

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

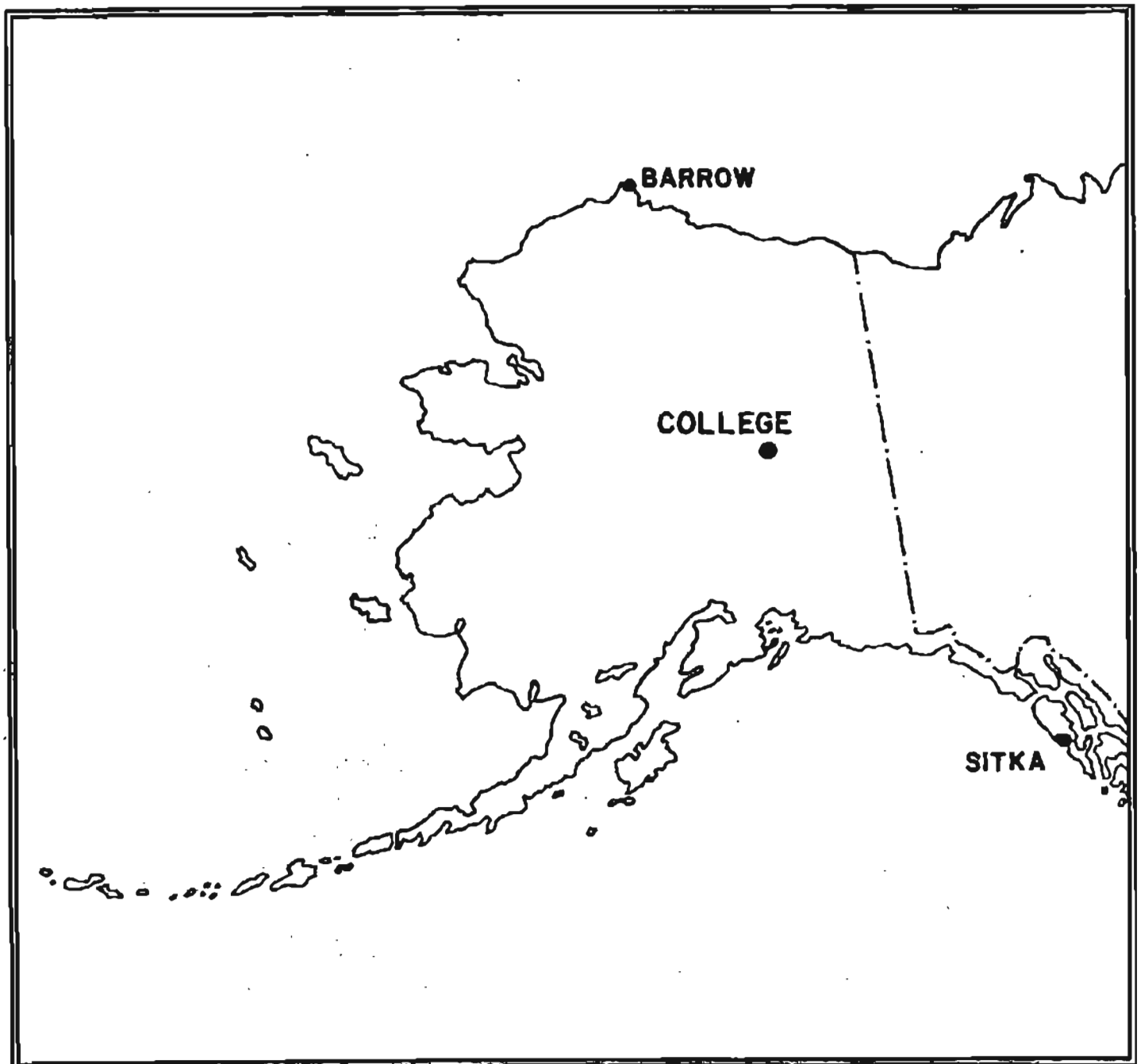
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

JUNE 1989

OPEN FILE REPORT 89-0300F



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 99775-5180

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.....84° 51.8'N
Geographic longitude.....147° 50.2'W
Geomagnetic latitude.....+84.8°
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 10⁷ 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 < 1850	7	140
1850 < 2500	8	240
2500+	9	400 (10 ⁷)

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:

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

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.

College, Alaska

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

June 1989

DATE	K-INDICES									A _K	TIME SCALE ON MAGNETOGRAMS		
	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09		SUM	20 mm/hr	
1	3	4	2	2	3	2	2	2	20	12	SUDDEN COMMENCEMENTS		
2	3	3	5	5	5	4	2	3	30	28	d	h	m
3	4	4	2	1	2	6	3	2	24	22			
4	3	5	2	0	1	2	1	1	15	11			
5	2	1	1	2	1	3	2	2	14	07			
6	3	4	2	3	2	1	1	3	19	12	06	23	14
7	5	4	5	6	4	0	3	3	30	33			
8	4	3	3	1	2	0	4	4	21	15	08	19	52
9	5	4	3	2	4	3	3	5	29	25			
10	5	5	5	6	6	6	5	4	42	57			
11	4	4	6	4	3	3	3	3	30	28			
12	3	4	4	4	3	4	2	2	26	19			
13	2	2	2	4	4	5	3	2	24	18	13	17	41
14	4	4	6	5	6	5	5	4	39	48			
15	5	5	5	6	5	6	6	3	41	56			
16	3	2	5	3	2	3	1	0	19	14			
17	1	0	0	1	2	3	1	2	10	05			
18	2	2	0	3	2	1	2	0	12	06	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
19	1	3	3	4	3	1	2	3	20	13			
20	3	2	3	6	4	5	5	3	31	32			
21	2	1	2	1	2	2	0	2	12	05			
22	2	1	2	0	2	1	2	2	12	05			
23	1	1	2	1	2	3	2	1	13	06			
24	2	1	4	4	4	1	1	1	18	13	BEGIN	END	
25	3	3	2	3	4	1	1	1	18	11	d	h	m
26	2	2	3	4	4	3	2	2	22	14			
27	2	2	1	3	2	1	2	2	15	07			
28	2	2	2	2	1	3	1	2	15	07			
29	4	4	4	5	5	5	3	2	32	31			
30	4	5	4	3	2	1	1	1	21	17			
31													

K SCALE USED: LOWER LIMIT FOR K = 9..... CURRENT SCALE VALUE..... LOWER LIMIT FOR K = 9.....	D	H	Z	(mm)
	675.7	322.2		(γ/mm)
	3.69	7.77		(to nearest 10γ)
	2490	2500		

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED

John B. Townshend, Chief

OBSERVER IN CHARGE

NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA

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

JUNE 19 89

Data from Individual Observatories:

Obs. 2 letter 1944 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	6	2314	SC	+24	+31	+28	7	4	6	134	1280	690	07 13
		8	1952	SC	-21	+113	-21	9	1	5	127	785	665	09 07
		9	22XX	..				10	4, 5, 6	6	183	1250	1180	11 10
		13	1741	SC	+9	+171	+5	14	3, 5	6	142	1390	800	15 20

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 6/1/89	2400 UT, 6/30/89	1.0 γ /mm	3.7 γ /mm	26° 51.1' E
H	(SAME)	2400 UT, 6/15/89	7.8 γ /mm		12631 γ
	0001 U.T., 6/16/89	2400 U.T., 6/28/89	(SAME)		12635 γ
	0001 U.T., 6/29/89	2400 U.T., 6/30/89	(SAME)		12639 γ
Z	(SAME)	(SAME)	7.7 γ /mm		55194 γ
	(SAME)	(SAME)	(SAME)		55199 γ
	(SAME)	(SAME)	(SAME)		55196 γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 6/1/89	2400 UT, 6/30/89	7.9 γ /mm	29.4 γ /mm	
H	(SAME)	(SAME)	43.5 γ /mm		
Z	(SAME)	(SAME)	49.0 γ /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): -5 γ ; i.e., H absolute and baseline values are 5 γ less than previously reported.
- Vertical Intensity (Z): +33 γ ; i.e., Z absolute and baseline values are 33 γ higher than previously reported.

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 02.2' E	12792 γ	55348 γ

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.
 DAYS USED: JUNE 17, 18, 21, 22, 23

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

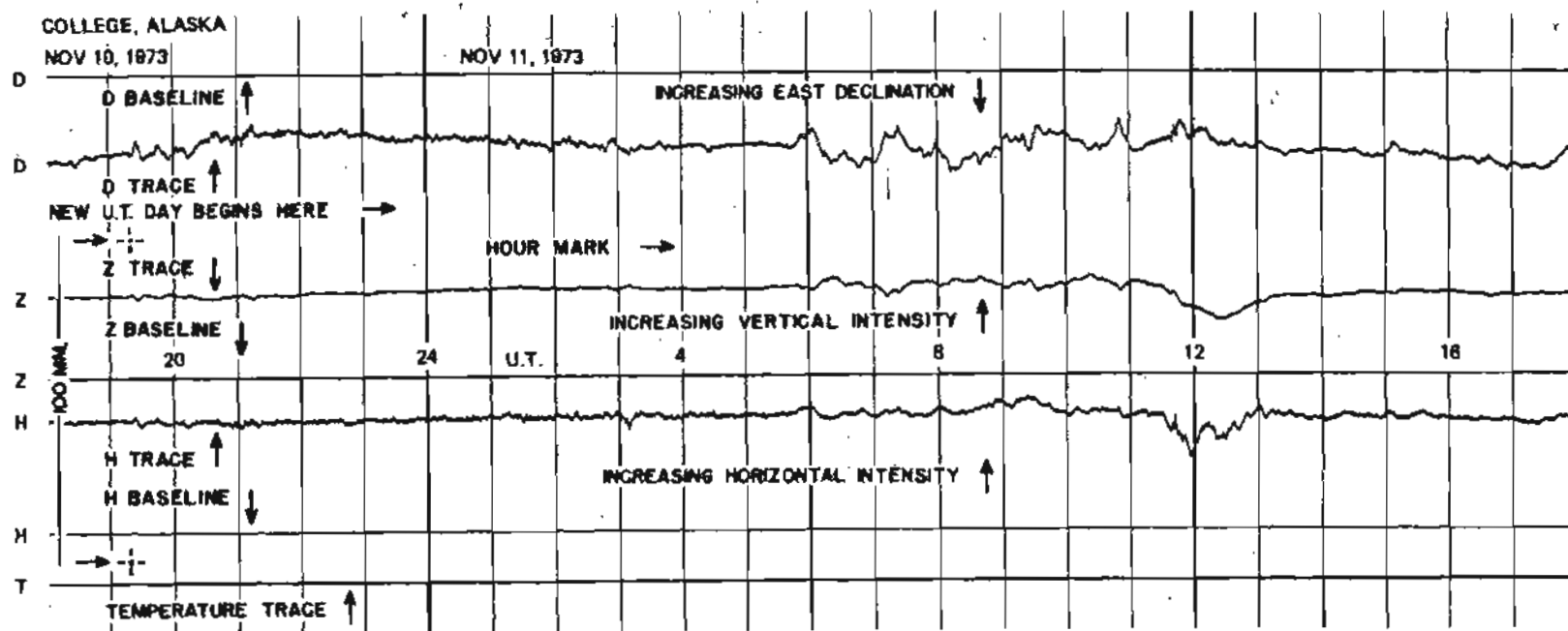
Values are in tenths of mm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT	D						H						Z						COMPONENT					
	DAY		21		22		23		17		18		19		20		21			22		23		DAY
	05	18	06	21	05	18	06	21	05	18	06	21	05	18	06	21	05	18		06	21	05	18	
01	55	21	33	30	51	50	191	191	193	196	199	254	210	210	210	211	211	217	211	209	244	203	203	203
02	79	13	-21	6	20	45	191	180	180	177	199	227	207	207	207	203	203	213	204	200	219	219	219	219
03	12	7	33	30	51	50	193	180	191	199	227	207	207	207	203	203	213	204	200	210	217	217	217	217
04	81	33	30	30	51	50	189	180	191	199	227	207	207	207	203	203	213	204	210	210	217	217	217	217
05	81	65	69	69	90	90	189	180	191	199	227	207	207	207	203	203	213	204	210	210	217	217	217	217
06	84	92	80	80	110	101	181	200	190	220	259	259	211	211	211	211	217	211	211	209	244	244	244	244
07	90	91	81	81	143	110	182	210	206	236	300	300	207	207	207	209	221	211	209	244	244	244	244	244
08	102	89	79	79	141	125	190	220	207	272	310	310	211	211	211	211	217	211	220	249	249	249	249	249
09	98	70	90	90	127	96	201	229	217	258	281	281	208	208	208	208	202	208	225	260	260	260	260	260
10	91	74	82	82	81	37	219	252	218	230	262	262	205	205	205	204	204	213	213	249	249	249	249	249
11	92	30	88	88	61	41	230	232	229	211	240	240	205	205	205	202	202	187	187	220	220	220	220	220
12	80	71	90	90	62	59	240	133	226	210	212	212	210	210	210	197	197	185	185	207	207	207	207	207
13	85	99	126	126	83	70	230	211	219	210	221	221	217	217	217	197	197	185	185	207	207	207	207	207
14	122	130	133	133	110	59	205	218	218	200	233	233	217	217	217	200	200	185	185	205	205	205	205	205
15	171	186	157	157	125	113	187	239	199	241	210	210	200	200	200	199	199	178	178	205	205	205	205	205
16	203	230	208	208	139	140	208	239	180	230	141	141	183	183	183	179	179	151	151	182	182	182	182	182
17	230	261	219	219	190	287	220	231	220	220	86	86	202	202	202	176	176	195	195	136	136	136	136	136
18	271	269	240	240	229	339	168	222	212	210	122	122	200	200	200	195	195	197	197	83	83	83	83	83
19	250	255	238	238	243	309	221	219	200	210	247	247	180	180	180	199	199	194	194	120	120	120	120	120
20	199	237	210	210	200	239	220	180	176	211	228	228	187	187	187	189	189	188	188	155	155	155	155	155
21	157	171	162	162	149	200	180	200	162	196	200	200	199	199	199	186	186	186	186	173	173	173	173	173
22	112	117	100	100	90	126	154	181	149	171	170	170	197	197	197	186	186	185	185	174	174	174	174	174
23	61	60	30	30	50	55	179	171	150	181	160	160	191	191	191	179	179	180	180	181	181	181	181	181
24	41	26	20	20	22	56	146	178	160	158	165	165	188	188	188	180	180	192	192	191	191	191	191	191
DAILY SUM	2947	2697	2524	2539	2748	4683	4951	4651	5040	5209	4863	4560	4711	4756	4770	4711	4756	4770	4711	4756	4770	4711	4756	4770
DAILY MEAN	123.	112	105	106	114	195	206	194	210	217	203	190	196	198	199	196	198	199	196	198	199	196	198	199
MEAN			112.				204				197													

Scaled **MMO**

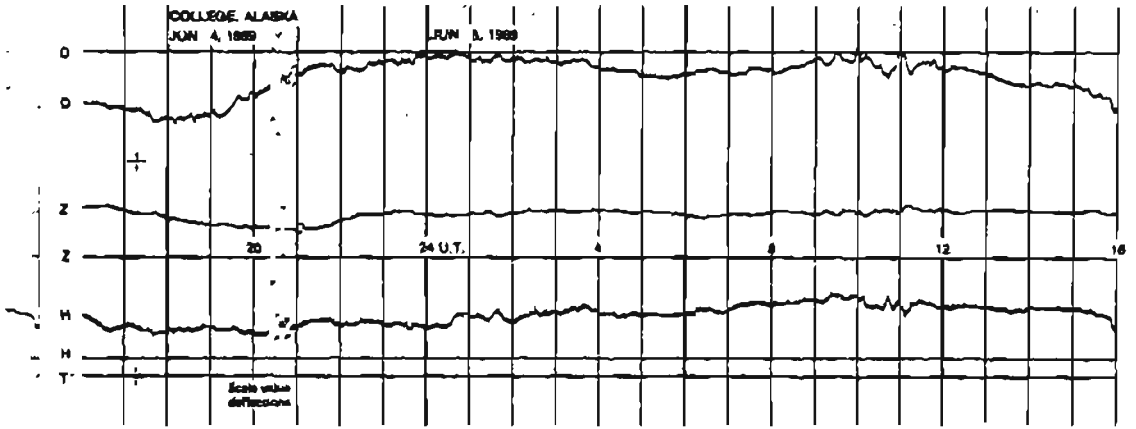
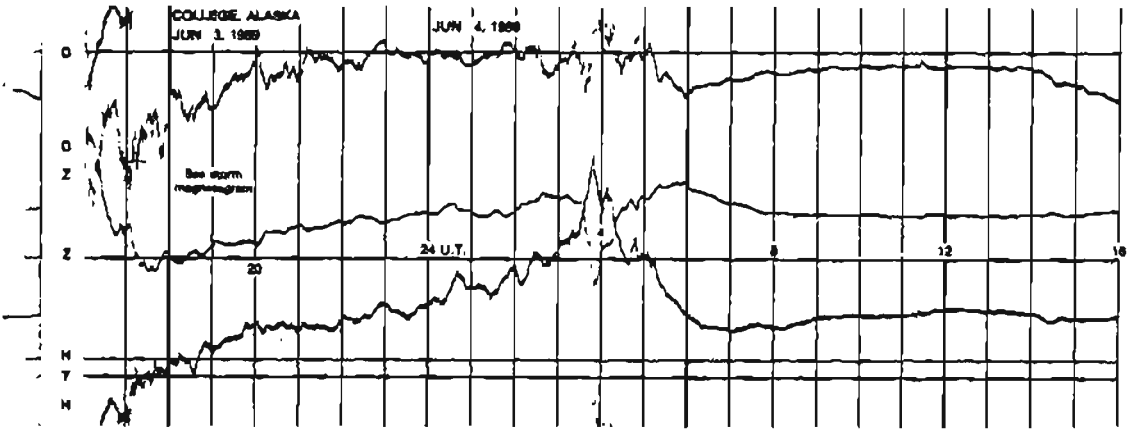
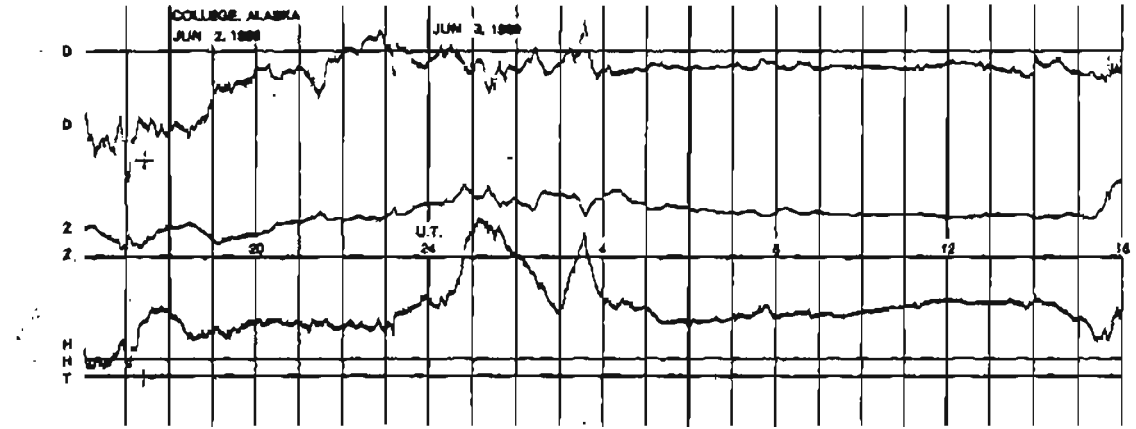
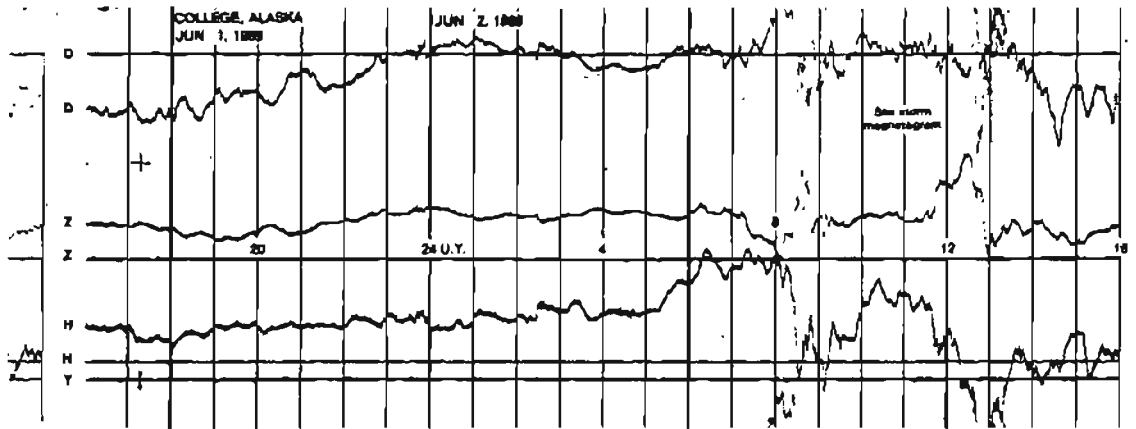
Checked **CAV**

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

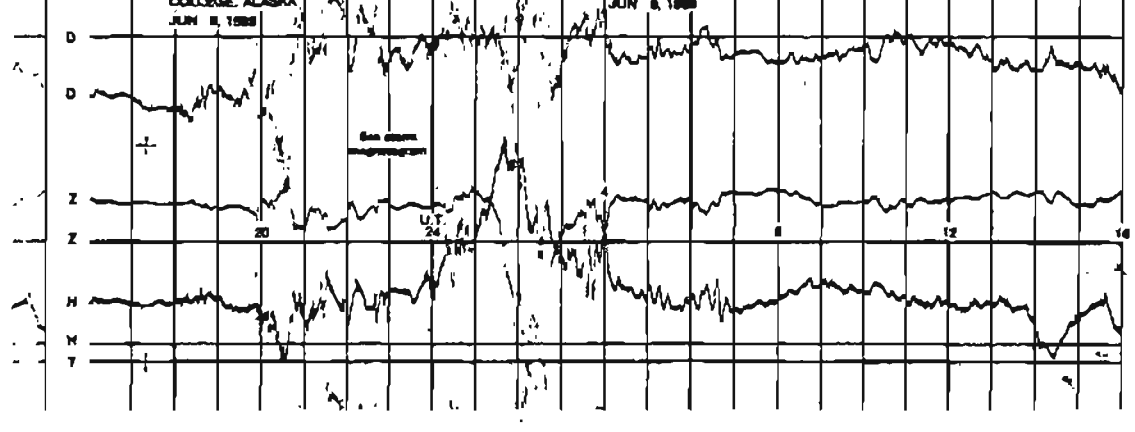
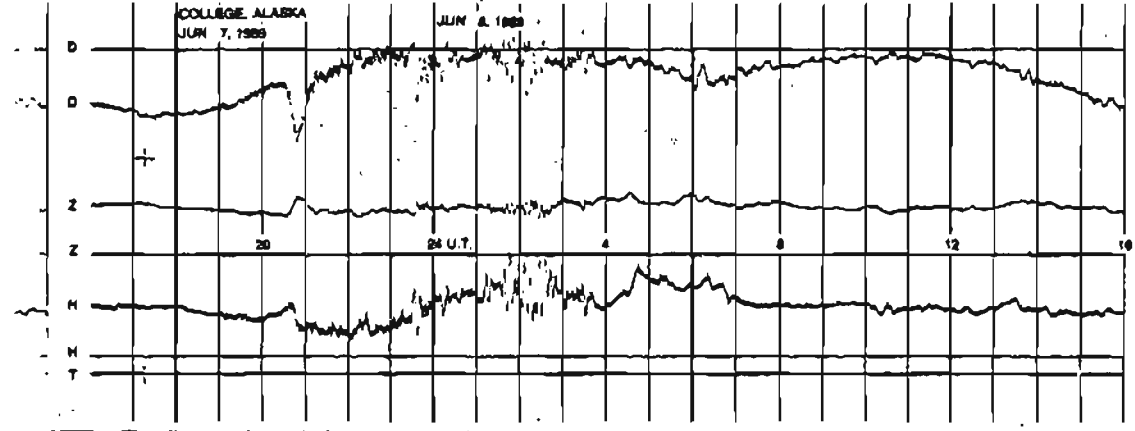
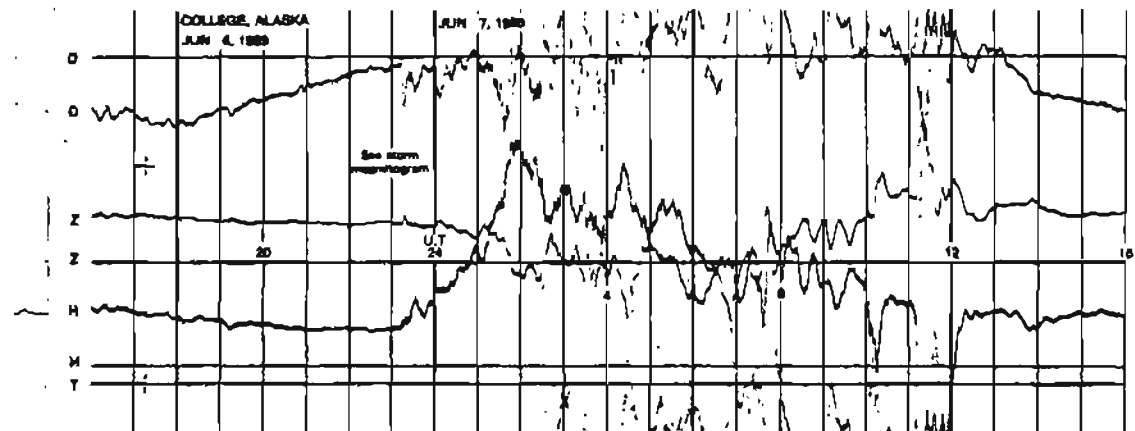
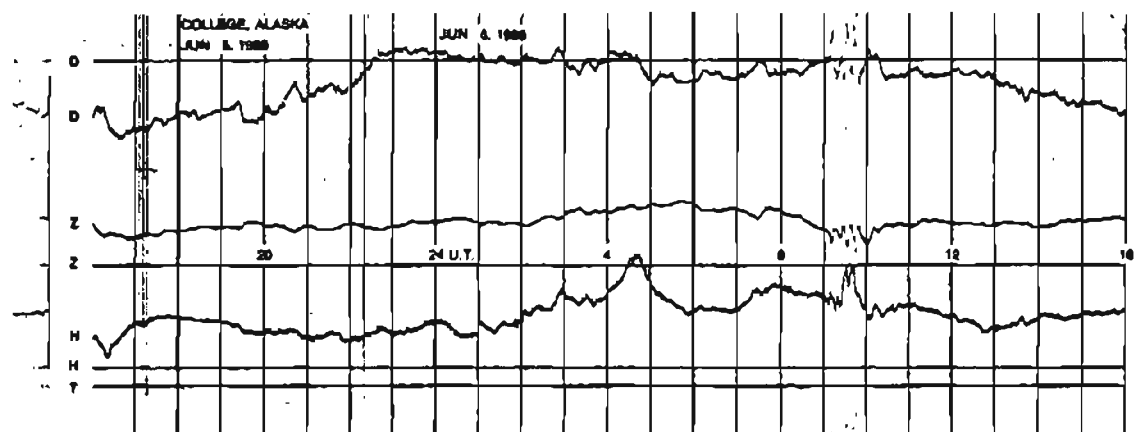


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

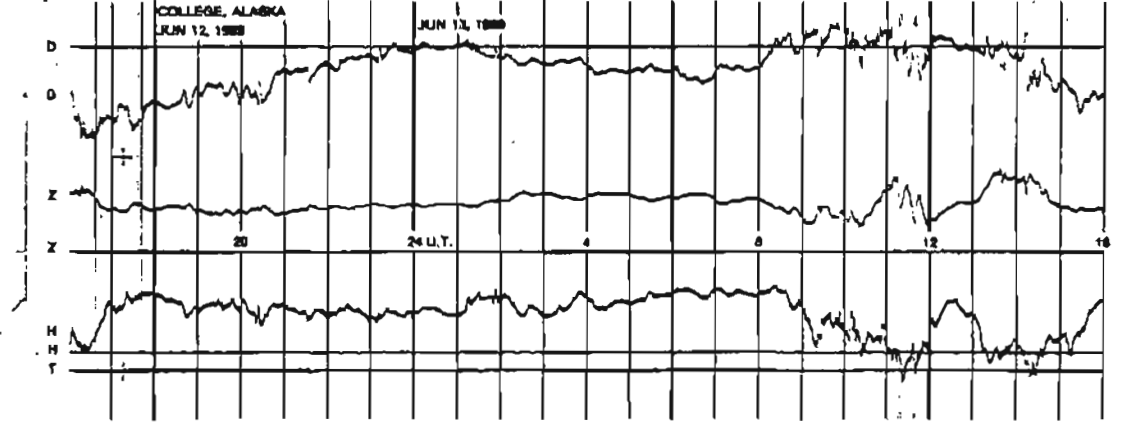
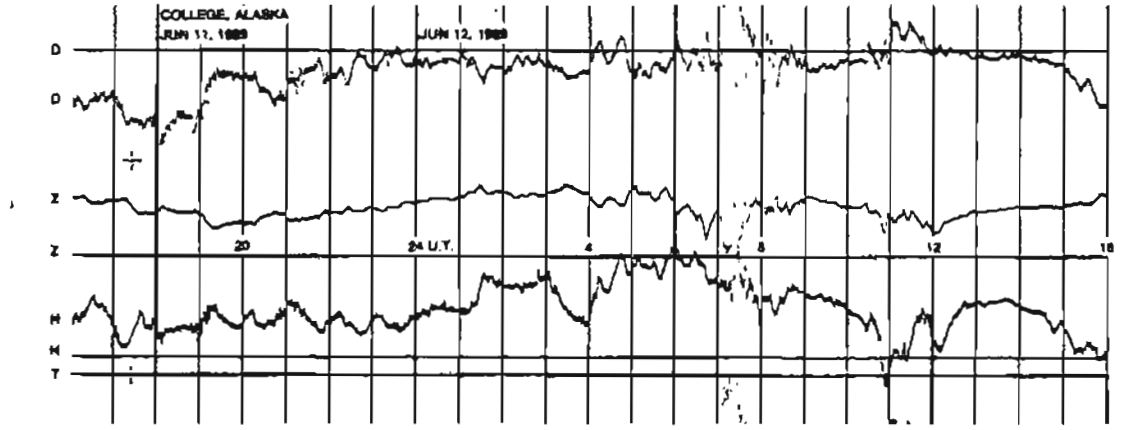
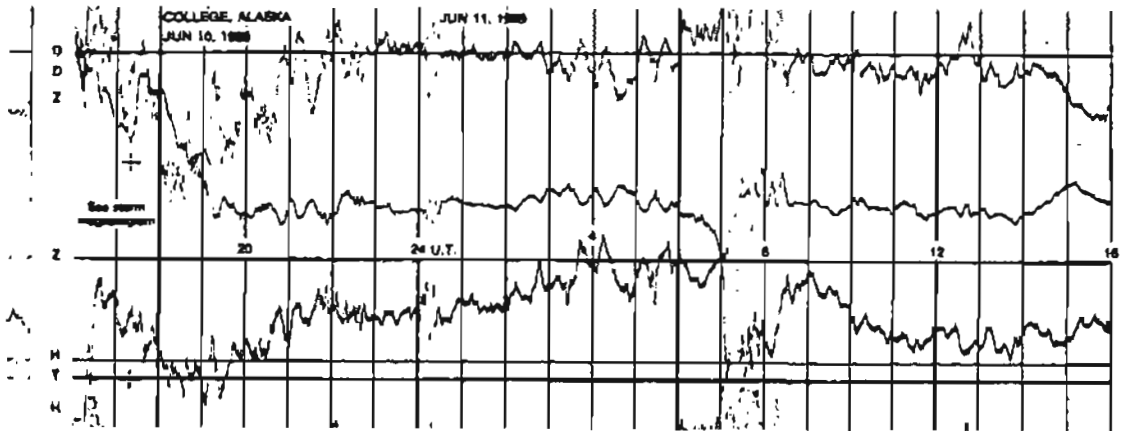
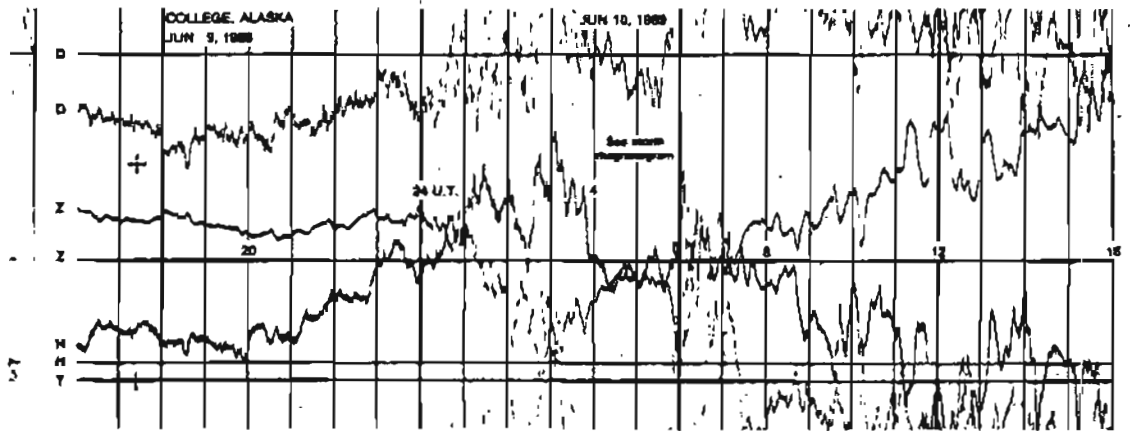
NORMAL MAGNETOGRAMS



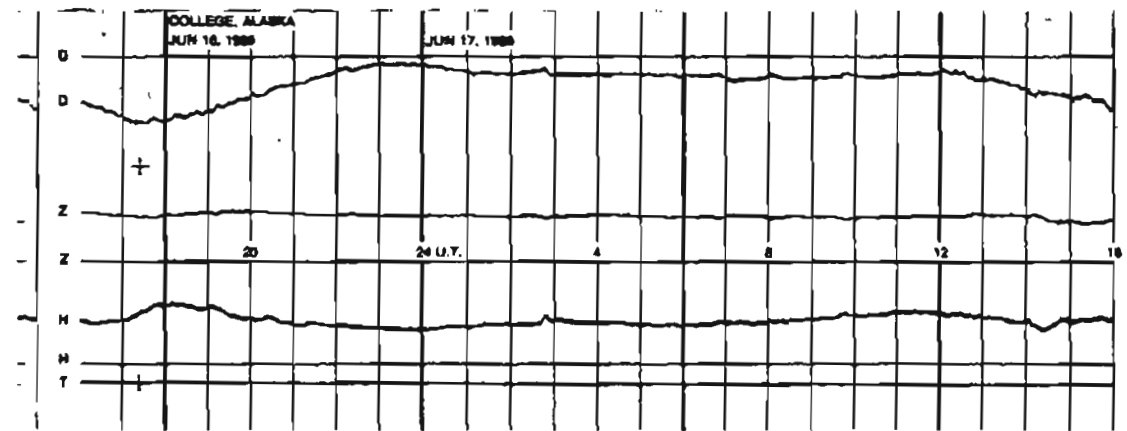
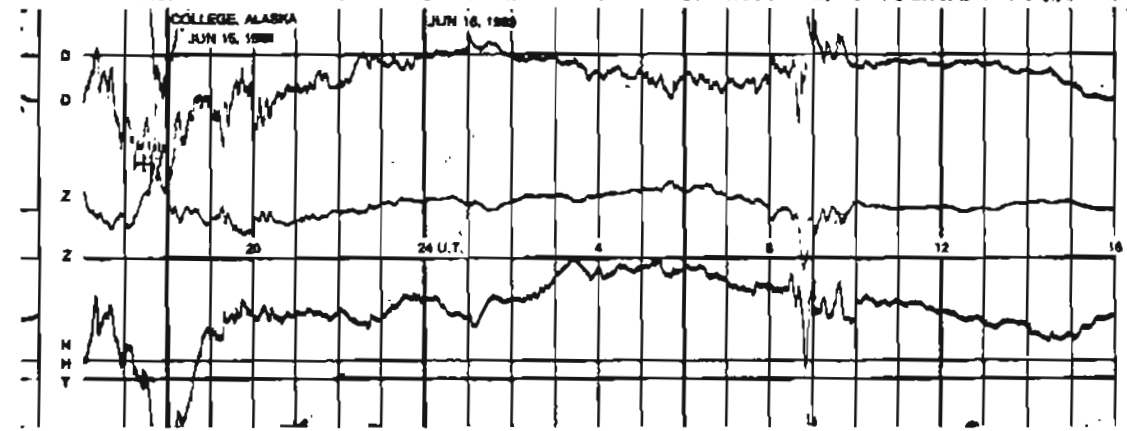
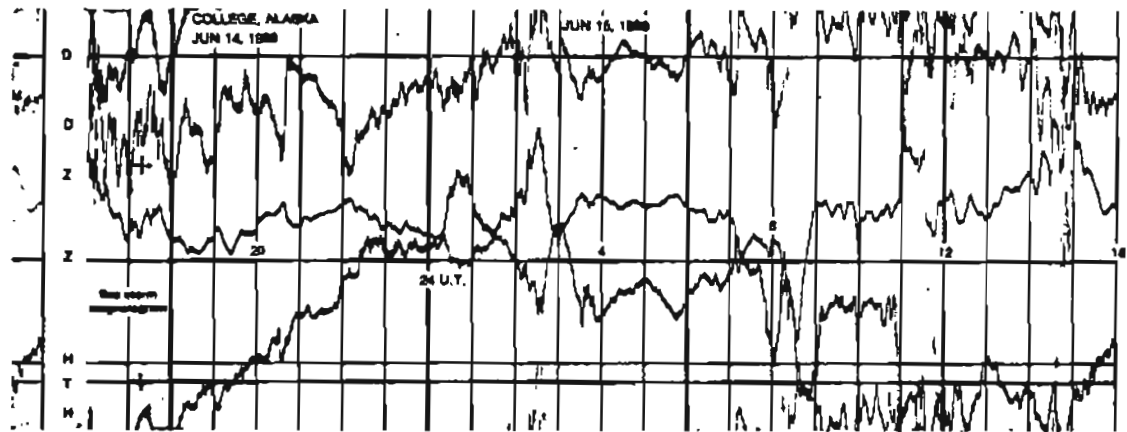
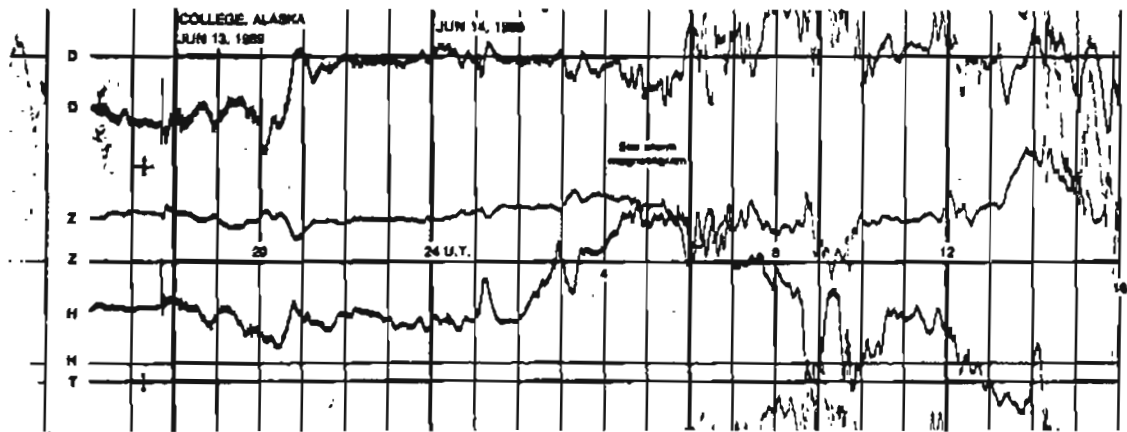
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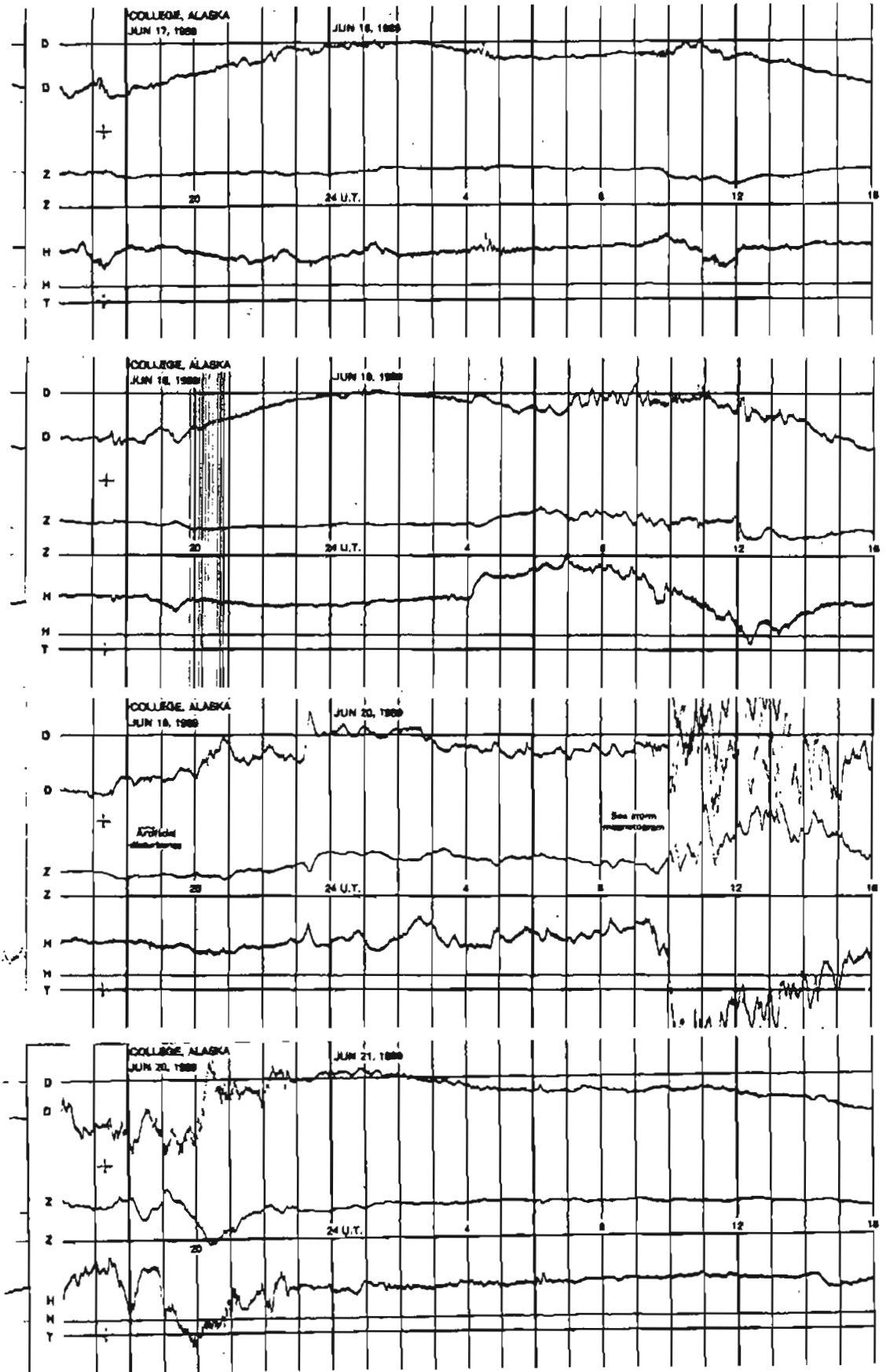
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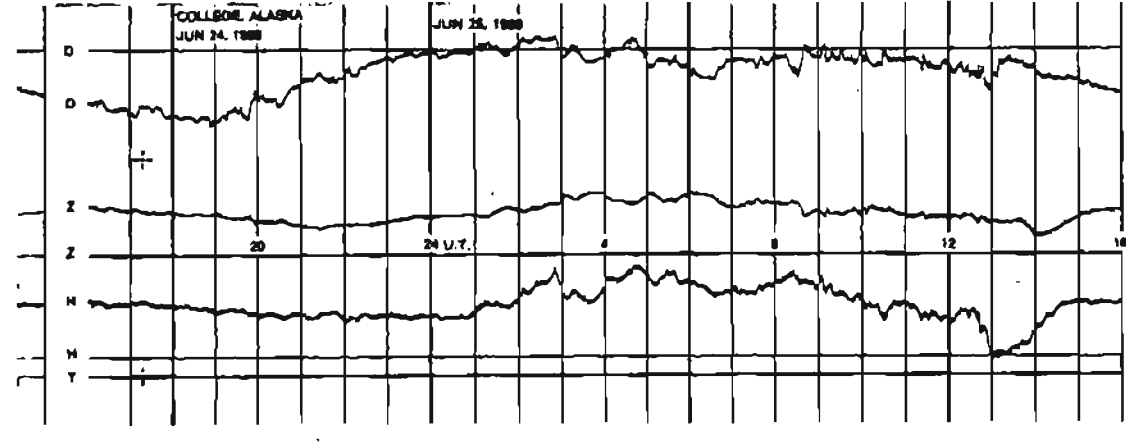
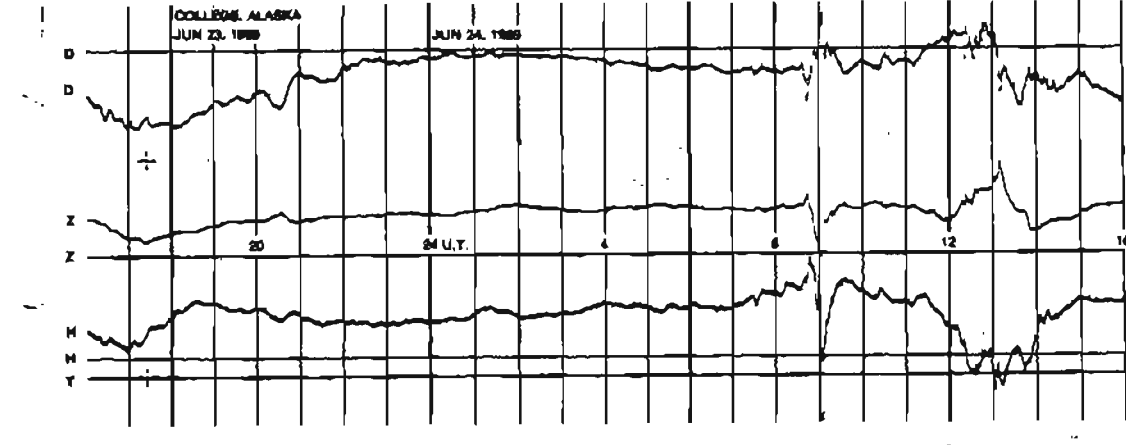
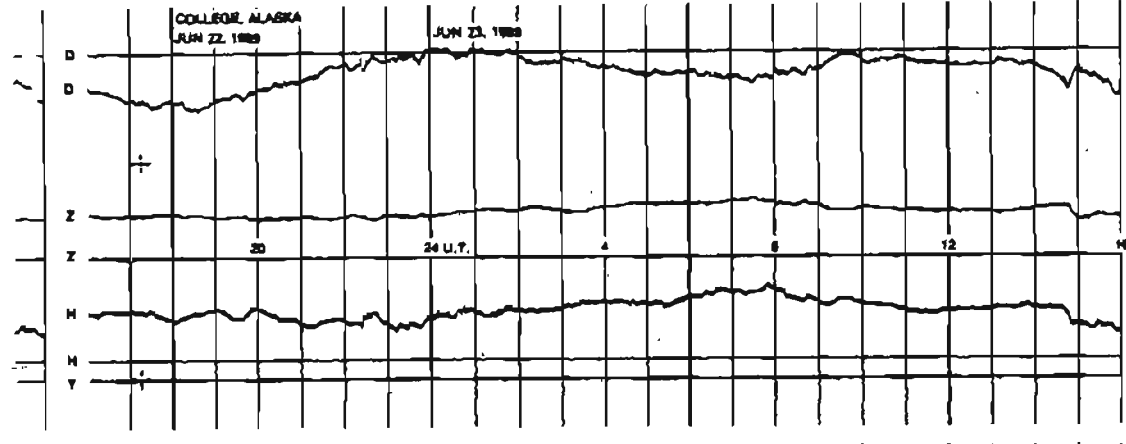
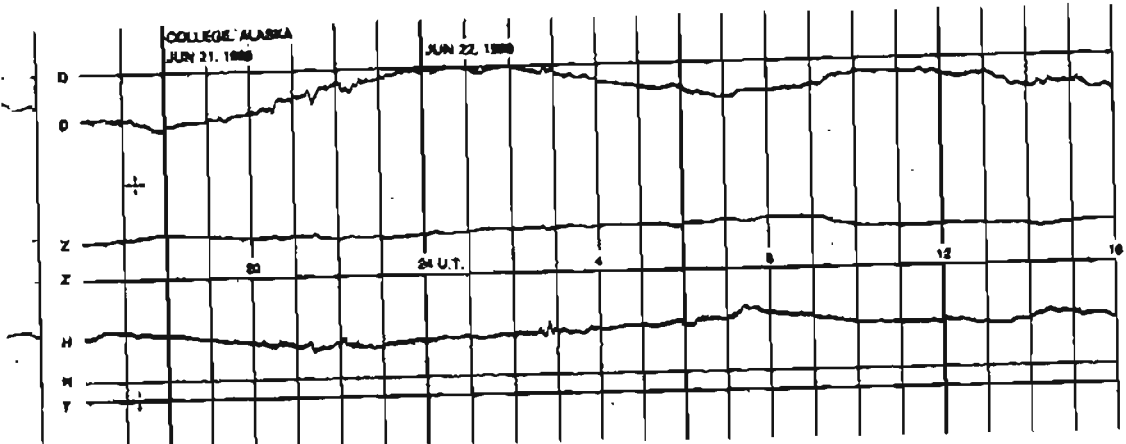
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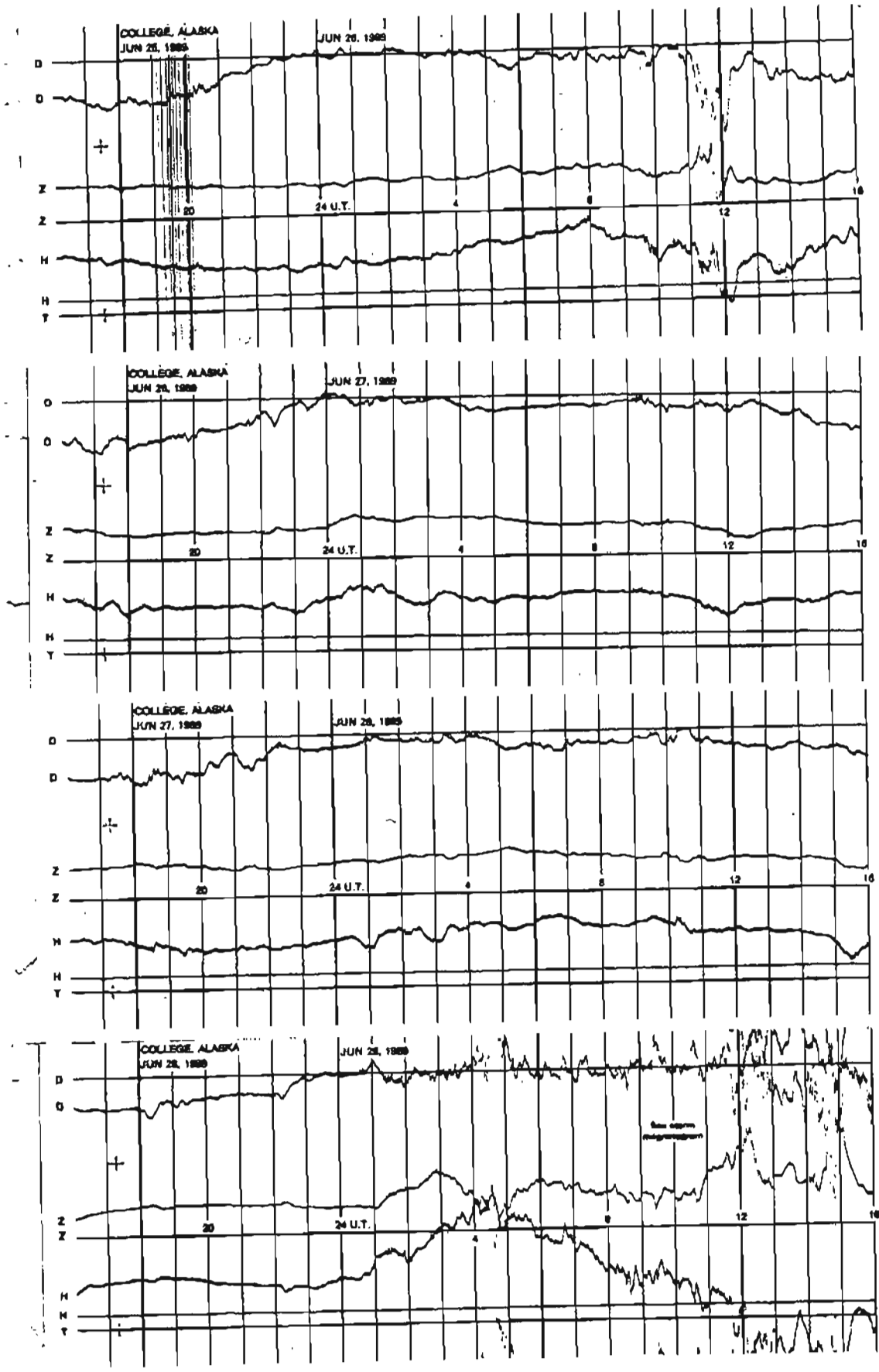
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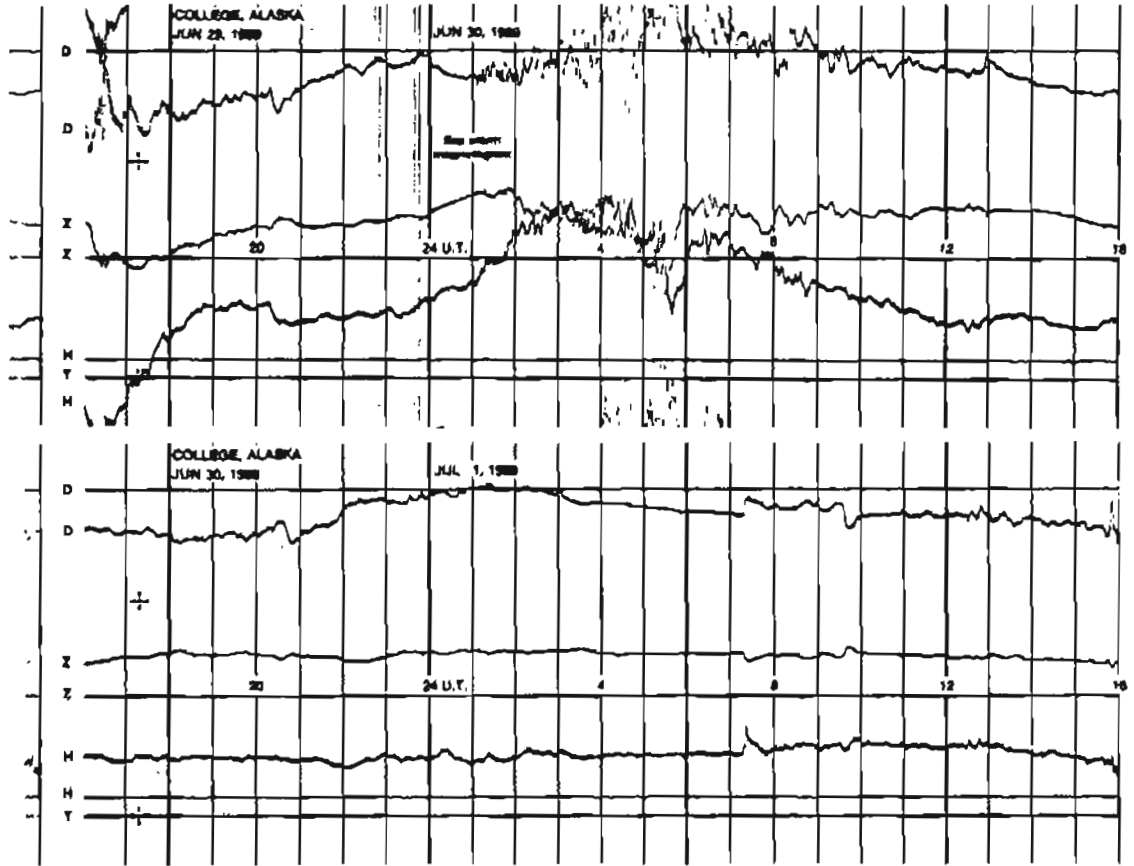
NORMAL MAGNETOGRAMS



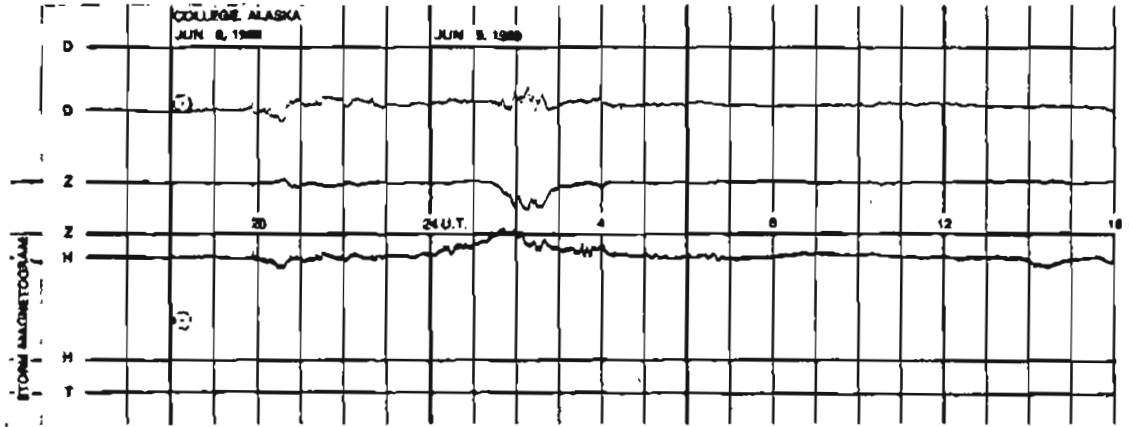
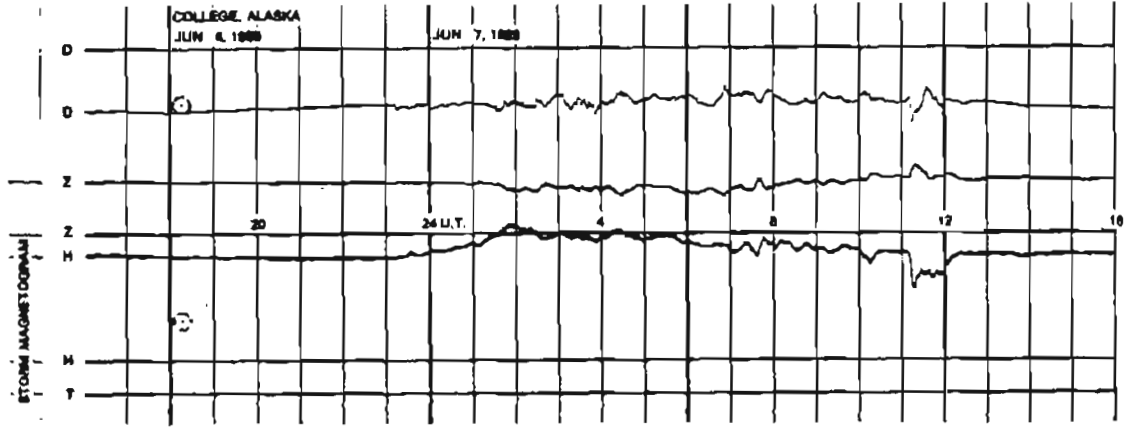
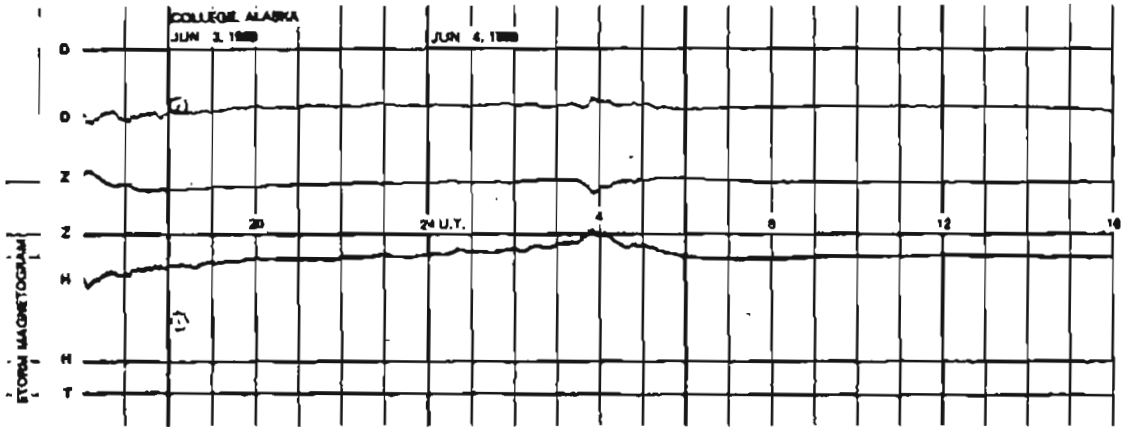
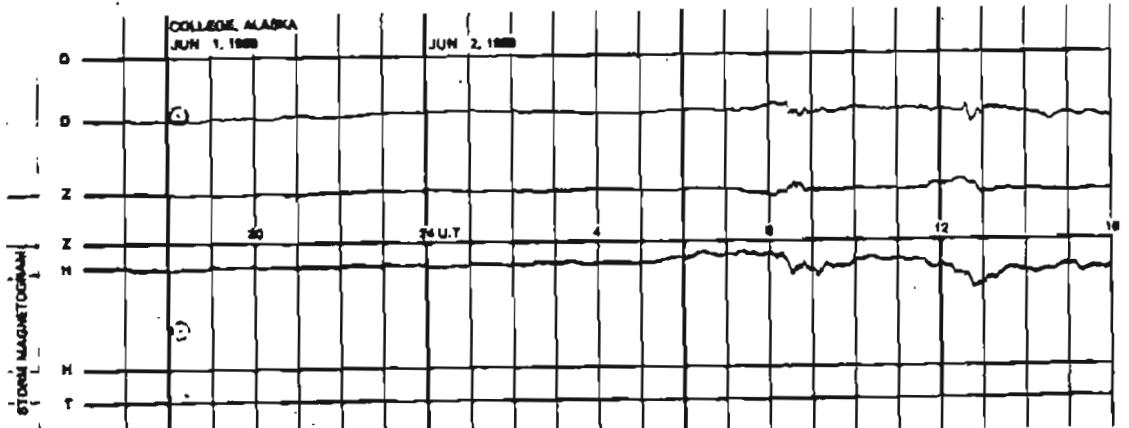
NORMAL MAGNETOGRAMS



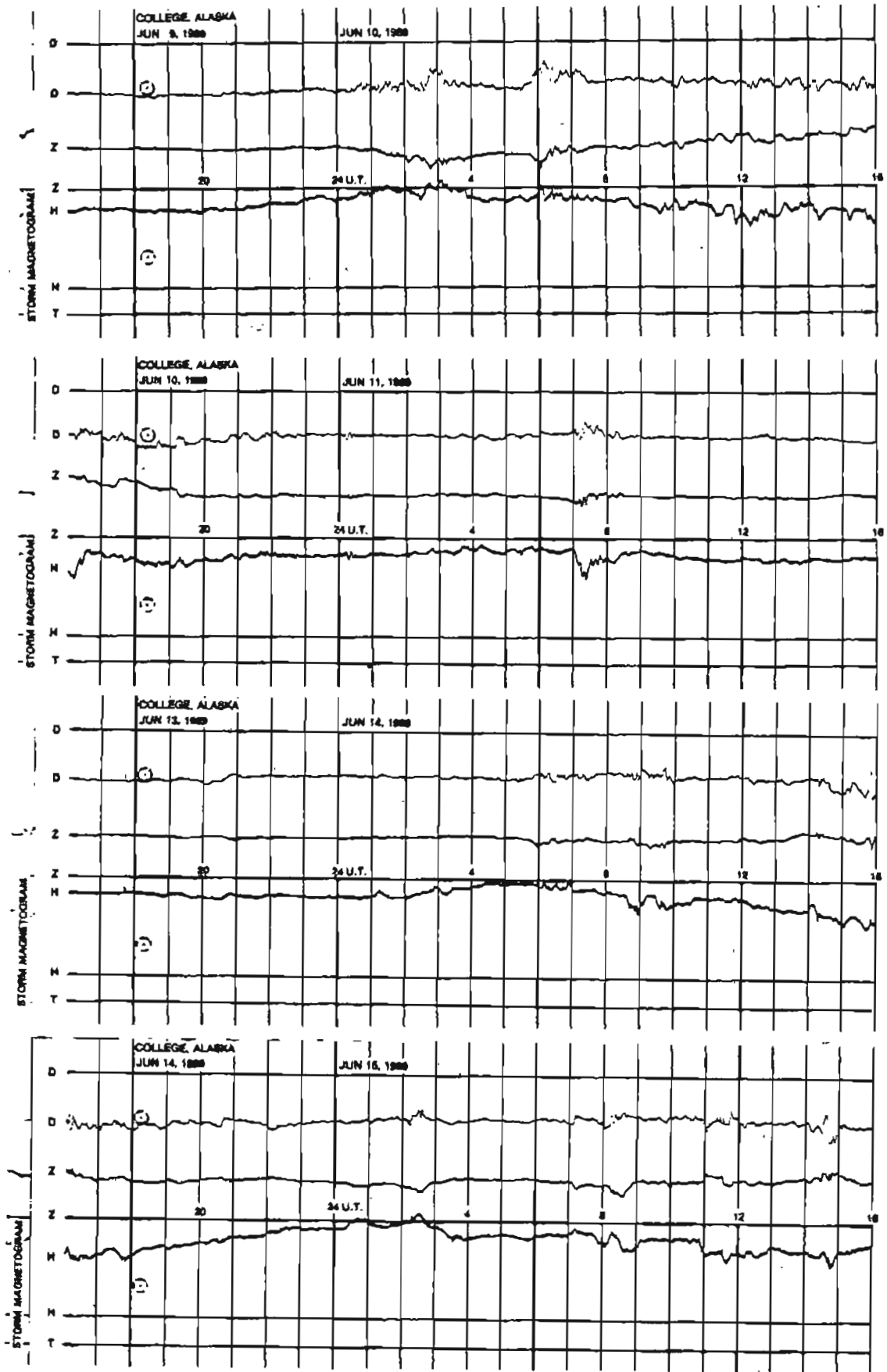
NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

