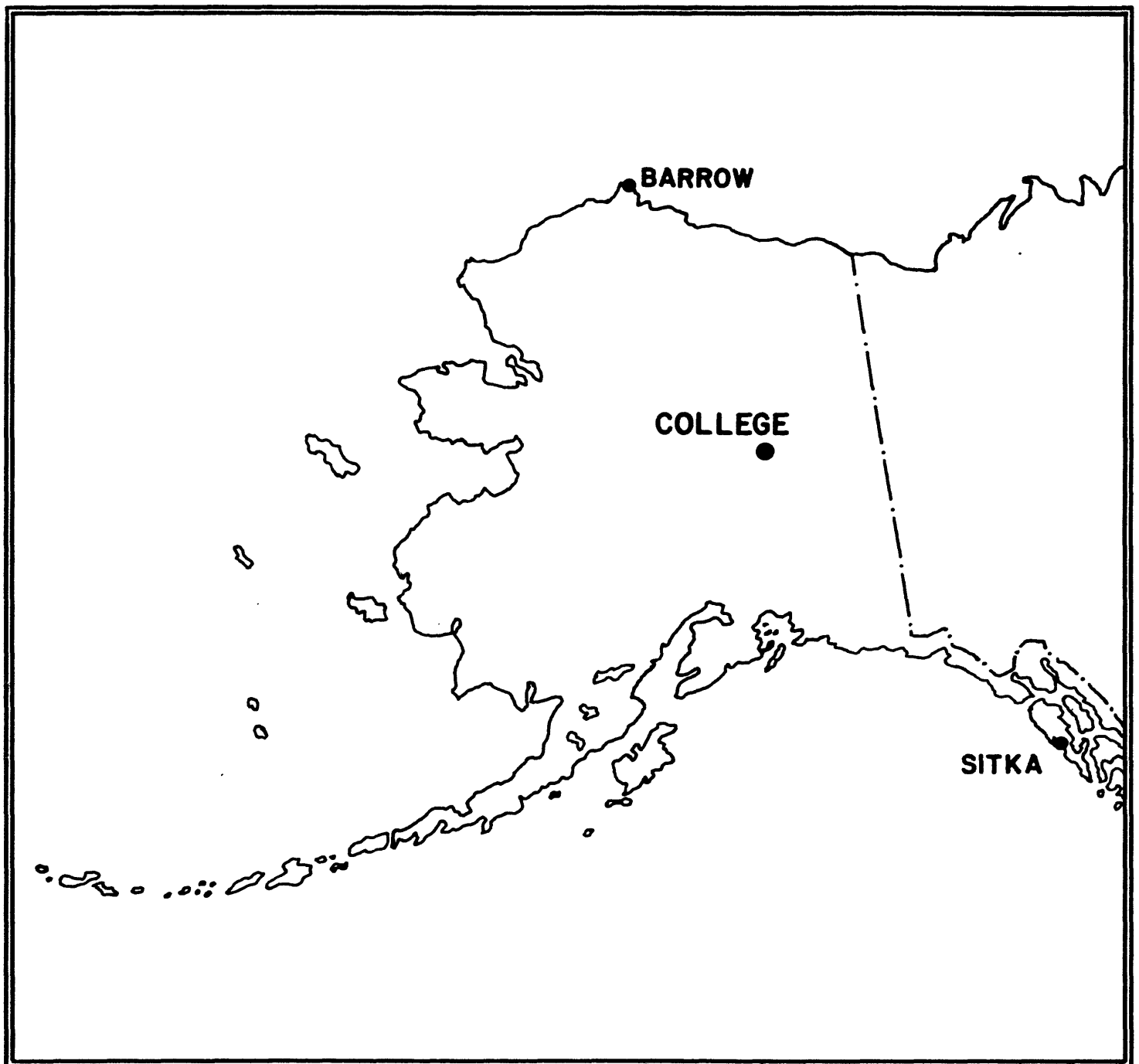


**UNITED STATES DEPARTMENT OF THE INTERIOR**  
**GEOLOGICAL SURVEY**

**PRELIMINARY GEOMAGNETIC DATA**  
**COLLEGE OBSERVATORY**  
**FAIRBANKS, ALASKA**

MARCH 1988

**OPEN FILE REPORT** 88-0300C



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 10 $\gamma$  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 $\gamma$ )

#### 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:

$$D = B_D + d \cdot S_D; \quad H = B_H + h \cdot S_H; \quad Z = B_Z + z \cdot S_Z$$

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.

NOAA FORM 76-133 (9-72)      U. S. DEPARTMENT OF COMMERCE      NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION										OBSERVATORY		
<b>MAGNETIC ACTIVITY</b> (Greenwich civil time, counted from midnight to midnight)										College Alaska MONTH AND YEAR March 1988		
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	20 mm/hr	
1	0	0	2	3	3	0	1	0	09	05	<b>SUDDEN COMMENCEMENTS</b> d      h      m	
2	0	0	4	4	0	2	1	2	13	09		
3	2	0	3	3	1	2	2	1	14	07		
4	2	4	6	5	6	6	2	1	32	42		
5	1	2	2	3	1	2	1	1	13	06		
6	3	3	4	5	5	5	2	2	29	27		
7	1	3	5	0	0	3	3	2	17	13		
8	2	4	5	6	6	3	2	2	30	34		
9	2	4	2	6	3	2	2	2	23	20		
10	2	0	1	0	5	5	3	3	19	17		
11	3	3	2	3	6	3	3	1	24	21	<b>POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)</b>	
12	2	1	3	4	2	3	2	2	19	11		
13	1	0	1	0	0	2	2	2	08	03		
14	1	1	1	1	5	3	3	2	17	12		
15	2	3	3	4	5	3	3	3	26	20		
16	3	3	6	6	2	1	2	2	25	27		
17	2	2	2	4	2	2	2	1	17	09		
18	1	1	3	3	2	2	1	0	13	07		
19	0	1	2	2	3	0	1	1	10	05		
20	0	0	1	5	5	0	0	0	11	12		
21	0	0	0	1	0	0	0	1	02	01	<b>BEGIN      END</b> d    h    m      d    h    m	
22	1	0	0	0	1	1	1	1	05	02		
23	1	0	1	1	4	3	1	0	11	07		
24	1	1	0	0	0	0	0	0	02	01		
25	0	1	2	2	6	4	3	2	20	18		
26	2	4	5	4	4	6	6	5	36	43		
27	4	4	3	5	3	5	4	3	31	28		
28	3	3	3	7	4	5	5	3	33	40		
29	3	3	5	6	5	6	4	3	35	41		
30	5	4	5	7	6	3	2	2	34	47		
31	2	4	2	4	4	3	2	1	22	15		
31	2	4	2	4	4	3	2	1	22	15		

K SCALE USED:	D	H	Z	
LOWER LIMIT FOR K = 9.....	675.7	322.2		(mm)
CURRENT SCALE VALUE.....	3.69	7.77		(γ/mm)
LOWER LIMIT FOR K = 9 .....	2490	2500		(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

## PRINCIPAL MAGNETIC STORMS

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

March 1988

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

Obs. 2 letter IAGA code	Geomag. lat.	Commencement			SC - amplitudes			Max. 3 hr - Index K			Ranges			UT End day hr
		day	hr min (UT)	type	D(')	H(γ)	Z(γ)	day	(3 hr - period)	K	D(')	H(γ)	Z(γ)	
CO	64.96 N	04	05xx	..				04	3, 5, 6	6	92	1050	460	04 19
		08	05xx	..				08	4, 5	6	135	1370	760	08 17
		26	04xx	..				26	6, 7	6	190	1180	710	27 06
		27	15xx	..				28	4	7	180	1280	730	28 14
		29	03xx	..				30	4	7	213	1450	860	30 16

## NORMAL MAGNETOGRAPHE

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	BASLINE
D	0000UT, 3/1/88	2400UT, 3/31/88	1.0' /mm	27° 01.1' E
H	(same)	(same)	7.8 <sup>8</sup> /mm	12628 <sup>8</sup>
Z	(same)	(same)	7.6 <sup>8</sup> /mm	55168 <sup>8</sup>

## STORM MAGNETOGRAPHE

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	BASLINE
D	0000 UT, 3/1/88	2400 UT, 3/31/88	7.9' /mm	29.4 <sup>8</sup> /mm
H	(same)	(same)	43.5 <sup>8</sup> /mm	
Z	(same)	(same)	49.0 <sup>8</sup> /mm	

## RAPID RUN MAGNETOGRAPHE

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

## MONTHLY MEAN ABSOLUTE VALUES\*

D	H	Z
27° 15.6' E	12834 <sup>8</sup>	55313 <sup>8</sup>

\* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

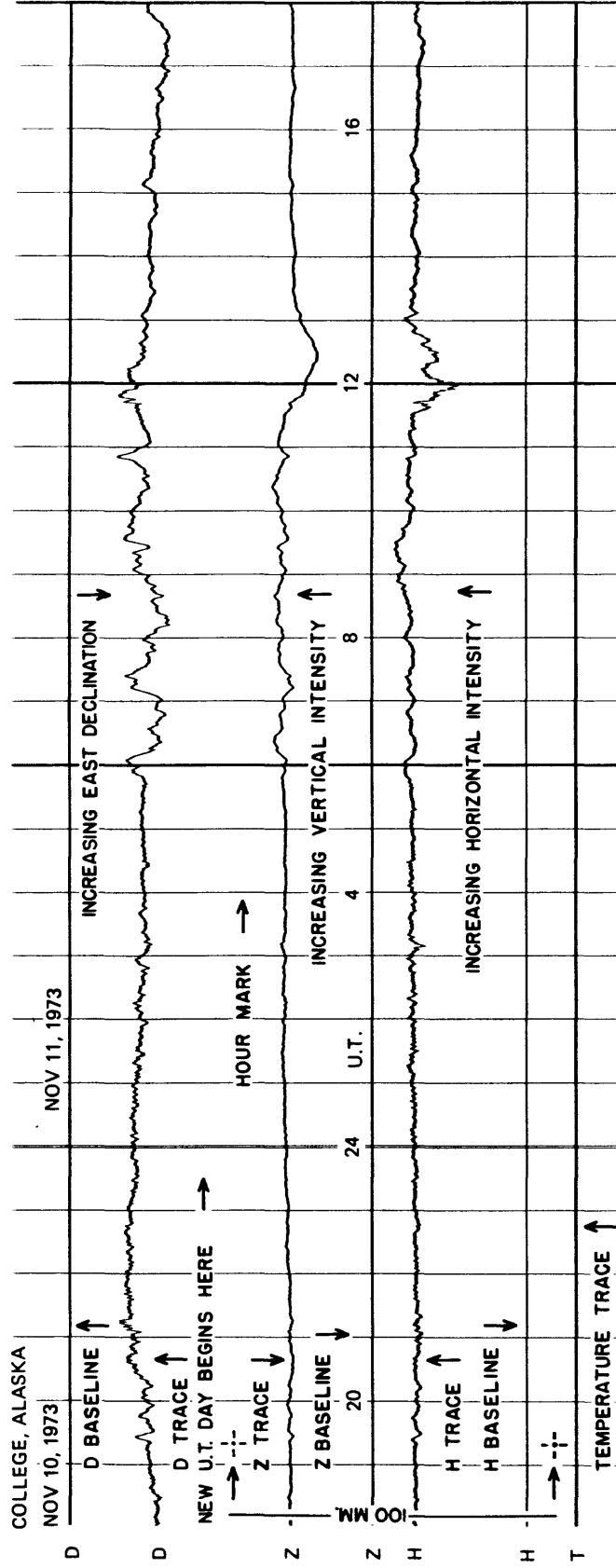
DAYS USED: MARCH 5, 13, 21, 22, 24,

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						COMPONENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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A <sub>k</sub>		06		03		01		02		06		03		01		02		01		06		03		01		02		01		A <sub>k</sub>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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		115	100	97	85	118	155	157	118	123	167	159	172	139	177	173	177	181	187	187	160	160	137	97	99	197	205	197	205	204	213	216	221	200	216	226	223	188	157	198	199	194	179	176	180	184	187	186	186	188	181	185	187	180	180	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186	186

# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

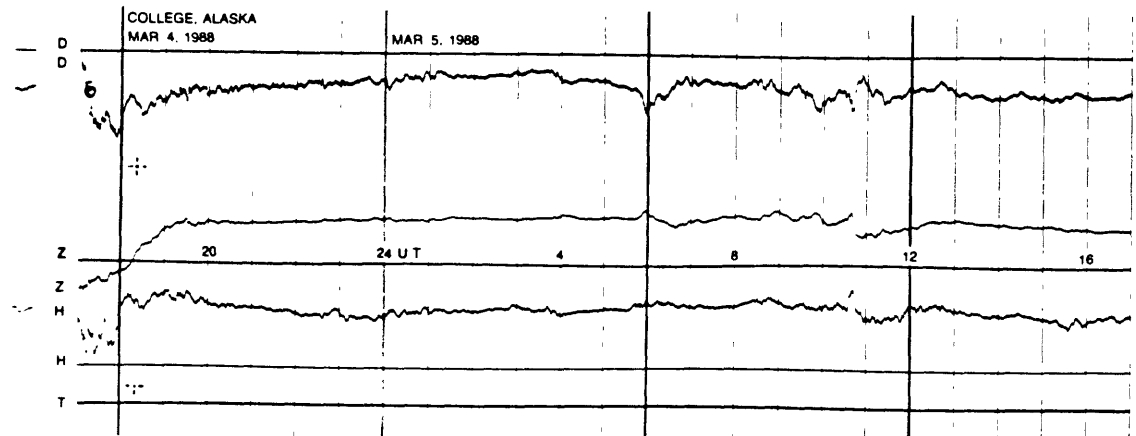
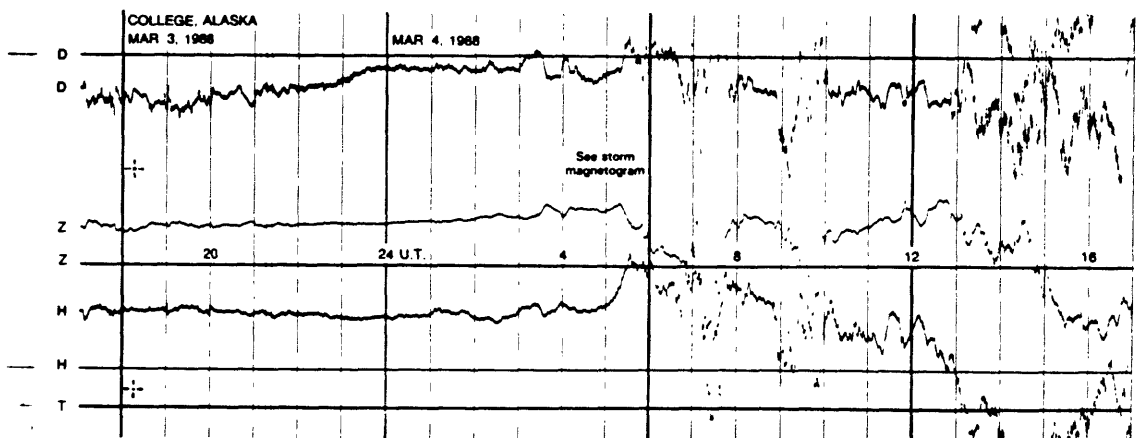
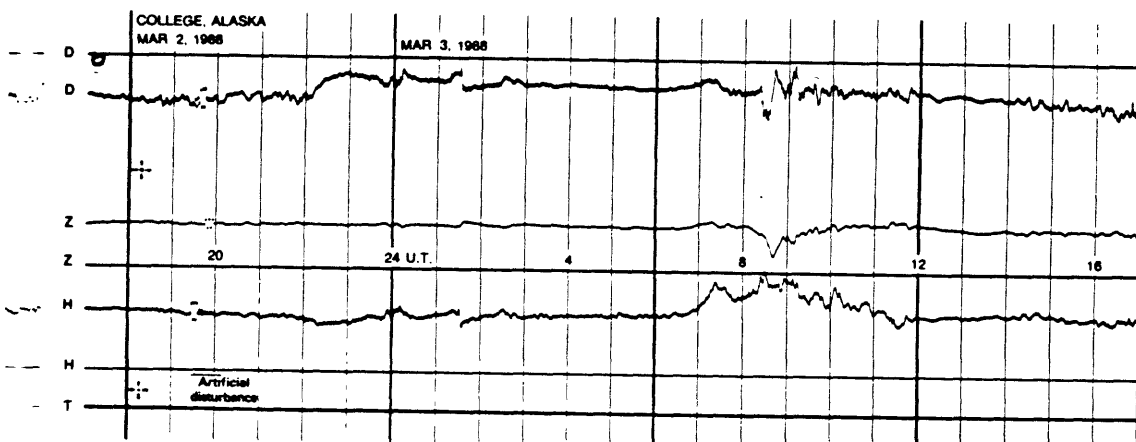
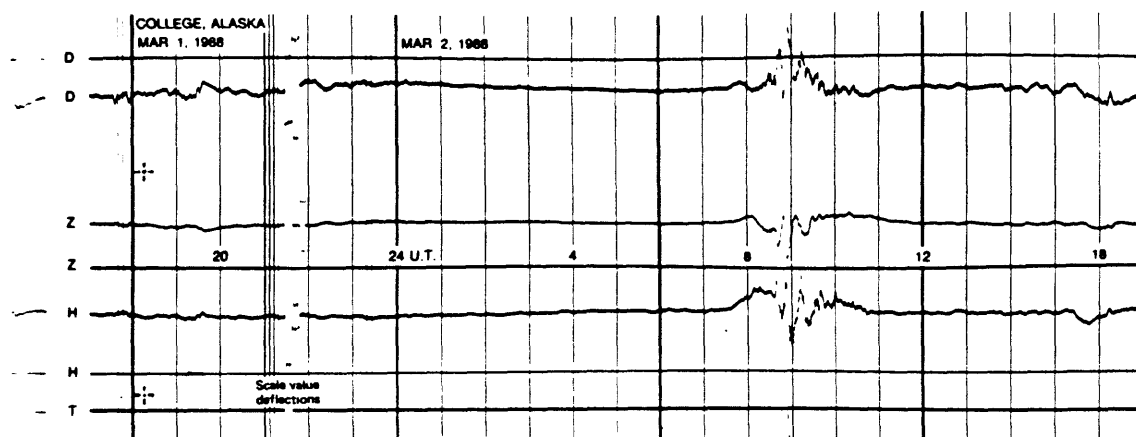


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

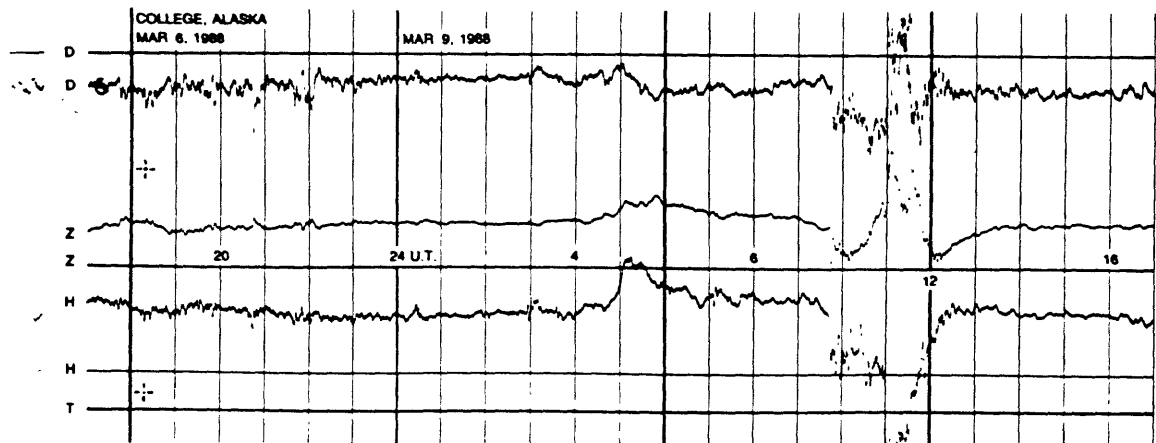
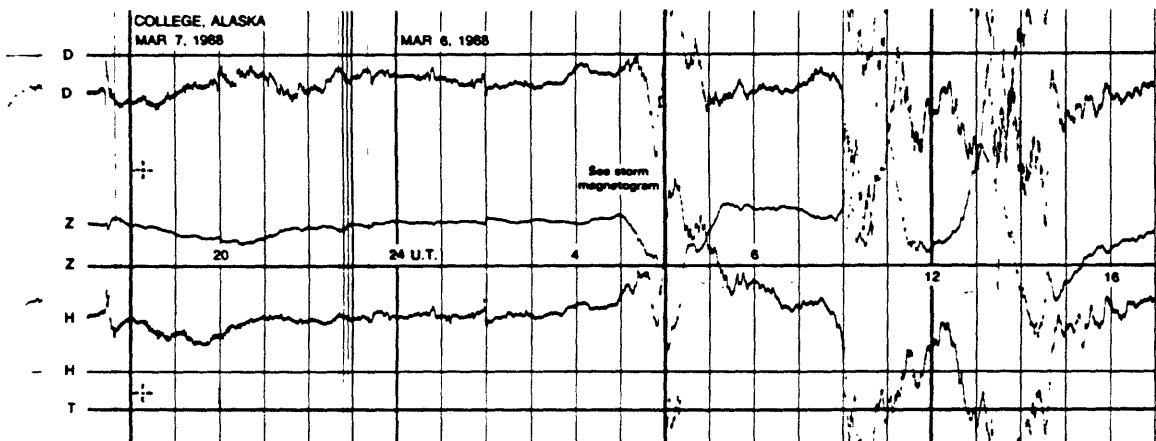
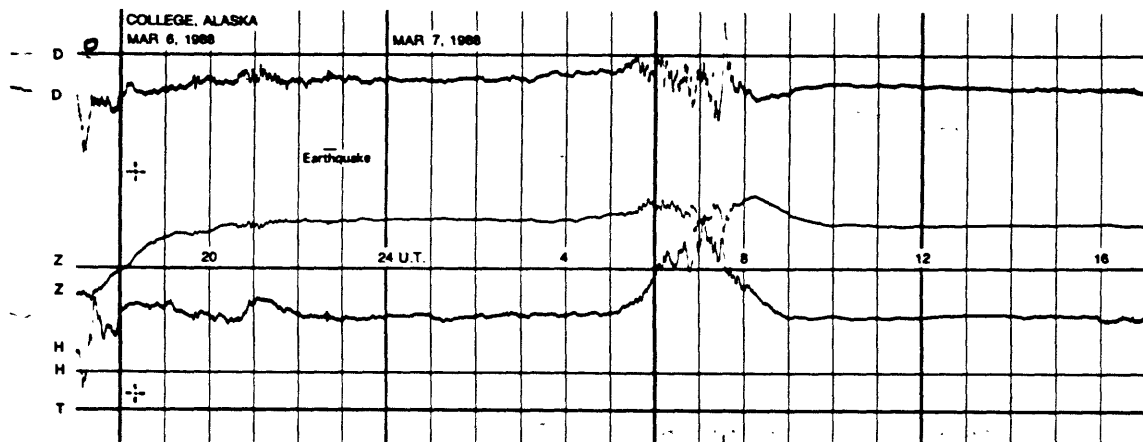
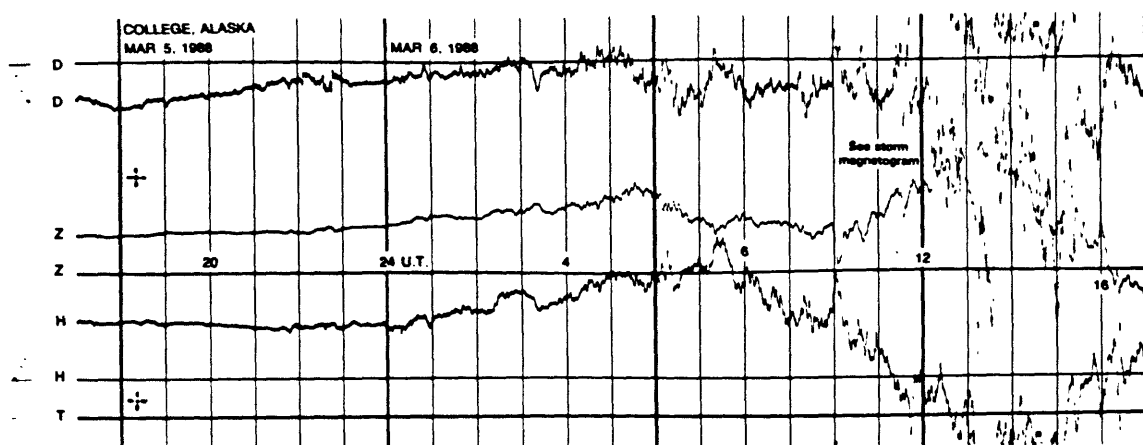
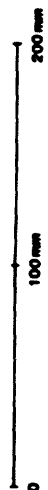


# NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0

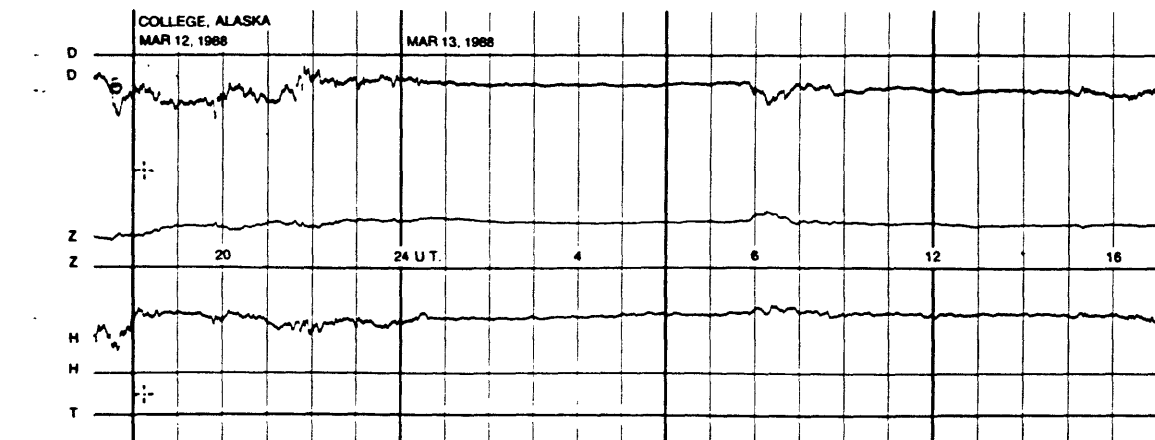
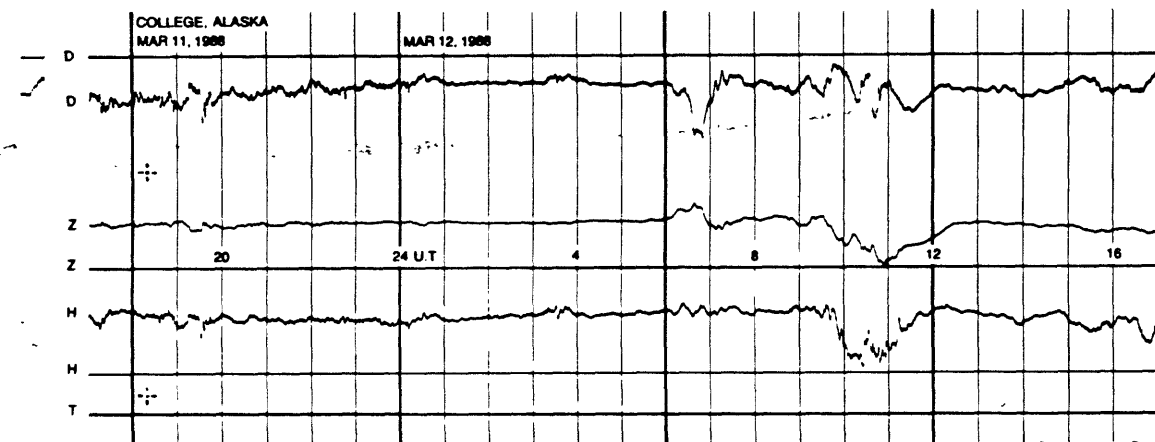
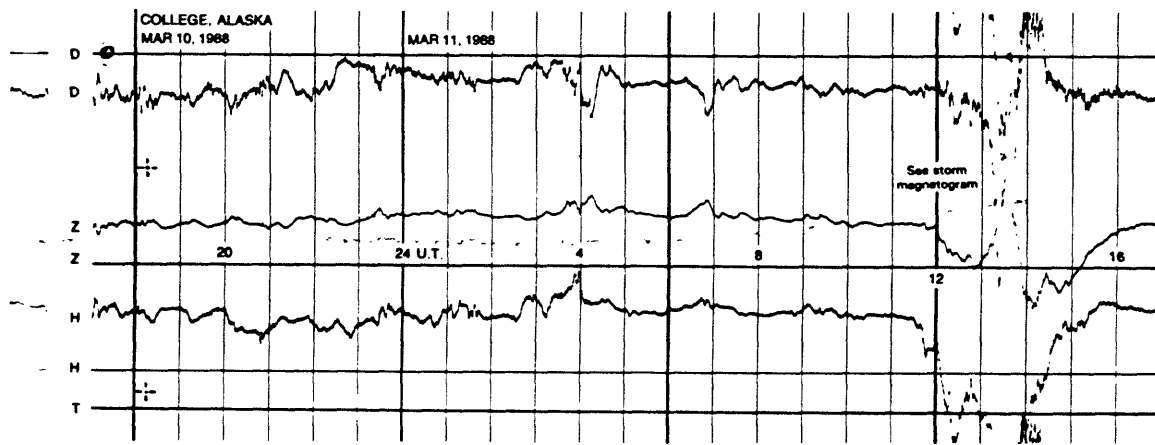
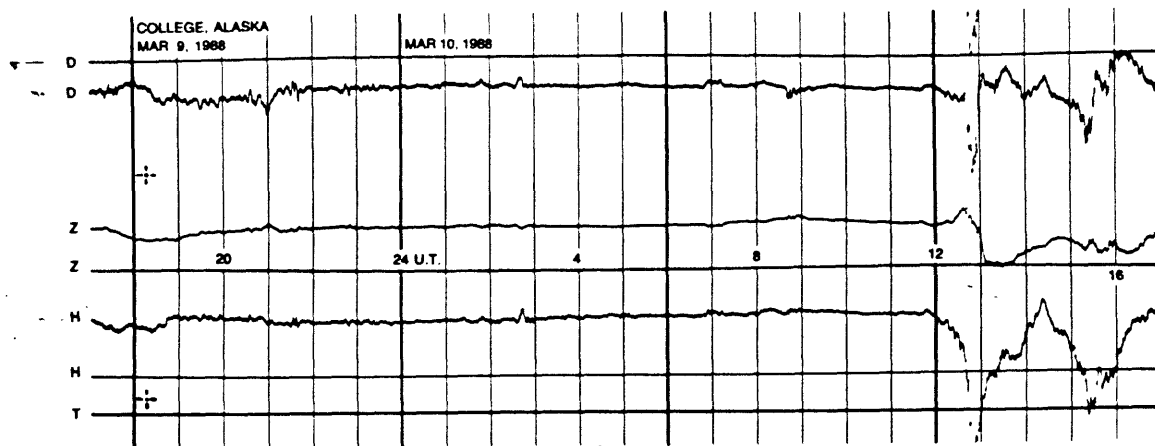


# NORMAL MAGNETOGRAMS

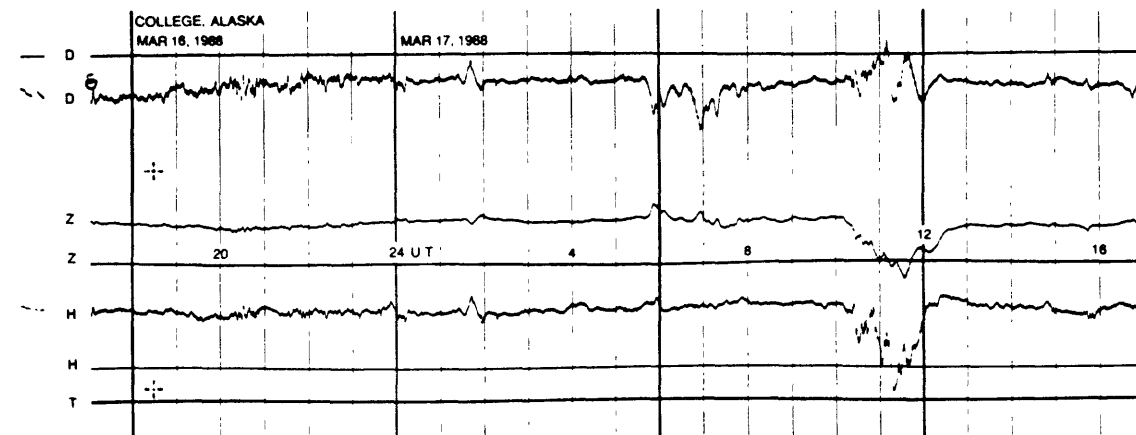
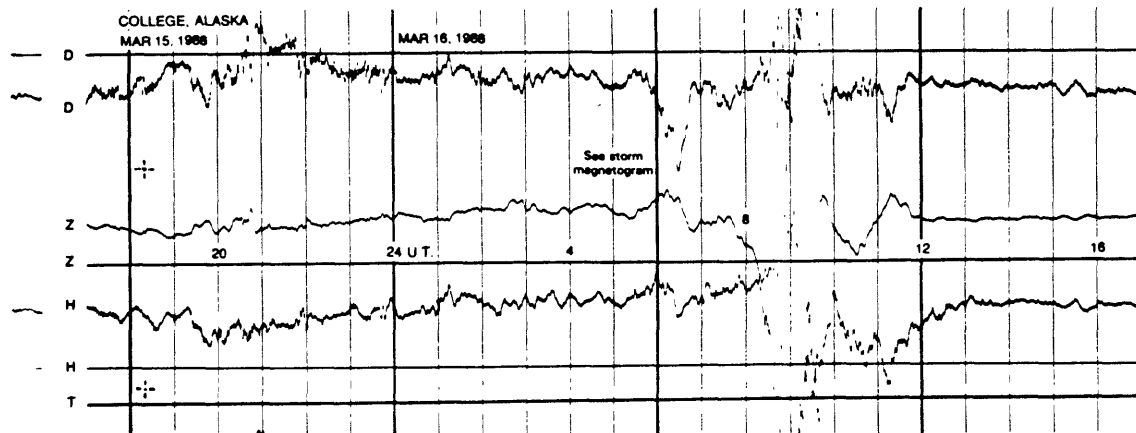
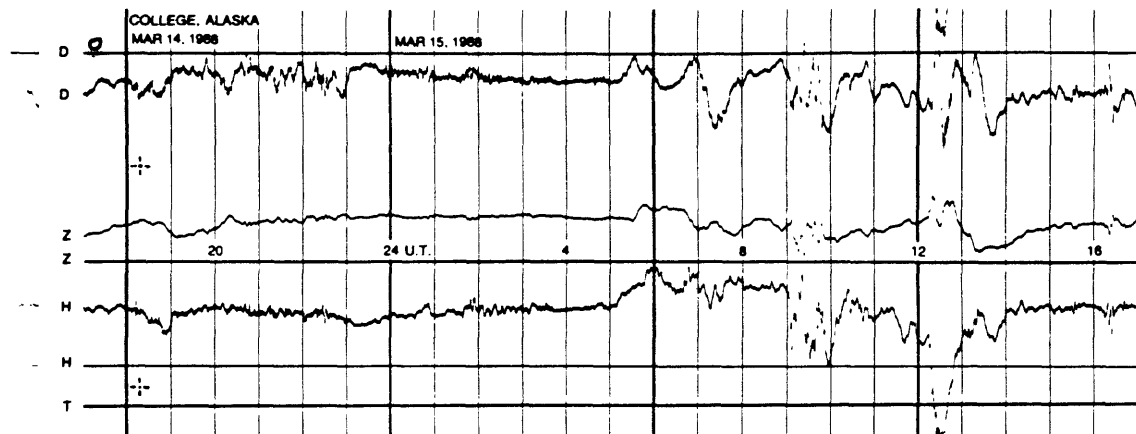
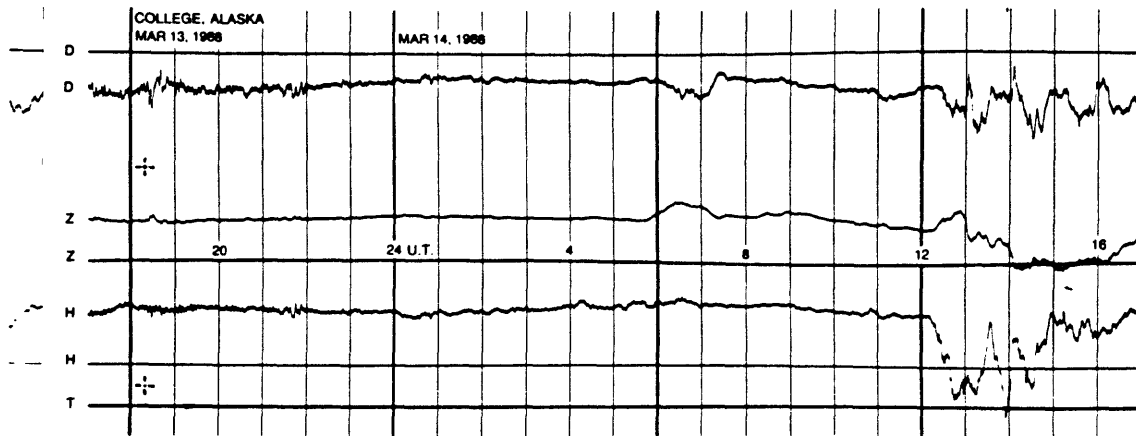


# NORMAL MAGNETOGRAMS

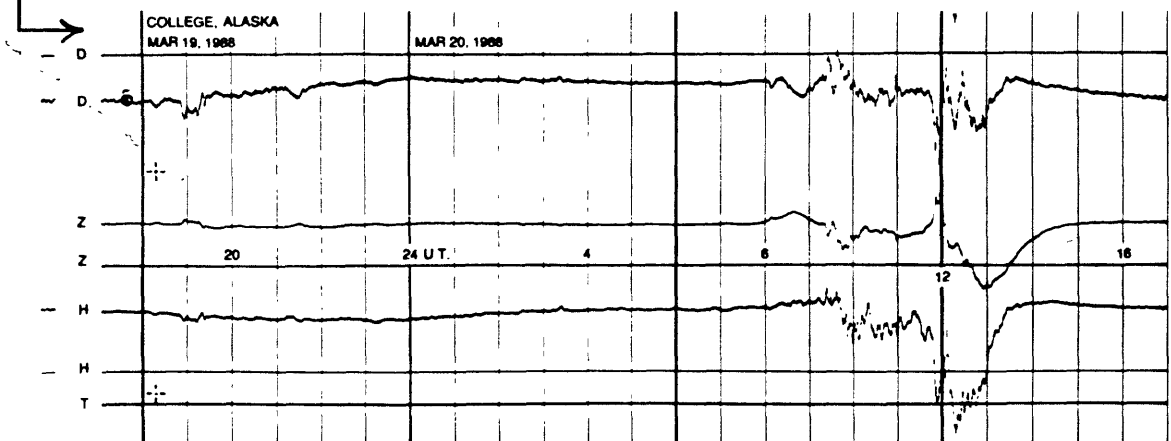
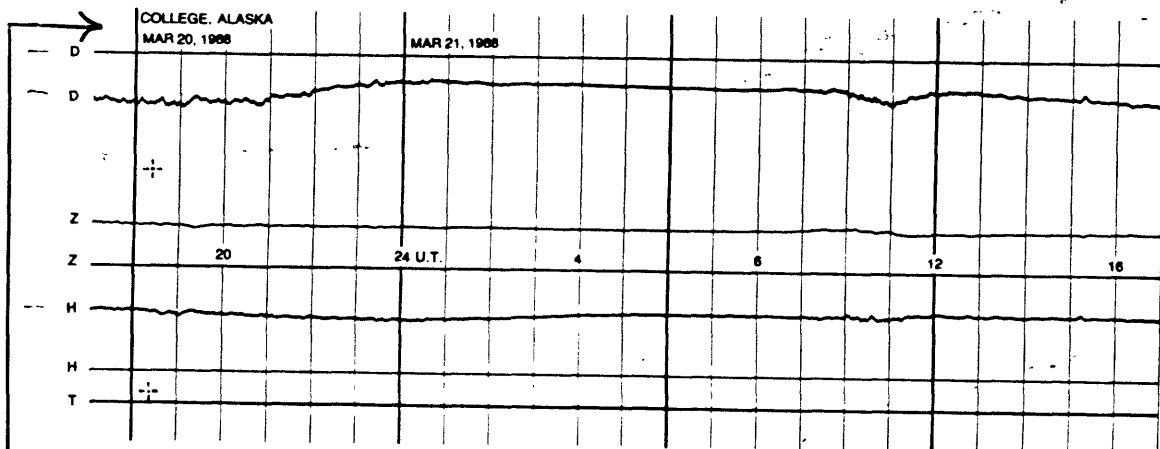
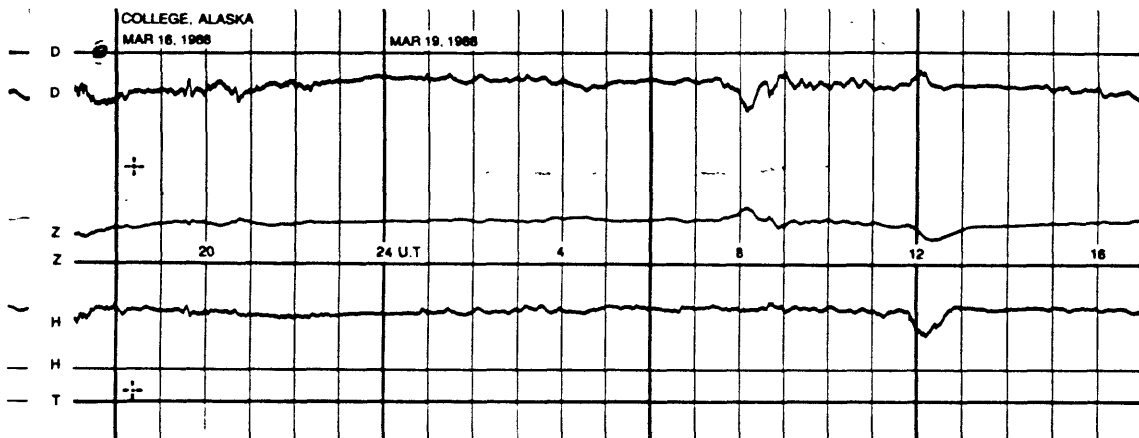
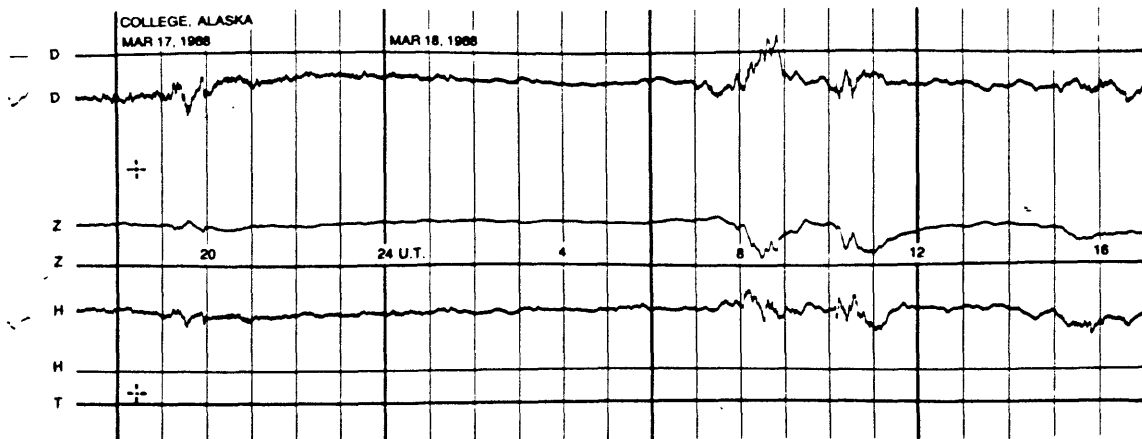
200 mm  
100 mm  
0



# NORMAL MAGNETOGRAMS

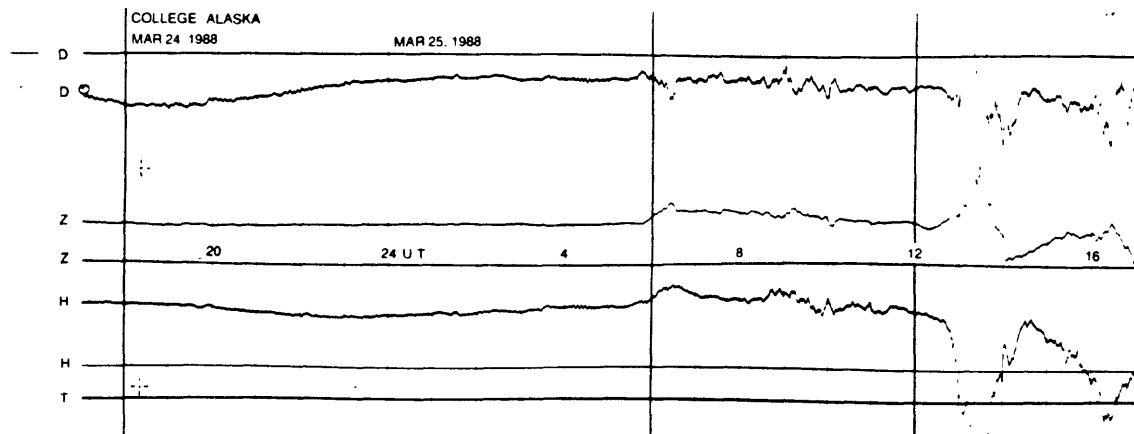
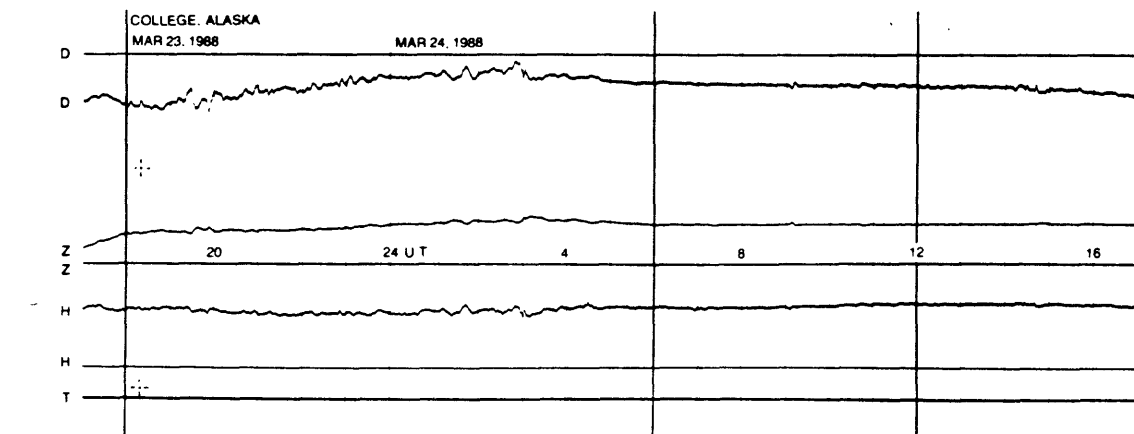
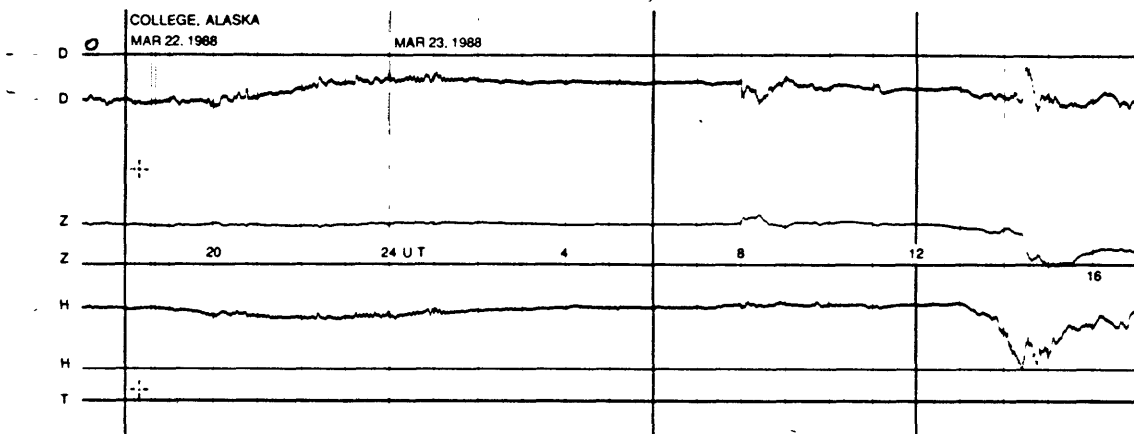
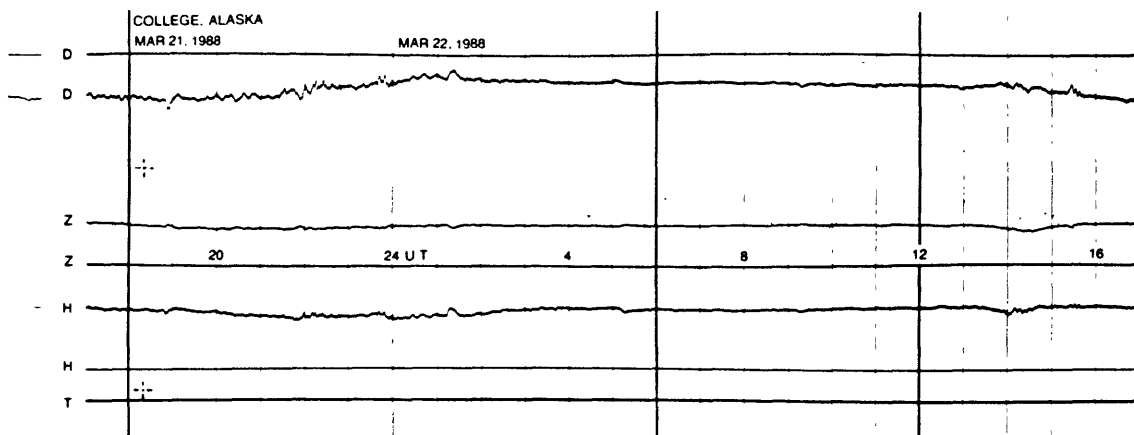


# NORMAL MAGNETOGRAMS

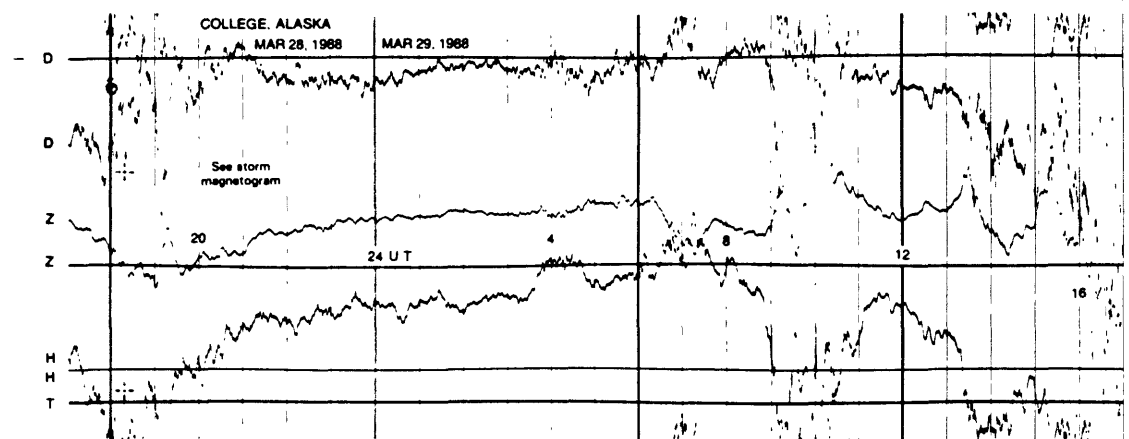
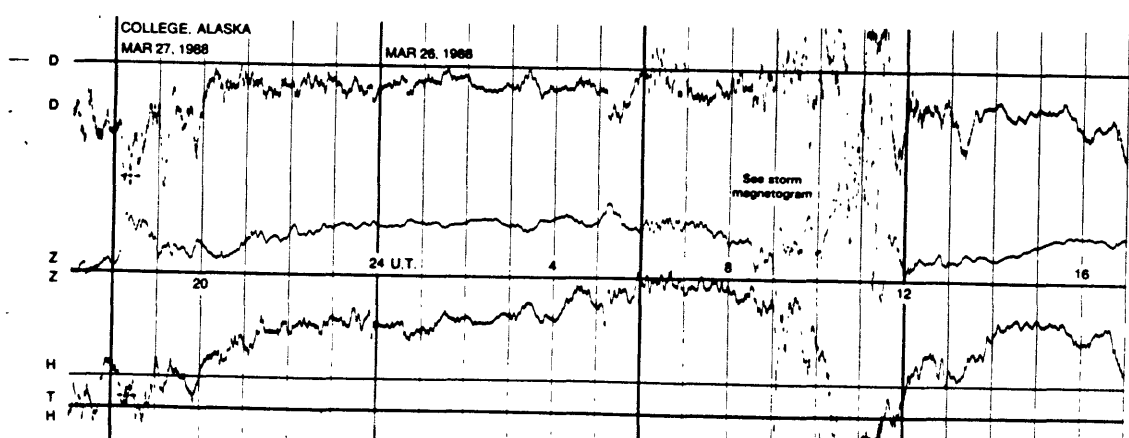
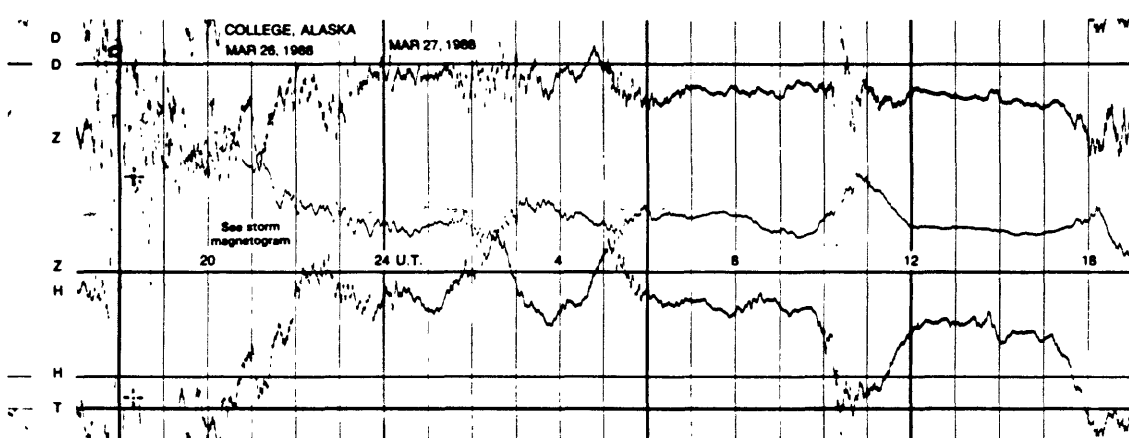
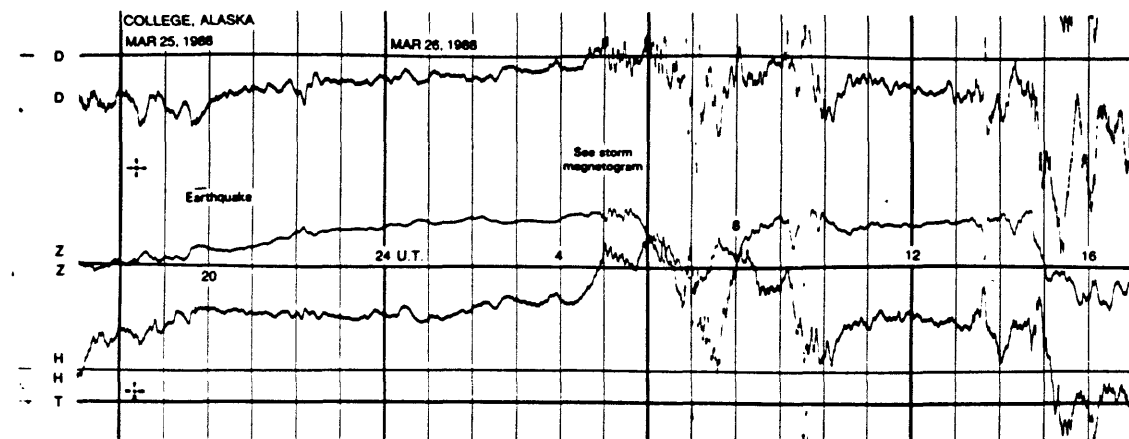
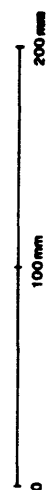


# NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0

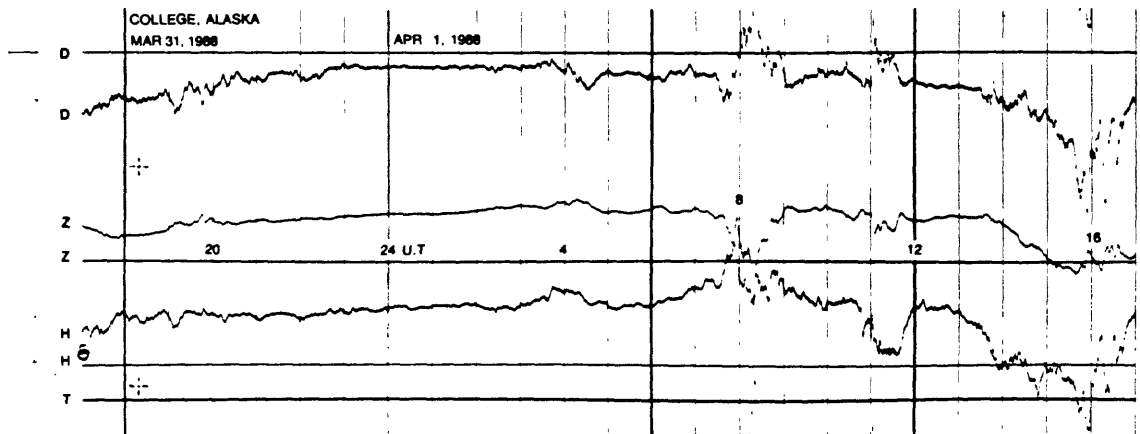
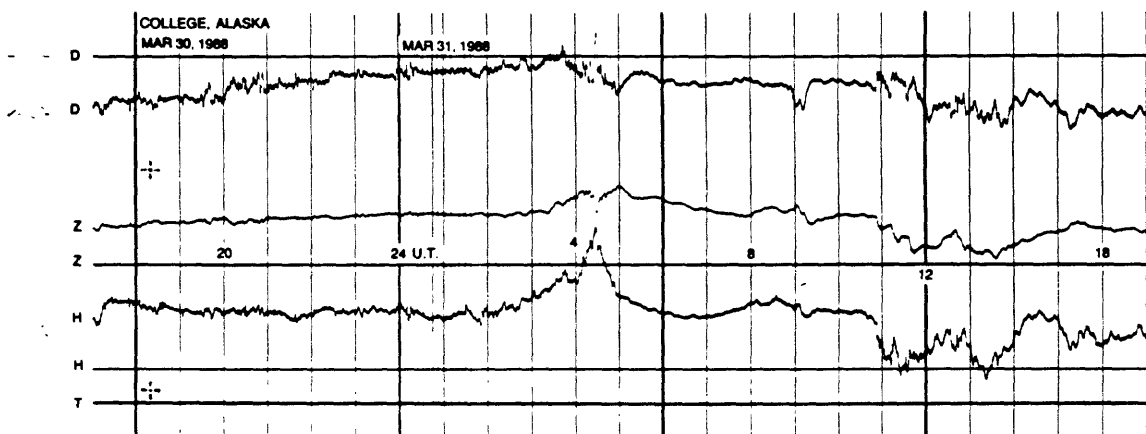
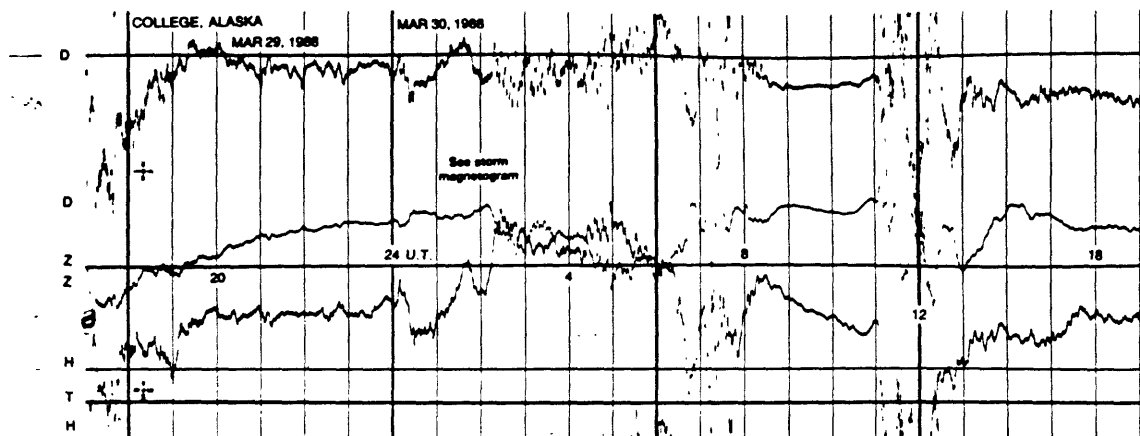


# NORMAL MAGNETOGRAMS



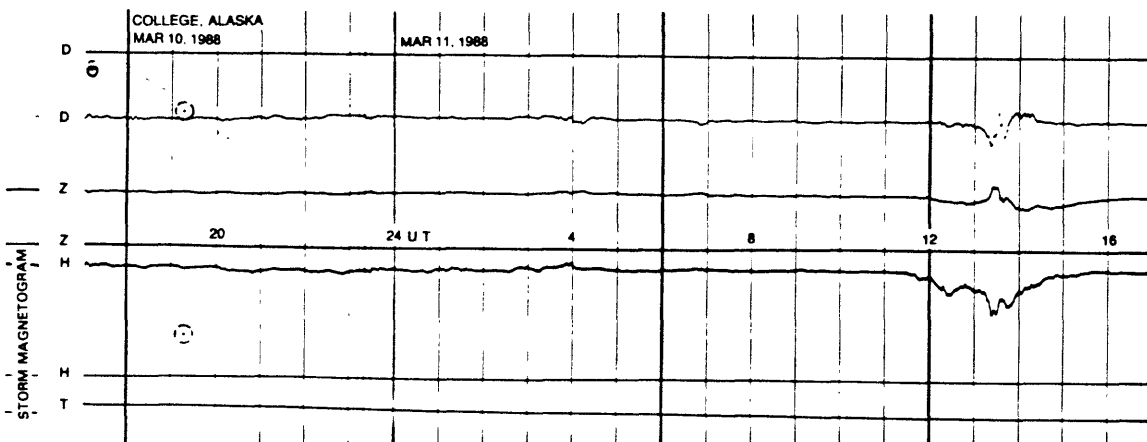
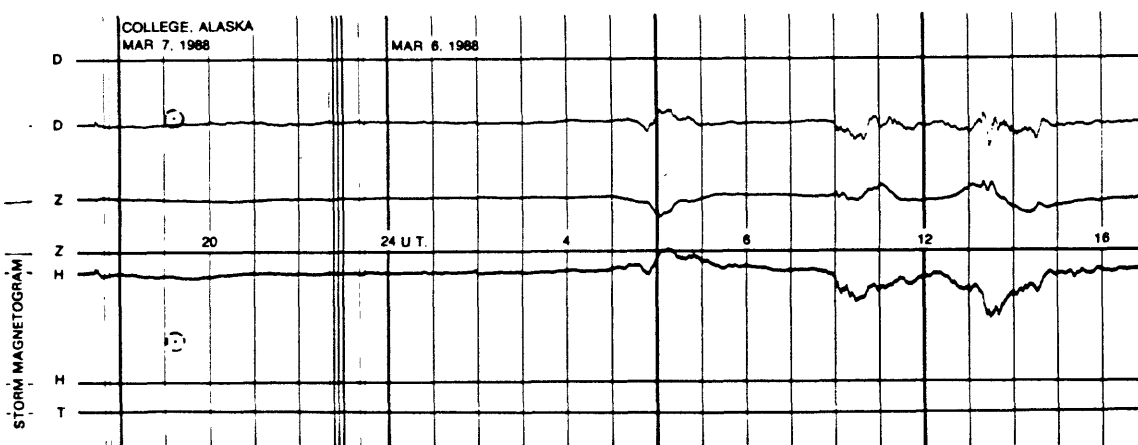
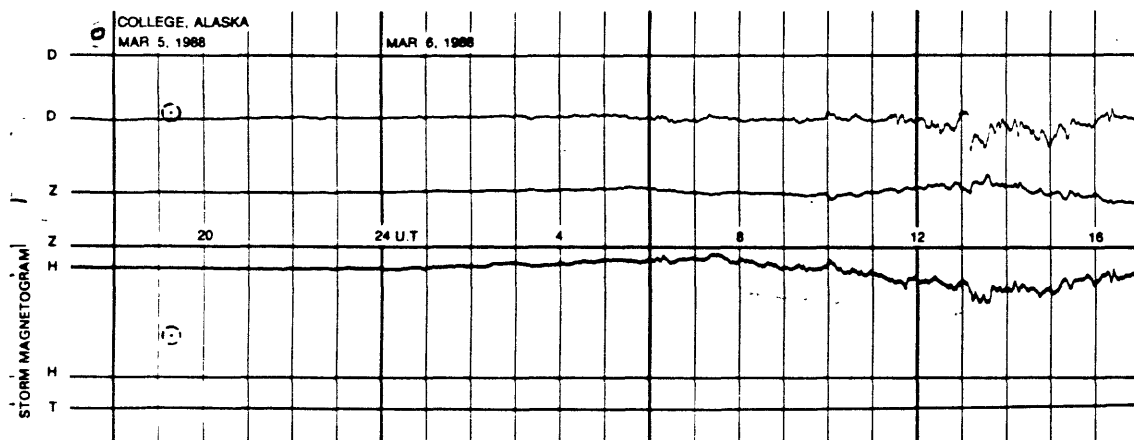
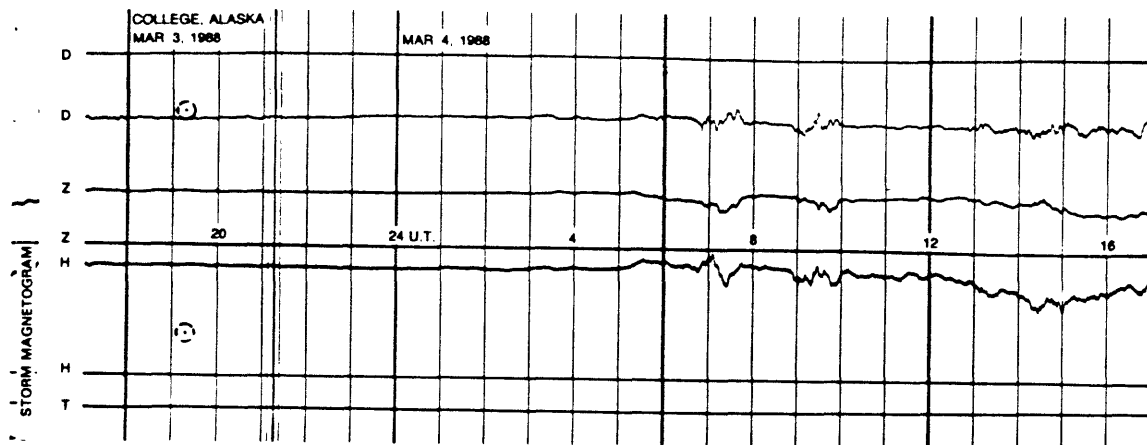
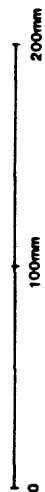
# NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0

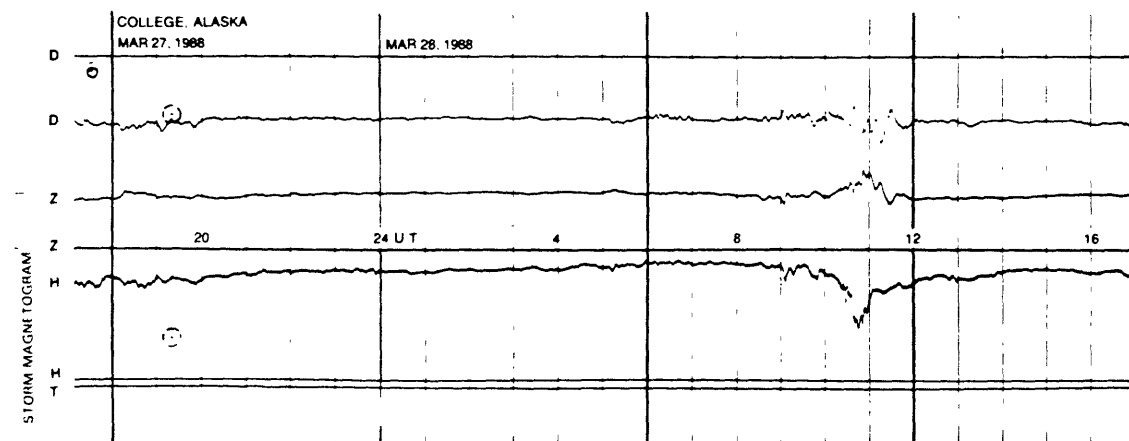
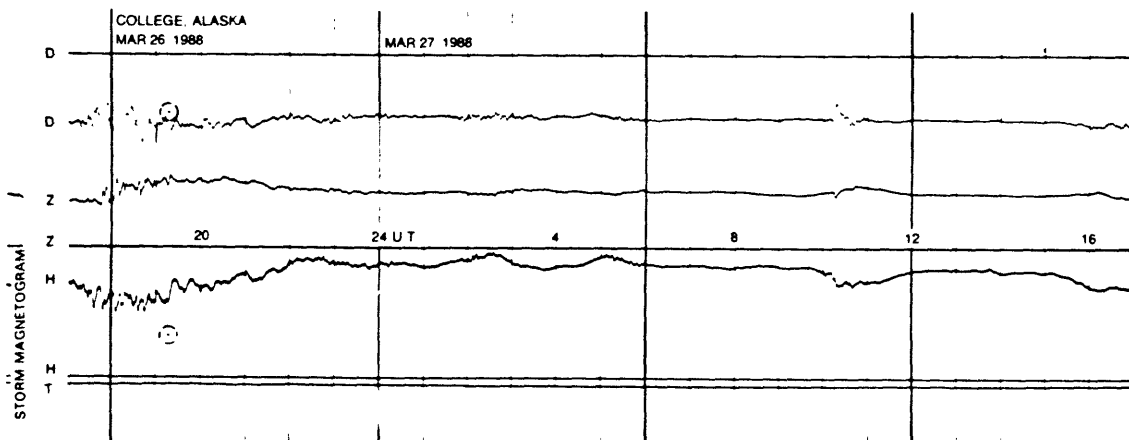
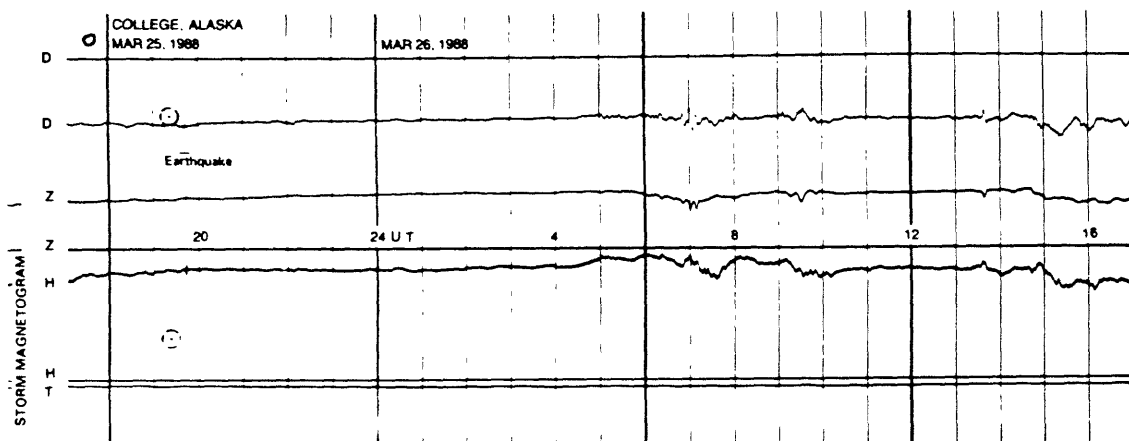
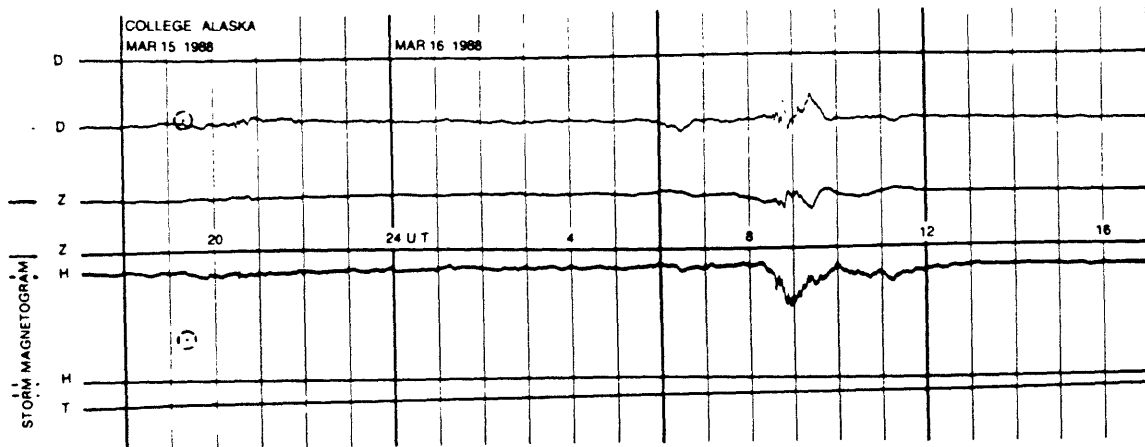
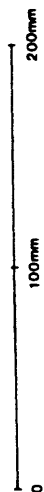




# STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS

