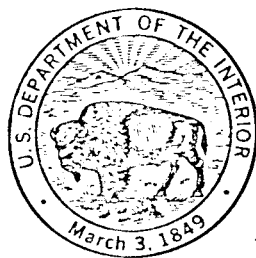


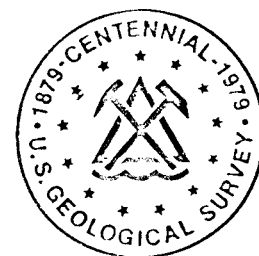
# UNITED STATES DEPARTMENT OF THE INTERIOR

ALASKAN GEOLOGY BRANCH  
TECHNICAL DATA FILE

## GEOLOGICAL SURVEY



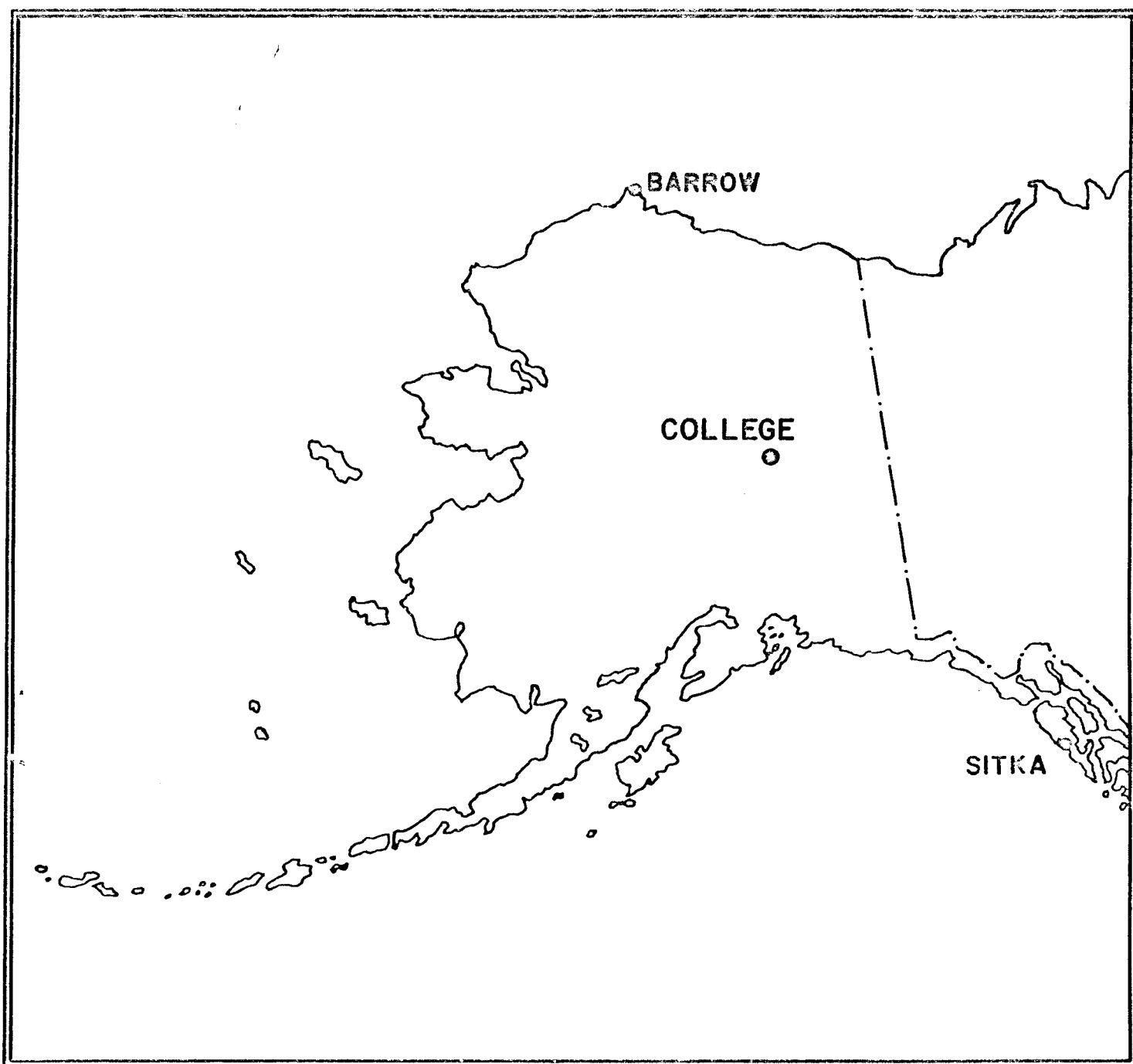
### PRELIMINARY GEOMAGNETIC DATA COLLEGE OBSERVATORY FAIRBANKS, ALASKA



DECEMBER 1979

OPEN FILE REPORT

79-300L



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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

### 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 $\gamma$  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 $\gamma$ )

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.

### 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

#### 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.

NOAA FORM 76-133 (9-72)      U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION										OBSERVATORY	
<b>MAGNETIC ACTIVITY</b> (Greenwich civil time, counted from midnight to midnight)										COLLEGE, ALASKA	
MONTH AND YEAR										DECEMBER 1979	
DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			20 mm/hr
1	0	0	3	4	4	4	2	1	18	13	SUDDEN COMMENCEMENTS d            h            m
2	1	1	3	5	3	1	0	0	14	11	
3	1	3	5	5	2	1	0	0	17	16	
4	0	3	6	5	5	6	3	2	30	37	
5	2	1	3	3	5	4	0	0	18	14	
6	1	1	1	1	0	0	0	0	04	02	
7	0	0	0	1	0	0	0	1	02	01	
8	0	1	0	3	4	4	2	1	15	10	
9	0	1	1	1	3	1	0	0	07	03	
10	0	0	1	1	3	3	1	0	09	05	
11	0	0	0	0	0	1	1	0	02	01	
12	0	0	0	2	1	1	1	0	05	02	
13	0	0	1	1	2	0	0	0	04	02	
14	0	0	0	1	0	1	1	0	03	01	
15	0	2	3	5	2	3	3	1	19	14	
16	2	2	2	3	3	4	1	1	18	11	
17	2	2	3	3	4	4	3	2	23	15	
18	1	1	1	3	4	1	1	0	12	07	
19	0	1	1	3	1	2	0	1	09	04	
20	0	1	1	3	5	4	2	0	16	13	
21	0	0	1	3	3	2	2	1	12	06	
22	0	2	2	6	3	5	5	1	24	26	
23	0	0	0	1	0	1	1	1	04	02	
24	1	0	0	5	3	5	0	0	14	14	
25	0	0	0	0	0	0	0	1	01	00	
26	0	0	0	1	3	3	3	2	12	07	
27	1	2	4	5	5	5	1	1	24	23	
28	0	1	1	6	6	5	1	3	23	29	
29	3	4	6	6	6	7	5	4	41	62	
30	3	3	6	5	4	5	2	1	29	30	
31	1	1	0	2	2	2	2	2	12	05	

K SCALE USED:	D	H	Z	
LOWER LIMIT FOR K = 9.....	683.8	321.7		(mm)
CURRENT SCALE VALUE.....	3.75	7.79		(γ/mm)
LOWER LIMIT FOR K = 9 .....	2560	2510		(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 DECEMBER	YEAR 1979
DATE	TIME U.T.	NATURE OF PHENOMENON <sup>1</sup>	REMARKS	
12	21XX	pc5		
IDENTIFIED BY: JEP			VERIFIED BY: JEP	

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  
DECEMBER 1979

WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS  
ENVIRONMENTAL DATA SERVICE, NOAA  
BOULDER, COLORADO 80302 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	3, 6	6	167	830	460	04	19
		28	10XX	..	..	..	..	29	6	7	203	1560	780	30	23

## NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 12-1-79	2400 U.T., 12-31-79	1.0/mm	3.88/mm	27° 47.2 E
H	0000 U.T., 12-1-79	2400 U.T., 12-15-79	7.88/mm		127528
	0000 U.T., 12-16-79	2400 U.T., 12-31-79	"		127468
Z	0000 U.T., 12-1-79	2400 U.T., 12-15-79	7.38/mm		551728
	0000 U.T., 12-16-79	2400 U.T., 12-31-79	"		551768

## STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 12-1-79	2400 U.T., 12-31-79	7.8/mm	29.78/mm	23° 50.1 E
H	0000 U.T., 12-1-79	2400 U.T., 12-15-79	44.08/mm		115118
	0000 U.T., 12-16-79	2400 U.T., 12-31-79	"		114948
Z	0000 U.T., 12-1-79	2400 U.T., 12-31-79	48.68/mm		540268

## RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

## MONTHLY MEAN ABSOLUTE VALUES\*

D	H	Z
28° 09.8 E	130208	553808

\* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: DEC 6, 7, 9, 11, 12, 13, 14, 19, 23, 25

## MAGNETOGRAM HOURLY SCALINGS

(UNIVERSAL TIME)

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. Storage corrections have been applied. Negative values are in red, with minus signs shown.

U. S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
OBSV. CO 79 DEC

C	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	216	216	220	220	219	212	211	210	221	320	329	346	419	451	382	339	253	209	218	237	226	220	219	216	6329
02	222	209	216	231	216	218	233	226	232	186	269	251	278	261	299	262	290	282	232	229	227	230	234	231	5764
03	220	181	182	198	191	170	141	191	261	362	229	221	249	241	226	239	251	256	242	247	251	251	251	241	5492
04	231	221	208	190	174	144	3	111	109	304	229	338	502	684	692	605	304	321	301	224	167	133	165	188	6548
05	176	171	184	199	201	213	211	189	217	197	226	247	247	283	277	351	311	250	261	239	209	221	223	219	5522
06	190	204	200	200	218	219	214	211	220	253	239	241	239	237	241	239	239	242	251	256	250	231	231	224	5489
07	216	201	200	211	211	214	220	221	221	231	231	232	230	231	236	241	249	251	263	260	263	246	238	219	5536
08	205	200	195	188	187	194	188	207	218	228	242	247	297	355	403	314	268	260	231	270	214	239	211	186	5767
09	189	204	201	199	203	208	207	219	238	240	231	230	249	229	221	231	248	249	257	261	276	256	248	220	5514
10	218	214	211	211	211	227	209	210	221	231	211	219	231	252	271	373	331	291	246	241	242	249	240	229	5789
11	221	219	210	207	208	211	210	217	218	218	218	220	230	233	231	243	260	261	259	218	241	248	238	221	5460
12	201	197	197	191	199	118	224	219	219	210	237	251	249	237	239	231	249	250	261	261	241	240	229	221	5371
13	210	211	208	208	211	204	218	199	221	230	230	239	334	302	257	242	251	261	271	271	244	243	221	211	5697
14	201	211	216	211	210	220	221	217	217	217	231	227	228	228	229	240	247	253	250	241	249	258	239	221	5482
15	213	212	211	199	164	210	217	199	213	269	258	229	230	239	242	243	258	269	188	190	187	249	241	229	5359
16	230	211	203	199	187	141	218	221	230	223	241	238	216	271	328	347	261	247	242	247	234	236	231	321	5805
17	188	202	208	211	194	199	201	264	231	231	225	229	259	282	378	359	208	269	227	237	247	236	203	294	5782
18	206	189	211	221	219	219	216	211	211	221	269	261	248	269	230	239	261	250	241	246	248	221	211	210	5528
19	217	213	219	200	182	211	218	230	229	201	180	242	221	231	228	231	221	262	251	253	241	229	215	210	5335
20	209	215	220	221	219	211	211	200	219	209	251	262	300	309	316	282	260	259	210	199	208	219	210	221	5640
21	223	216	218	219	220	220	227	221	220	199	191	247	292	310	328	327	341	297	328	271	196	177	139	142	5769
22	183	201	213	220	201	230	200	267	271	337	440	238	242	258	189	296	270	267	373	220	240	219	209	211	5995
23	217	219	221	218	226	227	229	221	220	220	237	228	221	228	230	233	240	242	249	249	247	240	229	221	5512
24	209	221	219	219	214	213	227	237	228	231	271	258	319	349	401	423	339	242	250	241	228	200	189	192	6120
25	197	211	219	219	220	221	221	220	220	221	229	231	231	231	233	238	240	242	248	247	238	223	222	211	5433
26	199	193	203	193	213	218	211	210	217	223	230	241	268	251	238	248	291	331	289	254	223	158	179	178	5459
27	184	188	199	211	169	197	215	245	168	129	131	245	270	361	452	439	329	205	250	239	237	236	219	217	5735
28	219	209	209	204	217	200	229	229	221	251	197	463	360	199	263	397	179	237	241	243	251	231	258	174	5881
29	148	149	181	171	248	111	168	231	281	455	249	232	288	486	549	106	121	185	281	231	32	81	162	162	5308
30	161	204	199	201	249	171	202	82	265	109	226	217	431	506	331	307	181	251	247	251	229	229	217	211	5677
31	211	214	219	218	218	220	224	220	217	229	217	241	240	232	230	239	250	247	262	229	229	247	210	174	5437

Preliminary baseline and scale values:

Scale Value  
Base-line Value

( ) Interpolated

( ) Significant portion of hour interpolated.

☐ No records or no values available because of faulty record.

\* Derived from Shortm

( ) Scaling uncertain because of magnetic storm.

&lt; &gt; Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.

\* Derived from Normal Maph.

SPT, EAS

JEP, SPT, EAS

JEP

CHECKED BY

SIGNED BY

PUNCHED BY

MONTHLY SUM

MONTHLY MEAN

DATES WITH GAPS:



## MAGNETOGRAM HOURLY SCALINGS

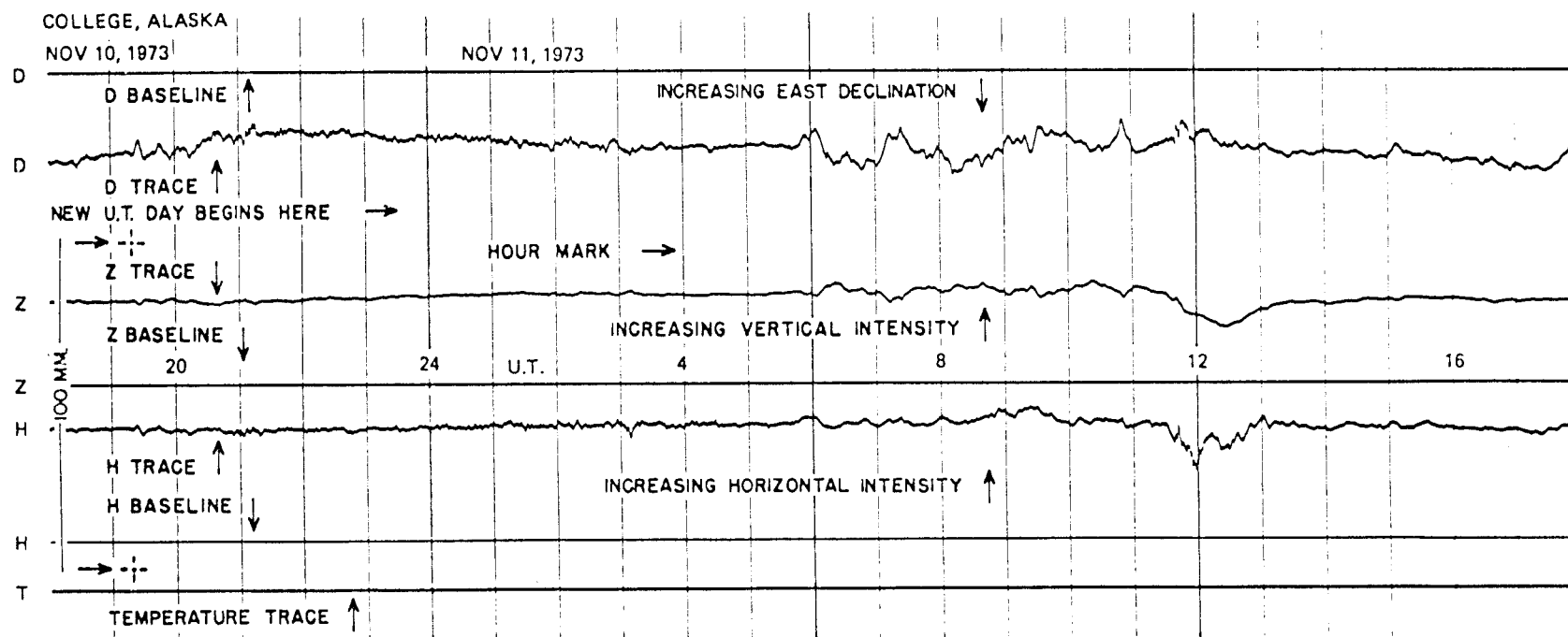
(UNIVERSAL TIME)

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (250W M.T.) is hour 11 of the same universal day.  
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		OBSY.		YEAR		MONTH		E.L.T.- MENT																				
		00		79		DEC		II																				
C	Q <sub>24</sub> S	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	332	331	337	340	341	336	332	330	237	183	144	141	01	-24	59	109	314	278	207	349	354	350	329	333	336	6372
		02	332	337	331	367	371	349	350	416	371	-15*	5	311	02	299	240	299	349	339	329	353	341	349	339	329	7443	
		03	330	341	369	371	403	481	539	438	259	41	306	349	03	310	289	266	331	348	348	341	333	334	330	329	8109	
		04	321	323	320	323	360	367	278*	397	250*	51*	121	34	04	-151	-164	-242*	-254*	-95*	173	294	326	271	276	301	4171	
		05	346	369	364	361	367	351	361	421	409	439	389	329	05	303	180	-30	205	294	351	341	329	322	330	329	7804	
		06	330	320	330	351	347	341	343	349	349	359	347	337	06	339	341	341	343	339	331	330	329	324	321	326	8108	
		07	329	337	342	340	348	358	351	351	349	350	339	354	07	351	351	351	350	350	347	346	342	332	331	332	8282	
		08	338	347	357	361	358	372	368	370	372	362	352	333	08	197	50	76	242	291	257	339	349	328	321	319	309	7368
		09	335	349	349	353	369	369	371	361	379	369	359	349	09	311	198	301	351	350	351	349	340	336	331	329	324	8183
		10	331	336	344	354	359	361	373	368	364	362	361	358	10	356	329	249	191	307	336	339	353	350	340	329	330	8080
		11	330	329	341	353	359	364	365	361	362	359	356	351	11	352	351	351	351	339	339	341	349	341	335	326	8336	
		12	332	341	351	354	350	354	360	361	366	365	337	349	12	349	350	344	341	349	350	353	351	339	339	329	8345	
		13	334	339	350	359	358	354	356	371	361	361	359	357	13	329	347	353	364	360	361	360	351	341	345	341	8452	
		14	341	346	351	351	352	361	359	359	353	354	356	359	14	356	359	360	360	364	359	350	354	351	349	340	8480	
		15	336	339	340	356	351	356	351	350	279	194	311	364	15	309	294	331	351	344	238	264	311	349	350	336	7721	
		16	329	331	360	390	389	434	398	367	349	339	316	237	16	141	251	170	241	363	359	370	356	344	329	321	7853	
		17	309	361	367	369	369	379	429	459	403	401	368	351	17	221	131	149	144	298	269	349	353	359	350	301	7803	
		18	339	349	361	361	351	358	357	357	361	352	341	291	18	213	189	300	358	350	353	359	360	347	331	329	334	8005
		19	339	350	359	361	369	366	372	364	361	364	279	291	19	356	349	344	291	324	340	341	350	346	312	330	8193	
		20	345	345	346	348	355	360	359	349	343	333	314	287	20	234	265	109	139	272	300	314	315	329	340	341	7379	
		21	347	349	350	354	358	359	359	359	368	351	354	309	21	320	284	270	279	294	299	299	351	340	334	336	7964	
		22	349	360	370	371	398	383	366	350	349	100	-184*	348	22	353	301	245	251	229	-121*	167	349	377	364	359	356	6790
		23	349	353	358	359	357	355	351	350	351	349	352	354	23	351	355	357	357	357	355	359	359	354	350	349	349	8490
		24	350	343	361	357	359	356	350	360	359	349	280	90	24	233	169	183	149	139	390	381	370	361	348	340	349	7326
		25	351	359	361	361	363	361	360	359	356	354	356	359	25	363	369	369	371	371	369	364	362	361	360	350	350	8659
		26	356	363	367	371	373	373	371	370	363	369	369	351	26	313	377	370	363	310	289	360	349	307	326	336	341	8437
		27	350	359	361	371	398	366	379	409	408	401	351	77	27	187	144	36	-8	93	371	381	351	349	347	347	344	7172
		28	345	349	354	358	350	379	376	370	360	366	313	212*	28	-111*	384	361	161	159	366	376	369	347	320	311	376	7127
		29	387	374	371	483	426	590	601	441	162	-88*	168	353	29	229	-234*	-341*	-394*	-99*	37*	169	94	241	260	308	356	4694
		30	428	419	419	441	434	489	439	309*	219*	304	99*	9	30	17	13	200	36	171	351	361	381	370	356	347	347	6959
		31	347	347	350	355	367	366	351	357	358	351	339	341	31	336	351	353	351	341	313	303	324	341	301	297	300	8140
SCALED BY																									MONTHLY SUM		236245	
CHECKED BY																									MONTHLY MEAN		318	
SIGNATURE																									MONTHLY DATES WITH GAPS:			
VIEWED BY																												
PUNCHED BY																												

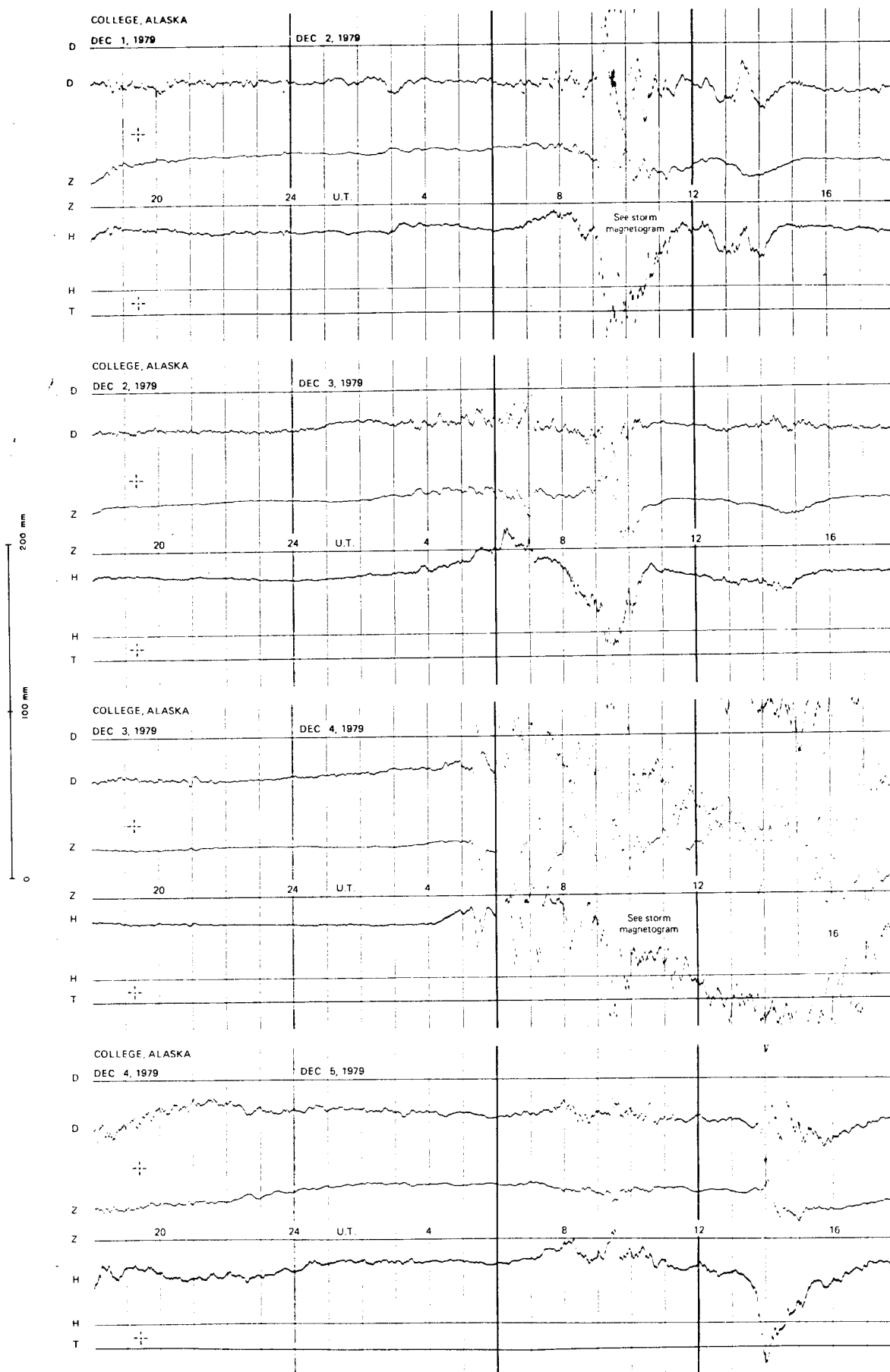


# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

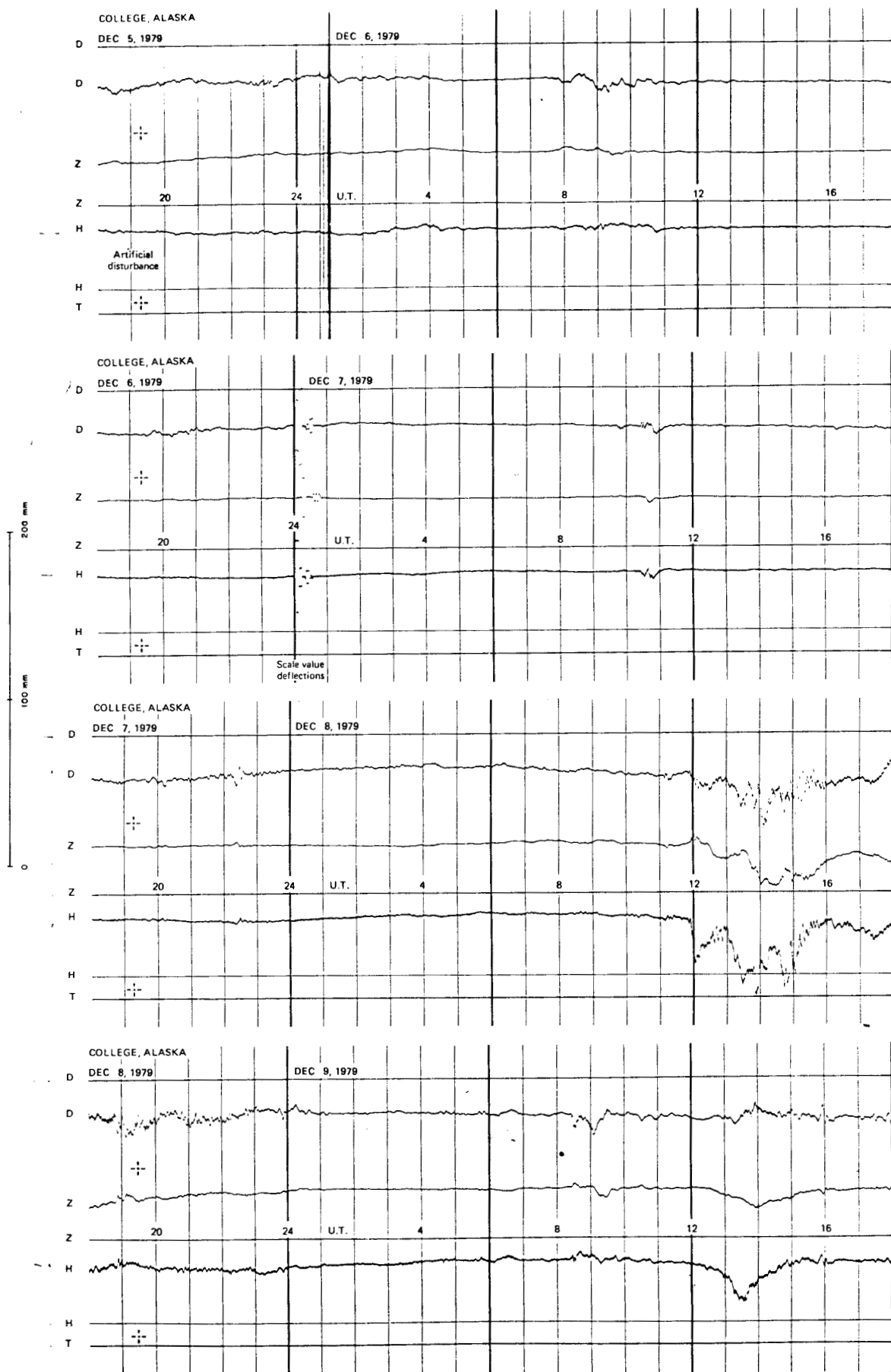


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

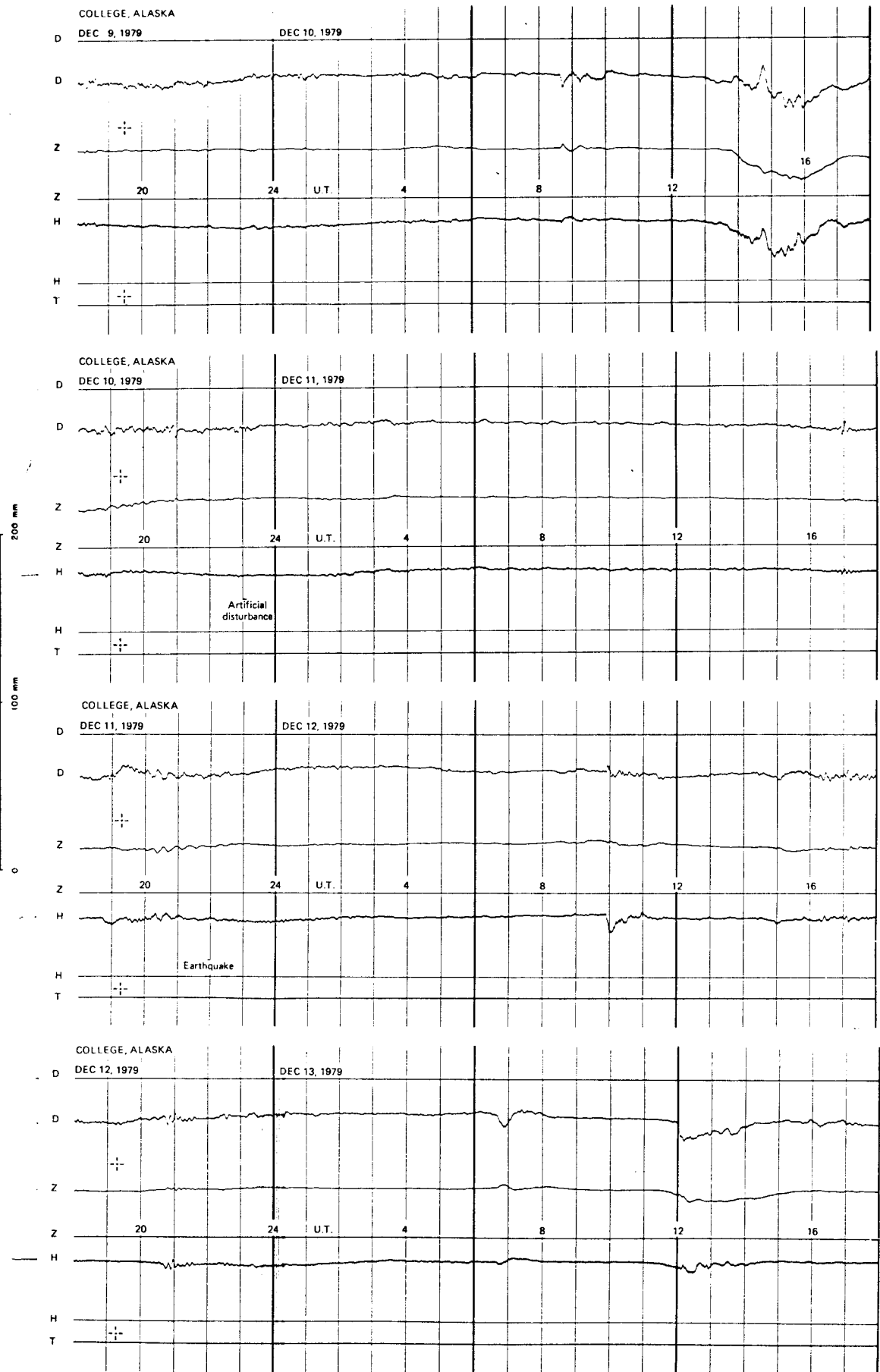
# NORMAL MAGNETOGRAMS



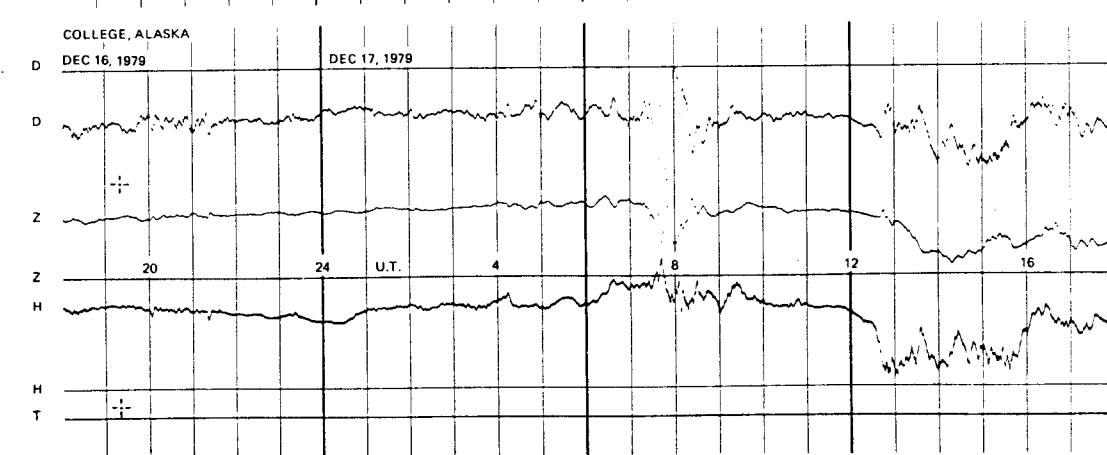
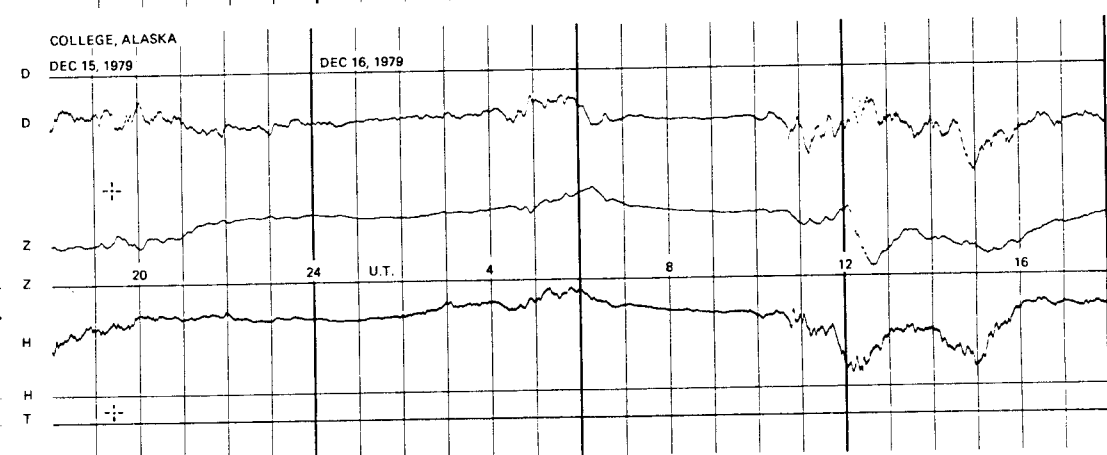
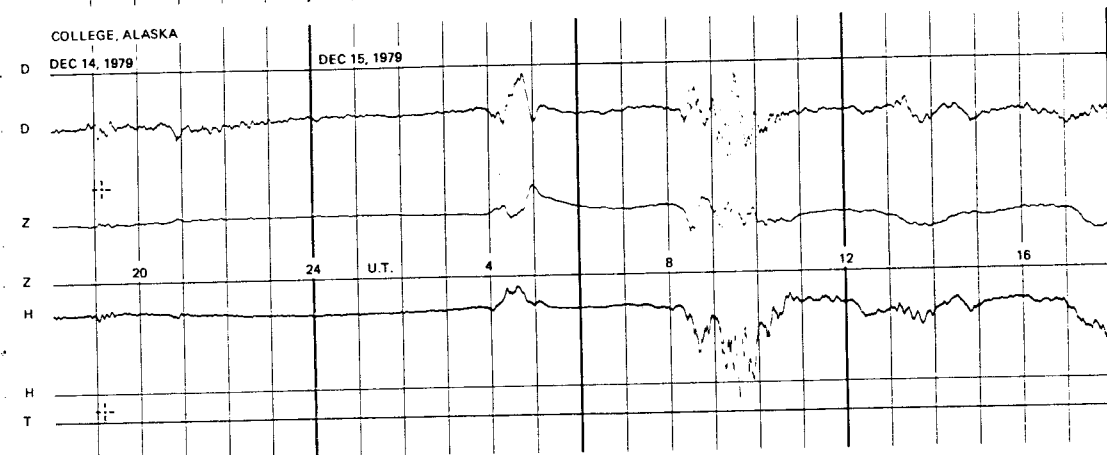
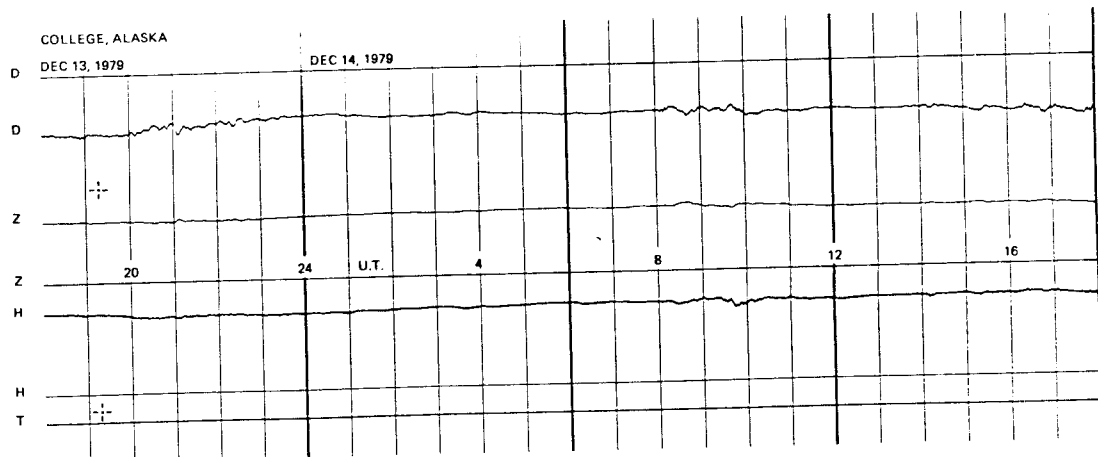
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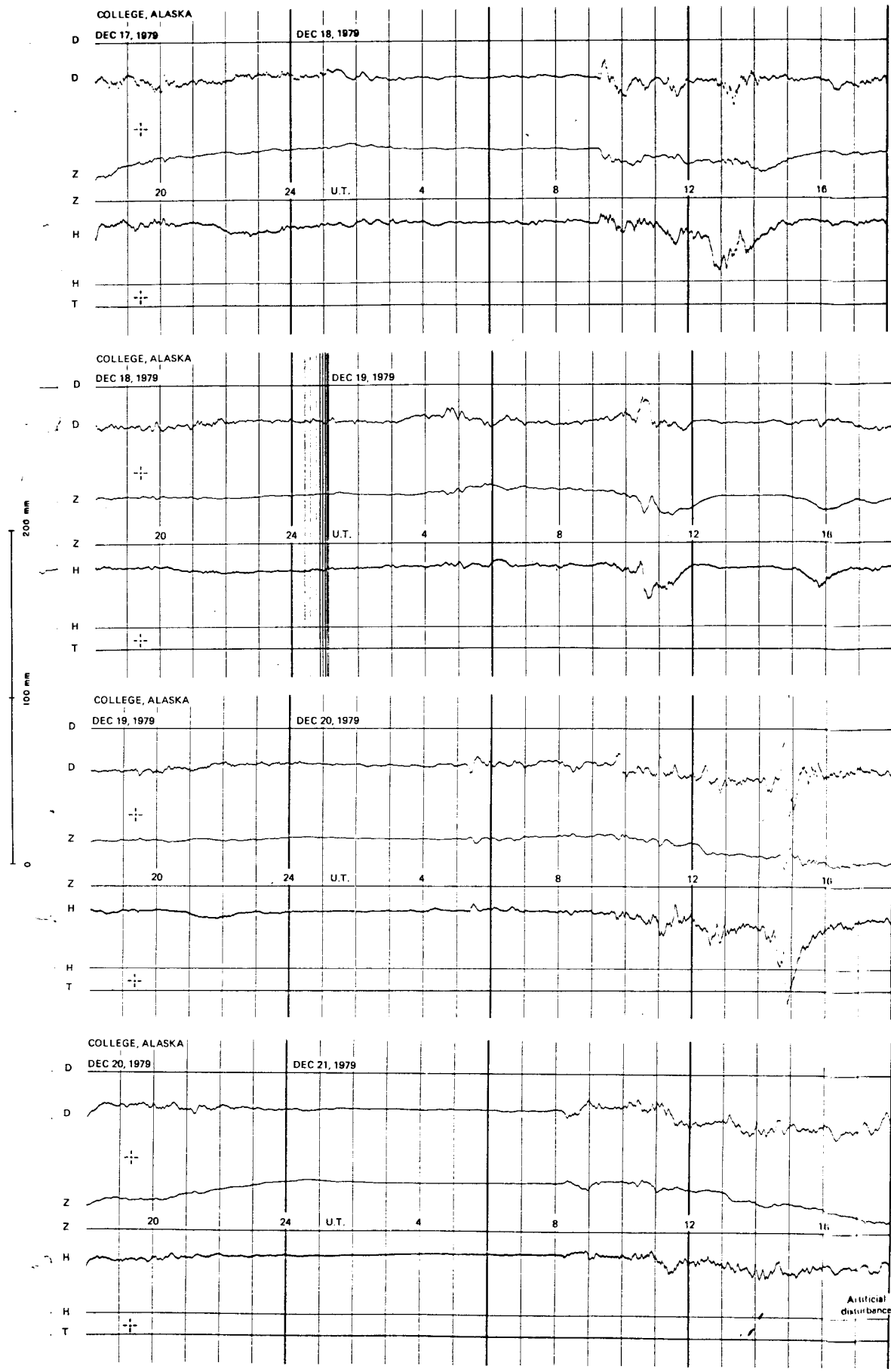
# NORMAL MAGNETOGRAMS



# NORMAL MAGNETOGRAMS

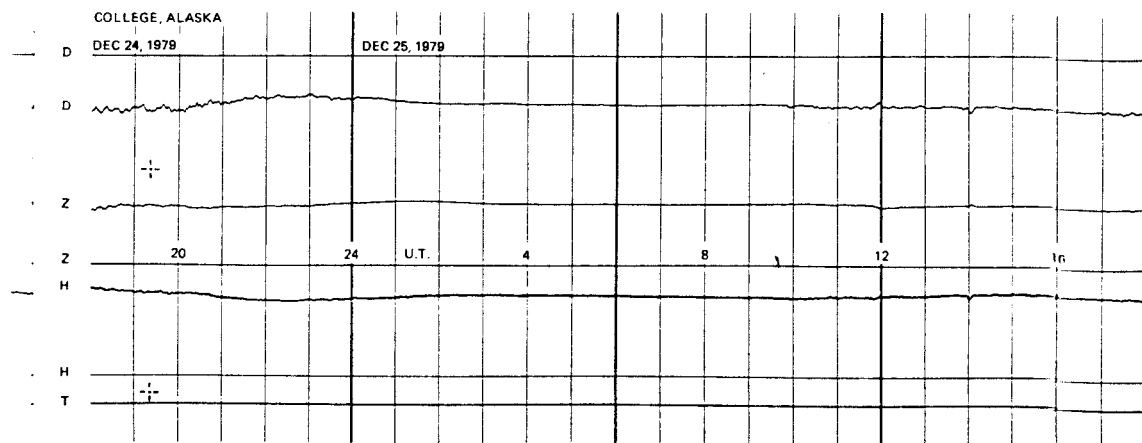
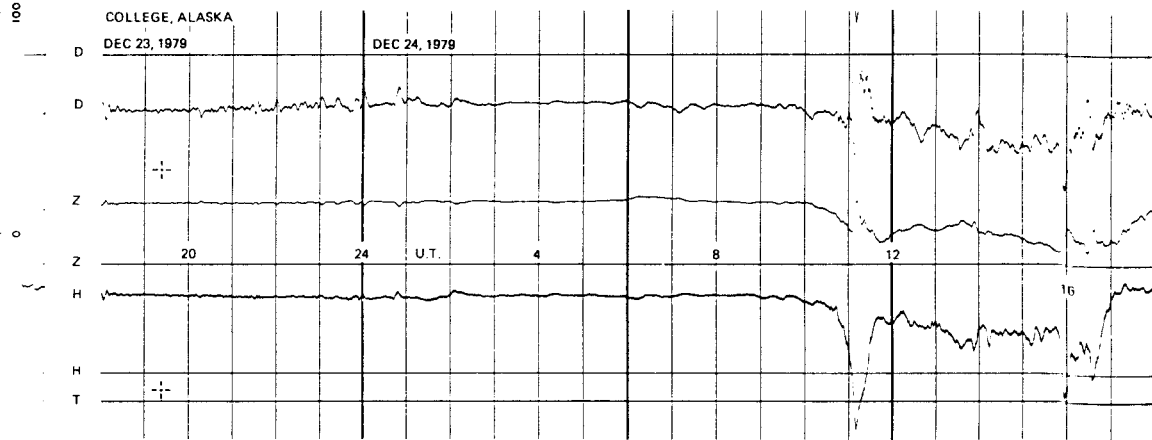
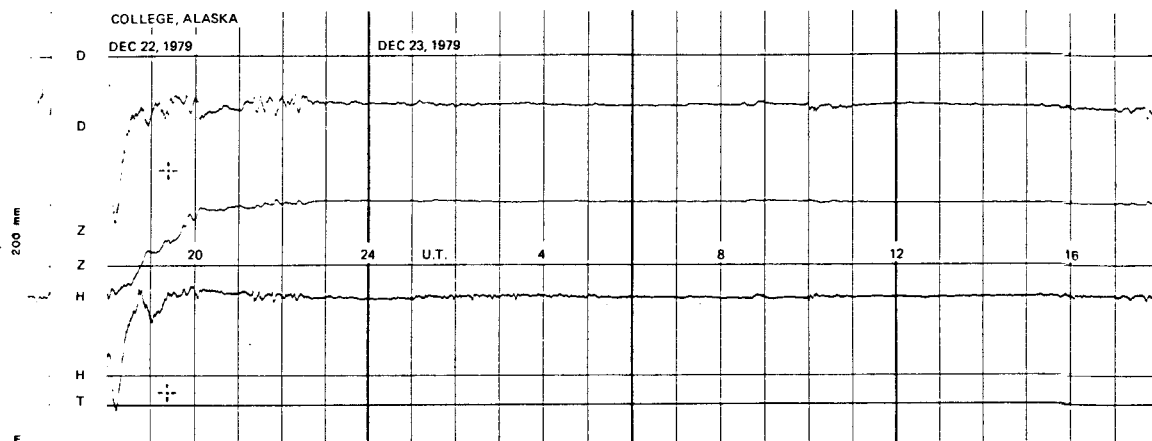
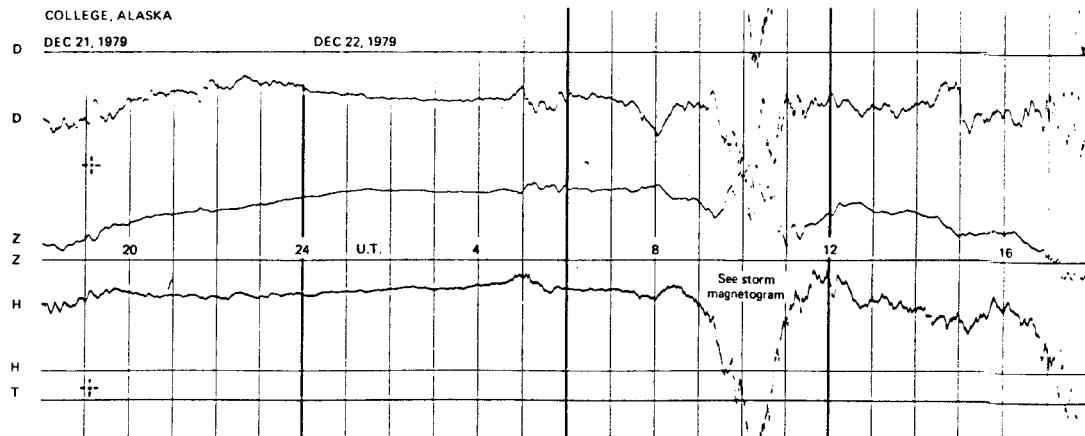


NORMAL MAGNETOGRAMS



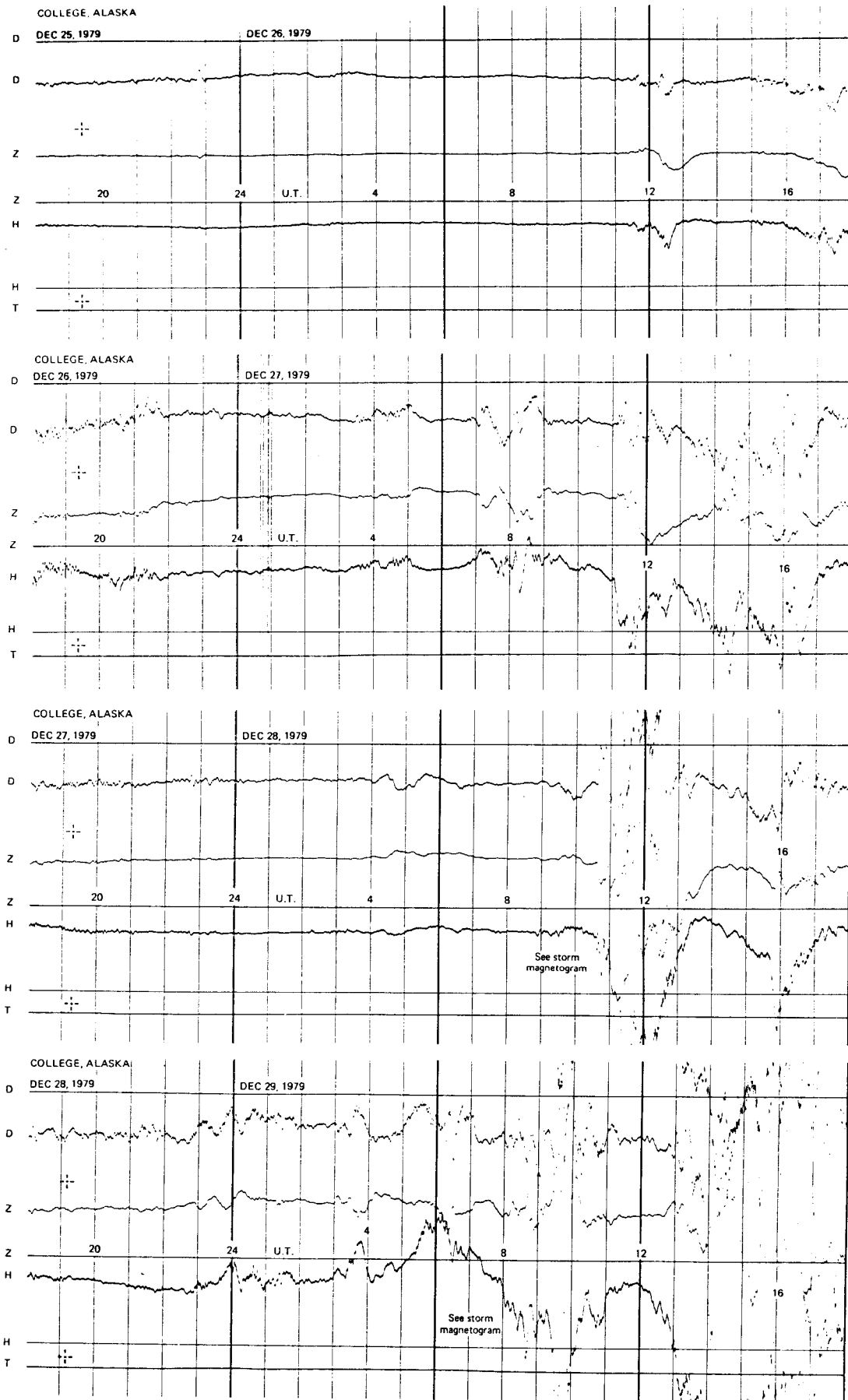


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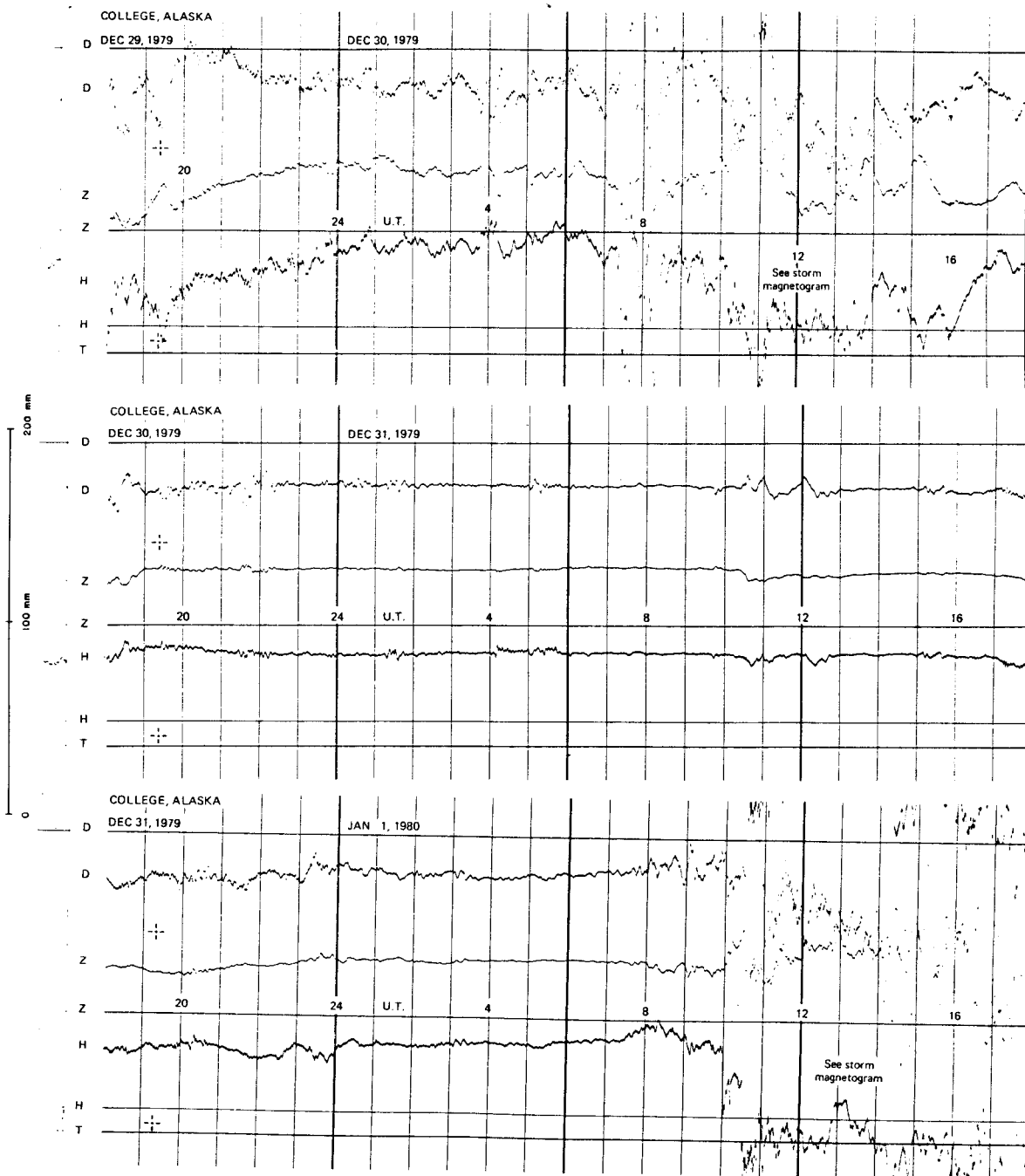


# NORMAL MAGNETOGRAMS

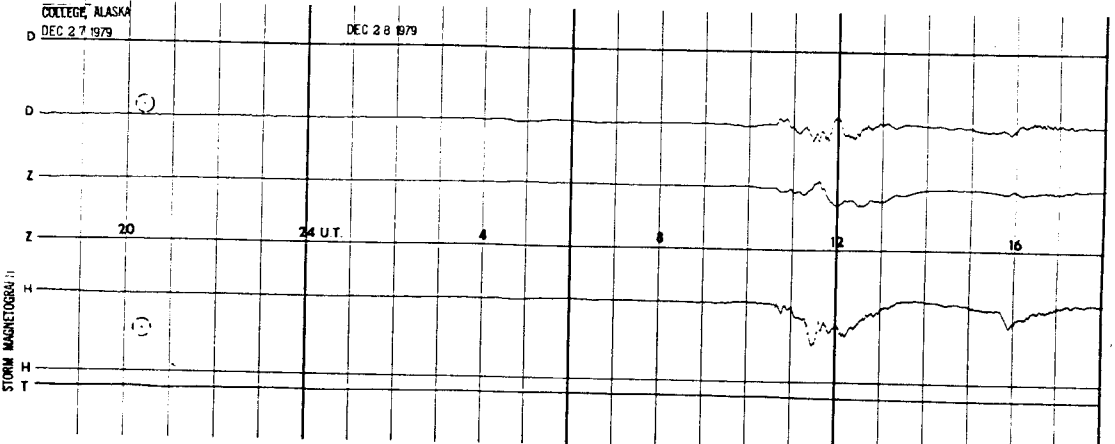
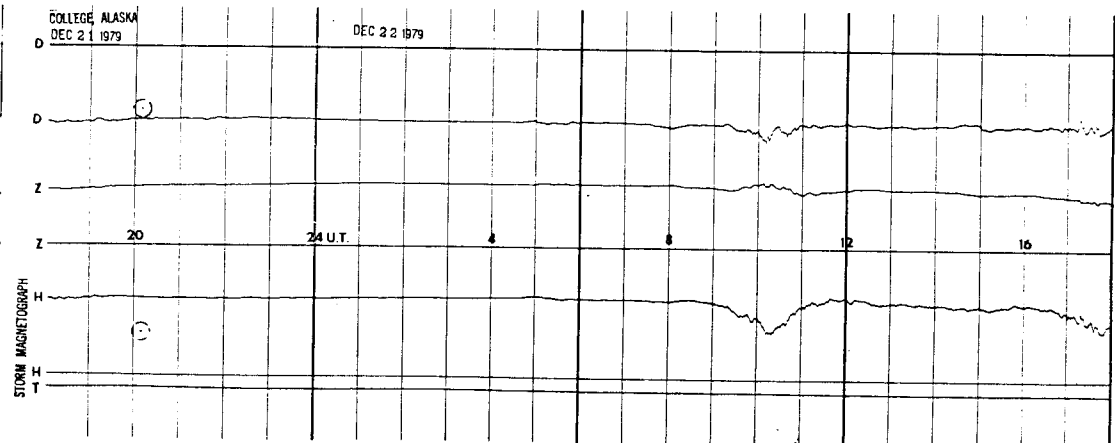
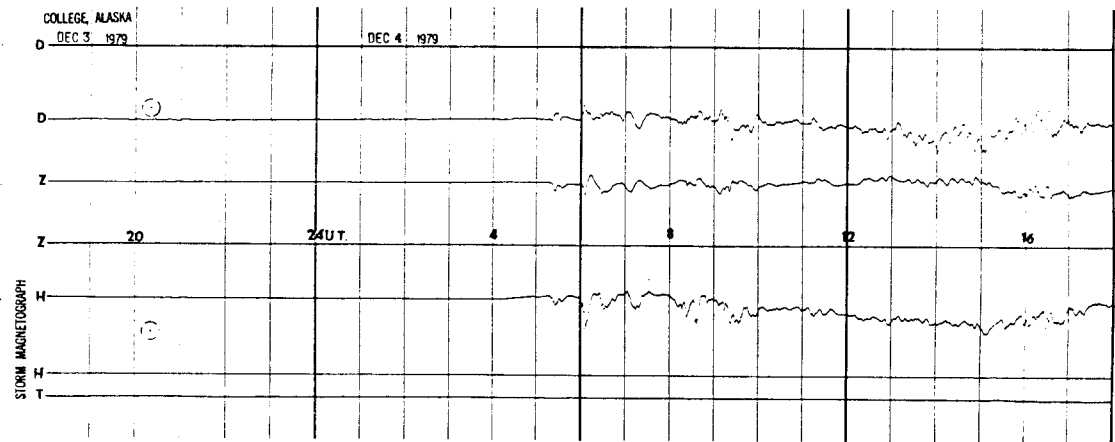
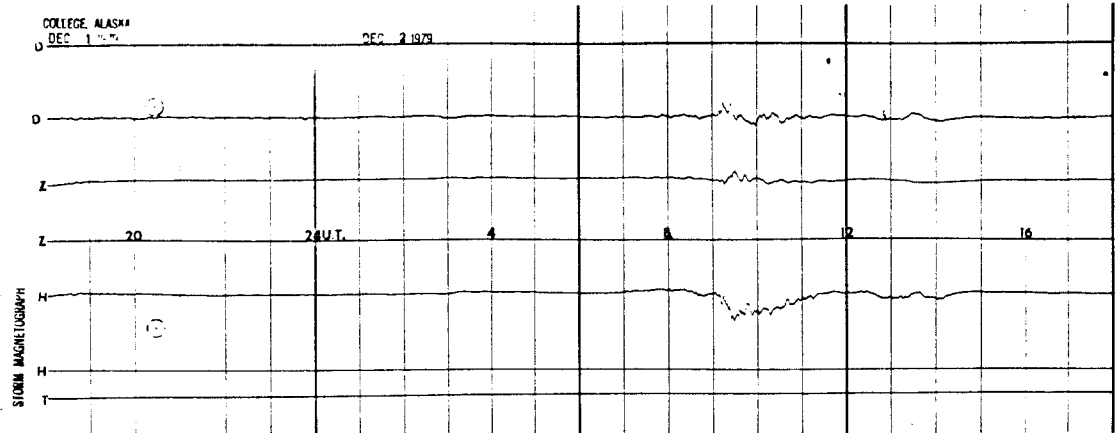
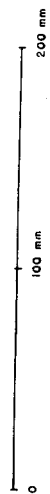
200 mm  
100 mm



# NORMAL MAGNETOGRAMS



# STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS

200 mm  
100 mm  
0

