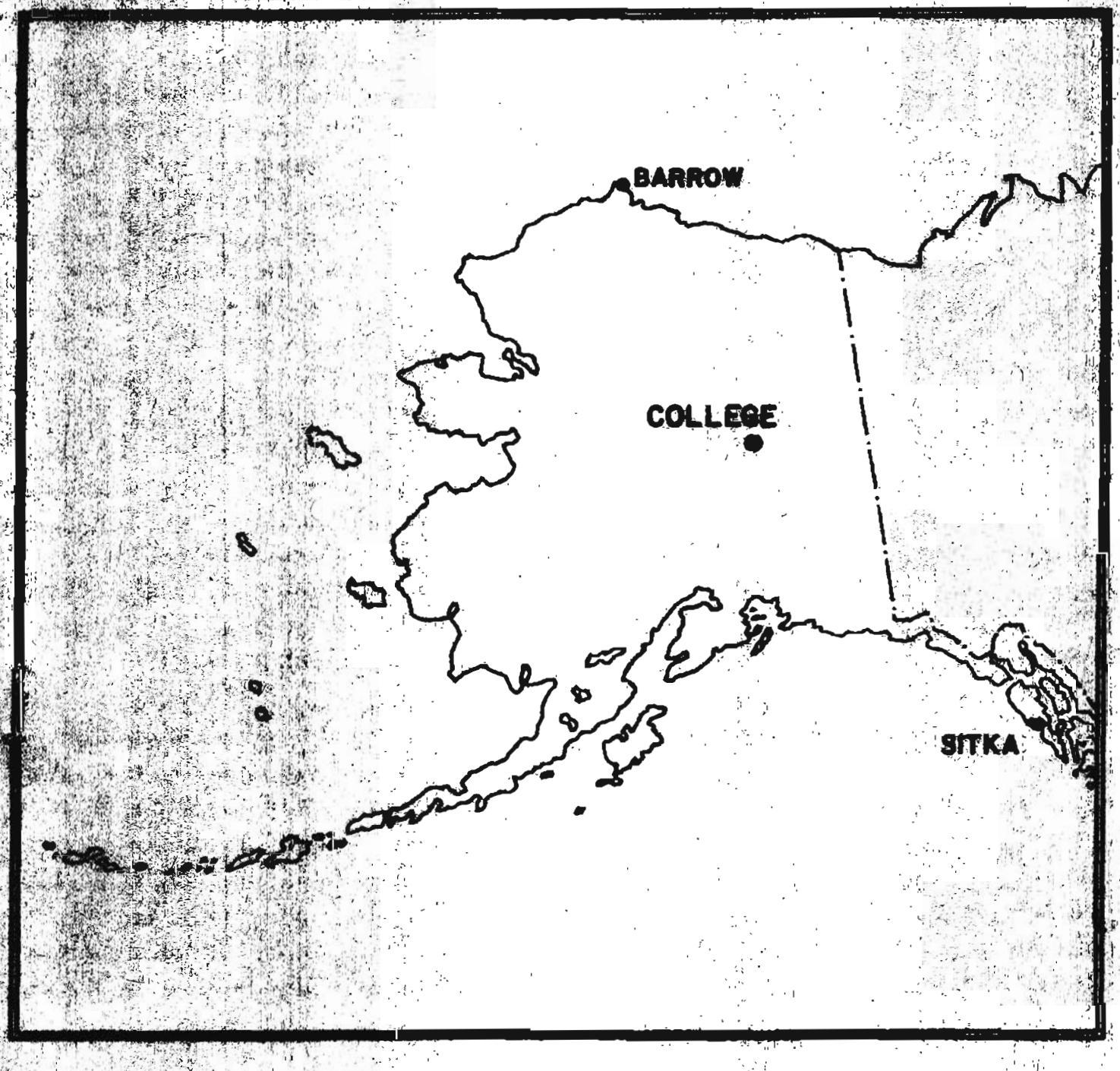
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

DECEMBER 1990

OPEN FILE REPORT 90-0300



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 D83m 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.....+64.8°
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: DECEMBER, 1990

DATE	K-INDICES 00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	A_K
1	1	1	1	0	0	2	0	1	6	2
2	0	0	0	1	1	1	1	0	4	2
3	1	0	1	0	1	3	2	1	9	4
4	3	3	3	5	4	5	2	3	28	24
5	3	1	4	6	4	6	3	1	28	31
6	1	2	1	5	4	2	1	1	17	13
7	1	0	0	0	0	1	1	0	3	1
8	0	0	2	3	4	3	2	1	15	9
9	1	0	2	2	3	3	0	0	11	6
10	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	1	1	3	2	2	9	4
13	3	3	6	3	2	3	1	1	22	19
14	1	1	1	1	3	4	1	0	12	7
15	0	0	3	2	0	1	2	1	9	4
16	0	1	2	5	5	4	2	1	20	18
17	1	1	0	1	0	2	2	1	8	3
18	1	1	0	4	4	1	1	0	12	8
19	0	0	0	0	0	0	0	0	0	0
20	0	0	1	4	4	4	2	1	16	12
21	0	0	0	0	0	1	1	0	2	1
22	0	0	1	1	0	0	0	1	3	1
23	0	0	2	3	0	0	0	2	7	4
24	1	1	2	3	5	5	4	3	24	21
25	3	3	3	4	4	4	3	1	25	18
26	1	0	1	2	1	1	0	0	6	2
27	0	1	1	2	3	1	0	0	8	4
28	0	0	1	2	0	0	0	0	3	1
29	0	0	0	1	1	1	1	0	4	2
30	2	2	2	3	1	1	1	1	13	6
31	0	0	0	4	5	4	2	2	17	15

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	BEGIN h	BEGIN m	END d	END h	END m

K SCALE USED:	D	H	Z	
LOWER LIMIT FOR K = 9.....	675.7	322.2		(mm)
CURRENT SCALE VALUE.....	3.66	7.72		(γ/mm)
LOWER LIMIT FOR K = 9	2470	2490		(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

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

DECEMBER 19 90

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

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													

No major or severe storms were recorded during this month.

College Observatory, College, Alaska -- Preliminary Calibration Data For: DECEMBER 1990

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 12-1-90	2400 U.T., 12-31-90	1.0'/mm	3.7 γ/mm	26° 34.4' E
H	(SAME)	(SAME)	7.7 γ/mm		12622 γ
Z	(SAME)	(SAME)	7.6 γ/mm		55214 γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 12-1-90	2400 U.T., 12-31-90	7.9'/mm	29.3 γ/mm	
H	(SAME)	(SAME)	43.3 γ/mm		
Z	(SAME)	(SAME)	48.7 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
26° 47.8' E	12769 γ	55323 γ

*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.
DAYS USED: DEC 10, 11, 19, 21, 22.

U.S. Dept. of Interior
Geological Survey

Observatory	Month	Year
College, Alaska	DECEMBER	1990

Jan-CO - 1/86

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

(UNIVERSAL TIME)

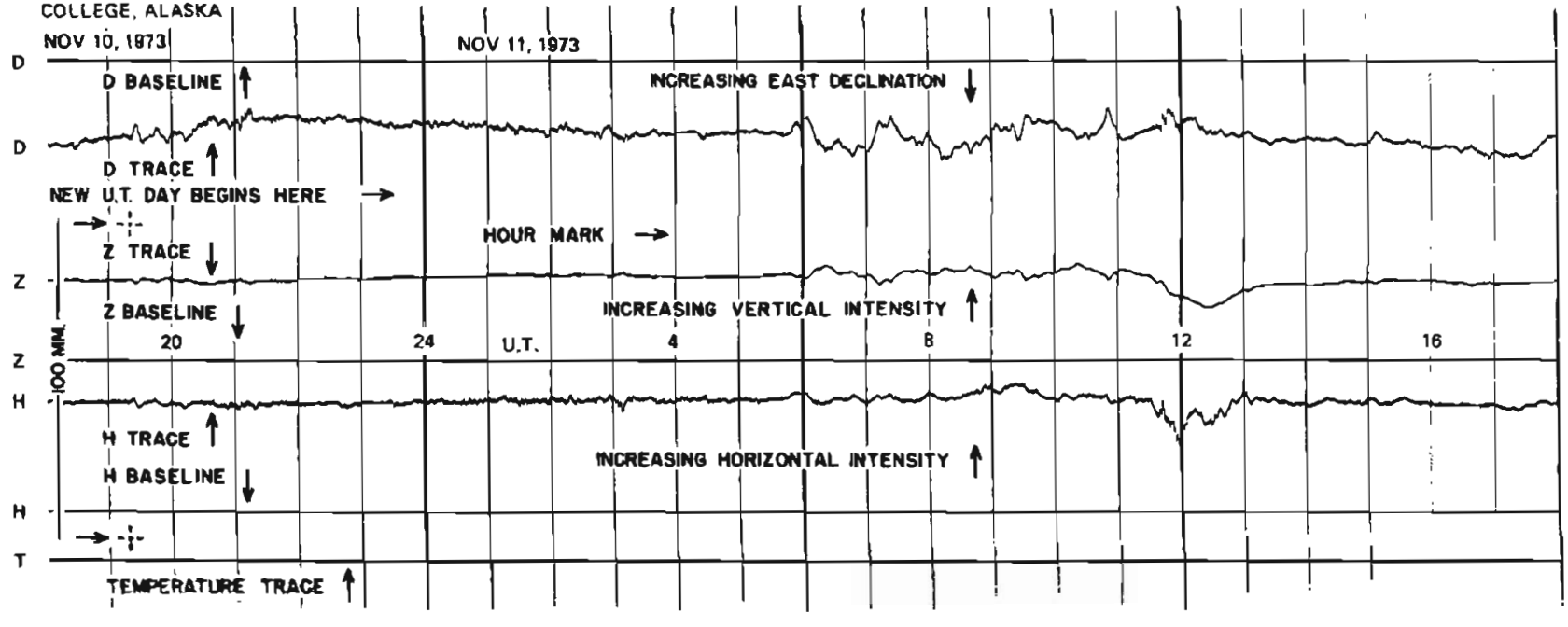
Values are in Tenths of gms and are Averages for Successive Periods of One Hour beginning at Midnight. Skrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT		D					H					Z					COMPONENT
DAY		10	11	19	21	22	10	11	19	21	22	10	11	19	21	22	DAY
A_k		0	0	0	1	1	0	0	0	1	1	0	0	0	1	1	A_k
HOUR	01	119	123	117	105	116	173	180	180	185	180	149	140	145	150	137	01 HOUR
	02	125	117	113	93	95	180	182	188	191	188	150	141	145	156	135	02
	03	127	119	113	100	112	188	189	195	194	199	150	144	145	149	136	03
	04	129	127	119	102	129	190	190	200	203	199	151	147	144	149	137	04
	05	130	130	125	110	124	190	191	196	200	200	150	146	144	145	137	05
	06	132	131	126	109	124	190	191	200	204	201	149	146	142	153	140	06
	07	132	130	126	109	122	194	194	202	208	200	147	144	140	166	143	07
	08	130	130	124	122	115	196	199	199	210	209	143	140	140	149	150	08
	09	129	126	126	130	127	199	200	198	201	192	144	140	139	139	161	09
	10	130	129	126	130	134	197	200	198	195	192	145	141	139	137	156	10
	11	135	129	126	132	127	196	200	198	191	192	143	141	137	134	139	11
	12	138	128	128	132	131	197	200	198	190	187	141	141	137	135	125	12
	13	143	131	136	139	130	197	197	199	190	187	145	142	137	134	130	13
	14	140	140	136	139	141	193	197	194	190	188	142	142	136	134	119	14
	15	145	141	140	139	133	197	197	198	190	190	139	142	130	132	130	15
	16	149	140	160	139	139	197	199	190	190	190	141	141	139	134	133	16
	17	148	147	143	141	145	198	198	191	191	191	140	141	133	136	135	17
	18	150	152	156	149	149	200	203	190	194	192	143	142	138	136	136	18
	19	160	140	165	161	147	200	200	191	189	190	146	140	139	136	136	19
	20	145	161	160	158	150	190	200	190	181	188	141	149	139	136	136	20
	21	160	167	150	149	154	180	189	182	180	180	141	152	144	135	138	21
	22	169	170	145	139	158	175	178	179	179	178	145	154	148	134	138	22
	23	156	160	137	137	159	174	170	174	178	171	146	150	149	136	142	23
	24	151	140	126	130	137	171	169	174	173	179	147	147	145	137	138	24
DAILY SUM		3272	3308	3223	3094	3198	4562	4613	4604	4597	4563	3478	3453	3374	3382	3307	DAILY SUM
DAILY MEAN		140	138	134	129	133	190	192	192	192	190	145	144	141	141	138	DAILY MEAN
MEAN				135					191					142			MEAN

Scaled TMO | Checked CAV

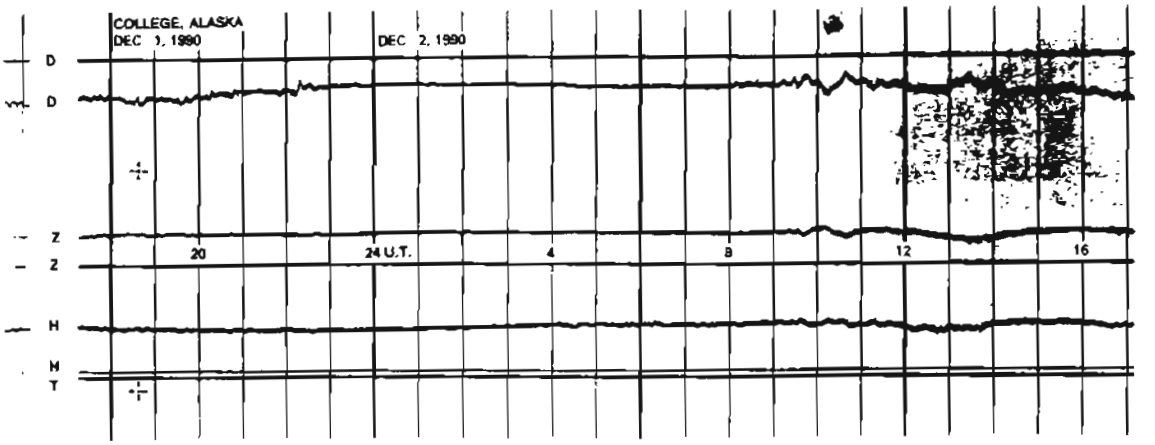
FORMAT FOR NORMAL & STORM MAGNETOGRAMS

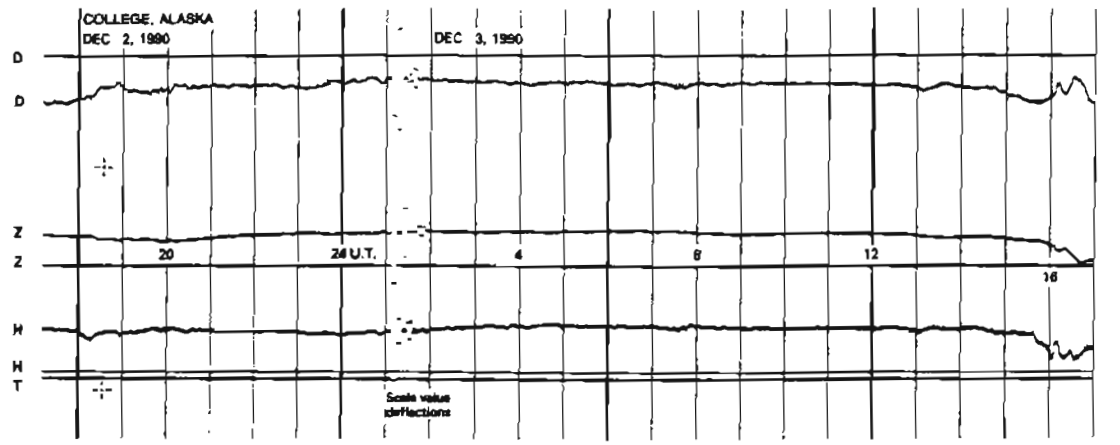
(SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS





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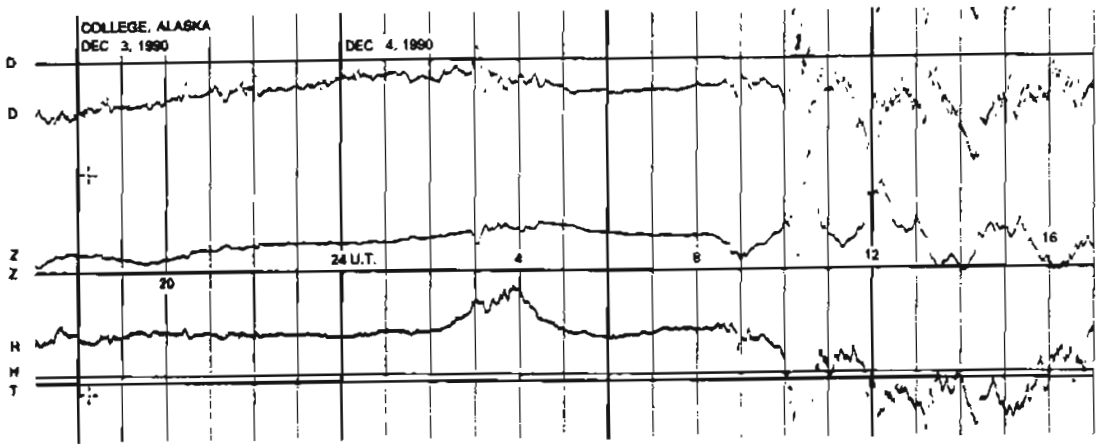

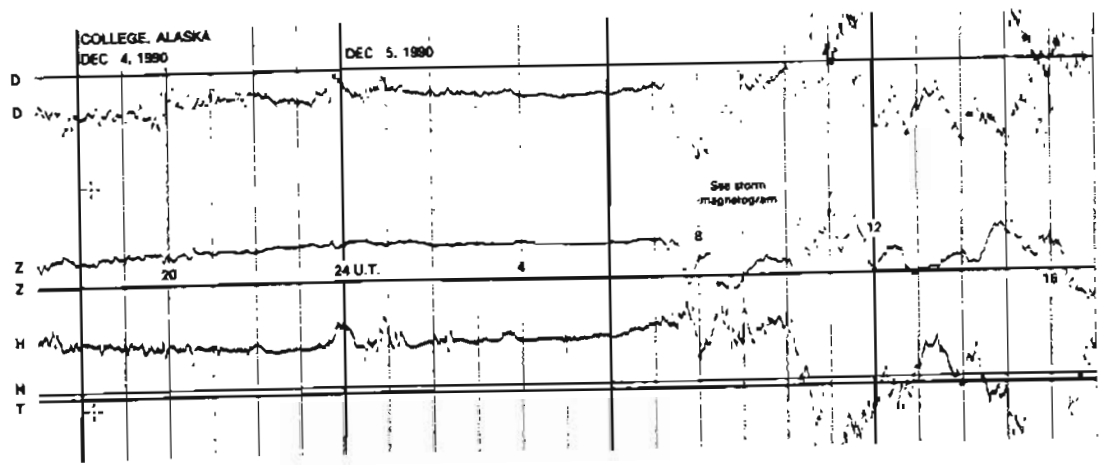

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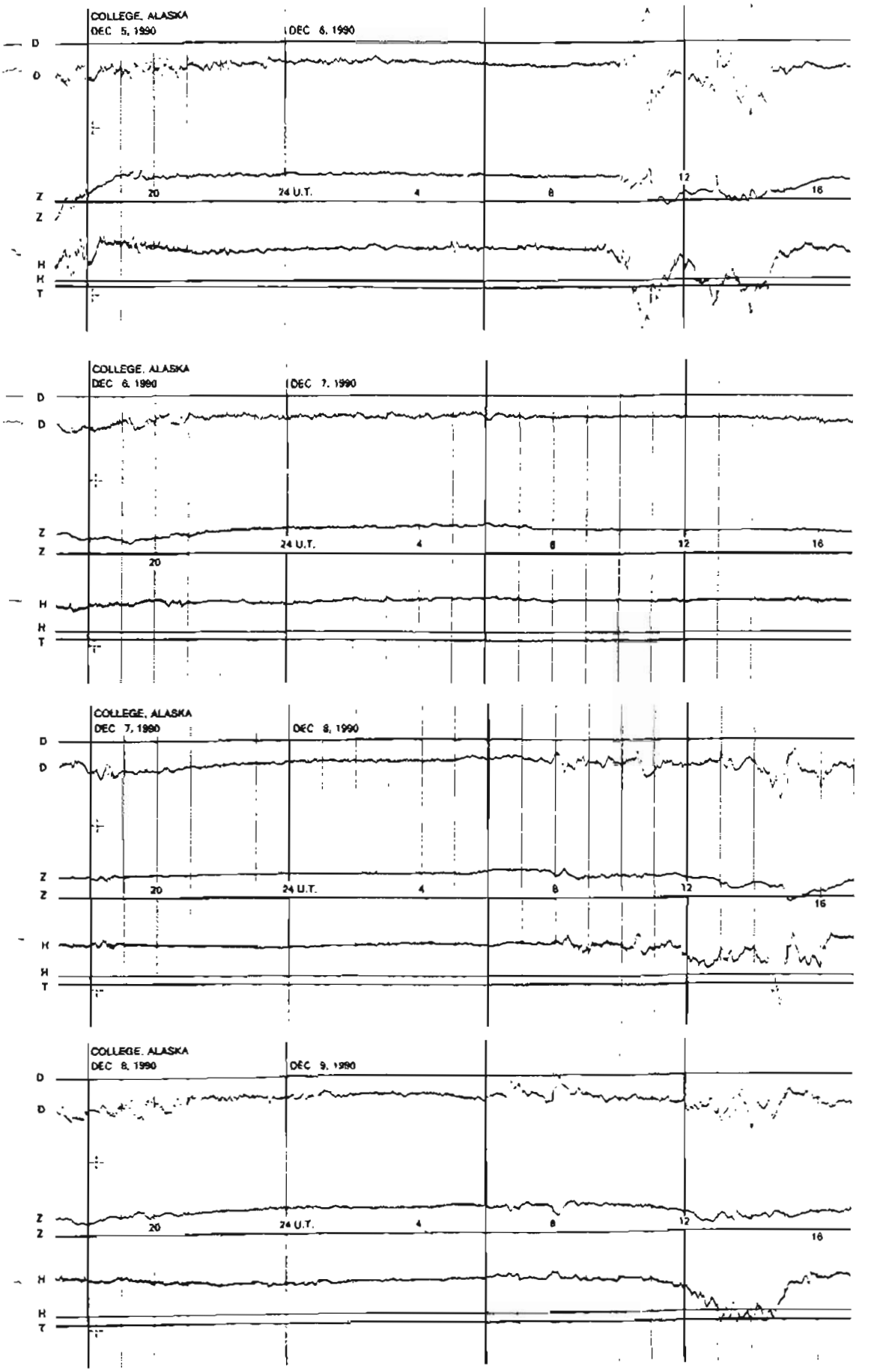

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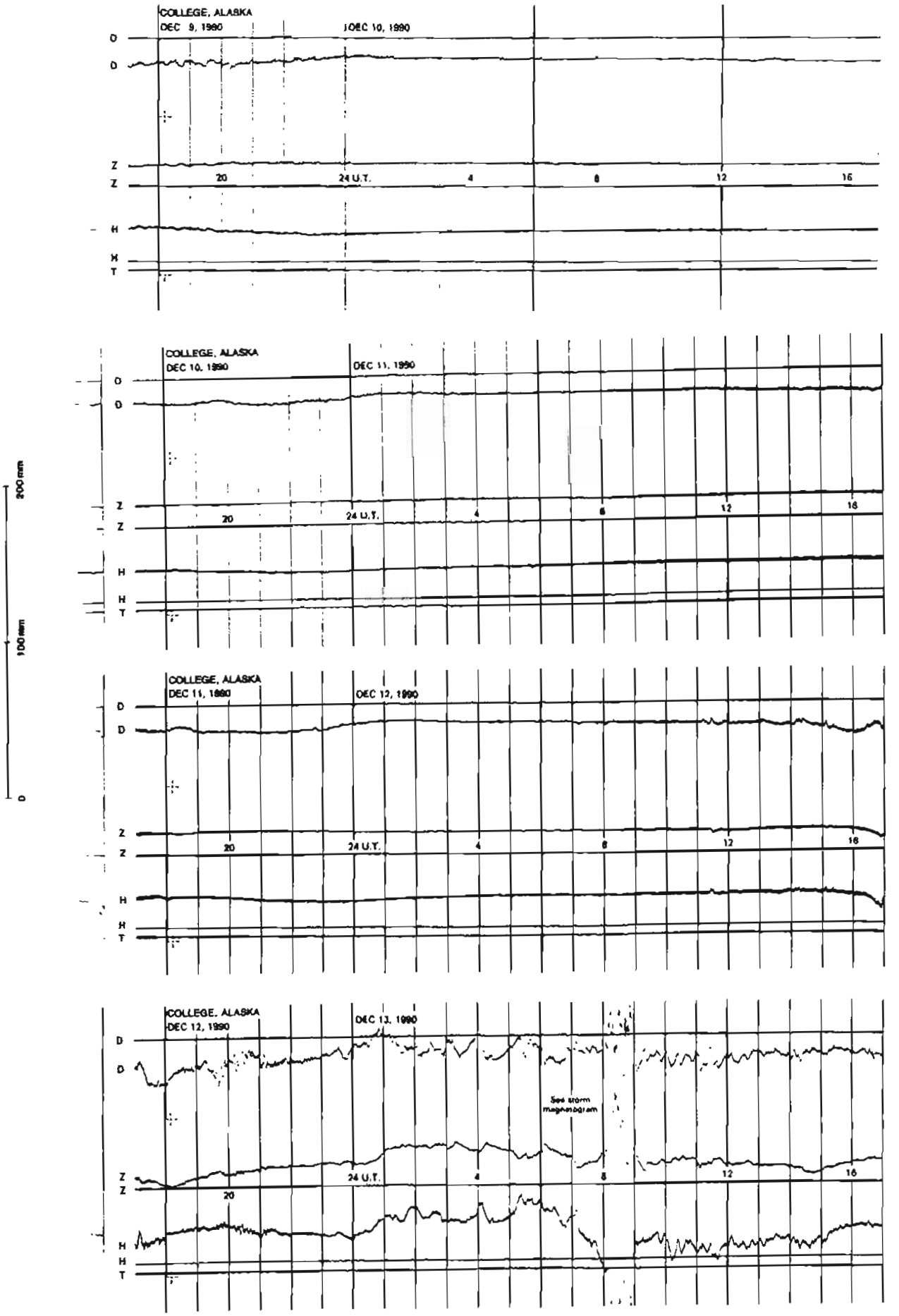

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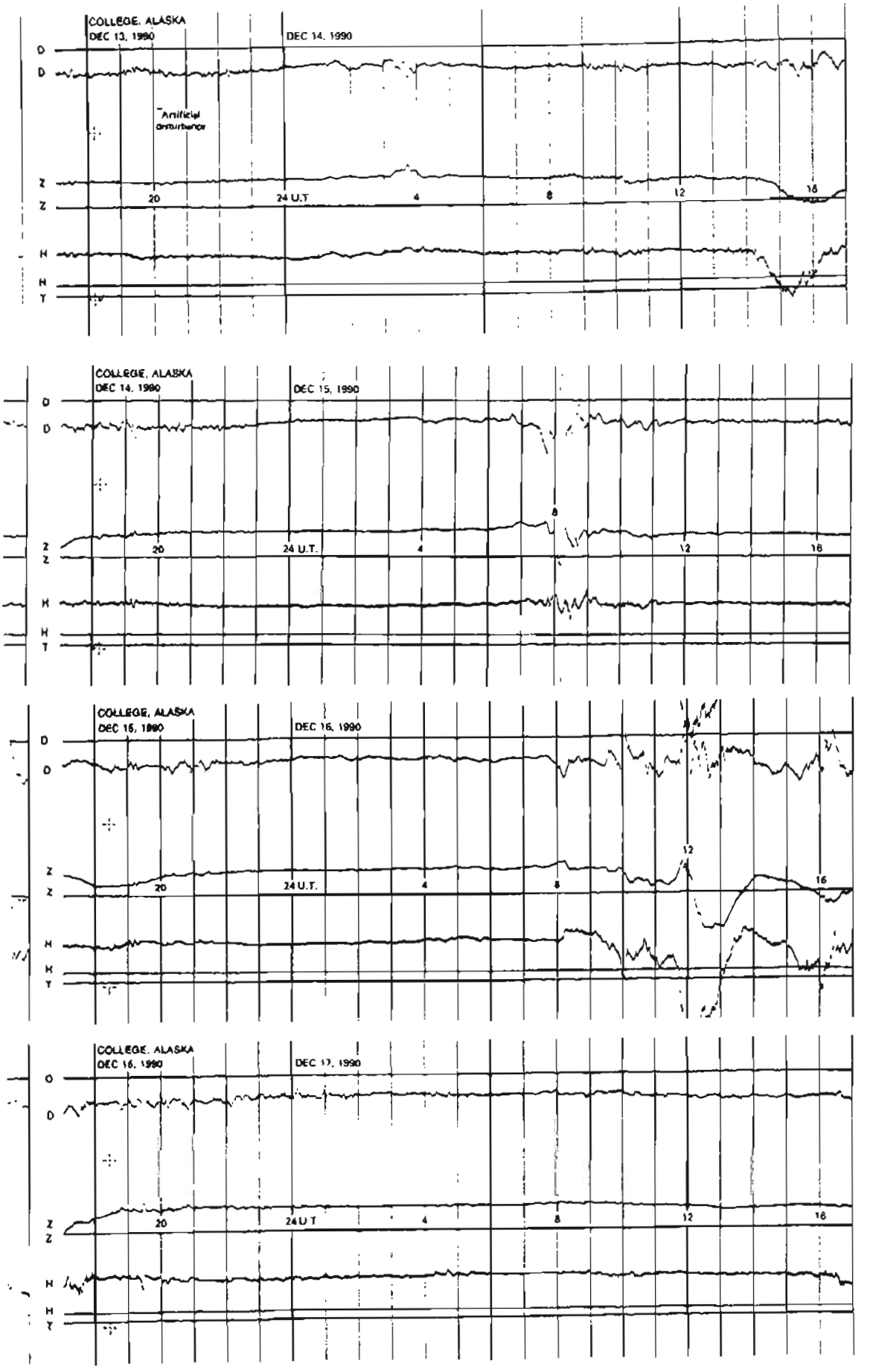

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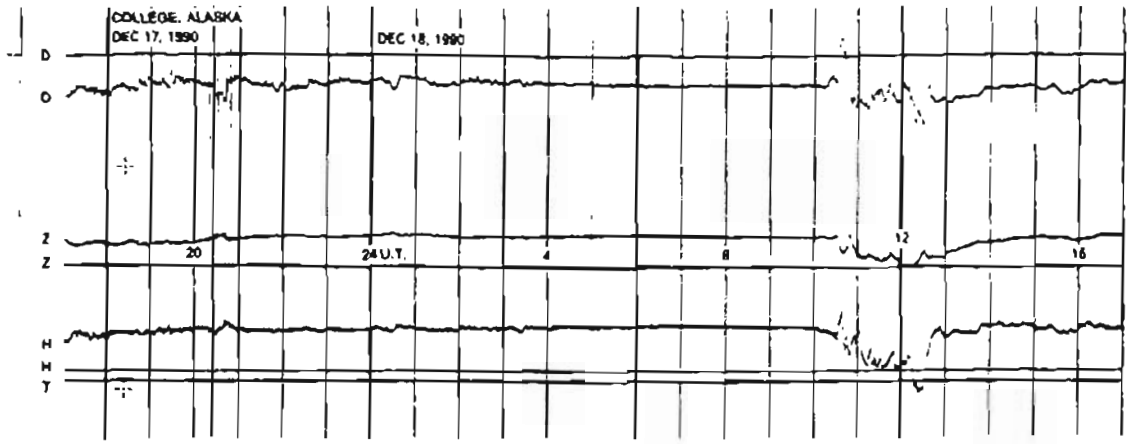

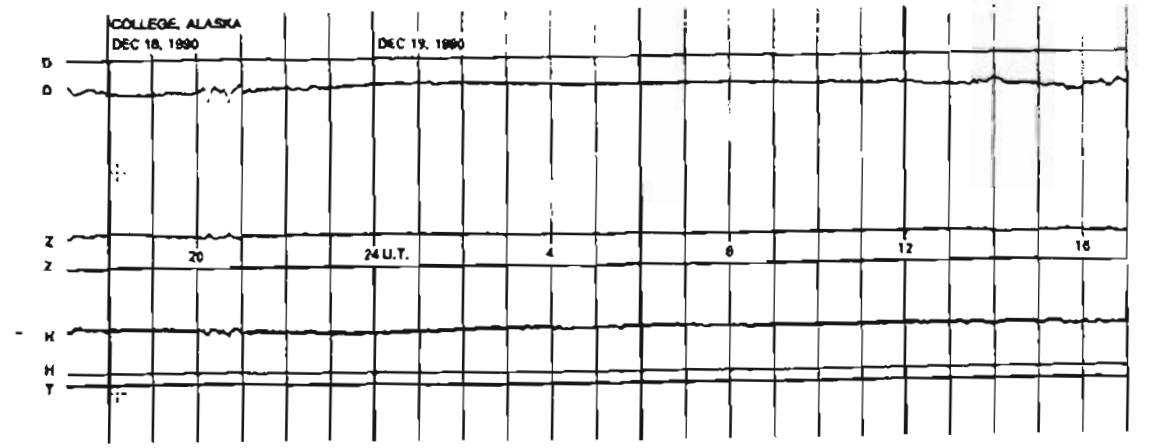

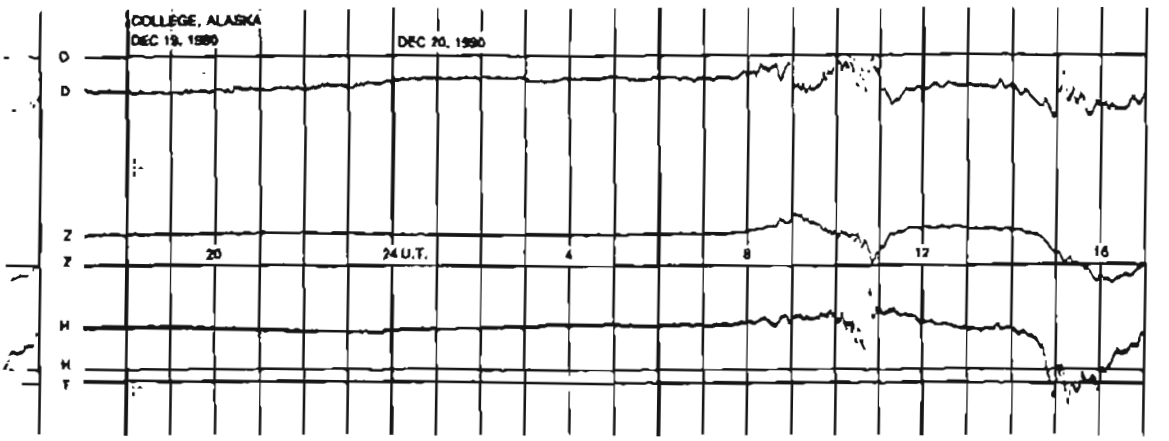

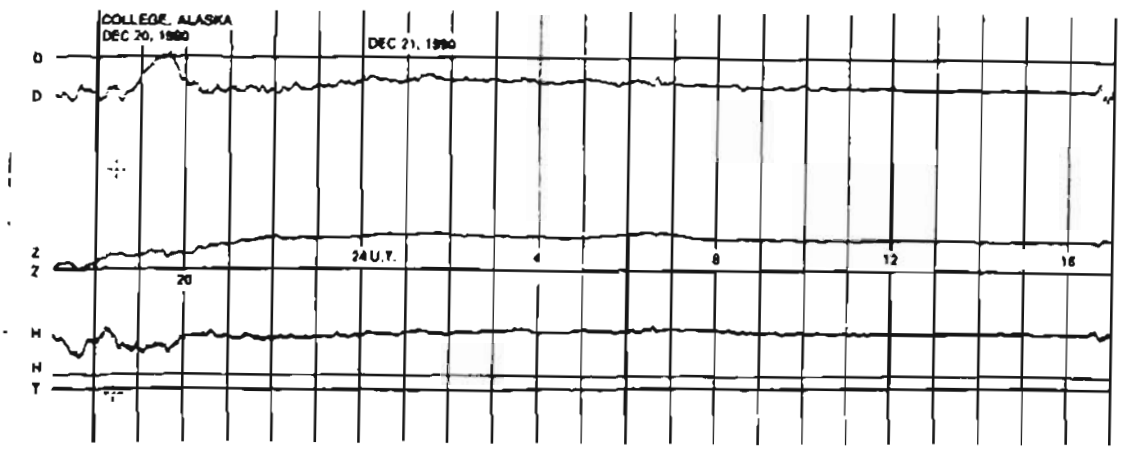

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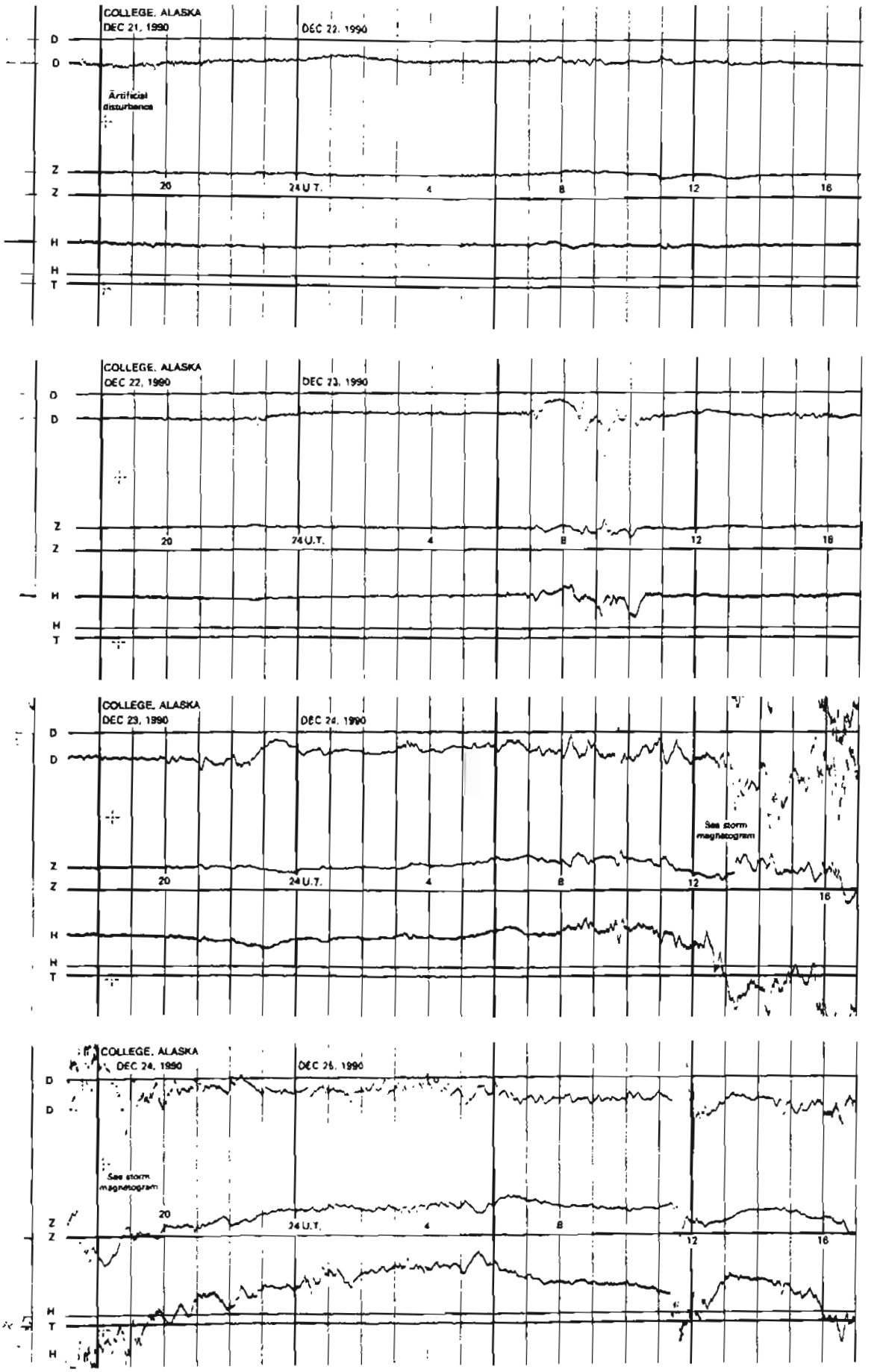

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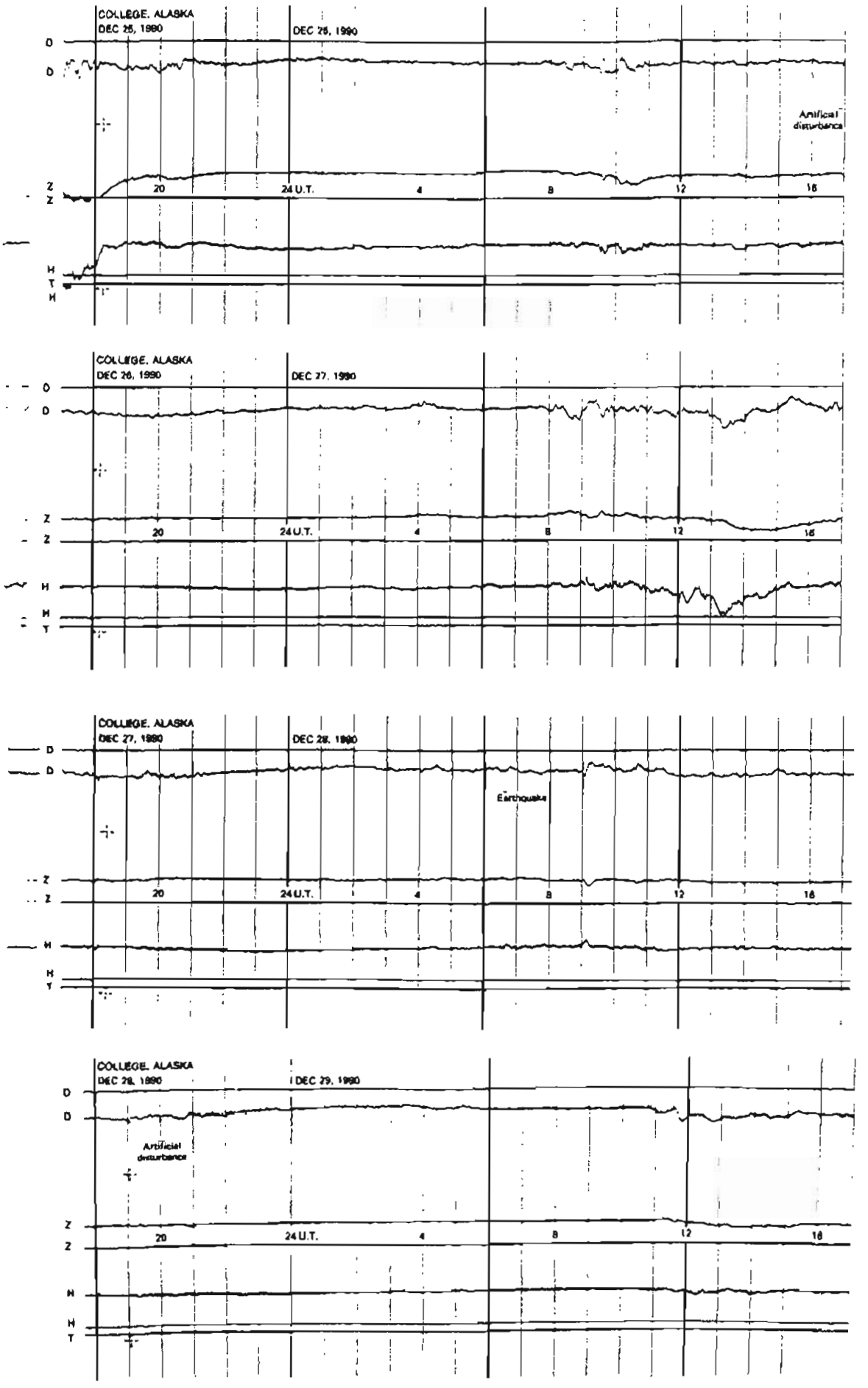

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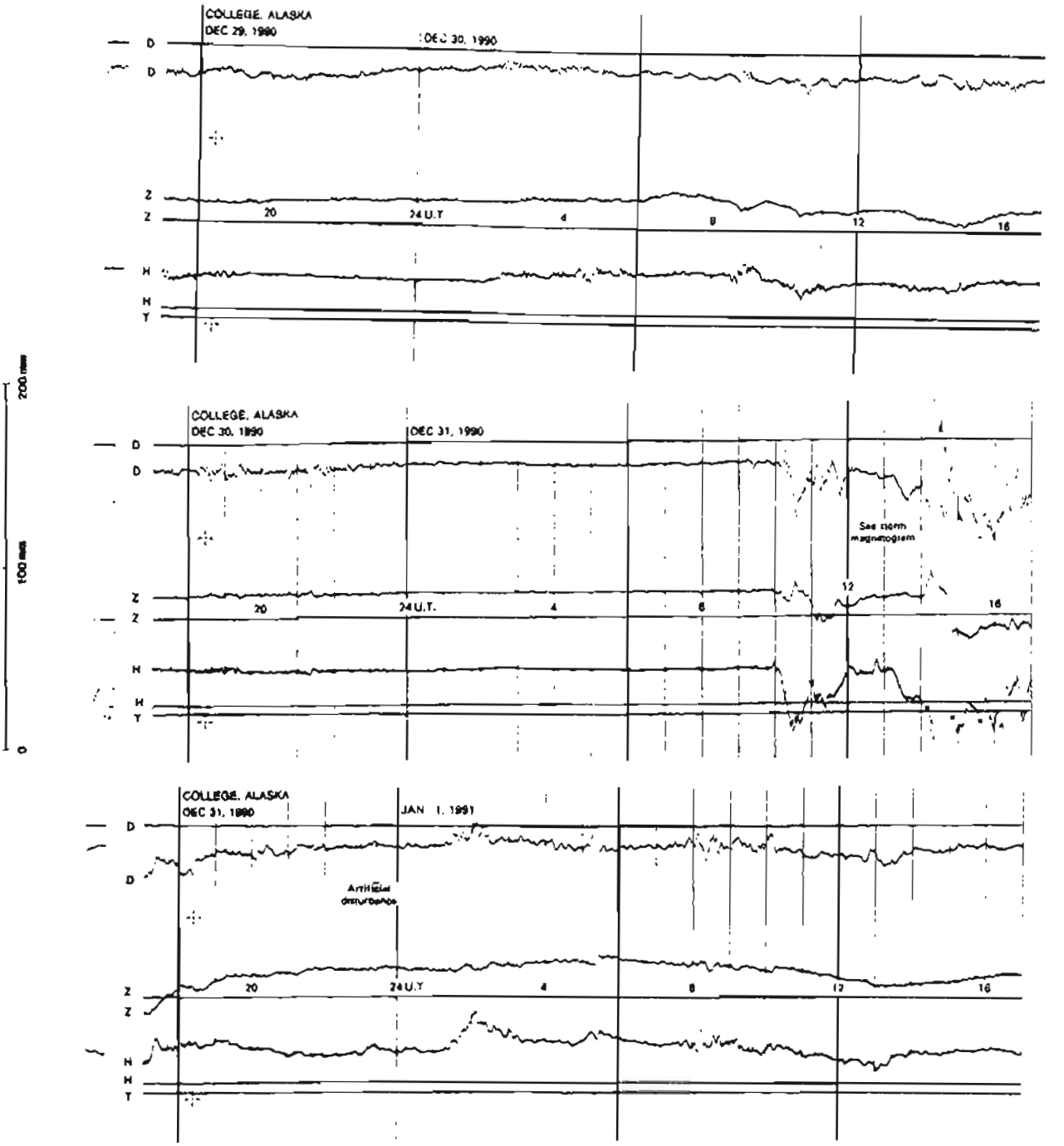
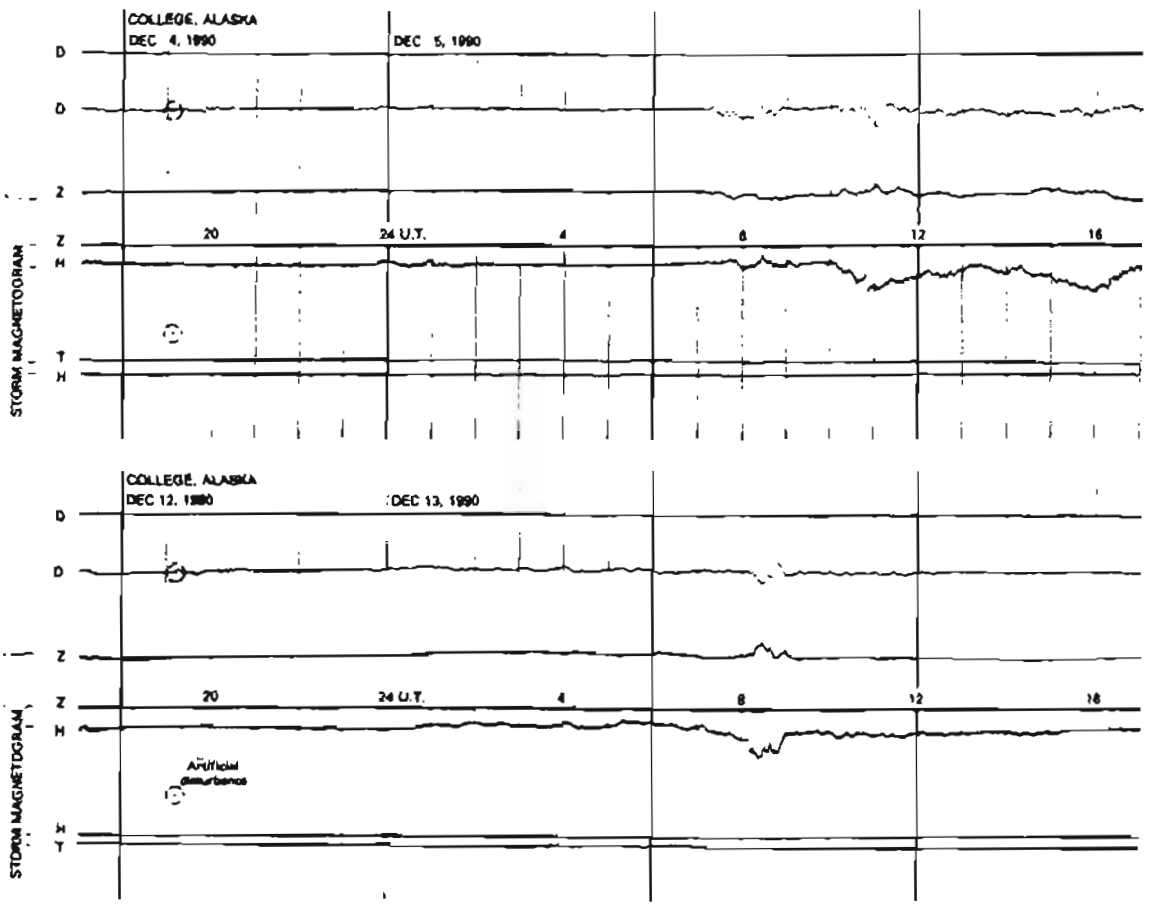
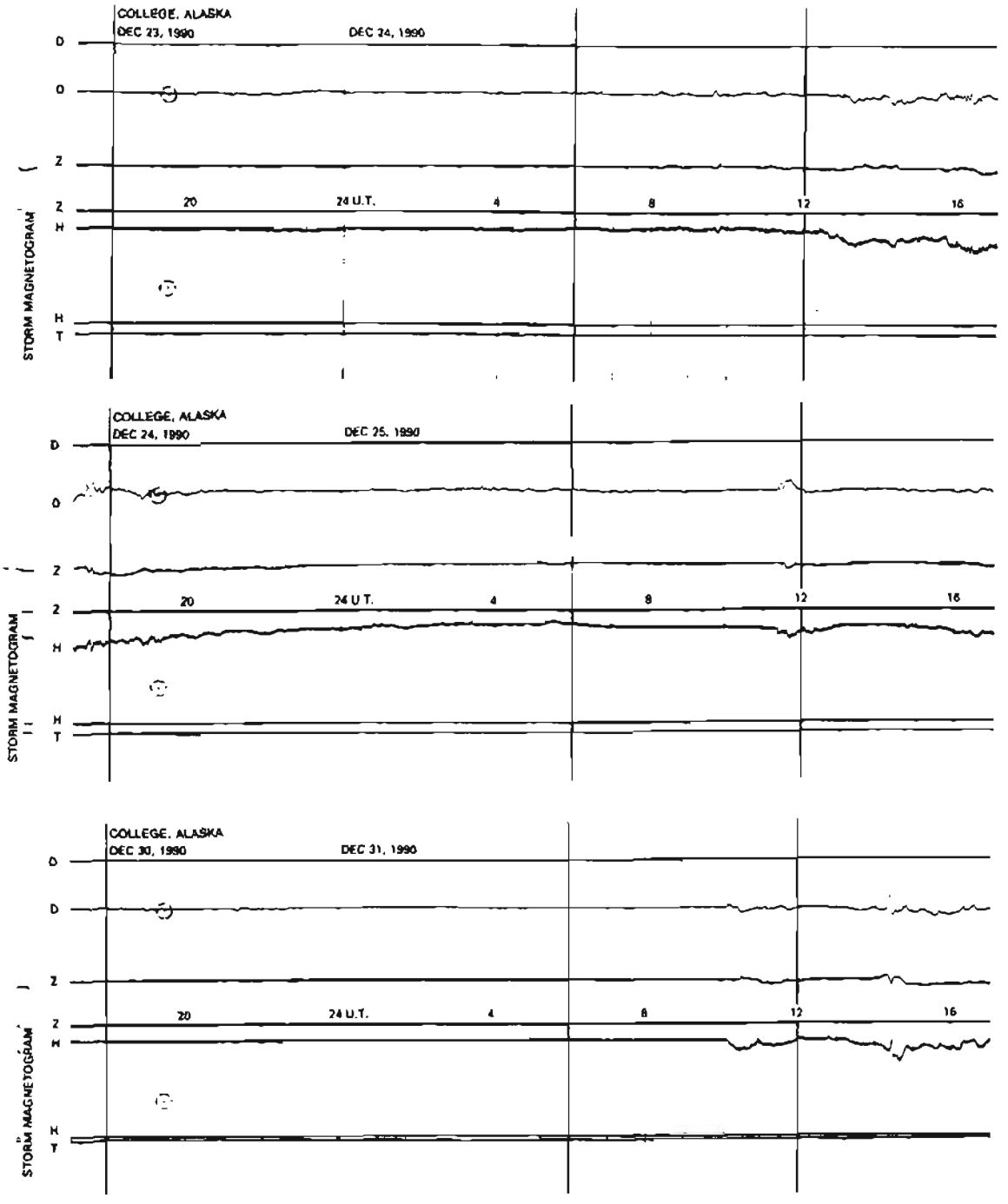


STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



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