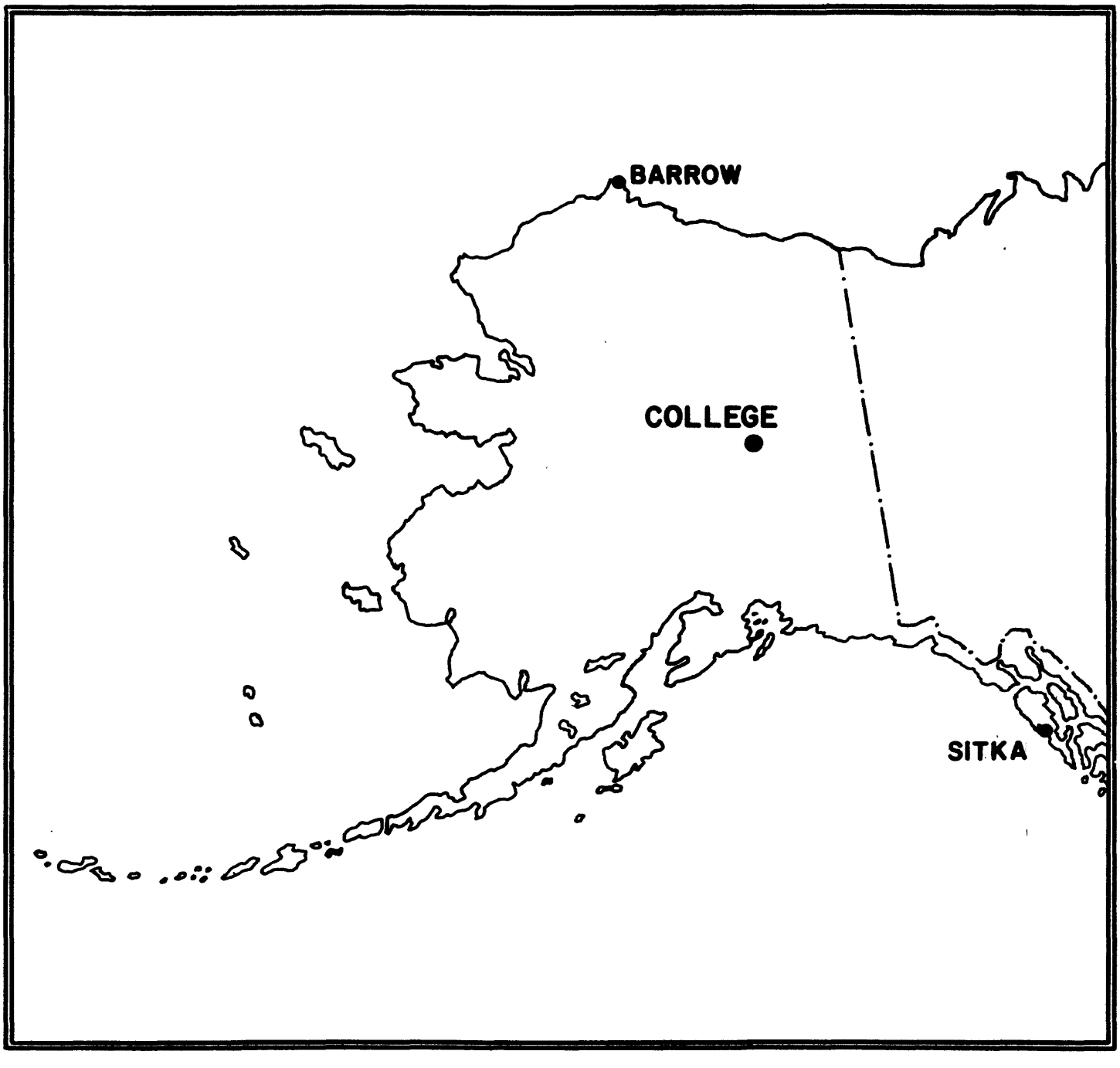
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

DECEMBER 1991

OPEN FILE REPORT 91-0300L



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: DECEMBER, 1991

DATE	K-INDICES 00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	Ak
1	3	1	2	3	3	2	2	2	18	10
2	2	2	4	6	5	3	3	2	27	26
3	2	1	2	3	4	4	3	2	21	14
4	3	3	1	4	5	3	3	2	24	18
5	2	1	2	1	1	2	2	1	12	5
6	1	1	1	2	1	0	0	1	7	3
7	0	1	1	3	2	1	1	1	10	5
8	1	1	3	3	3	2	1	0	14	8
9	0	0	0	1	2	3	2	3	11	6
10	2	2	3	2	2	4	4	3	22	14
11	2	2	1	2	5	3	3	3	21	15
12	3	2	1	1	2	4	3	3	19	12
13	1	1	2	6	6	3	3	2	24	26
14	2	5	5	5	4	5	3	2	31	31
15	2	2	2	2	3	1	1	0	13	6
16	0	1	1	6	6	6	5	4	29	40
17	3	4	4	6	5	6	6	4	38	48
18	3	3	5	6	5	3	3	0	28	30
19	0	0	3	5	5	5	5	2	25	27
20	0	1	2	3	2	5	3	3	19	14
21	4	3	7	6	5	5	4	3	37	50
22	2	2	2	3	0	1	1	1	12	6
23	1	3	4	5	3	3	4	2	25	20
24	2	2	2	5	4	4	2	0	21	16
25	0	1	1	5	6	2	2	1	18	19
26	1	1	1	1	1	2	2	2	11	5
27	2	2	4	6	5	6	4	4	33	38
28	3	3	3	5	5	6	m	m		
29	3	4	5	4	4	3	4	4	31	27
30	5	4	1	2	5	4	2	2	25	22
31	1	0	1	3	2	3	3	2	15	8

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.....	3.65	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

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

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

DECEMBER 19 91

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 STORMS WERE RECORDED DURING THIS MONTH												

College Observatory, College, Alaska -- Preliminary Calibration Data For: DECEMBER 1991

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 12-1-91	2400 UT, 12-31-91	1.0'/mm	3.6γ/mm	25° 59.8' E
H	0001 UT, 12-1-91	2400 U.T., 12-31-91	7.7γ/mm		12626γ
Z	0001 U.T., 12-1-91	2400 U.T., 12-21-91	7.7γ/mm		55216γ
	0001 UT, 12-22-91	2400 UT, 12-31-91			55224γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 12-1-91	2400 UT, 12-31-91	7.9'/mm	29.3γ/mm	
H	(SAME)	(SAME)	43.4γ/mm		
Z	(SAME)	(SAME)	48.9γ/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° 37.3' E	12748γ	55330γ

*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.
DAYS USED: DEC 5, 6, 7, 9, 26.

U.S. Dept. of Interior
Geological Survey

Observatory: College, Alaska | Month: DECEMBER | Year: 1991

jep-CO - 1/86

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

(UNIVERSAL TIME)

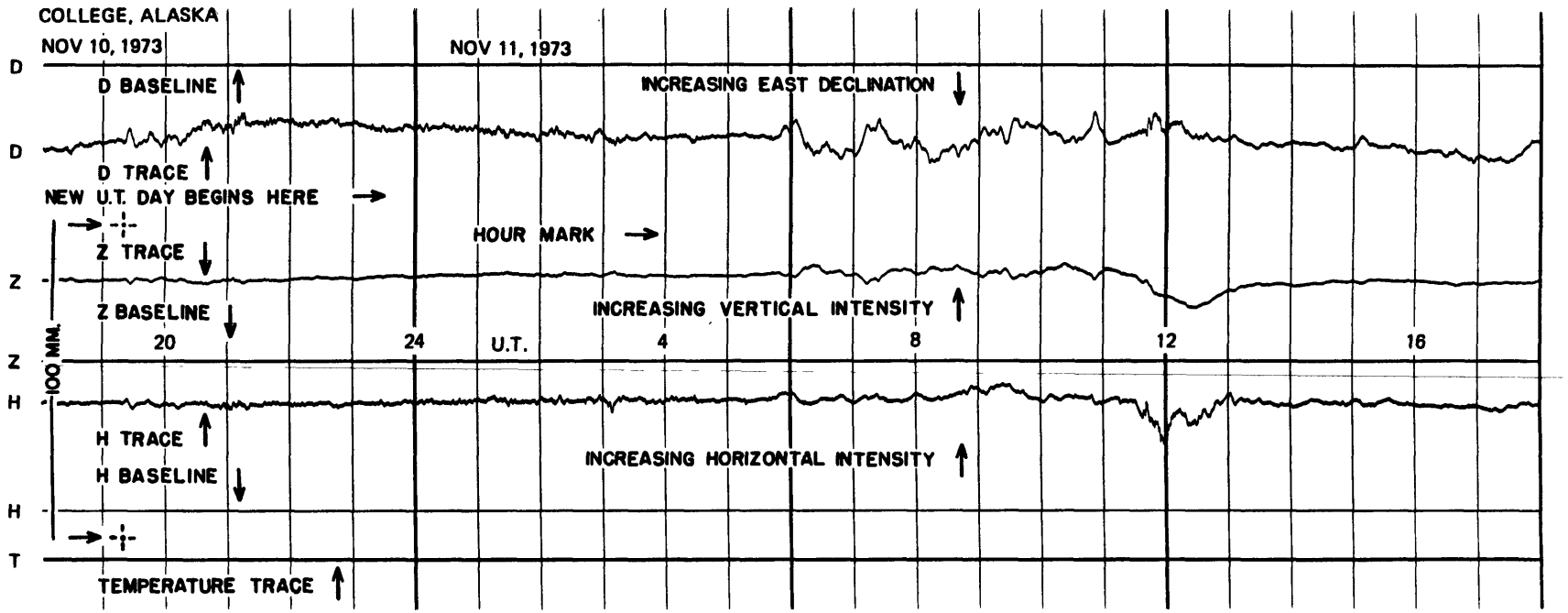
Values are in Tenths of nm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT	D					H					Z					COMPONENT
DAY	5	6	7	9	26	5	6	7	9	26	5	6	7	9	26	DAY
A_k	5	3	5	6	5	5	3	5	6	5	5	3	5	6	5	A_k
HOUR 01	370	376	318	359	345	154	145	158	152	144	162	161	153	151	141	01 HOUR
02	362	360	341	366	358	170	156	160	160	160	160	156	155	153	149	02
03	353	369	349	368	359	175	160	170	167	170	166	153	160	150	150	03
04	346	352	359	375	352	170	171	167	170	166	162	153	158	150	150	04
05	325	350	365	378	359	176	169	177	170	159	165	161	157	149	150	05
06	351	367	352	383	370	179	167	180	165	172	193	163	160	148	151	06
07	410	375	346	380	400	197	170	180	161	187	190	160	176	142	169	07
08	370	362	379	377	360	200	180	165	161	183	170	164	171	142	152	08
09	351	354	370	376	369	185	181	170	170	170	181	176	160	139	142	09
10	362	377	365	381	371	180	180	196	170	161	194	176	171	136	130	10
11	377	390	370	376	369	167	170	191	154	160	173	163	174	134	123	11
12	377	399	373	405	380	161	161	179	151	154	162	154	126	123	123	12
13	382	379	399	392	378	151	160	143	171	157	161	150	70	137	122	13
14	407	370	410	400	379	147	160	180	164	167	144	150	136	136	123	14
15	391	390	373	392	381	147	148	171	151	173	146	140	156	130	119	15
16	400	380	407	410	383	113	165	160	158	178	115	136	157	120	125	16
17	412	384	423	437	393	140	162	150	140	177	110	150	150	122	125	17
18	375	400	400	440	403	140	160	155	53	176	126	150	139	60	125	18
19	419	409	400	382	415	160	160	161	128	173	130	150	140	70	125	19
20	403	410	411	421	430	151	157	160	141	160	130	150	142	107	124	20
21	391	414	411	410	402	140	147	144	119	160	140	150	140	112	110	21
22	390	400	359	330	392	141	140	120	114	156	150	146	137	100	110	22
23	371	350	320	349	380	151	140	140	139	163	150	135	123	123	110	23
24	363	329	345	333	357	150	150	147	151	161	153	140	150	146	118	24
DAILY SUM	9058	[illegible]	8766	9245	9095	3849	3863	3722	3592	3993	3743	3691	3561	3082	3166	DAILY SUM
DAILY MEAN	377	379	374	385	379	160	161	163	149	166	156	154	148	128	132	DAILY MEAN
MEAN			377					160					144			MEAN

Scaled TWO Checked TKL

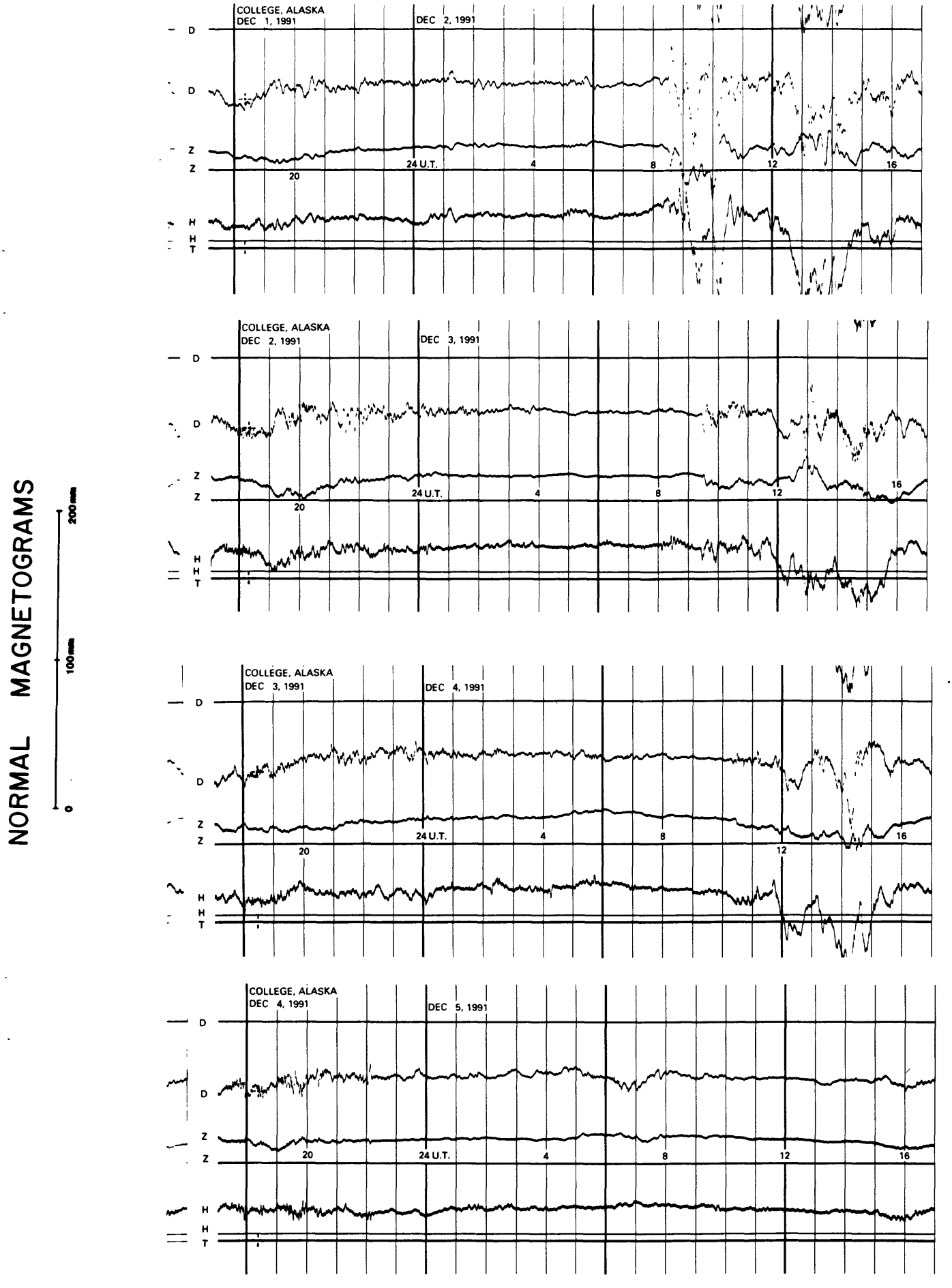
FORMAT FOR NORMAL & STORM MAGNETOGRAMS

(SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS



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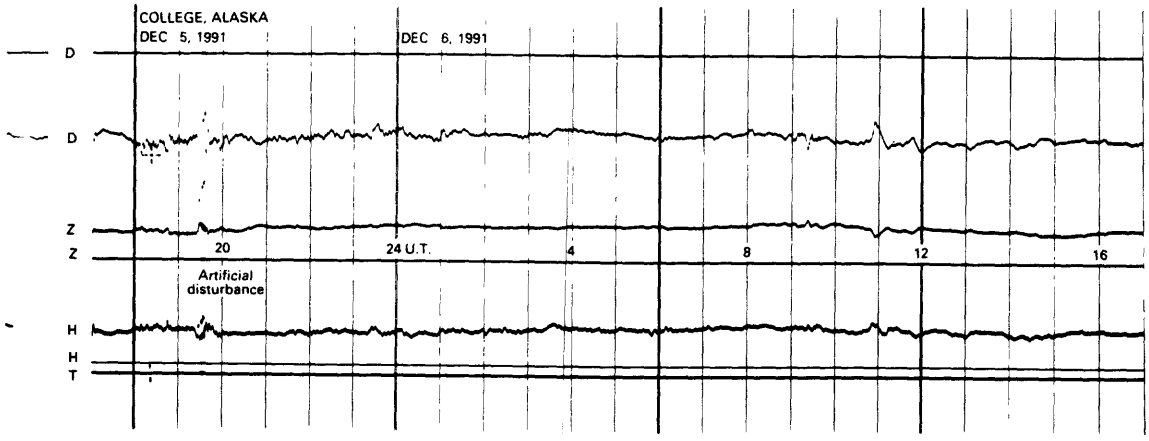

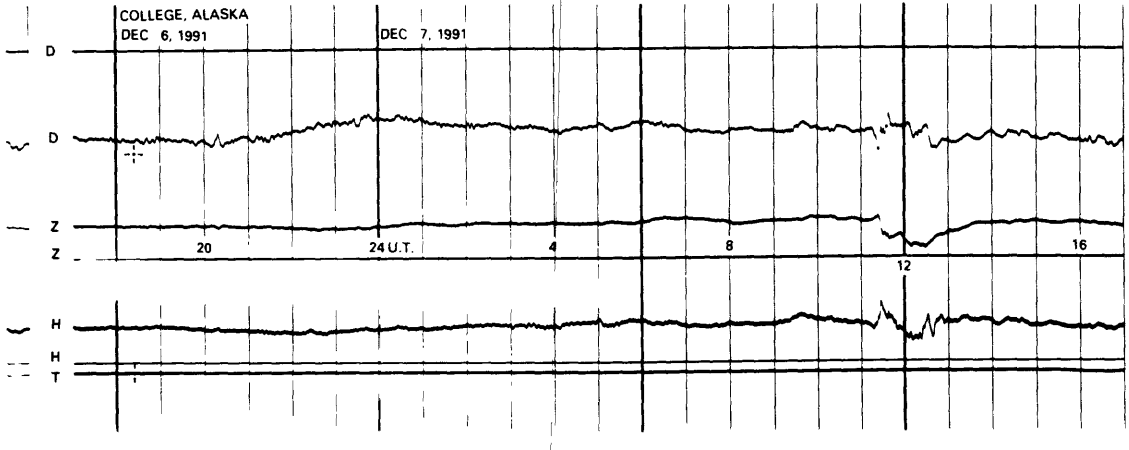

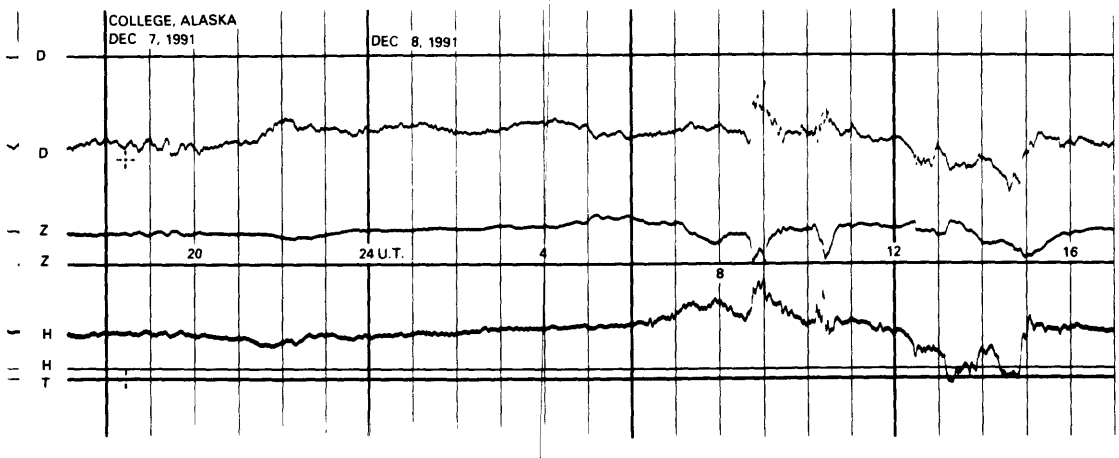

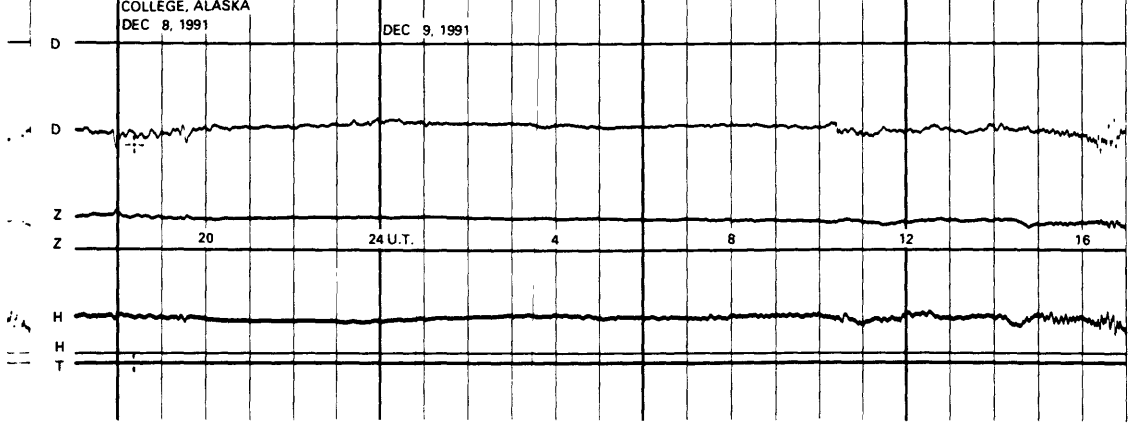

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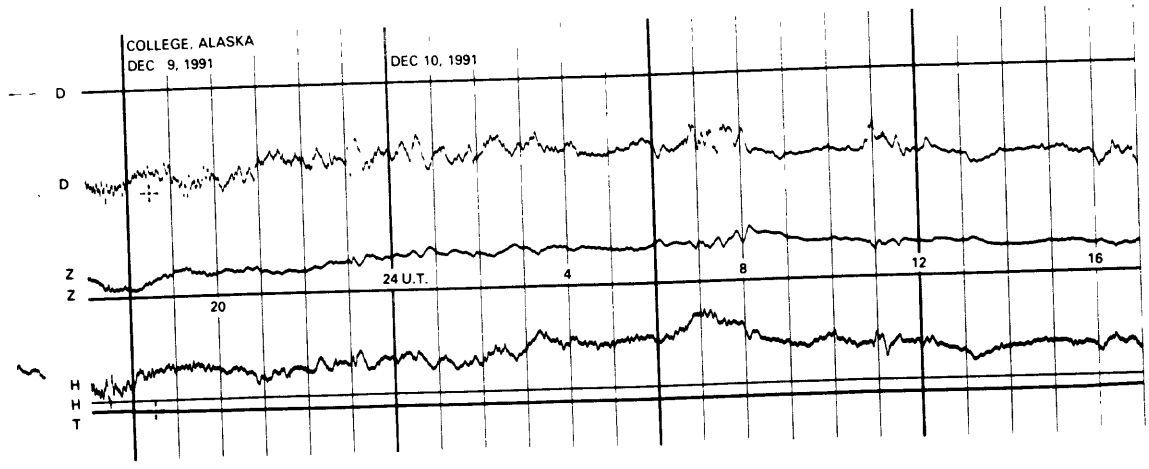

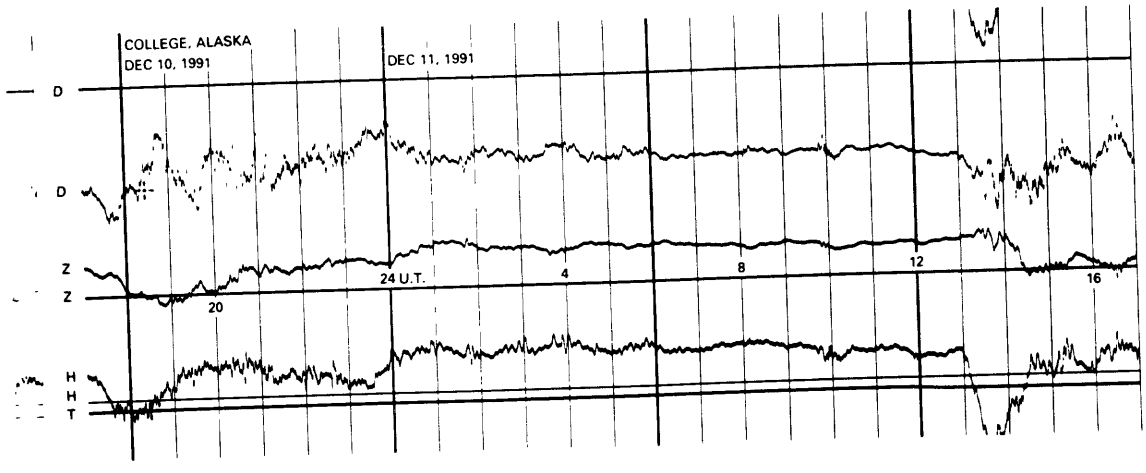

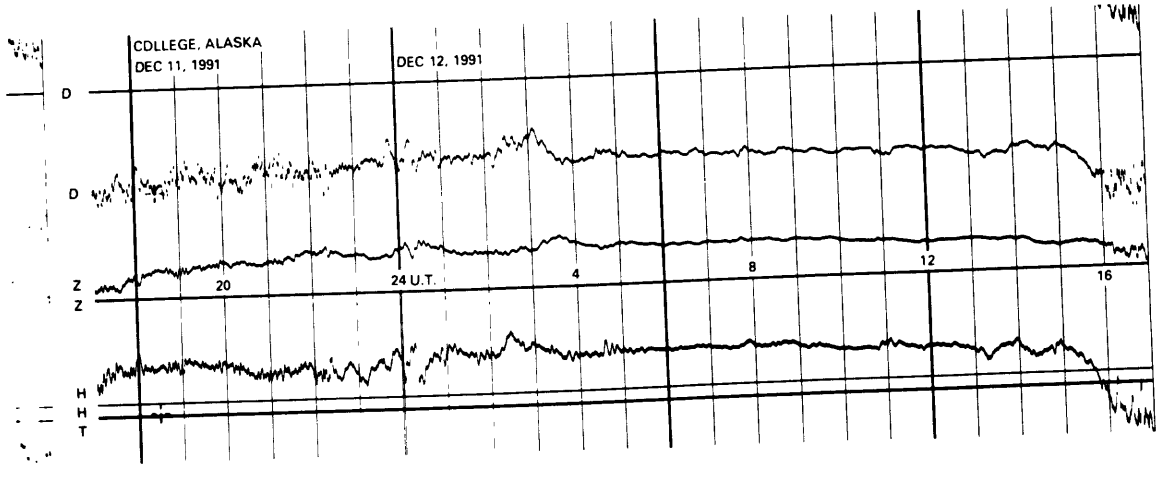

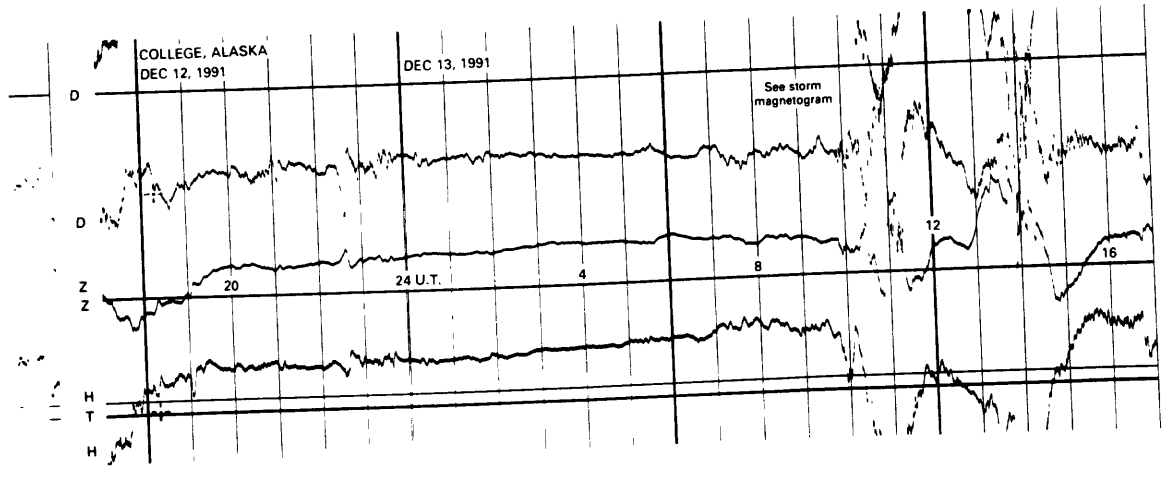

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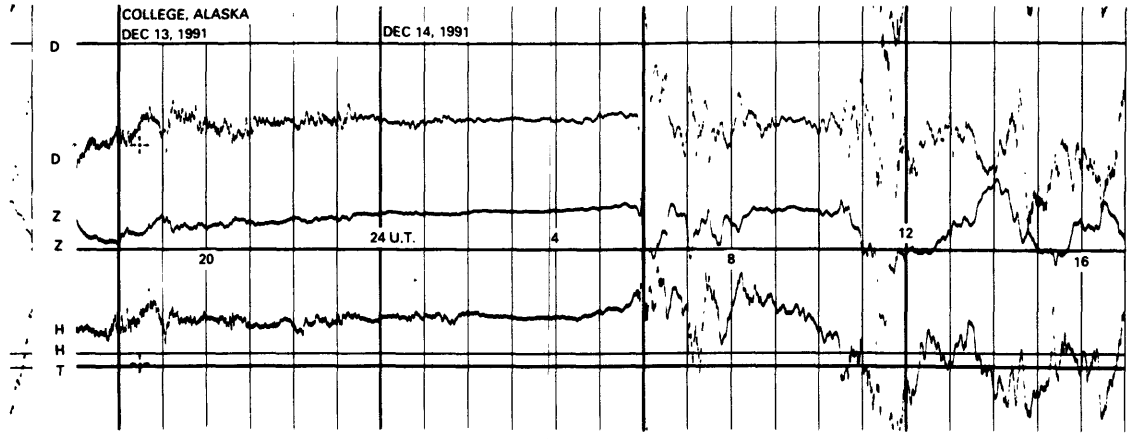

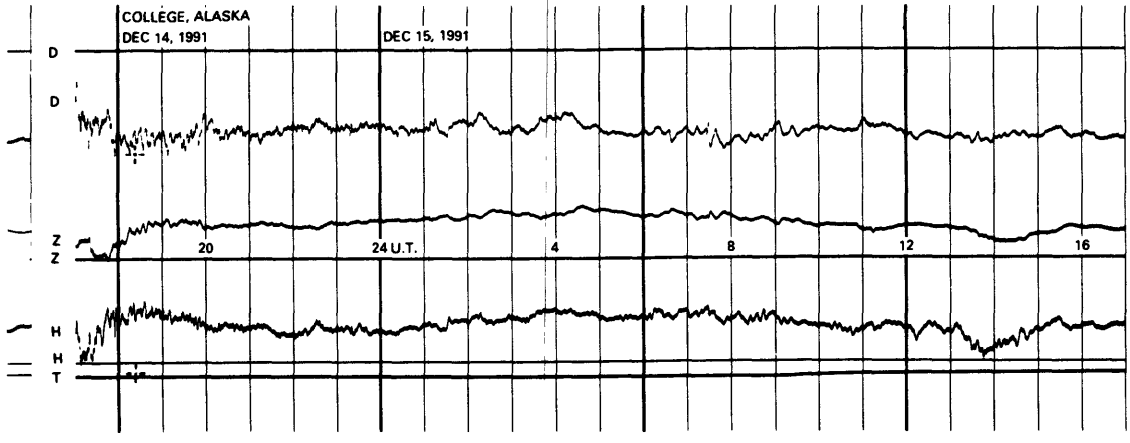

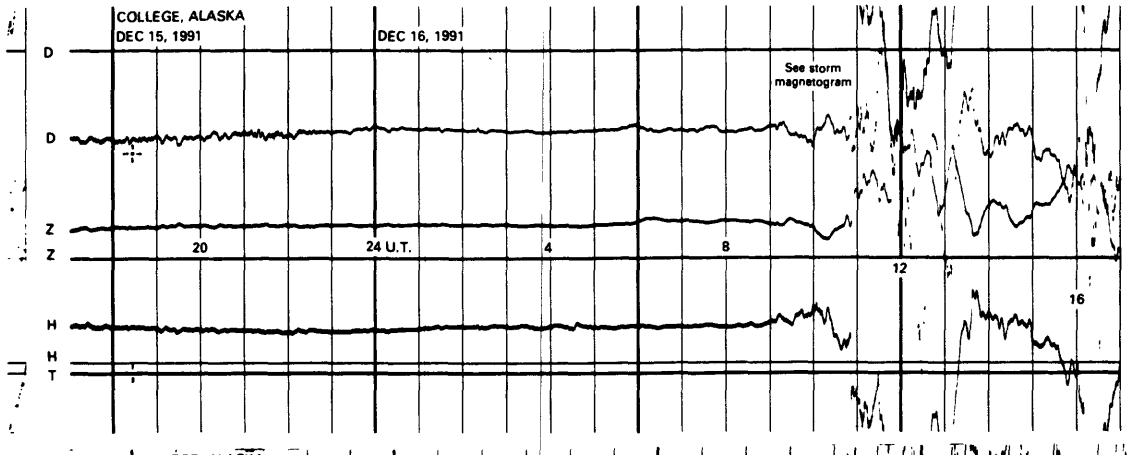

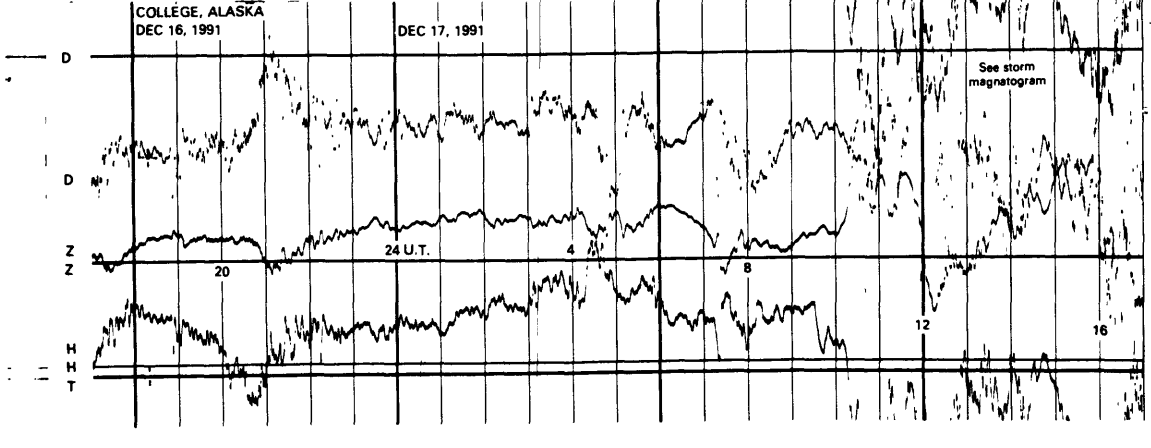

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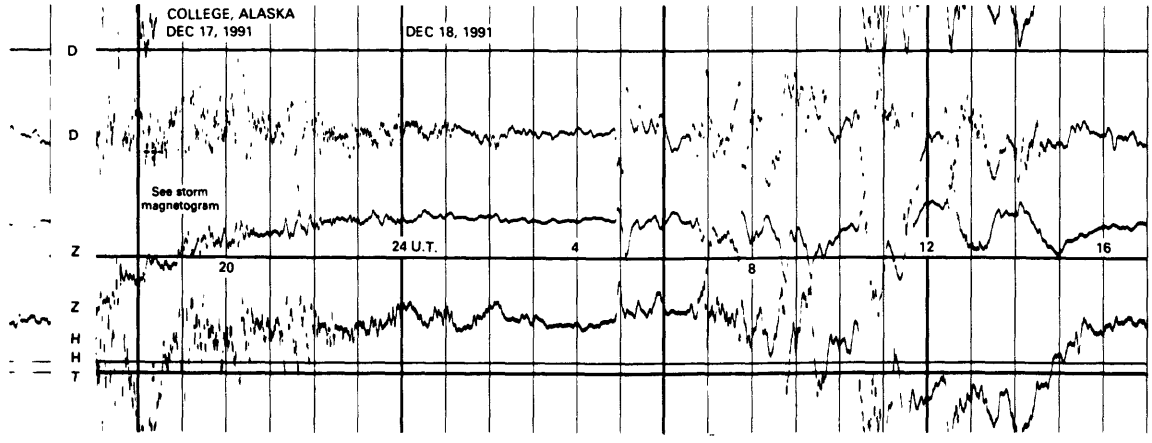

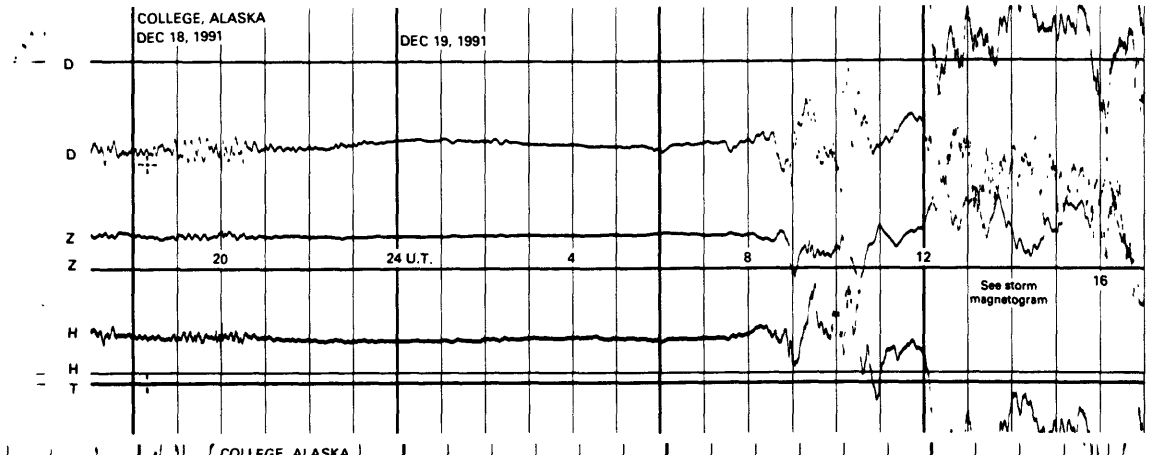

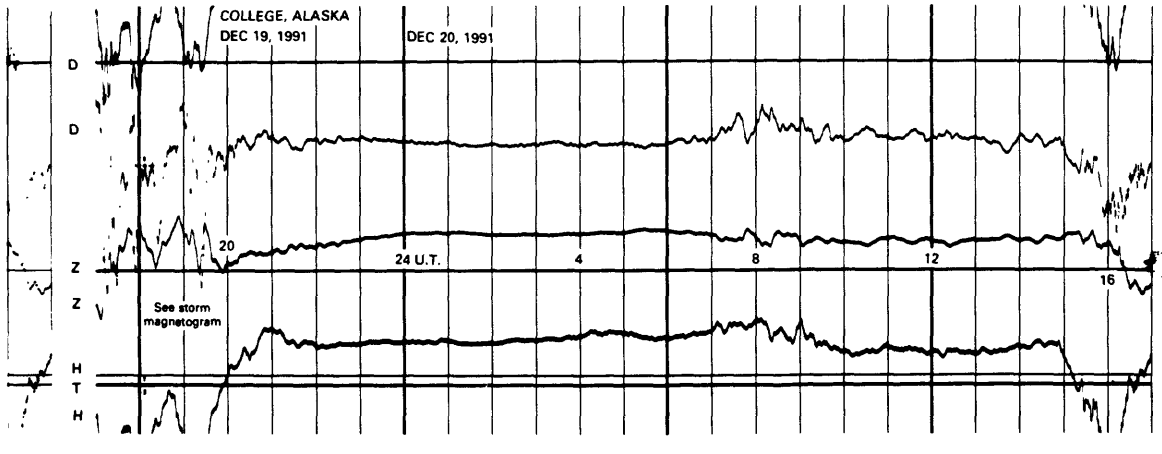

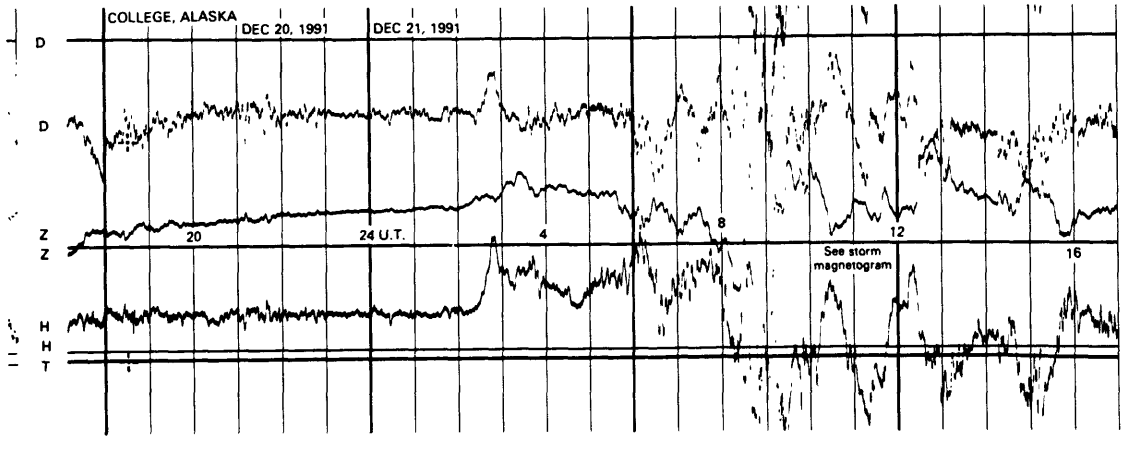

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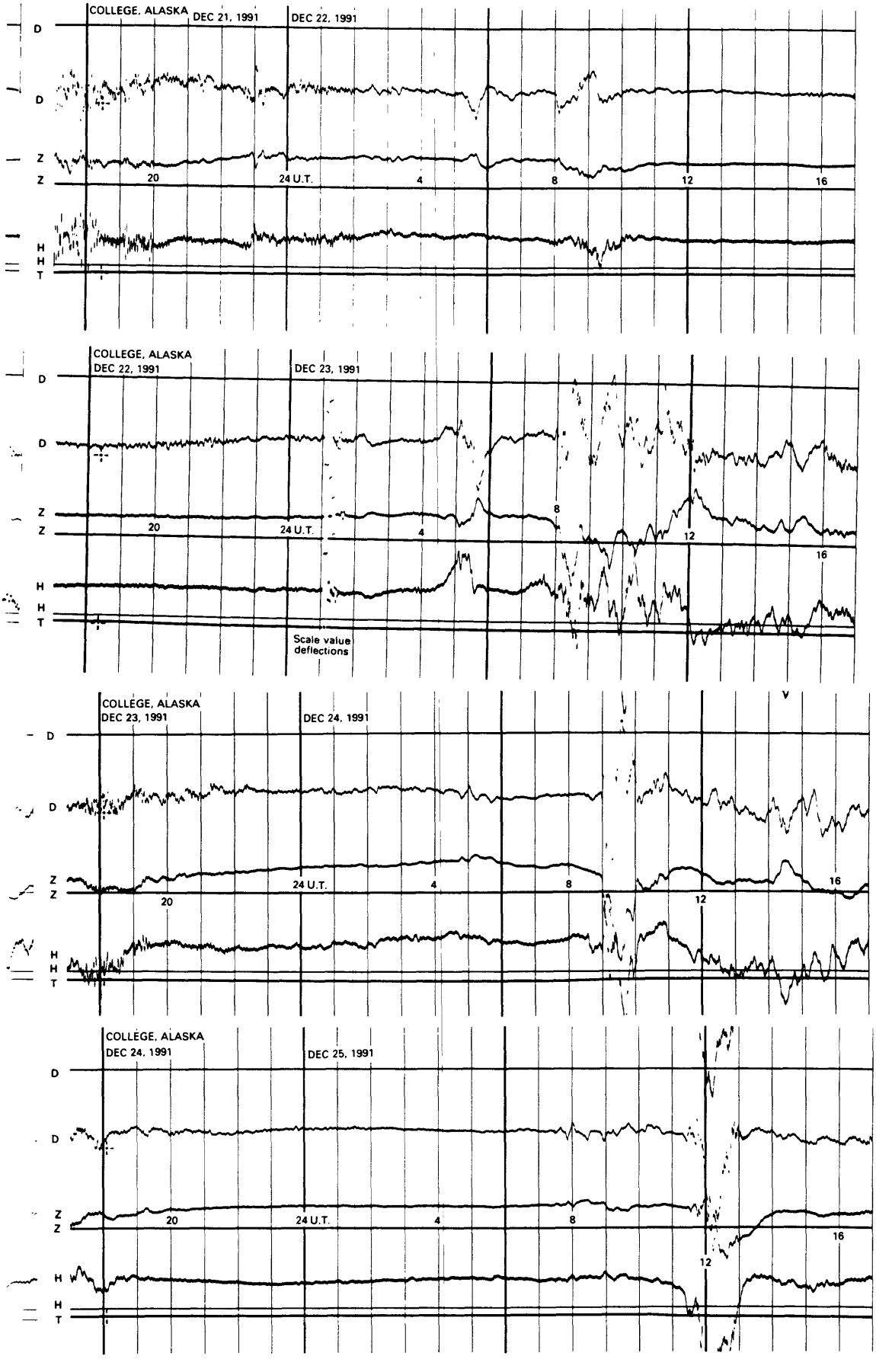

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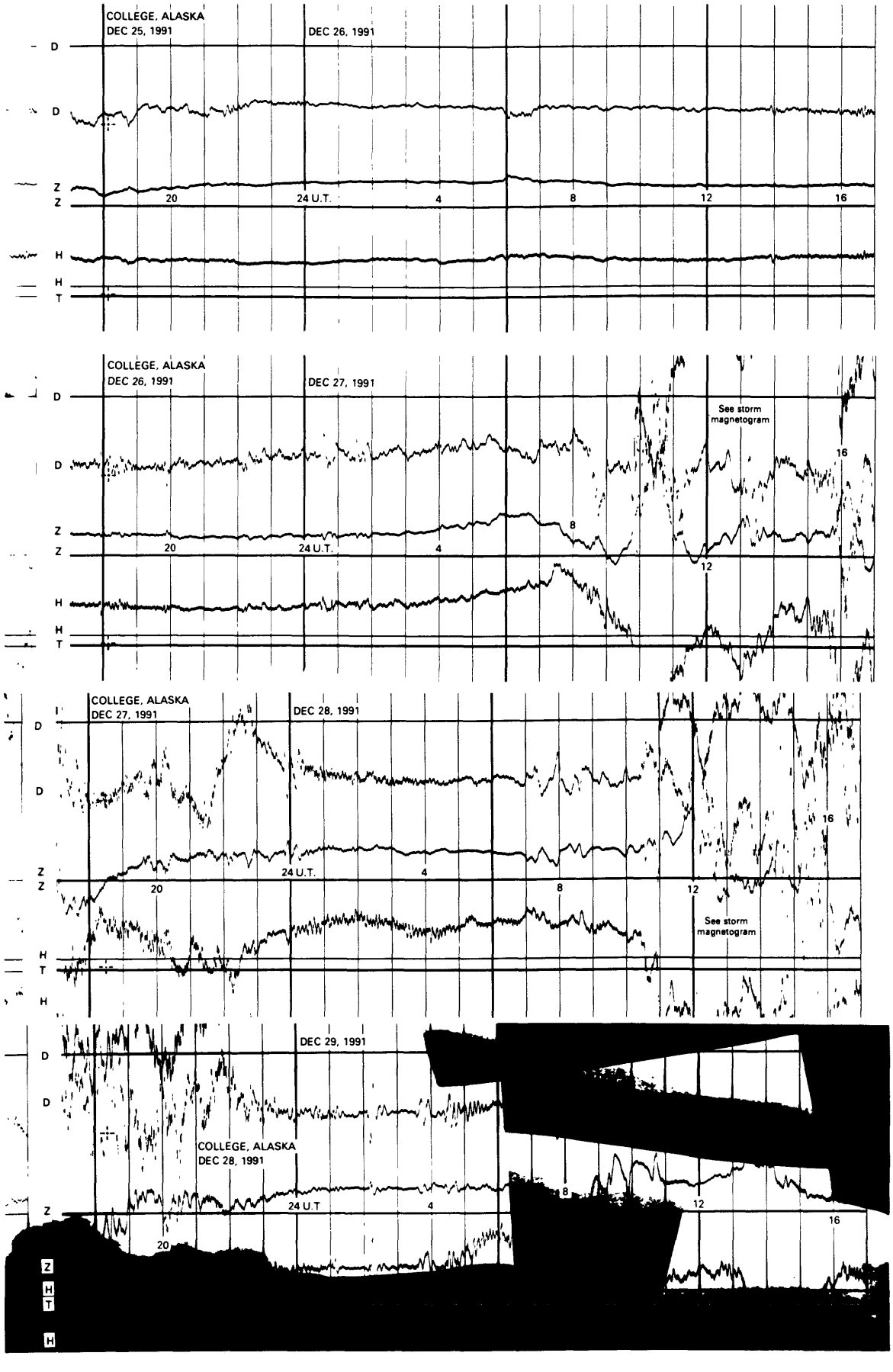

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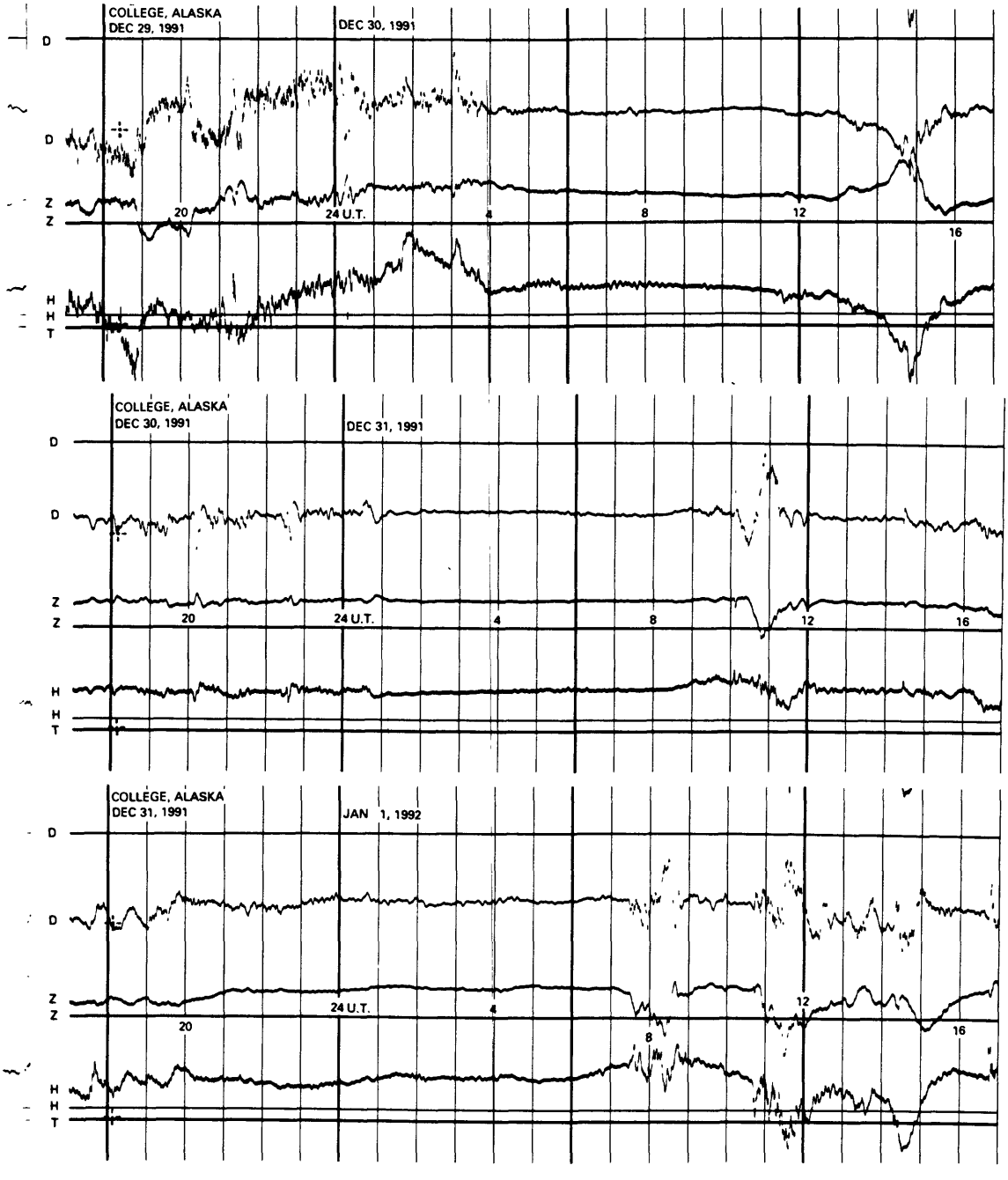
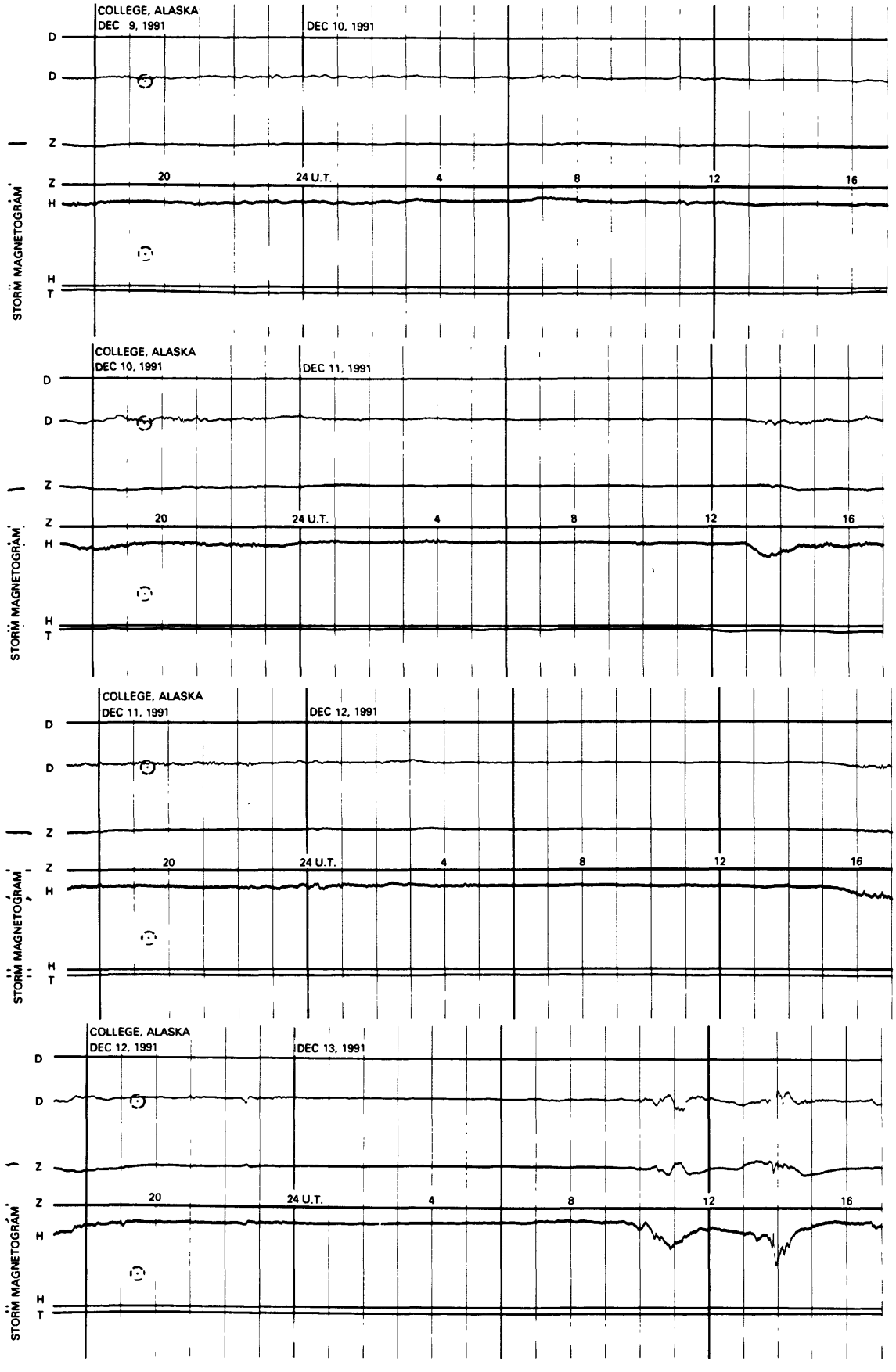


200mm
100mm
0

STORM MAGNETOGRAMS



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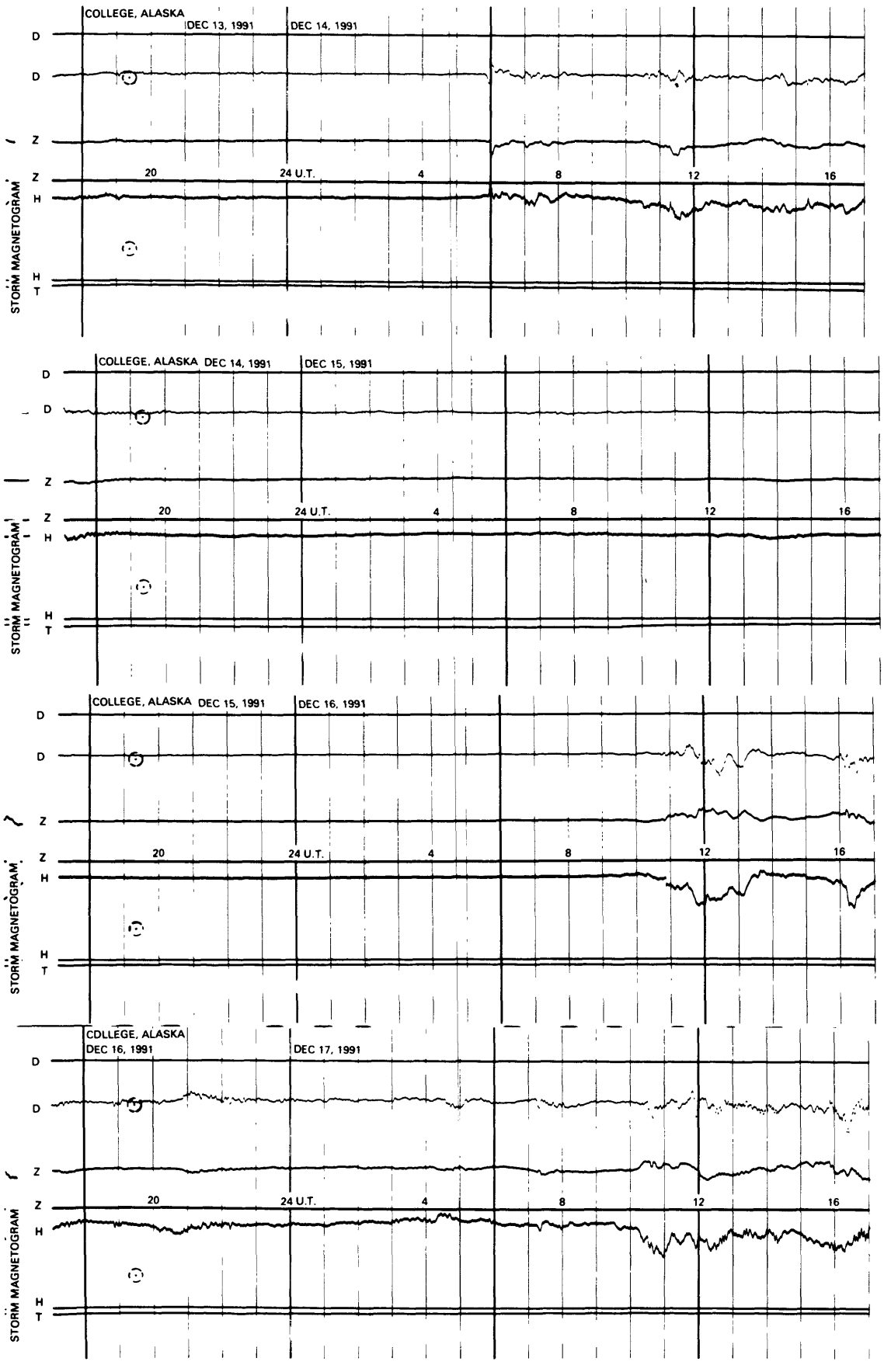

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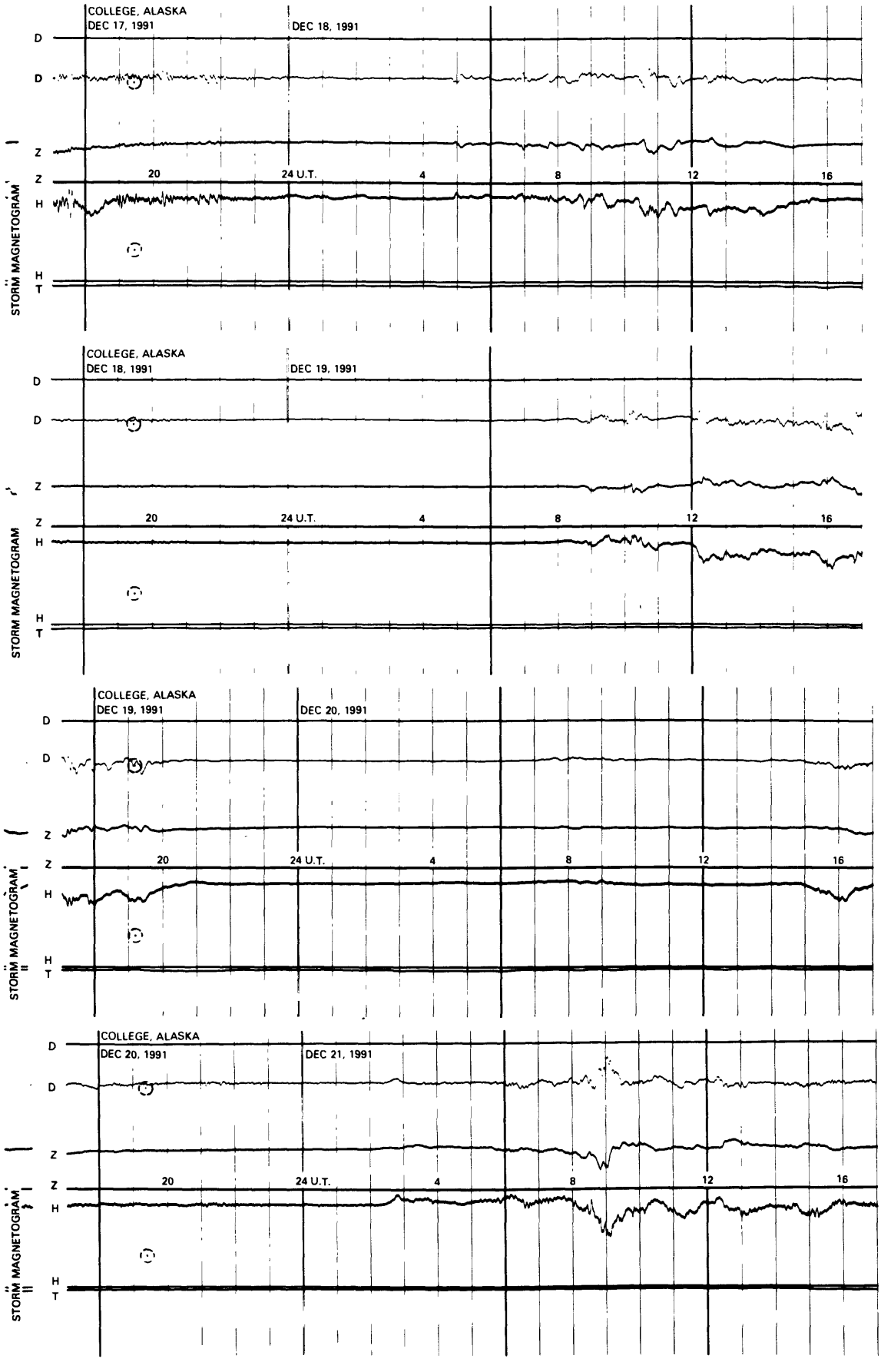

STORM MAGNETOGRAMS