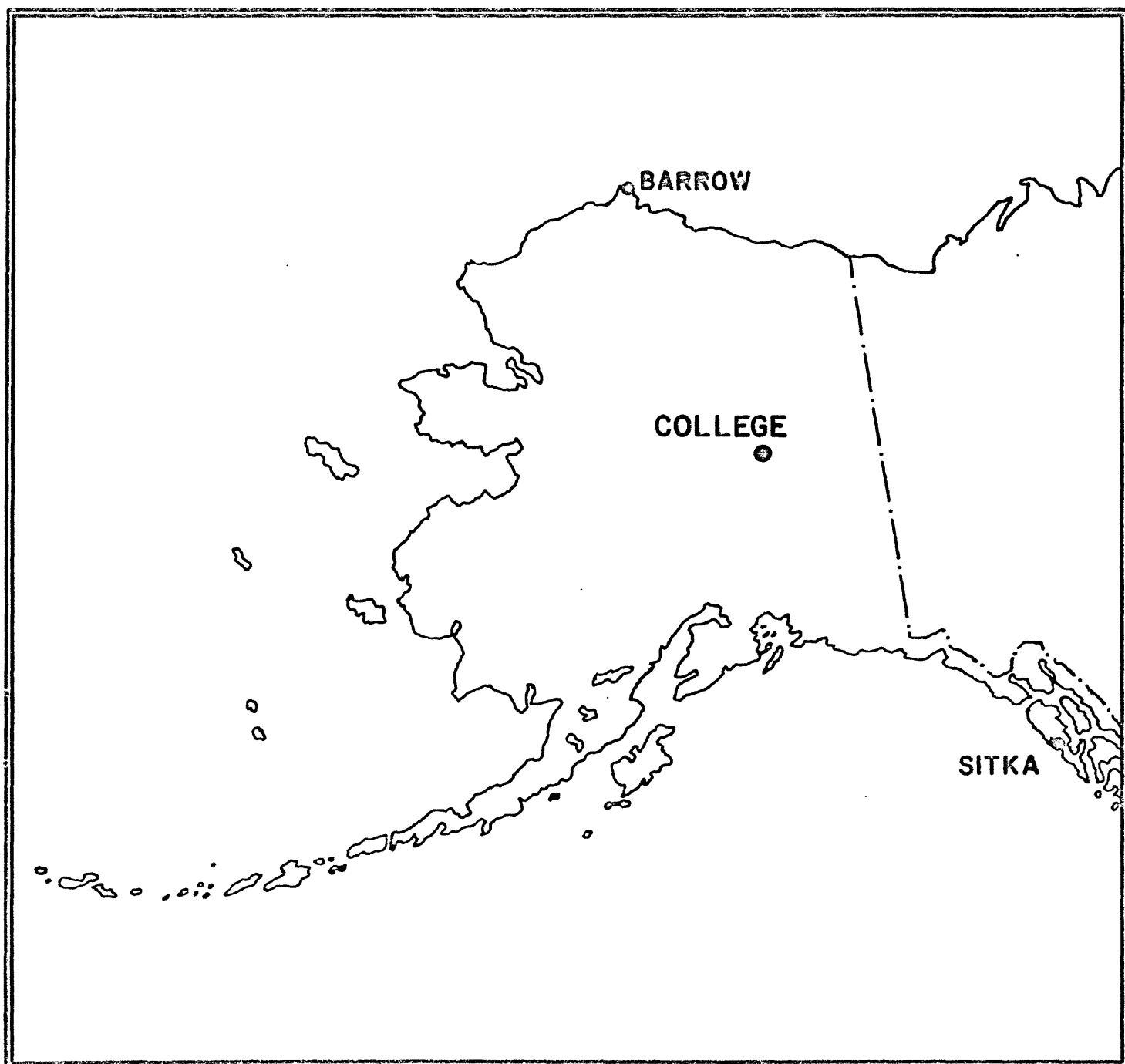


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

OCTOBER 1985

OPEN FILE REPORT 85-0300J



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSEND, CHIEF OF THE COLLEGE OBSERVATORY; WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: J.E. PAPP, E.A. SAUTER, 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..... $+256.0^{\circ}$
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 10 γ 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 (10 γ)

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.

COLLEGE, ALASKA

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

MONTH AND YEAR

OCTOBER 1985

DATE	K-INDICES									AK	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	1	1	0	0	1	0	0	0	03	01	SUDDEN COMMENCEMENTS			
2	1	0	3	3	0	1	1	1	10	05	d	h	m	
3	0	0	4	6	5	5	1	1	22	26				
4	1	2	3	4	4	4	2	2	22	15				
5	2	6	6	7	6	6	6	5	44	74				
6	5	4	7	6	6	5	3	3	39	57				
7	3	4	4	6	4	5	3	2	31	31				
8	3	3	3	5	5	3	2	2	26	21				
9	1	3	3	0	2	2	1	2	14	07				
10	0	2	3	2	4	0	1	0	12	07				
11	1	2	3	5	3	5	3	3	25	21				
12	3	2	1	3	2	3	1	2	17	09				
13	2	3	4	3	5	5	3	2	27	23				
14	1	2	1	5	2	2	1	0	14	10				
15	1	5	6	4	3	3	1	2	25	25				
16	3	2	4	6	4	3	1	2	25	23				
17	3	2	3	4	4	3	3	2	24	16				
18	3	2	4	6	6	5	2	3	31	35	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)			
19	3	2	4	7	4	2	1	0	23	28				
20	0	1	3	4	3	1	1	0	13	08				
21	0	1	2	3	4	4	3	3	20	14				
22	2	4	5	3	2	3	3	2	24	18				
23	2	2	2	5	5	3	2	2	23	18				
24	2	2	3	2	0	2	2	0	13	06	BEGIN	END		
25	3	1	3	4	3	2	3	2	21	13	d h m	d h m		
26	1	0	0	3	2	0	0	1	07	04				
27	0	0	0	0	0	1	0	1	02	01				
28	1	0	0	0	0	0	0	0	01	00				
29	1	3	4	6	4	1	0	0	19	19				
30	0	0	0	1	0	0	1	0	02	01				
31	0	0	0	1	4	2	3	1	11	07				

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

675.7

3.72

2510

H

322.2

7.80

2510

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John E. Papp, Assistant Chief, College Observatory

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY COLLEGE, ALASKA	
			MONTH	YEAR
			OCTOBER	1985
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
11	16xx	pg		
24	17xx	pc5		
27	21xx	pc5		
30	12xx	pc5		
IDENTIFIED BY: JEP			VERIFIED BY: JEP	

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

PRINCIPAL MAGNETIC STORMS
Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA
OCTOBER 1985

WDC-A FOR SOLAR-TERRESTRIAL 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
C0	64.6 N	05	03xx	..	..	..	..	05 06	4 3	7 7	283	1620	1100	08 17
		18	06xx	..	..	..	..	19	4	7	112	1210	480	19 16

OCTOBER 1985

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0000 U.T., 10-1-85	2400 U.T., 10-31-85	1.0/mm	3.78/mm	27° 16.8 E
H	0000 U.T., 10-1-85	2400 U.T., 10-15-85	7.88/mm		126898
	0000 U.T., 10-16-85	2400 U.T., 10-31-85	"		126748
Z	0000 U.T., 10-1-85	2400 U.T., 10-15-85	7.68/mm		551688
	0000 U.T., 10-16-85	2400 U.T., 10-31-85	"		551798

STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0000 U.T., 10-1-85	2400 U.T., 10-31-85	7.9/mm	29.58/mm	23° 45.0 E
H	0000 U.T., 10-1-85	2400 U.T., 10-15-85	43.98/mm		107248
	0000 U.T., 10-16-85	2400 U.T., 10-31-85	"		107088
Z	0000 U.T., 10-1-85	2400 U.T., 10-31-85	48.28/mm		541108

RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 36.7 E	128938	553368

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: OCT 1, 2, 9, 10, 24, 26, 27, 28, 30, 31

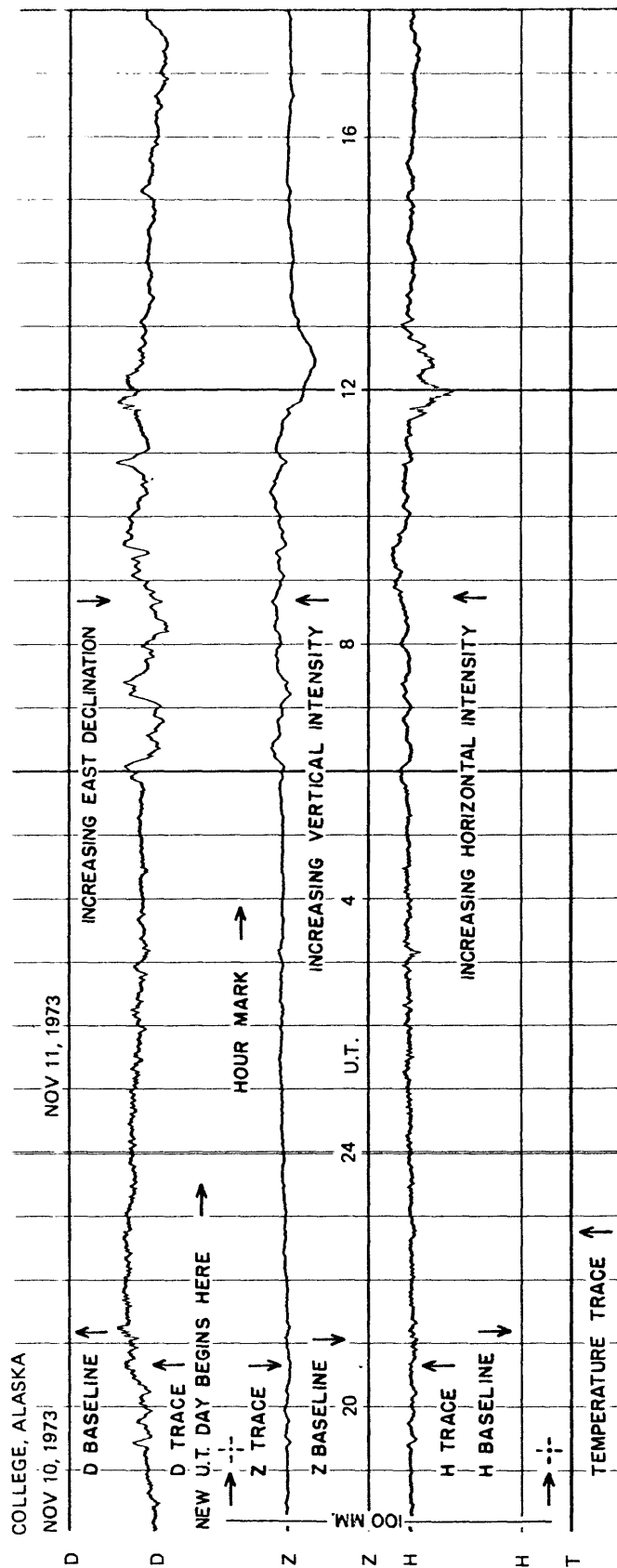
FORM C&G-404a

MAGNETOGRAM HOURLY SCALINGS

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day 20W M.T. is hour 08 of the same universal day. Corrections have been applied. Negative values are in red. With minus signs shown.

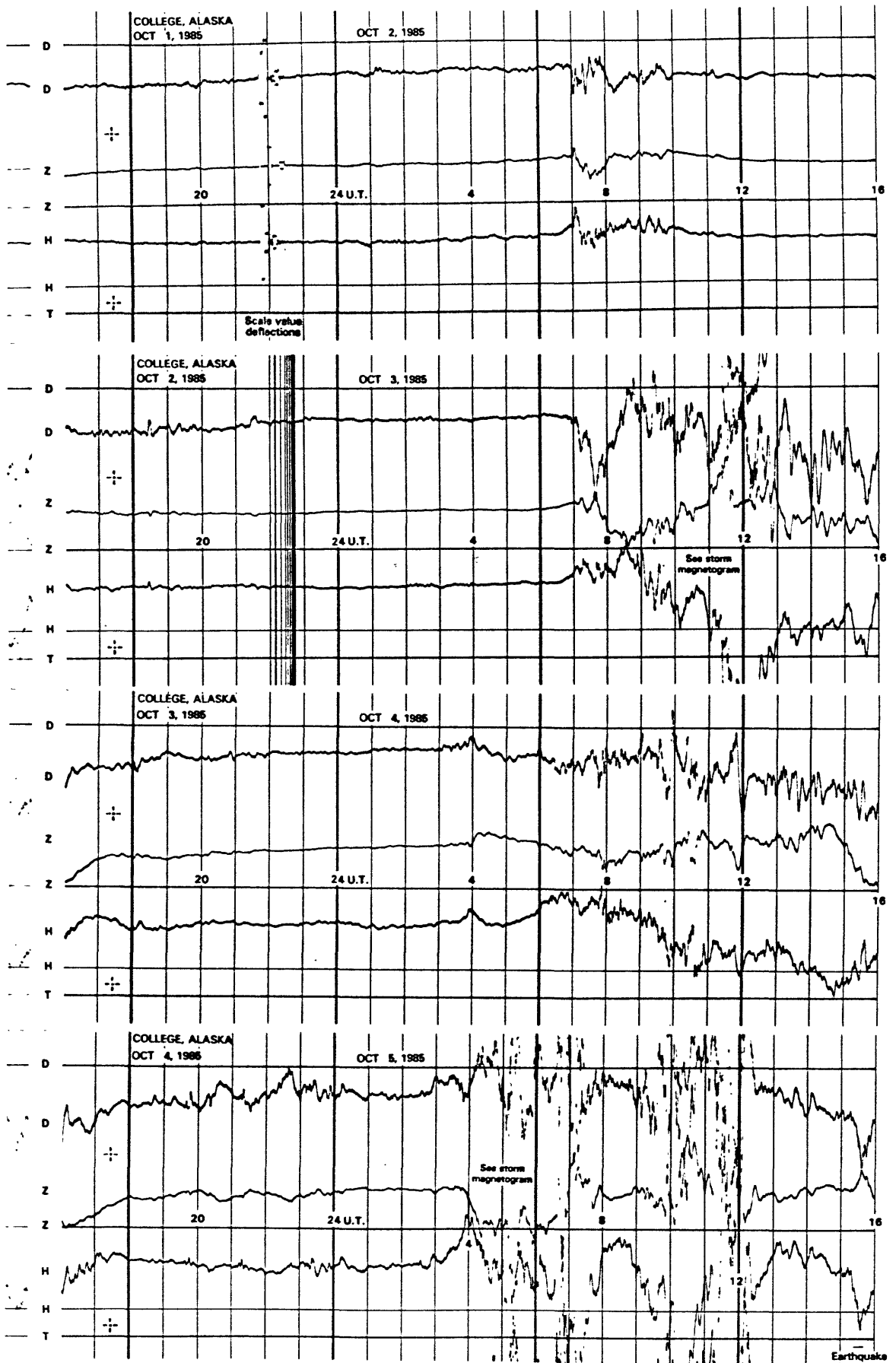
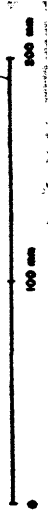
MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)													U.S. DEPARTMENT OF INTERIOR Geological Survey, Geologic Division Bismarck, ND 58105													OBSY.		YEAR		MONTH		ELEM- ENT	
Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.													of the SAME universal day.													CO		85		OCT		D	
C	S	Q	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	SUM						
01	170	173	165	183	187	196	197	196	197	196	193	206	235	233	01	230	230	243	273	239	240	233	233	217	208	203	188	5071					
02	182	173	183	163	163	173	153	208	238	202	200	213	213	213	02	213	213	223	225	253	259	243	234	236	202	193	177	4922					
03	183	186	180	187	177	171	166	380	173	147	240	239	446	333	03	446	333	419	467	269	247	200	182	186	170	159	157	5664					
04	154	132	133	110	142	170	208	206	176	163	241	242	313	330	04	313	330	343	431	340	248	220	216	161	191	113	138	5121					
05	156	166	152	100	-10	160	-63	212	103	211	239	517	48	177	05	48	177	238	360	462	265	192	280	228	-40	144	217	4414					
06	150	215	155	171	280	172	661	200	-63	-190	271	233	239	319	06	239	319	384	222	210	225	239	195	160	167	176	129	4920					
07	136	182	192	160	371	252	207	336	171	158	209	359	168	171	07	168	171	366	520	212	212	197	160	138	146	143	190	5356					
08	188	160	145	164	322	245	182	279	184	176	107	180	226	169	08	226	169	236	348	288	221	213	163	145	130	146	165	4782					
09	183	194	197	199	183	267	251	203	186	189	208	203	205	215	09	205	215	189	232	216	245	208	210	199	190	177	177	4926					
10	173	187	177	169	177	177	170	209	181	176	189	210	219	259	10	219	259	200	402	277	291	275	240	236	189	147	135	5097					
11	169	183	185	177	183	157	148	352	144	82	117	234	214	228	11	214	228	237	255	248	199	251	230	191	165	150	157	4618					
12	118	156	160	193	196	183	177	180	180	162	199	189	207	334	12	207	334	279	218	317	236	237	186	155	175	165	184	4988					
13	173	193	173	188	193	157	186	180	228	277	157	190	228	227	13	228	227	236	227	223	217	241	226	212	195	190	183	4727					
14	187	183	160	146	169	156	197	197	198	199	196	134	221	238	14	221	238	242	227	221	229	215	212	208	208	171	131	4914					
15	192	186	193	199	139	287	210	327	88	205	173	192	224	240	15	224	240	294	238	240	249	252	225	214	201	199	177	4991					
16	156	161	162	145	190	182	140	446	52	152	216	236	254	202	16	254	202	228	239	262	294	374	213	197	208	175	146	5046					
17	142	158	167	164	143	196	188	166	213	194	185	238	279	268	17	279	268	418	309	292	188	233	238	210	200	149	133	5025					
18	126	115	161	189	173	153	164	191	160	163	202	311	142	228	18	142	228	239	206	227	237	236	230	219	203	189	177	4641					
19	138	168	152	174	159	172	165	279	267	175	104	155	222	203	19	222	203	217	213	213	210	213	217	212	202	189	177	4825					
20	182	180	187	173	180	182	179	200	324	165	180	205	221	278	20	221	278	263	317	353	239	244	258	203	197	205	173	5221					
21	179	177	185	173	188	191	187	181	174	197	195	203	223	200	21	223	200	207	199	227	184	207	197	165	142	146	162	4386					
22	146	118	179	143	144	188	235	192	241	160	193	188	202	194	22	202	194	205	217	220	222	210	180	184	171	157	150	4363					
23	191	183	179	193	174	173	218	209	181	169	200	187	218	216	23	218	216	218	228	222	238	222	212	198	181	177	4796						
24	158	182	170	181	194	165	200	177	204	190	198	215	226	220	24	226	220	178	224	234	228	220	169	170	201	185	173	4699					
25	179	184	174	192	177	184	215	170	200	185	195	216	210	197	25	210	197	207	208	217	219	227	217	203	193	176	175	4737					
26	171	178	191	187	177	187	203	178	195	197	203	221	203	203	26	203	203	210	213	220	224	235	230	212	187	163	153	4773					
27	177	187	193	193	196	198	196	193	196	193	197	201	202	206	27	202	206	208	215	221	227	233	223	206	187	177	175	4675					
28	145	177	173	193	187	185	177	193	179	189	195	202	202	202	28	202	206	208	215	221	227	233	223	206	187	177	175	4675					
29	179	173	166	158	76	155	178	187	160	239	441	248	322	243	29	322	243	198	237	254	225	227	220	201	173	166	172	4998					
30	173	187	193	197	198	195	195	191	191	193	202	193	208	216	30	208	216	217	226	237	243	236	217	203	188	185	191	4875					
31	182	176	173	175	160	191	203	202	201	199	197	207	309	226	31	309	226	248	265	244	212	154	188	190	192	180	168	4844					
SCALED BY	LYT		Preliminary base-line and scale values:		Scale Value		Base-line Value		Punches		MONTHLY SUM		MONTHLY MEAN		GATES WITH GAPS:		151,314		203		4844		151,314		203								
CHECKED BY	EAS, JEP		Interpolated		Significant portion of hour interpolated.		No record; or no value available because of faulty record.		Derived from STORE		Mgph., converted to Normal Mgph.		Scaling uncertain because of magnetic storm.		<> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.																		
SIGNED BY	JEP		Interpolated		Significant portion of hour interpolated.		No record; or no value available because of faulty record.		Derived from STORE		Mgph., converted to Normal Mgph.		Scaling uncertain because of magnetic storm.		<> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.																		
PUNCHED BY	JEP		Interpolated		Significant portion of hour interpolated.		No record; or no value available because of faulty record.		Derived from STORE		Mgph., converted to Normal Mgph.		Scaling uncertain because of magnetic storm.		<> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.																		

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

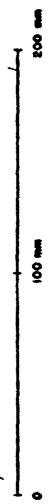


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

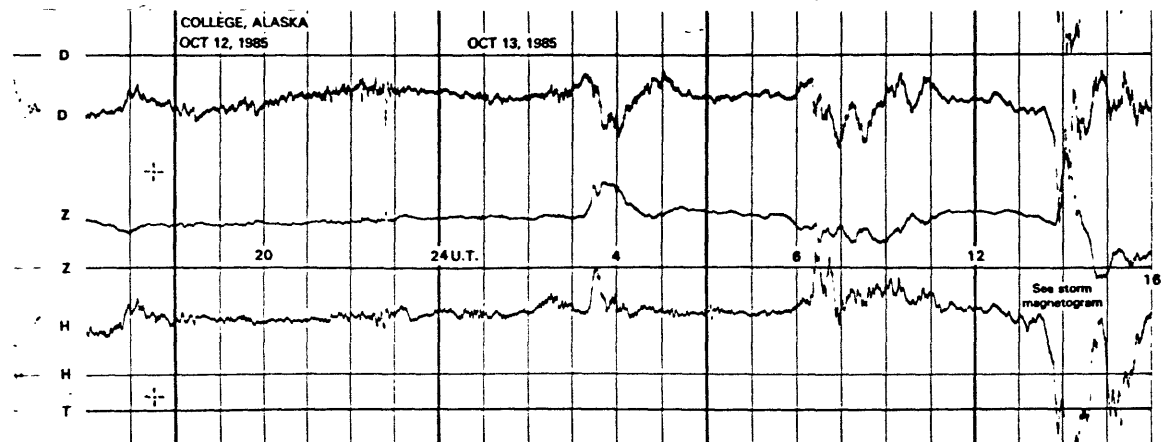
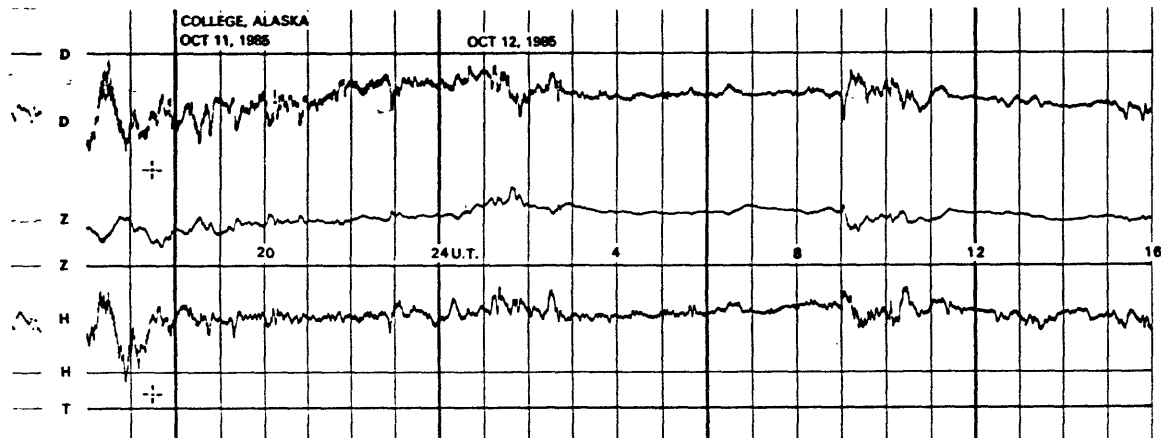
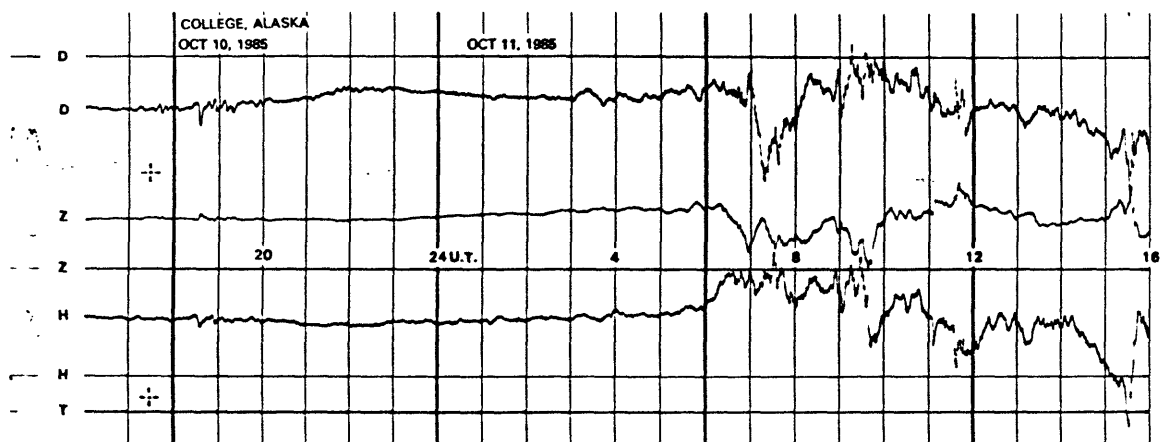
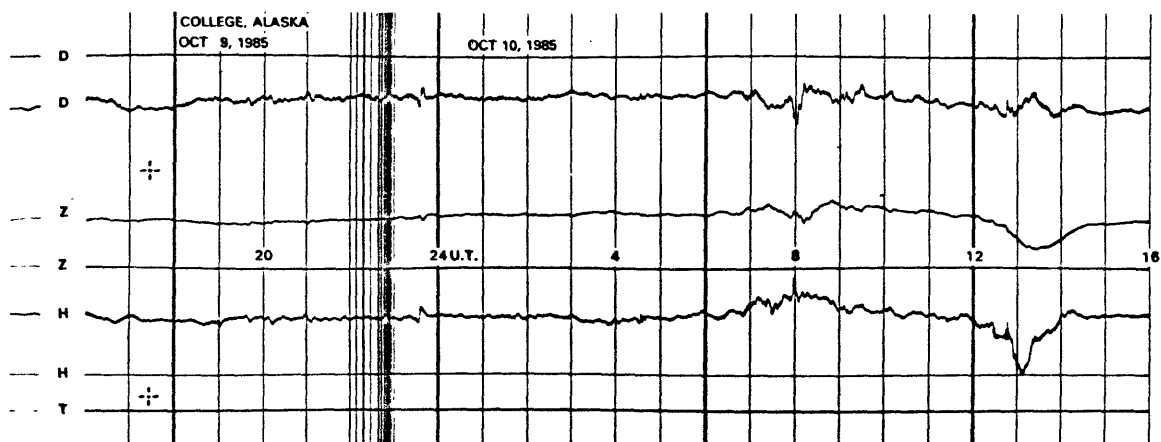
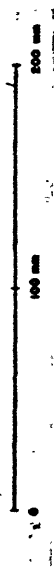
NORMAL MAGNETOGRAMS



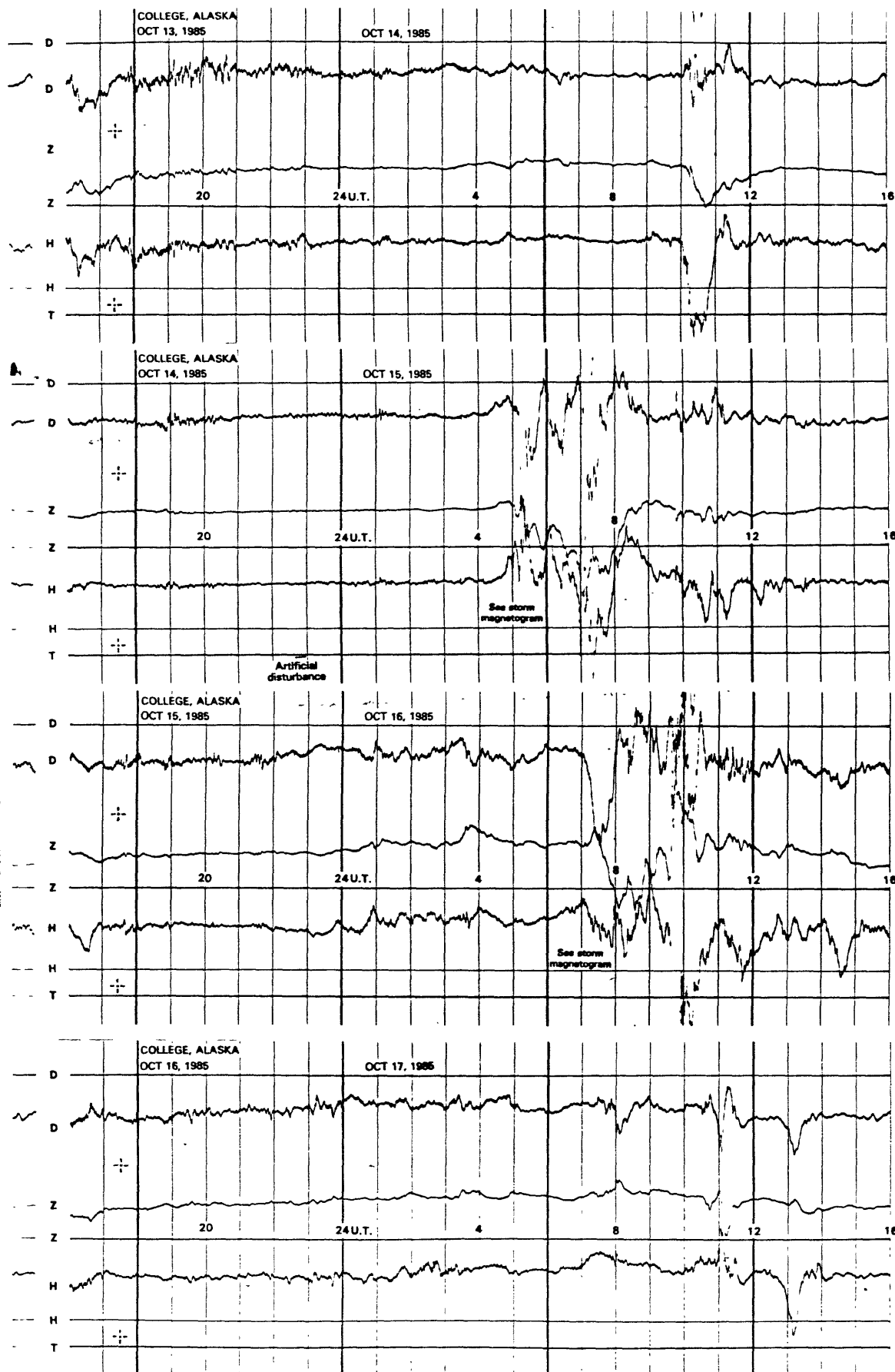
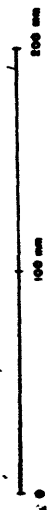
NORMAL MAGNETOGRAMS



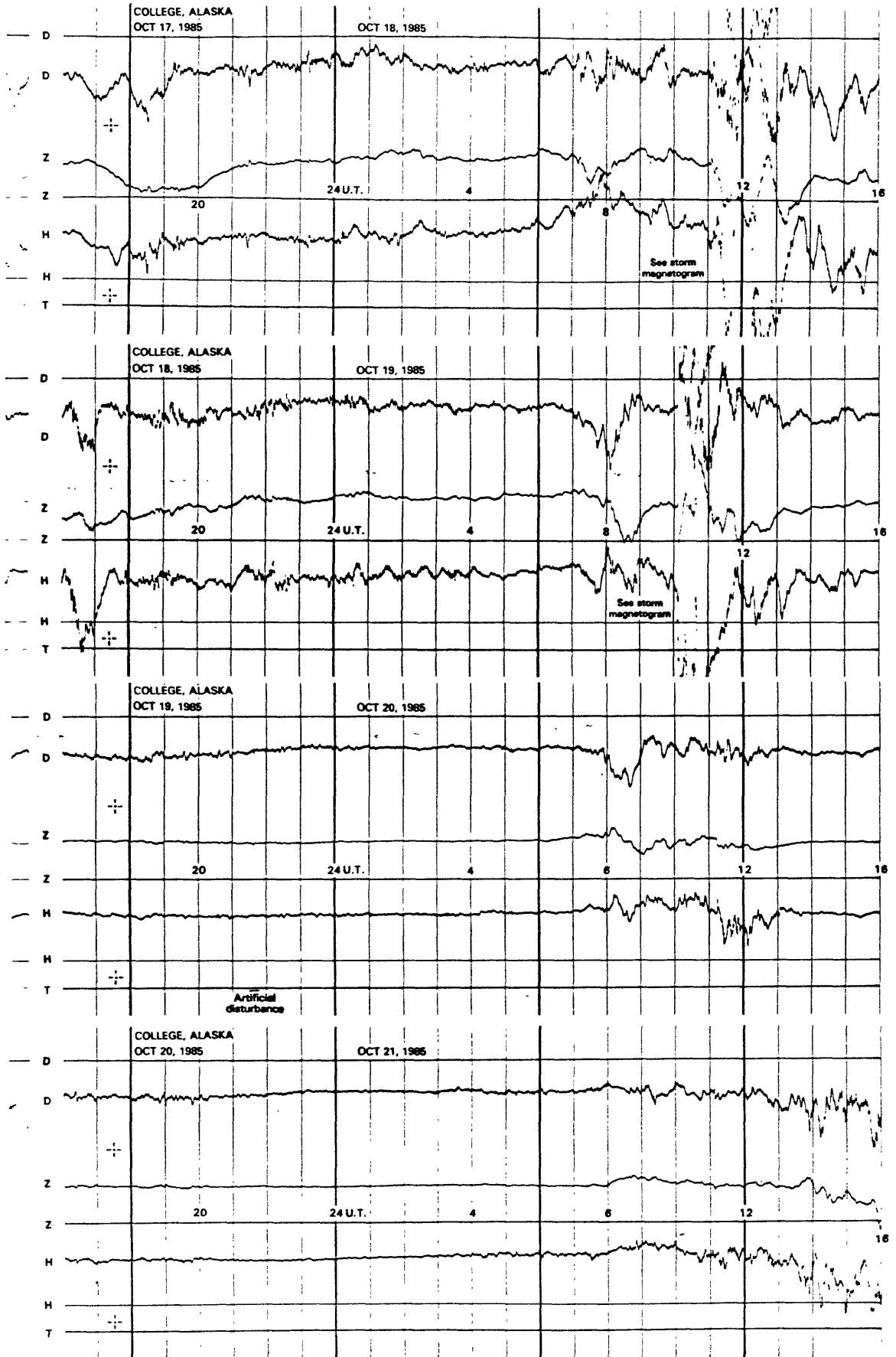
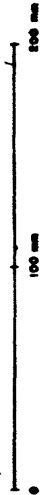
NORMAL MAGNETOGRAMS



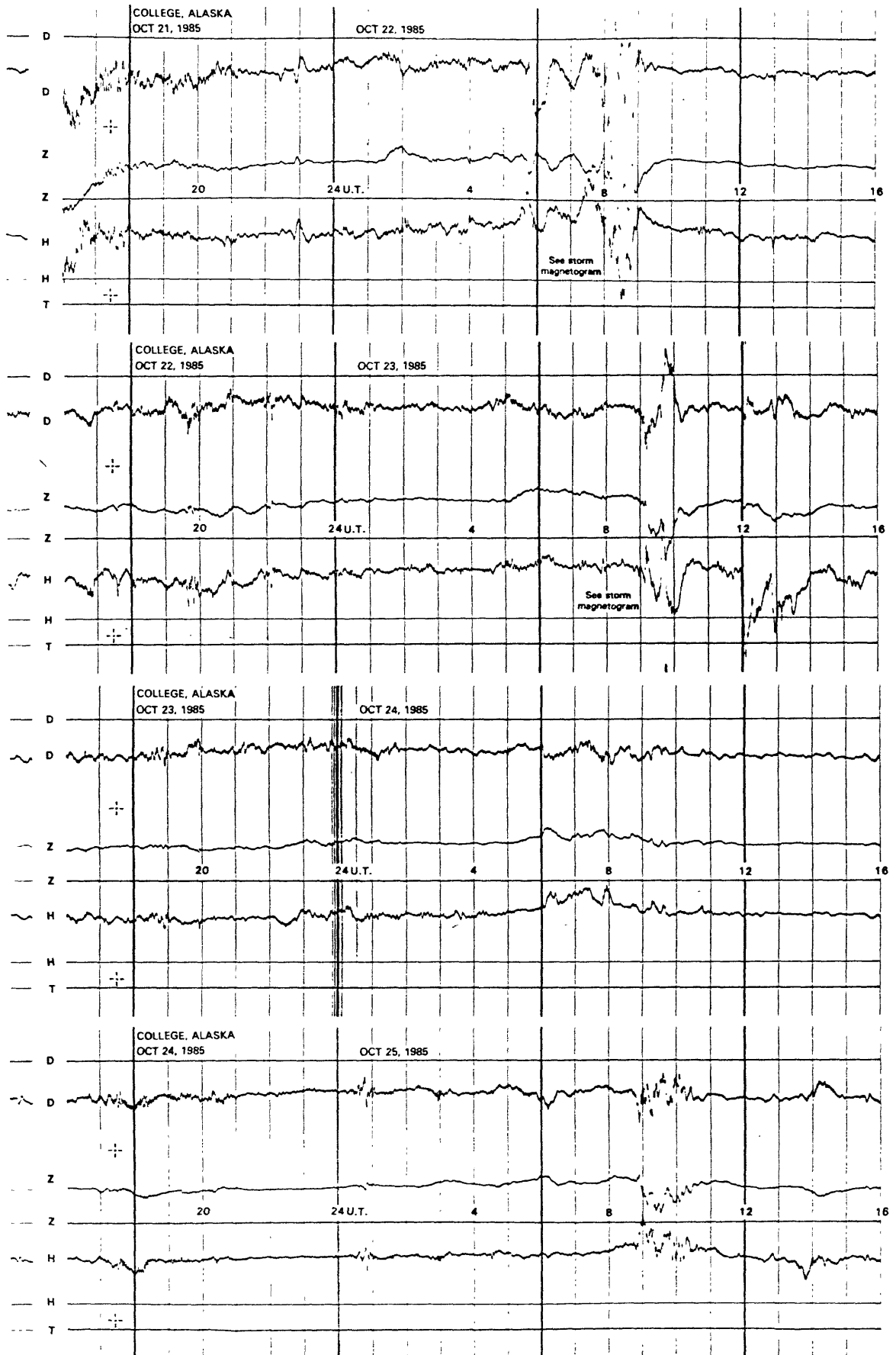
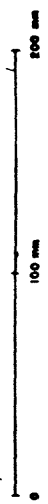
NORMAL MAGNETOGRAMS



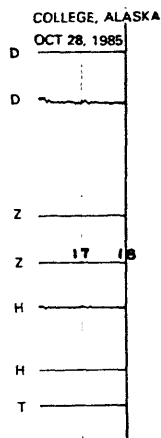
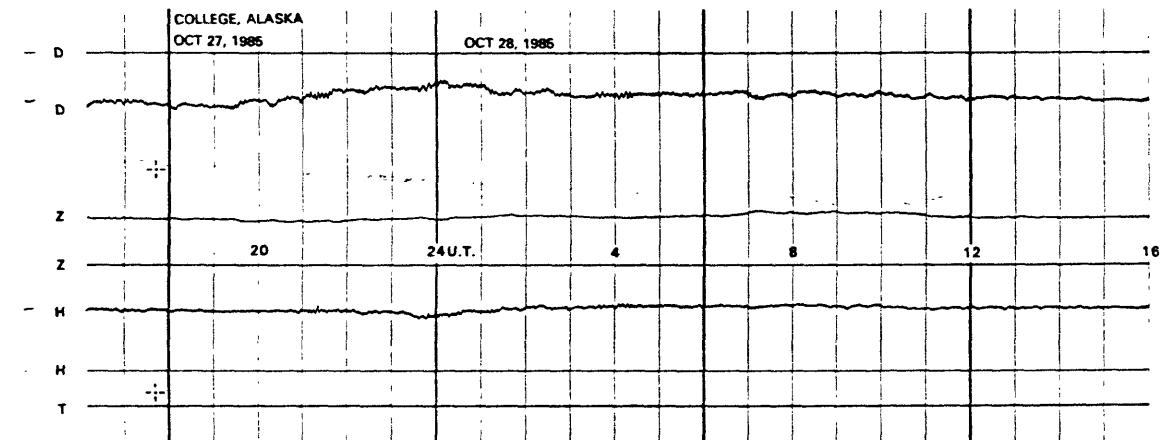
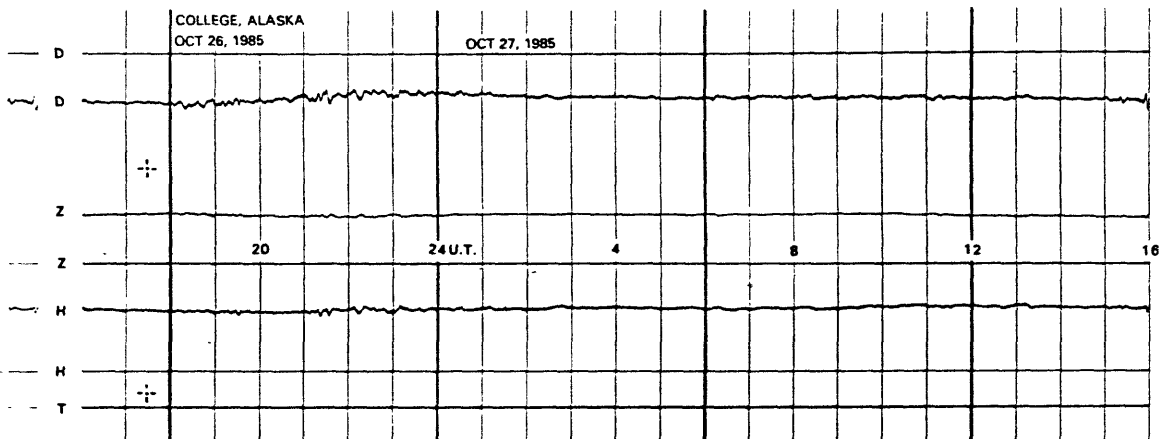
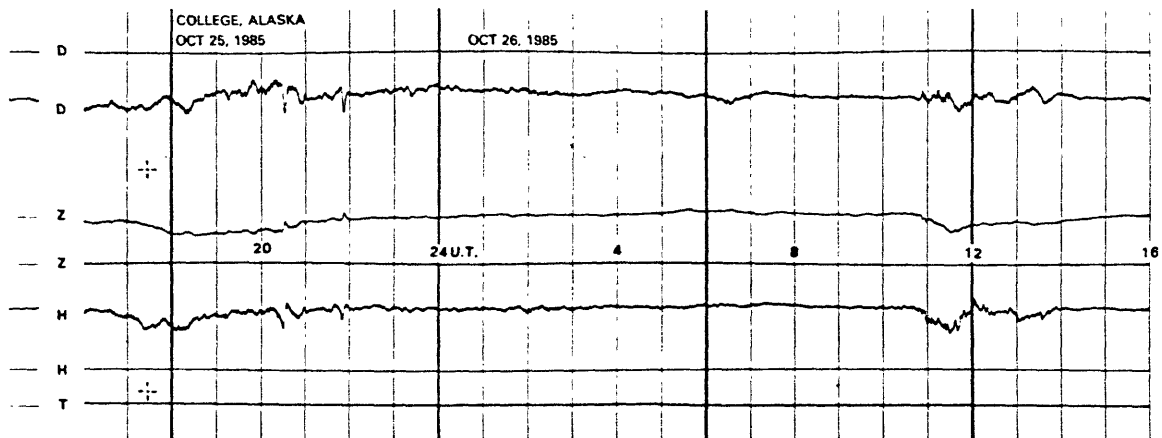
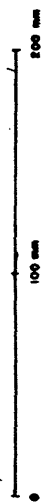
NORMAL MAGNETOGRAMS



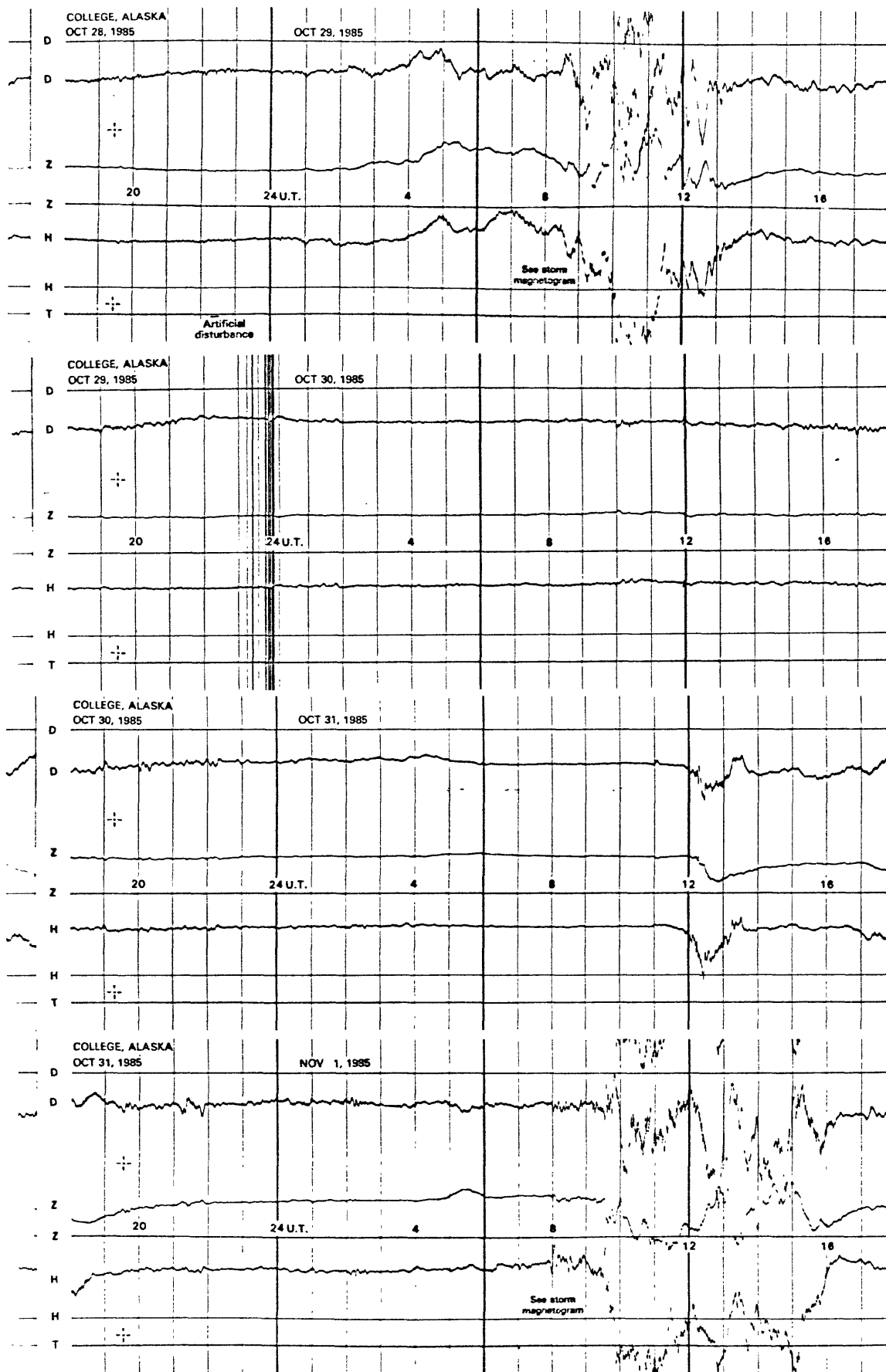
NORMAL MAGNETOGRAMS



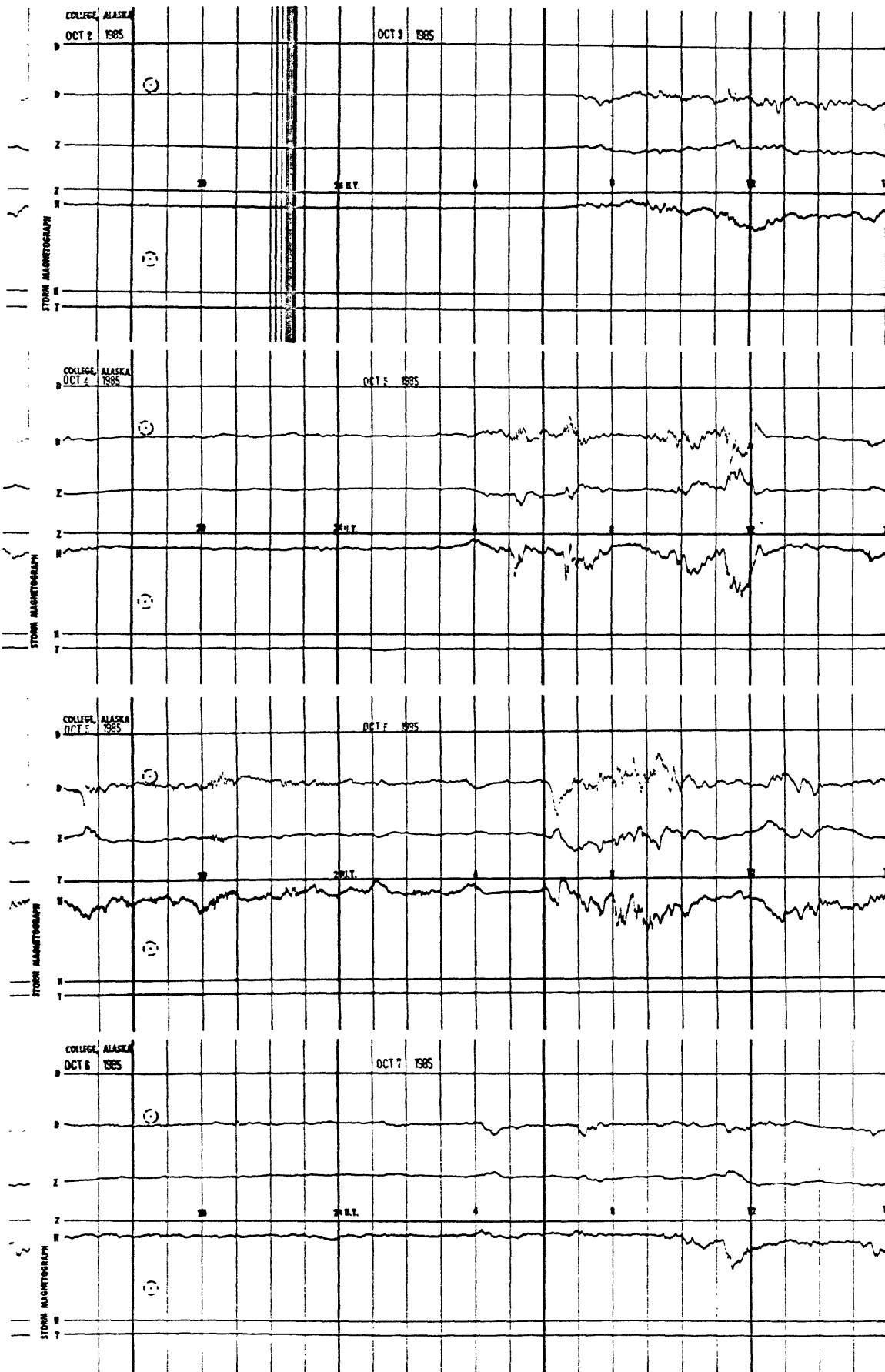
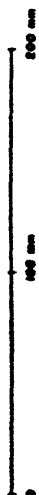
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

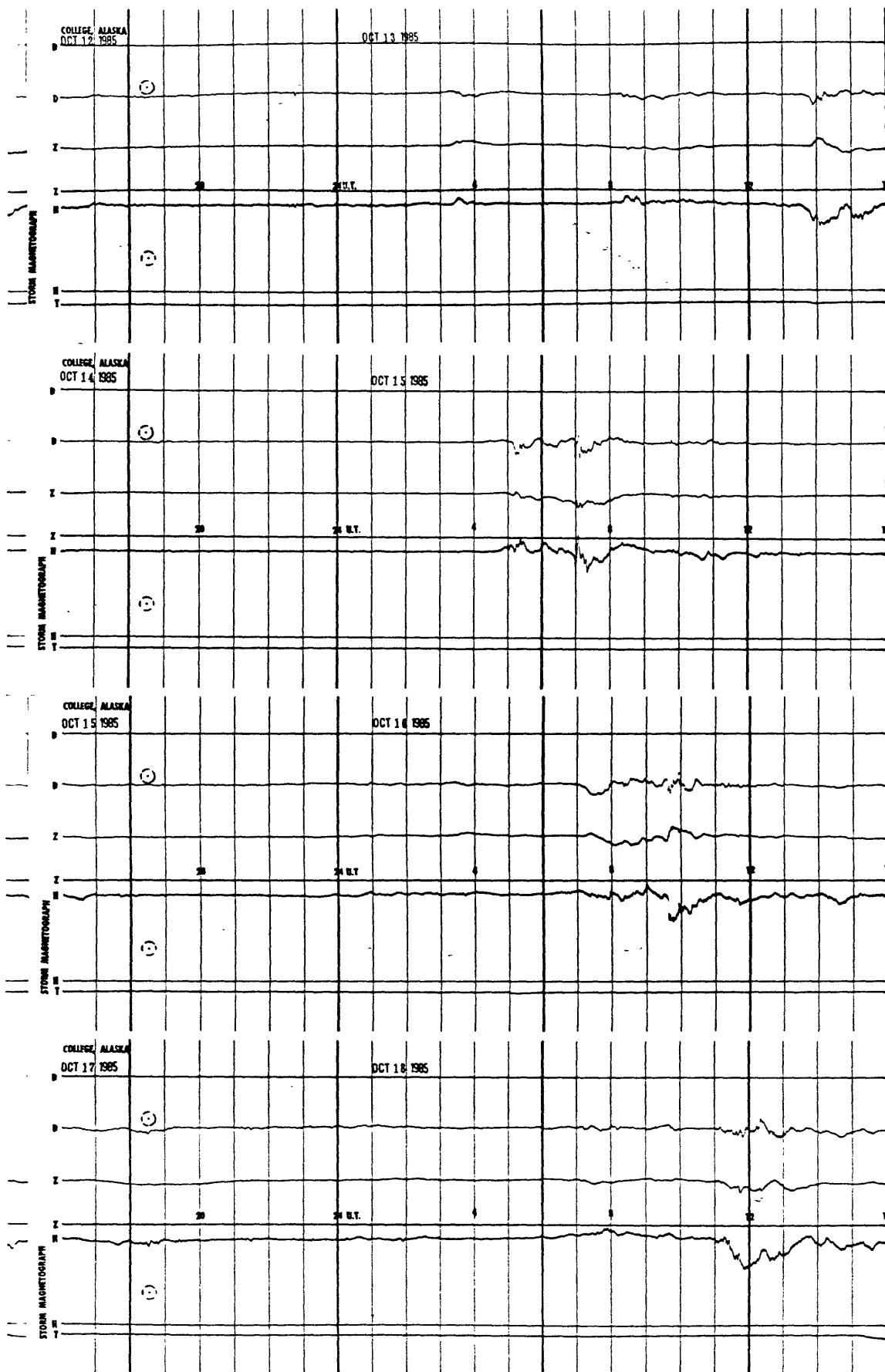


STORM MAGNETOGRAMS

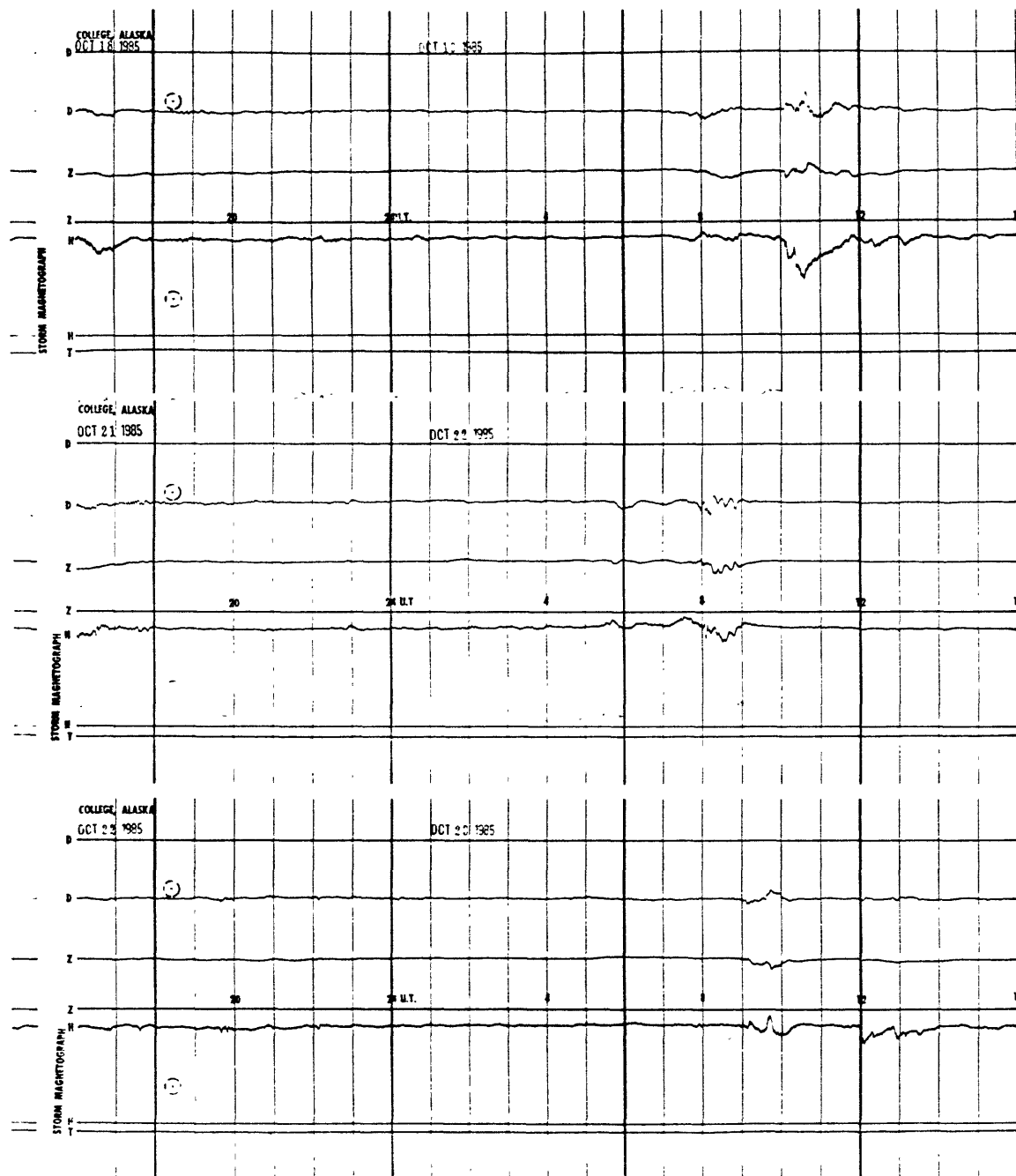


STORM MAGNETOGRAMS

100 nm
100 nm



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

0 500 mV
0 500 mV

