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PRELIMINARY GEOMAGNETIC DATA

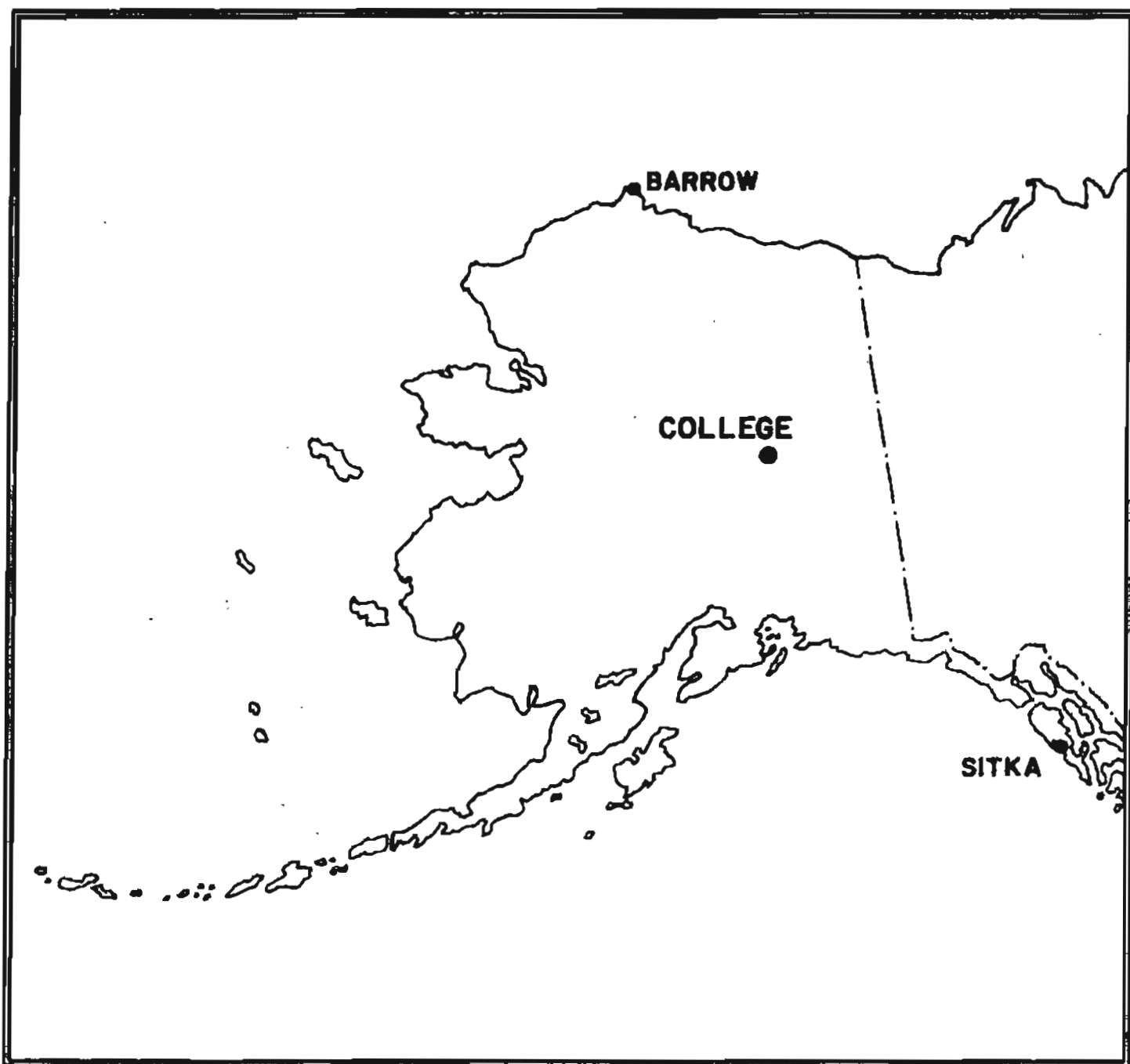
State Geological Survey
Fairbanks

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

MAY 1991

OPEN FILE REPORT 91-0300E



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.

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

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.....+64.8°
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 E) 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 10 γ 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 (10 γ)

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.

College, Alaska

MAGNETIC ACTIVITY
(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

May, 1991

DATE	K-INDICES									A _k	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	4	3	4	5	6	5	3	3	33	34	SUDDEN COMMENCEMENTS		
2	5	4	6	6	6	6	5	5	43	61	d	h	m
3	3	5	5	5	5	3	3	3	32	32	13	08	57
4	3	2	3	2	3	3	3	2	21	12	16	20	41
5	2	2	2	3	2	2	1	2	16	8	31	09	01
6	2	2	2	0	2	2	1	1	12	5			
7	1	3	2	3	1	1	2	1	14	7			
8	2	3	4	3	3	3	3	2	23	15			
9	2	1	2	2	1	3	4	2	17	10			
10	1	2	3	4	4	2	2	2	20	13			
11	1	1	1	2	0	1	0	0	6	2			
12	0	2	1	1	2	1	1	1	9	4			
13	2	3	3	6	5	5	6	2	32	38			
14	2	4	4	6	6	7	4	2	35	49			
15	2	3	3	3	2	1	1	1	16	9			
16	2	1	1	1	2	2	5	3	17	12			
17	5	6	7	5	4	3	2	2	34	47			
18	1	1	1	1	1	1	1	1	8	3			
19	1	1	0	0	0	1	2	2	7	3			
20	2	2	1	0	1	1	1	1	9	4			
21	1	0	0	3	2	3	3	2	14	8			
22	2	4	4	4	3	3	3	3	26	19			
23	4	3	3	3	6	6	3	3	31	33			
24	4	4	5	5	5	4	4	3	34	33			
25	5	6	6	6	5	5	4	3	40	53	BEGIN	END	
26	3	4	4	5	5	6	3	3	33	34	d	h	m
27	5	3	4	6	6	5	3	3	35	41			
28	5	5	4	4	5	5	5	4	37	40			
29	5	3	6	5	5	4	3	3	34	37			
30	3	3	3	6	5	5	2	2	29	29			
31	4	4	5	7	6	6	4	3	39	56			

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

K SCALE USED: LOWER LIMIT FOR K = 9..... CURRENT SCALE VALUE..... LOWER LIMIT FOR K = 9.....	D	H	Z	
	675.7	322.2		(mm)
	3.67	7.73		(γ/mm)
	2480	2490		(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED

John B. Townshend, Chief

OBSERVER IN CHARGE

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA

MAY 19 91

WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICES, NOAA
BOULDER, COLORADO 80508 U.S.A.

Data from Individual Observatories:

Obs. 2 letter 1-4A 1-4B	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	64.6 N	2	02XX	.				2	3,4,5,6	6	202	1320	830	2	23
		13	0857	SC	-12	-80	-70	13	4,7	6	117	930	820	13	20
		14	04XX	.				14	6	7	348	1390	950	14	19
		16	2041	SC	-21	+145	-25	17	3	7	139	1250	740	17	15
		25	00XX	.				25	2,3,4	6	193	1280	820	25	22
		31	0901	SC	+60	-730	+180	31	4	7	202	1620	770	31	22

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 5-1-91	2400 U.T., 5-31-91	1.0' /mm	3.7 γ/mm	26° 34.8' E
H	0001 U.T., 5-1-91	2400 U.T., 5-19-91	7.7 γ/mm		12638 γ
	0001 U.T., 5-20-91	2400 U.T., 5-31-91			12640 γ
Z	0001 U.T., 5-1-91	2400 U.T., 5-31-91	7.8 γ/mm		55203 γ

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 5-1-91	2400 U.T., 5-31-91	7.9' /mm	29.4 γ/mm	
H	(SAME)	(SAME)	43.4 γ/mm		
Z	(SAME)	(SAME)	49.0 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° 43.5' E	12755 γ	55323 γ

*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.
 DAYS USED: MAY 11, 12, 18, 19, 20.

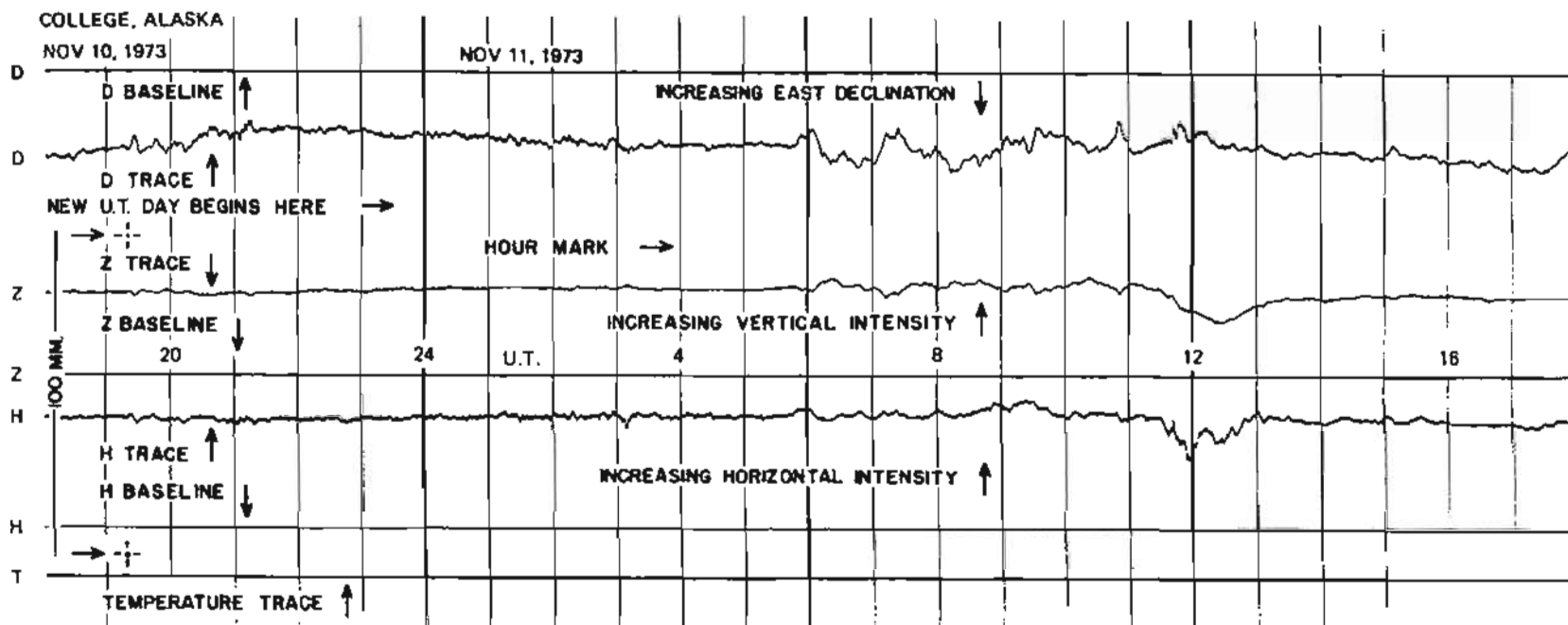
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

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			18			19			20			11			12			13			14			15			16			DAILY SUM	DAILY MEAN	MEAN				
	01	02	03	01	02	03	01	02	03	01	02	03	01	02	03	01	02	03	01	02	03	01	02	03	01	02	03	01	02	03				01	02	03	
01	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
02	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
03	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
04	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
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06	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
07	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
08	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
09	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
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11	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
12	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
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18	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
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22	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
23	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
24	10	26	31	40	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	3536	147	154	
DAILY SUM	2008	2245	2159	2125	1971	83	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	3536	147	154	
DAILY MEAN	86	94	90	89	83	83	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	147	154	154	
MEAN							88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	154	154	154	

Scaled T/Y/O Checked CA

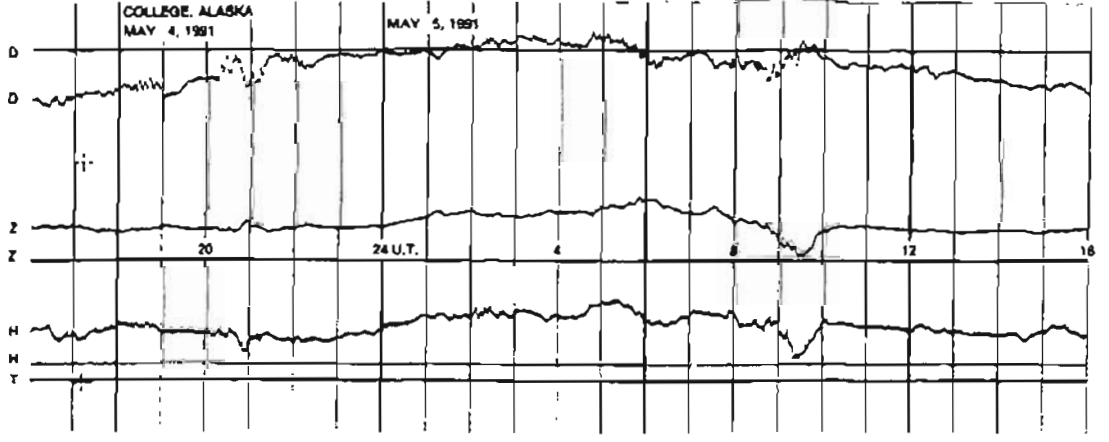
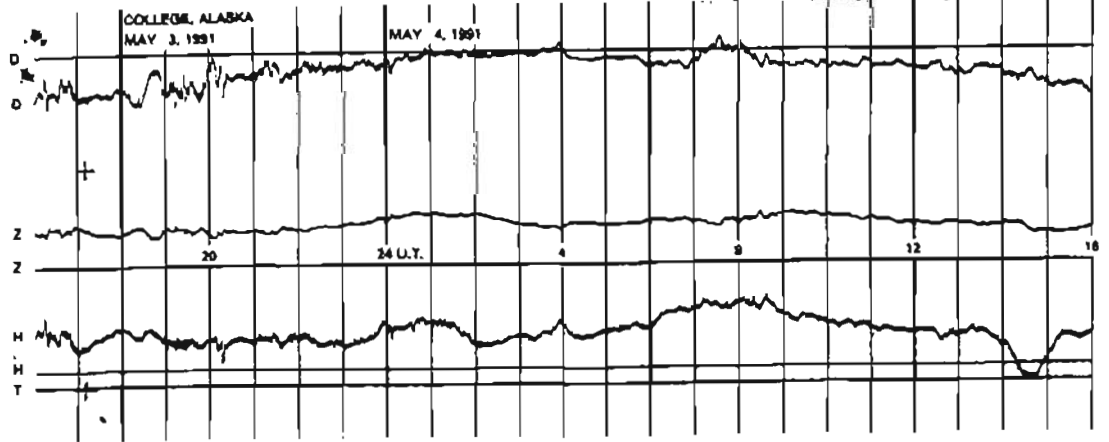
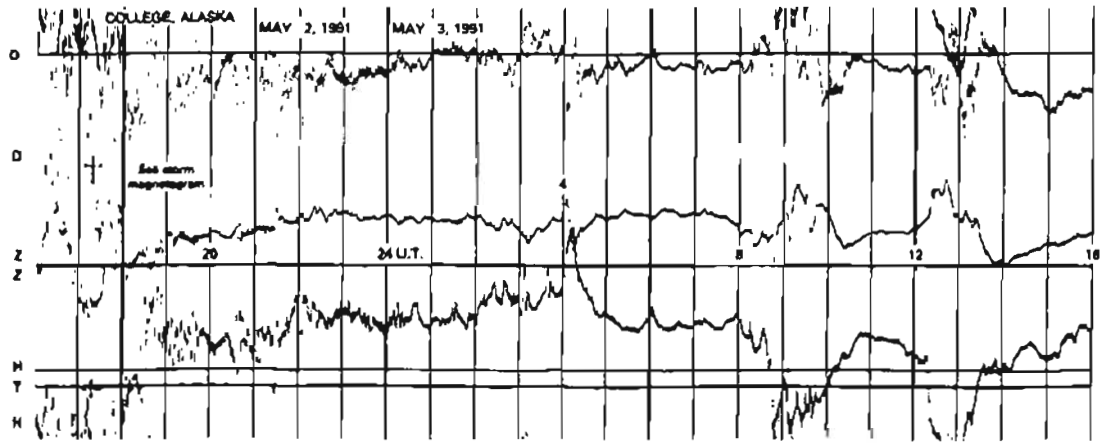
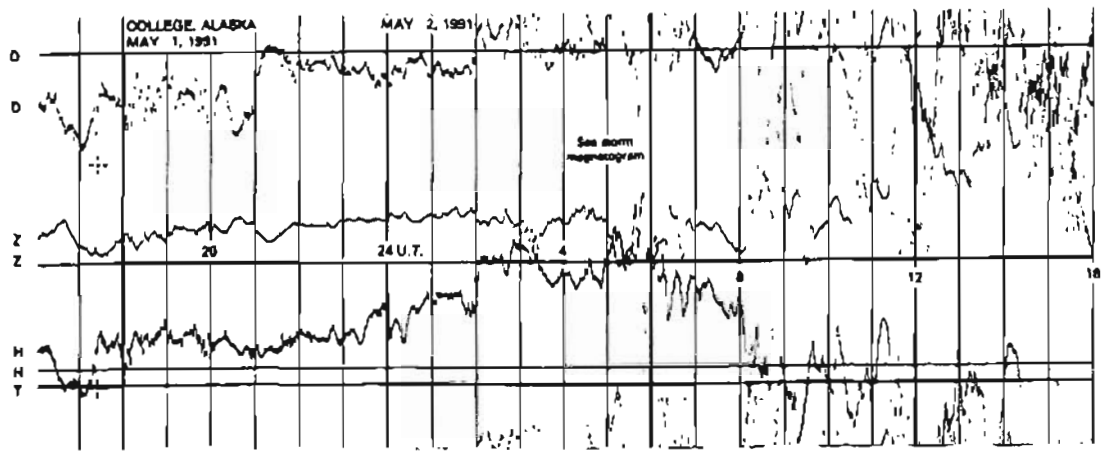
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

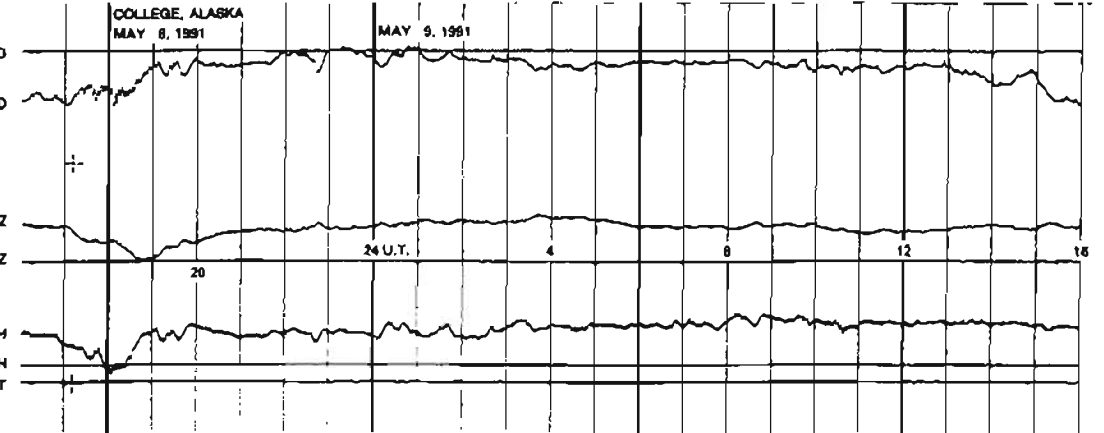
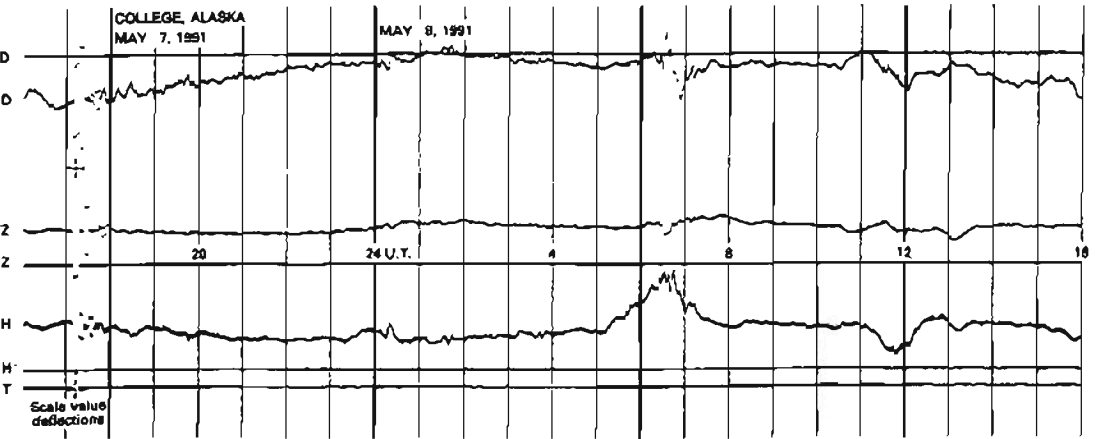
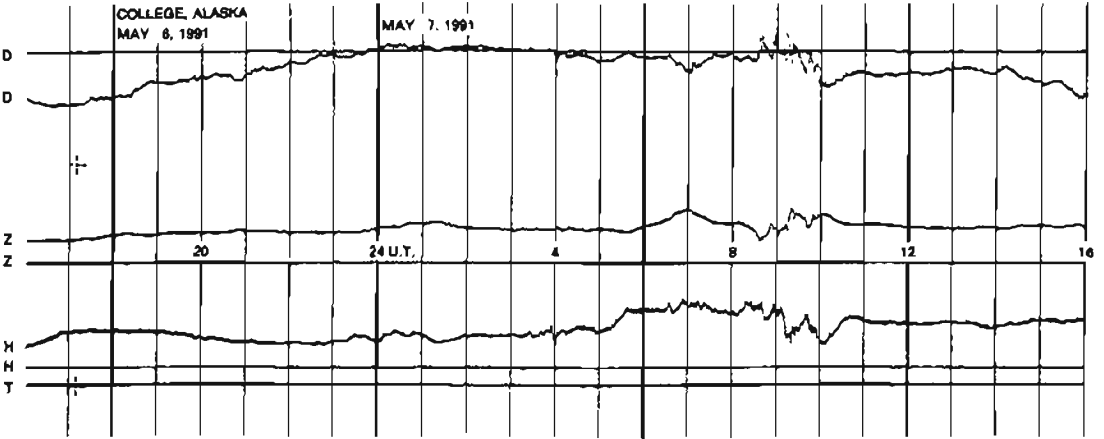
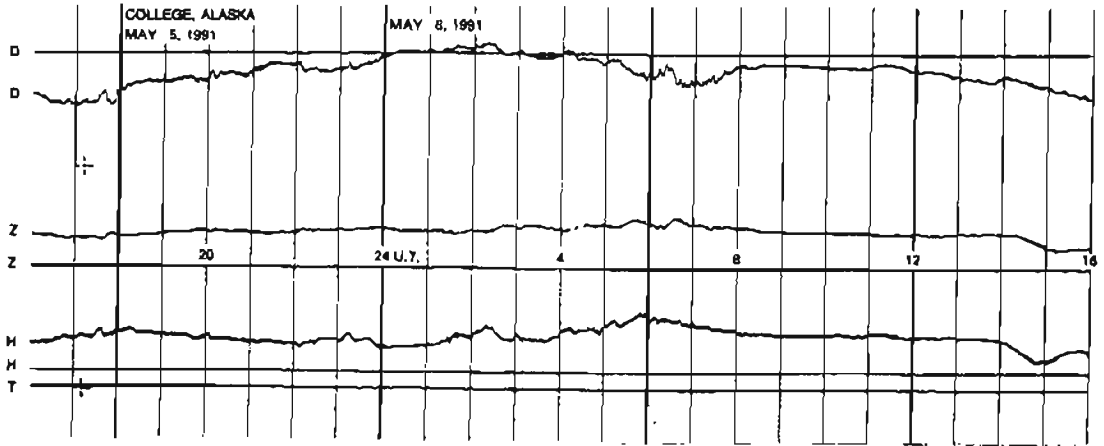
NORMAL MAGNETOGRAMS

200 nT
100 nT
0

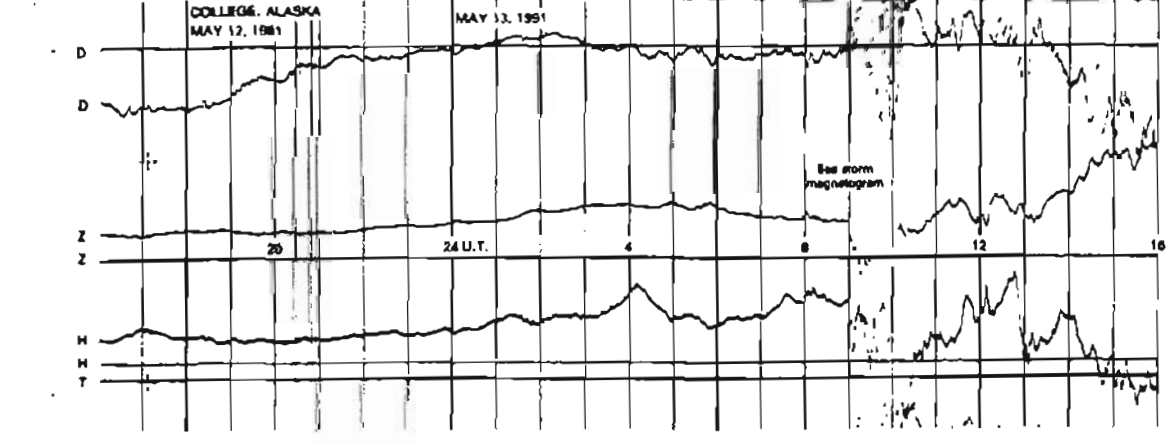
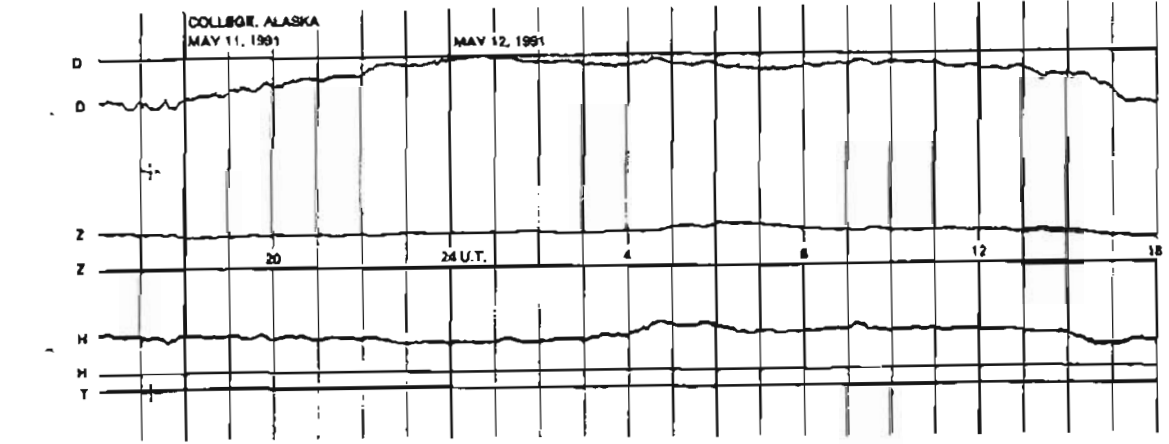
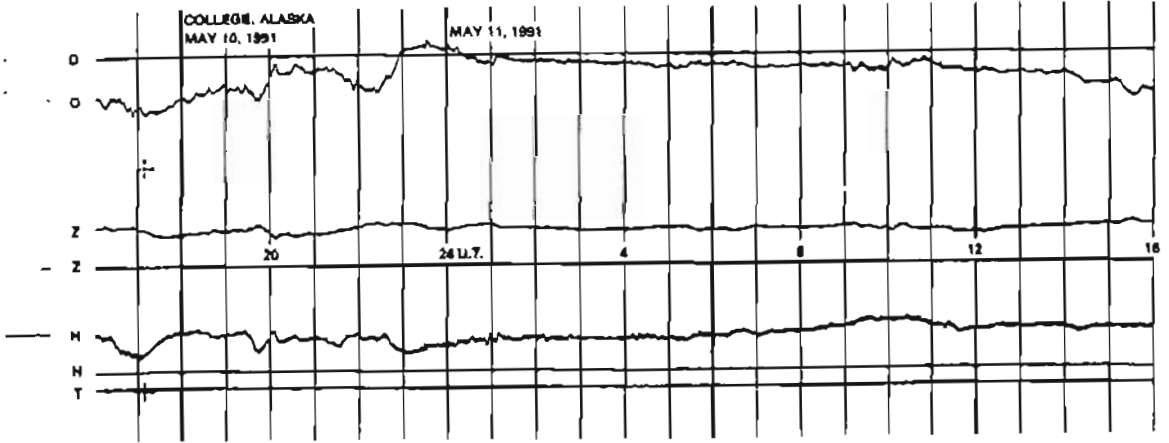
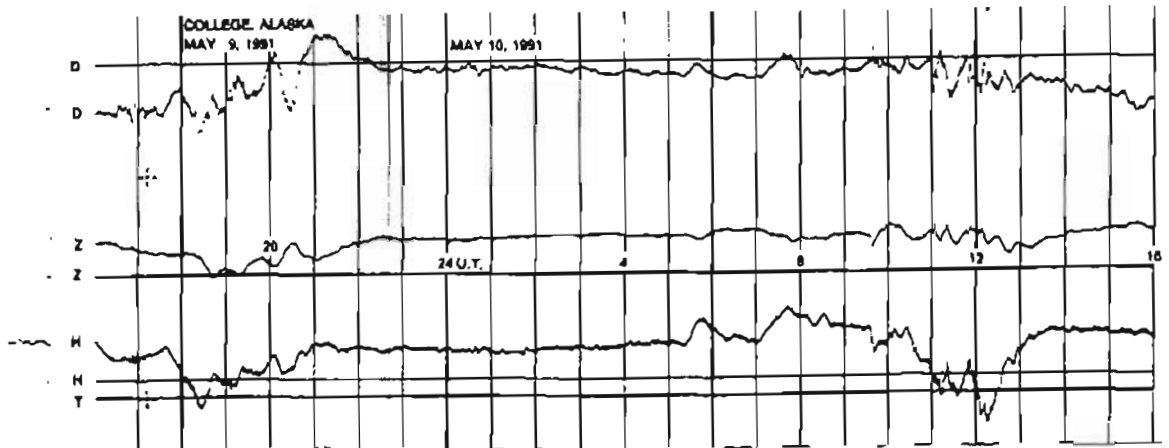


NORMAL MAGNETOGRAMS

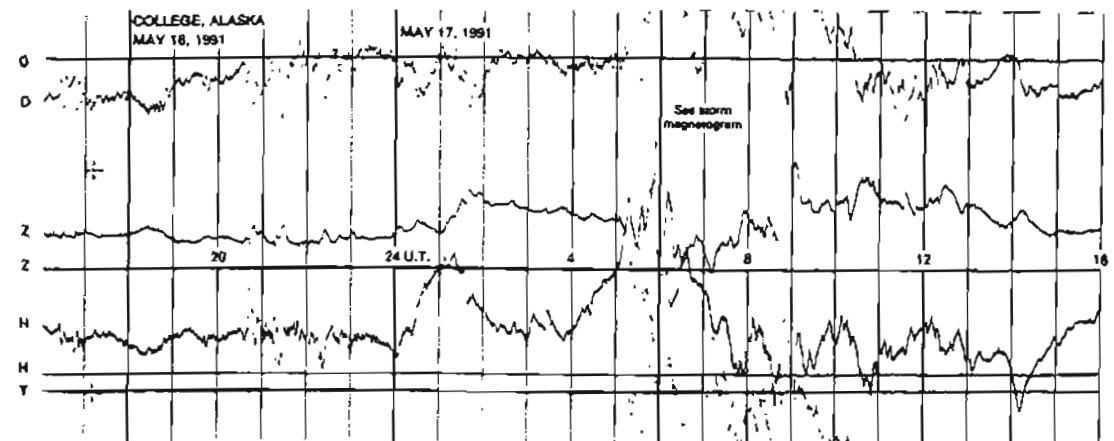
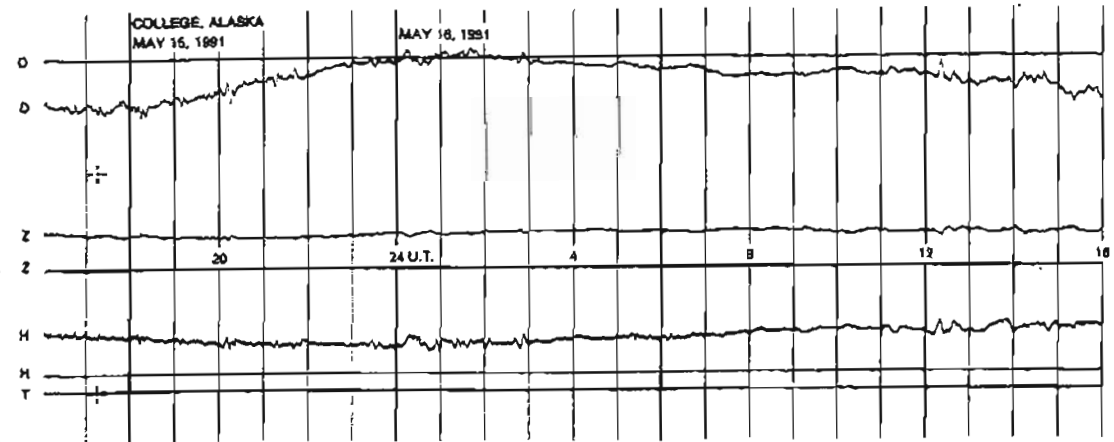
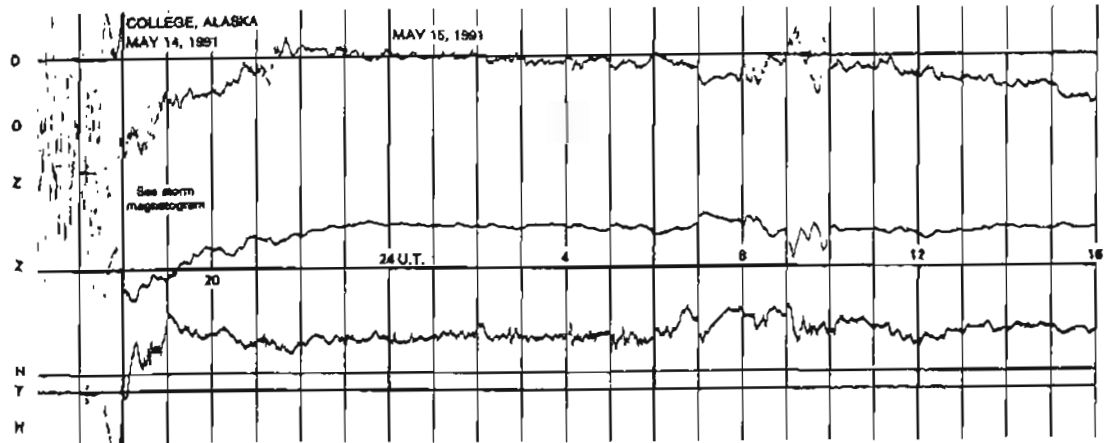
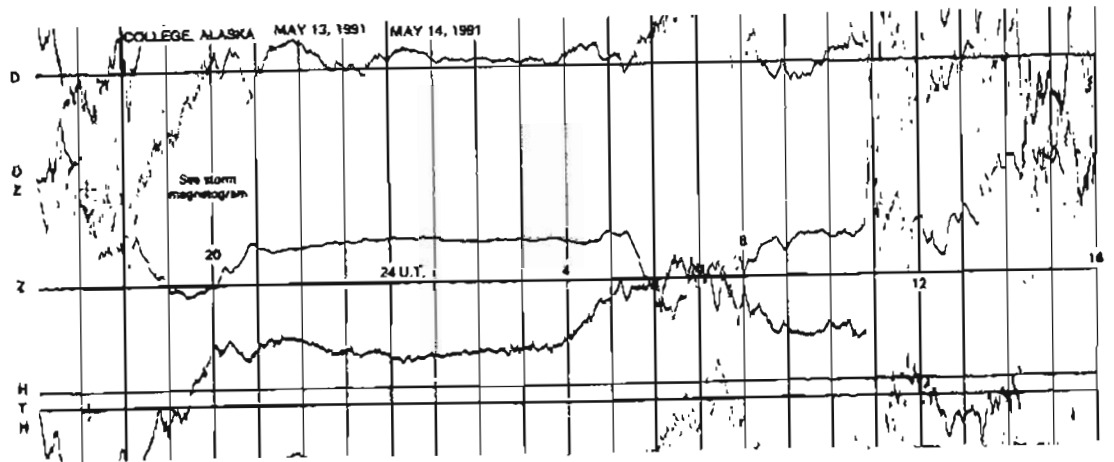
100-nm
100-nm
0



NORMAL MAGNETOGRAMS

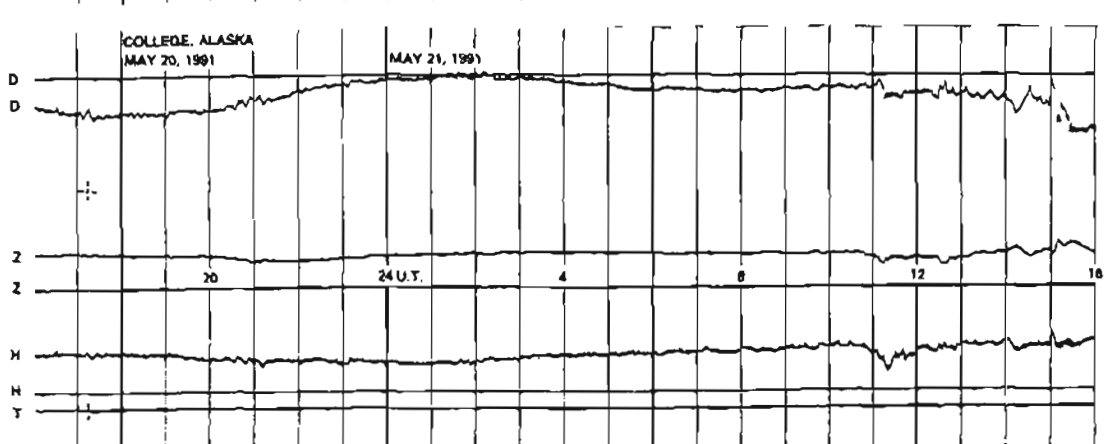
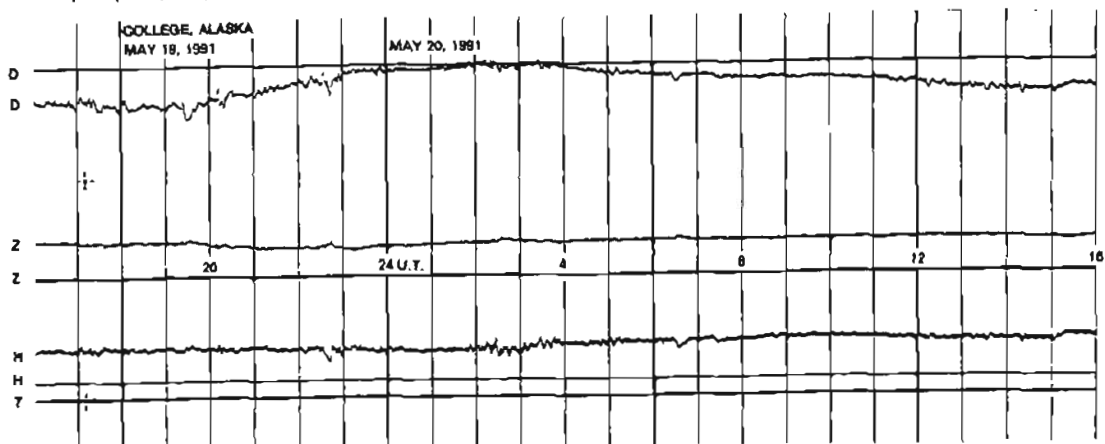
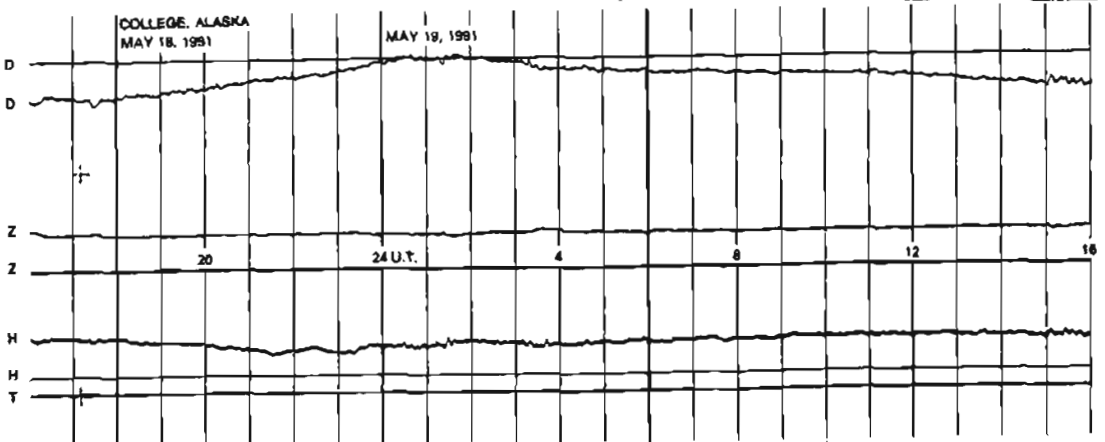
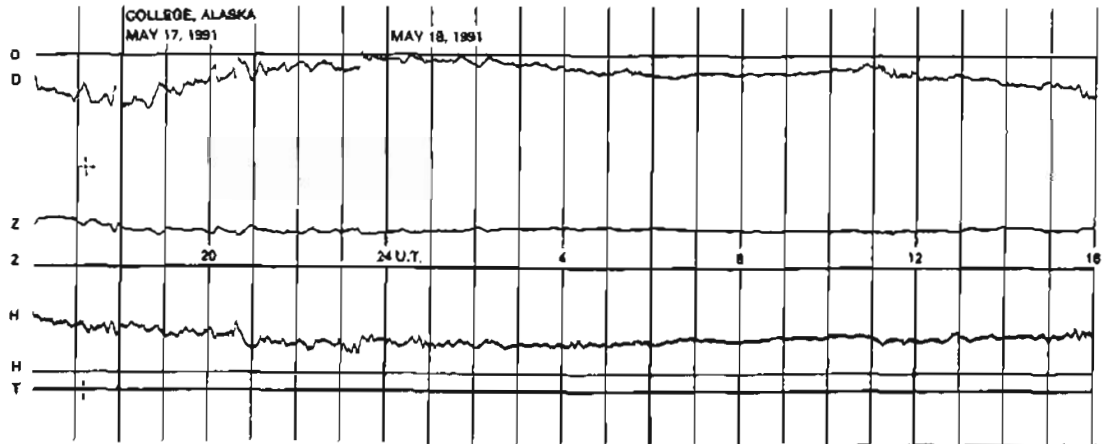


NORMAL MAGNETOGRAMS

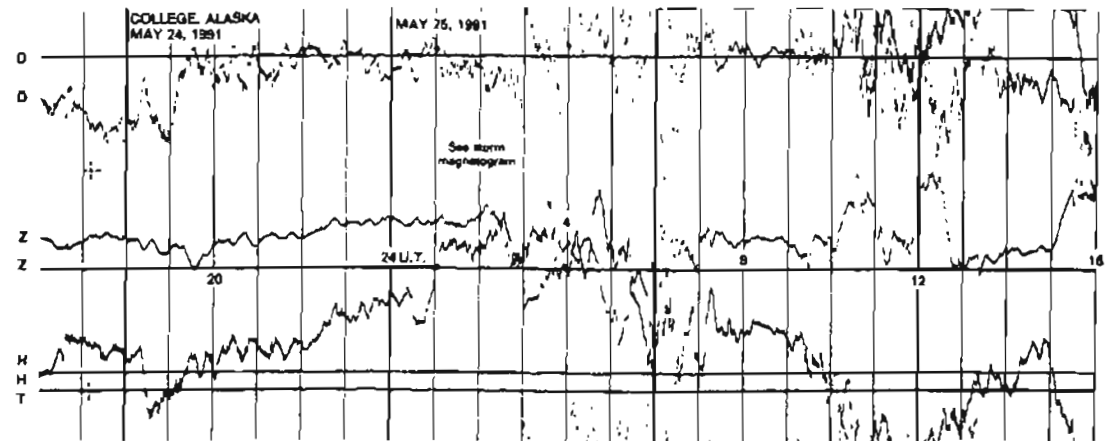
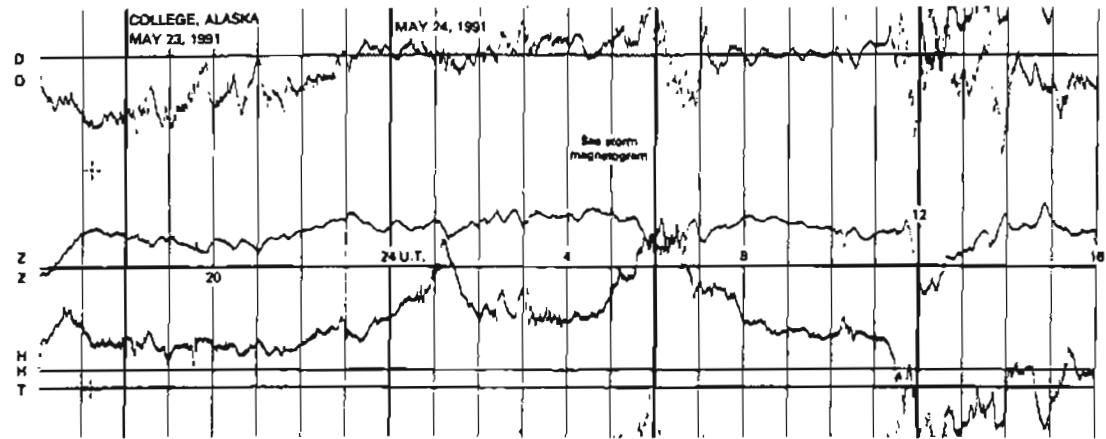
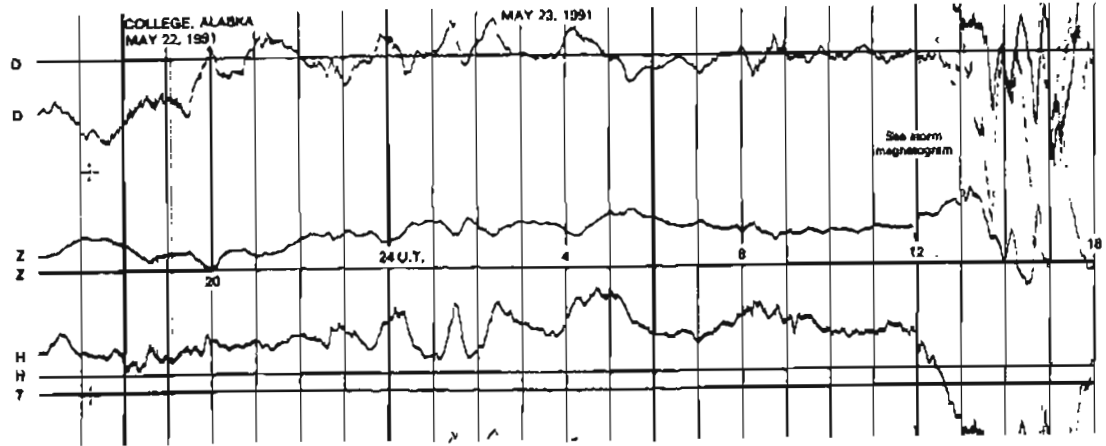
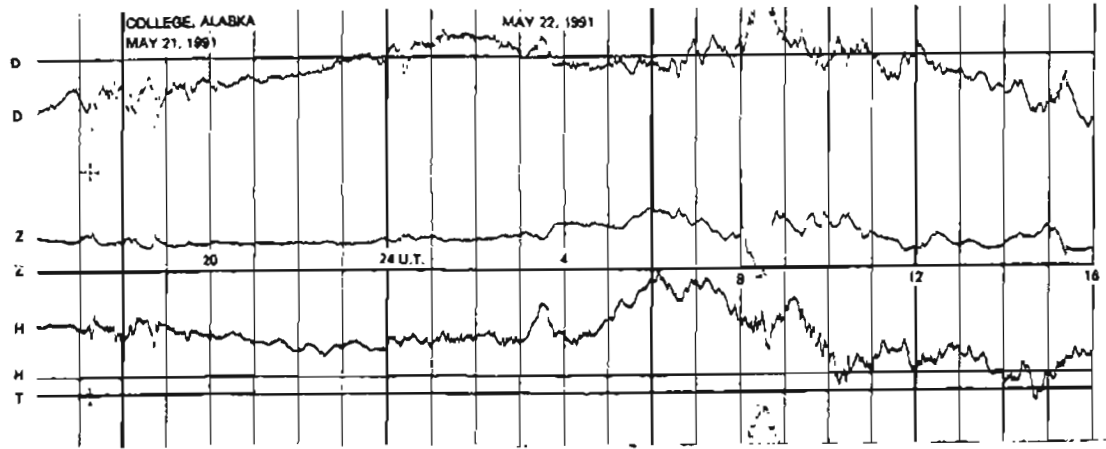


NORMAL MAGNETOGRAMS

200 mm
100 mm
0

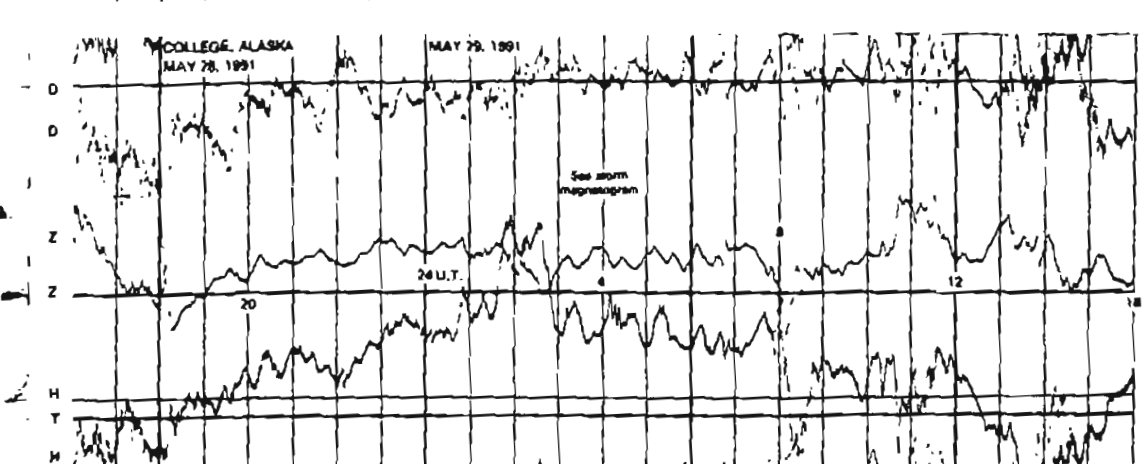
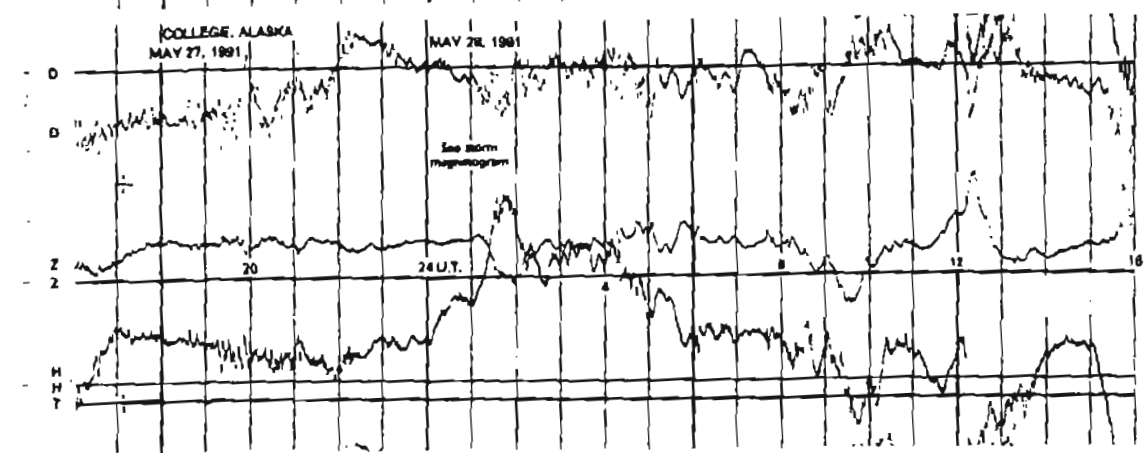
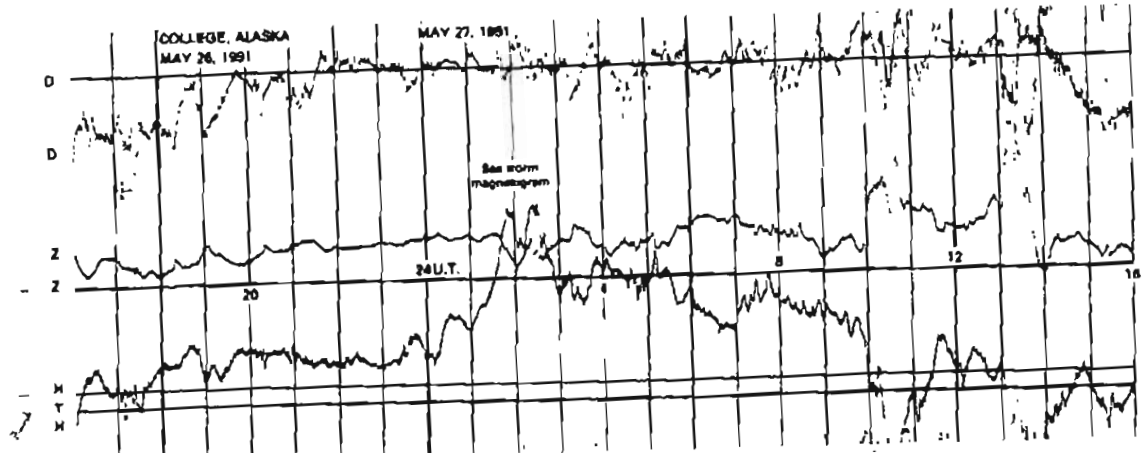
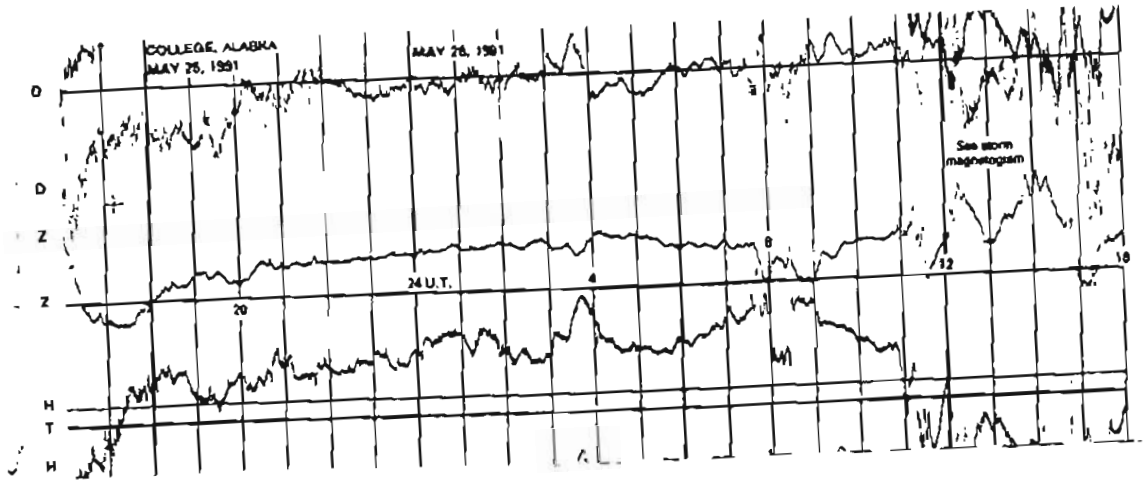


NORMAL MAGNETOGRAMS



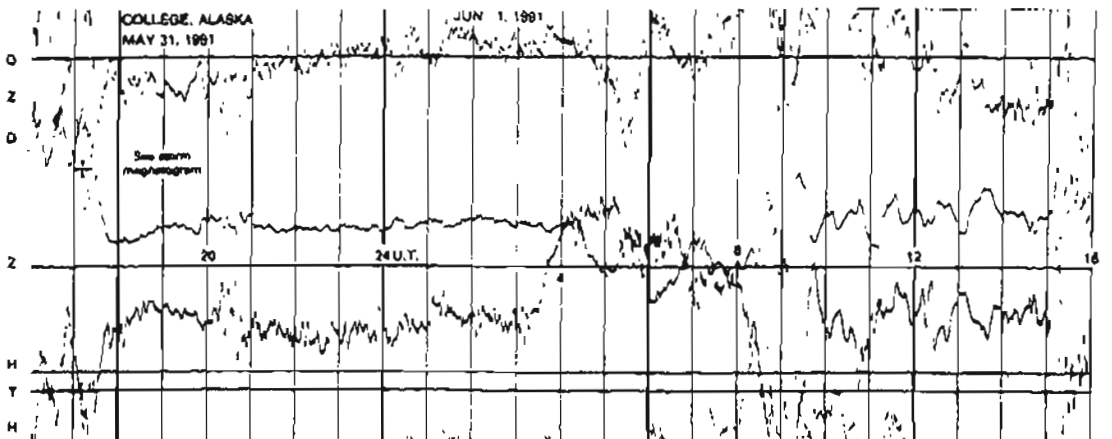
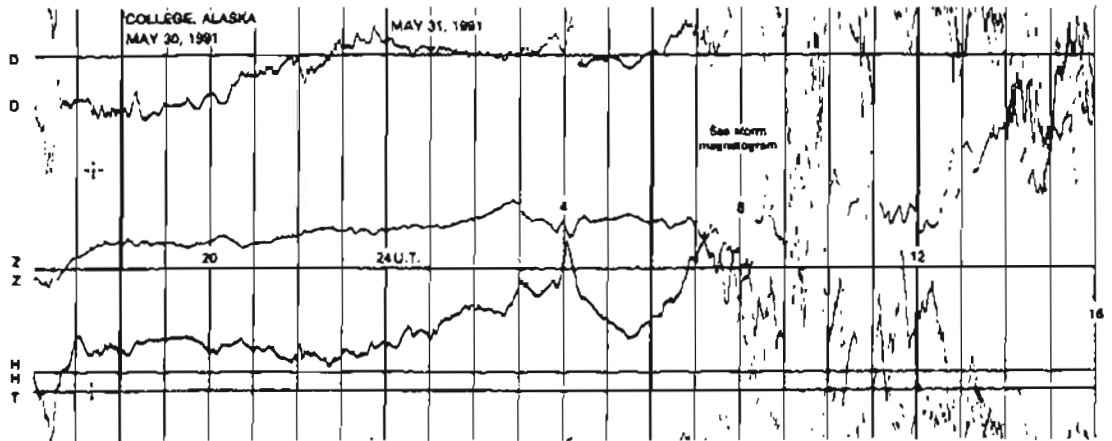
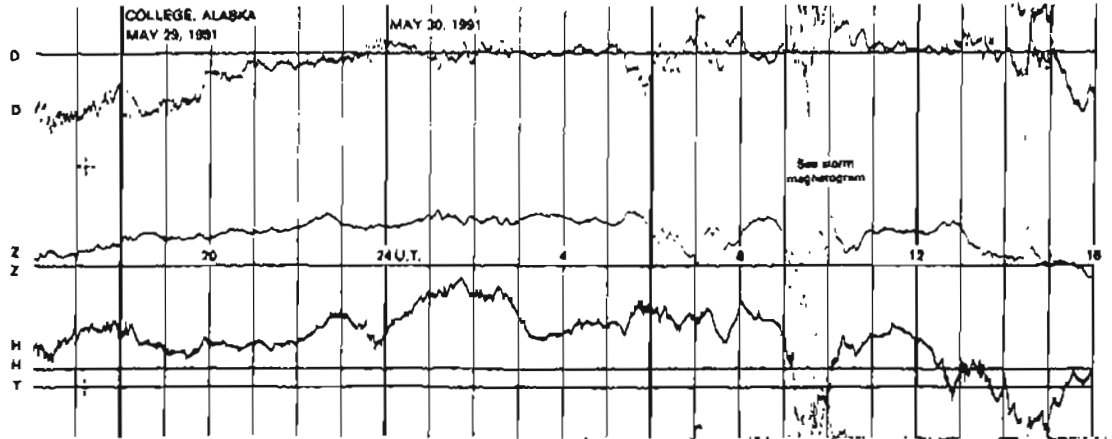
NORMAL MAGNETOGRAMS

200 mm
100 mm
0

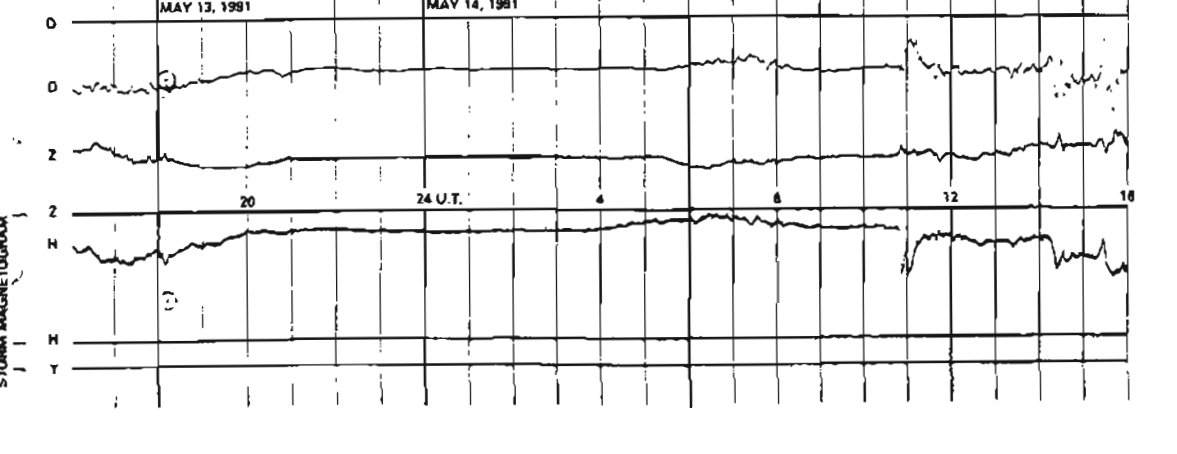
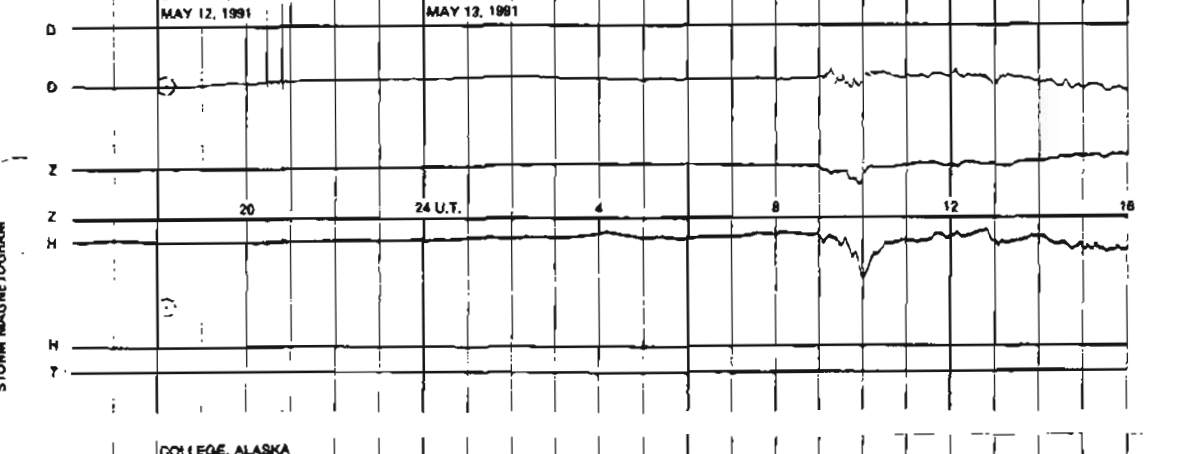
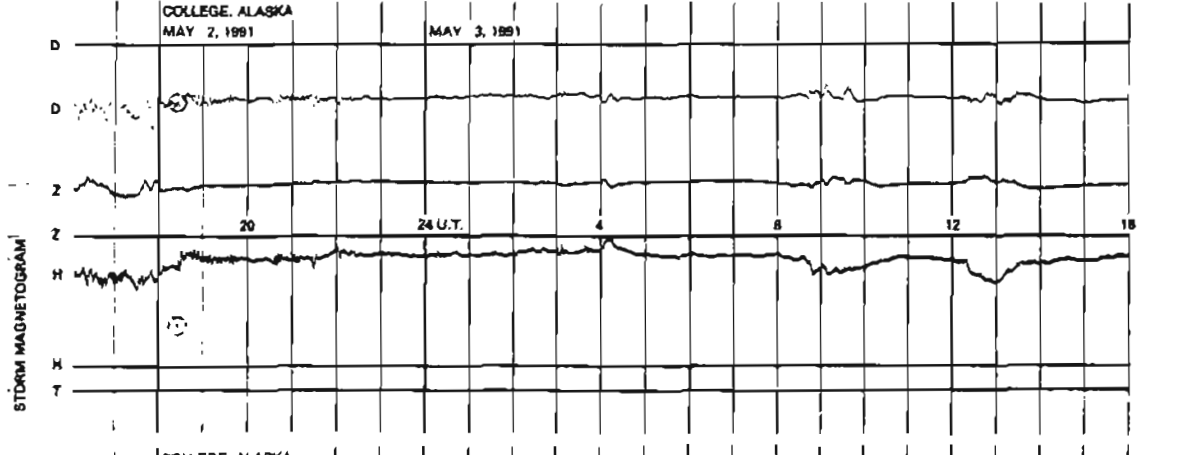
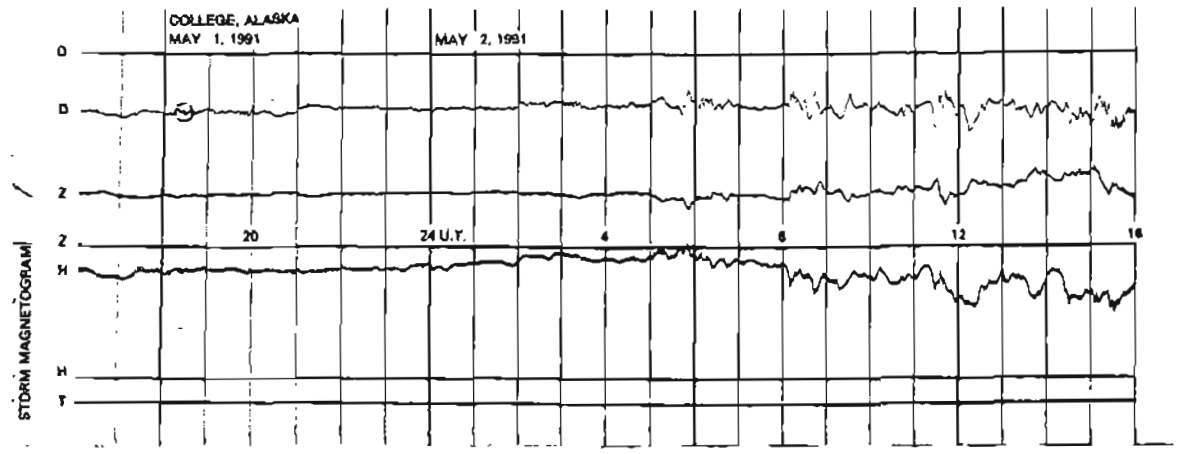


NORMAL MAGNETOGRAMS

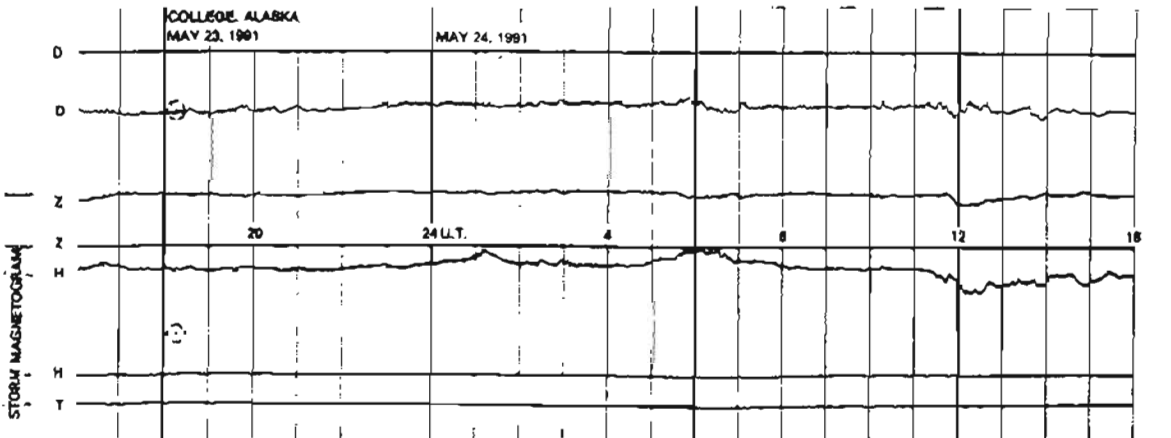
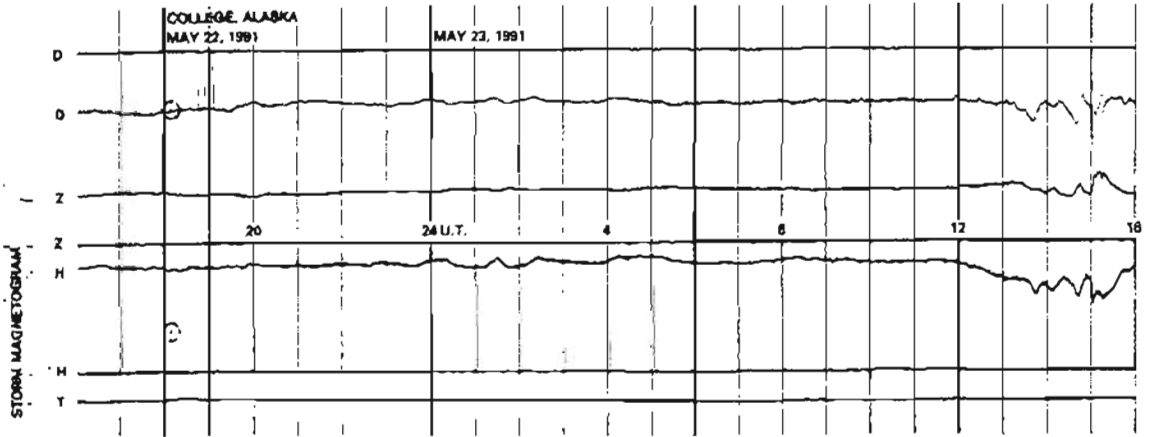
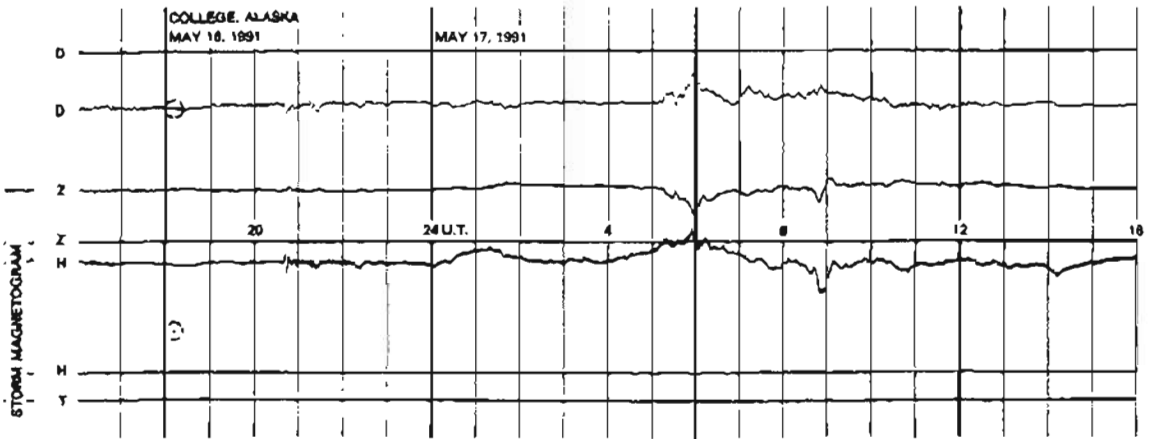
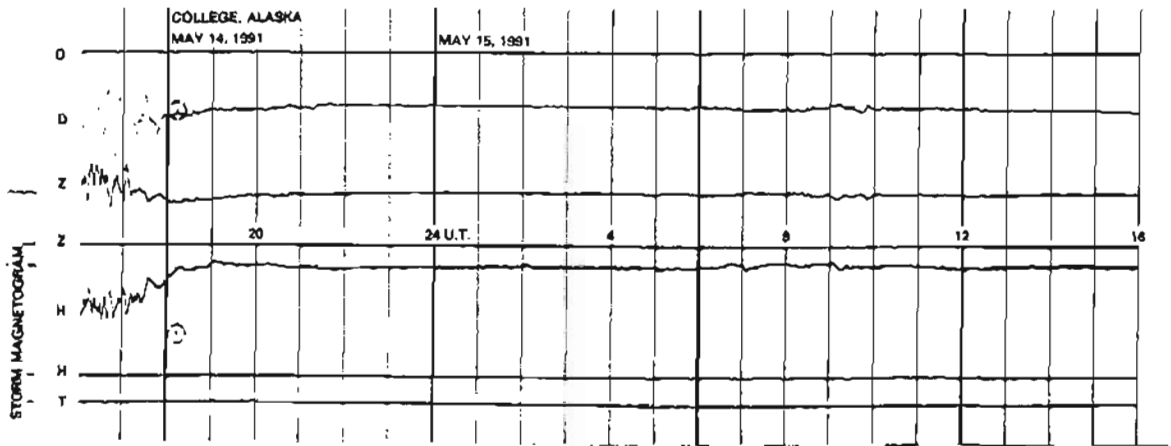
200mm
100mm
0



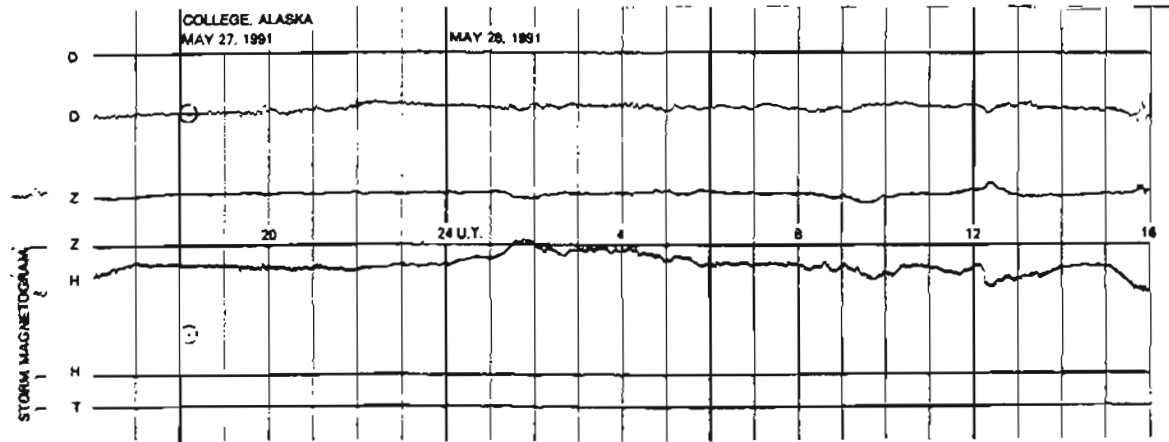
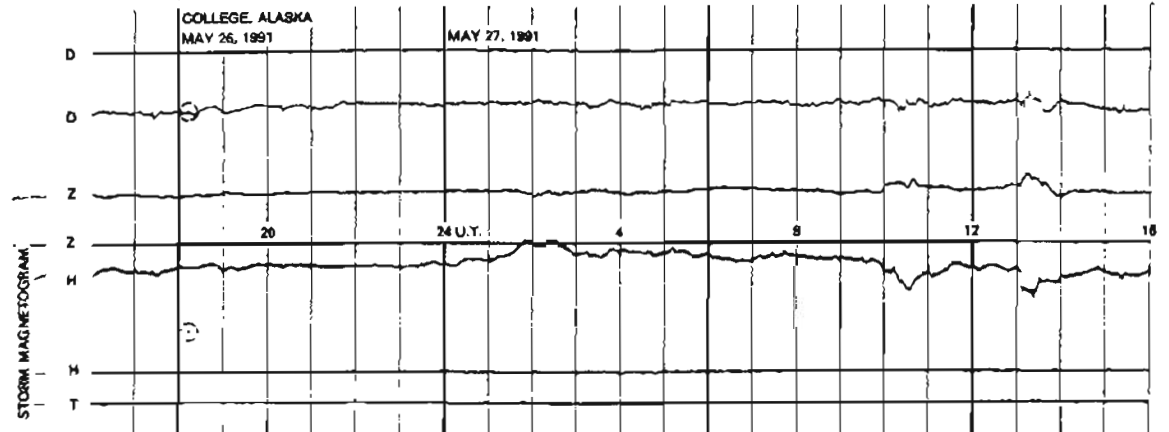
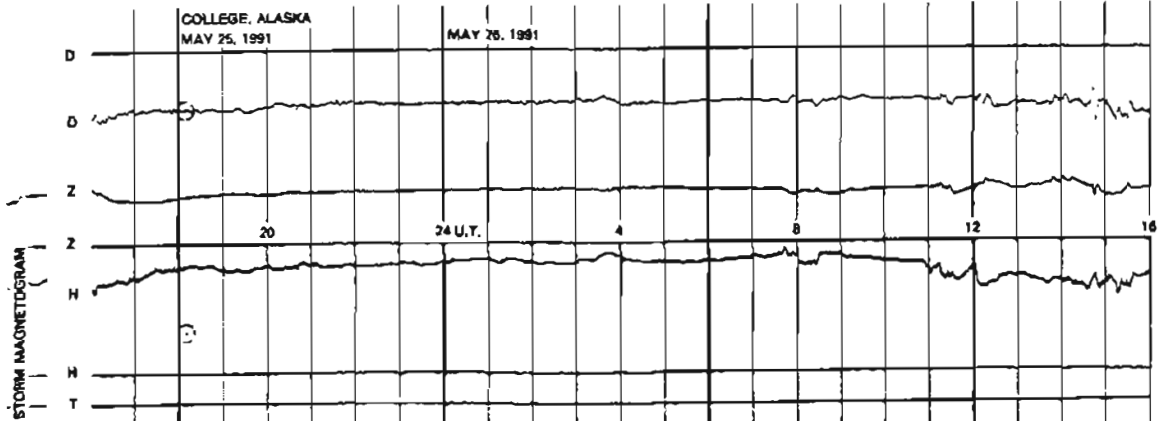
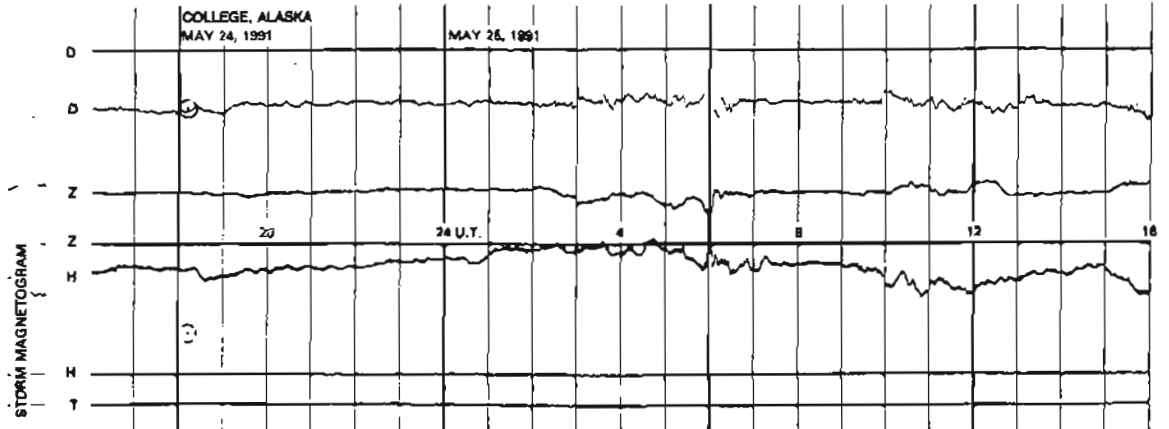
STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

