

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

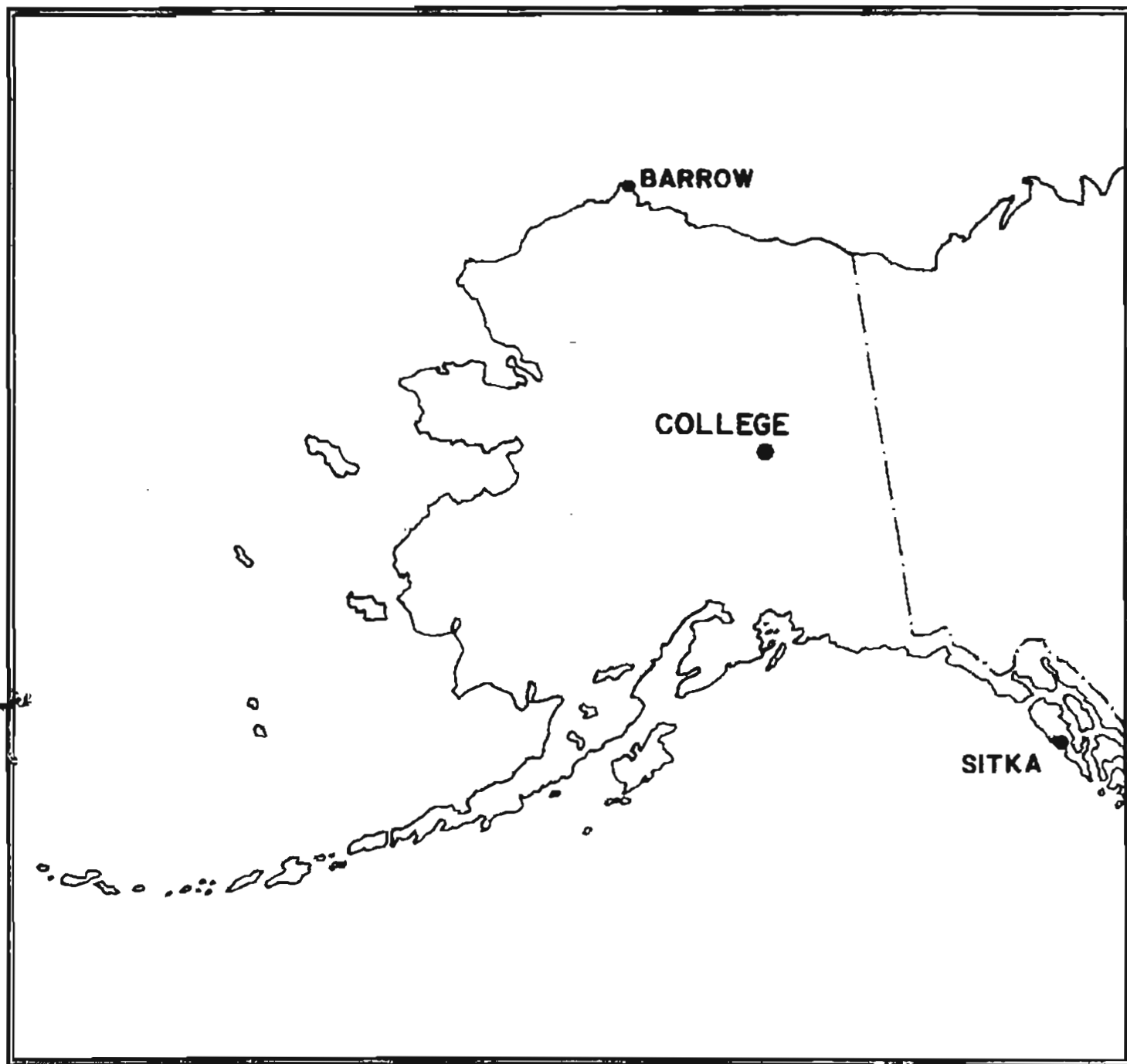
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

APRIL 1986

OPEN FILE REPORT 86-0300D



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: J.E. PAPP, H.K. REX, L.Y. TORRENCE, P.A. FRANKLIN 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

Outstanding Magnetic Effects

Principal Magnetic Storms

Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings

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 99701

Requests for copies of the magnetograms except for the current month should be addressed to:

World Data Center A  
NCAA D63, 225 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..... $147^{\circ}30.2'W$   
Geomagnetic latitude..... $+64.6^{\circ}$   
Geomagnetic longitude..... $+256.9^{\circ}$   
Elevation.....200 meters

### GEOMAGNETIC DATA

Normal, Storm and Rapid Run magnetograms and appropriate calibration data are processed daily at the observatory and are available for analysis or copying. Also available, are mean hourly scalings, K-Indices, selected magnetic phenomena reports and on a real-time basis are recordings from a 3-component fluxgate magnetometer and F-component proton magnetometer.

#### 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 beginning 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)

The Magnetic Daily Character Figure, C: To each Universal day a character is assigned on the basis C=0, if it is quiet; C=1, if it is moderately disturbed; C=2, if it is greatly disturbed. The method used to assign characters at the College Observatory is based on AK as follows:

AK Range	C
0-11	0
11-50	1
50+	2

Routine assignment of C was discontinued at College on January 1, 1976.

#### Selected Phenomena & Outstanding Magnetic Effects

Prior to January 1, 1976, the Normal and Rapid Run records were reviewed at the observatory for selected magnetic phenomena and the events identified were forwarded to the IUGG Commission on Magnetic Variations and Disturbances. This was discontinued on January 1, 1976, but a report on Outstanding Magnetic Effects is prepared monthly for this report.

#### 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 averages 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 sheets 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 he is interested in the detailed morphology of the magnetic field, he should 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

April 1986

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

K SCALE USED: LOWER LIMIT FOR K = 9..... CURRENT SCALE VALUE..... LOWER LIMIT FOR K = 9.....	D	H	Z	(mm)
	675.7	322.2		(γ/mm)
	3.71	7.80		(to nearest 10γ)
	2510	2510		

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.  
APPROVED John B. Townshend, Chief, College Observatory  
OBSERVER IN CHARGE

# OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY

College, Alaska

MONTH

YEAR

April

1986

DATE	TIME U.T.	NATURE OF PHENOMENON <sup>1</sup>	REMARKS
06	13xx	pi 2	
15	0434	si*	

IDENTIFIED BY: JEP

VERIFIED BY: JEP

1. NATURE OF PHENOMENON: ssc, ssc\*, si, si\*, b, bp, bs, bps, pc1, pc2 - - - pc5, pg, pi 1, pi 2, sfe.

PRINCIPAL MAGNETIC STORMS  
COLLEGE OBSERVATORY, COLLEGE, ALASKA

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

Data from Individual Observatories:

April 19 86

Obs. # letter IAGA use	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)								
00	64.96 N																					
		No Principal Magnetic Storms Observed This Month																				

NORMAL MAGNETOGRAPHS					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T. 4-1-86	2400 U.T. 4-30-86	1.6/mm	3.78/mm	27° 16.5 E
H	0000 U.T. 4-1-86	2400 U.T. 4-15-86	7.88/mm		126648
	0000 U.T. 4-16-86	2400 U.T. 4-30-86	"		126738
Z	0000 U.T. 4-1-86	2400 U.T. 4-15-86	7.68/mm		551868
	0000 U.T. 4-16-86	2400 U.T. 4-30-86	"		551818

STORM MAGNETOGRAPHS					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T. 4-1-86	2400 U.T. 4-30-86	7.9/mm	29.58/mm	23° 47.0 E
H	0000 U.T. 4-1-86	2400 U.T. 4-15-86	43.88/mm		106878
	0000 U.T. 4-16-86	2400 U.T. 4-30-86	"		107108
Z	0000 U.T. 4-1-86	2400 U.T. 4-15-86	48.78/mm		541348
	0000 U.T. 4-16-86	2400 U.T. 4-30-86	"		541498

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

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
27° 32.7 E	128788	553368

\* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: APRIL 4, 6, 7, 11, 27,

U.S. Dept. of Interior  
Geological Survey

Observatory  
College, Alamosa

Month  
April

Year  
1986

Jep-00 - 1/88

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS  
(UNUSUAL TIME)

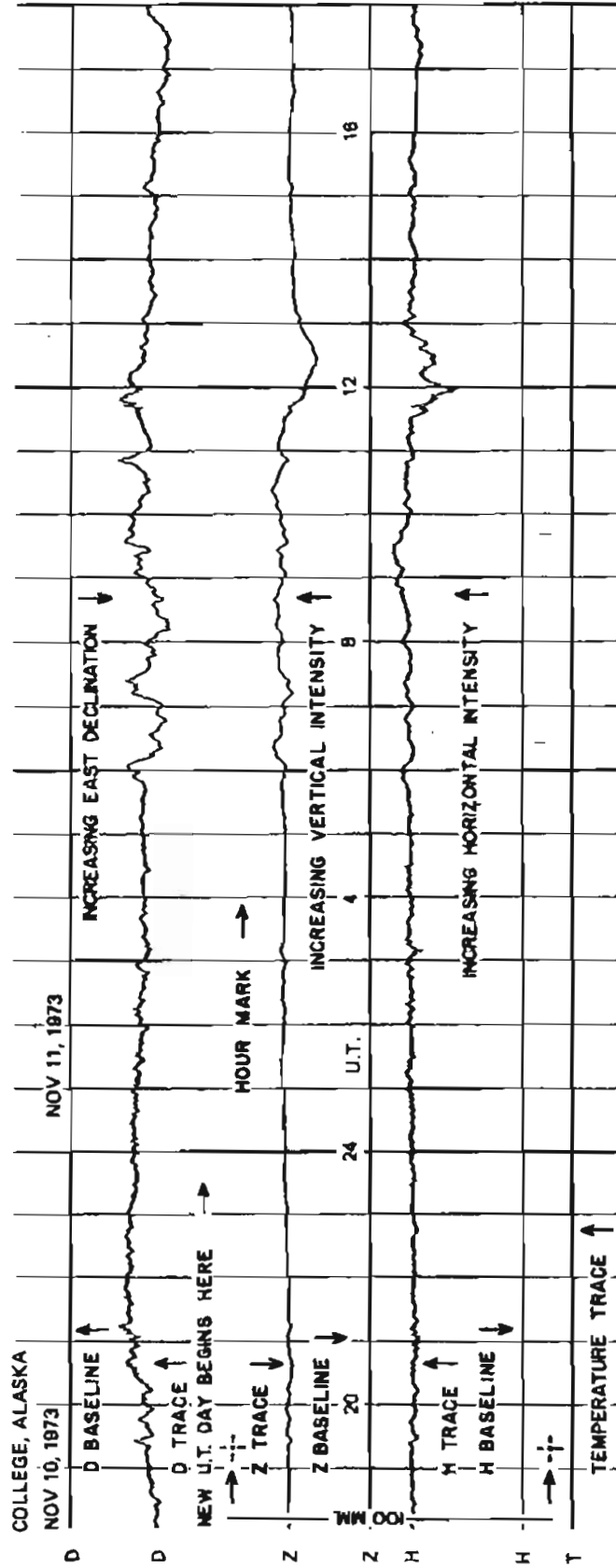
Values are in Testes of mm and are averages for successive periods of one hour beginning at Midnight. Shortage Corrections have been applied. Negative Values to be read with Minus.

COMPONENT	D												H												I												COMPONENT	
	4				6				7				11				11				11				11				11				11					DAY
	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12		
DAY	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	DAY	
Hr	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	Hr	
Hour	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	Hour	
01	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	01	
02	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	02		
03	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	03			
04	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	04				
05	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	05					
06	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	06						
07	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	07							
08	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	08								
09	170	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	09									
10	175	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	10										
11	180	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	11											
12	185	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	305	12												
13	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	13														
14	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	14															
15	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	15																
16	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	16																	
17	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	17																		
18	215	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	18																			
19	220	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	19																				
20	225	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	20																					
21	230	235	240	245	250	255	260	265	270	275	280	285	290	295	300	21																						
22	235	240	245	250	255	260	265	270	275	280	285	290	295	300	22																							
23	240	245	250	255	260	265	270	275	280	285	290	295	300	23																								
24	245	250	255	260	265	270	275	280	285	290	295	300	24																									
DAILY SUM	4180	4018	3854	3684	3514	3344	3174	3004	2834	2664	2494	2324	2154	1984	1814	1644	1474	1304	1134	964	794	624	454	284	114	44	24	DAILY SUM										
DAILY MEAN	174	167	163	158	153	148	143	138	133	128	123	118	113	108	103	98	93	88	83	78	73	68	63	58	53	48	43	DAILY MEAN										
MEAN	164												267												201												MEAN	

Scalings	Counted	Average
164	267	201



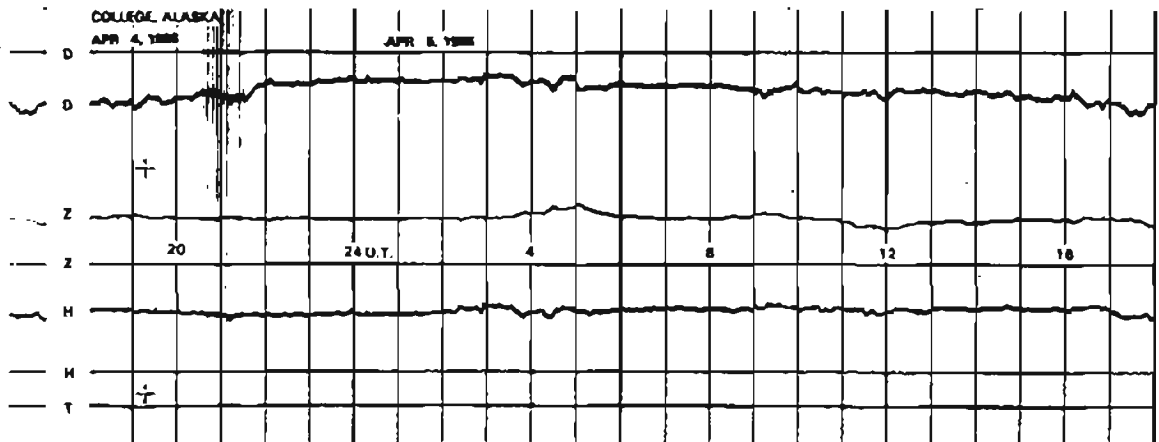
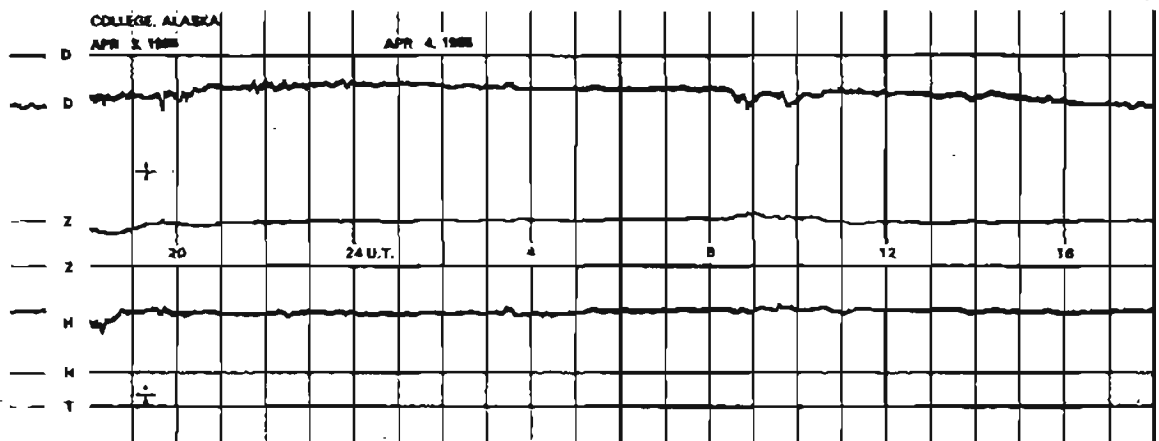
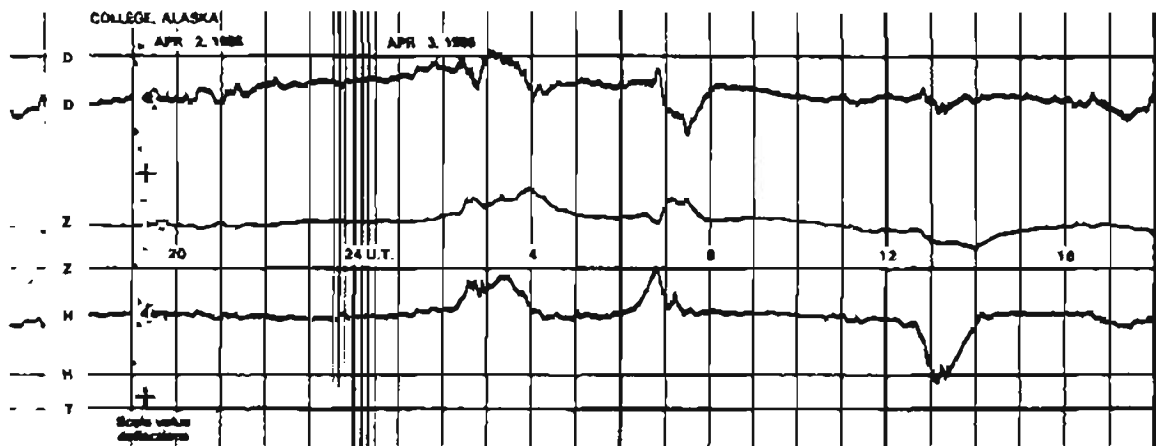
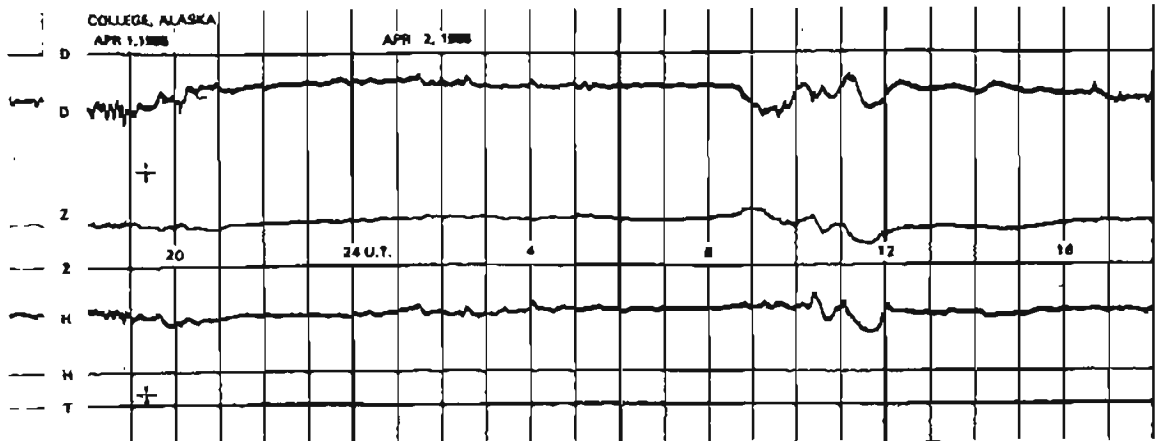
# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

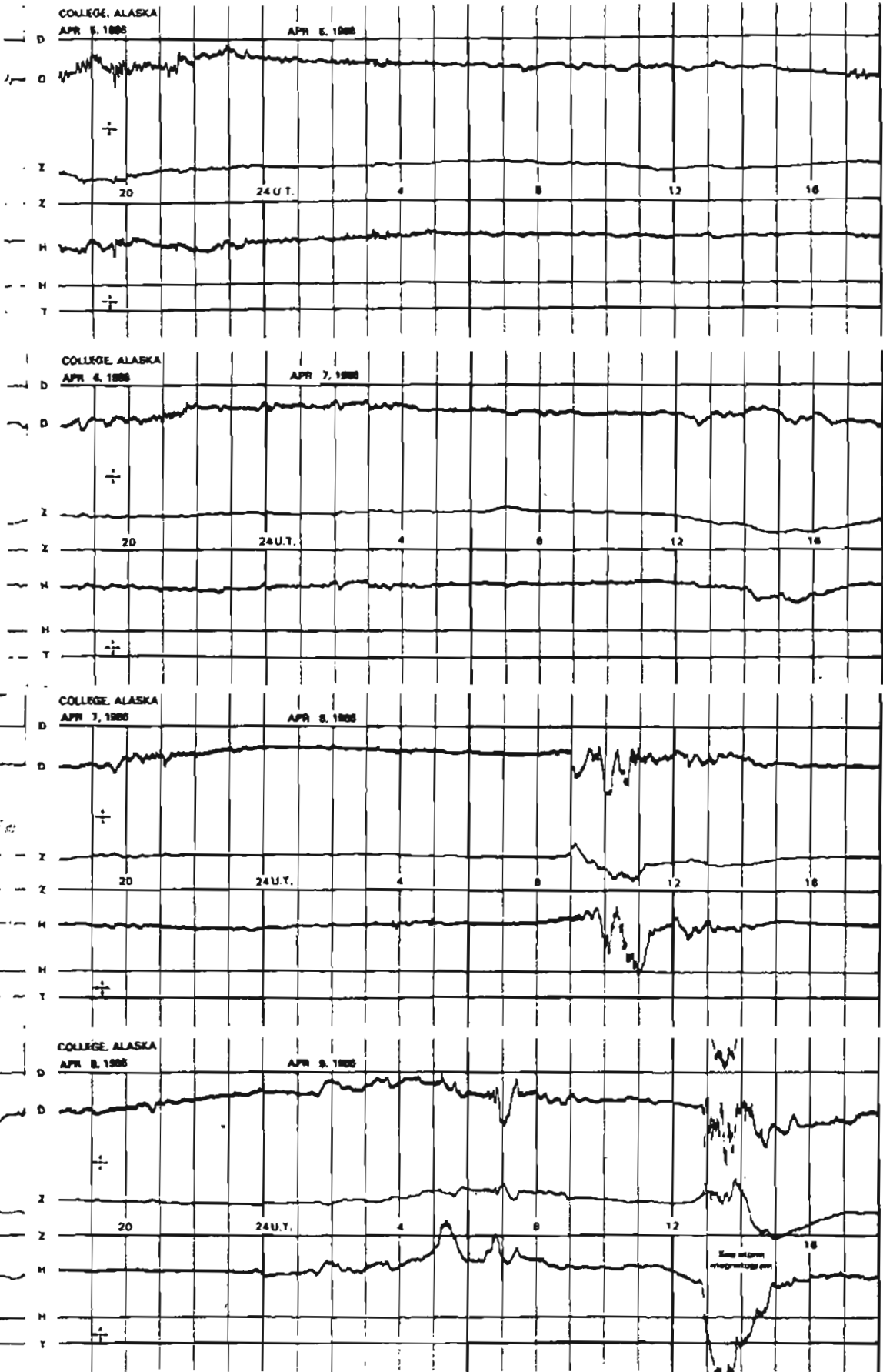
NORMAL MAGNETOGRAMS

100mm  
500mm



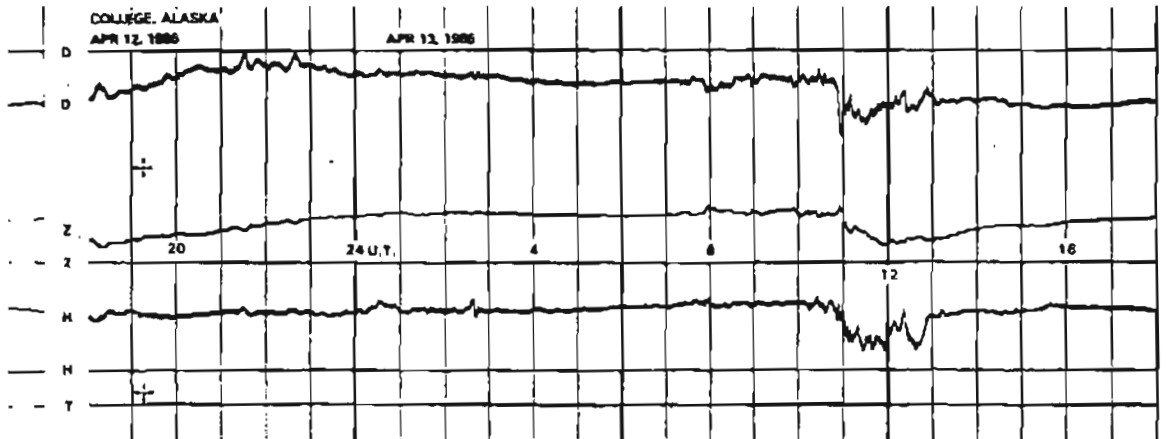
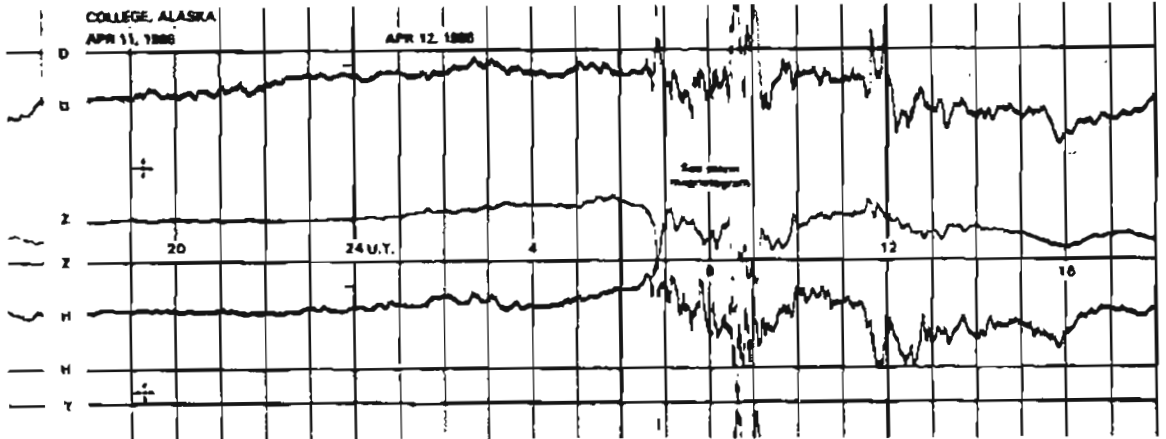
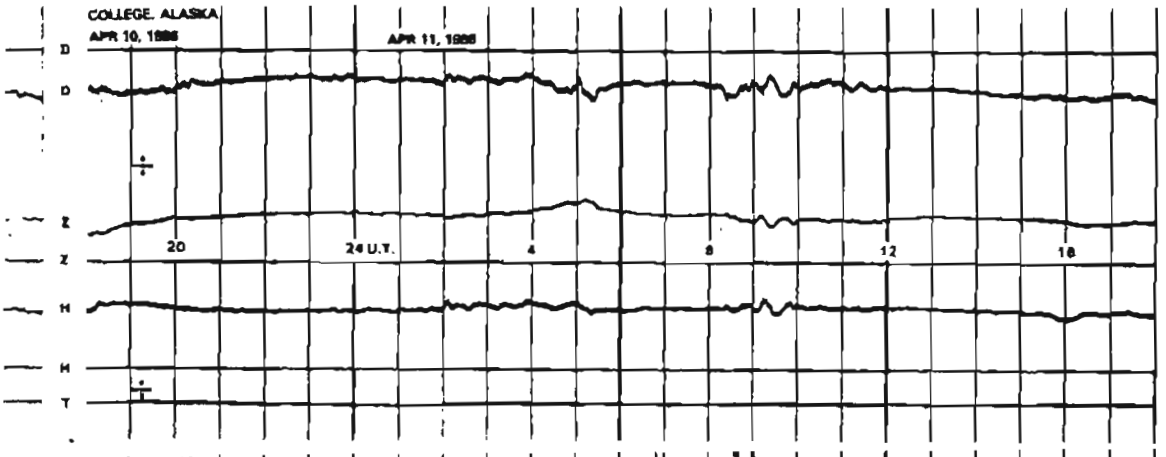
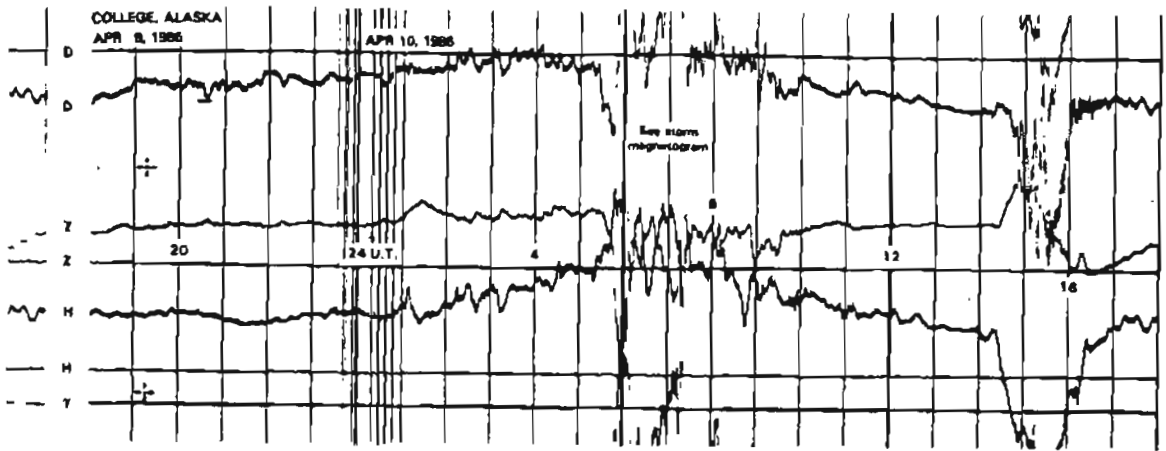
NORMAL MAGNETOGRAMS

100-mv  
200 min



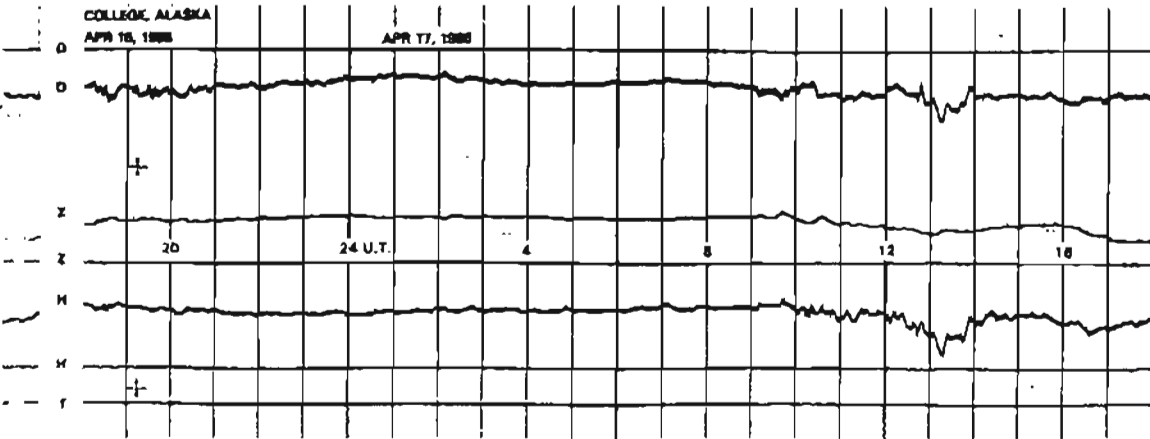
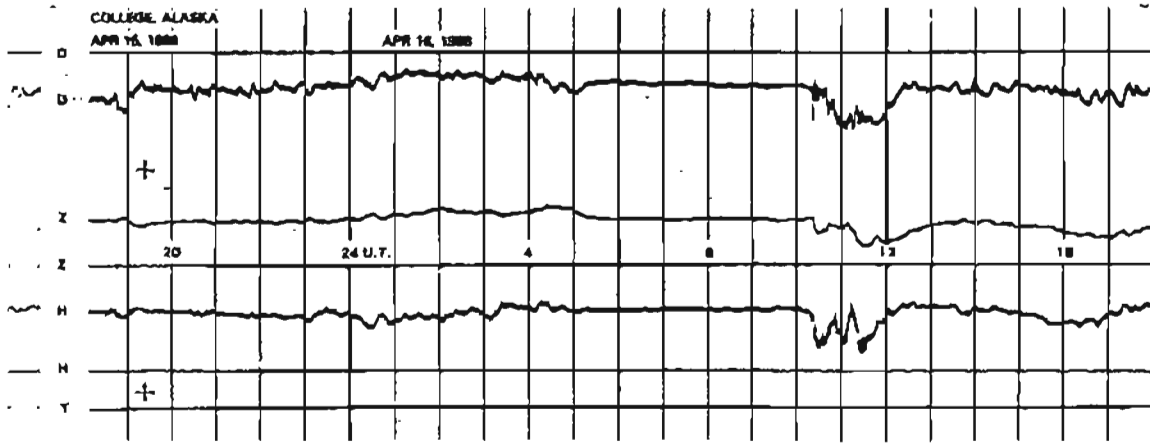
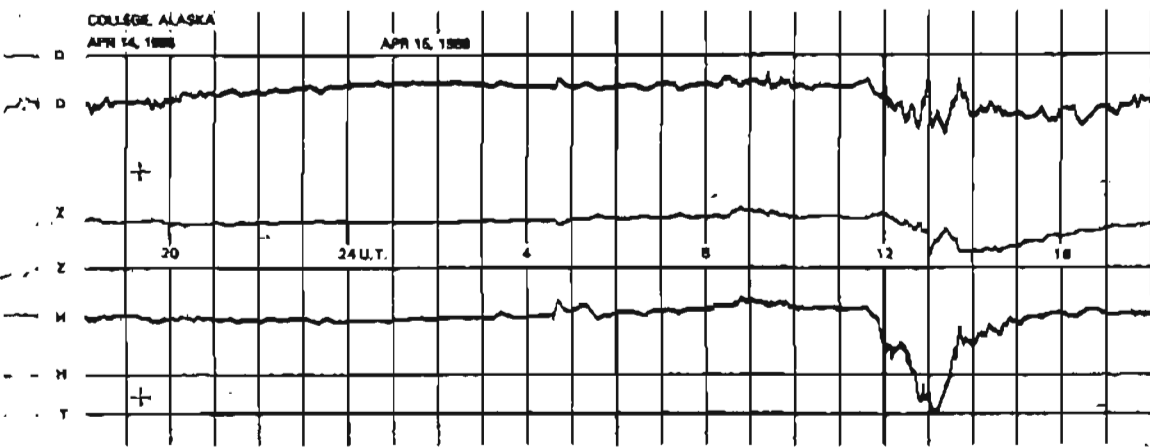
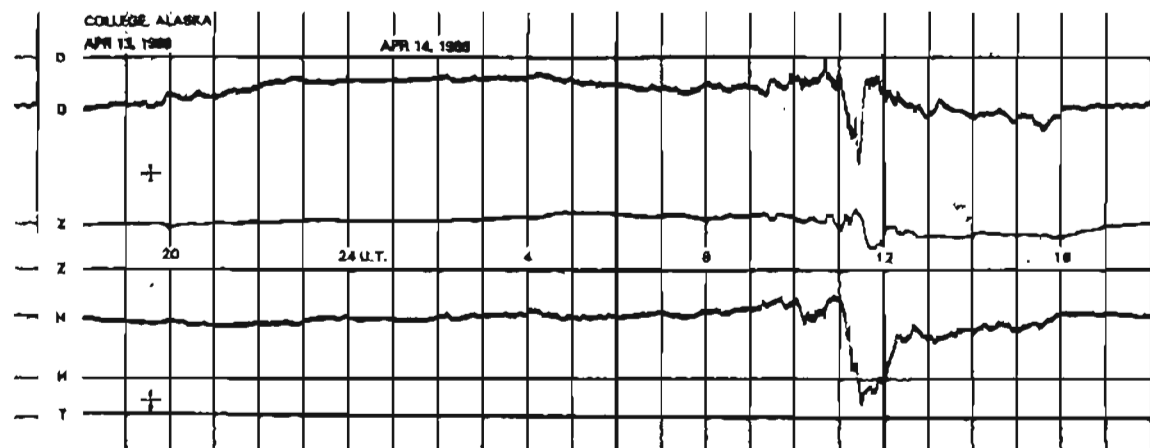
NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0

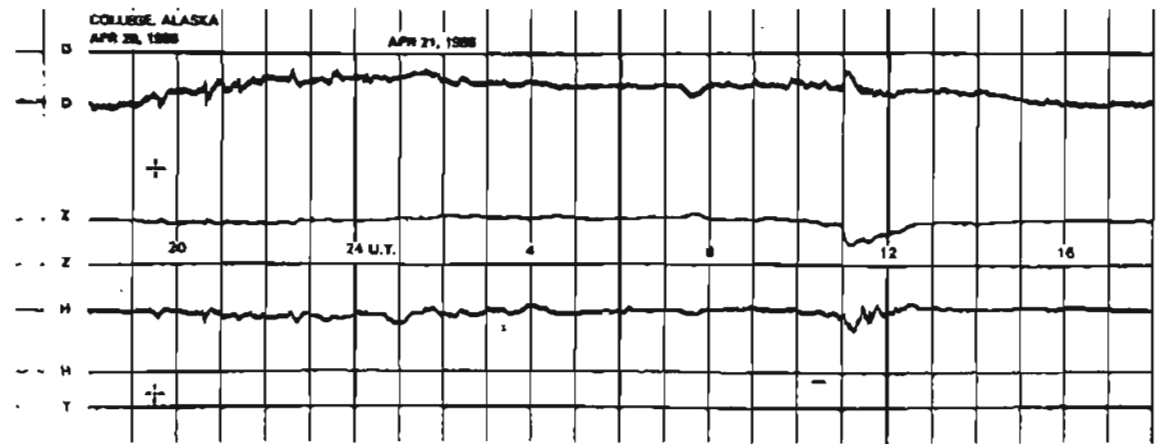
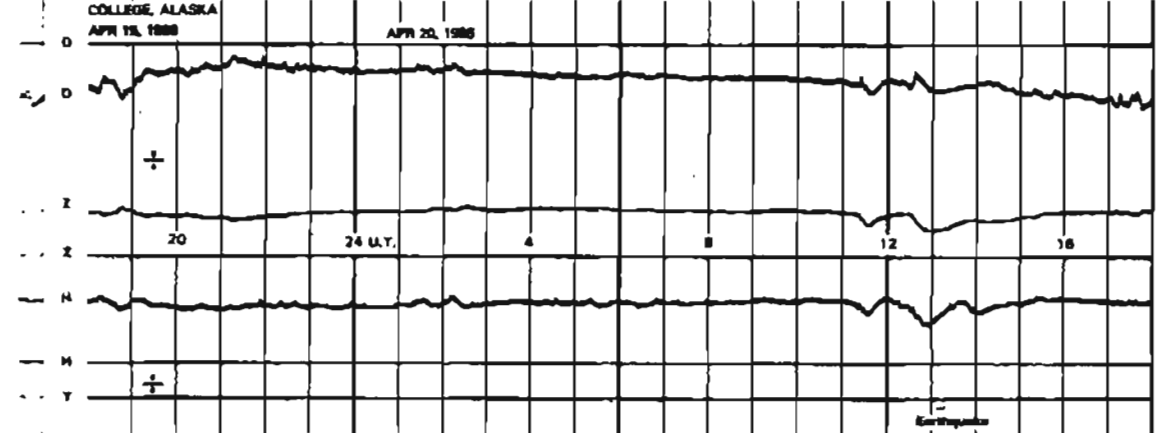
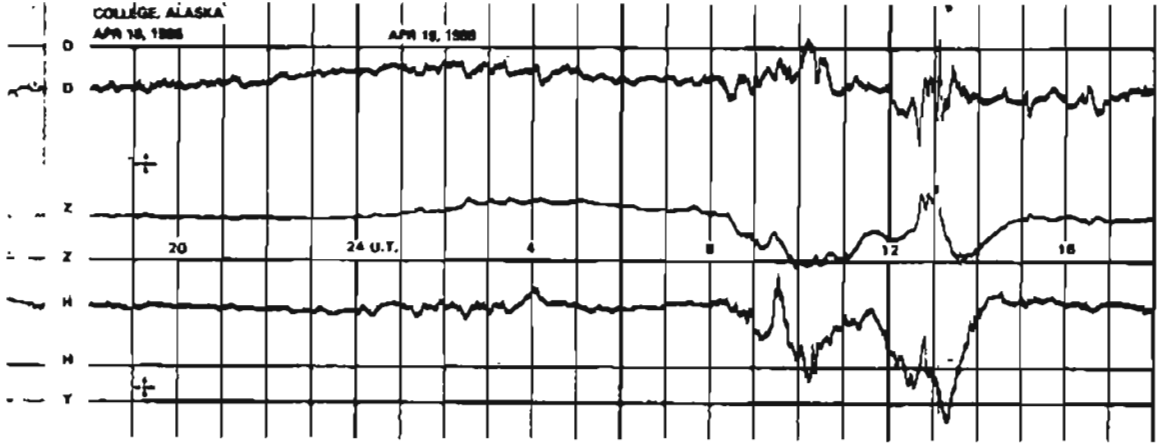
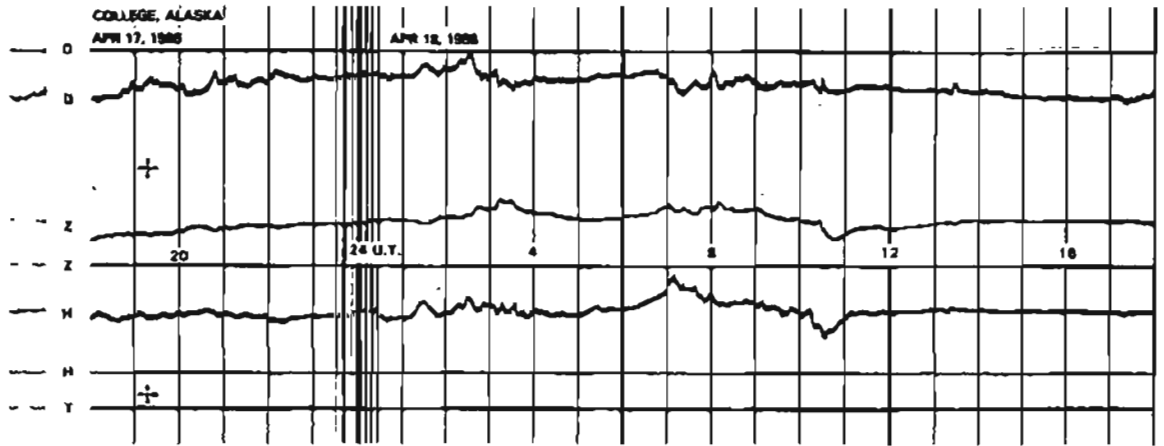


NORMAL MAGNETOGRAMS

200 mm  
150 mm  
0

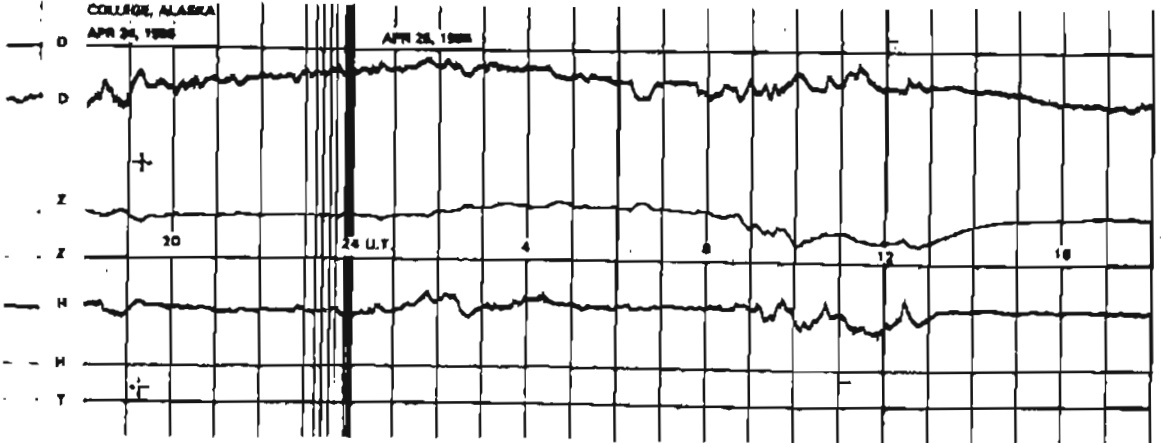
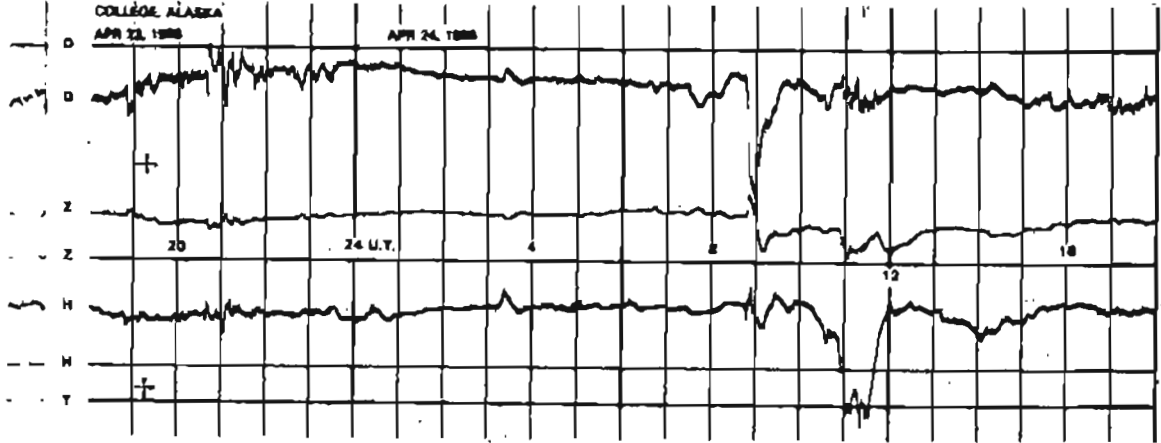
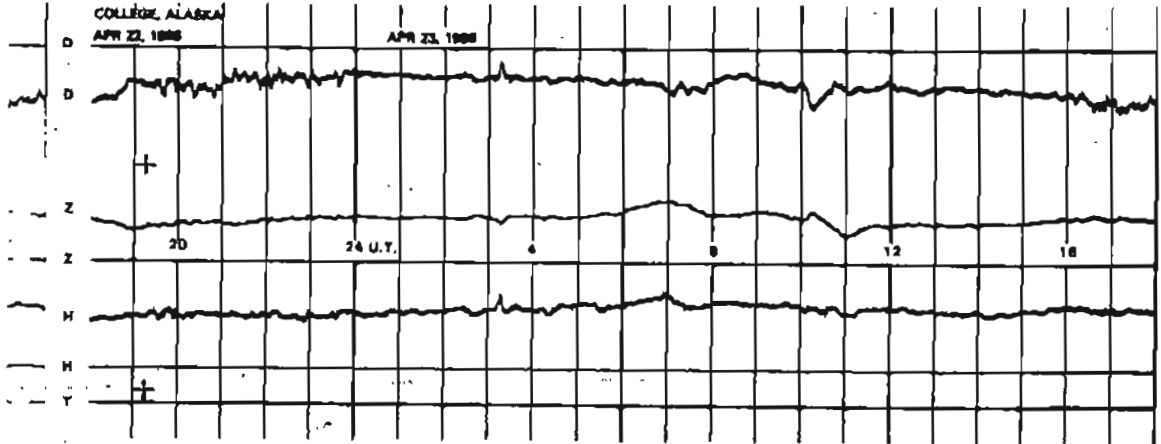
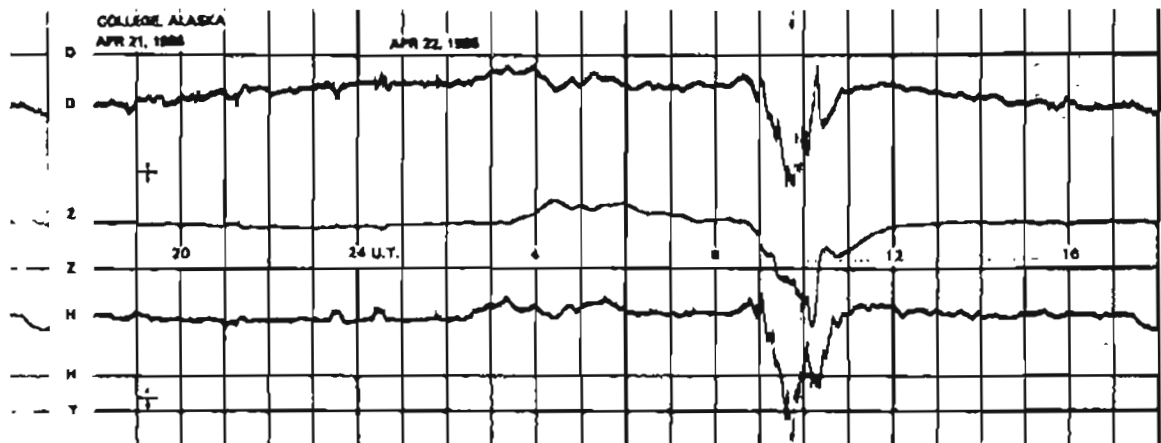


NORMAL MAGNETOGRAMS

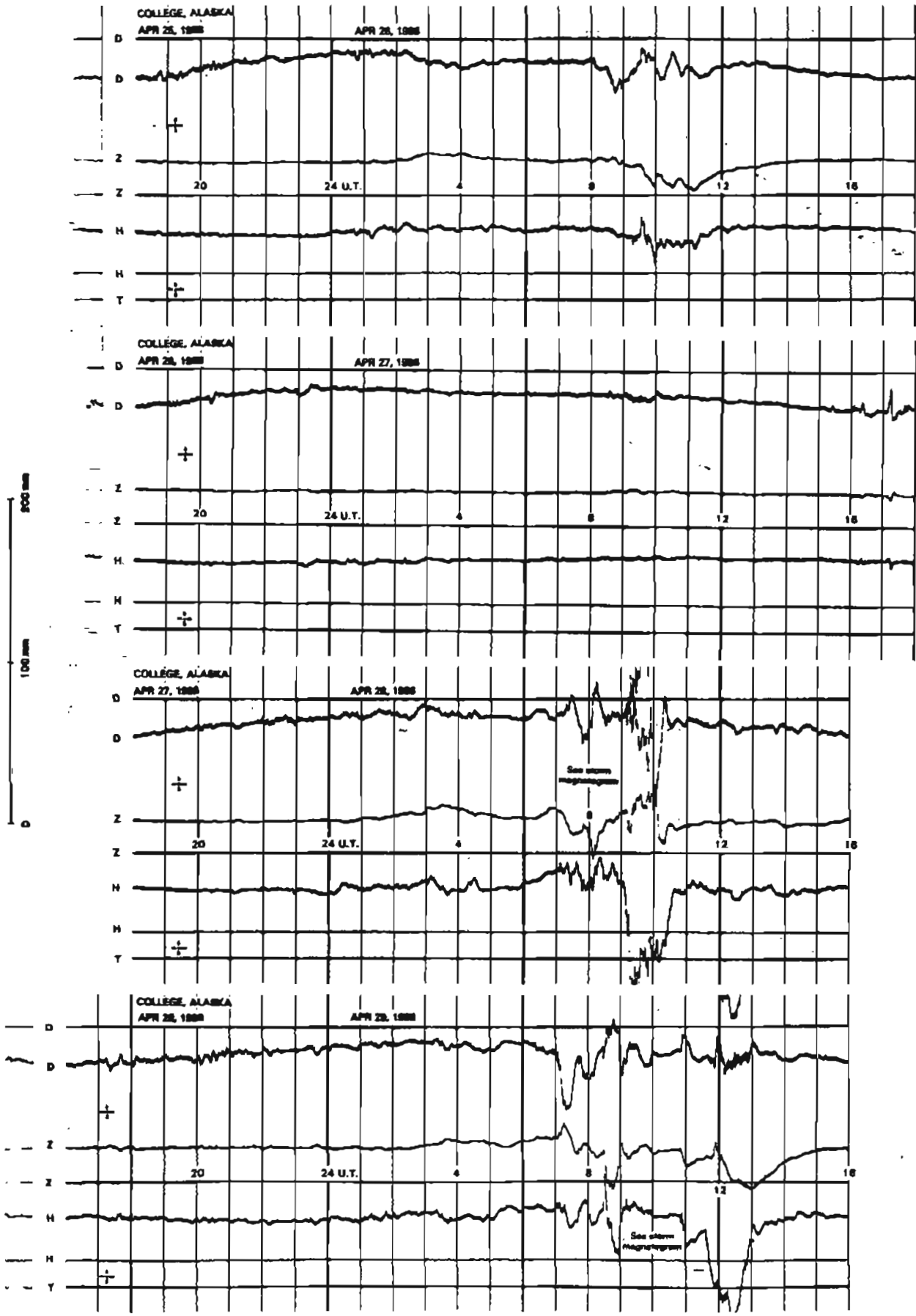


NORMAL MAGNETOGRAMS

800 mm  
100 mm  
0



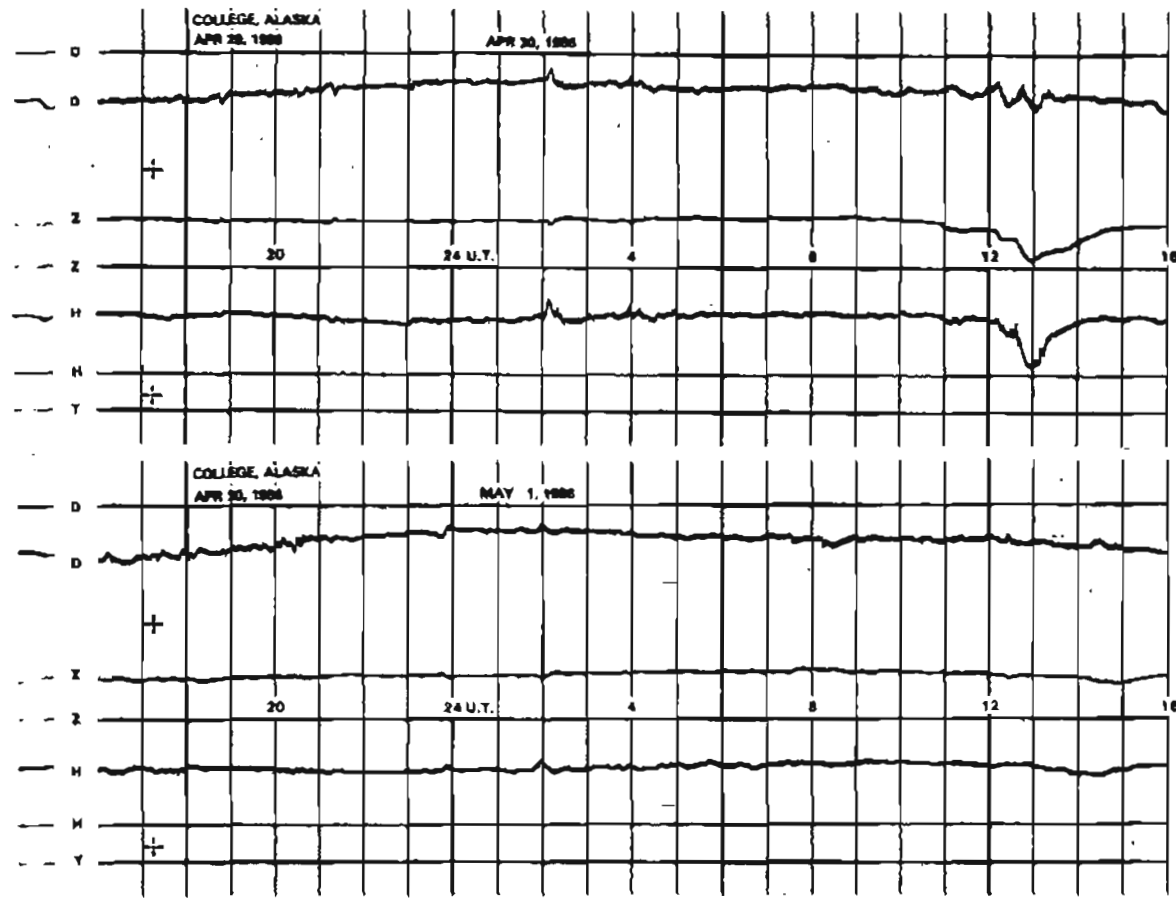
NORMAL MAGNETOGRAMS





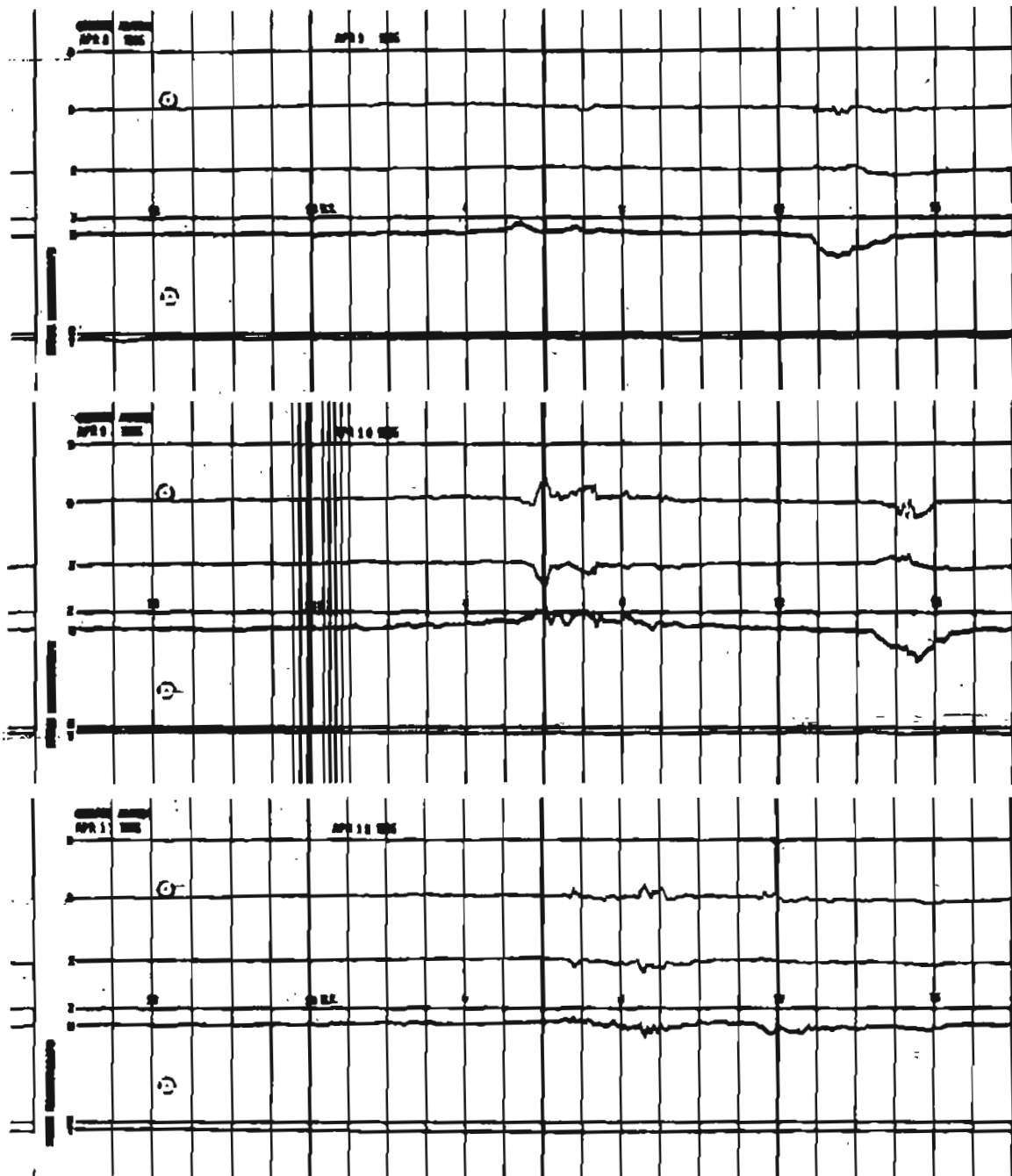
NORMAL MAGNETOGRAMS

100 mm  
150 mm  
0



# STORM MAGNETOGRAMS

100 Gauss  
100 Gauss



# STORM MAGNETOGRAMS

0 100 Gauss 200 Gauss

