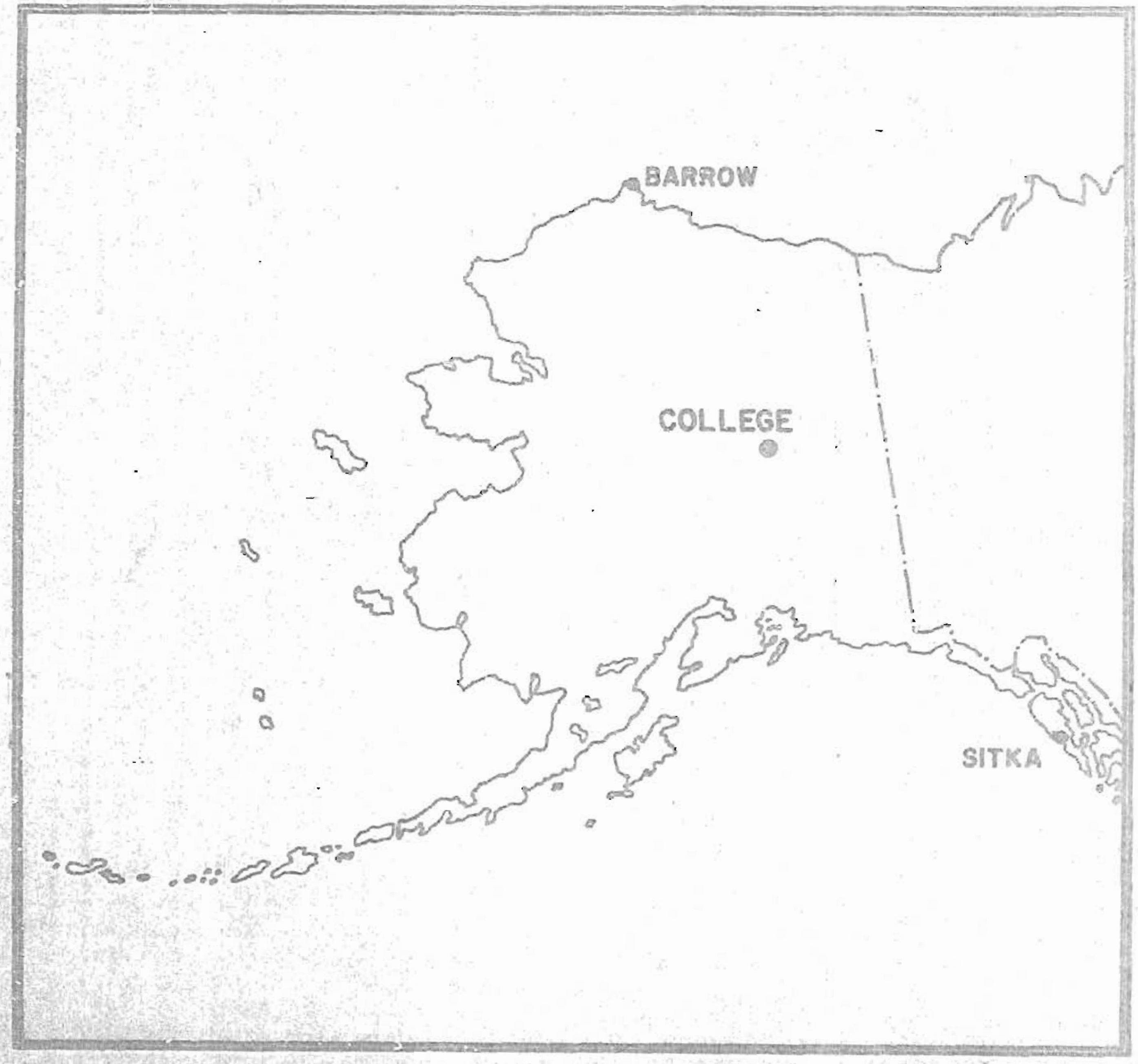
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

APRIL 1979

OPEN FILE REPORT 79-300D


BARROW
COLLEGE
SITKA

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Normal Magnetograms

Storm Magnetograms (When Normal is too disturbed to read)

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, 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 (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 "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

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

OBSERVATORY: COLLEGE, ALASKA

MONTH AND YEAR: APRIL 1979

TIME SCALE ON MAGNETOGRAMS: 20 mm/hr

DATE	K-INDICES 00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	AK
1	4	4	3	6	5	5	3	4	34	36
2	5	4	4	5	5	6	3	3	35	39
3	2	2	3	2	1	8	7	6	32	62
4	5	5	7	7	7	3	2	2	38	68
5	4	3	4	5	5	5	4	2	32	31
6	4	2	4	2	2	5	2	2	23	17
7	2	2	3	4	1	2	2	2	18	10
8	3	2	2	4	3	2	2	3	21	13
9	3	3	0	1	1	1	1	2	12	06
10	1	2	3	4	4	4	2	2	22	15
11	1	1	1	2	3	3	1	1	13	07
12	2	2	2	4	2	3	2	2	19	11
13	2	2	4	3	5	3	2	2	23	17
14	2	2	1	3	1	3	3	3	18	10
15	4	3	1	4	4	5	3	3	27	22
16	4	4	3	4	3	2	2	1	23	16
17	2	3	3	6	4	1	2	2	23	20
18	2	1	2	4	0	1	1	2	13	07
19	1	2	2	0	0	4	1	0	10	06
20	0	0	0	0	0	0	1	0	01	00
21	1	1	2	3	5	4	4	5	25	22
22	4	5	4	6	5	6	5	4	39	48
23	4	4	4	6	4	5	2	3	32	32
24	3	3	3	5	4	3	1	4	26	21
25	6	6	7	7	6	5	4	4	45	78
26	3	2	1	2	1	2	3	2	16	08
27	3	4	4	5	4	6	6	5	37	44
28	4	4	5	4	5	5	2	3	32	31
29	4	7	6	5	5	6	4	4	41	60
30	4	4	6	6	6	3	2	2	33	40
31										

SUDDEN COMMENCEMENTS

d	h	m

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.........	683.8	321.7		(mm)
CURRENT SCALE VALUE.........	3.75	7.80		(γ/mm)
LOWER LIMIT FOR K = 9	2560	2510		(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN B. TOWNSHEND, CHIEF, COLLEGE OBSERVATORY
OBSERVER IN CHARGE

☆ U.S. GOVERNMENT PRINTING OFFICE: 1973-751-587

OUTSTANDING MAGNETIC EFFECTS	OBSERVATORY COLLEGE, ALASKA	
	MONTH APRIL	YEAR 1979

DATE	TIME U.T.	NATURE OF PHENOMENON[1]	REMARKS
01	2150	si*	
05	0156	ssc*	
24	2358	ssc*	
26	13XX	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.

NOAA FORM 86-500
(11/73)

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

PRINCIPAL MAGNETIC STORMS

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

APRIL 1979

Obs. 2 letter IAGA code	Geomag.	Commencement			SC - amplitudes			Max. 3 hr - index K			Ranges			UT End	
	lat.	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	03	15XX	..	..	..	..	03	6	8	543	2170	1320	04	13
		05	0156	s.c.*	-26	+327	...	05	4, 5, 6	5	99	700	320	06	10
		21	07XX	..	..	..	..	22 23	4, 6 4	6 6	116	1150	660	23	21
		24	2358	s.c.*	-17	+319	+51	25	3, 4	7	379	2110	1420	26	02
		27	15XX	..	..	..	..	29	2	7	252	1440	640	30	15

COLLEGE OBSERVATORY, COLLEGE, ALASKA -- PRELIMINARY CALIBRATION DATA FOR: APRIL 1979

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 4-1-79	2400 U.T., 4-30-79	1.'0/mm	3.8 γ/mm	27° 47.'4 E
H	0000 U.T., 4-1-79	2400 U.T., 4-30-79	7.8 γ/mm		12755 γ
Z	0000 U.T., 4-1-79	2400 U.T., 4-30-79	7.3 γ/mm		55174 γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T. 4-1-79	2400 U.T. 4-30-79	7.'8/mm	29.7 γ/mm	23° 49.'1 E
H	0000 U.T., 4-1-79	2400 U.T. 4-30-79	44.0 γ/mm		11505 γ
Z	0000 U.T. 4-1-79	2400 U.T. 4-30-79	48.6 γ/mm		54022 γ

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION
	FROM	TO	SCALE VALUE
D			
H			
Z			

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
28° 12.'2 E	[illegible]025 γ	55387 γ

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: APR 7, 8, 9, 11, 12, 14, 18, 19, 20, 26

NOAA FORM 76-106

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

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 (150W M.T.) is hour 11 of the same universal day.
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

OBSY.	YEAR	MONTH	ELEMENT
CO	79	APR	D

C	Q m S	Ten D	Day	01	02	03	04	05	06	07	08	09	10	11	12	Day	13	14	15	16	17	18	19	20	21	22	23	24	SUM
			01	174	164	71	169	218	230	218	161	218	149	144	378*	01	401*	417*	299	499	377	312	321	319	351	354	389	191	6524
			02	179	292	171	179	119	131	179	232	222	93	221	196	02	363	552*	457*	489*	520*	417*	289	377	320	269	260	189	6716
			03	151	143	140	141	211	202	176	201	203	231	211	208	03	246	269	272	271	370*	749*	584*	805*	552*	242	594	611*	7645
			04	510	237	219	129	189	77*	-74*	-42*	-153*	68	152	188*	04	394*	262	318	342	322	349	321	302	304	279	299	230	5242
			05	204	189	179	198	174	221	209	147	83	15	42	238	05	231	244	313	386*	356	486	372	302	272	240	216	209	5526
			06	198	179	181	203	224	246	181	251	203	206	219	235	06	251	242	248	289	303	271	311	291	276	242	239	239	5728
			07	219	228	209	211	220	219	201	209	251	294	239	151	07	239	242	276	301	341	371	331	306	309	311	301	272	6251
			08	246	212	212	188	197	227	225	201	200	198	229	251	08	259	242	288	318	357	400	378	334	324	288	199	218	6191
			09	164	173	148	162	211	231	229	232	226	231	239	249	09	256	274	294	308	301	329	325	294	269	261	243	228	5877
			10	208	191	188	193	190	232	187	191	182	199	261	239	10	298	349	419	407	388	344	339	282	252	213	182	213	6147
			11	211	200	198	191	207	213	221	231	234	243	239	282	11	278	250	244	261	299	370	342	318	299	288	253	222	6094
			12	197	180	169	200	198	176	229	208	202	221	279	294	12	250	261	258	289	307	309	321	311	260	251	262	159	5791
			13	161	188	201	220	230	230	225	244	191	251	223	229	13	266	461*	240	289	291	294	290	294	307	279	223	212	6039
			14	212	200	200	228	231	239	242	230	238	239	254	266	14	261	248	269	293	393	362	328	291	311	379	192	164	6270
			15	148	171	160	232	245	240	242	248	241	270	262	240	15	221	259	259	261	312	332	331	320	312	258	201	177	5950
			16	178	157	158	151	268	277	240	226	271	187	250	218	16	240	243	251	259	290	302	288	281	288	269	259	237	5796
			17	211	193	198	179	213	225	411	289	247	232	251	298	17	168	251	281	297	318	311	321	294	262	272	259	216	6197
			18	201	200	189	200	212	269	242	221	239	350	271	238	18	237	249	254	289	311	317	309	290	261	274	248	219	6090
			19	216	204	206	170	231	222	249	218	222	211	219	235	19	248	251	248	251	279	344	329	326	303	271	239	231	5923
			20	222	211	203	208	216	229	232	239	249	241	247	247	20	251	262	281	292	298	297	306	311	280	249	229	216	6016
			21	197	197	200	188	209	209	201	239	232	202	216	220	21	249	463	408	546*	499*	602*	534	329	318	217	94	81	6850
			22	210	183	154	103	15	230	169	159	8	129	175*	309*	22	219	268	359	436*	587*	484*	543	319	214	127	191	156	5752
			23	197	168	122	159	201	247	189	202	199	173	157	306	23	321	279	304	327	364	322	311	241	251	201	191	192	5644
			24	192	150	118	117	152	188	218	307	241	222	197	96	24	209	268	308	344	311	369	342	320	251	219	177	138	5454
			25	138	163	254*	159*	-7*	-665*	-254*	-103*	56*	-31*	135*	1045*	25	127*	175*	476*	333*	594*	682*	251	191	176	238	151	171	4455
			26	158	116	138	162	190	208	221	229	241	222	238	231	26	241	251	271	309	342	361	370	301	332	229	168	178	5707
			27	176	172	128	210	206	171	230	191	176	71	141	179	27	239	241	319	391	412*	634*	381*	417	298	182	169	240	5974
			28	206	167	181	159	199	79	316	38	42	95	133	216	28	225	299	302	439	363	373	340	298	301	289	248	112	5420
			29	62	122	168	123	9	80*	-221*	112	19	265	234	180	29	255	321	571*	682*	602*	361	362	251	281	322	289	222	5672
			30	181	139	136	171	121	152	129	251	189	159*	206*	202	30	248	222*	133	292	351	384	371	319	292	307	247	241	5443
			31													31													

SCALED BY	SPT
CHECKED BY	JEP, EAS
SIGNS RE-VIEWED BY	JEP
PUNCHED BY	

Preliminary base-line and scale values:

Interval Beginning	Base-line Value	Scale Value

( ) Interpolated

[ ] Significant portion of hour interpolated.

[ ] No record; 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 Storm Mag., converted to Normal Mag.

MONTHLY SUM	178584
MONTHLY MEAN	248
DATES WITH GAPS:	

7

U.S. G.P.O. 1973-769-371/232 REG. #6

NOAA FORM 76-106
(5-72)

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)

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

OBSY.	YEAR	MONTH	ELEMENT
CO	79	APR	H

Values are in tenths of mm. 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.
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

C	Q or S	Int. Q	Da.	01	02	03	04	05	06	07	08	09	10	11	12	Da.	13	14	15	16	17	18	19	20	21	22	23	24	SUM
			01	530	354	449	520	340	339	349	414	370	387	309	-33*	01	-215*	-159	85	71	183	289	339	342	310	321	370	349	6613
			02	459	511	586	409	510	472	534	493	401	269	338	361	02	189	-102	-77	-102*	-153*	68	294	298	321	334	310	303	7026
			03	330	360	353	383	353	377	413	489	400	361	359	369	03	380	374	378	238	-486*	-685*	-618*	-583*	-91	254	385	525*	4598
			04	543	647	278	371	416	509	627	521*	142*	489	381	73*	04	-317*	299	331	282	350	299	319	324	309	281	296	297	8067
			05	300	306	359	352	401	393	439	570	474	276	411	216	05	378	369	475	259	269	138	270	361	348	326	314	310	8314
			06	316	338	372	400	408	390	458	411	289	333	351	350	06	339	359	332	228	88	348	351	341	319	333	321	320	8095
			07	344	321	326	336	362	394	419	424	387	340	259	221	07	370	350	347	338	346	297	299	331	339	321	310	319	8100
			08	330	308	323	362	377	387	383	381	419	448	409	306	08	261	349	359	367	330	307	278	300	317	319	341	376	8337
			09	370	389	419	416	419	363	359	360	365	371	361	363	09	361	360	360	359	360	353	350	341	339	339	320	311	8708
			10	319	324	330	350	409	411	470	469	449	424	411	: 21	10	-16	119	96	191	379	383	371	364	349	342	317	320	7908
			11	319	321	333	360	365	367	370	371	379	379	382	371	11	364	359	260	279	348	362	361	353	349	339	333	309	8333
			12	321	331	362	359	379	420	421	411	410	401	238	273	12	360	359	339	271	331	366	353	339	356	324	319	321	8364
			13	320	341	353	367	359	371	389	416	339	389	384	360	13	-59	-43	329	342	321	329	350	363	350	333	329	323	7655
			14	337	339	367	371	391	397	376	380	373	369	250	312	14	370	367	367	321	196	242	232	351	349	311	267	297	7982
			15	381	456	506	366	331	345	366	368	380	309	279	371	15	359	221	151	9*	351	368	356	358	330	321	332	318	7932
			16	350	374	484	575	541	491	416	421	424	249	256	359	16	336	269	289	351	366	319	319	329	338	321	311	319	8807
			17	358	319	339	381	361	388	421	382	377	379	301	-13*	17	239	381	370	351	331	349	340	324	340	349	347	321	8035
			18	310	331	353	356	361	379	370	374	386	339	331	380	18	377	366	363	366	373	364	351	346	346	340	329	311	8502
			19	311	326	339	396	361	390	399	429	392	374	370	370	19	379	381	376	359	206	199	342	341	336	334	332	329	8371
			20	323	330	337	348	353	361	367	368	371	376	374	373	20	371	370	370	369	369	359	350	341	339	331	319	311	8480
			21	311	322	340	369	363	379	401	459	453	424	399	369	21	178	-28	-27	-169	-57	-2	50	173	30	108	254	391	5490
			22	599	751	722	711	739	531	409	399	347	391	-35*	33*	22	353	339	186	-46*	-380*	-136*	-45	301	197	331	321	359	7377
			23	386	400	591	576	469	403	513	469	436	433	258	-111	23	149	269	173	-66	146	251	319	349	331	345	320	350	7759
			24	369	398	449	481	463	421	441	394	399	369	321	87	24	199	337	274	170	298	331	319	303	311	319	319	329	8101
			25	387	623*	753*	708*	640*	588*	566*	423	147*	175	79*	-828*	25	-12*	203*	-266*	-67	-148*	27	183	253	307	308	411	451	5911
			26	459	450	392	341	323	327	319	318	311	329	331	339	26	340	348	349	318	329	291	230	297	291	287	319	320	7958
			27	341	379	467	471	356	391	364	399	401	371	387	351	27	311	299	181	-40	-465*	-465*	33*	237	109	159	346	459	5842
			28	648	633	561	399	349	469	337	217	252	255	279	298	28	301	111	-81	-205*	107*	288	329	290	289	329	329	309	7093
			29	359	533	461	380	649	385*	272*	423	328	128	154	235	29	-125*	47	-148*	-80*	-170*	143	257	171	168	269	381	429	5649
			30	481	527	539	397	549	537	643	481	343	-198*	-40*	351	30	237	-108*	67*	382	342	321	309	299	311	310	311	319	7710
			31													31													

SCALED BY	SPT
CHECKED BY	JEP, EPS
SIGNS REVIEWED BY	JEP
PUNCHED BY	

Preliminary base-line and scale values:

Interval Beginning	Base-line Value	Scale Value

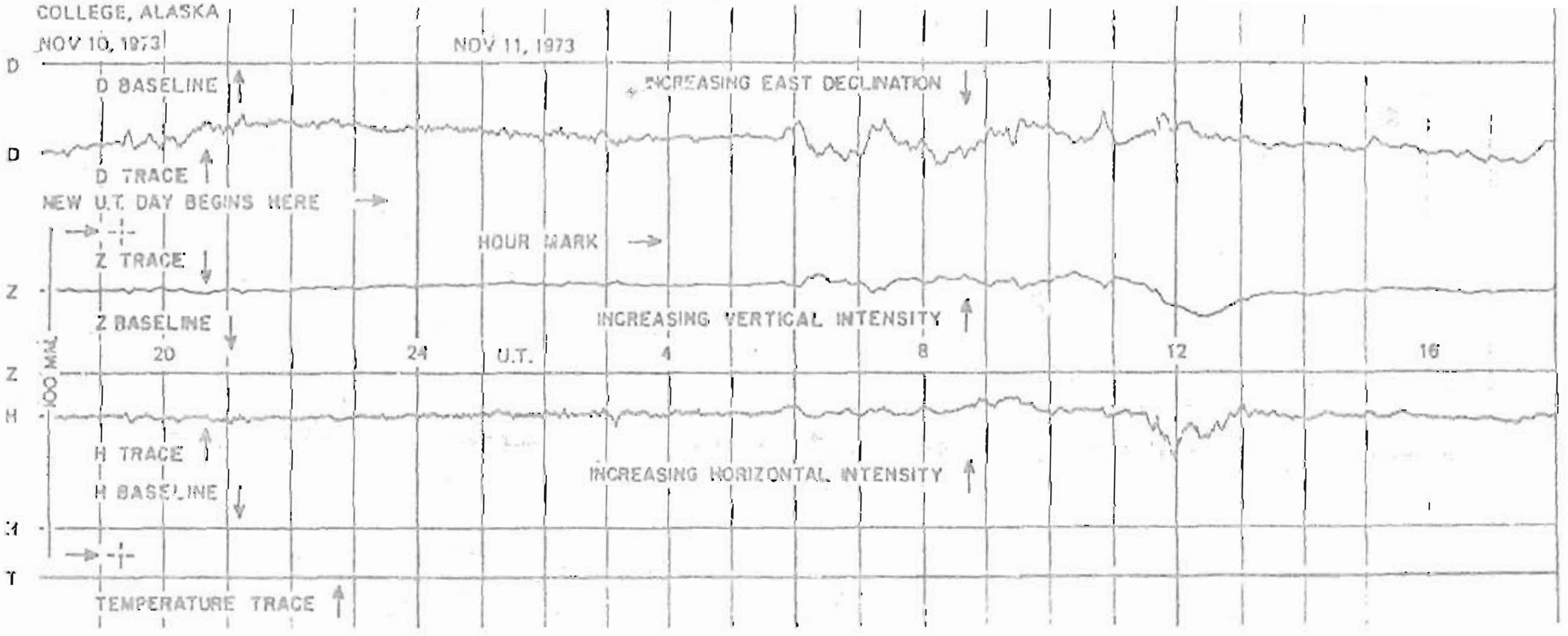
( ) Interpolated
[ ] Significant portion of hour interpolated.
[ ] No record; or no values available because of faulty record.
* Derived from Storm Mags., converted to Normal Mags.
[ ] Scaling uncertain because of magnetic storm.
< > Record off sheet for part or all of hour; if value is given, curve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

MONTHLY SUM	227117
MONTHLY MEAN	315
DATES WITH GAPS:	

8

FORMAT FOR NORMAL & STORM MAGNETOGRAMS

(SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NOAA FORM 76-196
(1-71)

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

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 (150W M.T.) is hour 11 of the same universal day. Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

OBSY.	YEAR	MONTH	ELEMENT
CO	79	APR	Z

C.	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
			01	299	378	330	332	361	321	315	301	247	190	261	440*	01	347*	473*	243	266	251	248	288	288	302	307	320	321	7429
			02	279	187	279	381	344	369	313	357	289	272	317	313	02	348	229	380*	427*	259*	141	178	257	264	276	297	302	7058
			03	301	320	337	344	337	312	310	319	364	339	291	311	03	321	311	306	306	259*	460*	674*	300*	166*	379	532	273*	8172
			04	71	-69	64	67	41	-231	-89	133	446*	302	287	313*	04	300*	287	269	306	294	319	291	291	303	309	311	310	4945
			05	320	321	318	311	307	318	316	231	156	198	346	364	05	310	373	338	353*	380	449	209	229	273	297	311	329	7363
			06	332	338	349	367	363	369	374	346	280	268	303	312	06	309	312	300	288	280	272	302	307	309	300	318	320	7618
			07	306	309	308	312	319	350	376	363	316	262	250	161	07	284	307	318	321	320	310	254	251	279	299	310	327	7212
			08	347	313	297	299	309	333	330	320	339	332	317	247	08	166	265	299	310	312	288	251	231	247	350	292	309	7111
			09	311	332	343	338	342	320	300	299	297	291	299	296	09	292	293	291	297	299	293	290	281	280	281	287	290	7242
			10	290	291	297	300	301	335	292	281	300	293	281	318	10	376	261	261	301	233	262	288	282	287	269	269	291	6999
			11	300	298	297	289	293	291	291	294	299	300	295	269	11	248	251	261	237	249	278	273	280	280	281	288	297	6758
			12	294	301	309	324	300	317	371	329	301	302	277	237	12	280	281	291	259	274	310	297	278	269	287	310	330	7158
			13	321	312	308	310	311	314	319	267	220	264	299	278	13	276	200*	203	252	241	291	278	291	299	301	299	311	6765
			14	316	316	325	331	311	313	326	303	301	270	197	219	14	238	267	271	285	287	200	173	221	271	301	280	328	6600
			15	318	335	326	362	336	308	308	310	310	271	192	270	15	272	289	270	219	221	271	280	287	300	299	299	321	6974
			16	320	330	354	272	251	320	340	303	269	221	231	267	16	287	289	268	277	299	309	299	287	290	289	291	301	6964
			17	320	308	308	307	313	311	303	221	300	298	238	144	17	149	267	300	301	293	289	296	290	287	300	309	306	6758
			18	304	299	299	310	313	321	307	298	310	211	173	270	18	291	299	291	290	265	291	290	293	282	279	290	303	6899
			19	292	289	296	290	330	320	339	329	323	309	298	291	19	296	296	288	287	228	108	211	270	283	282	279	290	6824
			20	300	301	300	298	296	292	290	273	291	295	292	280	20	283	287	269	288	284	289	290	287	280	280	279	282	6946
			21	281	280	287	289	299	298	307	324	305	330	304	291	21	289	281	329	446*	252*	233*	51	153	202	200	277	278	6566
			22	311	282	117	261	297	376	285	239	233	281	460*	492*	22	293	297	384	413*	460*	-17	48	138	249	222	279	270	6670
			23	342	347	290	284	346	349	240	317	326	280	284	430	23	264	211	329	320	176	180	221	249	284	292	300	304	7065
			24	339	338	331	330	362	382	354	281	317	319	271	251	24	197	221	244	229	239	281	269	274	258	279	295	305	6966
			25	309	217	-287*	166*	66*	-480*	-254*	124	342	299	439	499*	25	569	527*	606*	343	126*	69	96	252	291	334	334	329	5316
			26	329	307	344	350	354	338	324	314	319	308	307	308	26	303	309	315	316	311	318	291	231	273	276	281	300	7426
			27	301	321	331	386	356	346	353	321	262	197	269	359	27	310	311	284	337	213*	299*	87	193	252	241	338	348	7015
			28	268	242	269	368	339	278	122	149	167	371	401	349	28	370	429	347	260	107	181	248	279	310	327	321	330	6832
			29	304	319	349	332	269	157	206*	272	328	386	231	375	29	444	167	259*	211	353*	122	179	242	251	348	348	332	6784
			30	314	315	319	347	291	321	320	418	372	247*	227	268	30	351	501	409	271	327	328	317	281	282	308	302	312	7748
			31													31													

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

Preliminary base-line and scale values:

Interval Beginning	Base-line Value	Scale Value

( ) Interpolated

[ ] Significant portion of hour interpolated.

☐ No record; 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 Storm Mag., converted to Normal Mag.

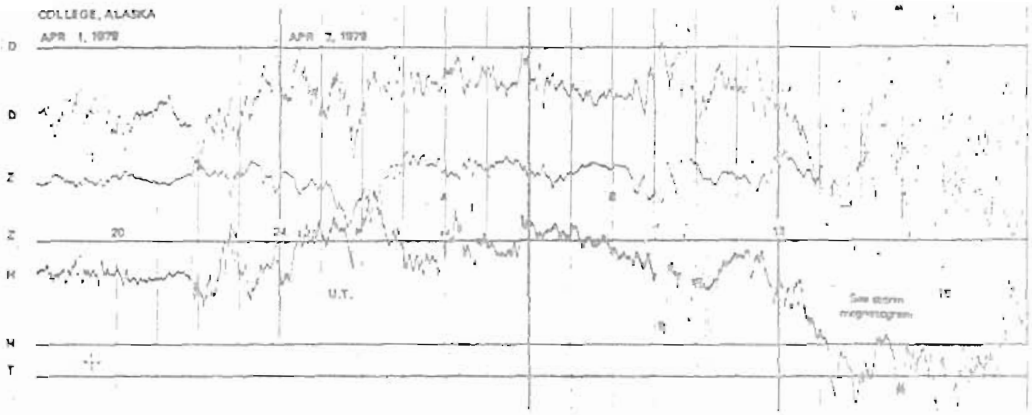
MONTHLY SUM	208198
MONTHLY MEAN	289
DATES WITH GAPS:	

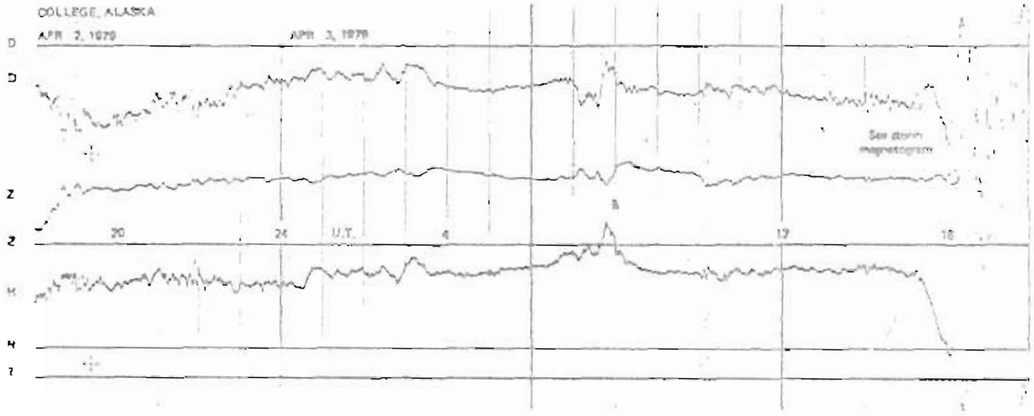
9

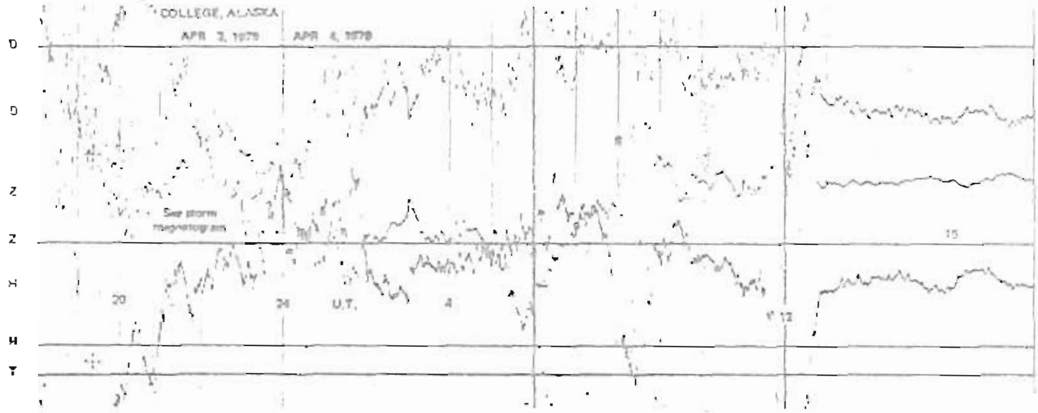
☆ U.S. G.P.O. 1973-769-571/932 REG. 8

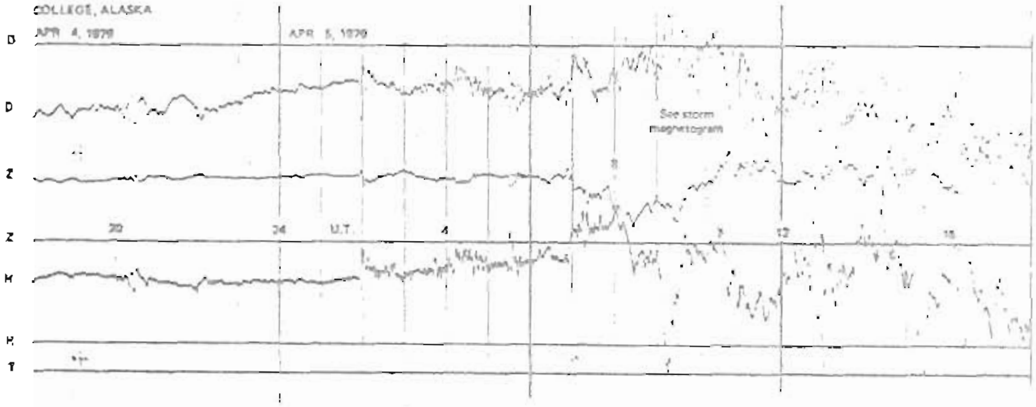
NORMAL MAGNETOGRAMS

200 mm
100 mm
0

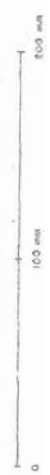




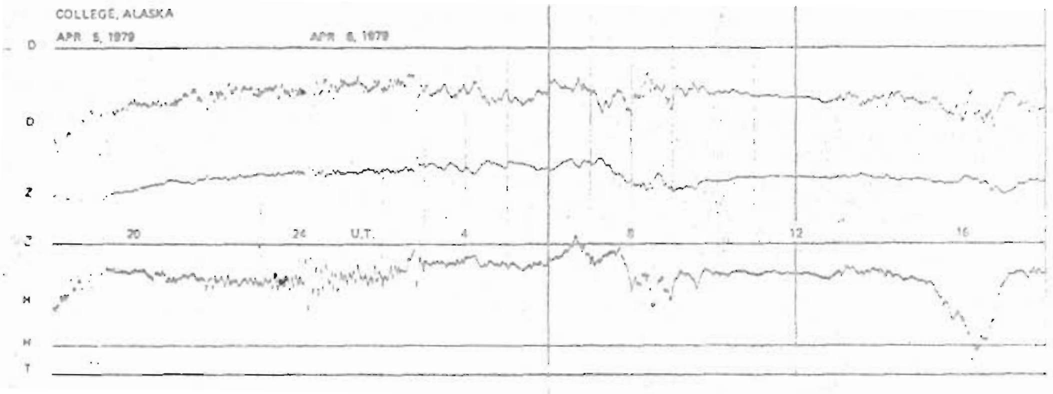


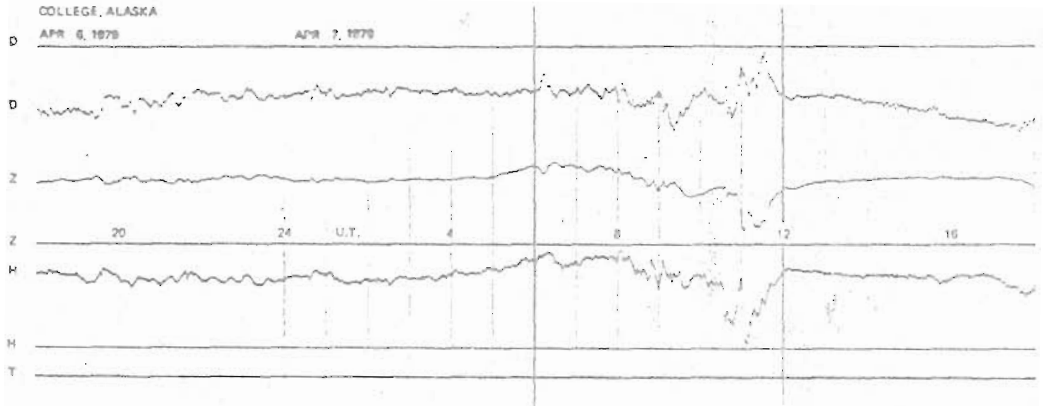


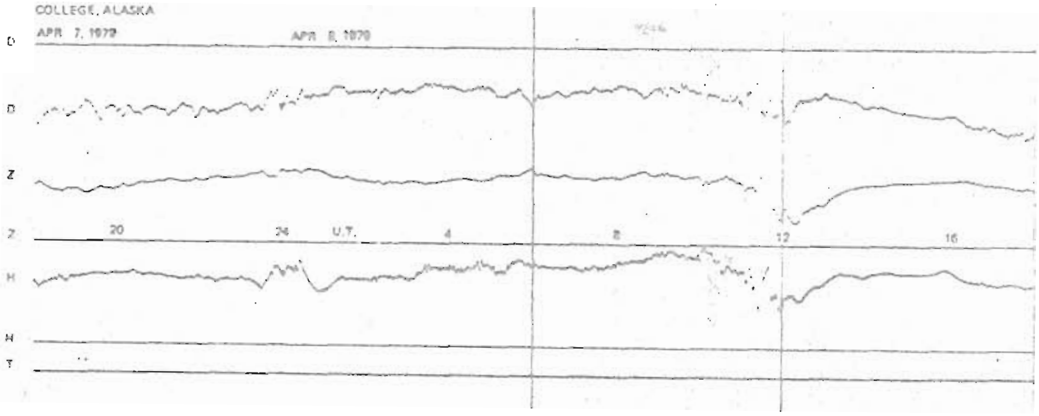
NORMAL MAGNETOGRAMS

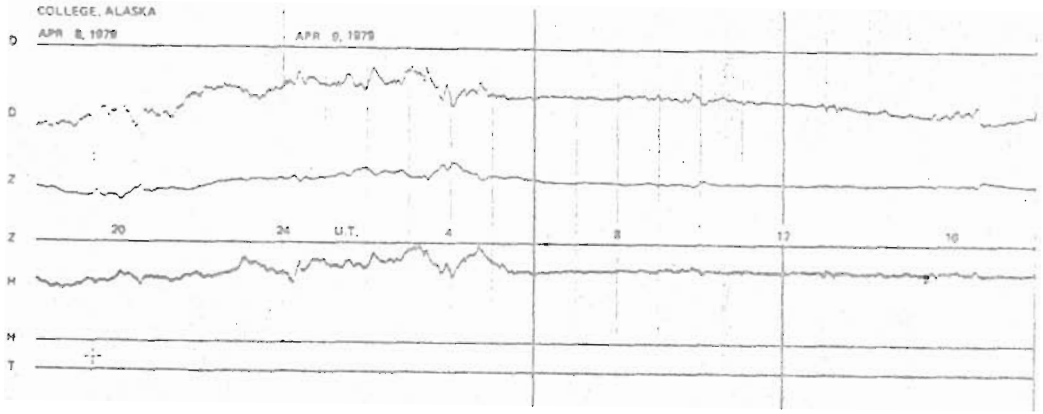


500 nT
100 nT
0









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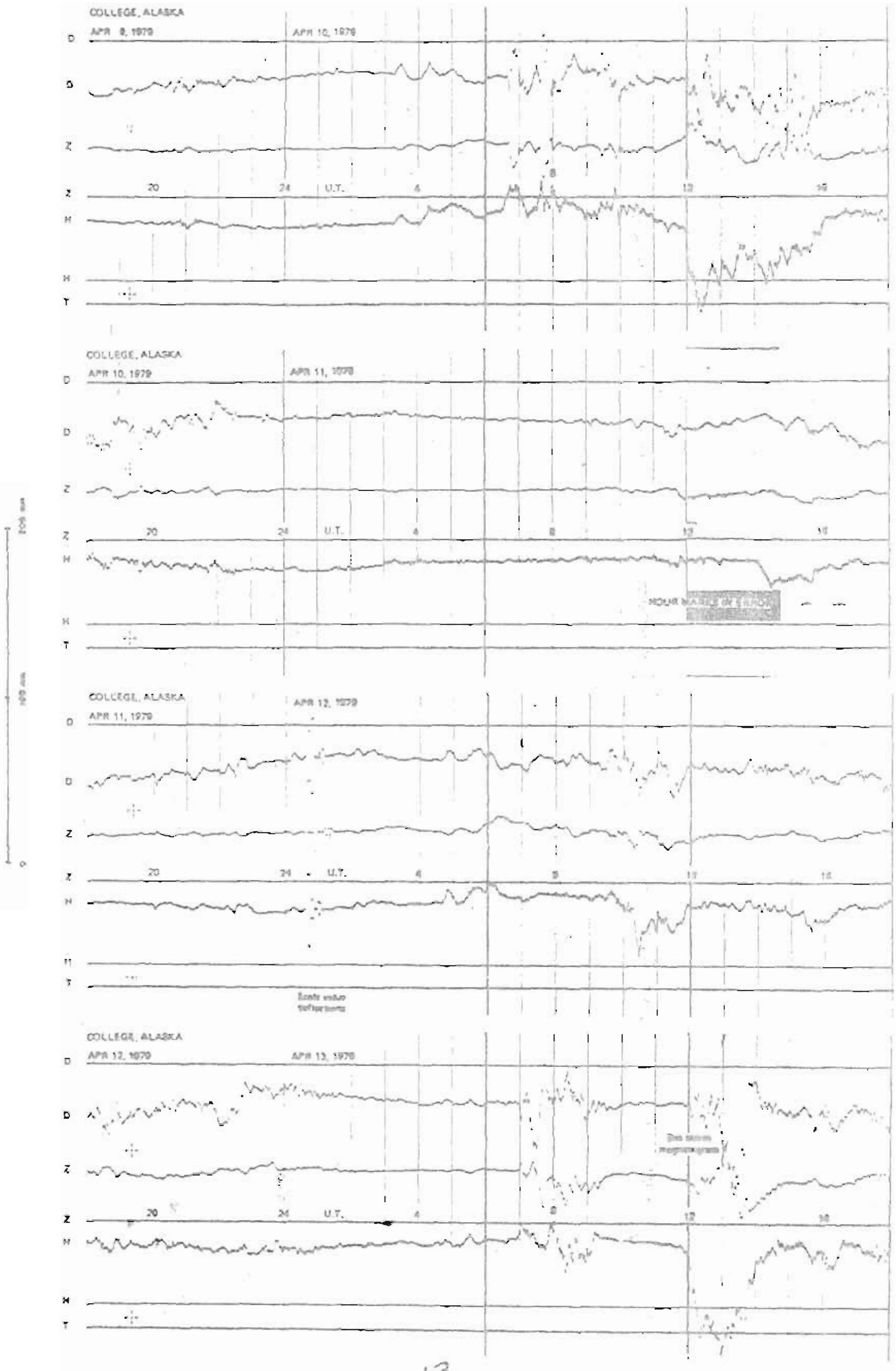

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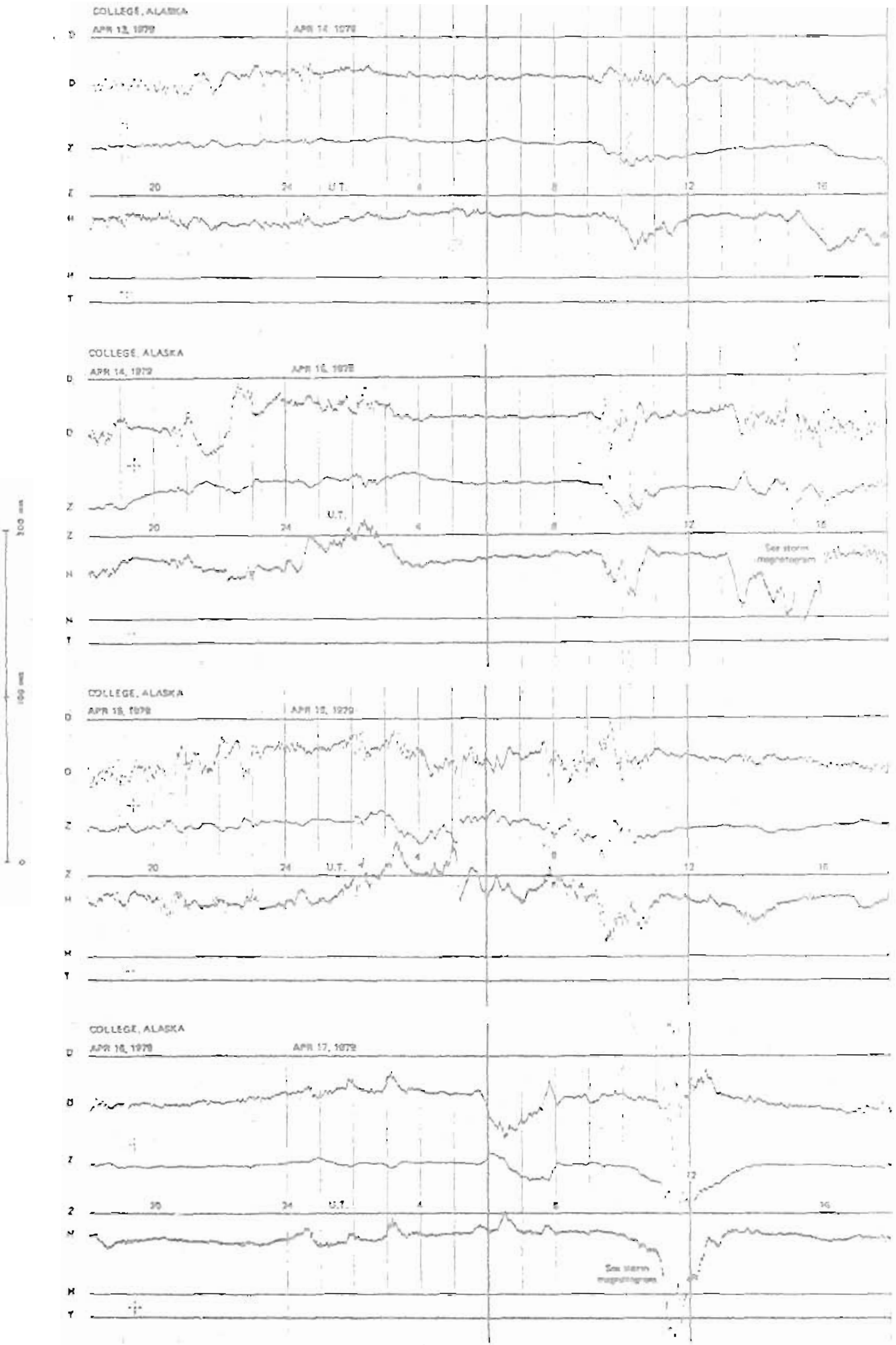
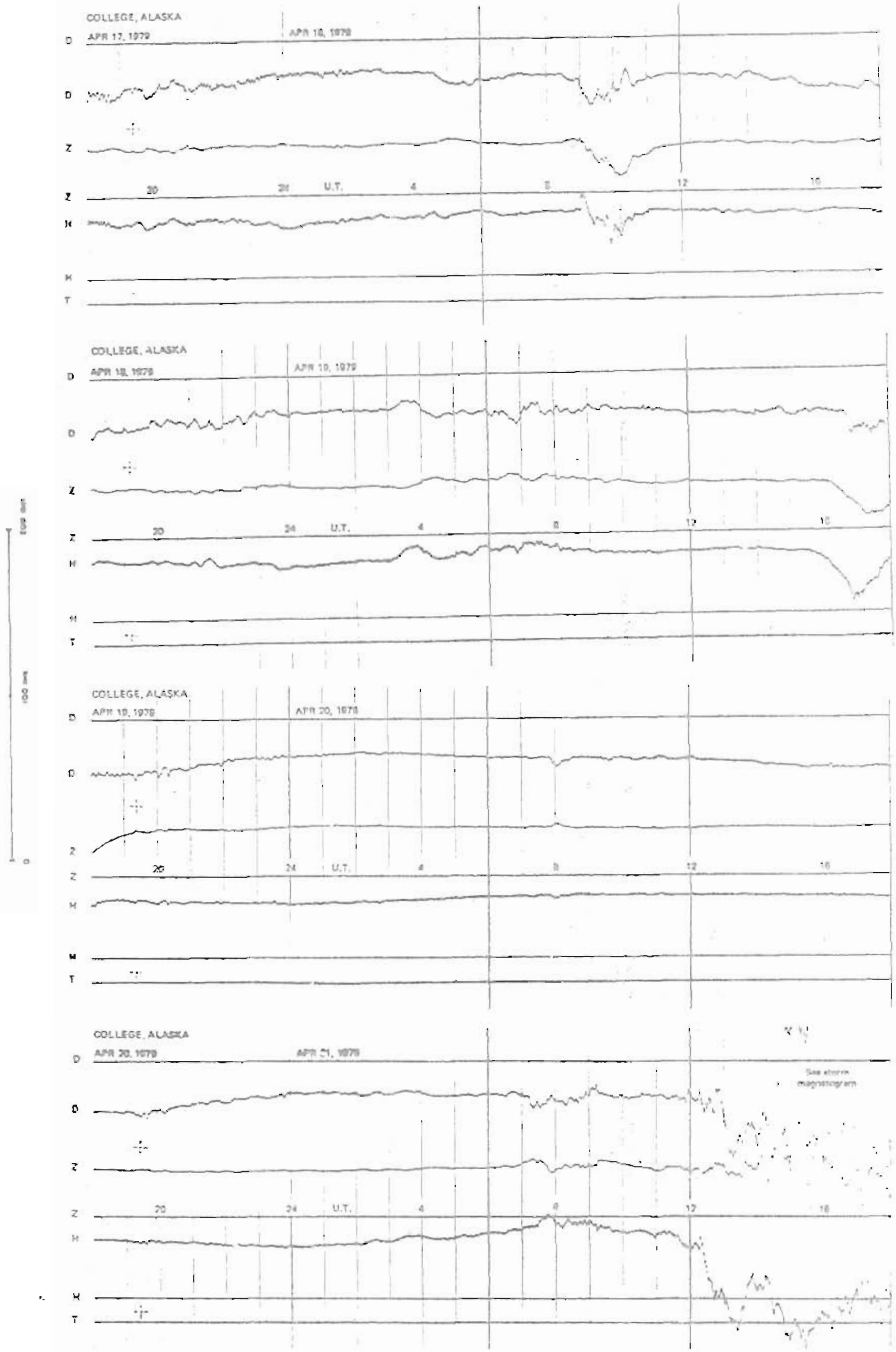


14

NORMAL MAGNETOGRAMS



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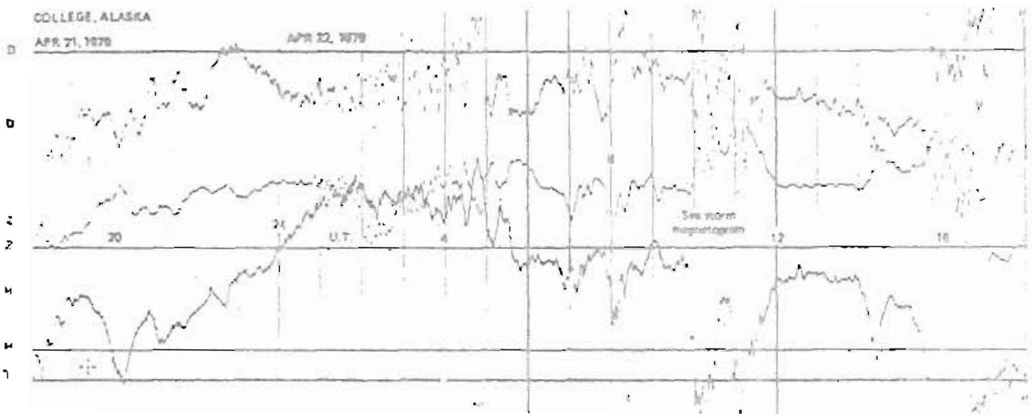

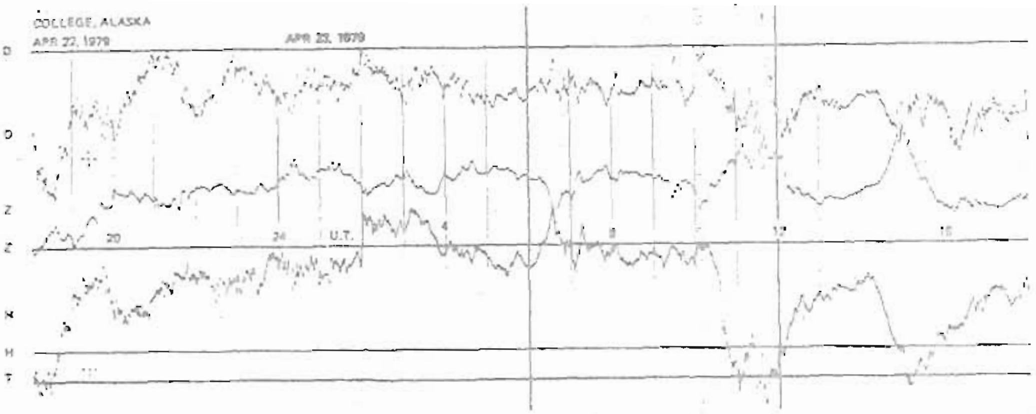

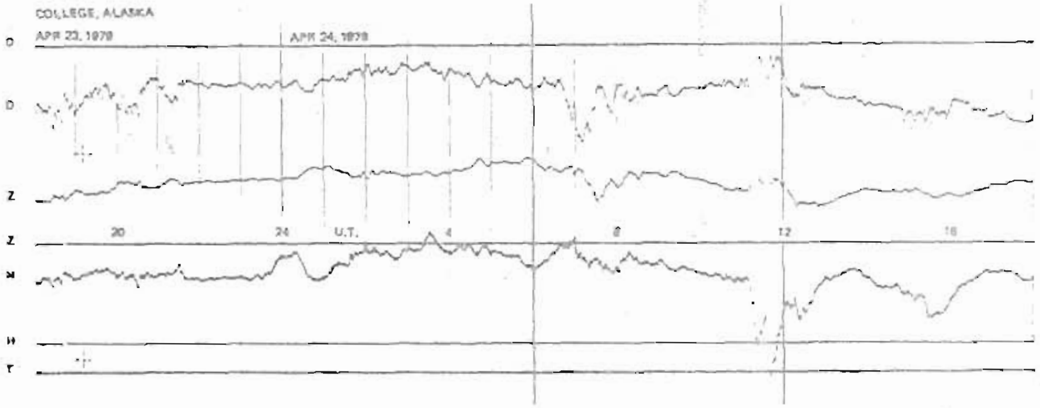

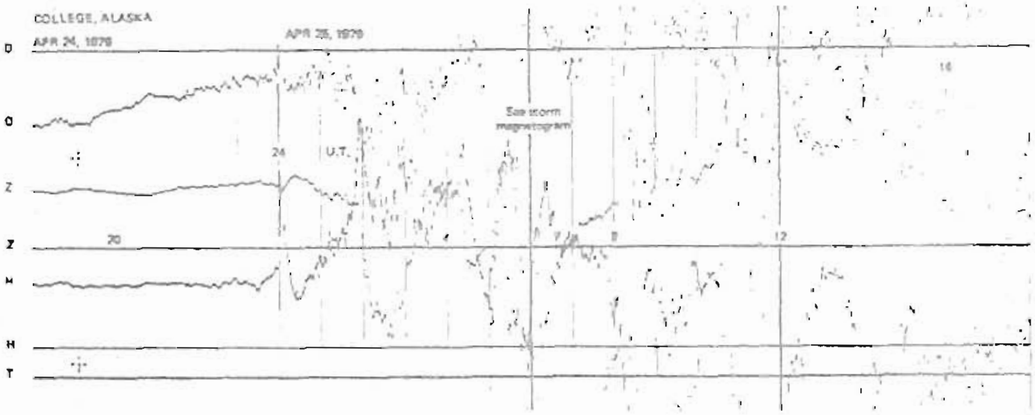

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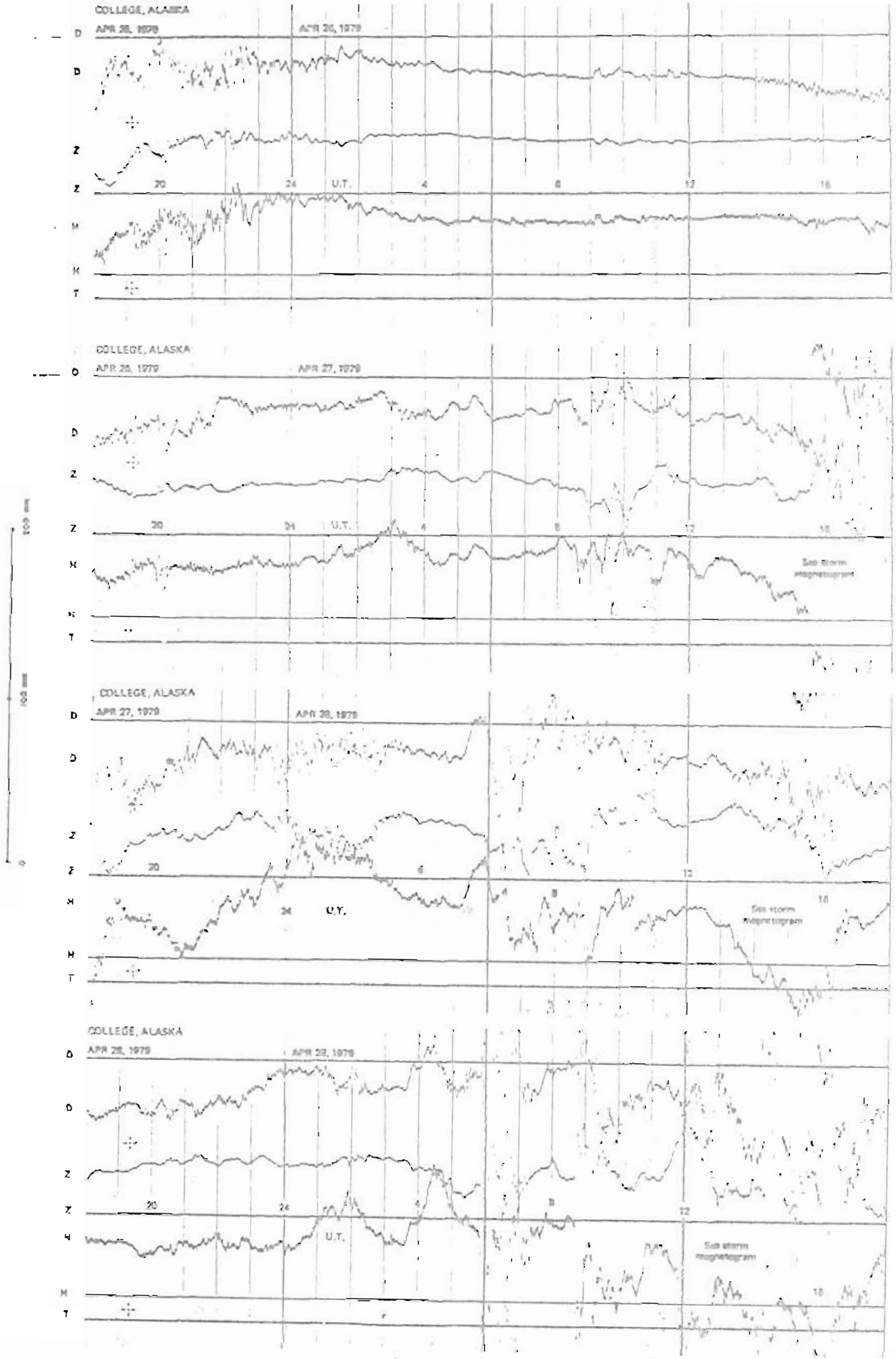

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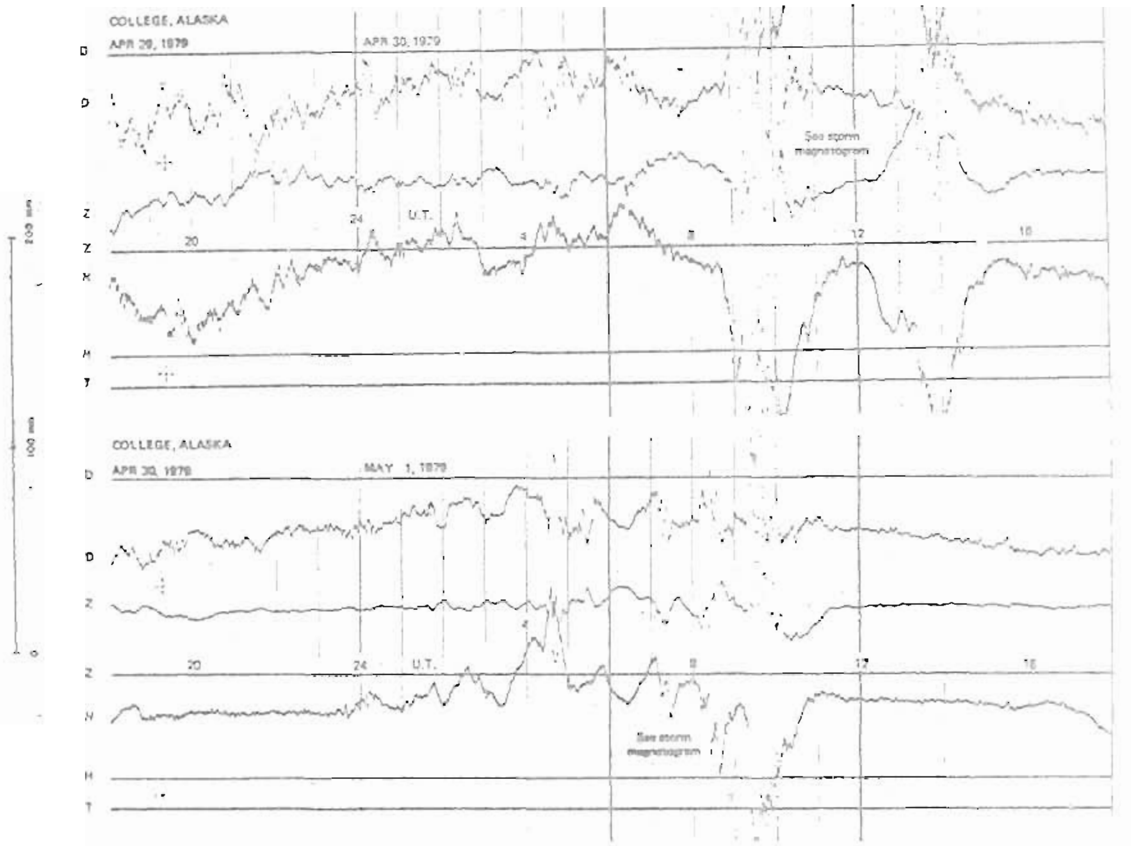
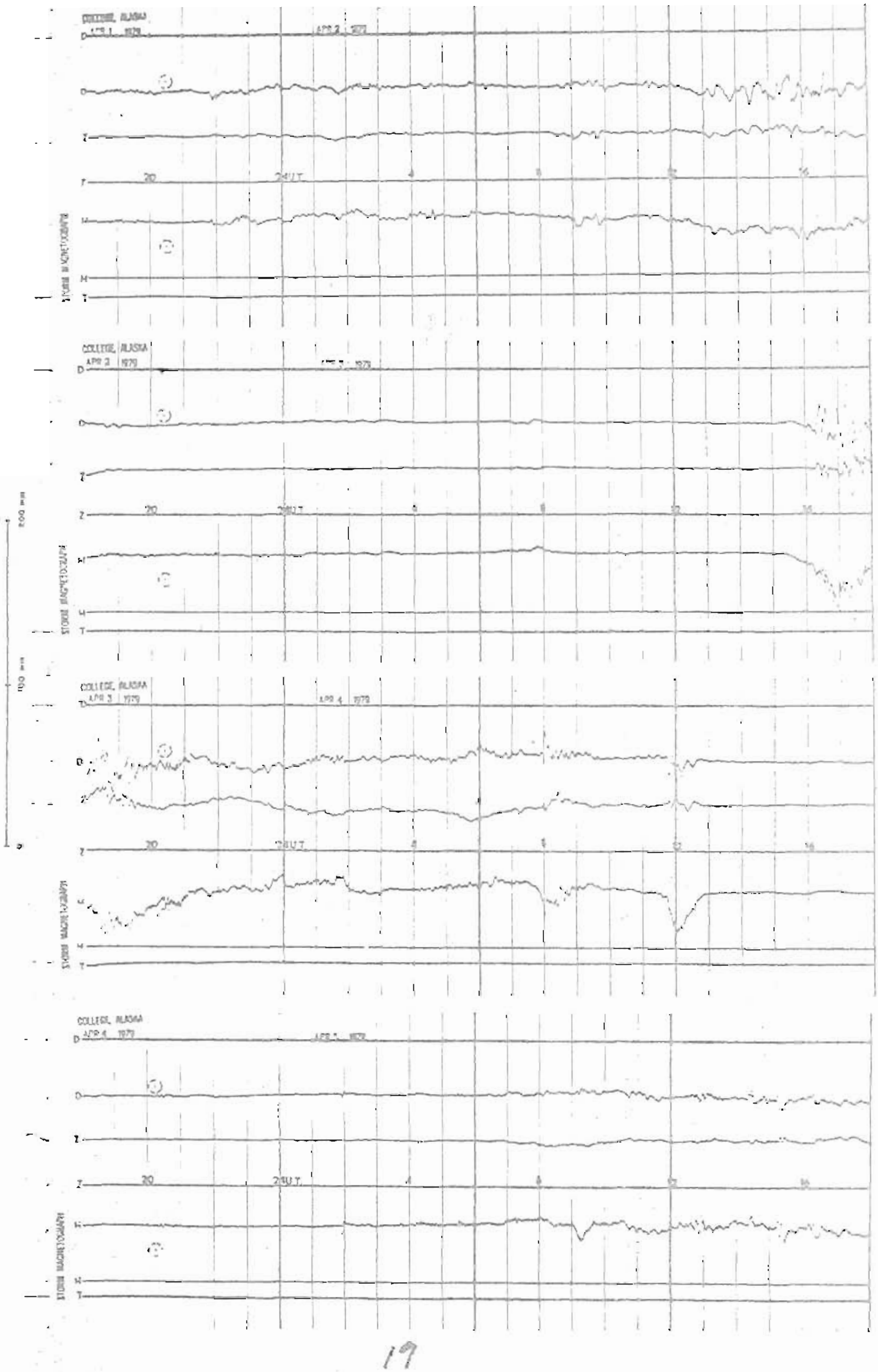


STORM MAGNETOGRAMS



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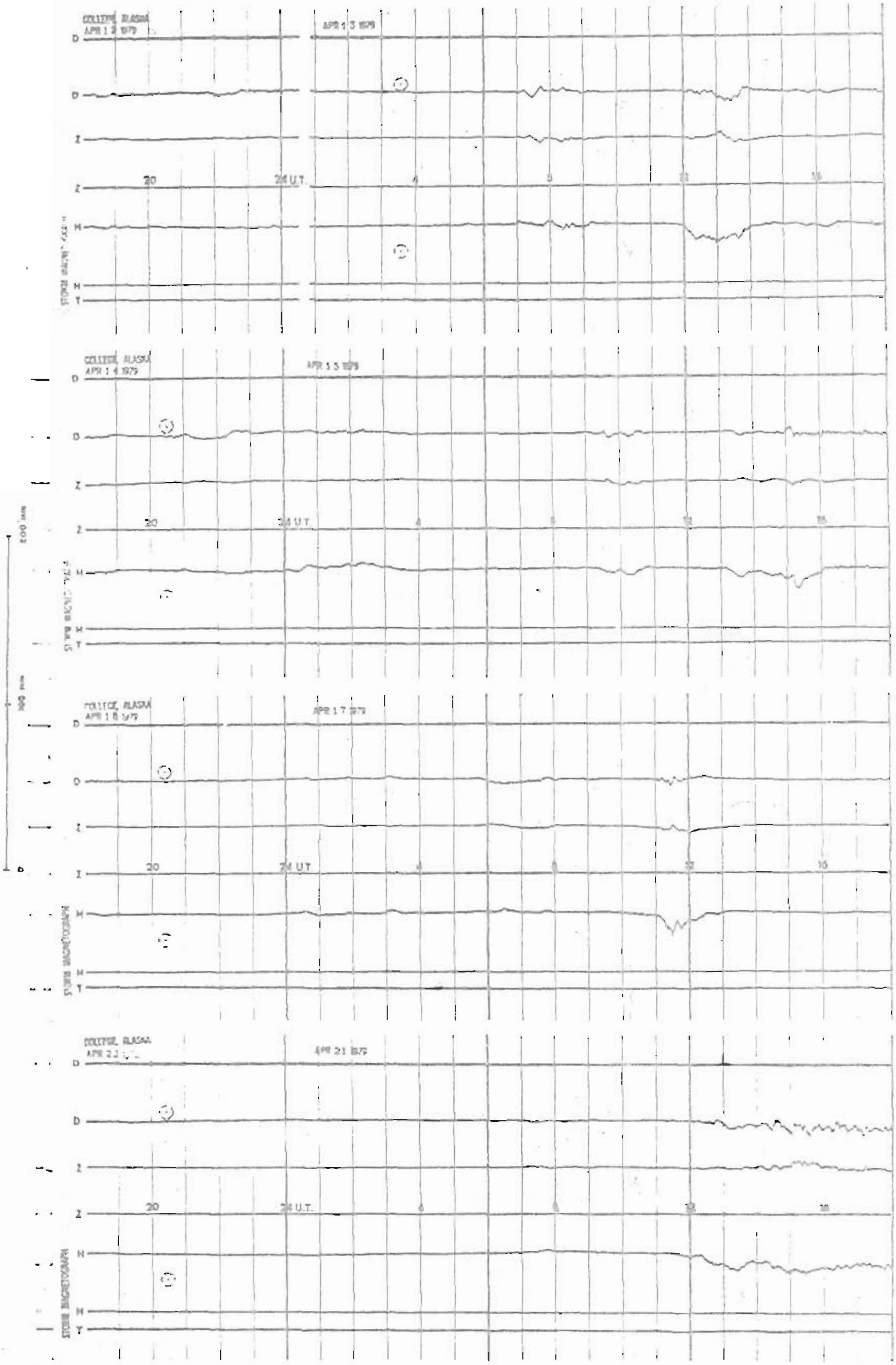
STORM MAGNETOGRAMS



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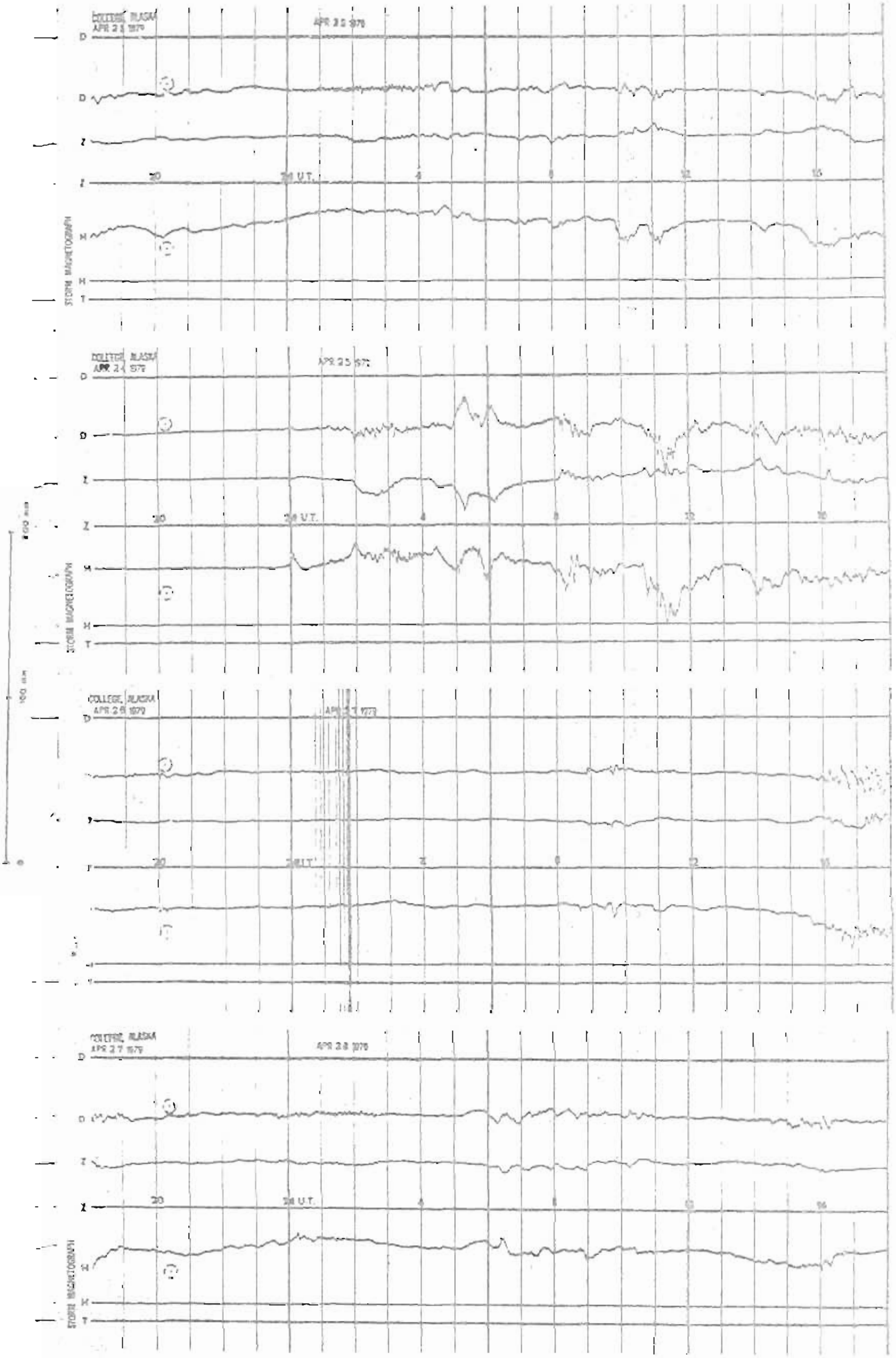
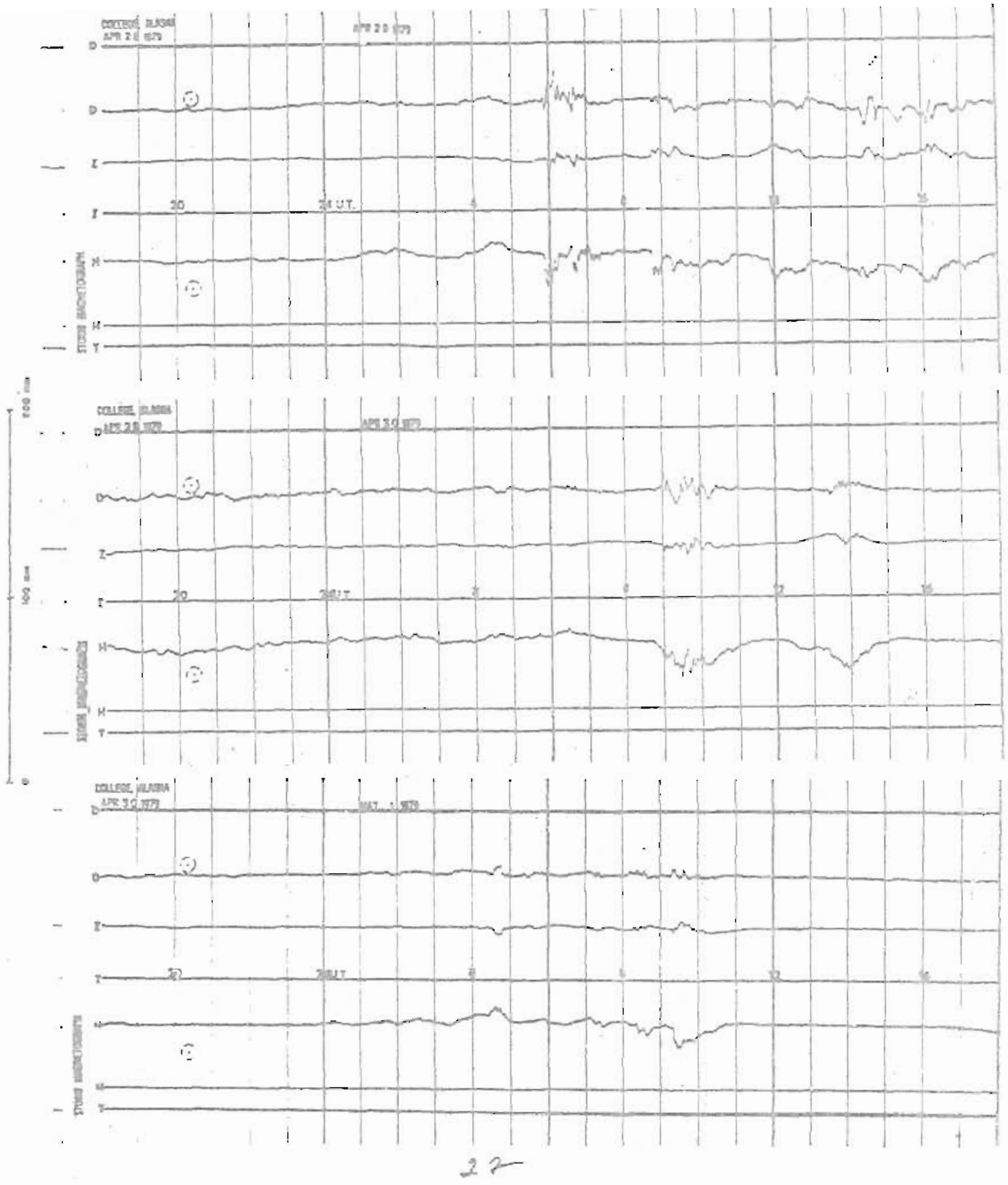
STORM MAGNETOGRAMS



STORM MAGNETOGRAMS