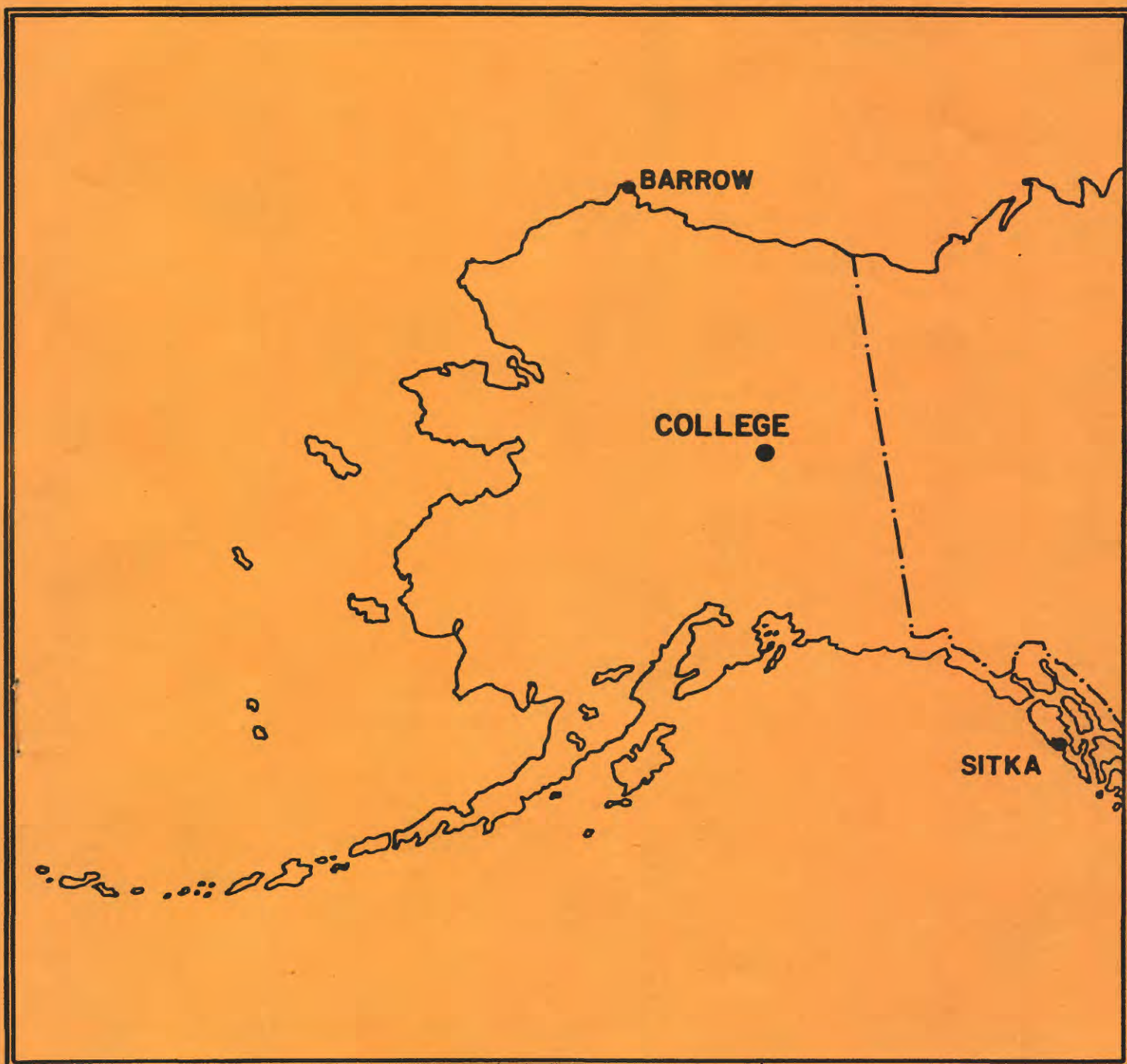


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

JANUARY 1989

OPEN FILE REPORT 89-0300A



COLLEGE OBSERVATORY PRELIMINARY GEOMAGNETIC DATA

EXPLANATION OF DATA AND REPORTS

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
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 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 and storm magnetograms and appropriate calibration data are processed at the observatory and are available for analysis or copying. Also available are mean hourly scalings for the five quietest days for the month and K-Indices.

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 a 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)

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 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 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.

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. THE COLLEGE OBSERVATORY IS A 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, ALASKA

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

JANUARY, 1989

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	3	3	4	4	5	4	3	2	28	23	SUDDEN COMMENCEMENTS		
2	1	0	2	3	4	1	1	1	13	08	d	h	m
3	0	0	0	0	1	1	2	0	4	02	4	23	06
4	0	1	2	0	1	1	2	2	9	04			
5	2	5	5	3	4	7	5	2	33	43	11	12	08
6	1	2	3	4	3	0	2	2	17	10	15	10	00
7	3	1	1	3	4	3	3	1	19	12			
8	0	1	1	3	6	6	4	3	24	28			
9	2	2	3	5	5	4	3	3	27	23			
10	3	2	3	3	5	4	2	1	23	17			
11	1	1	0	1	5	6	6	6	26	37			
12	3	3	4	3	3	3	3	1	23	15			
13	1	0	0	2	5	5	4	2	19	18			
14	2	1	0	3	2	3	4	4	19	13			
15	4	3	4	5	6	7	5	5	39	54			
16	4	3	4	6	4	6	5	3	35	40			
17	3	3	5	7	5	5	4	3	35	45			
18	3	2	3	6	4	3	1	1	23	21			
19	1	2	2	3	1	2	1	0	12	06			
20	2	1	0	3	8	8	6	4	32	77			
21	3	2	6	6	5	6	5	4	37	48			
22	3	4	4	5	7	5	5	3	36	46			
23	2	3	4	6	5	5	3	2	30	31			
24	2	2	1	4	5	4	3	2	23	18	BEGIN	END	
25	2	2	3	4	5	2	3	1	22	16	d	h	m
26	1	1	2	5	5	3	2	2	21	17			
27	2	2	2	3	5	4	1	0	19	14			
28	0	4	3	1	5	6	4	2	25	26			
29	1	1	1	6	5	6	2	1	23	28			
30	1	3	2	6	6	4	2	1	25	28			
31	1	3	4	5	6	6	6	5	36	48			

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

675.7

3.70

2500

H

322.2

7.77

2500

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend Chief, College Observatory

OBSERVER IN CHARGE

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA

Data from Individual Observatories:

JANUARY 1989

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

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(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	Z(Y)	day hr	
CO	64°6 N	4	2306	sc*	+12	+54	-	5	6	7	271	164'5	830	5 23	
		11	1208	sc	-5	+26	-12	11	6, 7, 8	6	162	1075	595	12 04	
		15	1000	sc	+11	-382	+78	15/17	6/4	7	206	1425	890	17 22	
		20	09xx	..				20	5, 6	8	354	1940	1065	21 03	
		21	07xx	..				22	5	7	237	1435	950	23 00	
		31	05xx	..				31	5, 6, 7	6	207	1195	800	1 02	

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0001 U.T., 1/1/89	2400 U.T., 1/31/89	1.0' /mm	3.7 γ/mm	26° 51.1' E
H	0001 U.T., 1/1/89	2400 U.T., 1/14/89	7.8 γ/mm		12624 γ
	0001 U.T., 1/15/89	2400 U.T., 1/17/89	(SAME)		12618 γ
	0001 U.T., 1/18/89	2400 U.T., 1/31/89	(SAME)		12612 γ
Z	0001 U.T., 1/1/89	2400 U.T., 1/14/89	7.7 γ/mm		55172 γ
	0001 U.T., 1/15/89	2400 U.T., 1/17/89	(SAME)		55176 γ
	0001 U.T., 1/18/89	2400 U.T., 1/31/89	(SAME)		55179 γ

STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0001 U.T., 1/1/89	2400 U.T., 1/31/89	7.9' /mm	29.5 γ/mm	
H	(SAME)	(SAME)	43.5 γ/mm		
Z	(SAME)	(SAME)	49.4 γ/mm		

RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 07.5' E	12809 γ	55318 γ

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

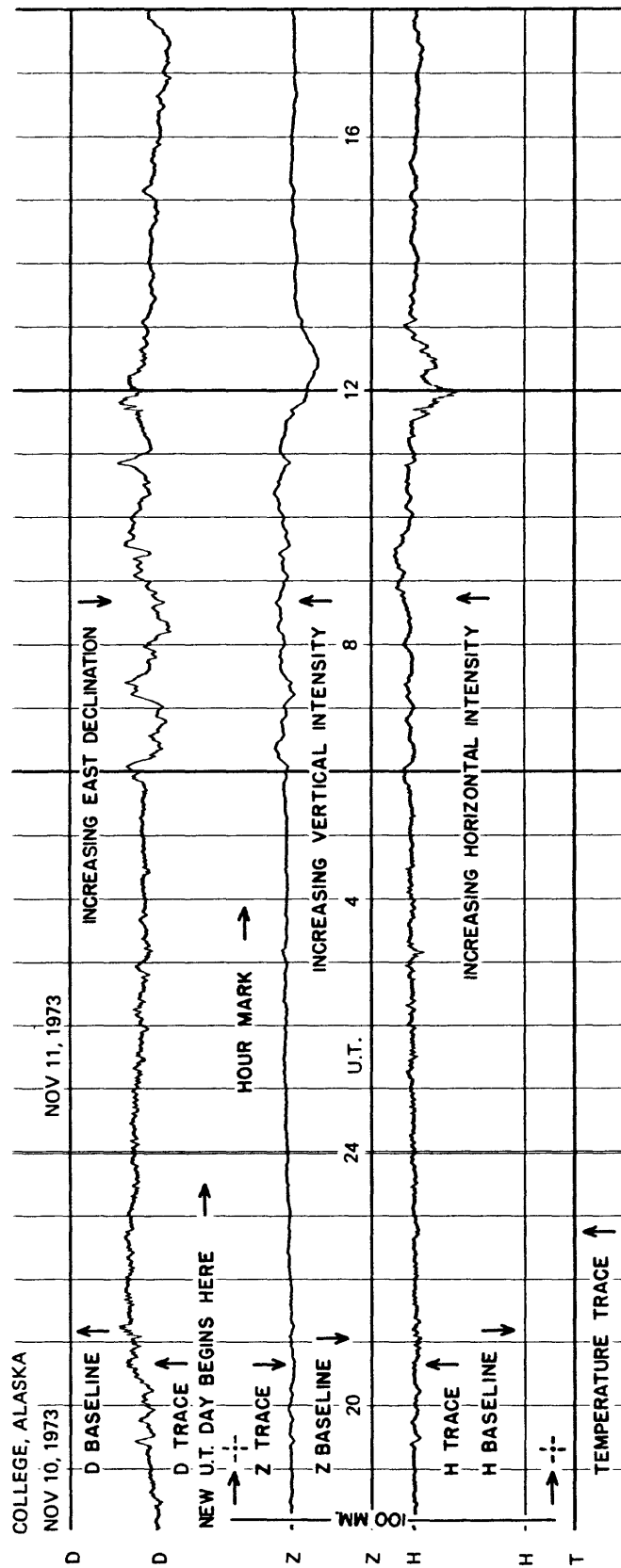
DAYS USED: JAN 2, 3, 4, 6, 19,

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	A _k	2	3	4	6	10	19	2	3	4	6	10	19	2	3	4	6	10	19	DAY	A _k
HOUR		01	02	04	10	120	118	232	241	230	241	239	239	204	190	185	204	196	195	HOUR	
02	03	153	152	126	159	130	138	238	241	235	241	241	241	199	193	185	204	196	195	02	03
04	05	160	160	128	150	138	138	241	242	247	249	234	234	199	190	185	205	194	194	04	05
06	07	164	160	119	153	112	112	250	247	256	246	260	260	199	189	193	205	196	196	06	07
08	09	160	160	120	121	120	120	250	242	262	270	261	261	198	190	208	220	213	213	08	09
10	11	155	160	122	145	119	119	256	243	270	260	300	300	206	190	213	237	213	213	10	11
12	13	170	161	122	121	121	121	255	248	272	300	286	286	205	189	240	213	211	211	12	13
14	15	156	160	179	100	149	149	256	251	261	320	301	301	200	188	217	134	240	240	14	15
16	17	219	160	162	163	147	147	249	250	260	316	311	311	210	187	192	134	217	217	16	17
18	19	209	160	162	140	110	110	247	250	255	321	332	332	166	186	187	152	200	200	18	19
20	21	163	169	160	197	169	169	226	245	251	211	320	320	154	182	186	126	164	164	20	21
22	23	200	171	170	153	168	168	170	250	249	111	266	266	159	184	187	166	206	206	22	23
24	25	180	171	194	233	188	188	102	249	248	154	251	251	183	184	183	170	199	199	24	25
26	27	185	182	183	183	187	187	150	250	254	288	242	242	160	177	178	164	176	176	26	27
28	29	169	177	170	167	180	180	240	252	255	260	233	233	150	180	180	210	173	173	28	29
30	31	161	170	170	170	181	181	260	253	255	241	219	219	168	180	181	211	164	164	30	31
32	33	171	177	180	192	200	200	264	250	259	234	186	186	194	183	183	210	146	146	32	33
34	35	189	160	188	200	178	178	251	259	260	231	243	243	190	184	180	206	160	160	34	35
36	37	200	187	197	210	189	189	246	251	257	230	250	250	183	193	182	203	159	159	36	37
38	39	193	199	210	204	181	181	222	250	251	223	257	257	176	190	185	199	160	160	38	39
40	41	161	200	201	211	180	180	209	240	249	220	261	261	143	185	181	197	164	164	40	41
42	43	141	199	189	200	155	155	221	233	240	223	257	257	140	189	181	196	162	162	42	43
44	45	150	180	180	190	152	152	232	230	232	222	252	252	165	185	181	195	172	172	44	45
46	47	150	161	165	171	151	151	228	224	250	222	239	239	178	187	174	196	180	180	46	47
DAILY SUM		4114	4082	3917	4053	3723	3723	5495	5889	6058	5832	6241	6241	4329	4475	4547	4549	4475	4475	DAILY SUM	
DAILY MEAN		171	170	163	169	155	155	229	245	252	243	260	260	180	186	189	190	186	186	DAILY MEAN	
MEAN		166						246						186						MEAN	

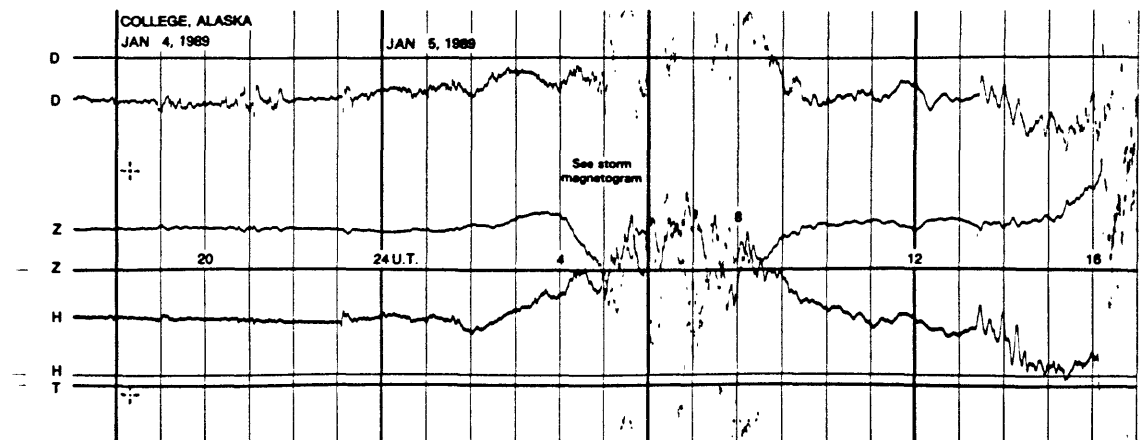
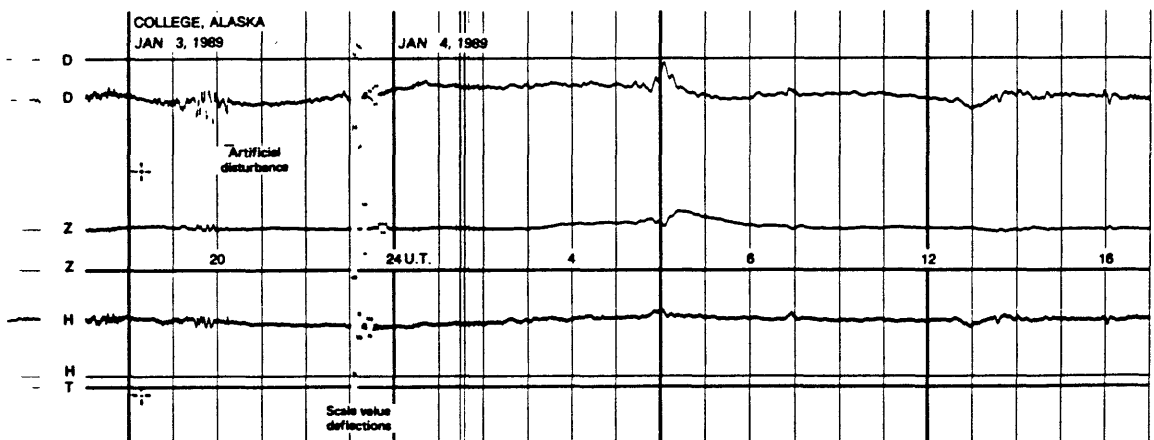
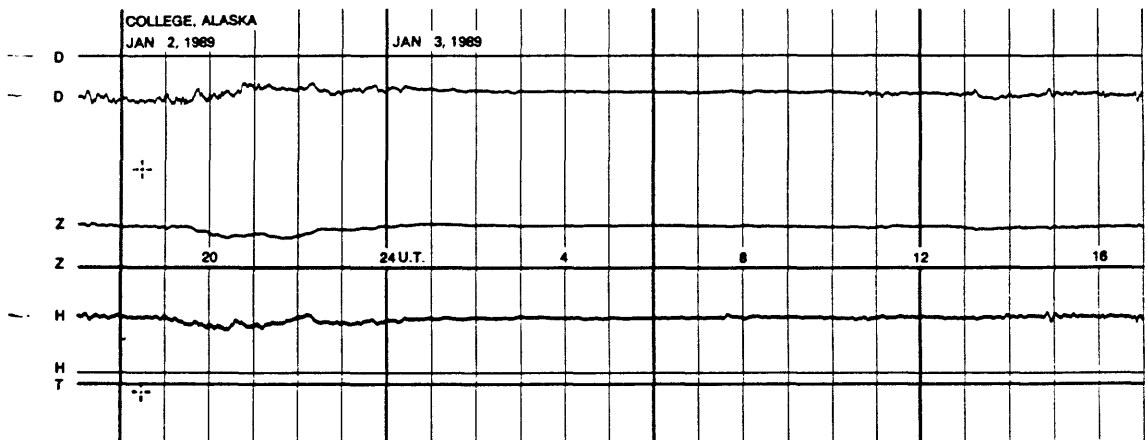
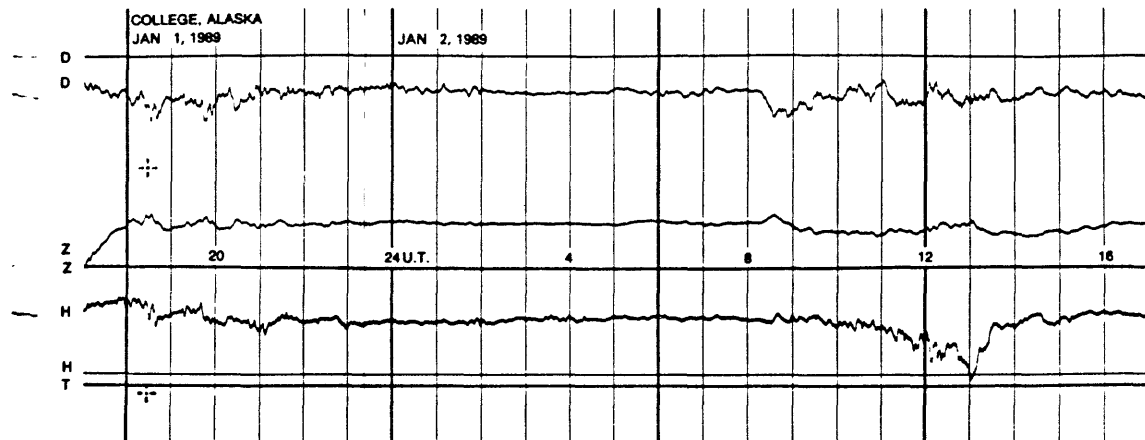
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



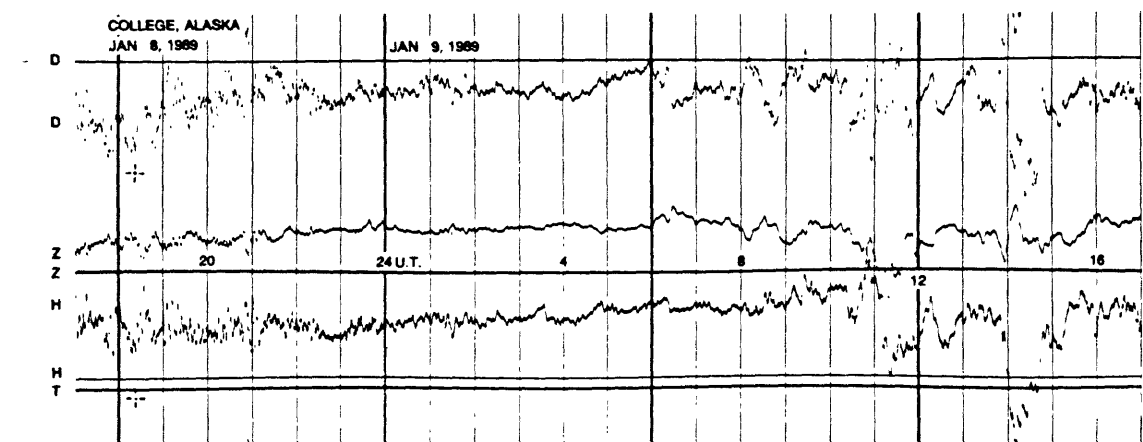
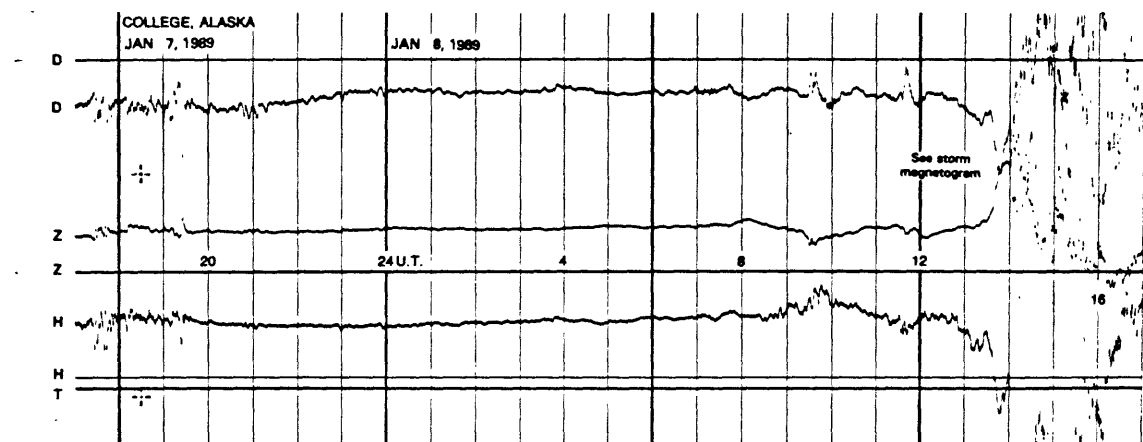
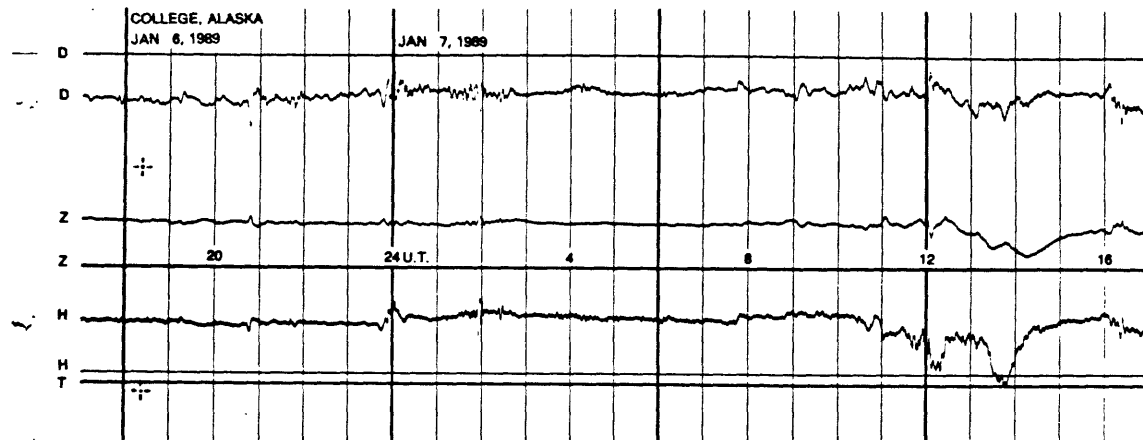
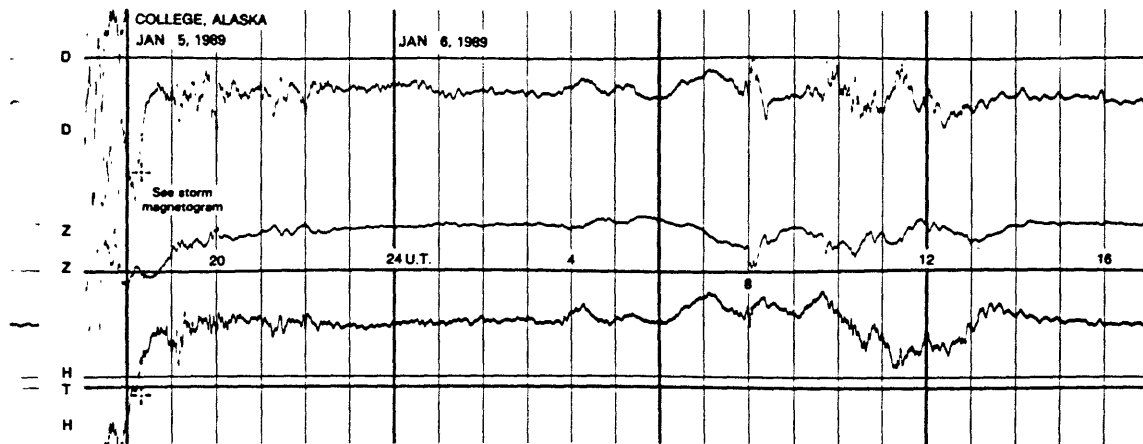
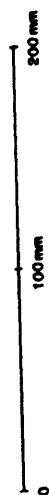
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

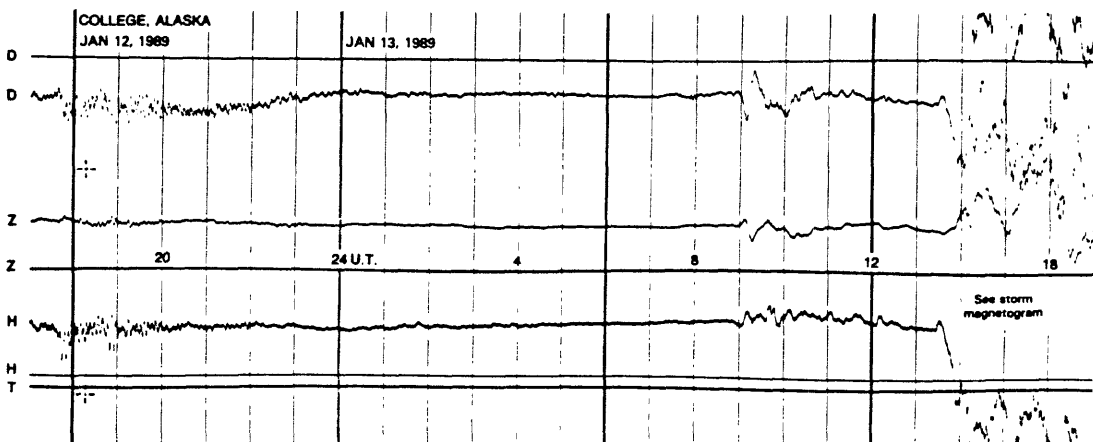
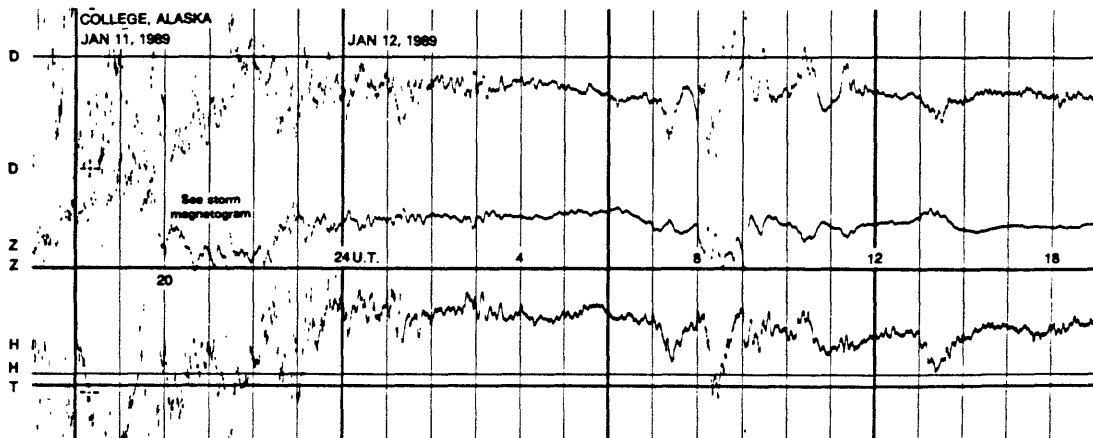
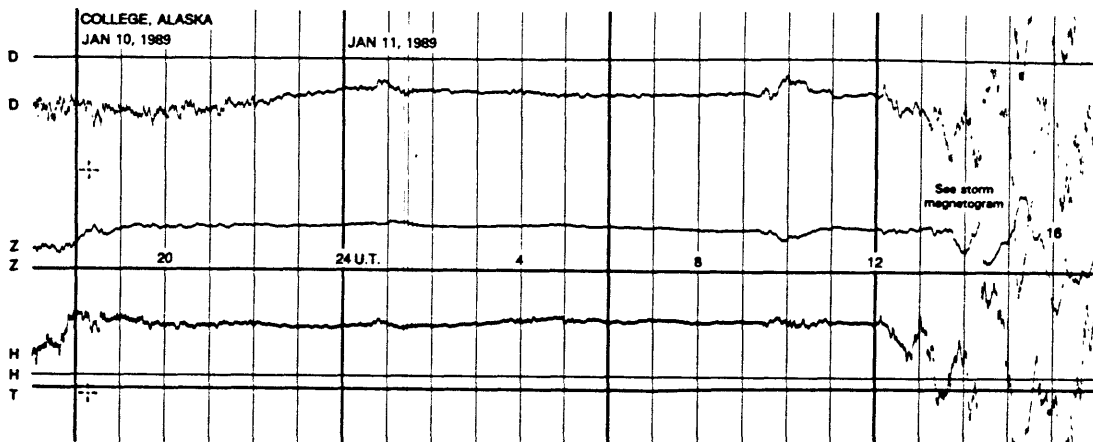
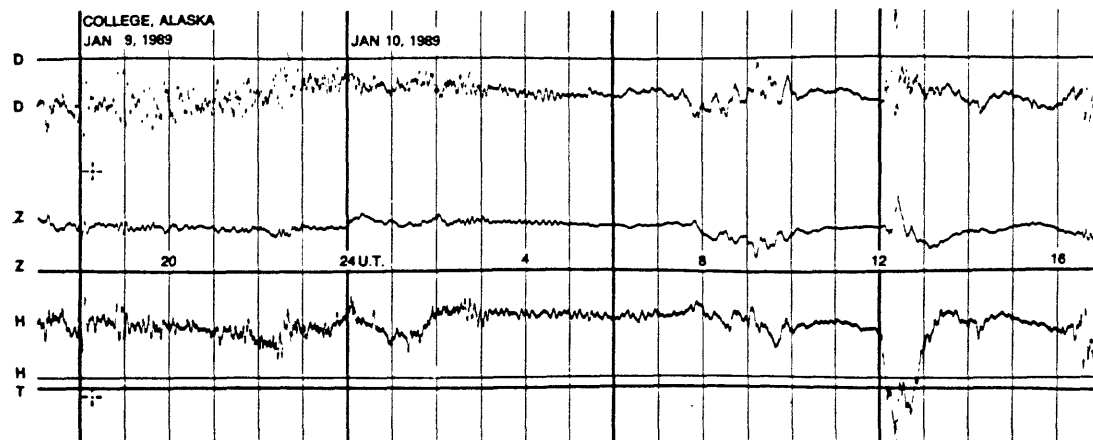
200 mm
100 mm
0



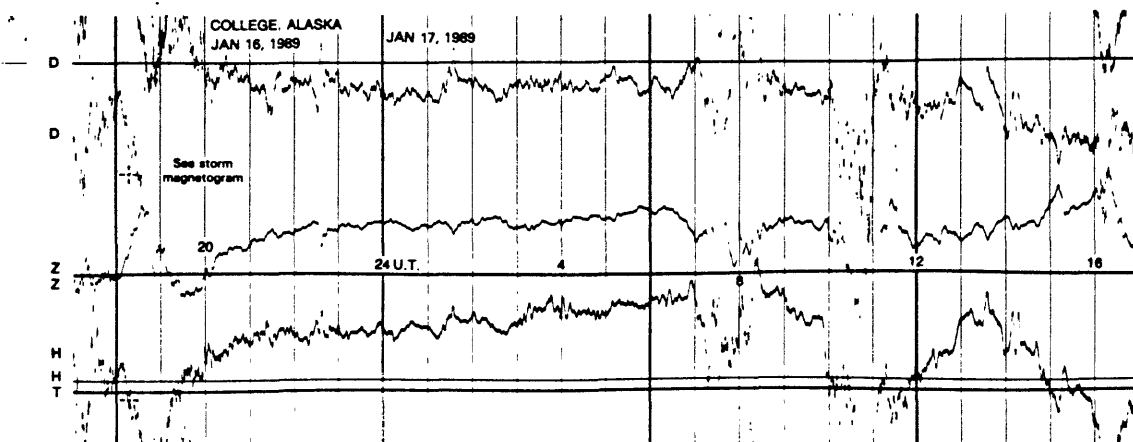
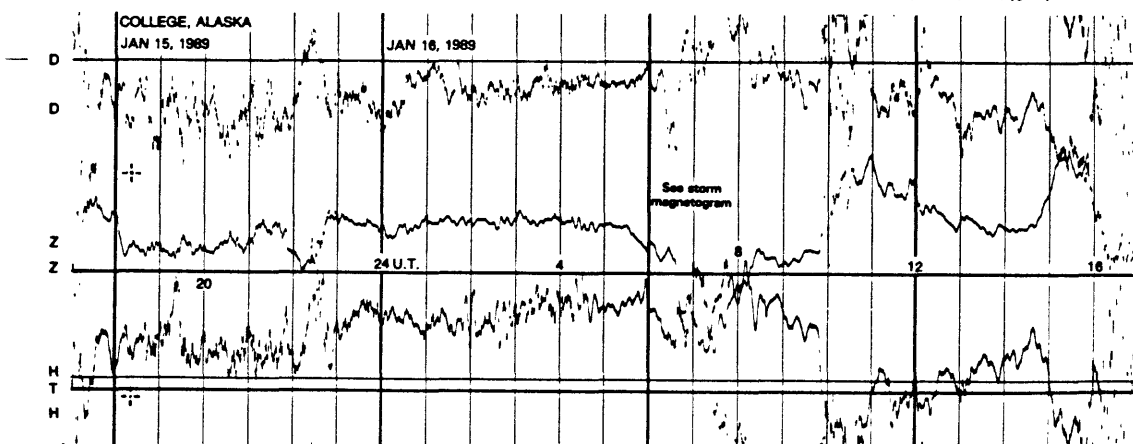
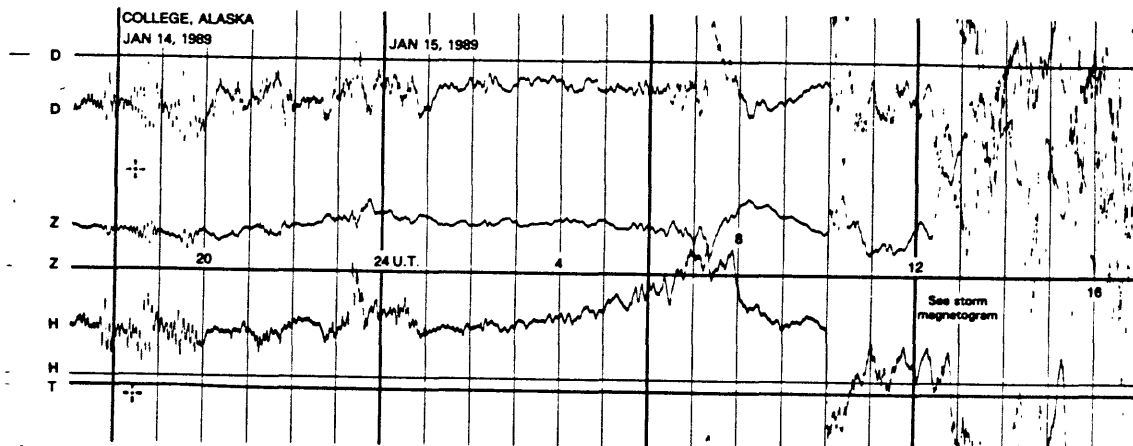
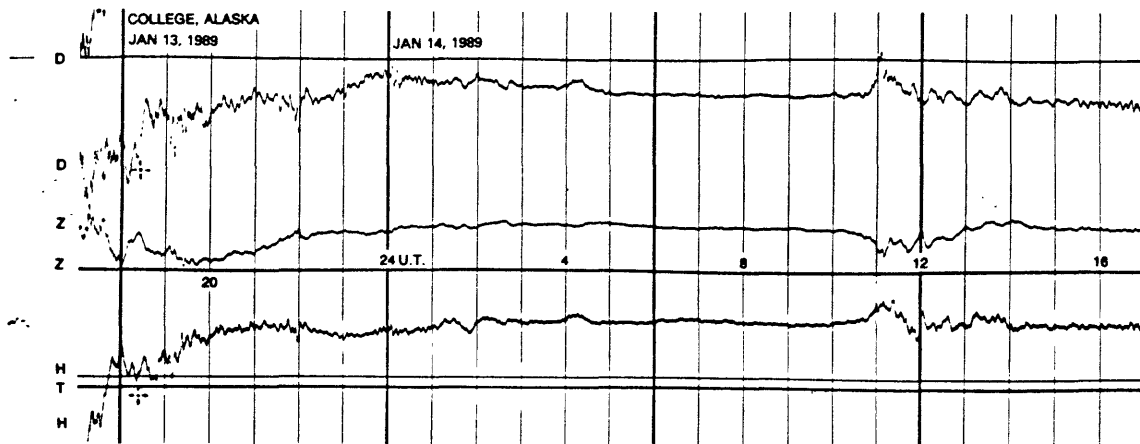
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

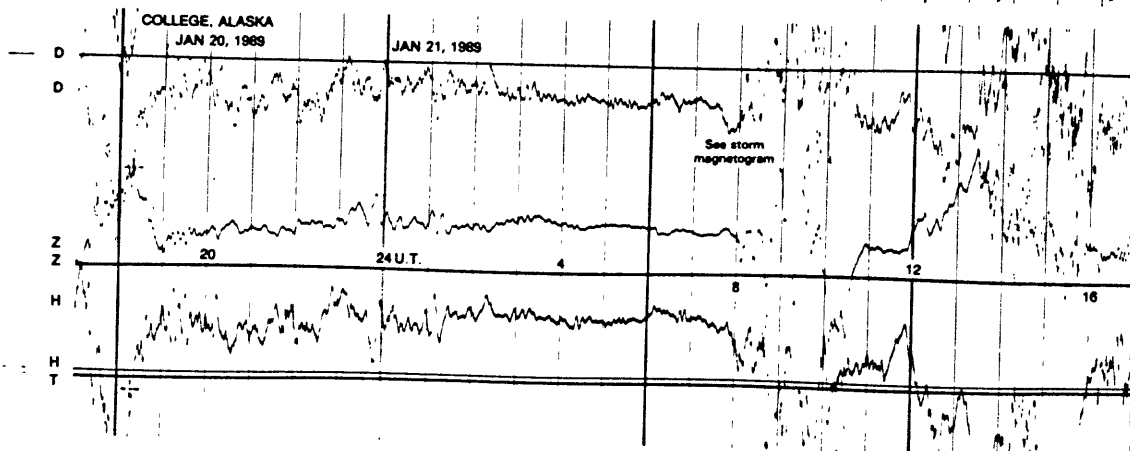
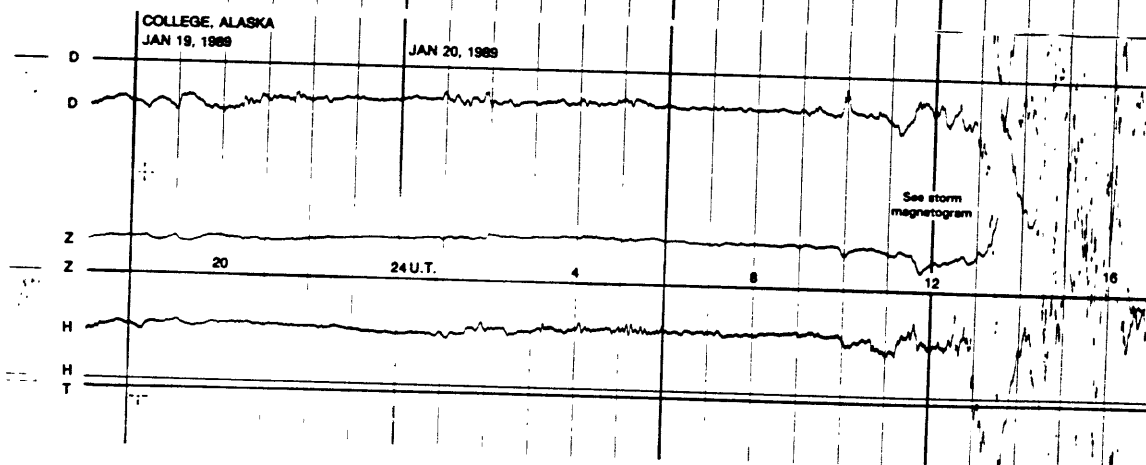
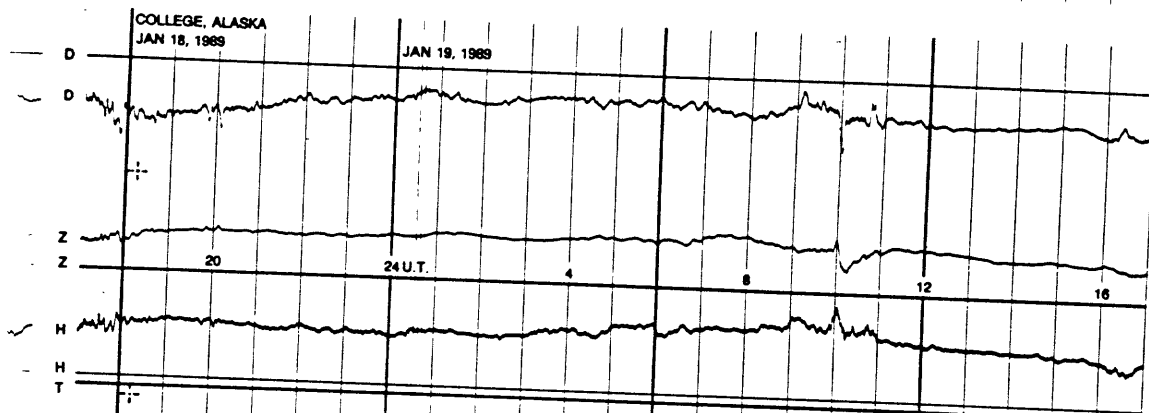
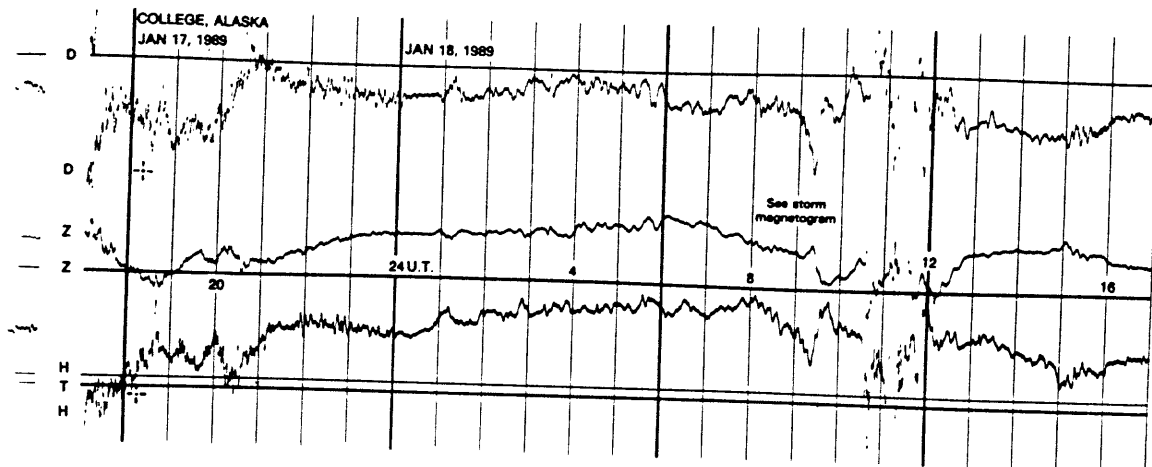


NORMAL MAGNETOGRAMS

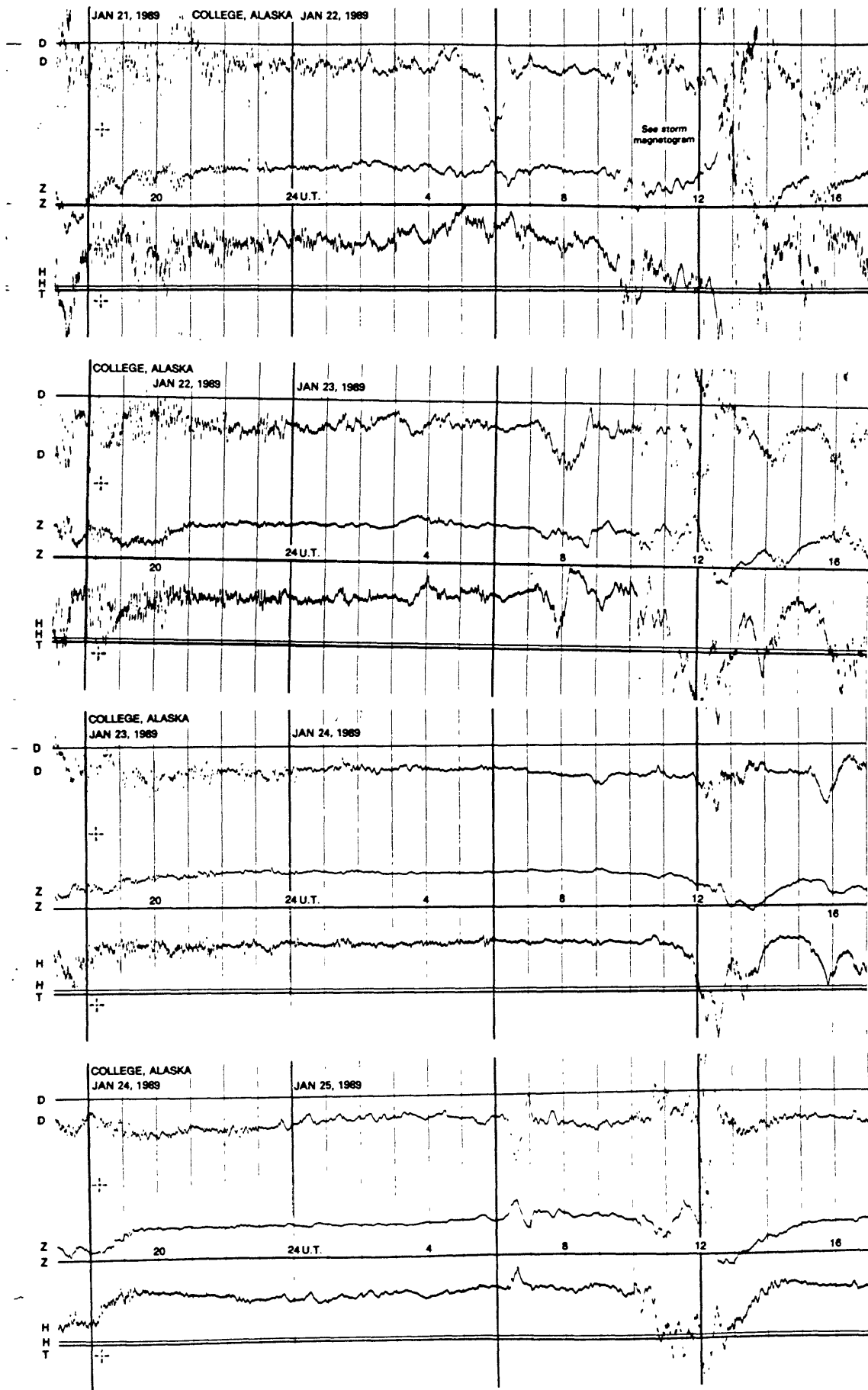
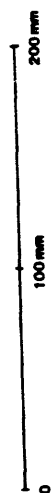


NORMAL MAGNETOGRAMS

200 mm
100 mm
0

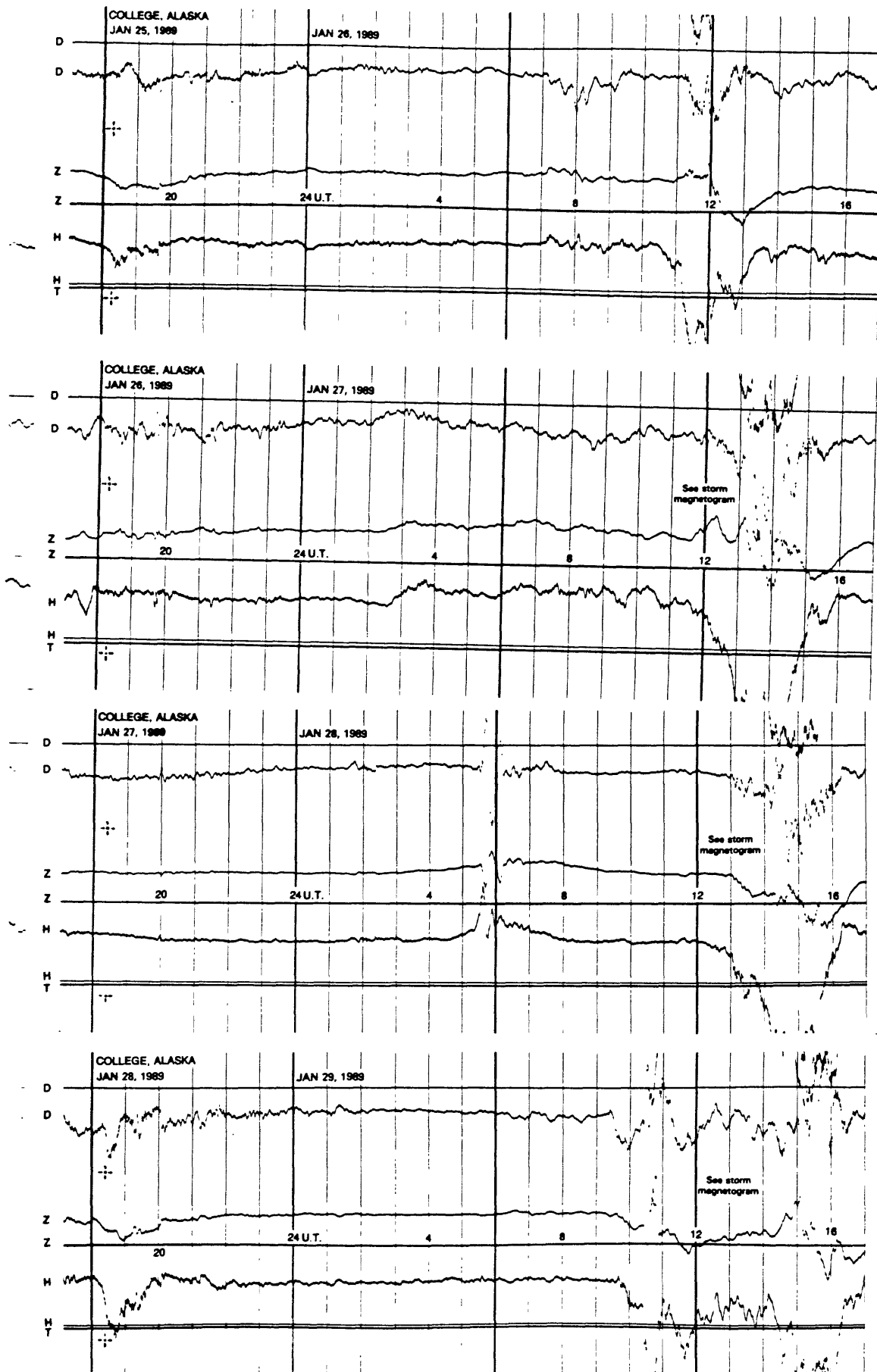


NORMAL MAGNETOGRAMS

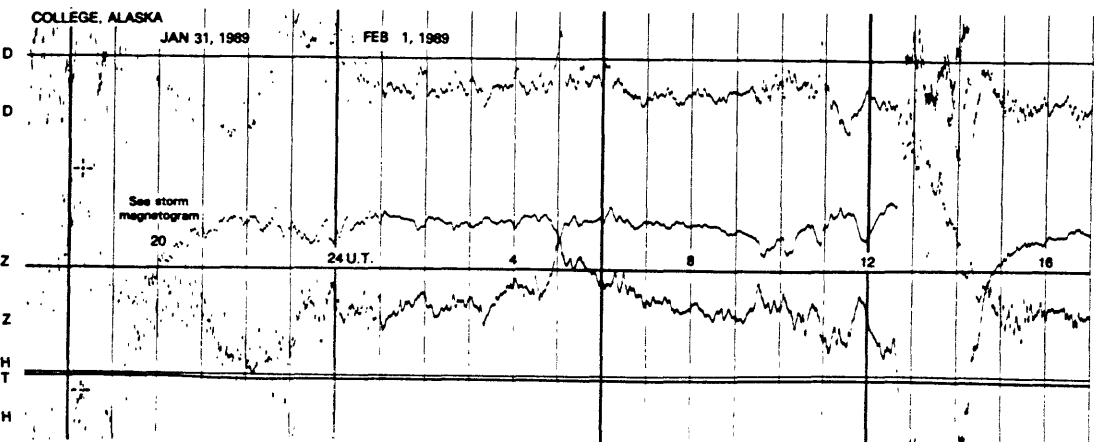
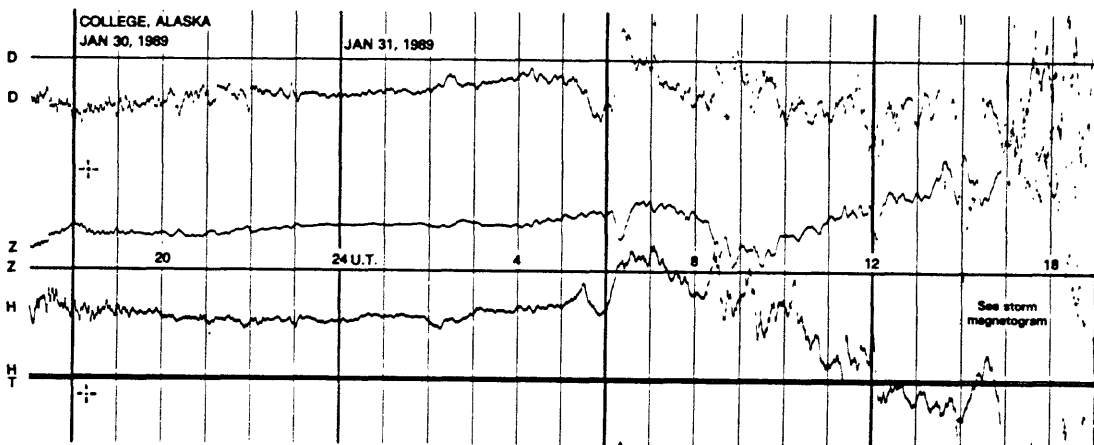
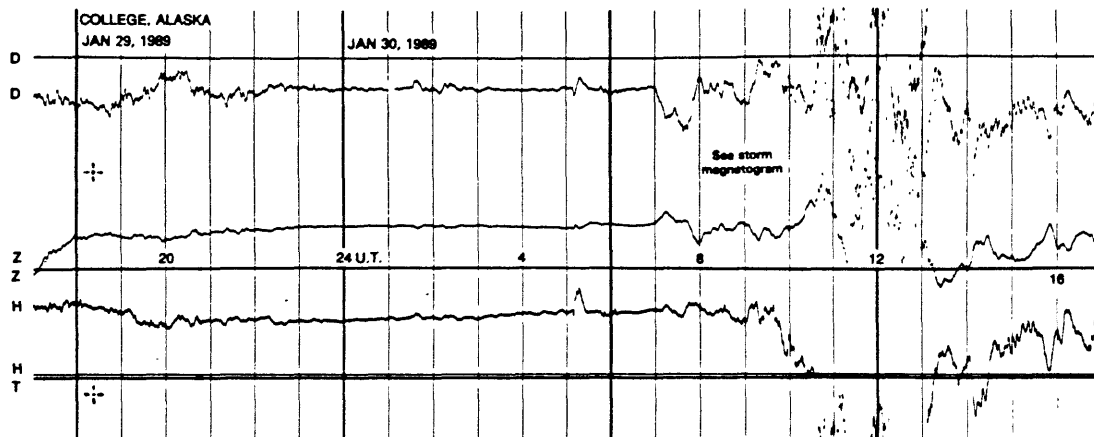


NORMAL MAGNETOGRAMS

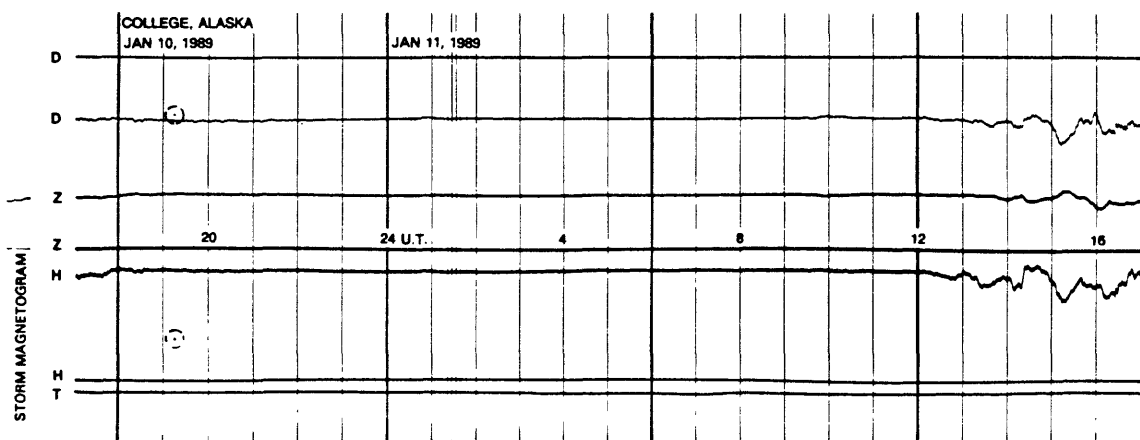
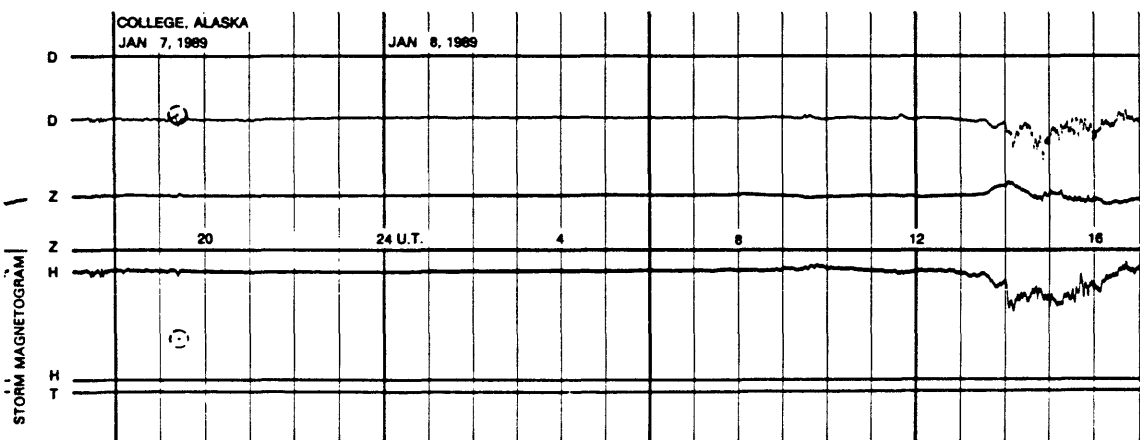
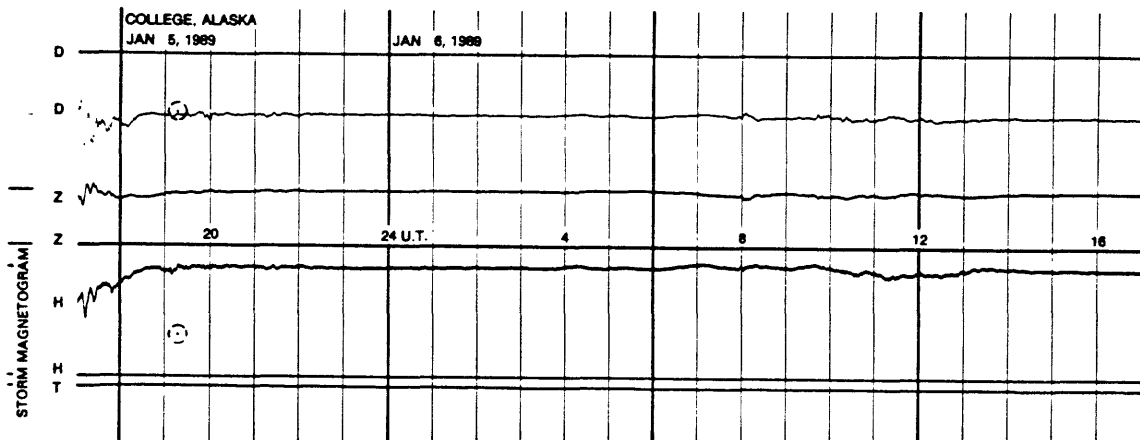
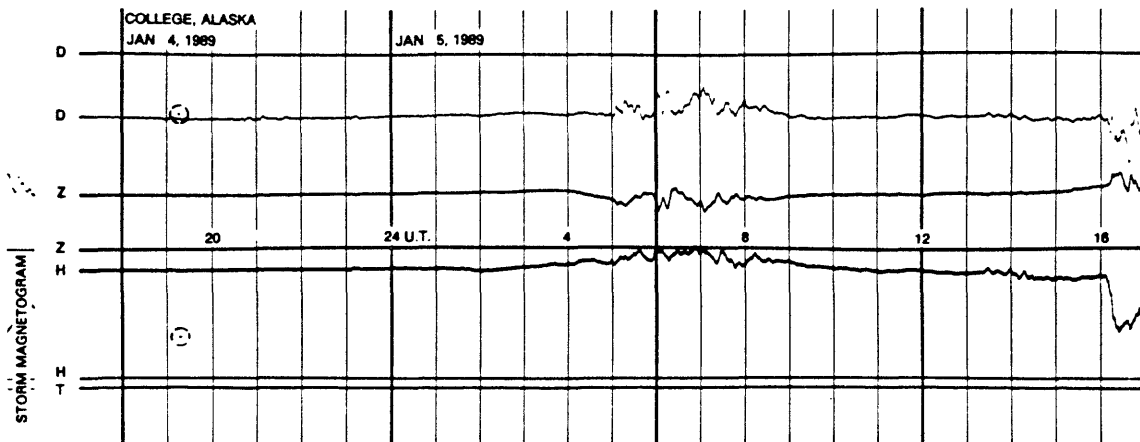
200 mm
100 mm
0



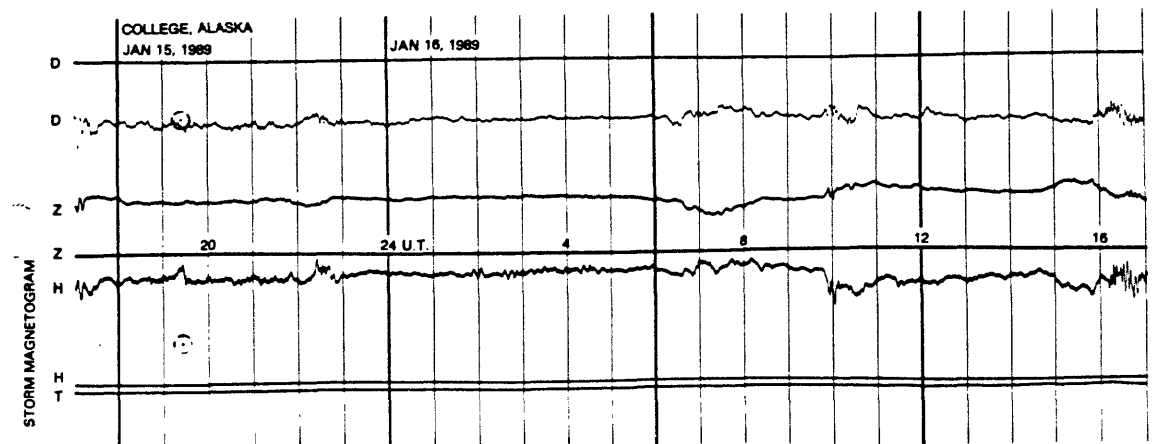
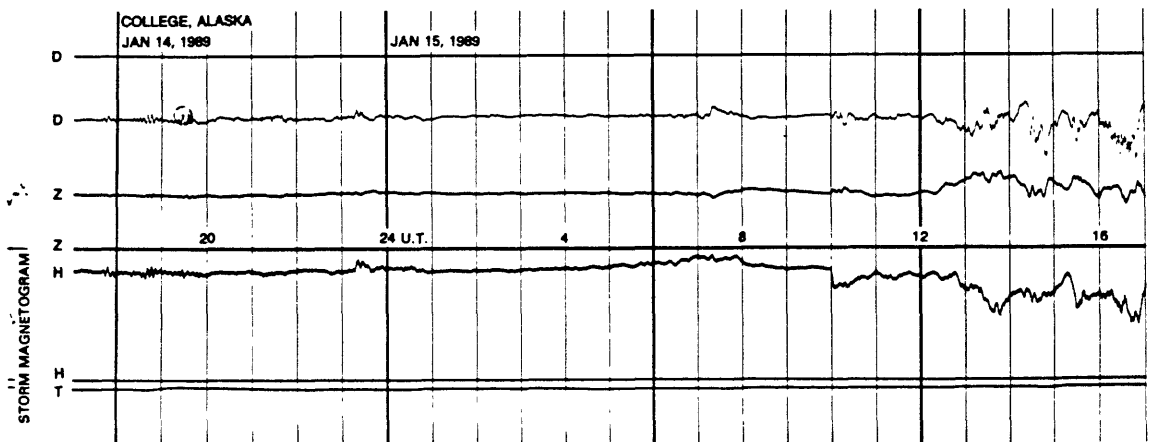
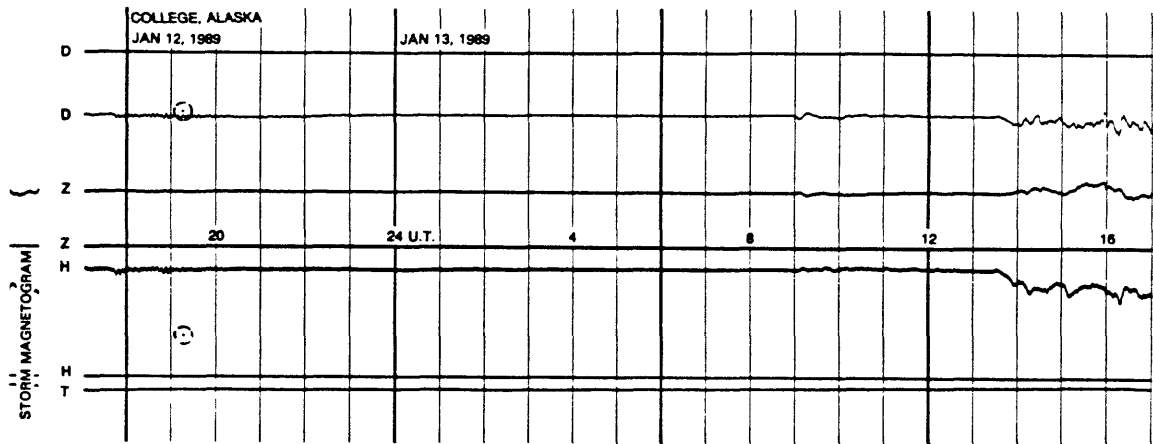
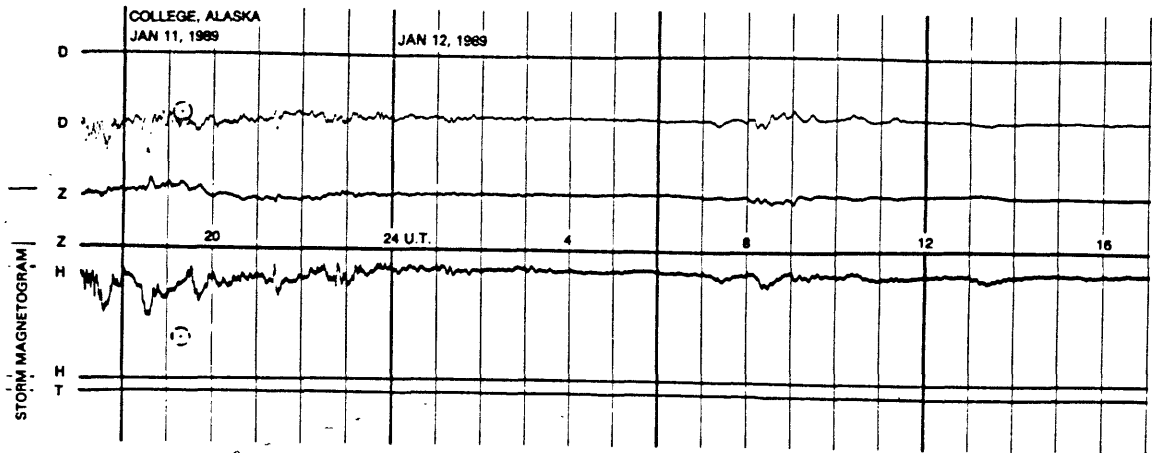
NORMAL MAGNETOGRAMS



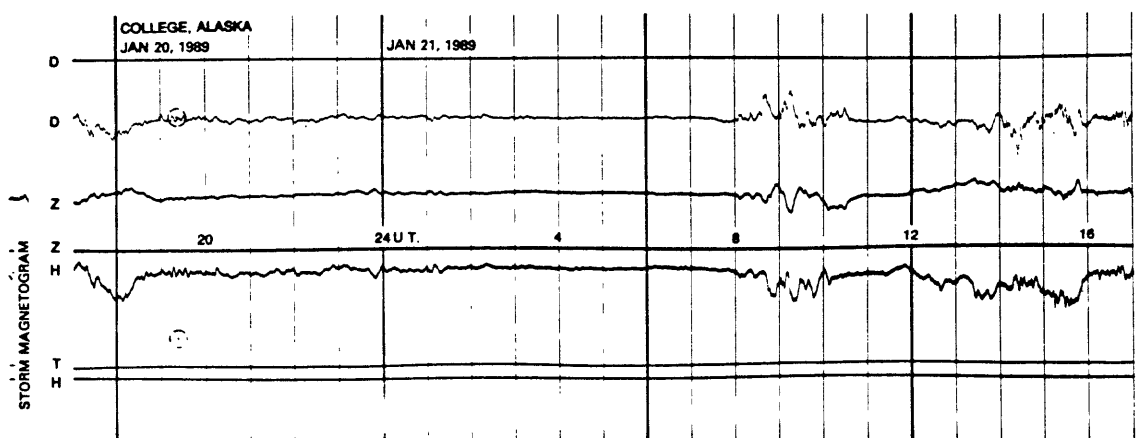
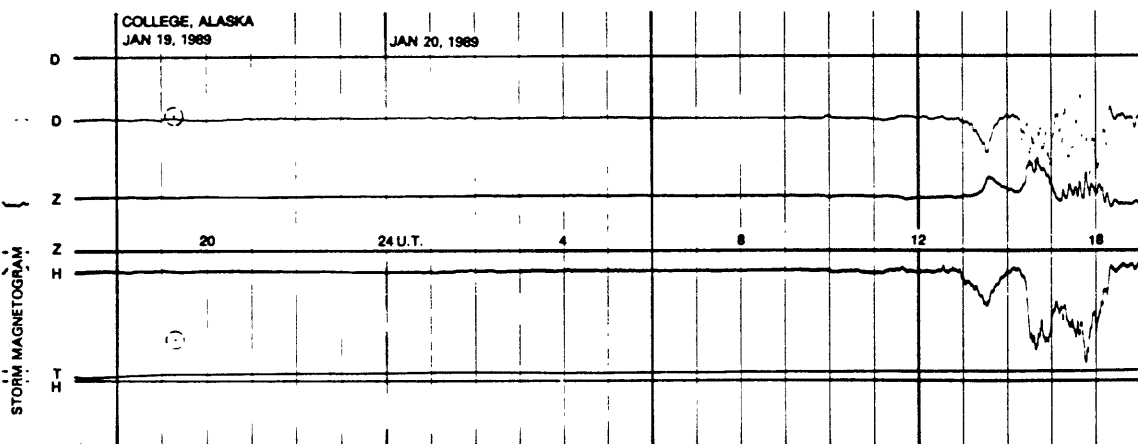
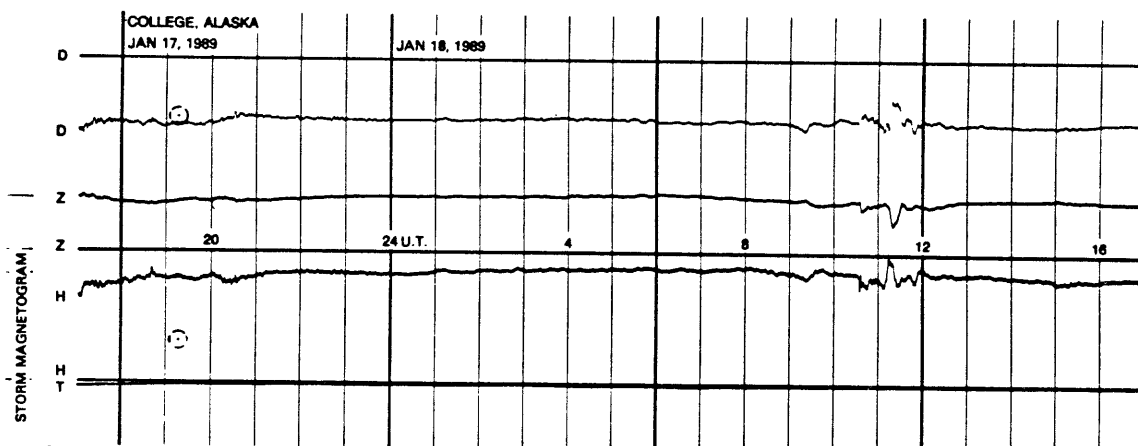
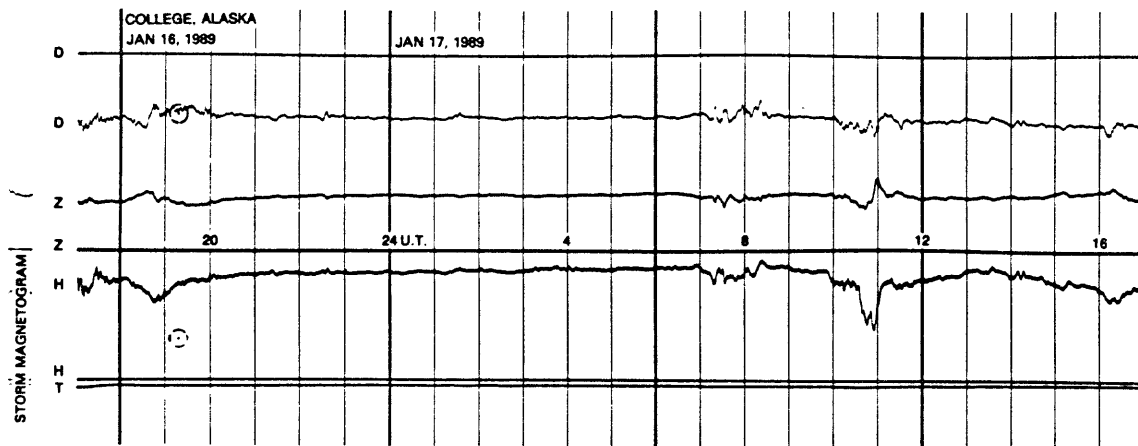
STORM MAGNETOGRAMS



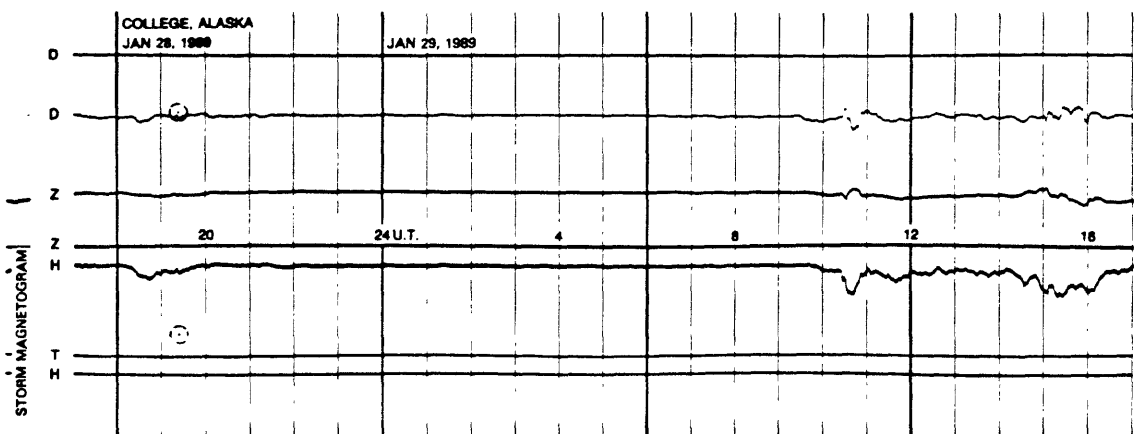
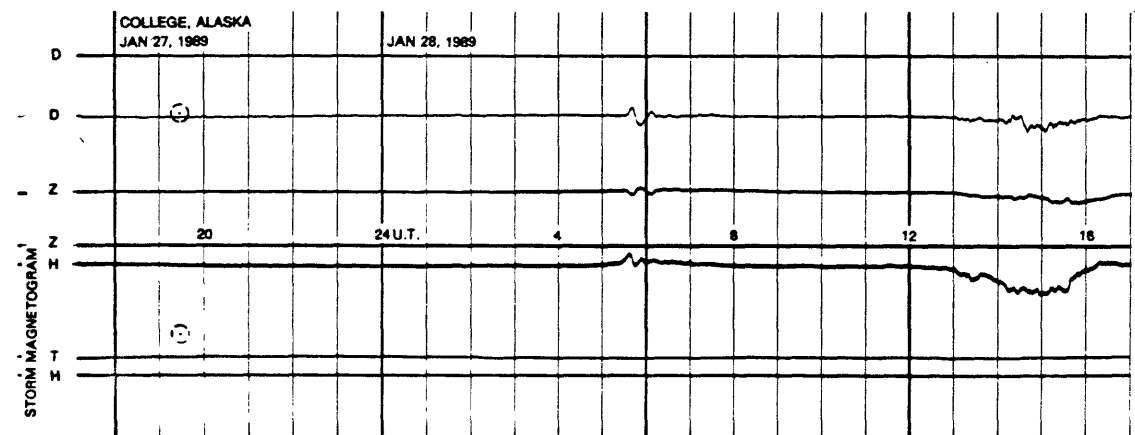
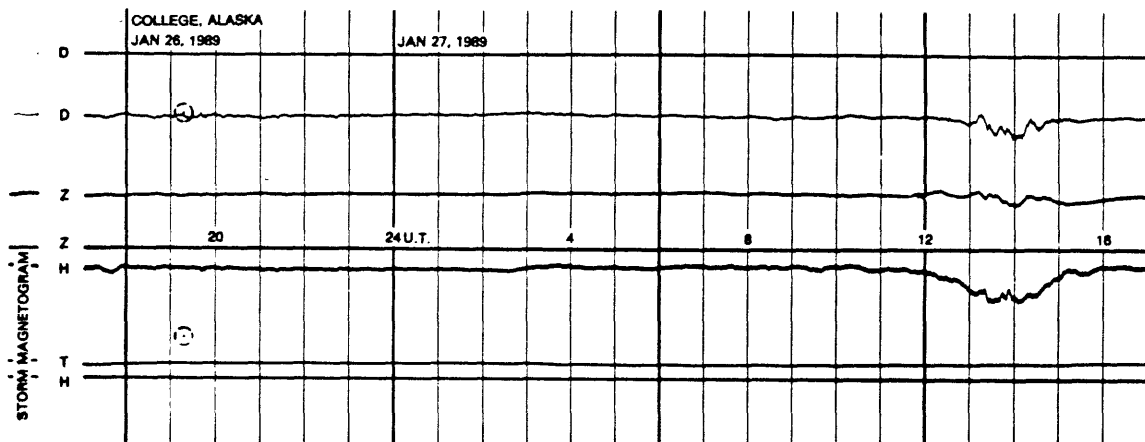
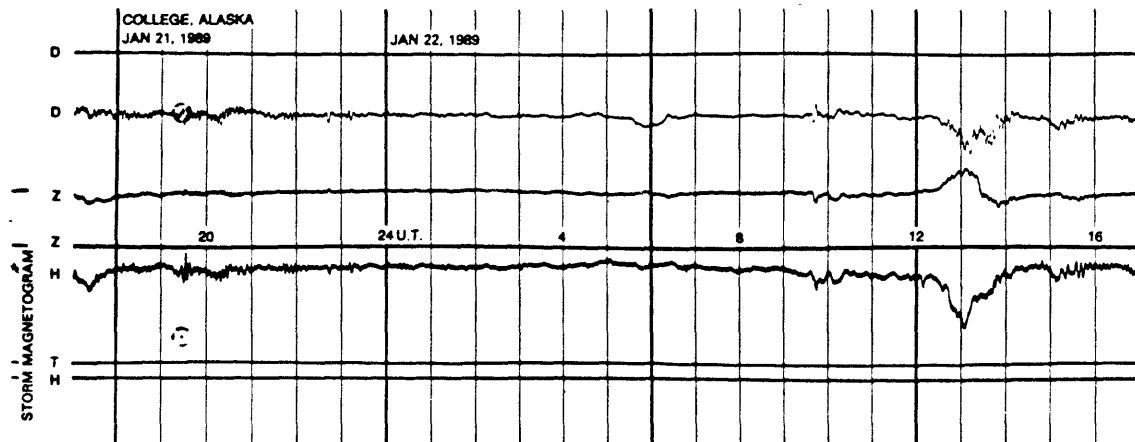
STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

