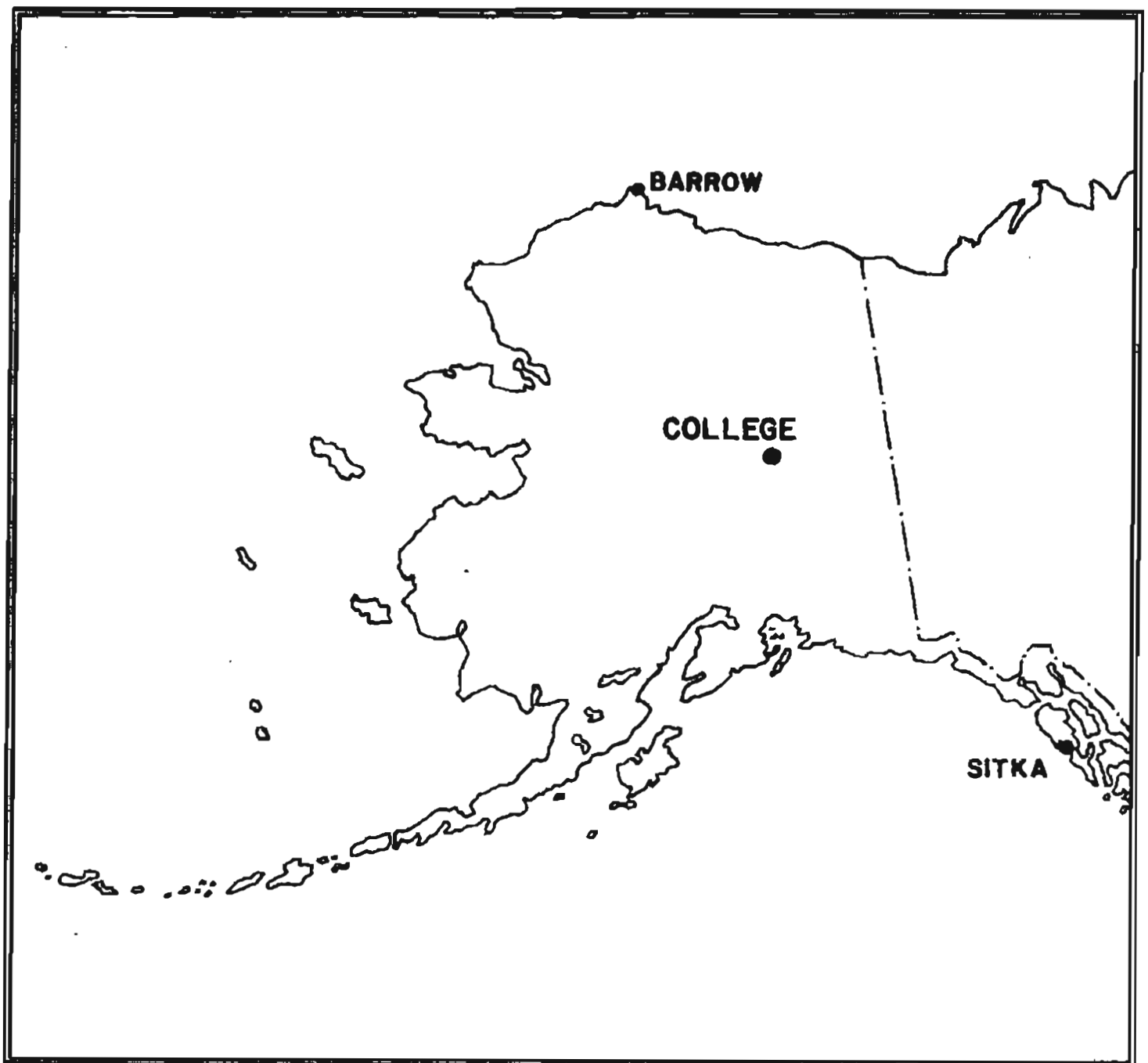


**UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY**

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

JUNE 1990

OPEN FILE REPORT 90-0300F



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<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:

<u>Gamma Range</u>	<u>K-Index</u>	<u>ak</u>
0 < 25	0	0
25 < 30	1	3
30 < 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 <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 "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.

### Absolute, 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<sub>D</sub>, B<sub>H</sub> and B<sub>Z</sub> are base-line values;  
S<sub>D</sub>, S<sub>H</sub> and S<sub>Z</sub> 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

JUNE 1990

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	2	3	3	3	4	2	2	1	20	12	SUDDEN COMMENCEMENTS d h m
2	2	2	2	3	1	1	1	1	13	6	
3	2	2	1	1	4	1	1	1	13	7	
4	1	2	3	3	2	0	1	1	13	7	
5	1	1	1	3	3	3	1	1	14	8	
6	3	4	2	3	3	3	2	2	22	14	
7	3	4	3	3	4	3	2	3	25	17	
8	3	4	4	5	4	4	2	3	29	24	
9	5	4	6	5	6	5	2	2	35	43	
10	5	4	2	4	5	3	2	3	28	24	
11	3	4	3	3	5	4	2	2	26	20	
12	4	4	4	6	6	7	6	5	42	64	
13	6	5	7	5	4	4	4	3	38	52	
14	6	6	4	6	7	7	4	2	42	73	
15	3	4	2	1	2	3	2	2	19	11	
16	2	2	1	1	2	1	1	1	11	5	
17	0	1	1	0	0	0	0	0	2	1	
18	1	1	3	4	4	3	1	2	19	13	
19	3	3	1	3	4	1	1	1	17	11	
20	1	0	1	0	0	0	0	0	2	1	
21	2	2	1	0	2	1	1	1	10	4	
22	3	3	2	1	1	1	1	1	13	7	
23	1	2	2	4	3	2	1	0	15	9	
24	1	2	3	2	2	2	2	2	16	8	
25	2	3	2	3	3	1	2	2	18	10	
26	2	2	3	4	3	3	2	1	20	12	
27	2	1	2	2	4	2	2	3	18	10	
28	3	3	3	4	3	2	1	1	20	13	
29	0	4	3	3	2	1	1	1	15	9	
30	1	1	0	0	2	1	1	1	7	3	
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

675.7

322.2

3.67

7.74

2480

2490

(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

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

Data from Individual Observatories:

JUNE 19 90

Obs. station	Geomag. lat.	Commencement		SC - amplitudes			Max. 3 hr - index K			Ranges			UT End	
		day	hr min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)		Z(Y)
CO	64.6 N	12	08XX	..				12	6	7	395	2290	970	13 10
		13	1416	SC	-32	+256	-98	14	5, 6	7	306	2260	990	14 20

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0001 UT, 6-1-90	2400 UT, 6-30-90	1.0' / mm	3.78 / mm	26° 35.0' E
H	0001 UT, 6-1-90	2400 UT, 6-21-90	7.7 γ / mm	12640 γ	
	0001 UT, 6-22-90	2400 UT, 6-26-90		12643 γ	
	0001 UT, 6-27-90	2400 UT, 6-30-90	↓	12646 γ	
Z	0001 UT, 6-1-90	2400 UT, 6-21-90	7.7 γ / mm	55204 γ	
	0001 UT, 6-22-90	2400 UT, 6-30-90	↓	55201 γ	

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0001 UT, 6-1-90	2400 UT, 6-30-90	7.9' / mm	29.48 / mm	
H	(SAME)	(SAME)	43.4 γ / mm		
Z	(SAME)	(SAME)	48.7 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° 52.8' E	12772 γ	55326 γ

\* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: JUNE 16, 17, 20, 21, 30

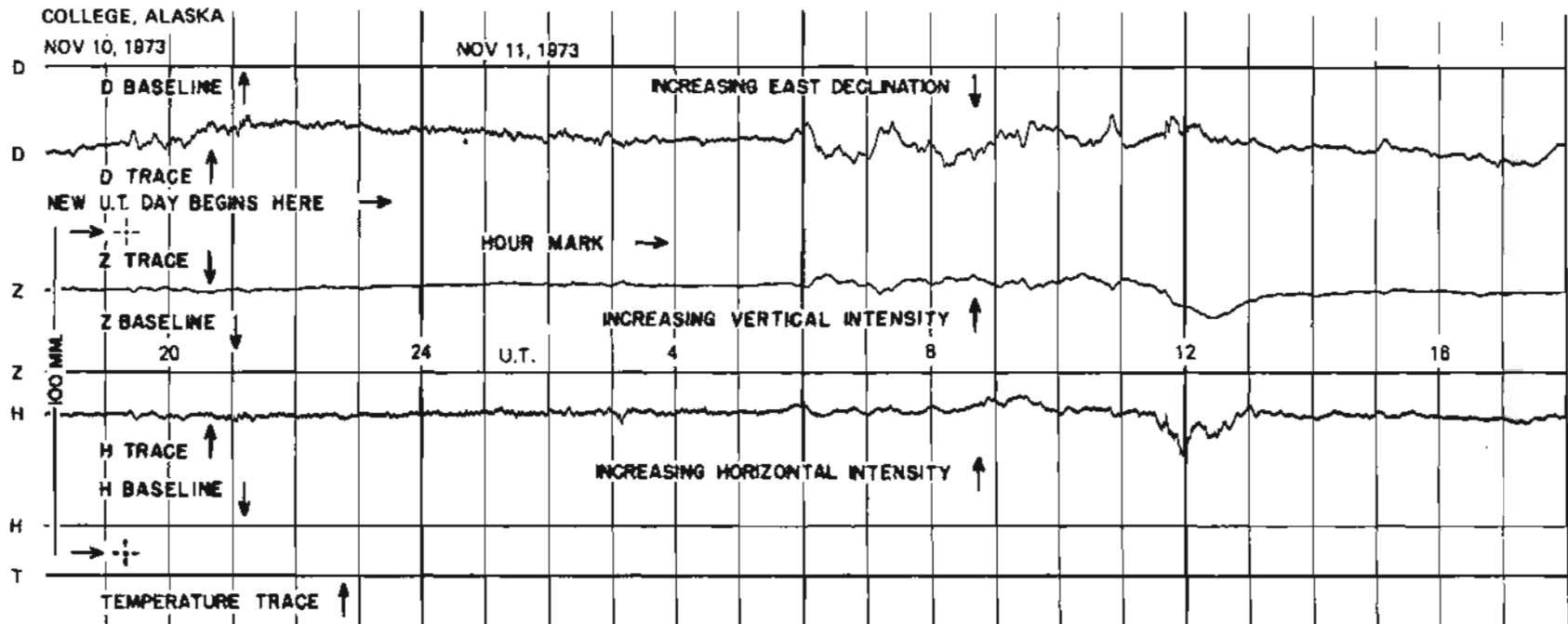
**MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS**  
(UNIVERSAL TIME)

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

COMPONENT	D					H					Z					COMPONENT	
	DAY					DAY					DAY					DAY	
	16	17	20	21	30	16	17	20	21	30	16	17	20	21	30	20	30
DAY	5	1	1	4	3	5	1	1	4	3	5	1	1	4	3	1	3
HOURLY	130	78	54	88	73	192	145	14	156	150	188	167	160	152	152	160	152
	130	31	71	33	91	207	149	175	160	179	193	172	165	152	173	165	173
	103	84	100	81	100	207	150	177	170	190	201	180	165	146	204	165	204
	105	102	117	110	115	200	156	190	181	191	211	175	166	150	206	166	206
	134	130	140	140	127	174	158	181	187	177	218	171	172	170	189	172	189
	160	140	150	150	147	130	167	181	220	176	216	170	174	176	174	174	174
	147	151	154	170	154	200	164	199	190	177	187	173	175	187	162	175	162
	147	143	179	160	154	190	150	217	190	186	182	165	190	174	158	190	158
	147	143	160	147	151	187	182	200	187	190	183	167	182	163	160	182	160
	160	141	154	139	133	200	150	193	190	199	194	173	175	156	154	175	154
	144	162	160	147	133	180	182	184	197	200	171	174	171	158	153	171	153
	151	177	169	153	132	159	174	181	190	207	169	174	171	160	156	171	156
	159	200	179	160	140	120	175	190	186	192	146	171	167	157	156	167	156
	174	214	219	180	156	147	131	180	170	157	150	171	175	148	149	175	149
	210	241	260	219	196	163	195	176	129	160	156	170	171	91	140	171	140
	234	262	279	261	244	163	190	179	190	146	159	167	163	133	137	163	137
	266	293	293	297	292	163	192	180	180	150	159	167	164	157	135	164	135
	251	310	307	317	284	150	170	170	163	177	161	167	161	155	135	161	135
	251	317	314	341	279	133	140	157	137	170	170	168	157	151	150	157	150
	245	31	295	291	261	133	127	148	134	150	157	167	155	133	147	155	147
	172	260	261	270	259	140	126	134	143	130	144	153	155	140	152	155	152
	130	210	205	241	211	141	122	135	129	127	143	152	142	154	143	142	143
	130	159	168	136	140	131	120	140	132	130	160	151	142	141	147	142	147
	50	115	123	81	115	135	130	143	171	130	163	150	146	146	157	146	157
DAILY SUM	4103	4153	4523	4371	4074	4037	3847	4152	4084	4043	4170	4019	3968	3665	3791	3665	3791
DAILY MEAN	171	173	188	182	171	168	160	173	170	168	174	167	165	153	158	165	158
MEAN	180					168					163					MEAN	

Scaled  Checked

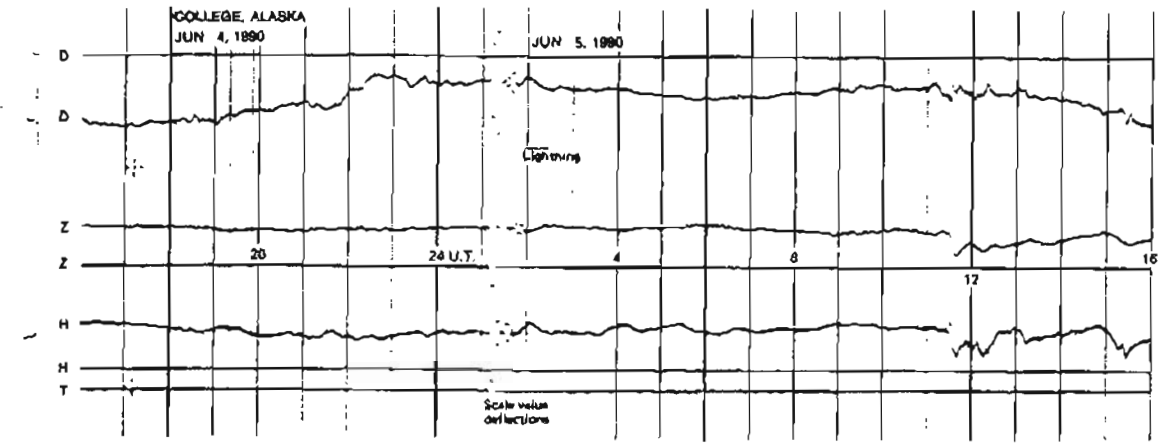
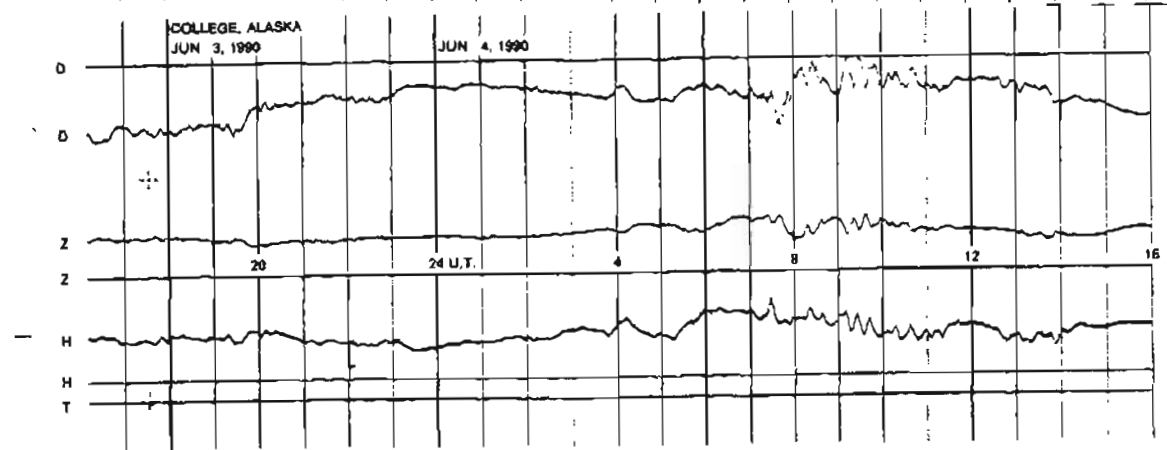
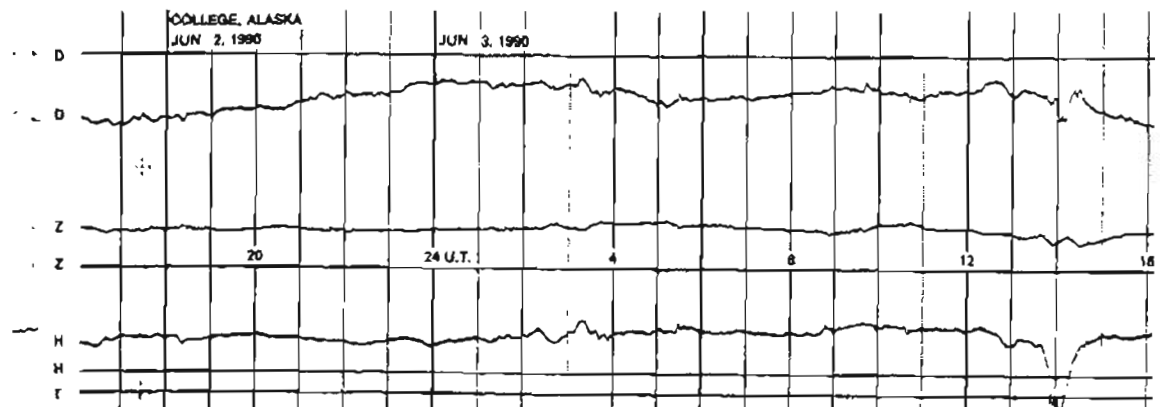
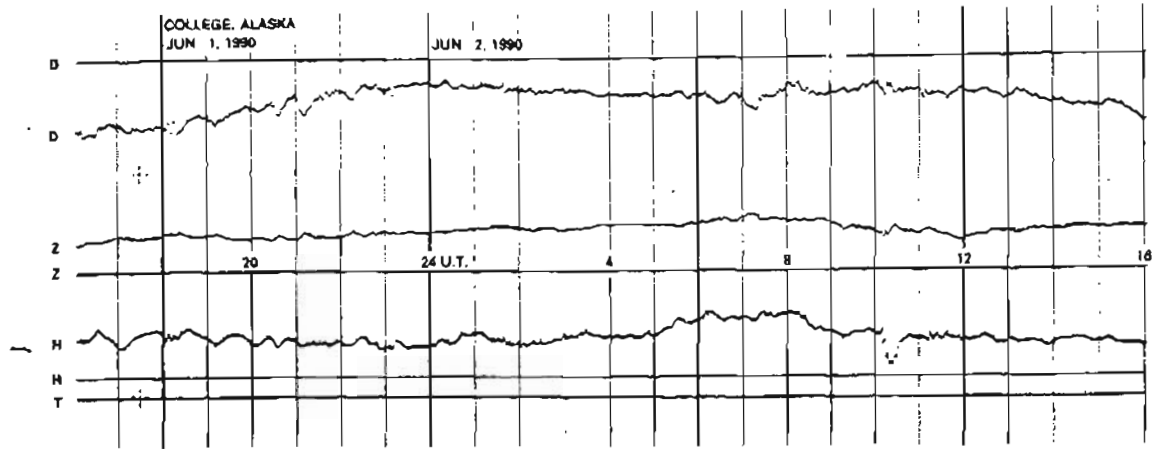
## FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



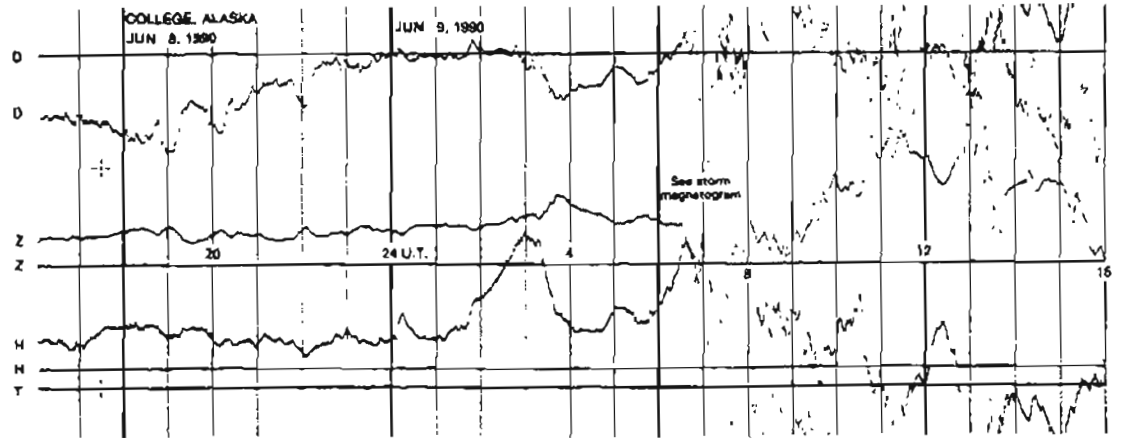
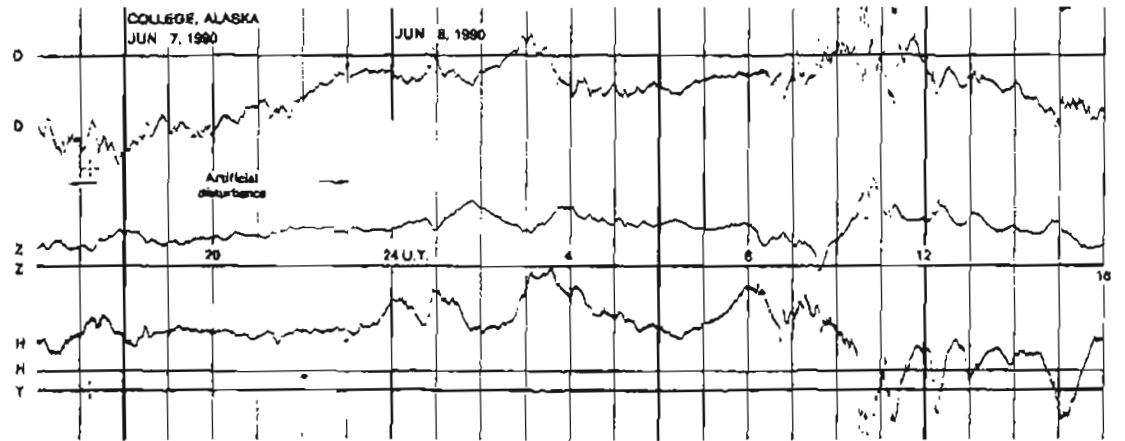
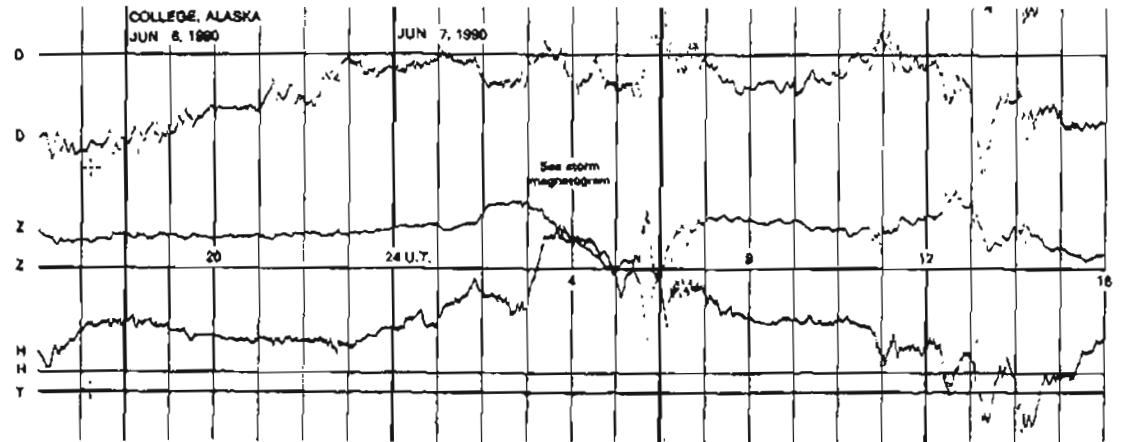
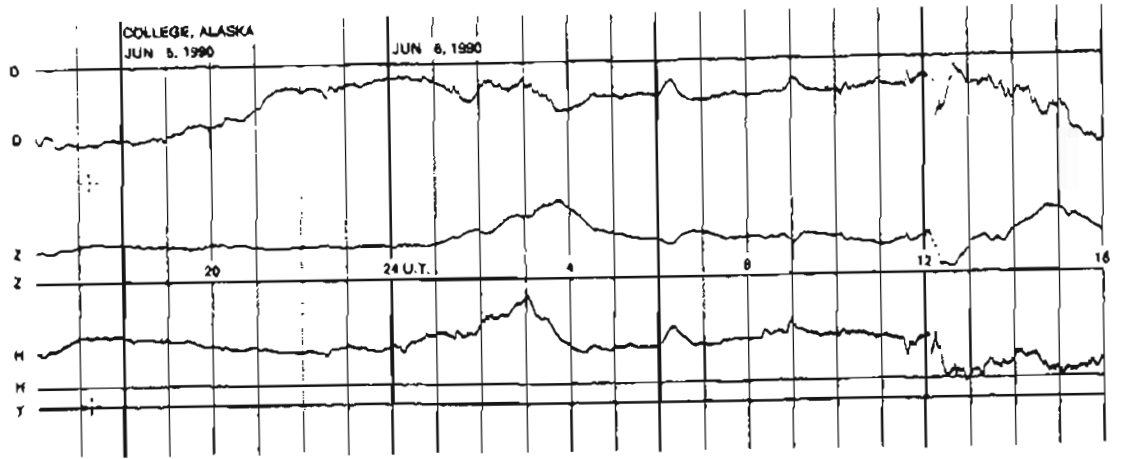
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES



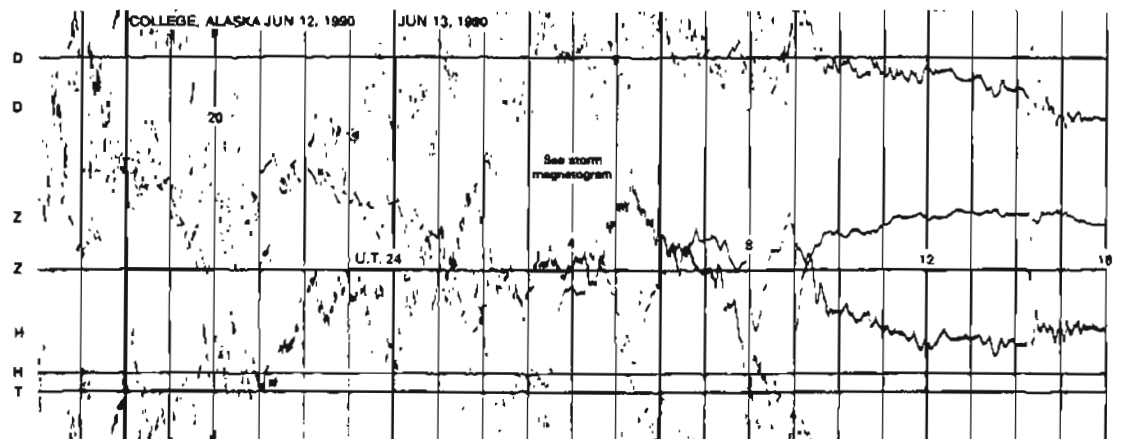
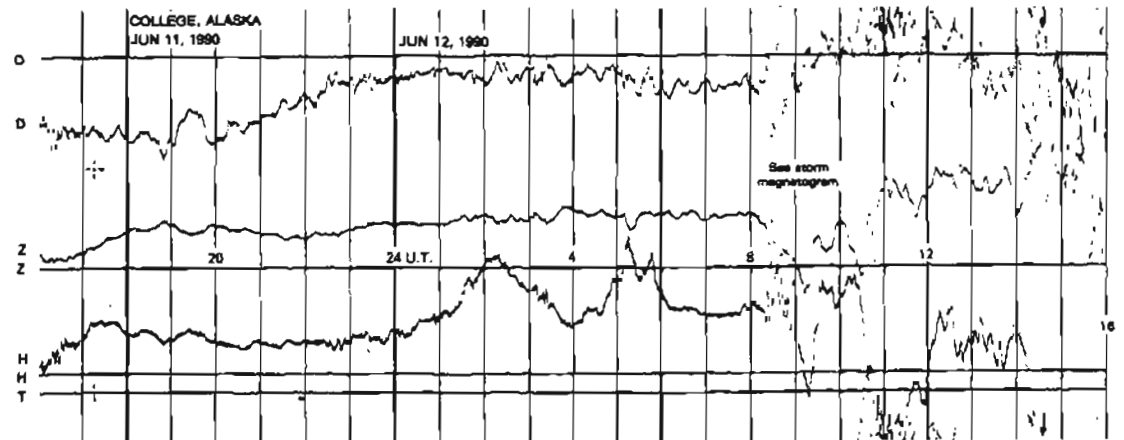
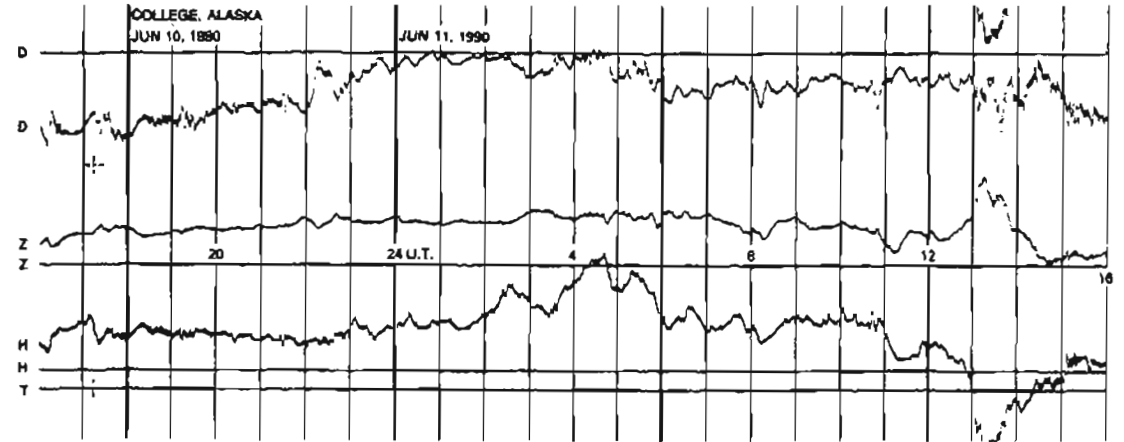
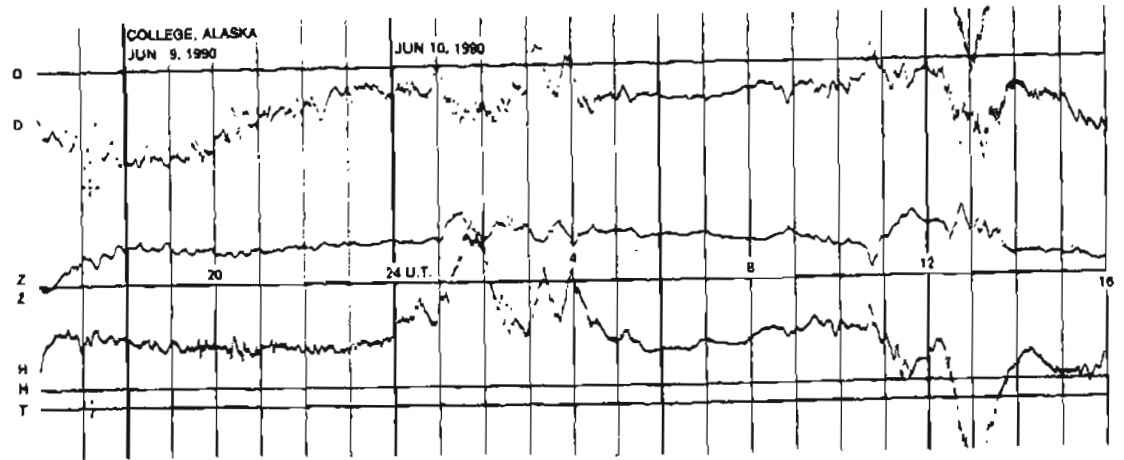
NORMAL MAGNETOGRAMS



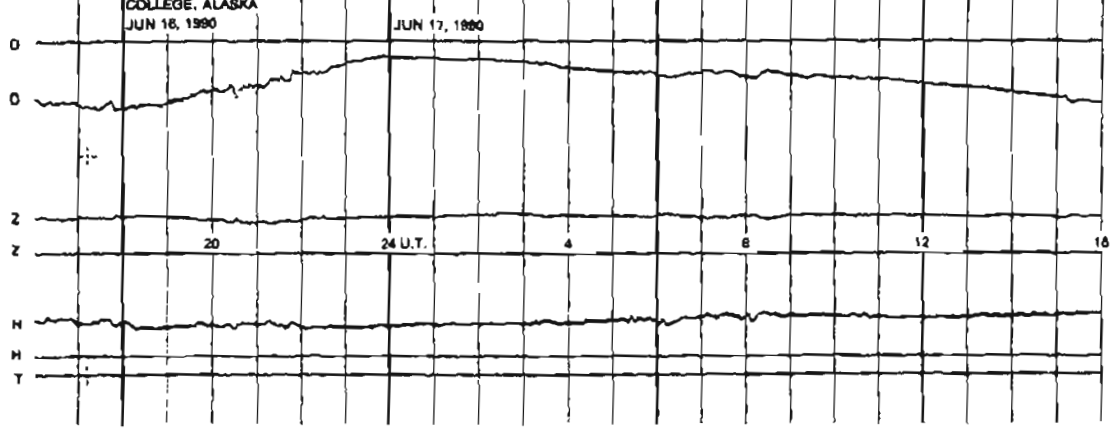
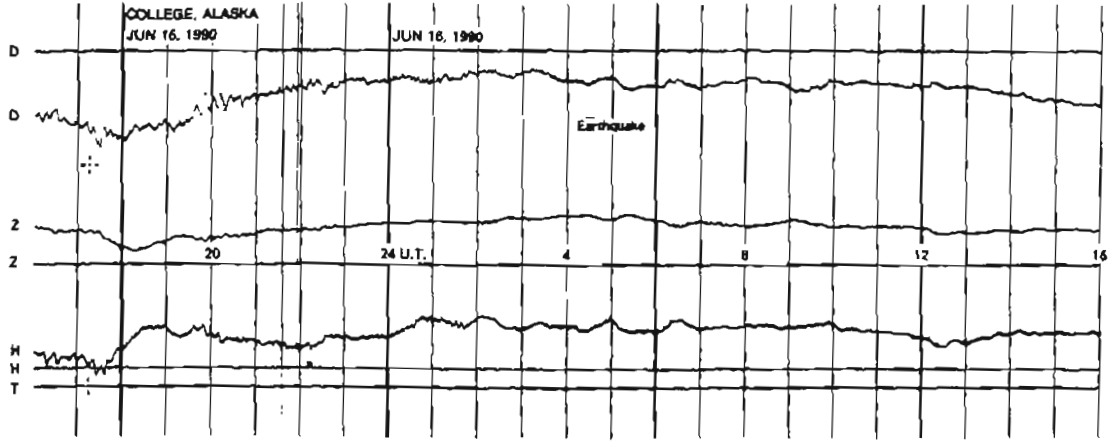
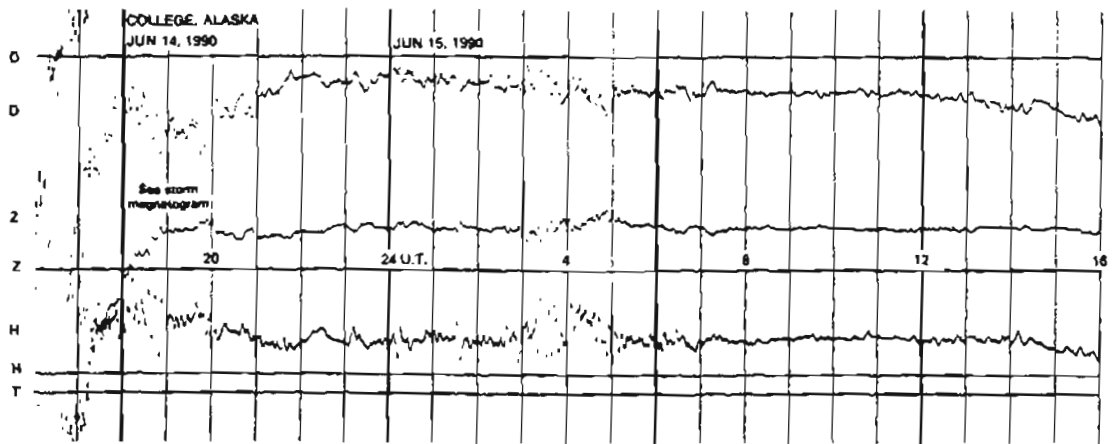
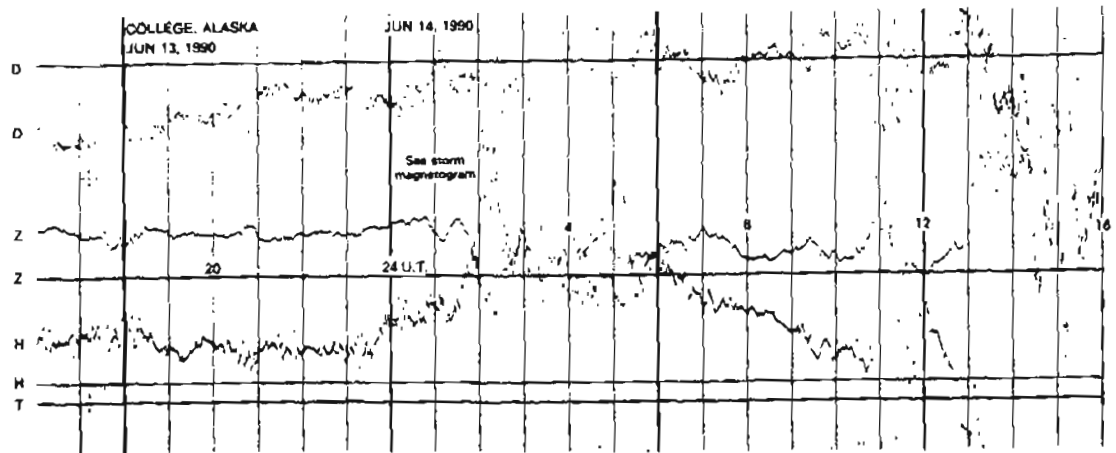
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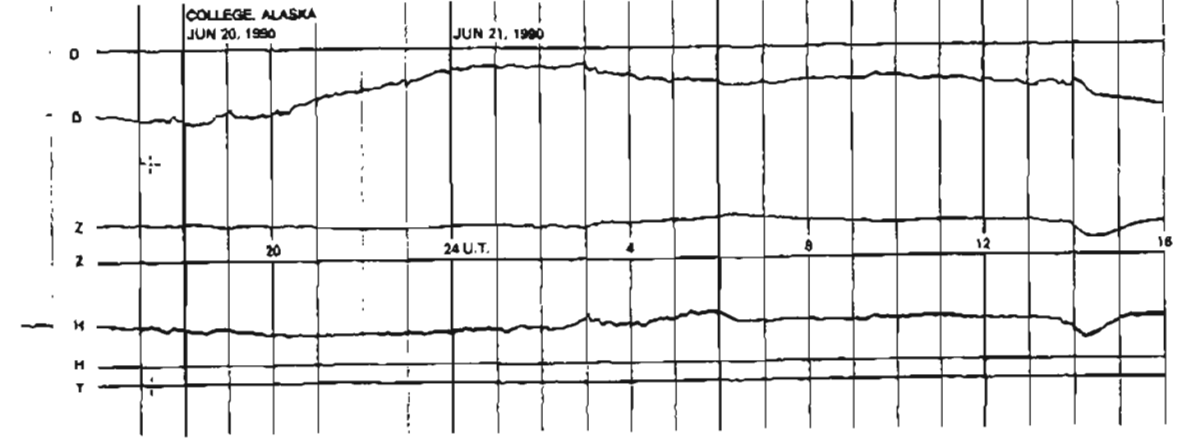
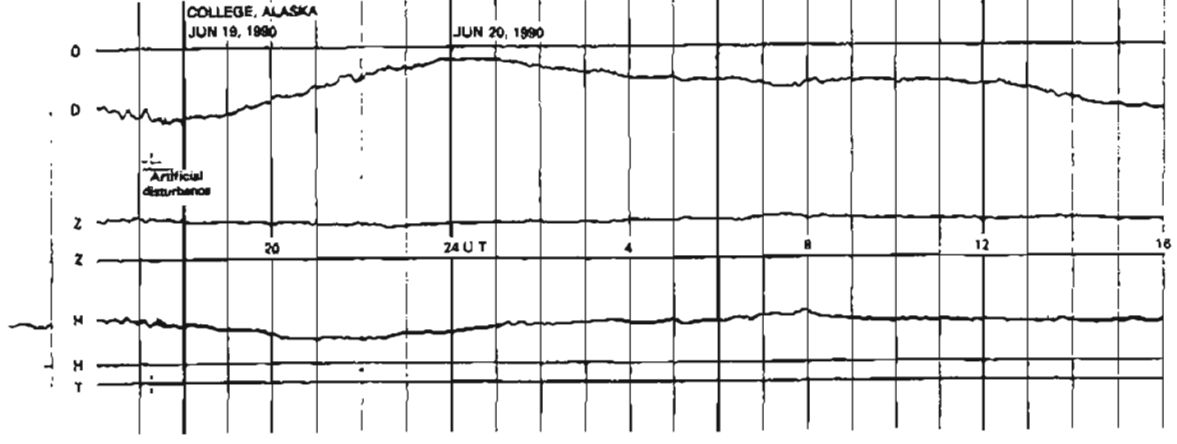
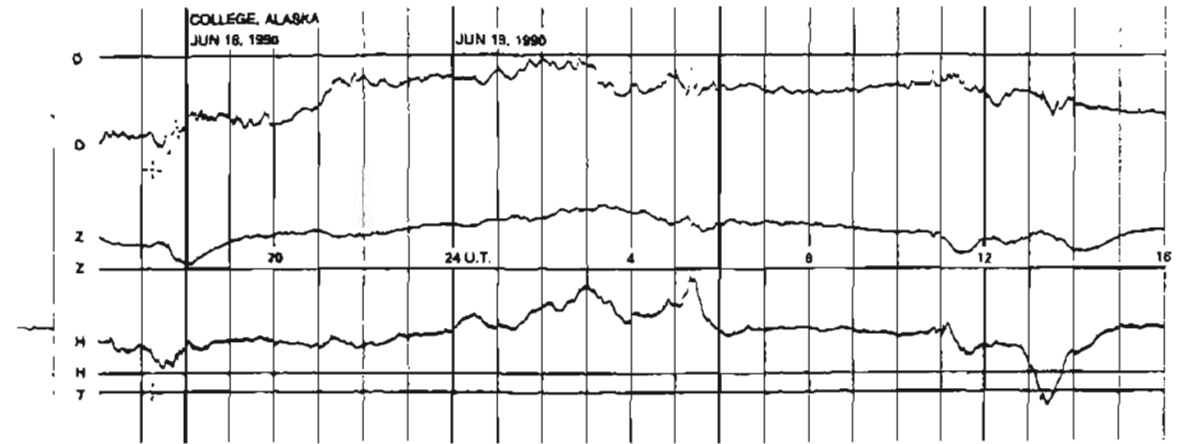
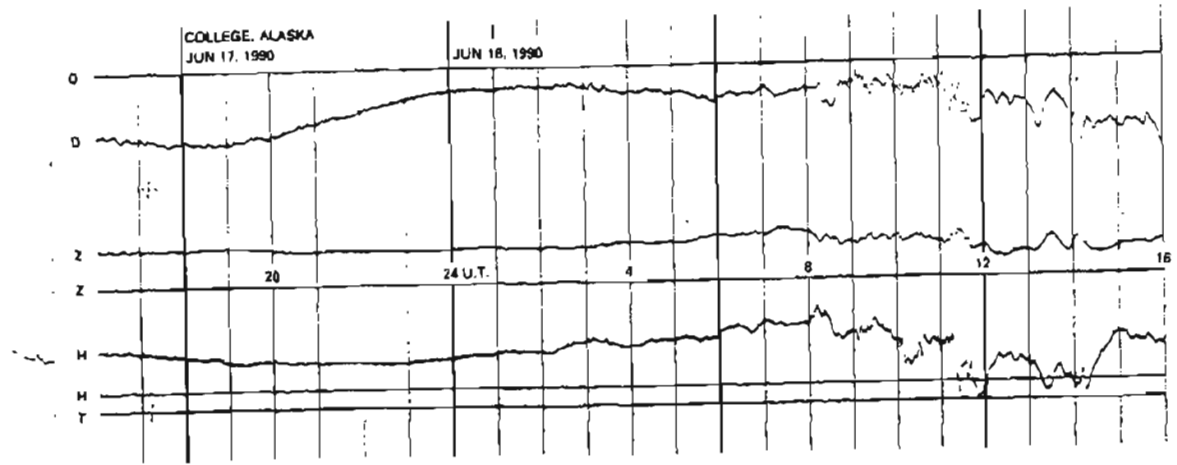
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

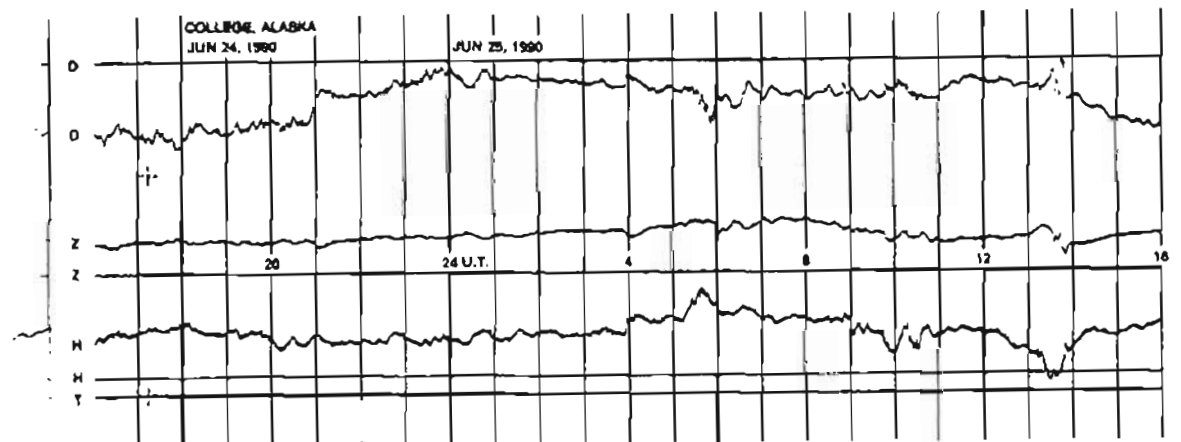
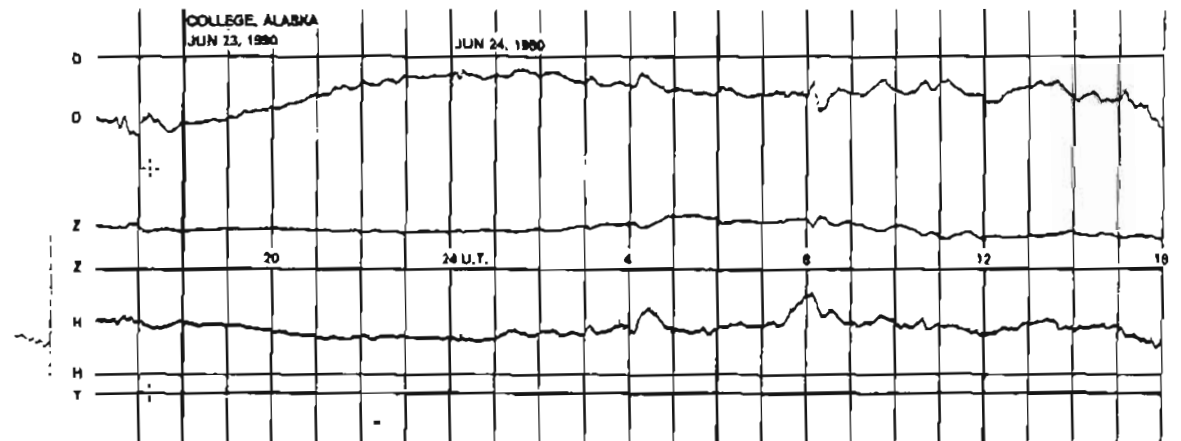
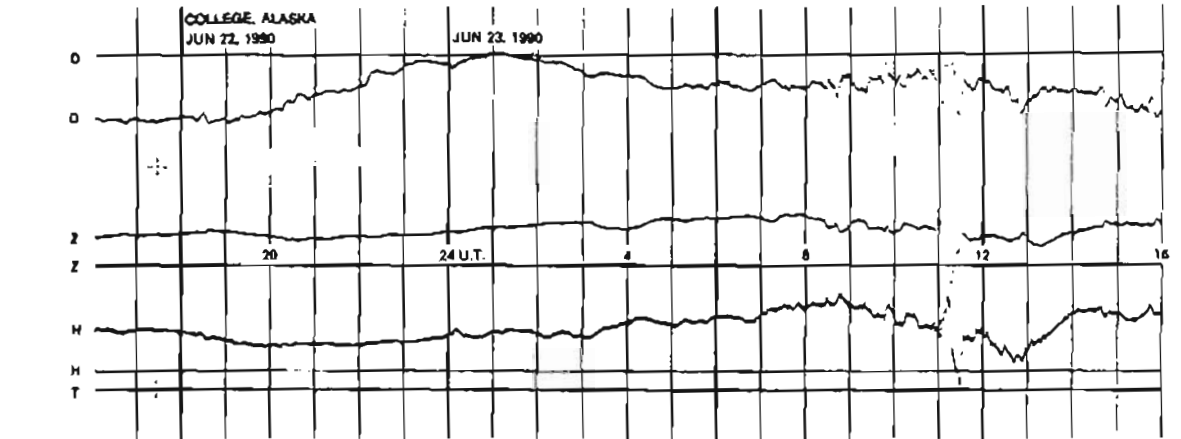
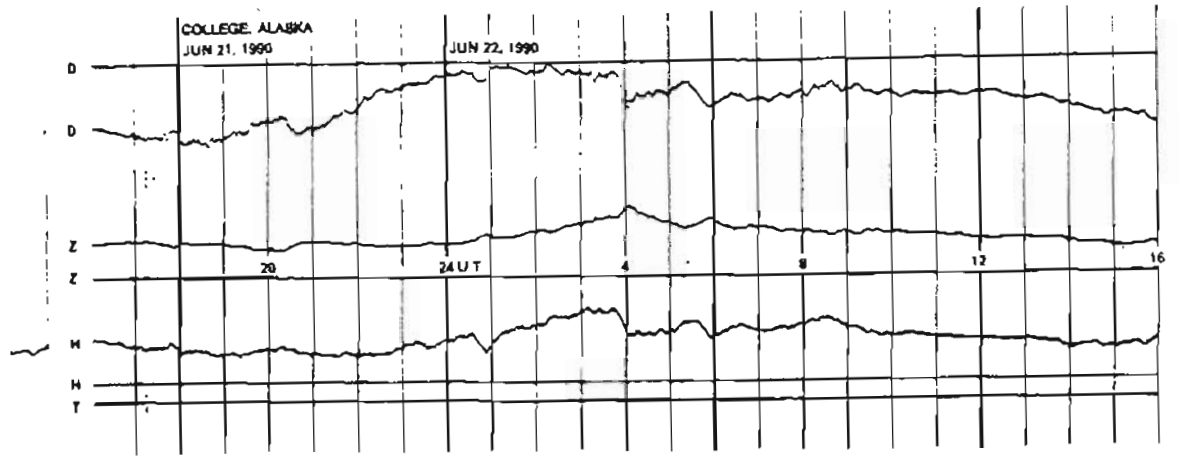


NORMAL MAGNETOGRAMS



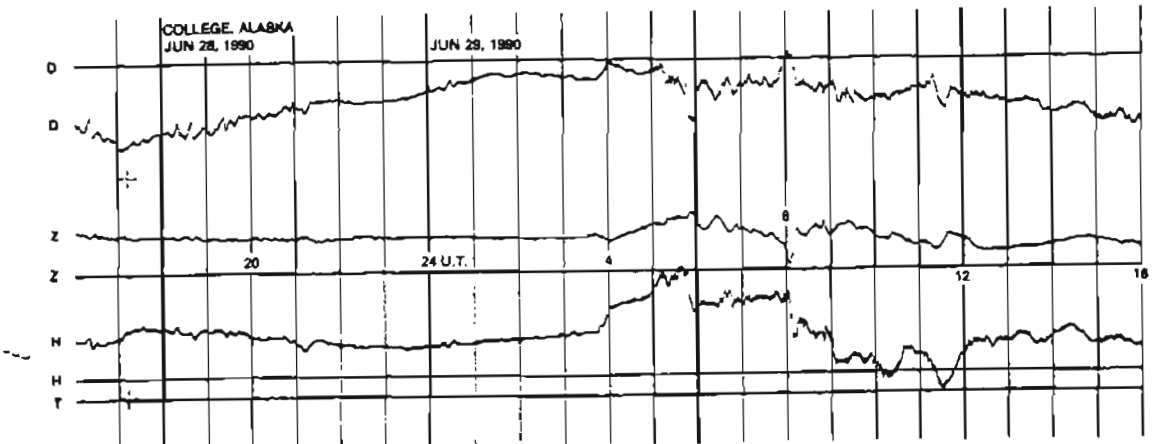
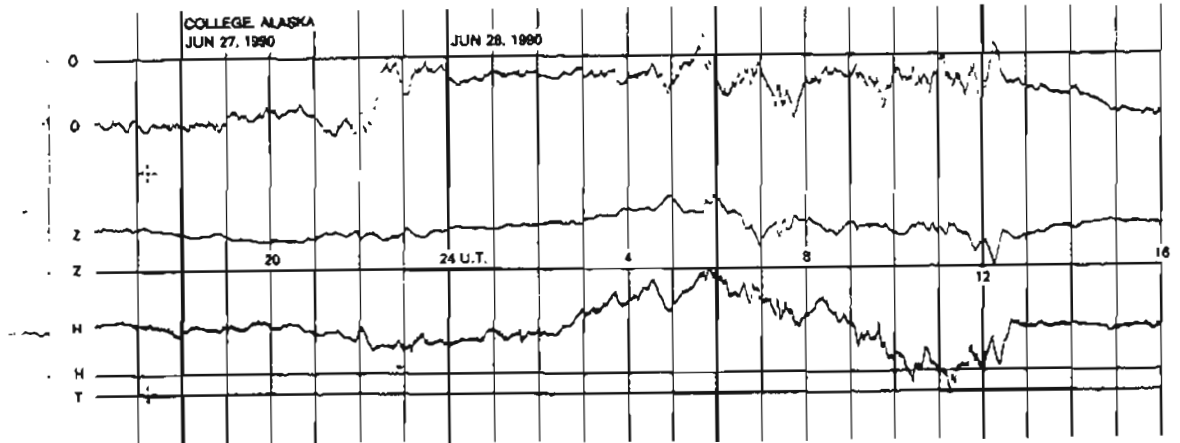
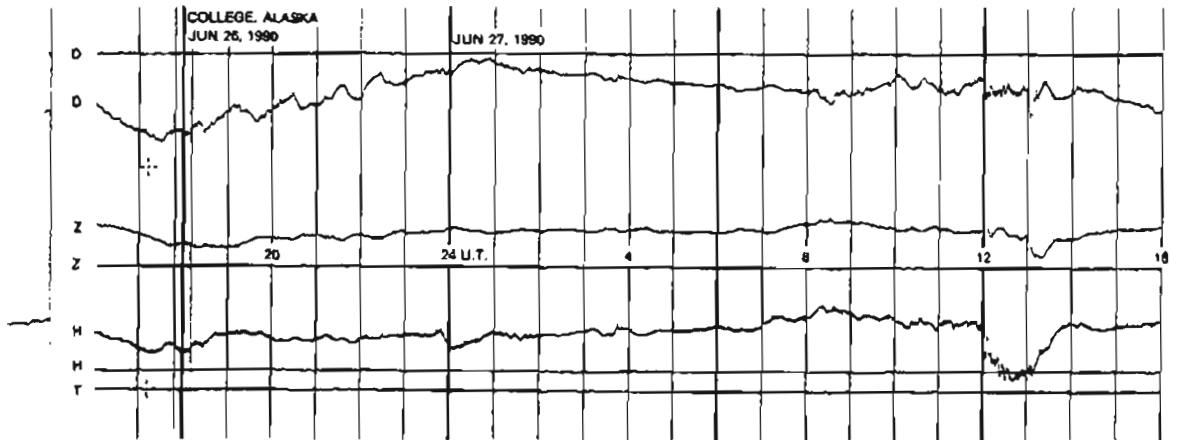
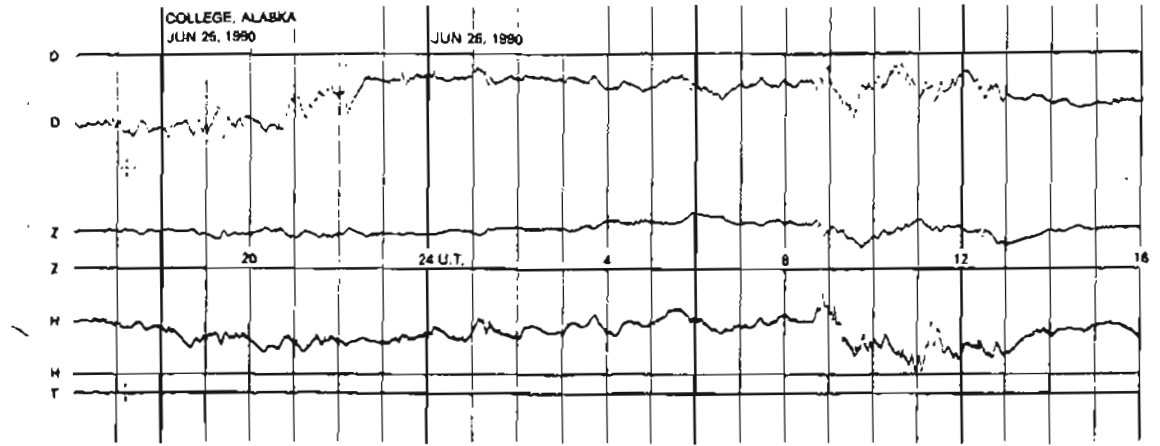
NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0

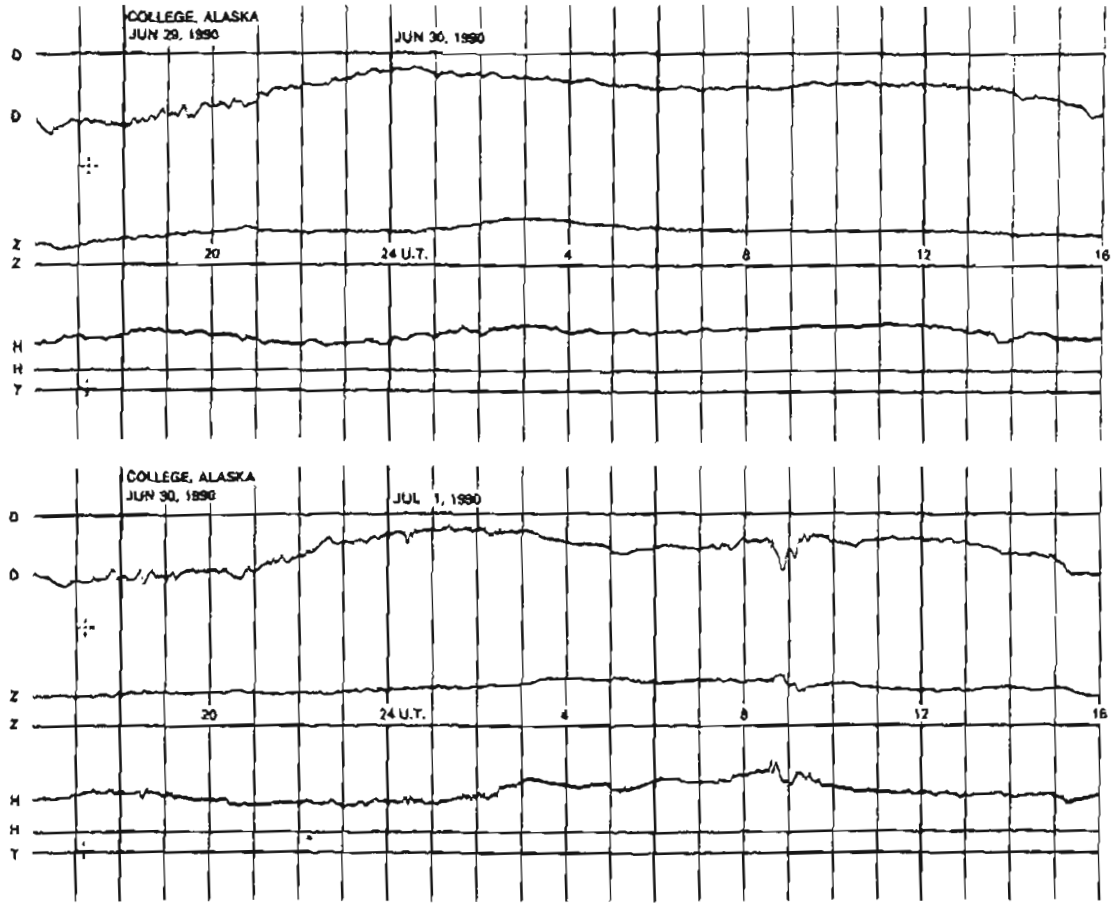


NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0



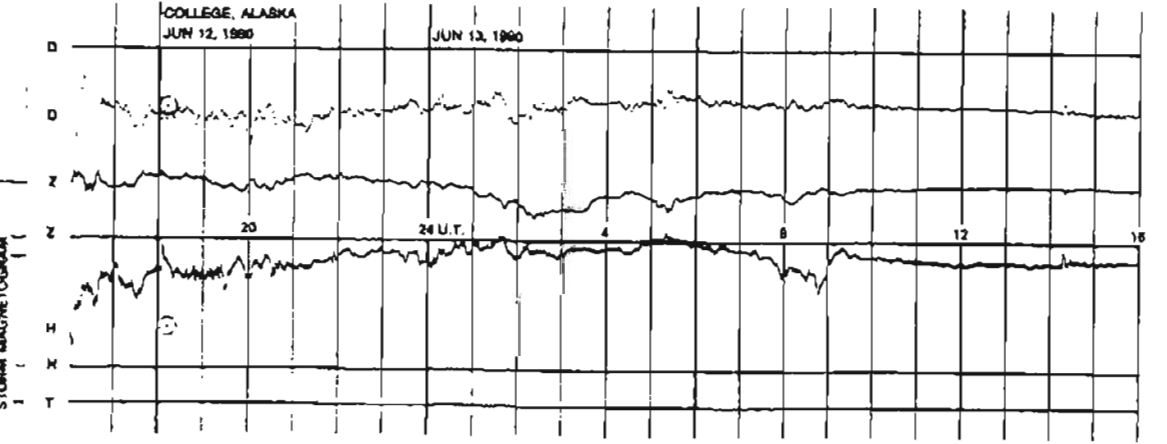
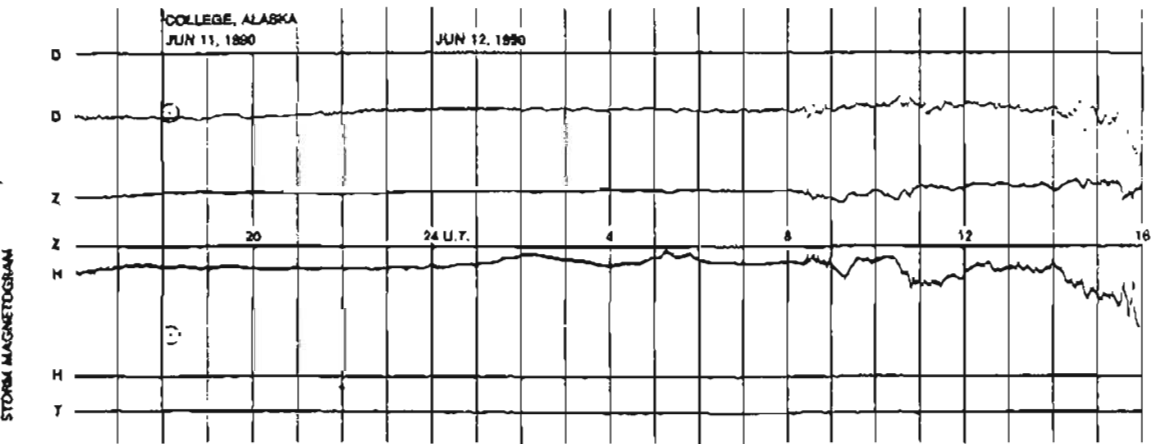
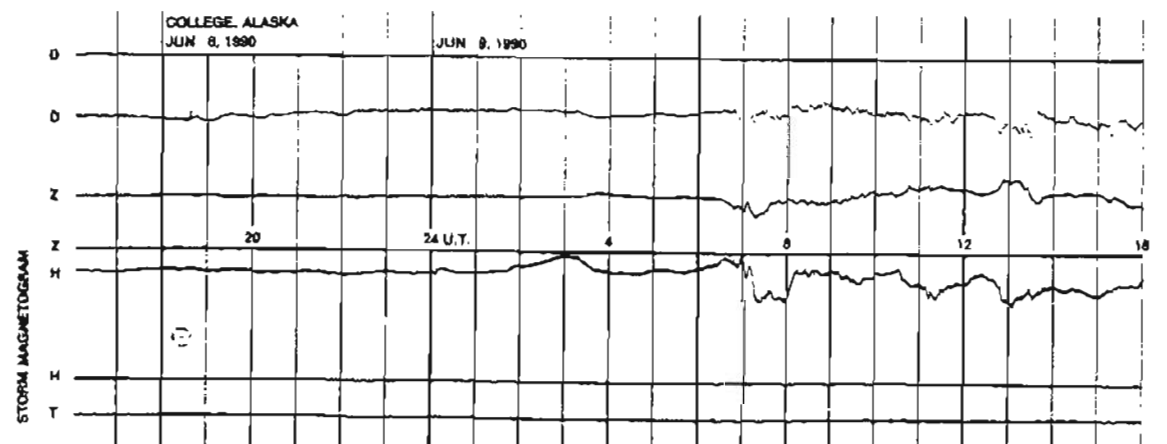
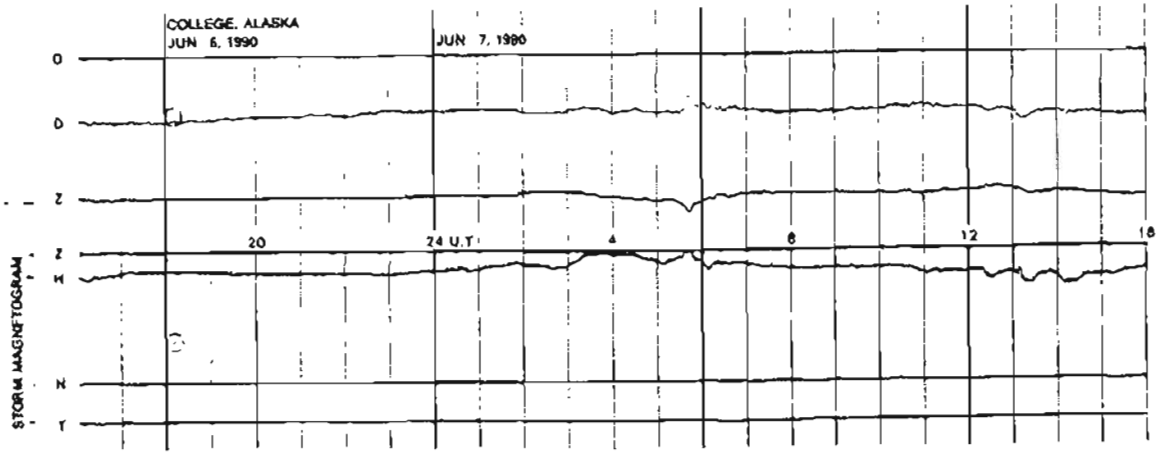
NORMAL MAGNETOGRAMS





# STORM MAGNETOGRAMS

200mm  
100mm  
D



# STORM MAGNETOGRAMS

