

UNITED STATES DEPARTMENT OF THE INTERIOR



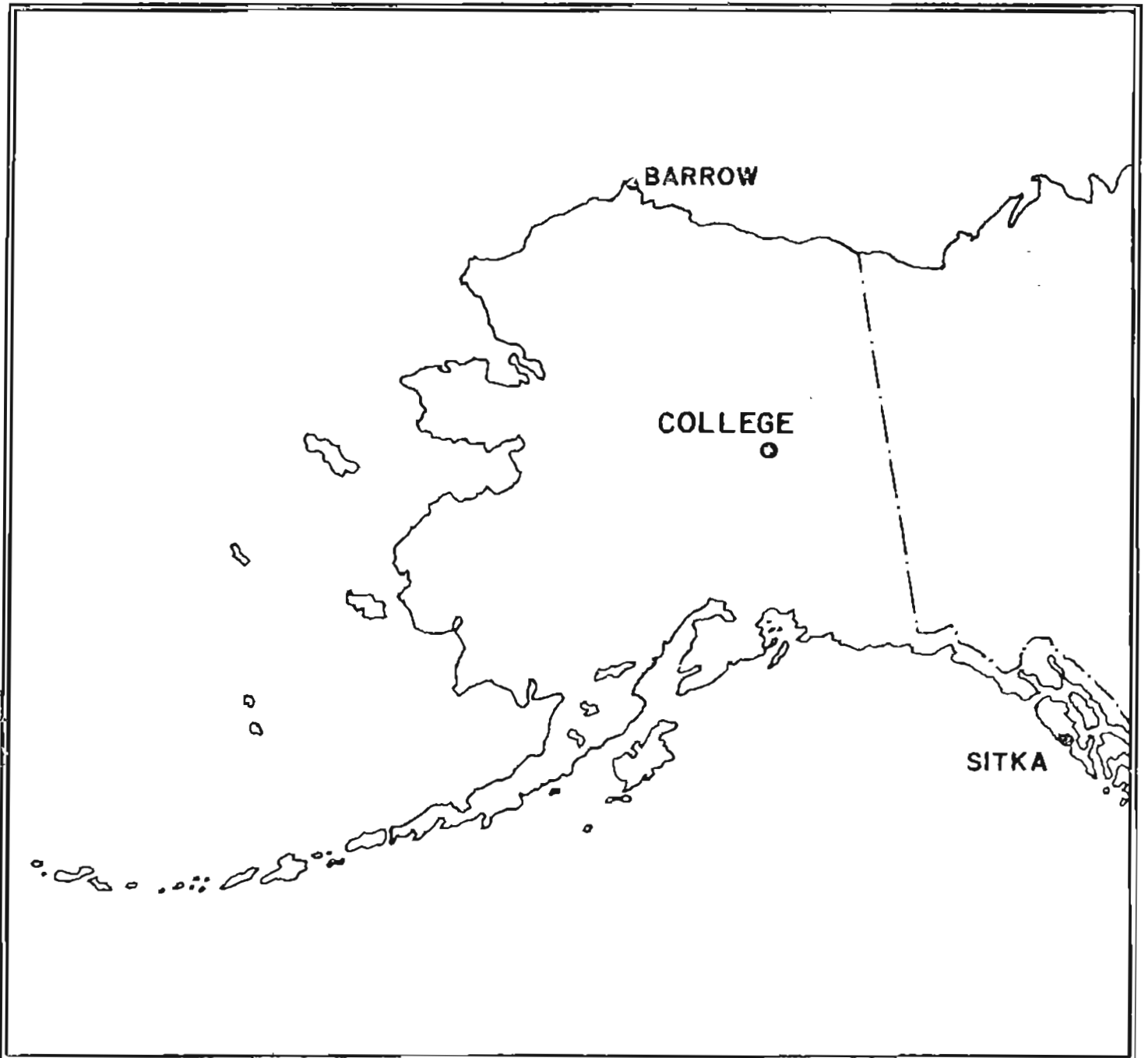
PROPERTY OF
GEOLOGICAL SURVEY
STATE OF ALASKA
DIVISION OF
GEOLOGICAL SURVEY
PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA



SEPTEMBER 1980

OPEN FILE REPORT

80-3001



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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, E.A. SAUTER, 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°51.6'N
Geographic longitude.....147°50.2'W
Geomagnetic latitude.....+64.6°
Geomagnetic longitude.....-256.5°
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, X-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 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	43
600 < 1000	6	80
1000 < 1650	7	140
1650 < 2500	8	240
2500+	9	400 (10γ)

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 ≤ 11	0
11 ≤ 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 "OI" 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.

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

DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS 20 mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			
1	3	2	3	0	0	0	0	08	05	SUDDEN COMMENCEMENTS d h m	
2	1	1	0	0	2	0	0	04	02		
3	1	0	0	1	3	5	5	18	17		
4	3	3	2	3	3	1	1	17	10		
5	1	4	4	4	3	5	4	27	23		
6	2	2	2	1	2	3	1	14	07		
7	2	2	1	4	1	2	1	15	08		
8	2	1	1	4	2	2	1	14	08		
9	1	1	2	3	4	3	1	16	10		
10	2	1	0	0	0	1	1	06	02		
11	1	1	0	3	3	3	1	12	07		
12	0	4	5	4	4	6	2	28	29		
13	3	4	4	6	6	4	2	28	27		
14	2	2	1	2	1	1	0	11	05		
15	2	2	2	4	4	3	2	20	13		
16	0	2	3	3	1	0	3	14	08		
17	2	1	4	5	5	3	1	23	20		
18	1	1	4	2	0	1	1	11	06		
19	1	0	0	4	4	1	1	12	08		
20	3	2	1	0	1	2	0	09	04		
21	0	0	0	0	0	0	0	00	00		
22	0	0	3	4	5	3	1	16	14		
23	1	0	0	4	1	0	1	07	05		
24	0	0	2	2	0	0	0	04	02		
25	1	2	3	3	1	2	0	12	06		
26	0	0	2	4	3	0	0	09	06		
27	0	0	0	1	1	1	1	05	02		
28	1	0	0	0	4	3	0	09	06		
29	1	0	1	0	0	2	2	07	03		
30	2	1	0	0	0	0	1	04	02		
31											

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

683.8

3.75

2560

K

321.7

7.81

2510

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN B. TOWNSHEND, CHIEF, COLLEGE OBSERVATORY

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY
COLLEGE, ALASKA

MONTH
SEPTEMBER

YEAR
1980

DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS
19	1115	Pi 2	
27	0927	Pi 2	
IDENTIFIED BY: JBT		VERIFIED BY: JBT	

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

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T. 9-1-80	2400 U.T. 9-30-80	1.0/MM	3.7/MM	27° 42' 1 E
H	0000 U.T. 9-1-80	2400 U.T. 9-30-80	2.88/MM		12772
Z	0000 U.T. 9-1-80	2400 U.T. 9-30-80	7.98/MM		55165

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T. 9-1-80	2400 U.T. 9-30-80	7.8/MM	29.78/MM	23° 47' 3 E
H	0000 U.T. 9-1-80	2400 U.T. 9-30-80	44.08/MM		11534
Z	0000 U.T. 9-1-80	2400 U.T. 9-30-80	48.58/MM		54028

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

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
28° 06' 6 E	13015	55379

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: SEP 1, 2, 10, 14, 20, 21, 24, 27, 29, 30

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)

U.S. DEPARTMENT OF INTERIOR
Geological Survey, Geologic Division
Denver Federal Center
Bldg. 1611, CO 80525

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (1508 M.T.) is hour 11 of the 0000 universal day.
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

OBSV. YEAR MONTH ELEMENT
CO RO SEP D

C	Q	5	Feb	Q	UT	01	02	03	04	05	06	07	08	09	10	11	12	UT	13	14	15	16	17	18	19	20	21	22	23	24	SUM
					01	128	118	104	138	141	118	231	172	164	178	191	199	01	208	207	231	260	290	303	294	268	251	219	181	151	4745
					02	151	140	130	160	151	159	168	170	171	180	191	189	02	232	227	249	278	301	303	304*	289	261	198	158	141	4901
					03	141	142	160	154	157	163	170	170	168	177	191	187	03	200	222	242	342	400*	510*	373	228	169	149	106	135	5056
					04	110	79	106	109	109	72	167	172	117	140	151	178	04	201	241	239	264	299	373	303	279	213	121	90	97	4230
					05	88	81	92	100	97	92	-39	106	162	158	176	264	05	222	242	285	331	384*	407*	218	218	82	-3	-7	62	3818
					06	98	138	164	178	184	153	151	171	172	199	199	197	06	201	211	224	289	320	305	280	236	199	178	157	138	4747
					07	92	128	152	177	198	200	198	185	172	191	153	202	07	199	181	188	226	280	338	316	228	167	116	148	149	4584
					08	143	138	164	191	197	191	181	177	173	231	221	186	08	191	199	240	291	308	308	293	271	249	182	143	147	5015
					09	153	159	180	169	170	170	249	250	211	164	195	226	09	226	232	259	272	351	287	271	278	251	208	141	121	5193
					10	94	128	147	168	187	187	186	183	187	186	185	188	10	199	199	221	257	269	299	297	250	221	190	157	150	4735
					11	131	140	139	150	170	180	163	163	170	160	190	218	11	248	244	245	262	336	290	249	226	191	158	149	138	4710
					12	130	122	127	129	125	70	3	35*	19	64	160	183	12	288	210	260	463*	590*	343	286	244	186	181	180	171	4569
					13	158	146	122	150	19*	3*	20	65	128	51*	84	150	13	170*	240	204	310	282	332	325	290	188	175	148	149	3909
					14	151	122	134	118	141	171	160	178	170	150	157	184	14	209	221	250	262	283	280	275	258	249	216	223	151	4713
					15	131	180	171	171	158	140	151	171	154	168	180	225	15	196	265	285	290	303	290	237	203	222	172	165	178	4806
					16	169	159	159	137	149	123	84	119	129	148	198	210	16	212	222	230	247	267	285	289	328	209	162	170	165	4570
					17	141	140	124	160	170	151	169	150	187	107	193	233*	17	308	256	288	278	264	254	249	214	220	238	172	178	4844
					18	170	165	165	164	160	149	151	132	202	170	189	199	18	213	220	226	240	251	258	241	222	201	182	189	180	4639
					19	175	160	175	169	171	168	177	176	182	189	190	216	19	351	290	240	249	258	270	239	230	228	210	181	169	5063
					20	160	118	110	98	79	130	151	160	165	180	190	199	20	218	220	230	245	299	289	287	249	229	181	169	158	4514
					21	170	169	170	169	170	172	171	169	171	169	180	189	21	200	211	230	239	255	261	276	261	230	198	171	171	4772
					22	173	169	158	148	155	149	139	140	142	139	68	197	22	213	201	324	267	261	277	273	232	203	158	147	151	4484
					23	148	161	173	173	176	171	171	172	175	171	199	157	23	223	225	224	250	267	270	268	252	218	181	140	125	4690
					24	151	161	161	170	174	175	169	167	201	179	189	197	24	197	198	201	216	240	241	234	249	216	179	168	151	4604
					25	158	138	131	150	153	131	156	162	134	169	201	231	25	206	200	209	210	251	267	247	201	181	169	157	160	4372
					26	159	170	167	160	167	159	155	138	151	156	184	212	26	228	231	240	254	259	262	247	221	217	207	194	190	4738
					27	181	173	161	159	160	169	162	164	165	171	193	206	27	210	239	231	240	258	251	269	228	190	205	185	175	4745
					28	169	148	161	150	160	162	158	154	148	159	189	200	28	209	210	306	339	289	308	309	265	235	236	161	160	4785
					29	160	140	141	140	143	149	138	134	160	179	194	200	29	210	229	230	245	277	290	270	262	200	202	189	160	4642
					30	159	125	130	155	148	162	163	160	172	180	198	200	30	260	200	205	221	247	264	295	262	289	219	199	182	4795
					31													31													

SCALED BY: SPT, EAS
 CHECKED BY: EAS, SPT, JEP
 SIGNS REVIEWED BY: EAS
 PUNCHED BY:

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

[] Interpolated
 [] Significant portion of hour interpolated.
 [] No records; or no values available because of faulty record.
 [] Scaling uncertain because of magnetic storm.
 <> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.
 * Derived from SLOEM Magph., converted to Normal Magph.

MONTHLY SUM: 140188
 MONTHLY MEAN: 195
 DATES WITH GAPS:

MAGNETOGRAM HOURLY SCALINGS

Values are in tenths of sec. and are corrections for successive periods of one hour beginning at midnight. Hour 01 of each day (1200 H.R.) is hour 11. All other hours are in italics. Values are in tenths of sec. and are corrections for successive periods of one hour beginning at midnight. Hour 01 of each day (1200 H.R.) is hour 11. All other hours are in italics. Values are in tenths of sec. and are corrections for successive periods of one hour beginning at midnight. Hour 01 of each day (1200 H.R.) is hour 11. All other hours are in italics.

C	Q	T ₀	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅	T ₁₆	T ₁₇	T ₁₈	T ₁₉	T ₂₀	T ₂₁	T ₂₂	T ₂₃	T ₂₄	SUM	
																												01
01	267	300	334	311	314	354	359	319	320	319	317	321	334	310	310	313	313	317	329	337	319	307	290	271	275	271	279	7414
02	281	290	319	293	303	313	320	319	319	317	321	334	310	310	307	301	303	309	309	309	300	276*	269	251	253	240	273	7120
03	294	301	299	300	302	310	317	321	327	330	331	330	330	330	321	301	303	309	309	309	300	284*	266	264	264	264	311	5714
04	314	300	394	393	361	435	411	393	417	374	328	287	267	267	220	216	261	259	249	250	259	249	238	238	249	272	300	7521
05	312	342	360	381	439	546	593	484	420	371	340	228	228	228	159	144	39	81*	449*	190	190	210	241	280	291	280	6447	
06	319	283	303	301	299	320	309	289	306	306	312	311	311	311	320	327	320	321	236	319	303	279	270	260	280	310	7203	
07	294	276	297	313	299	303	300	304	310	287	201	333	309	309	323	323	313	293	293	233	233	221	238	259	290	309	6852	
08	307	349	329	297	300	309	310	310	309	184	169	307	268	268	264	309	268	241	280	280	277	269	259	267	274	291	6792	
09	303	317	301	304	306	321	301	309	316	320	311	240	311	136	179	229	261	271	257	249	261	271	257	249	254	261	6366	
10	289	298	302	291	299	304	307	301	300	304	310	313	313	313	319	319	309	301	279	270	278	260	246	250	270	280	7008	
11	298	296	300	300	320	313	310	320	318	320	291	253	320	291	258	261	251	236	145	263	272	270	277	290	292	291	6725	
12	296	302	310	322	345	416	519	200	227	323	256	224	224	224	142	189	279*	197*	136	282	260	260	259	262	314	326	5652	
13	345	498	482	506	655	610	515	492	420	276	280	181	181	150	73	150	172	303	359	310	268	287	289	285	301	301	7899	
14	295	293	320	330	340	291	290	280	299	362	363	335	335	310	311	300	305	293	293	291	280	271	272	280	273	249	7277	
15	299	219	261	270	301	324	317	328	330	320	256	100	100	145	217	272	246	229	227	227	260	261	219	256	286	202	6365	
16	290	287	281	310	306	325	278	390	411	414	329	285	285	303	305	303	305	300	290	280	260	261	249	254	272	263	7474	
17	280	297	296	291	300	314	319	352	433	298	141	135	135	46	258	131	260	240	281	270	270	280	285	283	271	299	6310	
18	280	282	287	297	311	317	323	390	342	378	325	310	310	301	300	300	289	288	272	282	291	279	287	279	273	281	7324	
19	289	290	281	289	299	309	301	305	306	309	319	146	146	86	209	288	279	280	292	291	291	279	287	279	273	281	6561	
20	288	325	311	342	348	329	319	325	325	317	313	312	312	310	307	270	260	273	298	281	280	282	270	289	281	281	7315	
21	280	279	284	296	205	304	301	309	310	311	311	311	311	309	307	300	293	300	300	300	287	281	285	289	300	303	7155	
22	296	296	300	305	301	314	330	396	409	389	304	333	333	334	269	54*	189	271	253	290	290	289	277	281	283	276	6951	
23	300	289	284	296	300	304	301	309	313	343	221	219	219	329	316	321	319	310	310	300	290	283	283	266	276	286	7361	
24	289	297	301	303	309	309	311	318	319	303	319	312	312	318	313	310	306	299	294	291	284	277	277	277	288	291	7246	
25	280	299	292	322	321	319	319	348	347	311	311	307	307	310	276	289	256	229	279	284	270	273	269	277	277	279	7001	
26	290	281	283	288	300	309	325	356	379	289	219	156	156	279	311	290	289	300	301	281	270	272	272	273	274	281	6896	
27	285	289	290	300	301	300	311	312	310	324	311	324	311	311	327	324	318	309	301	274	270	278	278	278	279	270	7194	
28	285	300	297	309	311	319	331	333	329	321	321	322	322	315	287	171	249	316	300	281	269	275	271	265	280	7058		
29	277	280	289	302	316	320	324	346	346	323	320	316	316	316	311	313	299	297	295	297	279	278	271	276	278	7167		
30	264	293	299	279	302	305	319	325	317	310	303	306	306	308	308	304	302	300	295	279	272	270	279	280	278	278	7095	
31																												

SCALED BY: SPT.EAS MONTHLY SUM: 208603

CHECKED BY: EAS.SPIJEP MONTHLY WEAR: 290

HOVS RE- VIEWED BY: EAS DATES WITH GAPS:

PUNCHED BY:

Scale Value: 1000

Revised Value: 1000

Initial Beginning: 1200

Final Ending: 1200

Notes: () Interrupted () Significant portion of hour unscalled () No records or no values available because of faulty record. * Derived from SUMM. Month, converted to Normal High.

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)

Values are in tenths of m.u. and are averages for successive periods of one hour beginning at midnight. Hour of local day (LST) is hour (LST) at the time of universal day. U.S. DEPARTMENT OF INTERIOR Geological Survey, Goddard Station, Goddard, Alaska, 99501

C	S	Q	UNIVERSAL TIME																												MONTH	YEAR	FILE NO.
			01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
01	297	299	321	316	311	309	299	300	297	292	297	294	297	297	298	298	292	294	290	294	285	279	280	281	281	280	281	7220					
02	289	293	300	299	290	290	290	291	293	290	260	264	268	289	290	290	289	290	289	289	289	280	287	281	280	287	281	6903					
03	288	289	292	291	289	290	284	288	288	281	287	267	217	213	211	213	213	213	213	213	213	213	213	213	213	213	213	6509					
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31																																	

Interpolated
 Significant position of
 Non-interpolated.
 No records; or no value available because of faulty record.

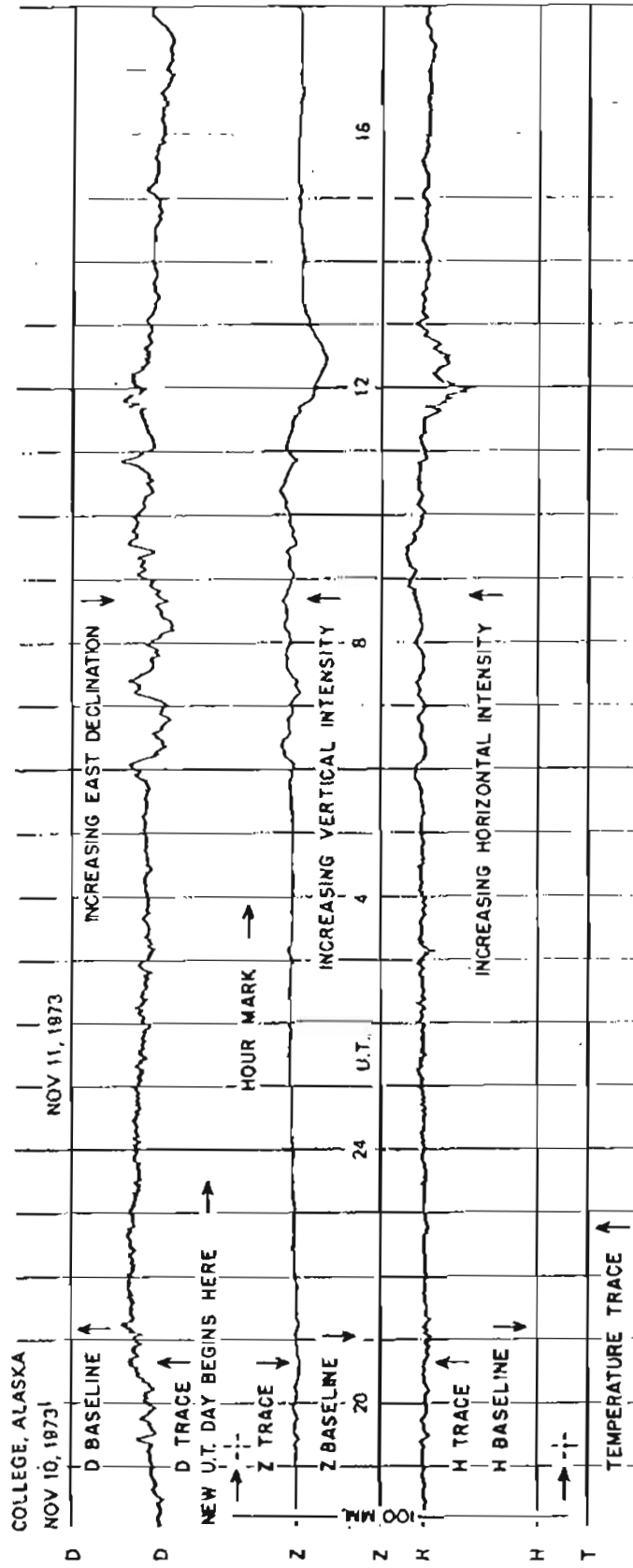
Scaling uncertain because of magnetic storm.
 Record off sheet for part or all of hour; if value is given, error was estimated for missing part.

* Derived from 510000 Magph., converted in Normal Magph.

Scaled by: SPILEAS
 Checked by: EAS, SPI, JEP
 Films rec. viewed by: EAS
 Punched by:

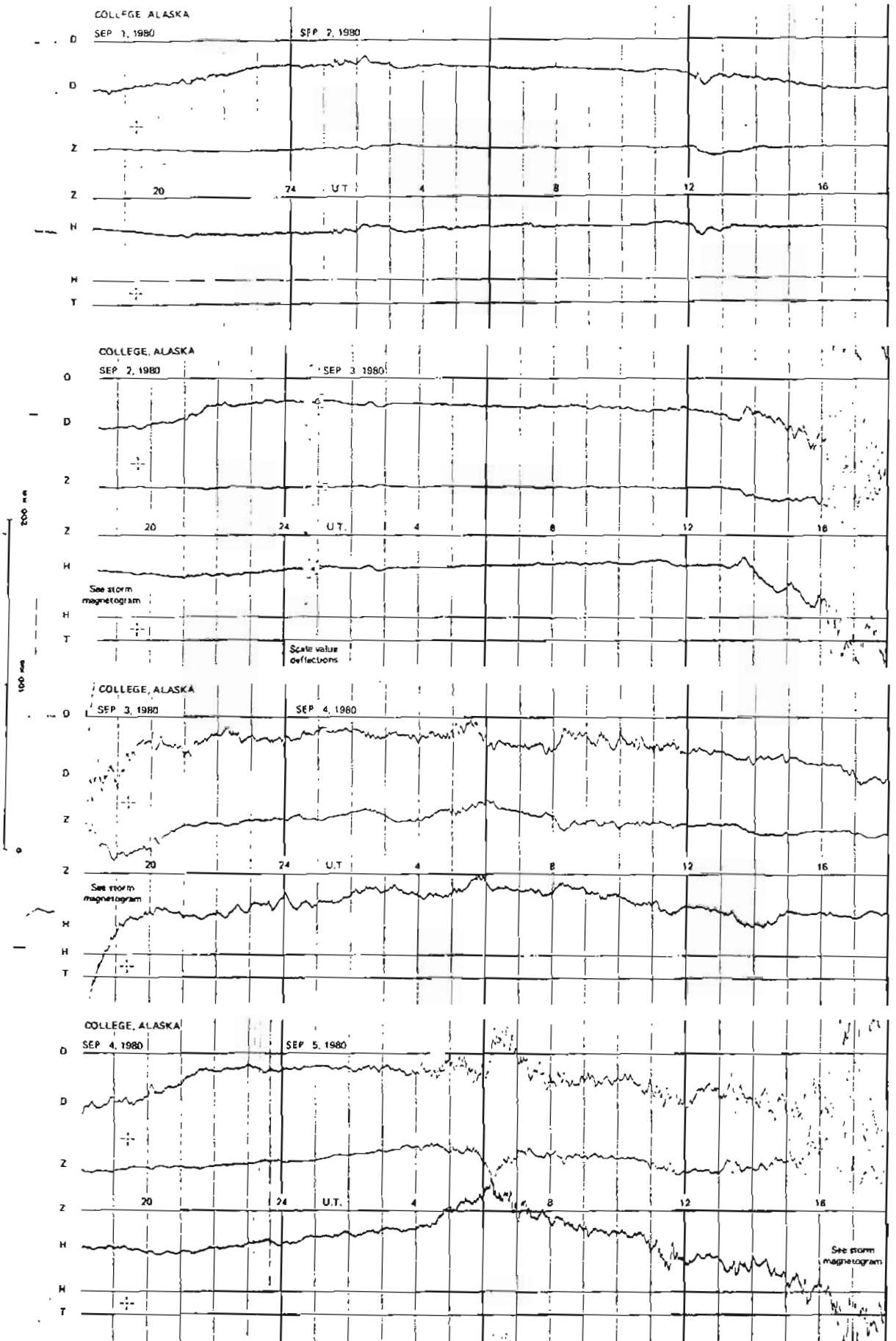
Monthly sum: 409155
 Monthly mean: 290
 Unit: 10⁻⁷ Gauss

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

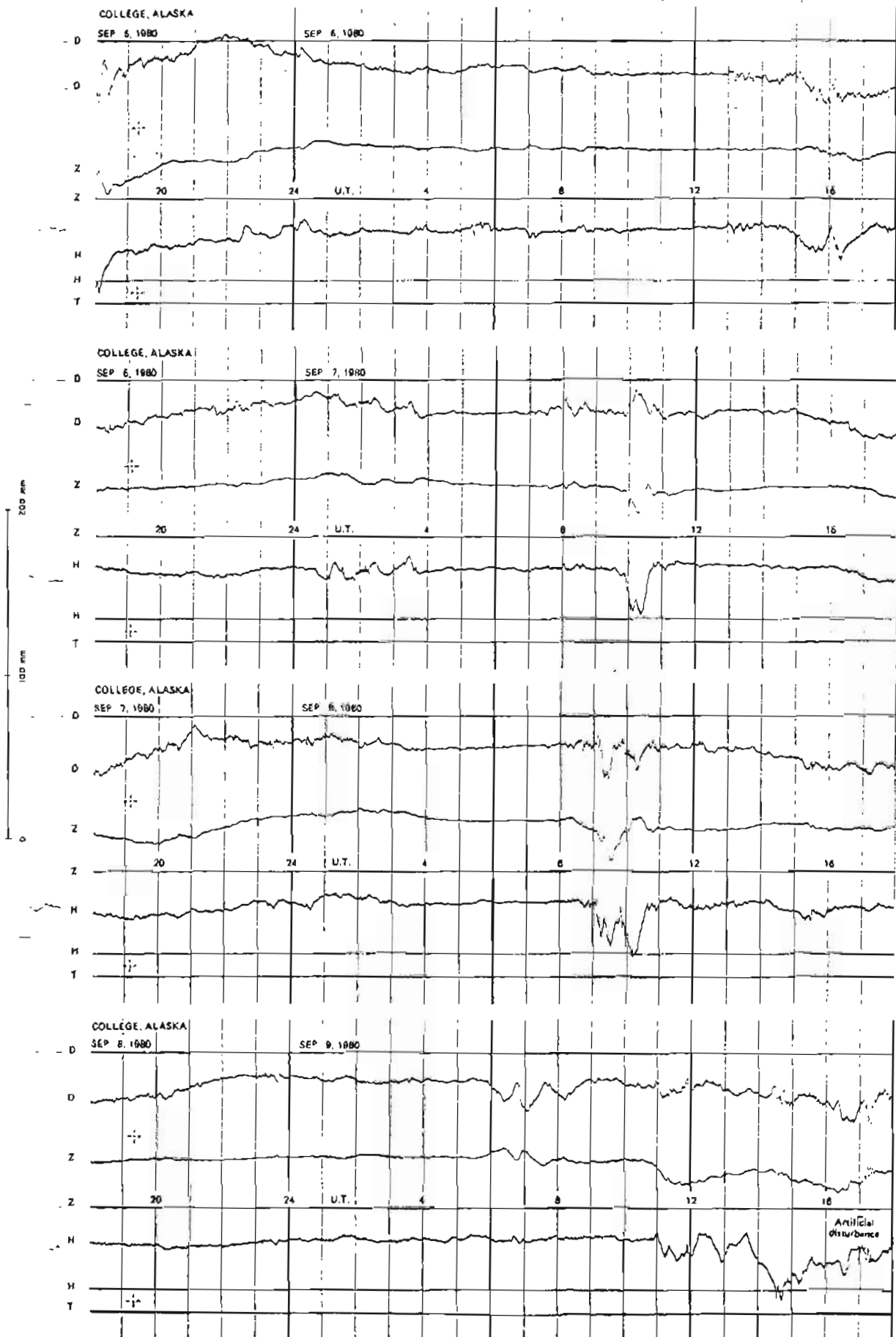


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

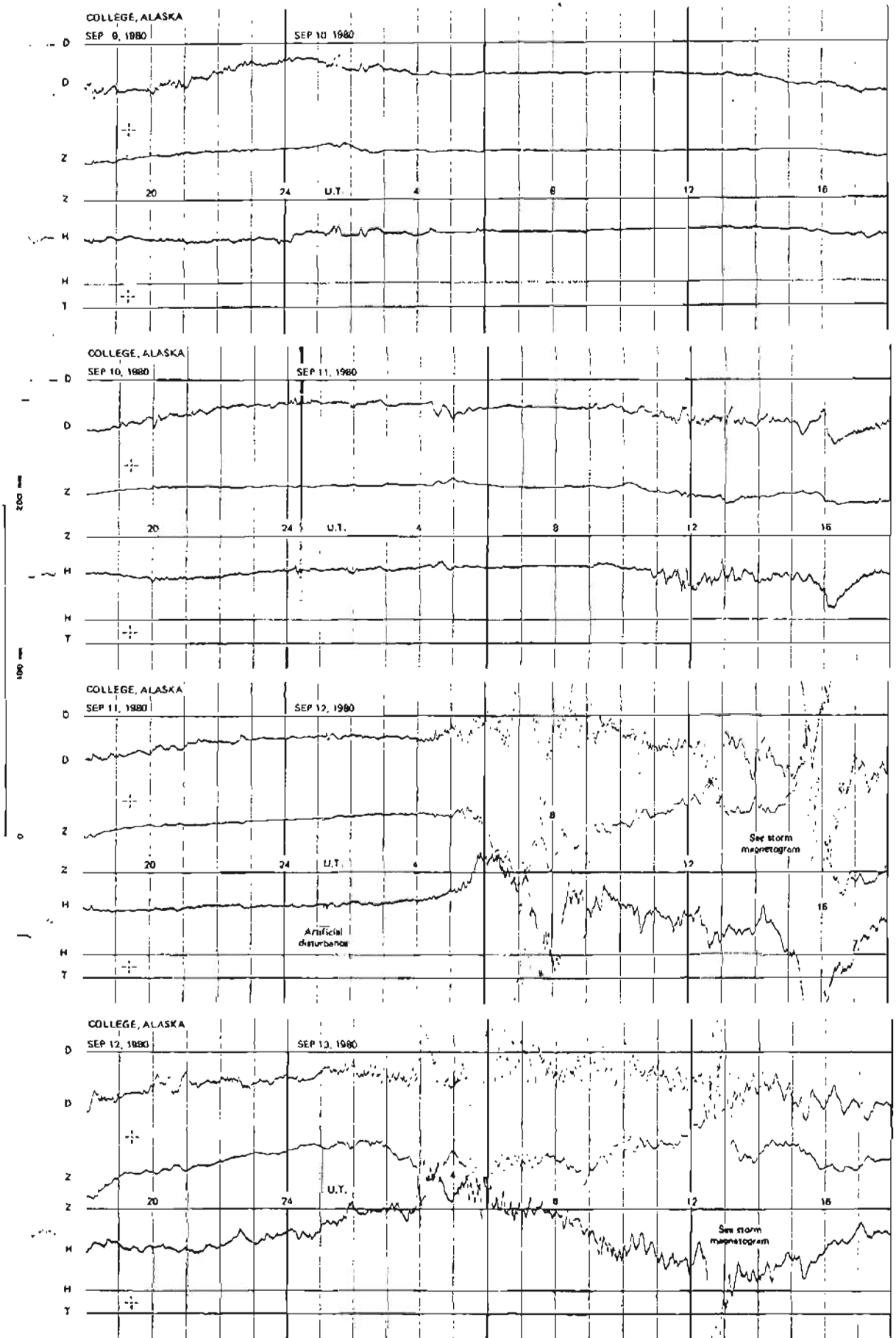
NORMAL MAGNETOGRAMS



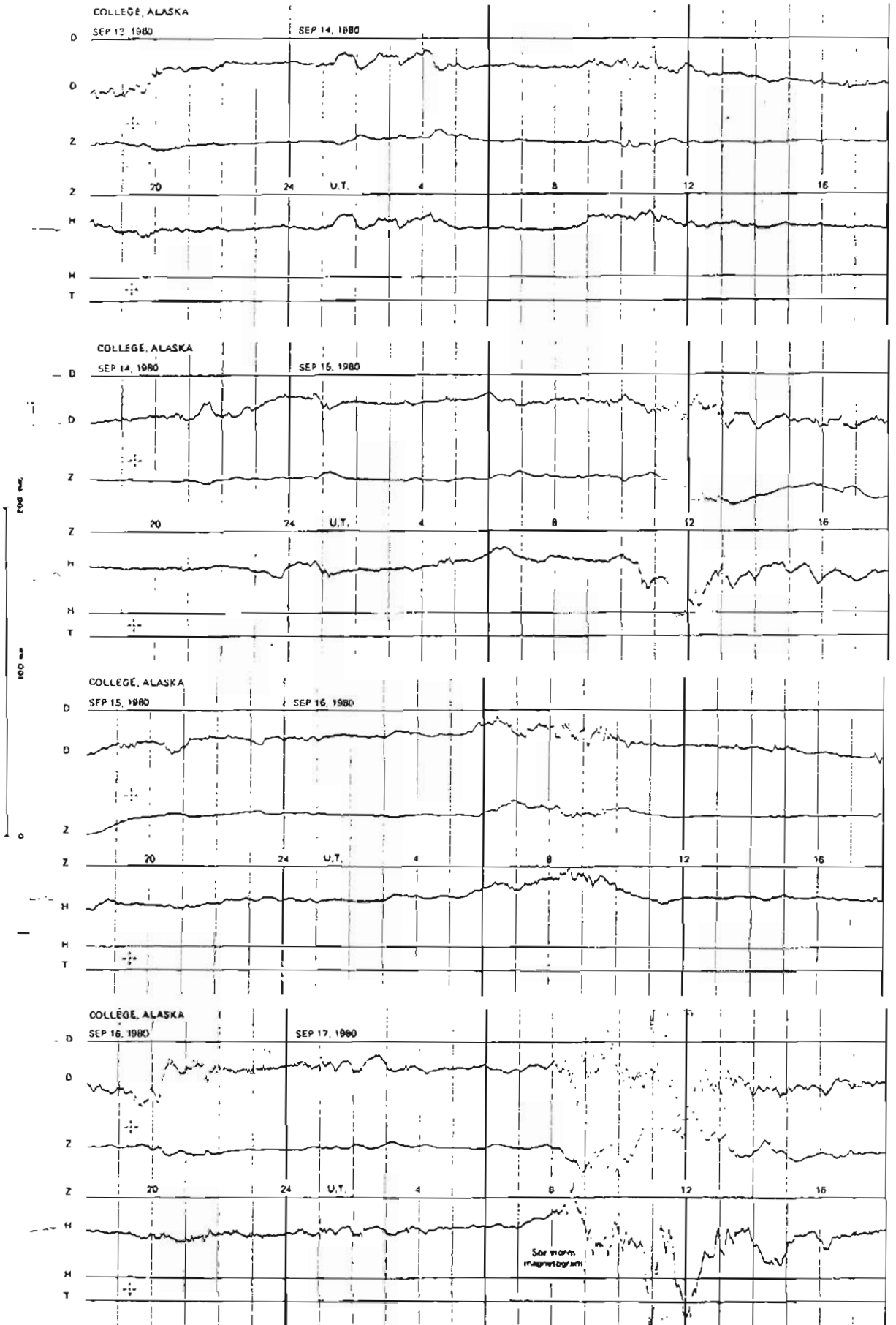
NORMAL MAGNETOGRAMS



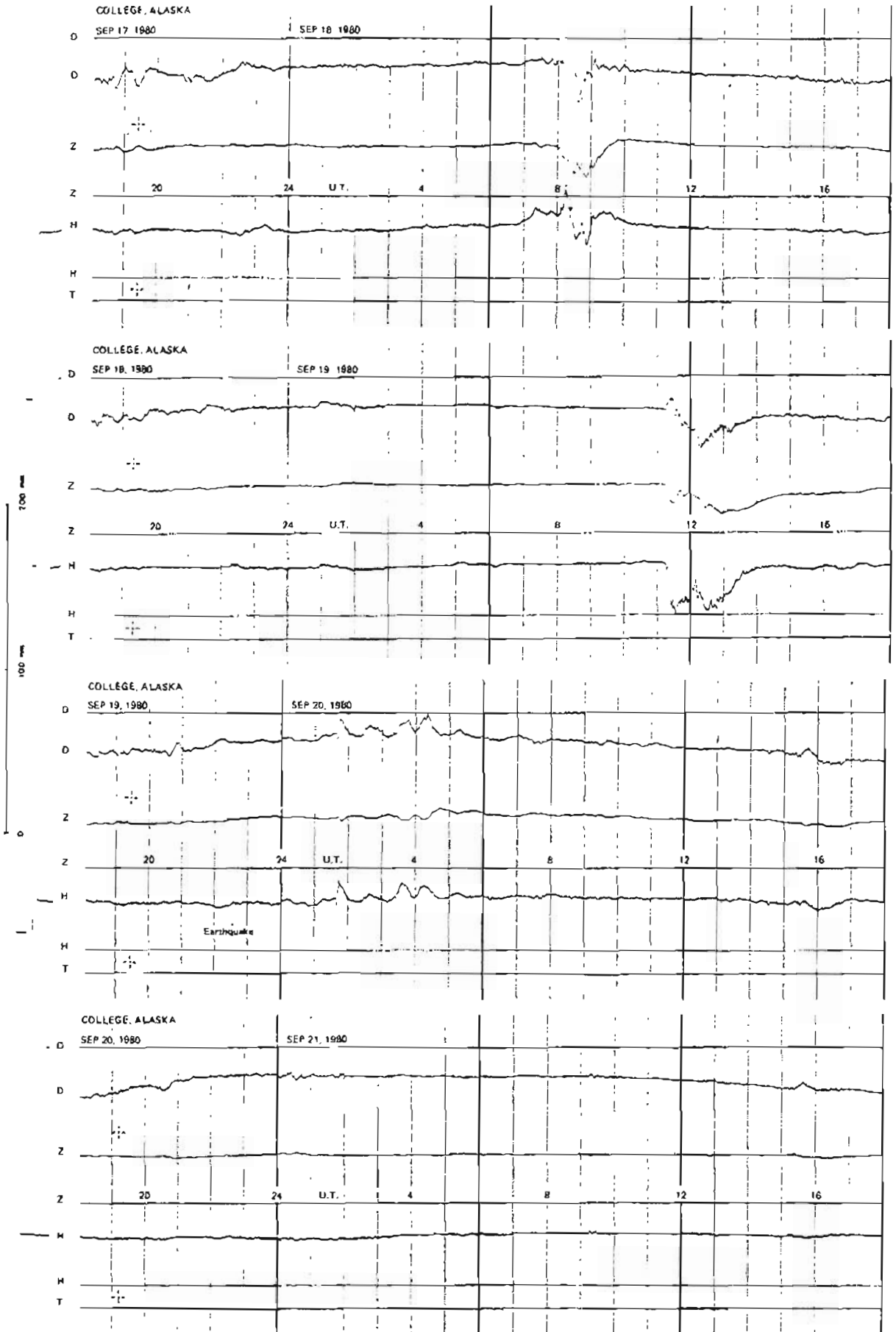
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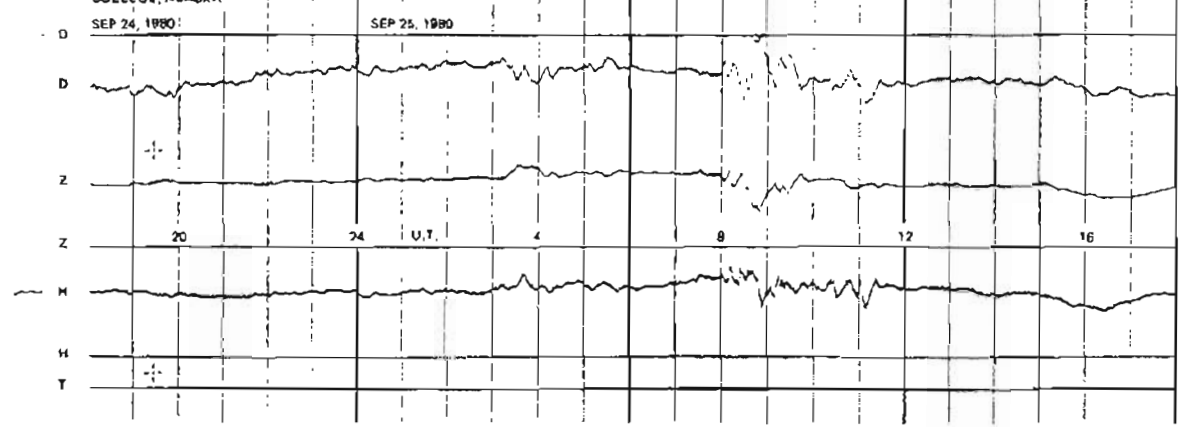
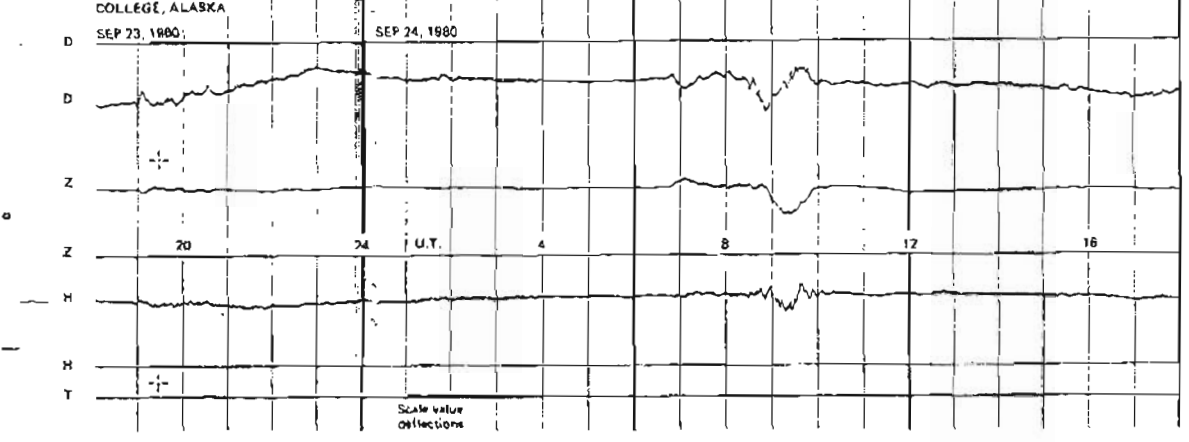
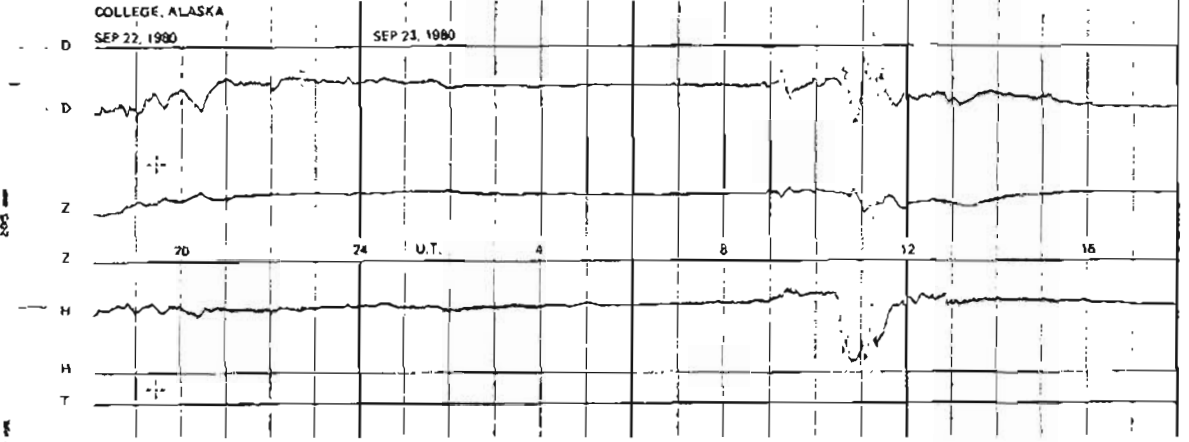
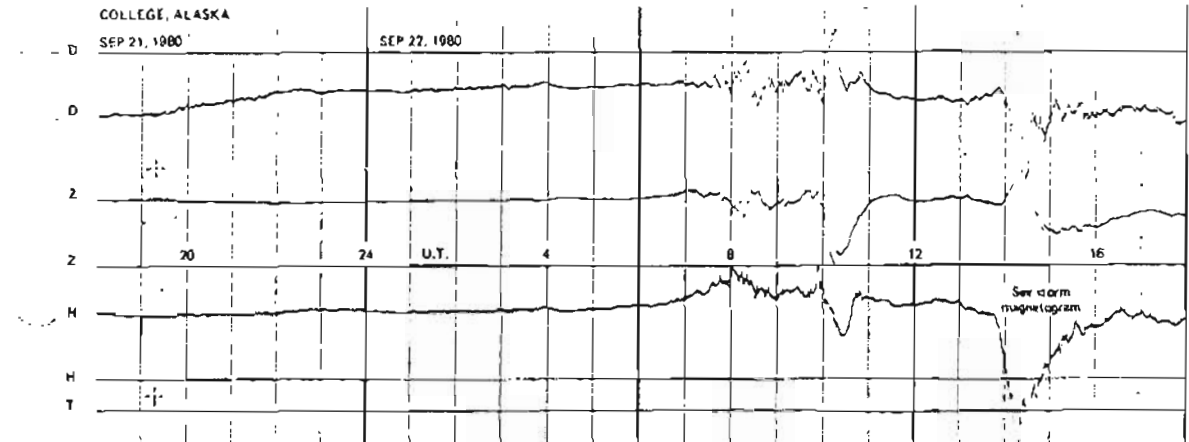
NORMAL MAGNETOGRAMS



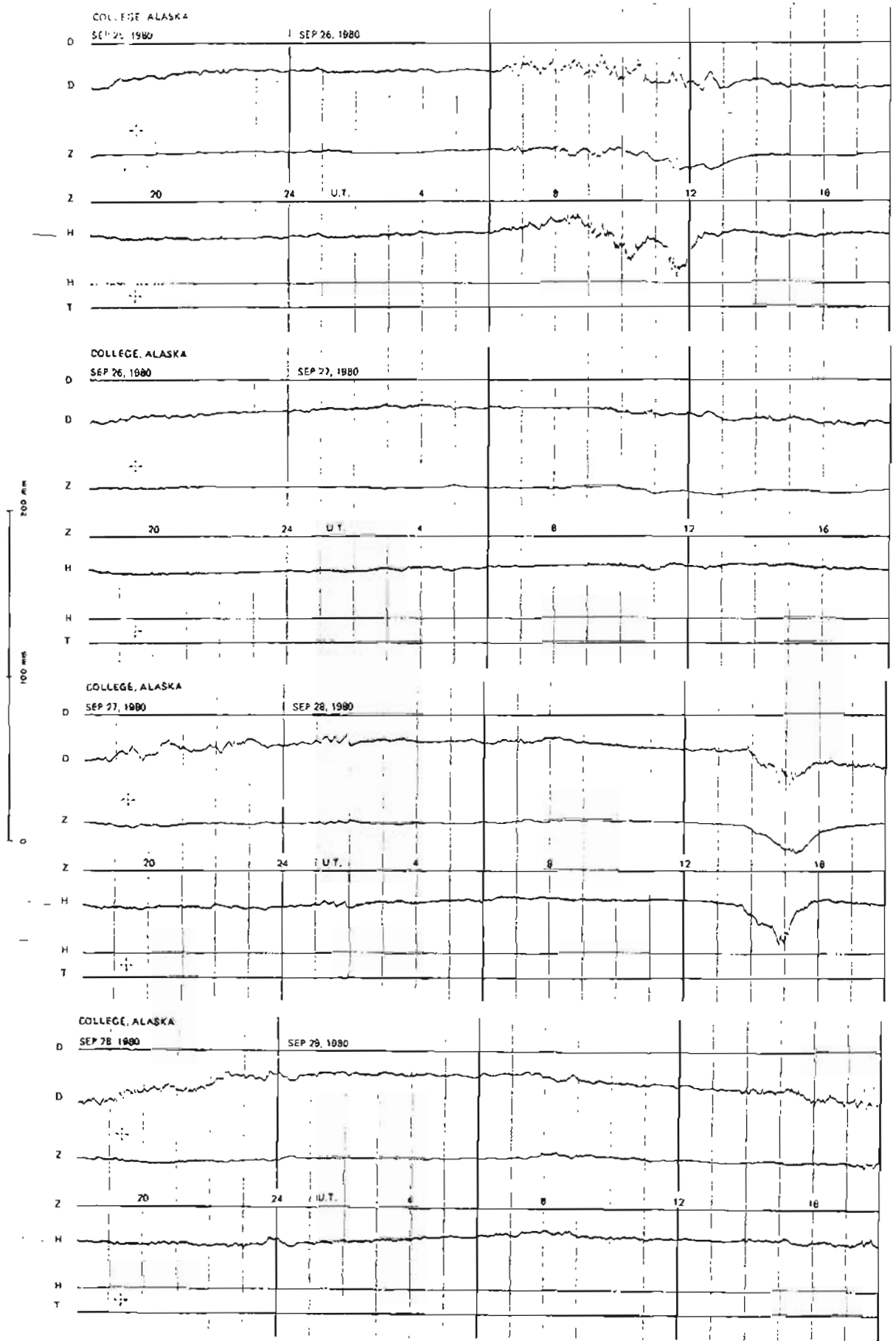
NORMAL MAGNETOGRAMS



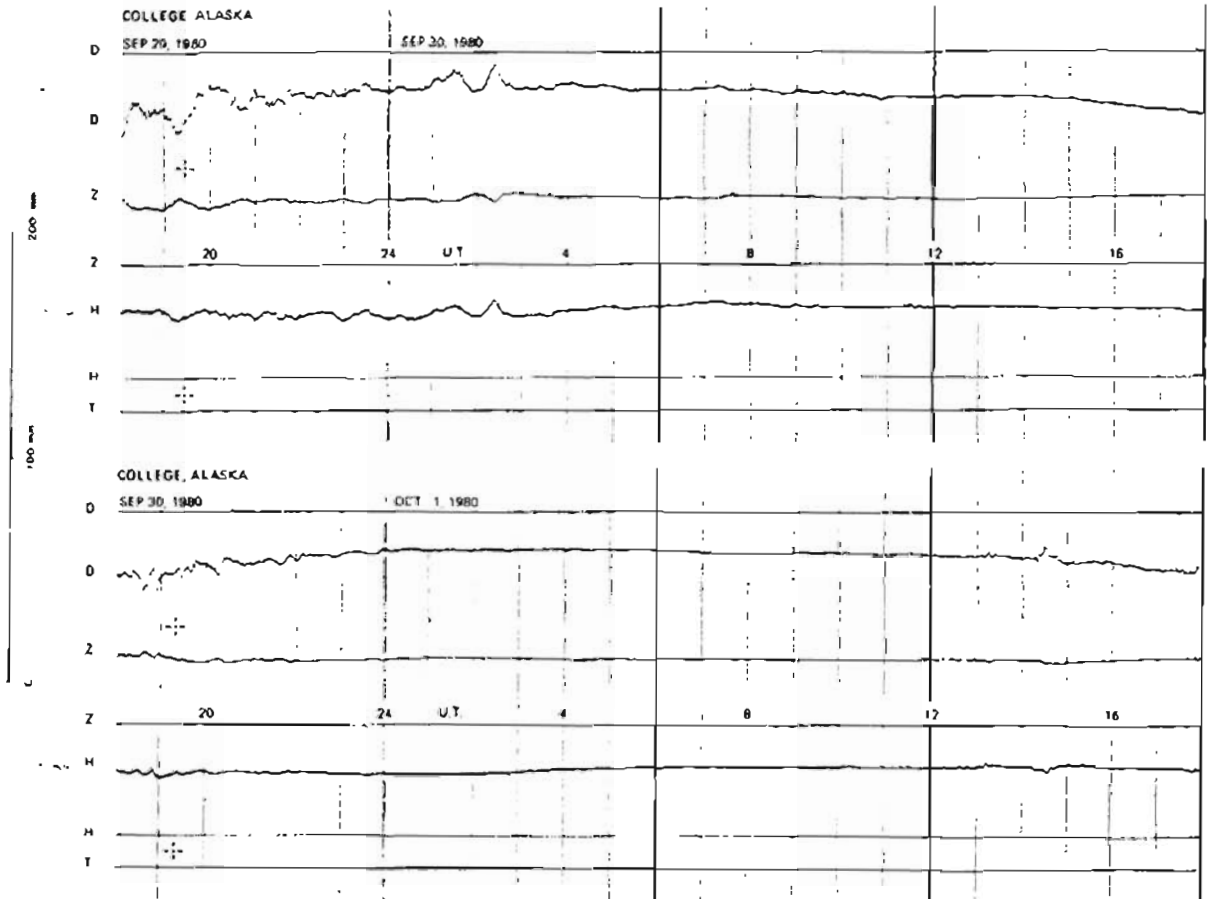
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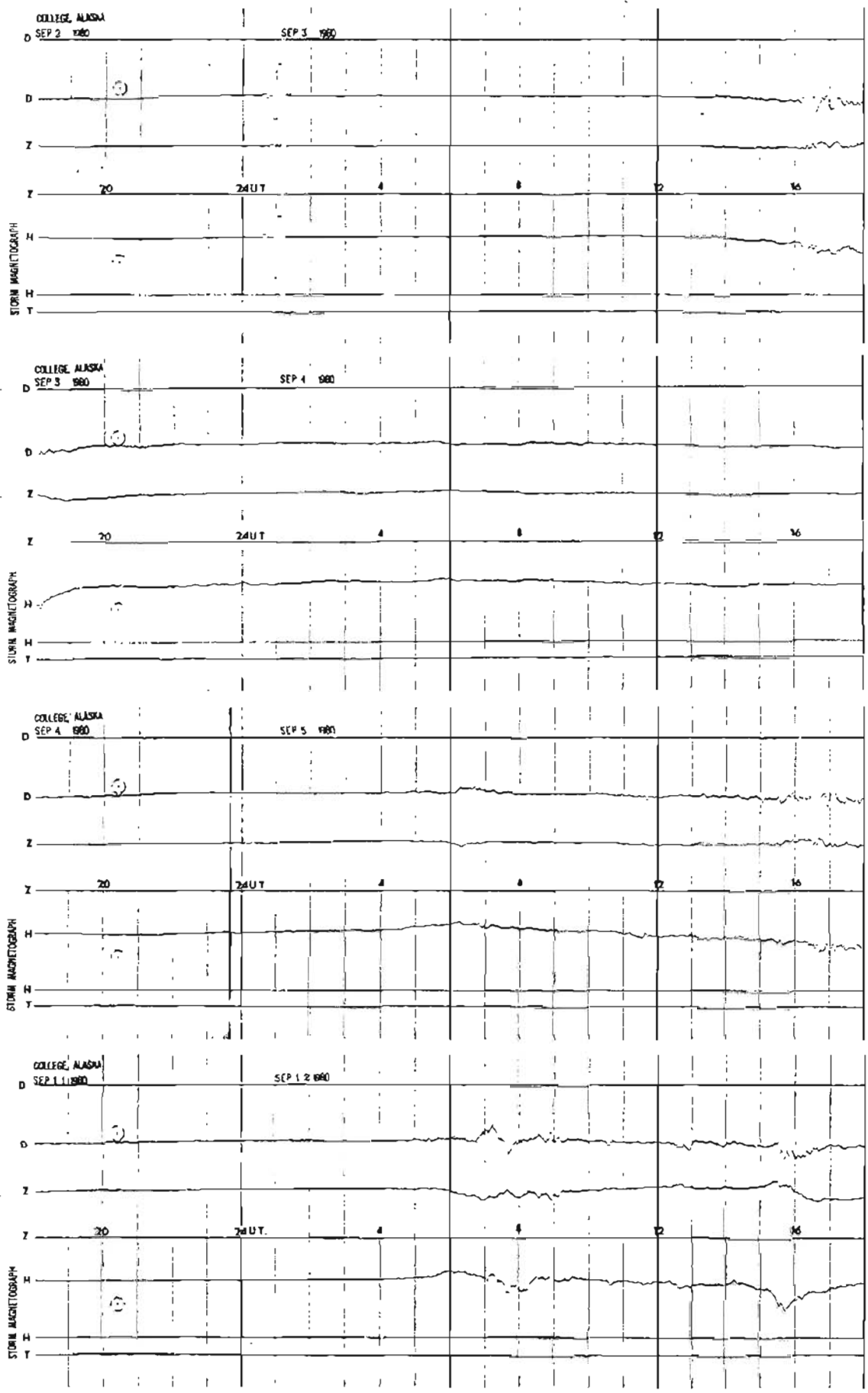
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

