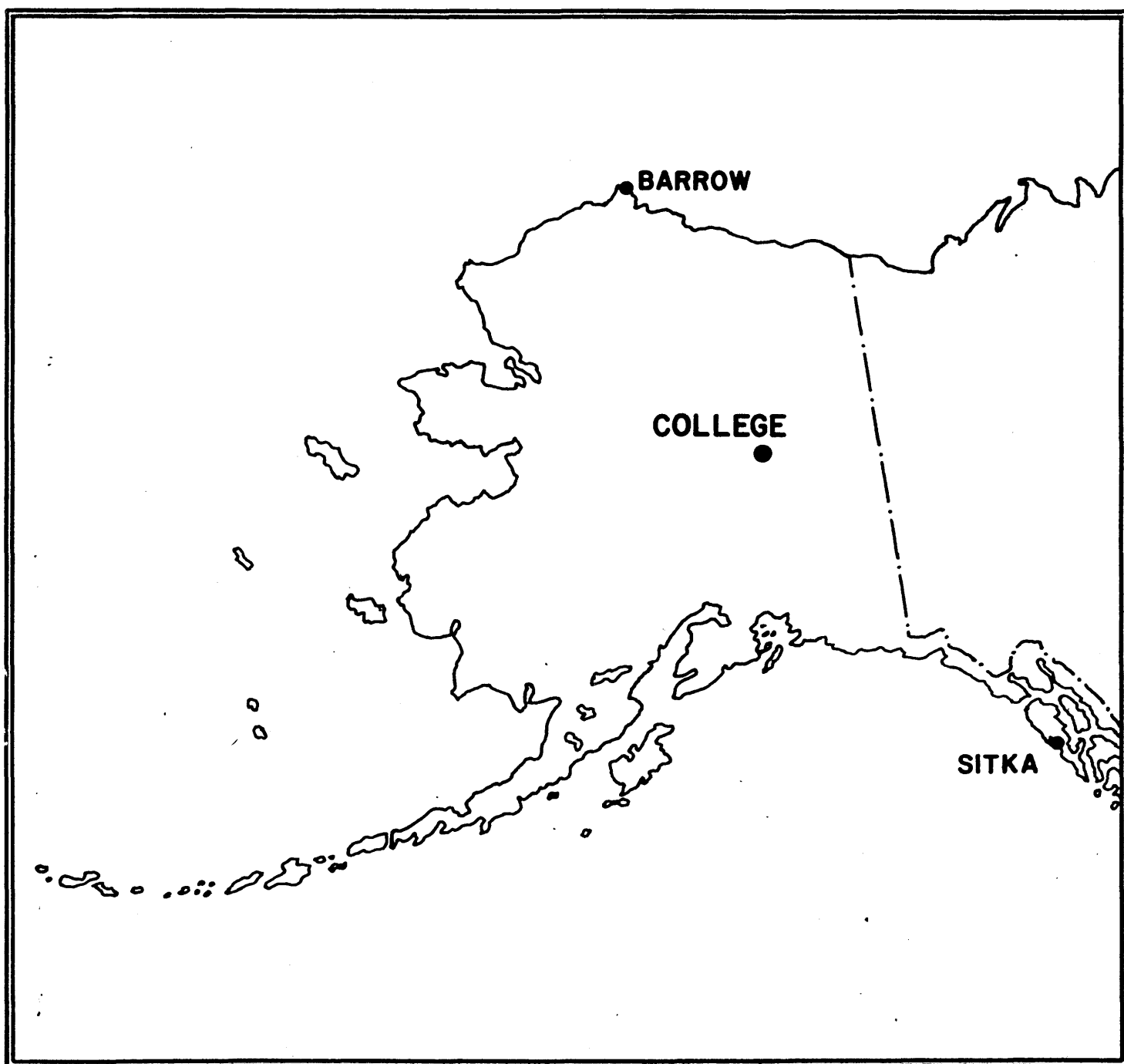


**UNITED STATES DEPARTMENT OF THE INTERIOR**  
**GEOLOGICAL SURVEY**

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

FEBRUARY 1987

**OPEN FILE REPORT** 87-0300B



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..... $64^{\circ} 51.6'N$   
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:

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

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

February 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		20 mm/hr		
1	1	2	0	1	3	2	1	1	11	05	SUDDEN COMMENCEMENTS d h m		
2	0	0	0	2	1	1	0	0	04	02			
3	0	0	2	2	0	0	0	0	04	02			
4	0	0	0	1	2	2	1	0	06	03			
5	0	0	0	2	0	0	0	1	03	01			
6	1	0	0	1	3	1	1	1	08	04			
7	1	1	1	3	4	3	1	1	15	09			
8	1	2	3	2	5	6	3	2	24	23			
9	2	1	1	5	5	3	1	1	19	16			
10	2	2	2	3	2	3	1	1	16	08			
11	1	0	0	1	1	0	2	1	06	02	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
12	3	2	5	5	6	5	3	1	30	33			
13	2	1	1	1	1	0	0	0	06	02			
14	0	2	2	2	1	1	1	1	10	04			
15	0	0	1	2	5	2	1	1	12	09			
16	1	0	2	5	4	6	2	1	21	22			
17	0	1	1	3	3	4	3	1	16	10			
18	2	1	2	4	3	1	1	1	15	09			
19	1	1	0	0	0	2	1	2	07	03			
20	1	3	4	7	6	5	3	3	32	43			
21	3	2	5	4	3	5	2	2	26	22	BEGIN                      END d h m                      d h m		
22	2	4	4	6	4	1	2	3	26	24			
23	3	3	1	5	5	4	3	1	25	22			
24	1	1	3	4	5	3	3	3	23	18			
25	2	1	2	5	2	1	1	1	15	10			
26	1	0	0	5	2	1	1	0	10	08			
27	0	1	3	4	3	4	3	2	20	14			
28	1	1	4	6	4	1	2	2	21	20			
29													
30													
31													

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

7.81

2520

Z

(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**

WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS  
ENVIRONMENTAL DATA SERVICE, NOAA  
BOULDER, COLORADO 80302 U.S.A.

February 1987

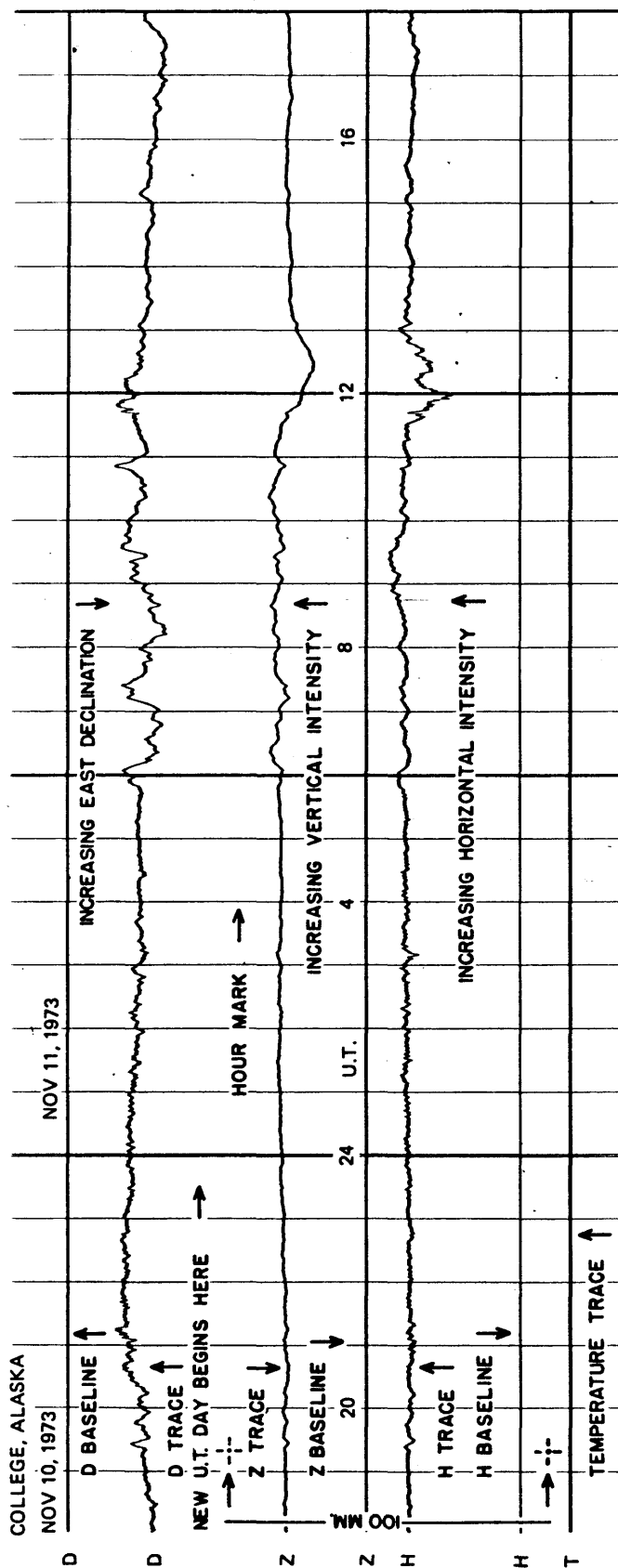
Obs. 2 letter IAGA code	Geomag. lat.	Commencement		SC - amplitudes			Max. 3 hr - index K			Ranges			UT End day hr
		day	hr min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	
C0	64°6 N	No	Principal	Magnetic	Storms	noted	during	this month.					

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		02	05	11	13	19	02	05	11	13	19	02	05	11	13	19	DAY		
A <sub>k</sub>		02	01	02	02	03	02	01	02	02	03	02	01	02	02	03	A <sub>k</sub>		
HOUR		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	HOUR		
01	233	227	233	223	208	308	316	308	318	300	193	183	188	192	197	197	01		
02	239	233	243	227	233	312	319	301	311	311	196	183	187	207	203	203	02		
03	243	236	242	228	237	317	323	309	303	316	191	184	184	203	194	194	03		
04	250	240	243	253	240	317	322	313	311	317	193	184	182	223	197	197	04		
05	253	243	243	237	244	321	323	313	323	322	187	182	184	203	192	192	05		
06	258	250	244	240	241	317	325	313	316	313	189	183	183	198	190	190	06		
07	252	252	243	237	236	322	323	313	314	314	187	183	184	192	189	189	07		
08	245	253	238	239	242	317	317	310	303	308	184	181	182	195	187	187	08		
09	245	248	237	243	238	310	318	309	302	306	186	180	187	189	189	189	09		
10	251	236	244	243	247	309	326	310	297	305	191	188	197	188	187	187	10		
11	248	243	237	258	250	305	333	307	297	303	189	203	194	187	181	181	11		
12	252	257	252	254	249	294	315	307	297	303	161	194	187	186	177	177	12		
13	270	251	251	254	263	302	313	293	293	307	168	177	160	162	177	177	13		
14	278	257	267	251	258	298	314	307	303	305	167	177	168	173	177	177	14		
15	271	260	291	246	263	301	316	306	307	307	173	177	173	183	176	176	15		
16	269	257	273	257	257	297	316	313	308	288	164	177	173	184	161	161	16		
17	267	253	278	261	259	284	316	311	306	318	151	174	172	186	158	158	17		
18	293	257	297	267	257	307	318	306	311	311	153	177	170	181	173	173	18		
19	267	263	269	273	263	310	320	285	303	311	163	181	157	179	173	173	19		
20	243	267	216	257	267	302	319	249	301	311	166	177	126	169	172	172	20		
21	231	259	163	233	253	308	313	293	300	309	170	176	121	169	169	169	21		
22	225	240	193	223	238	312	313	304	304	313	177	176	149	172	170	170	22		
23	227	236	199	220	225	317	313	320	309	315	183	176	163	177	173	173	23		
24	230	227	217	223	219	319	309	313	320	324	186	175	173	182	172	172	24		
DAILY SUM	6040	5945	5824	5857	5887	7406	7640	7313	7357	7439	4268	4348	4144	4480	4334	4334	DAILY SUM		
DAILY MEAN	252	248	243	244	245	309	318	305	307	310	178	181	173	187	181	181	DAILY MEAN		
MEAN			246					310					180				MEAN		
																		Scaled LYT	
																		Checked RVO	

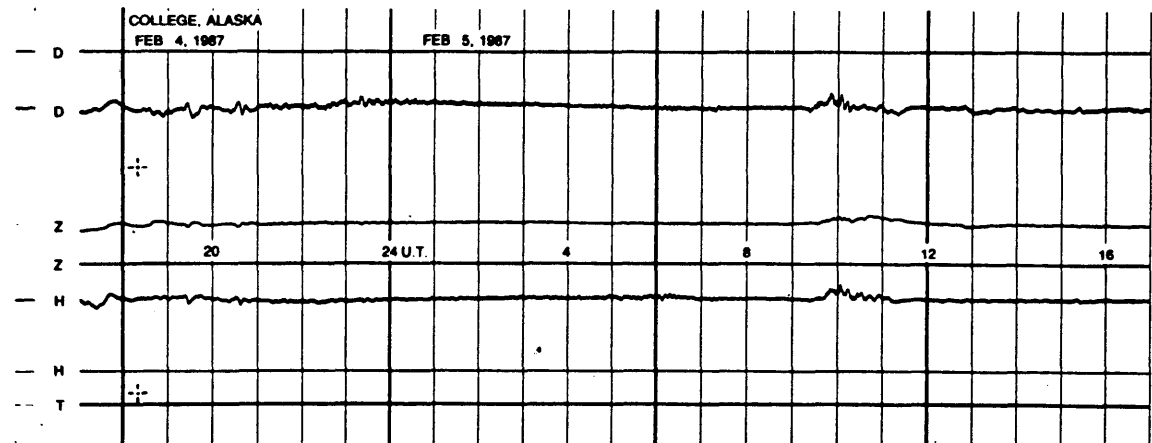
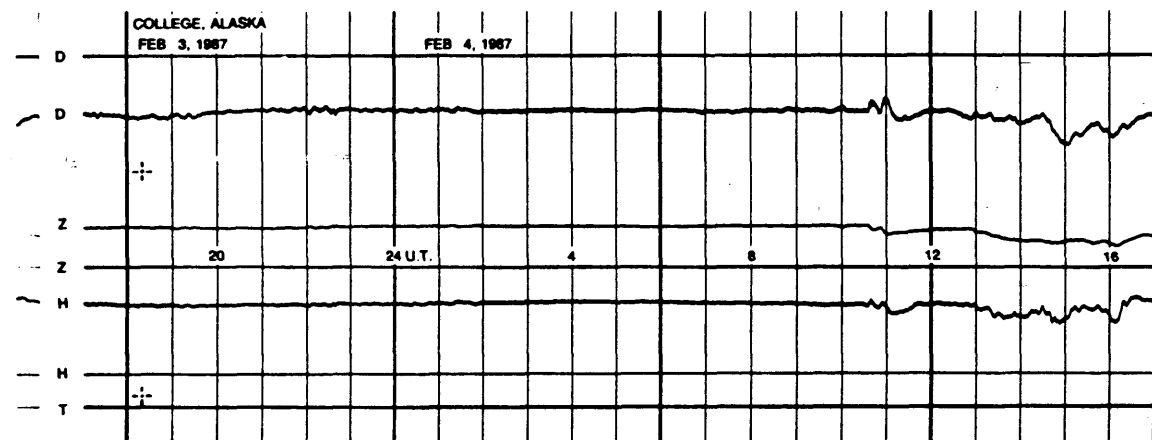
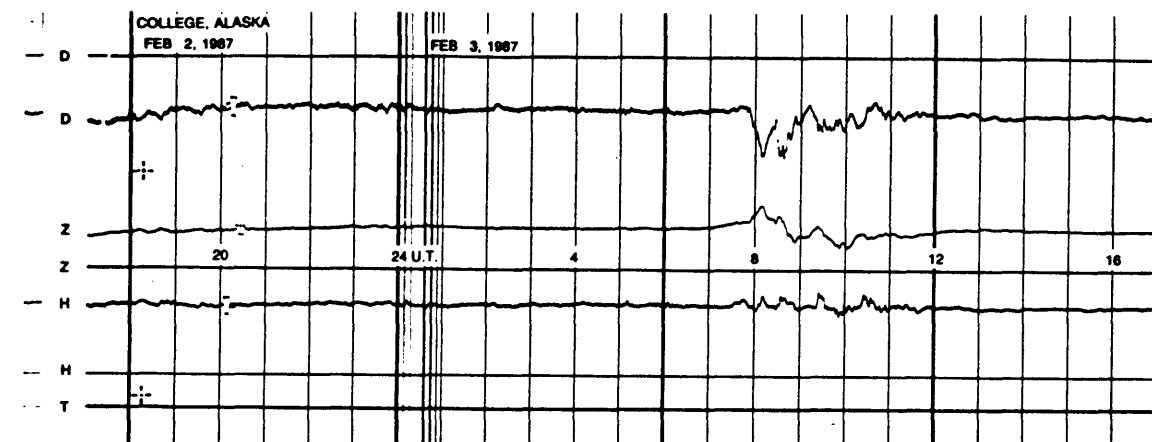
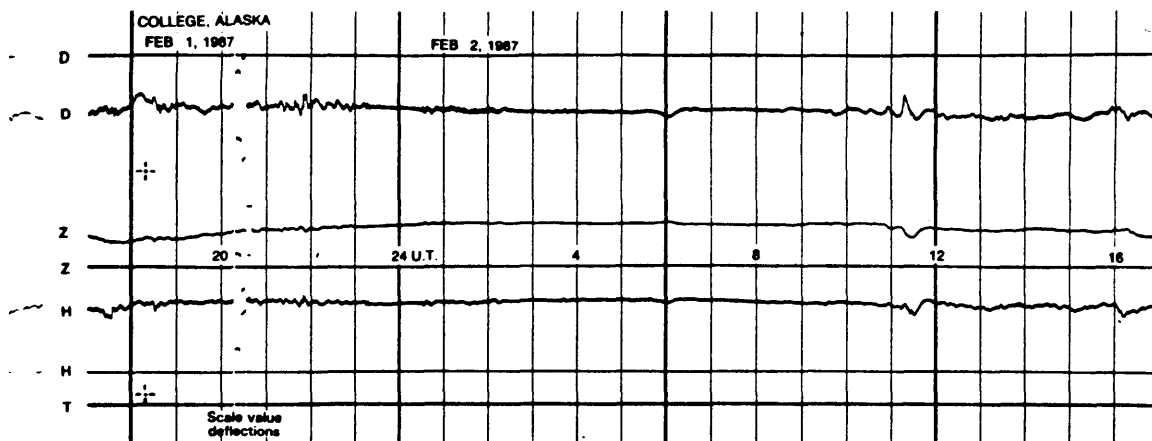
# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

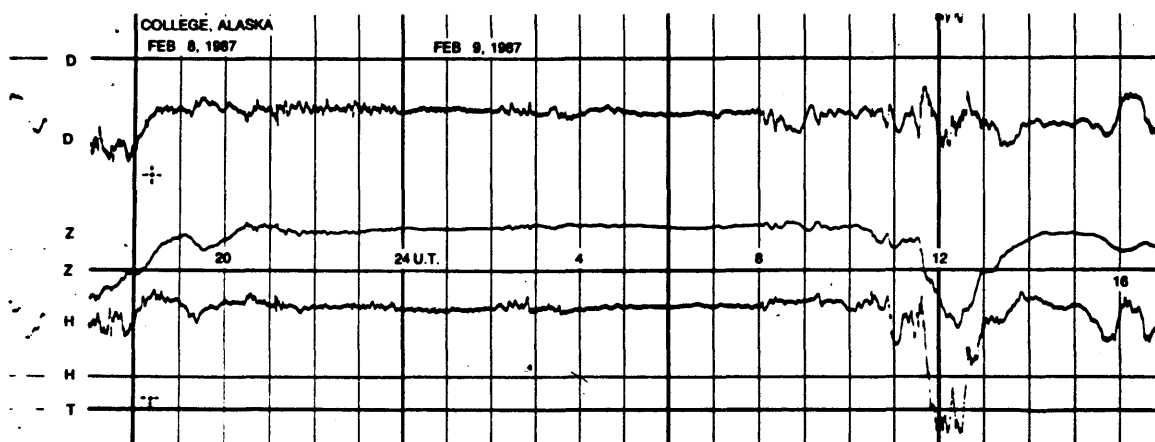
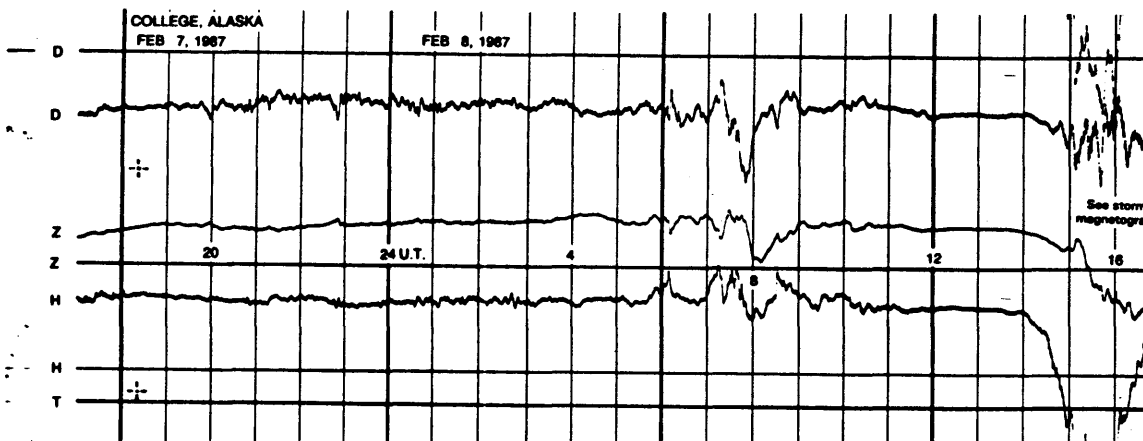
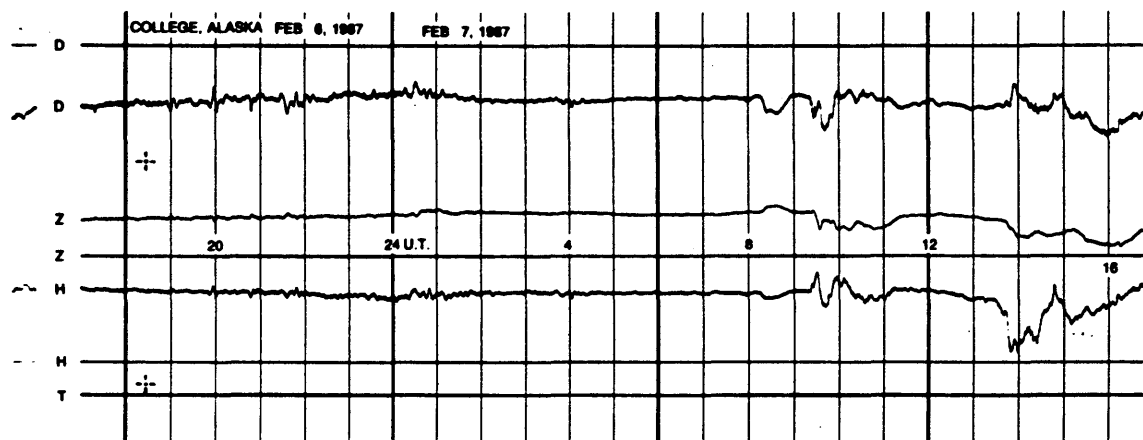
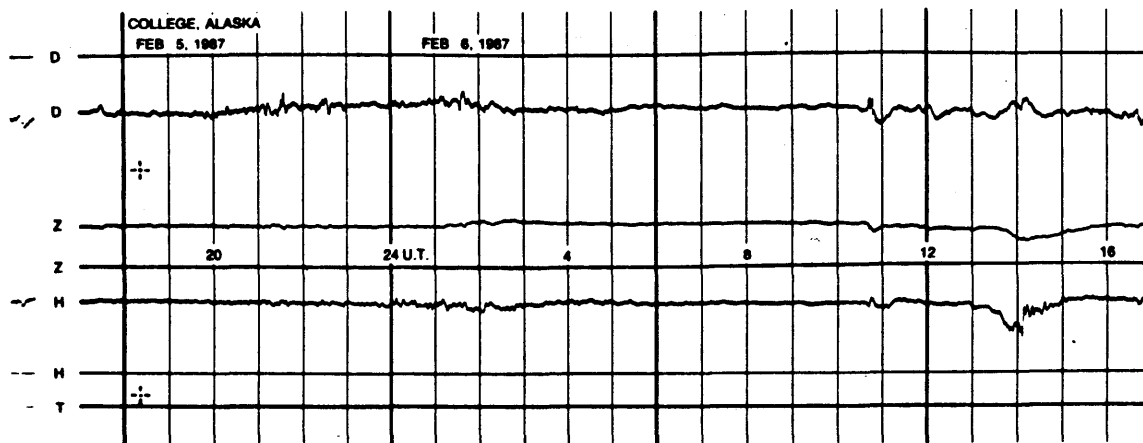
# NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0

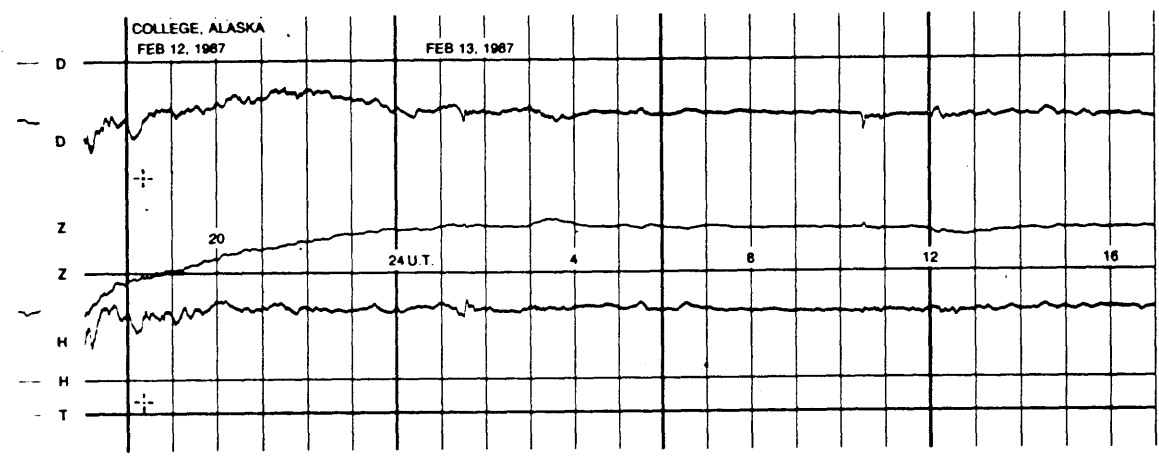
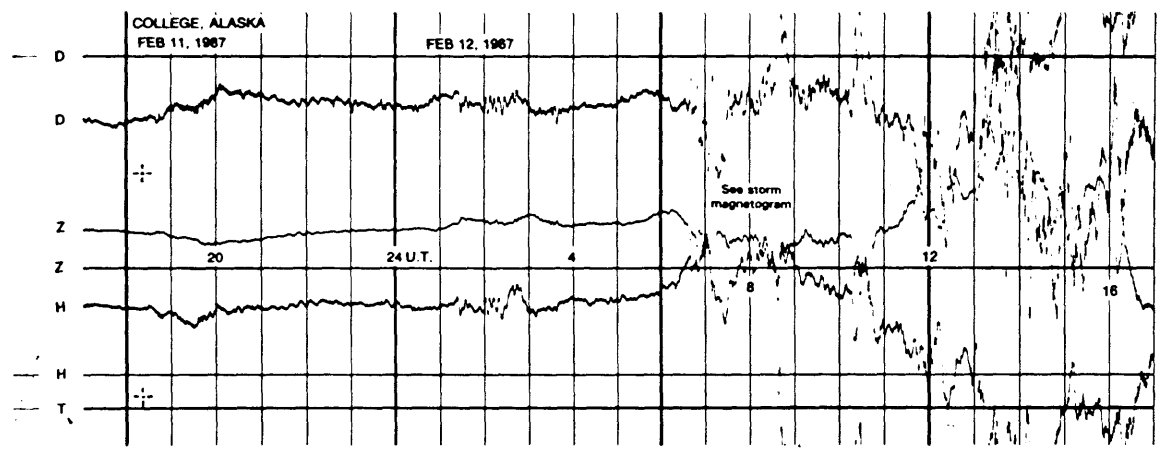
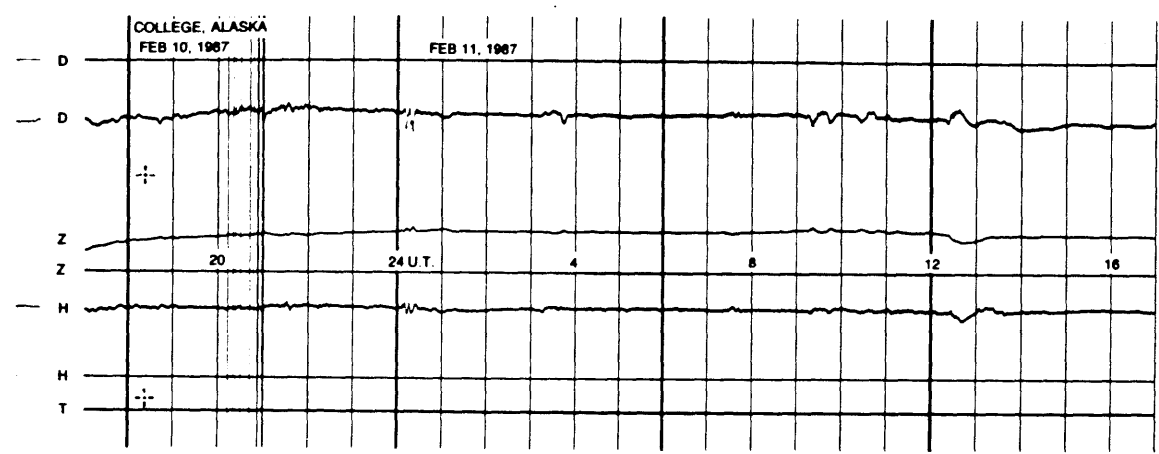
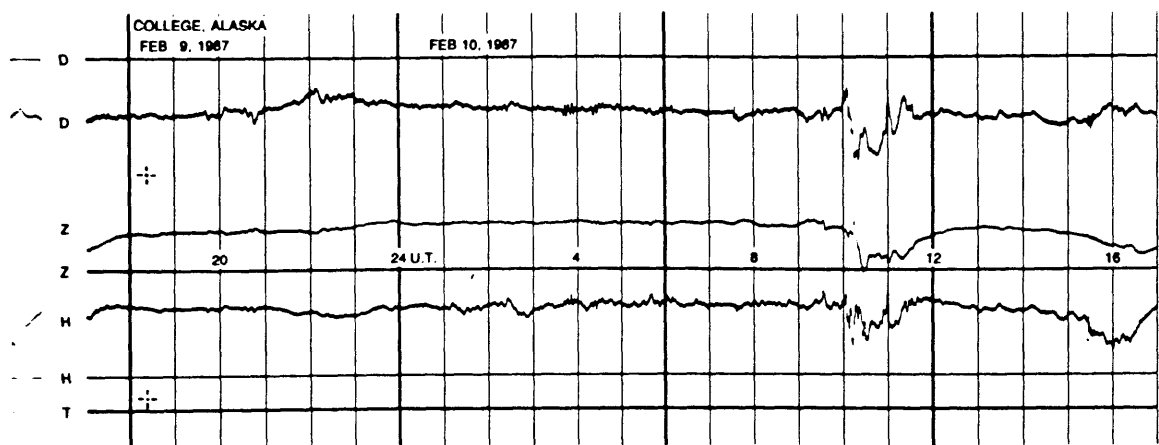




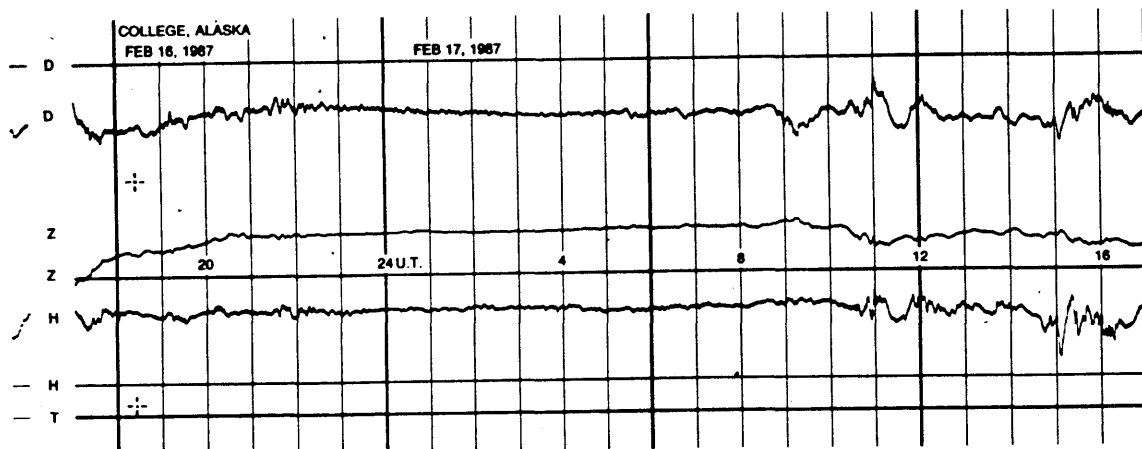
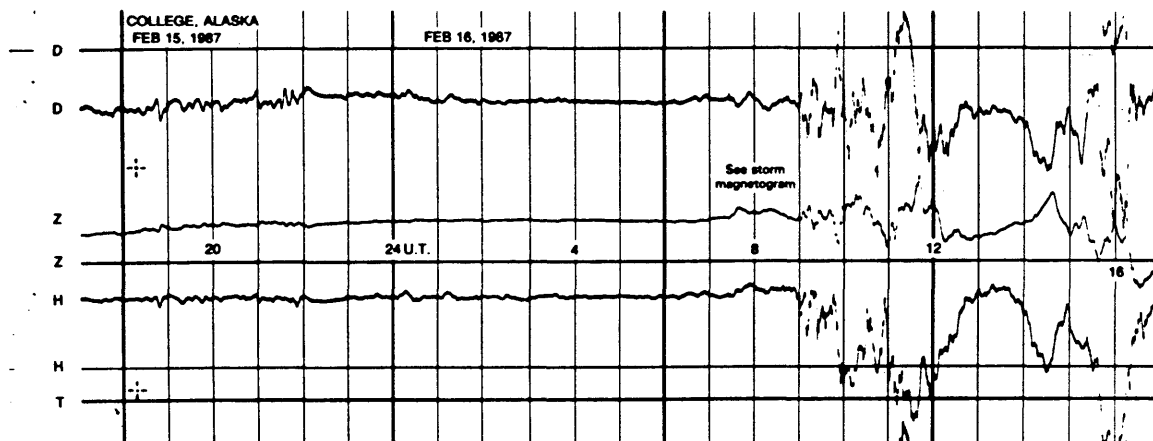
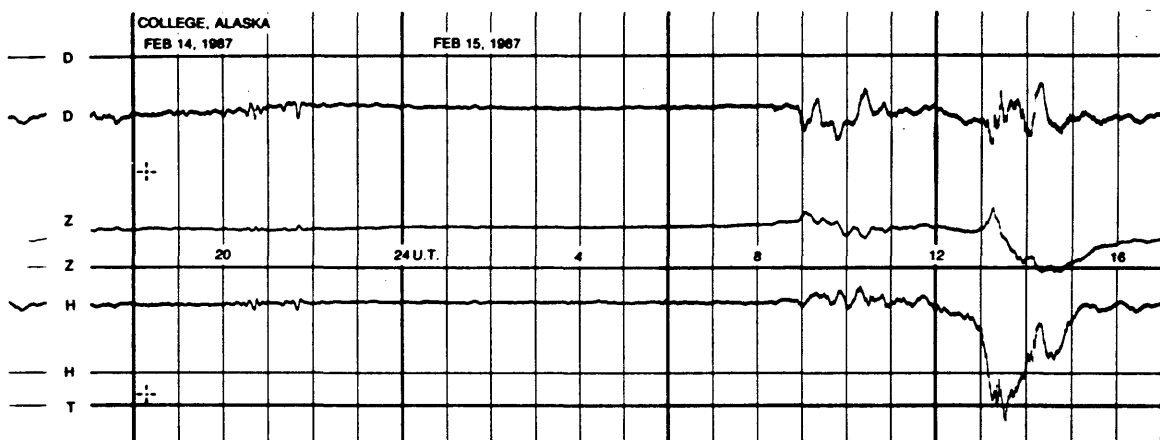
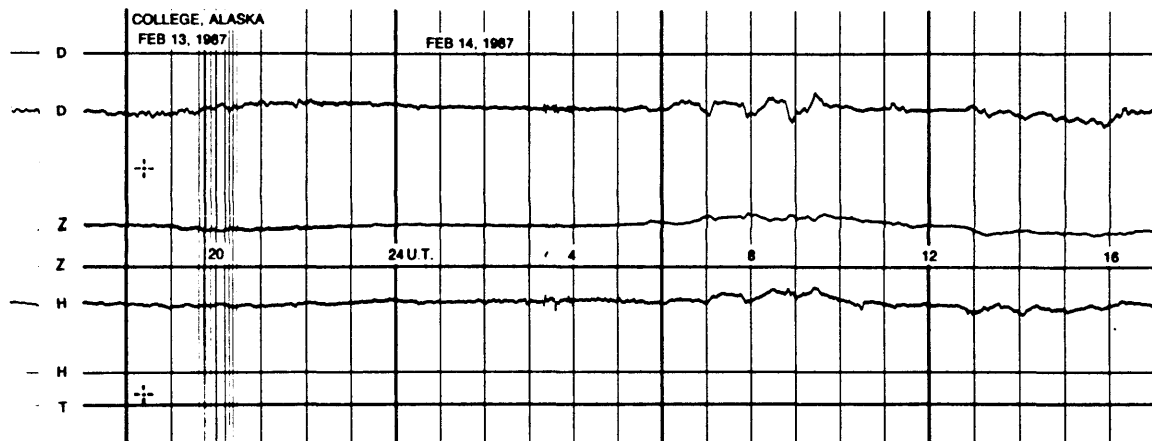
# NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

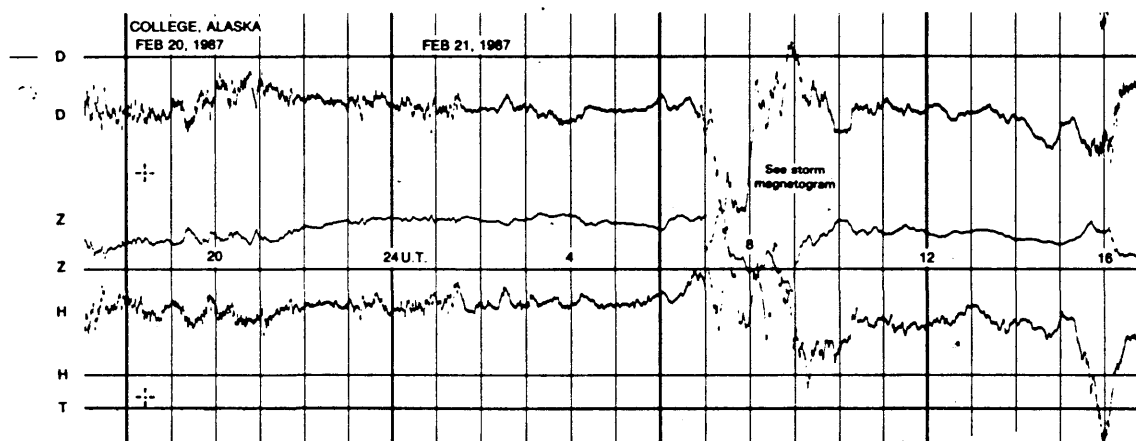
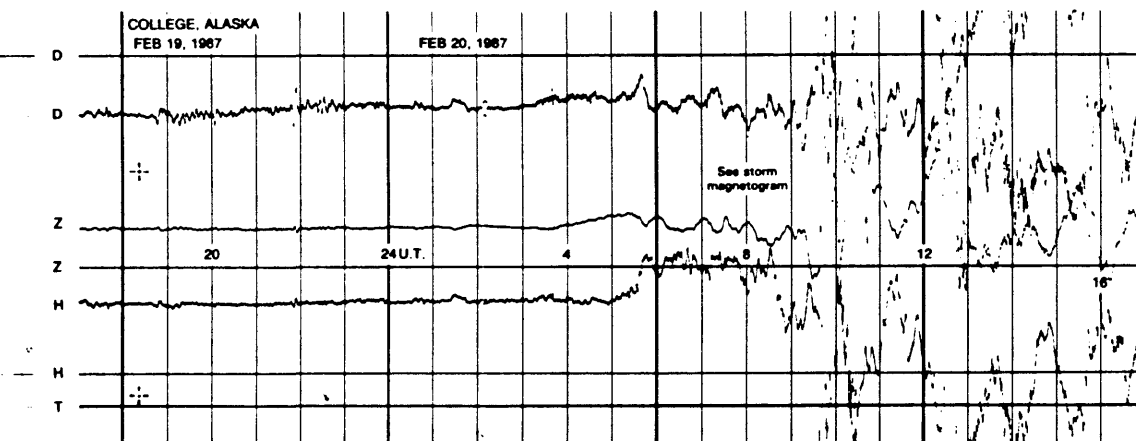
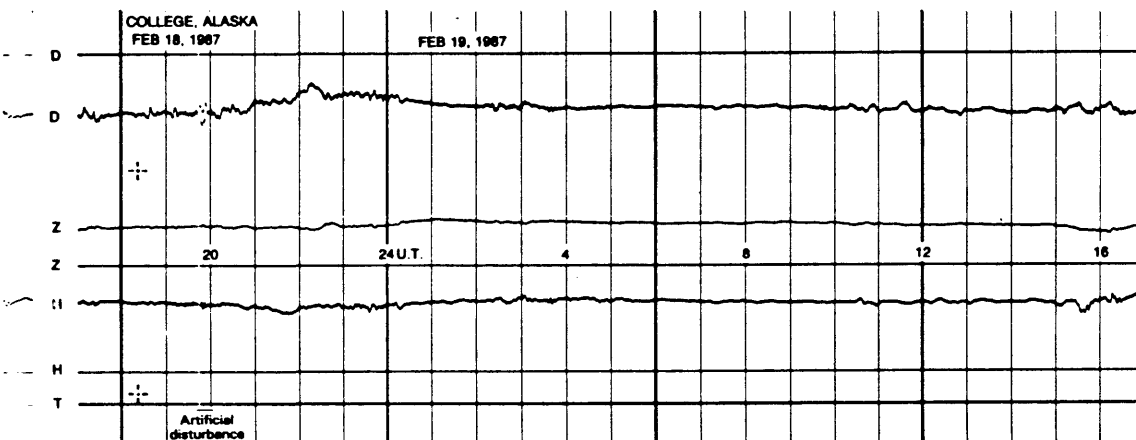
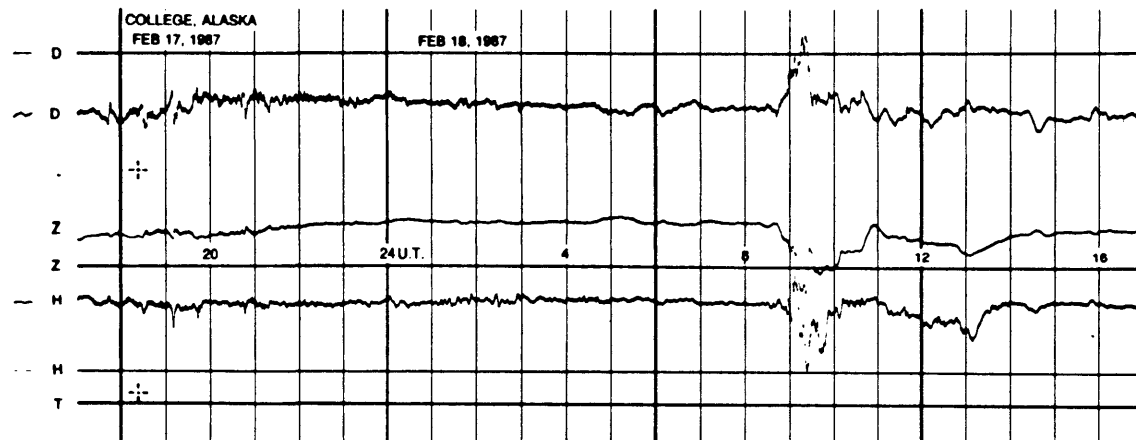


# NORMAL MAGNETOGRAMS



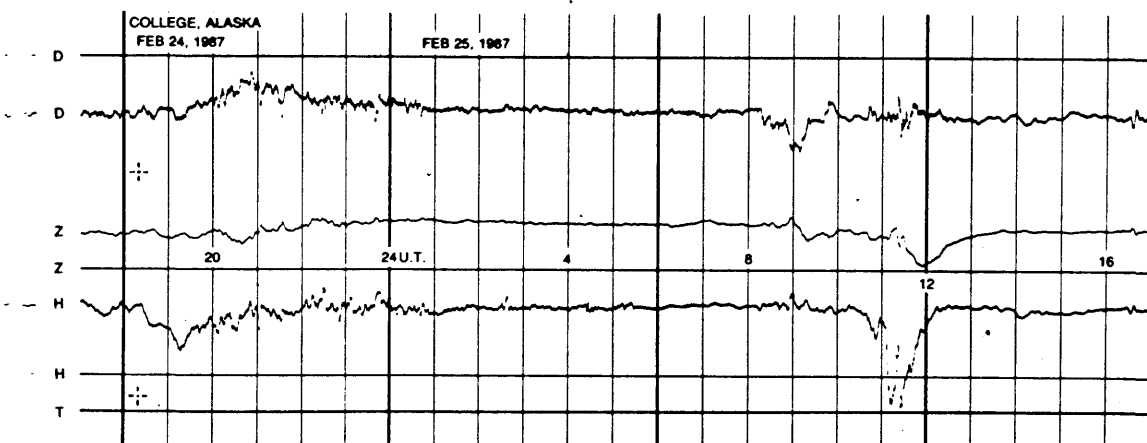
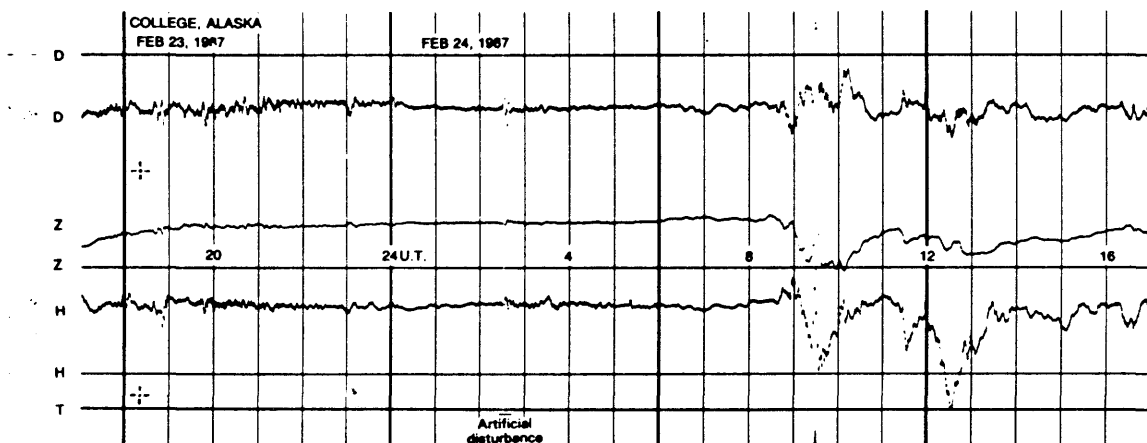
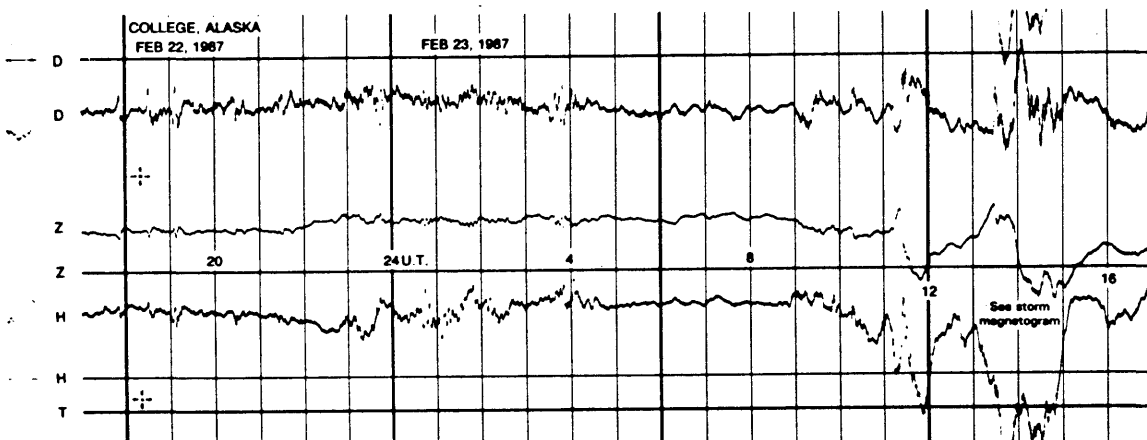
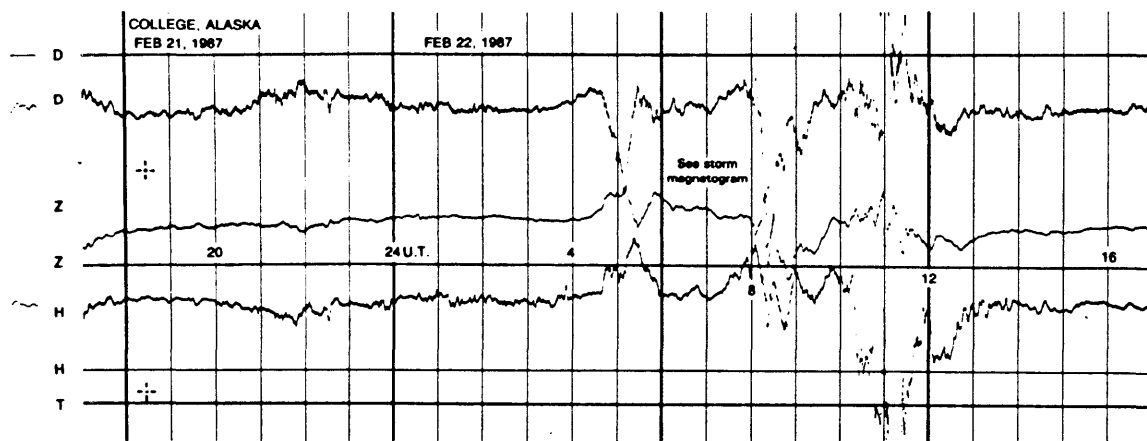
# NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0



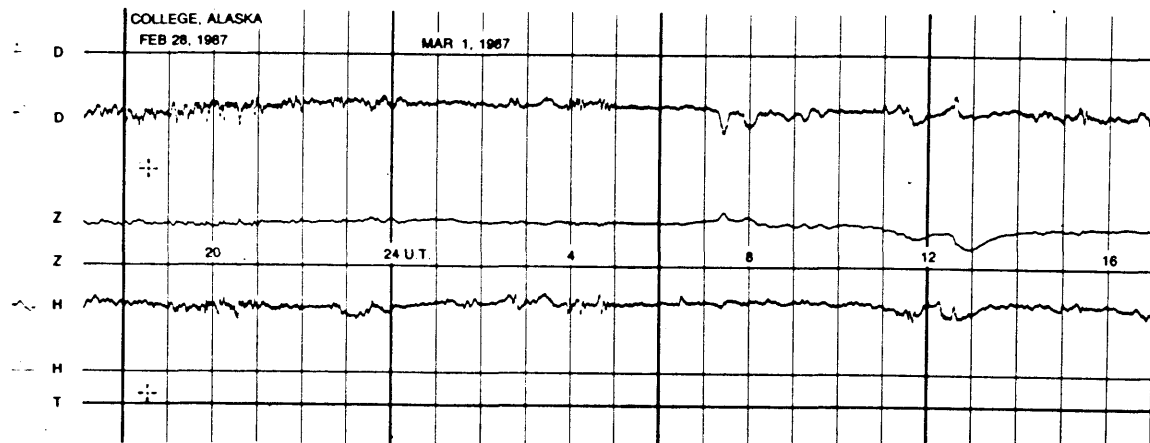
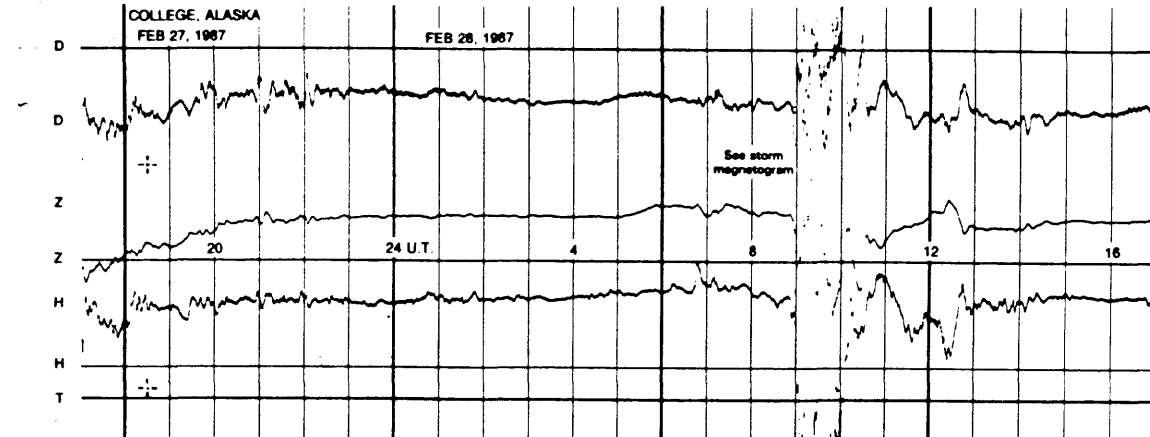
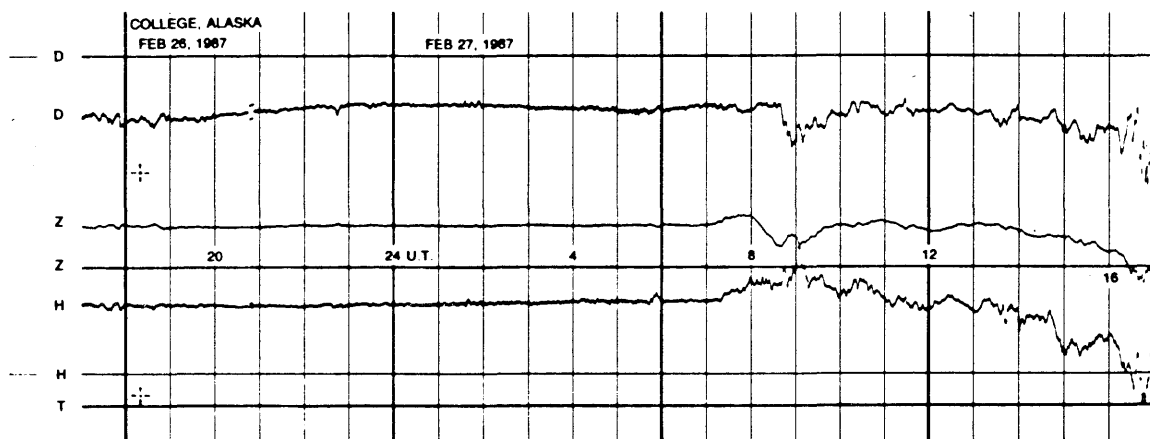
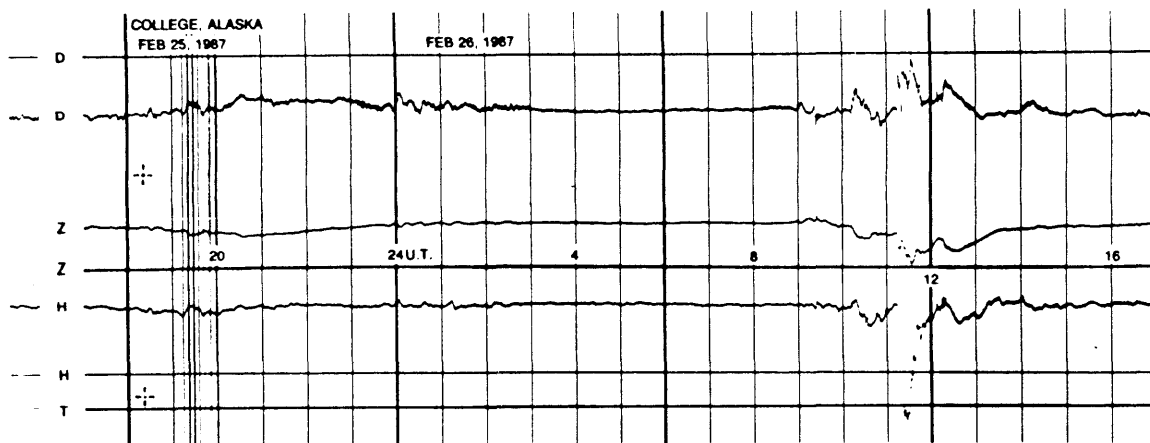
# NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0



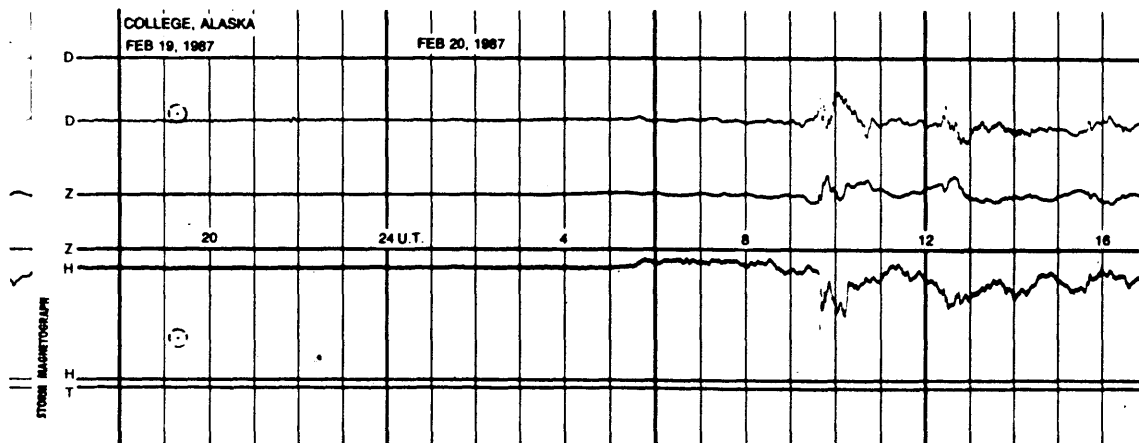
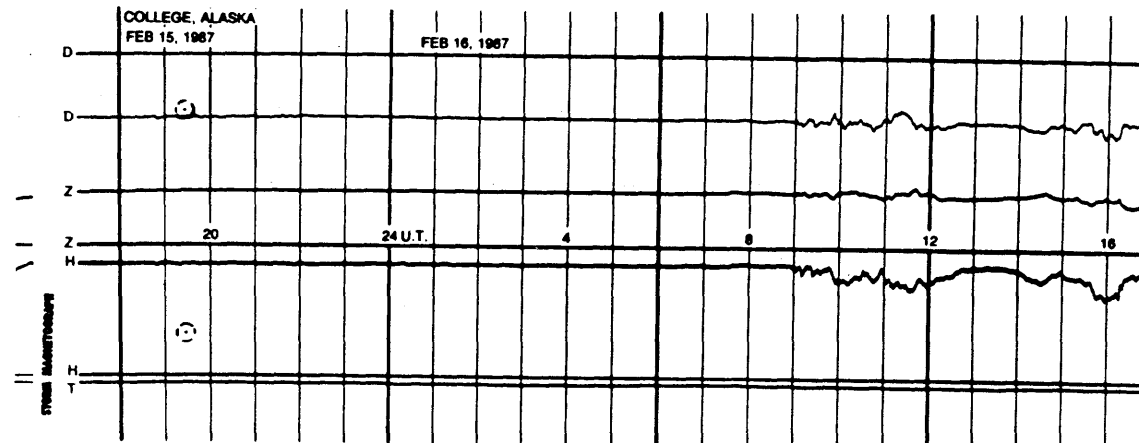
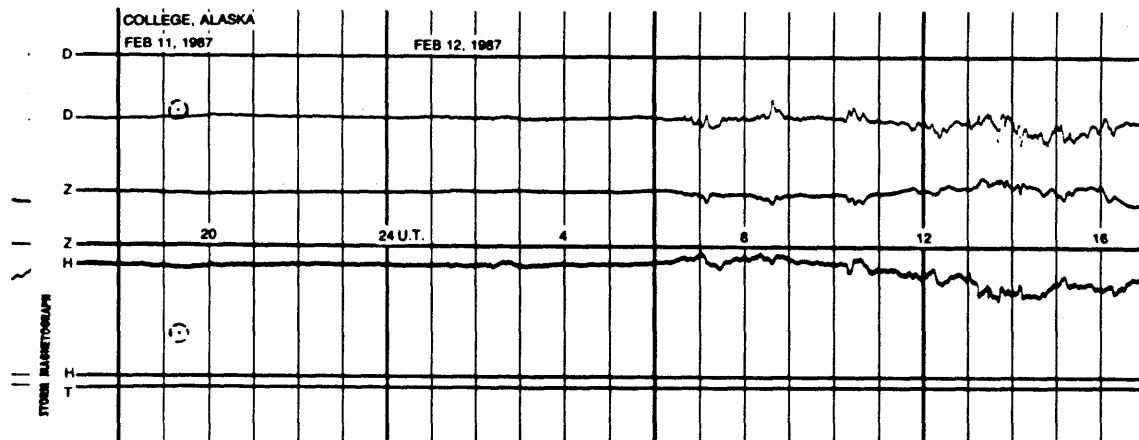
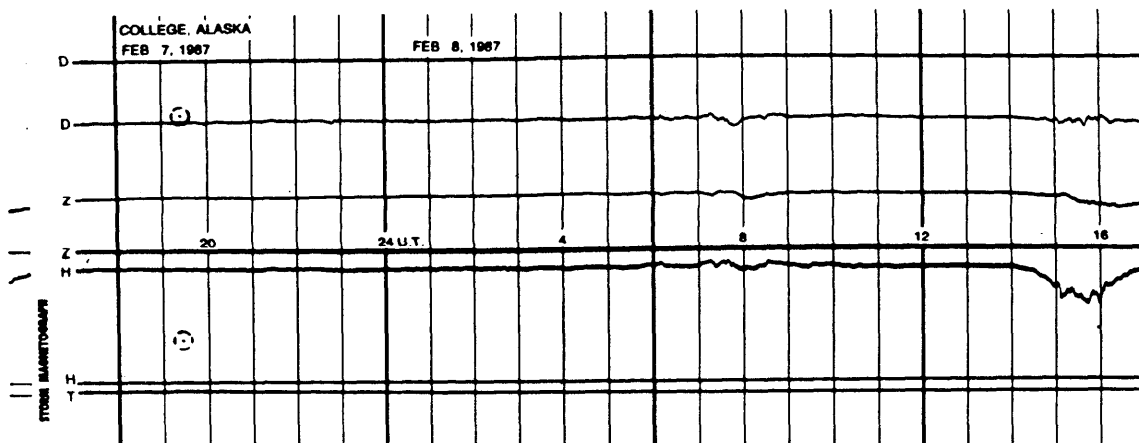
# NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0



# STORM MAGNETOGRAMS

200mm  
100mm  
0



# STORM MAGNETOGRAMS

