

# UNITED STATES DEPARTMENT OF THE INTERIOR

## GEOLOGICAL SURVEY

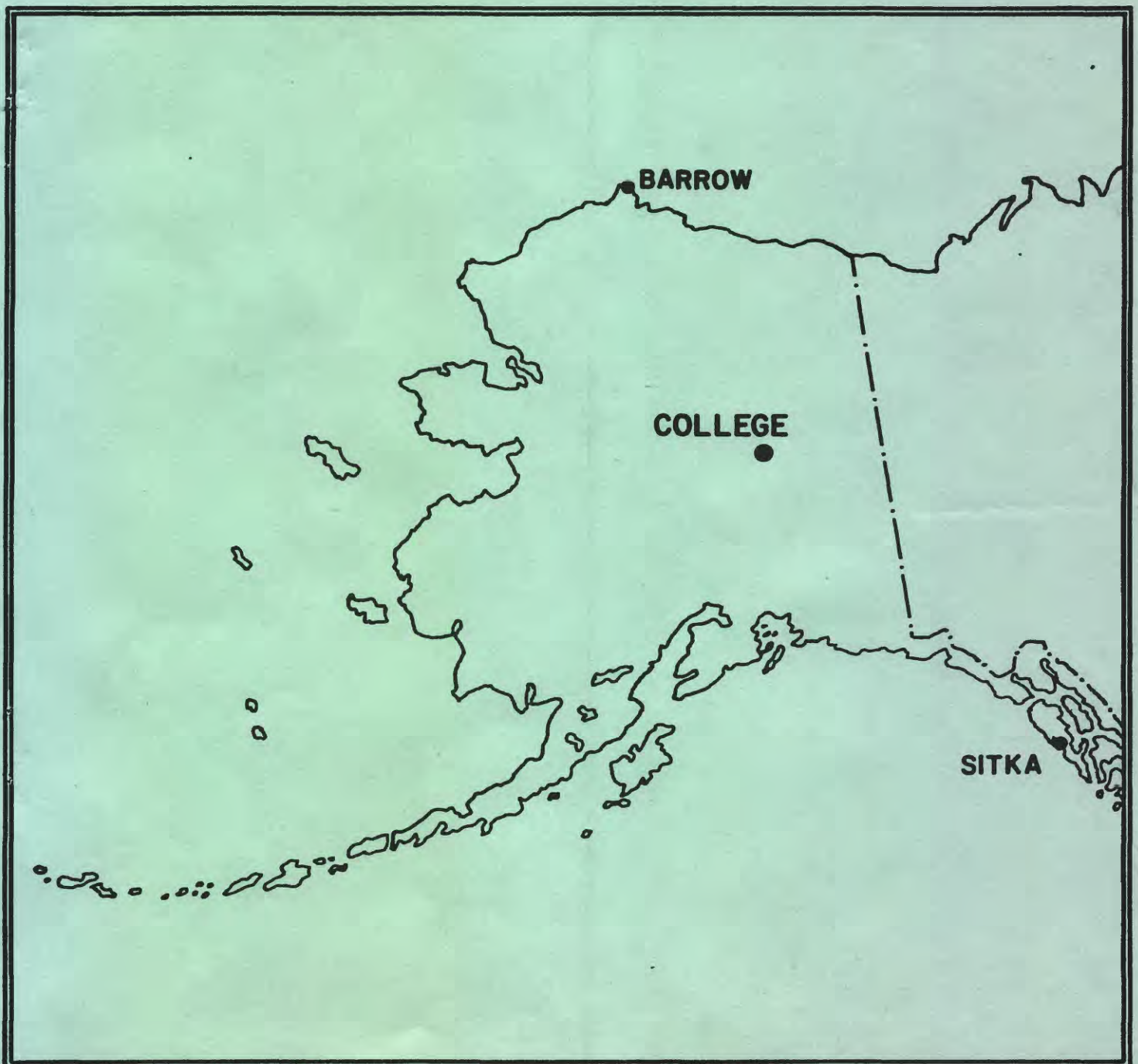
### PRELIMINARY GEOMAGNETIC DATA

#### COLLEGE OBSERVATORY

#### FAIRBANKS, ALASKA

OCTOBER 1987

OPEN FILE REPORT 87-0300J



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 Alaska

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

MONTH AND YEAR

October 1987

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	2	2	3	6	3	3	2	1	22	19	SUDDEN COMMENCEMENTS d h m
2	2	2	2	5	3	1	1	0	16	11	
3	0	1	5	5	7	7	5	4	34	57	
4	2	2	5	6	5	3	1	1	25	26	
5	2	1	1	5	4	1	1	1	16	12	
6	0	1	2	4	0	0	1	1	09	05	
7	0	1	2	5	6	2	1	1	18	19	
8	2	1	3	3	2	1	1	1	14	07	
9	0	0	0	0	0	0	0	0	00	00	
10	2	2	2	1	0	1	1	1	10	04	
11	2	4	3	3	6	6	4	3	31	33	
12	2	2	1	0	4	3	2	2	16	09	
13	2	2	3	5	5	5	4	4	30	28	
14	4	3	6	6	5	5	4	3	36	43	
15	2	5	6	7	6	6	3	2	37	57	
16	2	3	4	2	4	4	2	2	23	16	
17	2	1	2	5	7	4	3	2	26	32	
18	2	0	1	3	3	0	0	0	09	05	
19	0	0	0	4	3	2	0	0	09	06	
20	0	0	1	2	3	3	2	2	13	07	
21	3	2	3	3	5	4	3	1	24	18	
22	1	1	0	1	1	0	1	1	06	02	
23	1	3	4	4	3	4	0	0	19	14	
24	0	1	3	5	4	3	4	3	23	19	
25	3	5	6	7	5	2	2	2	32	44	
26	1	2	6	6	5	4	1	2	27	32	
27	2	4	7	7	6	6	6	4	42	73	
28	4	5	6	7	5	6	4	3	40	58	
29	3	4	4	7	5	3	3	2	31	37	
30	2	3	6	6	3	2	1	1	24	26	
31	1	2	5	5	4	4	2	2	25	22	

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.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

675.7

3.70

2500

H

322.2

7.79

2510

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED

John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

# 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:

<u>Gamma Range</u>	<u>K - Index</u>	<u>ak</u>
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.

PRINCIPAL MAGNETIC STORMS  
COLLEGE OBSERVATORY, COLLEGE, ALASKA  
1987

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

Data from Individual Observatories:

October

1987

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
C0	64.6 N	3	06xx	..				3	5, 6	7	260	1390	1380	3	23
		15	03xx	..				15	4	7	161	1525	640	15	21
		25	03xx	..				25	4	7	237	1725	870	25	15
		27	04xx	..				27	3, 4	7	284	1700	1090		
								28	4	7				28	20

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 10/1/87	2400 U.T., 10/31/87	1.0' /mm	3.7' /mm	27° 01.5' E
	(same)	(same)	7.8' /mm		12641' <sup>8</sup>
	(same)	(same)	7.7' /mm		55161' <sup>8</sup>

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 10/1/87	2400 U.T., 10/31/87	7.9' /mm	29.5' /mm	
	(same)	(same)	43.7' /mm		
	(same)	(same)	48.7' /mm		

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D					
H					
Z					

MONTHLY MEAN ABSOLUTE VALUES*					
D		H		Z	
27° 19.1' E		12841' <sup>8</sup>		55321' <sup>8</sup>	

\* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: OCT 6, 9, 10, 18, 22,

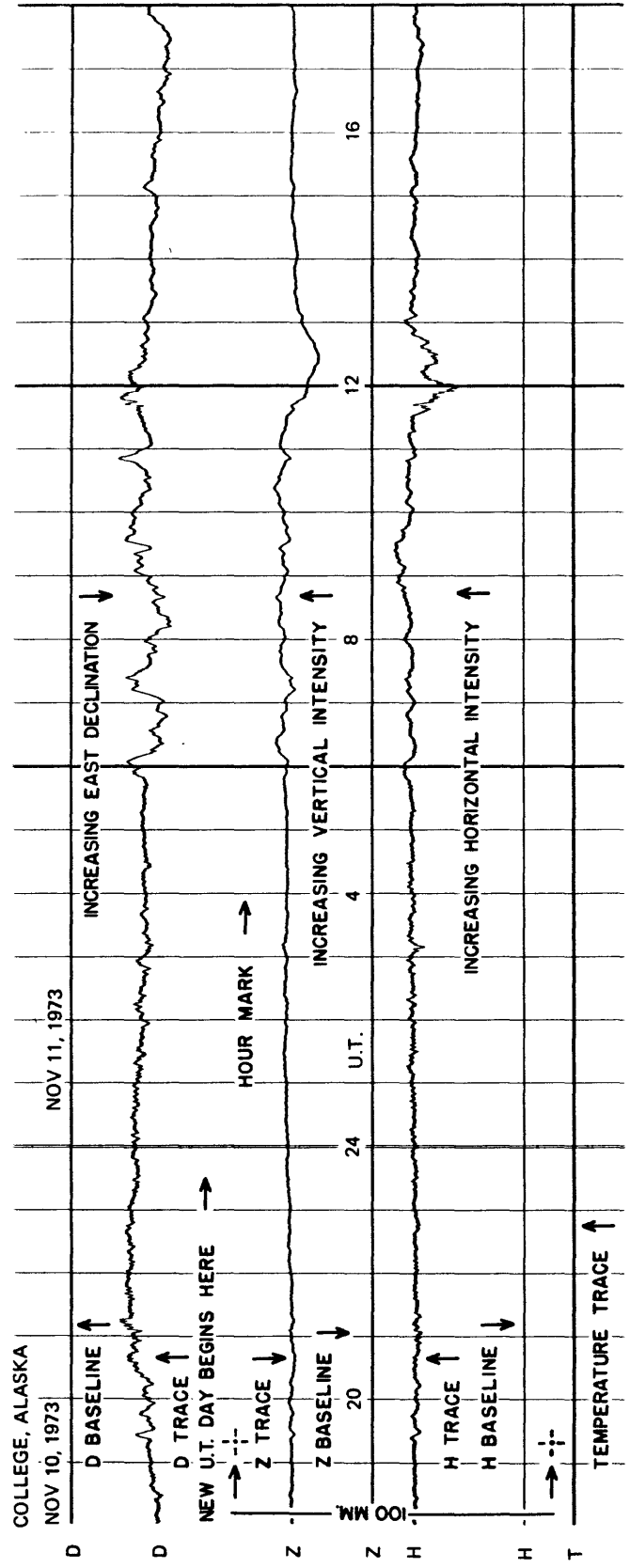
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS  
(UNIVERSAL TIME)

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										
	DAY	06	09	10	18	22	06	09	10	18	22	06	09	10	18		22									
A <sub>k</sub>	05	00	04	05	02	05	00	04	05	02	05	00	04	05	02											
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		
	144	147	157	165	170	168	160	173	177	176	273	263	293	262	260	262	256	253	240	240	262	216	216	205	206	
	147	167	173	170	173	168	177	177	177	176	277	263	279	272	265	268	260	257	273	260	268	216	216	237	206	
	157	173	156	163	162	263	323	283	277	261	323	263	283	277	265	270	263	257	247	263	263	216	215	242	207	
	165	170	173	173	163	267	268	267	263	261	267	263	293	263	265	270	263	261	293	263	263	217	214	227	210	
	170	173	143	167	180	268	268	300	263	260	268	267	300	263	265	270	268	267	300	263	263	221	213	236	210	
	168	176	157	170	183	268	268	303	261	260	268	267	303	261	260	260	268	267	308	260	260	222	208	249	209	
	160	177	100	166	176	273	273	293	262	263	273	263	293	262	263	263	273	263	209	273	263	232	209	273	210	
	173	177	157	156	176	277	277	279	272	265	277	263	279	272	265	268	277	263	209	255	265	246	209	217	217	
	143	177	147	167	177	323	323	283	277	261	323	263	283	277	265	270	263	257	242	255	261	229	212	236	216	
	102	179	150	215	180	156	156	276	286	263	156	260	276	286	263	263	260	260	211	233	263	145	211	233	211	
	179	183	173	179	187	264	264	260	250	258	264	263	260	250	258	258	264	263	209	227	258	180	209	227	206	
	173	186	177	190	185	268	268	263	177	250	268	260	263	177	250	250	268	263	207	216	250	206	207	216	193	
	199	187	184	202	199	260	260	261	210	240	260	263	261	210	240	240	260	263	206	216	240	197	206	216	173	
	195	193	195	195	187	261	261	259	266	260	261	263	259	266	260	260	261	263	206	207	260	210	206	207	185	
	197	195	197	197	185	260	260	261	254	267	260	261	261	254	267	267	260	261	207	211	267	208	207	211	193	
	205	199	209	209	192	259	259	260	248	268	259	259	260	248	268	268	259	259	209	211	268	212	209	211	199	
	217	217	230	206	197	249	249	253	256	269	249	252	253	256	269	269	249	252	213	217	269	214	213	217	206	
	222	233	256	209	215	249	249	240	253	261	249	243	240	253	261	261	249	243	213	213	261	214	213	213	207	
	218	235	221	223	222	250	250	234	252	263	250	236	234	252	263	263	250	236	206	192	263	207	206	206	209	
	216	214	215	227	226	240	240	237	250	257	240	220	237	250	257	257	240	220	197	193	257	206	197	202	207	
	192	147	196	207	213	231	231	238	249	257	231	223	238	249	257	257	231	223	179	193	257	203	179	200	199	
	163	107	158	197	190	236	236	235	248	256	236	233	235	248	256	256	236	233	176	193	256	203	176	203	194	
	135	93	133	180	163	241	241	246	249	255	241	236	246	249	255	255	241	236	177	199	255	206	177	203	194	
	125	102	126	177	150	246	246	240	249	260	246	240	257	249	260	260	246	240	193	201	260	209	193	208	200	
DAILY SUM	4165	4218	4075	4498	4397	6125	6061	6291	6070	6268	5035	4921	5282	4844	4867											
DAILY MEAN	174	176	170	187	183	255	252	262	253	261	210	205	220	202	203											
MEAN						257					208															

Scaled LYT Checked RVO

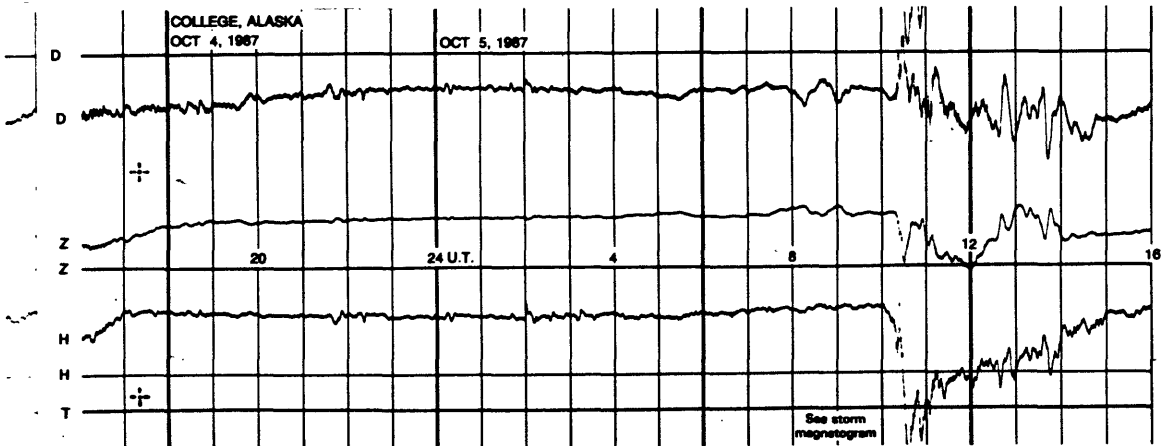
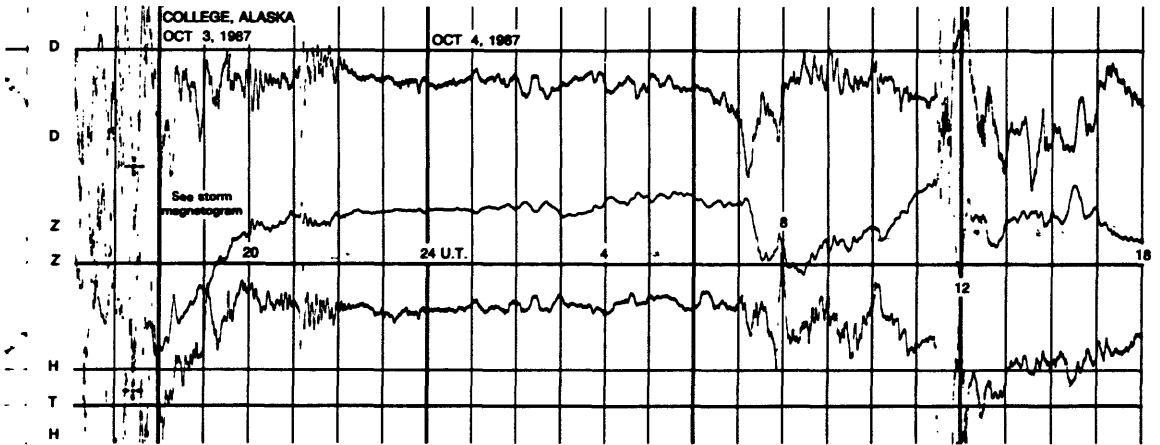
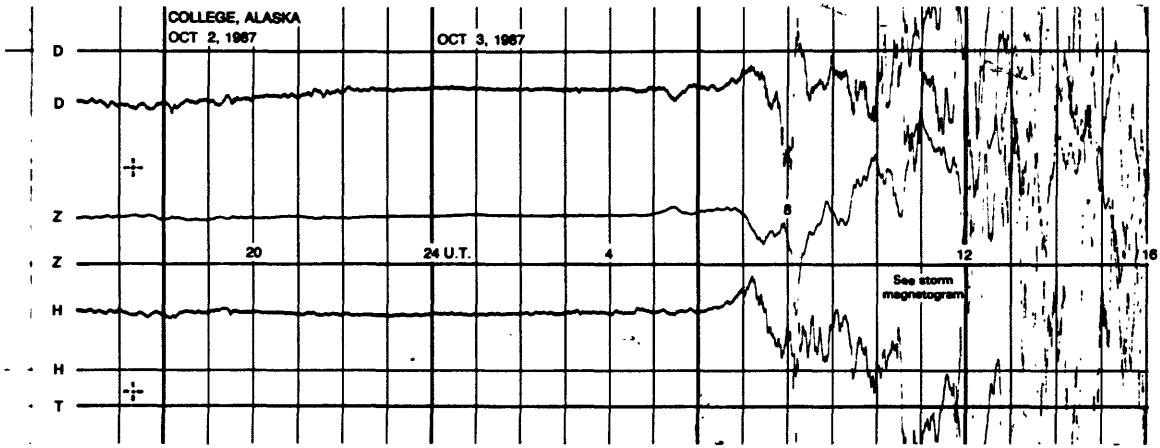
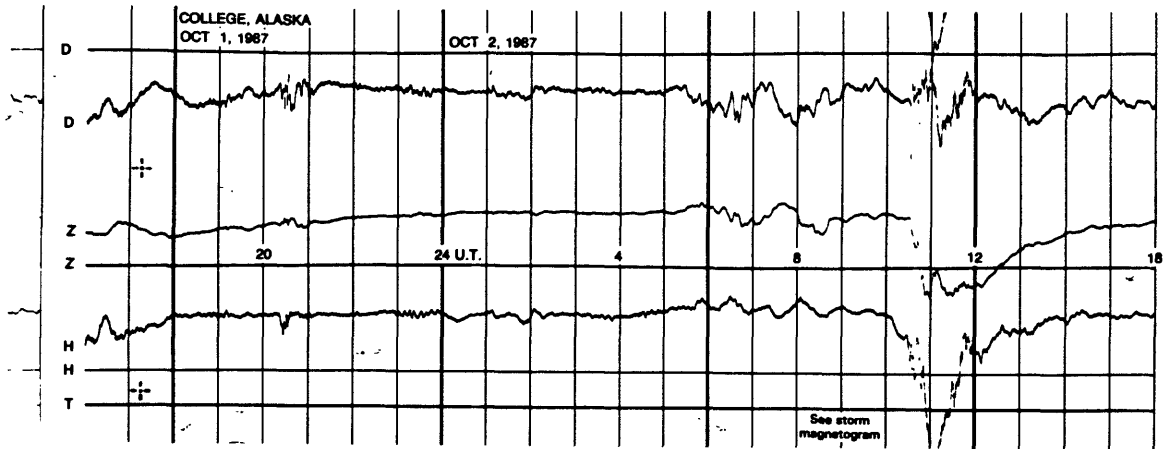
# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



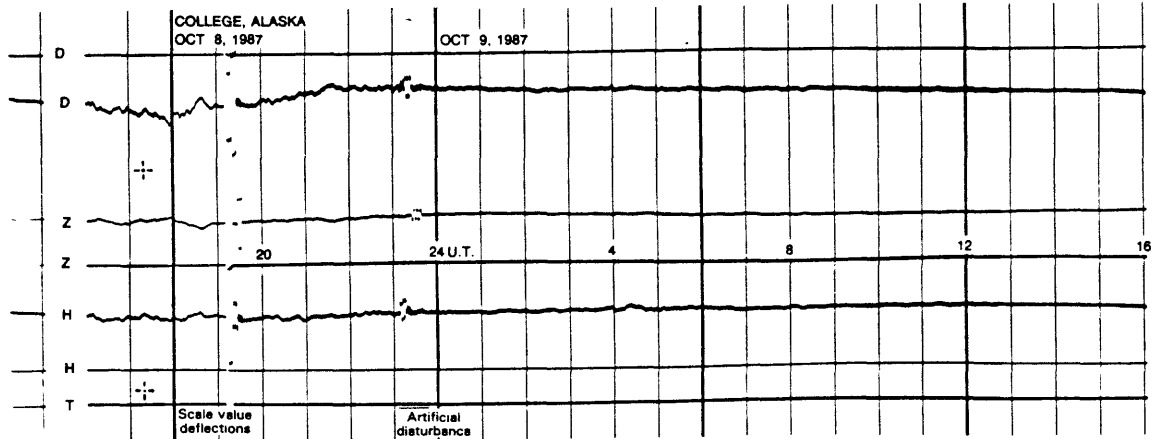
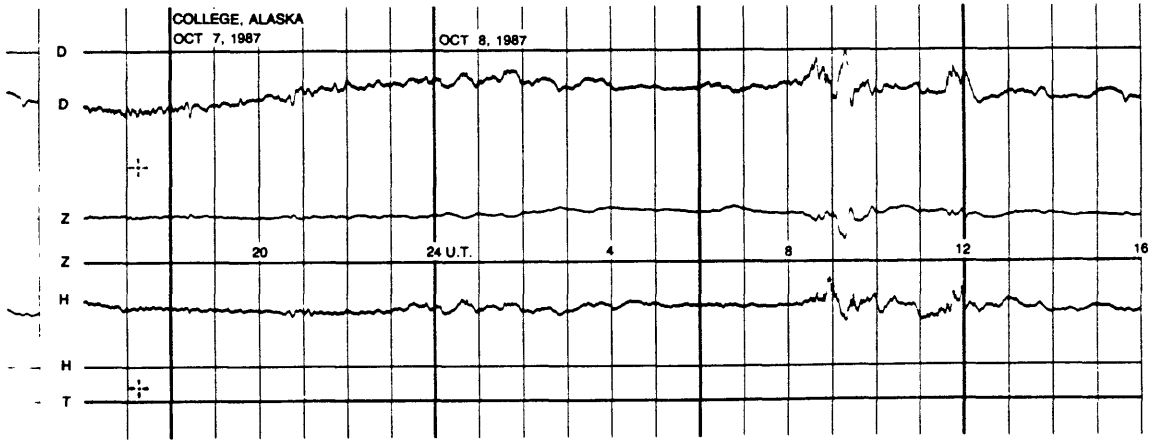
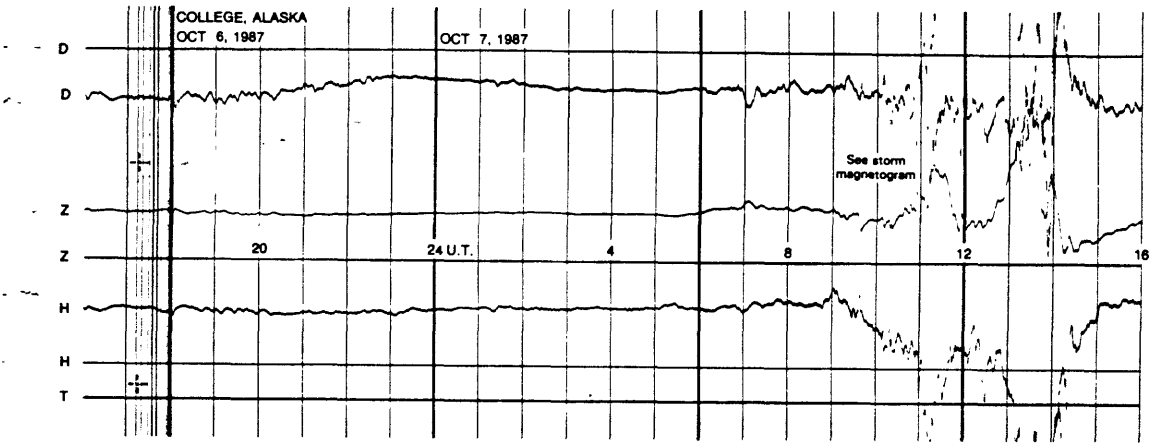
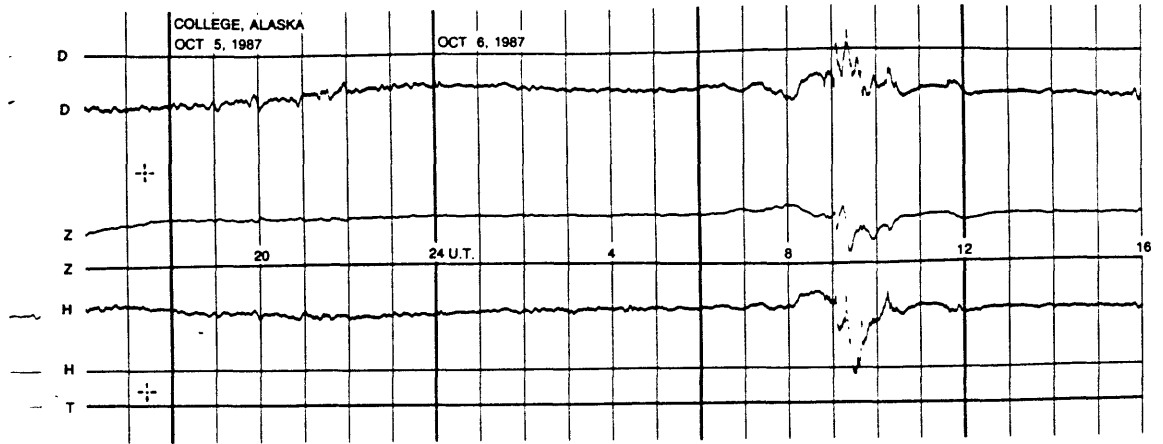
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES



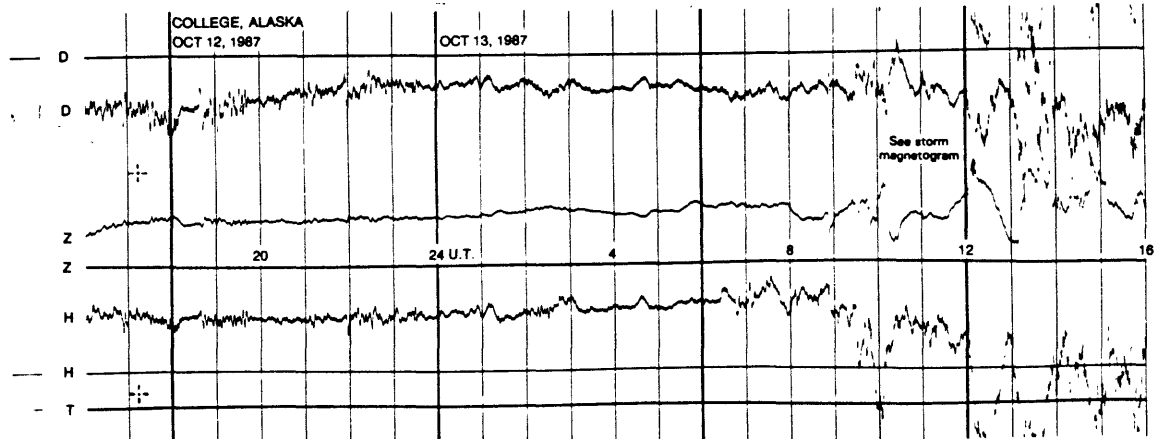
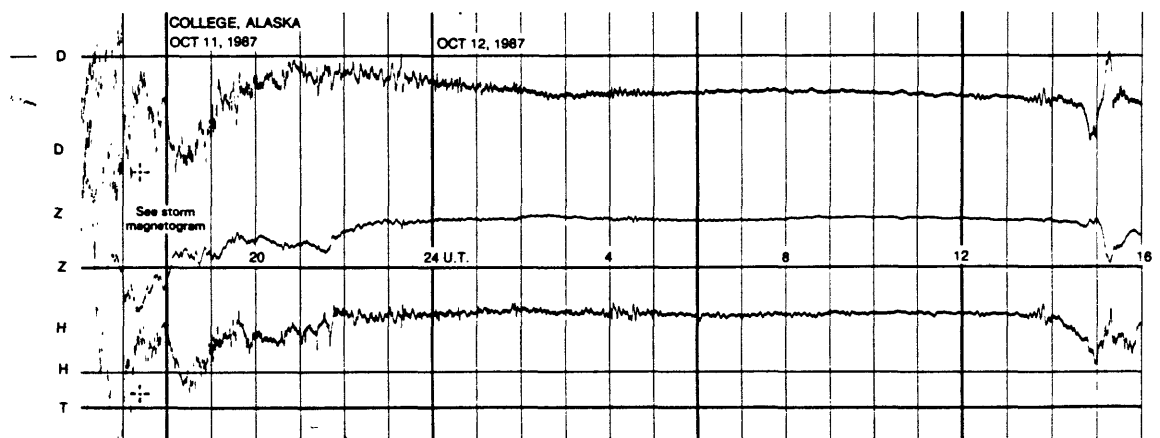
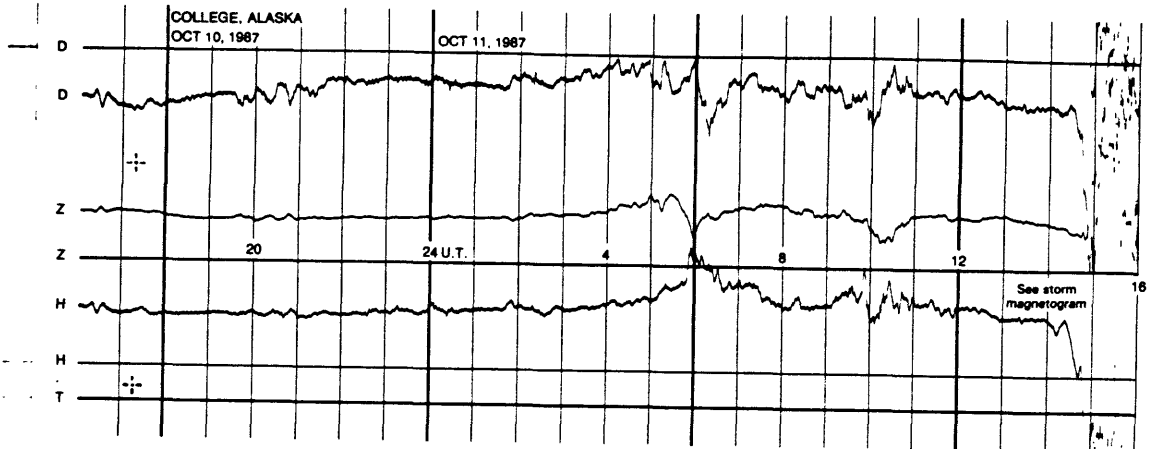
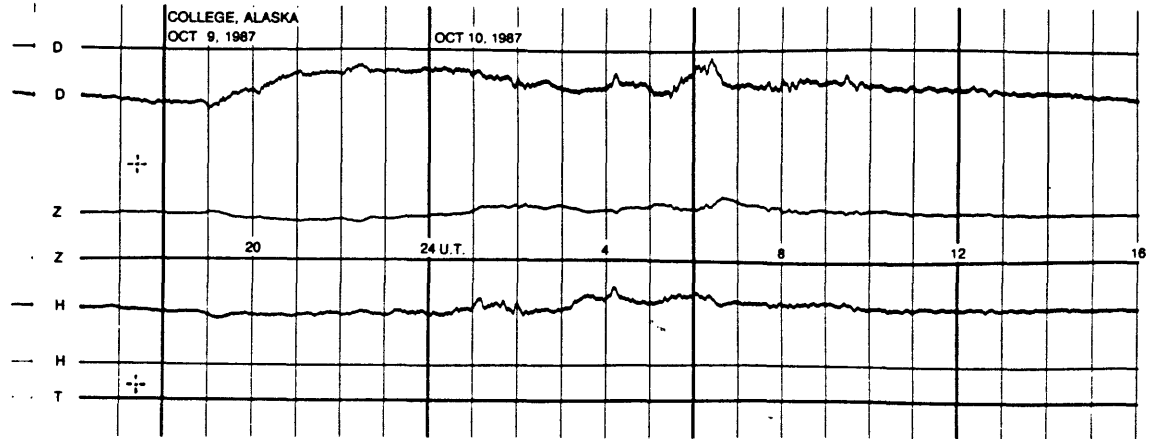
NORMAL MAGNETOGRAMS



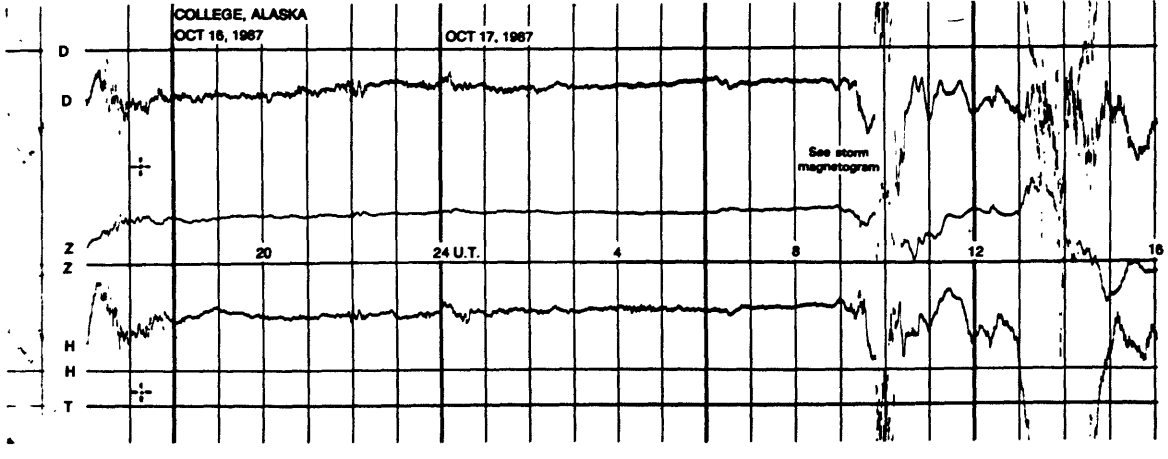
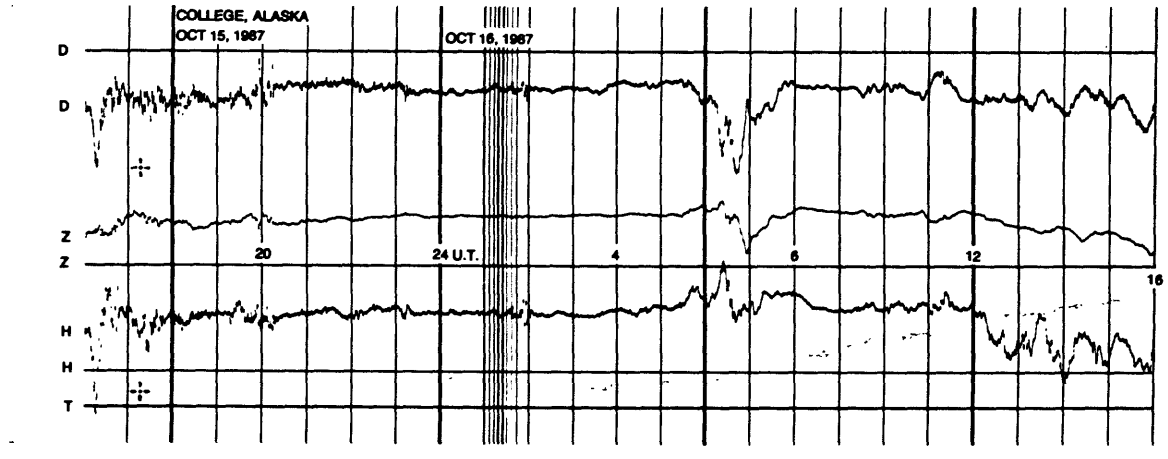
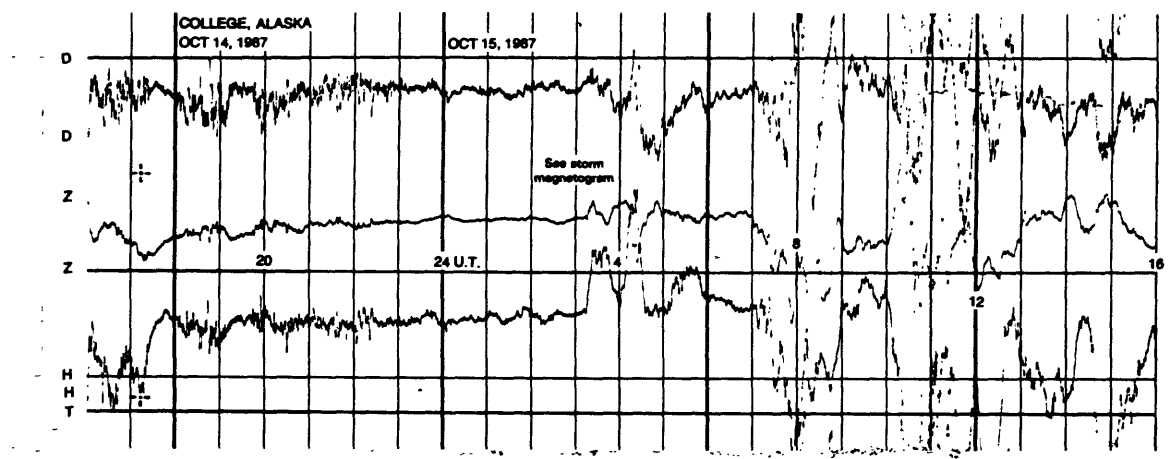
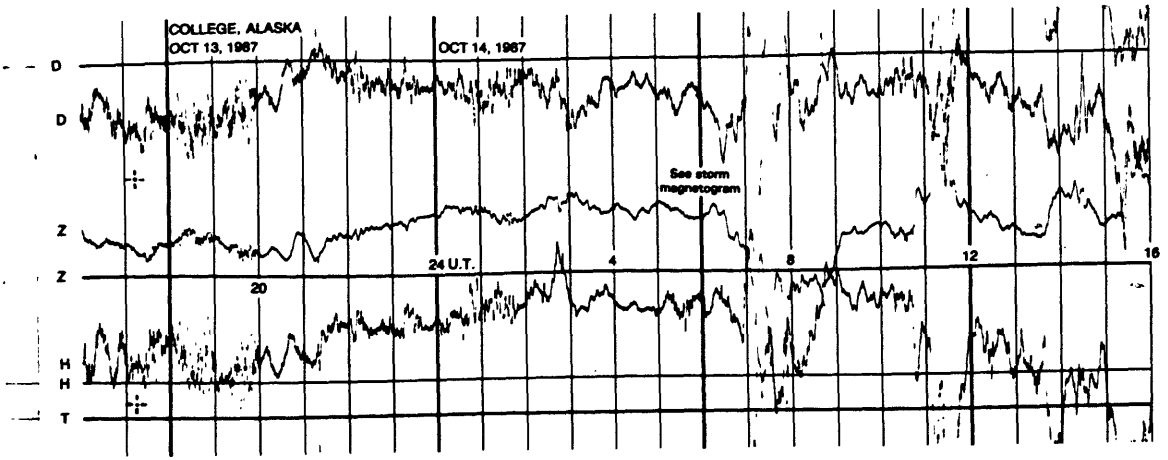
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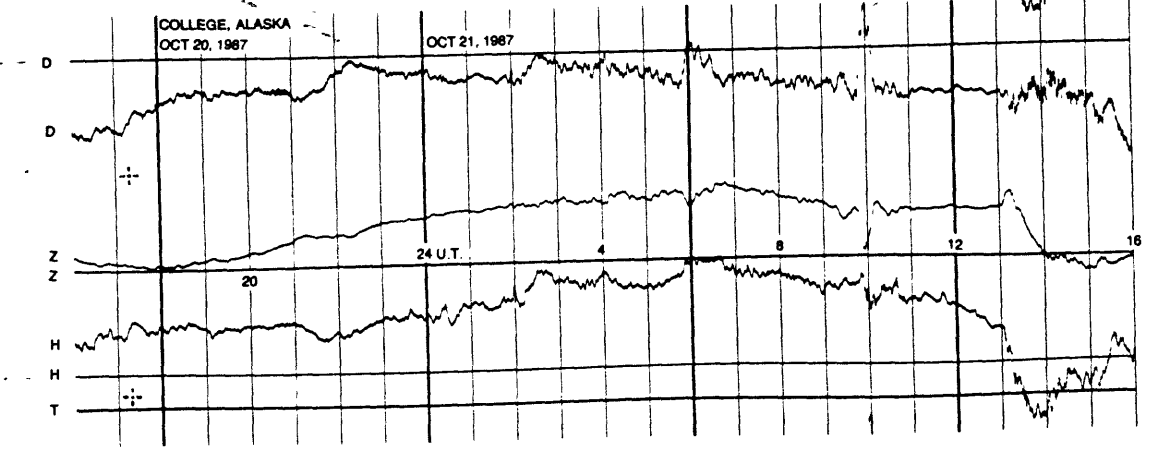
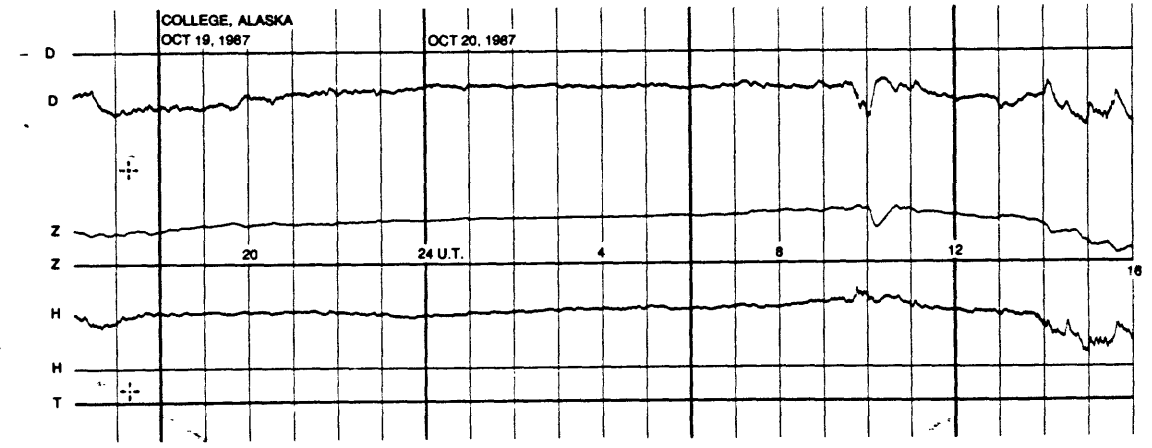
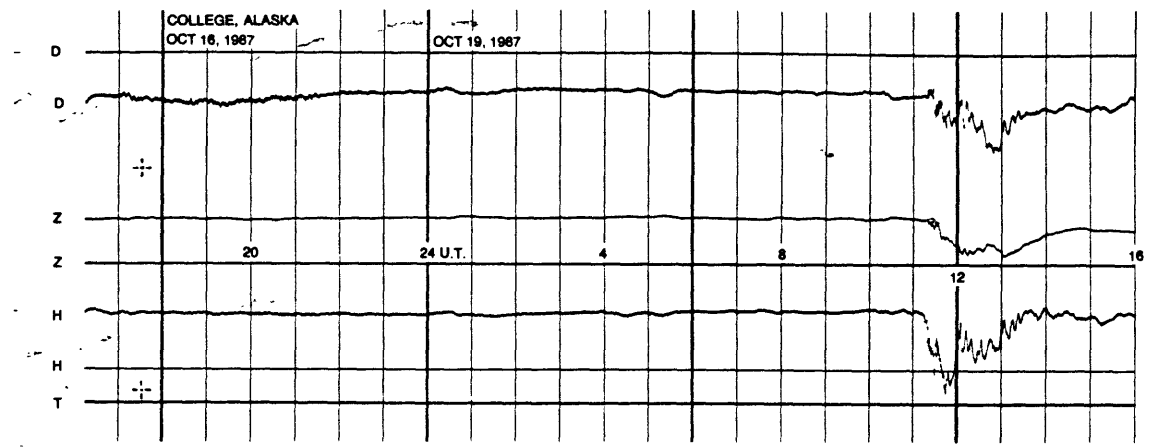
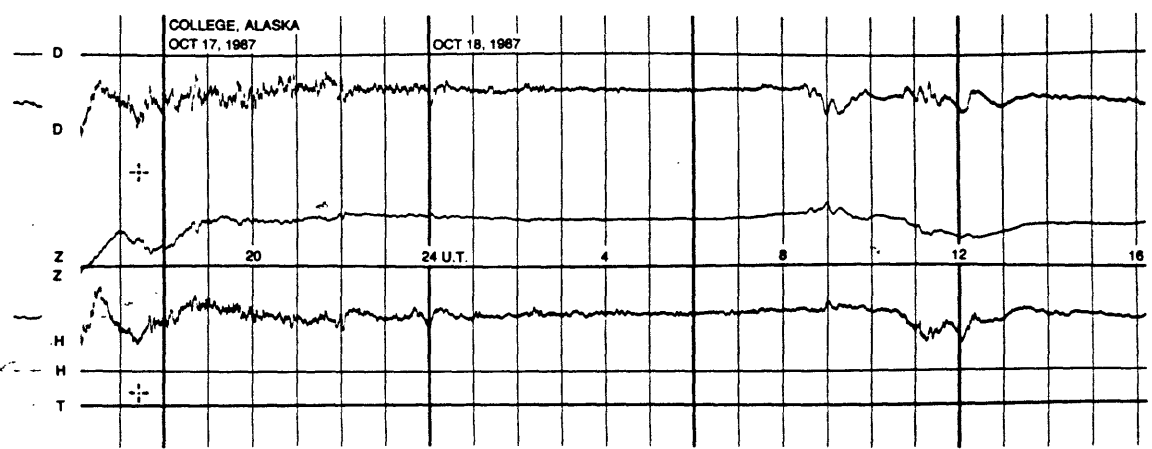
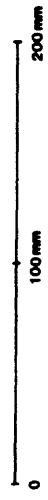
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

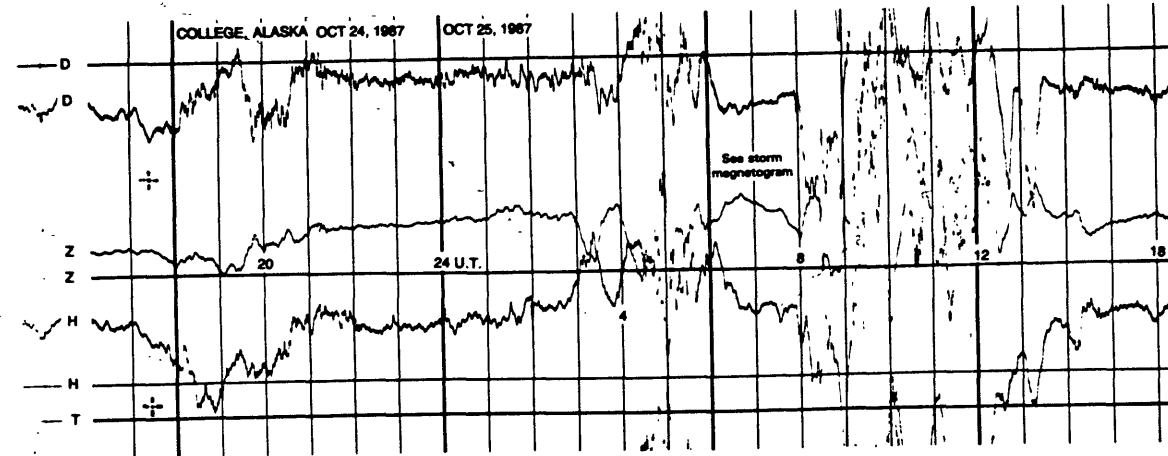
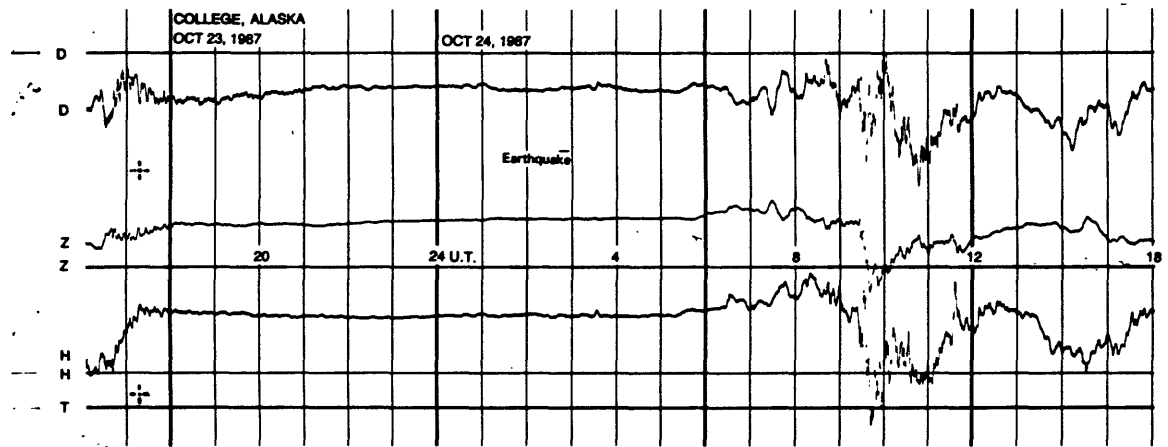
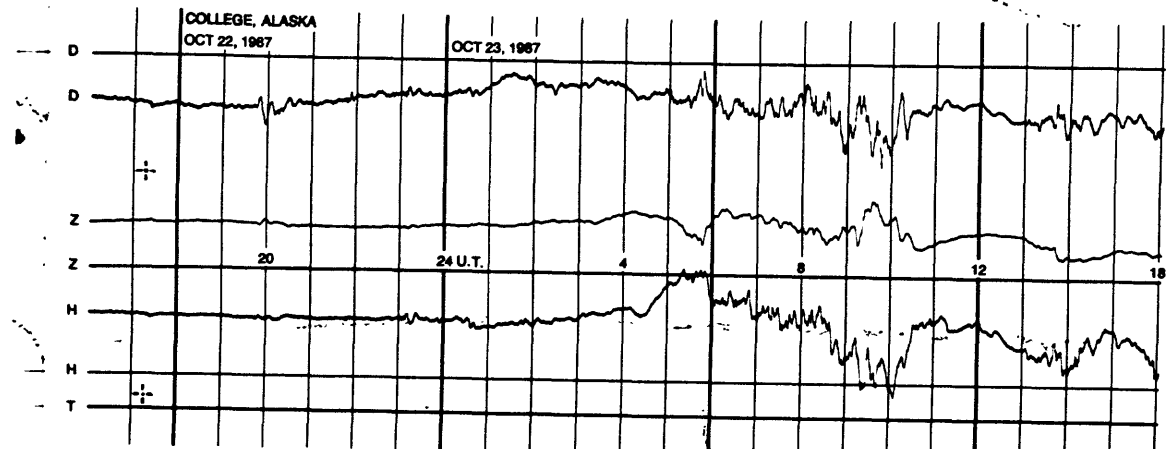
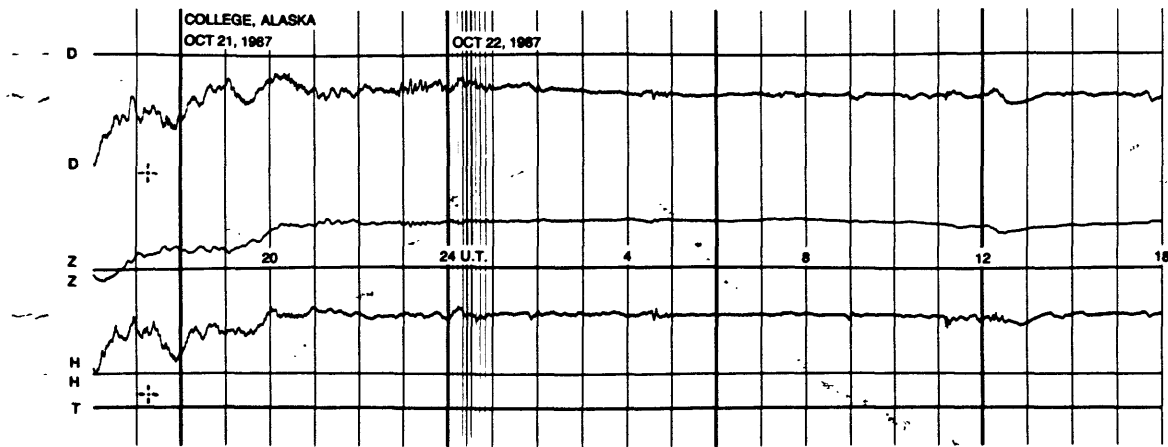


NORMAL MAGNETOGRAMS

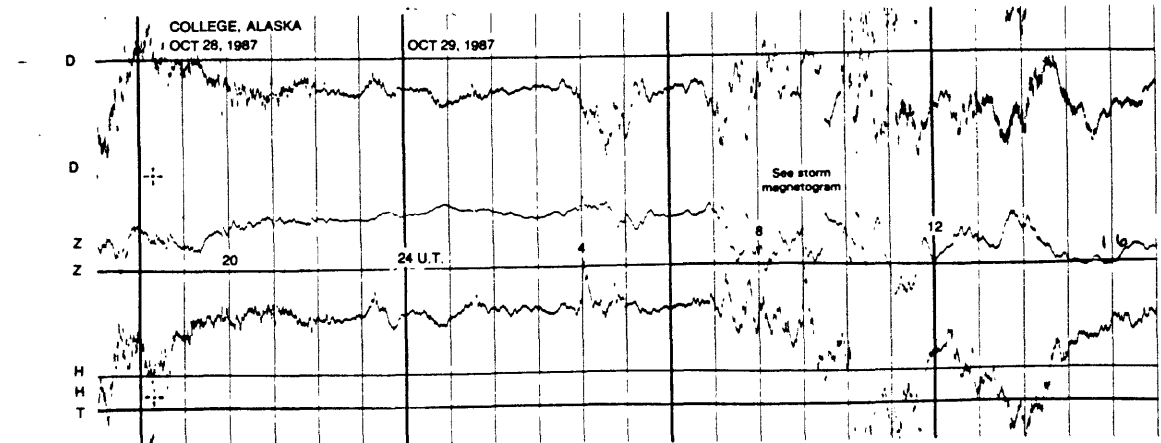
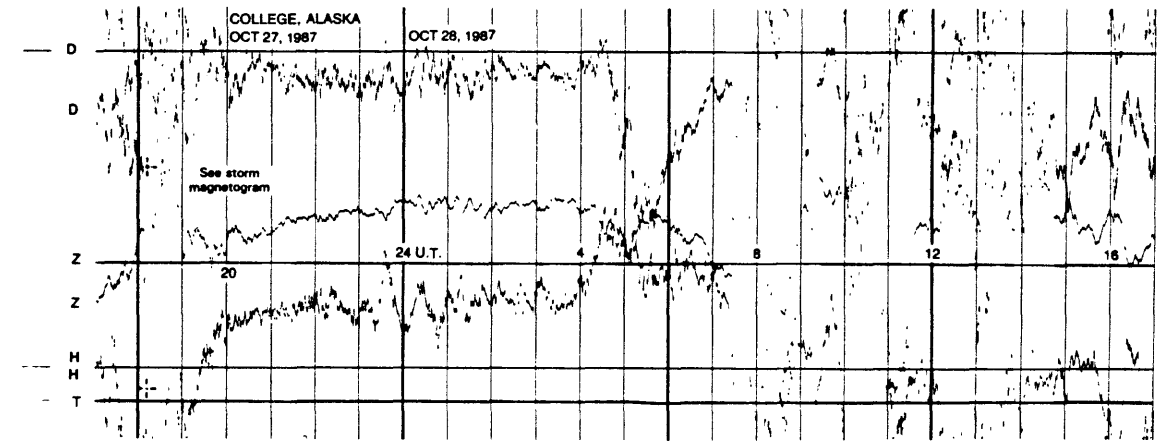
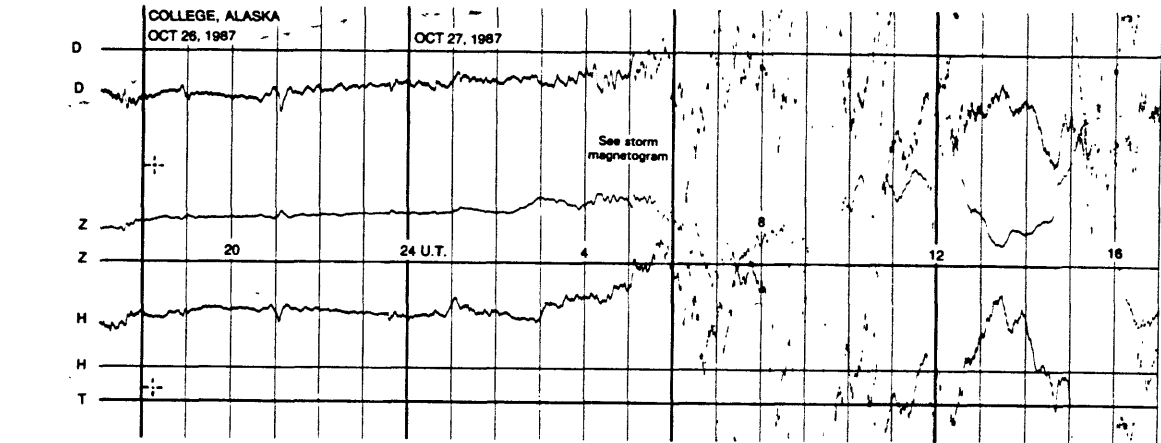
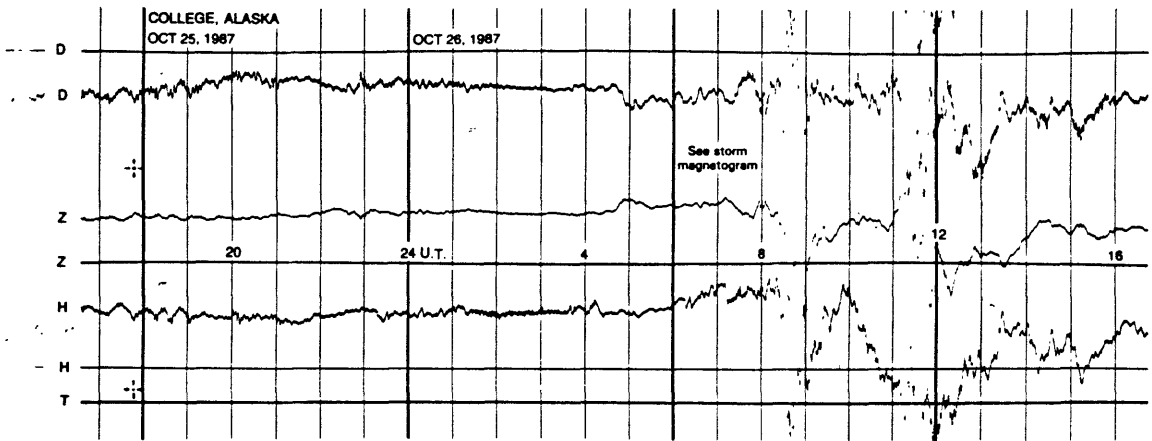
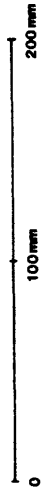


NORMAL MAGNETOGRAMS

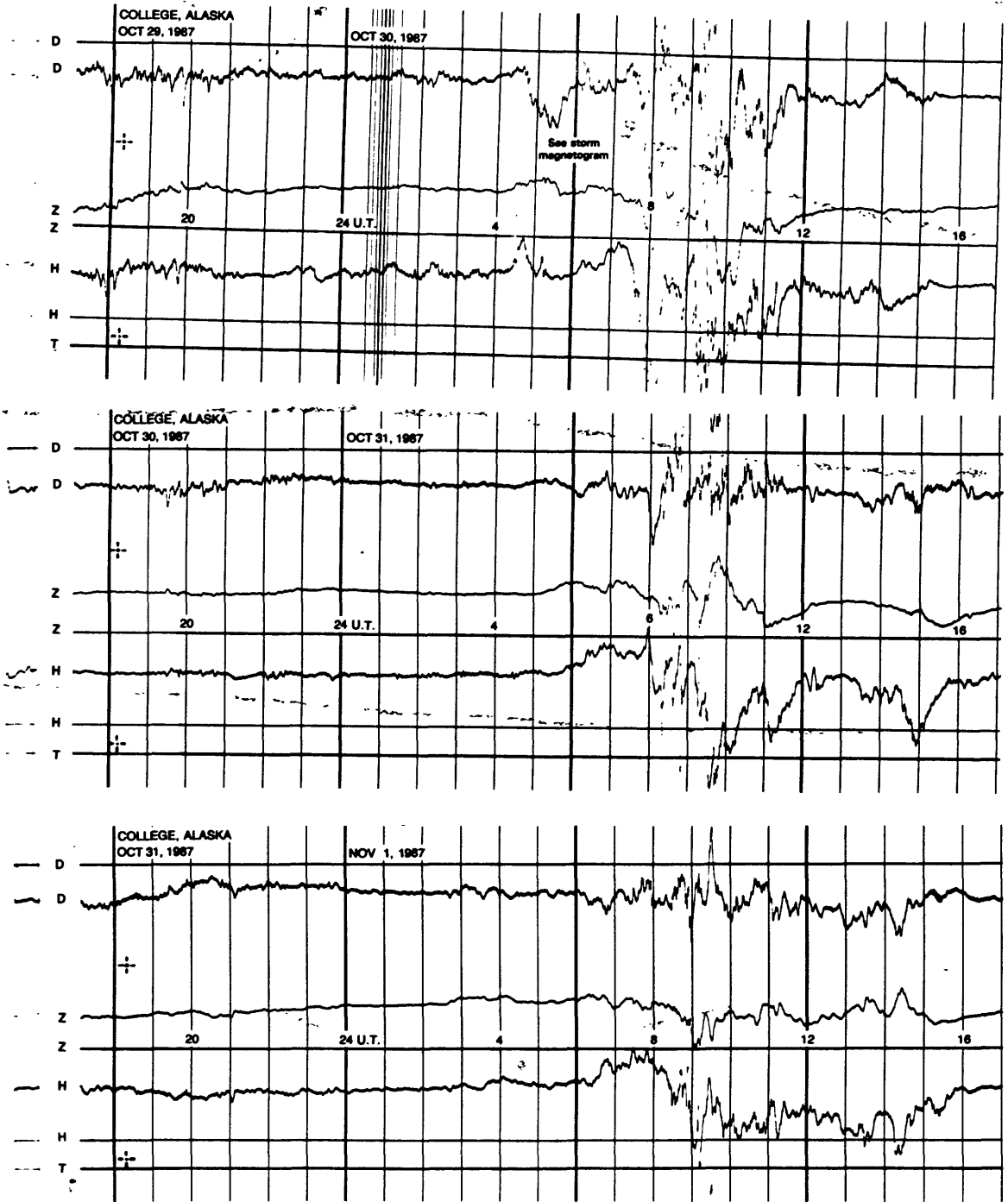
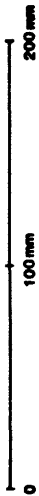
200 mm  
100 mm  
0



NORMAL MAGNETOGRAMS

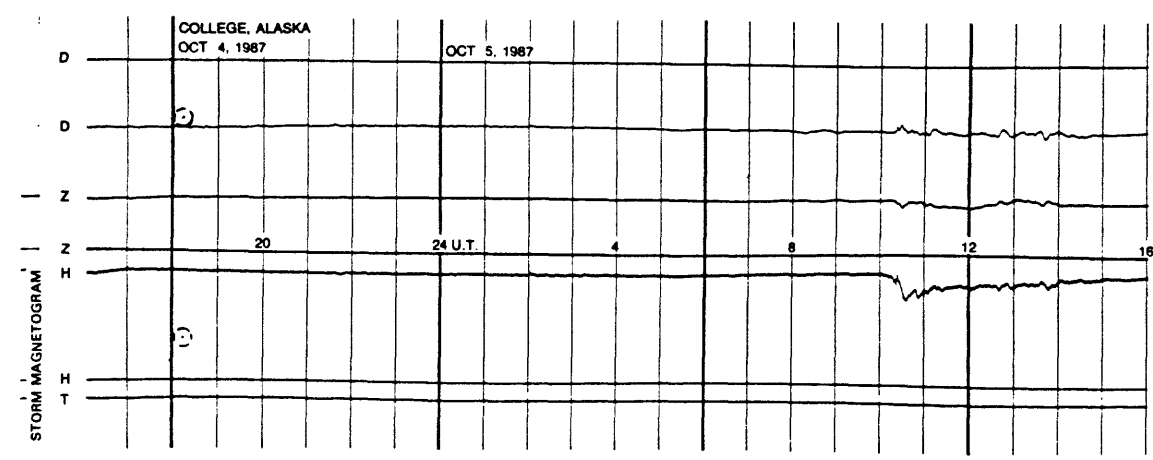
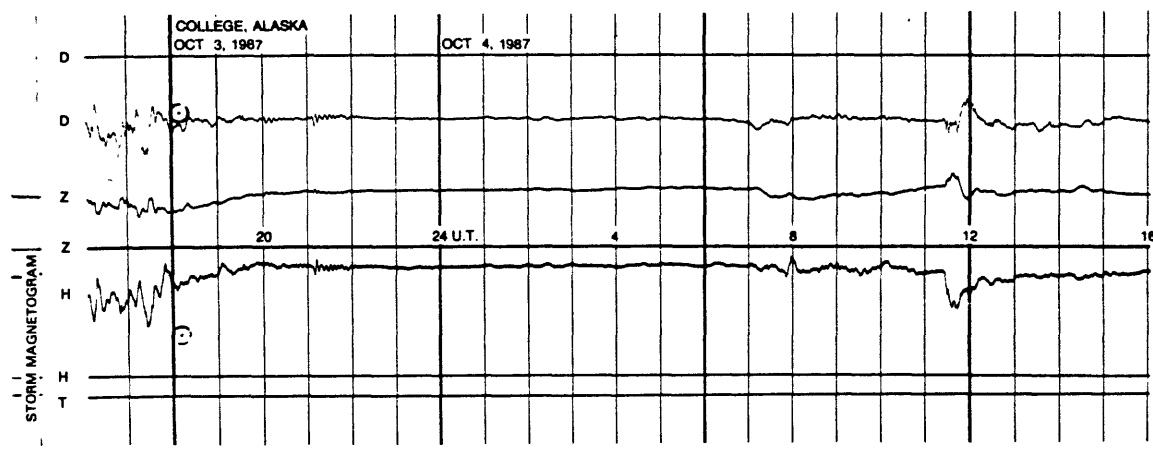
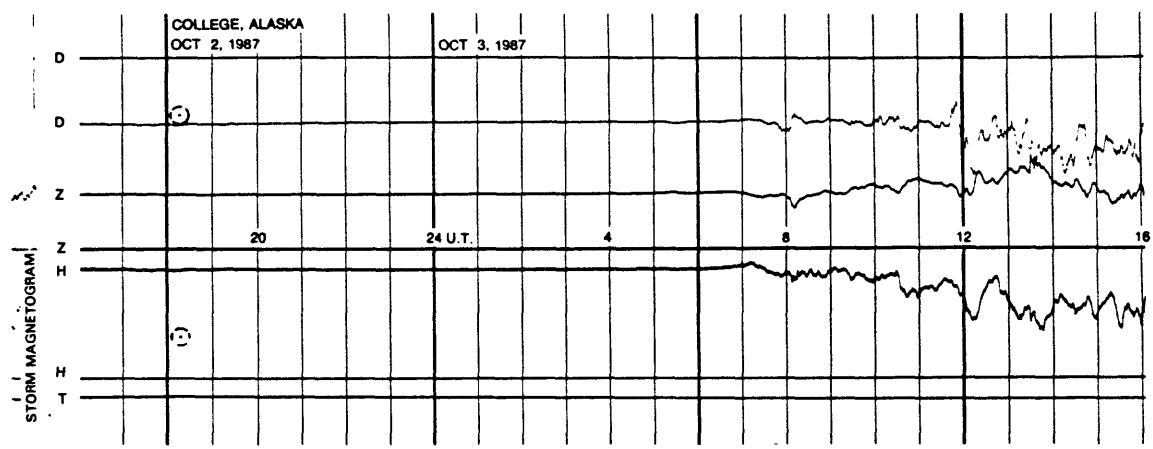
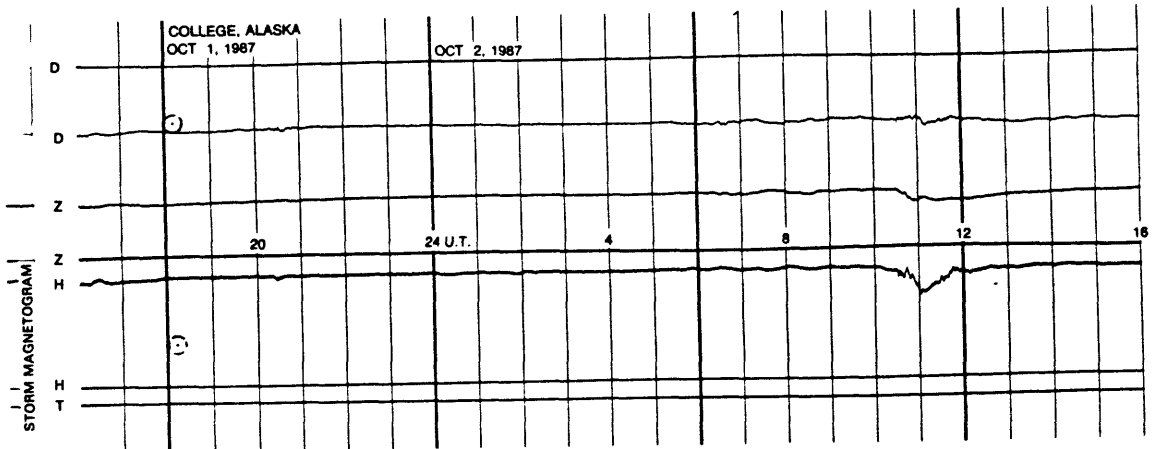


NORMAL MAGNETOGRAMS

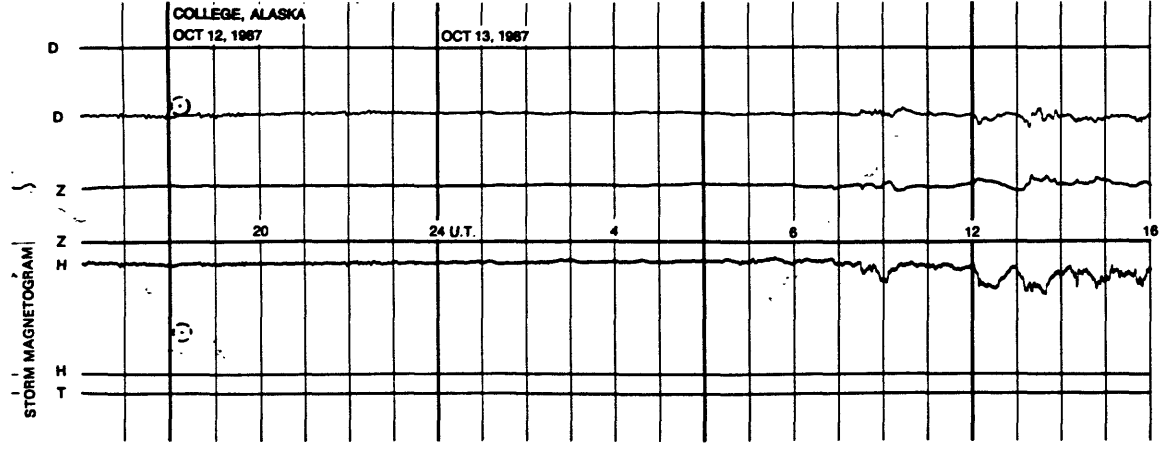
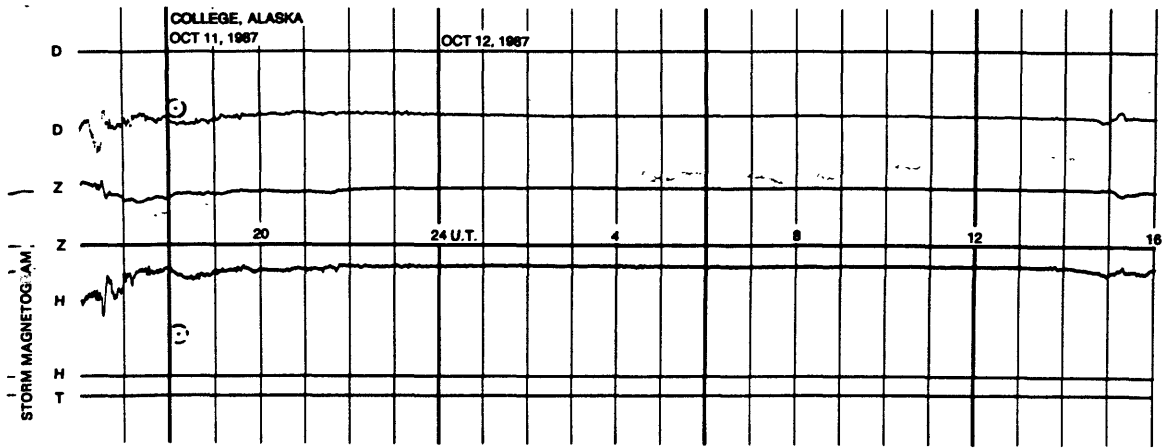
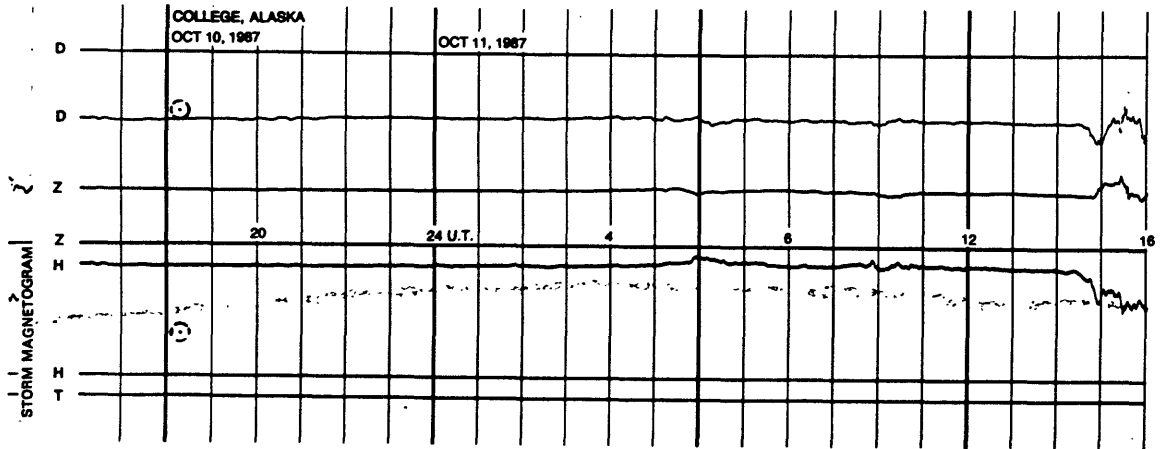
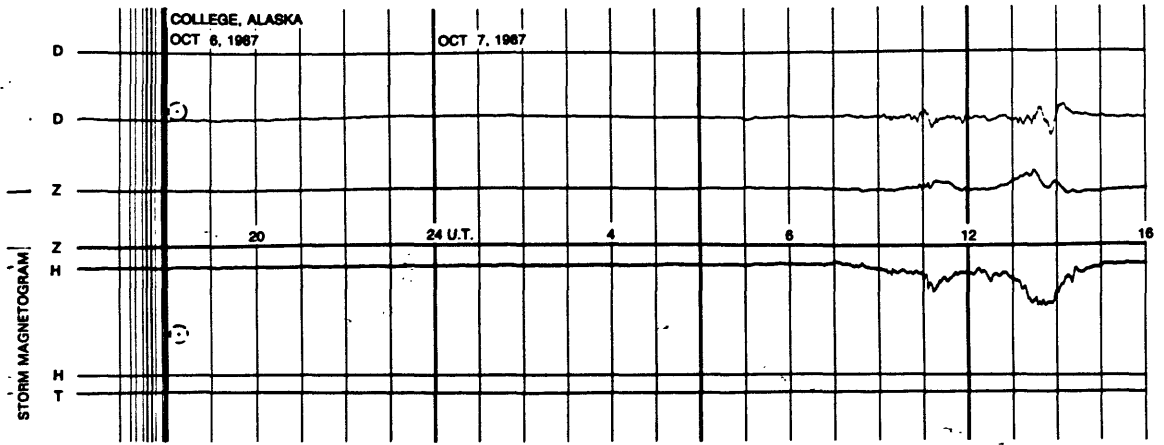




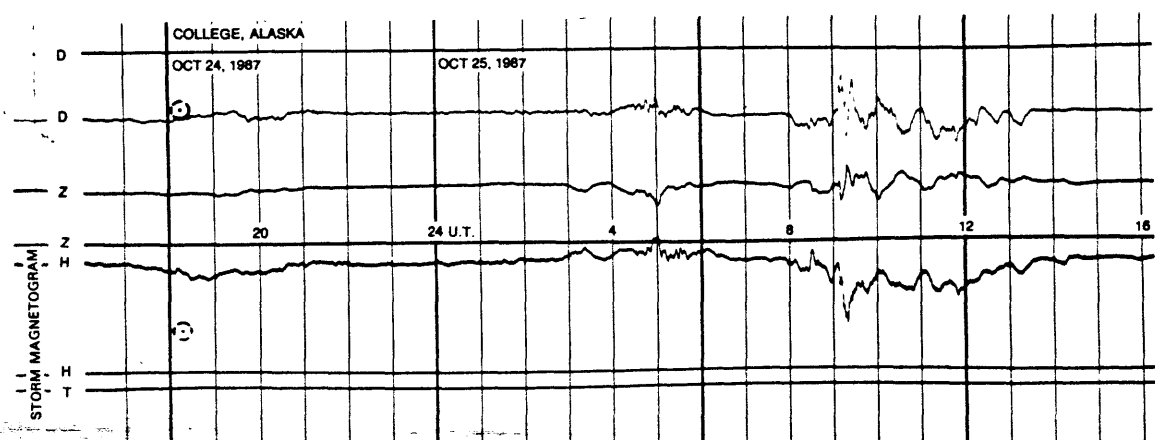
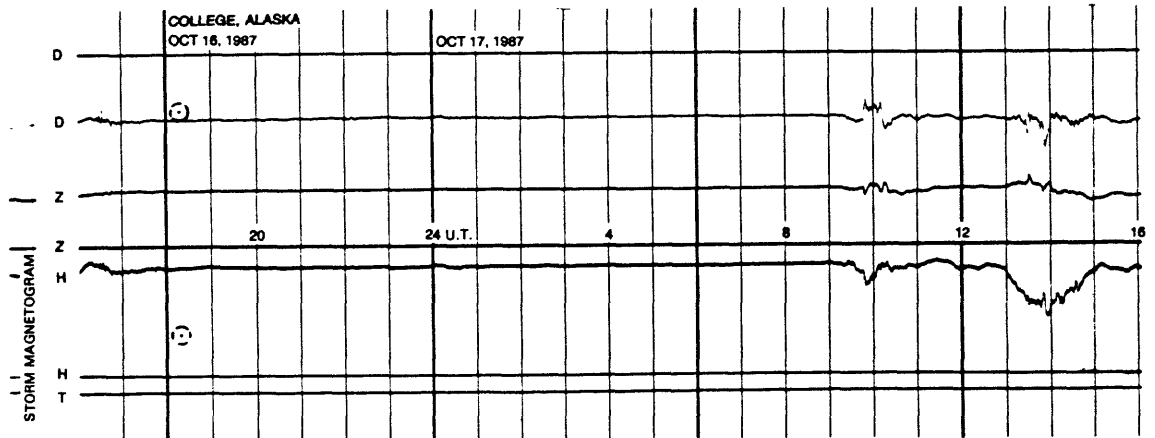
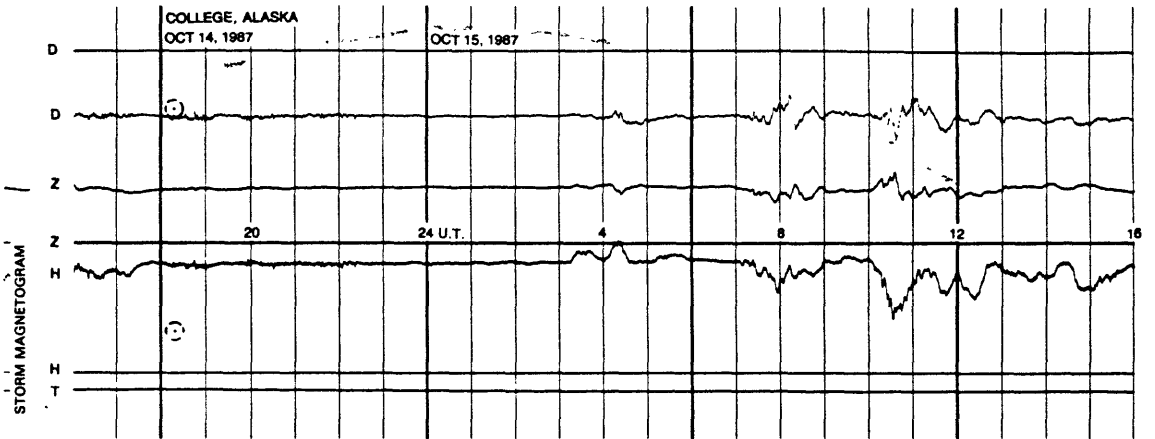
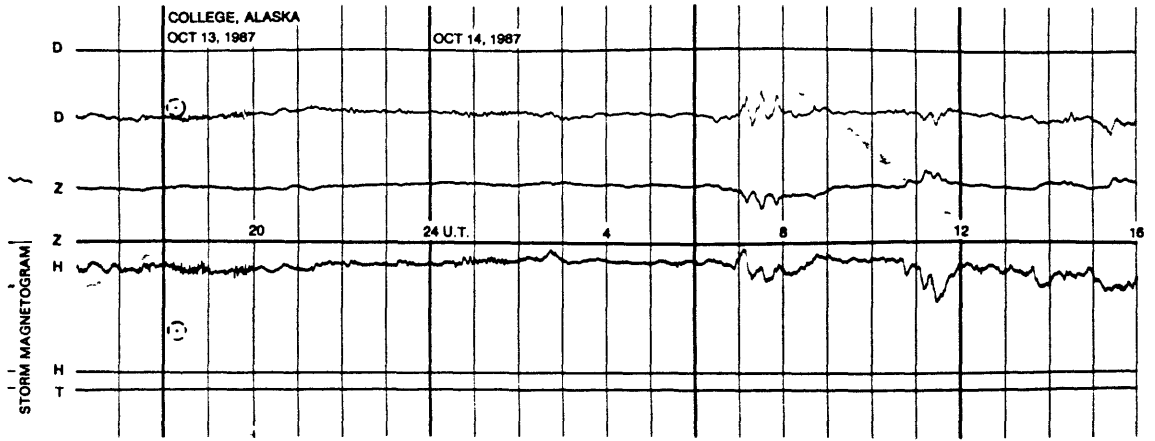
STORM MAGNETOGRAMS



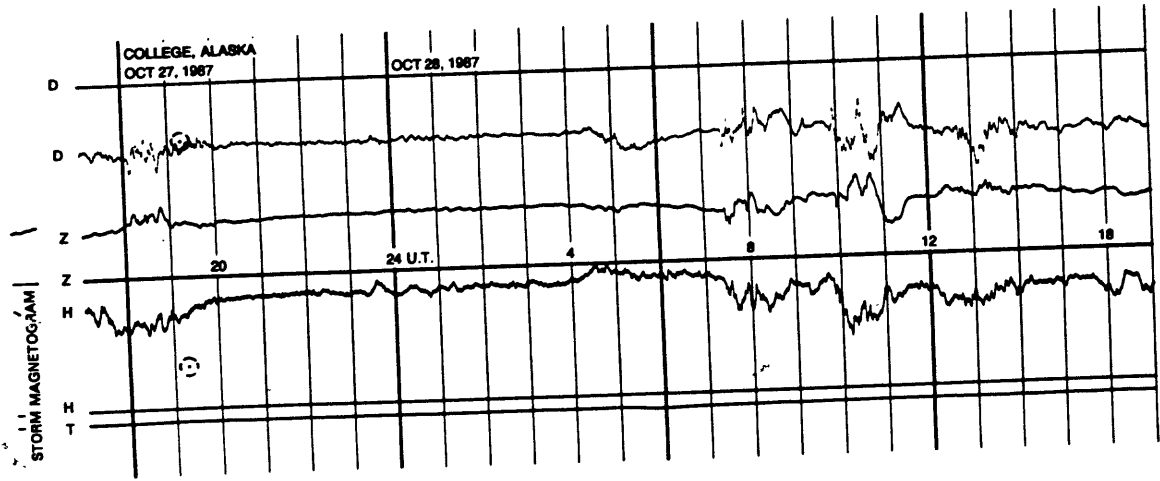
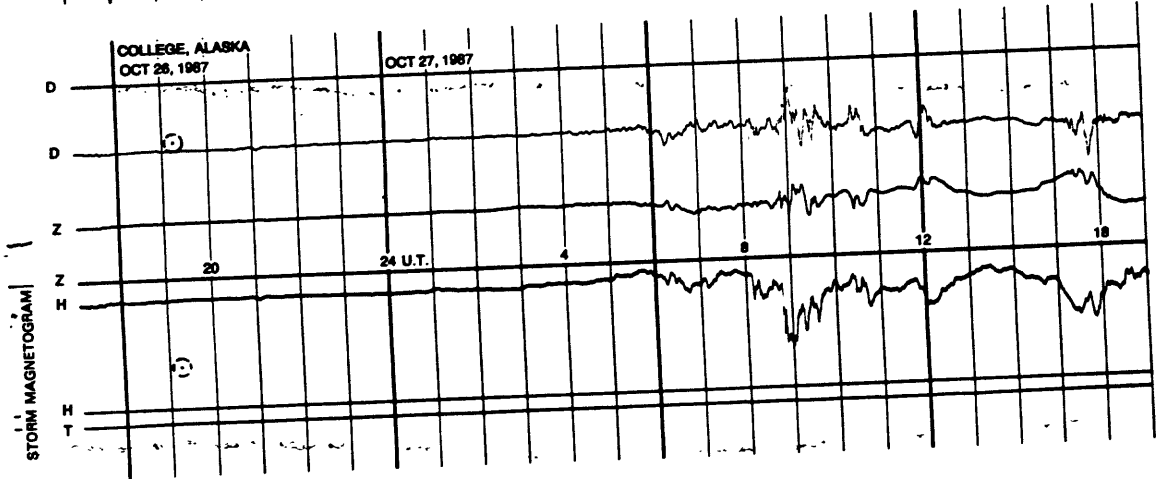
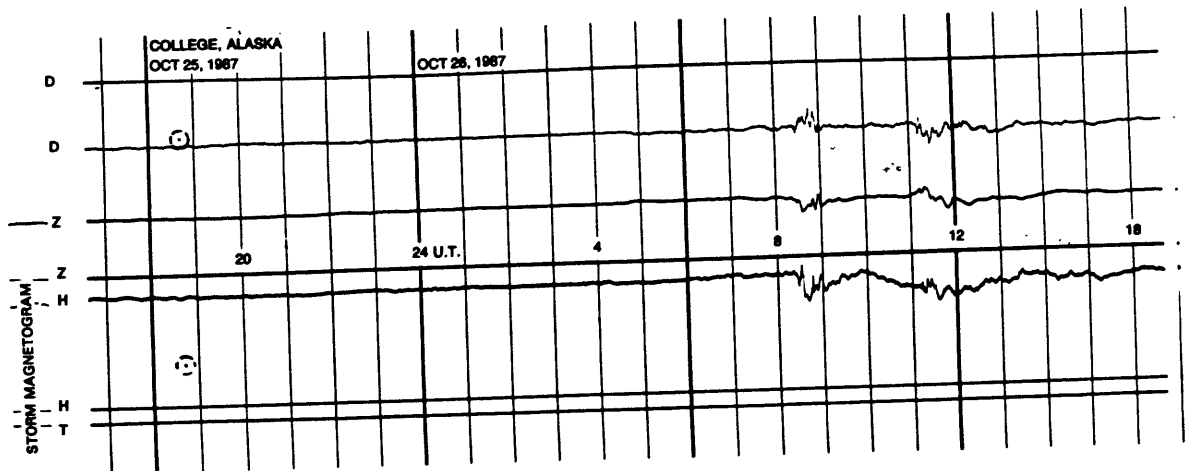
# STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS



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