

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

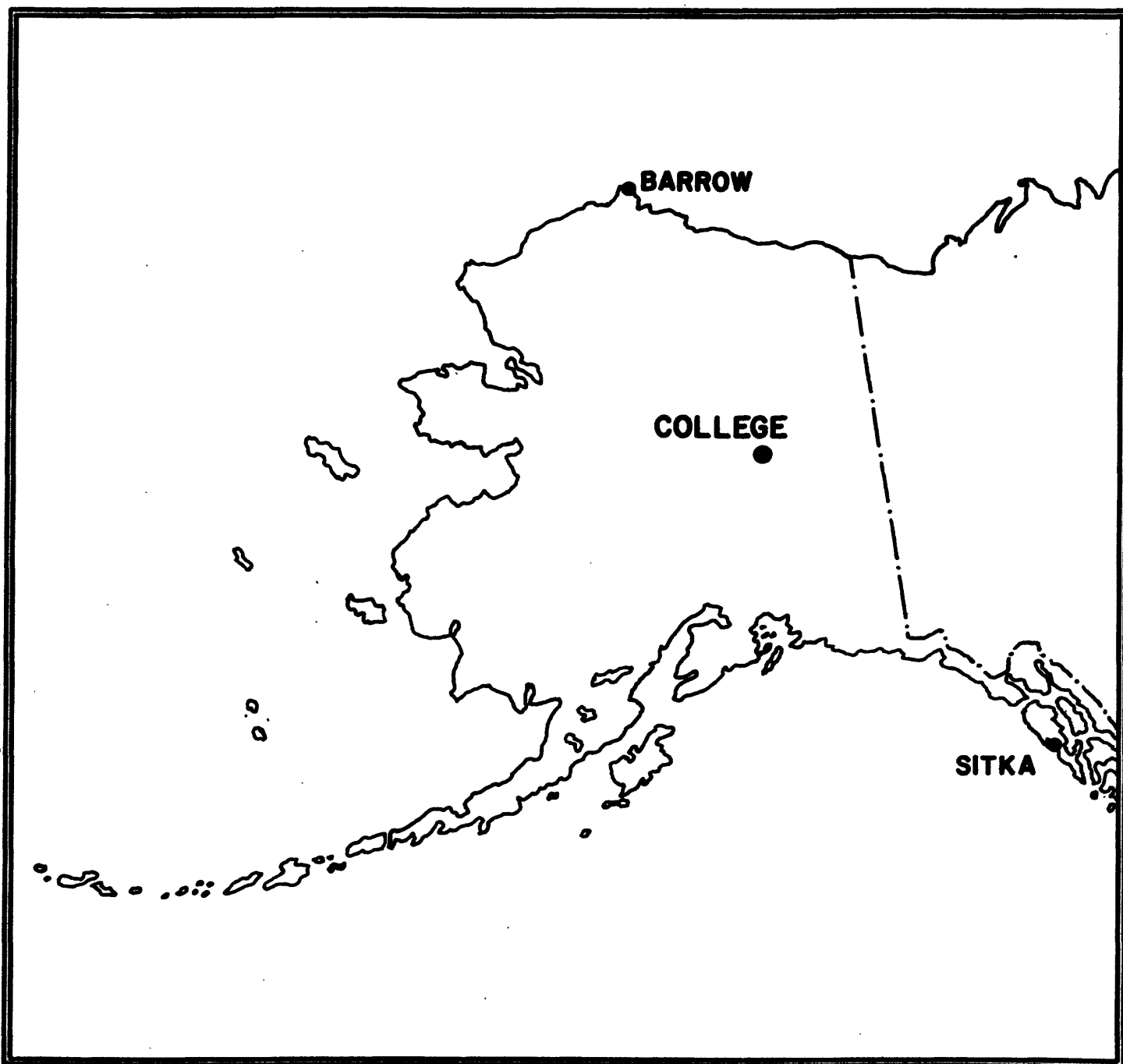
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

AUGUST 1991

OPEN FILE REPORT 91-0300H



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

AUGUST, 1991

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

DATE	K-INDICES								SUM	A _K	TIME SCALE ON MAGNETOGRAMS
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			20 mm/hr
1	2	2	2	2	4	5	5	4	26	22	SUDDEN COMMENCEMENTS d h m 5 20 46 11 02 53 18 18 34 20 08 01
2	3	5	7	6	6	5	4	4	40	58	
3	4	3	7	7	6	5	5	3	40	64	
4	5	5	7	5	6	3	3	4	43	65	
5	5	6	5	7	6	3	3	4	39	57	
6	5	4	4	5	5	5	3	2	33	34	
7	4	5	4	4	4	2	2	2	27	22	
8	4	4	6	5	4	2	2	2	29	29	
9	3	3	3	5	6	4	3	2	29	28	
10	2	3	3	4	4	4	2	1	23	16	
11	4	3	4	3	5	5	3	2	29	25	
12	3	5	7	5	7	6	6	4	43	72	
13	3	3	2	1	2	3	2	1	17	9	
14	1	2	2	1	2	4	4	4	20	14	
15	5	5	6	5	5	5	4	4	39	47	
16	5	5	3	3	4	3	3	3	29	25	
17	3	4	3	6	4	4	3	3	30	28	
18	3	3	2	3	4	4	5	4	28	23	
19	5	4	7	7	5	4	4	3	39	59	
20	3	3	4	7	6	4	5	3	35	46	
21	4	5	7	6	4	3	2	3	34	45	
22	5	6	6	6	5	4	3	3	38	49	
23	3	4	6	7	3	2	1	1	27	36	
24	3	3	2	1	2	1	2	1	15	8	
25	4	4	2	3	2	3	2	2	22	14	
26	3	3	1	3	3	2	2	2	19	11	
27	2	2	5	5	2	6	7	5	34	48	
28	3	3	3	3	4	5	3	3	27	21	
29	2	2	4	4	4	5	3	2	26	21	
30	3	4	3	6	7	4	5	4	36	47	
31	3	4	6	6	5	6	4	3	37	47	

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	(mm) (γ/mm) (to nearest 10γ)
	675.7	322.2		
	3.67	7.73		
	2480	2490		

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief

OBSERVER IN CHARGE

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA

Data from Individual Observatories:

AUGUST 1991

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

Obs. 2 letter 146A 9886	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)	K	D(')		H(Y)	Z(Y)		
CO	64°6 N	2	05XX	..				2	3	7						
								3	3,4	7						
								4	3	7	182	1470	1280	5 14		
								5	4	7						
				5	2046	SC	-14	+90	-10	6	1,4,5,6	5	109	1050	640	6 18
				11	0253	SC	-27	+290	+25	11	5,6	5	108	880	510	11 18
				12	03XX	..				12	3,5	7	376	1770	1470	12 22
				18	1834	SC	+27	-175	+50	19	3,4	7	234	1480	900	19 19
				20	0801	SC	-21	+70	-	20	4	7	220	1480	680	21 16
										21	3					

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0001 U.T., 8-1-91	2400 U.T., 8-31-91	1.0' / mm	3.7 γ / mm	25° 59.4' E
H	(SAME)	(SAME)	7.7 γ / mm	12652 γ	
Z	(SAME)	(SAME)	7.7 γ / mm	55201 γ	

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0001 U.T., 8-1-91	2400 U.T., 8-31-91	7.9' / mm	29.4 γ / mm	
H	(SAME)	(SAME)	43.5 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): -5 γ ; i.e., H absolute and baseline values are 5 γ less than previously reported.

Vertical Intensity (Z): +33 γ ; i.e., Z absolute and baseline values are 33 γ higher than previously reported.

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
26° 40.3' E	12741 γ	55337 γ

*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: AUG 13, 14, 24, 25, 26.

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

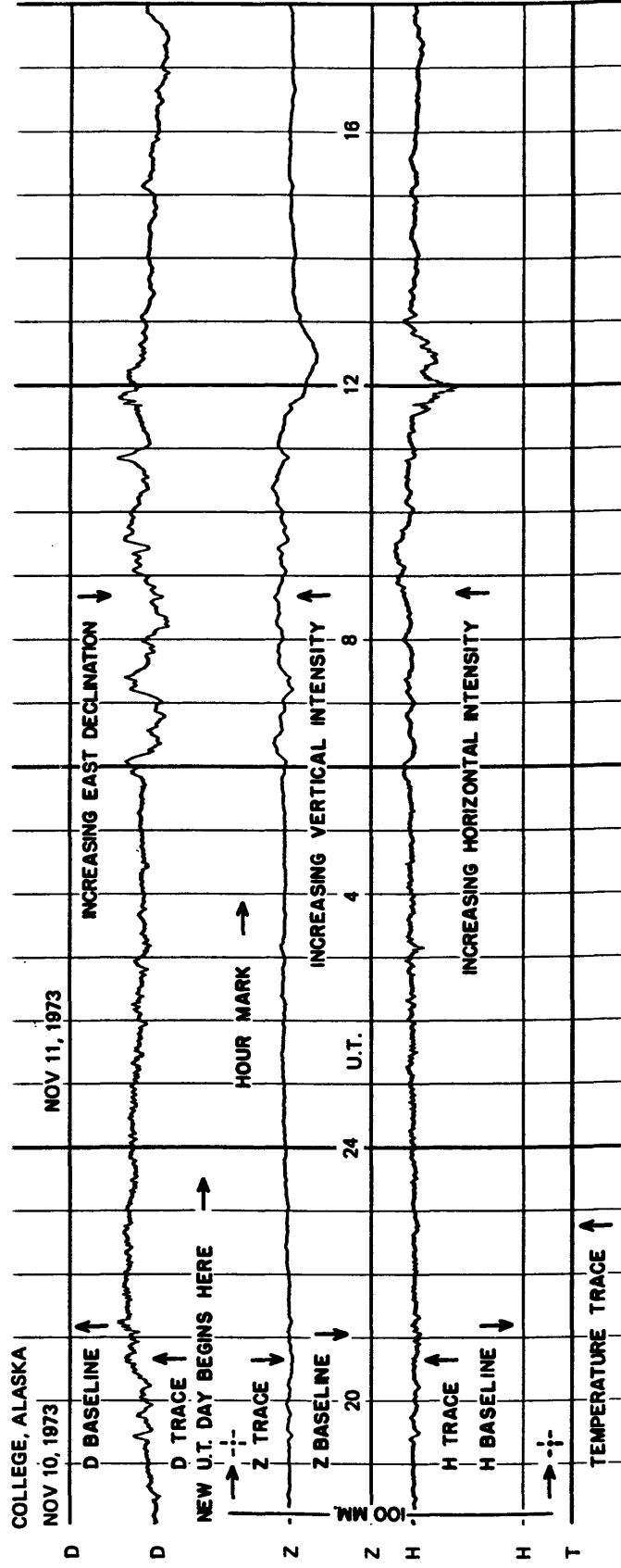
Values are in Tenths of mm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT	D												H												Z												COMPONENT	
	13			24			25			26			13			24			25			26			14			24			25			26				DAY
	13	14	14	24	24	8	25	14	14	26	11	11	9	9	14	8	8	8	26	11	11	13	13	14	24	24	8	25	14	14	26	26						
DAY	13	14	14	24	24	8	25	14	14	26	11	11	9	9	14	8	8	8	26	11	11	9	9	14	8	8	8	26	14	14	26	26						
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	25	26	27	28	29	30	31	32						
	319	359	356	323	340	381	329	344	391	302	314	329	100	96	122	89	121	169	196	194	195	183	179	205	183	210	236	183	205	222	205	240						
	320	360	360	381	391	370	329	349	395	314	329	370	96	111	122	121	171	169	194	194	195	179	184	205	179	236	262	184	205	222	205	240						
	340	370	380	364	374	370	292	345	395	292	313	370	110	122	140	140	177	186	205	205	201	179	246	310	179	246	262	287	310	287	310	240						
	359	380	392	364	370	370	370	411	372	314	374	370	112	140	177	232	232	249	201	201	201	180	219	304	180	219	246	304	240	249	304	240						
	364	392	392	364	370	417	417	379	392	370	417	417	122	125	160	154	154	237	200	200	200	182	217	237	182	217	237	237	230	230	237	230						
	369	381	380	361	380	382	380	412	409	380	382	382	131	160	179	148	148	194	189	189	189	177	222	220	177	222	222	220	194	194	220	194						
	380	379	358	380	367	390	367	431	445	390	390	390	121	176	171	150	150	187	191	191	191	186	207	198	186	207	207	198	187	187	198	187						
	387	358	380	376	349	391	349	468	467	391	391	391	121	192	165	131	131	188	192	192	192	209	200	164	209	200	200	164	188	188	164	188						
	397	380	392	398	345	395	345	468	467	395	395	395	121	150	159	129	129	176	190	190	190	215	184	167	215	184	184	167	176	176	167	176						
	395	392	380	380	411	372	411	468	467	372	372	372	131	135	149	139	139	188	189	189	189	190	186	206	190	186	186	206	163	163	206	163						
	400	401	406	406	379	392	379	468	467	392	392	392	120	141	130	90	90	176	190	190	190	174	177	171	174	177	177	171	125	125	171	125						
	398	409	410	410	412	409	412	468	467	409	409	409	101	136	146	107	107	152	183	183	183	180	177	166	180	177	177	166	152	152	166	152						
	446	426	459	417	431	445	431	468	467	445	445	445	90	139	140	140	140	187	179	179	179	184	184	183	184	184	184	183	157	157	183	157						
	445	459	436	436	468	467	468	468	467	467	467	467	106	109	68	134	134	188	166	166	166	181	150	190	181	150	150	190	180	180	190	180						
	478	510	510	510	550	520	550	468	467	520	520	520	65	108	110	102	102	181	178	178	178	179	156	155	179	156	156	155	181	181	155	181						
	570	598	574	574	639	592	639	468	467	592	592	592	40	10	126	68	68	181	164	164	164	158	173	185	158	173	173	185	158	158	185	158						
	561	641	581	581	671	581	671	468	467	581	581	581	112	-180	120	70	70	181	134	134	134	72	178	93	72	178	178	93	138	138	93	138						
	569	676	569	569	655	582	655	468	467	582	582	582	68	-97	107	83	83	181	163	163	163	-17	168	114	-17	168	168	114	150	150	114	150						
	530	508	516	516	520	481	520	468	467	481	481	481	51	40	76	66	66	181	145	145	145	38	180	105	38	180	180	105	142	142	105	142						
	463	540	470	470	420	458	420	468	467	458	458	458	43	70	50	24	24	181	140	140	140	127	170	128	127	170	170	128	149	149	128	149						
	420	639	386	386	371	297	371	468	467	297	297	297	80	109	67	30	30	181	150	150	150	184	160	164	184	160	160	164	117	117	164	117						
	371	539	325	325	328	313	328	468	467	313	313	313	87	297	80	71	71	181	154	154	154	113	174	171	113	174	174	171	150	150	171	150						
	340	420	310	310	277	327	277	468	467	327	327	327	91	293	82	99	99	181	166	166	166	119	202	176	119	202	202	176	176	176	176	176						
DAILY SUM	9923	10873	9968	9848	9897	9897	9897	9848	9897	9897	9897	9897	2341	2672	3122	2939	2732	4160	4254	4254	4254	3756	4638	4421	3756	4638	4638	4421	4160	4160	4421	4160						
DAILY MEAN	413	453	415	410	410	412	410	410	412	412	412	412	98	111	130	122	114	173	177	177	177	156	193	184	156	193	193	184	173	173	184	173						
MEAN	413*												115												177												MEAN	

* Using 13, 24, 25 and 26.

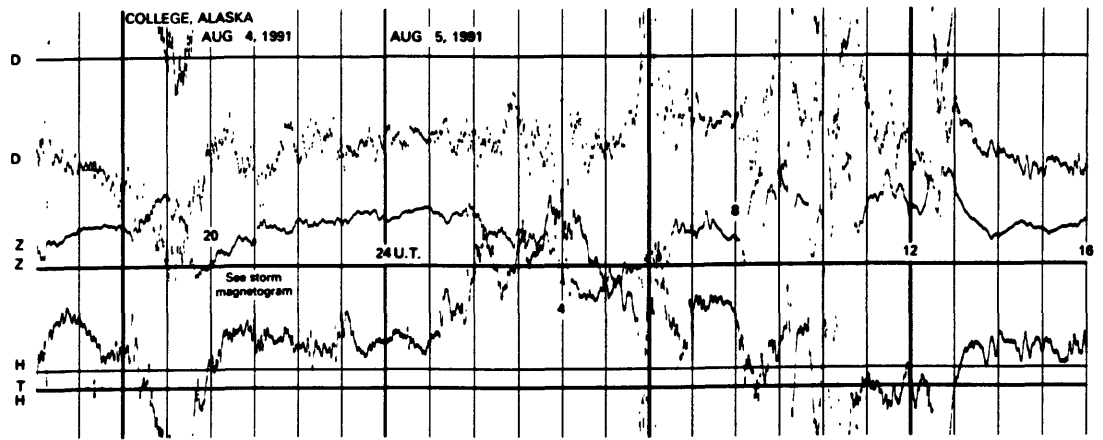
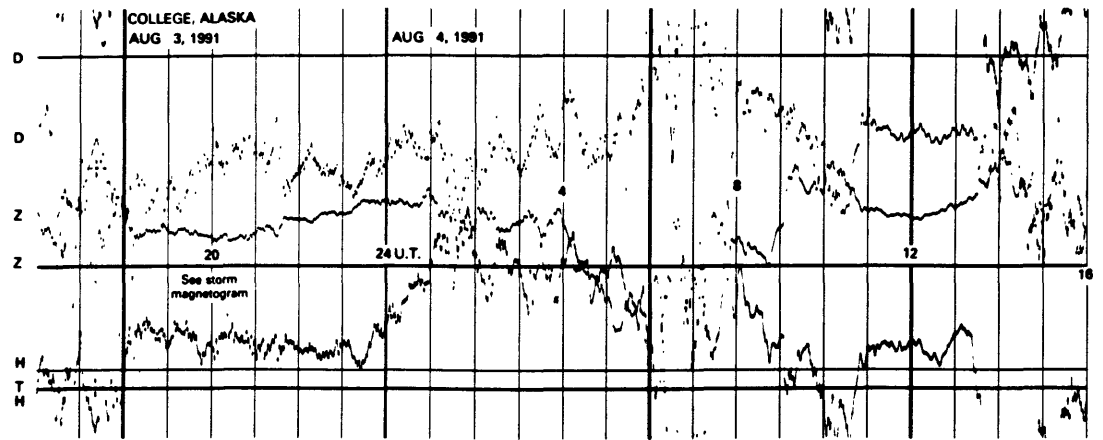
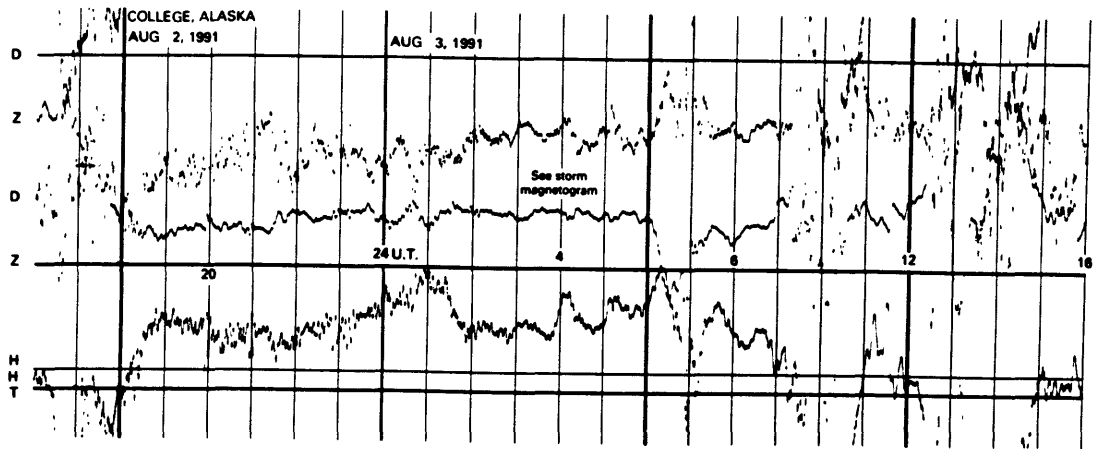
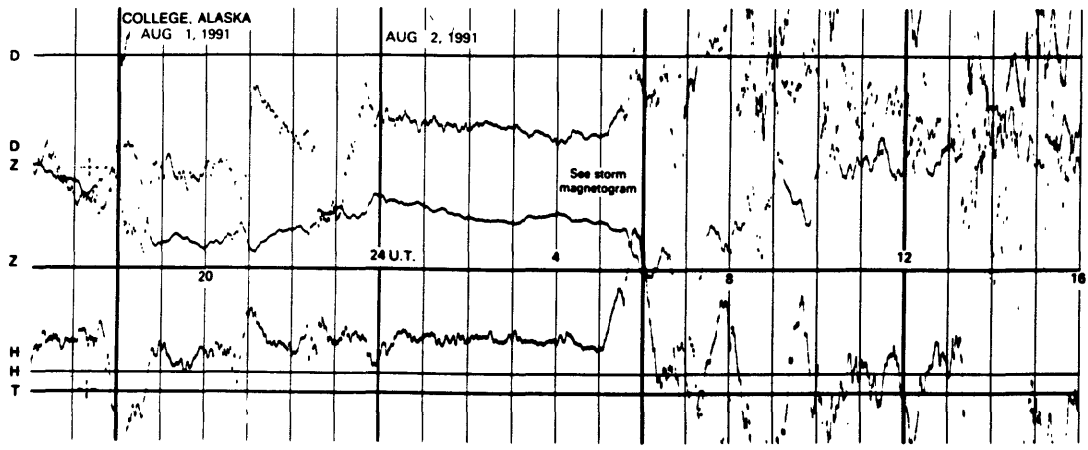
Scaled *RM* Checked *CA*

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

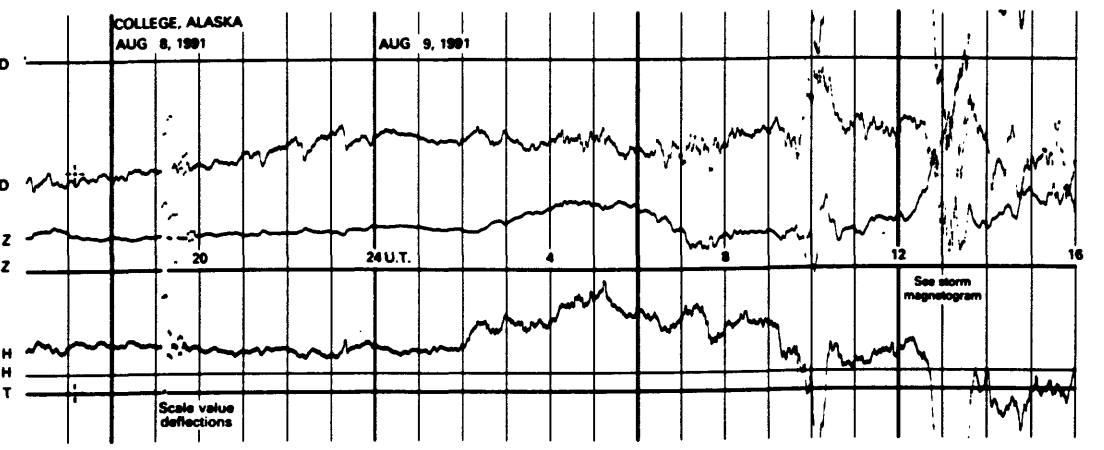
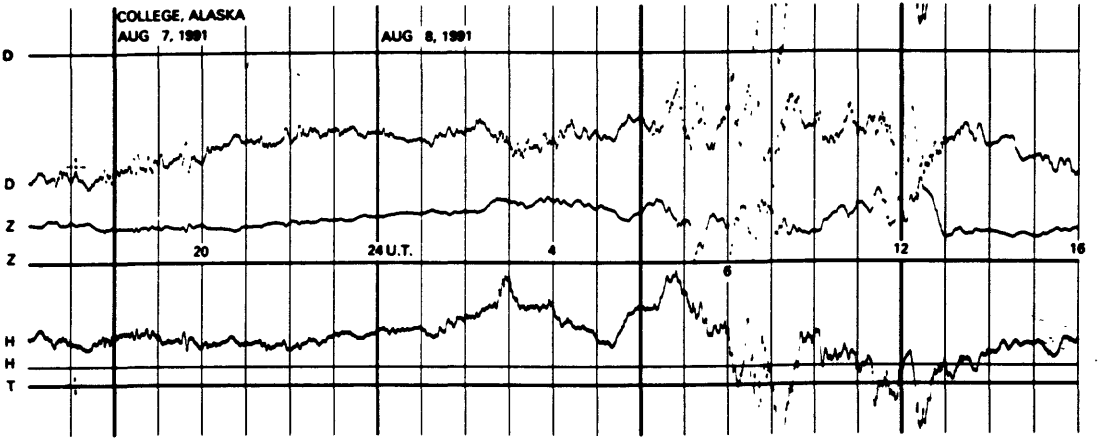
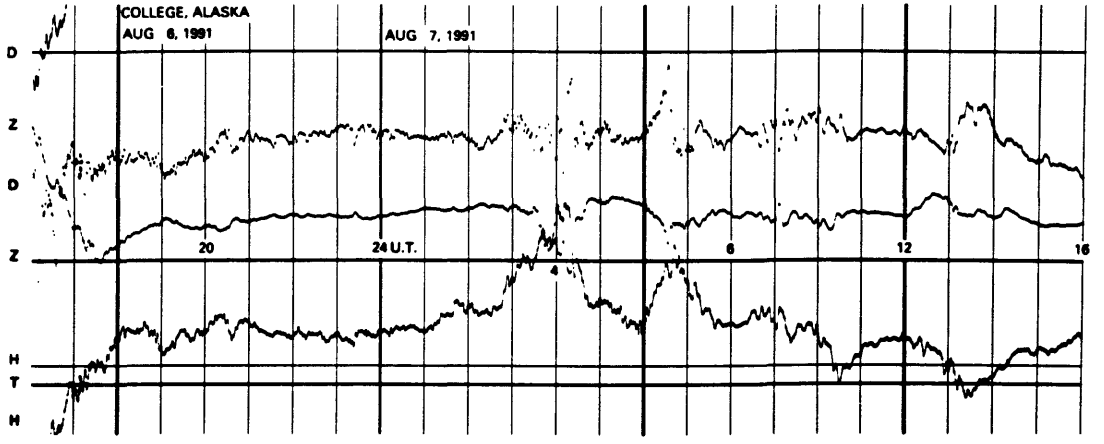
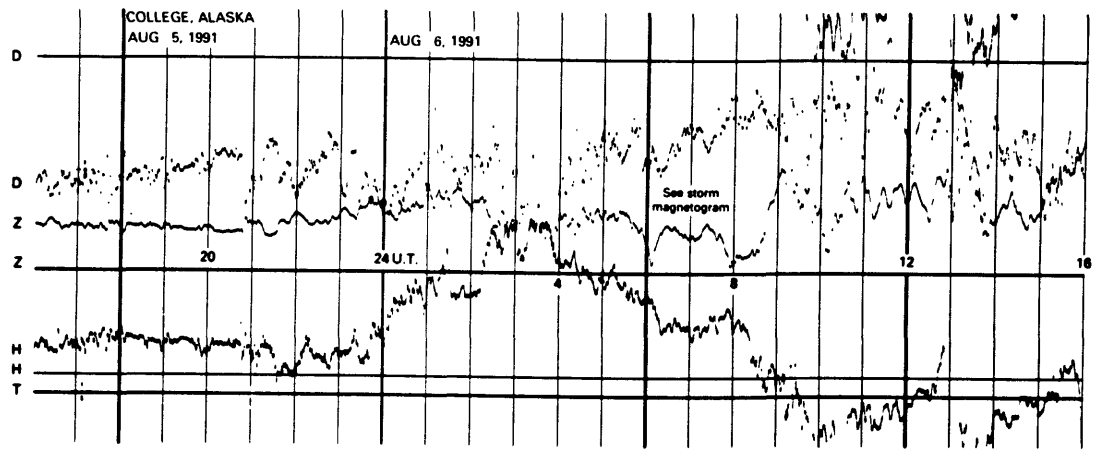


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

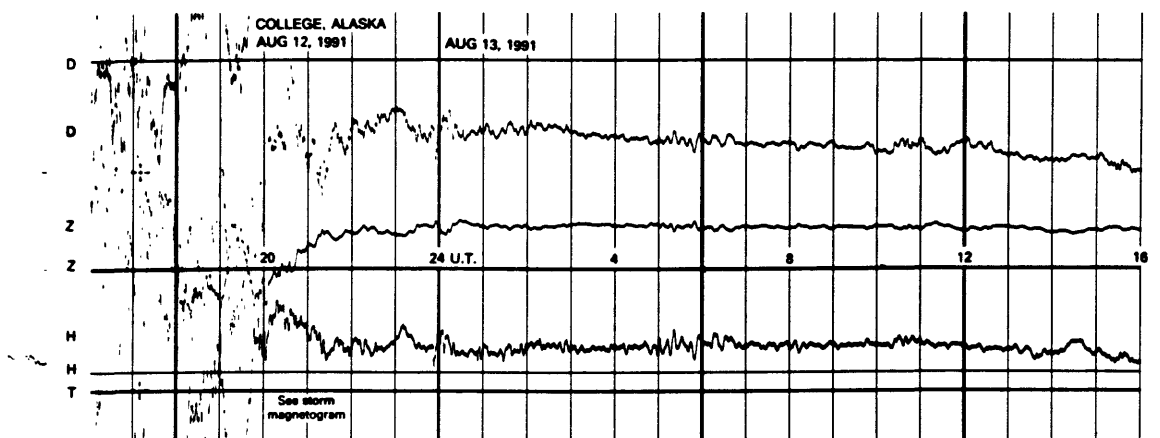
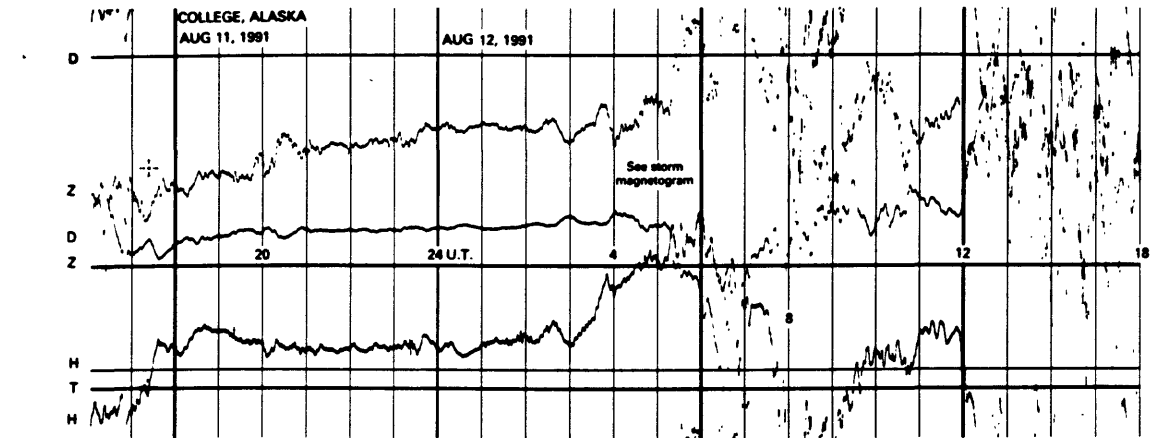
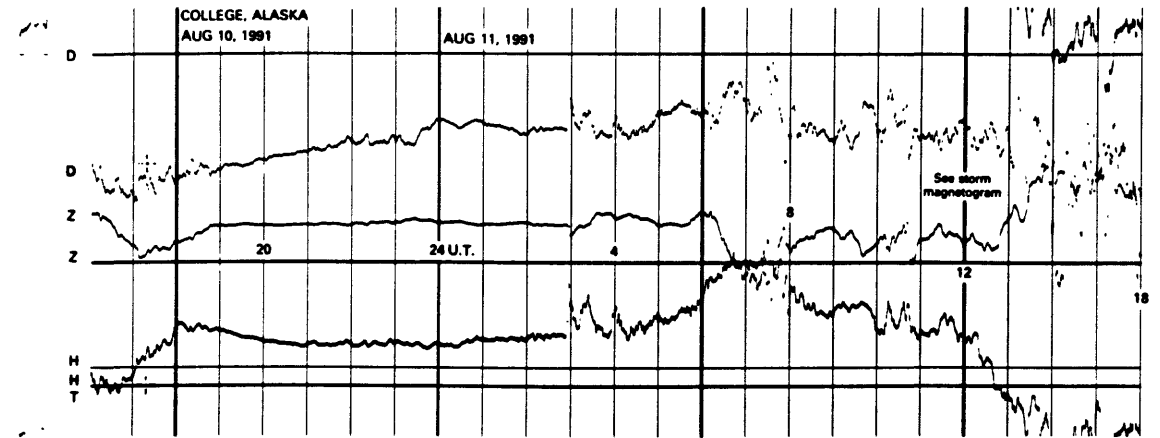
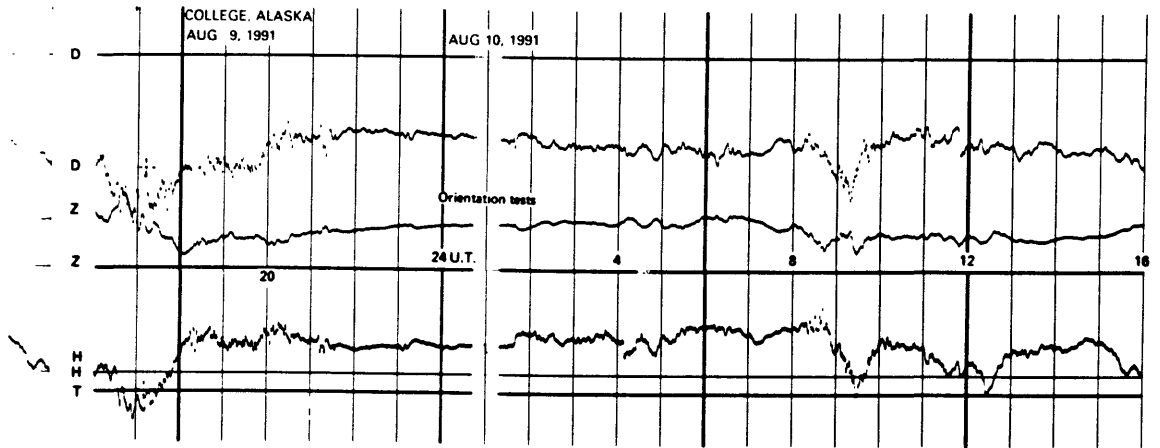
NORMAL MAGNETOGRAMS



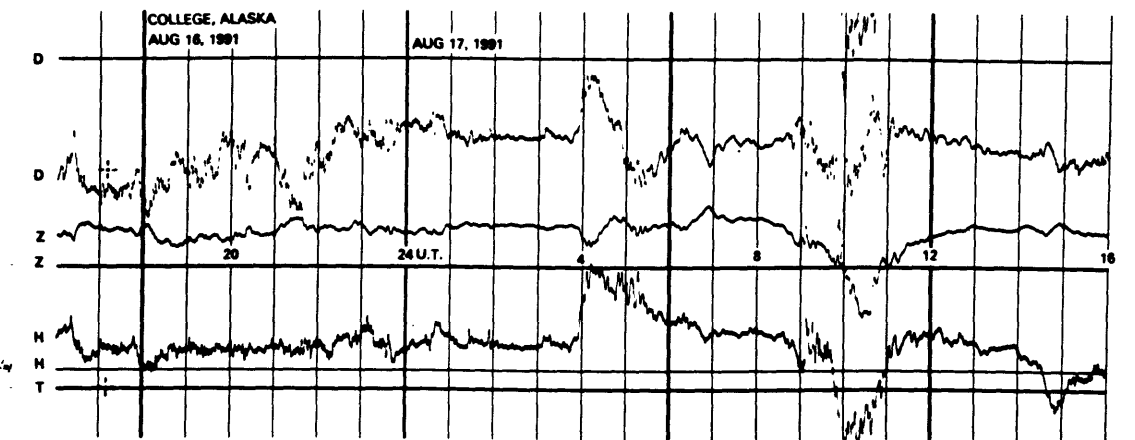
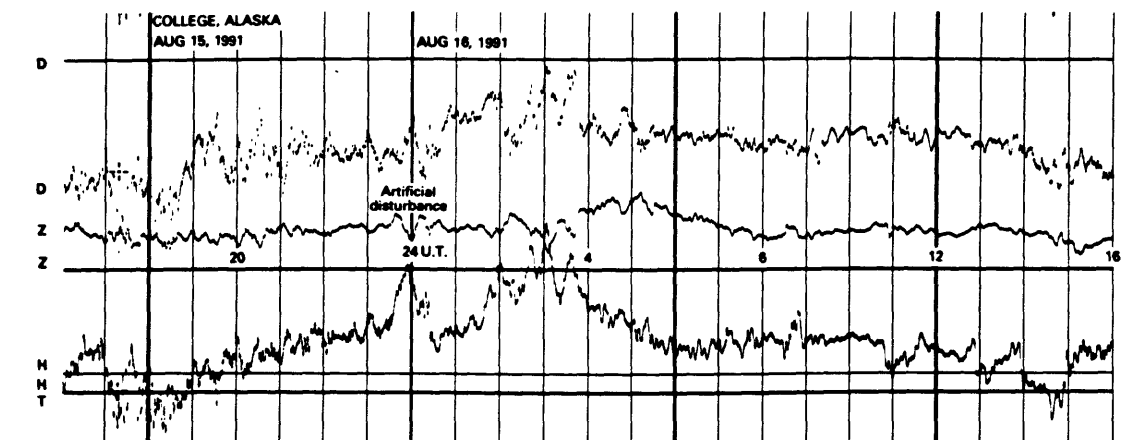
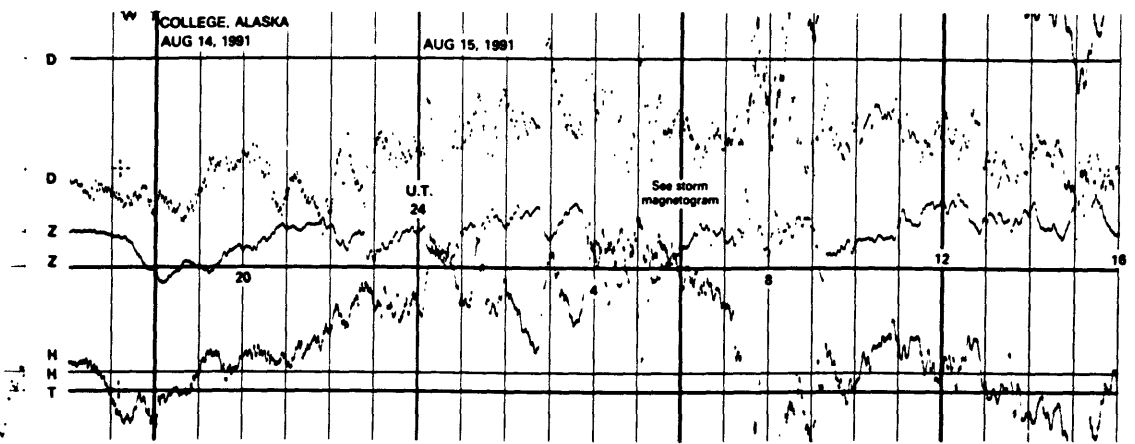
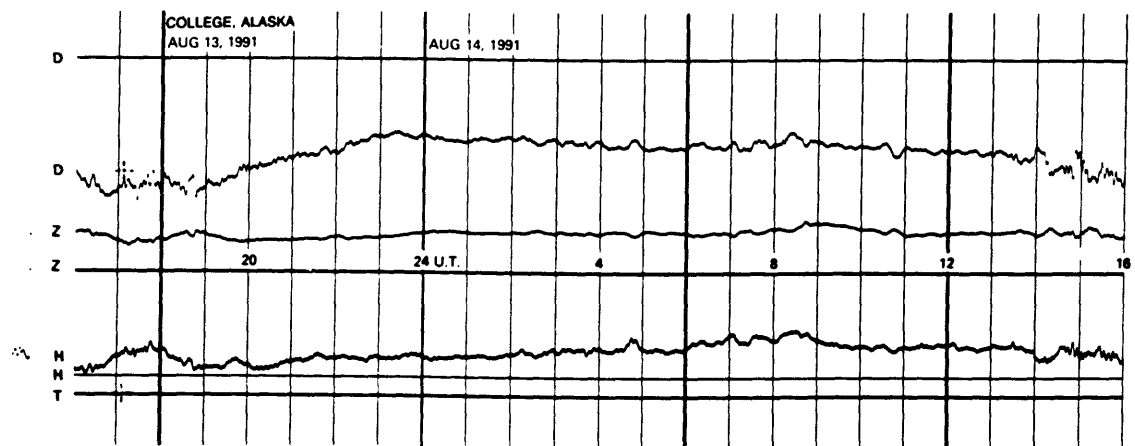
NORMAL MAGNETOGRAMS



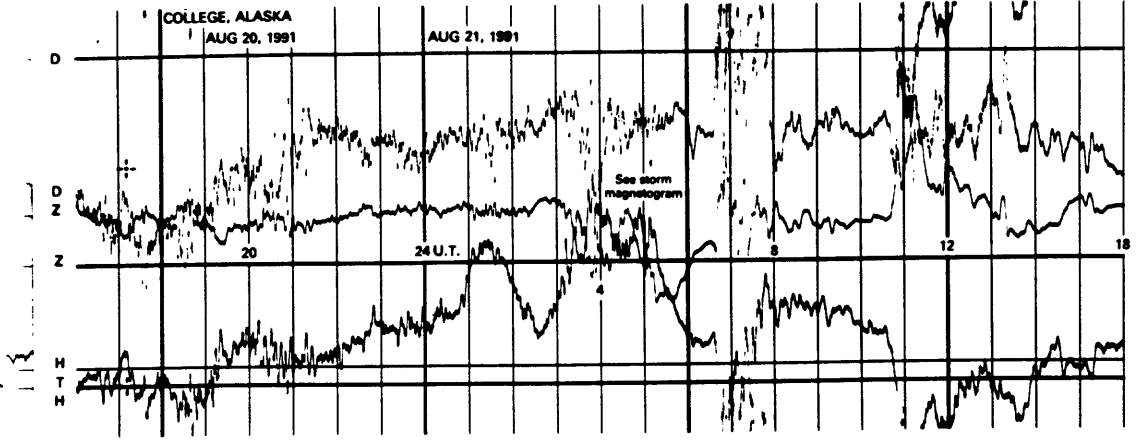
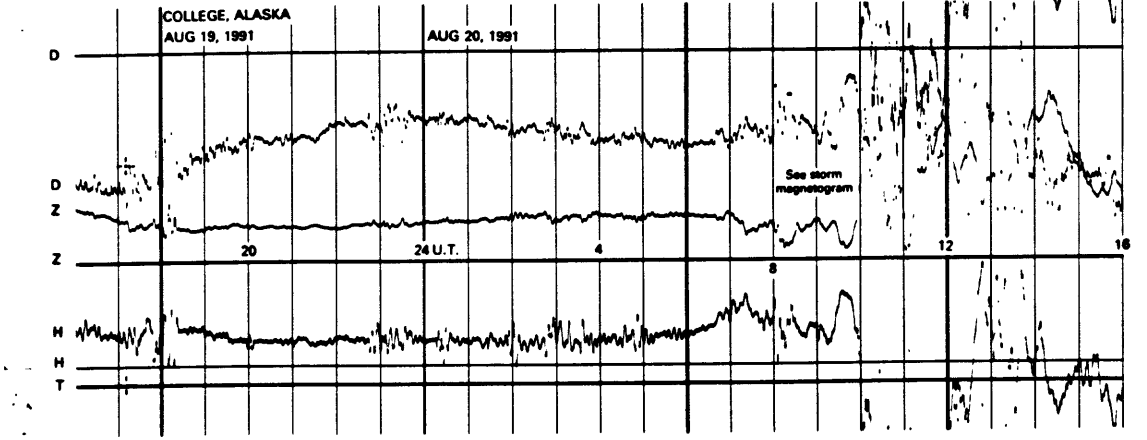
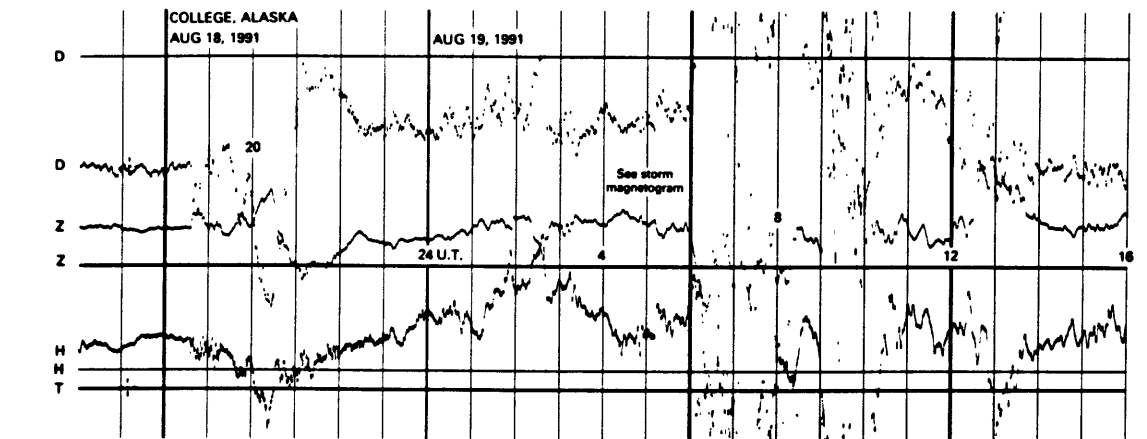
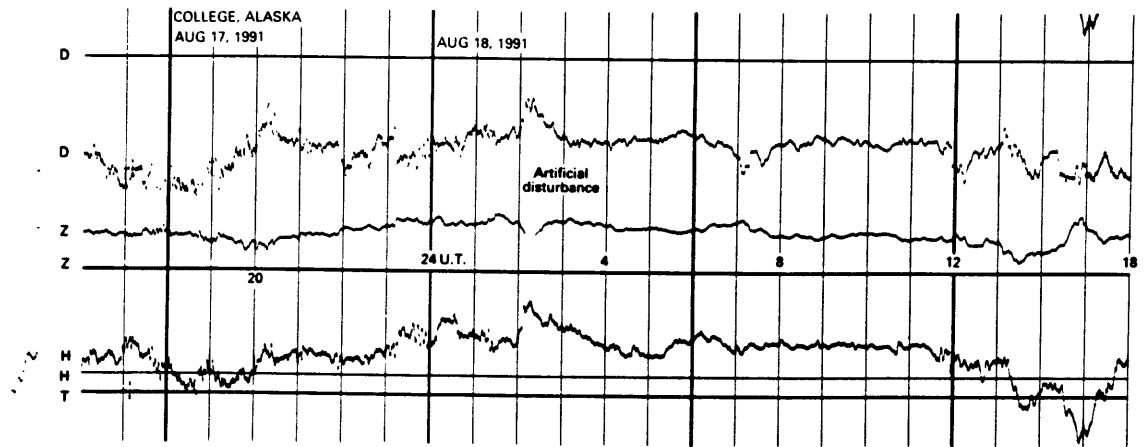
NORMAL MAGNETOGRAMS



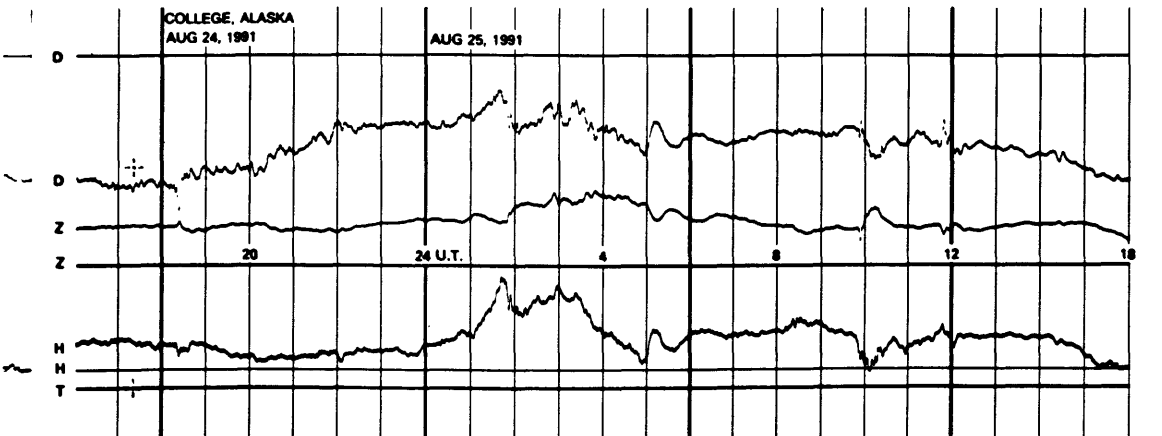
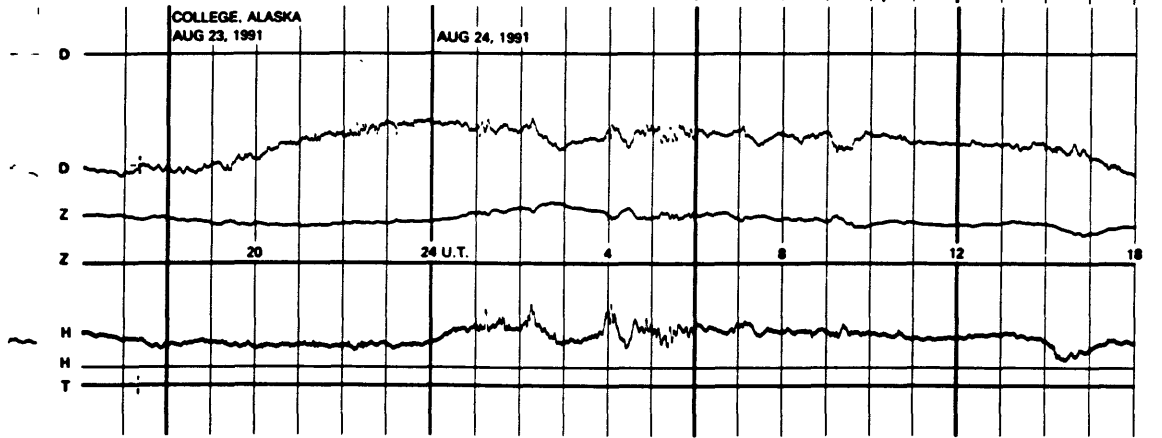
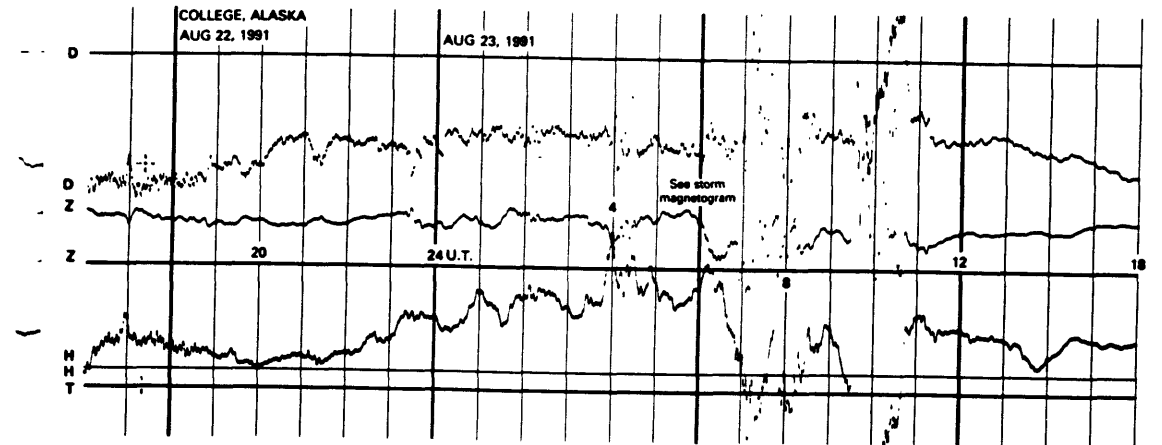
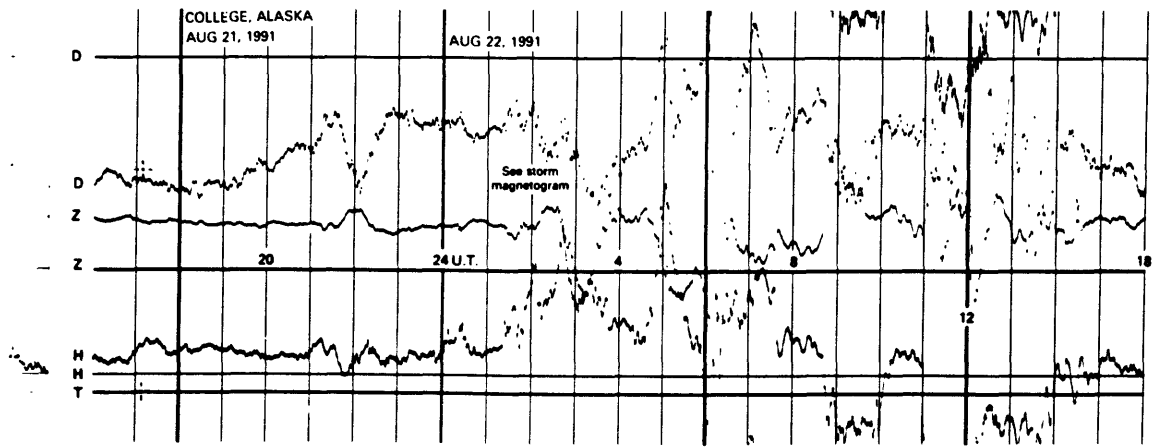
NORMAL MAGNETOGRAMS



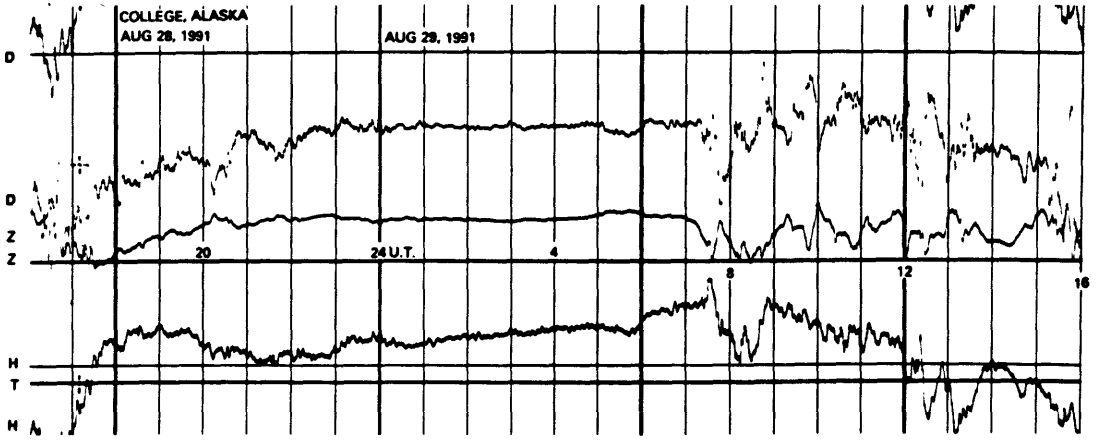
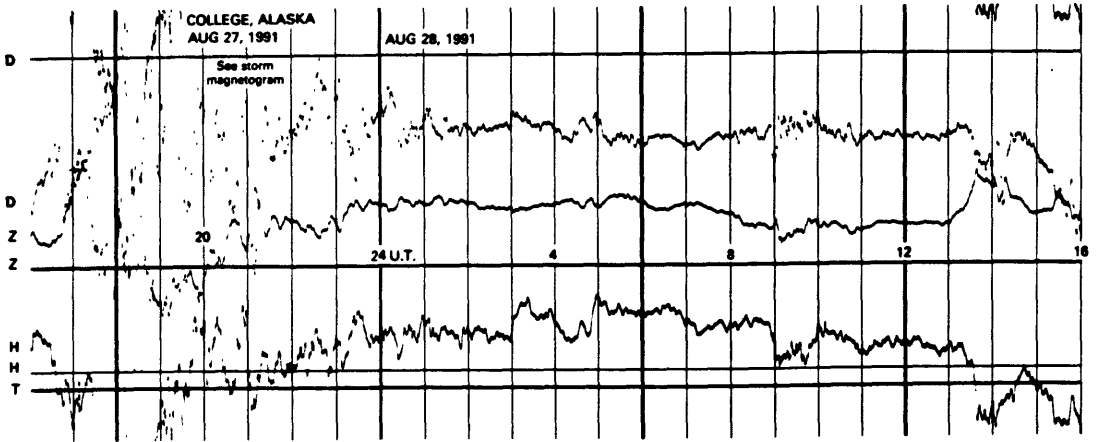
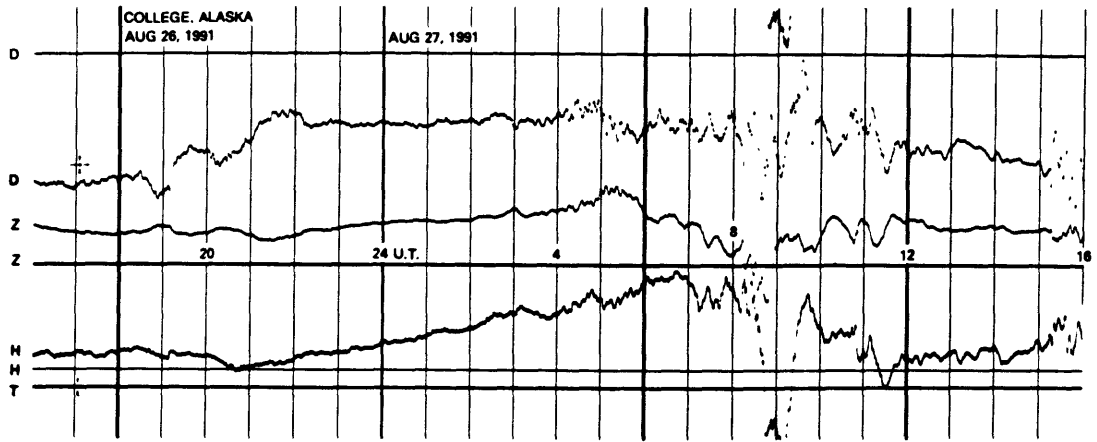
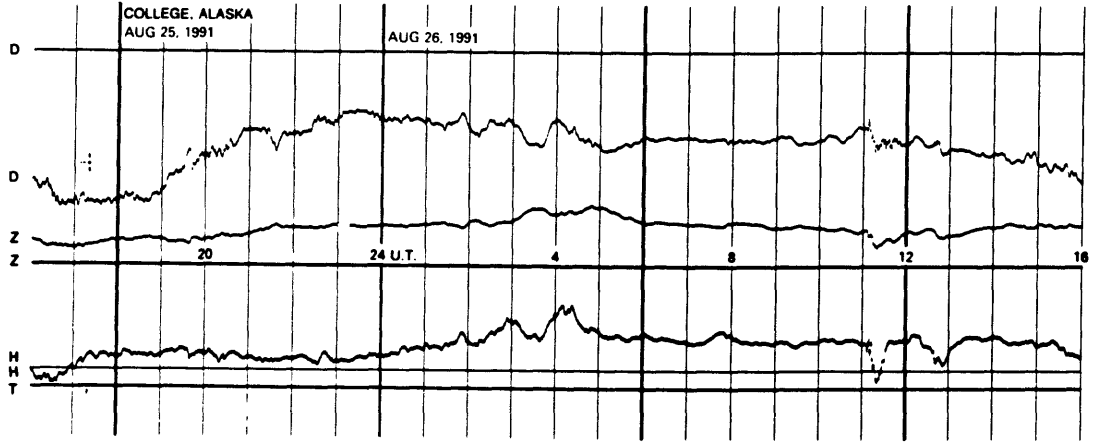
NORMAL MAGNETOGRAMS



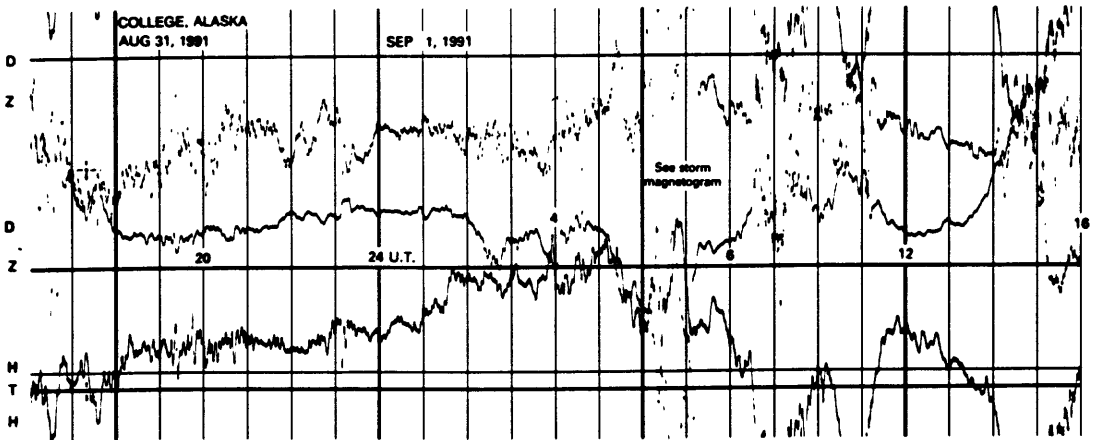
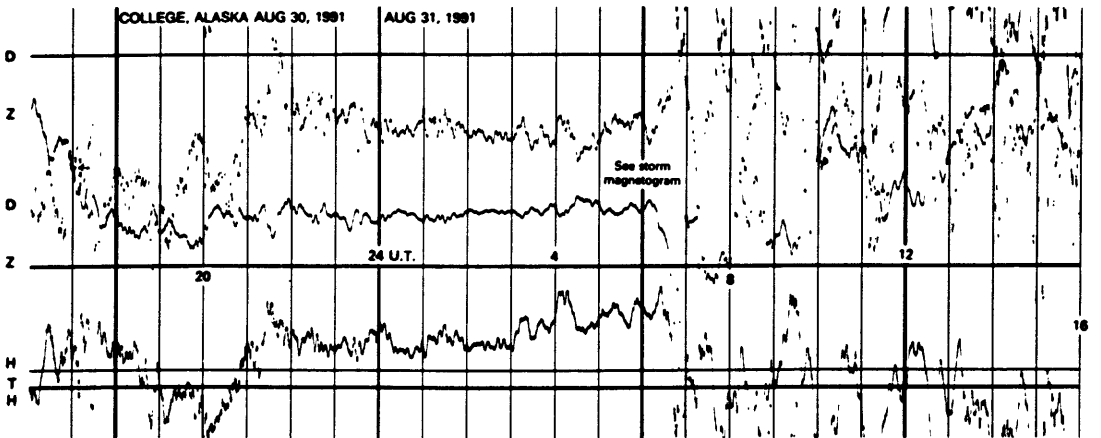
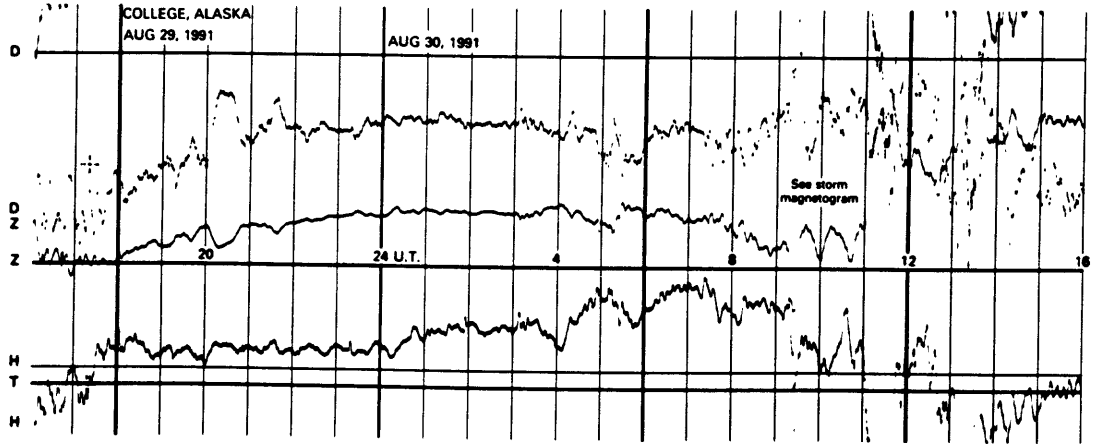
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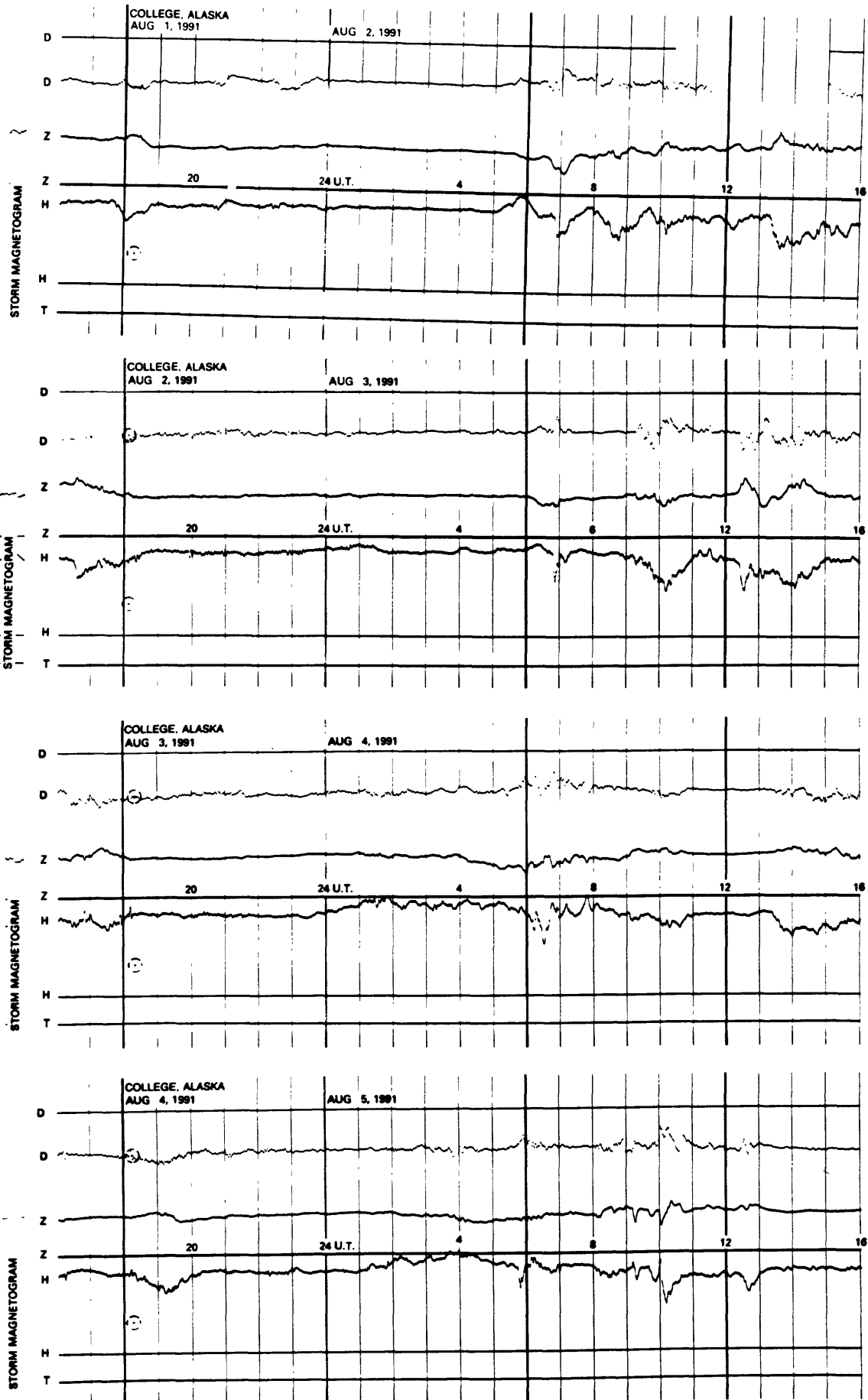
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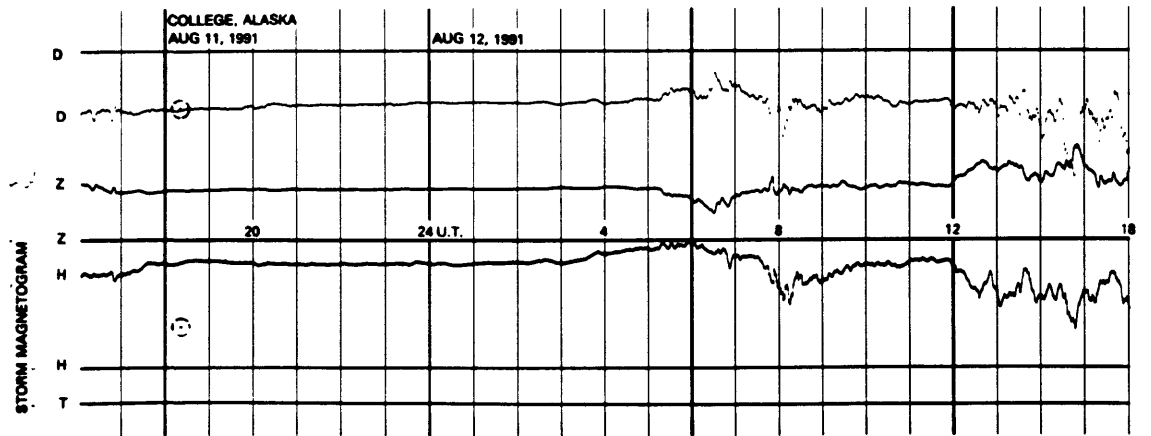
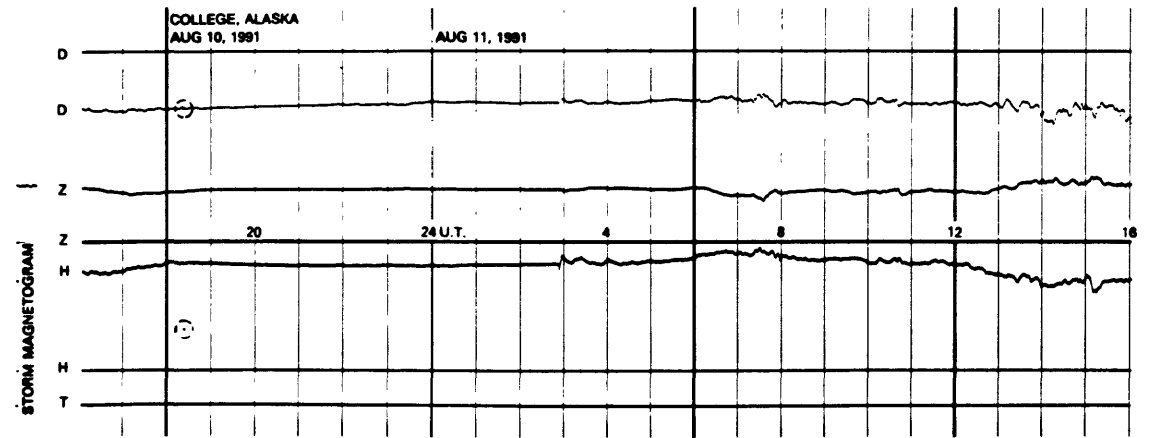
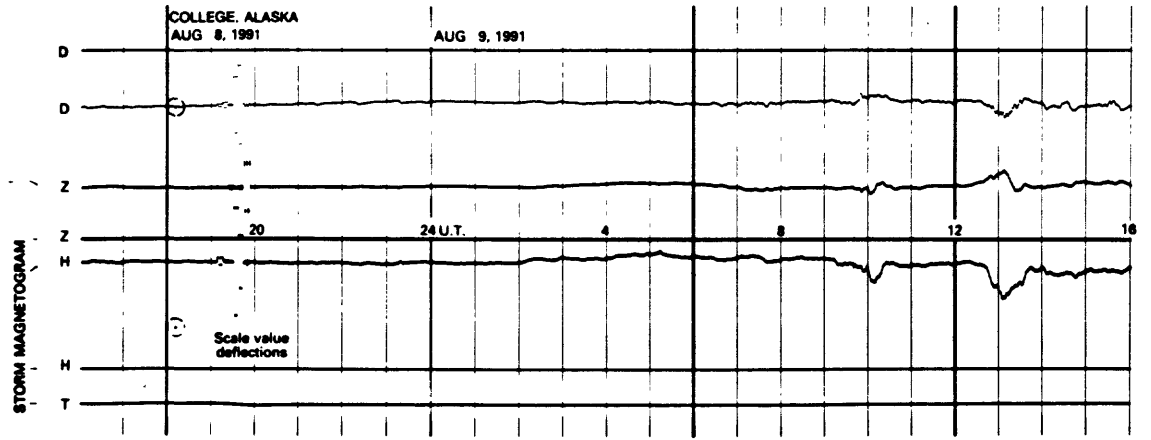
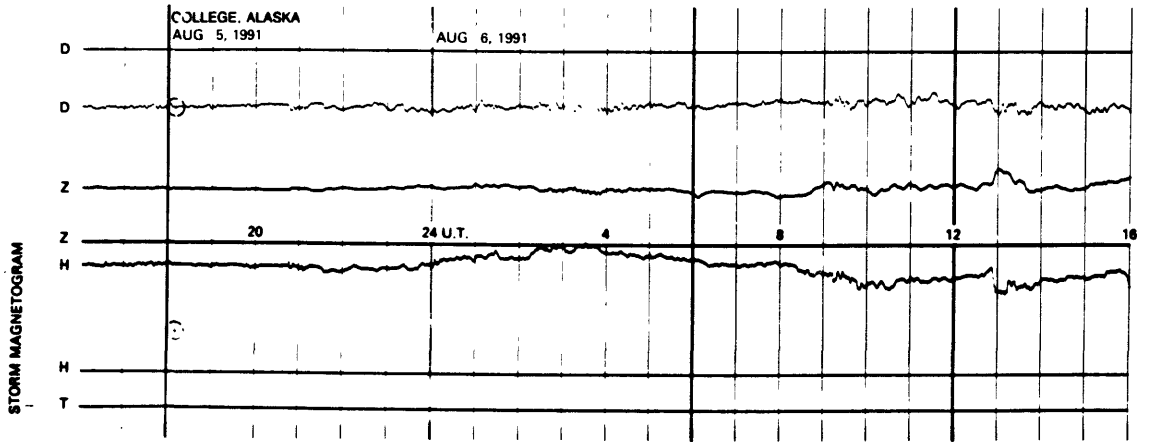
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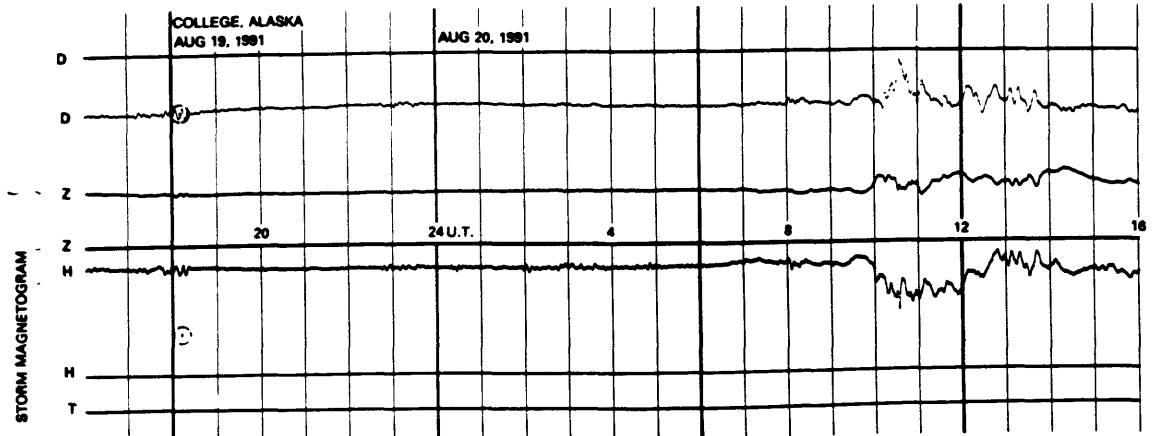
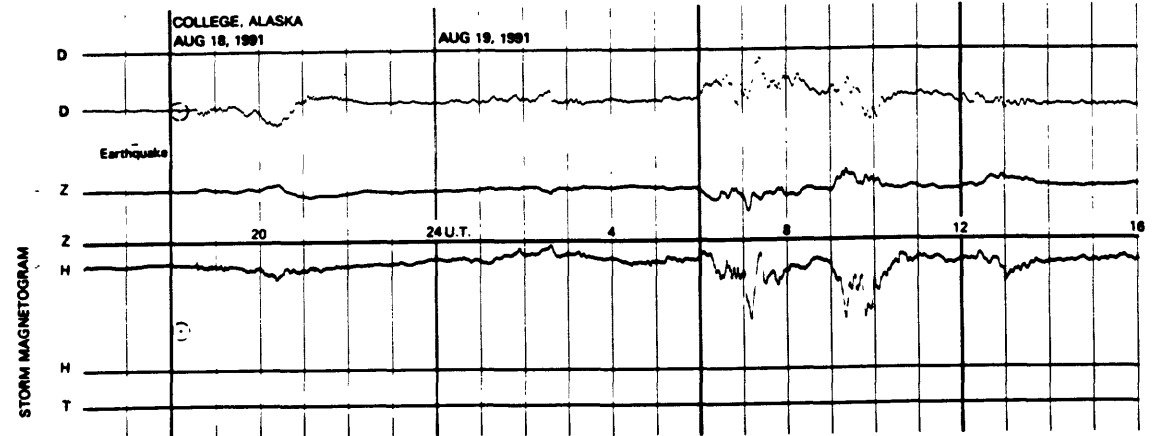
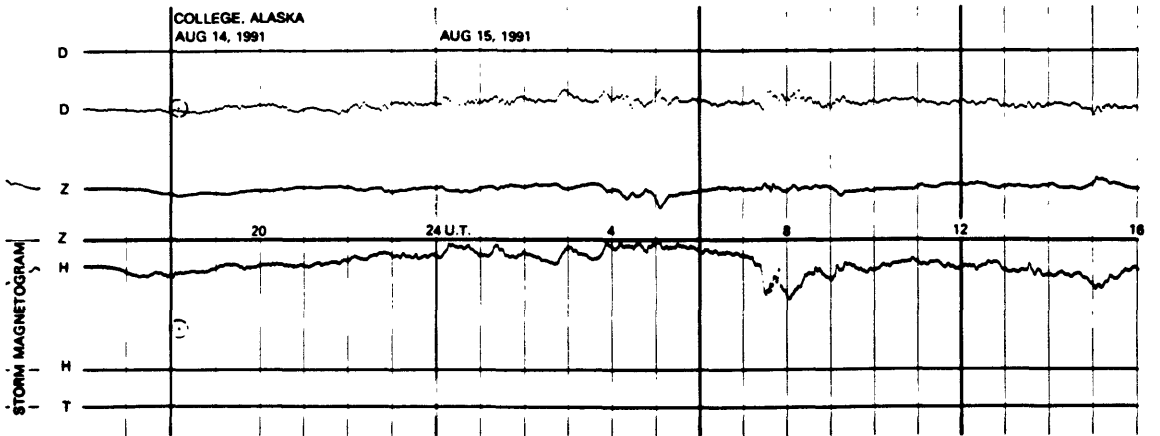
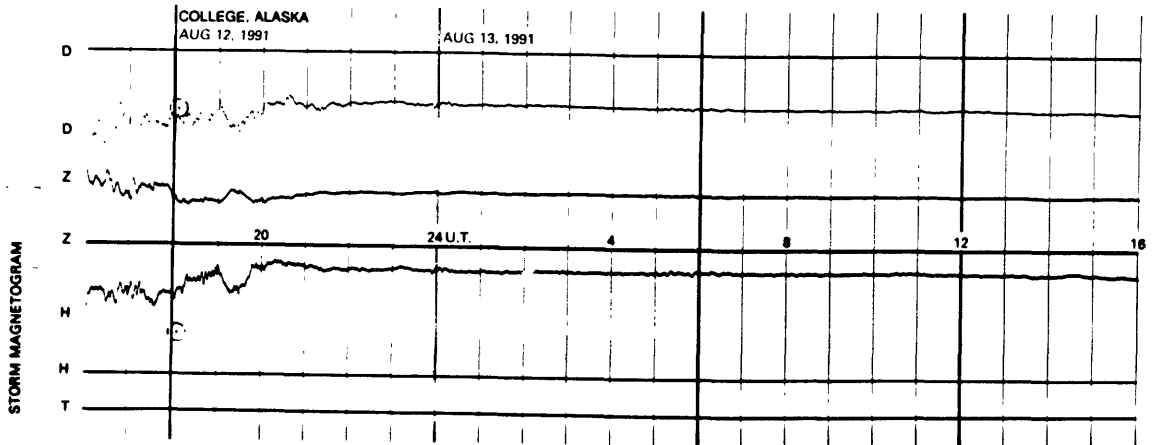
STORM MAGNETOGRAMS



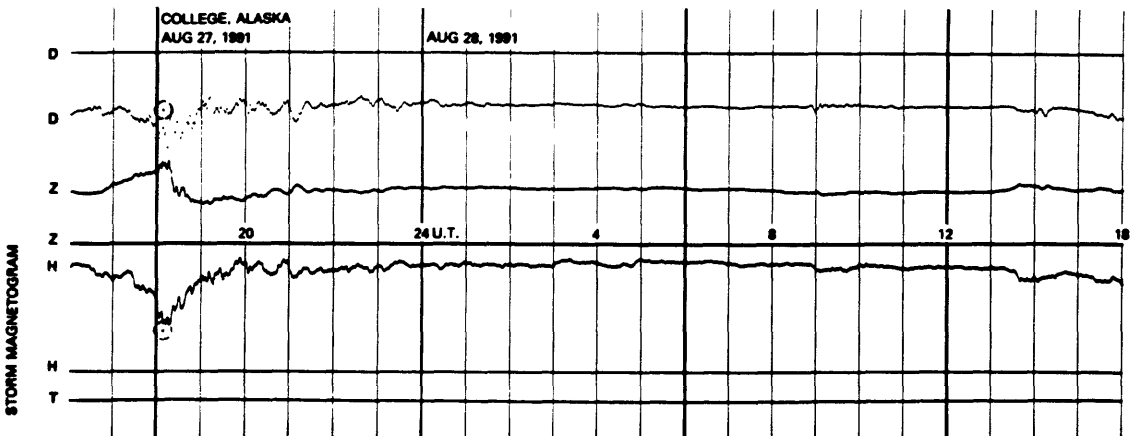
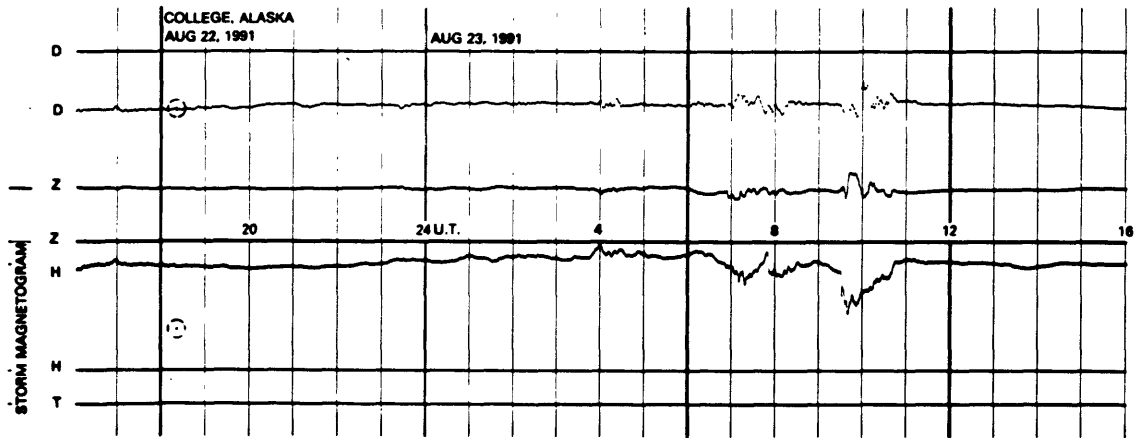
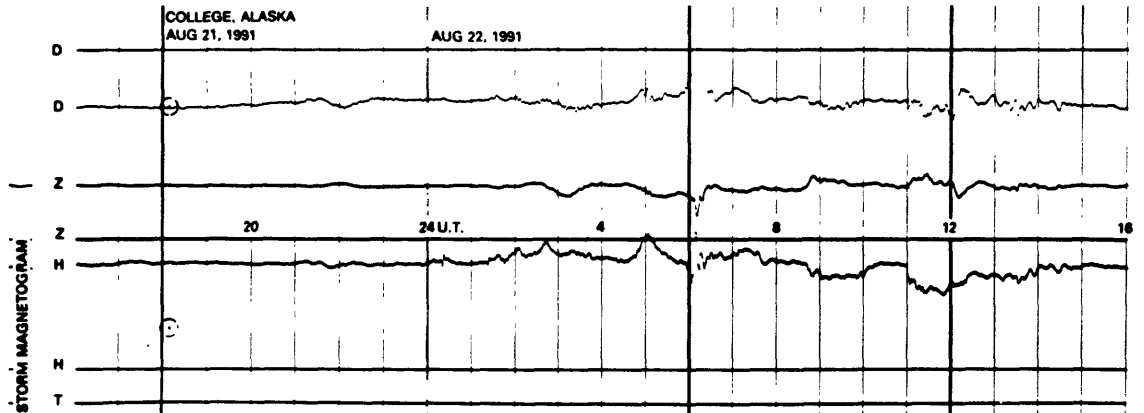
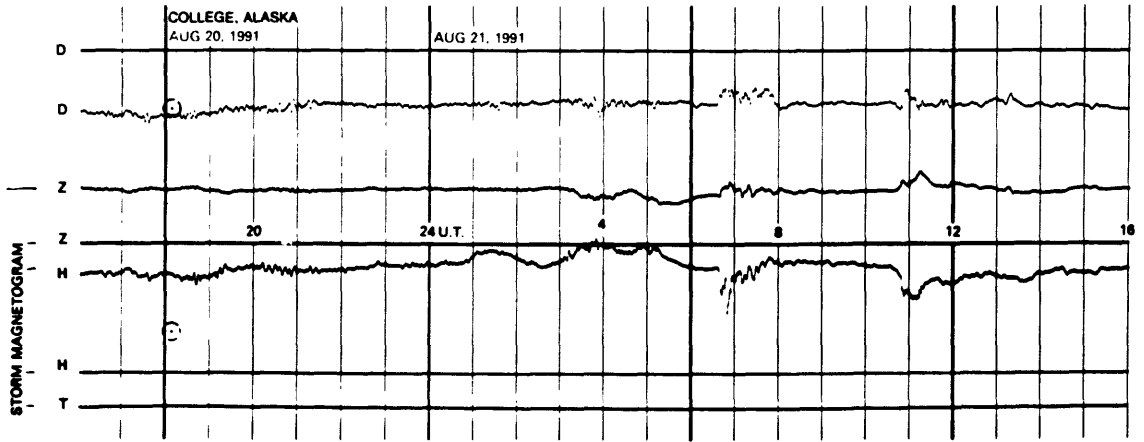
STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



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STORM MAGNETOGRAMS

