

**UNITED STATES DEPARTMENT OF THE INTERIOR**

**GEOLOGICAL SURVEY**

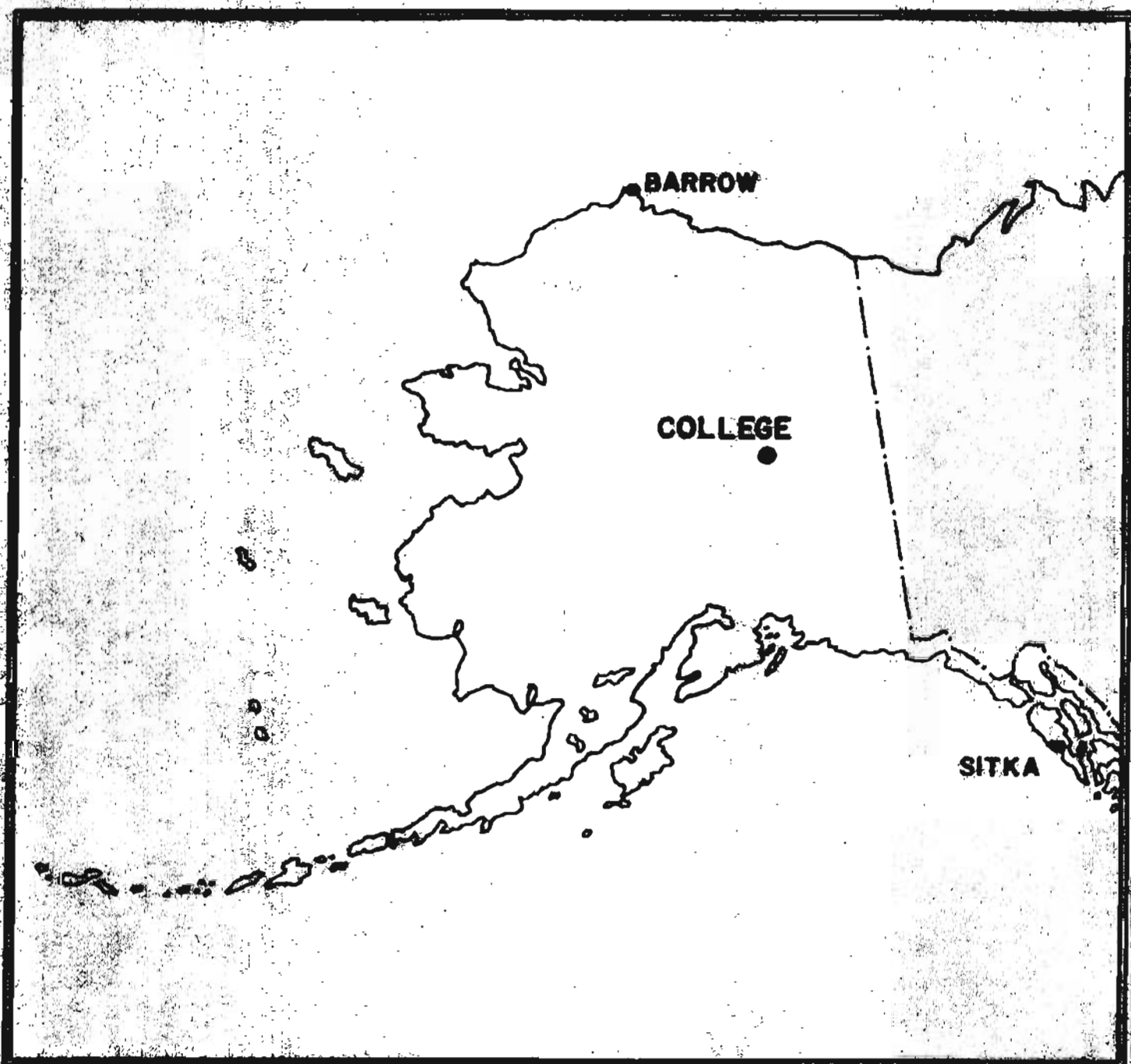
**PRELIMINARY GEOMAGNETIC DATA**

**COLLEGE OBSERVATORY**

**FAIRBANKS, ALASKA**

JULY 1990

OPEN FILE REPORT 90-03006



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 99775-5180

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° 51.8'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 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:

<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 (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:

$$D = E_D + d S_D; H = E_H + h S_H; Z = E_Z + z S_Z$$

where D, H and Z are absolute values;  
E<sub>D</sub>, E<sub>H</sub> and E<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

JULY, 1990

DATE	K-INDICES								SUM	A <sub>k</sub>	TIME SCALE ON MAGNETOGRAMS
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			
1	2	2	2	2	0	1	1	2	12	5	20 mm/hr  SUDDEN COMMENCEMENTS d h m
2	3	3	3	2	2	2	1	0	16	9	
3	2	5	2	2	1	0	1	1	14	10	
4	1	1	1	1	0	2	2	3	11	5	
5	3	4	1	5	4	4	2	1	24	20	
6	1	2	1	0	1	2	2	1	10	4	
7	1	2	2	1	2	1	1	2	12	5	
8	2	3	5	4	4	3	2	1	24	19	
9	1	2	1	1	1	1	0	0	7	3	
10	0	3	1	3	3	2	1	2	15	8	
11	2	2	2	1	4	1	2	1	15	8	
12	2	4	4	4	2	0	0	2	18	13	
13	4	5	5	3	1	3	3	2	26	22	
14	2	1	2	3	5	3	3	2	21	15	
15	4	3	2	3	3	1	2	2	20	12	
16	2	3	0	0	1	1	2	2	11	5	
17	1	3	1	1	1	1	1	2	11	5	
18	2	2	2	1	1	2	1	1	12	5	
19	2	3	3	5	5	4	2	3	27	23	
20	3	5	5	4	5	3	3	2	30	28	
21	2	1	2	3	3	3	2	1	17	9	
22	2	1	2	0	4	2	2	2	15	8	
23	1	2	0	0	0	1	1	1	6	2	
24	1	2	2	1	0	0	1	0	7	3	
25	1	2	2	1	1	0	0	0	7	3	
26	0	0	1	0	0	2	3	3	9	5	
27	2	3	4	4	1	3	2	1	20	13	
28	3	5	6	6	8	8	6	5	47	104	
29	5	7	7	7	7	5	4	3	45	87	
30	2	2	3	5	3	1	2	3	21	15	
31	3	1	3	2	0	0	1	1	11	6	

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.....

D

675.7

H

322.2

Z

(mm)

CURRENT SCALE VALUE.....

3.67

7.77

(γ/mm)

LOWER LIMIT FOR K = 9.....

2480

2500

(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-TERRRESTRIAL PHYSICS  
ENVIRONMENTAL DATA SERVICE, NOAA  
Boulder, Colorado 80502 U.S.A.

Data from Individual Observatories:

JULY 19 90

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)
C0	64.6 N	28	01 08	SC	-8	+111	-						
			03 31	SC	-32	+406	-23	28	8	624	2940	1800	29 23
		Aug 1	07 42	SC	-9	+92	-13	1	6	120	910	280	2 04

U.S. Dept. of Interior  
Geological Survey

Observatory  
College, Alaska

Month  
JULY

Year  
1990

Sept-CO - 1786

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	Z																								
	D						M						N						Z						
	DAY	9		23	24	25	6	9		23	24	25	6	9		23	24	25	6	9		23	24	25	
01	80	80	87	118	114	149	140	170	156	175	180	200	181	159	208	215	185	170	163	210	175	166	156	156	156
02	80	76	87	120	163	150	140	170	151	181	152	183	173	165	200	231	177	161	156	216	177	166	166	159	170
03	87	77	87	120	163	150	140	170	151	181	152	183	173	165	200	231	177	161	156	216	177	166	166	159	170
04	118	120	163	150	140	170	156	175	180	200	181	159	208	215	185	170	163	210	175	166	156	166	159	170	170
05	114	163	150	140	170	156	175	180	200	181	159	208	215	185	170	163	210	175	166	156	166	159	170	170	170
06	149	150	170	190	166	211	176	179	236	170	199	163	185	170	163	210	175	166	156	166	159	170	170	170	170
07	140	170	156	175	180	200	181	159	208	215	185	170	163	210	175	166	156	166	159	170	170	170	170	170	170
08	139	170	181	152	183	173	165	200	231	177	161	156	166	156	166	156	166	156	166	156	166	156	166	156	166
09	143	170	181	152	183	173	165	200	231	177	161	156	166	156	166	156	166	156	166	156	166	156	166	156	166
10	140	162	155	120	141	180	177	180	190	206	165	150	146	157	171	162	157	171	162	157	171	162	157	171	162
11	131	157	153	136	124	188	182	189	172	180	159	146	149	153	165	157	149	153	165	157	149	153	165	157	149
12	135	156	140	143	140	189	188	196	170	170	165	149	149	153	165	157	149	153	165	157	149	153	165	157	149
13	167	181	134	153	167	171	192	192	172	175	163	153	153	163	168	152	152	168	152	152	168	152	152	168	152
14	189	190	137	169	192	170	183	188	178	189	156	151	151	156	170	152	152	170	152	152	170	152	152	170	152
15	203	227	163	201	220	170	184	173	184	200	153	147	147	156	172	156	156	172	156	156	172	156	156	172	156
16	253	246	208	221	261	150	180	170	190	204	135	146	146	170	173	170	173	161	161	161	173	161	161	173	161
17	295	295	259	279	293	110	160	127	190	206	120	152	152	140	170	140	170	167	167	167	170	167	167	170	167
18	345	294	310	298	309	108	150	139	184	196	88	150	150	133	170	133	170	162	162	162	170	162	162	170	162
19	332	307	313	290	304	153	131	148	143	180	111	137	137	129	169	129	169	155	155	155	169	155	155	169	155
20	270	286	270	267	284	180	120	150	126	158	111	122	122	125	153	125	153	155	155	155	153	155	155	155	155
21	270	234	205	231	240	154	107	124	116	131	138	113	113	138	143	137	138	143	143	143	138	143	143	143	143
22	170	179	127	202	190	118	116	127	99	130	137	113	113	133	139	133	139	130	130	130	139	130	130	139	130
23	131	141	81	156	150	105	121	126	100	129	141	119	119	140	140	137	140	140	140	140	140	140	140	140	140
24	93	122	81	119	121	114	133	140	108	150	156	130	130	149	149	160	149	149	149	149	149	149	149	149	149
DAILY SUM	4246	4353	4038	4195	4308	3922	4140	3735	4070	4284	3705	3745	3745	4061	4061	3788	4061	3714	3714	3714	4061	3714	3714	4061	3714
DAILY MEAN	177	181	168	175	180	163	172	164	170	178	154	156	156	167	167	158	167	163	163	163	167	163	163	163	163
MEAN	176						170						160						160						

Scaled 7500 Checked CD

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 7-1-90	2400 UT, 7-31-90	1.0' / mm	3.78 / mm	26° 34.9' E
H	0001 UT, 7-1-90	2400 UT, 7-31-90	7.88 / mm		126468
Z	0001 UT, 7-1-90	1200 UT, 7-8-90	7.78 / mm		552018
	1201 UT, 7-8-90	2400 UT, 7-31-90	↓		552078

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 7-1-90	2400 UT, 7-31-90	7.9' / mm	29.48 / mm	
H	(SAME)	(SAME)	43.48 / mm		
Z	(SAME)	(SAME)	48.68 / 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:

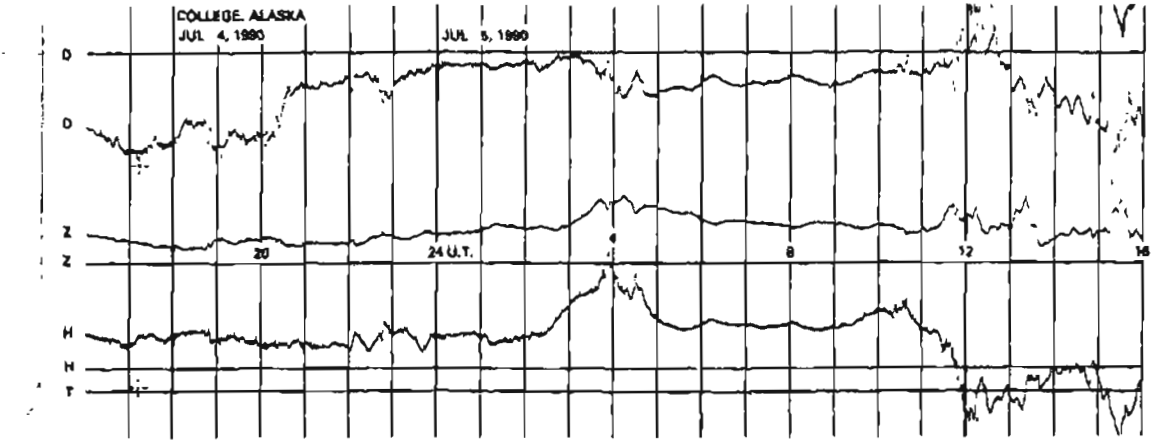
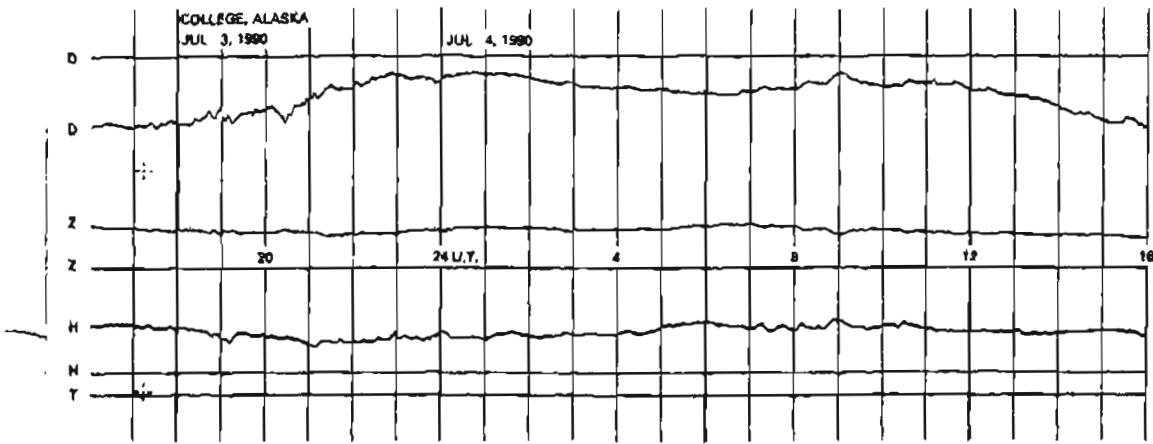
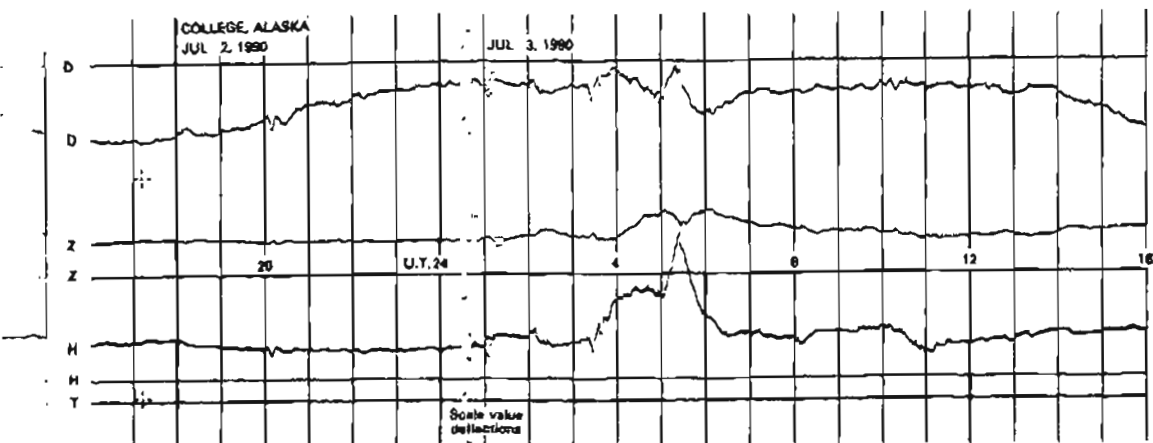
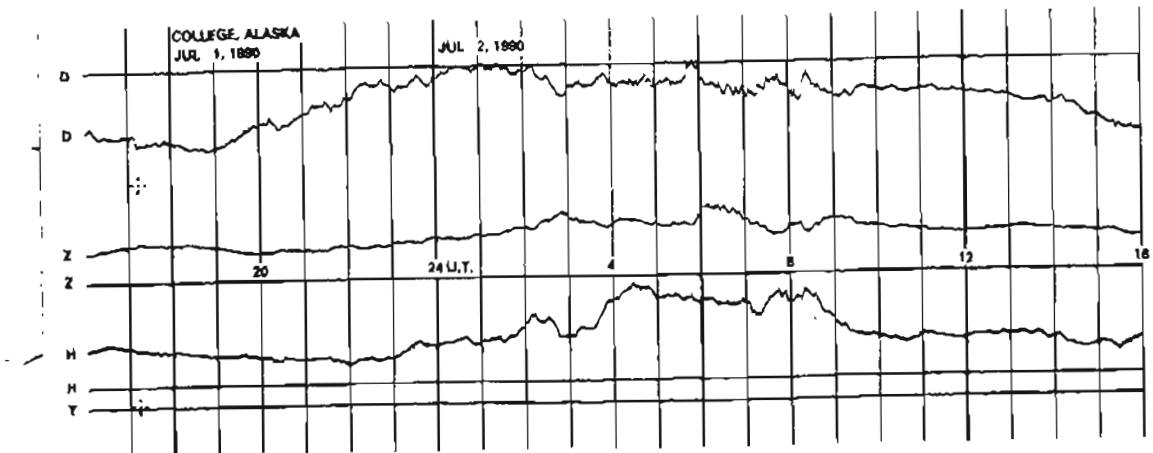
- Declination (D): No Change
- Horizontal Intensity (H): -5γ; i.e., H absolute and baseline values are 5γ less than previously reported.
- Vertical Intensity (Z): +33γ; i.e., Z absolute and baseline values are 33γ higher than previously reported.

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
26° 52.3' E	127788	553298

\* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

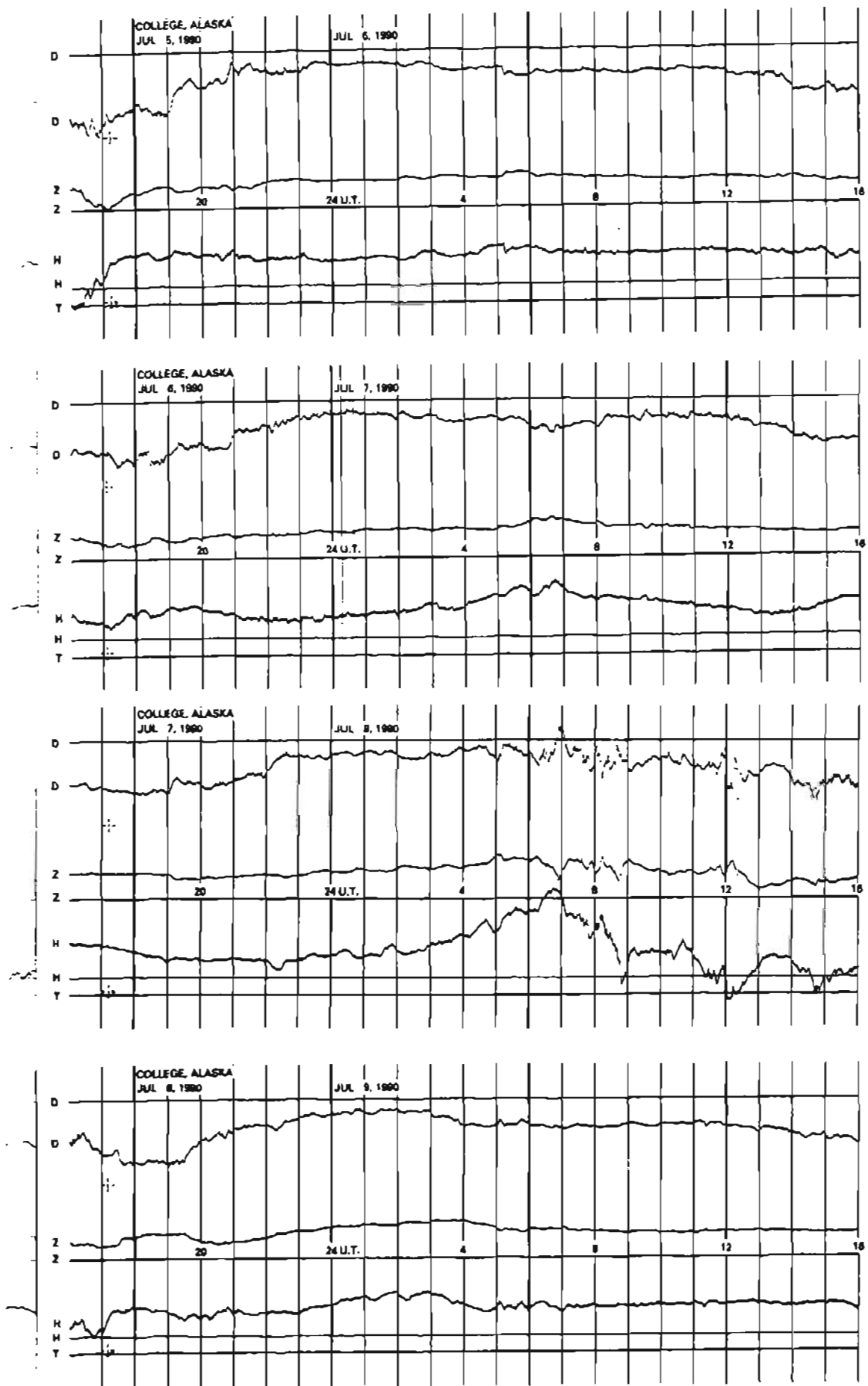
DAYS USED: JULY 6, 9, 23, 24, 25

NORMAL MAGNETOGRAMS

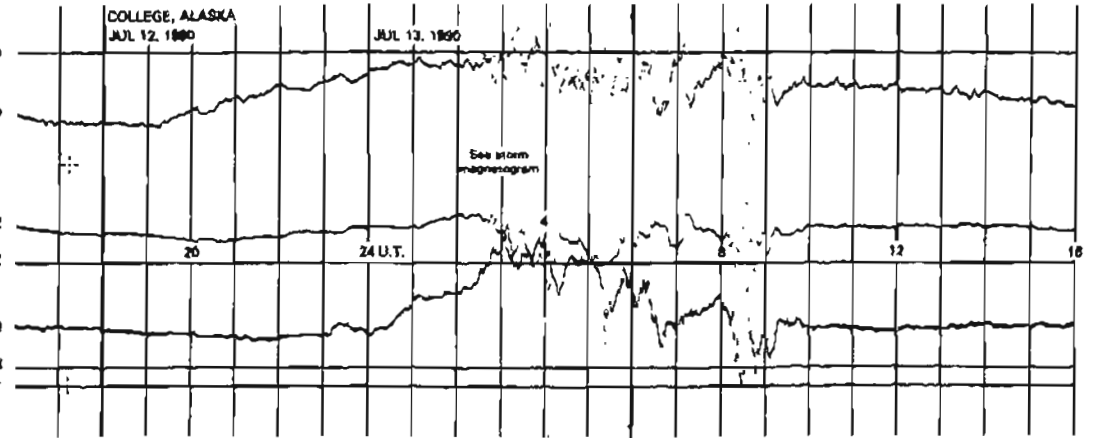
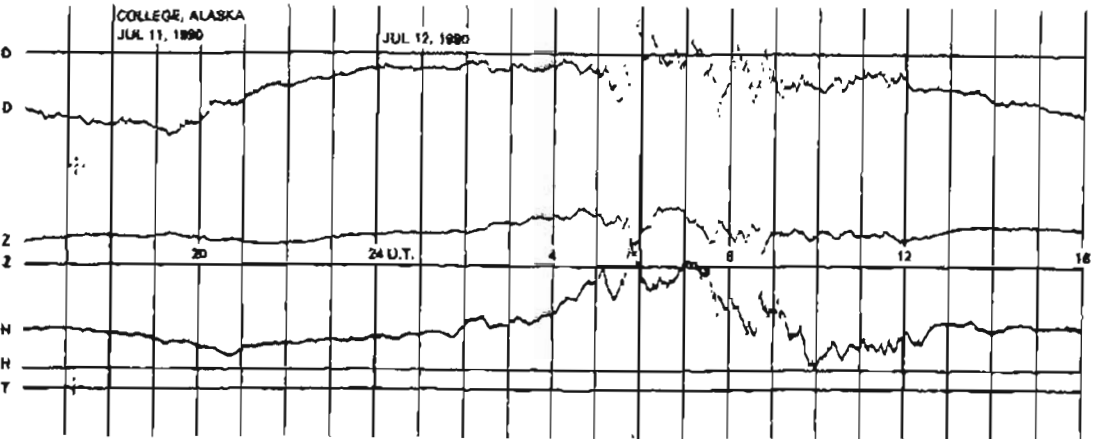
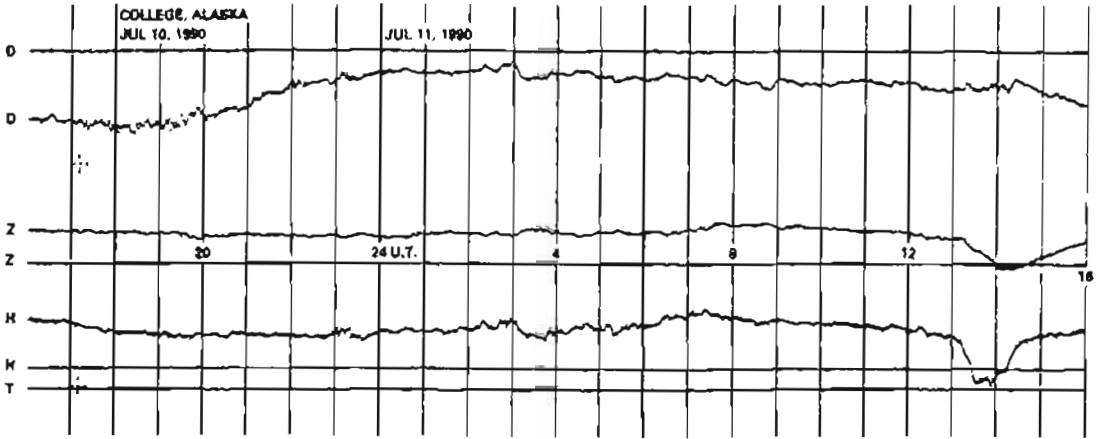
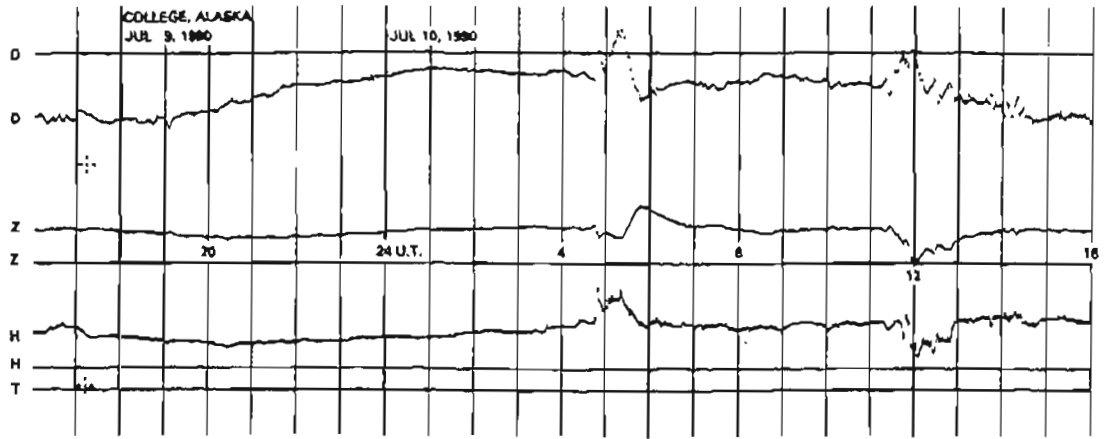




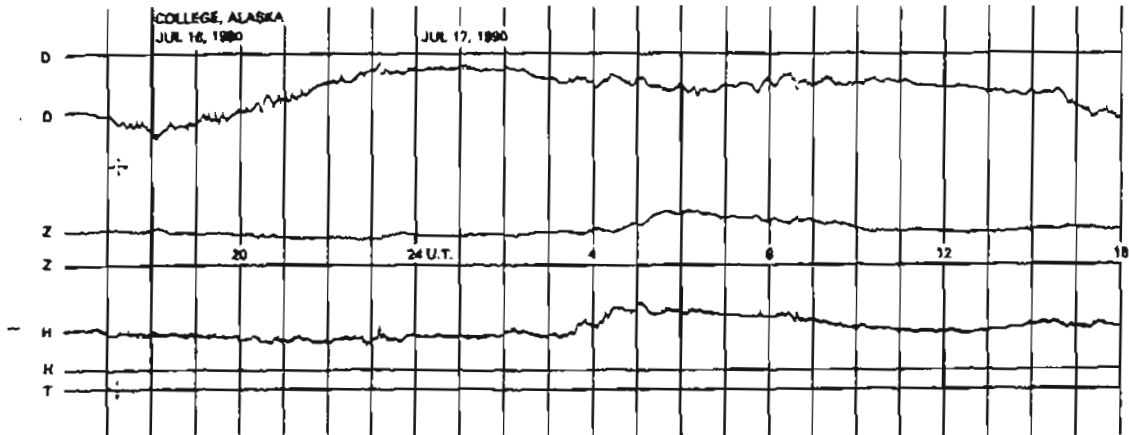
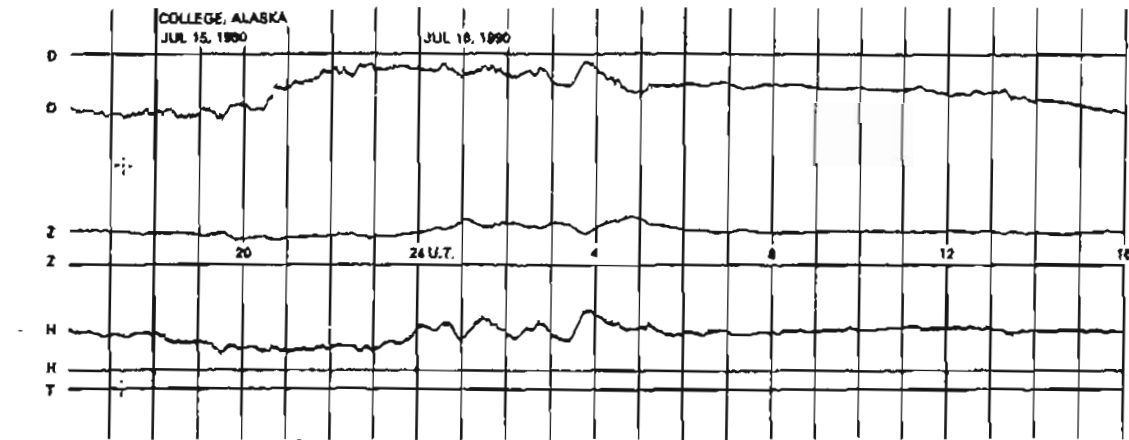
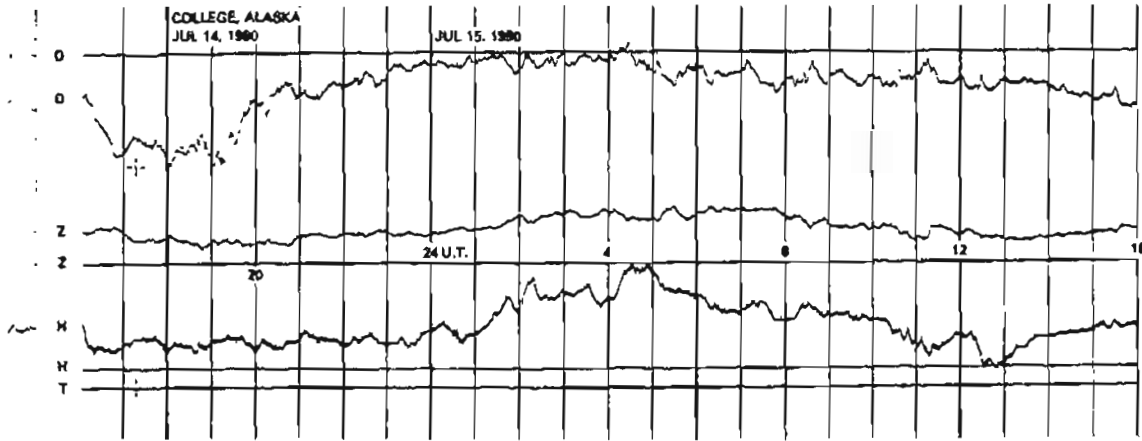
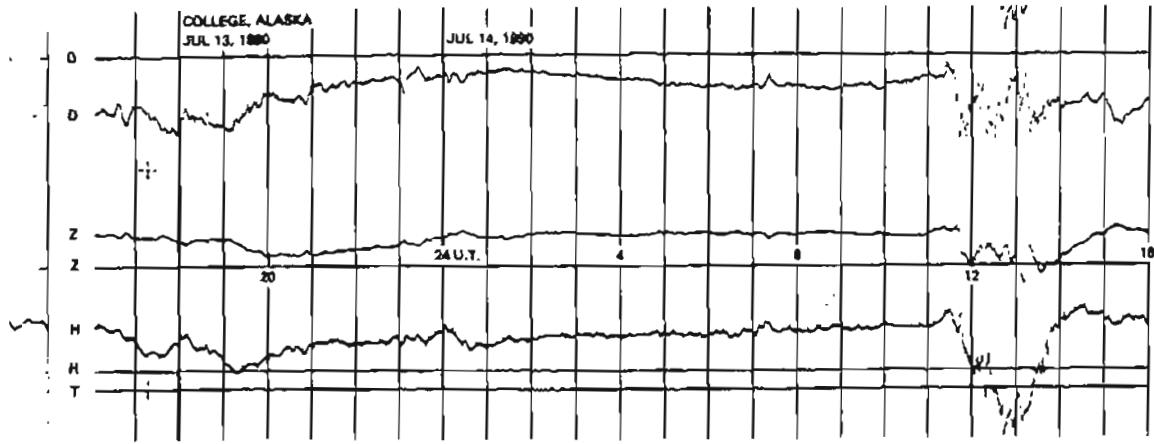
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

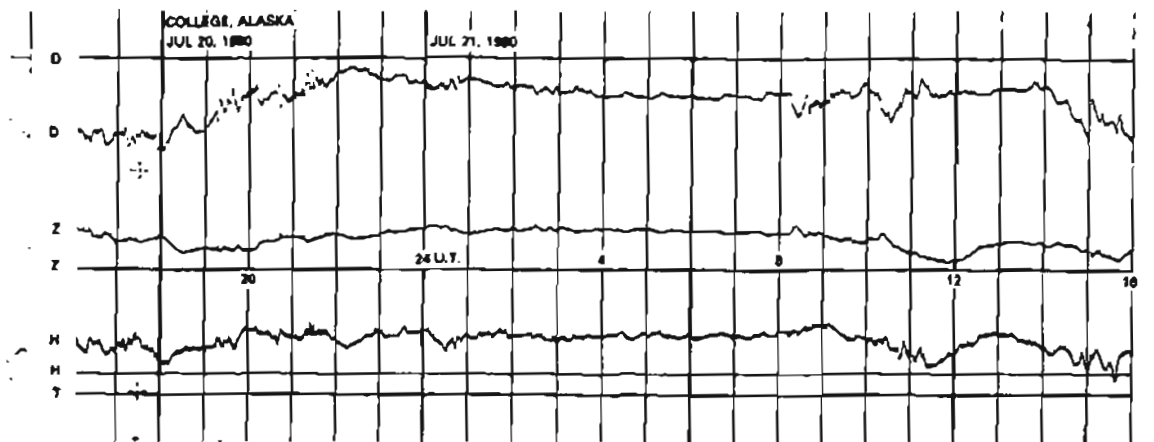
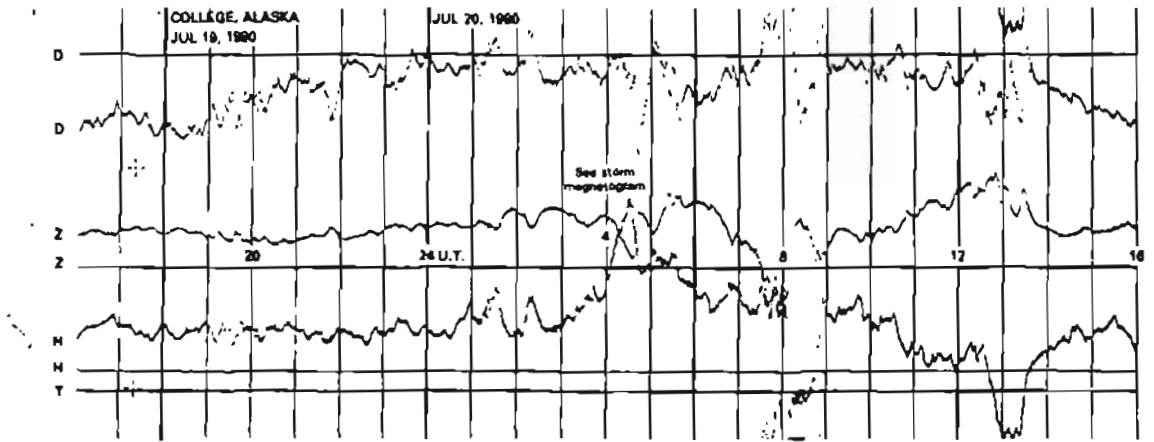
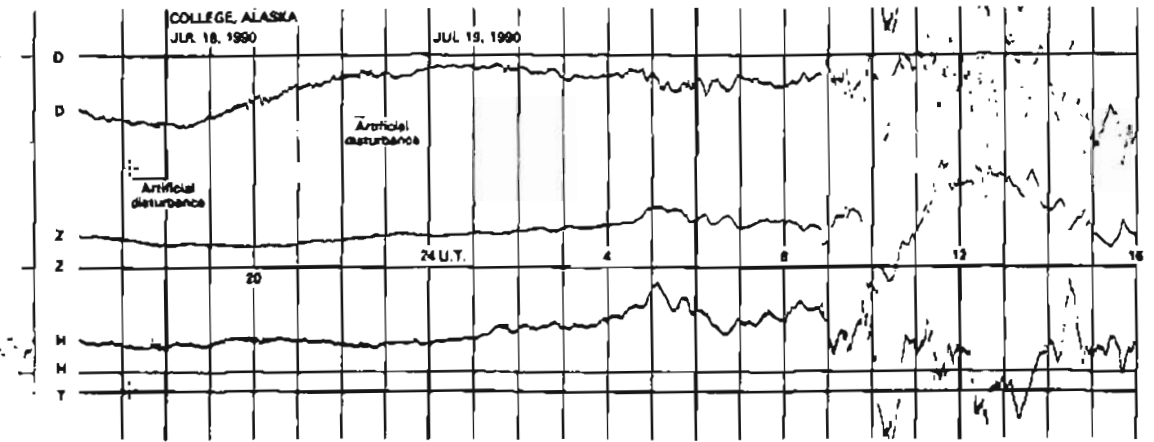
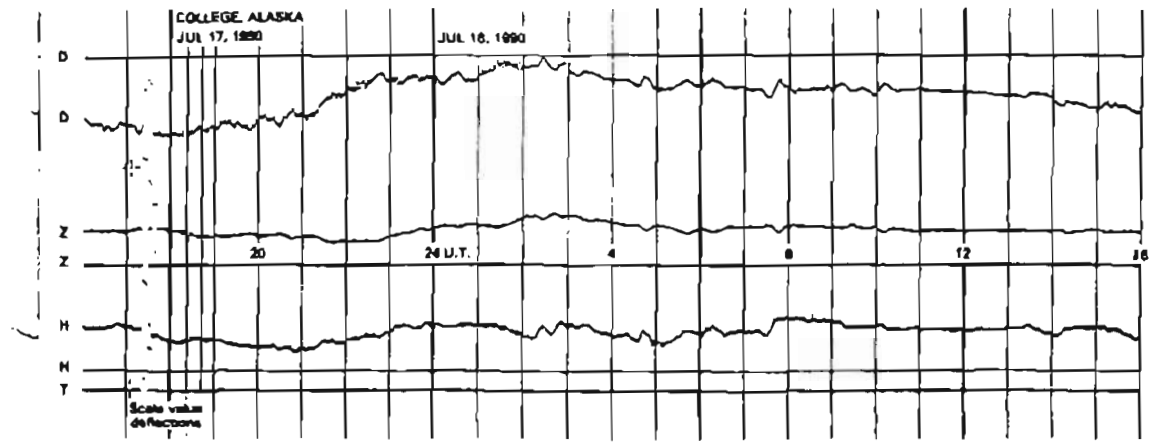


NORMAL MAGNETOGRAMS



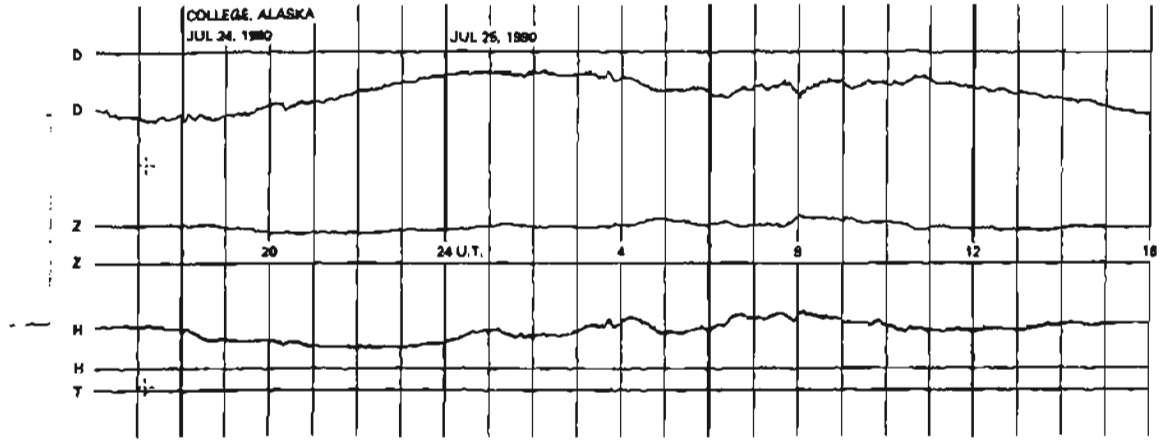
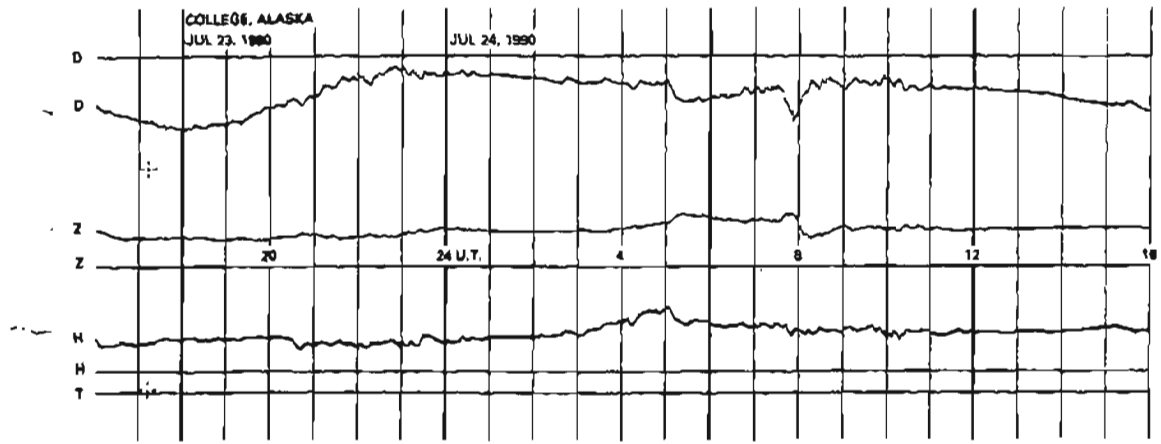
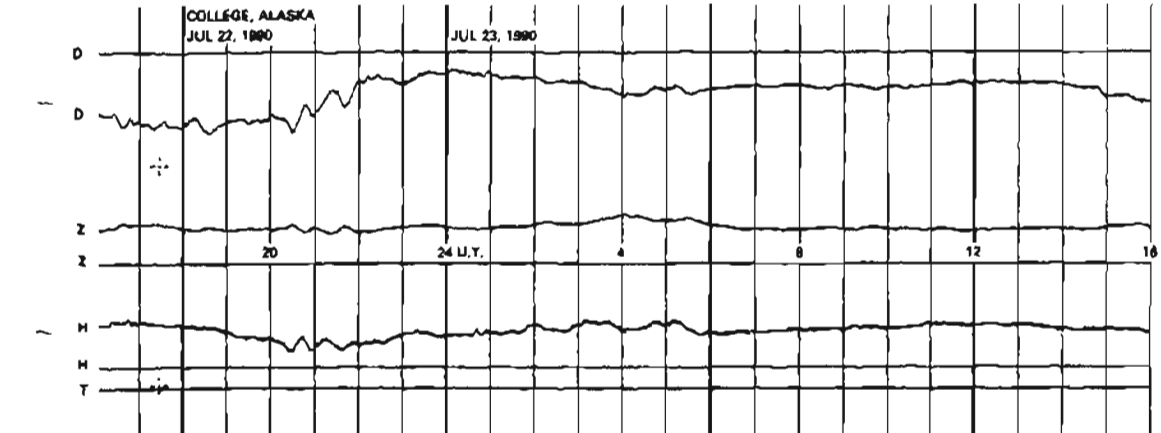
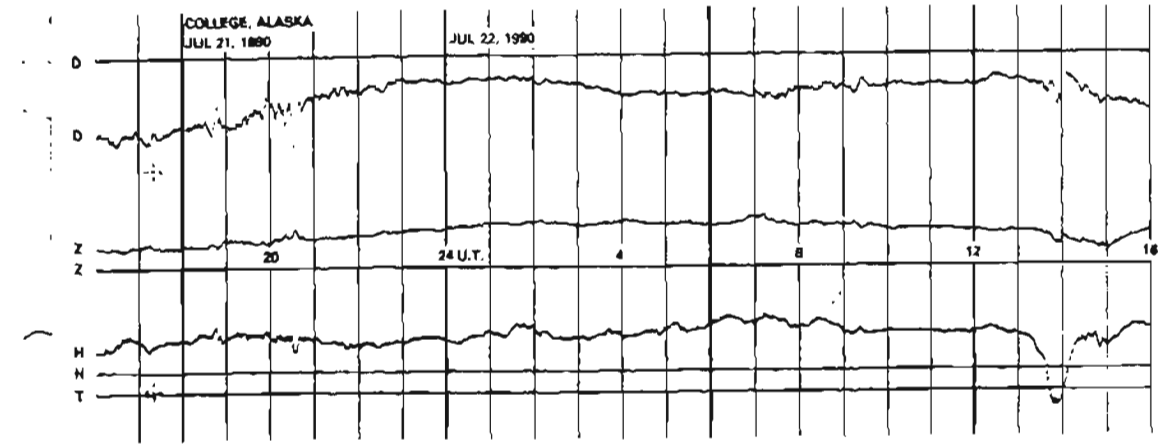
NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0



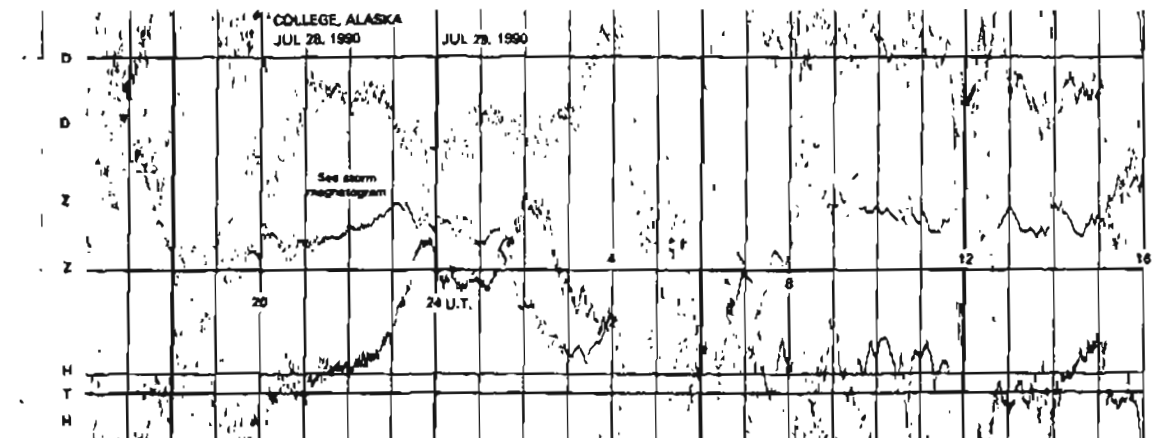
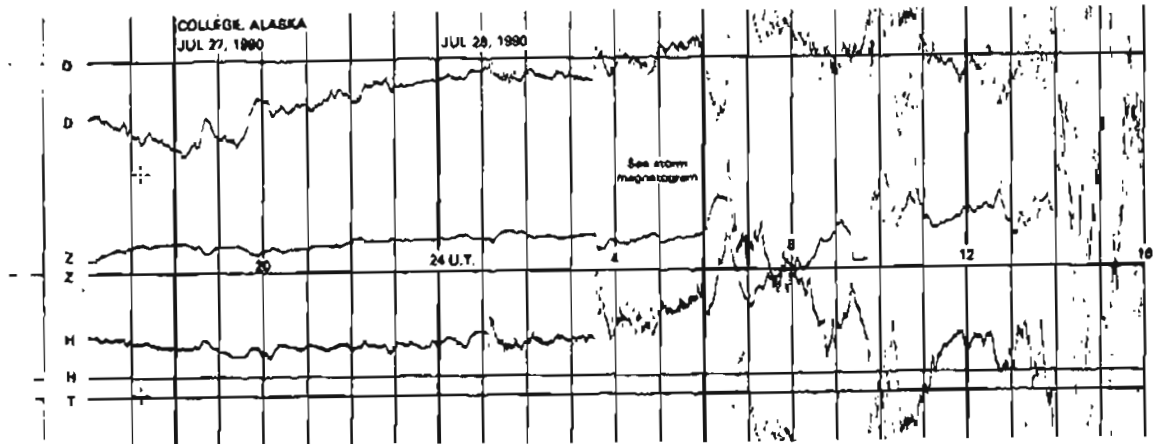
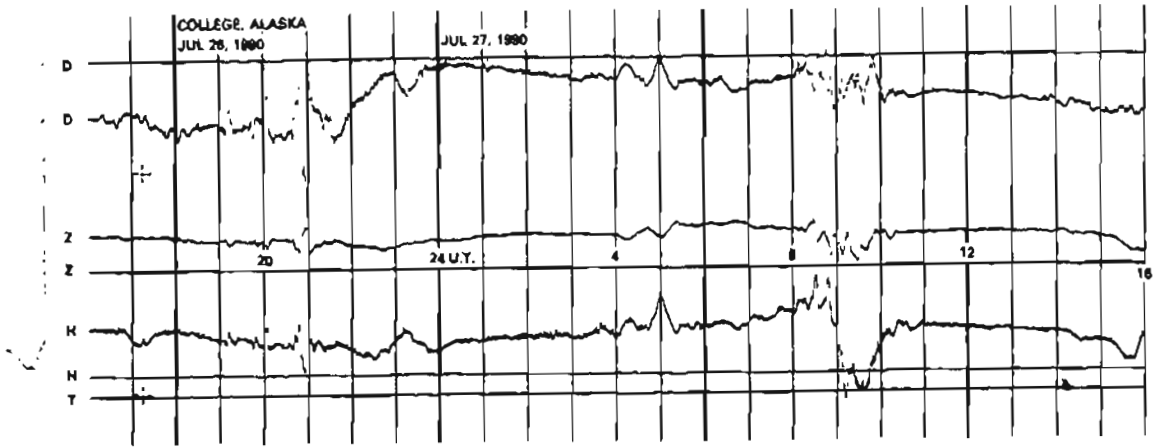
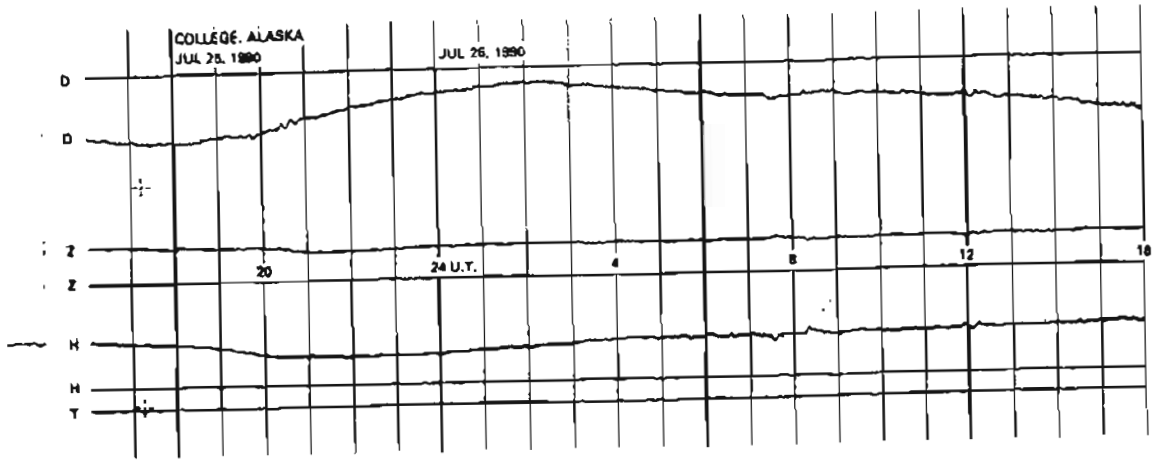
NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0



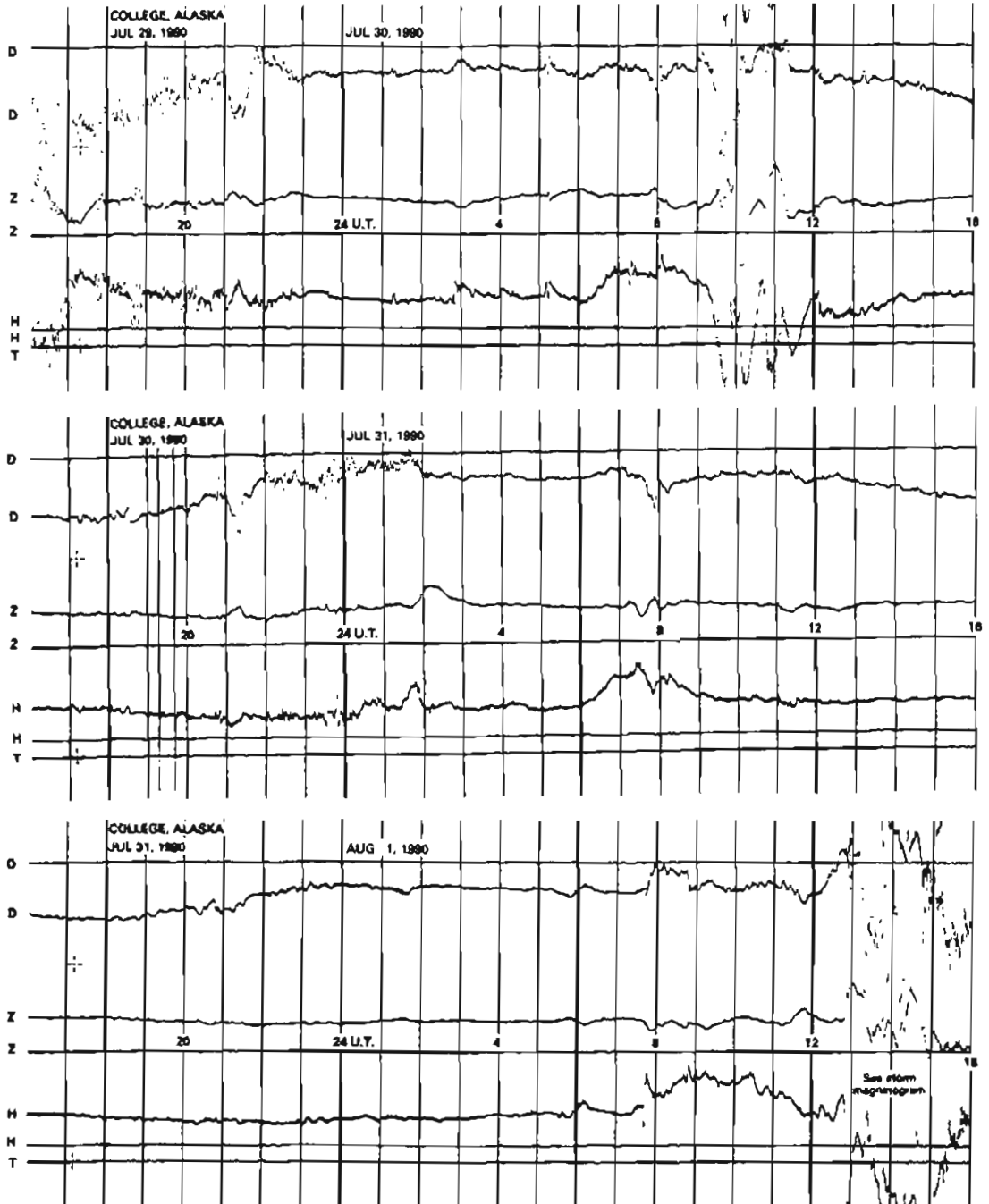
NORMAL MAGNETOGRAMS

200mm  
100mm  
0

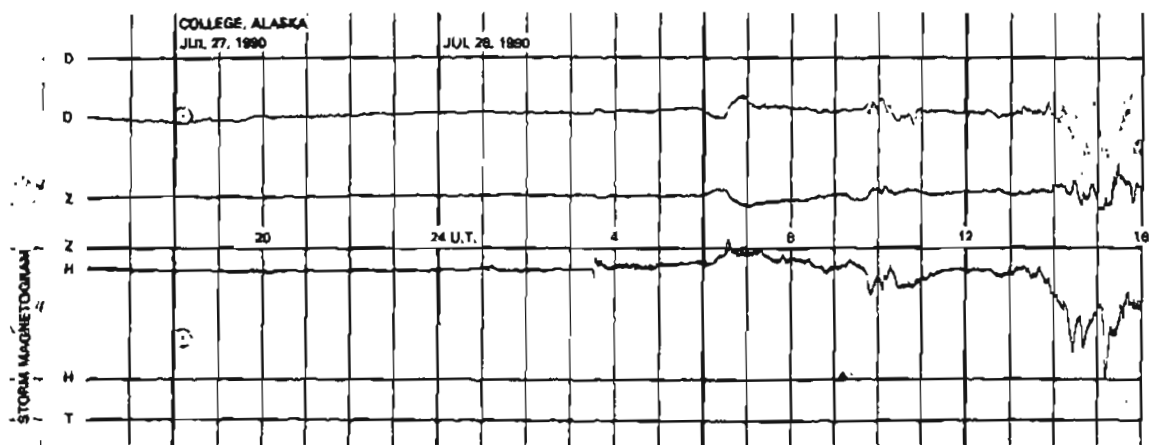
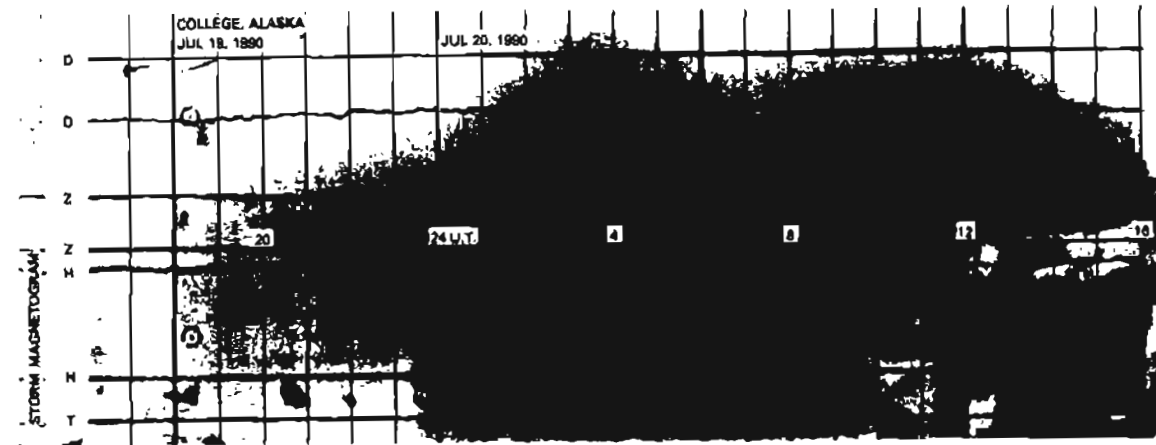
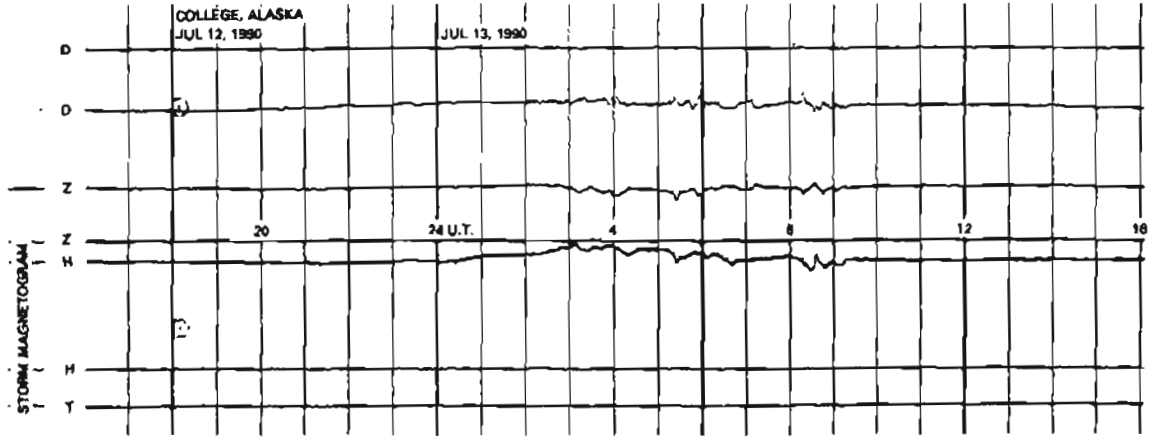


NORMAL MAGNETOGRAMS

200 mm  
100 mm  
0



# STORM MAGNETOGRAMS





# STORM MAGNETOGRAMS

