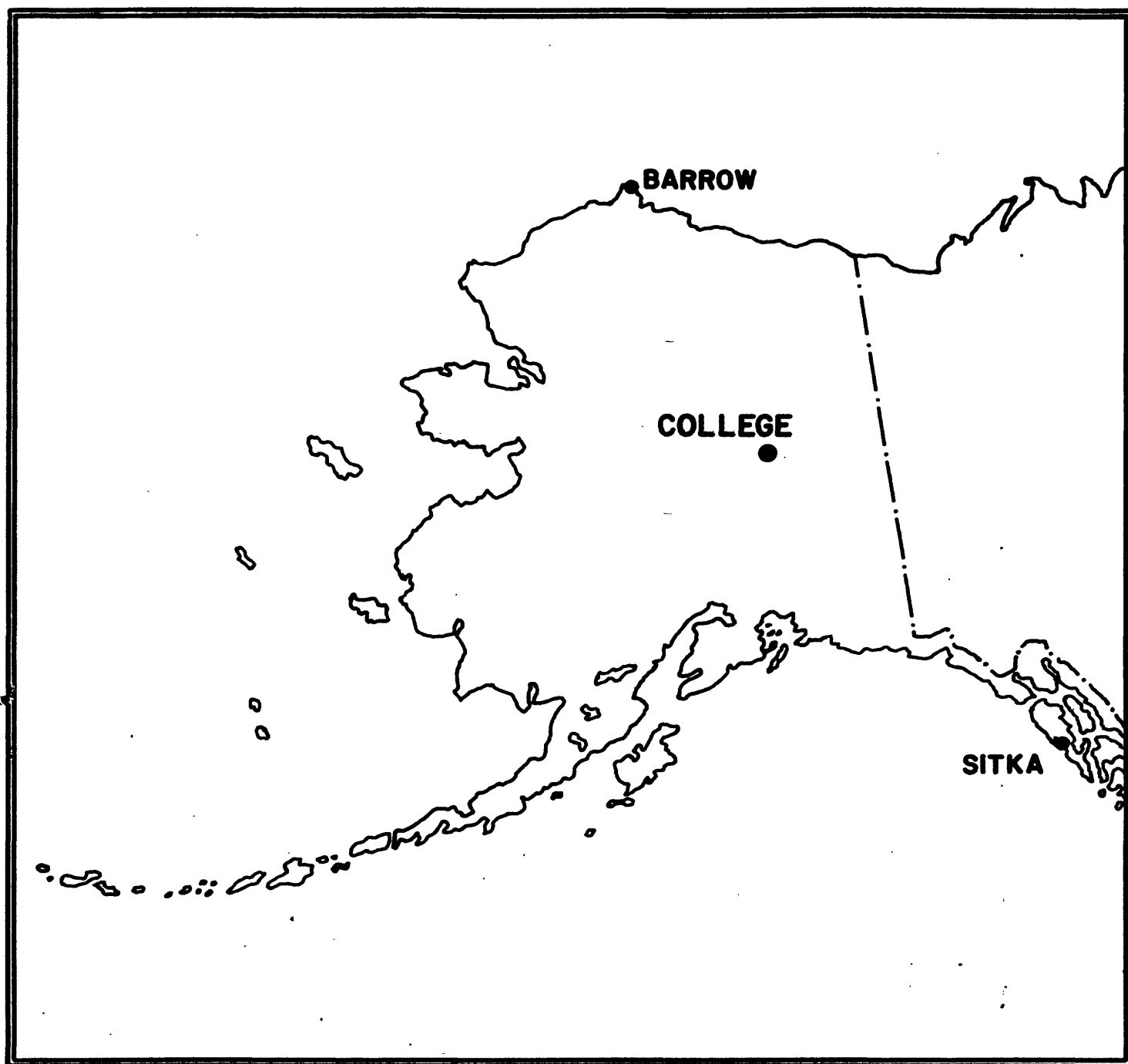


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

APRIL 1987

OPEN FILE REPORT 87-0300D



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSEND,
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:

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

April 1987

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	2	4	4	5	3	1	1	0	20	16	SUDDEN COMMENCEMENTS		
2	0	0	3	5	3	1	0	0	12	10	d	h	m
3	0	0	0	0	0	0	0	0	00	00	04	03	16
4	0	3	2	5	6	5	1	0	22	25			
5	2	2	1	2	5	3	2	2	19	13			
6	2	1	0	3	3	1	1	0	11	06			
7	2	4	4	3	2	4	2	0	21	15			
8	0	1	4	5	3	2	2	3	19	14			
9	1	2	2	4	3	2	2	1	17	10			
10	2	2	4	3	0	0	1	0	12	07			
11	1	2	4	4	4	3	1	1	20	14			
12	1	1	0	3	4	0	0	0	09	06			
13	1	1	2	4	0	5	3	1	17	13			
14	0	1	0	2	5	2	1	1	12	09			
15	1	1	0	1	2	1	1	1	08	03			
16	1	1	1	0	0	1	0	1	05	02			
17	1	0	0	0	1	1	1	0	04	02			
18	0	1	1	0	0	0	1	1	04	02			
19	1	3	4	3	1	0	1	1	14	09			
20	1	4	4	6	3	3	0	0	21	21			
21	1	1	2	3	0	0	0	0	07	04			
22	0	1	2	3	3	1	1	2	13	07			
23	1	1	1	0	0	0	1	1	05	02			
24	1	3	4	6	6	1	1	1	23	27			
25	0	0	2	2	0	1	1	0	06	03			
26	1	1	0	1	2	0	2	0	07	03			
27	0	1	3	5	3	2	1	1	16	12			
28	0	0	0	0	0	0	0	0	00	00			
29	0	0	0	1	0	1	1	0	03	01			
30	0	0	0	0	0	0	1	1	02	01			
31													

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9

D

675.7

H

322.2

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

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

Data from Individual Observatories:

April 1987

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	0316	sc*	16	164	31	4	5	6	95	900	460	04	20

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000U.T., 4-1-87	2400U.T., 4-30-87	1.0'/mm	3.7"/mm	27° 01.4' E
H	(same)	(same)	7.8"/mm		12633"
Z	(same)	(same)	7.7"/mm		5570"

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000U.T., 4-1-87	2400U.T., 4-30-87	7.9'/mm	29.5"/mm	
H	(same)	(same)	43.7"/mm		
Z	(same)	(same)	48.7"/mm		

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 23.9' E	12857"	55311"

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: APRIL 3, 17, 28, 29, 30.

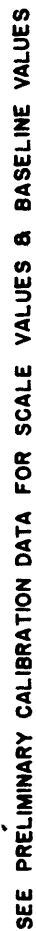
MAGNETOGRAM
HOURLY SCALINGS - FIVE QUIETEST DAYS
(UNIVERSAL TIME)

Values are in Tenths of nm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

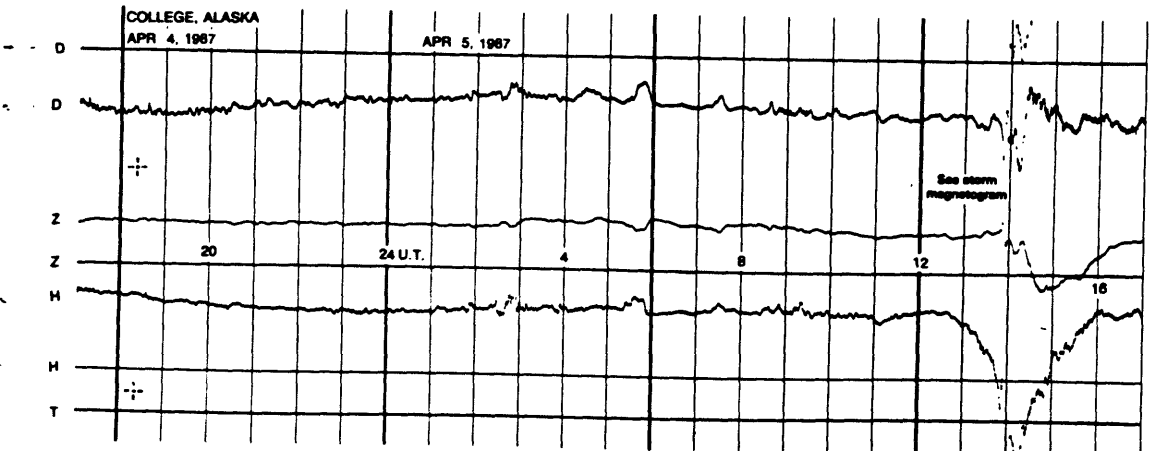
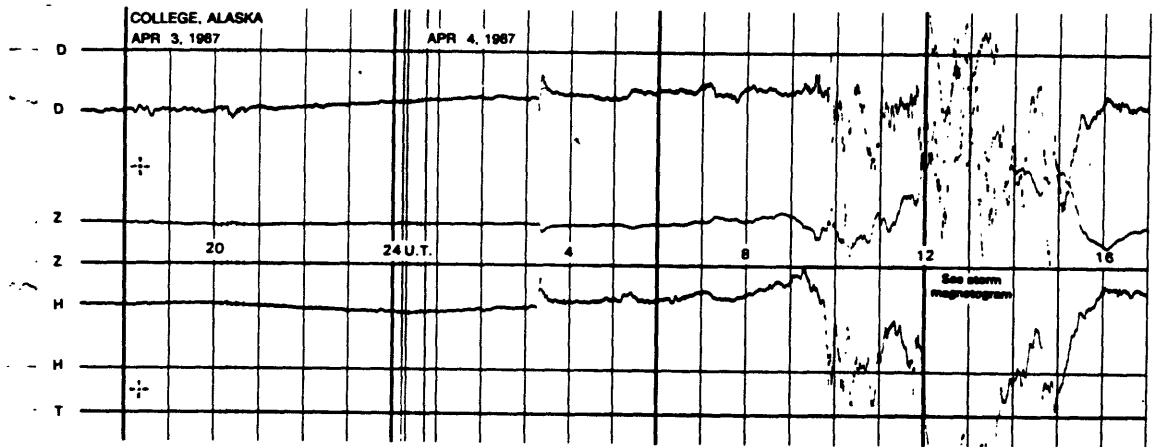
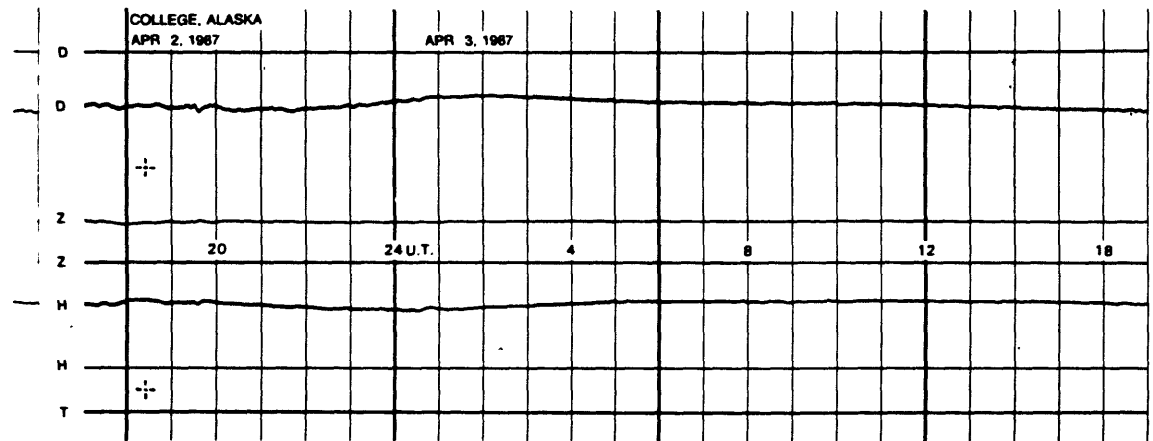
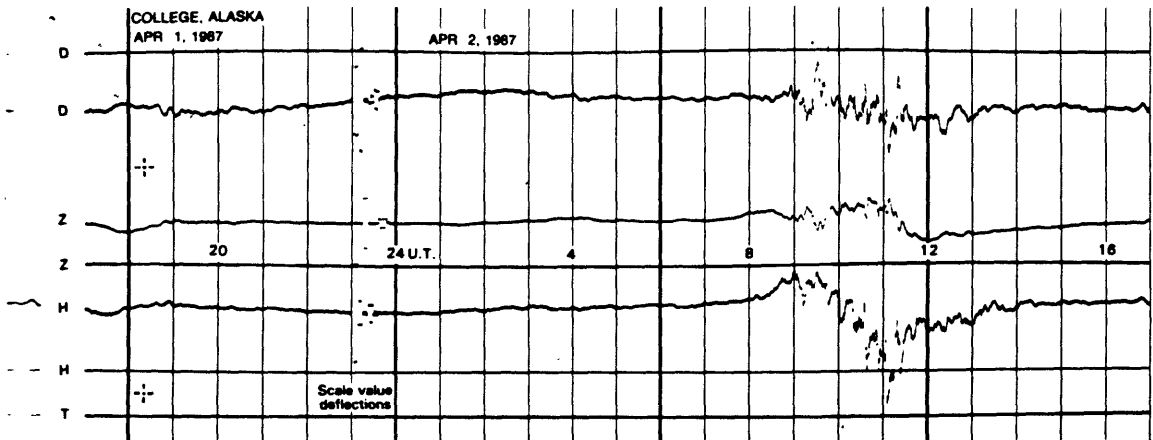
COMPONENT		D					H					Z					COMPONENT												
DAY	A _k	03	17	28	29	30	03	17	28	29	30	03	17	28	29	30	DAY	A _k											
HOUR		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	DAILY SUM	DAILY MEAN	MEAN	
01	211	183	168	163	163	154	262	273	265	275	269	183	188	198	189	175	01	01	01	01	01	01	01	01	01	01	01	01	
02	197	179	167	163	161	161	265	263	273	282	275	184	194	201	192	183	02	02	02	02	02	02	02	02	02	02	02	02	
03	197	179	176	179	172	172	275	280	285	287	279	184	190	197	193	185	03	03	03	03	03	03	03	03	03	03	03	03	
04	203	203	190	187	182	182	284	283	283	293	290	186	197	196	193	186	04	04	04	04	04	04	04	04	04	04	04	04	
05	213	213	203	193	183	183	293	288	288	300	303	187	193	196	193	187	05	05	05	05	05	05	05	05	05	05	05	05	
06	219	216	220	199	191	191	299	290	287	303	309	186	187	196	196	190	06	06	06	06	06	06	06	06	06	06	06	06	
07	223	219	222	207	202	202	298	295	290	293	303	187	183	196	199	194	07	07	07	07	07	07	07	07	07	07	07	07	
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14	247	211	232	241	247	247	298	305	304	310	311	187	173	189	183	188	14	14	14	14	14	14	14	14	14	14	14	14	
15	253	207	247	257	270	270	298	290	303	311	299	186	159	191	189	188	15	15	15	15	15	15	15	15	15	15	15	15	
16	258	241	267	279	287	287	295	280	299	297	293	186	142	191	189	180	16	16	16	16	16	16	16	16	16	16	16	16	
17	263	267	280	297	305	305	289	287	299	294	295	186	161	192	180	170	17	17	17	17	17	17	17	17	17	17	17	17	
18	270	273	278	298	334	334	289	283	293	289	299	186	173	190	178	166	18	18	18	18	18	18	18	18	18	18	18	18	
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21	263	246	270	216	268	268	287	279	250	259	264	173	169	178	166	169	21	21	21	21	21	21	21	21	21	21	21	21	
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24	230	177	163	169	182	182	263	267	260	263	263	180	174	182	174	166	24	24	24	24	24	24	24	24	24	24	24	24	
DAILY SUM		5661	5311	5382	5457	5459	6924	6888	6825	6952	6985	4411	4243	4560	4419	4341	DAILY SUM												
DAILY MEAN		236	221	224	227	227	288	287	284	290	291	184	177	190	184	181	DAILY MEAN												
MEAN				227					288								MEAN												

Scaled LYT Checked RVO

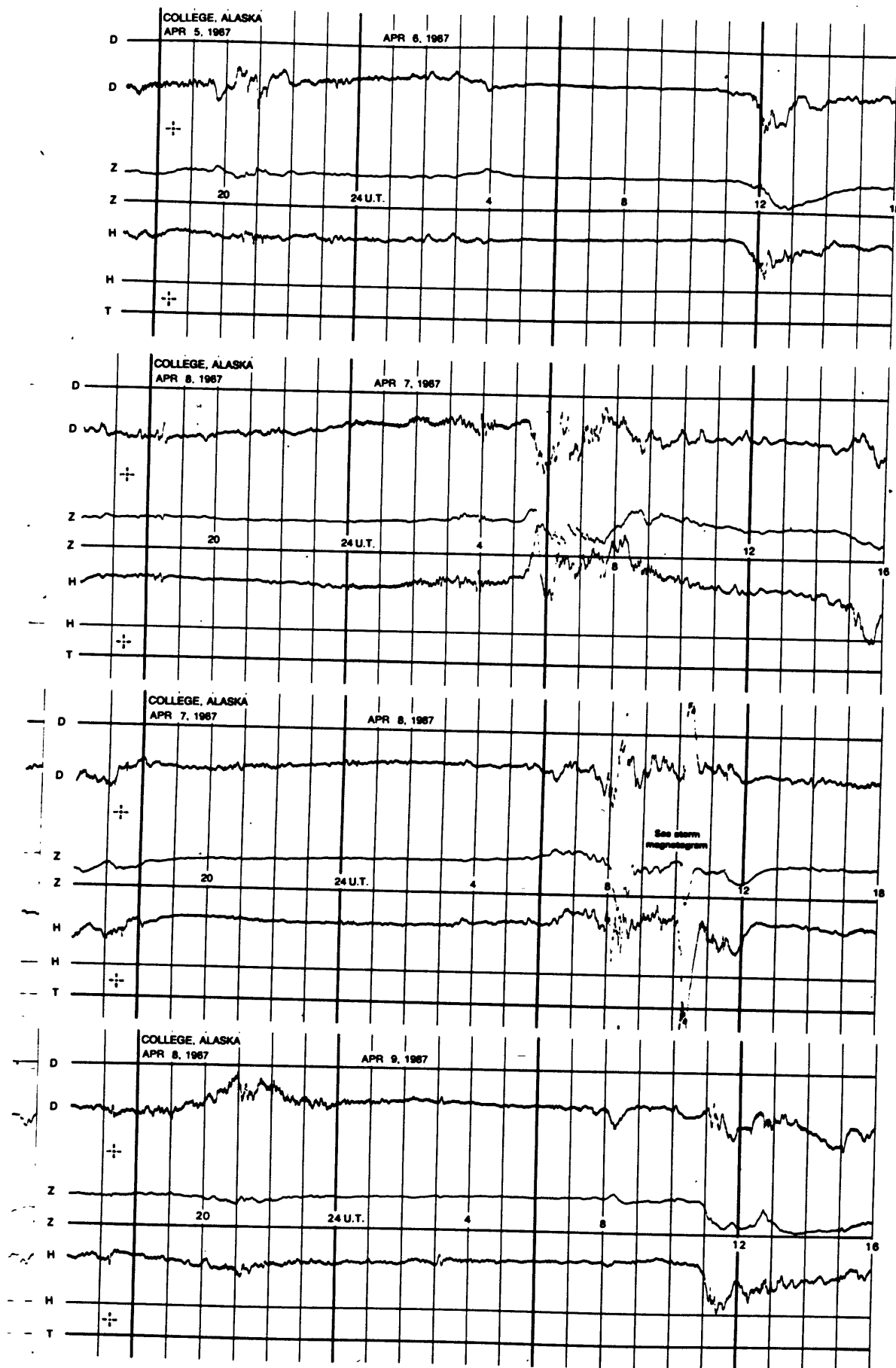
8



NORMAL MAGNETOGRAMS

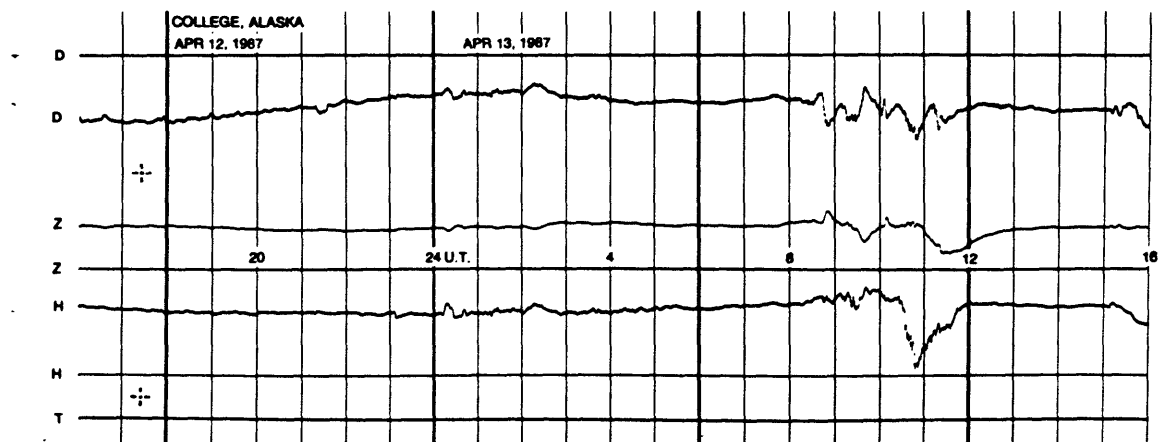
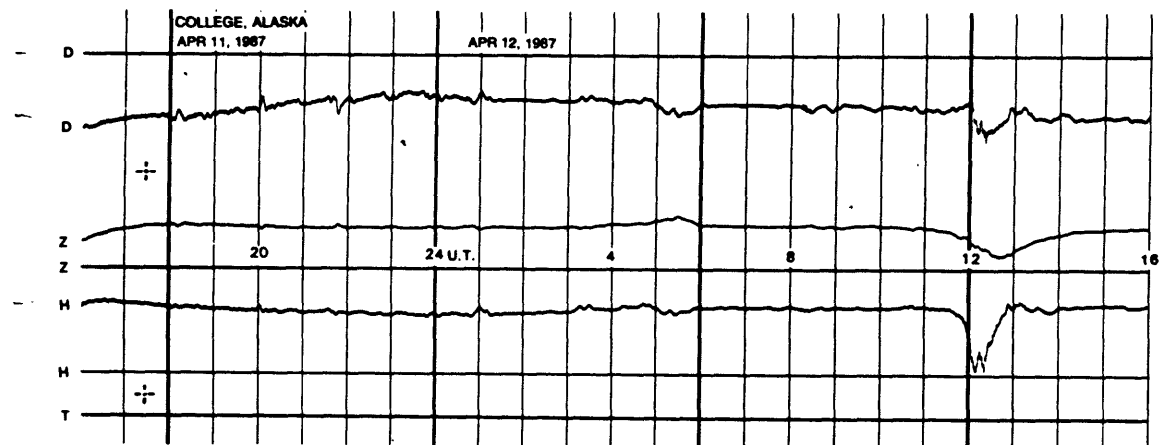
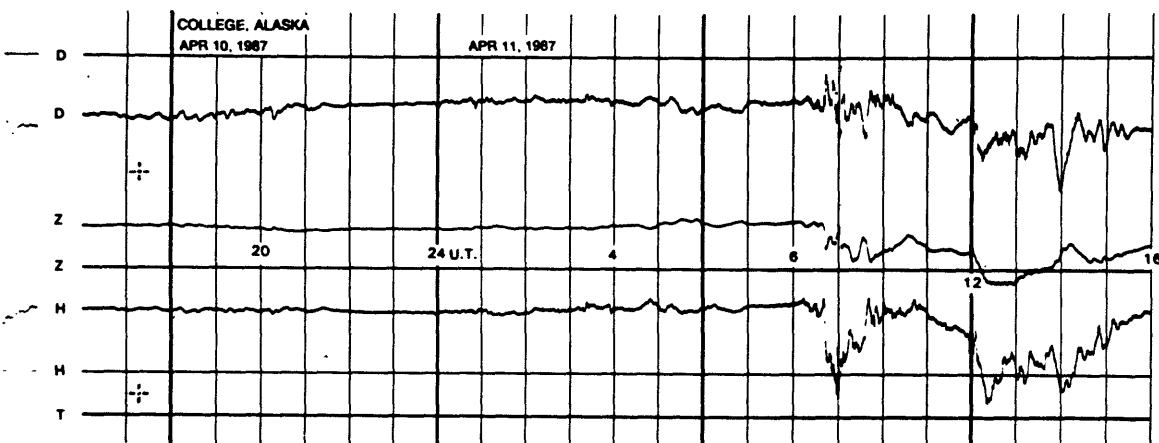
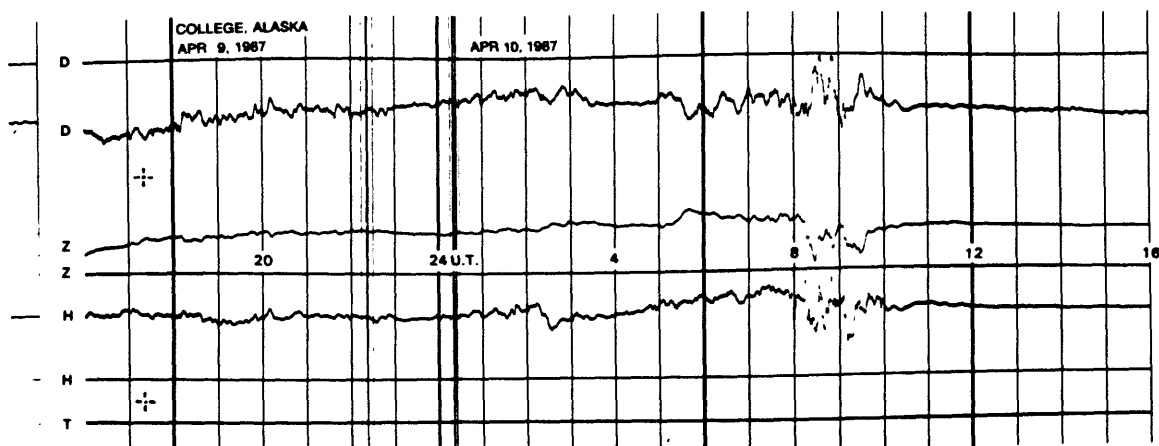


NORMAL MAGNETOGRAMS



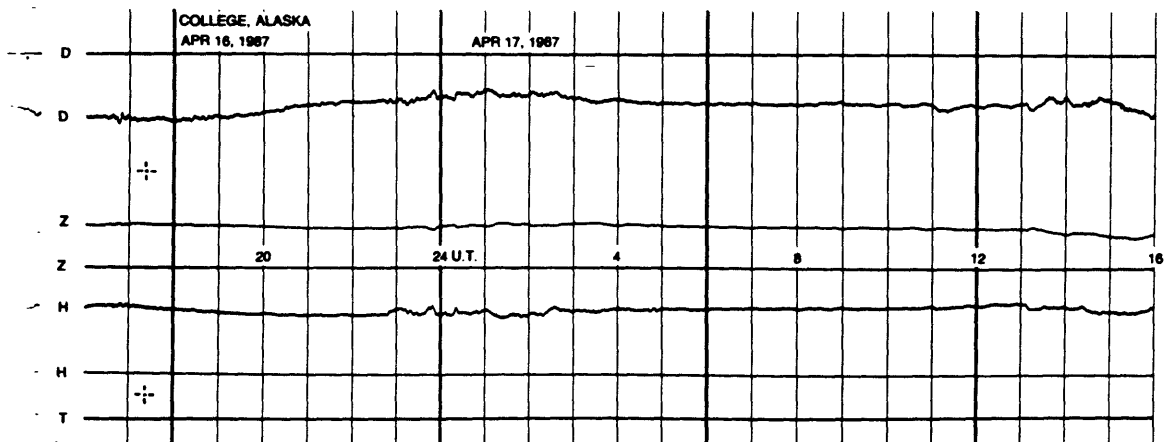
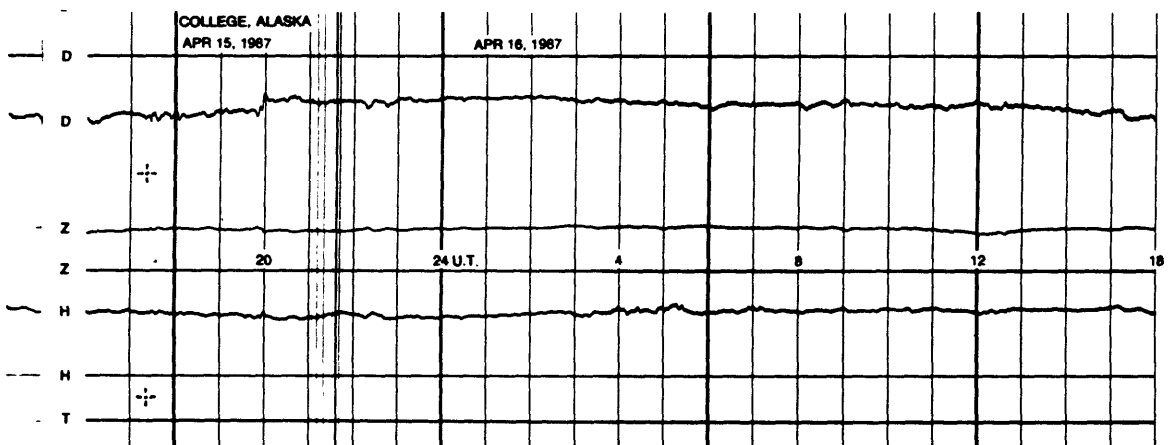
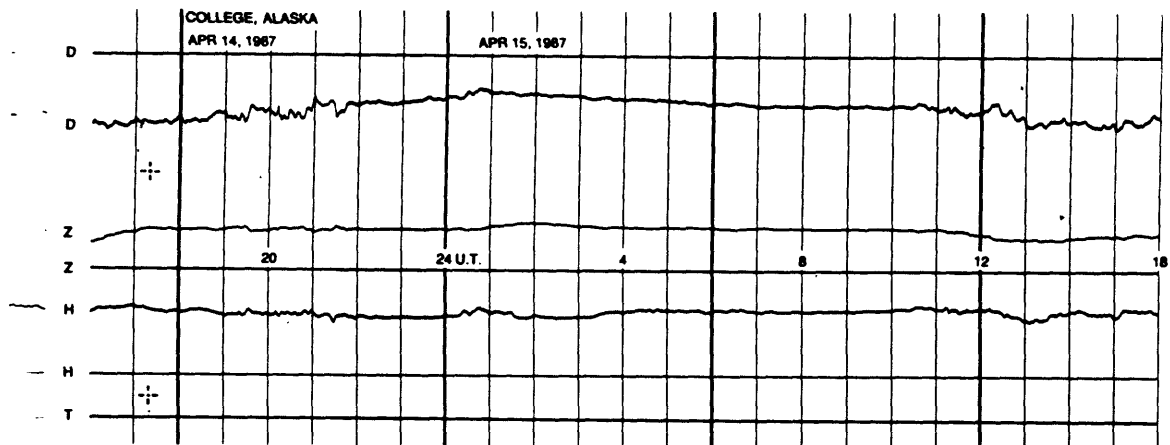
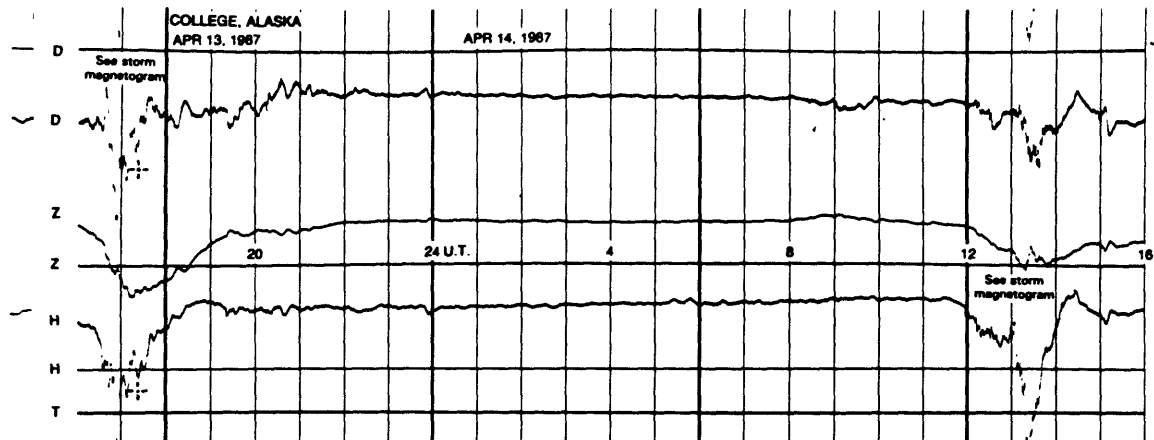
NORMAL MAGNETOGRAMS

0 100 mm 200 mm

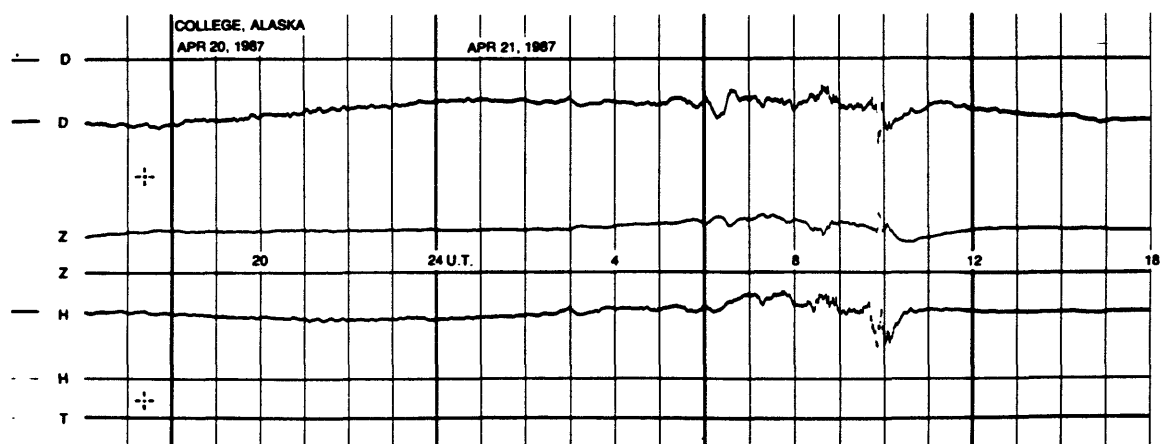
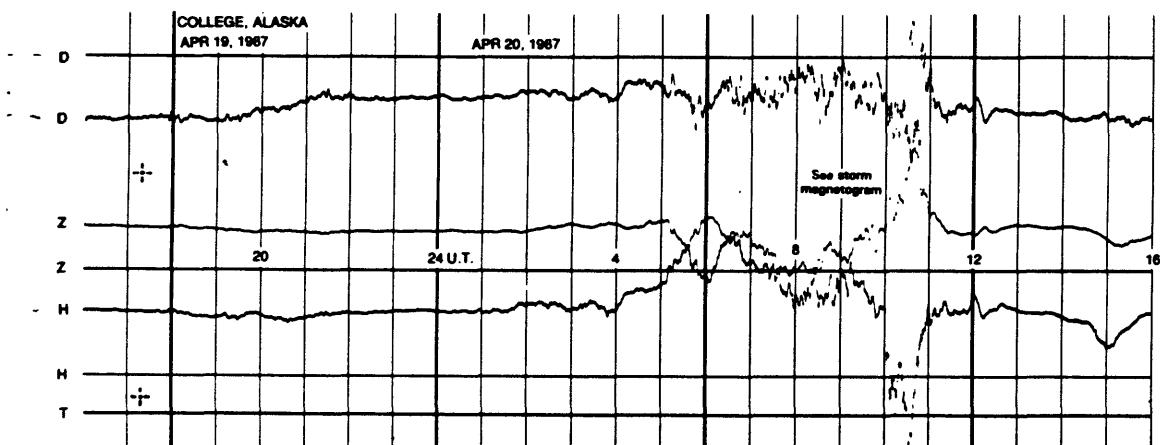
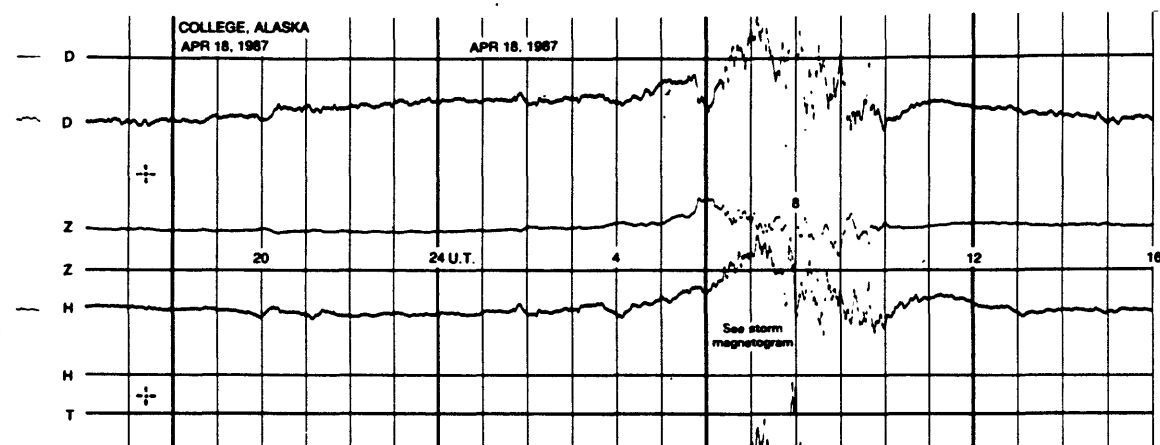
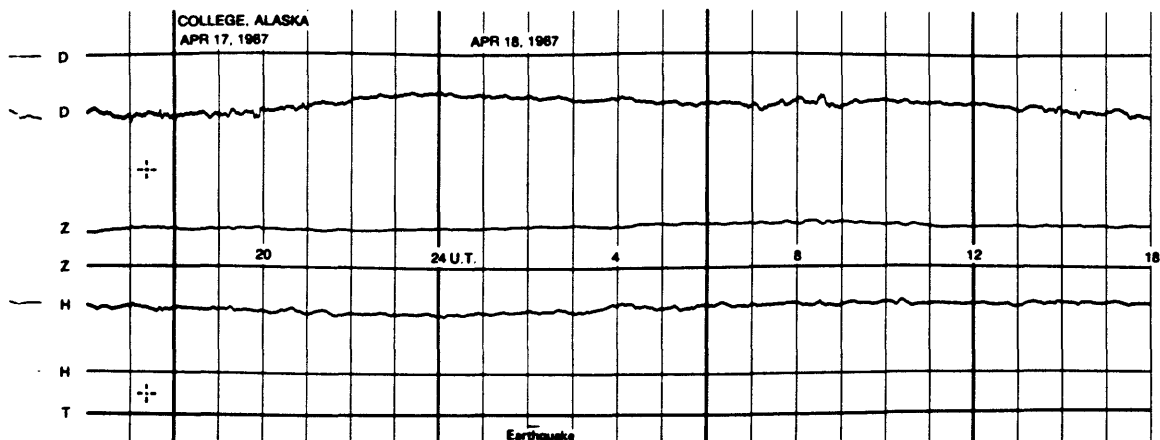


NORMAL MAGNETOGRAMS

200 mm
100 mm
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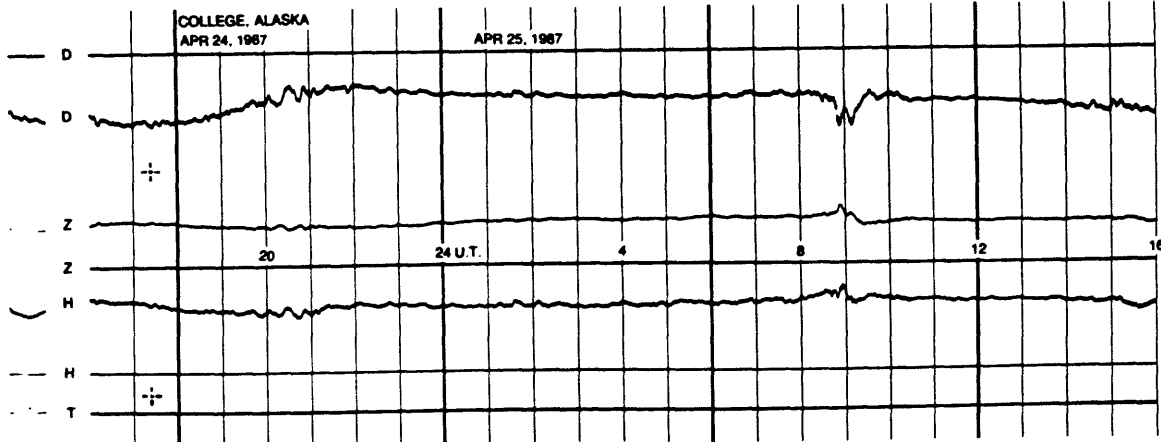
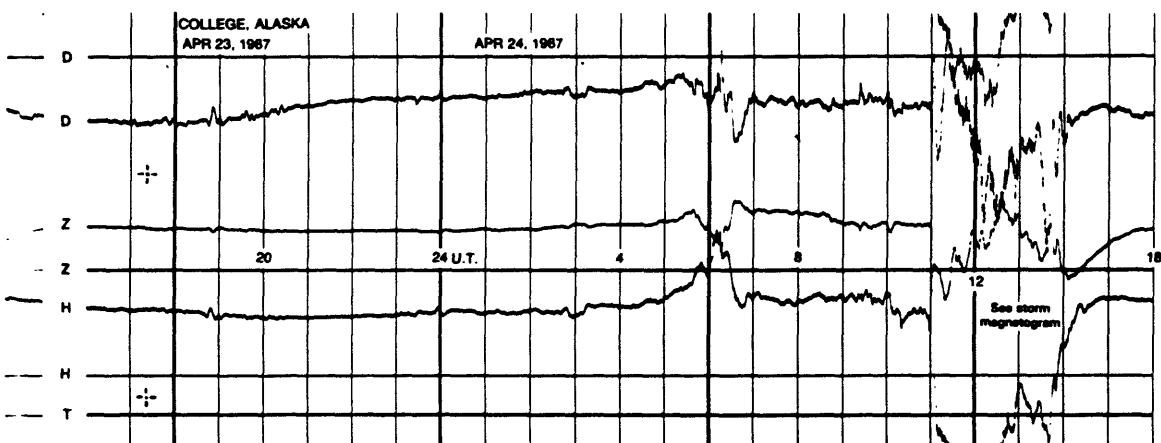
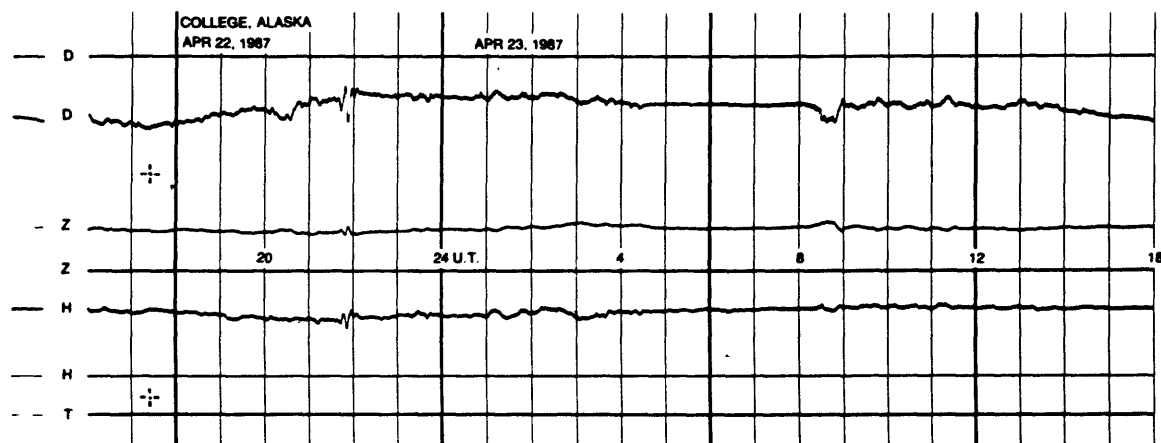
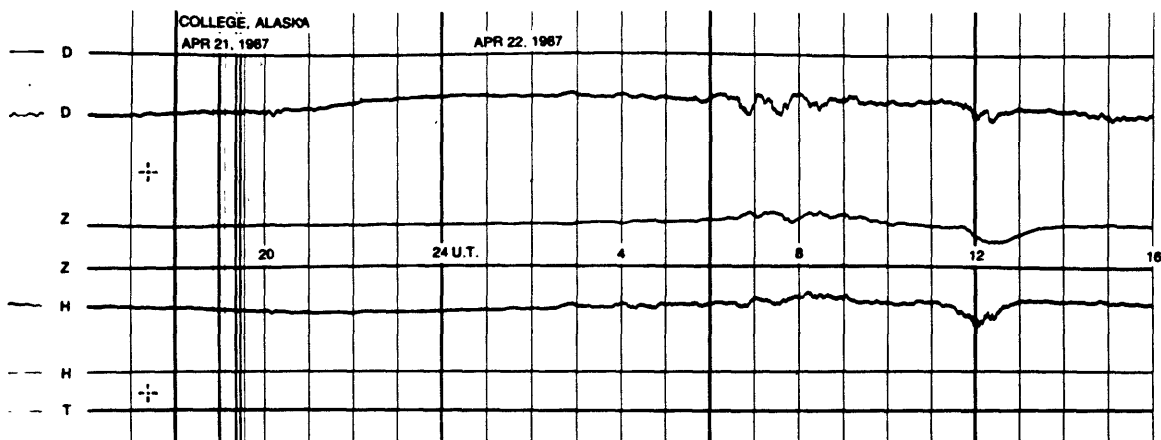


NORMAL MAGNETOGRAMS



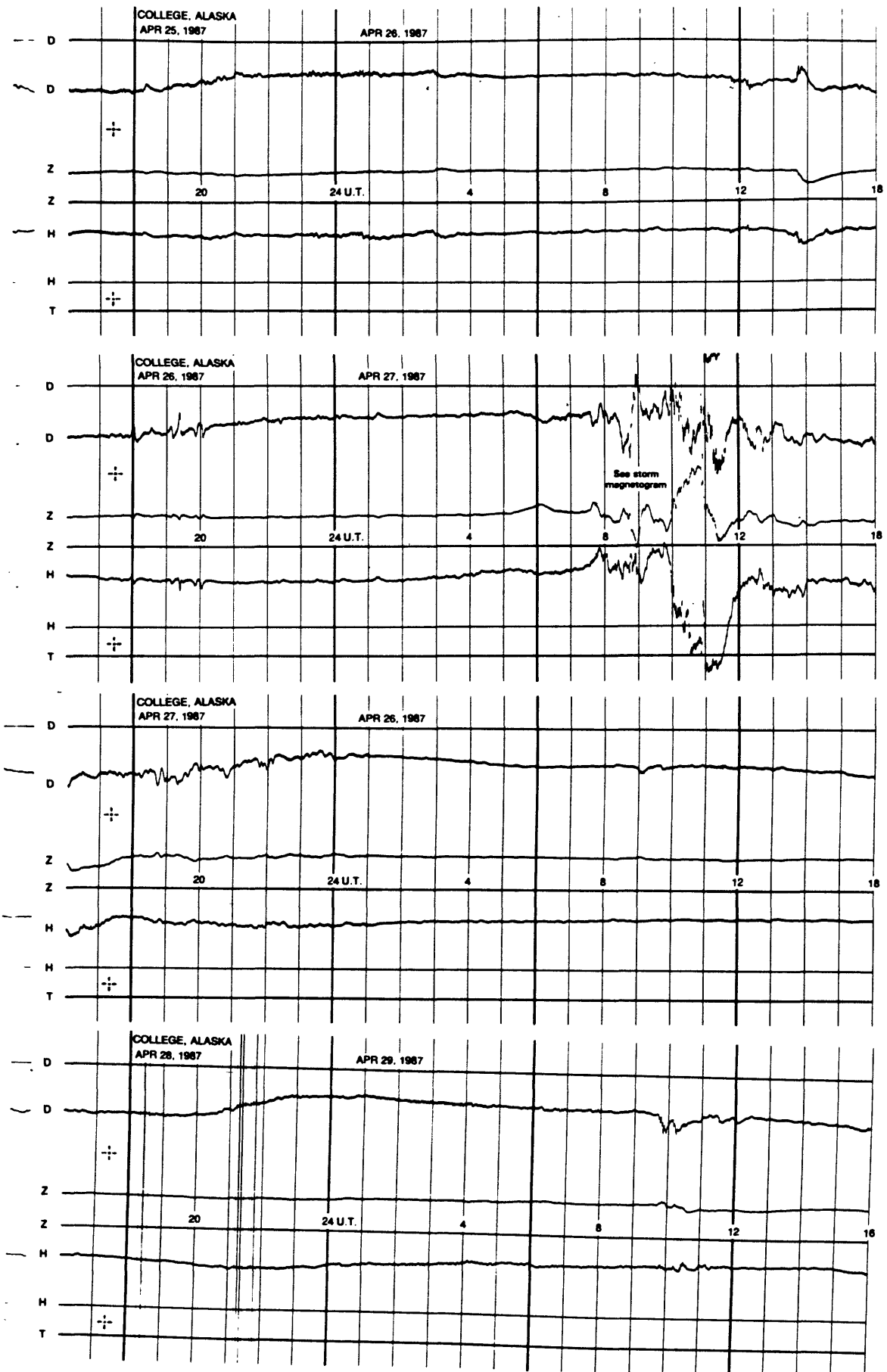
NORMAL MAGNETOGRAMS

200 mm
100 mm
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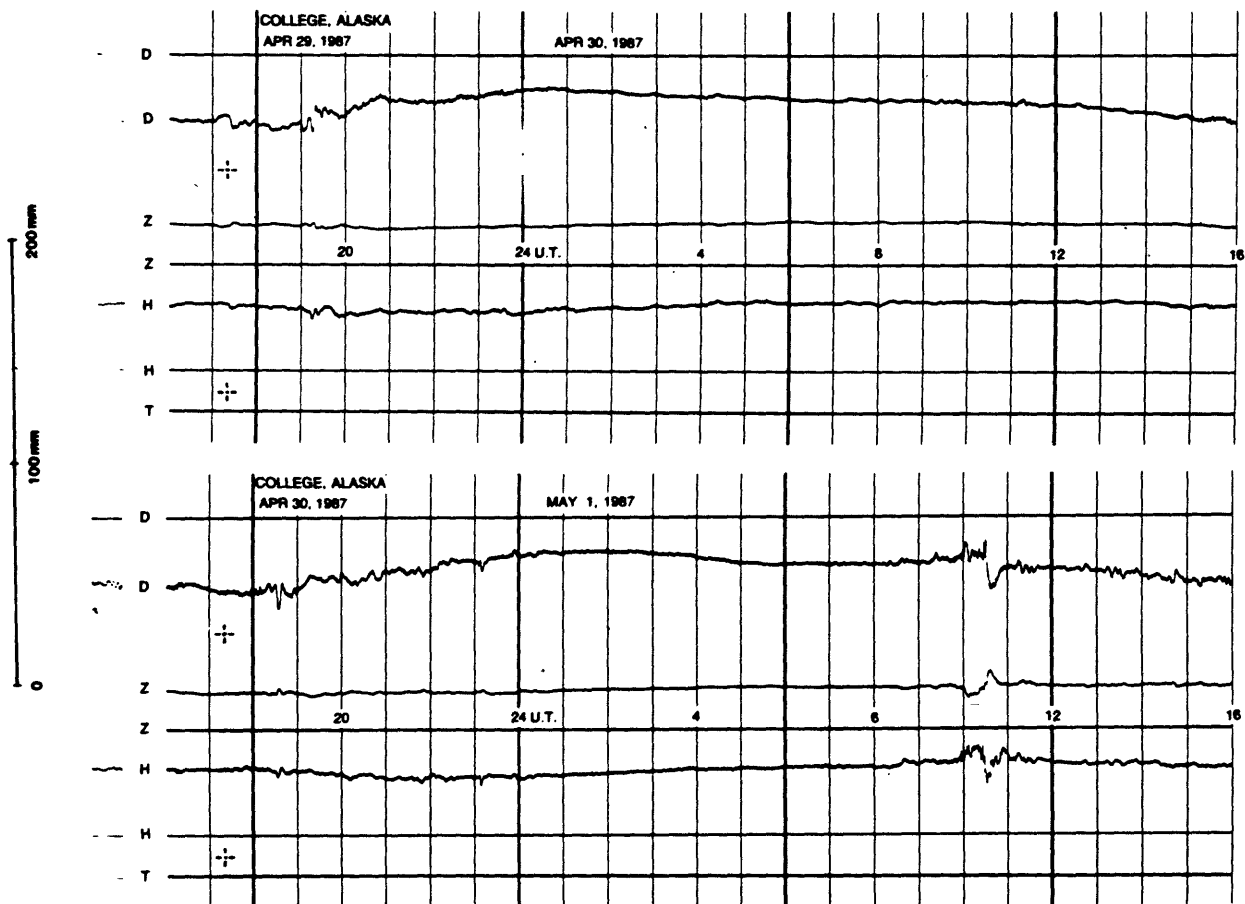


NORMAL MAGNETOGRAMS

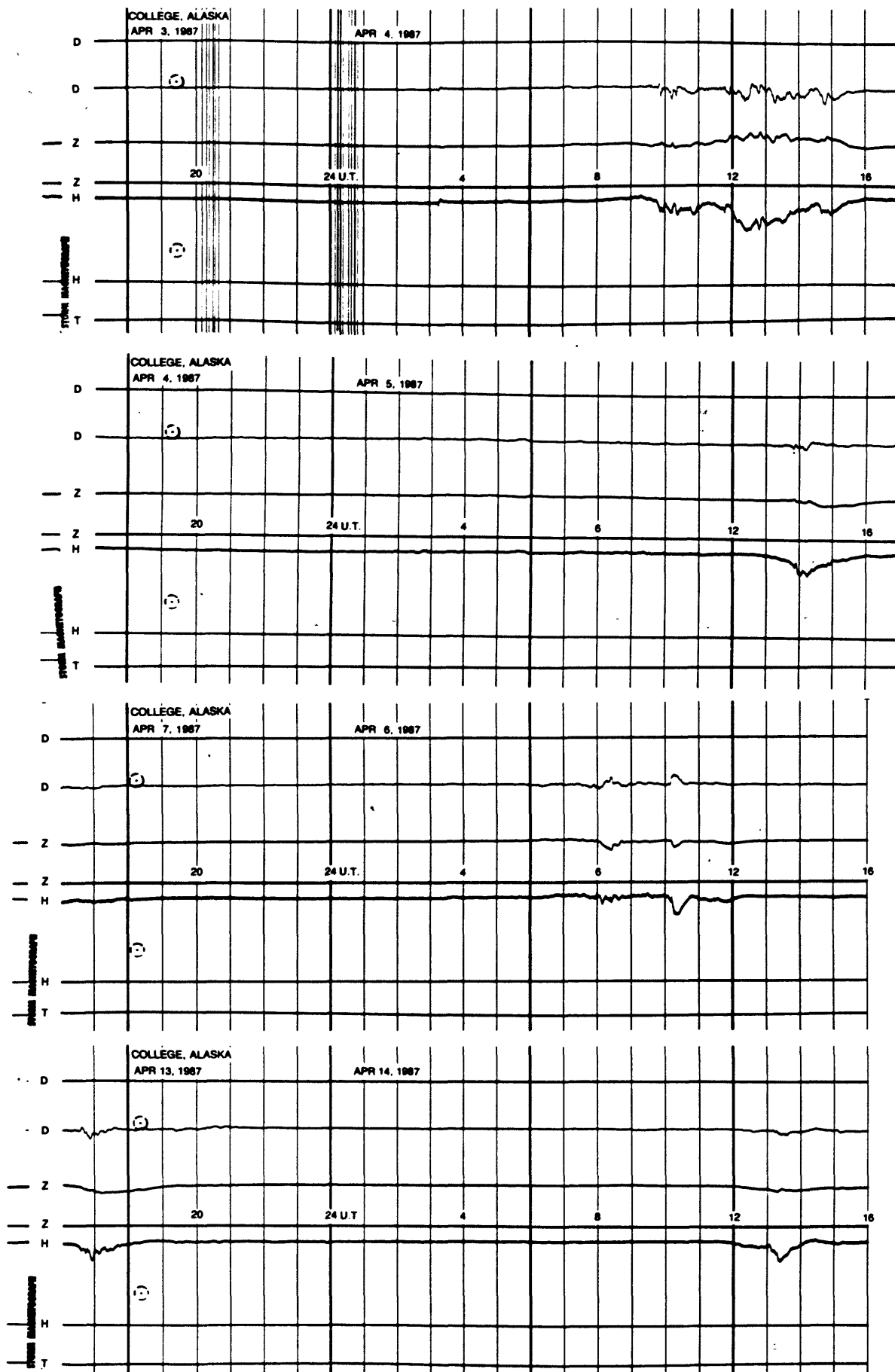
200 mm
100 mm
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NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

