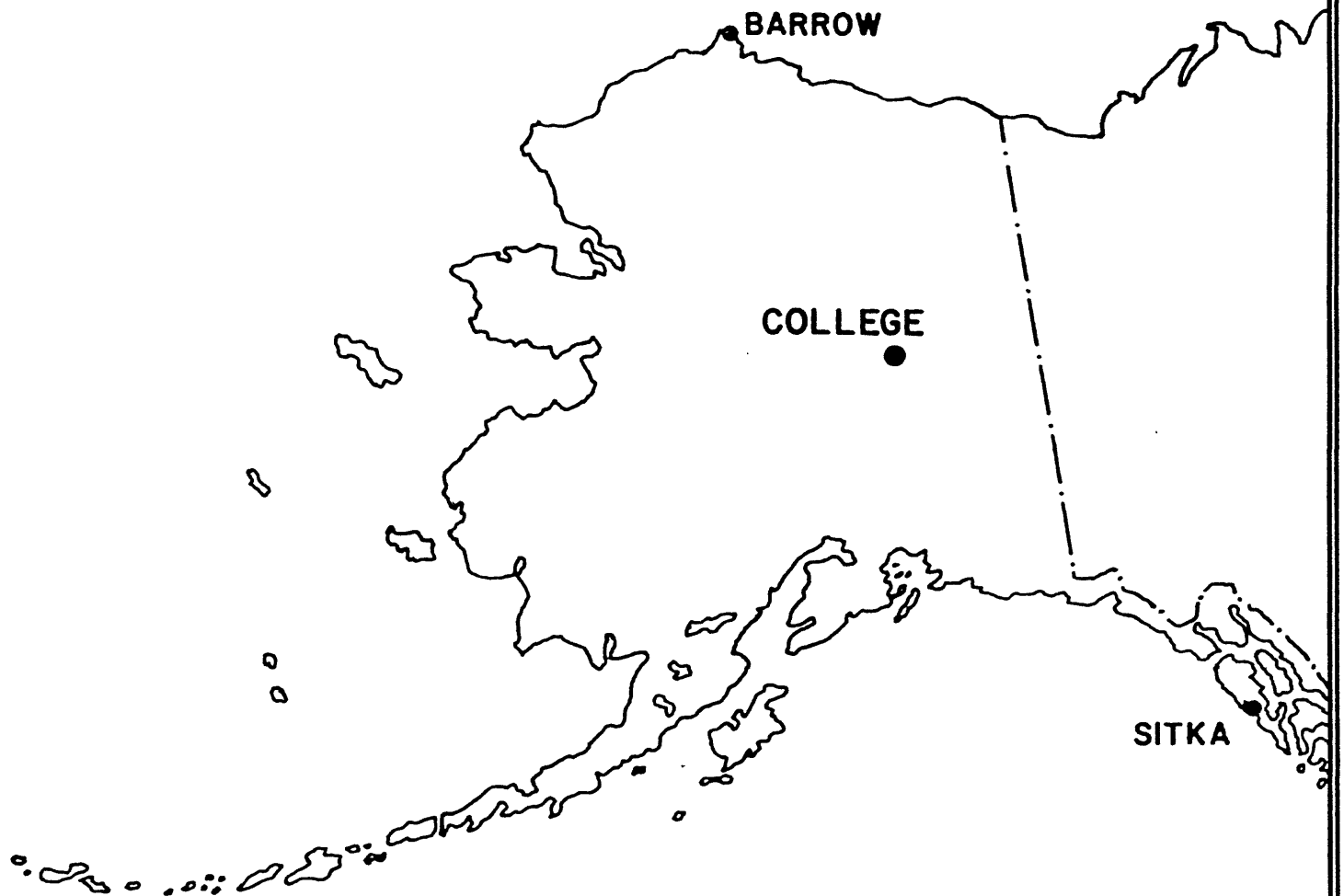


UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA  
COLLEGE OBSERVATORY  
FAIRBANKS, ALASKA

MARCH 1984

OPEN FILE REPORT 84-0300C



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: J.E. PAPP, E.A. SAUTER, L.Y. TORRENCE, P.A. FRANKLIN AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA. THE COLLEGE OBSERVATORY IS A PART OF THE BRANCH OF GLOBAL SEISMOLOGY AND GEOMAGNETISM OF THE U.S. GEOLOGICAL SURVEY.

Explanation of Data and Reports

Magnetic Activity Report

Outstanding Magnetic Effects

Principal Magnetic Storms

Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings

Sample Format for Normal and Storm Magnetograms

Normal Magnetograms

Storm Magnetograms (When Normal is too disturbed to read)

# COLLEGE OBSERVATORY PRELIMINARY GEOMAGNETIC DATA

## EXPLANATION OF DATA AND REPORTS

### 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. To avoid delay, all of 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 99701

Requests for copies of the magnetograms except for the current month should be addressed to:

World Data Center A  
NOAA D63, 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 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..... $64^{\circ}51.6'N$   
Geographic longitude..... $147^{\circ}50.2'W$   
Geomagnetic latitude..... $+64.6^{\circ}$   
Geomagnetic longitude..... $+256.5^{\circ}$   
Elevation.....200 meters

### GEOMAGNETIC DATA

Normal, Storm and Rapid Run magnetograms and appropriate calibration data are processed daily at the observatory and are available for analysis or copying. Also available, are mean hourly scalings, K-Indices, selected magnetic phenomena reports and on a real-time basis are recordings from a 3-component fluxgate magnetometer and F-component proton magnetometer.

#### 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 beginning 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 ( $10\gamma$ )

The Magnetic Daily Character Figure, C: To each Universal day a character is assigned on the basis C=0, if it is quiet; C=1, if it is moderately disturbed; C=2, if it is greatly disturbed. The method used to assign characters at the College Observatory is based on AK as follows:

AK Range	C
0 $\approx$ 11	0
11 $\approx$ 50	1
50+	2

Routine assignment of C was discontinued at College on January 1, 1976.

#### Selected Phenomena & Outstanding Magnetic Effects

Prior to January 1, 1976, the Normal and Rapid Run records were reviewed at the observatory for selected magnetic phenomena and the events identified were forwarded to the IUGG Commission on Magnetic Variations and Disturbances. This was discontinued on January 1, 1976, but a report on Outstanding Magnetic Effects is prepared monthly for this report.

#### 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 commencements; 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 averages 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 sheets 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 he is interested in the detailed morphology of the magnetic field, he should refer directly to the magnetograms.

#### 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:

$D = B_D + d \cdot S_D$ ;  $H = B_H + h \cdot S_H$ ;  $Z = B_Z + z \cdot S_Z$   
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.

NOAA FORM 76-133 (9-72)		U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		OBSERVATORY  COLLEGE, ALASKA									
MAGNETIC ACTIVITY (Greenwich civil time, counted from midnight to midnight)				MONTH AND YEAR MARCH 1984									
DATE	K-INDICES								AK	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	0	0	2	5	6	4	5	5	27	32	SUDDEN COMMENCEMENTS d      h      m		
2	4	5	6	6	6	5	5	3	40	53			
3	5	6	5	5	4	5	4	3	37	43			
4	2	4	3	3	2	3	1	0	18	11			
5	0	1	1	1	1	0	1	0	05	02			
6	2	4	5	4	5	5	6	4	35	39			
7	4	4	5	4	5	5	3	3	33	32			
8	3	2	4	5	5	6	5	3	33	36			
9	3	3	3	2	2	2	2	2	19	10			
10	2	1	3	4	5	5	4	3	27	24			
11	3	1	1	5	3	3	2	2	20	14			
12	2	2	2	3	3	3	3	2	20	11			
13	2	2	3	4	6	4	2	1	24	22			
14	1	1	3	3	1	1	1	0	11	06			
15	0	0	1	2	2	2	2	3	12	06			
16	0	2	4	3	6	6	2	1	24	27	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
17	1	3	5	7	6	5	3	2	32	45			
18	1	1	3	6	4	4	2	2	23	21			
19	2	3	4	6	3	2	1	2	23	20			
20	2	1	1	4	2	0	0	0	10	06			
21	0	1	0	2	4	3	2	2	14	08	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">BEGIN</div> <div style="width: 45%;">END</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;">d    h    m</div> <div style="width: 45%;">d    h    m</div> </div>		
22	2	3	6	3	0	2	3	2	21	18			
23	3	3	5	6	5	4	2	1	29	30			
24	2	2	2	3	5	4	1	2	21	15			
25	2	4	5	6	6	6	5	3	37	48			
26	2	2	1	4	2	3	3	3	20	12			
27	3	4	3	5	5	4	3	3	30	26			
28	3	4	5	6	6	7	6	5	42	65			
29	5	5	6	6	5	5	4	4	40	51			
30	4	4	6	5	5	4	4	3	35	37			
31	3	4	3	6	6	4	3	5	34	38			

K SCALE USED:	D	H	Z	
LOWER LIMIT FOR K = 9.....	675.7	322.2		(mm)
CURRENT SCALE VALUE.....	3.72	7.76		(γ/mm)
LOWER LIMIT FOR K = 9 .....	2510	2500		(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED

JOHN B. TOWNSHEND, CHIEF, COLLEGE OBSERVATORY

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY	
			COLLEGE, ALASKA	
			MONTH MARCH	YEAR 1984
DATE	TIME U.T.	NATURE OF PHENOMENON <sup>1</sup>	REMARKS	
			NO OUTSTANDING MAGNETIC EFFECTS SELECTED THIS MONTH.	
IDENTIFIED BY: JEP			VERIFIED BY: EAS	

1. NATURE OF PHENOMENON: ssc, ssc\*, si, si\*, b, bp, bs, bps, pc1, pc2 - - - pc5, pg, pi 1, pi 2, sfe.

PRINCIPAL MAGNETIC STORMS  
COLLEGE OBSERVATORY, COLLEGE, ALASKA  
19 84WDC-A FOR SOLAR-TERRESTRIAL PHYSICS  
ENVIRONMENTAL DATA SERVICE, NOAA  
BOULDER, COLORADO 80302 U.S.A.

Data from Individual Observatories:

MARCH

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	01	08xx	..	..	..	..	01 02	5 3,4,5	6 6	149	1250	770	04 10
		06	05xx	..	..	..	..	08	6	6	145	990	700	09 08
		17	03xx	..	..	..	..	17	4	7	147	1150	740	18 01
		25	04xx	..	..	..	..	25	4,5,6	6	188	1230	790	26 01
		26	15xx	..	..	..	..	04	6	8	393	2070	1270	06 13

MARCH

1984

## NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 3-1-84	2400 U.T., 3-31-84	1.0/mm	3.78/mm	27° 16.9 E
H	0000 U.T., 3-1-84	2400 U.T., 3-31-84	7.88/mm		126698
Z	0000 U.T., 3-1-84	2400 U.T., 3-31-84	7.68/mm		551828

## STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 3-1-84	2300 U.T., 3-13-84	7.9/mm	29.68/mm	24° 23.4 E
	2301 U.T., 3-13-84	2100 U.T., 3-15-84	"	"	No BLV
	2101 U.T., 3-15-84	2400 U.T., 3-31-84	"	"	23° 42.6 E
H	0000 U.T., 3-1-84	2400 U.T., 3-31-84	43.98/mm		107878
Z	0000 U.T., 3-1-84	2400 U.T., 3-31-84	48.08/mm		541028

## RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

## MONTHLY MEAN ABSOLUTE VALUES\*

D	H	Z
27° 48.5 E	129198	553668

\* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED:

MAR

4

5

9

11

12

14

15

20

21

26

## MAGNETOGRAM HOURLY SCALINGS

(UNIVERSAL TIME)

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 0 of local day ( 15 Oct. ) is hour 11 of the same universal day.

Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

OBSV.		YEAR		MONTH		DAY																																																									
CO		84		MAR		1																																																									
01	285	02	293	03	301	04	301	05	301	06	301	07	301	08	293	09	285	10	277	11	265	12	257	13	249	14	241	15	233	16	225	17	217	18	209	19	201	20	193	21	185	22	177	23	169	24	161	25	153	26	145	27	137	28	129	29	121	30	113	31	105	SUM	6853
01	268	02	276	03	284	04	292	05	300	06	308	07	316	08	324	09	332	10	340	11	348	12	356	13	364	14	372	15	380	16	388	17	396	18	404	19	412	20	420	21	428	22	436	23	444	24	452	25	460	26	468	27	476	28	484	29	492	30	500	31	508	SUM	6853
01	258	02	266	03	274	04	282	05	290	06	298	07	306	08	314	09	322	10	330	11	338	12	346	13	354	14	362	15	370	16	378	17	386	18	394	19	402	20	410	21	418	22	426	23	434	24	442	25	450	26	458	27	466	28	474	29	482	30	490	31	498	SUM	6853
01	248	02	256	03	264	04	272	05	280	06	288	07	296	08	304	09	312	10	320	11	328	12	336	13	344	14	352	15	360	16	368	17	376	18	384	19	392	20	400	21	408	22	416	23	424	24	432	25	440	26	448	27	456	28	464	29	472	30	480	31	488	SUM	6853
01	238	02	246	03	254	04	262	05	270	06	278	07	286	08	294	09	302	10	310	11	318	12	326	13	334	14	342	15	350	16	358	17	366	18	374	19	382	20	390	21	398	22	406	23	414	24	422	25	430	26	438	27	446	28	454	29	462	30	470	31	478	SUM	6853
01	228	02	236	03	244	04	252	05	260	06	268	07	276	08	284	09	292	10	300	11	308	12	316	13	324	14	332	15	340	16	348	17	356	18	364	19	372	20	380	21	388	22	396	23	404	24	412	25	420	26	428	27	436	28	444	29	452	30	460	31	468	SUM	6853
01	218	02	226	03	234	04	242	05	250	06	258	07	266	08	274	09	282	10	290	11	298	12	306	13	314	14	322	15	330	16	338	17	346	18	354	19	362	20	370	21	378	22	386	23	394	24	402	25	410	26	418	27	426	28	434	29	442	30	450	31	458	SUM	6853
01	208	02	216	03	224	04	232	05	240	06	248	07	256	08	264	09	272	10	280	11	288	12	296	13	304	14	312	15	320	16	328	17	336	18	344	19	352	20	360	21	368	22	376	23	384	24	392	25	400	26	408	27	416	28	424	29	432	30	440	31	448	SUM	6853
01	198	02	206	03	214	04	222	05	230	06	238	07	246	08	254	09	262	10	270	11	278	12	286	13	294	14	302	15	310	16	318	17	326	18	334	19	342	20	350	21	358	22	366	23	374	24	382	25	390	26	398	27	406	28	414	29	422	30	430	31	438	SUM	6853
01	188	02	196	03	204	04	212	05	220	06	228	07	236	08	244	09	252	10	260	11	268	12	276	13	284	14	292	15	300	16	308	17	316	18	324	19	332	20	340	21	348	22	356	23	364	24	372	25	380	26	388	27	396	28	404	29	412	30	420	31	428	SUM	6853
01	178	02	186	03	194	04	202	05	210	06	218	07	226	08	234	09	242	10	250	11	258	12	266	13	274	14	282	15	290	16	298	17	306	18	314	19	322	20	330	21	338	22	346	23	354	24	362	25	370	26	378	27	386	28	394	29	402	30	410	31	418	SUM	6853
01	168	02	176	03	184	04	192	05	200	06	208	07	216	08	224	09	232	10	240	11	248	12	256	13	264	14	272	15	280	16	288	17	296	18	304	19	312	20	320	21	328	22	336	23	344	24	352	25	360	26	368	27	376	28	384	29	392	30	400	31	408	SUM	6853
01	158	02	166	03	174	04	182	05	190	06	198	07	206	08	214	09	222	10	230	11	238	12	246	13	254	14	262	15	270	16	278	17	286	18	294	19	302	20	310	21	318	22	326	23	334	24	342	25	350	26	358	27	366	28	374	29	382	30	390	31	398	SUM	6853
01	148	02	156	03	164	04	172	05	180	06	188	07	196	08	204	09	212	10	220	11	228	12	236	13	244	14	252	15	260	16	268	17	276	18	284	19	292	20	300	21	308	22	316	23	324	24	332	25	340	26	348	27	356	28	364	29	372	30	380	31	388	SUM	6853
01	138	02	146	03	154	04	162	05	170	06	178	07	186	08	194	09	202	10	210	11	218	12	226	13	234	14	242	15	250	16	258	17	266	18	274	19	282	20	290	21	298	22	306	23	314	24	322	25	330	26	338	27	346	28	354	29	362	30	370	31	378	SUM	6853
01	128	02	136	03	144	04	152	05	160	06	168	07	176	08	184	09	192	10	200	11	208	12	216	13	224	14	232	15	240	16	248	17	256	18	264	19	272	20	280	21	288	22	296	23	304	24	312	25	320	26	328	27	336	28	344	29	352	30	360	31	368	SUM	6853
01	118	02	126	03	134	04	142	05	150	06	158	07	166	08	174	09	182	10	190	11	198	12	206	13	214	14	222	15	230	16	238	17	246	18	254	19	262	20	270	21	278	22	286	23	294	24	302	25	310	26	318	27	326	28	334	29	342	30	350	31	358	SUM	6853
01	108	02	116	03	124	04	132	05	140	06	148	07	156	08	164	09	172	10	180	11	188	12	196	13	204	14	212	15	220	16	228	17	236	18	244	19	252	20	260	21	268	22	276	23	284	24	292	25	300	26	308	27	316	28	324	29	332	30	340	31	348	SUM	6853
01	98	02	106	03	114	04	122	05	130	06	138	07	146	08	154	09	162	10	170	11	178	12	186	13	194	14	202	15	210	16	218	17	226	18	234	19	242	20	250	21	258	22	266	23	274	24	282	25	290	26	298	27	306	28	314	29	322	30	330	31	338	SUM	6853
01	88	02	96	03	104	04	112	05	120	06	128	07	136	08	144	09	152	10	160	11	168	12	176	13	184	14	192	15	200	16	208	17	216	18	224	19	232	20	240	21	248	22	256	23	264	24	272	25	280	26	288	27	296	28	304	29	312	30	320	31	328	SUM	6853
01	78	02	86	03	94	04	102	05	110	06	118	07	126	08	134	09	142	10	150	11	158	12	166	13	174	14	182	15	190	16	198	17	206	18	214	19	222	20	230	21	238	22	246	23	254	24	262	25	270	26	278	27	286	28	294	29	302	30	310	31	318	SUM	6853
01	68	02	76	03	84	04	92	05	100	06	108	07	116	08	124	09	132	10	140	11	148	12	156	13	164	14	172	15	180	16	188	17	196	18	204	19	212	20	220	21	228	22	236	23	244	24	252	25	260	26	268	27	276	28	284	29	292	30	300	31	308	SUM	6853
01	58	02	66	03	74	04	82	05	90	06	98	07	106	08	114	09	122	10	130	11	138	12	146	13	154	14	162	15	170	16	178	17	186	18	194	19	202	20	210	21	218	22	226	23	234	24	242	25	250	26	258	27	266	28	274	29	282	30	290	31	298	SUM	6853
01	48	02	56	03	64	04	72	05	80	06	88	07	96	08	104	09	112	10	120	11	128	12	136	13	144	14	152	15	160	16	168	17	176	18	184	19	192	20	200	21	208	22	216	23	224	24	232	25	240	26	248	27	256	28	264	29	272	30	280	31	288	SUM	6853
01	38	02	46	03	54	04	62	05	70	06	78	07	86	08	94	09	102	10	110	11	118	12	126	13	134	14	142	15	150	16	158	17	166	18	174	19	182	20	190	21	198	22																					



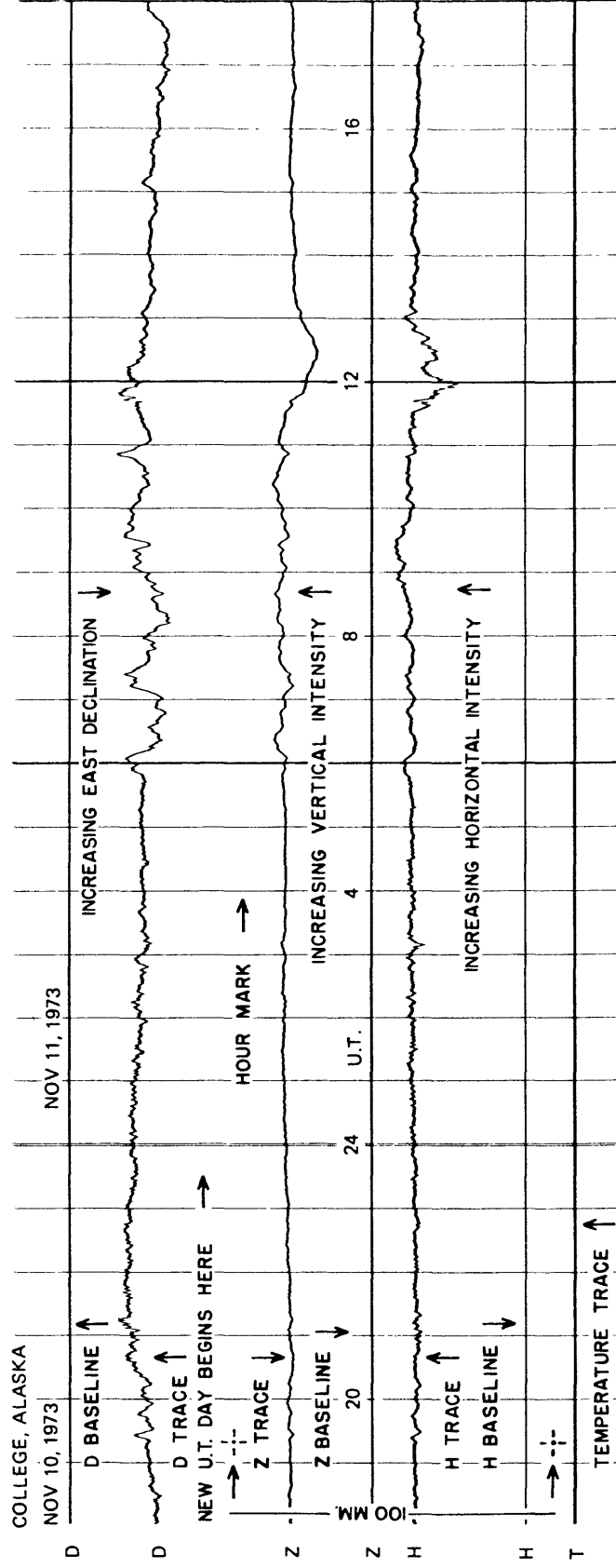
# MAGNETOGRAM HOURLY SCALINGS

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day ( 150 M.T.) is hour 11 of the same universal day. Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

U.S. DEPARTMENT OF INTERIOR Geological Survey, Geological Division Denver Federal Center Denver, CO 80215		OBSV.		YEAR		MONTH		SCALE- MENT	
		CO		84		MAR		2	
		same		universal day.					
		11		150 M.T.) is hour		of the			
		11		150 M.T.) is hour		of the			
		11		150 M.T.) is hour		of the			
		11		150 M.T.) is hour		of the			
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		11		150 M.T.) is hour		of the			
		11		150 M.T.) is hour		of the			
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		11		150 M.T.) is hour		of the			
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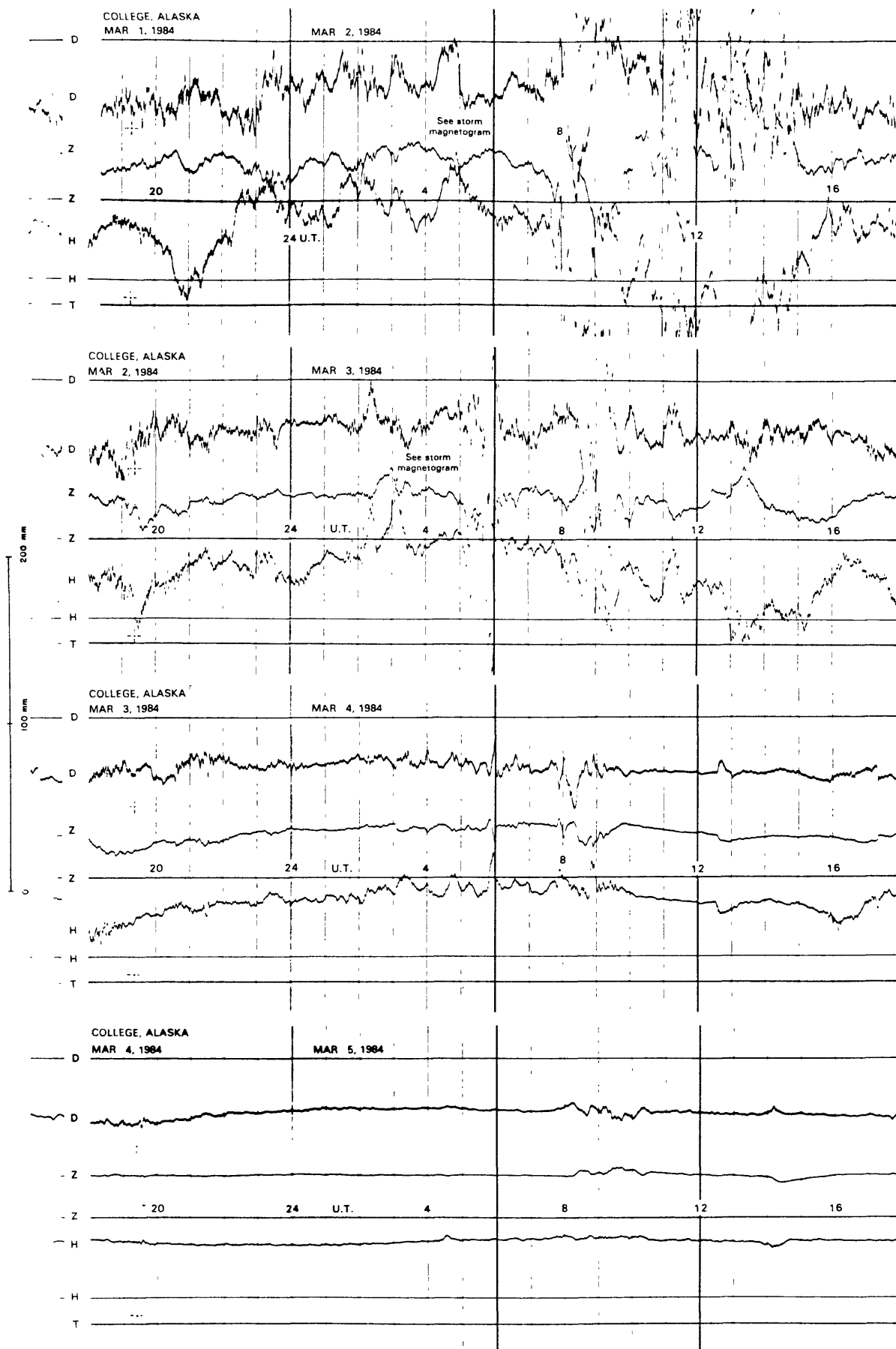


# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

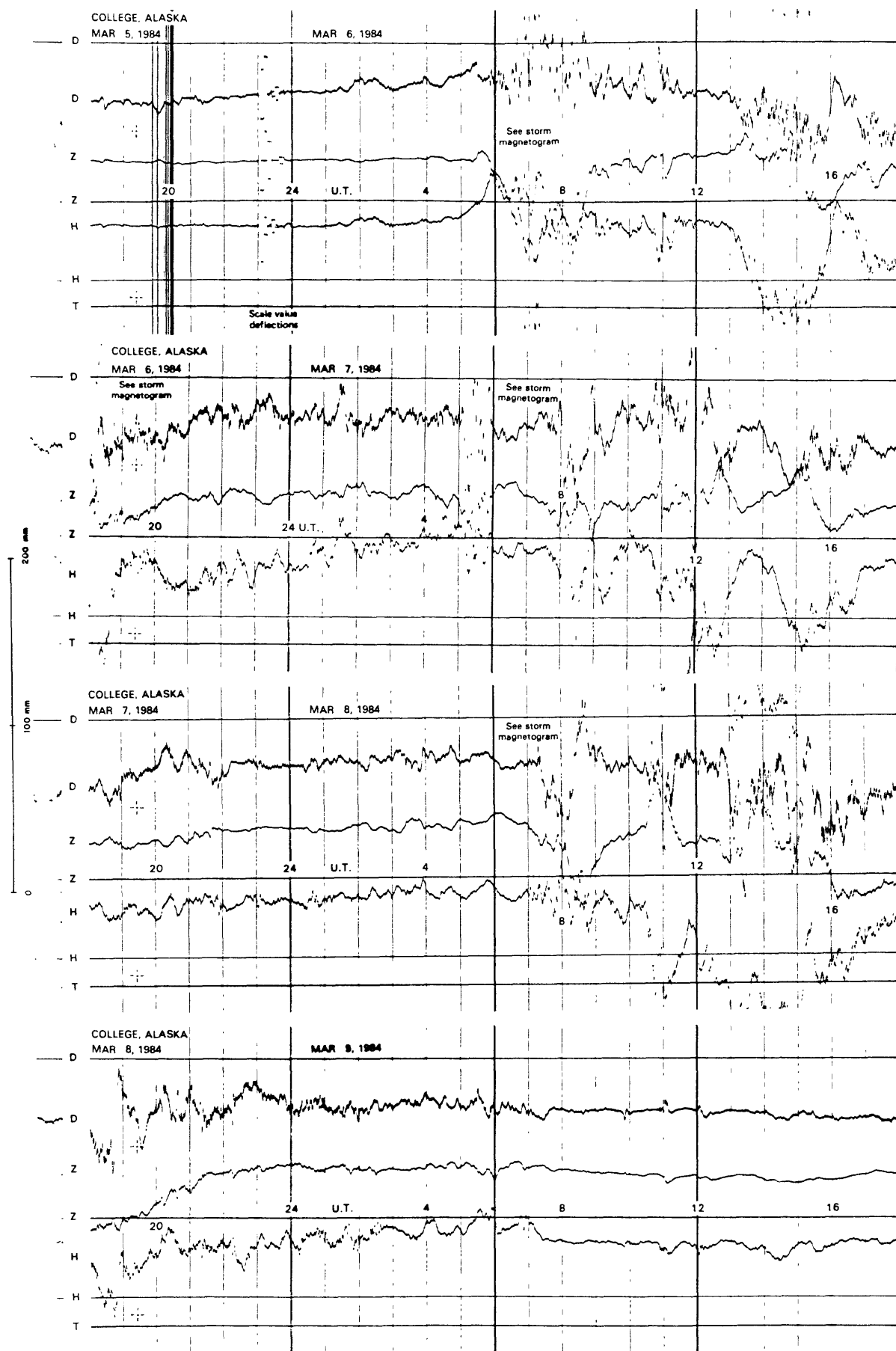


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

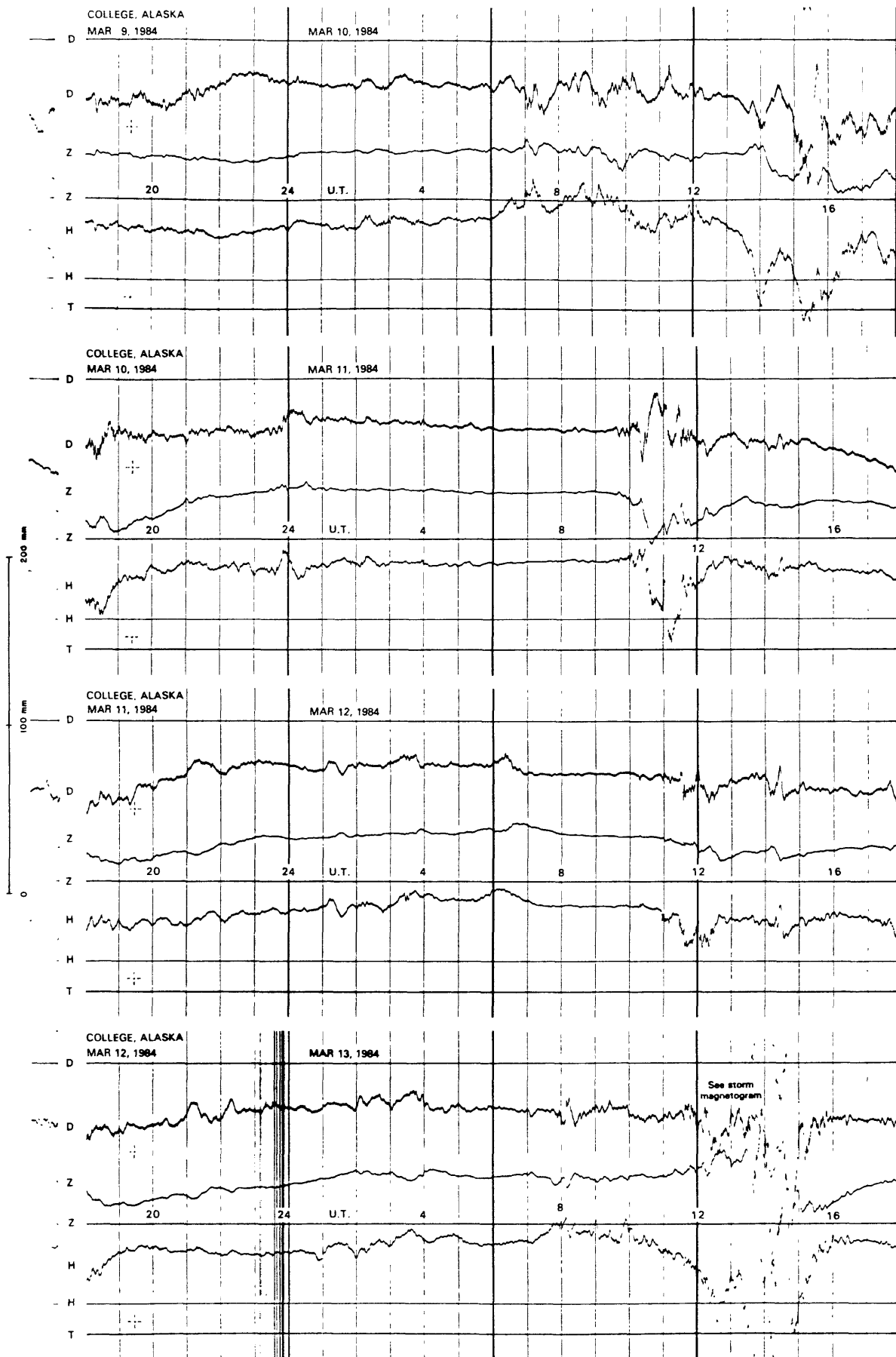
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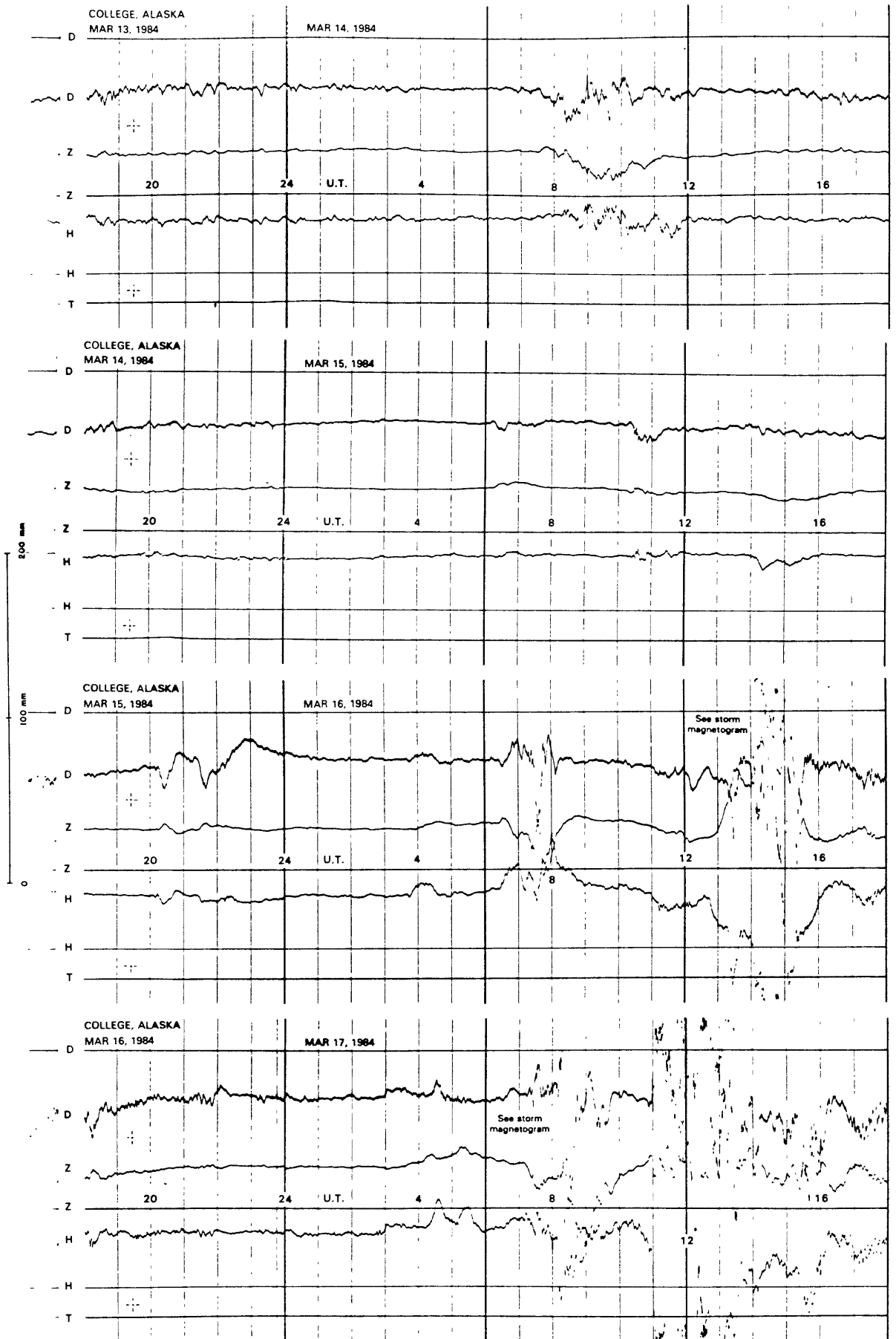
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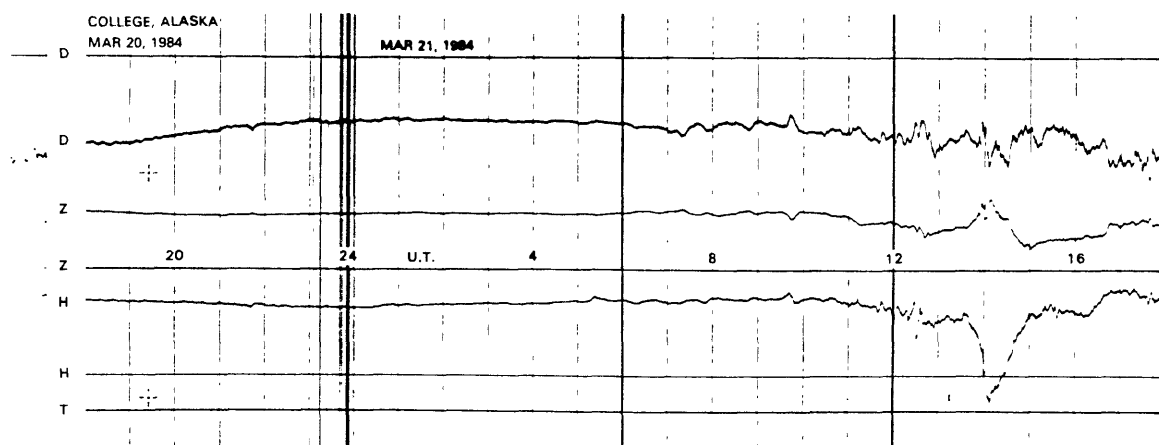
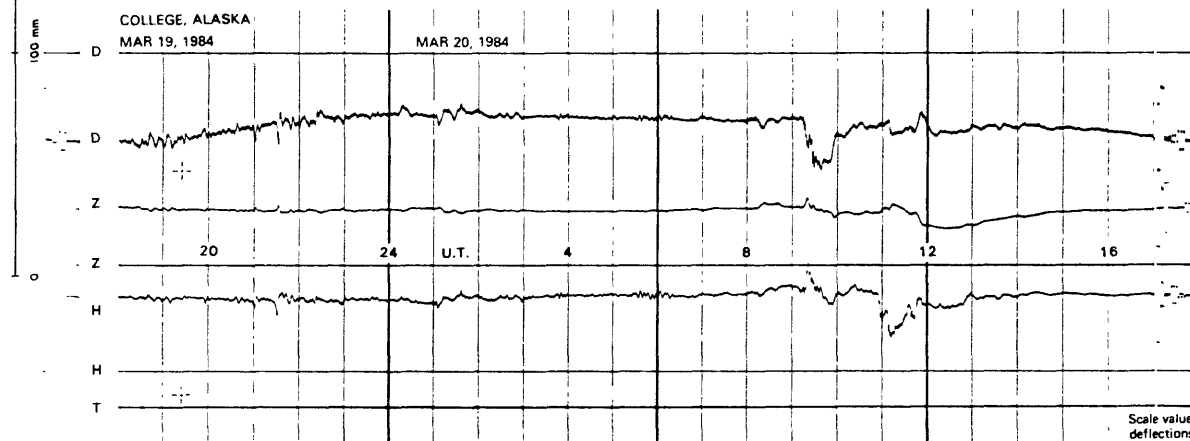
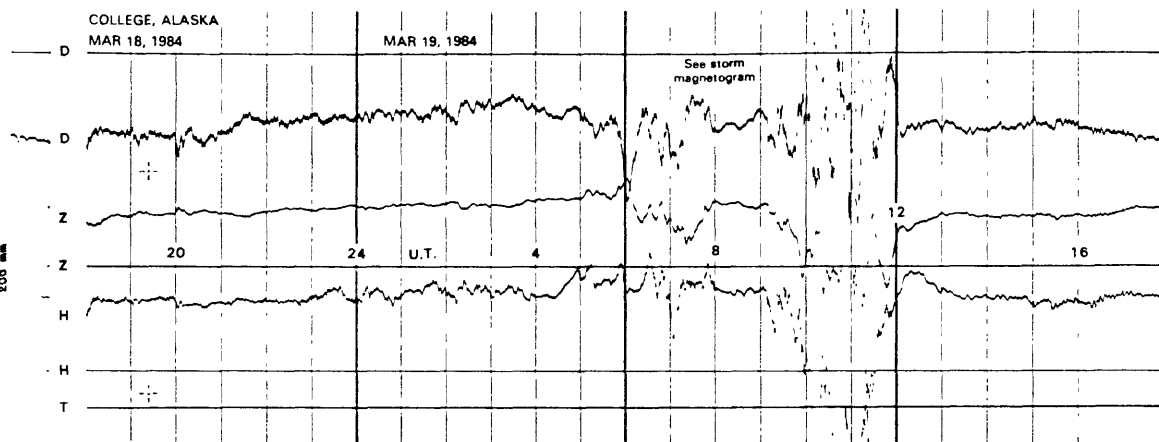
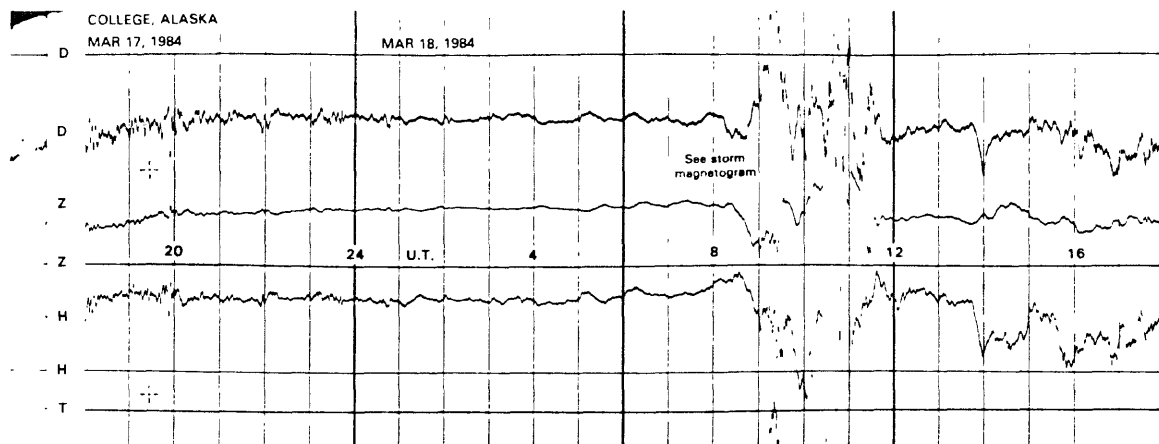
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# NORMAL MAGNETOGRAMS

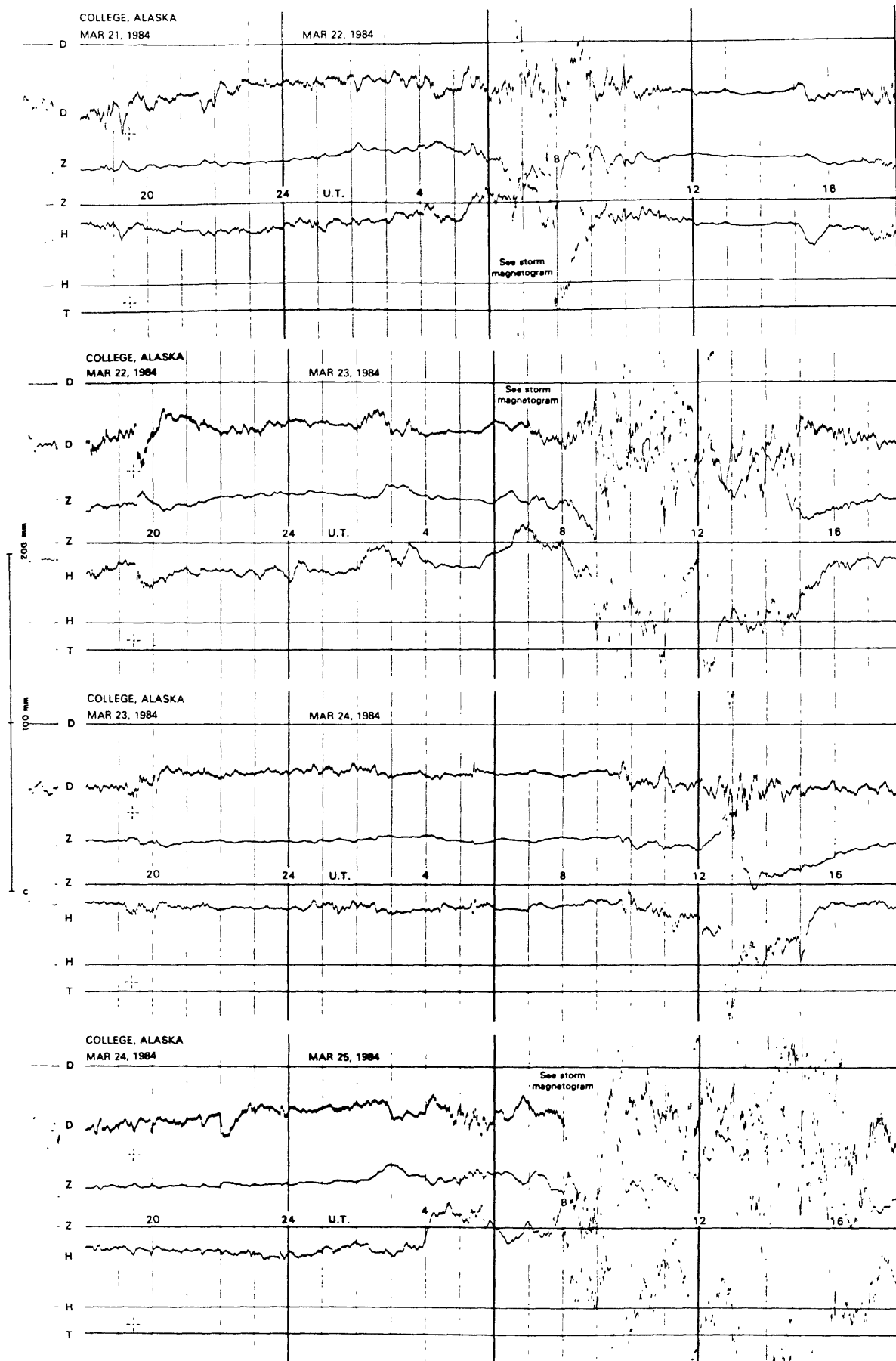


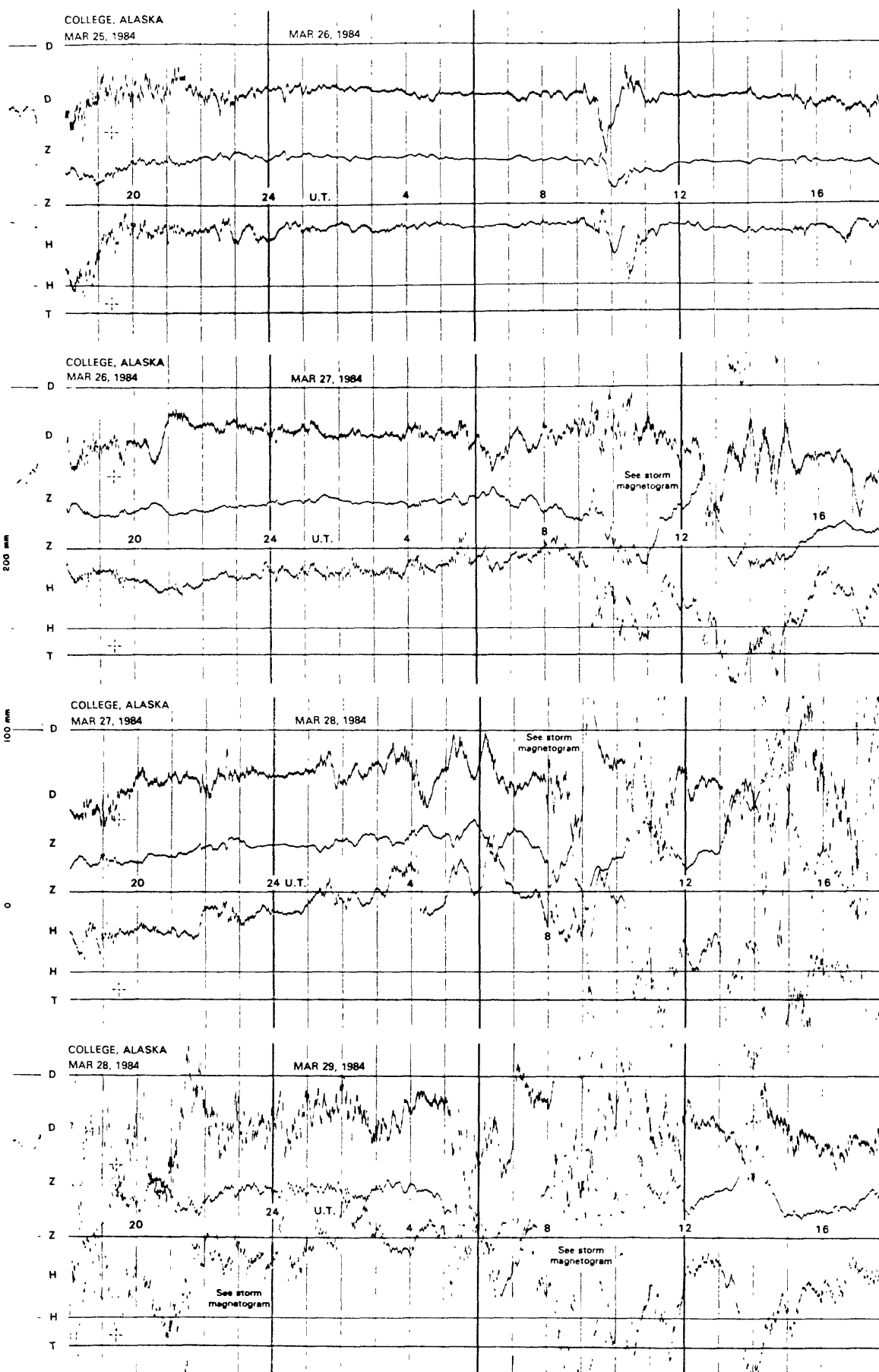
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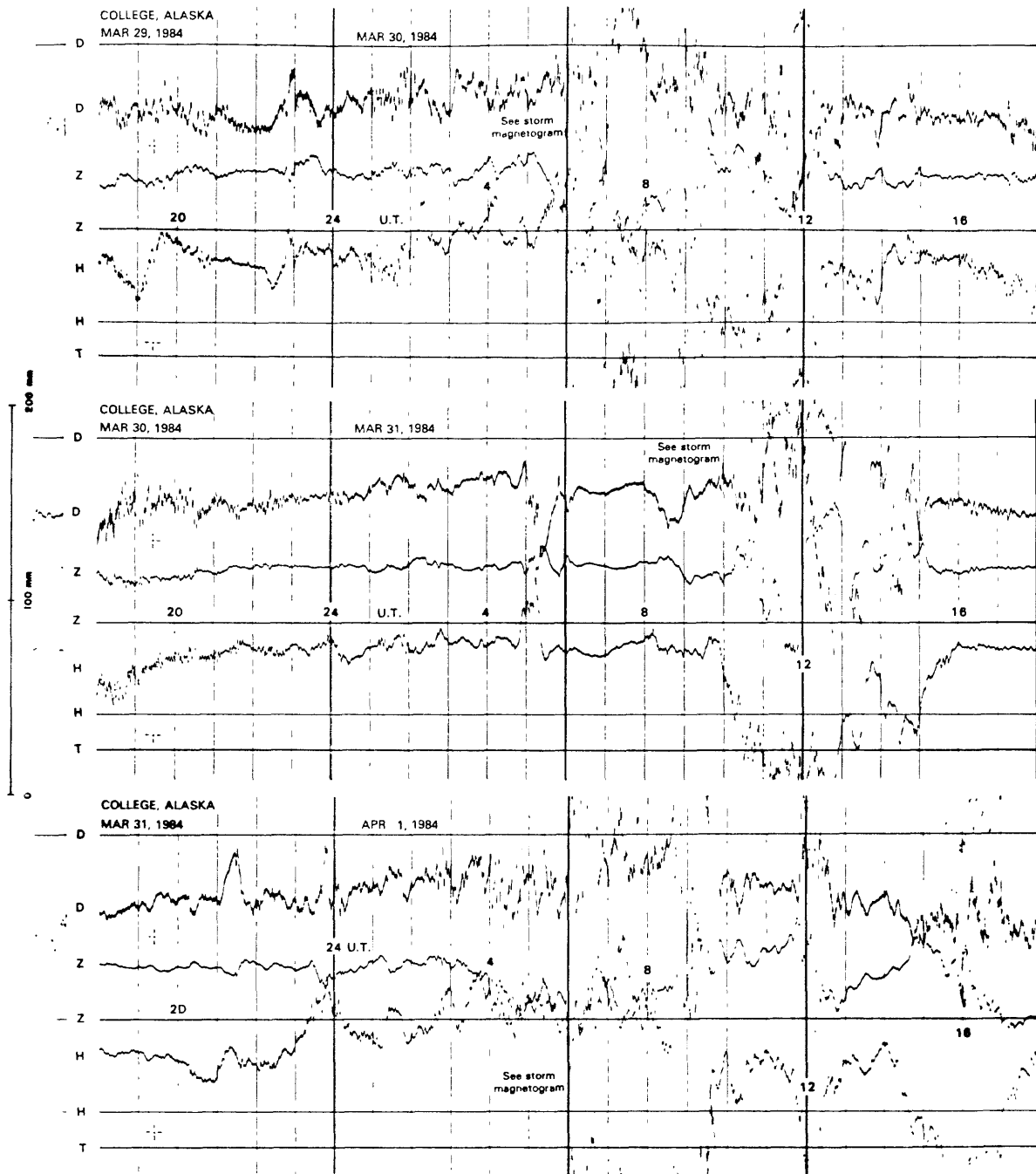


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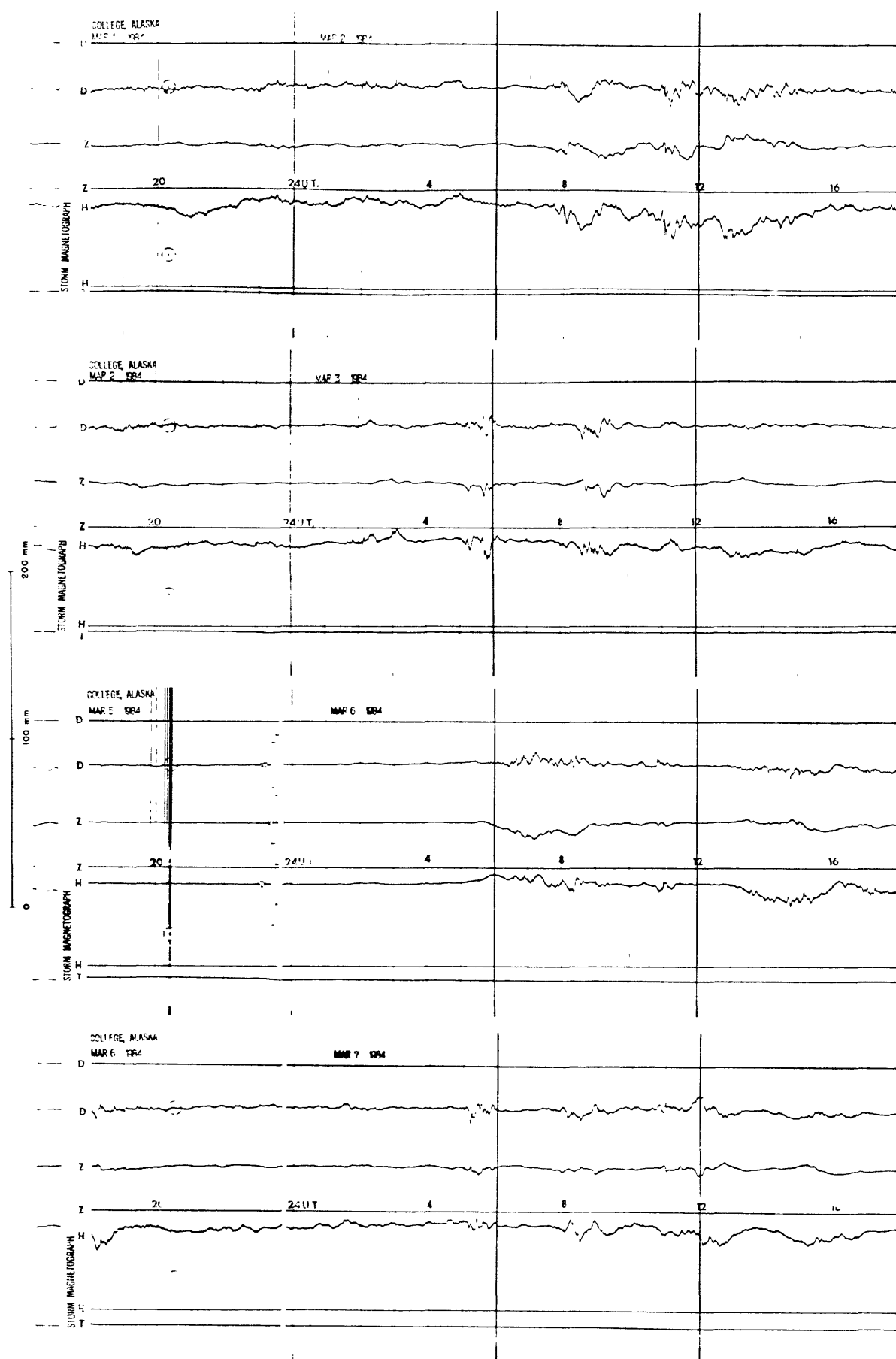




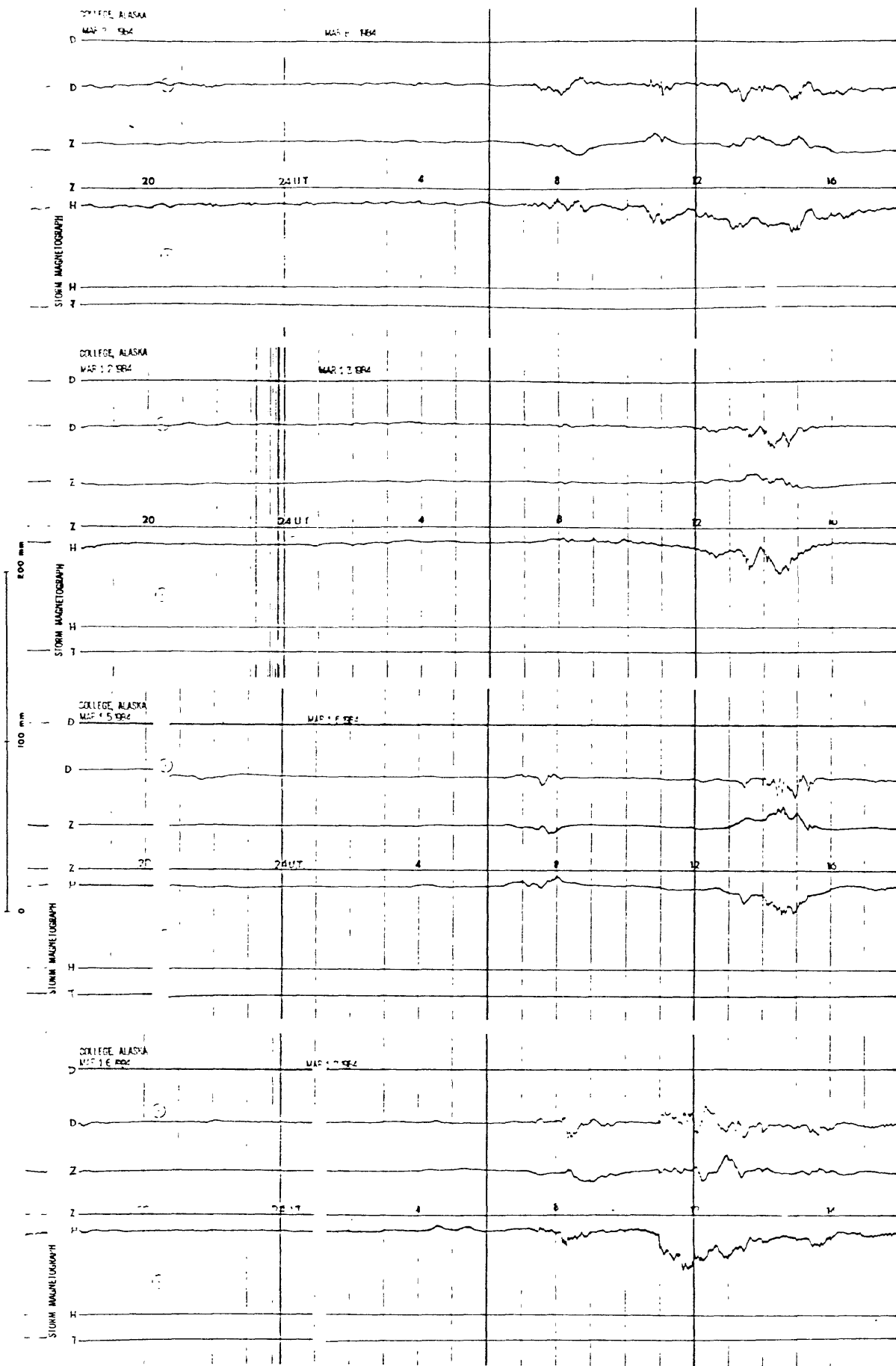
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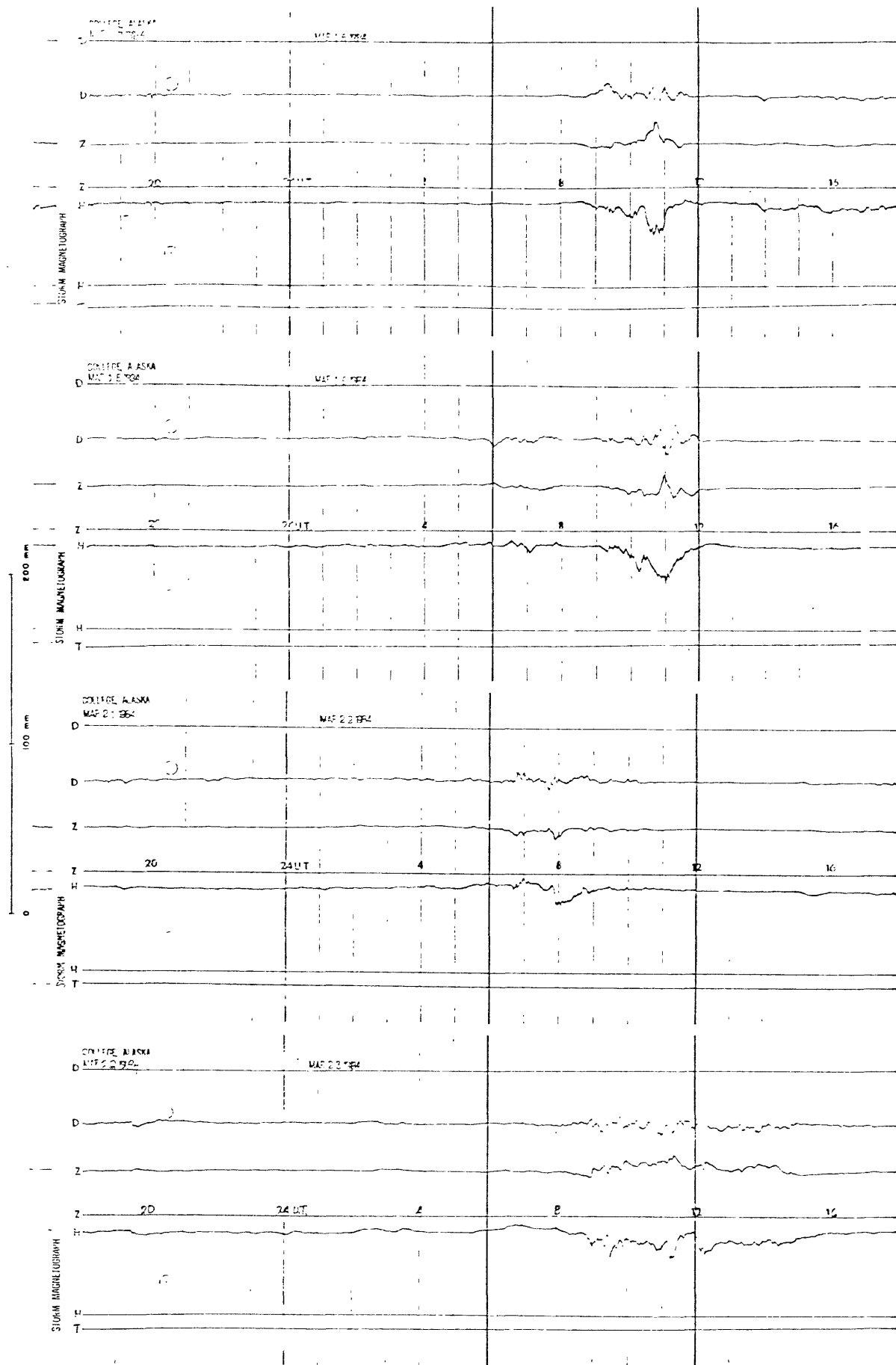
# STORM MAGNETOGRAMS



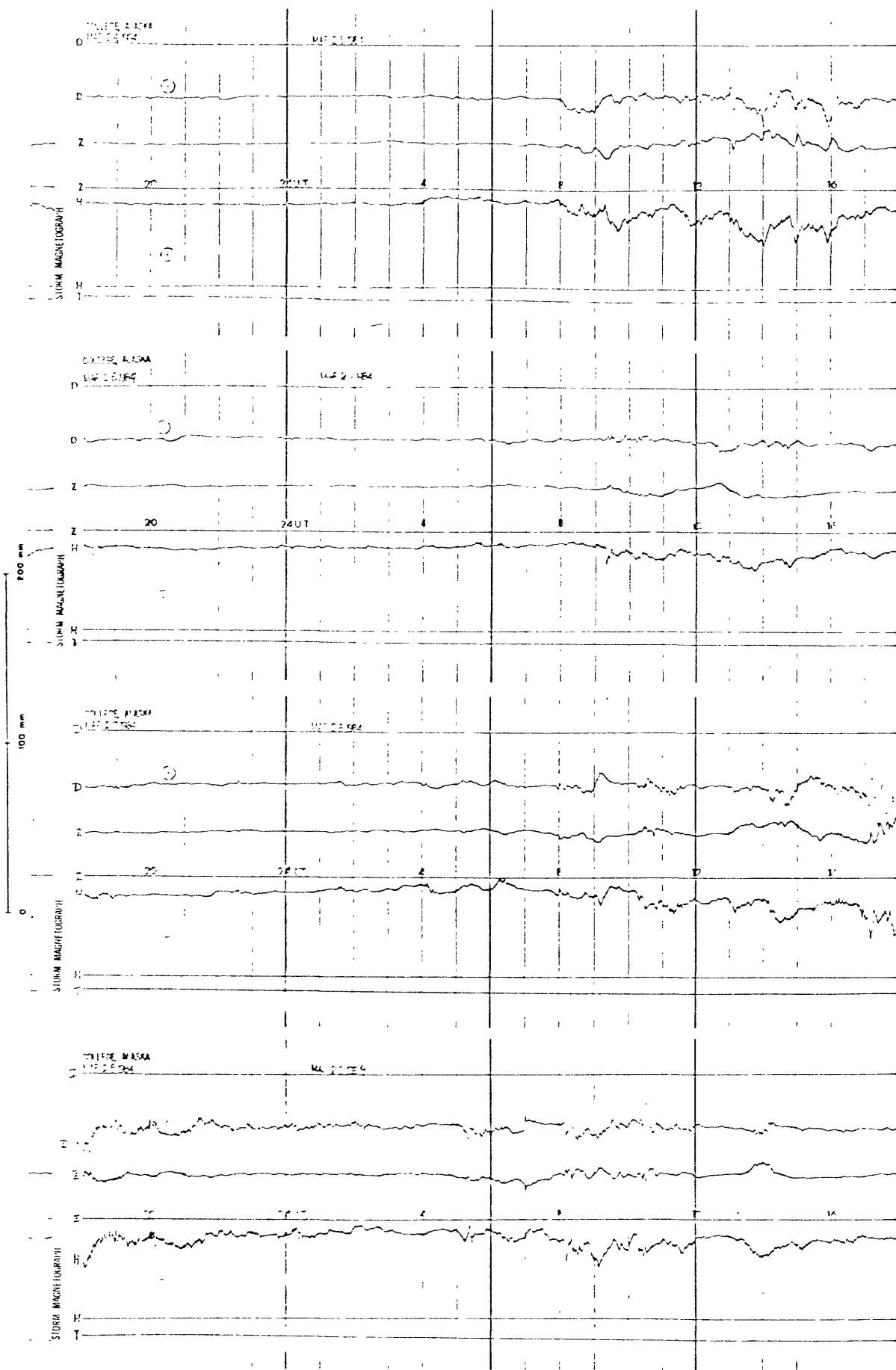
# STORM MAGNETOGRAMS



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