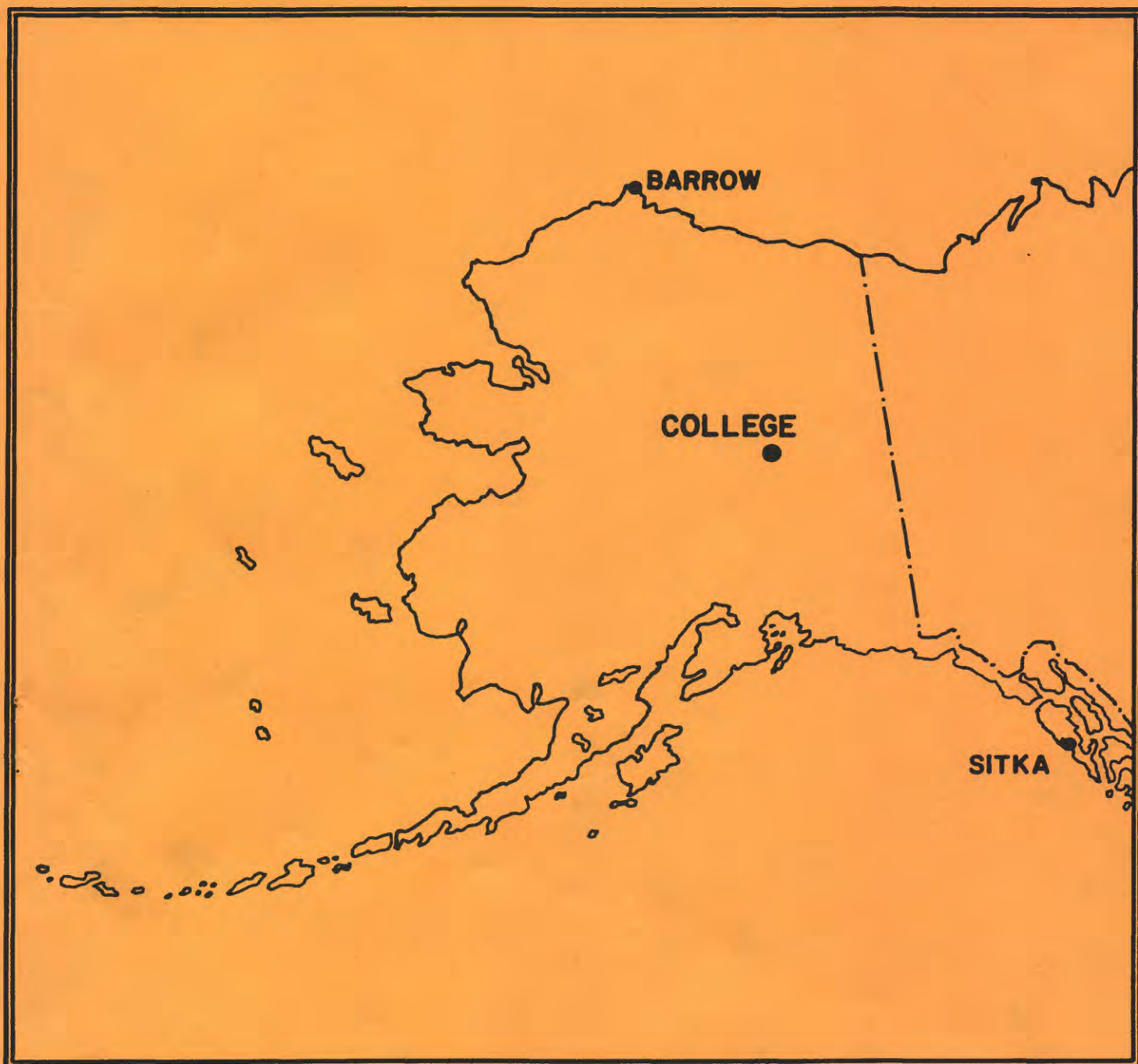


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

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 99775-5160

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 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° 51.6'N
Geographic longitude.....147° 50.2'W
Geomagnetic latitude.....+64.6°
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 γ 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:

<u>Gamma Range</u>	<u>K-Index</u>	<u>ak</u>
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 (10 γ)

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.

OBSERVATORY

College, Alaska

MONTH AND YEAR

JANUARY, 1990

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

DATE	K-INDICES									A _k	TIME SCALE ON MAGNETOGRAMS		
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM		20 mm/hr		
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	
22	3	3	3	5	3	4	4	2	27	21			
23	2	3	3	5	4	3	3	3	26	20	d h m	d h m	
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:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9

D

675.7

3.68

2490

H

322.2

7.73

2490

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 90

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

Obs. 2 letter 1-4A 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	64.06 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		BASELINE
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		BASELINE
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		

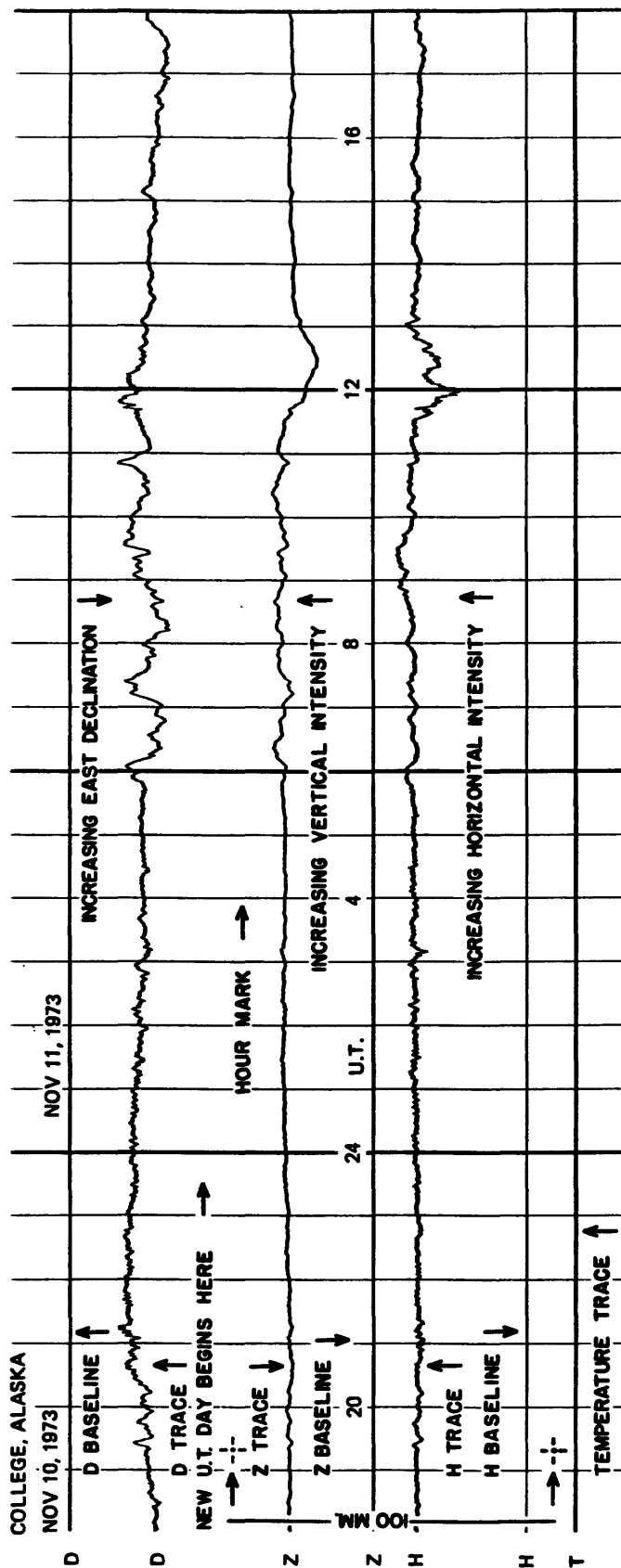
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

Values are in tenths of mm and are Averages for Successive Periods of One hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT		D				H				Z				COMPONENT				
DAY	A _k	6	7	19	27	28	6	7	19	27	28	6	7	19	27	28	DAY	
HOUR		6	7	19	27	28	6	7	19	27	28	6	7	19	27	28	A _k	
01	01	140	170	190	189	204	181	199	208	212	200	193	156	166	168	156	01	
02	02	181	186	201	200	200	230	223	210	212	212	193	158	171	168	156	02	
03	03	209	188	200	196	203	241	235	230	219	225	195	170	172	166	155	03	
04	04	183	201	200	159	210	244	237	231	221	228	189	177	170	173	153	04	
05	05	201	200	210	171	213	242	232	230	231	235	199	189	171	191	150	05	
06	06	218	190	221	201	218	244	262	230	240	235	196	203	171	185	151	06	
07	07	218	179	229	212	221	252	330	231	239	237	194	237	166	171	151	07	
08	08	237	227	230	211	217	251	350	230	239	240	195	231	160	167	150	08	
09	09	242	236	230	217	213	258	268	227	230	240	179	205	162	162	149	09	
10	10	246	246	225	212	217	260	265	230	230	235	166	192	163	164	150	10	
11	11	192	228	218	212	218	190	240	229	229	234	118	183	167	166	150	11	
12	12	229	228	220	229	218	161	229	220	224	240	130	176	163	167	149	12	
13	13	254	264	234	241	227	219	220	212	222	240	163	170	150	164	150	13	
14	14	244	246	246	248	229	222	230	221	222	241	163	170	142	156	150	14	
15	15	232	249	232	245	241	222	220	230	221	249	162	170	142	154	149	15	
16	16	229	245	234	245	248	220	219	230	223	245	164	171	152	155	147	16	
17	17	251	249	241	257	252	220	218	231	222	240	162	170	153	157	146	17	
18	18	259	260	255	260	260	220	220	230	210	228	159	160	154	160	150	18	
19	19	277	270	279	280	281	203	220	232	205	203	160	154	155	159	157	19	
20	20	277	280	289	263	261	217	222	229	209	178	160	152	153	154	134	20	
21	21	274	279	293	270	230	215	228	222	209	198	163	160	153	150	87	21	
22	22	259	270	278	252	232	211	225	211	209	220	155	160	154	151	112	22	
23	23	232	250	250	237	210	210	214	200	200	227	151	160	156	156	120	23	
24	24	217	241	230	219	198	200	210	196	200	211	155	167	153	157	137	24	
DAILY SUM		5501	5582	5635	5426	5421	5333	5716	5350	5278	5441	4064	4241	3819	3921	3459	DAILY SUM	
DAILY MEAN		229	233	235	226	226	222	238	223	220	227	169	177	159	163	144	DAILY MEAN	
MEAN		230				226				163				163				MEAN

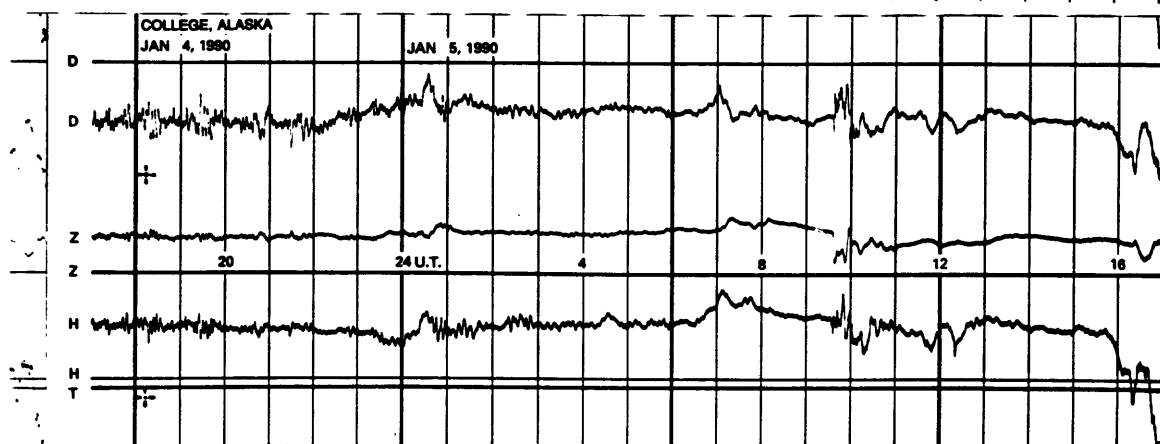
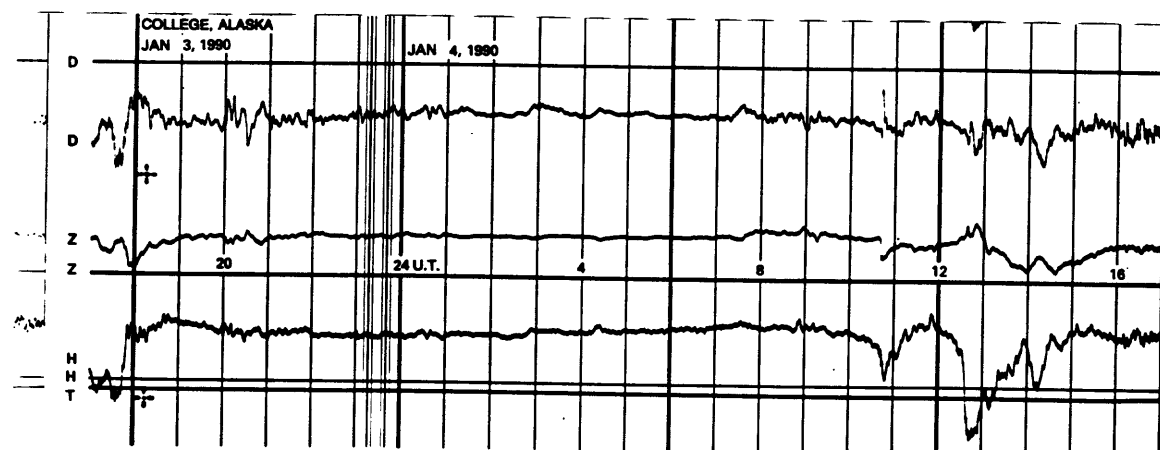
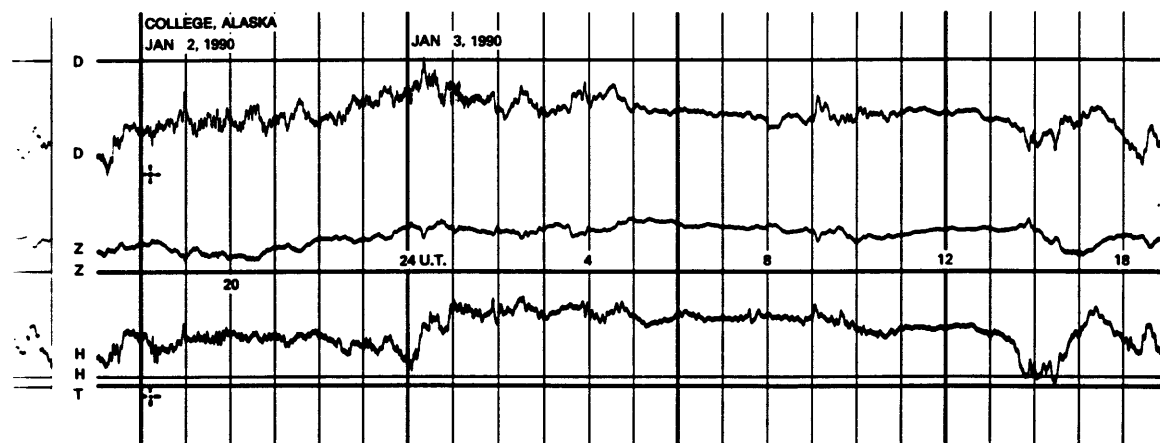
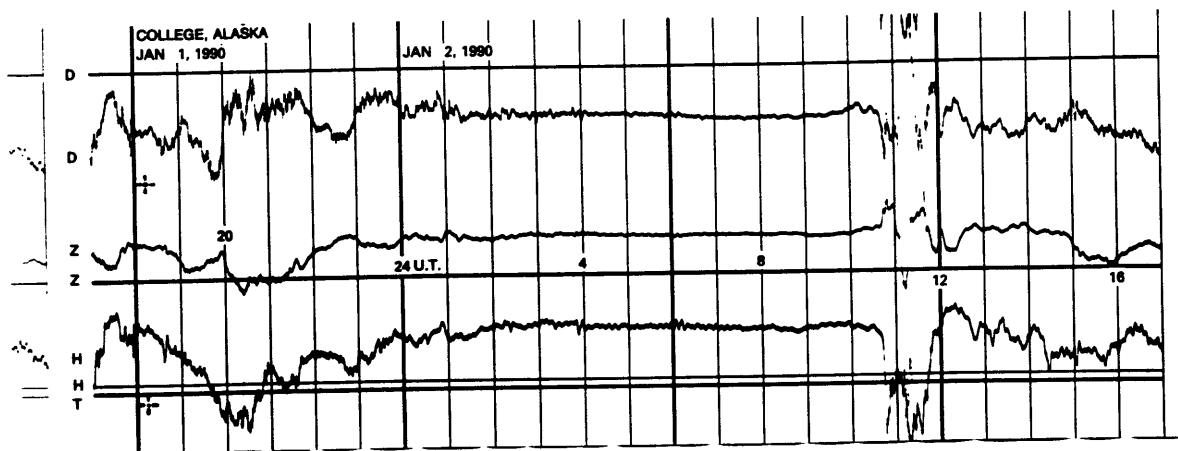
Scaled *NO* Checked *(S)*

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



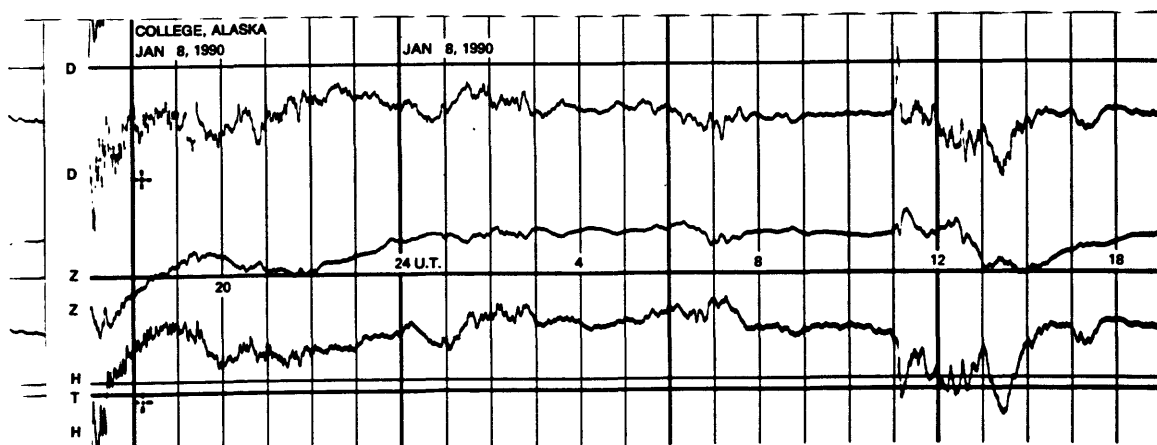
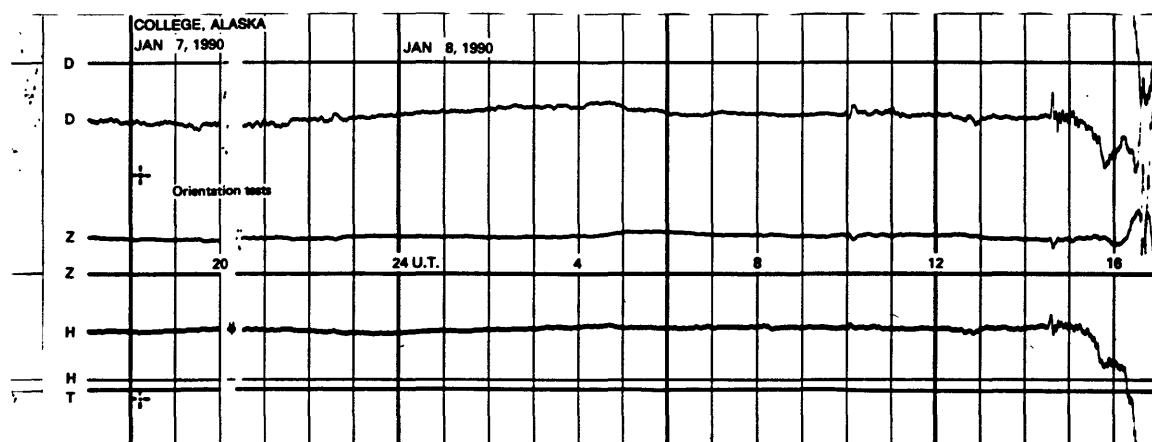
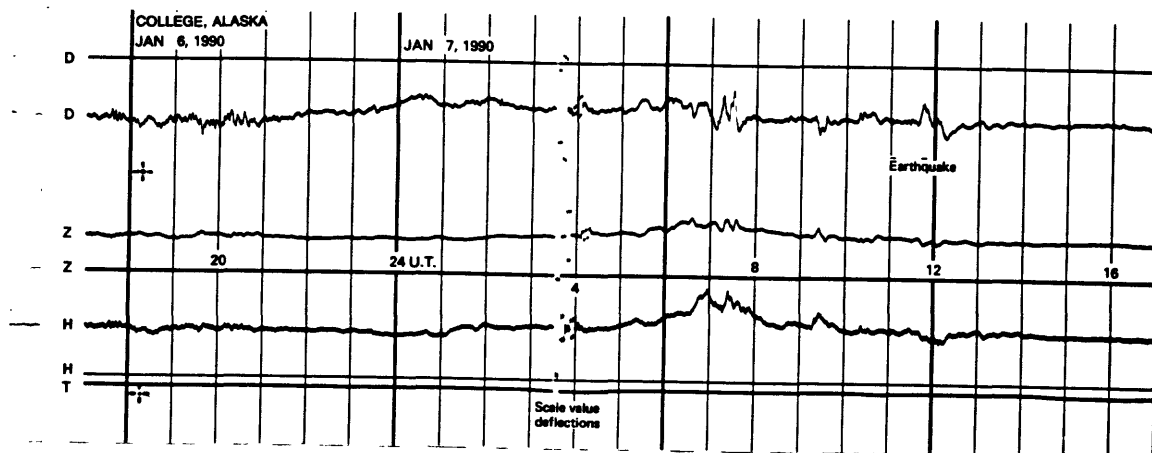
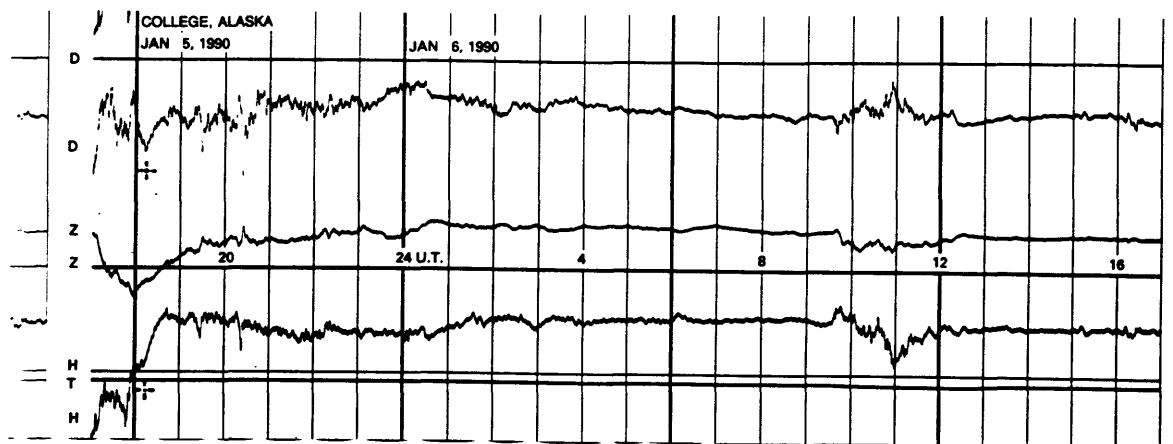
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS



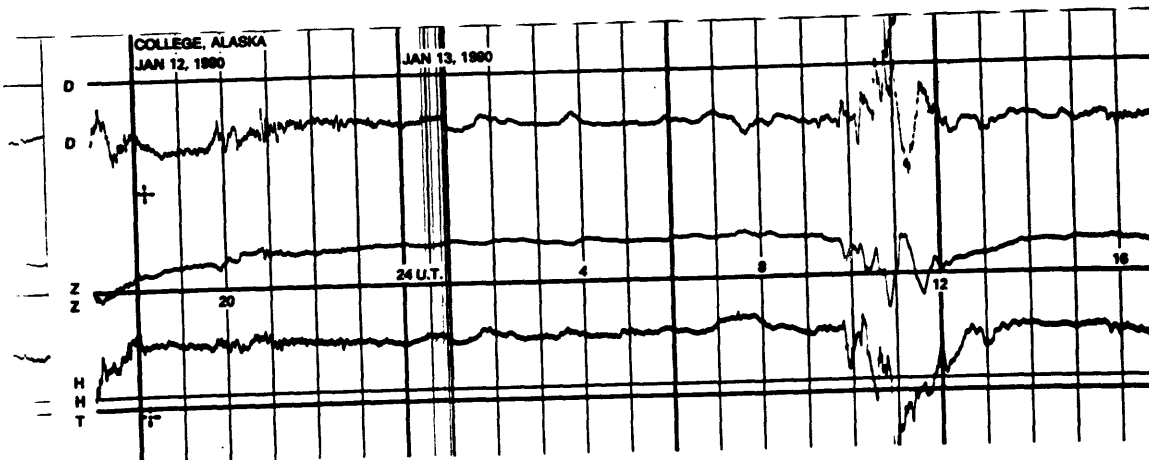
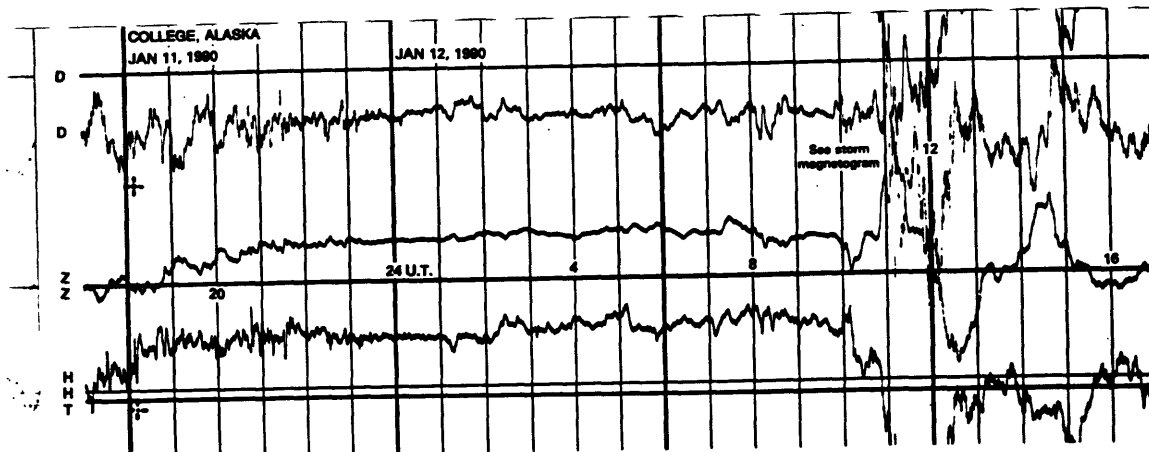
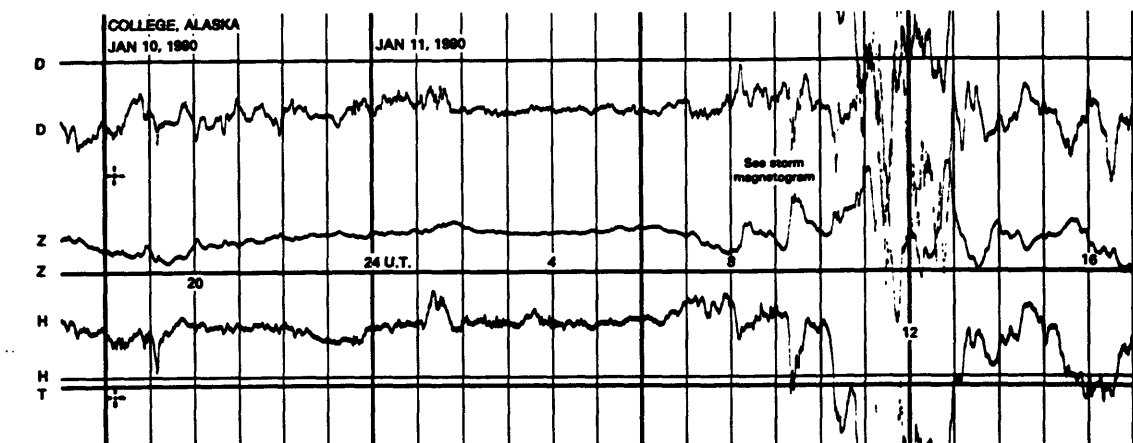
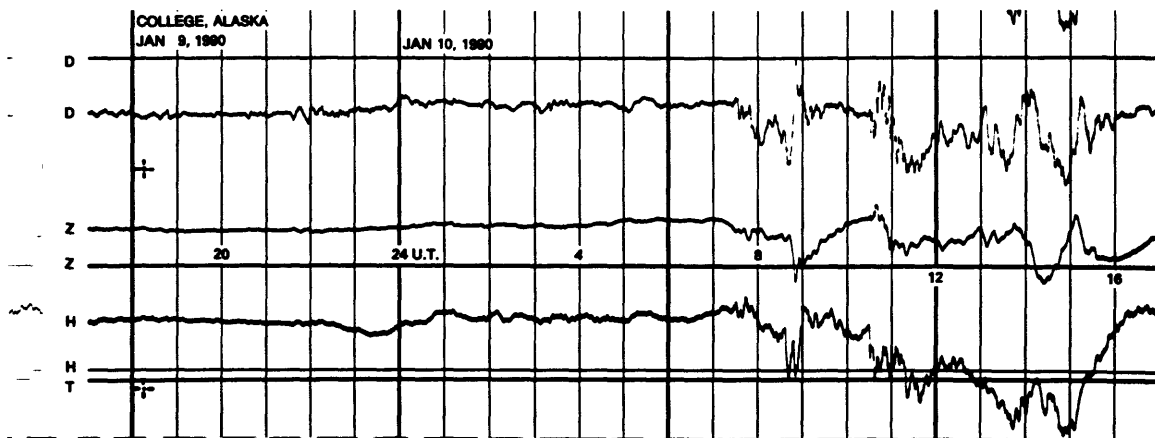
NORMAL MAGNETOGRAMS

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100 mm
0

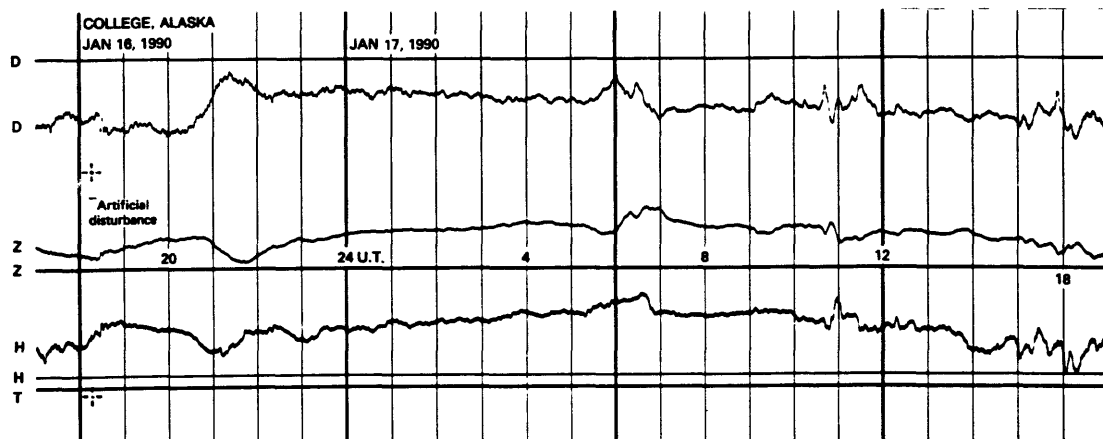
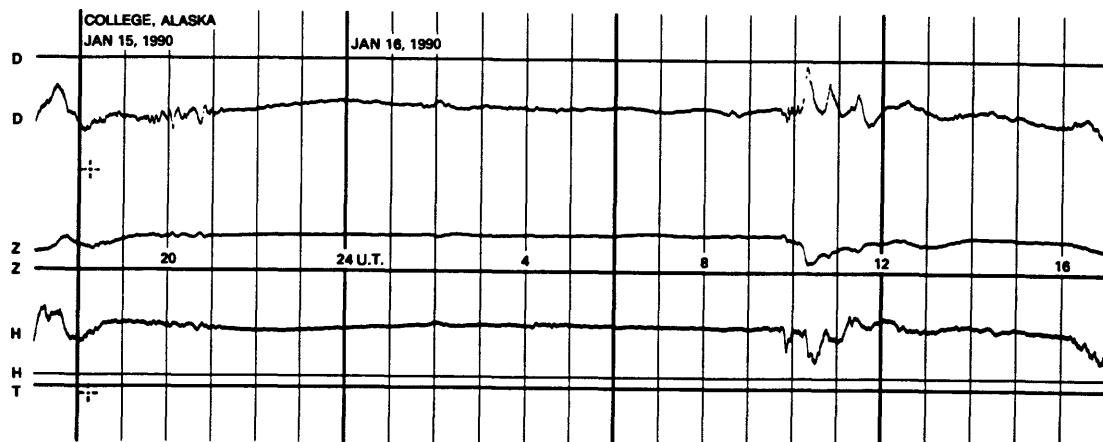
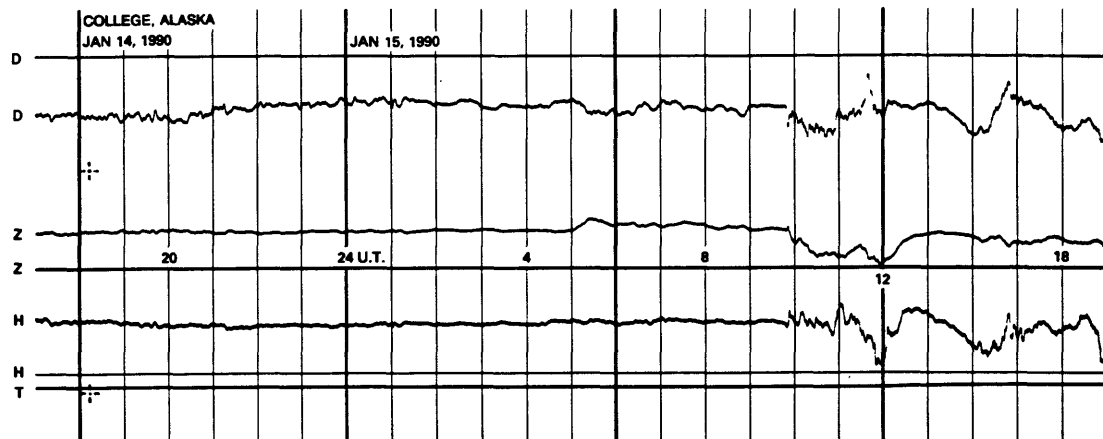
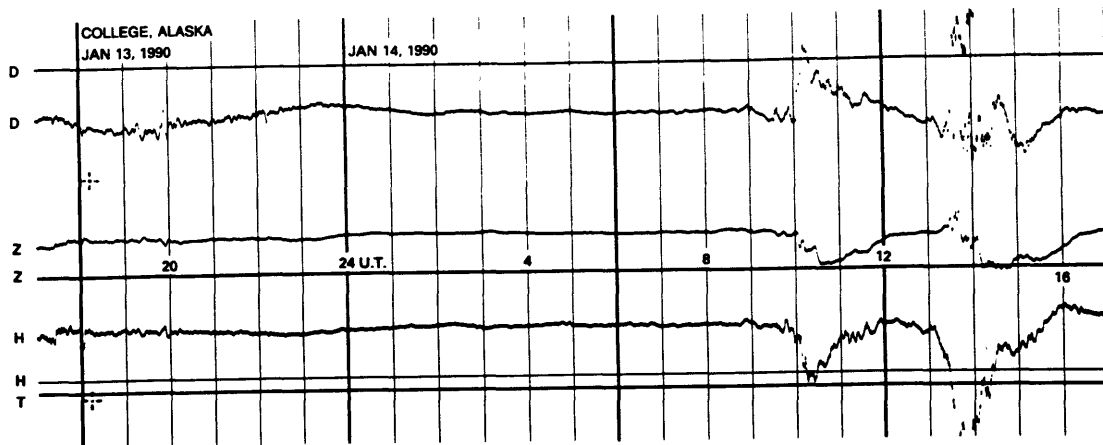


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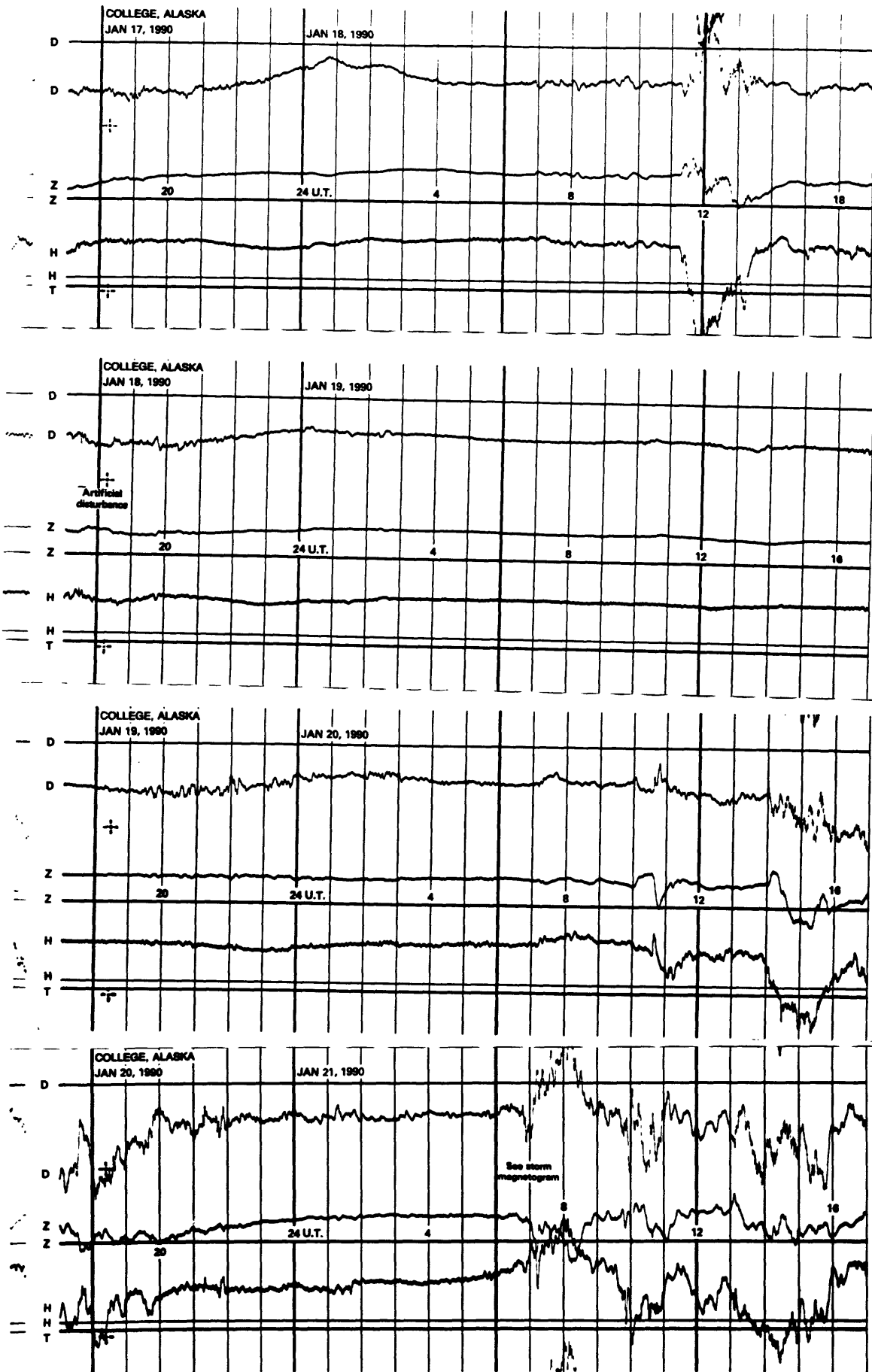
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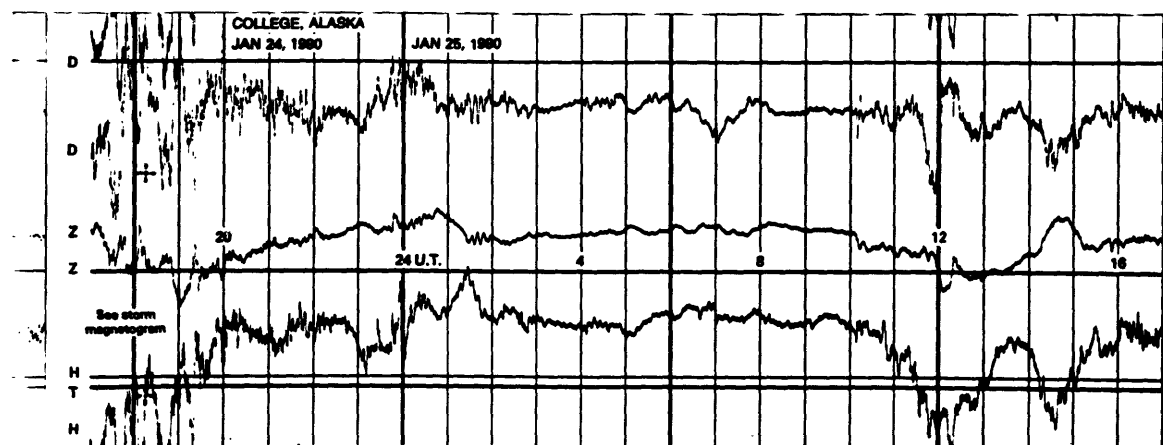
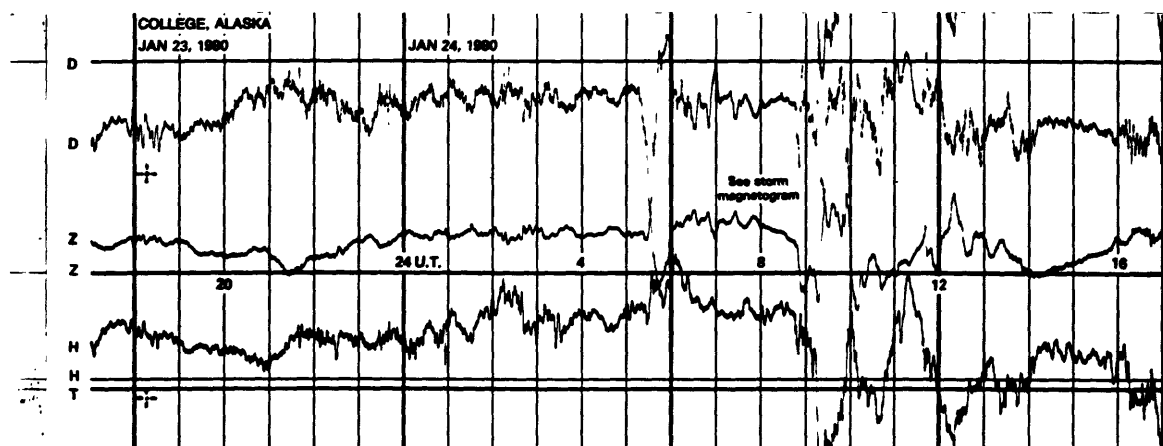
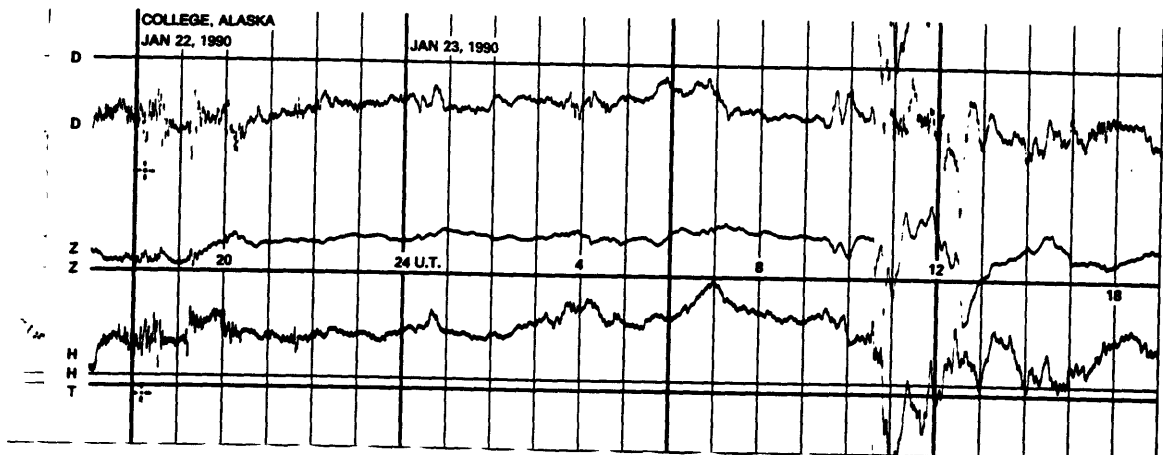
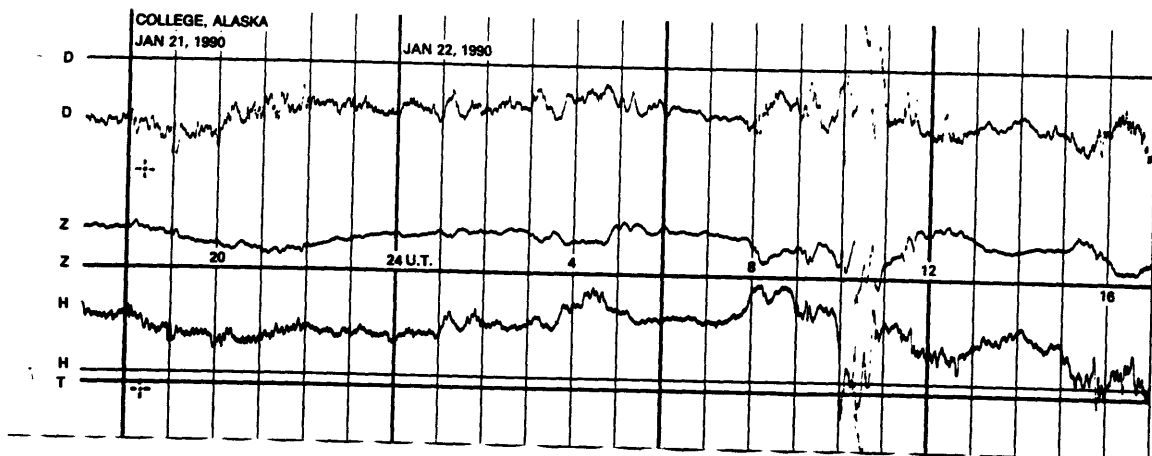
NORMAL MAGNETOGRAMS



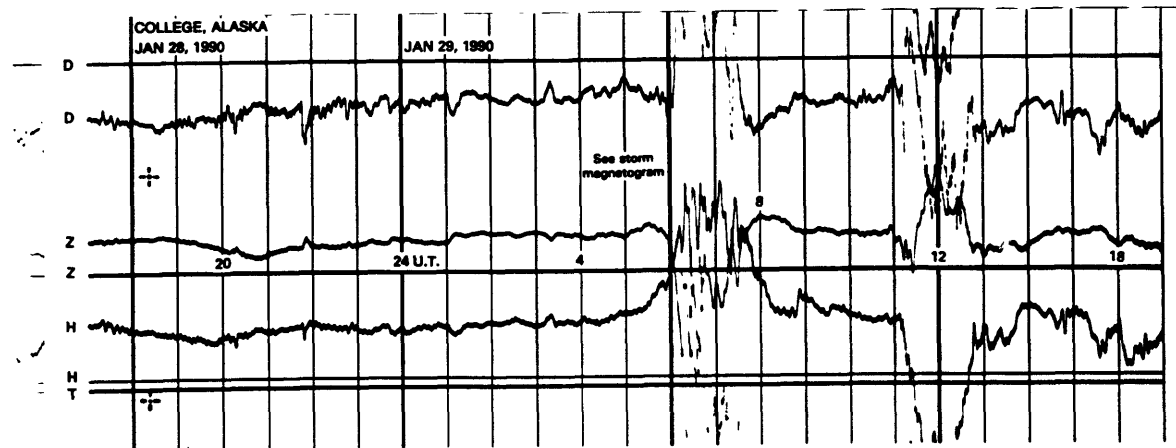
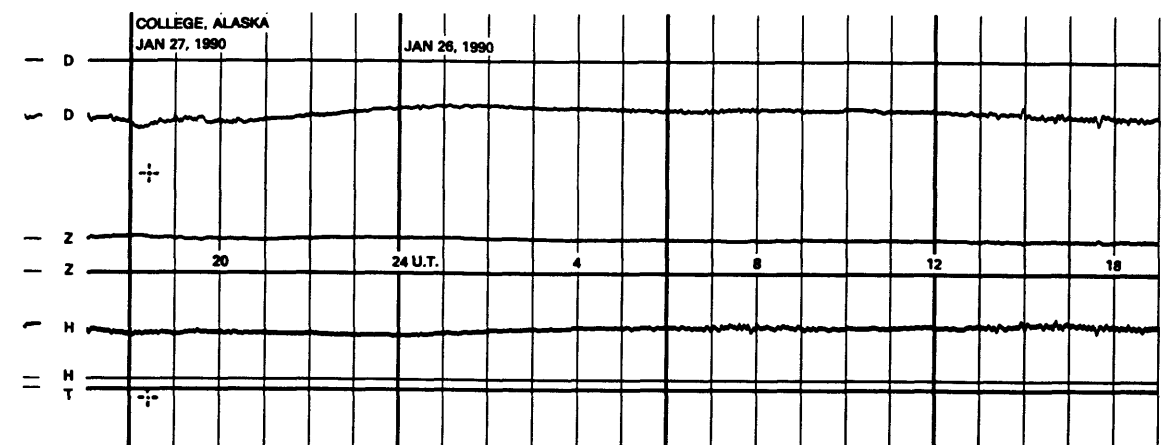
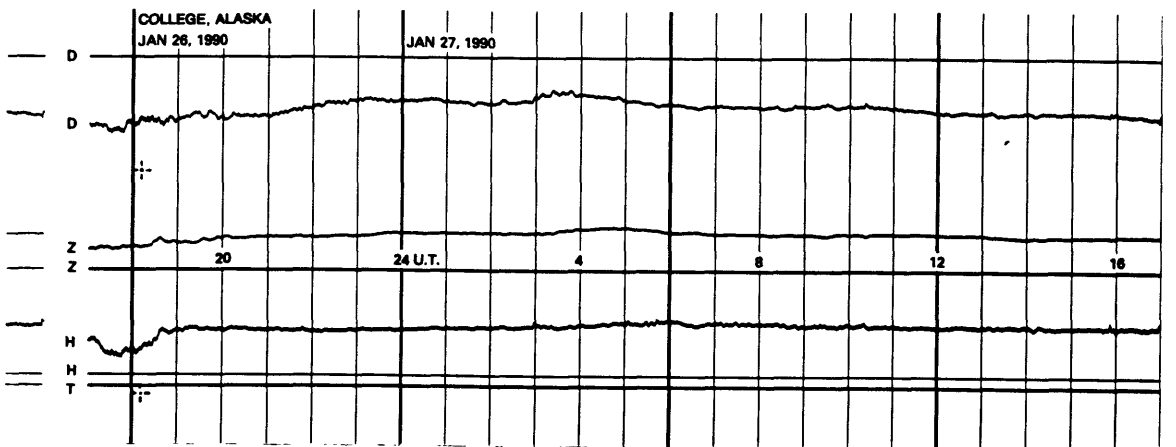
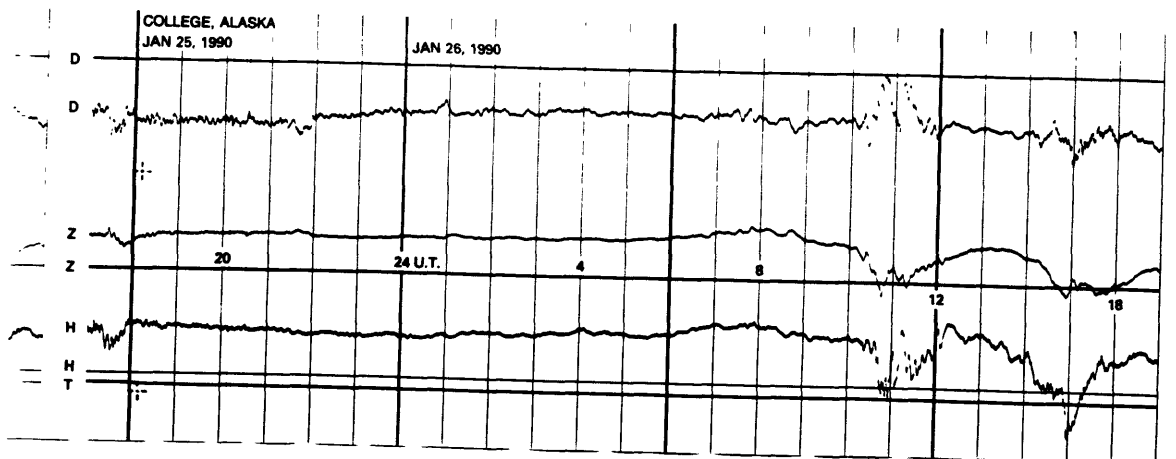
NORMAL MAGNETOGRAMS



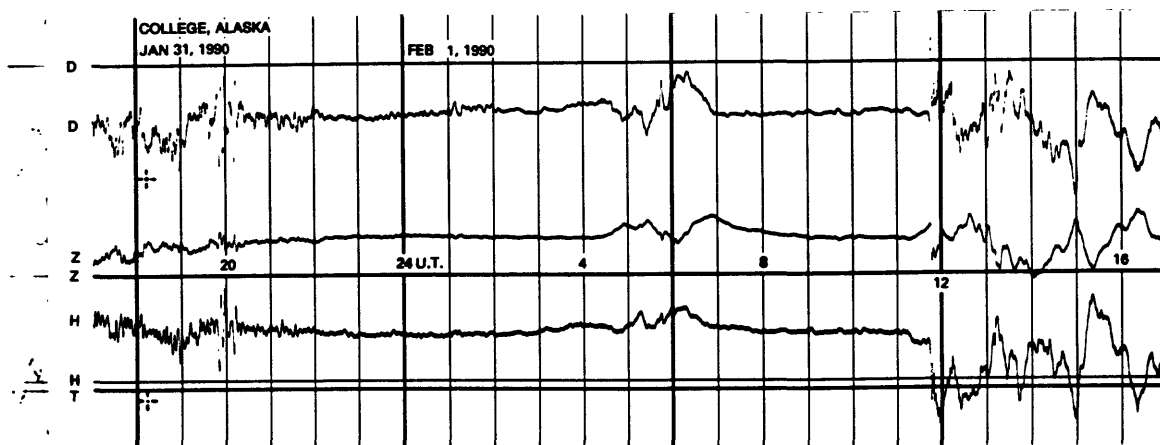
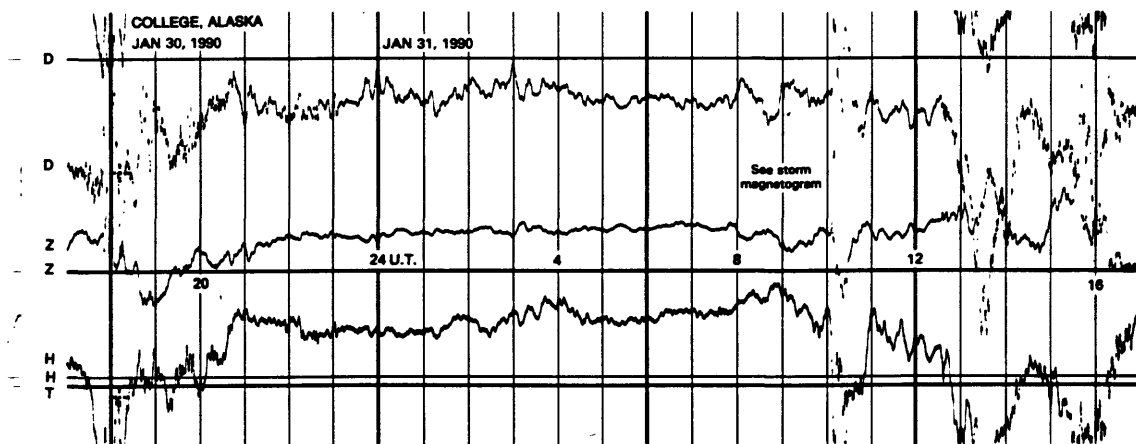
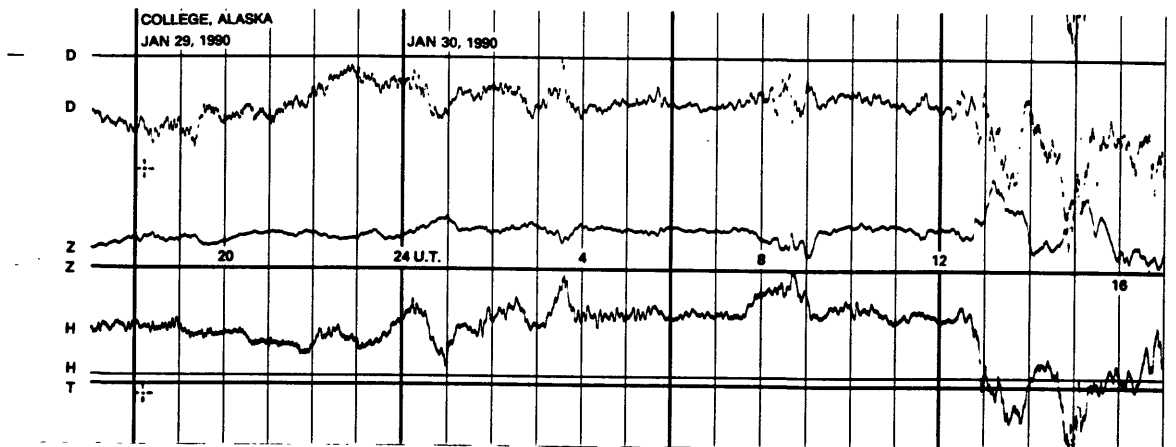
NORMAL MAGNETOGRAMS



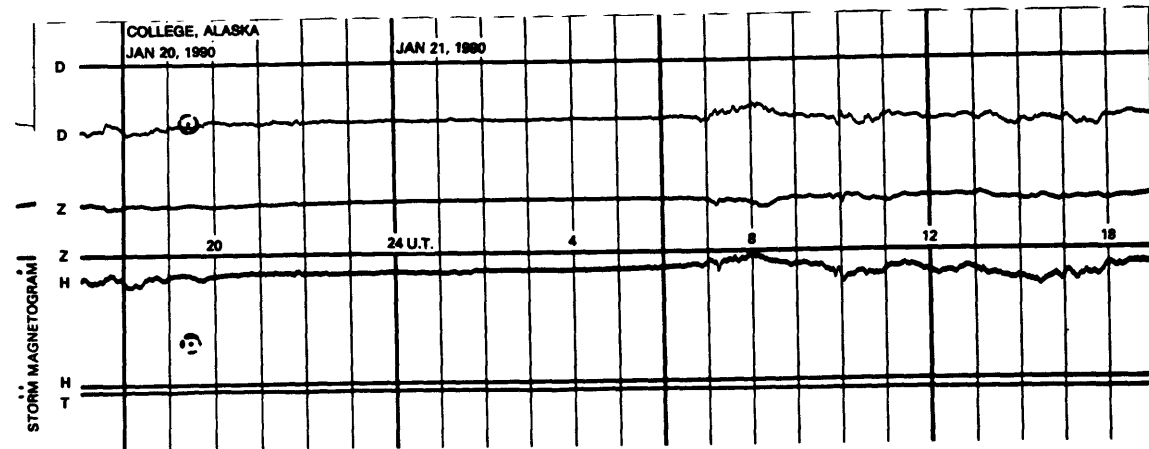
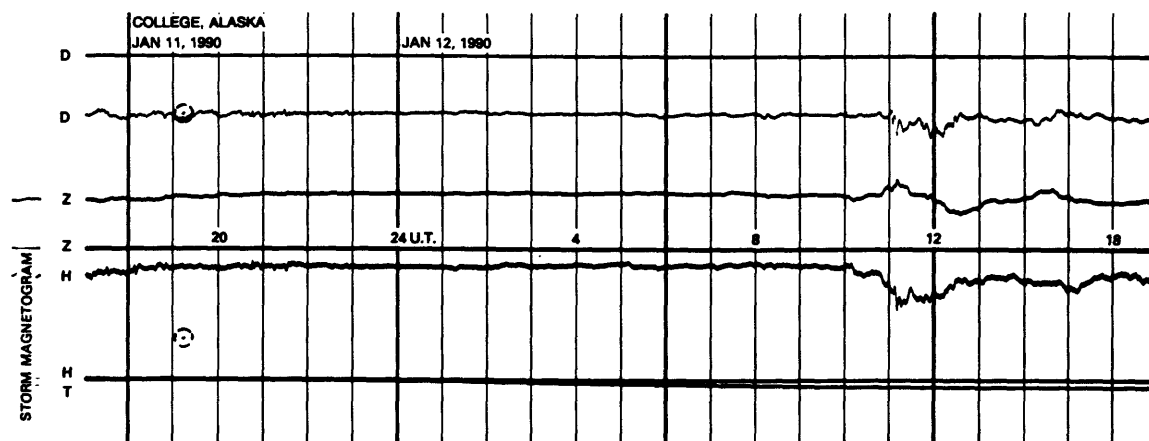
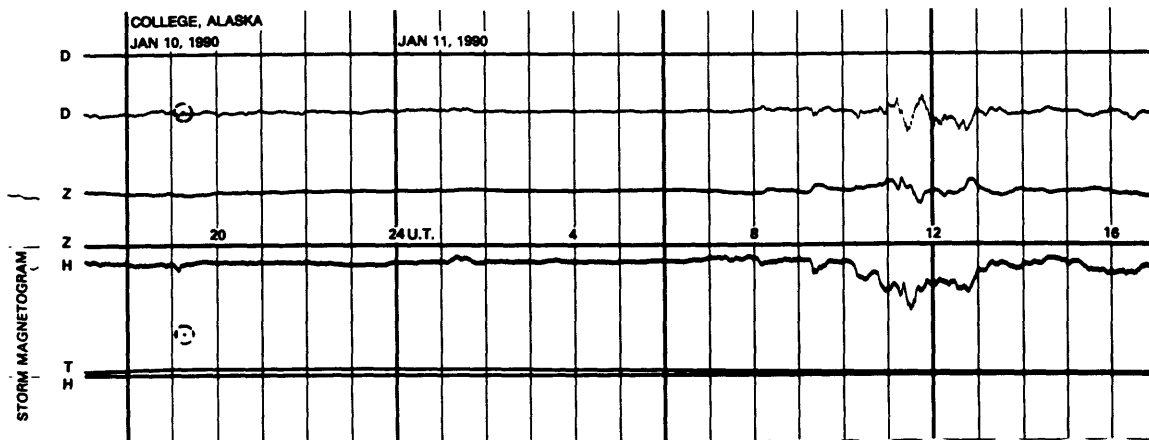
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

