

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

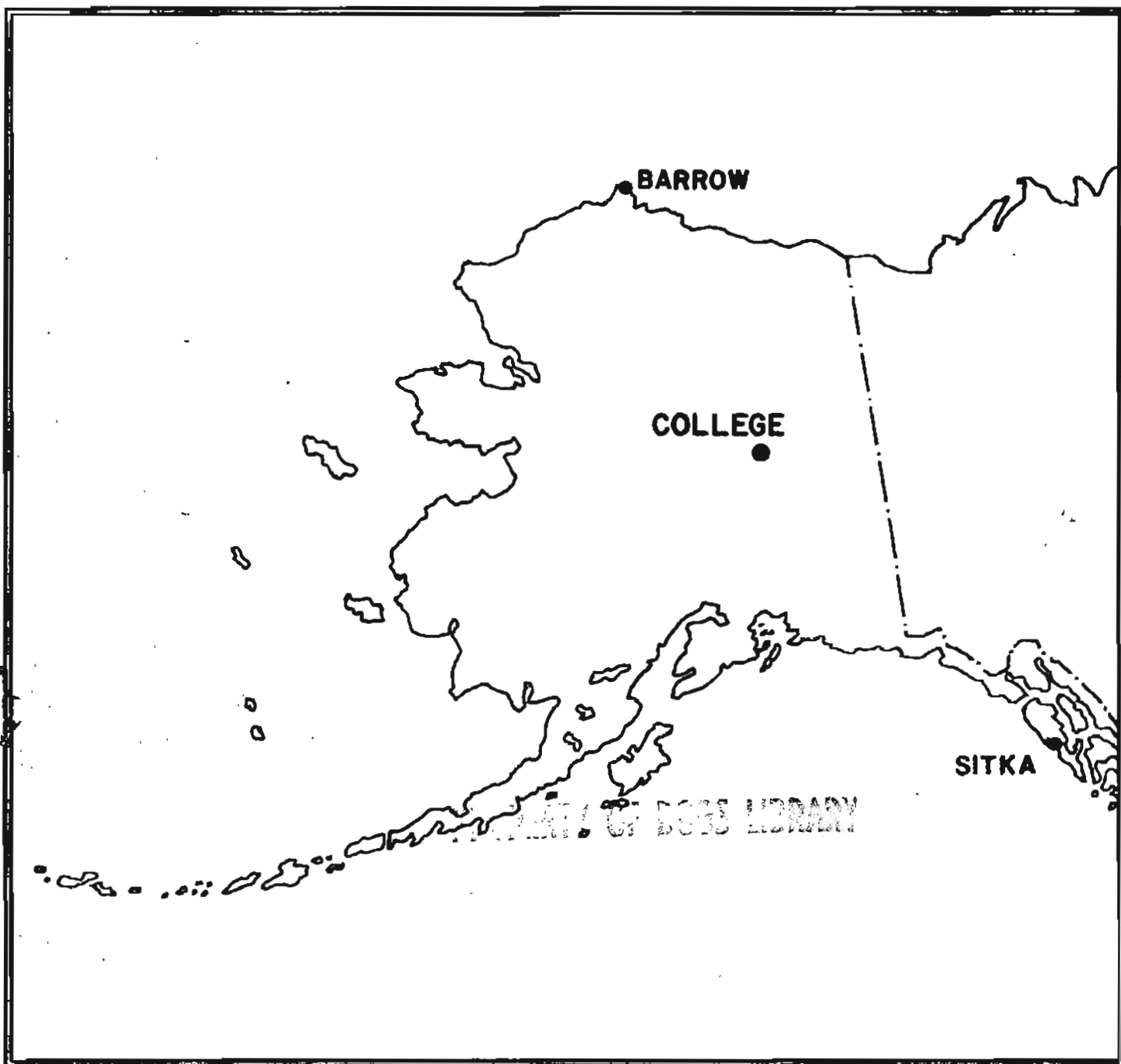
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

AUGUST 1986

OPEN FILE REPORT 86-0300H



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 AND L.Y. TORRENCE AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA. 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

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..... $+256.5^{\circ}$
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
0-11	0
11-50	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:

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

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.

College, Alaska

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

MONTH AND YEAR

August 1986

DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS		
	03-05	06-08	09-11	12-14	15-17	18-20	21-24	20 mm/hr					
1	2	2	3	2	2	1	1	2	15	07	SUDDEN COMMENCEMENTS		
2	1	2	3	2	2	0	0	1	11	05	d	h	m
3	2	4	4	7	4	4	3	3	31	36			
4	4	4	4	5	5	3	2	2	29	26			
5	2	3	2	3	3	1	2	2	18	10			
6	2	2	3	0	1	2	1	1	12	06			
7	1	0	1	1	1	1	1	2	08	03			
8	2	2	3	3	4	4	2	1	21	14			
9	1	2	0	1	3	3	3	2	15	08			
10	2	1	2	2	2	1	1	1	12	05			
11	2	2	2	5	5	4	1	0	21	18			
12	1	4	6	5	3	2	1	1	23	23			
13	1	3	4	6	7	3	1	2	27	36			
14	1	1	0	1	2	2	1	1	09	04			
15	1	2	1	5	4	1	1	1	16	12			
16	1	1	1	2	0	0	1	1	07	03			
17	1	2	0	2	1	1	0	0	07	03			
18	1	1	0	0	0	0	0	0	02	01	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
19	1	0	2	5	4	1	1	0	14	11			
20	1	1	2	2	3	4	4	3	20	13			
21	3	3	5	6	7	6	2	3	35	50			
22	3	5	6	5	7	4	3	3	36	49			
23	2	4	6	5	5	5	3	3	33	36			
24	3	3	4	3	4	5	5	3	30	26	BEGIN	END	
25	4	4	5	5	3	2	2	2	27	23	d	h	m
26	3	3	4	4	6	3	1	1	25	23			
27	3	2	4	5	7	2	1	2	26	32			
28	2	2	2	4	6	4	3	2	25	22			
29	3	4	5	5	5	5	2	2	31	31			
30	3	3	4	5	5	3	3	3	29	25			
31	5	5	2	4	3	3	2	2	26	22			

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		
	3.71	7.80		
	2510	2510		

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY	
			College, Alaska	
			MONTH	YEAR
			August	1986
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
			<p style="text-align: center;"> OUTSTANDING MAGNETIC EFFECTS ARE DISCONTINUED STARTING AUGUST 1, 1986 AND WILL NOT APPEAR IN THIS REPORT IN THE FUTURE. </p>	
IDENTIFIED BY:			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

AUGUST 19 86

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

Data from Individual Observatories:

Obs. # 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	20	1351	s.c.*	..	+20	..	21	5	7	198	1490	1230	21	20

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 8-1-86	2400 U.T., 8-31-86	1.0/mm	3.78/mm	27° 16.3 E
B	0000 U.T., 8-1-86	2400 U.T., 8-31-86	7.88/mm		126888
Z	0000 U.T., 8-1-86	2400 U.T., 8-31-86	7.78/mm		551728

STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 8-1-86	2400 U.T., 8-31-86	7.9/mm	29.58/mm	23° 44.8 E
B	0000 U.T., 8-1-86	2400 U.T., 8-31-86	49.88/mm		107258
Z	0000 U.T., 8-1-86	2400 U.T., 8-31-86	48.78/mm		541128

RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
B				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	B	Z
27° 29.4 E	128718	553188

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: AUG 7, 14, 16, 17, 18

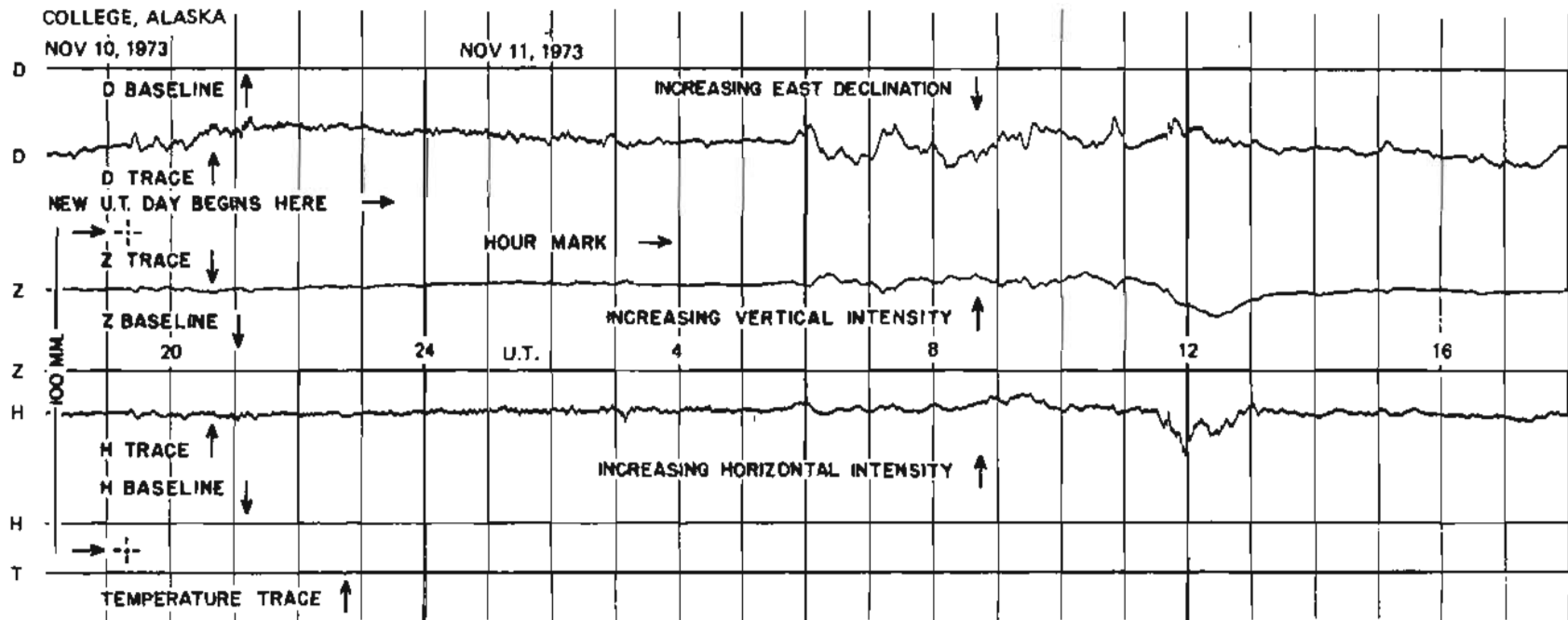
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

Values are in tenths of mm and are averages for successive periods of one hour beginning at midnight. Smallpage corrections have been applied. Negative values in red with minus.

COMPONENT		D					H					Z					COMPONENT			
DAY	h ₁	07	14	16	17	18	07	14	16	17	18	07	14	16	17	18	07	18	DAY	h ₂
	01	80	57	78	70	68	220	227	220	234	228	190	201	221	189	189	190	201	17	01
	02	80	68	79	71	78	230	241	233	230	232	192	205	221	189	189	192	205	18	02
	03	90	90	82	77	84	232	242	231	243	238	195	206	214	190	190	195	206	19	03
	04	100	110	101	78	87	242	240	224	248	240	195	205	210	182	191	195	205	20	04
	05	104	119	116	79	93	244	240	235	234	240	197	210	199	187	193	197	210	21	05
	06	107	122	110	115	101	245	239	244	254	249	191	210	198	185	199	191	210	22	06
	07	107	116	105	100	116	259	246	248	247	243	200	201	199	186	210	200	201	23	07
	08	103	110	97	106	99	259	241	260	240	247	200	200	208	183	200	200	200	24	08
	09	94	100	110	99	103	272	247	259	248	247	203	203	204	196	200	203	203	25	09
	10	112	136	102	108	107	268	251	260	250	247	203	200	210	208	199	203	200	26	10
	11	104	110	107	129	112	258	270	239	251	249	220	191	181	190	195	190	190	27	11
	12	120	104	112	147	119	260	259	241	230	257	211	200	144	171	197	211	200	28	12
	13	133	139	122	148	152	244	224	247	236	248	205	152	183	138	190	205	152	29	13
	14	142	200	137	155	158	240	222	240	242	249	205	156	190	149	189	205	156	30	14
	15	188	231	176	177	179	221	250	241	250	241	190	168	198	174	186	190	168	31	15
	16	232	232	189	197	213	230	249	238	248	239	146	181	192	184	185	146	181	32	16
	17	250	235	201	218	220	249	240	231	240	242	162	187	196	188	188	162	187	33	17
	18	244	209	244	255	250	227	208	220	219	237	181	173	191	191	189	181	173	34	18
	19	250	196	223	207	201	212	210	208	209	225	184	159	190	190	190	184	159	35	19
	20	184	176	184	191	170	203	211	204	201	210	181	157	190	189	190	181	157	36	20
	21	148	142	144	148	139	200	211	208	200	201	181	162	179	181	190	181	162	37	21
	22	109	90	99	108	118	209	194	221	208	199	181	170	178	181	198	181	170	38	22
	23	94	57	85	77	104	211	204	230	218	199	190	180	179	188	199	190	180	39	23
	24	65	50	76	72	90	222	215	239	222	207	191	188	183	190	198	191	188	40	24
	DAILY SUM	3235	3025	3109	3112	3145	5622	5581	5627	5615	5621	4661	4445	4625	4648	4648	4661	4445	DAILY SUM	
	DAILY MEAN	135	126	130	130	131	234	233	234	234	234	194	185	191	194	194	194	185	DAILY MEAN	
	MEAN			132			234		234		234			191					MEAN	

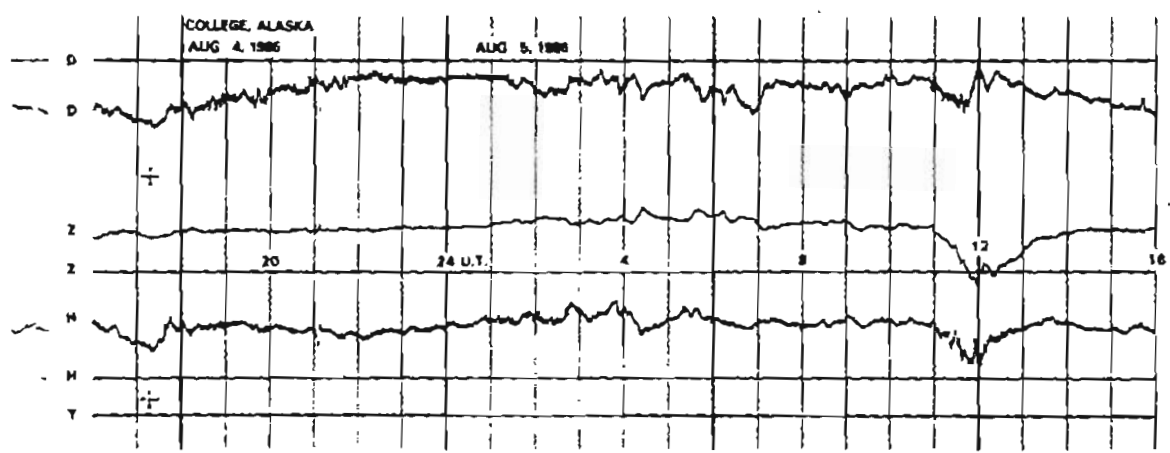
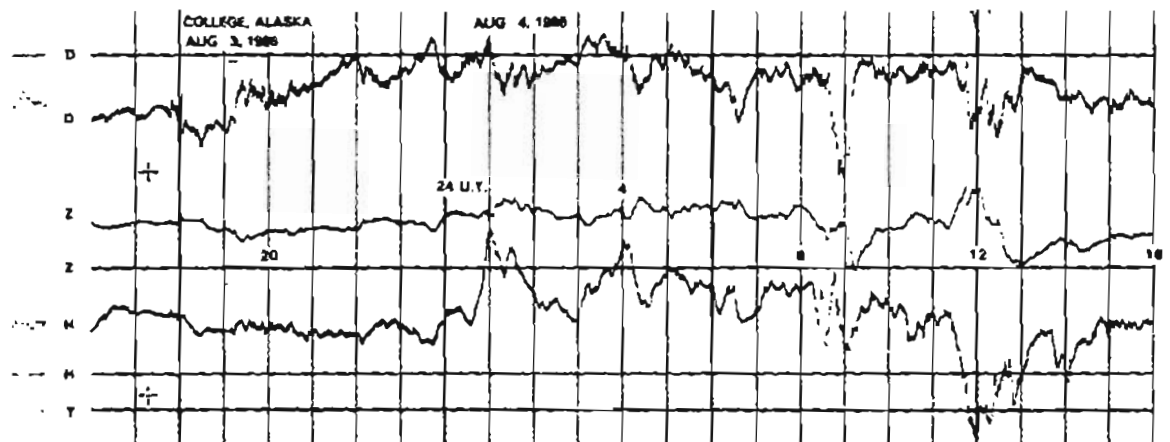
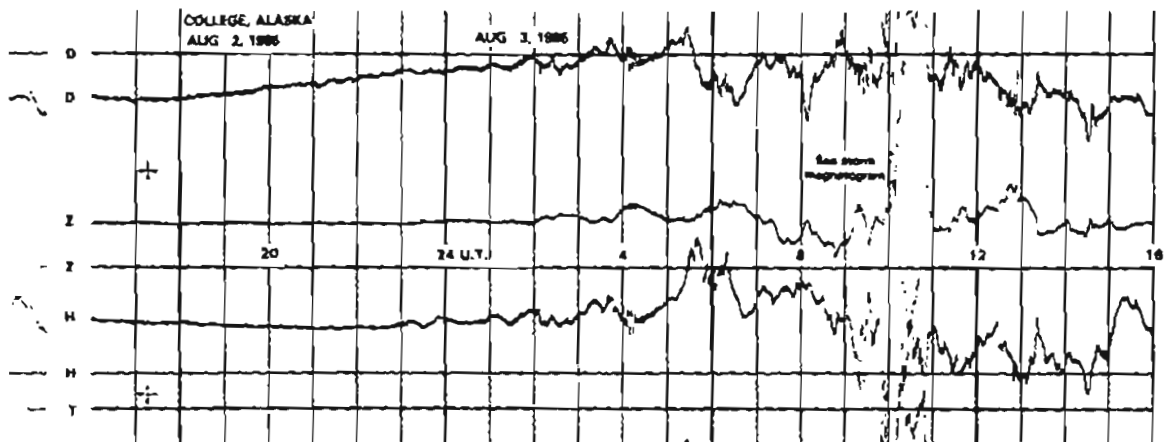
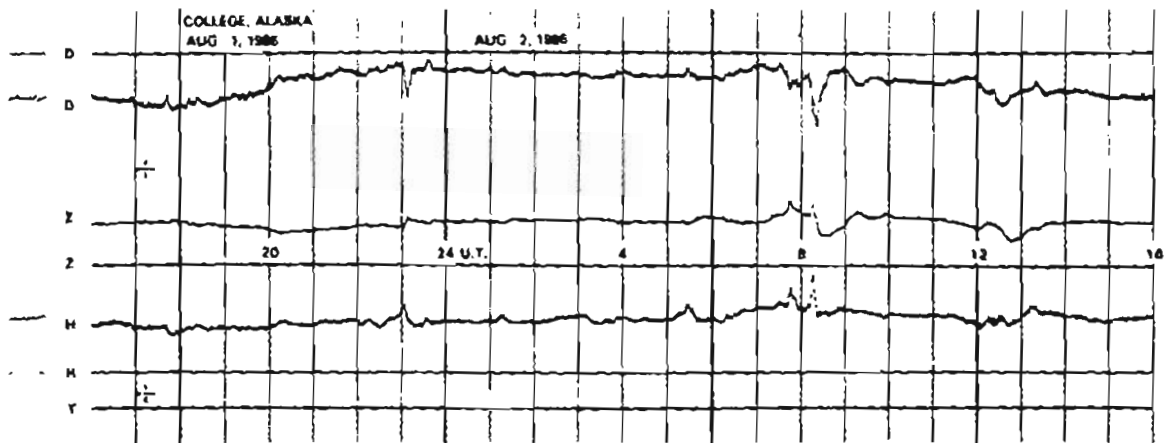
Scaled - JEP
Checked - MKC

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



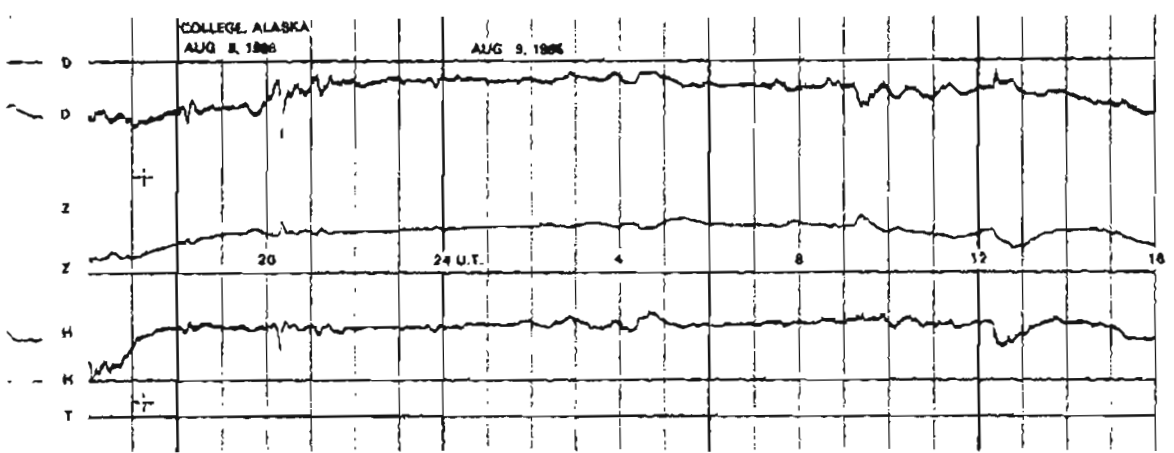
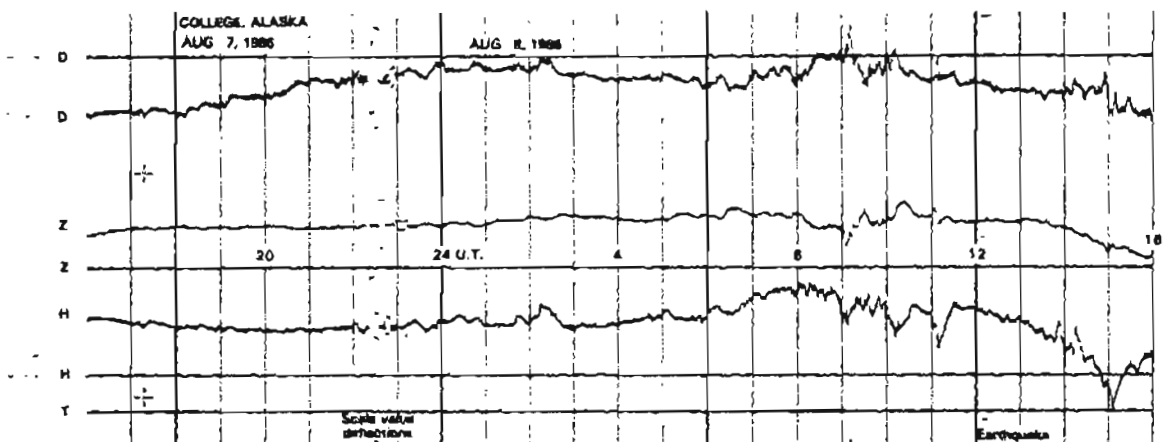
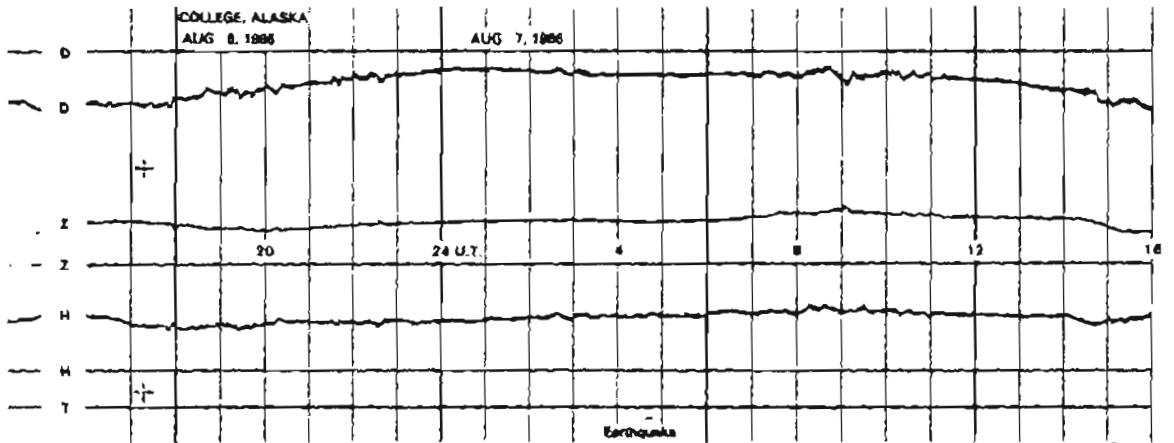
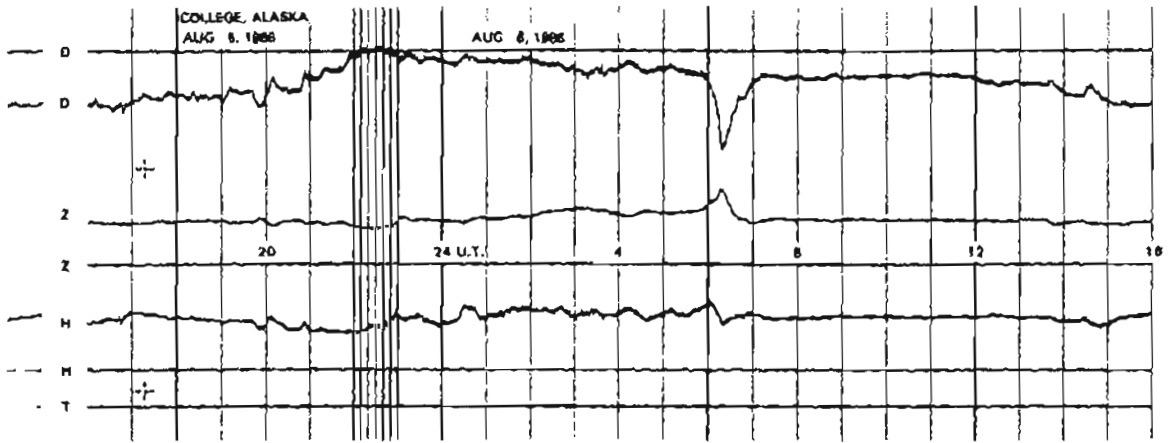
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

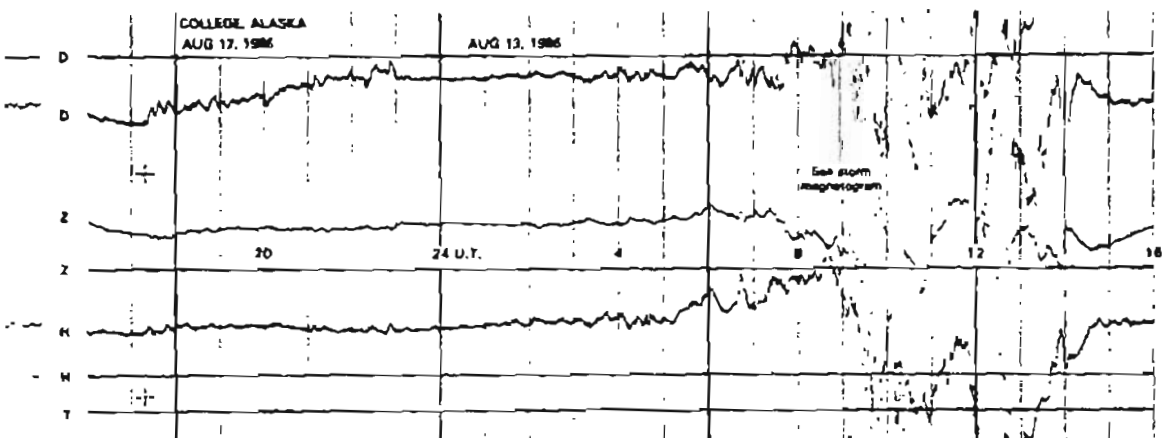
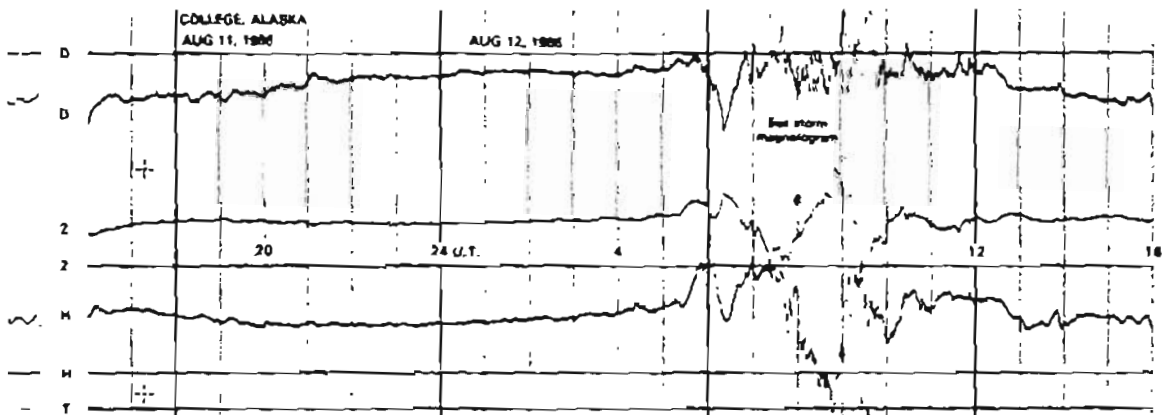
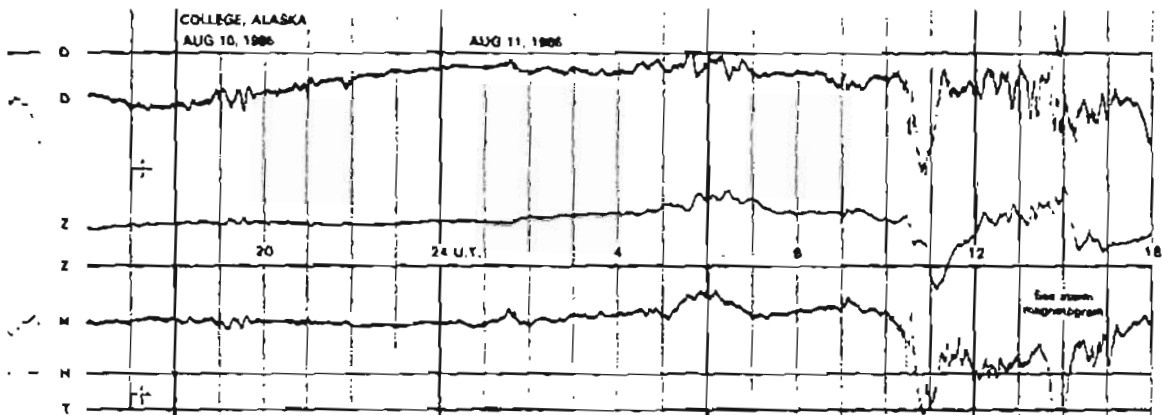
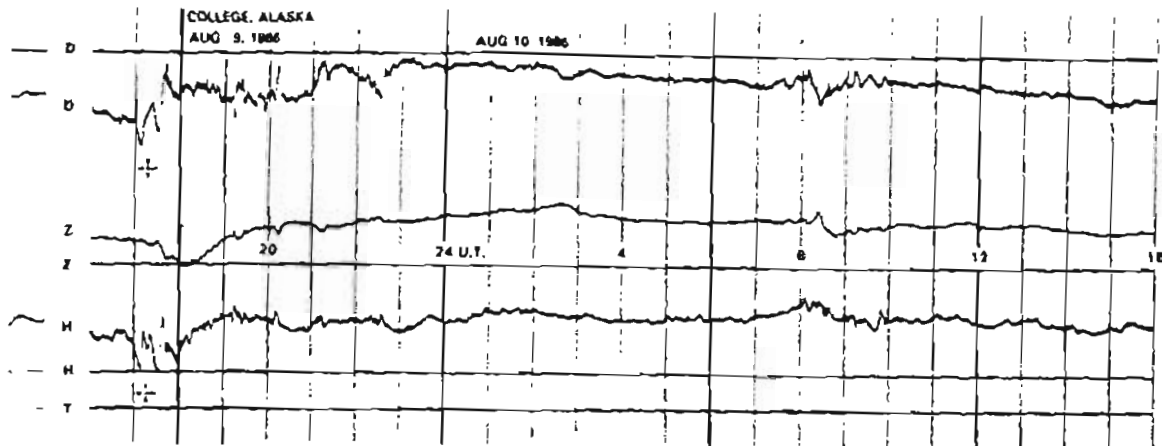


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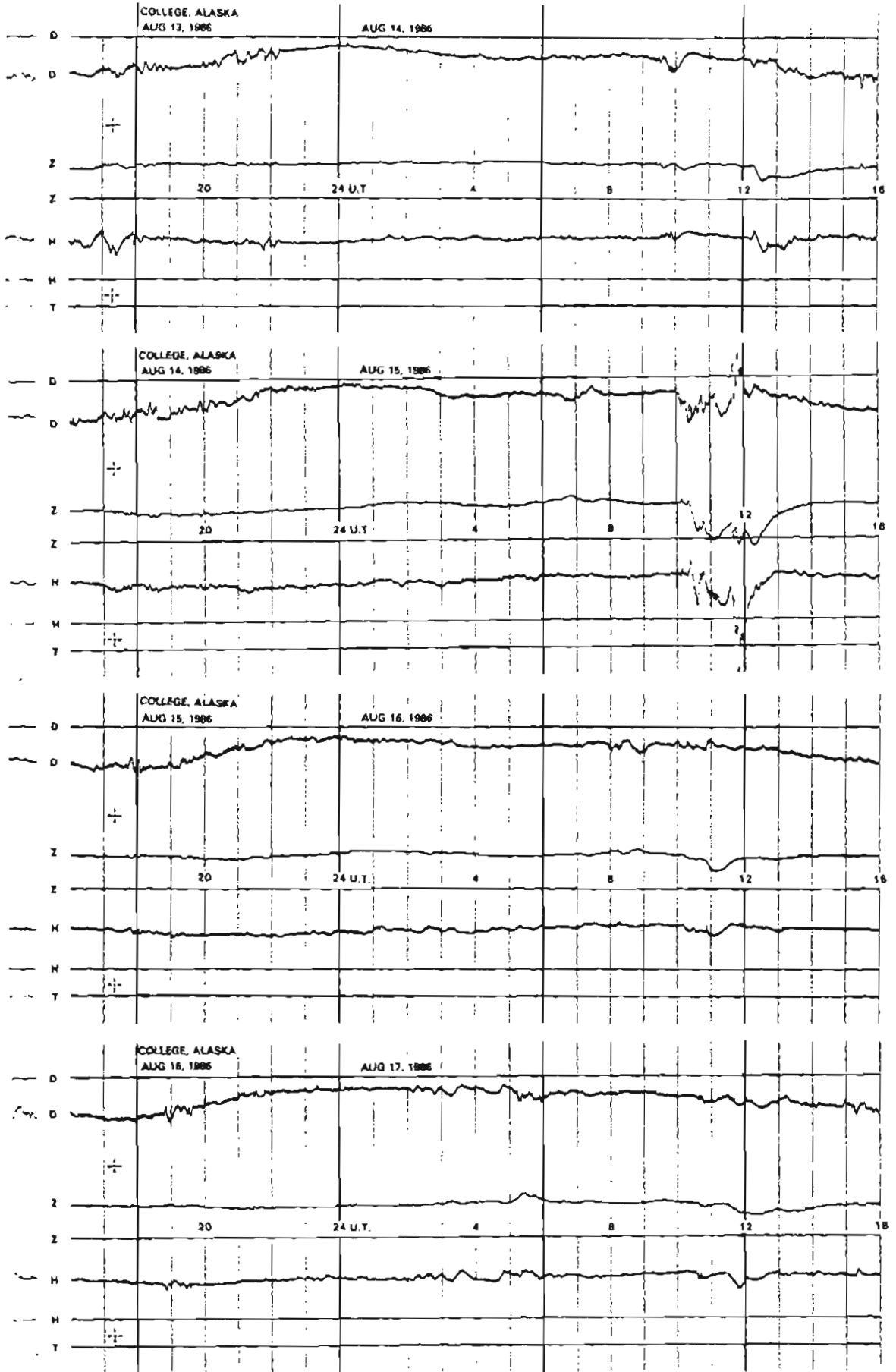
200 mm
100 mm
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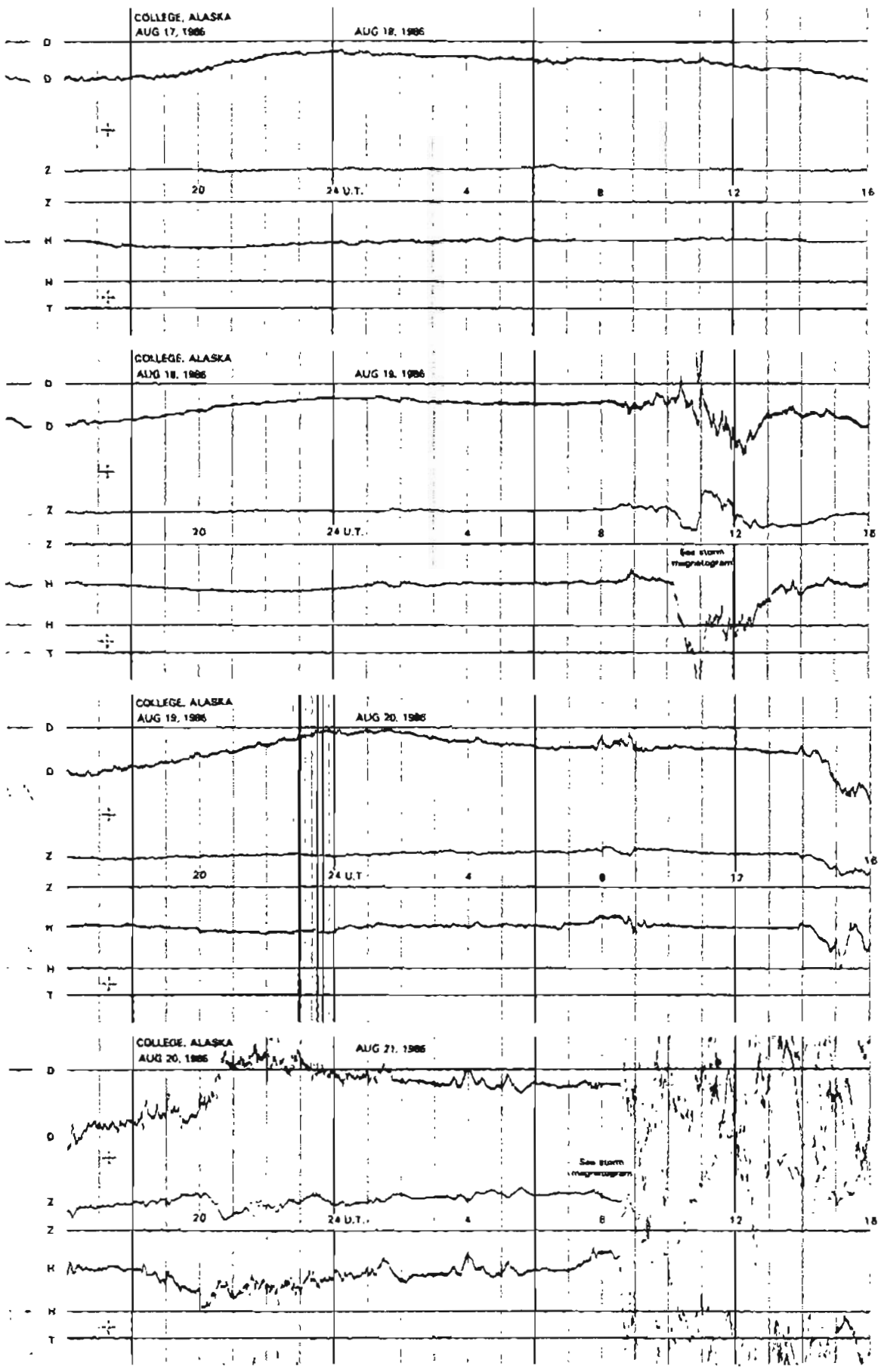
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

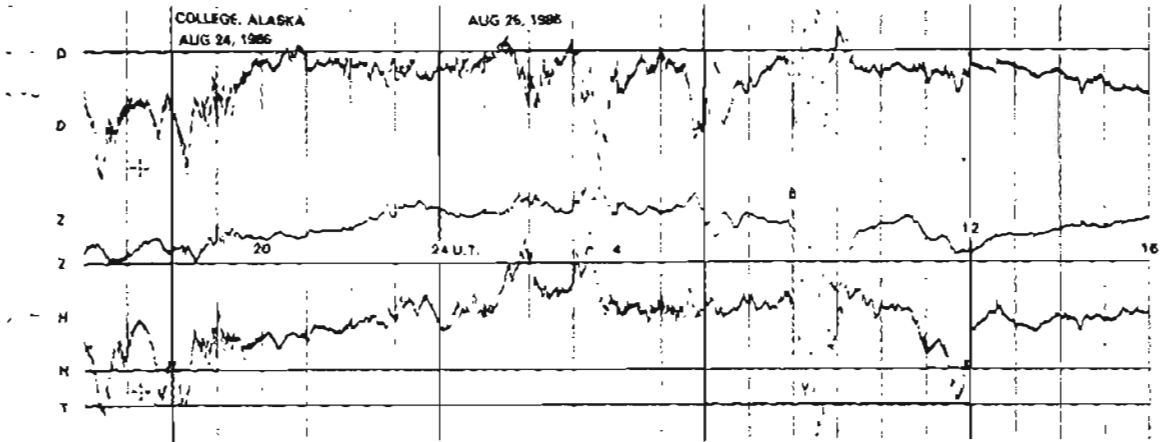
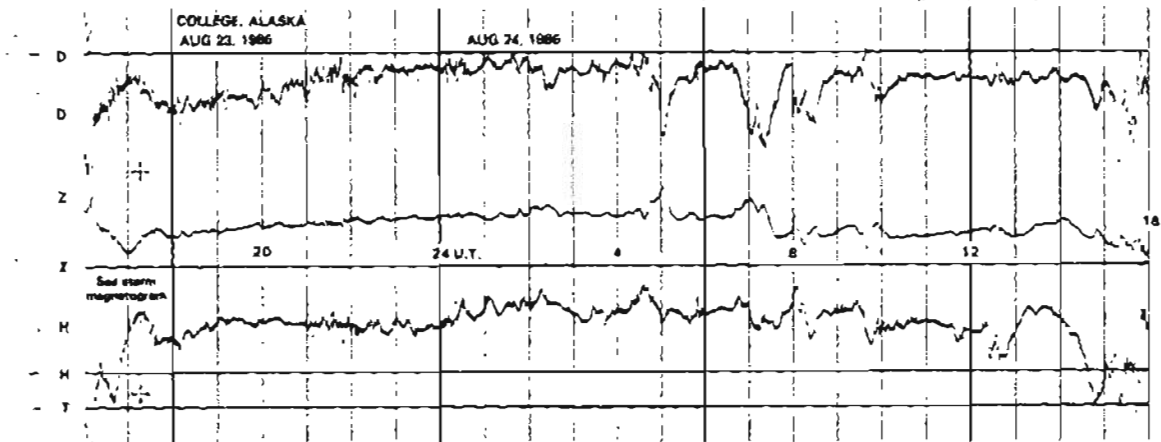
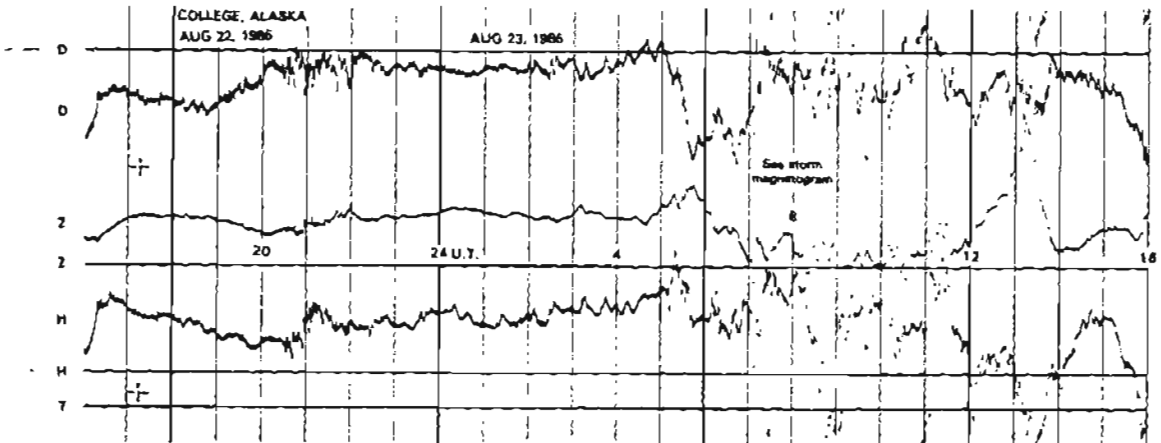
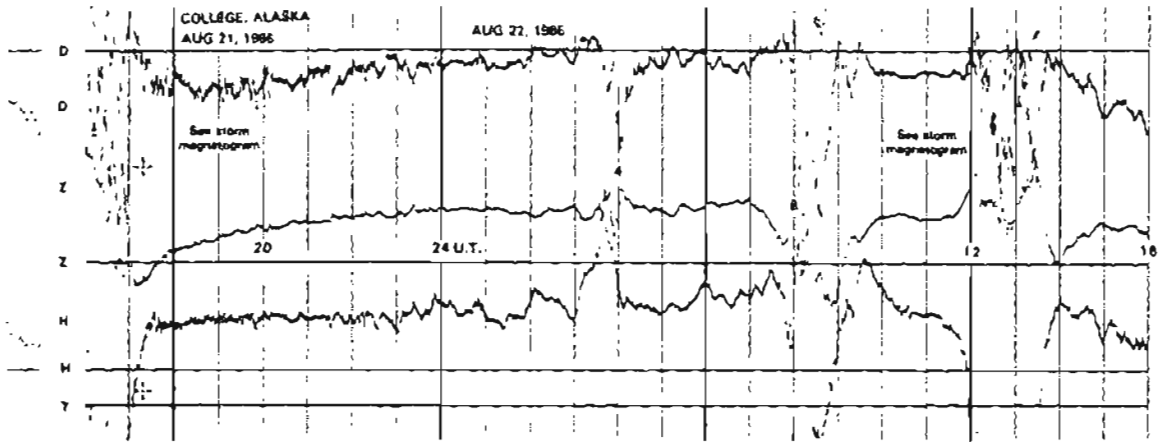


NORMAL MAGNETOGRAMS

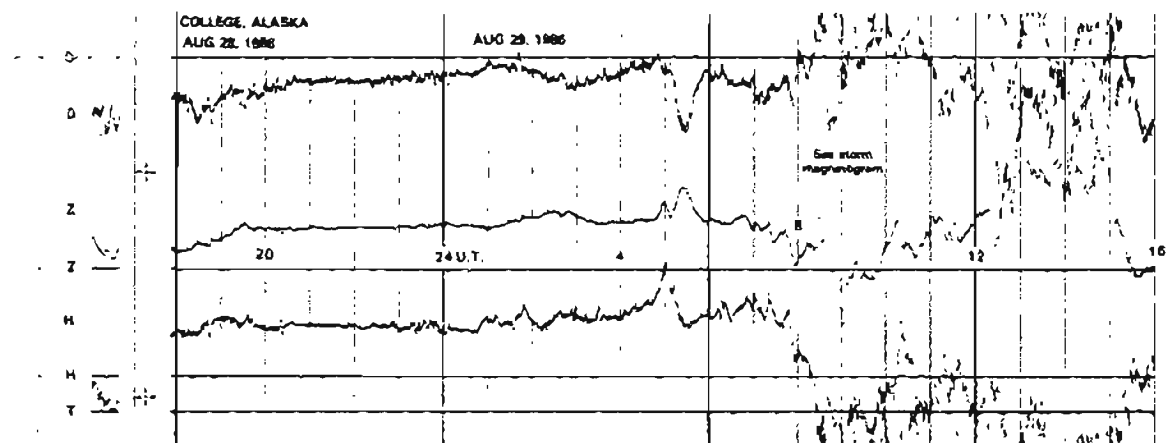
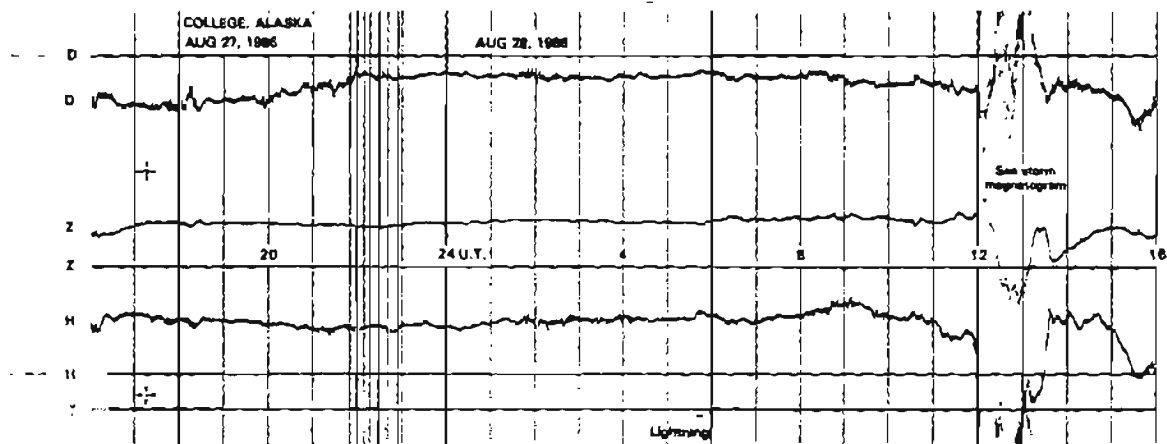
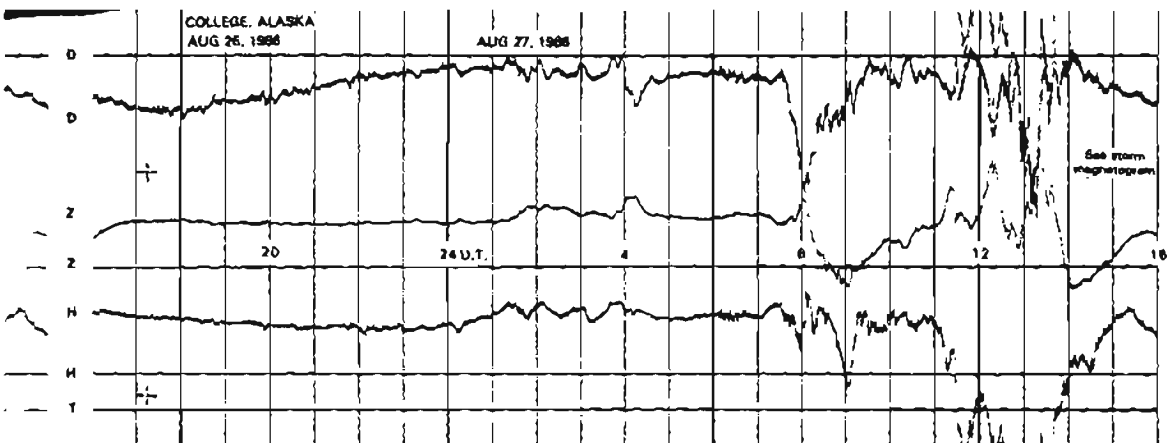
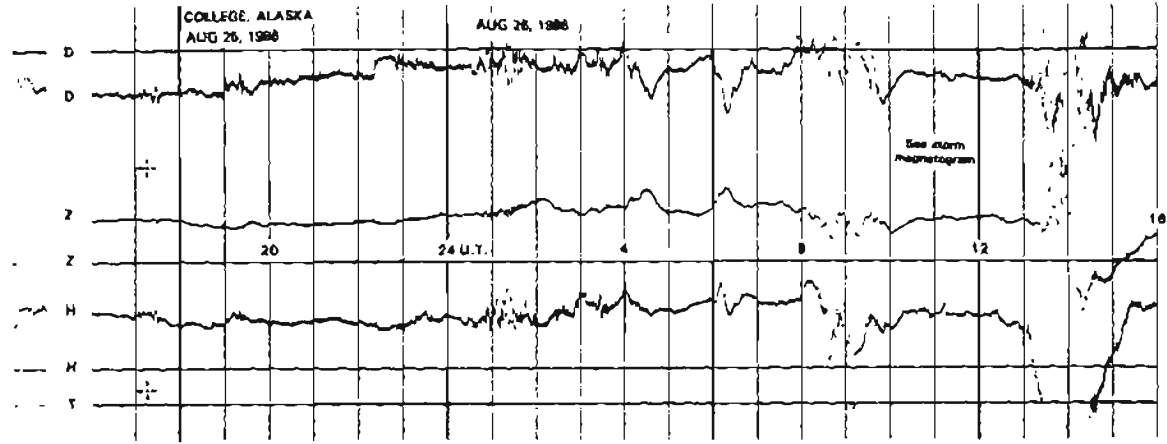
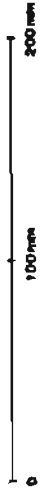


NORMAL MAGNETOGRAMS

200 mm
100 mm
0

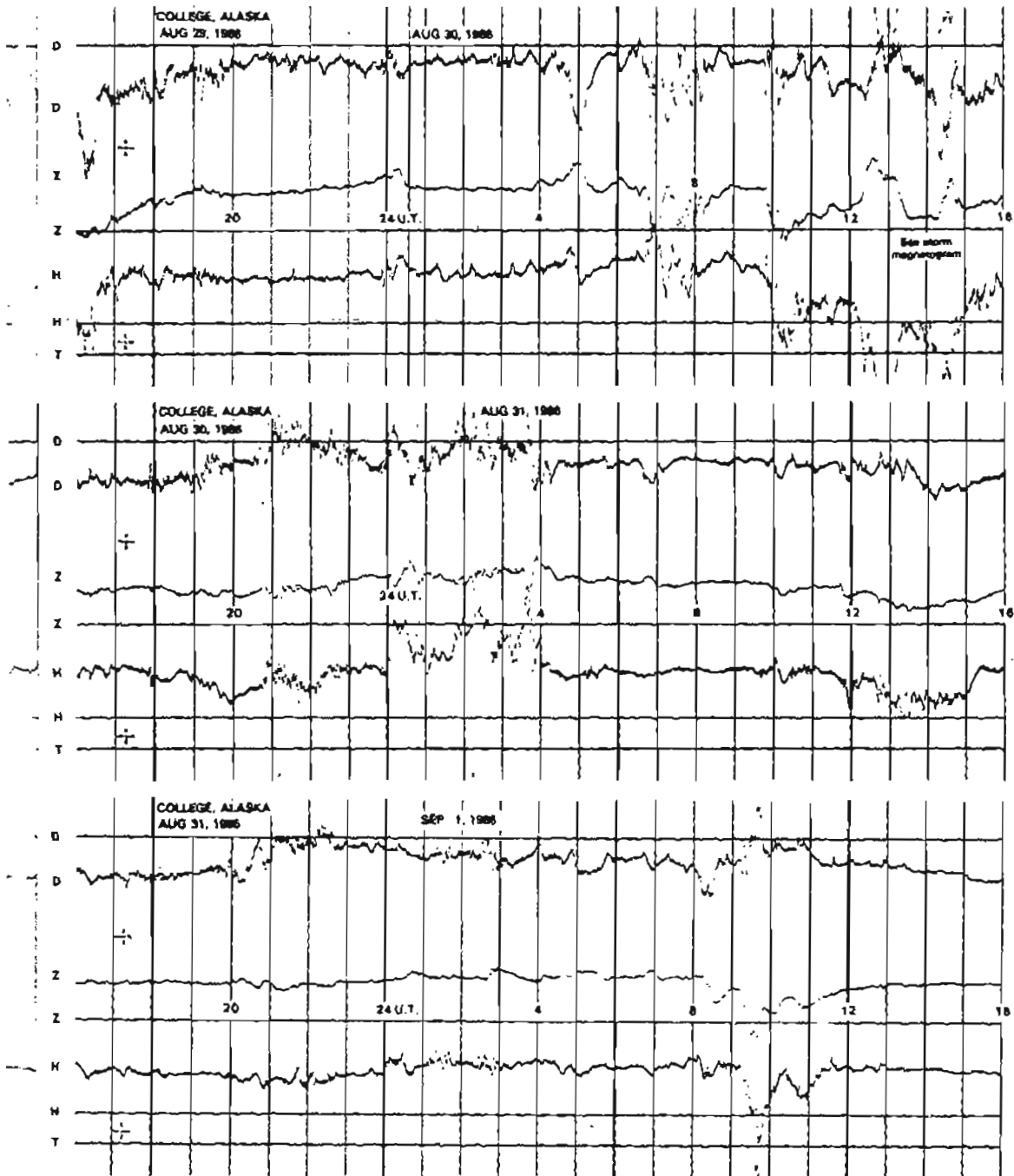


NORMAL MAGNETOGRAMS



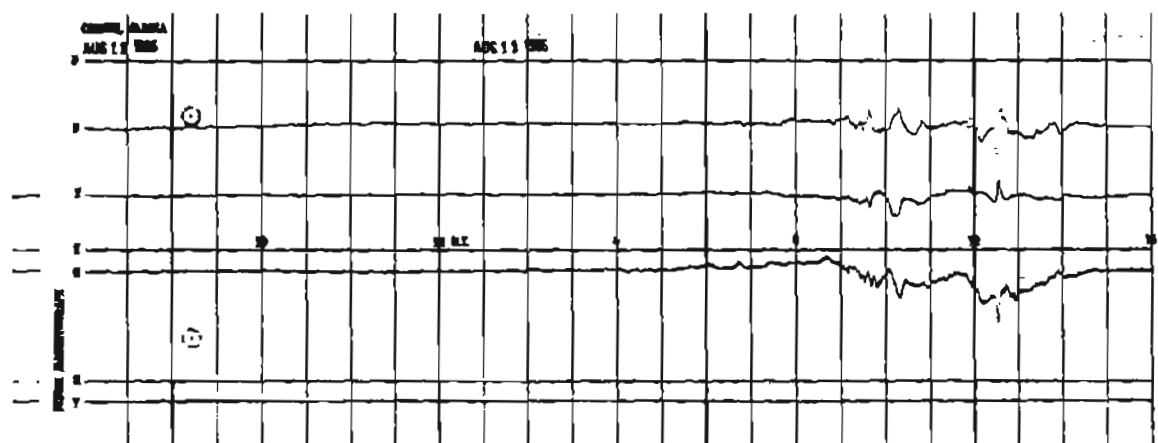
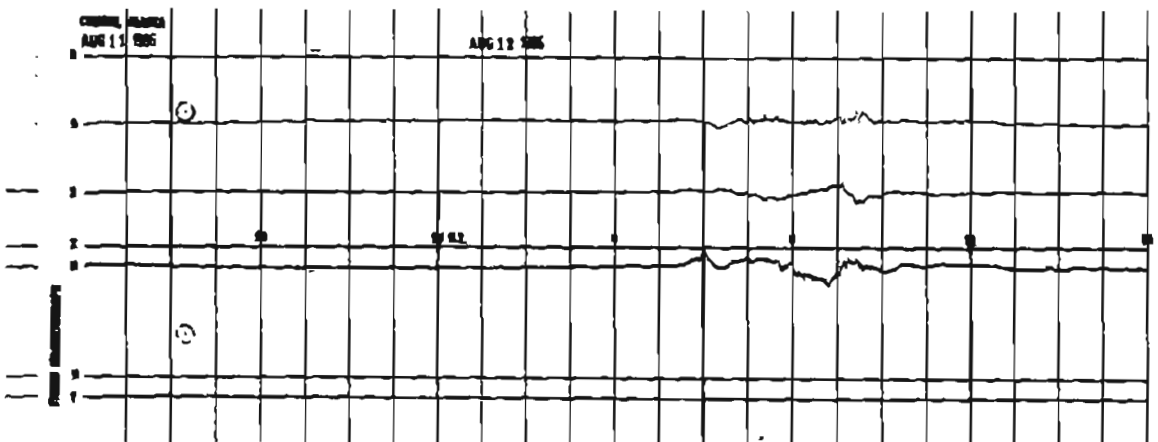
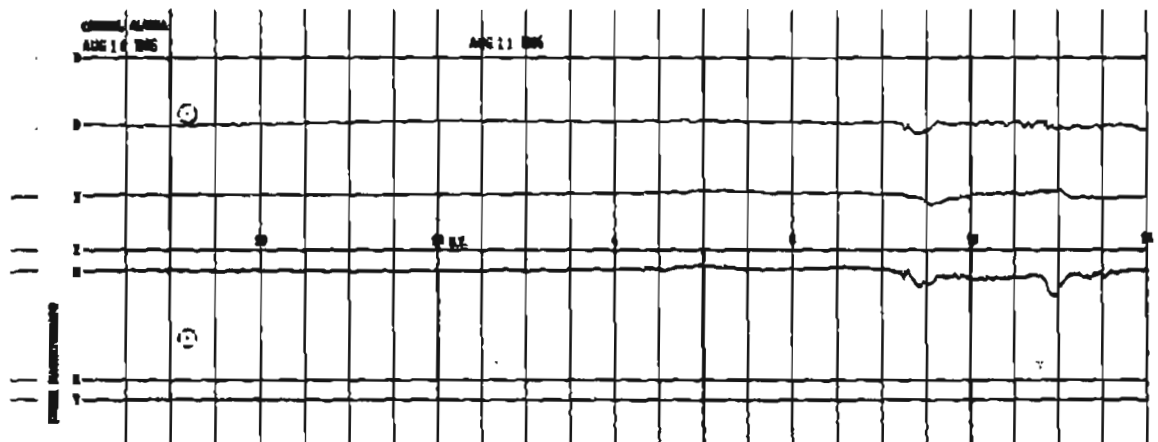
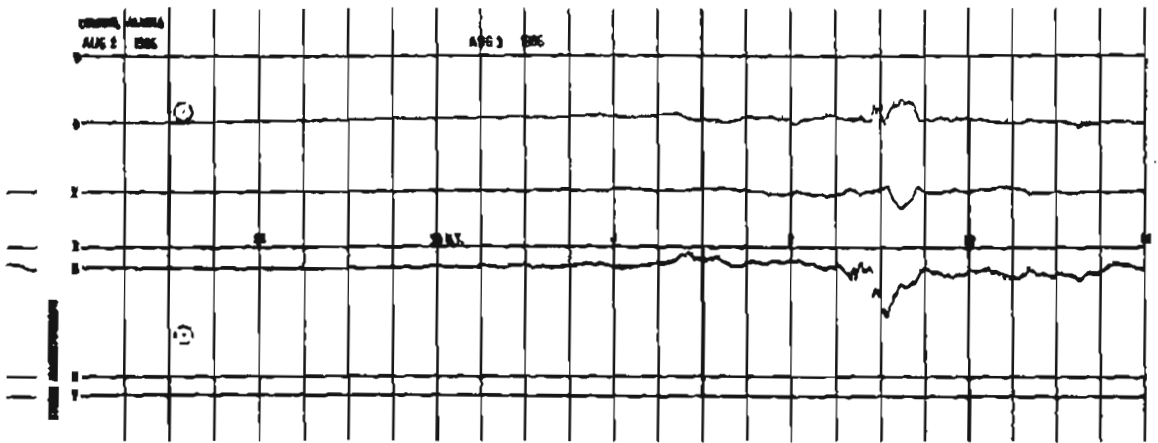
NORMAL MAGNETOGRAMS

200 mm
100 mm
0



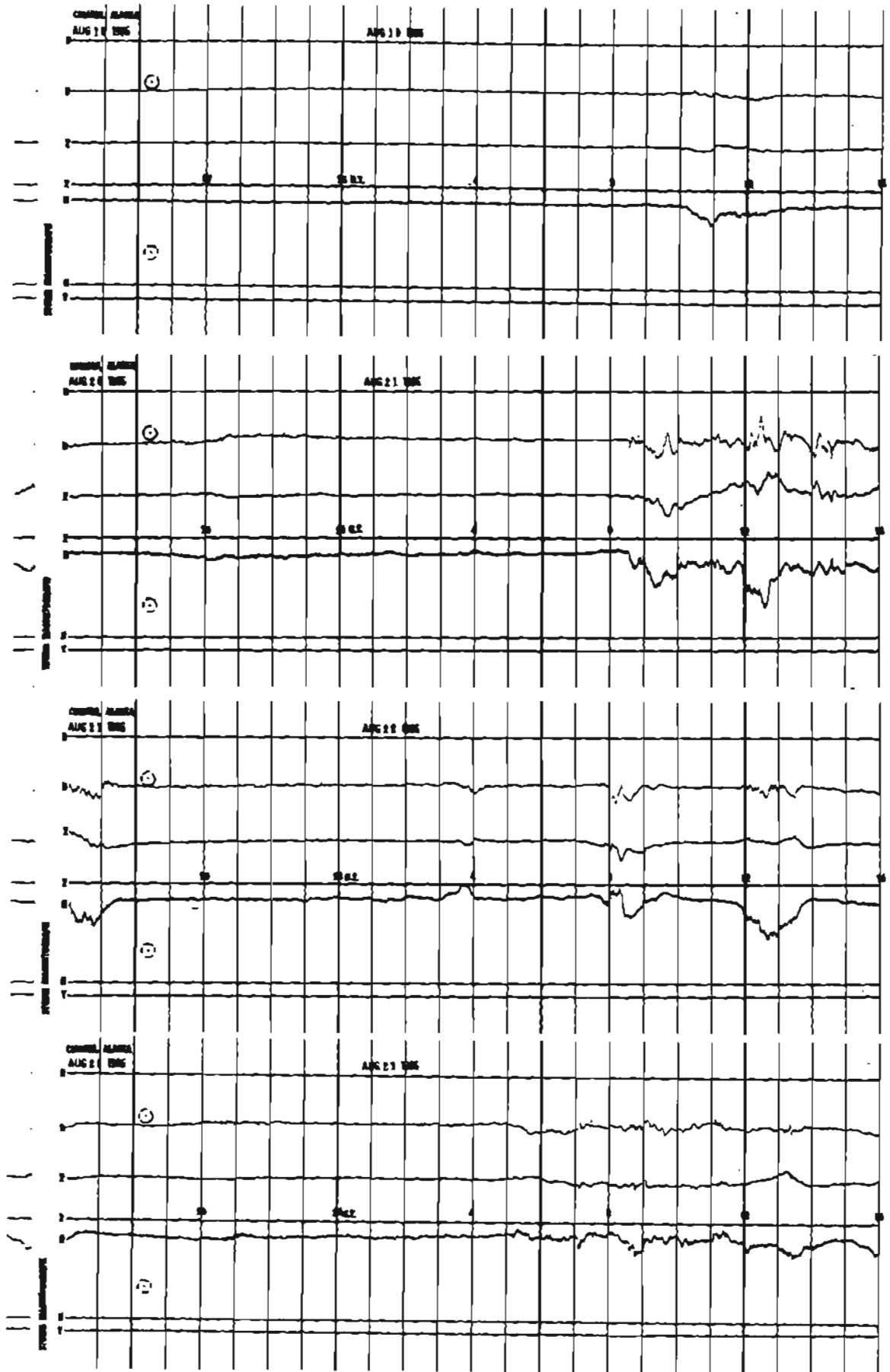
STORM MAGNETOGRAMS

200mm
100mm
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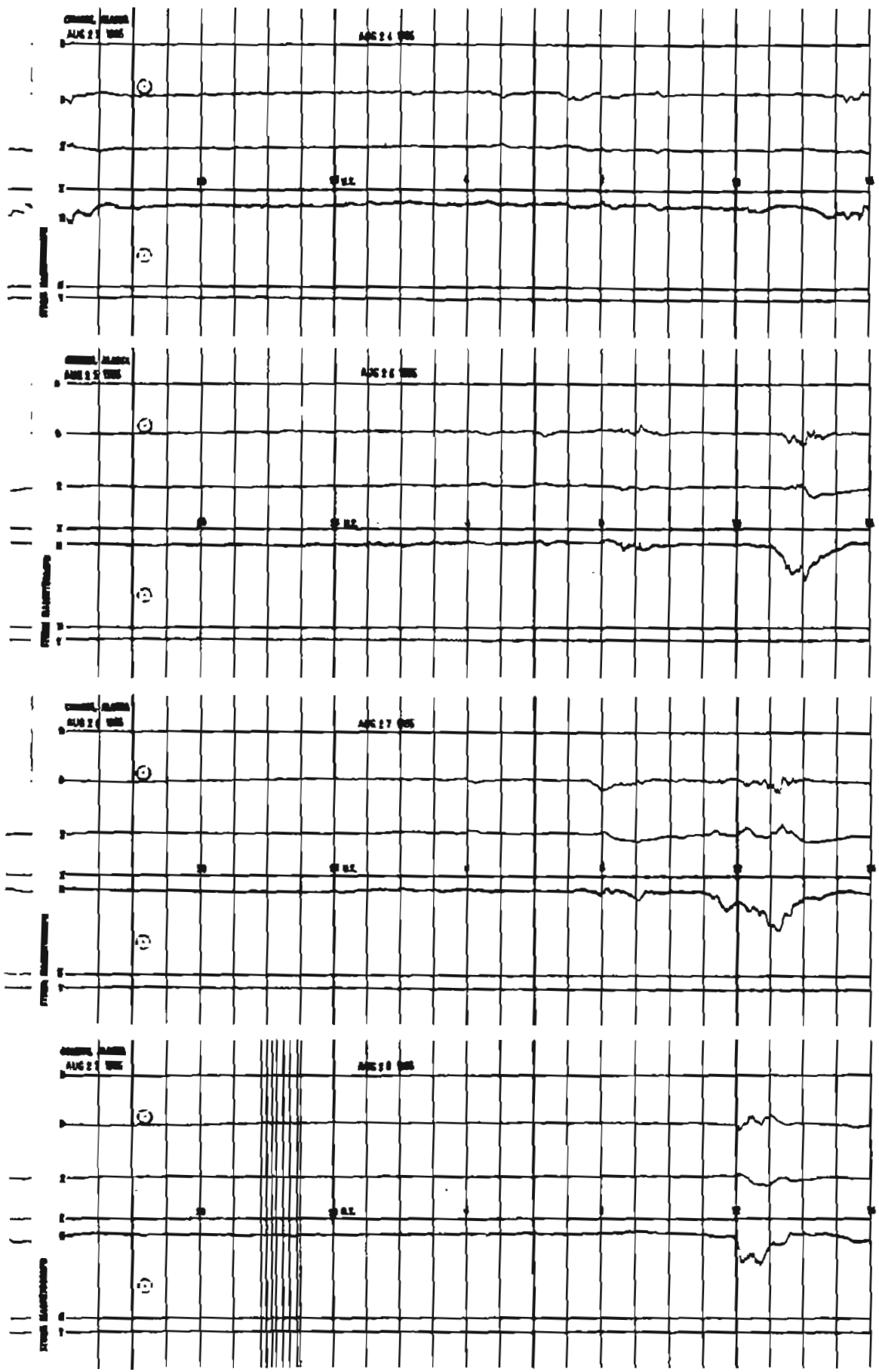
STORM MAGNETOGRAMS

0 100mm 200mm



STORM MAGNETOGRAMS

100 Gauss
0 100 Gauss



STORM MAGNETOGRAMS

0 100mm 200mm

