

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

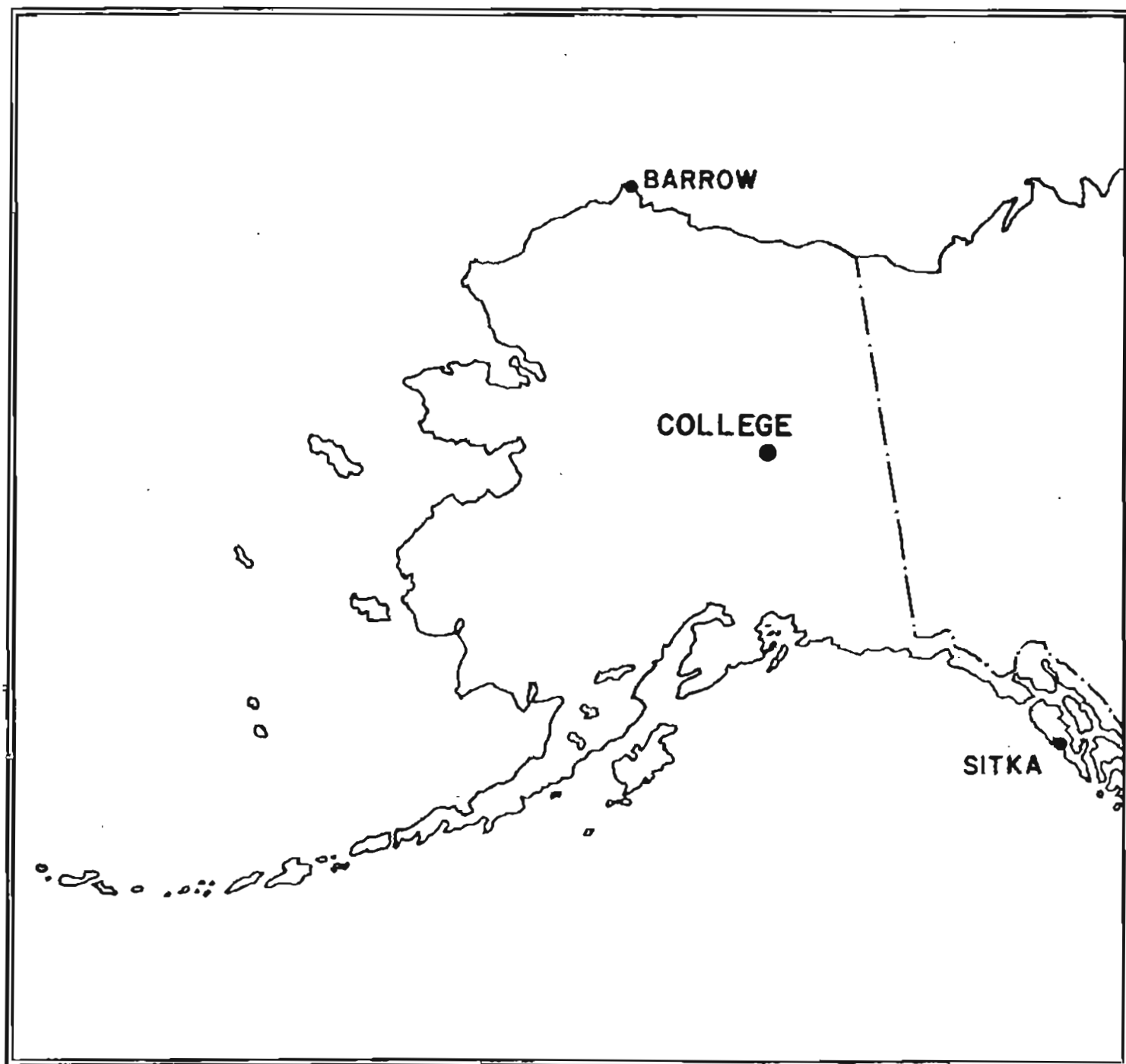
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

SEPTEMBER 1984

OPEN FILE REPORT 84-03001



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY; WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: J.E. PAPP, E.A. SAUTER, L.Y. TORRENCE, P.A. FRANKLIN AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA, THE COLLEGE OBSERVATORY IS A PART OF THE BRANCH OF GLOBAL SEISMOLOGY AND GEOMAGNETISM OF THE U.S. GEOLOGICAL SURVEY.

Explanation of Data and Reports

Magnetic Activity Report

Outstanding Magnetic Effects

Principal Magnetic Storms

Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings

Sample Format for Normal and Storm Magnetograms

Normal Magnetograms

Storm Magnetograms (When Normal is too disturbed to read)

COLLEGE OBSERVATORY PRELIMINARY GEOMAGNETIC DATA

EXPLANATION OF DATA AND REPORTS

INTRODUCTION

The preliminary geomagnetic data included here is made available to scientific personnel and organizations as part of a cooperative effort and on a data exchange basis because of the early need by some users. To avoid delay, all of the data is copied from original forms processed at the observatory; therefore it should be regarded as preliminary. Inquiries about this report or about the College Observatory should be addressed to:

Chief, College Observatory
U.S. Geological Survey
800 Yukon Drive
Fairbanks, Alaska 99701

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

World Data Center A
NOAA D63, 325 Broadway
Boulder, Colorado 80303

OBSERVATORY LOCATION

The College Observatory, operated by the U.S. Geological Survey, is located at the University of Alaska, Fairbanks, Alaska. It is near the Auroral Zone and the northern limit of the world's greatest earthquake belt, the circum-Pacific Seismic belt. Although the observatory's basic operation is in geomagnetism and seismology, it cooperates with other scientists and organizations in areas where the facility and personnel can be of service.

The observatory is one of three operated by the USGS in Alaska. The others are located at Barrow and Sitka.

The position of the observatory site is:
Geographic latitude..... $64^{\circ}51.6'N$
Geographic longitude..... $147^{\circ}50.2'W$
Geomagnetic latitude..... $+64.6^{\circ}$
Geomagnetic longitude..... $+236.5^{\circ}$
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 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)

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 and 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

SEPTEMBER 1984

DATE	K-INDICES									AK	TIME SCALE ON MAGNETOGRAMS
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM		
1	2	3	3	1	0	2	2	2	15	08	SUDDEN COMMENCEMENTS d h m
2	3	3	4	4	5	5	2	1	27	24	
3	2	4	4	2	2	2	1	1	18	11	
4	1	3	6	6	8	8	3	3	38	86	
5	3	6	6	7	6	6	4	3	41	65	
6	2	2	4	4	5	3	2	1	23	18	
7	2	2	2	2	3	2	1	0	14	07	
8	2	1	3	3	3	3	2	2	19	11	
9	2	2	3	4	3	2	2	3	21	13	
10	3	2	6	7	3	4	3	4	32	41	
11	3	5	4	4	4	3	3	2	28	23	
12	2	2	3	5	5	4	2	2	25	21	
13	3	3	3	4	1	2	1	1	18	11	
14	2	3	3	5	2	2	2	2	21	14	
15	2	1	3	4	4	4	0	1	19	14	
16	2	2	1	0	4	3	1	1	14	08	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)
17	1	2	3	0	0	1	1	0	08	04	
18	0	1	0	2	0	0	0	0	03	01	
19	1	1	3	7	5	5	3	3	28	36	
20	3	5	5	6	4	4	2	1	30	32	
21	1	0	4	6	4	3	1	2	21	20	
22	2	2	6	6	7	2	4	4	33	47	
23	4	6	7	8	7	8	5	5	50	120	
24	5	5	7	6	6	5	4	3	41	61	
25	3	3	7	6	6	6	4	4	39	58	
26	4	4	7	7	7	5	3	2	39	68	BEGIN d h m END d h m
27	4	4	6	7	6	3	2	3	35	49	
28	2	3	2	5	5	4	3	3	27	23	
29	3	4	3	4	3	2	2	1	22	15	
30	1	2	6	2	0	1	0	0	12	13	
31											

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

675.7

3.72

2510

H

322.2

7.83

2520

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 1984
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
14	18xx	pc4		
15	02xx	pc5		
17	18xx	pc4		
28	14xx	pg		
IDENTIFIED BY: JBT			VERIFIED BY: EAS	

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

PRINCIPAL MAGNETIC STORMS
Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA
1984
SEPTEMBERWDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80502 U.S.A.

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(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	Z(Y)	day hr
CO	64°6 N	04	04xx	..	..	..	..	04	5,6	8	282	1870	1400	05 23
		22	19xx	..	..	..	..	23	4,6	8	472	2630	1790	27 18

SEPTEMBER

1984

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	BASELINE
D	0000 U.T., 9-1-84	2400 U.T., 9-30-84	1.2/mm	3.78/mm
				27° 16.8 E
H	0000 U.T., 9-1-84	2400 U.T., 9-30-84	7.88/mm	12.6898
Z	0000 U.T., 9-1-84	2400 U.T., 9-30-84	7.68/mm	55.1725

STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	BASELINE
D	0000 U.T., 9-1-84	2400 U.T., 9-30-84	7.9/mm	29.68/mm
				23° 41.9
H	0000 U.T., 9-1-84	2400 U.T., 9-30-84	43.98/mm	108078
Z	0000 U.T., 9-1-84	2400 U.T., 9-30-84	48.38/mm	540488

RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 44.4 E	129228	553588

* COMPILED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED:

SEP

1

3

7

8

9

13

16

17

18

30

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)

Values are in weeks of sun. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (150 M.T.) is hour 11 of the same universal day. Driftage corrections have been applied. Negative values are in red, with minus signs shown.

U.S. DEPARTMENT OF INTERIOR
BIOLOGICAL SERVICE, GEOLOGICAL DIVISION
DOWNS FOLDER CENTER

YEAR	MONTH
------	-------

10710
-1173

C	Q	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	215	206	213	193	230	274	200	254	258	242	247	262	254	283	308	338	358	367	353	304	242	223	196	205	6227
	02	216	235	212	246	158	281	251	232	244	247	264	258	255	298	331	466	384	376	355	316	255	238	255	251	6724
	03	253	246	244	252	193	386	204	243	212	242	263	269	296	297	313	873	351	358	314	321	235	269	223	242	6659
	04	251	257	239	215	203	232	342	109	106	139	355	206	343	426	665	959	363	410	420	329	288	280	254	246	7656
	05	250	214	162	62	537	356	428	-145	117	15	315	551	335	410	633	570	704	489	485	326	209	116	147	187	7566
	06	200	222	249	228	246	269	364	247	430	168	238	272	327	234	286	337	380	415	329	292	264	252	234	226	6719
	07	228	220	223	233	238	246	242	262	260	258	263	286	255	298	339	374	405	372	346	330	268	257	250	239	6732
	08	234	236	245	255	261	245	222	204	177	272	278	278	300	313	342	410	415	425	372	328	322	255	230	208	6827
	09	202	219	232	254	260	272	269	236	266	300	275	251	284	302	335	340	359	385	335	361	298	345	257	169	6866
	10	172	186	197	218	232	259	258	309	531	245	214	248	266	296	323	355	458	402	360	428	270	170	180	192	6769
	11	199	203	202	254	251	215	422	231	259	242	197	238	288	341	314	356	366	384	304	292	236	199	204	207	6404
	12	225	254	248	271	255	253	261	404	286	283	218	248	350	238	449	400	459	410	360	304	265	235	232	231	7139
	13	244	223	217	263	279	266	254	294	243	349	344	252	269	288	324	340	360	377	379	346	318	182	250	229	6992
	14	227	233	246	252	242	271	342	222	360	313	234	245	294	322	311	348	379	364	347	278	219	208	242	231	6730
	15	252	262	261	264	266	262	254	242	360	213	296	278	288	308	314	330	325	356	341	322	327	271	226	212	6840
	16	238	240	252	255	239	238	254	258	247	266	276	282	290	297	337	341	354	368	354	313	280	262	270	270	6781
	17	267	253	257	248	250	281	358	236	252	255	269	276	285	301	312	317	338	344	338	306	290	266	249	247	6795
	18	262	258	244	247	248	252	266	265	266	271	280	315	306	302	303	314	330	335	327	309	292	272	250	250	6764
	19	254	254	248	243	253	238	235	239	225	274	712	736	368	410	459	607	752	446	278	242	191	214	220	252	8243
	20	232	227	277	219	252	380	276	334	450	194	228	272	306	402	315	402	339	313	311	262	218	235	249	262	6955
	21	270	271	268	268	252	256	249	260	222	180	252	283	363	321	328	309	356	352	329	306	297	273	237	236	6738
	22	339	253	248	260	259	237	246	359	284	140	163	334	648	263	310	305	297	320	313	269	288	88	175	218	6621
	23	13	183	198	253	187	-6	-10	29	323	140	331	665	288	246	625	243	665	434	303	307	233	253	247	233	6739
	24	249	235	331	289	395	871	127	127	431	37	132	109	220	132	343	570	426	243	247	293	222	293	233	214	6051
	25	234	260	325	287	538	470	200	117	300	180	346	474	320	426	498	1617	474	382	313	213	213	252	260	230	7837
	26	239	248	293	258	279	287	307	140	165	315	474	235	704	459	402	362	554	351	363	263	256	223	240	247	7664
	27	257	227	283	247	337	300	313	268	379	207	276	235	728	284	363	243	533	371	342	293	253	237	245	213	7254
	28	231	239	248	235	379	260	257	253	237	252	280	286	354	353	258	359	393	328	326	282	213	138	193	204	6678
	29	217	231	223	240	230	264	338	277	233	230	260	317	253	287	303	289	304	300	307	303	278	223	223	229	6399
	30	218	227	240	222	233	238	269	220	313	247	288	282	275	279	284	287	300	301	307	297	273	257	248	217	6309
	31																									

- ☐ Scaling increases because of magnetic noise.
- ☒ Record off about 100 parts in 100 of hours if value is given, curves estimated for missing parts.
- ☐ Interpolated
- ☐ Sufficient portion of box interpolated.
- ☐ No record, or no values available because of faulty record.

Scale Value

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

LYT
EAS, JEP

AS CHECKED	AS CALCULATED
---------------	------------------

* Derived from STORED Mph., converted to Normal Mphb.

074306

MAGNETOCRAK HOURLY SCALINGS

Values are in tenths of inch, and are averages for successive periods of one hour beginning at midnight. Hour 01 of each day (1500 hrs.) is known as 11 of the same universal day.

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	ILLUSTRATION
01	277	304	302	303	306	332	292	292	285	263	254	246	01	244	251	251	250	238	204	212	226	218	236	244	262	6282	
02	273	277	276	320	329	337	272	257	272	104	178	236	02	242	251	171	124	122	210	230	227	236	246	252	249	5695	
03	257	278	275	269	275	308	291	275	148	261	252	256	03	247	254	217	214	241	240	244	247	239	244	239	243	5996	
04	257	268	277	287	320	307	211	196	128	355	401	308	04	433	490	682	555	94	248	226	224	226	236	243	249	7221	
05	256	291	304	228	207	193	705	385	21	49	273	261	05	343	462	426	638	415	-46	-4	106	130	181	217	239	3868	
06	268	283	278	272	278	192	290	250	206	113	244	249	06	348	175	180	250	235	196	174	199	220	242	251	263	5756	
07	267	268	274	279	267	274	279	297	283	280	262	262	07	241	165	190	237	221	227	233	239	240	249	253	252	6060	
08	252	248	248	250	253	252	263	266	256	312	268	257	08	257	251	218	198	198	213	203	206	231	229	231	245	5745	
09	277	252	247	260	254	266	263	255	212	253	254	176	09	192	259	258	257	257	253	238	214	197	222	208	262	5786	
10	278	274	274	282	273	294	290	261	61	99	41	28	10	229	272	272	255	218	160	144	236	170	188	243	248	5030	
11	272	284	272	290	274	262	277	287	275	228	156	166	11	230	200	234	258	254	243	205	204	220	236	247	256	5830	
12	269	278	273	269	266	280	291	269	231	196	142	121	12	260	260	266	260	249	237	240	236	230	236	229	233	5905	
13	286	277	300	303	270	254	254	278	236	142	121	248	13	221	255	229	226	229	238	226	220	231	228	249	266	5787	
14	239	259	262	254	252	306	292	264	157	170	248	266	14	253	253	234	116	177	228	236	236	239	232	242	247	5646	
15	294	264	254	256	257	250	248	245	273	177	197	238	15	247	242	233	150	135	192	210	227	230	233	243	244	5779	
16	266	276	255	250	255	275	280	279	276	267	262	252	16	242	249	245	235	226	223	226	233	236	236	237	243	5904	
17	250	250	250	243	250	303	280	241	255	252	257	247	17	230	238	243	246	246	243	238	235	233	232	230	232	5823	
18	247	246	247	248	253	252	263	253	253	254	250	211	18	314	366	468	334	97	-70	93	203	200	242	262	257	6227	
19	233	246	240	240	243	253	280	283	256	292	299	397	19	254	339	212	212	181	153	177	180	195	230	253	259	5500	
20	263	262	317	264	257	300	262	210	295	213	269	229	20	263	300	223	159	189	200	200	217	232	243	248	249	5552	
21	256	259	260	259	259	270	292	294	252	219	58	247	21	339	80	229	227	200	187	180	193	213	189	218	253	5174	
22	258	267	277	267	258	272	308	214	38	338	230	314	22	339	80	229	227	200	187	180	193	213	189	218	253	5174	
23	257	285	294	330	115	236	90	38	499	377	608	573	23	110	608	691	497	77	30	203	217	260	307	306	287	6765	
24	350	310	262	346	262	185	65	70	350	339	295	372	24	224	183	193	244	224	100	167	208	217	264	315	277	5587	
25	273	278	297	272	282	237	154	135	153	377	90	199	25	493	544	230	167	147	87	166	173	197	273	293	289	5806	
26	284	297	320	323	293	160	7	122	301	287	289	634	26	845	698	327	222	174	178	224	237	258	257	273	278	7287	
27	297	293	327	284	330	280	237	83	147	200	366	534	27	436	495	481	145	207	251	233	213	228	360	287	273	6982	
28	297	282	302	285	346	306	303	307	289	219	187	233	28	243	93	189	186	121	173	219	197	226	215	228	262	5718	
29	274	294	306	312	334	327	327	303	277	263	252	173	29	177	186	196	237	256	230	216	247	243	243	267	279	6219	
30	284	304	317	294	315	257	207	45	187	262	284	257	30	254	246	249	257	257	246	240	233	240	248	259	261	6043	
31													31														

SCALED BY	LVT	MONTHLY SUM	76041
CHECKED BY	EA3, JEP	MONTHLY MEAN	245
FIELD NO.		DATE WITH DATA	
FILED BY			
PURPOSE			
BY			

(1) Interpolated
 (2) Significant portion of how interpolated.
☐ No record; no value available because of faulty record.
 (3) Derived from STORE. Apph., converted to Manual Magph.

FORM 74-104

MAGNETOGRAM HOURLY SCALINGS

(UNIVERSAL TIME)

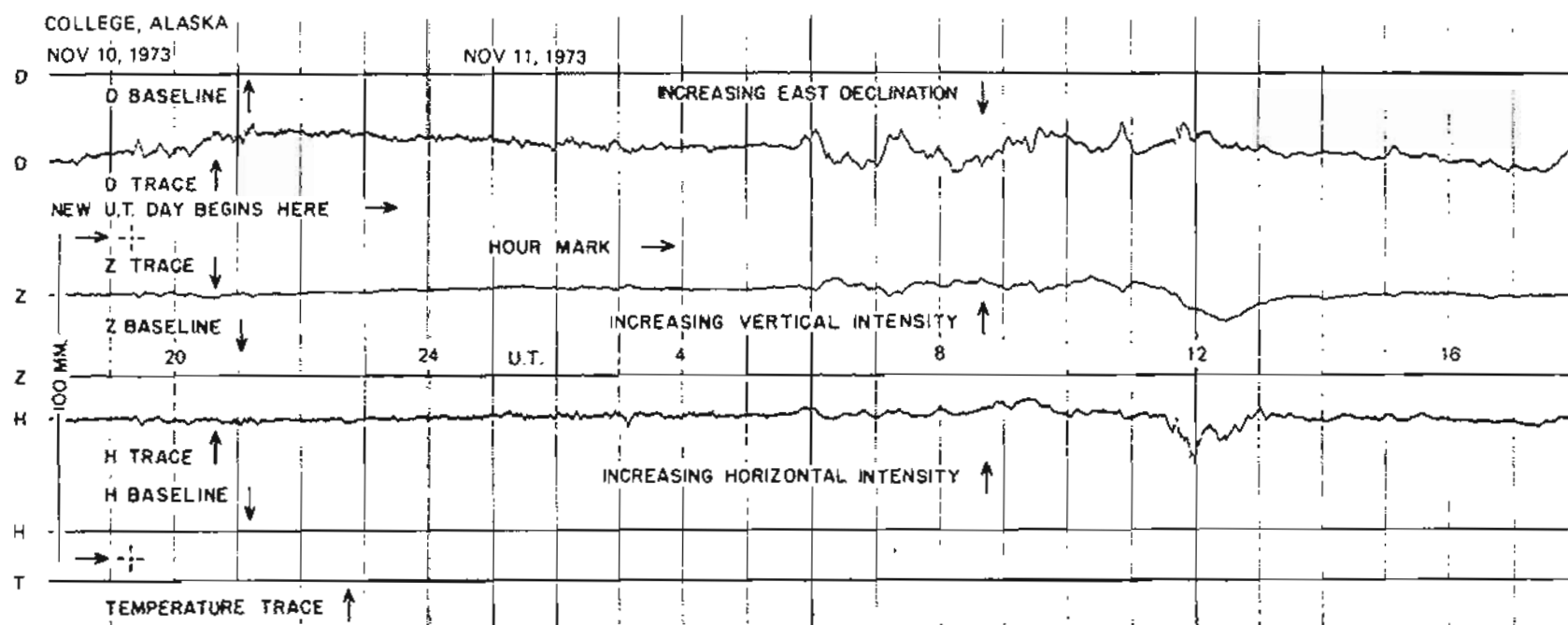
Values are in terms of one and six averaged for summation periods of one hour beginning at midnight. Hour 01 of local day 1 150 (M.T.) at hour 11 of the same.

Small corrections have been applied. Negative values are indicated with minus signs above.

UT	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	
01	294	315	306	318	300	367	442	412	336	296	296	300	313	298	301	288	263	265	274	246	258	257	255	268	7268	
02	285	282	332	345	392	402	409	384	357	222	298	314	300	103	-12	-6	267	311	283	278	272	286	285	291	6680	
03	304	312	284	310	370	420	448	425	266	344	318	297	297	269	258	279	294	280	270	258	262	264	268	280	7377	
04	299	298	301	326	369	418	364	216	214	306	-92	47	320	335	-165	-552	333	337	291	281	289	292	302	329	5458	
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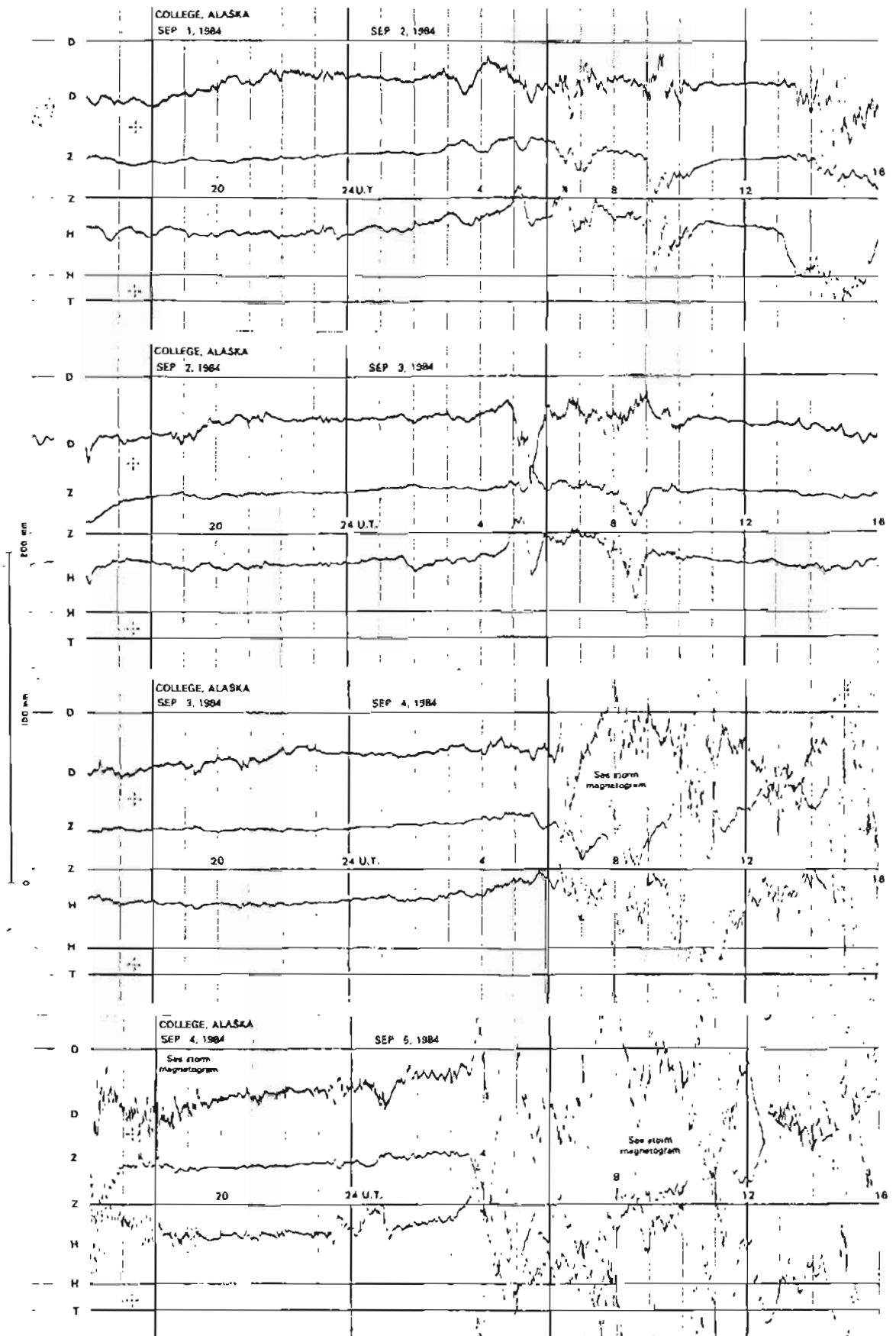
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FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

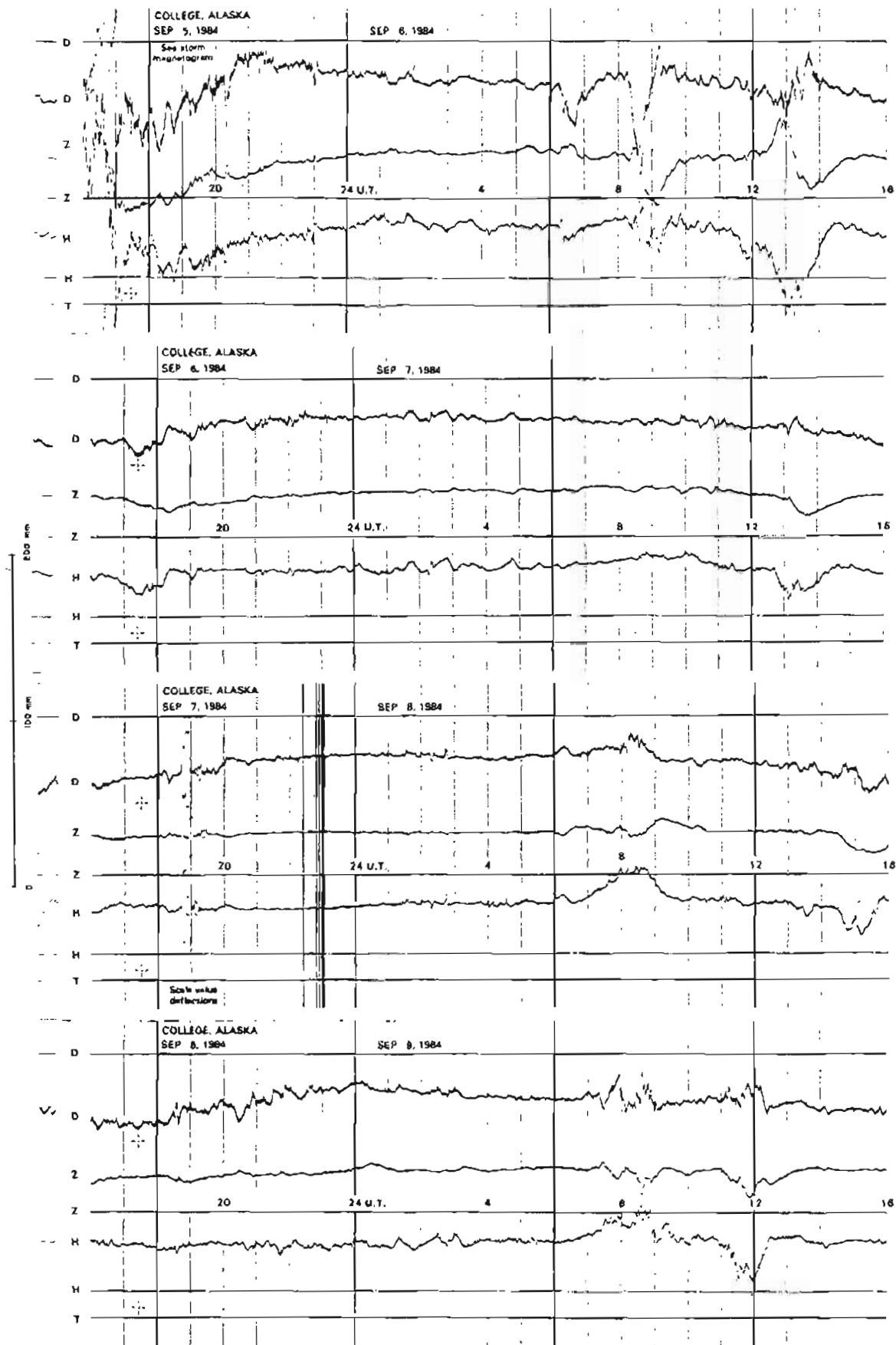


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

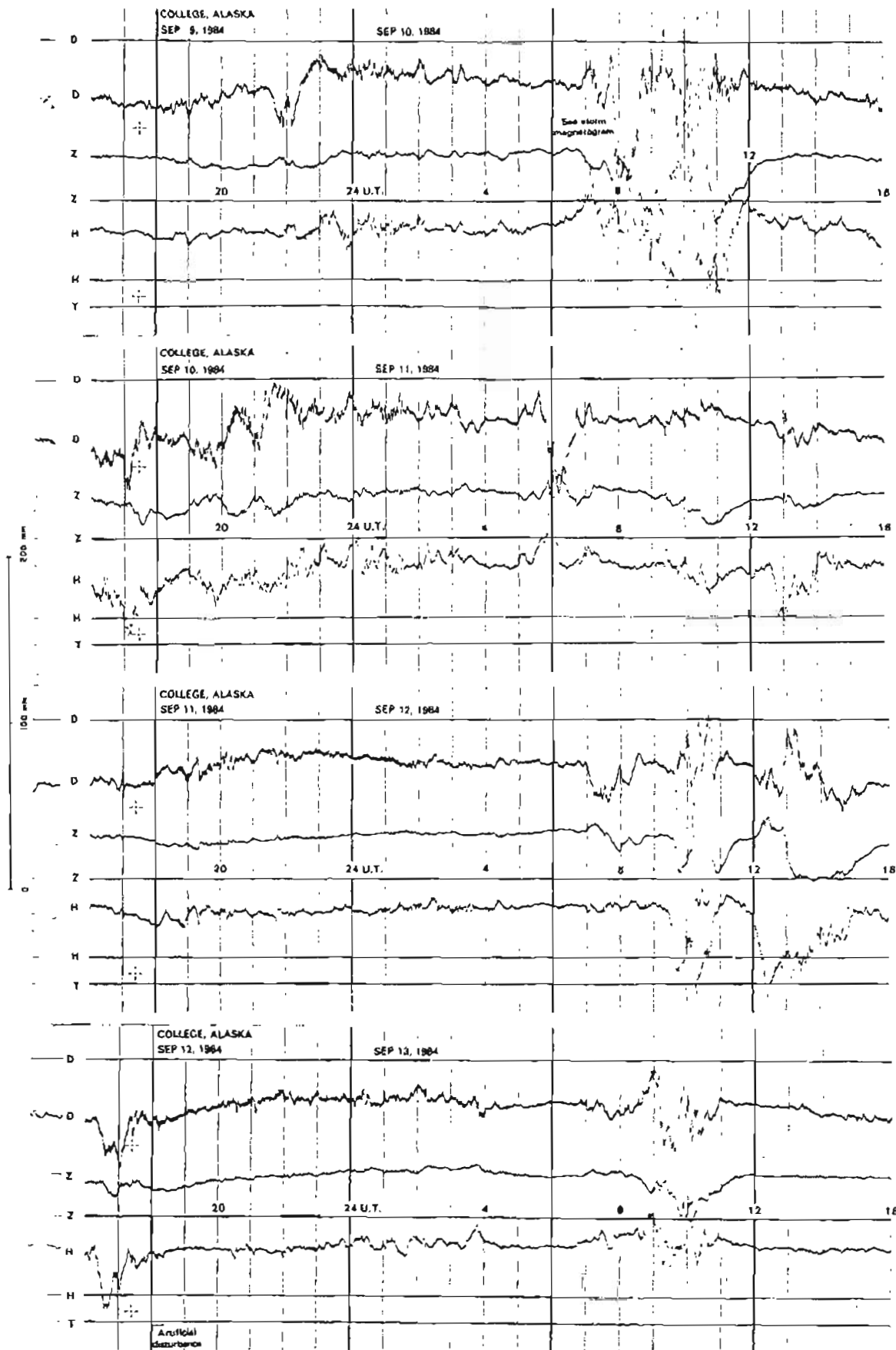
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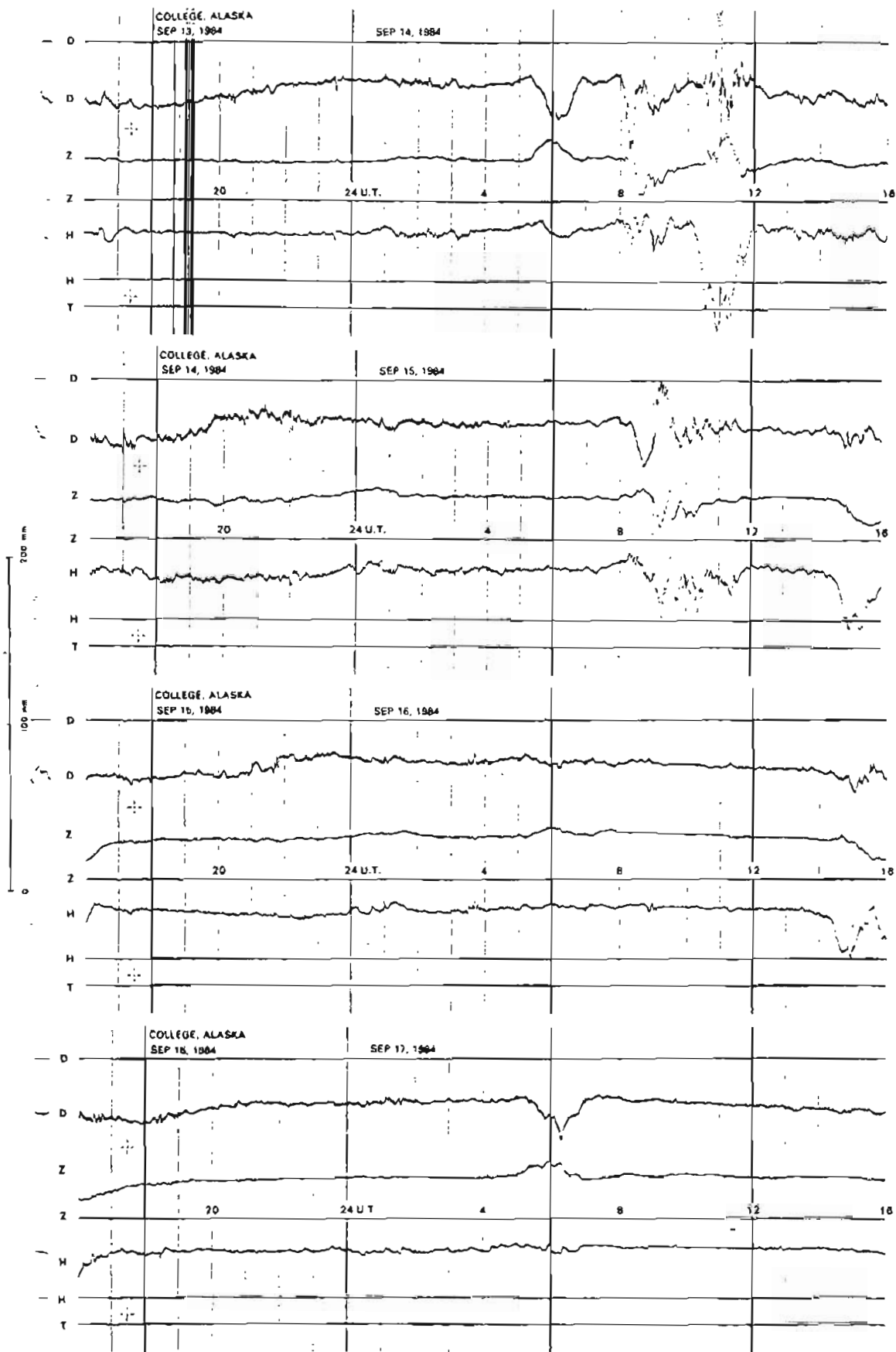
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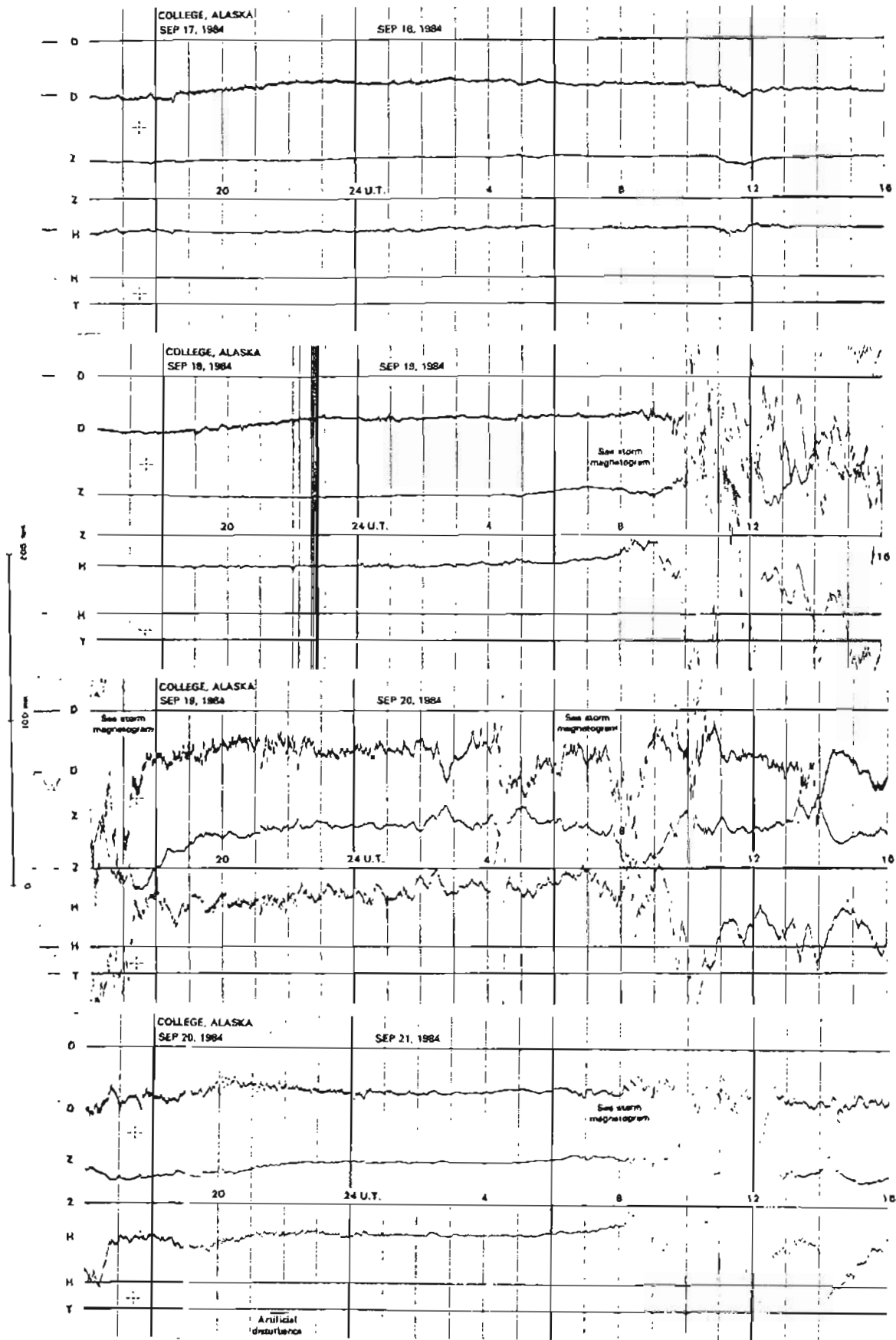
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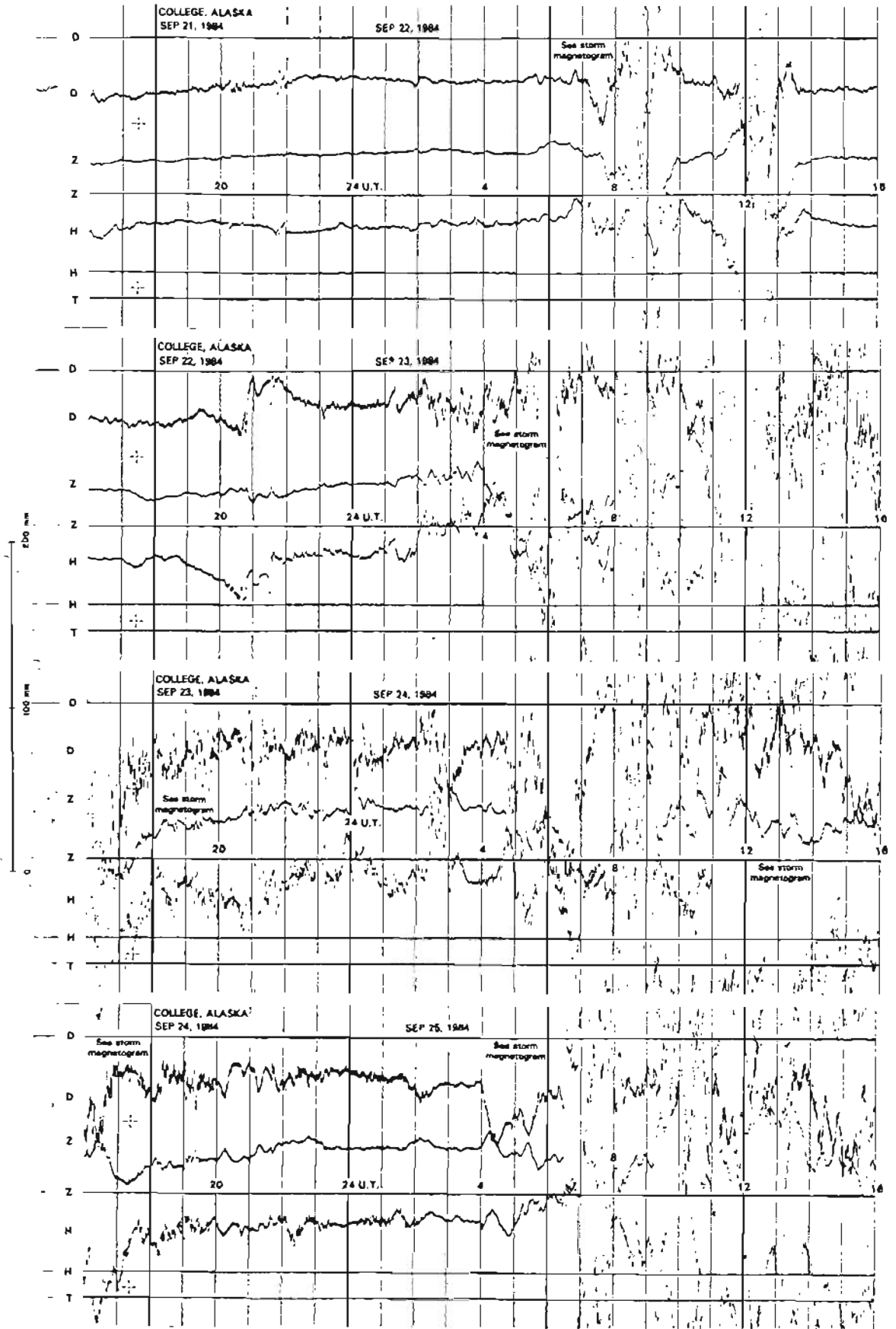
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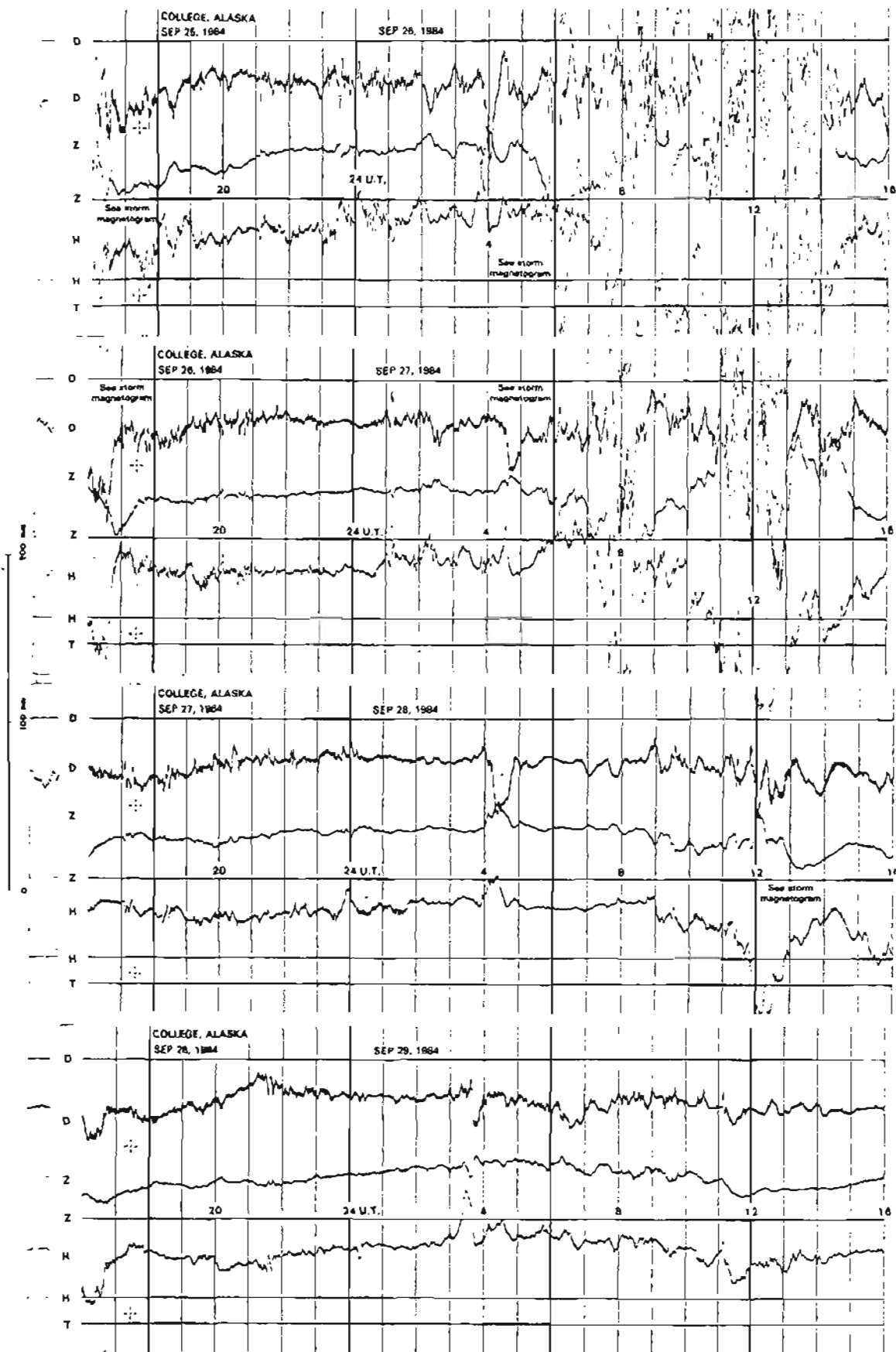
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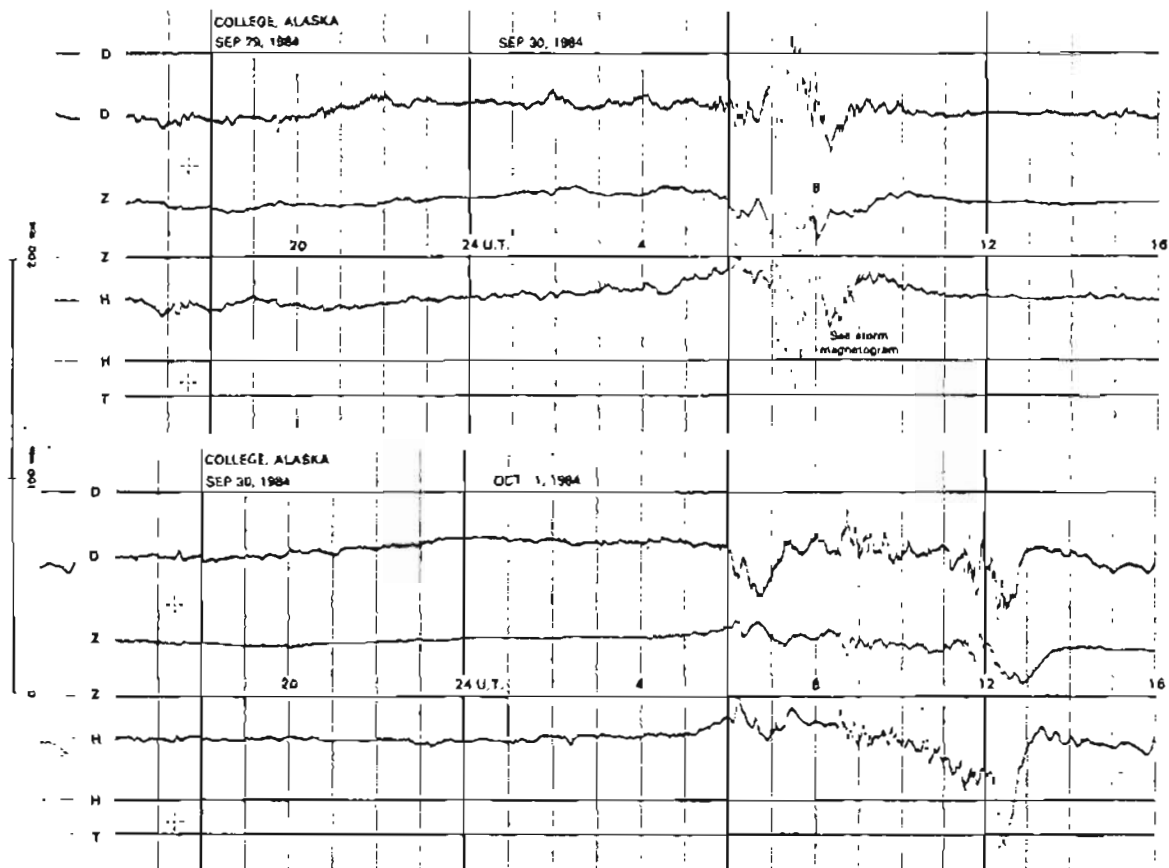
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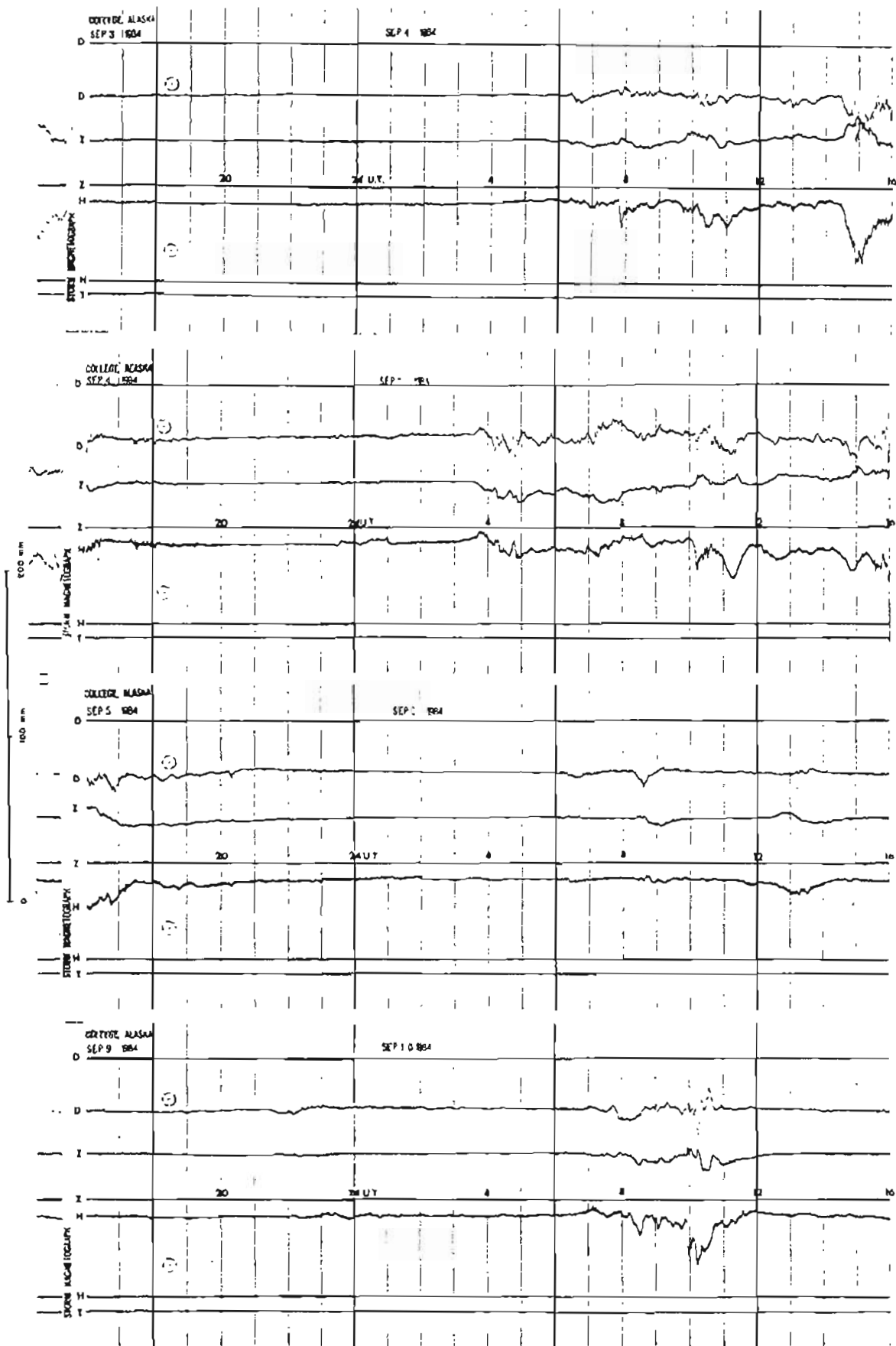
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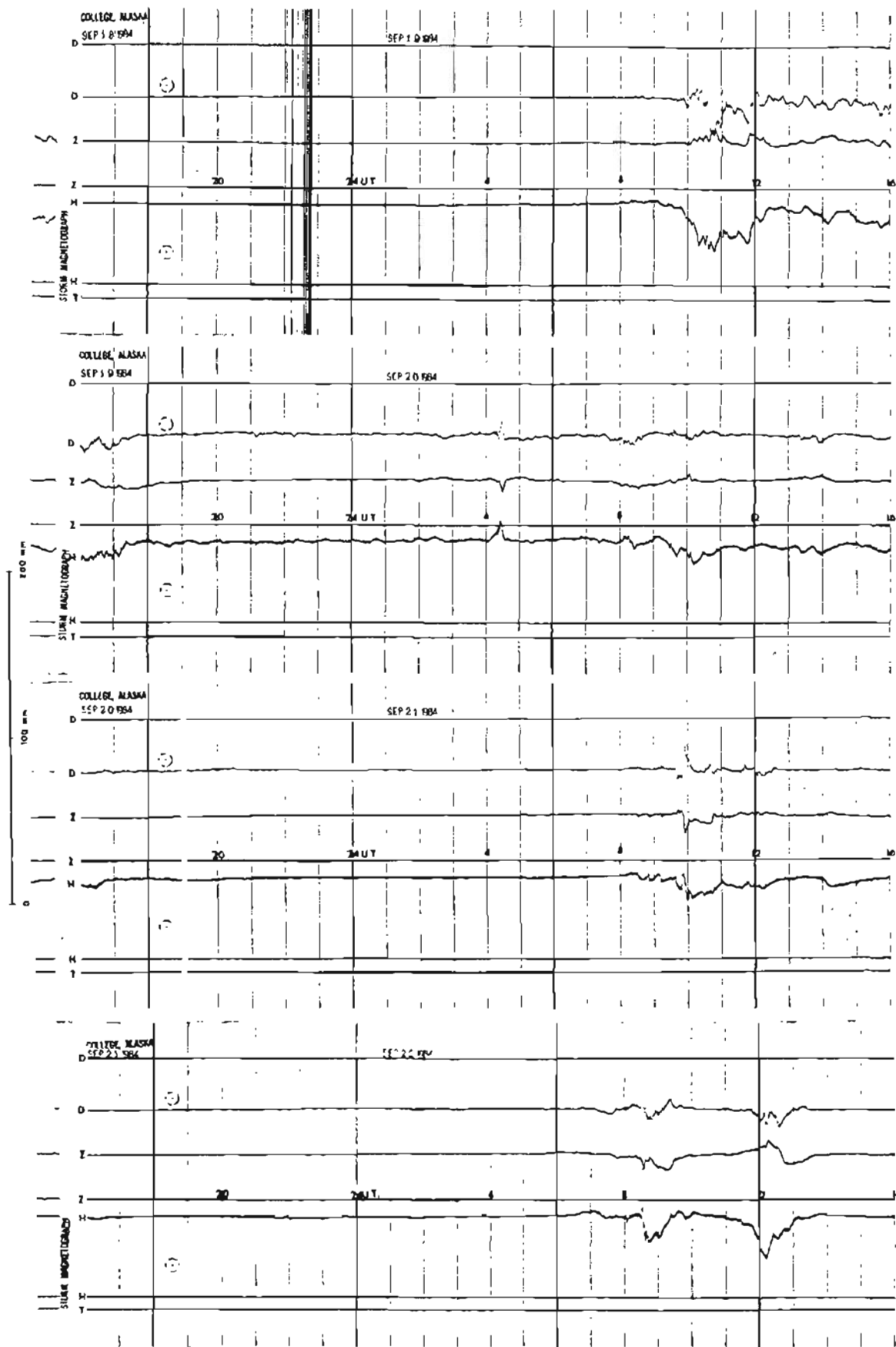
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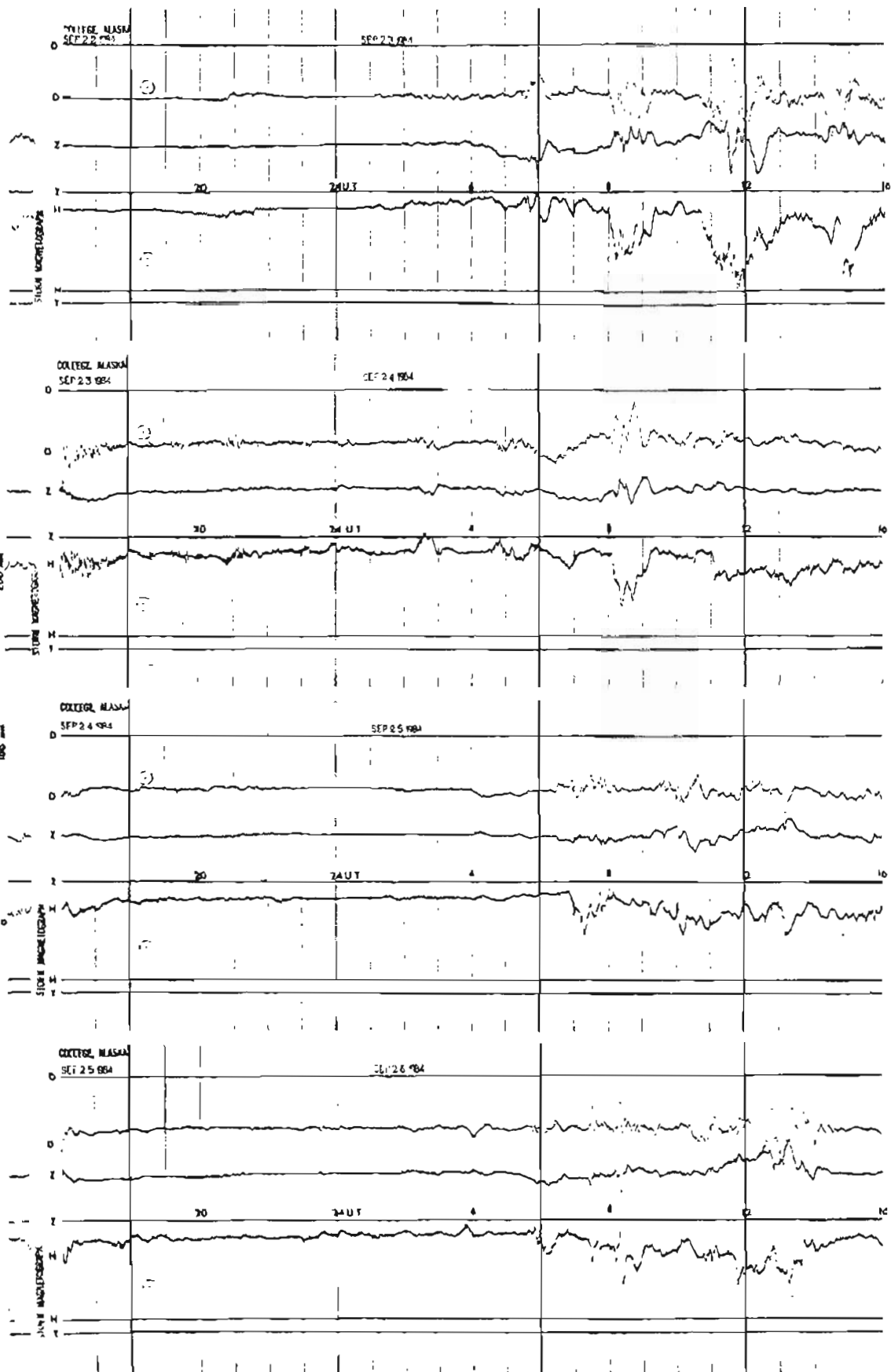
STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

