419	414	413	424	
10		413	414	415	416	415	414	412	412	407	403	409	410	406	406	415	427	429	432	425	414	413	387	394	413	413	
11		401	395	363	343	363	378	395	405	410	412	410	408	409	411	411	412	422	433	420	415	413	412	410	407	402	
12	Q	411	412	418	418	418	419	417	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	413	
13		403	405	392	366	386	394	385	387	392	396	400	402	405	409	409	413	412	414	413	414	418	415	410	409	402	
14		409	410	412	411	411	412	410	411	408	407	404	402	400	402	406	407	407	407	406	406	407	410	405	399	407	
15	Q	409	410	412	411	411	412	410	411	408	407	404	402	400	402	406	407	407	407	406	406	407	410	405	399	407	
16		396	401	406	408	407	405	403	401	404	404	404	408	410	411	406	412	417	421	420	412	410	410	408	398	408	
17	Q	398	406	411	412	411	411	412	411	410	409	407	404	406	407	411	413	414	415	415	411	411	411	407	402	409	
18	Q	373	389	399	405	408	407	406	408	410	407	404	400	398	399	405	408	411	412	410	408	407	407	407	406	414	
19		406	408	412	413	405	388	390	396	401	397	397	398	399	403	421	445	472	526	551	515	495	425	237	246	404	
20	D	230	225																								

LERWICK

VERTICAL INTENSITY

1985 MAY

47500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE, UT, 0-24, MEAN. Contains magnetic intensity data for May 1985.

LERWICK

VERTICAL INTENSITY

1985 JUNE

47500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

Table with columns: DATE, UT, 0-24, MEAN. Contains magnetic intensity data for June 1985.

LERWICK

VERTICAL INTENSITY

1985 JULY

47500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

DATE	UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN	
1		393	304	307	365	382	390	399	409	411	411	412	411	407	410	417	424	429	424	421	421	421	417	411	409	400	400	
2	Q	411	414	416	419	420	420	418	417	417	414	409	400	400	405	412	418	422	420	417	420	418	418	415	416	415	416	415
3		416	416	415	417	417	416	409	410	409	406	404	400	406	405	407	409	412	411	406	407	408	405	409	396	409	409	409
4	D	372	386	384	391	402	405	405	404	397	393	394	388	396	433	430	433	470	497	473	433	367	380	312	337	403	403	
5		368	386	395	372	376	371	385	398	403	402	405	406	403	416	426	425	425	425	414	417	419	408	399	376	401	401	
6	D	345	357	376	373	378	395	404	413	408	402	404	404	408	411	425	429	434	447	448	435	425	385	393	379	403	403	
7		282	304	289	325	376	397	408	411	419	426	427	422	415	414	435	449	444	433	424	421	428	424	410	383	399	399	
8		398	409	414	419	417	411	407	400	405	405	409	408	409	409	418	423	416	415	443	438	433	425	371	376	412	412	
9		405	404	392	359	339	362	390	403	412	417	414	410	409	407	412	412	416	422	425	425	422	426	422	419	405	405	
10		419	415	398	406	415	419	426	431	434	428	426	425	420	417	417	415	416	419	418	423	431	432	425	416	420	420	
11		405	403	409	400	398	404	406	411	416	409	404	397	395	398	397	397	400	402	404	415	428	425	410	388	405	405	
12	D	364	327	321	279	286	313	364	376	381	402	436	439	449	473	497	546	589	563	501	429	405	435	436	429	418	418	
13	D	428	430	430	431	431	432	431	429	426	424	426	429	418	425	441	461	490	496	492	471	445	415	380	328	434	434	
14		330	366	339	372	353	321	360	379	398	409	429	434	429	431	435	431	435	447	441	431	425	426	425	424	403	403	
15		424	423	418	407	397	350	379	402	414	416	420	418	419	423	419	419	413	412	415	414	411	412	413	412	410	410	
16	Q	412	408	411	414	417	414	411	412	414	411	412	410	409	413	414	419	428	427	424	424	420	415	416	410	415	415	
17		400	399	408	408	397	387	396	397	401	406	415	409	419	416	444	481	482	454	444	441	428	418	411	406	419	419	
18		372	333	371	395	404	408	411	415	413	408	405	407	416	428	431	430	435	443	437	425	421	420	385	398	409	409	
19		407	408	390	392	404	412	414	417	419	419	420	413	404	409	427	433	435	433	427	424	419	417	413	413	415	415	
20		414	416	418	413	411	412	414	416	416	414	412	410	403	406	412	428	450	447	433	424	415	415	413	410	417	417	
21	Q	410	403	406	397	405	414	415	408	411	413	410	404	405	409	413	417	417	421	423	420	420	420	416	412	412	412	
22	Q	414	416	418	421	422	423	423	418	411	408	404	397	395	396	399	407	408	412	413	413	407	408	408	410	411	411	
23		406	411	415	418	417	381	398	406	403	397	392	391	395	411	413	419	425	425	431	424	423	422	416	380	409	409	
24		386	399	403	405	409	413	409	406	407	406	400	401	405	403	407	413	411	410	409	411	423	418	410	395	407	407	
25		370	362	371	344	366	386	392	393	388	389	394	397	397	397	393	397	399	408	420	425	421	416	410	400	393	393	
26		376	391	400	403	400	384	375	393	404	408	408	404	406	409	411	419	410	410	409	392	364	356	324	394	394	394	
27		326	372	379	368	388	395	388	391	399	404	406	408	399	420	418	408	409	410	406	414	416	411	408	398	398	398	
28		360	361	380	378	366	384	397	401	399	402	405	405	401	402	402	405	405	401	397	402	421	410	403	405	395	395	
29	Q	406	402	401	407	410	409	407	408	409	409	403	399	397	403	411	411	416	425	418	418	416	417	417	415	410	410	
30		410	410	409	408	404	385	380	393	398	399	395	397	394	413	446	439	425	418	414	411	407	409	408	409	408	408	
31	D	408	413	416	416	415	413	409	401	391	413	408	393	408	424	499	555	576	480	481	476	446	372	290	286	425	425	
MEAN		388	389	390	391	394	394	401	405	408	409	410	408	408	414	423	431	437	434	430	424	419	412	400	392	409	409	
MEAN Q		411	409	410	412	415	416	415	413	412	411	408	402	401	405	410	414	418	421	419	419	416	416	415	413	413	413	
MEAN D		383	383	385	378	382	392	403	405	401	407	414	411	416	433	458	485	512	497	479	449	418	397	362	352	417	417	

LERWICK

VERTICAL INTENSITY

1985 AUGUST

47500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

DATE	UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1		312	366	397	405	405	409	417	416	420	418	413	400	403	402	417	440	439	431	436	435	424	400	408	404	409	409
2		393	386	400	411	413	409	414	409	410	404	401	400	397	402	408	415	436	436	446	441	429	407	391	392	410	410
3		396	387	411	415	418	416	420	423	424	419	414	408	404	407	414	417	421	423	435	431	427	422	417	420	416	416
4		415	408	404	407	402	410	405	407	408	407	408	410	410	411	418	421	426	425	419	417	420	414	416	410	412	412
5	Q	410	408	409	414	416	412	413	414	412	414	412	408	399	391	392	397	406	413	416	420	421	418	418	415	413	412
6	Q	413	409	409	414	417	418	416	415	418	414	408	407	405	405	409	412	414	415	417	419	423	416	413	412	413	413
7	Q	412	404	400	410	415	416	418	417	415	413	406	400	398	400	399	403	408	408	408	406	407	409	406	407	408	408
8		400	397	400	401	408	406	403	405	404	403	399	394	392	392	389	394	397	400	402	403	408	412	412	407	401	401
9	Q	394	387	396	402	408	409	410	412	412	406	400	396	393	395	399	401	402	400	400	399	403	407	405	405	402	402
10		403	402	402	401	416	412	413	414	412	403	397	403	401	396	393	392	402	414	421	420	414	415	414	412	409	406
11	Q	387	349	381	391	398	405	407	407	403	398	394	397	402	405	408	406	405	408	407	406	405	405	405	405	406	399
12	D	407																									

LERWICK

VERTICAL INTENSITY

1985 SEPTEMBER

47500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

DATE	UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1		399	414	419	422	421	423	426	425	421	414	406	405	409	415	420	423	429	444	440	426	421	412	412	414	414	419
2	Q	418	421	423	425	425	426	428	429	427	424	416	410	407	410	415	420	423	423	423	420	416	415	414	414	412	419
3	Q	414	416	418	419	424	423	424	424	422	420	415	405	400	405	414	421	423	422	419	418	418	419	414	414	415	417
4	Q	416	418	419	422	423	424	425	424	421	414	408	404	404	407	411	414	418	417	414	415	415	415	415	415	415	416
5	Q	415	415	416	417	418	419	419	417	415	411	406	401	398	398	402	410	411	413	414	416	419	420	418	417	415	413
6		416	415	412	407	408	407	408	410	412	411	411	410	411	418	433	445	463	490	476	462	467	448	433	419	429	
7		379	398	379	386	403	407	410	413	417	416	419	417	412	411	414	415	416	420	425	428	430	426	406	400	410	
8		393	401	407	410	412	415	421	424	419	414	412	414	410	423	429	430	424	428	430	426	427	389	396	388	413	
9		390	406	413	414	414	407	407	412	413	412	411	413	415	419	421	429	451	470	472	448	435	423	415	409	422	
10		414	418	420	421	417	417	419	413	415	418	418	416	419	423	424	425	434	443	449	428	413	407	381	369	417	
11		388	388	388	395	404	403	408	416	418	417	415	410	409	410	414	414	414	418	430	444	429	416	415	413	411	
12		413	413	414	415	415	414	414	415	416	416	413	412	415	425	432	433	434	431	424	420	418	417	417	417	419	
13		417	421	423	423	421	422	418	417	414	419	424	418	418	419	420	422	426	428	430	429	427	424	419	410	421	
14	D	381	406	416	420	419	411	402	400	393	394	396	405	411	439	420	460	438	429	426	427	429	425	416	410	418	
15		420	425	424	426	422	423	425	423	422	421	417	413	412	415	421	424	423	423	431	501	454	418	387	383	423	
16	D	388	354	387	394	396	395	419	425	423	420	416	421	447	442	433	436	458	463	441	426	418	405	355	357	413	
17		362	365	377	401	407	414	417	424	423	422	422	419	421	421	424	427	429	429	426	429	438	417	416	420	415	
18		418	420	421	422	424	426	427	426	422	421	422	419	415	414	419	425	424	427	425	422	419	418	416	413	421	
19	D	409	400	410	411	409	406	408	409	414	436	443	432	421	420	420	436	529	506	470	457	479	430	426	419	433	
20	D	412	377	370	373	352	380	407	419	429	429	435	436	430	430	445	455	438	434	443	441	440	375	375	384	413	
21	D	395	405	391	387	383	379	389	409	422	424	422	425	422	423	433	428	440	446	450	443	429	409	408	382	414	
22		383	392	403	402	405	401	412	419	419	423	423	420	418	420	432	441	449	454	435	436	437	431	423	419	421	
23		419	421	420	417	417	413	415	416	419	415	414	416	416	415	416	418	419	420	417	417	420	423	422	421	418	
24		420	419	419	415	412	410	411	412	406	406	411	412	413	412	420	420	425	440	450	443	428	393	383	397	416	
25		384	408	398	401	407	408	413	398	402	407	410	414	417	419	447	456	443	435	419	410	410	360	335	388	408	
26		405	410	407	411	411	408	405	401	410	424	419	416	410	409	413	418	420	419	424	436	433	380	353	364	409	
27		377	396	414	418	418	419	414	398	405	411	417	419	418	420	419	422	424	425	425	440	433	382	341	375	409	
28		409	416	418	417	418	419	419	417	416	415	412	411	416	424	430	426	422	421	421	419	419	416	412	413	418	
29	Q	417	419	420	414	415	414	414	412	410	411	413	412	413	412	414	414	416	417	418	421	420	416	418	415	415	
30		408	411	417	418	419	418	418	418	417	411	405	403	408	412	413	417	420	421	424	424	427	426	394	398	414	
MEAN		403	406	409	411	411	412	414	416	416	417	416	414	414	417	423	427	433	436	434	433	429	412	401	402	417	
MEAN Q		416	418	419	419	421	421	422	421	419	416	412	406	404	406	411	416	418	418	417	418	418	416	415	414	416	
MEAN D		397	388	395	397	392	394	405	412	416	421	422	424	426	431	444	443	461	456	446	439	439	409	396	390	418	

LERWICK

VERTICAL INTENSITY

1985 OCTOBER

47500. NANOTESLA PLUS TABULAR QUANTITIES (UNIT 1 NANOTESLA)

DATE	UT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	Q	411	416	420	422	423	423	422	421	420	417	412	412	413	416	421	425	426	425	423	418	415	414	411	410	418	
2		406	398	403	412	417	418	413	408	405	401	402	402	401	403	406	409	414	418	419	418	420	424	416	398	410	
3		406	408	409	409	406	405	406	409	409	407	410	409	418	426	431	448	450	441	454	449	433	428	420	412	421	
4		394	374	387	389	390	397	403	399	398	402	408	407	409	414	427	449	459	456	450	437	441	442	417	416	415	
5	D	417	410	415	400	371	351	370	374	391	999	999	999	999	999	999	999	999	999	999	999	999	300	294	264	209	
6	D	263	223	337	367	393	397	398	395	414	444	437	431	447	455	472	462	454	446	430	432	434	380	321	309	397	
7	D	328	356	376	386	385	386	398	416	421	423	426	433	442	437	437	449	474	489	451	438	427	382	386	333	412	
8		327	346	383	397	404	410	410	419	424	426	429	426	427	433	440	445	459	447	440	440	431	412	419	418	417	
9		420	421	422	418	416	418	421	422	433	436	433	430	429	434	434	428	429	433	438	429	433	430	428	428	428	
10		434	430	425	417	419	424	425	428	428	430	429	431	435	434	434	434	433	432	432	435	442	451	441	426	431	
11		406	406	418	416	411	407	407	406	405	408	411	418	419	421	426	437	463	464	470	473	444	421	428	416	425	
12		350	311	382	411	418	419	420	422	422	424	426	425	424	423	422	426	438	436	427	430	420	408	414	417	413	
13	D	411	417	422	401	376	396	408	414	418	421	420	419	420	422	436	447	447	462	440	435	429	402	411	411	420	
14		418	428	425	423	422	417	422	422	423	422	426	424	421	421	426	436	438	432	428	428	426	420	420	421	425	
15		424	427	427	425	416	390	400	399	407	413	417	419	423	425	427	434	445	444	441	437	433	429	427	407	422	
16		400	393	396	368	365	392	401	414	418	420	423	421	418	419	428	442	445	438	438	437	434	433	404	396	414	
17		400	401	401	413	408	422	424	424	423	419	417	418	416	421	422	427	429	444	468	502	474	443	427	396	427	
18	D	403	362	377	410	420	421	420	419	422	422	419	422	433	423	428	442	460	455	449	446	405	399	415	396	419	
19		353	386	407	413	411	413	412	419	423	423	426	427	420	416	422	427	426	426	427	429	428	427	425	425	417	
20		424	424	423	418	421	422	423	423	429	425	423	423	424	422	423	426	428	430	432	431	428	428	427	428	425	
21																											

Lerwick K INDICES FOR THE YEAR 1985 From *D* and *H* combined

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	3322 2355	3222 2432	1422 0013	1113 4522	1111 2301	4422 2222	4121 2222	3212 4323	1100 1233	0000 0101	2111 1352	1212 1254
2	3221 2124	0221 2222	2222 3444	1121 2342	4543 2101	1101 1121	0000 2010	2221 2322	0001 1110	2110 0111	0112 3464	3221 1242
3	3211 1133	2100 2230	2321 1223	3211 2342	1011 2122	0001 2211	0100 1112	2111 1221	0111 1101	0111 2322	4313 3432	1110 1311
4	3111 1113	0000 0001	2110 1113	1211 2333	1211 2311	2001 2110	2222 4344	2111 2111	0111 0100	3221 2123	4322 1432	0211 1242
5	1000 0112	1232 3344	3332 2477	1200 1011	1110 1121	1010 2110	3322 3233	1101 1110	0000 0011	254 6	1012 1234	3111 1121
6	2100 0033	4342 3553	4333 2243	0001 1033	3221 1212	2312 4425	3322 2335	0000 0110	1111 2323	5343 4334	2311 2311	2111 1111
7	1100 0021	2122 3313	3122 2343	0121 2210	3100 1122	3333 3342	4222 3223	1000 0012	3211 1122	4332 2533	2111 1021	0001 0020
8	1010 1244	3213 2444	4432 2333	0011 1234	2121 1212	4322 2212	0122 3432	2111 1222	1111 3323	2221 1342	2000 1022	0000 0010
9	3533 4434	2232 3223	1000 0003	3332 4621	2211 1120	1211 1246	2311 1111	2100 1121	2112 2323	1110 130	0102 2341	1100 0011
10	4433 3442	3332 3352	2001 2213	0012 2213	0000 1113	6433 2233	1101 1232	1221 2211	1122 1233	1111 1022	3222 2125	2213 3212
11	2222 2233	2111 2233	2001 3100	3221 1301	1111 1110	2212 1322	2211 2222	3201 0000	2211 1141	2221 2333	2111 1122	3111 1123
12	2222 3333	1211 2321	0000 1143	1111 1110	0112 2232	3220 2222	4533 5561	0001 2358	1000 1221	4111 2322	0000 0011	1100 0122
13	2211 2322	0003 2242	0011 1100	0001 1212	3211 1224	0000 1222	1013 4444	6533 3345	0001 1101	2311 3433	2111 2254	3324 3314
14	1101 2211	2121 1324	0000 2132	2320 2212	2111 1131	2010 1002	3432 3211	2221 2212	3133 4223	1212 1111	4312 2223	3211 1213
15	1011 1332	2220 0023	3233 2002	1101 1002	3221 2323	1200 1121	0321 1201	2222 1122	0100 2253	1331 2213	2212 3133	3221 0033
16	1211 1110	0001 1132	2111 3234	1012 2112	1111 2333	0100 0000	1110 2211	2211 3233	4413 3324	3332 1112	2212 1223	2010 0022
17	0001 1322	2221 2321	2101 0043	2010 1013	2012 2223	2201 2311	2323 4221	1322 2212	2112 2132	2211 2322	1111 2542	3110 1111
18	1000 0032	0001 0010	3210 1033	3000 1101	3111 2323	0110 1210	3211 3323	1112 2324	1011 1100	4112 3334	2311 1233	0022 2113
19	0001 0200	1100 0033	1101 2242	1122 3344	2211 1322	0001 1100	2102 3210	2311 1122	2123 3354	3222 1000	3411 1121	2444 3553
20	1000 0221	3221 1112	1011 2200	5442 2267	3100 1121	0013 4412	0302 3320	2321 2312	4333 3334	0121 1120	0001 0012	3212 2101
21	1321 1110	0011 1222	1100 1111	9764 4543	2111 2322	1211 2212	1211 1000	2222 1123	3233 2442	0111 2422	1000 0011	2211 0011
22	0011 1214	2101 1212	2100 1101	2112 2212	2211 1111	1211 0210	1000 1011	3334 2443	3121 3221	3221 1243	2201 1020	1211 0111
23	2433 3334	1101 1133	2201 1022	3211 3321	2210 1111	2201 3210	2322 2123	4412 2323	1112 0110	2112 2223	0000 0001	0000 0113
24	1010 1122	3221 2224	1010 0103	3332 2210	1100 1222	0001 1212	0022 2332	3211 1112	0112 3333	2111 1132	0000 0002	2 21
25	3221 0000	2211 1303	2000 0221	3333 2223	0010 1213	2120 2232	3322 1222	1332 2312	3232 2343	1201 1122	2001 1011	0000 0113
26	1001 0112	3200 0022	2111 2122	4522 1334	3111 3321	2222 3233	2322 2234	3211 2233	2123 0233	1001 0000	1121 0001	3200 1010
27	1100 0134	2001 1127	2101 2232	3422 4435	1111 2110	3111 2323	2223 3212	3211 2321	2122 2134	0000 0022	0232 3422	1111 10
28	5422 6665	6643 3332	3320 2133	6565 4221	0110 1112	4322 3323	3312 2332	1112 2333	0101 2101	2011 0000	2211 0021	
29	5301 2146		1000 1232	2610 2110	1110 0111	2113 2332	0101 1211	3232 3332	0101 0011	2222 2100	0012 1377	1211 0002
30	3122 1413		3001 2111	1004 5432	0001 1101	2001 2233	1312 3201	2200 1232	2000 0012	0000 0020	7443 3332	5542 2534
31	3112 2224		2112 2110		2210 1113		1233 5535	3334 3423		0101 0220		3223 3443

LERWICK 1985

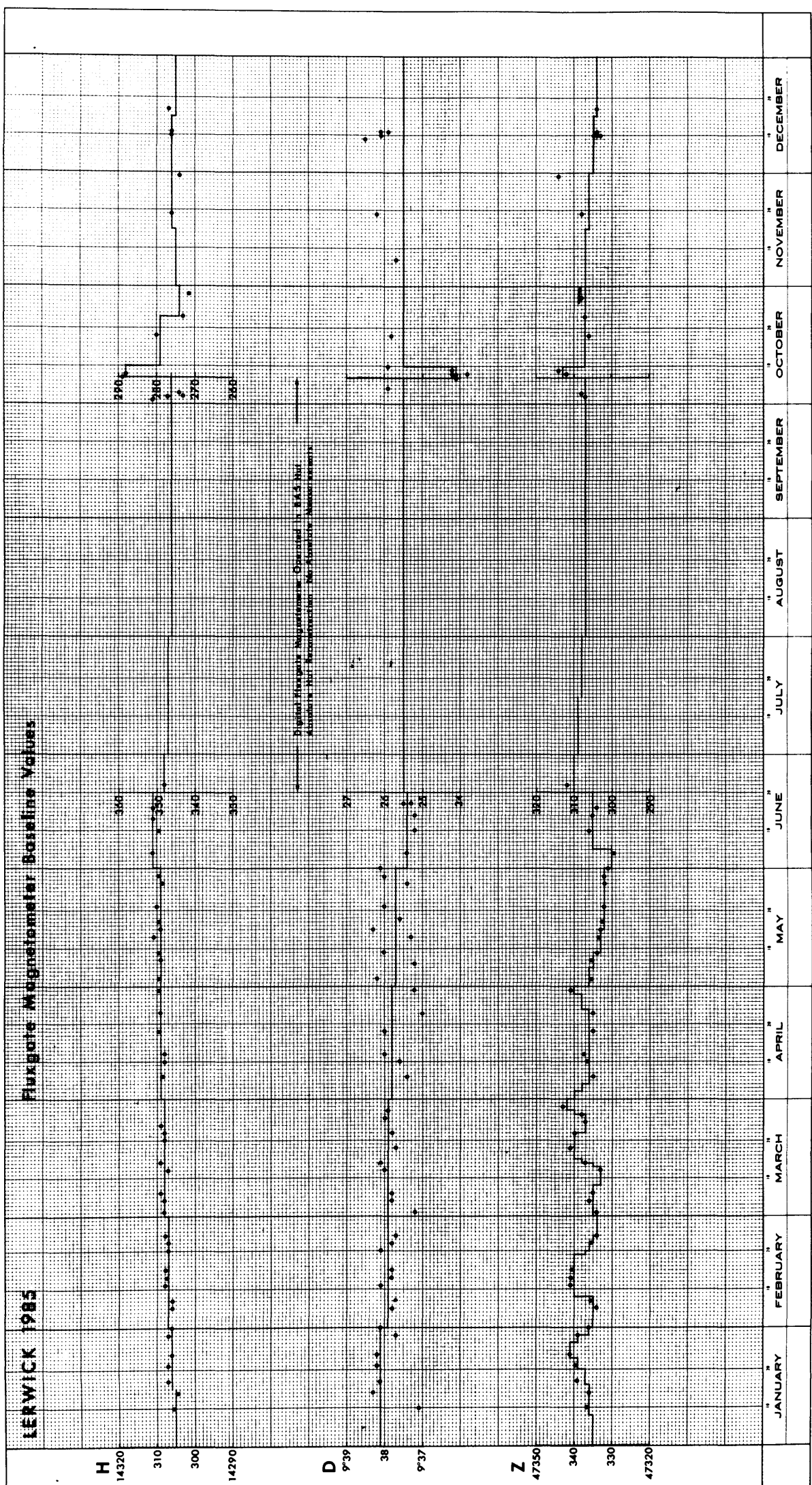
MEAN MONTHLY AND ANNUAL VALUES OF GEOMAGNETIC ELEMENTS

ALL DAYS

	<i>D</i>	<i>I</i>	<i>H</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>F</i>
January	-7° 8.9	72° 41.4	14934	14818	-1858	47916	50189
February	-7° 8.3	72° 41.3	14934	14818	-1856	47911	50185
March	-7° 8.6	72° 40.9	14938	14822	-1858	47908	50183
April	-7° 6.5	72° 41.6	14927	14812	-1847	47905	50177
May	-7° 6.3	72° 40.8	14940	14825	-1848	47910	50185
June	-7° 5.4	72° 40.5	14943	14829	-1844	47904	50181
July	-7° 5.0	72° 40.8	14940	14826	-1842	47909	50184
August	-7° 4.5	72° 41.2	14933	14819	-1839	47906	50179
September	-7° 4.6	72° 41.4	14933	14819	-1840	47917	50190
October	-7° 3.5	72° 41.6	14931	14818	-1835	47920	50192
November	-7° 2.2	72° 42.2	14924	14812	-1828	47925	50195
December	-7° 2.2	72° 42.2	14925	14813	-1828	47928	50198
Year	-7° 5.5	72° 41.3	14933	14819	-1844	47913	50186

INTERNATIONAL QUIET DAYS

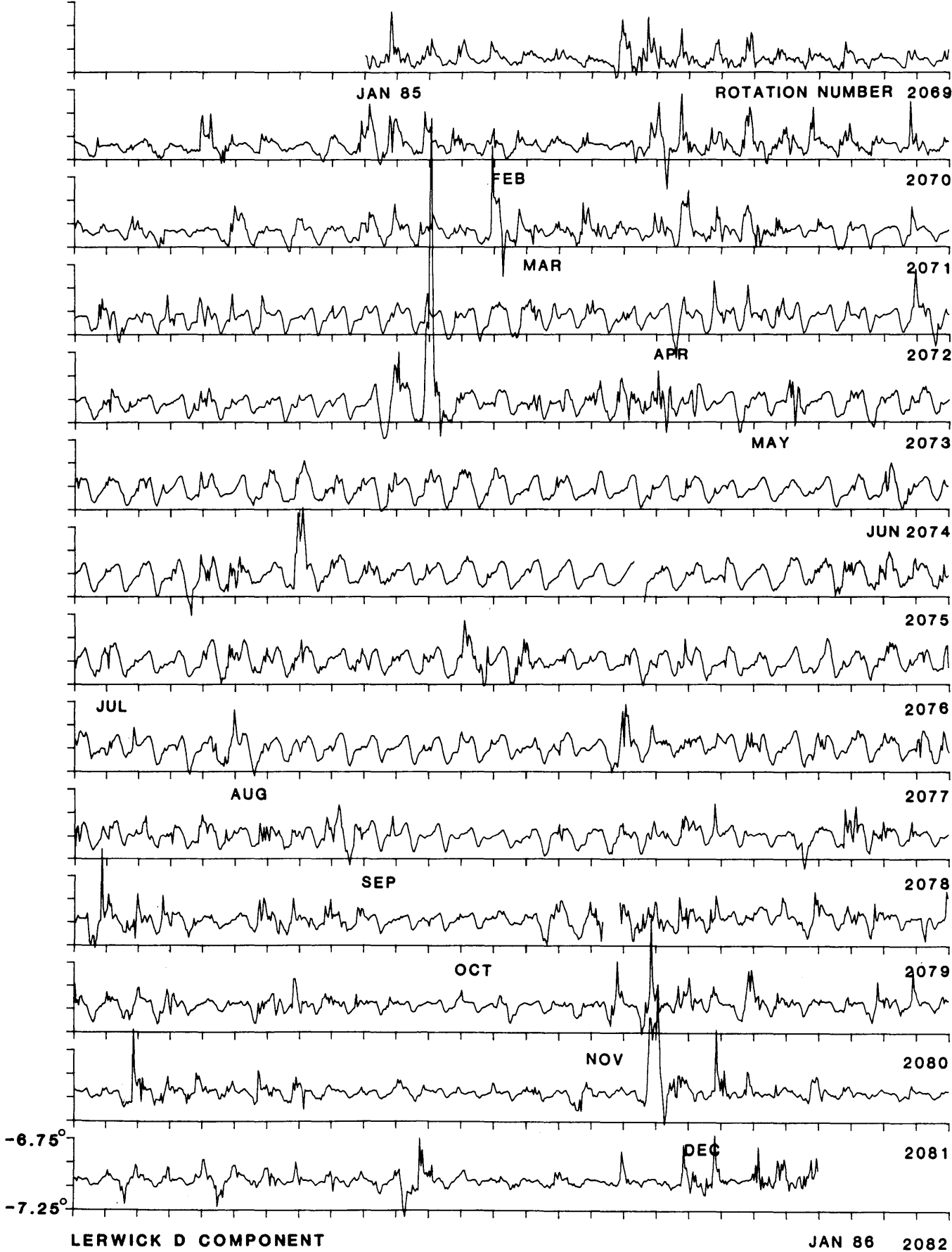
	<i>D</i>	<i>I</i>	<i>H</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>F</i>
January	-7° 9.4	72° 41.0	14939	14823	-1861	47913	50188
February	-7° 8.3	72° 40.9	14939	14823	-1856	47912	50187
March	-7° 8.2	72° 40.8	14940	14824	-1856	47908	50183
April	-7° 7.1	72° 40.7	14941	14826	-1851	47908	50184
May	-7° 6.6	72° 40.5	14945	14830	-1850	47909	50186
June	-7° 5.8	72° 40.6	14944	14830	-1846	47912	50188
July	-7° 5.6	72° 40.7	14943	14829	-1845	47913	50189
August	-7° 4.7	72° 40.9	14938	14824	-1841	47906	50181
September	-7° 5.1	72° 41.2	14936	14822	-1842	47916	50190
October	-7° 3.4	72° 41.7	14930	14817	-1834	47922	50194
November	-7° 3.0	72° 41.5	14934	14821	-1833	47924	50197
December	-7° 2.7	72° 41.8	14931	14818	-1831	47928	50200
Year	-7° 5.8	72° 41.0	14938	14824	-1845	47914	50189



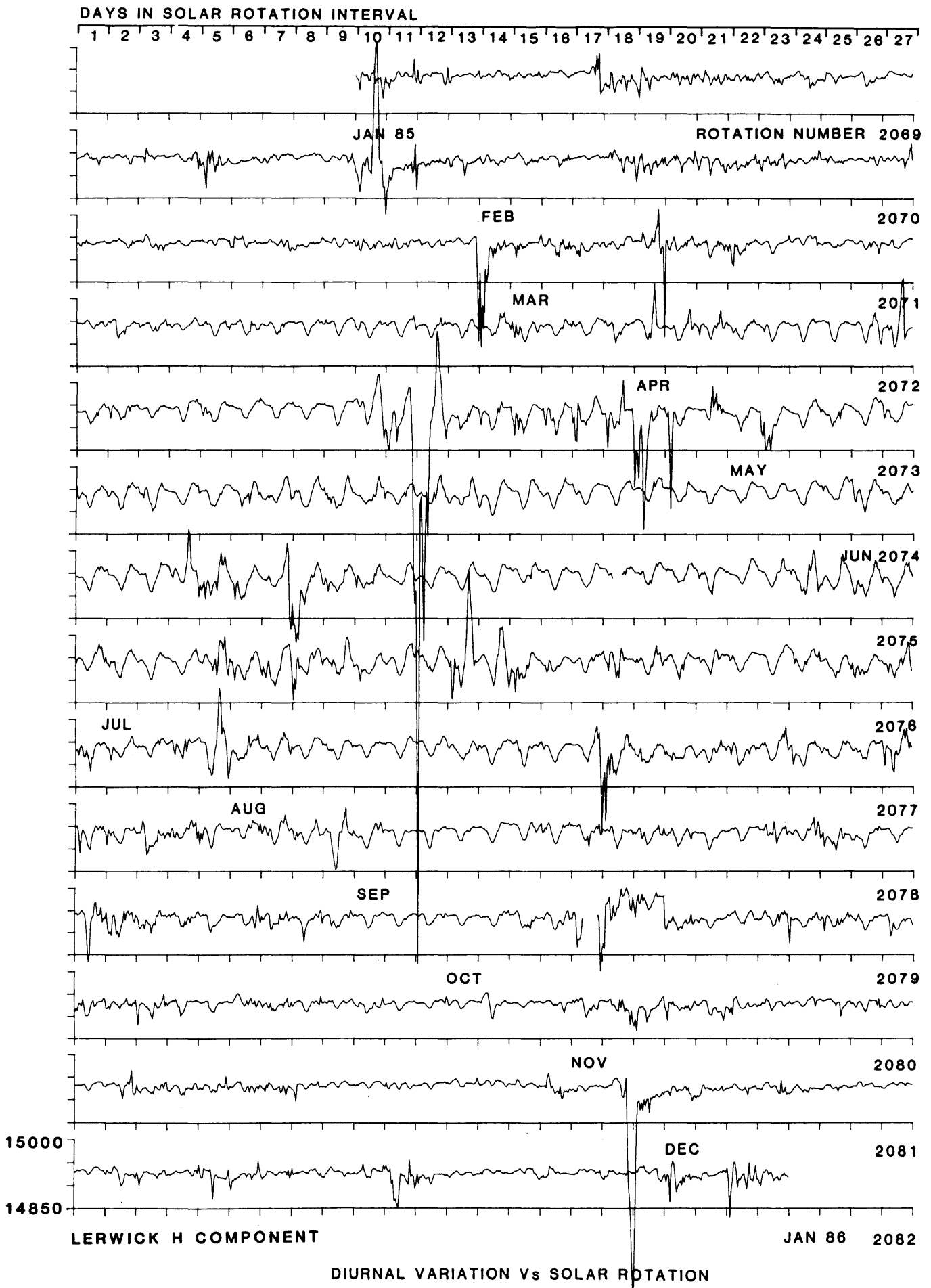
Lerwick 1985 Observed and allocated baseline values D_0 , H_0 and Z_0

DAYS IN SOLAR ROTATION INTERVAL

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

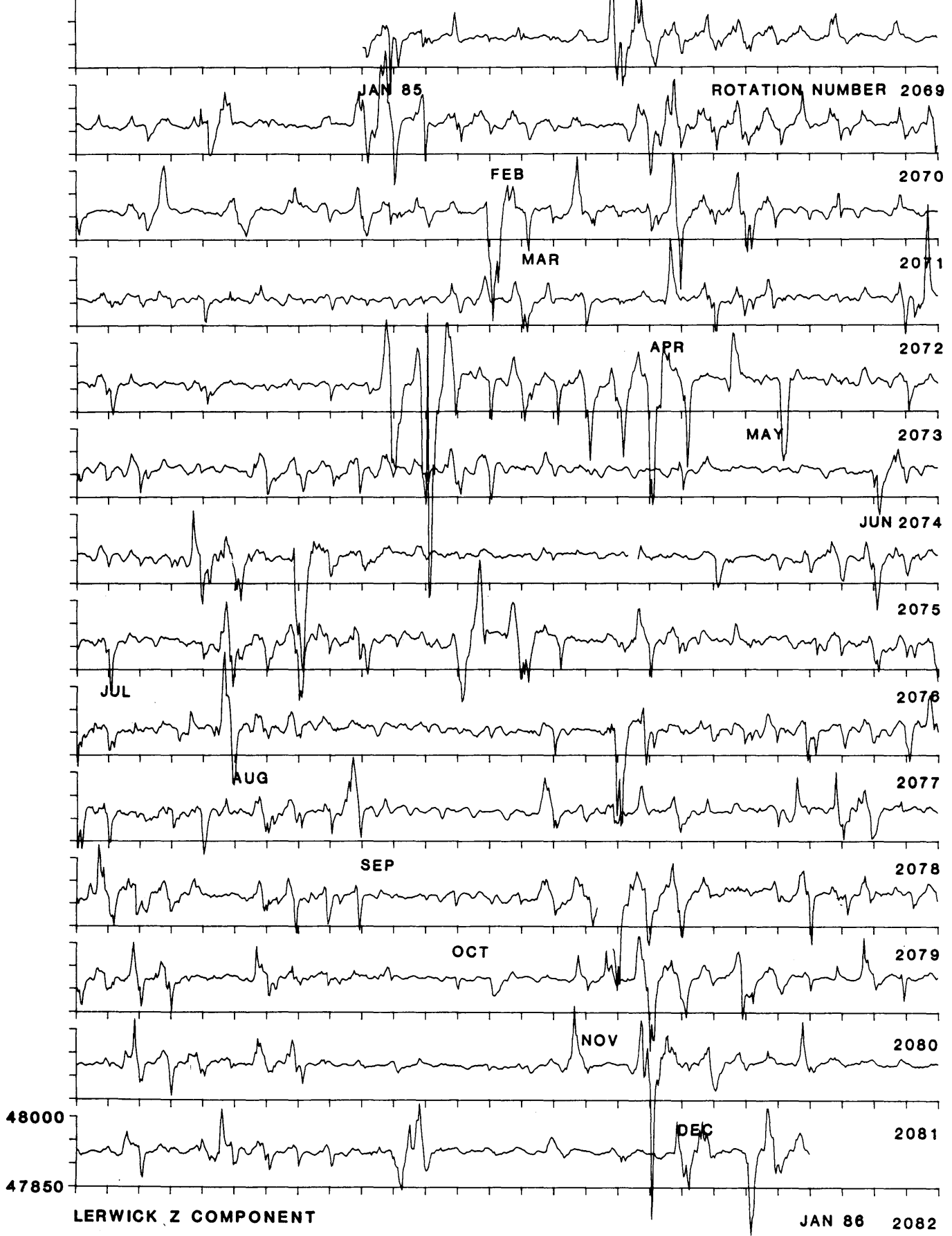


DIURNAL VARIATION Vs SOLAR ROTATION



DAYS IN SOLAR ROTATION INTERVAL

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



DIURNAL VARIATION Vs SOLAR ROTATION

ANNUAL VALUES OF GEOMAGNETIC ELEMENTS

LERWICK

Year	D	I	H	X	Y	Z	F
1923	-15 40.3	72 33.7	14655	14111	-3959	46655	48902
1924	-15 26.5	72 35.7	14642	14113	-3899	46708	48950
1925	-15 13.5	72 37.2	14621	14108	-3840	46713	48948
1926	-14 58.6	72 37.1	14618	14121	-3778	46699	48933
1927	-14 45.7	72 38.1	14607	14125	-3722	46713	48944
1928	-14 32.9	72 39.4	14585	14117	-3664	46702	48926
1929	-14 19.4	72 40.3	14556	14104	-3601	46651	48869
1930	-14 7.0	72 41.6	14527	14088	-3543	46624	48835
1931	-13 55.4	72 42.3	14517	14090	-3493	46623	48830
1932	-13 41.9	72 43.5	14495	14083	-3433	46608	48809
1933	-13 29.8	72 44.6	14477	14077	-3379	46605	48802
1934	-13 17.7	72 48.0	14462	14074	-3326	46716	48903
1935	-13 5.3	72 49.4	14445	14070	-3271	46730	48911
1936	-12 53.6	72 51.2	14428	14064	-3220	46763	48938
1937	-12 42.4	72 52.8	14411	14058	-3170	46785	48955
1938	-12 31.6	72 53.9	14401	14059	-3124	46809	48973
1939	-12 21.4	72 54.9	14394	14061	-3080	46833	48995
1940	-12 11.1	72 55.8	14389	14065	-3037	46960	49018
1941	-12 1.0	72 56.8	14382	14067	-2994	46884	49040
1942	-11 52.5	72 56.8	14386	14078	-2960	46899	49056
1943	-11 43.5	72 57.8	14378	14078	-2922	46919	49073
1944	-11 35.1	72 58.1	14380	14087	-2888	46940	49093
1945	-11 26.3	72 58.8	14376	14090	-2851	46963	49114
1946	-11 17.1	73 0.2	14363	14085	-2811	46989	49135
1947	-11 8.7	73 0.5	14363	14092	-2776	47002	49148
1948	-11 0.9	73 0.1	14371	14106	-2746	47009	49157
1949	-10 53.1	73 0.2	14378	14119	-2715	47037	49185
1950	-10 45.5	72 59.5	14388	14135	-2686	47039	49190
1951	-10 37.7	72 59.1	14402	14155	-2656	47061	49215
1952	-10 29.9	72 58.6	14417	14176	-2627	47087	49245
1953	-10 22.8	72 57.8	14435	14199	-2601	47106	49268
1954	-10 15.6	72 57.3	14450	14219	-2574	47129	49294
1955	-10 9.2	72 56.9	14464	14237	-2550	47156	49324
1956	-10 2.8	72 57.3	14469	14247	-2524	47191	49359
1957	-9 57.5	72 56.8	14486	14268	-2505	47225	49397
1958	-9 52.7	72 55.8	14507	14292	-2489	47246	49423
1959	-9 48.1	72 55.3	14523	14311	-2472	47271	49452
1960	-9 43.4	72 54.9	14538	14329	-2455	47299	49483
1961	-9 39.1	72 53.5	14565	14359	-2442	47318	49509
1962	-9 33.3	72 52.1	14591	14389	-2422	47336	49534
1963	-9 28.5	72 51.3	14610	14411	-2405	47359	49561
1964	-9 24.4	72 50.2	14634	14437	-2392	47382	49590
1965	-9 21.1	72 49.2	14656	14461	-2382	47403	49617
1966	-9 17.8	72 48.7	14672	14479	-2370	47431	49648
1967	-9 14.2	72 48.3	14688	14498	-2358	47464	49685
1968	-9 12.1	72 47.4	14712	14523	-2353	47496	49722
1969	-9 10.3	72 46.2	14740	14552	-2349	47531	49764
1970	-9 7.9	72 45.4	14766	14579	-2343	47573	49812
1971	-9 5.2	72 44.1	14796	14610	-2337	47607	49853
1972	-8 59.5	72 43.3	14820	14638	-2316	47646	49898
1973	-8 53.6	72 42.4	14844	14666	-2295	47680	49937
1974	-8 46.5	72 41.8	14866	14692	-2268	47719	49981
1975	-8 38.4	72 40.9	14890	14721	-2237	47753	50021
1976	-8 29.9	72 40.1	14911	14747	-2204	47780	50053
1977	-8 20.9	72 39.5	14927	14769	-2167	47803	50079
1978	-8 10.1	72 39.8	14933	14782	-2122	47835	50112
1979	-8 0.3	72 39.3	14944	14798	-2081	47850	50129
1980	-7 50.4	72 39.0	14952	14812	-2039	47858	50139
1981	-7 40.9	72 39.7	14946	14812	-1998	47875	50154
1982	-7 31.6	72 40.4	14940	14812	-1957	47890	50166
1983	-7 22.6	72 40.4	14942	14818	-1918	47895	50172
1984	-7 13.4	72 40.9	14936	14818	-1878	47902	50177
1985	-7 5.5	72 41.3	14933	14819	-1844	47913	50186

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