

**UNITED STATES DEPARTMENT OF THE INTERIOR**

**GEOLOGICAL SURVEY**

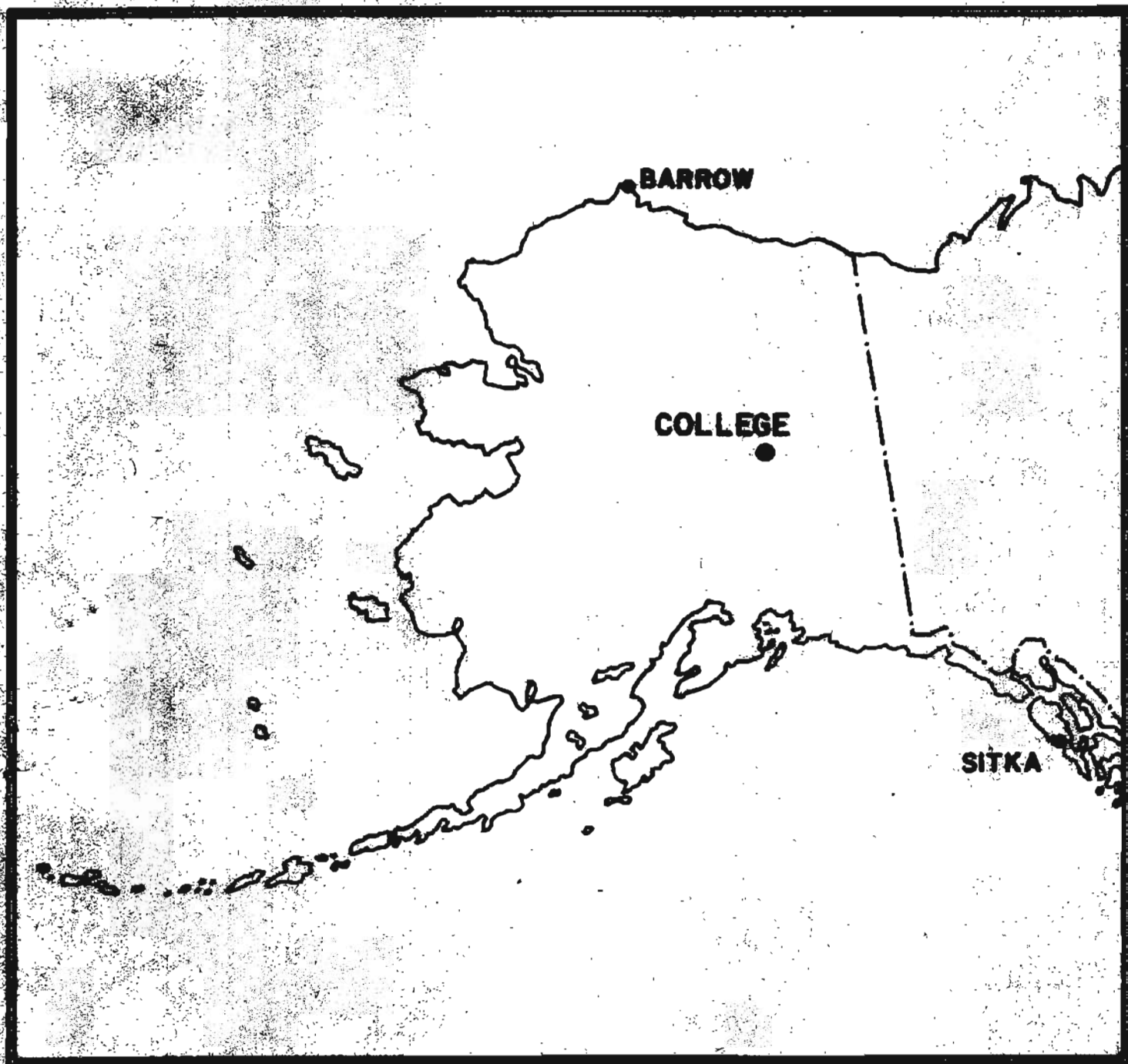
**PRELIMINARY GEOMAGNETIC DATA**

**COLLEGE OBSERVATORY**

**FAIRBANKS, ALASKA**

**FEBRUARY 1986**

**OPEN FILE REPORT 86-0300B**



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: 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  
NOAA D63, 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..... $62^{\circ}51.6'N$   
Geographic longitude..... $147^{\circ}50.2'W$   
Geomagnetic latitude..... $+64.6^{\circ}$   
Geomagnetic longitude..... $+256.5^{\circ}$   
Elevation.....200 meters

### GEOMAGNETIC DATA

Normal, 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 R) 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.

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

MONTH AND YEAR  
FEBRUARY 1986

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	0	0	0	2	2	4	1	2	11	06	SUDDEN COMMENCEMENTS d h m		
2	0	0	2	2	3	1	2	1	11	05			
3	0	1	0	2	1	2	1	2	09	04			
4	2	2	1	1	0	1	1	0	08	03			
5	1	0	0	2	2	3	1	1	10	05			
6	0	0	0	2	4	5	2	2	15	12			
7	2	3	2	7	7	8	7	7	43	104			
8	5	6	7	7	9	9	7	7	57	186			
9	6	5	4	3	4	6	6	4	38	48			
10	3	2	1	1	0	2	4	4	17	11			
11	2	1	1	5	6	7	4	3	29	40			
12	4	3	4	5	5	4	2	3	30	27			
13	2	3	5	5	4	3	2	2	26	22			
14	3	2	3	2	2	3	2	3	20	11			
15	1	1	0	0	0	1	0	0	03	01			
16	1	1	1	0	0	1	2	2	08	03			
17	2	1	0	0	1	2	2	3	11	05			
18	3	2	2	4	4	3	1	2	21	14			
19	2	1	1	4	4	1	2	1	16	10			
20	2	3	2	4	5	5	3	2	26	22			
21	3	3	4	6	4	2	2	4	28	26			
22	4	4	4	6	6	6	5	4	39	50			
23	4	4	5	6	7	7	4	3	40	63			
24	3	3	3	6	6	3	3	3	30	31			
25	3	3	5	6	5	4	3	3	32	33			
26	2	3	5	7	5	7	2	3	34	53			
27	3	4	3	6	3	2	3	2	26	23			
28	3	3	3	6	4	6	5	3	33	37			
29											POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
30													
31													
												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) (γ/mm) (to nearest 10γ)
	675.7	322.2		
	3.71	7.80		
	2510	2510		

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN B. TOWNSHEND, CHIEF, COLLEGE OBSERVATORY  
OBSERVER IN CHARGE

# OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY	
College Observatory	
MONTH	YEAR
February	1986

DATE	TIME U. T.	NATURE OF PHENOMENON <sup>1</sup>	REMARKS
03	18xx	pc5	
.17	13xx	pc3, pc4, pc5	Mixed

IDENTIFIED BY: JEP

VERIFIED BY: JBT

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

PRINCIPAL MAGNETIC STORMS  
COLLEGE OBSERVATORY, COLLEGE, ALASKA  
FEBRUARY 19 86

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

Data from Individual Observatories:

Obs. station 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	07	09XX	..	..	..	..	08	5, 6	9	1056	6110	3000	10 03
		21	23XX	..	..	..	..	23	5, 6	7	183	1350	890	23 23

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 2-1-86	2400 U.T., 2-28-86	1.0/mm	3.7 $\gamma$ /mm	27° 16.5 E
H	0000 U.T., 2-1-86	2400 U.T., 2-28-86	7.8 $\gamma$ /mm		12671 $\gamma$
Z	0000 U.T., 2-1-86	2400 U.T., 2-28-86	7.6 $\gamma$ /mm		55185 $\gamma$

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 2-1-86	2400 U.T., 2-28-86	7.9/mm	29.5 $\gamma$ /mm	23° 46.0 E
H	0000 U.T., 2-1-86	2400 U.T., 2-28-86	43.8 $\gamma$ /mm		10693 $\gamma$
Z	0000 U.T., 2-1-86	2400 U.T., 2-28-86	48.3 $\gamma$ /mm		54149 $\gamma$

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES\*

D	H	Z
27° 34.1 E	12885 $\gamma$	55341 $\gamma$

\* COMPUTED FROM <sup>FIVE</sup> QUIETEST DAYS DURING MONTH.

DAYS USED: FEB 2, 3, 4, 15, 16

U.S. Dept. of Interior  
Geological Survey

Inverness, ALASKA  
Month: FEBRUARY  
Year: 1986

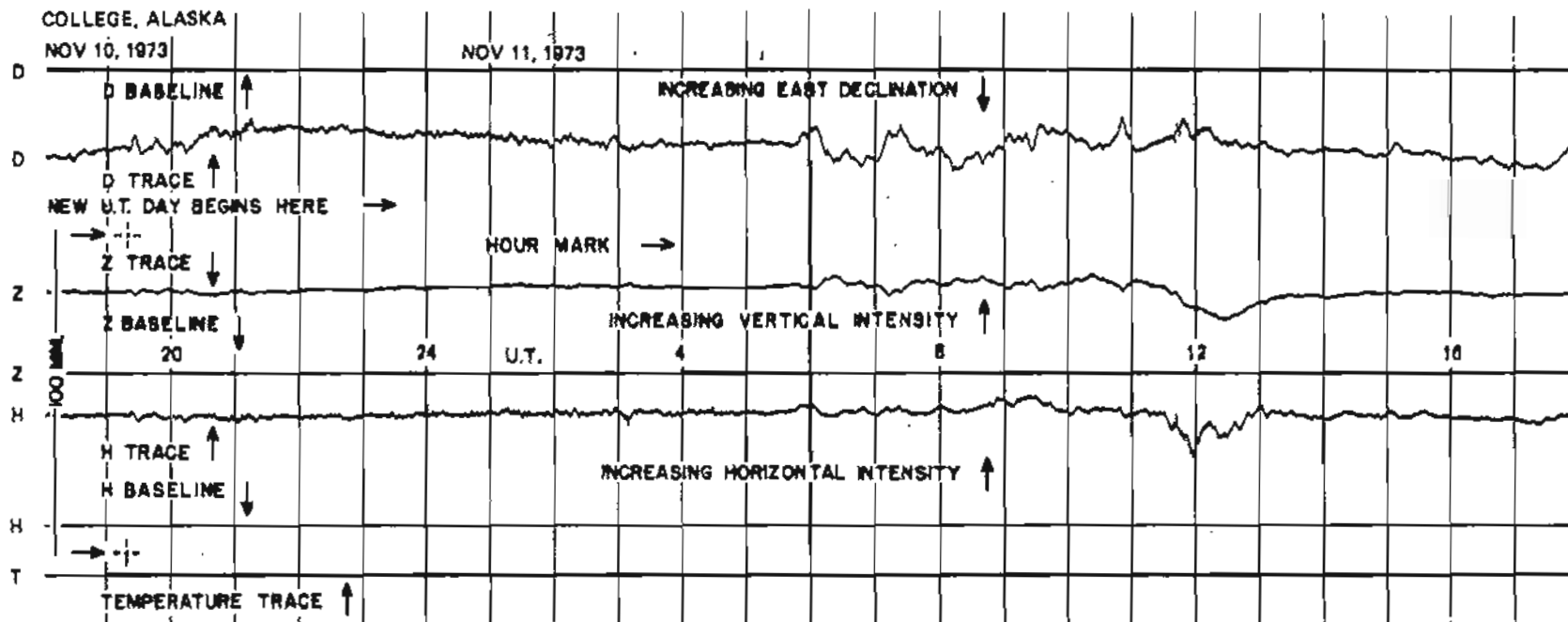
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS  
(UNIVERSAL TIME)

Values are in tenths of m and are averages for successive periods of one hour beginning at midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMMENT	D					R					Z					COMMENT
	2	3	4	15	16	2	3	4	15	16	2	3	4	15	16	
DAY	03	04	03	01	08	05	04	03	01	03	05	04	03	01	03	
HOURLY	156	164	157	162	171	200	177	162	160	215	198	196	200	221	223	
	160	164	161	160	167	290	279	269	248	251	200	199	205	226	222	
	164	168	164	145	168	289	287	279	259	259	200	195	203	220	222	
	169	168	173	150	172	285	290	284	271	261	205	195	200	223	224	
	159	198	170	146	174	289	290	289	276	262	201	197	196	230	220	
	165	168	174	165	177	293	289	284	265	262	200	200	199	225	221	
	167	163	176	173	174	289	290	288	264	262	204	205	201	231	222	
	179	180	178	173	170	288	288	288	261	261	217	208	201	231	226	
	224	180	188	171	174	289	285	279	259	259	221	204	210	231	225	
	179	185	188	170	169	290	289	283	256	261	194	200	209	230	223	
	178	185	186	170	172	290	281	288	259	259	185	197	200	229	222	
	179	176	180	180	176	290	284	289	259	294	164	192	193	230	214	
	142	174	177	187	179	233	279	281	235	261	100	189	191	224	215	
	176	174	177	181	179	274	276	276	260	260	164	189	190	221	211	
	183	180	190	182	184	301	282	280	260	260	176	189	190	222	214	
	178	159	185	190	179	287	269	269	261	261	175	188	179	223	218	
	194	172	194	190	190	289	295	283	264	263	167	183	179	224	217	
	204	245	181	199	198	291	309	278	269	269	170	191	180	223	221	
	200	210	187	201	208	284	294	269	261	271	179	190	176	220	221	
	199	200	178	195	208	284	285	280	260	272	184	186	176	221	213	
	182	195	180	190	193	279	286	282	255	270	202	187	180	220	212	
	183	195	179	175	187	289	285	278	263	268	209	190	188	220	212	
	189	168	180	169	184	280	271	277	261	269	209	191	191	221	214	
	181	150	178	169	178	277	263	275	250	269	201	194	193	221	218	
DAILY SUM	4287	4257	4277	4200	4338	6896	6847	6710	6293	6271	4525	4657	4630	5397	5250	
DAILY MEAN	179	177	178	175	181	286	284	280	260	261	189	194	193	225	219	
MEAN						274					204					MEAN
											Scaled					Checked
											MEP					MR

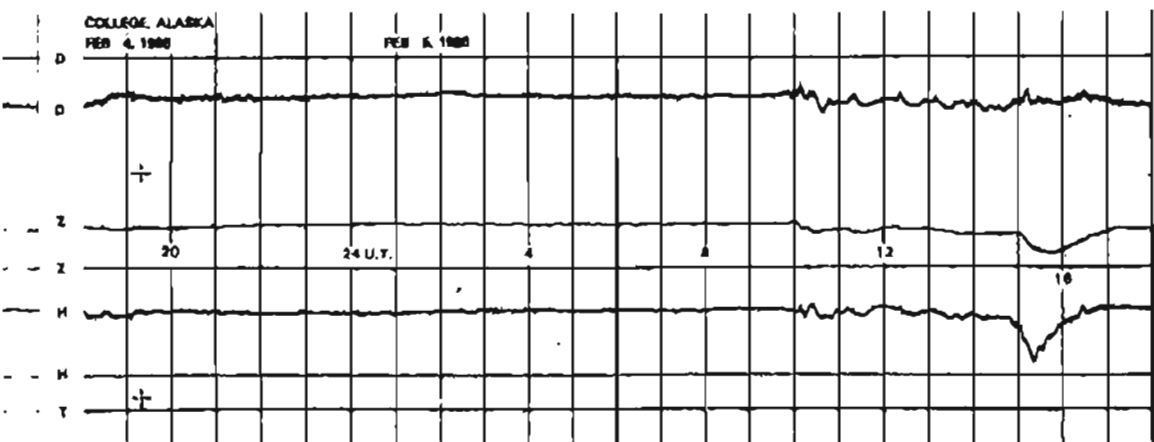
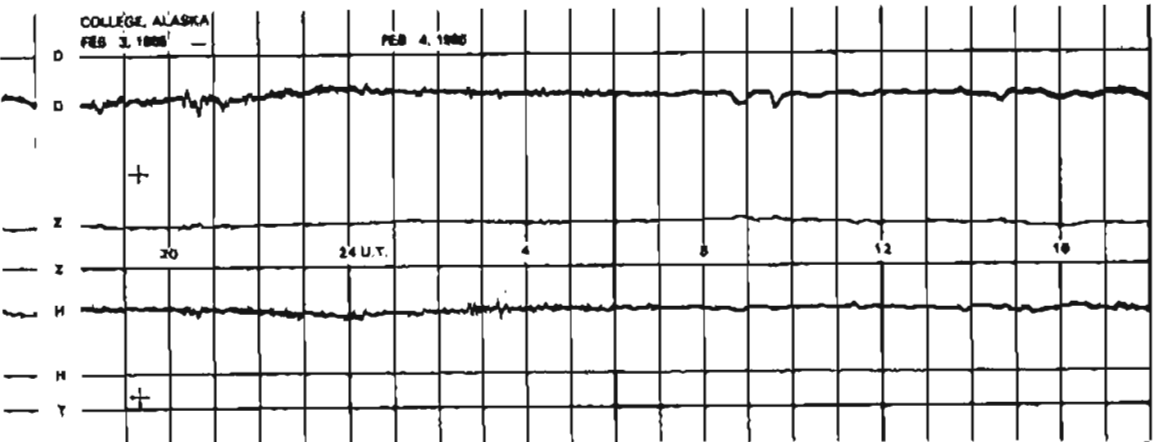
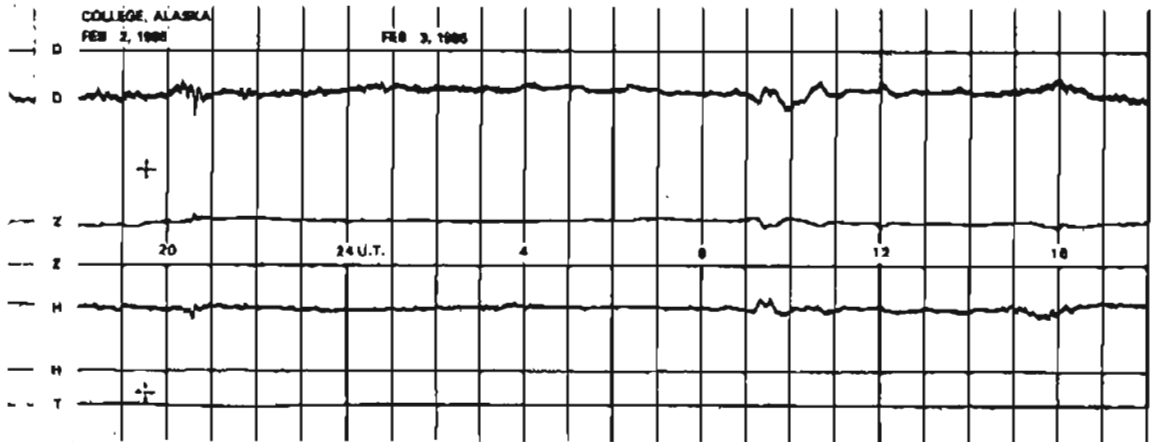
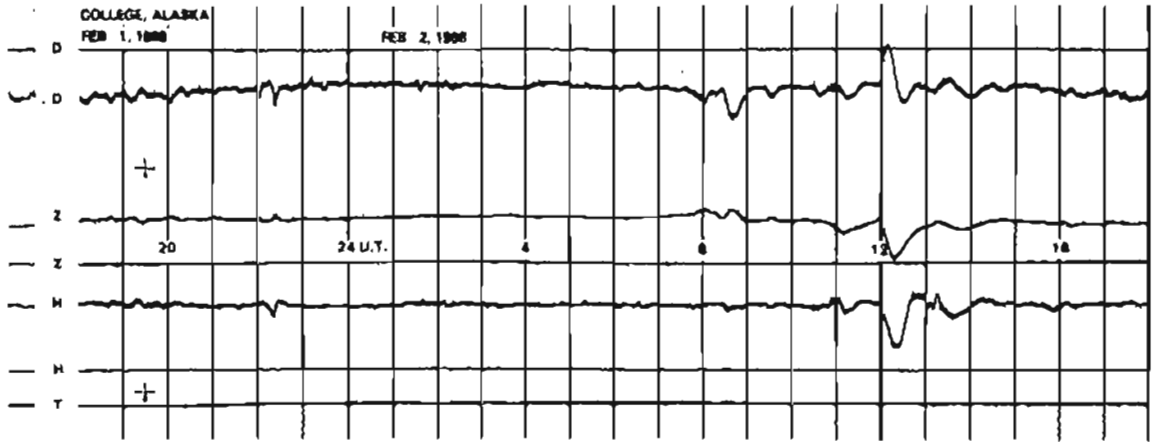


# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



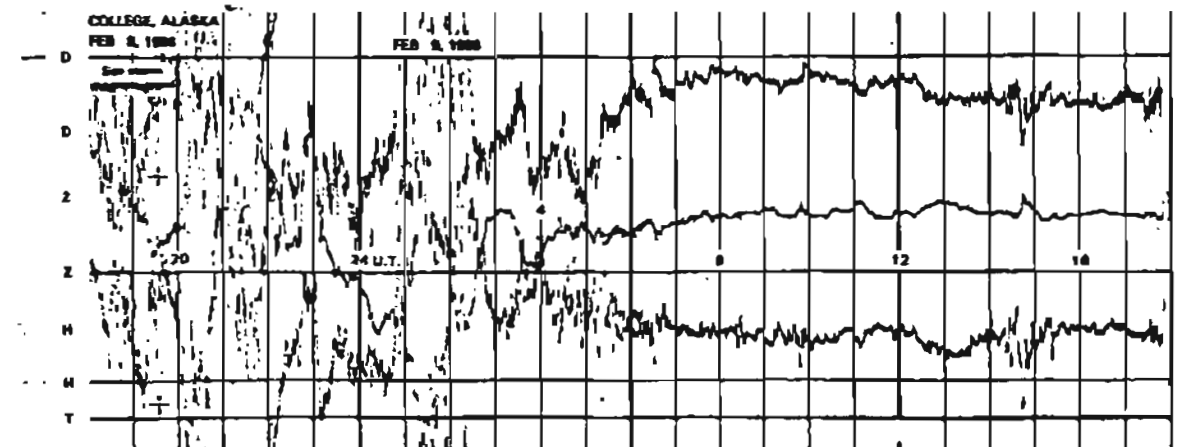
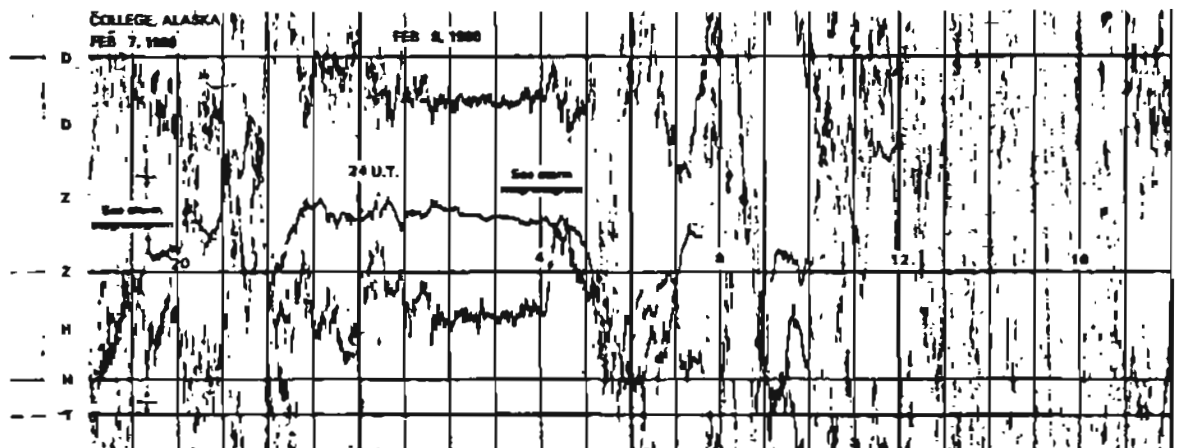
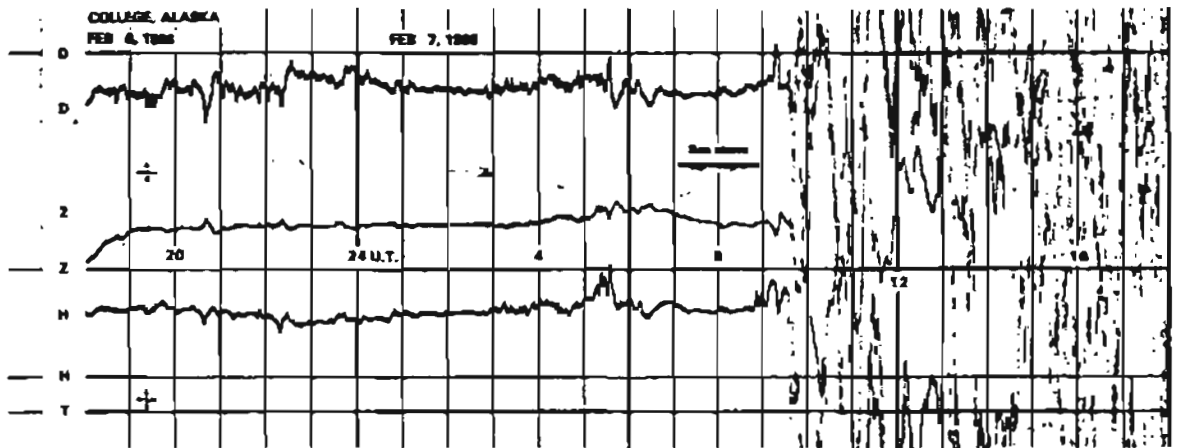
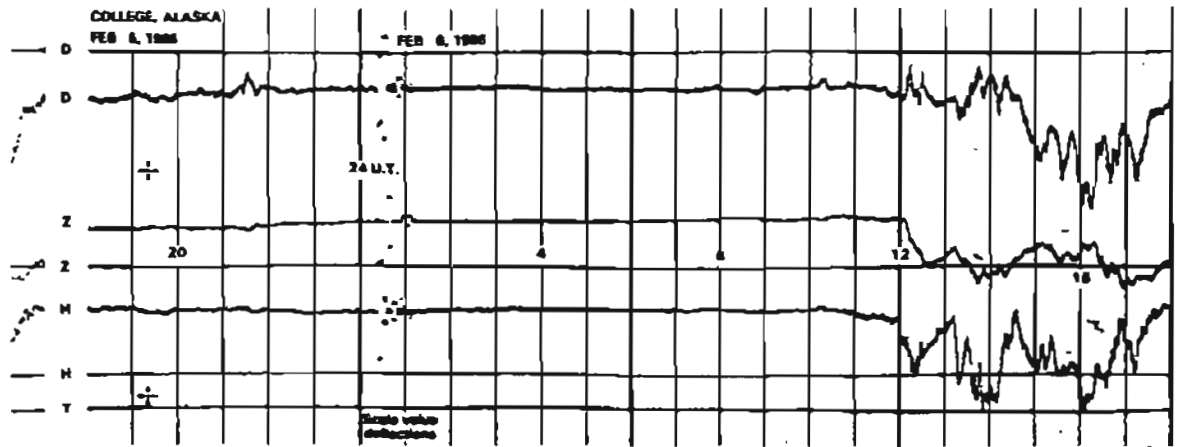
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

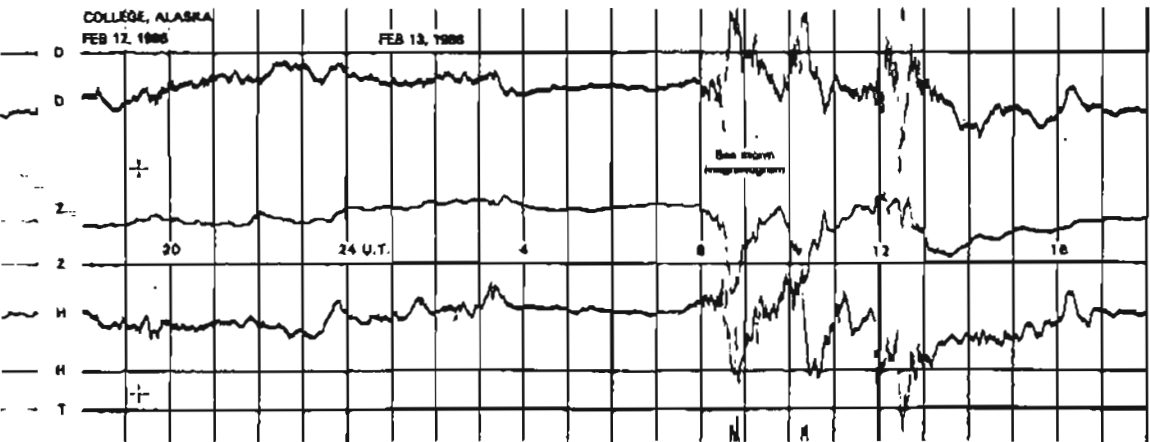
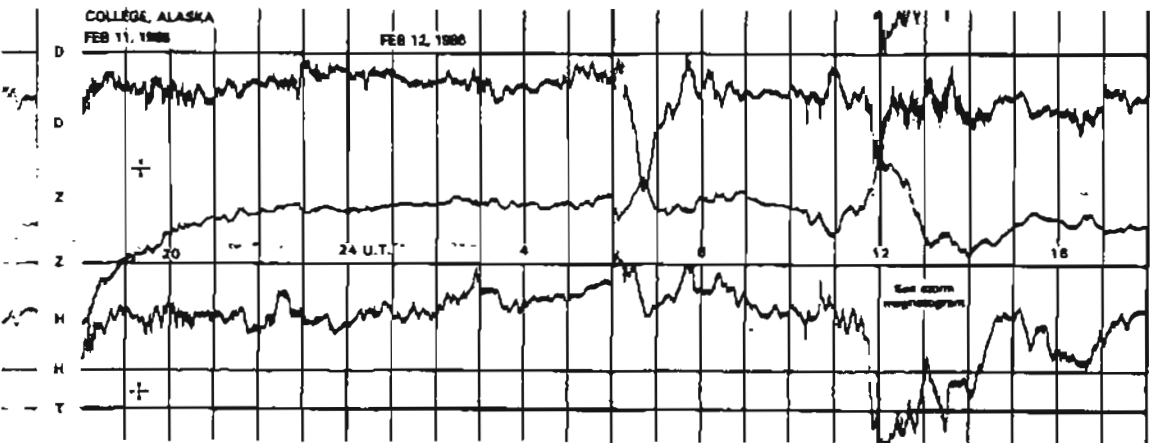
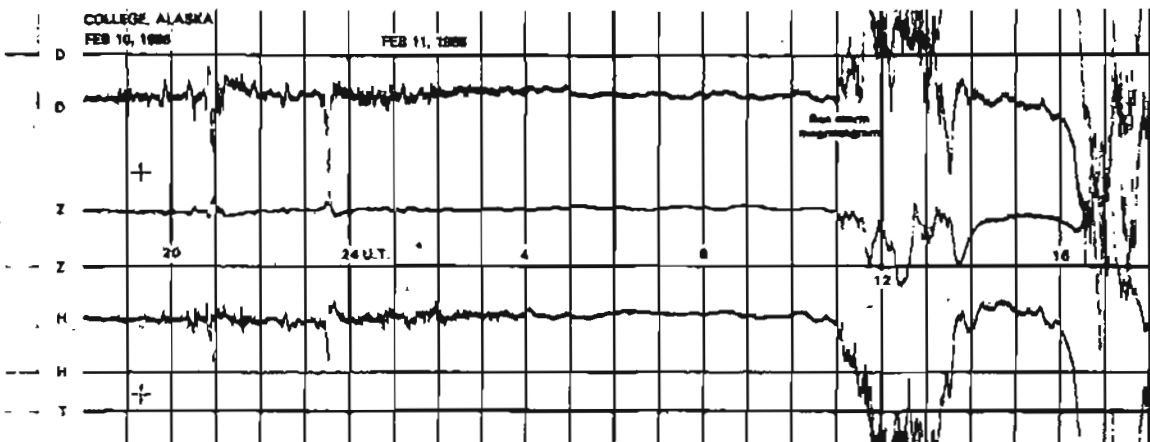
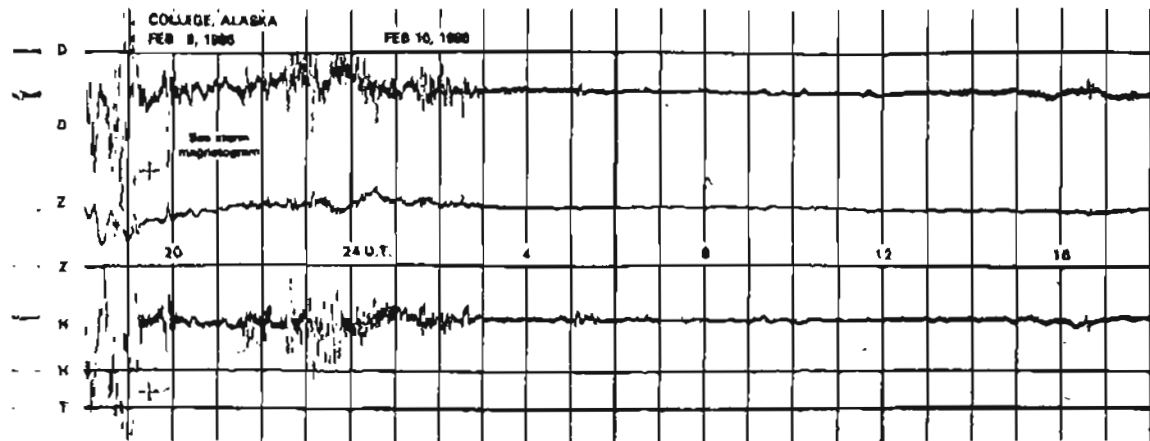


NORMAL MAGNETOGRAMS

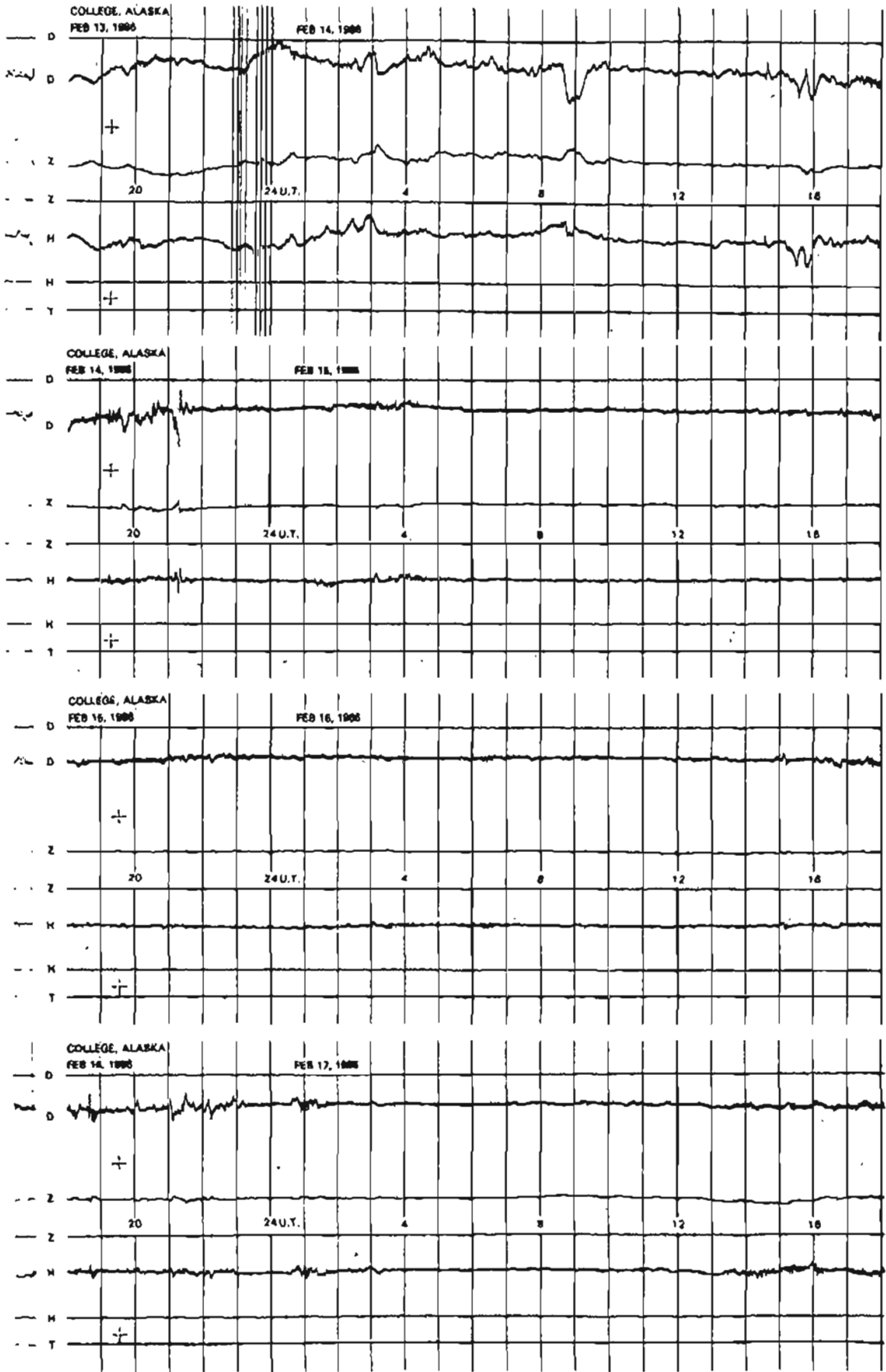
100 mm  
0  
100 mm



NORMAL MAGNETOGRAMS

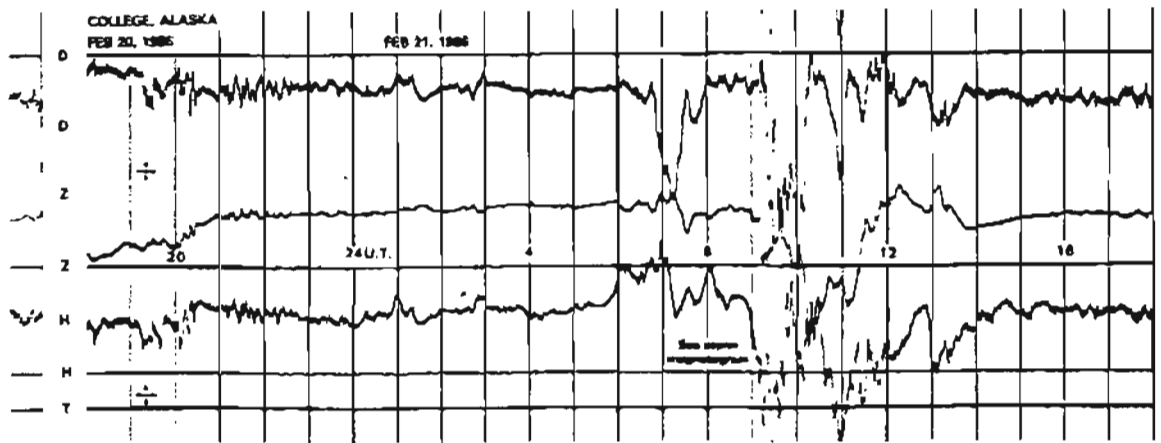
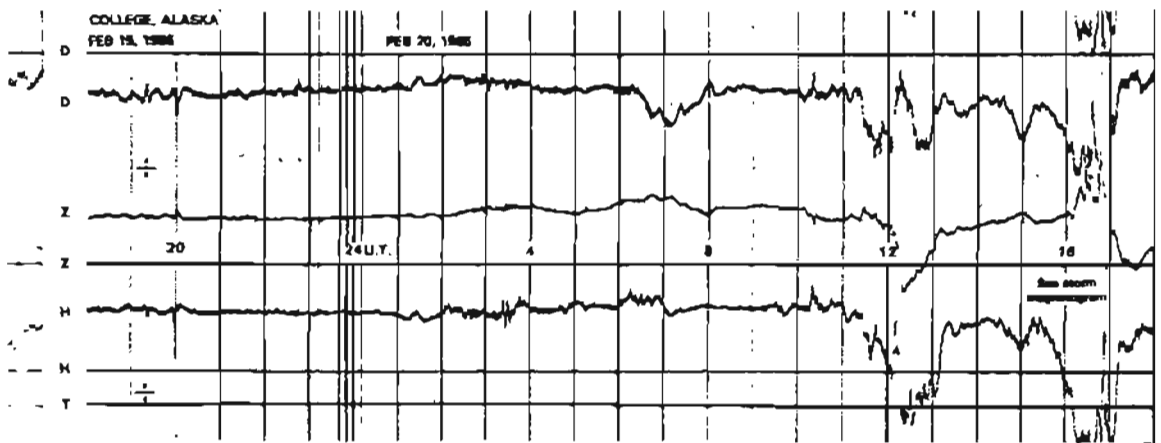
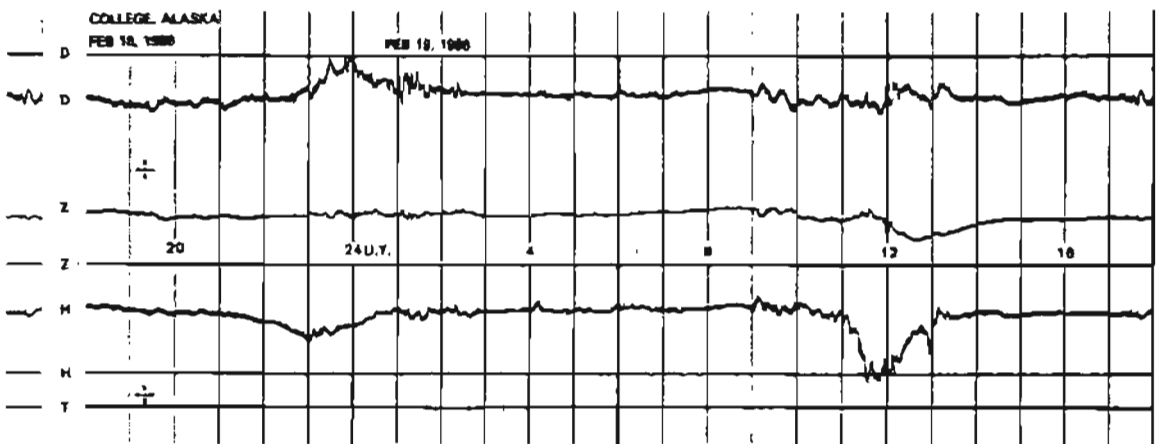
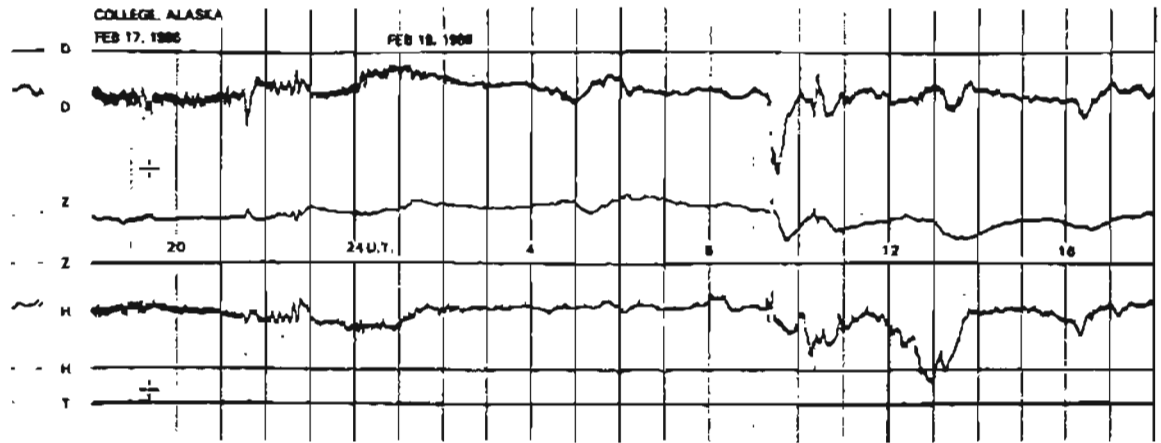


NORMAL MAGNETOGRAMS



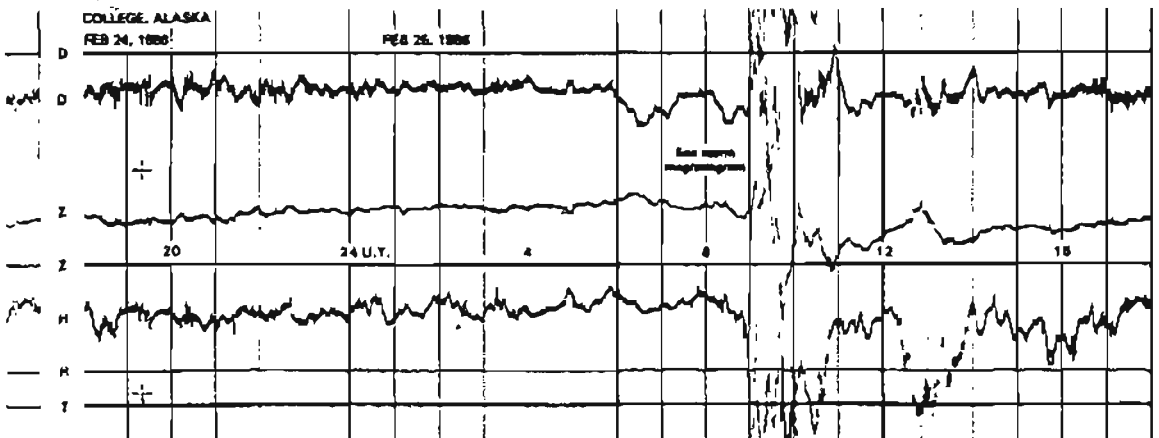
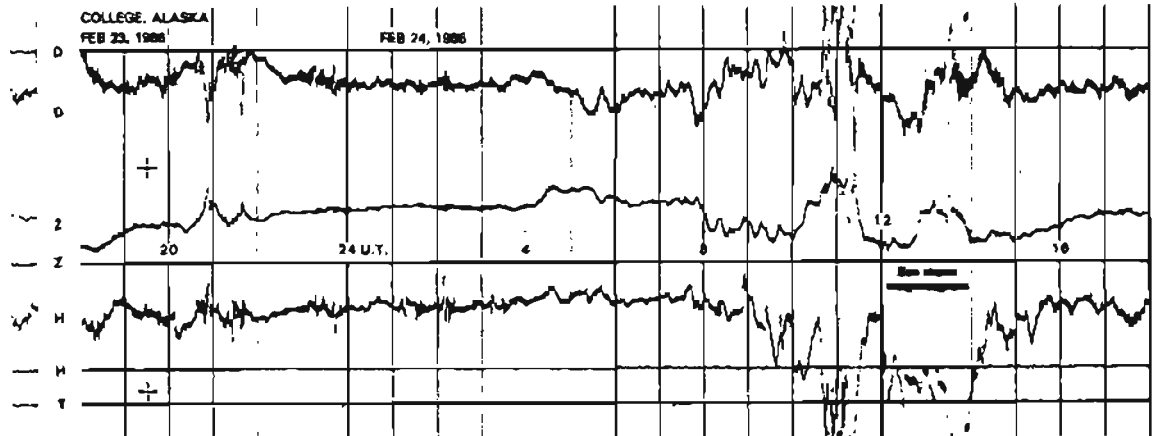
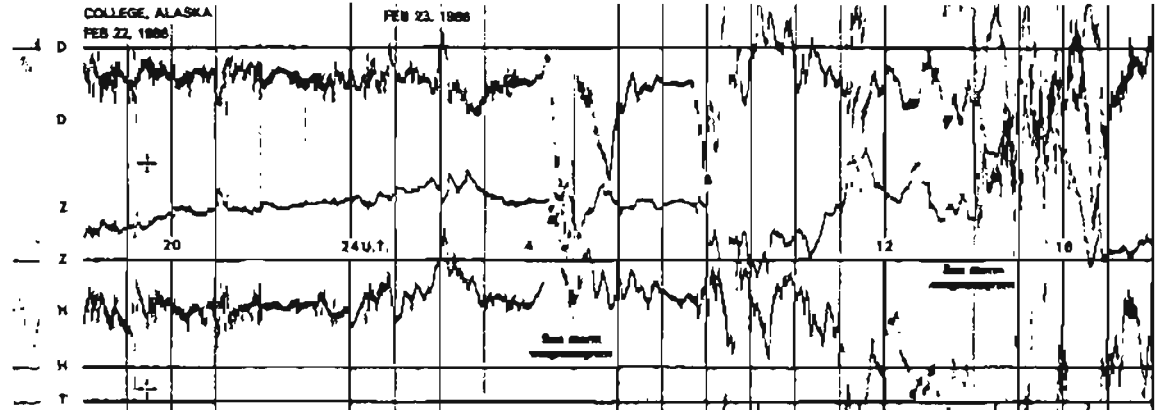
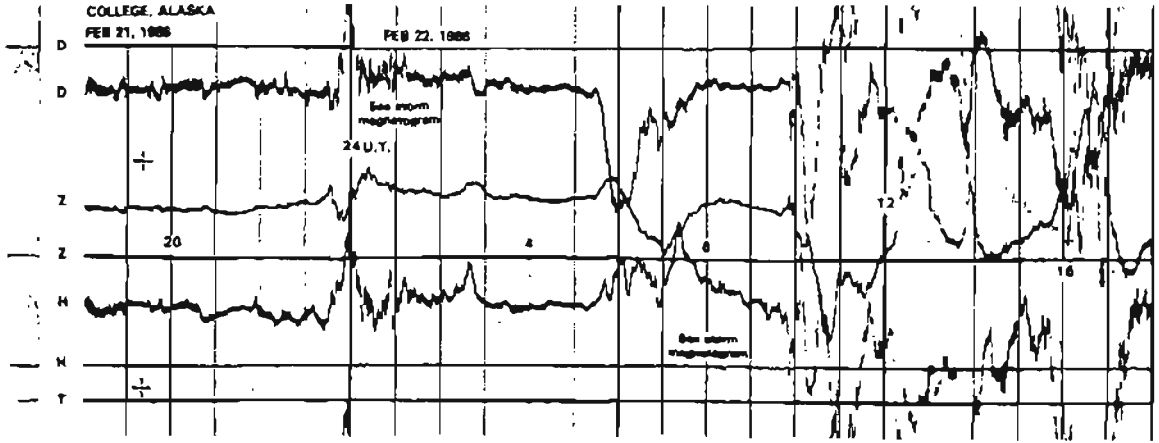
NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0



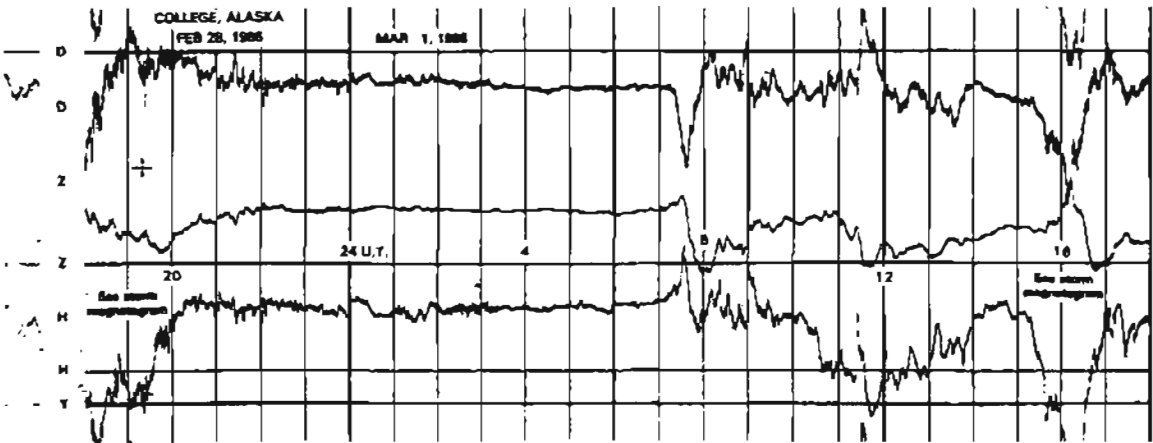
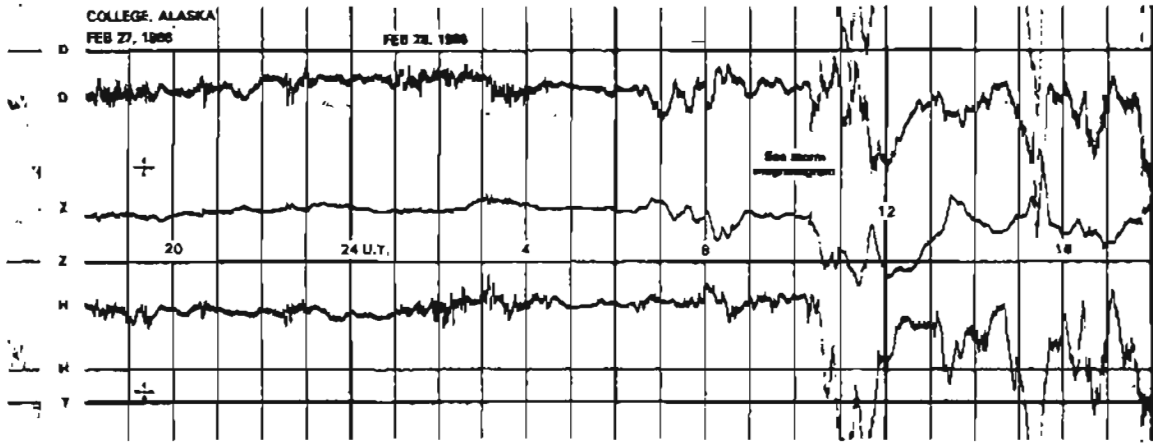
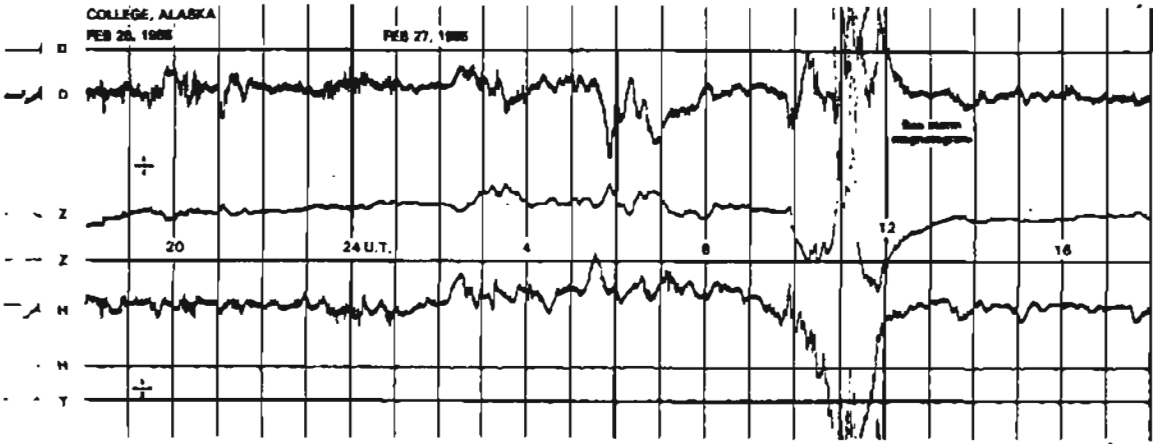
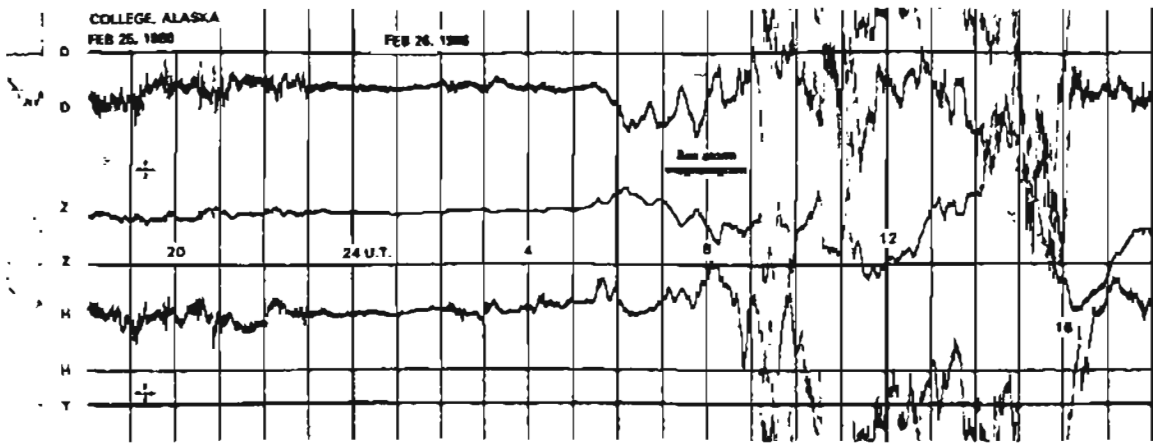
NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0



NORMAL MAGNETOGRAMS

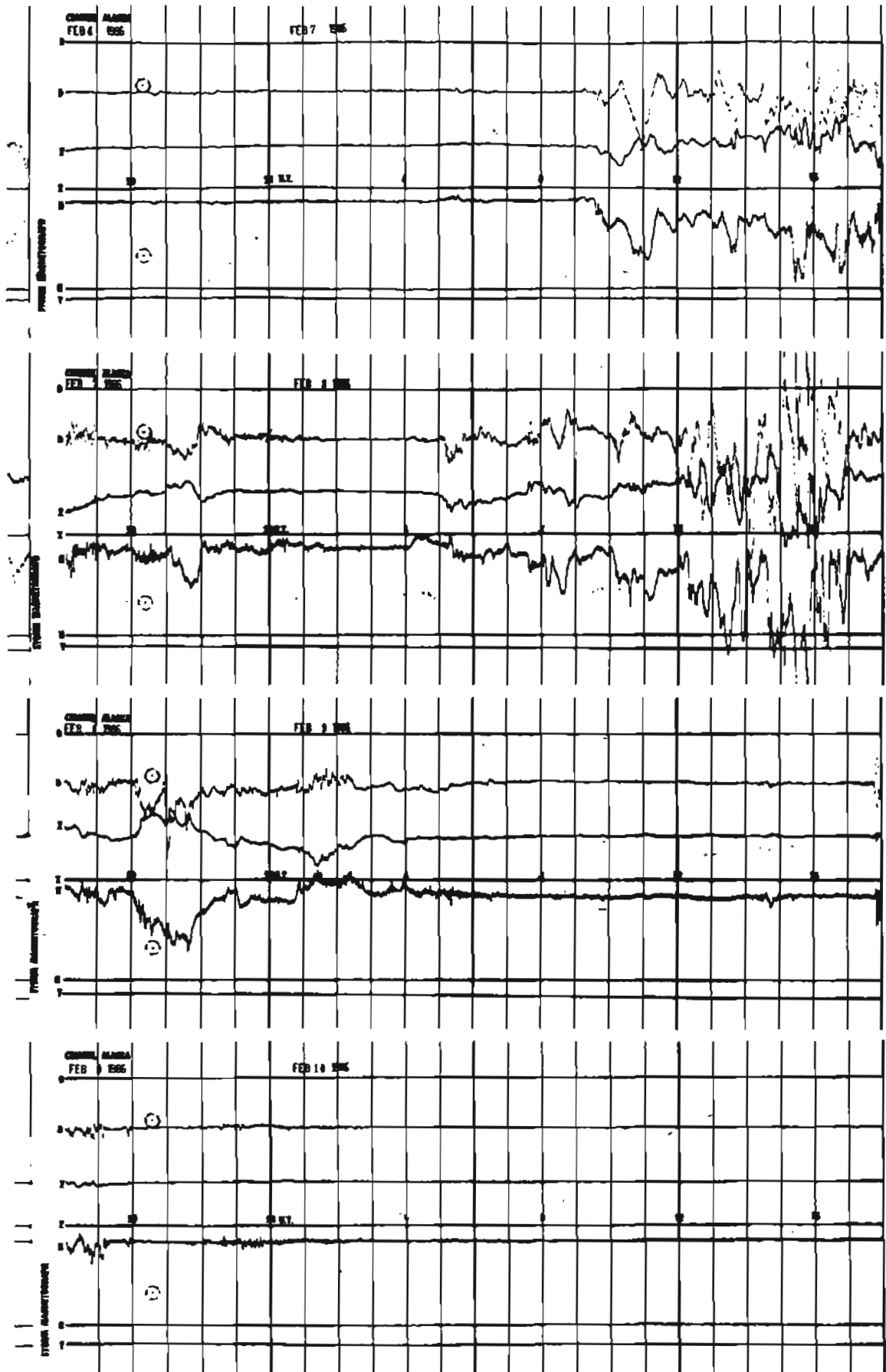
100 mm  
0





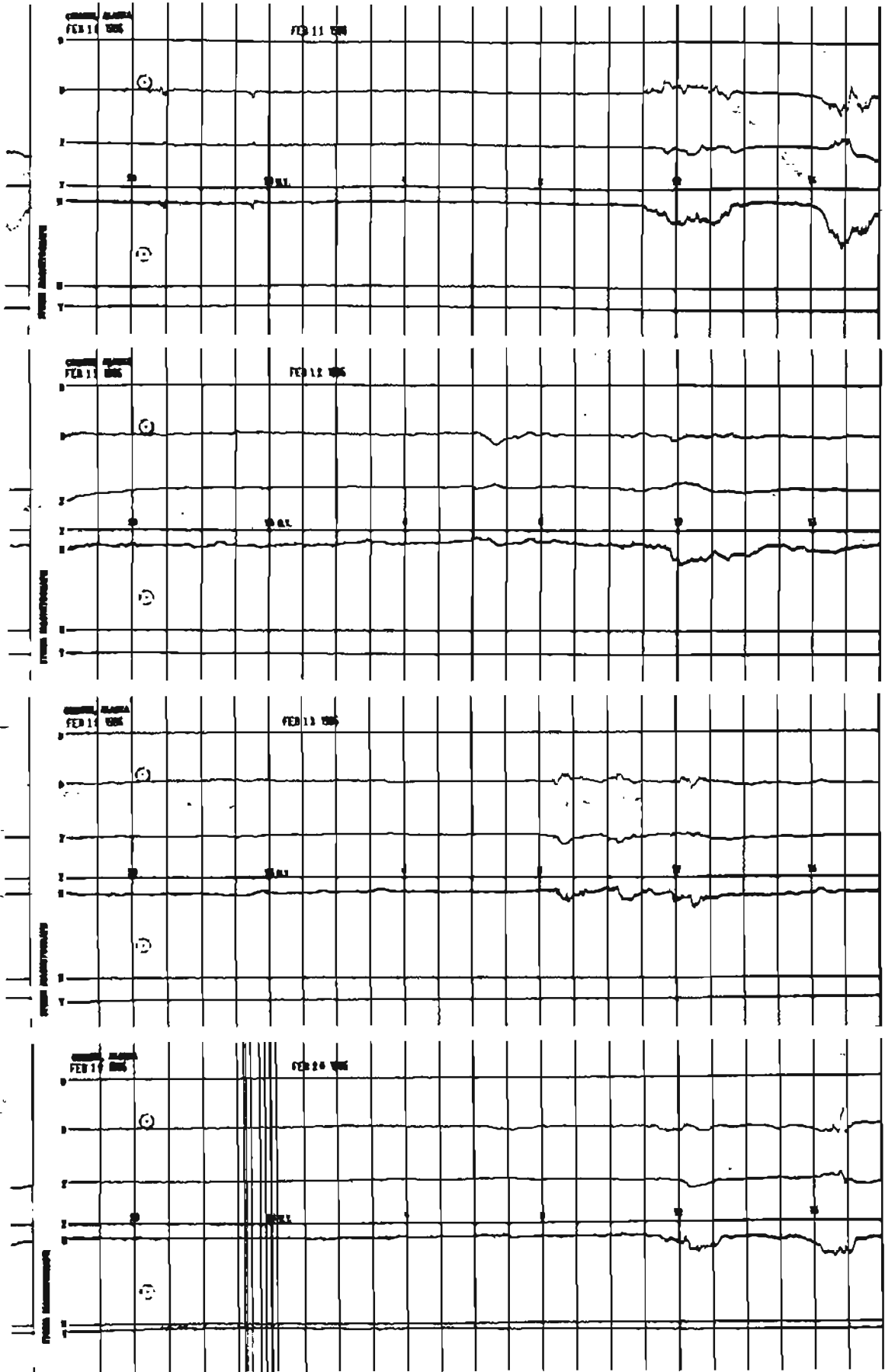
# STORM MAGNETOGRAMS

0 100mm 200mm



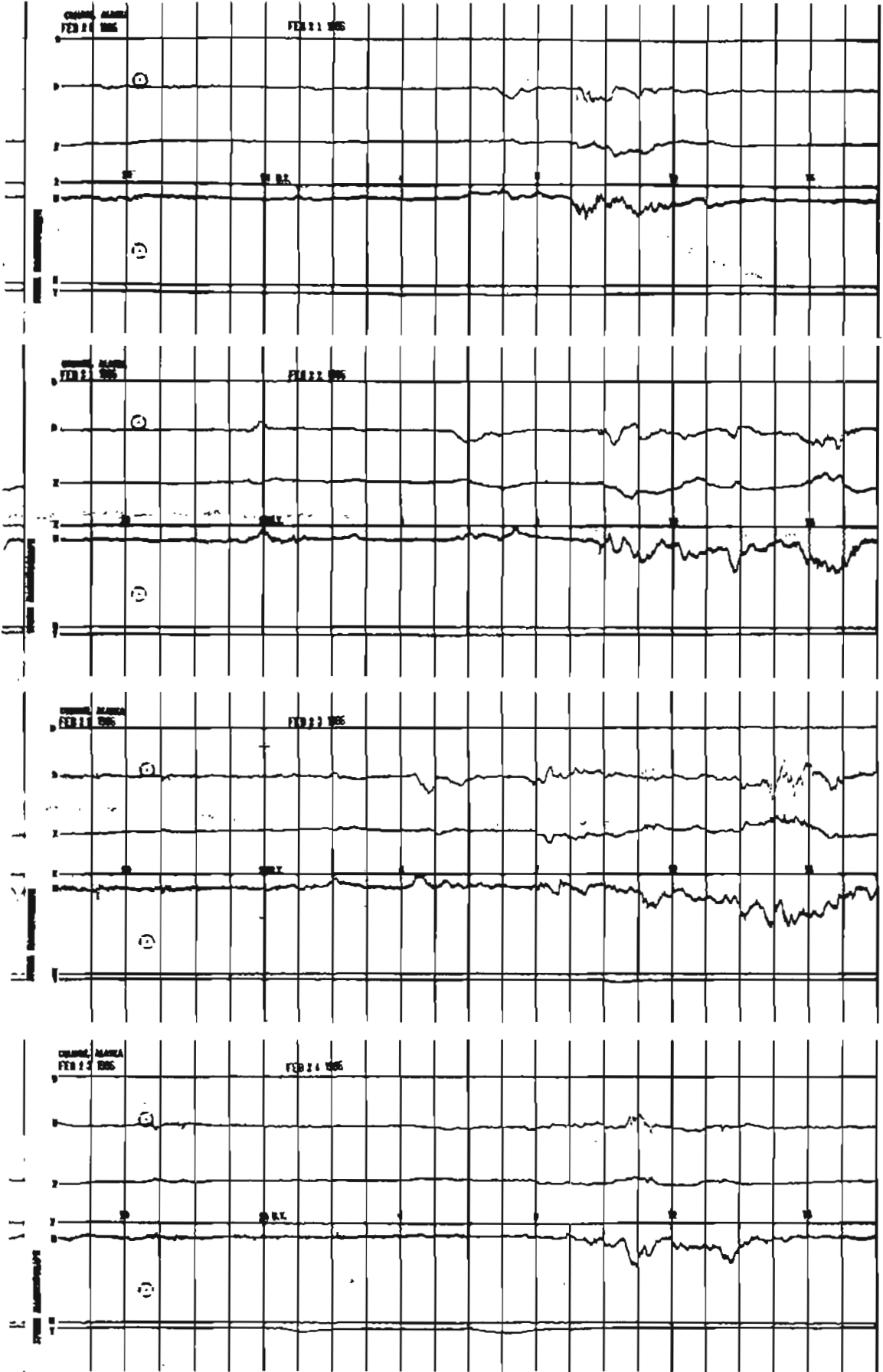
# STORM MAGNETOGRAMS

0 100mm 200mm



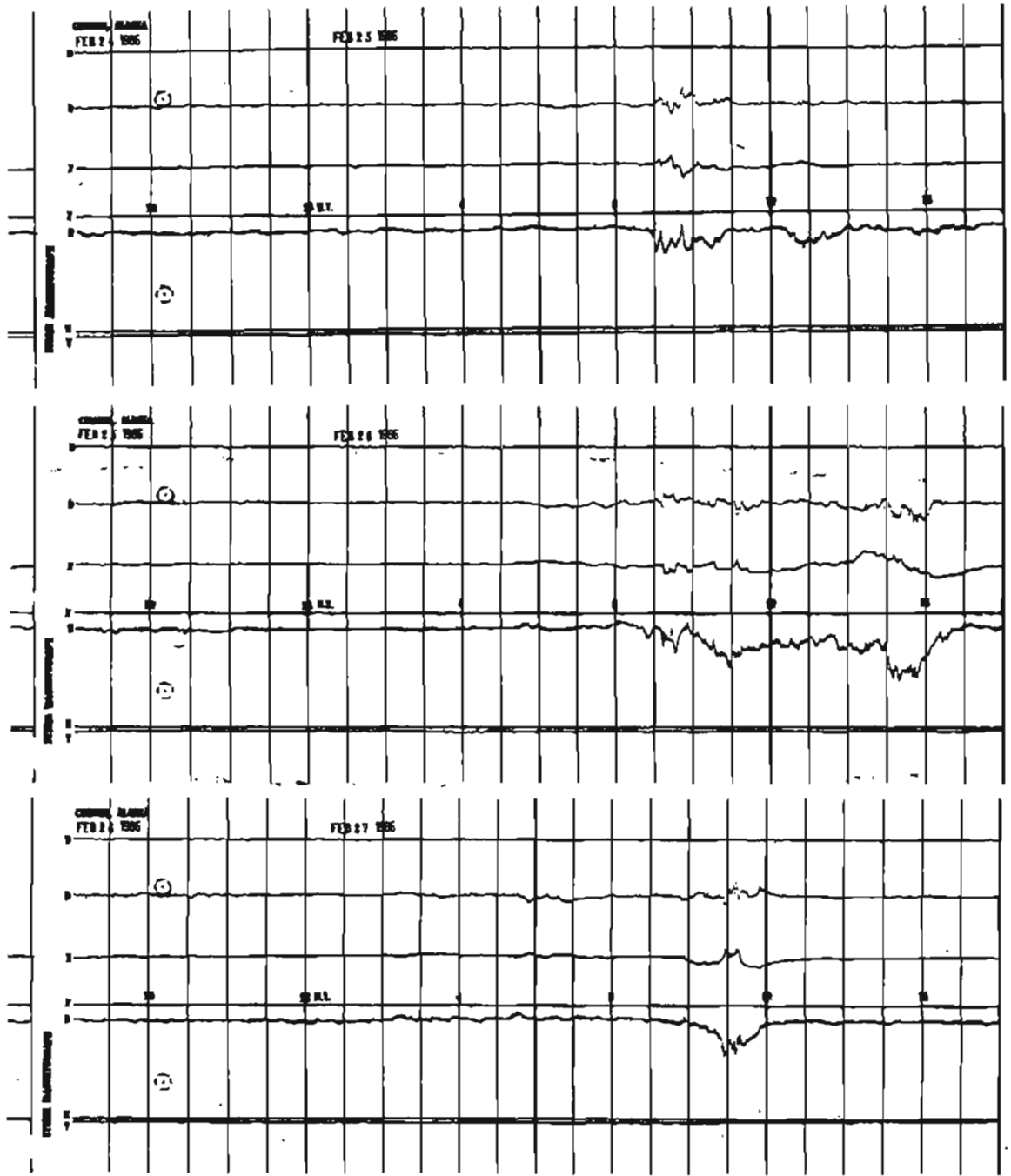
STORM MAGNETOGRAMS

0 100mm 200mm



# STORM MAGNETOGRAMS

100 Gauss  
0  
100 Gauss



# STORM MAGNETOGRAMS

0 100mm 200mm

