

# UNITED STATES DEPARTMENT OF THE INTERIOR

## GEOLOGICAL SURVEY

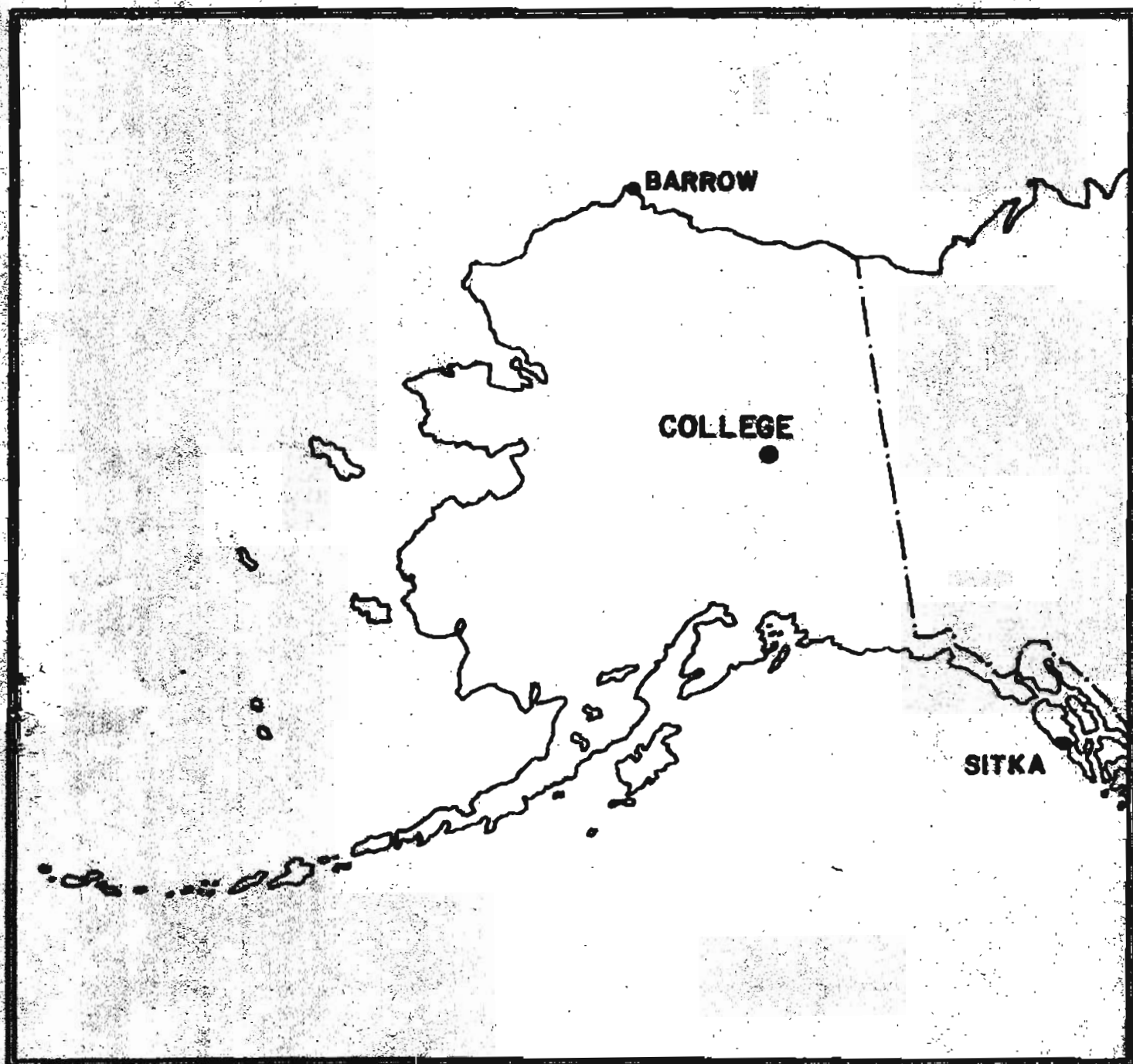
### PRELIMINARY GEOMAGNETIC DATA

### COLLEGE OBSERVATORY

### FAIRBANKS, ALASKA

DECEMBER 1988

OPEN FILE REPORT 88-0300L



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 L.Y. TORRENCE 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 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 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:

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 (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 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:

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

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.



PRINCIPAL MAGNETIC STORMS  
COLLEGE OBSERVATORY, COLLEGE, ALASKA  
December 1988

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

Data from Individual Observatories:

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	64.96 N	16	11 XX	..				16	6	7	205	1100	560	17 02
		17	07 XX	..				17	4	8	228	1740	590	17 15
		17	18 24	sc*	+58	+319	+14	17	7	7	156	1300	590	19 21

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 12/1/88	2400 UT, 12/31/88	1.0' /mm	3.7 γ/mm	26° 51.2' E
H	0001 UT, 12/1/88	2400 UT, 12/12/88	7.8 γ/mm		12620 γ
	0001 UT, 12/13/88	2400 UT, 12/24/88	(SAME)		12622 γ
	0001 UT, 12/25/88	2400 UT, 12/31/88	(SAME)		12624 γ
Z	0001 UT, 12/1/88	2400 UT, 12/8/88	7.7 γ/mm		55174 γ
	0001 UT, 12/9/88	2400 UT, 12/14/88	(SAME)		55173 γ
	0001 UT, 12/15/88	2400 UT, 12/31/88	(SAME)		55172 γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 12/1/88	2400 UT, 12/31/88	7.9' /mm	29.5 γ/mm	
H	(SAME)	(SAME)	43.5 γ/mm		
Z	(SAME)	(SAME)	49.3 γ/mm		

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D					
H					
Z					

MONTHLY MEAN ABSOLUTE VALUES\*

D	H	Z
27° 08.8' E	12812 γ	55306 γ

\* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DATE USED: DEC 6, 7, 8, 9, 23

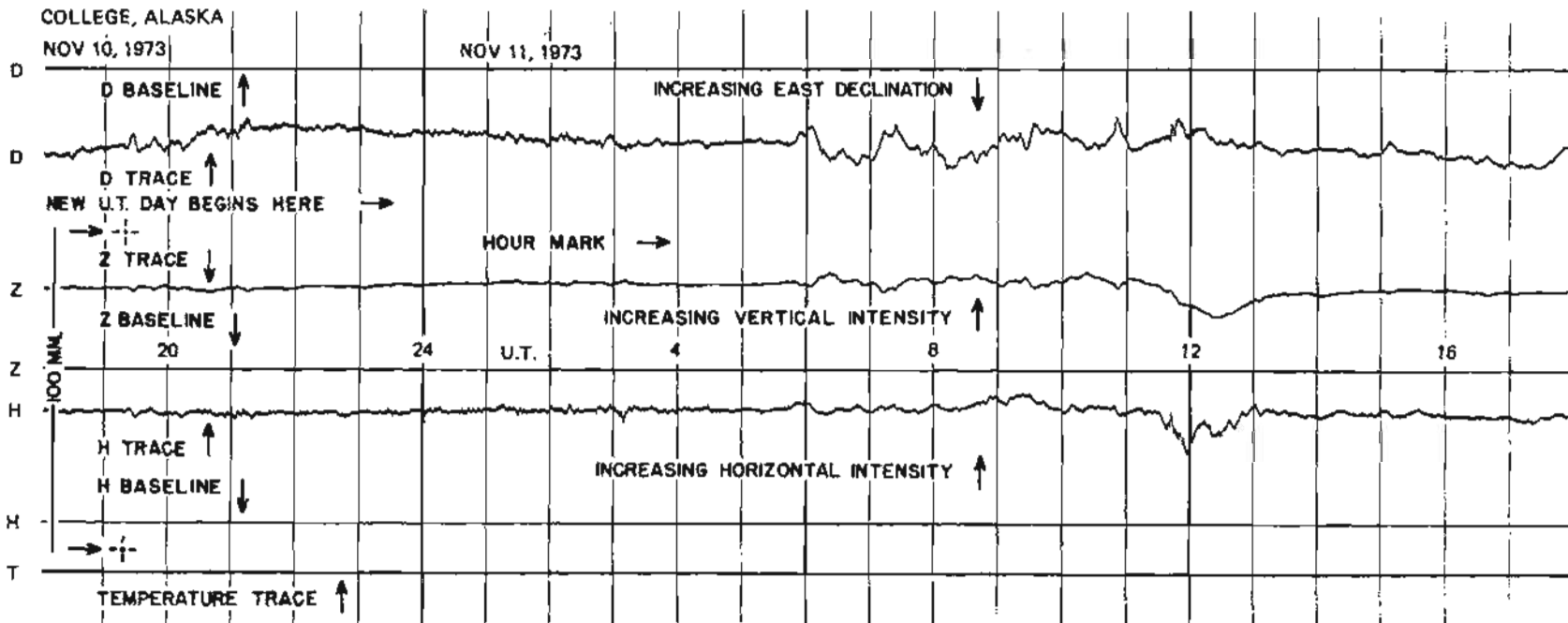
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS  
(UNIVERSAL TIME)

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						7						8						9						23						6						7						8						9						01						23																																																																																																																																																																																																																																																																																																																																																																																															
	02						02						02						01						01						02						02						01						01						01																																																																																																																																																																																																																																																																																																																																																																																																					
HOUR	01	160	176	171	163	147	150	230	239	240	244	229	193	182	181	172	207	02	164	171	161	241	243	240	252	194	180	181	174	207	03	152	169	160	246	248	242	259	194	177	183	174	174	214	04	159	169	160	240	250	250	262	195	177	186	173	173	225	05	155	167	158	248	251	249	261	196	177	196	175	175	209	06	147	162	164	250	251	251	262	205	180	197	176	176	194	07	161	162	171	259	251	259	265	214	186	194	176	176	190	08	190	166	169	269	251	255	265	215	185	189	176	176	189	09	159	170	162	270	250	251	266	205	186	188	177	177	191	10	196	170	163	246	250	250	268	184	187	185	177	177	190	11	181	194	191	225	239	242	260	149	175	164	180	180	183	12	197	240	187	216	192	257	260	162	113	164	178	172	172	13	198	212	179	212	230	264	260	156	115	173	179	184	184	14	201	180	189	229	240	251	259	150	150	170	174	185	185	15	192	158	188	241	209	250	259	163	126	155	171	185	185	16	173	182	184	249	210	205	259	168	120	130	170	185	185	17	171	195	210	248	228	160	249	172	110	62	161	186	186	18	180	186	189	251	259	258	250	174	143	124	144	187	187	19	204	200	209	260	260	259	261	179	166	160	145	187	187	20	204	201	210	251	261	262	265	178	173	165	140	187	187	21	201	192	190	250	258	257	260	173	174	160	153	187	187	22	197	190	180	249	251	252	249	173	177	164	164	186	186	23	191	189	173	241	240	241	252	176	180	170	170	185	185	24	180	179	159	239	235	234	259	179	182	170	172	185	185	DAILY SUM	4313	4380	4269	4208	4231	5860	5796	5880	6206	5761	4347	3921	4011	4051	4608	DAILY MEAN	180	182	178	175	176	244	242	245	259	240	181	163	167	169	192	MEAN	178																								246																								174																								MEAN
	DAILY SUM	4313	4380	4269	4208	4231	5860	5796	5880	6206	5761	4347	3921	4011	4051	4608	DAILY MEAN	180	182	178	175	176	244	242	245	259	240	181	163	167	169	192	MEAN	178																								246																								174																								MEAN																																																																																																																																																																																																																																																																																																																																																		
	MEAN	178																								246																								174																								MEAN																																																																																																																																																																																																																																																																																																																																																																																		

Scaled  YVO  Checked

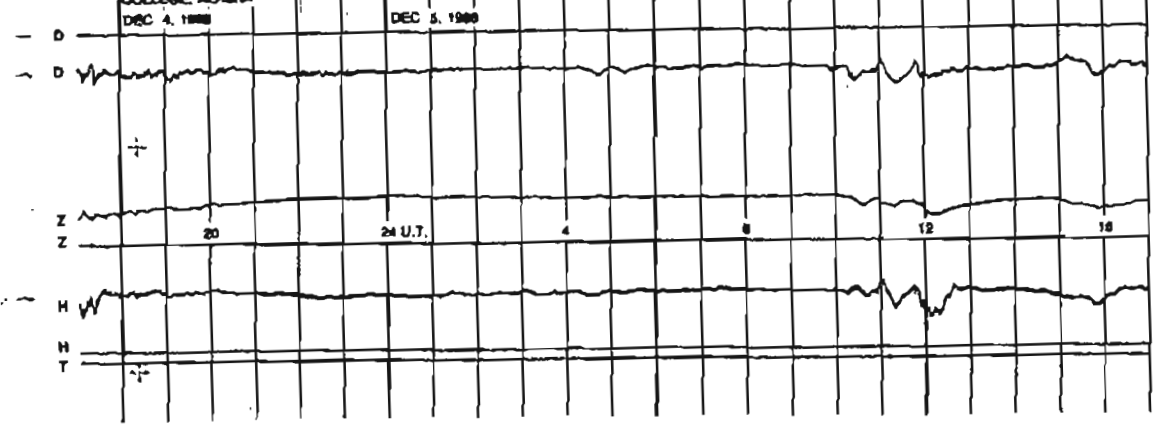
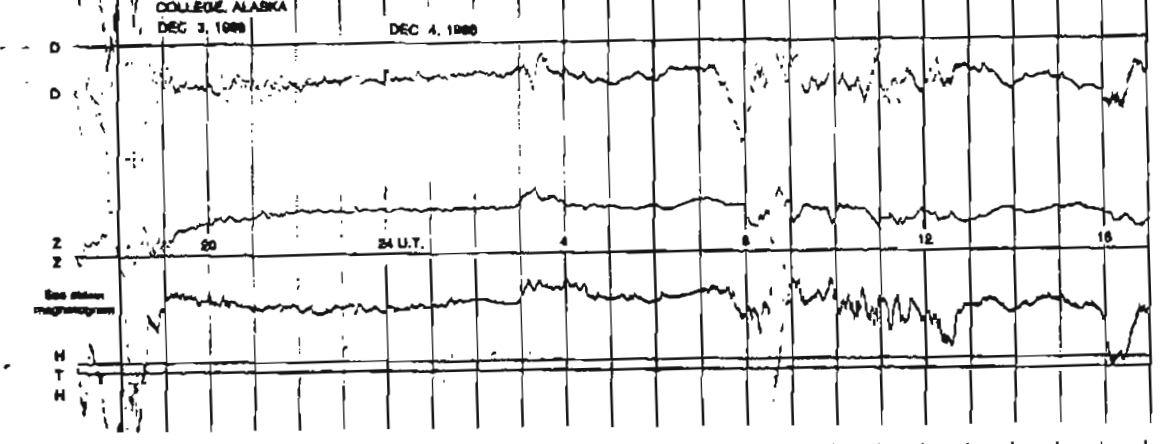
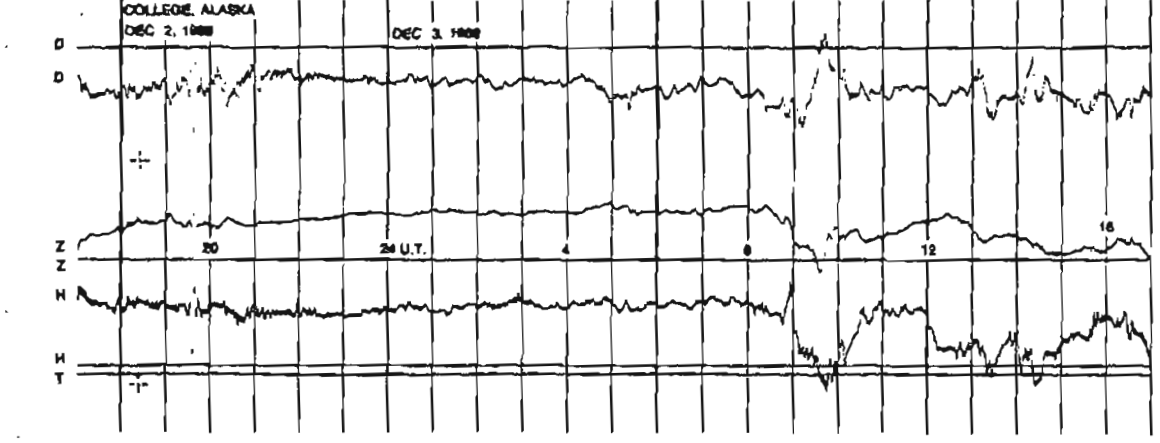
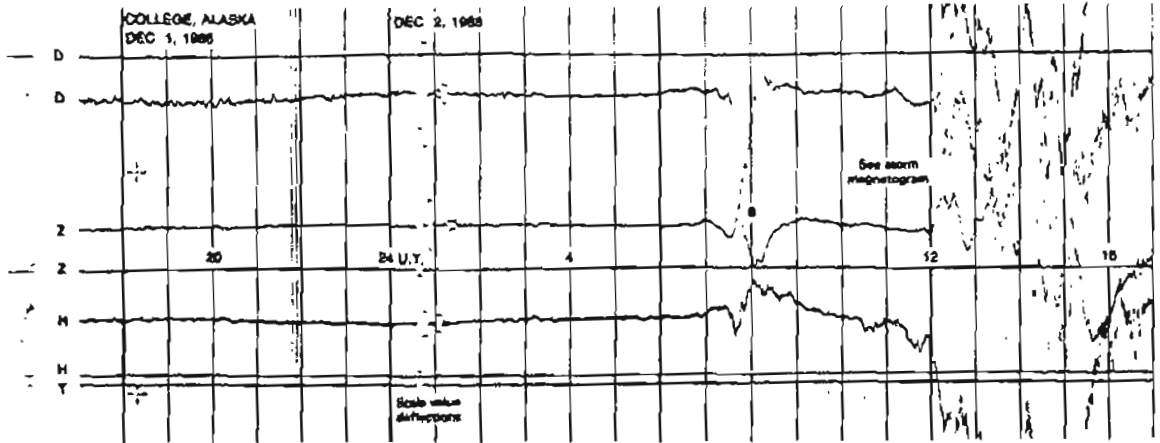
# FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



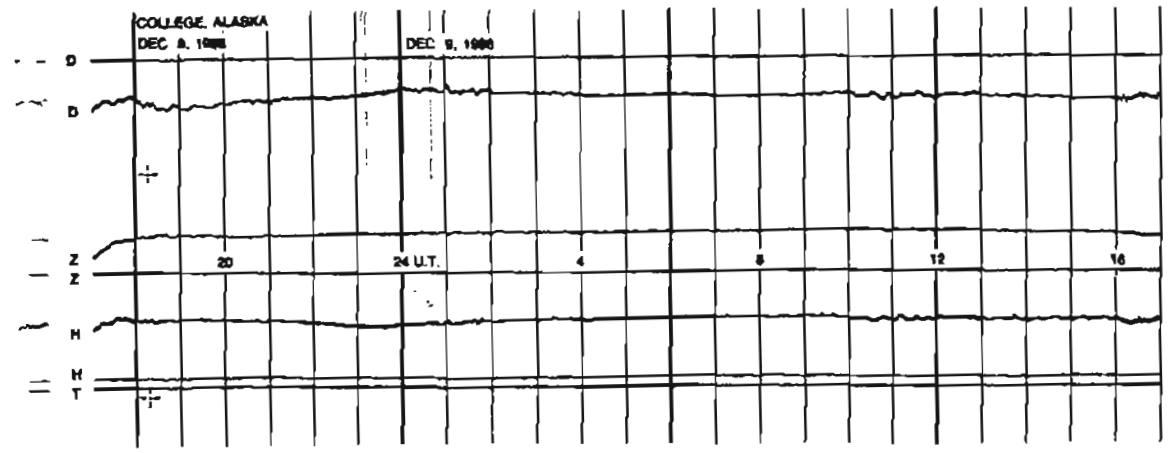
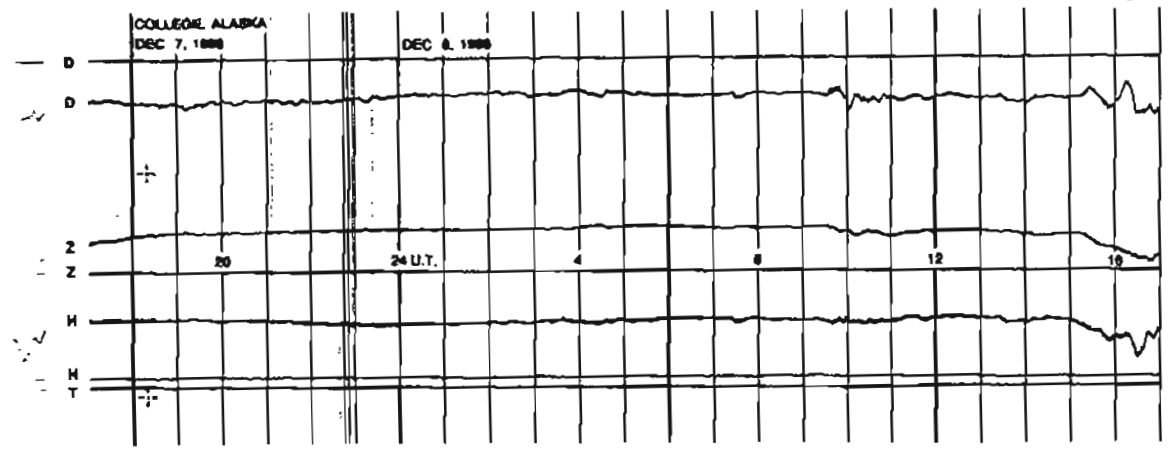
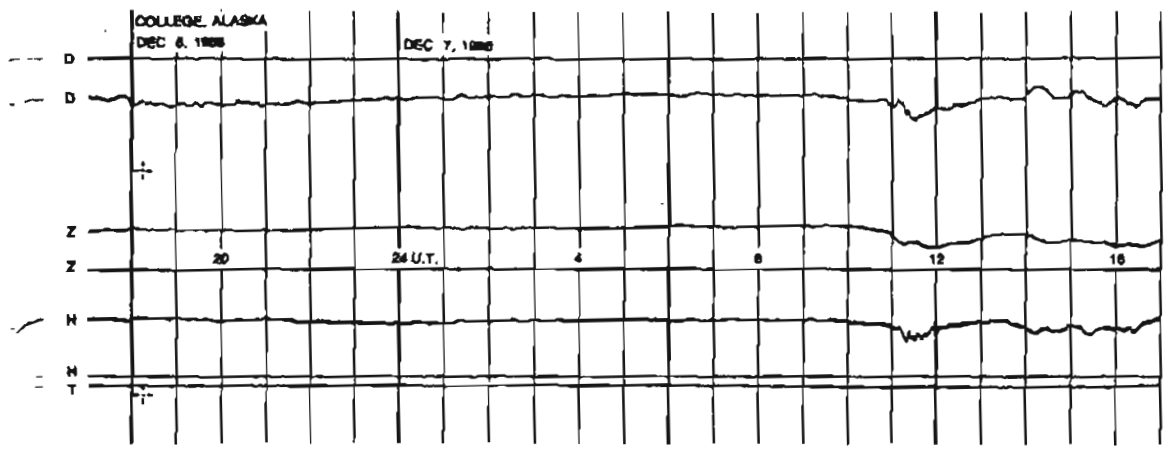
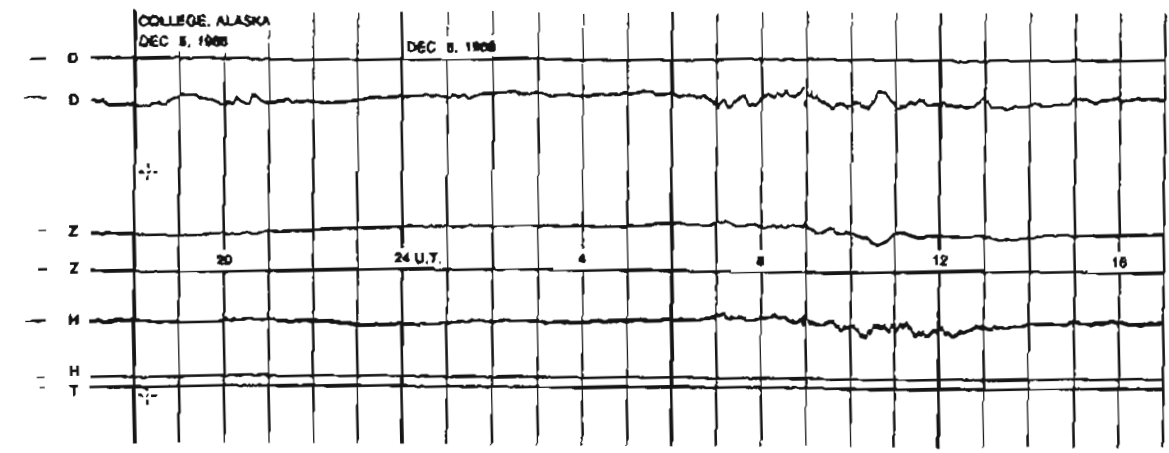
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES



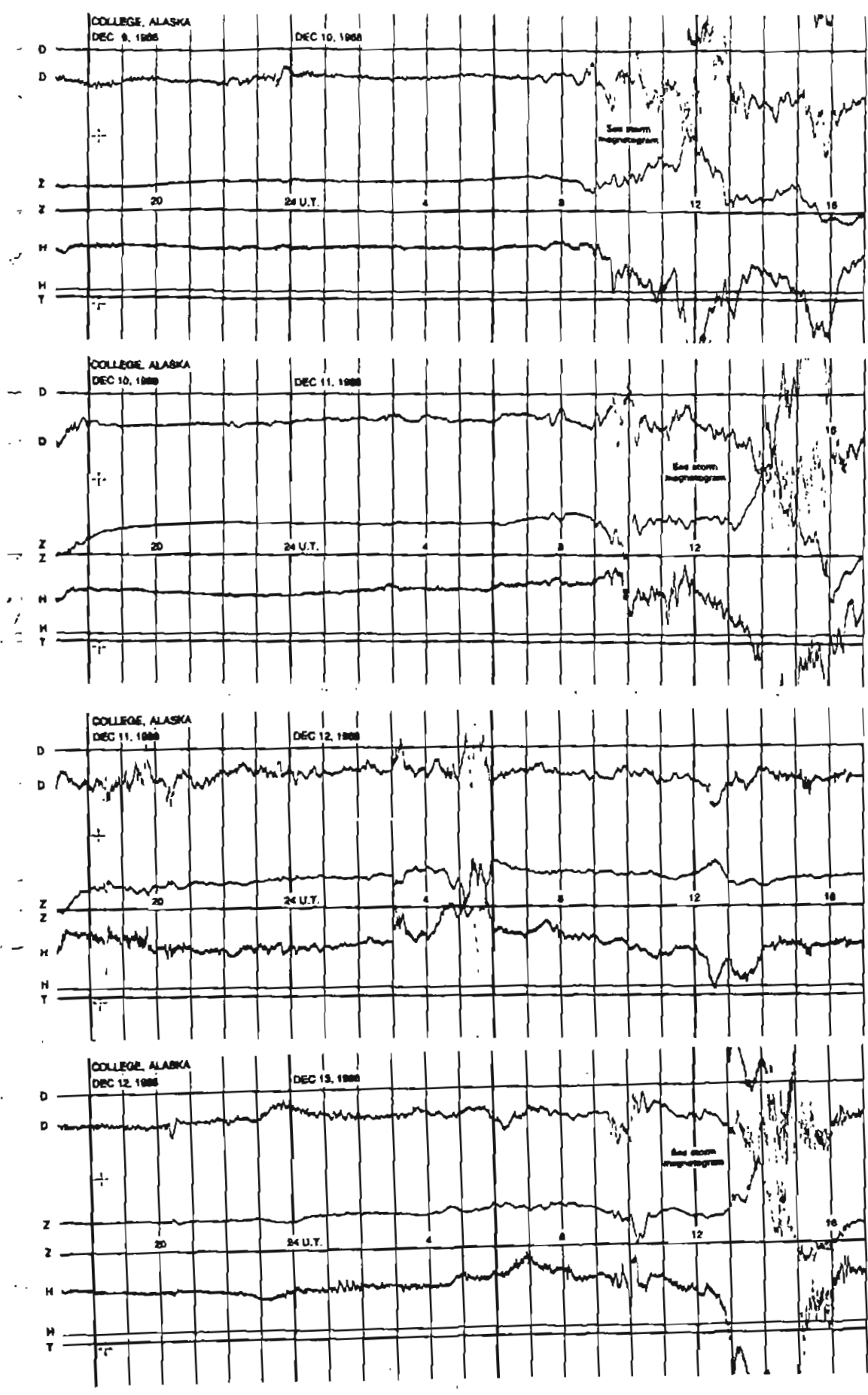
NORMAL MAGNETOGRAMS



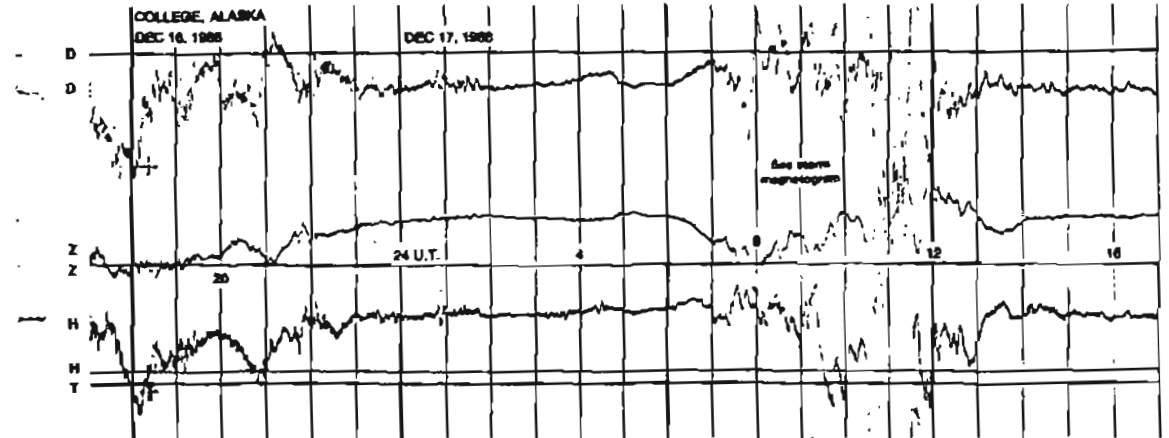
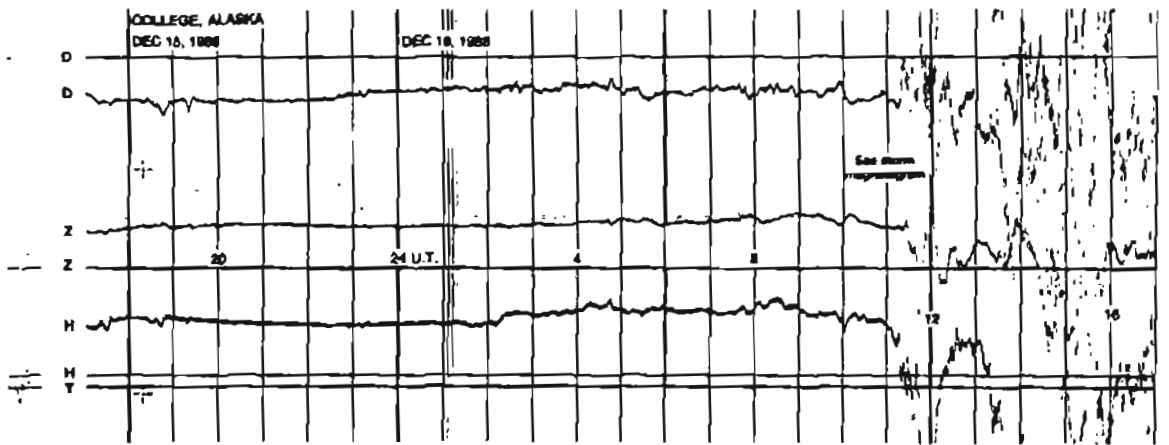
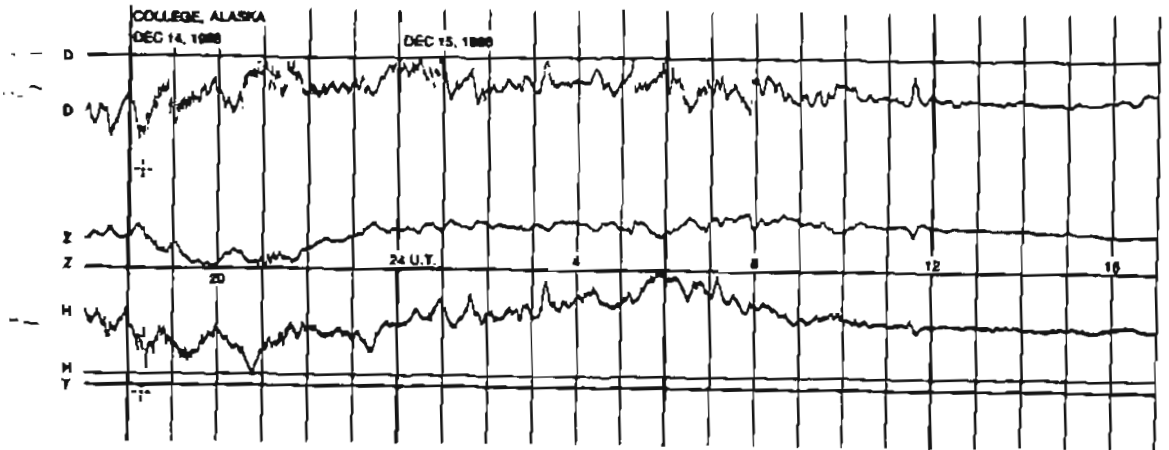
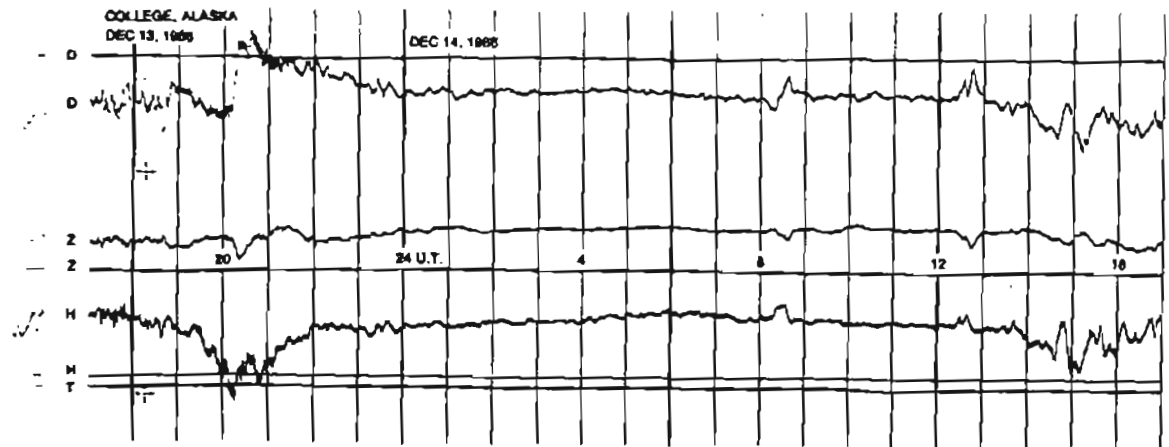
NORMAL MAGNETOGRAMS



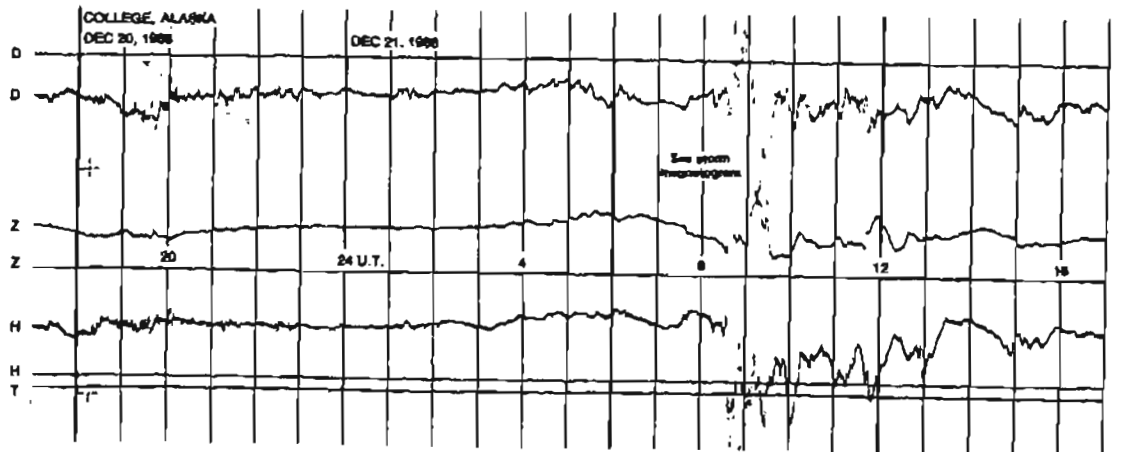
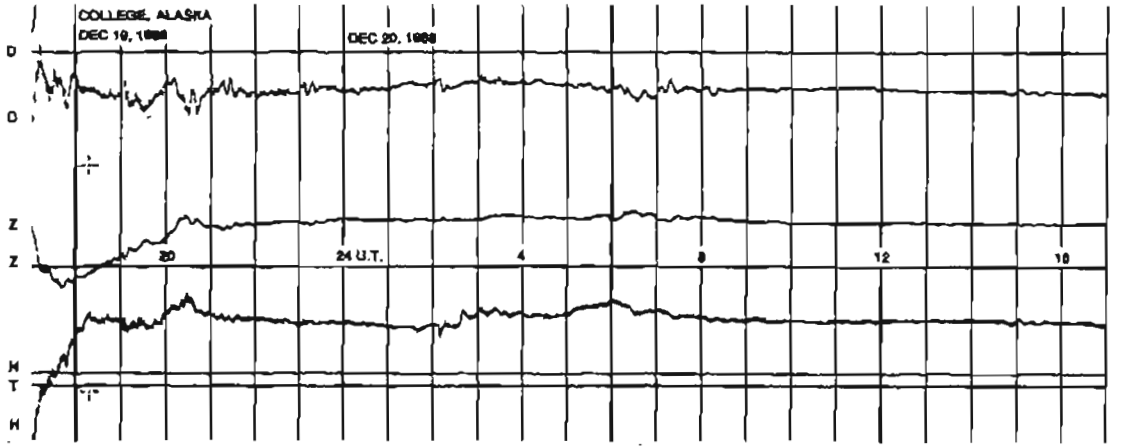
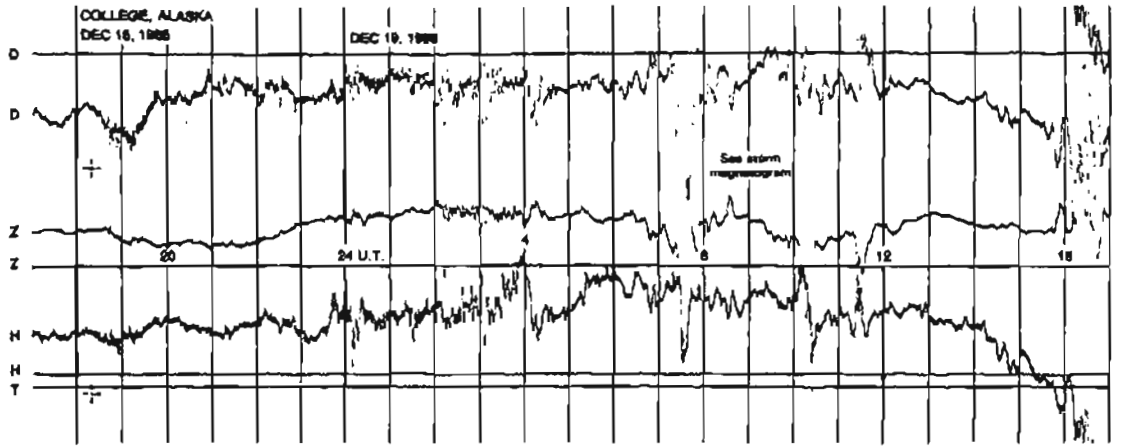
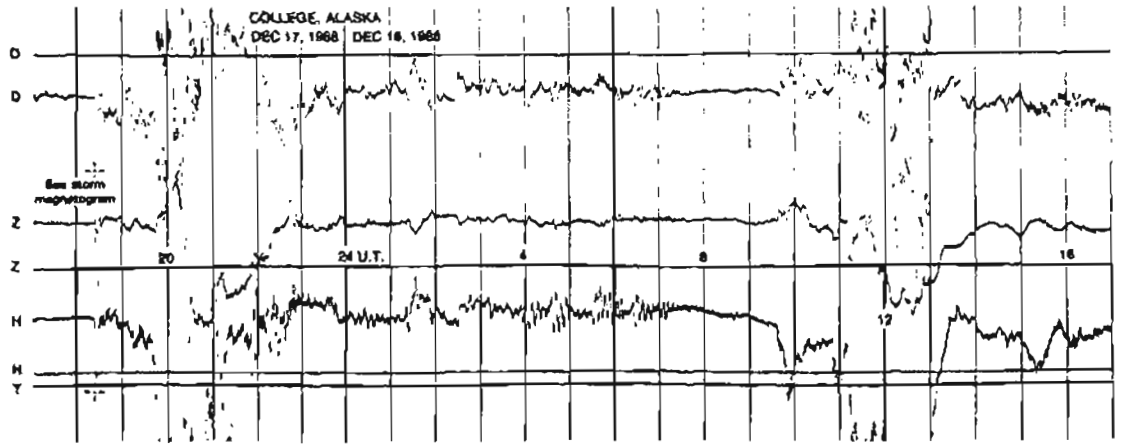
NORMAL MAGNETOGRAMS



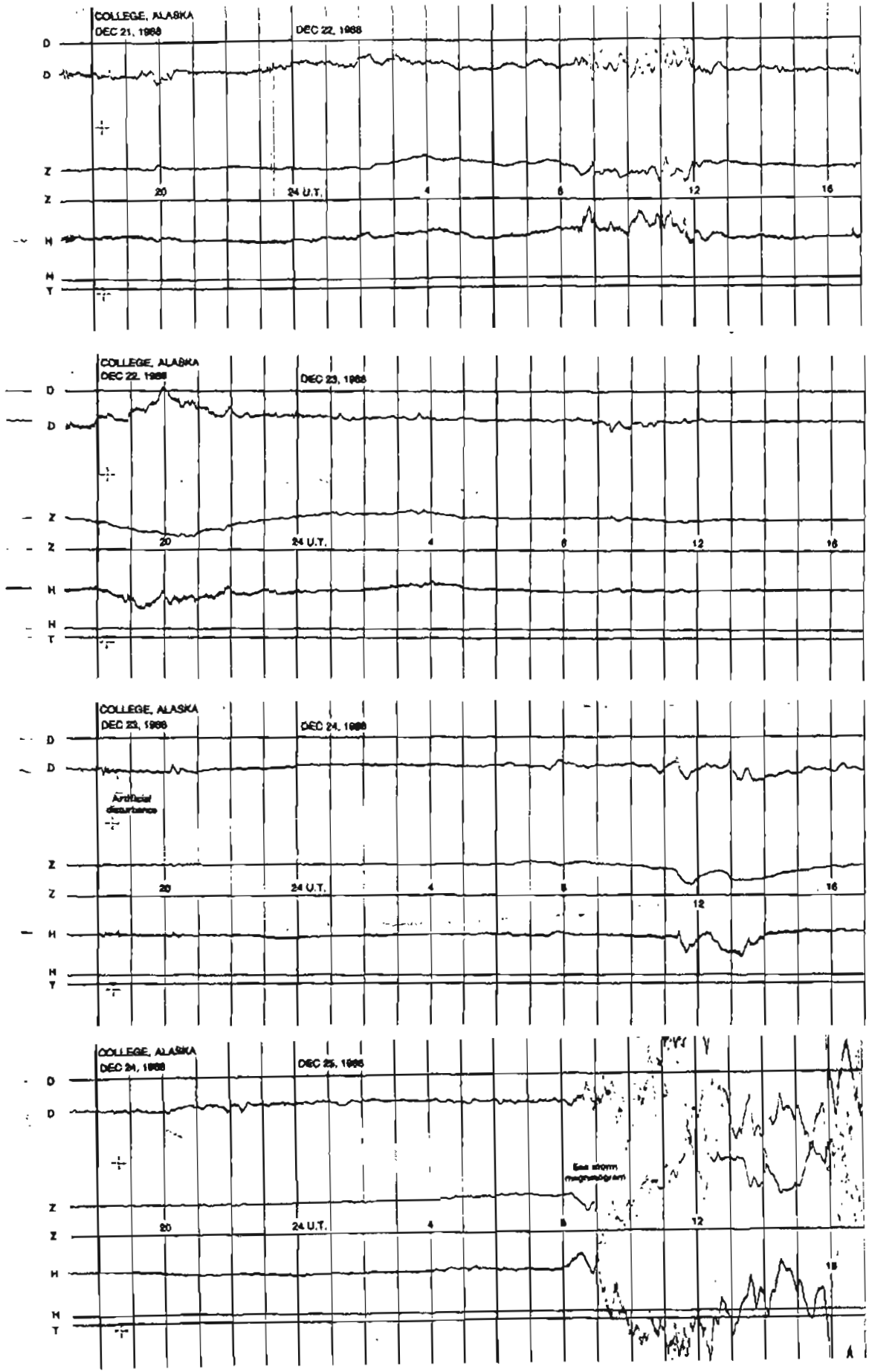
NORMAL MAGNETOGRAMS



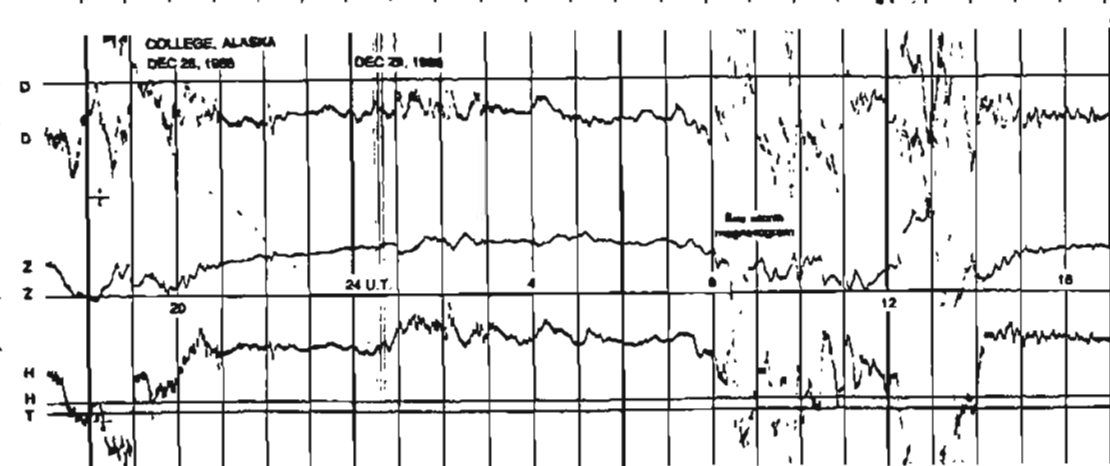
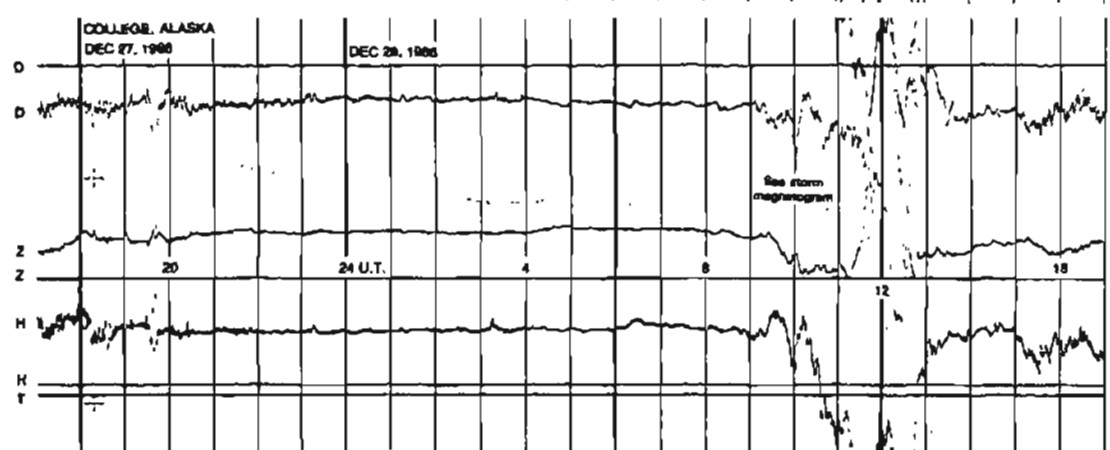
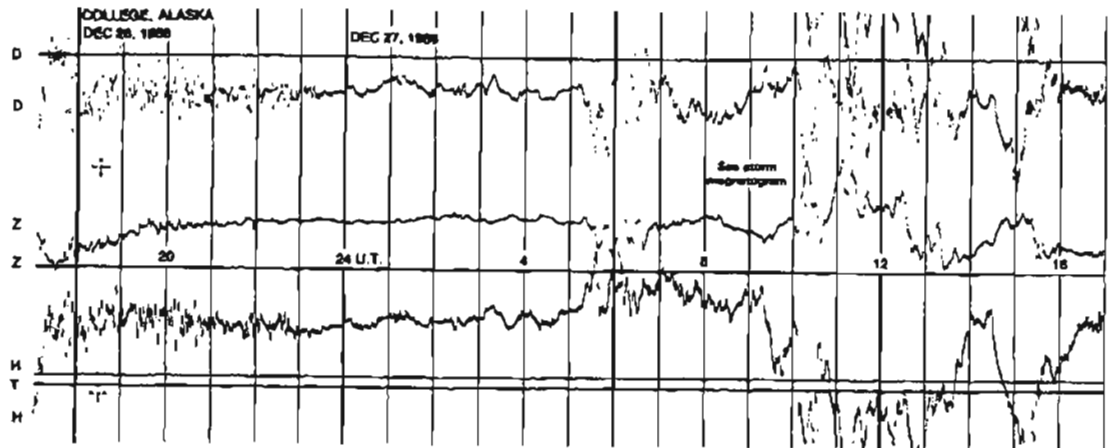
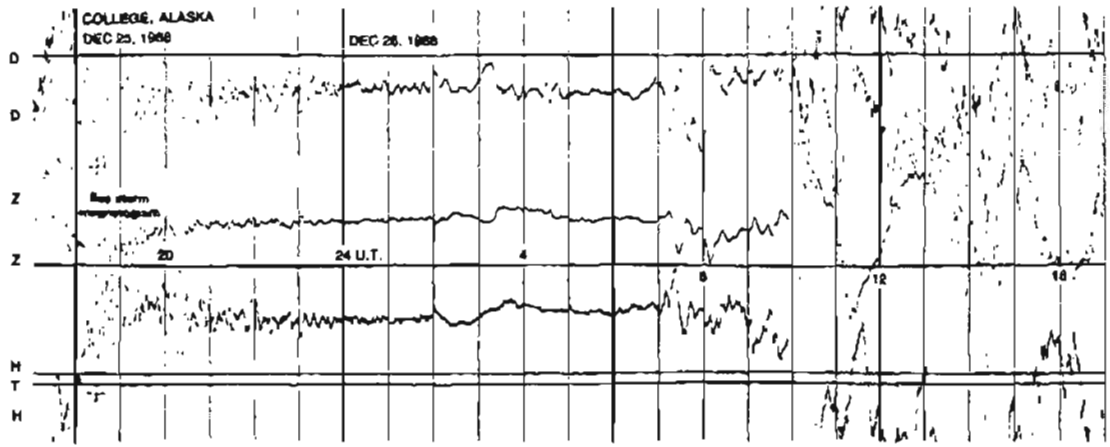
NORMAL MAGNETOGRAMS



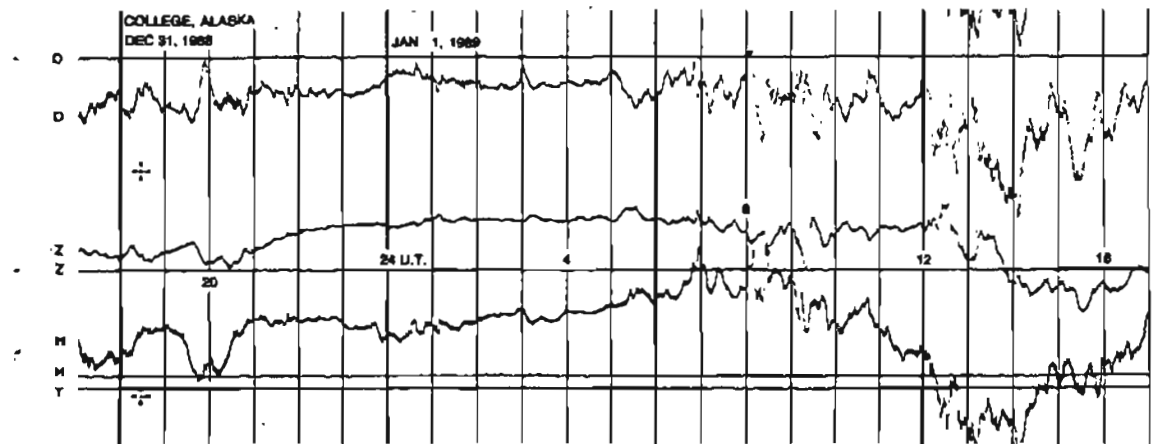
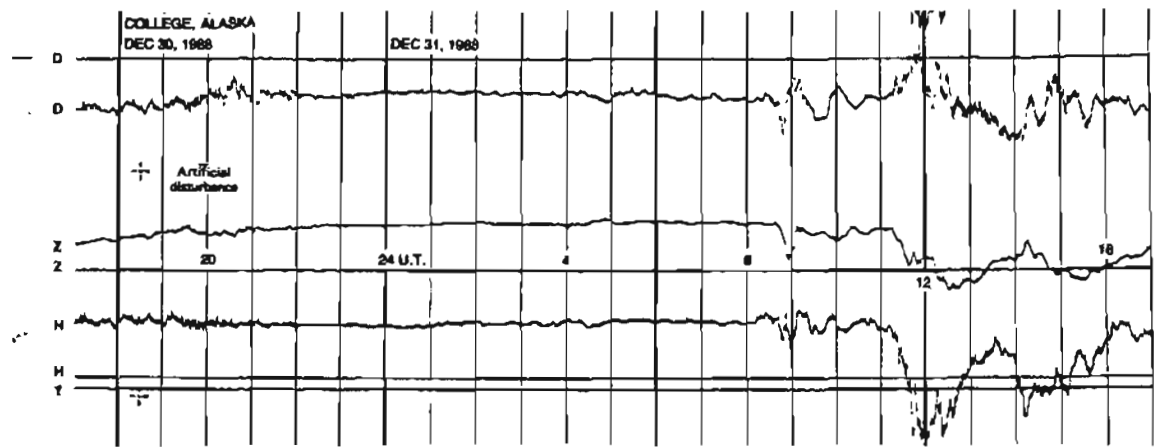
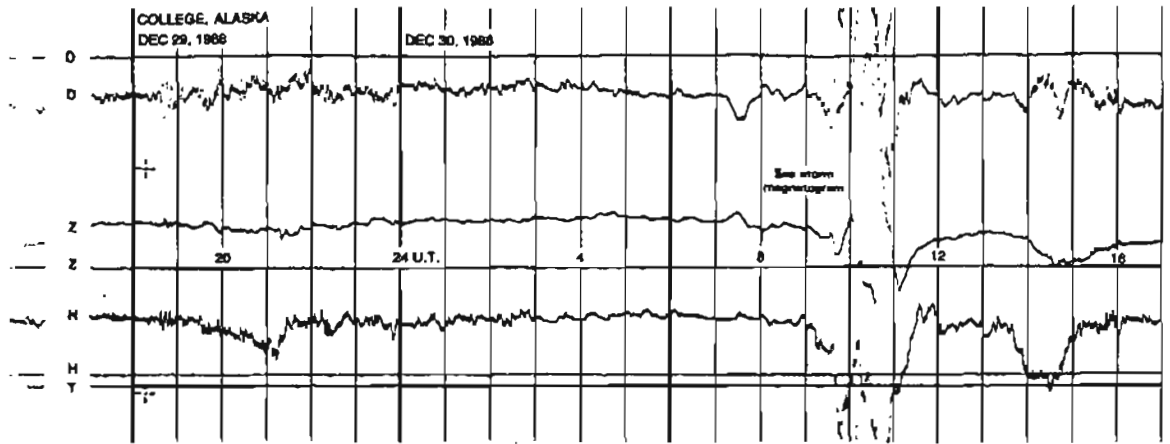
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS



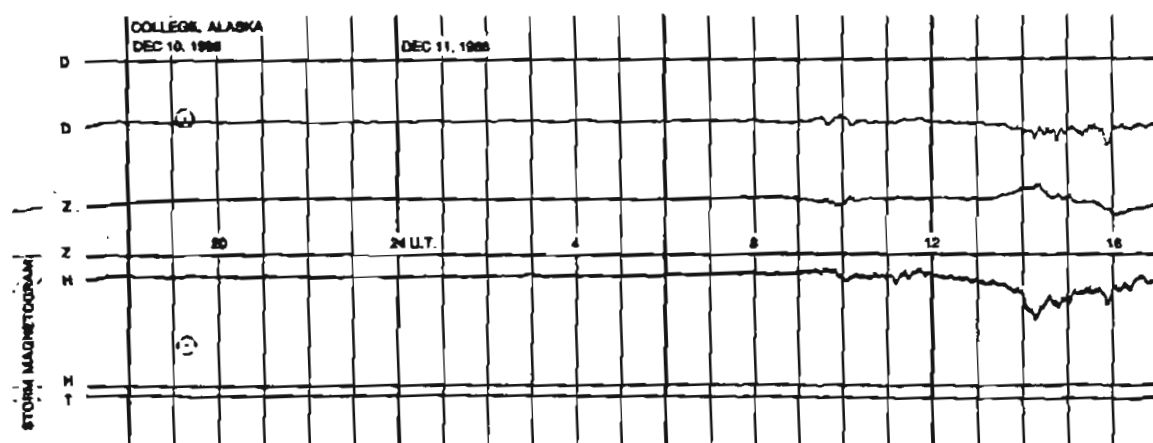
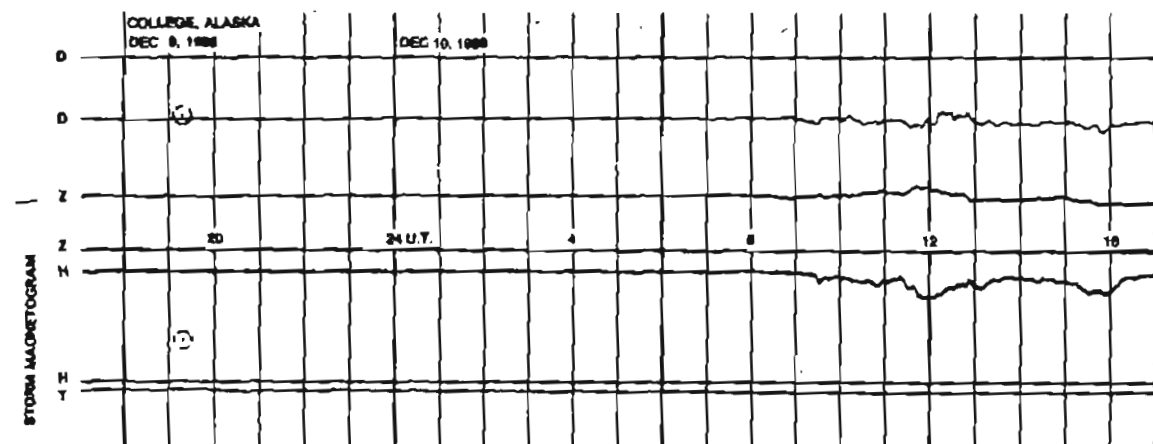
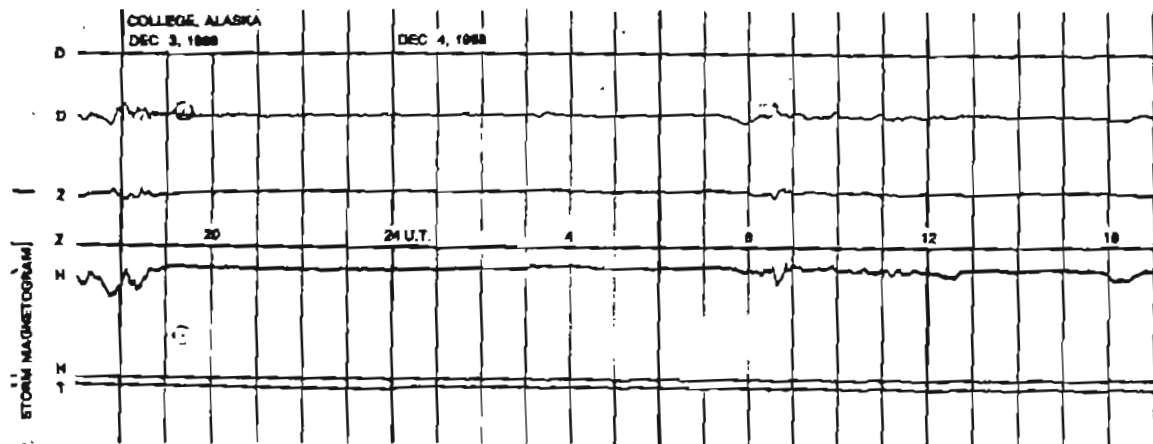
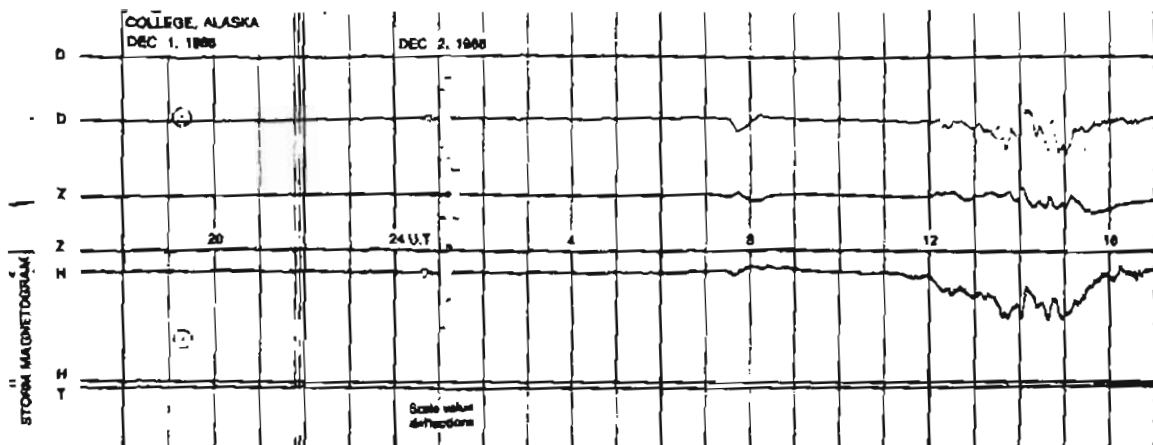
NORMAL MAGNETOGRAMS



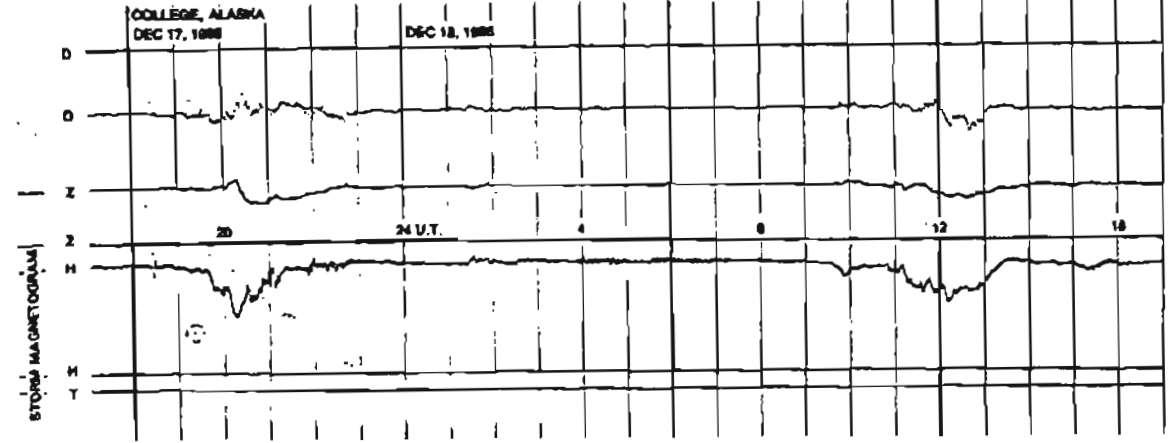
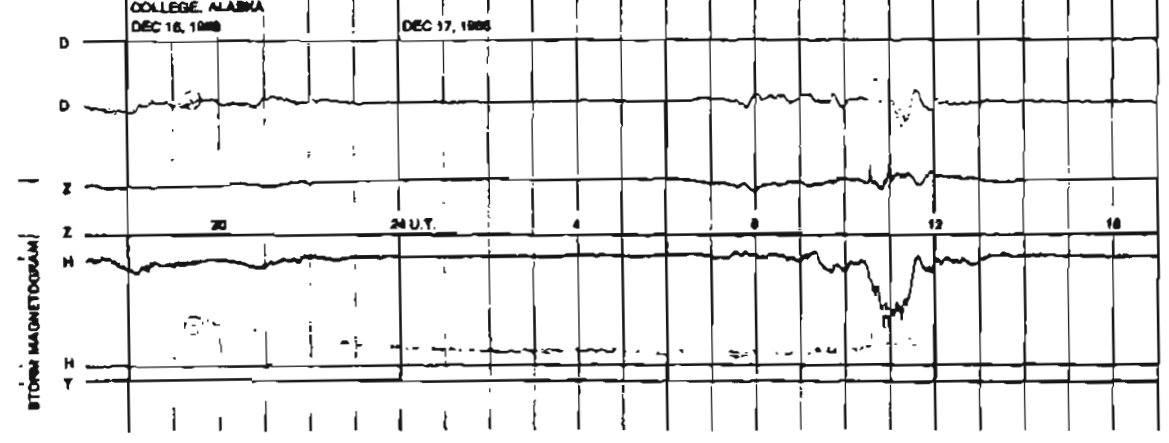
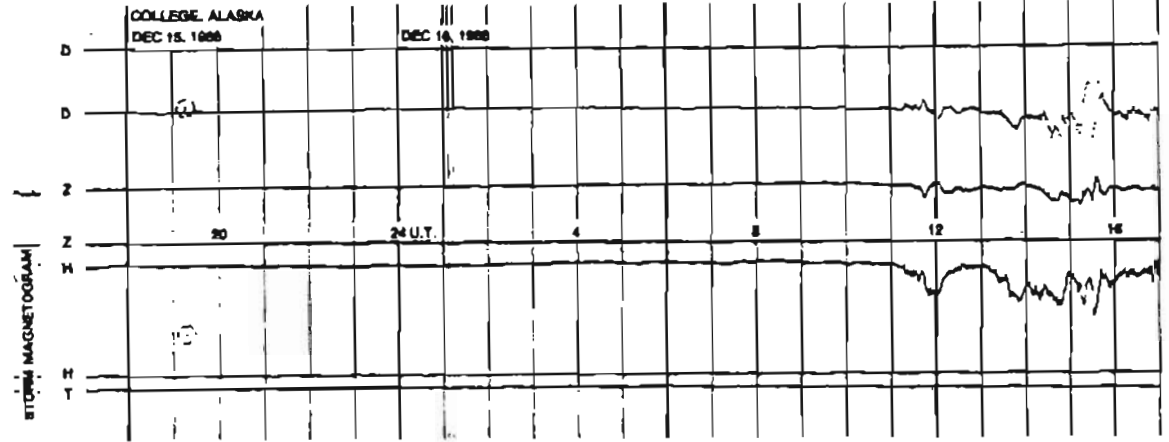
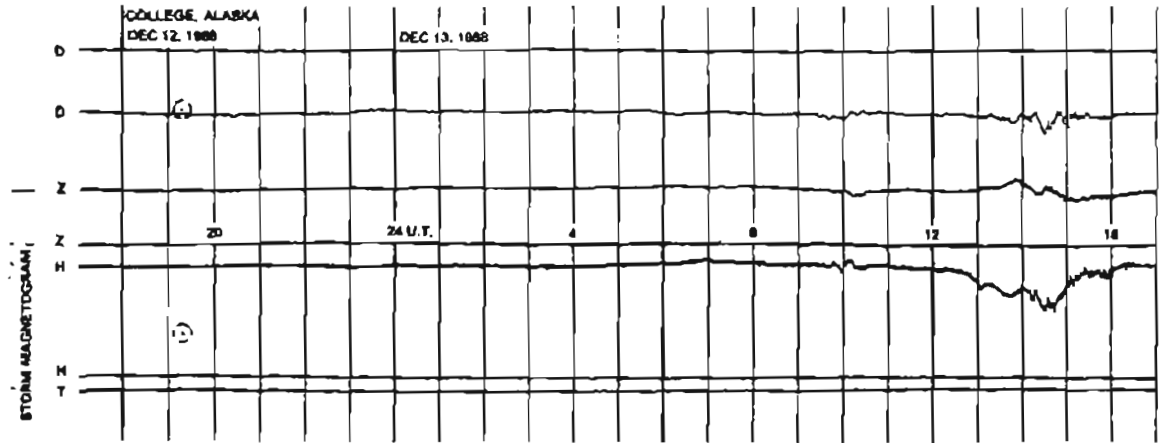


# STORM MAGNETOGRAMS

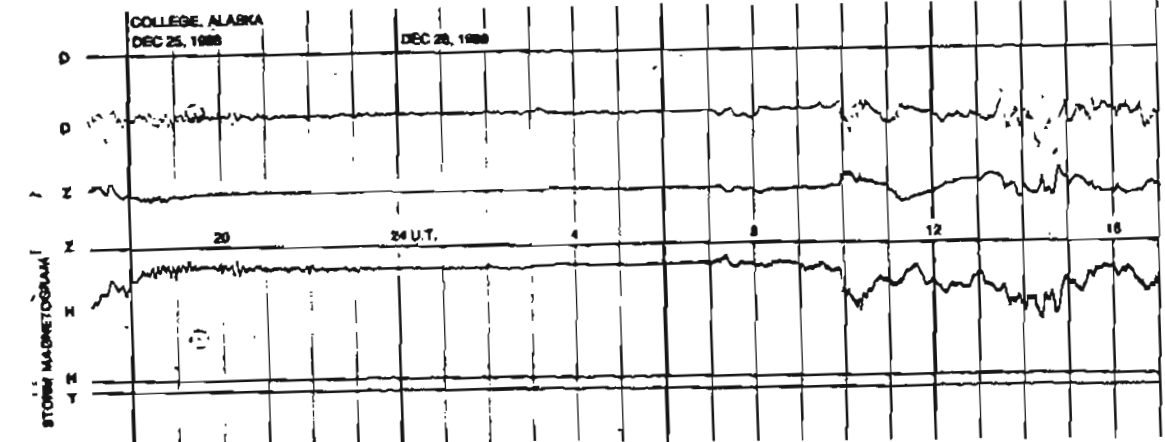
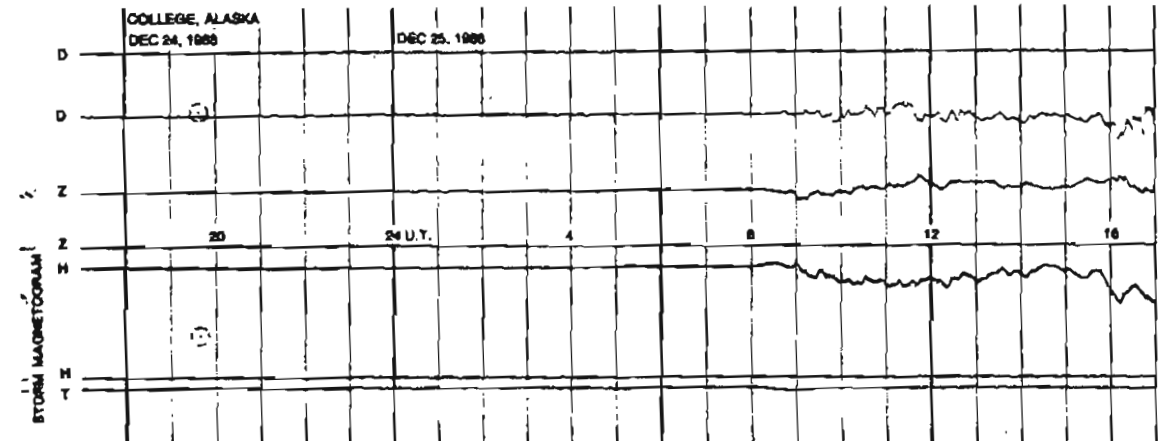
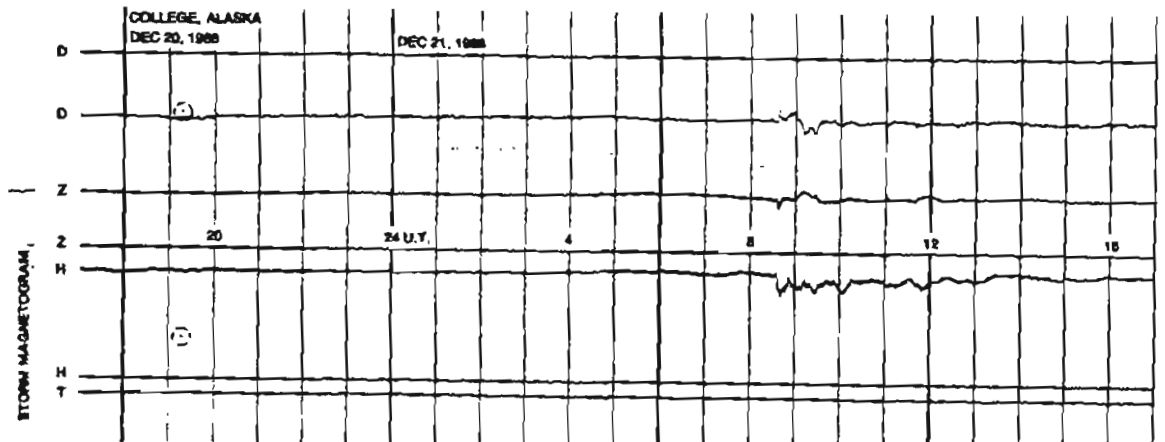
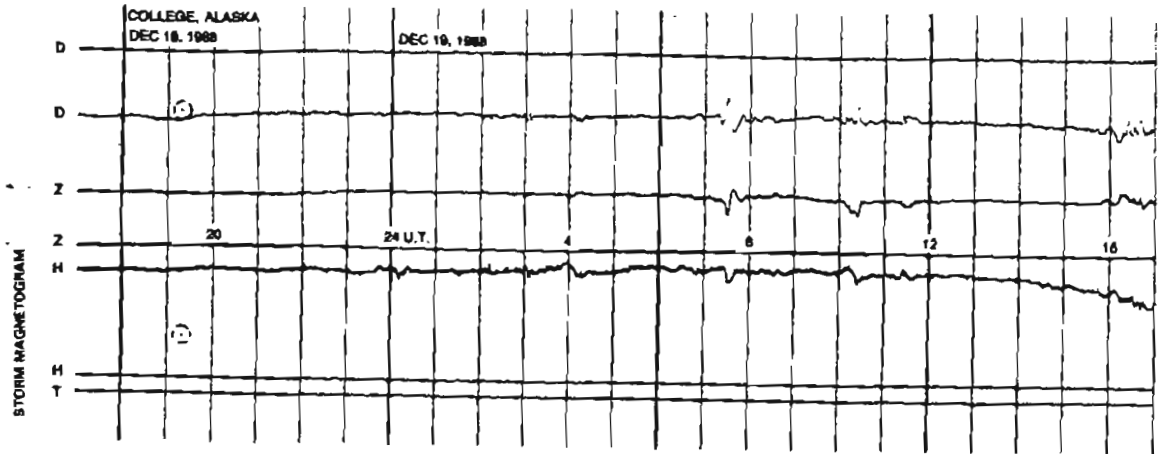
200mm  
100mm  
0



STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS



# STORM MAGNETOGRAMS

