

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

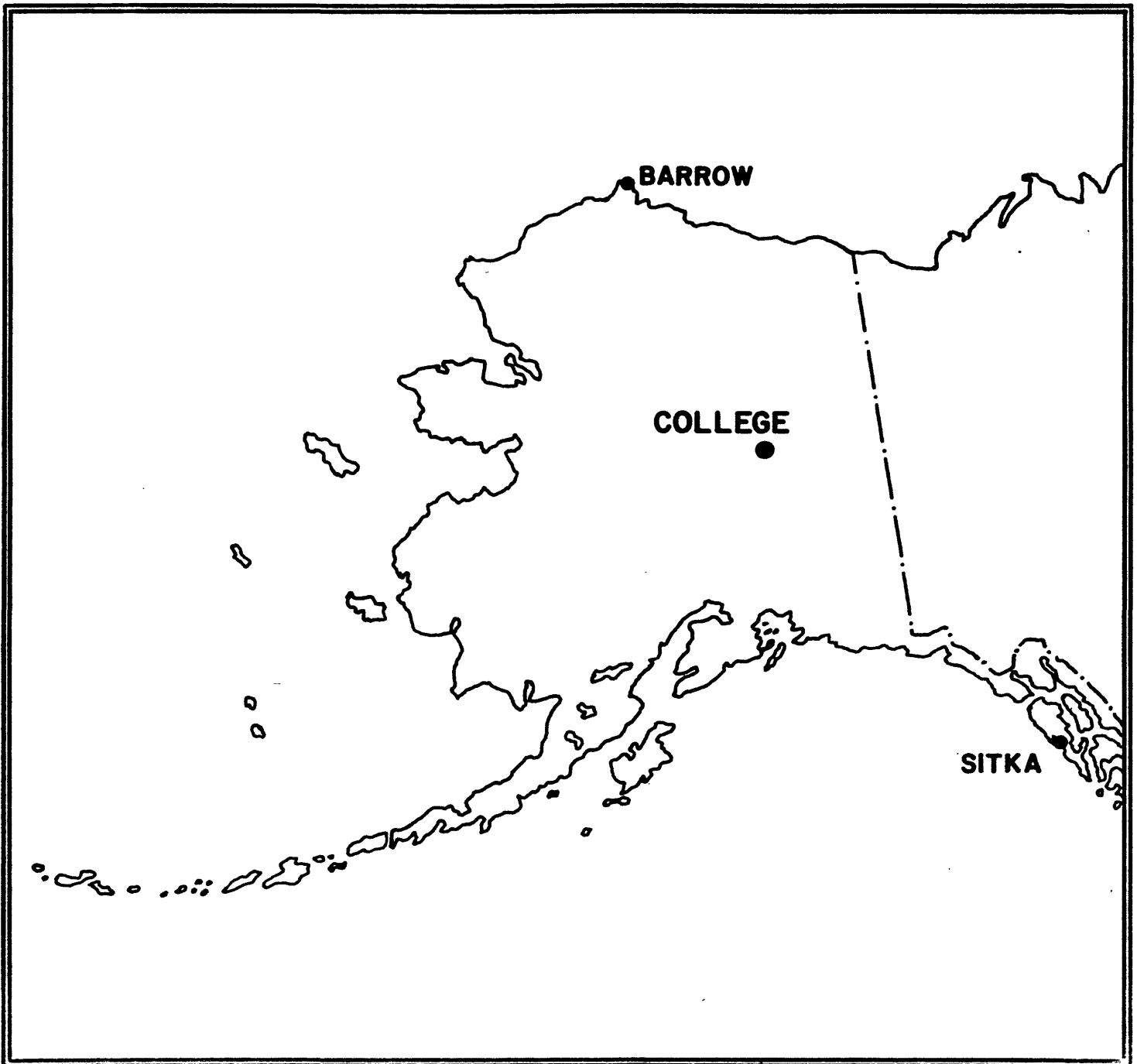
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

JANUARY 1986

OPEN FILE REPORT 86-0300A



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: J.E. PAPP, H.K. REX, L.Y. TORRENCE, P.A. FRANKLIN 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

Outstanding Magnetic Effects

Principal Magnetic Storms

Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings

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 99701

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

World Data Center A
NOAA D63, 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..... $+256.9^{\circ}$
Elevation.....200 meters

GEOMAGNETIC DATA

Normal, Storm and Rapid Run magnetograms and appropriate calibration data are processed daily at the observatory and are available for analysis or copying. Also available, are mean hourly scalings, K-Indices, selected magnetic phenomena reports and on a real-time basis are recordings from a 3-component fluxgate magnetometer and F-component proton magnetometer.

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 beginning 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)

The Magnetic Daily Character Figure, C: To each Universal day a character is assigned on the basis C=0, if it is quiet; C=1, if it is moderately disturbed; C=2, if it is greatly disturbed. The method used to assign characters at the College Observatory is based on AK as follows:

AK Range	C
0 \approx 11	0
11 \approx 50	1
50+	2

Routine assignment of C was discontinued at College on January 1, 1976.

Selected Phenomena & Outstanding Magnetic Effects

Prior to January 1, 1976, the Normal and Rapid Run records were reviewed at the observatory for selected magnetic phenomena and the events identified were forwarded to the IUGG Commission on Magnetic Variations and Disturbances. This was discontinued on January 1, 1976, but a report on Outstanding Magnetic Effects is prepared monthly for this report.

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 averages 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 sheets 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 he is interested in the detailed morphology of the magnetic field, he should 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.

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

MONTH AND YEAR
JANUARY 1986

DATE	K-INDICES									AK	TIME SCALE ON MAGNETOGRAMS 20 mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM		
1	3	3	5	5	6	5	4	3	34	37	SUDDEN COMMENCEMENTS d h m
2	4	3	4	4	7	5	3	1	31	38	
3	0	0	2	6	5	4	1	1	19	21	
4	1	1	0	1	2	0	1	1	08	04	
5	1	0	2	2	1	0	0	1	07	03	
6	1	0	0	2	1	1	3	5	13	10	
7	4	4	5	6	5	4	3	3	34	36	
8	3	3	1	3	3	4	1	1	19	12	
9	1	0	1	2	1	3	3	3	14	08	
10	3	3	1	4	4	0	1	0	16	11	
11	0	0	0	1	1	1	0	0	03	01	
12	1	0	2	0	0	0	0	1	04	02	
13	0	0	0	1	0	0	0	0	01	00	
14	0	0	0	2	0	0	1	0	03	01	
15	0	0	0	2	2	2	1	0	07	03	
16	0	0	0	2	0	0	0	0	02	01	
17	0	0	1	3	0	0	2	2	08	04	
18	2	2	2	6	1	0	1	1	15	14	
19	0	0	0	1	1	1	1	1	05	02	
20	2	3	5	3	3	0	1	3	20	15	
21	4	1	1	2	5	6	5	3	27	29	
22	2	1	4	4	4	4	2	1	22	16	
23	1	2	3	6	5	6	3	3	29	33	
24	2	2	5	6	5	2	3	2	27	27	
25	2	2	4	4	6	5	5	4	32	34	
26	4	2	3	5	5	2	2	2	25	21	
27	0	4	7	6	7	6	4	4	38	65	
28	3	3	4	6	6	5	3	3	33	37	
29	3	3	2	5	5	5	3	3	29	26	
30	3	3	4	6	4	2	3	2	27	24	
31	1	2	2	4	3	1	1	0	14	08	

POSSIBLE SOLAR-FLARE
EFFECTS BASED ON
INSPECTION OF GRAMS
ALONE (WITHOUT
REFERENCE TO DATA
FROM OTHER SOURCES)

BEGIN

END

d h m

d h m

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

675.7

3.71

2510

H

322.2

7.80

2510

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN B. TOWNSEND, CHIEF, COLLEGE OBSERVATORY

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY

College, Alaska

MONTH

YEAR

January

1986

DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS
05	01xx	pc4	
06	10xx	pi 2	
IDENTIFIED BY: JEP			VERIFIED BY: JBT

1. NATURE OF PHENOMENON: ssc, ssc*, si, si*, b, bp, bs, bps, pc1, pc2 - - - pc5, pg, pi 1, pi 2, sfe.

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA

January 1986

WDC-A FOR SOLAR-TERRRESTRIAL 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)
00	64.6 N	06	19xx	..	..	..	07	4	6	87	1060	480	08 04
		25	08xx	..	..	..	25	5	6	95	920	370	26 16
		27	03xx	..	..	..	27	3, 5	7	327	2340	870	30 14

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 1-1-86	2400 U.T., 1-31-86	1.0/mm	3.78/mm	27° 16.7 E
H	0000 U.T., 1-1-86	2400 U.T., 1-31-86	7.88/mm		126668
Z	0000 U.T., 1-1-86	2400 U.T., 1-31-86	7.68/mm		551788

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 1-1-86	2400 U.T., 1-31-86	7.9/mm	29.58/mm	23° 46.8 E
H	0000 U.T., 1-1-86	2400 U.T., 1-31-86	43.88/mm		106938
Z	0000 U.T., 1-1-86	2400 U.T., 1-31-86	48.38/mm		541458

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D					
H					
Z					

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
27° 34.7 E	128868	553318

* COMPUTED FROM ^{FIVE} QUIETEST DAYS DURING MONTH.

DAYS USED: JAN 11, 12, 13, 14, 16, _____, _____, _____, _____, _____

SPECIAL NOTICE

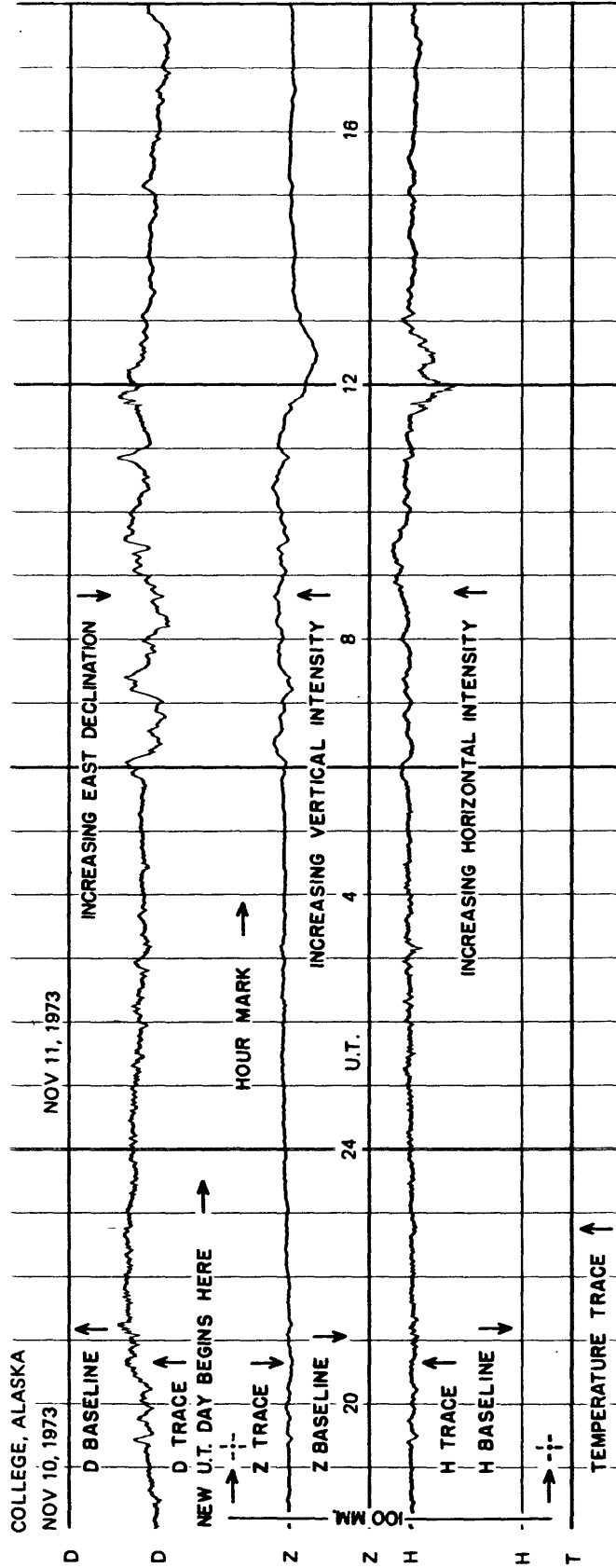
Starting January 1, 1986 Magnetogram Hourly Values for each day of the month will not be published. Instead, the five quietest days will be scaled and published in this data report.

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.

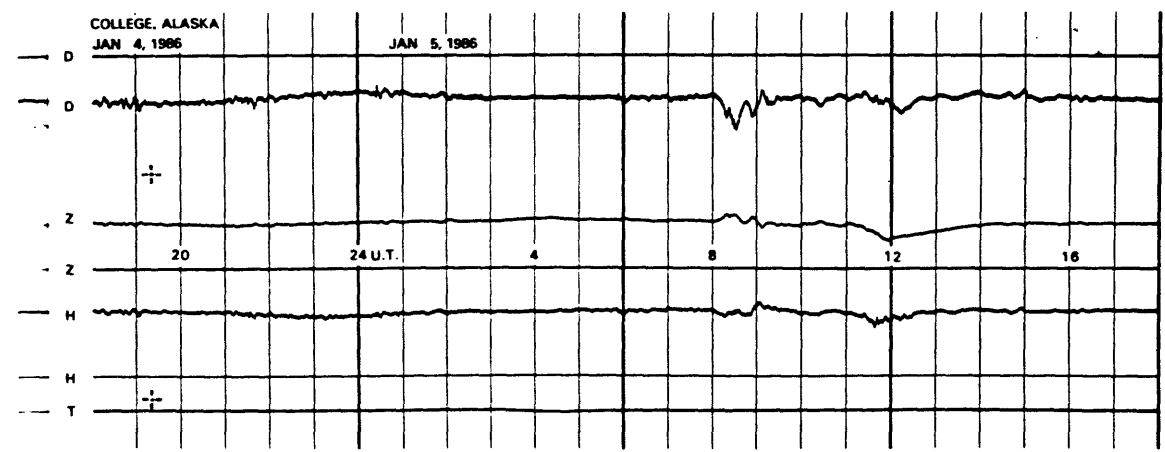
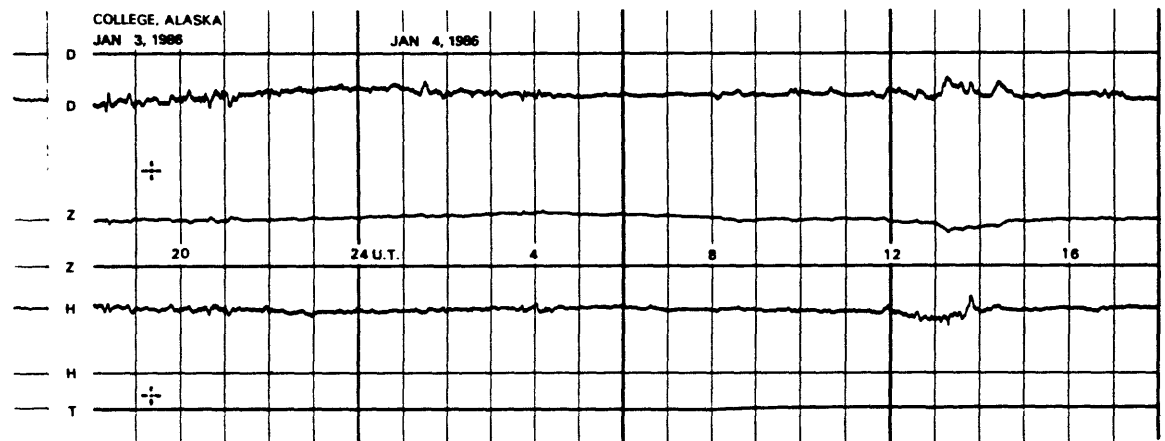
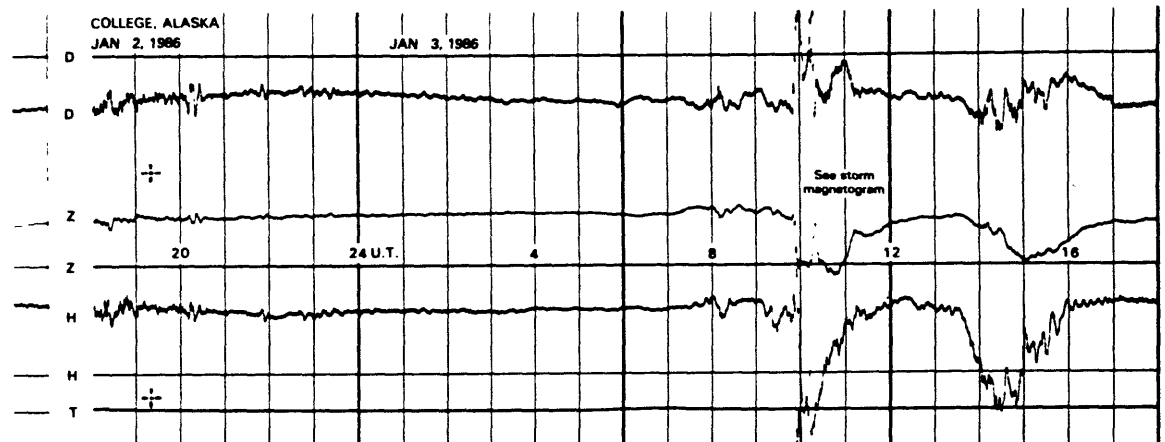
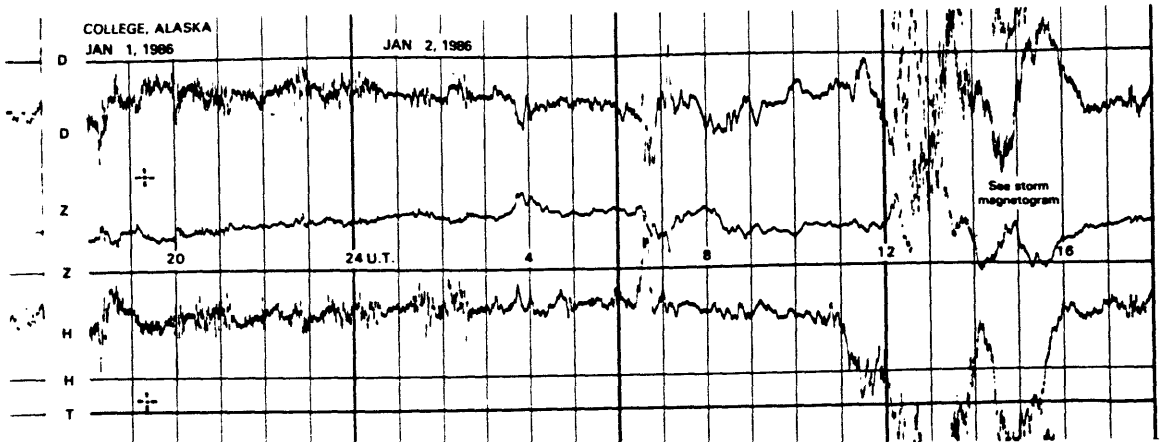
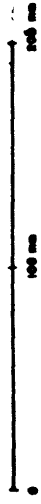
COMPONENT	D																								H					I					Z					COMPONENT
	DAY	11	12	13	14	14	16	11	12	13	14	16	11	12	13	14	16	11	12	13	14	16	14	16	DAY															
Ak	01	01	02	00	01	01	01	01	02	00	01	01	01	02	00	01	01	01	02	00	01	01	01	01	Ak															
HOUR	01	175	165	152	179	169	169	279	289	291	280	280	219	202	199	209	280	279	202	199	209	202	202	202	01															
	02	168	175	164	178	174	174	280	286	295	280	279	218	200	202	206	280	279	202	202	206	203	203	203	02															
	03	173	169	174	178	175	175	284	279	296	280	283	209	200	200	204	283	279	200	200	204	200	200	200	03															
	04	184	170	176	178	175	175	280	283	291	282	283	209	200	201	200	283	279	201	200	200	200	200	200	04															
	05	175	177	178	180	183	183	279	288	290	283	285	211	200	202	199	285	279	202	199	199	199	199	199	05															
	06	189	183	183	184	186	186	278	288	288	279	280	221	204	204	200	280	279	204	200	200	200	200	200	06															
	07	189	178	184	179	187	187	280	287	284	281	280	220	213	204	200	280	279	204	200	200	199	199	199	07															
	08	189	239	183	185	184	184	280	310	285	280	278	214	259	212	201	280	278	212	201	201	199	199	199	08															
	09	189	166	176	176	182	182	279	298	283	279	279	206	231	226	203	280	279	226	203	203	199	199	199	09															
	10	186	172	174	174	197	197	270	286	280	286	279	202	211	229	184	280	279	229	184	184	195	195	195	10															
	11	179	176	179	154	160	160	271	278	281	284	279	200	204	212	168	280	279	212	168	168	192	192	192	11															
	12	176	178	164	174	179	179	273	279	279	289	280	191	209	204	178	280	279	204	178	178	208	208	208	12															
	13	174	181	179	168	186	186	279	279	280	289	277	190	208	202	196	280	277	202	196	196	202	202	202	13															
	14	186	184	185	188	188	188	280	281	290	283	278	199	200	204	206	280	278	204	206	206	201	201	201	14															
	15	187	186	183	194	183	183	288	279	289	283	279	201	199	204	199	283	279	204	199	199	203	203	203	15															
	16	198	187	189	198	193	193	280	281	286	285	278	199	198	199	195	285	278	199	199	195	201	201	201	16															
	17	189	190	194	199	191	191	279	280	287	284	279	198	199	199	195	284	279	198	199	195	198	198	198	17															
	18	190	196	195	188	195	188	278	280	279	280	279	200	198	199	193	280	279	199	199	193	195	195	195	18															
	19	187	190	195	194	200	200	278	274	280	281	279	199	198	199	194	281	279	199	198	194	200	200	200	19															
	20	195	204	194	197	194	194	278	278	275	279	279	196	195	198	195	279	279	198	198	195	196	196	196	20															
	21	180	189	185	190	187	187	279	273	276	281	279	190	190	194	192	281	279	194	194	192	192	192	192	21															
	22	165	164	174	183	180	180	280	269	279	281	279	190	189	196	194	281	279	190	196	194	198	198	198	22															
	23	160	159	177	178	178	178	280	279	281	280	279	194	193	199	198	280	279	199	199	198	196	196	196	23															
	24	159	156	181	170	174	174	278	289	281	280	279	199	197	200	199	280	279	200	199	199	200	200	200	24															
DAILY SUM	4342	4334	4334	4318	4989	4408	4408	4690	6793	6826	6769	6709	4875	4897	4888	4708	4778	4888	4897	4888	4708	4778	4778	4778	DAILY SUM															
DAILY MEAN	181	181	181	180	183	184	184	179	283	284	282	280	203	204	204	196	199	280	204	196	199	199	199	199	DAILY MEAN															
MEAN																									182	282	201				MEAN									

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

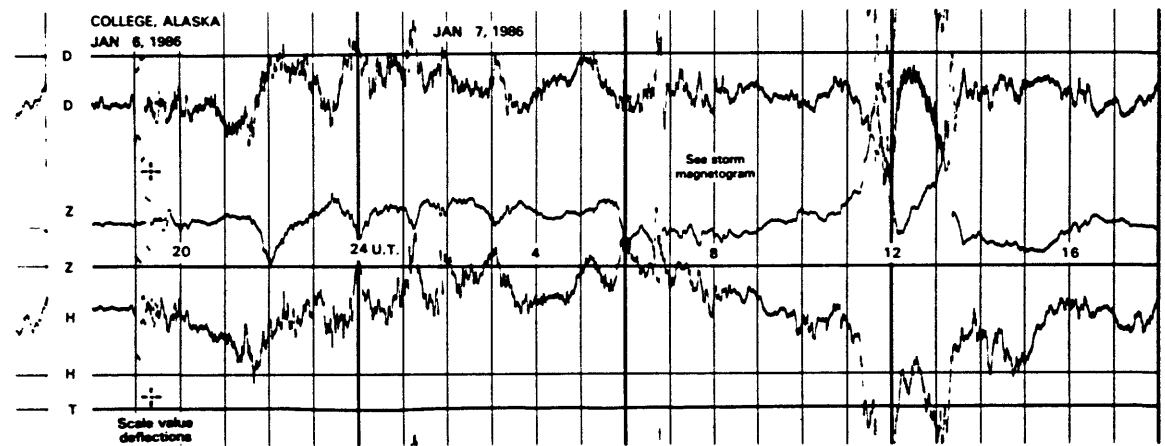
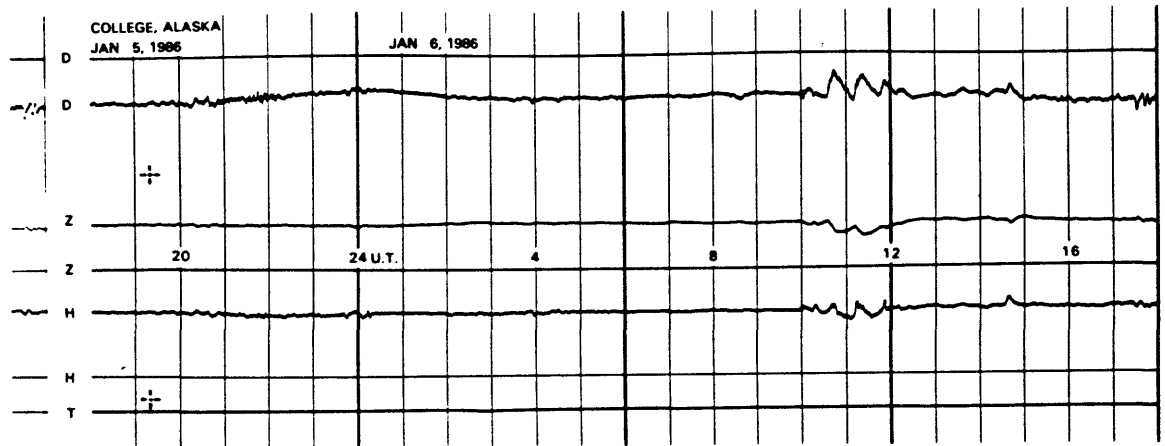


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

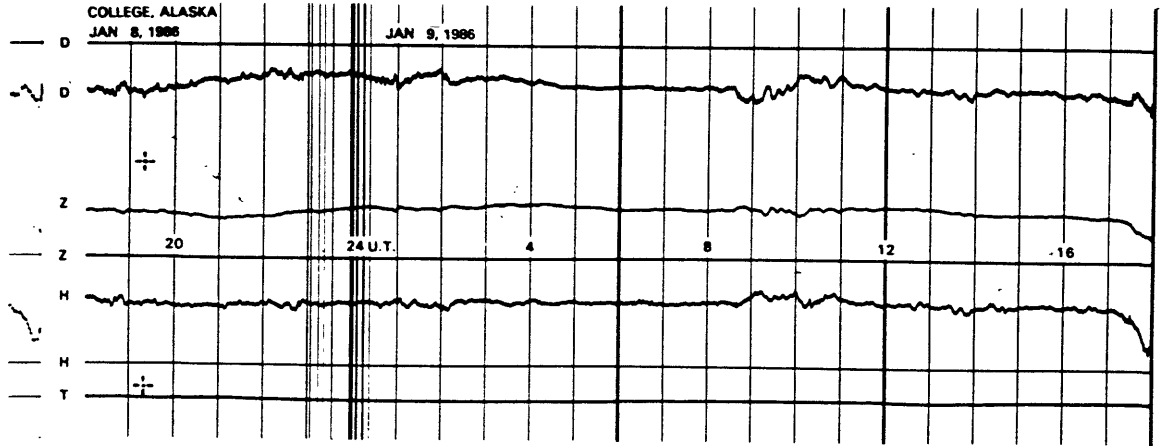
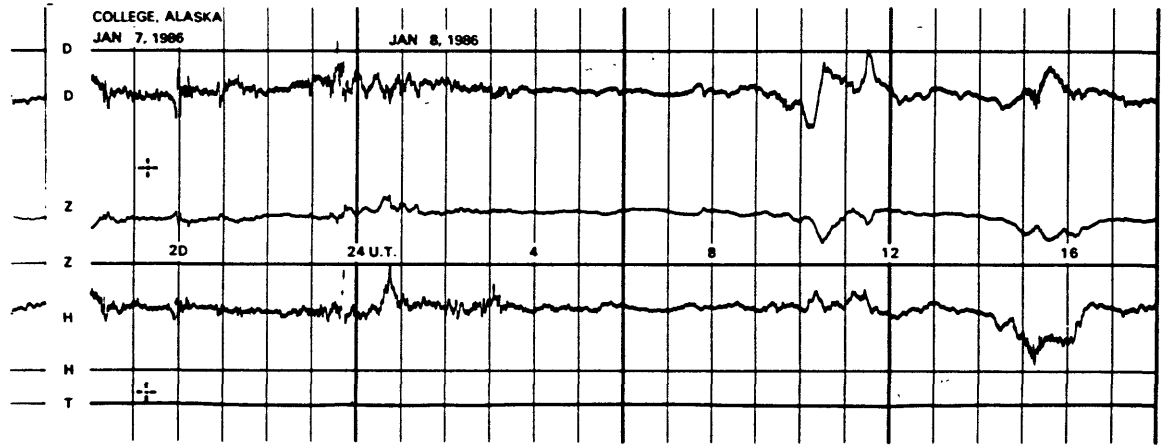
NORMAL MAGNETOGRAMS



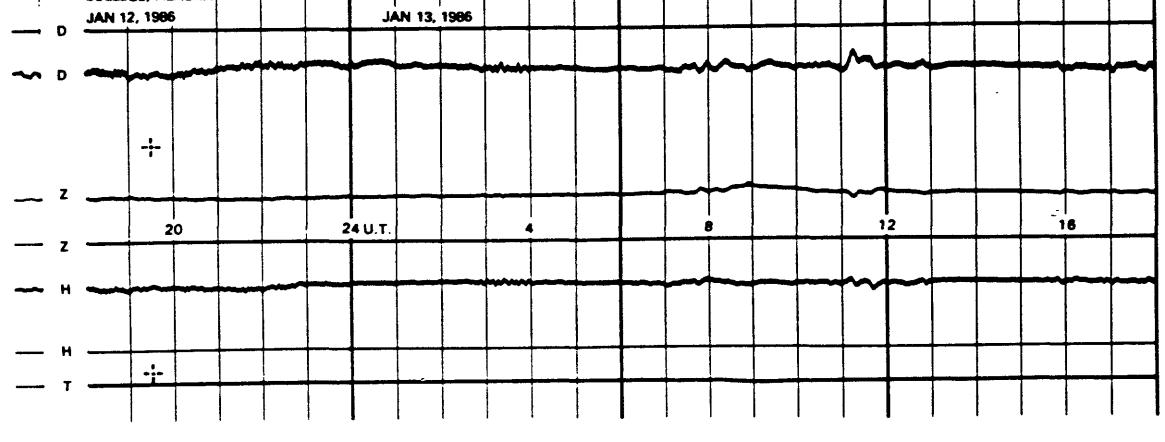
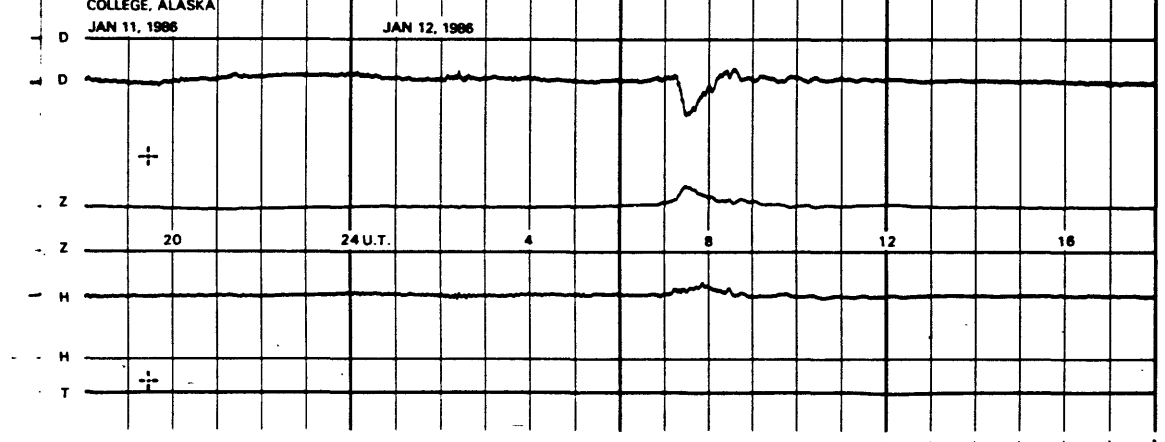
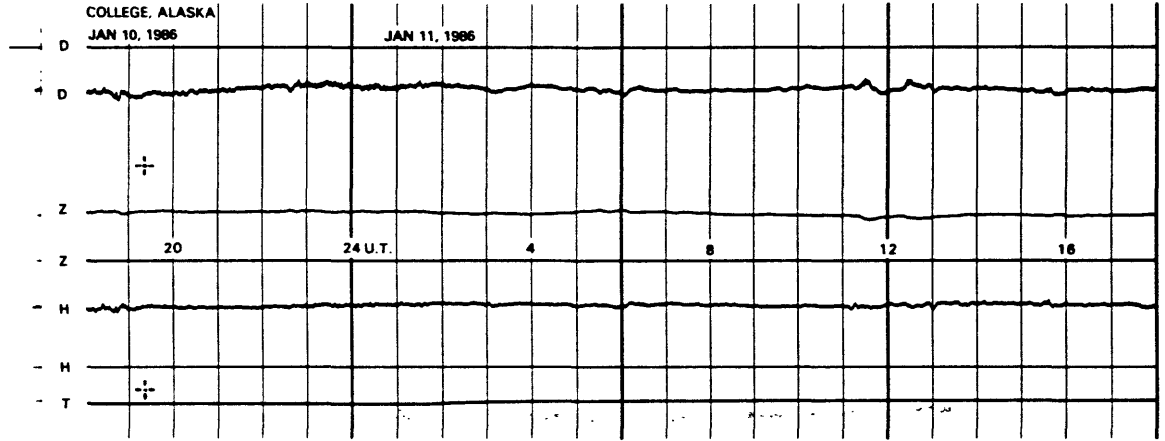
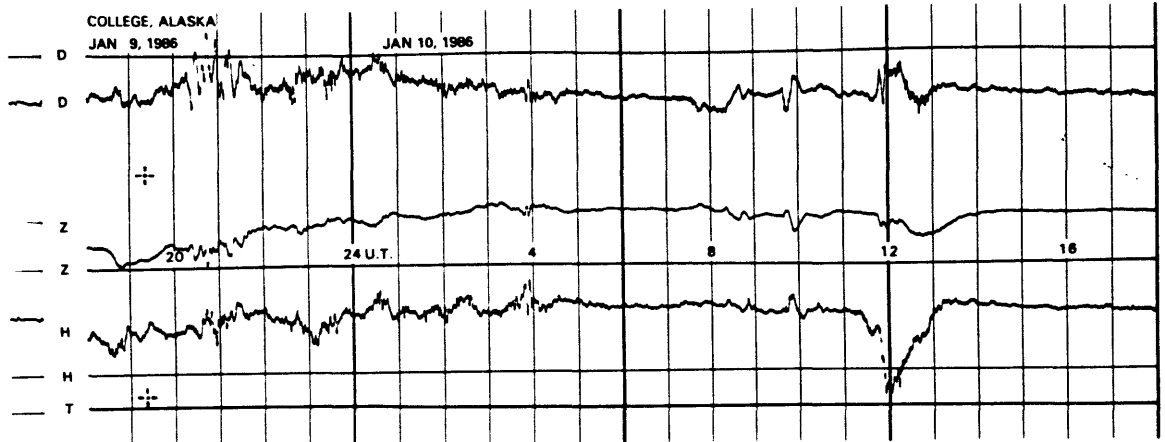
NORMAL MAGNETOGRAMS



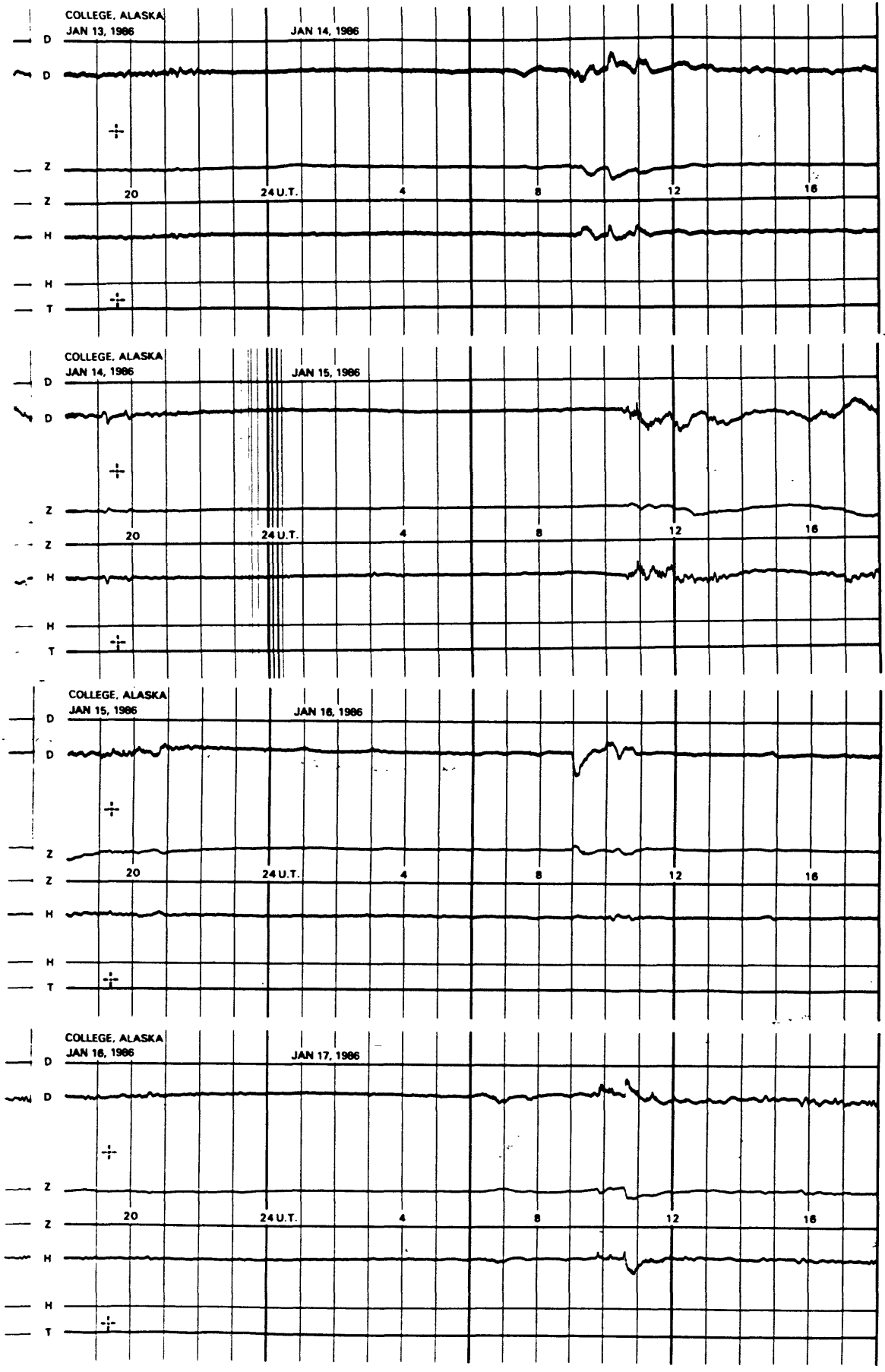
Scale value
deflections



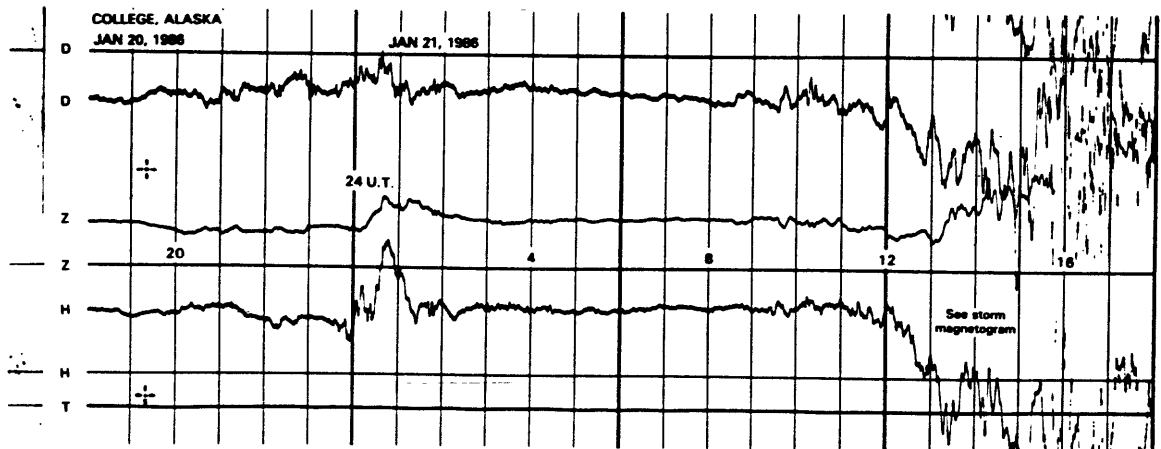
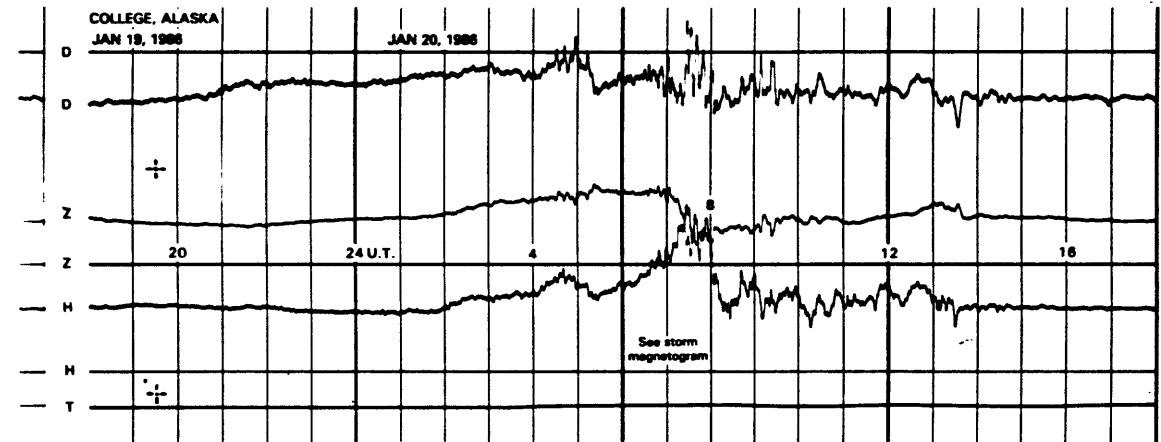
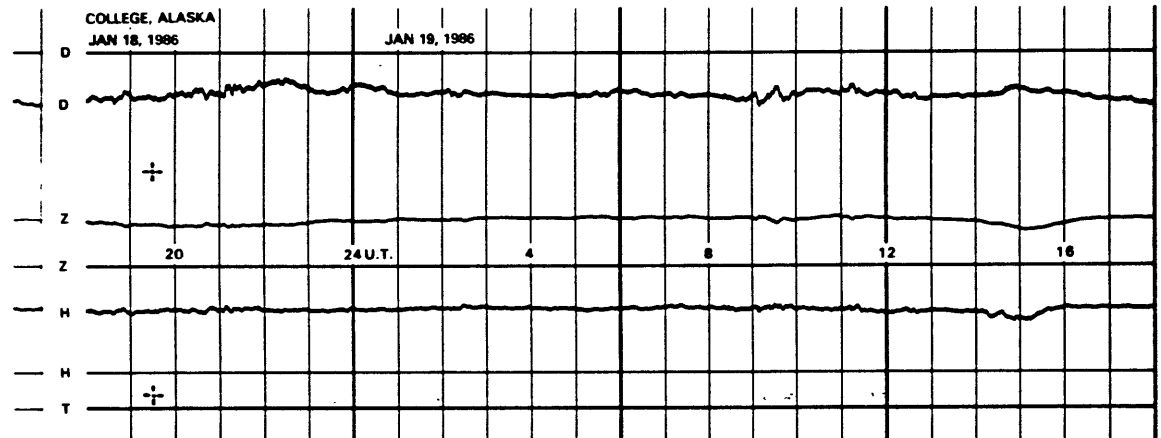
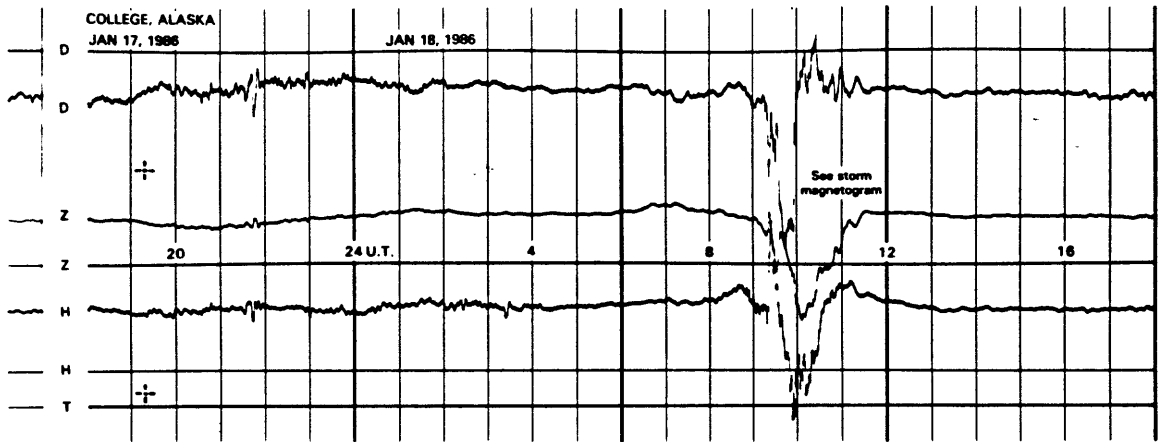
NORMAL MAGNETOGRAMS



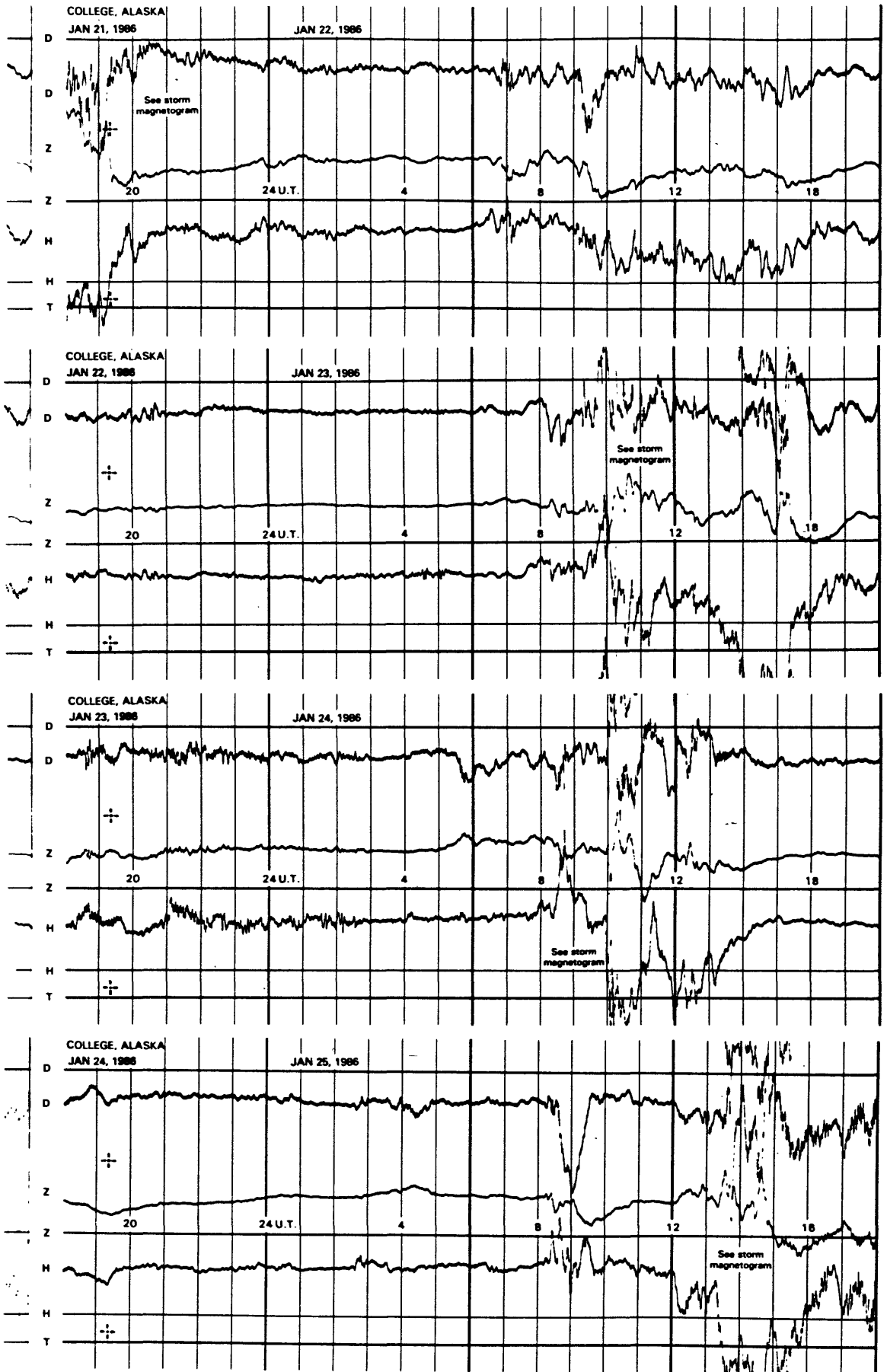
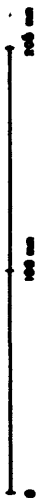
NORMAL MAGNETOGRAMS



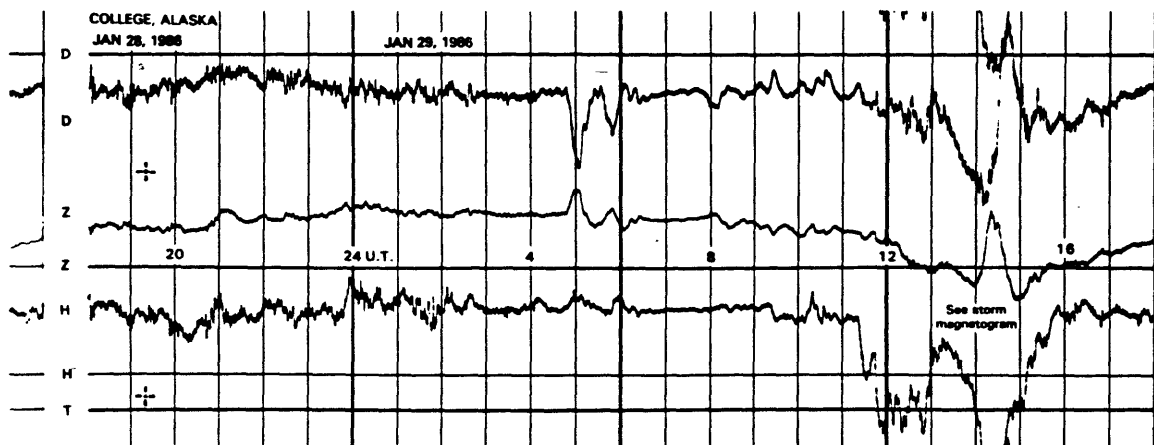
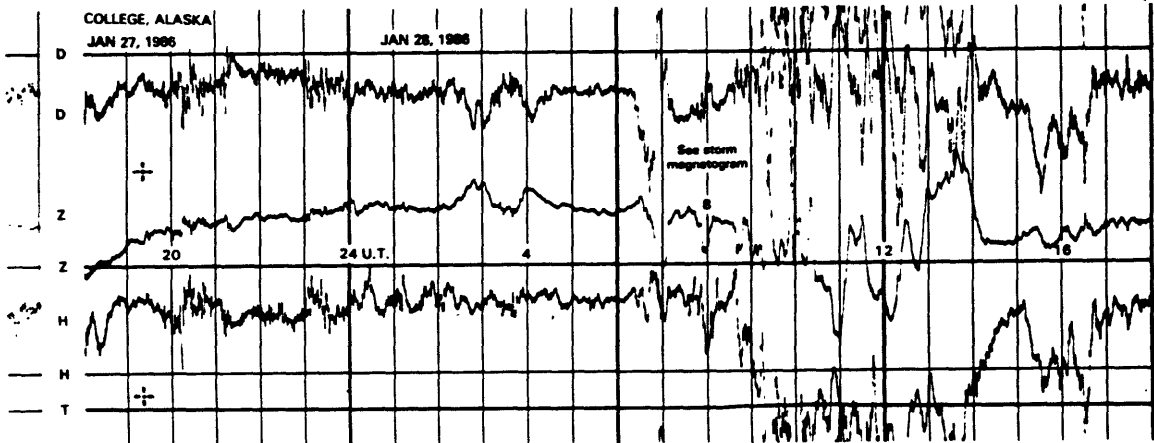
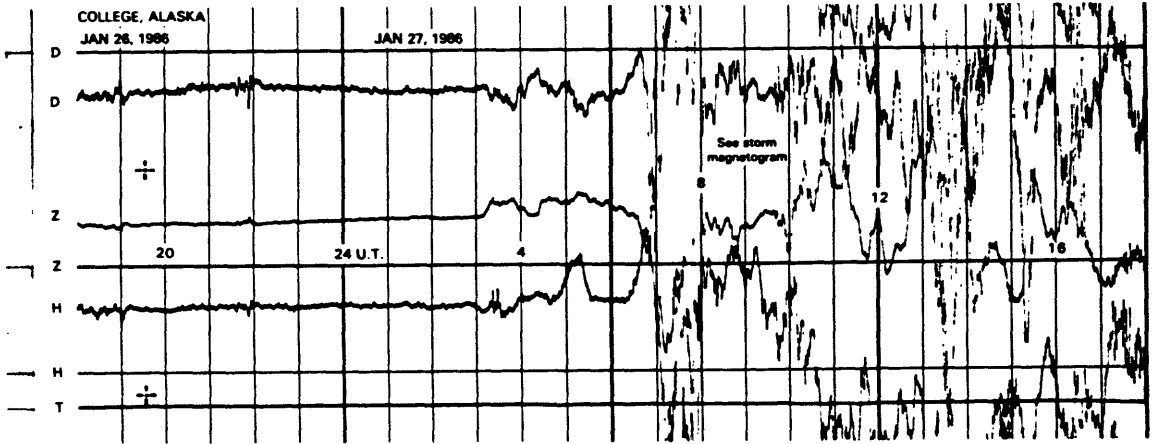
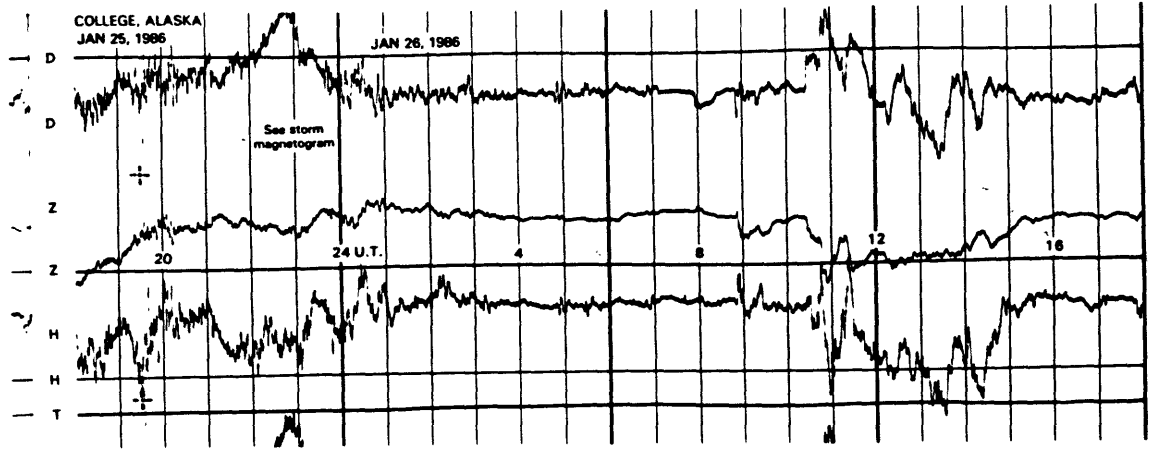
NORMAL MAGNETOGRAMS



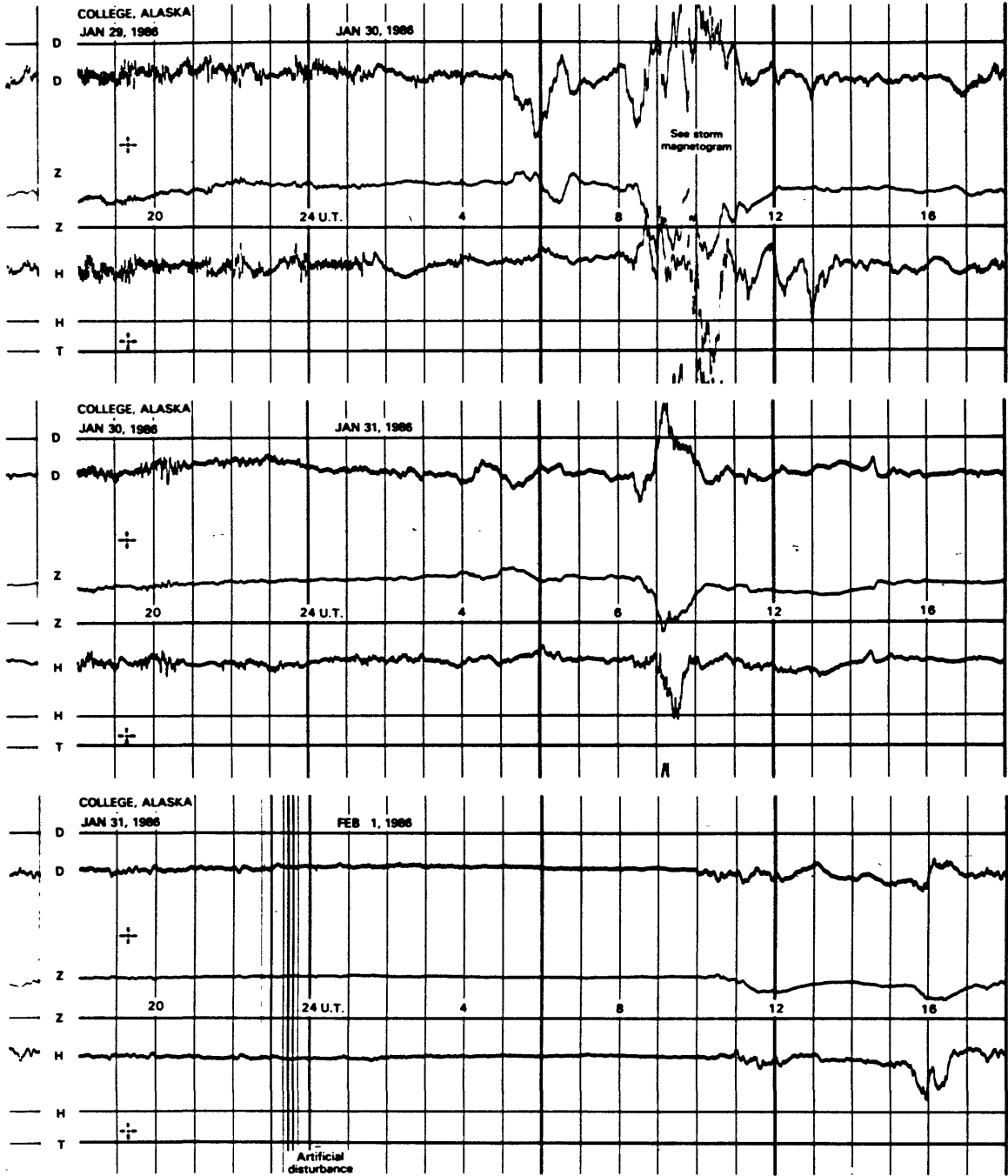
NORMAL MAGNETOGRAMS



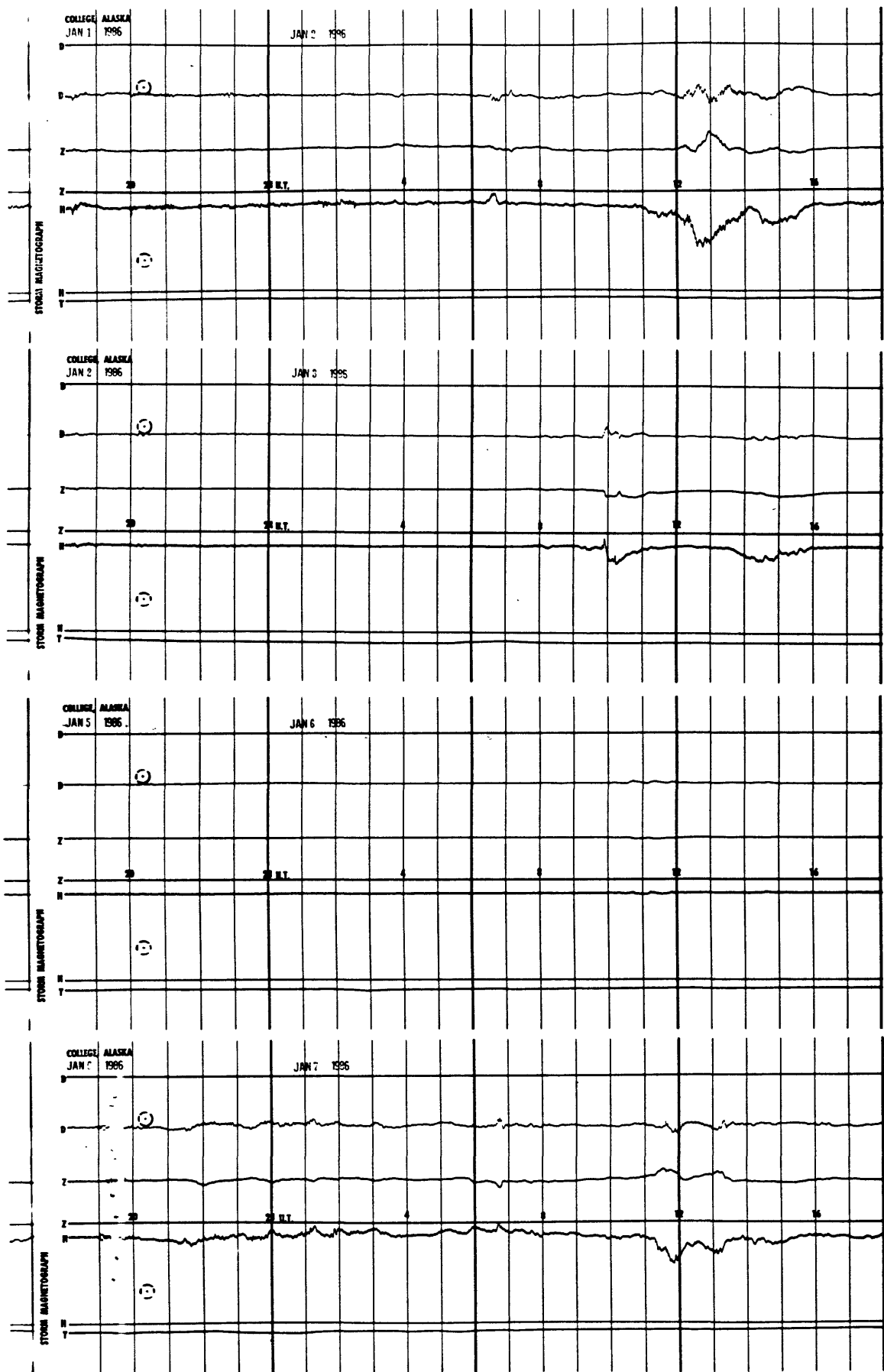
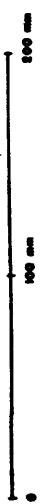
NORMAL MAGNETOGRAMS



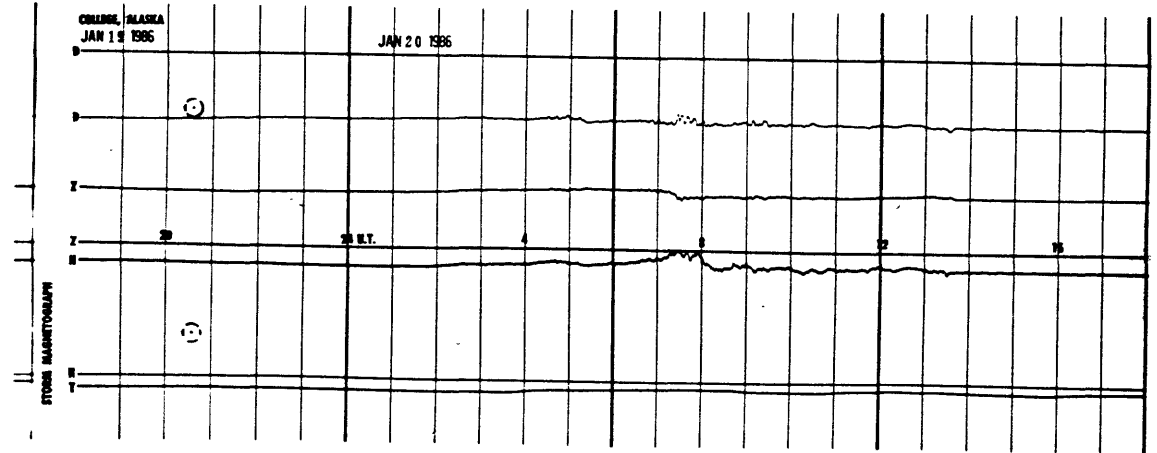
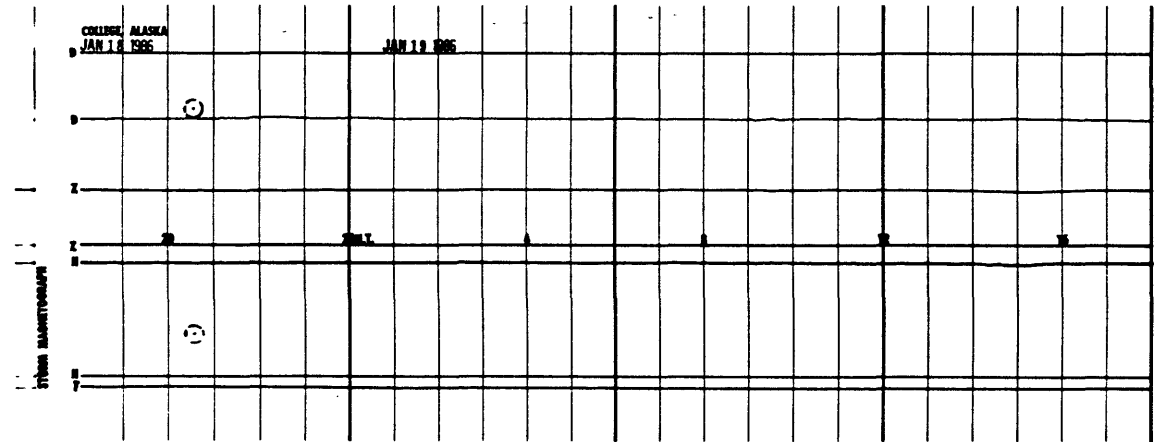
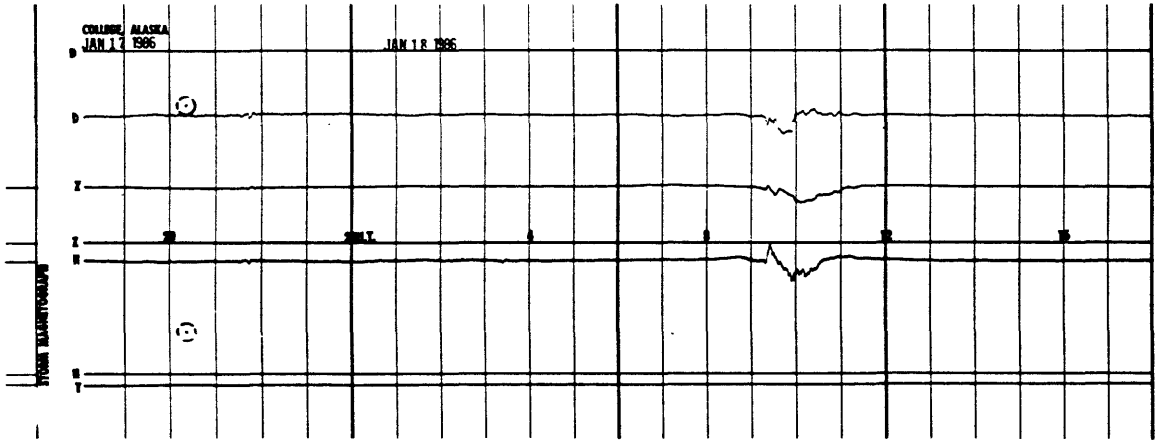
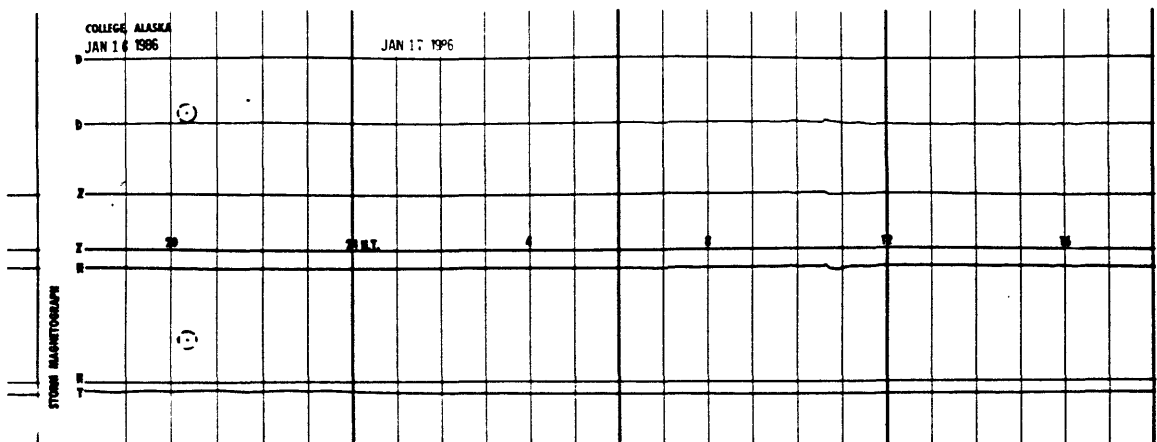
NORMAL MAGNETOGRAMS



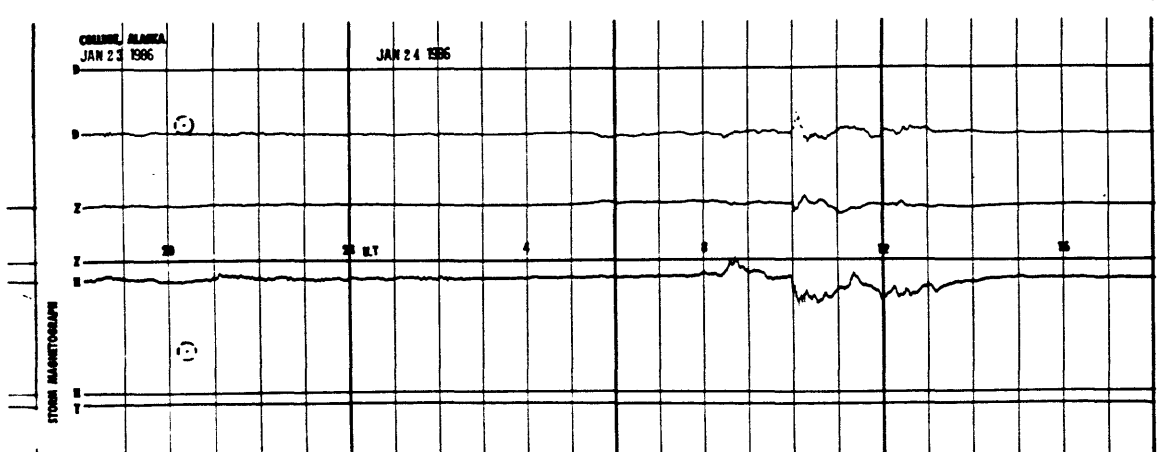
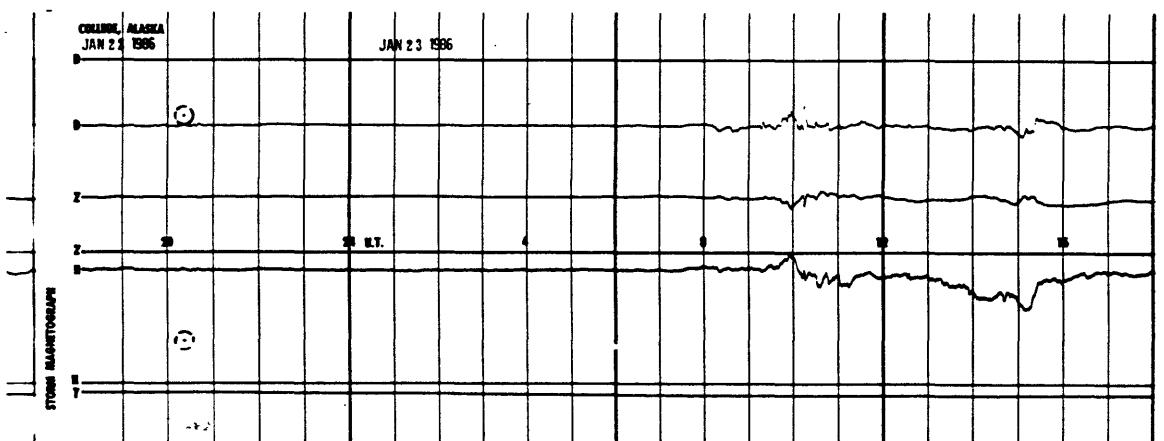
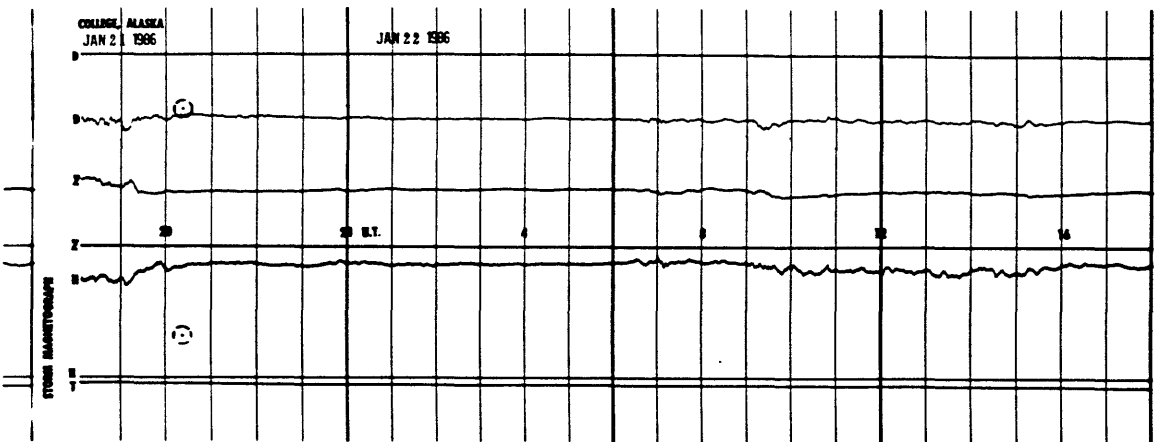
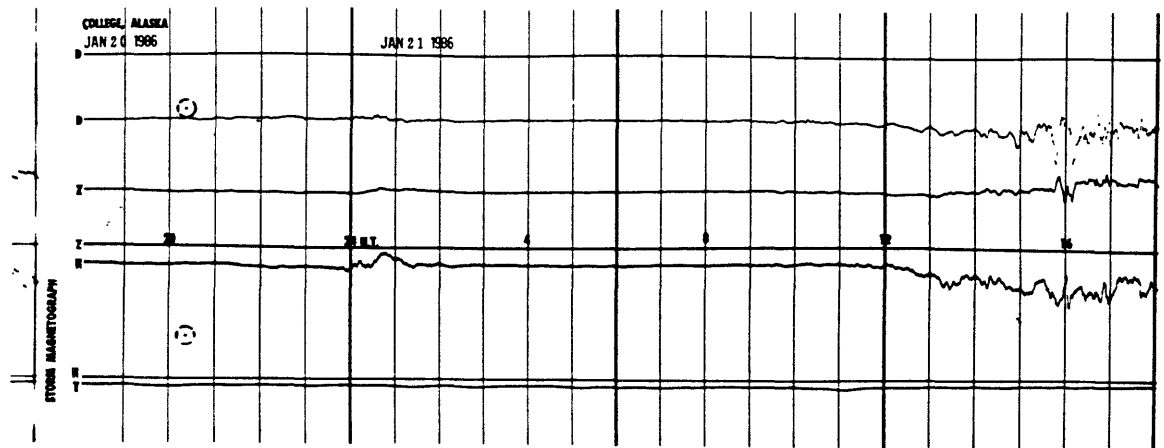
STORM MAGNETOGRAMS



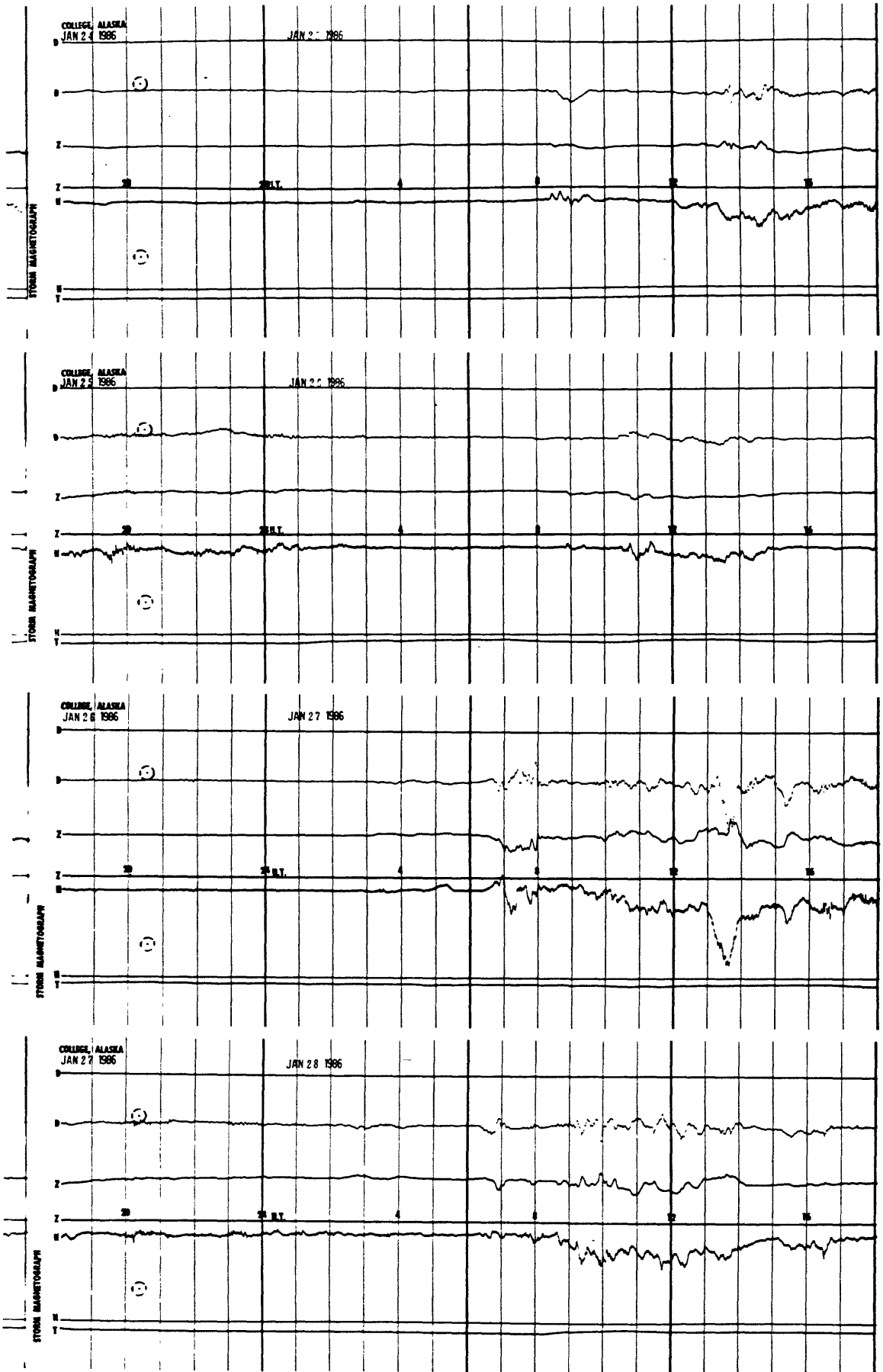
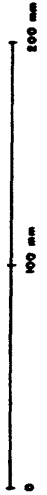
STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

