

UNITED STATES DEPARTMENT OF THE INTERIOR

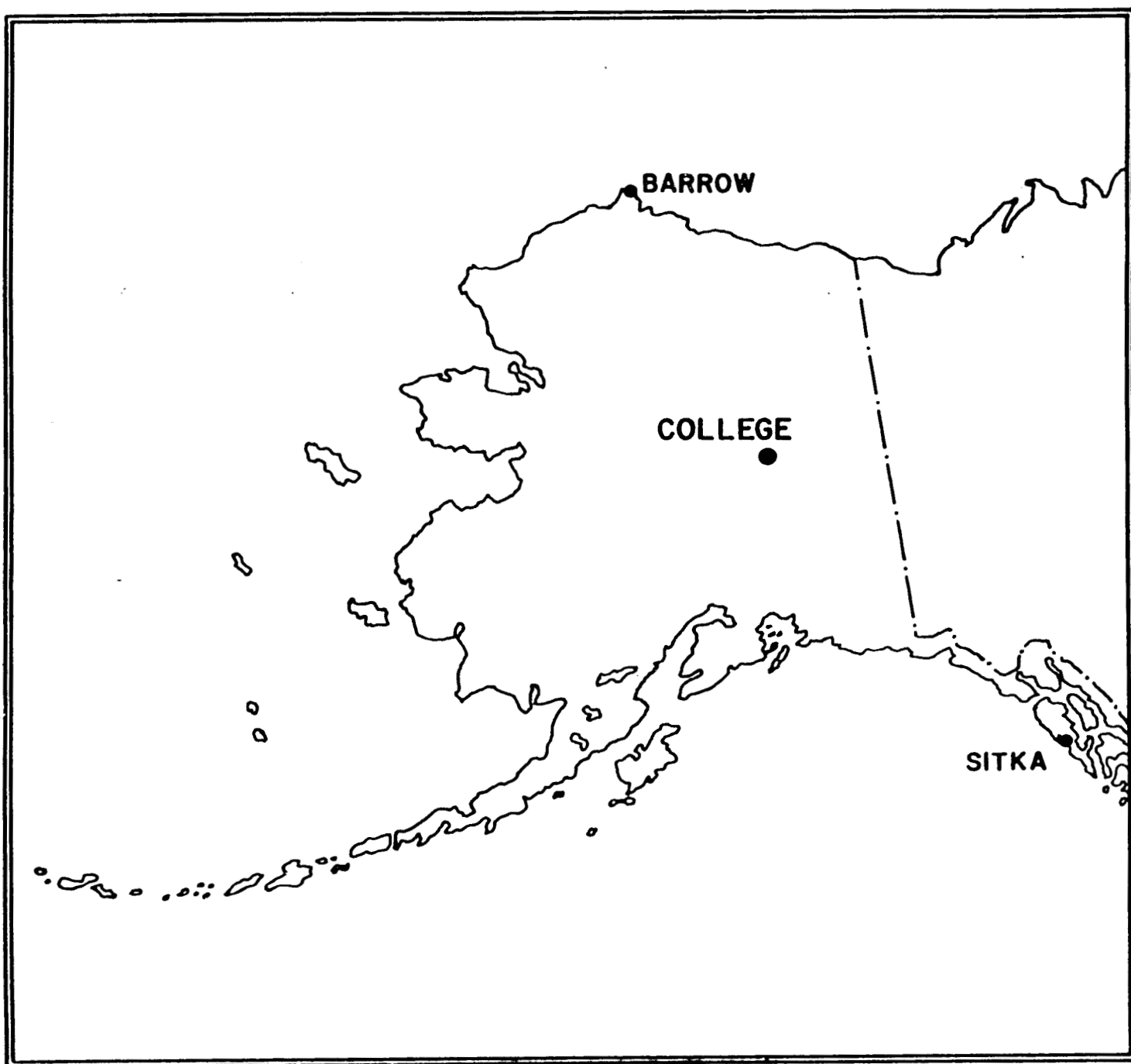
GEOLOGICAL SURVEY

ALASKAN GEOLOGY BRANCH
TECHNICAL DATA FILE

PRELIMINARY GEOMAGNETIC DATA COLLEGE OBSERVATORY FAIRBANKS, ALASKA

AUGUST 1978

OPEN FILE REPORT 78-300H



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Normal Magnetograms

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THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY WITH THE ASSISTANCE OF OBSERVATORY STAFF MEMBERS J. E. PAPP, ASST. CHIEF, AND S. P. TILTON, AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA. THE COLLEGE OBSERVATORY IS A PART OF THE BRANCH OF ELECTROMAGNETISM AND GEOMAGNETISM OF THE U.S. GEOLOGICAL SURVEY.

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. 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
Yukon Drive on West Ridge
Fairbanks, Alaska 99701

Requests for copies of the magnetograms except for the current month should be addressed to:

World Data Center A-NOAA
Environmental Data Service
Boulder, Colorado 80302

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, Storm, and Rapid Run magnetograms and appropriate calibration data are processed daily at the observatory and are available for analysis or copying. Also available are mean hourly scalings, K-Indices, selected magnetic phenomena reports, and on a real-time basis are recordings from a 3-component fluxgate magnetometer and F-component proton magnetometer.

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 beginning 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)

The Magnetic Daily Character Figure, C. To each Universal day a character is assigned on the basis C=0, if it is quiet; C=1 if it is moderately disturbed; C=2 if it is greatly disturbed. The method used to assign characters at the College Observatory is based on AK as follows:

AK Range	C
0 \approx 11	0
11 \approx 50	1
50+	2

Routine assignment of C was discontinued at College on January 1, 1976.

Selected Phenomena & Outstanding Magnetic Effects

Prior to January 1, 1976, the Normal & Rapid Run records were reviewed at the observatory for selected magnetic phenomena and the events identified were forwarded to the IUGG Commission on Magnetic Variations and Disturbances. This was discontinued on January 1, 1976, but a report on Outstanding Magnetic Effects is prepared monthly for this report.

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 averages 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 sheets 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 he is interested in the detailed morphology of the magnetic field, he should 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

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

AUGUST 1978

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		20 mm/hr					
1	1	1	2	2	1	1	0	0	08	03	SUDDEN COMMENCEMENTS d h m					
2	0	0	0	0	0	0	1	1	02	01						
3	2	3	3	5	4	3	3	2	25	19						
4	5	6	4	6	4	3	2	2	32	36						
5	3	3	6	6	5	5	3	2	33	39						
6	3	3	6	3	5	5	2	2	29	29						
7	2	2	2	2	3	2	1	0	14	07						
8	1	1	2	3	3	3	0	0	13	07						
9	1	2	2	4	2	0	1	1	13	07						
10	1	1	2	4	4	4	1	1	18	13						
11	2	1	1	3	5	5	2	1	20	17	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)					
12	2	4	6	5	4	3	3	2	29	28						
13	3	3	2	6	6	3	1	2	26	28						
14	2	2	1	2	1	1	1	0	10	04						
15	1	0	0	0	1	0	0	0	02	01						
16	0	0	0	0	0	1	1	1	03	01						
17	2	0	0	5	4	2	2	2	17	13						
18	2	2	1	1	2	3	3	2	16	08						
19	3	1	5	4	4	4	1	1	23	19						
20	1	1	0	0	0	0	1	1	04	02						
21	1	1	0	2	0	2	1	2	09	04	BEGIN			END		
22	3	2	1	1	1	0	0	0	08	04						
23	1	1	0	2	2	1	1	0	08	03	d h m			d h m		
24	2	2	0	3	2	0	0	0	09	05						
25	1	0	2	3	4	2	1	1	14	08						
26	1	0	0	1	0	0	0	0	02	01						
27	3	3	4	5	5	5	4	3	32	30						
28	4	5	8	8	8	7	4	4	48	124						
29	4	5	7	6	6	5	3	2	38	56						
30	3	3	4	7	6	5	4	4	36	47						
31	4	4	7	6	5	7	3	3	39	62						

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

683.8

3.75

2560

H

321.7

7.80

2510

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN B. TOWNSEND, CHIEF, COLLEGE OBSERVATORY

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY COLLEGE, ALASKA	
			MONTH AUGUST	YEAR 1978
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
16	10XX	pi2		
20	09XX	pi2		
21	10XX	pi2	With small bay	
22	10XX	pi2		
27	0246	ssc*		
IDENTIFIED BY: JBT			VERIFIED BY: JEP	

1. NATURE OF PHENOMENON: ssc, ssc*, si, si*, b, bp, bs, bps, pc1, pc2 - - - pc5, pg, pi 1, pi 2, sfe.

Obs. 2 letter 1000 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)	K	D(')	H(Y)	Z(Y)	
CO	64.6 N	03	02XX	..	..	..	..	04	2, 4	6	140	1410	620	06 18
								05	3, 4	6				
								06	3	6				
		27	0246	s.c.*	-23	+100	-16	28	3, 4, 5	8	499	2430	1710	Sep. 02 15

AUGUST

1978

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 8-1-78	2400 U.T., 8-31-78	1.0/mm	3.88/mm	27° 47.1 E
H	0000 U.T., 8-1-78	2400 U.T., 8-31-78	7.88/mm		127758
Z	0000 U.T., 8-1-78	2400 U.T., 8-31-78	7.88/mm		551158

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 8-1-78	2400 U.T., 8-31-78	7.9/mm	29.78/mm	24° 18.0 E
H	0000 U.T., 8-1-78	2400 U.T., 8-31-78	44.18/mm		115298
Z	0000 U.T., 8-1-78	2400 U.T., 8-31-78	48.88/mm		540148

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D					
H					
Z					

MONTHLY MEAN ABSOLUTE VALUES*					
D		H		Z	
28° 14.5 E		130398		553758	

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: Aug 1, 2, 14, 15, 16, 20, 21, 22, 23, 26

MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)															U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION										CO	YEAR	MONTH	ELT- MENT			
Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight, hour 01 of local day (1500 M.T.) is hour 11 of the same universal day. Shrinkage corrections have been applied. Negative values are in red, with minus sign shown.															CO	78	AUG	H													
C	Q	S	Q	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	SUM			
				344	361	370	376	390	367	371	384	410	376	359	330	360	359	360	370	370	367	319	316	321	329	333	336	8578			
				326	338	340	348	344	344	346	345	348	350	355	356	355	350	359	364	347	332	320	311	319	303	310	327	8127			
				336	340	370	389	374	409	491	476	416	386	391	214	249	380	358	332	292	220	301	340	327	311	315	318	8335			
				359	355	509	856	453	541	580	488	409	275	-224*	96	168	299	285	361	239	339	309	349	331	857	539	513	8385			
				589	341	406	426	417	490	563	198	356	483	162	-105*	-51	98	186	17	154	326	365	277	274	314	338	320	6694			
				320	318	442	433	456	530	383*	303*	428	369	347	277	-105*	-40	-94	-147	20	341	367	580	358	522	320	342	6630			
				350	330	360	331	331	338	352	362	381	368	340	350	350	320	250	342	346	346	325	305	310	294	296	300	7976			
				318	342	342	349	346	351	358	372	390	342	300	284	196	200	236	316	330	342	360	334	314	307	300	315	7644			
				330	330	323	368	390	424	428	395	390	279	322	290	346	355	360	379	375	367	341	304	310	318	321	331	8376			
				328	330	335	347	326	359	352	380	364	399	329	257	180	248	106	176	333	339	339	331	324	308	310	324	7424			
				330	360	350	355	367	370	374	380	381	387	327	326	330	198	245	232	-86	255	342	350	324	295	300	314	7406			
				329	361	413	433	578	604	431	-89*	594	371	316	83	183	294	339	386	328	302	299	339	312	322	332	339	8199			
				389	447	459	404	399	340	346	362	372	360	-179*	-37*	-26*	127*	379	329	199	260	310	302	299	284	316	349	6810			
				349	368	358	362	350	334	369	356	355	353	349	343	351	336	350	349	348	320	310	305	303	305	308	320	8151			
				324	329	340	340	340	330	335	339	348	351	349	347	338	343	329	333	328	329	312	321	318	311	319	329	7982			
				330	330	339	343	347	340	341	346	349	355	356	359	341	351	350	354	350	344	320	296	306	306	315	310	8078			
				349	352	319	332	349	344	344	350	353	362	399	94	226	341	370	310	346	347	324	290	280	288	299	308	7676			
				399	348	380	380	353	341	340	346	352	356	356	350	350	334	372	360	351	282	148	211	281	266	270	270	7796			
				358	341	319	331	326	321	329	349	287*	343	333	260	109	93	-15	282	346	340	312	311	300	307	310	307	6899			
				310	329	339	344	354	339	340	339	341	340	348	349	341	343	336	338	334	319	309	300	299	310	309	320	7930			
				327	341	347	353	346	344	344	349	350	359	344	340	360	347	339	309	306	348	341	321	309	303	300	321	8048			
				332	380	447	380	324	330	331	340	339	347	349	354	350	353	347	343	339	330	307	300	301	308	312	321	8164			
				320	330	350	330	341	339	347	352	350	360	350	317	339	347	350	347	327	311	310	321	317	309	310	319	7993			
				322	320	341	354	349	357	360	349	370	373	380	309	320	343	369	361	360	348	330	319	311	310	310	319	8204			
				331	334	329	350	359	369	367	366	364	380	343	380	309	334	311	370	349	321	316	321	316	312	317	325	8172			
				340	329	333	340	350	350	350	349	350	359	359	341	336	349	340	337	341	340	327	320	309	319	320	330	8118			
				334	340	379	360	364	411	624	546	507	353	180	185	287	-103	-36	178	350	381	334	337	350	330	350	421	7762			
				436	490	636	614*	354	208	-42*	-830*	59*	-320*	-468*	-174*	252*	-943*	-910*	-207*	-263*	384	373	346	233	226	271	356	1607			
				433	511	410	461	561	481	235*	-37*	190*	351	-127*	-434*	-154*	-94*	127*	306	311	240	229	287	297	310	321	311	5546			
				371	331	366	400	460	379	511	424	406	287	-332*	-207*	223	-54*	-219*	83	-104	53	116	213	159	289	320	361	4836			
				463	429	379	305	359	430	406	331	-122*	-411*	221	236	35	236	-93	-490*	-139*	239	325	287	270	299	319	340	4648			
SCALED BY	SPT, JEP			Preliminary base-line and scale values:												<input type="checkbox"/> Interpolated <input type="checkbox"/> Significant portion of hour interpolated. <input type="checkbox"/> No record; or no values available because of faulty record. <input checked="" type="checkbox"/> Derived from STORM Maph., converted to Normal Maph.										<input type="checkbox"/> Scaling uncertain because of magnetic storm. <input checked="" type="checkbox"/> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.				MONTHLY SUM	228194
CHECKED BY	JEP, SPT			Interval Beginning	Base-line Value				Scale Value														MONTHLY MEAN	307							
SIGNS REVIEWED BY	JEP																									DATES WITH GAPS:					
PUNCHED BY																															

MAGNETOGRAM HOURLY SCALINGS

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. (UNIVERSAL TIME)
On larger corrections have been applied. Negative values are in red, with minus signs shown.

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
OBT. CO 78 AUG 7
TELE-
MENT
Z

C	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	SUM
01	330	341	352	363	374	384	400	390	378	371	361	371	347	350	349	353	352	349	348	321	311	314	329	332	8465	
02	327	330	336	332	334	334	339	339	337	334	334	333	333	334	340	344	345	341	328	321	305	316	311	318	7933	
03	332	340	330	340	372	394	421	392	392	382	359	340	298	224	300	342	346	320	213	178	163	319	337	349	7811	
04	304	449	389	177	419	434	355	355	335	371	337	298	408	494	387	379	349	349	328	317	312	325	336	389	8520	
05	348	350	361	402	458	410	498	498	484	315	354	372	265	449	449	455	307	203	450	330	328	316	335	361	8305	
06	867	353	351	399	403	360	179	141	141	320	350	340	350	341	140	192	58	78	240	322	341	355	352	362	7049	
07	371	372	360	353	351	350	350	370	370	350	336	330	338	342	326	450	300	330	340	347	347	333	344	342	8182	
08	350	357	370	370	352	347	349	349	371	347	333	310	305	290	283	230	250	320	310	331	323	327	330	343	7842	
09	347	350	357	349	370	406	433	430	430	390	212	290	290	310	330	343	346	349	340	340	332	322	322	342	8229	
10	357	360	367	380	385	360	364	352	352	362	342	345	369	327	333	306	260	310	321	320	311	313	324	336	8153	
11	341	359	378	375	369	382	391	382	387	387	373	357	337	319	317	320	329	241	162	237	269	311	329	336	7933	
12	339	341	367	391	411	247	154	134	134	260	334	433	455	362	382	364	359	367	357	298	299	337	342	341	8024	
13	328	392	418	399	373	363	376	395	363	363	342	374	392	525	314	347	360	328	258	309	318	319	326	339	8628	
14	373	375	368	360	369	390	359	350	348	348	349	331	319	342	335	348	357	346	350	339	335	327	328	336	8358	
15	343	343	341	340	341	341	339	339	339	339	339	339	339	329	339	341	329	320	320	317	311	315	321	323	7976	
16	334	340	339	336	334	340	337	337	337	336	332	330	337	331	324	338	333	320	319	328	329	310	323	330	7942	
17	332	340	342	337	331	337	337	337	334	339	336	329	269	263	264	331	332	333	323	320	336	329	330	332	7795	
18	342	379	362	379	369	350	349	349	349	340	347	338	330	292	289	332	330	322	319	253	184	233	299	318	362	7767
19	331	360	351	349	341	340	340	340	336	304	257	296	331	348	287	213	247	307	330	339	337	334	330	337	342	7687
20	343	344	341	337	338	341	340	340	340	339	340	339	334	338	331	334	331	333	330	329	324	320	319	329	331	8025
21	334	338	334	338	341	341	338	338	339	336	342	311	293	326	338	332	328	286	292	313	326	323	328	347	349	7887
22	357	380	397	422	397	364	343	343	334	331	331	338	339	331	339	339	336	329	330	328	324	324	327	330	337	8311
23	333	330	330	344	331	338	339	337	337	341	340	341	337	300	326	339	340	334	321	322	314	317	323	326	331	7934
24	330	331	324	332	340	341	340	340	333	340	344	344	282	261	248	317	320	327	333	336	331	323	319	324	321	7741
25	325	331	340	331	332	336	340	340	378	335	320	241	272	279	291	272	320	339	321	301	308	327	328	331	337	7635
26	340	346	336	331	340	341	340	340	340	330	327	327	309	299	309	320	324	323	325	323	316	312	317	326	328	7829
27	328	328	321	348	387	377	367	367	261	144	282	308	296	421	689	599	537	339	313	331	267	300	309	317	351	8520
28	380	381	311	97	-40	-87	-16	689	417	890	690	783	739	536	645	714	757	399	303	362	358	390	387	420	406	10461
29	401	358	390	397	362	231	136	197	187	361	418	418	110	458	624	280	284	378	369	331	321	327	366	381	387	8044
30	399	422	411	386	456	420	338	290	298	421	588	292	292	226	506	462	252	230	211	229	256	343	332	394	412	8574
31	428	427	407	418	401	414	284	309	441	79	317	408	408	712	514	582	783	292	189	279	320	327	339	357	381	9108

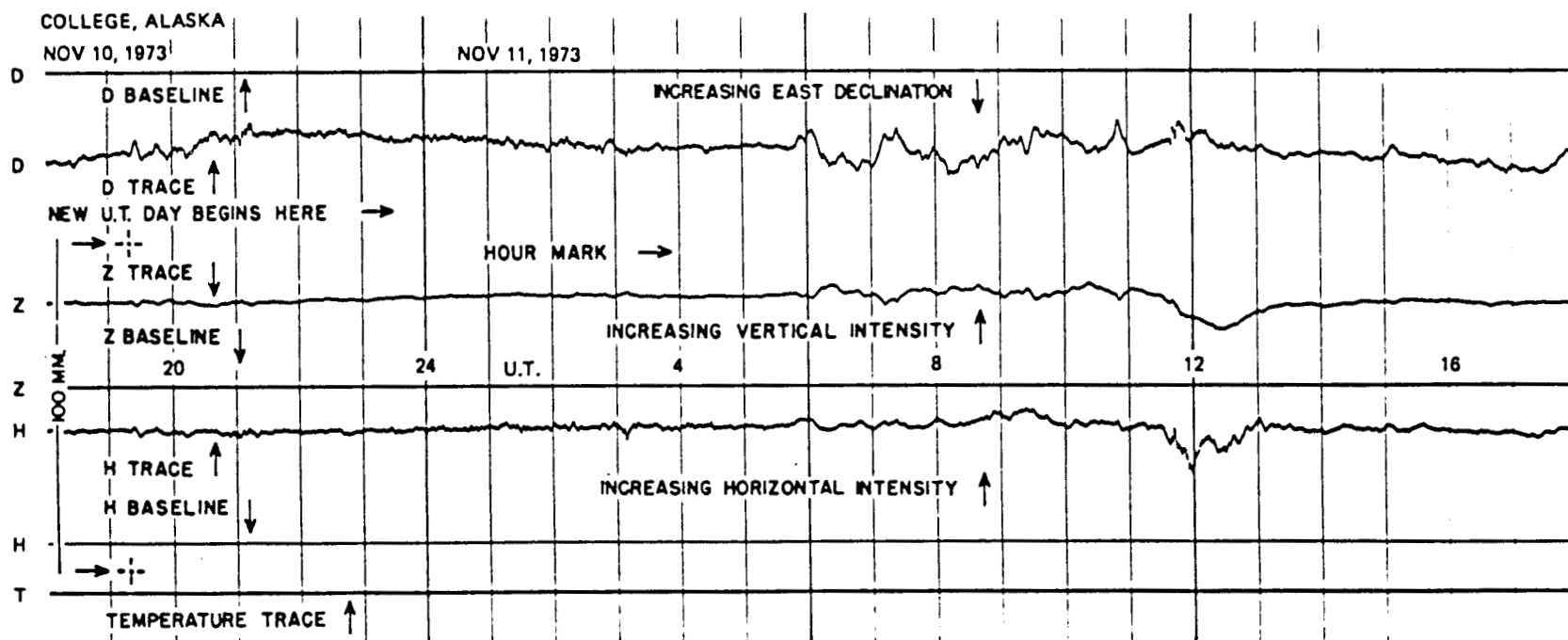
() Interpolated
() Significant portion of hour interpolated.
□ No record; or no value available because of faulty record.
• Derived from SLOM Magph., converted to Normal Magph.

Scale Value
Base-line Value
Preliminary base-line and scale values:
Interval Beginning

SCALED BY SPT, JEP
CHECKED BY JEP, SPT
NOTES RE-
VIEWED BY JEP
PUNCHED BY

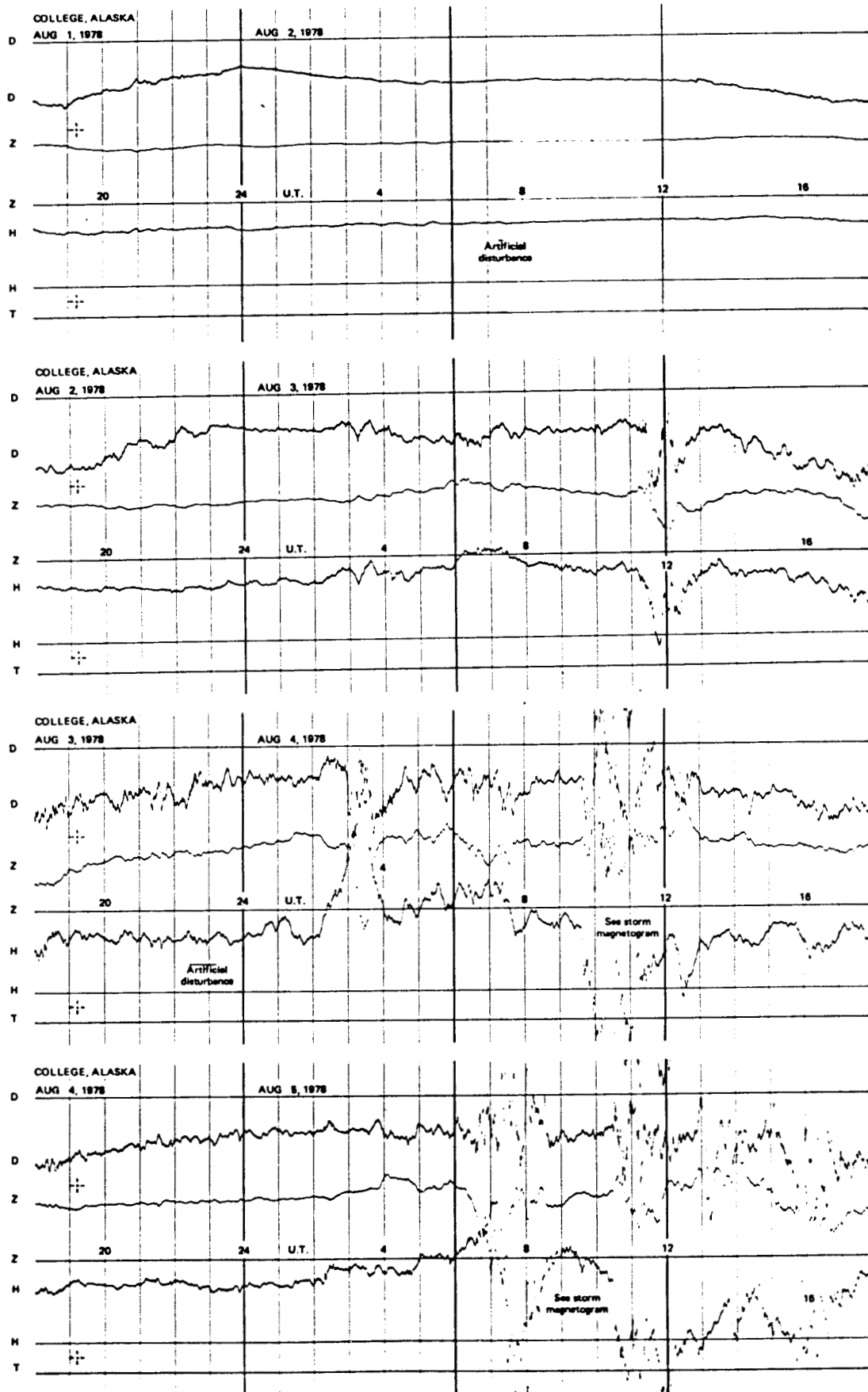
MONTHLY SUM
MONTHLY MEAN
DATES WITH GAPS

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

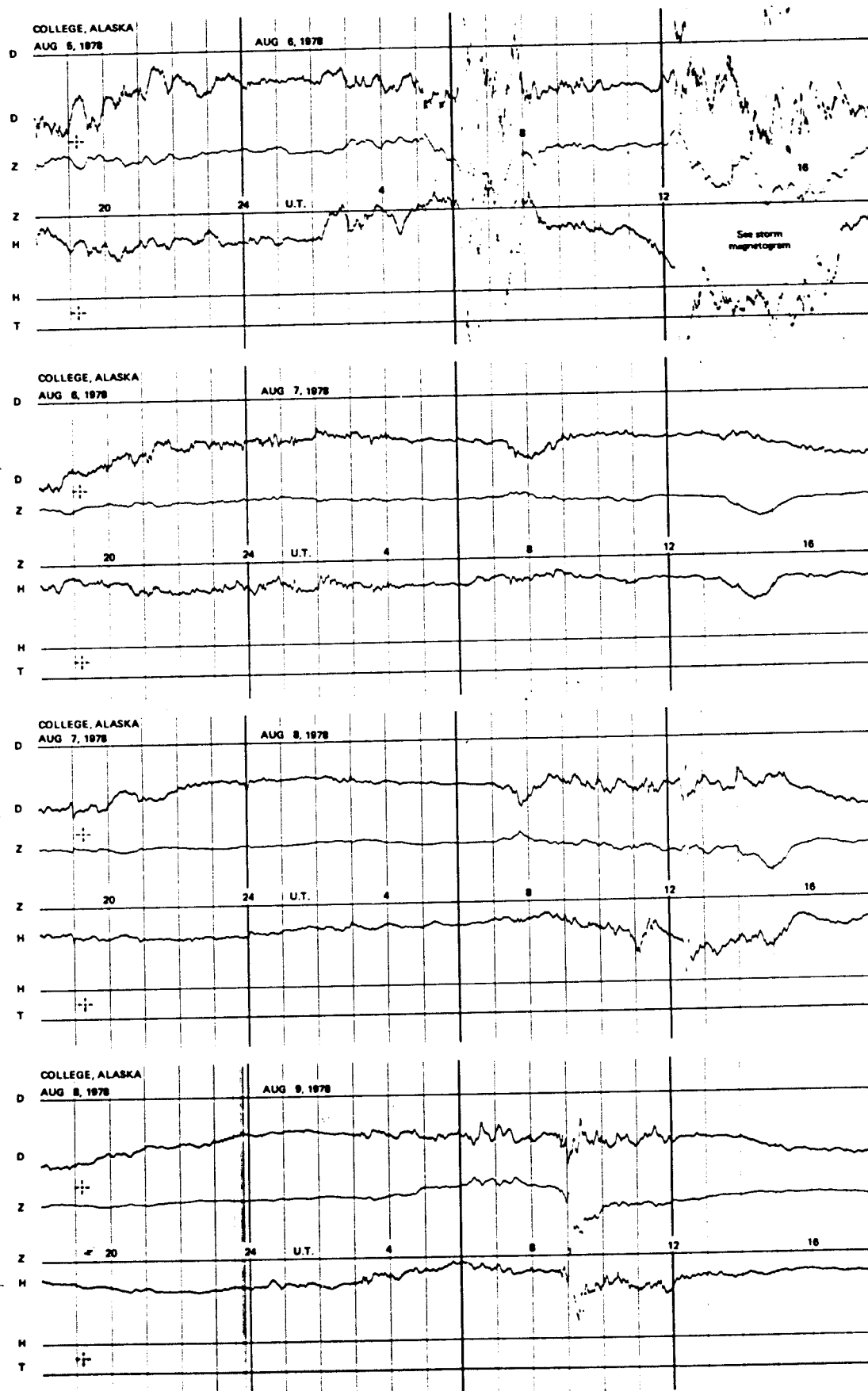


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

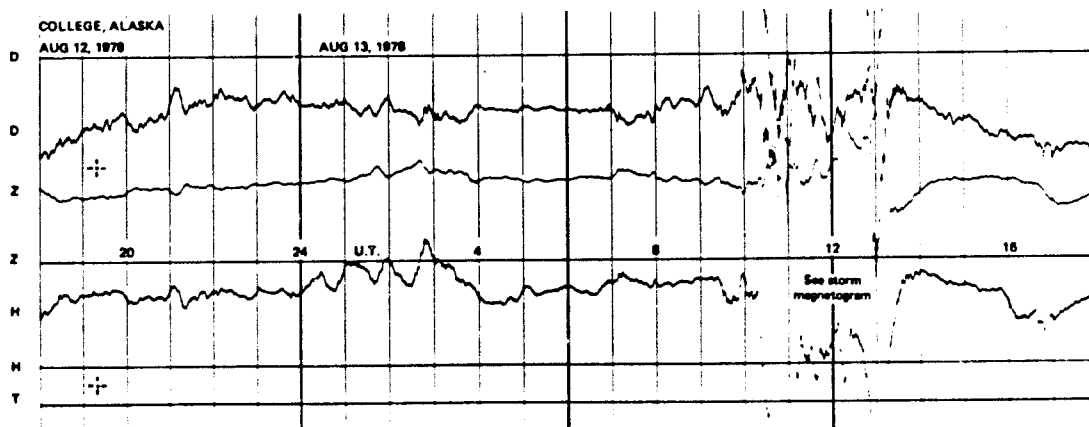
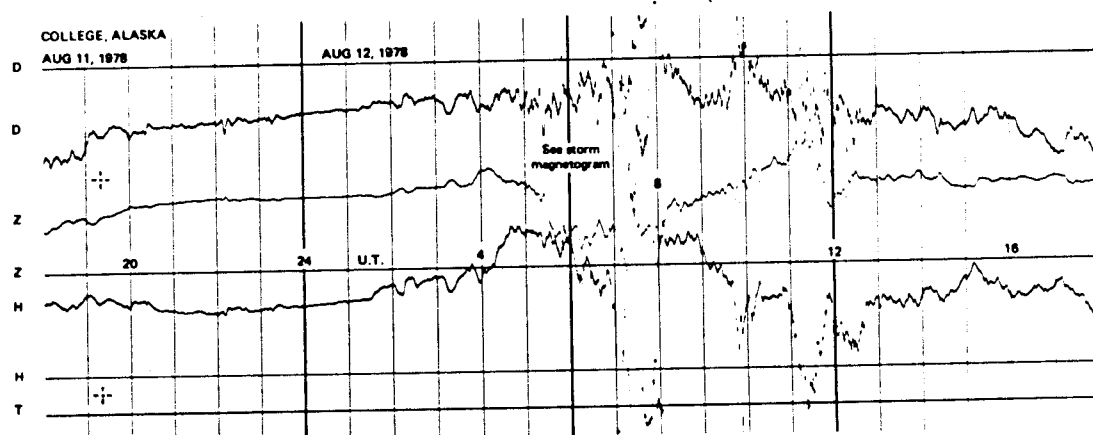
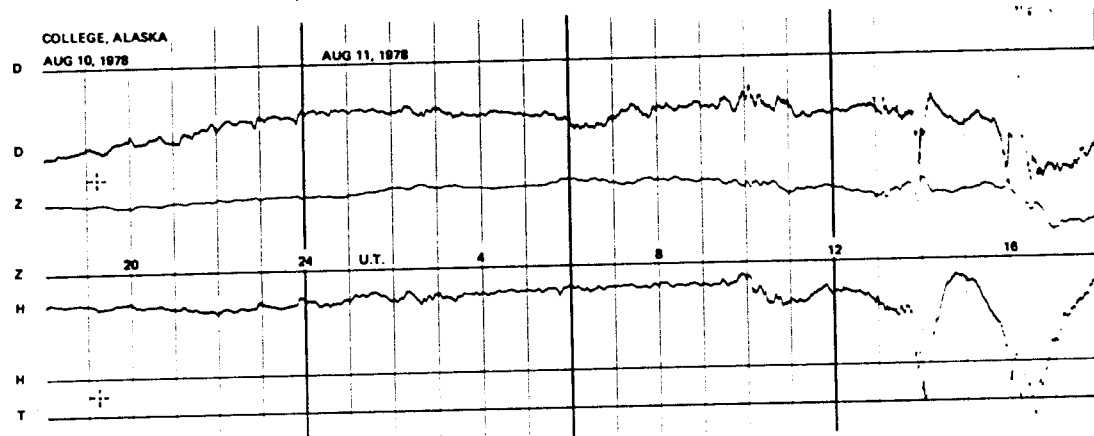
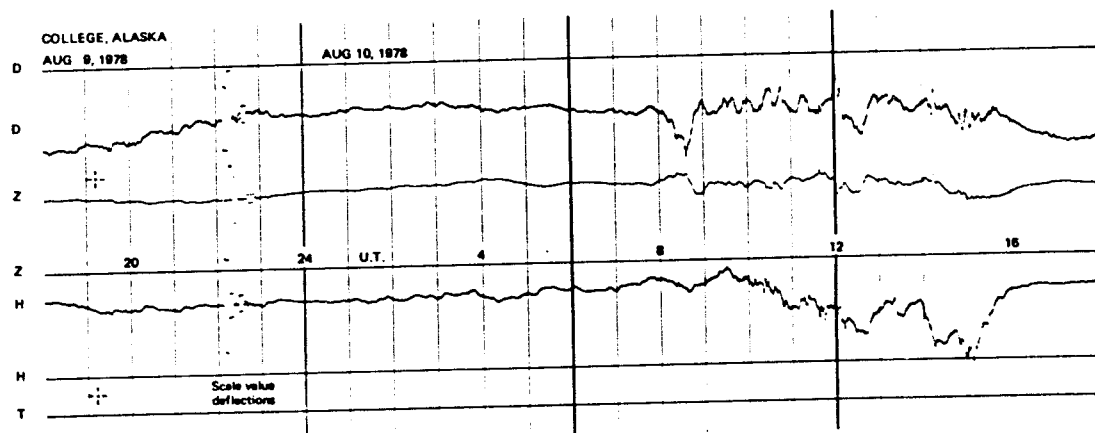
NORMAL MAGNETOGRAMS



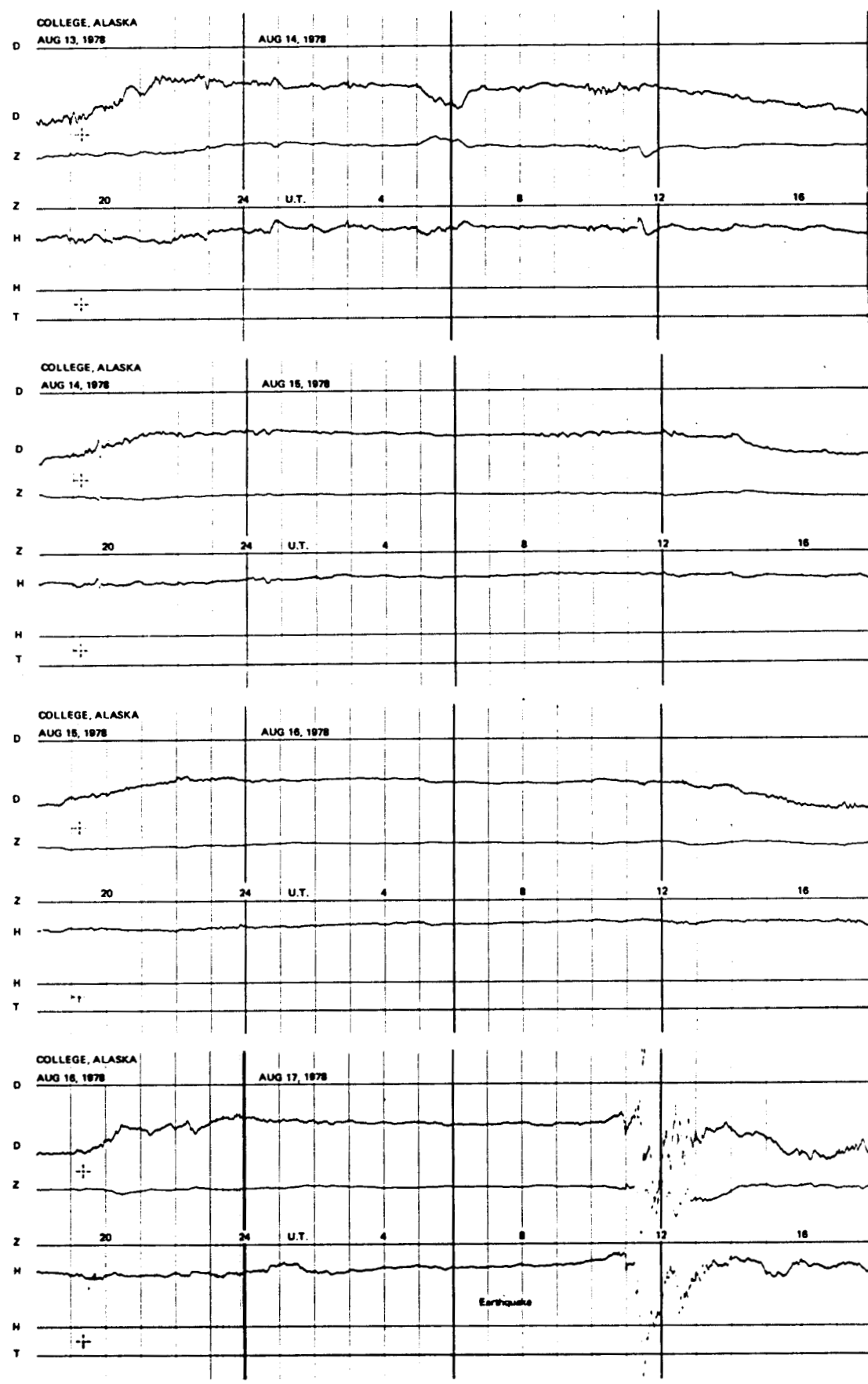
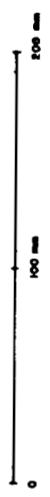
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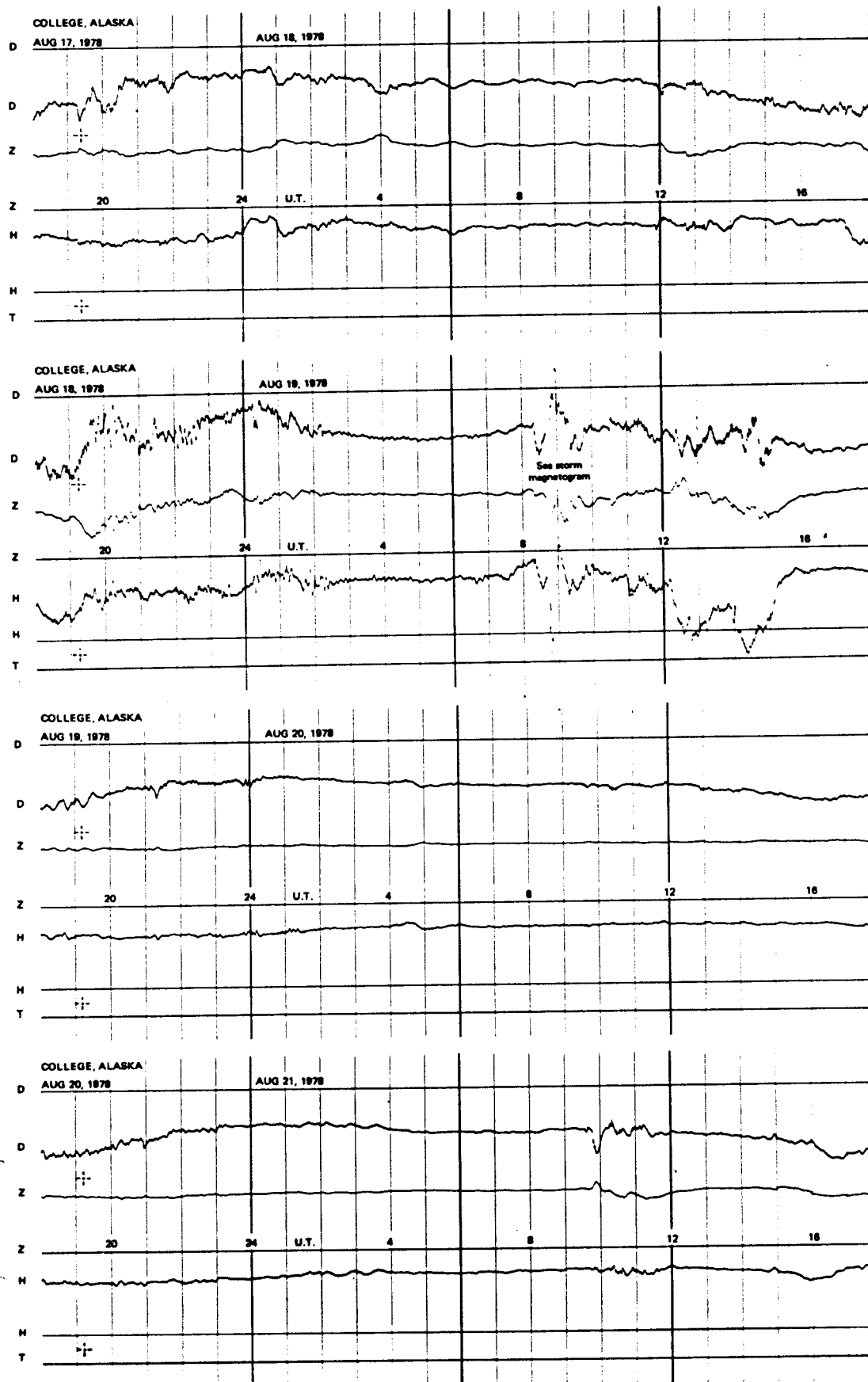
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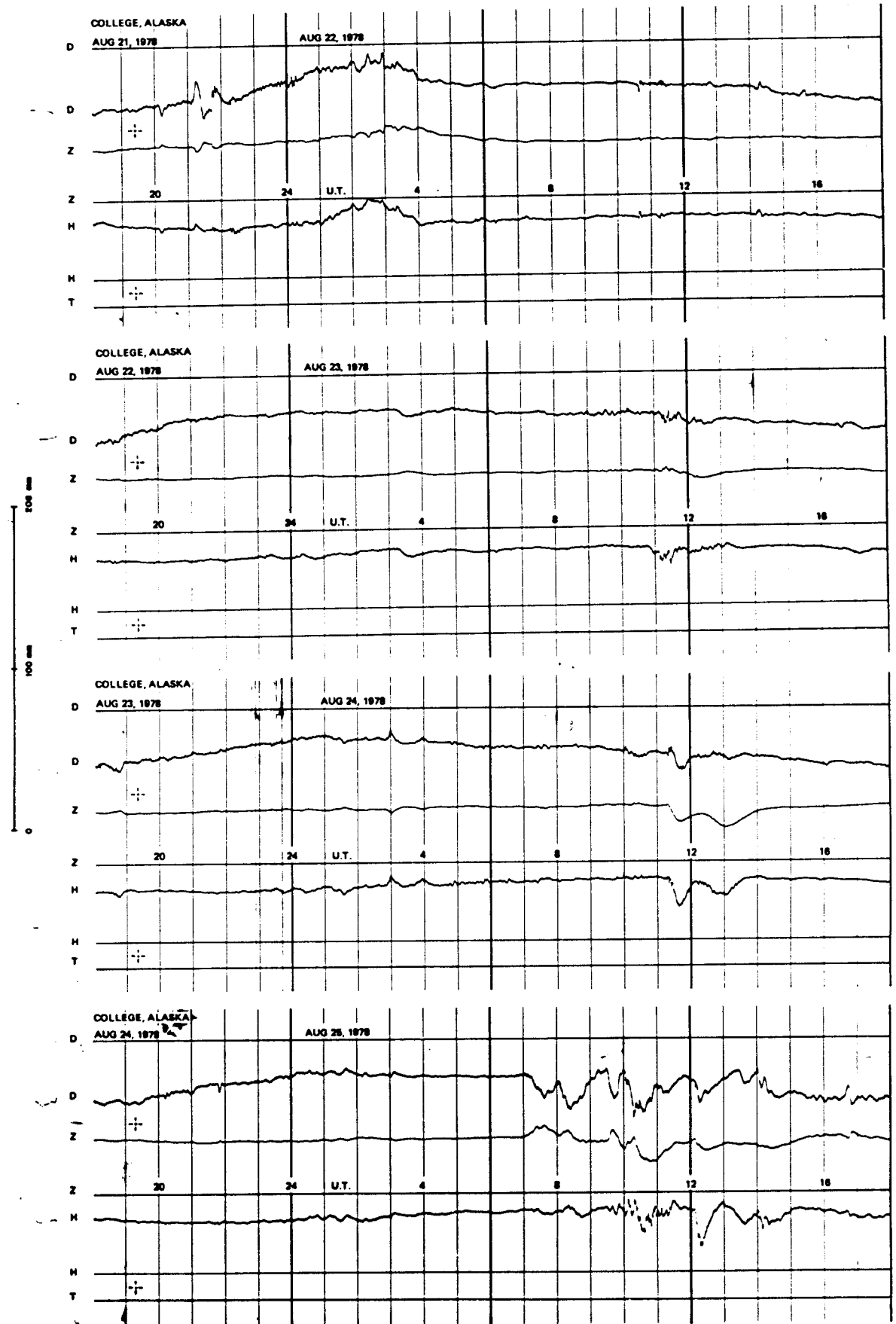
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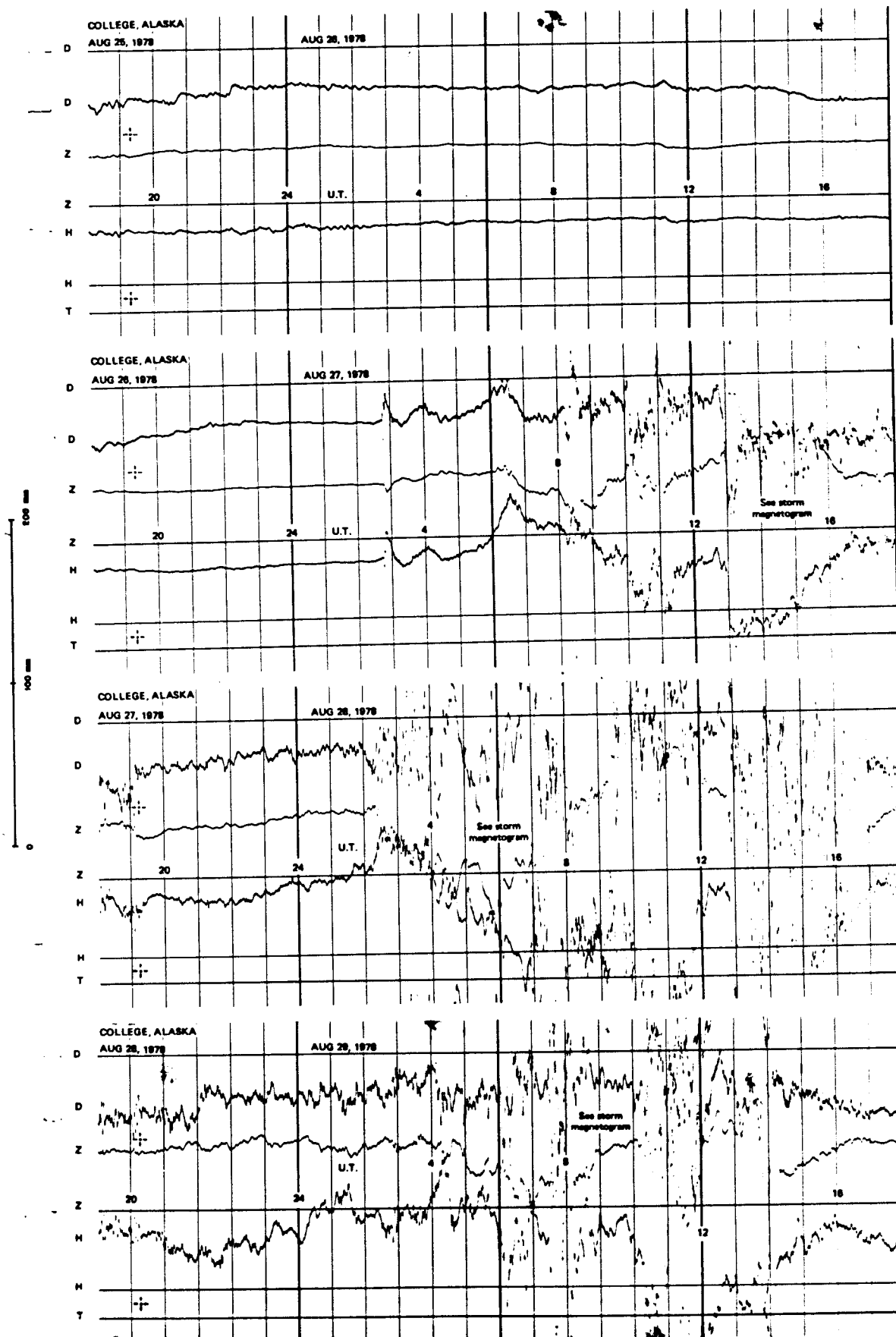
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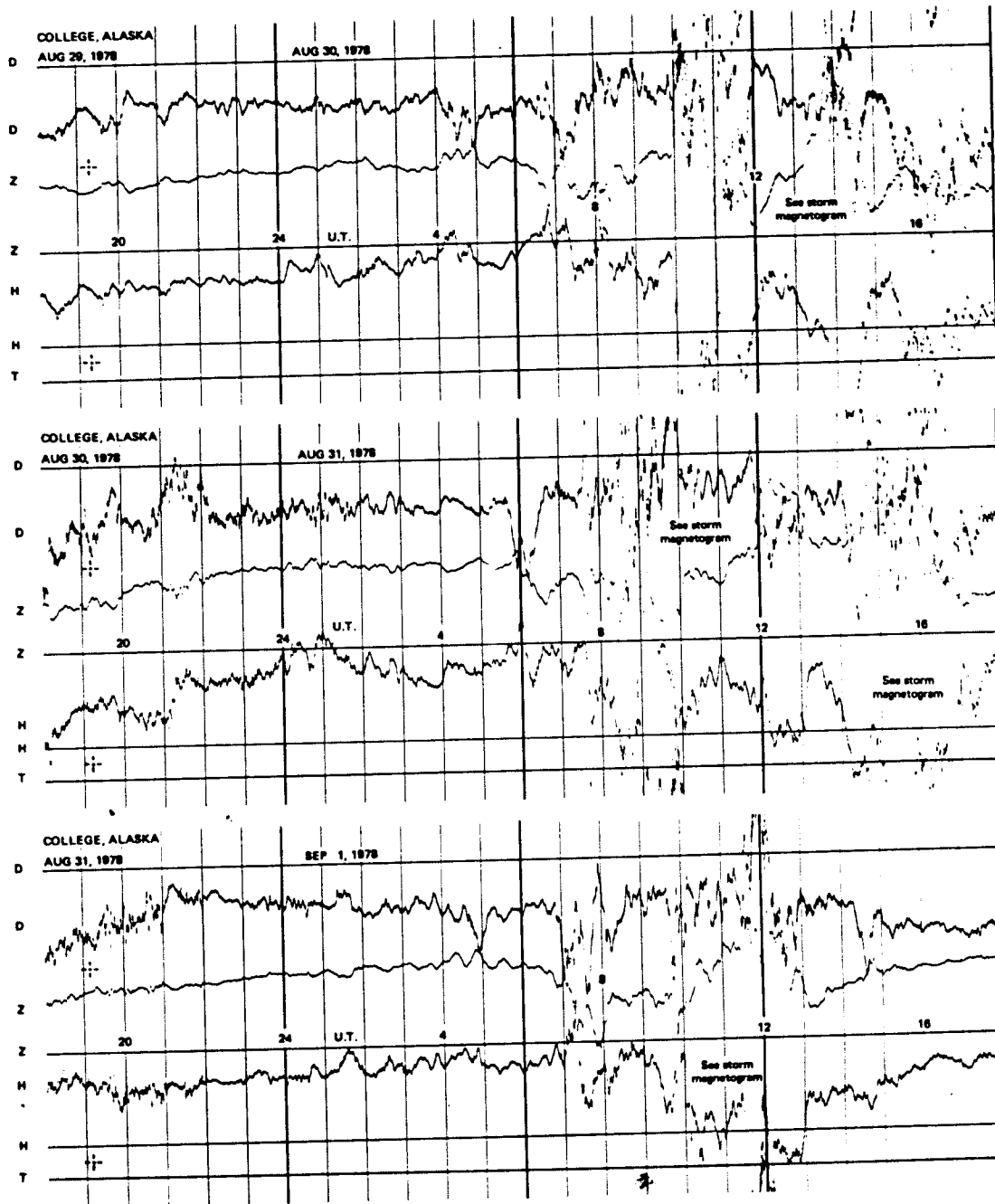
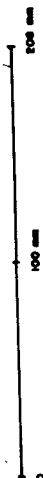
NORMAL MAGNETOGRAMS



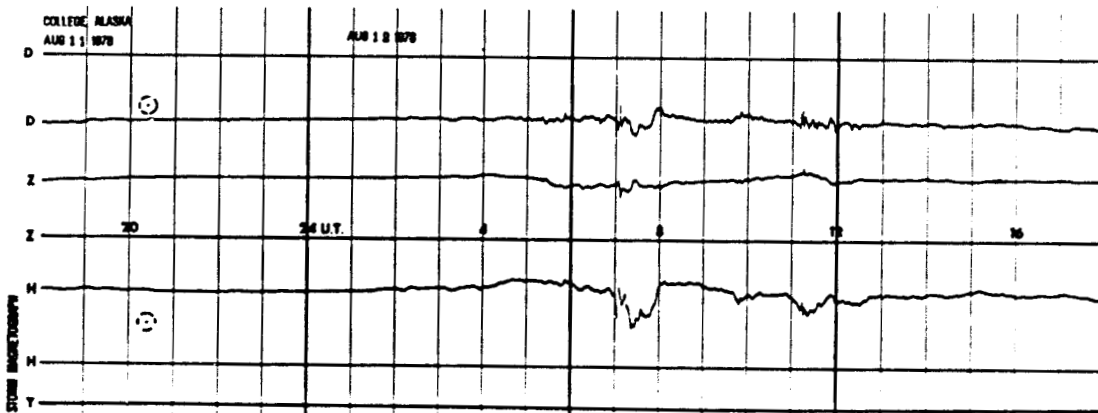
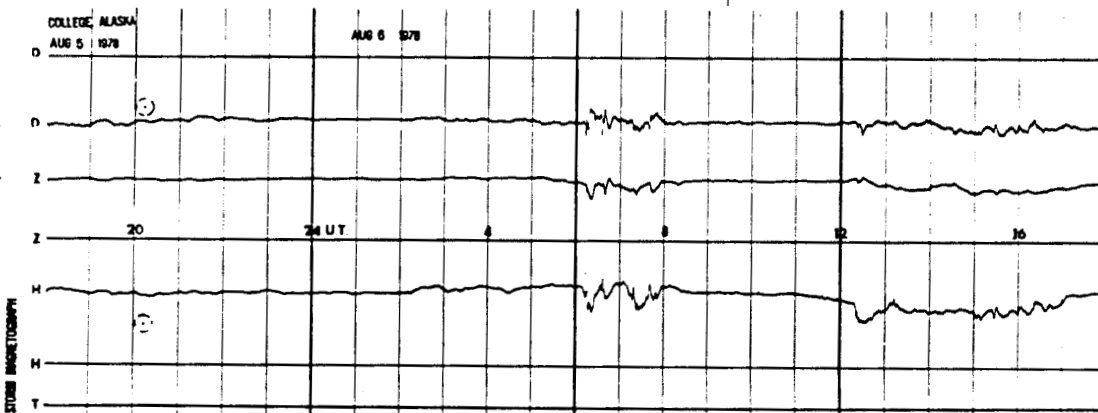
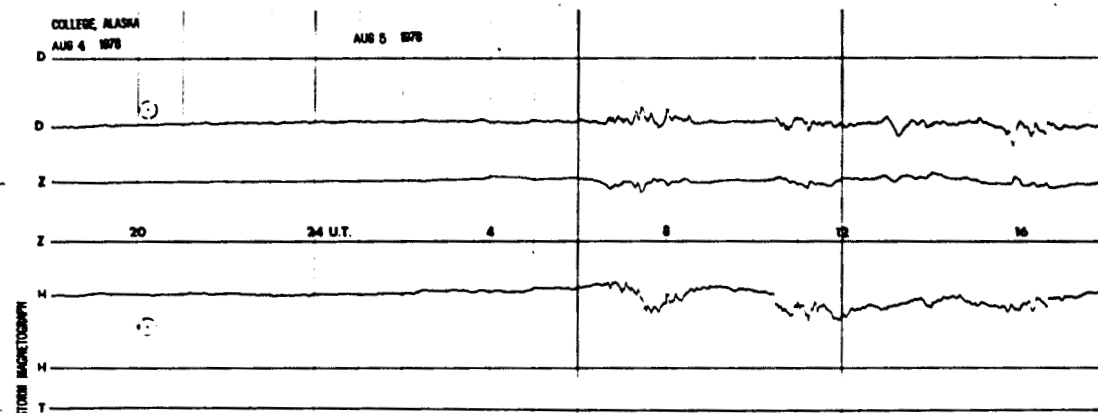
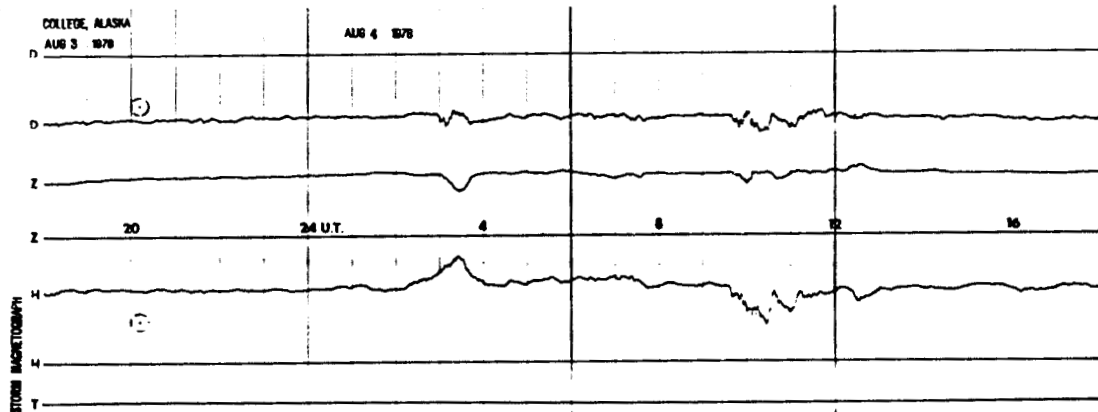
NORMAL MAGNETOGRAMS



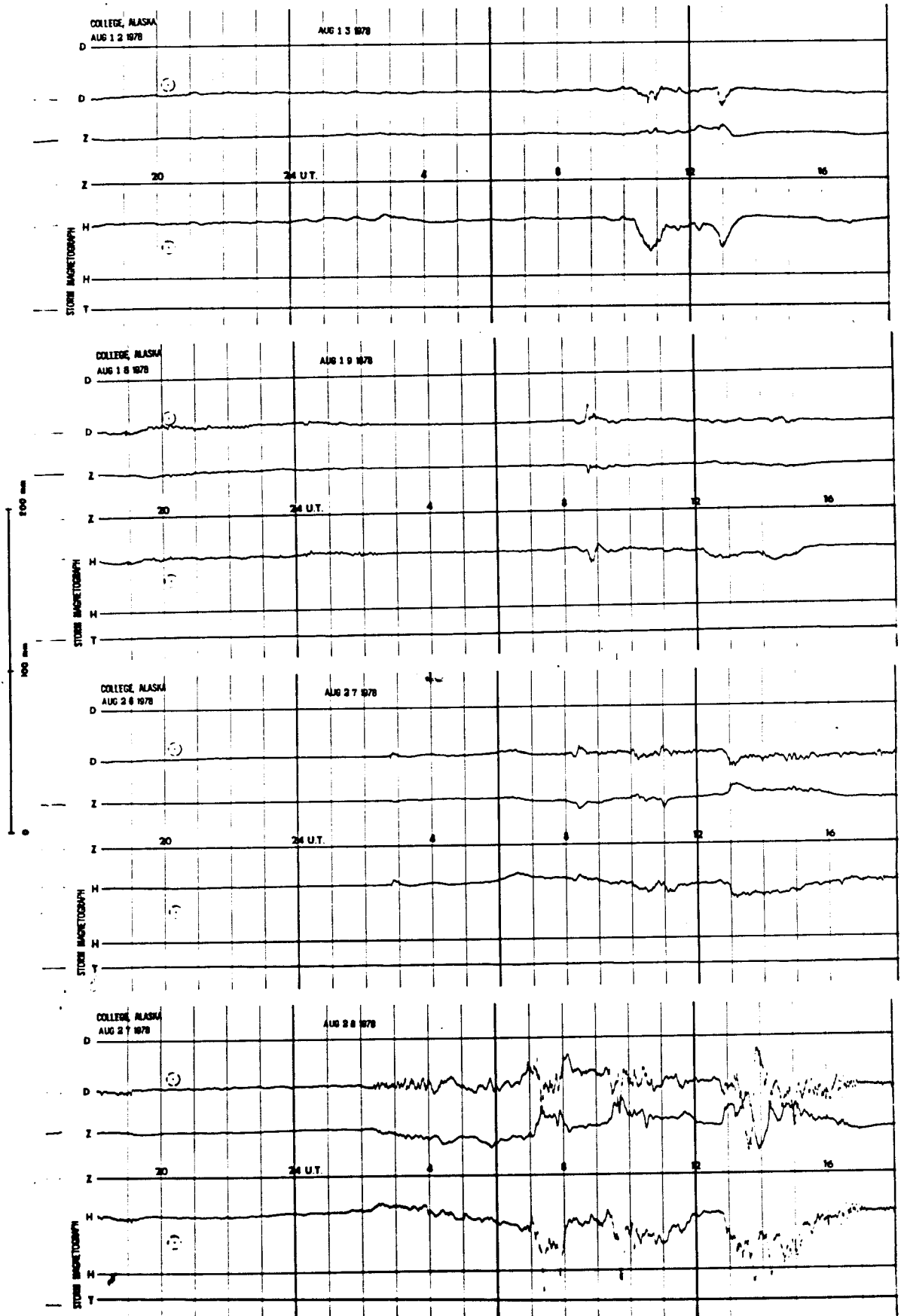
NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

