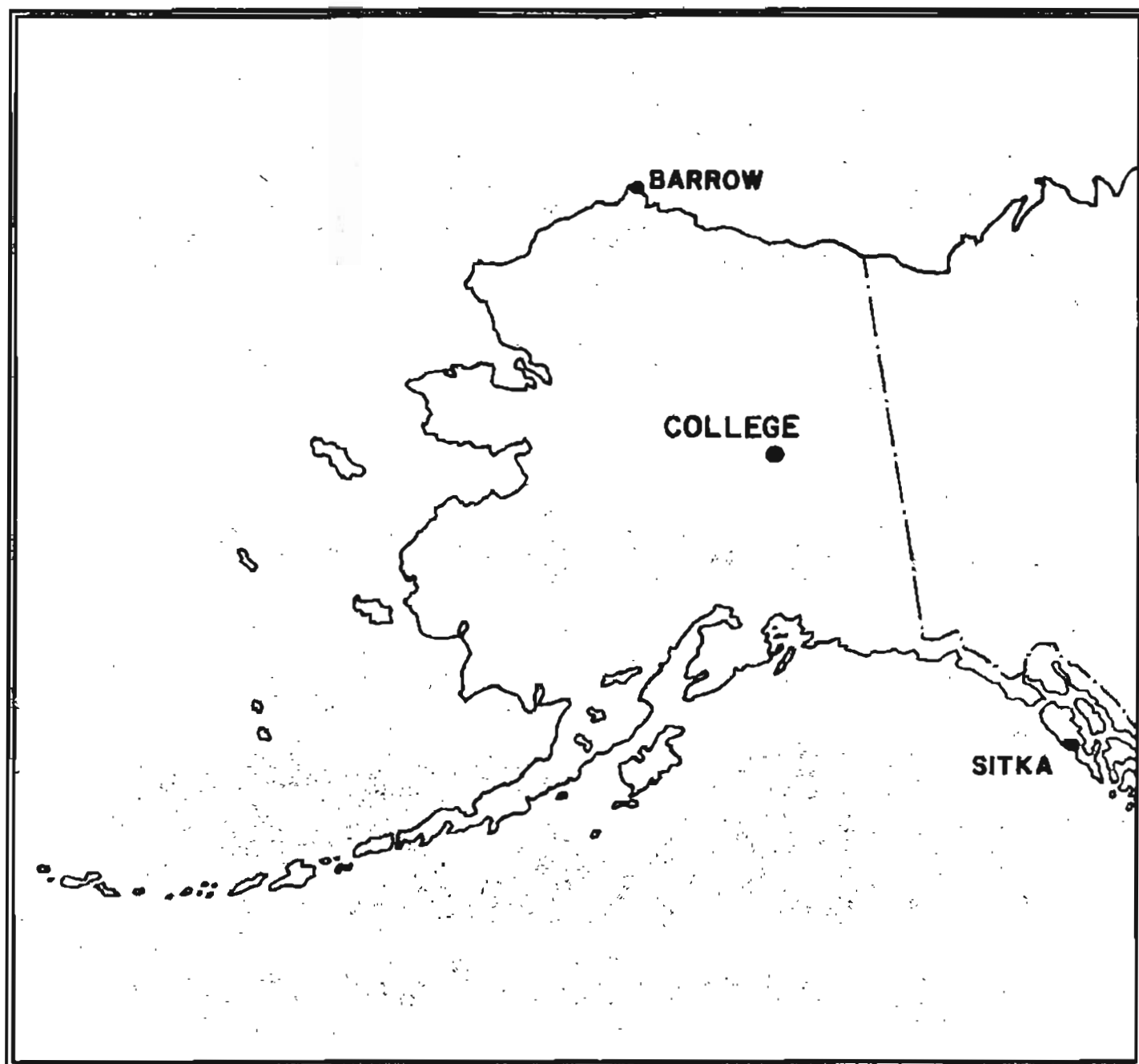


UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA  
COLLEGE OBSERVATORY  
FAIRBANKS, ALASKA

JANUARY 1990

OPEN FILE REPORT 90-0300A



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B TOWNSEND,  
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 99775-5180

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

World Data Center A  
NOAA D83m 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.....+64.8°  
Geomagnetic longitude.....+256.5°  
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<sup>7</sup> 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< 1850	7	140
1850< 2500	8	240
2500+	9	400 (10 <sup>7</sup> )

### 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 "D1" 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:

$$D = R_D + d \quad S_D; \quad H = R_H + h \quad S_H; \quad Z = R_Z + z \quad S_Z$$

where D, H and Z are absolute values;  
 $R_D$ ,  $R_H$  and  $R_Z$  are base-line values;  
 $S_D$ ,  $S_H$  and  $S_Z$  are scale values;  
and d, h and z are scalings in millimeters.

NOAA FORM 76-133 (9-72) U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION										OBSERVATORY	
MAGNETIC ACTIVITY (Greenwich civil time, counted from midnight to midnight)										College, Alaska	
										MONTH AND YEAR JANUARY, 1990	
DATE	K-INDICES								SUM	$A_K$	TIME SCALE ON MAGNETOGRAMS  20 mm/hr
	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08			
1	1	2	5	5	4	5	5	3	30	31	SUDDEN COMMENCEMENTS d h m
2	2	2	1	5	4	3	3	2	22	16	
3	4	2	2	3	3	4	2	1	21	14	
4	1	1	1	4	5	2	2	2	18	13	
5	3	2	3	4	3	5	4	2	26	20	
6	2	1	1	4	1	1	1	0	11	6	
7	1	1	3	2	1	0	0	0	8	4	
8	0	0	0	0	2	6	3	2	13	14	
9	3	2	3	4	4	2	0	1	19	13	
10	1	1	4	4	4	5	3	2	24	20	
11	3	2	3	7	6	4	4	3	32	41	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)
12	3	3	3	6	5	5	2	1	28	29	
13	2	1	2	5	3	2	2	0	17	12	
14	0	0	1	4	5	3	0	0	13	12	
15	0	0	1	4	3	3	2	0	13	8	
16	0	0	0	3	1	3	3	2	12	7	
17	1	2	2	3	3	3	1	0	15	8	
18	1	0	1	5	5	2	1	0	15	14	
19	0	0	0	0	1	0	1	1	3	1	
20	1	1	2	4	5	5	4	2	24	21	
21	2	1	4	5	5	5	3	2	27	25	BEGIN      END d h m      d h m
22	3	3	3	5	3	4	4	2	27	21	
23	2	3	3	5	4	3	3	3	26	20	
24	4	4	4	6	5	5	6	4	38	46	
25	4	2	2	5	5	4	1	1	24	21	
26	1	1	2	4	5	4	2	0	19	15	
27	0	1	0	0	0	1	0	0	2	1	
28	0	0	1	0	1	1	2	2	7	3	
29	2	3	5	6	6	3	2	3	30	33	
30	4	3	3	3	6	5	5	3	32	33	
31	2	2	3	5	5	5	4	2	28	26	

K SCALE USED:	D	H	Z	
LOWER LIMIT FOR K = 9.....	675.7	322.2		(mm)
CURRENT SCALE VALUE.....	3.68	7.73		(γ/mm)
LOWER LIMIT FOR K = 9.....	2490	2490		(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED \_\_\_\_\_  
 John B. Townshend, Chief

OBSERVER IN CHARGE  
 \_\_\_\_\_

## PRINCIPAL MAGNETIC STORMS

Data from Individual Observatories:

COLLEGE OBSERVATORY, COLLEGE, ALASKA

JANUARY 19 90

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

Obs. 2 letter 1 ASA 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)	
00	64.6 N	24	05xx	..				24	4,7	6	81	870	350	25 03
	(Feb)	1	1146	SC	-44	-200	-120	1	6,7	7	313	1120	880	1 21

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0022 UT, 1-1-90	2400 UT, 1-31-90	1.0' /mm	3.7 γ /mm	26° 34.3' E
H	0001 UT, 1-1-90	2400 UT, 1-26-90	7.7 γ /mm		12612 γ
	0001 UT, 1-27-90	2400 UT, 1-31-90	↓		12608 γ
Z	0001 UT, 1-1-90	2400 UT, 1-26-90	7.7 γ /mm		55210 γ
	0001 UT, 1-27-90	2400 UT, 1-31-90	↓		55214 γ

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0001 UT, 1-1-90	2400 UT, 1-31-90	7.9' /mm	29.4 γ /mm	
H	(SAME)	(SAME)	43.5 γ /mm		
Z	(SAME)	(SAME)	49.0 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): -5γ; i.e., H absolute and baseline values are 5γ less than previously reported.

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

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
26° 57.1' E	12787 γ	55337 γ
* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.		
DAYS USED: JAN. 6, 7, 19, 27, 28		

## 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. Starlike Corrections have been applied. Negative Values in Red with Minus.

COMPONENT		D						H						Z						COMPONENT			
DAY		6	7	19	27	28	6	7	19	27	28	6	7	19	27	28	6	7	19	27	28	DAY	
A <sub>1</sub>		6	4	1	1	3	6	4	1	1	3	6	4	1	1	3	6	4	1	1	3	A <sub>1</sub>	
Hour		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	Hour	
		140	186	188	1201	200	218	179	237	242	246	192	229	254	244	232	229	251	237	193	156	156	01
		181	186	188	1201	200	218	179	237	242	246	192	229	254	244	232	229	251	237	193	158	168	02
		209	188	200	159	210	213	200	210	210	210	201	210	210	210	210	210	210	210	195	170	168	03
		183	1201	200	159	210	213	200	210	210	210	201	210	210	210	210	210	210	210	189	177	166	04
		201	200	210	171	213	218	200	210	210	210	201	210	210	210	210	210	210	210	199	189	173	05
		218	190	221	201	218	221	229	230	230	230	244	262	240	240	240	240	240	240	196	203	185	06
		218	179	229	212	221	221	229	230	230	230	252	330	239	239	239	239	239	239	194	237	171	07
		237	227	230	211	217	217	227	230	230	230	251	350	239	239	239	239	239	239	195	231	167	08
		242	236	230	217	213	213	236	230	230	230	258	268	230	230	230	230	230	230	179	205	162	09
		246	246	225	212	217	217	246	225	225	225	260	265	230	230	230	230	230	230	166	192	164	10
		192	228	218	212	218	218	228	218	218	218	190	240	229	229	229	229	229	229	118	183	166	11
		229	228	220	229	218	218	228	220	220	220	161	229	220	220	220	220	220	220	130	176	167	12
		254	264	234	241	227	227	264	234	234	234	219	220	212	222	222	222	222	222	163	170	164	13
		244	246	246	248	229	229	246	246	246	246	222	230	221	222	222	222	222	222	163	170	156	14
		232	249	232	245	241	241	249	232	232	232	222	220	230	221	221	221	221	221	162	170	154	15
		229	245	234	245	248	248	245	234	234	234	220	219	230	223	223	223	223	223	164	171	155	16
		251	249	241	257	252	252	249	241	241	241	220	218	231	222	222	222	222	222	162	170	157	17
		259	260	255	260	260	260	260	255	255	255	220	220	230	210	210	210	210	210	159	160	160	18
		277	270	279	280	281	281	270	279	279	279	203	220	232	205	203	203	203	203	160	154	159	19
		277	280	289	263	261	261	280	279	279	279	217	222	229	209	178	178	178	178	160	152	154	20
		274	279	293	270	230	230	279	279	279	279	215	228	222	209	198	198	198	198	163	160	150	21
		259	270	278	252	232	232	270	278	278	278	211	225	211	209	220	220	220	220	155	160	151	22
		232	250	250	237	210	210	250	250	250	250	210	214	200	200	227	227	227	227	151	160	156	23
		217	241	230	219	198	198	241	230	230	230	200	210	196	200	211	211	211	211	155	167	157	24
DAILY SUM		5501	5582	5635	5426	5421	5421	5582	5635	5635	5421	5333	5716	5350	5278	5441	4064	4241	3819	4064	4241	3921	3459
DAILY MEAN		229	233	235	226	226	226	233	235	235	226	222	238	223	220	227	169	177	159	169	177	163	144
MEAN		230						226						163						MEAN			

Sched 7810

Checked (J)

COLLEGE, ALASKA

NOV 10, 1973

NOV 11, 1973

20 24 4 8 12 16

U.T.

D BASELINE ↑

D TRACE ↑

NEW U.T. DAY BEGINS HERE →

Z TRACE ↓

Z BASELINE ↓

H TRACE ↑

H BASELINE ↓

TEMPERATURE TRACE ↑

INCREASING EAST DECLINATION ↓

HOUR MARK →

INCREASING VERTICAL INTENSITY ↑

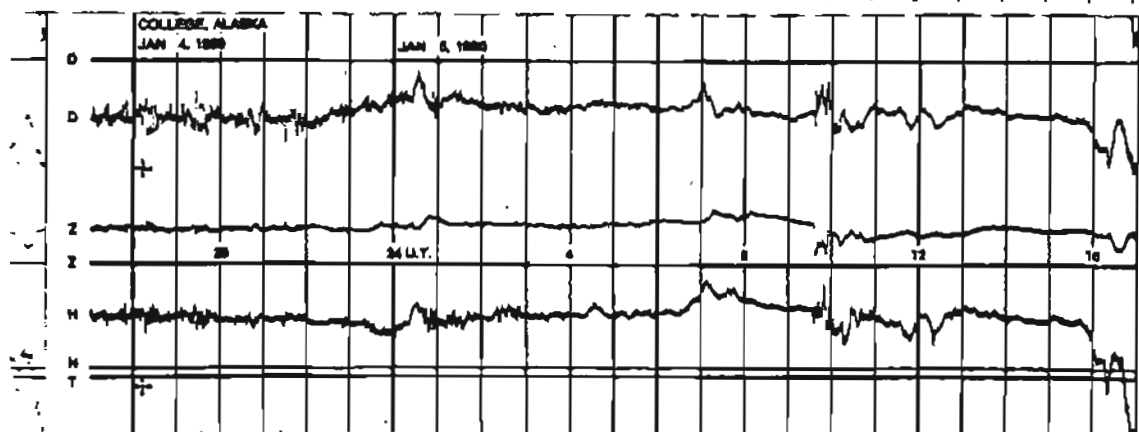
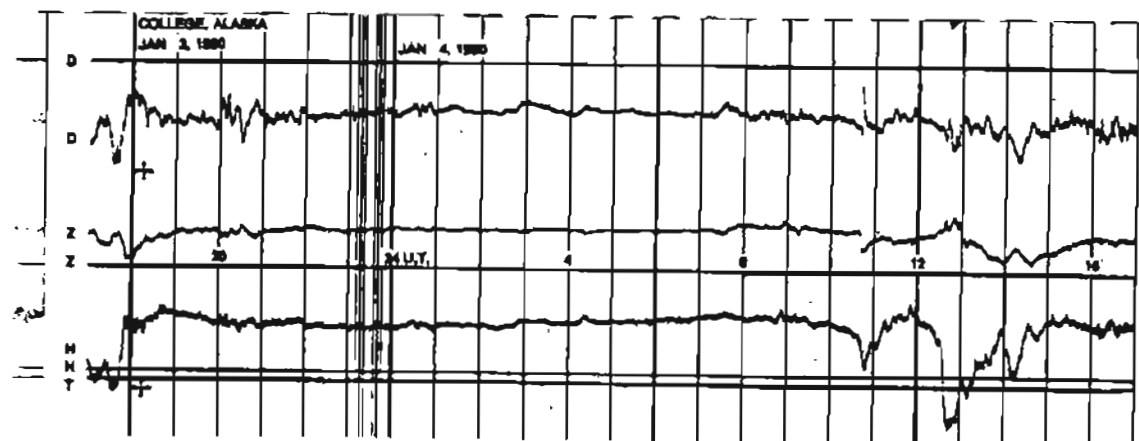
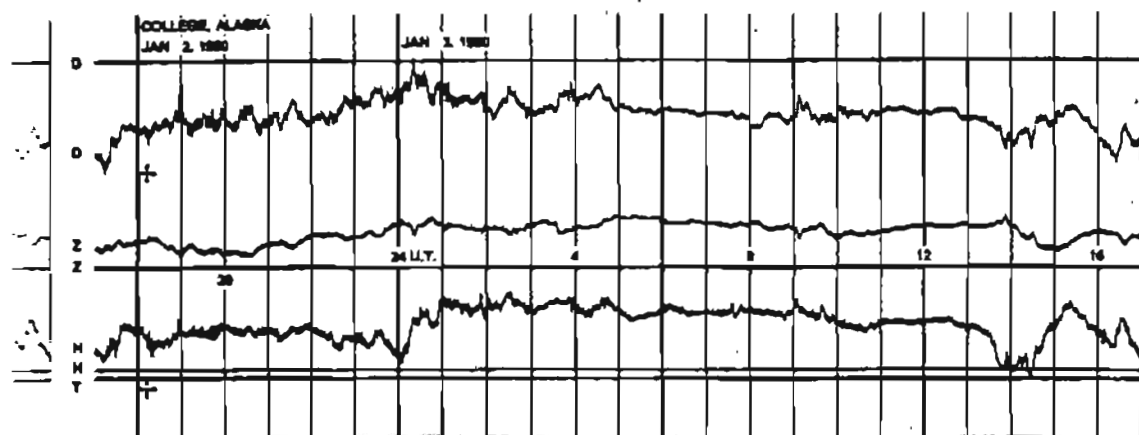
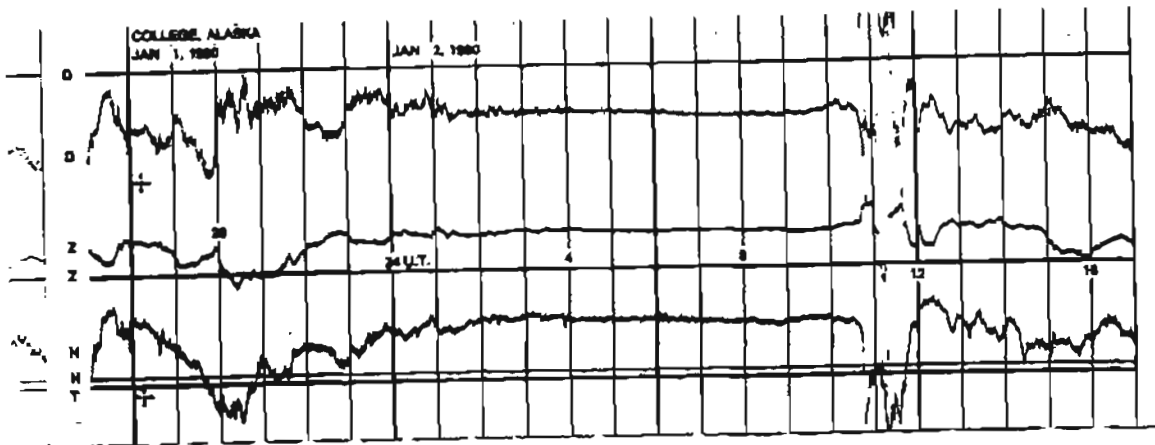
INCREASING HORIZONTAL INTENSITY ↑

SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES



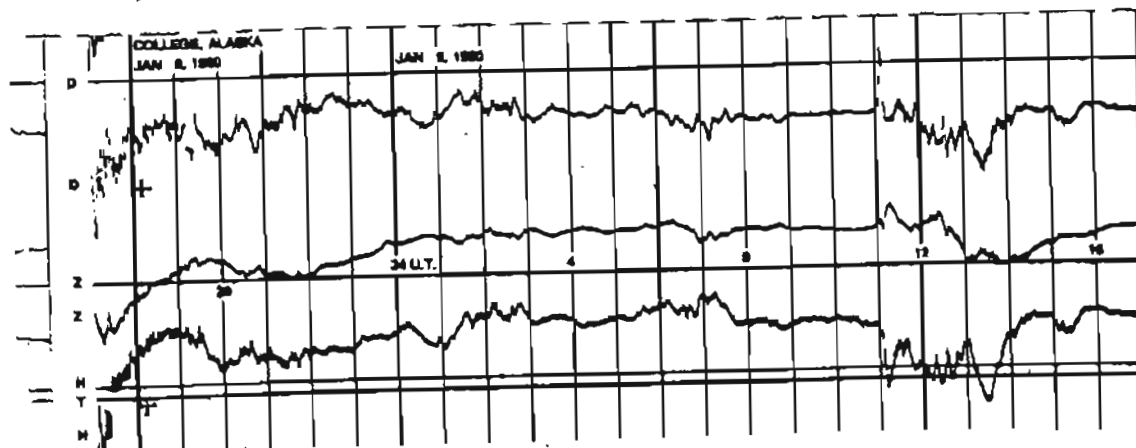
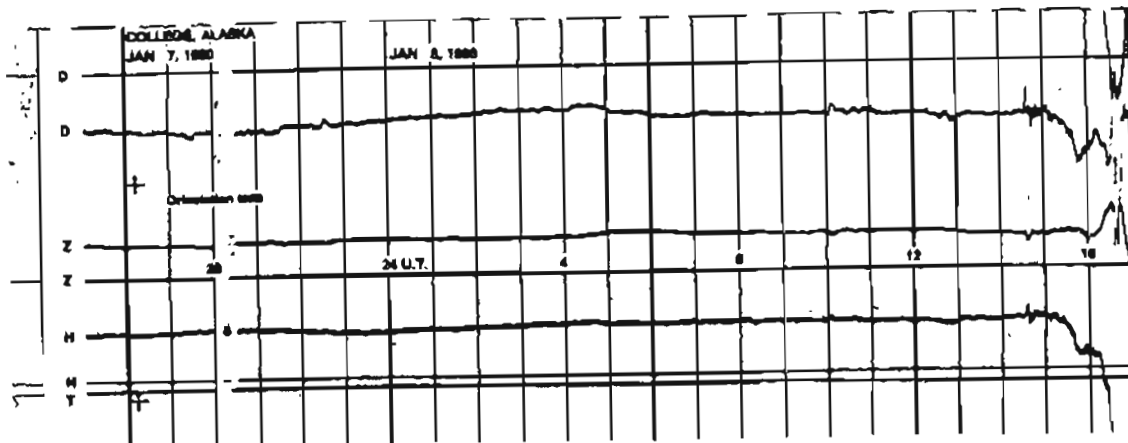
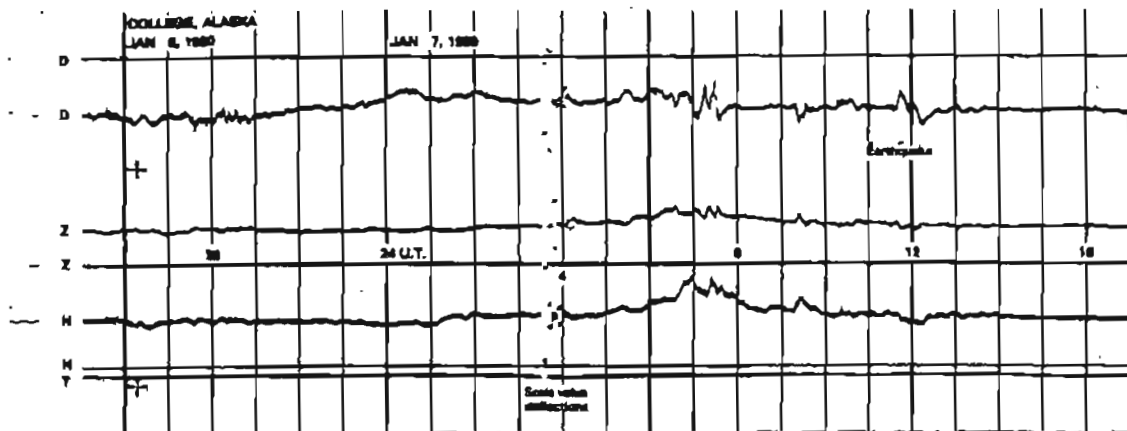
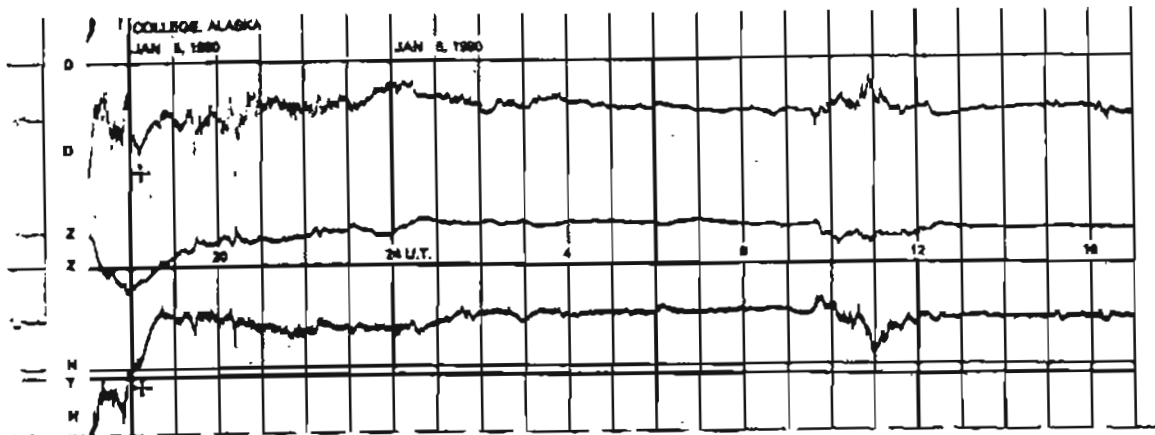
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100 mV  
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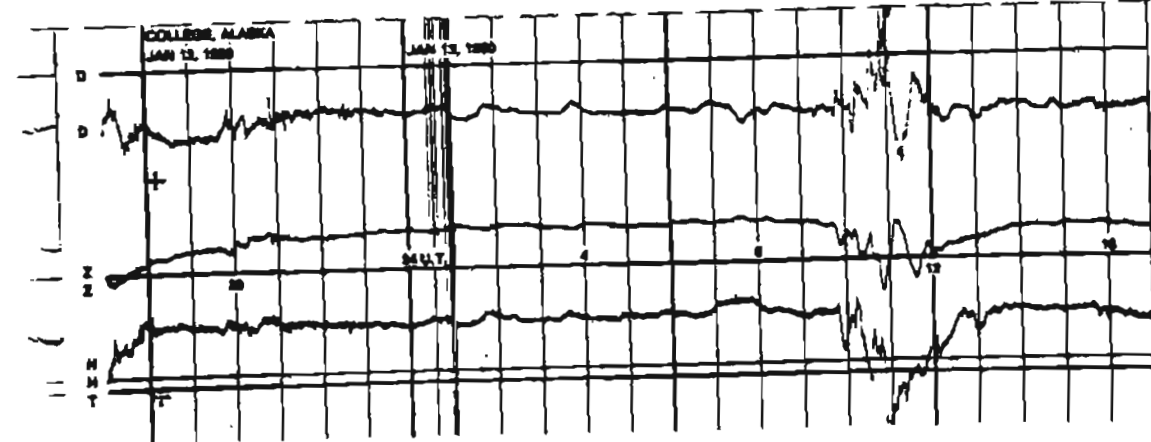
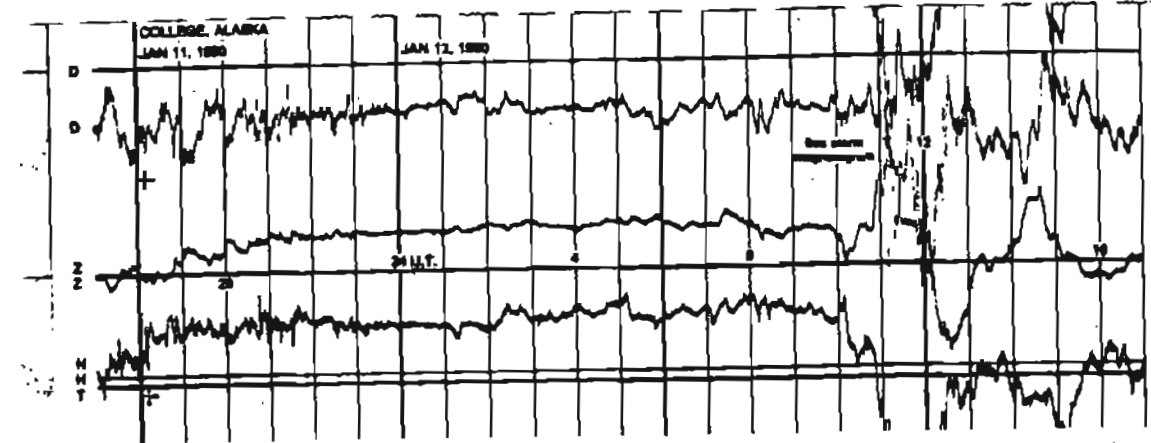
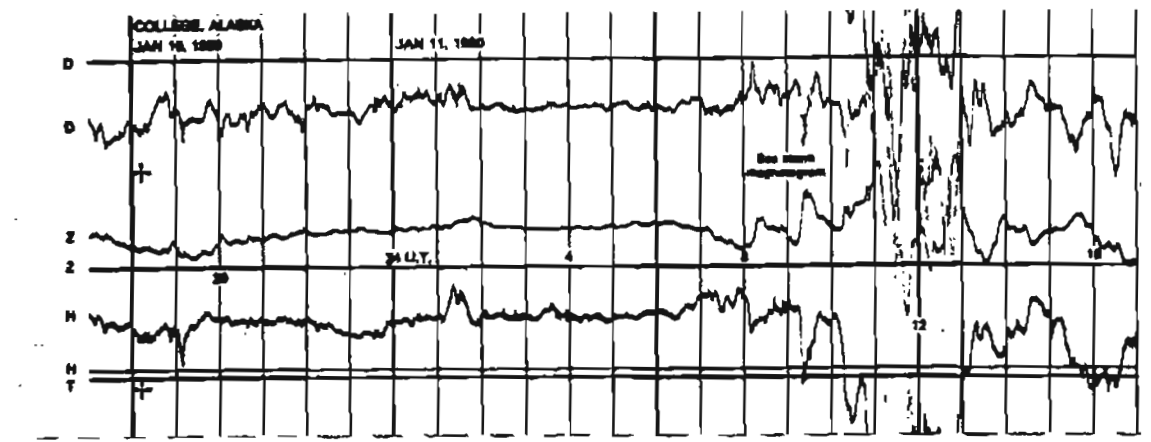
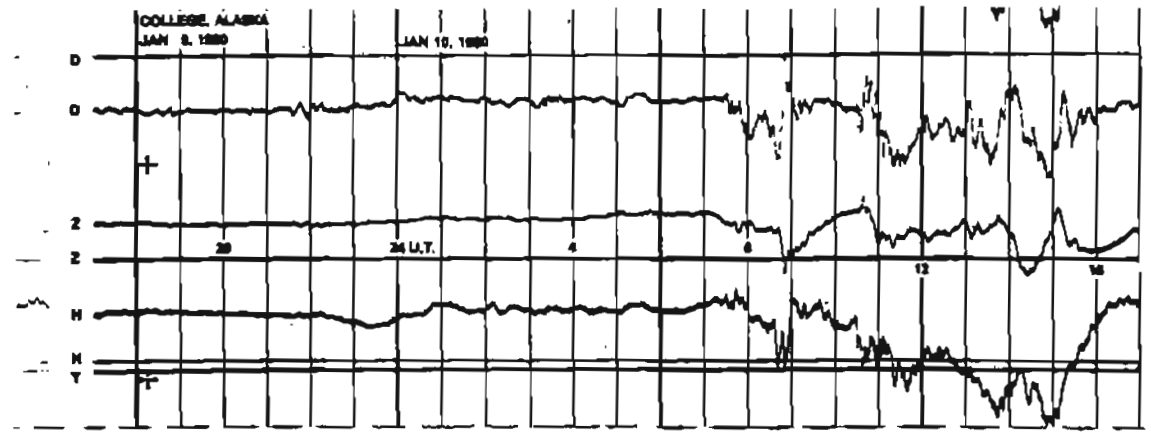


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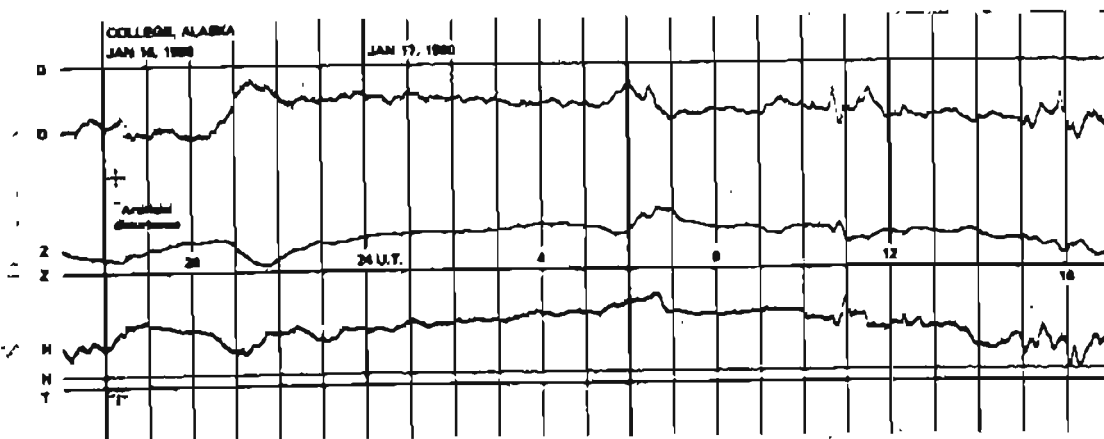
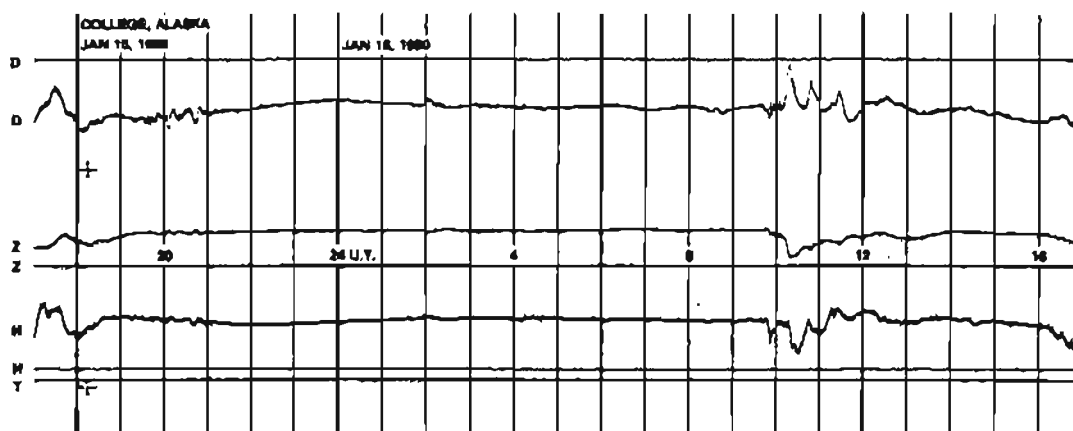
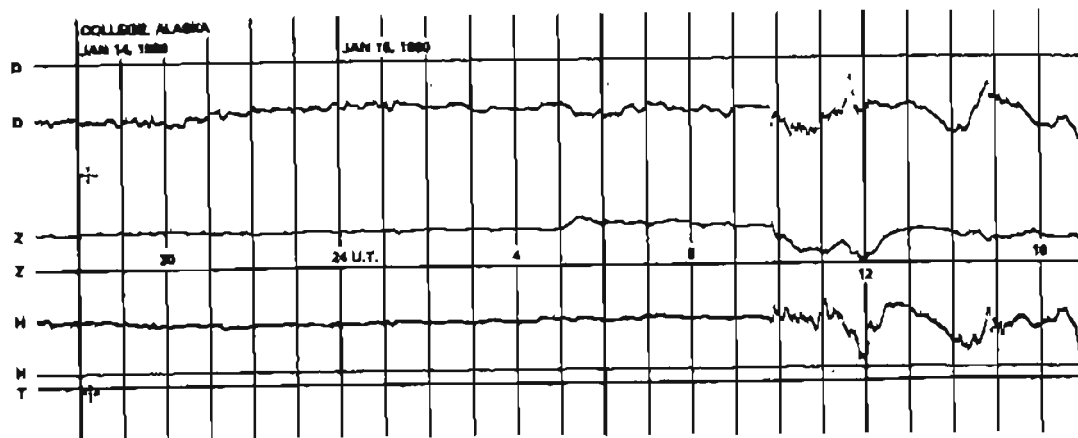
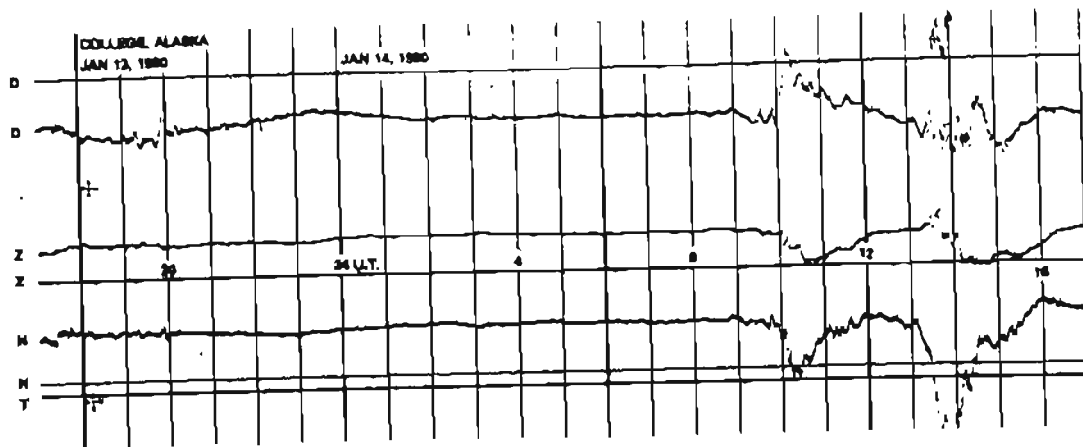
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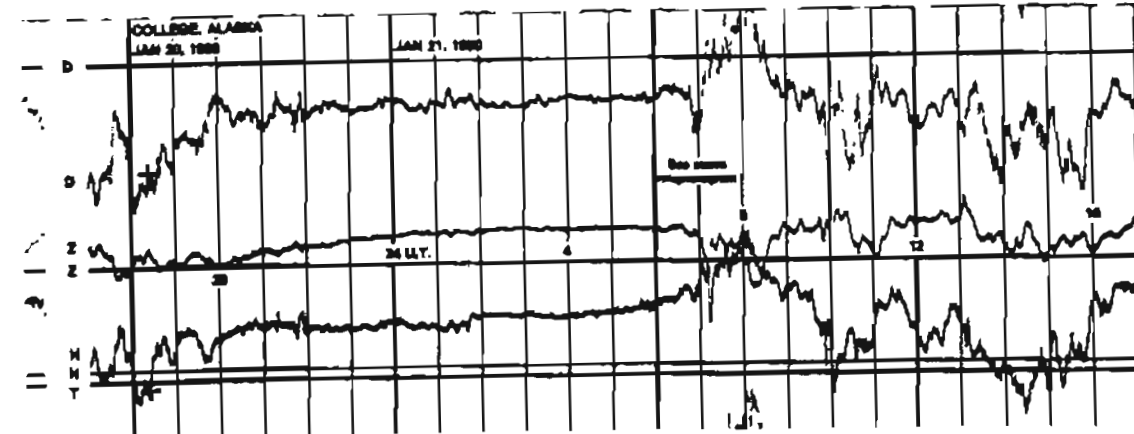
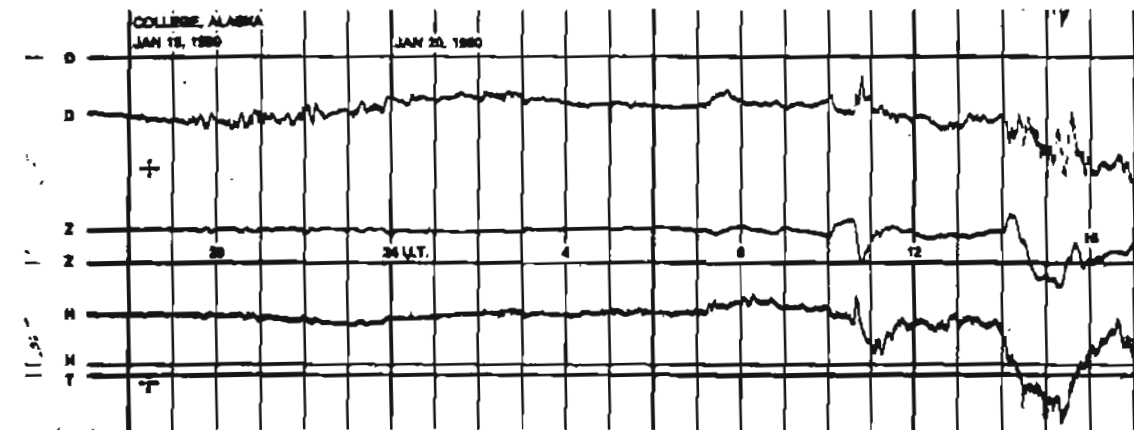
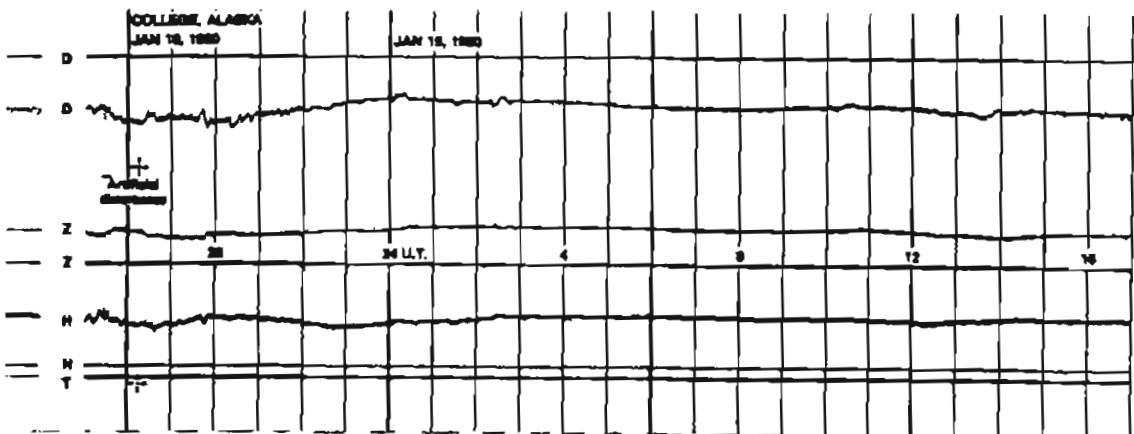
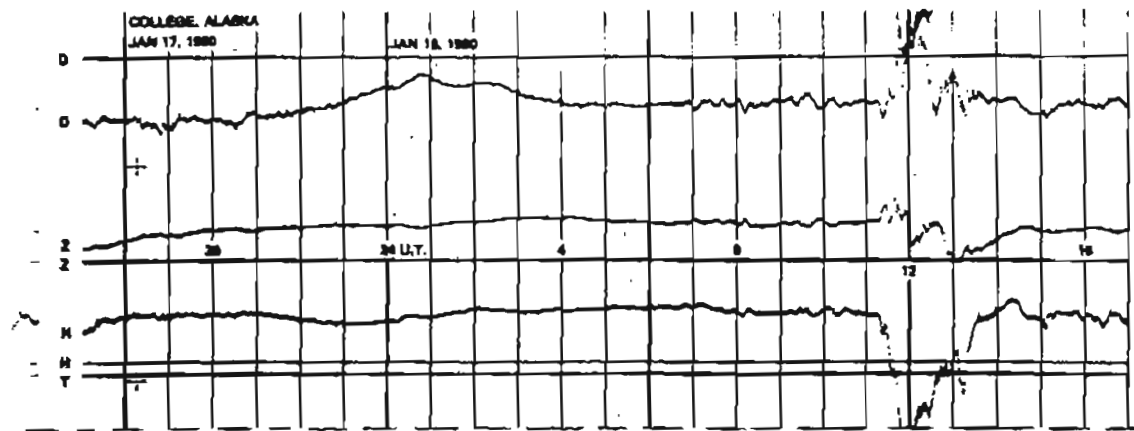


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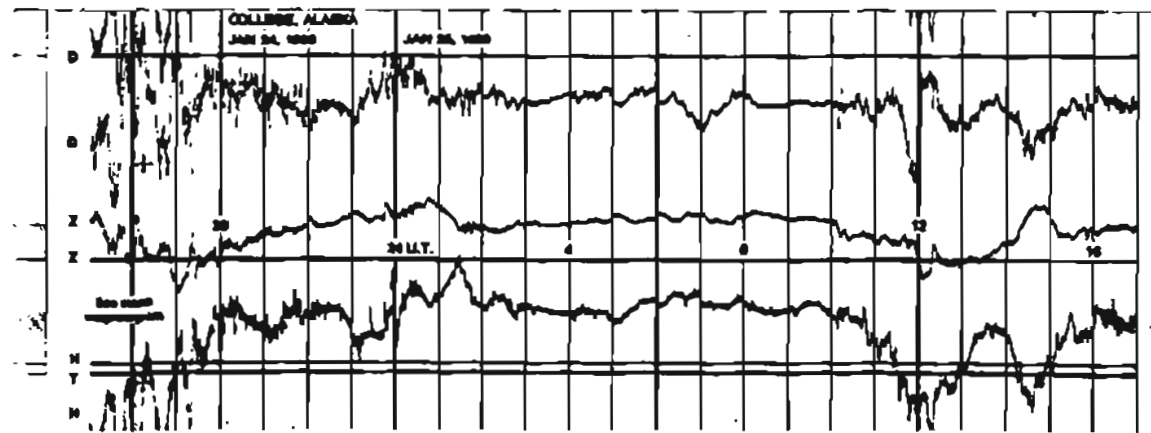
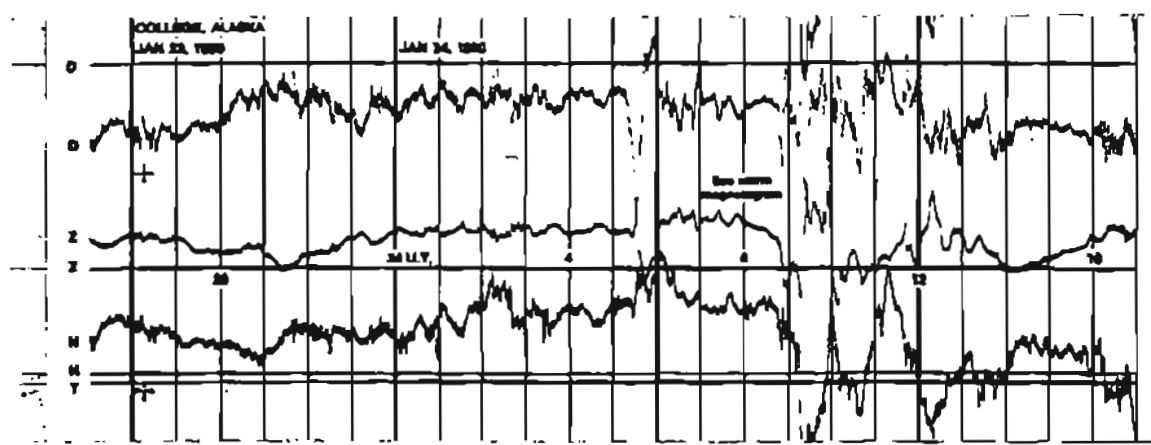
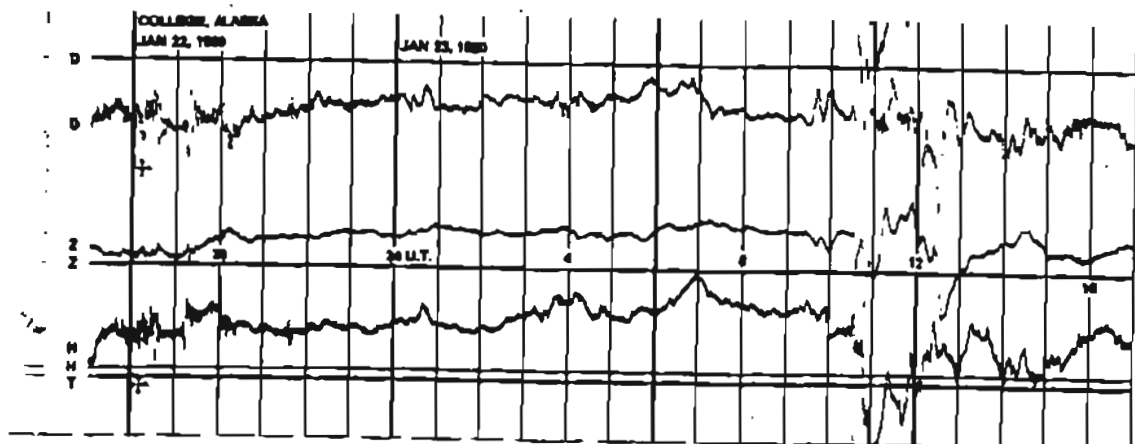
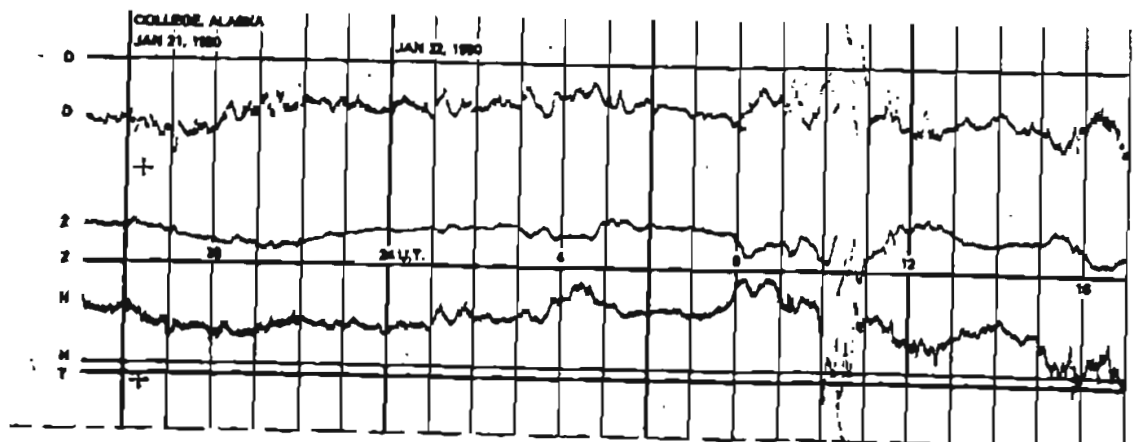


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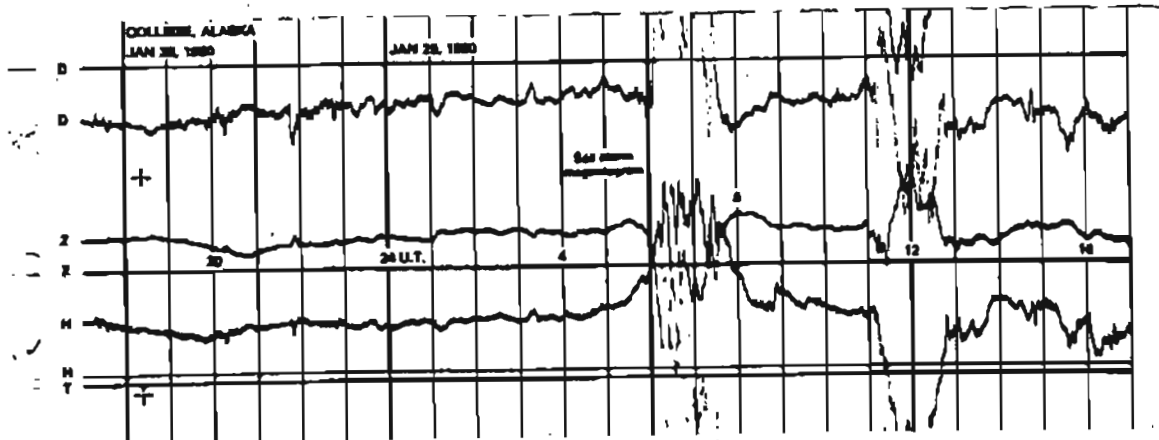
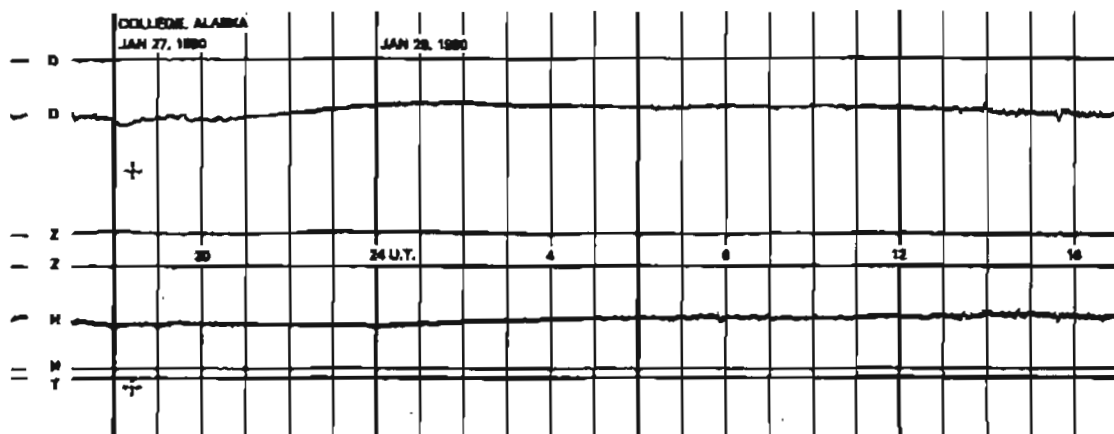
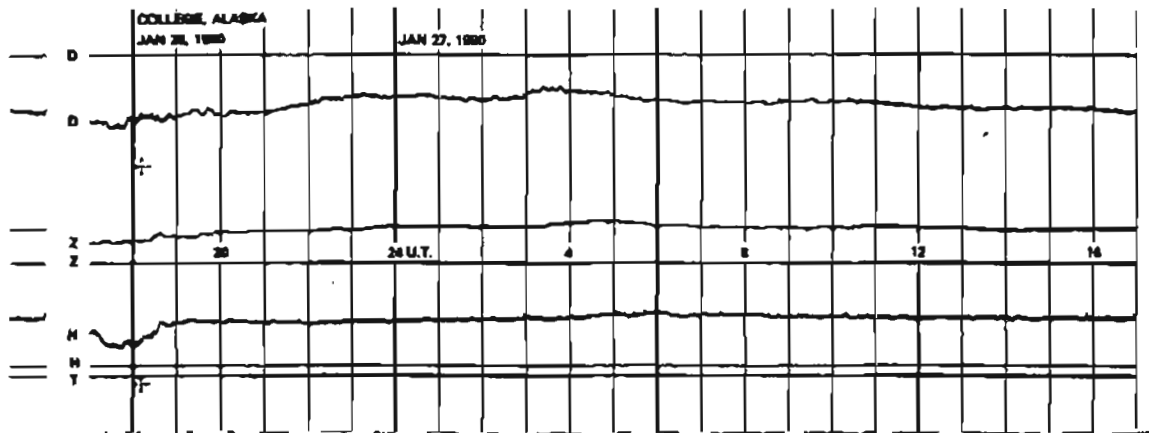
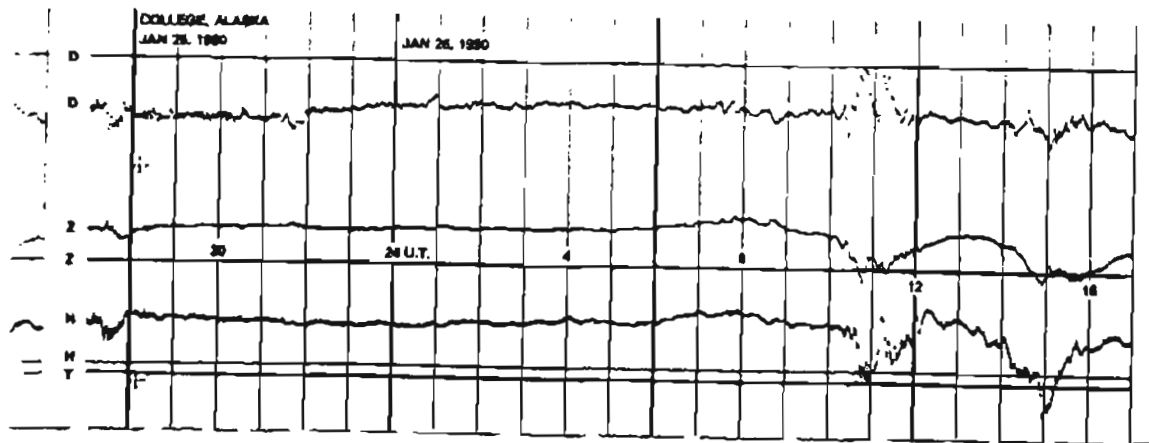
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100 mm  
0



# NORMAL MAGNETOGRAMS

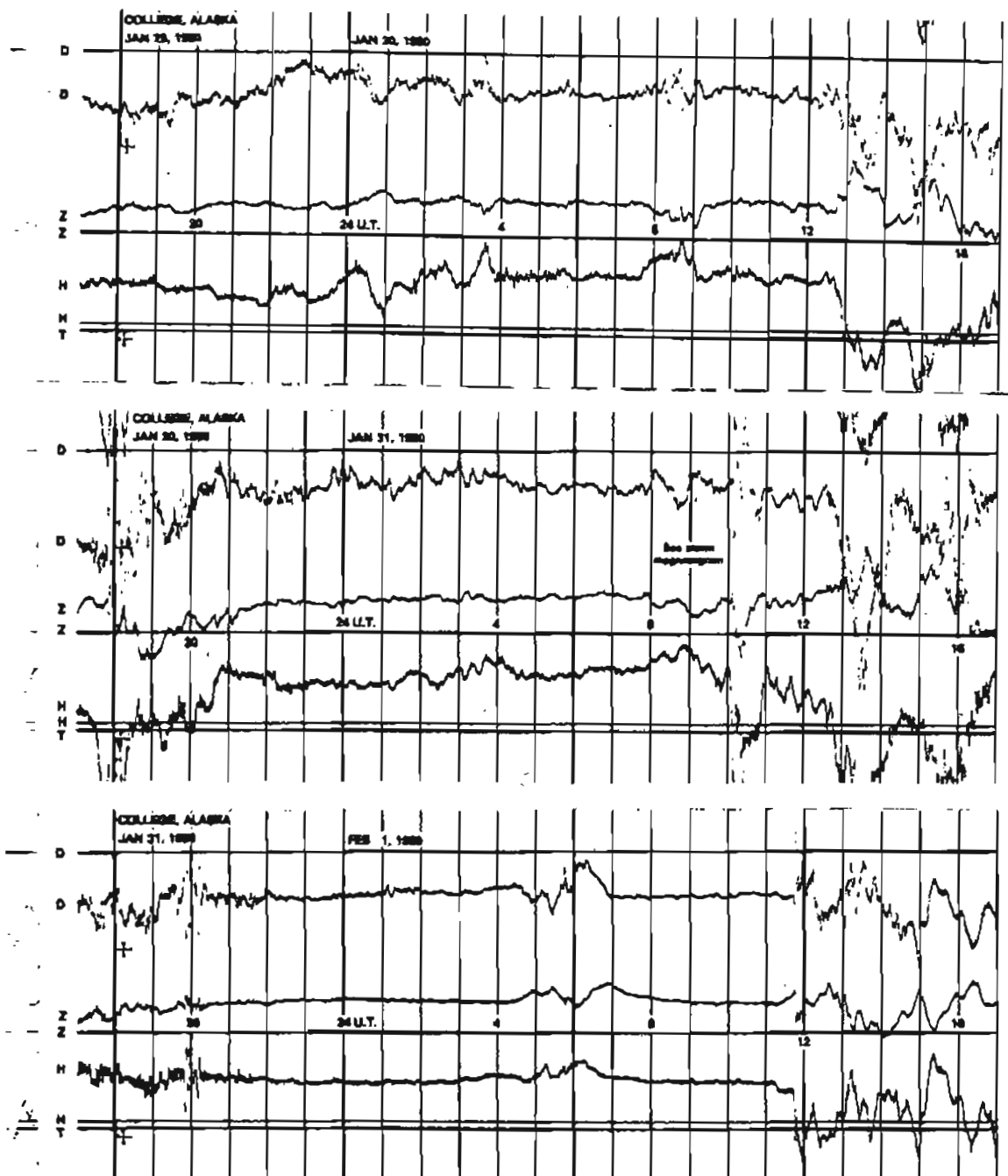


# NORMAL MAGNETOGRAMS



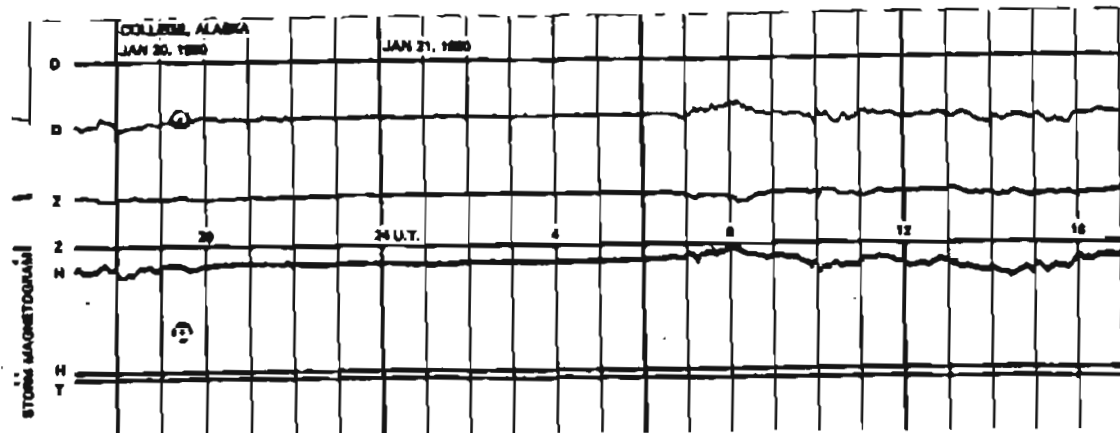
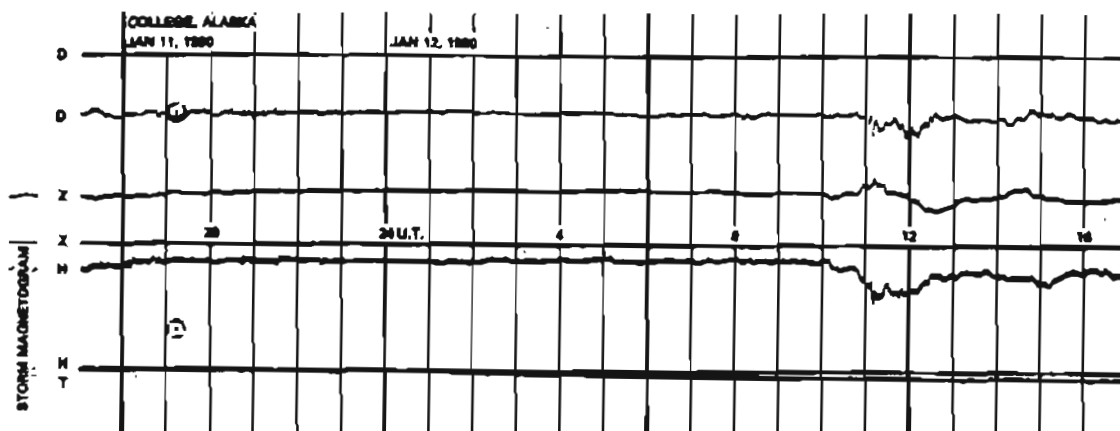
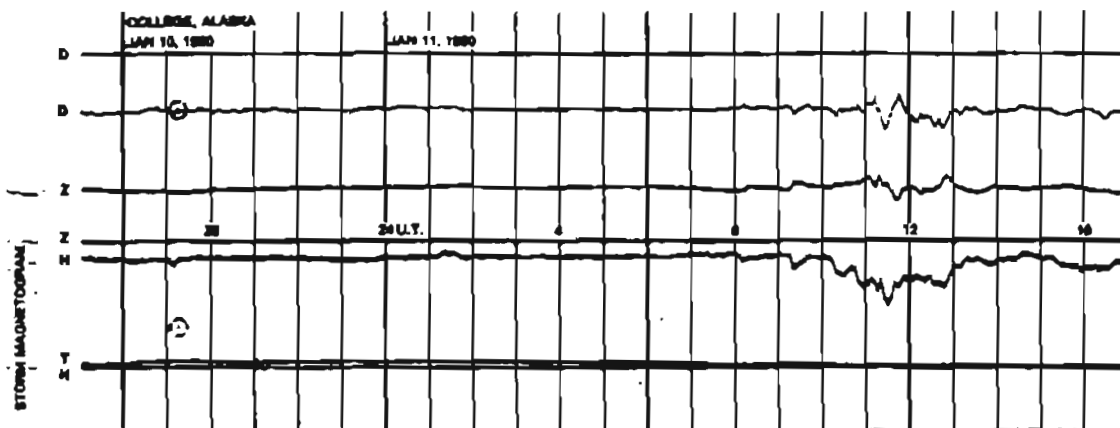
# NORMAL MAGNETOGRAMS

0 100 mm 200 mm





# STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS

