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UNITED STATES DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY. *[Reports - Open file series]*

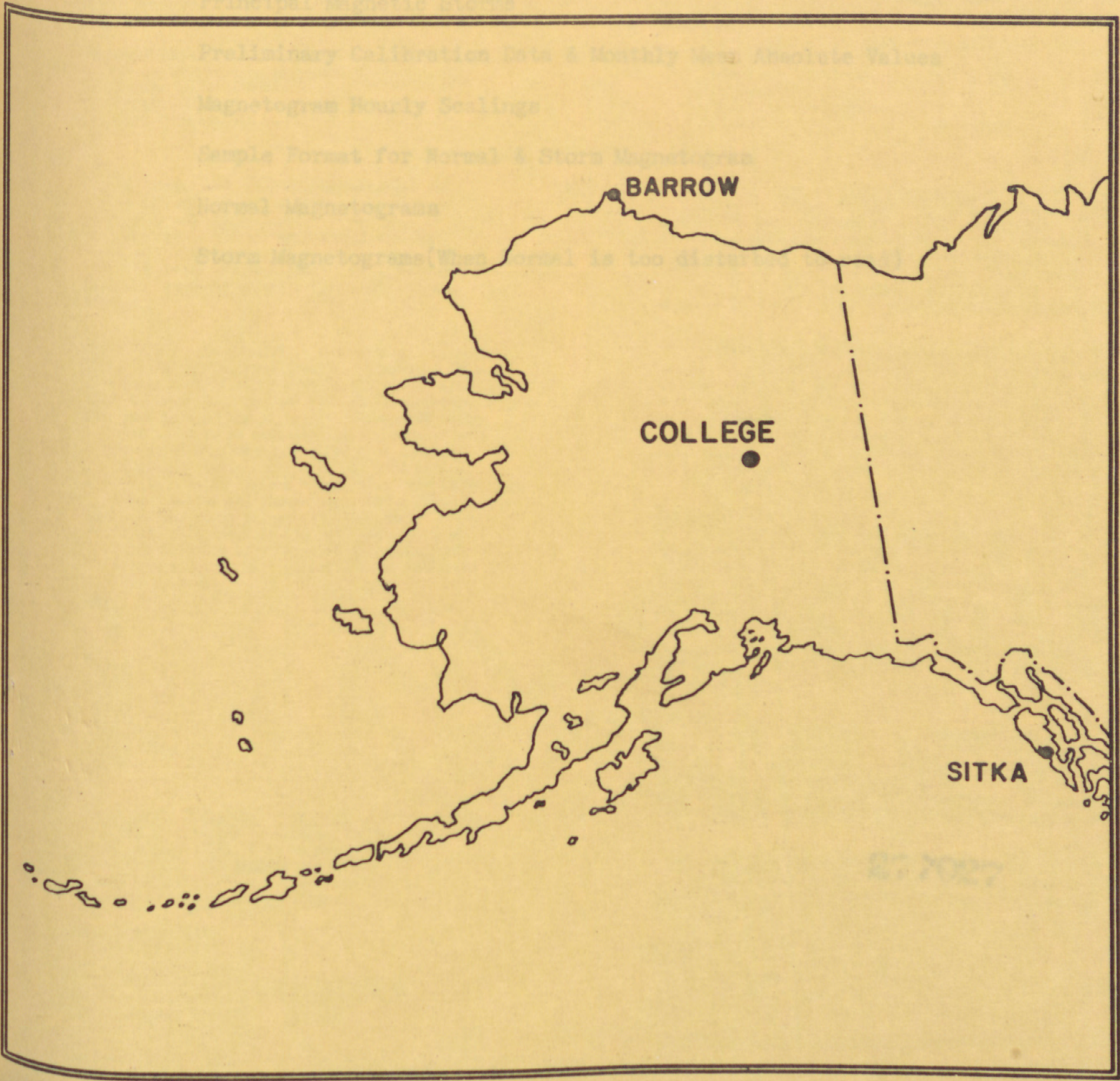
PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

TM

open entry

APRIL 1977

OPEN FILE REPORT 77-300D



UNITED STATES DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

APRIL 1977



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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, M. J. MOORMAN, C. E. DEADMON, 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.

COLLEGE OBSERVATORY PRELIMINARY GEOMAGNETIC DATA

INTRODUCTION

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

Chief, College Observatory
U.S. Geological Survey
Yukon Drive on West Ridge
Fairbanks, Alaska 99701

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

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

OBSERVATORY LOCATION

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

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

The position of the observatory site is:

Geographic latitude..... $64^{\circ}51.6'N$
Geographic longitude..... $147^{\circ}50.2'W$
Geomagnetic latitude..... $+64.6^{\circ}$
Geomagnetic longitude..... $+256.5^{\circ}$
Elevation.....200 meters

GEOMAGNETIC DATA

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

Magnetic Activity

The K-Index. The K-Index is a logarithmic measurement of the range of the most disturbed component (D or H) of the geomagnetic field for eight intervals beginning 0000-0300, 0300-0600...2100-2400 UT. It is a measure of the difference between the highest and lowest deviation from a smooth curve to be expected for a component on a magnetically quiet day, within a three hour interval.

The Equivalent Daily Amplitude, AK. The K-Index is converted into an equivalent range, ak, which is near the center of the limiting gamma ranges for a given K. The average of the eight values is called equivalent daily amplitude AK. The unit 10 γ has been chosen so as not to give the illusion of an accuracy not justified.

The schedule for converting gamma range to K, and K to ak is as follows:

Gamma Range	K - Index	ak*
0 < 25	0	0
25 < 50	1	3
50 < 100	2	7
100 < 200	3	15
200 < 350	4	27
350 < 600	5	48
600 < 1000	6	80
1000 < 1650	7	140
1650 < 2500	8	240
2500+	9	400 (10 γ)

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

AK Range	C
0-11	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.

COLLEGE, ALASKA

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

MONTH AND YEAR

APRIL 1977

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	0	1	2	2	0	1	1	0	07	03	SUDDEN COMMENCEMENTS d h m
2	0	0	2	3	1	0	0	1	07	04	
3	2	1	2	5	3	0	1	1	15	11	
4	5	3	5	4	5	2	2	2	28	26	
5	2	2	3	3	3	3	2	2	20	11	
6	3	4	5	1	4	6	5	4	32	34	
7	5	4	5	6	7	3	3	2	35	48	
8	3	4	5	6	6	7	3	2	36	52	
9	3	4	6	6	6	5	3	2	35	44	
10	2	3	3	2	4	3	2	2	21	13	
11	2	2	2	2	5	3	4	1	21	15	
12	2	1	0	0	4	2	1	3	13	08	
13	2	0	3	1	1	1	1	1	10	05	
14	2	1	3	3	1	2	1	3	16	09	
15	2	4	3	1	3	3	0	1	17	11	
16	1	2	1	1	4	4	4	3	20	14	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)
17	3	2	3	5	1	1	2	1	18	13	
18	1	2	0	4	3	3	1	1	15	09	
19	3	4	7	6	6	4	3	3	36	50	
20	4	3	5	7	5	5	2	2	33	43	
21	3	2	5	3	3	2	1	1	20	14	
22	2	1	3	3	1	1	1	1	13	07	
23	1	3	3	3	3	2	0	0	15	09	
24	1	1	2	4	4	5	2	2	21	16	
25	5	4	5	5	2	2	1	1	25	24	
26	1	1	1	1	0	1	0	0	05	02	BEGIN d h m END d h m
27	1	1	0	3	1	0	0	0	06	03	
28	0	1	0	1	0	2	1	1	06	02	
29	2	4	7	6	6	1	2	2	30	44	
30	2	2	2	1	3	2	1	2	15	07	
31											

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

683.8

3.76

2570

H

321.7

7.82

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 APRIL	YEAR 1977
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
02	2102	ssc*		
03	0908	si		
05	12XX	pi2		
06	12XX	pi2		
07	1846	si		
07	1955	si		
11	18XX	pc3		
10	21XX	pc3, pc4, pc5		
12	23XX	pc5		
13	0757	bps		
13	18XX	pc4		
14	01XX	pc5		
23	04XX	pg		
23	14XX	pg		
26	23XX	pc3, pc4		
30	13XX	pi2		
IDENTIFIED BY: JEP			VERIFIED BY: JBT	

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

COLLEGE OBSERVATORY, COLLEGE, ALASKA

BOULDER, COLORADO 80502 U.S.A.

COLLEGE OBSERVATORY, COLLEGE, ALASKA

19 77

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(γ)	Z(γ)	day	(3 hr - period)	K	D(')	H(γ)	Z(γ)	day	hr
CO	64.6 N	06	14XX	..	..	..	..	07 08	5 6	7 7	185	1600	830	09	21
		19	01XX	..	..	..	..	19 20	3 4	7 7	288	1410	910	20	18
		29	03XX	.. (Polar Storm)	..	..	..	29	3	7	136	1160	590	29	15

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 4-1-77	2400 UT, 4-30-77	1.0/mm	3.8 x/mm	28°07.0 E
H	0000 UT, 4-1-77	2400 UT, 4-17-77	7.8 x/mm		12752 x
	0000 UT, 4-18-77	2400 UT, 4-30-77	7.8 x/mm		12757 x
Z	0000 UT, 4-1-77	2400 UT, 4-30-77	7.7 x/mm		55131 x

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 4-1-77	2400 UT, 4-30-77	7.9/mm	29.8 x/mm	24°23.0 E
H	0000 UT, 4-1-77	2400 UT, 4-17-77	44.1 x/mm		11492 x
	0000 UT, 4-18-77	2400 UT, 4-30-77	44.1 x/mm		11502 x
Z	0000 UT, 4-1-77	2400 UT, 4-30-77	48.9 x/mm		53995 x

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D	0000 UT, 4-1-77	2400 UT, 4-30-77	0.3/mm	1.0 x/mm
H	0000 UT, 4-1-77	2400 UT, 4-30-77	1.0 x/mm	
Z	0000 UT, 4-1-77	2400 UT, 4-30-77	2.4 x/mm	

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
28°19.9 E	13047 x	55367 x

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

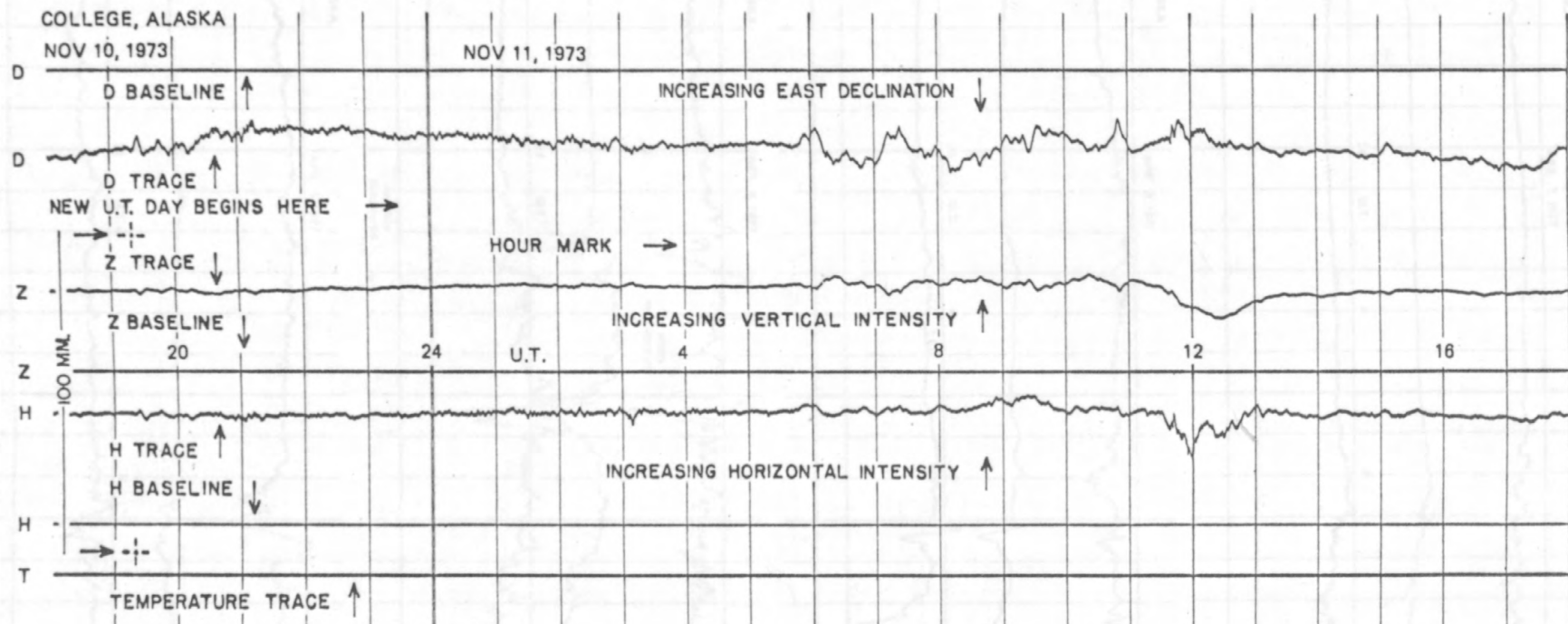
DAYS USED: APRIL 1, 2, 12, 13, 22, 23, 26, 27, 28, 30

FORM C&GS-40a 10-57		MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)																				U.S. DEPARTMENT OF COMMERCE ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION COAST AND GEODETIC SURVEY GEOMAGNETISM DIVISION		JOBSY.	YEAR	MONTH	ELE- MENT					
Values are in tenths of mm, and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (LST/M.T.) is hour 11 of the 1950 universal day. Magnetic corrections have been applied. Negative values are in red, with minus signs shown.																						CO	77	APR	D							
STATION	DATE	TIME	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	81	78	83	92	109	120	111	114	113	123	138	141	01	143	157	158	148	169	188	192	174	143	131	123	111	3140				
		02	97	90	93	100	102	99	98	102	121	138	137	158	02	163	138	140	142	162	166	171	177	176	162	141	99	3132				
		03	72	18	52	72	91	111	95	138	156	129	109	141	03	171	143	149	157	169	181	188	176	150	140	138	108	3054				
		04	81	29	107	-23	46	51	138*	74	82	128	103	179	04	213	227	192	184	193	213	149	151	140	123	89	68	2937				
		05	61	102	64	77	91	109	111	117	236	120	139	127	05	141	159	142	161	213	150	132	134	131	101	96	98	3012				
		06	62	28	34	22	-3	28	248	98	113	115	131	122	06	151	150	177	274	614*	400*	328*	198	138	276	238	166	4108				
		07	134	125	23	186	188	69	289*	-18	33	89	96	170*	07	297*	67*	216	189	188	199	176	175	179	144	137	3540					
		08	47	41	41	40	16	82	121	103	69	203	-25	148	08	187	231	439*	186*	733*	126	143	142	92	124	152	146	3567				
		09	73	53	40	46	156	70	130	439*	242	83	55	51	09	141	227	297*	247	233	225	124	88	141	99	97	79	3436				
		10	71	56	81	109	43	133	104	121	278	128	111	121	10	130	159	190	210	240	232	161	152	140	76	76	97	3219				
		11	71	69	79	54	119	87	91	90	119	114	130	126	11	127	138	159	167	171	183	3	-36	89	169	137	99	2555				
		12	66	87	91	101	116	121	119	120	121	131	138	134	12	136	131	197	171	200	228	184	159	132	122	111	63	3179				
		13	63	84	96	106	111	121	117	116	190	116	129	138	13	142	150	157	192	181	182	186	174	177	158	129	92	3307				
		14	64	68	101	79	81	96	73	87	152	102	117	152	14	150	168	183	199	212	192	169	149	143	154	113	32	3030				
		15	31	16	-6	-8	41	27	188	140	103	118	111	130	15	117	141	130	181	190	191	171	157	132	120	98	75	2594				
		16	51	56	81	101	81	77	91	92	107	103	109	126	16	131	147	184	263	309	229	161	147	88	70	94	56	2954				
		17	66	53	60	91	66	73	153	202	122	87	145	107	17	133	150	150	189	227	200	181	163	134	112	92	89	3045				
		18	70	81	99	71	109	111	116	107	113	104	111	208	18	238	208	181	220	267	239	189	170	149	117	109	77	3464				
		19	47	31	19	-61	55	-19	144*	-94*	73*	-86*	48*	17*	19	303*	111	187	287	385	239	154	162	155	98	89	101	2445				
		20	113	69	78	103	77	144	304	25*	65*	17*	-38*	90	20	141	177	151	283	261	192	112	181	113	103	81	87	2929				
		21	69	60	61	50	96	92	56	9*	120	47	127	141	21	114	136	151	174	183	187	203	183	167	131	104	104	2765				
		22	79	64	67	71	98	123	121	110	253	129	150	164	22	147	141	169	192	220	229	188	158	176	139	120	92	3400				
		23	71	60	53	57	26	109	90	130	131	127	134	125	23	130	131	144	176	193	202	198	191	167	112	96	79	2932				
		24	67	58	41	61	62	95	86	167	97	68	142	121	24	128	151	203	310	256	258	172	169	141	107	53	53	3066				
		25	36	11	18	94	51	17	110	104	176	106	206	78	25	111	124	137	161	184	173	157	148	133	113	94	98	2640				
		26	86	82	81	90	100	111	106	101	106	127	133	135	26	131	142	162	173	187	179	170	168	151	134	116	108	3079				
		27	96	86	88	91	97	98	99	112	121	121	139	176	27	126	156	159	173	186	170	159	140	133	129	120	110	3085				
		28	91	79	83	97	106	114	119	122	123	123	129	127	28	131	133	137	139	170	168	170	164	147	124	100	89	2985				
		29	77	70	79	60	52	97	44	9	100*	-42*	140	291*	29	196*	191	207	179	193	197	189	168	121	76	44	42	2780				
		30	47	56	58	62	84	170	103	97	84	104	128	118	30	135	140	147	189	204	204	184	166	121	68	37	20	2726				
		31													31																	
SCALED BY	SPT	Preliminary base-line and scale values:																								<input type="checkbox"/> Interpolated <input type="checkbox"/> Significant portion of hour interpolated. <input type="checkbox"/> No record; or no values available because of faulty record.		<input type="checkbox"/> 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	92185	
CHECKED BY	JEP	Interval	Base-line	Scale																											MONTHLY MEAN	128
SIGNS RE- VIEWED BY	JEP	Beginning	Value	Value																											DATES WITH GAPS:	
PUNCHED BY																										* Derived from Storm Mph., converted to Normal Mph.						

MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)												U.S. DEPARTMENT OF COMMERCE ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION COAST AND GEODETIC SURVEY GEOMAGNETISM DIVISION										OBSY.	YEAR	MONTH	ELL. MENT	
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 0300 universal day. Minor corrections have been applied. Negative values are in red, with minus signs shown.																						CO	77	APR	11	
STATION	TIME	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	371	376	389	393	394	400	416	433	419	420	393	390	01	380	374	377	369	380	391	393	384	380	374	369	368	9333
02	373	379	389	401	403	403	405	429	453	393	367	349	02	389	400	391	397	396	396	391	387	380	370	370	369	9380
03	361	389	407	410	401	393	411	441	433	397	393	166	03	364	400	396	390	386	380	366	359	357	351	347	346	9144
04	363	410	527	479	440	487	448	472	473	430	356	270	04	287	264	382	373	366	346	376	364	346	330	351	347	9287
05	406	408	383	377	383	381	384	400	406	342	373	389	05	339	313	357	320	309	271	300	346	363	340	360	369	8619
06	373	381	424	428	466	576	461	464	392	386	393	380	06	349	330	287	-21	-263*	-603*	-235*	30	132	386	536	469	6521
07	729	536	643	729	675	670	365*	632	531	461	401	-47*	07	-540*	59*	331	401	424	416	406	405	379	369	377	403	7155
08	384	421	416	396	421	448	466	507	371*	11	297	257	08	127	206	-183*	-76*	-572*	286	410	390	377	383	380	381	6564
09	460	391	416	556	396	400	432	356	337	388	163	180	09	301	59*	-342*	119	267	232	328	373	389	350	363	367	7281
10	390	411	429	439	433	424	397	408	396	407	388	380	10	383	213	205	237	309	271	363	364	349	345	351	372	8664
11	397	379	409	414	449	409	419	424	421	411	384	376	11	270	101	371	399	370	290	130	273	354	380	368	349	8547
12	330	361	362	366	374	383	380	383	386	387	390	389	12	390	324	246	383	361	346	344	359	354	345	341	353	8637
13	359	346	363	369	377	380	389	400	404	414	394	390	13	370	367	375	371	389	380	379	380	376	369	359	359	9059
14	369	366	380	396	389	393	412	457	449	464	441	390	14	391	381	377	381	359	367	350	350	361	356	335	354	9268
15	387	427	438	470	505	565	532	442	469	409	401	381	15	376	269	256	350	395	401	393	383	371	361	364	371	9716
16	377	377	379	378	421	393	390	400	396	394	408	416	16	408	376	321	237	216	159	161	206	309	343	409	399	8273
17	406	371	406	400	411	410	419	407	461	356	137	387	17	381	379	356	348	359	380	362	361	356	363	363	371	8950
18	379	390	381	413	366	378	380	391	391	400	251	251	18	329	358	338	319	331	381	376	380	369	364	364	366	8646
19	379	357	409	563	589	674	-273*	172	-358*	117*	60*	-74*	19	-200*	446	406	289	114	271	316	330	360	366	374	403	6090
20	506	429	428	411	400	456	442	292*	406	-177*	174*	463	20	399	357	104	-19	216	231	375	344	340	321	340	367	7605
21	384	400	420	404	400	386	456	458	388	370	356	330	21	319	376	372	378	383	351	339	341	351	346	339	353	9000
22	373	378	366	394	390	379	396	396	387	387	353	341	22	371	366	343	336	343	330	361	369	370	354	351	350	8774
23	353	360	387	391	459	477	436	421	350	406	389	384	23	366	303	279	349	370	379	366	350	333	333	339	344	8924
24	346	372	387	376	386	373	414	426	420	473	420	451	24	394	360	282	27	261	333	374	359	354	346	340	361	8635
25	370	423	647	469	370	518	555	446	243	225	23	326	25	393	400	386	369	346	374	380	370	363	356	353	357	9062
26	354	362	364	373	379	376	380	382	396	378	369	378	26	380	384	376	379	360	371	366	364	364	362	360	354	8905
27	356	346	356	364	370	390	386	389	395	399	359	349	27	399	381	384	387	389	386	385	378	378	366	364	357	9013
28	359	357	352	361	374	379	380	384	391	381	387	306	28	387	384	373	346	360	376	393	389	387	386	380	374	9026
29	379	370	383	422	456	596	601	564	13*	172	179	-191*	29	-78*	320	340	419	413	401	380	357	349	324	350	366	7885
30	364	378	394	409	424	413	410	414	444	416	406	386	30	360	258	284	393	394	386	370	349	329	332	339	363	9015
31													31													

SCALED BY	SPT	Preliminary base-line and scale values: Interval Beginning Base-line Value Scale Value	() Interpolated	[] Scaling uncertain because of magnetic storm.	MONTHLY SUM	257578
CHECKED BY	JEP		[] Significant portion of hour interpolated.	<> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.	MONTHLY MEAN	358
SIGNS REVIEWED BY	JEP		[] No record; or no values available because of faulty record.		DATES WITH GAPS:	
PUNCHED BY			* Derived from Storm Mgh., converted to Normal Mgh.			

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

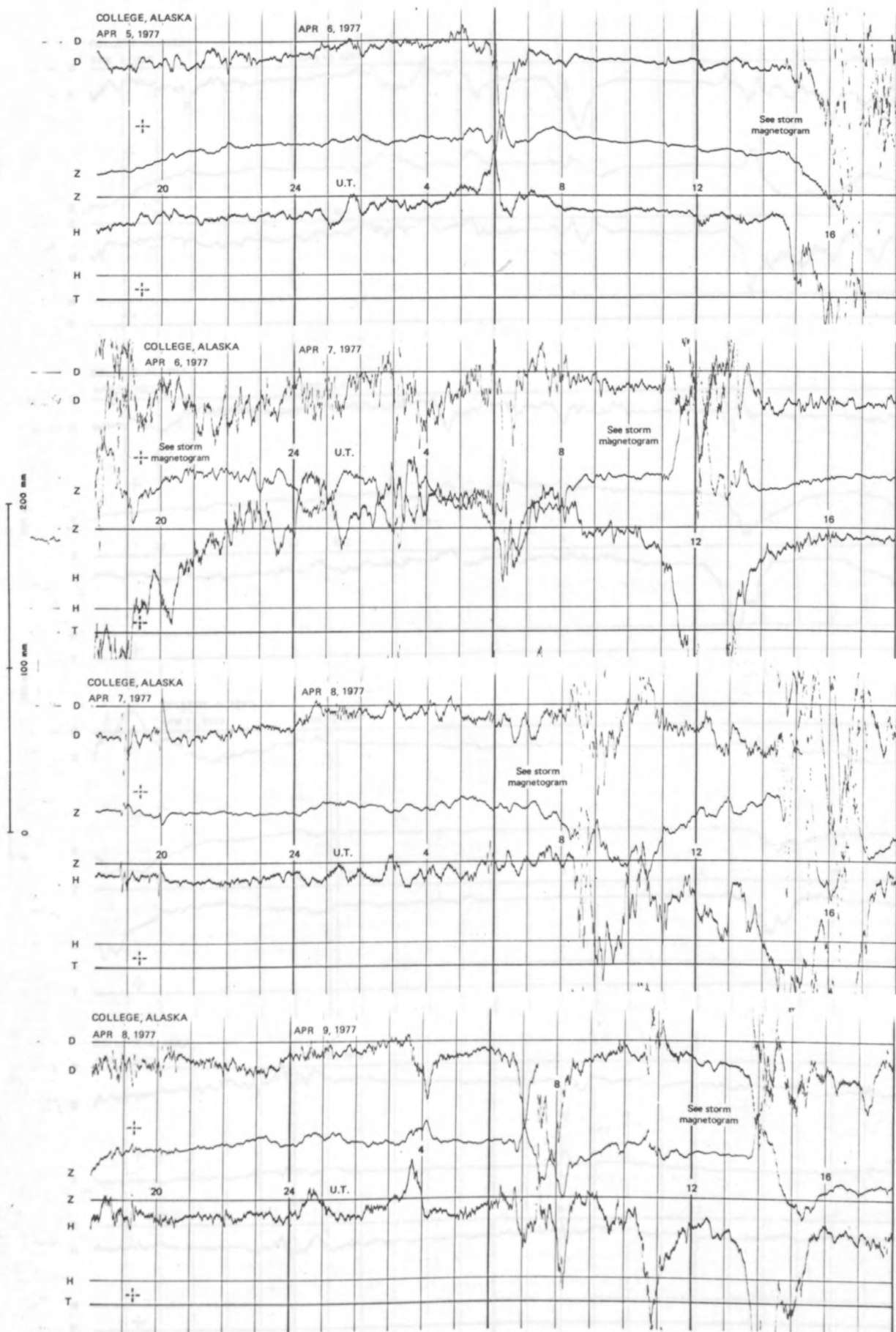


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

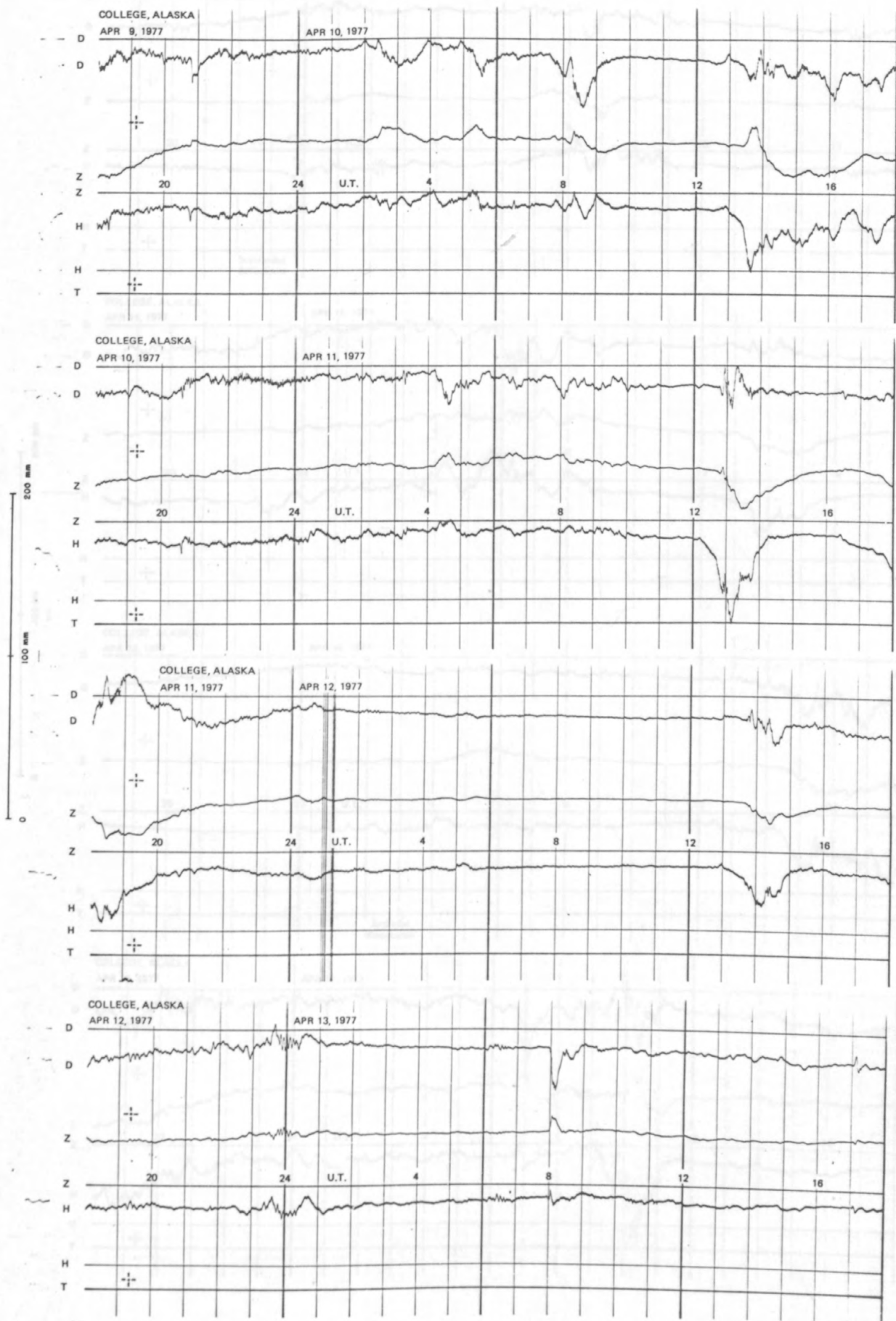
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

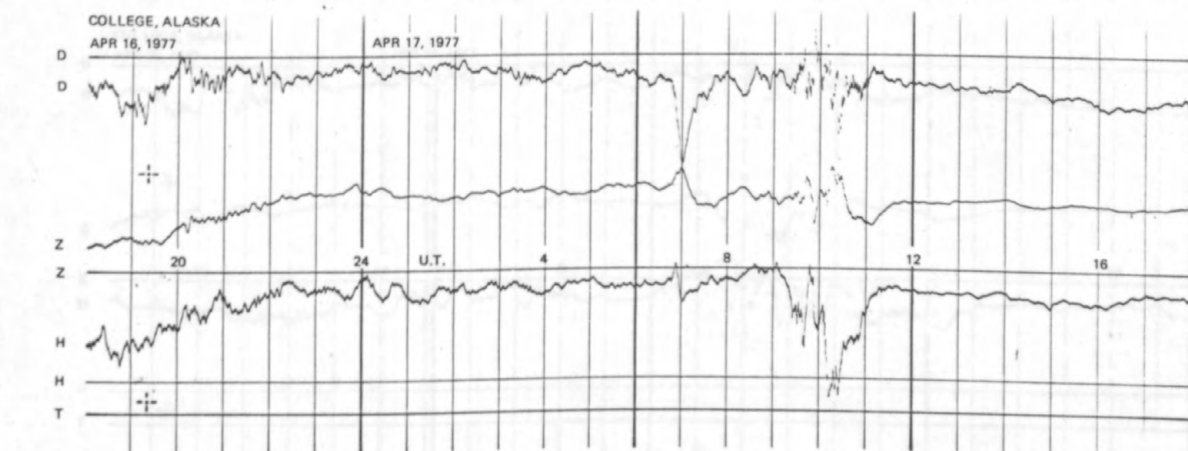
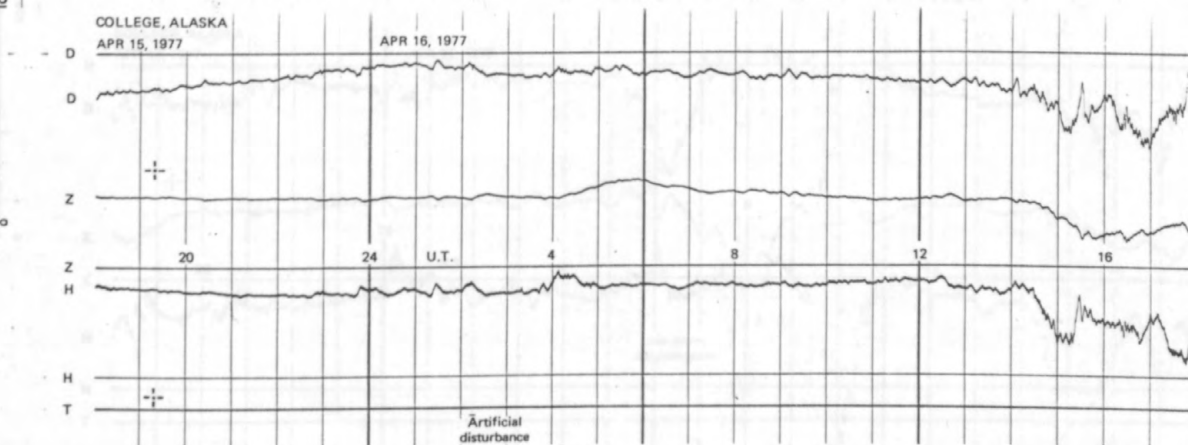
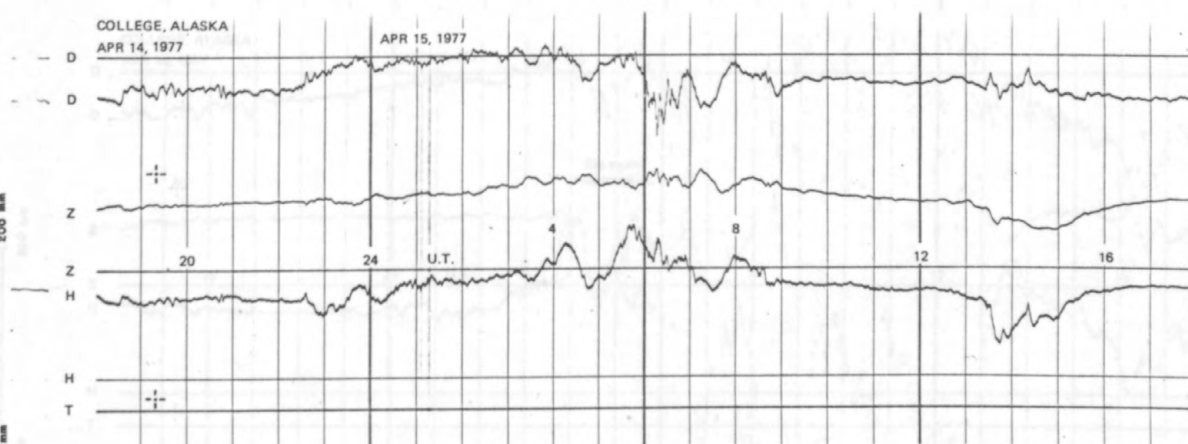
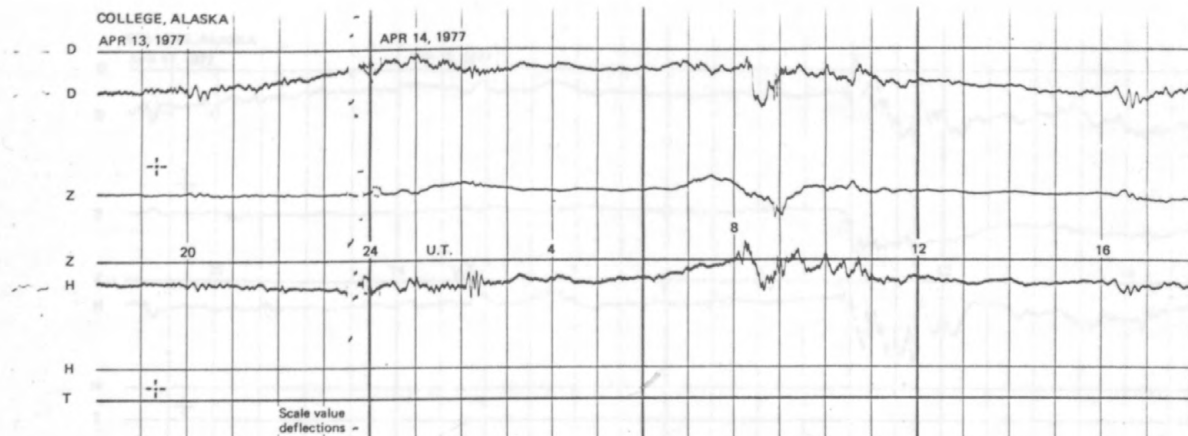


NORMAL MAGNETOGRAMS



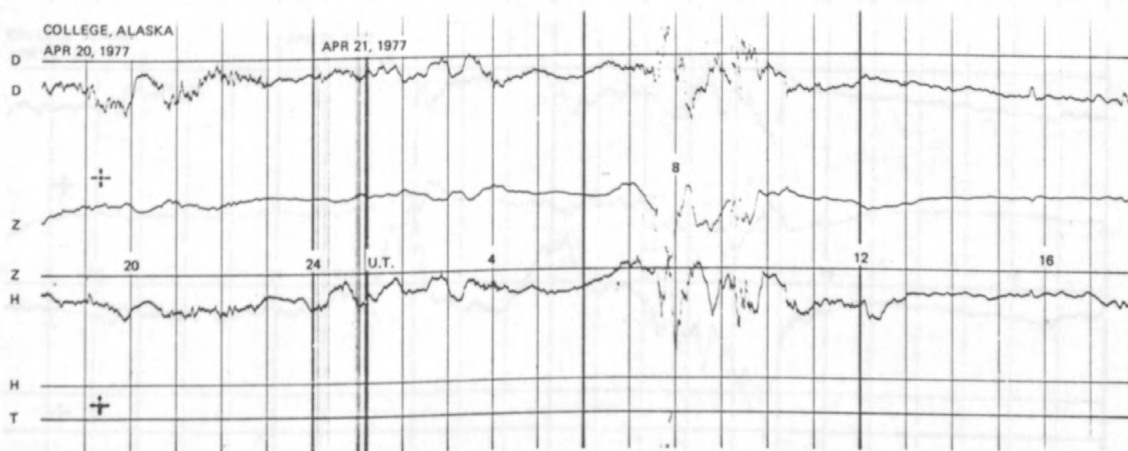
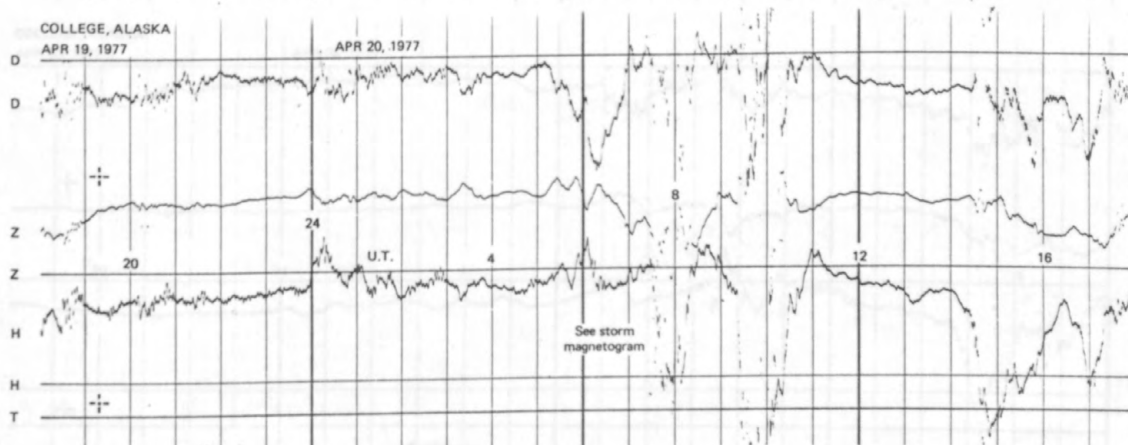
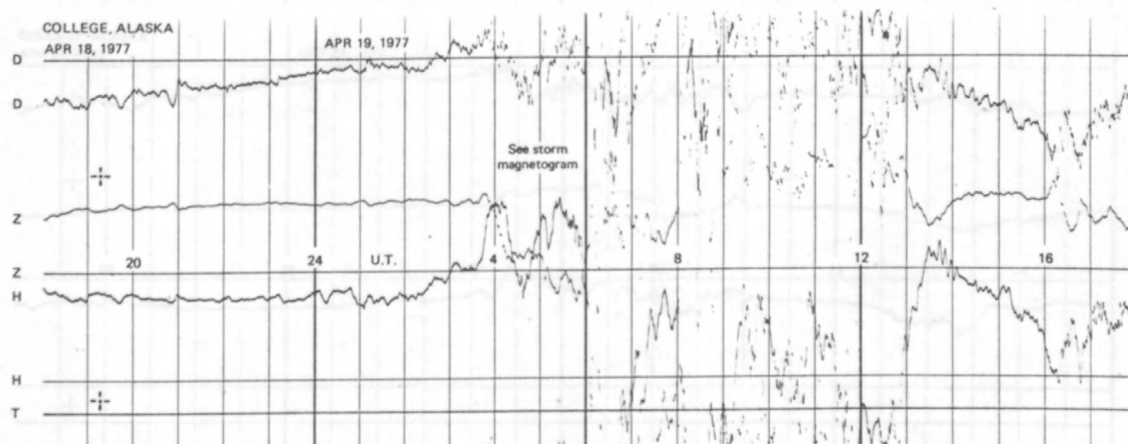
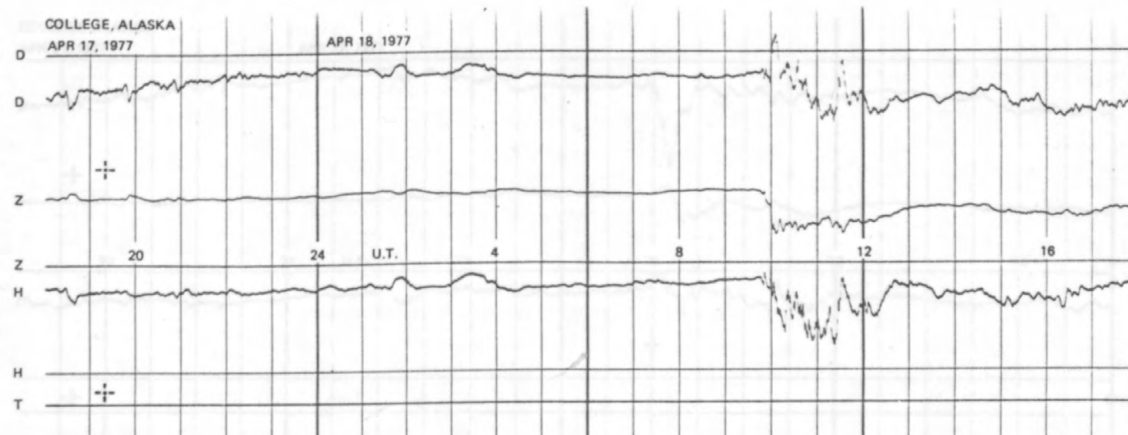
NORMAL MAGNETOGRAMS

200 mm
100 mm
0

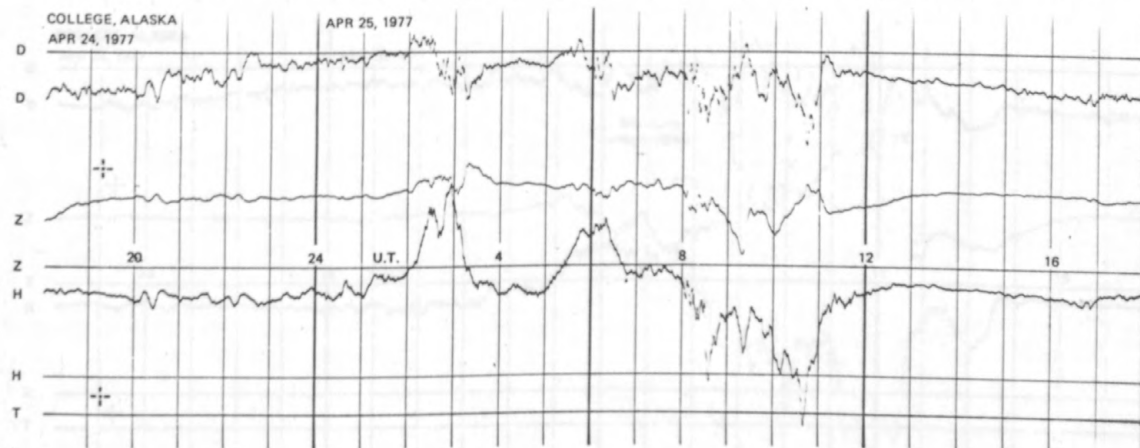
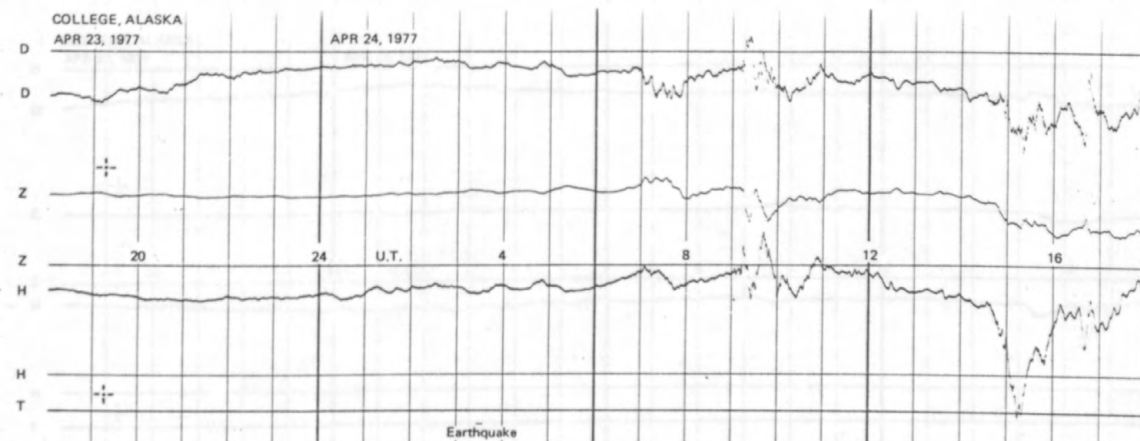
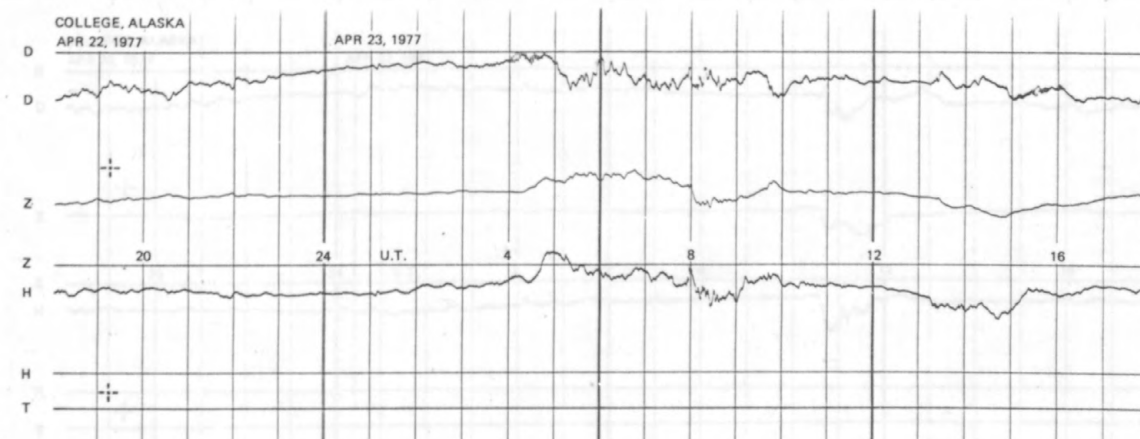
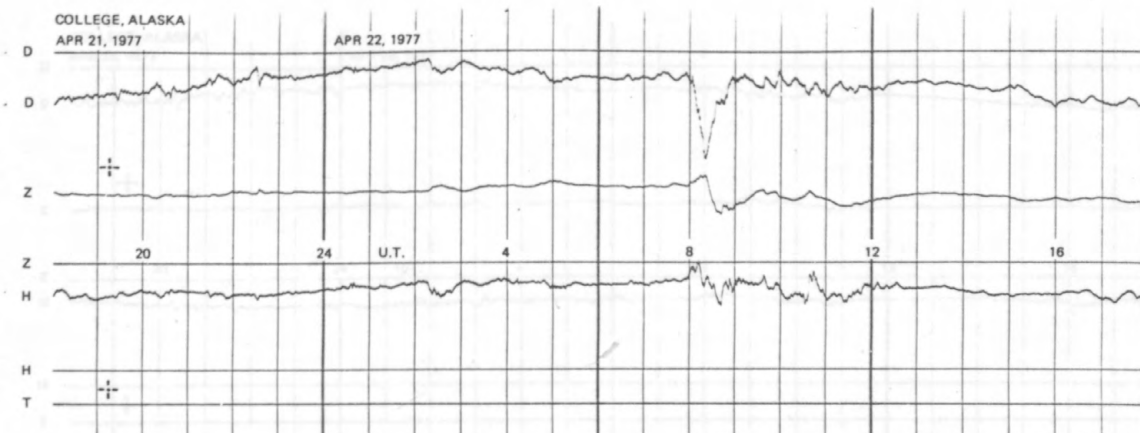


NORMAL MAGNETOGRAMS

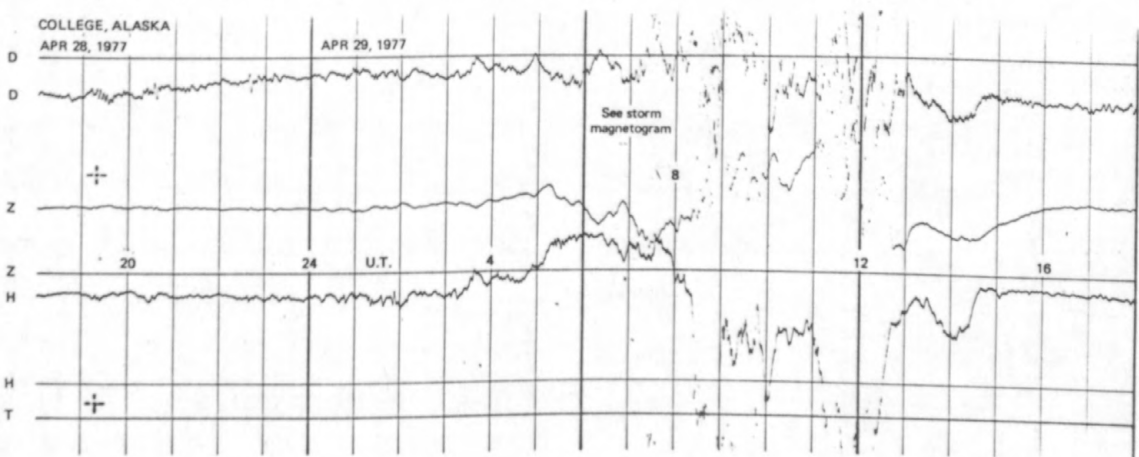
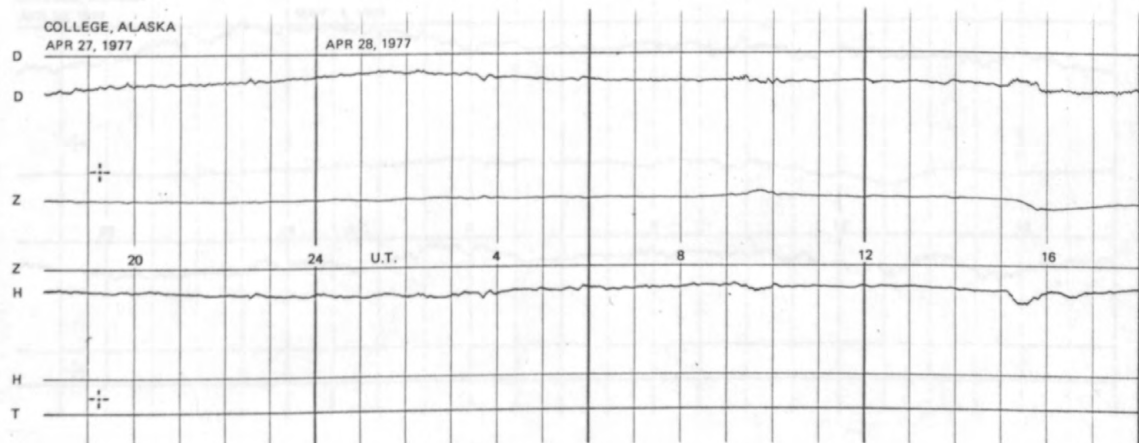
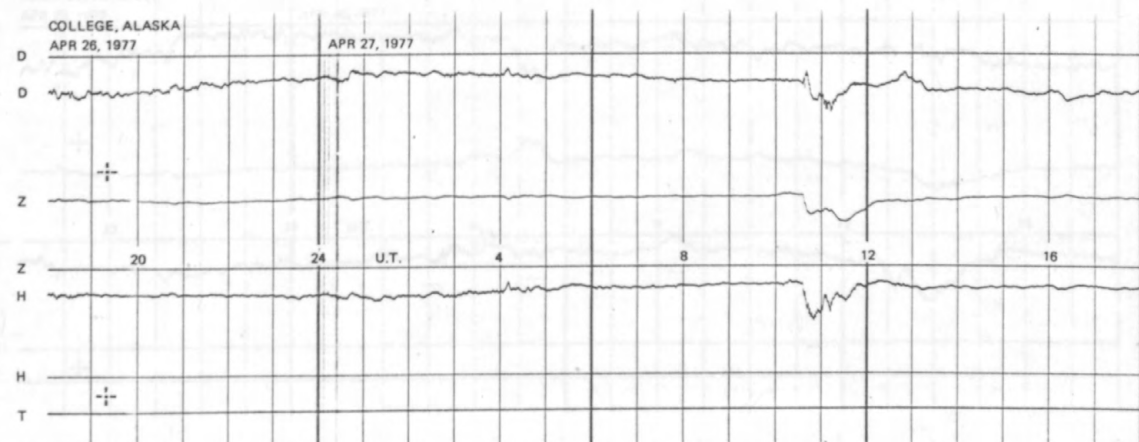
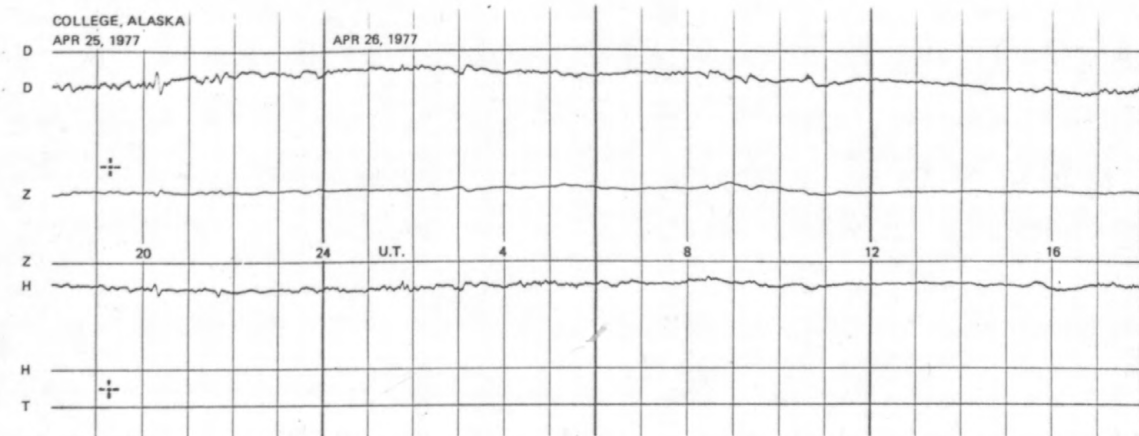
200 mV
100 mV
0



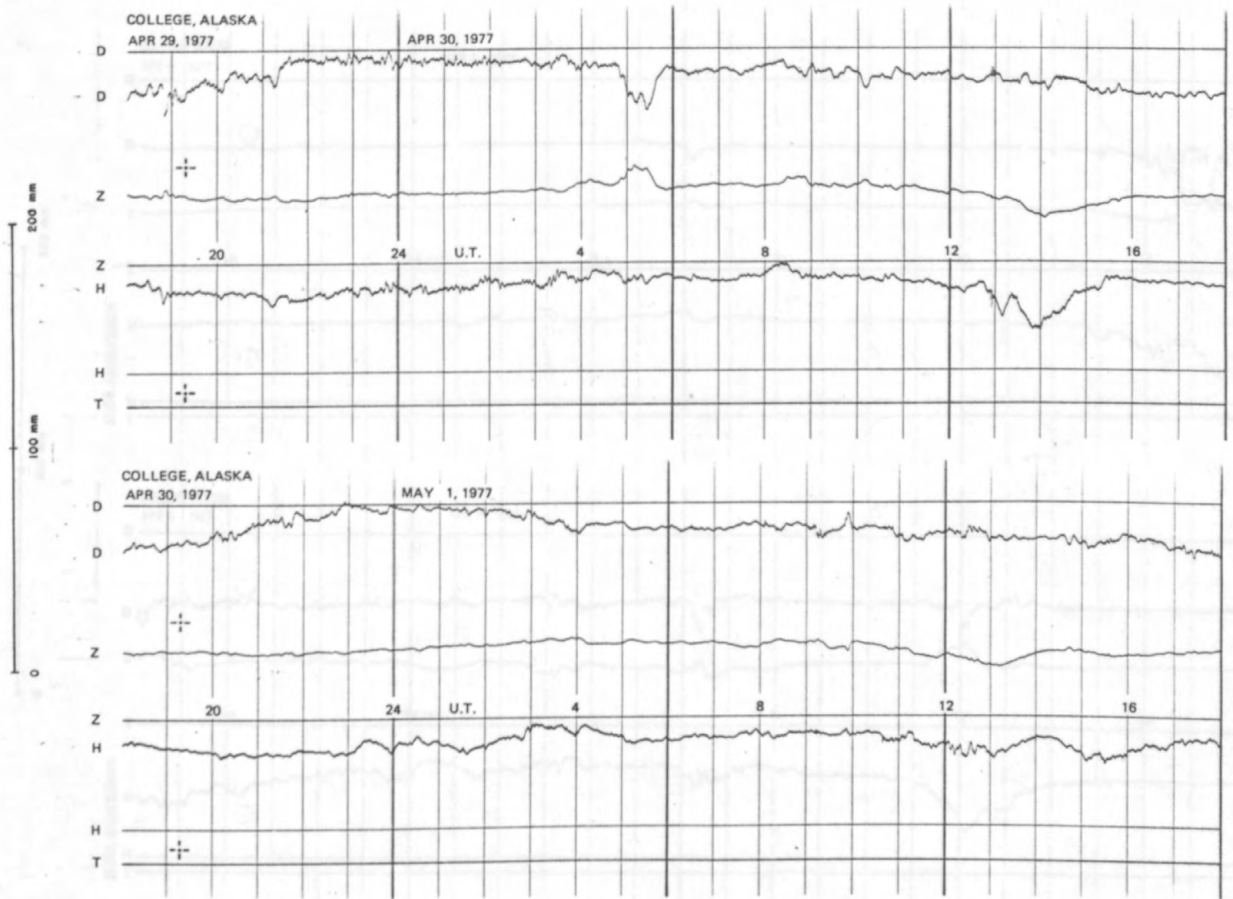
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

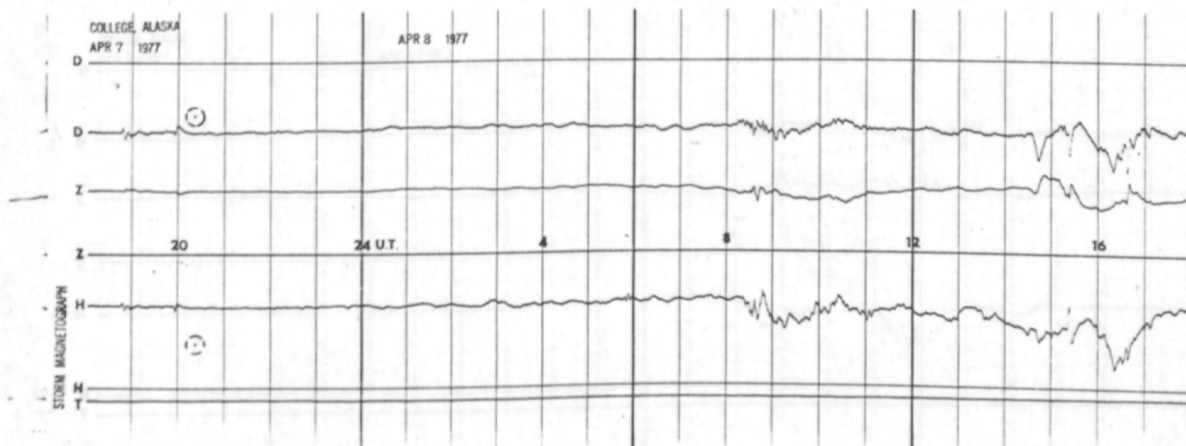
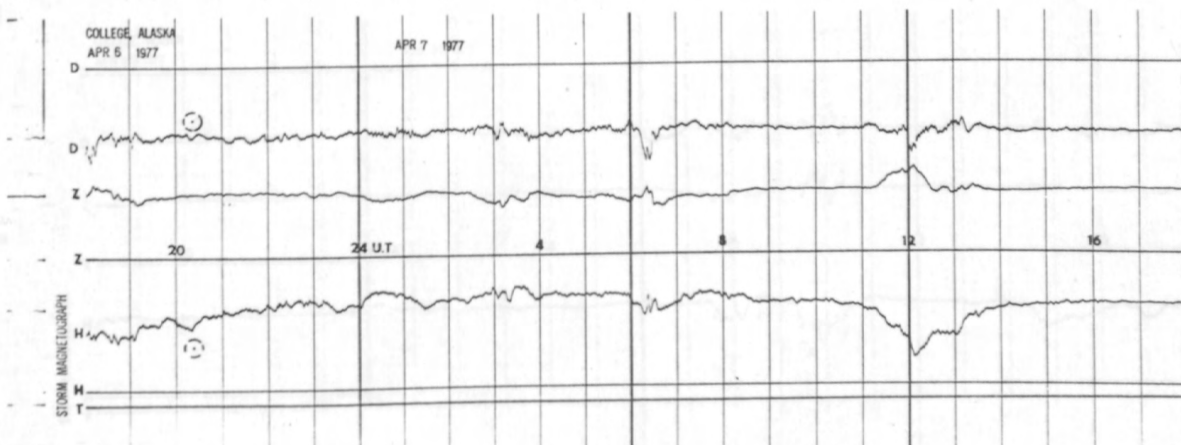
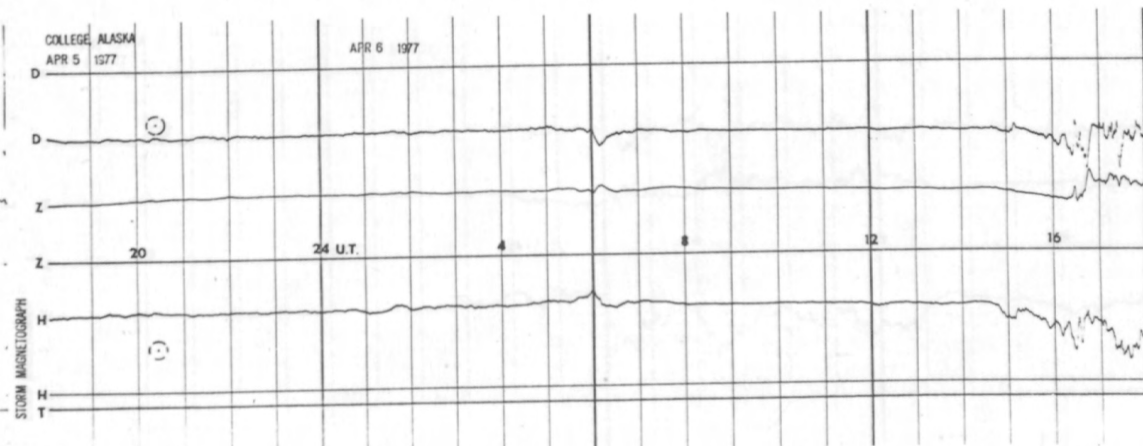
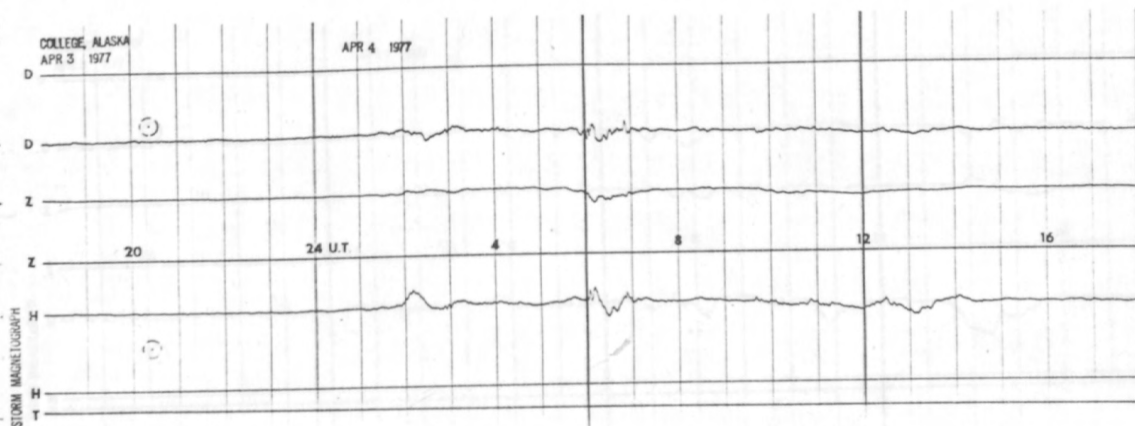


NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS

200 mm
100 mm
0



STORM MAGNETOGRAMS

200 mm
100 mm
0

