

# UNITED STATES DEPARTMENT OF THE INTERIOR



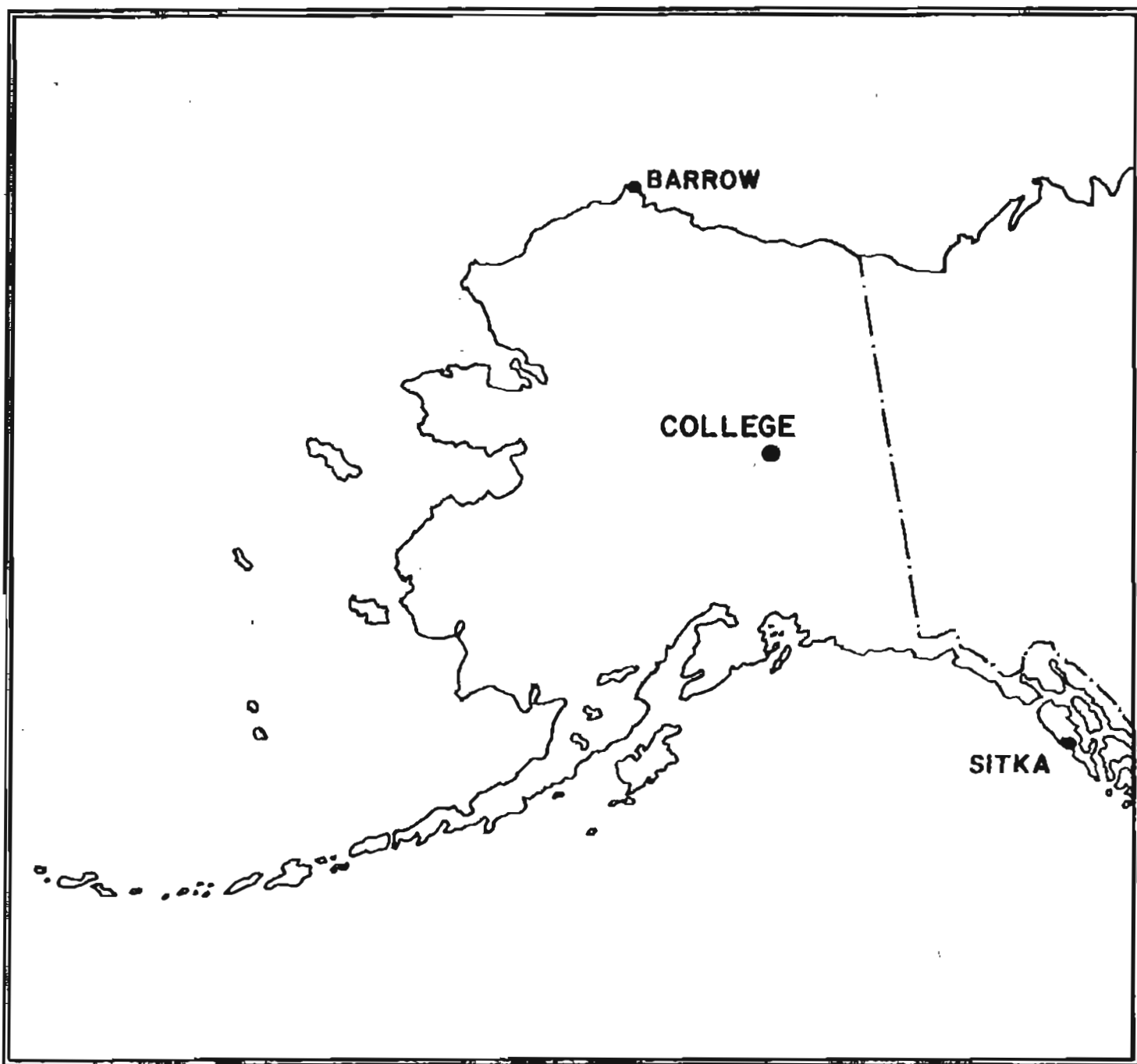
**PROPERTY OF  
LIBRARY  
STATE OF ALASKA  
DIVISION OF  
GEOLOGICAL SURVEY  
GEOLOGICAL SURVEY  
GEOMAGNETIC DATA  
COLLEGE OBSERVATORY  
FAIRBANKS, ALASKA**



DECEMBER 1980

OPEN FILE REPORT

80-300L



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Normal Magnetograms

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THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY WITH THE ASSISTANCE OF OBSERVATORY STAFF MEMBERS J.E. PAPP, E.A. SAUTER, AND S.P. TILTON, AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA. THE COLLEGE OBSERVATORY IS A PART OF THE BRANCH OF ELECTROMAGNETISM 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. 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  
Yukon Drive on West Ridge  
Fairbanks, Alaska 99701

Requests for copies of the magnetograms except for the current month should be addressed to:  
World Data Center A-NOAA  
Environmental Data Service  
Boulder, Colorado 80302

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 in 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 & 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<sub>D</sub>, B<sub>H</sub> and B<sub>Z</sub> are base-line values;  
S<sub>D</sub>, S<sub>H</sub> and S<sub>Z</sub> are scale values;  
and d, h, and z are scalings in millimeters.

**MAGNETIC ACTIVITY**

(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

DECEMBER 1980

DATE	K-INDICES									AK	TIME SCALE ON MAGNETOGRAMS  20 mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM		
1	3	2	3	4	5	1	1	0	19	15	SUDDEN COMMENCEMENTS d h m
2	0	0	0	2	2	1	2	2	09	04	
3	1	4	6	6	5	4	3	3	32	37	
4	2	2	3	3	2	0	0	0	12	06	
5	0	1	1	1	0	1	0	0	04	02	
6	0	0	0	1	0	0	1	0	02	01	
7	0	0	1	3	1	0	0	0	05	03	
8	1	1	1	1	0	1	1	1	07	03	
9	0	1	2	2	2	3	2	1	13	06	
10	3	3	1	2	1	1	1	1	13	07	
11	0	0	1	3	5	5	4	3	21	20	
12	4	3	3	2	1	0	2	2	17	10	
13	0	0	1	5	3	0	0	0	09	08	
14	0	0	0	4	3	3	1	0	11	08	
15	1	1	3	5	4	3	1	1	19	15	
16	0	1	2	5	6	5	4	1	24	27	
17	0	1	0	0	0	2	3	0	06	03	
18	0	2	6	6	3	5	4	1	27	33	
19	1	5	4	4	8	8	5	3	38	81	
20	2	2	4	5	3	4	4	2	26	21	
21	3	3	5	6	3	4	3	2	29	28	
22	2	3	4	4	3	2	2	1	21	14	
23	2	1	2	5	2	0	0	0	12	09	
24	0	0	0	0	0	0	1	0	01	00	
25	0	0	0	4	3	0	0	1	08	06	
26	1	1	1	3	5	1	0	0	12	09	
27	0	0	3	6	4	2	1	1	17	17	
28	0	0	1	1	2	1	0	0	05	02	
29	0	0	1	4	4	3	2	1	15	10	
30	1	1	3	6	5	1	0	0	17	19	
31	2	2	3	0	1	4	3	3	18	11	

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

BEGIN

END

d

h

m

d

h

m

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

683.8

3.75

2560

H

321.7

7.81

2510

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN B. TOWNSEND, CHIEF, COLLEGE OBSERVATORY

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY  
COLLEGE, ALASKA

MONTH  
DECEMBER

YEAR  
1980

DATE	TIME U. T.	NATURE OF PHENOMENON <sup>1</sup>	REMARKS
11	17XX	pc5	
19	0456	ssc*	
20	14XX	pc5	
22	16XX	pc5	
24	12XX	pc5	
IDENTIFIED BY: JEP		VERIFIED BY: EAS	

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

NOAA FORM 86-500  
(11/73)

PRINCIPAL MAGNETIC STORMS  
COLLEGE OBSERVATORY, COLLEGE, ALASKA

Data from Individual Observatories:

DECEMBER 19 80

WDC-A FOR SOLAR-TERRESTRIAL PHYSICS  
ENVIRONMENTAL DATA SERVICE, NOAA  
BOULDER, COLORADO 80502 U.S.A.

Obs. Z. (cellar 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)	
CO	64°6 N	03	04XX	..	..	..	03	3, 4	6	150	860	610	04 02
		19	0456	s.c.*	-13	-121	19	5, 6	8	451	2060	970	23 02

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

DECEMBER

1980

NORMAL MAGNETOGRAPH			
COMPONENT	PERIOD	TO	CALIBRATION
	FROM		SCALE VALUE
D	0000 UT, 12-1-80	2400 UT, 12-31-80	1.0/mm
	0000 UT, 12-1-80	2400 UT, 12-31-80	3.7 &/mm
B	0000 UT, 12-1-80	2400 UT, 12-8-80	7.8 &/mm
	0000 UT, 12-9-80	2400 UT, 12-31-80	"
Z	0000 UT, 12-1-80	2400 UT, 12-8-80	7.7 &/mm
	0000 UT, 12-9-80	2400 UT, 12-31-80	"
			55197 &
			55146 &
			BASELINE

STORM MAGNETOGRAPH			
COMPONENT	PERIOD	TO	CALIBRATION
	FROM		SCALE VALUE
D	0000 UT, 12-1-80	2400 UT, 12-31-80	7.8/mm
	0000 UT, 12-1-80	2400 UT, 12-31-80	297 &/mm
B	0000 UT, 12-1-80	2400 UT, 12-31-80	44.0 &/mm
	0000 UT, 12-1-80	2400 UT, 12-31-80	11495 &
Z	0000 UT, 12-1-80	2400 UT, 12-31-80	48.5 &/mm
	0000 UT, 12-1-80	2400 UT, 12-31-80	54029 &
			BASELINE

RAPID RUN MAGNETOGRAPH			
COMPONENT	PERIOD	TO	CALIBRATION
	FROM		SCALE VALUE
D			
B			
Z			

MONTHLY MEAN ABSOLUTE VALUES*			
D	B	Z	
28° 06.2 E	13000 &	55386 &	

\* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED:

DEC 2, 4, 5, 6, 7, 8, 9, 17, 24, 28

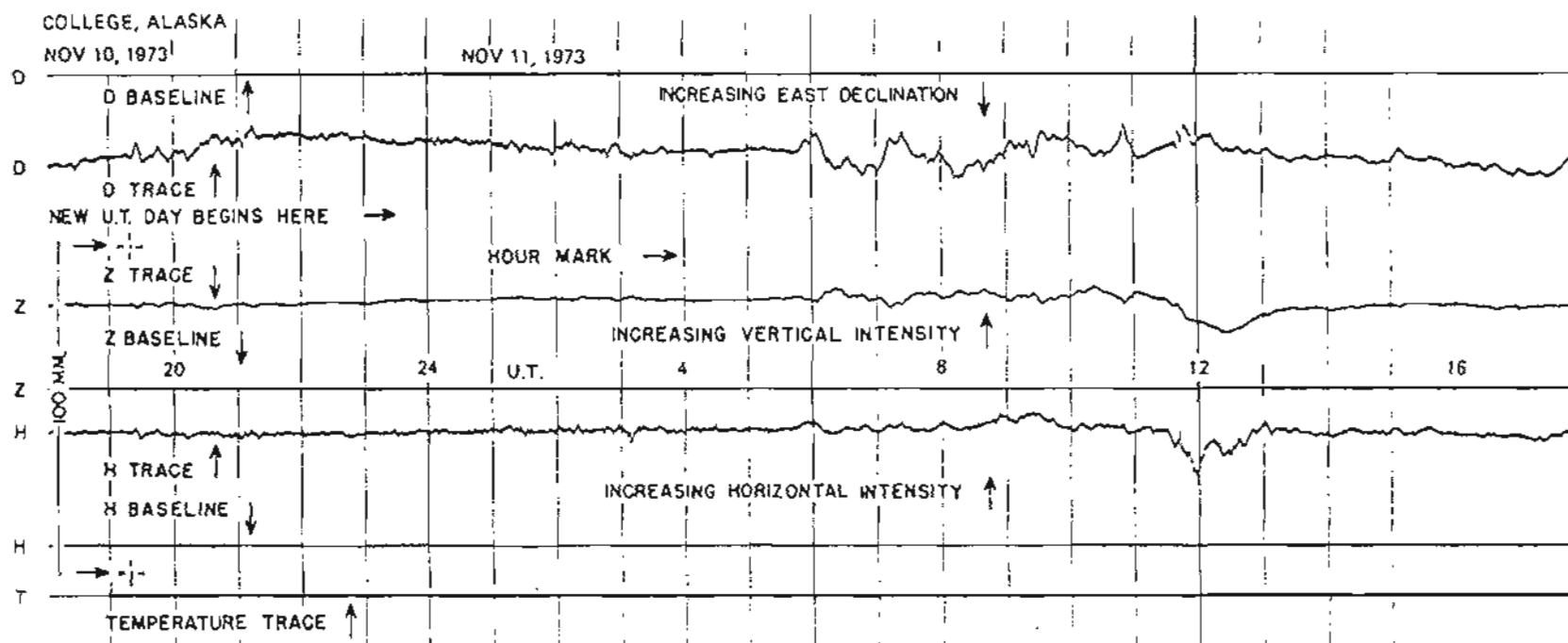






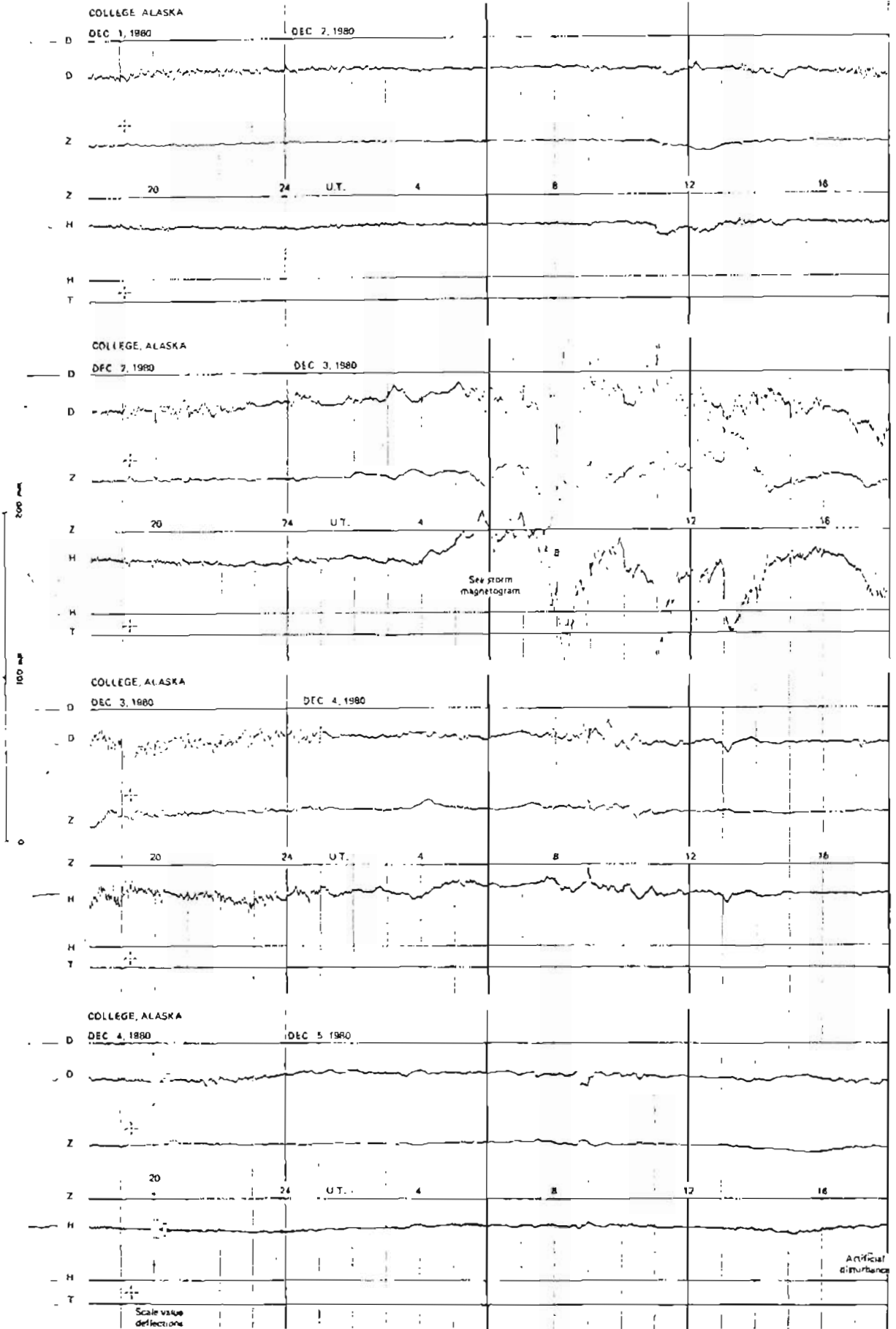


## FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

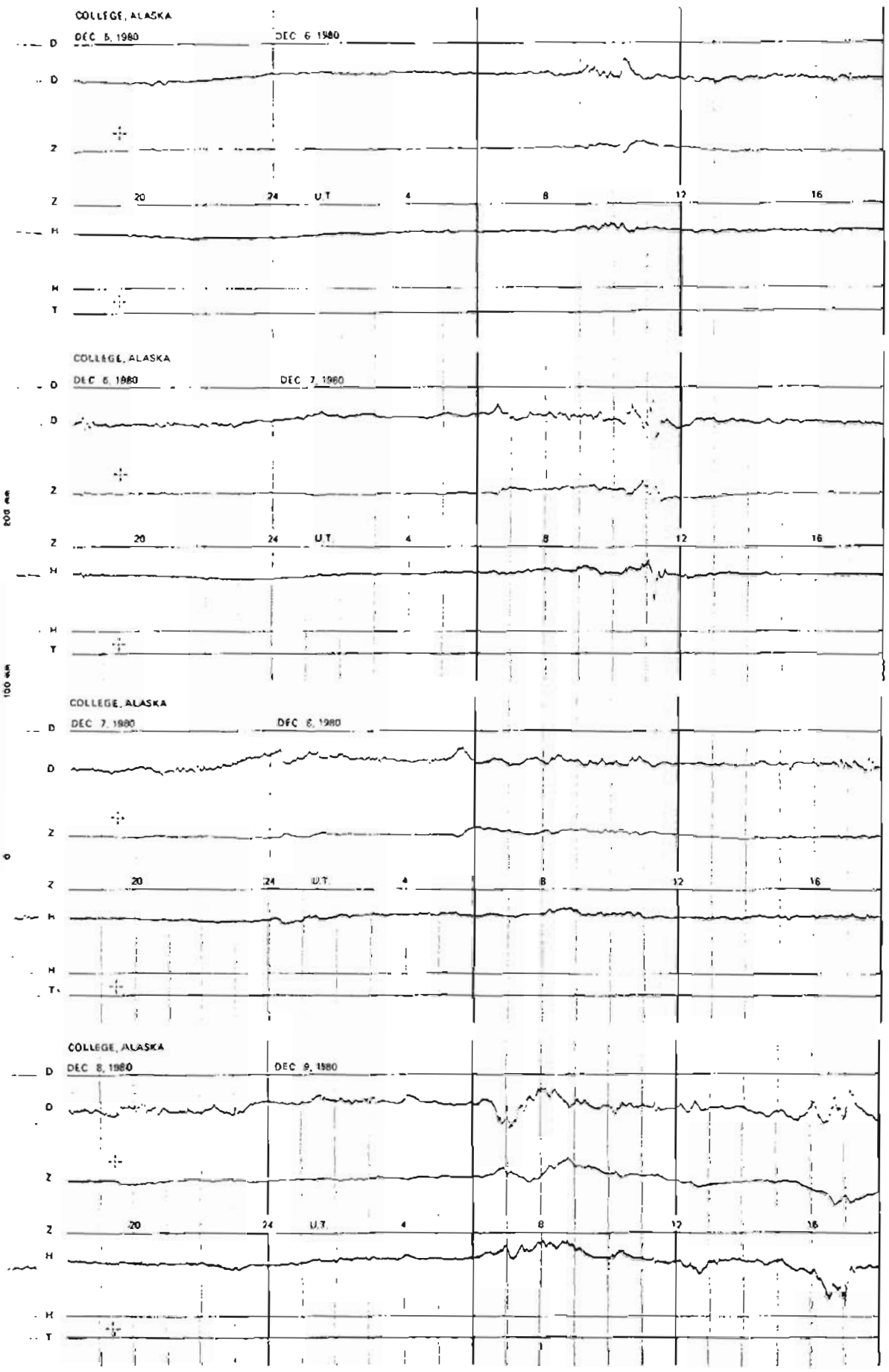


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

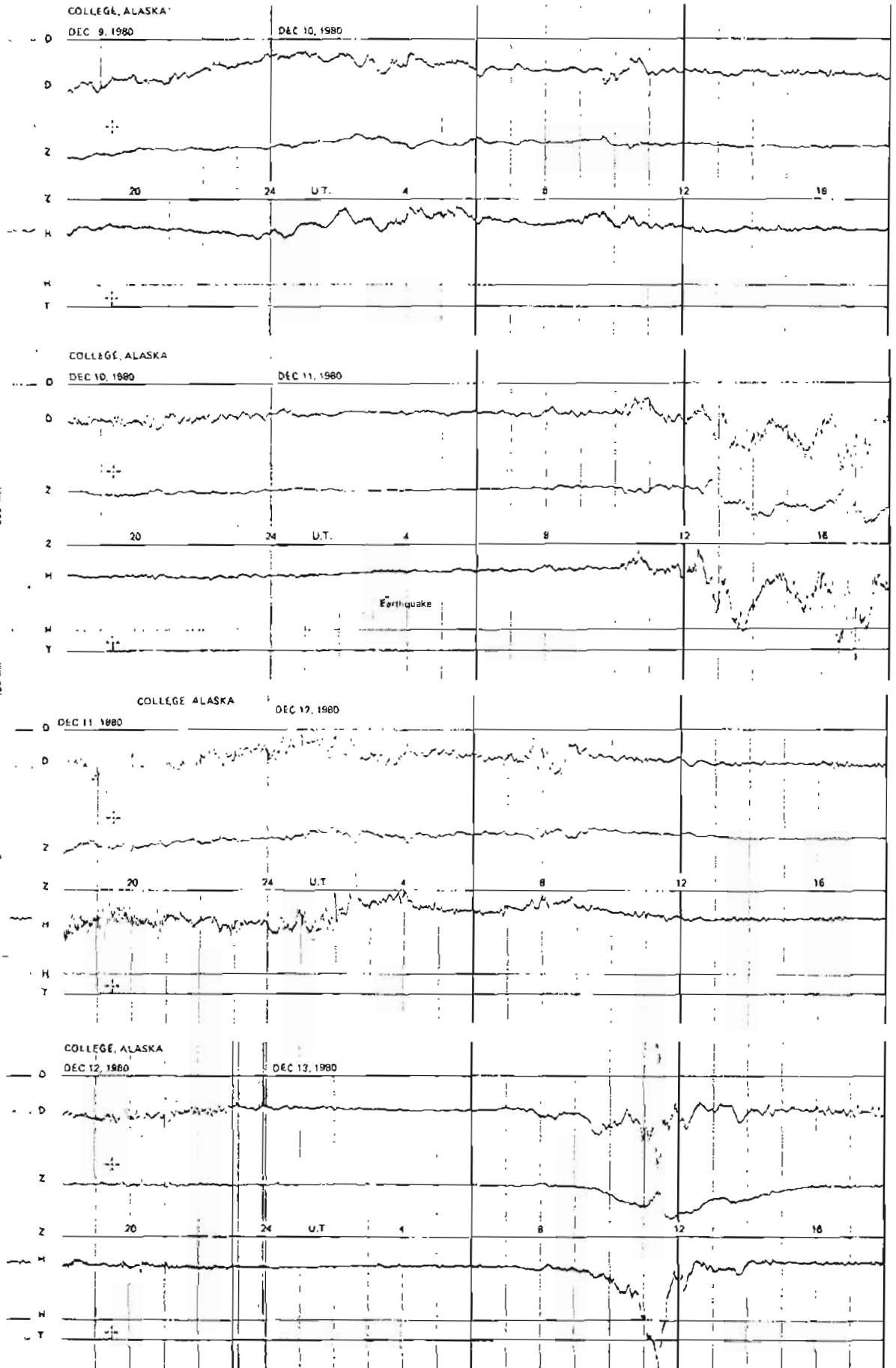
NORMAL MAGNETOGRAMS



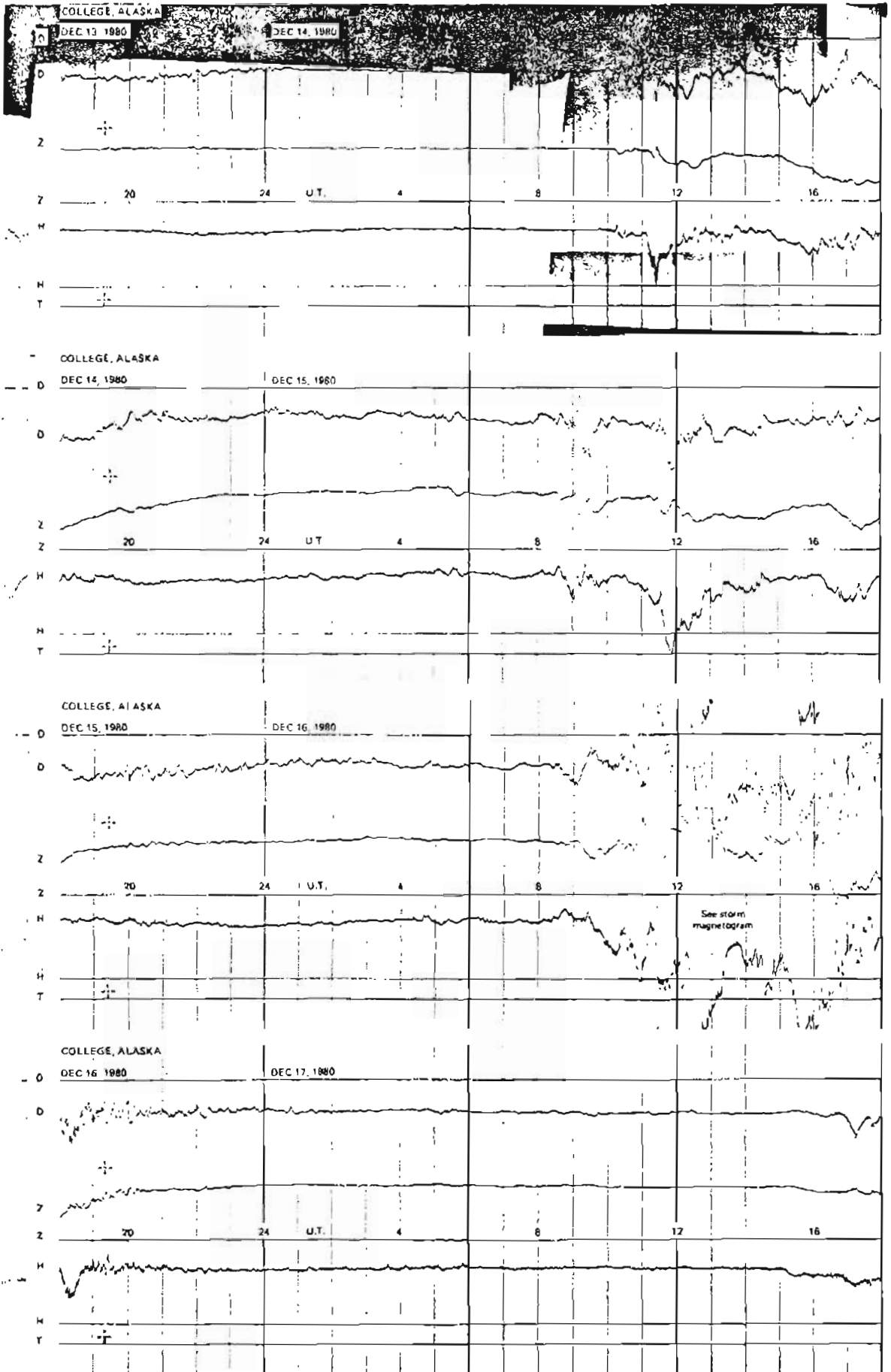
NORMAL MAGNETOGRAMS



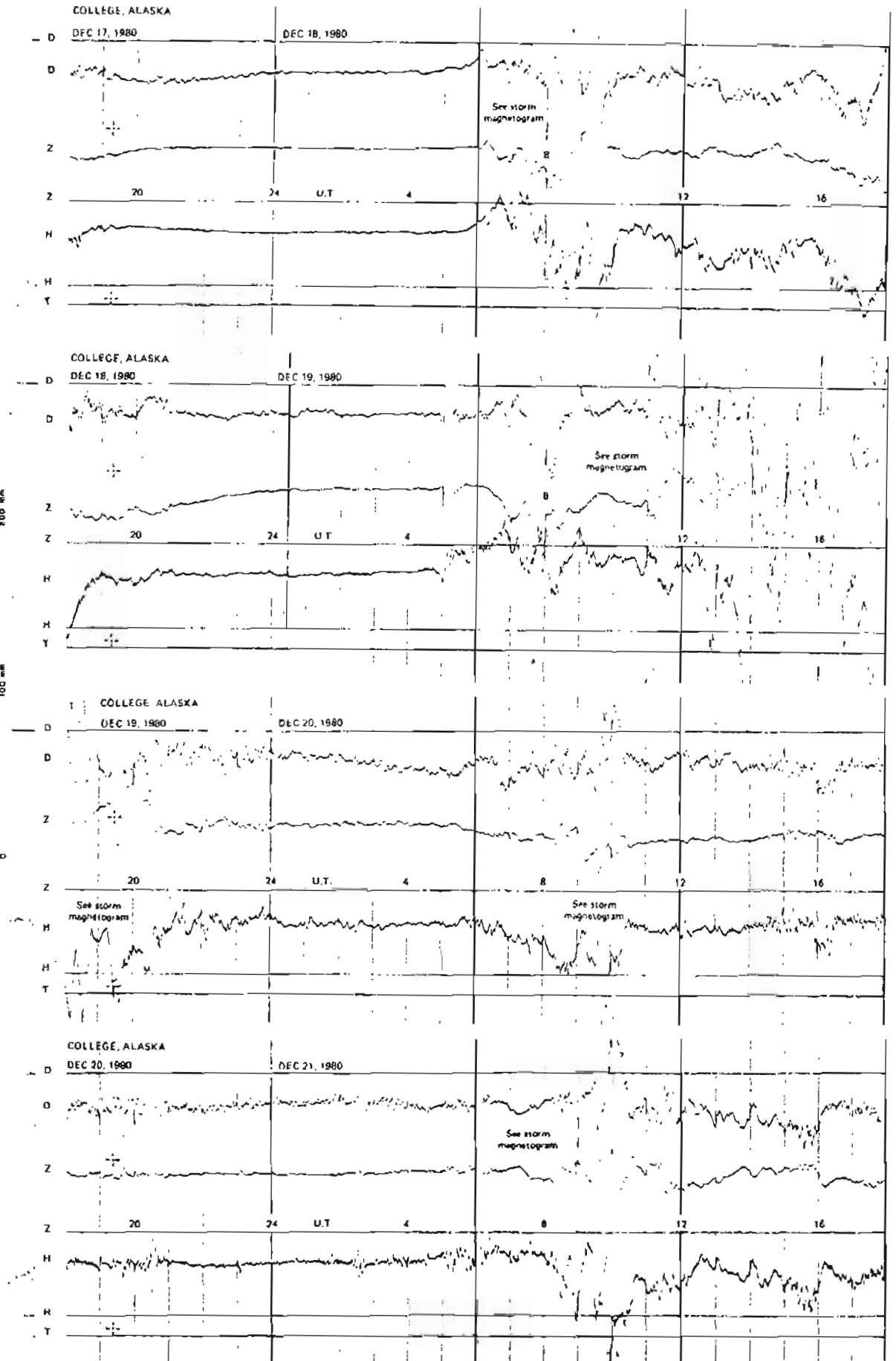
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

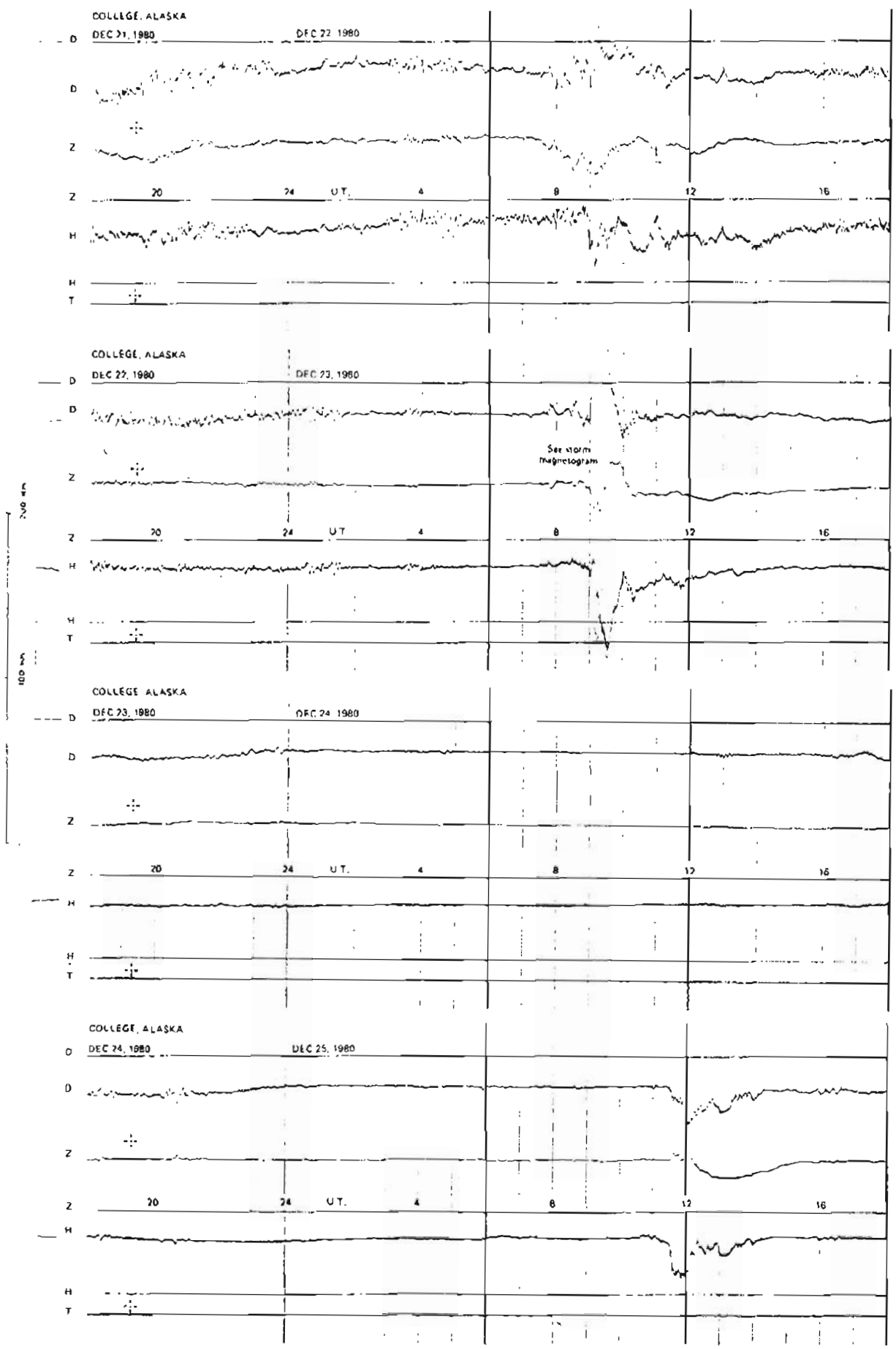


NORMAL MAGNETOGRAMS

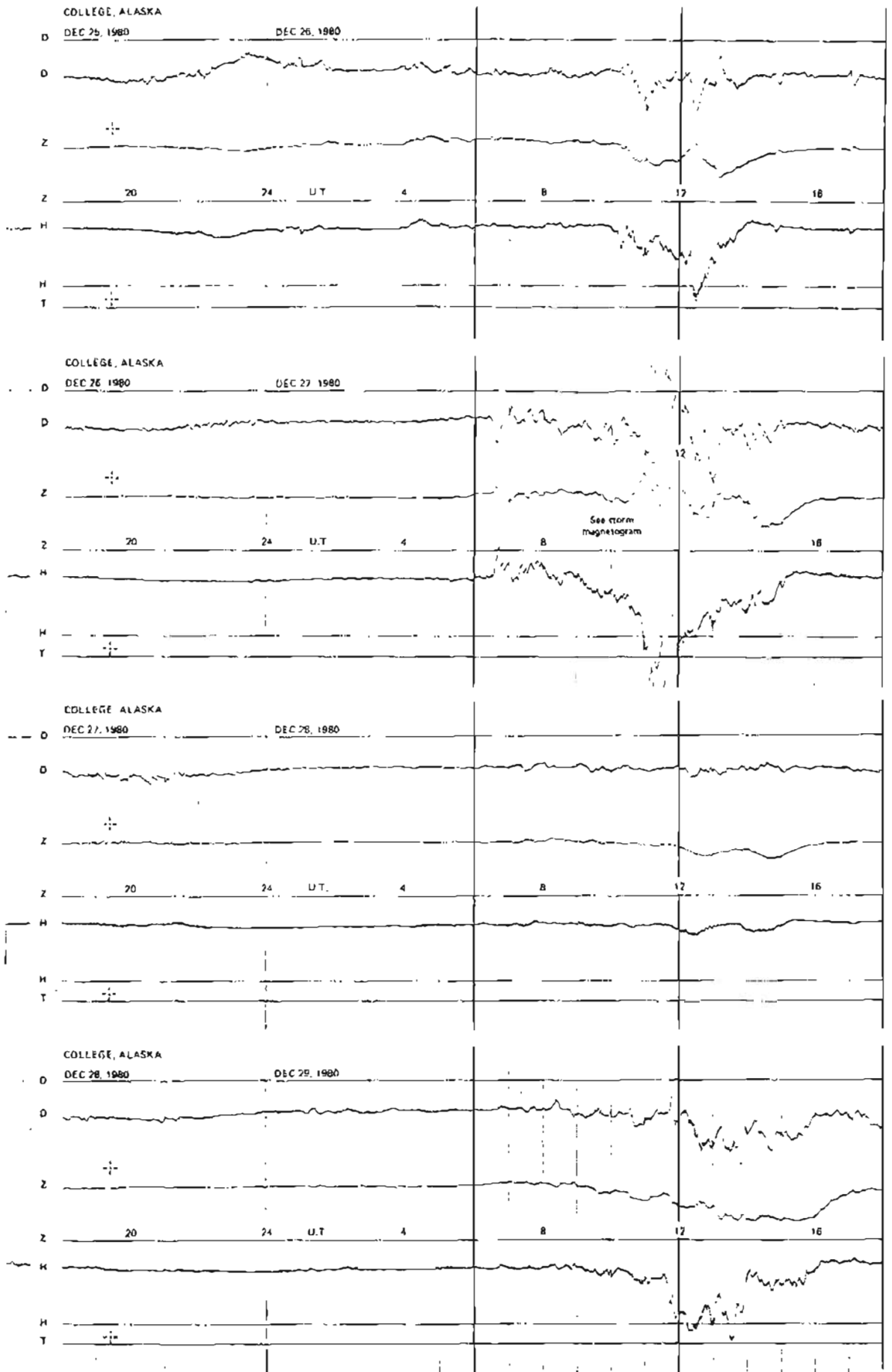




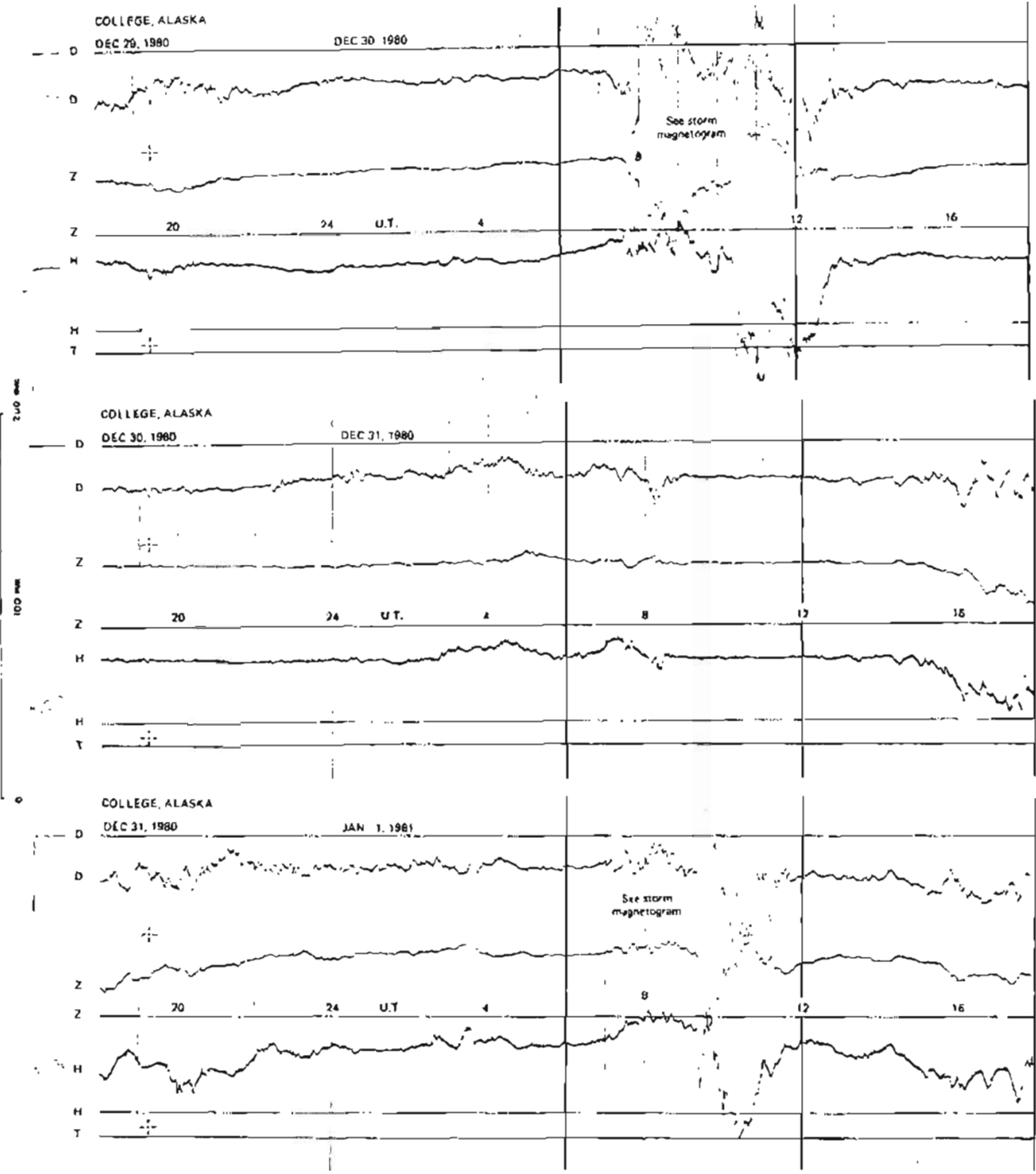
NORMAL MAGNETOGRAMS



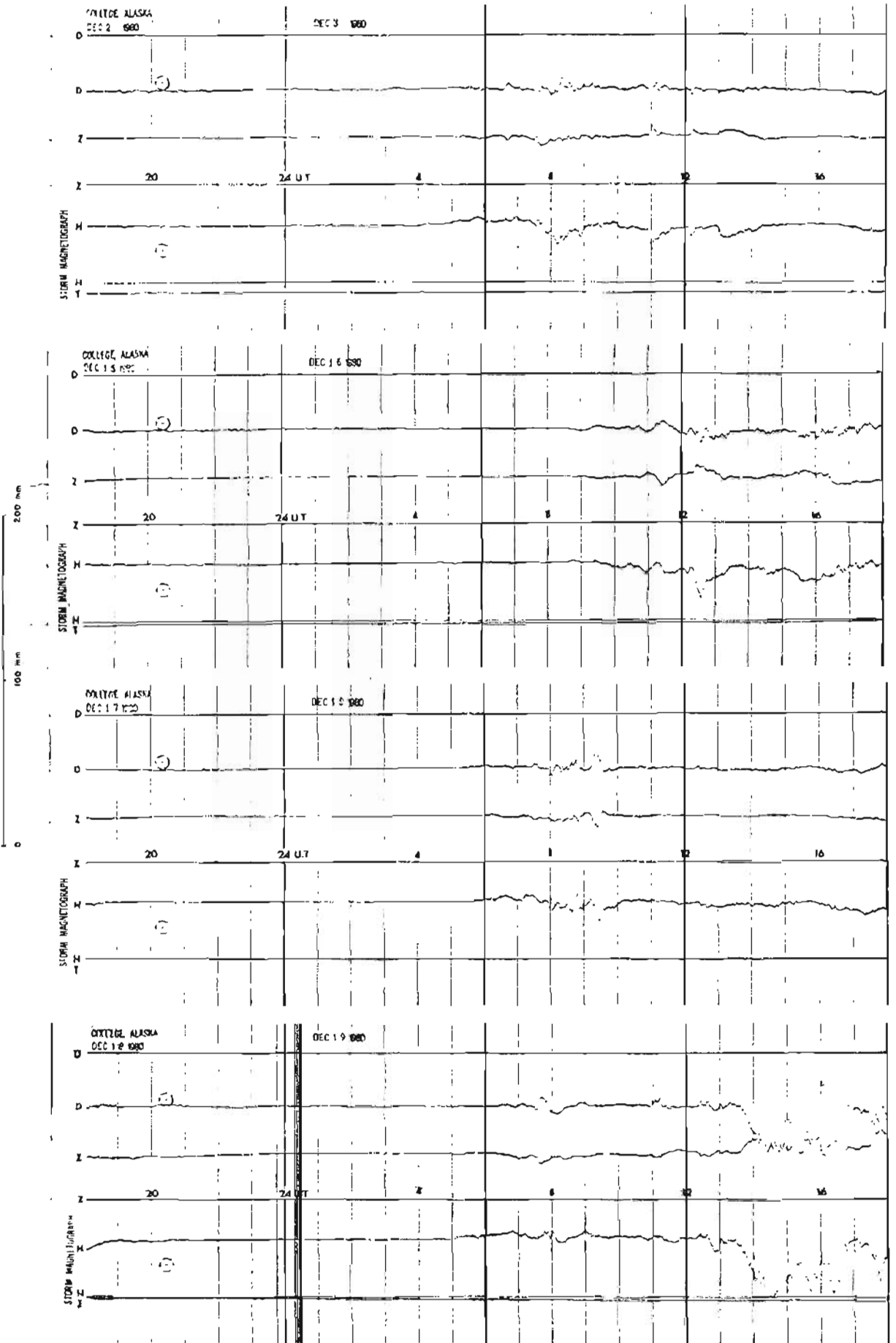
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS



# STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS

800 mm  
100 mm  
0



# STORM MAGNETOGRAMS

