

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

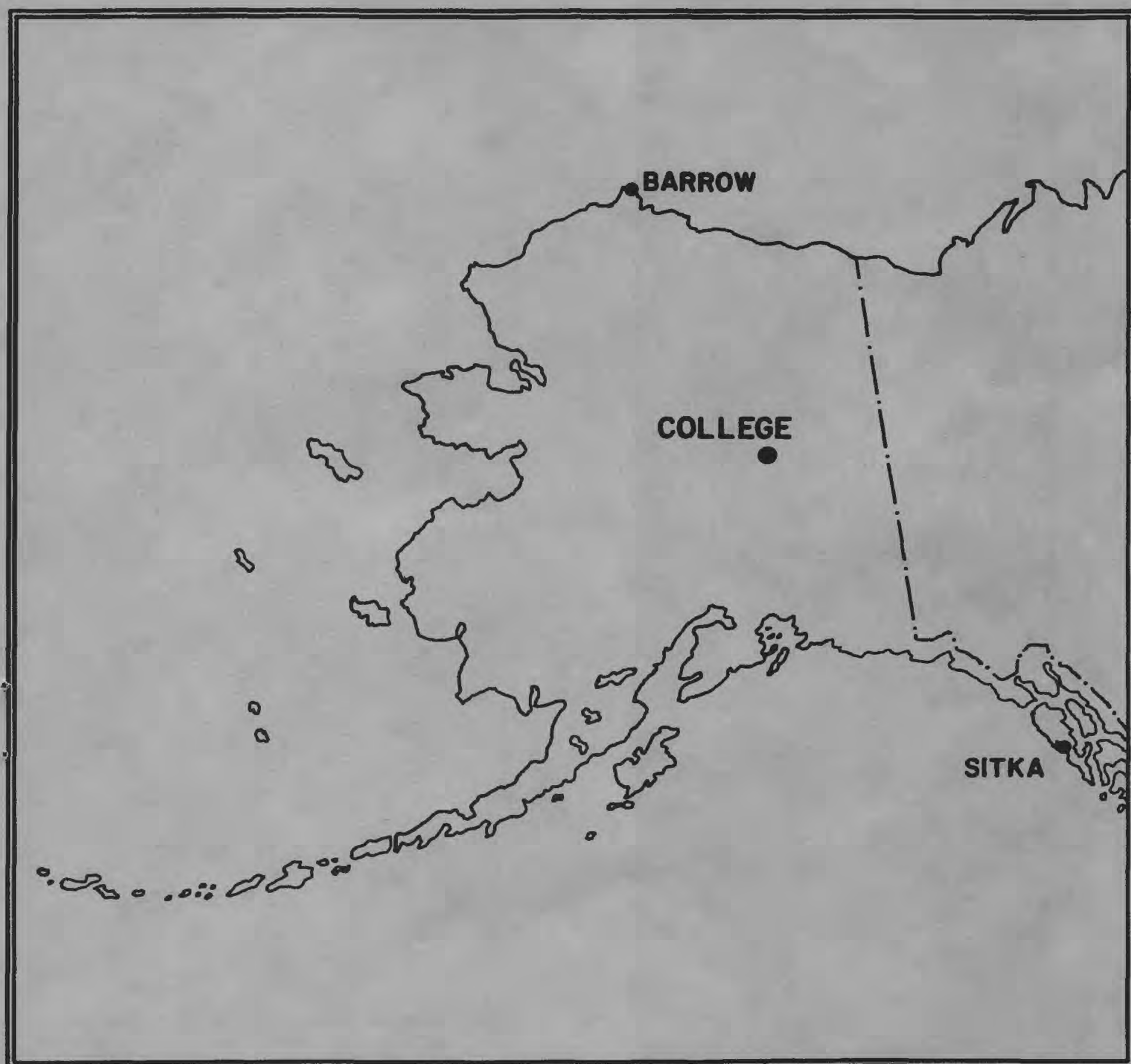
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

NOVEMBER 1991

OPEN FILE REPORT 91-0300K



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.....+64.6°
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 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:

<u>Gamma Range</u>	<u>K-Index</u>	<u>ak</u>
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

MONTH AND YEAR

NOVEMBER, 1991

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

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	6	7	7	7	7	5	46	91	SUDDEN COMMENCEMENTS d h m	
2	5	4	2	4	4	4	3	2	28	23		
3	2	2	3	6	5	3	4	3	28	27		
4	2	4	3	5	3	5	5	5	32	32		
5	5	4	6	4	5	5	4	2	35	39		
6	2	5	5	4	3	4	4	2	29	26		
7	3	2	2	4	2	3	2	2	20	12		
8	1	2	5	4	7	7	7	5	38	69		
9	5	6	8	7	7	6	7	3	49	110		
10	2	2	3	6	3	4	4	2	27	24		
11	2	3	3	5	4	4	4	4	28	23	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)	
12	2	2	4	2	1	2	2	1	16	9		
13	0	1	3	3	6	5	2	2	22	22		
14	2	3	5	5	4	1	2	2	24	20		
15	2	3	5	6	6	5	5	2	34	42		
16	3	3	5	6	6	3	3	3	32	35		
17	2	2	3	6	6	5	4	2	30	34		
18	3	3	4	6	6	5	6	3	36	45		
19	3	5	5	6	6	7	6	3	41	63		
20	2	2	3	5	5	5	4	4	30	28		
21	3	3	5	7	7	8	6	7	46	102	BEGIN	END
22	5	5	7	6	7	4	5	3	42	68		
23	3	3	6	7	6	5	4	4	38	54	d h m	d h m
24	2	3	3	3	5	5	2	3	26	21		
25	2	2	3	2	3	3	2	1	18	10	d h m	d h m
26	1	2	3	5	3	3	1	0	18	13		
27	0	1	0	2	4	5	2	1	15	12	d h m	d h m
28	2	0	1	4	5	2	2	2	18	13		
29	3	2	1	4	5	5	2	3	25	21	d h m	d h m
30	3	4	3	4	3	1	2	3	23	16		
31												

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

675.7

3.66

2470

H

322.2

7.73

2490

Z

(mm)

(Y/mm)

(to nearest 10Y)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED

John B. Townshend, Chief

OBSERVER IN CHARGE

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA
NOVEMBER 19 91

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

Data from Individual Observatories:

Obs. 2 letter 1 digit 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)	D(')	H(Y)	Z(Y)	
C0	64.6 N	1	05 XX	.				1	4, 5, 6, 7	290	1640	1200	2 05
		8	06 47	SC		+35		9	3	430	2240	1300	9 21
		19	03 XX	.				19	6	280	1760	720	19 23
		21	06 XX	.				21	6	490	2810	1180	22 20

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 11-1-91	2400 U.T., 11-30-91	1.0' /mm	3.78 /mm	26° 58.9' E
H	0001 U.T., 11-1-91	2400 U.T., 11-5-91	7.7 8 /mm		126348
	0001 U.T., 11-6-91	2400 U.T., 11-18-91			126308
	0001 U.T., 11-19-91	2400 U.T., 11-30-91	↓		126268
Z	0001 U.T., 11-1-91	2400 U.T., 11-6-91	7.8 8 /mm		552088
	0001 U.T., 11-7-91	2400 U.T., 11-15-91			552108
	0001 U.T., 11-16-91	2400 U.T., 11-24-91			552128
	0001 U.T., 11-25-91	2400 U.T., 11-30-91			552148

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 11-1-91	2400 U.T., 11-30-91	7.9' /mm	29.38 /mm	
H	(SAME)	(SAME)	43.48 /mm		
Z	(SAME)	(SAME)	49.08 /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): -58; i.e., H absolute and baseline values are 58 less than previously reported.

Vertical Intensity (Z): +338; i.e., Z absolute and baseline values are 338 higher than previously reported.

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
26° 37.0' E	127448	553428

*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: NOV 12, 25, _____, _____, _____.

ONLY TWO DAYS OF THIS
MONTH HAVING $A_k \leq 10$

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 10-1-91	2400 UT, 10-31-91	1.0'/mm	3.78'/mm	25° 59.2' E
H	0001 UT, 10-1-91	2400 UT, 10-7-91	7.78'/mm		126458
	0001 U.T., 10-8-91	2400 UT, 10-20-91	↓		6408
	0001 UT, 10-21-91	2400 UT, 10-31-91			6358
Z	0001 UT, 10-1-91	2400 UT, 10-6-91	7.88'/mm		552048
	0001 UT, 10-7-91	2400 UT, 10-12-91	↓		2068
	0001 UT, 10-13-91	2400 UT, 10-31-91			2088

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 10-1-91	2400 U.T., 10-31-91	7.9'/mm	29.38'/mm	
H	(SAME)	(SAME)	43.48'/mm		
Z	(SAME)	(SAME)	48.98'/mm		

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Declination (D): No Change

Horizontal Intensity (H): -58; i.e., H absolute and baseline values are 58 less than previously reported.

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MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
26° 38.8' E	127508	553268

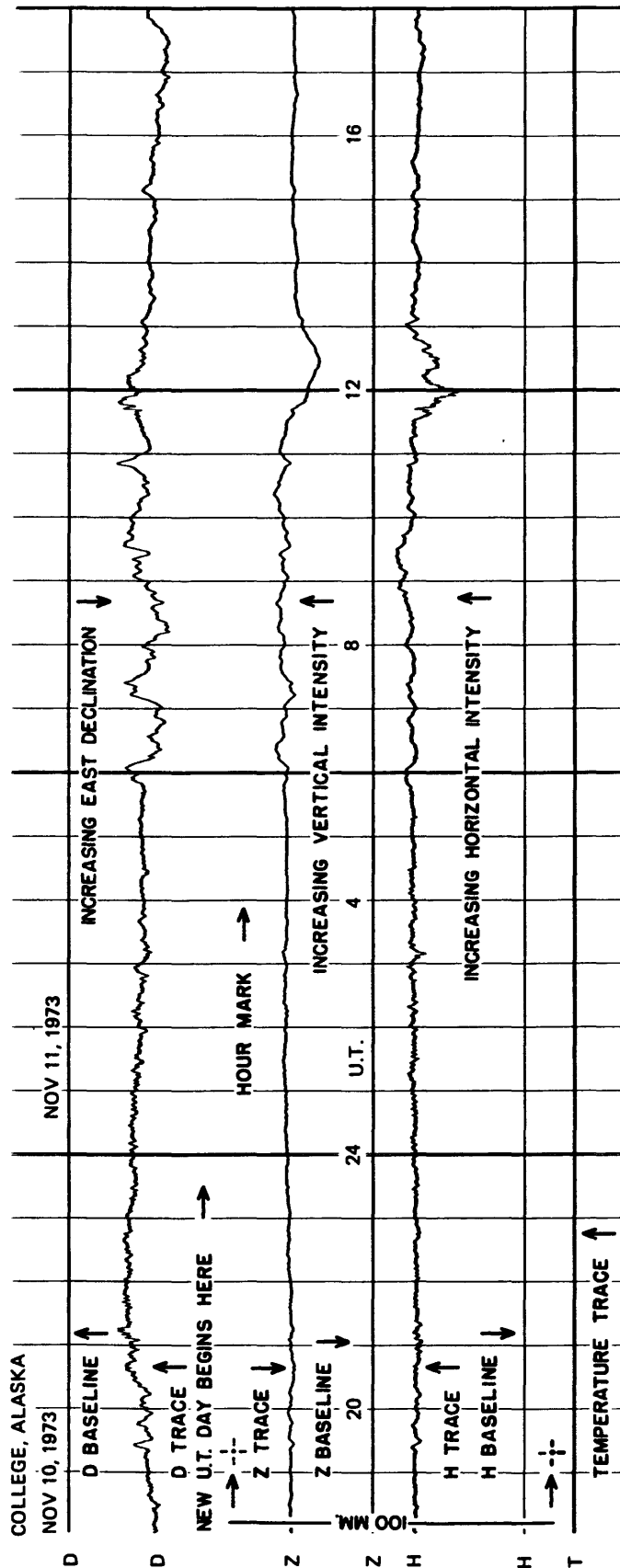
*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: OCT 12, 14, 15, 16, 17.

U.S. Dept. of Interior Geological Survey		Observatory College, Alaska		Month OCTOBER		Year 1991		Jep-CO - 1/86								
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS (UNIVERSAL TIME)																
Values are in Tenths of am 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	12	14	15	16	17	12	14	15	16	17	12	14	15	16	17	DAY
A _h	4	3	4	3	2	4	3	4	3	2	4	3	4	3	2	A _h
HOURL	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	HOURL
	351	324	341	368	375	120	122	104	119	125	179	153	154	153	150	01
	347	333	324	364	360	140	130	120	130	122	180	159	152	154	150	02
	356	358	329	364	364	128	130	149	134	129	181	170	164	154	155	03
	356	369	350	368	369	128	140	150	140	140	176	170	176	155	153	04
	364	372	360	362	375	142	150	151	150	147	178	162	170	155	150	05
	362	372	363	361	381	156	151	160	158	150	174	161	168	159	150	06
	369	370	369	371	381	151	159	161	151	151	179	163	172	166	148	07
	379	369	360	380	379	150	162	191	157	157	180	171	183	167	148	08
	380	400	374	371	380	147	172	212	163	156	183	170	190	165	150	09
	391	370	393	400	380	139	161	169	170	160	170	160	182	152	150	10
	409	388	390	399	387	121	151	149	160	161	138	166	162	152	150	11
	394	391	392	405	390	145	151	143	152	166	150	163	155	153	149	12
	393	400	400	404	397	140	150	140	152	170	162	158	150	153	150	13
	399	419	402	404	408	140	141	147	129	187	161	154	150	143	143	14
	407	415	410	413	435	140	148	150	150	173	161	148	151	127	147	15
	418	424	412	419	438	138	151	149	148	150	162	142	153	144	142	16
	441	441	430	440	462	130	157	150	148	160	163	152	157	154	146	17
	482	487	459	441	469	128	141	149	149	160	162	163	159	157	144	18
	502	528	470	454	490	115	110	140	140	156	160	153	158	161	127	19
	479	430	482	460	489	119	77	130	128	141	144	83	153	156	120	20
	500	420	442	439	468	106	100	119	114	130	154	84	144	150	124	21
	432	421	420	398	411	98	113	110	119	125	145	125	146	146	123	22
	402	399	387	390	390	85	116	111	120	121	157	140	152	141	135	23
	374	369	379	379	381	99	109	112	126	124	160	150	154	146	146	24
DAILY SUM	9687	9569	9438	9554	9759	3105	3292	3466	3407	3561	3959	3620	3855	3663	3450	DAILY SUM
DAILY MEAN	404	399	393	398	407	129	137	144	142	148	165	151	161	153	144	DAILY MEAN
MEAN	400				140				155				MEAN			
Checked <u>180</u>																

October 1991 Hourly Scalings Sheet was not available when October Report was mailed.
It is included in the November report.

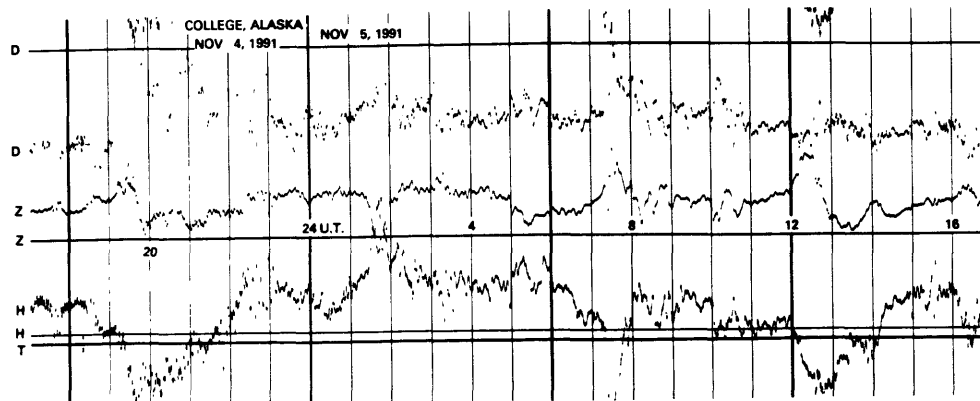
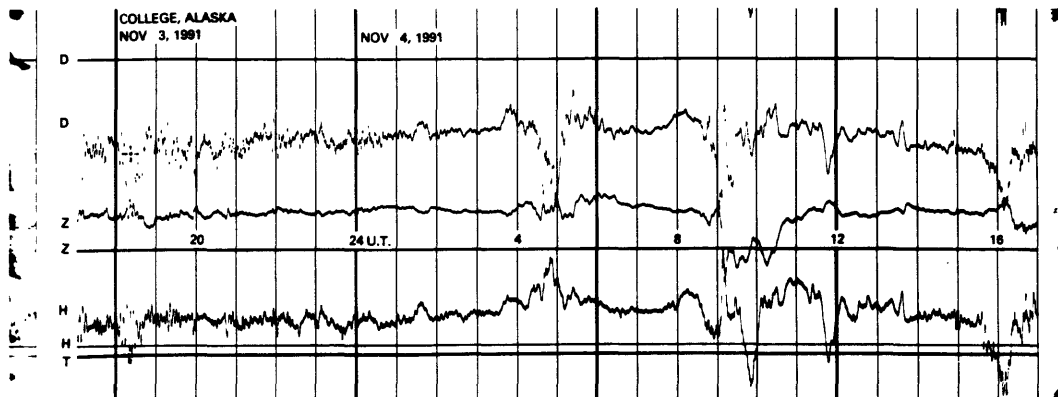
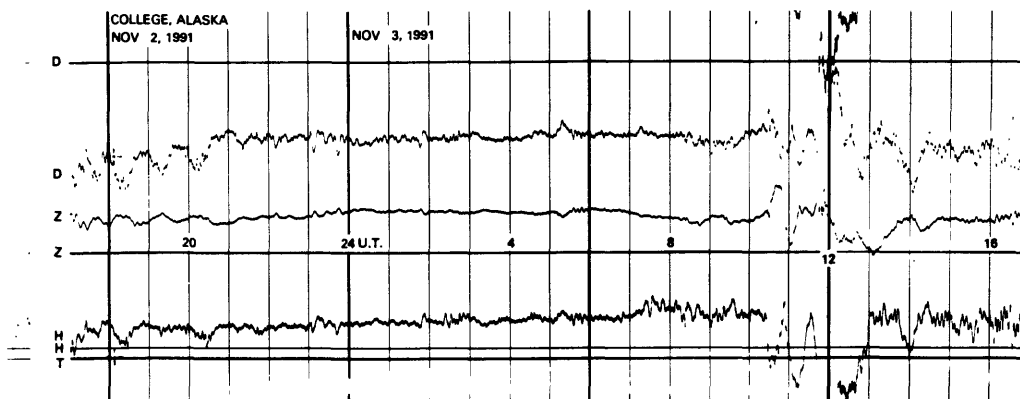
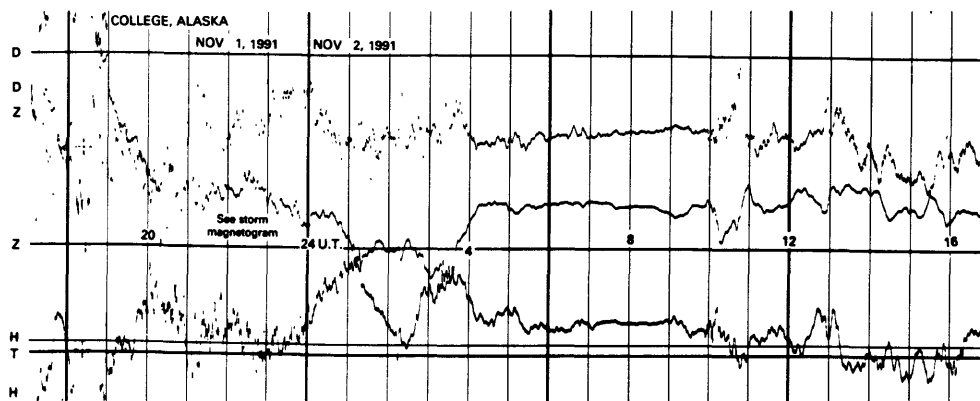
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



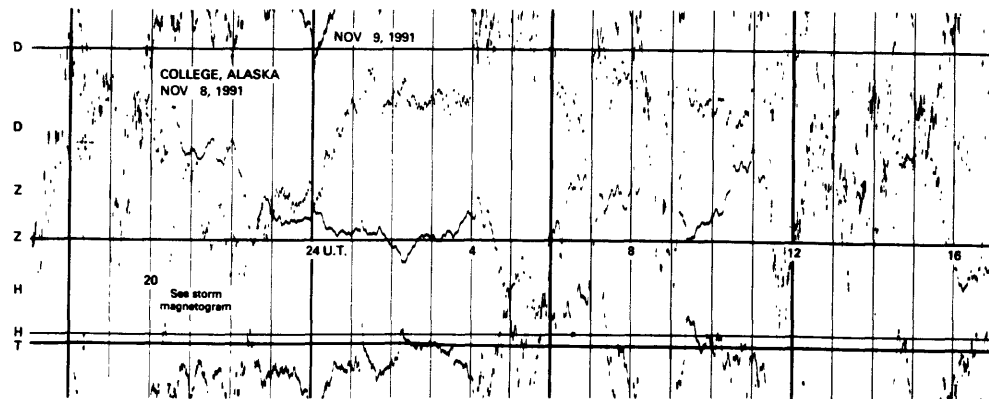
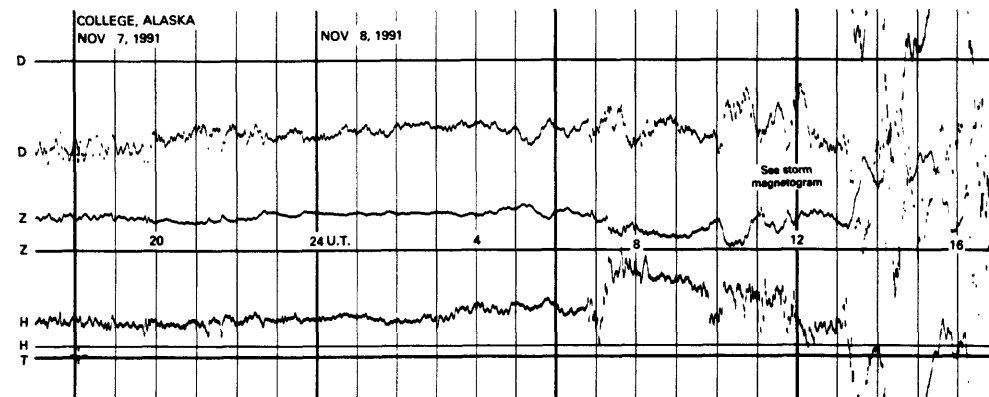
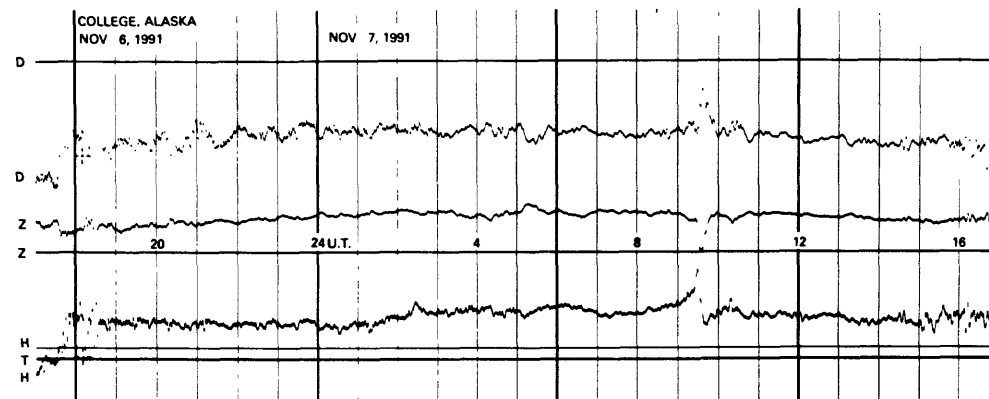
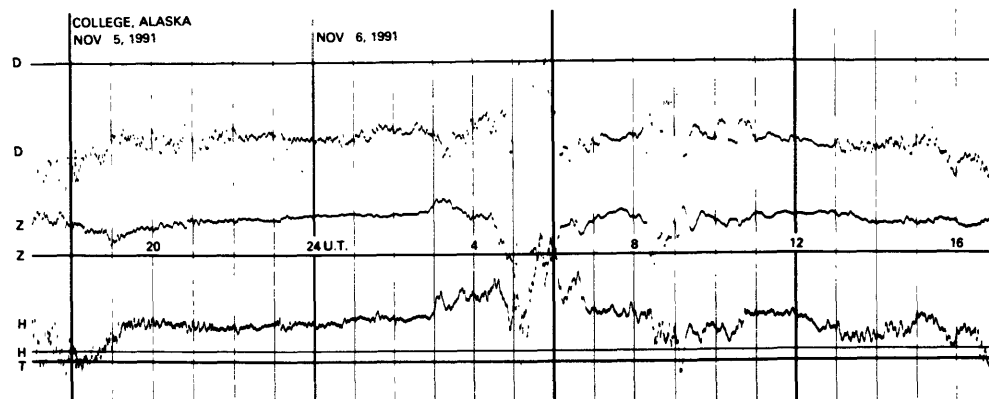
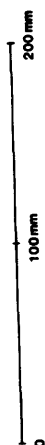
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

200 mm
100 mm
0

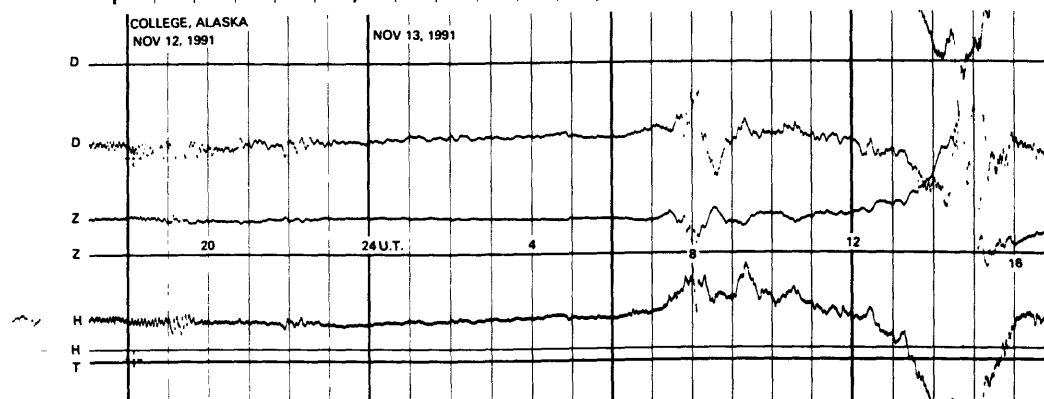
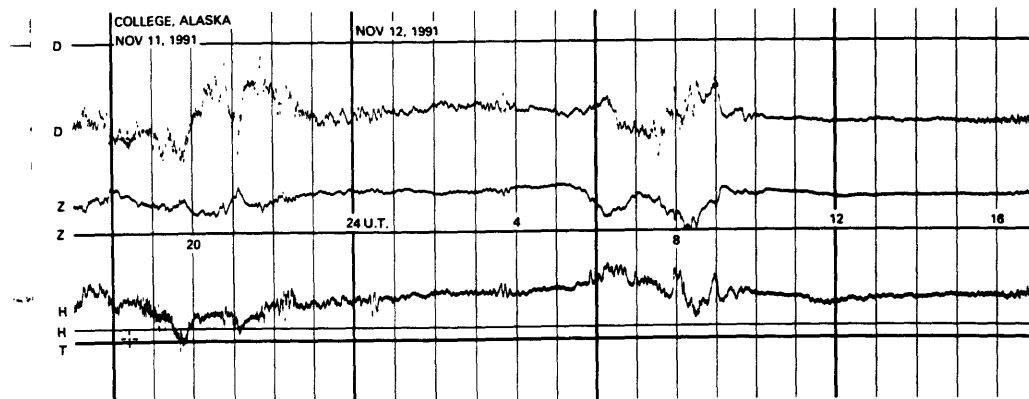
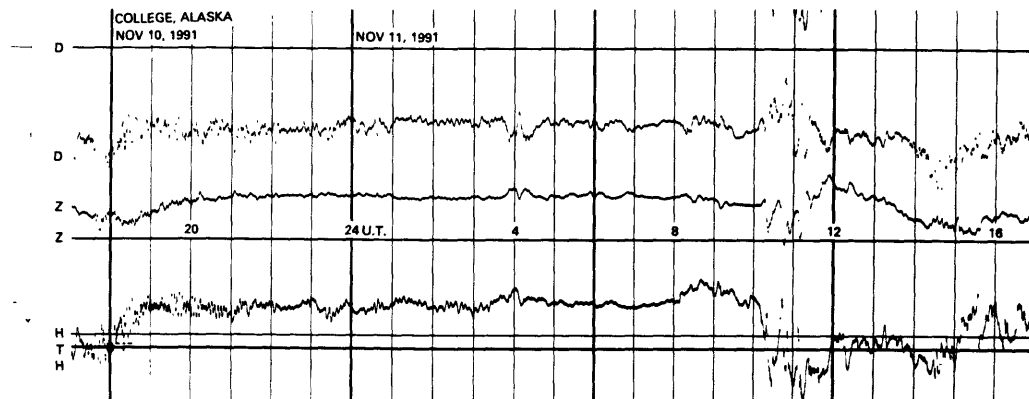
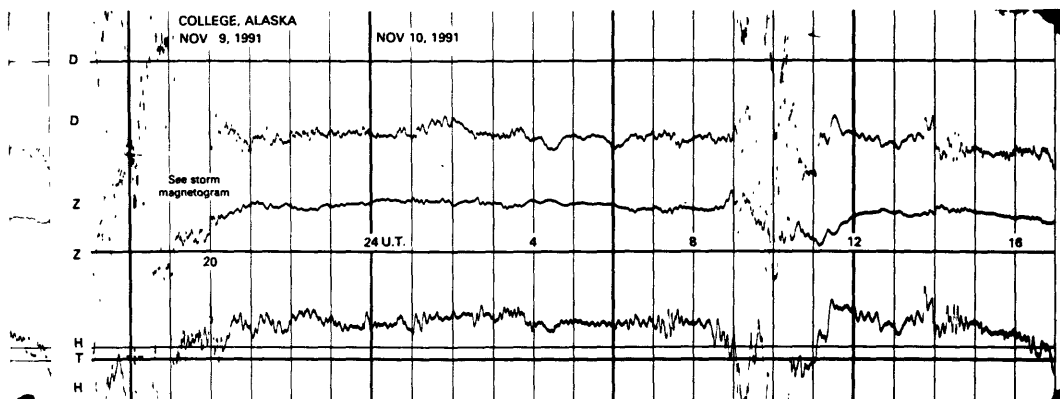


NORMAL MAGNETOGRAMS

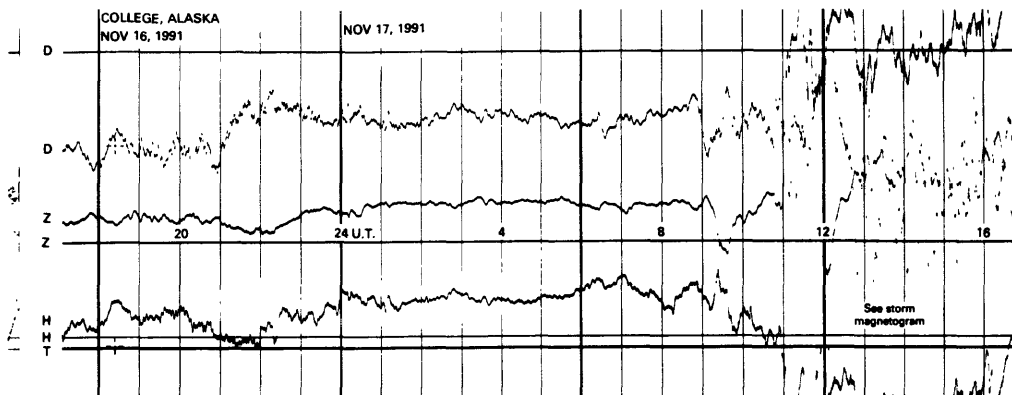
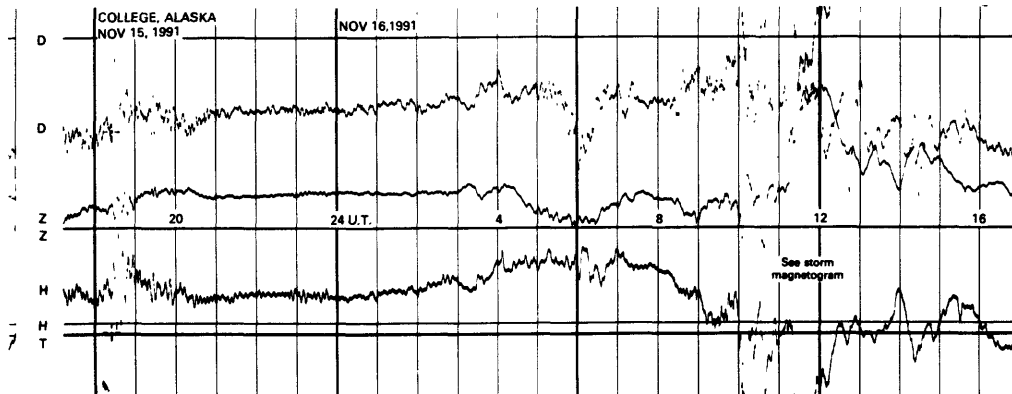
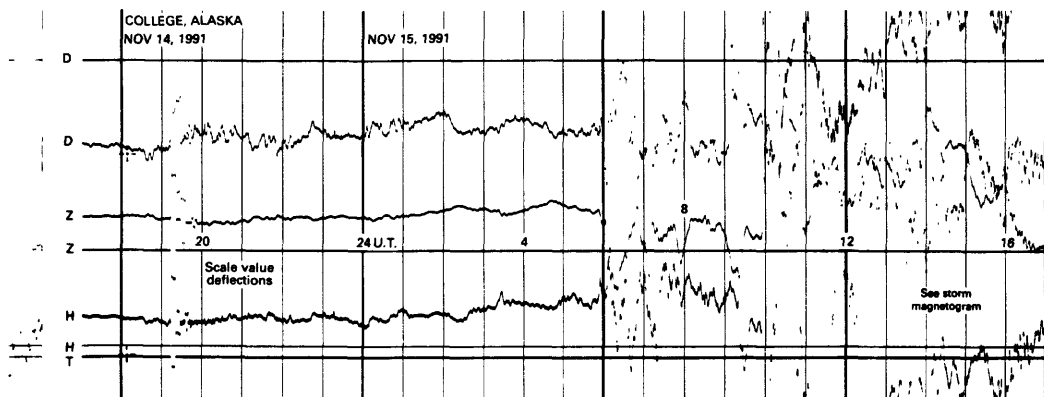
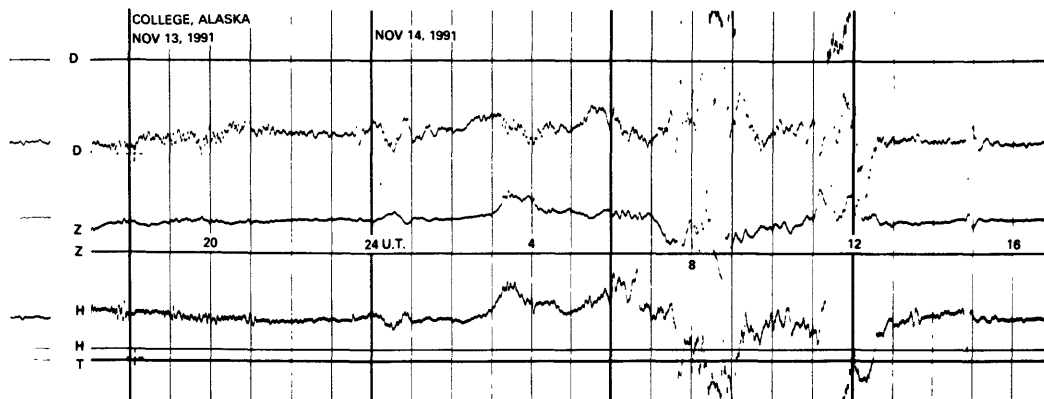
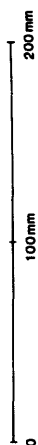


NORMAL MAGNETOGRAMS

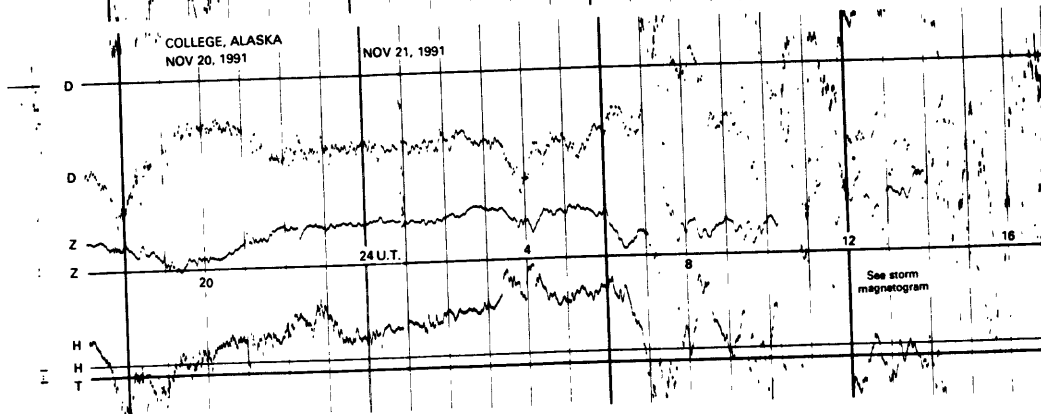
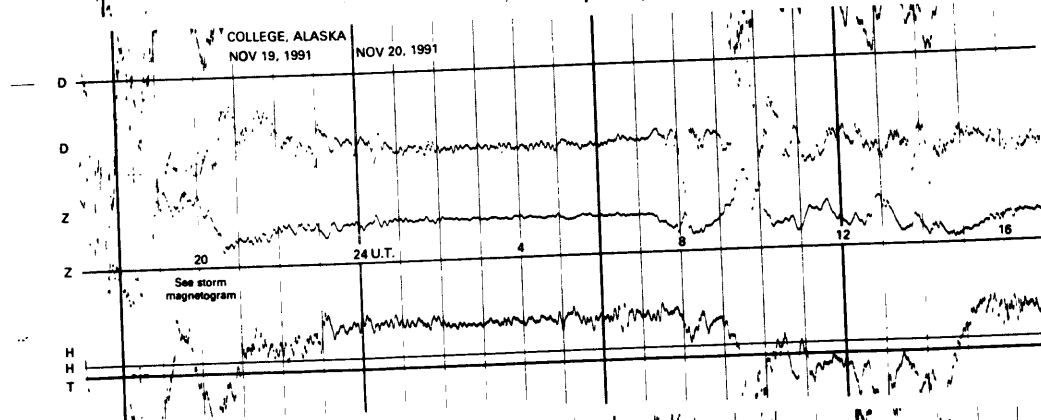
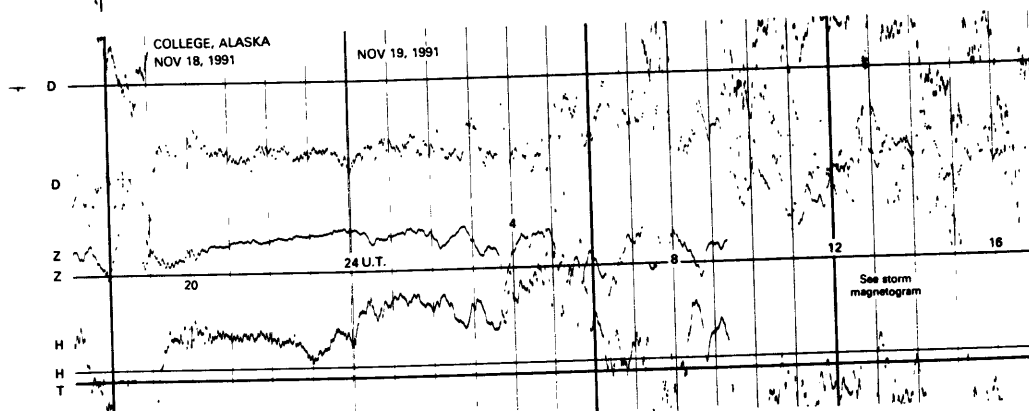
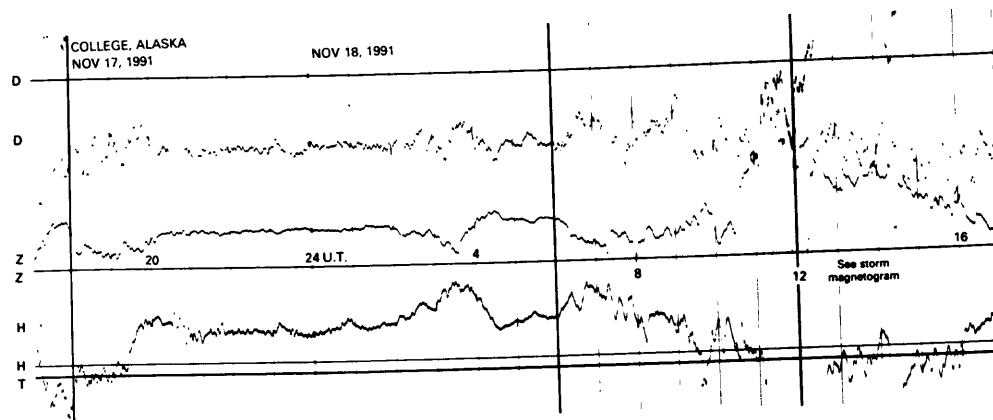
200 mm
100 mm
0



NORMAL MAGNETOGRAMS

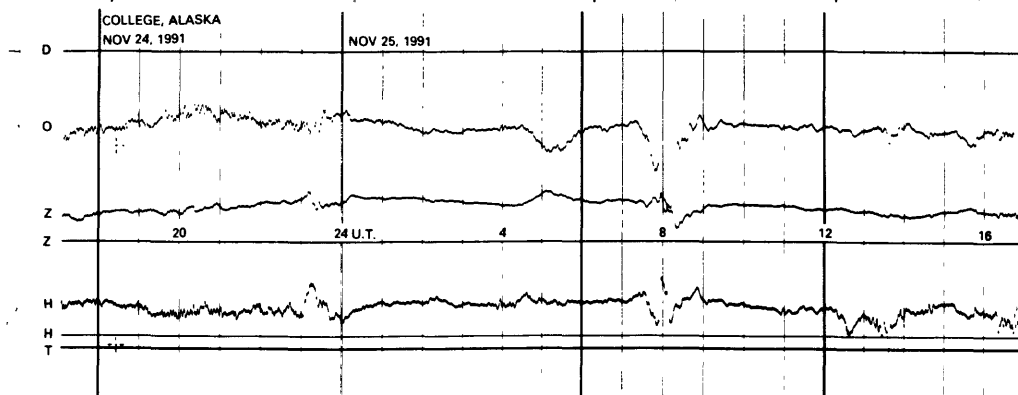
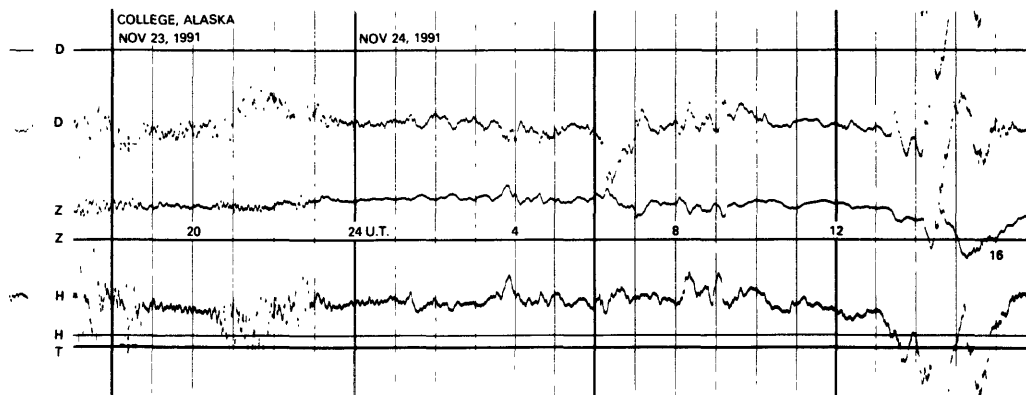
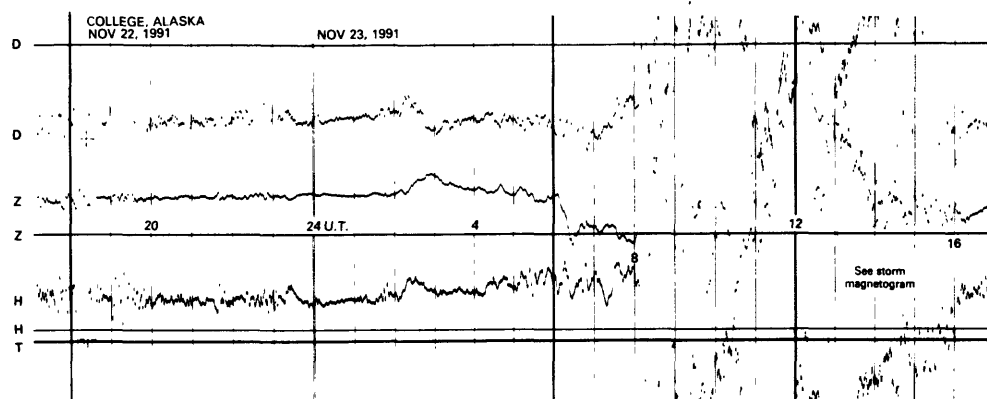
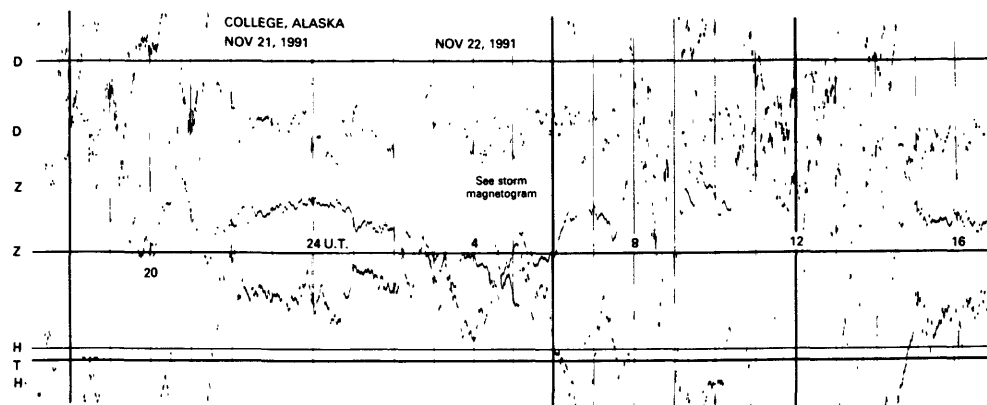


NORMAL MAGNETOGRAMS



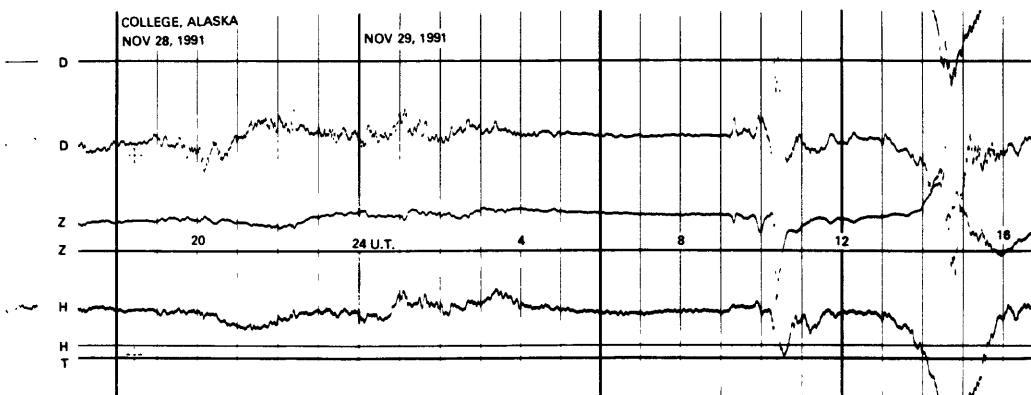
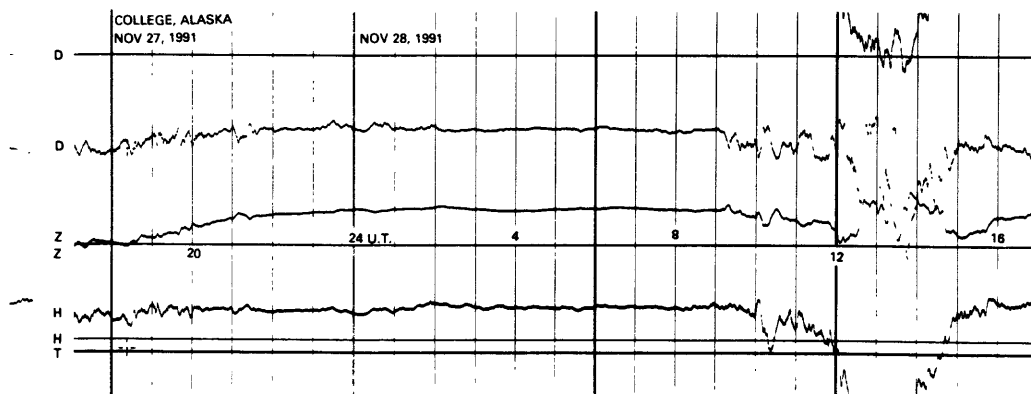
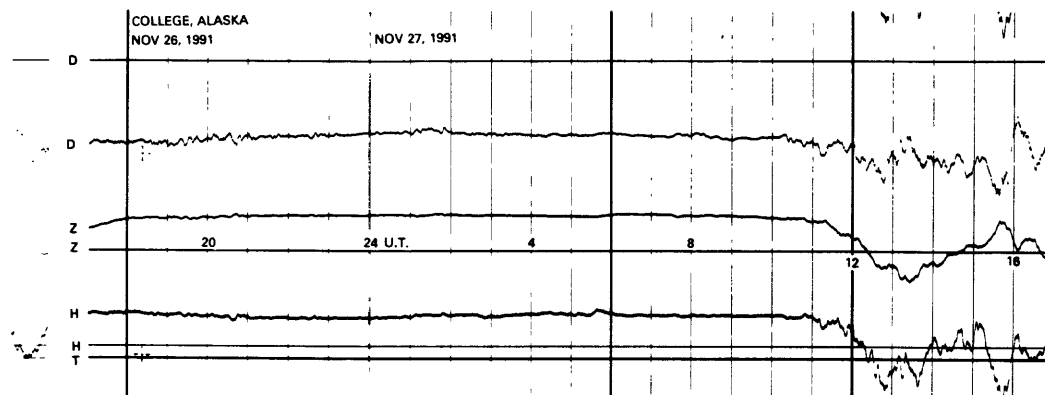
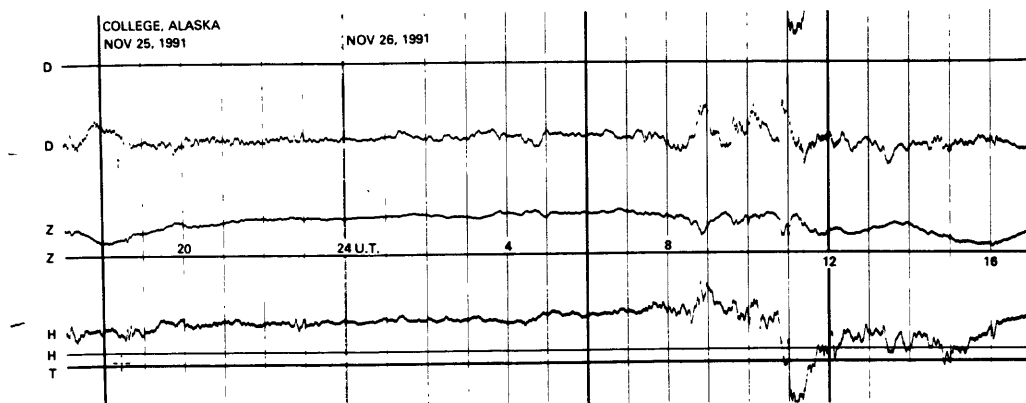
NORMAL MAGNETOGRAMS

200 mm
100 mm
0

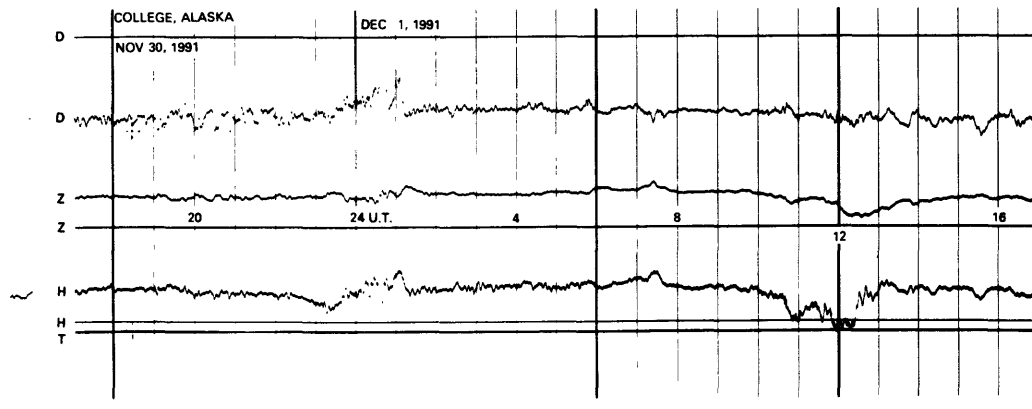
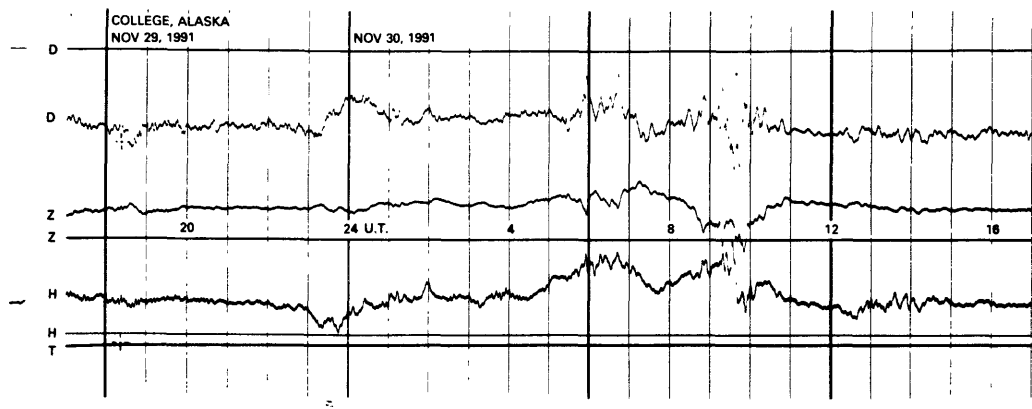
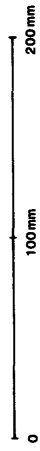


NORMAL MAGNETOGRAMS

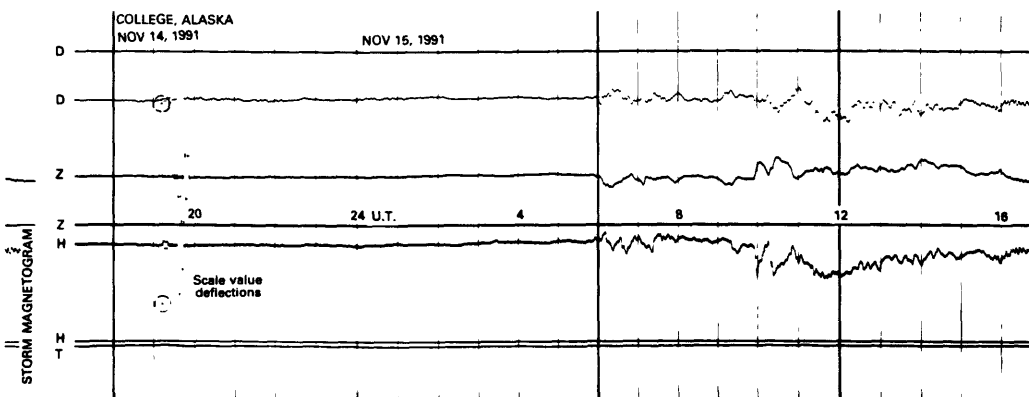
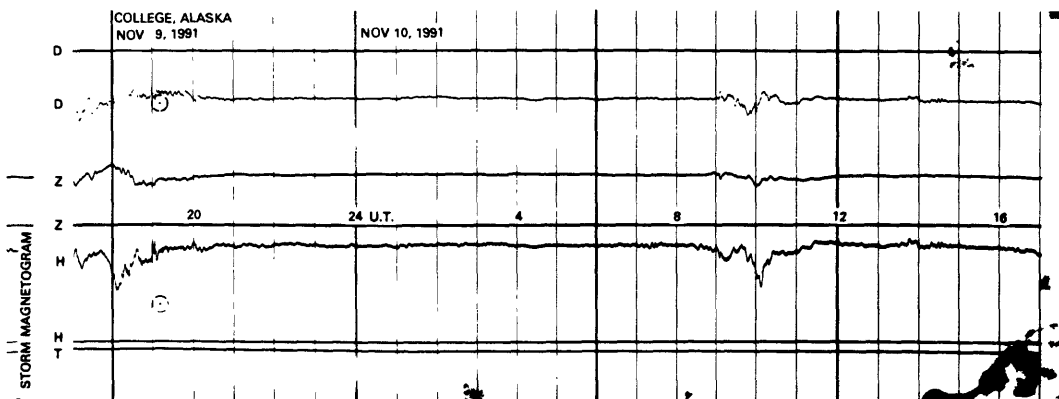
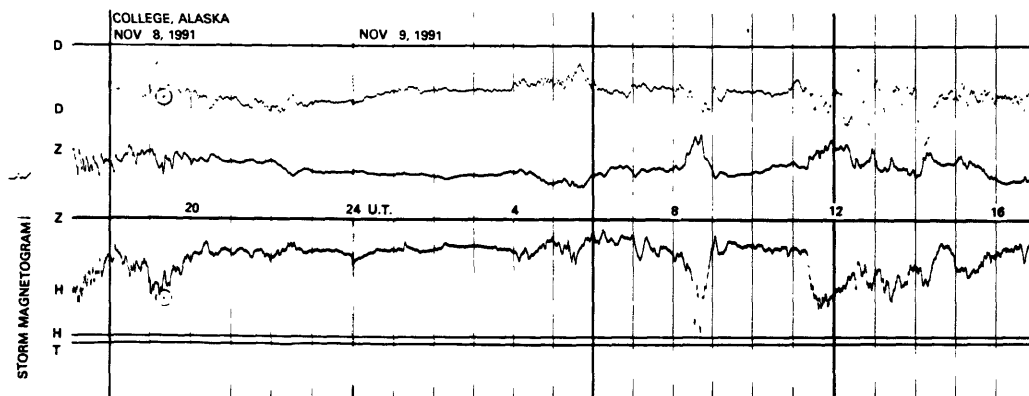
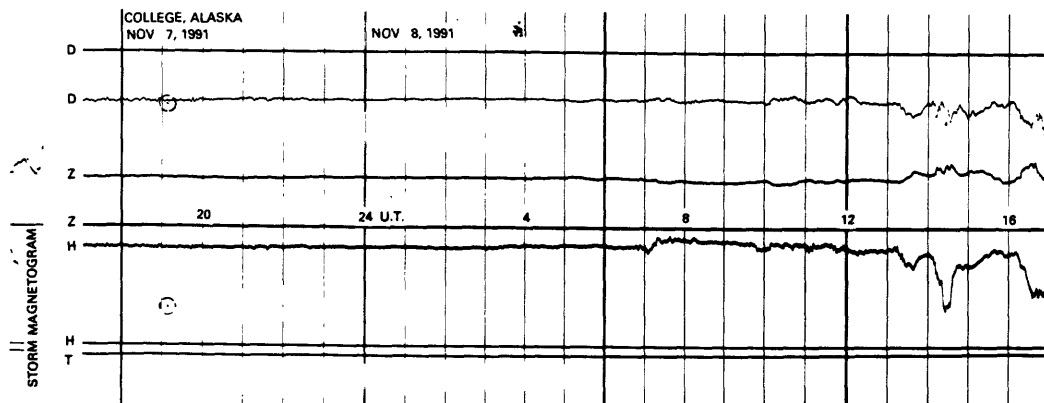
200 mm
100 mm
0



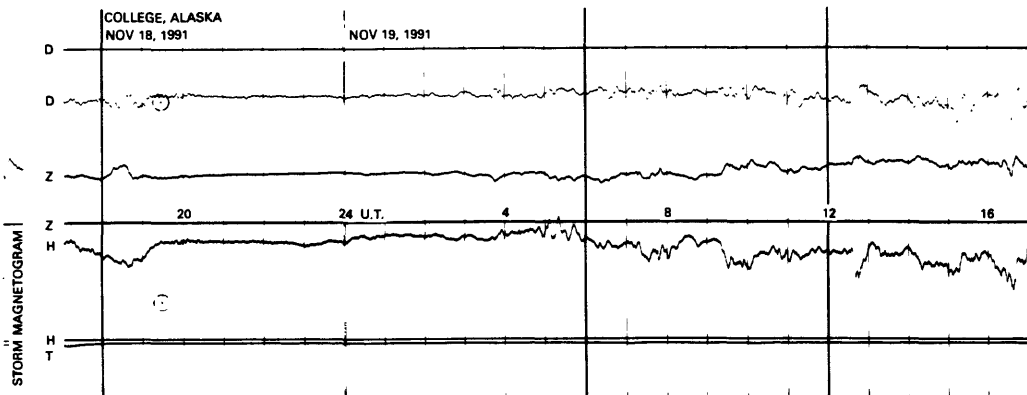
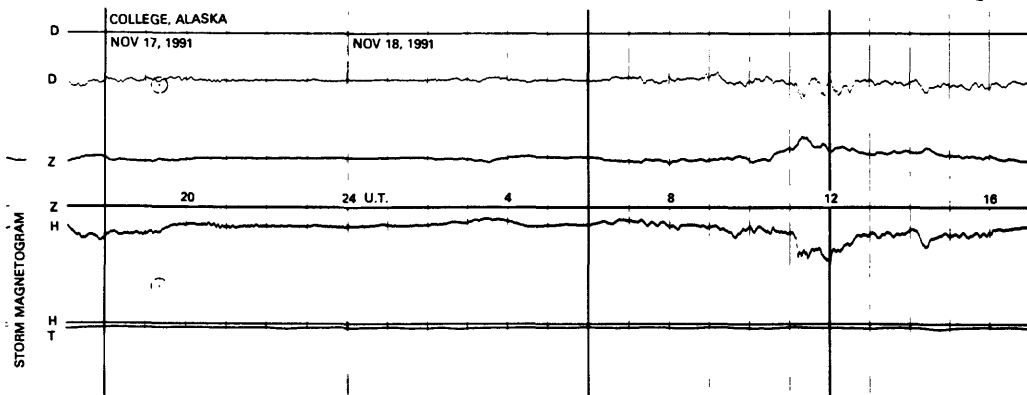
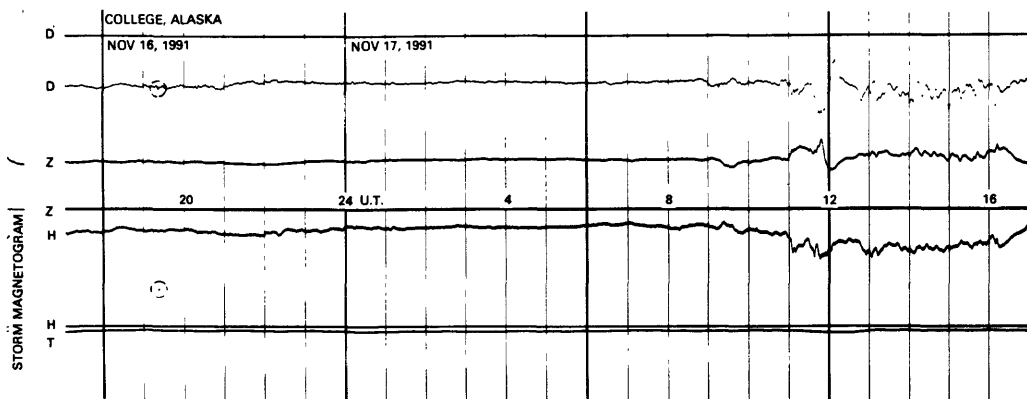
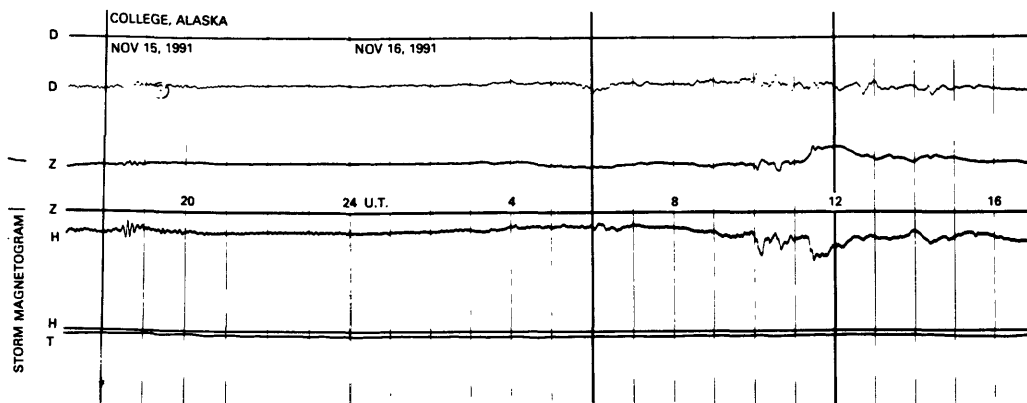
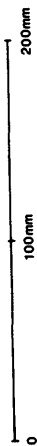
NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

