

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

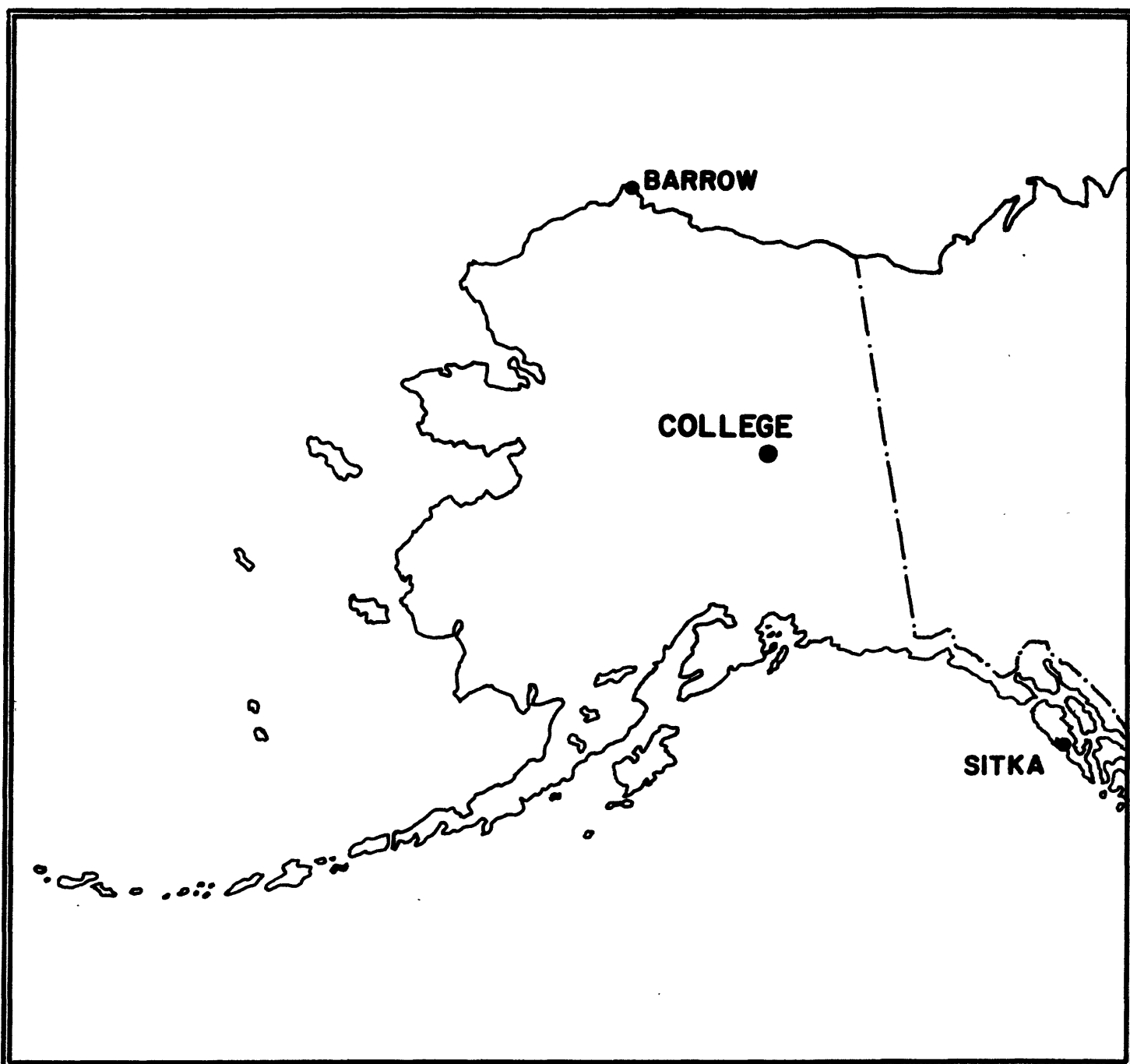
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

MAY 1990

OPEN FILE REPORT 90-0300E



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: R.V. O'CONNELL AND CAROL ANN VARNER AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA FAIRBANKS. THE COLLEGE OBSERVATORY IS PART OF THE BRANCH OF GLOBAL SEISMOLOGY AND GEOMAGNETISM OF THE U.S. GEOLOGICAL SURVEY.

Explanation of Data and Reports

Magnetic Activity Report

Principal Magnetic Storms

Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings - Five Quietest Days

Sample Format for Normal and Storm Magnetograms

Normal Magnetograms

Storm Magnetograms (When Normal is too disturbed to read)

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. 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
800 Yukon Drive
Fairbanks, Alaska 99775-5160

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

World Data Center A
NOAA D63m 325 Broadway
Boulder, Colorado 80303

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 the 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

EXPLANATION OF DATA & REPORTS

Available Data & Reports

Normal and storm magnetograms and appropriate calibration data are processed at the observatory and are available for analysis or copying. Magnetic Activity Report (K-Indices & AK values), Principal Magnetic Storms Report, and Magnetogram Hourly Scalings for the five quietest days of the month are also available.

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 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:

<u>Gamma Range</u>	<u>K-Index</u>	<u>ak</u>
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)

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 commencement; 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 averaged 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 sheet 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 one is interested in the detailed morphology of the magnetic field, refer directly to the magnetogram.

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:

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

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 MAY, 1990			
DATE	K-INDICES								A _k	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	2	3	2	3	3	2	2	2	19	10	SUDDEN COMMENCEMENTS d h m 18 07 40 26 20 37		
2	1	2	3	5	6	1	2	2	22	21			
3	2	3	3	5	6	2	3	3	27	25			
4	3	3	2	5	4	2	3	2	24	18			
5	2	1	4	6	1	2	2	1	19	17			
6	1	2	2	3	1	0	2	1	12	6			
7	1	2	1	3	3	5	1	2	18	13			
8	1	2	2	1	3	3	2	2	16	8			
9	3	3	4	5	6	4	3	3	31	30			
10	3	4	5	6	4	4	3	3	32	32			
11	4	6	5	4	5	5	5	3	37	43			
12	3	3	2	1	0	0	1	1	11	6			
13	2	1	2	1	1	5	2	3	17	12			
14	1	1	1	0	1	1	1	1	7	3			
15	1	2	1	1	2	1	1	0	9	4			
16	0	1	0	0	0	0	0	0	1	0	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
17	1	2	2	2	2	1	2	0	12	5			
18	2	2	3	4	6	7	3	3	30	38			
19	5	4	3	4	5	4	3	3	31	28			
20	4	5	3	4	3	5	4	3	31	28			
21	3	3	0	5	4	6	4	4	29	30	BEGIN END d h m d h m		
22	4	4	6	5	6	5	5	3	38	47			
23	3	3	4	4	3	4	3	1	25	18			
24	1	1	1	1	1	2	2	2	11	5			
25	3	4	4	4	4	5	4	2	30	26			
26	4	4	3	3	5	4	4	5	32	29			
27	4	4	7	6	4	5	3	2	35	47			
28	1	3	2	5	2	4	2	2	21	15			
29	3	2	3	4	3	3	3	3	24	16			
30	3	4	5	5	5	4	3	2	31	29			
31	3	3	2	3	5	3	3	2	24	17			
K SCALE USED: LOWER LIMIT FOR K = 9..... CURRENT SCALE VALUE..... LOWER LIMIT FOR K = 9					D 675.7 3.67 2480	H 322.2 7.73 2490	Z 	(mm) (γ/mm) (to nearest 10γ)					
SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.													
APPROVED John B. Townshend, Chief													
OBSERVER IN CHARGE													

PRINCIPAL MAGNETIC STORMS
Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

MAY 19 90

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

Obs. 2 letter 1-3A 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)
C0	64°6 N	18	0740	SC	-10	+85	-36	18	6	7	271	1250	910	18 20
		26	2037	SC	-14	+85	+38	27	3	7	221	1470	810	27 18

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 5-1-90	2400 UT, 5-31-90	1.0' / mm	3.78' / mm	26° 34.5' E
H	0001 UT, 5-1-90	2400 UT, 5-11-90	7.78' / mm		126298
	0001 UT, 5-12-90	2400 UT, 5-19-90	↓		126338
	0001 UT, 5-20-90	2400 UT, 5-31-90			126368
Z	0001 UT, 5-1-90	2400 UT, 5-24-90	7.78' / mm		552068
	0001 UT, 5-25-90	2400 UT, 5-31-90	↓		552048

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 5-1-90	2400 UT, 5-31-90	7.9' / mm	29.48' / mm	
H	(SAME)	(SAME)	43.48' / mm		
Z	(SAME)	(SAME)	48.98' / mm		

The College Observatory has used several absolute instruments and different observing piers since it began operations in 1948. To avoid artificial secular shifts in the absolute values published when instruments were changed, corrections were applied to provide continuity in the data from the time the Observatory began operating. For many years the instruments used for observing absolute values have had zero correction. Effective with the May 1989 Preliminary Data Report, in accordance with a directive issued by the USGS Branch of Global Seismology and Geomagnetism analysis personnel, these longstanding corrections are discontinued and all data listed (D, H & Z) are for the position at absolute pier 1a and without any corrections applied. The net effect of these changes is as follows:

Declination (D): No Change

Horizontal Intensity (H): -5γ; i.e., H absolute and baseline values are 5γ less than previously reported.

Vertical Intensity (Z): +33γ; i.e., Z absolute and baseline values are 33γ higher than previously reported.

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
26° 53.5' E	127828	553408

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: MAY 14, 15, 16, 17, 24

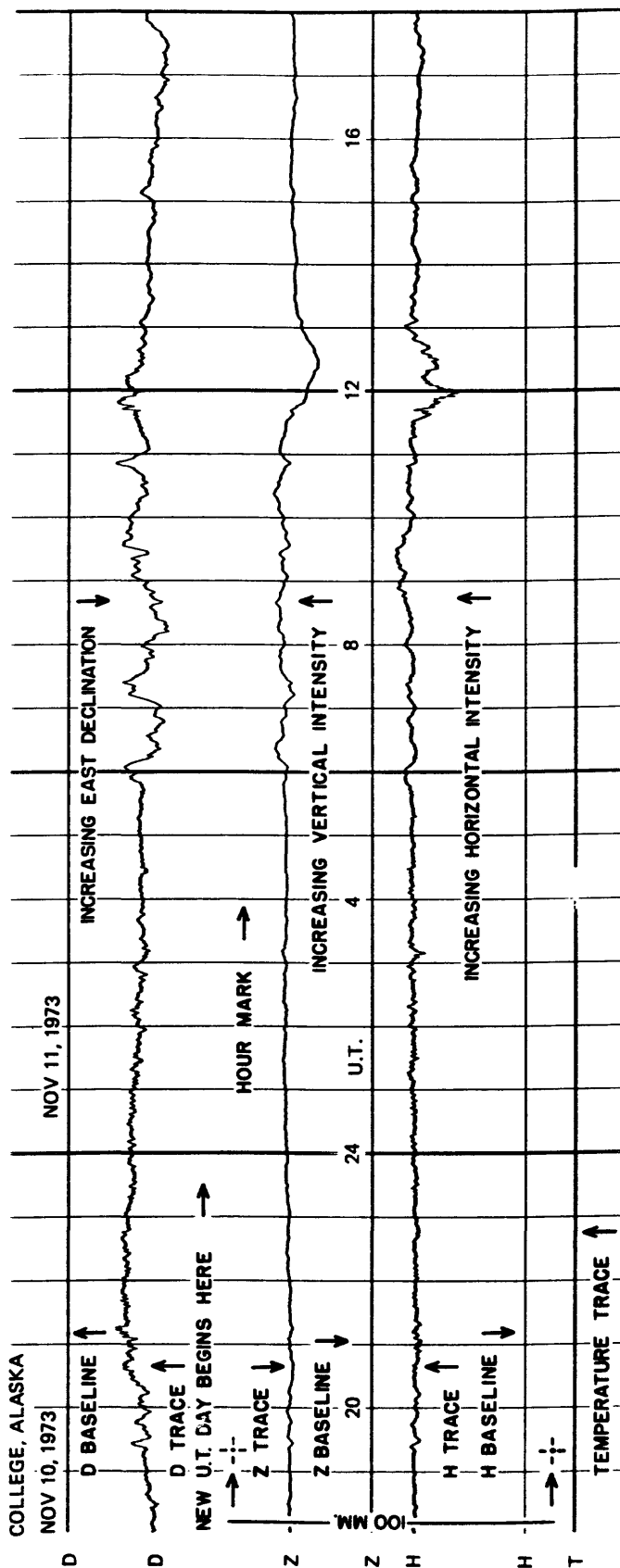
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

(UNIVERSAL TIME)

Values are in Tenths of mm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT		D					H					Z					COMPONENT	
DAY	A _k	14	15	16	17	24	14	15	16	17	24	14	15	16	17	24	DAY	A _k
HOUR		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	01	02
		100	110	114	110	119	118	132	158	158	184	182	162	171	170	162	219	212
		108	107	105	107	130	130	160	164	170	180	159	163	171	173	163	212	211
		123	106	120	114	149	159	170	167	180	190	169	173	170	173	173	232	232
		140	101	130	128	179	190	193	180	202	210	186	175	165	177	199	240	240
		161	113	140	158	201	208	230	186	230	212	199	172	170	199	209	230	230
		179	138	141	183	195	224	236	199	220	219	201	209	170	211	215	215	212
		186	180	147	163	190	200	241	211	257	220	189	211	170	211	215	212	210
		192	174	156	160	181	192	236	210	240	220	182	201	174	215	215	212	194
		198	160	170	148	169	195	230	222	220	199	180	188	180	186	170	173	174
		198	166	170	130	152	199	230	228	218	203	181	187	179	170	173	173	174
		181	161	176	129	179	200	239	228	211	212	178	177	179	167	150	174	174
		178	148	186	141	133	201	218	229	186	201	178	167	170	150	174	174	174
		181	163	201	190	134	200	177	230	189	200	173	156	170	140	185	185	185
		201	165	219	221	146	190	159	240	186	212	167	139	175	144	190	190	190
		235	178	257	276	177	202	186	239	173	225	172	154	178	149	201	201	201
		273	245	280	293	210	198	210	237	210	160	175	172	180	133	190	190	190
		310	306	320	317	302	200	200	230	213	150	177	182	181	172	174	174	174
		356	325	322	320	328	170	184	220	201	196	180	173	175	173	175	175	175
		330	310	320	322	316	170	172	206	179	199	160	161	172	173	180	180	180
		273	281	266	270	279	162	167	184	160	191	154	162	165	157	170	170	170
		281	226	229	187	283	150	140	162	163	150	155	155	159	147	186	186	186
		240	183	180	159	230	149	149	150	156	134	151	157	153	160	172	172	172
		190	140	134	140	101	139	149	149	157	157	151	163	158	161	153	153	153
		139	131	111	129	144	140	151	146	160	216	157	171	161	160	184	184	184
		4973	4321	4594	4495	4627	4286	4564	4777	4644	4640	4158	4155	4096	4073	4692	4692	4692
DAILY SUM		207	180	191	187	193	179	190	199	194	193	173	173	171	170	195	195	195
DAILY MEAN		192					191					176					MEAN	
MEAN		192					191					176					MEAN	
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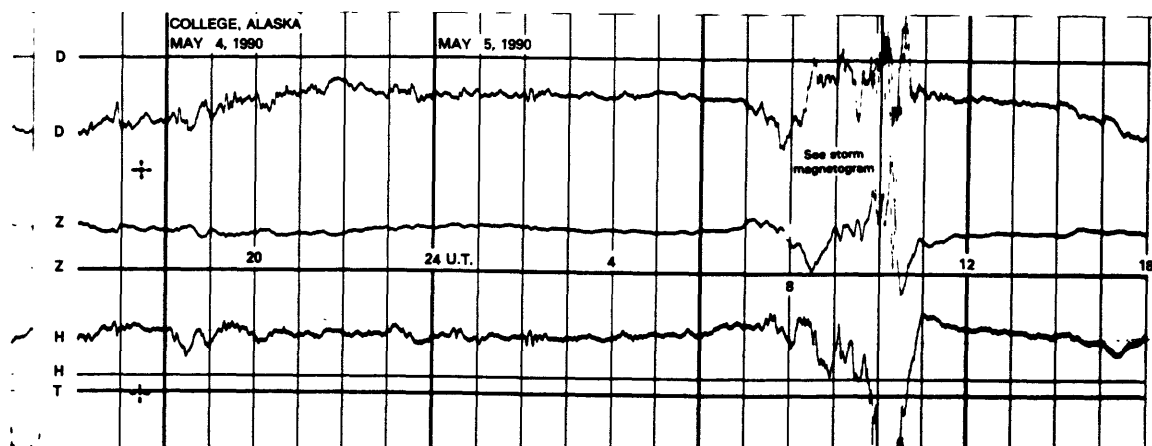
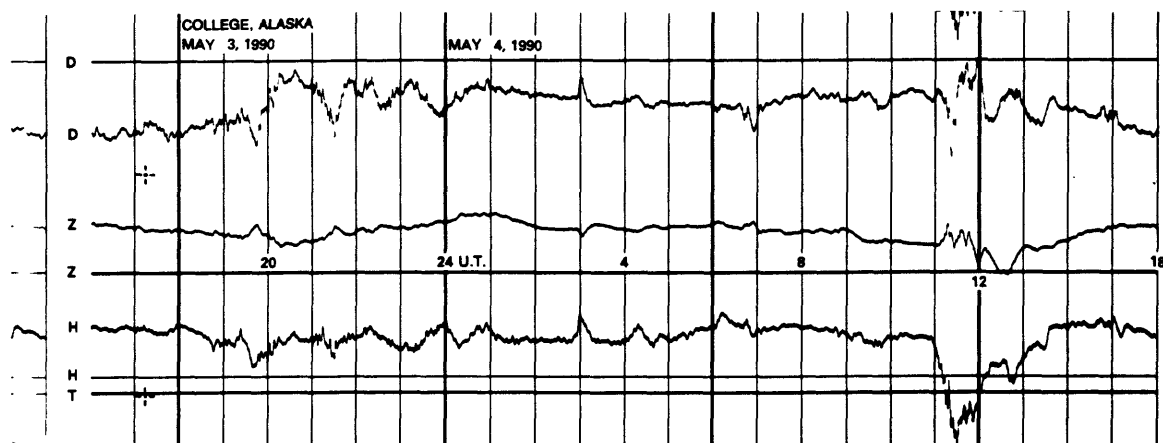
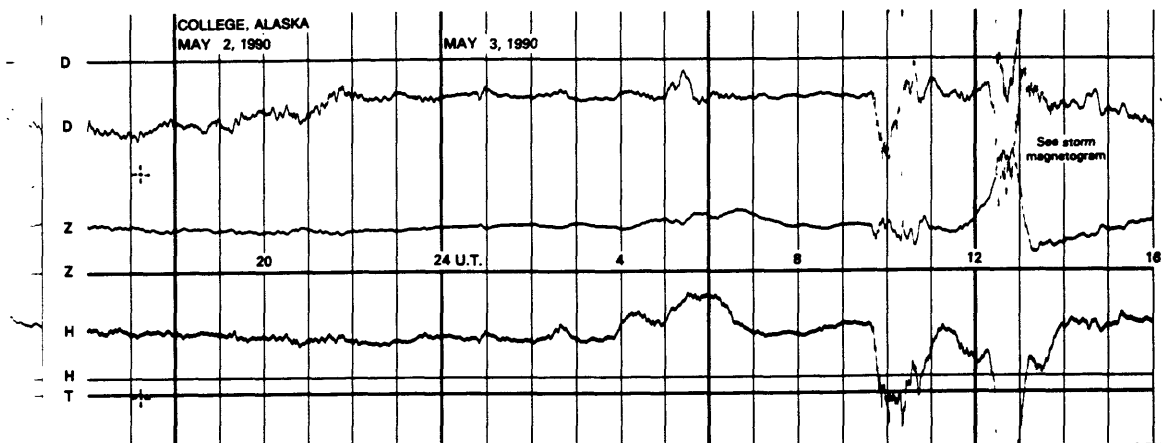
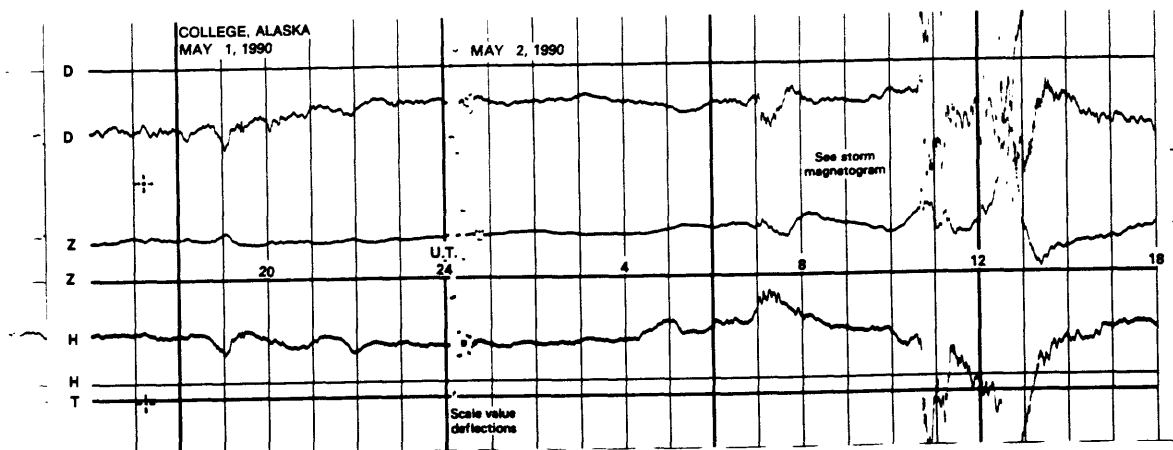
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



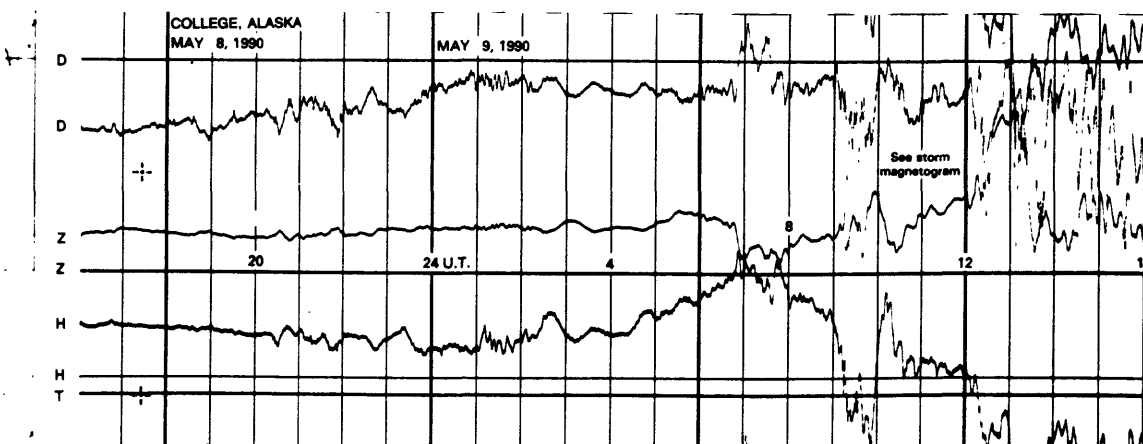
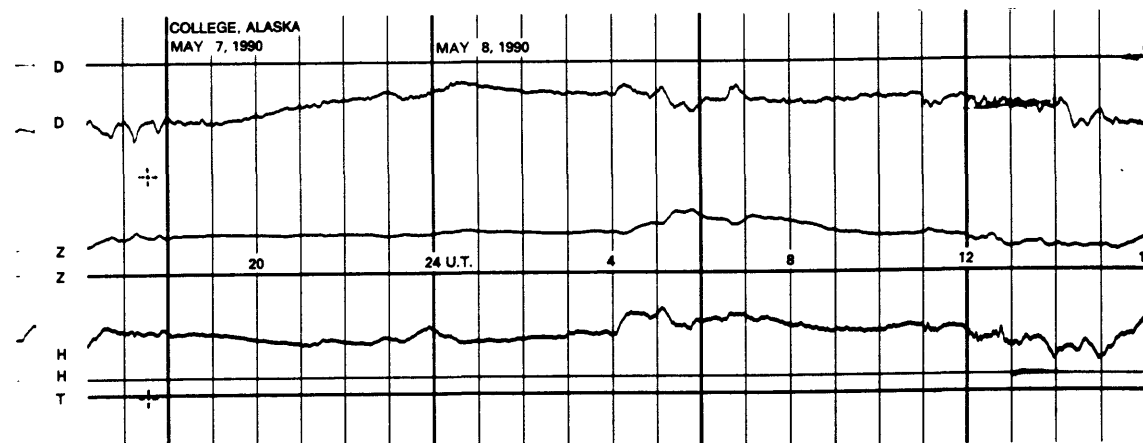
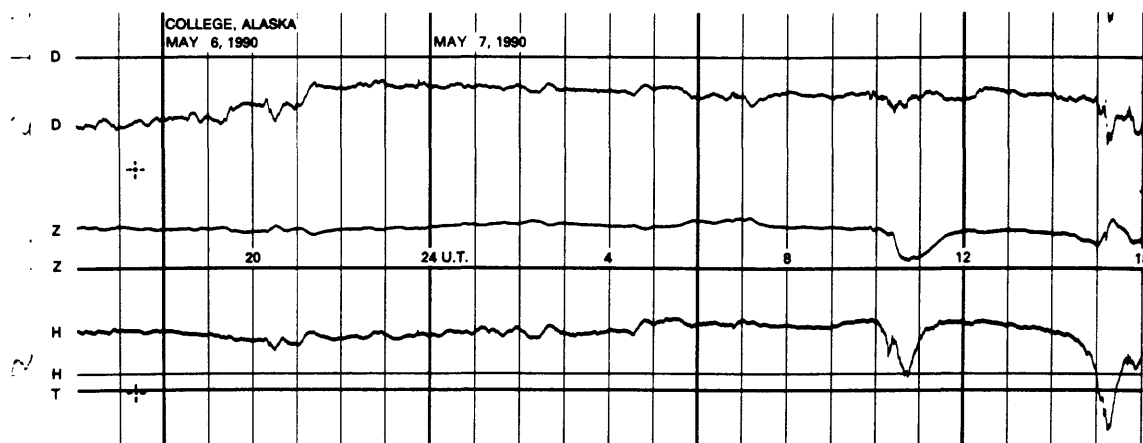
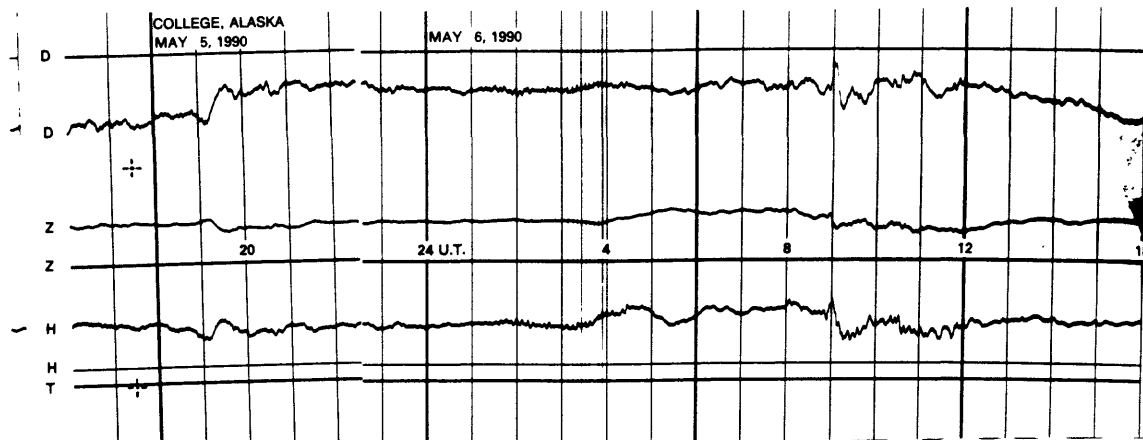
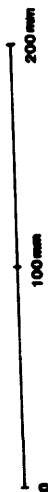
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

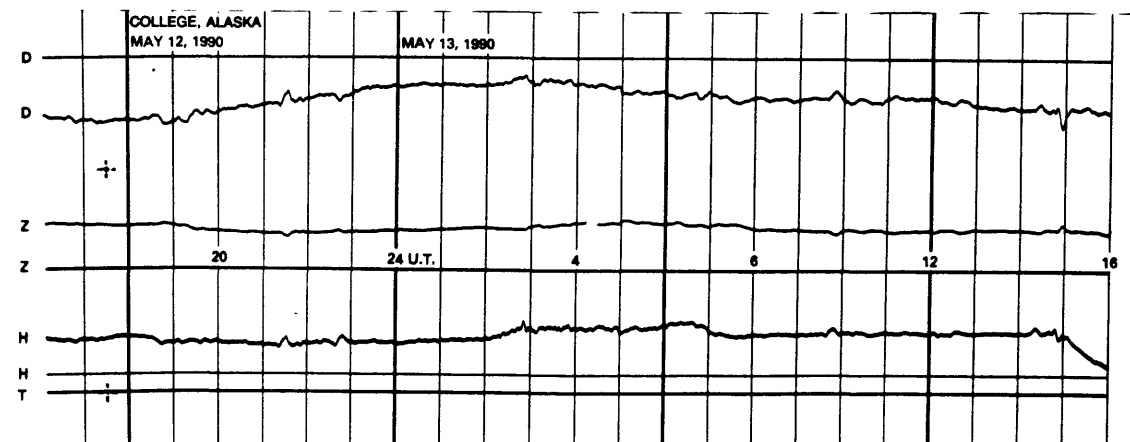
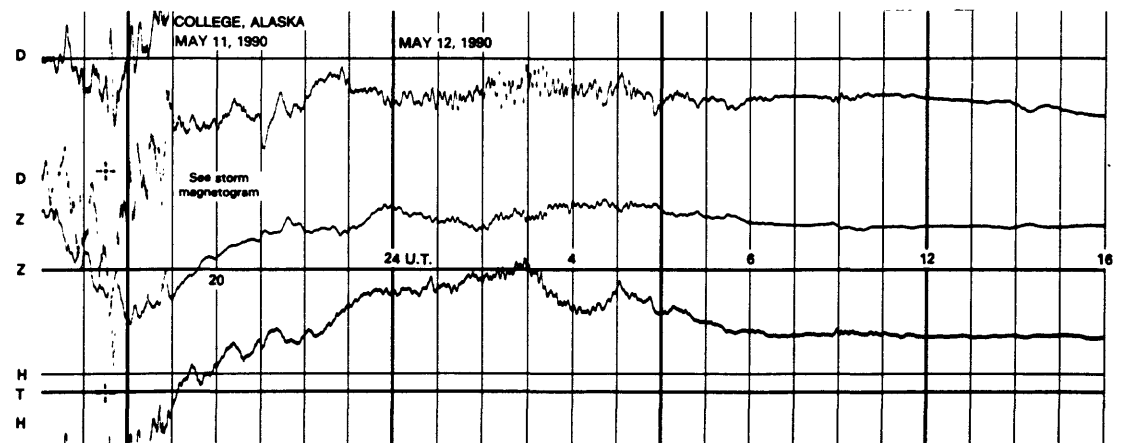
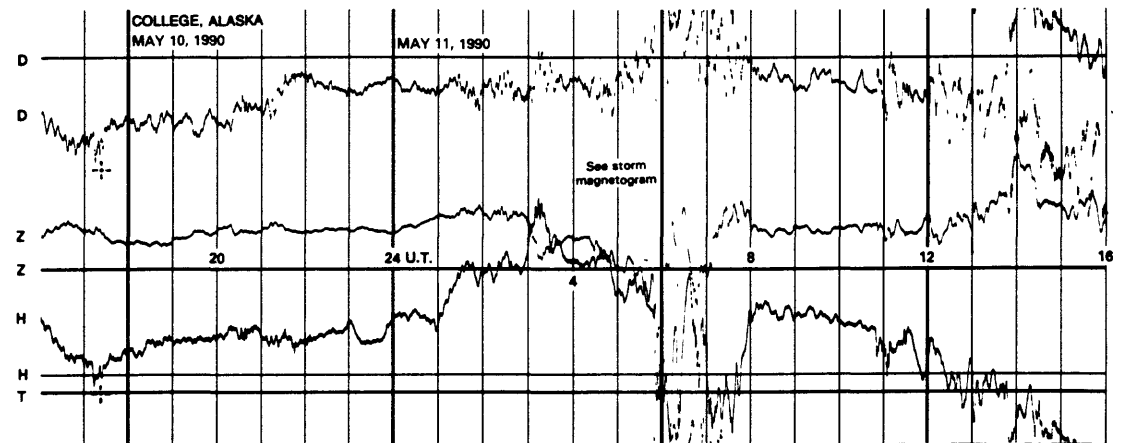
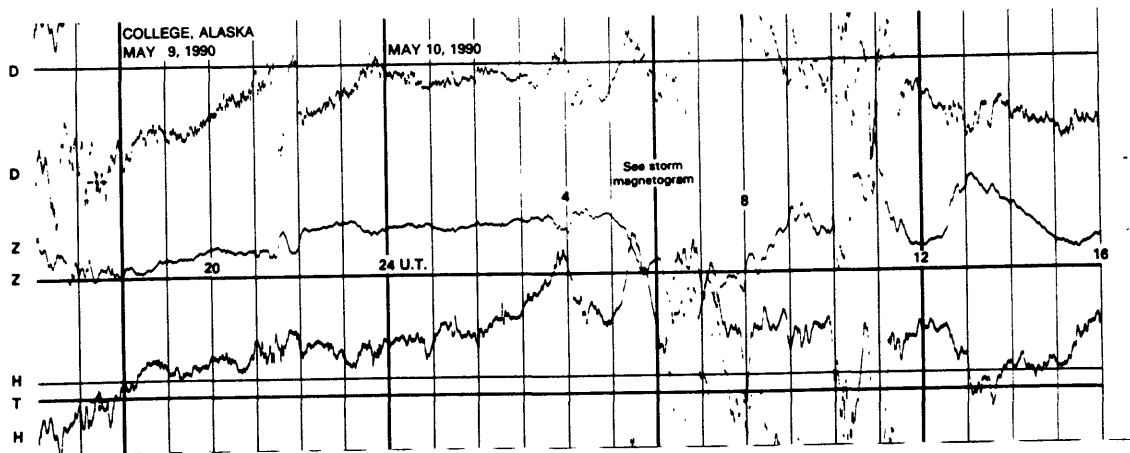
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100 mm
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NORMAL MAGNETOGRAMS

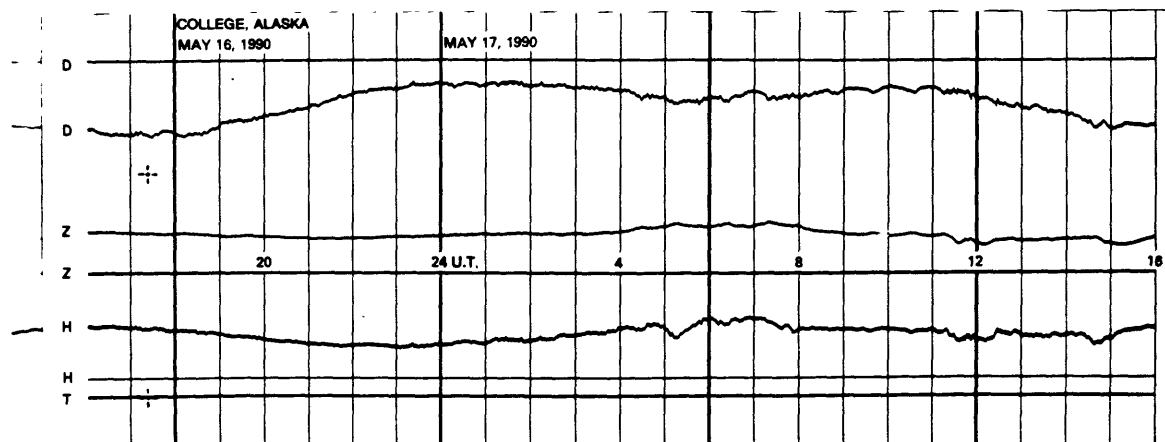
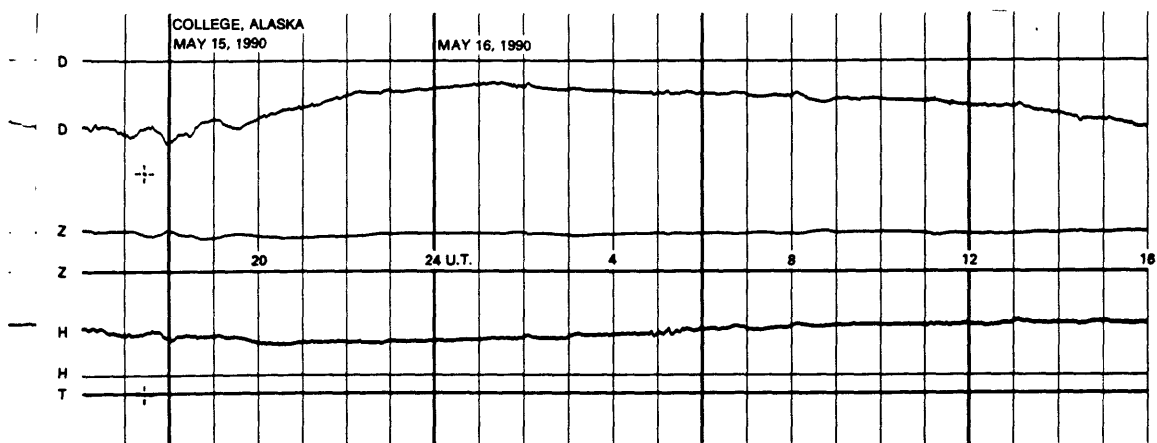
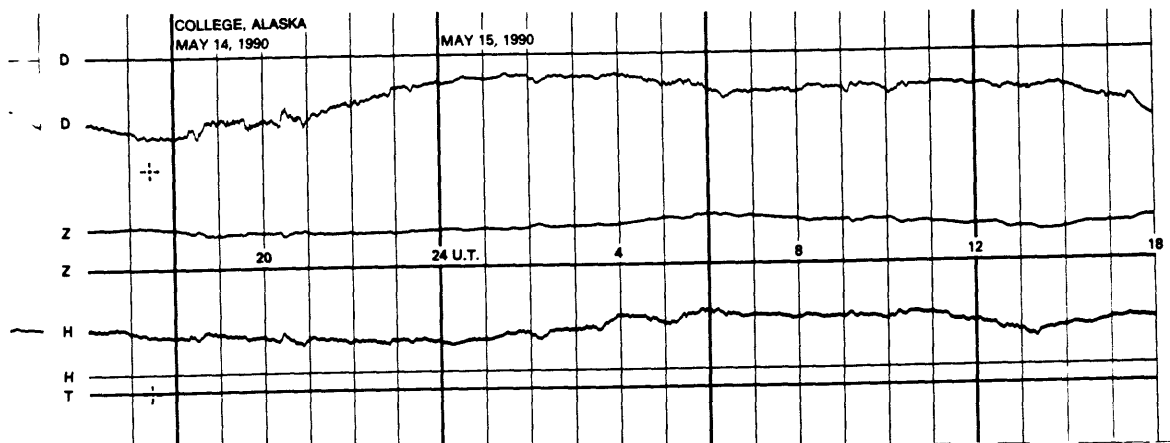
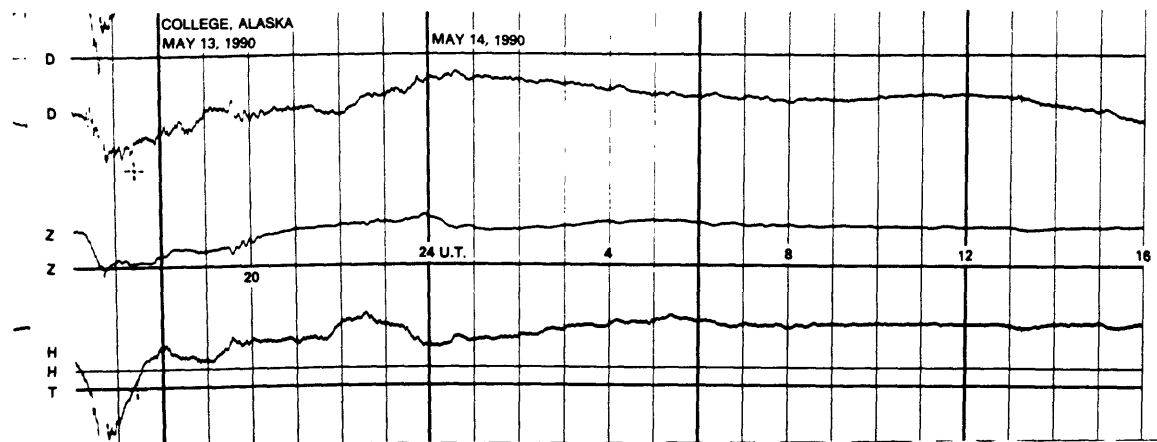


NORMAL MAGNETOGRAMS



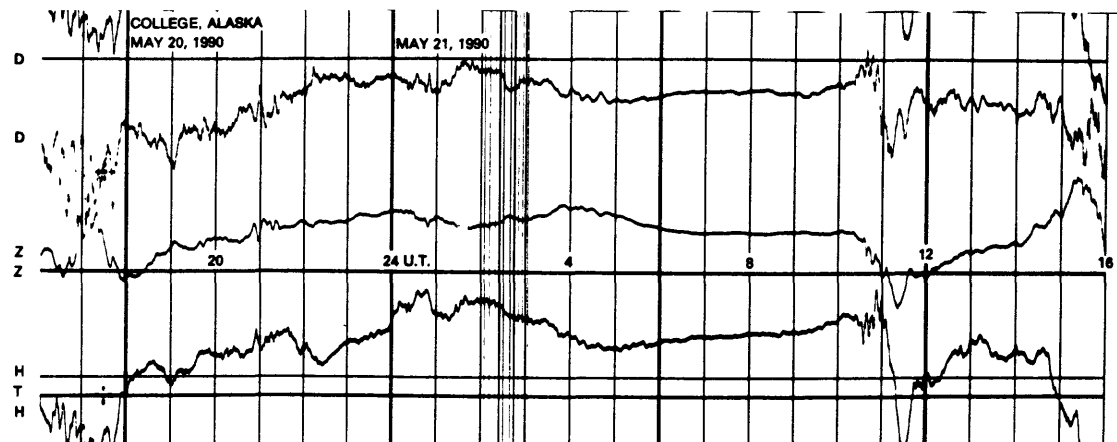
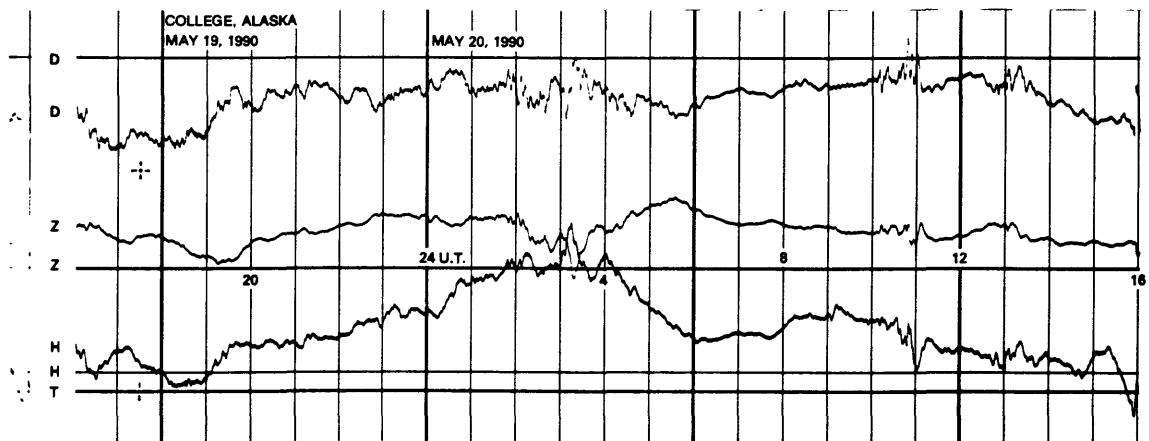
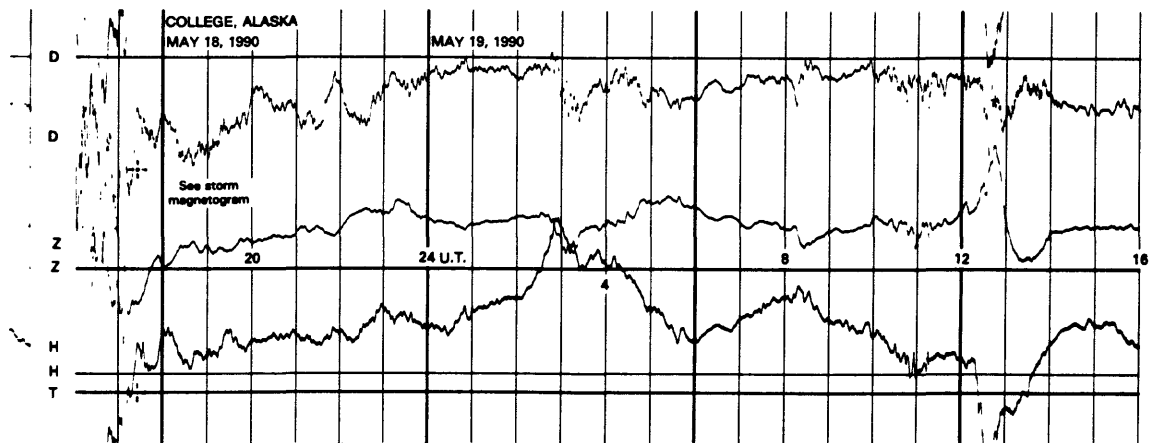
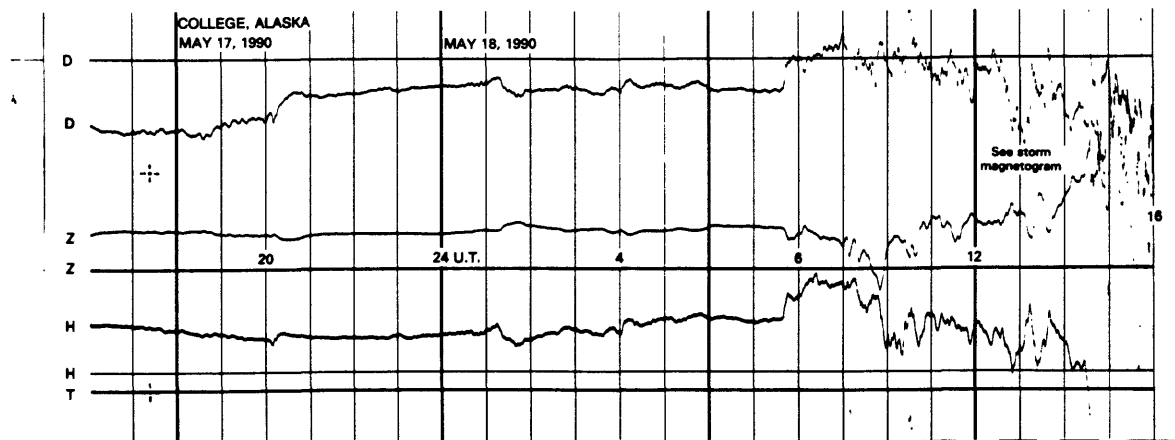
NORMAL MAGNETOGRAMS

200 mm
100 mm
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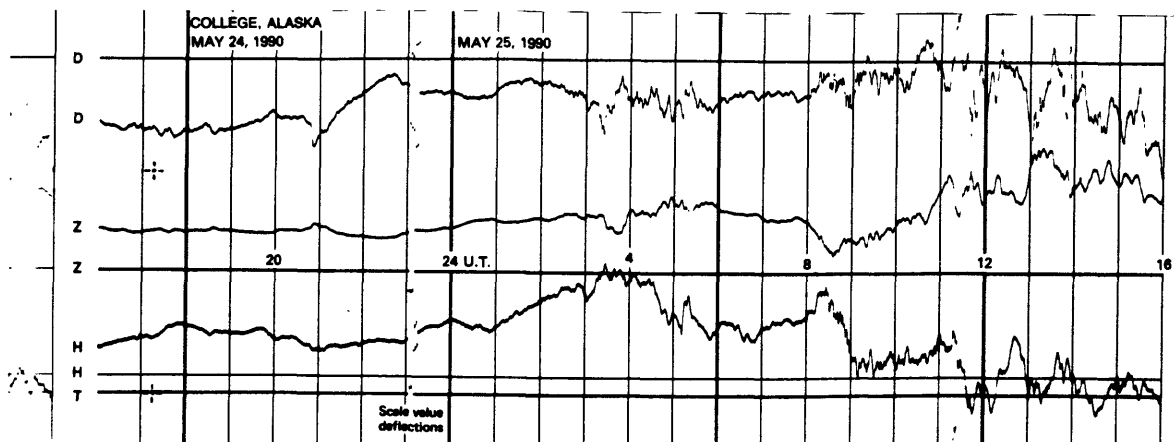
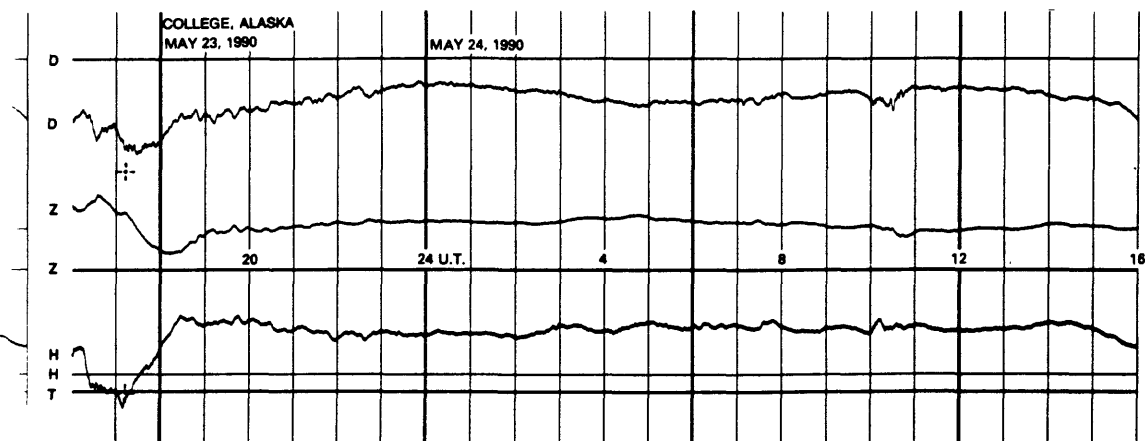
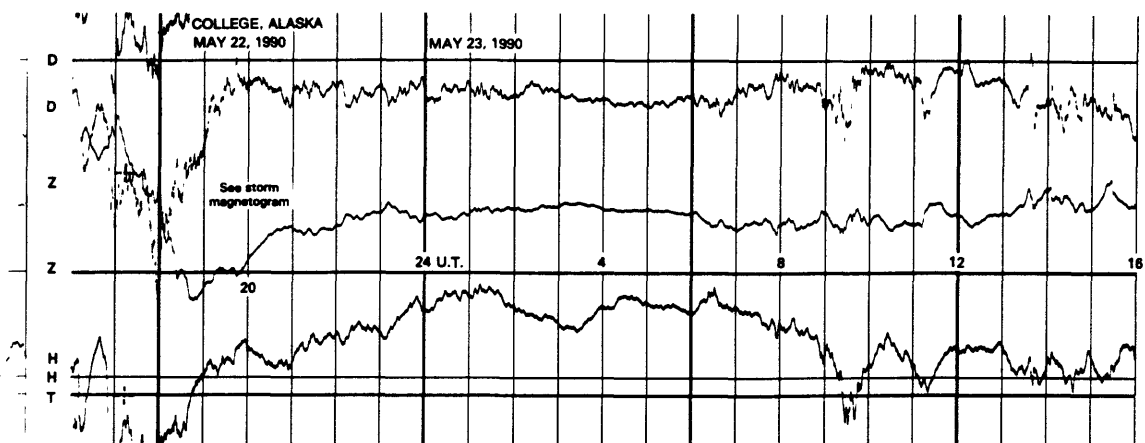
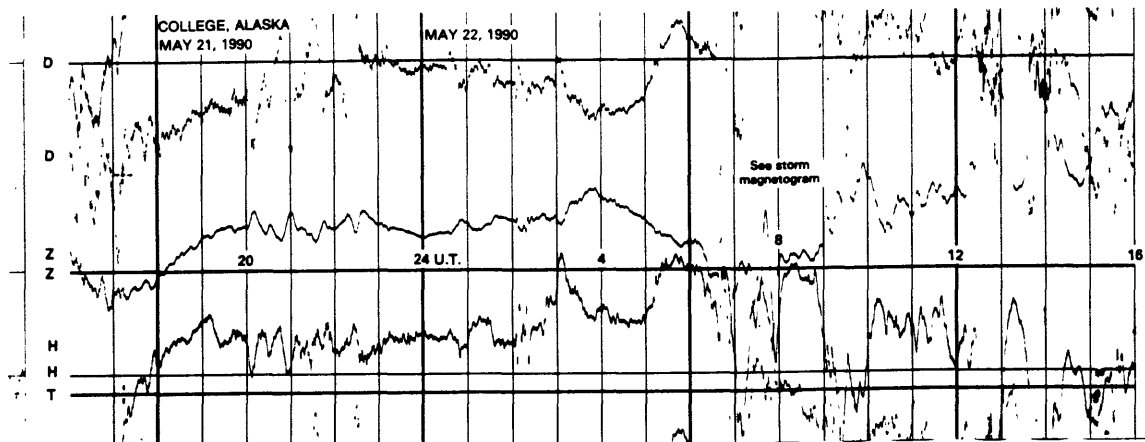


NORMAL MAGNETOGRAMS

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100 mm
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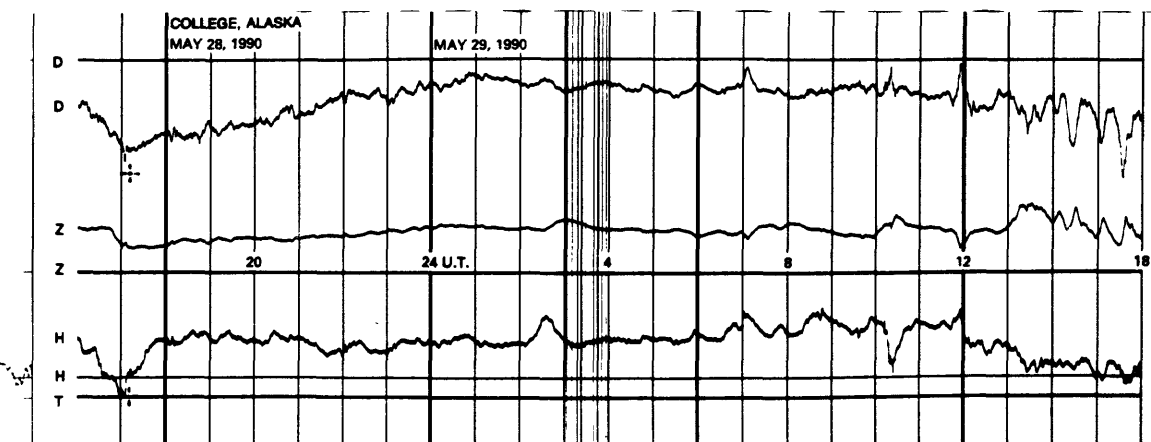
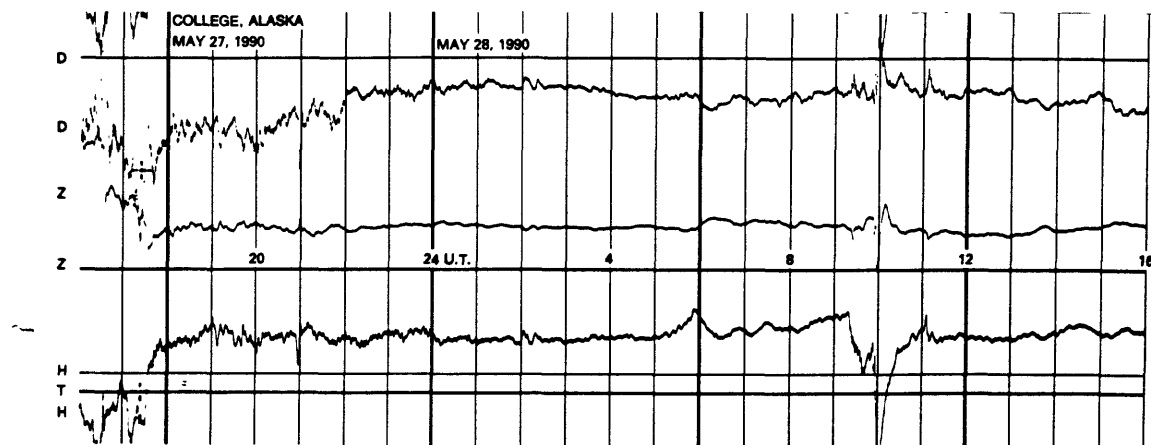
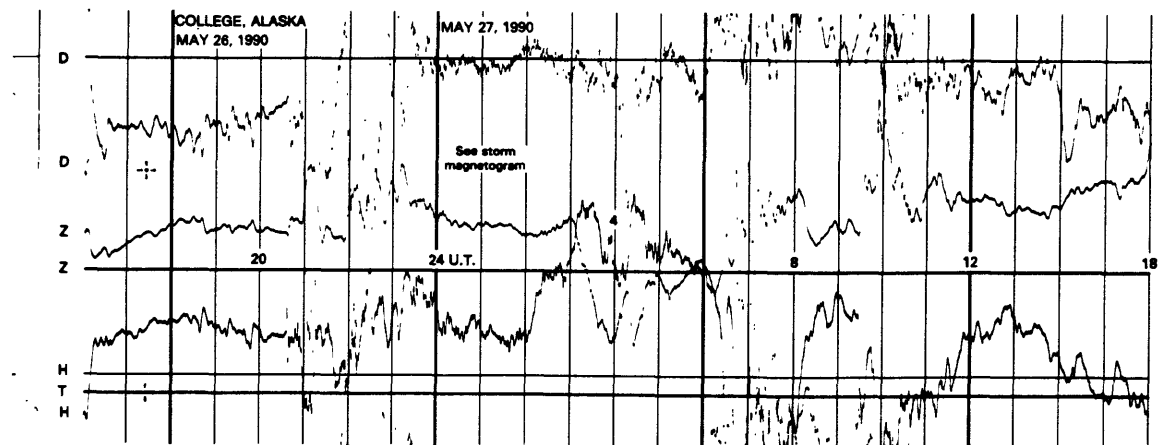
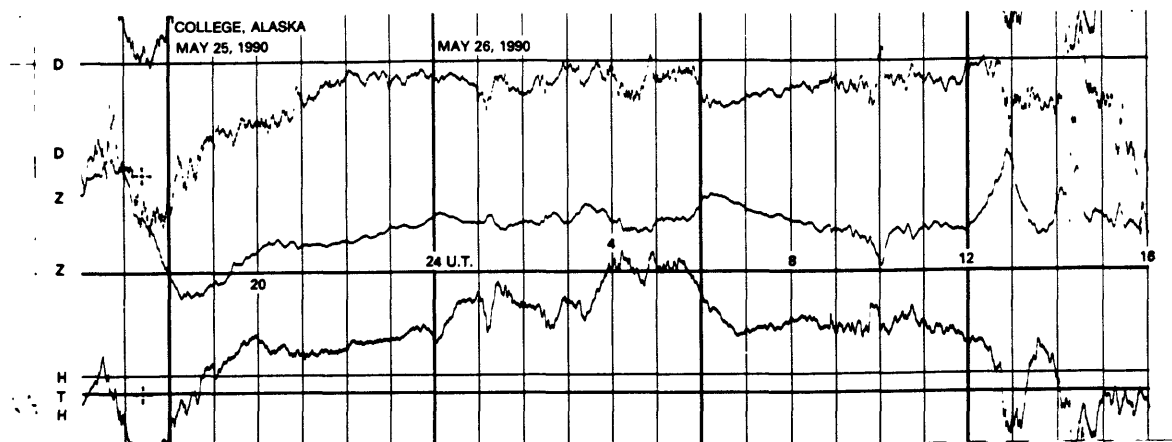


NORMAL MAGNETOGRAMS

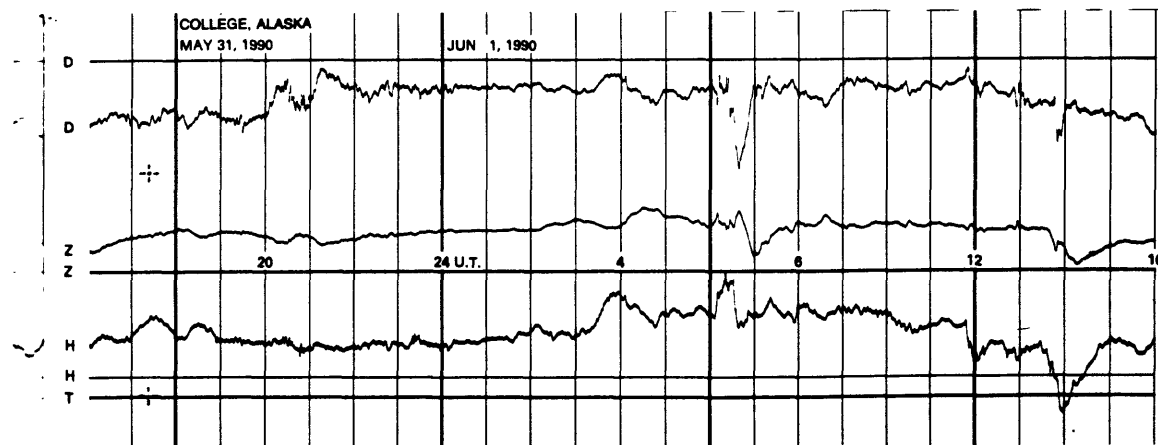
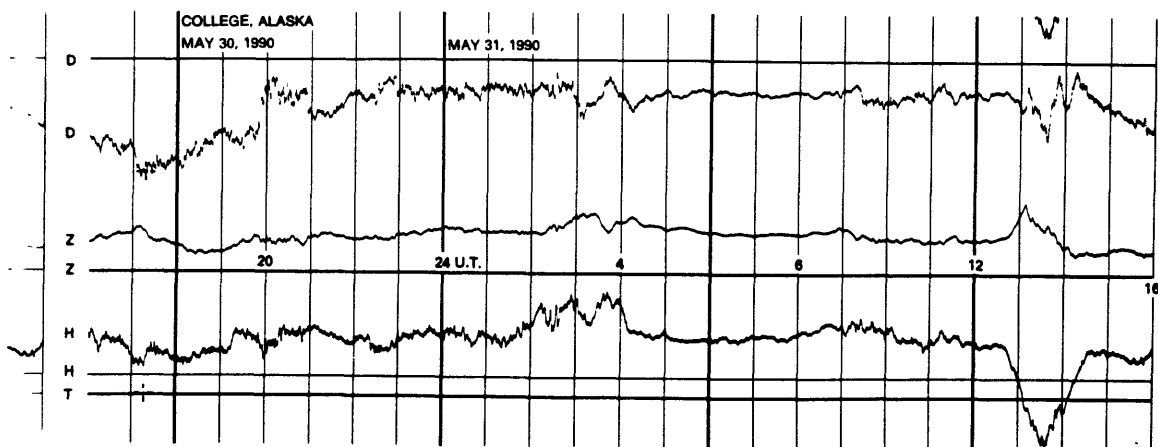
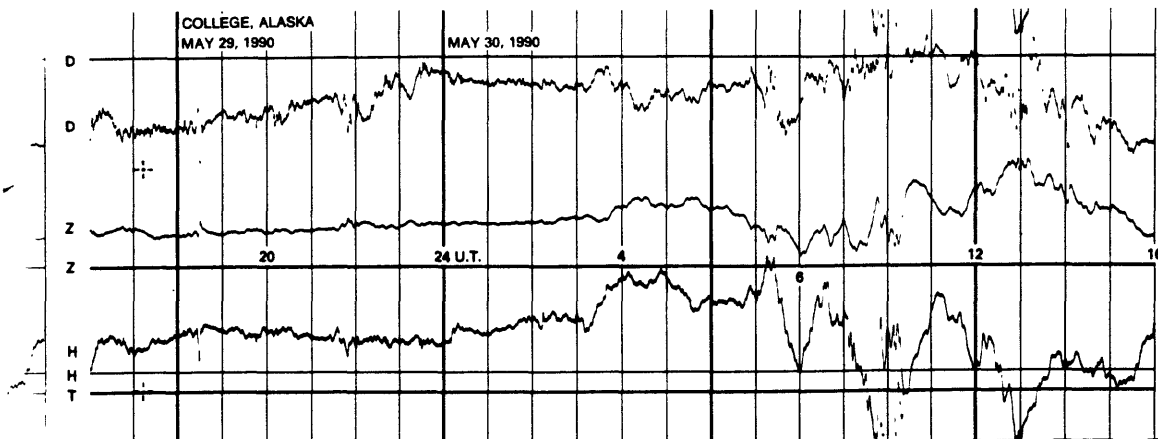


NORMAL MAGNETOGRAMS

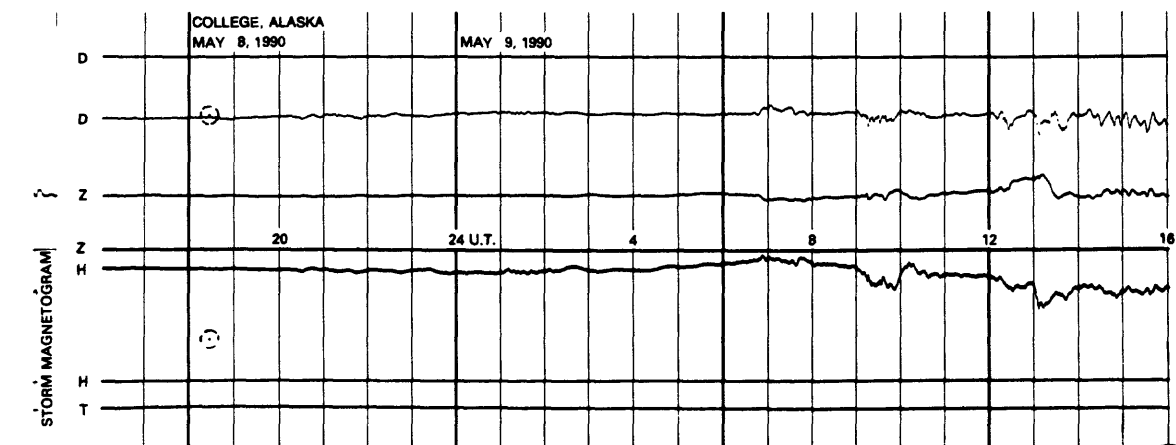
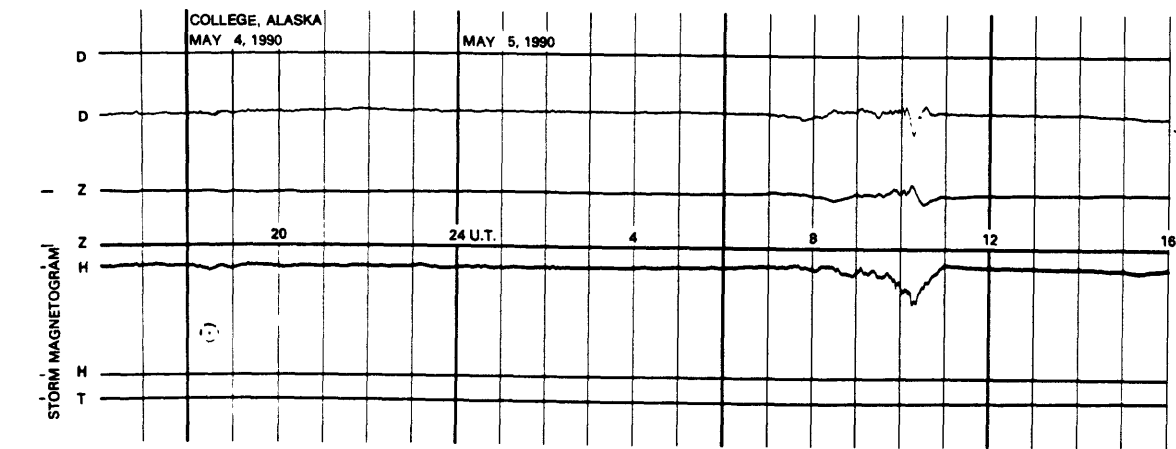
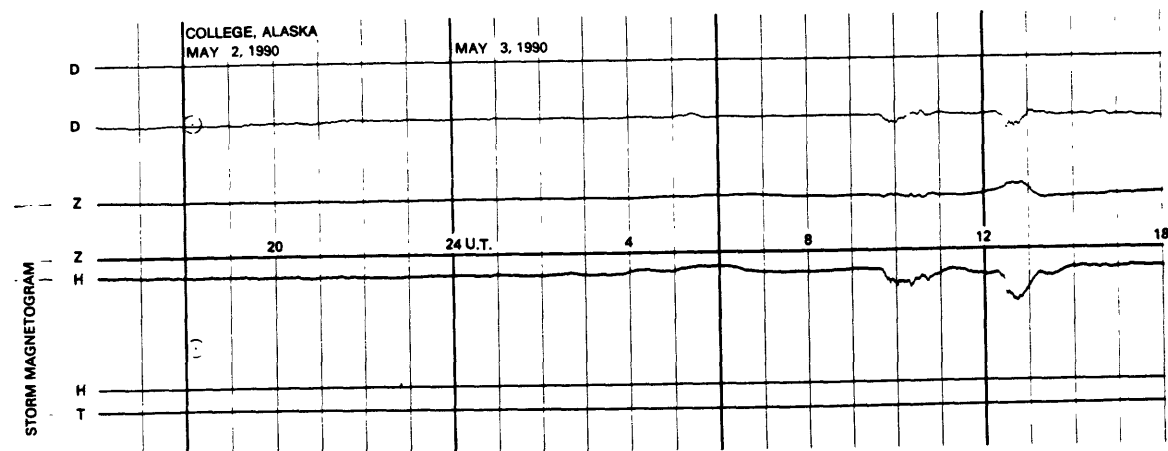
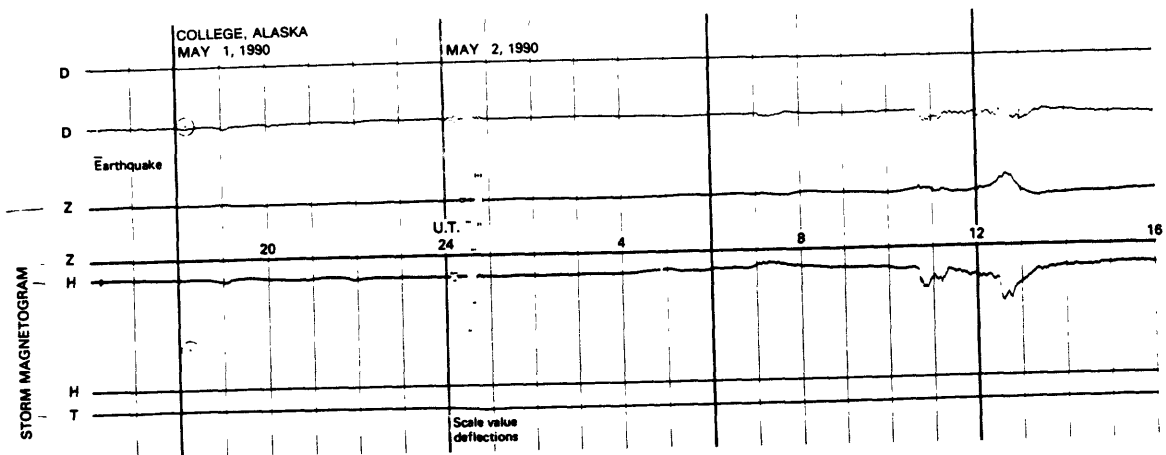
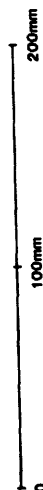
200 mm
100 mm
0



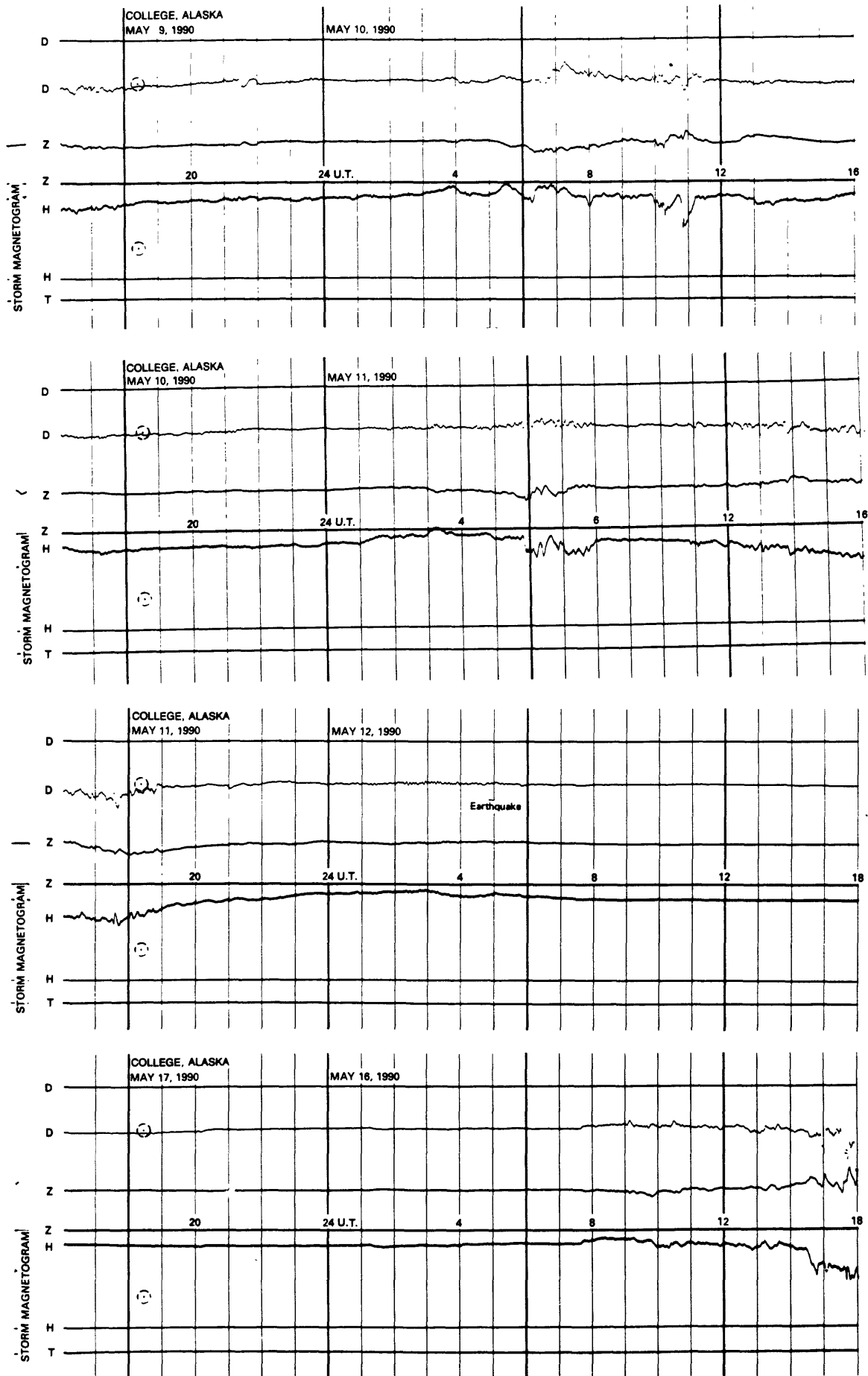
NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

