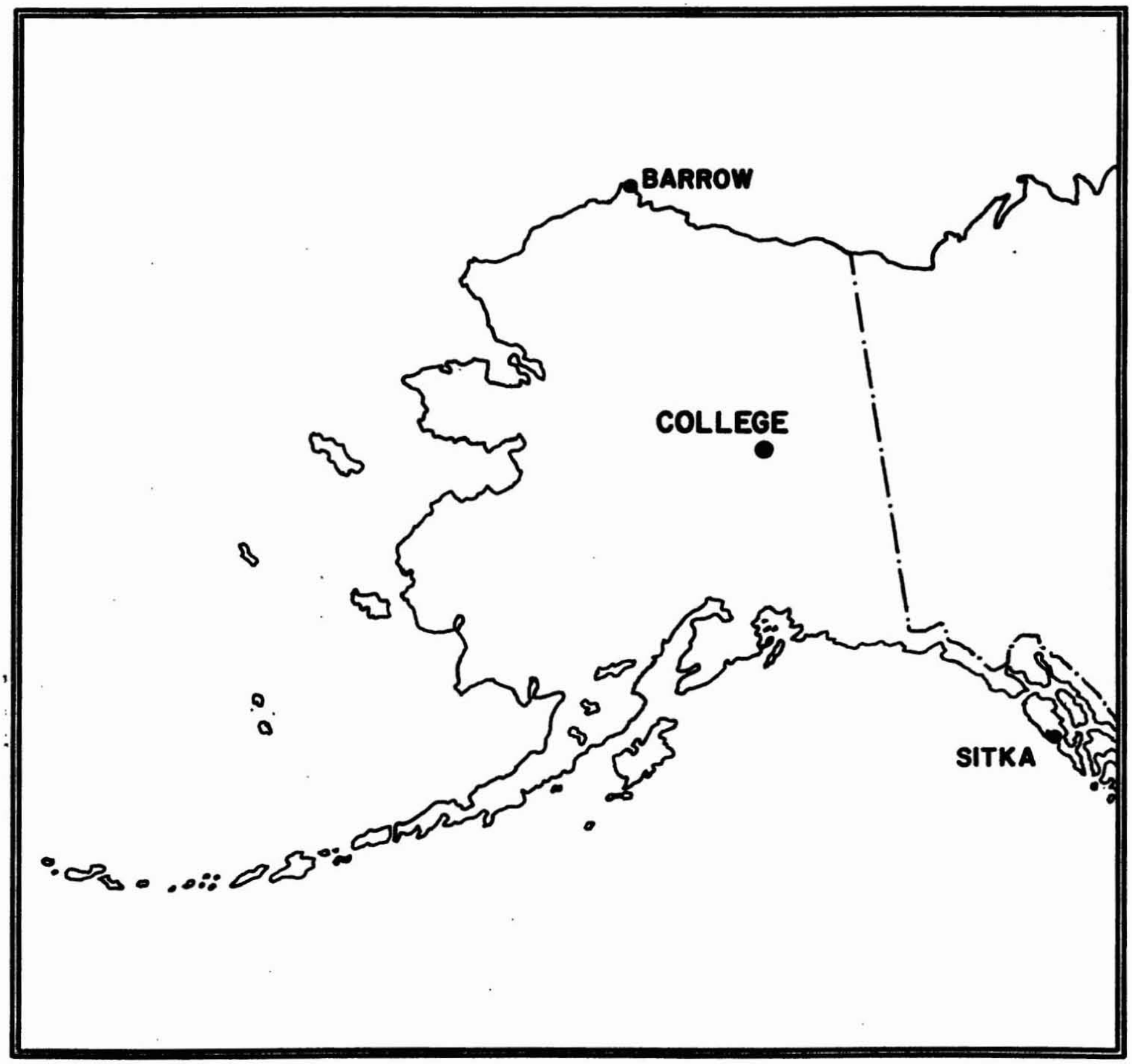
UNITED STATES DEPARTMENT OF THE INTERIOR

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 10γ has been chosen so as not to give the illusion of an accuracy not justified.

The schedule for converting gamma range to K, and K to ak is as follows:

Gamma Range	K-Index	ak
0< 25	0	0
25< 50	1	3
50< 100	2	7
100< 200	3	15
200< 350	4	27
350< 600	5	48
600< 1000	6	80
1000< 1650	7	140
1650< 2500	8	240
2500+	9	400 (10γ)

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 scslings in millimeters.

NOAA FORM 76-133 (9-72)

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

OBSERVATORY: College, Alaska

MONTH AND YEAR: AUGUST, 1991

DATE	K-INDICES 00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	A_K
1	2	2	2	2	4	5	5	4	26	22
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

TIME SCALE ON MAGNETOGRAMS: 20 mm/hr

SUDDEN COMMENCEMENTS

d	h	m
5	20	46
11	02	53
18	18	34
20	08	01

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

BEGIN d	h	m	END d	h	m

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

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief

OBSERVER IN CHARGE

NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS

WDC-A FOR SOLAR-TERRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80302 U.S.A.

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

AUGUST 1991

Obs. 2 letter IAGA code	Geomag. lat.	Commencement			SC - amplitudes			Max. 3 hr - index K			Ranges			UT End
		day	hr min (UT)	type	D(')	H(γ)	Z(γ)	day	(3 hr - period)	K	D(')	H(γ)	Z(γ)	day hr
CO	64°.6 N	2	05XX	..				2	3	7				
								3	3,4	7				
								4	3	7				
								5	4	7	182	1470	1280	5 14
		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				
								21	3	7	220	1480	680	21 16

College Observatory, College, Alaska -- Preliminary Calibration Data For: AUGUST 1991

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): -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° 40.3' E	12741 γ	55337 γ

*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

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

U.S. Dept. of Interior
Geological Survey

Observatory	Month	Year
College, Alaska	AUGUST	1991

jep-CO - 1/86

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.

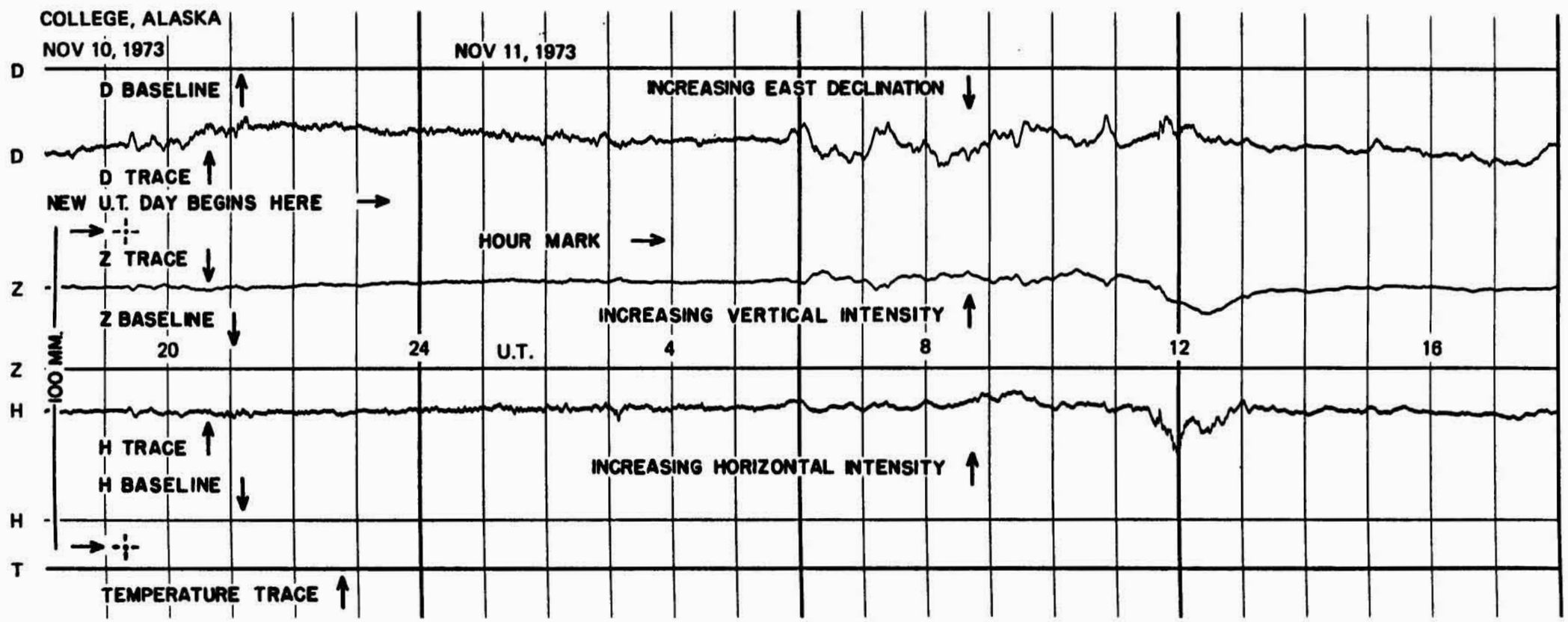
COMPONENT		D					H					Z					COMPONENT	
DAY		13	14	24	25	26	13	14	24	25	26	13	14	24	25	26	DAY	
A_k		9	14	8	14	11	9	14	8	14	11	9	14	8	14	11	A_k	
HOUR	01	319	359	323	309	302	100	89	160	140	89	196	183	210	205	180	01	HOUR
	02	320	356	340	240	314	96	97	189	277	121	194	179	236	222	184	02	
	03	302	360	381	290	329	122	111	171	308	169	195	184	262	287	194	03	
	04	340	370	391	292	373	110	122	140	275	186	205	179	246	310	240	04	
	05	359	380	364	374	370	112	140	177	110	232	201	180	219	304	249	05	
	06	364	392	364	370	417	122	125	160	123	154	200	182	217	237	230	06	
	07	369	381	361	380	382	131	160	179	167	148	189	177	222	220	194	07	
	08	380	379	380	367	390	121	176	171	165	150	191	186	207	198	187	08	
	09	387	358	376	349	391	121	192	165	203	131	192	209	200	164	188	09	
	10	397	380	398	345	395	121	150	159	150	129	190	215	184	167	176	10	
	11	395	392	380	411	372	131	135	149	80	139	189	190	186	206	163	11	
	12	400	401	406	379	392	120	141	130	135	90	190	174	177	171	125	12	
	13	398	409	410	412	409	101	136	146	141	107	183	180	177	166	152	13	
	14	446	426	417	431	445	90	139	140	146	140	179	184	184	183	157	14	
	15	445	459	436	468	467	106	109	68	120	134	166	181	150	190	180	15	
	16	478	510	510	550	520	65	108	110	20	102	178	179	156	155	181	16	
	17	570	598	574	639	592	40	10	126	-31	68	164	158	173	185	158	17	
	18	561	641	581	671	581	112	-180	120	52	70	134	72	178	93	138	18	
	19	569	676	569	655	582	68	-97	107	63	83	163	-17	168	114	150	19	
	20	530	508	516	520	481	51	40	76	78	66	145	38	180	105	142	20	
	21	463	540	470	420	458	43	70	50	62	24	140	127	170	128	149	21	
	22	420	639	386	371	297	80	109	67	49	30	150	184	160	164	117	22	
	23	371	539	325	328	313	87	297	80	51	71	154	113	174	171	150	23	
	24	340	420	310	277	327	91	293	82	55	99	166	119	202	176	176	24	
DAILY SUM		9923	10873	9968	9848	9899	2341	2672	3122	2939	2732	4254	3756	4638	4421	4160	DAILY SUM	
DAILY MEAN		413	453	415	410	412	98	111	130	122	114	177	156	193	184	173	DAILY MEAN	
MEAN			413*					115					177				MEAN	

* Using 13, 24, 25 and 26.

Scaled RNB Checked CA

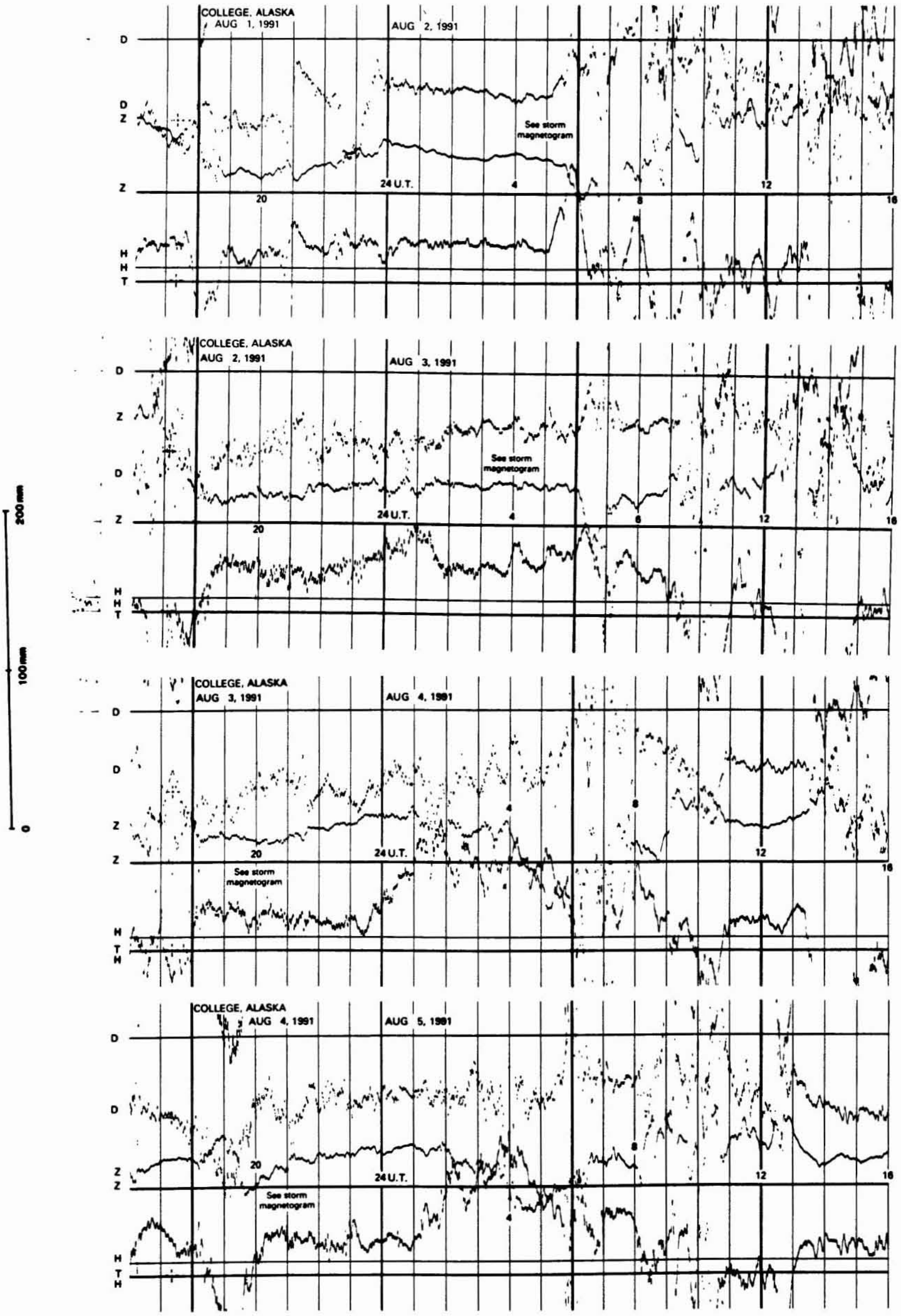
FORMAT FOR NORMAL & STORM MAGNETOGRAMS

(SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS



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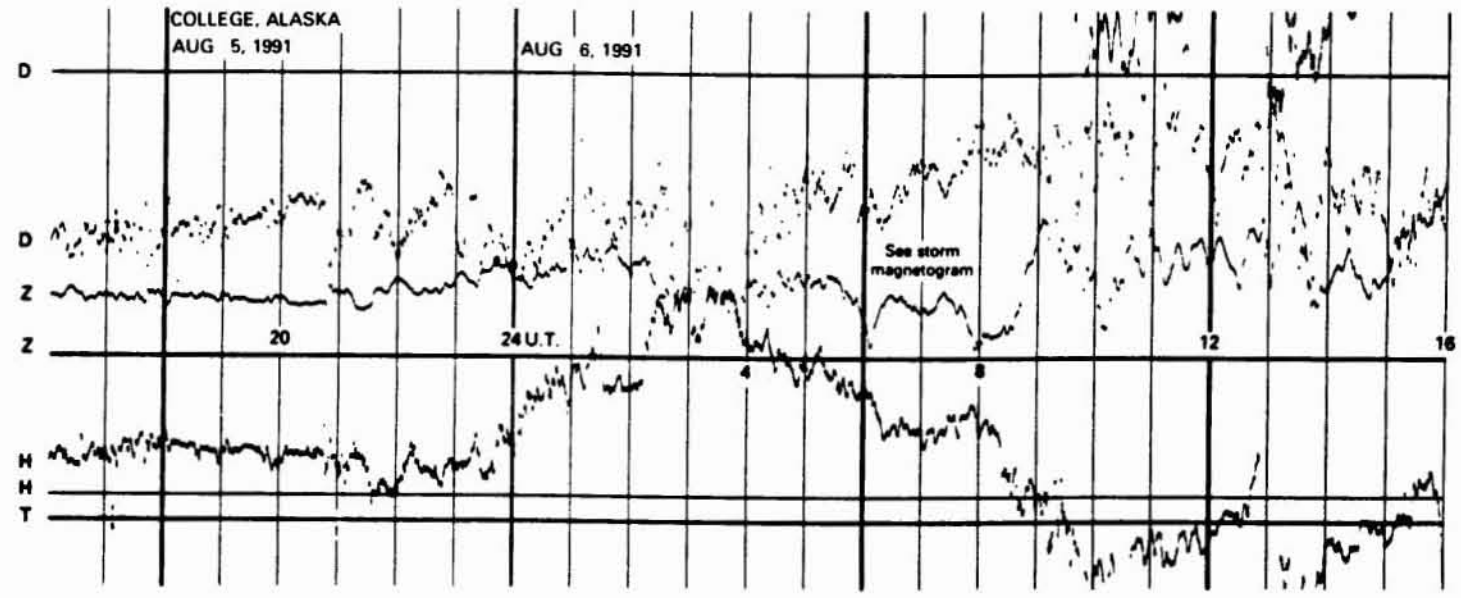

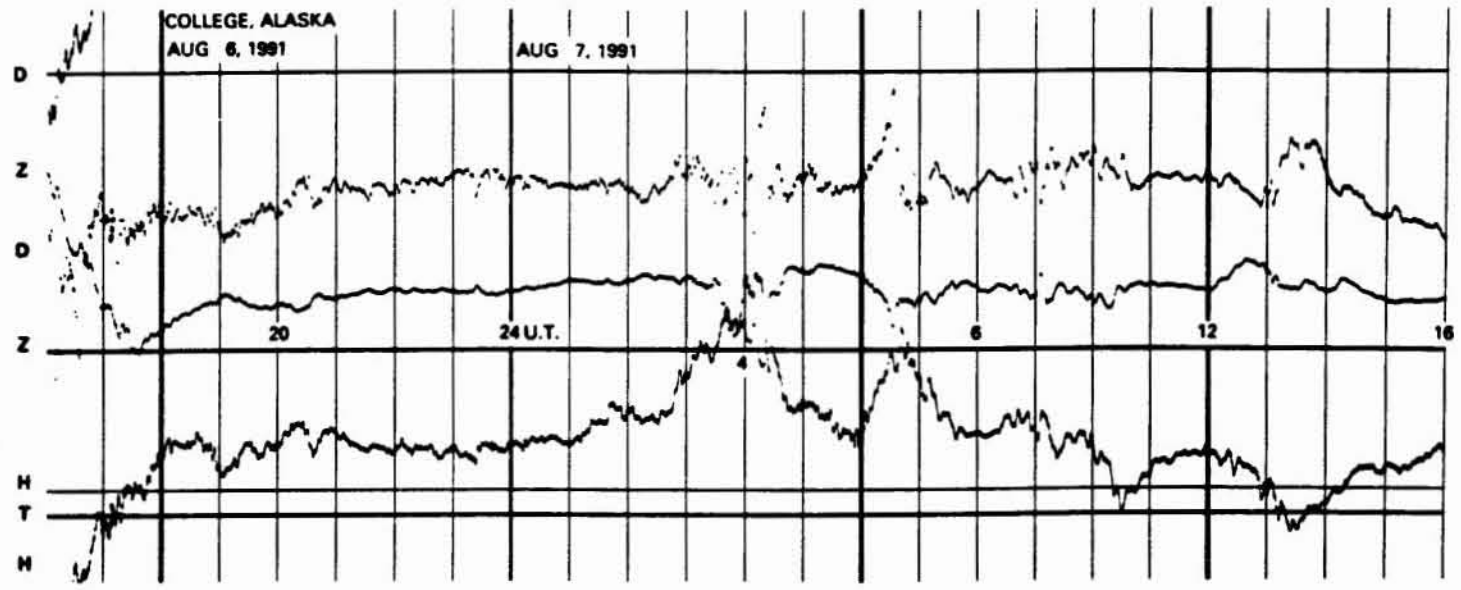

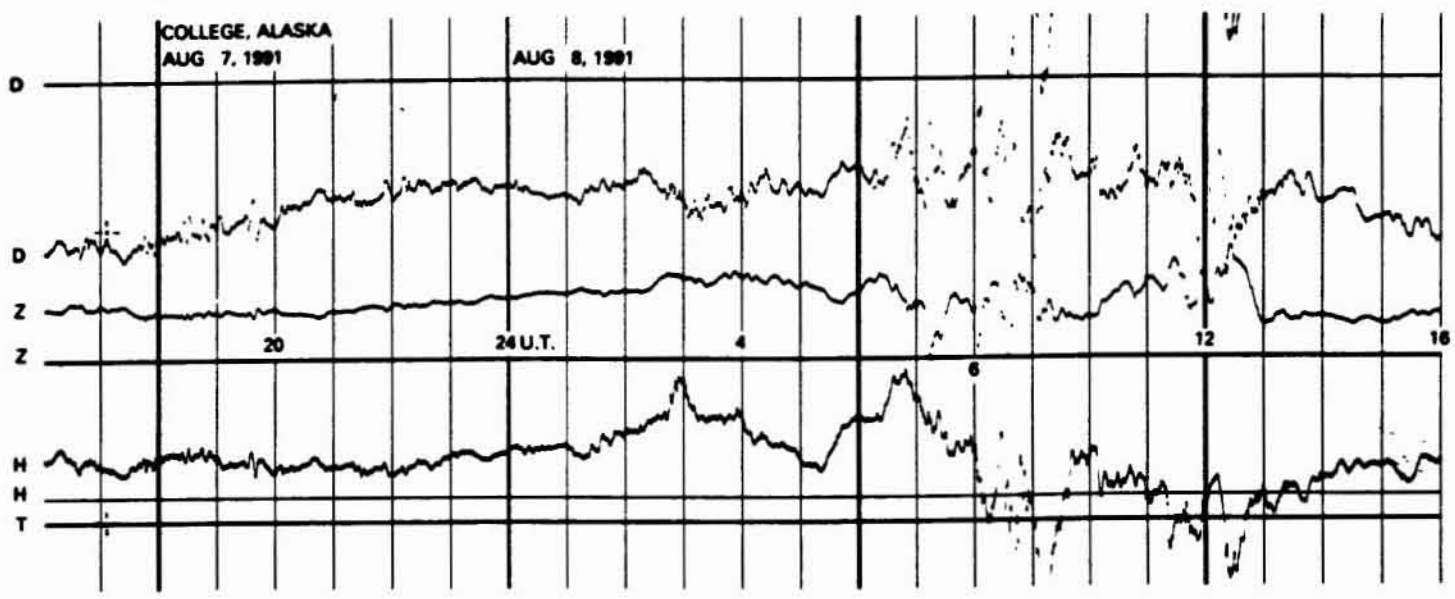

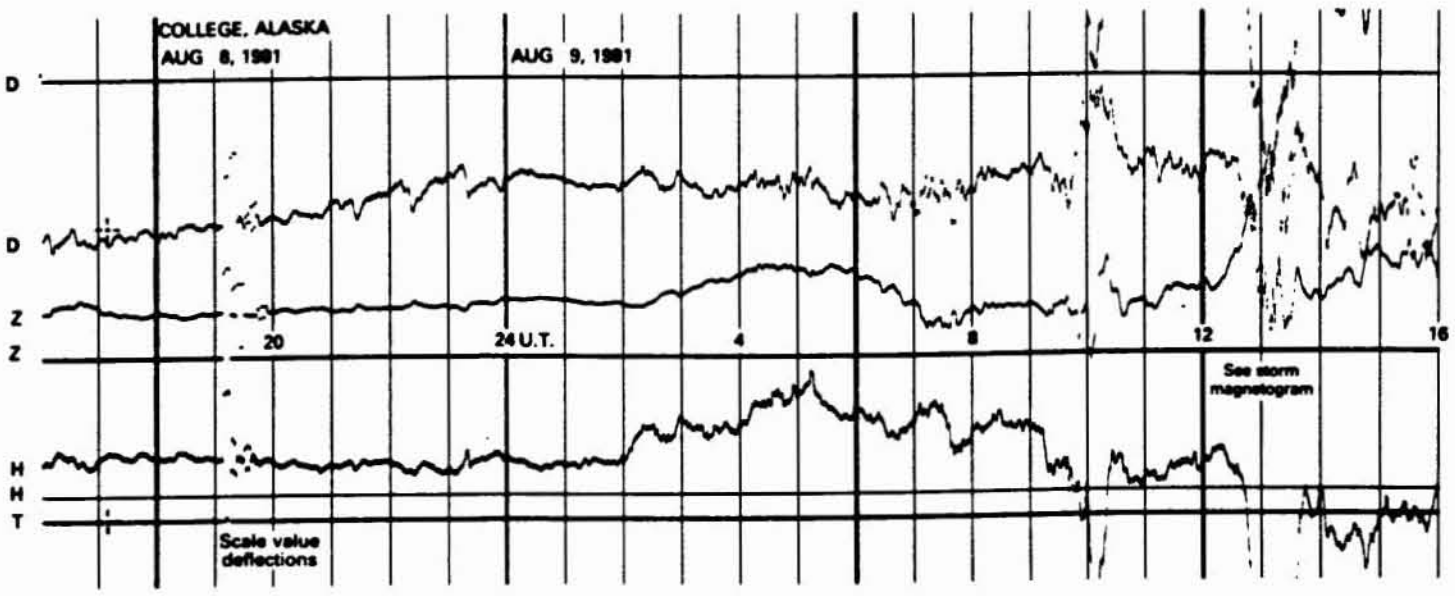

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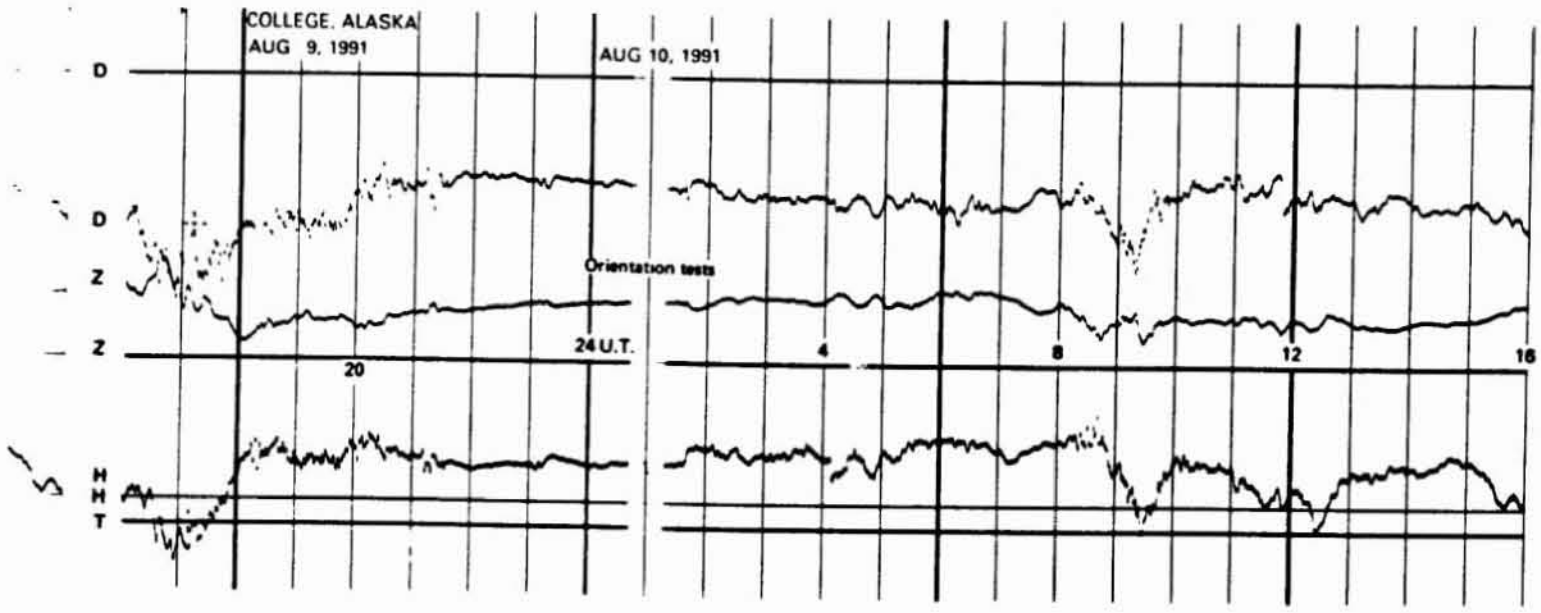

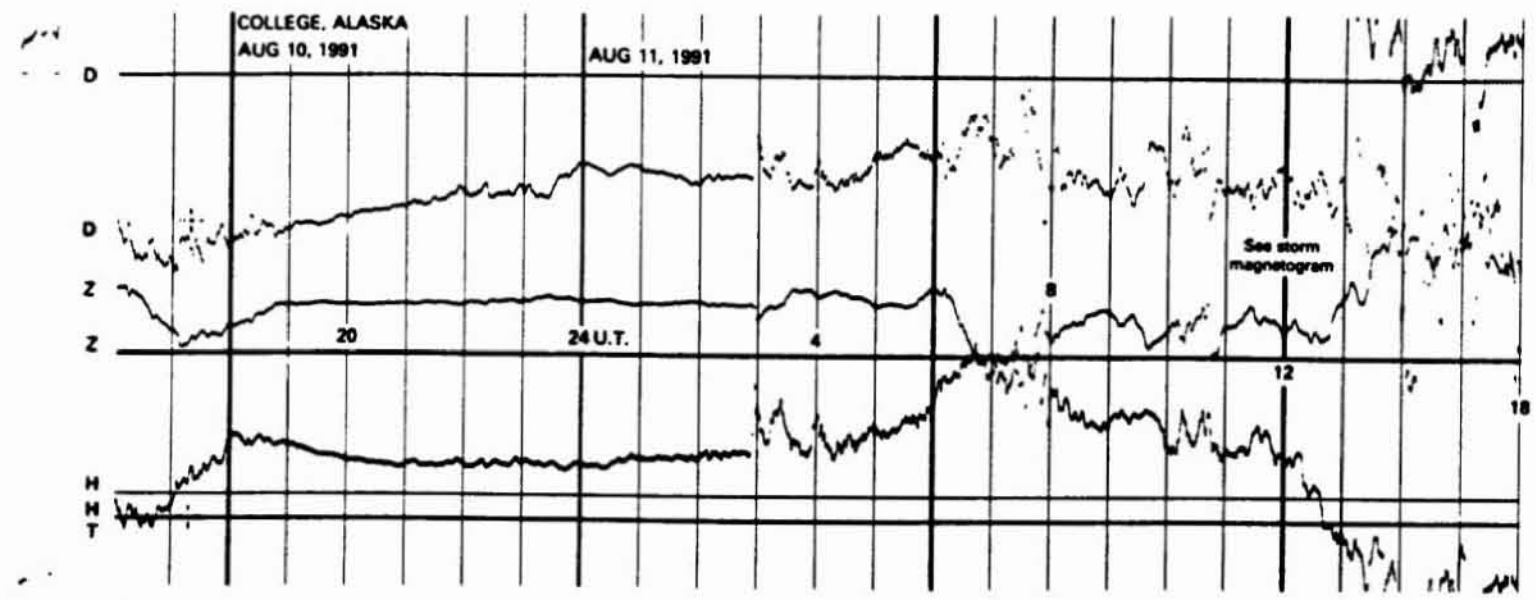

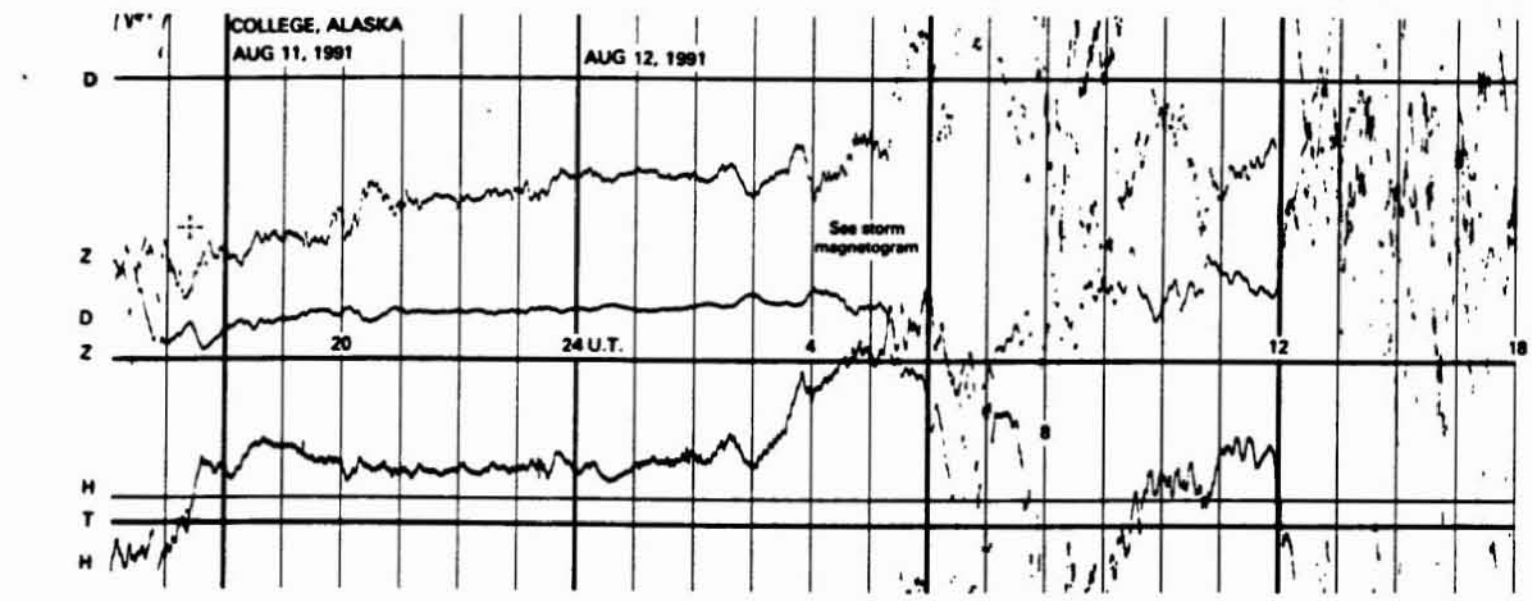

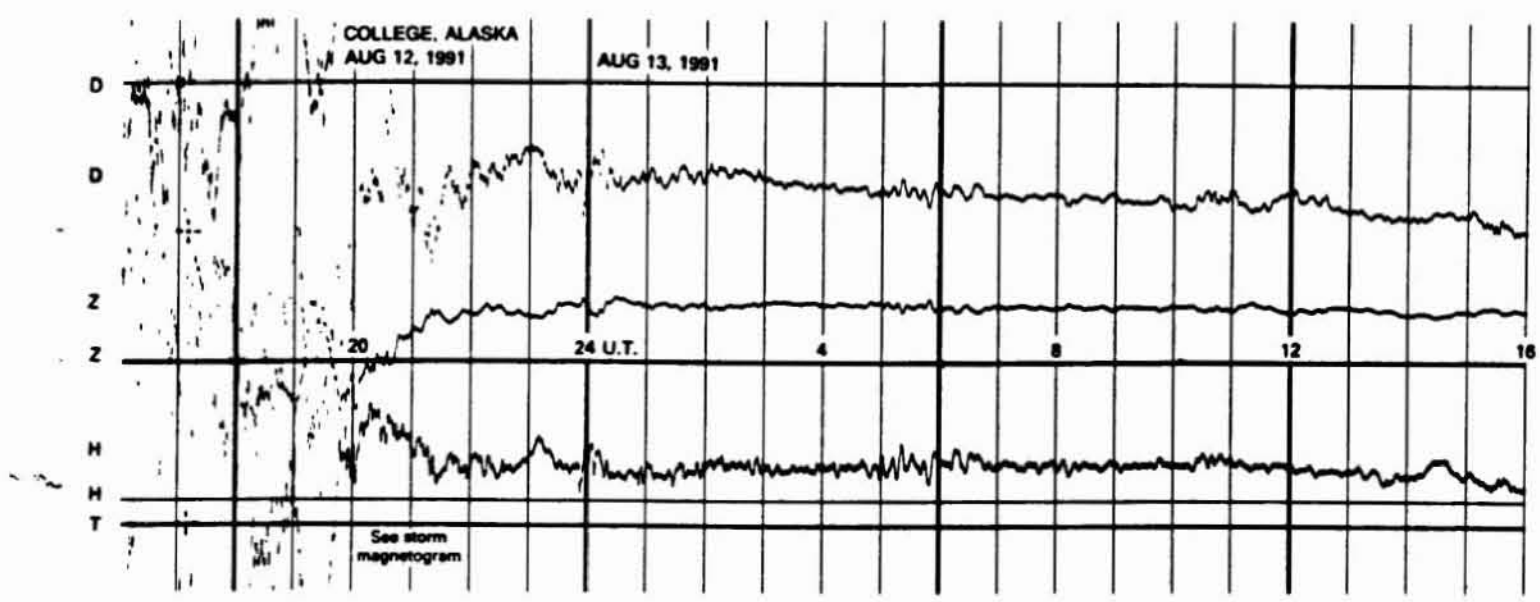

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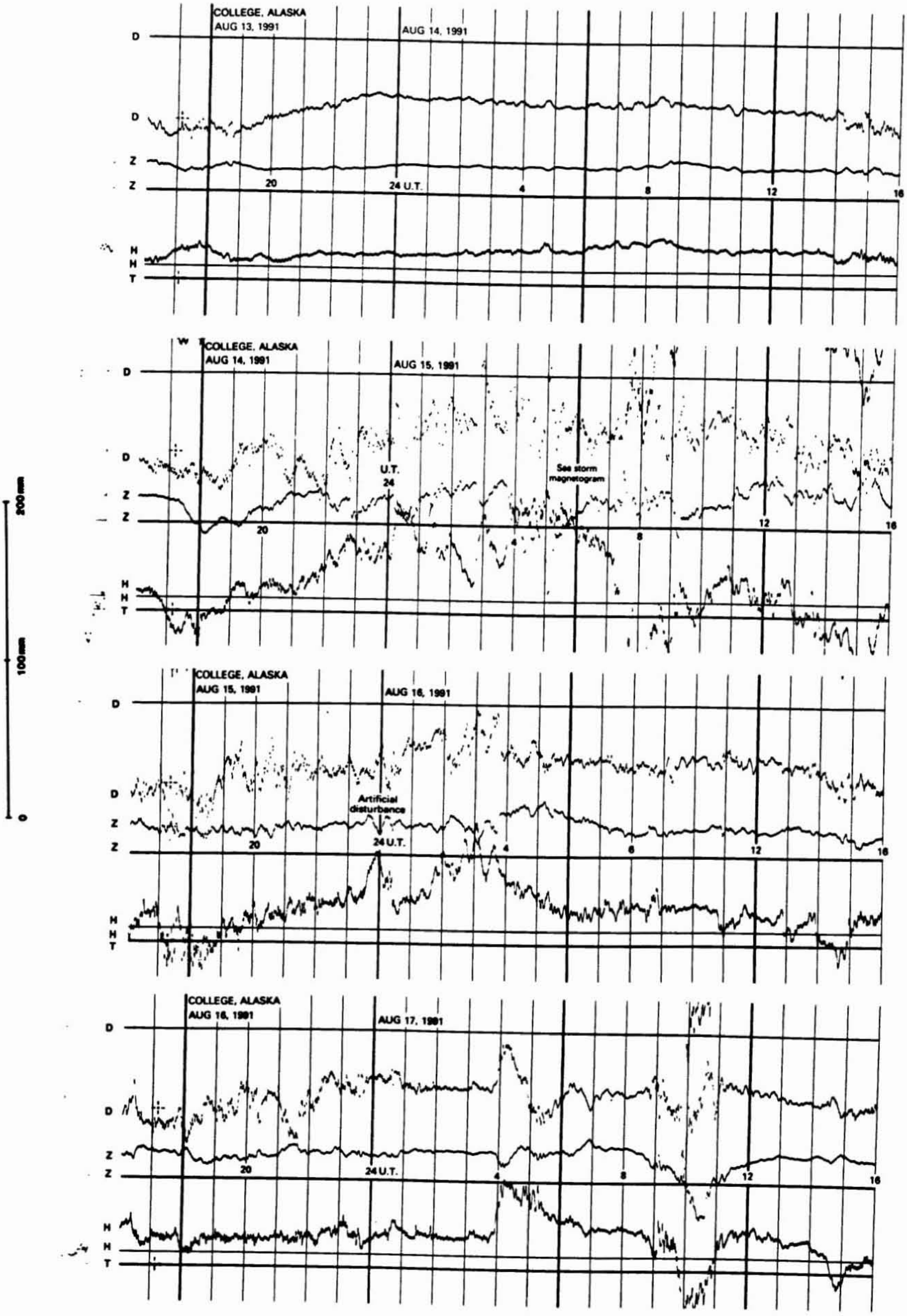

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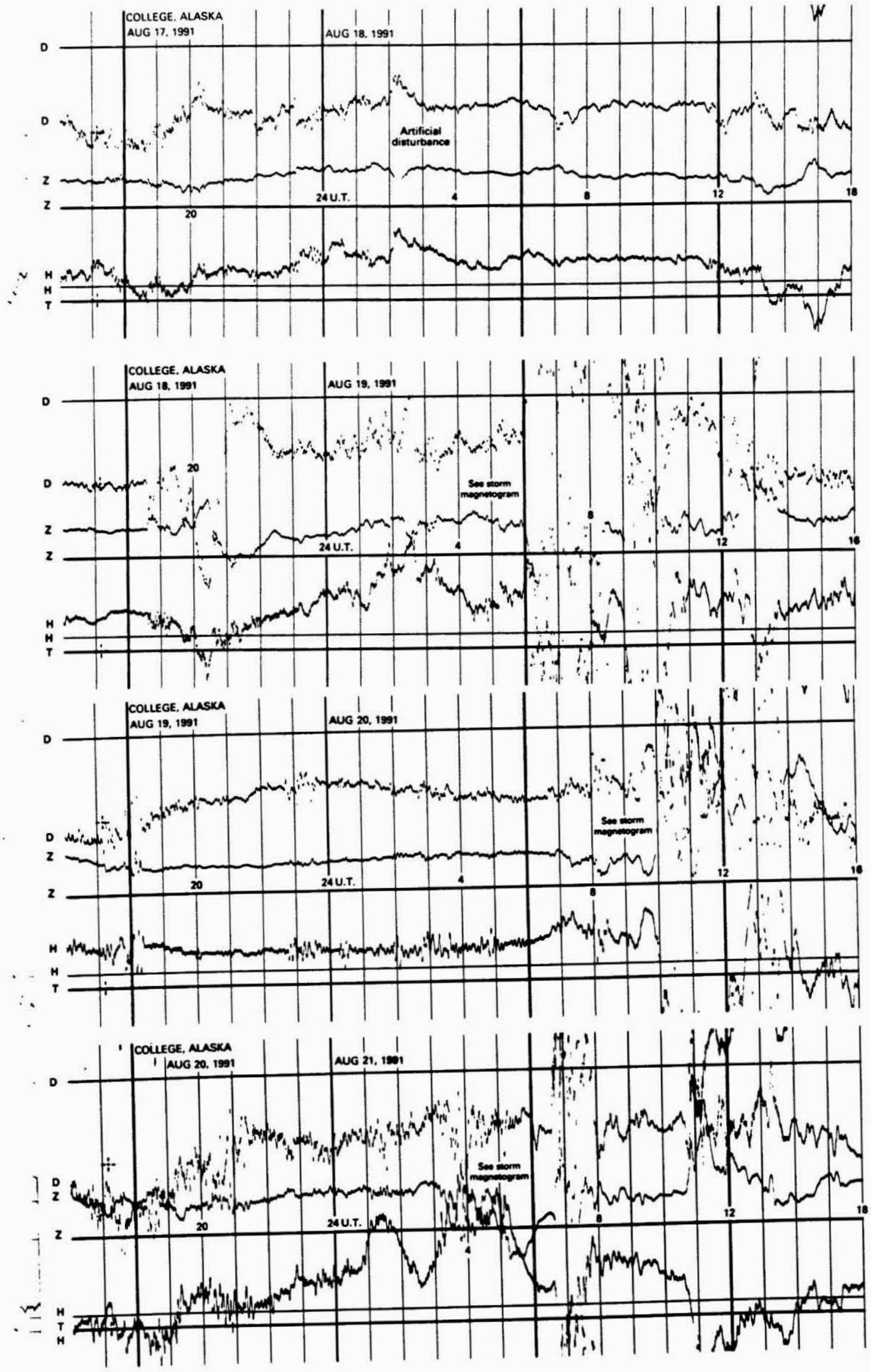

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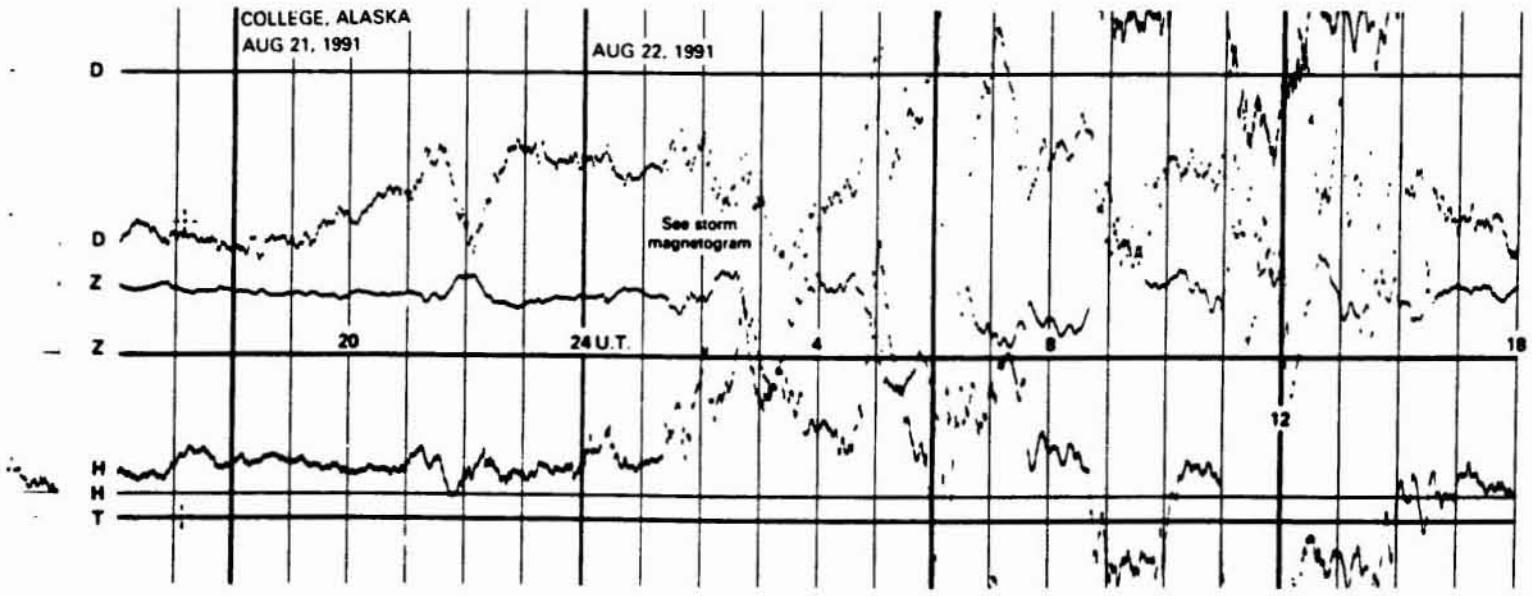
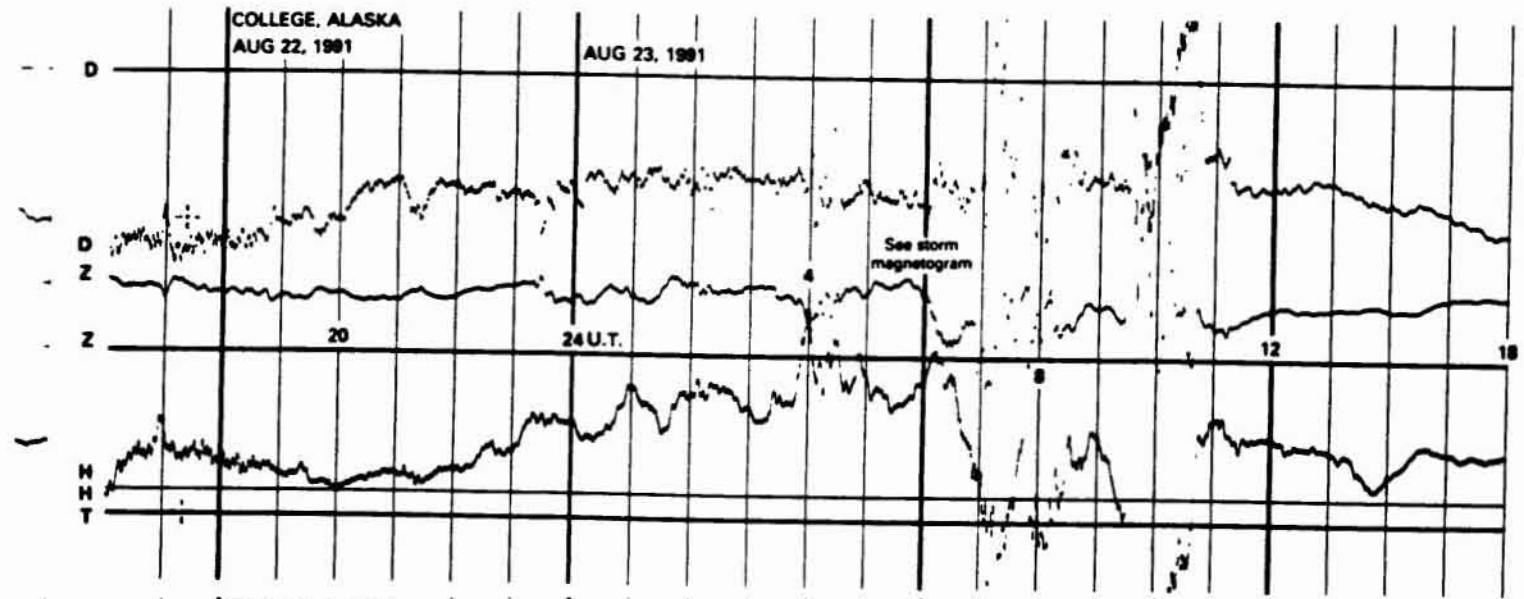
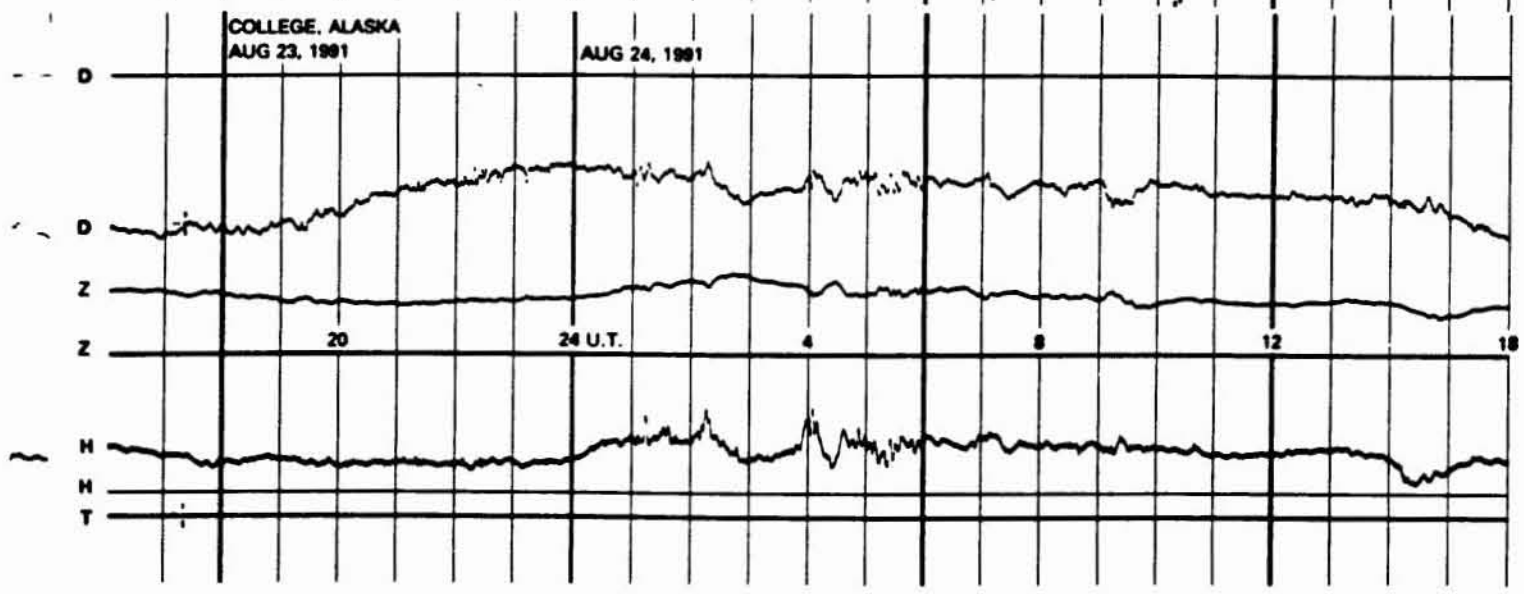
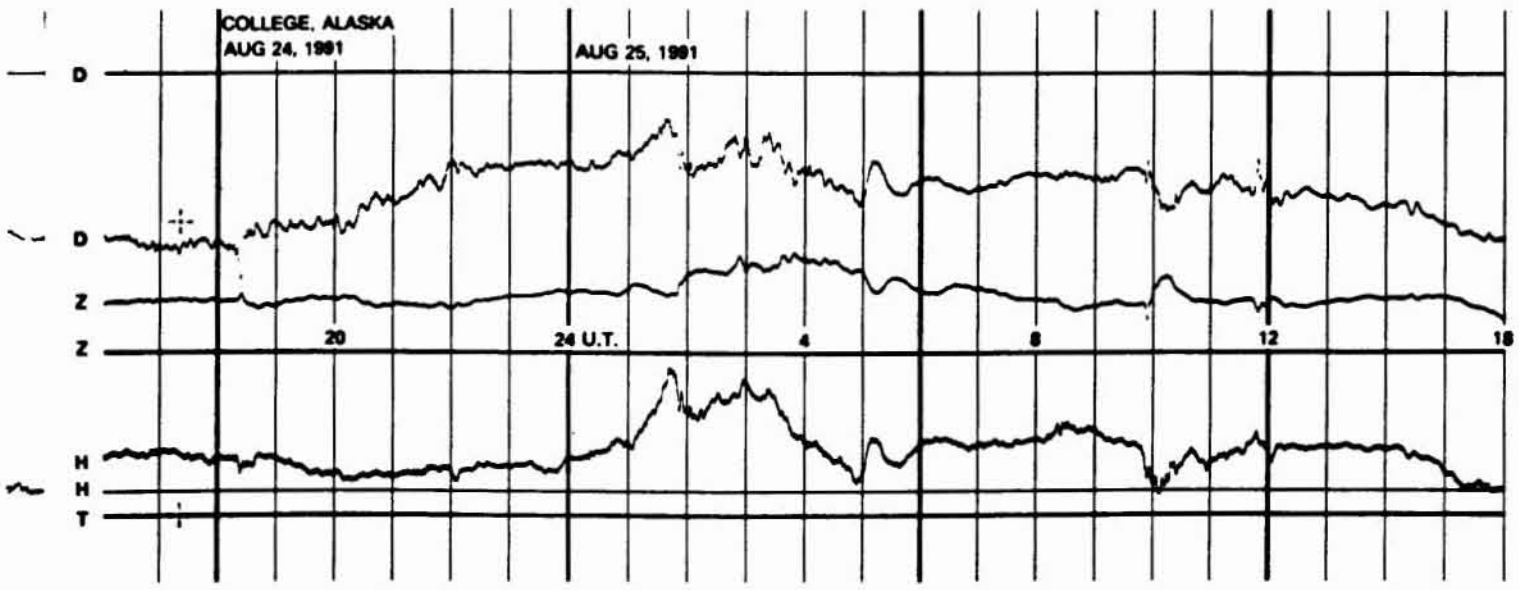
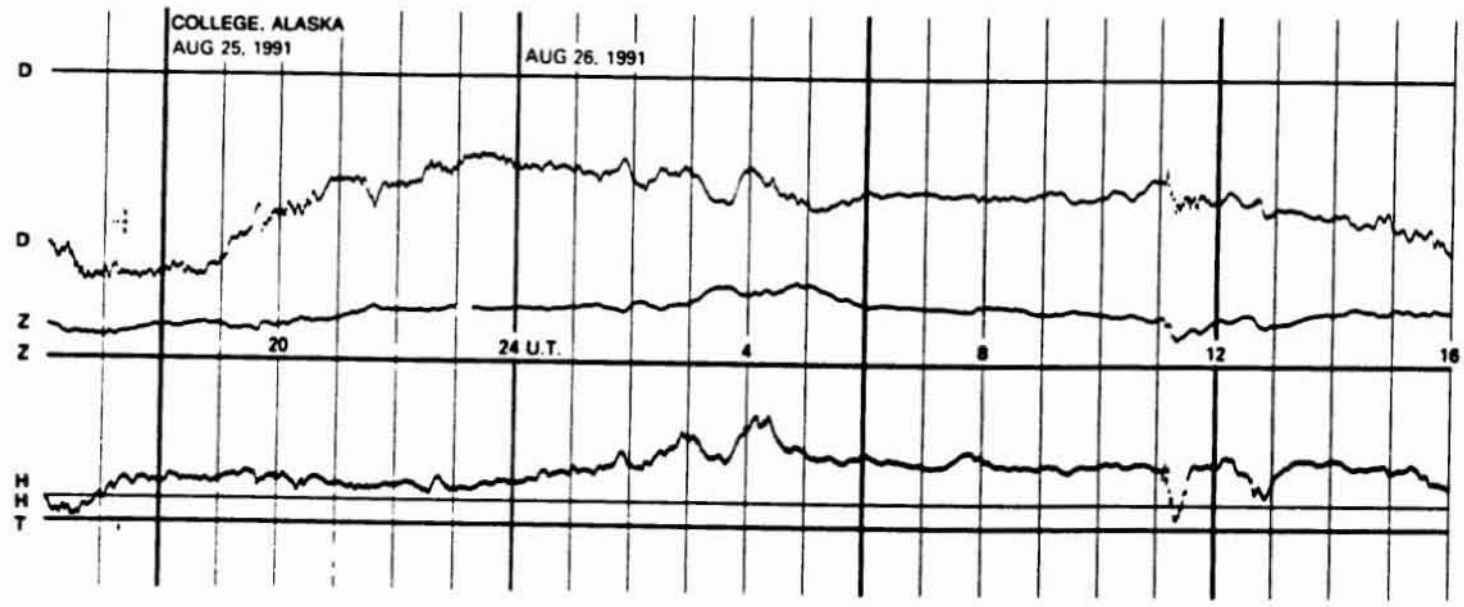


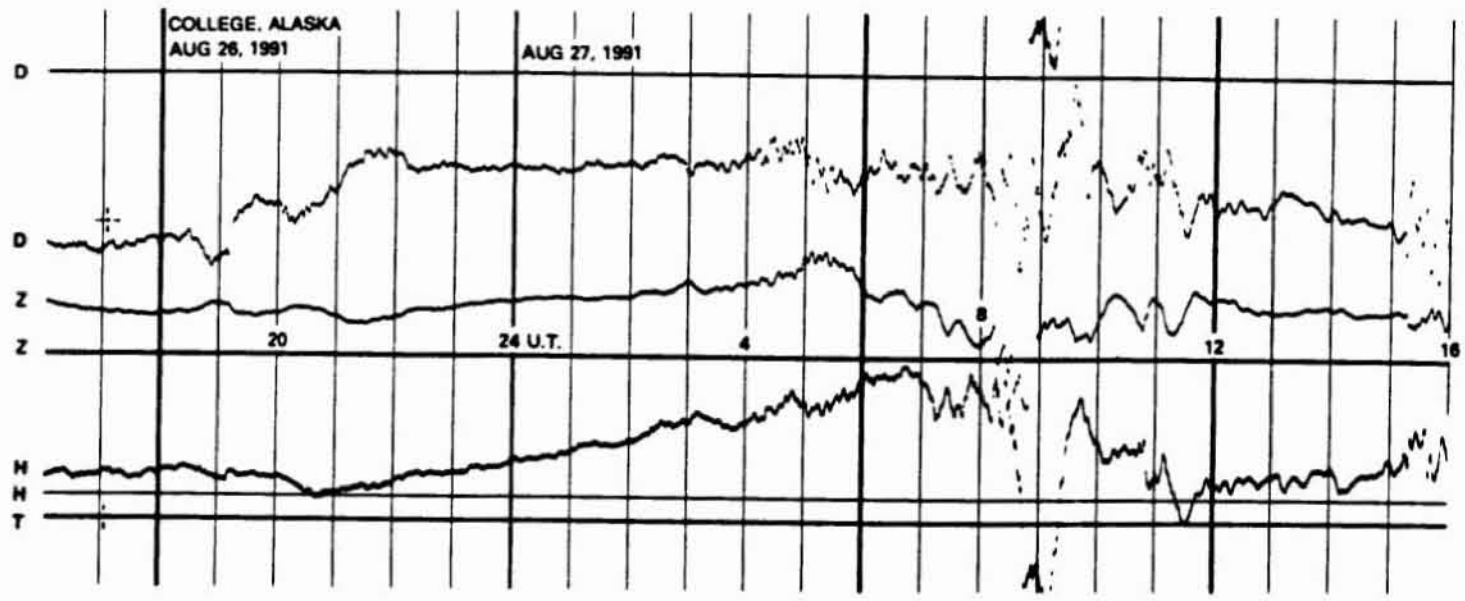


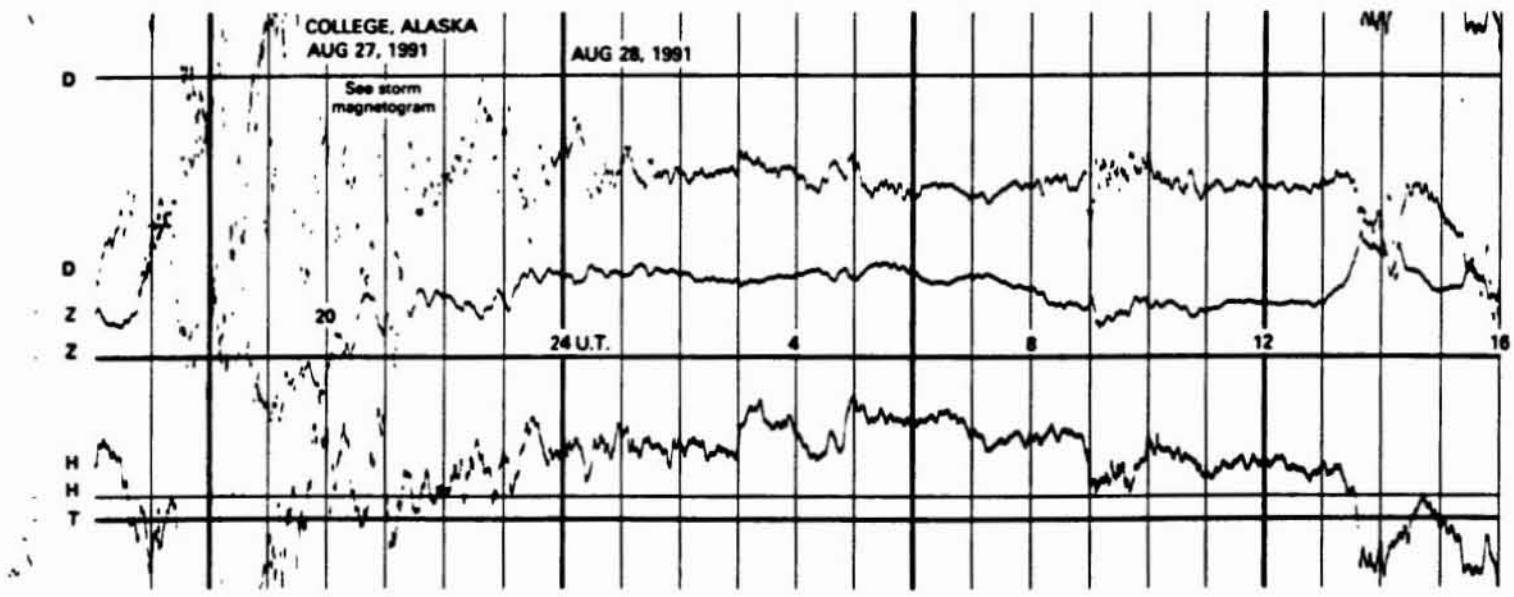


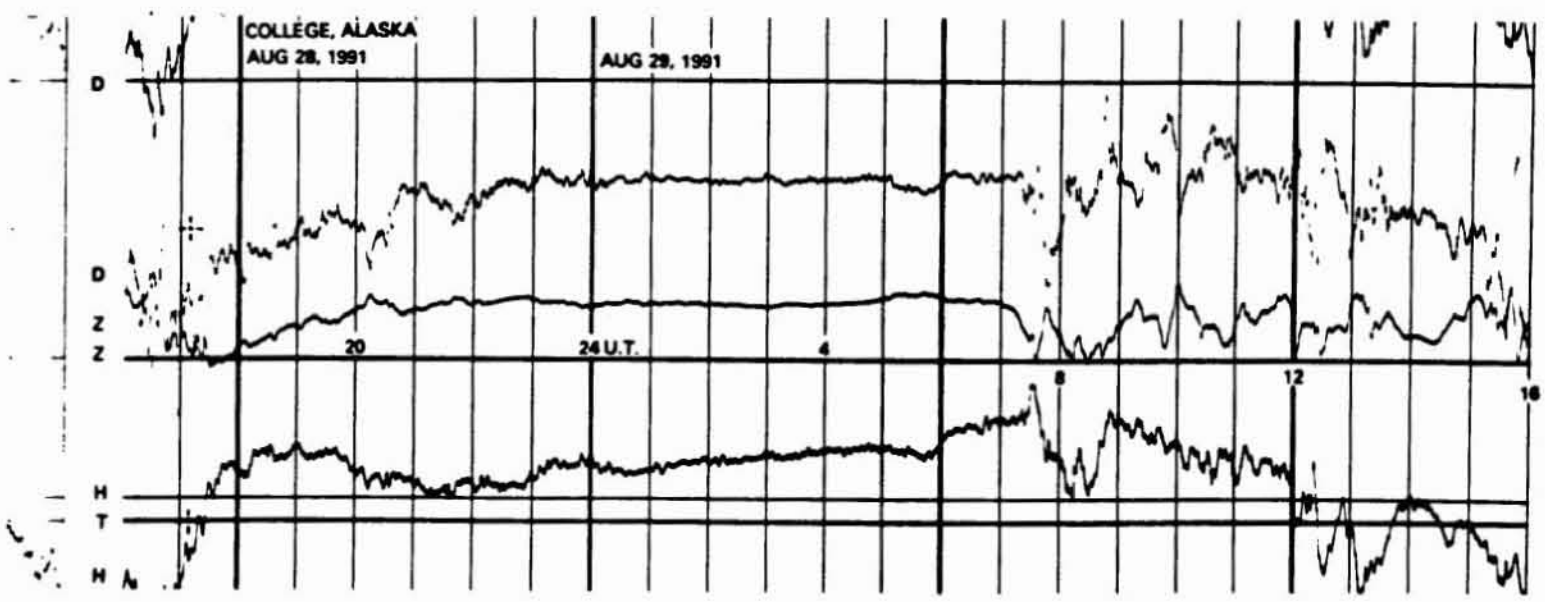


NORMAL MAGNETOGRAMS

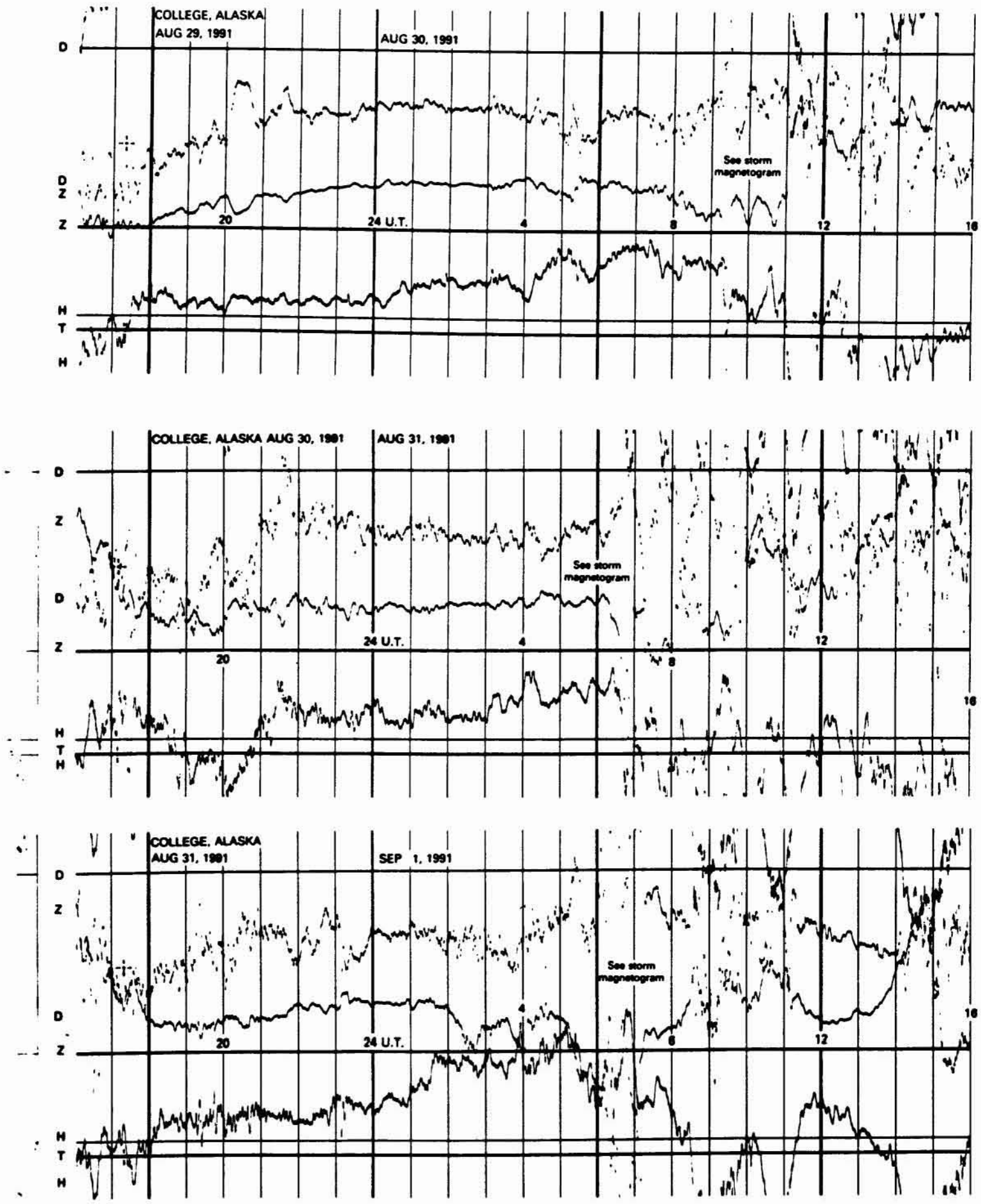




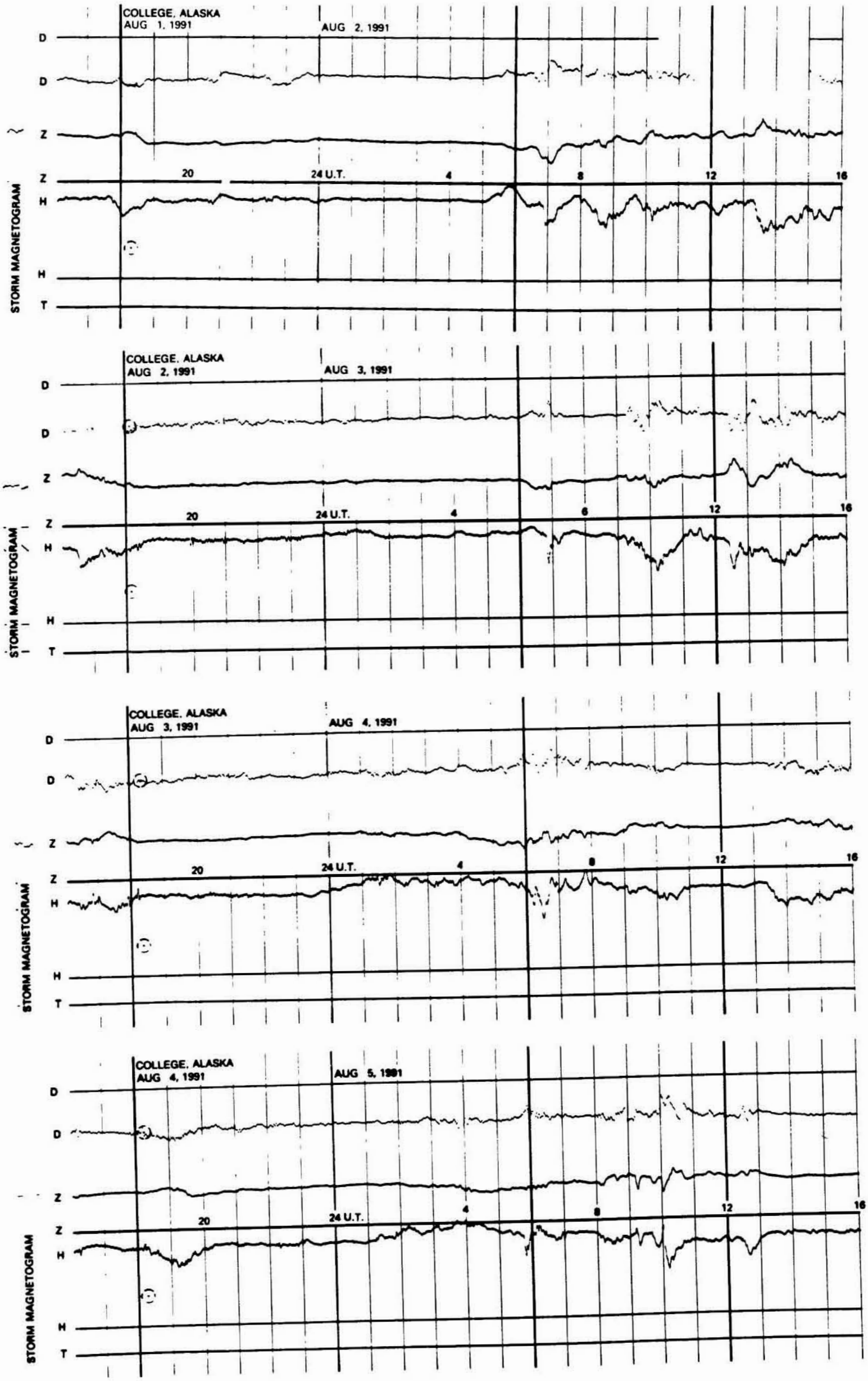




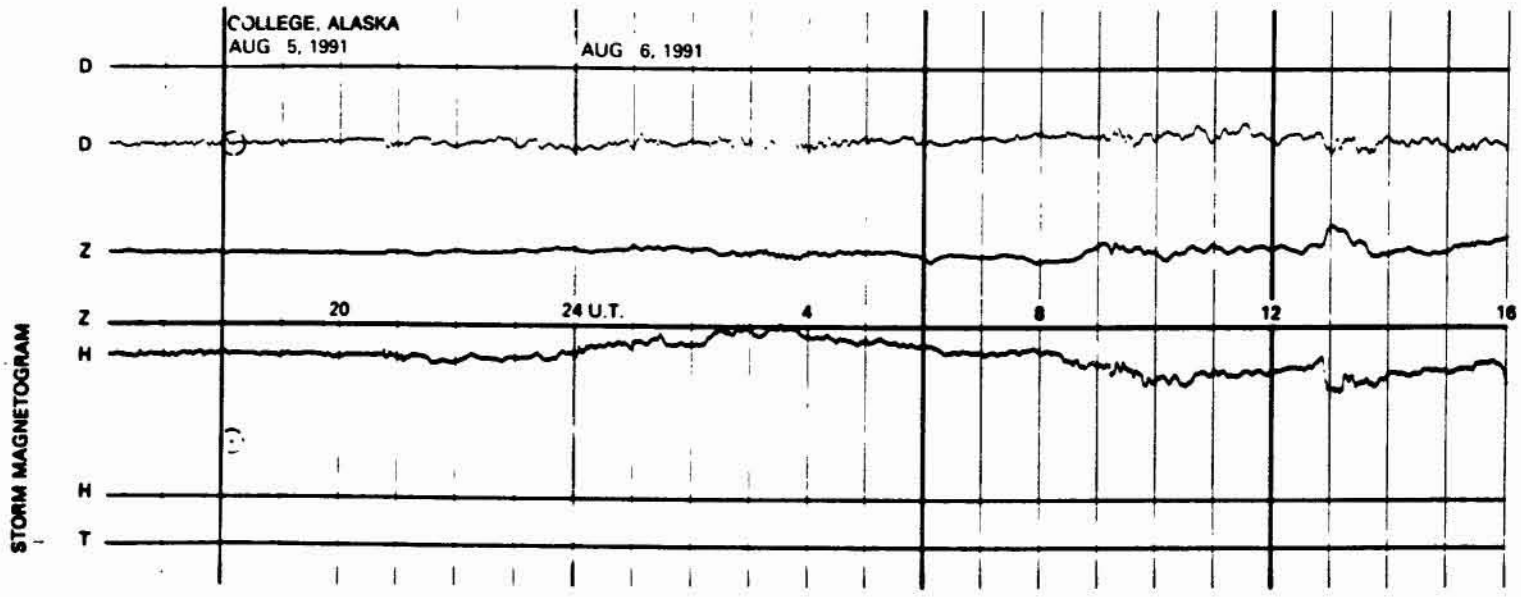
NORMAL MAGNETOGRAMS

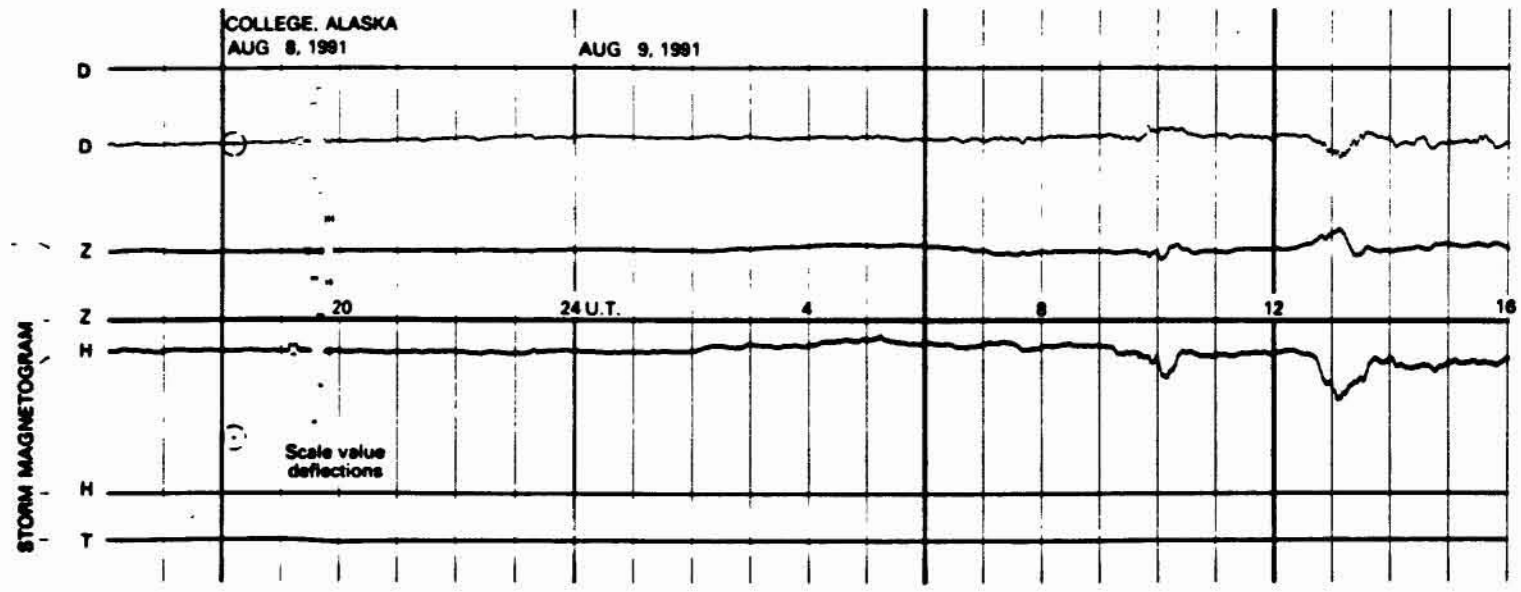


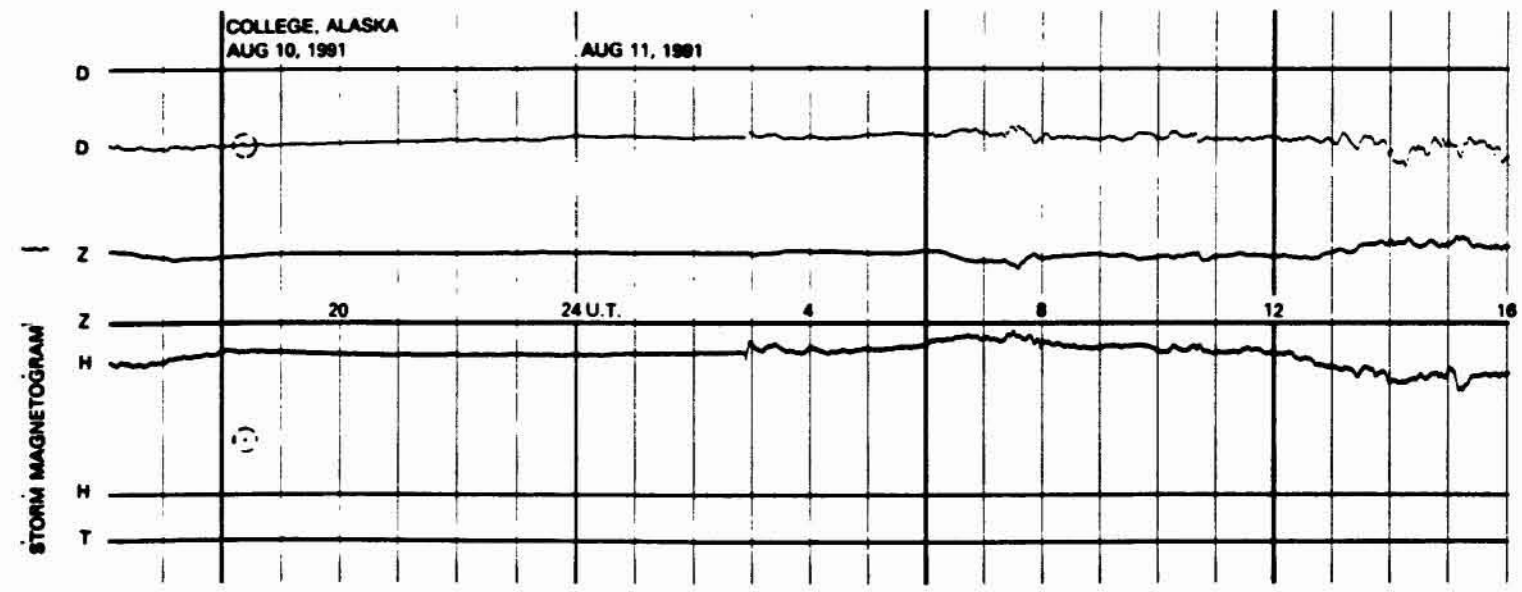
STORM MAGNETOGRAMS

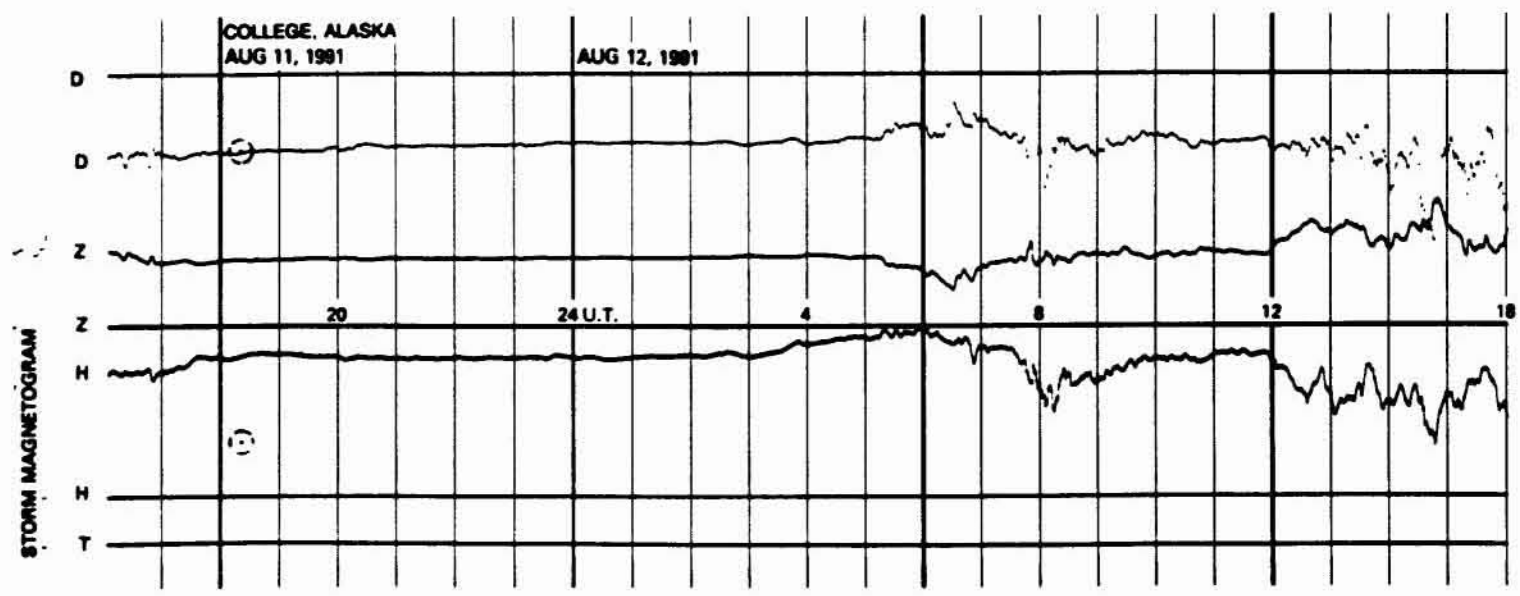


STORM MAGNETOGRAMS









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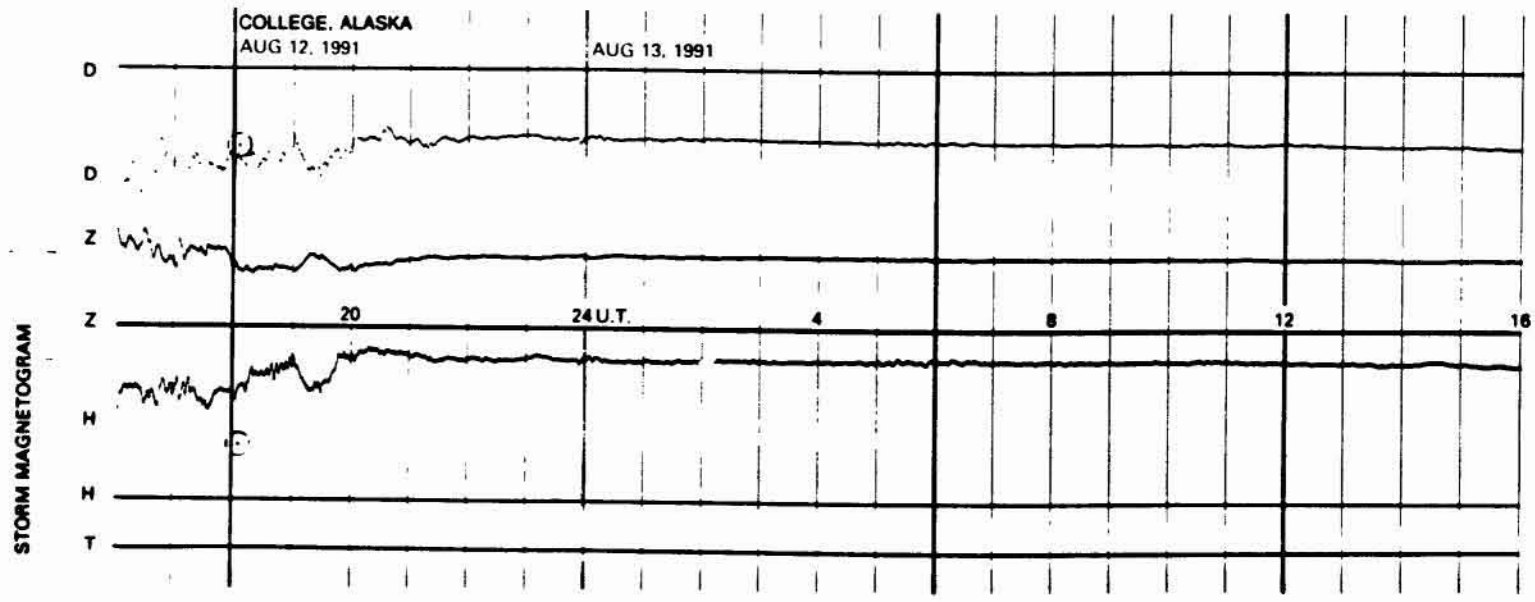

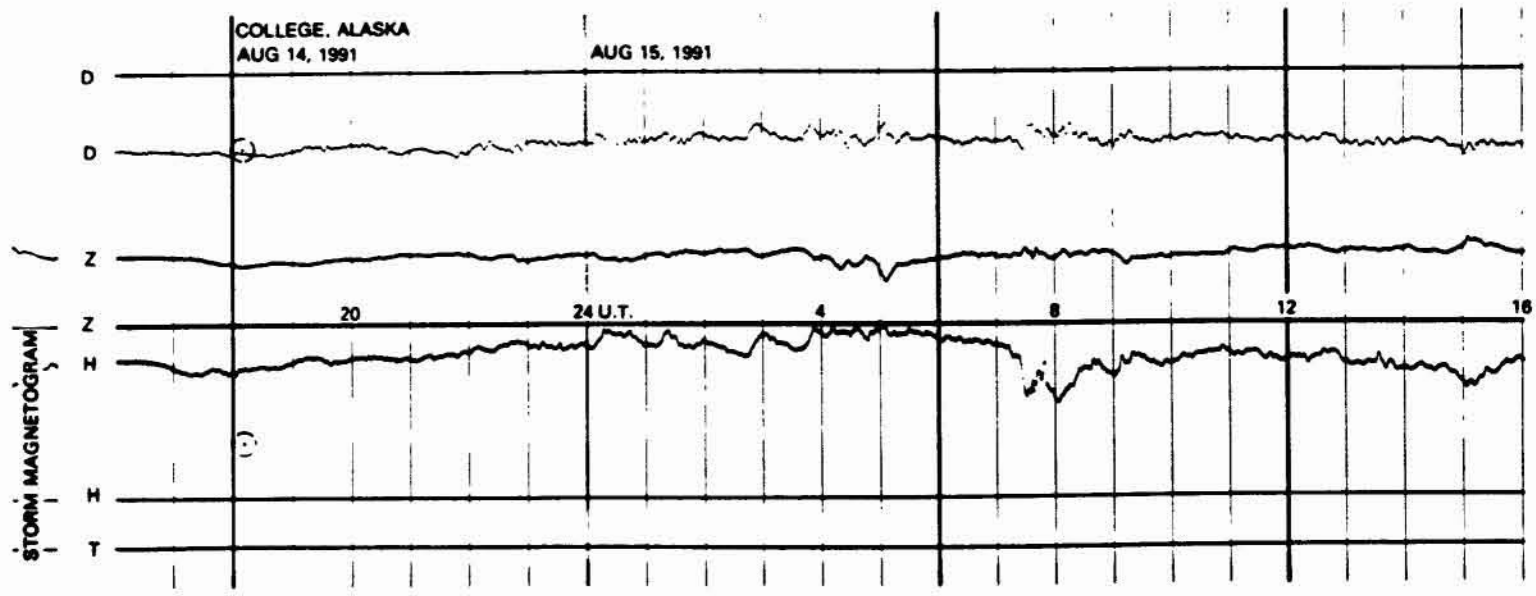

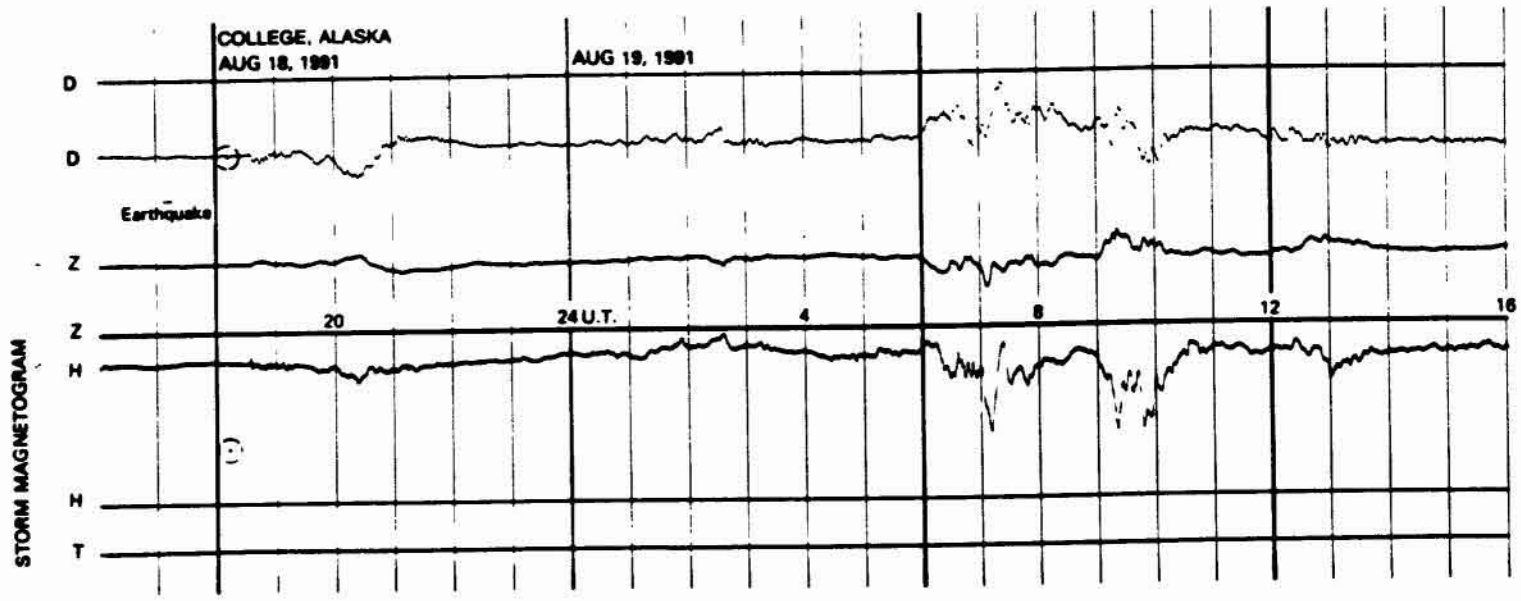

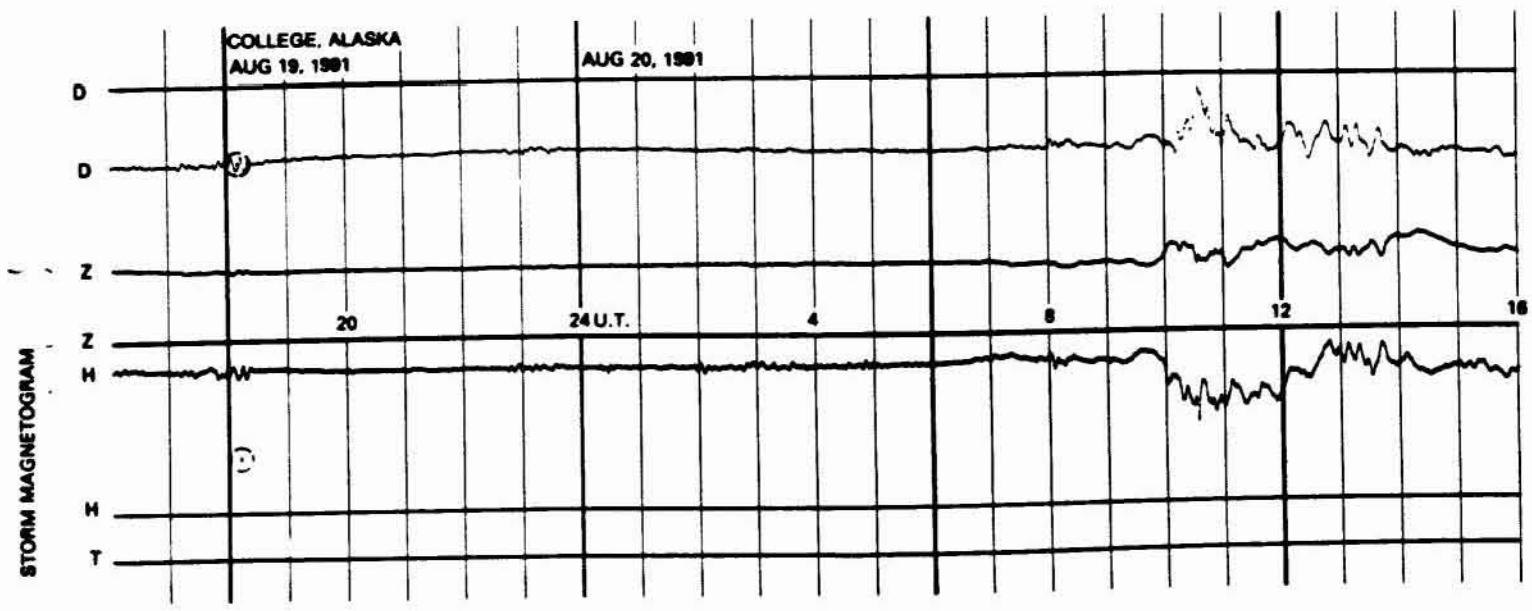

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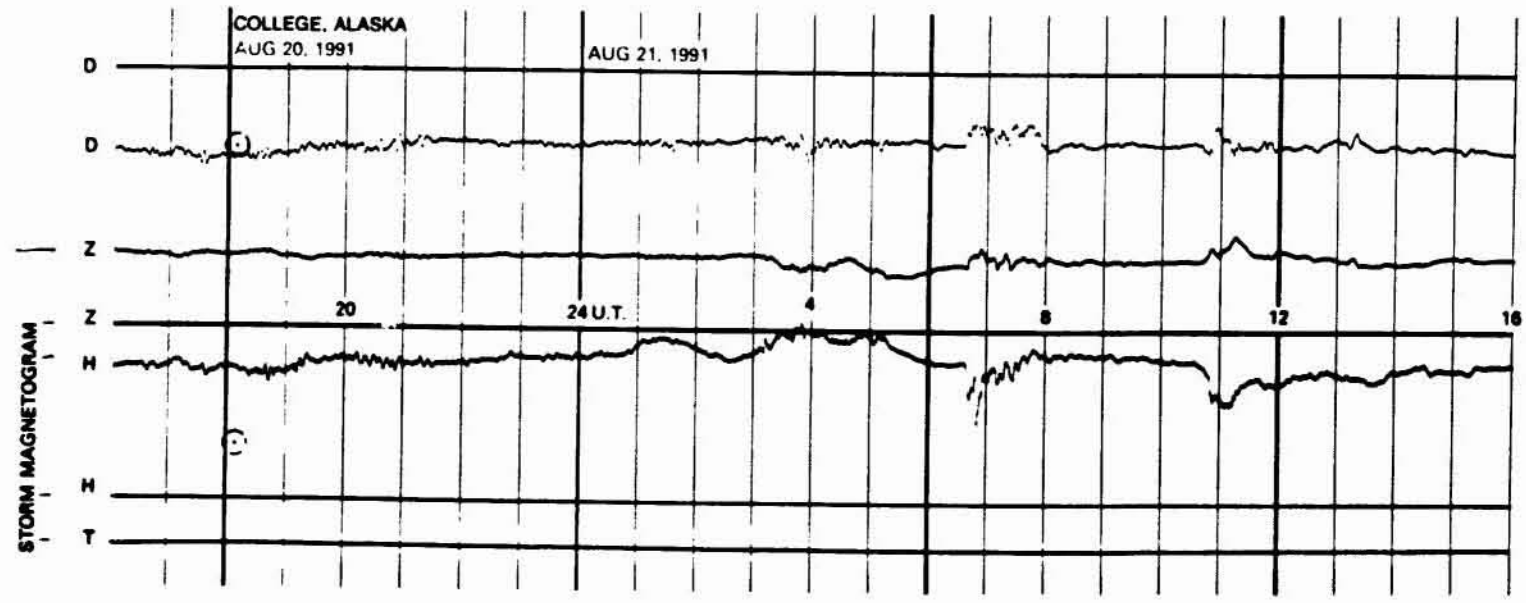

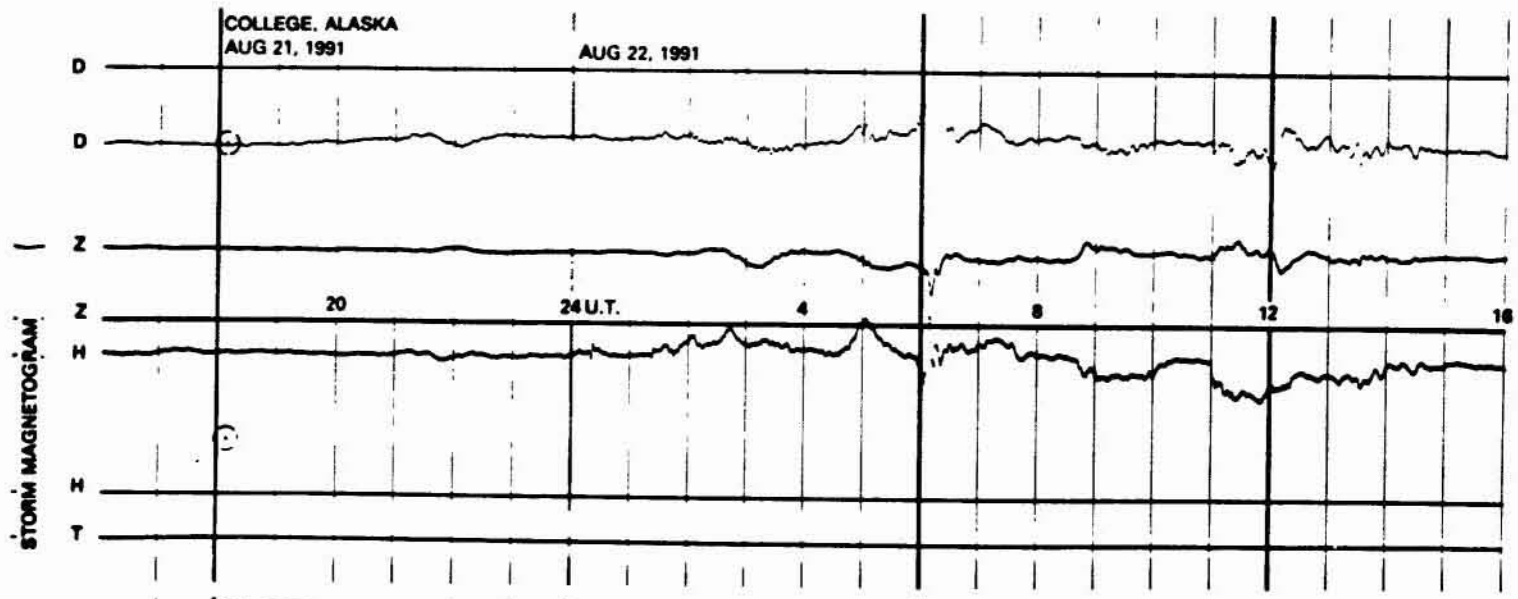

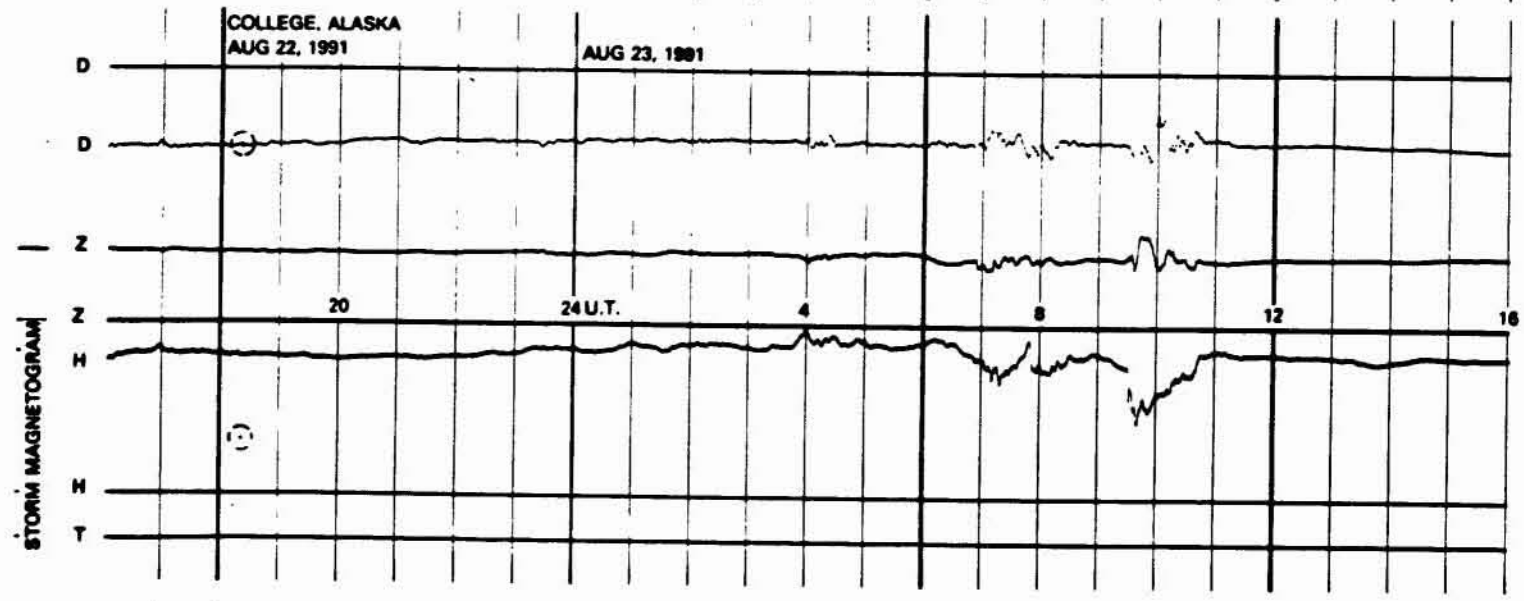

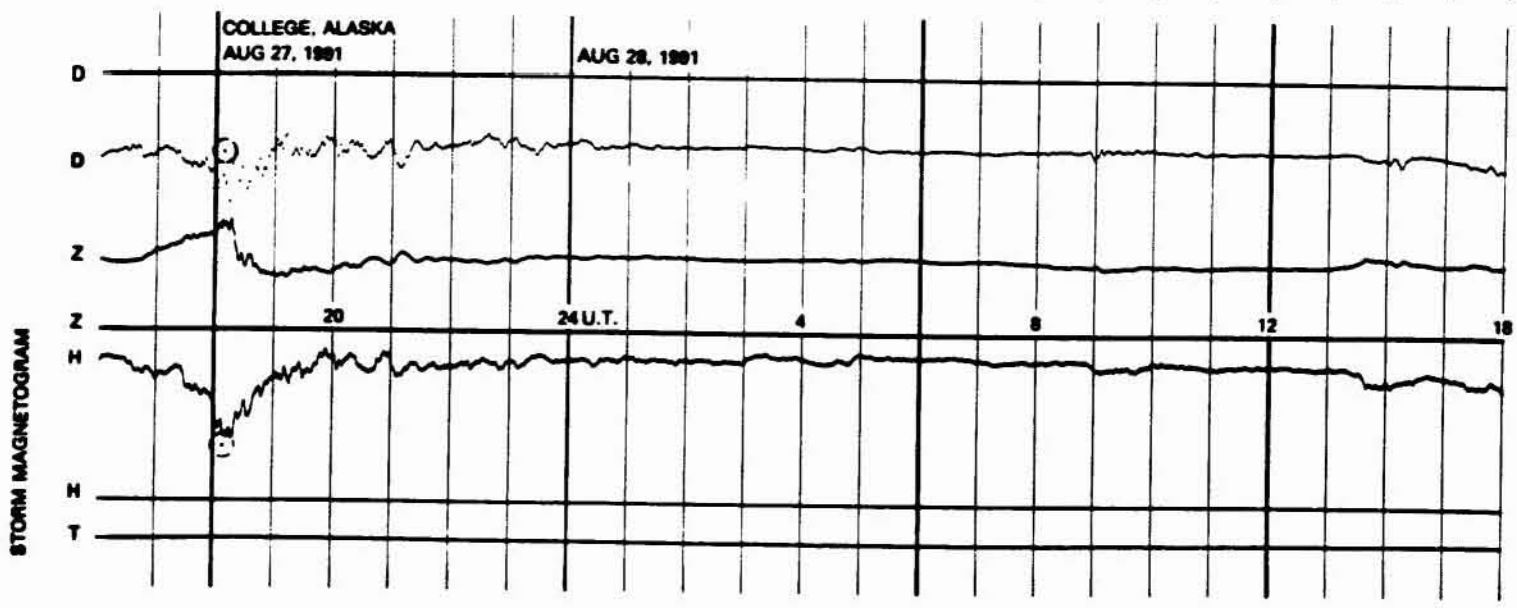
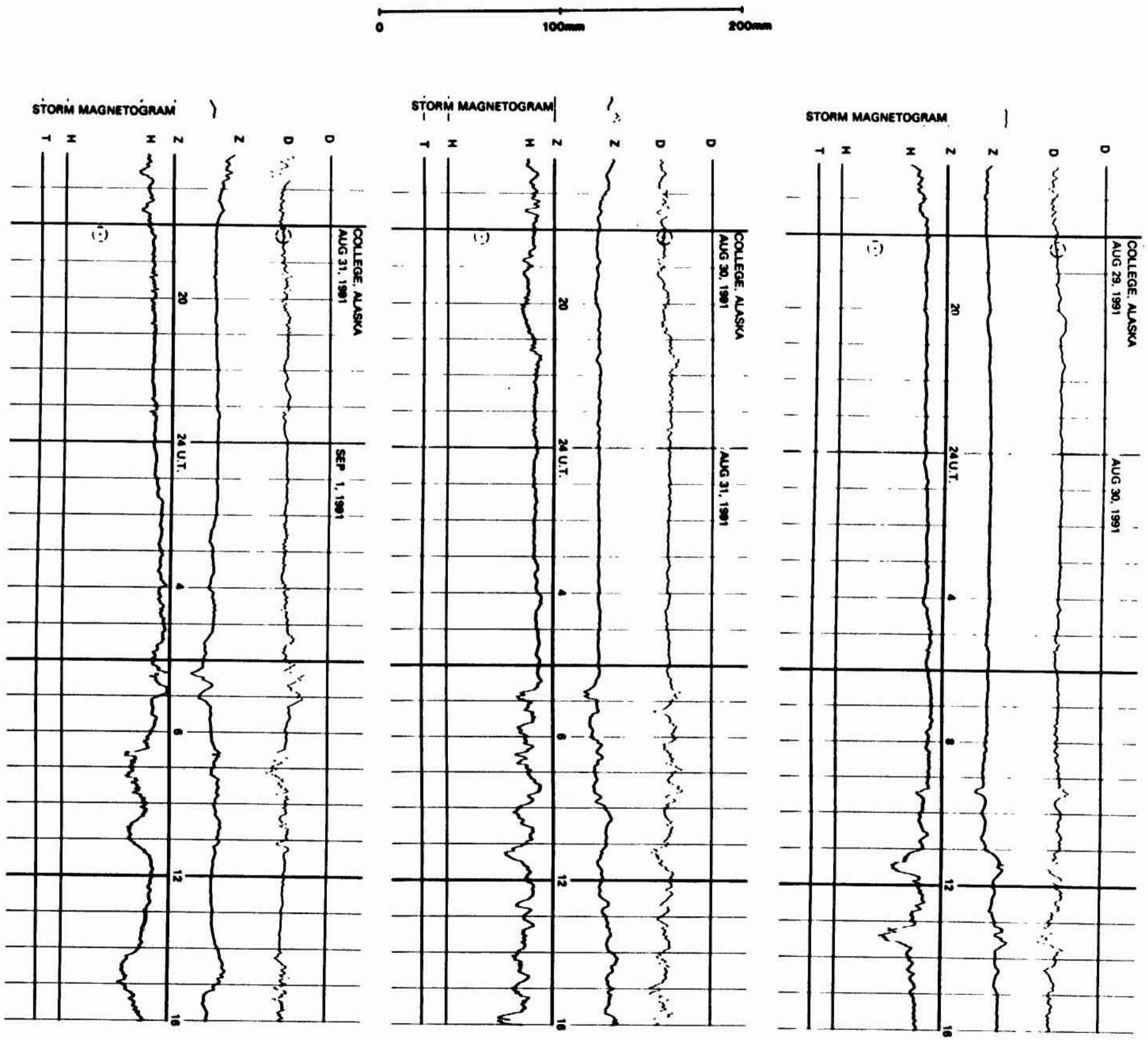
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