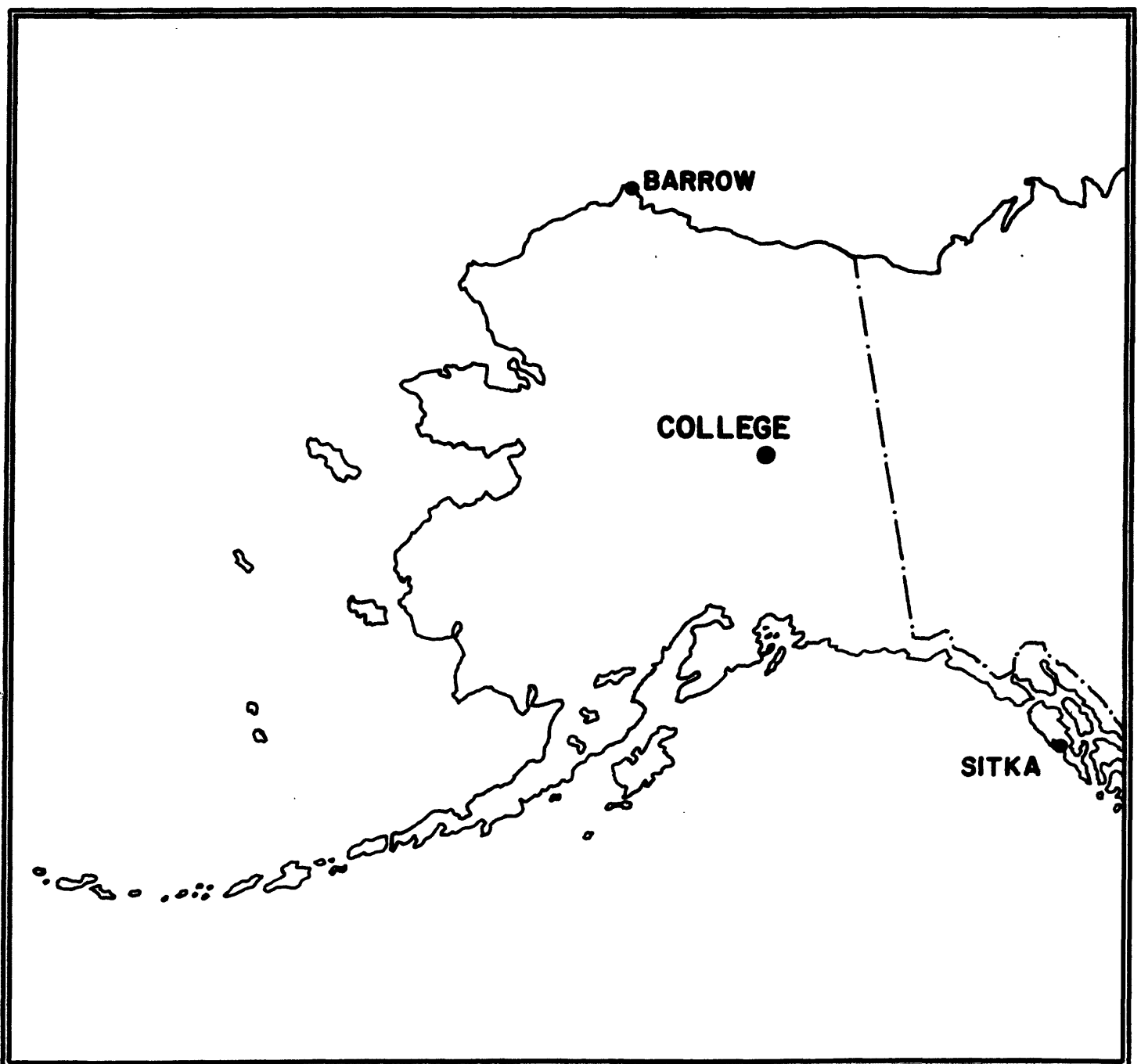


**UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY**

**PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA**

FEBRUARY 1991

OPEN FILE REPORT 91-0300B



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: 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.

College, Alaska

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

MONTH AND YEAR

February, 1991

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		
1	2	1	3	6	4	5	5	5	31	35	20 mm/hr SUDDEN COMMENCEMENTS d h m
2	3	3	1	4	2	1	0	1	15	9	
3	1	1	2	2	3	1	0	1	11	5	
4	0	0	0	1	0	0	1	2	4	2	
5	1	1	2	3	2	1	1	2	13	6	
6	1	2	0	2	3	1	2	1	12	6	
7	1	2	2	4	4	4	2	2	21	14	
8	2	2	4	5	6	4	3	2	28	27	
9	3	1	2	4	3	5	5	2	25	21	
10	3	2	2	5	3	1	1	1	18	13	
11	2	2	2	3	2	5	2	3	21	14	
12	2	2	2	3	5	3	2	1	20	14	
13	1	1	0	4	4	3	2	1	16	12	
14	0	1	0	2	2	3	1	1	10	5	
15	2	1	2	1	2	1	1	1	11	5	
16	1	0	0	4	0	1	0	0	6	4	
17	1	1	0	1	2	1	0	0	6	2	
18	0	1	1	1	0	0	0	1	4	2	
19	1	0	0	1	4	4	2	1	13	9	
20	1	0	2	3	3	4	4	1	18	12	
21	1	1	2	3	3	1	2	0	13	7	
22	1	2	4	4	3	1	2	2	19	12	
23	2	1	4	5	6	5	4	3	30	32	
24	1	1	0	0	1	1	2	1	7	3	
25	1	0	0	4	5	4	2	1	17	14	
26	1	2	3	4	1	1	1	1	14	8	
27	0	0	1	4	2	2	3	2	14	8	
28	3	2	3	4	4	3	3	1	23	16	
29											
30											
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) (γ/mm) (to nearest 10γ)
	675.7	322.2		
	3.66	7.72		
	2470	2490		

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:

February 19 91

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

Obs. 2 letter 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	1	09XX	..			1	4	6	229	760	505	2	02
		8	08XX	..			8	5	6	63	650	415	8	19
		23	06XX	..			23	5	6	93	965	385	23	22

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0001 U.T., 2-1-91	2400 U.T., 2-28-91	1.0' / mm	3.7 γ / mm	26° 34.1' E
H	(SAME)	(SAME)	7.7 γ / mm	12623 γ	
Z	(SAME)	(SAME)	7.8 γ / mm	55213 γ	

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0001 U.T., 2-1-91	2400 U.T., 2-28-91	7.9' / mm	29.4 γ / mm	
H	(SAME)	(SAME)	43.4 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): -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° 45.5' E	12759 γ	55318 γ

*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.
 DAYS USED: FEB 4, 16, 17, 18, 24.

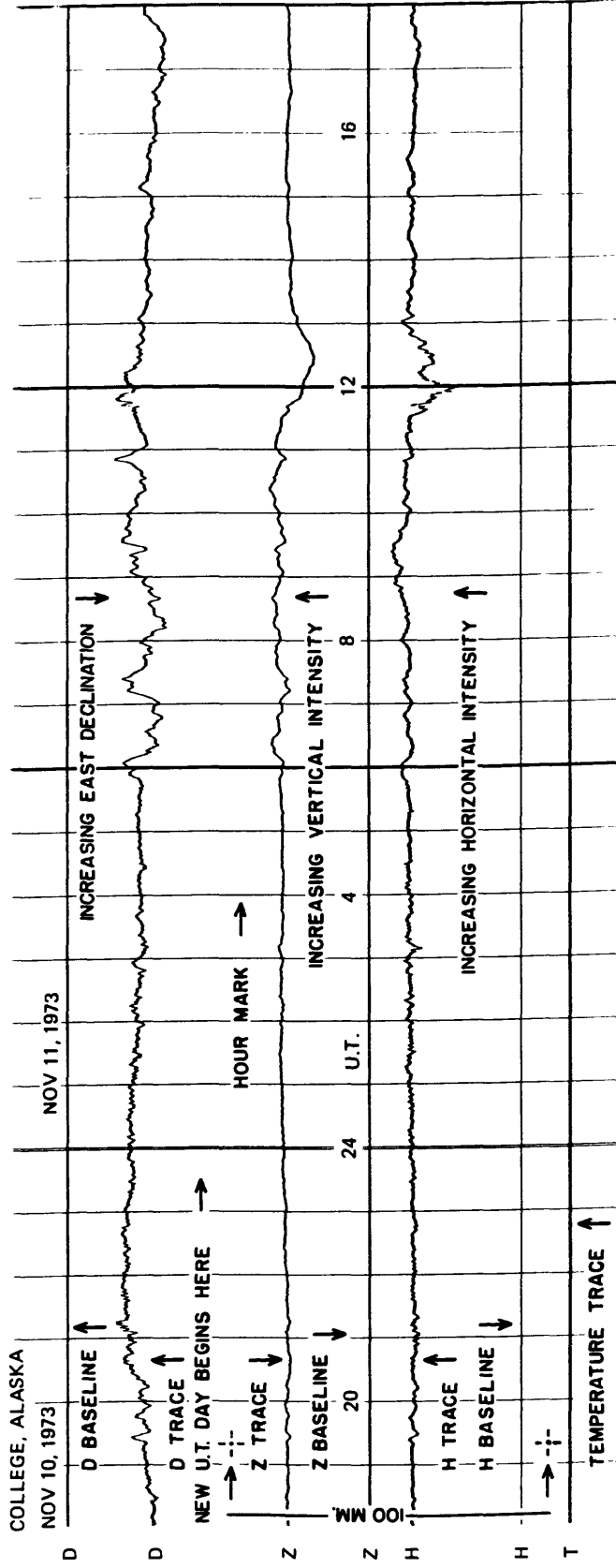
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

Values are in Tenths of nm 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	4	16	17	18	24	4	16	17	18	24	4	16	17	18	24	4	16	17	18	24	DAY	A _k
HOURLY		2	4	2	2	3	2	4	2	2	3	2	4	2	2	3	2	4	2	2	3		HOURLY
01	88	81	79	64	101	158	167	158	160	154	156	142	138	144	140	139	142	138	144	140	140	01	139
02	91	71	50	68	86	157	157	170	174	165	170	145	135	144	140	150	145	135	144	140	140	02	150
03	79	68	40	63	73	172	172	181	180	172	176	140	140	145	140	141	140	140	145	140	140	03	141
04	79	87	42	60	79	183	183	180	187	181	176	140	140	160	144	150	140	140	160	144	150	04	150
05	86	86	56	69	80	189	189	190	201	190	180	153	138	172	149	150	153	138	172	149	150	05	150
06	110	87	73	67	83	189	189	192	209	204	189	155	144	172	150	150	155	144	172	150	150	06	150
07	113	85	102	64	91	188	188	201	197	206	198	146	143	166	174	152	146	143	166	174	152	07	152
08	113	87	113	83	99	187	187	201	195	218	198	144	161	144	174	150	144	161	144	174	150	08	150
09	111	86	109	92	112	181	181	201	189	210	190	143	154	141	163	151	143	154	141	163	151	09	151
10	112	13	109	81	108	180	180	166	182	199	180	143	86	146	155	138	143	86	146	155	138	10	138
11	127	120	112	109	119	180	180	175	180	199	180	140	123	138	155	134	140	123	138	155	134	11	134
12	140	110	109	117	117	180	180	200	173	190	180	135	149	124	155	132	135	149	124	155	132	12	132
13	130	127	126	128	124	189	189	183	167	189	176	135	146	117	143	124	135	146	117	143	124	13	124
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18	156	153	178	157	117	180	180	163	180	171	181	144	126	120	127	134	144	126	120	127	134	18	134
19	172	164	209	181	90	168	168	169	177	170	142	155	121	126	117	117	155	121	126	122	117	19	117
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21	161	156	193	199	130	150	150	162	159	163	176	145	113	126	127	127	145	113	126	115	127	21	127
22	130	139	150	169	158	158	158	160	153	142	160	136	122	130	140	140	136	122	130	120	140	22	140
23	121	108	115	128	119	170	170	159	150	132	169	131	131	133	126	145	131	131	133	126	145	23	145
24	103	95	81	79	91	170	170	154	150	130	158	134	142	136	133	150	134	142	136	133	150	24	150
DAILY SUM		2936	2699	2842	2684	2625	4218	4251	4192	4309	4218	3395	3158	3172	3374	3254	3395	3158	3172	3374	3254	DAILY SUM	
DAILY MEAN		122	112	118	112	109	176	177	175	180	176	141	132	132	141	136	141	132	132	141	136	DAILY MEAN	
MEAN				115					177													MEAN	

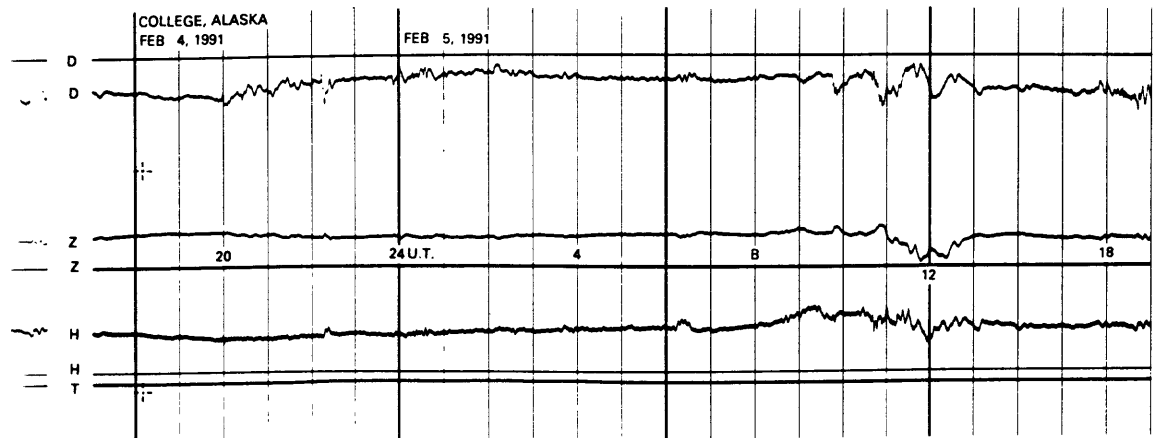
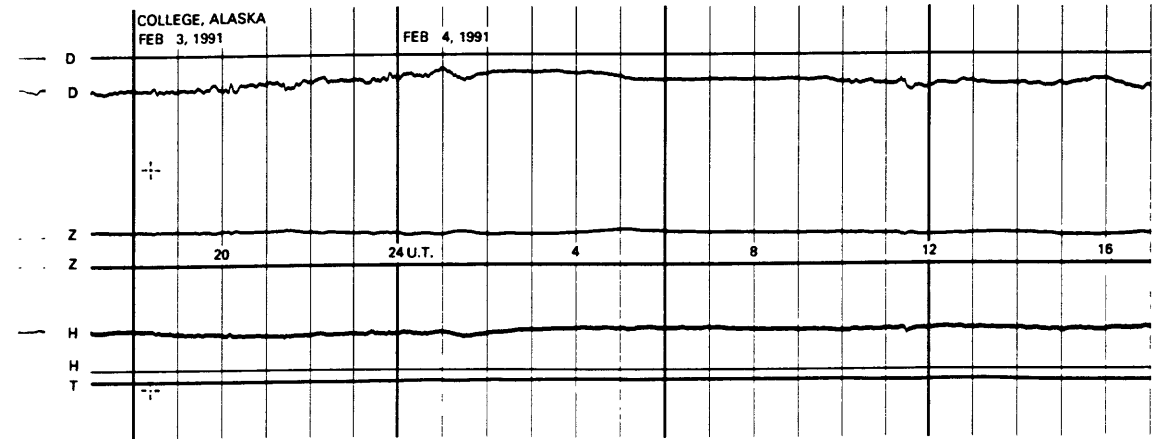
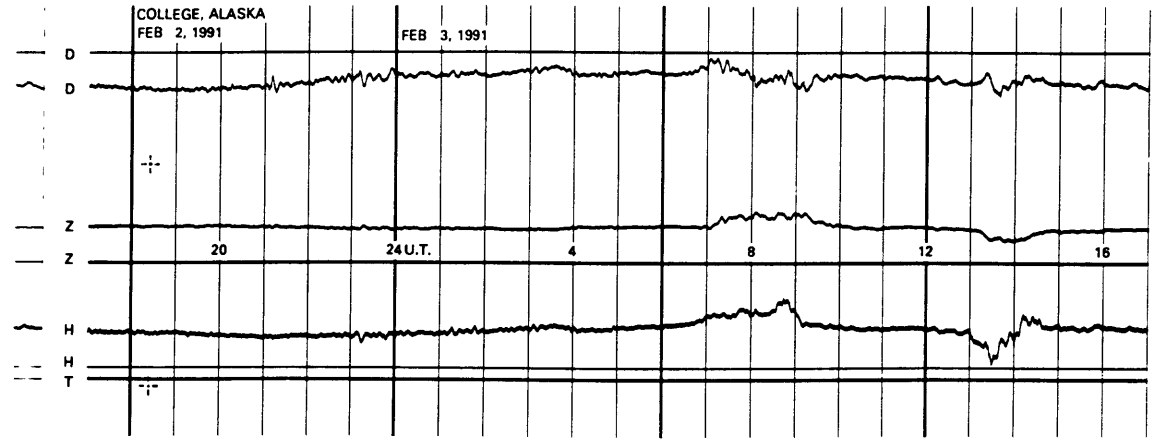
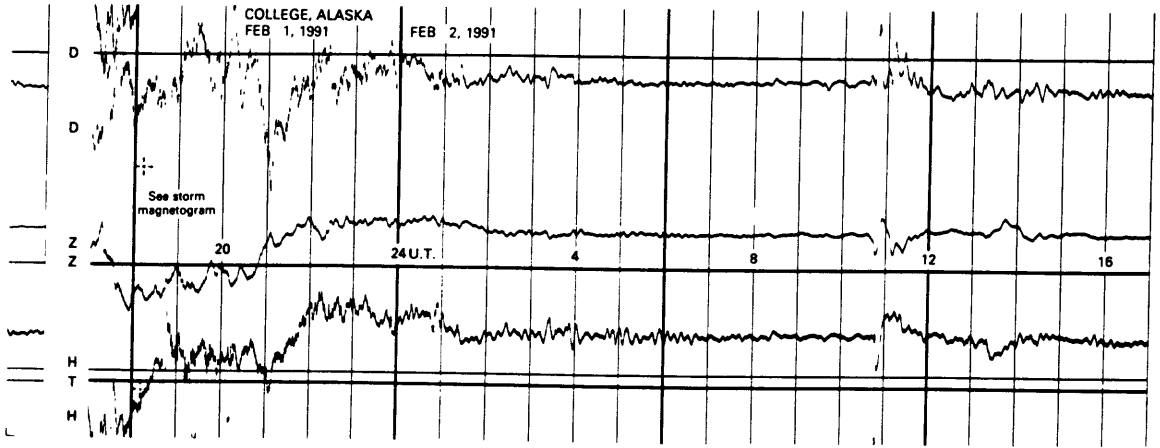
Scaled AND Checked CP

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

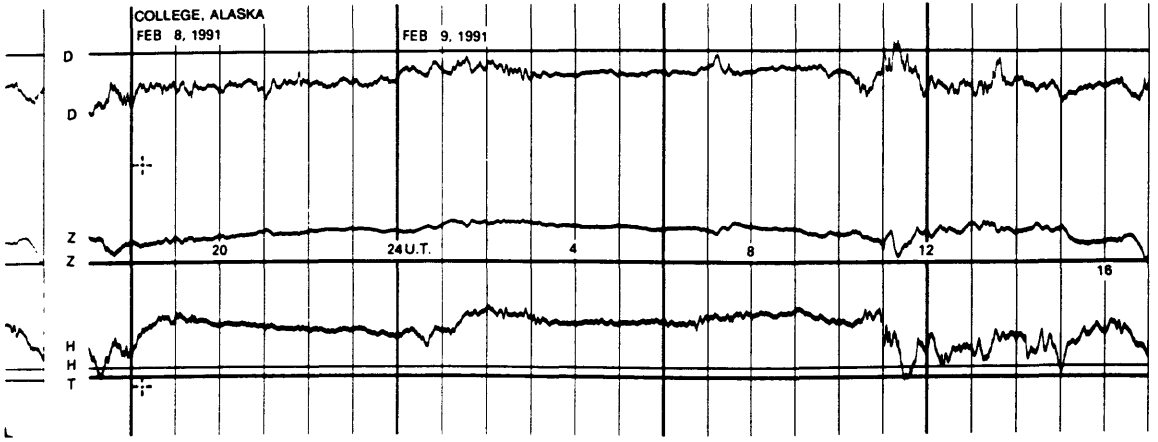
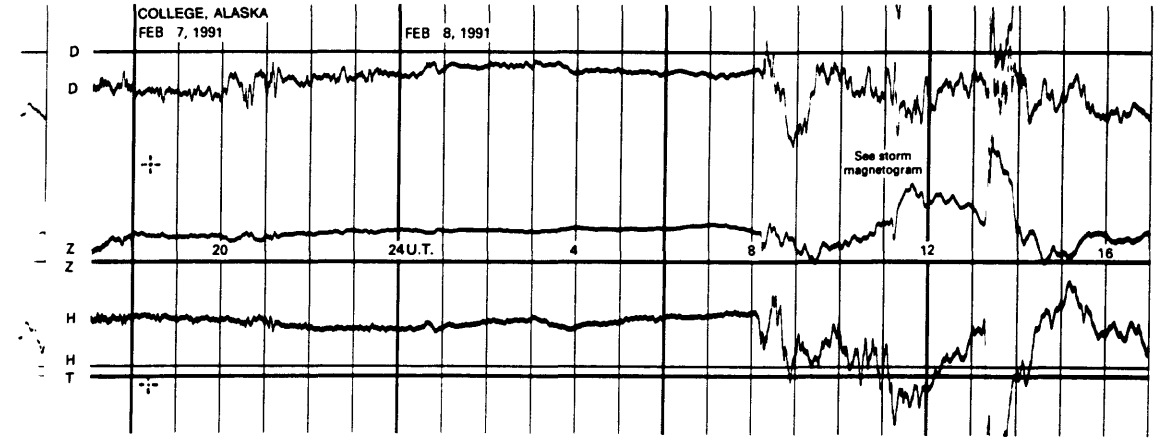
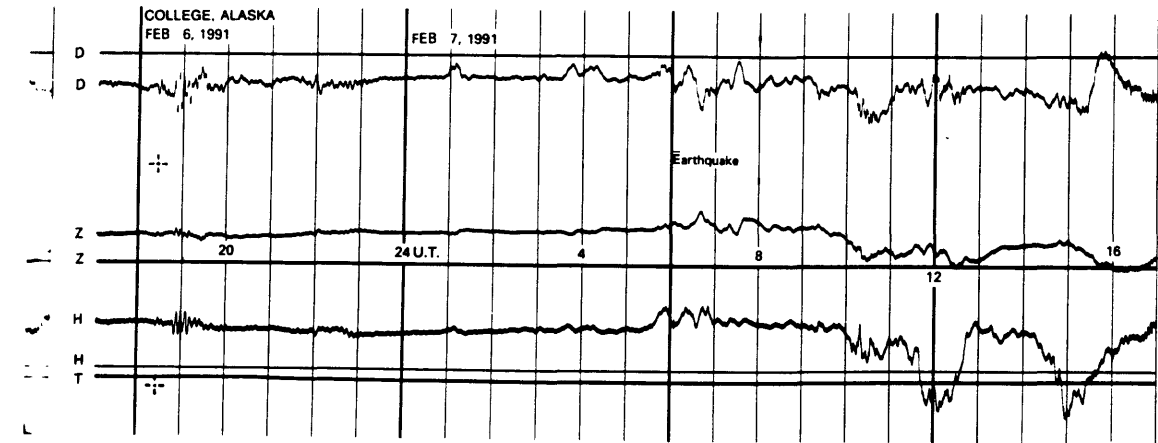
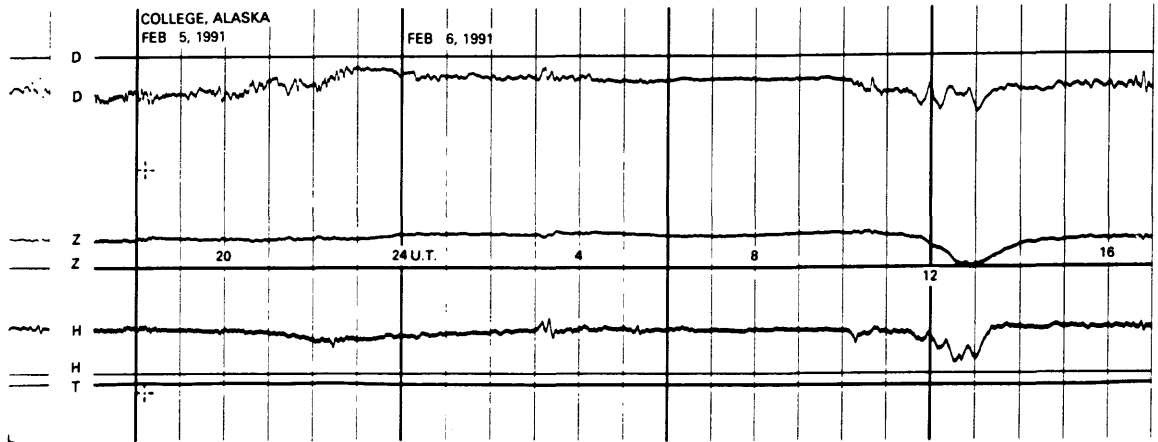


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

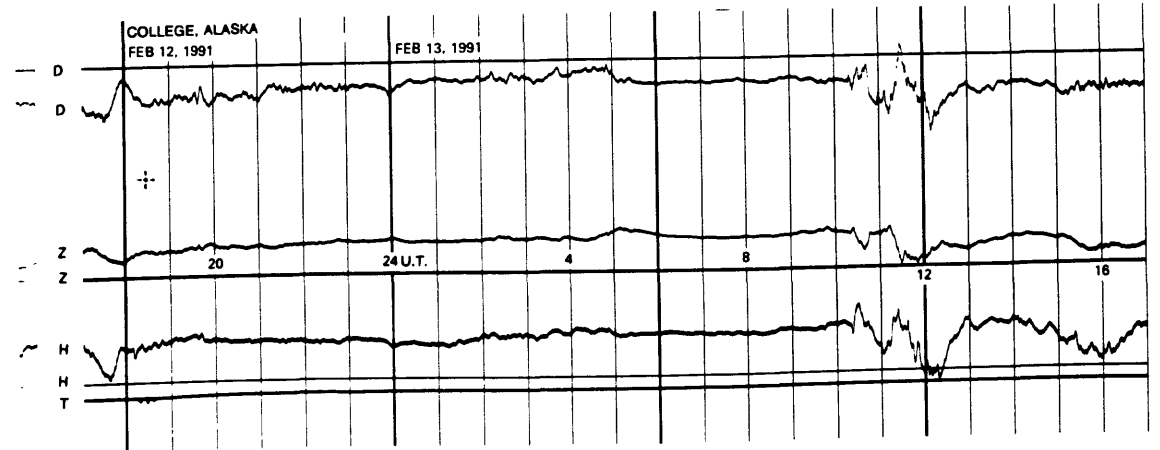
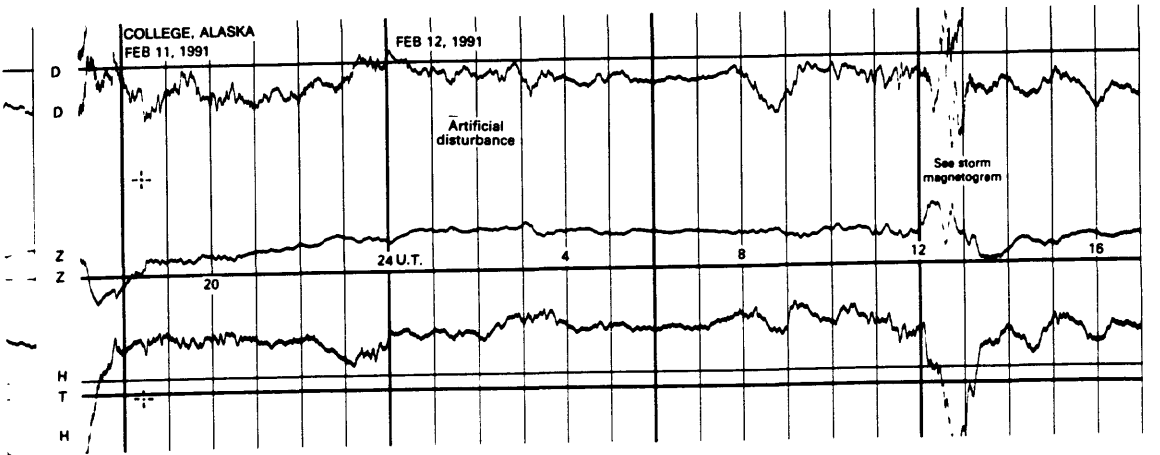
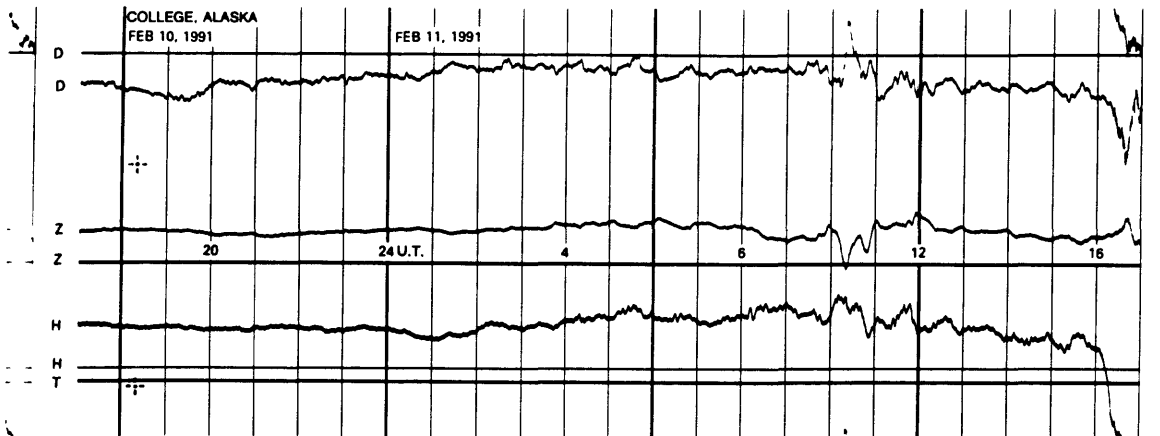
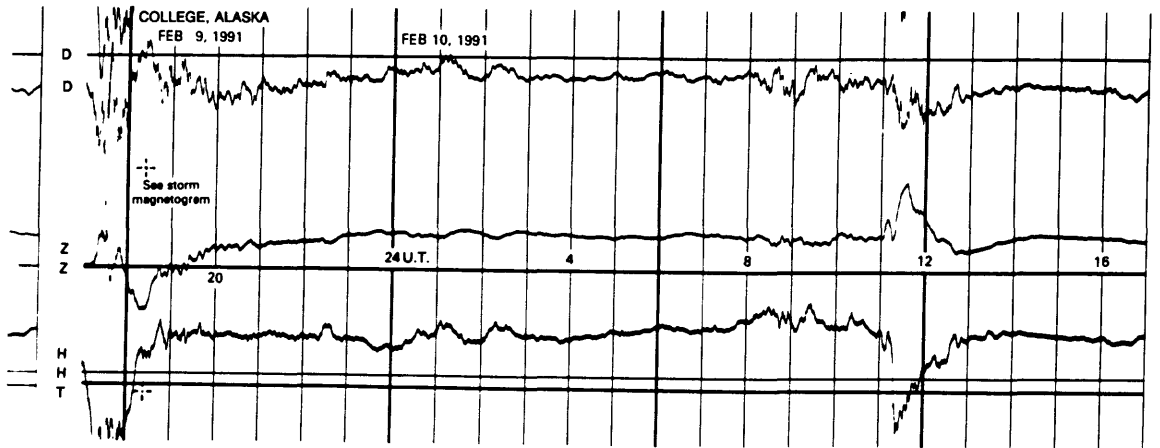
NORMAL MAGNETOGRAMS



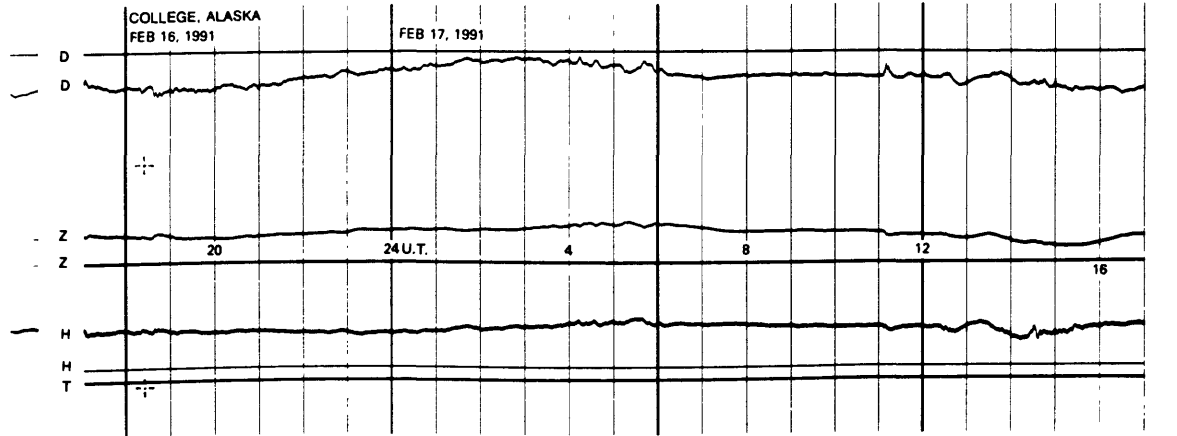
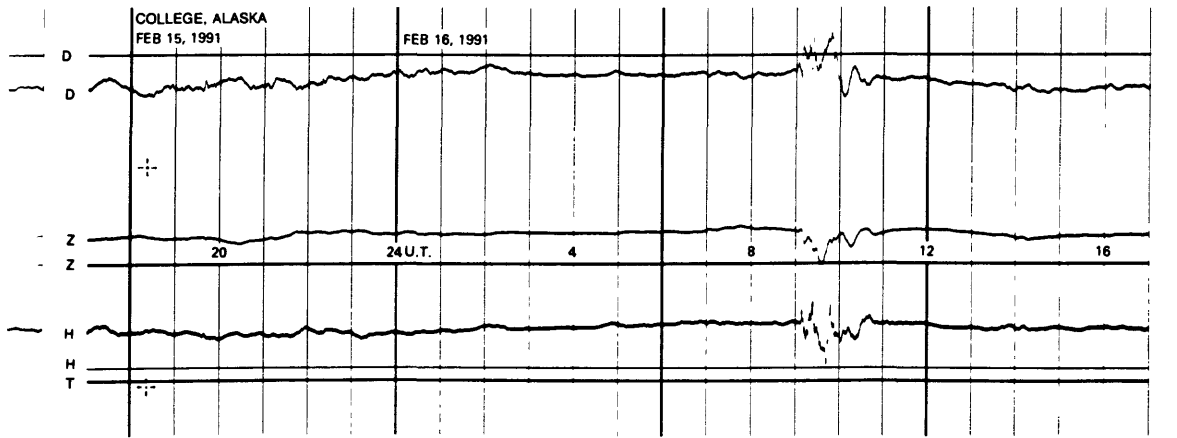
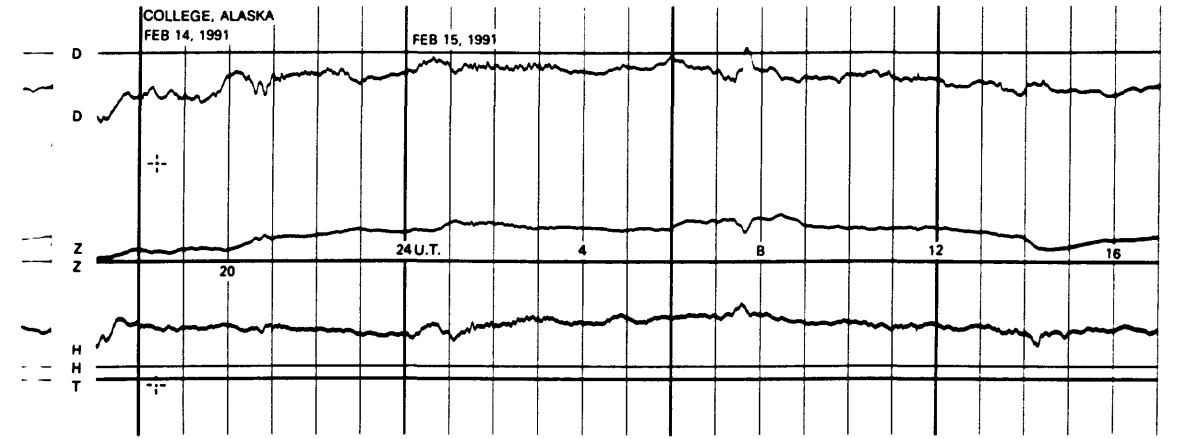
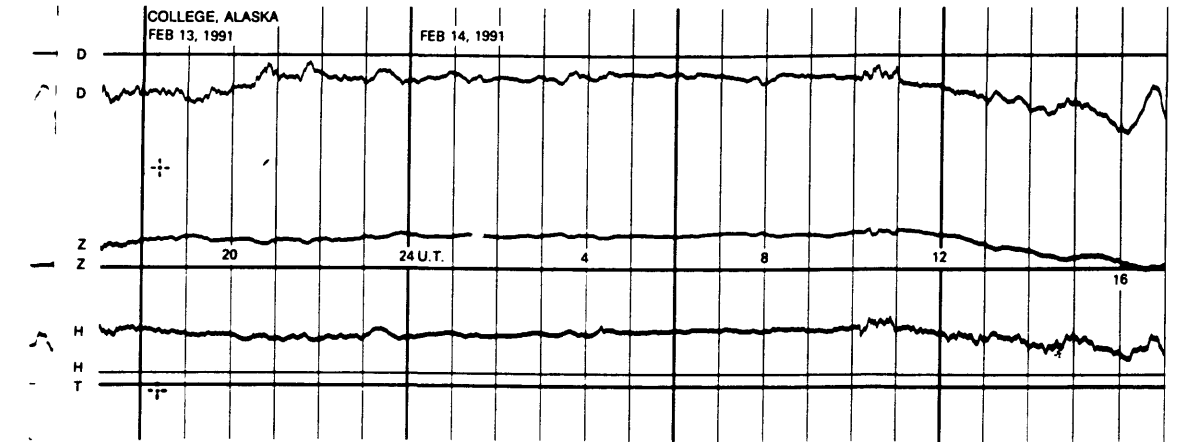
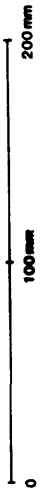
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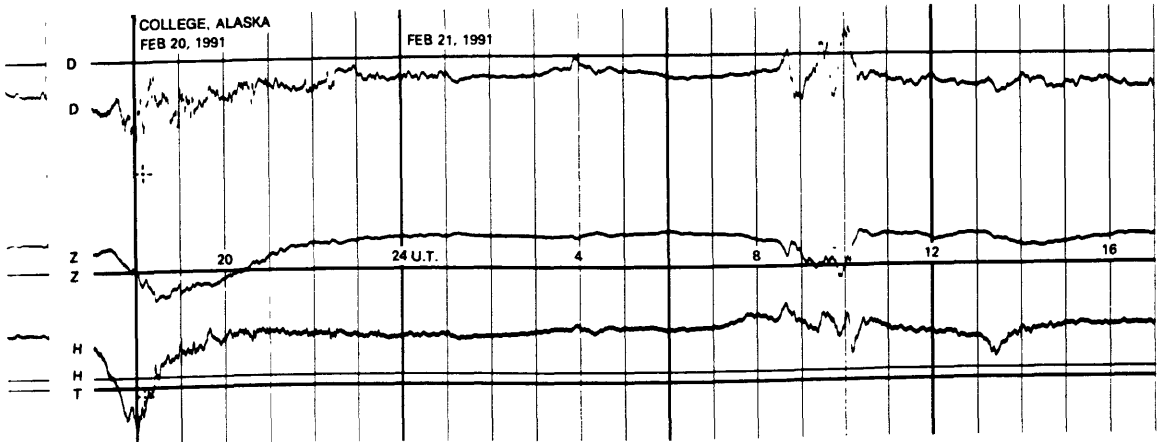
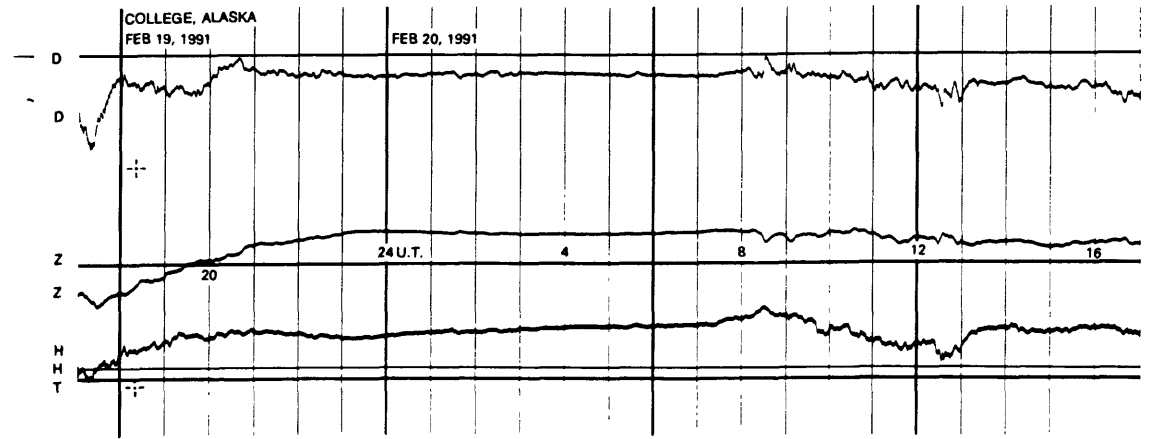
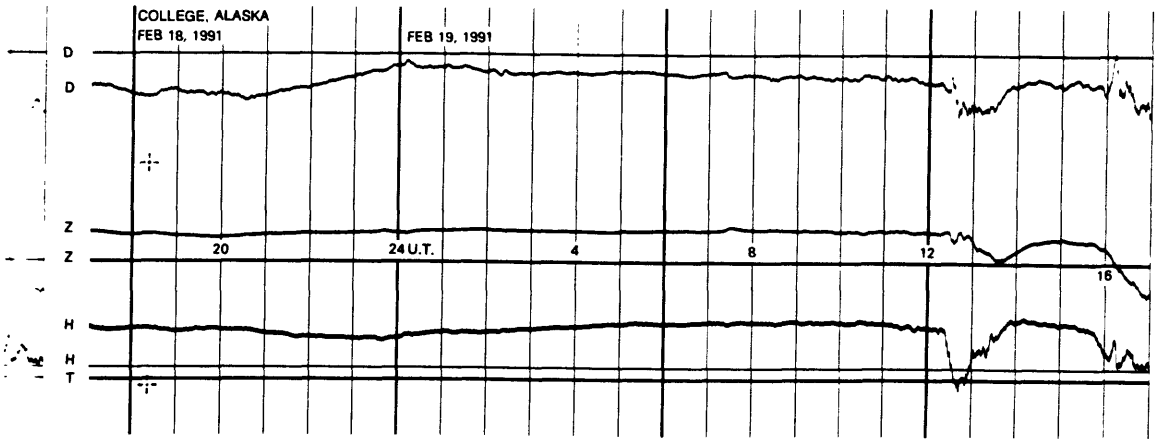
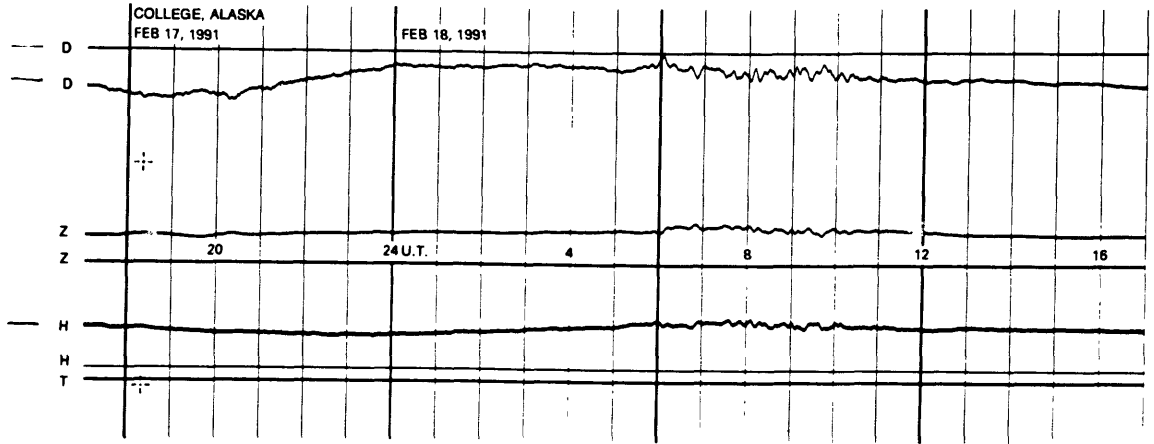
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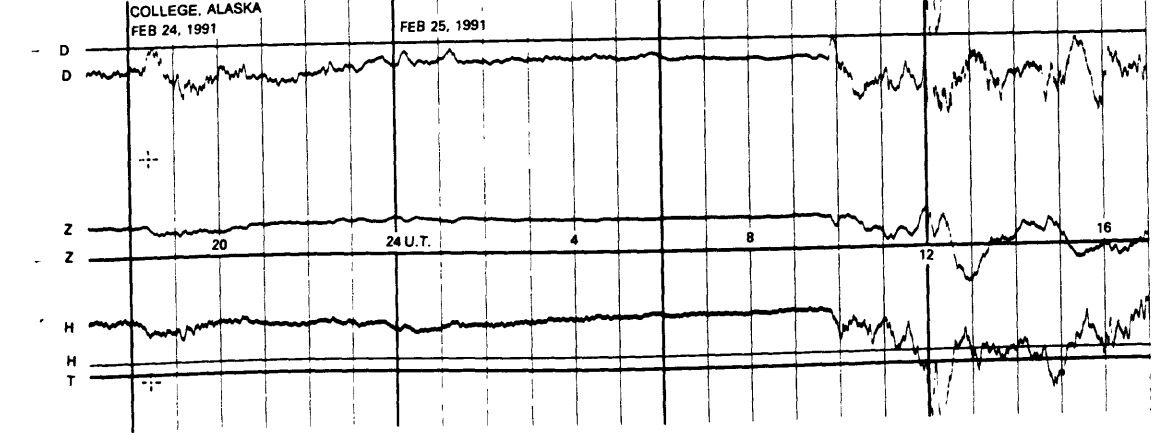
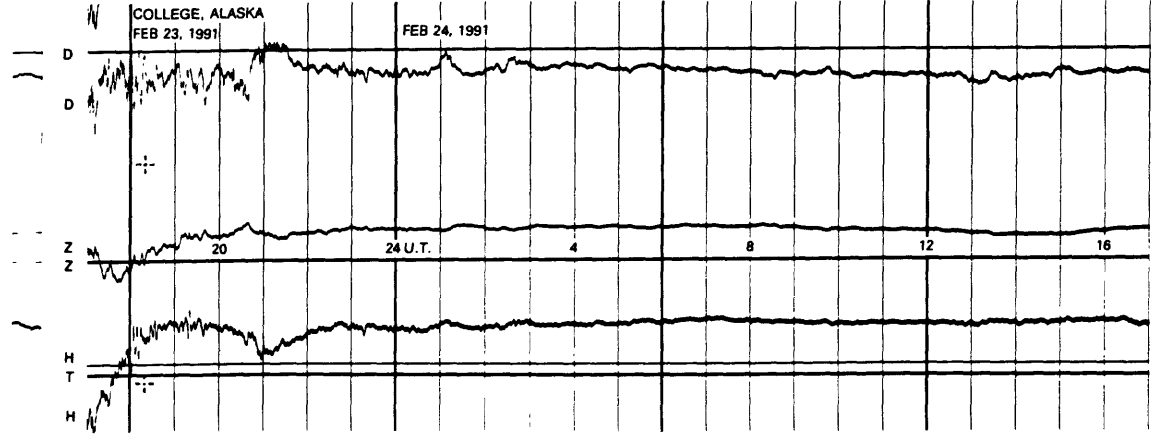
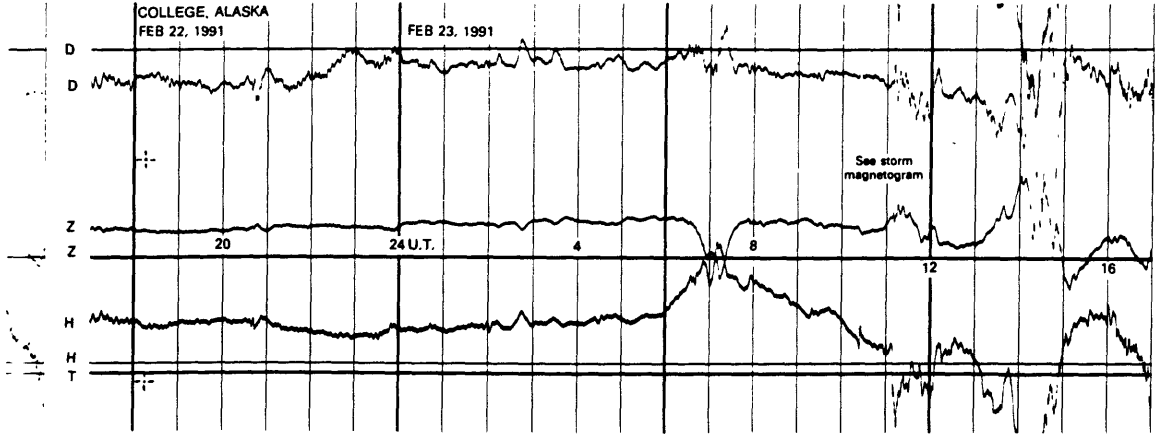
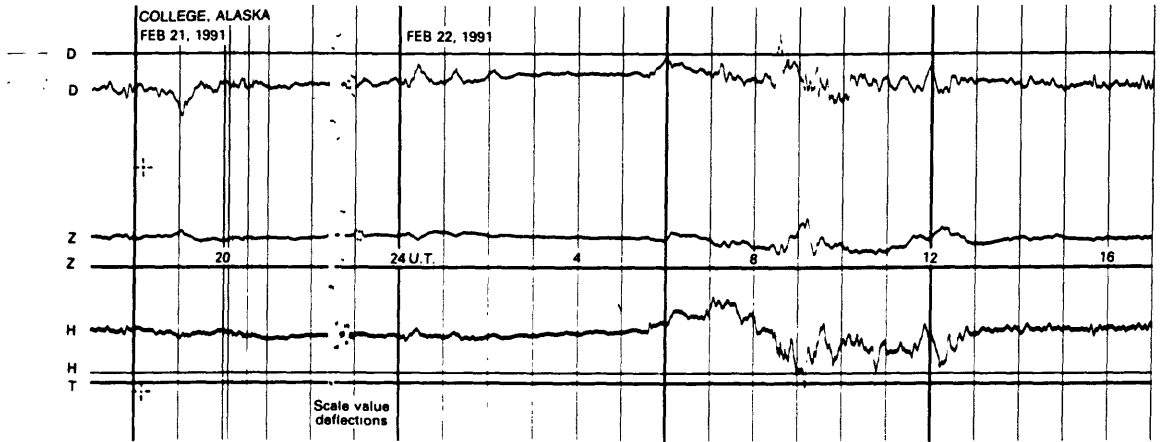
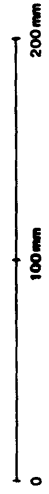
NORMAL MAGNETOGRAMS



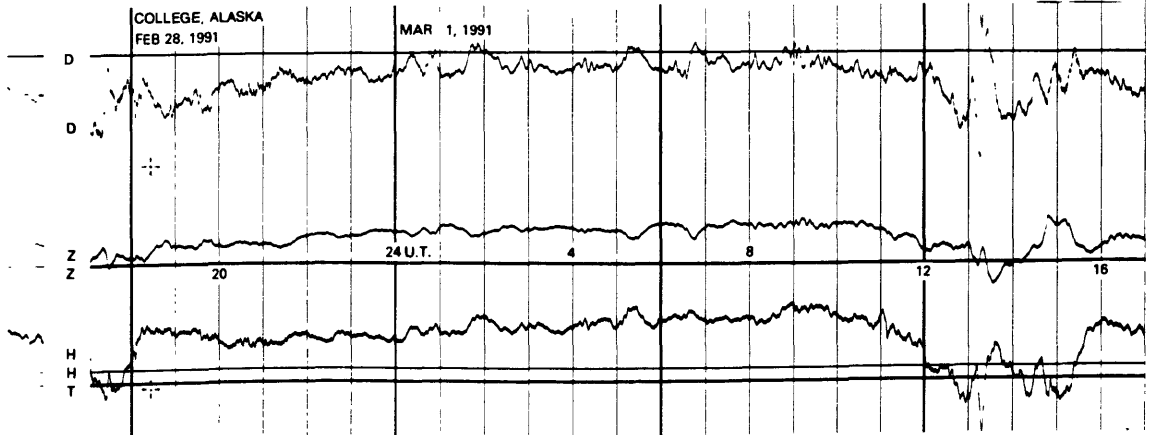
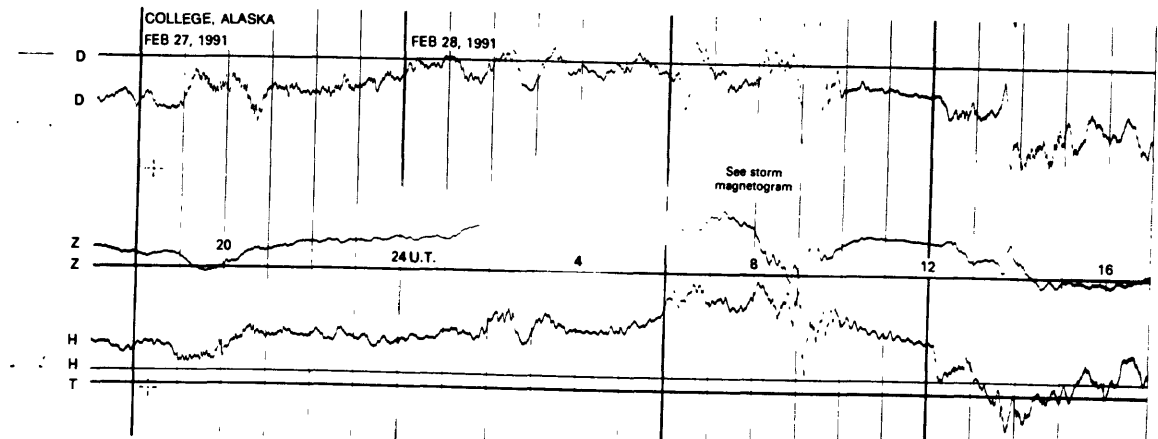
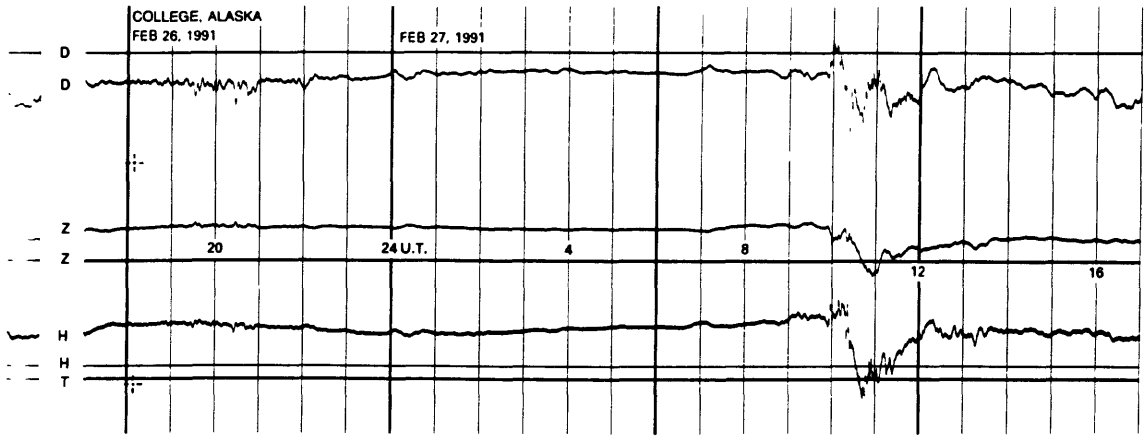
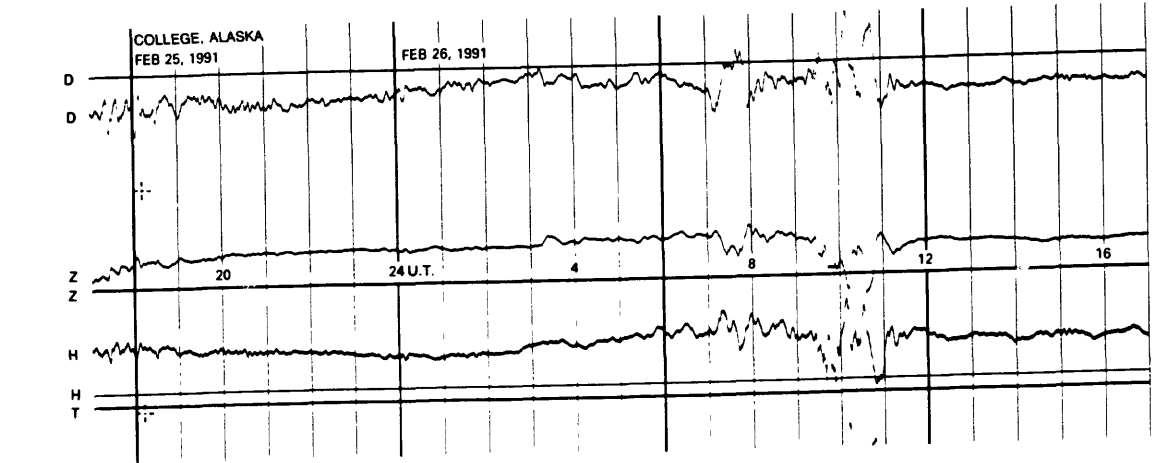
NORMAL MAGNETOGRAMS



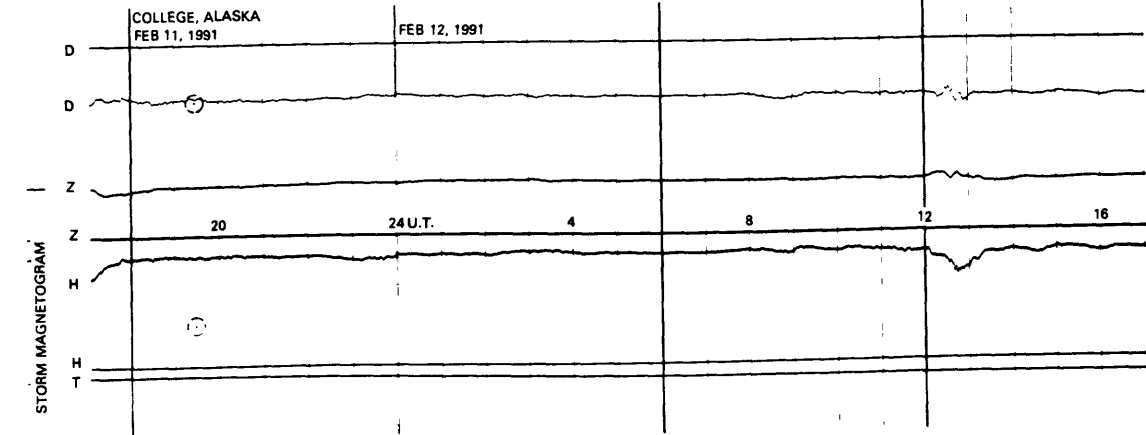
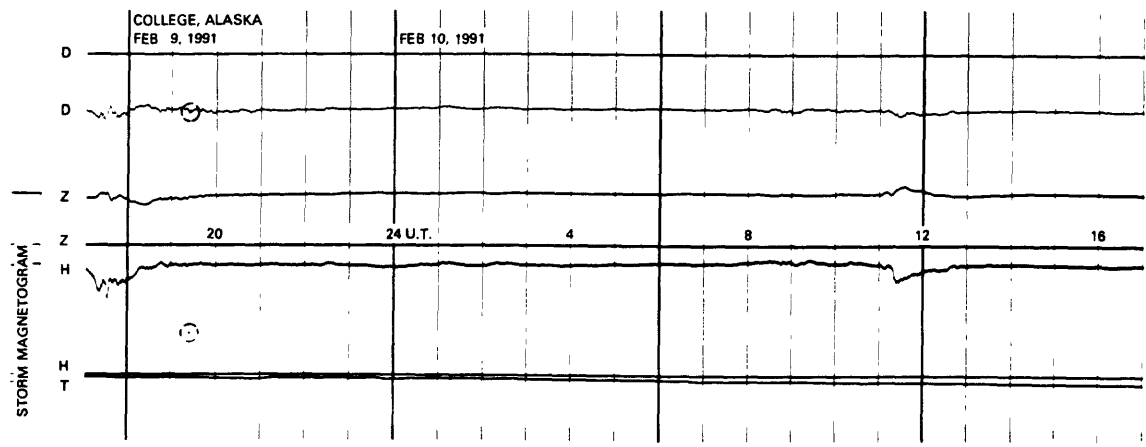
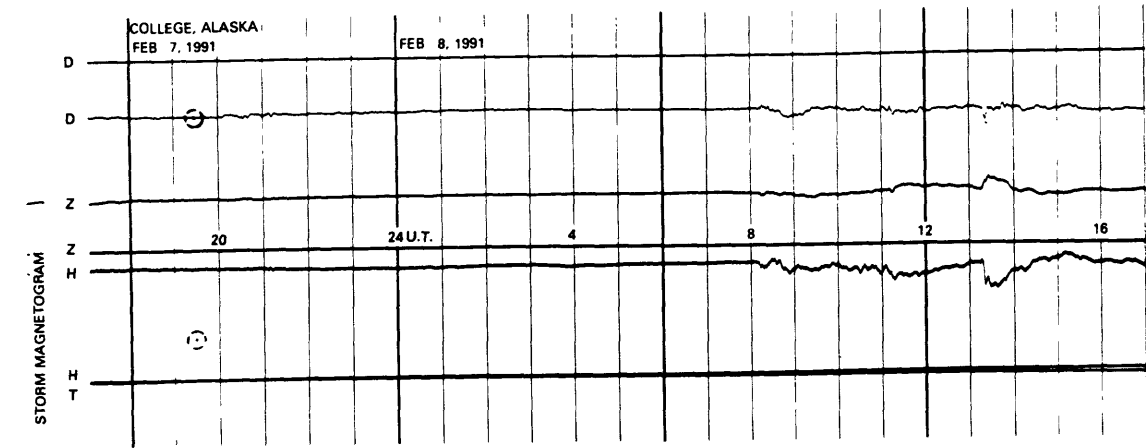
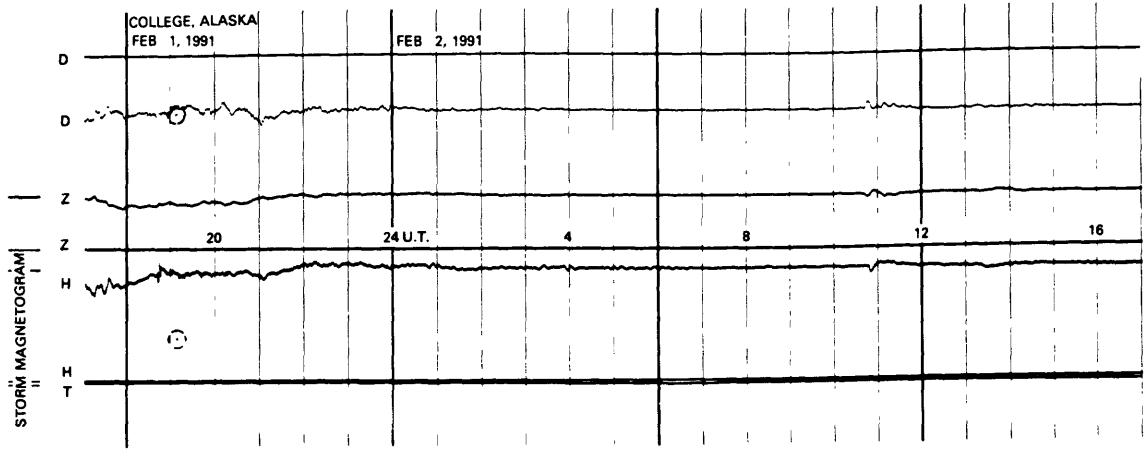
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

