

UNITED STATES (DEPARTMENT OF THE INTERIOR)

GEOLOGICAL SURVEY.

(200)
R290

no. 76-300K

PRELIMINARY GEOMAGNETIC DATA

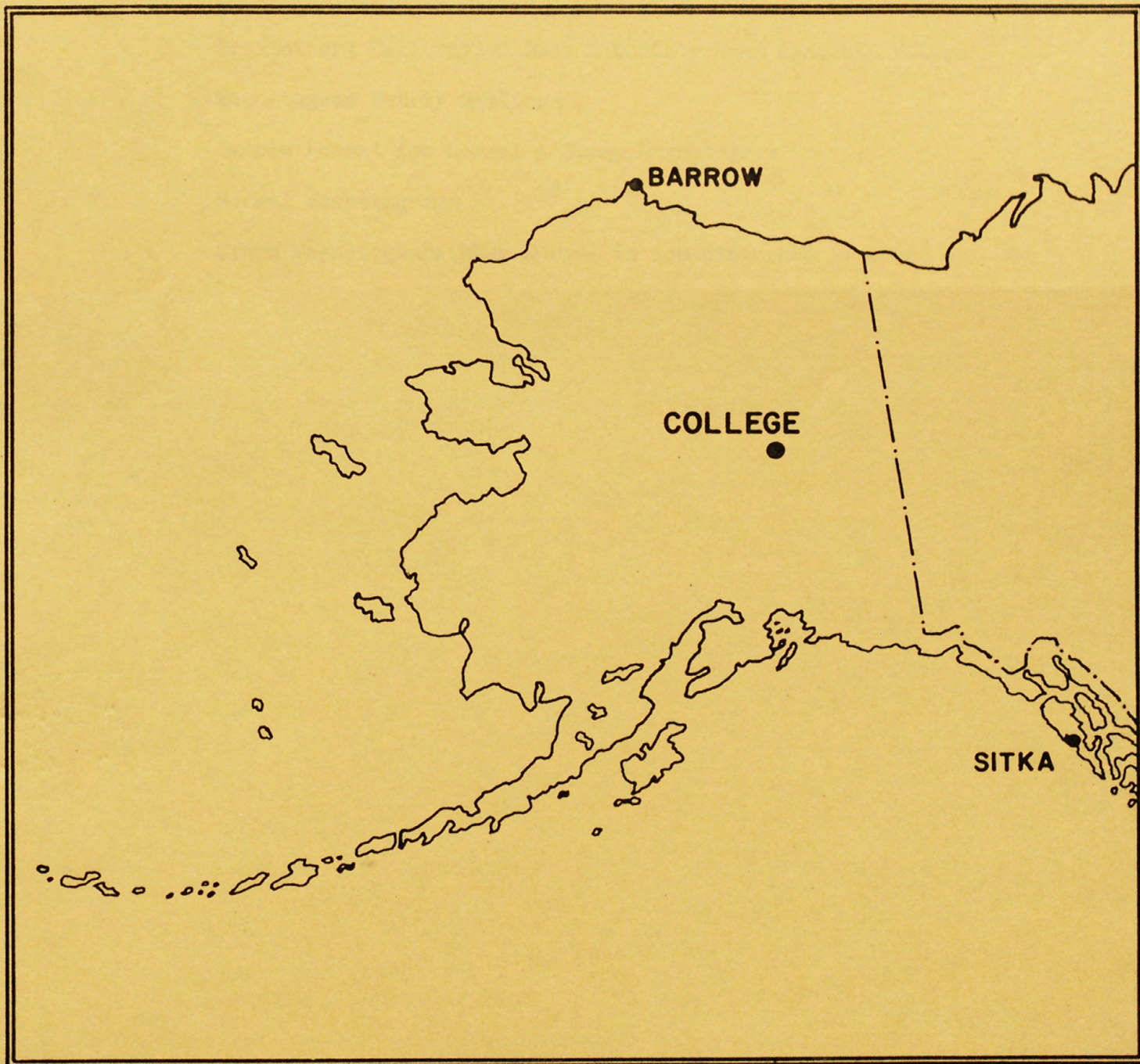
COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

TM
cm
op. entry

NOVEMBER 1976

OPEN FILE REPORT 76-300K





ORDER OF CONTENTS

Explanation of Data & Reports

Magnetic Activity Report

Outstanding Magnetic Effects

Principal Magnetic Storms

Preliminary Calibration Data & Monthly Mean Absolute Values

Magnetogram Hourly Scalings

Sample Format for Normal & Storm Magnetogram

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, 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

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 \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 COLLEGE, ALASKA									
MAGNETIC ACTIVITY (Greenwich civil time, counted from midnight to midnight)																				MONTH AND YEAR NOVEMBER, 1976									
DATE		K-INDICES										AK	TIME SCALE ON MAGNETOGRAMS 20 mm/hr																
		00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM																			
1		3	2	3	4	2	0	1	2	17	10	SUDDEN COMMENCEMENTS d h m																	
2		1	1	3	3	4	2	1	0	15	09																		
3		1	1	3	2	2	3	0	1	13	07																		
4		1	0	1	3	2	1	0	0	08	04																		
5		0	0	1	1	1	0	0	0	03	01																		
6		0	0	2	1	0	0	0	0	03	01																		
7		0	1	1	2	0	0	0	0	04	02																		
8		0	0	0	0	1	2	1	2	06	03																		
9		1	1	2	4	3	1	2	0	14	08																		
10		0	3	2	6	5	3	2	3	24	23																		
11		2	3	4	6	6	6	5	3	35	44	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)																	
12		4	2	2	5	5	4	3	4	29	26																		
13		3	3	6	7	7	4	4	2	36	56																		
14		2	1	2	5	6	4	3	2	25	24																		
15		2	2	2	3	5	2	1	0	17	12																		
16		0	0	2	3	4	3	2	1	15	09																		
17		0	1	1	4	4	1	1	1	13	09																		
18		1	1	0	2	0	0	0	0	04	02																		
19		1	1	2	3	3	3	2	1	16	09																		
20		1	1	2	5	3	0	1	1	14	10																		
21		0	1	0	2	1	0	1	0	05	02	BEGIN END d h m d h m																	
22		0	1	0	3	2	0	1	1	08	04																		
23		1	0	0	2	1	1	0	0	05	02																		
24		0	1	0	1	2	0	0	0	04	02																		
25		0	3	6	6	5	3	2	1	26	31																		
26		1	1	0	5	3	3	3	2	18	13																		
27		2	2	3	2	0	1	0	0	10	05																		
28		0	0	0	1	2	1	1	0	05	02																		
29		0	0	3	2	1	2	1	1	10	05																		
30		2	2	1	3	4	3	1	0	16	10																		
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

NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS

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

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

NOVEMBER 1976

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	10	03XX	..	..	..	..	10	4	6	182	1100	770	12	03
		11						11	4,5,6	6					
		12	1025	sc	?	?	?	13	4,5	7	210	1650	830	13	21

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0000 UT, 11-1-76	2400 UT, 11-30-76	1.0/mm	3.8 γ /mm	28°07.1E
H	0000 UT, 11-1-76	2400 UT, 11-30-76	7.8 γ /mm		12754 γ
Z	0000 UT, 11-1-76	2400 UT, 11-30-76	7.6 γ /mm		55134 γ

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0000 UT, 11-1-76	2400 UT, 11-30-76	7.9/mm	29.8 γ /mm	24°22.9E
H	0000 UT, 11-1-76	2400 UT, 11-30-76	44.1 γ /mm		11504 γ
Z	0000 UT, 11-1-76	2400 UT, 11-30-76	48.9 γ /mm		53999 γ

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D	0000 UT, 11-1-76	2400 UT, 11-30-76	0.3/mm		1.0 γ /mm
H	0000 UT, 11-1-76	2400 UT, 11-30-76	1.0 γ /mm		
Z	0000 UT, 11-1-76	2400 UT, 11-30-76	2.4 γ /mm		

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
28°21.5E	13054 γ	55360 γ

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: NOV. 5, 6, 7, 8, 18, 21, 22, 23, 24, 28

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY
GEOMAGNETISM DIVISIONOBSY. YEAR MONTH ELEMENT
CO 76 NOV DValues are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (1500M.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 of S	Tra Q	01	02	03	04	05	06	07	08	09	10	11	12	NIP	13	14	15	16	17	18	19	20	21	22	23	24	SUM	
			01	113	116	155	140	140	201	154	160	132	-25	139	158	01	161	176	172	162	163	162	155	150	112	77	73	97	3243
			02	121	136	122	157	137	138	138	232	139	143	152	182	02	181	199	162	232	215	148	162	154	131	112	110	119	3722
			03	124	129	131	135	140	128	134	160	85	152	148	149	03	151	159	172	173	189	180	172	162	138	120	108	121	3460
			04	127	139	143	149	150	143	143	142	140	142	138	168	04	130	153	160	160	161	162	173	164	150	133	114	120	3504
			05	128	142	143	144	140	141	148	144	141	142	149	163	05	151	153	153	163	172	183	183	174	157	143	138	133	3628
			06	132	129	133	130	134	142	132	113	133	163	154	144	06	150	161	164	168	170	173	172	160	139	132	129	131	3488
			07	134	143	142	133	122	122	121	148	150	158	157	172	07	142	144	154	159	163	163	164	154	138	122	119	121	3445
			08	122	123	133	139	140	142	142	142	143	144	147	150	08	148	157	178	172	238	216	200	194	177	108	-14	31	3472
			09	86	100	82	119	132	143	135	165	177	163	168	215	09	174	203	224	229	230	185	167	150	138	122	112	113	3732
			10	115	114	123	119	128	208	170	121	122	132	162	142	10	186	285	286	158	281	218	109	111	57	-38	28	61	3420
			11	111	129	119	120	198	107	122	97	152	198	72	249	11	343*	121*	693*	224*	93	209	131	124	91	80	97	96	3975
			12	102	112	140	124	142	157	152	158	132	131	133	192	12	192	142	140	158	127	160	122	98	45	-7	40	91	2993
			13	101	123	168	125	191	208	125*	251	161	198	165*	220*	13	831*	92	332	242	77	148	7	52	53	67	121	132	4190
			14	125	134	148	155	158	148	141	139	171	210	252	192	14	208	-2*	324	176	198	169	173	164	121	113	119	112	3848
			15	113	118	115	129	145	152	142	143	170	214	133	152	15	163	63	188	194	193	182	174	159	124	118	128	122	3534
			16	133	142	145	143	144	141	144	138	123	152	162	140	16	152	201	277	248	202	191	160	138	129	122	123	113	3765
			17	121	120	130	143	141	132	134	133	122	213	144	191	17	263	171	159	137	171	186	154	126	112	113	127	114	3521
			18	125	122	130	119	138	142	141	135	141	168	140	148	18	145	163	159	174	179	162	168	163	132	101	103	115	3250
			19	128	123	115	123	137	148	141	150	161	110	138	133	19	155	162	185	170	191	204	179	183	140	78	99	98	3451
			20	101	111	99	133	142	143	142	142	125	123	96	46	20	173	150	160	183	179	168	170	139	119	112	101	102	3159
			21	111	129	147	156	151	154	147	145	139	142	142	154	21	155	153	163	168	178	180	157	148	132	131	125	122	3529
			22	123	133	140	151	156	151	144	138	132	140	144	153	22	154	162	150	198	177	174	170	148	119	91	93	93	3414
			23	114	122	139	148	152	151	142	141	123	129	151	153	23	162	172	165	212	183	177	162	150	123	120	113	113	3517
			24	123	130	132	139	150	122	138	142	142	134	140	174	24	192	158	162	165	167	162	156	139	130	123	119	119	3458
			25	120	122	124	118	82	73	107	126	19*	80	146*	245	25	196	338	283	205	212	154	87	84	47	77	89	109	3243
			26	114	120	140	155	162	140	152	143	142	134	171	86	26	190	191	228	233	241	208	134	97	31	-18	46	62	3302
			27	98	99	72	86	127	142	118	130	97	112	138	131	27	143	145	143	144	189	163	159	143	134	108	110	128	3029
			28	138	140	142	151	152	150	137	129	119	138	162	179	28	158	215	154	150	152	125	159	143	139	129	124	132	3517
			29	138	139	140	142	144	148	139	129	136	144	168	140	29	149	154	150	198	182	138	139	147	135	118	109	108	3494
			30	81	113	112	104	77	139	141	143	199	153	151	123	30	80	154	190	184	159	111	160	142	130	114	113	110	3183
			31													31													

SCALED BY SPT
CHECKED BY CED, MIM, JEP
SIGNS REVIEWED BY CED
PUNCHED BY

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

() Interpolated

[] Significant portion of hour interpolated.

[] No record; or no values available because of faulty record.

* Derived from Storm Mph., converted to Normal Mph.

[] 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 104476
MONTHLY MEAN 145
DATES WITH GAPS

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY
GEOMAGNETISM DIVISION

OBSY.

YEAR

MONTH

ELEMENT

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 italics, with minus signs shown.

00

76

NOV

H

C	Q or S	Ten	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	379	406	432	387	392	389	397	402	438	302	383	362	01	354	349	366	380	373	374	375	374	356	352	370	373	9065
				02	366	374	381	396	386	387	393	400	412	423	363	335	02	254	289	377	357	304	313	353	367	382	386	389	384	8771
				03	373	382	387	382	376	383	384	396	373	423	387	386	03	385	378	343	293	363	391	390	387	381	369	362	364	9038
				04	380	382	382	384	388	390	388	385	392	390	336	317	04	389	394	386	376	372	376	382	386	383	376	368	372	9076
				05	376	379	385	389	389	383	383	393	392	388	391	389	05	393	388	389	386	385	382	381	378	379	381	382	385	9246
				06	387	392	392	396	391	391	386	379	369	375	389	391	06	388	381	378	388	385	382	378	375	376	381	383	389	9242
				07	391	392	393	398	390	392	396	388	391	395	381	399	07	393	388	385	383	381	381	375	372	375	378	385	392	9294
				08	393	392	392	392	392	388	388	386	389	390	389	391	08	392	389	355	331	348	388	388	383	380	327	359	384	9106
				09	400	403	393	384	390	382	404	409	402	382	288	300	09	313	370	370	375	384	394	381	371	372	375	372	382	8996
				10	383	389	382	391	401	476	436	402	393	379	358	29*	10	-61	185	158	367	314	279	326	298	301	376	375	369	7648
				11	425	402	400	431	403	413	429	489	429	401	202	285*	11	217*	-409*	-165*	-240*	58	271	405	391	359	353	370	395	5710
				12	377	523	429	401	403	388	375	366	358	356	255	323	12	162	231	67	232	341	367	340	313	247	291	355	378	7878
				13	377	432	411	426	421	410	400*	328	319	430	-41*	-39*	13	-691*	6	103	103	156	249	275	272	360	352	387	384	5494
				14	373	370	380	389	382	374	373	380	377	356	329	98	14	-53*	-103*	70	341	323	378	338	361	373	364	372	373	7258
				15	383	390	402	387	382	387	379	373	372	408	359	318	15	122	136	322	309	335	333	381	380	375	379	375	376	8363
				16	381	382	384	379	374	372	369	373	376	369	382	375	16	277	98	235	327	382	375	382	380	375	374	378	377	8500
				17	379	372	372	385	385	386	381	384	401	389	342	218	17	227	304	369	383	375	373	366	363	363	367	375	378	8657
				18	374	371	379	383	375	374	375	374	372	382	385	384	18	382	373	372	375	381	378	375	376	363	366	379	384	9032
				19	388	390	392	373	390	393	392	383	420	422	402	393	19	383	376	312	376	379	397	385	371	362	371	381	391	9224
				20	395	398	395	378	391	389	390	392	413	405	244	100	20	370	427	399	382	380	383	372	365	359	374	382	384	8867
				21	386	385	389	392	385	385	382	376	381	382	382	359	21	403	386	381	382	381	379	382	380	378	379	381	382	9178
				22	385	392	394	390	395	396	386	394	386	385	389	351	22	396	386	385	380	386	386	381	374	369	372	379	383	9220
				23	388	393	392	391	383	384	386	386	389	375	381	396	23	391	386	381	372	383	381	377	373	376	376	379	383	9202
				24	384	390	396	394	390	396	392	390	386	384	380	382	24	366	387	383	387	382	384	381	378	381	385	389	392	9259
				25	391	393	402	379	414	503	545	580	287	202	55*	-14	25	13	90	262	365	352	335	349	371	367	366	382	368	7779
				26	382	382	379	389	378	381	385	378	379	356	321	155	26	353	258	253	314	355	386	378	329	260	326	346	355	8198
				27	379	395	416	457	436	423	502	445	405	404	400	386	27	380	375	372	375	371	381	374	373	371	360	365	374	9513
				28	377	377	379	383	381	377	374	376	377	367	360	354	28	350	374	388	386	382	370	380	384	386	387	387	384	9040
				29	383	385	387	387	387	383	373	368	387	384	377	390	29	380	373	370	341	341	371	376	384	381	365	386	370	9047
				30	362	382	402	386	411	402	382	373	372	385	377	268	30	258	353	345	341	288	338	394	390	391	387	380	382	8769
				31													31													

SCALED BY SPT
CHECKED BY CED, MTM, JEP
SIGNS REVIEWED BY CED
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 Mgbh., converted to Normal Mgbh.

[] Scaling uncertain because of magnetic storm.

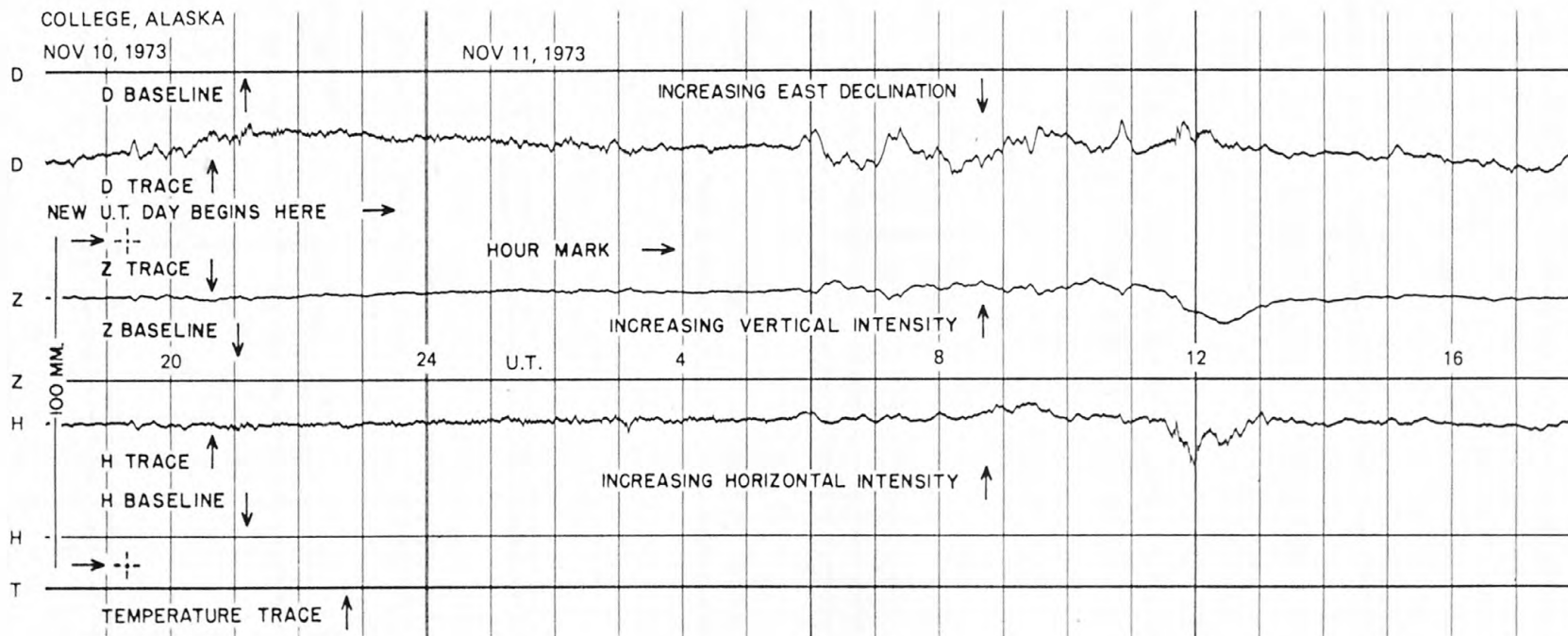
<> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.

MONTHLY SUM 257690

MONTHLY MEAN 358

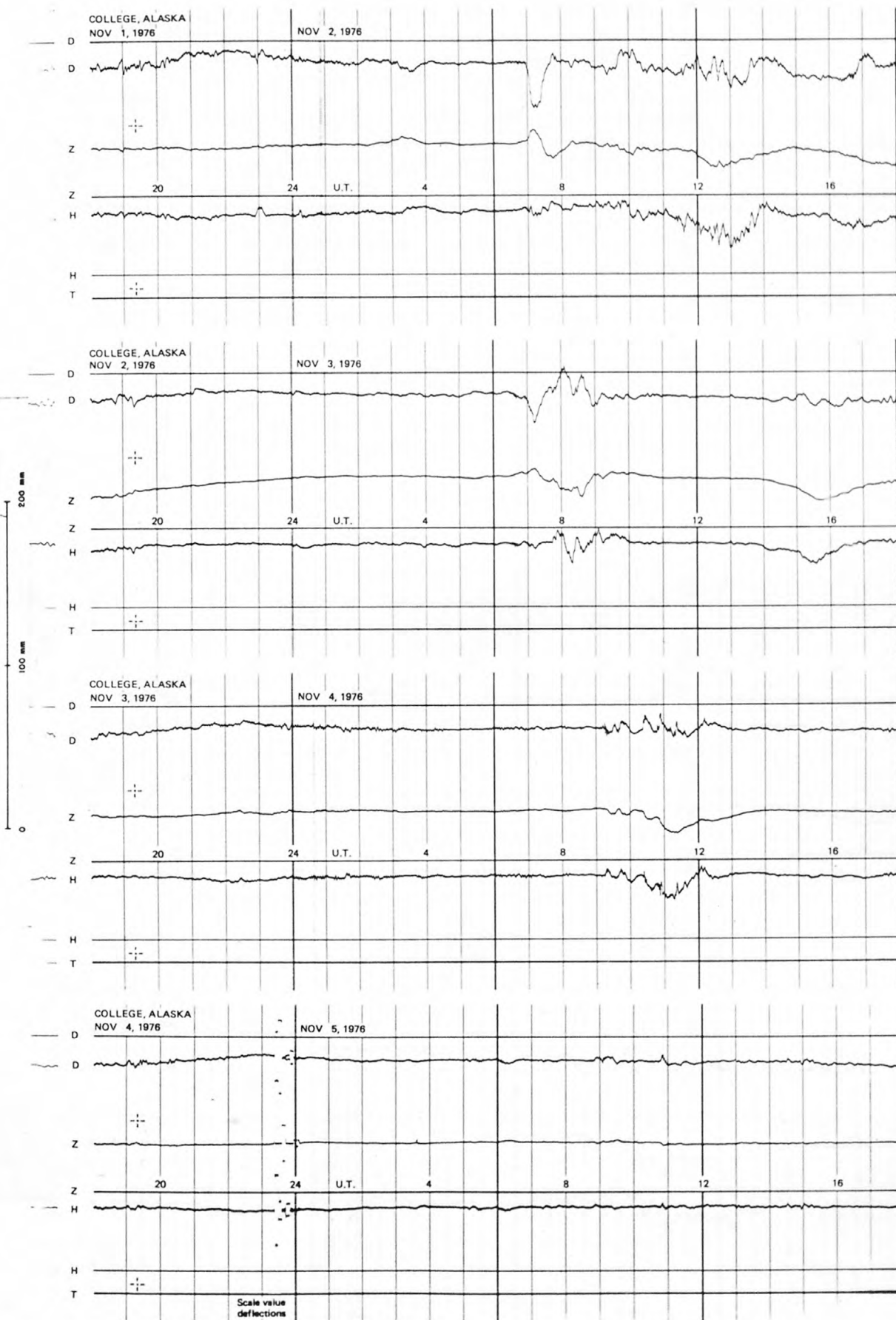
DATES WITH GAPS.

FORMAT FOR NORMAL & STORM MAGNETOGRAMS
(SAMPLE ONLY)

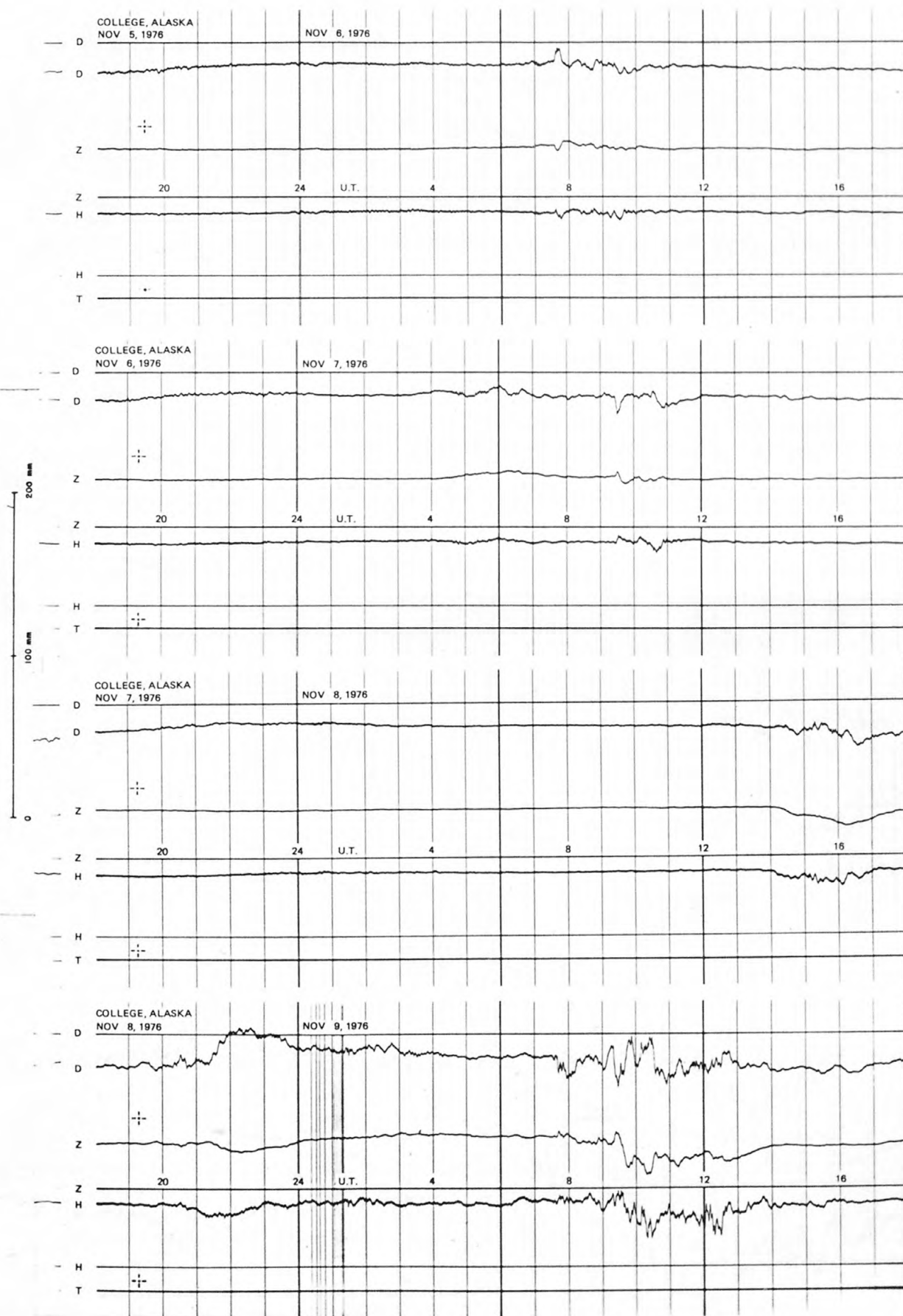


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

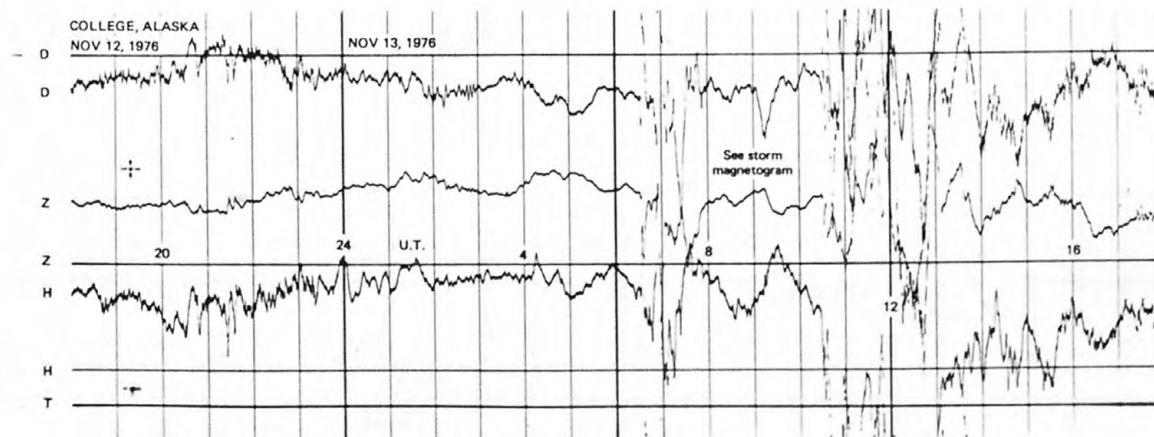
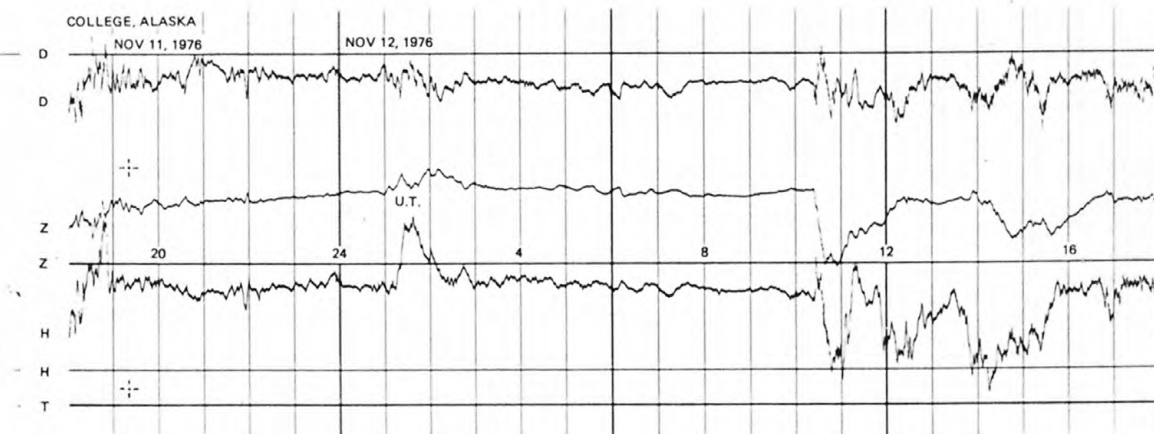
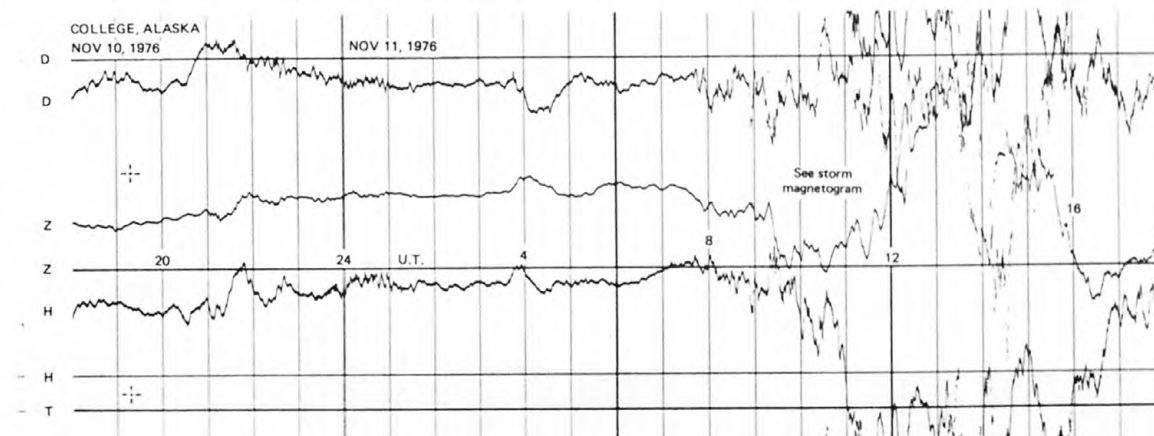
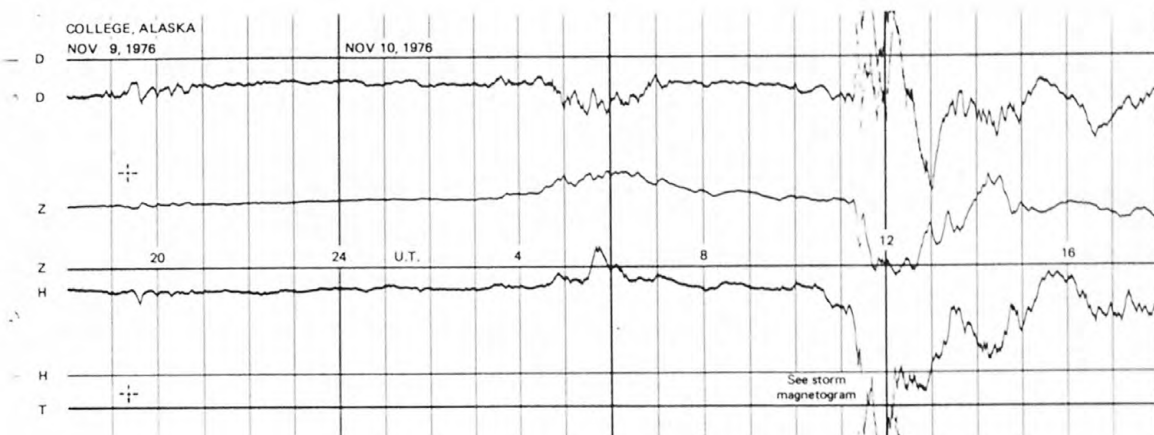
NORMAL MAGNETOGRAMS



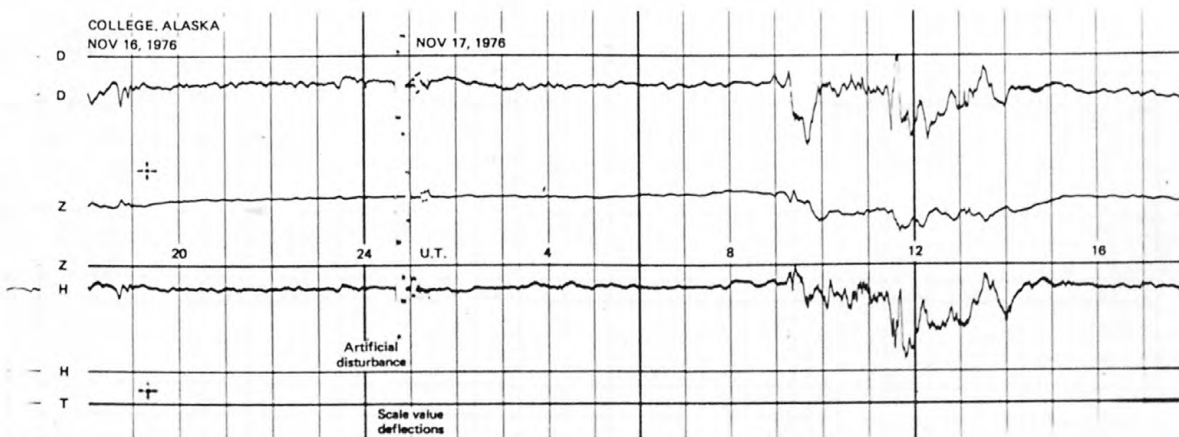
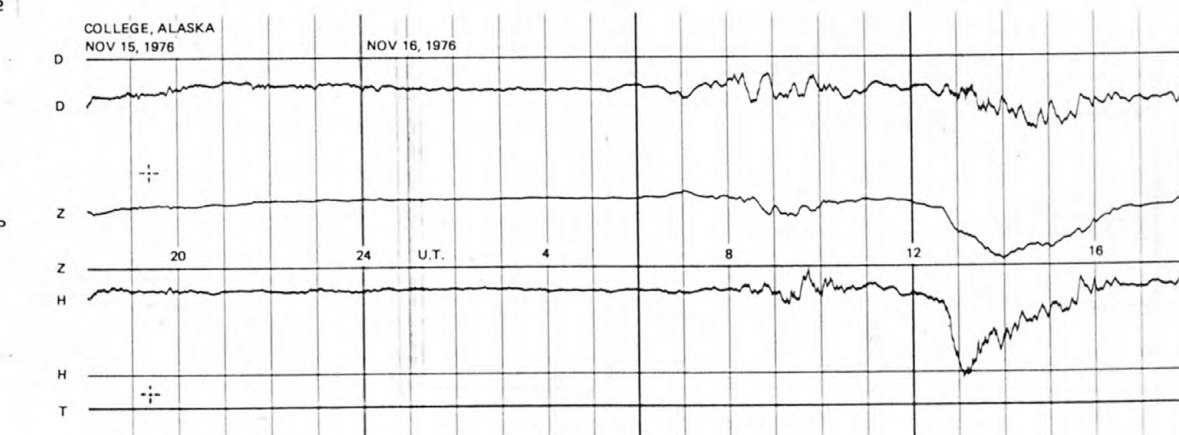
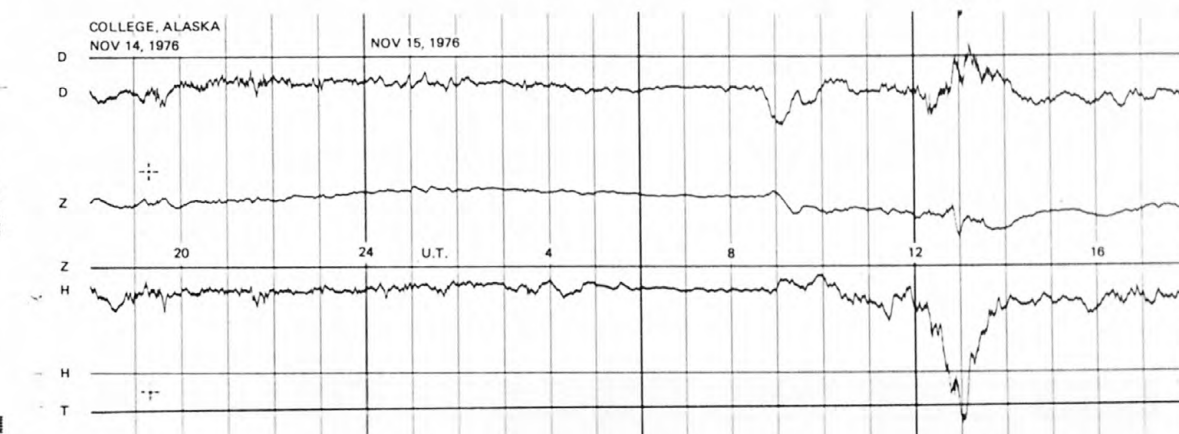
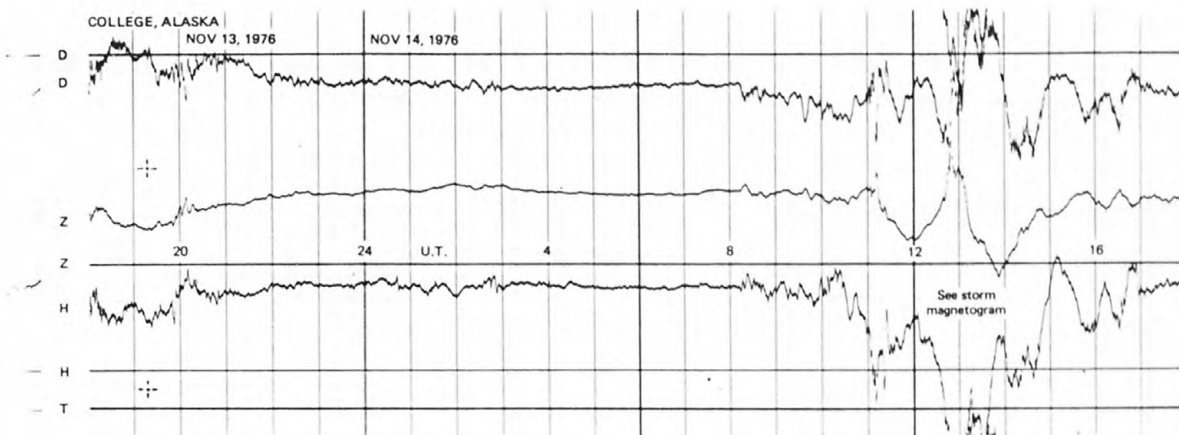
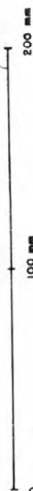
NORMAL MAGNETOGRAMS



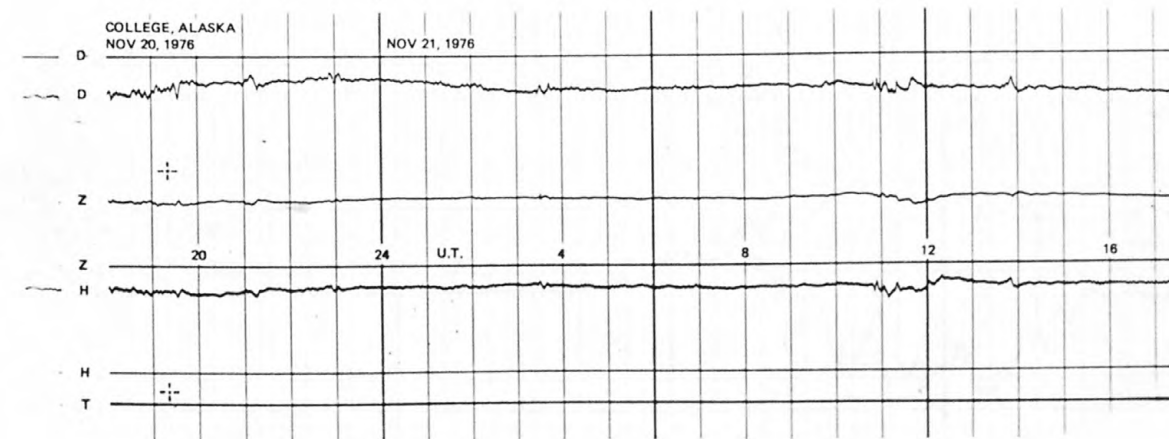
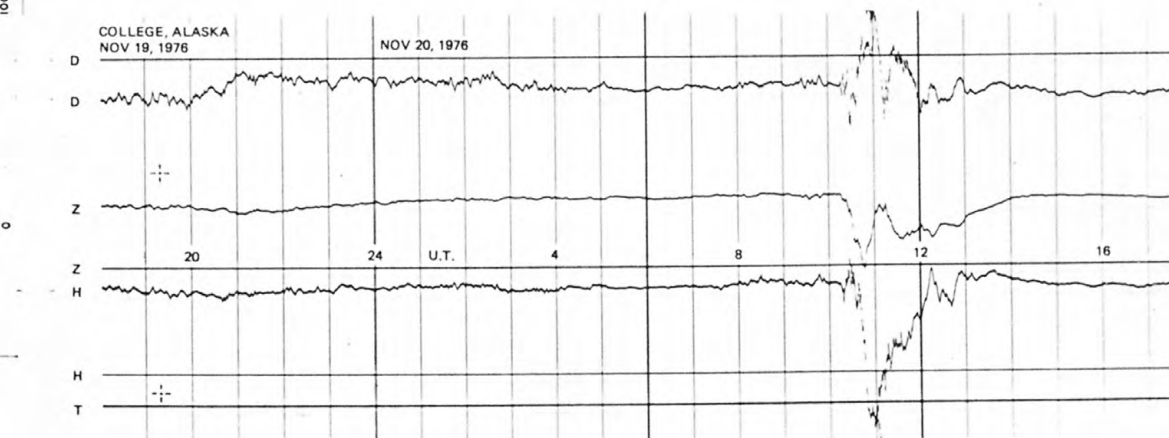
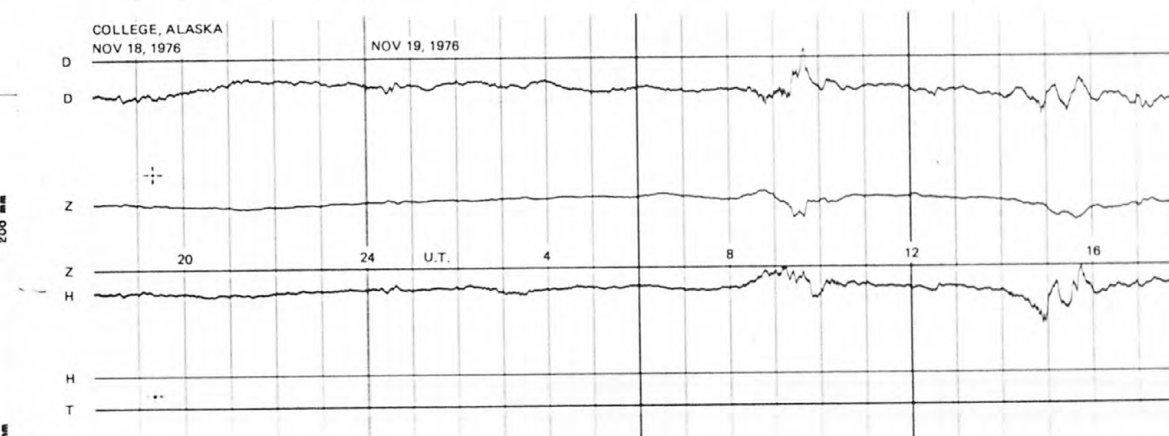
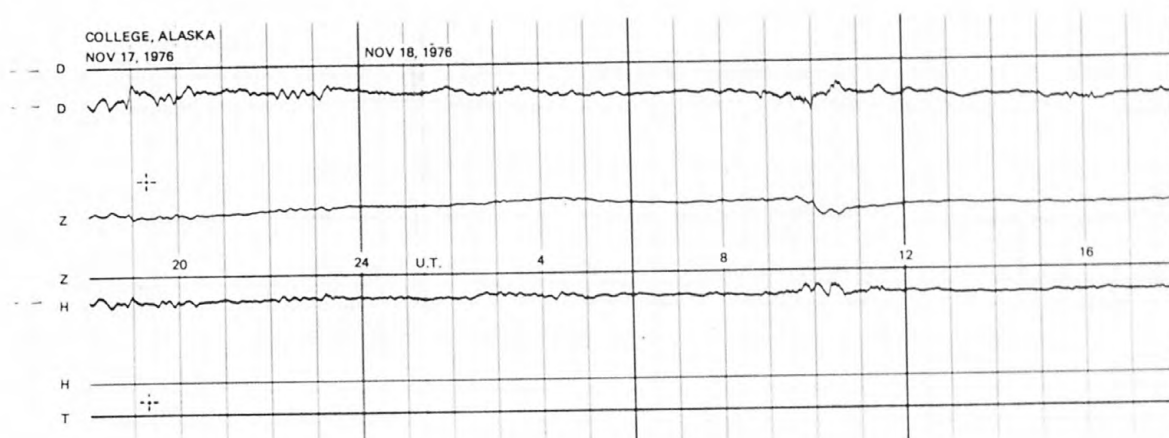
NORMAL MAGNETOGRAMS



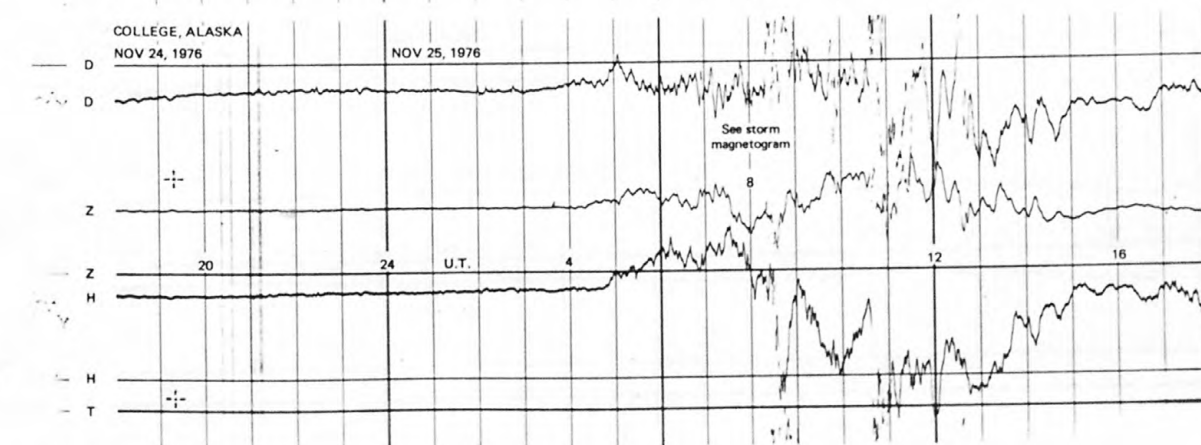
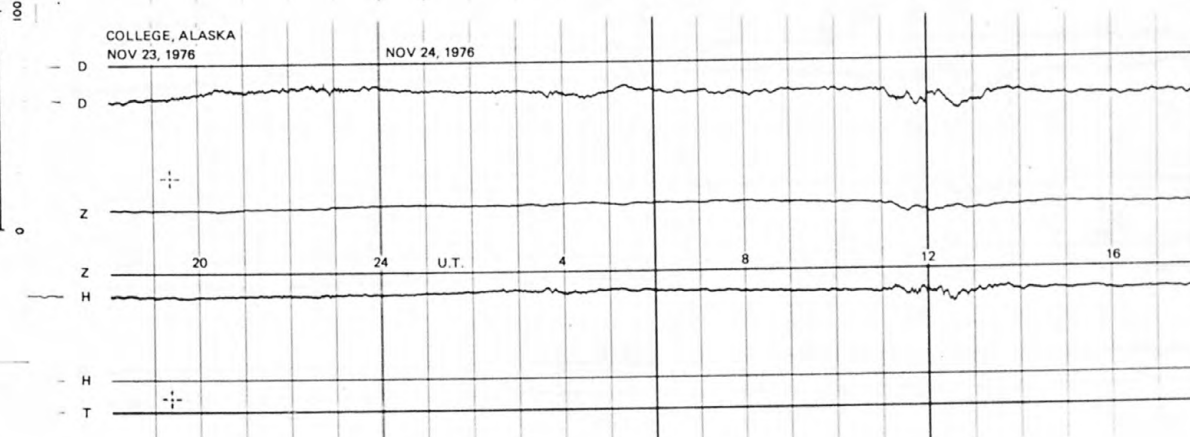
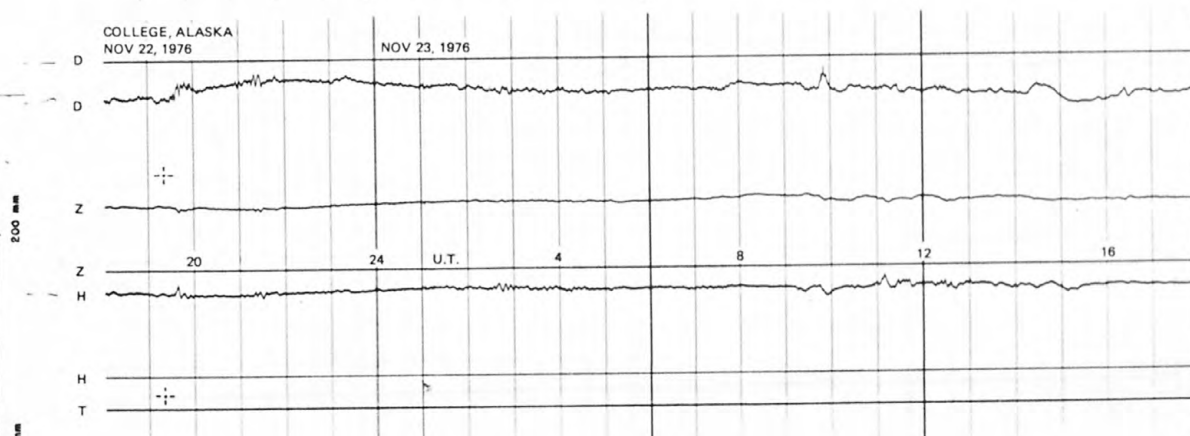
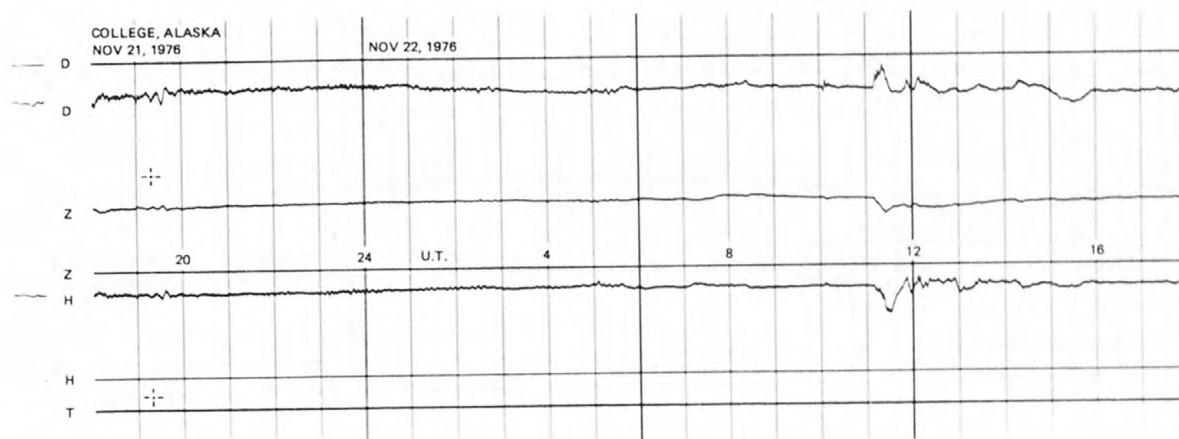
NORMAL MAGNETOGRAMS



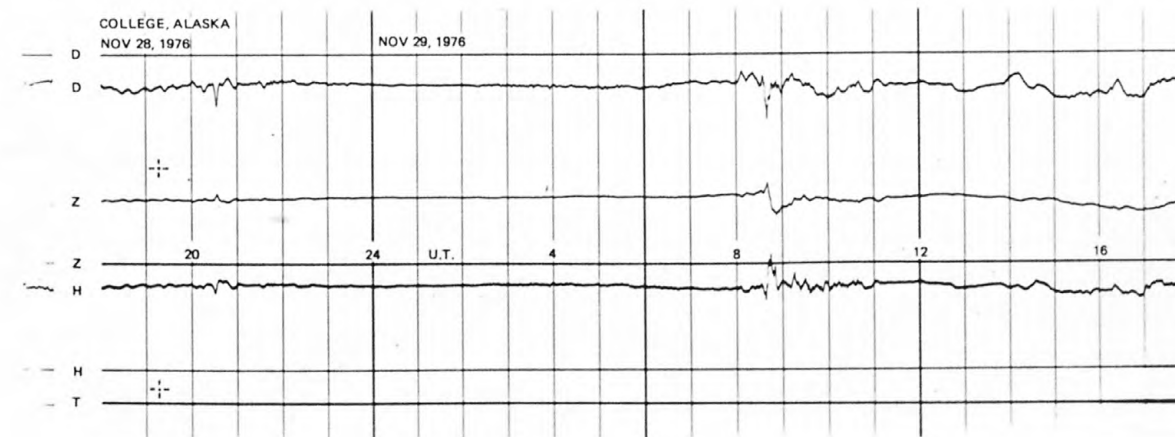
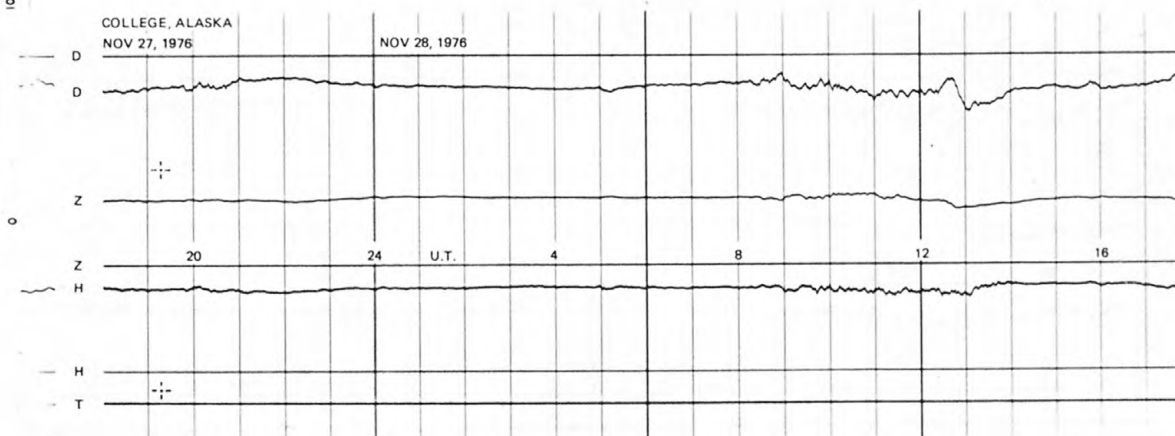
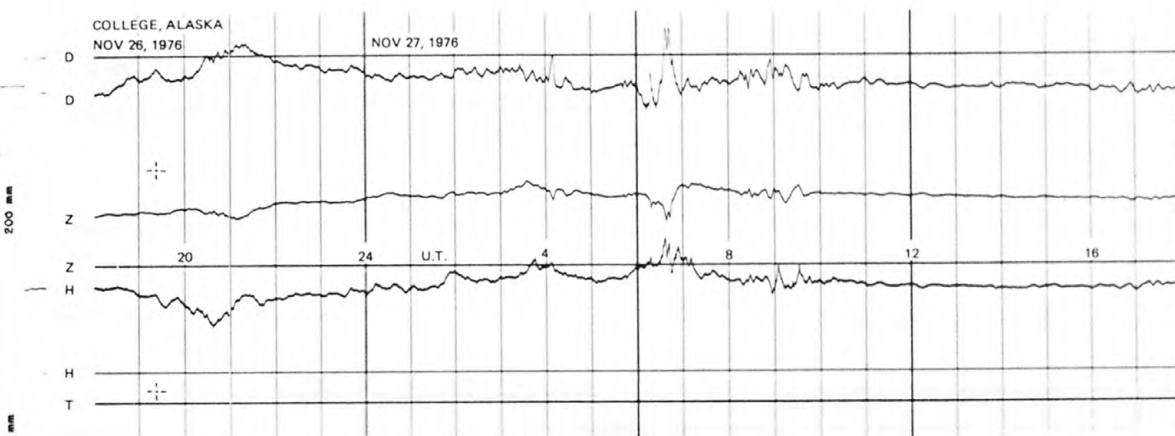
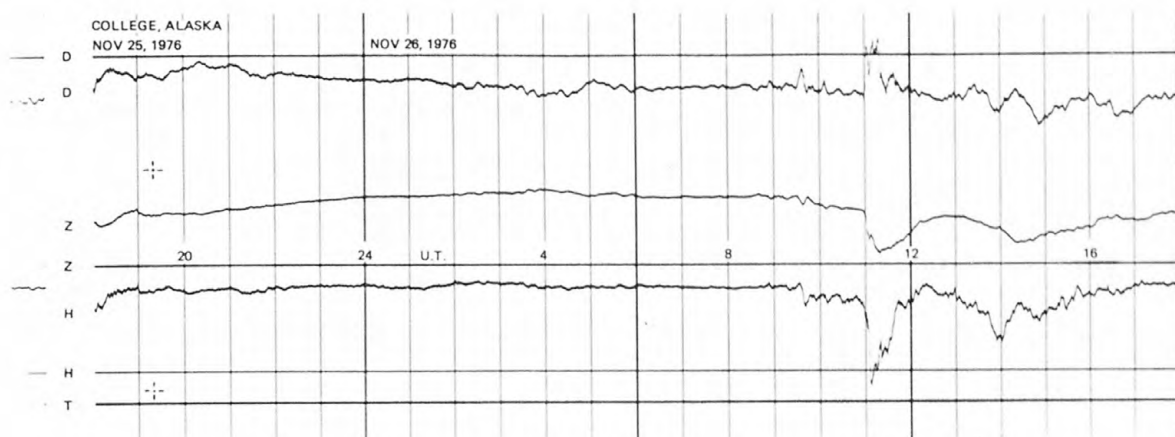
NORMAL MAGNETOGRAMS



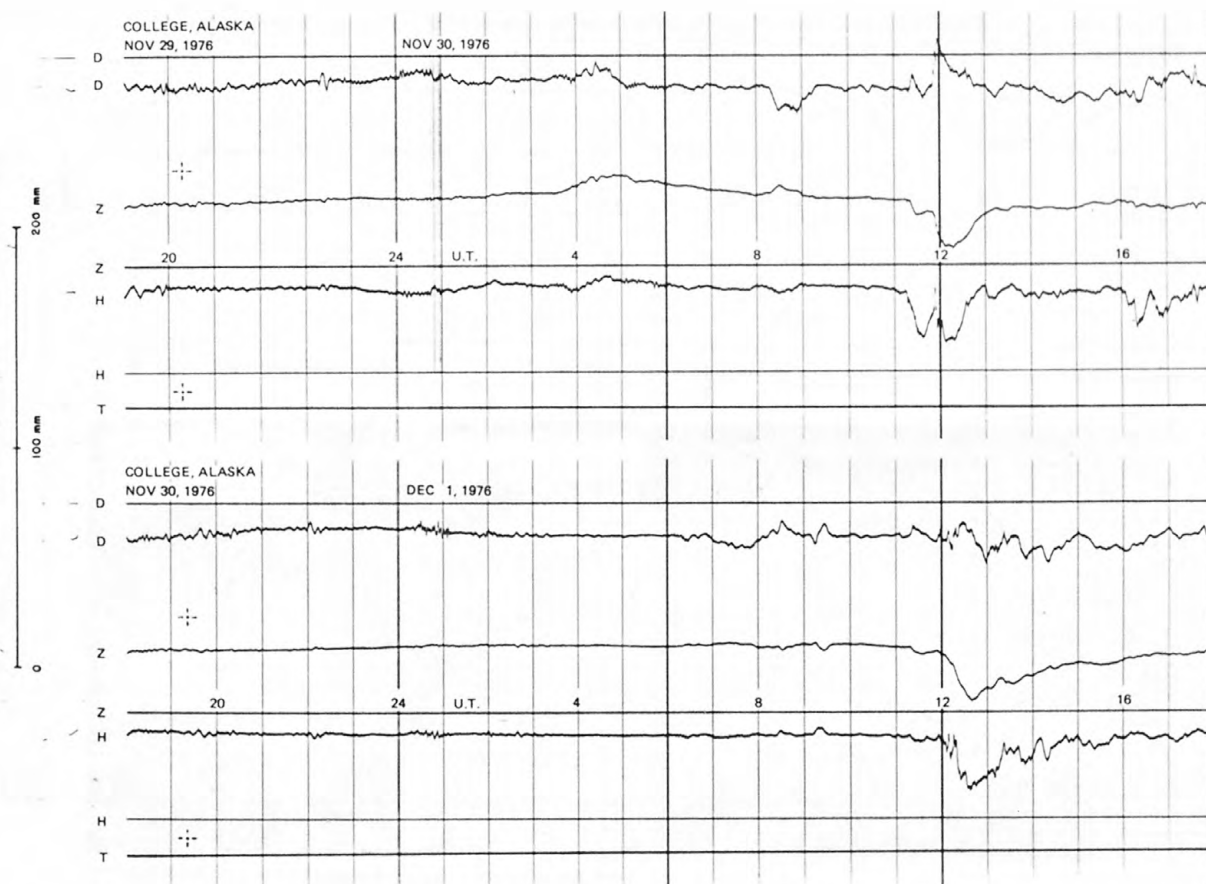
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

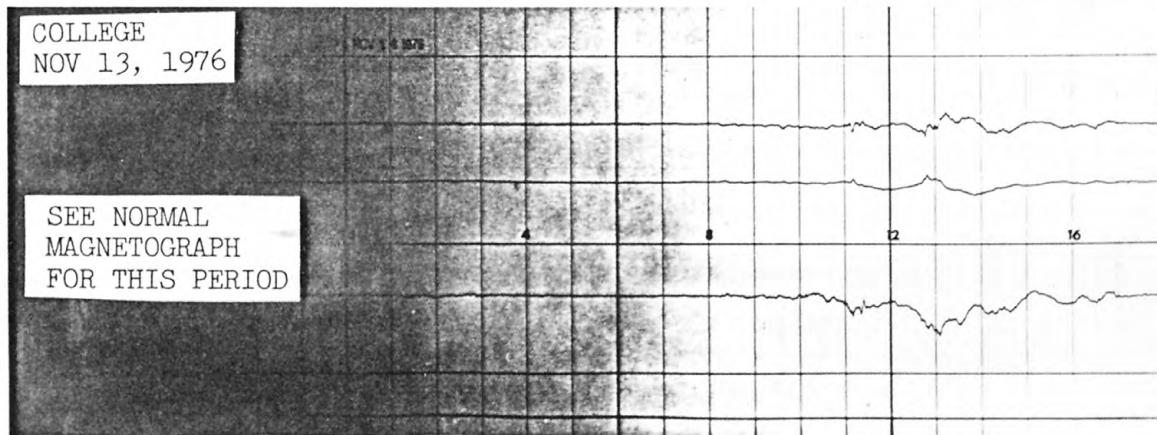
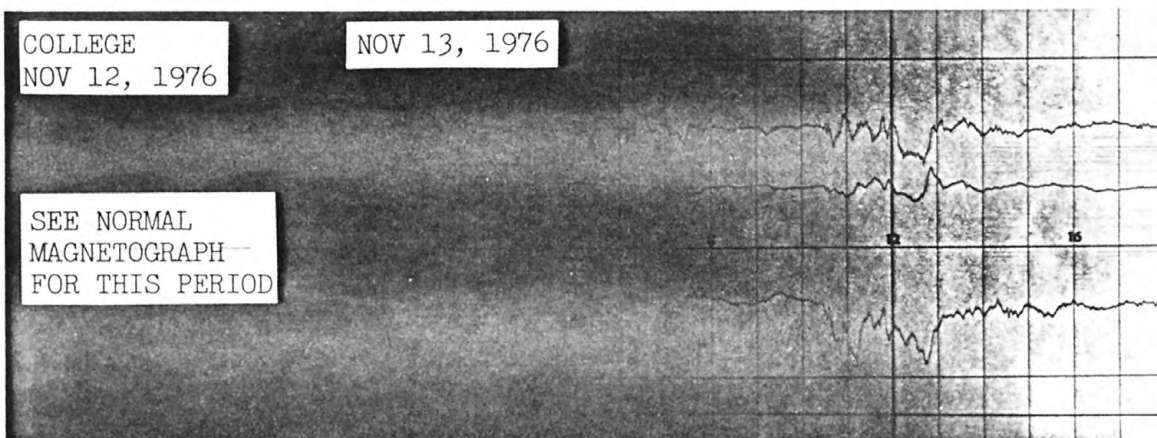
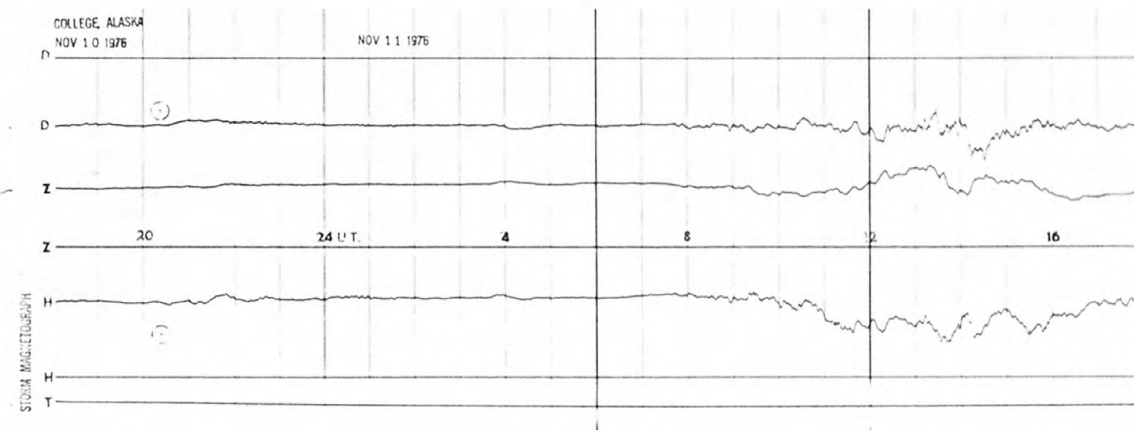
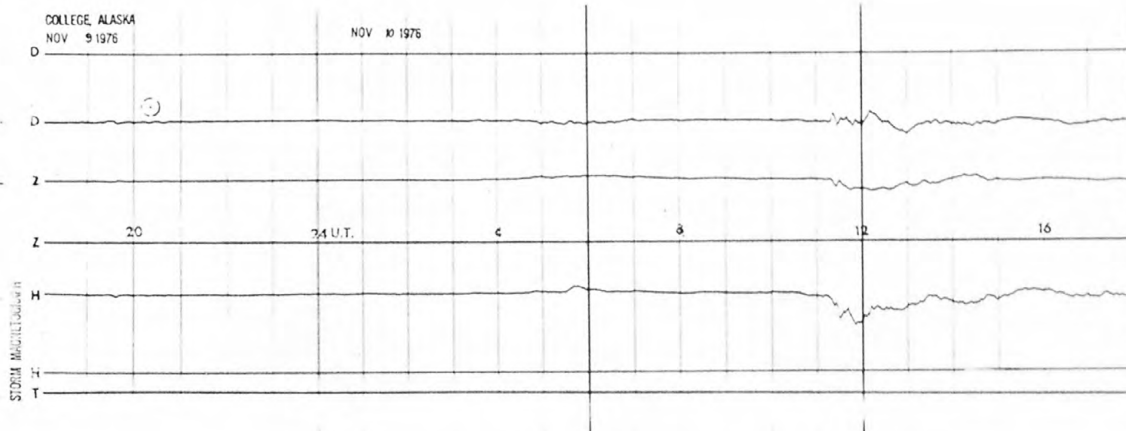


NORMAL MAGNETOGRAMS

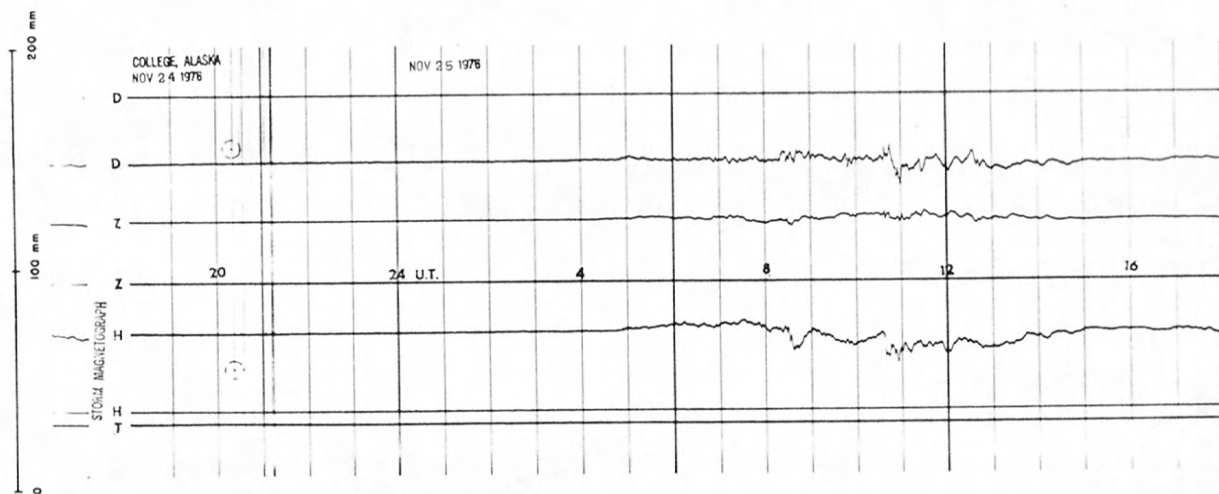


STORM MAGNETOGRAMS

200 mm
100 mm
0



STORM MAGNETOGRAMS



USGS LIBRARY-RESTON



3 1818 00076180 7