

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

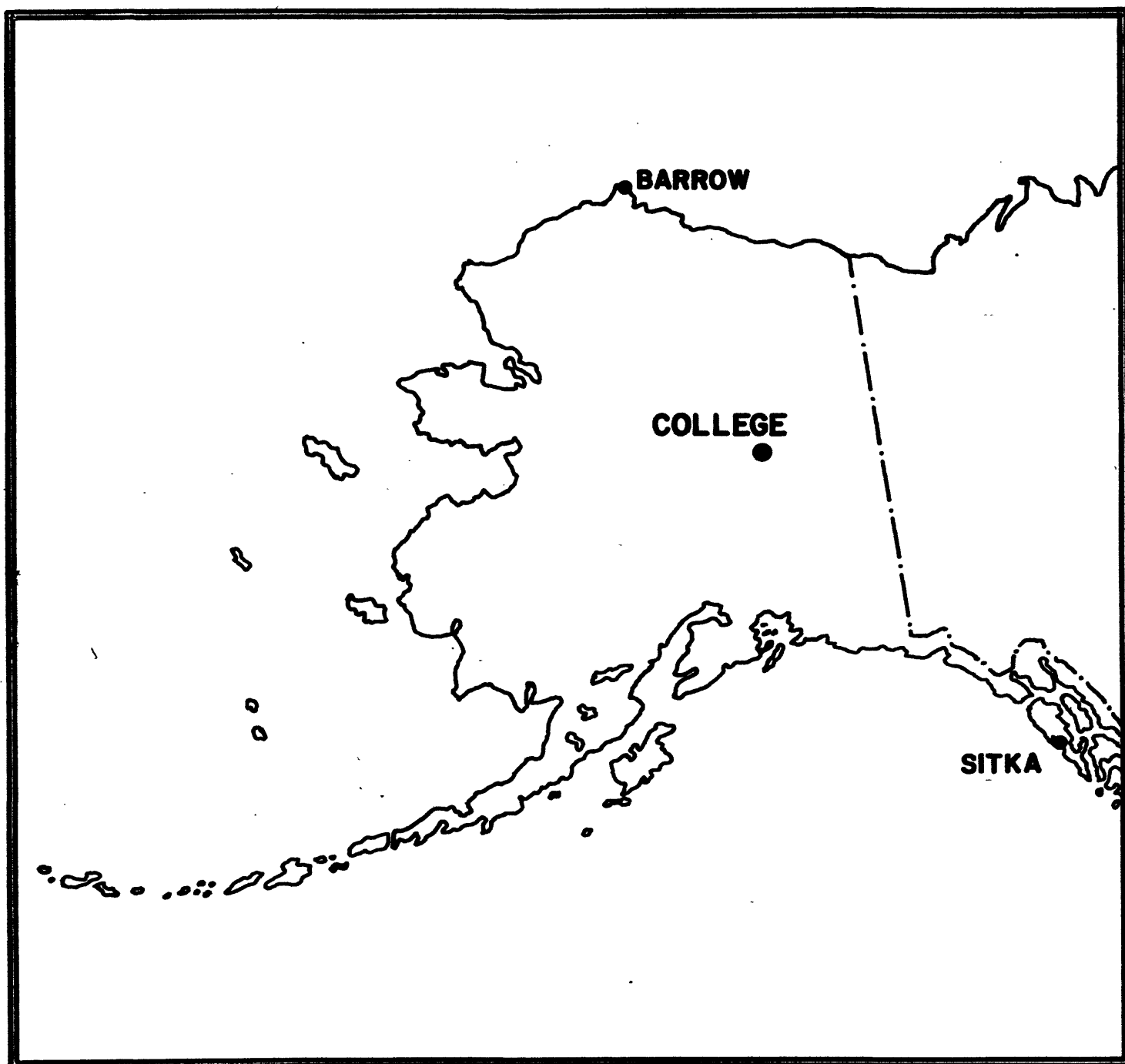
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

MAY 1986

OPEN FILE REPORT 86-0300E



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: J.E. PAPP, H.K. REX AND L.Y. TORRENCE AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA. THE COLLEGE OBSERVATORY IS PART OF THE BRANCH OF GLOBAL SEISMOLOGY AND GEOMAGNETISM OF THE U.S. GEOLOGICAL SURVEY.

Explanation of Data and Reports

Magnetic Activity Report

Outstanding Magnetic Effects

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Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings

Sample Format for Normal and Storm Magnetograms

Normal Magnetograms

Storm Magnetograms (When Normal is too disturbed to read)

COLLEGE OBSERVATORY PRELIMINARY GEOMAGNETIC DATA

EXPLANATION OF DATA AND REPORTS

INTRODUCTION

The preliminary geomagnetic data included here is made available to scientific personnel and organizations as part of a cooperative effort and on a data exchange basis because of the early need by some users. To avoid delay, all of the data is copied from original forms processed at the observatory; therefore it should be regarded as preliminary. Inquiries about this report or about the College Observatory should be addressed to:

Chief, College Observatory
U.S. Geological Survey
800 Yukon Drive
Fairbanks, Alaska 99701

Requests for copies of the magnetograms except for the current month should be addressed to:

World Data Center A
NOAA D63, 325 Broadway
Boulder, Colorado 80303

OBSERVATORY LOCATION

The College Observatory, operated by the U.S. Geological Survey, is located at the University of Alaska, Fairbanks, Alaska. It is near the Auroral Zone and the northern limit of the world's greatest earthquake belt, the circum-Pacific Seismic belt. Although the observatory's basic operation is in geomagnetism and seismology, it cooperates with other scientists and organizations in areas where the facility and personnel can be of service.

The observatory is one of three operated by the USGS in Alaska. The others are located at Barrow and Sitka.

The position of the observatory site is:

Geographic latitude..... $64^{\circ}51.6'N$
Geographic longitude..... $147^{\circ}50.2'W$
Geomagnetic latitude..... $+64.6^{\circ}$
Geomagnetic longitude..... $+256.9^{\circ}$
Elevation.....200 meters

GEOMAGNETIC DATA

Normal, Storm and Rapid Run magnetograms and appropriate calibration data are processed daily at the observatory and are available for analysis or copying. Also available, are mean hourly scalings, K-Indices, selected magnetic phenomena reports and on a real-time basis are recordings from a 3-component fluxgate magnetometer and F-component proton magnetometer.

Magnetic Activity

The K-Index: The K-Index is a logarithmic measurement of the range of the most disturbed component (D or H) of the geomagnetic field for eight intervals beginning 0000-0300, 0300-0600...2100-2400 UT. It is a measure of the difference between the highest and lowest deviation from a smooth curve to be expected for a component on a magnetically quiet day, within a three hour interval.

The Equivalent Daily Amplitude, AK: The K-Index is converted into an equivalent range, ak, which is near the center of the limiting gamma ranges for a given K. The average of the eight values is called equivalent daily amplitude AK. The unit 10 γ has been chosen so as not to give the illusion of an accuracy not justified.

The schedule for converting gamma range to K, and K to ak is as follows:

Gamma Range	K - Index	ak
0 < 25	0	0
25 < 50	1	3
50 < 100	2	7
100 < 200	3	15
200 < 350	4	27
350 < 600	5	48
600 < 1000	6	80
1000 < 1650	7	140
1650 < 2500	8	240
2500+	9	400 (10 γ)

The Magnetic Daily Character Figure, C: To each Universal day a character is assigned on the basis C=0, if it is quiet; C=1, if it is moderately disturbed; C=2, if it is greatly disturbed. The method used to assign characters at the College Observatory is based on AK as follows:

AK Range	C
0-11	0
11-50	1
50+	2

Routine assignment of C was discontinued at College on January 1, 1976.

Selected Phenomena & Outstanding Magnetic Effects

Prior to January 1, 1976, the Normal and Rapid Run records were reviewed at the observatory for selected magnetic phenomena and the events identified were forwarded to the IUGG Commission on Magnetic Variations and Disturbances. This was discontinued on January 1, 1976, but a report on Outstanding Magnetic Effects is prepared monthly for this report.

Principal Magnetic Storms

Gradual and sudden commencement magnetic disturbances with at least one K-Index of 5 or greater, which are believed to be part of a world-wide disturbance, are classified as principal magnetic storms. The time of the storm beginning and ending; direction and amplitude of sudden commencements; period of maximum activity; and storm range are reported. Monthly reports of these data are forwarded to the World Data Center A in Boulder, Colorado.

Magnetogram Hourly Scalings

Magnetogram hourly scalings are averages for successive periods of one hour for the D, H and Z elements. The Value in the column headed "01" is the average for the hour beginning 0000 and ending 0100. Note that the values on the scaling sheets are in tenths of mm with the decimal point omitted. The user of these scalings should keep in mind that the tabular values are hourly means and if he is interested in the detailed morphology of the magnetic field, he should refer directly to the magnetograms.

Magnetograms

The normal magnetograms in this report are reproduced at about one-third the size of the originals. Preliminary base-line values and scale values adopted for use with the original magnetograms are included. For days when the magnetic field is too disturbed for the Normal magnetogram to be readable, Storm magnetograms are reproduced.

Absolutes, Base-lines and Scale Values

To determine the absolute value of the magnetic field from the hourly means or from point scalings the following equations should be used:

$D = B_D + d \cdot S_D$; $H = B_H + h \cdot S_H$; $Z = B_Z + z \cdot S_Z$
where D, H and Z are absolute values;
 B_D , B_H and B_Z are base-line values;
 S_D , S_H and S_Z are scale values;
and d, h and z are scalings in millimeters.

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

College, Alaska

MONTH AND YEAR

May 1986

DATE	K-INDICES									AK	TIME SCALE ON MAGNETOGRAMS	
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM			
1	1	1	0	0	1	0	1	1	05	02	SUDDEN COMMENCEMENTS d h m	
2	2	3	3	6	7	7	6	5	39	66		
3	4	4	6	5	2	2	1	1	25	25		
4	2	3	4	4	6	3	2	2	26	23		
5	3	2	2	5	5	4	3	3	27	23		
6	4	6	6	6	6	6	6	4	44	67		
7	3	2	3	5	4	3	2	1	23	17		
8	2	1	2	4	5	2	2	1	19	14		
9	2	2	2	3	2	1	1	2	15	07		
10	2	0	0	1	2	1	2	1	09	04		
11	2	2	1	3	3	2	1	1	15	08		
12	2	2	2	3	3	1	1	1	15	08		
13	1	1	0	1	2	0	1	1	07	03		
14	1	1	1	0	0	0	1	0	04	02		
15	0	0	1	2	1	0	1	1	06	02		
16	1	2	3	4	4	2	2	1	19	12	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)	
17	3	3	2	2	5	4	2	1	22	16		
18	2	2	3	3	3	1	1	1	16	09		
19	2	2	0	1	4	4	2	1	16	10		
20	2	1	1	1	1	1	2	1	10	04		
21	1	1	3	4	4	2	2	1	18	12	BEGIN	END
22	0	1	0	0	1	1	2	1	06	02		
23	2	2	3	4	2	1	1	2	17	10	d h m	d h m
24	2	1	1	2	4	3	1	1	15	09		
25	3	4	4	6	3	2	1	2	25	23		
26	1	2	3	6	2	4	1	1	20	18		
27	1	2	3	1	1	2	1	2	13	06		
28	2	0	0	0	0	0	1	1	04	02		
29	1	1	0	1	0	0	1	1	05	02		
30	1	1	0	1	2	3	3	2	13	07		
31	3	4	5	5	4	2	3	2	28	24		

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9

D

675.7

3.71

2510

H

322.2

7.80

2510

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY	
			College, Alaska	
			MONTH	YEAR
			May	1986
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
			No Outstanding Magnetic Effects Observed this Month.	
IDENTIFIED BY: JEP			VERIFIED BY: JEP	

1. NATURE OF PHENOMENON: ssc, ssc*, si, si*, b, bp, bs, bps, pc1, pc2 - - - pc5, pg, pi 1, pi 2, sfe.

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA

WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80503 U.S.A.

Data from Individual Observatories:

May 1986

Obs. 2 letter IAEA code	Geomag. lat.	Commencement			SC - amplitudes			Max. 3 hr - index K			Ranges			UT End	
		day	hr min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	Z(Y)	day	hr
C0	64°6 N	01	18XX	..	..	..	..	02	5, 6	7	249	1940	1020	03	12
		05	11XX	..	..	..	..	06	2, 3, 4, 5, 6, 7	6	295	1550	1200	07	20

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0000 U.T., 5-1-86	2400 U.T., 5-31-86	1.6/mm	3.7 x/mm	27° 16.3 E
H	0000 U.T., 5-1-86	2400 U.T., 5-31-86	7.8 x/mm		12679 x
Z	0000 U.T., 5-1-86	2400 U.T., 5-12-86	7.7 x/mm		55174 x
	0000 U.T., 5-13-86	2400 U.T., 5-31-86	"		55179 x

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0000 U.T., 5-1-86	2400 U.T., 5-18-86	7.9/mm	29.5 x/mm	23° 43.5 E
	0000 U.T., 5-19-86	2400 U.T., 5-31-86	"	"	23° 45.5 E
H	0000 U.T., 5-1-86	2400 U.T., 5-31-86	43.8 x/mm		10710 x
Z	0000 U.T., 5-1-86	2400 U.T., 5-12-86	48.7 x/mm		55148 x
	0000 U.T., 5-13-86	2400 U.T., 5-31-86	"		55134 x

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 31.1 E	12679 x	55330 x

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: MAY 1, 14, 15, 22, 28,

U.S. Dept. of Interior
Geological Survey

Barrow, Alaska

North

May

Year

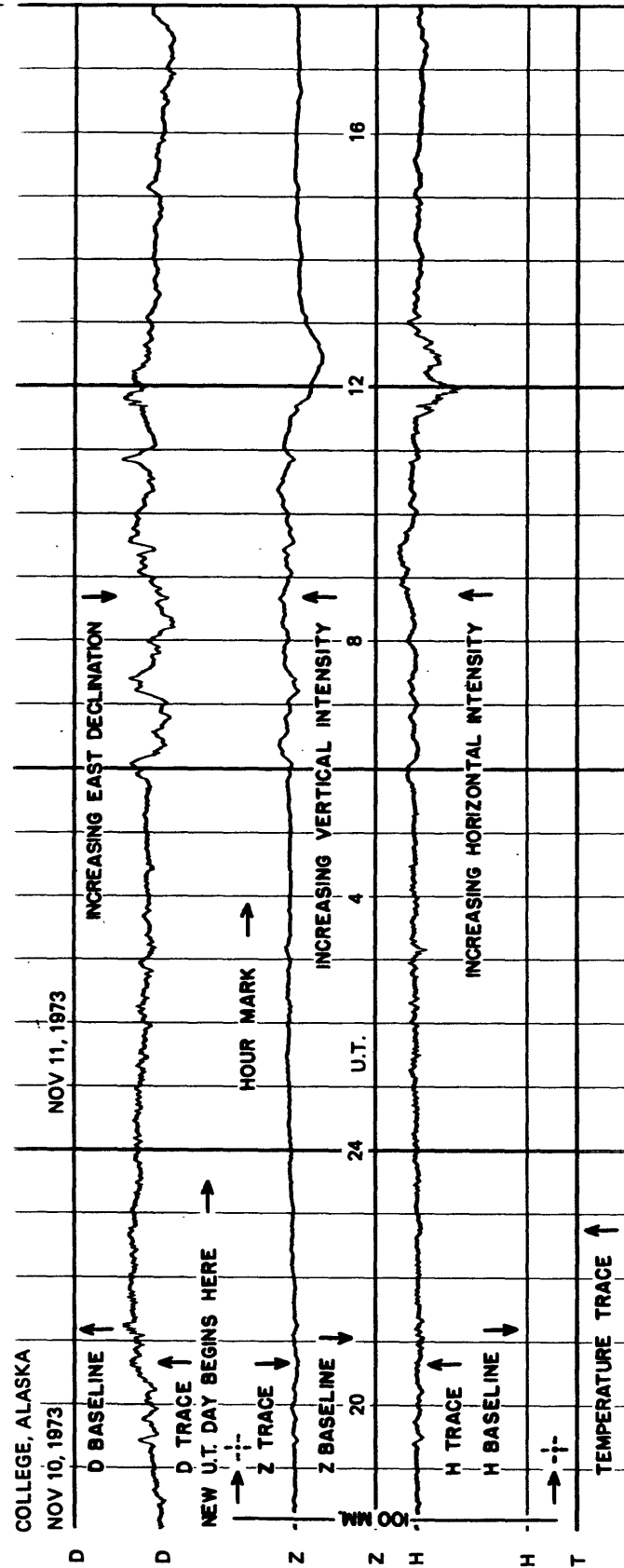
Jan-02 - 1/86

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

Values are in Tenths of mm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT	D					H					Z					COMMENT	
	1	14	15	22	28	1	14	15	22	28	1	14	15	22	28	DAY	DATE
DAY	02	02	02	02	02	02	02	02	02	02	02	02	02	02	02		
HOUR	01	110	106	98	68	248	241	239	267	262	190	210	197	194	220	01	1986
	02	110	100	99	57	251	242	243	271	263	196	213	201	194	216	02	
	03	110	103	116	98	252	260	249	268	253	201	211	206	196	220	03	
	04	120	131	124	109	259	249	259	261	264	205	220	210	190	214	04	
	05	136	139	113	130	259	272	269	262	260	209	219	221	193	209	05	
	06	139	143	123	145	271	271	268	260	260	209	245	229	190	200	06	
	07	144	161	130	149	267	261	273	267	269	212	240	233	194	199	07	
	08	145	140	119	144	275	273	280	270	264	211	231	226	193	199	08	
	09	162	191	142	135	271	278	279	272	268	214	230	240	199	195	09	
	10	149	131	132	137	280	261	288	280	265	210	220	232	200	194	10	
	11	153	139	108	130	277	260	293	283	265	208	210	239	197	189	11	
	12	149	145	138	141	270	261	264	269	260	202	210	216	193	190	12	
	13	159	160	153	139	264	265	242	289	260	190	205	185	196	188	13	
	14	174	171	193	187	247	261	242	286	262	189	210	191	195	194	14	
	15	180	189	211	185	232	269	248	288	260	169	210	189	198	205	15	
	16	205	202	238	218	268	270	239	274	259	176	209	180	201	200	16	
	17	218	218	247	260	262	261	239	259	259	199	207	166	193	200	17	
	18	246	220	237	269	268	253	249	259	263	200	204	169	188	199	18	
	19	197	218	218	249	255	242	239	250	249	199	200	180	179	194	19	
	20	177	198	198	202	251	235	229	239	240	193	196	182	171	189	20	
	21	168	188	153	168	251	239	229	230	230	194	189	180	169	184	21	
	22	149	135	84	138	260	228	238	226	230	189	181	180	164	190	22	
	23	123	130	65	116	248	229	234	230	239	188	187	194	170	191	23	
	24	98	177	68	99	244	231	246	240	238	190	192	199	180	191	24	
DAILY SUM	3669	3667	3430	3613	3590	6211	6087	6067	6317	6035	4743	5009	4825	4936	4770	DAILY SUM	
DAILY MEAN	153	153	145	151	147	259	254	253	263	257	198	210	201	189	199	DAILY MEAN	
MEAN			150					256					199			MEAN	
Total MEAN																	Decided MEAN

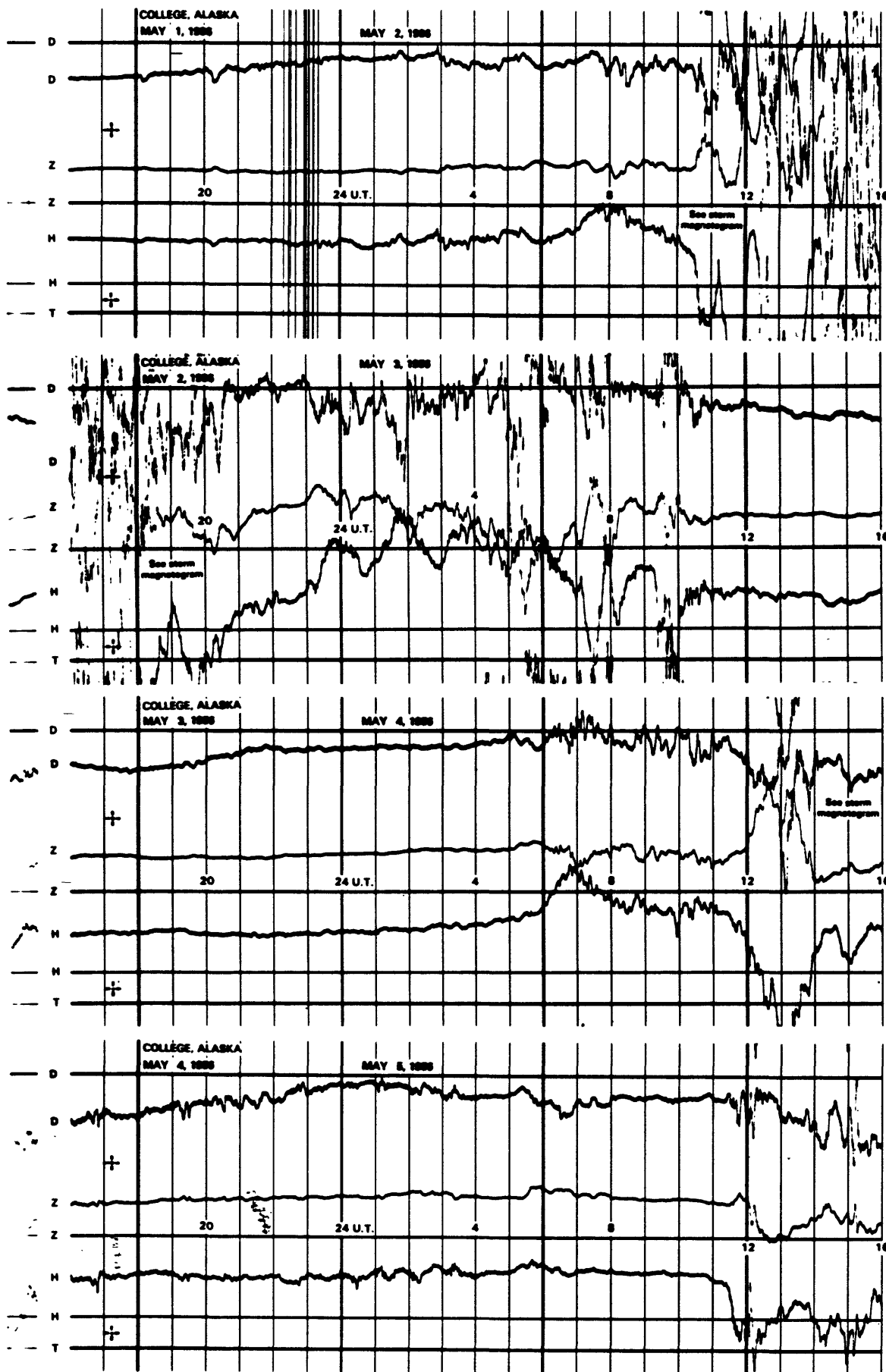
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

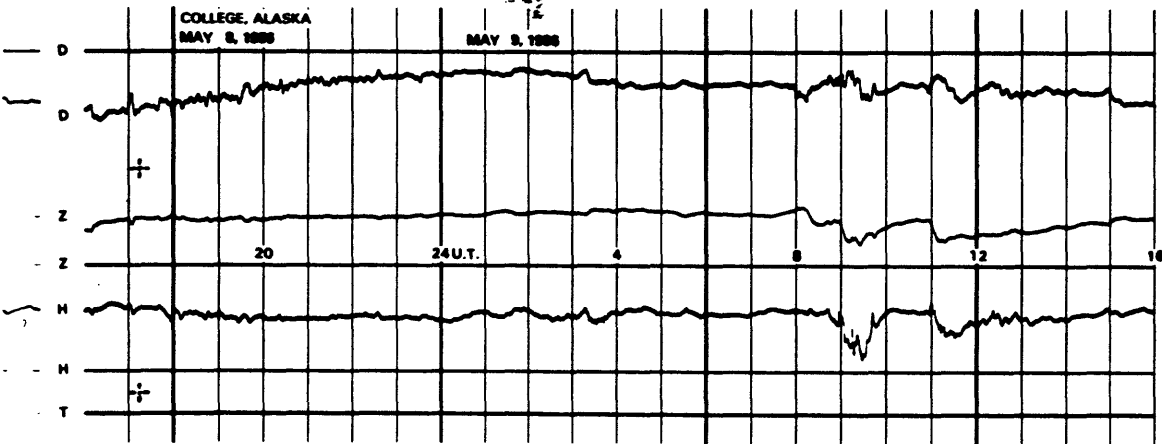
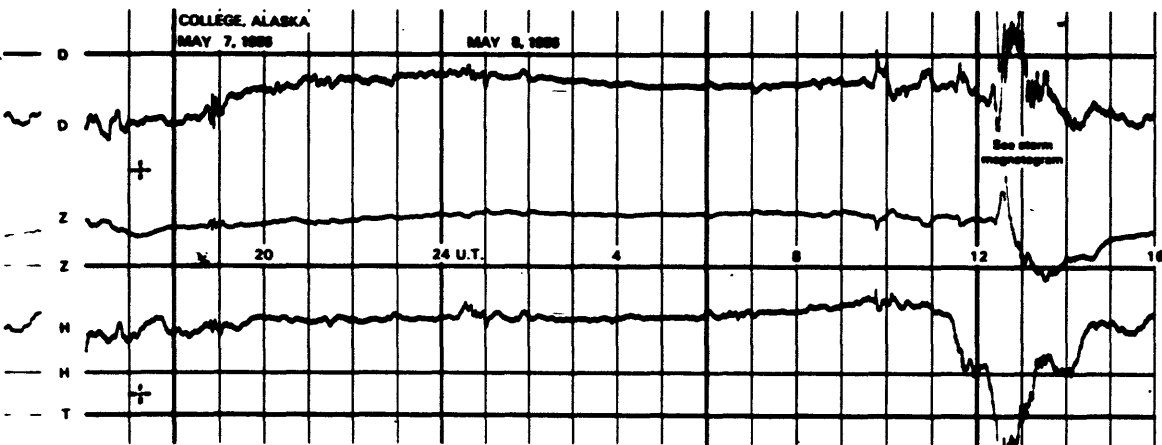
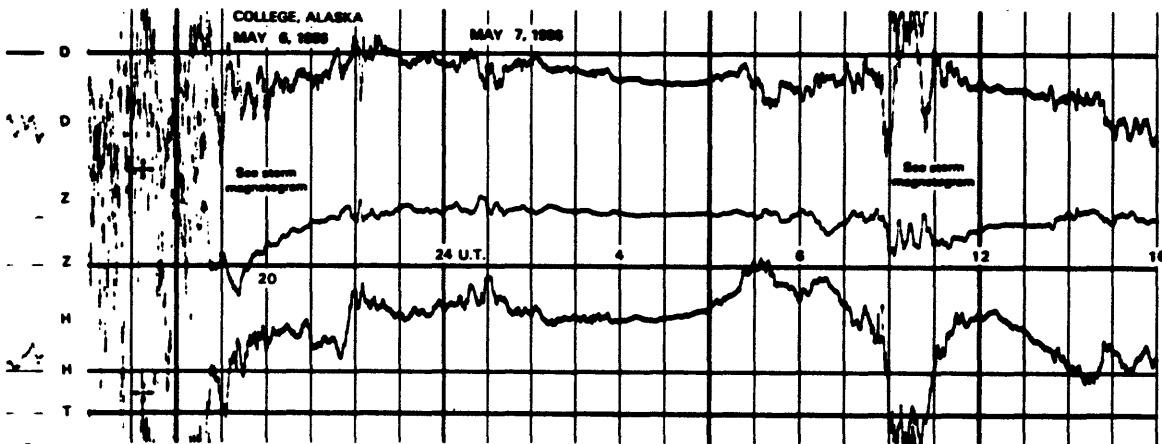
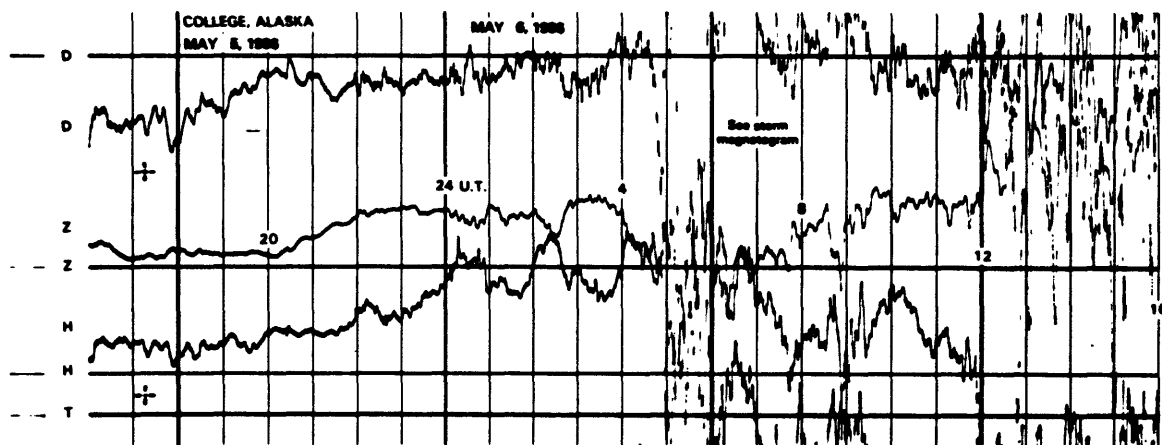
NORMAL MAGNETOGRAMS

500mm
100mm



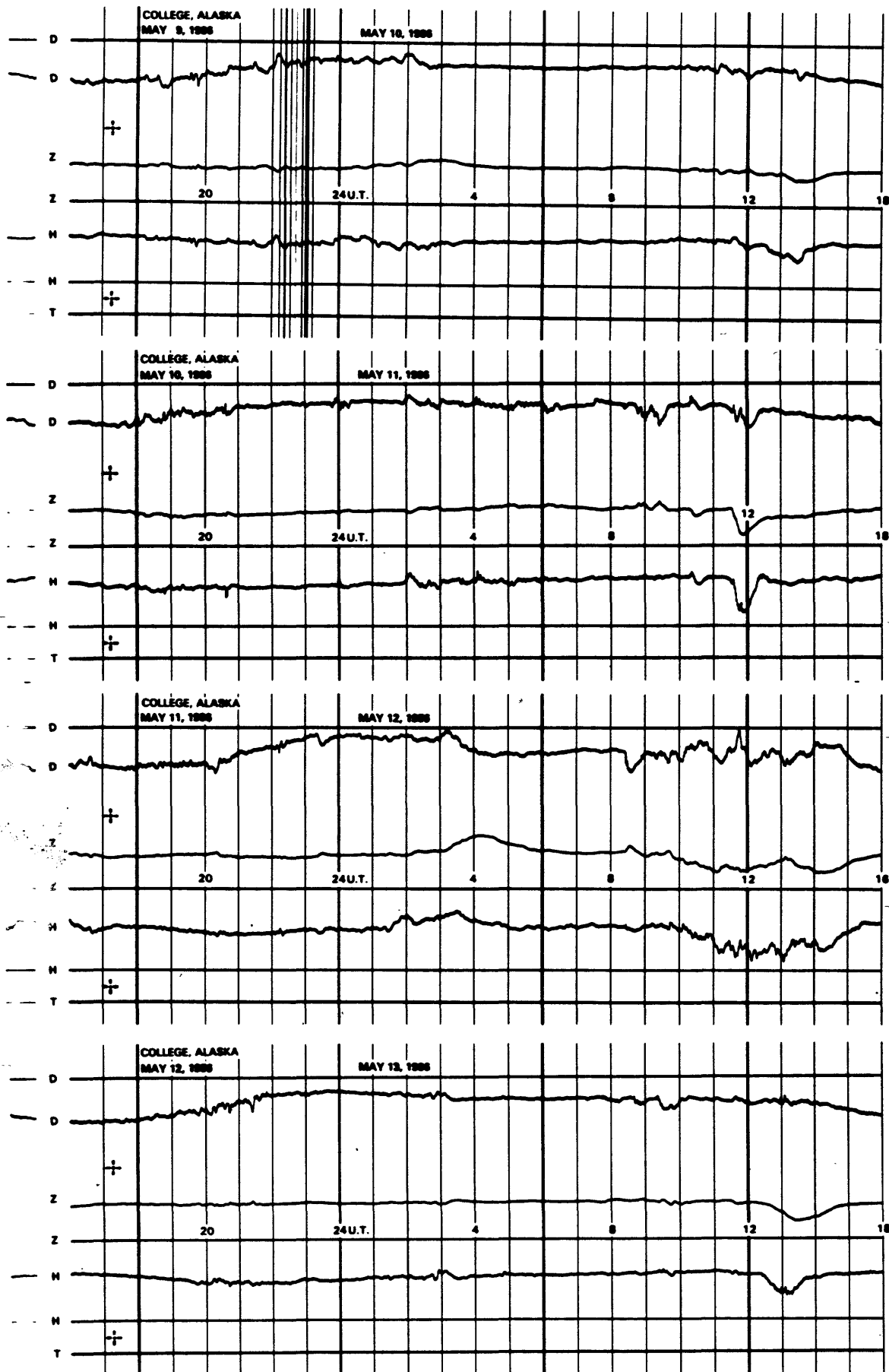
NORMAL MAGNETOGRAMS

200 mm
100 mm
0



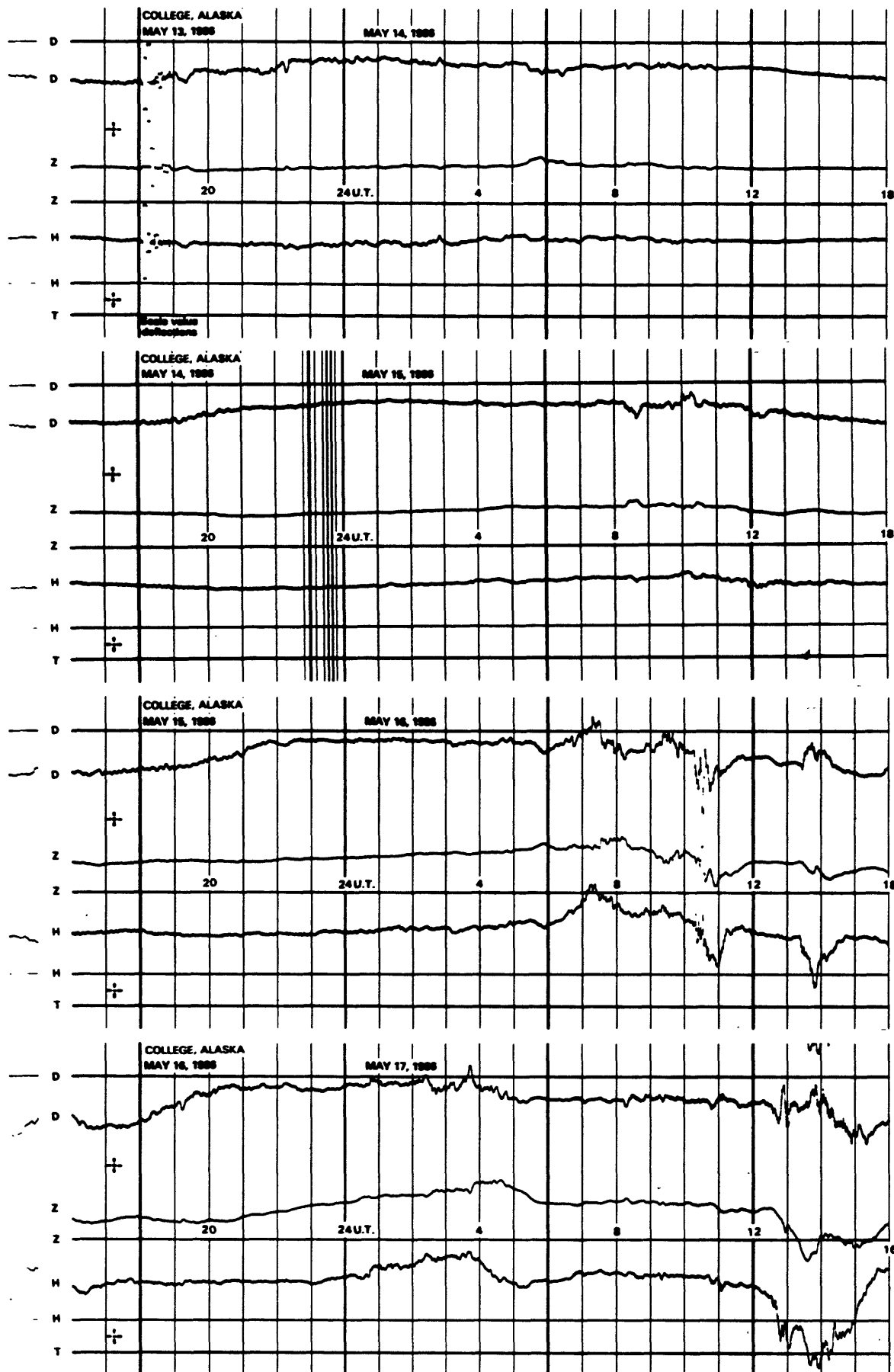
NORMAL MAGNETOGRAMS

200 mm
100 mm



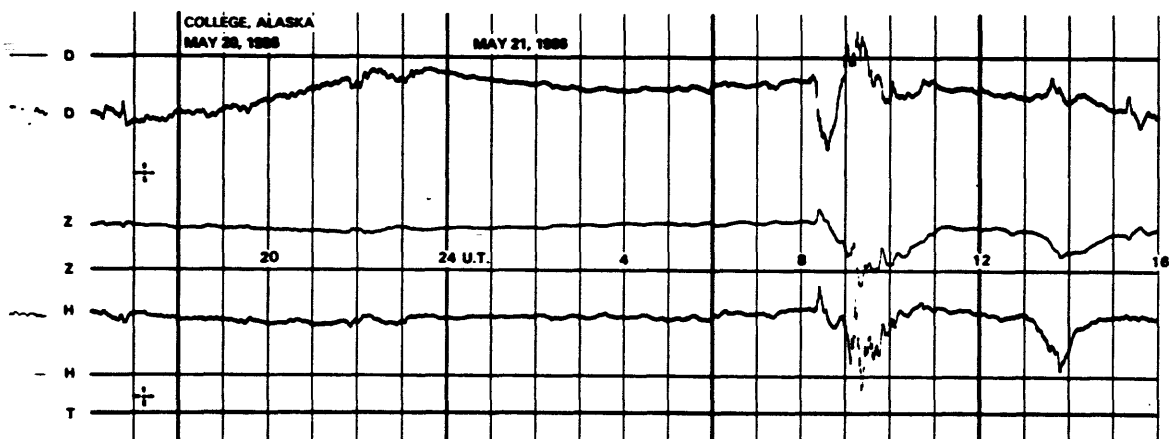
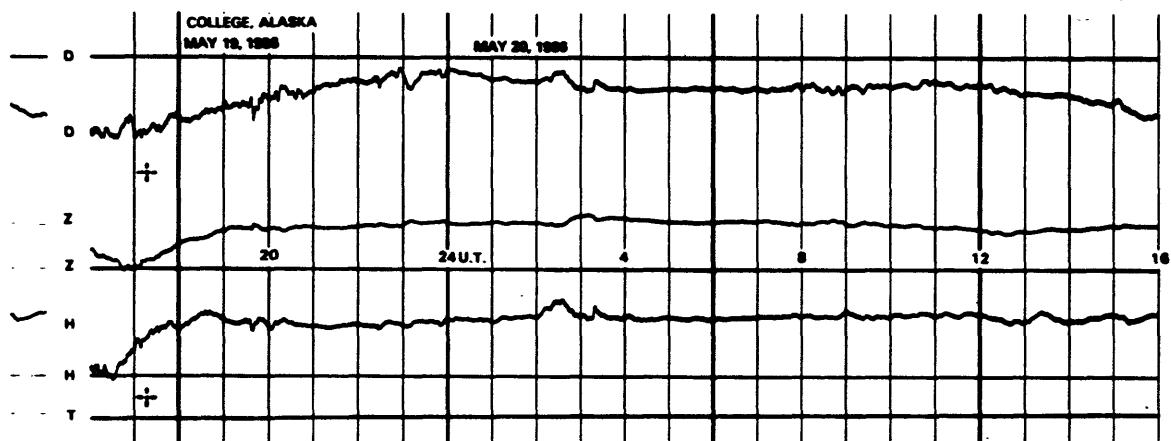
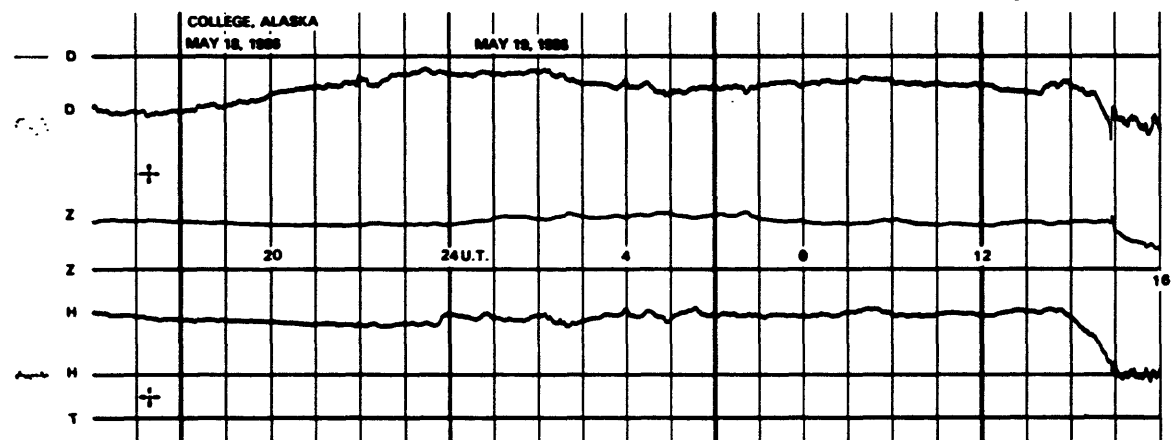
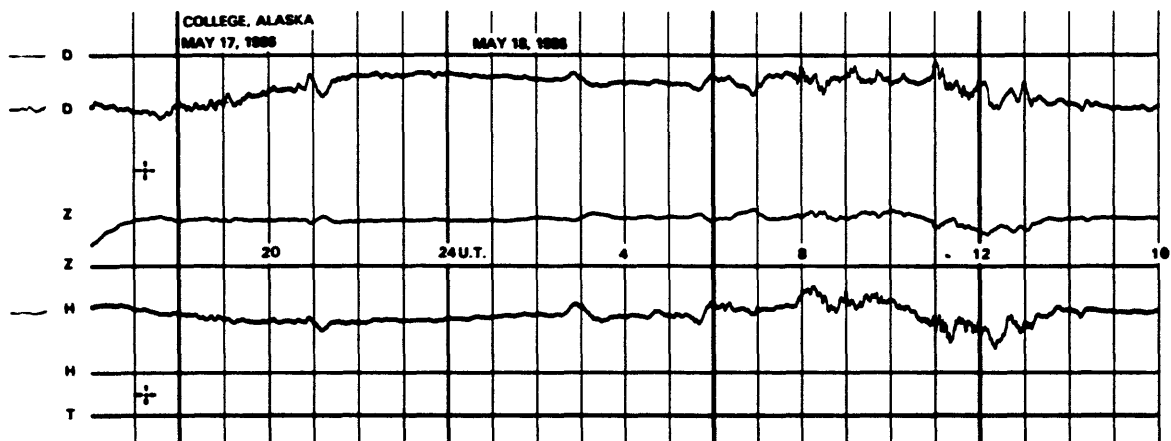
NORMAL MAGNETOGRAMS

200 mm
100 mm
0

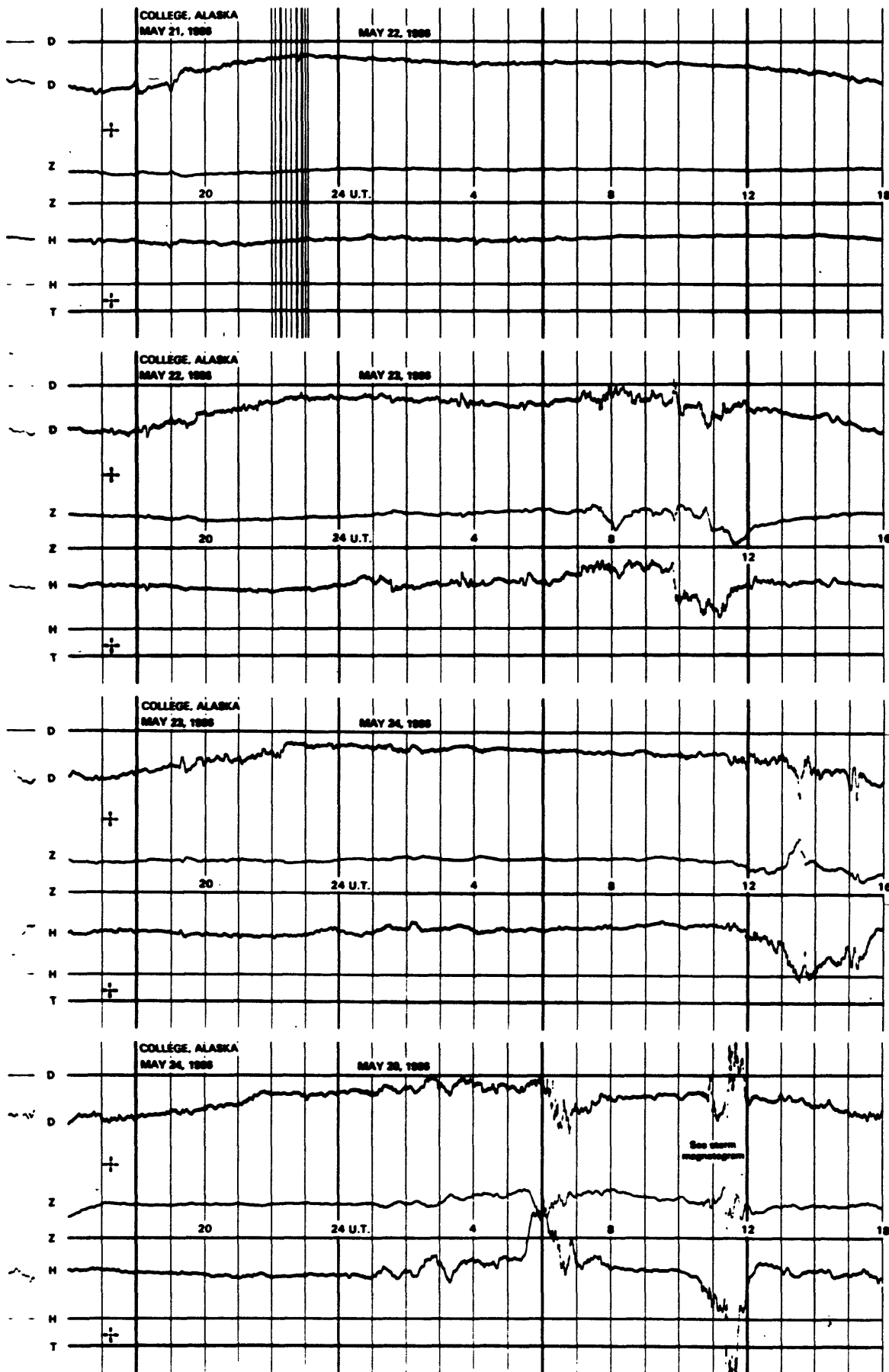


NORMAL MAGNETOGRAMS

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100 mm
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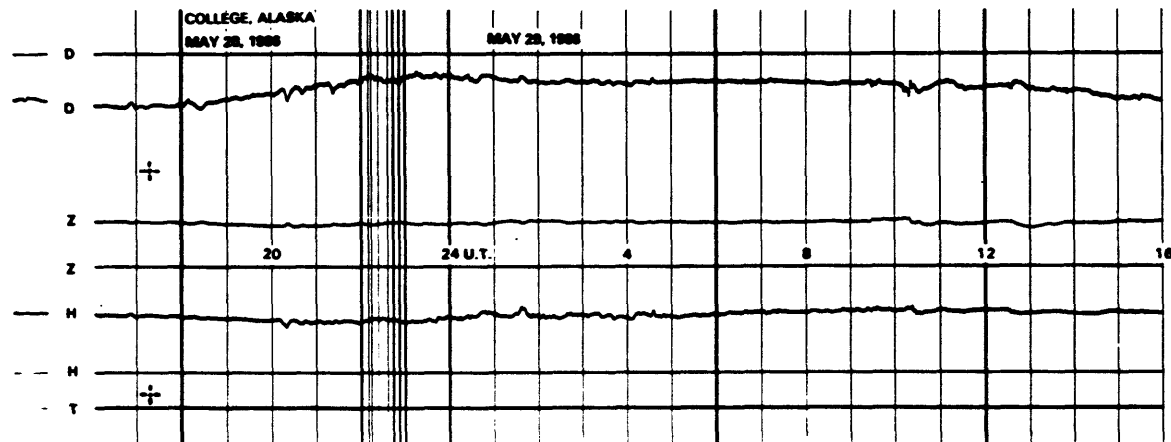
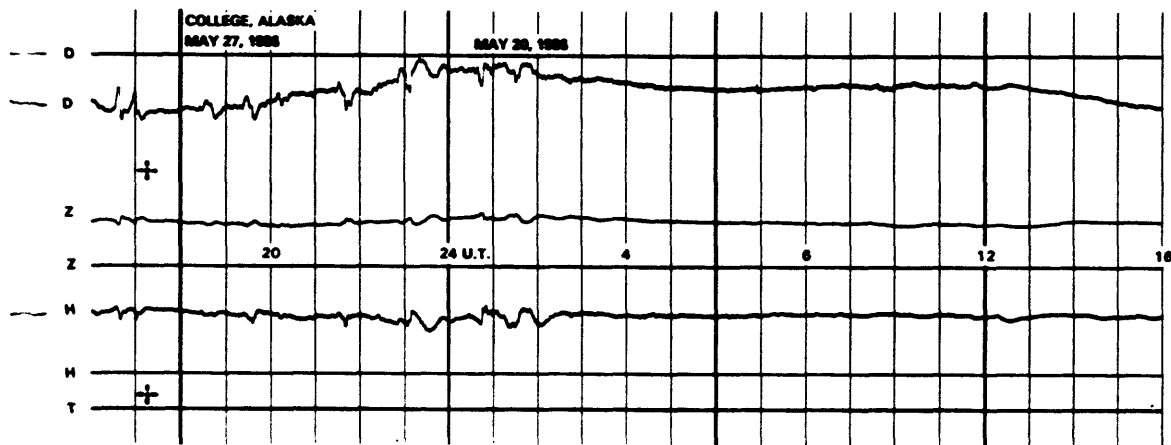
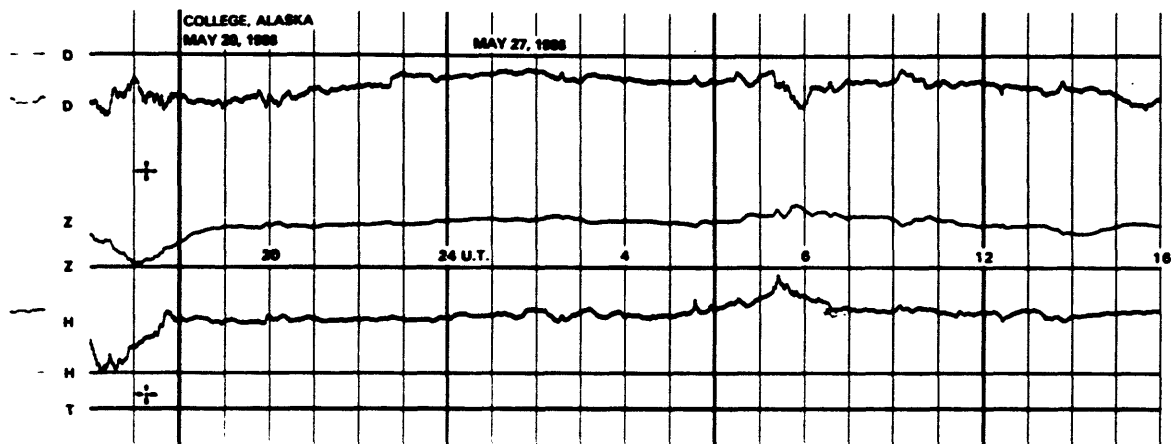
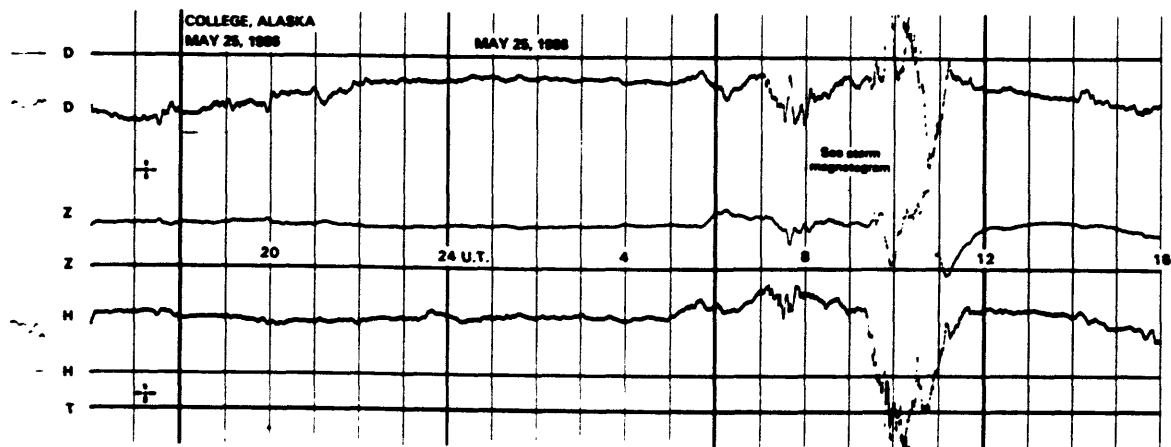


NORMAL MAGNETOGRAMS

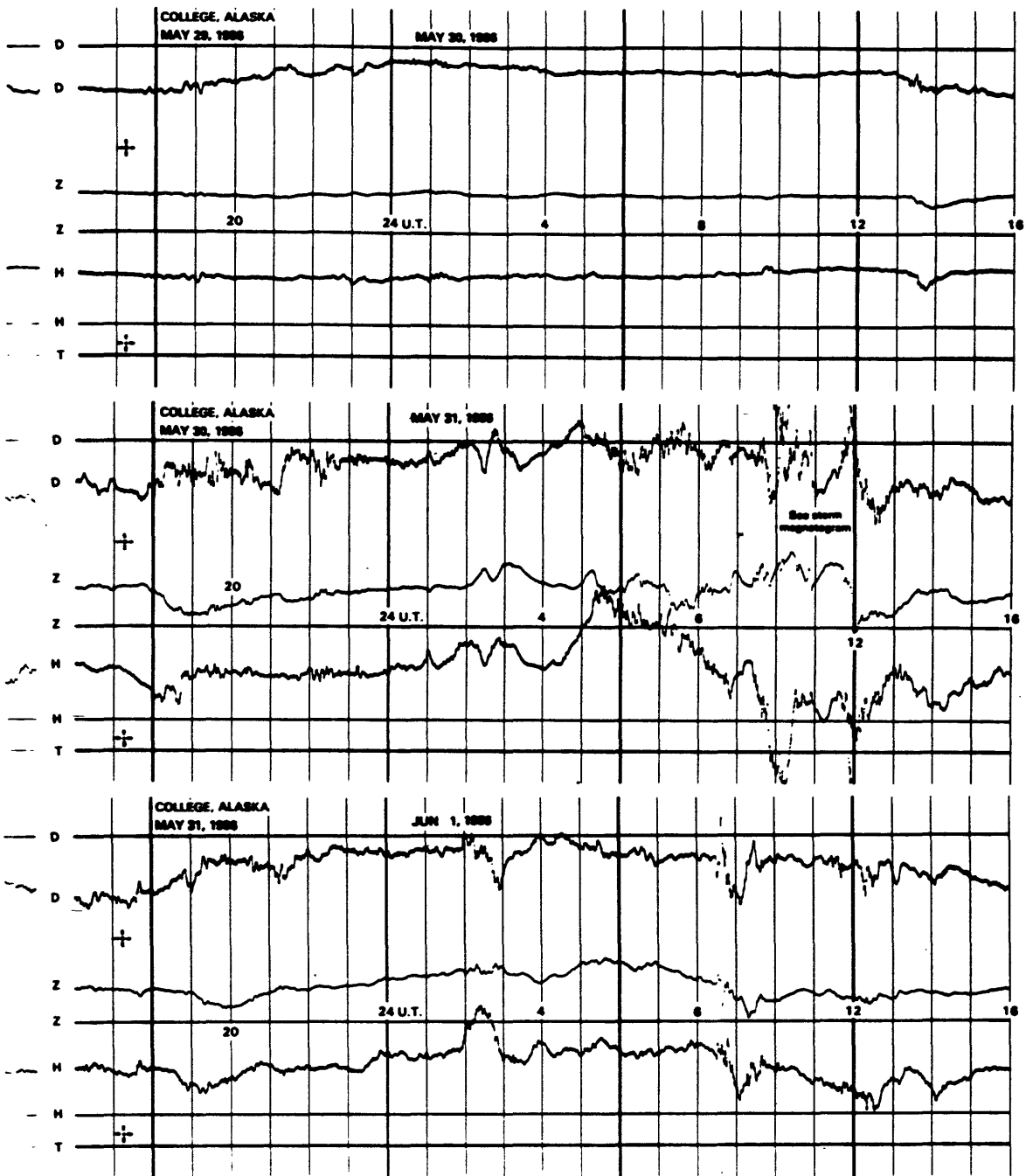


NORMAL MAGNETOGRAMS

200 mm
100 mm
0

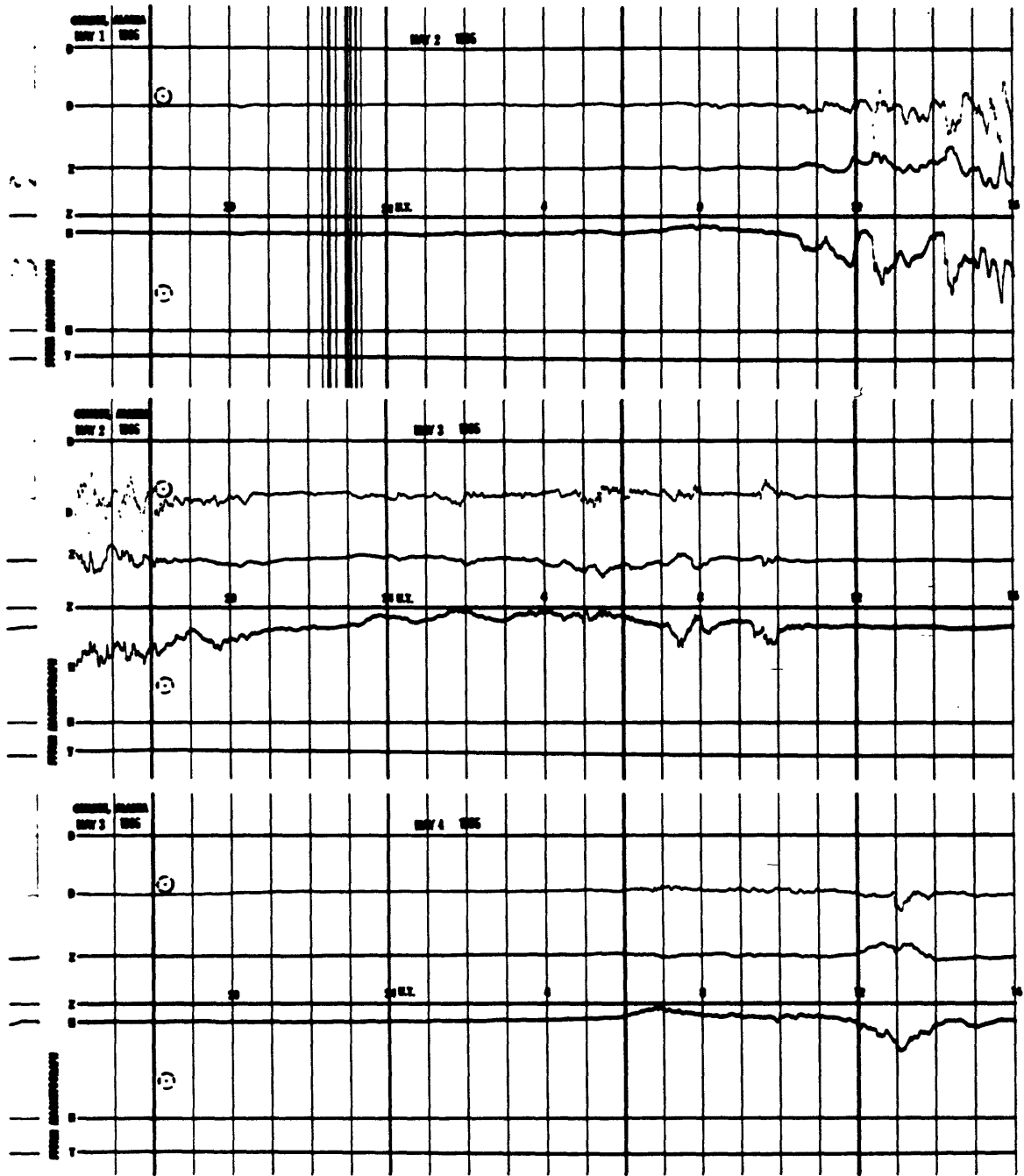


NORMAL MAGNETOGRAMS

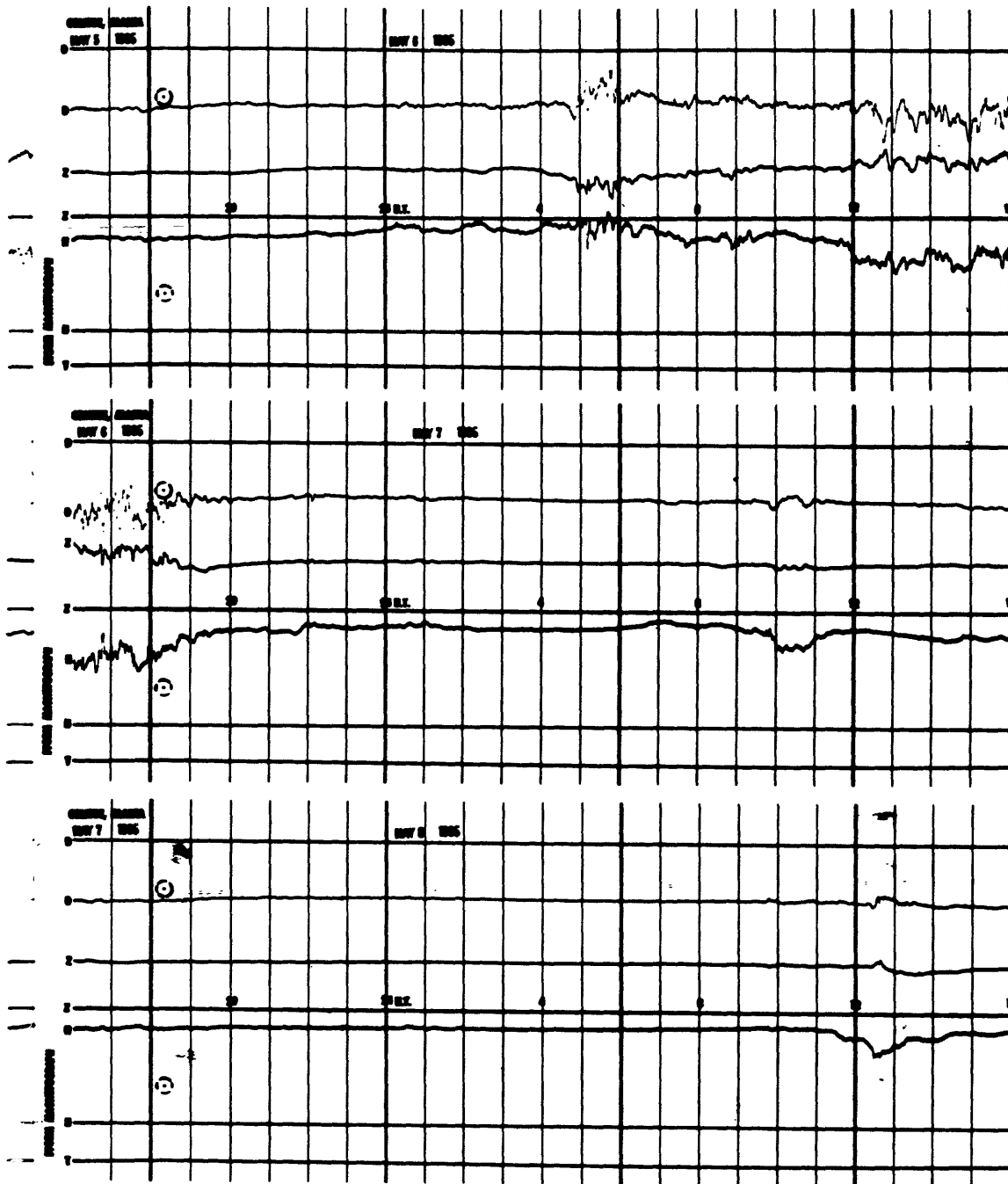


STORM MAGNETOGRAMS

0 100mm 200mm



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

