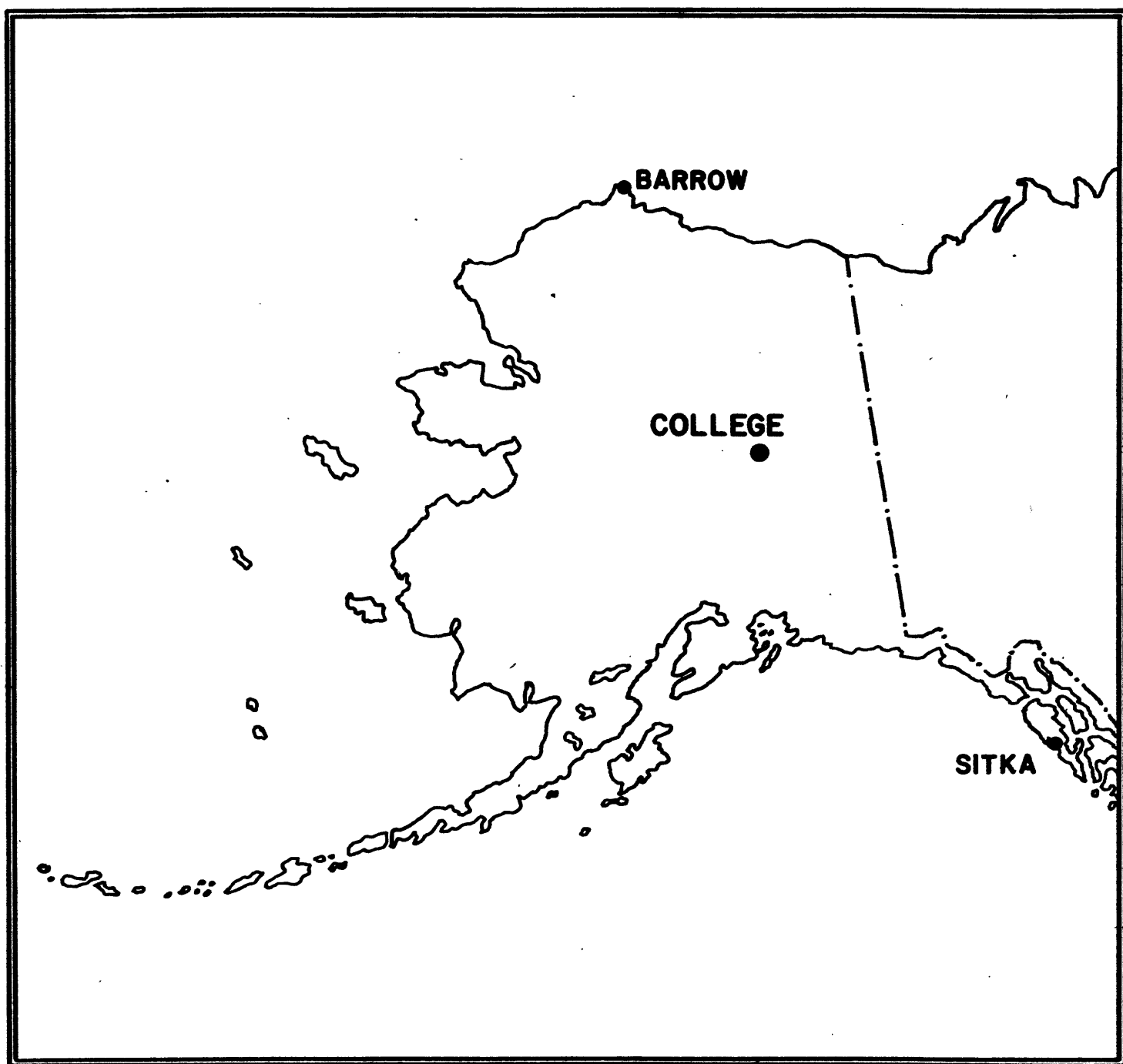


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

JULY 1989

OPEN FILE REPORT 89-03006



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 99775-5160

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 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 (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

MONTH AND YEAR

JULY, 1989

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

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	1	3	1	2	6	6	4	25	28	SUDDEN COMMENCEMENTS		
2	3	3	2	2	0	0	1	1	12	06	d	h	m
3	1	1	0	0	0	1	1	0	4	02			
4	1	0	0	0	0	0	0	0	1	00	1	07	17
5	2	1	1	4	3	3	3	3	20	13			
6	3	3	3	4	4	4	3	2	26	19	17	01	54
7	2	3	4	2	2	1	2	1	17	10			
8	0	0	0	1	0	1	1	0	3	01			
9	3	3	0	1	1	1	1	1	11	06			
10	2	4	3	4	4	3	3	1	24	17			
11	2	1	0	1	1	2	0	1	8	03			
12	0	0	0	0	0	0	0	1	1	00			
13	2	3	4	1	3	1	1	0	15	09			
14	1	3	1	3	1	1	1	1	12	06			
15	1	2	2	3	1	2	2	1	14	07			
16	0	1	0	0	0	0	0	0	1	00			
17	4	3	4	2	5	3	3	2	26	20			
18	4	6	3	4	3	5	2	1	28	28			
19	2	2	2	0	3	0	1	1	11	05	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
20	1	2	1	0	0	1	1	1	7	03			
21	2	3	3	3	1	1	1	1	15	08			
22	1	1	2	2	3	3	1	2	15	08			
23	4	4	3	3	2	2	2	1	21	14			
24	2	2	3	4	2	2	2	2	19	11	BEGIN	END	
25	3	3	2	1	1	1	1	1	13	07	d h m	d h m	
26	3	2	4	5	6	3	2	2	27	26			
27	2	3	3	2	2	3	1	2	18	10			
28	3	3	2	1	2	2	2	2	17	09			
29	2	2	1	2	4	2	2	2	17	09			
30	2	2	2	2	1	1	1	1	12	05			
31	2	1	2	1	1	0	1	1	9	04			

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

675.7

3.69

2490

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
COLLEGE OBSERVATORY, COLLEGE, ALASKA

JULY 19 89

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

Data from Individual Observatories:

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	1	0717	SC	-7	+101	-34	1	6,7	6	104	1125	300	2 02
		17	0154	SC*	-15	+208	-52	18	2	6	162	1045	600	18 17

NORMAL MAGNETOGRAPHE

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 7-1-89	2400 UT, 7-31-89	1.0' /mm	3.7 γ/mm	26° 51.1' E
H	0001 UT, 7-1-89	2400 UT, 7-5-89	7.8 γ/mm		12639 γ
	0001 UT, 7-6-89	2400 UT, 7-19-89	(SAME)		12644 γ
	0001 UT, 7-20-89	2400 UT, 7-31-89	(SAME)		12642 γ
Z	0001 UT, 7-1-89	2400 UT, 7-14-89	7.7 γ/mm		55196 γ
	0001 UT, 7-15-89	2400 UT, 7-31-89	(SAME)		55200 γ

STORM MAGNETOGRAPHE

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 7-1-89	2400 UT, 7-31-89	7.9' /mm	29.4 γ/mm	
H	(SAME)	(SAME)	43.5 γ/mm		
Z	(SAME)	(SAME)	49.0 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
27° 02.1' E	12798 γ	55340 γ

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: JULY 3, 4, 8, 12, 16,

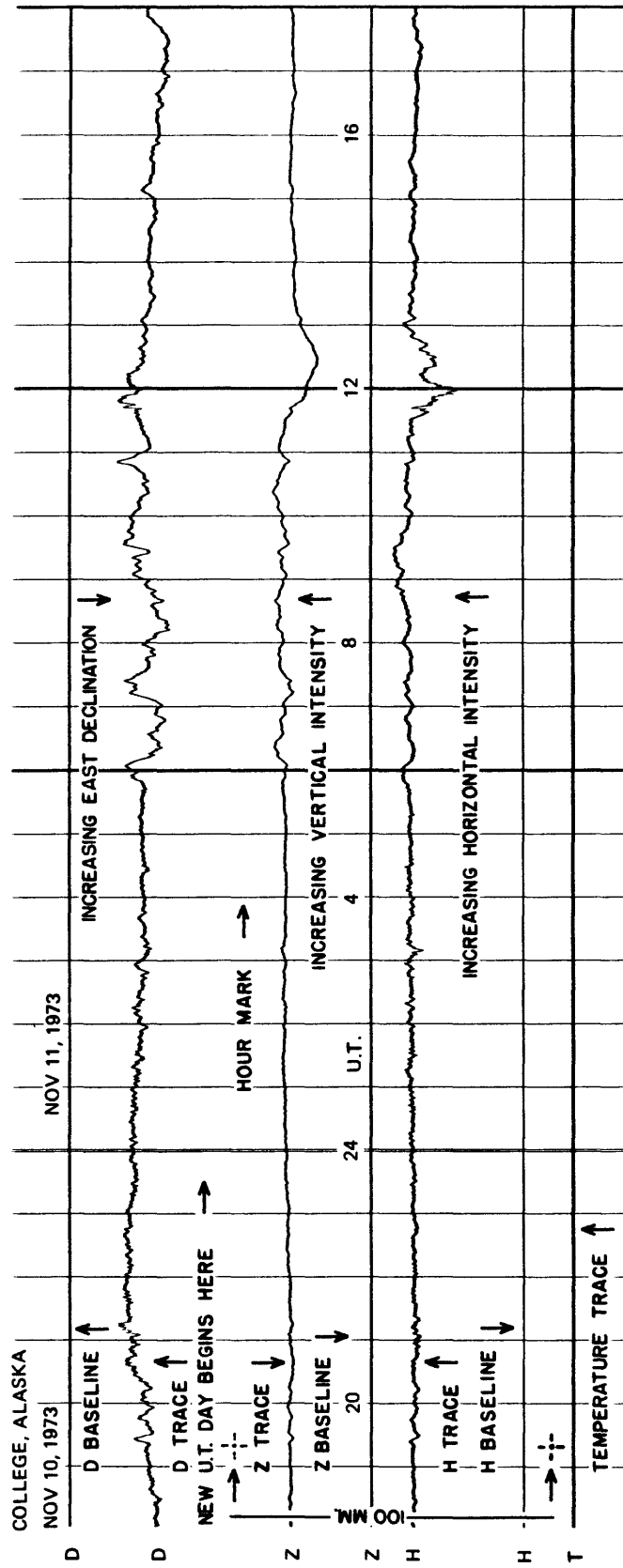
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

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
	3			4			8			12			16			3			4			8			12			16			DAY	A _k	HOUR				
	02	00	00	00	01	00	00	00	01	00	00	00	00	00	02	00	00	01	00	00	00	00	00	00	00	00	00										
01	10	-39	40	9	17	26	196	160	175	160	160	160	204	191	185	181	187	07	112	102	96	97	100	100	201	210	217	209	208	210	196	195	190	185	187	01	
02	-1	-23	41	17	41	51	210	182	179	176	180	210	210	220	220	210	220	207	210	220	220	220	220	207	210	220	220	220	220	204	196	199	188	187	02		
03	12	-8	51	41	51	51	217	211	190	192	192	210	210	230	230	210	217	219	219	230	210	217	217	219	219	230	210	210	198	190	200	182	189	03			
04	40	40	60	64	73	73	222	200	200	206	201	206	206	209	209	218	218	209	209	225	210	218	218	219	219	230	210	210	198	190	200	182	189	04			
05	91	72	71	78	87	87	211	208	206	210	222	210	210	206	206	218	218	206	206	222	212	218	218	219	219	230	210	210	196	190	191	180	180	05			
06	113	91	73	86	101	101	206	210	210	210	205	210	210	202	202	220	220	202	217	219	230	220	220	219	219	230	210	195	190	195	179	182	06				
07	112	102	96	97	97	97	201	210	217	209	208	209	209	200	200	229	230	200	221	218	229	230	230	219	219	230	210	192	190	200	184	177	07				
08	112	102	97	100	100	100	207	210	220	210	220	210	210	190	190	230	230	190	220	221	230	230	230	219	219	230	210	191	190	200	190	162	08				
09	100	98	88	91	98	98	219	209	230	224	239	239	205	179	179	224	239	179	224	224	224	239	239	219	219	230	210	169	179	191	173	173	09				
10	100	97	99	88	80	80	209	210	225	210	218	210	205	205	205	210	210	205	210	210	210	210	210	210	210	210	210	165	180	179	189	174	16				
11	92	50	94	81	76	76	206	212	222	228	218	210	210	210	210	210	210	210	210	220	220	218	218	219	219	230	210	173	183	178	180	173	17				
12	94	50	84	81	85	85	202	217	219	230	220	208	197	197	197	208	239	202	217	217	208	239	239	219	219	230	210	173	185	200	180	174	18				
13	101	91	101	91	98	98	200	221	218	229	230	230	199	199	199	191	220	200	218	201	191	220	220	219	219	230	210	170	185	194	169	175	19				
14	126	101	125	119	116	116	190	220	221	230	230	230	174	174	174	182	198	174	189	180	182	198	198	219	219	230	210	155	182	180	154	176	20				
15	140	119	128	157	132	132	179	210	224	224	239	170	170	170	170	179	179	170	170	170	160	179	179	219	219	230	210	142	171	174	154	173	21				
16	182	180	180	211	189	189	205	237	210	210	210	189	189	205	205	210	210	189	189	210	158	174	174	219	219	230	210	149	162	174	160	163	22				
17	222	215	229	260	240	240	210	243	220	210	239	210	210	210	210	210	210	159	157	160	158	174	174	219	219	230	210	169	167	161	157	23					
18	251	222	243	272	258	258	197	240	217	208	239	197	197	197	197	208	239	197	217	217	208	239	239	219	219	230	180	185	200	180	174	18					
19	254	213	253	251	260	260	199	218	201	191	220	260	199	199	199	191	220	200	218	201	191	220	220	219	219	230	170	185	194	169	175	19					
20	221	190	221	212	229	229	174	189	180	182	198	229	174	174	174	182	198	174	189	180	182	198	198	219	219	230	155	182	180	154	176	20					
21	170	155	188	160	183	183	170	170	170	160	179	183	170	170	170	160	179	170	170	170	158	174	174	219	219	230	142	171	174	154	173	21					
22	119	80	120	106	140	140	159	157	160	158	174	140	159	159	159	158	174	159	157	160	158	174	174	219	219	230	149	162	174	160	163	22					
23	58	22	51	58	90	90	136	149	151	151	166	90	136	136	149	151	166	136	149	151	151	166	166	219	219	230	169	167	176	161	157	23					
24	-1	-10	11	13	49	49	139	143	157	160	175	49	139	139	143	157	175	139	143	157	160	175	175	219	219	230	177	178	173	163	150	24					
DAILY SUM	2718	2290	2744	2743	2861	2861	4664	4836	4822	4772	4980	4482	4502	4482	4580	4289	4302	4482	4502	4580	4289	4302	4482	4502	4482	4580	4289	4302	4482	4580	4289	4302	DAILY SUM				
DAILY MEAN	113	95	114	114	119	119	194	202	201	199	208	187	188	187	191	179	179	187	188	191	179	179	187	188	187	191	179	179	187	179	179	DAILY MEAN					
MEAN	111												201												185												MEAN

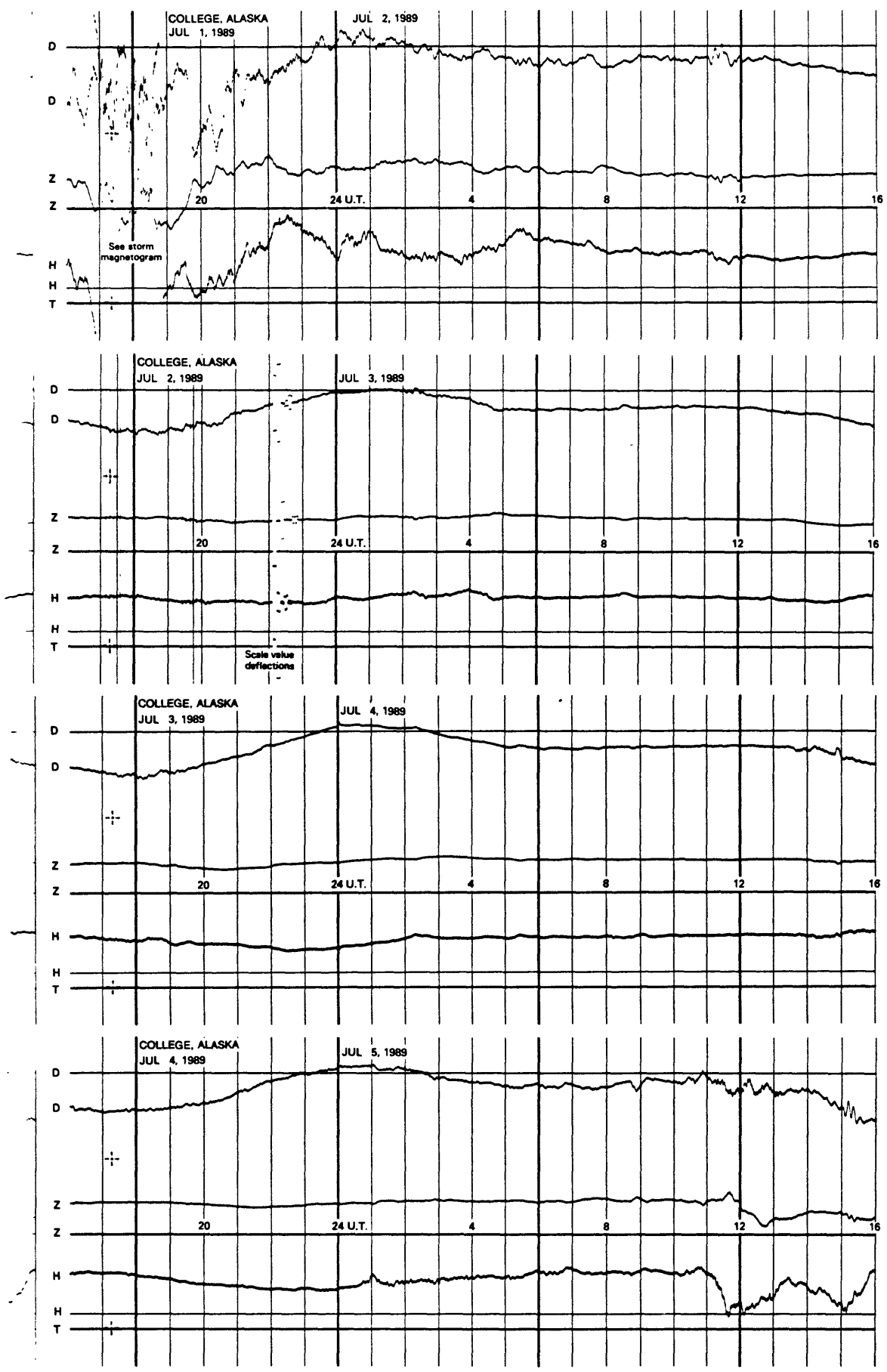
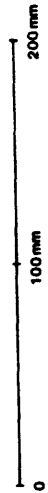
Scaled *MD* Checked *CAJ*

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

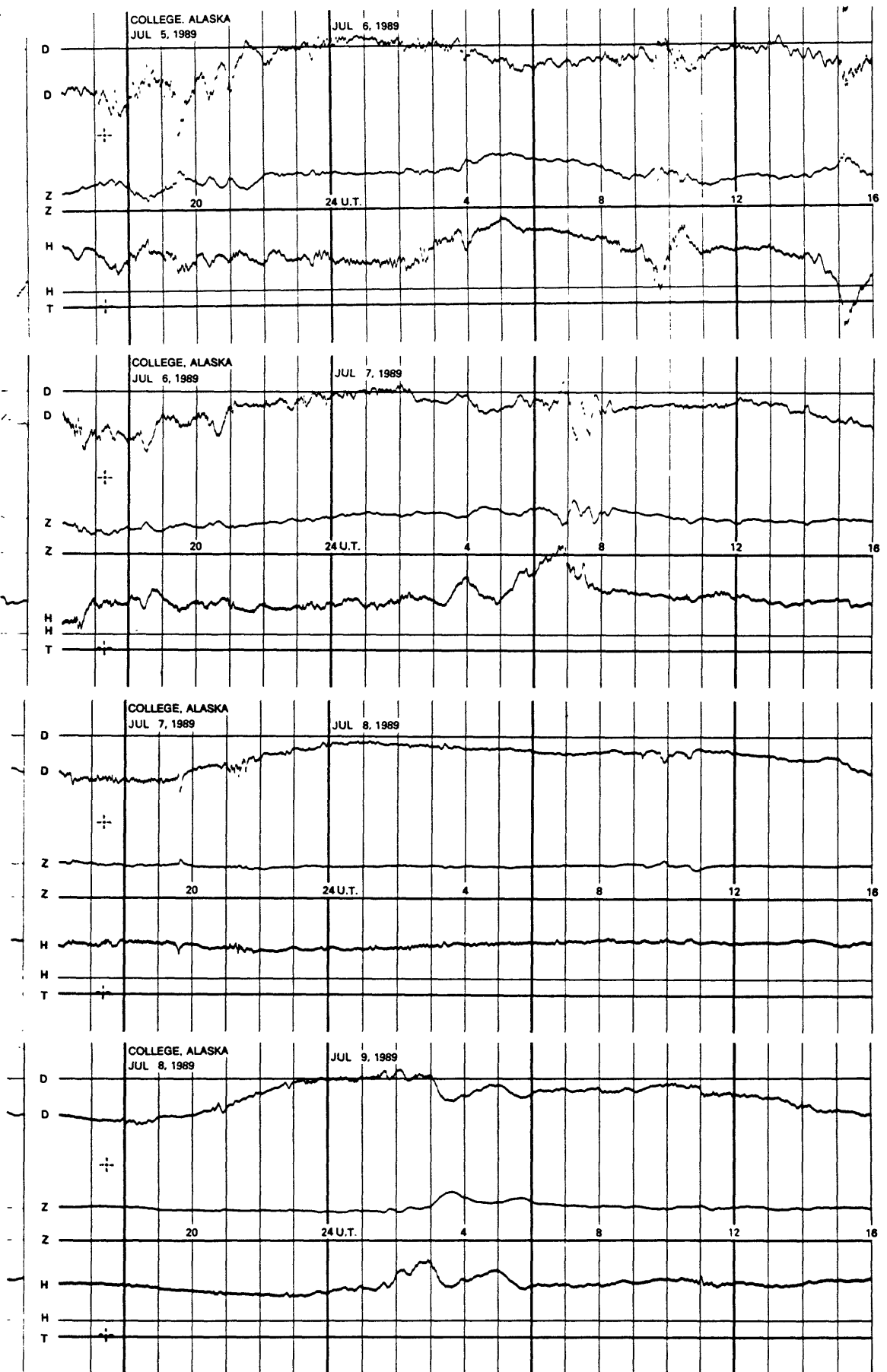


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

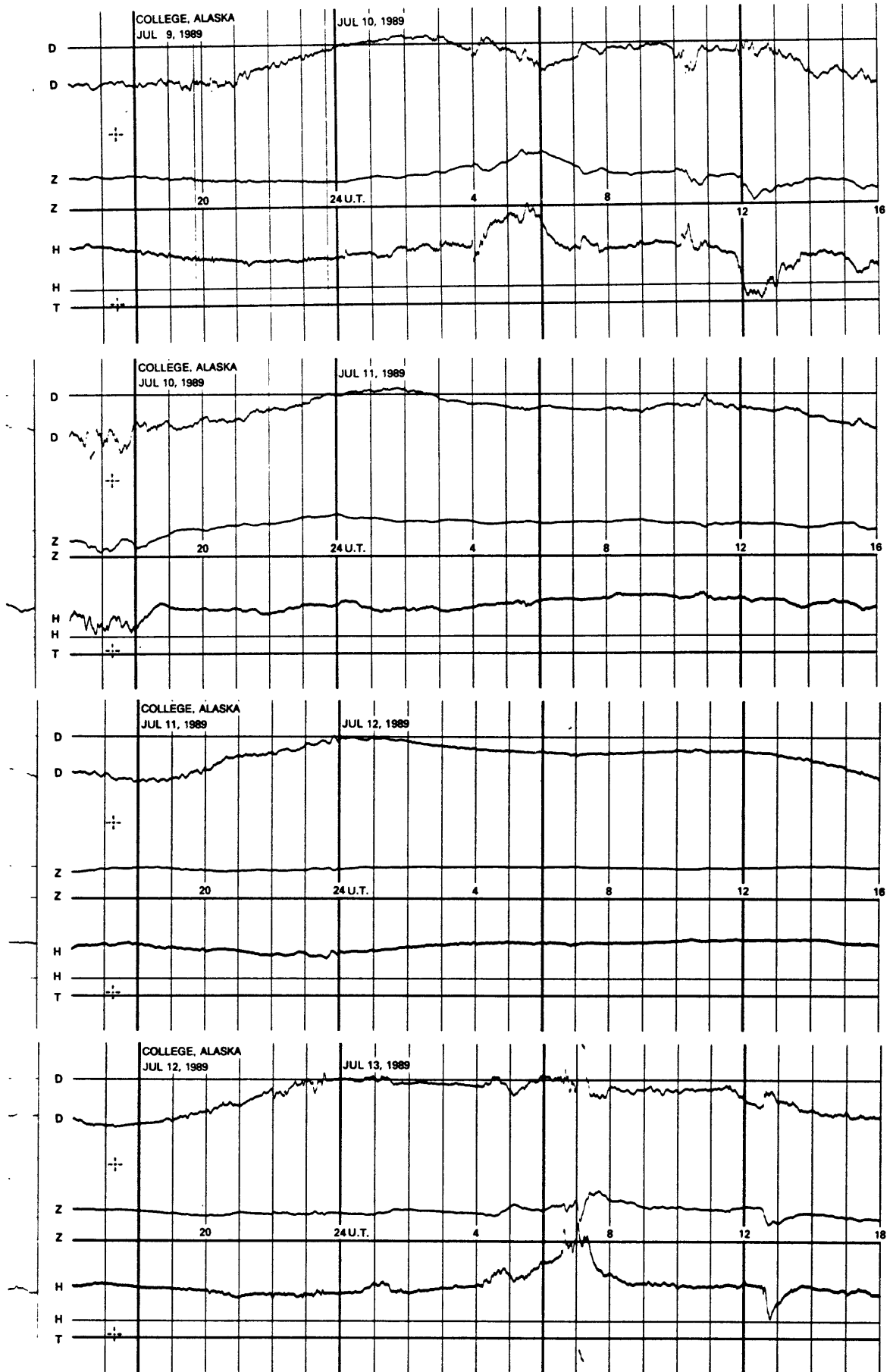
NORMAL MAGNETOGRAMS



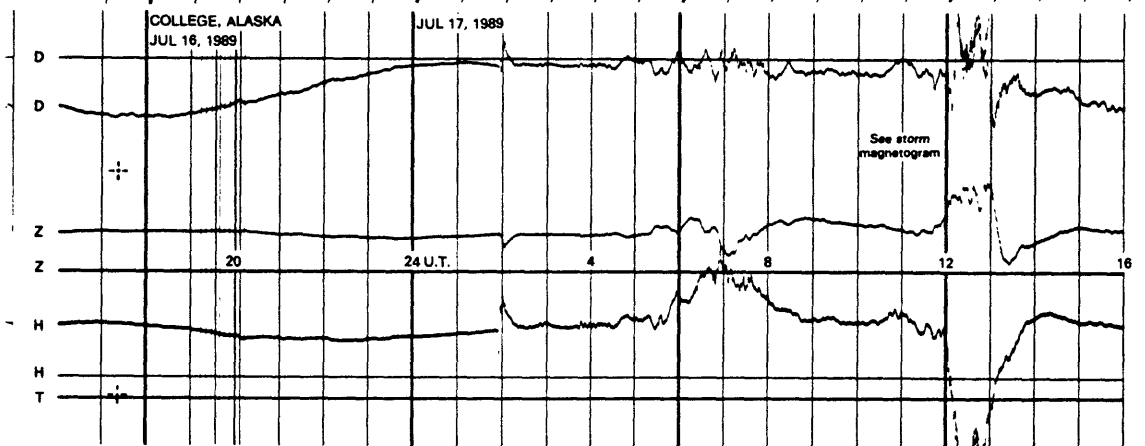
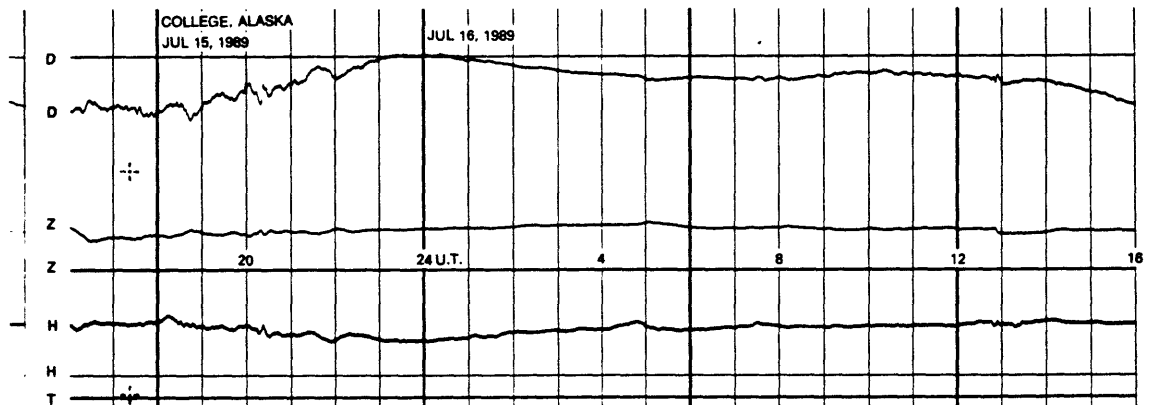
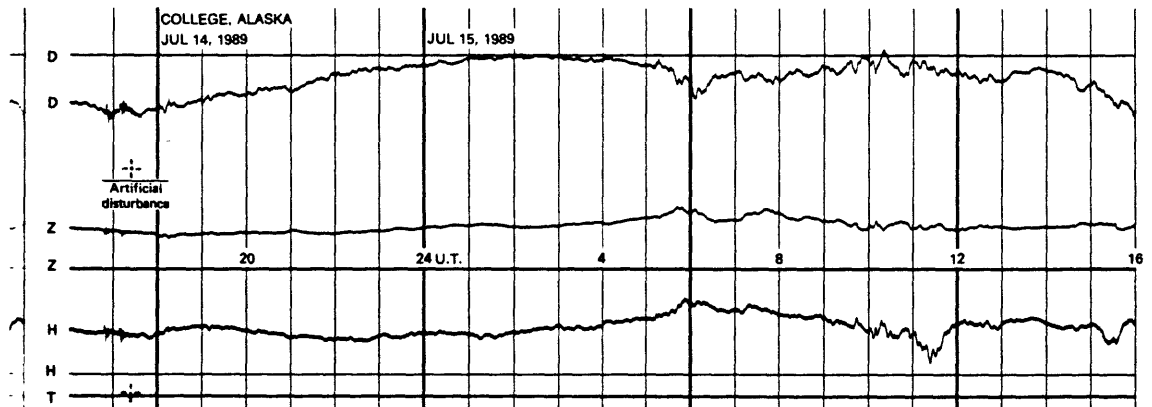
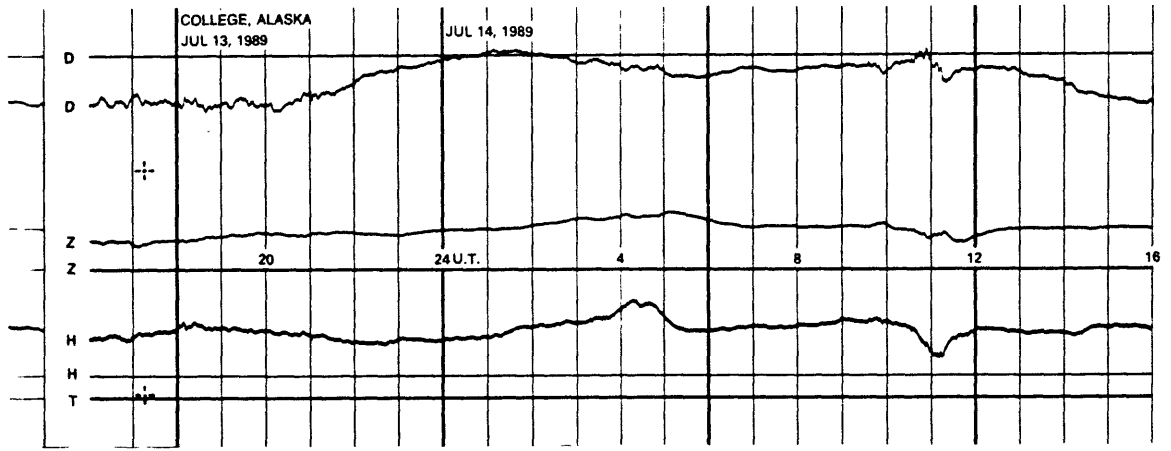
NORMAL MAGNETOGRAMS



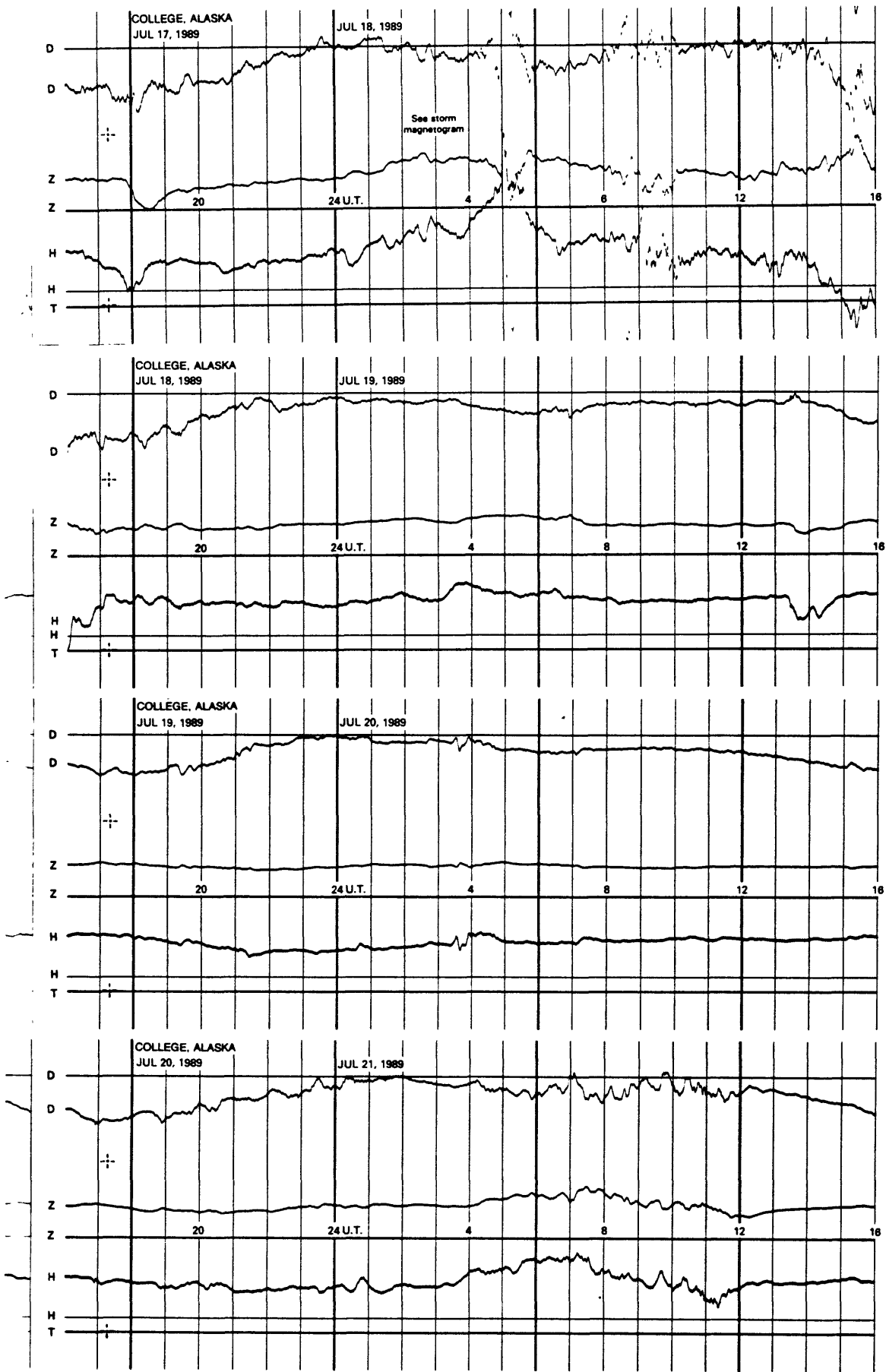
NORMAL MAGNETOGRAMS



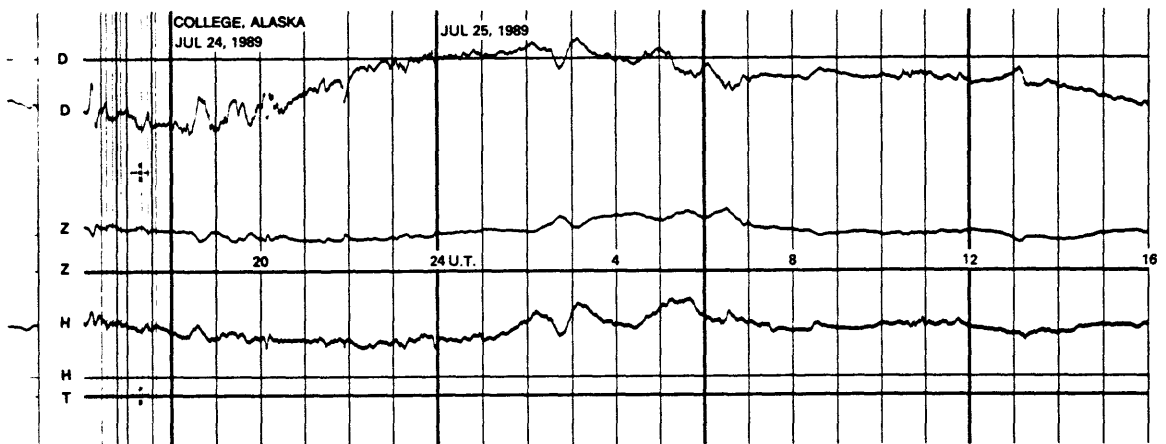
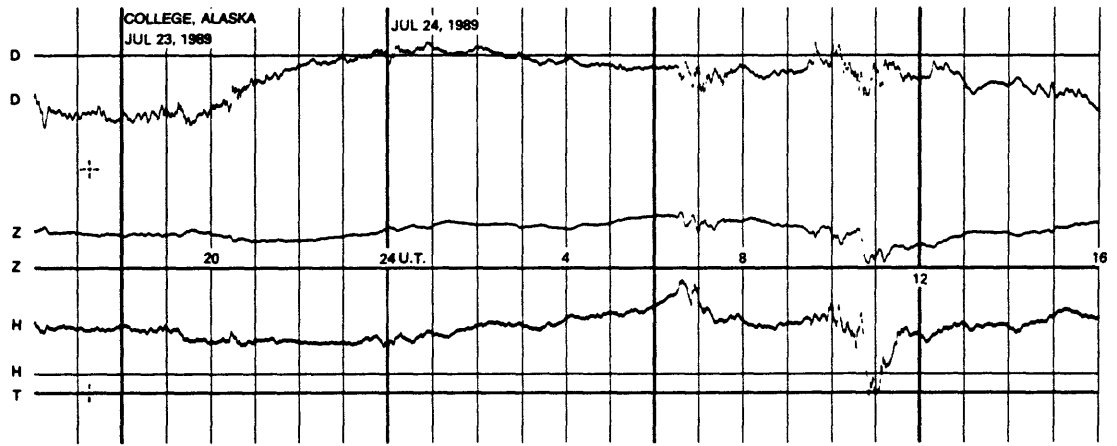
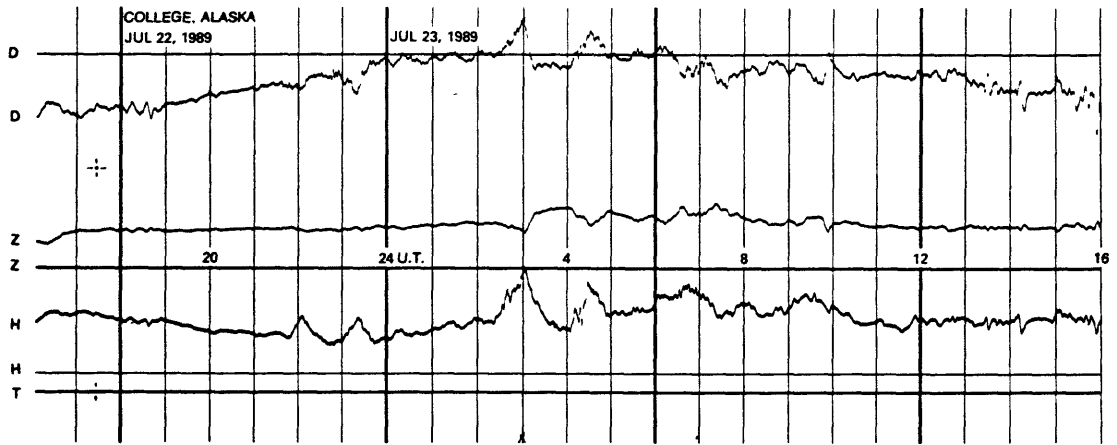
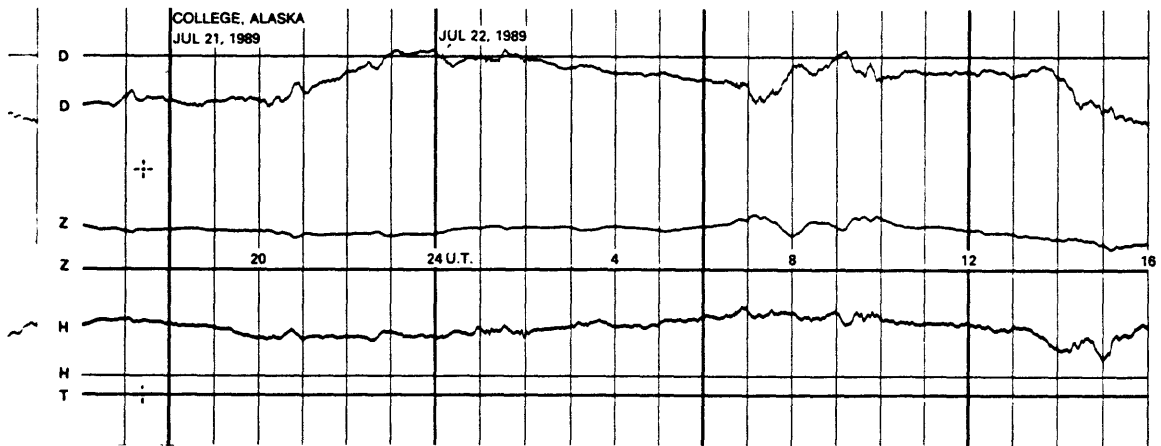
NORMAL MAGNETOGRAMS



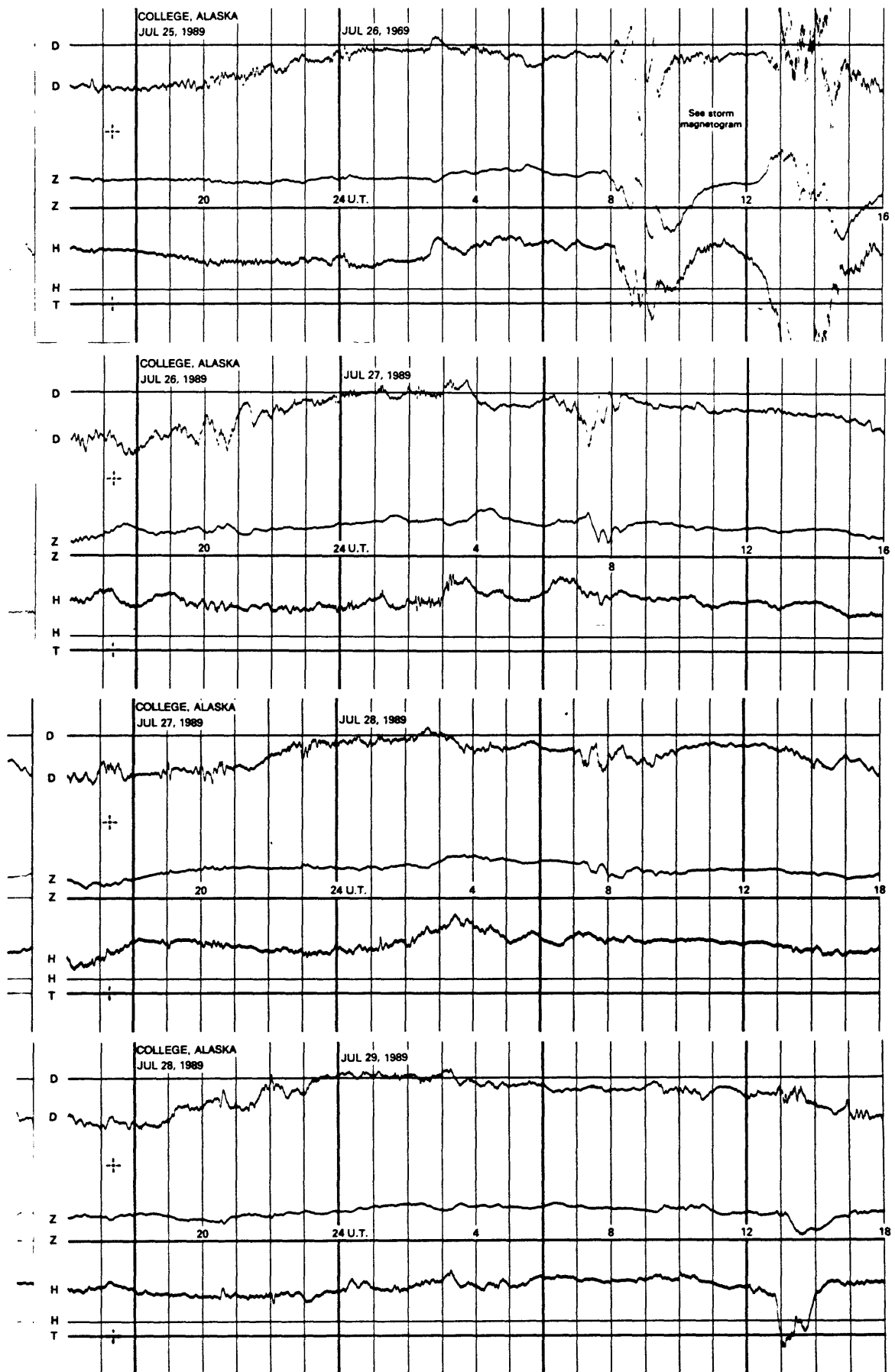
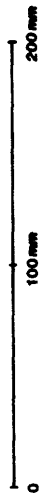
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

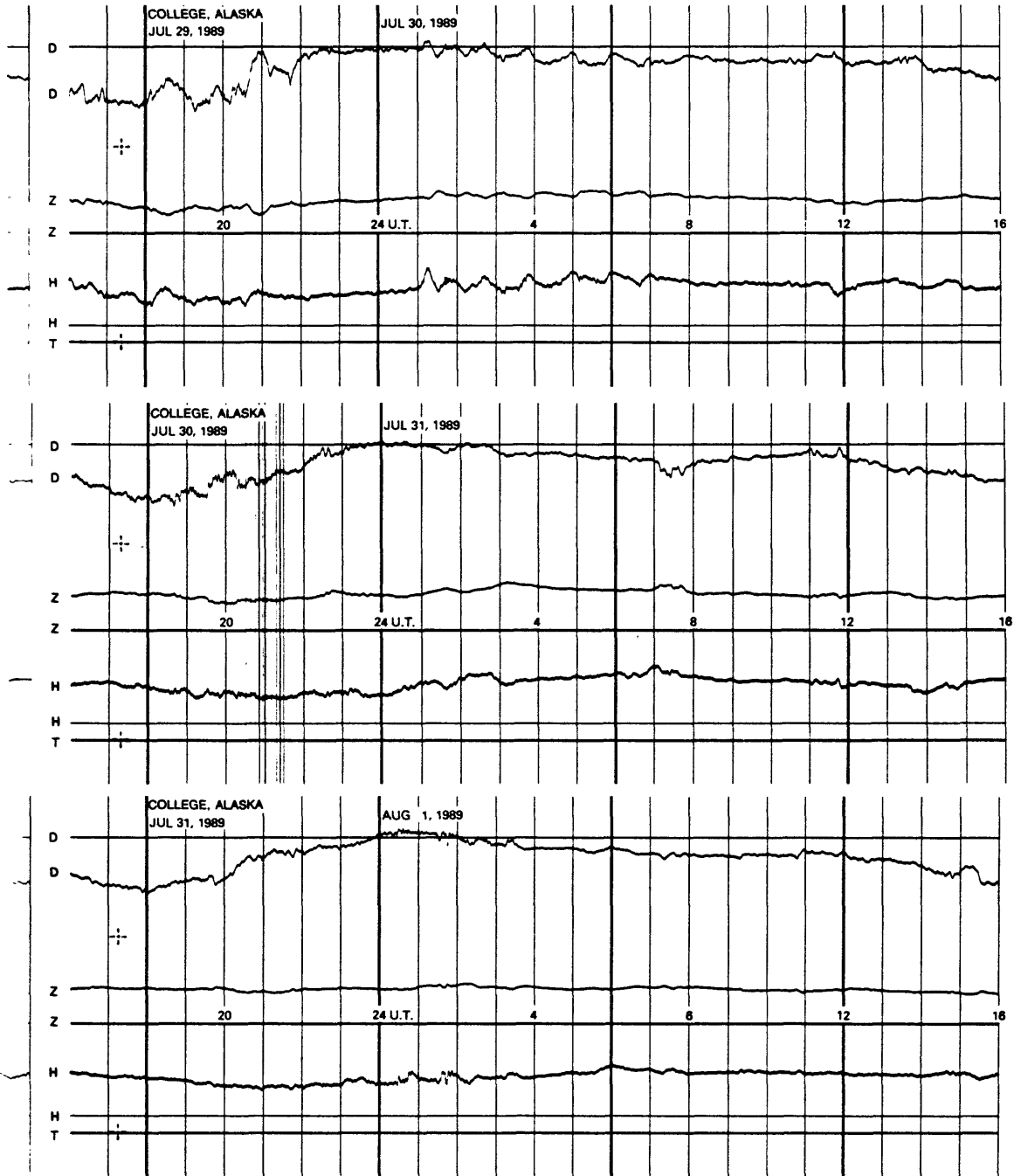


NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

200 mm
100 mm
0



STORM MAGNETOGRAMS

