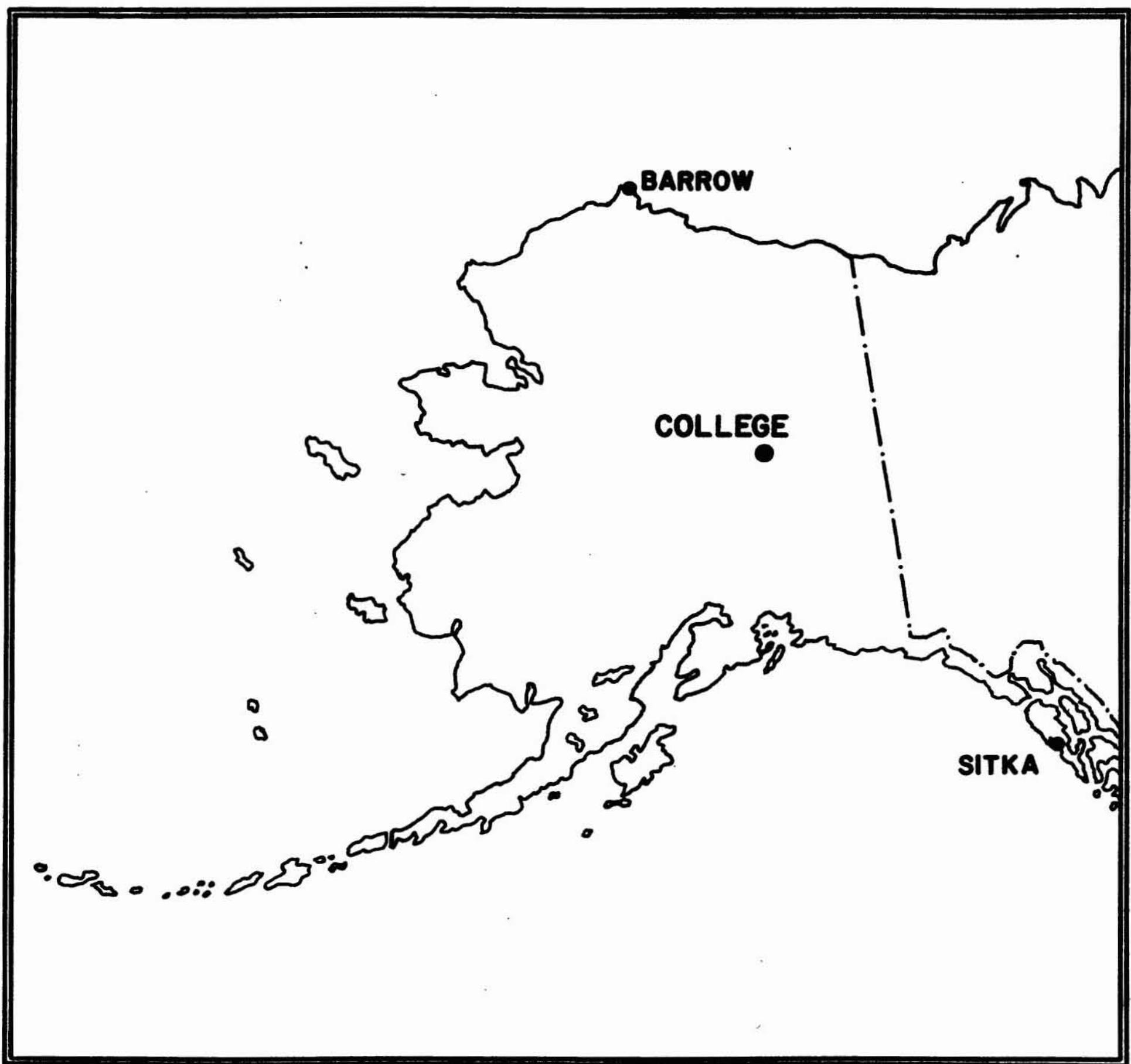


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

JULY 1991

OPEN FILE REPORT 91-0300G



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 10⁷ 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 ⁷)

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

JULY, 1991

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		20 mm hr	d	h	m
1	4	4	2	2	2	3	3	2	22	14			
2	2	4	4	5	3	4	3	3	28	23			
3	4	5	5	5	5	4	3	4	35	36	8	16	37
4	4	4	4	3	4	3	2	1	25	19			
5	2	1	2	2	1	2	1	1	12	5			
6	2	2	1	2	3	3	2	2	17	9			
7	3	4	0	0	2	2	2	2	15	9			
8	3	4	5	5	5	8	7	4	41	74			
9	3	6	7	7	8	5	6	4	46	96			
10	4	4	5	5	5	4	3	2	32	31			
11	2	3	5	6	5	5	3	3	32	35			
12	4	4	4	6	3	5	4	3	33	33			
13	5	6	7	7	7	7	6	5	50	102			
14	6	6	6	6	6	5	5	3	43	64			
15	4	4	4	4	2	2	2	2	24	17			
16	4	3	2	1	2	5	5	3	25	21			
17	5	4	6	5	4	5	3	4	36	40			
18	4	3	2	2	3	3	3	3	23	15			
19	3	4	6	6	5	6	5	4	39	51			
20	4	5	7	5	5	4	3	3	36	46			
21	5	6	4	4	5	3	3	3	33	34			
22	4	5	4	5	5	3	3	4	33	32			
23	4	3	2	4	4	4	3	2	26	19			
24	2	3	2	3	3	2	2	2	19	10			
25	1	3	5	4	4	4	2	1	24	20			
26	2	2	2	1	3	2	1	1	14	7			
27	1	1	1	0	0	2	2	3	10	5			
28	3	3	1	0	0	1	1	2	11	6			
29	2	2	1	2	3	2	1	2	15	7			
30	2	2	3	2	1	3	2	1	16	8			
31	2	1	2	0	1	1	1	2	10	4			

K SCALE USED:
 LOWER LIMIT FOR K = 9
 CURRENT SCALE VALUE
 LOWER LIMIT FOR K = 9

D	H	Z
675.7	322.2	
3.68	7.73	
2490	2490	

(mm)
 (γ/mm)
 (to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED

John B. Townshend, Chief

OBSERVER IN CHARGE

Data from Individual Observatories:PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKAJULY 19⁹¹WDC-A FOR SOLAR-TERRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80302 U.S.A.

Obs. # letter 1st 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)	
CO	64°6' N	3	03XX	..				3	2,3,4,5	5	105	940	690	3 19
		8	1637	SC	+207	-1980	+325	8	6	8	317	2940	1100	10 19
								9	5					
		13	02XX	..				13	3,4,5,6	7	417	2200	1670	14 20
		16	16XX	..				17	3	6	112	1050	620	18 04
		19	05XX	..				20	3	7	158	1280	640	22 16

College Observatory, College, Alaska -- Preliminary Calibration Data For: JULY

1991

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0001 U.T., 7-1-91	1600 U.T., 7-30-91	1.0' / mm	3.78' / mm	26° 34.7' E
	1601 U.T., 7-30-91	2400 U.T., 7-31-91	↓	↓	25° 59.3' E
H	0001 U.T., 7-1-91	2400 U.T., 7-31-91	7.7 δ / mm	55202 δ	
Z	0001 U.T., 7-1-91	2400 U.T., 7-31-91	7.8 δ / mm	12650 δ	

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	BASELINE
D	0001 U.T., 7-1-91	2400 U.T., 7-31-91	7.9' / mm	29.4 δ / mm
H	(SAME)	(SAME)	43.4 δ / mm	
Z	(SAME)	(SAME)	48.9 δ / 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): -5δ; i.e., H absolute and baseline values are 5δ less than previously reported.

Vertical Intensity (Z): +33δ; i.e., Z absolute and baseline values are 33δ higher than previously reported.

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
26° 40.8' E	12752 δ	55328 δ

*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: JULY 5, 26, 27, 28, 29.

Observatory
College, Alaska Month: JULY Year: 1991

Form CO - 1/86

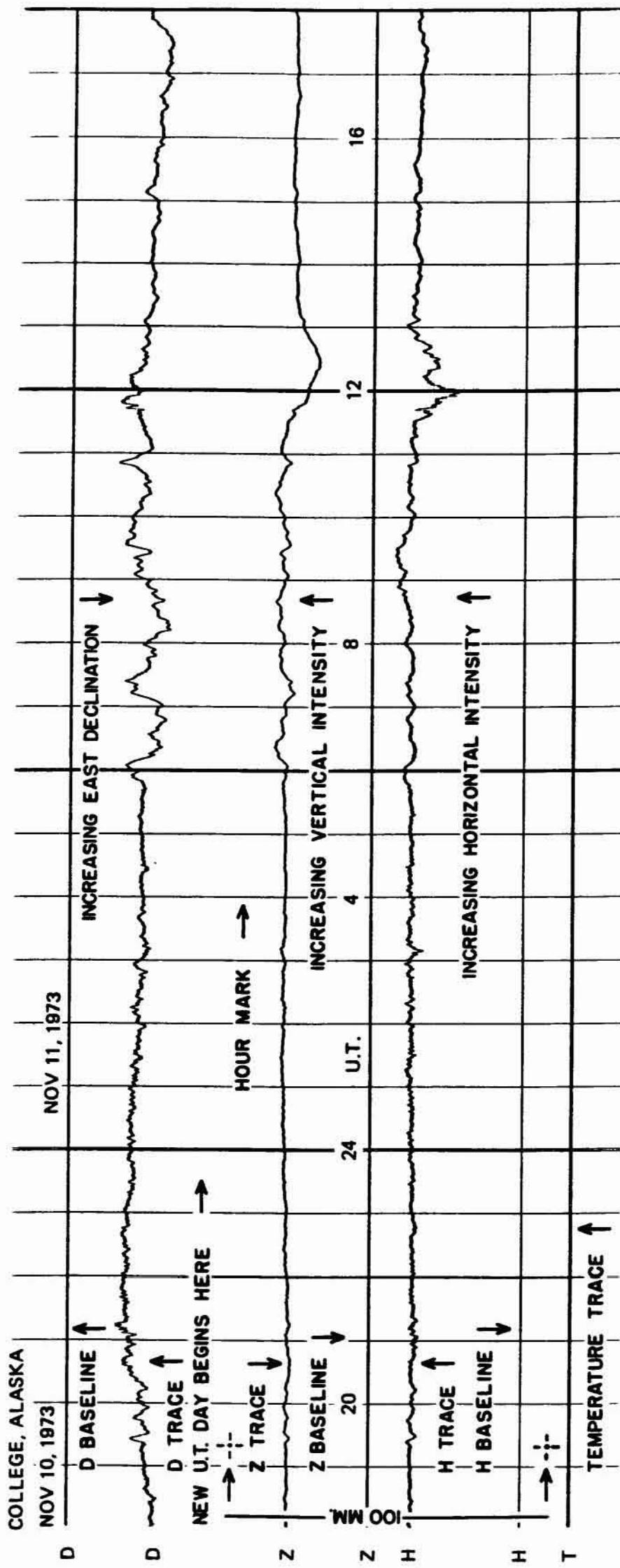
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

(UNIVERSAL TIME)

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

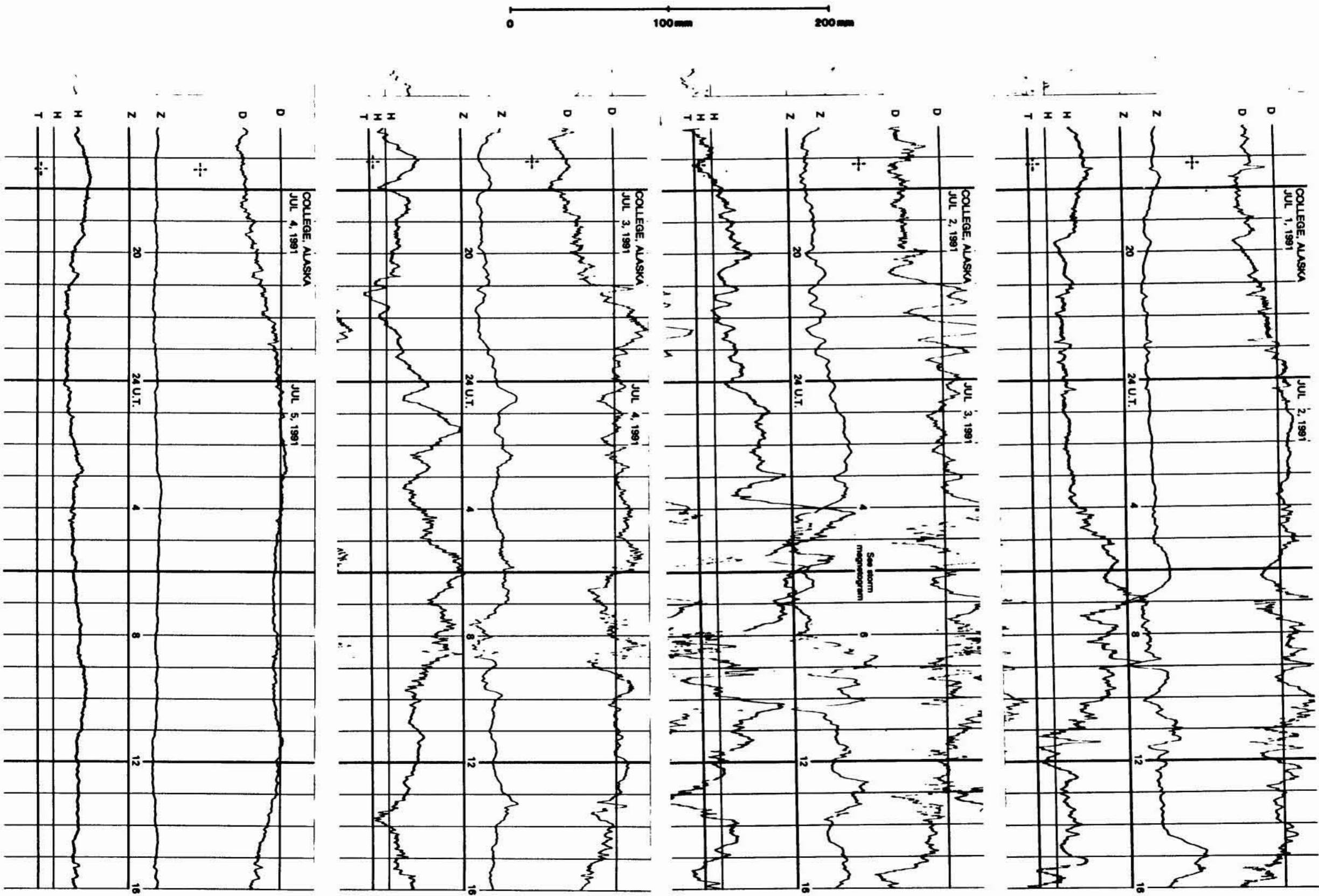
COMPONENT	D					H					Z					COMPONENT		
	DAY	5	26	27	28	29	5	26	27	28	29	5	26	27	28	29		
A ₁	01	7	-55	-40	-71	-31	94	112	130	158	101	172	158	149	200	164	A ₁	
	02	-8	-61	-51	-60	-43	116	134	152	110	115	174	159	149	209	162	HOUR	
	03	-26	-38	-30	-89	-41	157	147	158	151	140	180	170	189	170	155	03	
	04	-9	-24	-37	-37	-21	134	139	136	240	146	202	176	167	230	155	04	
	05	10	7	-19	17	-25	121	174	152	158	166	197	179	164	222	140	05	
	06	30	18	10	31	7	130	204	150	136	172	189	210	171	190	160	06	
	07	43	18	19	29	-5	141	192	165	132	170	188	203	179	168	158	07	
	08	39	23	35	42	29	166	166	167	136	170	182	205	183	169	170	08	
	09	30	22	40	51	50	170	162	150	151	163	176	190	174	172	172	09	
	10	37	23	41	49	37	201	170	150	137	162	180	181	167	166	167	10	
	11	28	34	49	36	20	187	172	157	140	175	176	182	163	160	160	11	
	12	3	24	50	48	6	150	163	160	142	166	156	170	160	161	154	12	
	13	19	12	62	63	56	154	83	162	150	157	155	117	160	163	161	13	
	14	59	70	100	80	80	152	137	160	156	63	168	96	165	167	138	14	
	15	14	139	136	110	151	136	146	162	160	58	180	147	159	121	84	15	
	16	150	171	159	144	214	138	170	170	160	142	173	154	151	121	123	16	
	17	199	189	153	184	228	139	160	148	154	140	172	161	155	175	140	17	
	18	206	220	212	209	221	122	130	120	148	113	159	168	146	172	143	18	
	19	180	195	228	201	230	130	102	95	122	81	142	151	138	191	152	145	24
	20	141	169	246	180	202	125	101	76	99	66	143	149	159	167	130	20	
	21	103	120	194	108	162	120	101	42	97	72	138	137	142	154	118	21	
	22	92	41	121	89	92	105	112	48	90	71	150	126	121	149	112	22	
	23	43	-11	-29	31	3	103	120	61	94	84	147	129	140	149	119	23	
	24	8	-7	-72	13	-39	98	136	113	102	104	159	138	191	152	145	24	
DAILY SUM	1498	1332	1590	1458	1583	3289	3447	3184	3323	3004	4058	3856	3837	4199	3474	DAILY SUM		
DAILY MEAN	62	56	66	61	66	137	144	133	138	125	169	161	160	175	145	DAILY MEAN		
MEAN			62								135			162		MEAN		
																Sealed TWO Checked ✓		

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

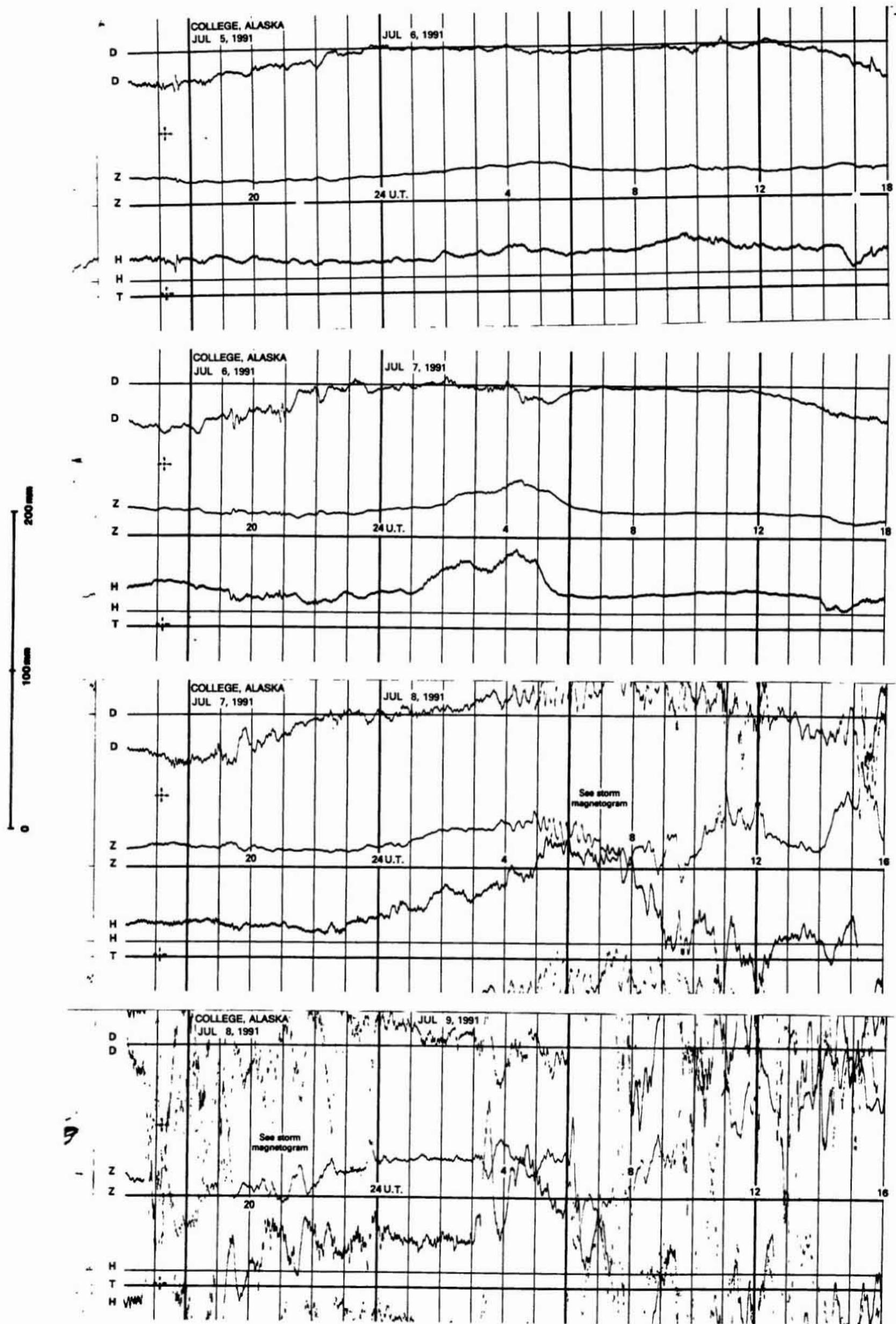


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

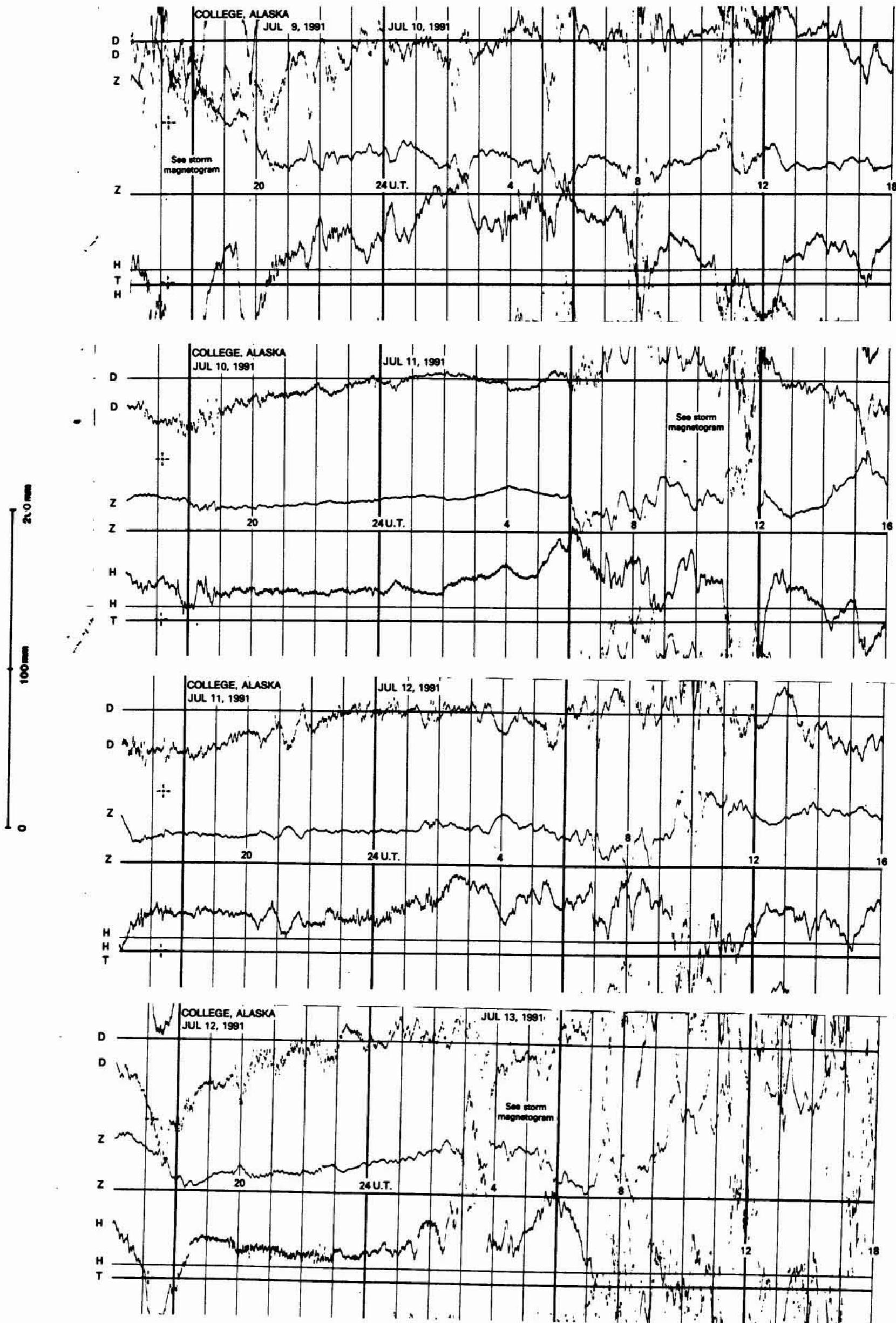
NORMAL MAGNETOGrams



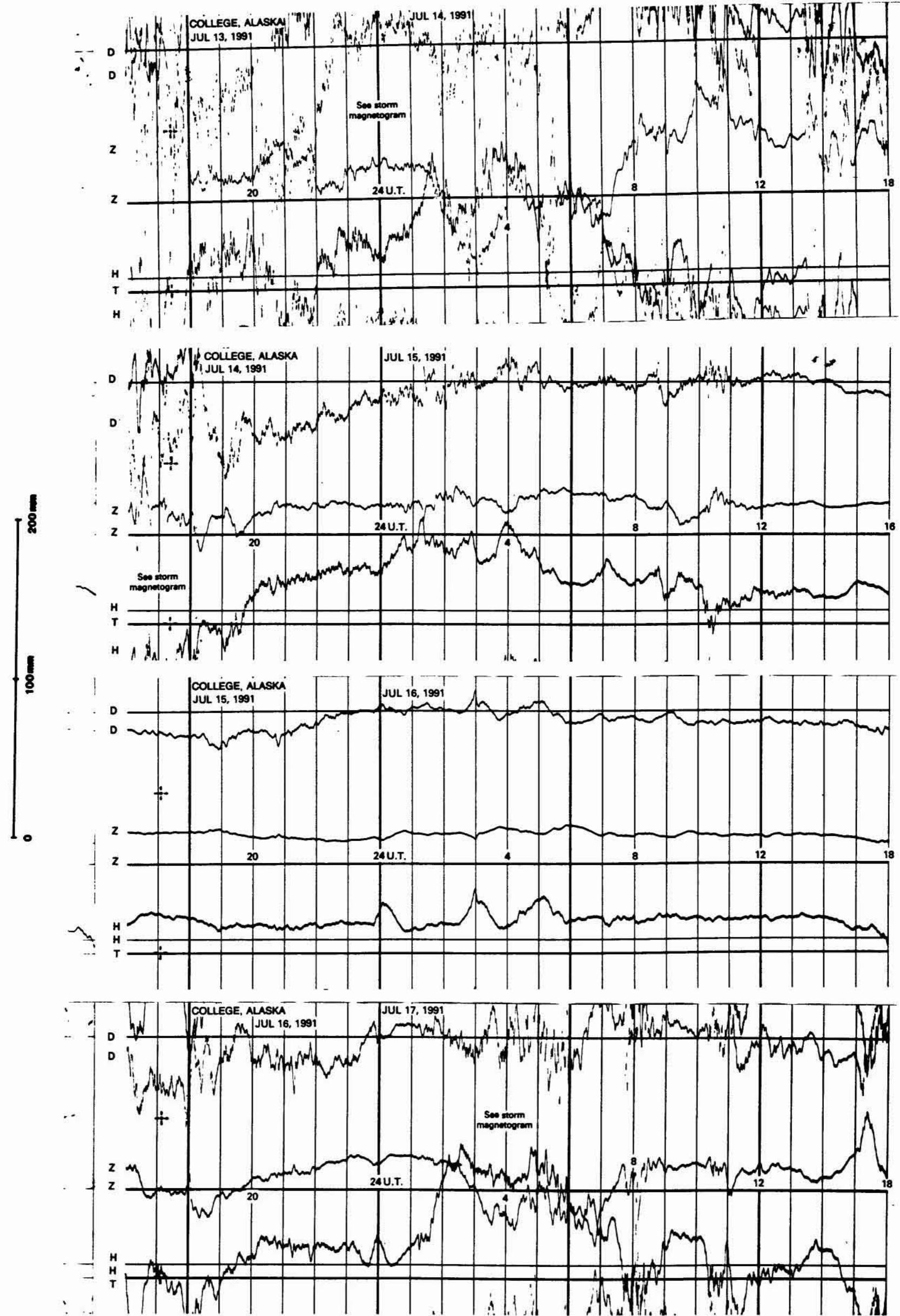
NORMAL MAGNETograms



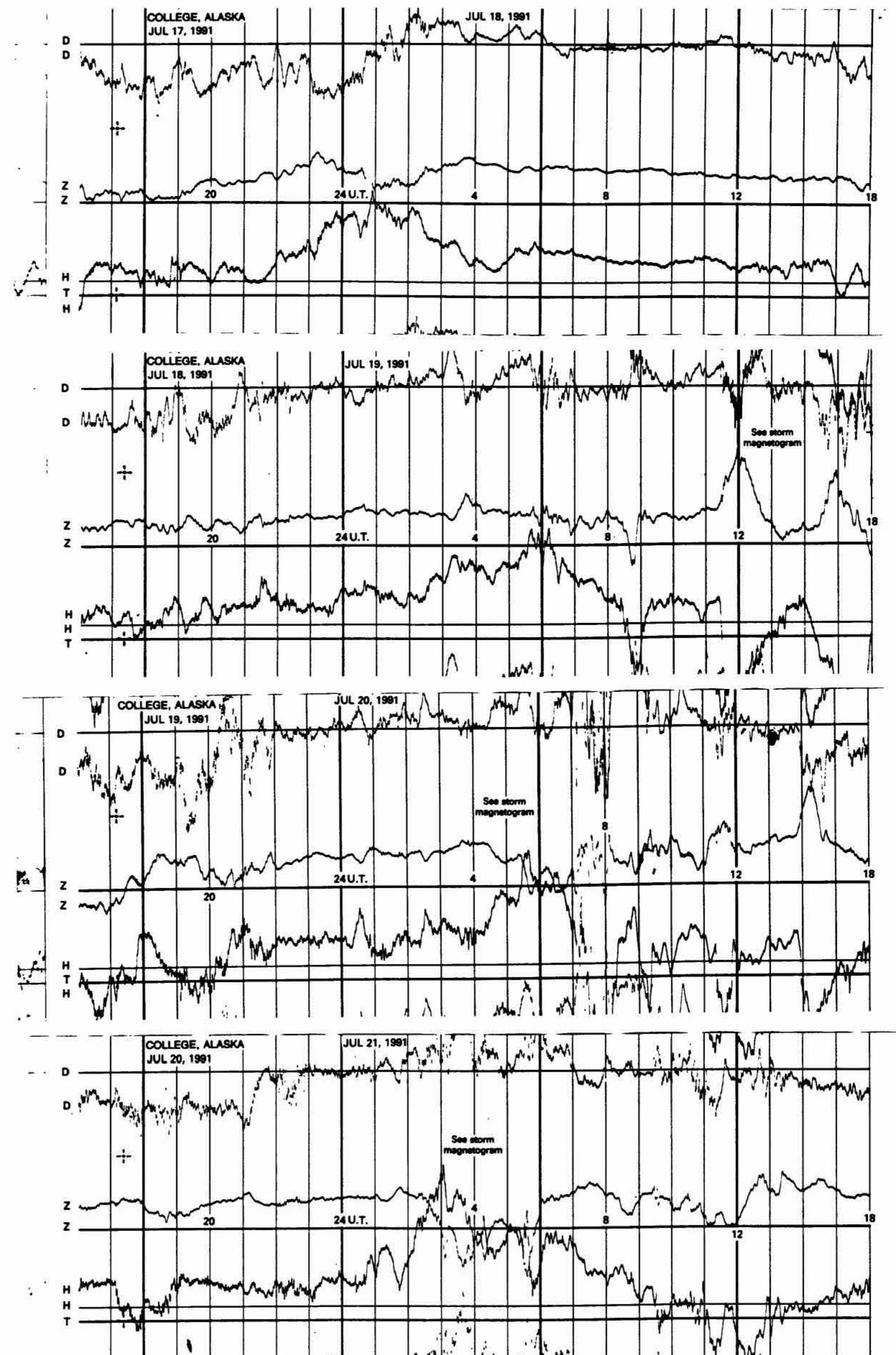
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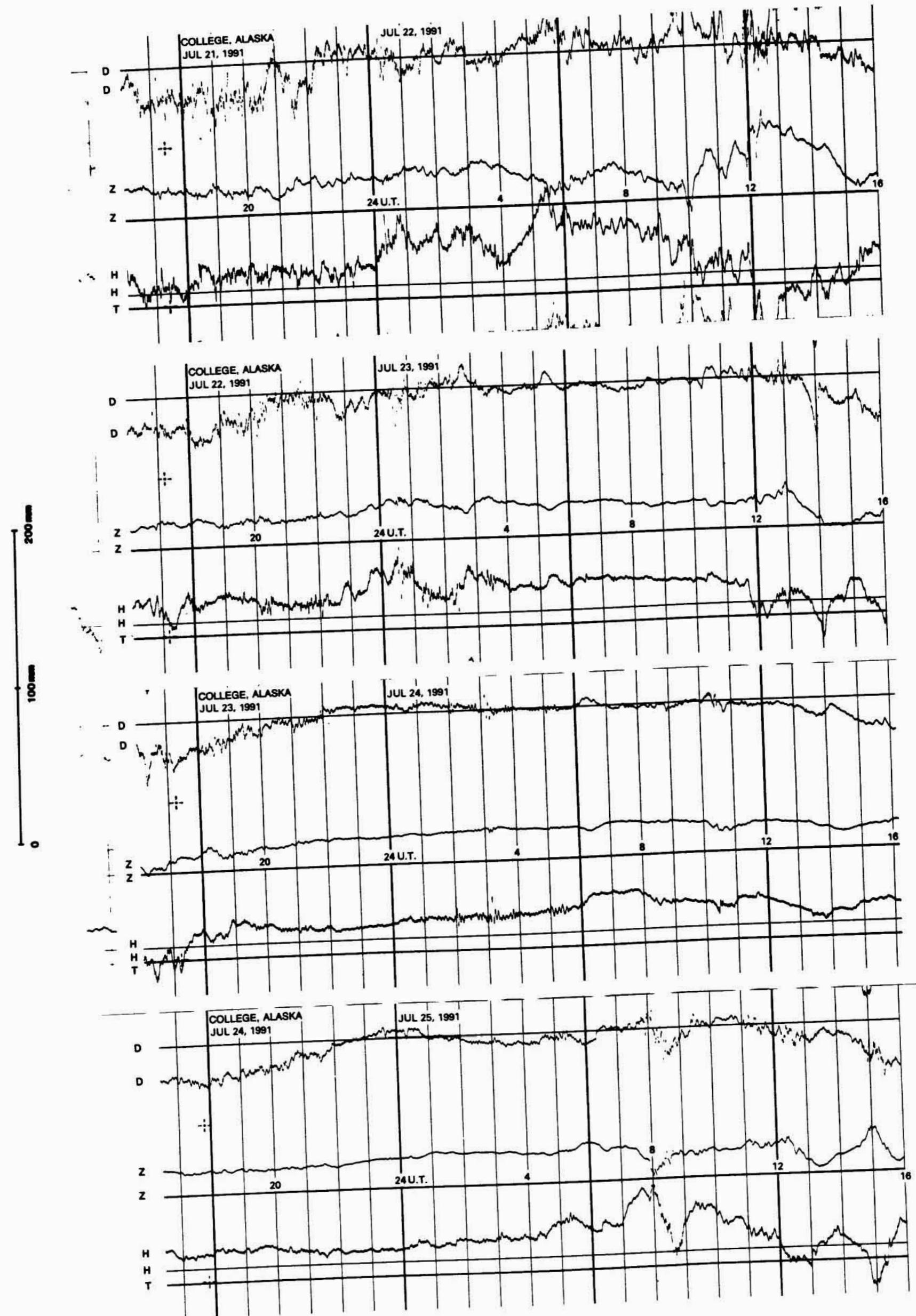
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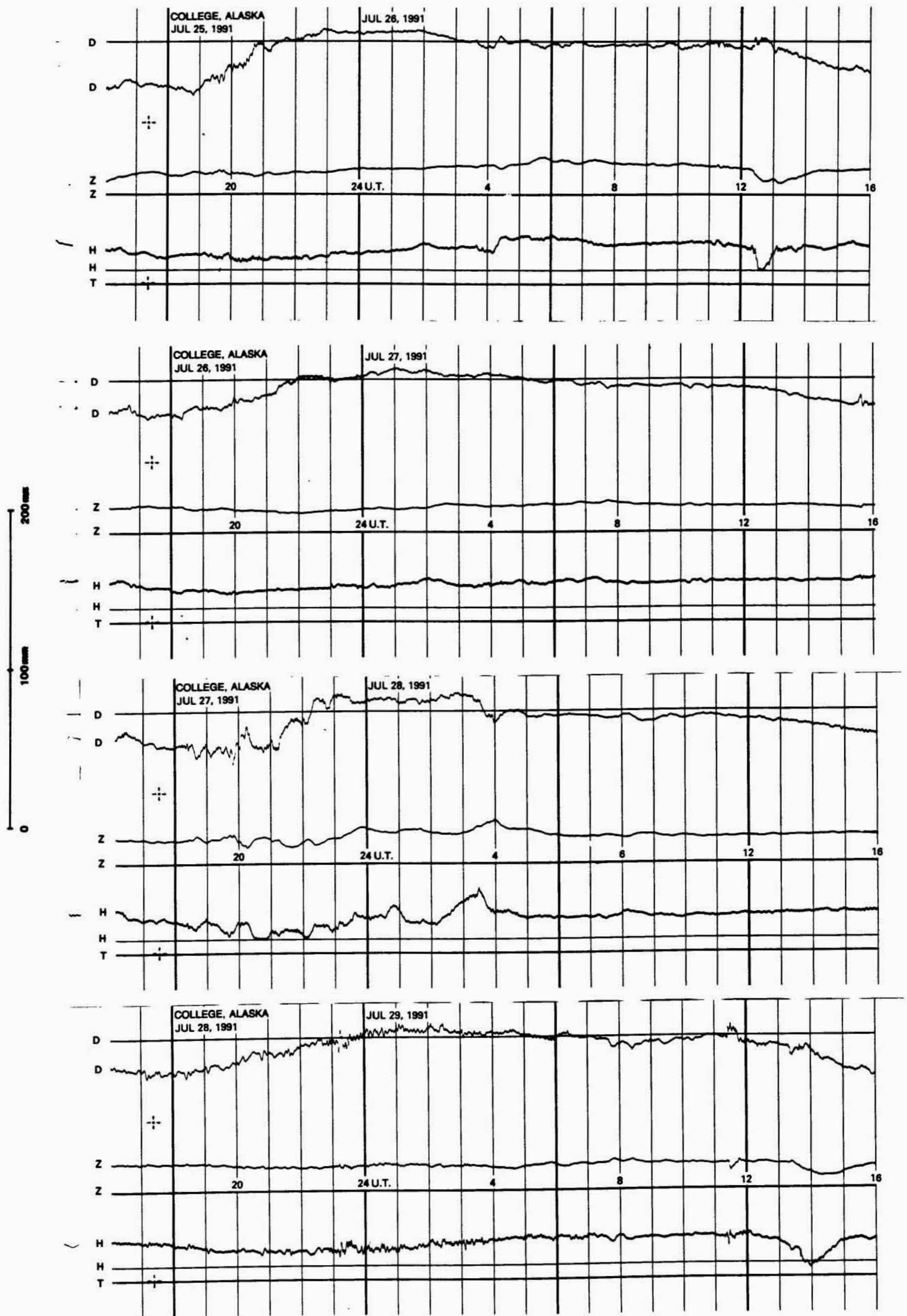
NORMAL MAGNETOGRAMS



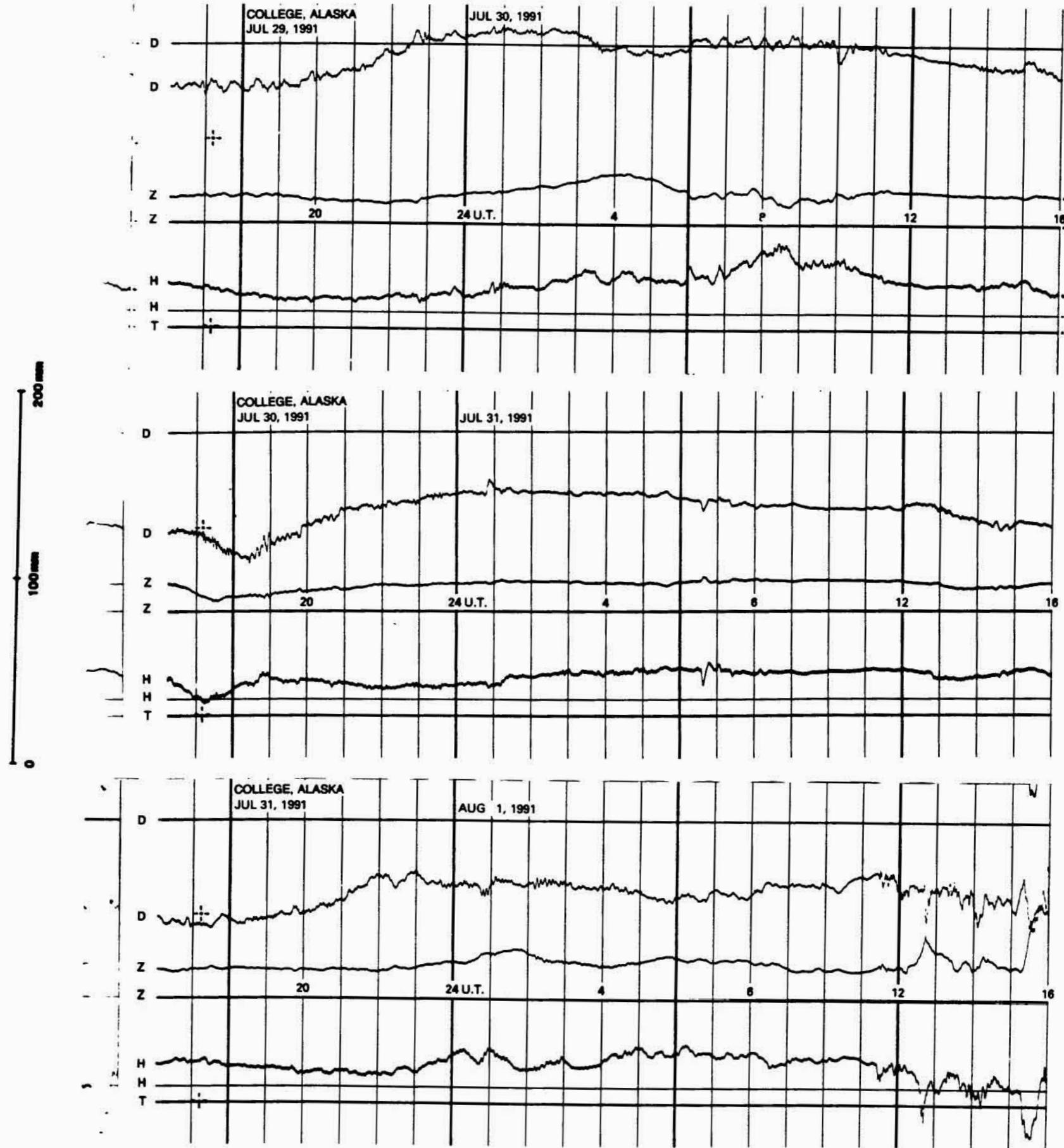
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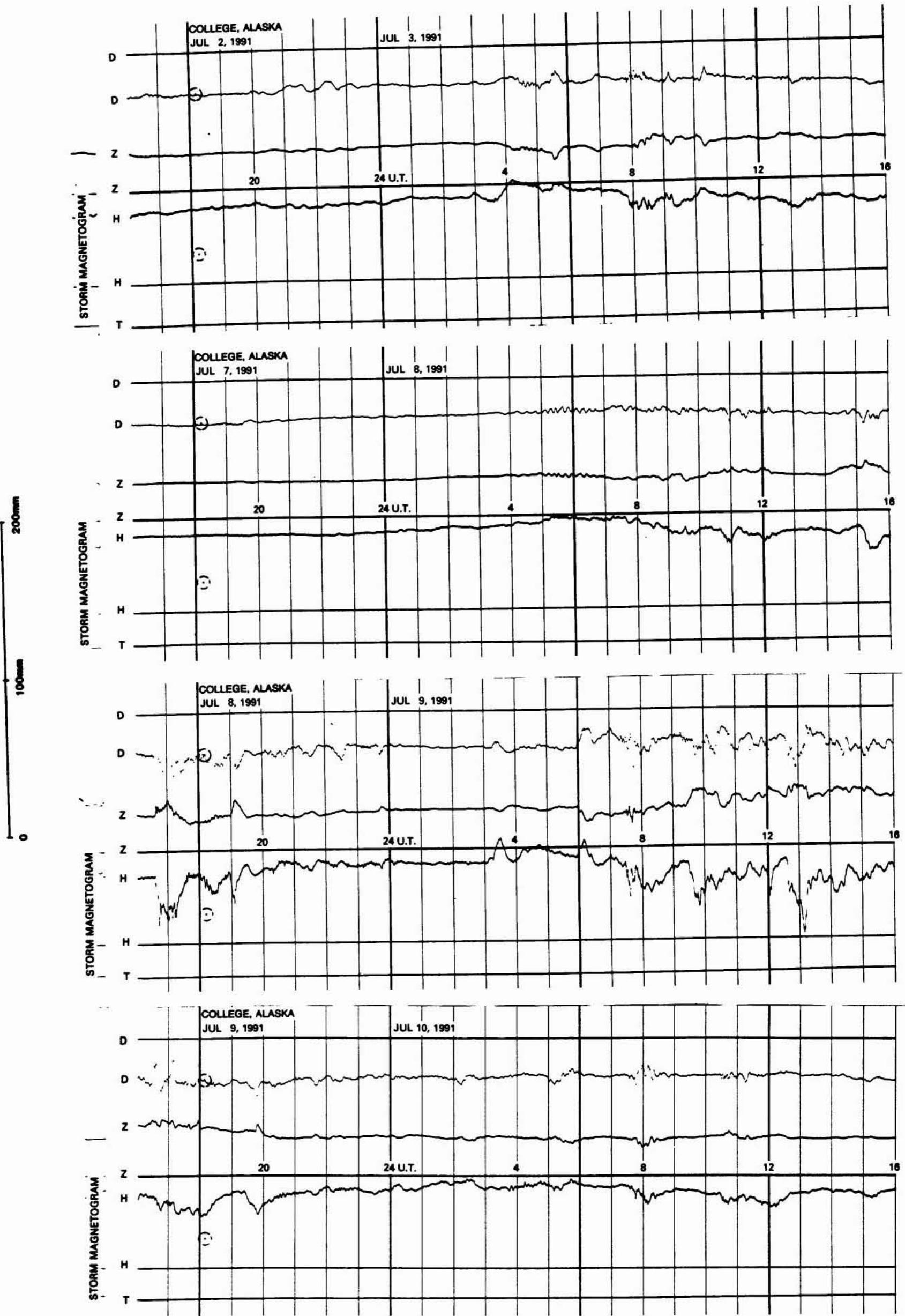
NORMAL MAGNETograms



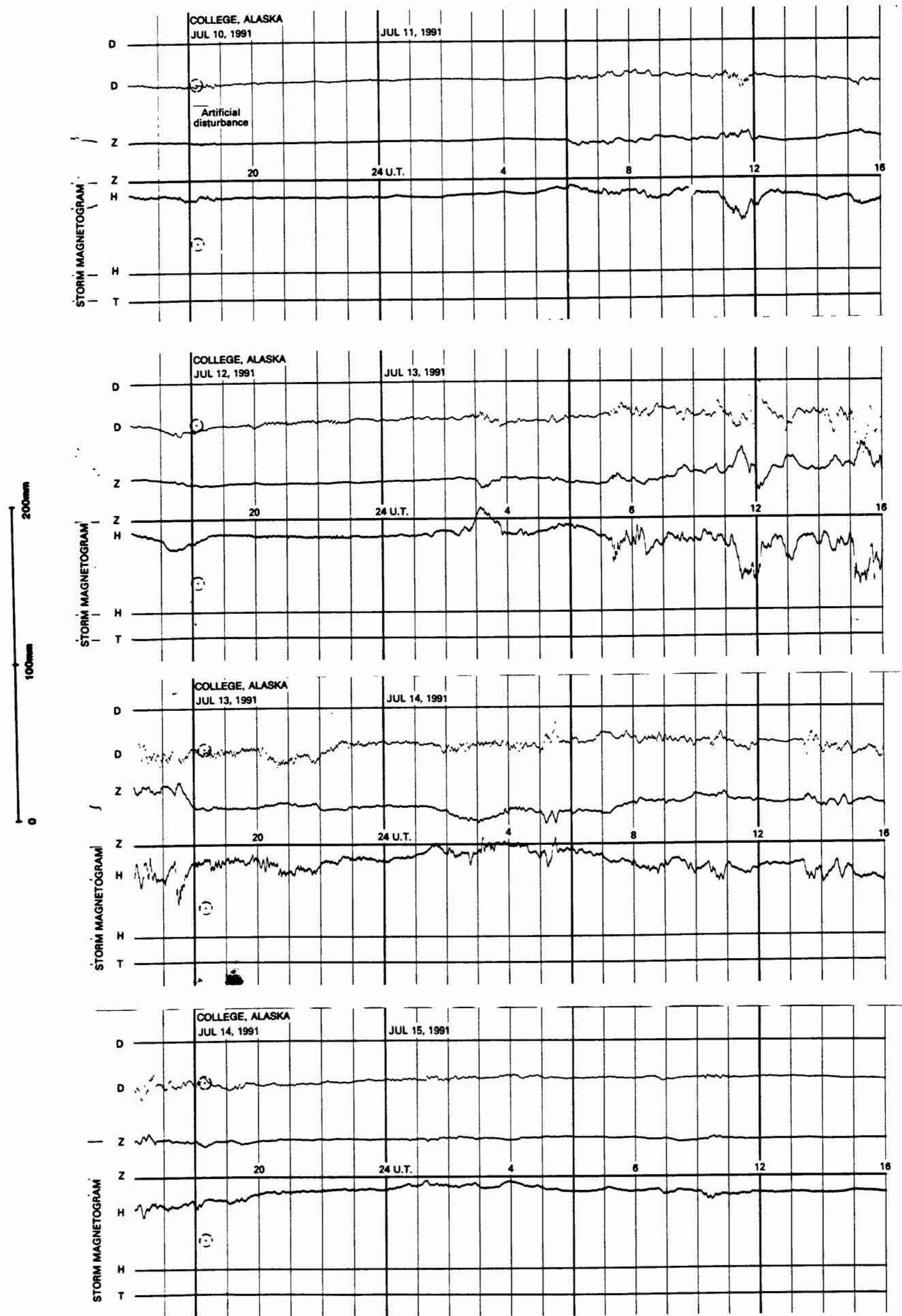
NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

