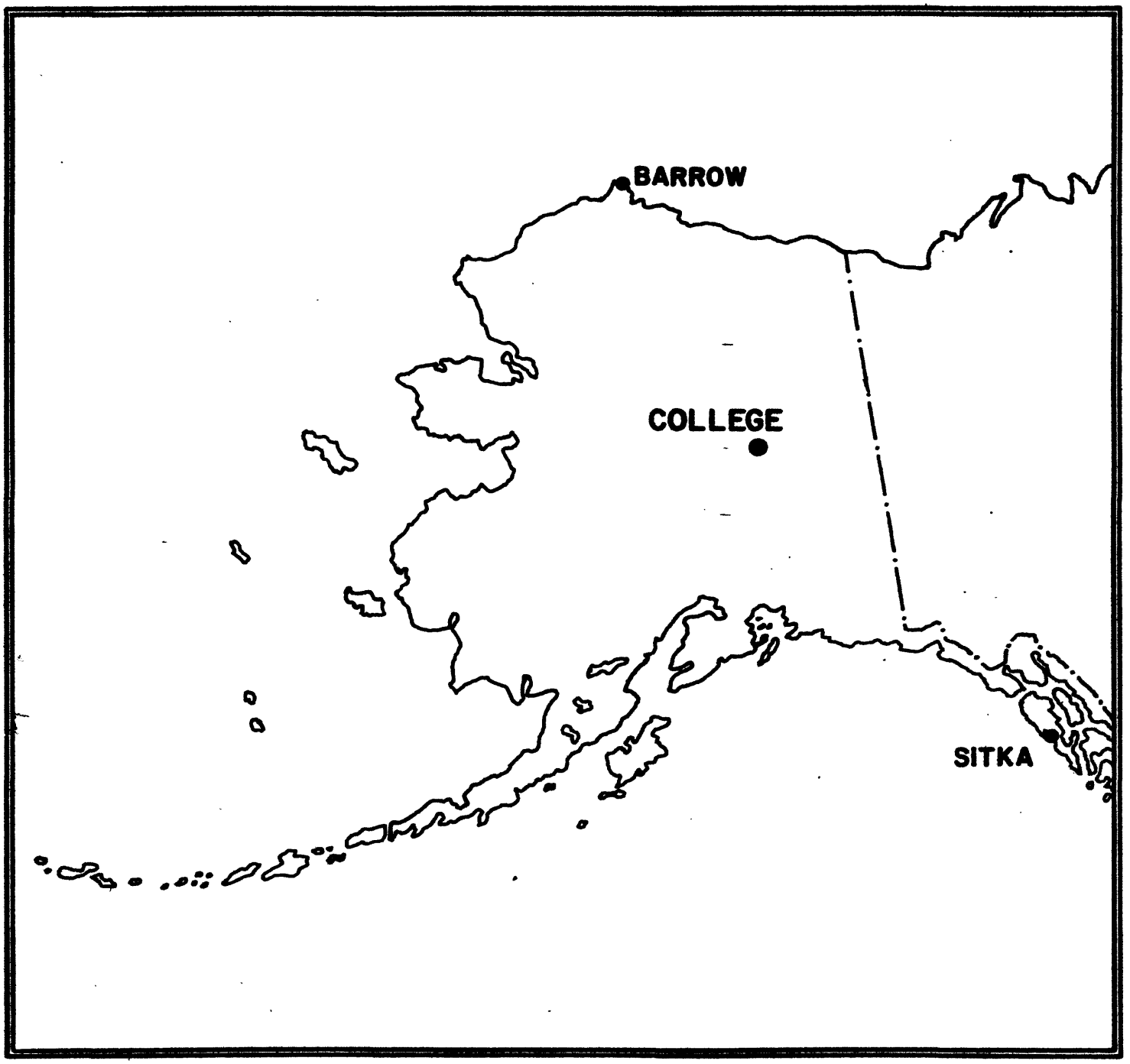
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

MARCH 1986

OPEN FILE REPORT 86-0300C



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, H.K. REX, 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°51.6'N
Geographic longitude.....147°50.2'W
Geomagnetic latitude.....+64.6°
Geomagnetic longitude.....+256.5°
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 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:

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 (10γ)

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≈11	0
11≈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

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

OBSERVATORY: College, Alaska

MONTH AND YEAR: March 1986

DATE	K-INDICES 00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	AK
1	2	1	4	5	4	6	3	2	27	27
2	2	2	4	5	4	2	1	1	21	16
3	2	1	2	2	2	2	2	3	16	08
4	3	2	2	2	3	3	1	1	17	09
5	1	1	0	3	4	2	2	1	14	08
6	4	3	2	6	6	5	5	5	36	44
7	4	4	5	6	5	5	3	4	36	40
8	4	3	4	4	5	4	3	2	29	24
9	2	2	2	1	0	0	0	0	07	03
10	0	0	0	0	0	0	0	0	00	00
11	0	0	0	0	0	0	1	0	01	00
12	0	0	2	4	3	1	0	1	11	07
13	2	2	3	5	6	6	2	1	27	31
14	3	2	2	3	1	1	2	0	14	07
15	1	1	2	3	1	1	2	2	13	06
16	2	1	3	5	4	1	1	1	18	14
17	0	1	2	3	1	1	1	0	09	04
18	1	1	3	4	3	5	1	2	20	15
19	1	1	3	2	2	2	2	0	13	06
20	0	0	0	1	1	1	0	1	04	02
21	1	1	4	4	7	3	2	2	24	29
22	4	3	3	3	5	5	3	2	28	24
23	1	2	2	4	4	1	2	2	18	11
24	3	3	3	6	6	5	3	2	31	34
25	2	3	6	5	5	5	3	3	32	35
26	4	1	2	3	5	5	3	2	25	21
27	4	3	5	5	6	3	1	1	28	30
28	2	2	4	5	3	3	2	2	23	17
29	2	2	1	2	5	5	1	1	19	16
30	0	0	0	2	2	1	1	1	07	03
31	2	1	0	4	4	3	2	1	17	11

TIME SCALE ON MAGNETOGRAMS: 20 mm/hr

SUDDEN COMMENCEMENTS

d	h	m

POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)

BEGIN d	h	m	END d	h	m

K SCALE USED:	D	H	Z	
LOWER LIMIT FOR K = 9.....	675.7	322.2		(mm)
CURRENT SCALE VALUE.....	3.71	7.80		(γ/mm)
LOWER LIMIT FOR K = 9	2510	2510		(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory
OBSERVER IN CHARGE

NOAA FORM 76-133 SUPERSEDES C&GS FORM 815

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OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY	
College, Alaska	
MONTH	YEAR
March	1986

DATE	TIME U.T.	NATURE OF PHENOMENON[1]	REMARKS
03	00xx	pc4, pc5	
04	22xx	pc4	
09	18xx	pc4	Some pc5's mixed in
19	0833	bps	
30	11xx	pi2	

IDENTIFIED BY: JEP	VERIFIED BY: JBT

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

NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS

WDC-A FOR SOLAR-TERRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80302 U.S.A.

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

March 1986

Obs. 2 letter IAGA code	Geomag. lat.	Commencement			SC - amplitudes			Max. 3 hr - index K			Ranges			UT End	
		day	hr min (UT)	type	D(')	H(γ)	Z(γ)	day	(3 hr - period)	K	D(')	H(γ)	Z(γ)	day	hr
CO	64.6 N	06	10XX	..	..	..	..	06 07	4, 5 4	6 6	219	1250	710	09	00

COLLEGE OBSERVATORY, COLLEGE, ALASKA -- PRELIMINARY CALIBRATION DATA FOR: MARCH 1986

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 3-1-86	2400 U.T., 3-31-86	1.0'/mm	3.7 γ/mm	27° 16.5' E
H	0000 U.T., 3-1-86	2400 U.T., 3-31-86	7.8 γ/mm		12666 γ
Z	0000 U.T., 3-1-86	2400 U.T., 3-31-86	7.6 γ/mm		55181 γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 3-1-86	2400 U.T., 3-31-86	7.9'/mm	29.5 γ/mm	23° 47.0' E
H	0000 U.T., 3-1-86	2400 U.T., 3-31-86	43.8 γ/mm		10688 γ
Z	0000 U.T., 3-1-86	2400 U.T., 3-31-86	48.7 γ/mm		54137 γ

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION
	FROM	TO	SCALE VALUE
D			
H			
Z			

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 33.6' E	12877 γ	55344 γ

* COMPUTED FROM ~~TEN~~ FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: MAR 9, 10, 11, 20, 30, ____, ____, ____, ____, ____

U.S. Dept. of Interior
Geological Survey

Observatory	Month	Year
COLLEGE, ALASKA	MARCH	1986

Jep-CO - 1/86

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

(UNIVERSAL TIME)

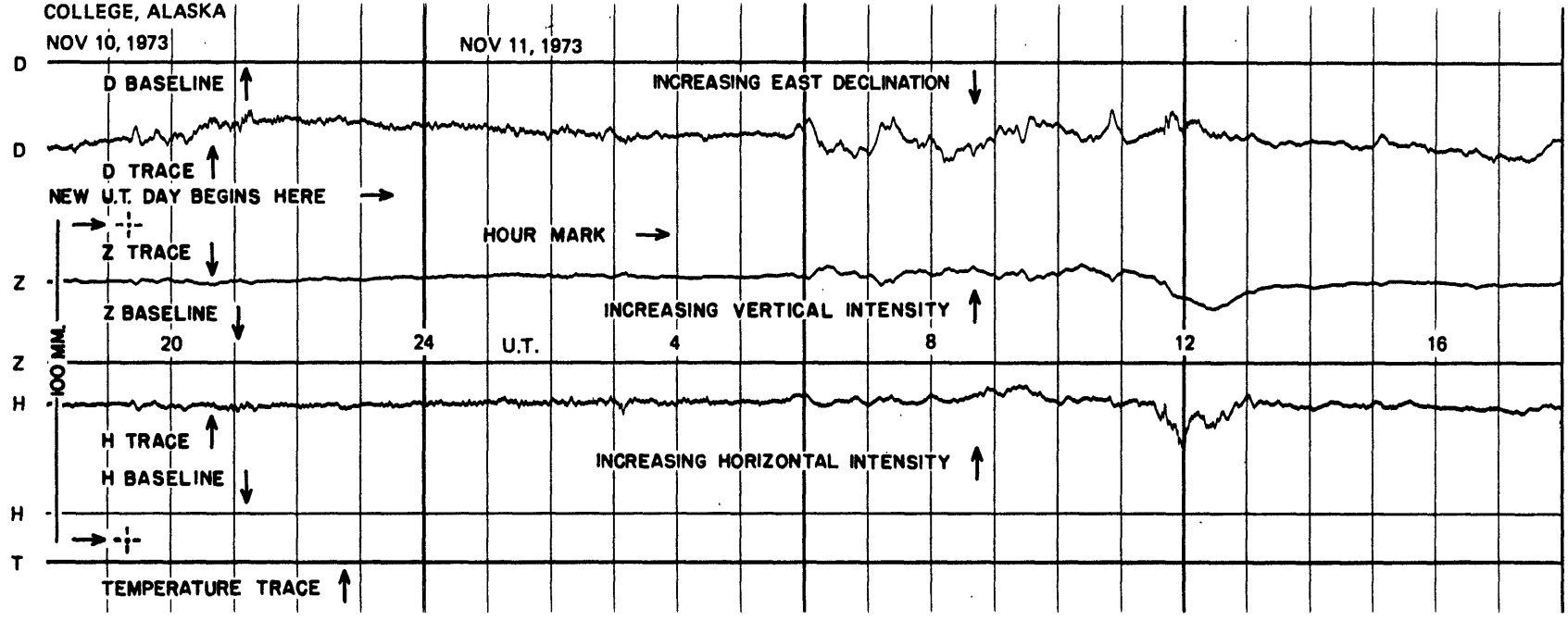
Values are in Tenths of mm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT		D					H					Z					COMPONENT
DAY		09	10	11	20	30	09	10	11	20	30	09	10	11	20	30	DAY
A_k		03	00	00	02	03	03	00	00	02	03	03	00	00	02	03	A_k
HOUR	01	133	155	156	149	123	262	259	251	252	256	234	221	221	209	213	01 HOUR
	02	138	159	158	138	122	263	261	259	258	258	239	222	223	209	213	02
	03	131	160	159	143	128	278	268	266	264	259	238	222	220	210	217	03
	04	143	166	158	150	138	280	269	270	269	269	244	221	219	209	219	04
	05	151	167	161	158	144	280	273	271	276	274	234	220	219	209	221	05
	06	155	166	159	164	147	288	272	278	276	270	231	220	219	208	219	06
	07	149	167	164	166	146	282	271	275	272	278	233	220	220	209	219	07
	08	153	167	166	167	157	275	272	275	272	276	235	220	219	208	217	08
	09	167	167	170	160	156	271	271	273	277	276	242	220	220	209	228	09
	10	189	169	169	164	156	274	271	276	277	281	238	219	220	209	228	10
	11	194	170	175	173	161	276	278	278	279	271	223	219	215	205	212	11
	12	168	173	181	204	181	278	278	279	267	263	216	218	203	191	188	12
	13	167	178	179	194	172	277	278	287	274	268	217	215	209	183	195	13
	14	173	176	179	184	179	276	279	286	272	256	214	210	208	182	189	14
	15	177	183	178	183	193	274	280	289	279	251	216	213	210	184	164	15
	16	186	182	179	188	197	269	280	287	280	280	216	215	213	186	189	16
	17	191	199	181	196	210	268	281	283	279	269	219	218	215	200	189	17
	18	205	203	205	213	219	271	283	287	280	271	219	216	214	203	198	18
	19	209	211	210	199	220	277	279	279	274	267	214	216	214	202	203	19
	20	200	223	195	203	205	271	270	279	275	263	213	220	211	200	200	20
	21	197	195	174	202	184	267	268	260	270	250	213	220	212	199	200	21
	22	192	193	184	188	158	261	260	252	261	245	213	223	215	199	202	22
	23	176	179	176	170	137	258	250	247	260	250	219	220	217	202	209	23
	24	169	168	168	155	131	256	249	247	260	249	221	220	220	205	214	24
DAILY SUM		4113	4276	4184	4211	3964	6633	6500	6534	6483	6350	5400	5248	5176	4830	4956	DAILY SUM
DAILY MEAN		171	178	174	175	165	272	271	272	270	265	225	219	216	201	206	DAILY MEAN
MEAN		173					270					213					MEAN

Scaled JEP | Checked MKR

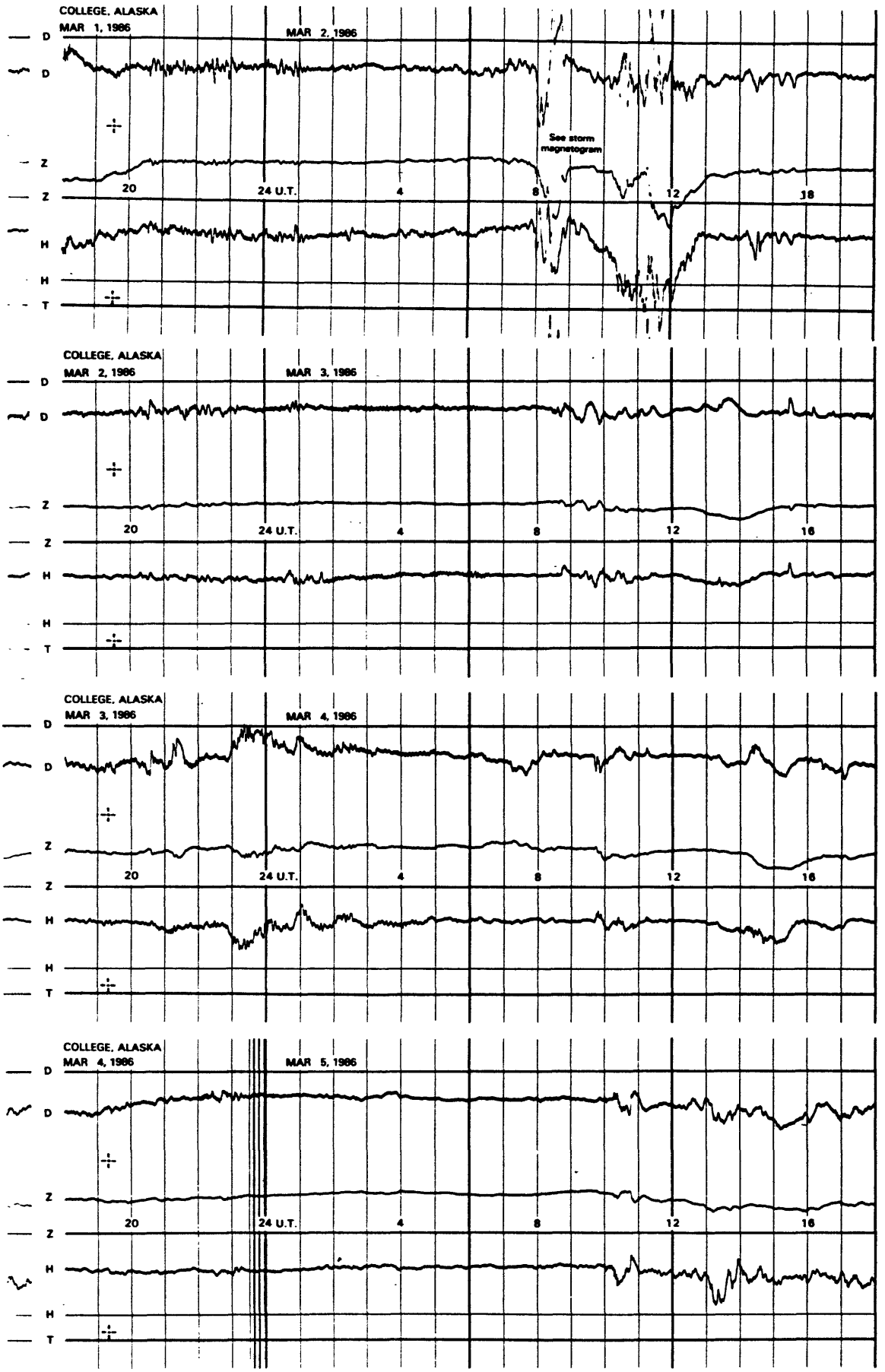
FORMAT FOR NORMAL & STORM MAGNETOGRAMS

(SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS



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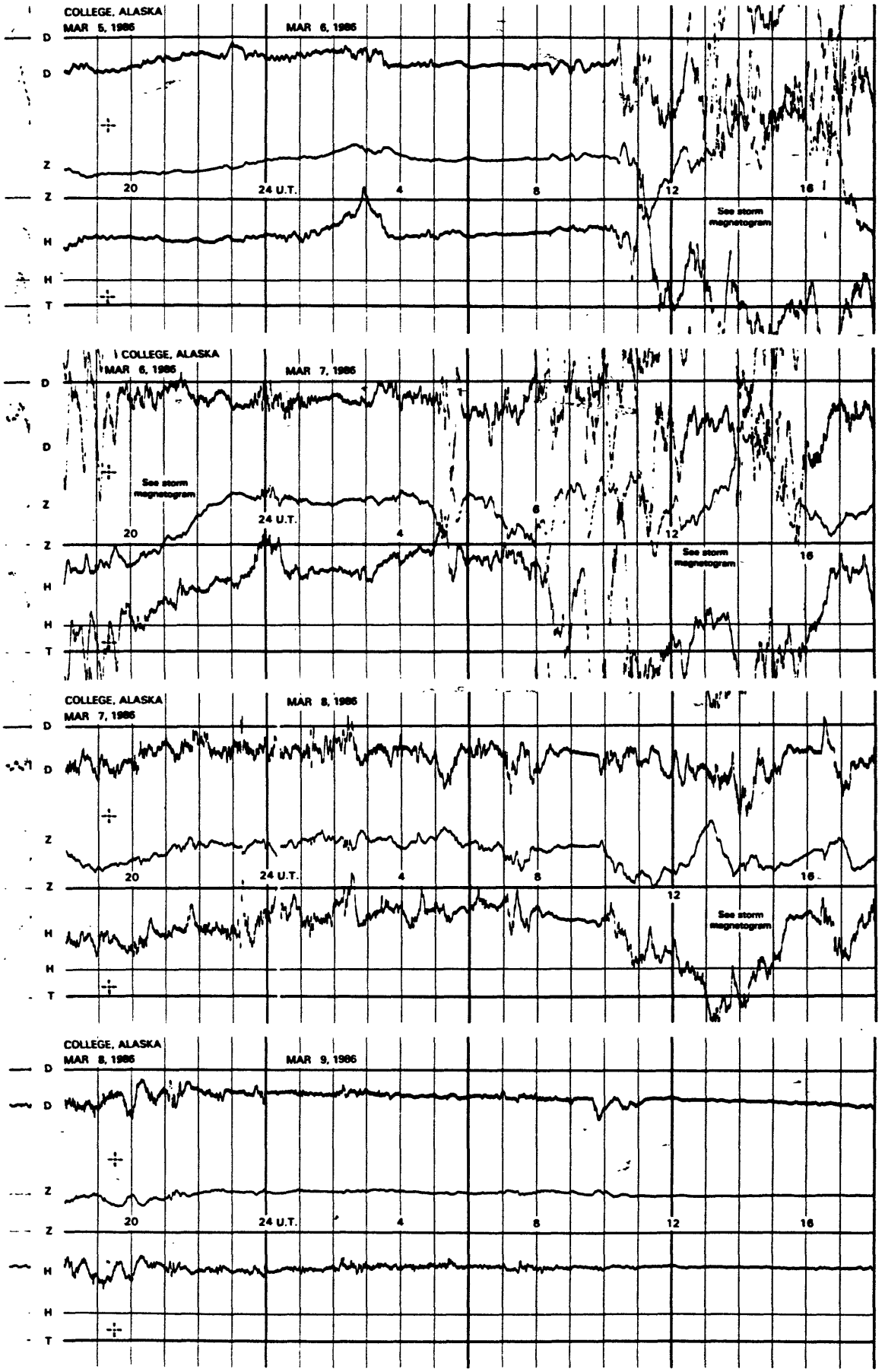

200 mm
100 mm
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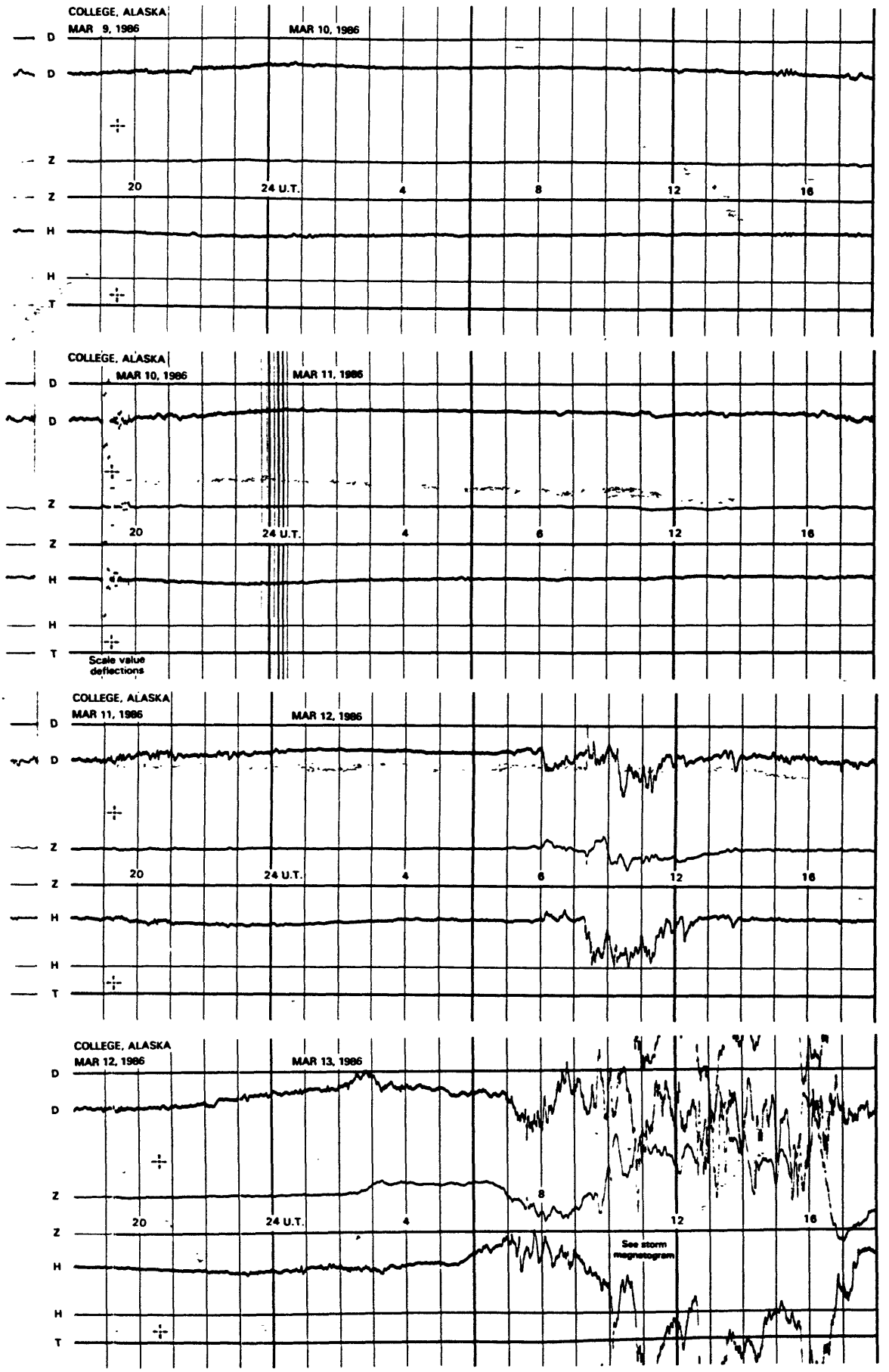
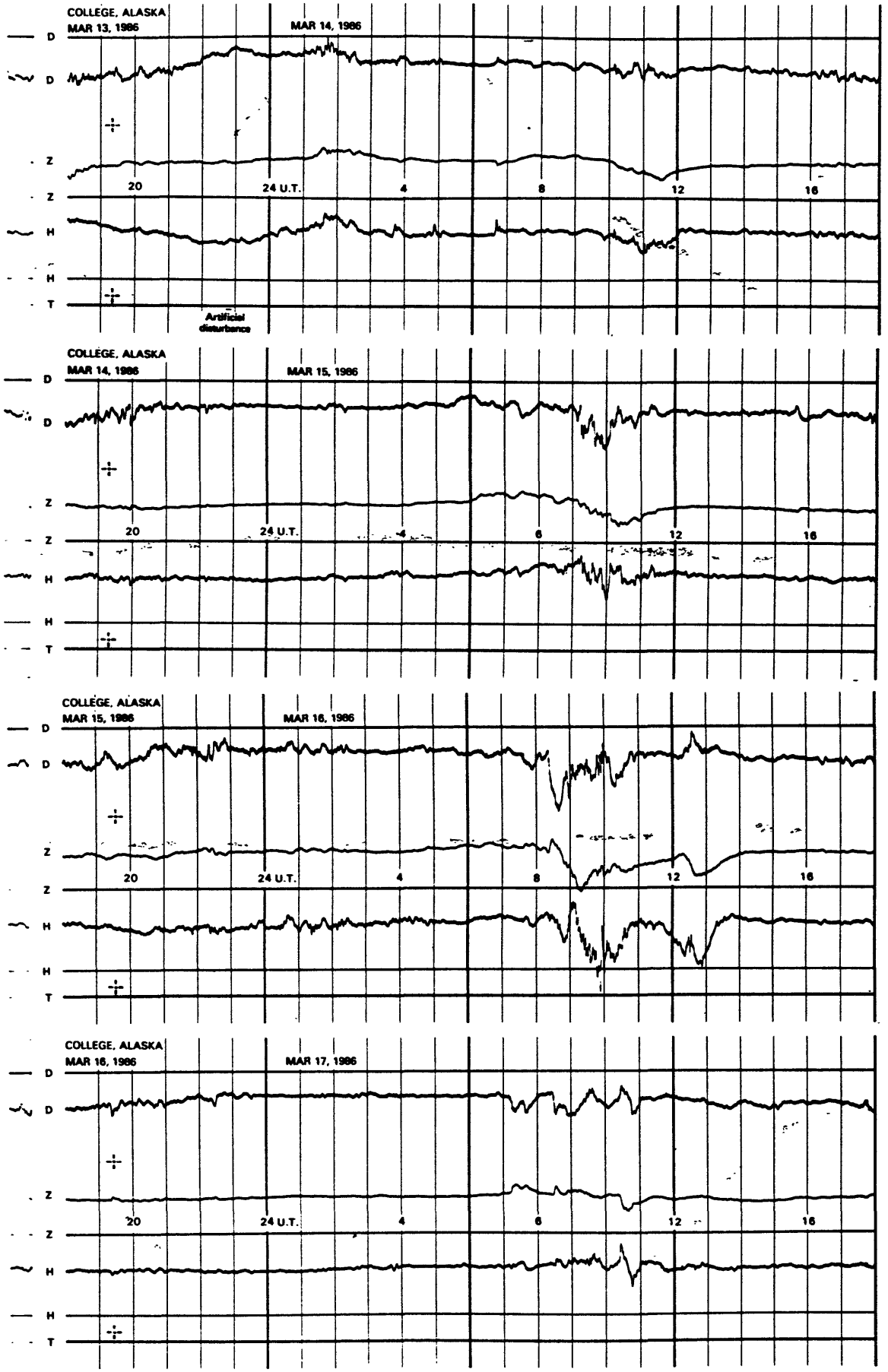
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS.



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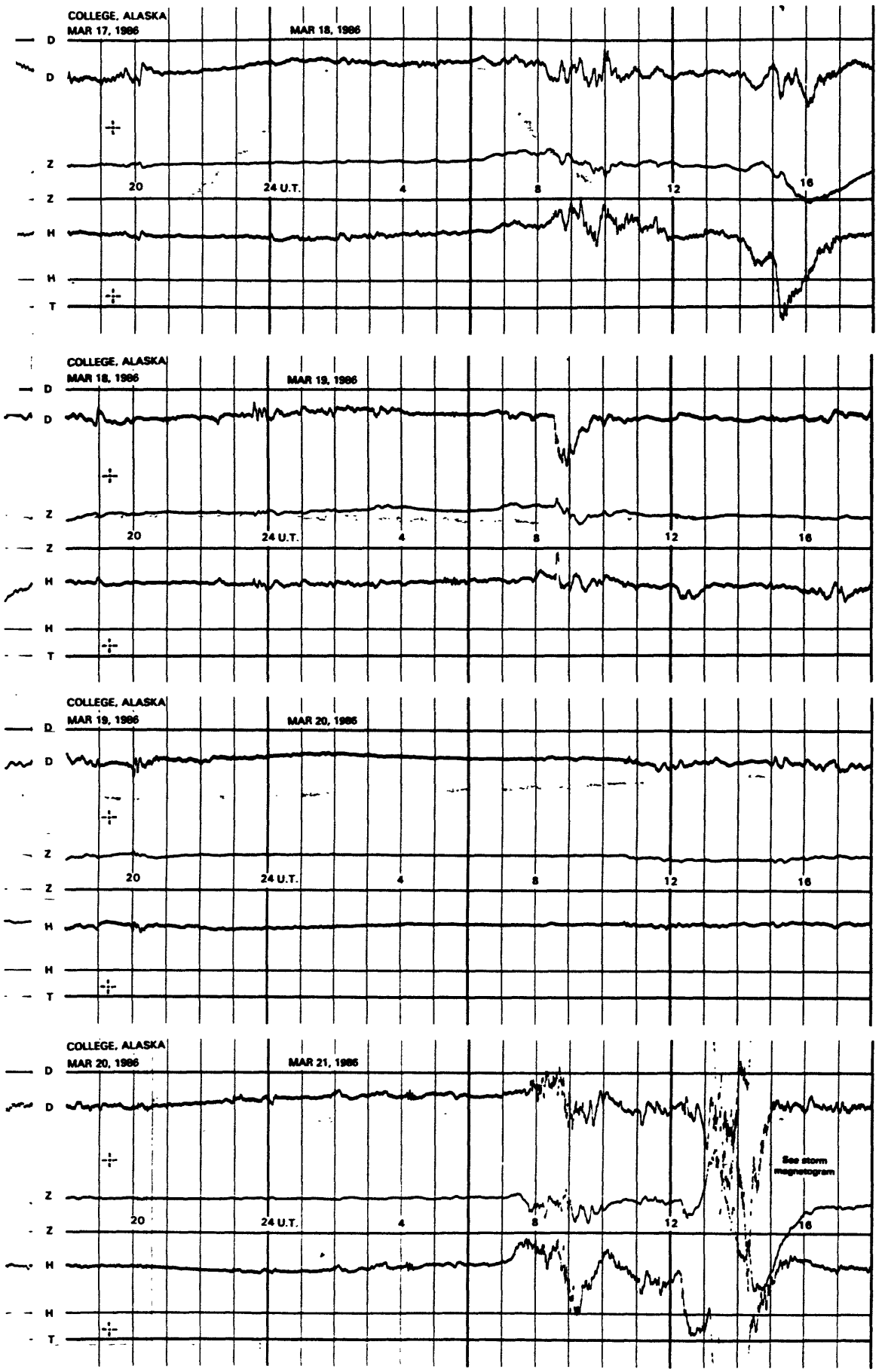

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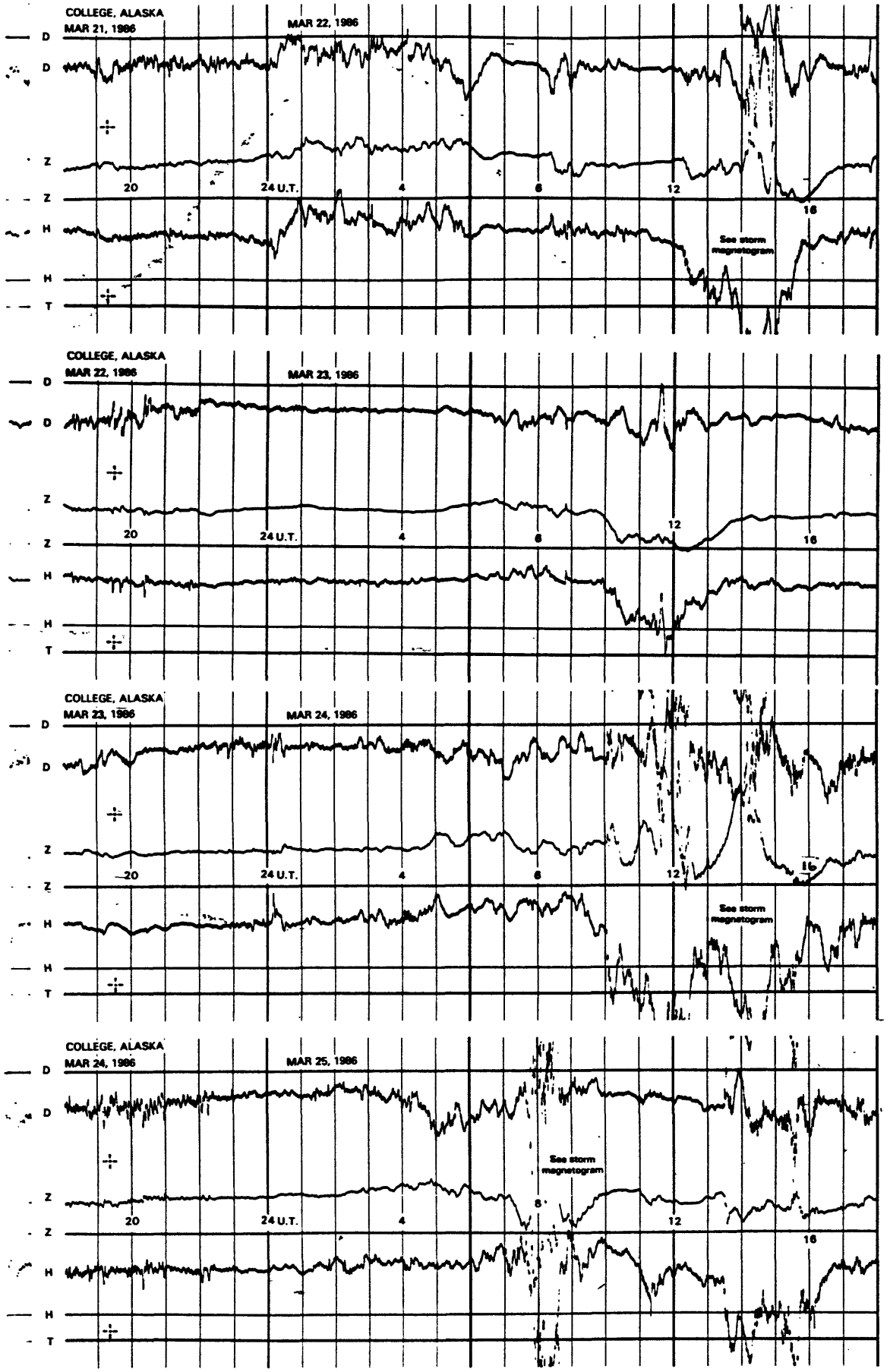

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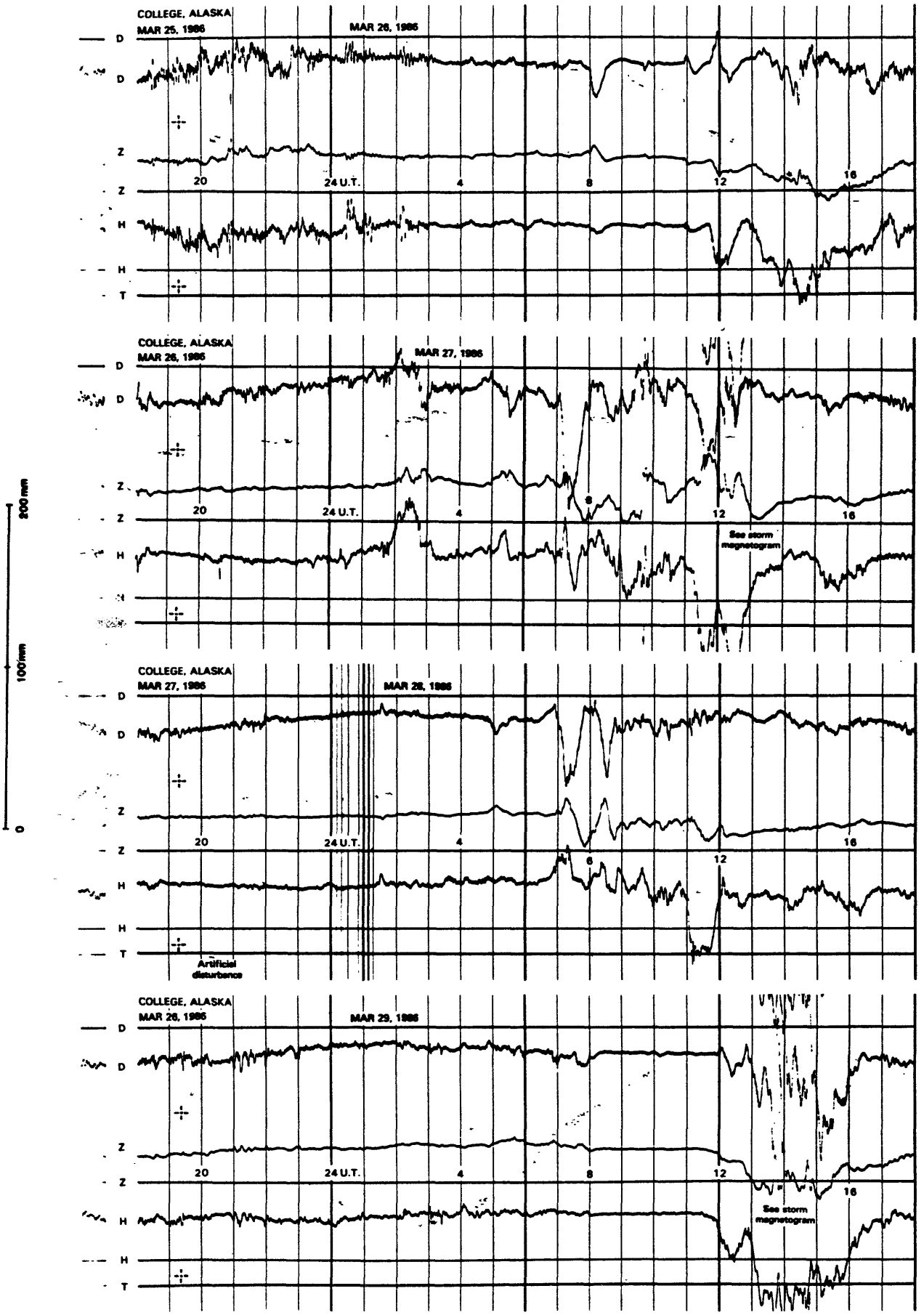

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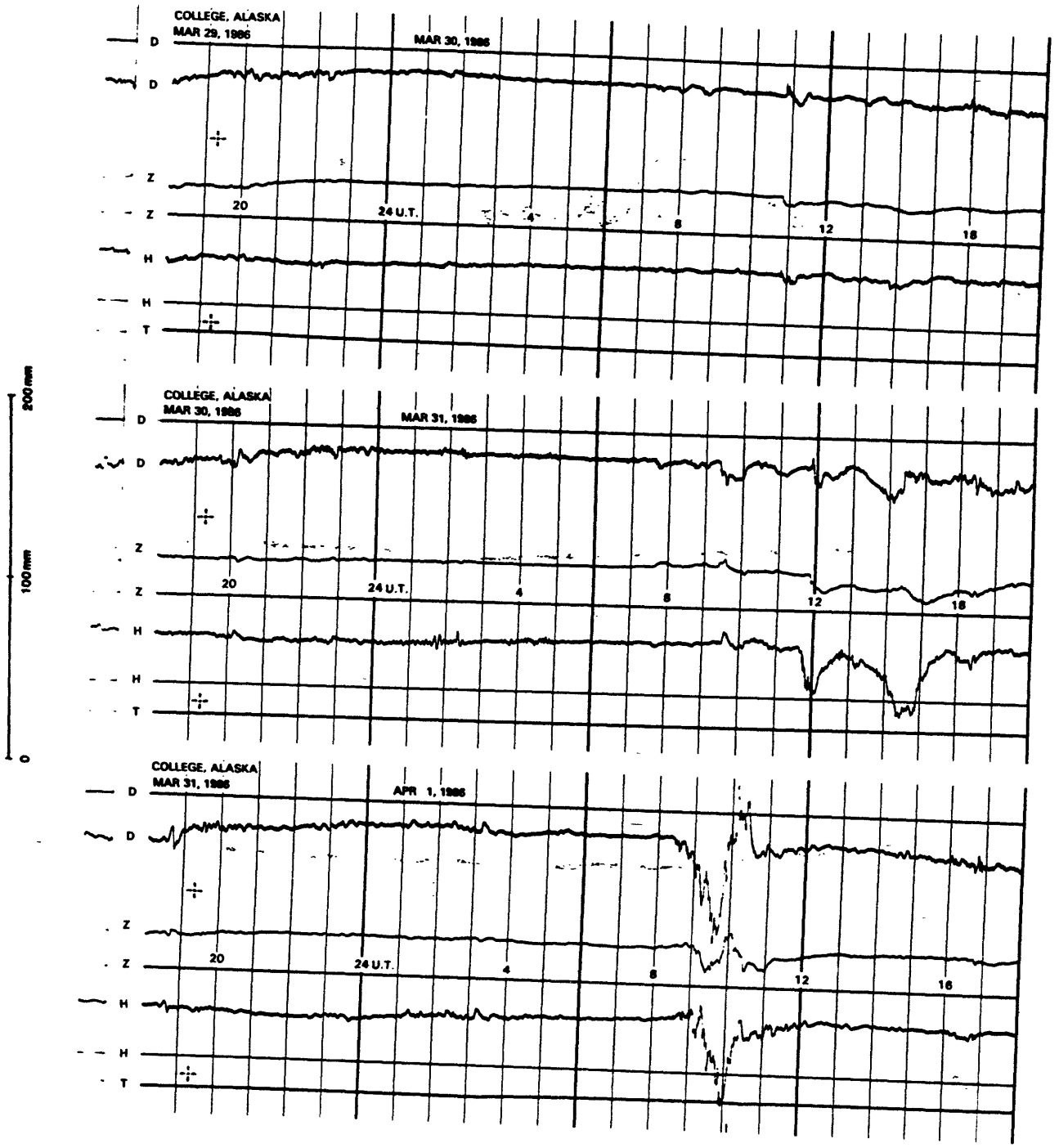
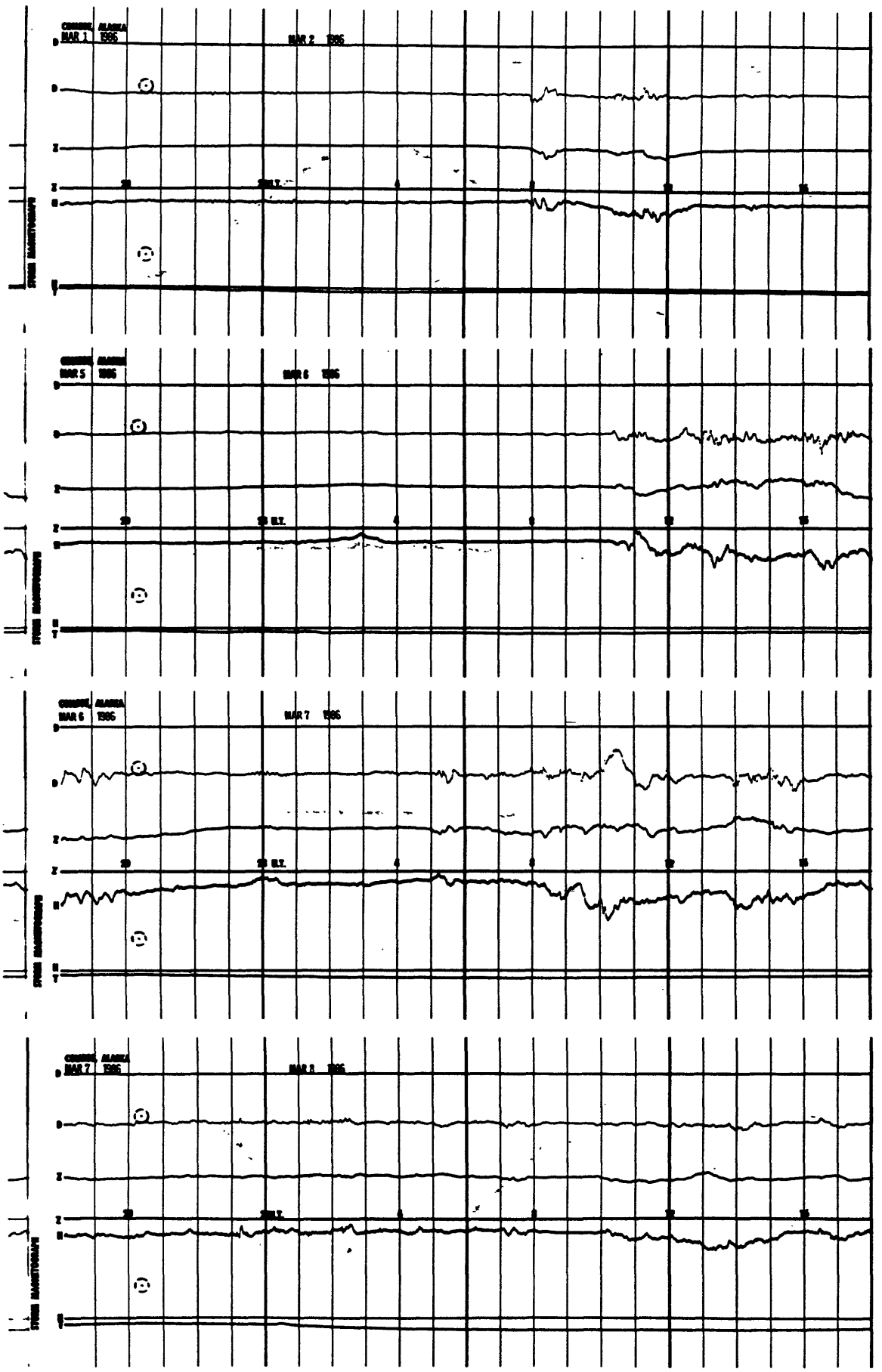
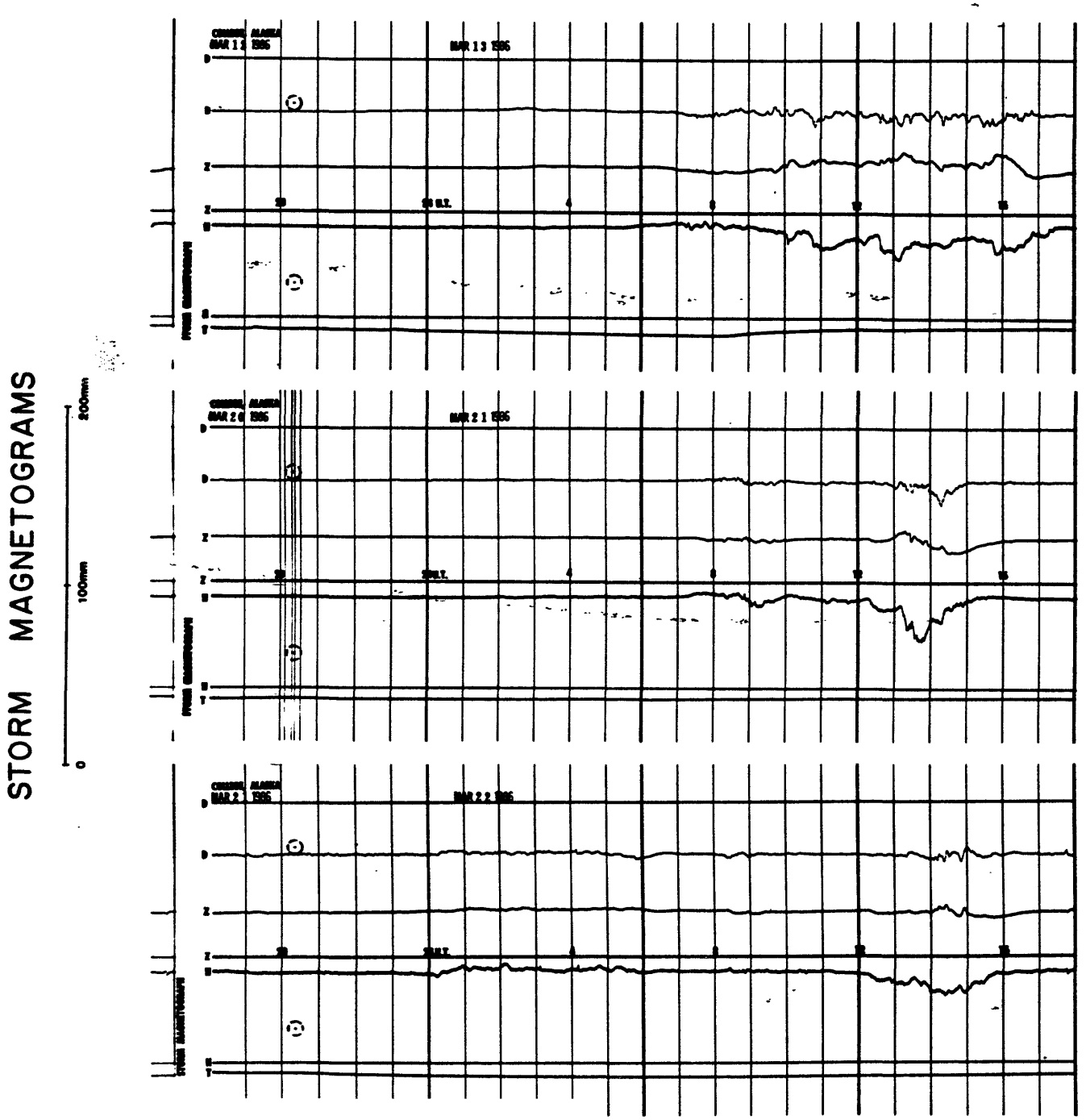


STORM MAGNETOGRAMS




STORM MAGNETOGRAMS
200mm
100mm
0

STORM MAGNETOGRAMS