

# UNITED STATES DEPARTMENT OF THE INTERIOR

## GEOLOGICAL SURVEY

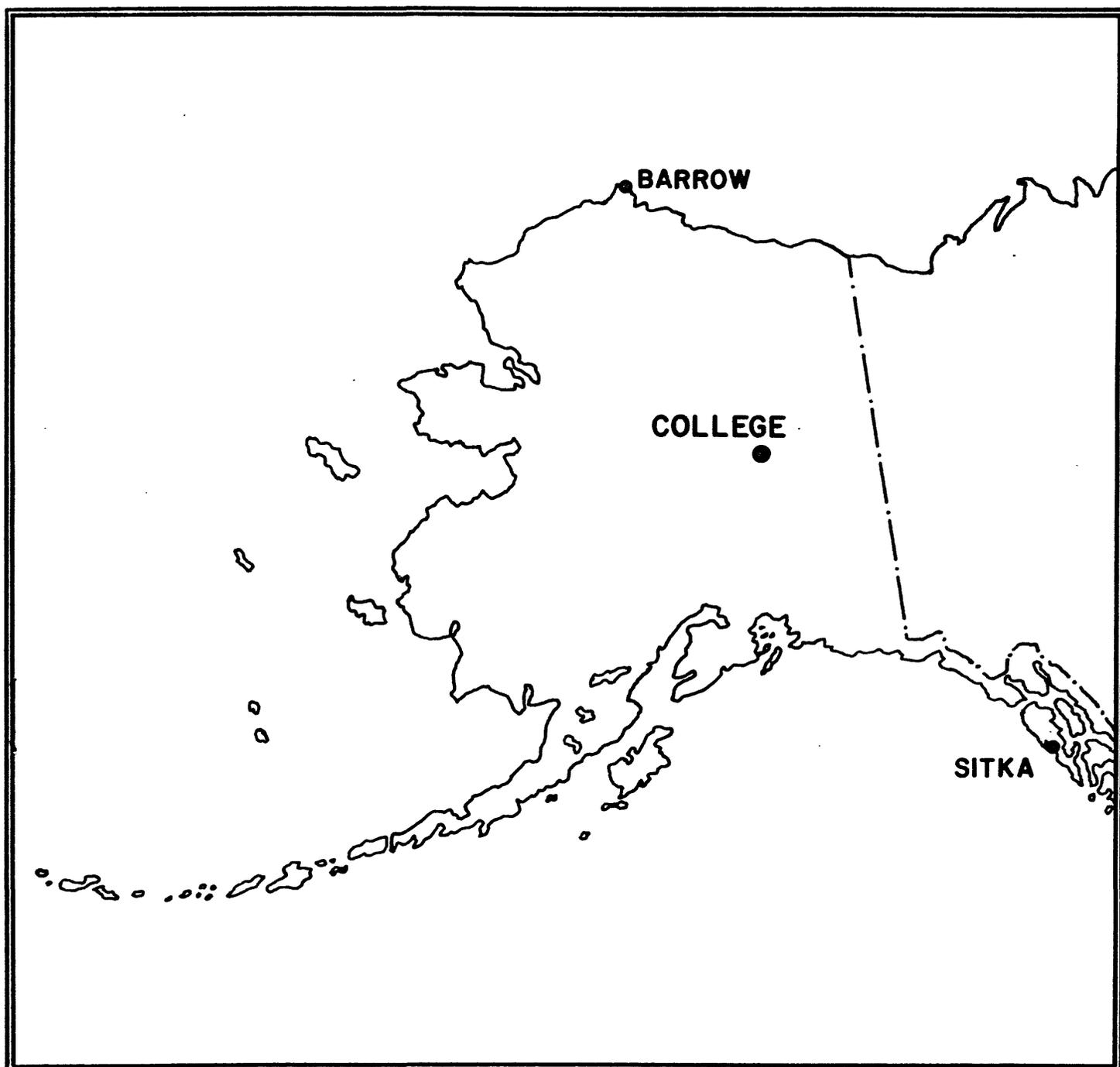
### PRELIMINARY GEOMAGNETIC DATA

### COLLEGE OBSERVATORY

### FAIRBANKS, ALASKA

SEPTEMBER 1983

OPEN FILE REPORT 88-03001



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, 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° 51.6'N  
Geographic longitude.....147° 50.2'W  
Geomagnetic latitude.....+64.6°  
Geomagnetic longitude.....+256.5°  
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:

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

where D, H and Z are absolute values;  
B<sub>D</sub>, B<sub>H</sub> and B<sub>Z</sub> are base-line values;  
S<sub>D</sub>, S<sub>H</sub> and S<sub>Z</sub> 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

September 1988

DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			
1	5	4	4	5	6	3	2	2	31	32	SUDDEN COMMENCEMENTS d h m
2	2	3	2	1	4	4	2	3	21	14	
3	3	2	1	2	0	2	2	1	13	06	
4	2	1	2	2	3	1	1	1	13	06	
5	2	1	0	2	0	0	0	0	5	02	
6	0	0	0	0	0	0	2	1	3	01	
7	1	1	3	3	0	0	0	0	8	05	
8	0	1	0	0	0	1	1	1	4	02	
9	1	1	0	0	1	0	2	1	6	02	
10	1	1	0	3	0	1	2	2	10	05	
11	2	4	5	6	6	6	5	5	39	52	
12	5	3	5	2	5	4	2	1	27	25	
13	2	3	4	5	3	4	2	1	24	19	
14	2	2	4	4	5	4	1	1	23	19	
15	1	1	3	6	5	5	1	1	23	25	
16	1	2	2	3	1	0	0	0	9	04	
17	1	4	5	4	6	4	3	3	30	30	
18	3	5	4	4	5	1	3	4	29	26	
19	3	3	6	5	3	4	2	3	29	28	
20	2	3	4	3	2	2	2	2	20	12	
21	3	1	2	4	3	1	2	2	18	11	
22	2	4	5	6	4	6	2	1	30	35	
23	2	3	4	2	3	1	1	2	18	11	
24	1	1	2	4	4	0	1	2	15	10	
25	5	2	1	0	4	3	1	2	18	14	
26	1	1	2	3	2	2	2	1	14	07	
27	2	1	0	0	1	0	1	1	6	02	
28	1	1	0	0	0	0	1	1	4	02	
29	0	0	0	0	0	0	0	0	0	00	
30	0	0	1	1	1	2	2	2	9	04	
31											

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

d h m

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

H

Z

675.7

322.2

3.69

7.79

2490

2510

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED

John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

PRINCIPAL MAGNETIC STORMS  
COLLEGE OBSERVATORY, COLLEGE, ALASKA  
1988

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

Data from Individual Observatories:  
September

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(Y)	Z(Y)	day	(3 hr - period)	K		D(')	H(Y)	Z(Y)
CO	64.6 N	11	06xx	..				11	4,5,6	6	144	1045	710	12 10
		17	1845	ssc*	-21	+83	-16	18	2,5	5	92	740	380	18 15
		22	05xx	..				22	4,6	6	76	1175	465	22 18

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0121 U.T., 9/2/88	2400 U.T., 9/30/88	1.0'/mm	37 <sup>8</sup> /mm	26° 51.3' E
	(SAME)	(SAME)			
H	(SAME)	(SAME)	7.8 <sup>8</sup> /mm		12645 <sup>8</sup>
Z	(SAME)	(SAME)	7.7 <sup>8</sup> /mm		55160 <sup>8</sup>

STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 9/1/88	2400 U.T., 9/30/88	7.9'/mm	29.4 <sup>8</sup> /mm	
	(SAME)	(SAME)	435 <sup>8</sup> /mm		
H	(SAME)	(SAME)	49.0 <sup>8</sup> /mm		
Z	(SAME)	(SAME)			

RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D					
H					
Z					

MONTHLY MEAN ABSOLUTE VALUES\*

D	H	Z
27° 11.0' E	12816 <sup>8</sup>	55310 <sup>8</sup>

\* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: SEPT 5, 6, 8, 28, 29,

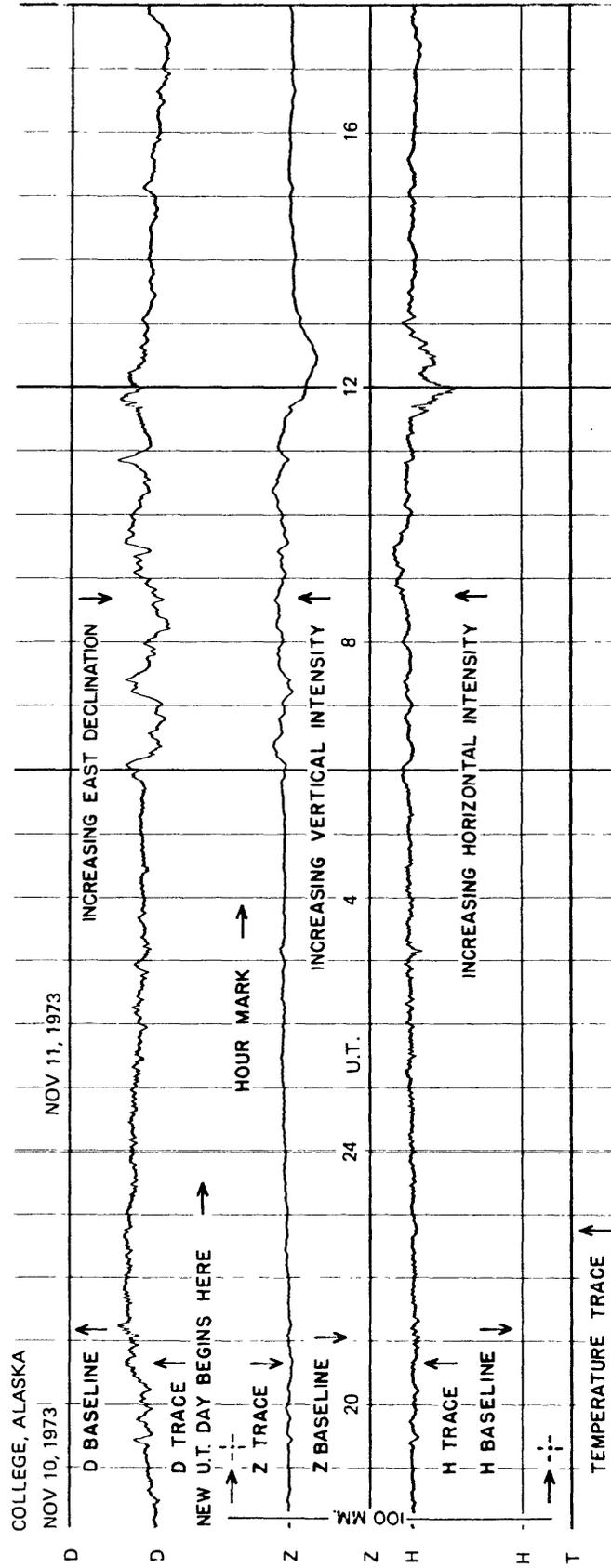
**MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS**  
(UNIVERSAL TIME)

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	Z																									
	D						H						I						Z							
	DAY	05	06	08	28	29	05	06	08	28	29	05	06	08	28	29	05	06	08	28	29	05	06	08	28	29
DAY	05	06	08	28	29	05	06	08	28	29	05	06	08	28	29	05	06	08	28	29	05	06	08	28	29	
A <sub>k</sub>	02	01	02	02	00	02	01	02	02	00	02	01	02	02	00	02	01	02	02	02	00	02	01	02	00	
HOUR	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
01	147	173	177	159	171	229	200	219	210	211	229	200	219	210	211	207	206	204	201	201	206	206	201	206	186	
02	147	171	171	170	173	216	200	220	200	213	216	200	220	200	213	203	205	205	197	194	205	205	194	186	186	
03	147	169	172	144	165	227	199	219	227	219	222	208	223	227	219	220	204	204	196	189	204	204	189	186	186	
04	176	160	161	165	165	222	208	223	225	222	239	217	236	239	229	220	204	204	194	197	195	195	188	186	186	
05	162	163	163	152	163	236	217	236	239	229	232	223	252	239	232	207	202	202	197	195	195	195	188	186	186	
06	177	167	162	167	173	221	223	252	235	232	232	223	252	235	232	207	201	198	197	197	197	197	189	186	186	
07	182	175	173	160	178	230	226	233	242	235	235	226	233	242	235	203	204	214	196	196	196	196	188	186	186	
08	181	175	176	176	181	228	233	232	233	232	232	233	233	233	232	200	201	213	199	199	199	199	191	186	186	
09	177	183	182	165	183	230	230	233	240	235	235	231	240	240	235	199	203	204	199	199	199	199	190	186	186	
10	173	189	188	182	183	236	231	240	233	235	235	233	248	233	235	205	202	198	204	190	190	190	189	186	186	
11	196	193	193	180	185	252	233	248	234	236	236	233	248	234	236	207	201	195	199	199	199	199	189	186	186	
12	206	199	207	205	187	229	233	242	229	236	236	233	242	229	236	180	200	193	204	190	190	190	190	186	186	
13	219	197	208	203	187	238	230	231	234	231	238	230	231	234	231	202	196	184	196	191	191	191	191	186	186	
14	205	218	213	200	201	228	230	237	233	229	228	230	237	233	229	201	197	188	194	193	193	193	193	186	186	
15	239	236	213	210	205	219	221	230	237	233	219	221	230	237	233	199	208	192	195	193	193	193	193	186	186	
16	263	260	248	233	219	219	219	228	227	229	219	219	228	227	229	199	204	190	198	195	195	195	195	186	186	
17	273	295	260	263	239	203	222	235	216	228	203	222	235	216	228	196	201	196	199	199	199	199	196	186	186	
18	258	295	270	270	265	203	225	195	213	220	203	225	195	213	220	182	193	189	193	197	197	197	196	186	186	
19	241	301	232	277	279	194	197	163	198	203	187	197	163	198	203	187	197	150	194	199	199	199	186	186	186	
20	213	224	218	258	275	200	190	174	179	188	183	190	174	179	188	183	177	133	189	199	199	199	186	186	186	
21	204	200	219	229	239	206	197	181	180	183	186	197	181	180	183	195	173	164	185	195	195	195	186	186	186	
22	189	212	199	188	201	208	197	171	193	190	195	197	171	193	190	195	186	187	176	193	193	193	186	186	186	
23	191	206	142	173	179	212	199	200	210	200	197	199	200	210	200	197	196	204	179	199	199	199	186	186	186	
24	182	185	127	163	170	219	193	197	209	208	203	193	197	209	208	203	203	213	183	193	193	193	186	186	186	
DAILY SUM	4748	4946	4679	4692	4766	5305	5153	5239	5276	5277	4804	4759	4590	4649	4591	4804	4759	4590	4649	4591	4591	4591	4591	4591	4591	4591
DAILY MEAN	198	206	195	196	199	221	215	218	220	220	200	198	191	194	191	200	198	191	194	191	191	191	191	191	191	191
MEAN	199																									

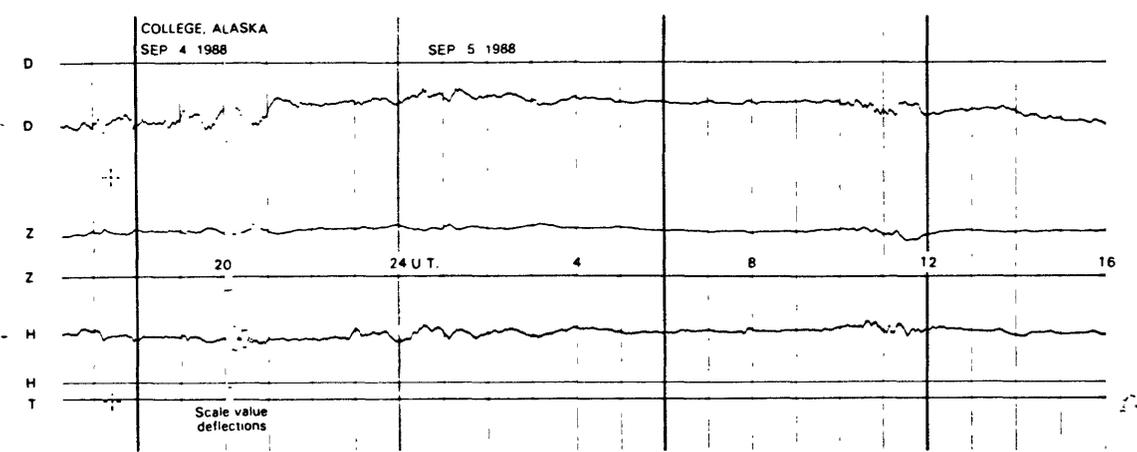
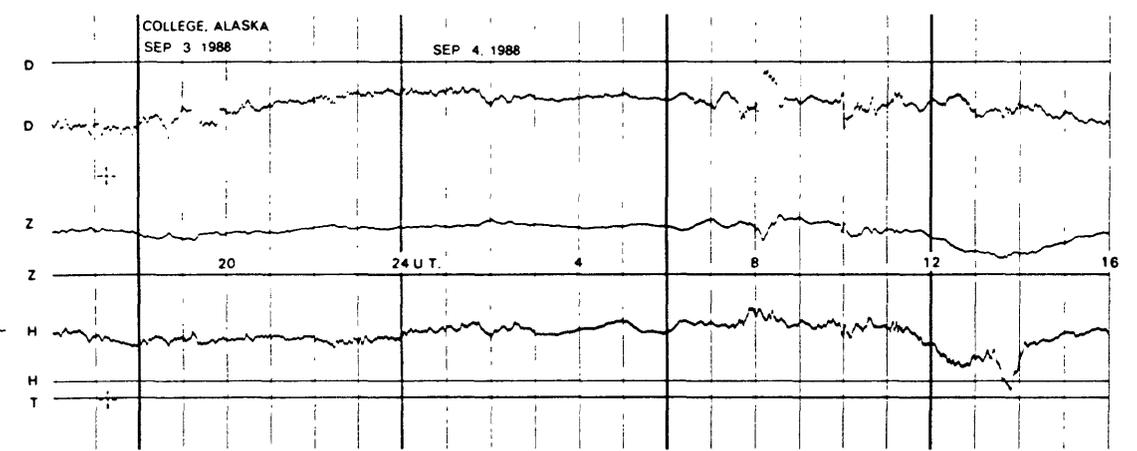
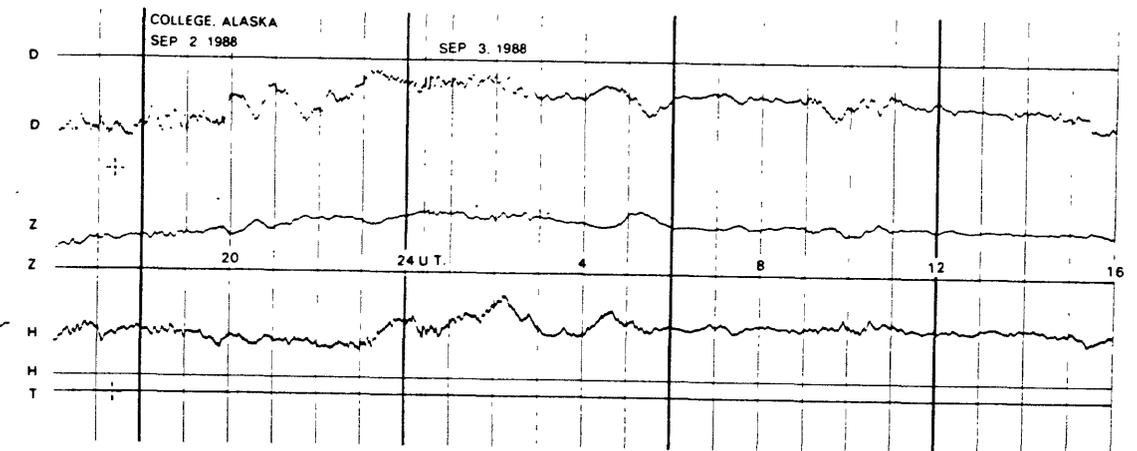
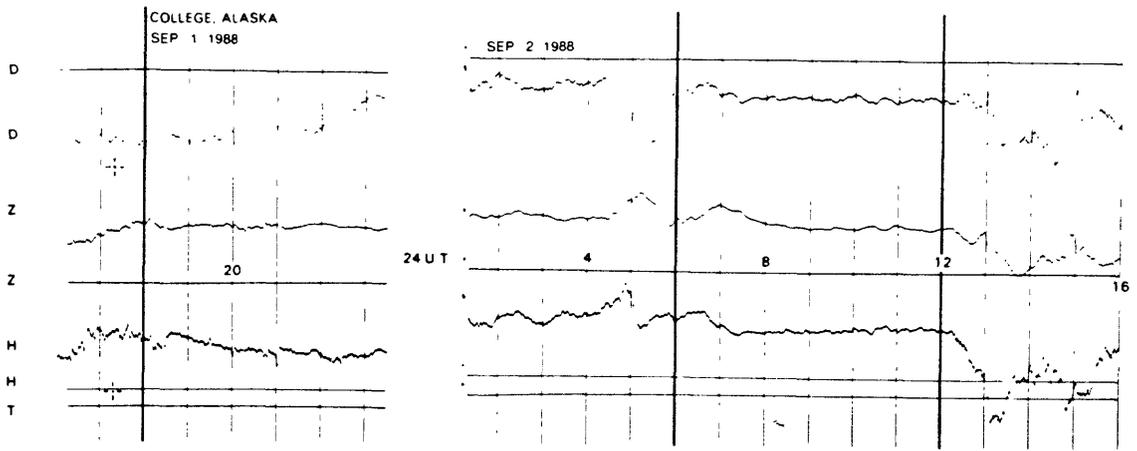
Scaled LYT Checked RVO

# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

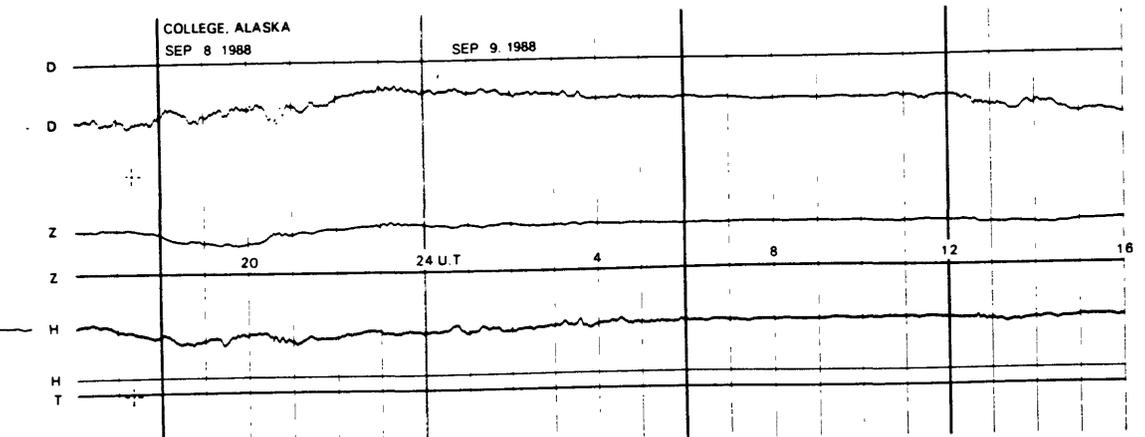
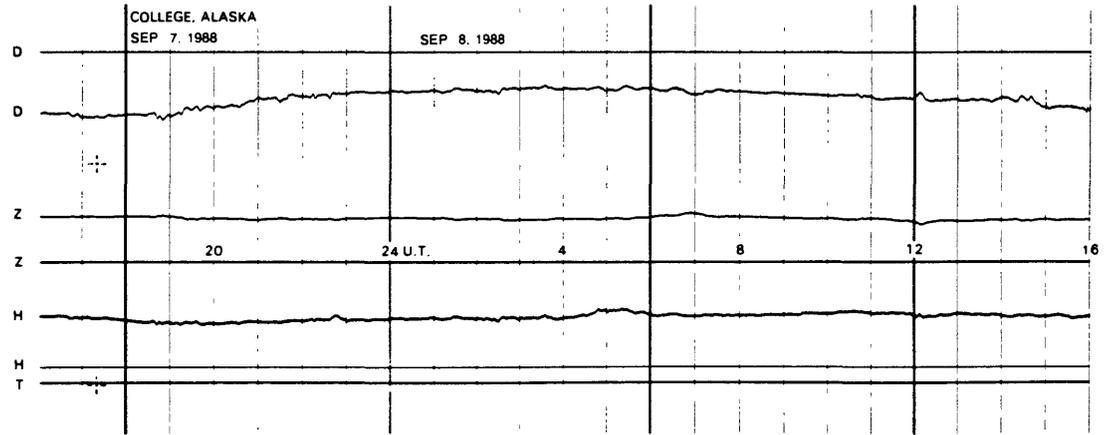
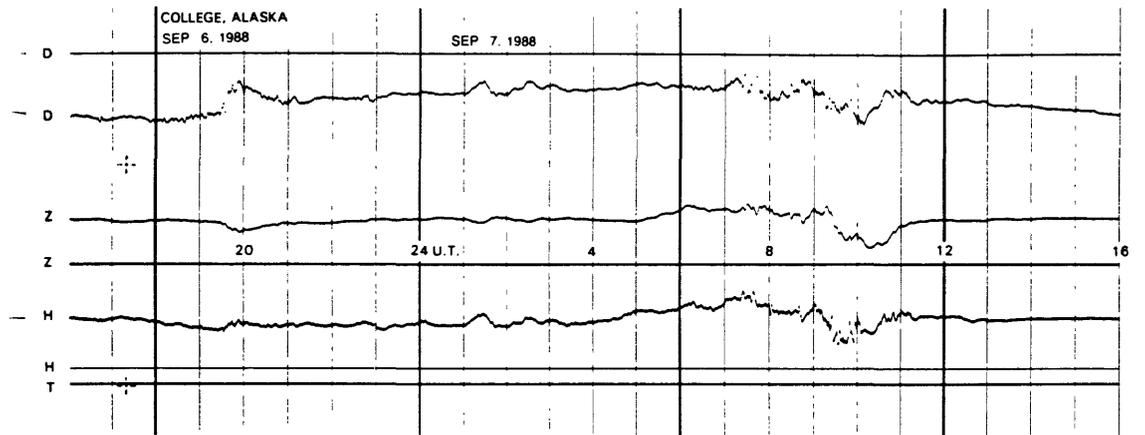
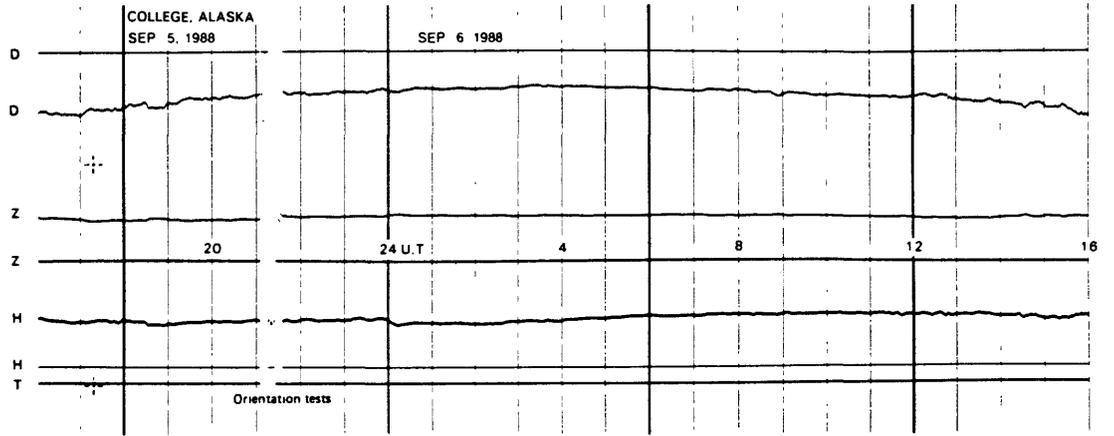


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

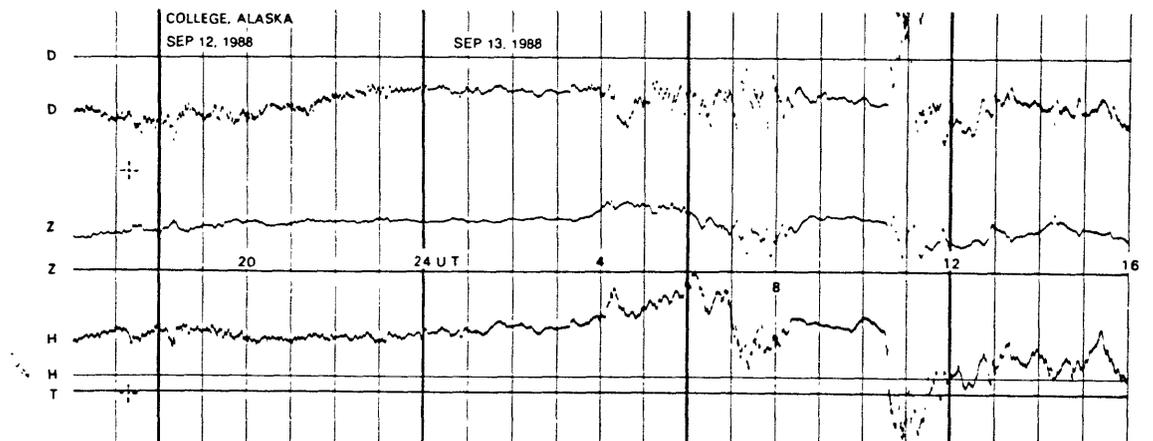
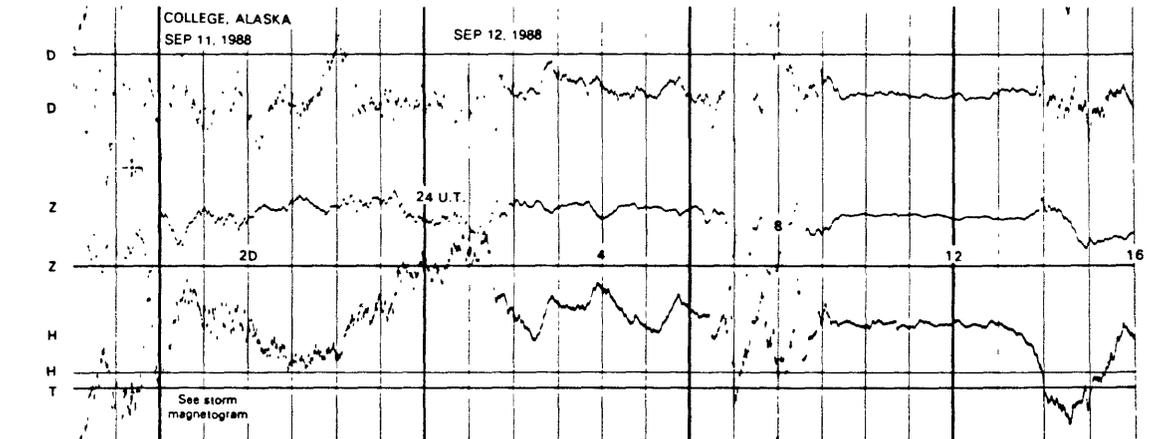
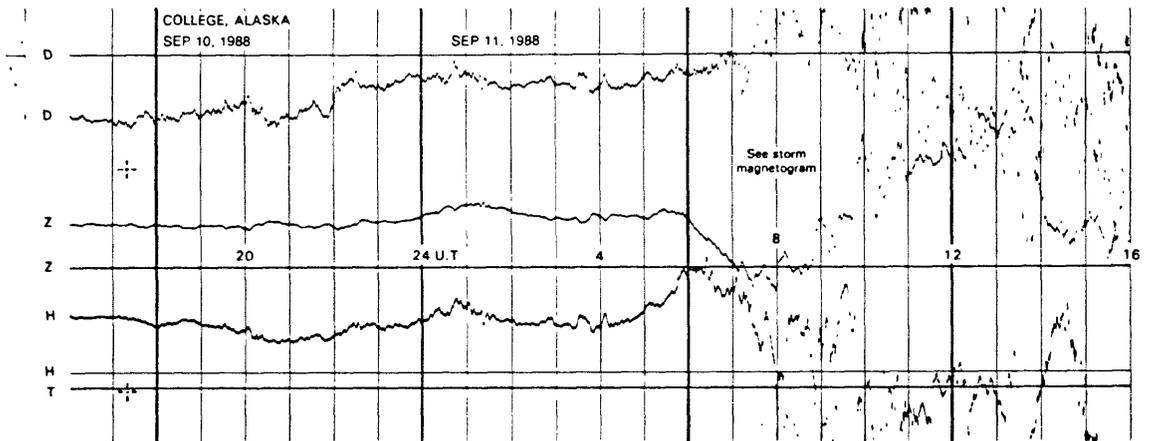
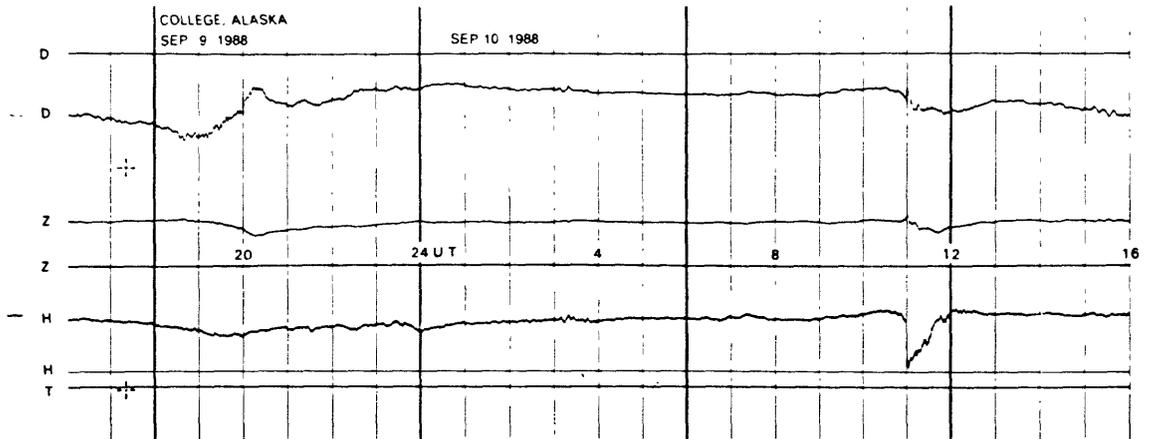
NORMAL MAGNETOGRAMS



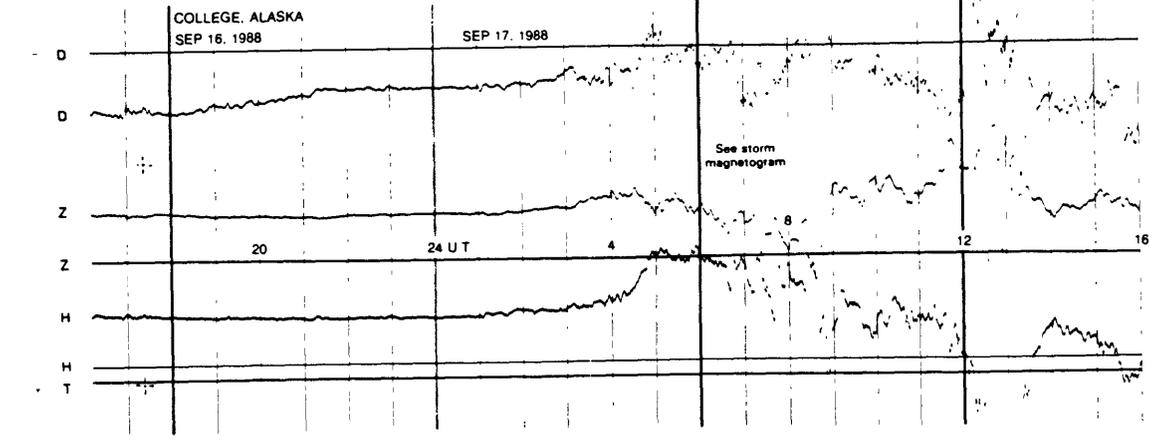
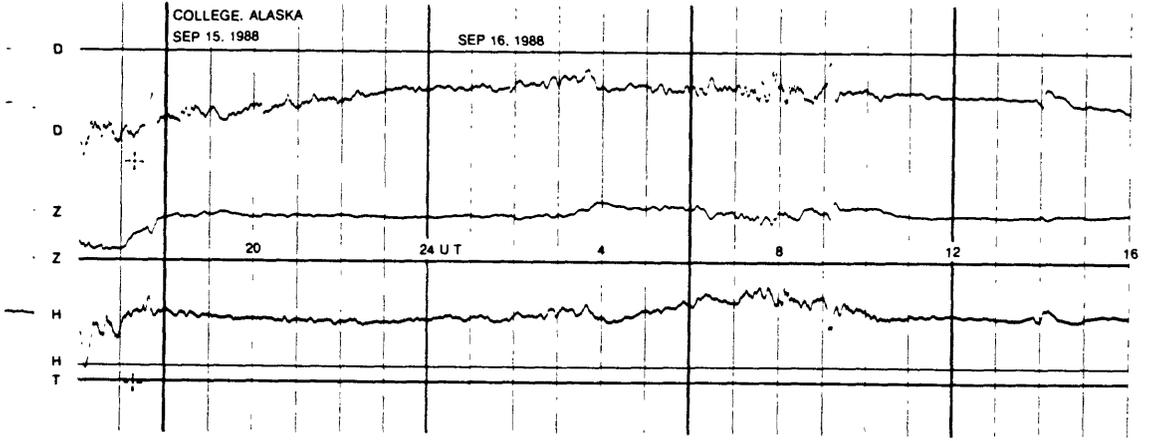
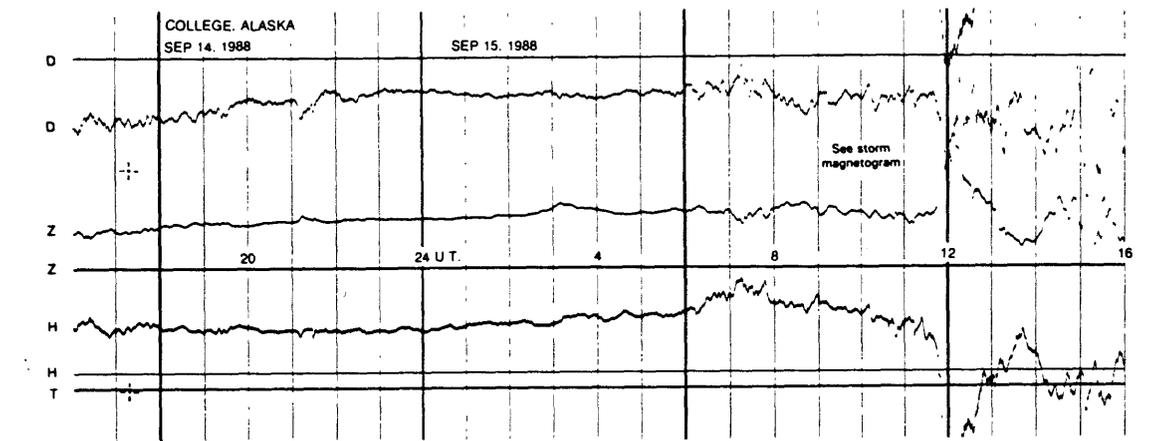
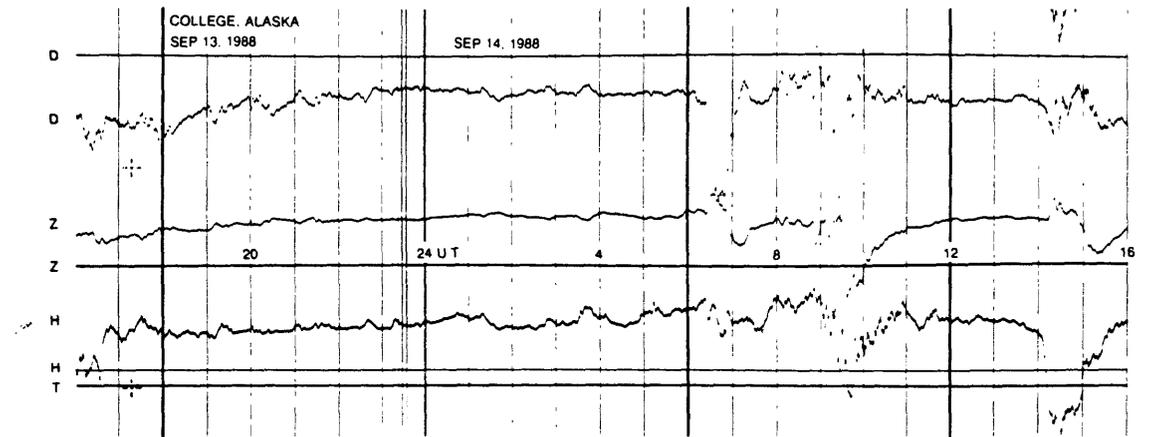
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

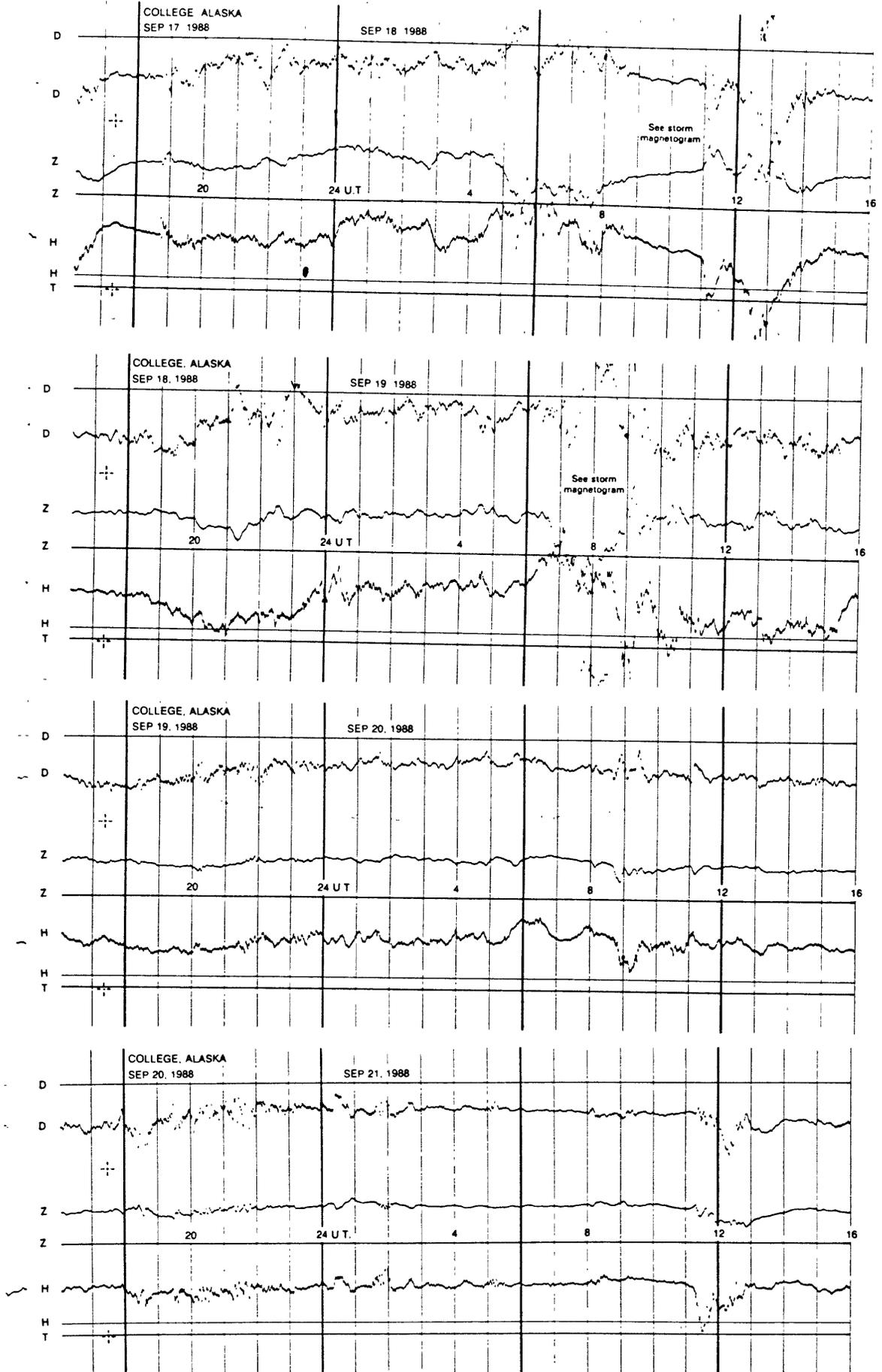


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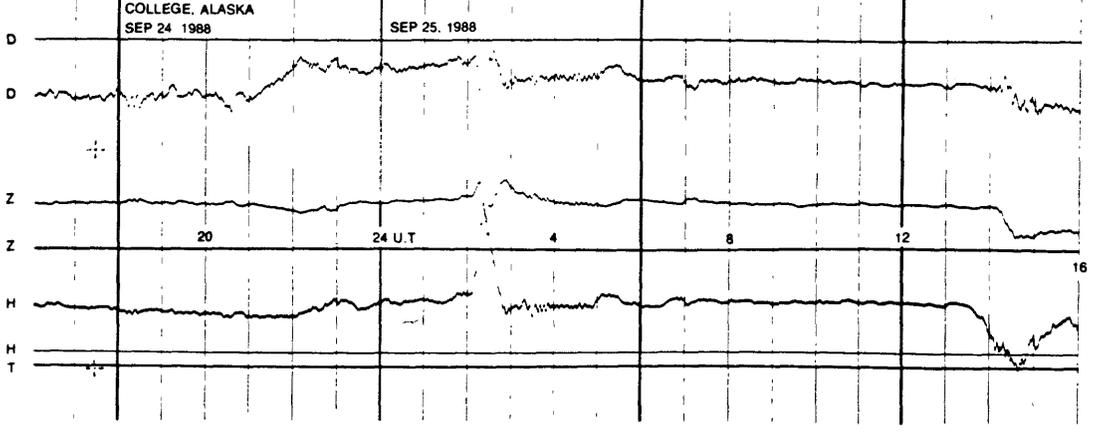
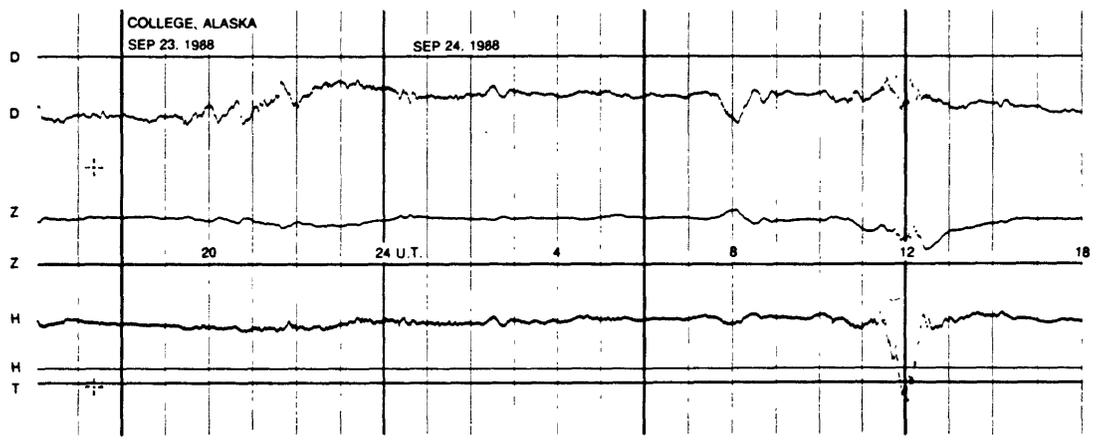
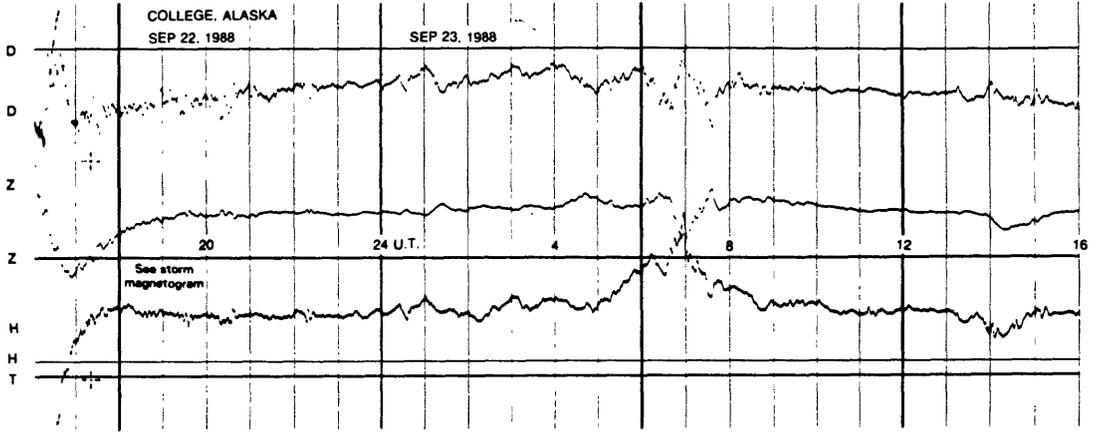
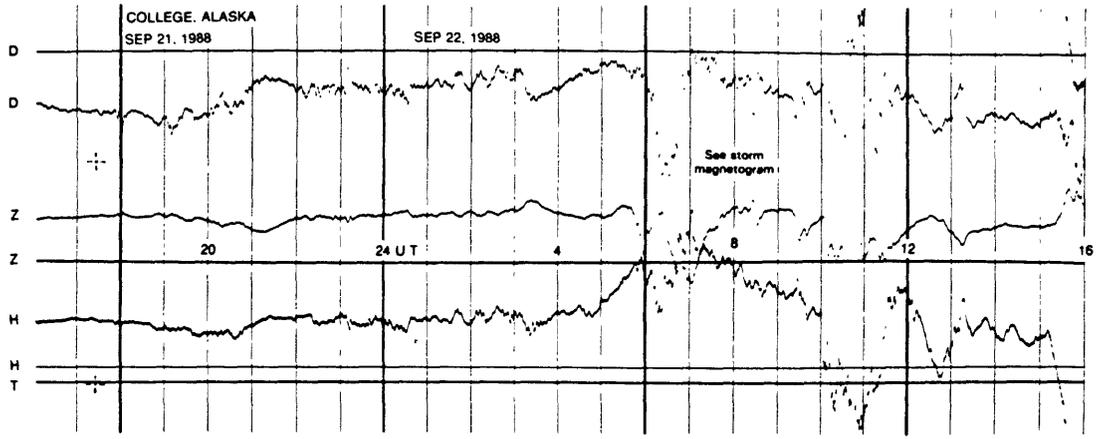


NORMAL MAGNETOGRAMS

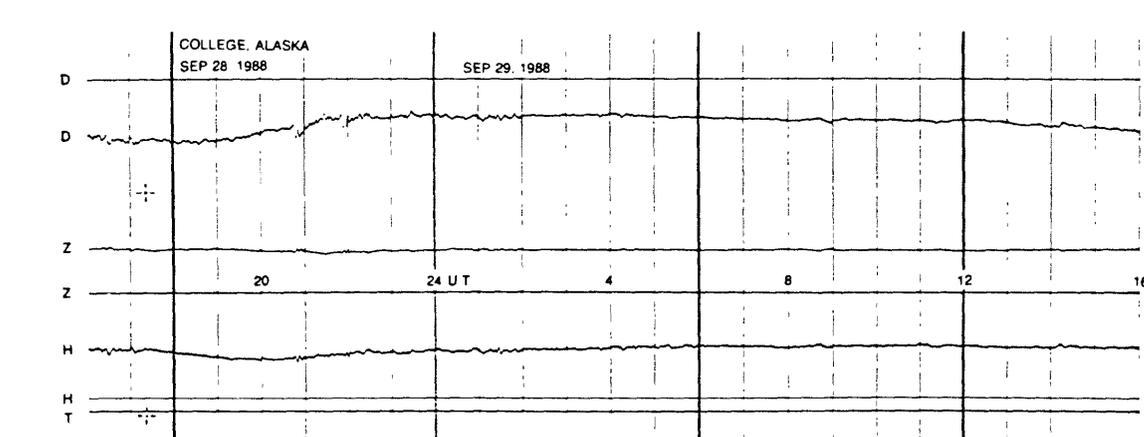
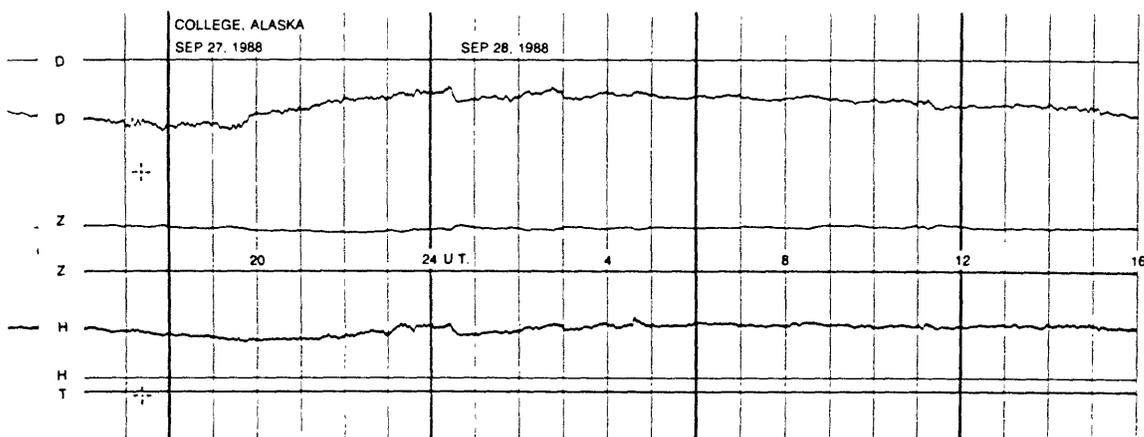
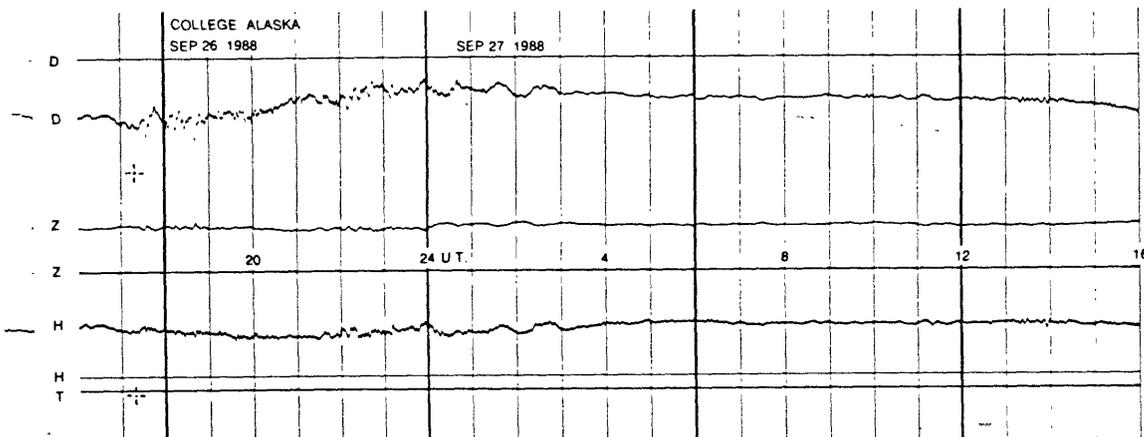
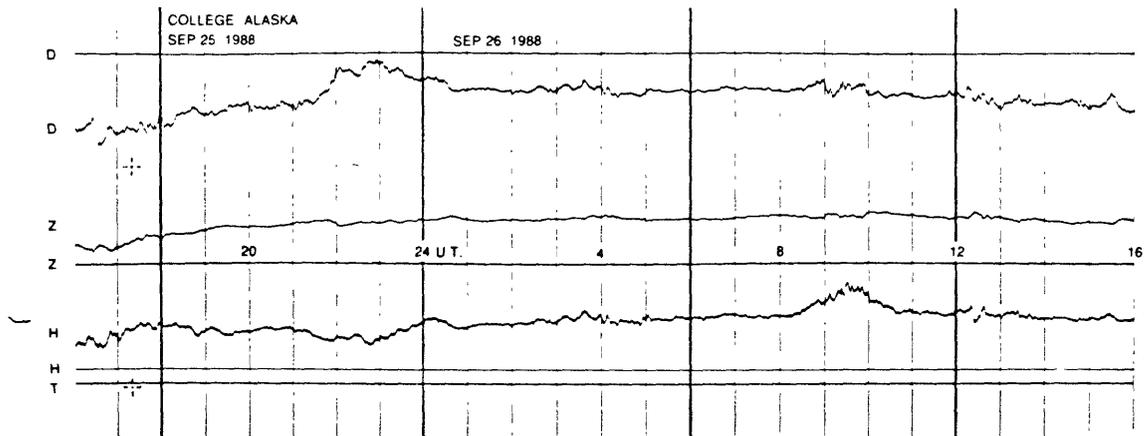
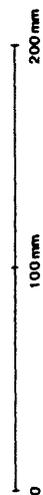
200 mm  
100 mm  
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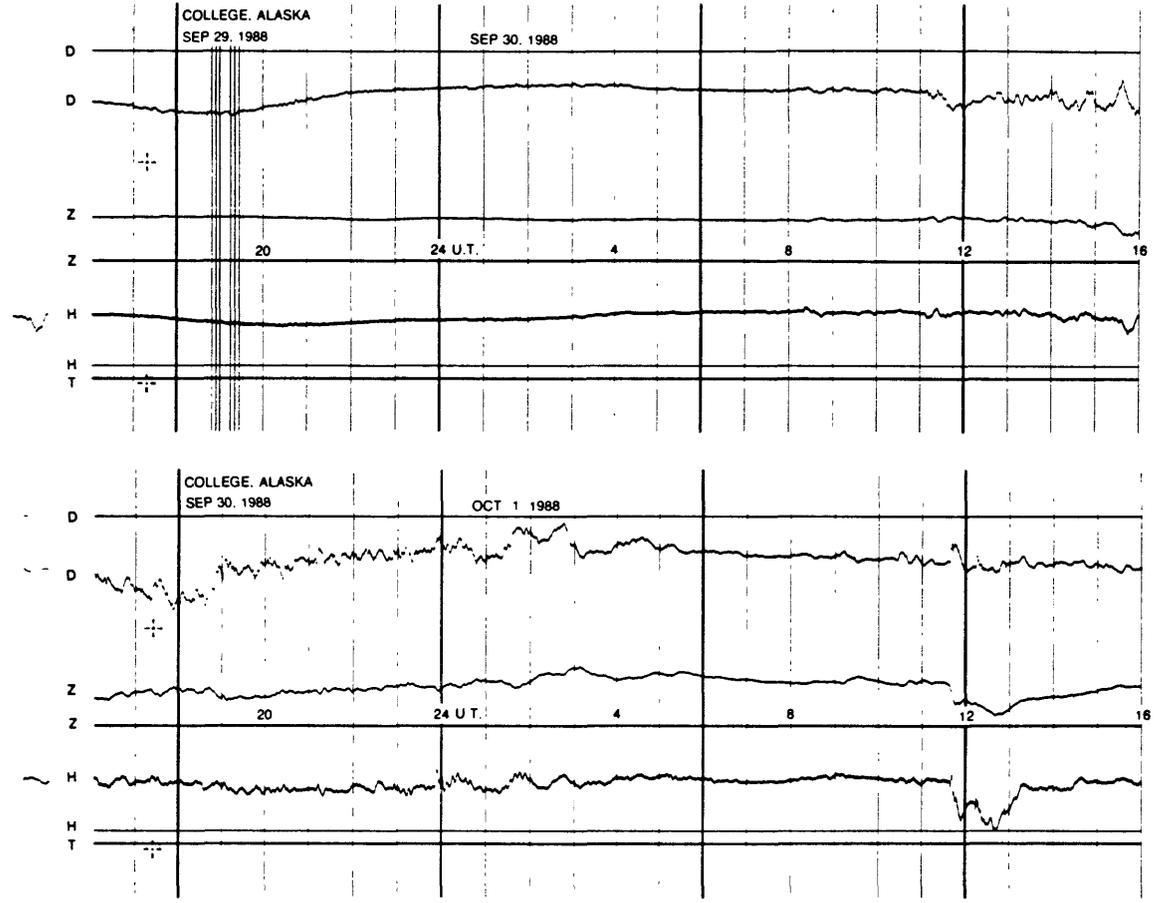
NORMAL MAGNETOGRAMS



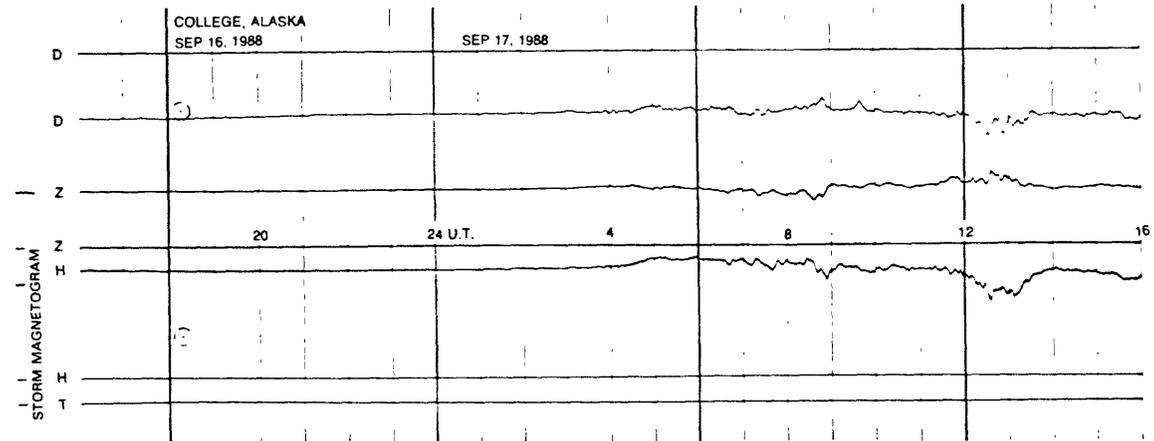
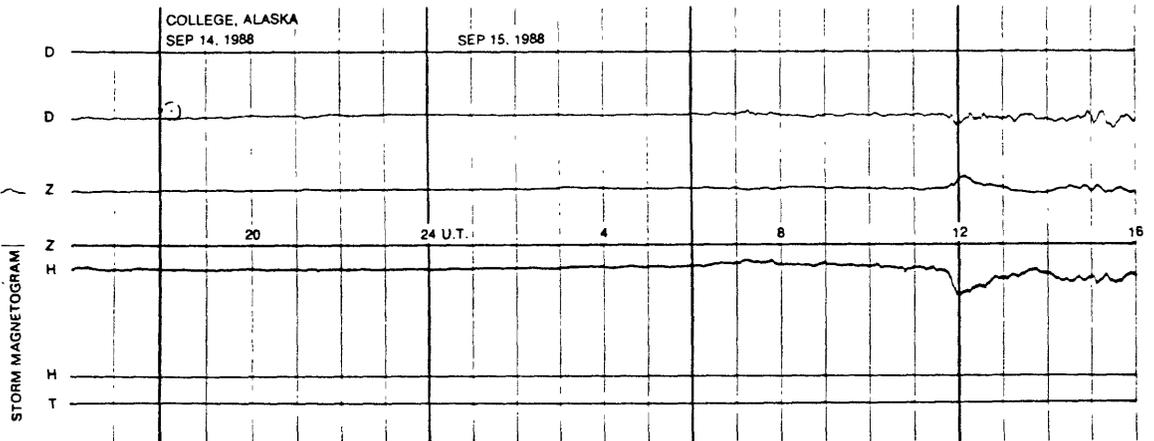
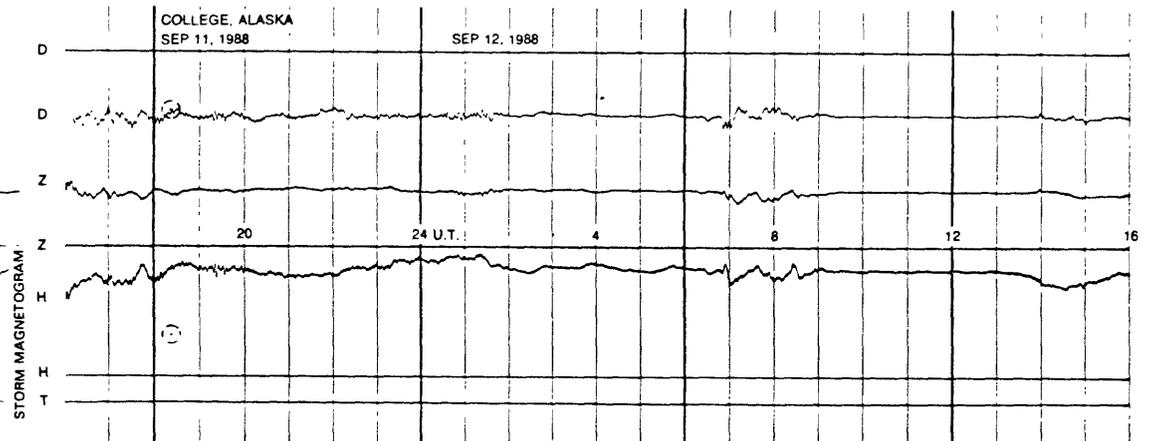
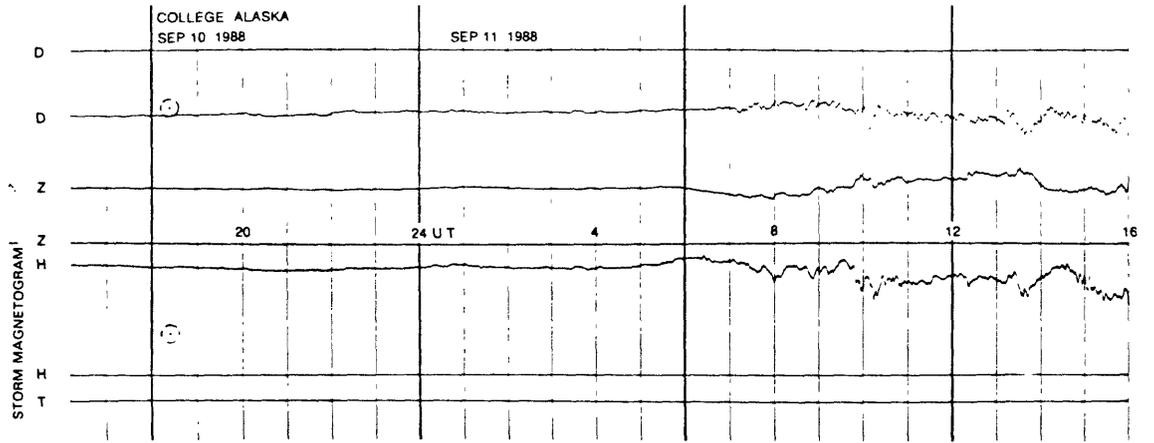
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS

