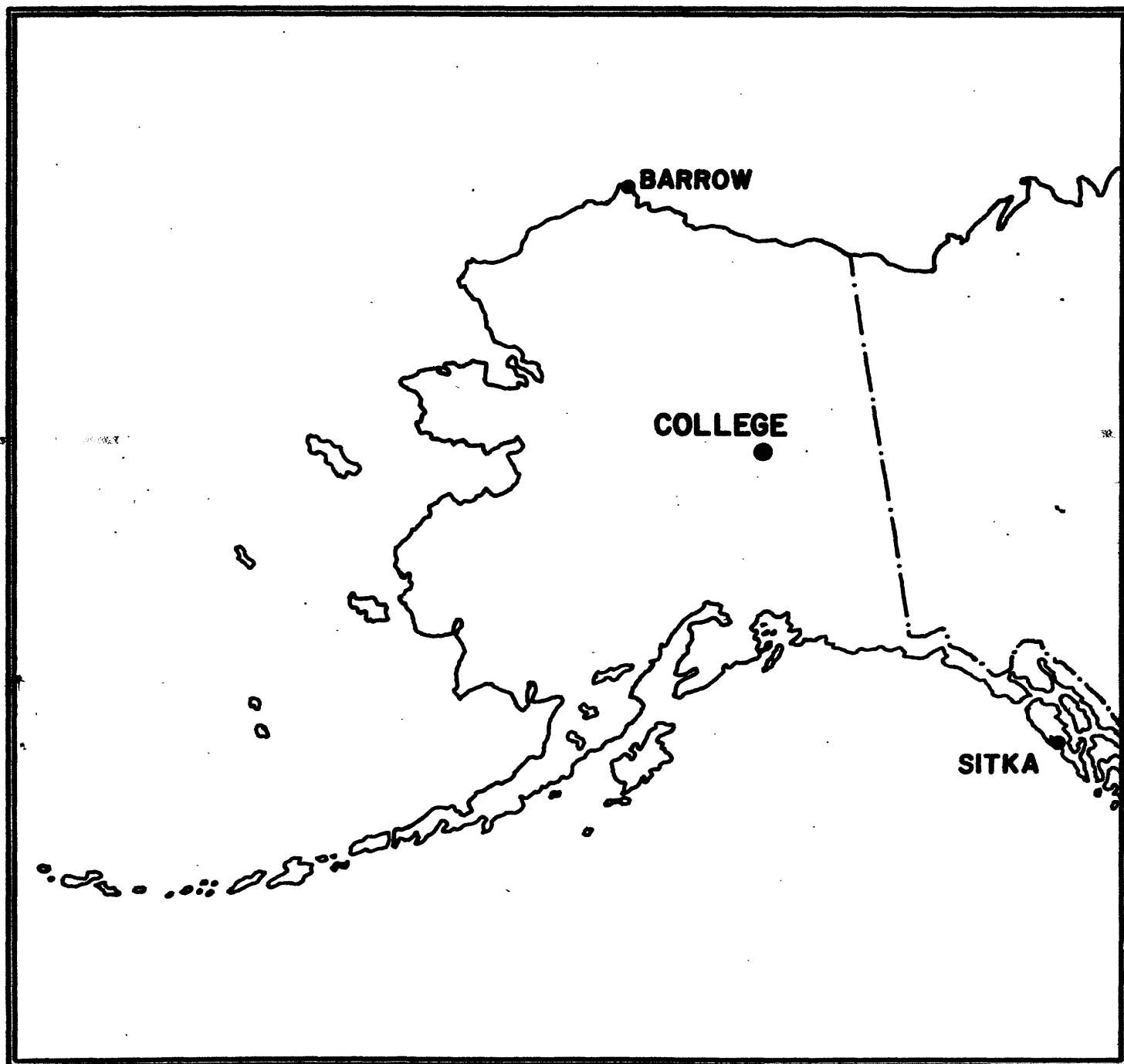


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

AUGUST 1988

OPEN FILE REPORT 88-0300H



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSEND,
CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE
OBSERVATORY STAFF MEMBERS: R.V. O'CONNELL AND L.Y. TORRENCE AND
IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY
OF ALASKA. THE COLLEGE OBSERVATORY IS A 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 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 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..... $+256.5^{\circ}$
Elevation.....200 meters

GEOMAGNETIC DATA

Normal and storm magnetograms and appropriate calibration data are processed at the observatory and are available for analysis or copying. Also available are mean hourly scalings for the five quietest days for the month and K-Indices.

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 10γ has been chosen so as not to give the illusion of a 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)

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 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 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.

College Alaska

MONTH AND YEAR

August 1988

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

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		
1	3	3	2	1	1	1	2	1	14	07	SUDDEN COMMENCEMENTS d h m
2	2	2	0	0	1	1	1	1	8	03	
3	2	3	3	2	2	0	0	0	12	06	
4	1	1	0	0	0	1	0	0	3	01	
5	1	1	1	2	4	5	1	2	17	13	
6	2	2	2	0	0	0	1	1	8	03	
7	1	2	1	0	0	0	1	1	6	02	
8	0	0	0	0	0	0	2	1	3	01	
9	1	3	2	1	2	3	4	4	20	13	
10	3	2	1	2	0	2	2	2	14	07	
11	2	2	2	6	5	1	2	1	21	20	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)
12	3	2	3	5	5	5	3	2	28	25	
13	3	4	3	6	6	5	2	2	31	35	
14	2	3	6	5	5	5	2	1	29	32	
15	2	3	5	7	5	5	3	2	32	41	
16	3	2	5	4	3	3	2	0	22	17	
17	2	2	3	2	2	0	1	1	13	06	
18	2	3	3	6	4	4	1	1	24	22	
19	2	2	3	4	4	5	1	1	22	17	
20	2	4	4	3	6	5	2	2	28	27	
21	2	1	1	1	3	0	0	3	11	06	BEGIN END d h m d h m
22	4	5	5	1	1	2	2	1	21	18	
23	3	3	3	3	3	5	2	2	24	17	
24	2	2	2	4	3	2	2	3	20	12	
25	2	3	3	3	4	4	2	1	22	15	
26	2	3	1	0	2	2	1	2	13	06	
27	3	4	3	5	4	4	2	2	27	22	
28	1	2	4	2	2	2	2	3	18	10	
29	3	3	5	5	2	4	2	2	26	22	
30	3	4	6	2	0	2	2	1	20	18	
31	2	2	0	0	1	5	3	3	16	12	

K SCALE USED:

LOWER LIMIT FOR K = 9.....

D

675.7

H

322.2

Z

(mm)

CURRENT SCALE VALUE.....

3.70

7.79

(γ/mm)

LOWER LIMIT FOR K = 9.....

2500

2510

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

[illegible]

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0000 U.T., 8/1/88	2330 U.T., 8/31/88	1.0' /mm	3.7' /mm	27° 01.3' E
H	(SAME)	(SAME)	7.8' /mm		12650'
Z	(SAME)	(SAME)	7.7' /mm		55160'

STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0000 U.T., 8/1/88	2400 U.T., 8/31/88	7.9' /mm	29.5' /mm	
H	(SAME)	(SAME)	43.5' /mm		
Z	(SAME)	(SAME)	49.0' /mm		

RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 10.3' E	12828'	55307'

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: AUGUST 2, 4, 6, 7, 8,

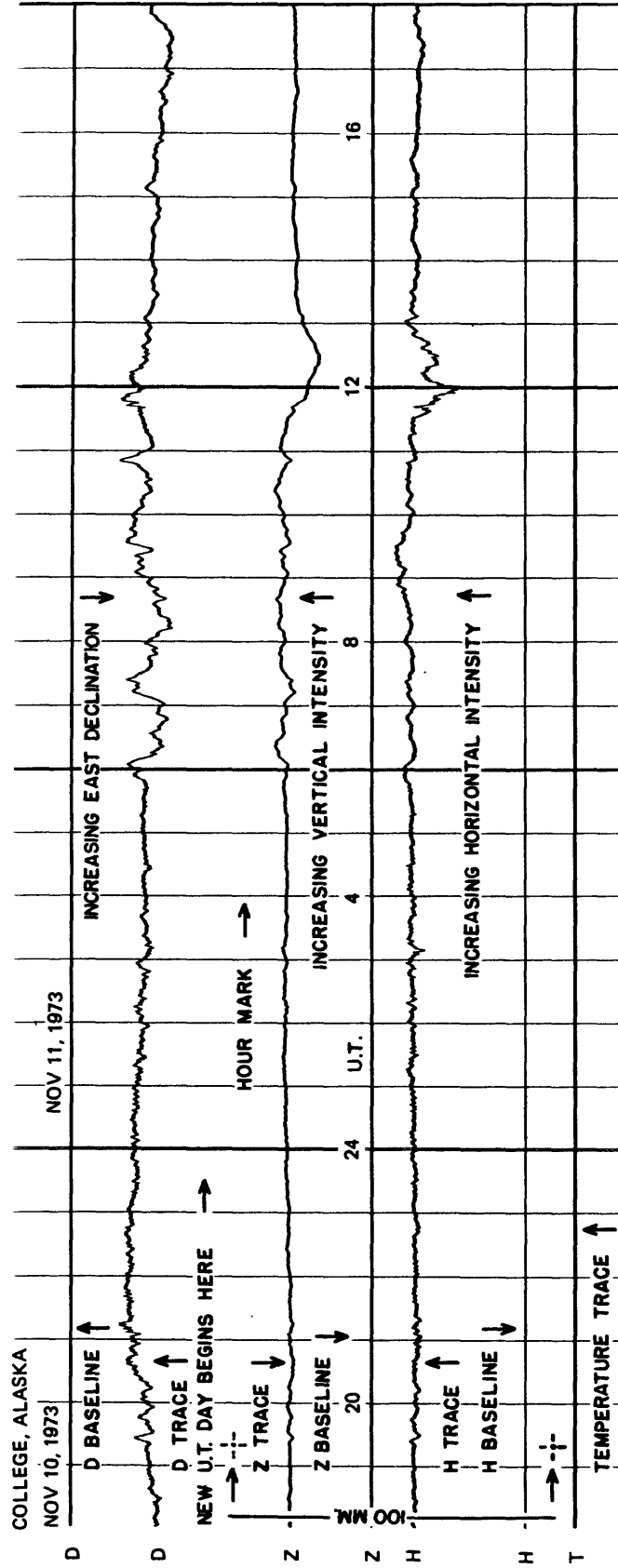
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

Values are in Tenths of mm 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		02	04	06	07	08	02	04	06	07	08	02	04	06	07	08	02	04	06	07	08	02	04	06	07	08	DAY	
A _k		03	01	03	02	01	03	01	03	02	01	03	01	03	02	01	03	01	03	02	01	03	01	03	02	01	A _k	
HOUR		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	HOUR		
		17	31	10	52	35	240	219	218	220	214	172	193	182	191	182	196	198	193	195	191	205	206	200	190	01	182	
		29	30	30	25	50	258	230	228	220	220	196	205	193	193	190	211	205	192	193	195	193	200	190	02	190		
		44	30	08	32	49	241	247	241	239	221	211	205	192	193	192	211	205	192	193	195	193	200	190	03	192		
		47	41	29	29	43	248	232	232	250	229	208	206	193	193	189	208	206	193	193	195	200	190	04	189			
		34	45	16	41	48	241	246	254	240	240	211	201	189	200	190	211	201	189	200	195	200	190	05	190			
		80	50	60	77	69	236	258	229	221	240	240	207	201	204	192	240	207	201	204	195	204	192	06	192			
		68	82	68	71	73	234	266	234	233	239	208	213	195	192	190	208	213	195	192	191	192	190	07	190			
		70	83	70	81	77	244	260	235	238	248	200	211	191	191	190	200	211	191	191	191	191	190	08	190			
		78	83	75	86	81	250	250	239	245	240	201	220	191	191	191	201	220	191	191	191	190	190	09	191			
		81	98	79	80	76	245	244	240	250	255	200	220	191	190	190	200	220	191	190	188	193	192	193	10	190		
		83	102	89	79	90	242	238	239	250	247	198	208	191	188	195	198	208	191	188	193	192	192	193	11	195		
		89	112	106	98	99	238	233	239	238	236	197	202	193	192	193	197	202	193	192	192	192	192	193	12	193		
		94	122	121	120	120	235	231	246	239	237	190	200	195	192	191	190	200	195	192	192	192	192	193	13	191		
		116	140	140	134	141	220	236	240	249	239	187	200	195	192	192	187	200	195	192	192	192	192	193	14	192		
		146	149	162	155	160	207	235	245	250	239	168	198	193	191	190	168	198	193	191	191	191	191	190	15	190		
		180	163	171	169	187	220	227	252	246	240	174	195	189	187	188	174	195	189	187	187	185	185	180	16	188		
		209	172	170	189	202	216	230	251	236	239	183	192	191	185	180	183	192	191	185	185	185	185	180	17	180		
		222	181	181	194	220	205	210	241	224	238	194	193	193	189	177	194	193	193	189	189	189	189	177	18	177		
		241	191	179	190	221	180	209	236	200	229	193	189	192	188	172	193	189	192	188	188	188	188	172	19	172		
		173	170	158	158	210	167	200	225	192	211	170	183	184	176	171	164	183	184	176	176	176	176	171	20	171		
		124	134	150	112	160	197	192	211	192	200	164	172	179	175	164	165	172	179	175	175	175	175	164	21	164		
		48	90	102	79	111	206	194	208	205	198	165	173	167	171	160	173	173	167	171	171	171	171	160	22	160		
		23	67	91	60	90	200	194	220	206	208	177	181	169	179	167	177	181	169	179	179	179	179	167	23	167		
		40	38	101	45	72	210	205	237	201	208	180	181	188	184	170	180	181	188	184	184	184	184	170	24	170		
DAILY SUM		1336	2404	2366	2356	2684	5400	5476	5646	5484	5515	4587	4741	4537	4529	4406										DAILY SUM		
DAILY MEAN		97	100	99	98	112	225	228	235	228	230	191	198	189	189	184										DAILY MEAN		
MEAN				101					229					190												MEAN		

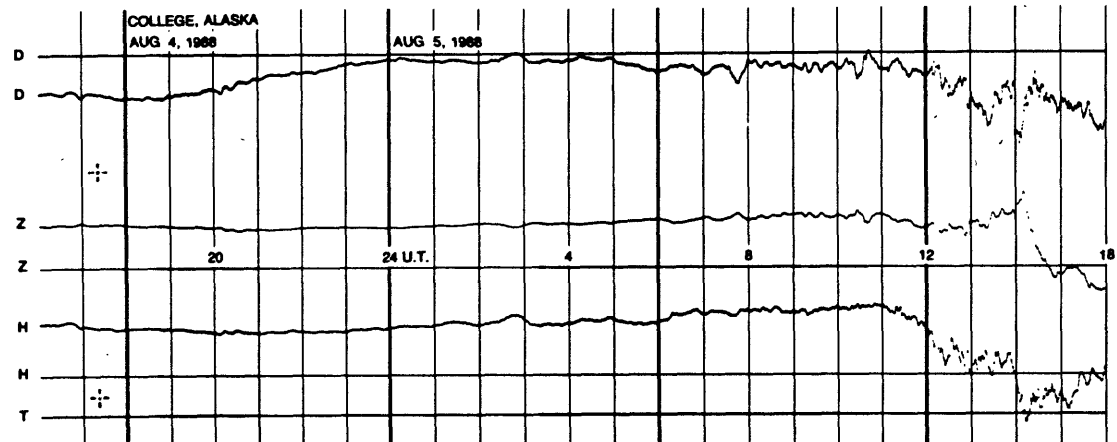
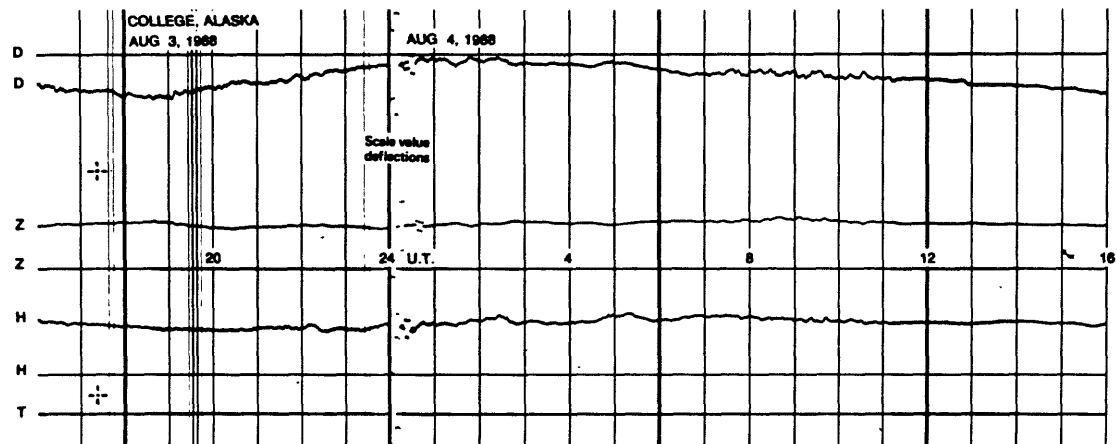
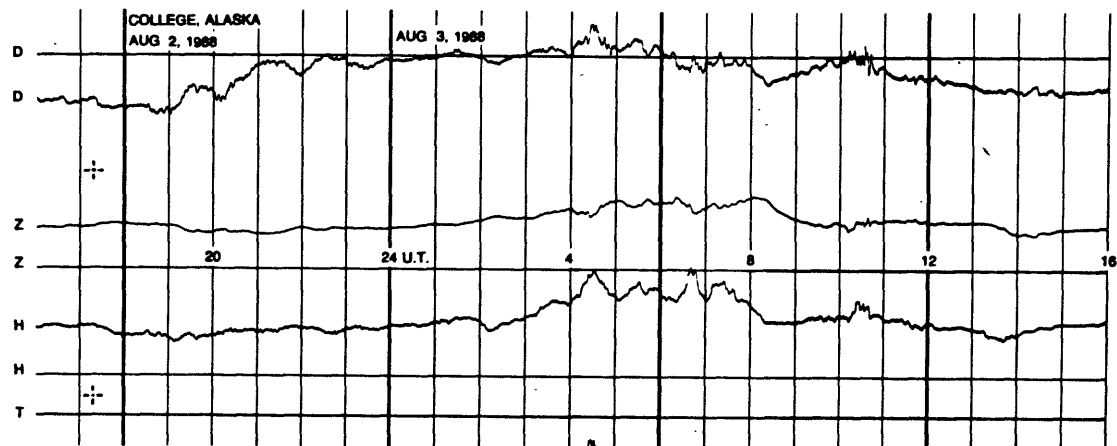
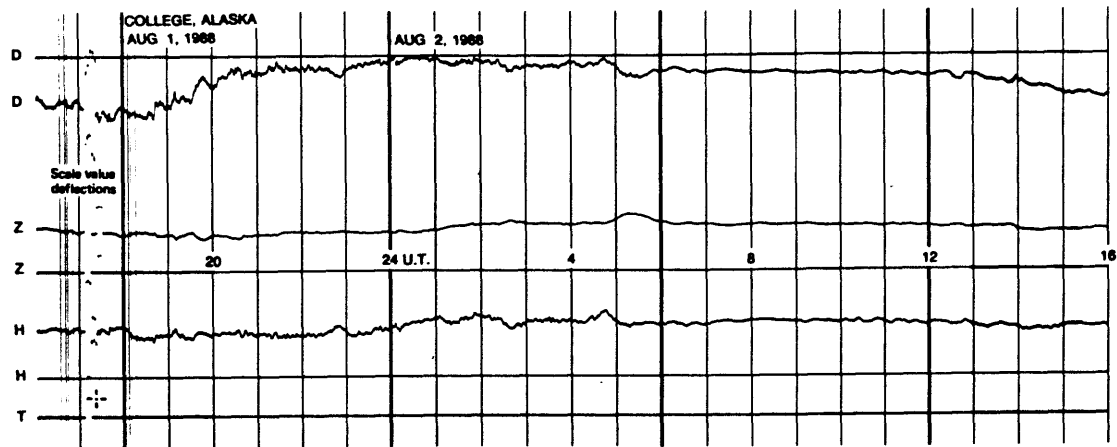
Scaled RVO Checked LYT

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



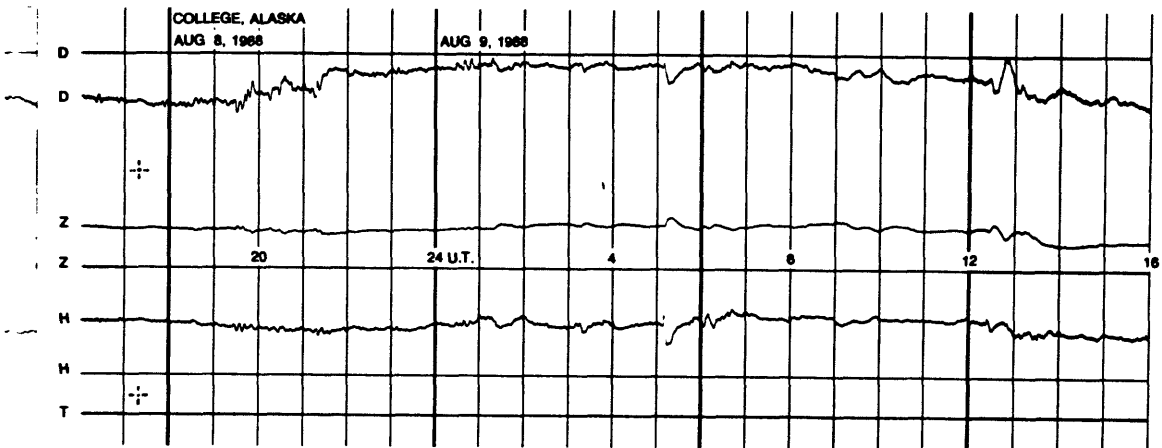
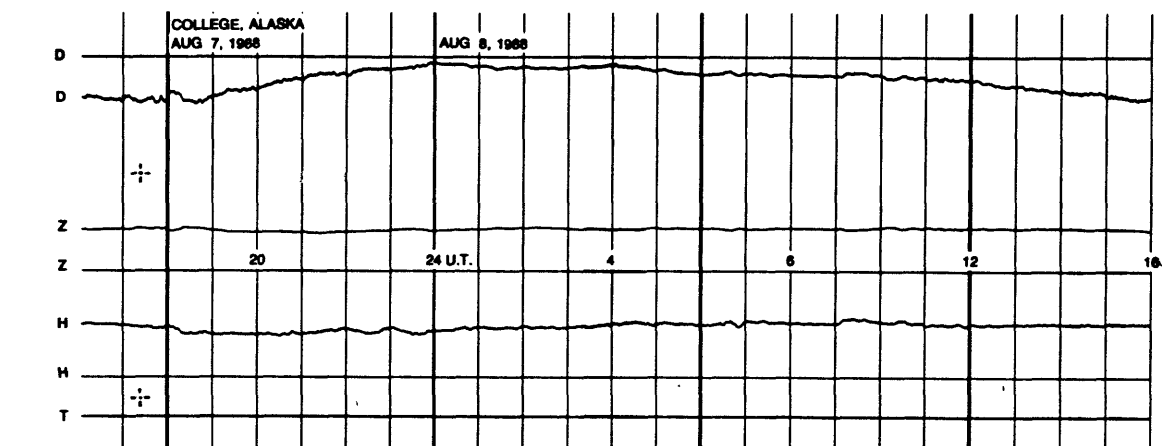
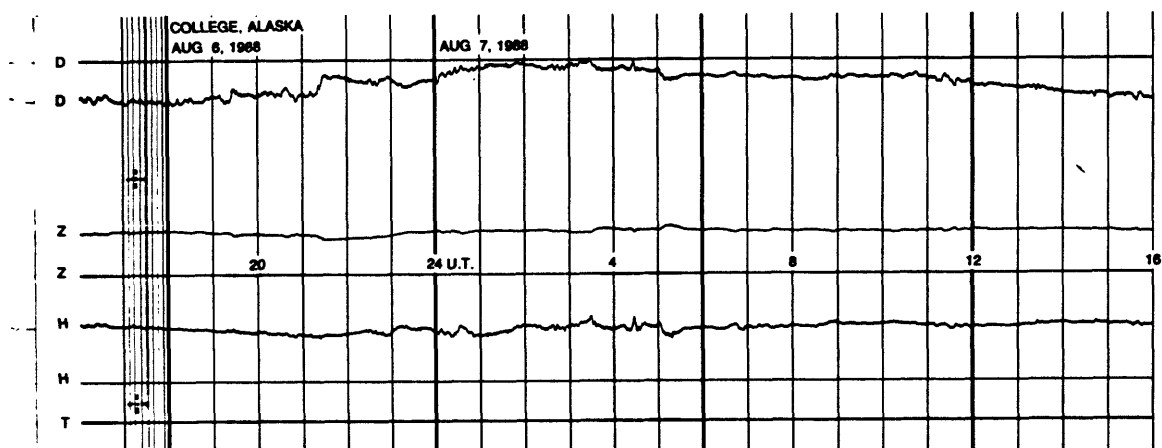
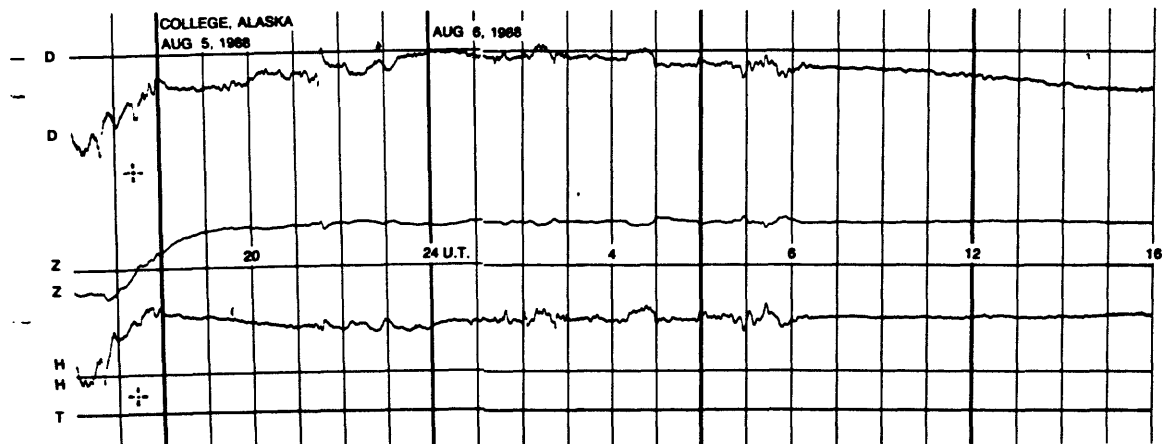
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

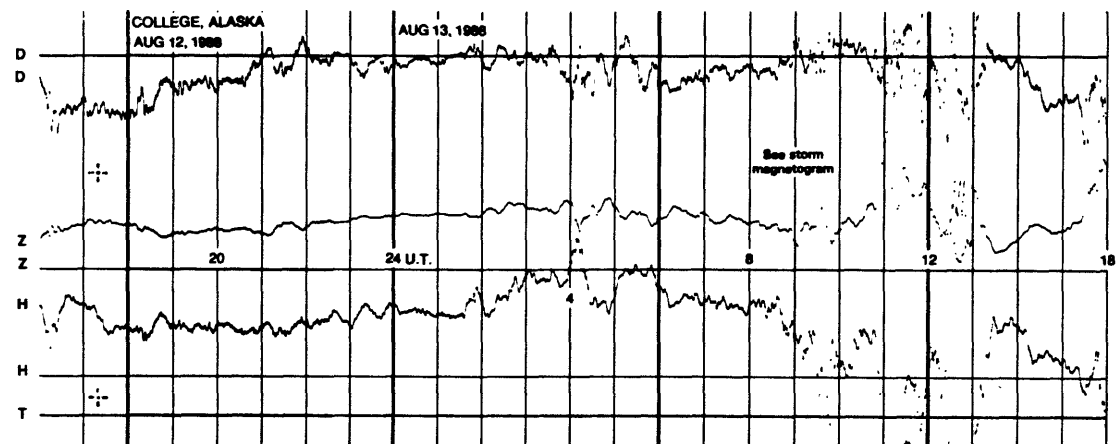
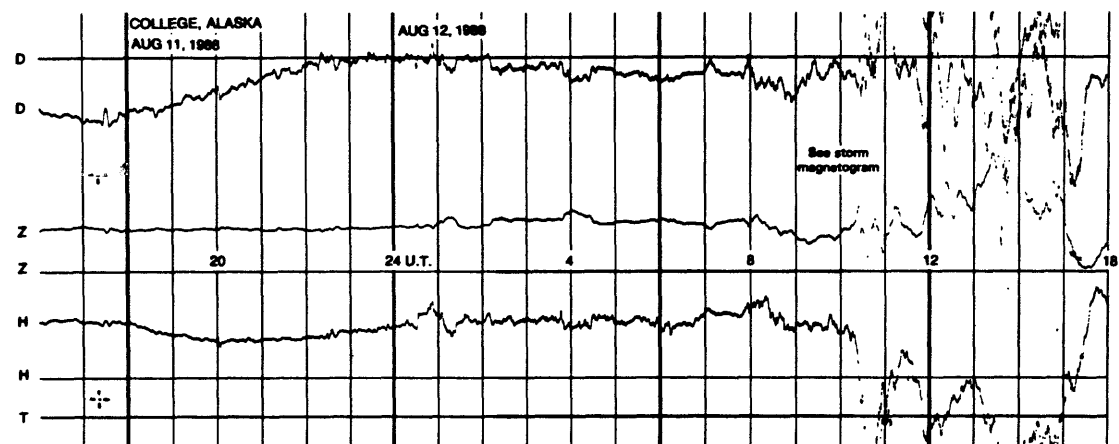
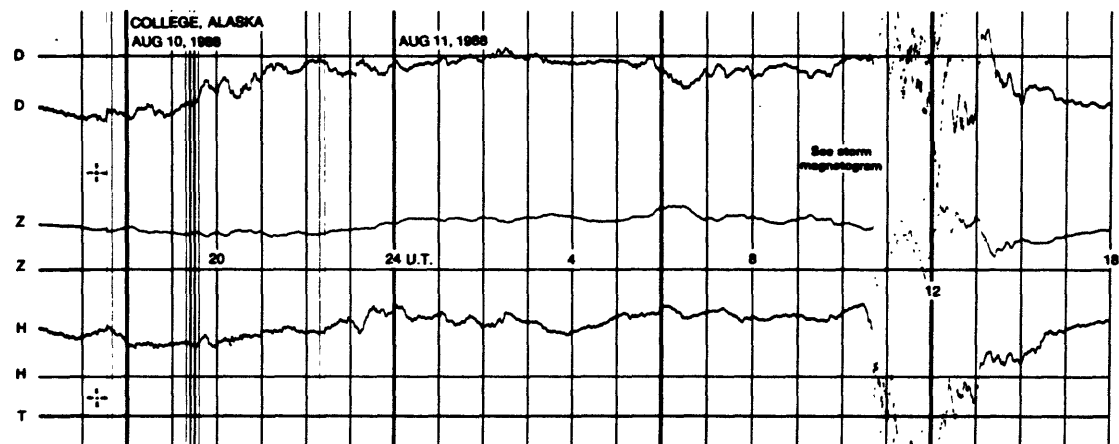
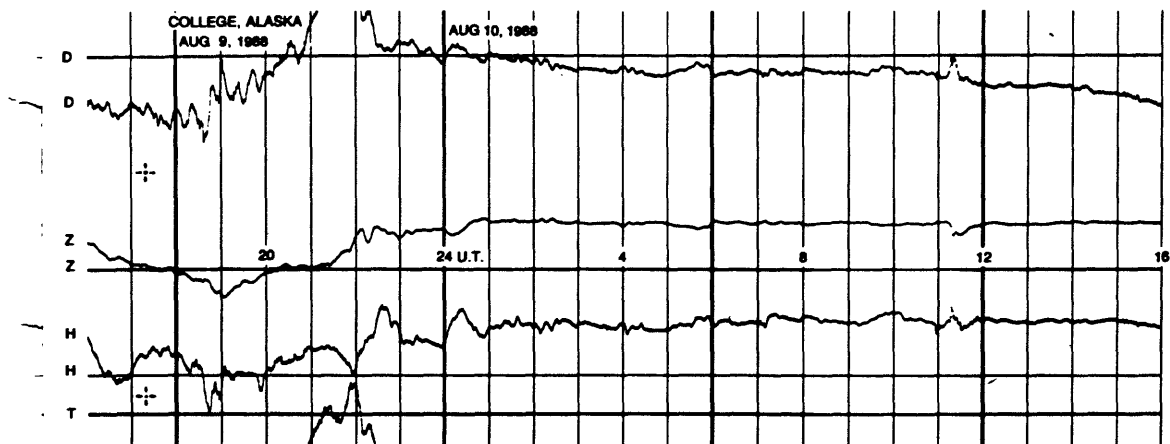


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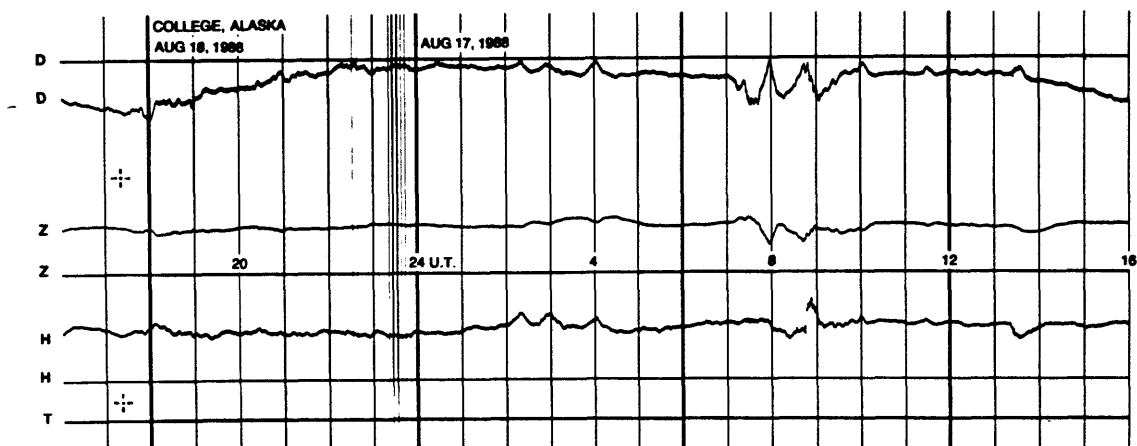
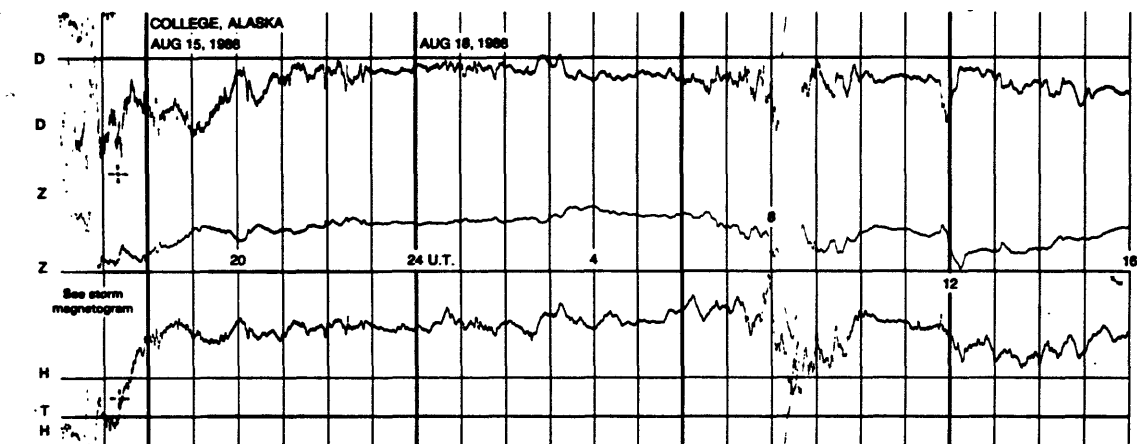
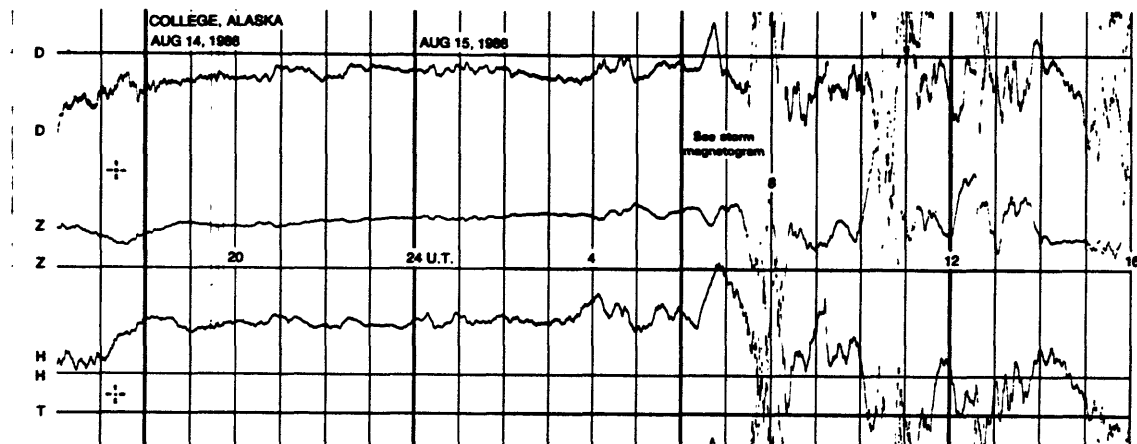
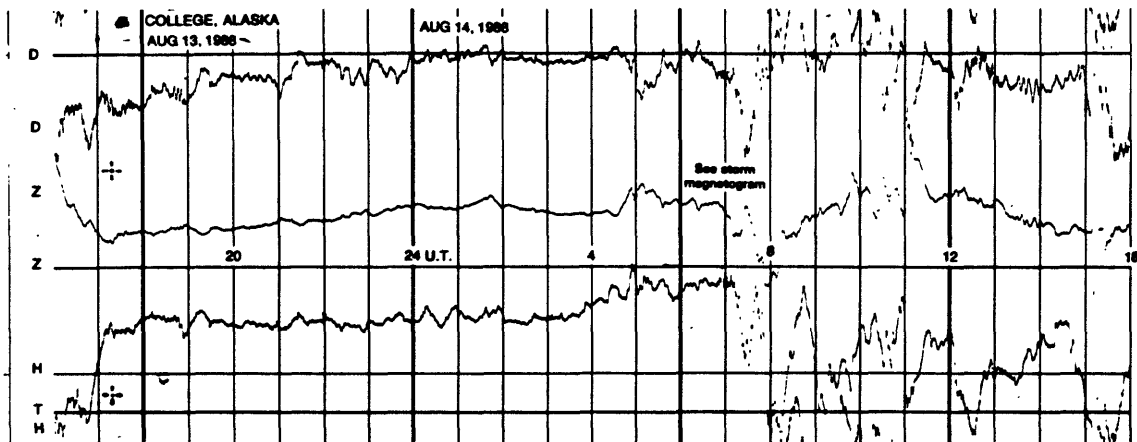
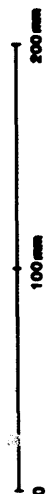
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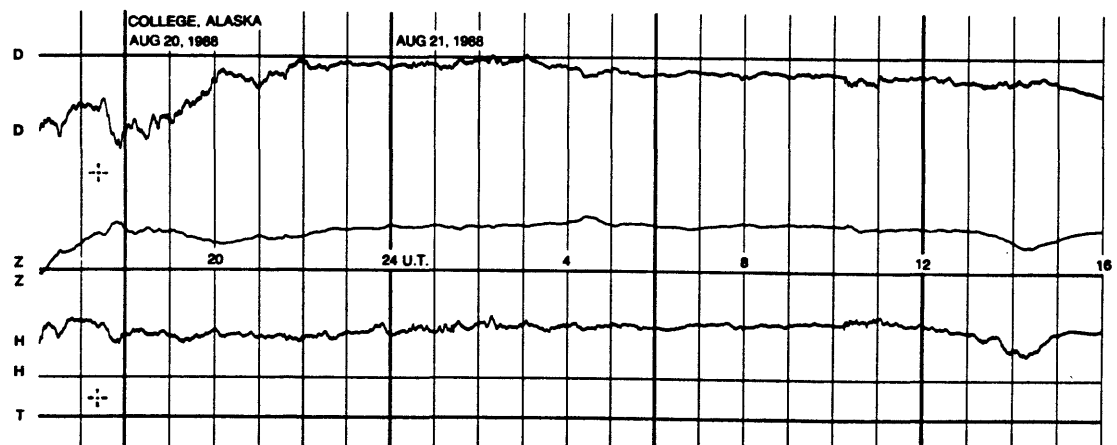
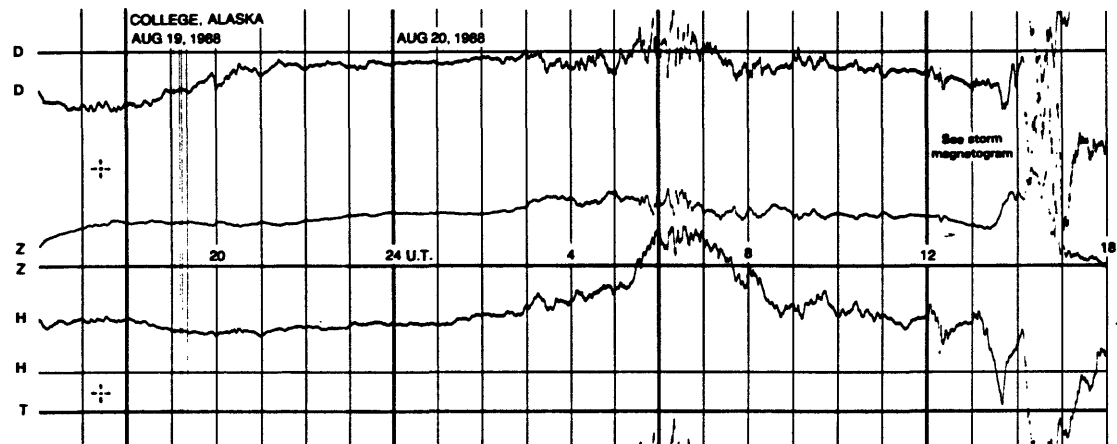
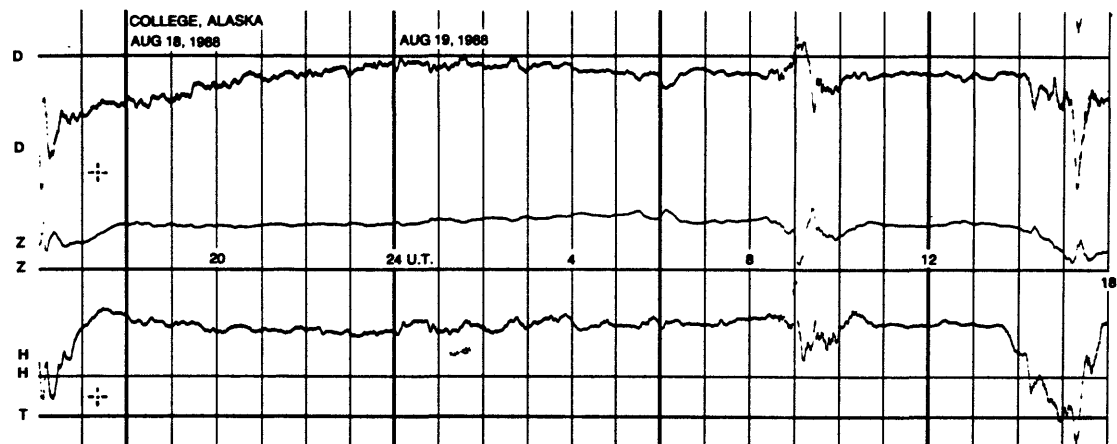
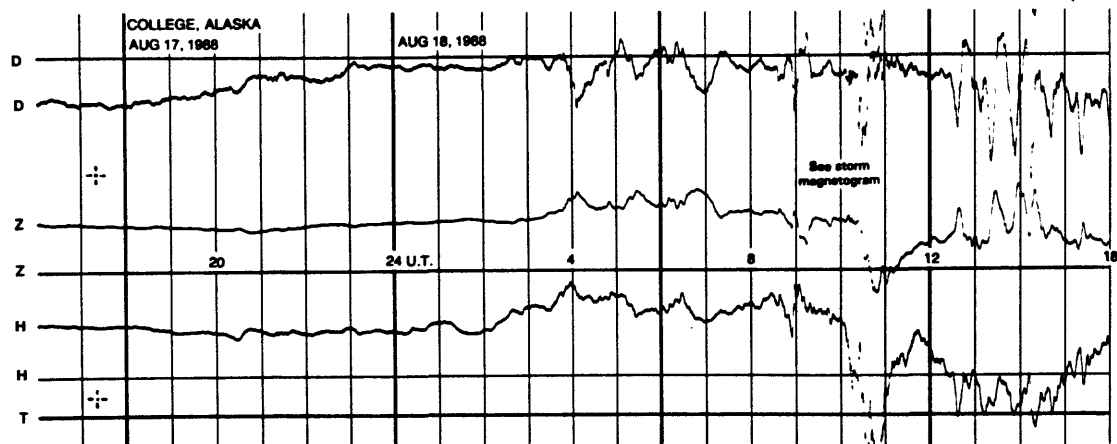
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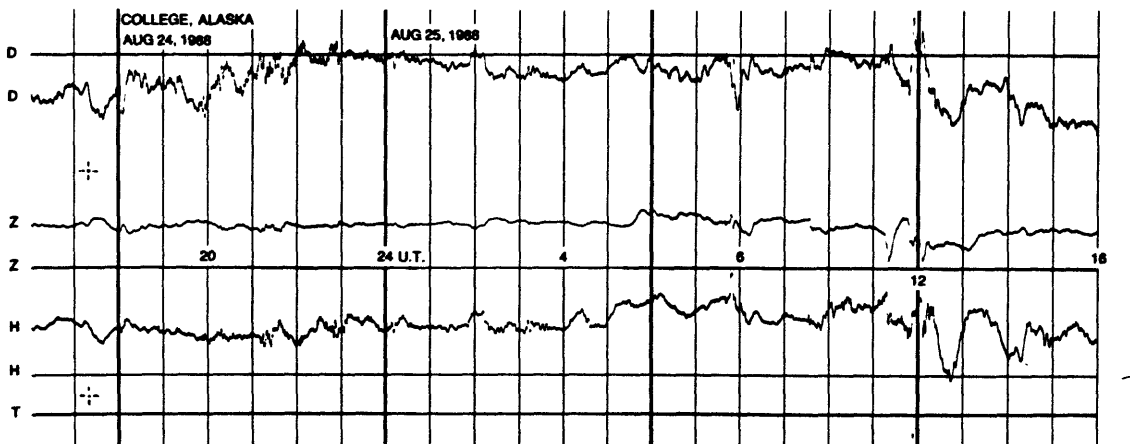
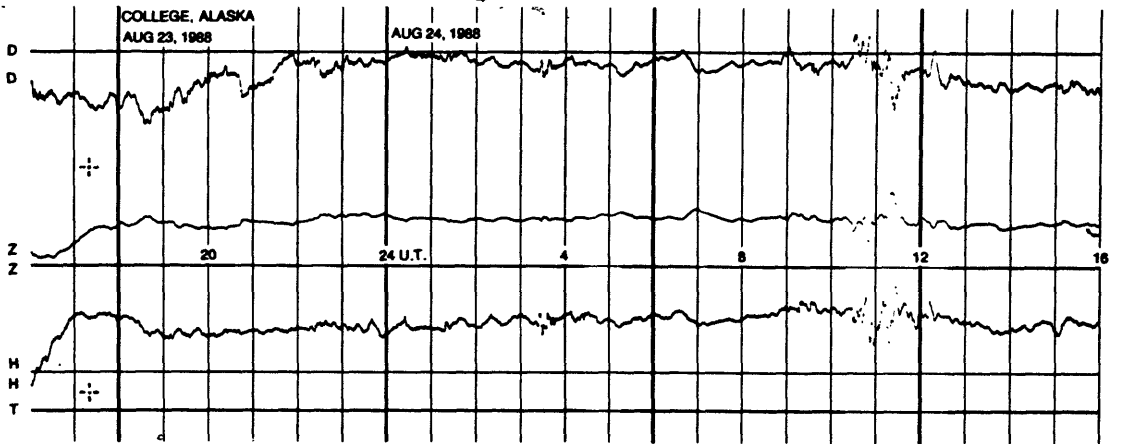
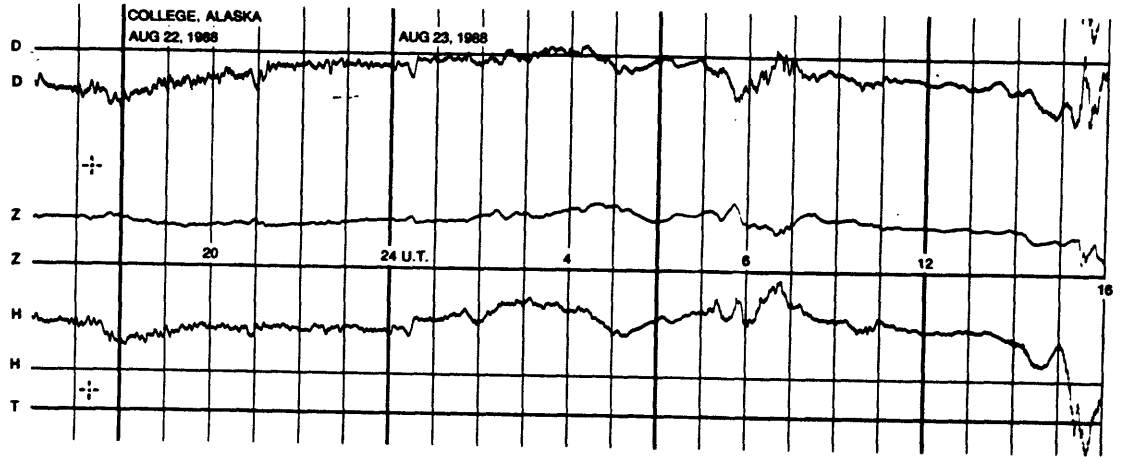
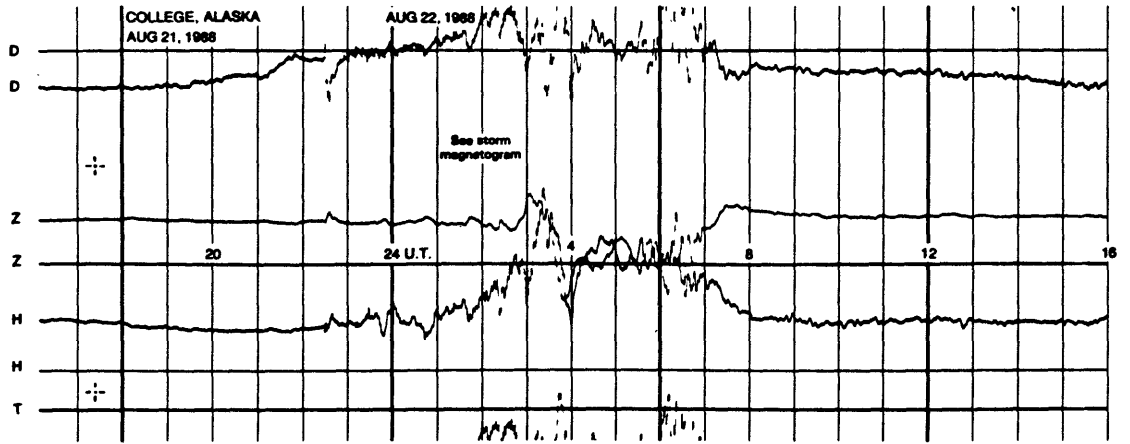
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

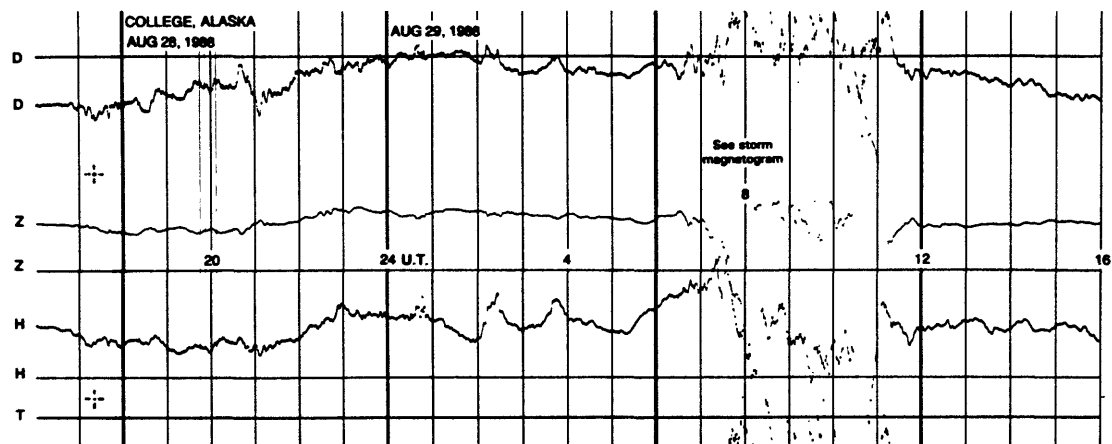
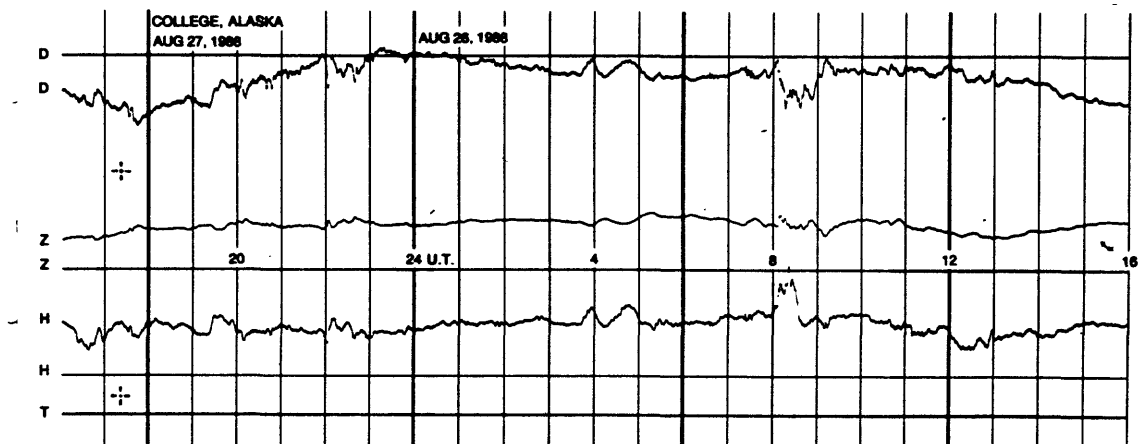
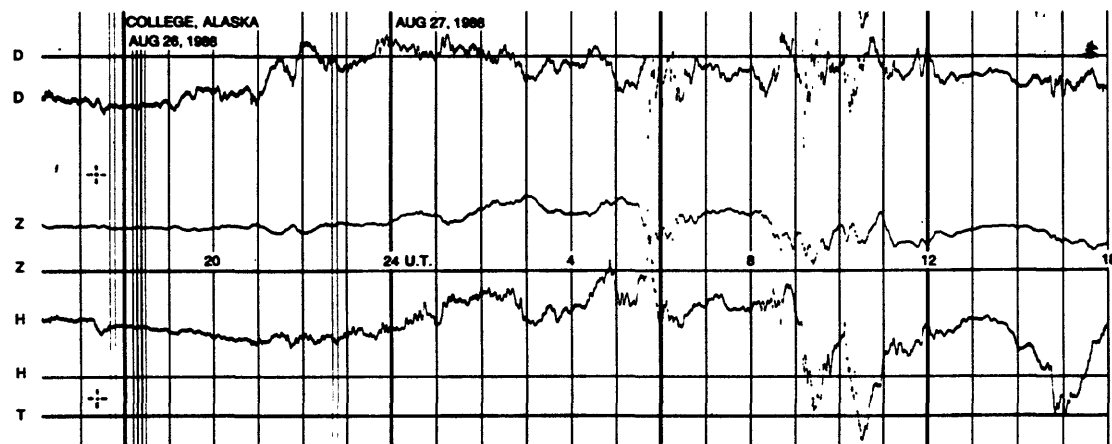
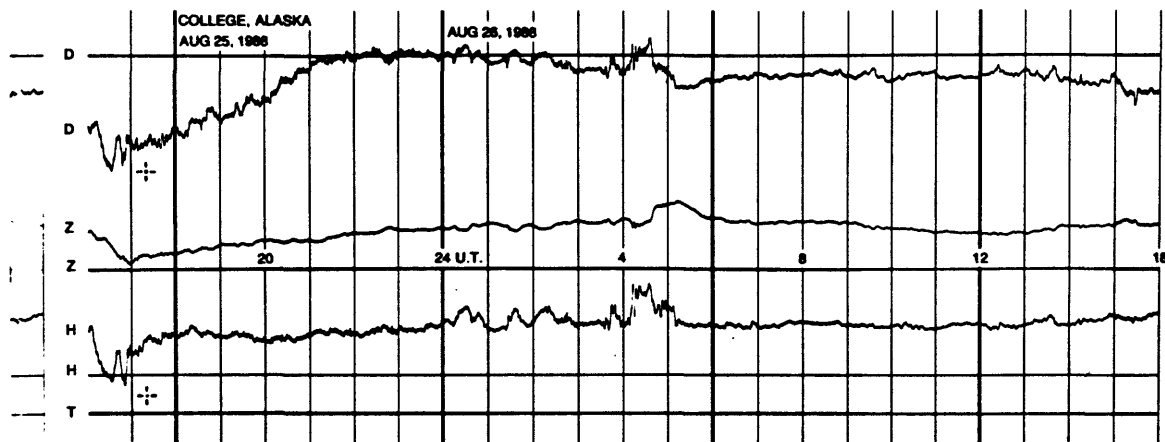


NORMAL MAGNETOGRAMS

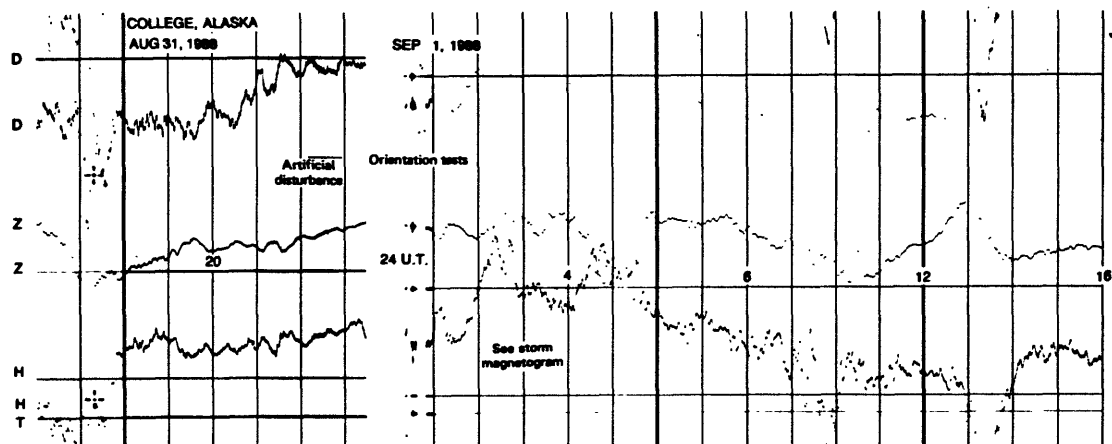
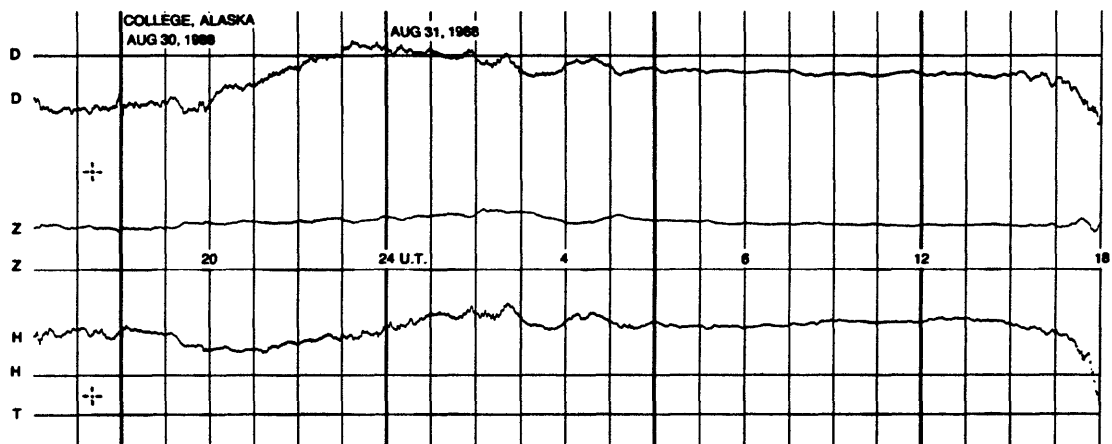
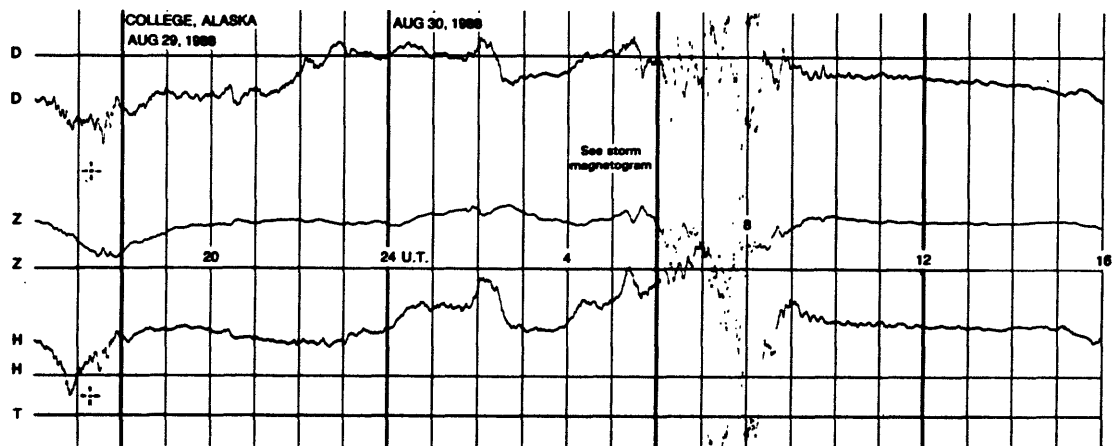


NORMAL MAGNETOGRAMS

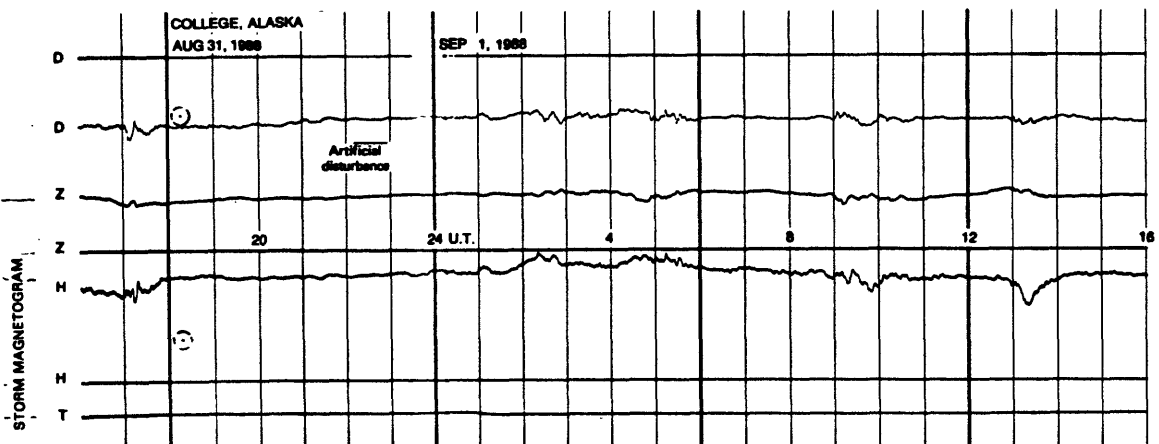
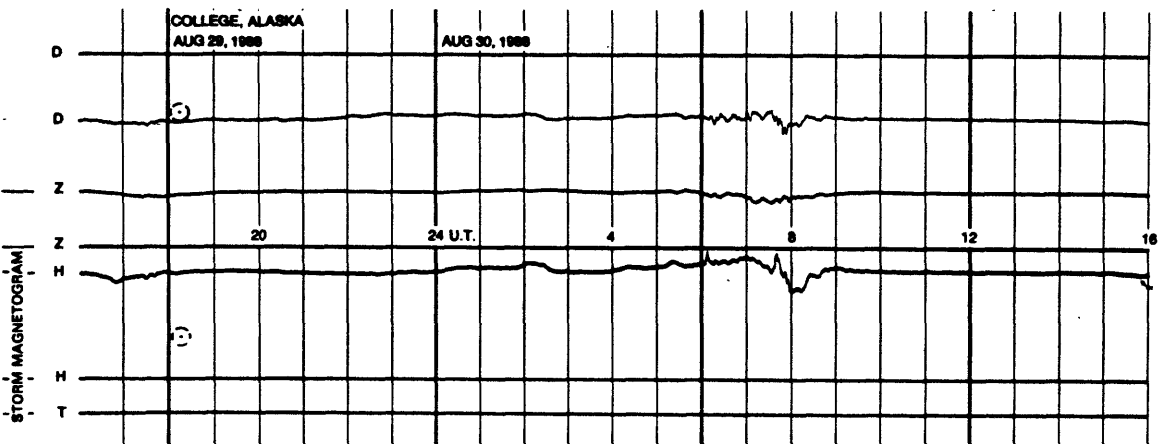
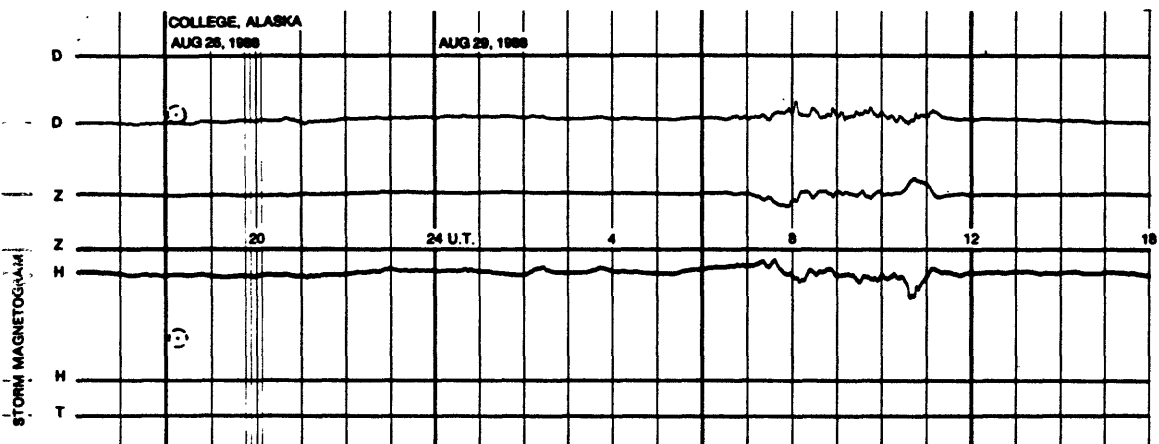
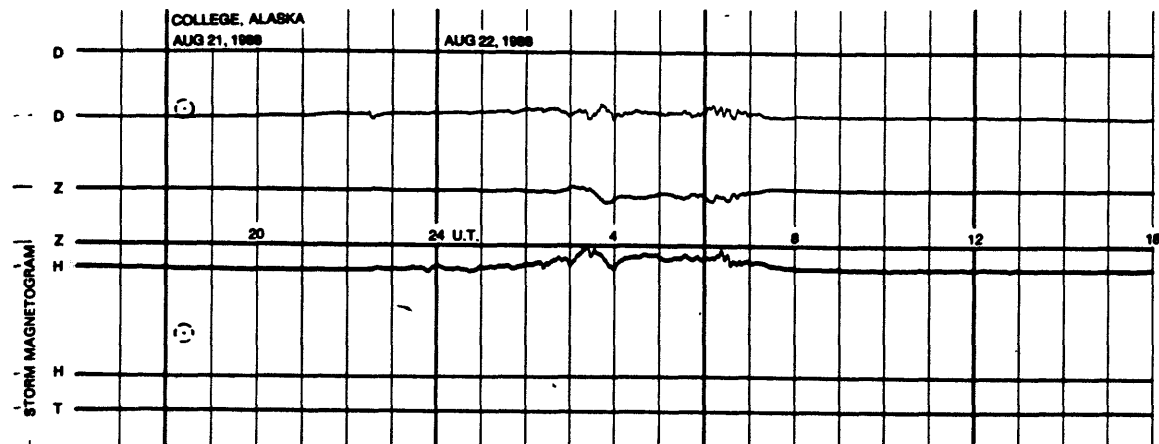
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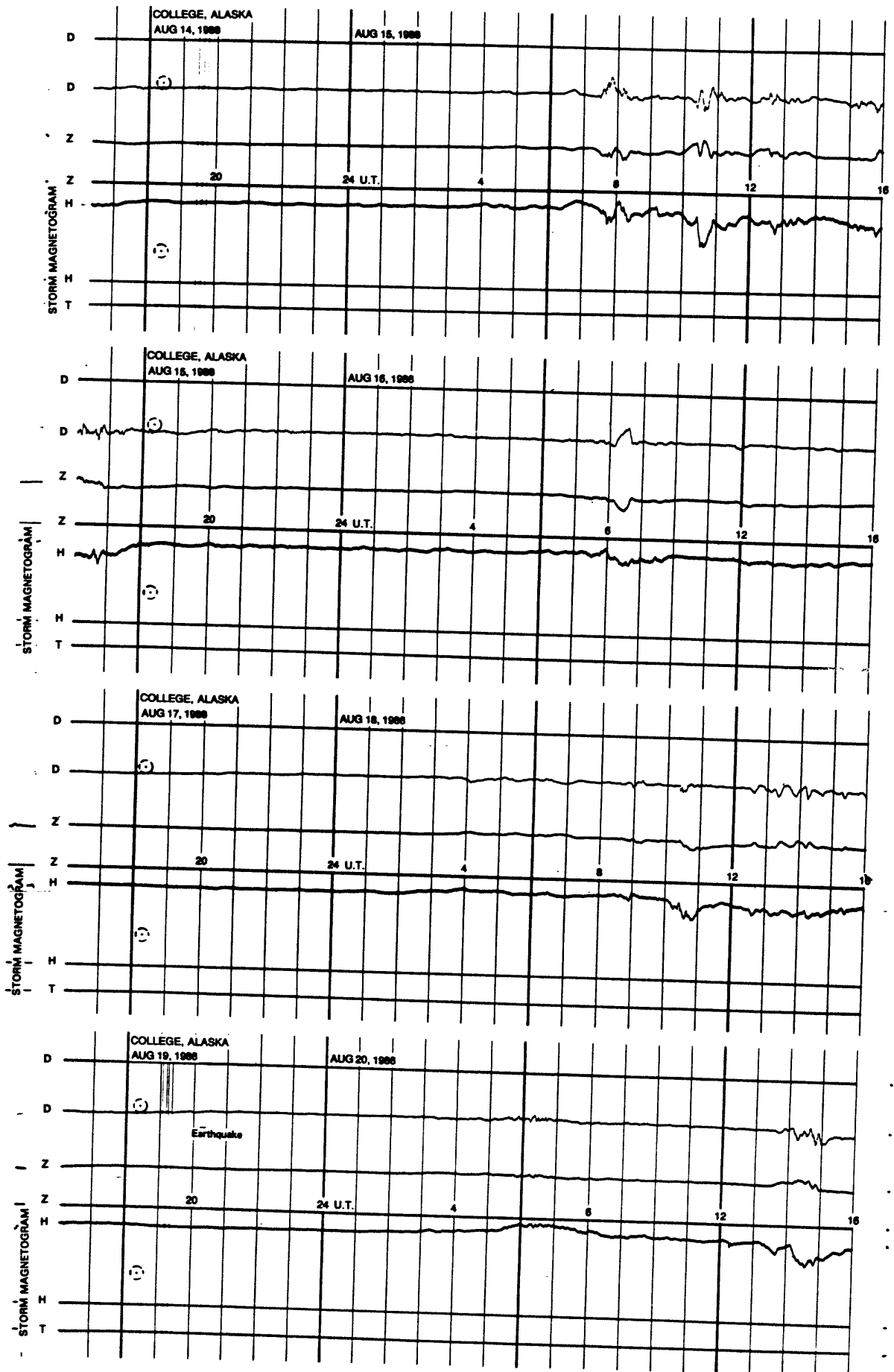
NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

