

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

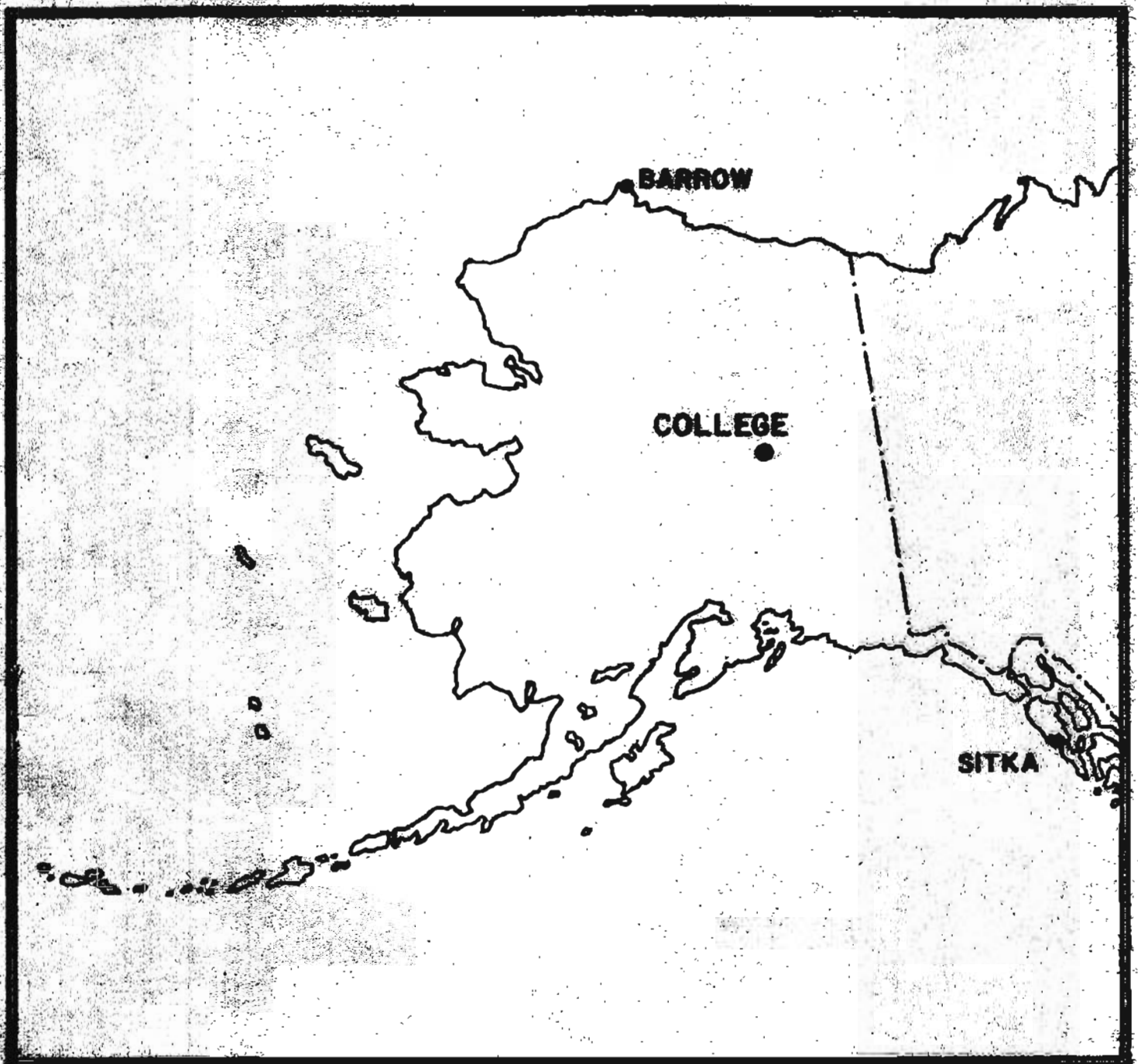
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

MAY 1987

OPEN FILE REPORT 87-0300E



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:

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

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.

College Alaska

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

MONTH AND YEAR

May 1987

DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS 20 mm/hr
	0003	0106	0209	0312	12-15	15-18	18-21	21-24			
1	0	0	1	3	1	2	2	2	11	05	SUDDEN COMMENCEMENTS d h m
2	1	1	2	4	1	0	1	1	11	06	
3	0	0	3	5	4	0	1	1	14	12	
4	1	2	2	3	2	2	1	0	13	06	
5	0	0	0	2	2	1	1	0	6	03	
6	0	0	0	0	1	0	1	1	3	01	
7	3	3	3	3	3	1	1	0	17	10	
8	1	1	0	2	1	1	0	1	7	03	
9	1	1	1	1	0	0	1	1	6	02	
10	1	1	2	5	5	2	1	1	18	15	
11	2	1	1	1	0	0	1	1	7	03	
12	1	0	0	0	0	0	0	1	2	01	
13	1	1	3	2	0	1	1	1	10	05	
14	2	2	3	2	5	3	1	1	19	13	
15	0	0	1	2	2	1	1	1	8	03	
16	2	2	0	0	0	1	1	1	7	03	
17	1	0	0	0	0	0	1	1	3	01	
18	1	0	0	0	0	0	0	0	1	00	
19	0	1	0	0	0	1	0	0	2	01	
20	2	0	0	0	0	0	1	0	3	01	
21	1	1	0	0	0	0	0	0	2	01	
22	0	1	2	1	1	2	2	1	10	04	
23	2	1	1	2	1	2	2	2	13	06	
24	2	2	4	5	3	5	3	3	27	23	
25	3	6	5	4	3	2	2	0	25	25	
26	1	2	2	4	3	4	2	2	20	13	
27	3	4	4	5	4	2	2	2	26	21	
28	2	2	3	3	1	0	2	3	16	09	
29	4	5	7	7	6	4	2	1	36	59	
30	1	1	3	4	6	2	2	1	20	18	
31	1	2	2	5	4	4	3	2	23	18	

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

H

Z

675.7

322.2

3.70

7.79

2500

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
May 1987

WDC-4 FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80508 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)	
C0	64.6 N	28	18xx	29	3,4	7	257	1670	810	2918

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0000UT, 5/1/87	2400UT, 5/31/87	1.0' /mm	3.7 ^s /mm	27° 01.2' E
H	(same)	(same)	7.8 ^s /mm	12634 ^s	
Z	(same)	(same)	7.7 ^s /mm	55169 ^s	

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0000UT, 5/1/87	2400UT, 5/31/87	7.9' /mm	29.5 ^s /mm	
H	(same)	(same)	43.7 ^s /mm		
Z	(same)	(same)	48.7 ^s /mm		

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

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
27° 22.9' E	12861 ^s	55307 ^s

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DATE USED: MAY 6, 12, 17, 18, 21

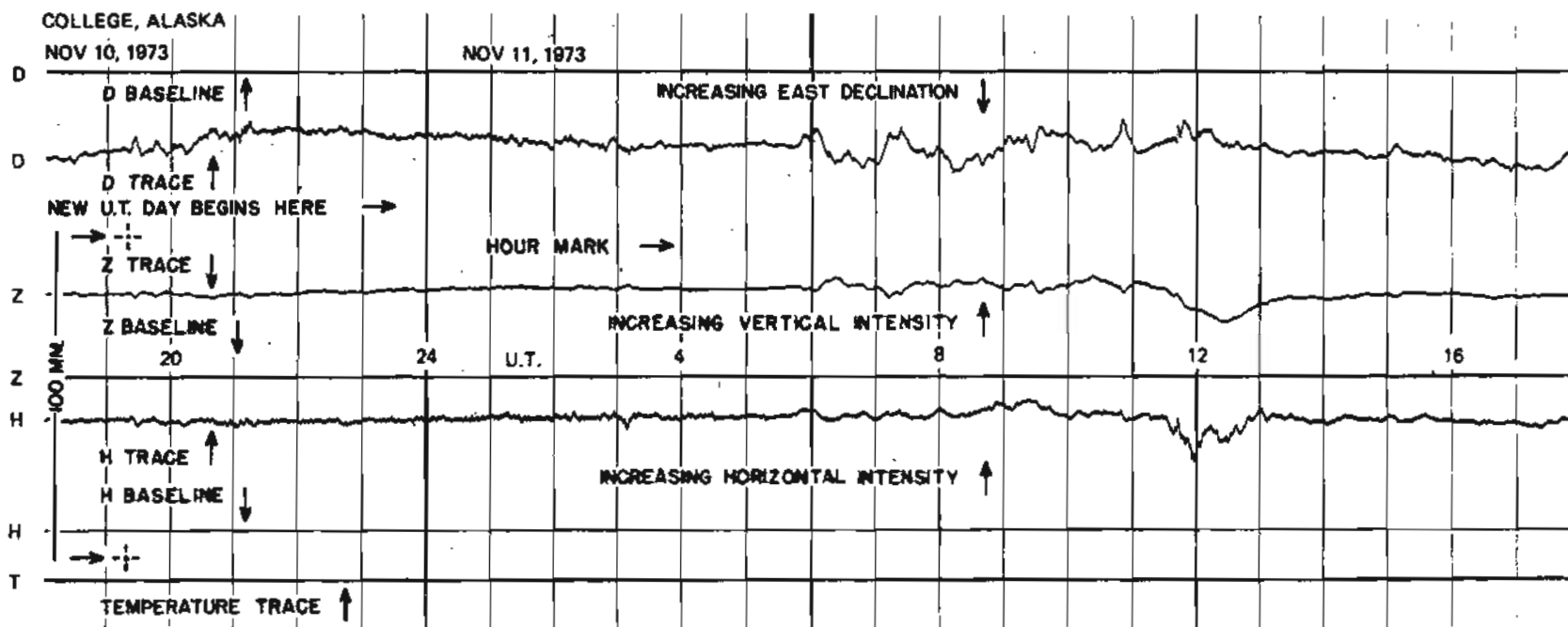
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

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		HOUR			DAY		HOUR			DAY		HOUR			DAY	HOUR	
	06	01	12	17	18	21	06	01	12	17	18	21	06	01	12	17	18	21
01	172	173	182	184	196	203	212	213	213	213	221	236	251	265	303	307	293	258
02	173	147	177	199	210	218	216	216	213	214	213	217	223	247	263	279	293	287
03	182	157	177	169	198	204	203	207	207	205	201	207	232	252	273	299	288	266
04	184	157	177	169	198	204	203	207	207	205	201	207	232	252	273	299	288	266
05	196	187	210	187	198	204	203	207	207	205	201	207	232	252	273	299	288	266
06	203	199	218	199	204	209	207	207	207	205	201	207	232	252	273	299	288	266
07	212	203	216	203	205	211	207	207	207	205	201	207	232	252	273	299	288	266
08	213	207	216	207	206	203	207	207	207	205	201	207	232	252	273	299	288	266
09	213	211	213	211	207	205	208	302	303	302	303	300	307	306	303	304	300	306
10	213	214	213	213	205	201	308	306	303	303	300	300	307	306	303	304	300	306
11	213	213	213	207	207	203	309	308	308	307	305	306	307	306	303	304	300	306
12	221	207	211	207	209	212	307	308	307	305	306	306	307	306	303	304	300	306
13	236	209	217	209	216	222	306	309	308	302	306	306	307	306	303	304	300	306
14	251	232	223	232	226	237	295	310	310	307	307	307	307	307	303	304	300	306
15	265	256	247	256	252	262	303	301	311	306	309	309	307	307	303	304	300	306
16	303	275	263	275	273	273	306	303	310	309	303	303	303	303	303	304	300	306
17	307	303	279	303	299	297	297	297	313	304	302	302	302	302	302	304	300	306
18	293	297	298	297	317	307	288	300	310	300	293	293	293	293	293	300	293	306
19	258	299	288	299	318	307	293	287	295	288	293	293	293	293	293	300	293	306
20	287	276	266	276	300	267	298	271	281	280	273	273	273	273	273	276	273	306
21	291	240	224	240	272	218	279	262	268	276	270	270	270	270	266	269	269	306
22	233	179	179	200	226	197	279	262	260	267	267	267	267	267	259	267	267	306
23	174	151	151	168	193	184	268	267	264	262	273	273	273	273	261	273	273	306
24	156	139	139	143	167	168	270	270	259	261	273	273	273	267	269	273	273	306
DAILY SUM	5449	5143	5143	5156	5337	5210	7049	6974	7028	7028	6963	6963	6963	6963	4002	4355	4442	4470
DAILY MEAN	227	214	214	215	222	217	294	291	293	293	290	290	290	290	167	181	185	186
MEAN									292								180	

Scaled/LYT Checked RYO

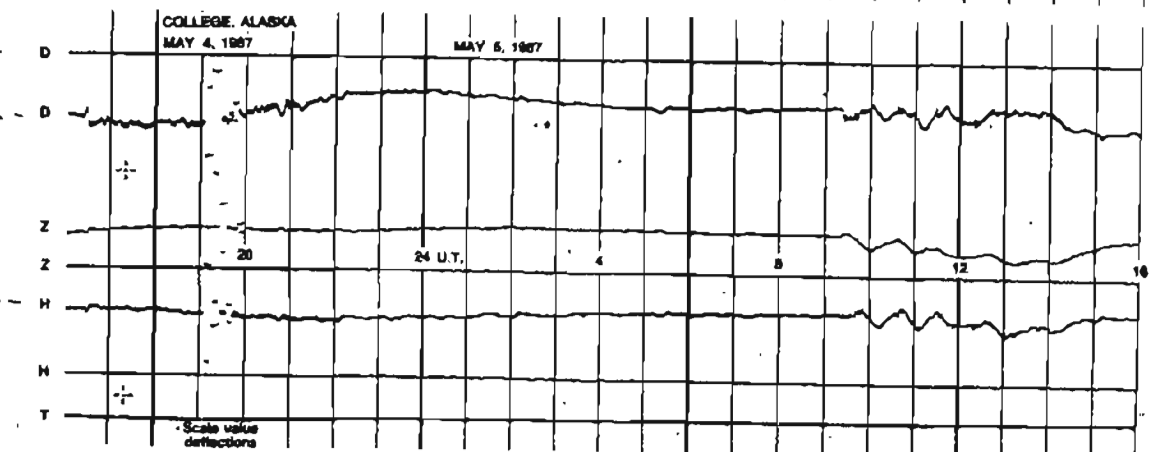
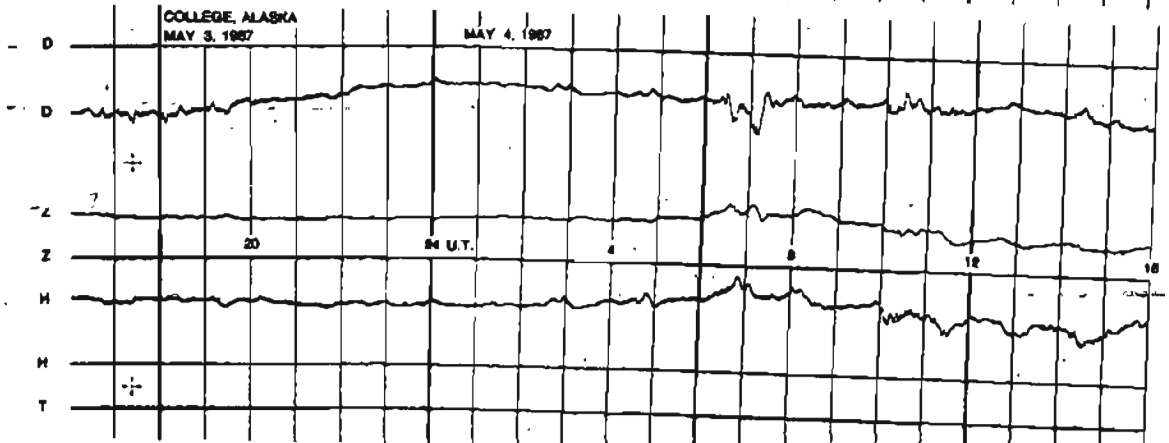
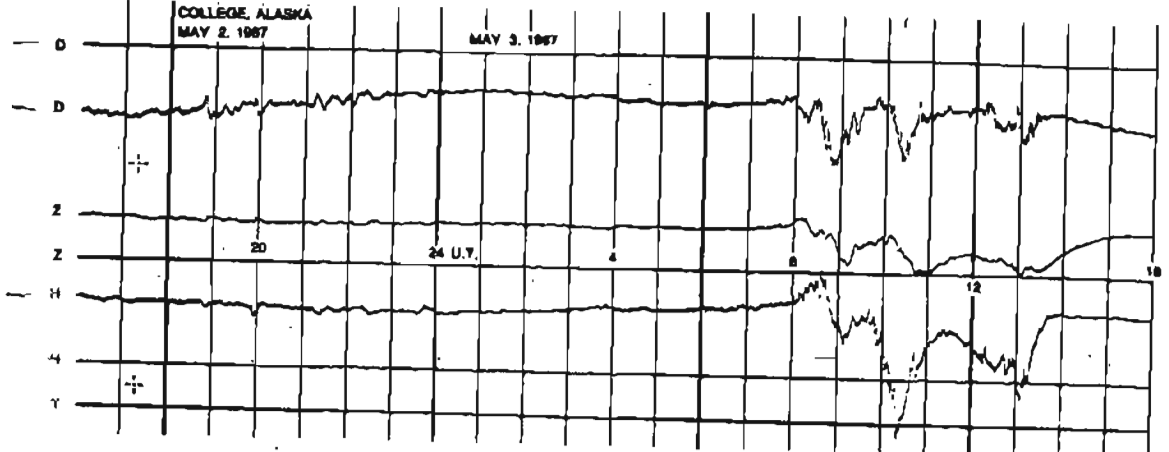
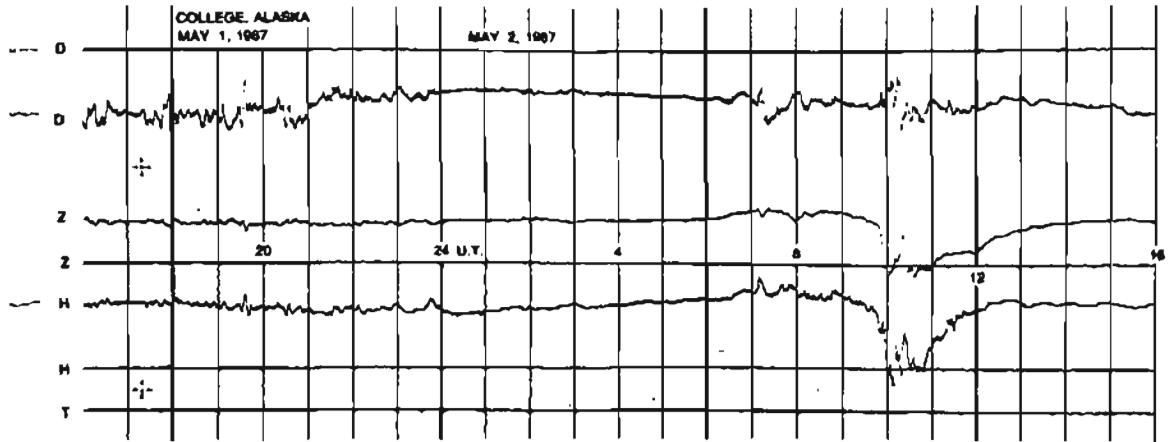
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

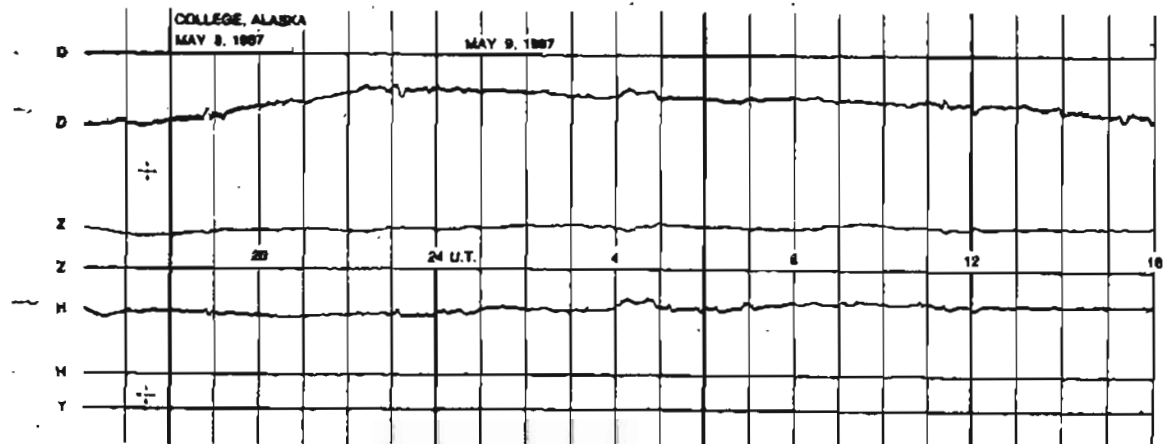
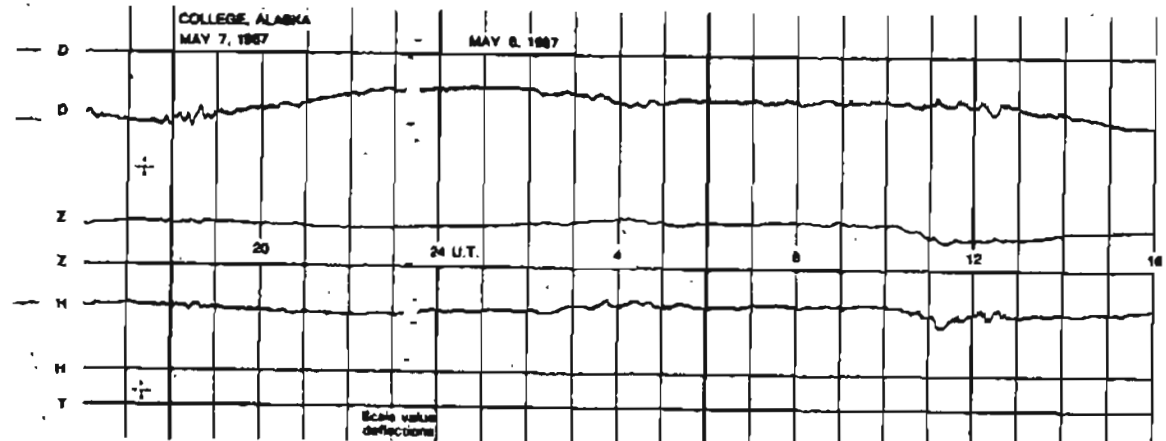
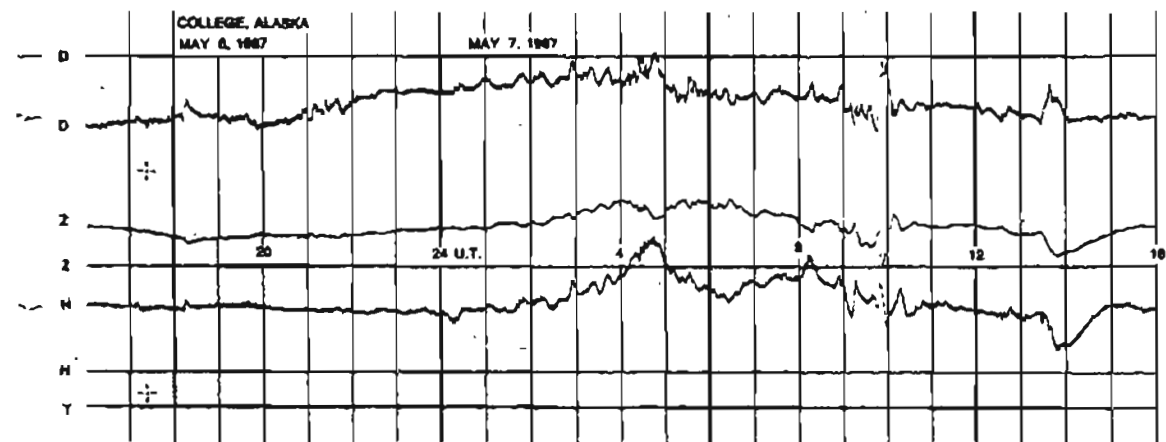
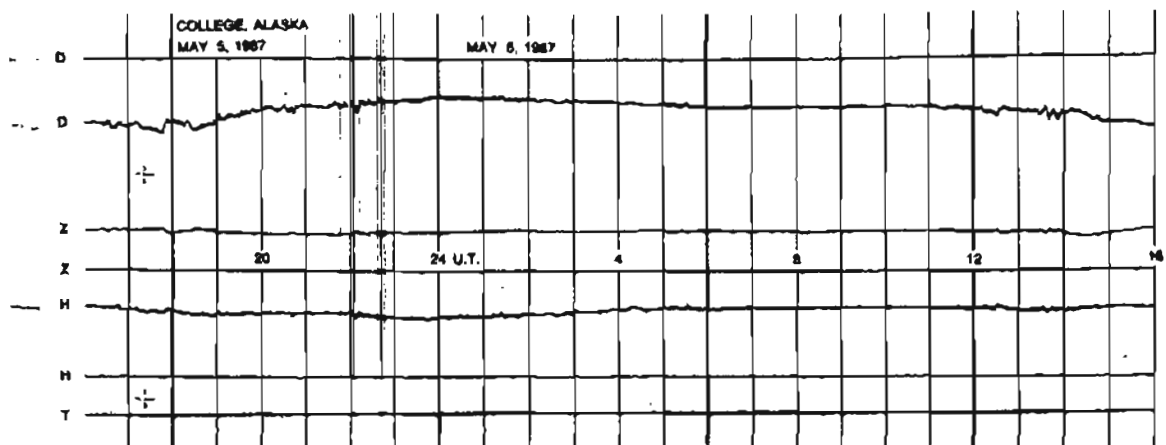
NORMAL MAGNETOGRAMS

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100 mm
0

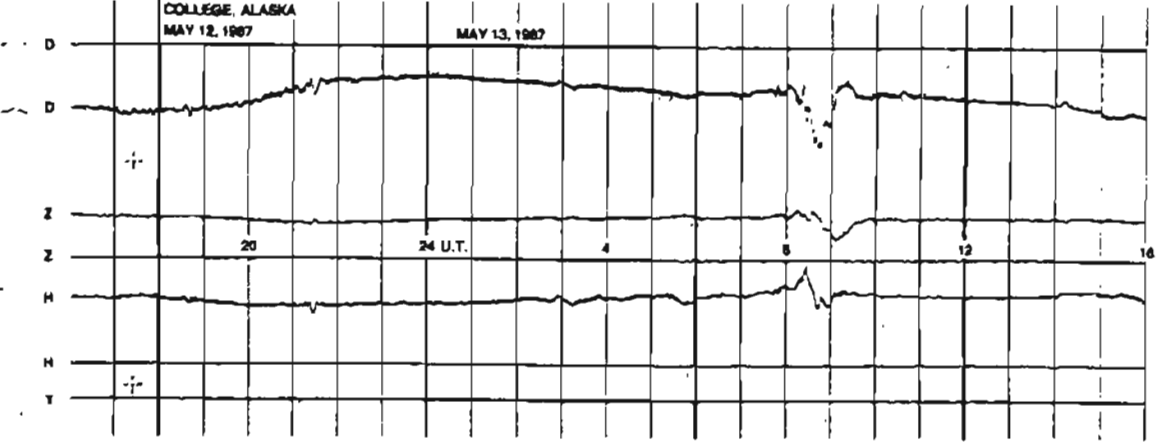
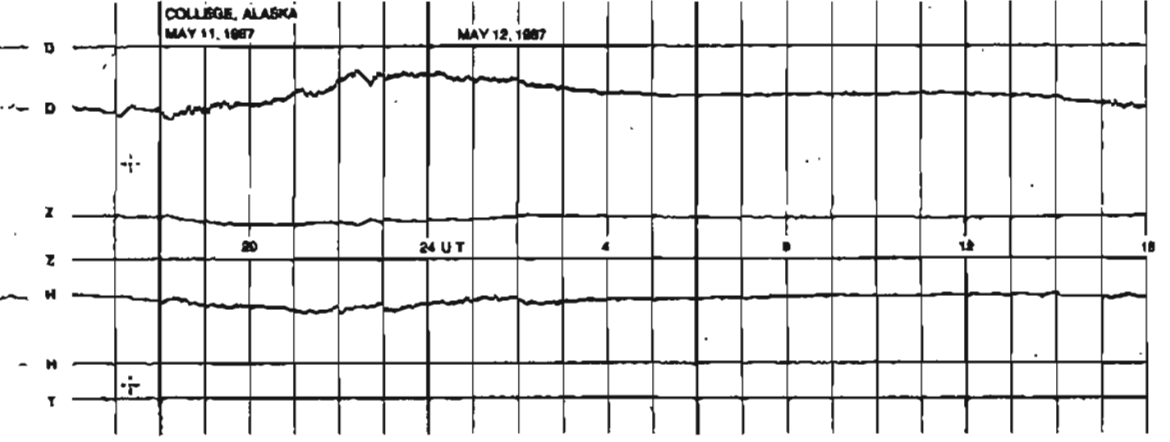
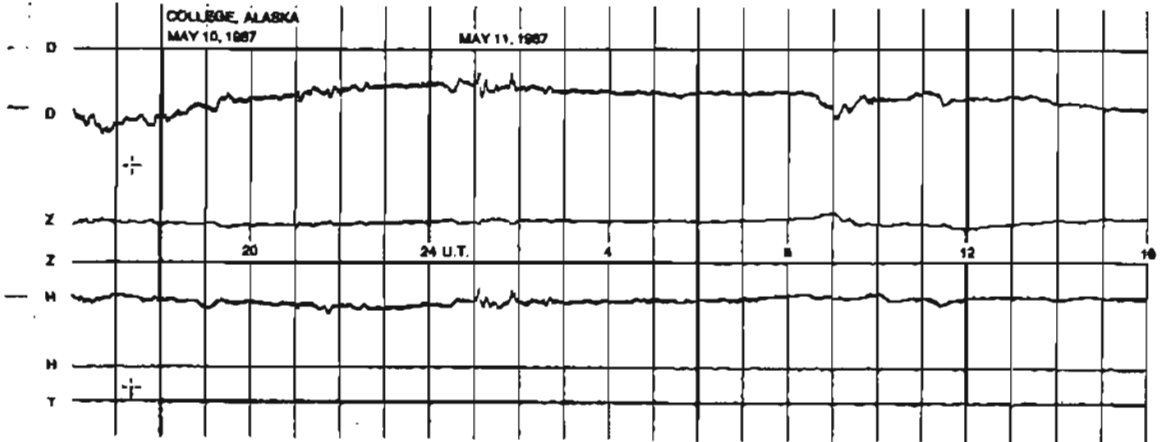
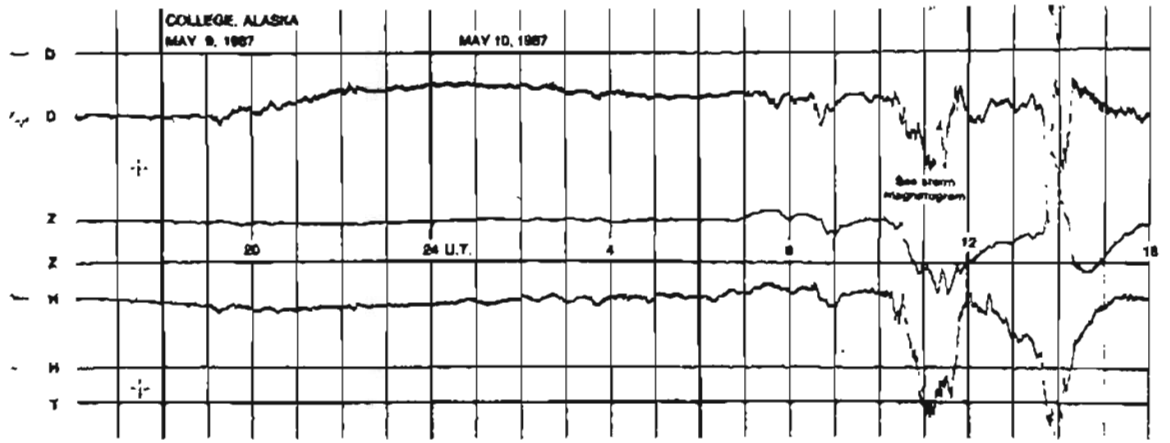


Scale value
deflections

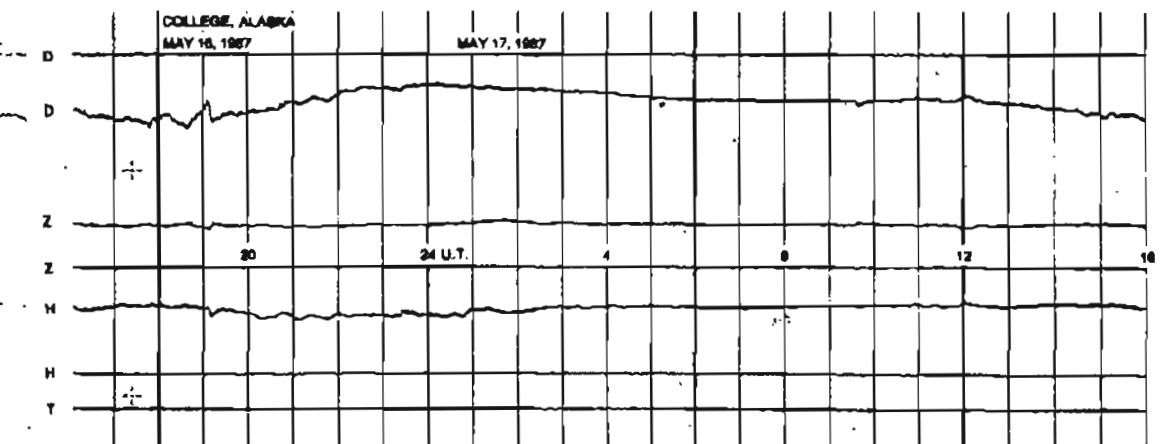
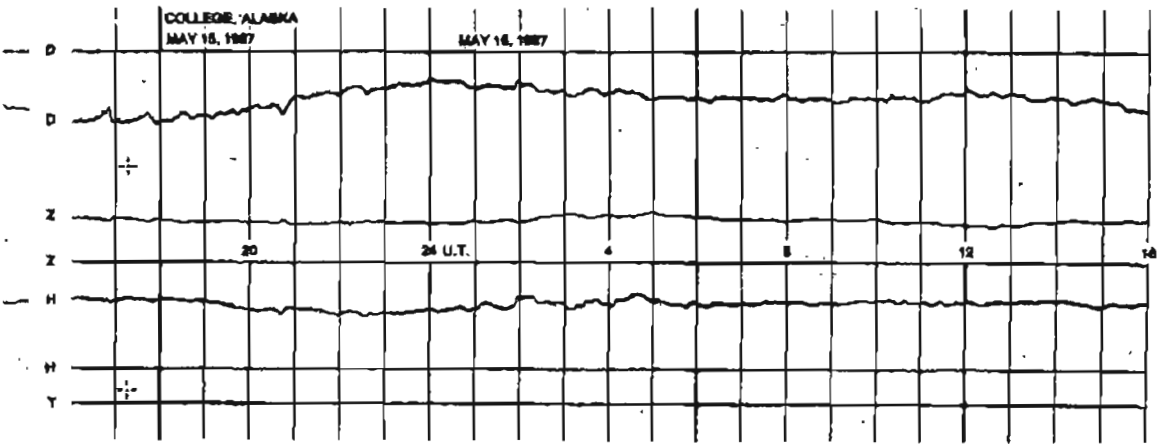
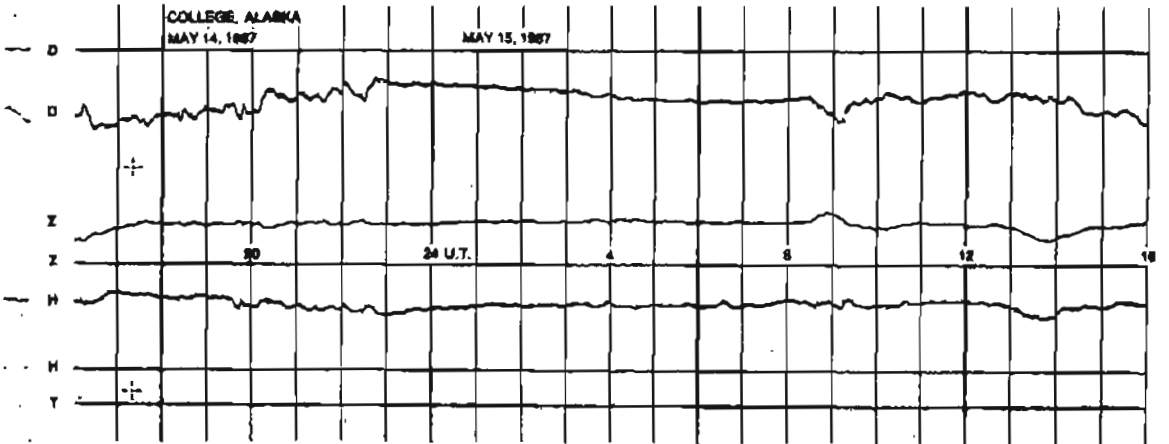
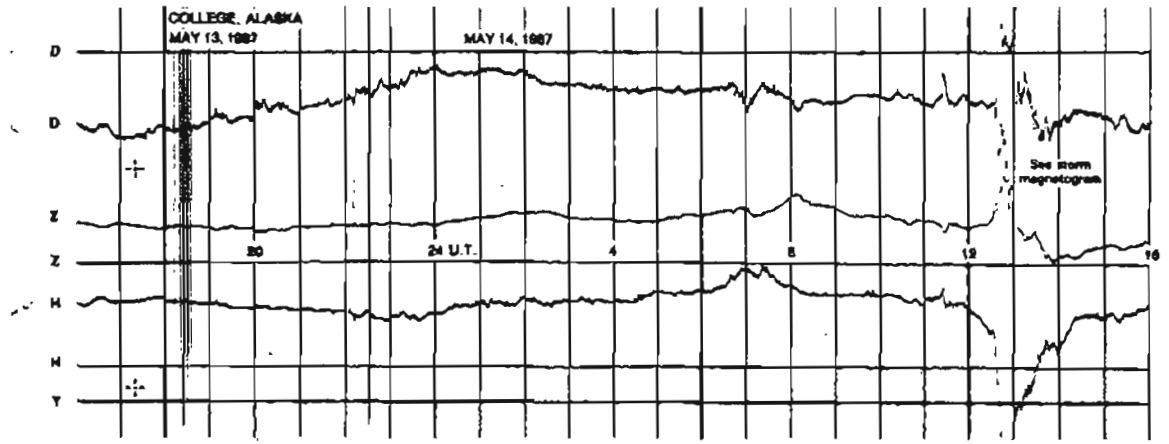
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

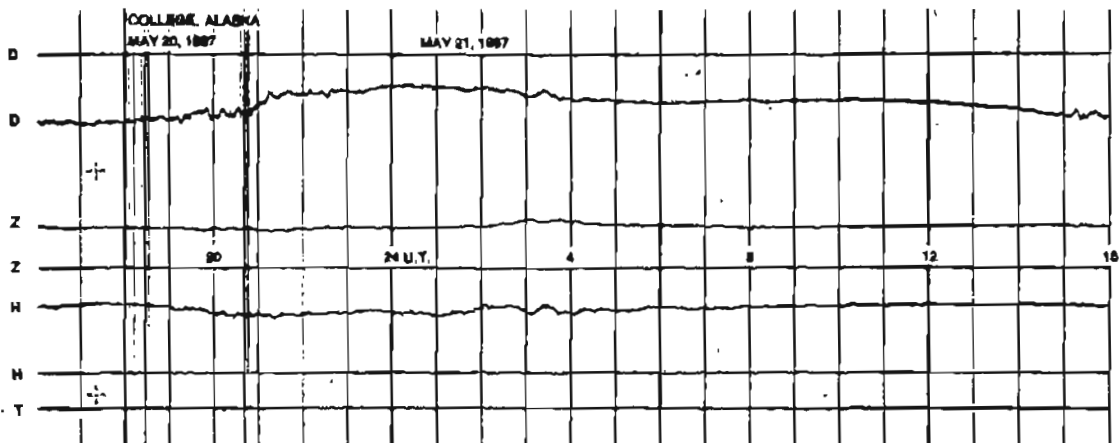
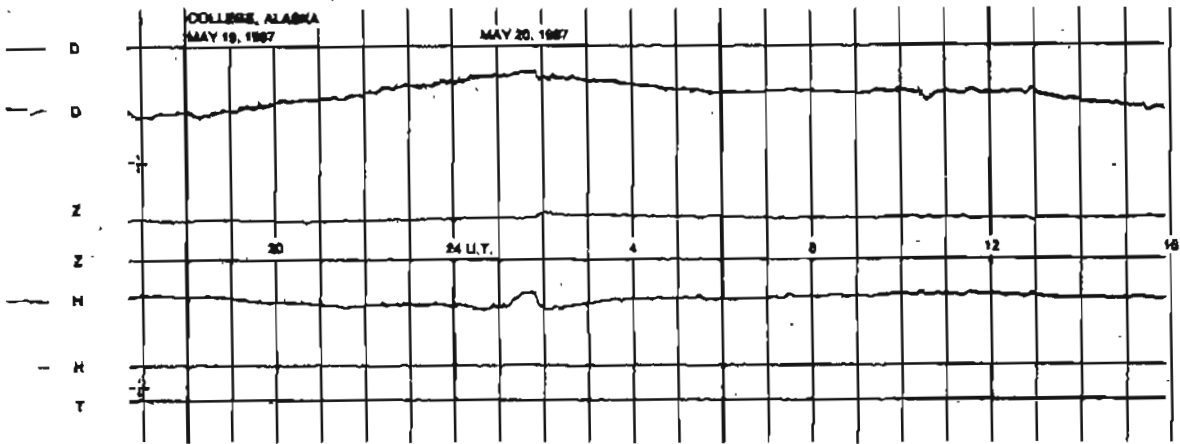
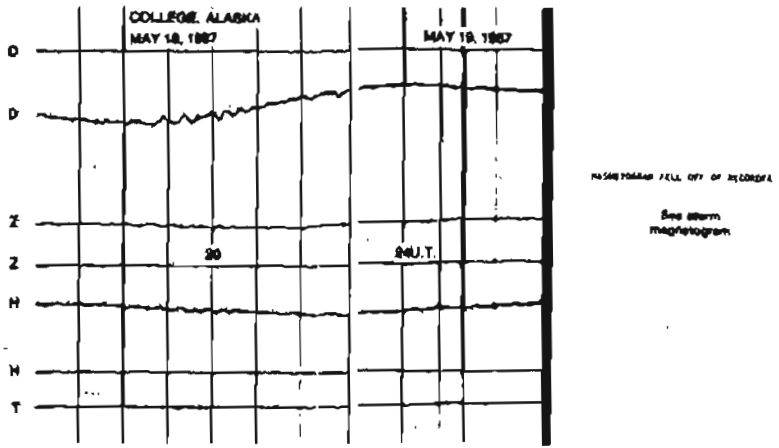
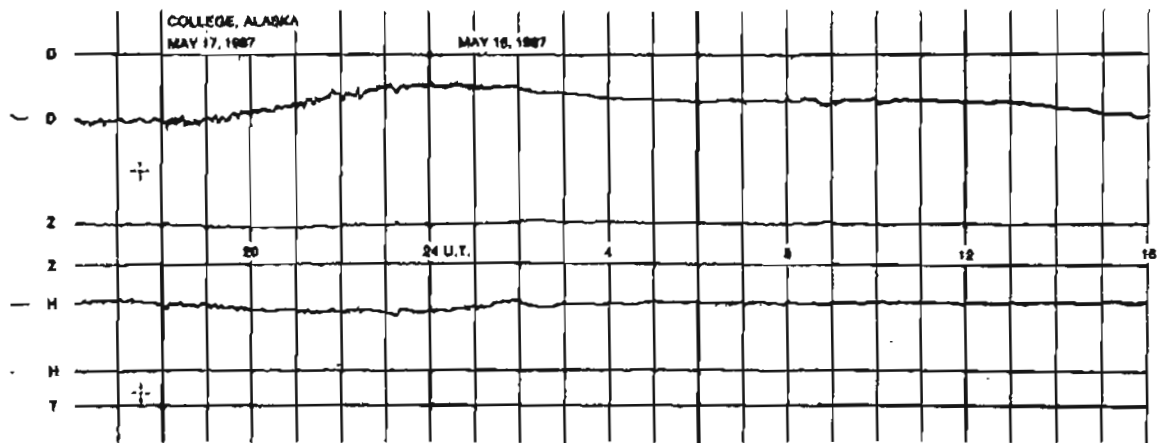


NORMAL MAGNETOGRAMS



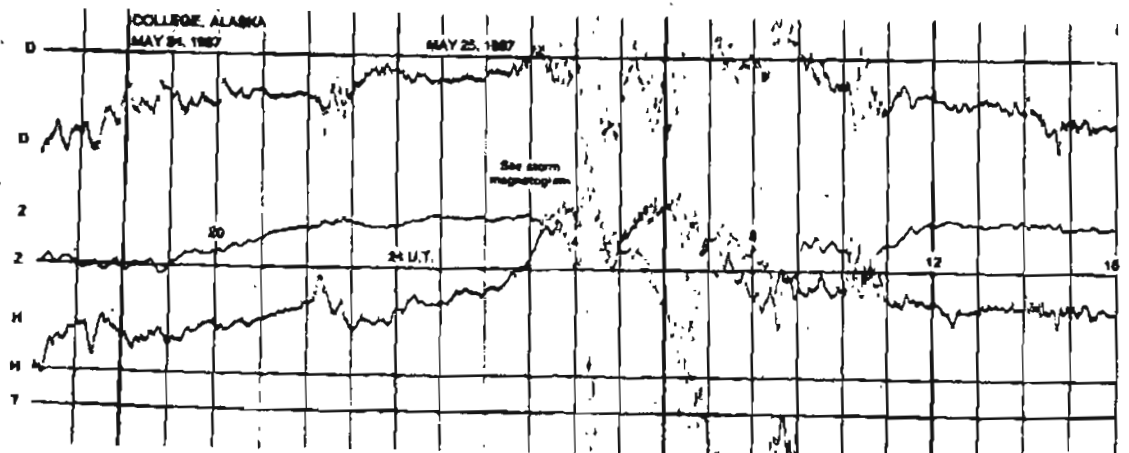
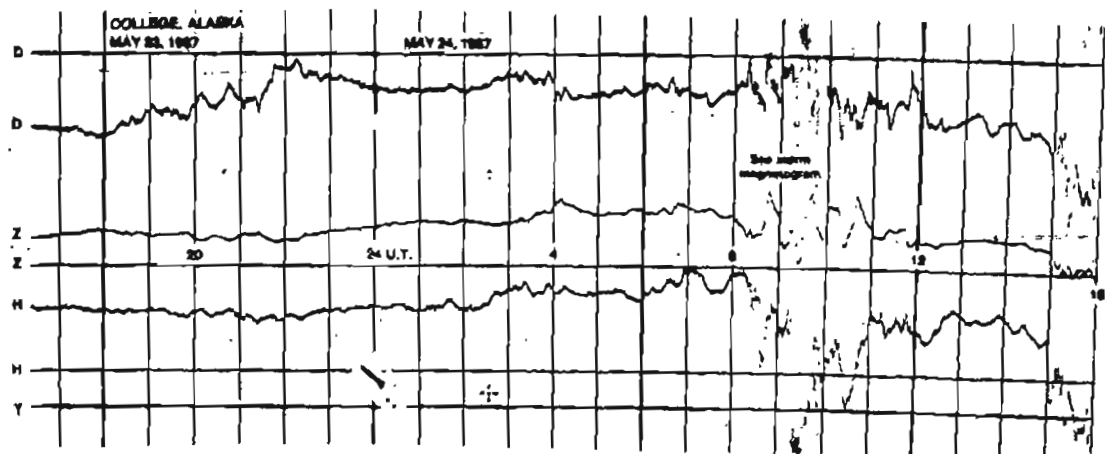
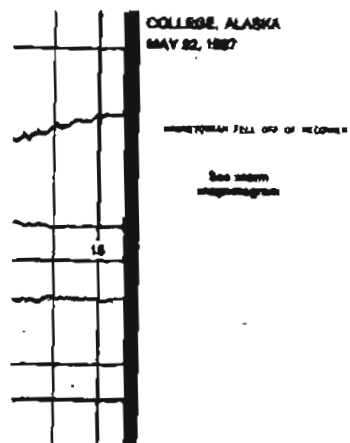
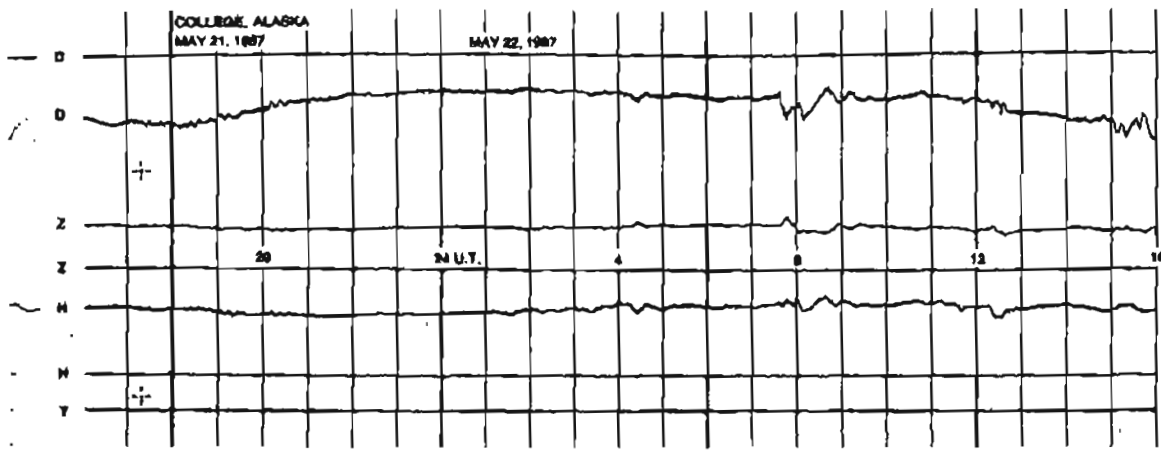
NORMAL MAGNETOGRAMS

200 mm
100 mm
0

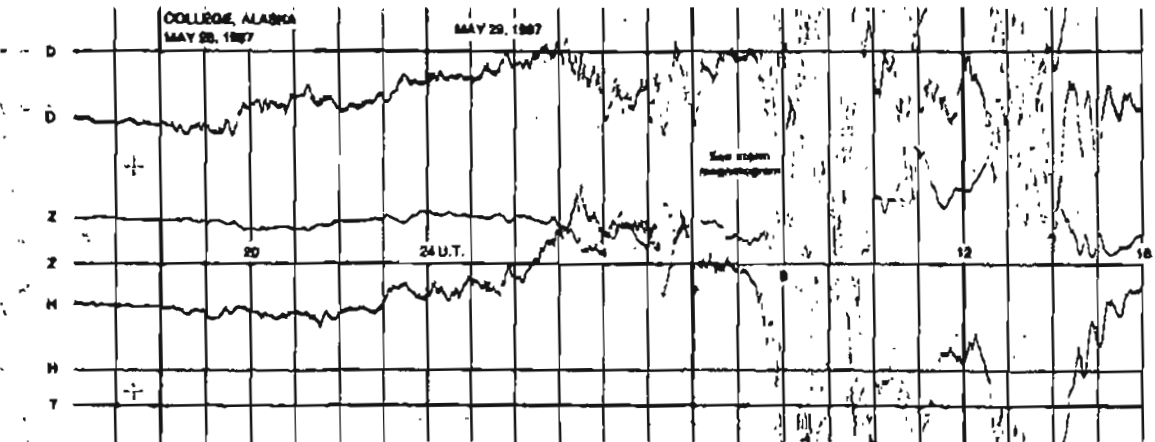
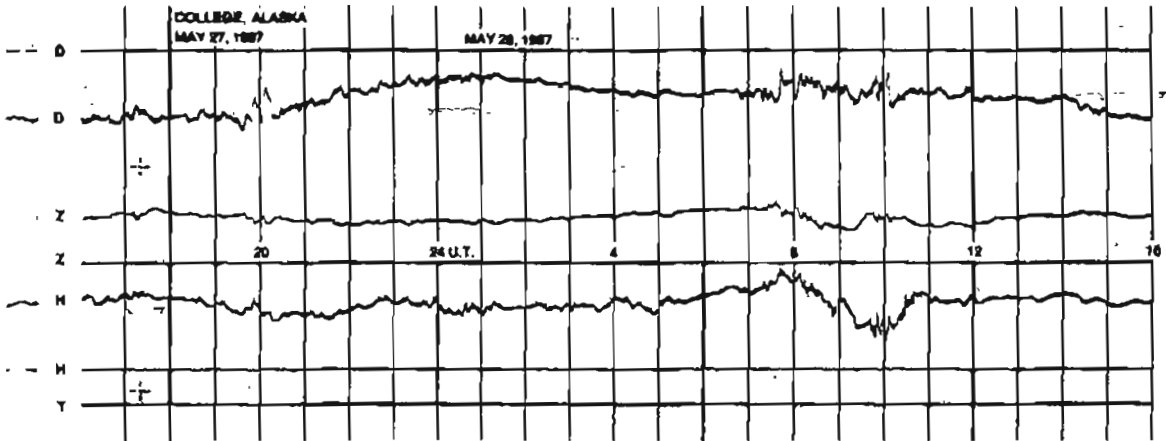
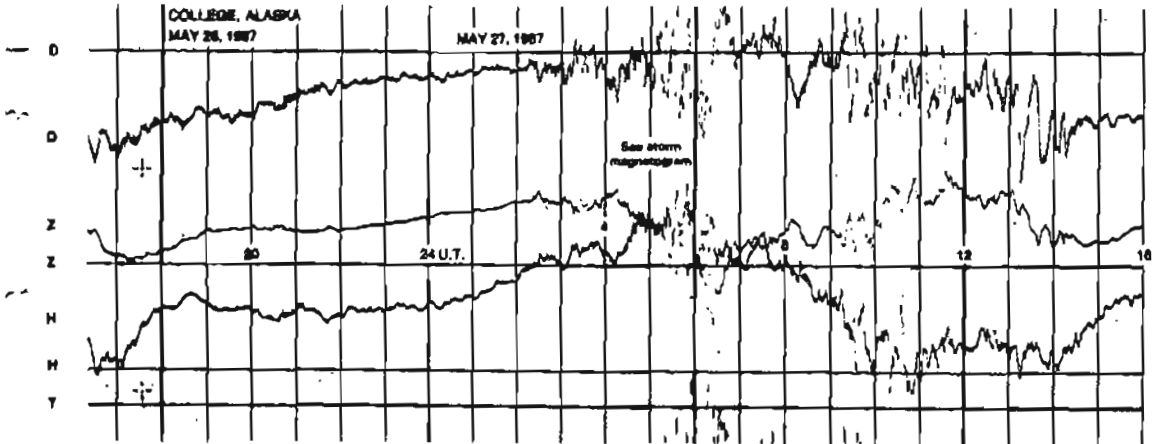
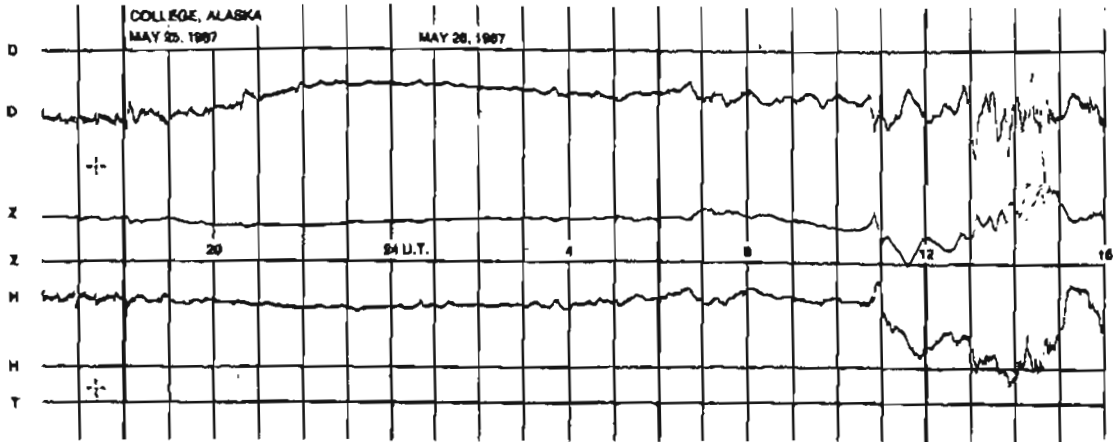


NORMAL MAGNETOGRAMS

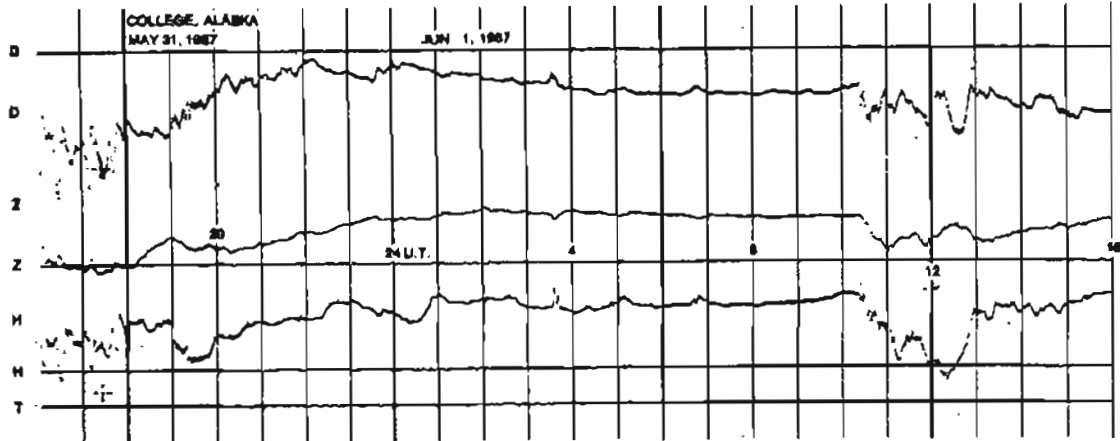
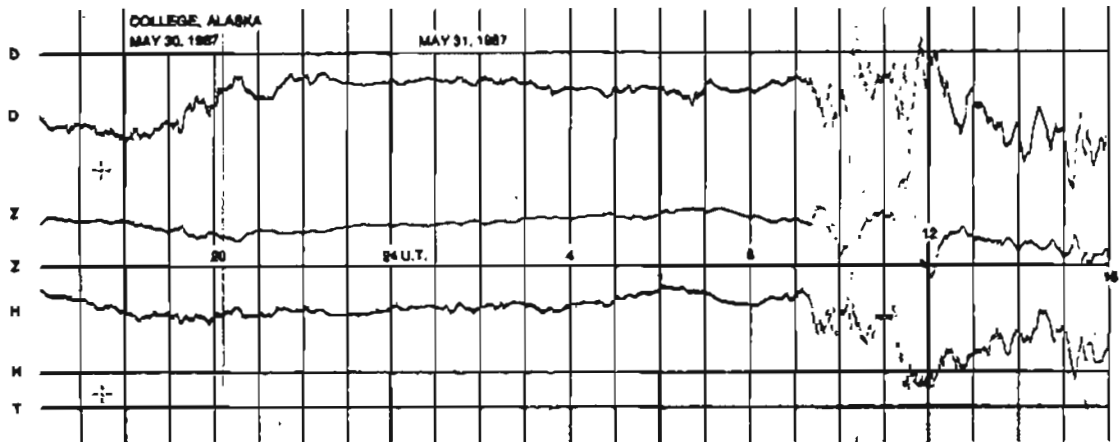
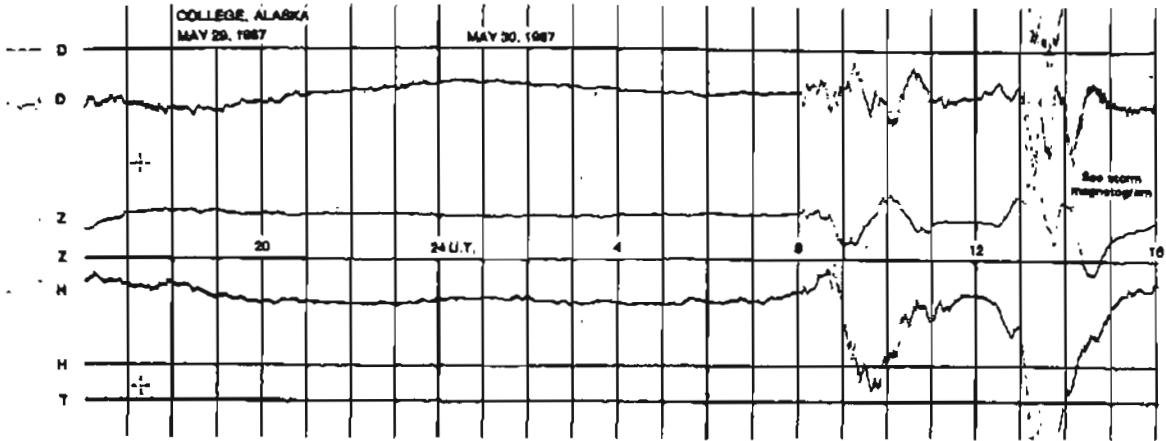
200 mm
100 mm
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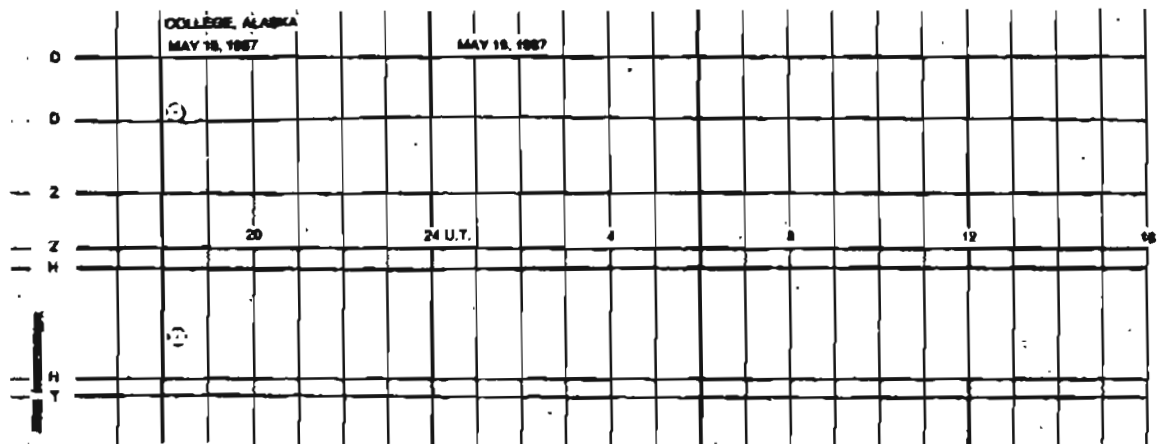
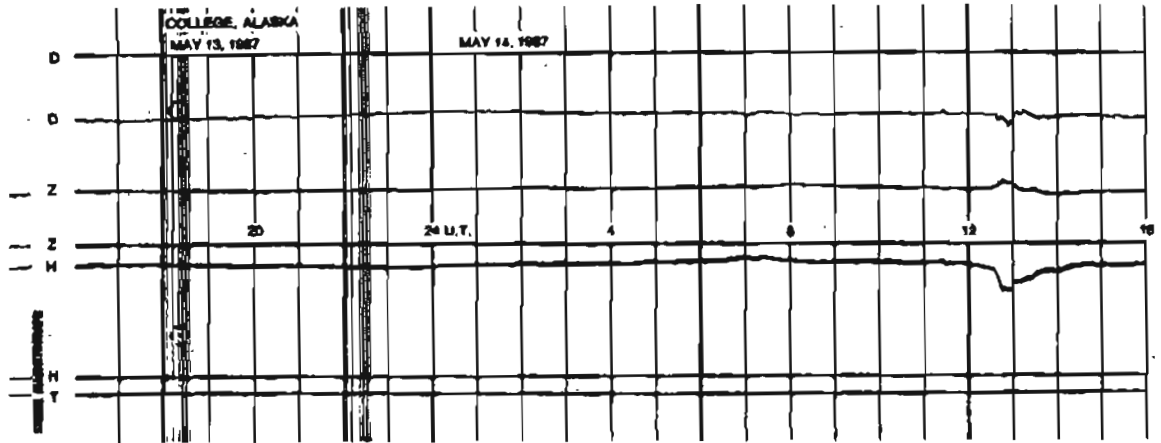
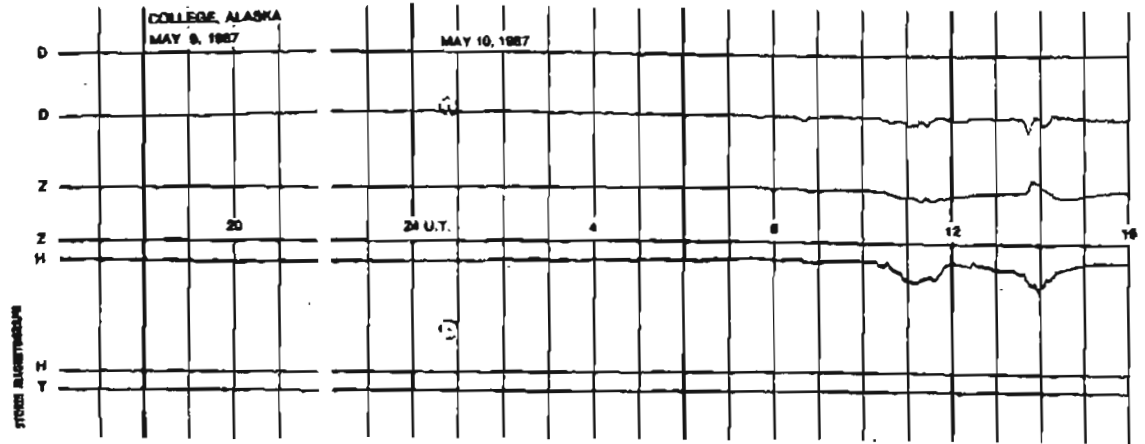
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

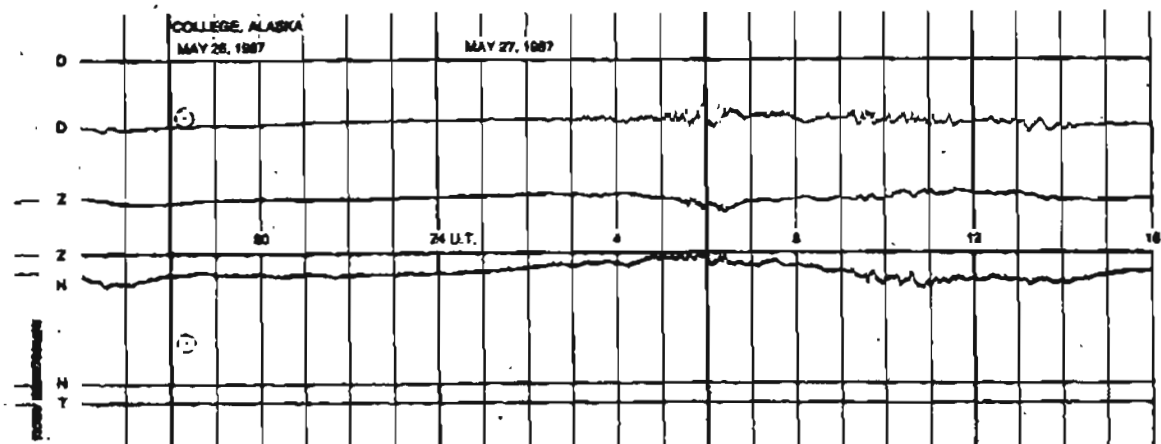
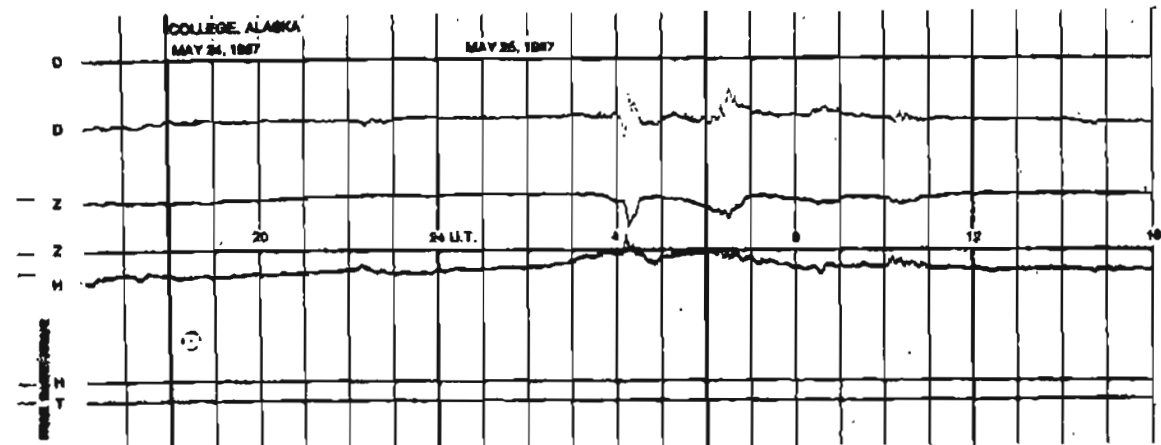
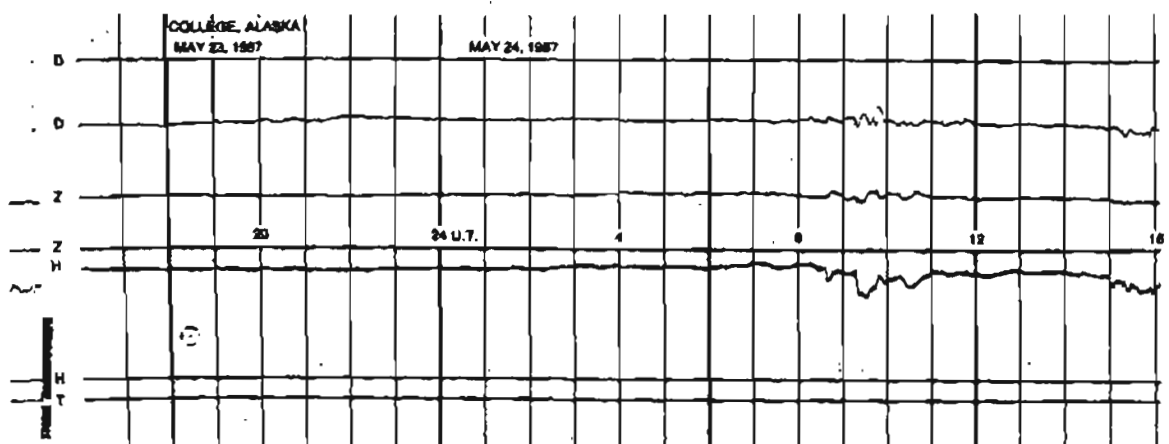
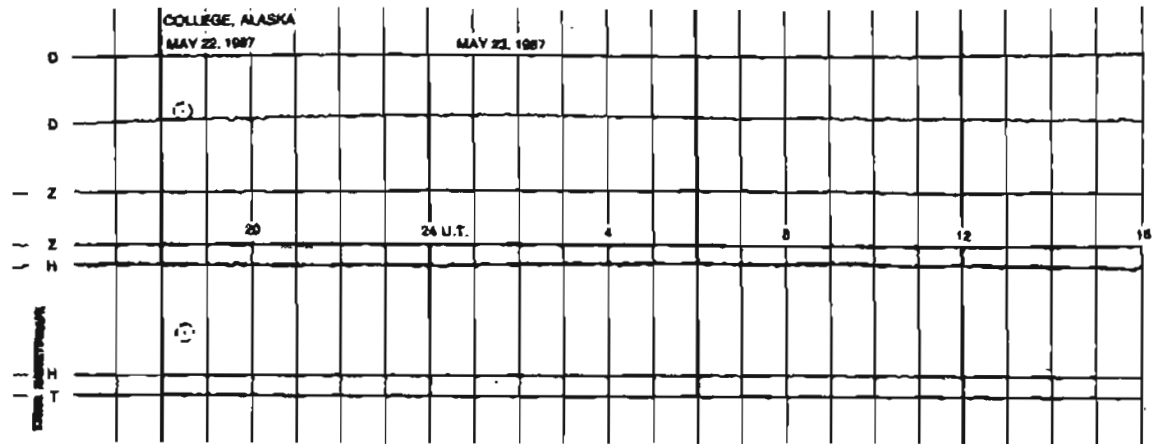


STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

200mm
100mm
0



STORM MAGNETOGRAMS

