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# UNITED STATES DEPARTMENT OF THE INTERIOR

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USGS  
OFR  
81-300B

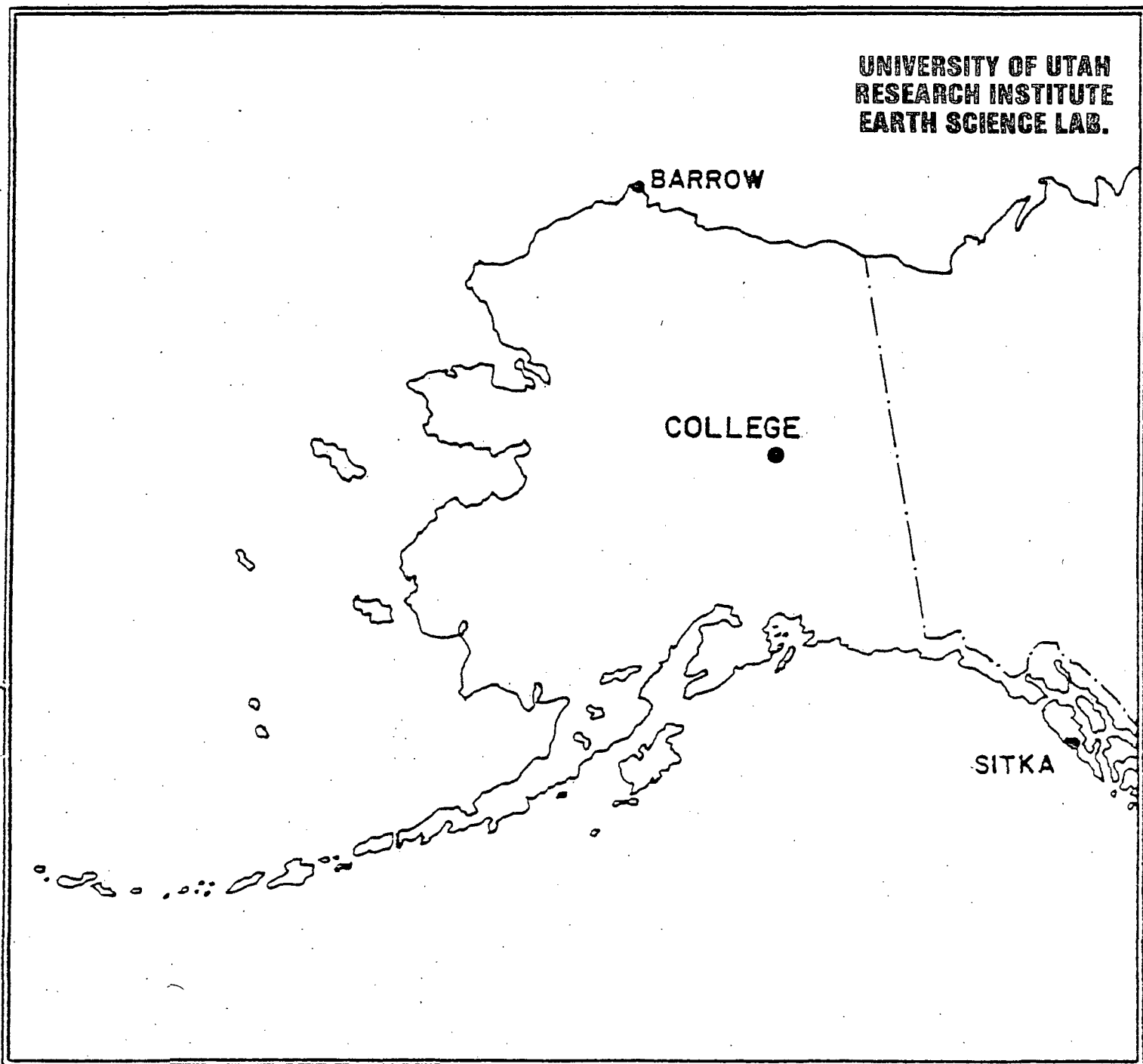
## GEOLOGICAL SURVEY

### PRELIMINARY GEOMAGNETIC DATA COLLEGE OBSERVATORY FAIRBANKS, ALASKA

FEBRUARY 1981

OPEN FILE REPORT

81-300B



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THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSEND, 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

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	30
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.

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

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 "OI" 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:

$$D = D_d + d \cdot S_d; H = H_h + h \cdot S_h; Z = Z_z + z \cdot S_z$$

where D, H, and Z are absolute values;  
D<sub>d</sub>, H<sub>h</sub> and Z<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

FEBRUARY 1981

DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS  20 mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			
1	1	3	4	3	5	2	2	3	23	17	SUDDEN COMMENCEMENTS d h m
2	3	3	4	4	5	5	5	2	31	29	
3	2	2	5	4	5	3	1	1	23	20	
4	1	1	0	2	0	3	2	1	10	05	
5	1	3	4	8	7	7	4	2	36	75	
6	2	2	1	4	7	8	7	6	37	81	
7	5	4	4	2	1	0	0	0	16	14	
8	0	0	0	0	3	5	3	3	14	12	
9	4	5	5	4	5	1	0	0	24	25	
10	0	1	0	0	1	0	0	0	02	01	
11	0	0	0	0	5	3	3	2	13	11	
12	2	2	3	4	3	0	2	1	17	10	
13	0	0	1	4	3	2	1	0	11	07	
14	0	0	0	2	1	1	0	0	04	02	
15	0	0	0	1	3	6	3	2	15	15	
16	2	2	0	5	4	3	1	0	17	13	
17	1	0	2	3	2	3	1	0	12	06	
18	0	0	0	0	3	1	1	1	06	03	
19	1	1	3	1	1	1	1	1	10	05	
20	0	0	2	6	5	5	2	0	20	24	
21	0	1	3	5	5	0	0	0	14	14	
22	0	0	0	0	0	0	2	2	04	02	
23	2	2	1	1	1	3	1	2	13	06	
24	1	1	1	2	5	5	4	3	22	19	
25	3	4	7	6	4	5	3	3	35	46	
26	3	3	4	6	4	6	6	3	35	42	
27	3	4	6	6	5	5	3	2	34	40	
28	3	2	1	3	2	3	1	2	17	09	
29											POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)
30											
31											

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	H	Z
683.8	321.7	
3.75	7.81	
2560	2510	

(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 FEBRUARY	YEAR 1981
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DATE	TIME U. T.	NATURE OF PHENOMENON <sup>1</sup>	REMARKS
08	1346	ssc*	
15	08XX	pi2	
Mar. 01	0738	ssc*	
IDENTIFIED BY: JEP			VERIFIED BY: EAS

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-TERRRESTRIAL PHYSICS  
ENVIRONMENTAL DATA SERVICE, NOAA  
BOULDER, COLORADO 80502 U.S.A.

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA  
FEBRUARY 19 81

Obs. 2 letter IAOA 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	05	04XX	..	..	..	..	05	4	8	302	2080	1010	06	01
		06	09XX	..	..	..	..	06	6	8	294	1900	950	07	08
		08	1346	s.c.*	-14	-148	-15	08 09	6 2, 3, 5	5 5	95	880	350	09	15
		24	13XX	..	..	..	..	25	3	7	168	1180	580	28	00

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 2-1-81	2400 U.T., 2-28-81	1.6/mm	3.78/mm	27° 46.7 E
H	0000 U.T., 2-1-81	2400 U.T., 2-16-81	7.88/mm		127538
	0000 U.T., 2-17-81	2400 U.T., 2-24-81	"		127448
	0000 U.T., 2-25-81	2400 U.T., 2-28-81	"		127528
Z	0000 U.T., 2-1-81	2400 U.T., 2-28-81	7.78/mm		551428

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 2-1-81	2400 U.T., 2-28-81	7.8/mm	29.78/mm	23° 49.2 E
H	0000 U.T., 2-1-81	2400 U.T., 2-16-81	44.08/mm		115088
	0000 U.T., 2-17-81	2400 U.T., 2-24-81	"		114908
	0000 U.T., 2-25-81	2400 U.T., 2-28-81	"		115168
Z	0000 U.T., 2-1-81	2400 U.T., 2-28-81	48.68/mm		550548

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

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
28° 05.3 E	129938	553808

\* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: FEB 4, 10, 13, 14, 17, 18, 19, 22, 23, 28

U. S. DEPARTMENT OF INTERIOR  
Geological Survey, Centennial Station  
Denver Federal Center  
DENVER, CO 80215

FILE - MONTHLY REPORT  
YEAR MONTH DAY  
CO BL FEB D

Values are in tenths of mm., and are averages for successive periods of one hour beginning at midnight. Hour (H) of local day (LOCAL M.T.) is hour 11 of the G.M.T. Universal Day.  
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

Table with columns for hours (01-24), months (JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEPT, OCT, NOV, DEC), and years (1955-1965). It contains magnetic hourly scalings data with various annotations and a legend at the top.



MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)

U.S. DEPARTMENT OF INTERIOR Geological Survey, Geologic Division Denver Federal Center DENVER, CO 80225

Table with columns: OBSY., YEAR, MONTH, ELEMENT, CO, BL, FEB, H

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (5:50W M.T.) is hour 11 of the 331902 universal day. Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

Main data table with 26 columns (01-24, SUM) and 31 rows (01-31). Contains magnetic scaling values for each hour.

Administrative table with rows: SCALED BY, CHECKED BY, SIGNS REVIEWED BY, PUNCHED BY

Table for Preliminary base-line and scale values: Interval Beginning, Base-line Value, Scale Value

- Legend items: ( ) Interpolated, [ ] Significant portion of hour interpolated, [ ] Scaling uncertain because of magnetic storm, <> Record off sheet for part or all of hour, etc.

Summary table with rows: MONTHLY SUM, MONTHLY MEAN, DATES WITH GAPS

MAGNETOGRAM HOURLY SCALINGS

U.S. DEPARTMENT OF INTERIOR  
Geological Survey, Geological Station  
Denver, Colorado 80225

CO  
BT  
PM  
YEAR MONTH

Where are in terms of hour, and are averages for more exact periods of one hour beginning at midnight. Hour of local day (LOCAL TIME) and hour of local day (LOCAL TIME) are shown in boldface type. Negative values are in italics, with minus signs shown.

Where are in terms of hour, and are averages for more exact periods of one hour beginning at midnight. Hour of local day (LOCAL TIME) and hour of local day (LOCAL TIME) are shown in boldface type. Negative values are in italics, with minus signs shown.

Table with columns for SCALING BY, CHECKED BY, SIGHTS RECORDED BY, PUNCHES BY, SCALED, and data columns for hours 01 to 31. Includes a summary row at the bottom with 'SUM' and '24'.

Finality base-line and scale values:

Interval  
Base-line  
Value  
Scale

( ) Interpolated  
(\*) Significant portion of hour interpolated

(\*) Significant portion of hour interpolated  
(\*) Significant portion of hour interpolated

[ ] No record or no value  
[ ] No record or no value

\* Derived from TROMA  
Magnet, converted to Normal Magnet.

MONTHLY MEAN  
201536  
304

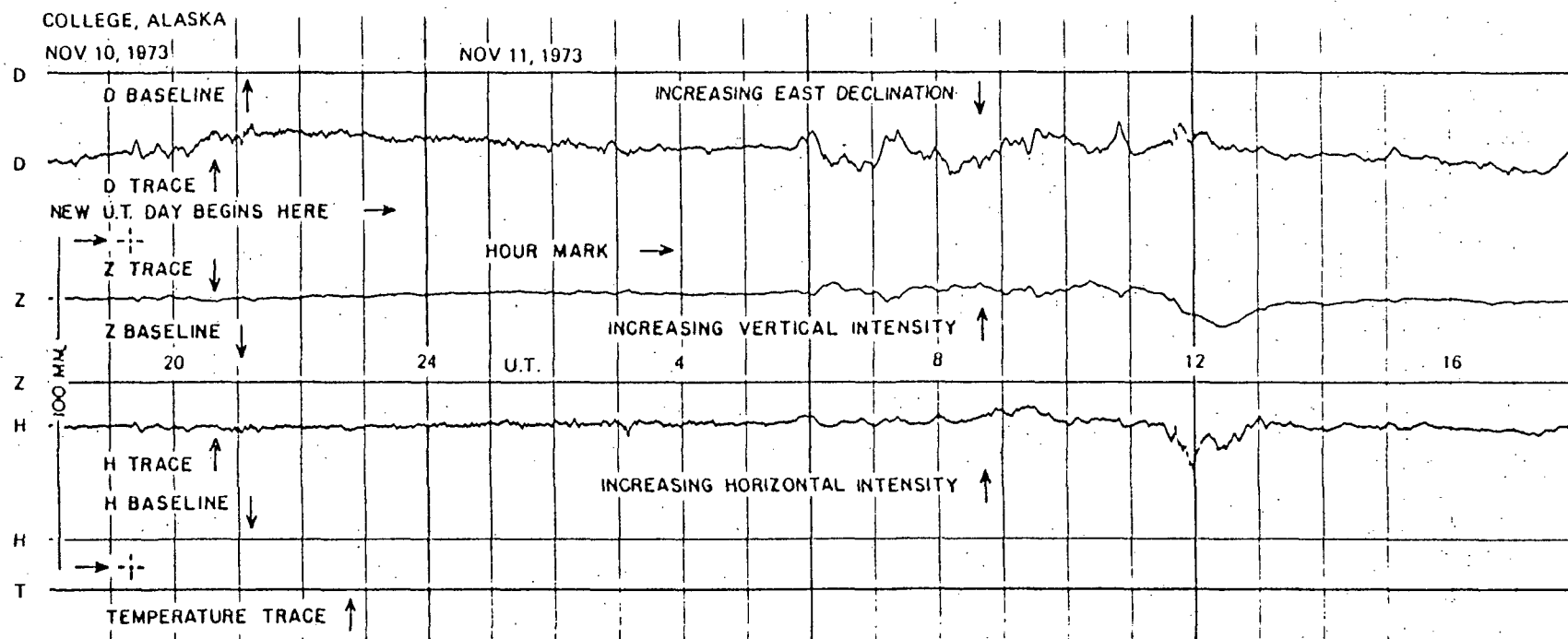
MONTHLY MEAN  
304

MONTHLY MEAN  
304

MONTHLY MEAN  
304

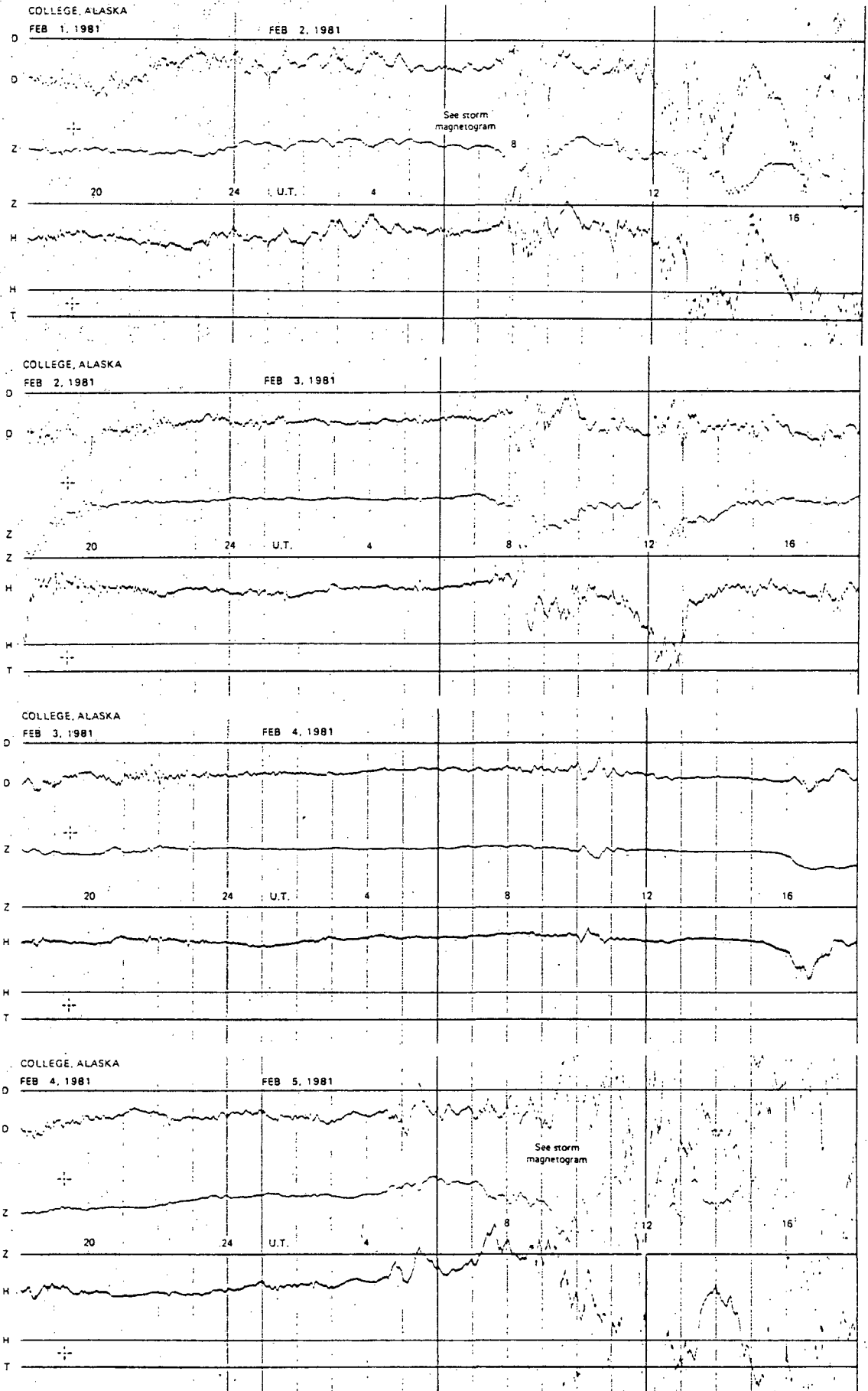
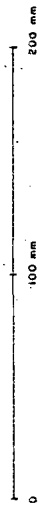
MONTHLY MEAN  
304

# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

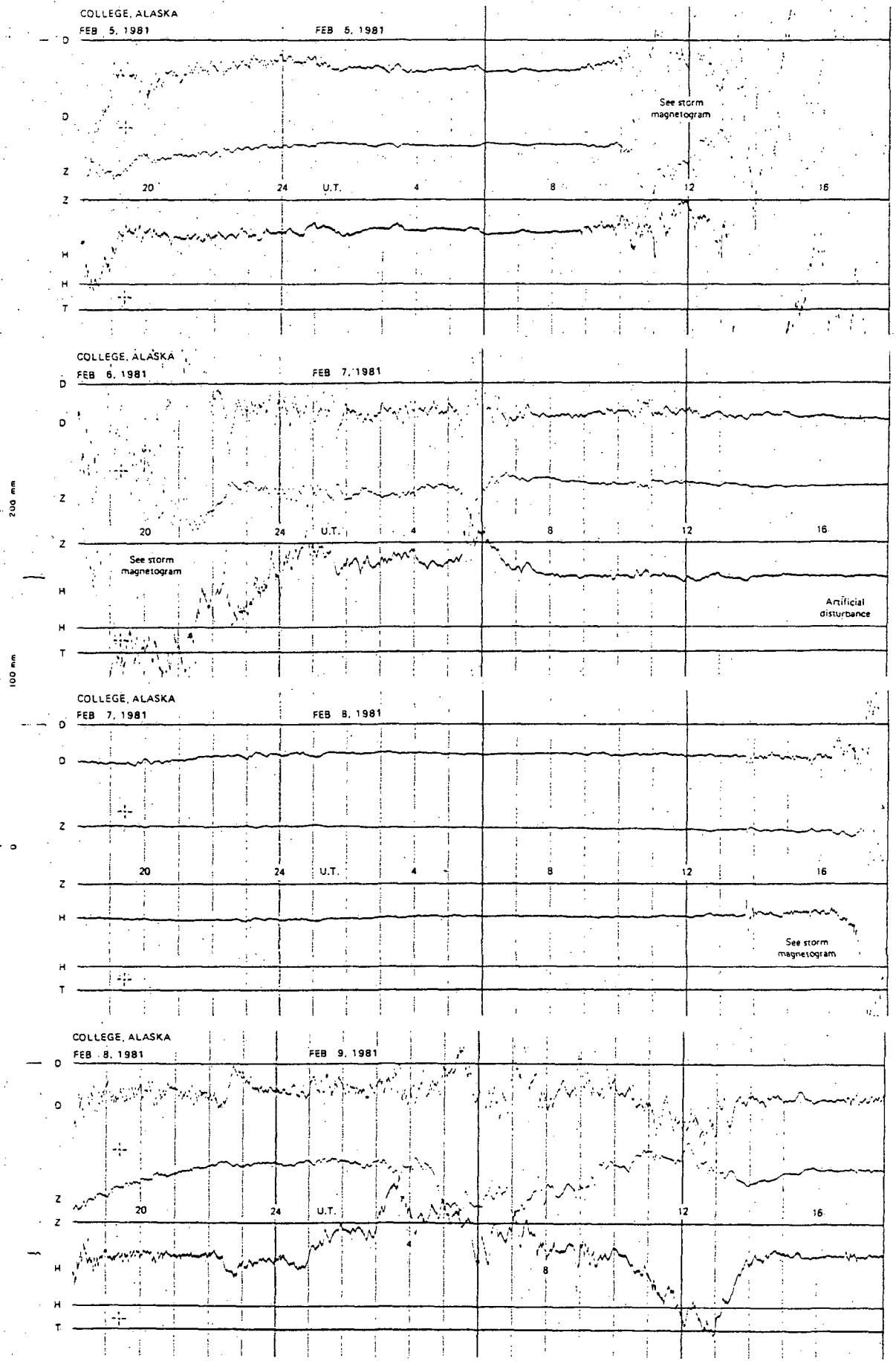


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

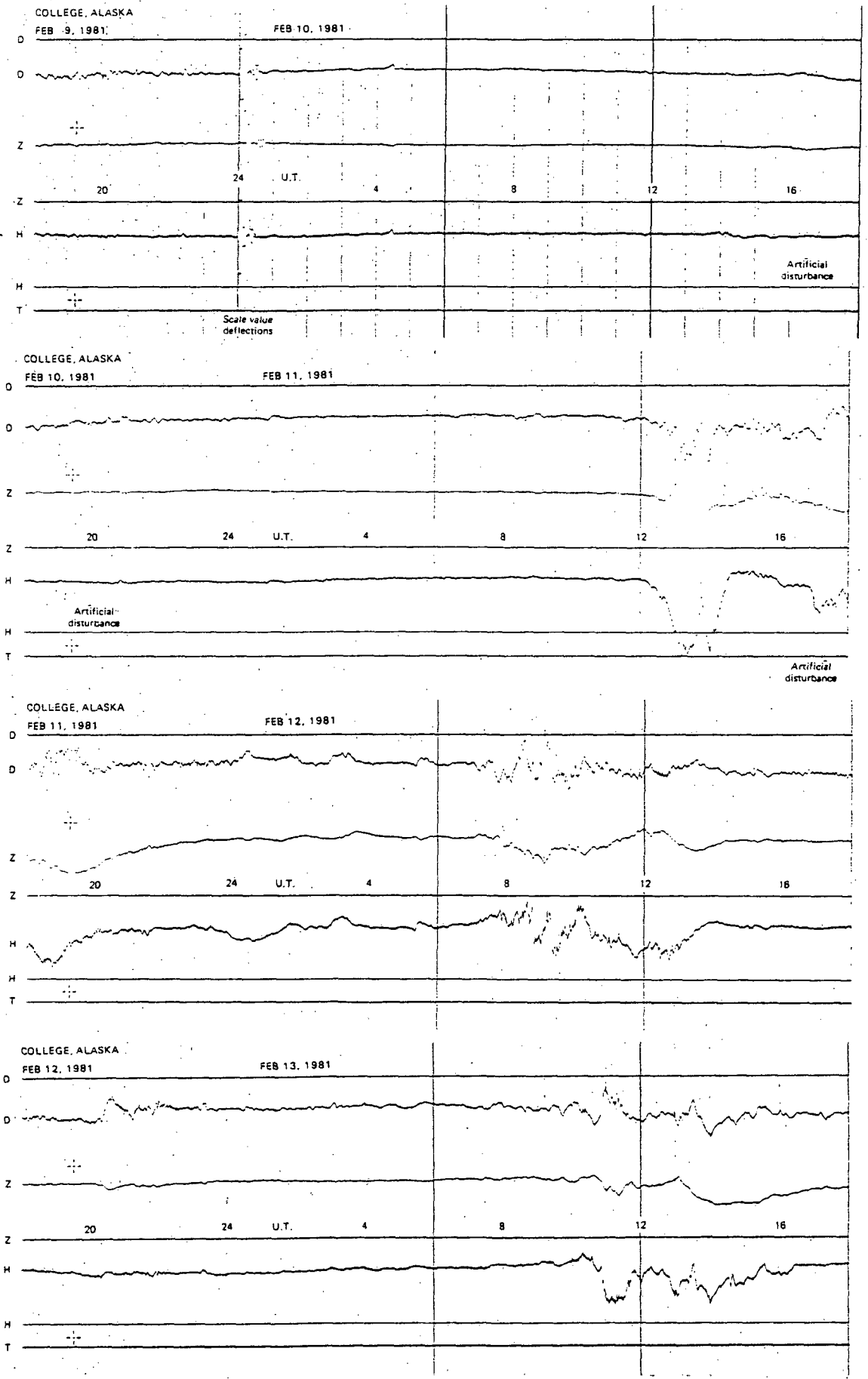
NORMAL MAGNETOGRAMS



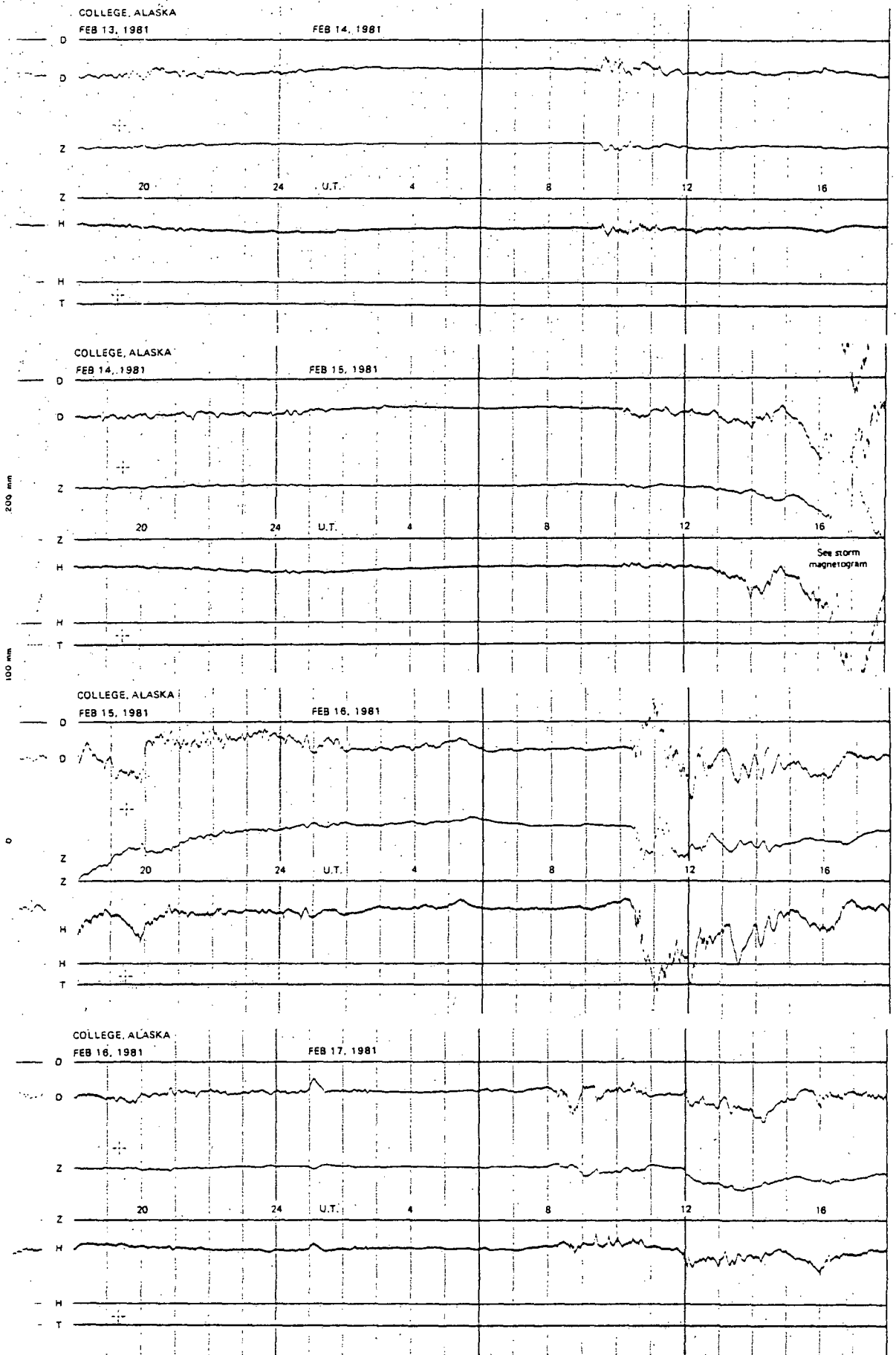
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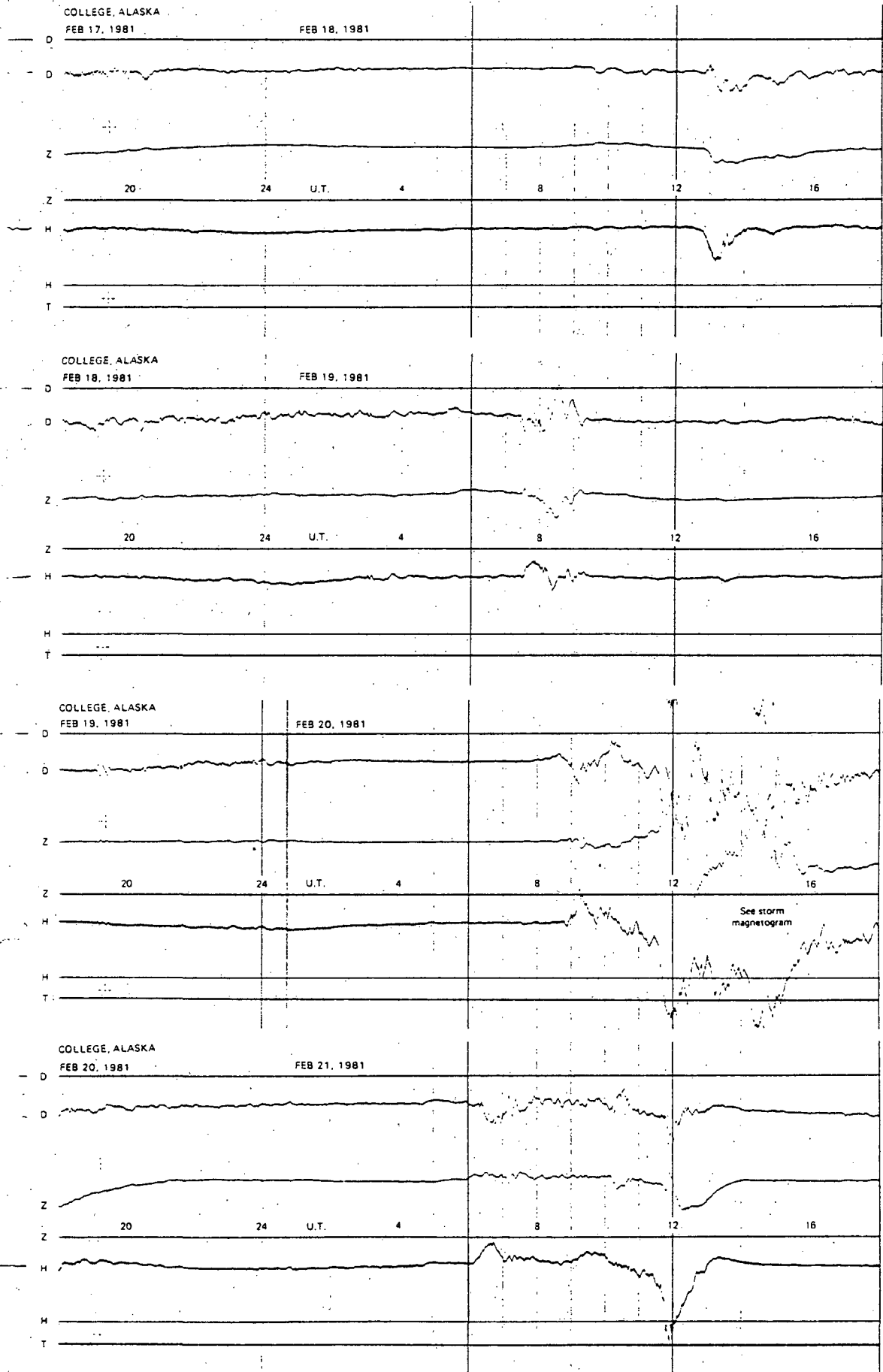
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

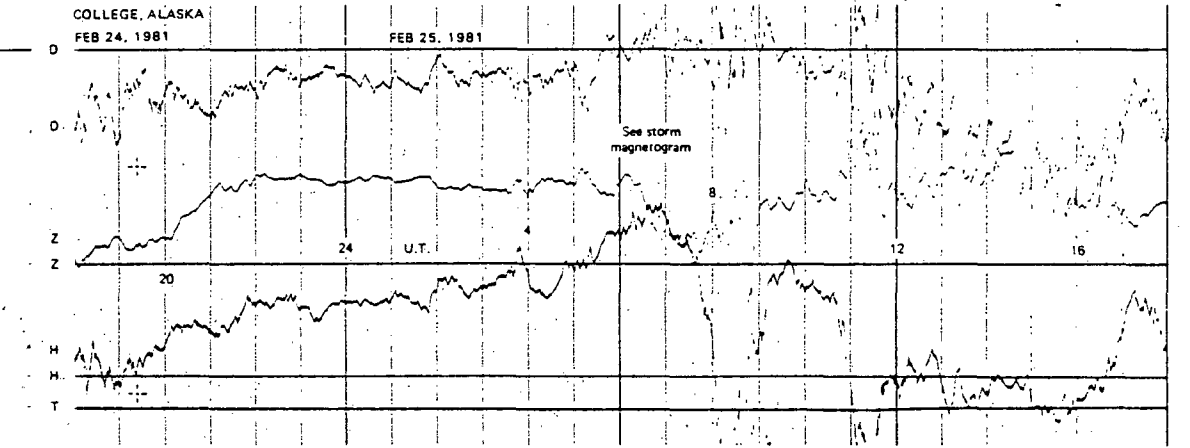
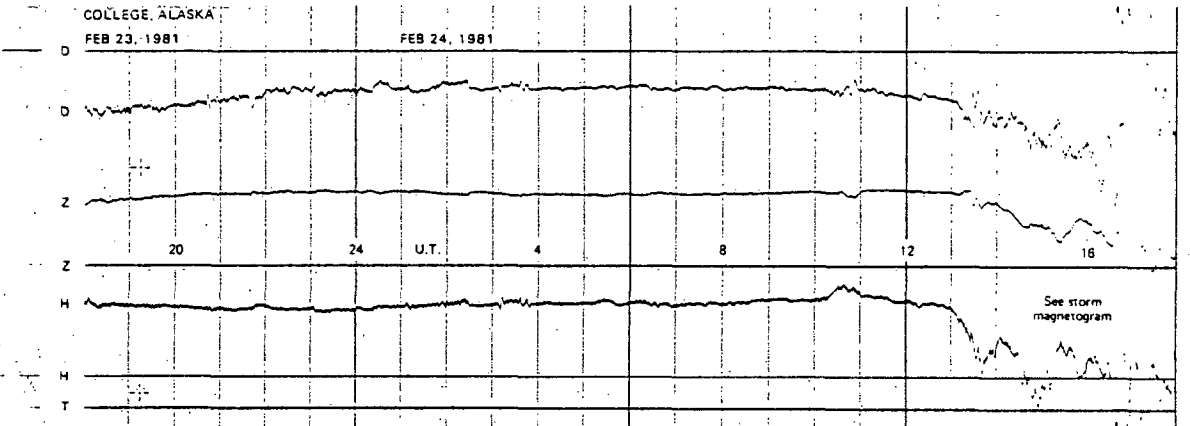
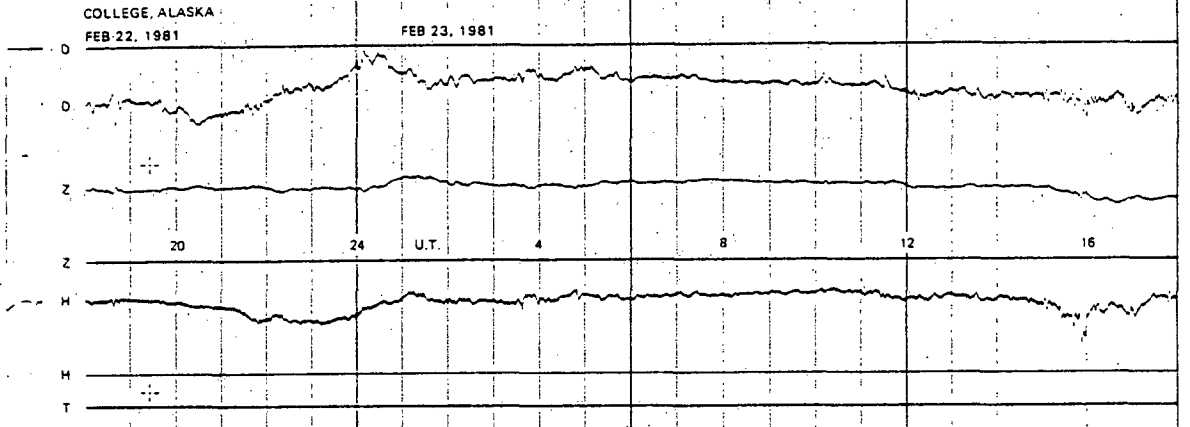
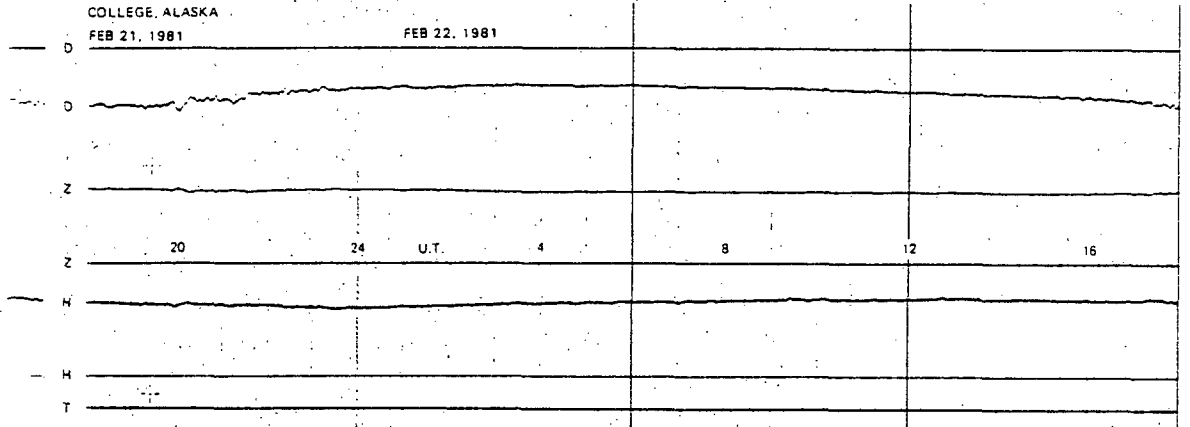


NORMAL MAGNETOGRAMS

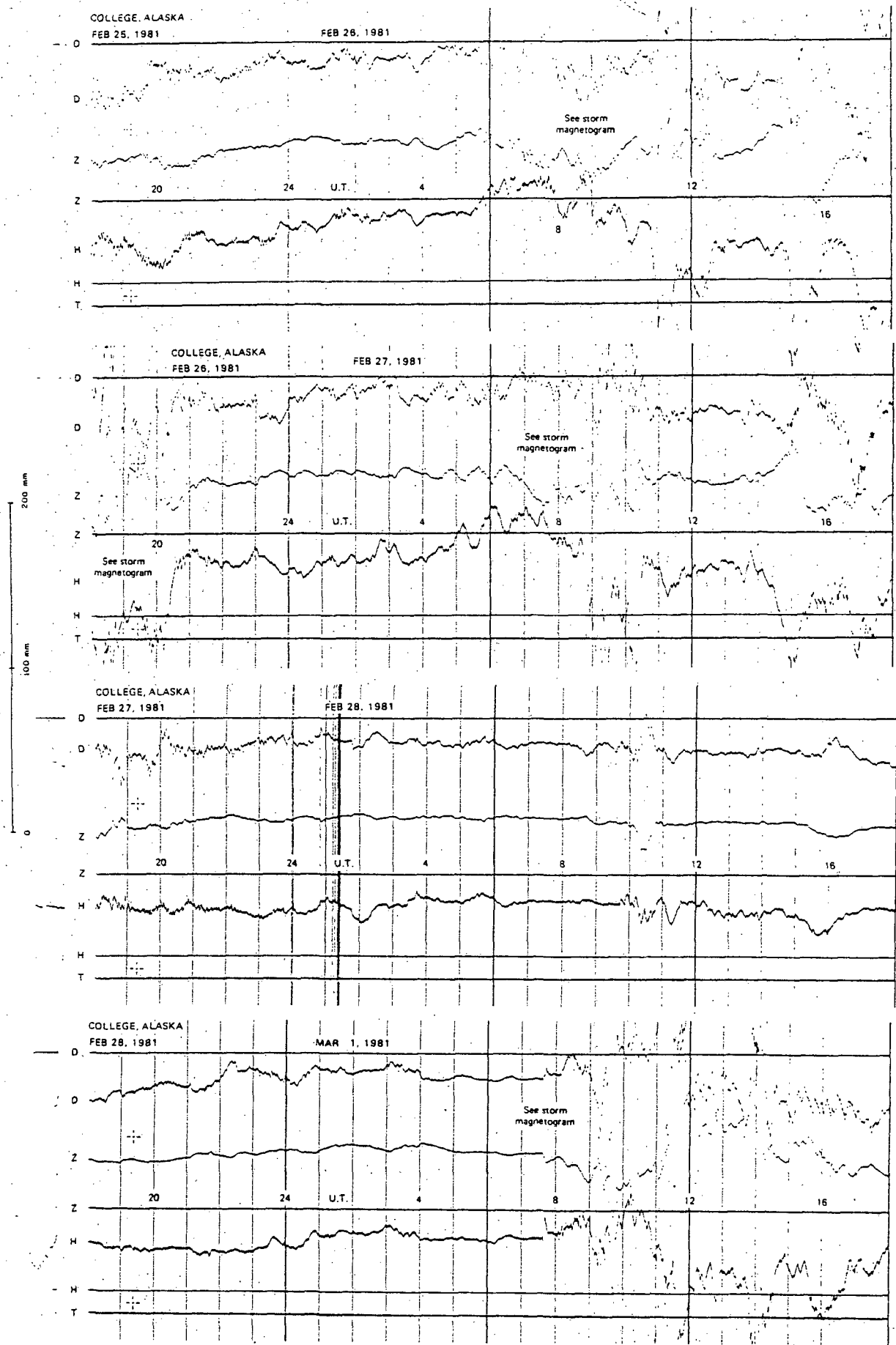




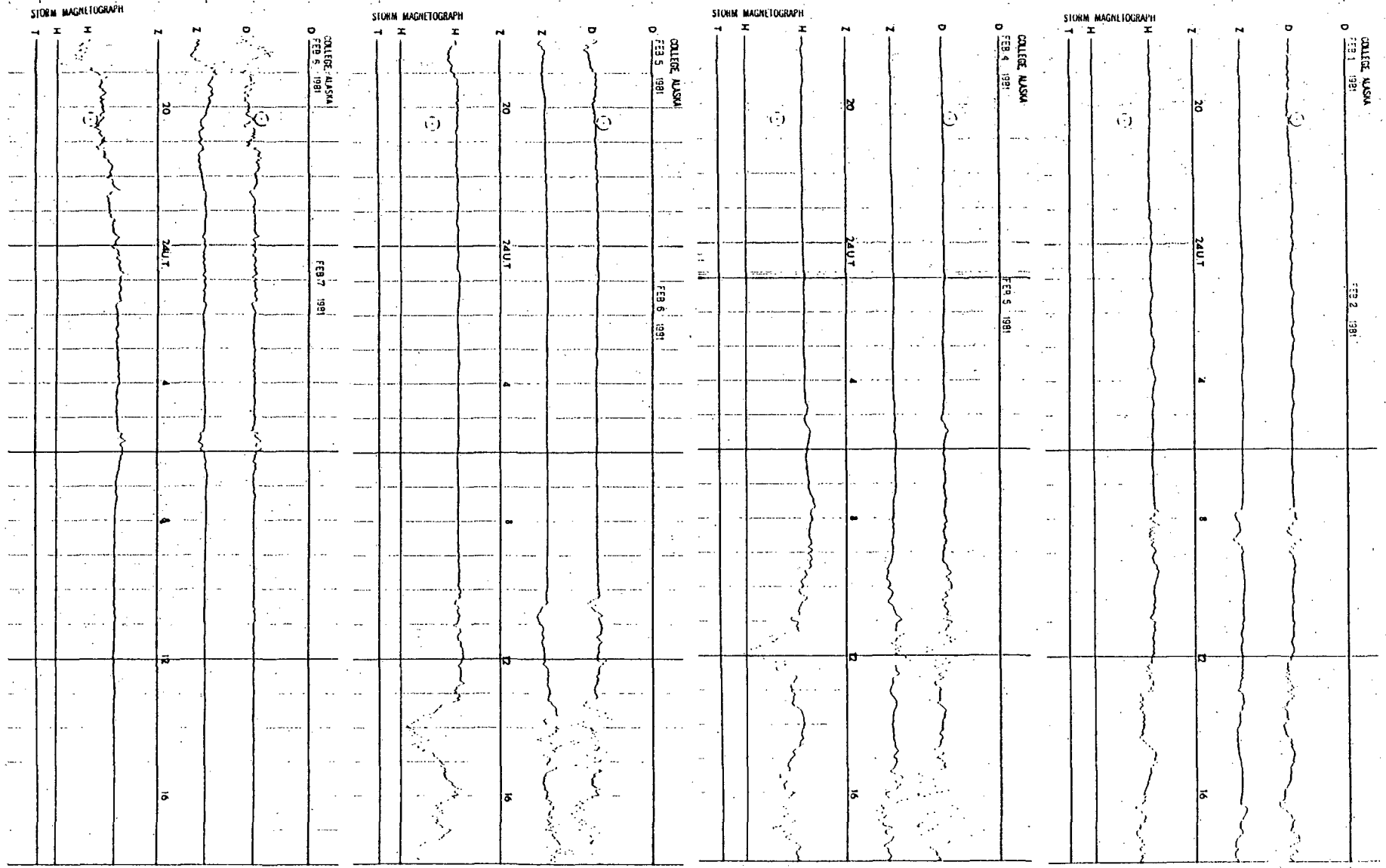
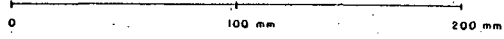
NORMAL MAGNETOGRAMS



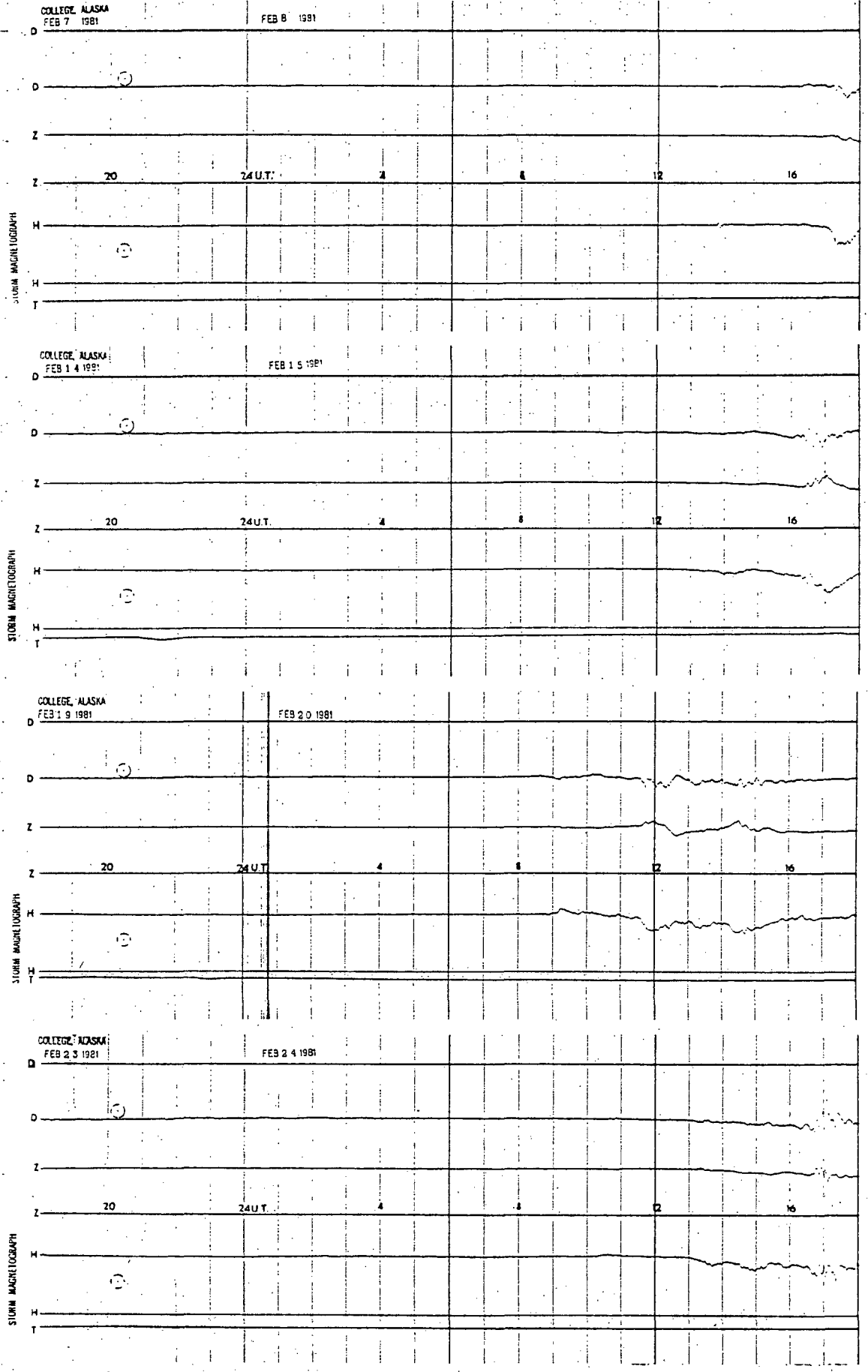
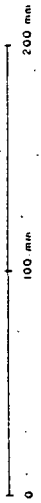
NORMAL MAGNETOGRAMS



# STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

