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PERIODICAL
UNITED STATES DEPARTMENT OF THE INTERIOR

DOCUMENTS

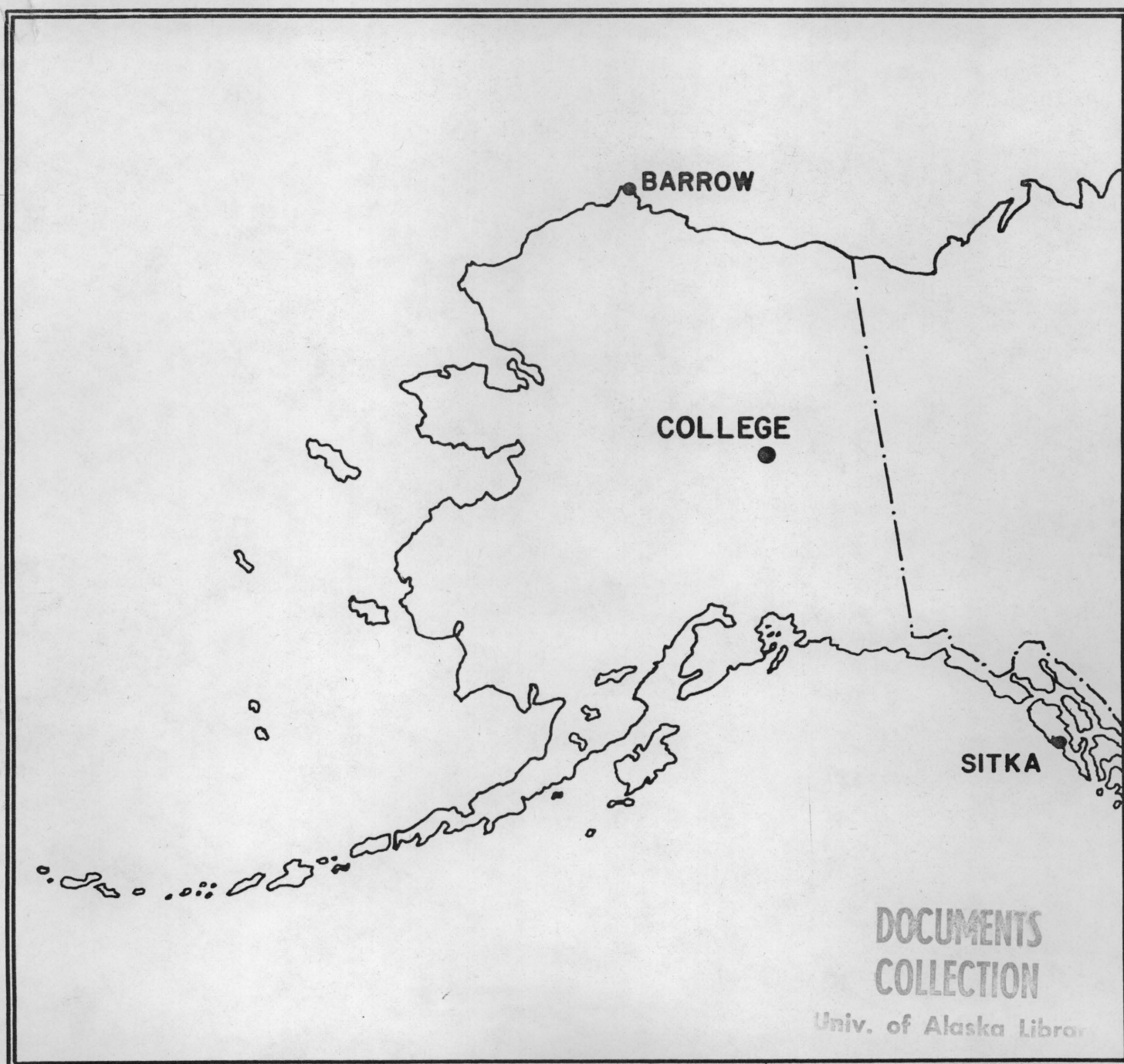
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76-300F

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

JUNE 1976

OPEN FILE REPORT 76-300F



SEP 11 1980

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Normal Magnetograms

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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 $\approx$ 11	0
11 $\approx$ 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										OBSERVATORY COLLEGE, ALASKA									
MAGNETIC ACTIVITY (Greenwich civil time, counted from midnight to midnight)																				MONTH AND YEAR JUNE, 1976									
DATE		K-INDICES												AK		TIME SCALE ON MAGNETOGRAMS													
		00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	20 mm/hr																		
1		1	1	4	3	2	3	1	1	16	10		SUDDEN COMMENCEMENTS d h m																
2		1	2	3	4	1	2	1	1	15	09																		
3		2	2	1	2	1	1	3	2	14	07																		
4		4	4	4	4	6	2	2	2	28	26																		
5		3	4	4	6	6	4	3	2	32	35																		
6		2	2	2	4	4	3	1	2	20	13		POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)																
7		3	3	3	3	4	2	1	2	21	13																		
8		3	2	4	5	2	2	1	1	20	15																		
9		1	1	3	3	0	0	1	1	10	05																		
10		1	2	0	1	3	1	1	2	11	05																		
11		5	5	6	6	5	4	3	1	35	44																		
12		1	3	2	5	5	2	1	1	20	17																		
13		1	2	3	2	3	0	0	1	12	06																		
14		3	1	1	0	0	0	0	0	05	03																		
15		0	0	0	0	0	1	1	2	04	02																		
16		2	2	1	2	1	0	1	1	10	04																		
17		2	3	2	5	5	5	2	2	26	23																		
18		3	4	5	5	5	3	2	2	29	27																		
19		1	1	2	3	1	1	1	0	10	05																		
20		1	1	3	4	2	2	1	1	15	09																		
21		1	0	1	0	1	0	1	0	04	02																		
22		0	0	1	1	1	0	0	0	03	01																		
23		2	1	1	1	1	0	0	0	06	02																		
24		1	1	2	0	1	3	3	3	14	08																		
25		5	3	5	3	5	2	2	2	27	24																		
26		2	1	1	1	2	1	1	1	10	04																		
27		2	2	3	2	2	2	1	2	16	08																		
28		2	2	2	2	1	1	1	1	12	05																		
29		1	1	2	2	0	1	1	0	08	03																		
30		2	3	5	7	3	3	3	3	29	34																		
31																													

K SCALE USED:				D	H	Z	(mm) (γ/mm) (to nearest 10γ)
LOWER LIMIT FOR K = 9.....				683.8	321.7		
CURRENT SCALE VALUE.....				3.76	7.82		
LOWER LIMIT FOR K = 9				2570	2520		

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

/s/ John B. Townshend

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY	
			COLLEGE, ALASKA	
			MONTH	YEAR
			JUNE	1976
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
06	03XX	pc5		
09	1947	si	Might be related to storm on 6/11.	
10	0240	si	Might be related to storm on 6/11.	
14	0234	si		
15	08XX	pi2		
24	1632	ssc*		
29	16XX	pcl	Remarkable event	
IDENTIFIED BY: MJM,JEP,JBT			VERIFIED BY: JBT	

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

NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA

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

Data from Individual Observatories:

JUNE 1976

Obs. 2 letter IAGA code	Geomag. lat.	Commencement			SC - amplitudes			Max. 3 hr - index K			Ranges			UT End day hr
		day	hr min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	Z(Y)	
CO	64°6 N	11	00XX	..	..	..	..	11	3, 4	6	165	1320	850	11 19
		24	1632	sc*	-11	-58	-19	25	1,3,5	5	78	780	210	25 20

JUNE

1976

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 6-1-76	2400 UT, 6-30-76	1.0/mm	3.88/mm	28° 07.0 E
H	0000 UT, 6-1-76	2400 UT, 6-30-76	7.88/mm		127658
Z	0000 UT, 6-1-76	2400 UT, 6-30-76	7.68/mm		551198

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 6-1-76	2400 UT, 6-30-76	7.9/mm	29.88/mm	24° 21.7 E
H	0000 UT, 6-1-76	2400 UT, 6-30-76	44.18/mm		115088
Z	0000 UT, 6-1-76	2400 UT, 6-30-76	48.68/mm		540148

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D	0000 UT, 6-1-76	2400 UT, 6-30-76	0.3/mm		1.08/mm
H	0000 UT, 6-1-76	2400 UT, 6-30-76	1.08/mm		
Z	0000 UT, 6-1-76	2400 UT, 6-30-76	2.48/mm		

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
28° 22.5 E	130578	553588

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: JUNE 9, 14, 15, 16, 21, 22, 23, 26, 28, 29

FORM CAGS-1246
10-55

MAGNETOGRAM HOURLY SCALINGS

Values are in tenths of amp. 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.
 Negative corrections have been applied. Negative values are in italics with minus sign shown.

MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)																													
Values are in tenths of mm., and are averages for successive periods of one hour beginning at midnight, floor 01 of local day (1500H, T.) is hour 11 of the same universal day. Surrogate corrections have been applied. Negative values are in red, with minus signs shown.																													
C.	Q.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	SUM			
01	80	88	98	111	112	118	128	130	168	150	140	01	158	191	173	242	264	244	279	260	223	159	129	73	3881				
02	66	78	80	79	98	113	134	140	150	159	134	02	144	159	182	202	232	228	238	219	179	117	95	69	3454				
03	63	58	70	60	73	145	128	136	128	143	200	03	171	172	192	242	303	320	309	219	173	11	47	67	3628				
04	62	61	18	92	91	99	127	257	130	198	158	04	220	87	155	200	237	242	223	209	200	168	139	130	3665				
05	77	47	45	56	58	156	61	215	176	52	77	05	-147	255	196	257	232	220	172	188	182	169	169	69	3000				
06	68	90	94	98	118	132	148	199	159	137	145	06	143	169	199	226	238	242	212	198	182	158	148	103	3674				
07	108	89	88	91	119	178	141	289	132	128	114	07	148	200	194	253	259	224	229	205	178	193	124	91	3713				
08	90	72	101	108	139	188	162	132	126	98	118	08	139	178	193	212	238	248	235	213	178	137	118	95	3632				
09	98	120	139	152	163	148	148	162	149	139	132	09	143	153	182	209	235	244	247	229	193	154	138	128	3934				
10	112	97	89	105	138	147	148	139	129	133	137	10	144	131	222	260	272	281	263	255	207	164	122	132	3784				
11	118	111	44	187	72	-12	-31	43	27	99	187	11	146	266	305	465	412	330	282	258	198	144	87	77	3520				
12	78	72	78	97	117	130	180	144	149	121	134	12	159	161	191	204	245	242	225	205	181	147	118	108	3685				
13	98	89	95	114	141	143	149	153	232	119	129	13	162	219	193	228	240	252	249	230	211	164	116	110	4004				
14	99	94	91	92	118	148	150	139	146	133	143	14	163	177	191	218	238	249	259	248	212	153	116	98	3824				
15	98	101	98	113	134	142	138	138	133	142	149	15	150	164	188	221	250	264	270	263	263	180	81	71	3896				
16	62	61	38	88	91	111	128	125	112	149	133	16	145	172	207	211	232	253	243	223	218	168	118	99	3514				
17	62	58	72	68	82	109	93	133	148	118	480	17	163	169	226	268	220	249	221	202	194	164	90	77	3902				
18	87	58	66	58	-29	134	52	215	129	67	191	18	168	111	253	187	242	258	238	230	167	143	117	94	3367				
19	120	128	124	125	129	124	169	133	128	130	174	19	138	152	183	218	228	252	233	195	148	114	78	72	3646				
20	81	103	112	122	131	133	128	133	137	81	63	20	128	158	195	259	295	272	255	214	172	128	112	100	3634				
21	88	95	113	138	148	154	157	148	137	138	135	21	190	152	163	194	218	241	218	238	194	171	144	108	3821				
22	109	105	123	135	150	153	143	143	148	138	161	22	149	150	159	185	221	246	254	238	209	182	158	95	3872				
23	93	78	98	112	129	122	120	128	127	124	133	23	174	190	229	256	251	239	218	215	210	165	138	106	3811				
24	103	89	88	102	119	143	133	133	129	128	130	24	158	191	223	220	264	339	308	212	222	159	169	106	3996				
25	4	-14	33	37	42	43	197	138	128	128	130	25	146	214	221	198	253	261	263	237	160	82	37	38	3100				
26	56	81	110	134	148	153	158	148	144	133	141	26	142	151	191	209	242	258	269	235	192	158	83	79	3763				
27	94	90	78	92	93	108	104	92	199	123	122	27	158	172	204	233	234	251	241	231	192	134	118	92	3576				
28	67	67	52	69	82	104	172	148	142	124	131	28	128	148	182	213	246	252	270	222	171	119	100	91	3433				
29	68	72	67	91	101	127	143	130	168	180	117	29	133	160	188	229	263	262	279	249	192	170	125	102	3723				
30	74	57	56	72	73	42	118	60	146	28	1	30	135	128	161	179	252	265	231	206	185	106	95	74	2951				
31												31																	
SCALED BY		SPT, CED										Preliminary base-line and scale values:										Scale Value		MONTHLY SUM		MONTHLY MEAN			
CHECKED BY		CED, JEP, M3JM																						DATES WITH GAPS:		152			
SIGAT RE-VIEWED BY		CED																											
PUNCHED BY																													

() Interpolated
 () Significant portion of hour interpolated.
 () No record; or no values available because of faulty record.
 * Derived from Storm Mph., converted to Normal Mph.

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

SPT, CED
 CED, JEP, MJM
 CED
 PUS-CED BY

MONTHLY SUM
 MONTHLY MEAN
 DATES WITH GAPS

109805
 152

UACOMMOD 101010101

7-240 C&G-404e
(6-4-77)

MAGNETOGRAM HOURLY SCALINGS

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day 050W (M.T.) is hour 11 of the 60000 universal day.
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

FORM 645-604a		MAGNETOGRAM HOURLY SCALINGS		U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANOGRAPHIC SERVICE COAST AND GEODETIC SURVEY GEOMAGNETIC DIVISION		SUBJ.		YEAR		MONTH		DAY		SUM	
				(UNIVERSAL TIME)				76		JUNE		00			

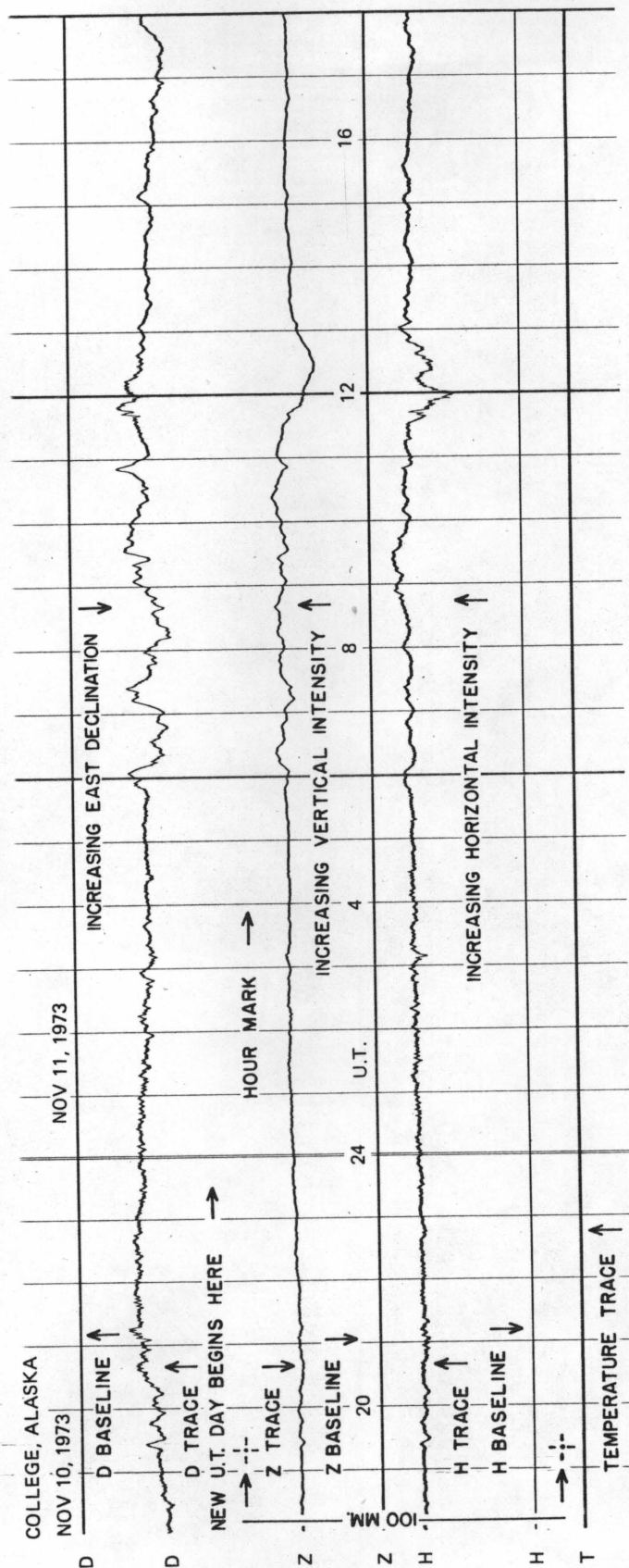
MAGNETOGRAM HOURLY SCALINGS

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

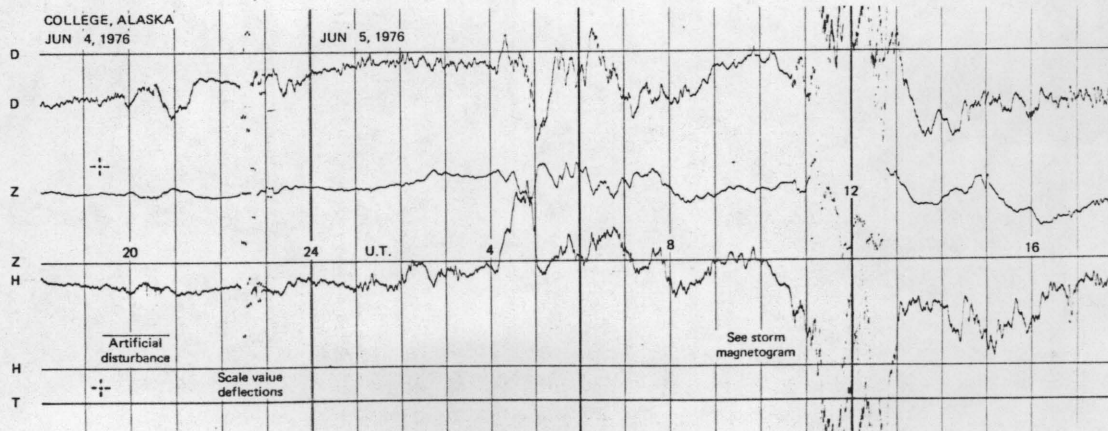
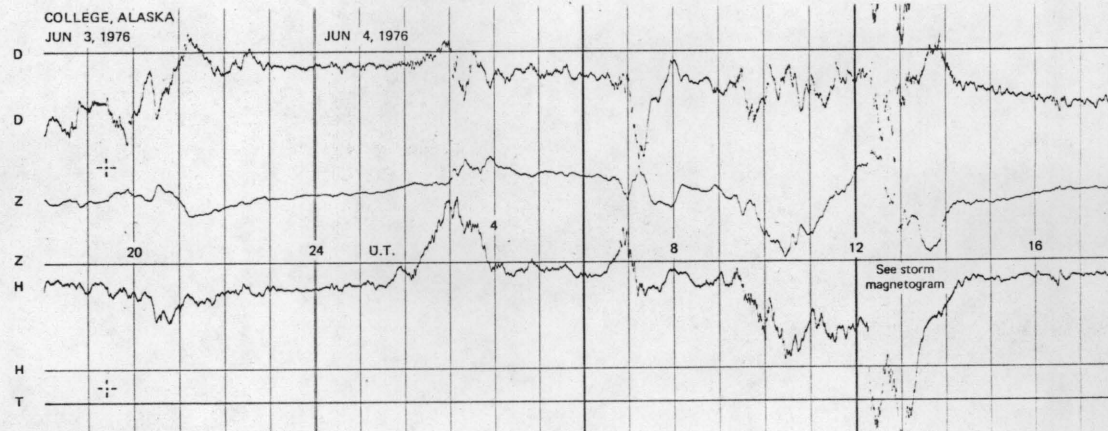
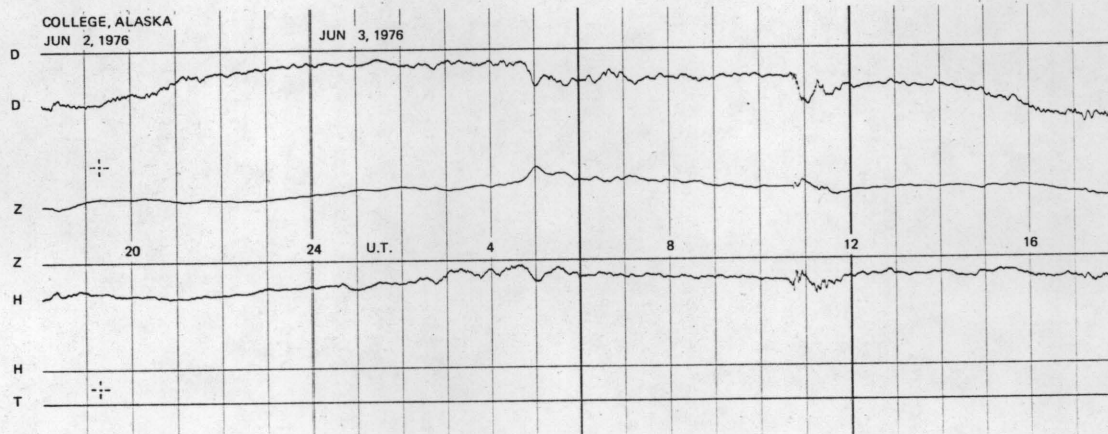
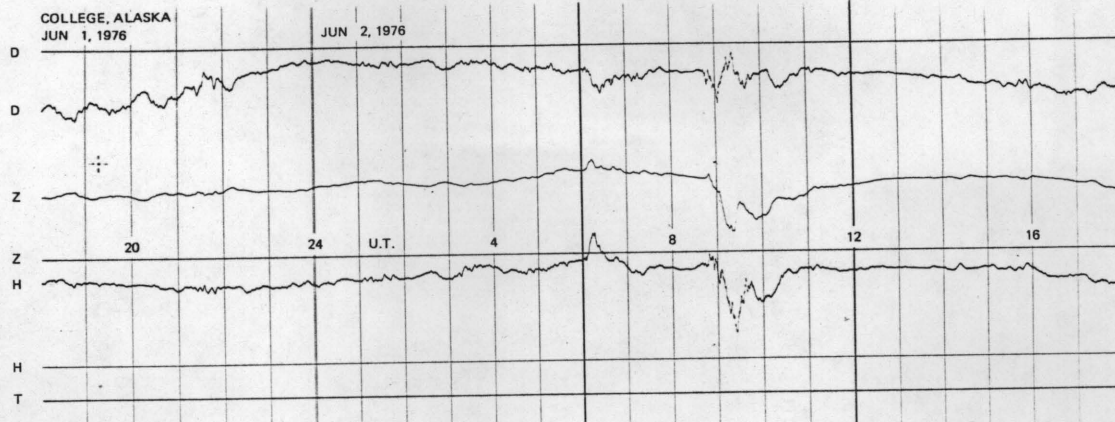
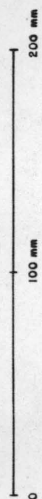
U.S. DEPARTMENT OF COMMERCE ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION COAST AND GEODENSIC DIVISION		OBSY.		YEAR		MONTH		C.E.	
		CO		76		JUNE		Z	

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



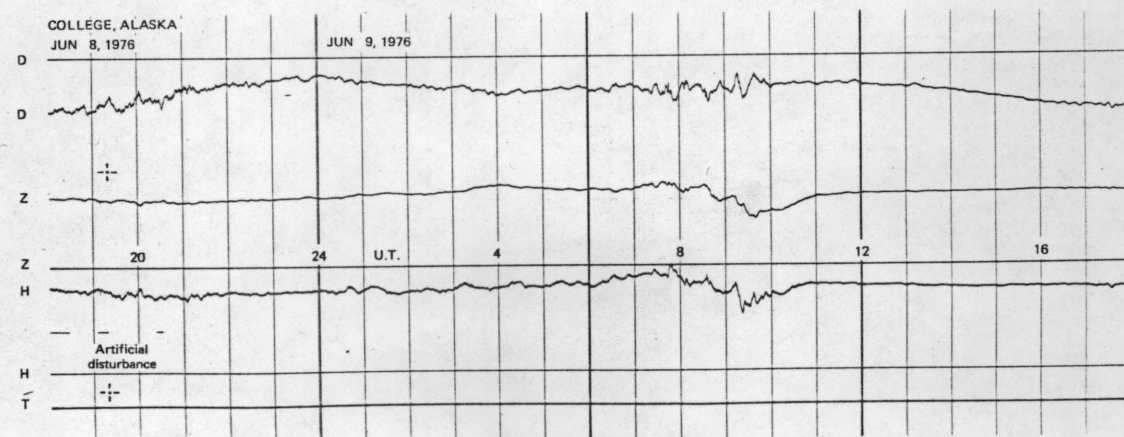
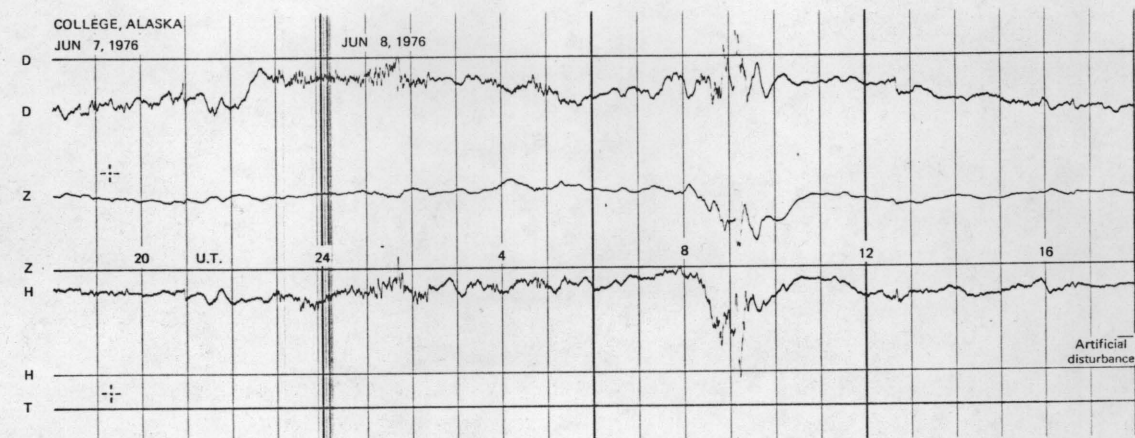
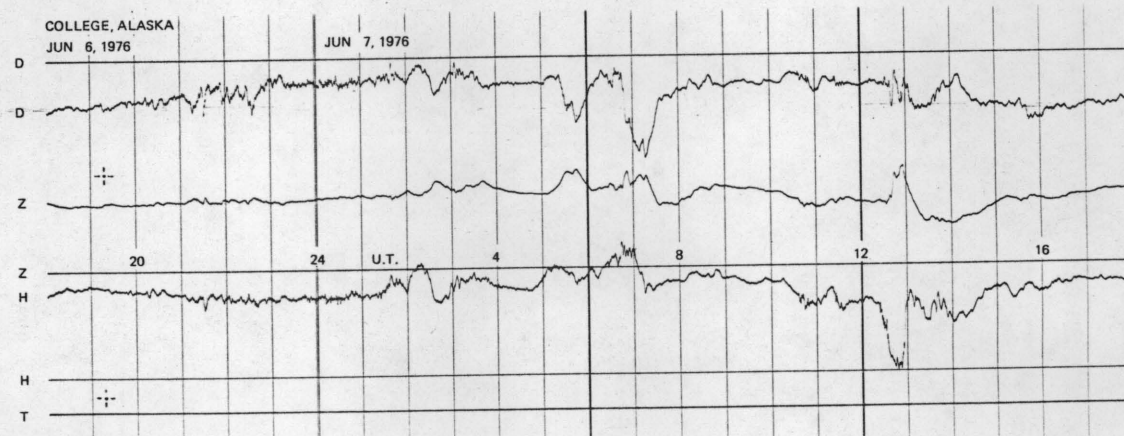
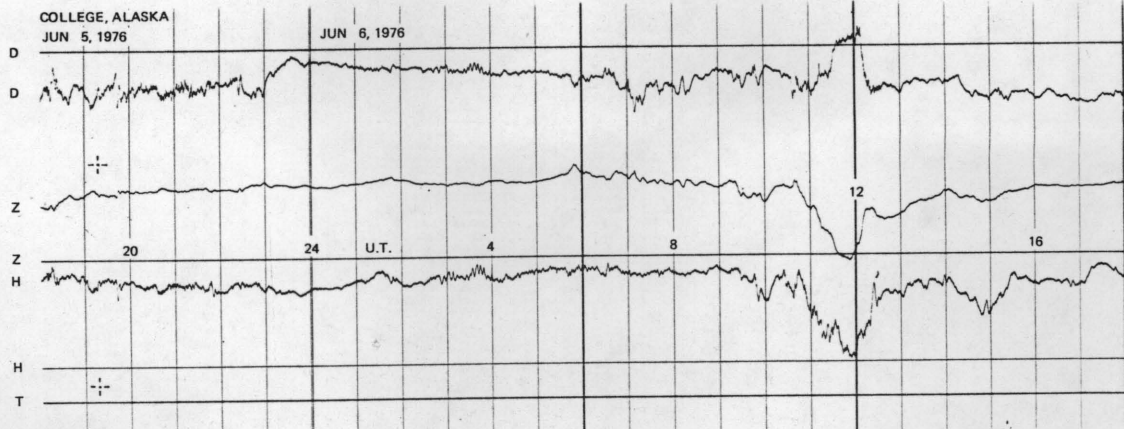
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

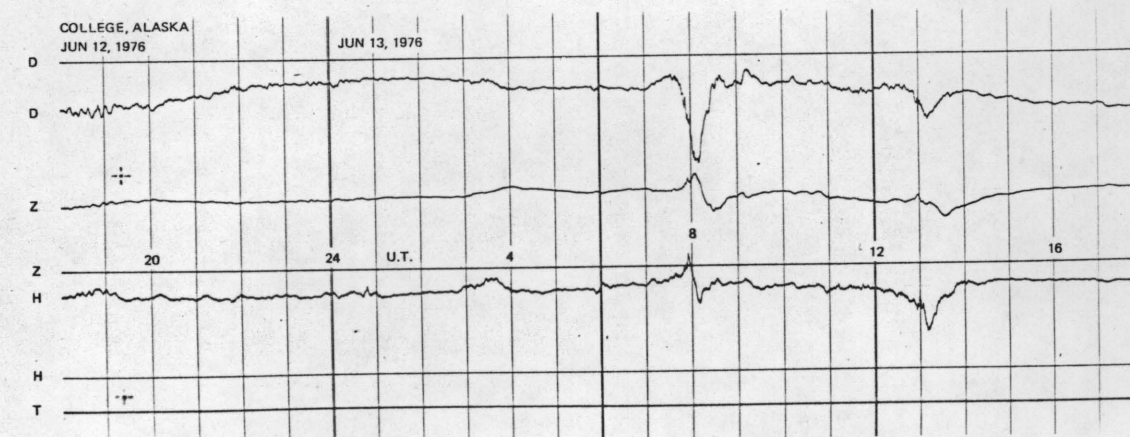
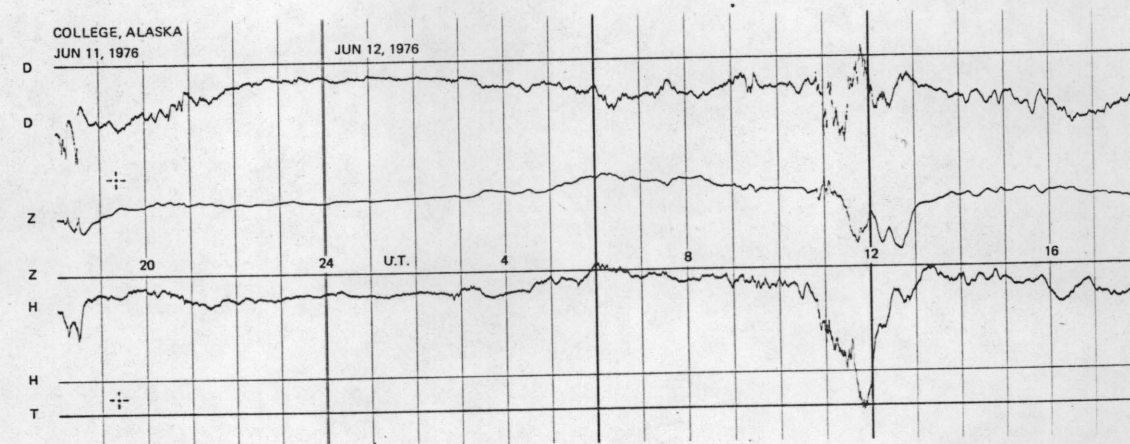
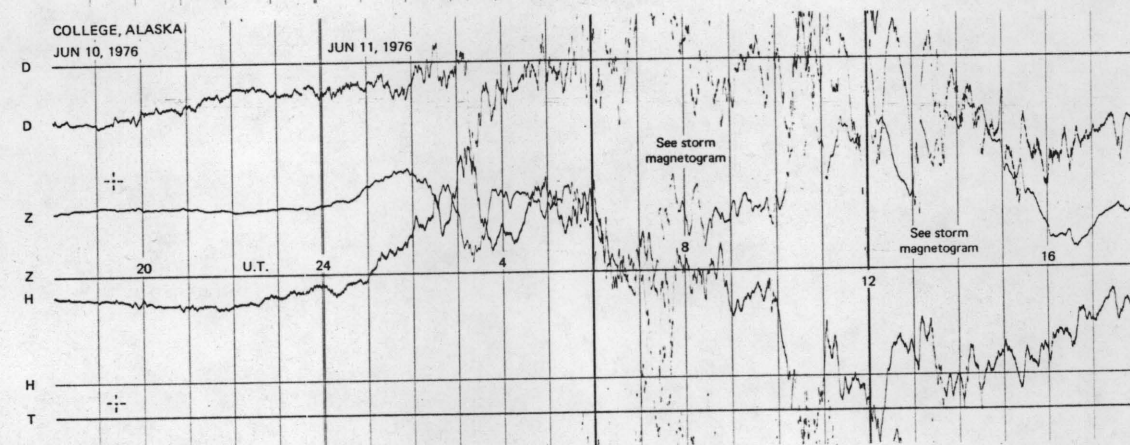
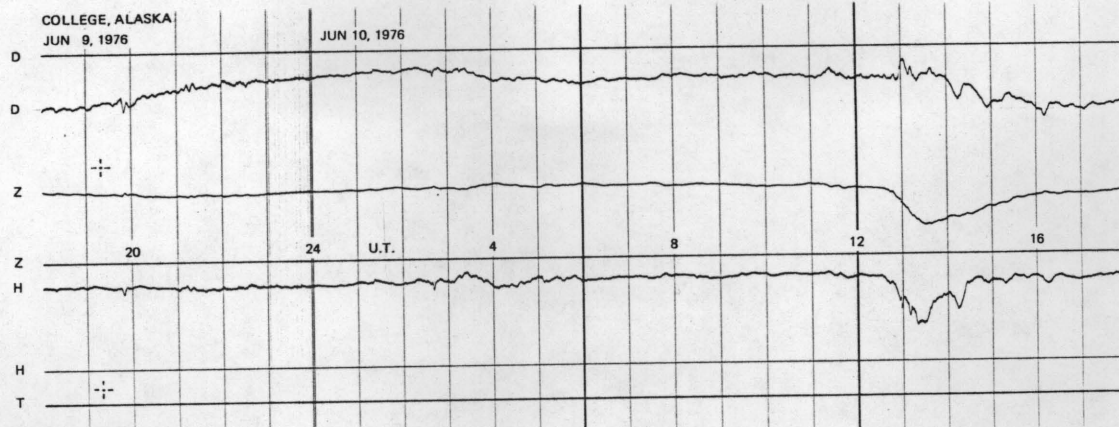
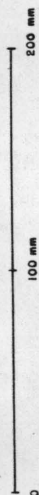


NORMAL MAGNETOGRAMS

200 mm
100 mm
0

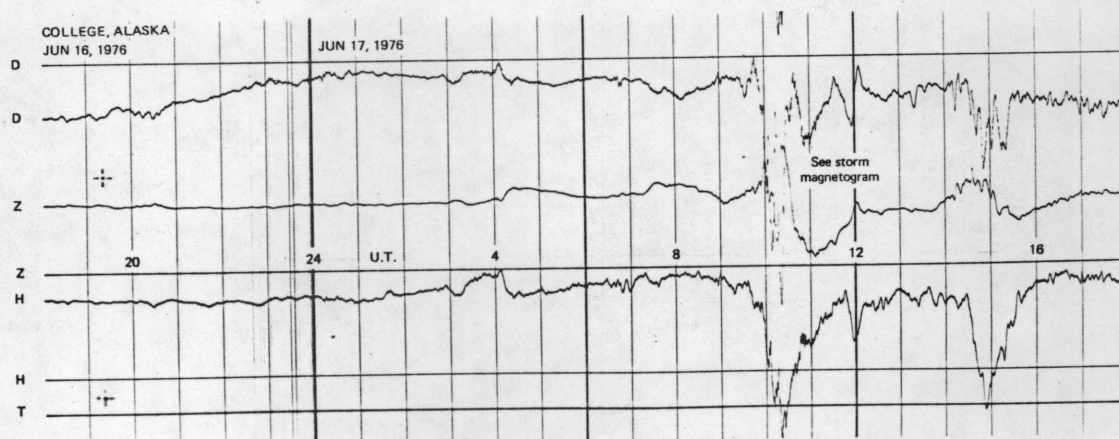
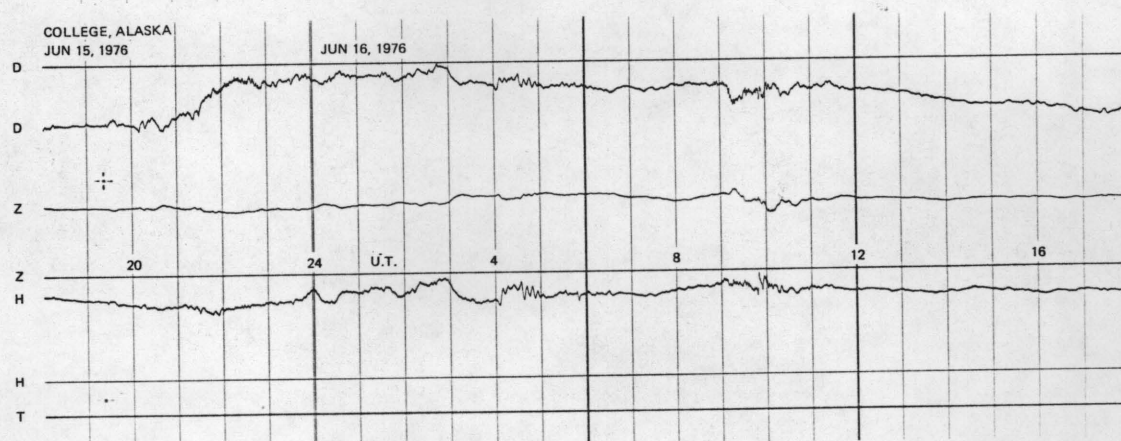
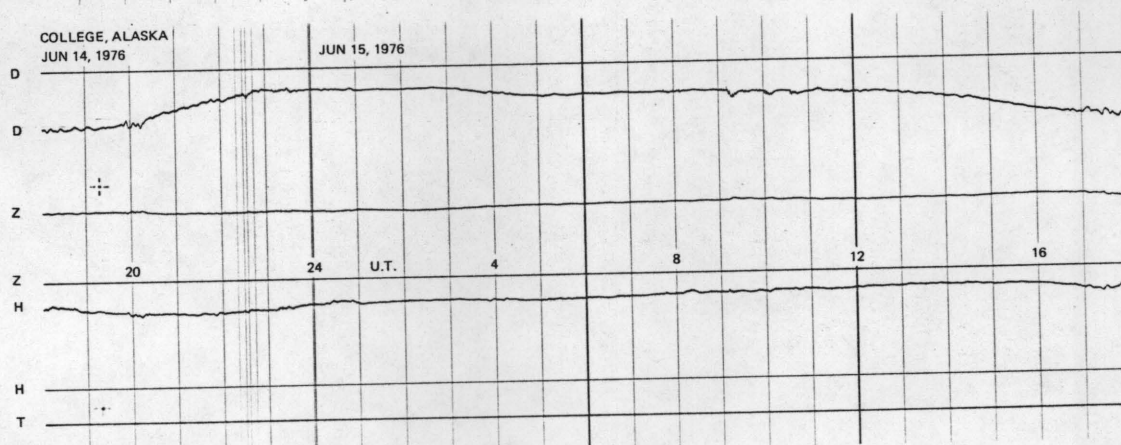
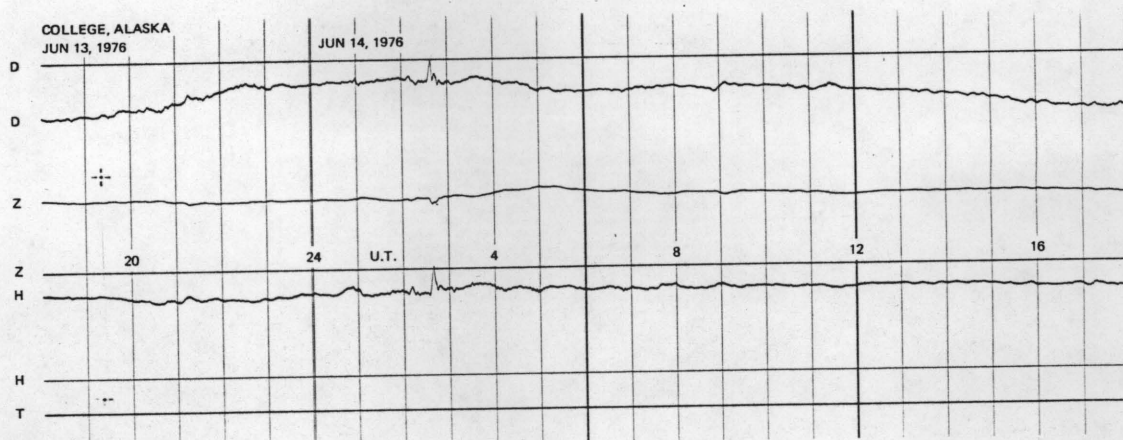


NORMAL MAGNETOGRAMS

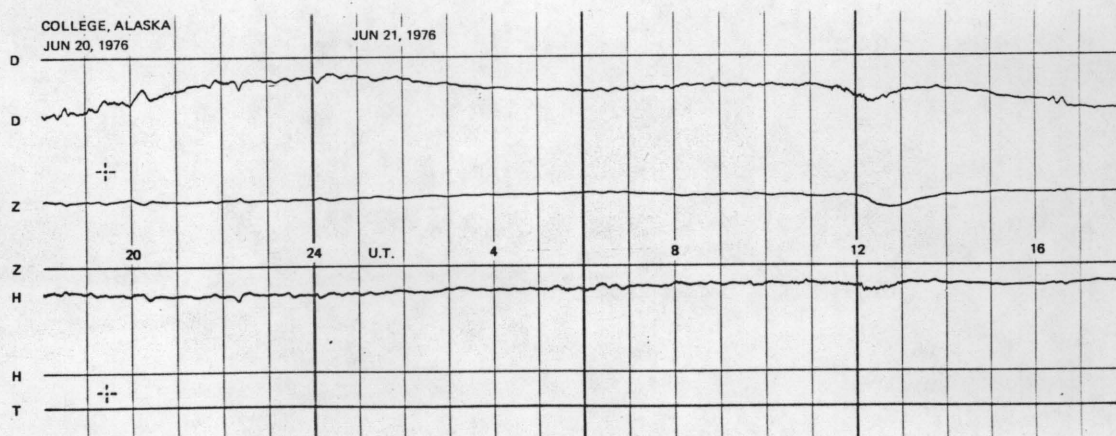
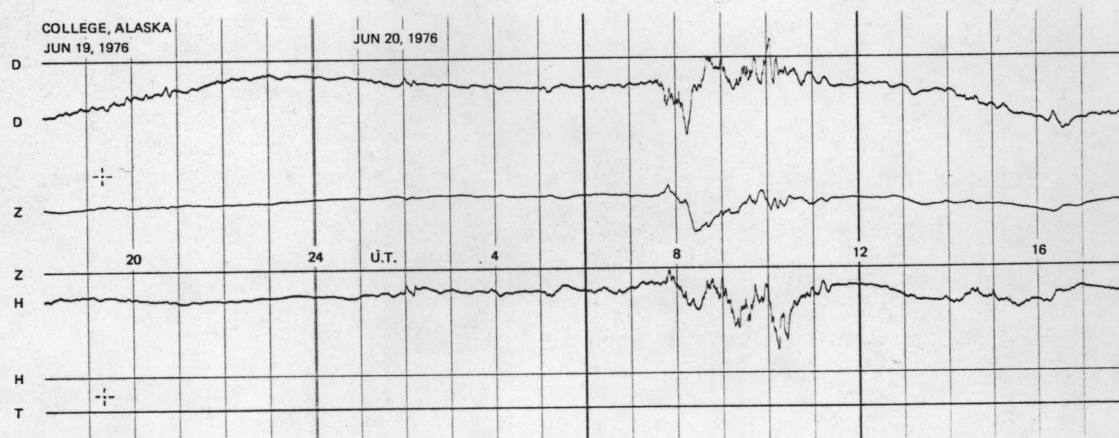
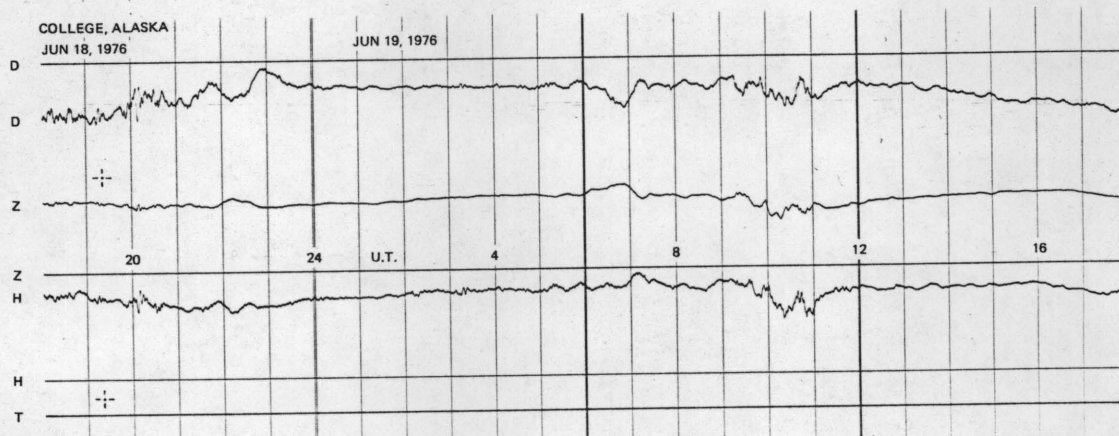
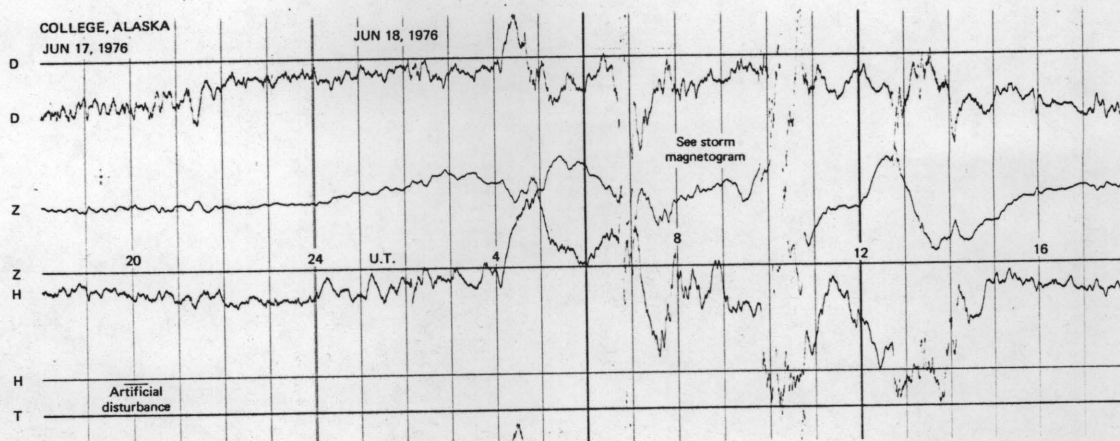
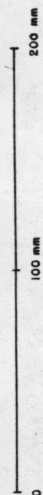


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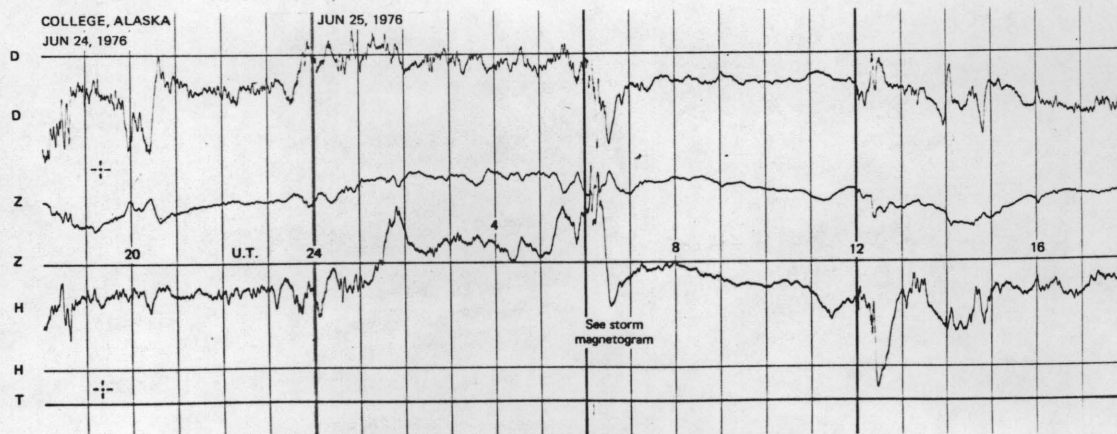
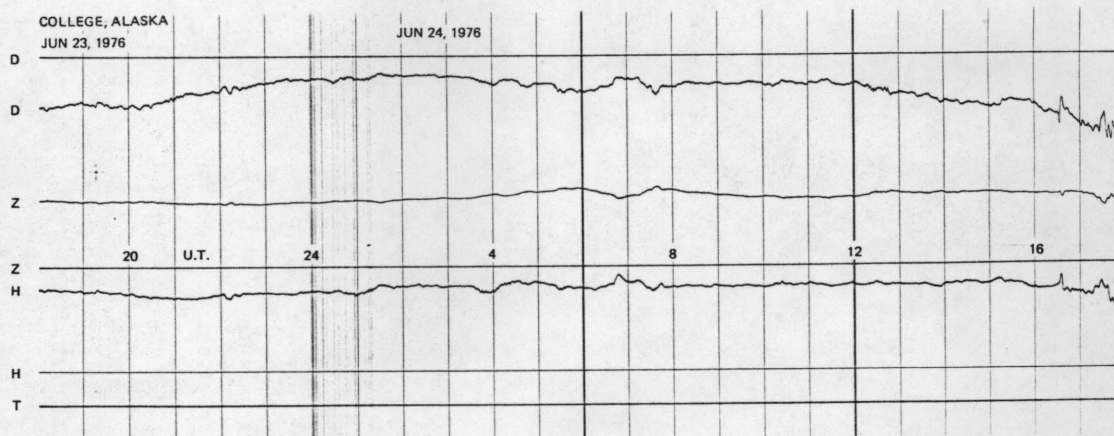
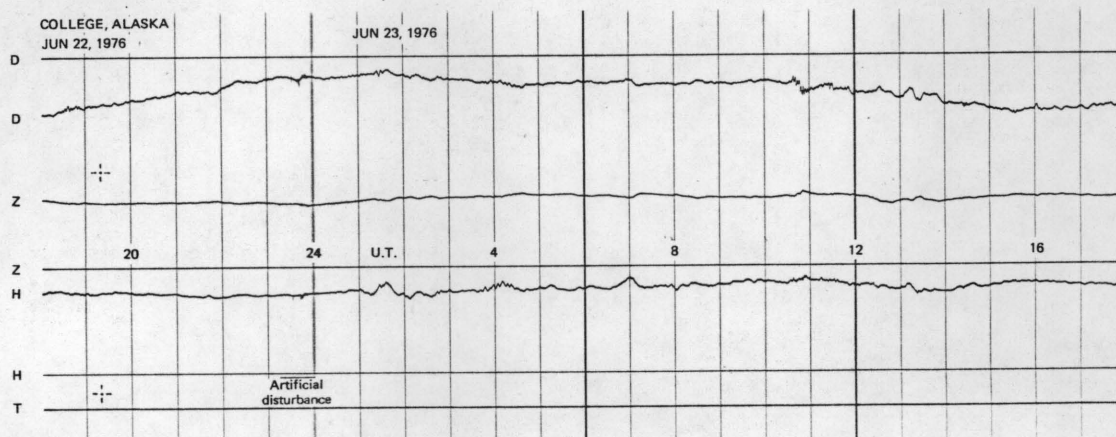
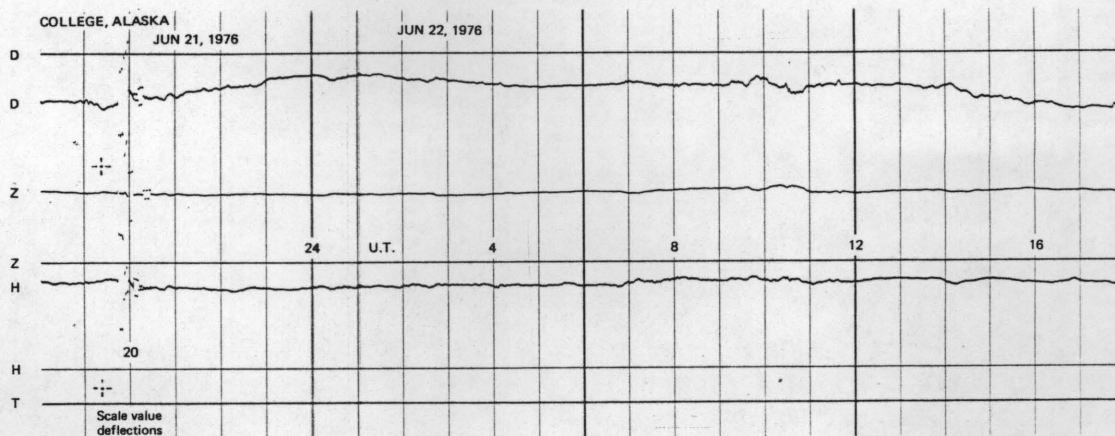
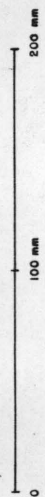
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100 mm
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NORMAL MAGNETOGRAMS

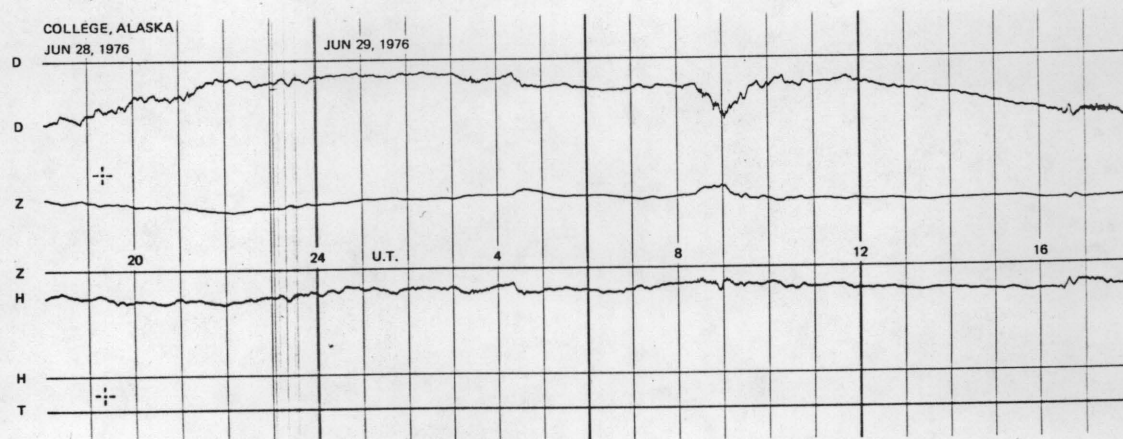
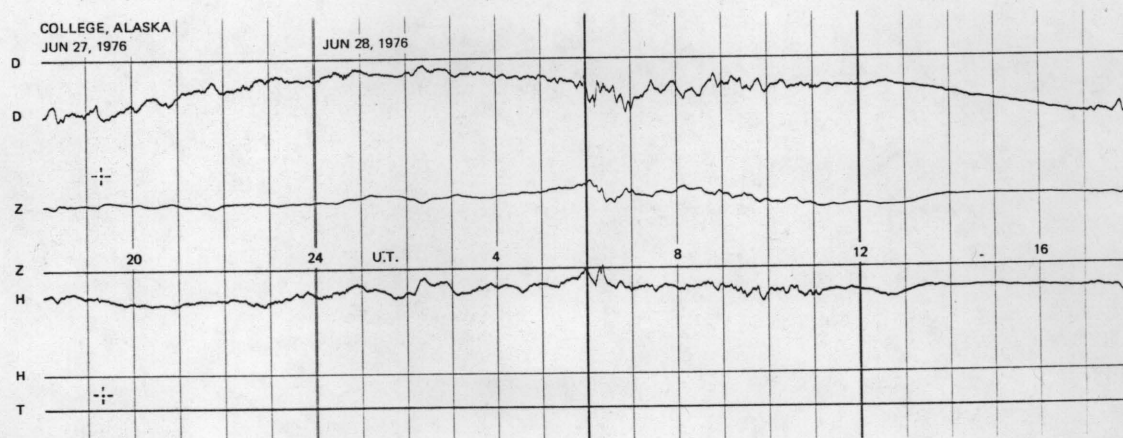
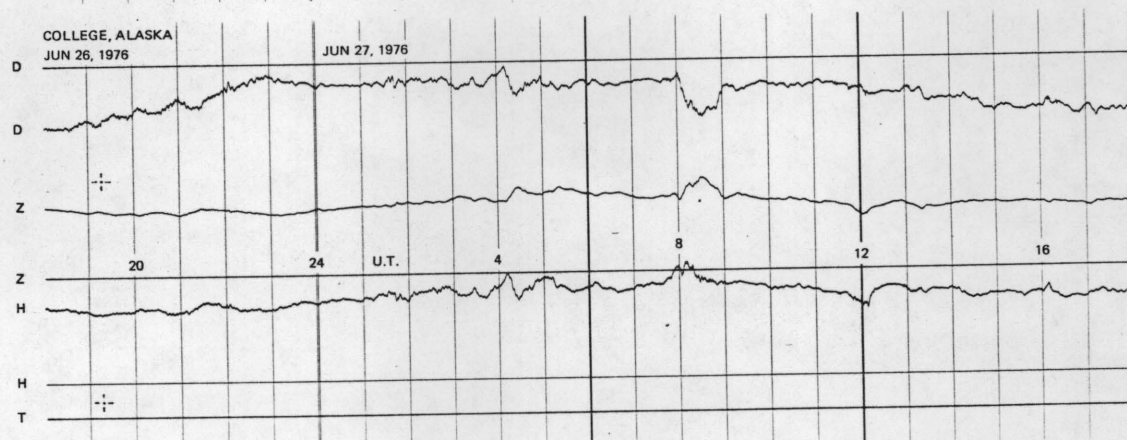
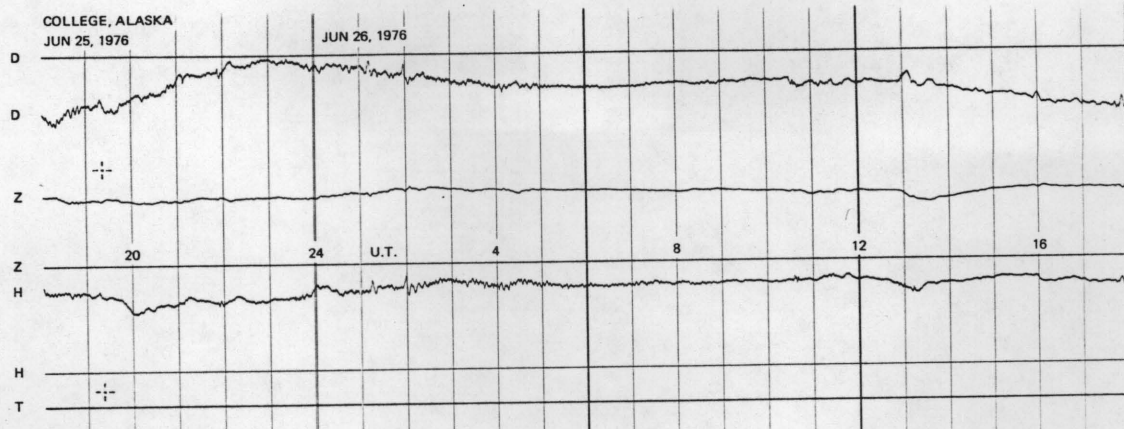


NORMAL MAGNETOGRAMS



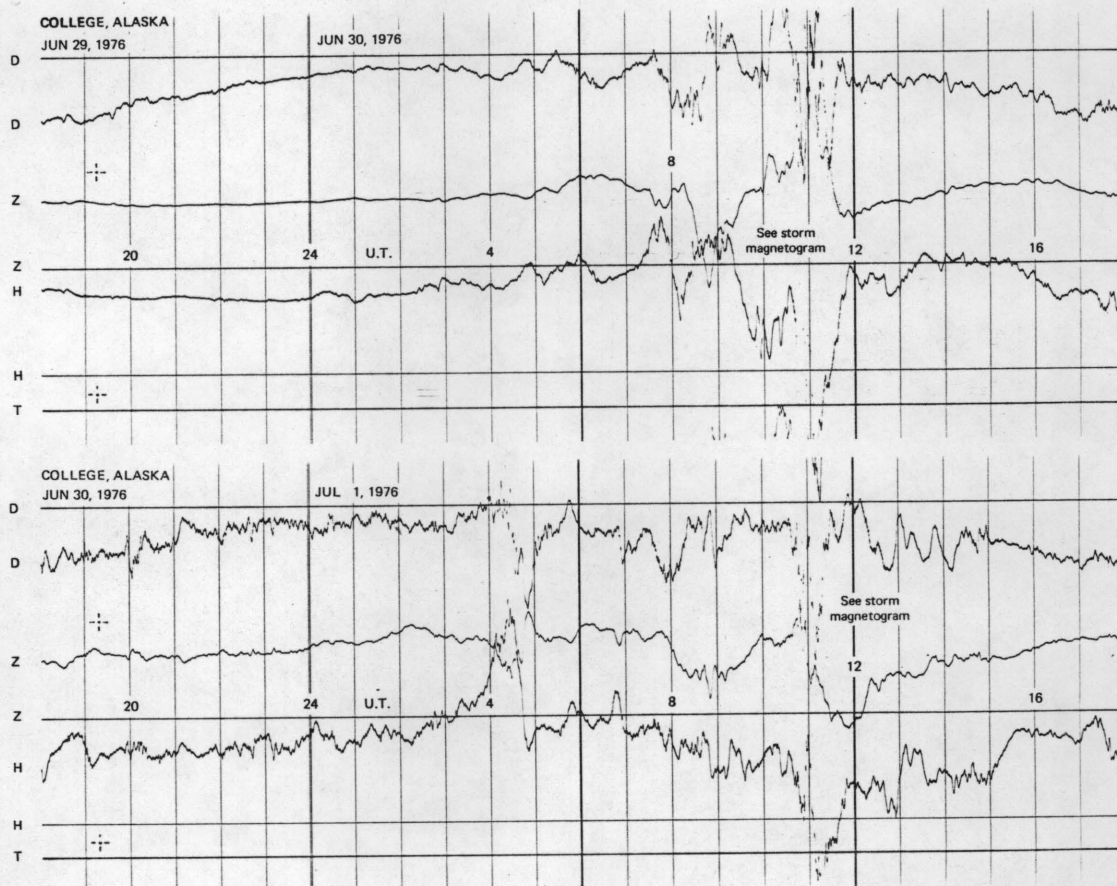
NORMAL MAGNETOGRAMS

200 mm
100 mm
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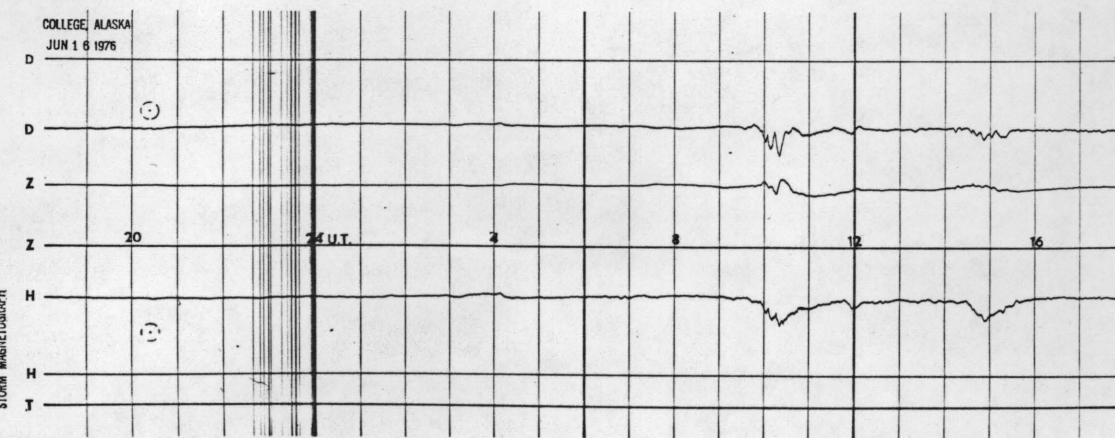
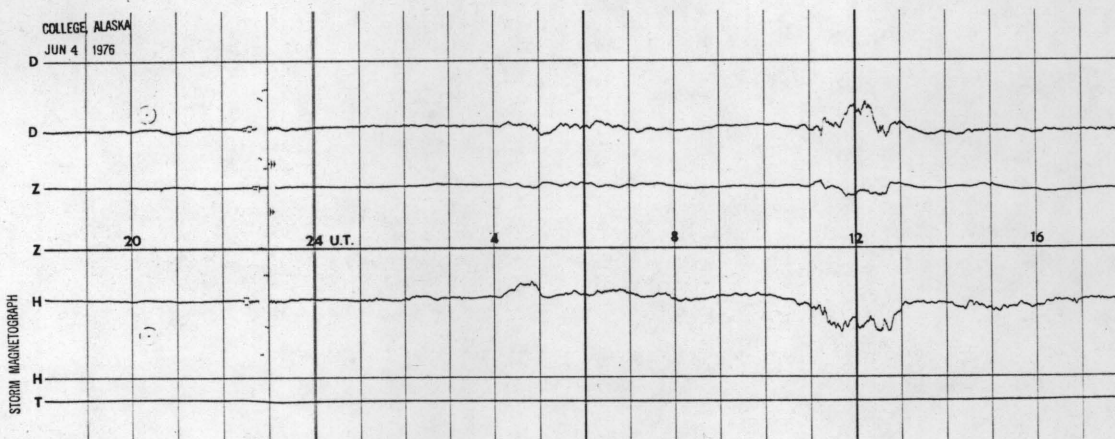
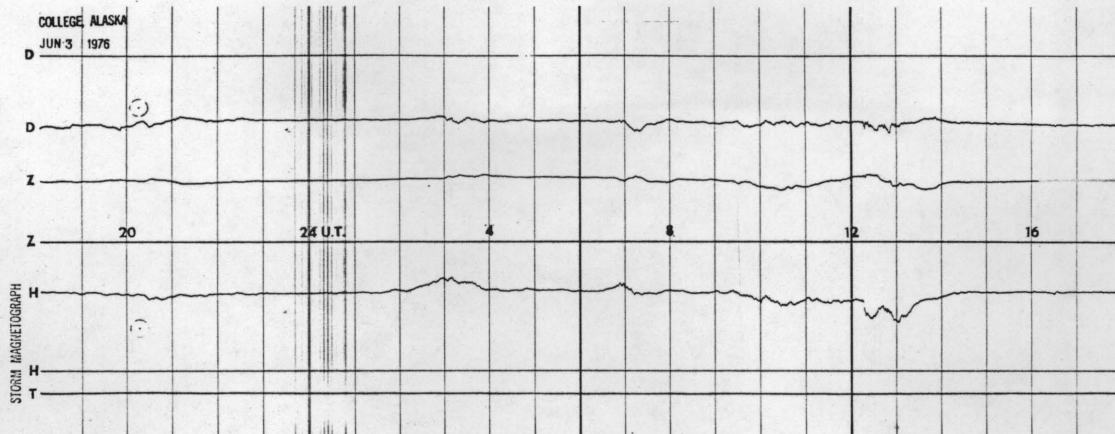
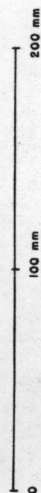


NORMAL MAGNETOGRAMS

200 mm
100 mm
0



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

200 mm
100 mm
0

