

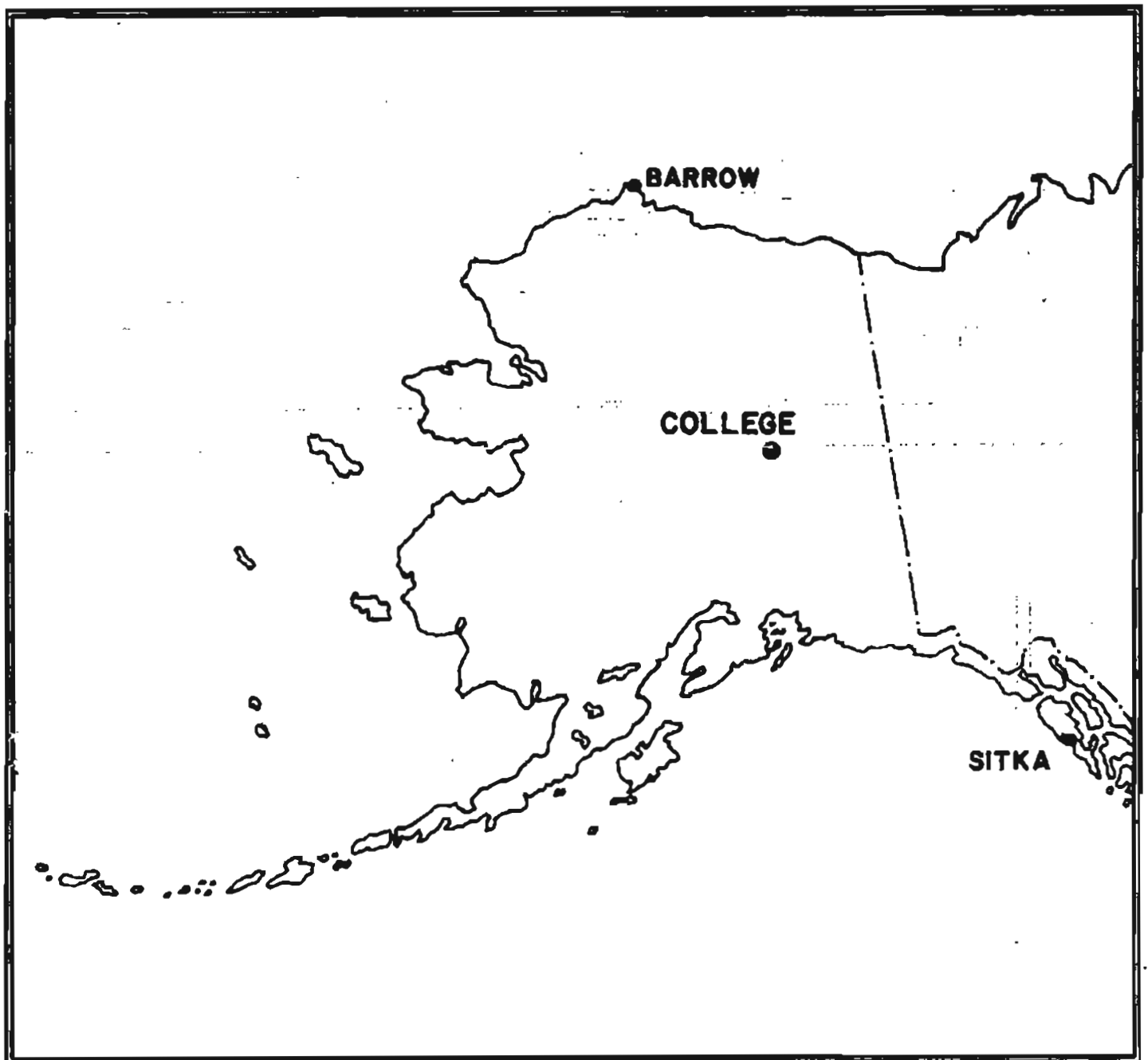
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

MARCH 1990

OPEN FILE REPORT 90-0300C



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.....+258.5°
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 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)

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:

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

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

MONTH AND YEAR

MARCH, 1990

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

DATE	K-INDICES								SUM	A _k	TIME SCALE ON MAGNETOGRAMS		
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			20 mm/hr		
1	3	3	3	4	6	5	3	2	29	28	SUDDEN COMMENCEMENTS		
2	2	3	4	6	4	3	3	2	27	24	d	h	m
3	2	1	2	2	3	3	3	1	17	9			
4	0	0	2	4	1	0	1	1	9	5			
5	3	3	2	3	1	2	1	1	16	9			
6	4	3	3	5	5	6	2	2	30	31	12	15	03
7	2	1	1	2	5	3	2	1	17	12	20	22	43
8	1	1	1	5	3	4	1	1	17	13			
9	1	1	1	6	4	2	1	2	18	17			
10	1	0	2	3	4	3	2	1	16	10			
11	2	1	1	6	3	4	1	1	19	18			
12	1	1	2	3	3	7	4	5	26	32			
13	4	3	2	4	6	4	2	4	29	27			
14	4	4	3	6	5	4	2	2	30	30			
15	3	2	4	3	5	3	1	1	22	17			
16	2	3	4	3	2	1	1	1	17	10			
17	0	0	0	0	0	0	0	0	0	0			
18	1	1	3	6	5	6	4	4	30	35	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
19	3	3	2	2	2	2	2	2	18	9			
20	3	2	2	4	5	5	4	5	30	28			
21	5	5	6	5	6	6	6	4	43	61			
22	4	2	6	6	5	5	4	4	36	43			
23	4	4	4	6	6	6	4	3	37	45			
24	3	3	3	5	4	3	4	3	28	22	BEGIN	END	
25	3	3	3	6	6	6	6	5	38	52	d	h	m
26	4	4	6	6	4	7	5	4	40	57	d	h	m
27	4	5	4	5	2	6	6	4	36	43			
28	3	3	5	6	5	4	3	4	33	34			
29	3	3	1	5	6	5	4	4	31	33			
30	3	4	8	8	6	4	3	2	38	81			
31	2	1	1	2	4	1	2	2	15	8			

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	M	Z
675.7	322.2	
3.68	7.71	
2490	2480	

(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

March 19 90

WDC-4 FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOSTON, COLLEGE 98508 U.S.A.

Data from Individual Observatories:

Obs. & letter ID 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	64.6 N	12	1503	SC	+8	+102	+7	12	6	7	169	1680	540	13 05
		20	2243	SC*		+437		21	3, 5, 6, 7	6	237	1350	910	22 02
		25	09XX	..				26	6	7	236	1460	860	27 12
		30	03XX	..				30	3, 4	8	262	2230	1370	30 20

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 3-1-90	2400 UT, 3-31-90	1.0' /mm	3.78 /mm	26° 33.2' E
H	0001 UT, 3-1-90	2400 UT, 3-24-90	7.78 /mm		126188
	0001 UT, 3-25-90	2400 UT, 3-31-90	↓		126258
Z	0001 UT, 3-1-90	2400 UT, 3-24-90	7.78 /mm		552088
	0001 UT, 3-25-90	2400 UT, 3-31-90	↓		552038

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 3-1-90	2400 UT, 3-31-90	7.9' /mm	29.48 /mm	
H	(SAME)	(SAME)	43.48 /mm		
Z	(SAME)	(SAME)	49.08 /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° 54.4' E	127728	553428

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: MAR 3, 4, 5, 17, 31

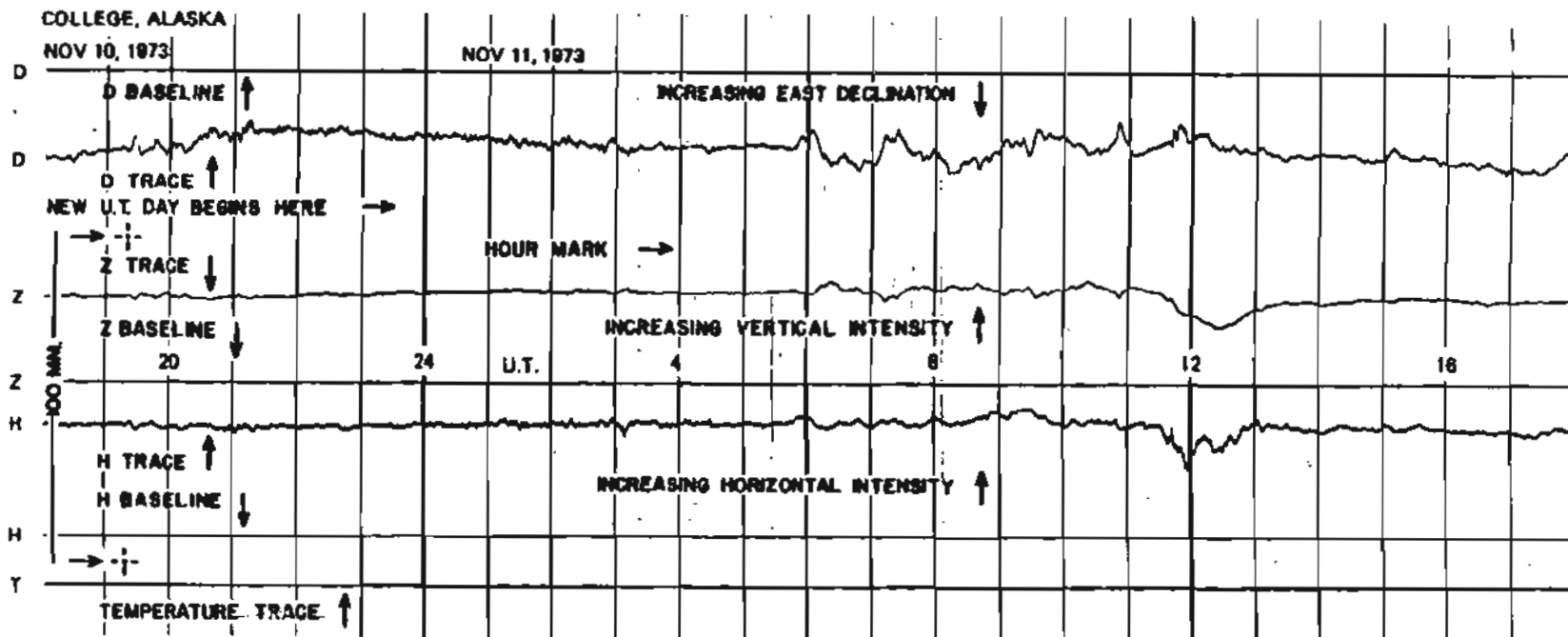
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

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

COMPONENT	D					N					Z					COMPONENT						
	3		4		5		3		4		5		3		4		5		DAY			
	3	4	5	17	31	3	4	5	17	31	3	4	5	17	31	3	4	5	17	31	8	
DAY																						
A ₁																						
HOURLY	01	214	209	171	160	171	202	190	181	170	197	195	192	193	178	194	190	180	178	178	194	194
	02	196	200	140	156	162	220	200	230	199	174	190	180	214	202	202	190	178	175	175	202	202
	03	190	207	115	157	171	220	196	263	204	180	190	178	227	207	184	171	175	175	175	207	207
	04	181	200	100	157	173	221	206	271	211	177	184	171	245	204	183	172	172	175	175	204	204
	05	185	199	142	170	168	230	219	249	220	180	183	172	242	201	189	173	173	179	179	201	201
	06	181	201	180	177	168	250	211	282	221	191	189	173	245	205	205	170	170	179	179	205	205
	07	219	200	198	182	180	271	220	240	228	191	205	170	203	217	205	170	170	187	187	217	217
	08	218	199	190	187	170	310	249	256	237	190	203	183	200	204	203	183	183	191	191	204	204
	09	200	169	202	196	166	281	247	261	224	198	222	166	189	213	222	166	166	184	184	213	213
	10	230	190	209	202	172	275	84	270	224	211	201	43	161	235	201	43	161	174	174	235	235
	11	220	240	239	210	207	260	253	175	225	195	198	154	157	223	198	154	157	171	171	223	223
	12	216	210	220	210	209	225	230	221	225	180	191	179	151	213	191	179	151	168	168	213	213
	13	220	222	209	211	211	146	220	222	225	80	169	177	164	194	169	177	164	163	163	194	194
	14	250	220	220	220	270	151	219	202	220	-	170	170	164	174	170	170	164	157	157	174	174
	15	264	233	220	230	250	70	216	218	218	160	170	169	145	112	170	169	145	149	149	112	112
	16	239	230	187	241	241	118	220	201	200	200	110	167	134	194	110	167	134	153	153	194	194
	17	210	240	228	253	262	700	222	226	226	189	75	172	150	213	75	172	150	162	162	213	213
	18	230	250	270	280	279	33	221	224	222	183	49	173	175	213	49	173	175	167	167	213	213
	19	239	269	281	291	266	120	191	230	220	180	70	172	160	210	70	172	160	168	168	210	210
	20	260	260	293	299	264	201	189	213	210	161	79	154	160	207	79	154	160	167	167	207	207
	21	226	257	284	277	269	195	180	200	200	150	139	142	153	189	139	142	153	163	163	189	189
	22	219	257	300	257	232	190	160	176	189	145	177	150	159	187	177	150	159	160	160	187	187
	23	220	199	260	233	189	200	167	167	142	142	182	152	164	187	182	152	164	161	161	187	187
	24	210	162	191	210	160	189	177	160	185	159	180	162	175	187	180	162	175	160	160	187	187
DAILY SUM	5226	5223	5049	5156	5010	4738	4887	5347	5108	3917	3917	3921	3911	4320	4068	4785	3921	3911	4320	4068	4785	4785
DAILY MEAN	218	218	210	215	209	197	204	223	213	163	163	163	163	180	170	199	163	163	180	170	199	199
MEAN			214					200						175								

Scaled *AM* Checked *AM*

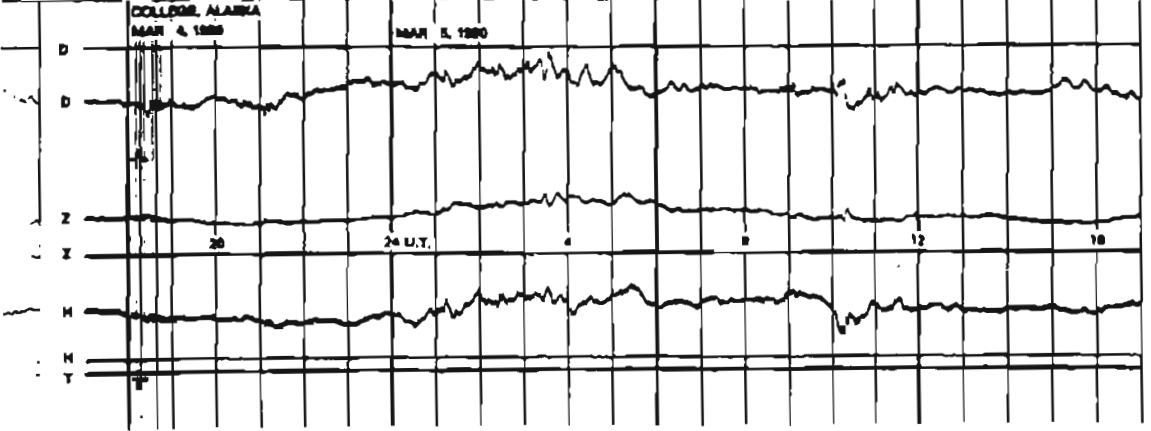
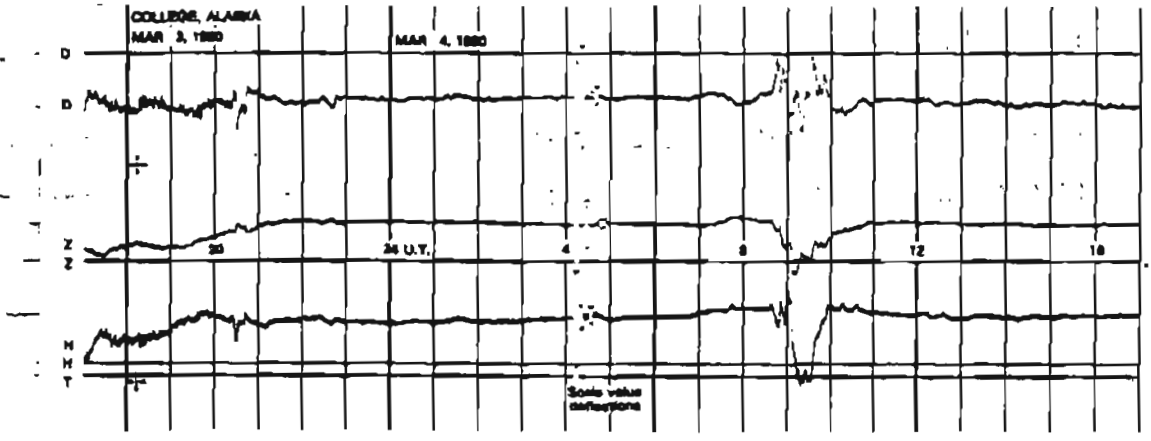
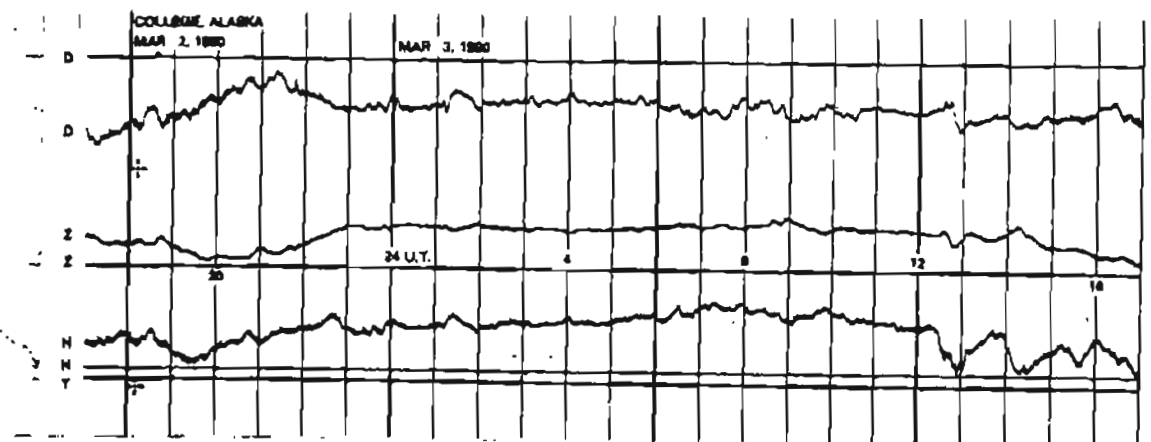
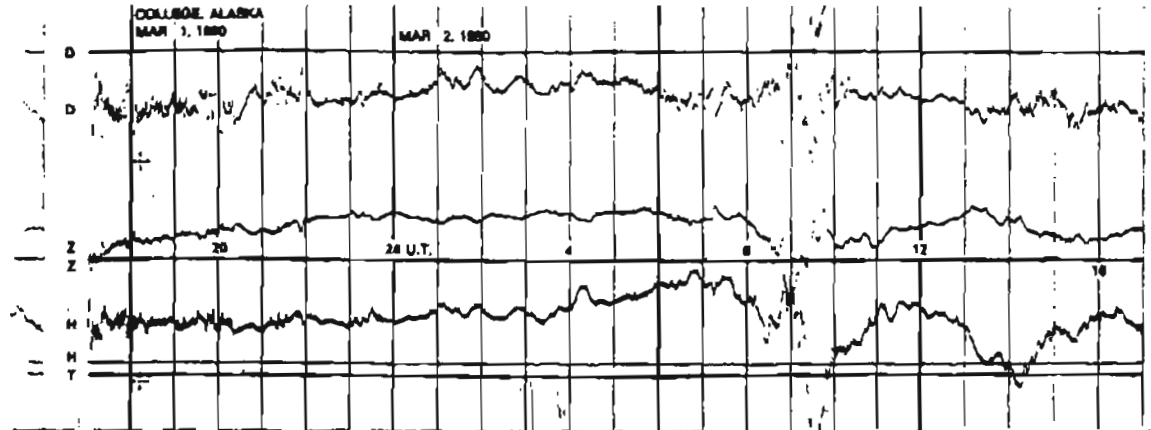
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

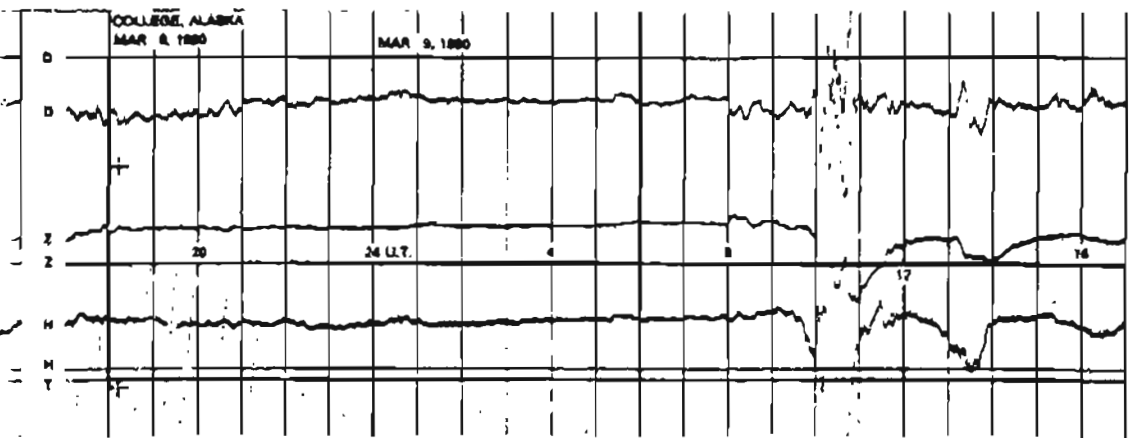
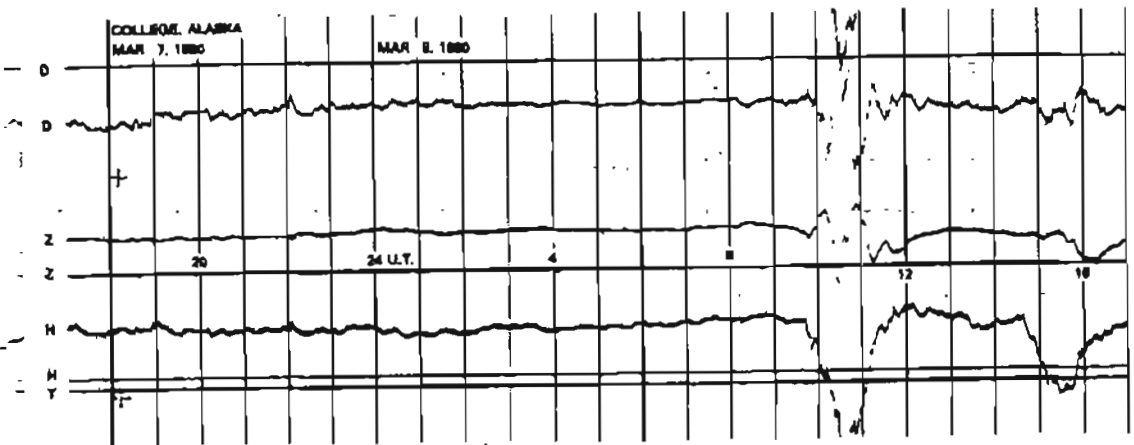
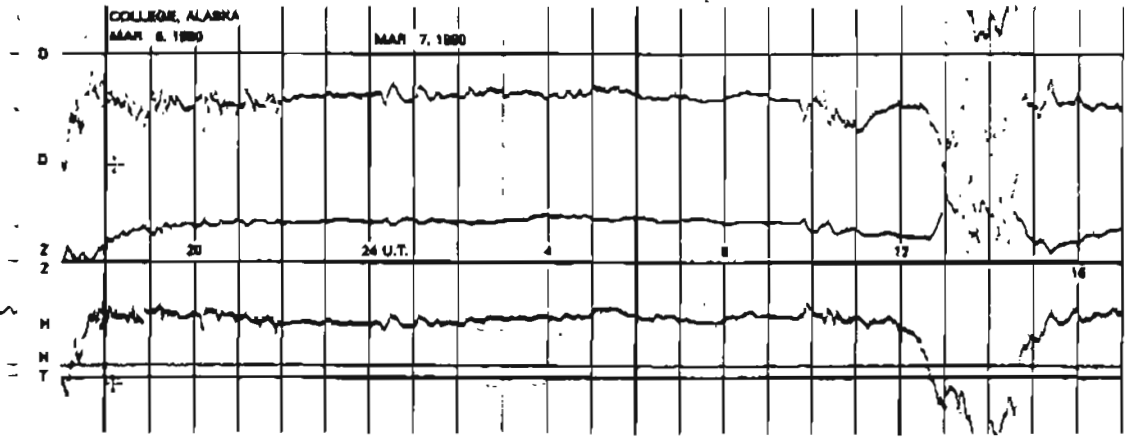
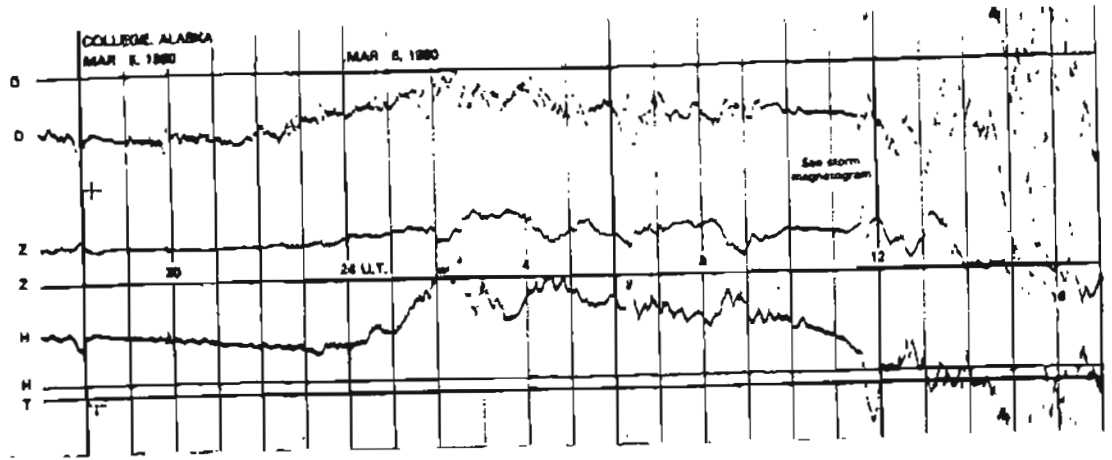
NORMAL MAGNETOGRAMS

200 mm
100 mm

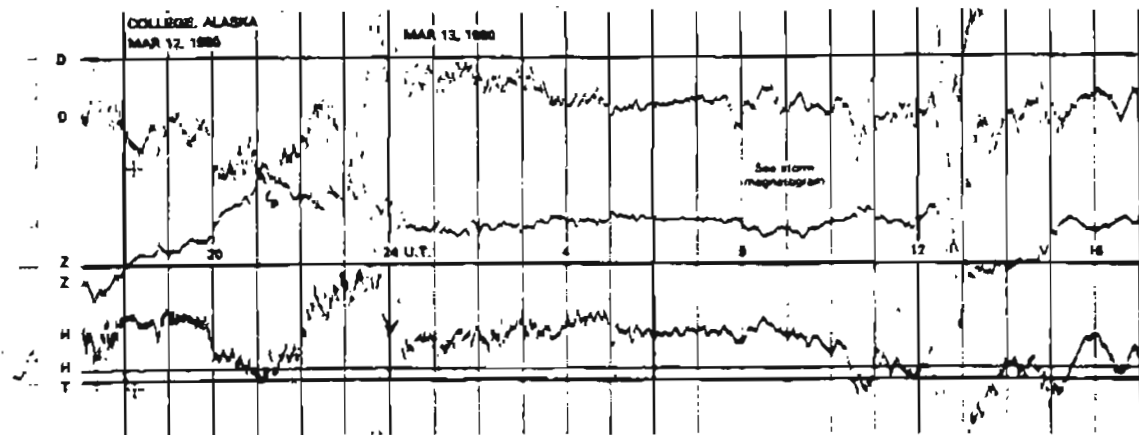
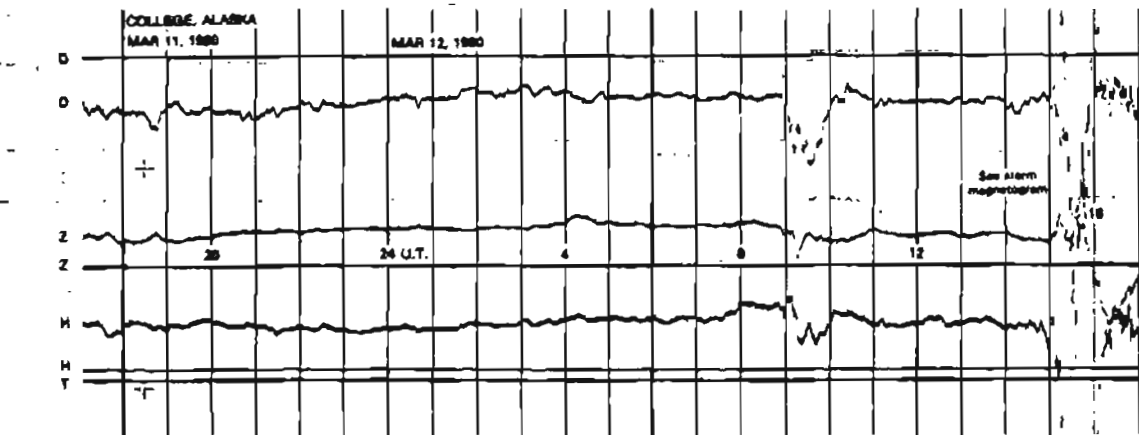
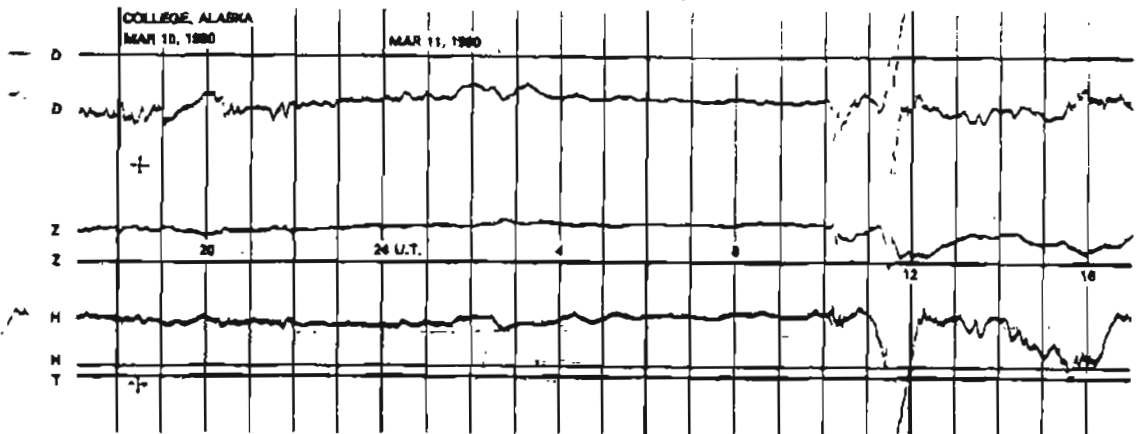
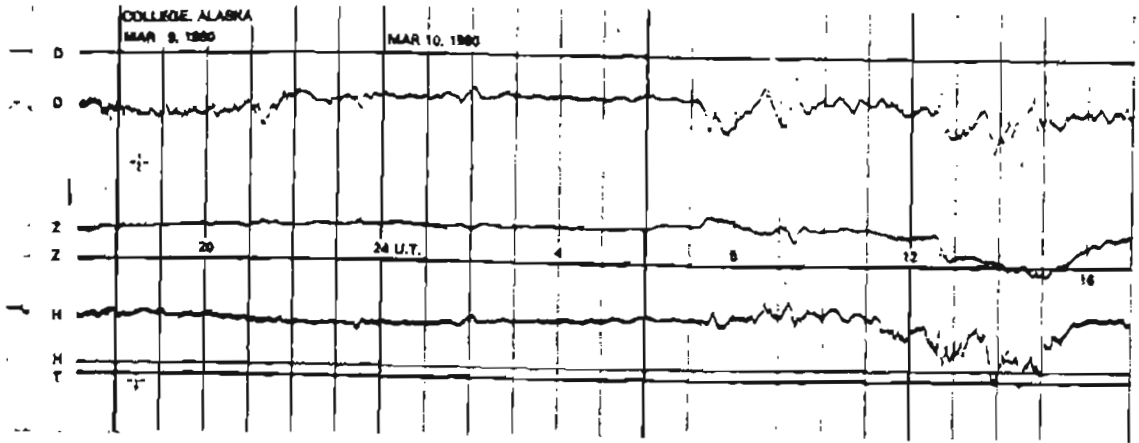


NORMAL MAGNETOGRAMS

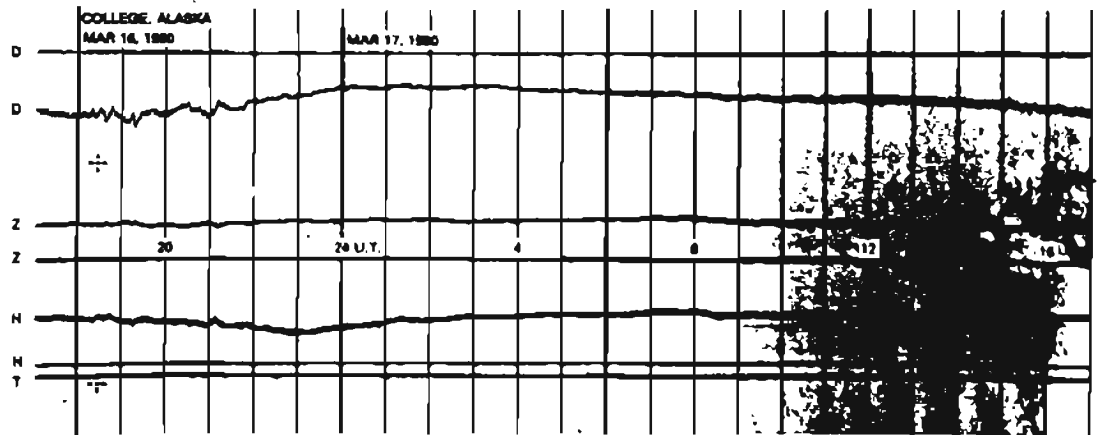
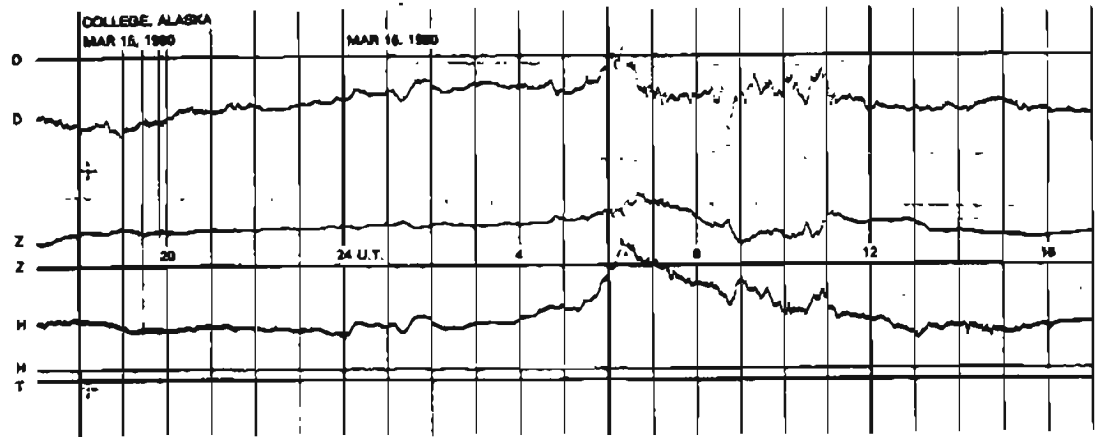
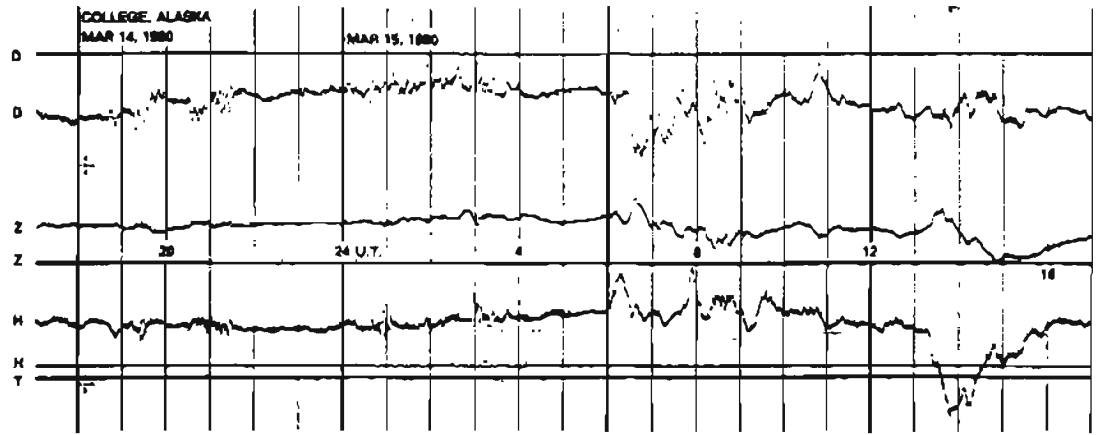
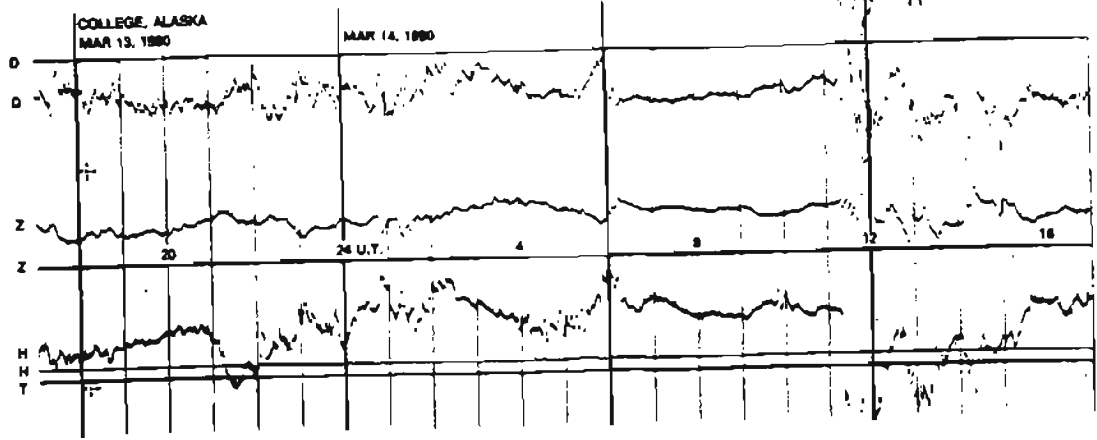
200 mm
100 mm
0



NORMAL MAGNETOGRAMS

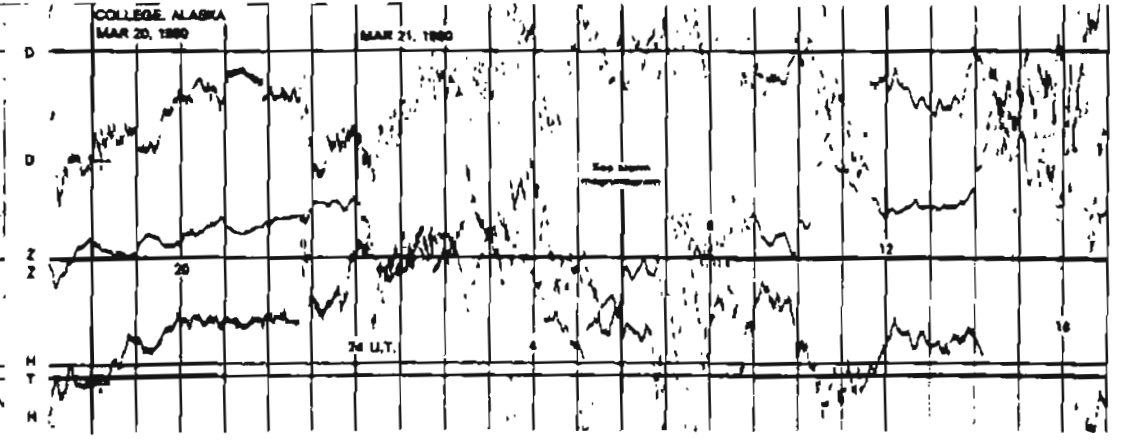
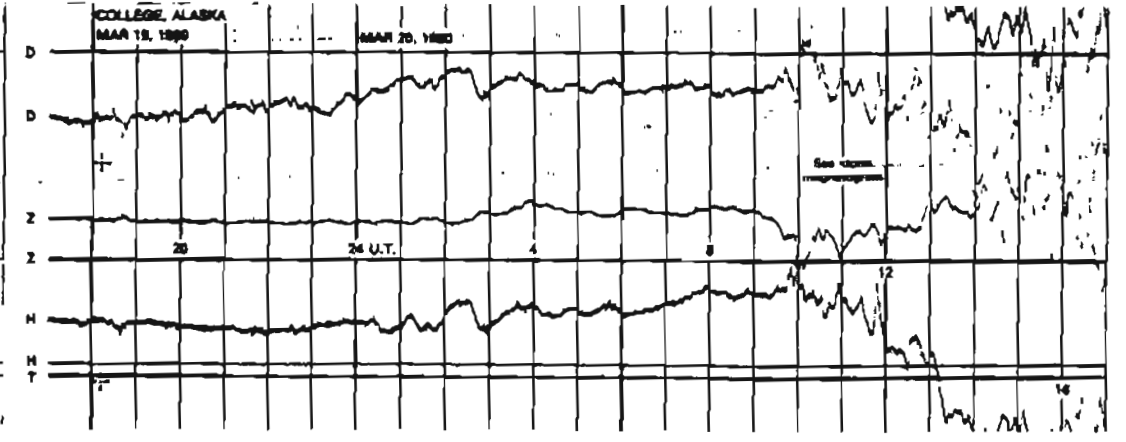
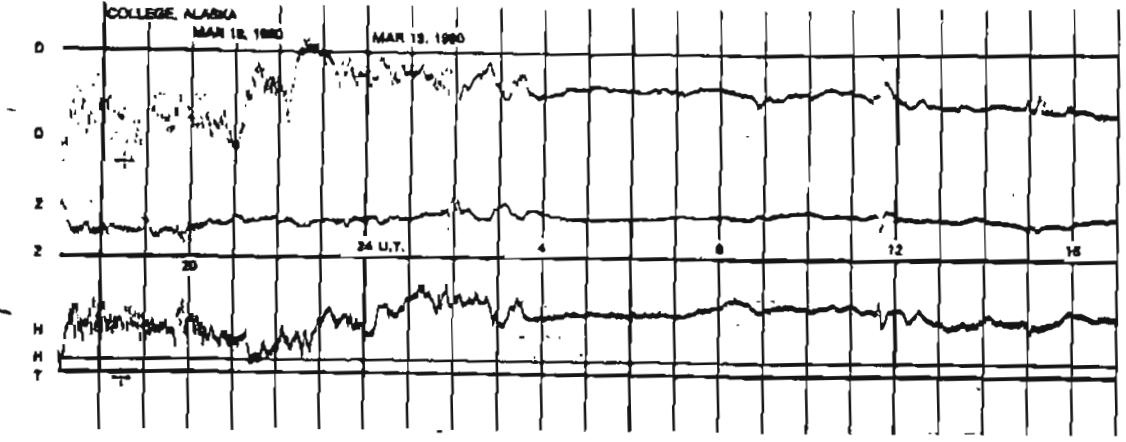
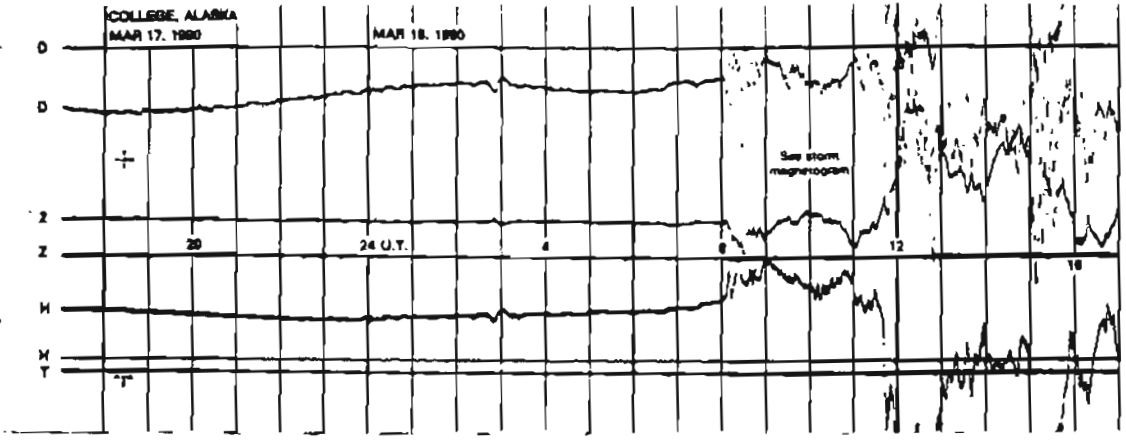


NORMAL MAGNETOGRAMS

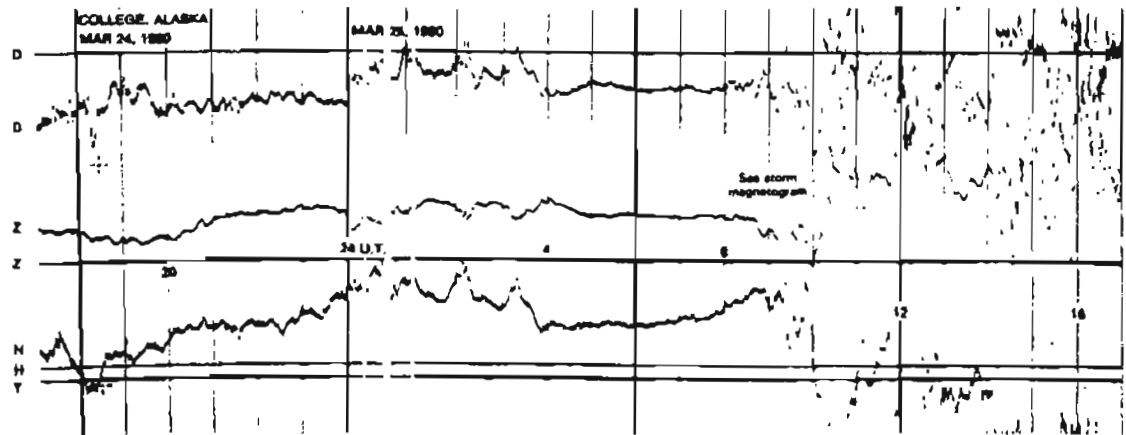
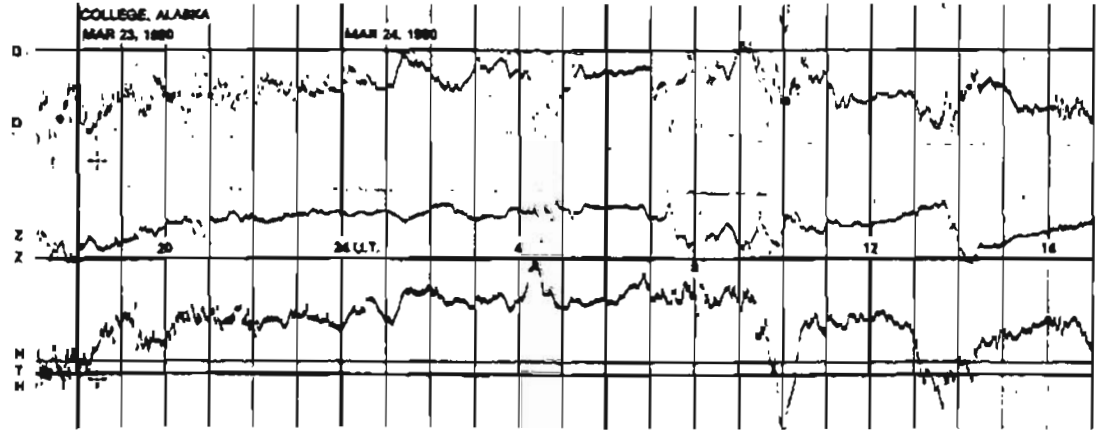
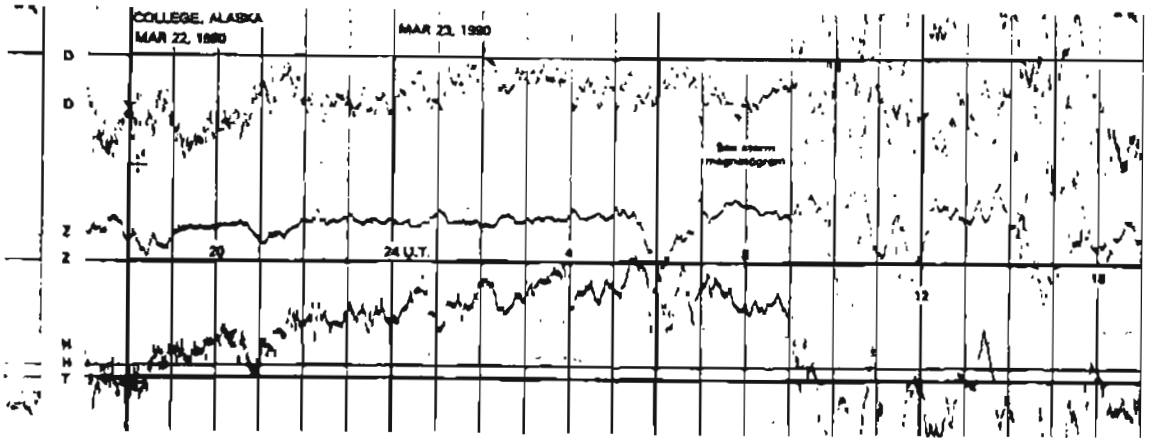
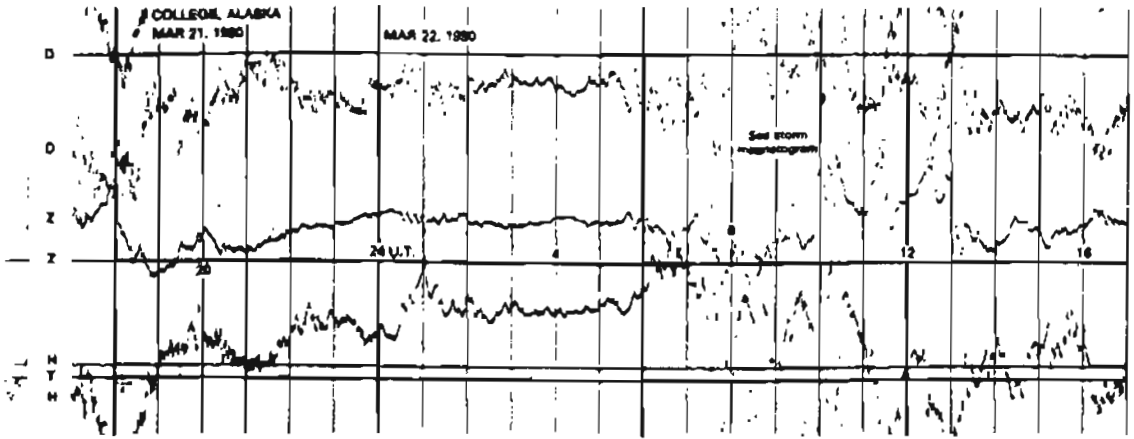


REPRODUCED FROM BEST AVAILABLE COPY

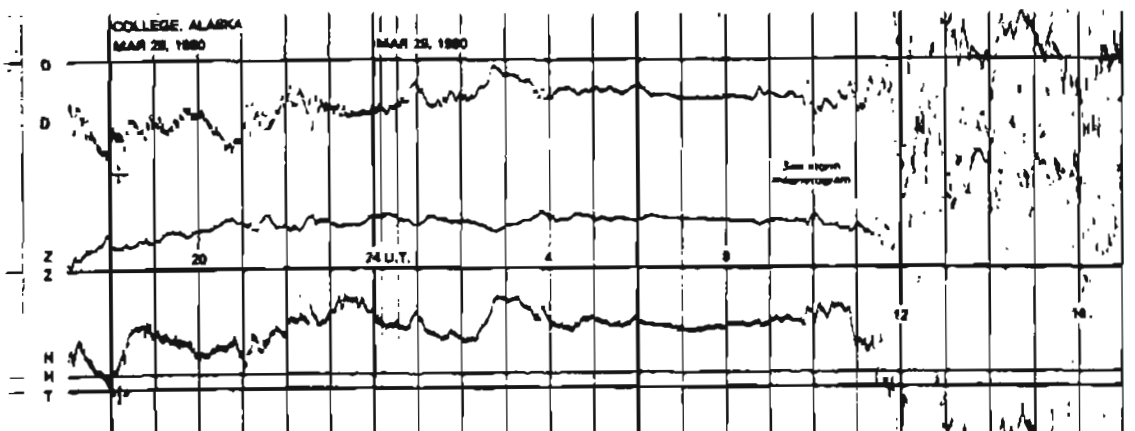
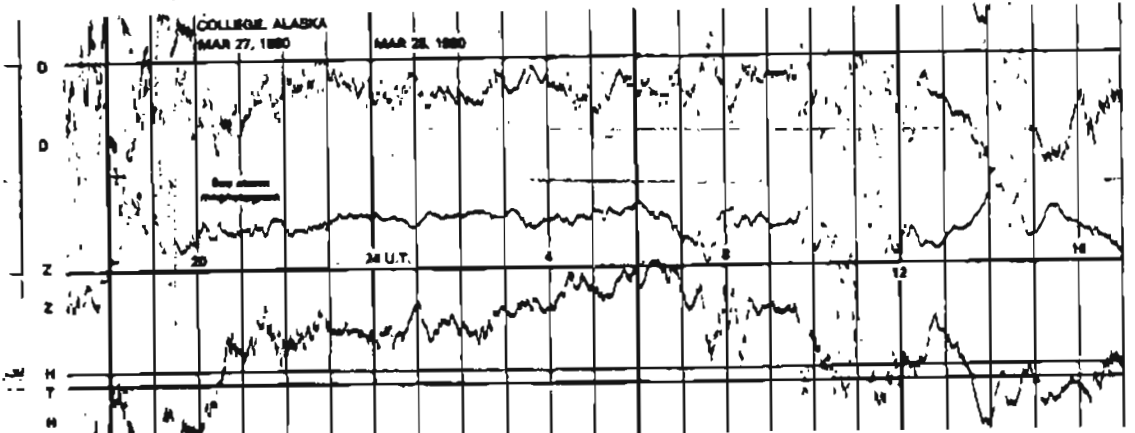
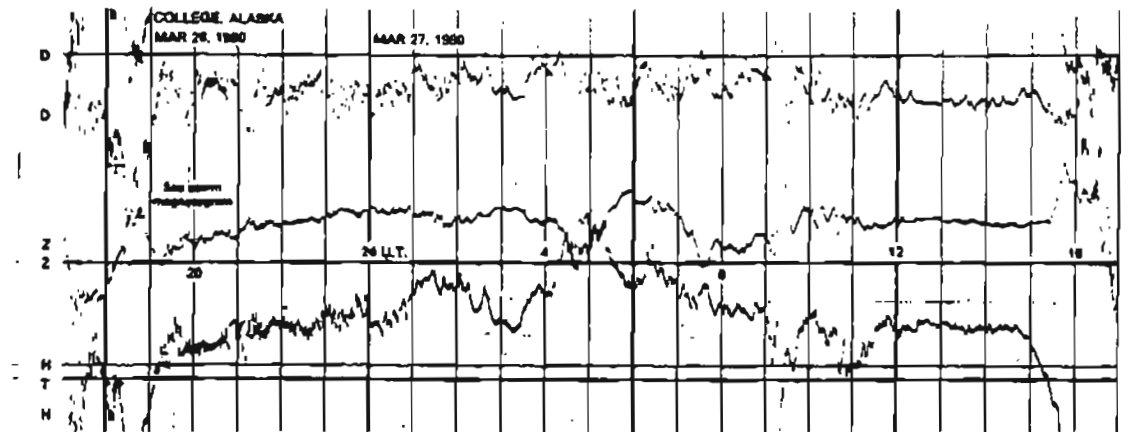
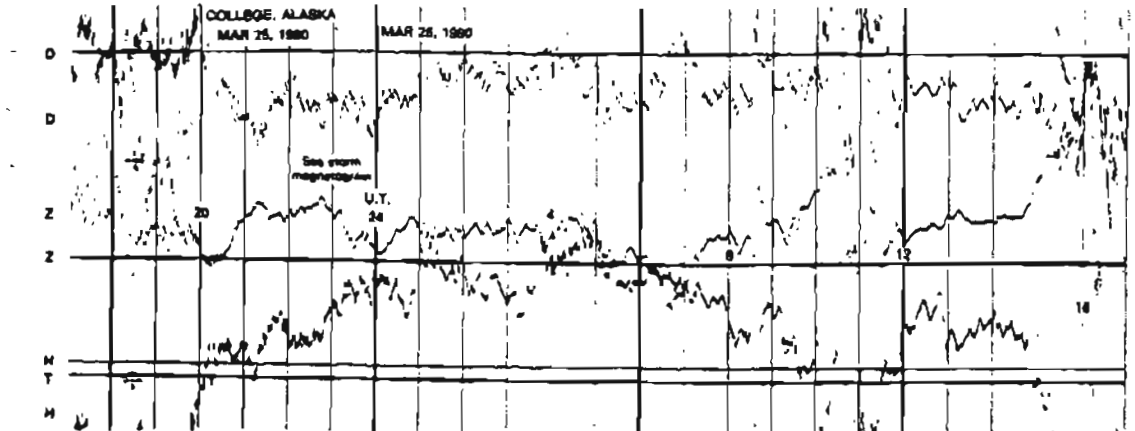
NORMAL MAGNETOGRAMS



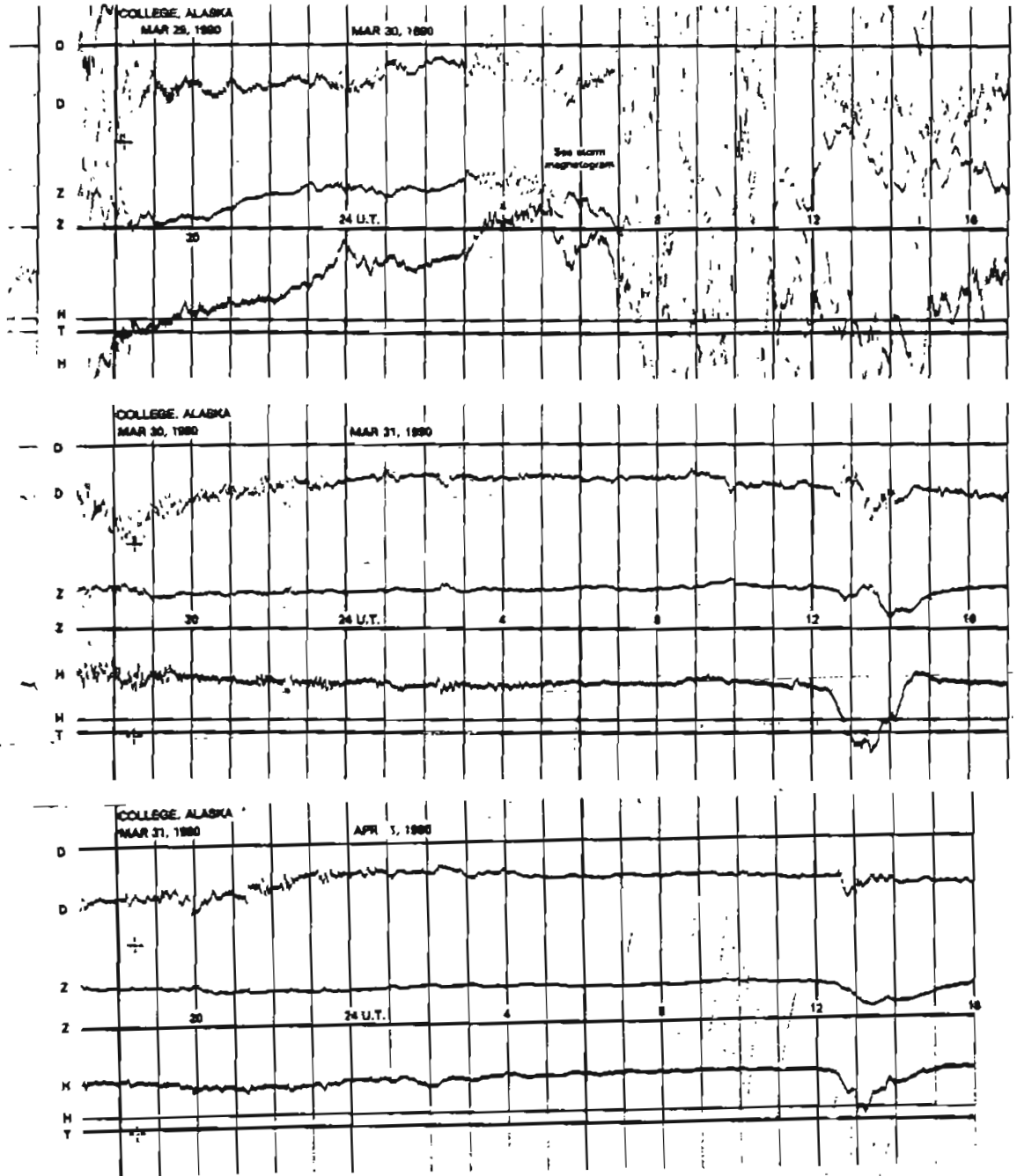
NORMAL MAGNETOGRAMS



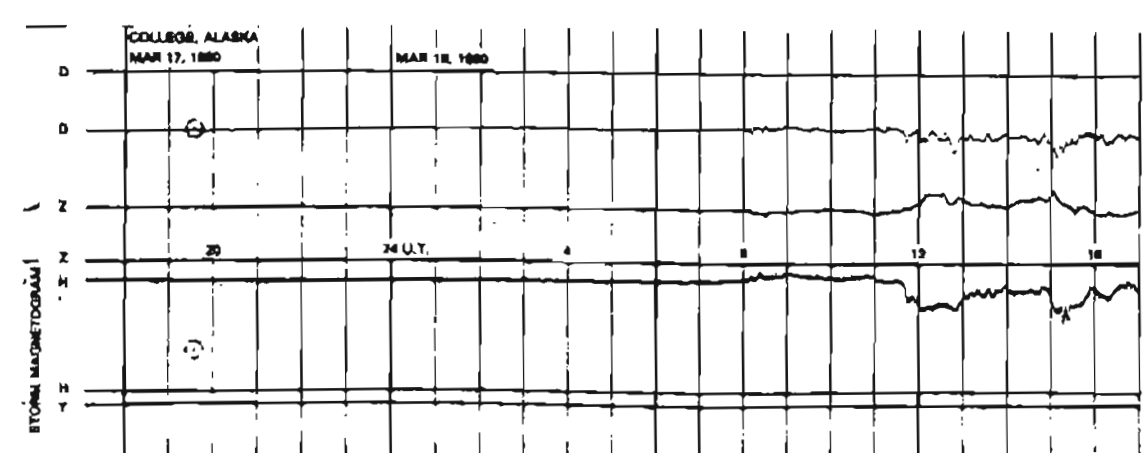
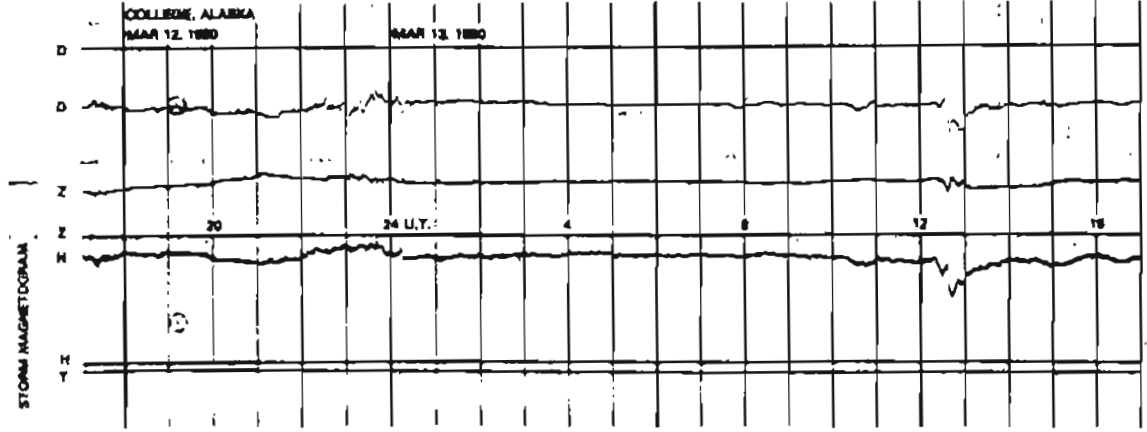
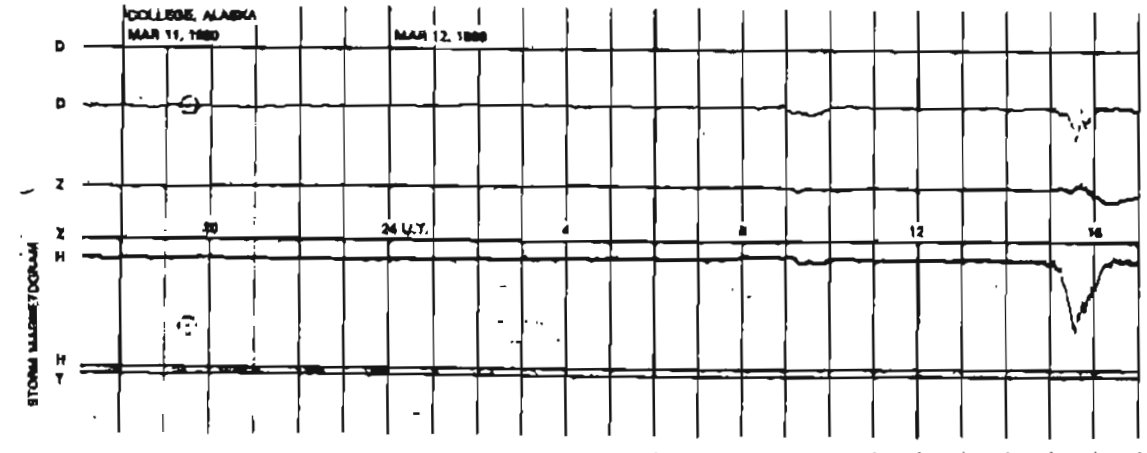
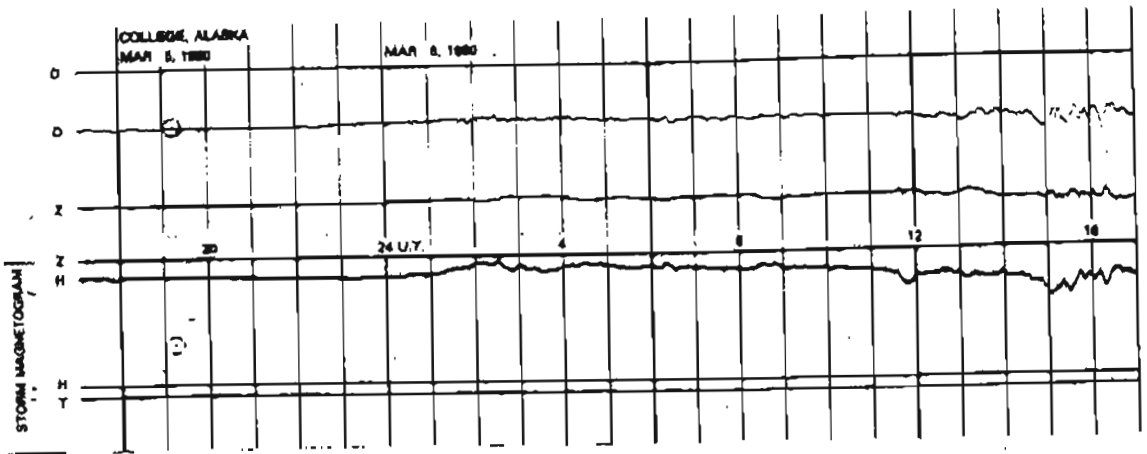
NORMAL MAGNETOGRAMS



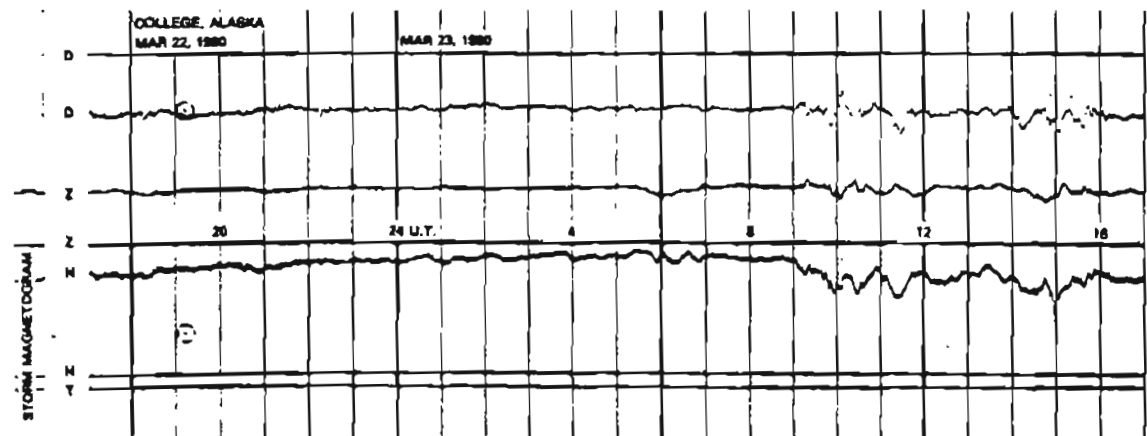
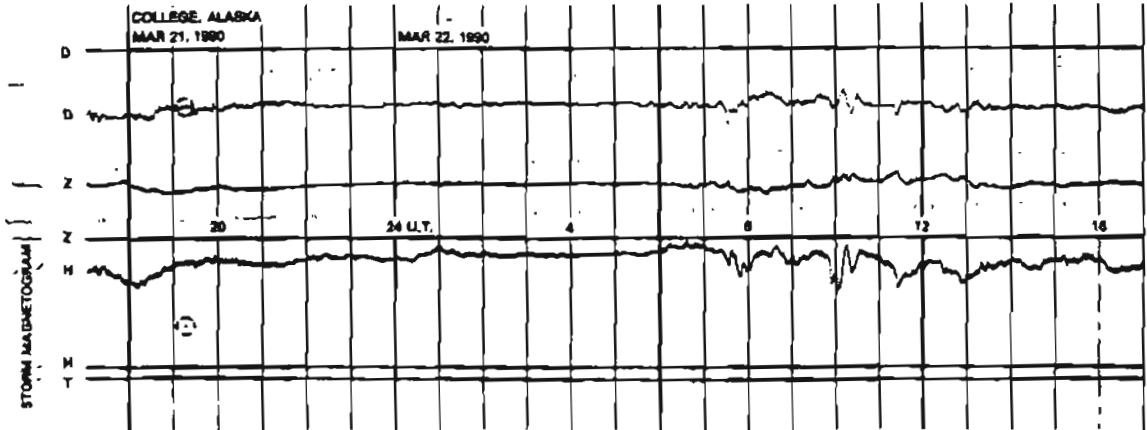
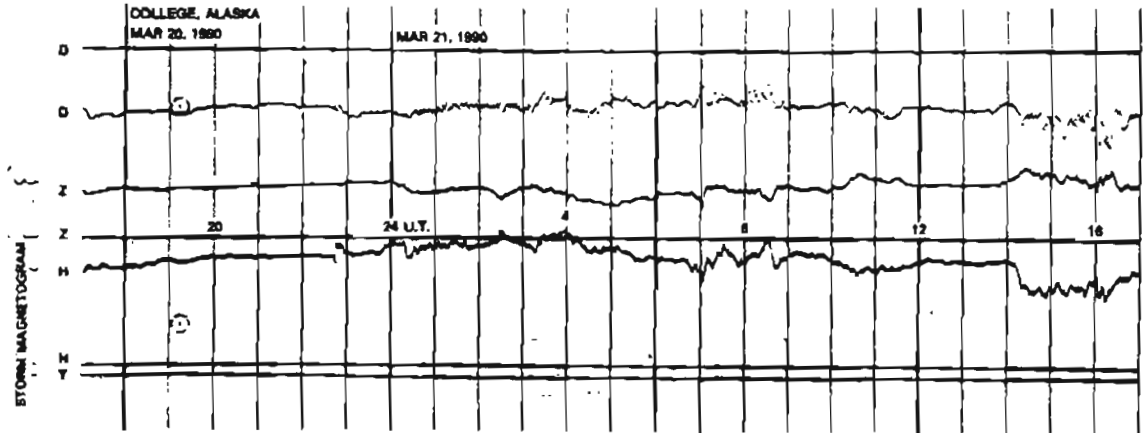
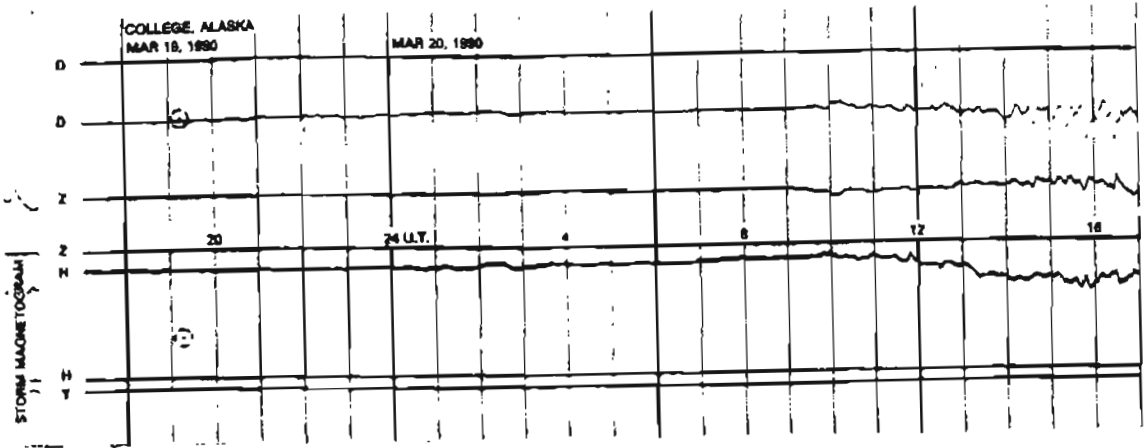
NORMAL MAGNETOGRAMS



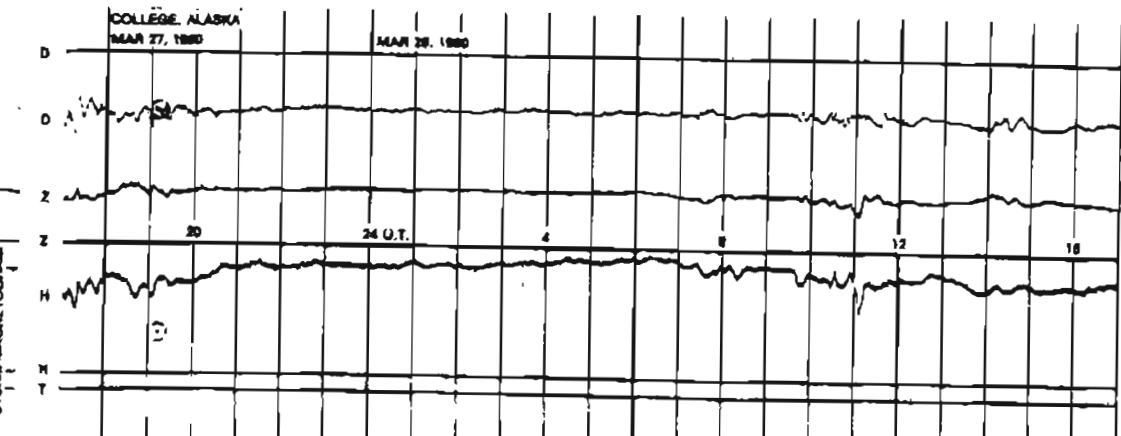
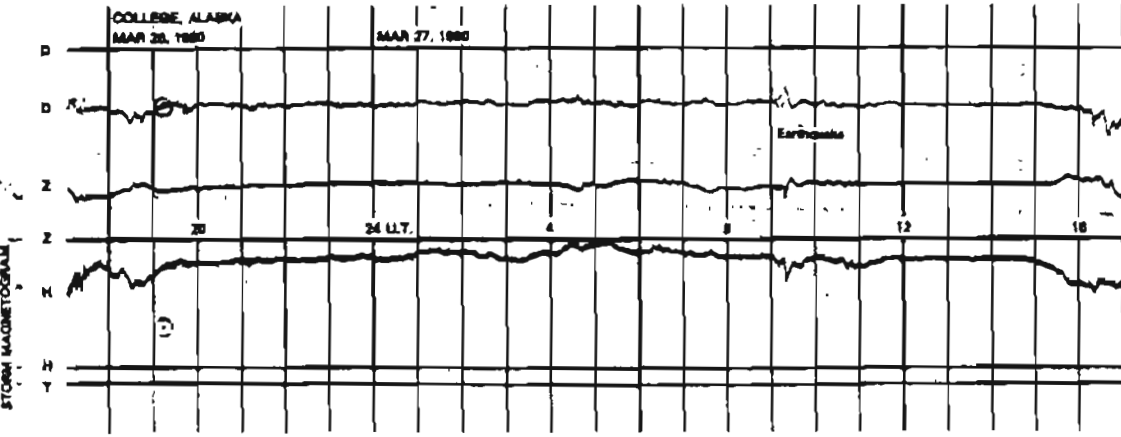
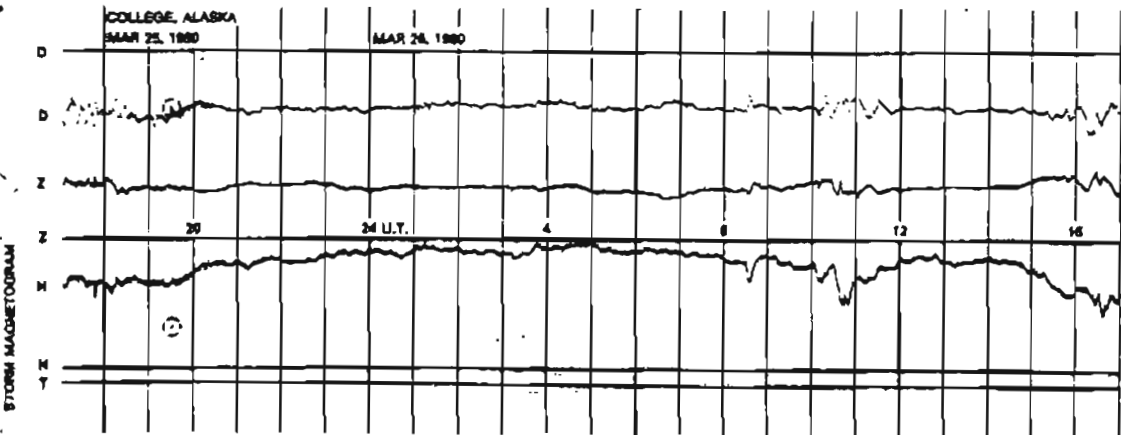
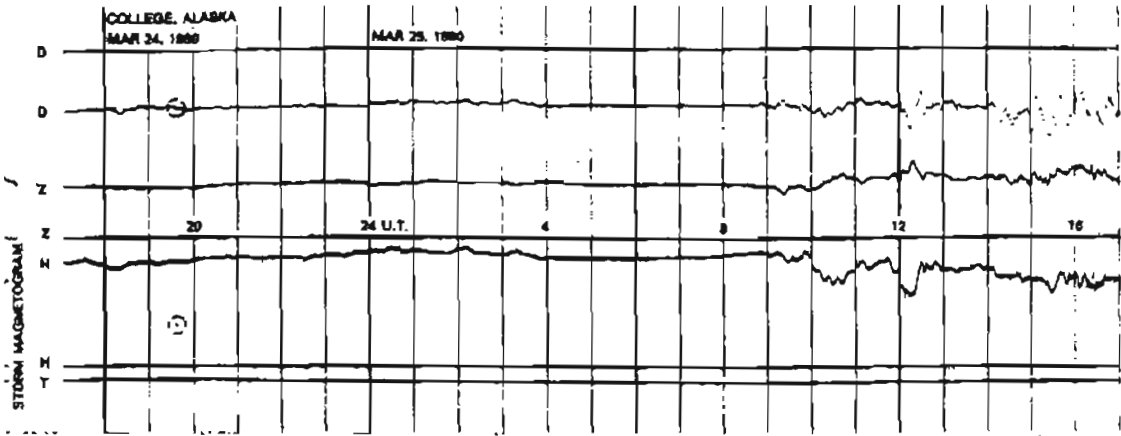
STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

