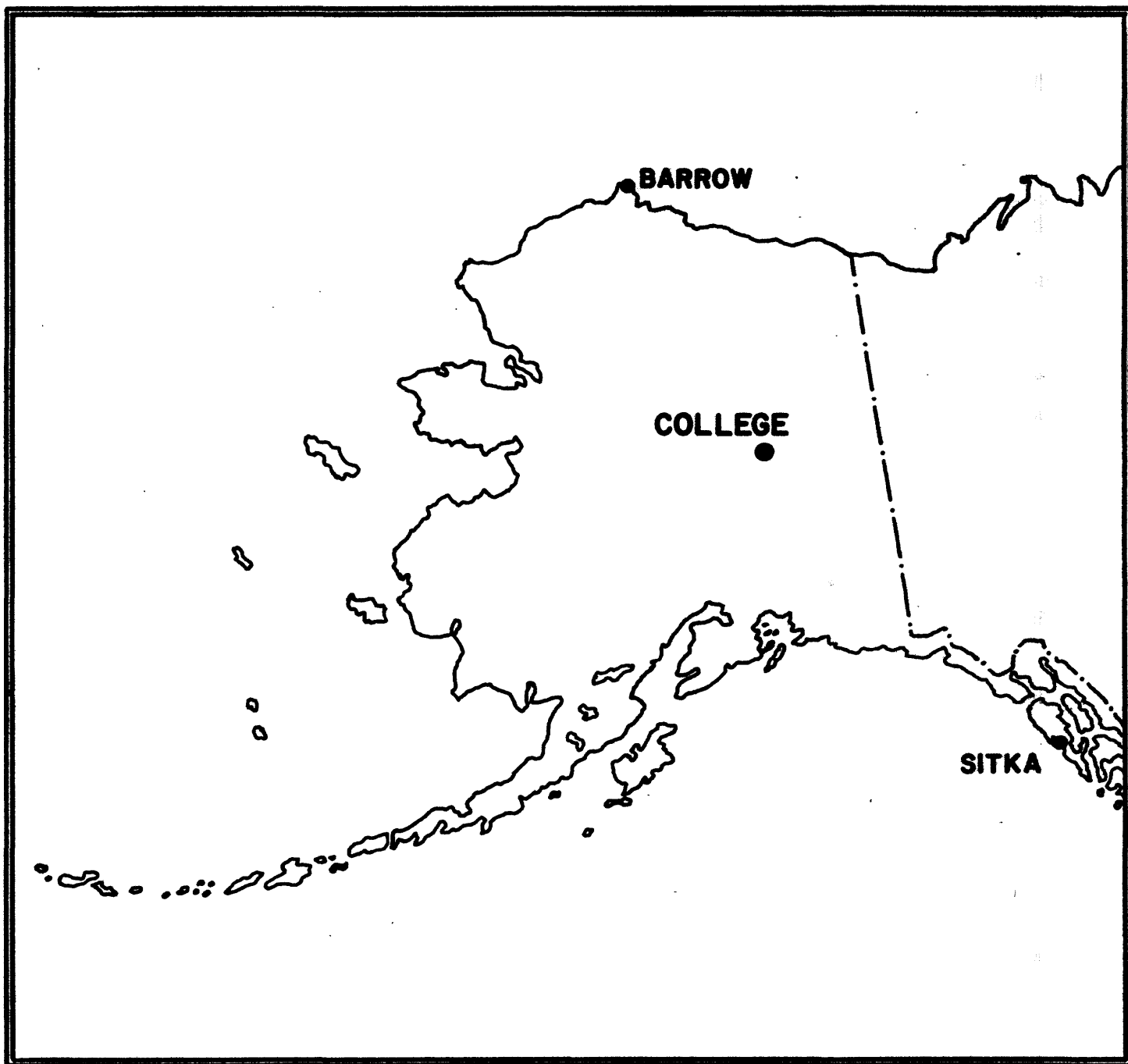


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

MAY 1989

OPEN FILE REPORT 89-0300E



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 10γ has been chosen so as not to give the illusion of an accuracy not justified.

The schedule for converting gamma range to K, and K to ak is as follows:

<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 (10γ)

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.

College, Alaska

MAGNETIC ACTIVITY
(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

May 1989

DATE	K-INDICES								SUM	A _k	TIME SCALE ON MAGNETOGRAMS		
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			20 mm/hr		
1	2	2	2	1	2	3	2	3	17	09	SUDDEN COMMENCEMENTS		
2	3	4	6	3	4	4	4	3	31	29	d	h	m
3	3	4	2	4	2	1	2	3	21	14			
4	3	5	3	4	4	4	3	4	30	25	4	23	52
5	6	6	6	5	4	3	3	3	36	45			
6											7	05	12
6	2	3	4	5	5	3	3	3	28	24			
7	2	5	6	6	6	5	5	3	38	51			
8	2	1	2	5	2	3	1	1	17	12			
9	0	1	2	2	2	2	0	0	9	04			
10	2	1	0	1	0	0	0	1	5	02			
11													
11	1	1	2	3	3	3	2	0	15	08			
12	2	4	5	5	2	4	2	2	26	22			
13	1	2	1	1	3	3	1	0	12	06			
14	1	4	2	3	4	3	2	2	21	14			
15	2	3	4	5	4	3	3	2	26	20			
16	2	3	1	1	4	2	2	1	16	09			
17	3	2	3	4	4	2	1	1	20	13	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
18	2	2	2	2	3	2	2	1	16	08			
19	1	2	2	3	2	2	1	0	13	06			
20	2	3	3	7	6	3	2	1	27	35			
21	1	2	3	4	4	2	2	0	18	12			
22	2	2	3	3	4	3	3	3	23	15			
23	2	2	2	2	5	6	6	4	29	33			
24	5	5	6	6	6	5	5	5	43	60	BEGIN	END	
25	4	4	7	4	6	5	3	2	35	46	d h m	d h m	
26	4	3	1	3	4	4	3	4	26	20			
27	4	4	4	4	4	4	3	2	29	23			
28	4	4	2	3	5	4	4	3	29	24			
29	3	4	2	4	5	4	2	3	27	22			
30	4	4	2	3	1	2	1	1	18	12			
31	3	3	2	2	5	4	2	2	23	17			

K SCALE USED: LOWER LIMIT FOR K = 9..... CURRENT SCALE VALUE..... LOWER LIMIT FOR K = 9.....	D	H	Z	(mm) (γ/mm) (to nearest 10γ)
	675.7	322.2		
	3.69	7.79		
	2490	2510		

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

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

MAY 1989

Obs. 2 letter IAEA 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)
00	64.0 N	4	2352	SC*	-10	+273	-15	5	1,2,3	6	157	1310	880	5 14
		7	0512	SC	-27	+335	-89	7	3,4,5	6	166	1135	700	7 24
		23	13xx	..				25	3	7	181	1405	985	25 21

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 5/1/89	2400 U.T., 5/4/89	1.0' / mm	3.7 γ / mm	26° 51.2' E
	0001 U.T., 5/5/89	2400 U.T., 5/31/89			26° 51.0' E
H	0001 U.T., 5/1/89	2400 U.T., 5/15/89	7.8 γ / mm		12626 γ
	0001 U.T., 5/16/89	2400 U.T., 5/26/89			12630 γ
	0001 U.T., 5/27/89	2400 U.T., 5/31/89			12633 γ
Z	0001 U.T., 5/1/89	2400 U.T., 5/15/89	7.8 γ / mm		55197 γ
	0001 U.T., 5/16/89	2400 U.T., 5/31/89			55194 γ

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 U.T., 5/1/89	2400 U.T., 5/31/89	7.9' / mm	29.4 γ / mm	
H	(SAME)	(SAME)	43.6 γ / mm		
Z	(SAME)	(SAME)	49.2 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° 04.1' E	12798 γ	55347 γ

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: MAY 9, 10, 11, 13, 19,

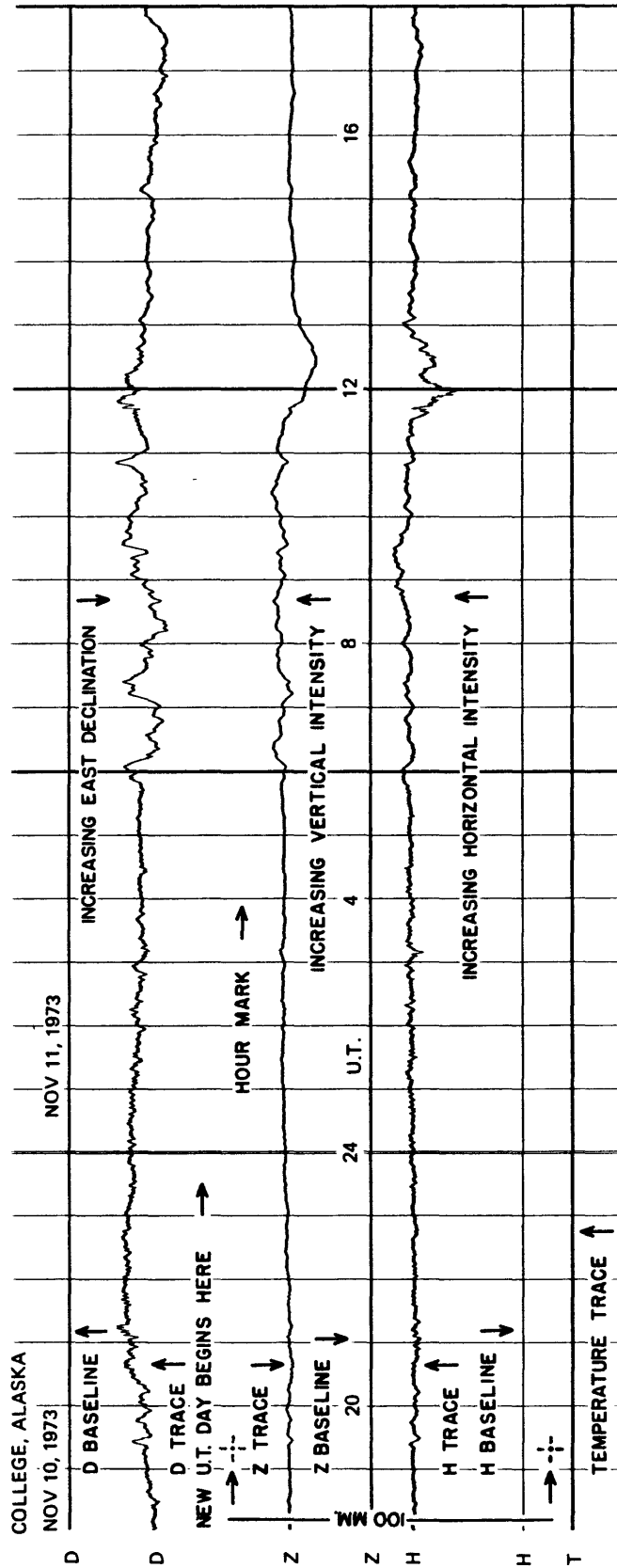
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

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	At	10	11	13	19	9	10	11	13	19	9	10	11	13	19	DAY
At	HOUR	01	02	03	04	05	06	07	08	09	10	11	12	13	14	HOUR
	01	30	57	70	16	193	209	190	190	192	212	195	194	213	189	01
	02	48	70	80	20	190	238	220	184	203	212	213	196	216	202	02
	03	70	60	90	46	186	230	216	209	210	213	234	208	225	203	03
	04	81	72	94	81	190	252	230	225	247	212	236	200	234	222	04
	05	86	77	70	109	218	240	250	279	236	212	220	215	220	224	05
	06	86	81	102	128	234	250	251	261	233	216	217	212	220	223	06
	07	137	100	129	130	258	259	255	241	231	250	212	218	223	214	07
	08	179	111	125	121	270	250	278	228	257	213	213	218	202	204	08
	09	96	100	101	98	260	260	339	229	290	213	203	210	190	205	09
	10	89	90	102	90	261	260	320	231	249	216	205	173	191	194	10
	11	92	97	121	123	226	258	289	231	259	208	210	167	200	186	11
	12	120	110	94	89	200	244	220	230	187	183	200	184	186	134	12
	13	119	139	110	98	210	231	128	180	231	160	200	218	170	173	13
	14	142	163	156	110	224	224	174	144	249	187	202	187	164	191	14
	15	185	200	190	159	180	219	180	212	260	190	200	204	184	217	15
	16	249	218	320	229	141	230	129	162	259	155	188	169	172	219	16
	17	249	224	349	270	208	233	230	164	260	168	189	150	139	213	17
	18	260	228	367	284	227	220	247	109	239	185	188	175	95	213	18
	19	245	230	267	270	210	200	222	201	230	193	187	190	113	200	19
	20	220	223	189	231	175	181	211	187	220	195	179	176	139	196	20
	21	163	170	168	170	170	170	202	200	200	186	160	173	160	182	21
	22	120	128	110	100	176	180	199	181	200	186	160	171	170	179	22
	23	90	110	75	80	180	188	190	177	200	194	169	174	181	186	23
	24	76	71	61	44	191	180	185	180	194	197	178	179	187	193	24
DAILY SUM		3232	3122	2815	3096	4918	5406	5355	4835	5536	4756	4758	4561	4394	4762	DAILY SUM
DAILY MEAN		135	130	117	148	207	225	223	201	231	198	198	190	183	198	DAILY MEAN
MEAN				132				218					194			MEAN

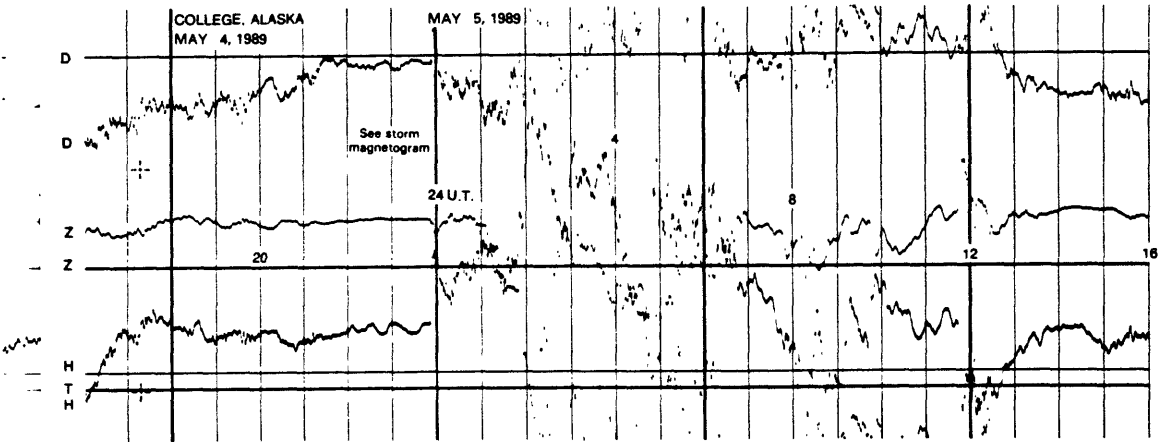
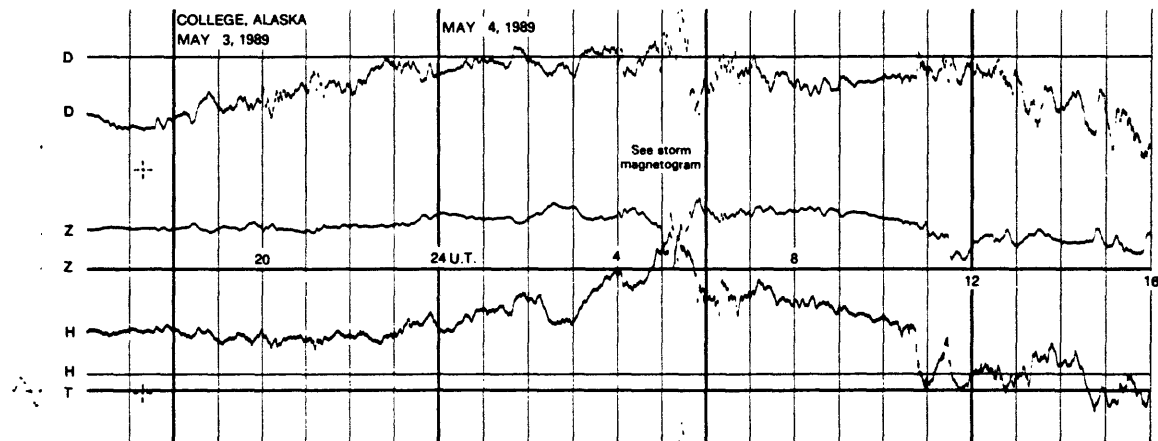
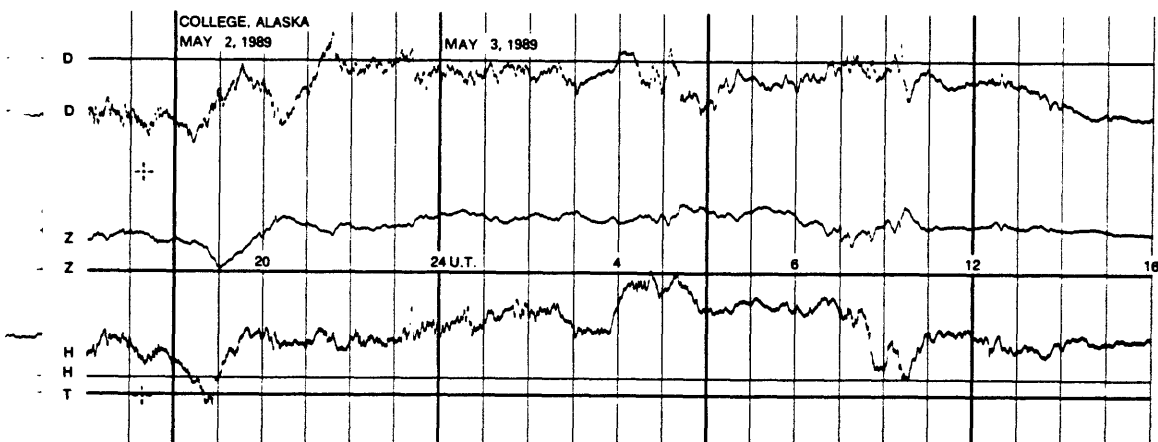
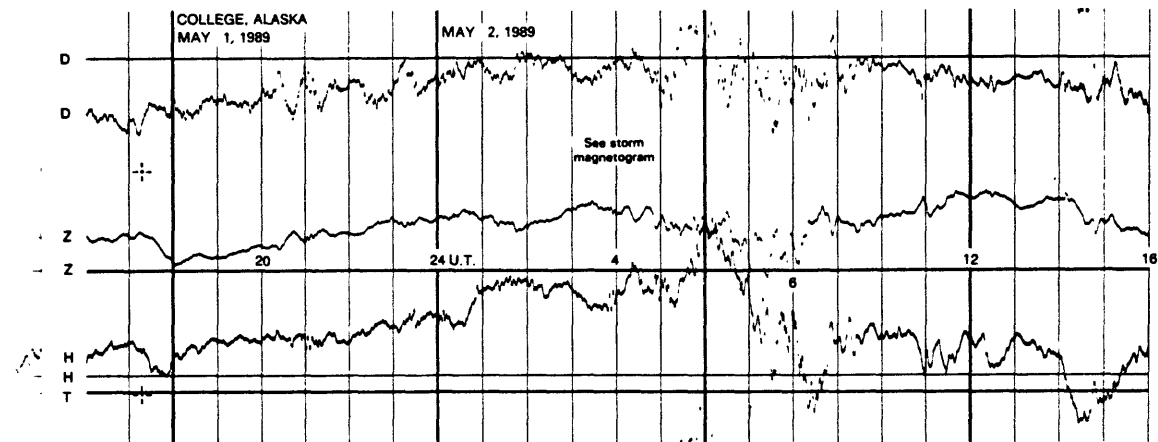
Scaled *TWO* Checked *CAV*

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

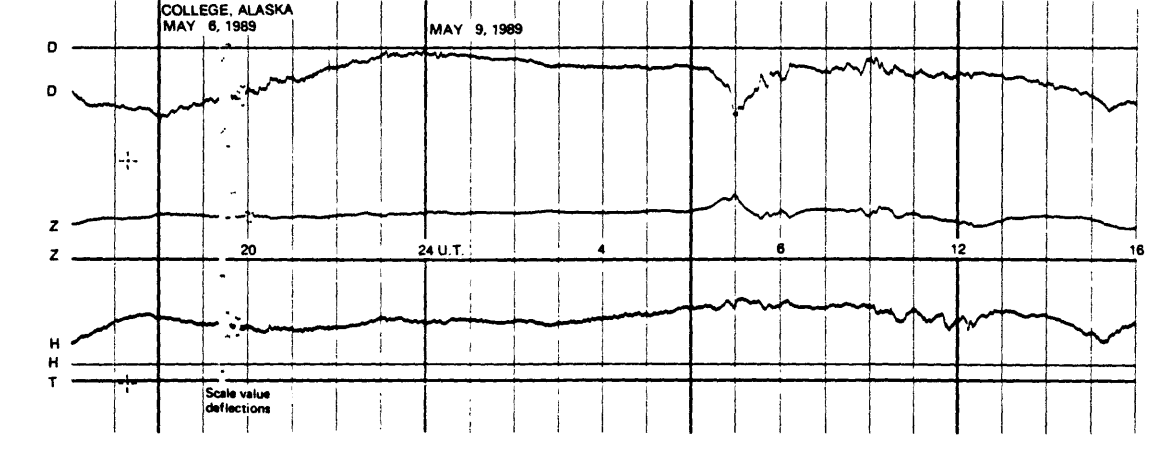
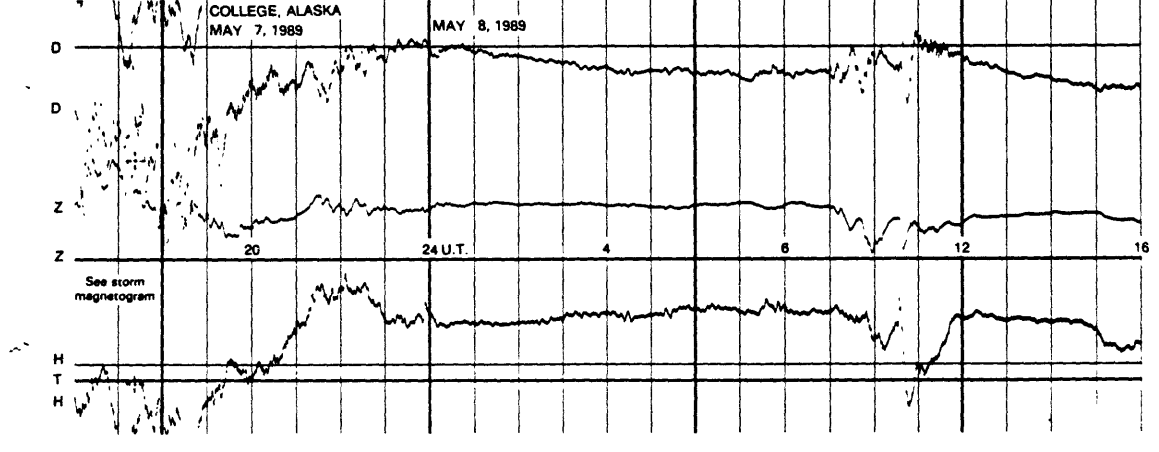
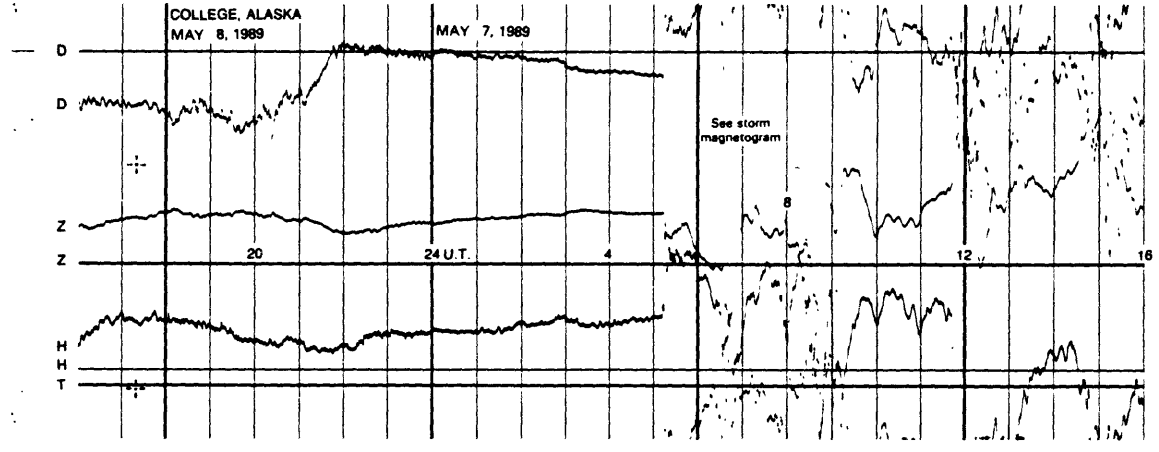
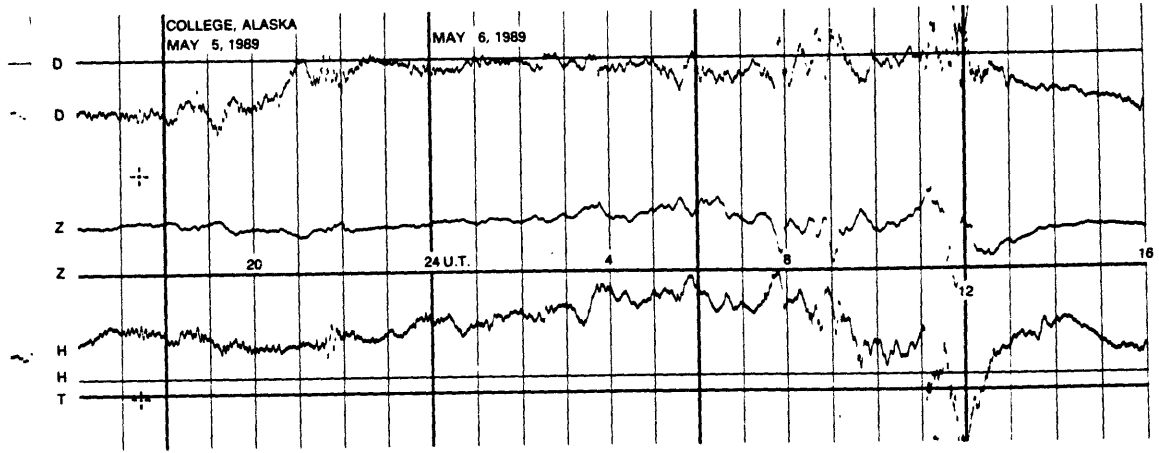


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

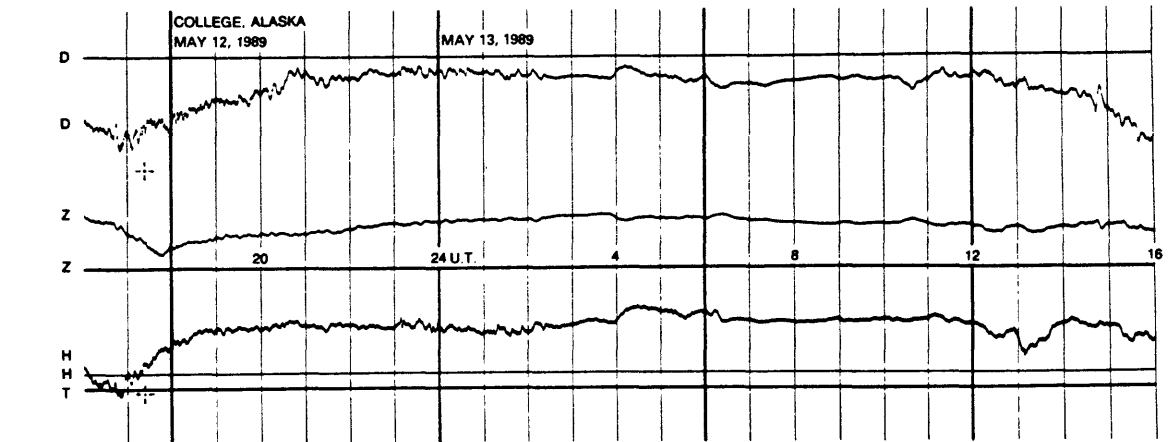
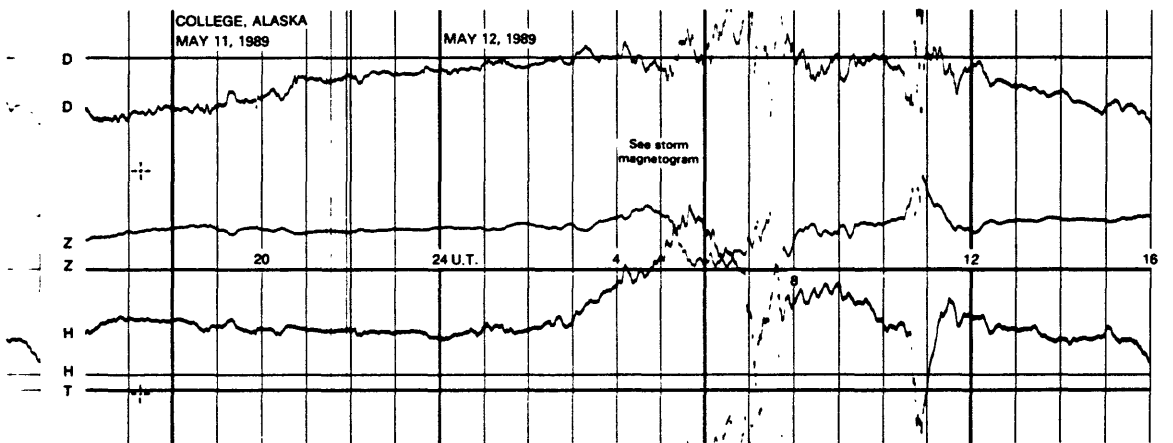
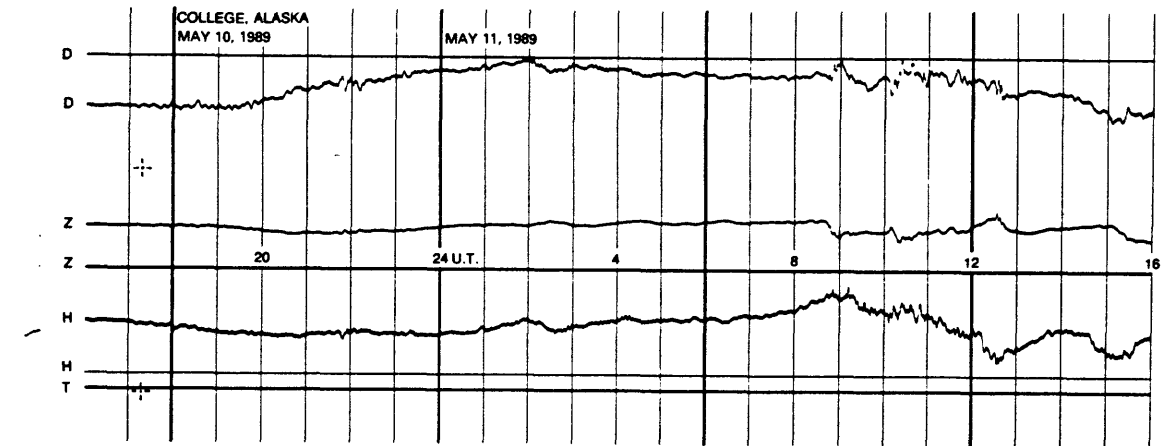
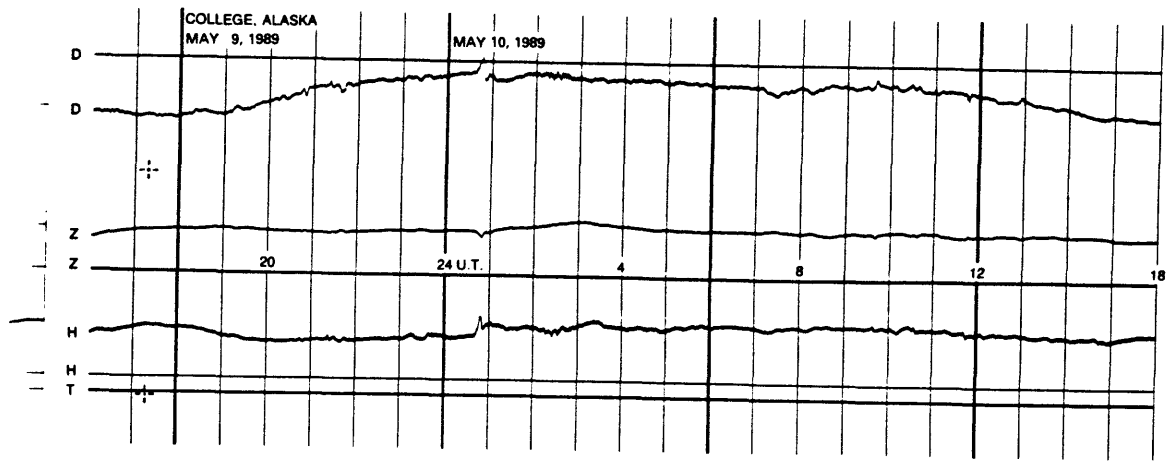
NORMAL MAGNETOGRAMS



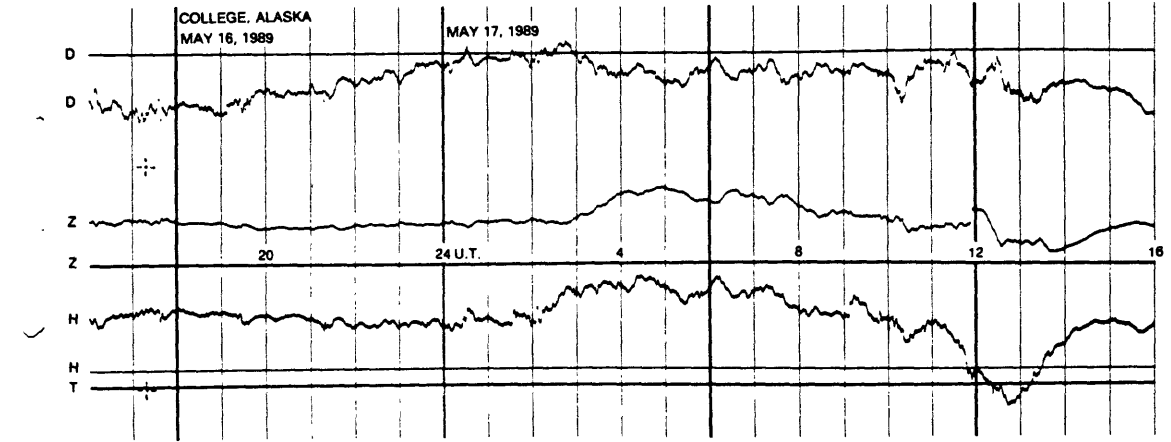
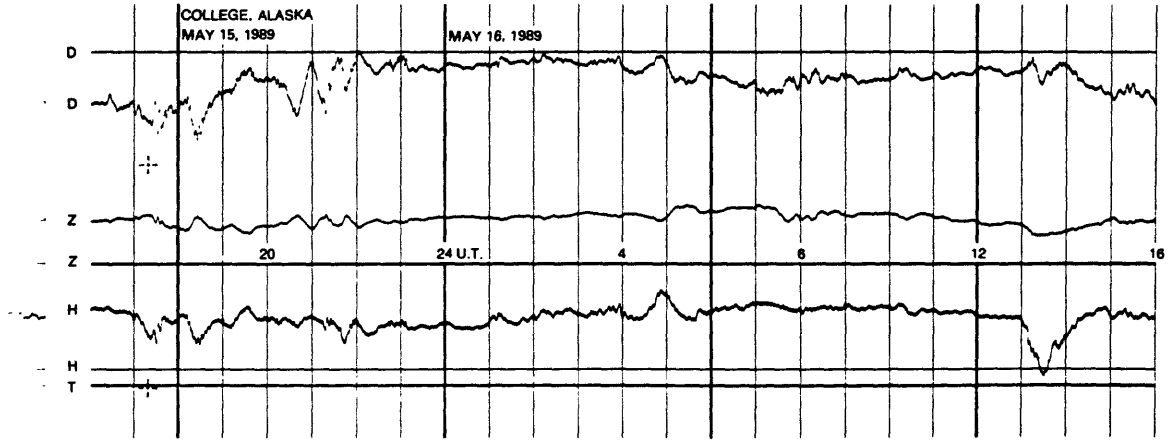
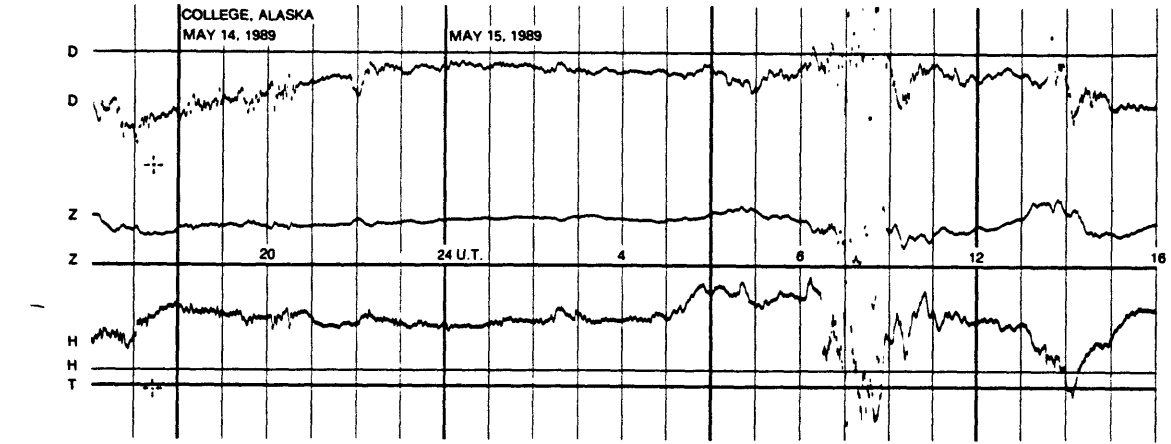
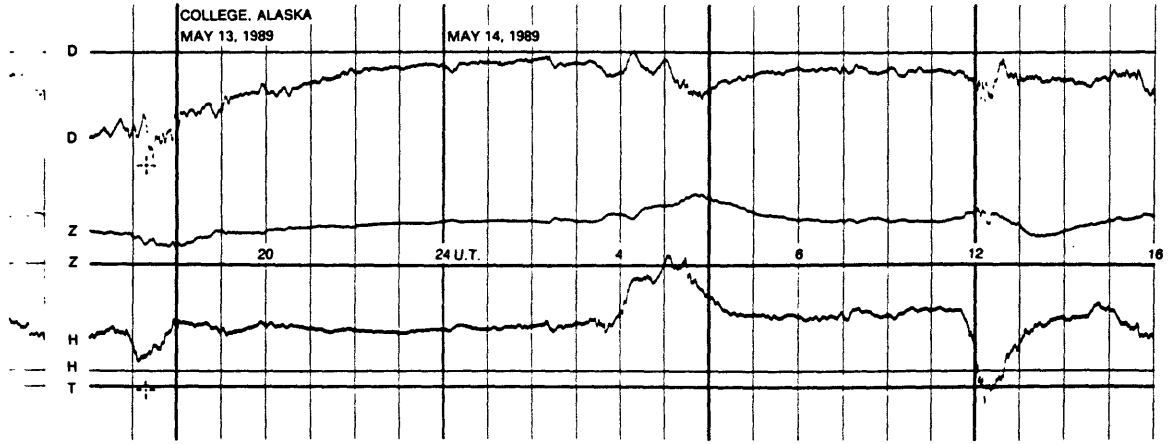
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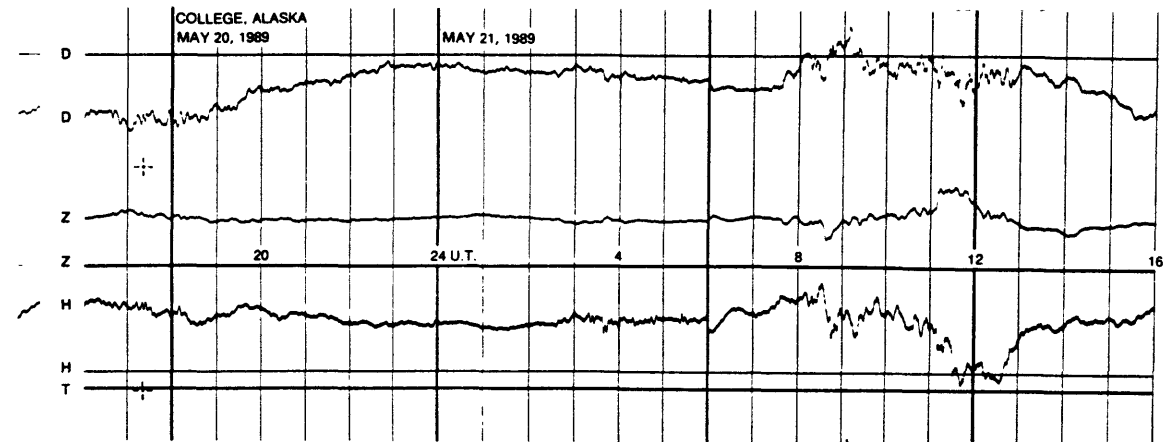
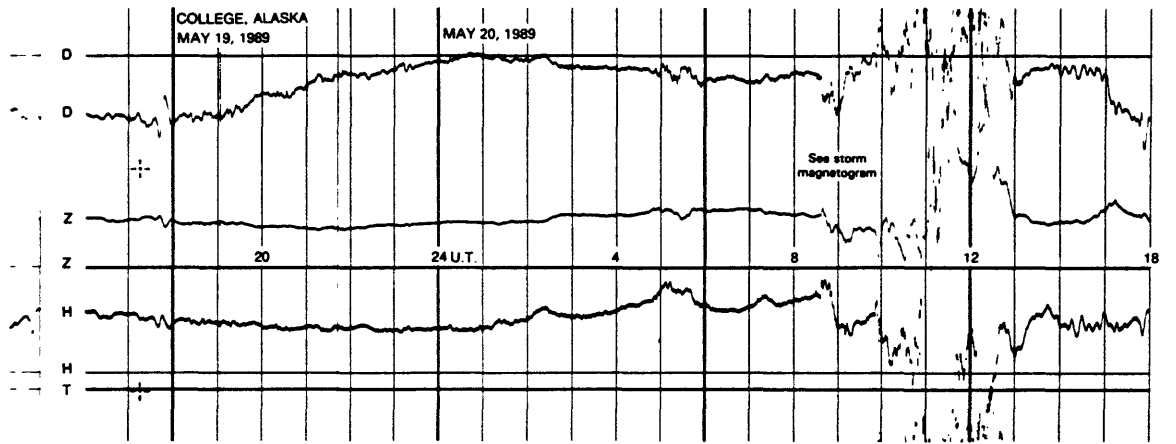
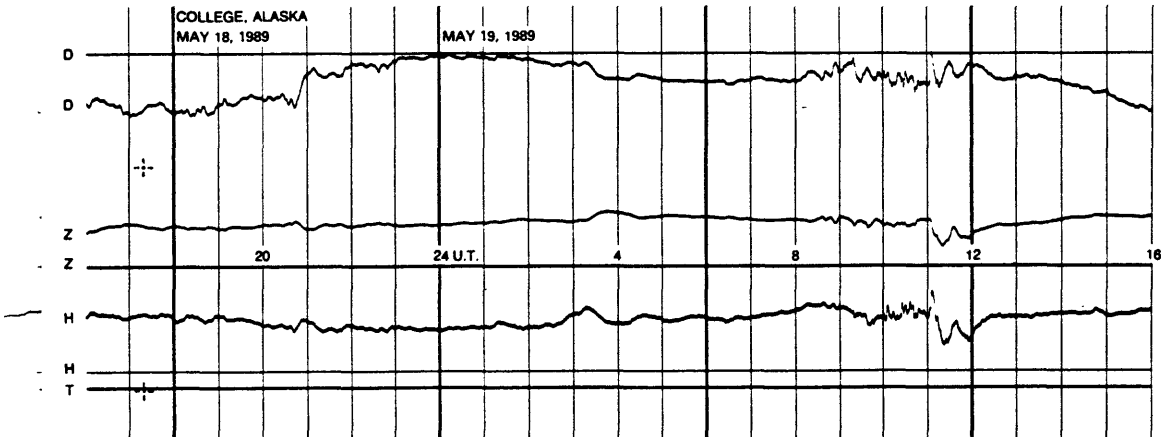
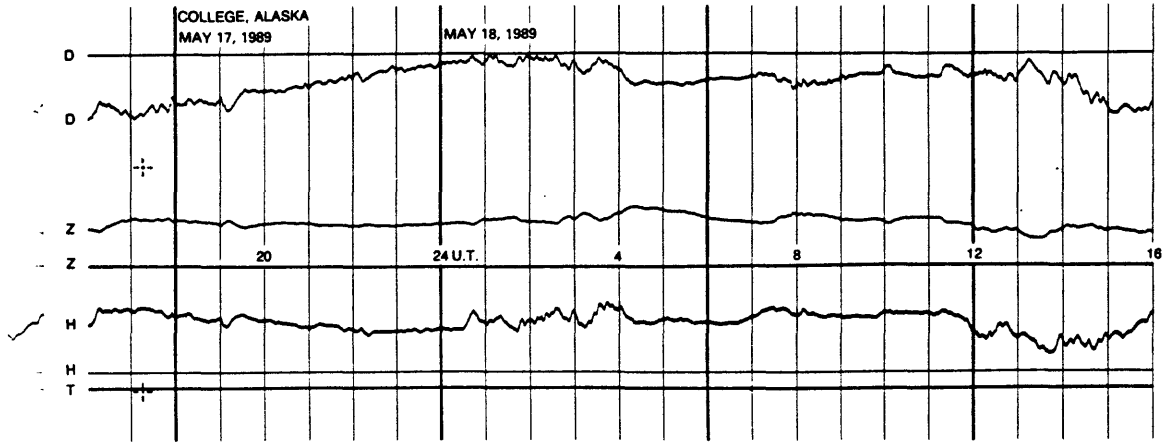
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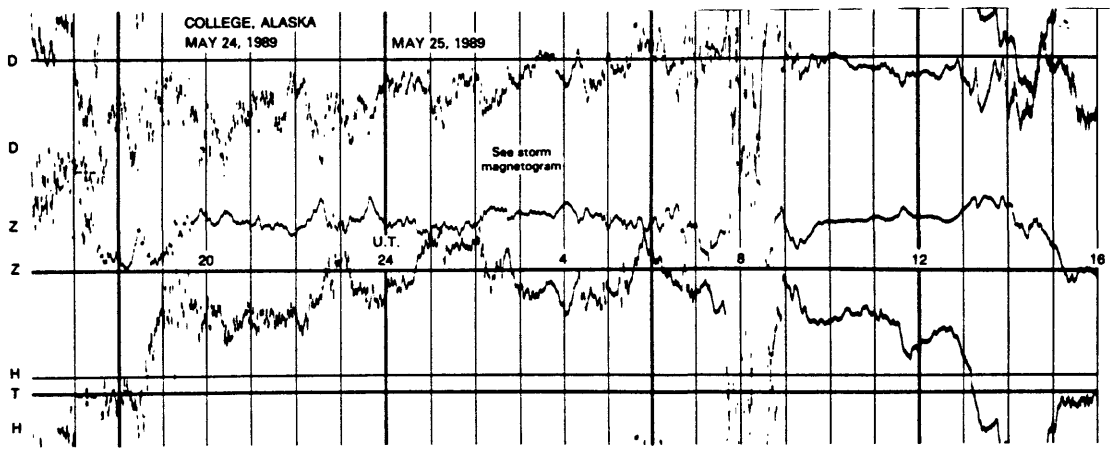
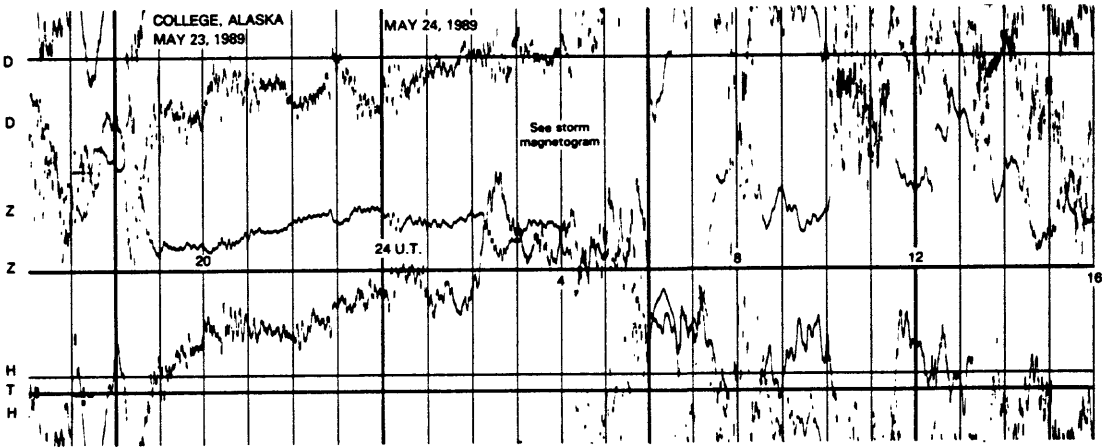
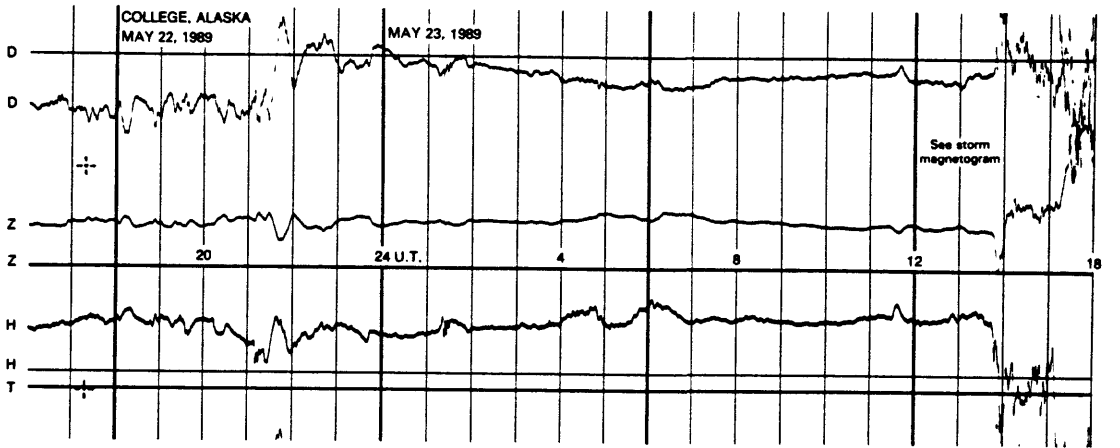
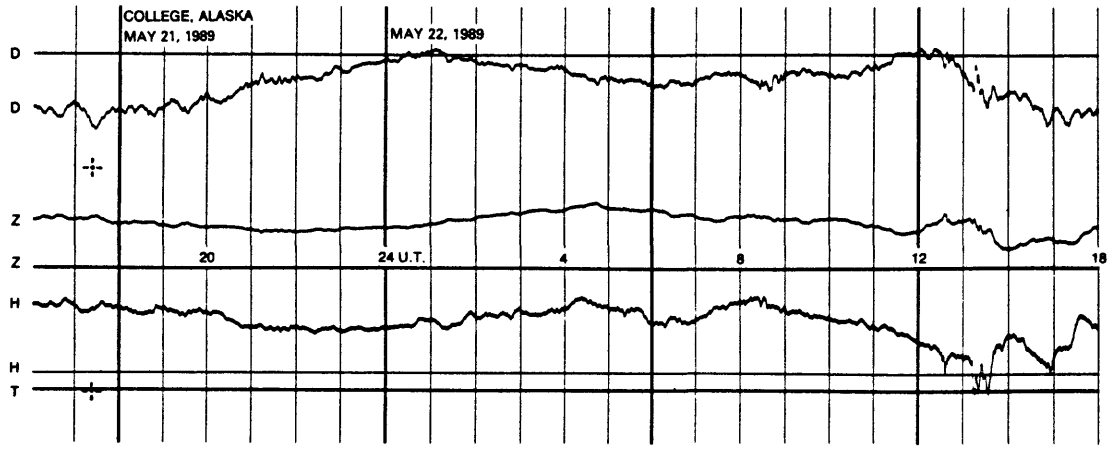
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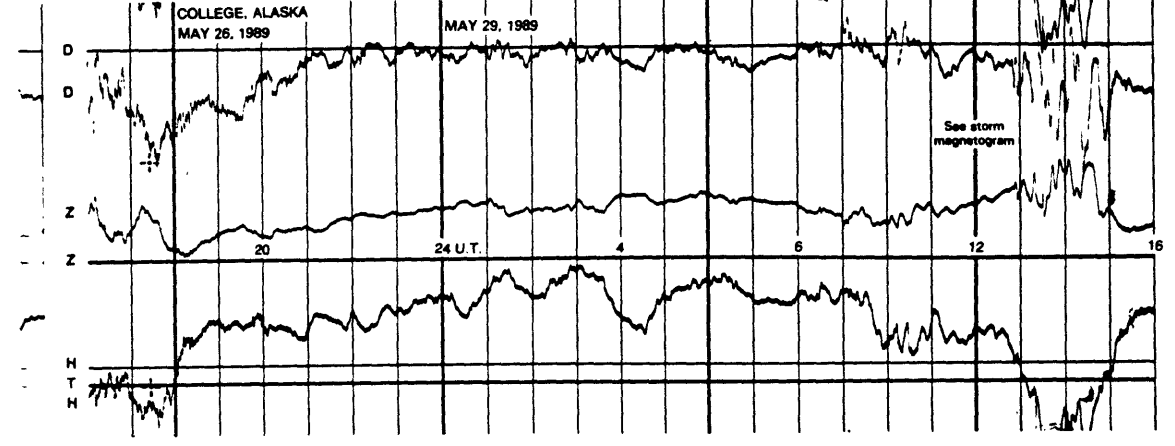
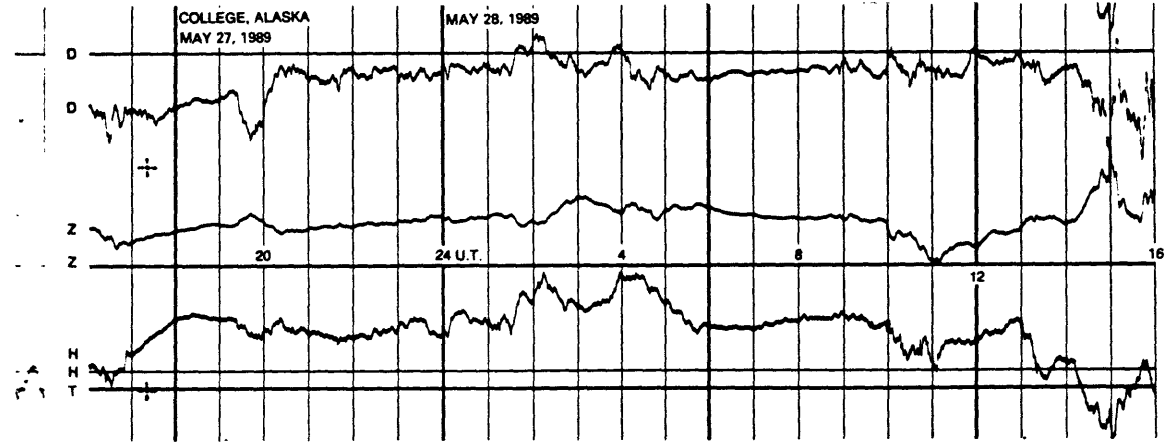
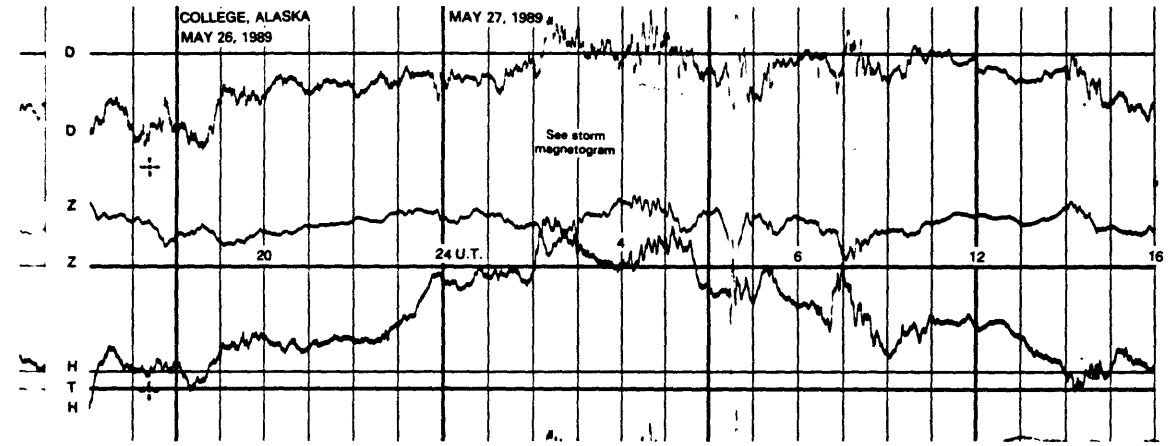
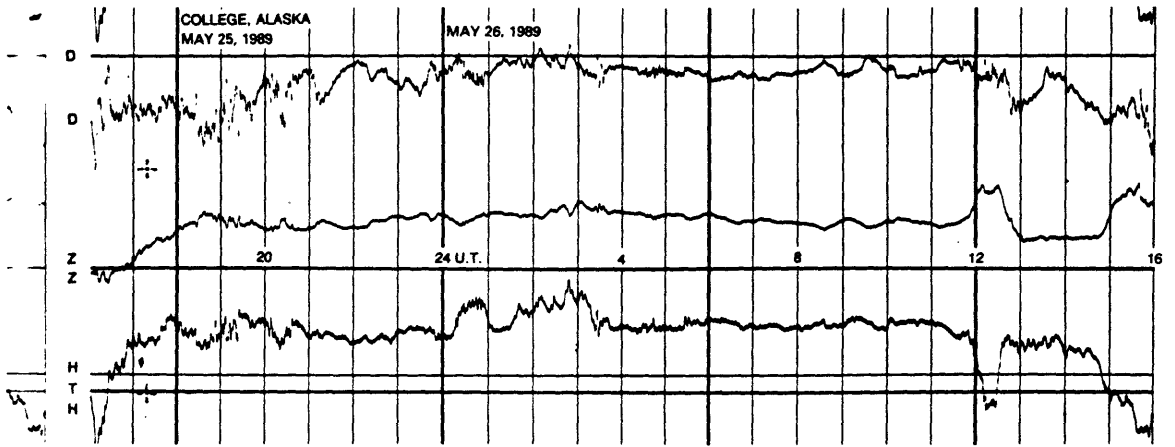
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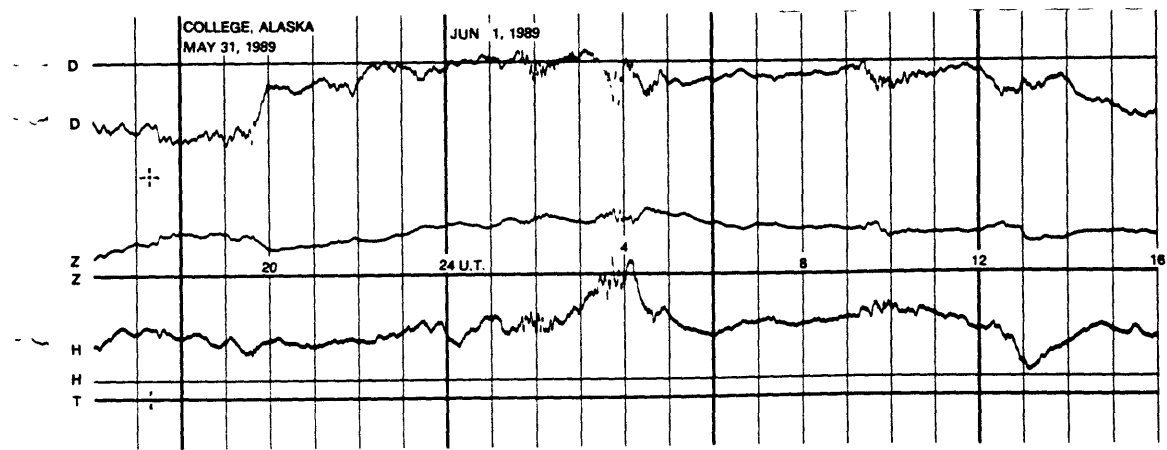
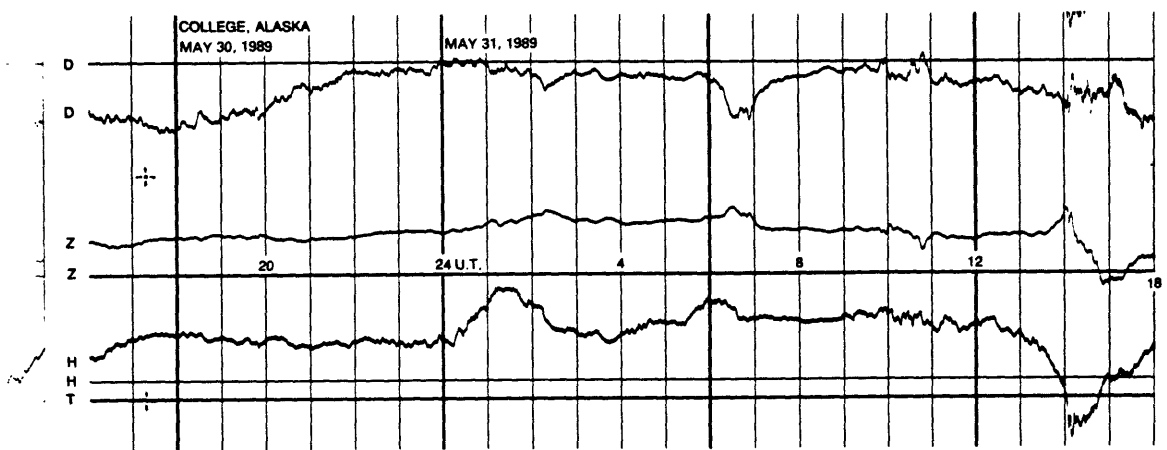
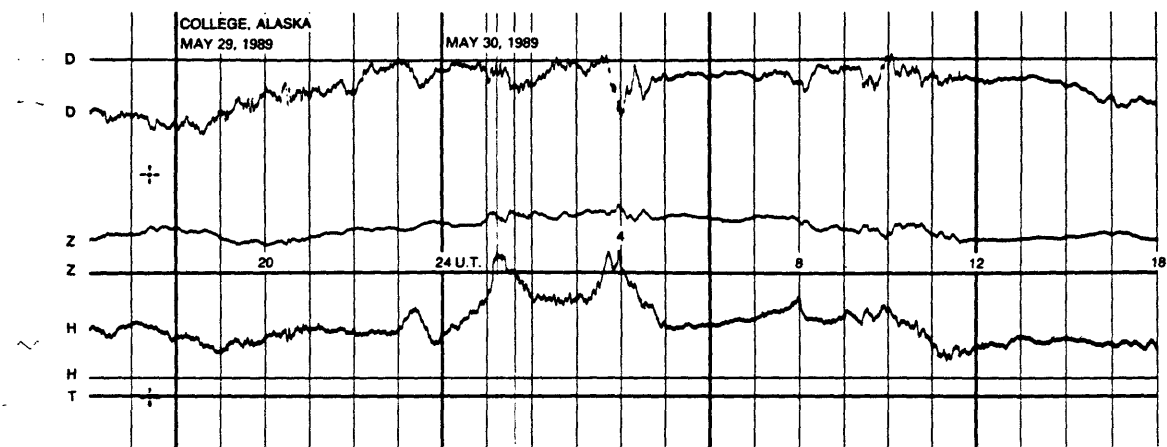
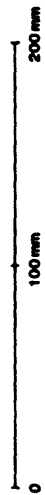
NORMAL MAGNETOGRAMS



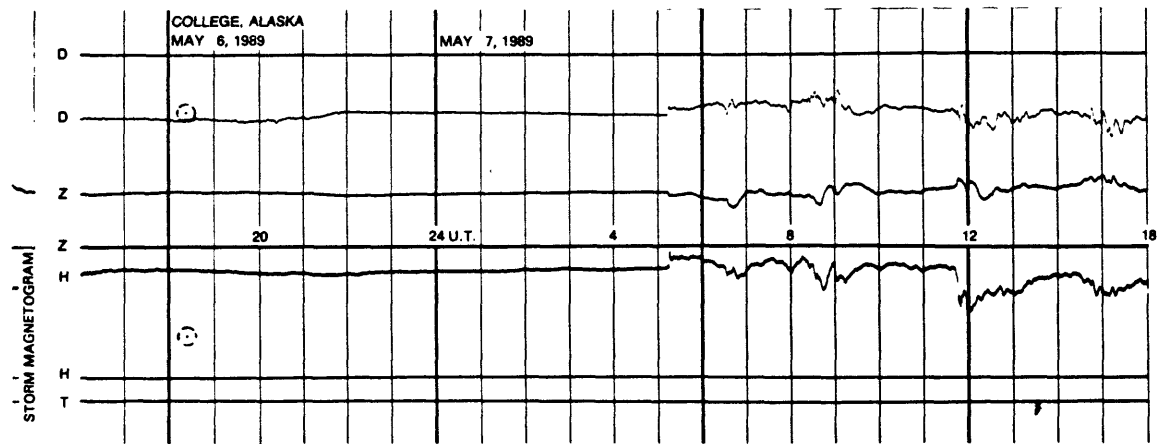
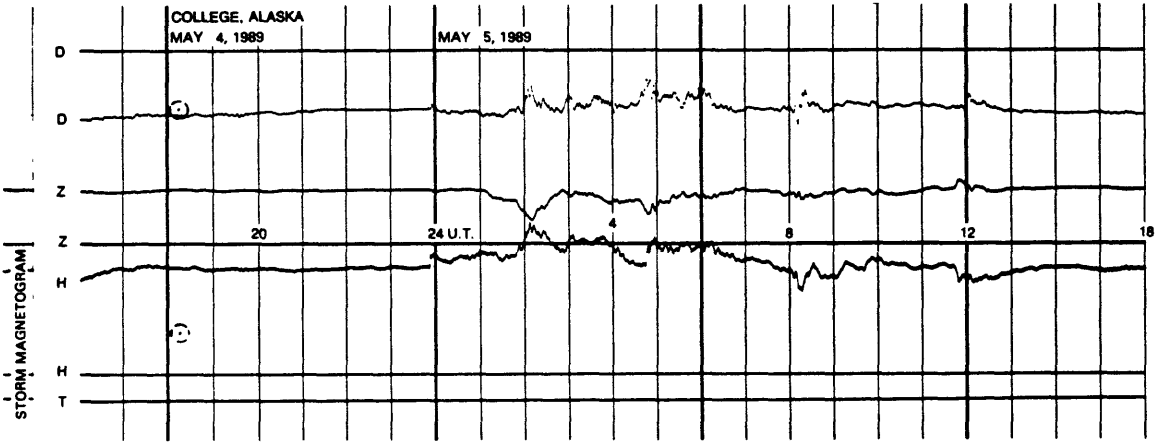
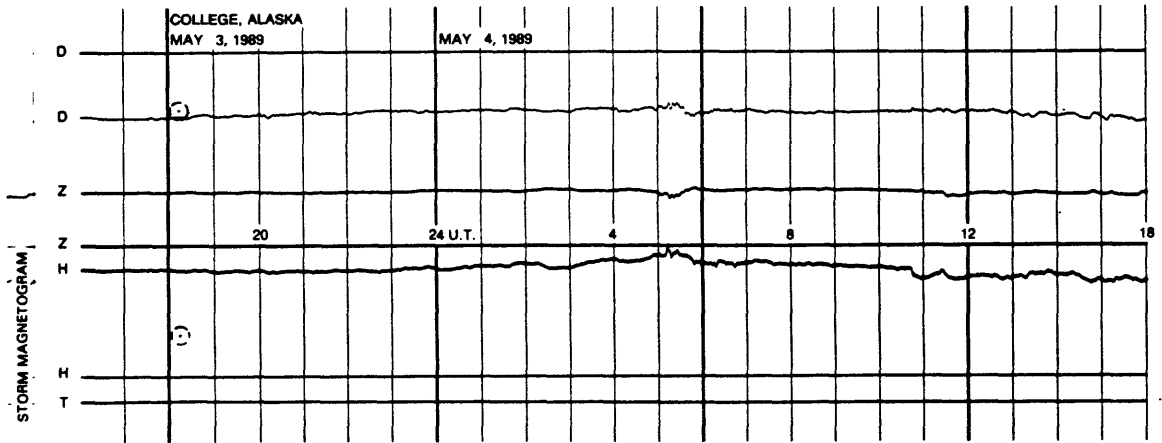
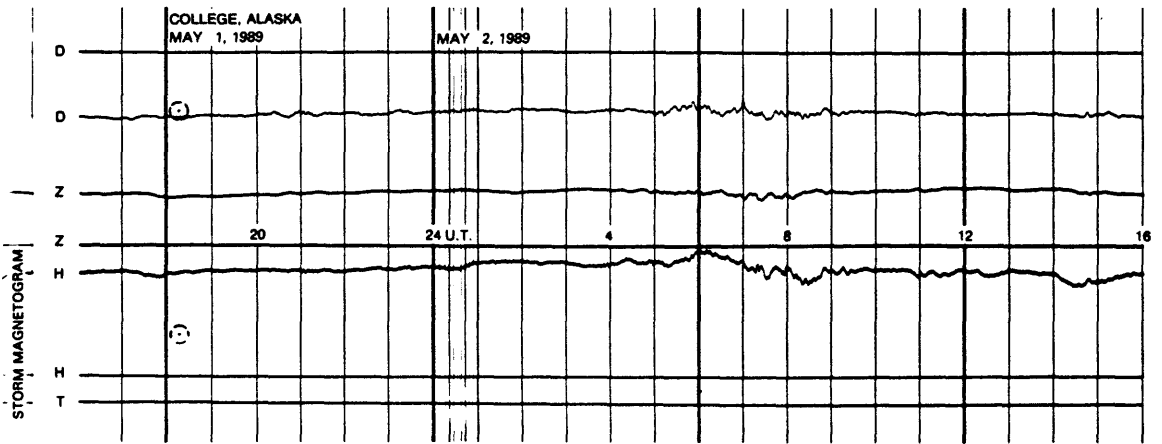
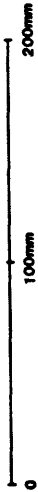
NORMAL MAGNETOGRAMS



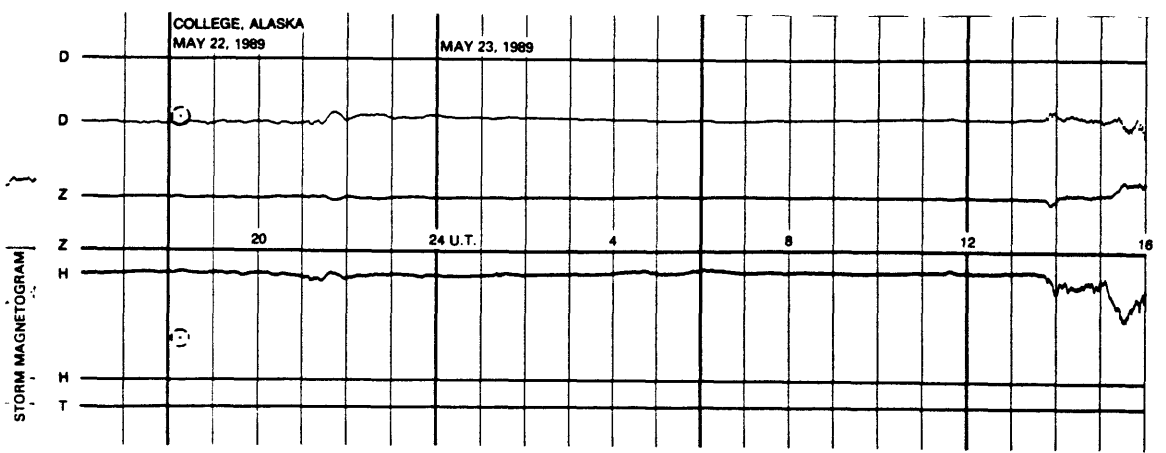
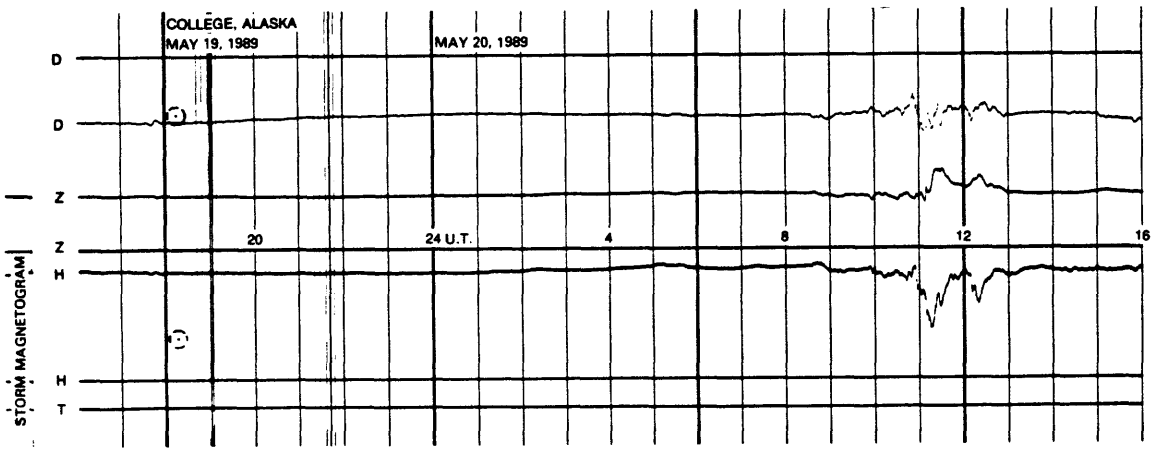
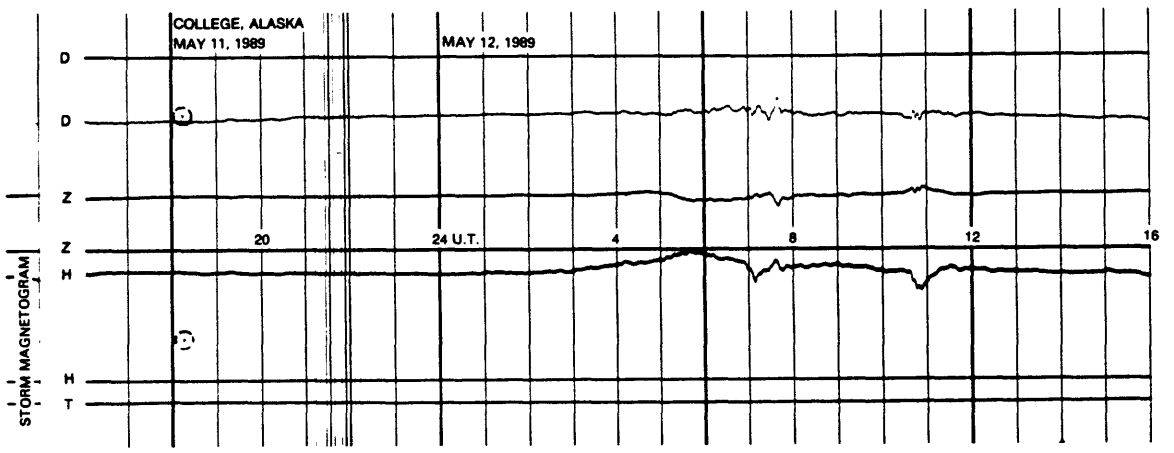
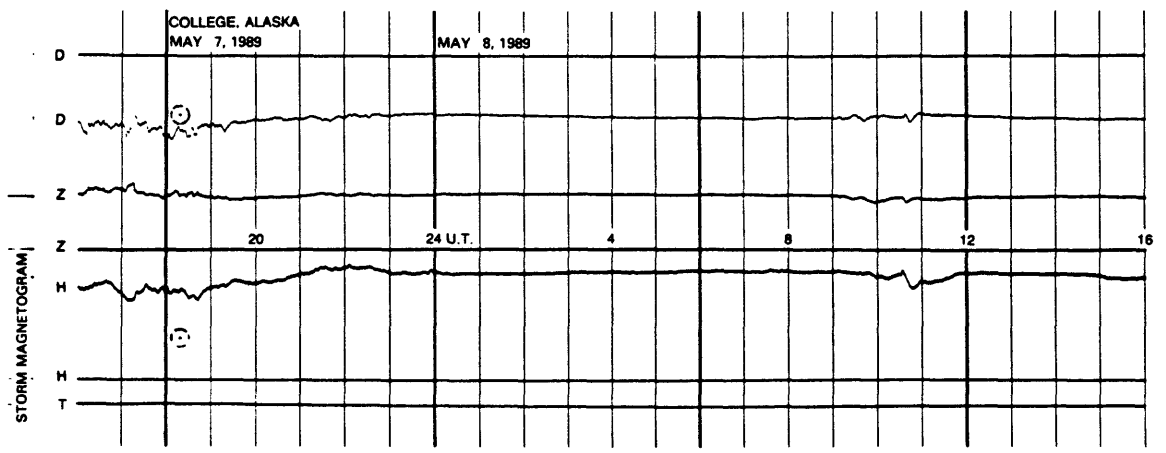
NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

