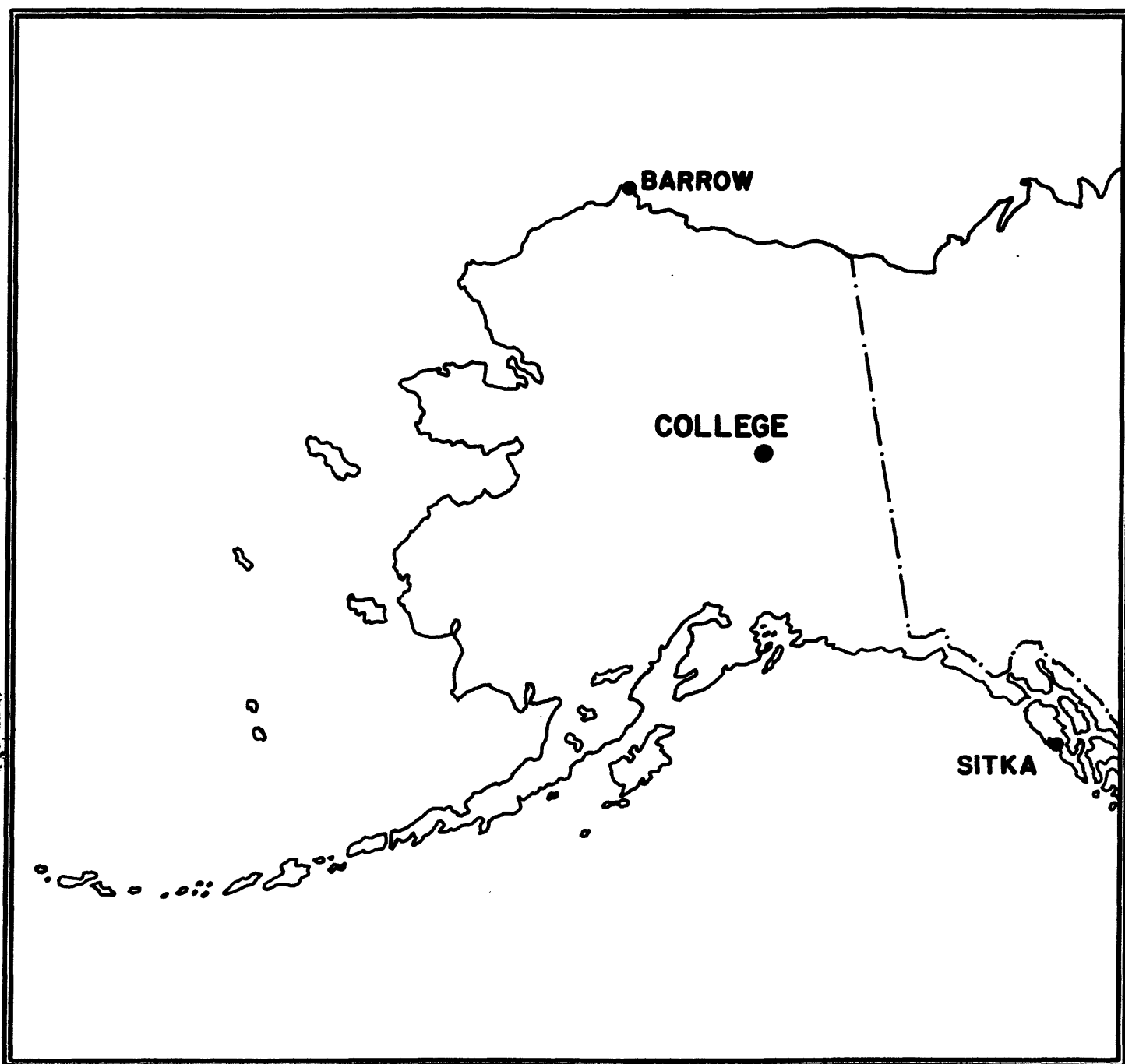


**UNITED STATES DEPARTMENT OF THE INTERIOR**  
**GEOLOGICAL SURVEY**

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

JULY 1990

**OPEN FILE REPORT** 90-0300G



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 $\gamma$  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 (10 $\gamma$ )

### 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

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

MONTH AND YEAR

JULY, 1990

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	2	2	2	2	0	1	1	2	12	5	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	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)
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	BEGIN d h m
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	
											END d h m

## K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

675.7

3.67

2480

H

322.2

7.77

2500

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED

John B. Townshend, Chief

OBSERVER IN CHARGE

# PRINCIPAL MAGNETIC STORMS Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

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

JULY 19 90

Obs. 2 letter data code	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)	day hr	
CO	64.6 N	28	01 08	SC	-8	+111	-								
			03 31	SC	-32	+406	-23	28	5, 6	8	624	2940	1800	29 23	
		Aug 1	07 42	SC	-9	+92	-13	1	5, 6	6	120	910	280	2 04	

U.S. Dept. of Interior Geological Survey		Observatory College, Alaska		Month JULY		Year 1990		Jep-CO - 1/86										
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																	DAY	
A <sub>k</sub>																	A <sub>k</sub>	
HOUR																	HOUR	
01	80	9	23	24	25	6	9	23	24	25	6	9	23	24	25	01		
02	80	76	111	91	96	158	220	150	146	150	165	220	160	166	156	02		
03	87	77	130	109	98	170	240	165	156	155	164	174	166	159	170	03		
04	118	120	160	117	104	179	221	180	168	150	176	210	182	160	163	04		
05	114	163	179	127	140	179	221	200	199	191	187	221	200	163	165	05		
06	149	150	170	190	166	204	161	185	255	201	179	201	206	184	187	06		
07	140	170	156	175	180	211	176	179	236	170	199	163	193	228	185	07		
08	139	170	151	181	152	200	181	159	208	215	185	170	163	210	175	08		
09	143	170	153	139	145	183	173	165	200	231	179	161	156	216	177	09		
10	140	162	155	120	141	178	175	173	180	237	173	154	159	155	203	10		
11	131	157	153	136	124	180	179	180	190	206	165	150	157	173	188	11		
12	135	156	140	143	140	188	182	189	172	180	159	146	157	171	169	12		
13	167	181	134	153	167	189	188	196	170	170	165	149	153	165	159	13		
14	189	190	137	169	172	171	192	192	172	175	163	153	153	168	154	14		
15	263	227	163	201	220	170	183	188	178	189	156	151	157	170	152	15		
16	263	246	208	221	261	170	184	173	184	200	153	147	156	172	162	16		
17	295	295	259	279	293	150	180	170	190	204	135	146	170	173	161	17		
18	345	294	310	298	309	110	180	127	190	206	120	152	140	170	167	18		
19	332	307	313	290	304	108	150	139	194	176	88	150	133	170	162	19		
20	270	286	270	267	284	153	131	148	143	180	111	137	129	169	155	20		
21	270	234	205	231	240	180	120	150	126	158	111	122	125	153	155	21		
22	170	179	127	202	190	154	107	134	116	131	138	113	137	138	143	22		
23	131	141	81	156	150	118	116	127	99	130	137	113	133	139	130	23		
24	93	122	81	119	121	105	121	126	100	129	141	119	137	140	134	24		
DAILY SUM		4246	4353	4038	4195	4308	3222	4140	3735	4070	4284	3705	3745	4061	3714	DAILY SUM		
DAILY MEAN		177	181	168	175	180	163	172	164	170	178	154	156	169	163	DAILY MEAN		
MEAN		176					170					160					MEAN	

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 7-1-90	2400 U.T., 7-31-90	1.0' /mm	3.7γ /mm	26° 34.9' E
H	0001 U.T., 7-1-90	2400 U.T., 7-31-90	7.8 γ /mm		12646 γ
Z	0001 U.T., 7-1-90	1200 U.T., 7-8-90	7.7 γ /mm		55201 γ
	1201 U.T., 7-8-90	2400 U.T., 7-31-90	↓		55207 γ

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 7-1-90	2400 U.T., 7-31-90	7.9' /mm	29.4 γ /mm	
H	(SAME)	(SAME)	43.4 γ /mm		
Z	(SAME)	(SAME)	48.6 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:

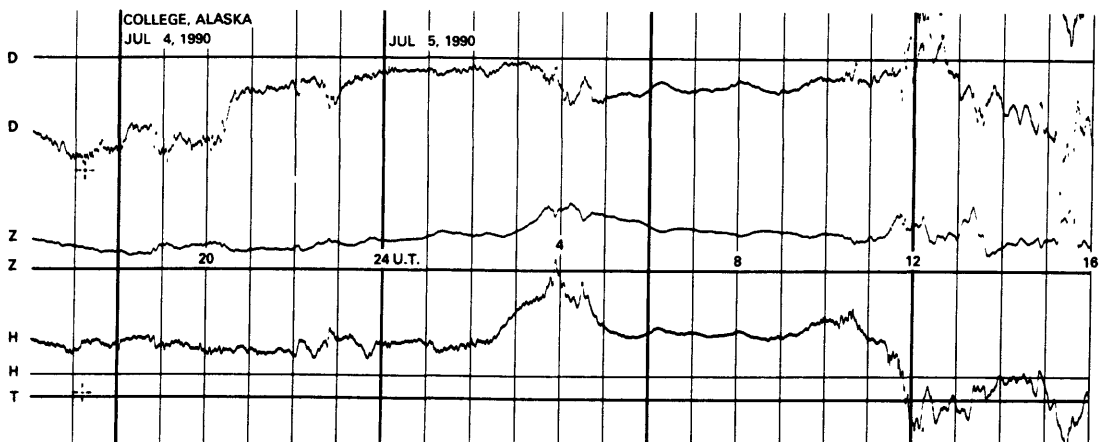
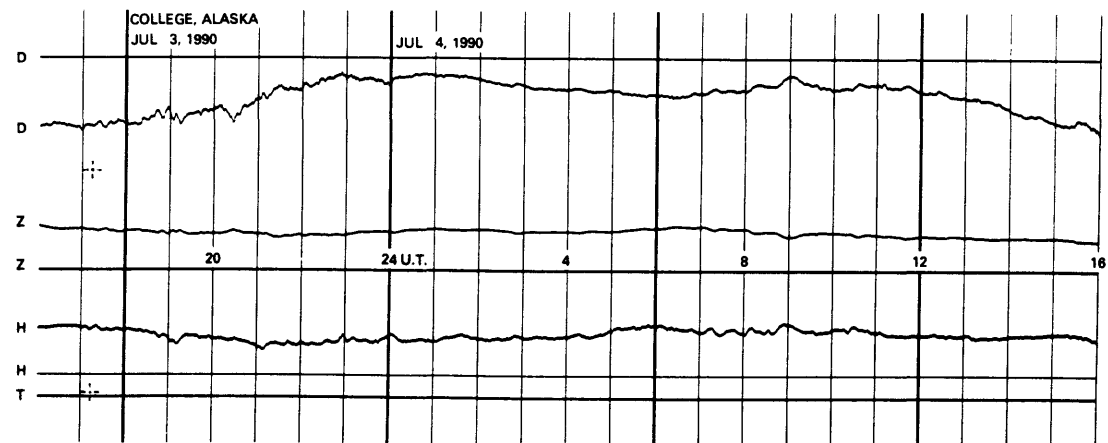
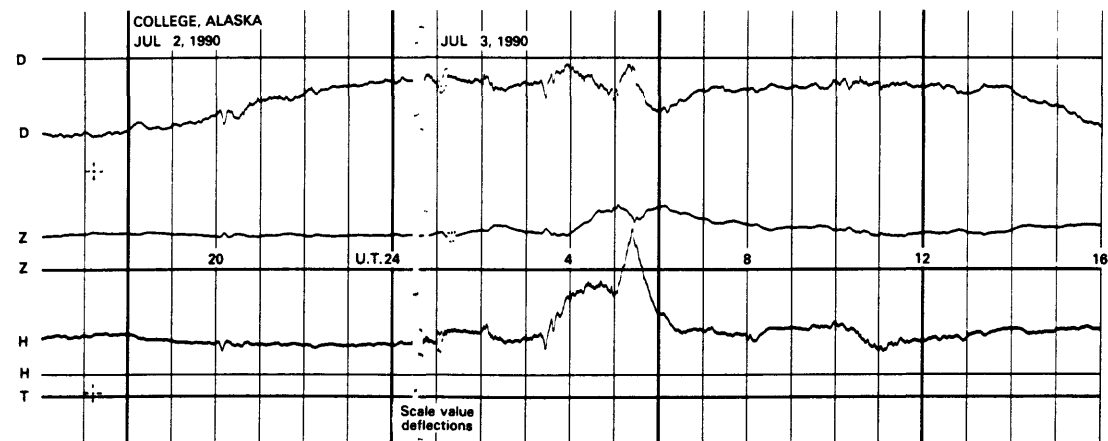
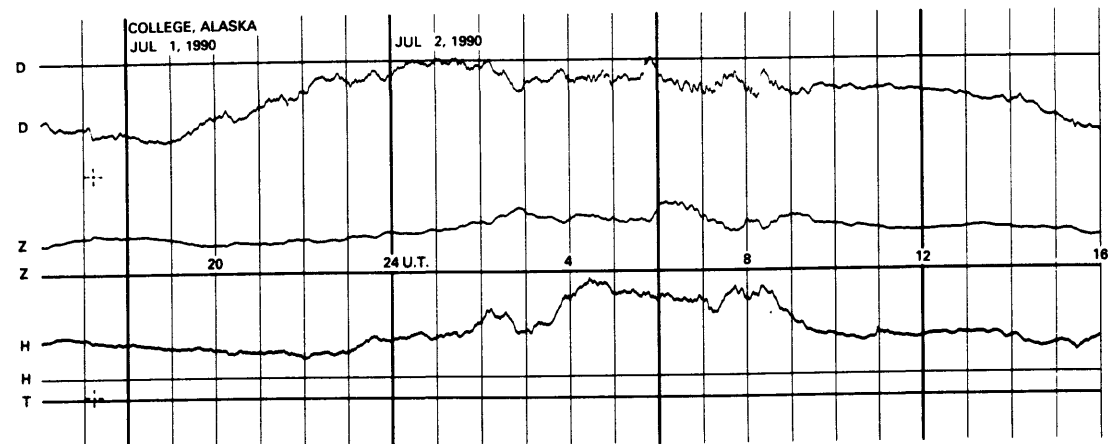
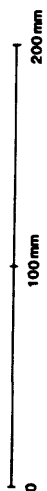
Declination (D): No Change

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° 52.3' E	12778 γ	55329 γ
* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.		
DAYS USED: JULY 6, 9, 23, 24, 25		

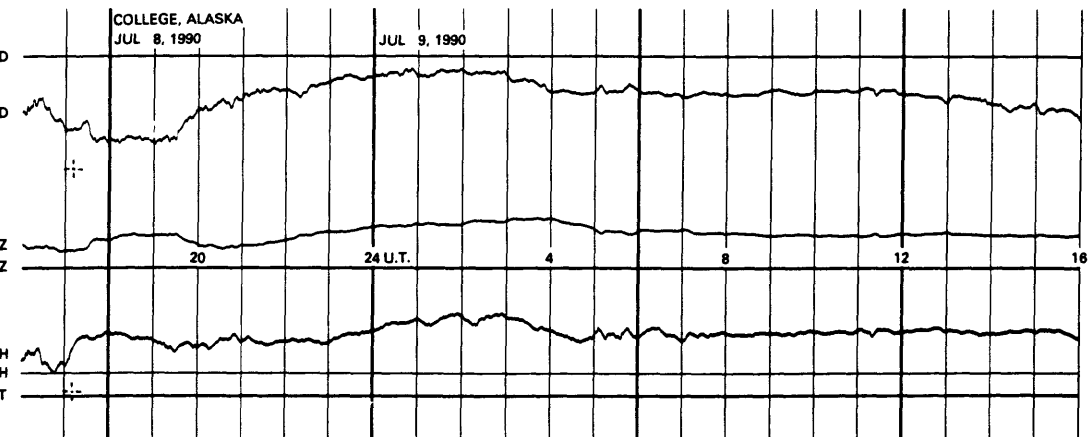
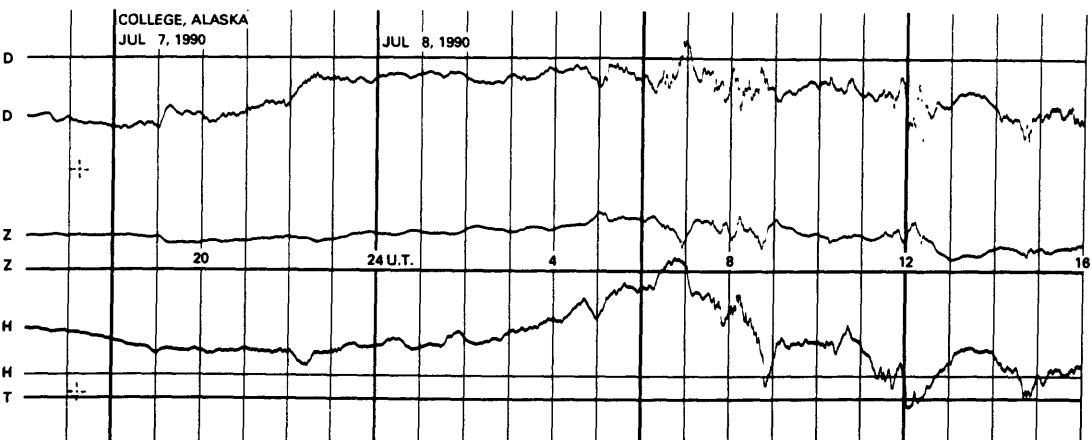
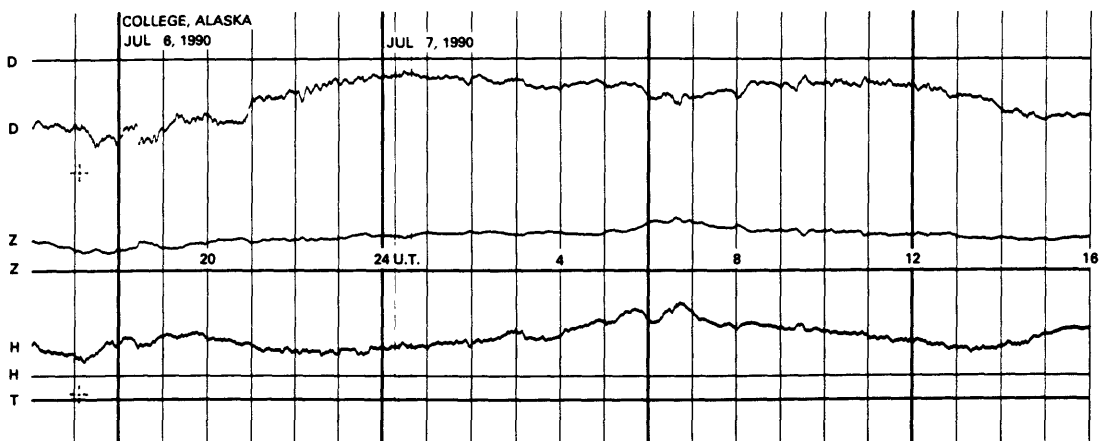
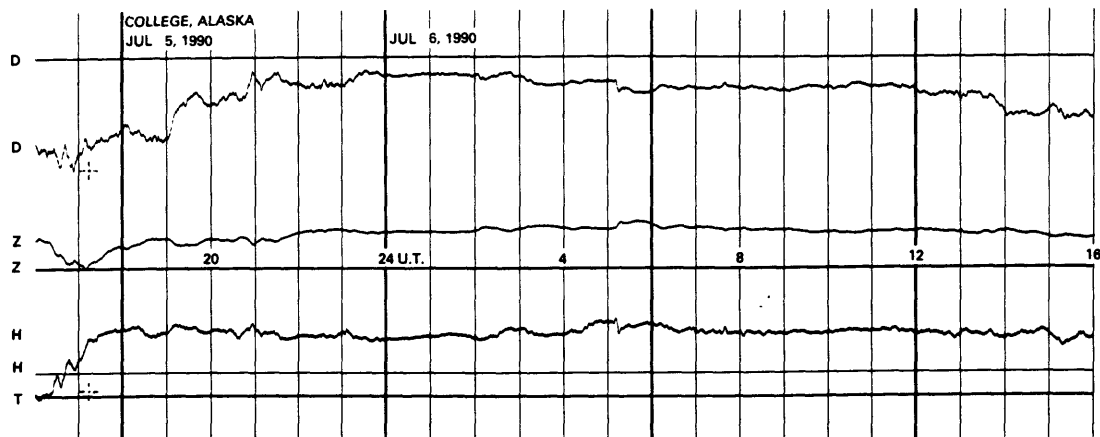
# NORMAL MAGNETOGRAMS



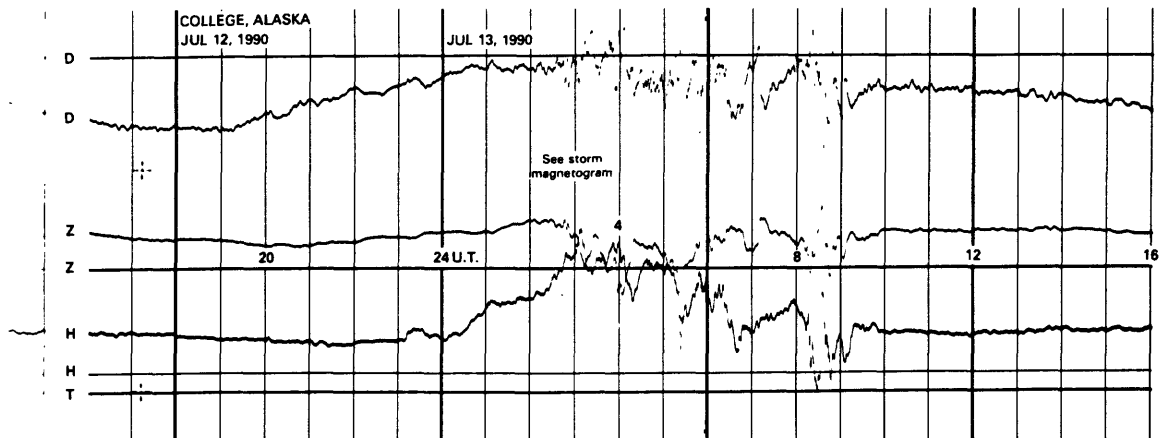
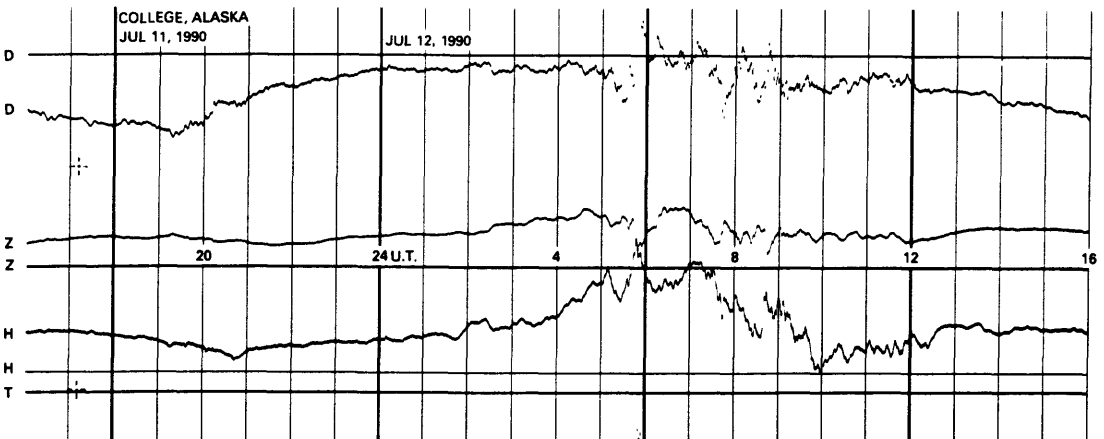
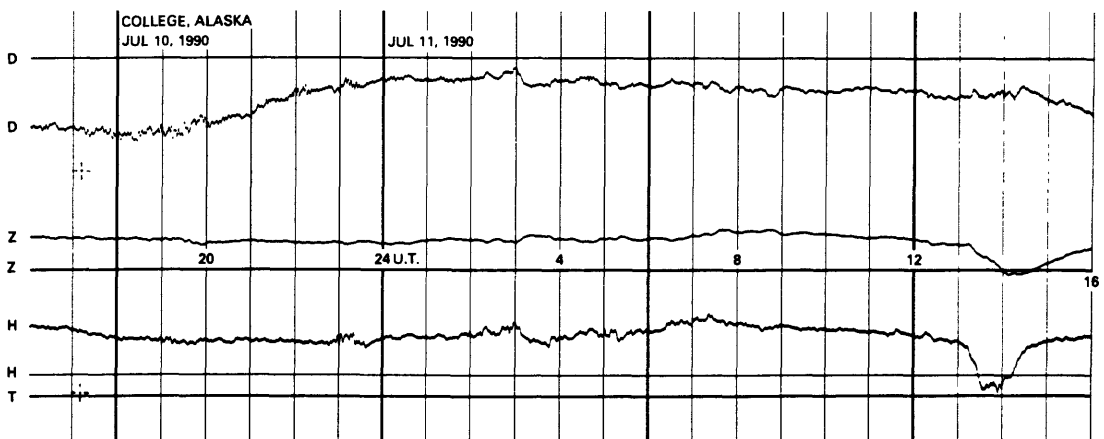
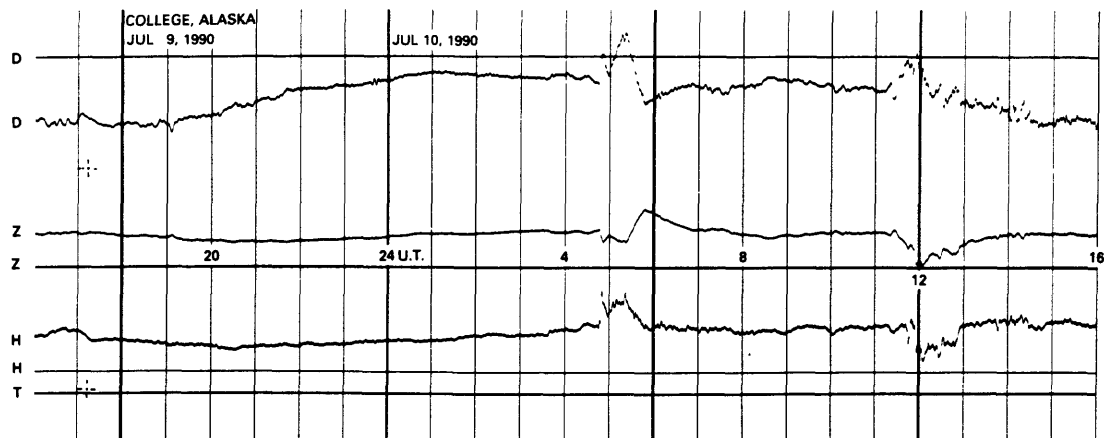
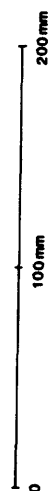


# NORMAL MAGNETOGRAMS

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100 mm  
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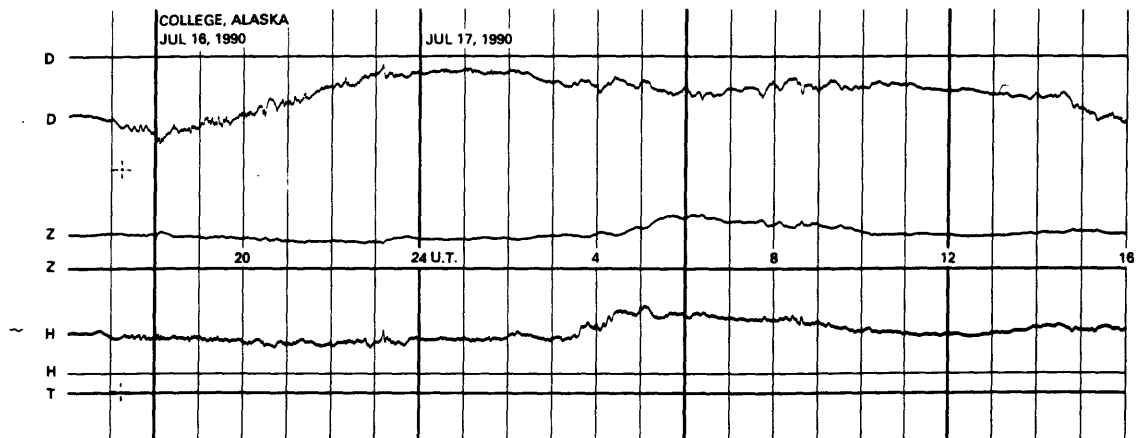
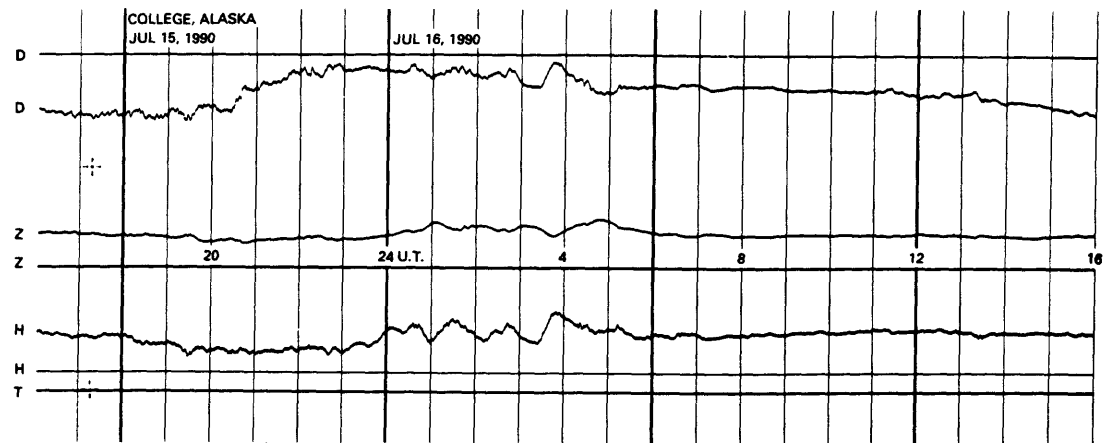
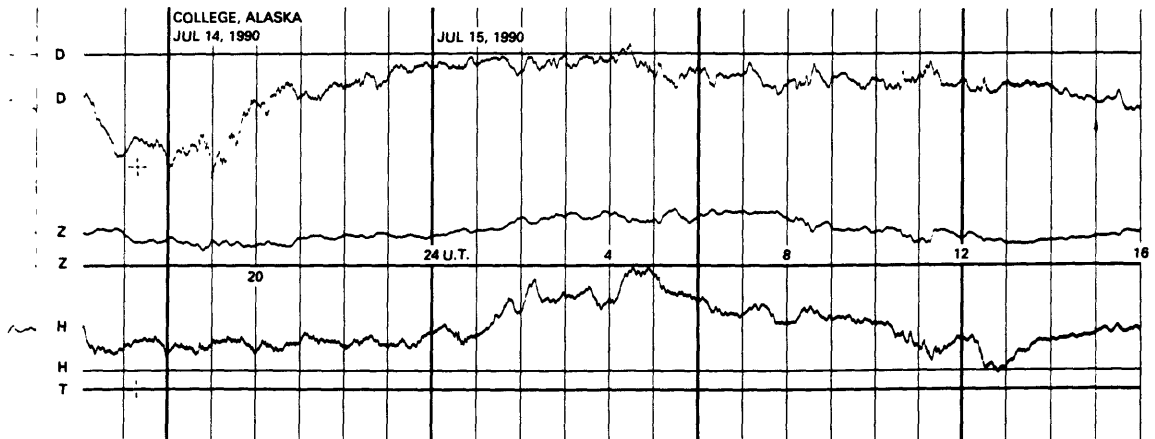
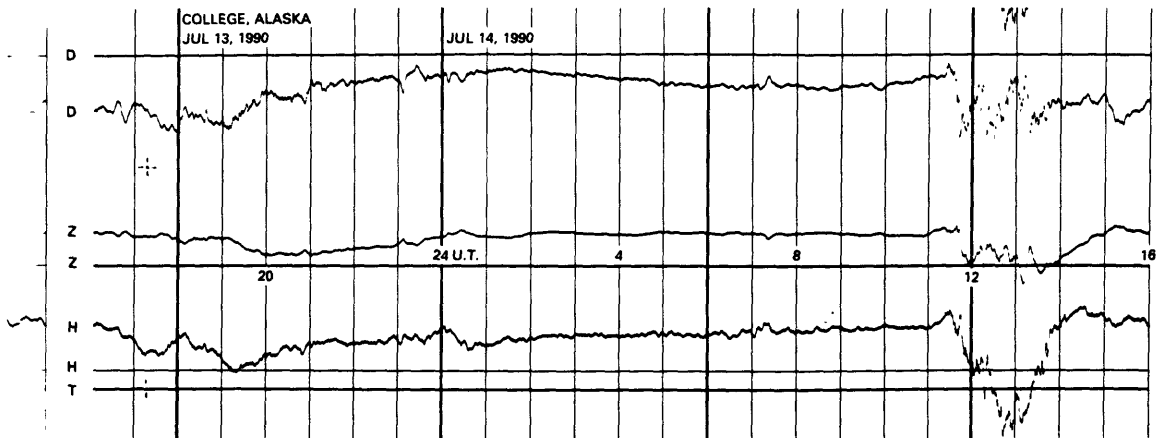


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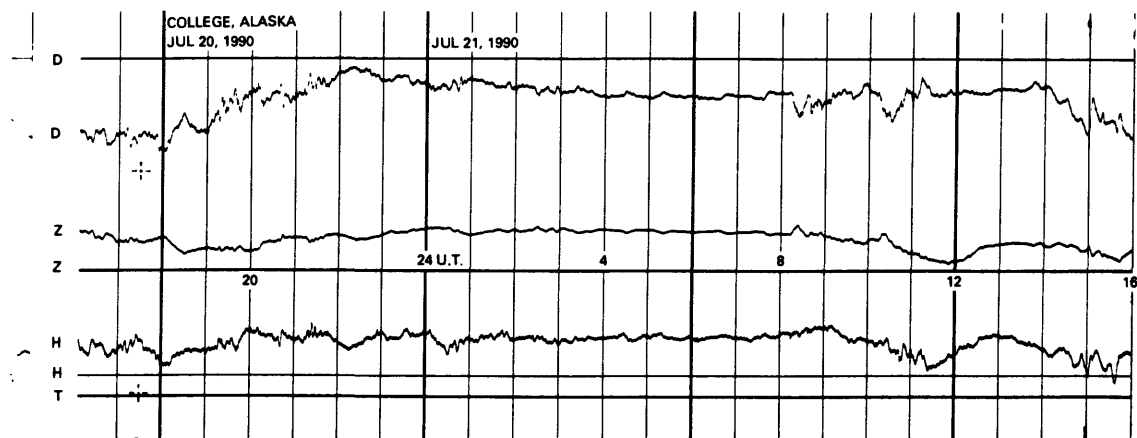
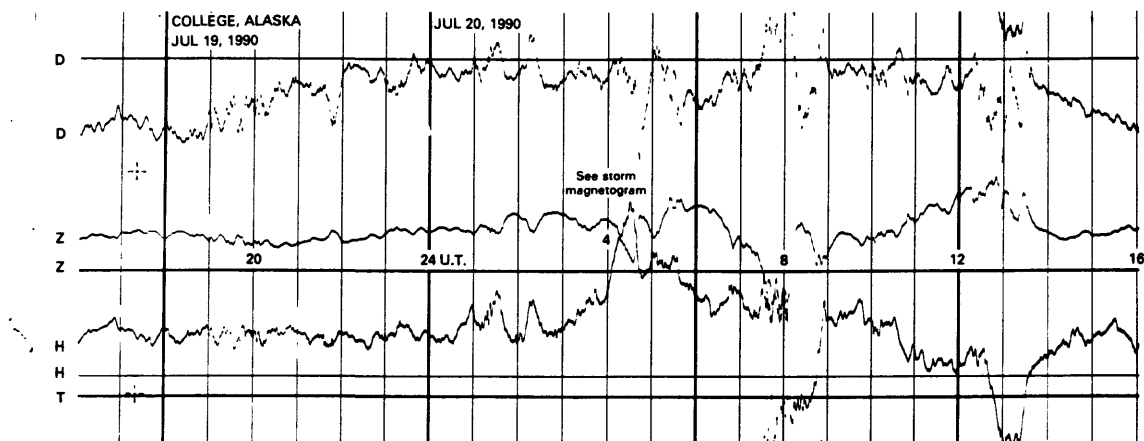
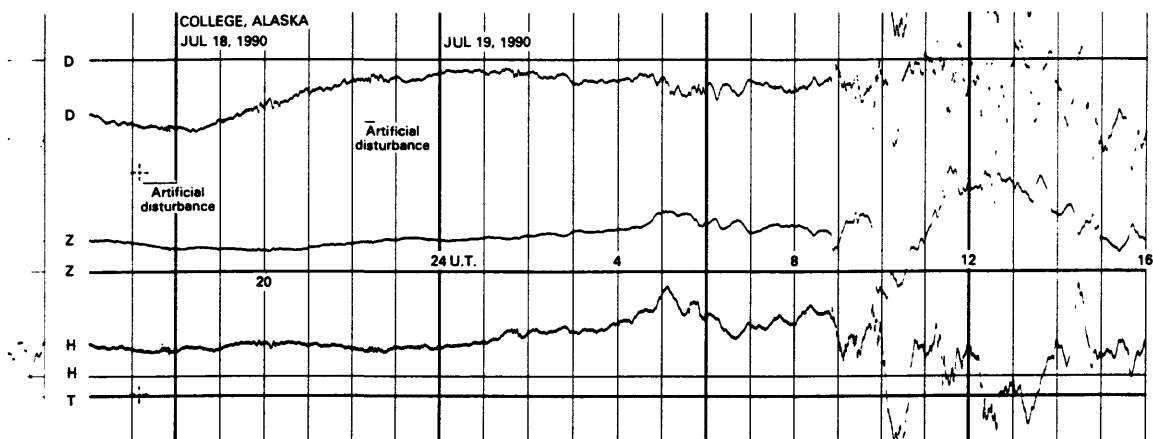
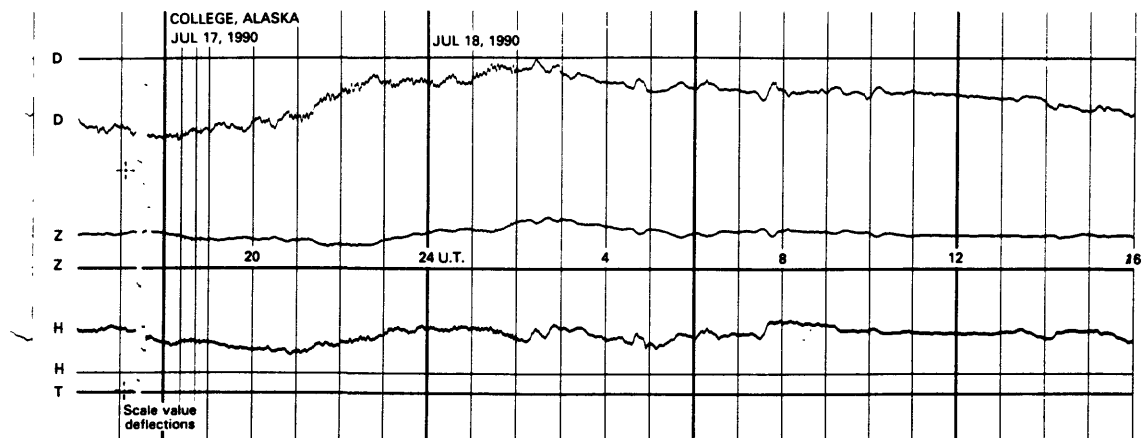
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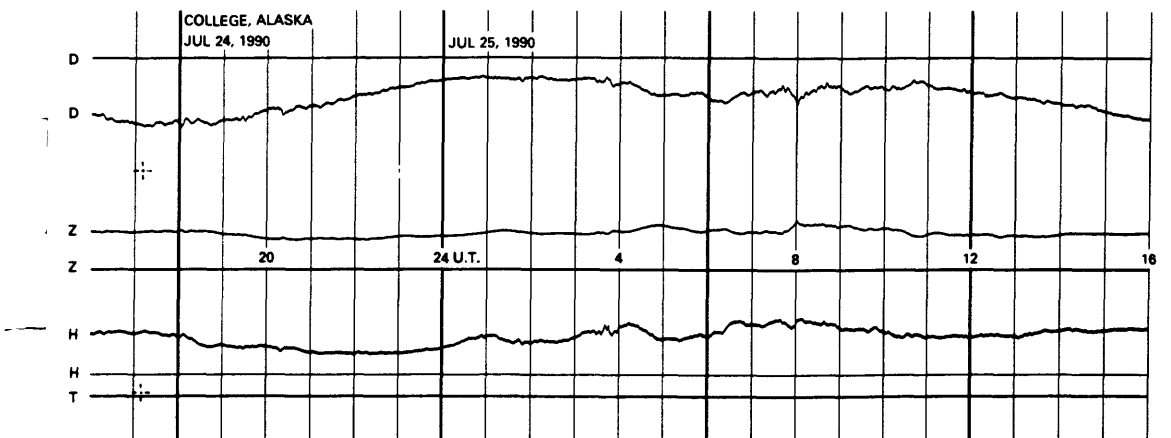
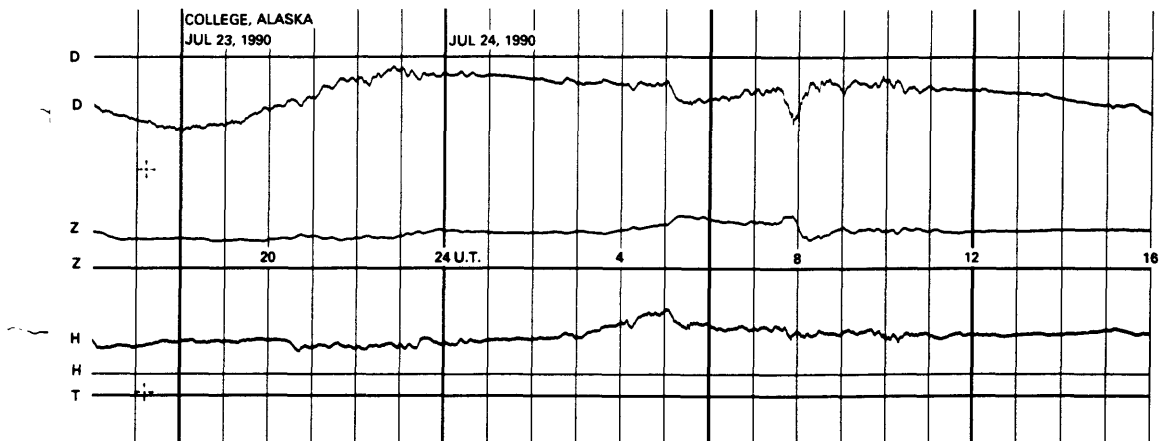
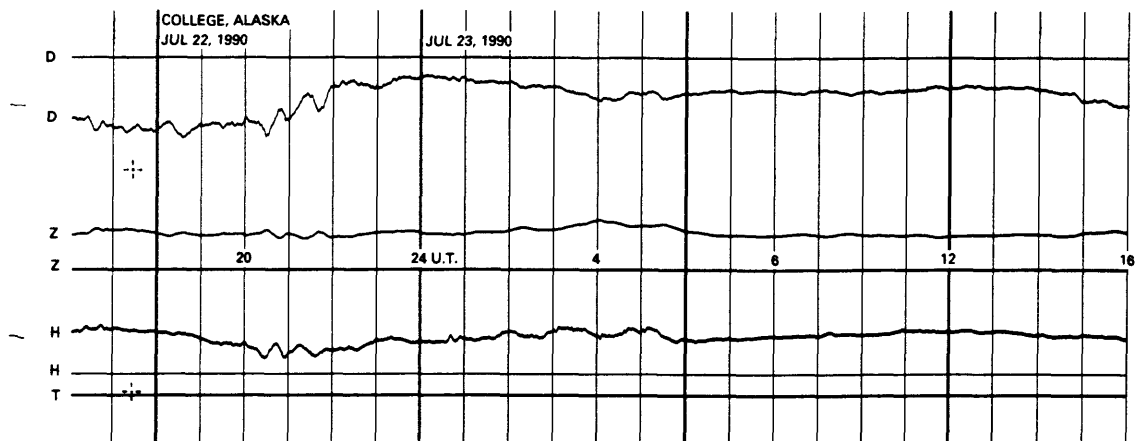
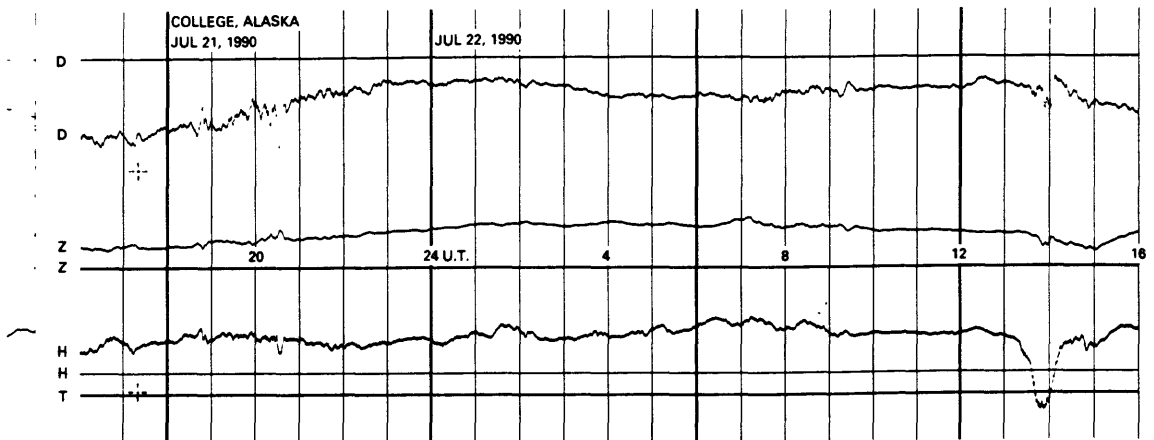
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100 mm  
0



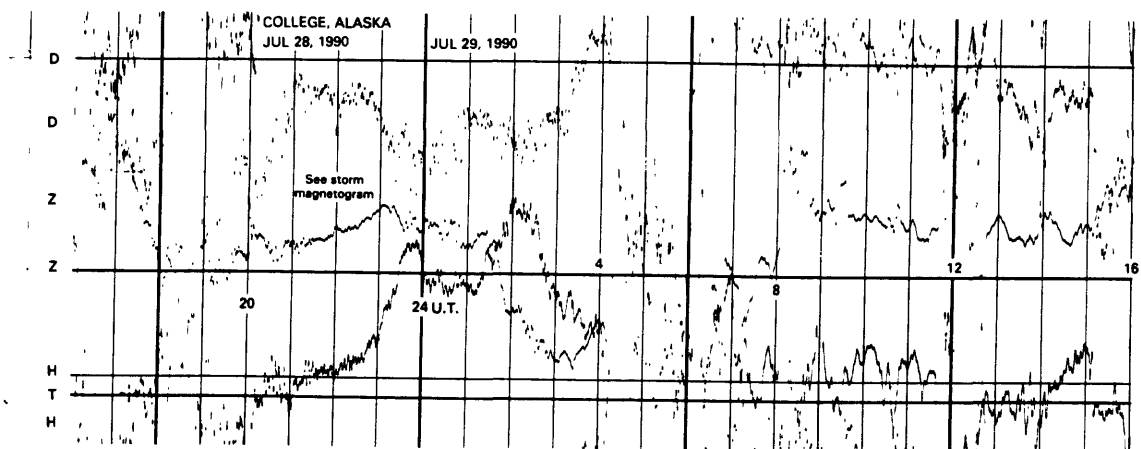
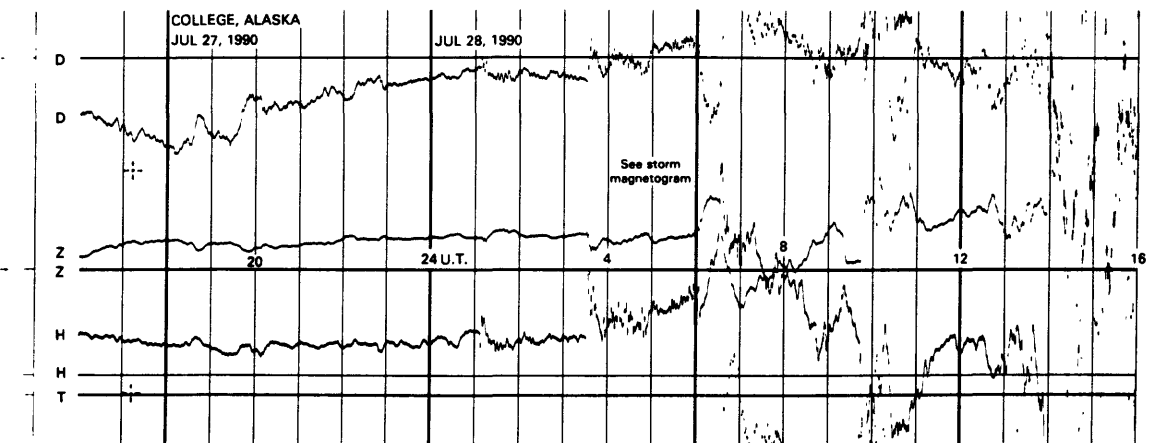
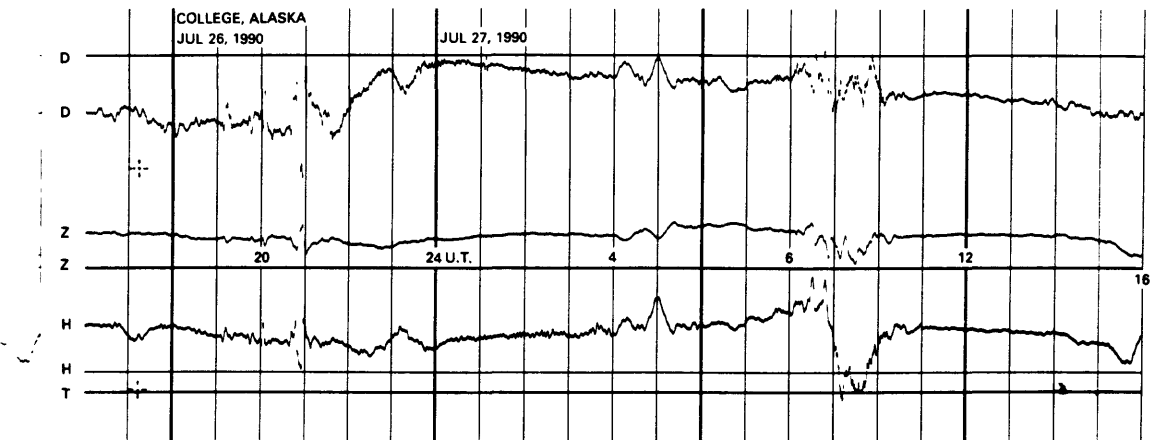
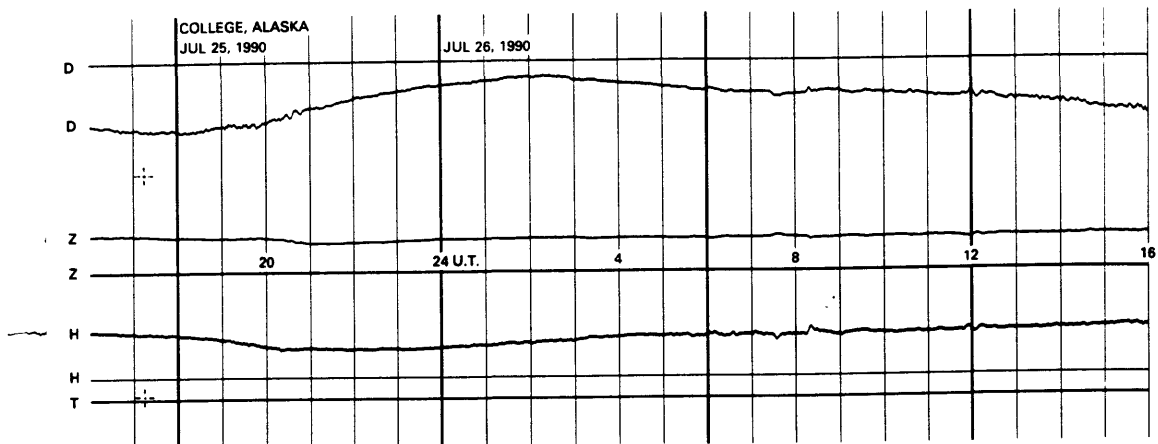
# NORMAL MAGNETOGRAMS

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100 mm  
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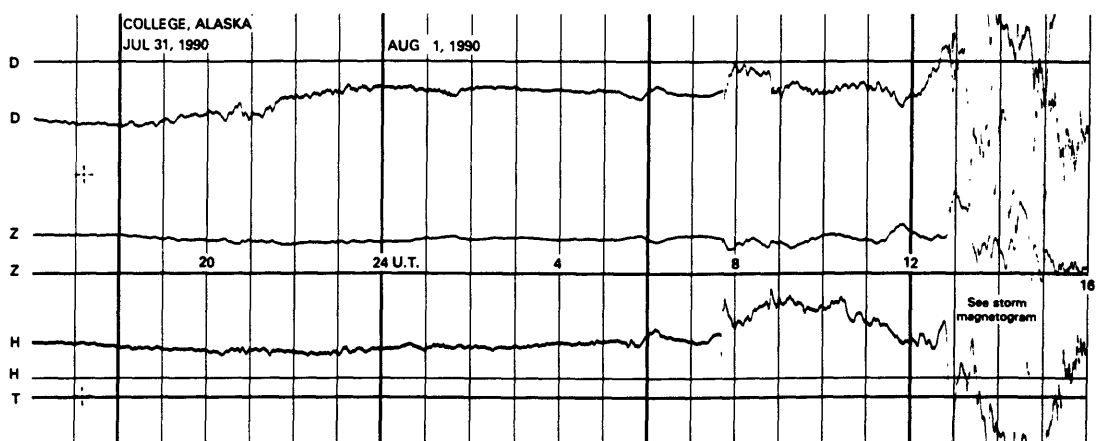
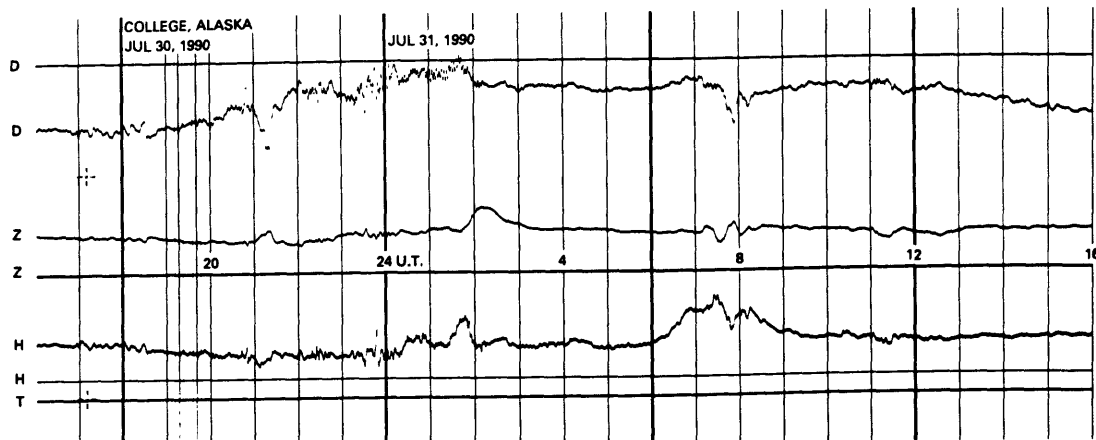
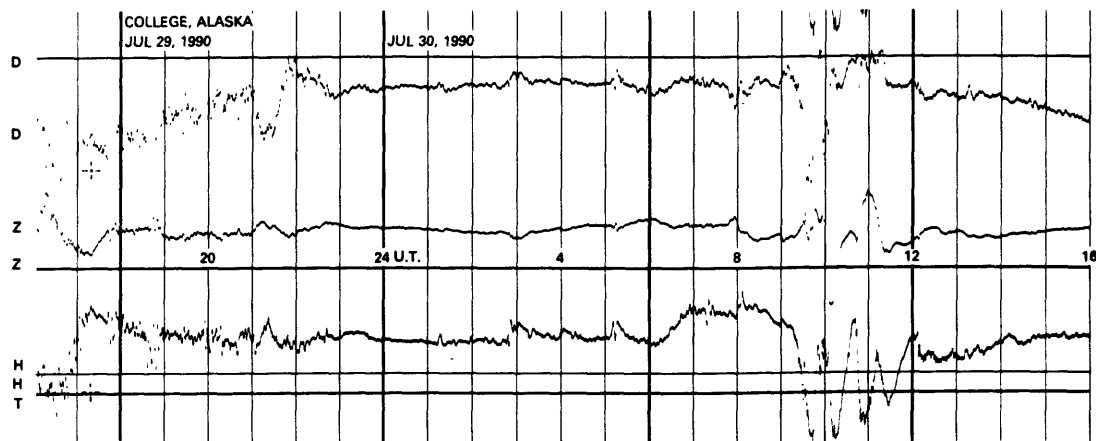
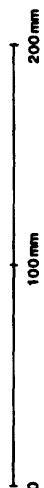


# NORMAL MAGNETOGRAMS

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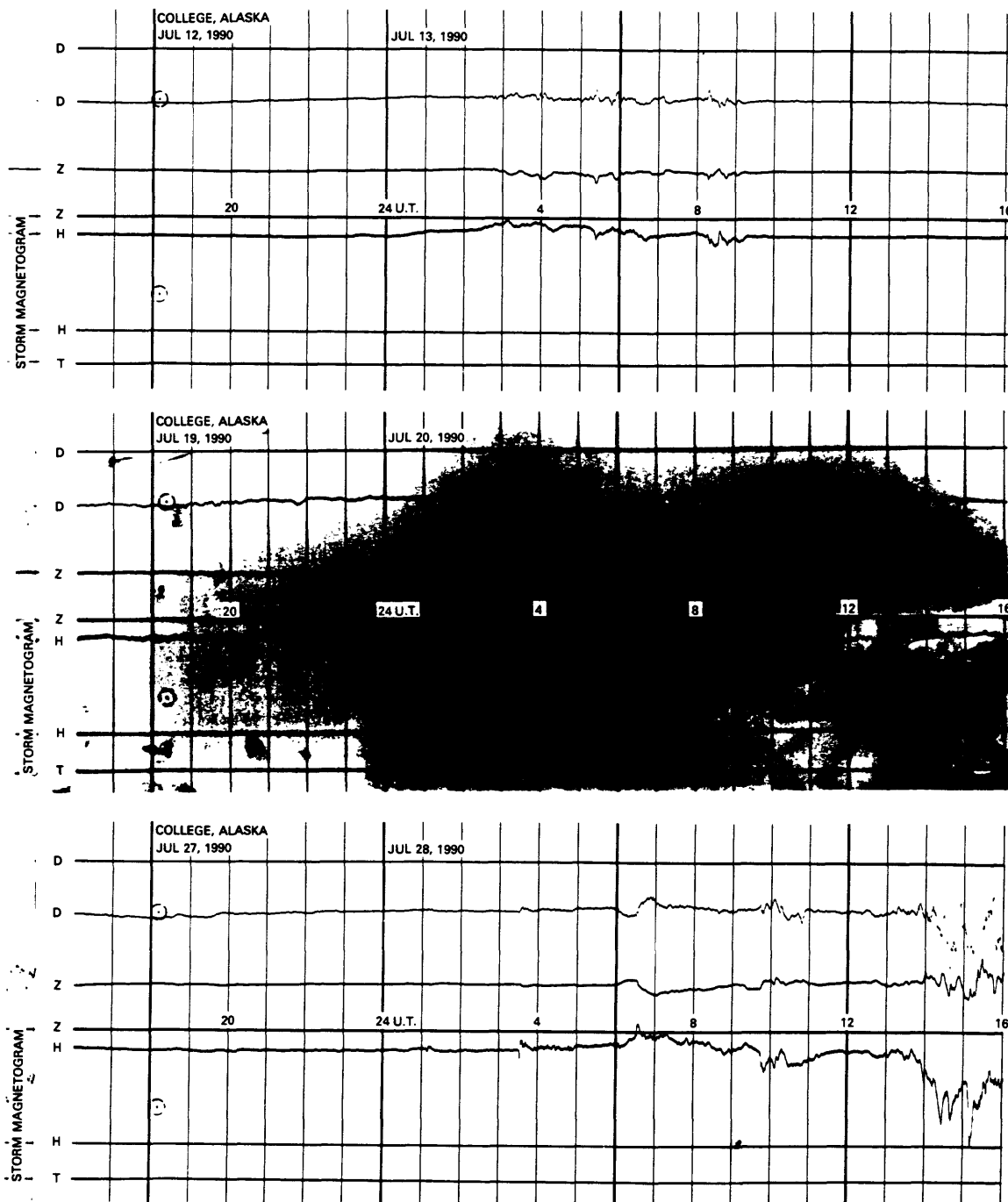


# NORMAL MAGNETOGRAMS



# STORM MAGNETOGRAMS

200mm  
100mm  
0



REPRODUCED FROM BEST AVAILABLE COPY



# STORM MAGNETOGRAMS

