

807  
80  
77-300-D

UNITED STATES DEPARTMENT OF THE INTERIOR

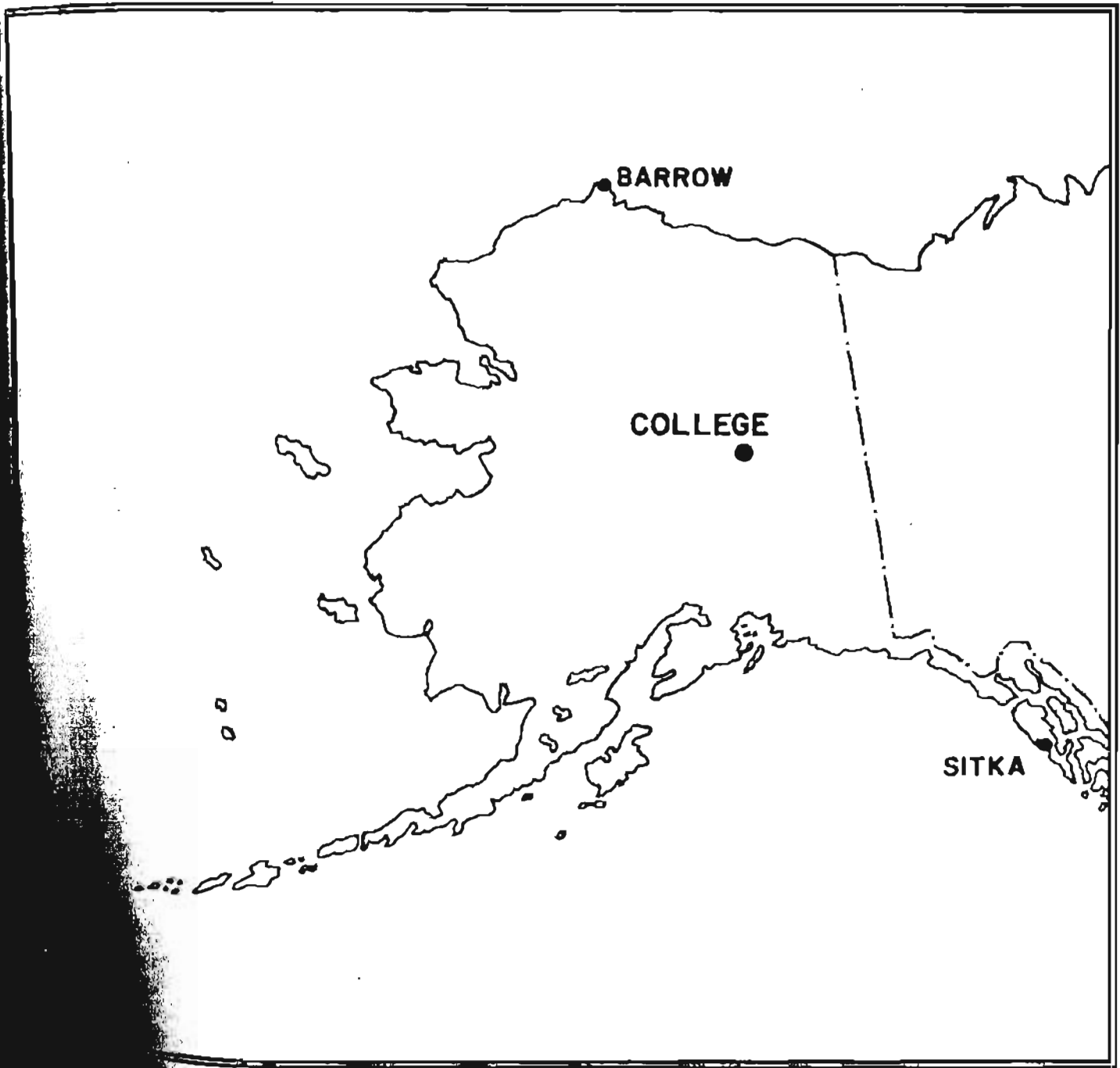
U.S. GEOLOGICAL SURVEY, [Reports - Open File  
Data]

PRELIMINARY GEOMAGNETIC DATA  
COLLEGE OBSERVATORY  
FAIRBANKS, ALASKA

7/4  
open file

APRIL 1977

OPEN FILE REPORT 77-300D



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25 7027

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°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 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	sk*
0 < 25	0	0
25 < 50	1	3
50 < 100	2	7
100 < 200	3	15
200 < 350	4	27
350 < 600	5	42
600 < 1000	6	60
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
0-25	0
25-50	0
50-100	1
100-200	2

Assignment of C was discontinued at 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:

$$D = B_D \cdot d \cdot S_D; H = B_H \cdot h \cdot S_H; Z = B_Z \cdot z \cdot S_Z$$

where D, H, and Z are absolute values;  
B<sub>D</sub>, B<sub>H</sub> and B<sub>Z</sub> are base-line values;  
S<sub>D</sub>, S<sub>H</sub> and S<sub>Z</sub> are scale values;  
and d, h, and z are scalings in millimeters.



# OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY  
COLLEGE, ALASKA

MONTH  
APRIL

YEAR  
1977

DATE	TIME U. T.	NATURE OF PHENOMENON <sup>1</sup>	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	

RECORDED 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.

PRINCIPAL MAGNETIC STORMS  
 COLLEGE OBSERVATORY, COLLEGE, ALASKA  
 APRIL 19 77

WDC/A FOR SOLAR-TERRRESTRIAL PHYSICS  
 ENVIRONMENTAL DATA SERVICE, NOAA  
 BOULDER, COLORADO 80502 U.S.A.

CC	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)
00	64.6 N	06	14XX	..	..	..	..	07	5	7	185	1600	830	09 21
								08	6	7				
		19	01XX	..	..	..	..	19	3	7	288	1410	910	20 18
								20	4	7				
		29	03XX	..	..	..	..	29	3	7	136	1160	590	29 15

(Polar Storm)

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

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

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

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
28°19.9 E	13047x	55367x

\* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

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





FORM C-10-54  
10-17-57

MAGNETOGRAM HOURLY SCALINGS  
(UNIVERSAL TIME)

U.S. DEPARTMENT OF COMMERCE  
ENVIRONMENTAL RECORD SERVICE  
COAST AND GEODETIC SURVEY  
WASHINGTON, D.C. 20540

OBSY. YEAR MONTH YEAR  
CO 77 APR 11

Values are in units of mG, and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (150W) is hour 11 of the 1-1000 universal day.  
Negative data points have been applied. Negative values are in red, with minus signs before.

Hour	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	380	374	377	349	380	391	393	384	390	374	349	348	9338	
02	373	379	389	401	403	403	405	429	453	393	347	349	389	400	391	397	396	396	391	387	380	270	370	369	9380	
03	361	389	407	410	401	393	411	441	433	397	393	146	364	400	396	390	386	380	344	359	357	351	347	346	9144	
04	363	410	527	479	440	487	448	472	473	430	356	270	287	264	382	379	346	346	376	324	346	330	351	347	9287	
05	406	409	383	377	383	381	384	400	406	342	373	389	339	313	357	320	309	271	300	346	363	340	360	369	8619	
06	375	381	424	428	466	576	461	464	392	386	393	380	349	330	287	-21	263*	-603*	-235*	30	132	386	536	409	6521	
07	729	536	643	729	675	670	365*	632	531	461	401	-117*	-540*	59*	331	401	424	416	406	405	379	369	377	403	9755	
08	384	421	416	396	421	448	466	507	371	11	297	257	127	206	-183*	-76*	-572*	286	410	390	377	383	380	361	6564	
09	450	391	416	556	396	400	432	356	337	388	163	180	301	59*	342*	119	267	232	328	373	389	350	363	367	7281	
10	390	411	429	439	423	424	397	408	396	407	388	380	393	413	205	237	309	271	363	364	349	345	351	372	5664	
11	397	379	409	414	449	409	419	424	421	411	384	376	270	101	371	399	370	290	130	273	354	380	368	349	8547	
12	330	341	362	366	374	383	380	383	386	387	390	389	390	324	246	363	361	346	344	359	354	345	341	353	8237	
13	359	346	363	369	377	380	389	400	404	414	394	390	370	367	375	371	389	380	379	380	376	369	369	359	9059	
14	369	366	380	396	389	393	412	457	419	464	441	390	391	381	377	381	359	367	350	350	361	356	335	354	9268	
15	397	427	428	470	505	525	532	442	469	409	401	381	376	269	256	350	395	401	393	383	371	361	364	371	9716	
16	371	377	379	378	421	393	390	400	396	394	408	416	408	376	321	237	216	159	161	206	309	343	409	359	8273	
17	406	371	406	400	411	410	419	407	461	356	137	387	381	379	356	348	359	380	362	361	356	363	371		8950	
18	379	390	381	413	366	378	380	391	391	400	251	251	329	358	338	319	331	381	376	380	369	364	364	360	8646	
19	379	357	409	563	589	674	273*	172	-358*	117*	60*	-74*	-200*	446	406	289	114	271	316	330	360	366	374	403	6090	
20	506	429	428	411	460	456	442	292*	406	-177*	174*	463	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	319	376	372	378	383	351	339	341	351	346	339	353	9000	
22	373	379	366	394	390	379	396	396	387	387	353	341	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	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	394	360	282	27	261	333	374	359	354	346	340	301	8635	
25	370	423	647	469	370	518	555	446	243	225	23	326	393	400	386	349	346	374	380	370	363	356	353	357	9062	
26	354	362	364	373	379	376	380	382	396	378	369	378	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	399	381	384	387	389	386	385	378	366	364	357		9013	
28	359	357	352	361	374	379	380	384	391	381	387	386	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	380	357	389	389	324	350	7885	
30	364	378	394	409	424	413	410	414	444	416	406	386	360	258	284	393	394	386	370	349	329	332	339	363	9015	
31																										

SCALED BY: SPT  
CHECKED BY: JEP  
REVISIONS BY: JEP  
PUNCHED BY:

Preliminary base-line and scale values:  
Interest 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 Map, converted to X-mal Npph.
- ( ) 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: 257578  
MONTHLY MEAN: 358  
DATE WITH GAPS:

FD-504 (Rev. 4-15-64)

MAGNETOGRAM HOURLY SCALINGS  
(UNIVERSAL TIME)

U.S. DEPARTMENT OF COMMERCE  
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION  
COAST AND GEODETIC SURVEY  
GEOMAGNETISM DIVISION

MOSEY. YEAR MONTH DAY  
CO 77 APR 2

Values are in units of  $\gamma$  and are correct for conversion periods of one hour beginning at midnight. Hour 01 of each day is 2500 LT. Hour 11 of the scale is universal day.  
Greater corrections have been applied. Negative values are in red, with minus signs shown.

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	303	300	309	311	315	316	326	370	350	354	334	310	298	285	291	295	297	306	306	301	298	302	306	305	7506	
02	306	309	311	313	318	322	338	358	361	333	287	279	261	289	299	301	318	317	320	316	316	308	301	298	7461	
03	301	300	341	356	347	336	344	360	338	273	310	253	236	297	308	311	315	319	307	301	301	299	307	313	7473	
04	317	317	392	397	423	372	145	310	348	324	207	171	193	224	278	270	280	288	282	292	300	312	309	312	7077	
05	330	348	322	317	314	315	318	316	304	240	248	290	263	236	245	238	207	156	151	191	258	287	311	321	6550	
06	318	341	334	342	344	366	359	386	358	329	328	306	378	257	254	91	176*	449*	372*	188	316	338	316	296	7542	
07	139	279	186	90	182	118	729*	131	257	311	312	544*	487	278	240	281	311	308	321	303	291	306	297	296	6939	
08	326	356	333	327	343	363	329	301	181*	59	21	207	306	319	449*	227*	86*	76	251	300	297	318	340	351	6466	
09	369	368	335	345	369	333	332	238	156	286	322	260	271	219	229	-32	58	69	119	210	287	299	318	321	6181	
10	319	320	362	346	328	361	329	331	316	276	305	308	307	329	155	126	174	228	247	266	281	291	306	322	6333	
11	323	341	350	329	265	356	396	387	367	350	331	320	306	137	213	292	314	291	132	128	220	279	293	317	7137	
12	320	316	312	313	318	319	316	316	316	316	311	311	308	290	216	251	281	282	267	270	276	283	296	319	7123	
13	318	318	310	310	311	313	312	318	341	332	321	307	293	291	289	269	299	308	303	301	299	289	298	299	7379	
14	307	330	325	316	313	311	321	359	284	298	321	309	308	300	300	299	294	271	281	291	293	301	306	301	7349	
15	223	232	352	286	297	373	399	380	381	339	318	302	293	242	186	226	284	306	310	310	306	306	304	303	7658	
16	307	309	314	306	326	377	356	327	326	313	299	291	303	294	269	166	147	175	127	144	226	275	329	350	6656	
17	344	320	333	349	335	359	371	310	323	310	317	266	297	306	291	290	279	267	304	301	300	299	306	306	7500	
18	313	320	319	313	320	314	310	311	313	315	160	173	207	250	247	220	211	237	269	284	296	296	304	304	6606	
19	303	306	310	304	92	-44	189*	169	546*	530	396*	526*	527	254	321	319	276	221	186	285	301	300	316	341	7276	
20	326	334	339	343	337	364	293	124	192	393*	215*	306	319	293	293	221	152	166	276	306	301	302	323	332	6850	
21	327	342	336	340	348	334	336	194	241	267	327	300	274	307	319	320	321	320	309	306	303	308	320	319	7418	
22	318	318	328	333	344	347	337	343	304	301	290	263	293	307	298	280	284	276	279	290	306	306	309	307	7361	
23	310	316	320	324	346	389	397	370	283	326	324	318	313	276	234	254	277	310	316	311	312	302	307	304	7539	
24	306	316	320	329	326	339	334	360	327	277	290	326	326	317	280	184	166	156	250	293	300	306	307	309	7050	
25	310	319	349	334	359	343	336	349	263	176	266	257	267	326	330	328	320	306	313	316	314	316	314	320	7531	
26	321	319	322	323	327	336	324	328	336	336	313	309	313	315	316	311	310	309	306	304	296	294	297	301	7566	
27	308	309	309	309	309	307	306	307	308	309	287	228	284	294	303	307	308	304	304	300	299	298	295	300	7195	
28	304	302	307	307	306	306	306	306	308	323	313	307	304	301	300	277	259	276	289	291	287	287	284	284	7134	
29	279	286	296	298	324	322	249	176	352*	437	460	505*	294*	196	175	263	311	309	307	297	291	286	296	307	7316	
30	309	309	317	326	356	373	339	341	356	337	336	320	303	254	220	266	289	296	296	299	291	289	296	304	7422	
31																										

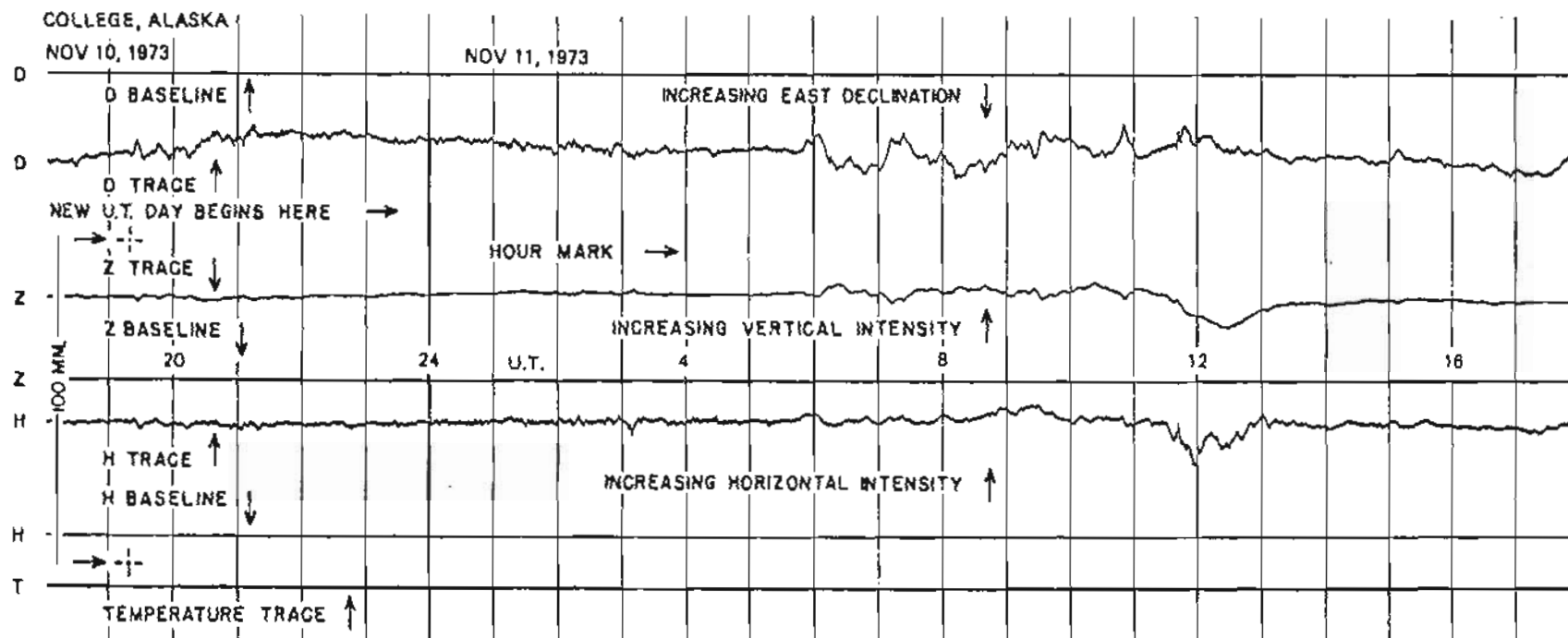
SCALED BY: SYT  
CHECKED BY: JEP  
SIGNS RECORDED BY: JEP  
PULSED BY:

Preliminary baseline 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 not kept for part or all of hour; if value is given, same was estimated for missing part.  
\* Derived from SL07B Meph., converted to Natural Meph.

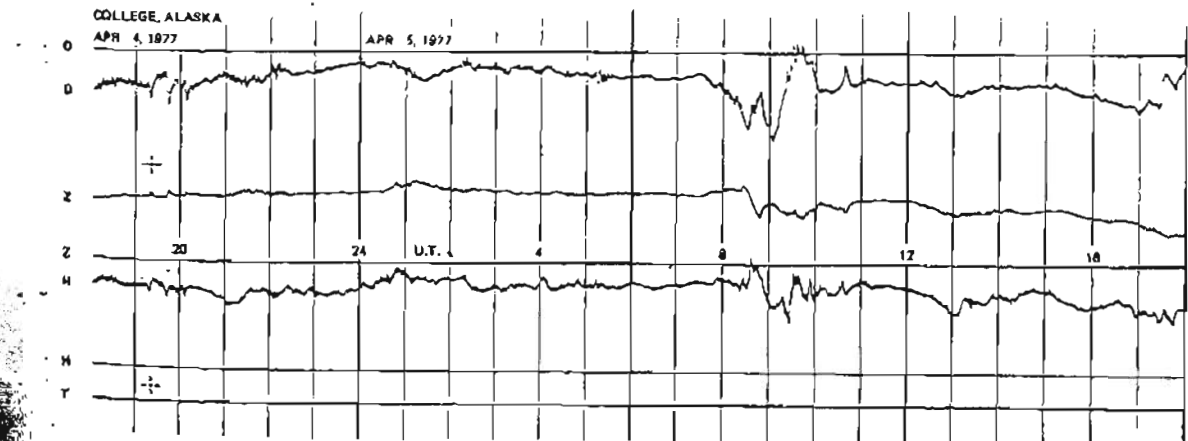
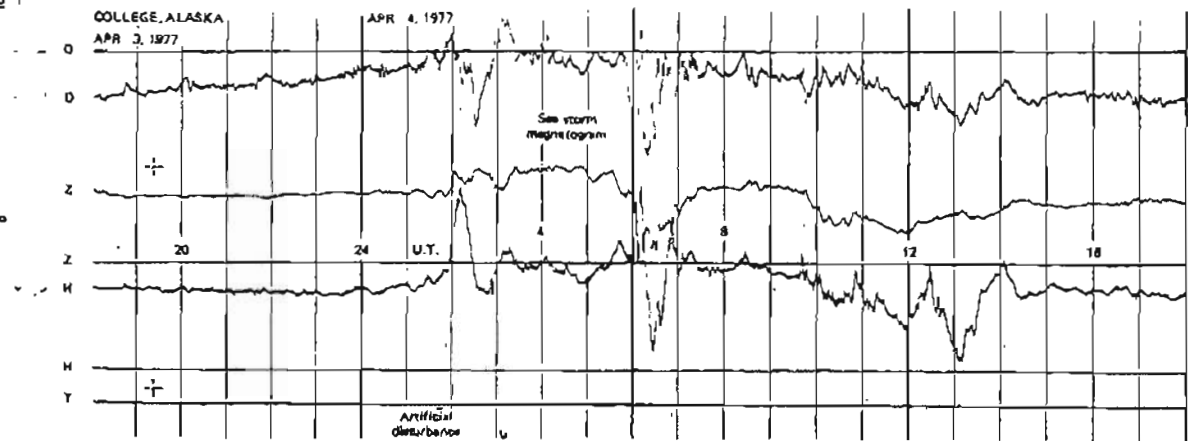
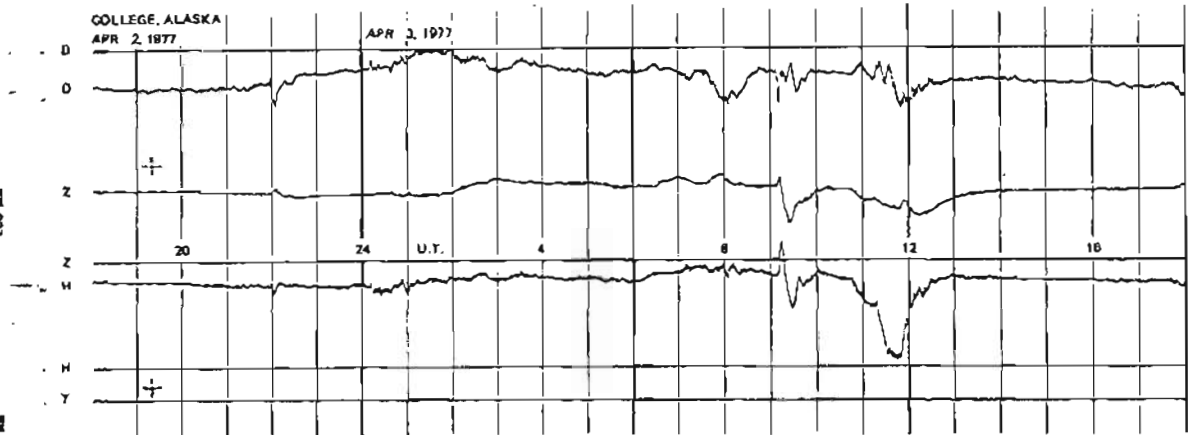
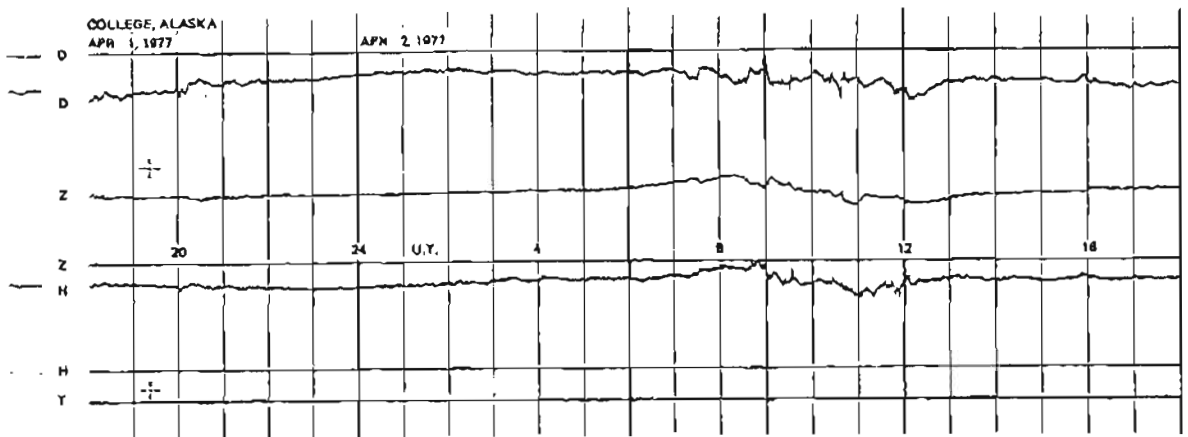
MONTHLY SUM: 215274  
MONTHLY MEAN: 299  
DAILY WITH GAPS:

# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

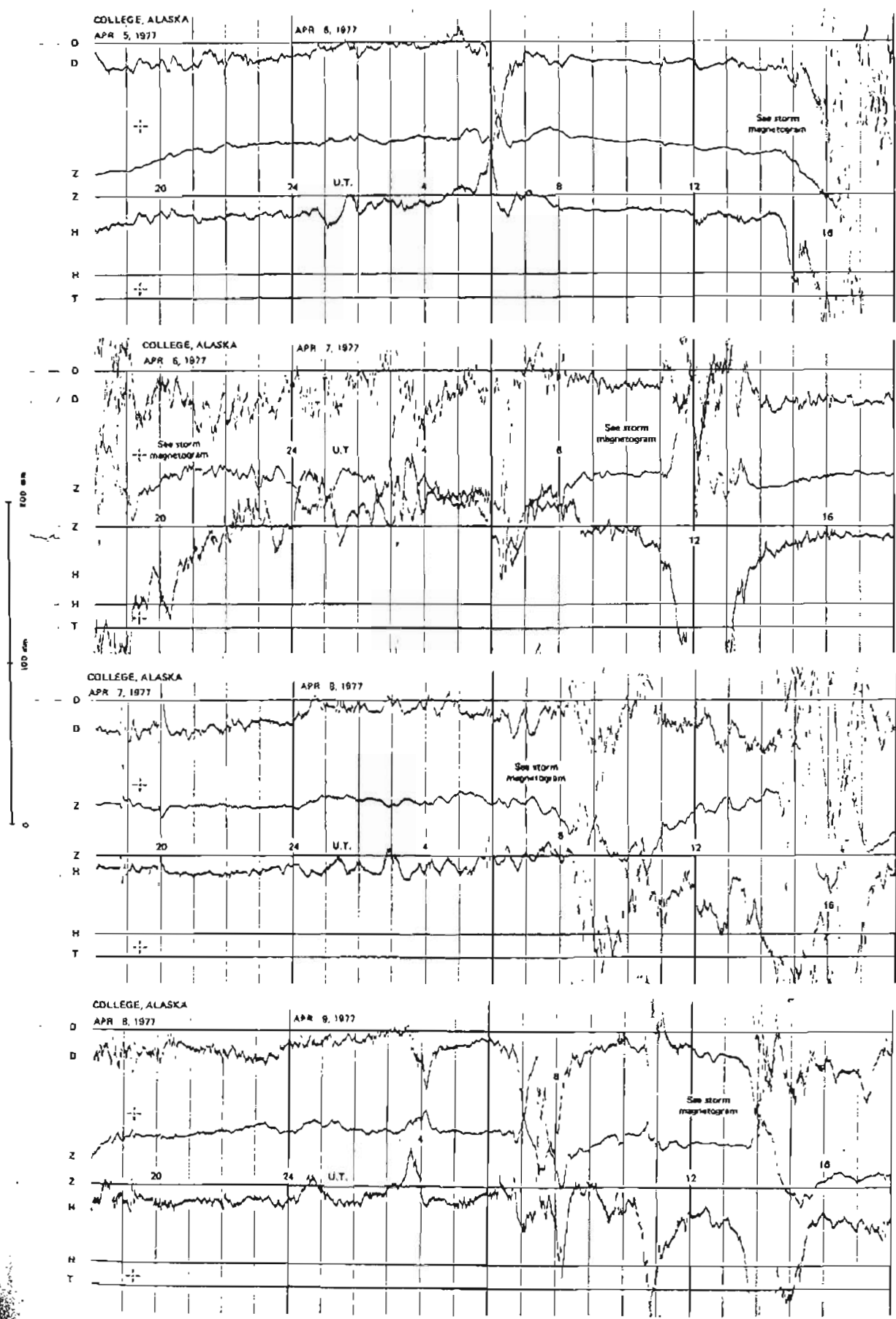


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS



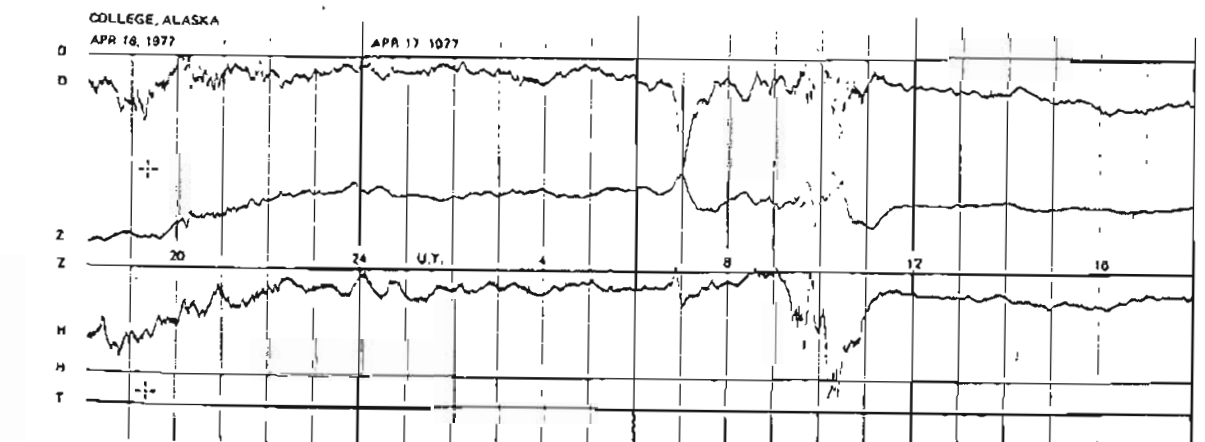
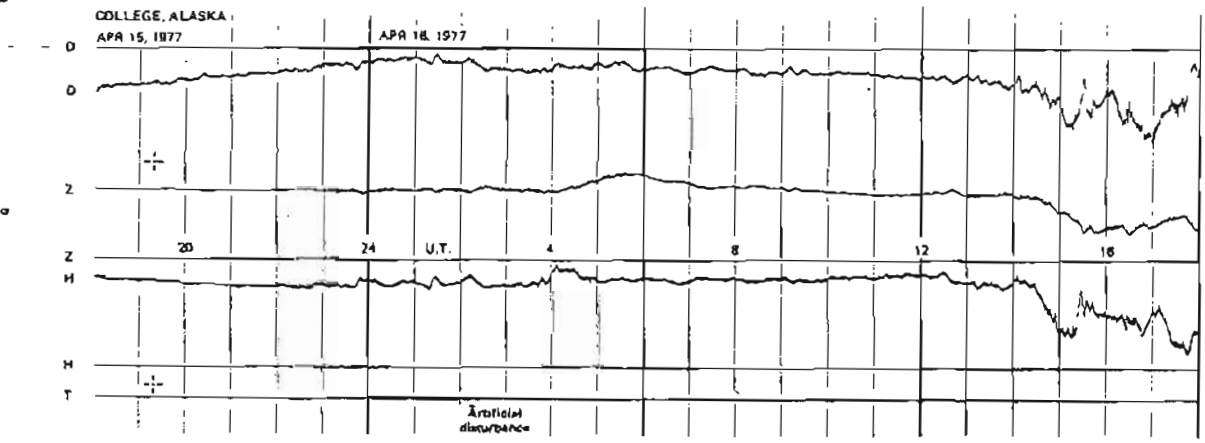
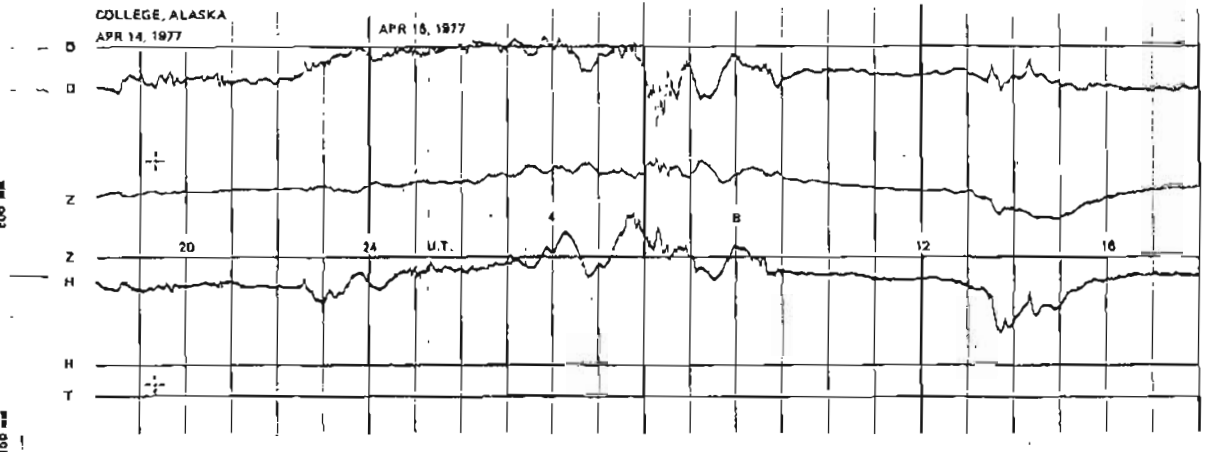
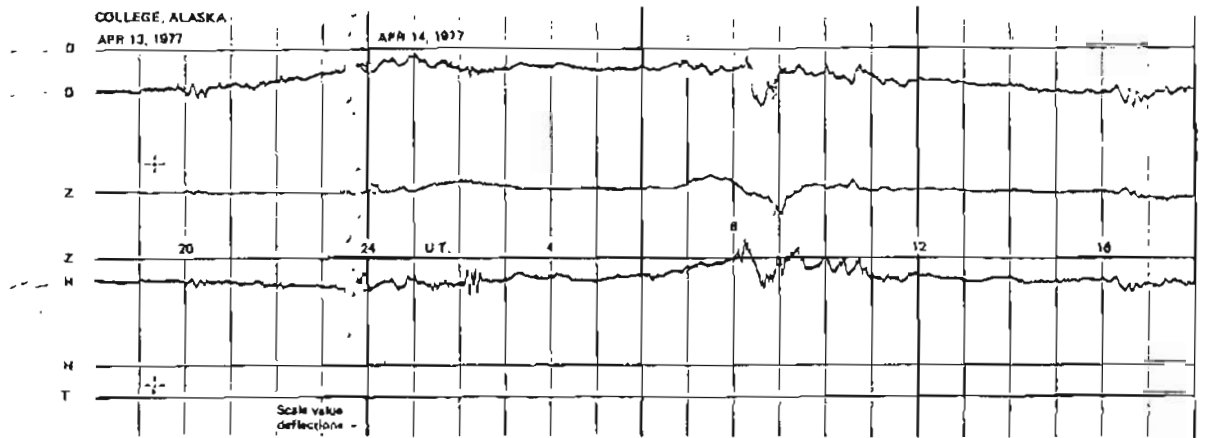
NORMAL MAGNETOGRAMS



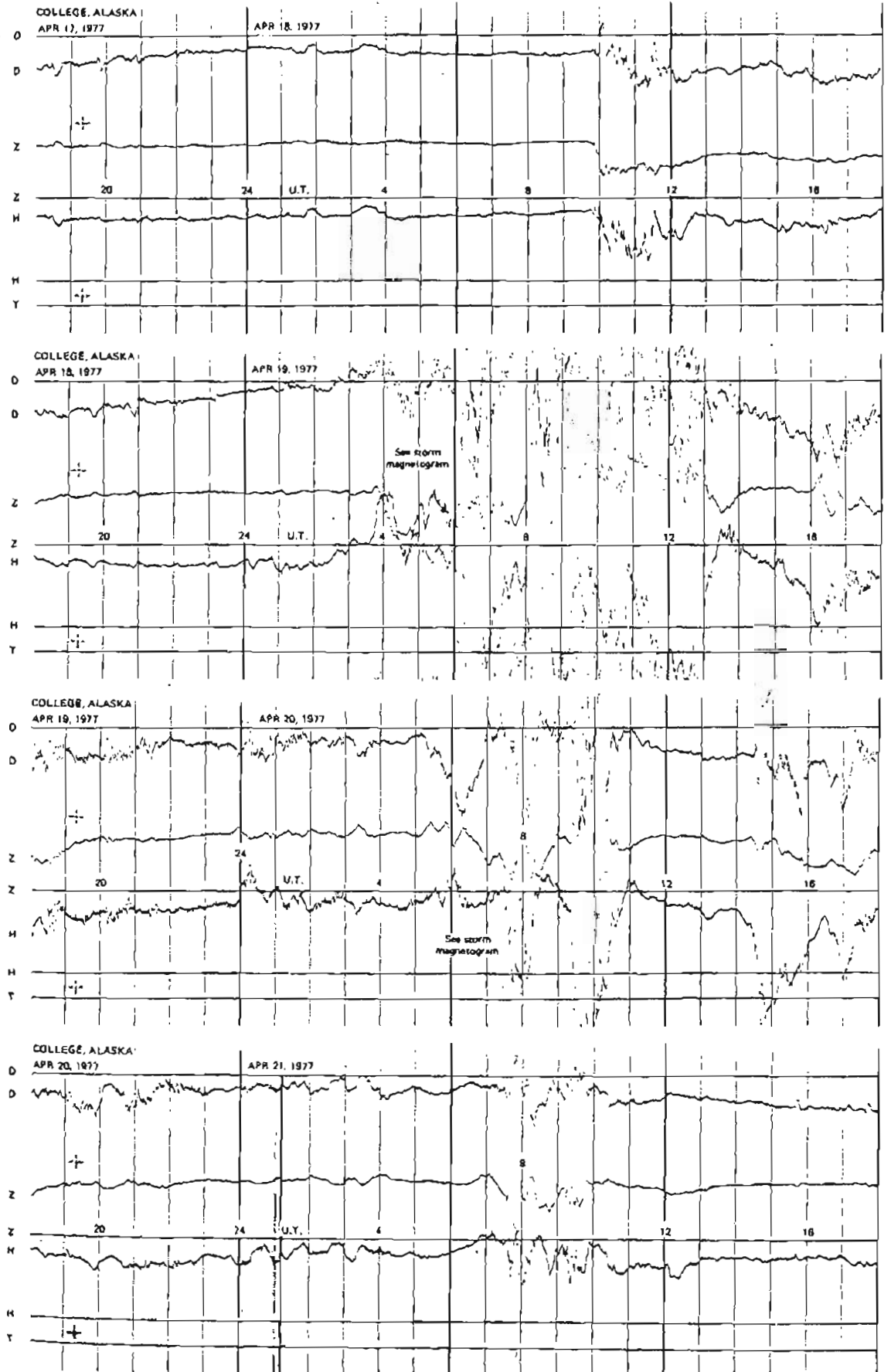
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS



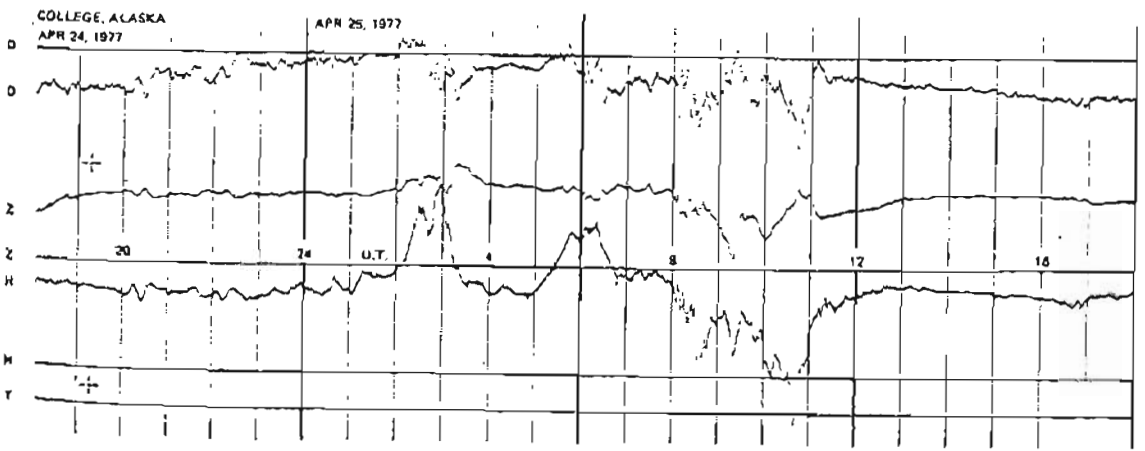
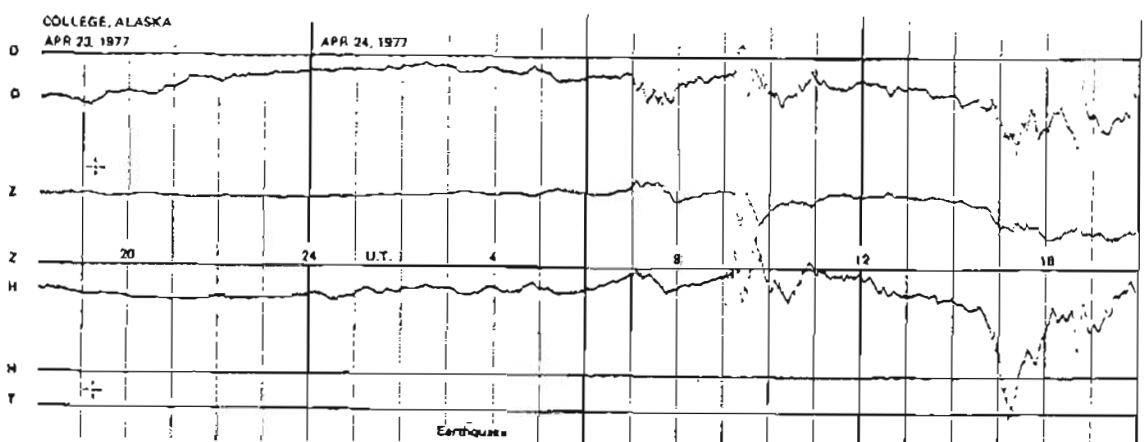
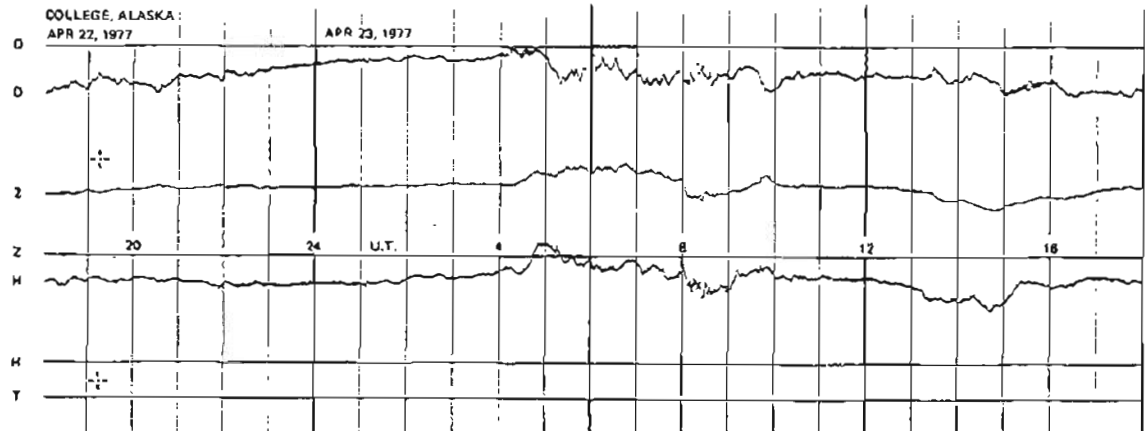
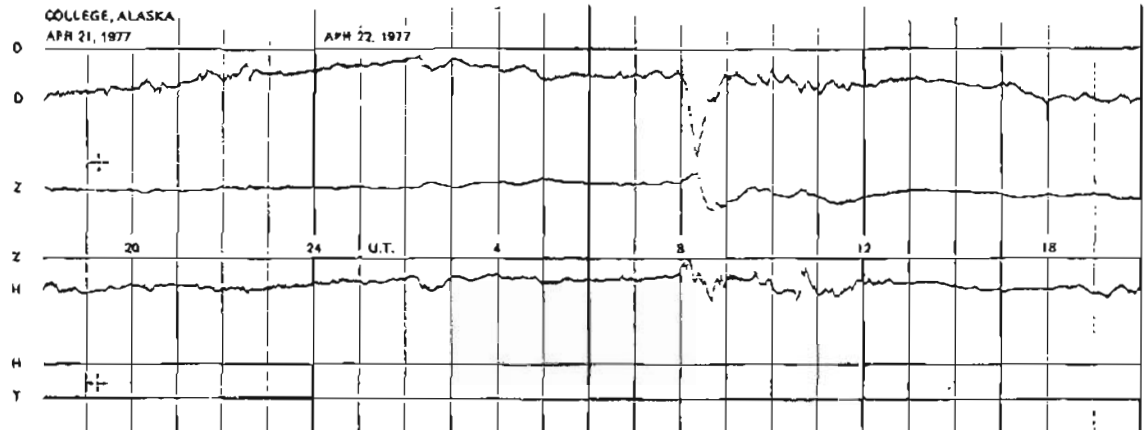
NORMAL MAGNETOGRAMS



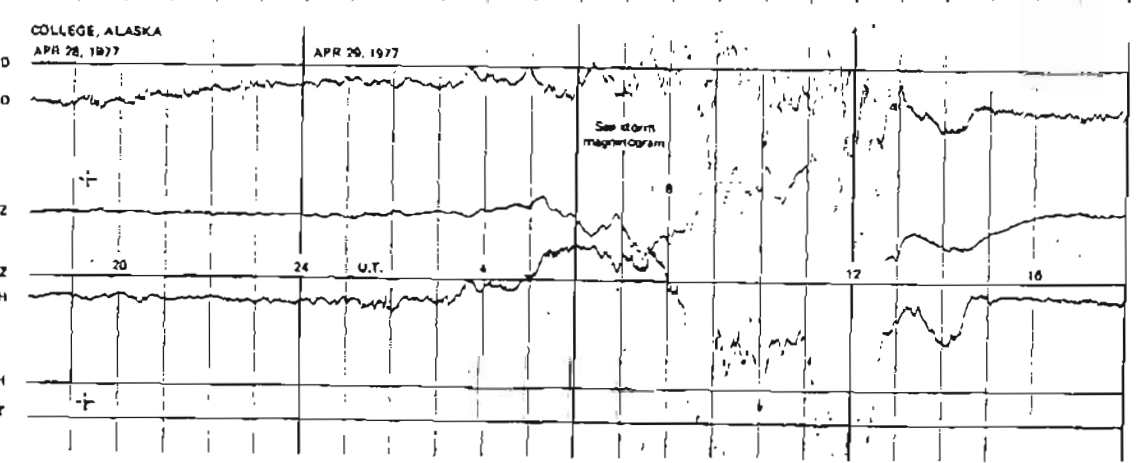
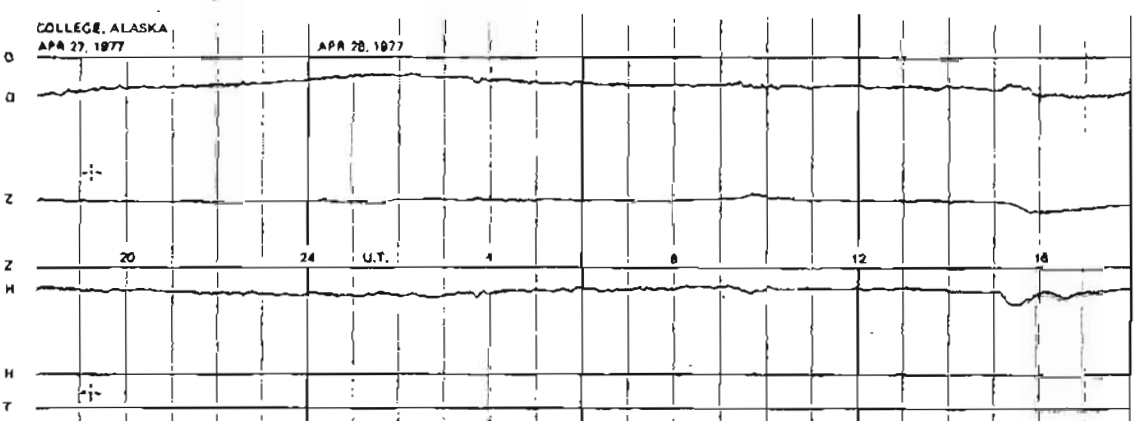
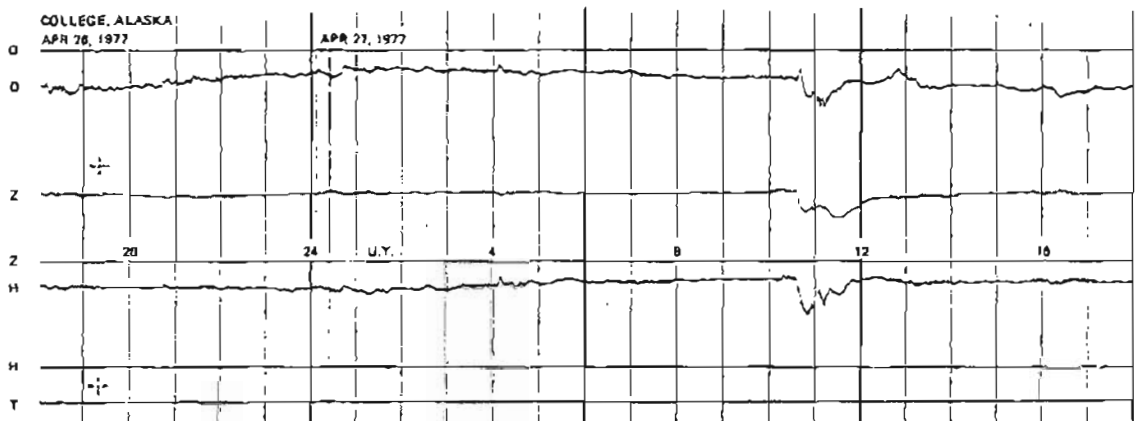
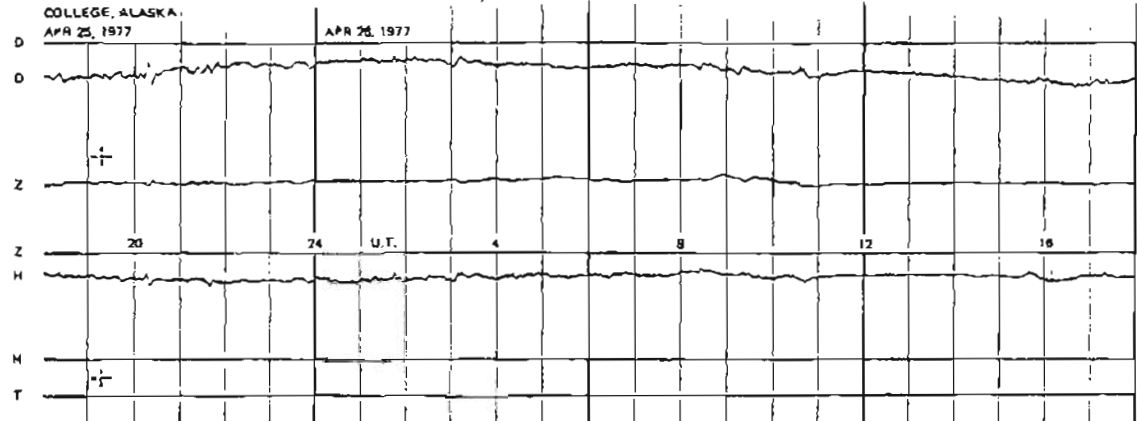


NORMAL MAGNETOGRAMS

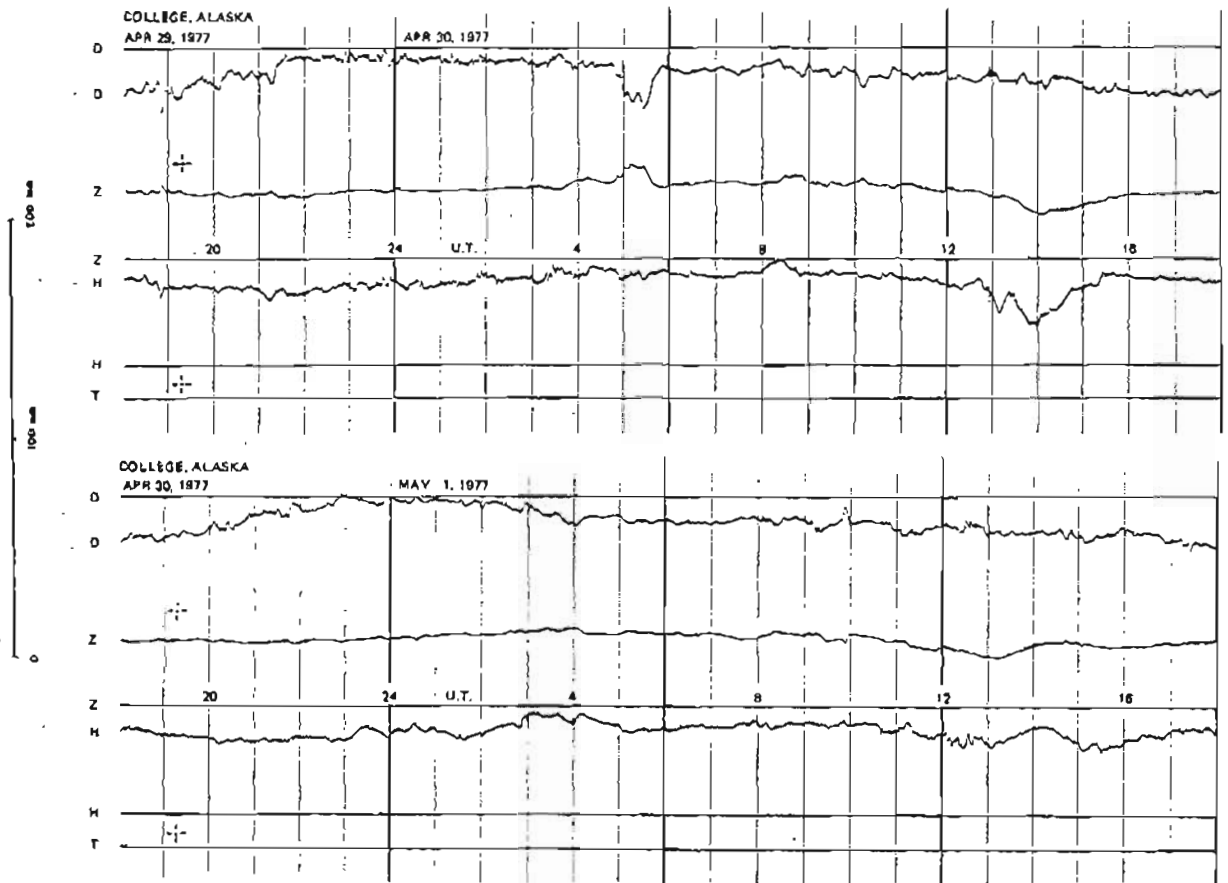
200 mV  
160 mm  
0



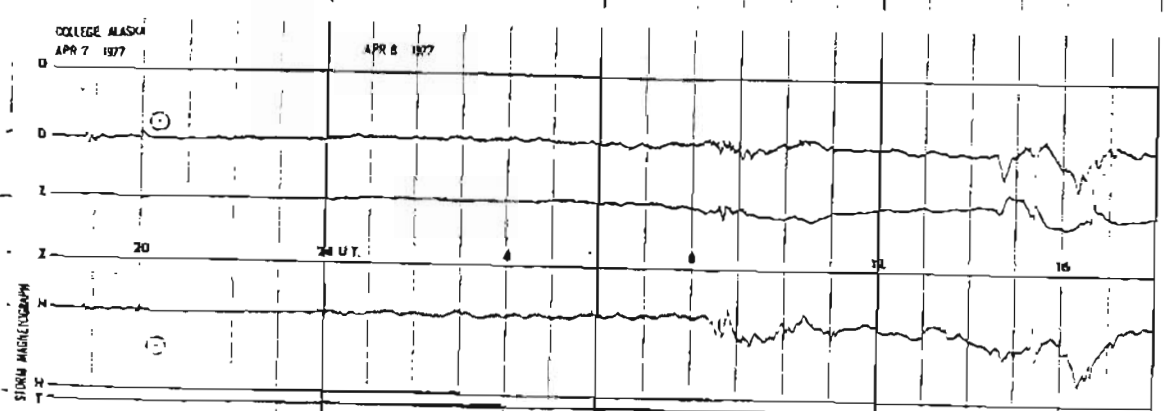
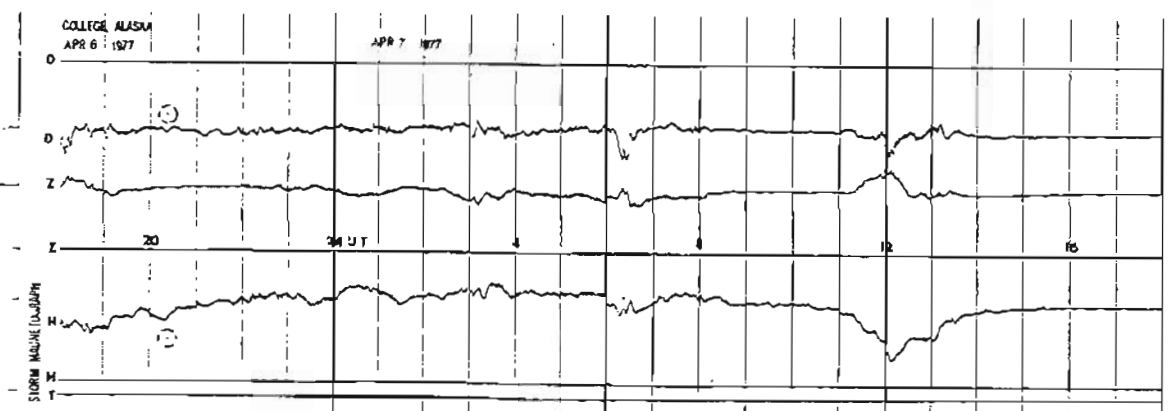
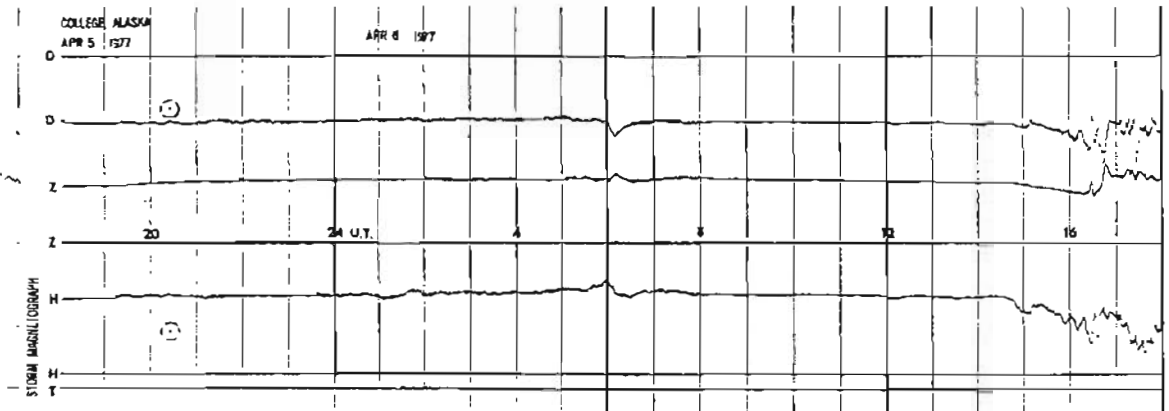
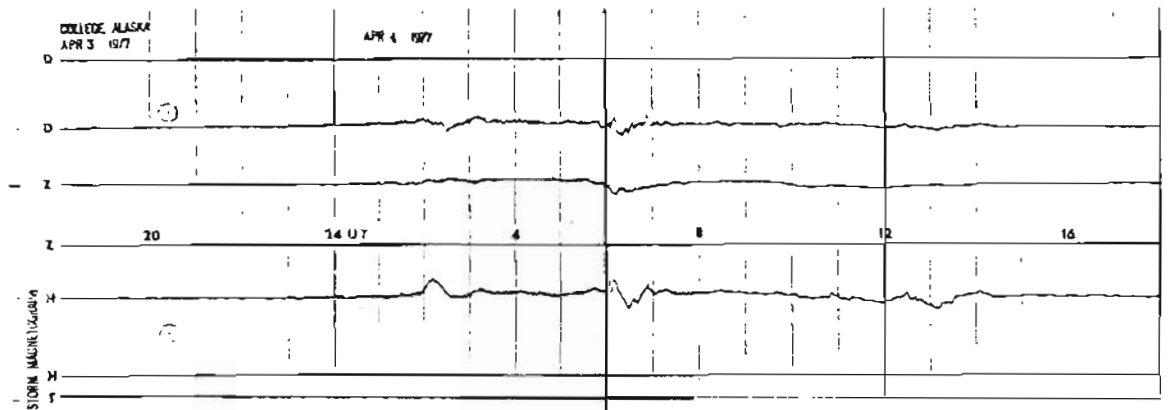
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

