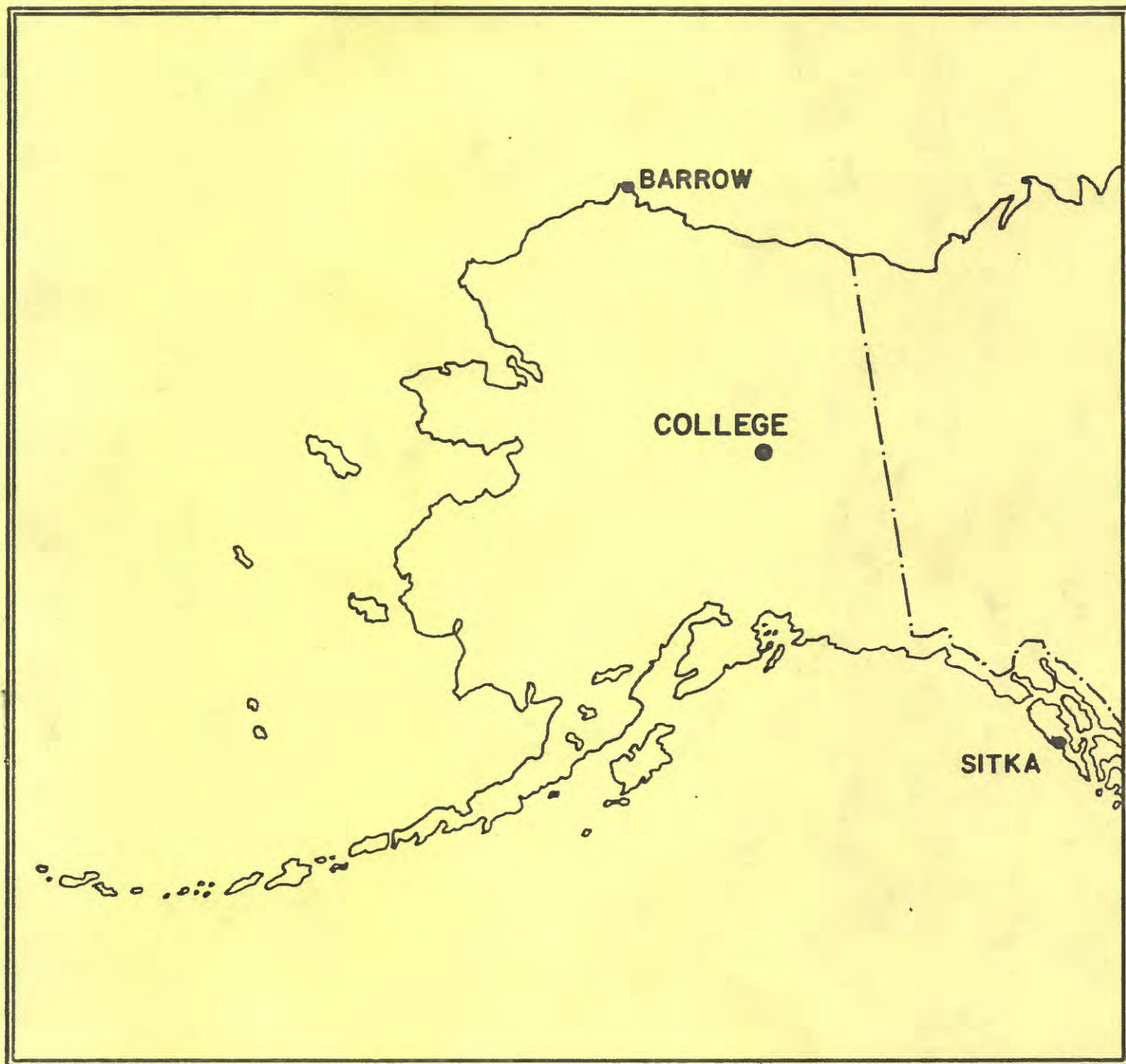


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

SEPTEMBER 1986

OPEN FILE REPORT 86-03001



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: H.K. REX AND L.Y. TORRENCE AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA. THE COLLEGE OBSERVATORY IS PART OF THE BRANCH OF GLOBAL SEISMOLOGY AND GEOMAGNETISM OF THE U.S. GEOLOGICAL SURVEY.

Explanation of Data and Reports

Magnetic Activity Report

Principal Magnetic Storms

Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings - Five Quietest Days

Sample Format for Normal and Storm Magnetograms

Normal Magnetograms

Storm Magnetograms (When Normal is too disturbed to read)

COLLEGE OBSERVATORY PRELIMINARY GEOMAGNETIC DATA

EXPLANATION OF DATA AND REPORTS

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
800 Yukon Drive
Fairbanks, Alaska 99701

Requests for copies of the magnetograms except for the current month should be addressed to:

World Data Center A
NOAA D63, 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 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..... $64^{\circ}51.6'N$
Geographic longitude..... $147^{\circ}50.2'W$
Geomagnetic latitude..... $+64.6^{\circ}$
Geomagnetic longitude..... $+256.9^{\circ}$
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 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	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
$0 \approx 11$	0
$11 \approx 50$	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 and 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_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.

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

College, Alaska

MONTH AND YEAR

September 1986

DATE	K-INDICES									AK	TIME SCALE ON MAGNETOGRAMS		
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM		20 mm/hr		
1	3	2	2	5	1	1	1	2	17	12	SUDDEN COMMENCEMENTS		
2	2	5	4	5	5	3	1	1	26	25	d	h	m
3	2	2	1	0	1	2	1	2	11	05			
4	3	2	1	0	2	1	1	2	12	06			
5	2	2	1	4	3	2	2	2	18	10			
6	3	1	1	4	3	1	0	1	14	09			
7	2	1	1	3	3	0	0	1	11	06			
8	1	0	4	4	1	0	1	1	12	08			
9	1	3	2	4	2	0	0	0	12	07			
10	1	1	1	1	0	0	0	0	04	02			
11	1	1	0	1	1	0	2	4	10	06			
12	4	7	6	7	4	5	3	3	39	62			
13	3	4	6	6	4	2	2	3	30	32			
14	4	2	2	3	2	2	1	1	17	10			
15	1	2	3	6	6	5	3	1	27	31			
16	1	1	0	1	1	1	2	2	09	04			
17	2	4	4	2	1	2	1	3	19	12			
18	3	4	4	4	3	3	4	3	28	21	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
19	3	3	4	4	3	6	2	1	26	24			
20	3	2	5	3	3	2	2	3	23	16			
21	4	3	1	2	2	1	1	1	15	09			
22	0	1	1	2	1	0	2	2	09	04			
23	2	4	5	5	5	6	4	3	34	38			
24	3	4	6	5	6	4	3	3	34	38			
25	3	3	3	6	6	5	3	3	32	35			
26	4	5	6	7	6	4	2	2	36	52			
27	3	2	4	6	5	3	3	3	29	28			
28	3	2	4	4	2	1	1	2	19	12			
29	3	1	3	3	2	2	2	3	19	10			
30	2	1	1	4	3	0	0	0	11	07			
31													

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9

D

H

Z

675.7

322.2

3.71

7.81

2510

2520

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA

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

Data from Individual Observatories:

September 1986

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(Y)	Z(Y)	day (3 hr - period)	K	D(')	H(Y)	Z(Y)	day hr
CO	64.06 N		NO PRINCIPAL MAGNETIC			STORMS	SCALED	THIS MONTH.					

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 9-1-86	2400 U.T., 9-30-86	1.0/mm	3.7 ⁸ /mm	27° 16.4 E
H	"	"	7.8 ⁸ /mm		12690
Z	"	"	7.7 ⁸ /mm		55170

STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 9-1-86	2400 U.T., 9-30-86	7.9/mm	29.5 ⁸ /mm	23° 43.7 E
H	"	"	43.8 ⁸ /mm		10727
Z	"	"	48.7 ⁸ /mm		54109

RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 29.2 E	12868	55328

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: SEP 3, 4, 10, 16, 22,

U.S. Dept. of Interior
Geological Survey

Observatory
College

Month
September

Year
1966

Exp. (C) 1-46

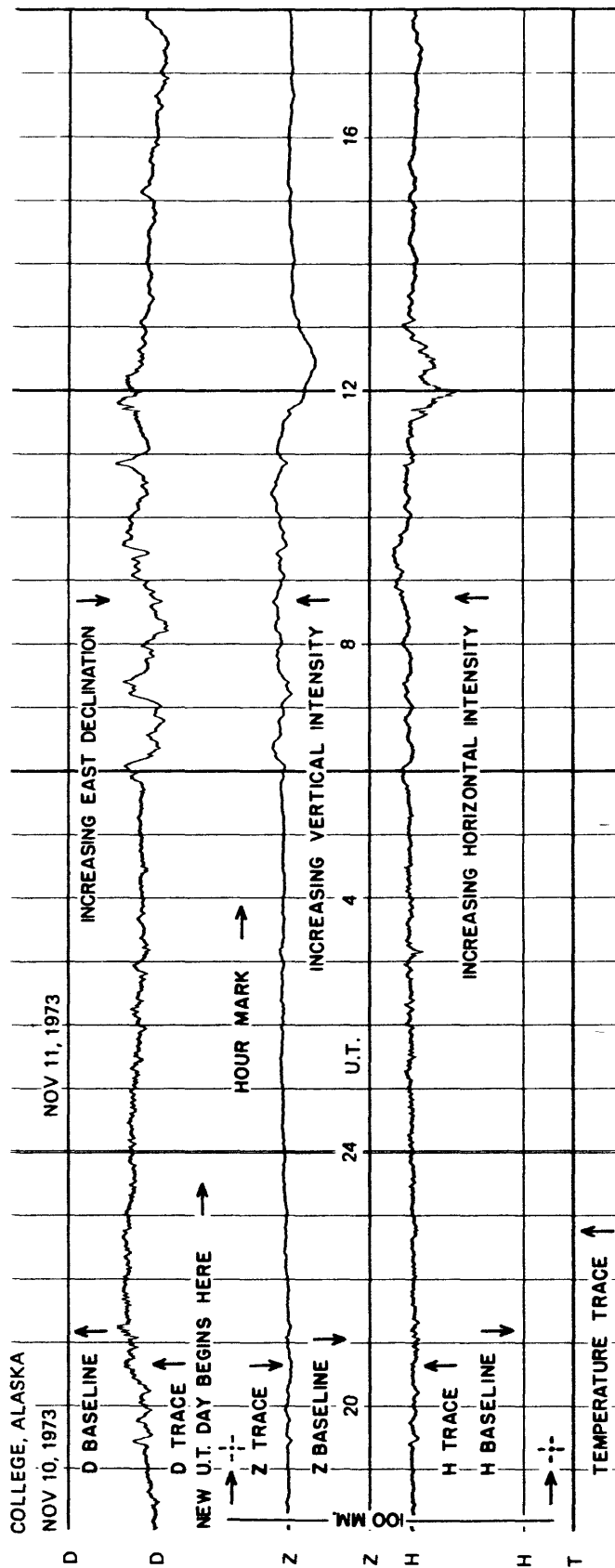
MAGNETOGRAM HOURLY READINGS - FIVE QUITE TEST DAYS
(UNIVERSAL TIME)

Values are in tenths of an and are Averages for Successive Periods of One Hour beginning at Midnight. No linkage corrections have been applied. Negative values in Red with Minus.

COMPONENT		I																COMPONENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
DAY	HR	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22	3	4	10	16	22

Scaled 1/17 | Checked JB7

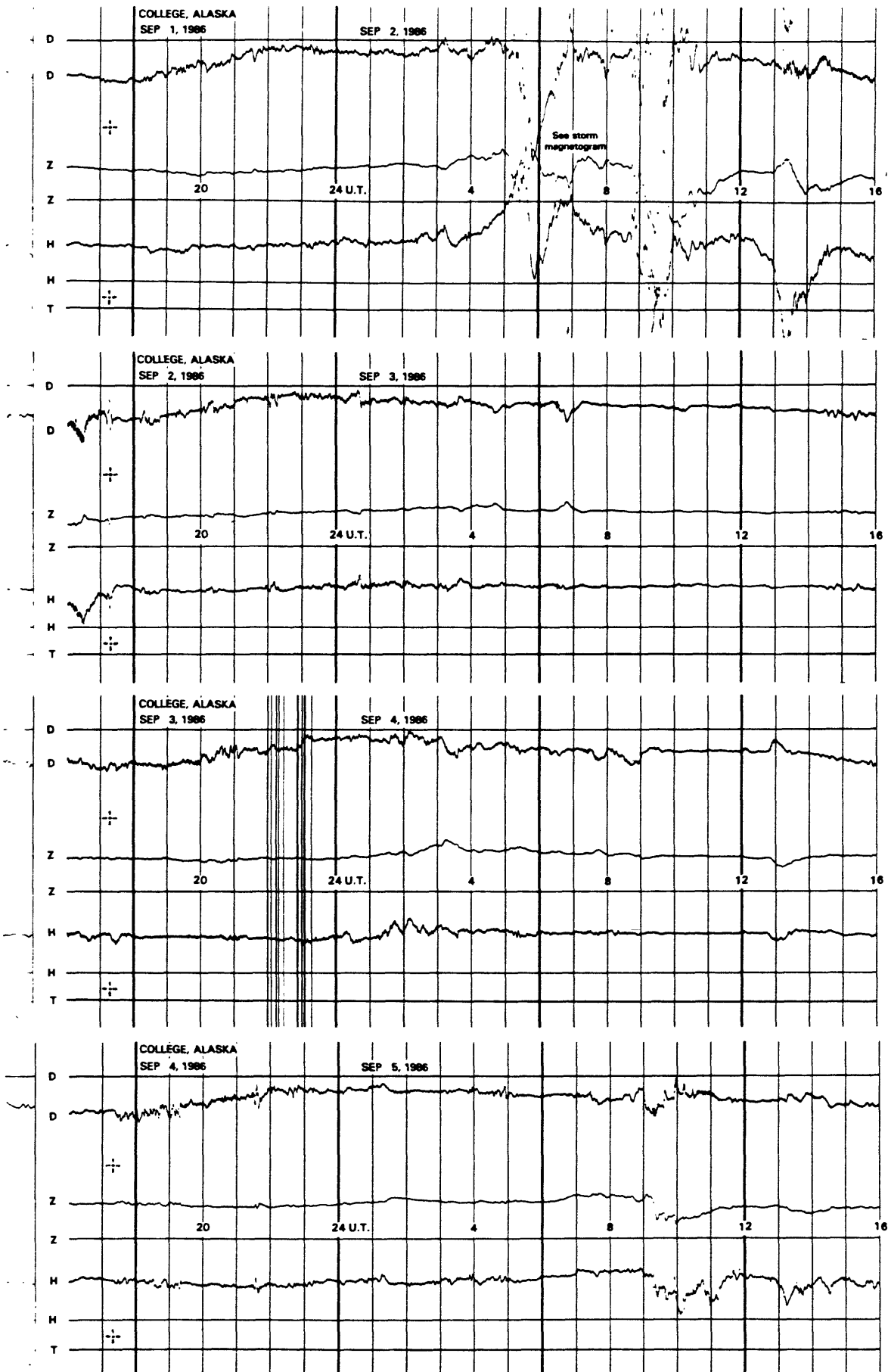
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

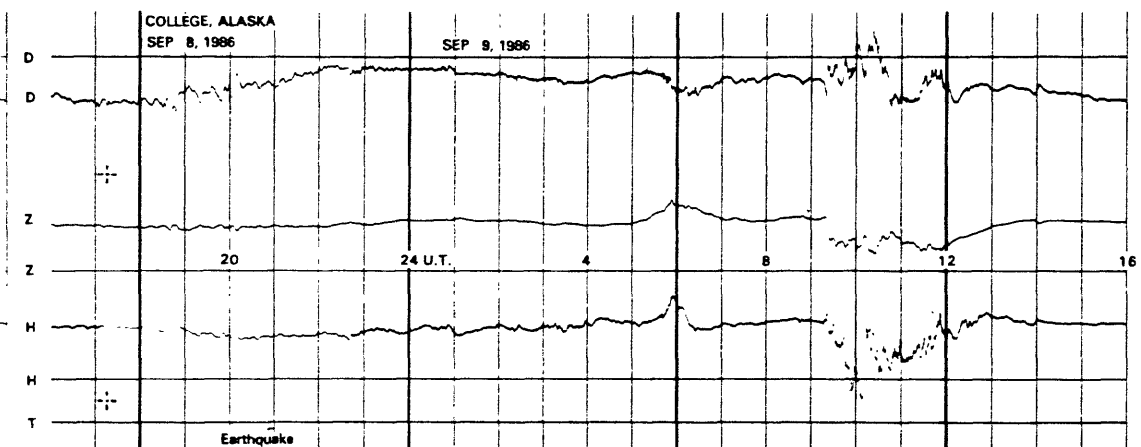
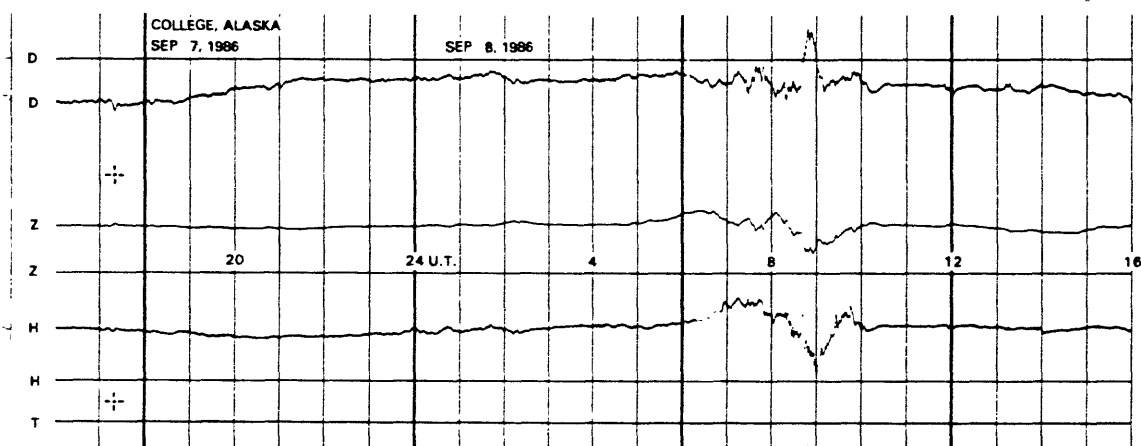
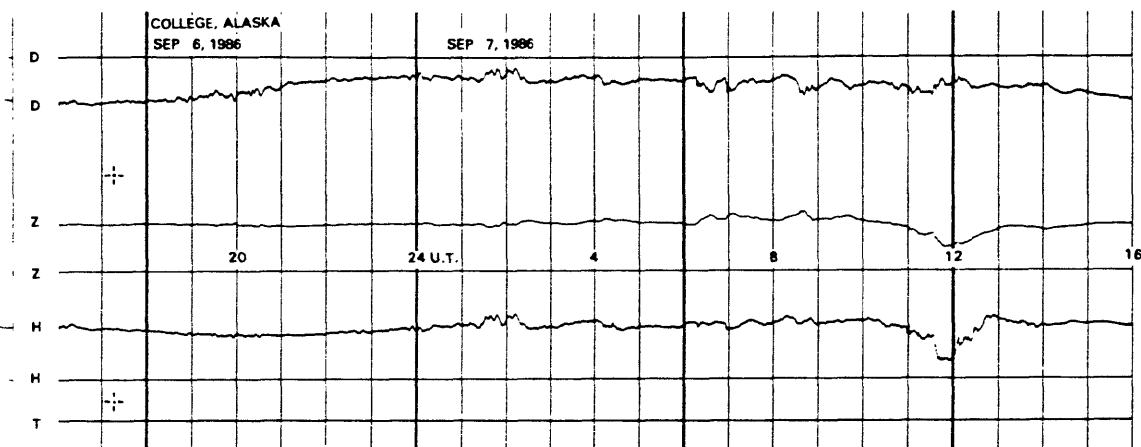
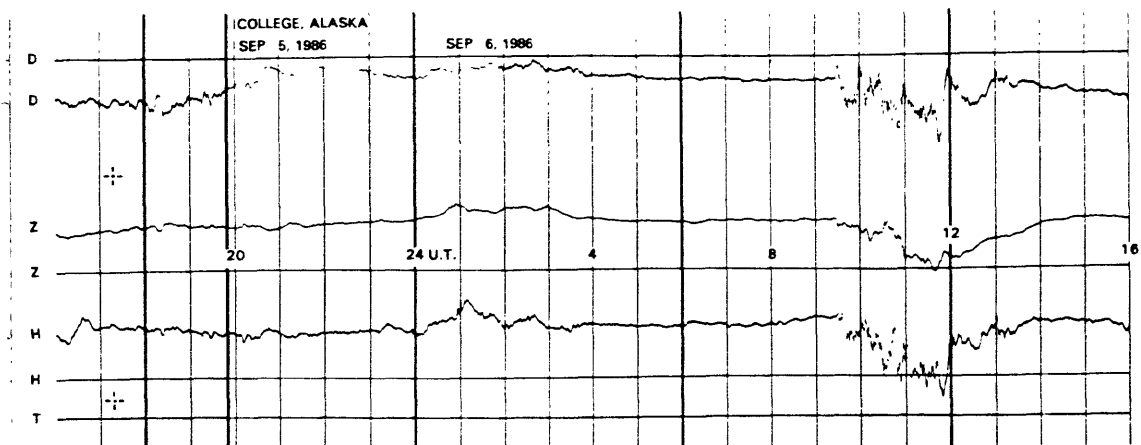
NORMAL MAGNETOGRAMS

200 mm
100 mm
0



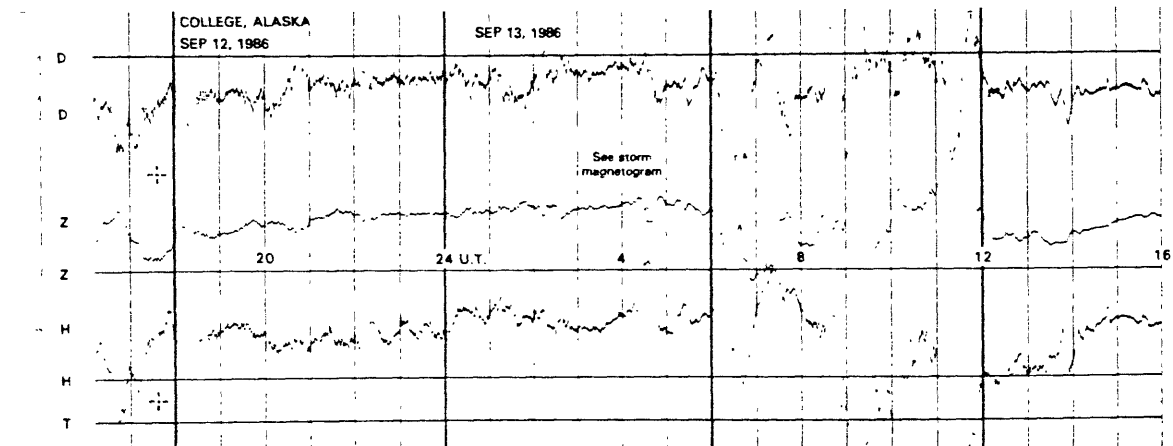
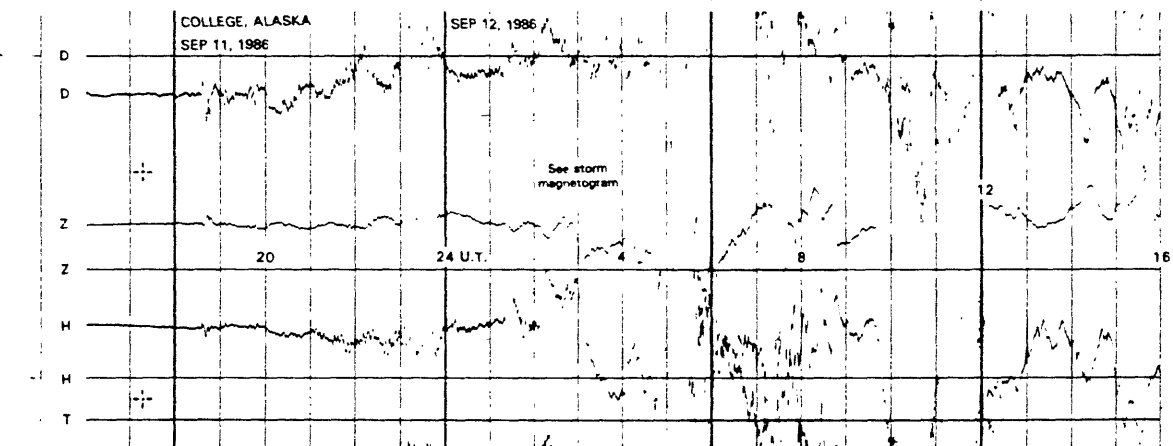
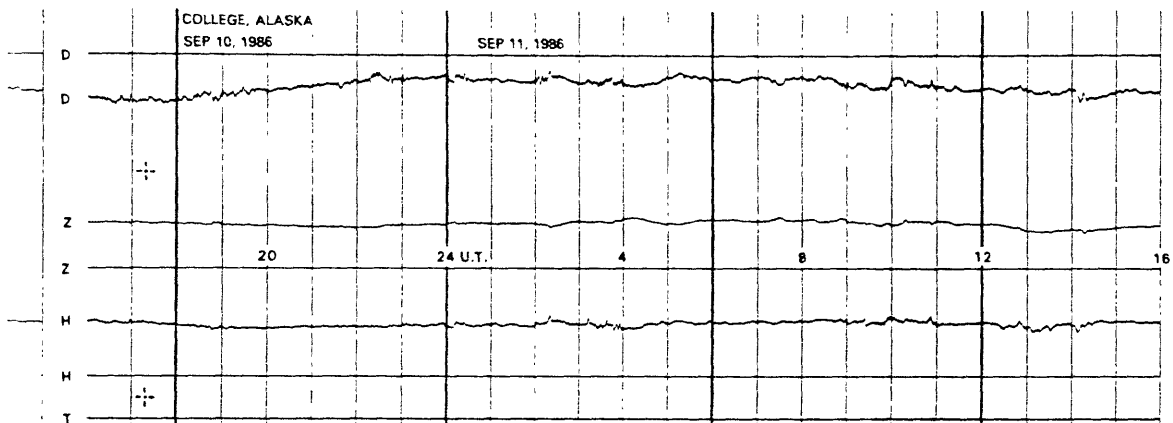
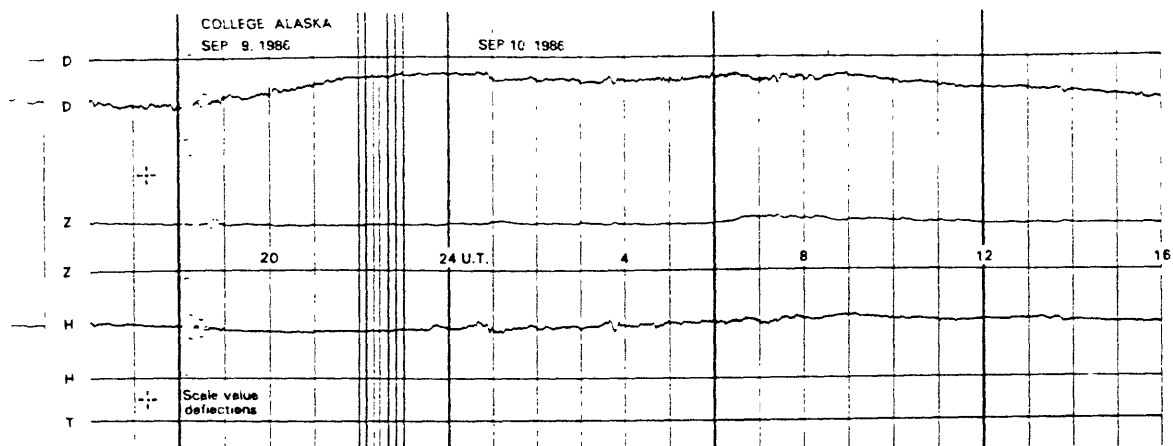
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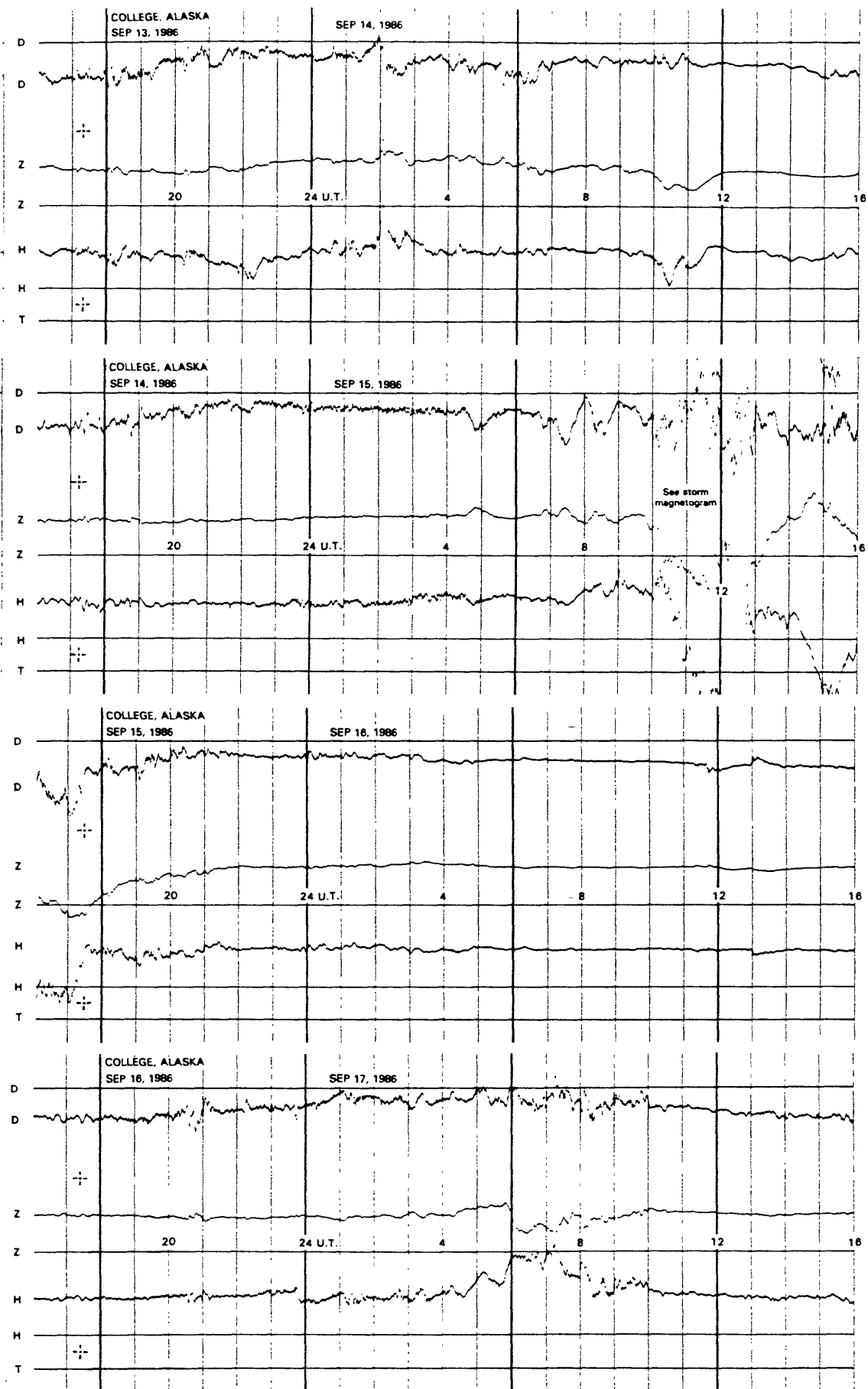
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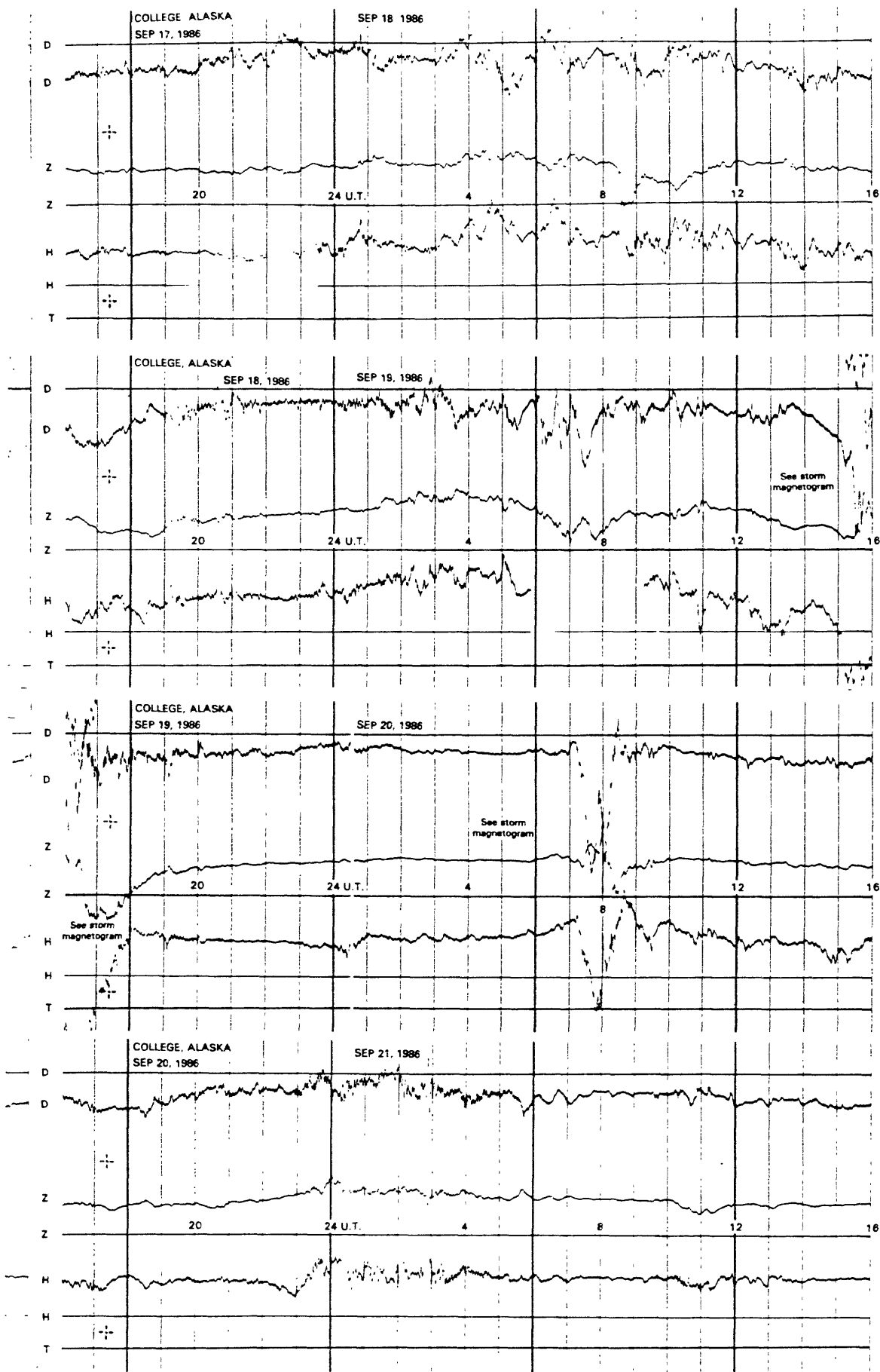
NORMAL MAGNETOGRAMS

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100 mm
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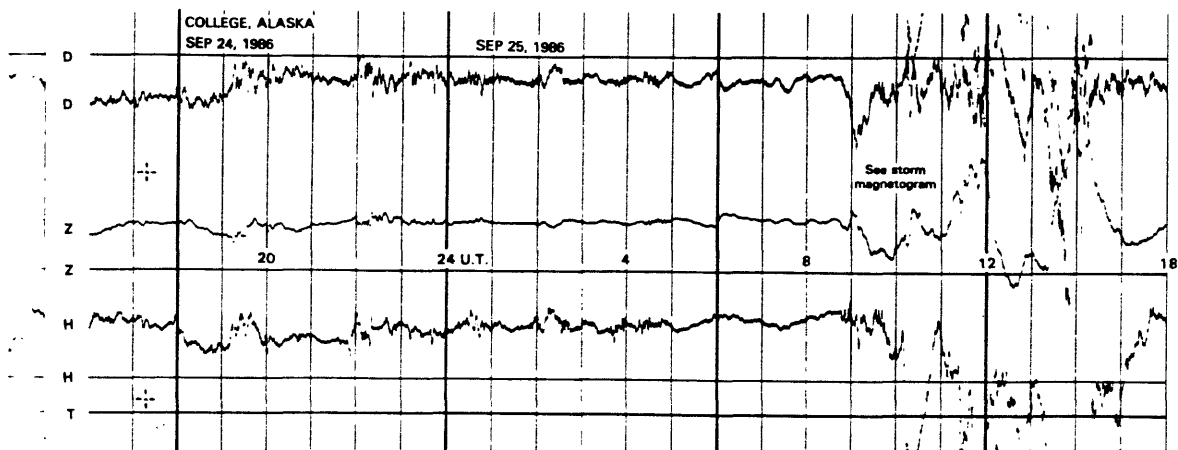
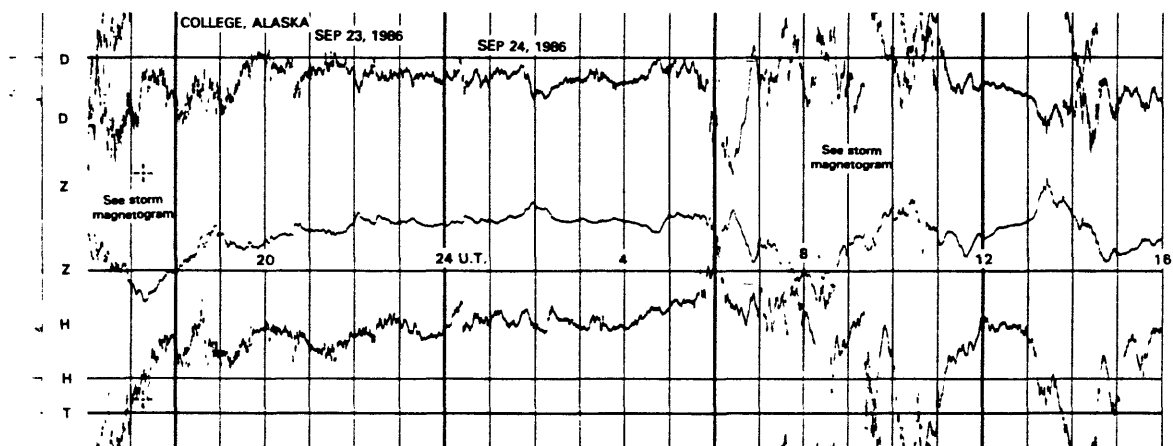
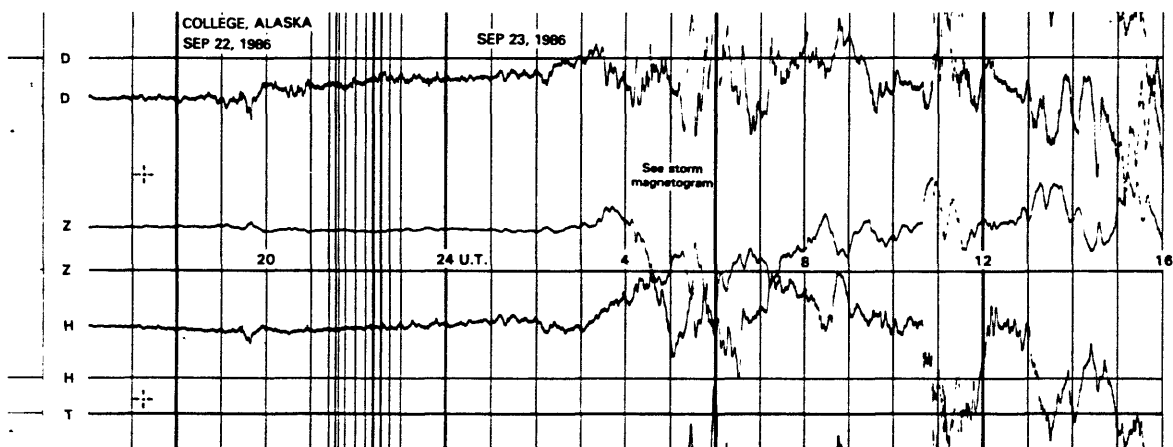
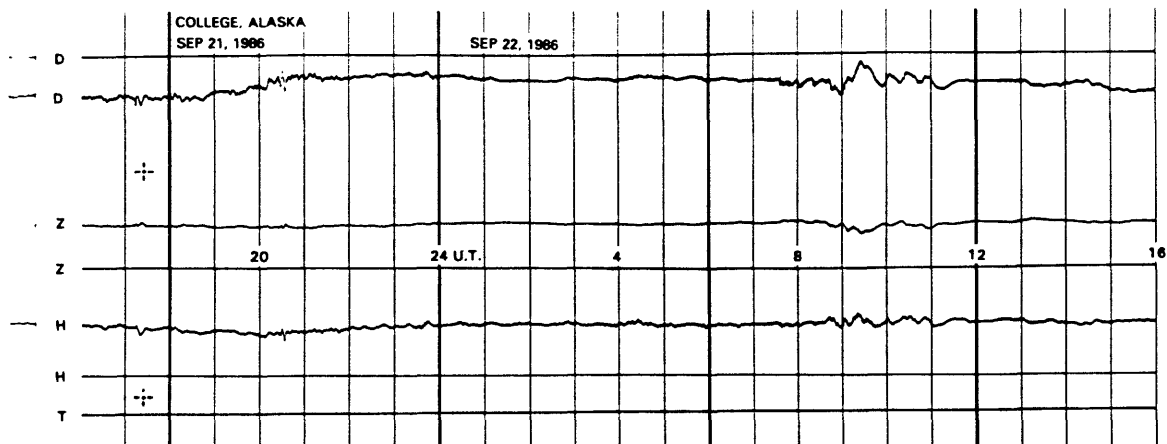
NORMAL MAGNETOGRAMS

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100 mm
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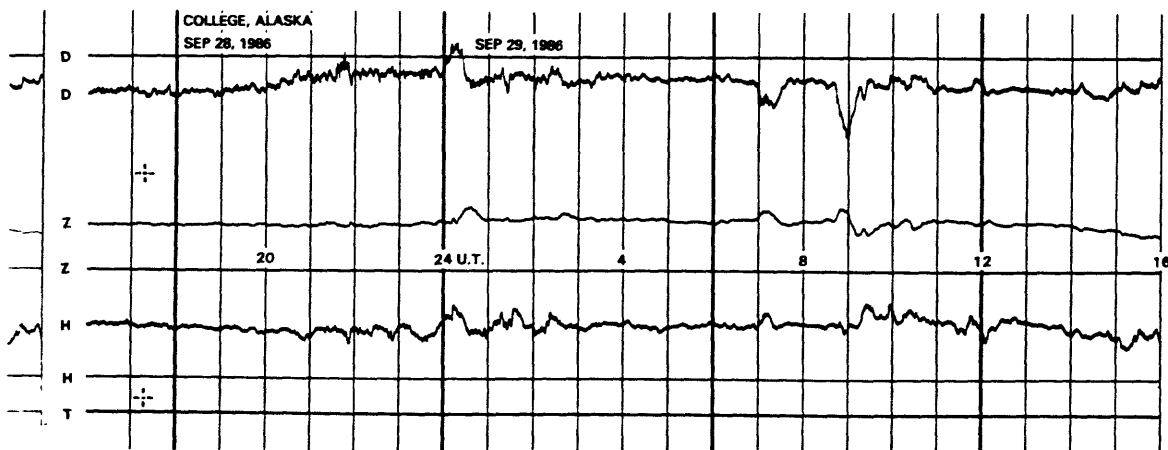
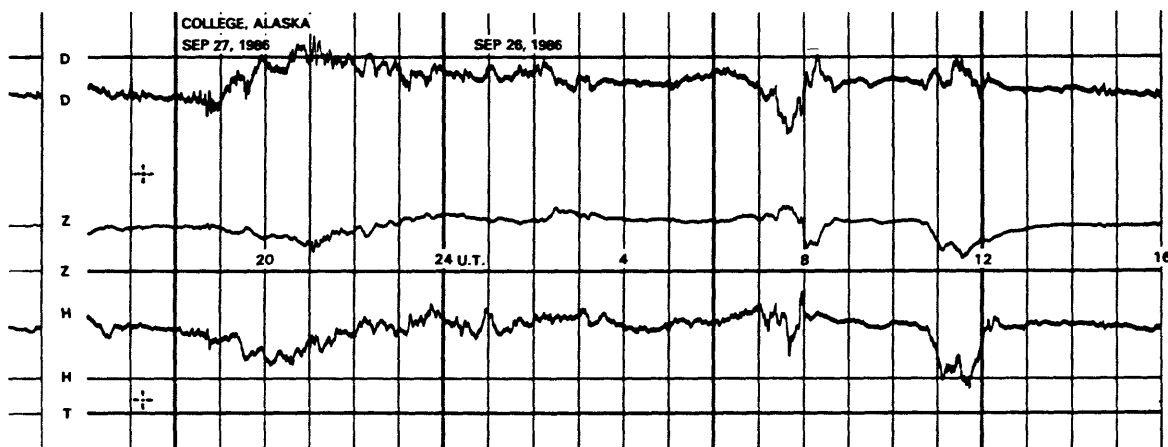
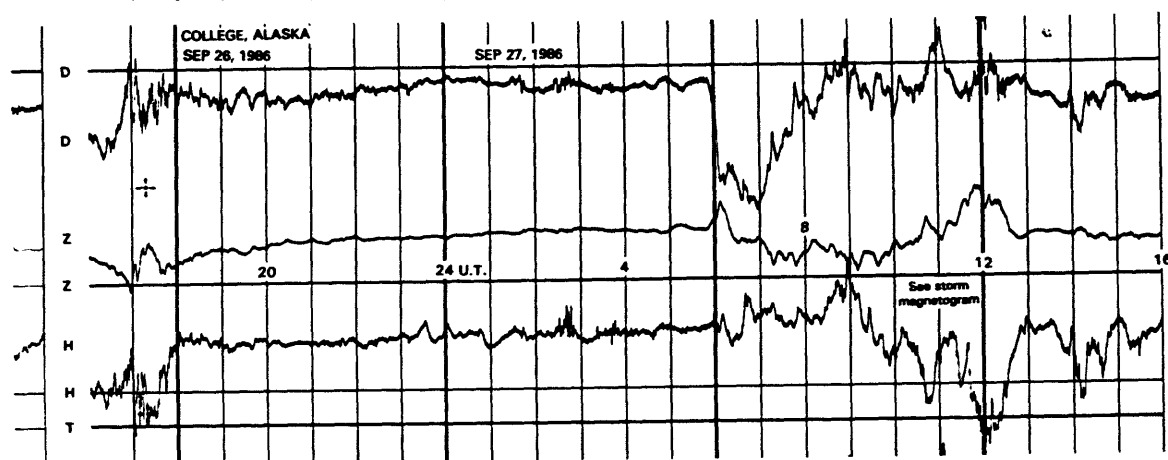
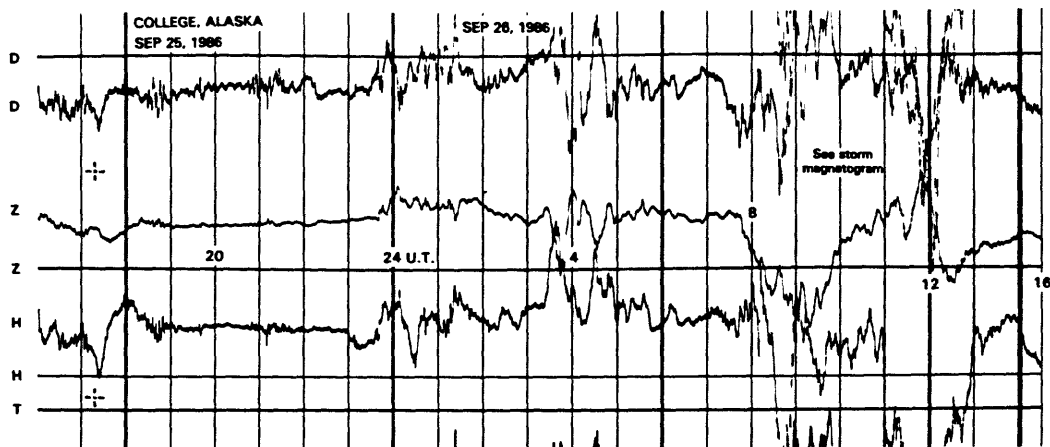
NORMAL MAGNETOGRAMS

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100 mm
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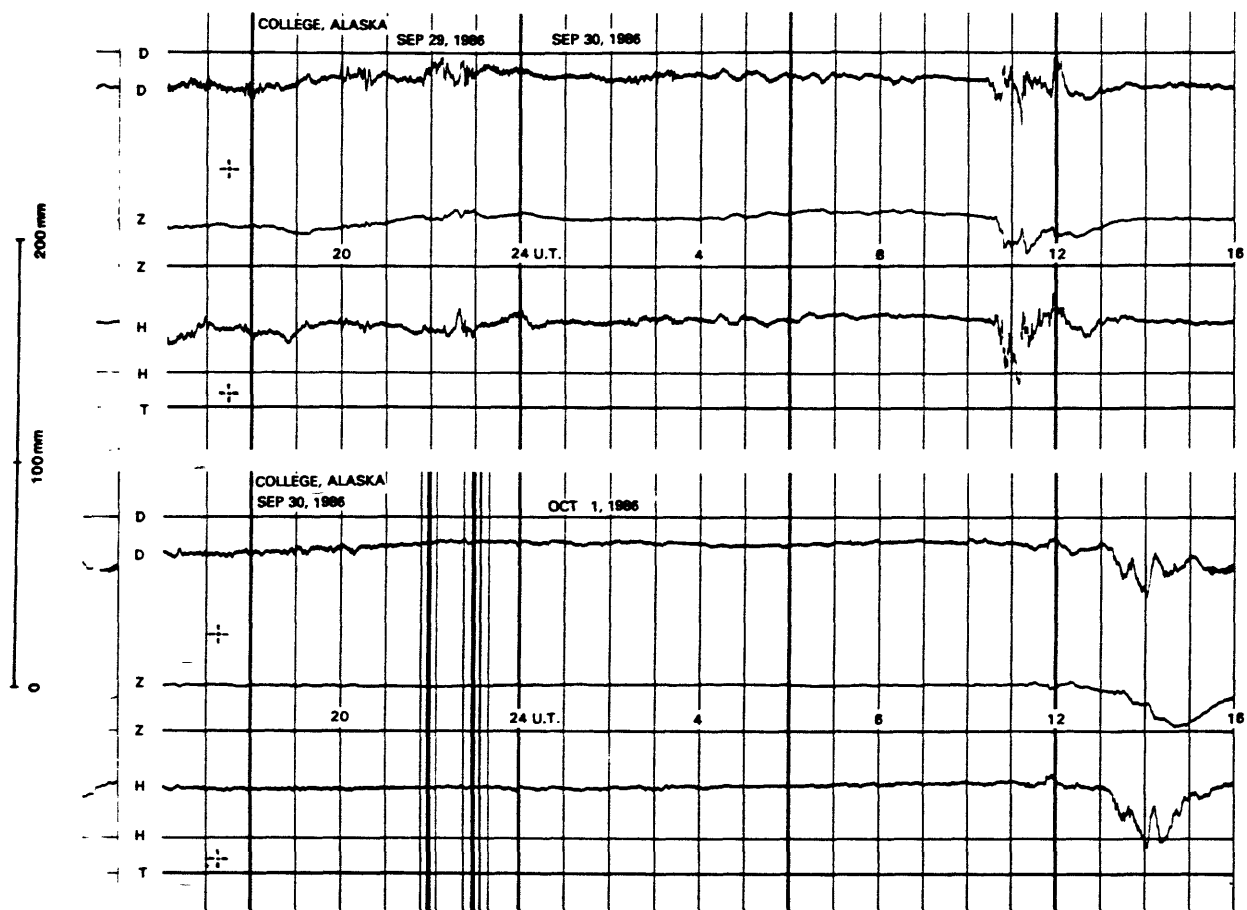


NORMAL MAGNETOGRAMS

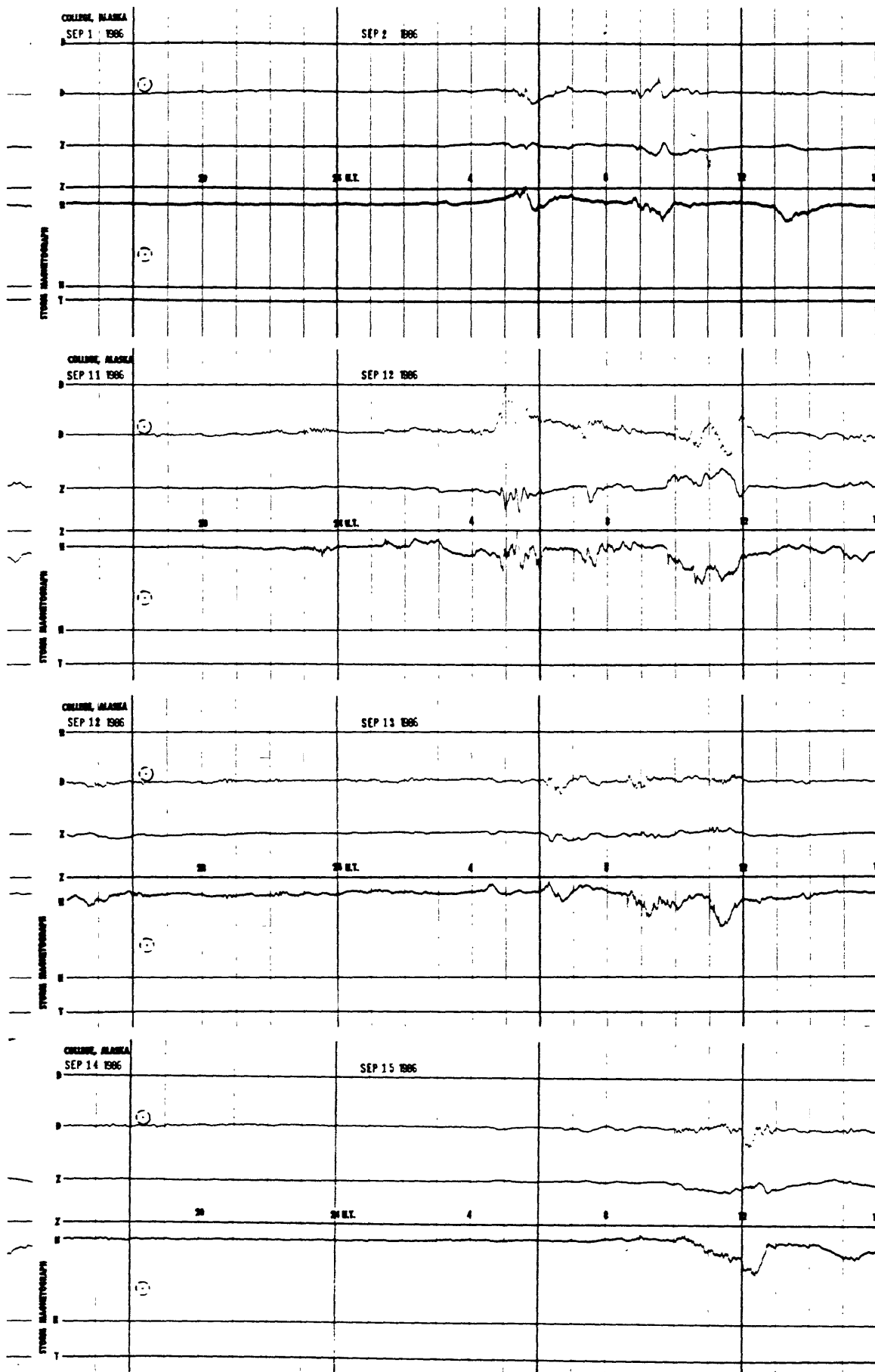
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100 mm
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NORMAL MAGNETOGRAMS

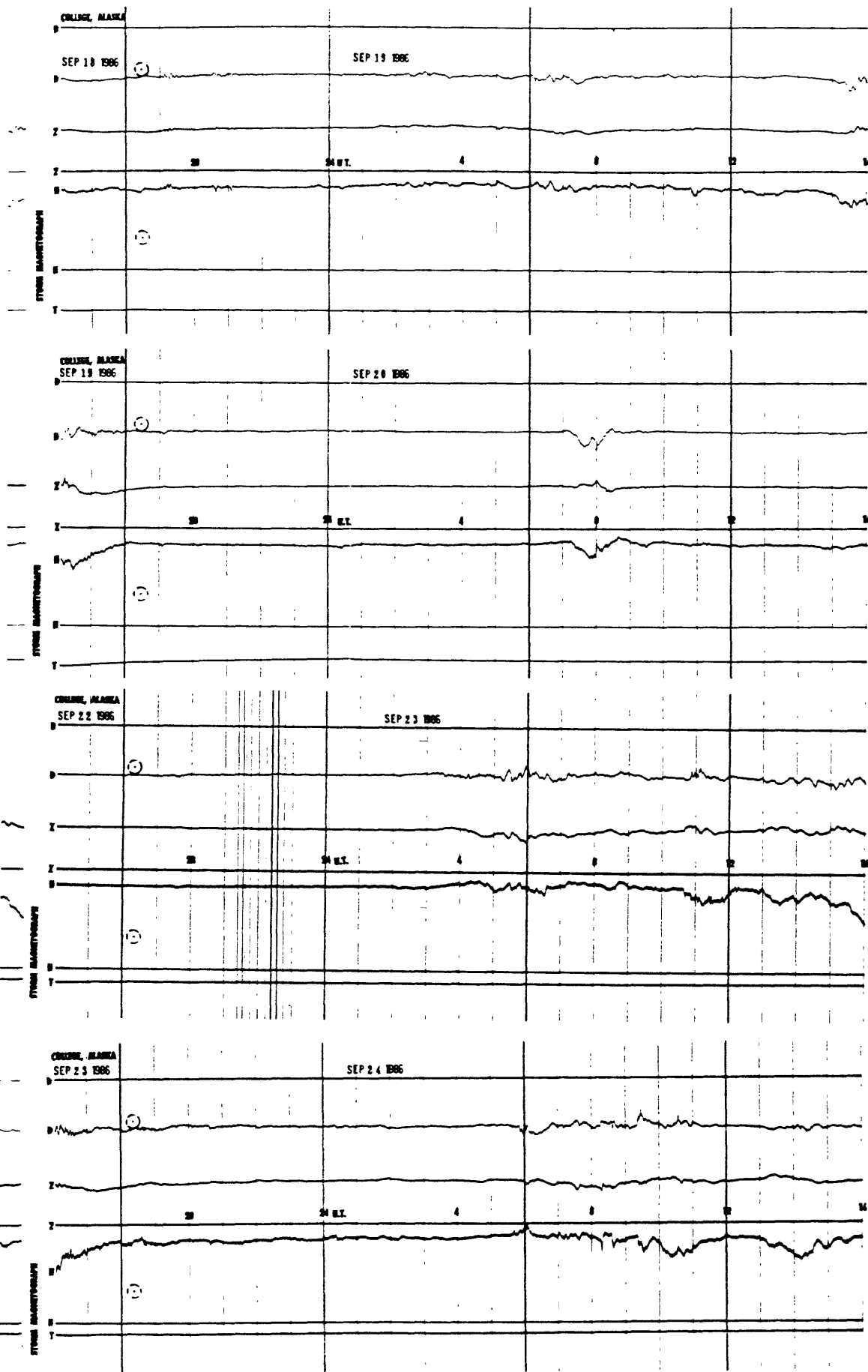


STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

0 100mm 200mm



STORM MAGNETOGRAMS

