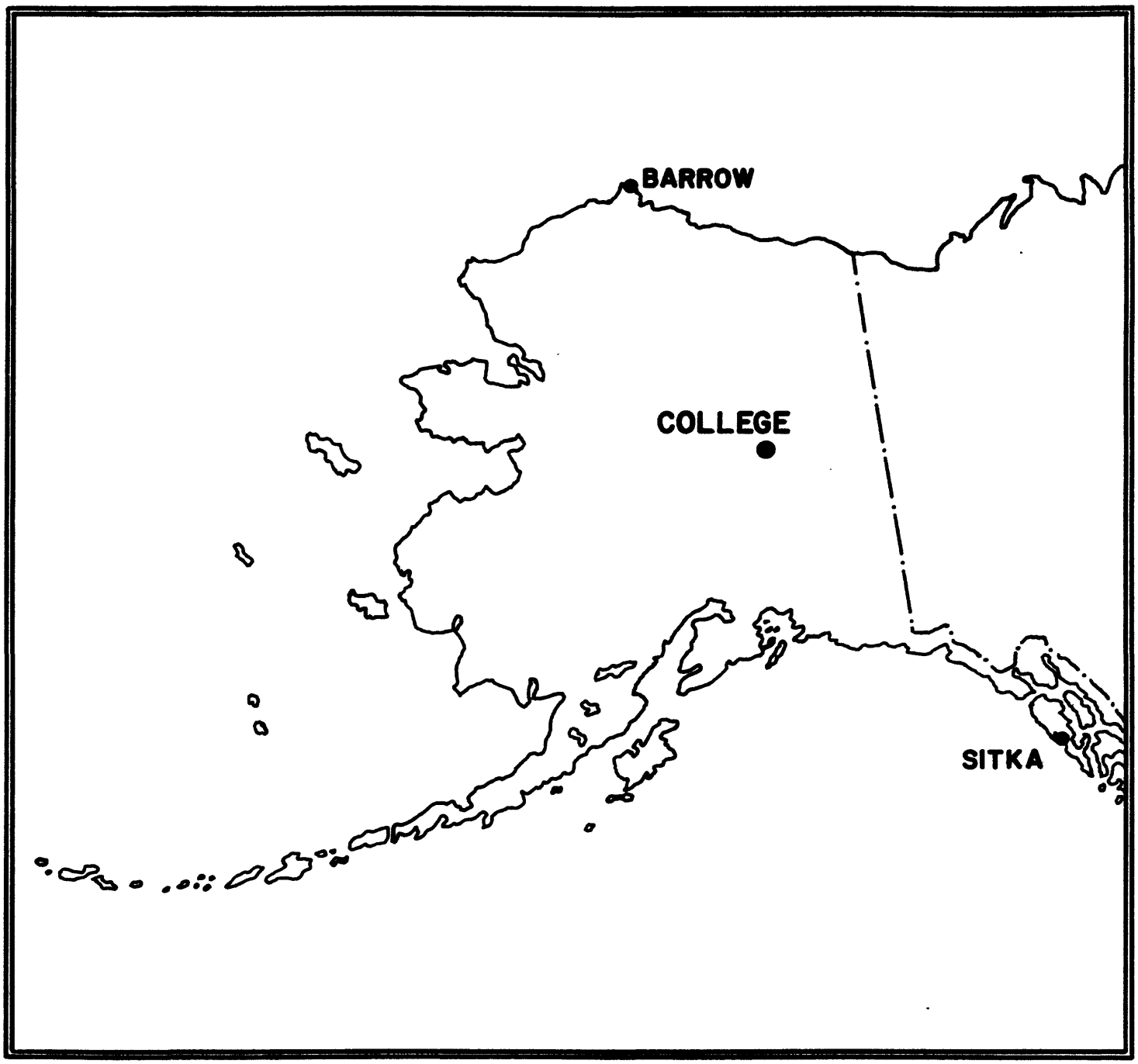
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

FEBRUARY 1990

OPEN FILE REPORT 90-0300B



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.

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:

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)

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.

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: FEBRUARY, 1990

DATE	K-INDICES 00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	Ak
1	1	2	2	4	5	7	7	2	30	47
2	3	4	4	5	6	5	4	3	34	36
3	2	1	0	3	4	4	3	1	18	12
4	2	2	3	4	4	7	6	4	32	41
5	4	3	5	7	4	5	5	2	35	45
6	2	2	3	0	1	1	1	1	11	5
7	0	2	5	4	5	6	4	4	30	33
8	3	2	2	3	1	0	1	0	12	6
9	0	0	1	4	3	3	1	1	13	8
10	0	0	2	3	5	5	1	0	16	15
11	0	2	2	4	4	4	2	1	19	13
12	2	2	2	4	1	0	0	0	11	6
13	0	0	0	3	2	2	0	1	8	4
14	3	5	5	4	3	2	1	3	26	22
15	1	0	3	4	6	7	5	6	32	49
16	4	6	6	4	6	5	4	4	39	50
17	4	4	3	6	5	6	3	3	34	38
18	2	3	5	5	6	4	5	4	34	38
19	3	3	2	4	6	5	5	4	32	33
20	4	3	4	5	7	6	4	4	37	49
21	3	2	1	5	5	4	3	1	24	21
22	1	2	4	5	6	6	4	4	32	37
23	4	3	5	6	6	7	5	5	41	61
24	4	3	5	4	4	5	6	4	35	37
25	4	4	4	6	5	5	5	3	36	40
26	3	3	3	5	6	2	4	4	30	29
27	3	3	4	7	5	4	3	1	30	36
28	3	7	5	6	5	4	3	3	36	49
29										
30										
31										

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.....	3.66	7.71		(γ/mm)
LOWER LIMIT FOR K = 9	2470	2480		(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief
OBSERVER IN CHARGE

NOAA FORM 76-133 SUPERSEDES C&GS FORM 815

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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

FEBRUARY 19 90

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	4	10XX	..				4	6	7	182	1220	860	5	20
		15	06XX	..				15	6	7	279	1760	970	16	16
		23	06XX	..				23	6	7	167	1200	870	24	22

COLLEGE OBSERVATORY, COLLEGE, ALASKA -- PRELIMINARY CALIBRATION DATA FOR: FEBRUARY 1990

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE		CALIBRATION BASELINE
D	0000 UT, 2-1-90	2400 UT, 2-28-90	1.0'/mm	3.7γ/mm	26° 33.8' E
H	0000 UT, 2-1-90	2400 UT, 2-19-90	7.7γ/mm		12605γ
	0000 UT, 2-20-90	2400 UT, 2-28-90	(SAME)		12609γ
Z	0000 UT, 2-1-90	2400 UT, 2-28-90	7.7γ/mm		55212γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE		CALIBRATION BASELINE
D	0000 UT, 2-1-90	2400 UT, 2-28-90	7.9'/mm	29.4γ/mm	
H	(SAME)	(SAME)	43.4γ/mm		
Z	(SAME)	(SAME)	49.0γ/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° 56.6' E	12783γ	55337γ

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: FEB 6, 8, 9, 12, 13

U.S. Dept. of Interior
Geological Survey

Observatory: **COLLEGE, ALASKA** | Month: FEBRUARY | Year: 1990

jep-CO - 1/86

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

(UNIVERSAL TIME)

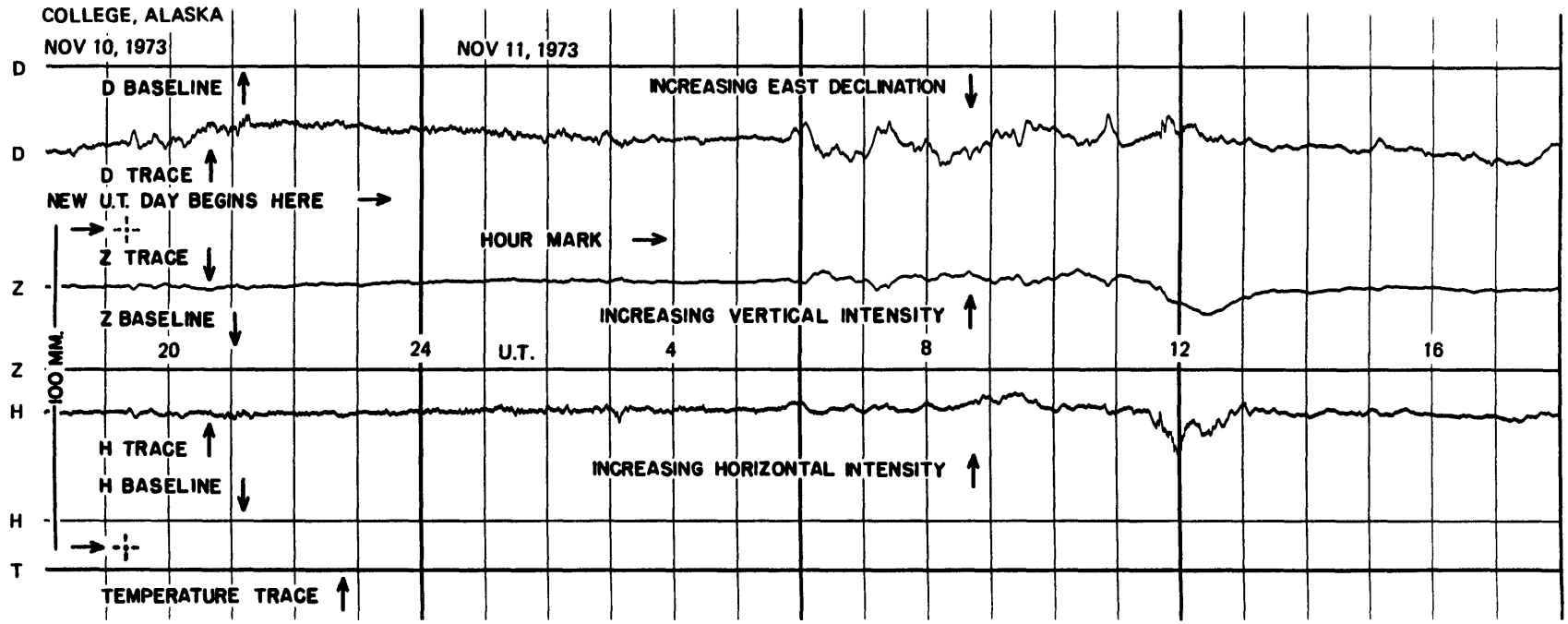
Values are in Tenths of mm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT		D					H					Z					COMPONENT
DAY		6	8	9	12	13	6	8	9	12	13	6	8	9	12	13	DAY
A_k		5	6	8	6	4	5	6	8	6	4	5	6	8	6	4	A_k
HOUR	01	200	180	230	219	219	201	277	210	223	217	179	171	176	173	169	01 HOUR
	02	202	219	220	181	218	210	248	211	223	217	181	190	176	173	163	02
	03	202	202	217	166	210	210	270	216	290	221	190	179	176	194	158	03
	04	210	209	214	165	212	226	250	220	281	229	203	170	174	182	158	04
	05	217	210	219	168	220	260	248	222	268	230	195	159	170	210	158	05
	06	229	191	210	204	220	253	279	228	250	234	197	180	170	204	158	06
	07	260	188	211	198	220	250	281	231	251	231	189	191	202	198	158	07
	08	251	185	213	190	218	231	321	224	262	230	180	230	194	196	158	08
	09	270	218	219	253	213	250	300	221	250	230	175	221	182	189	156	09
	10	221	232	230	257	243	230	335	211	260	232	175	195	175	113	170	10
	11	221	174	243	203	217	220	289	121	262	208	167	200	143	121	143	11
	12	213	189	288	211	269	220	258	68	250	129	166	174	108	170	90	12
	13	220	215	279	220	260	210	232	179	238	202	162	190	95	170	70	13
	14	220	220	221	221	228	219	227	228	221	241	161	180	126	154	125	14
	15	229	226	250	222	238	216	224	179	223	239	160	171	134	133	150	15
	16	229	228	270	237	255	200	229	150	240	240	154	170	110	140	150	16
	17	241	225	249	246	255	199	230	151	240	241	139	168	84	153	153	17
	18	270	241	260	250	271	229	230	254	240	256	140	173	133	152	154	18
	19	272	250	263	250	291	240	230	239	240	258	159	178	160	152	150	19
	20	279	256	263	241	279	230	230	232	239	250	159	178	163	153	145	20
	21	278	260	250	229	260	237	229	225	230	240	160	181	163	149	141	21
	22	260	254	231	219	241	220	213	220	228	239	162	184	165	157	140	22
	23	243	248	231	219	275	212	211	209	221	210	169	184	171	164	145	23
	24	235	240	205	219	261	209	211	216	215	190	170	182	170	168	143	24
DAILY SUM		5672	5260	5686	5188	5793	5382	6052	4865	5845	5414	4092	4399	3720	3968	3505	DAILY SUM
DAILY MEAN		236	219	237	216	241	224	252	203	244	226	170	183	155	165	146	DAILY MEAN
MEAN				230					230					164			MEAN

Scaled [illegible] | Checked [illegible]

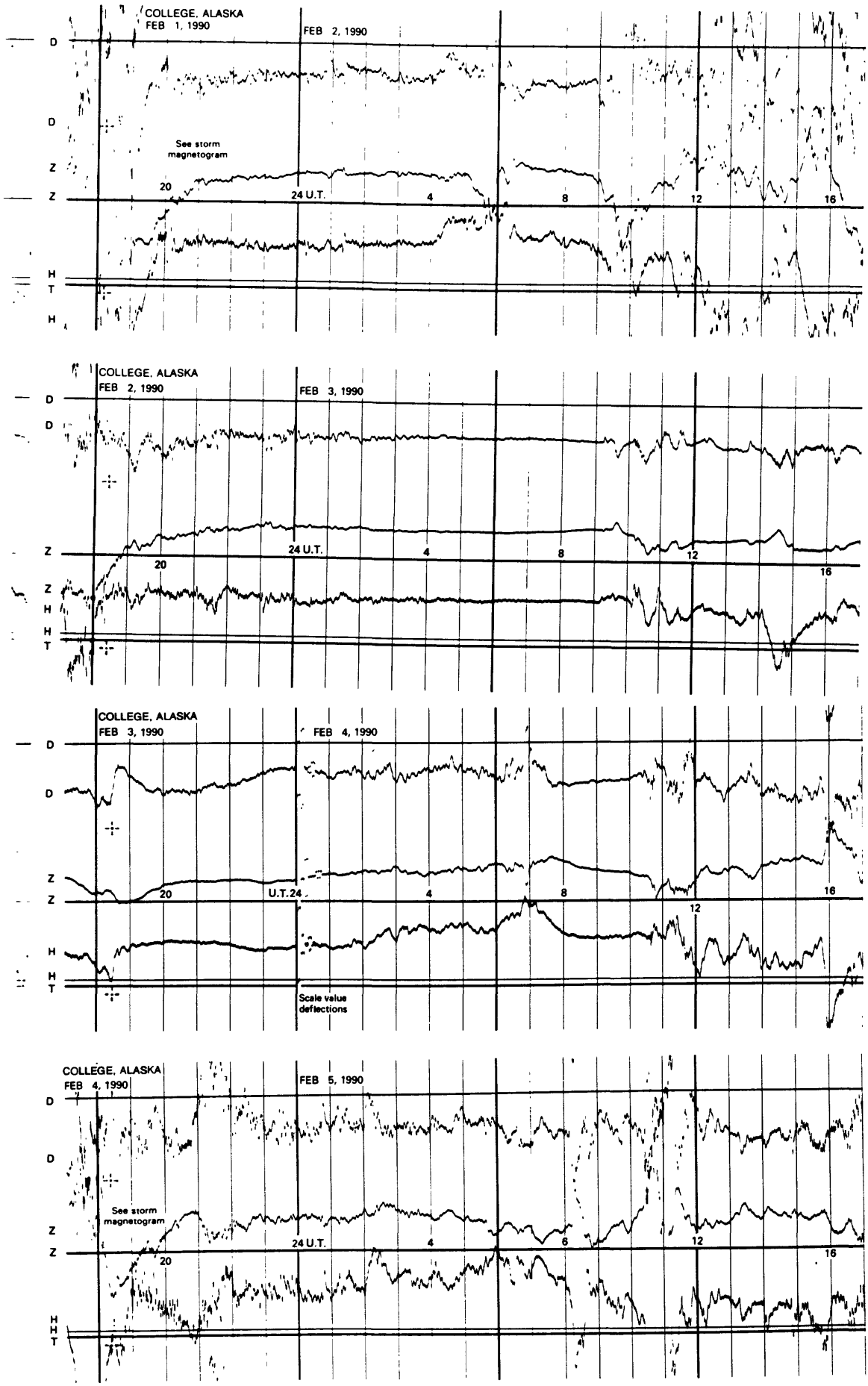
-9-

FORMAT FOR NORMAL & STORM MAGNETOGRAMS
(SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS



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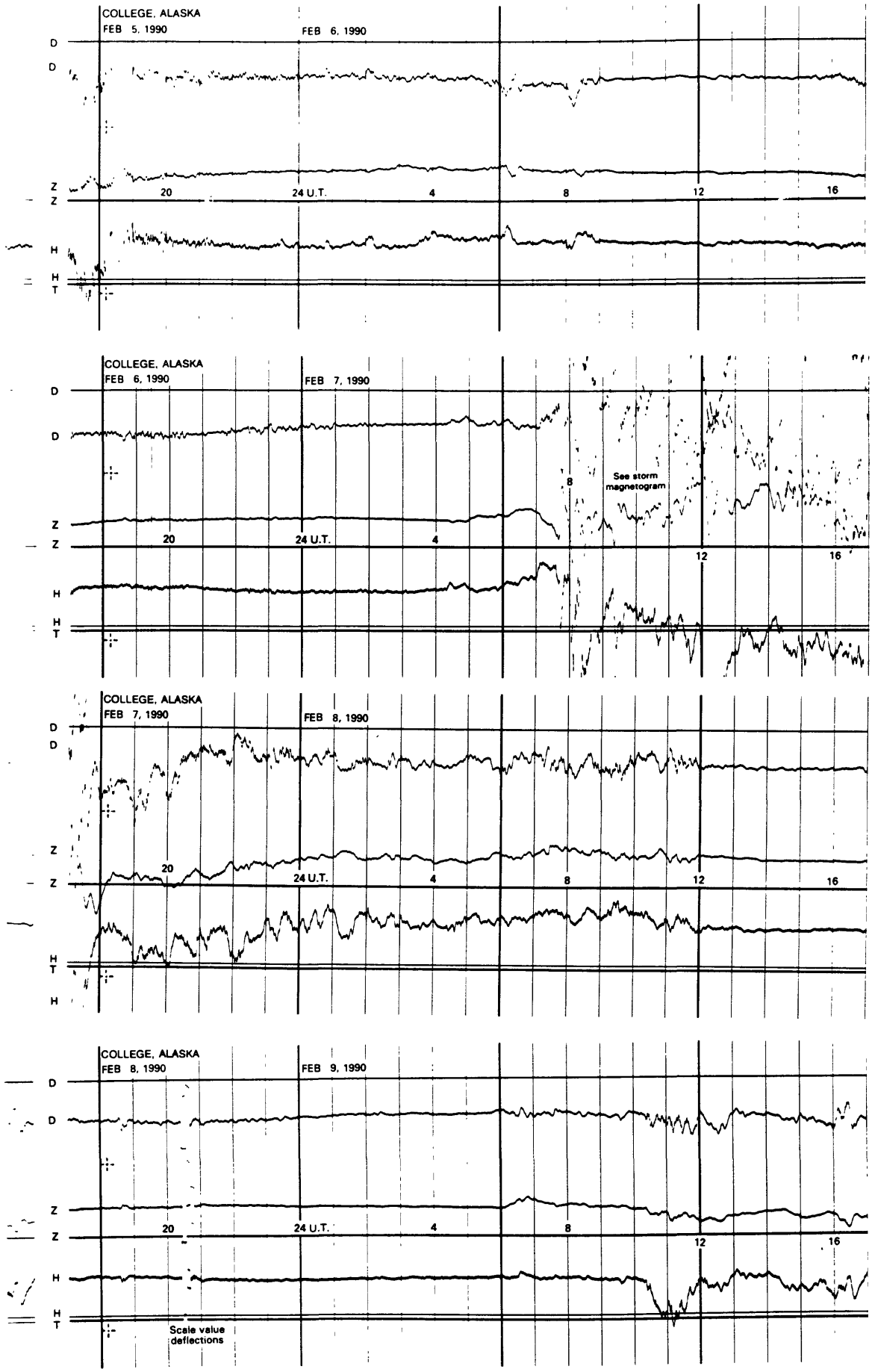

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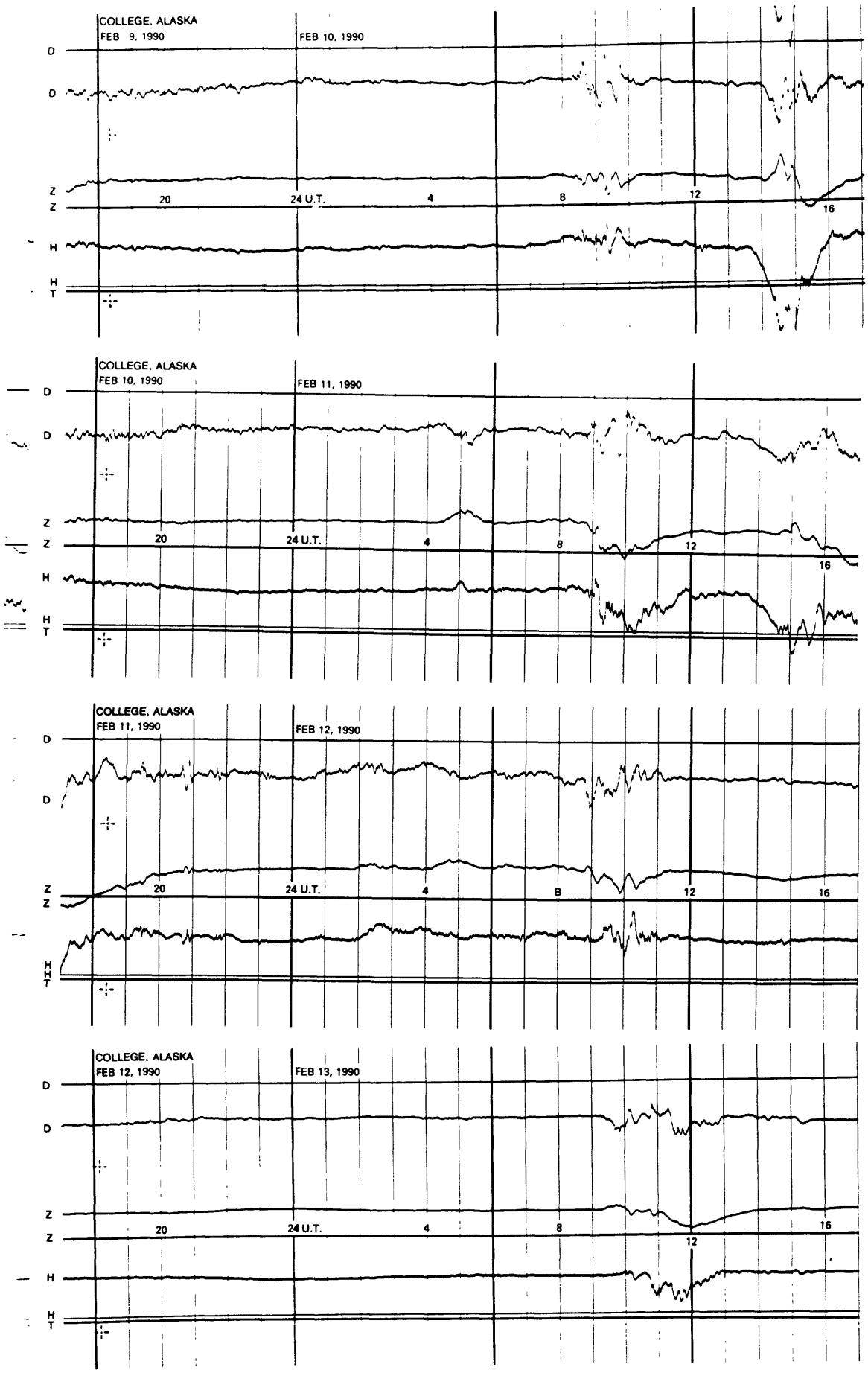

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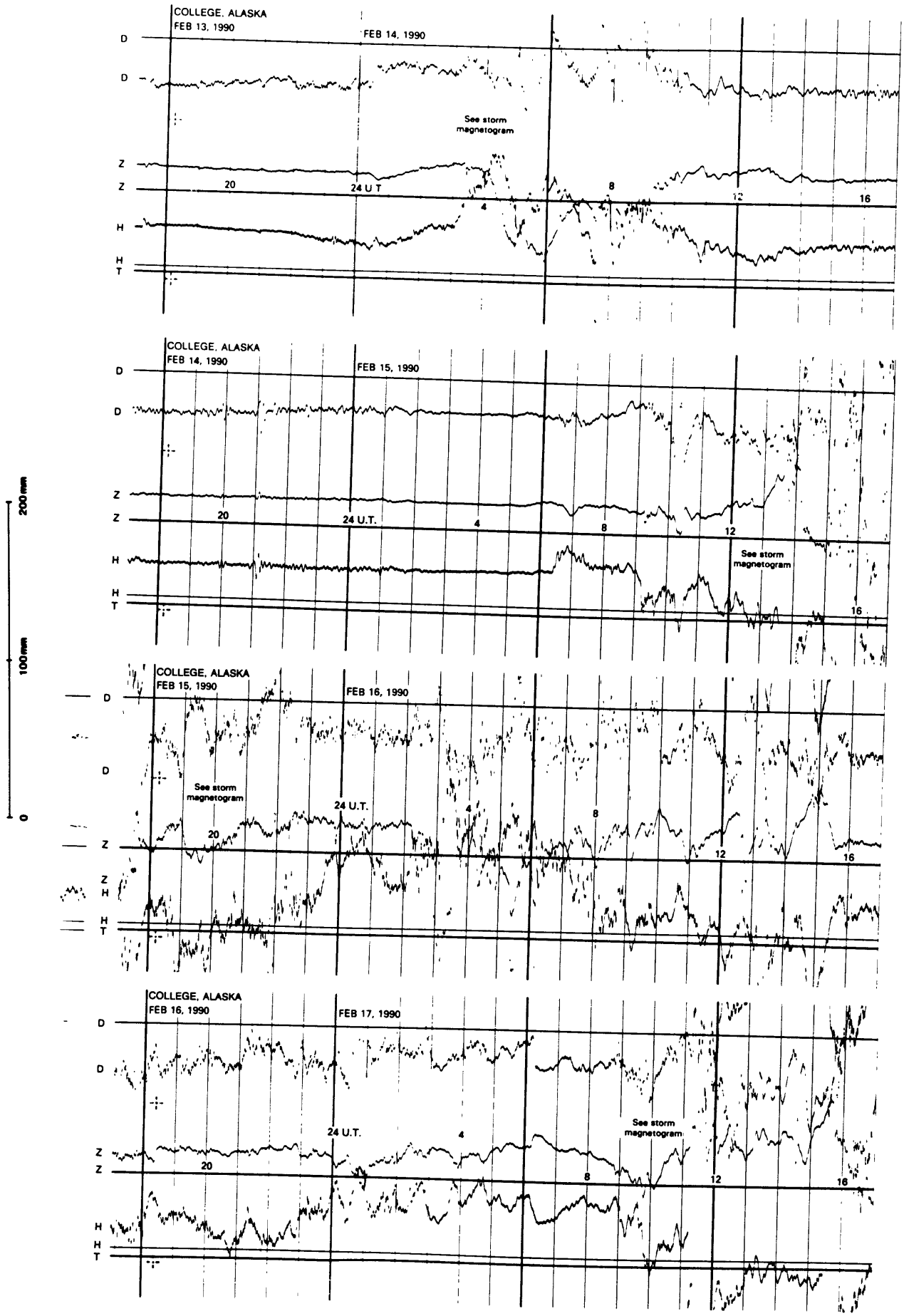

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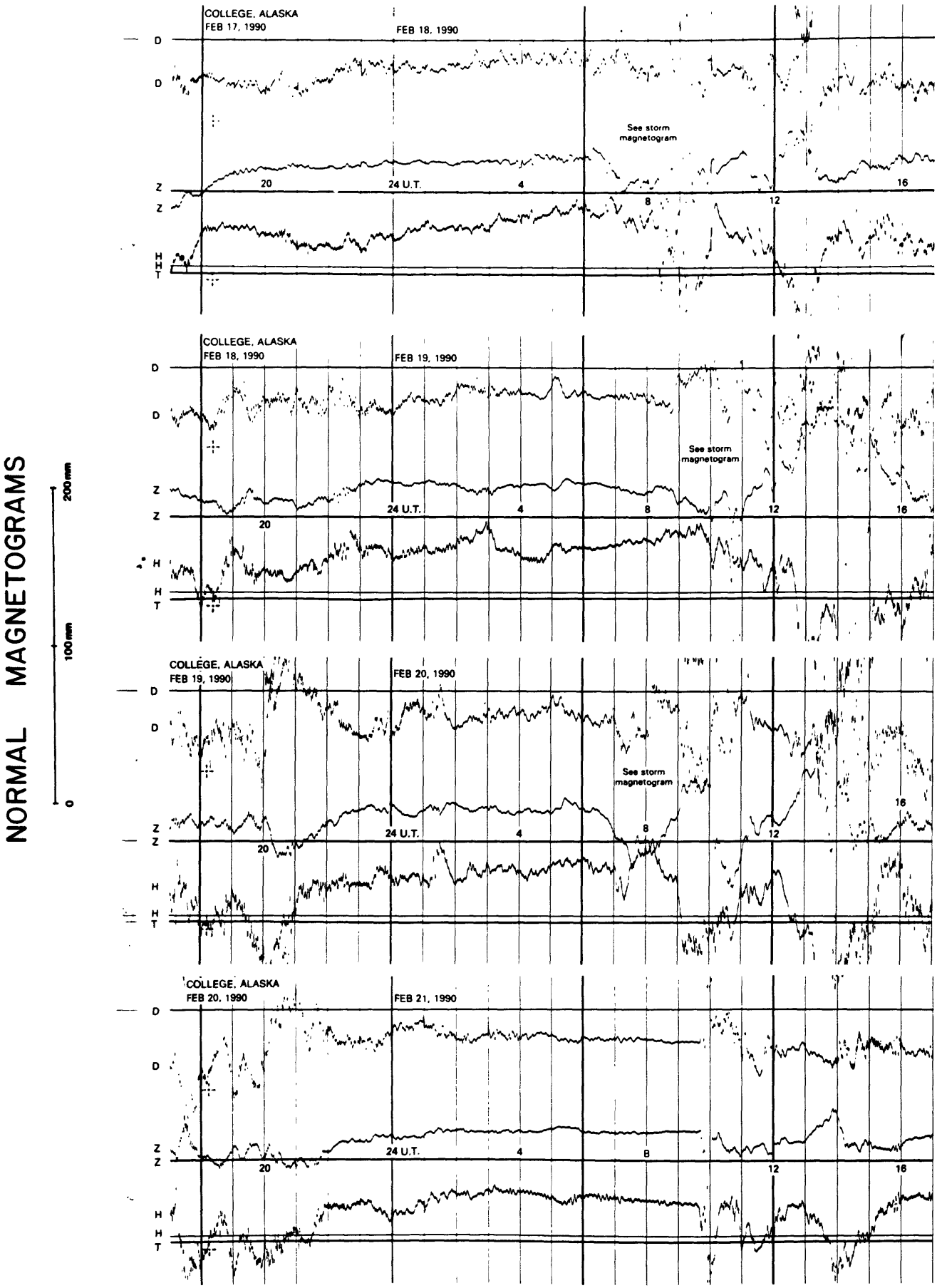

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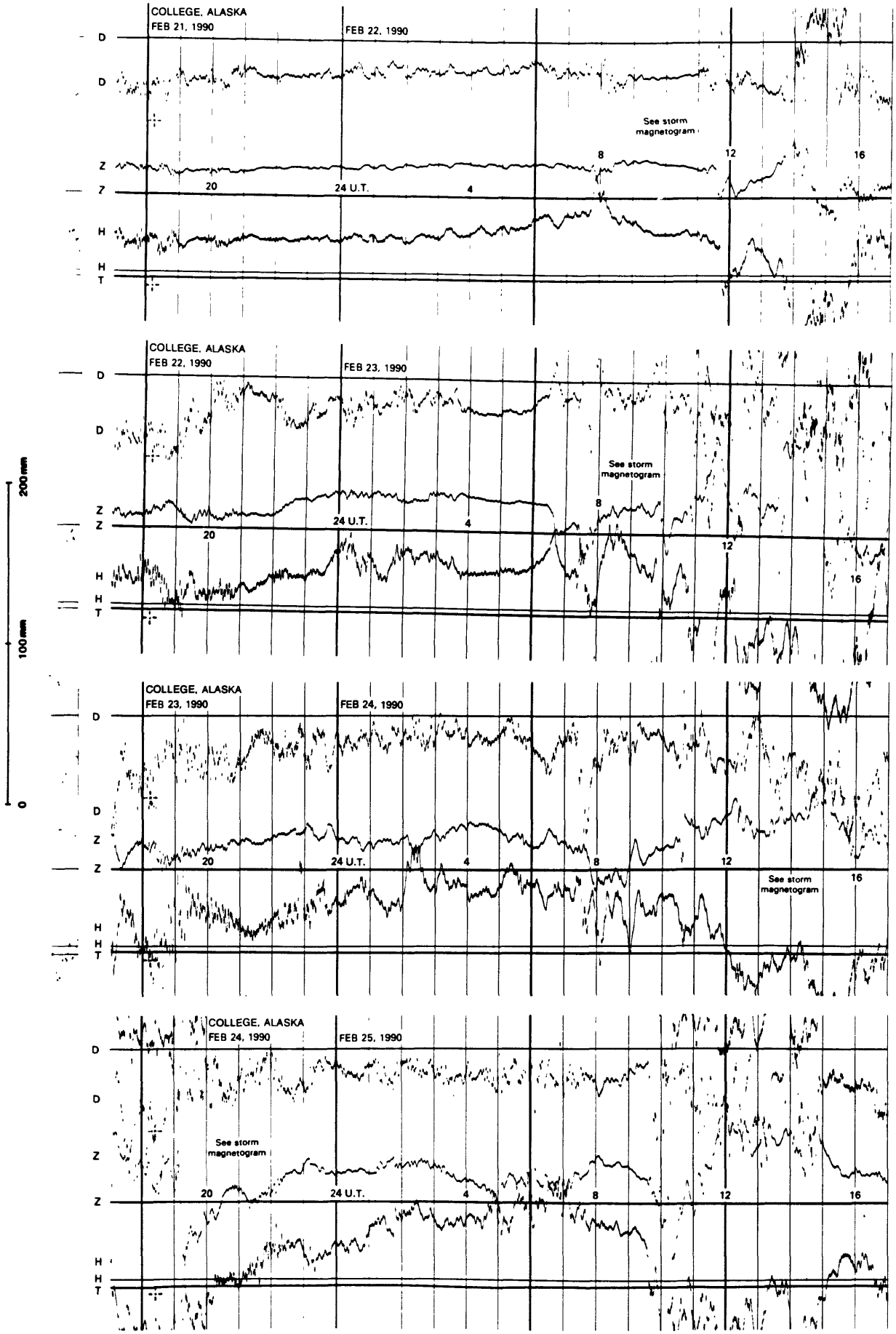

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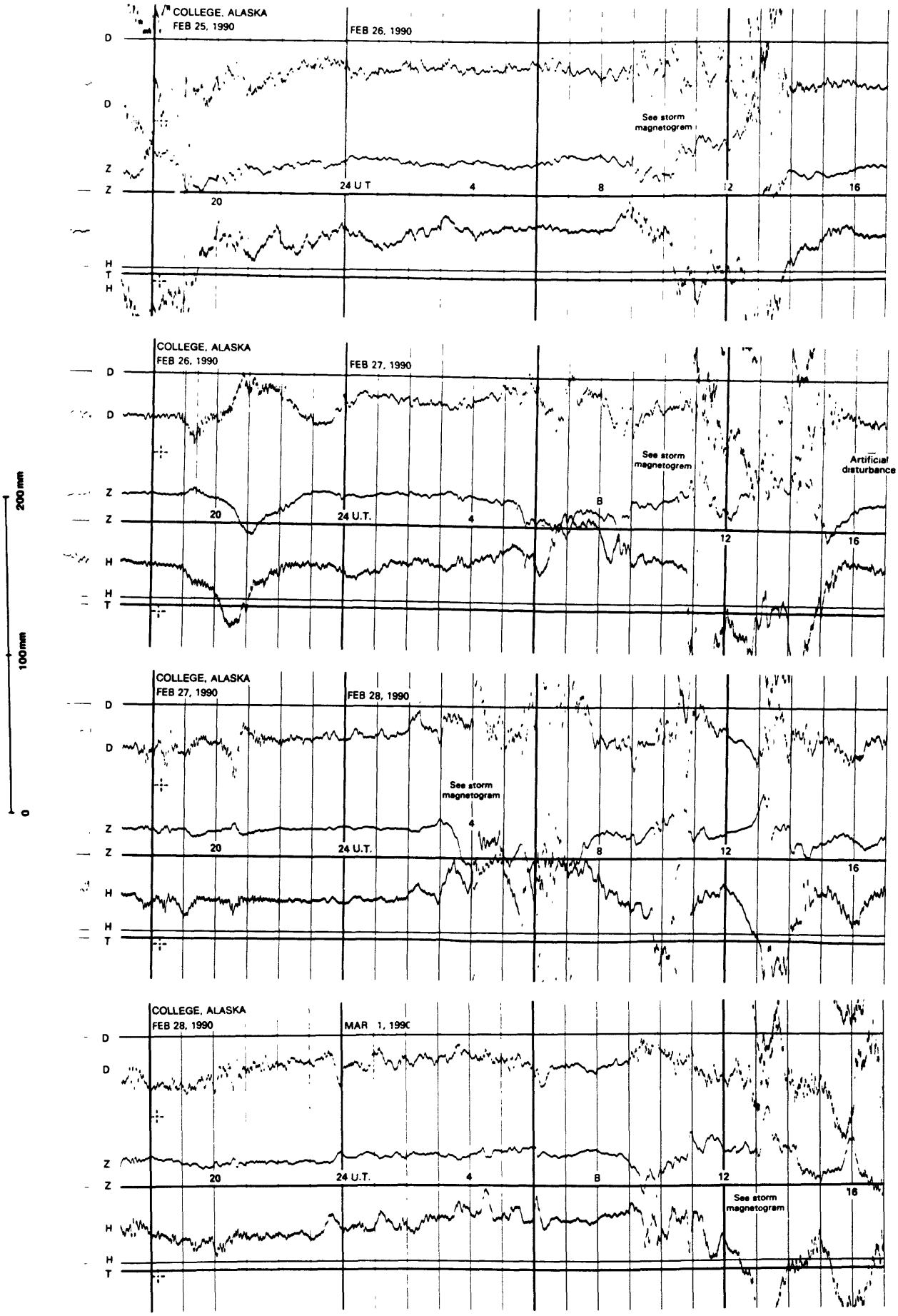

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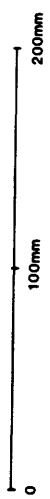

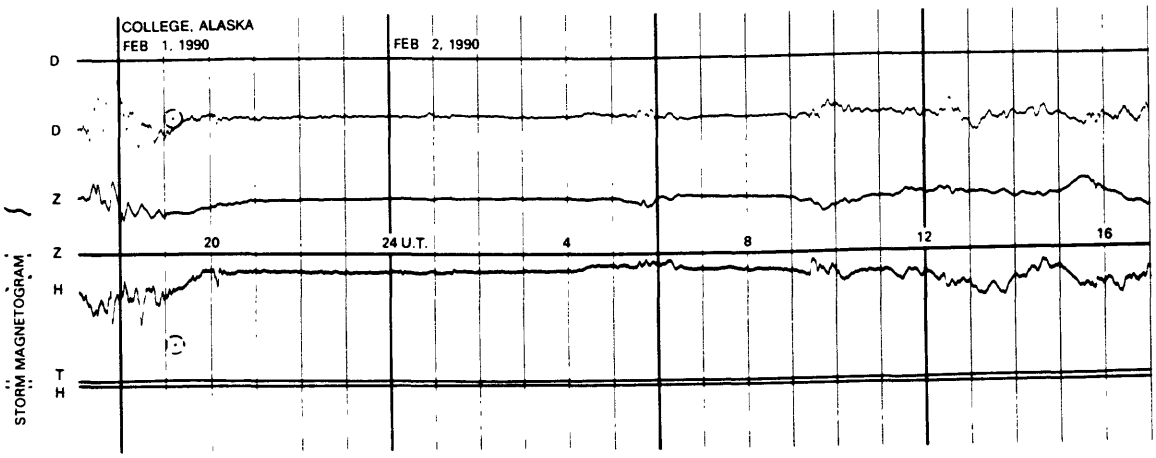

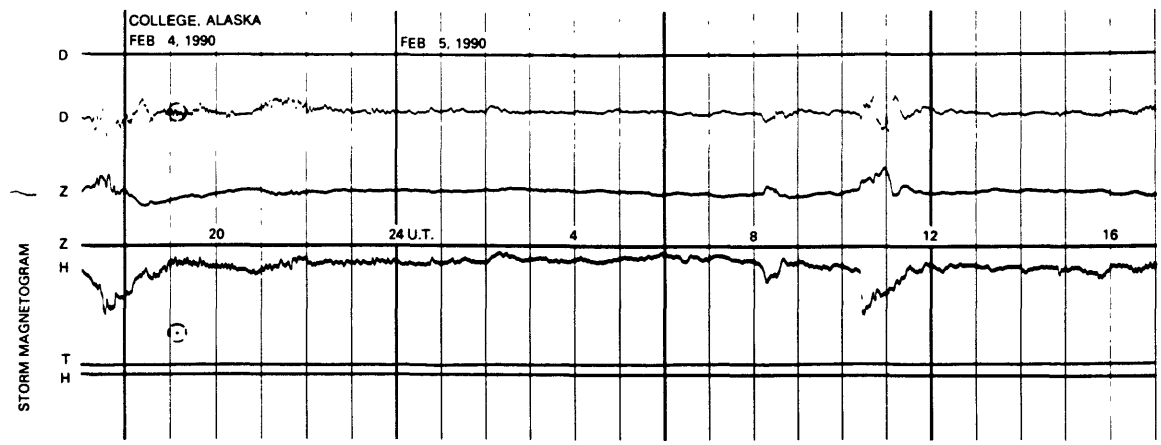

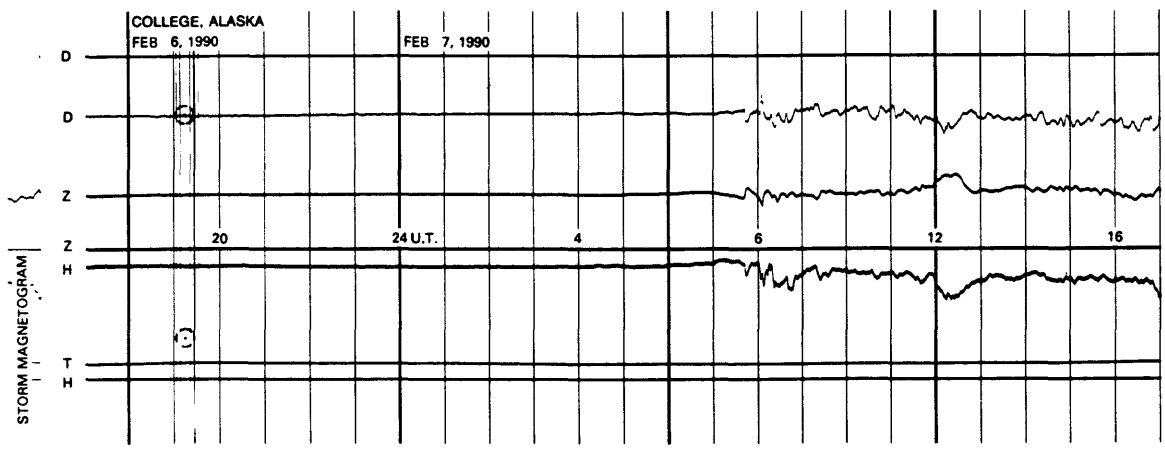

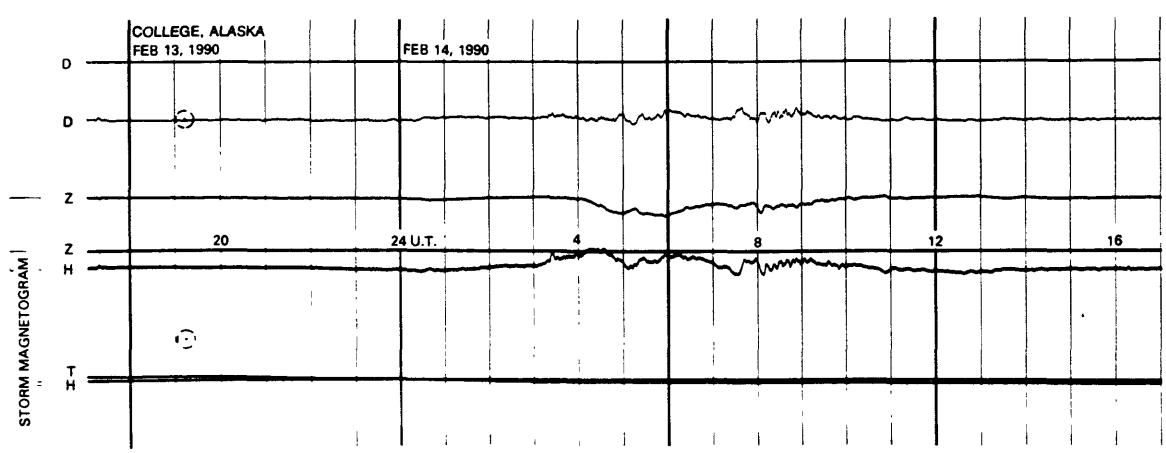

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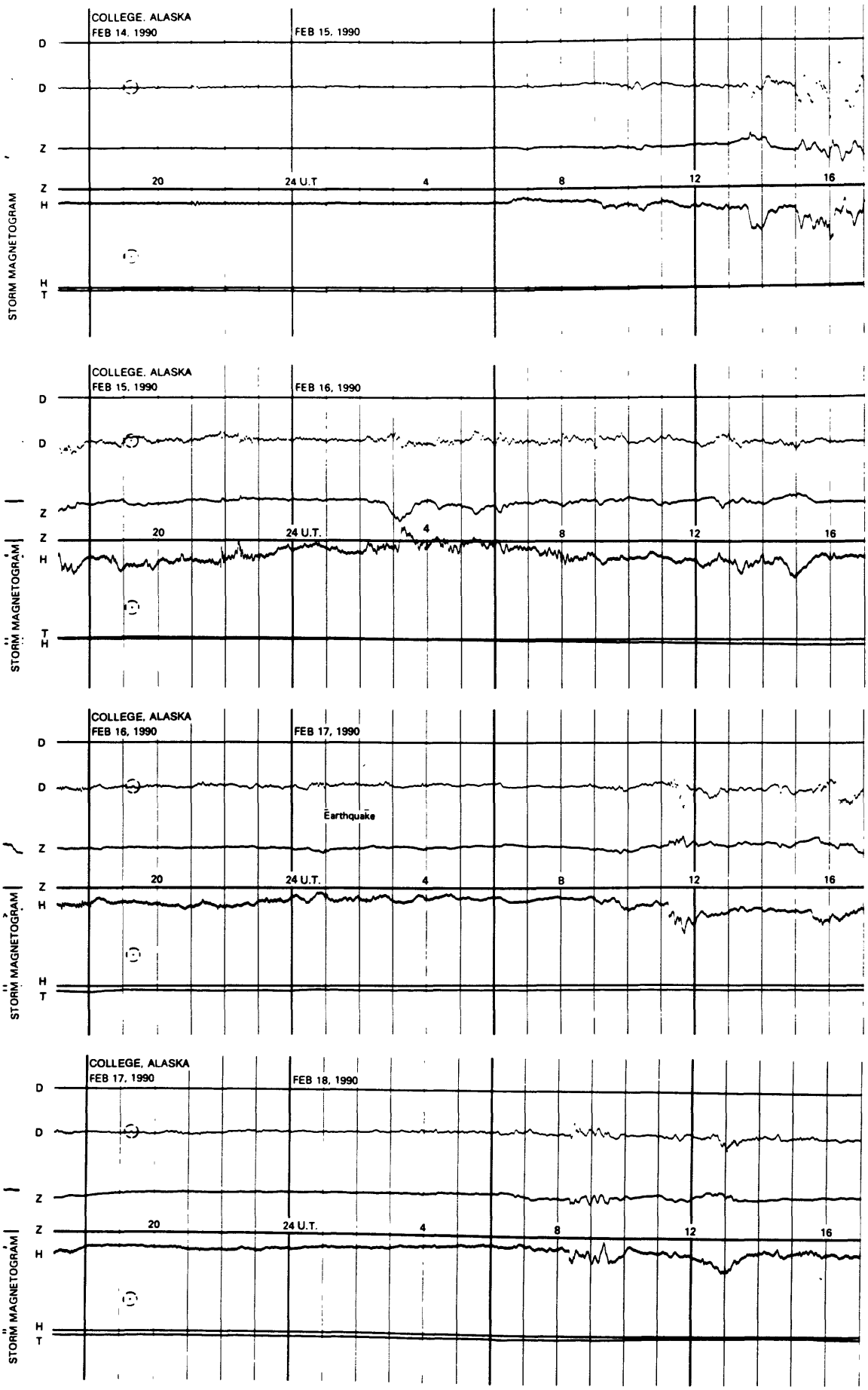

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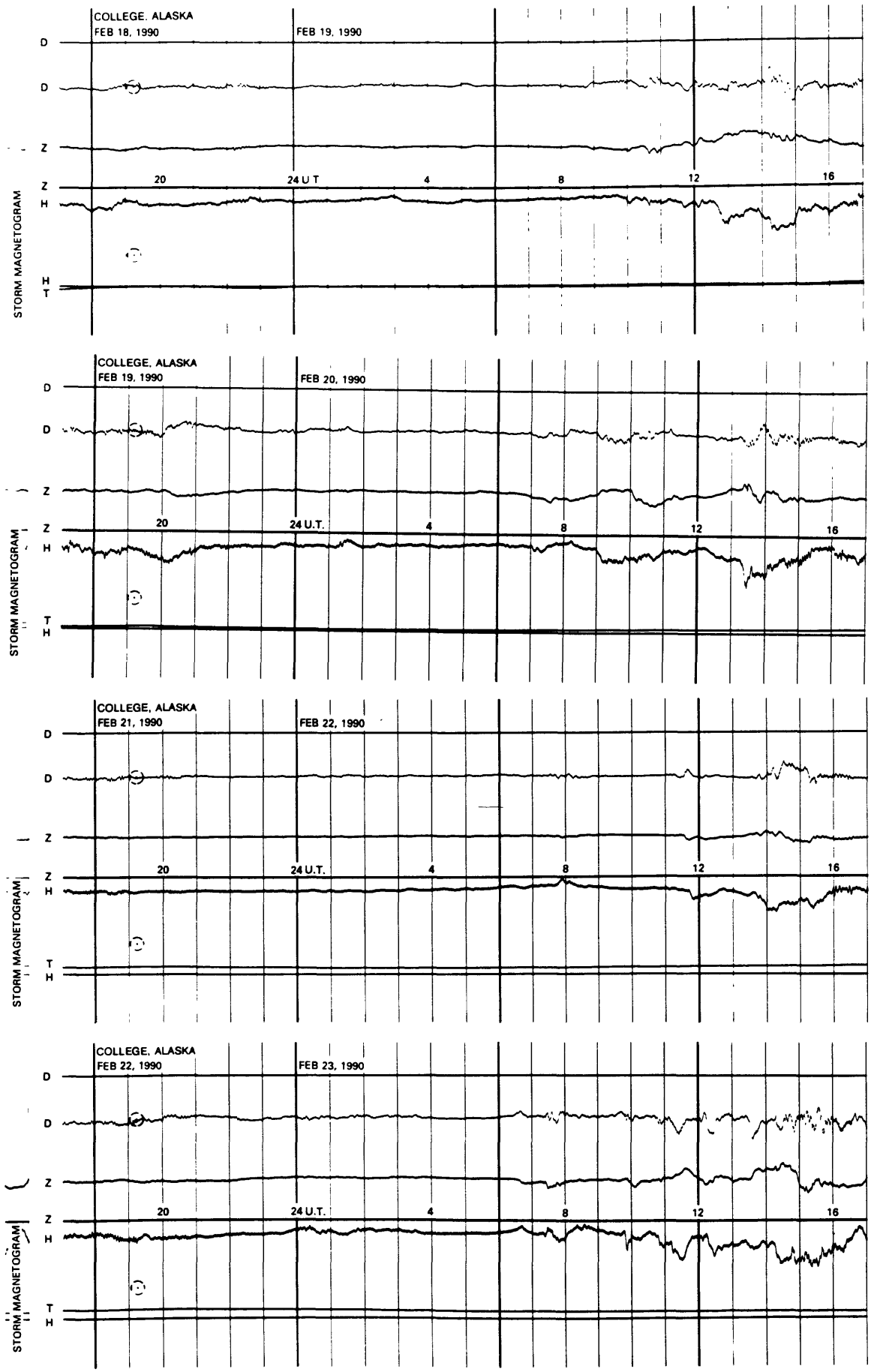

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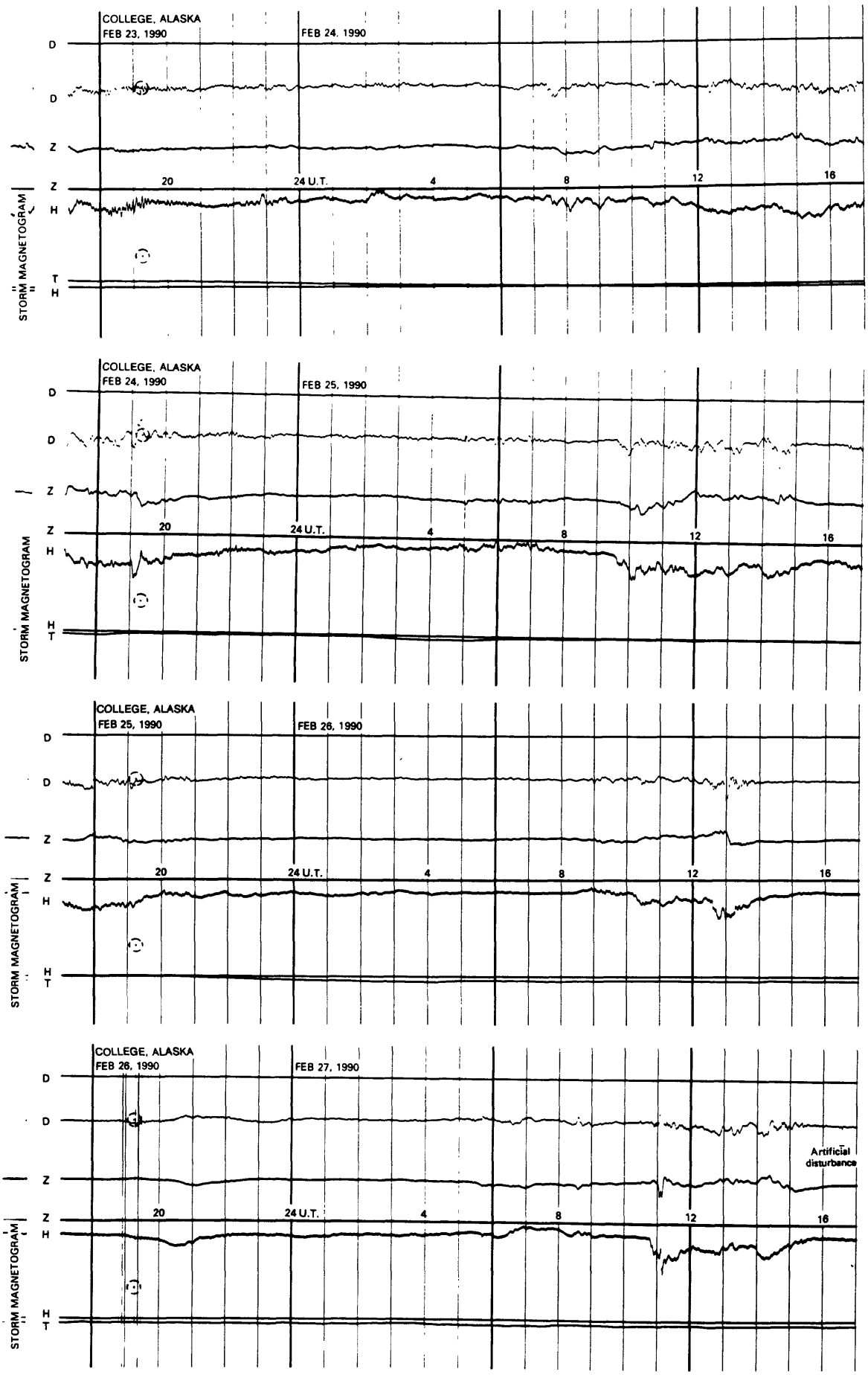

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STORM MAGNETOGRAMS