

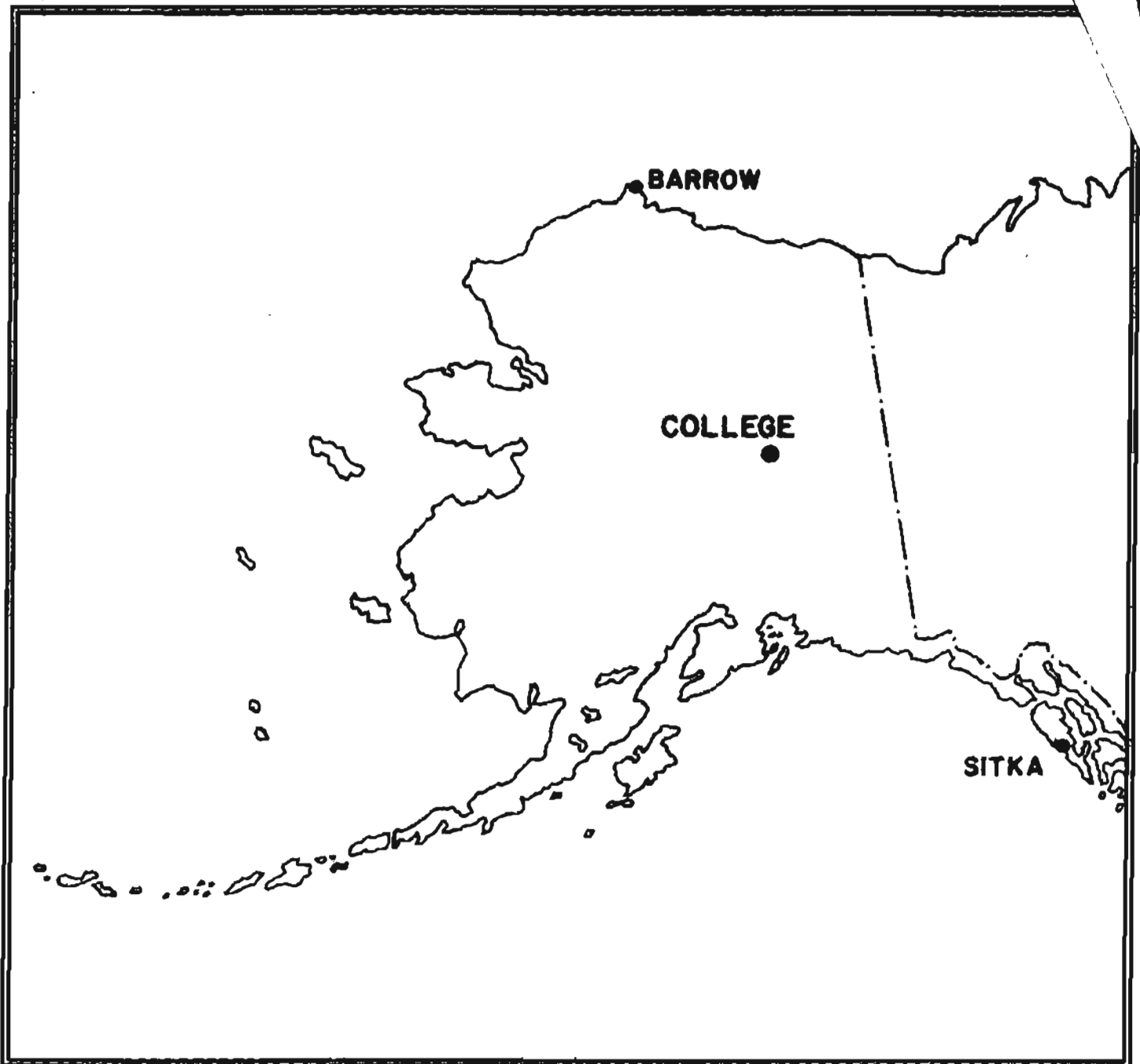
UNITED STATES DEPARTMENT OF THE  
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA  
COLLEGE OBSERVATORY  
FAIRBANKS, ALASKA

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JANUARY 1991

OPEN FILE REPORT 91-0300A



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 CAROL ANN VARNER AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA FAIRBANKS. THE COLLEGE OBSERVATORY IS 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

## 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. 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 DB3m 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 the 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° 51.8'N  
Geographic longitude.....147° 50.2'W  
Geomagnetic latitude.....+64.6°  
Geomagnetic longitude....+258.3°  
Elevation.....200 meters

## EXPLANATION OF DATA & REPORTS

### Available Data & Reports

Normal and storm magnetograms and appropriate calibration data are processed at the observatory and are available for analysis or copying. Magnetic Activity Report (K-Indices & AK values), Principal Magnetic Storms Report, and Magnetogram Hourly Scalings for the five quietest days of the month are also available.

### 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 < 500	5	48
500 < 1000	6	80
1000 < 1850	7	140
1850 < 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 commencement; 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 magnetogram.

### 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:

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

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

January, 1991

DATE	K-INDICES								SUM	A <sub>k</sub>	TIME SCALE ON MAGNETOGRAMS  20 mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			
1	3	2	2	2	2	1	0	0	12	6	SUDDEN COMMENCEMENTS d h m
2	0	1	3	5	4	3	2	0	18	14	
3	1	2	4	4	6	1	0	1	19	19	
4	1	2	3	4	1	1	2	1	15	9	
5	1	1	1	4	3	1	1	1	13	8	
6	0	1	1	0	0	0	1	0	3	1	
7	0	0	0	1	0	0	0	0	1	0	
8	1	1	2	4	4	1	1	0	14	9	
9	0	0	1	3	1	1	1	1	8	4	
10	1	0	1	4	4	4	1	1	16	12	
11	0	0	0	3	5	2	1	1	12	10	
12	1	1	5	4	2	5	3	1	22	19	
13	2	4	3	3	1	2	3	1	19	12	
14	0	0	0	0	0	0	0	1	3	1	
15	2	1	4	5	3	3	0	3	21	16	
16	1	1	2	5	3	2	1	1	16	11	
17	1	1	1	5	6	5	2	1	22	24	
18	2	1	1	1	4	4	2	3	18	12	
19	1	0	0	2	1	2	1	1	8	3	
20	1	1	0	2	0	2	1	0	7	3	
21	0	1	0	2	2	0	0	0	5	2	
22	1	1	0	0	0	0	0	0	2	1	
23	0	0	1	4	2	2	1	2	12	7	
24	3	2	3	5	3	5	5	1	27	25	
25	1	1	2	2	1	4	4	2	17	11	
26	1	2	2	3	3	2	1	2	16	8	
27	0	0	1	1	4	2	1	1	10	6	
28	0	0	0	2	1	1	0	1	5	2	
29	1	0	1	2	2	0	0	1	7	3	
30	0	0	0	0	0	3	2	1	6	3	
31	1	2	5	5	3	3	2	3	24	20	

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

675.7

3.66

2470

H

322.2

7.71

2480

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED

John B. Townshend, Chief

OBSERVER IN CHARGE

**PRINCIPAL MAGNETIC STORMS**  
**COLLEGE OBSERVATORY, COLLEGE, ALASKA**  
 Data from Individual Observatories  
 JANUARY 19 91

WDC-A FOR SOLAR-TERRESTRIAL PHYSICS  
 ENVIRONMENTAL DATA SERVICE, NOAA  
 BOULDER, COLORADO 80508 U.S.A.

Obs. # letter YABA ###	Geomag. Lat. 64.6 N	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)	
00					NO MAJOR OR SEVERE STORMS WERE RECORDED DURING THIS MONTH.							

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0001 U.T., 1-1-91	2400 U.T., 1-31-91	1.0' / mm	3.7 γ / mm	26° 34.8' E
H	0001 U.T., 1-1-91	2400 U.T., 1-19-91	7.7 γ / mm	12620 γ	
	0001 U.T., 1-20-91	2400 U.T., 1-31-91	↓	12626 γ	
Z	0001 U.T., 1-1-91	2400 U.T., 1-13-91	7.7 γ / mm	55217 γ	
	0001 U.T., 1-14-91	2400 U.T., 1-31-91	↓	55214 γ	

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0001 U.T., 1-1-91	2400 U.T., 1-31-91	7.9' / mm	29.3 γ / mm	
H	(SAME)	(SAME)	43.3 γ / mm		
Z	(SAME)	(SAME)	48.9 γ / mm		

The College Observatory has used several absolute instruments and different observing piers since it began operations in 1948. To avoid artificial secular shifts in the absolute values published when instruments were changed, corrections were applied to provide continuity in the data from the time the Observatory began operating. For many years the instruments used for observing absolute values have had zero correction. Effective with the May 1989 Preliminary Data Report, in accordance with a directive issued by the USGS Branch of Global Seismology and Geomagnetism analysis personnel, these longstanding corrections are discontinued and all data listed (D, H & Z) are for the position at absolute pier 1a and without any corrections applied. The net effect of these changes is as follows:

Declination (D): No Change

Horizontal Intensity (H): -5%; i.e., H absolute and baseline values are 5% less than previously reported.

Vertical Intensity (Z): +33%; i.e., Z absolute and baseline values are 33% higher than previously reported.

MONTHLY MEAN ABSOLUTE VALUES\*

D	H	Z
26° 47.4' E	12769 γ	55317 γ

\*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: JAN 6, 7, 14, 22, 28.

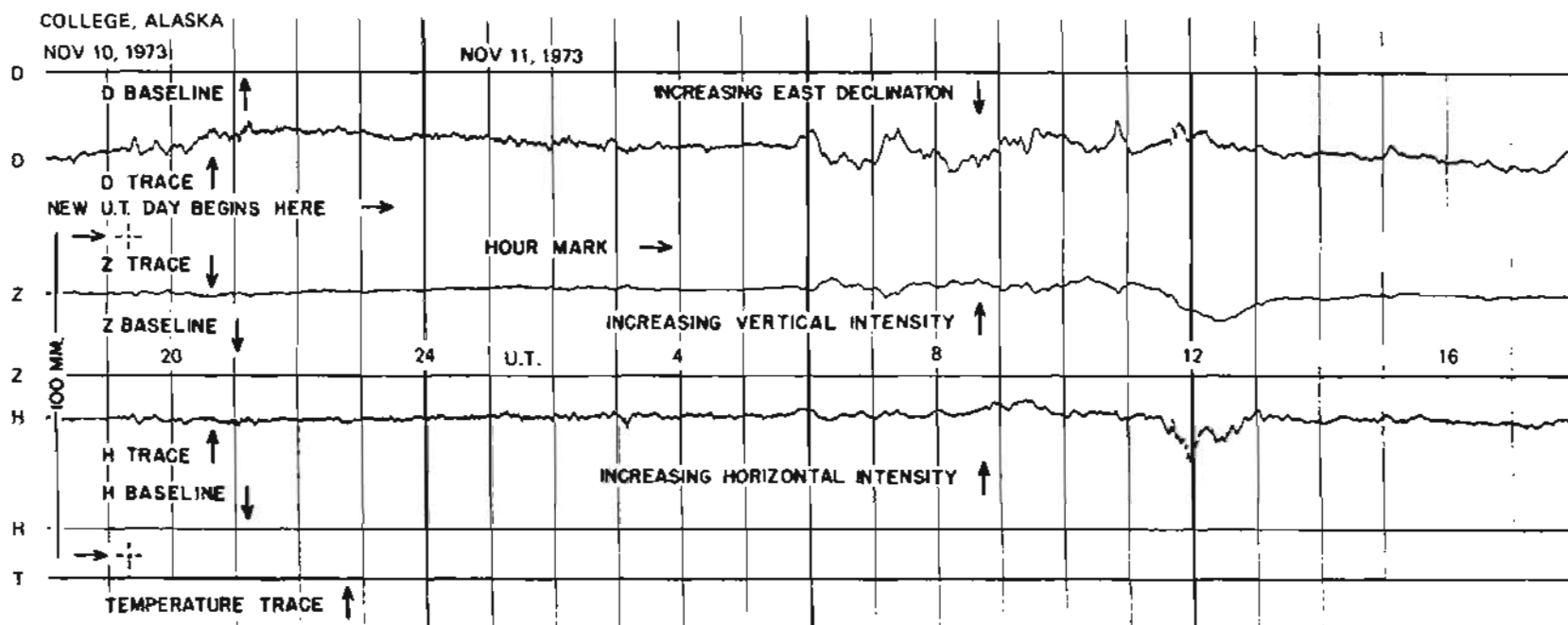
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS  
(UNIVERSAL TIME)

Values are in Tenths of gauss and are Averages for Successive Periods of One Hour beginning at Midnight. Slightage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT	D							H							Z							COMPONENT	
	DAY							DAY							DAY								DAY
	6	7	1 <sup>st</sup>	22	28	6	7	14	22	28	6	7	14	22	28	6	7	14	22	28	2		
A <sub>k</sub>	1	0	1	1	2	1	0	1	1	2	1	0	1	1	2	1	0	1	1	2	2		
HOURLY	120	110	132	81	110	180	178	175	167	140	180	180	179	183	157	142	141	139	138	150			
	110	101	129	71	110	187	180	179	183	157	197	182	184	194	161	141	141	135	139	151			
	106	99	124	80	103	197	182	184	194	161	200	195	191	189	177	140	140	136	141	150			
	110	107	112	102	92	200	195	191	189	177	198	201	190	200	180	142	140	134	145	150			
	106	104	119	81	99	198	201	190	200	180	207	201	195	197	181	140	140	134	145	152			
	104	110	119	109	101	207	201	195	197	181	220	206	197	199	189	143	140	134	140	151			
	107	119	119	113	104	220	206	197	199	189	213	209	197	201	190	141	140	134	143	150			
	116	122	119	117	110	213	209	197	201	190	201	202	196	201	180	140	137	134	140	141			
	122	120	114	117	113	201	202	196	201	180	198	201	196	196	185	138	134	136	139	140			
	127	109	119	112	130	198	201	196	196	185	192	198	197	191	171	138	140	135	139	110			
	127	109	120	113	124	192	198	197	191	171	189	188	199	191	145	134	136	134	139	95			
	130	113	129	120	130	189	188	199	191	145	190	180	197	191	178	122	141	131	134	103			
	137	151	129	127	136	190	180	197	191	178	190	190	181	191	181	126	137	114	129	122			
	126	149	122	124	130	190	190	181	191	181	190	190	190	198	190	131	128	120	132	134			
	128	150	160	119	129	192	190	197	191	172	192	190	197	191	172	125	126	113	121	130			
	130	152	143	119	127	192	190	192	192	170	192	190	192	192	170	130	110	121	110	125			
	137	140	144	148	131	194	199	192	202	180	194	194	192	202	180	130	115	123	111	125			
	138	142	148	145	152	200	198	190	204	182	200	198	190	204	182	130	123	124	122	128			
	149	166	155	157	161	197	193	190	201	193	197	193	190	201	193	130	130	128	129	131			
	150	170	131	160	160	188	189	190	198	190	188	189	190	198	190	131	128	120	132	134			
	151	171	139	158	163	190	191	194	190	187	190	191	194	190	187	130	123	120	133	137			
	142	164	149	150	160	190	189	196	171	175	190	189	196	171	175	129	123	124	132	140			
	129	138	138	135	160	180	175	190	164	171	180	175	190	164	171	133	125	124	130	142			
	119	116	130	112	140	178	174	180	170	150	178	174	180	170	150	139	131	130	130	145			
DAILY SUM	3021	3132	3143	2870	3075	4665	4599	4585	4576	4185	3237	3183	3101	3197	3251	3197	3133	3129	3133	3135			
DAILY MEAN	126	130	131	120	128	194	192	191	191	174	135	133	129	133	135	135	133	129	133	135			
MEAN			127					188										133					

Scaled TR10 Checked CA

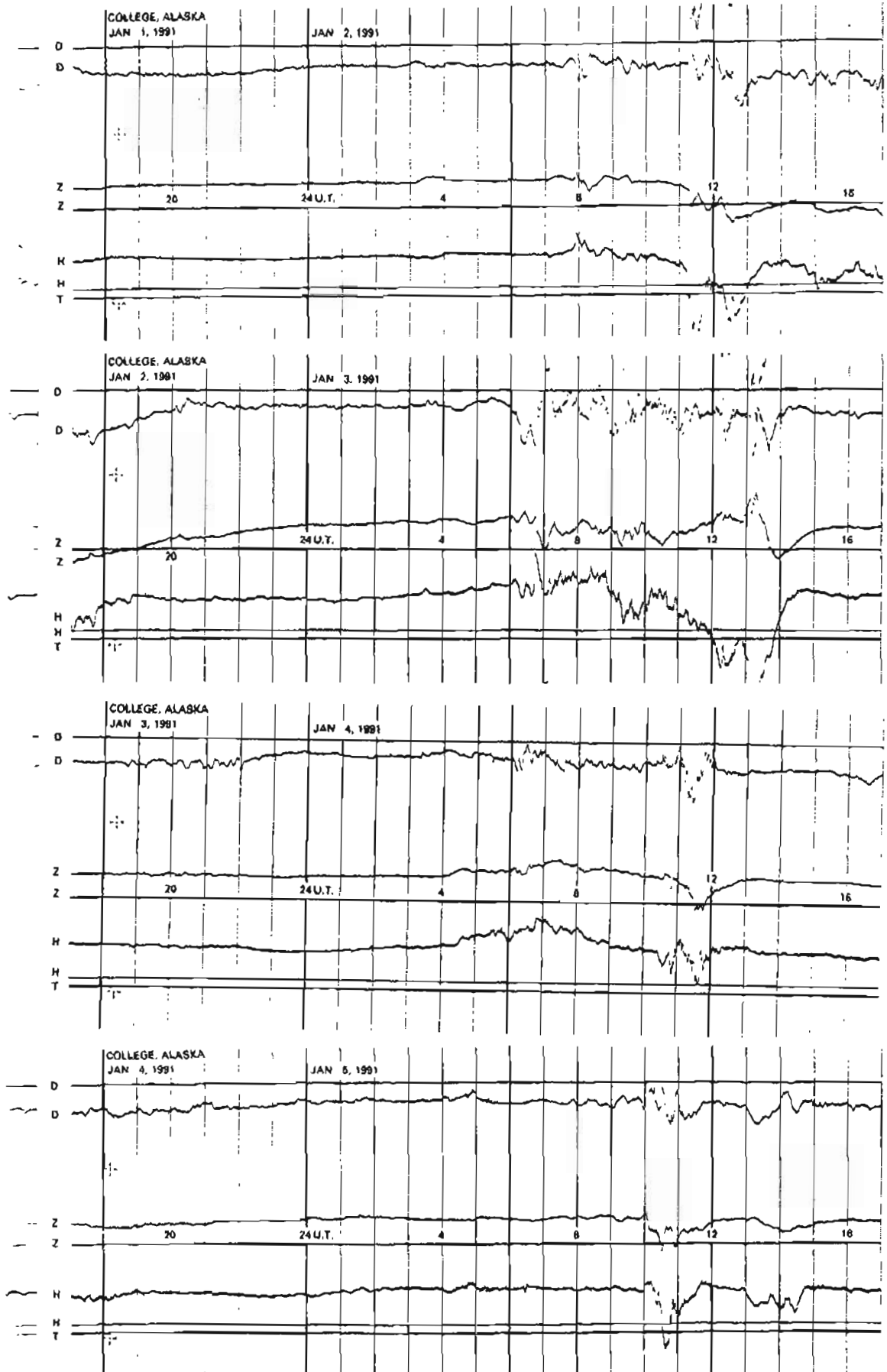
## FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



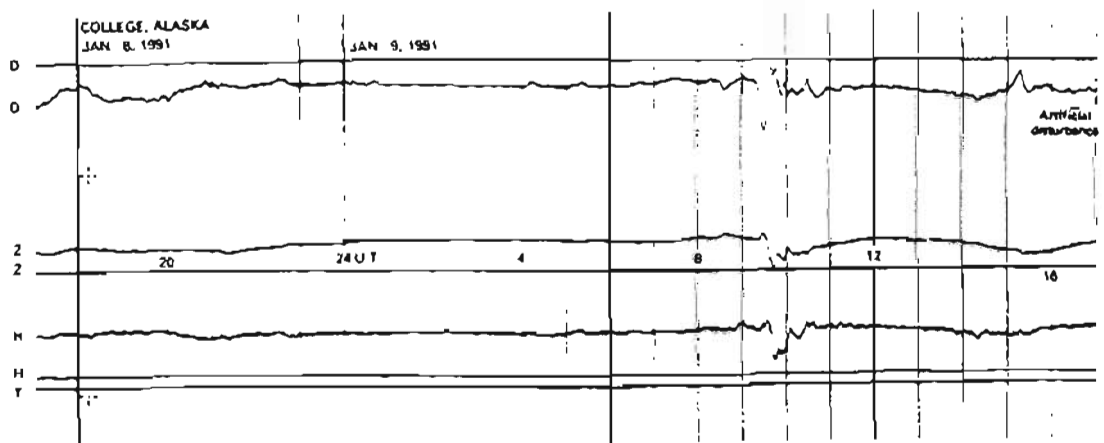
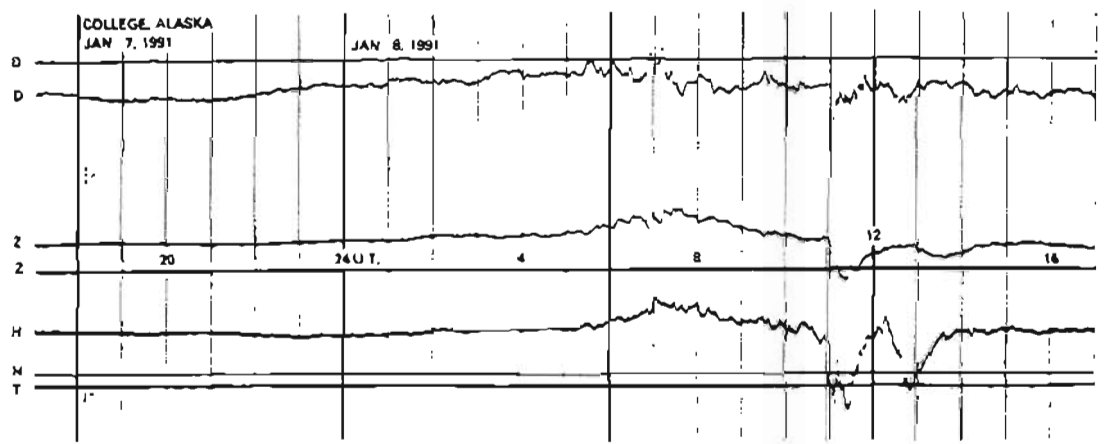
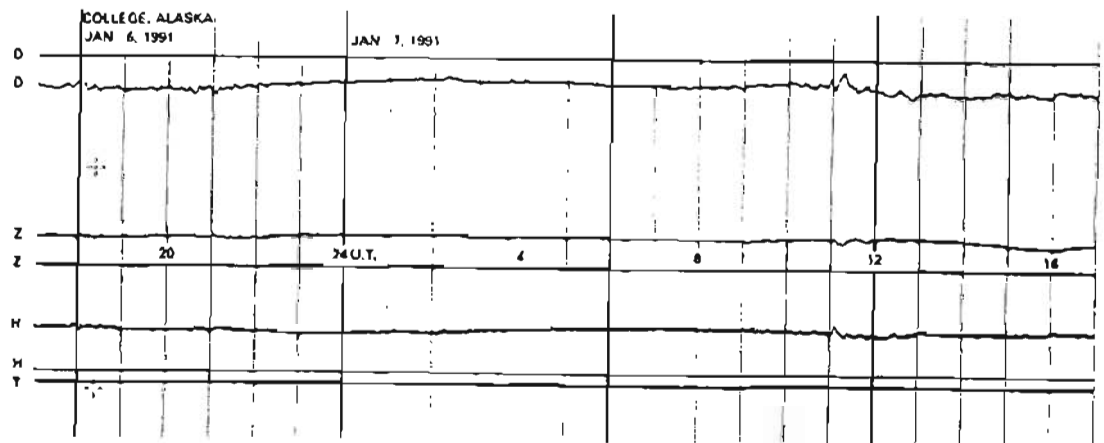
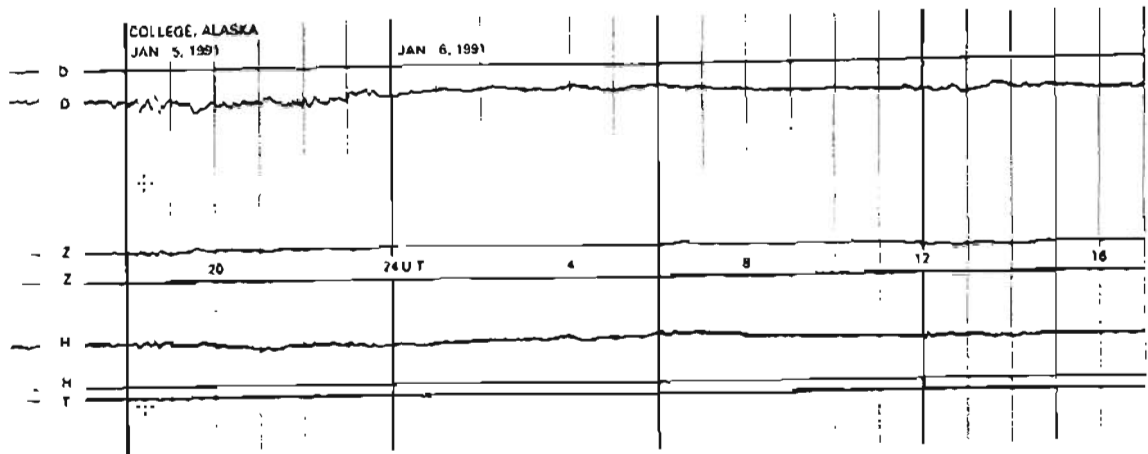
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES



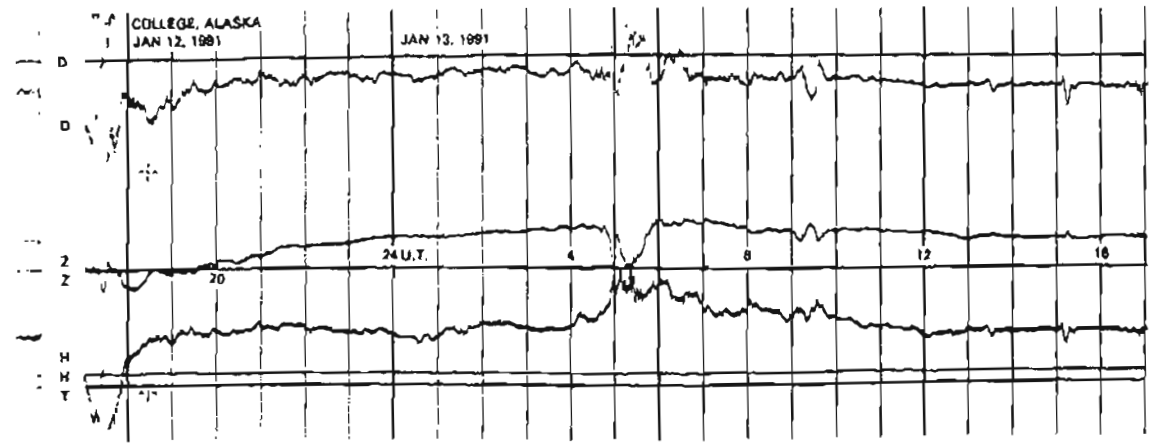
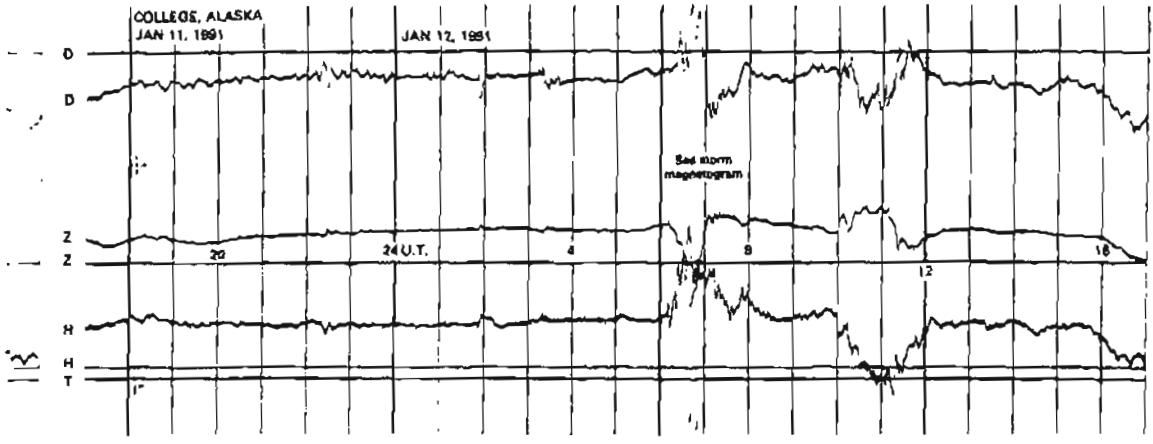
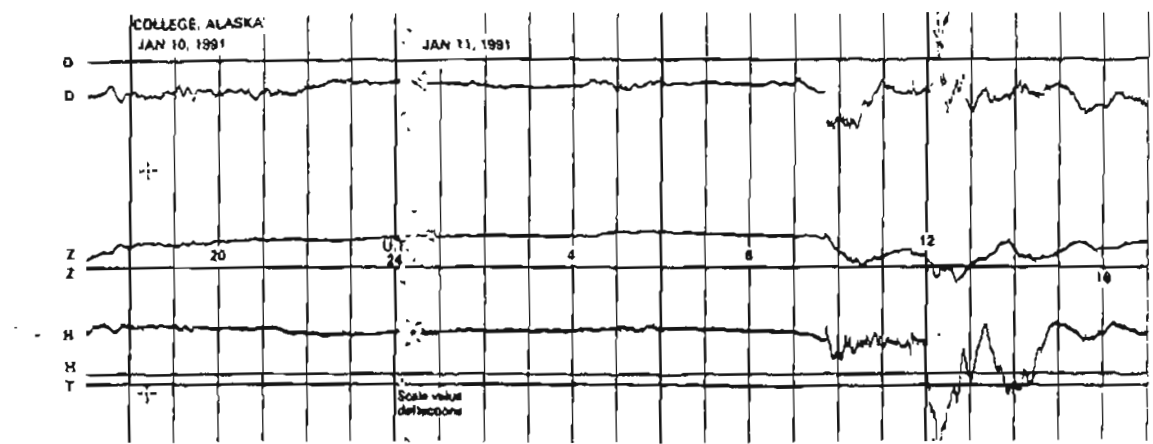
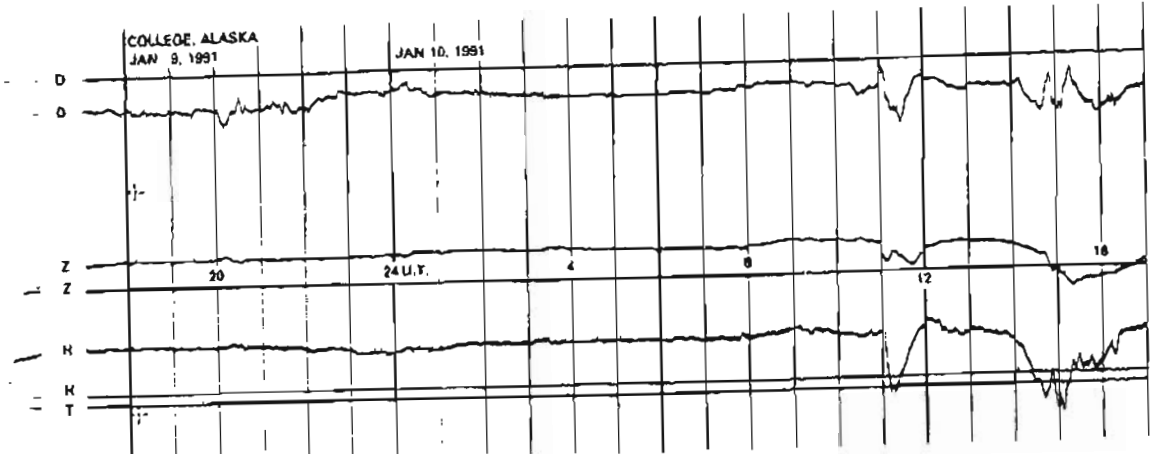
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

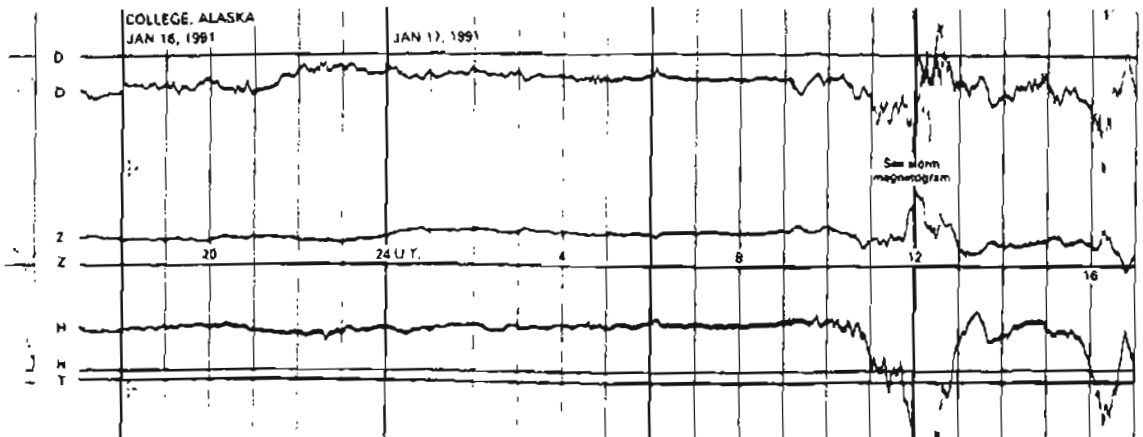
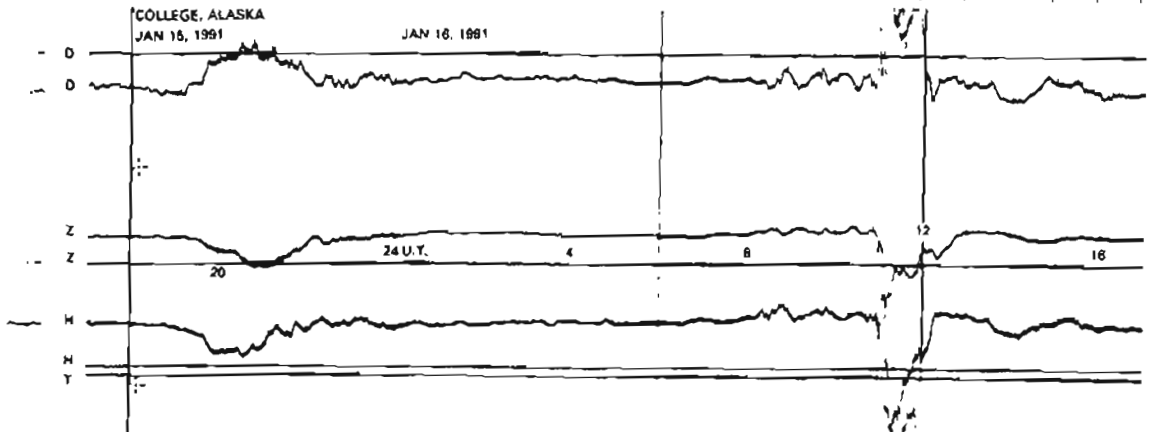
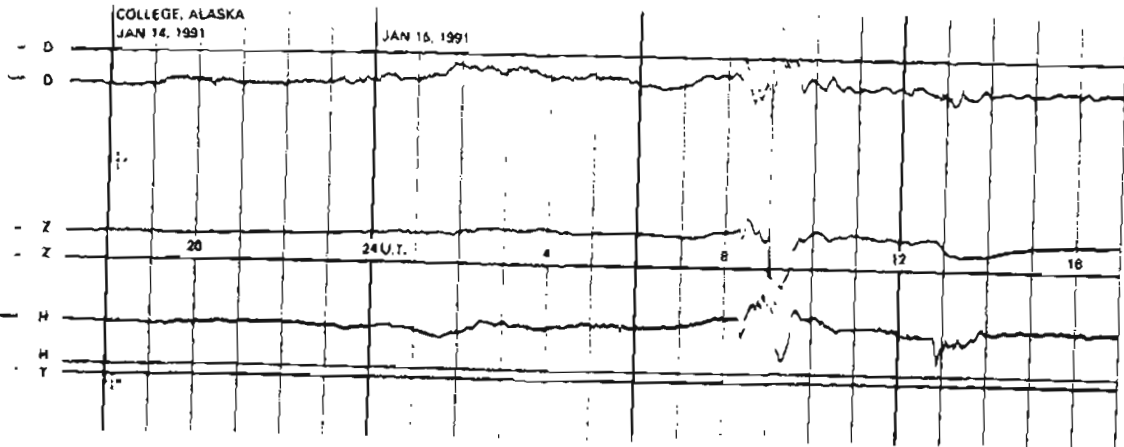
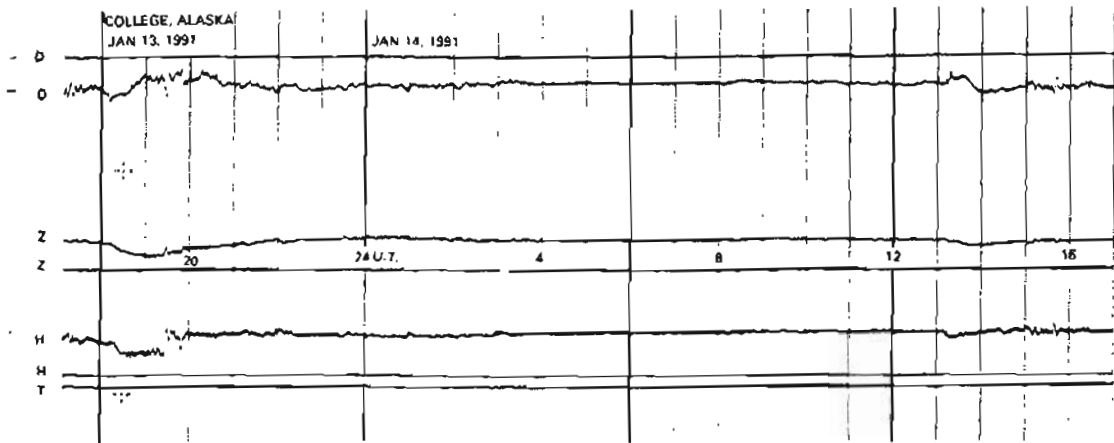


NORMAL MAGNETOGRAMS

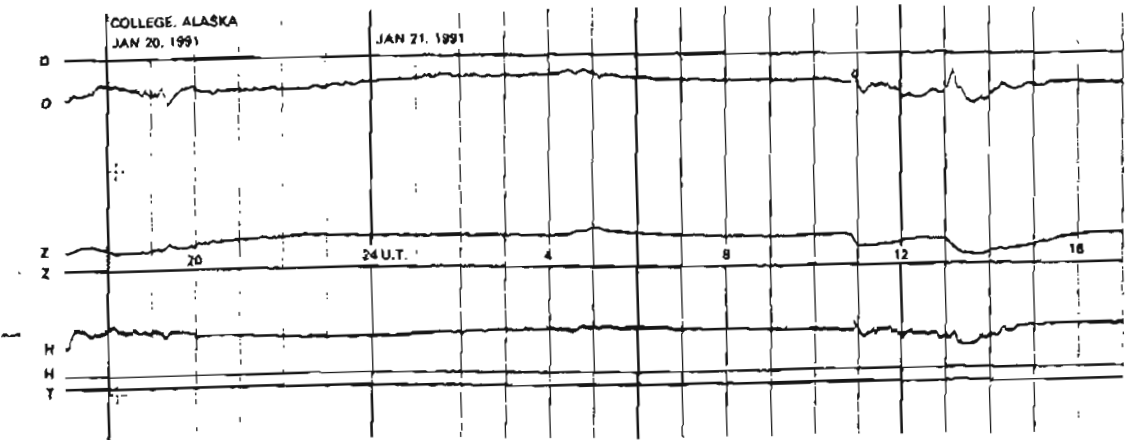
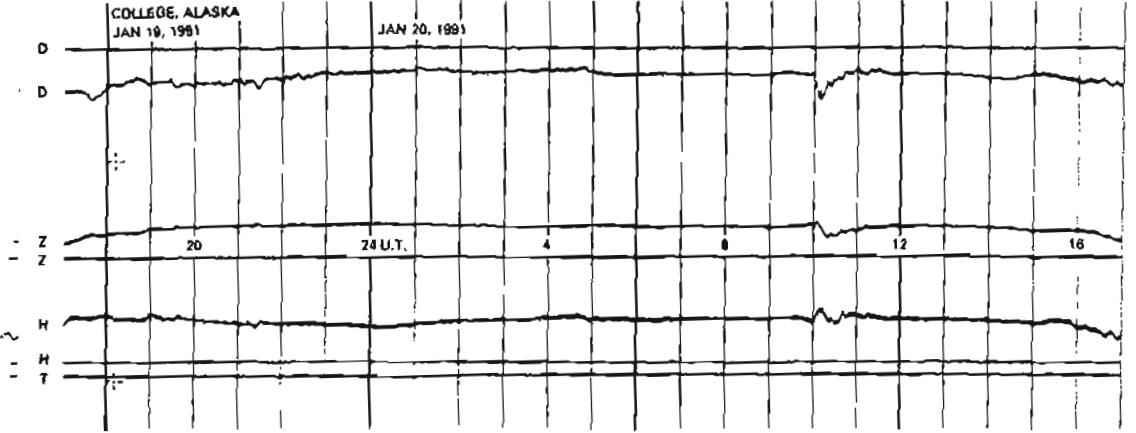
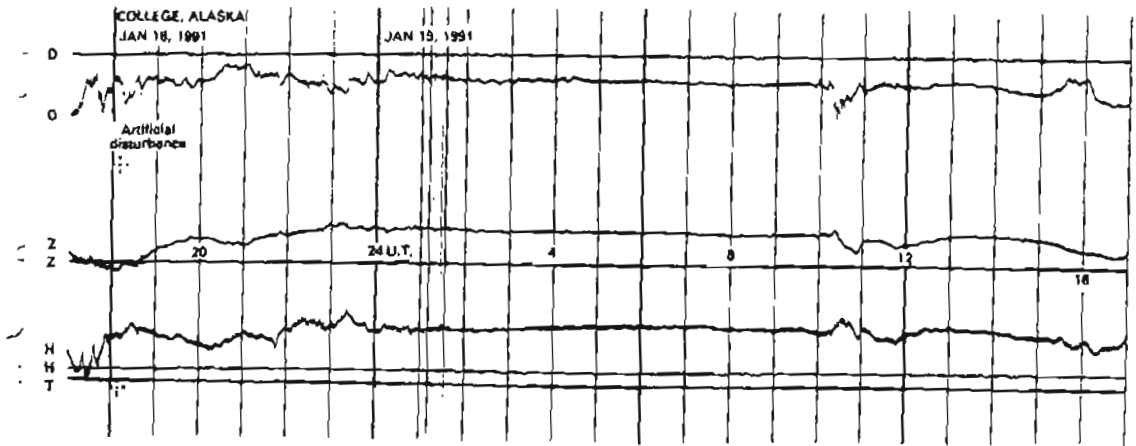
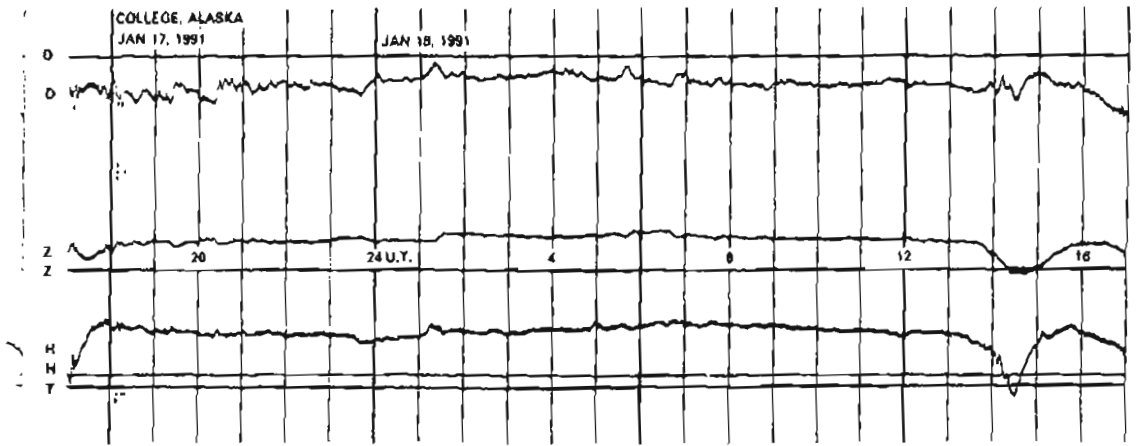


NORMAL MAGNETOGRAMS

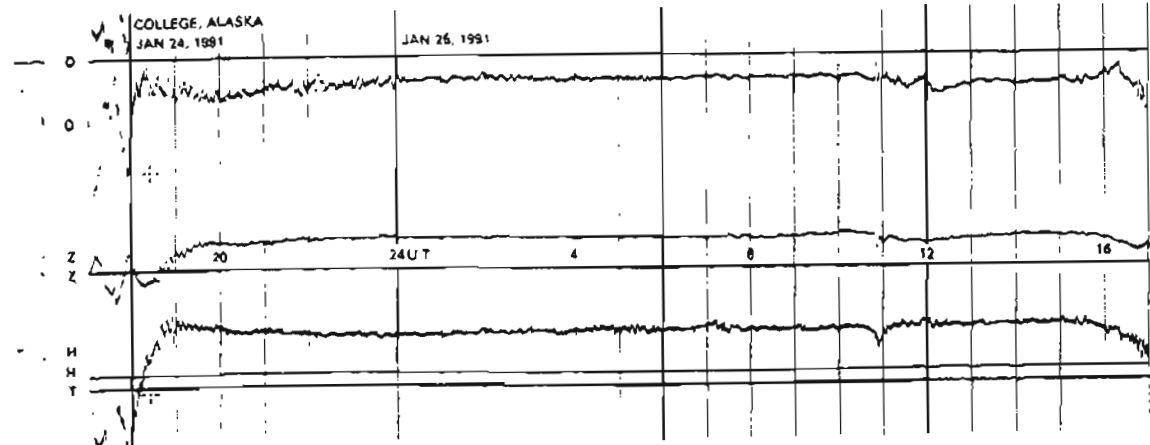
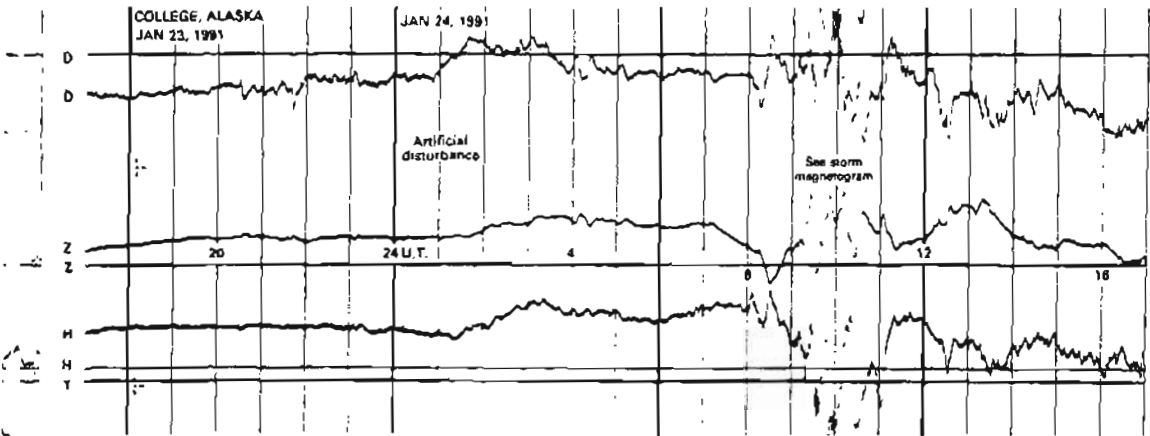
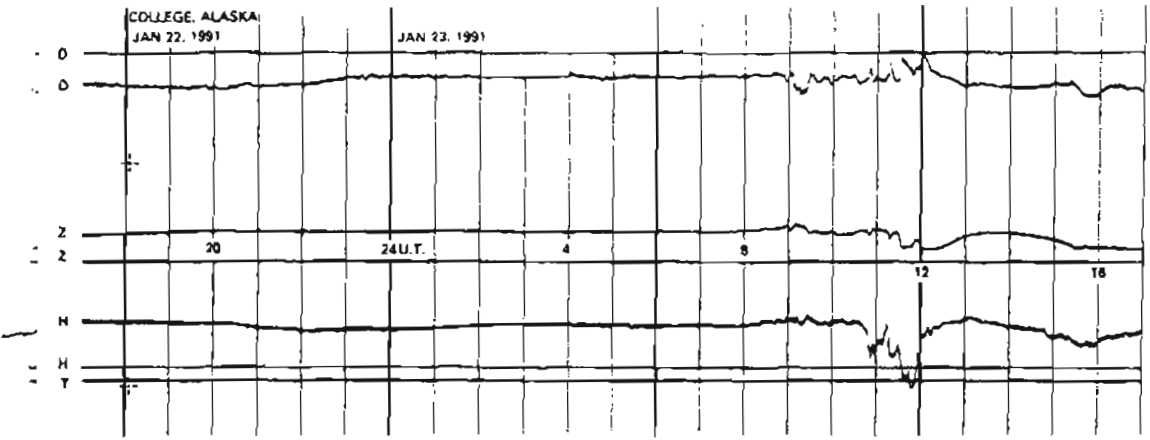
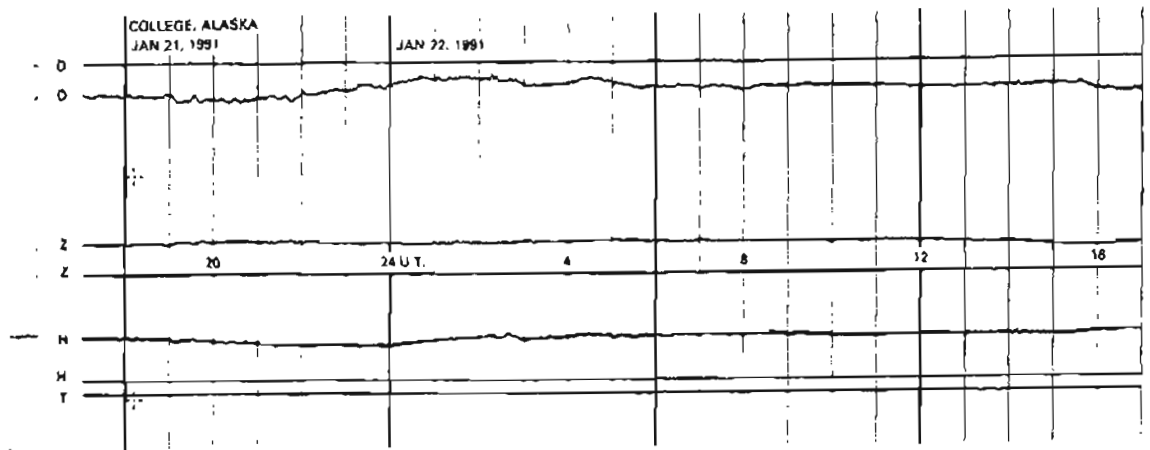
200 mm  
100 mm  
0



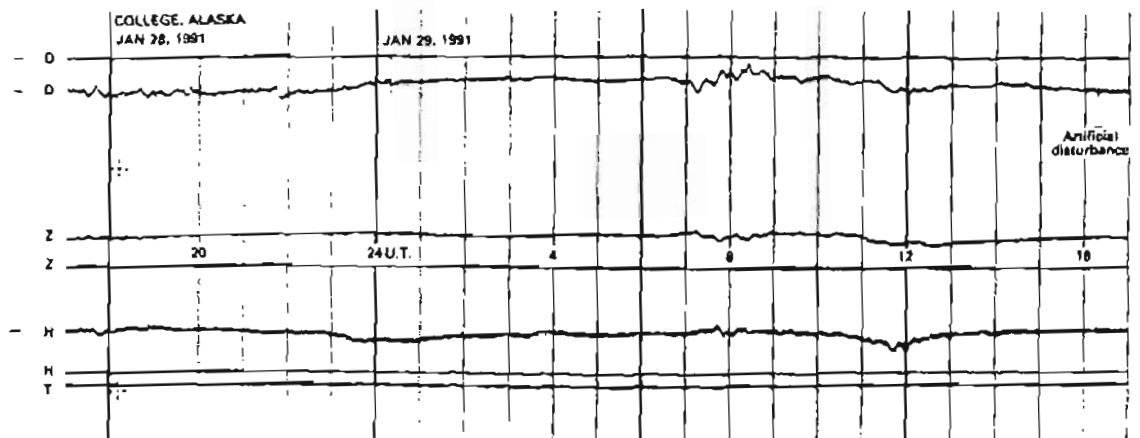
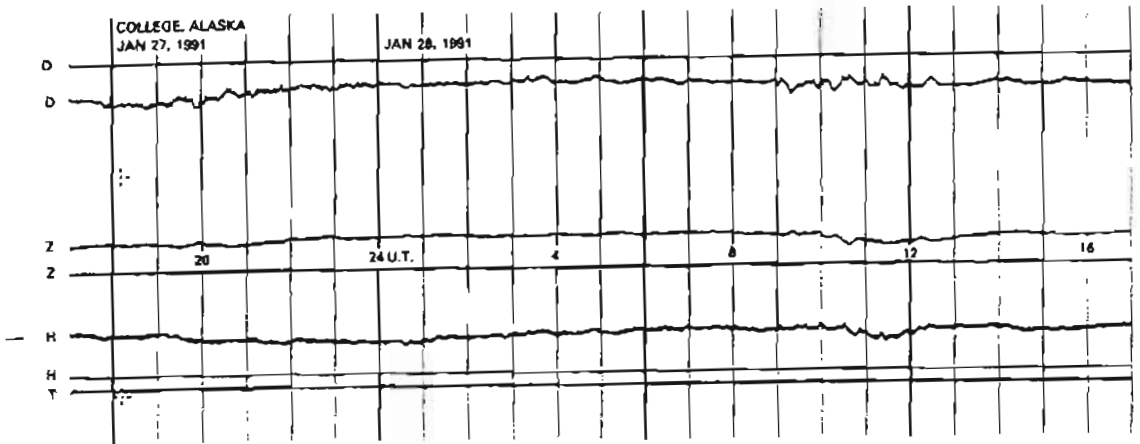
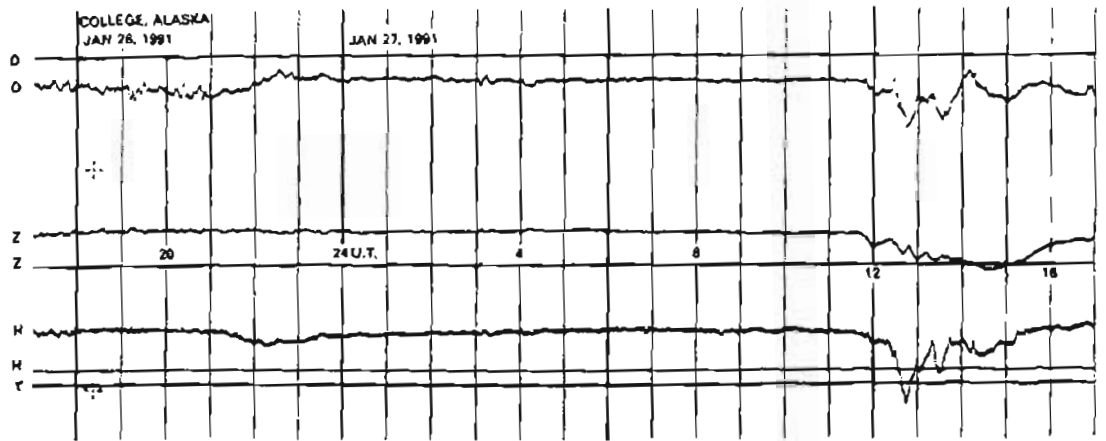
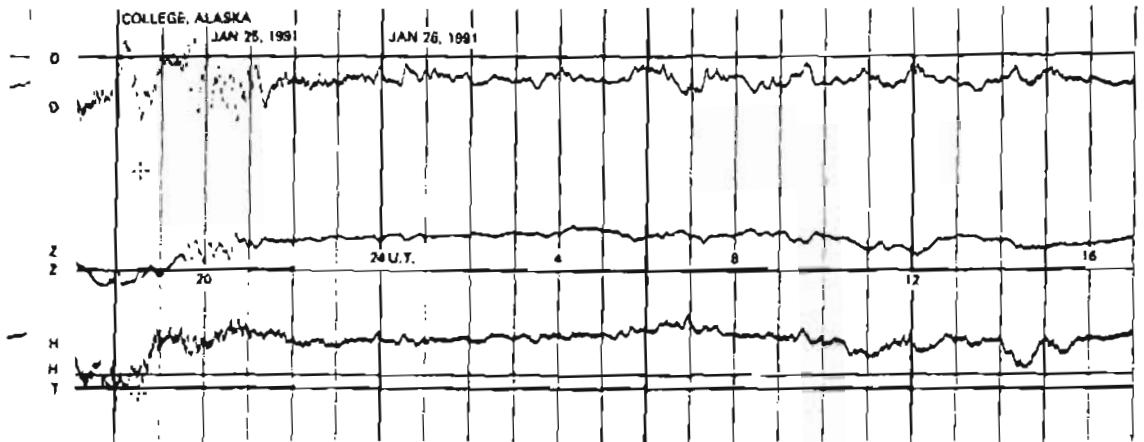
NORMAL MAGNETOGRAMS



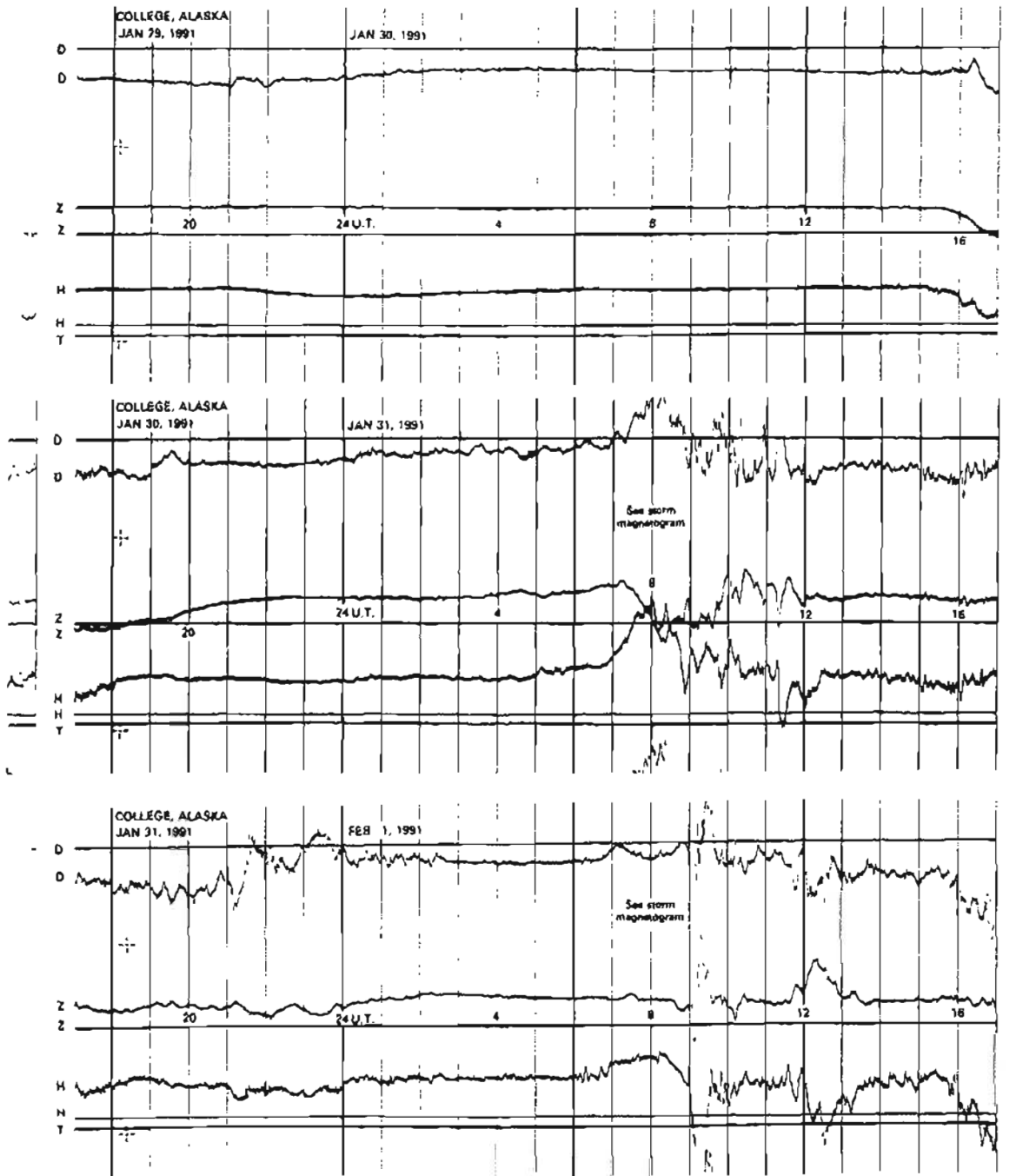
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

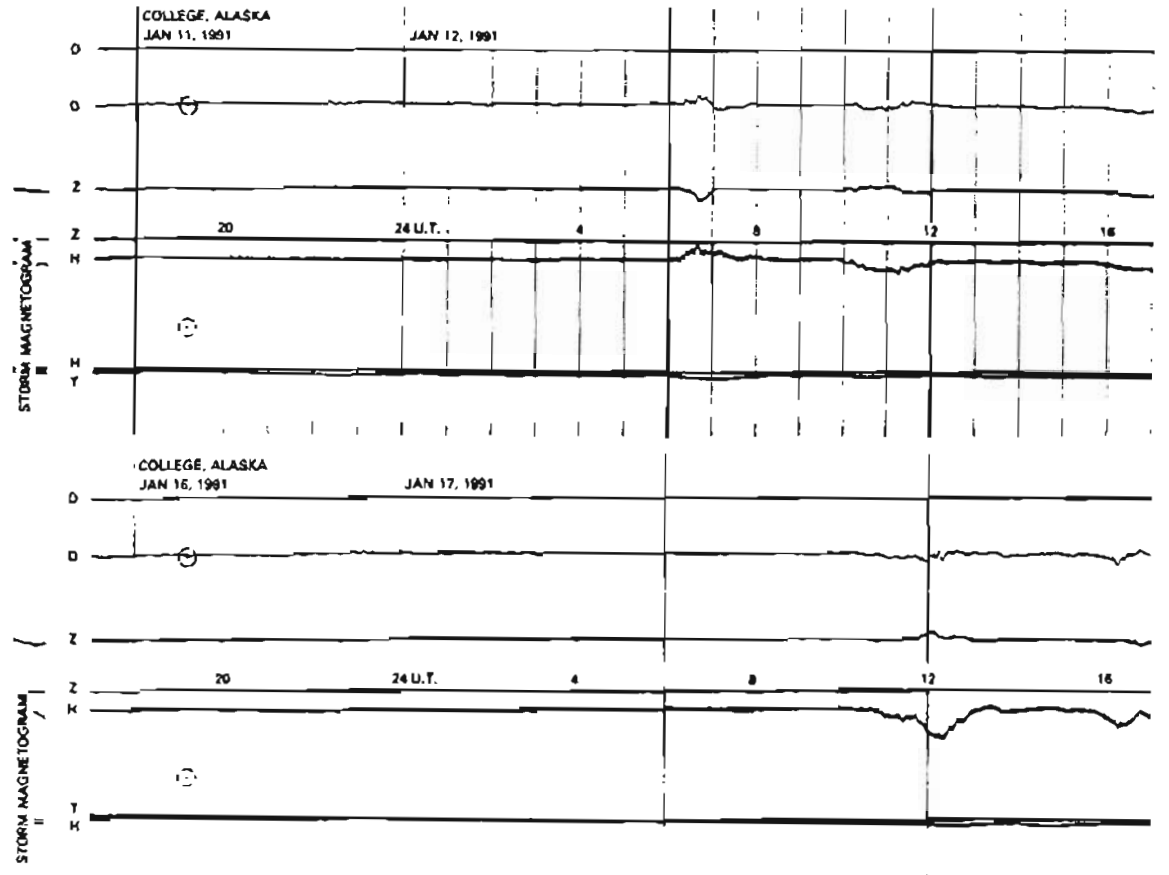


NORMAL MAGNETOGRAMS





# STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS

200nT  
100nT  
0

