

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

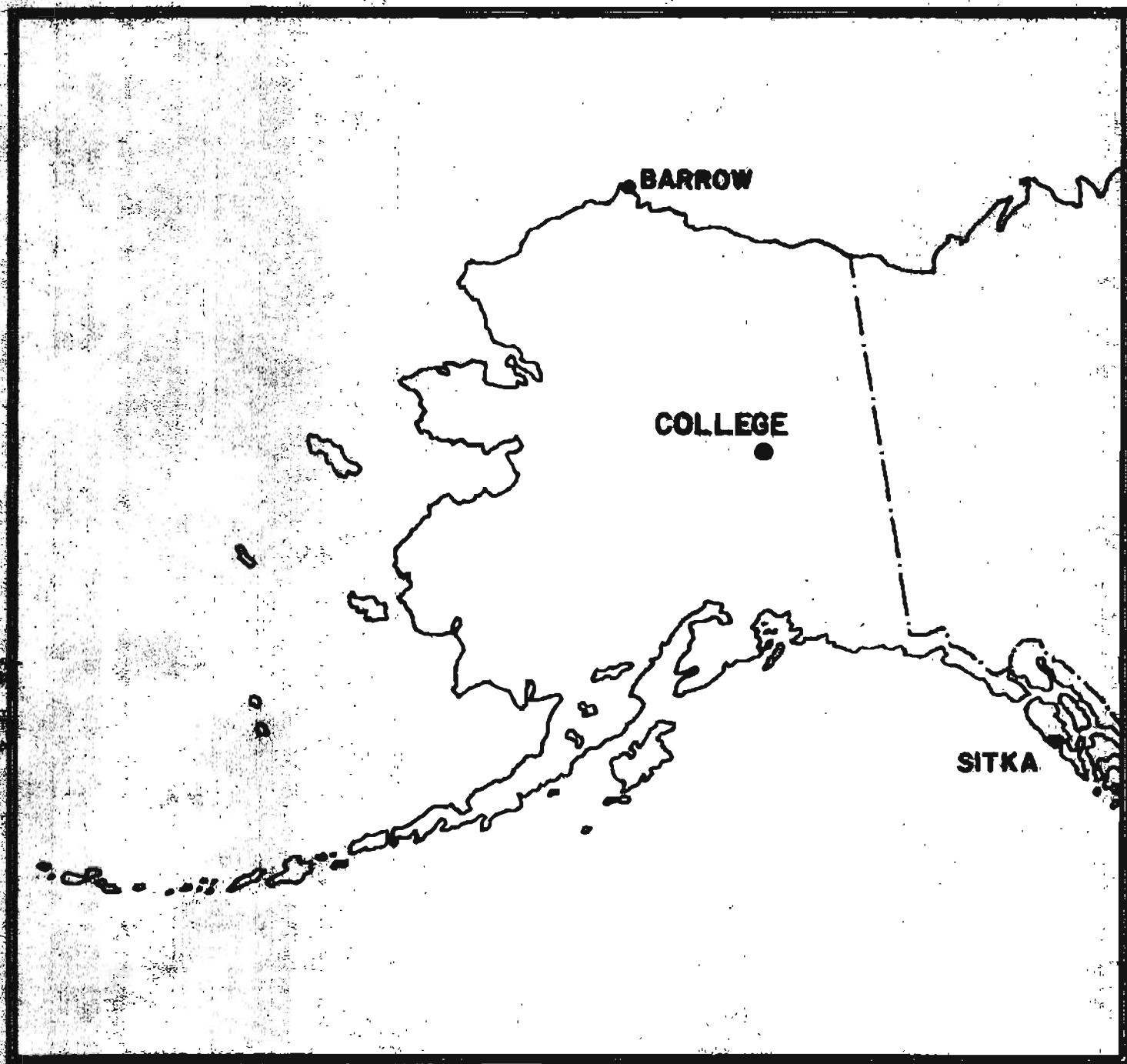
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

MAY 1988

OPEN FILE REPORT 88-0300E



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: R.V. O'CONNELL AND L.Y. TORRENCE AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA. THE COLLEGE OBSERVATORY IS A PART OF THE BRANCH OF GLOBAL SEISMOLOGY AND GEOMAGNETISM OF THE U.S. GEOLOGICAL SURVEY.

Explanation of Data and Reports

Magnetic Activity Report

Principal Magnetic Storms

Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings - Five Quietest Days

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 99775-5160

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

World Data Center A
NOAA D63m 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..... $+256.5^{\circ}$
Elevation.....200 meters

GEOMAGNETIC DATA

Normal and storm magnetograms and appropriate calibration data are processed at the observatory and are available for analysis or copying. Also available are mean hourly scalings for the five quietest days for the month and K-Indices.

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 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 10γ 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 (10γ)

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 averaged 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 sheet 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 one is interested in the detailed morphology of the magnetic field, 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.

College Alaska

MAGNETIC ACTIVITY
(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

May 1988

DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS 20 mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			
1	2	1	1	2	1	1	1	1	10	04	SUDDEN COMMENCEMENTS d h m
2	2	1	1	2	4	2	2	2	16	09	
3	2	2	2	3	3	1	2	1	16	08	
4	3	4	4	3	3	1	2	1	21	14	
5	1	1	3	6	5	1	2	3	22	22	
6	5	6	7	6	7	6	5	3	45	79	
7	3	1	2	2	5	3	3	3	22	16	
8	3	2	2	5	6	5	2	2	27	27	
9	2	2	5	5	3	2	3	2	24	19	
10	3	3	4	4	4	3	2	2	25	18	
11	1	2	3	4	3	2	1	1	17	10	
12	2	1	1	1	0	1	1	1	08	03	
13	1	1	1	3	3	1	0	0	10	05	
14	1	0	1	4	3	0	0	0	09	06	
15	1	4	2	0	0	1	0	1	09	05	
16	2	3	3	5	4	6	1	1	25	25	
17	2	5	5	5	6	3	3	2	31	34	
18	4	4	5	4	4	3	2	3	29	24	
19	3	2	2	3	3	3	1	1	18	10	
20	2	2	1	0	1	1	2	2	11	05	
21	2	4	4	2	3	2	2	2	21	13	
22	3	3	3	1	4	4	1	0	19	13	
23	2	2	1	0	0	0	0	1	06	03	
24	2	2	3	3	5	1	1	1	18	17	
25	2	0	0	2	1	1	1	2	09	04	
26	3	4	1	1	1	2	0	0	12	07	
27	1	2	0	0	0	0	0	0	03	01	
28	1	0	0	0	0	1	1	1	04	02	
29	1	2	3	2	2	2	1	2	15	08	
30	2	2	5	2	2	1	2	3	19	13	
31	3	2	2	3	2	2	3	2	19	10	

POSSIBLE SOLAR-FLARE
EFFECTS BASED ON
INSPECTION OF GRAMS
ALONE (WITHOUT
REFERENCE TO DATA
FROM OTHER SOURCES)

BEGIN

END

d h m

d h m

K SCALE USED:

LOWER LIMIT FOR K = 9.....

D

M

Z

675.7

322.2

(mm)

CURRENT SCALE VALUE.....

3.69

7.77

(γ /mm)

LOWER LIMIT FOR K = 9.....

2490

2500

(to nearest 10 γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA
May 1988

WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80502 U.S.A.

Data from Individual Observatories:

Obs. 2 letter IAGA 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
00	64.6 N	5	23xx	..				6	3, 5	7	248	1760	1370	7	00

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 5/1/88	2400 U.T., 5/24/88	1.0' / mm	3.7 ⁸ / mm	27° 01.2' E
	0001 U.T., 5/25/88	2400 U.T., 5/31/88	1.0' / mm	3.7 ⁸ / mm	27° 01.1' E
H	0000 U.T. 5/1/88	2400 U.T. 5/31/88	7.77 ⁸ / mm		12637 ⁸
Z	0000 U.T., 5/1/88	2400 U.T., 5/31/88	7.65 ⁸ / mm		55162 ⁸

STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	BASELINE
D	0000 U.T., 5/1/88	2400 U.T., 5/31/88	7.9' / mm	29.4 ⁸ / mm
H	(same)	(same)	43.5 ⁸ / mm	
Z	(same)	(same)	48.7 ⁸ / mm	

RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION
	FROM	TO	SCALE VALUE
D			
H			
Z			

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 13.6' E	12831 ⁸	55313 ⁸

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: MAY 1, 12, 23, 27, 28,

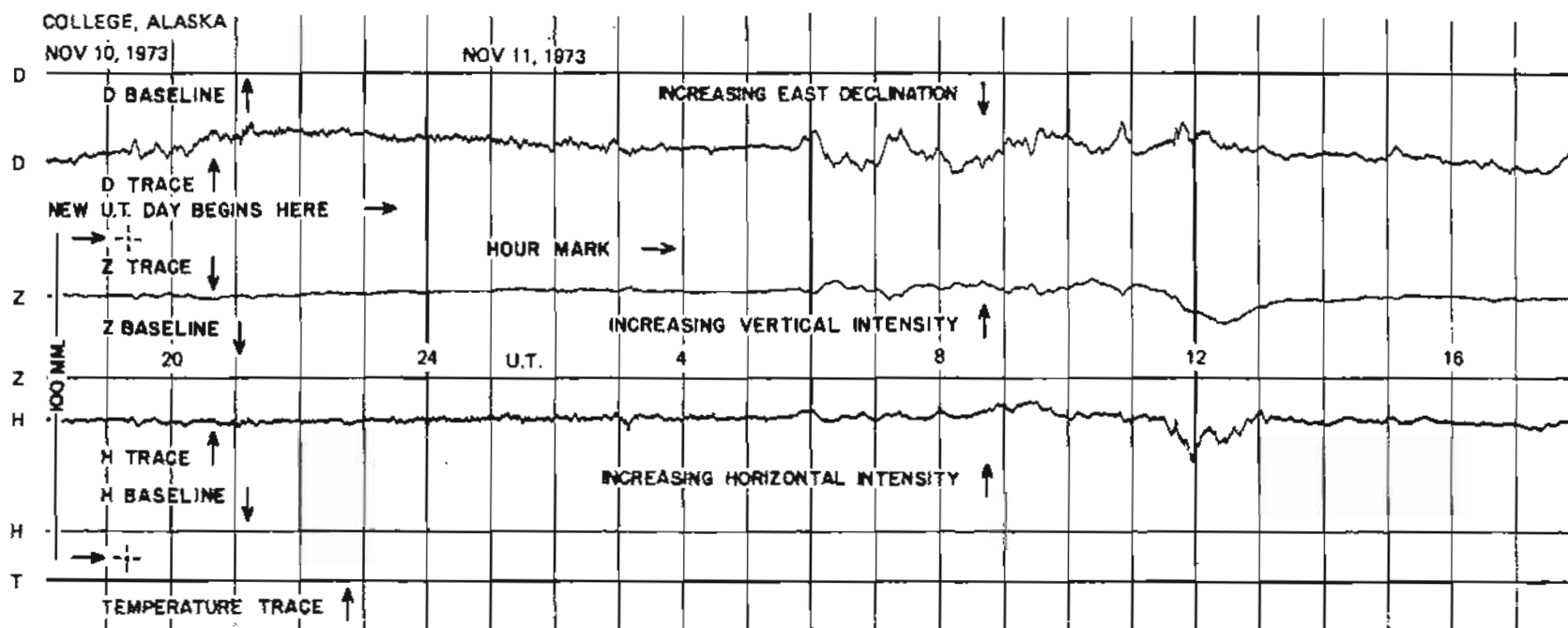
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

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

COMPONENT	D												E												H												Z												COMPONENT
	DAY			23			27			28			01			12			23			27			28			01			12			23			27			28									
	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07													
DAY	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07	01	04	07										
HOURLY	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17													
DAILY SUM	3198	2842	2855	3180	2912	2912	121	132	132	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126													
DAILY MEAN	133	123	119	132	121	121	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126													
MEAN													250												198																								

Scaled / Y/T Checked **RVO**

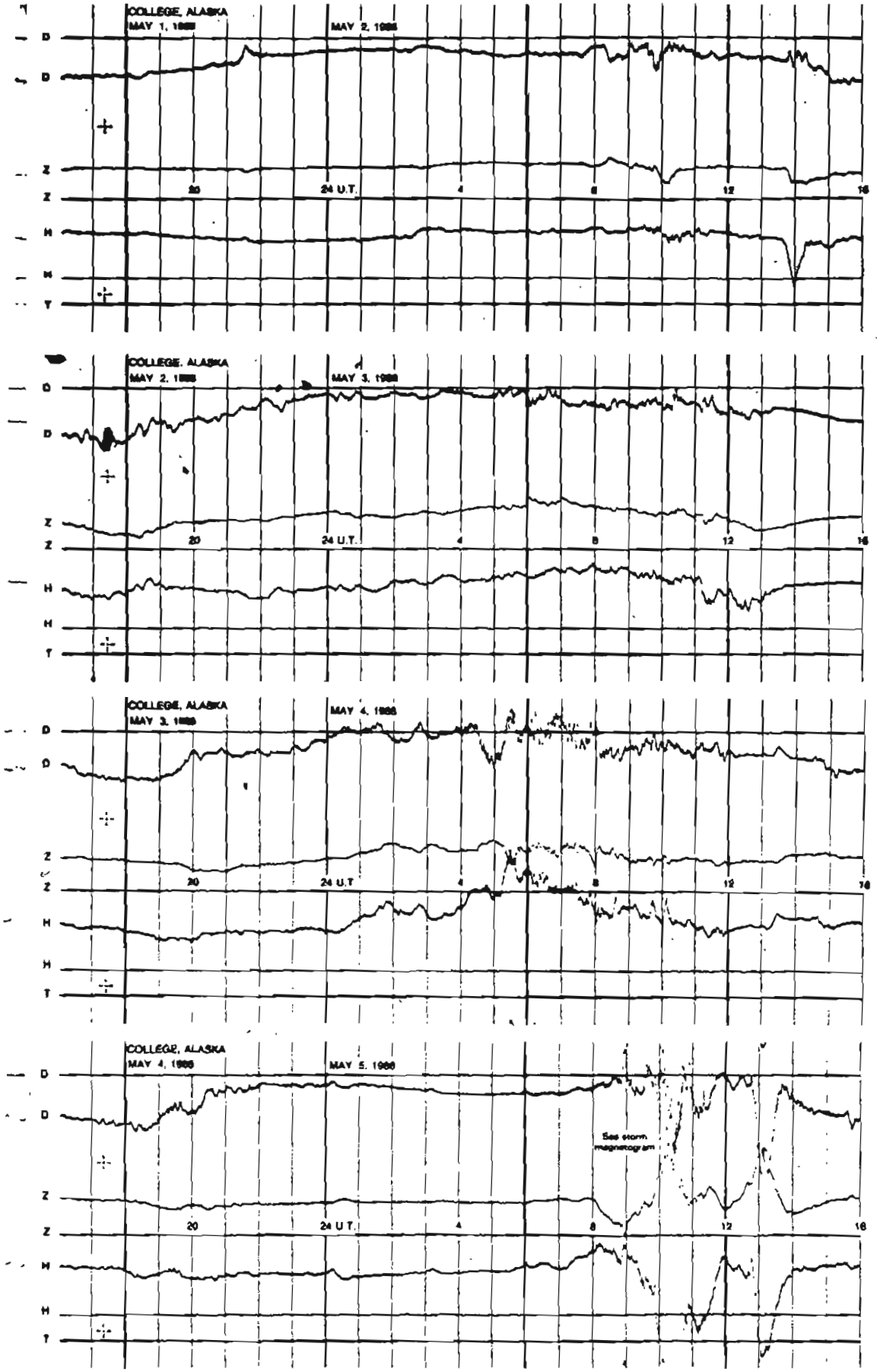
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



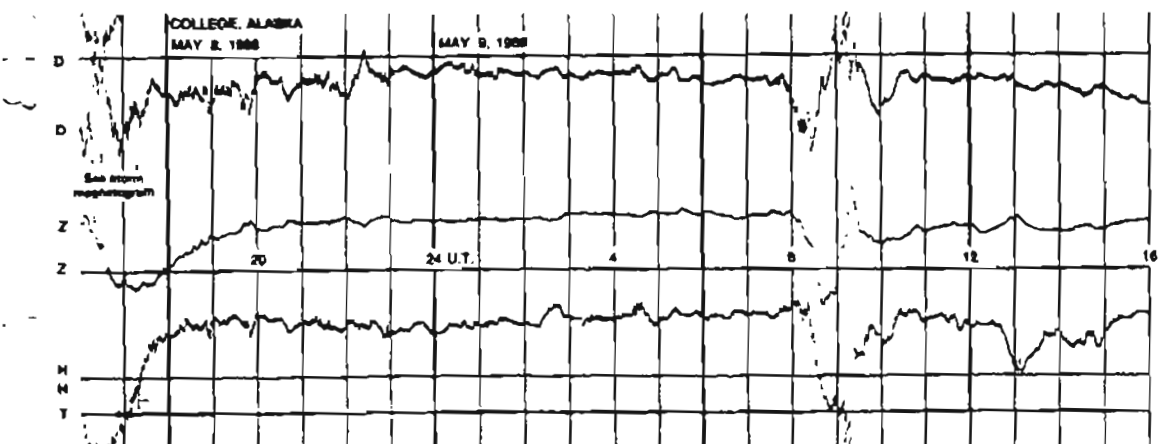
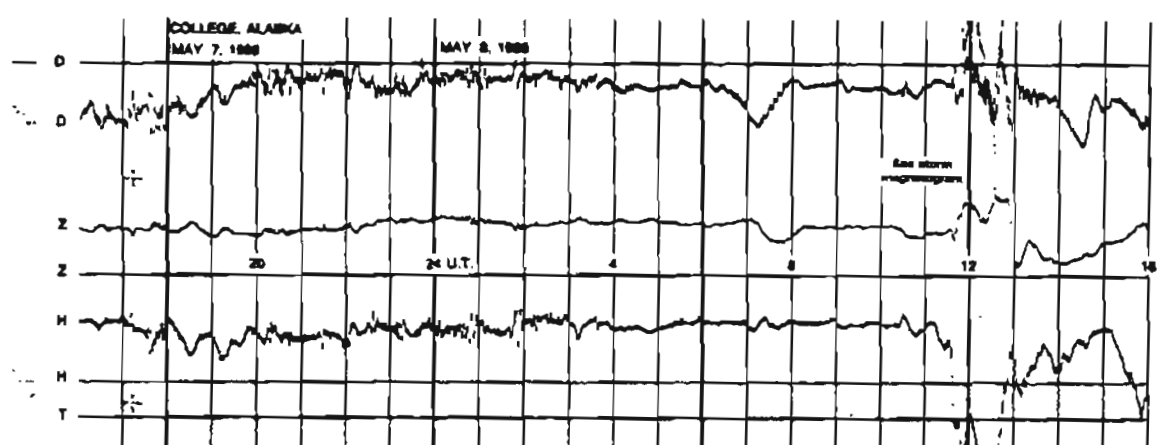
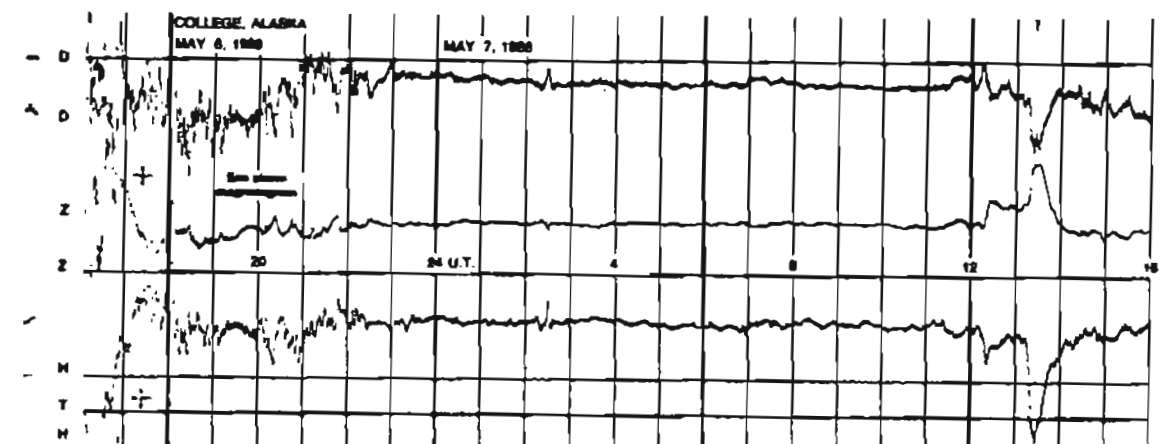
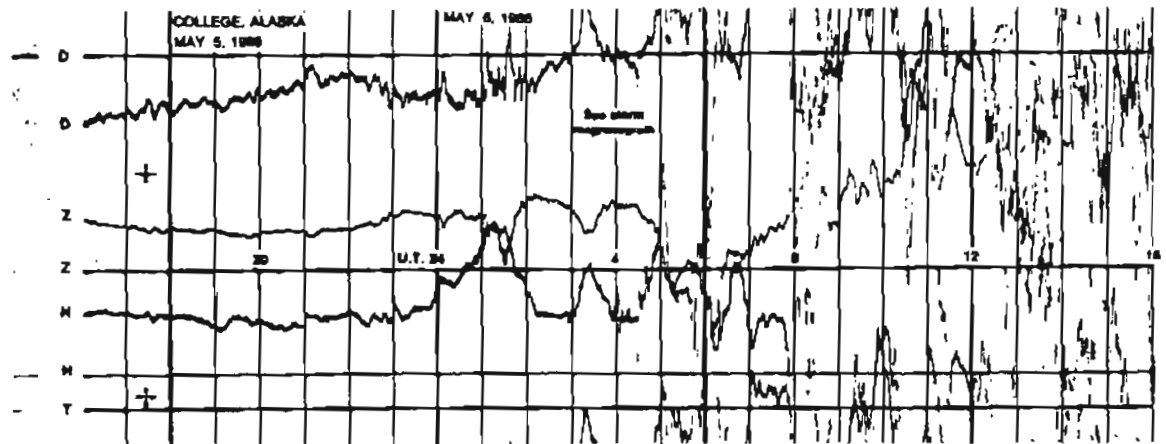
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

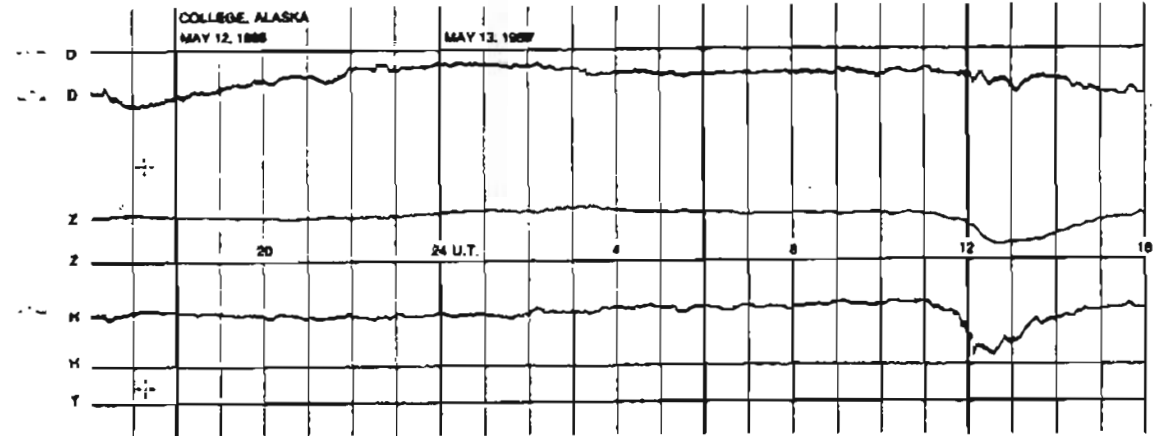
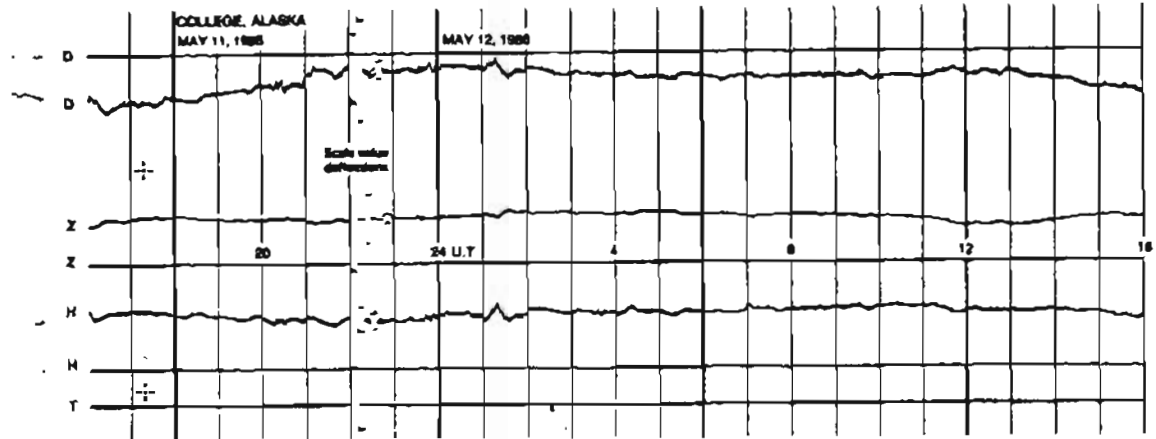
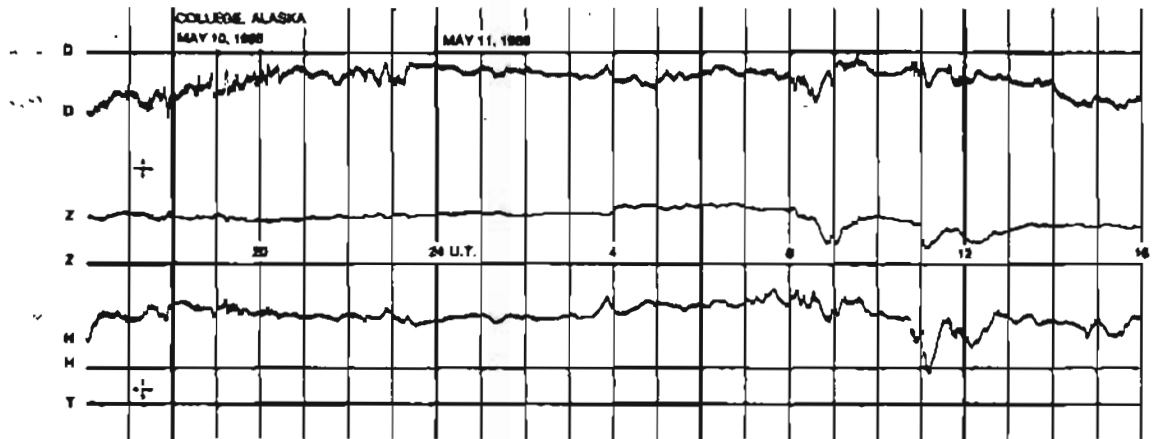
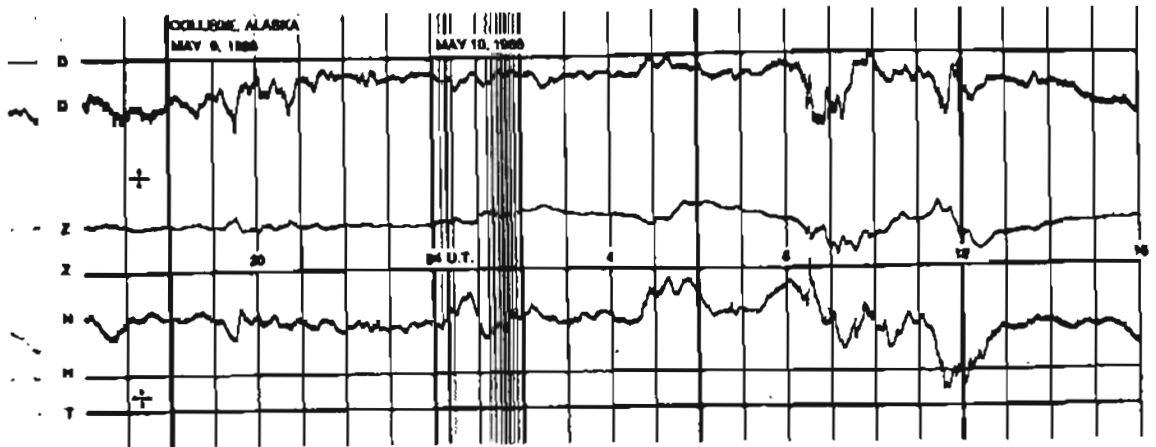
1000 gauss
1000 gauss
0



NORMAL MAGNETOGRAMS

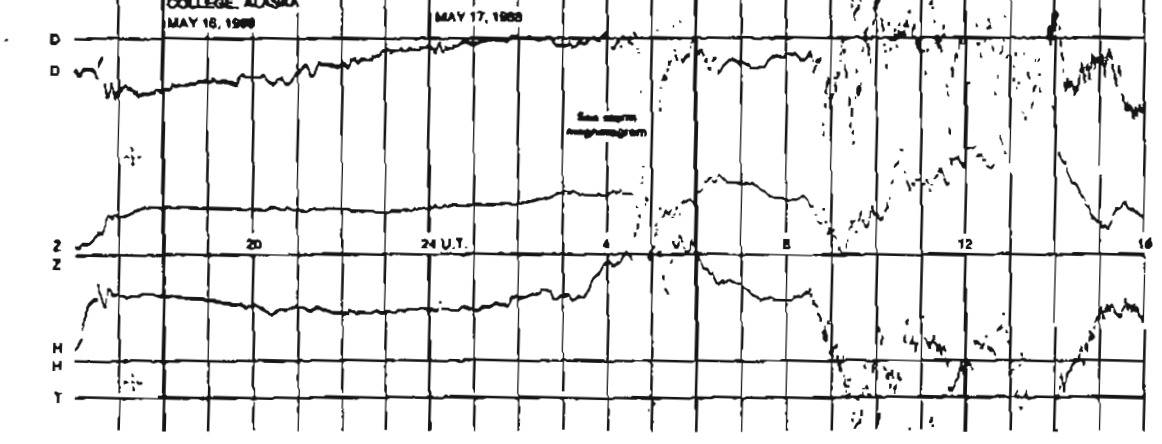
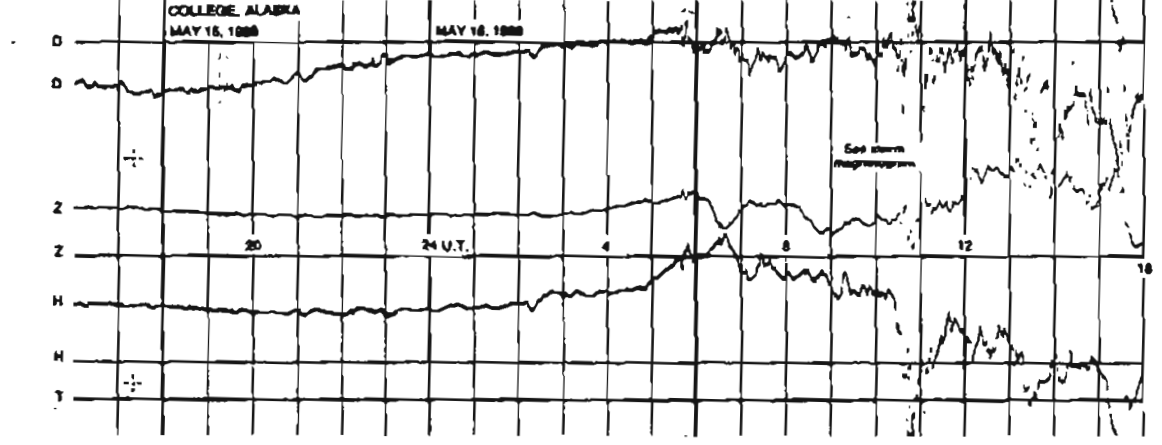
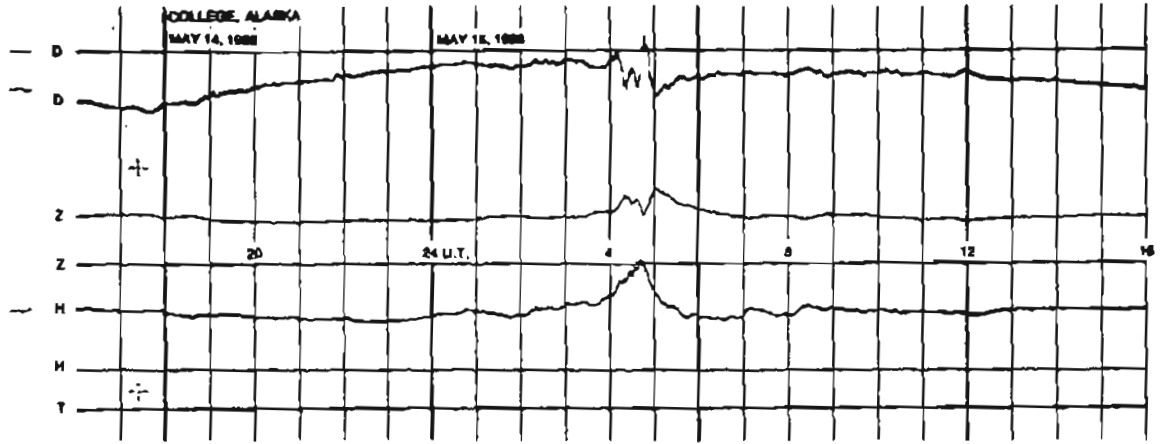
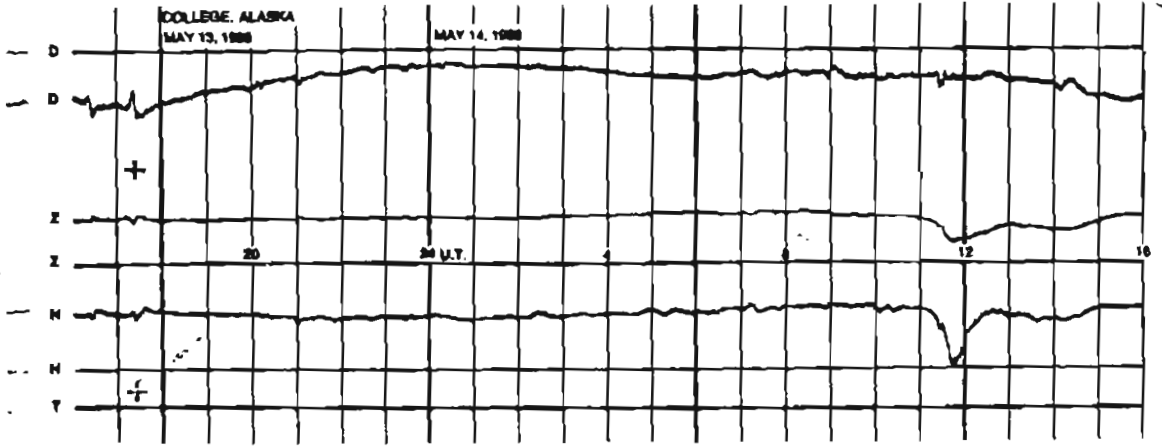


NORMAL MAGNETOGRAMS



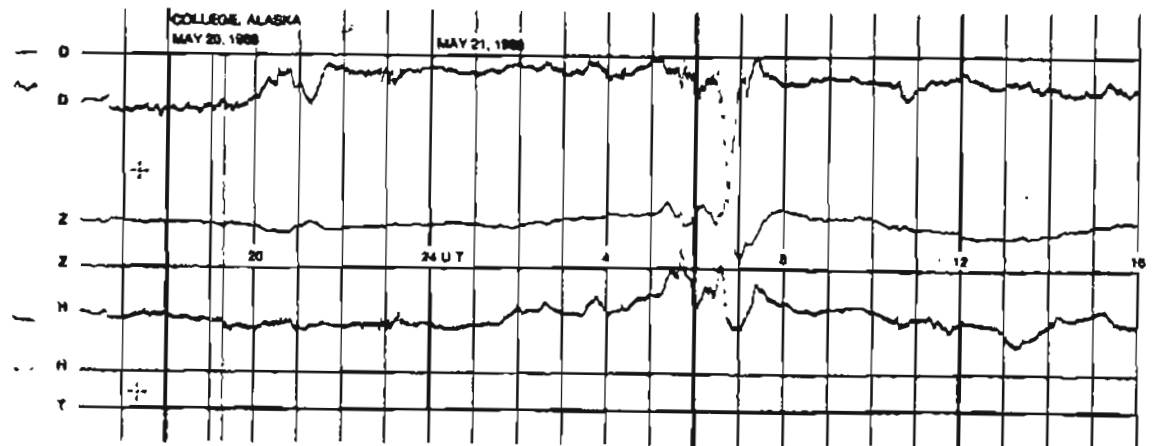
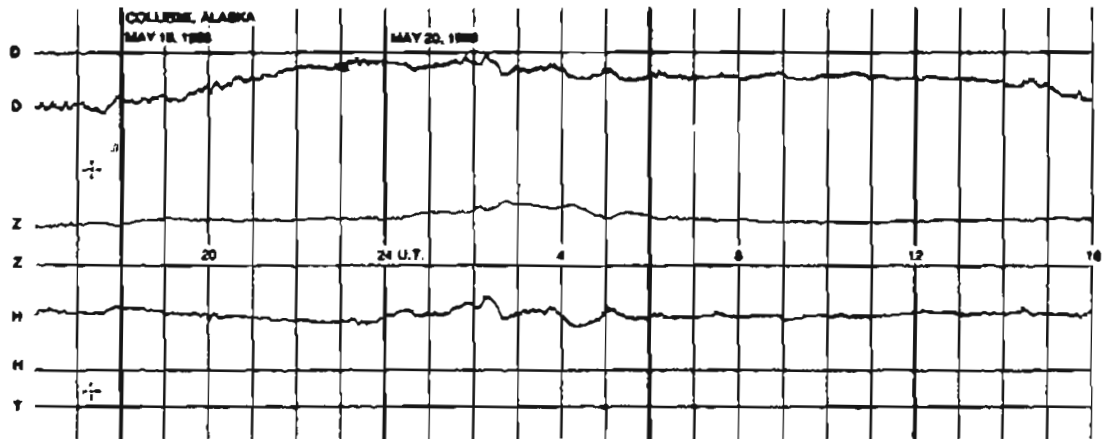
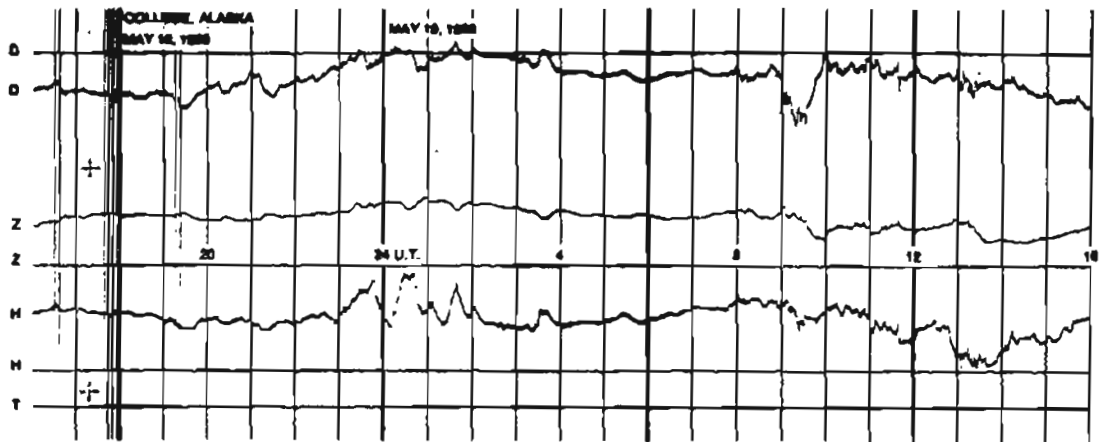
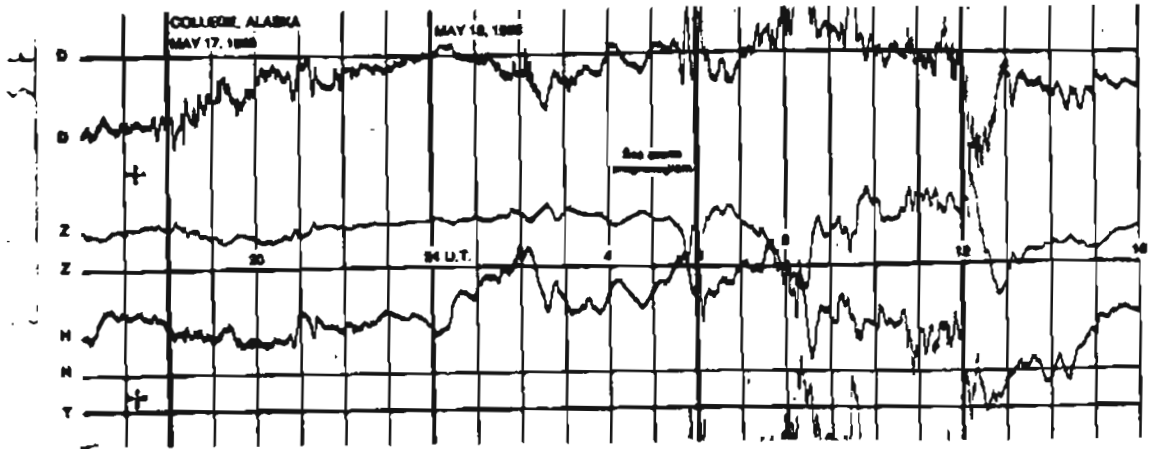
200 mm
100 mm
0

NORMAL MAGNETOGRAMS



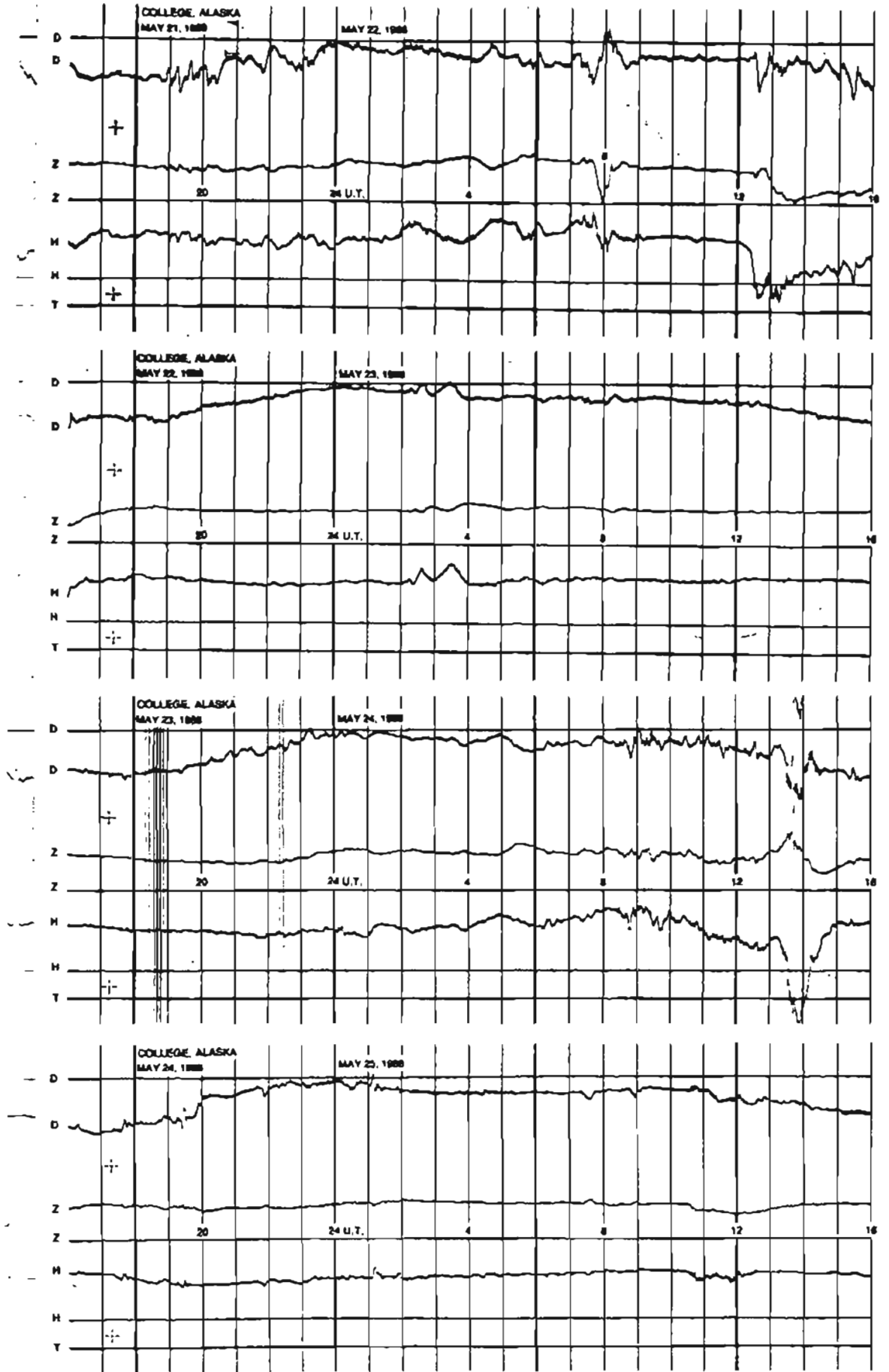
NORMAL MAGNETOGRAMS

500 mm
100 mm
0



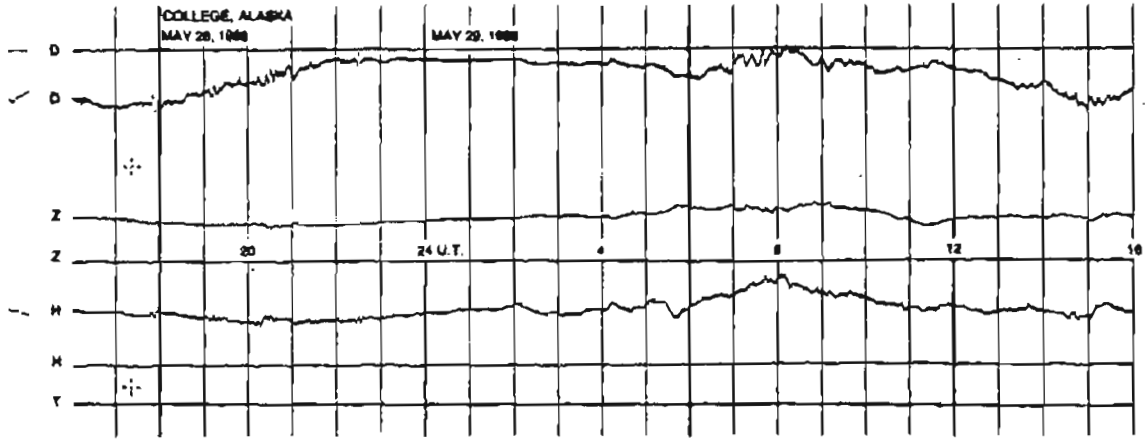
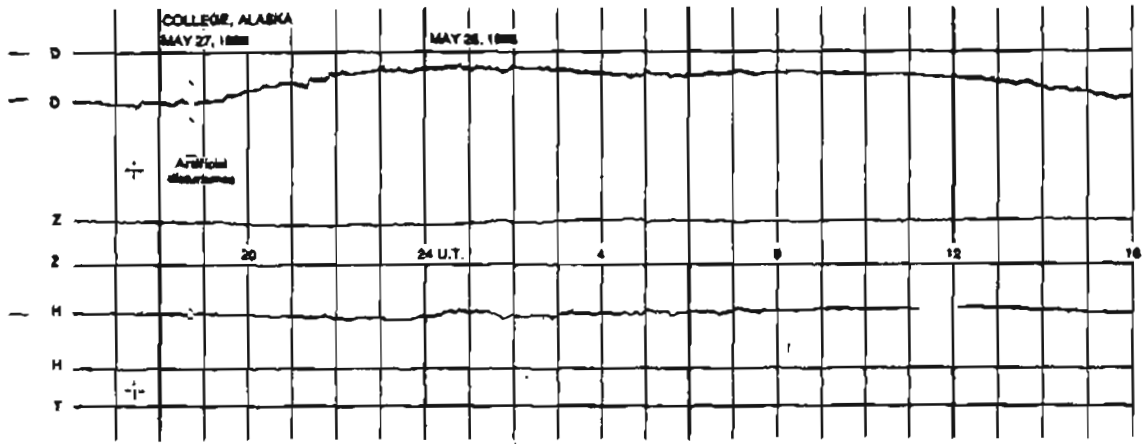
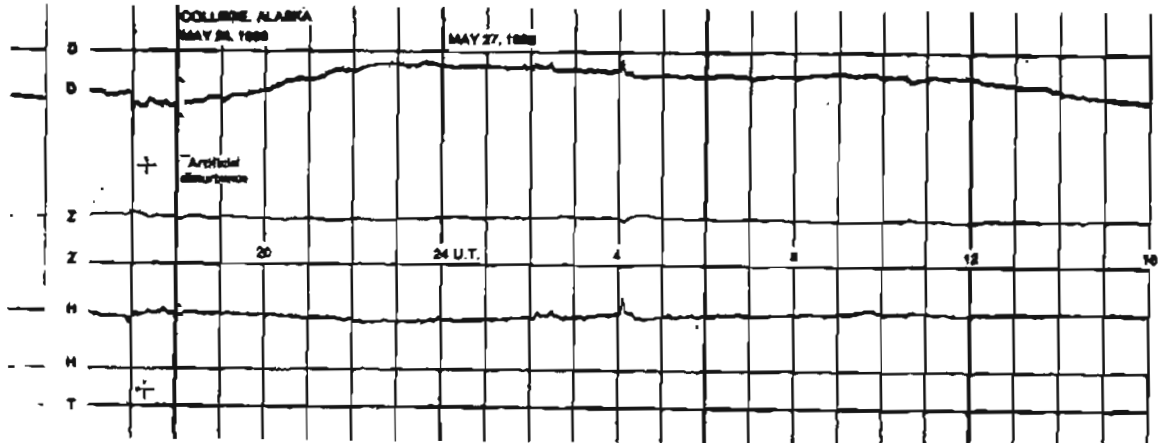
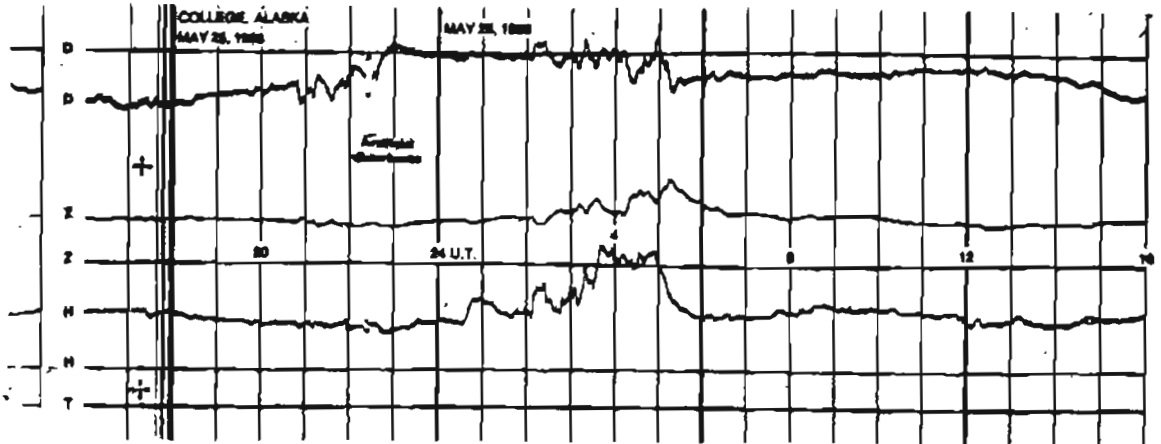
NORMAL MAGNETOGRAMS

100 mm
100 mm
0

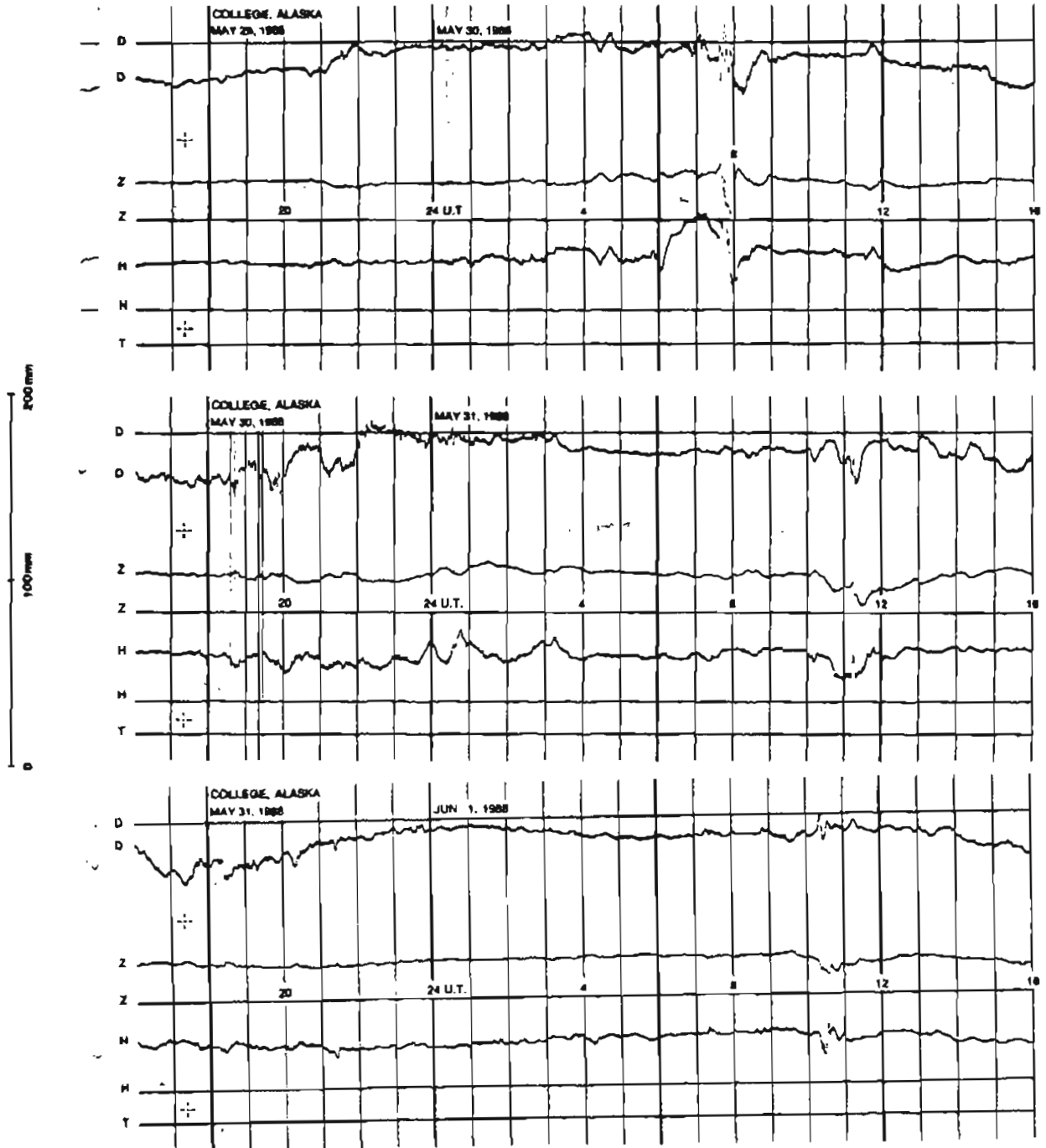


NORMAL MAGNETOGRAMS

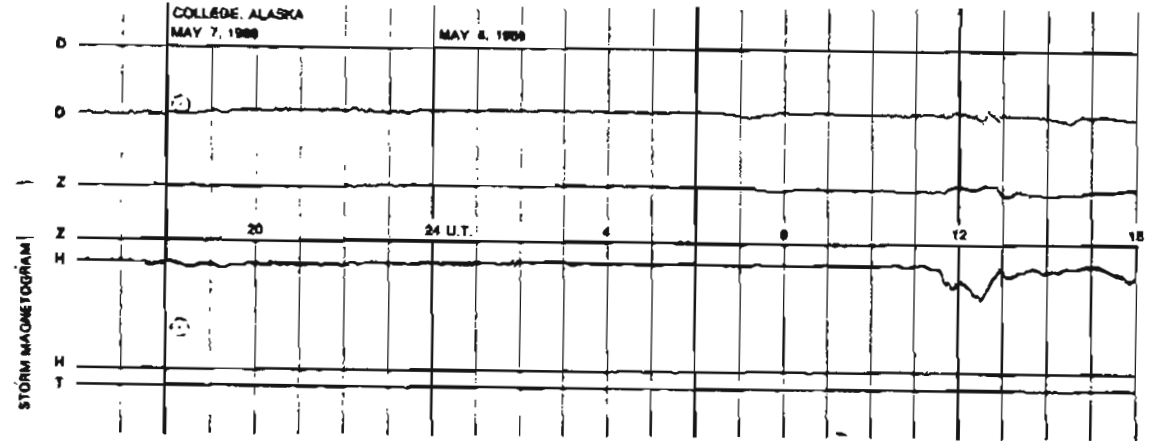
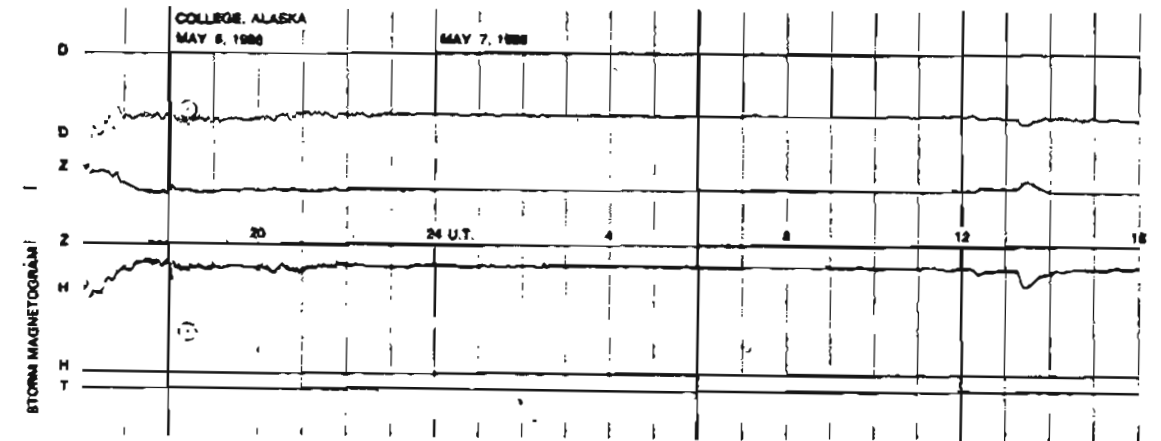
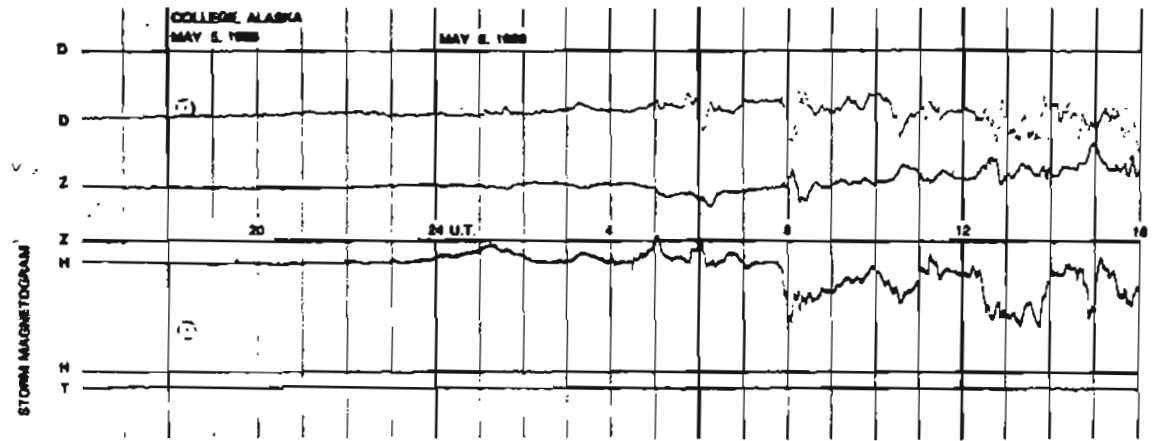
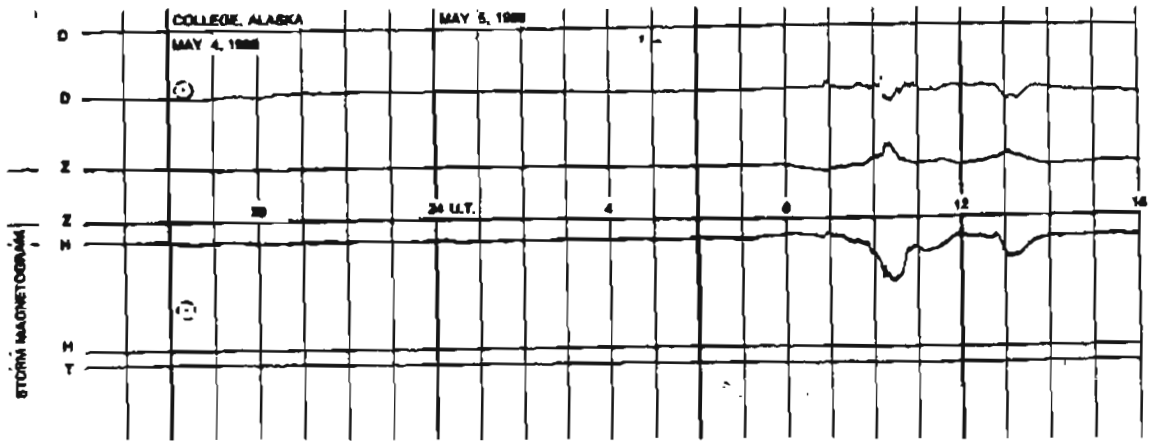
200mm
100mm
0



NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

100mm
500mm

