

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

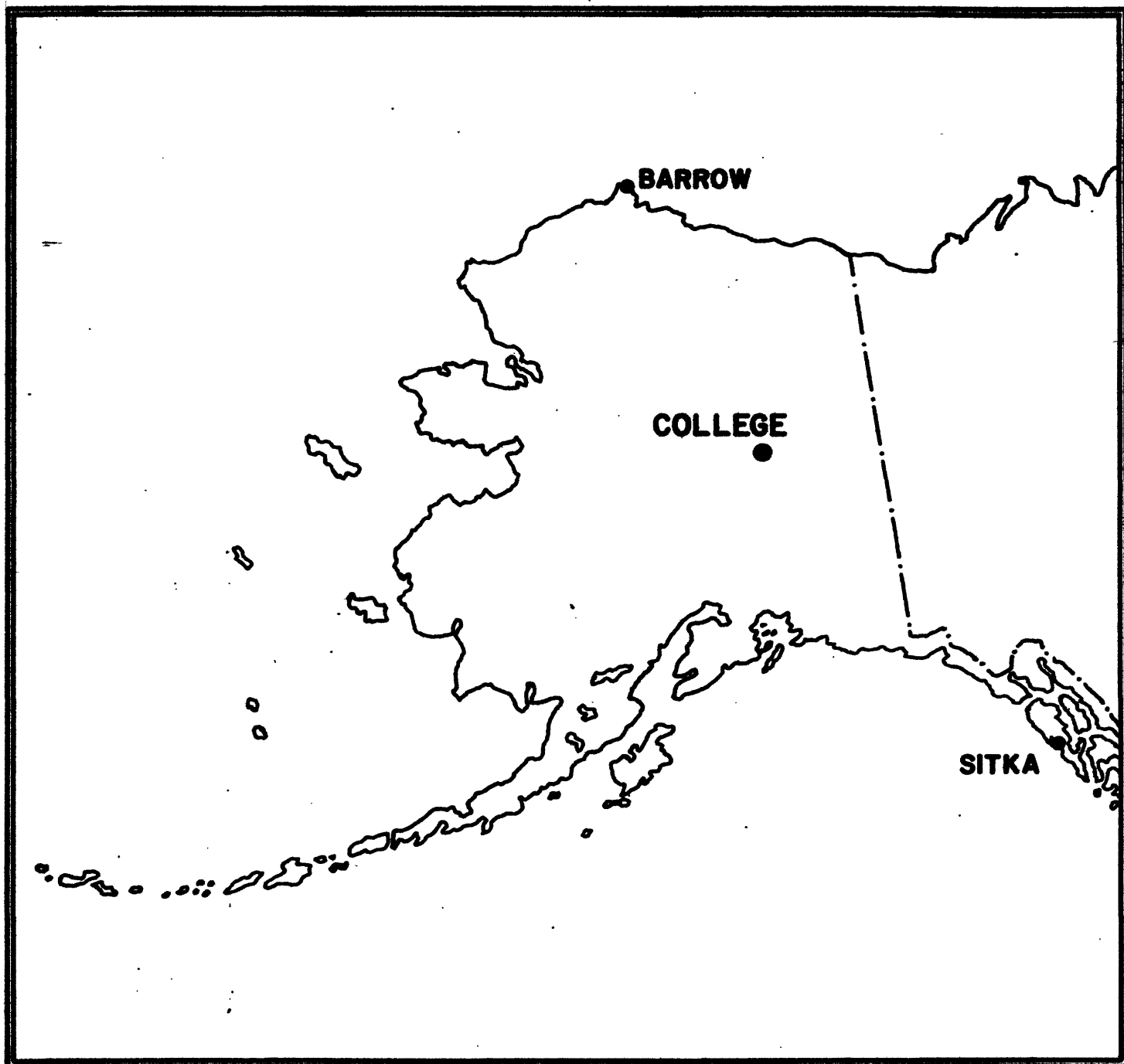
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

MARCH 1987

OPEN FILE REPORT 87-0300C



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 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

March 1987

DATE	K-INDICES									AK	TIME SCALE ON MAGNETOGRAMS 20 mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM		
1	1	2	1	2	2	3	2	2	15	07	SUDDEN COMMENCEMENTS d h m
2	0	0	1	1	0	1	1	0	04	02	
3	0	0	2	4	1	2	1	1	11	06	
4	2	1	2	4	4	3	1	1	18	12	
5	1	3	0	6	6	5	3	3	27	32	
6	2	1	2	4	2	0	1	2	14	08	
7	3	2	6	5	6	1	2	1	26	30	
8	2	2	3	5	4	5	1	2	24	20	
9	1	3	2	1	0	0	1	1	09	04	
10	0	2	6	4	6	5	1	0	24	31	
11	2	1	1	3	4	3	3	1	18	11	
12	1	2	2	5	2	1	2	2	17	11	
13	2	1	3	4	3	2	1	1	17	10	
14	2	3	1	4	3	1	1	1	16	10	
15	2	3	2	3	3	1	2	1	17	09	
16	2	1	3	6	6	1	2	1	22	25	
17	2	4	3	1	3	1	1	0	15	09	
18	1	0	2	0	1	3	3	2	12	06	
19	2	2	1	5	4	1	1	1	17	13	
20	1	0	0	1	1	1	0	0	04	02	
21	0	0	2	5	5	7	3	2	24	33	
22	3	1	3	5	2	2	3	2	21	15	
23	2	1	1	3	3	1	1	0	12	06	
24	0	0	2	0	0	1	1	1	05	02	
25	0	0	0	0	0	3	1	1	05	03	
26	2	2	3	5	4	4	1	1	22	17	
27	1	4	4	7	5	6	4	2	33	45	
28	3	3	4	5	3	2	1	0	21	16	
29	0	1	2	4	0	0	1	0	08	05	
30	0	0	1	1	3	2	1	0	08	04	
31	1	1	1	4	4	0	1	0	12	08	

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 675.7

H 322.2

Z

(mm)

CURRENT SCALE VALUE.....

3.70

7.80

(γ/mm)

LOWER LIMIT FOR K = 9.....

2500

2510

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

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		09		20		24		25		02		09		20		24		25		DAY														
	A _k	HOUR	02	04	02	03	02	04	02	02	02	03	02	04	02	02	04	02	02	02	03	02	02	A _k	HOUR												
01	223	207	216	209	296	301	290	283	280	190	190	197	190	190	190	197	190	190	190	190	190	190	190	186	01												
02	223	193	208	203	303	324	292	284	280	190	190	203	193	190	190	203	193	190	190	190	190	190	190	189	02												
03	228	182	212	198	308	307	301	295	289	189	189	226	188	188	189	226	188	188	188	188	188	188	188	189	03												
04	229	196	213	205	314	350	303	302	295	189	189	236	188	188	189	236	188	188	188	188	188	188	188	187	04												
05	232	170	225	216	312	390	308	306	303	189	189	233	190	188	189	233	190	190	190	190	190	190	190	188	05												
06	233	310	226	221	313	381	311	303	303	188	188	255	189	189	188	255	189	193	193	193	193	193	193	189	06												
07	242	217	225	223	312	339	304	307	303	193	193	253	193	193	193	253	193	193	193	193	193	193	193	188	07												
08	256	229	225	223	309	353	309	310	303	199	199	259	190	190	199	259	190	190	190	190	190	190	190	188	08												
09	276	256	223	219	303	328	311	312	304	198	198	236	193	193	198	236	193	193	193	193	193	193	193	188	09												
10	252	212	242	229	308	319	303	300	305	186	186	203	193	193	186	203	193	193	193	193	193	193	193	188	10												
11	253	229	254	233	313	307	303	302	303	183	183	193	183	183	183	193	183	183	183	183	183	183	183	188	11												
12	242	239	249	236	307	303	310	303	306	161	161	183	176	176	161	183	176	176	176	176	176	176	176	188	12												
13	243	247	240	241	311	297	296	303	303	178	178	183	173	173	178	183	173	173	173	173	173	173	173	188	13												
14	237	247	238	247	299	293	283	302	299	176	176	178	138	138	176	178	138	138	138	138	138	138	138	188	14												
15	239	247	266	253	300	301	298	301	299	177	177	168	140	140	177	168	140	140	140	140	140	140	140	188	15												
16	243	242	263	263	301	307	314	298	295	177	177	177	173	173	177	177	173	173	173	173	173	173	173	189	16												
17	245	230	287	270	307	300	318	297	180	177	177	177	180	180	177	177	180	180	180	180	180	180	180	154	17												
18	273	254	294	281	310	312	319	297	207	179	179	187	184	184	179	187	184	184	184	184	184	184	184	076	18												
19	278	273	285	287	311	308	313	293	293	184	184	188	184	184	184	188	184	184	184	184	184	184	184	136	19												
20	283	276	270	283	312	313	302	290	299	179	179	187	179	179	179	187	179	179	179	179	179	179	179	167	20												
21	274	264	268	264	301	303	296	288	291	182	182	185	180	180	182	185	180	180	180	180	180	180	180	176	21												
22	243	251	247	257	296	298	289	283	283	180	180	183	176	176	180	183	176	176	176	176	176	176	176	183	22												
23	230	241	240	228	294	299	283	277	276	181	181	184	177	177	181	184	177	177	177	177	177	177	177	180	23												
24	216	225	225	219	307	295	287	281	272	186	186	187	183	183	186	187	183	183	183	183	183	183	183	183	183	24											
DAILY SUM	5893	5637	5841	5708	7347	7628	7243	7117	6871	4411	4411	4861	4333	4570	4264	4861	4333	4570	4264	4264	4264	4264	4264	4264	DAILY SUM												
DAILY MEAN	246	235	243	236	306	318	302	297	286	184	184	203	181	190	178	203	181	190	178	178	178	178	178	178	DAILY MEAN												
MEAN			239				302						187												MEAN												

Scaled LYT Checked PVO

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA
March 19 87

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					
		day	hr min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')		H(Y)	Z(Y)			
CO	64.6 N	No	Principal	Magnetic Storms	Noted	During	This	Month									

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 3/1/87	2400 UT, 3/31/87	1.0'/mm	3.7 ⁸ /mm	27° 01.3' E
H	0000 UT, 3/1/87	2359 UT, 3/21/87	7.8 ⁸ /mm		12621
	0000 UT, 3/22/87	2400 UT, 3/31/87	7.8 ⁸ /mm		12632
Z	0000 UT, 3/1/87	2359 UT, 3/21/87	7.7 ⁸ /mm		55174
	0000 UT, 3/22/87	2400 UT, 3/31/87	7.7 ⁸ /mm		55170

STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 3/1/87	2400 UT, 3/31/87	7.9 ⁸ /mm	29.5 ⁸ /mm	
H	(same)	(same)	43.7 ⁸ /mm		
Z	(same)	(same)	48.7 ⁸ /mm		

RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D					
H					
Z					

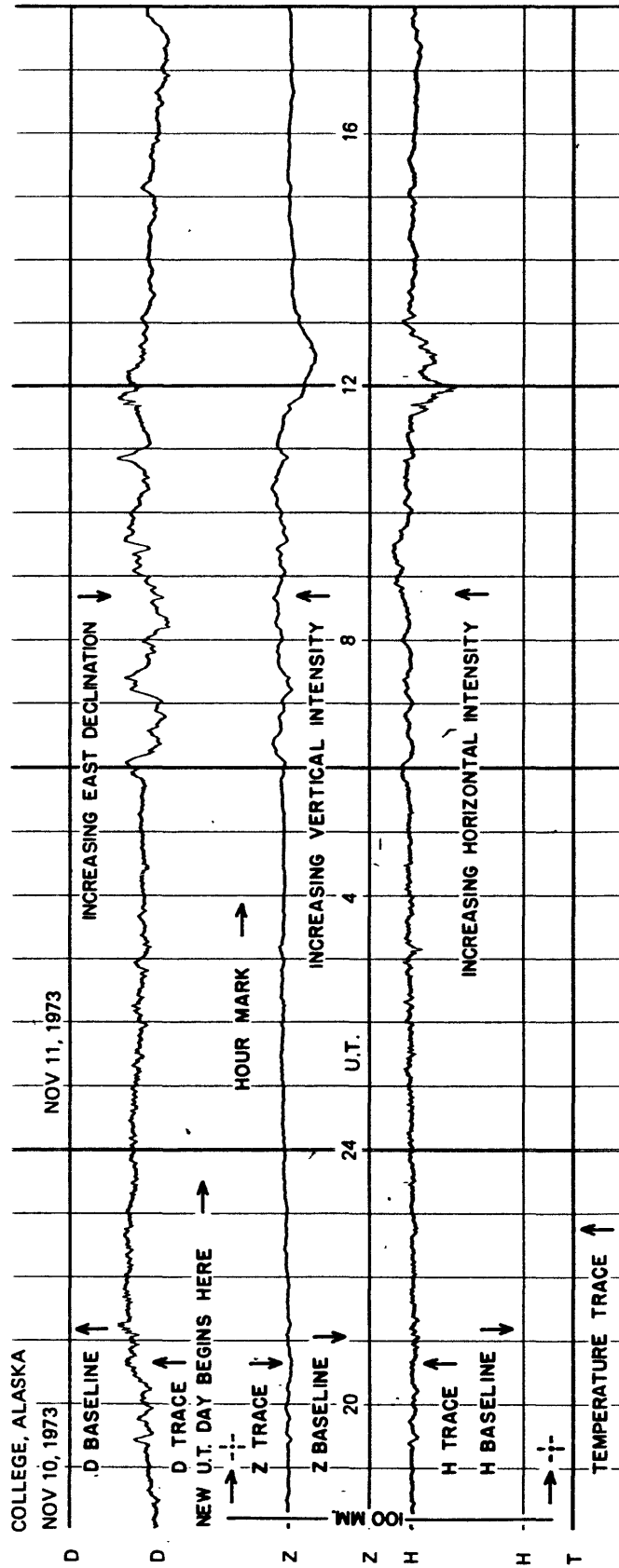
MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 25.0' E	12862 ⁸	55316 ⁸

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

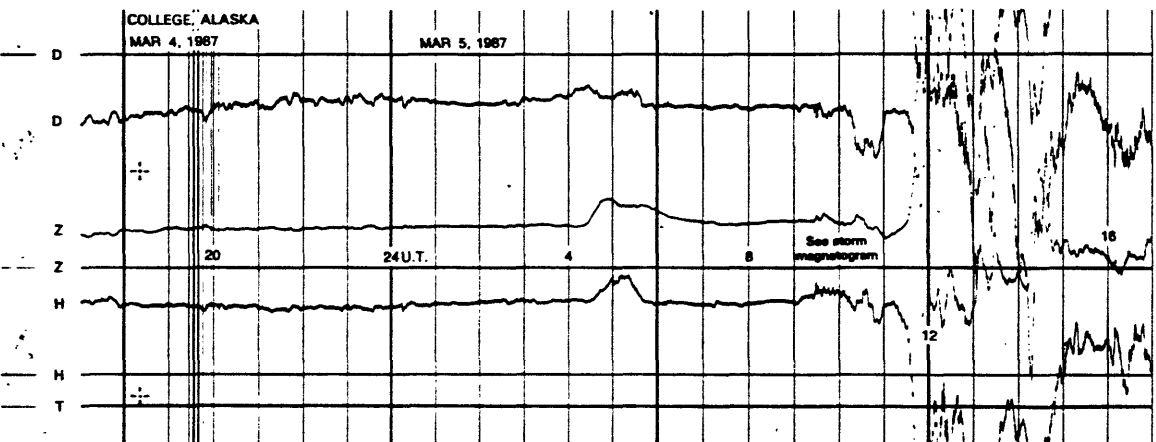
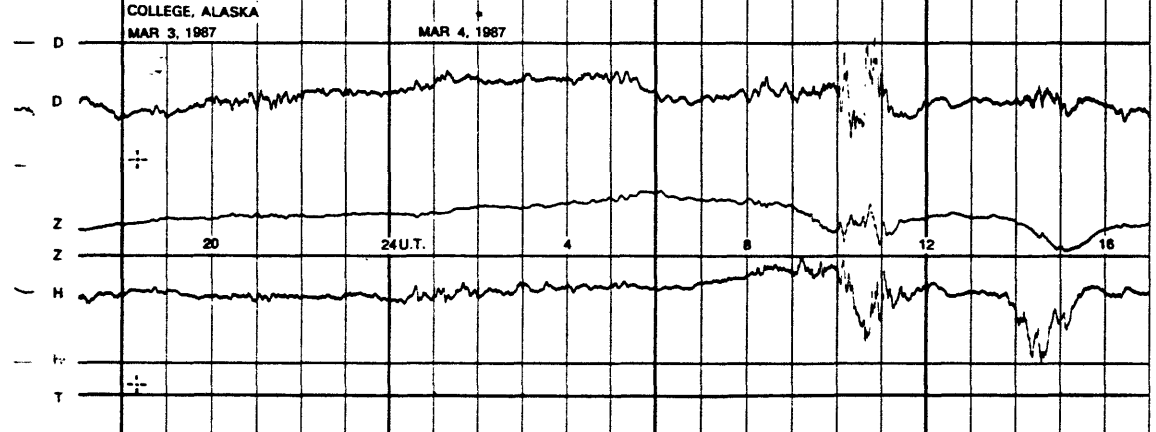
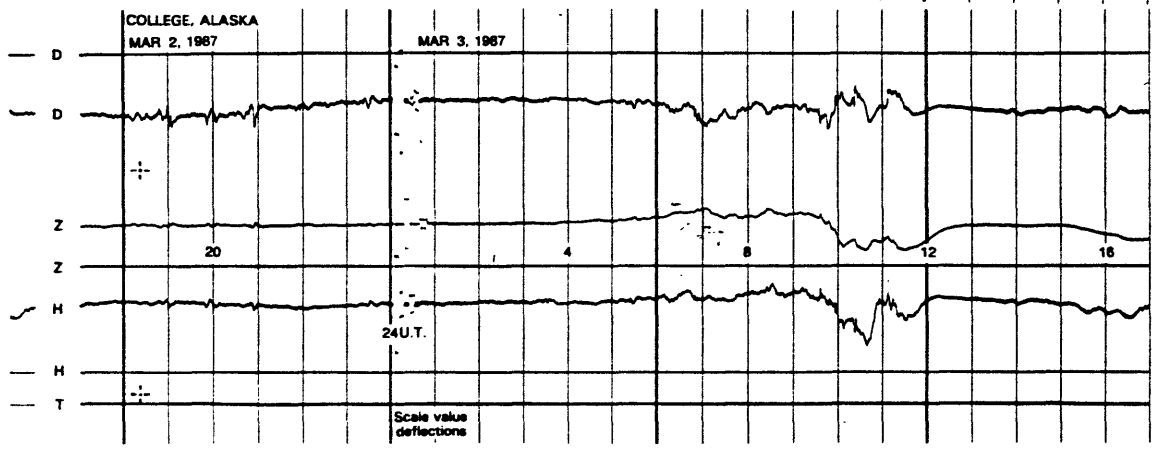
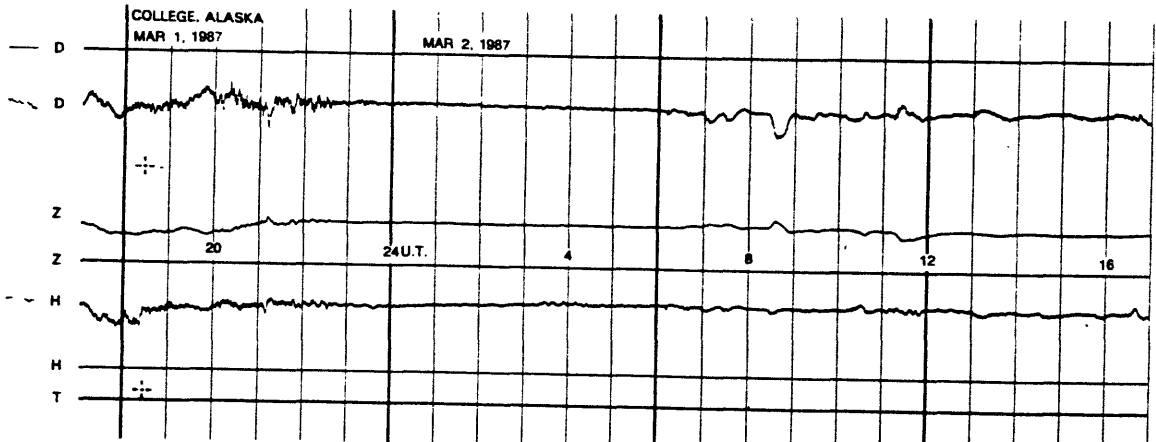
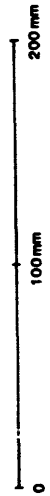
DAYS USED: MARCH 2, 9, 20, 24, 25.

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

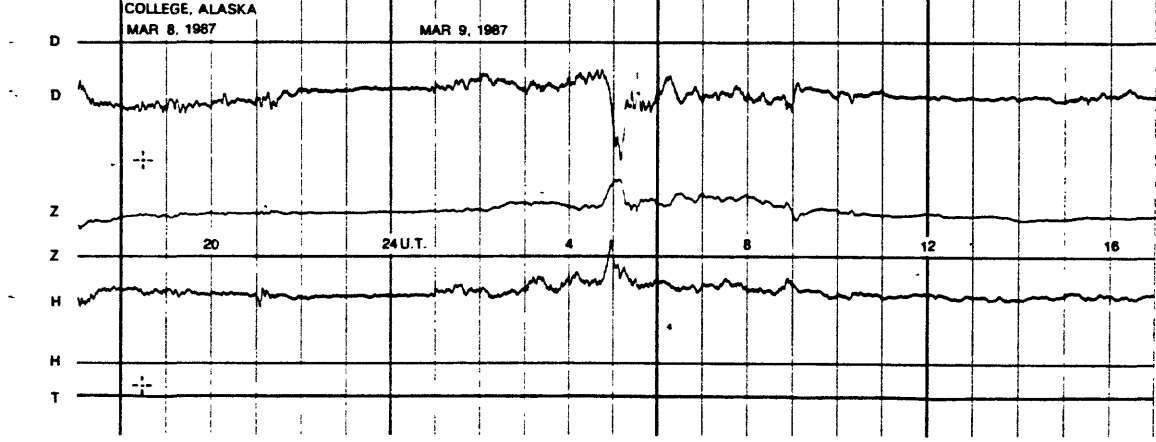
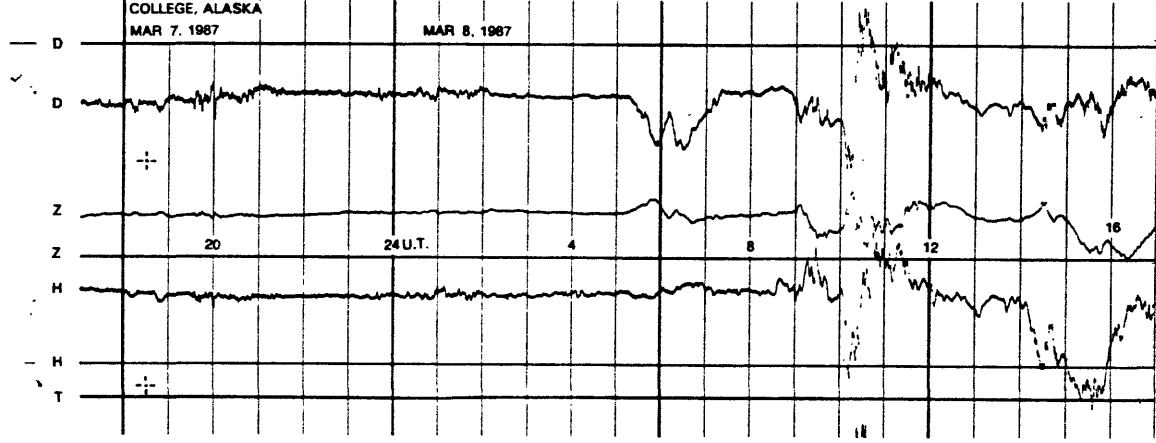
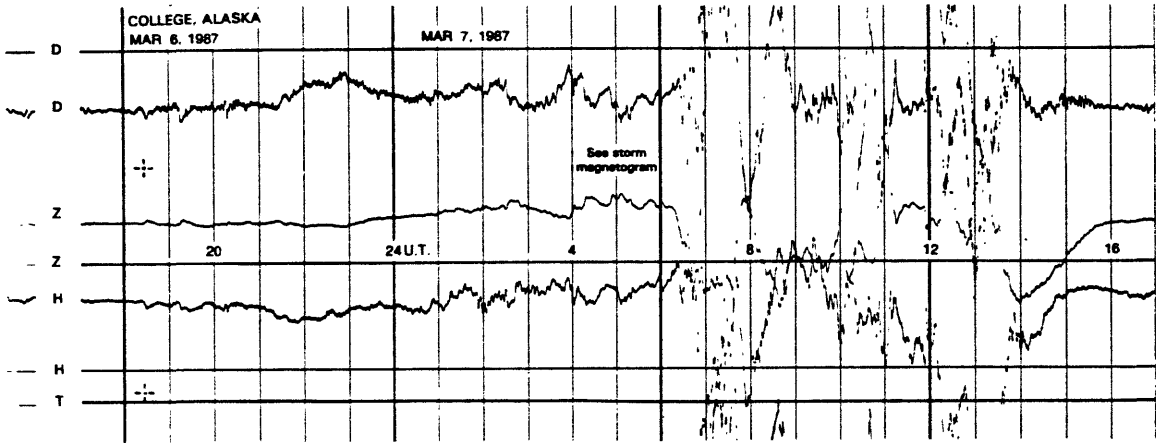
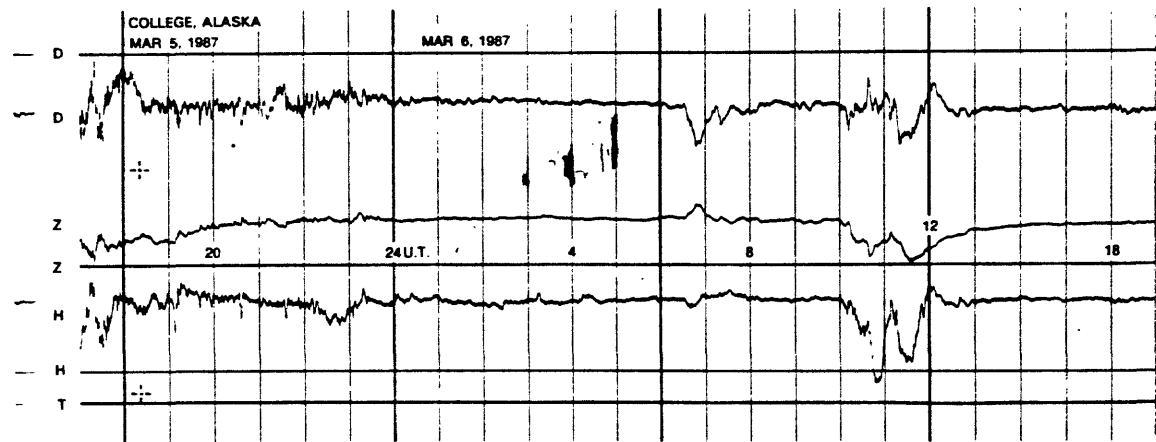


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

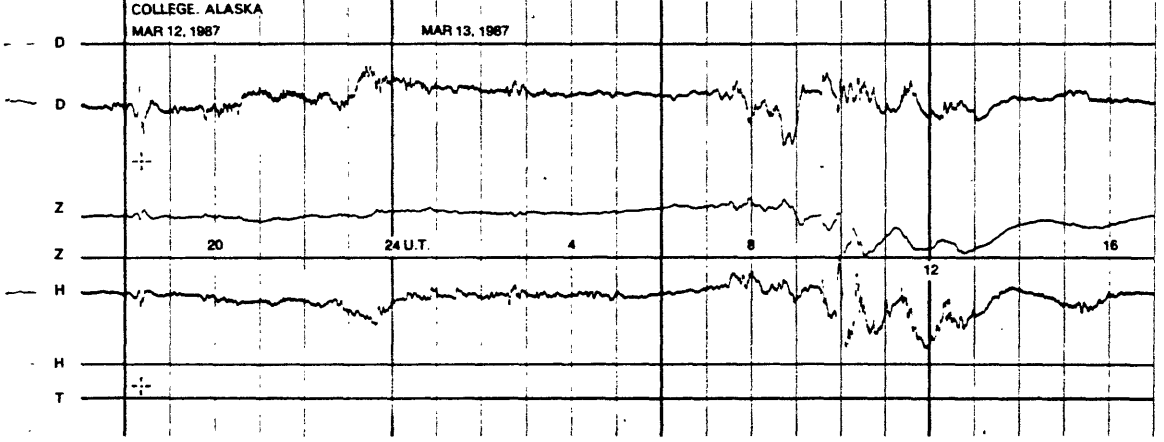
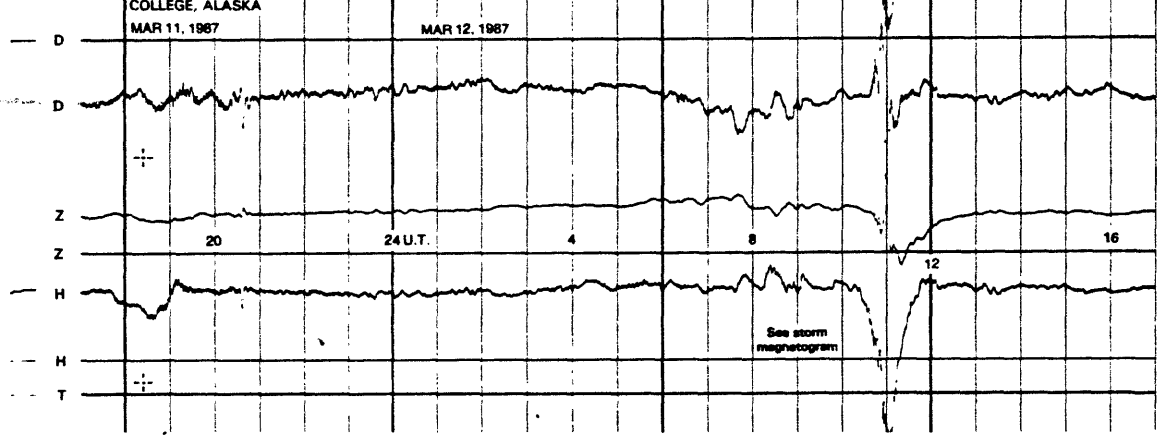
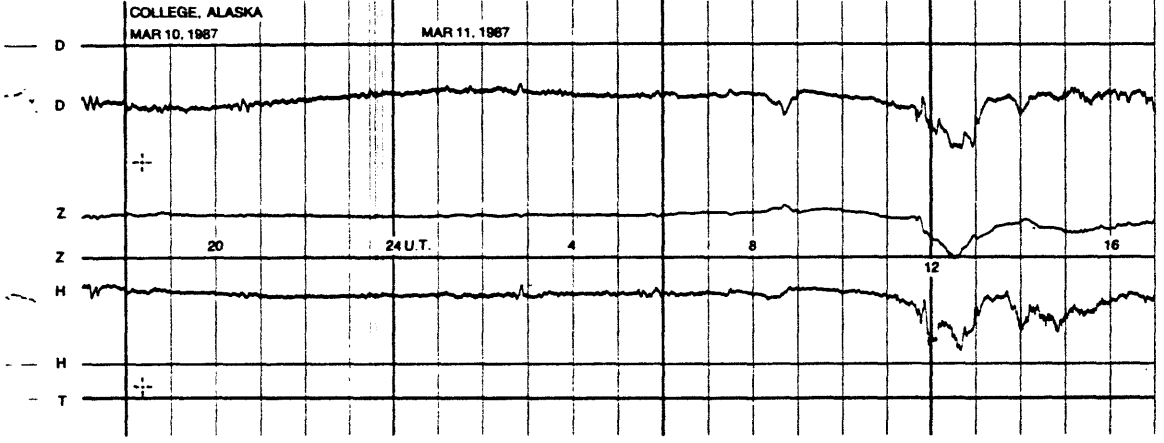
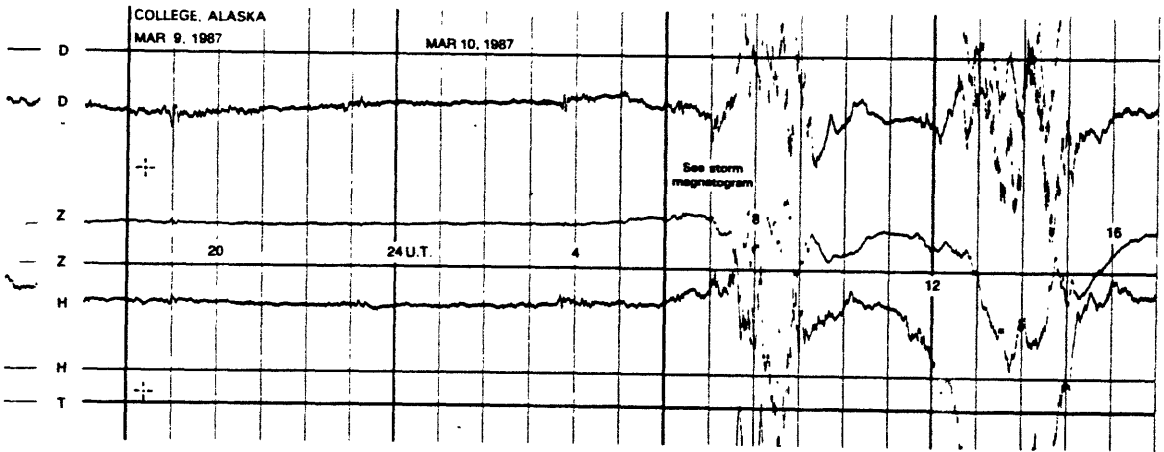
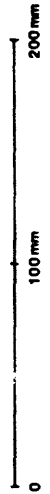
NORMAL MAGNETOGRAMS



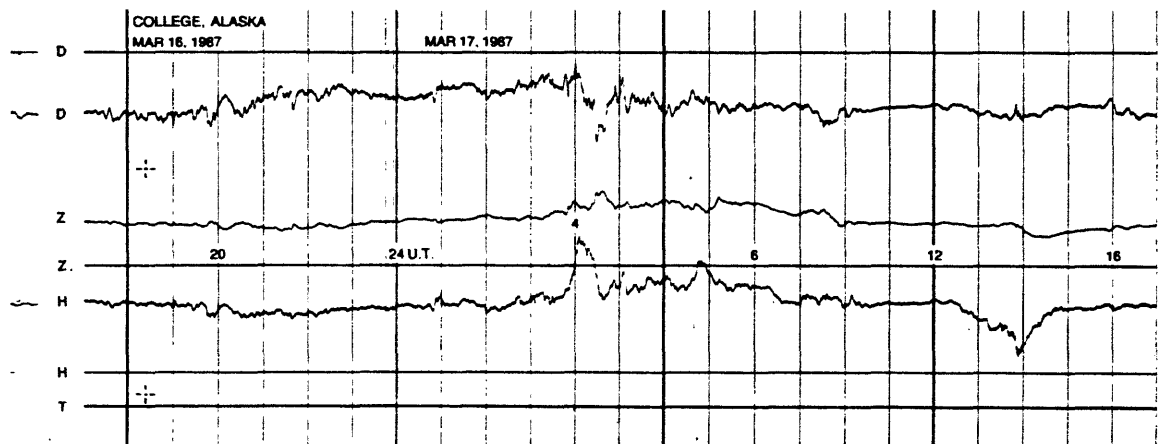
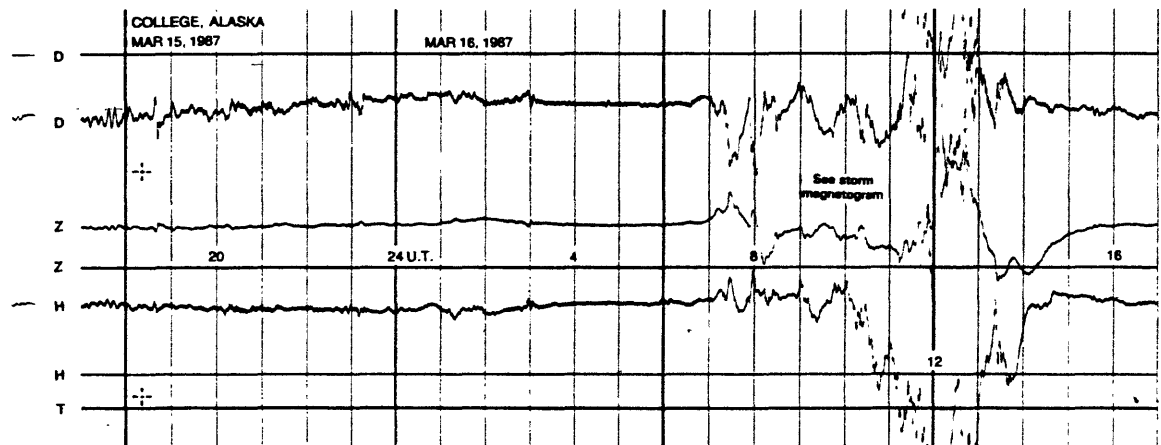
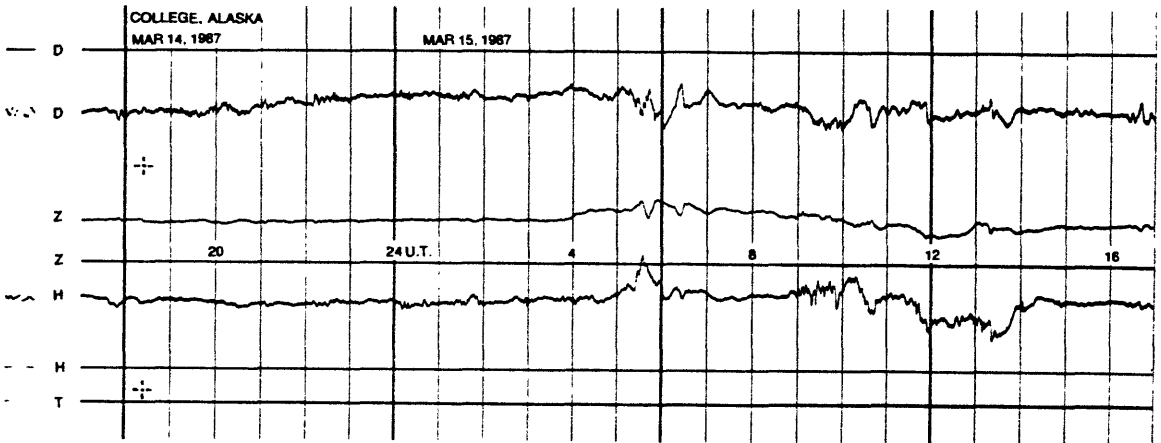
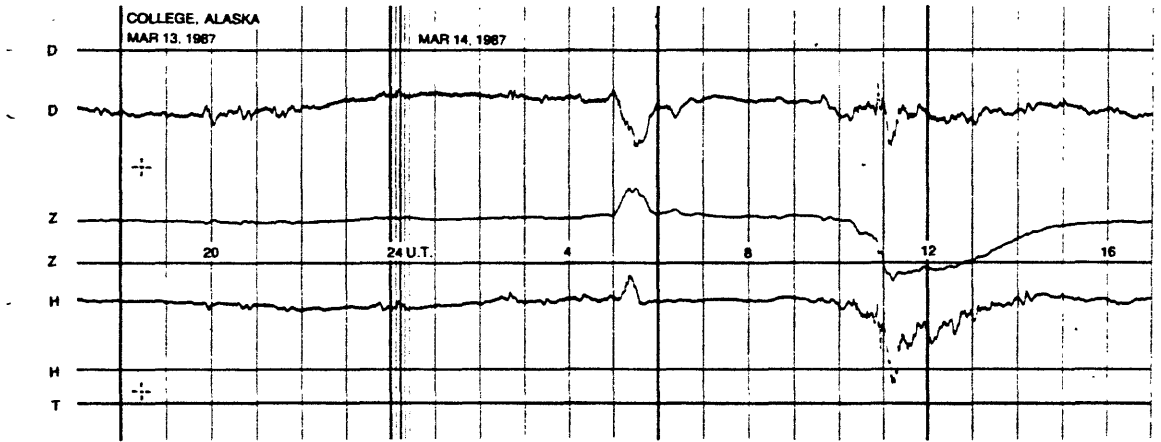
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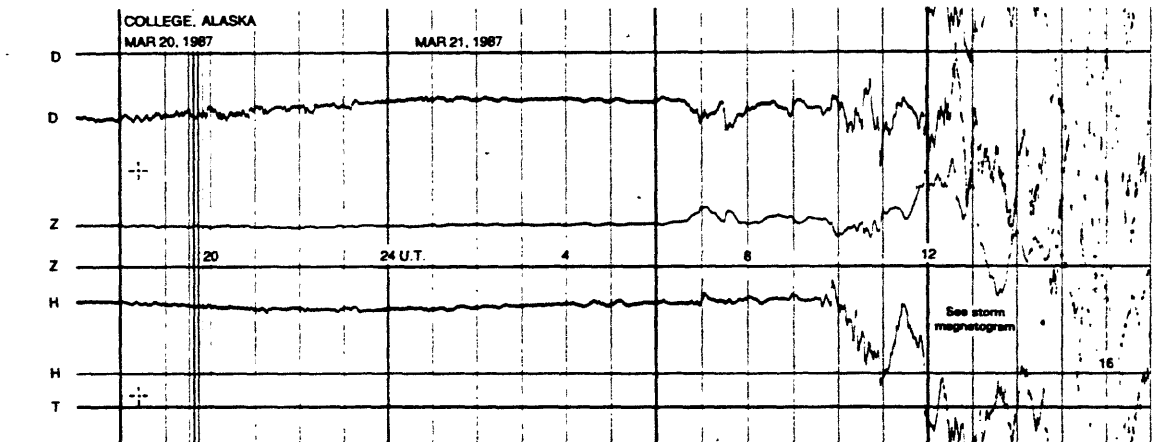
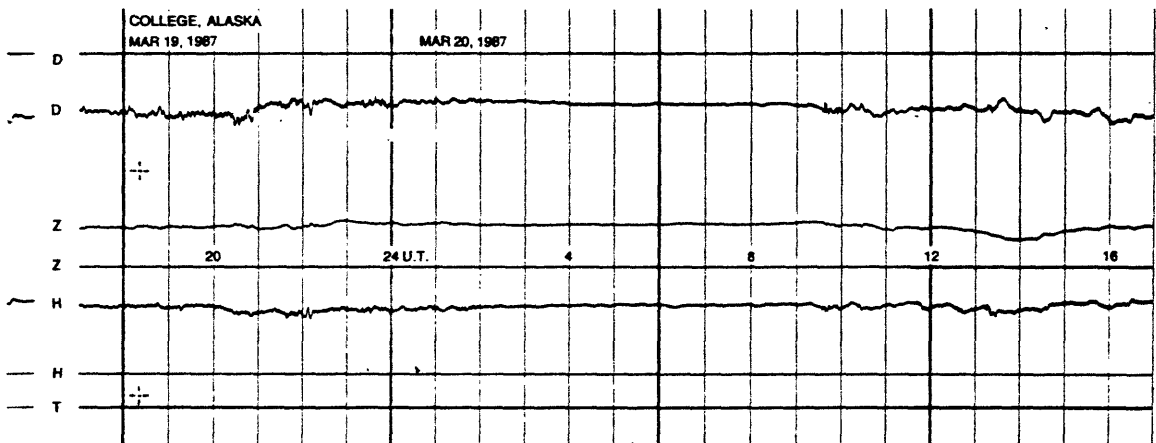
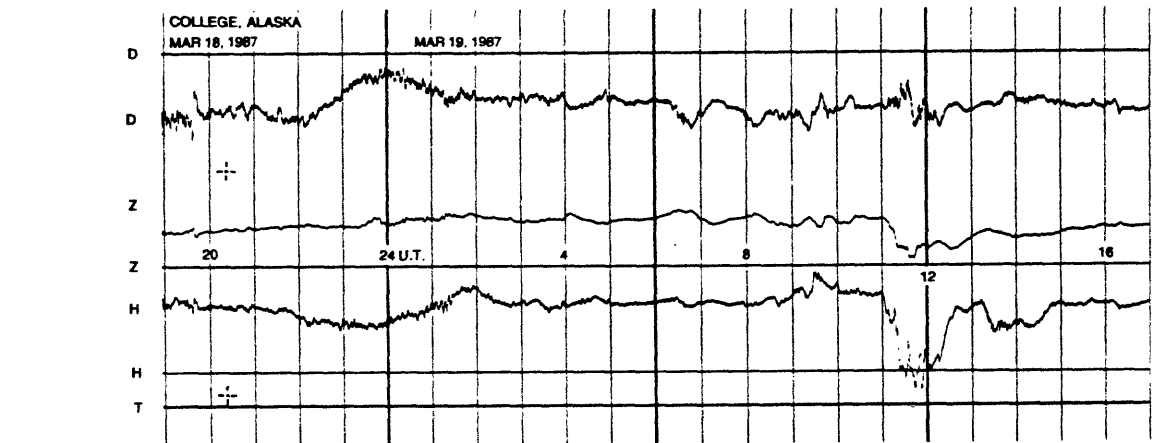
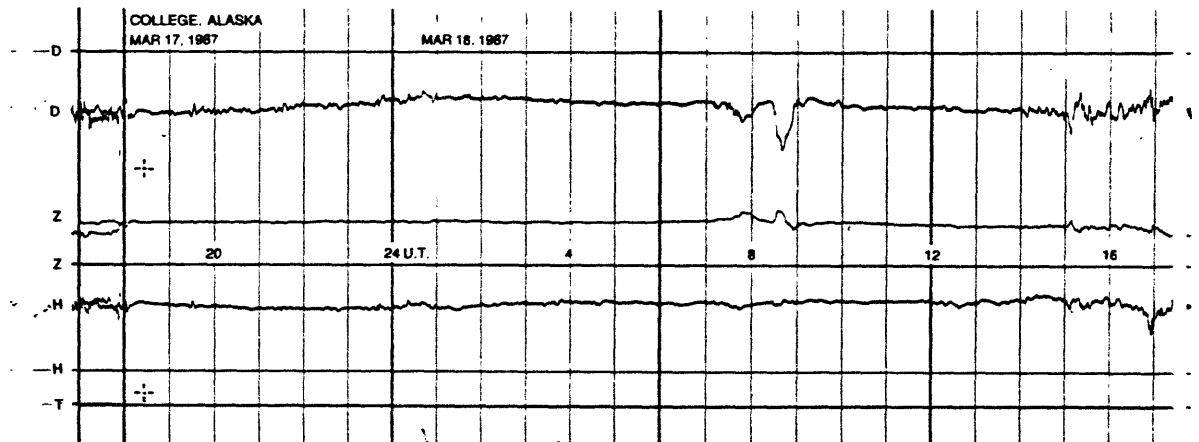
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

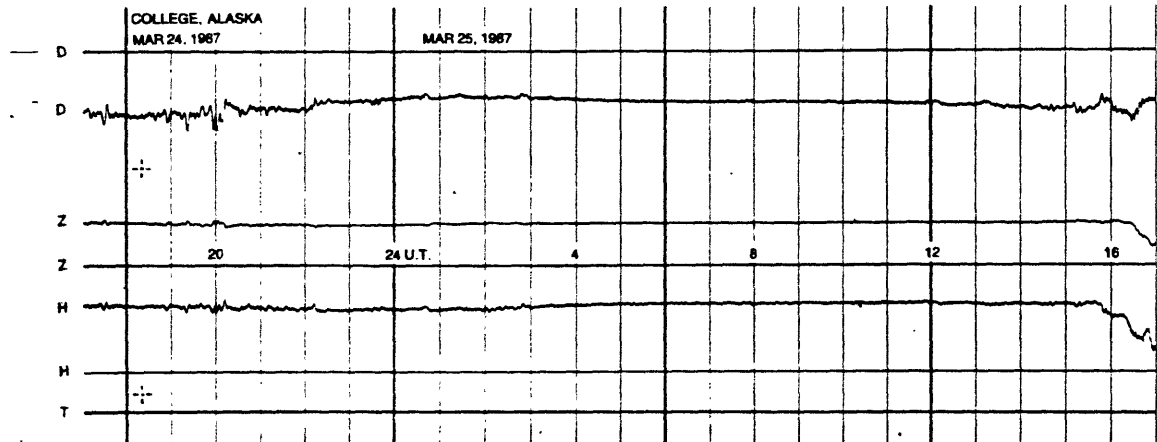
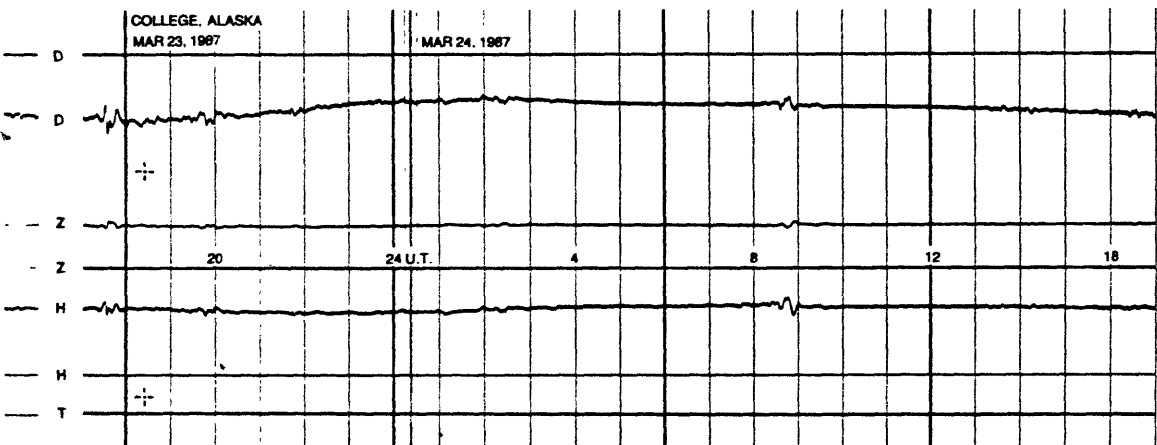
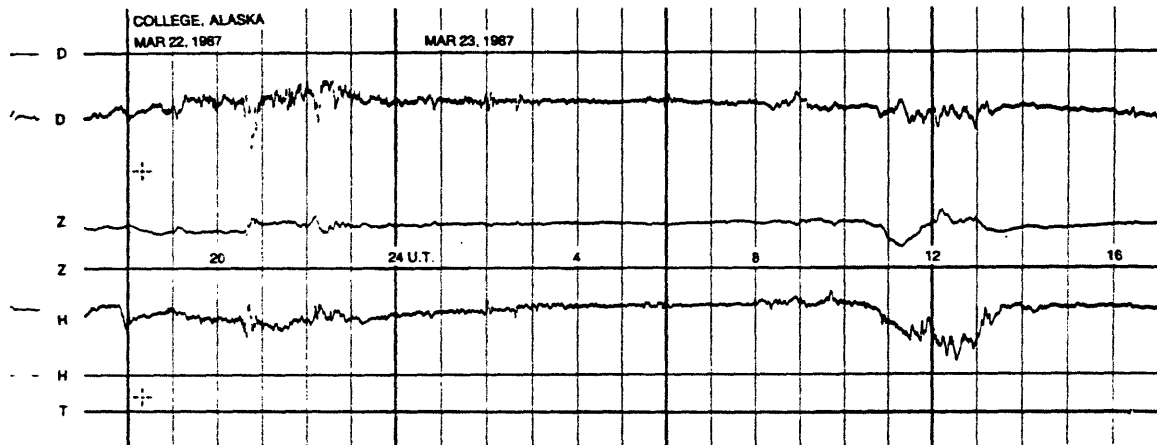
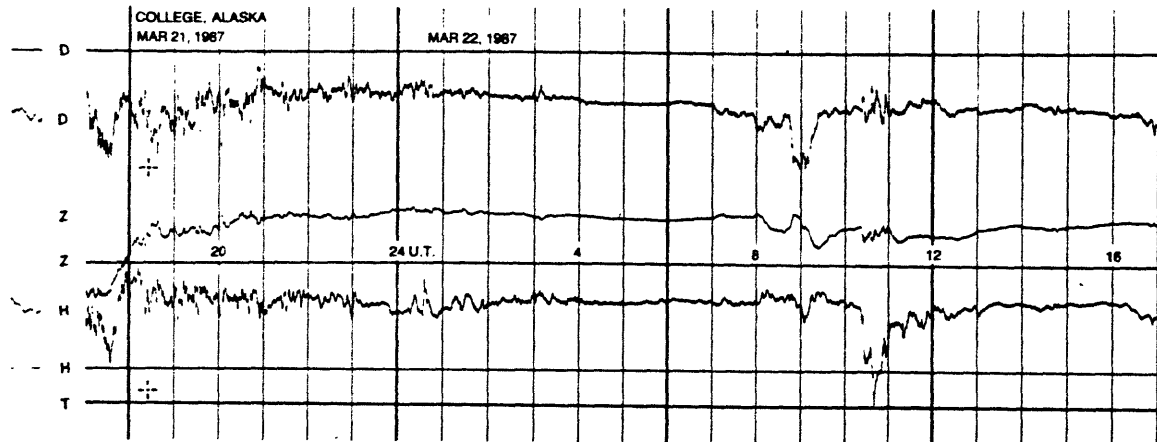


NORMAL MAGNETOGRAMS

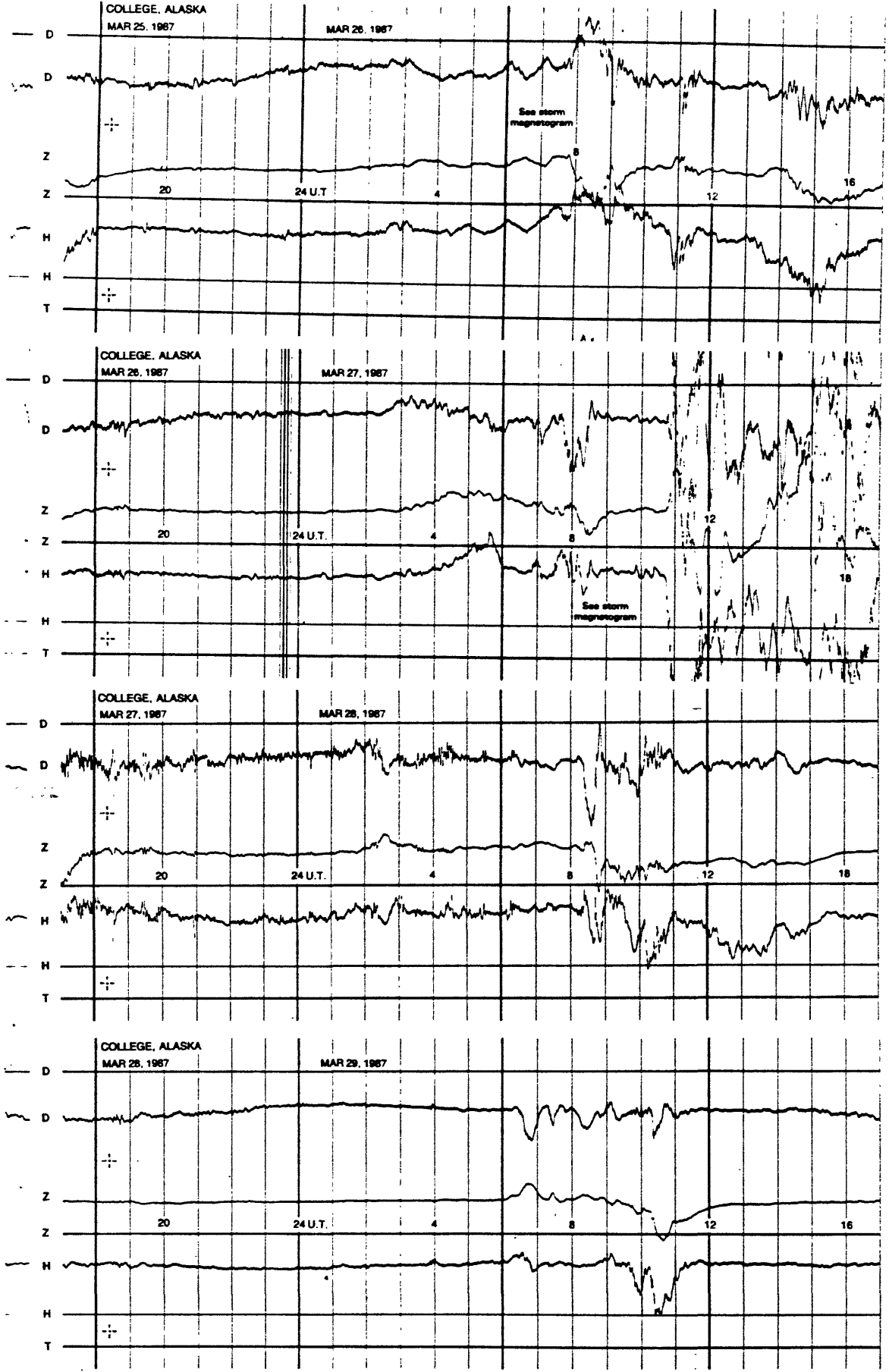


NORMAL MAGNETOGRAMS

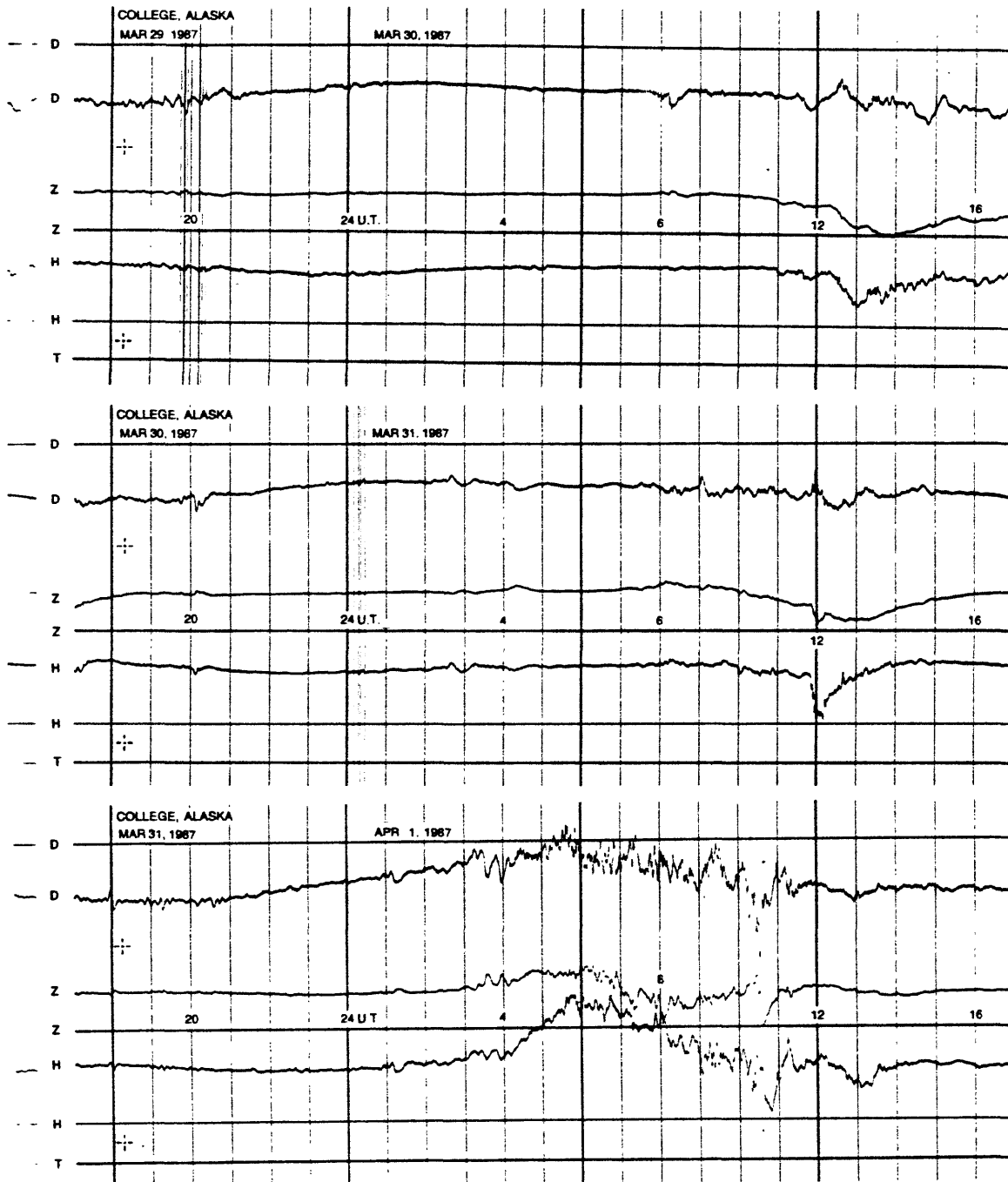
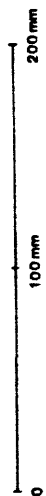
200 mm
100 mm
0



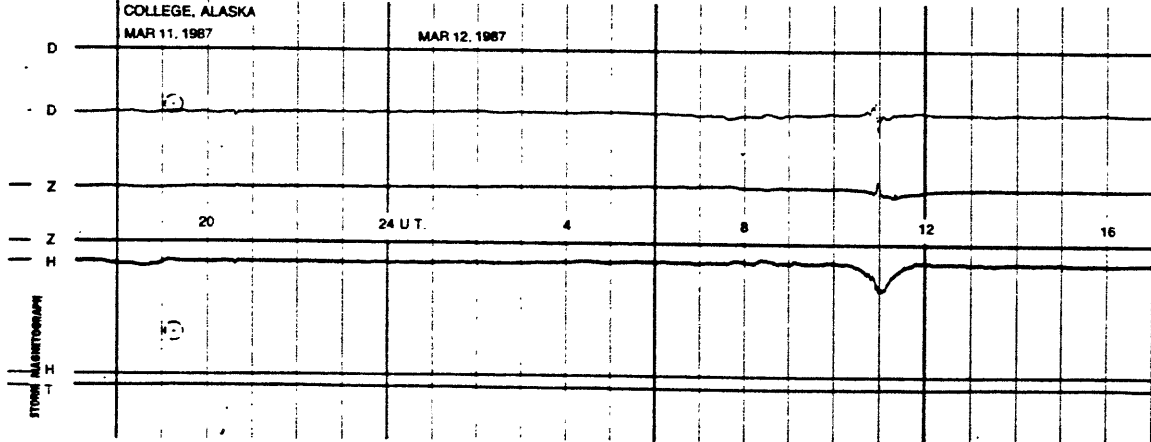
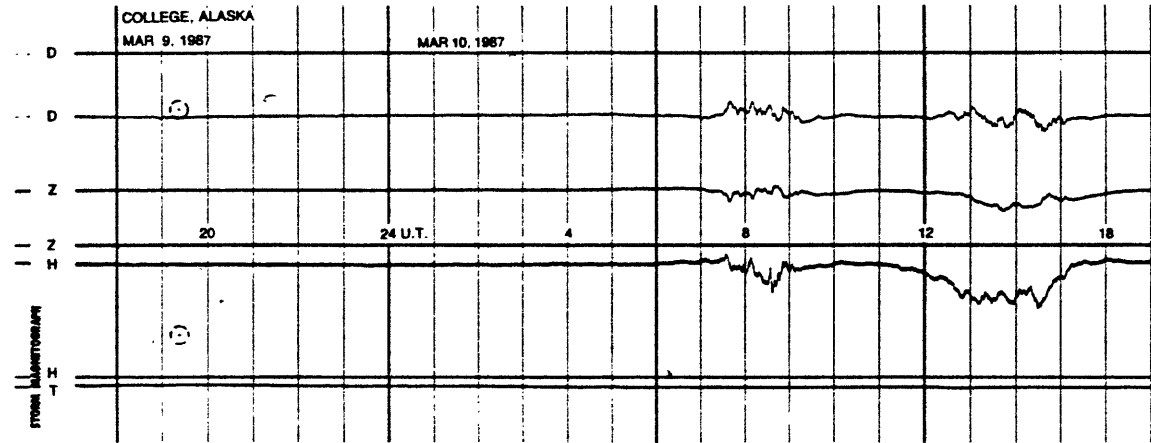
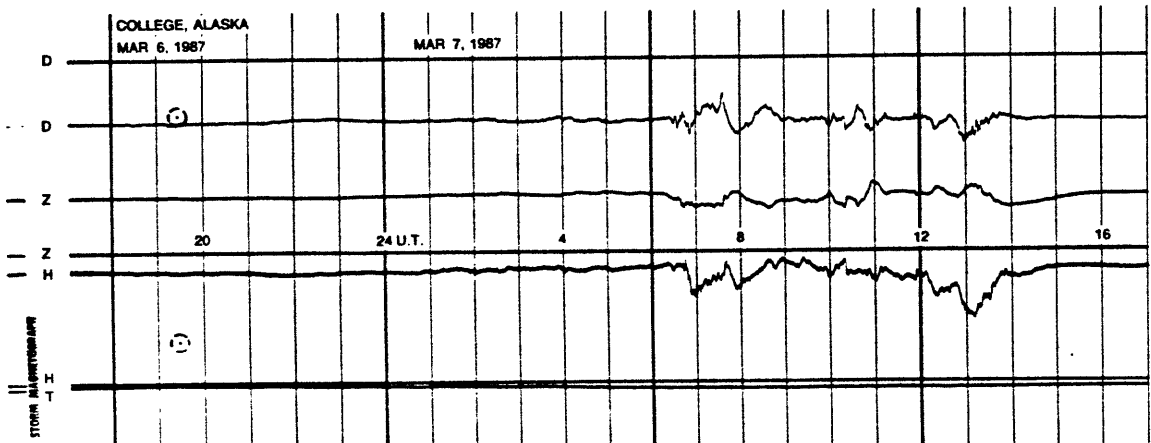
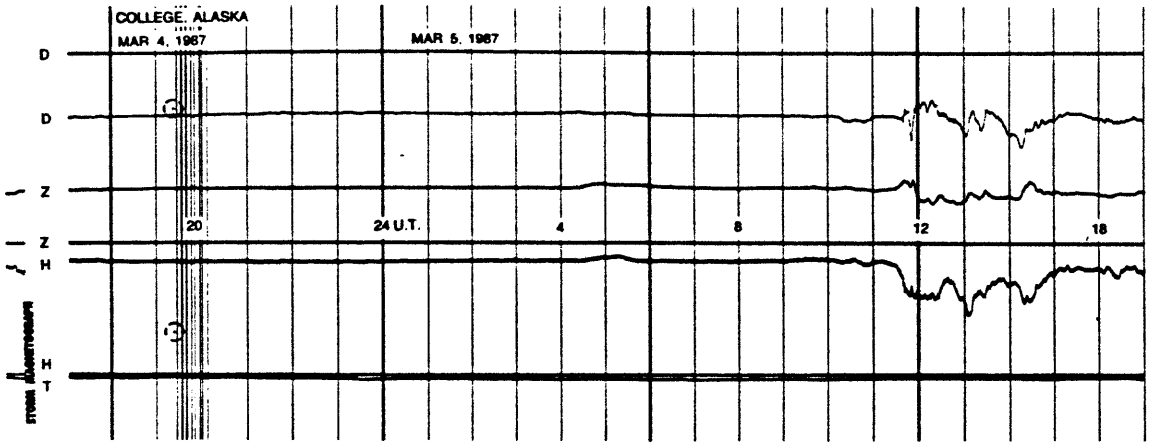
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

