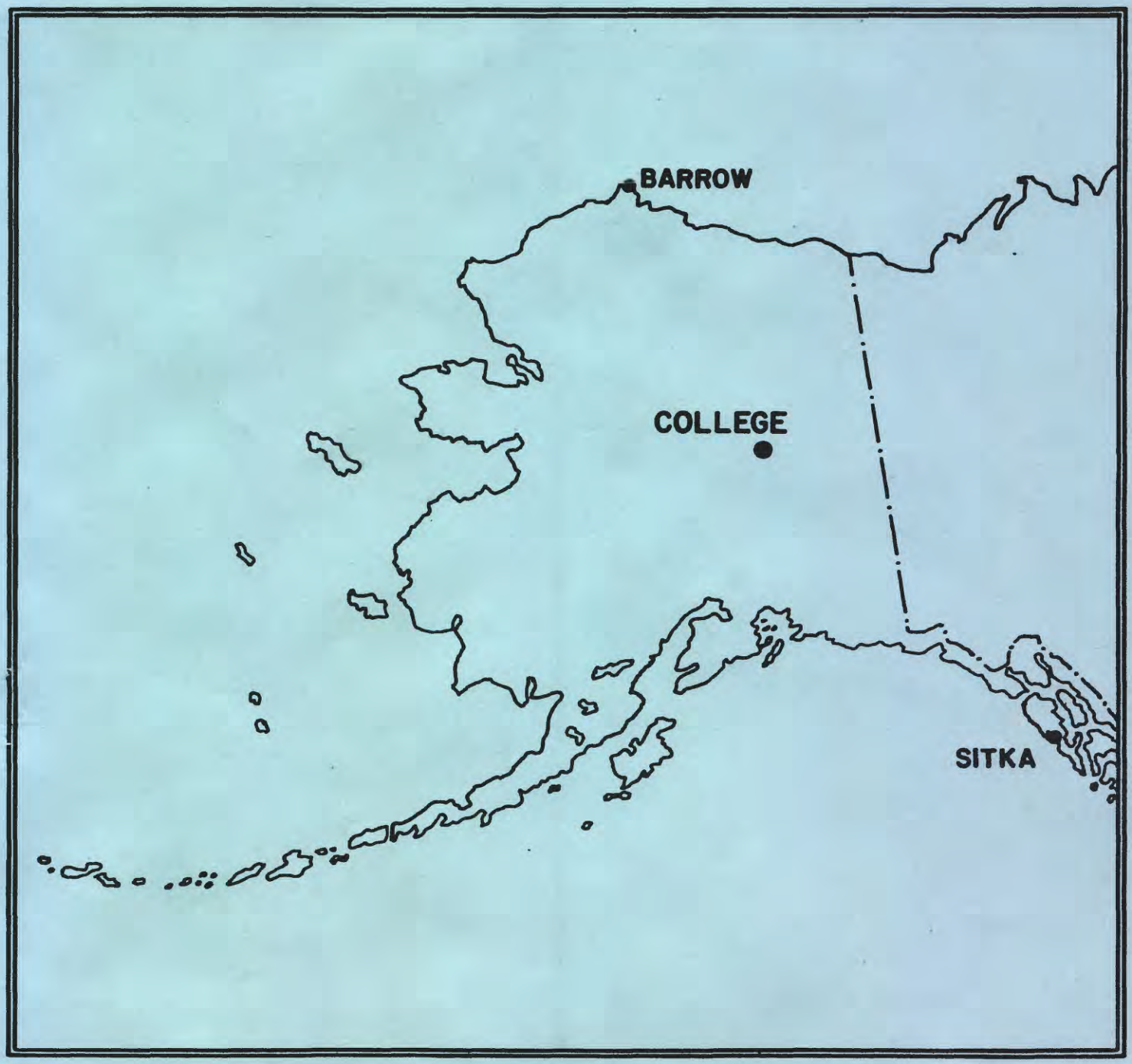
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

DECEMBER 1987

OPEN FILE REPORT 87-0300L



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.

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 latitute.....64° 51.6'N
Geographic longitude.....147° 50.2'W
Geomagnetic latitude.....+64.6°
Geomagnetic longitude.....+256.5°
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 a 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.

NOAA FORM 76-133 (9-72)

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

OBSERVATORY: College Alaska

MONTH AND YEAR: December 1987

DATE	K-INDICES 00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	AK
1	0	0	0	3	2	1	0	0	06	03
2	0	0	0	0	0	1	1	0	02	01
3	1	2	2	2	4	6	1	1	19	17
4	2	1	2	1	1	1	2	4	14	08
5	3	3	6	4	3	3	3	1	26	23
6	0	1	2	2	3	3	2	2	15	08
7	1	1	1	1	1	2	2	0	09	04
8	0	0	0	0	0	0	0	0	00	00
9	0	0	0	1	0	0	2	2	05	02
10	2	1	3	5	6	7	5	4	33	46
11	3	2	1	4	4	4	3	2	23	16
12	3	2	2	5	4	3	2	1	22	16
13	1	0	1	2	0	1	1	0	06	02
14	0	0	1	1	2	0	0	1	05	02
15	0	0	0	1	3	5	3	2	14	11
16	4	5	7	6	6	6	4	4	42	64
17	3	3	0	6	6	5	3	2	28	32
18	2	2	3	3	2	1	0	0	13	07
19	0	0	2	5	4	2	2	0	15	12
20	0	1	1	2	3	2	2	0	11	05
21	0	1	2	5	5	4	3	3	23	20
22	4	4	3	5	6	3	3	4	32	32
23	3	3	4	5	5	3	1	0	24	21
24	0	0	2	5	4	3	1	0	15	13
25	1	1	3	3	4	1	0	1	14	09
26	1	1	0	3	2	1	0	0	08	04
27	0	0	0	2	0	0	0	0	02	01
28	0	0	0	1	2	0	0	0	03	01
29	0	1	2	2	0	0	1	0	06	03
30	0	0	1	2	1	0	0	0	04	02
31	0	0	1	4	3	1	1	0	10	06

TIME SCALE ON MAGNETOGRAMS: 20 mm/hr

SUDDEN COMMENCEMENTS

d	h	m
09	19	41

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

BEGIN d	h	m	END d	h	m

K SCALE USED:	D	H	Z	
LOWER LIMIT FOR K = 9.....	675.7	322.2		mm)
CURRENT SCALE VALUE.....	3.70	7.79		(γ/mm)
LOWER LIMIT FOR K = 9	2500	2510		(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

NOAA FORM 76-133 SUPERSEDES C&GS FORM 815

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NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS

WDC-A FOR SOLAR-TERRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80302 U.S.A.

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

December 19 87

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(γ)	Z(γ)	day	(3 hr - period)	K	D(')	H(γ)	Z(γ)	day	hr
CO	64.6 N	09	1941	s.c.*	-13	+50	..	10	6	7	105	1300	590	11	04
		16	01xx	..				16	3	7	206	1290	690	17	05

COLLEGE OBSERVATORY, COLLEGE, ALASKA -- PRELIMINARY CALIBRATION DATA FOR: December 1987

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE		CALIBRATION BASELINE
D	0000 U.T., 12/1/87	2400 U.T., 12/31/87	1.0'/mm	3.7″/mm	27° 01.2' E
H	(same)	(same)	7.8″/mm		12621″
Z	(same)	(same)	7.7″/mm		55173″

STORM MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE		CALIBRATION BASELINE
D	0000 U.T., 12/1/87	2400 U.T., 12/31/87	7.9'/mm	29.4″/mm	
H	(same)	(same)	43.6″/mm		
Z	(same)	(same)	49.0″/mm		

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE
D			
H			
Z			

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 17.8' E	12841″	55315″

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: DEC 2, 8, 14, 27, 28,

U.S. Dept. of Interior
Geological Survey

Observatory	Month	Year
COLLEGE, ALASKA	December	1987

Jep-CO - 1/86

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

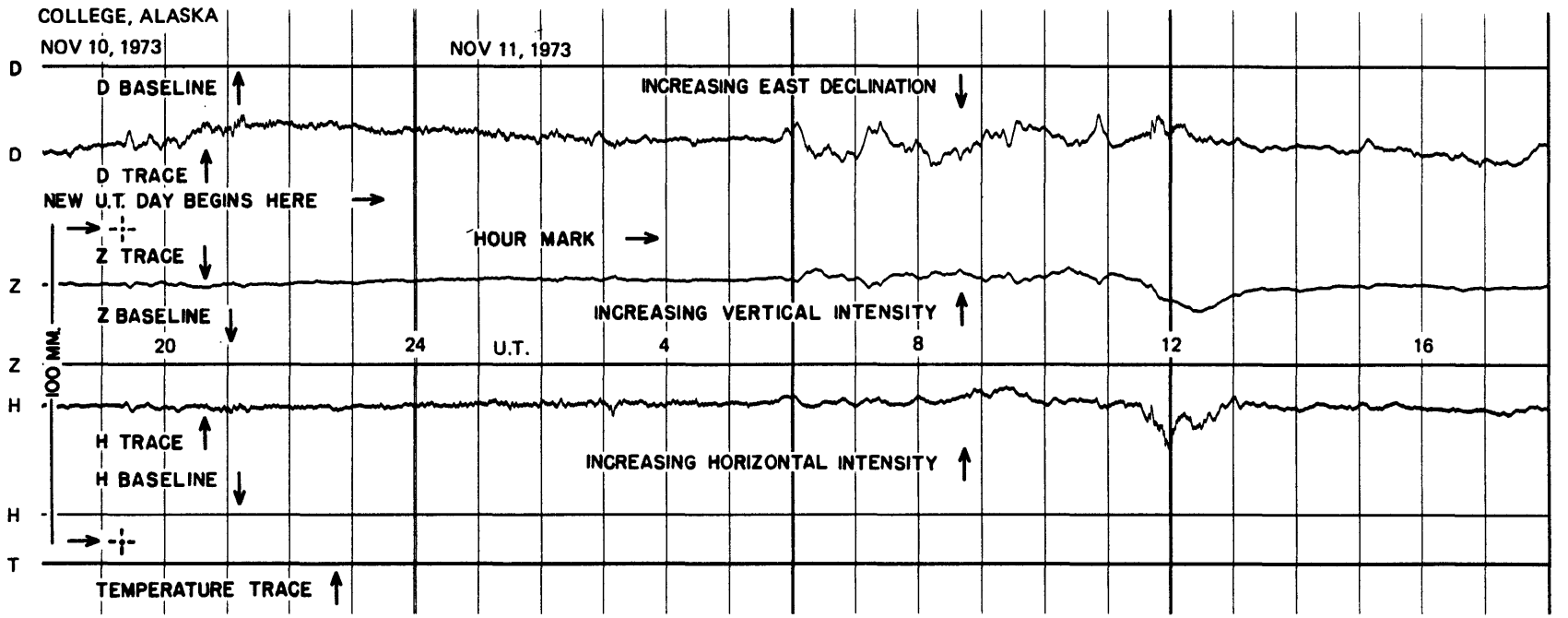
(UNIVERSAL TIME)

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		02	08	14	27	28	02	08	14	27	28	02	08	14	27	28	DAY
A_k		02	00	02	01	01	02	00	02	01	01	02	00	02	01	01	A_k
HOUR	01	167	149	153	153	153	280	283	288	276	283	185	193	190	192	189	01 HOUR
	02	163	156	147	153	156	287	290	288	283	287	186	193	187	192	188	02
	03	163	153	163	160	157	292	292	287	287	287	186	195	187	192	187	03
	04	167	166	163	163	165	290	293	287	288	288	187	188	187	193	188	04
	05	173	170	163	164	167	287	293	286	288	288	189	186	189	194	187	05
	06	173	173	173	167	168	293	288	283	283	290	193	185	189	193	187	06
	07	153	173	174	170	163	297	285	280	284	287	193	185	189	189	186	07
	08	155	173	190	167	157	297	282	276	280	286	193	185	196	188	186	08
	09	163	172	199	166	163	290	280	273	281	283	196	186	192	188	195	09
	10	165	169	182	173	183	287	280	270	279	278	188	186	187	192	198	10
	11	163	168	187	168	178	288	281	277	282	285	188	187	174	192	193	11
	12	173	169	167	164	157	288	282	273	279	278	189	187	184	186	186	12
	13	175	173	183	163	152	288	283	263	279	267	186	188	174	192	153	13
	14	180	176	160	164	153	287	282	231	277	303	186	187	142	190	176	14
	15	181	168	153	173	166	291	285	273	280	294	185	185	153	188	189	15
	16	187	173	188	173	187	280	287	280	279	286	185	184	177	186	187	16
	17	165	177	205	177	184	278	288	282	282	289	185	186	186	186	184	17
	18	186	175	203	177	193	276	286	279	280	287	183	184	173	184	180	18
	19	183	182	193	171	197	277	284	281	279	283	183	182	170	185	179	19
	20	180	183	189	169	175	278	279	279	279	277	180	184	170	186	172	20
	21	167	184	176	163	156	281	273	274	278	280	175	190	173	185	160	21
	22	170	177	156	160	133	280	273	263	280	284	180	187	178	185	160	22
	23	168	160	152	155	123	285	277	279	282	288	177	188	189	186	169	23
	24	161	157	149	152	123	281	280	284	283	288	176	191	192	187	177	24
DAILY SUM		4101	4076	4168	3965	3909	6858	6806	6636	6748	6846	4454	4492	4328	4531	4356	DAILY SUM
DAILY MEAN		171	170	174	165	163	286	284	276	281	285	186	187	180	189	182	DAILY MEAN
MEAN			168					282					185				MEAN

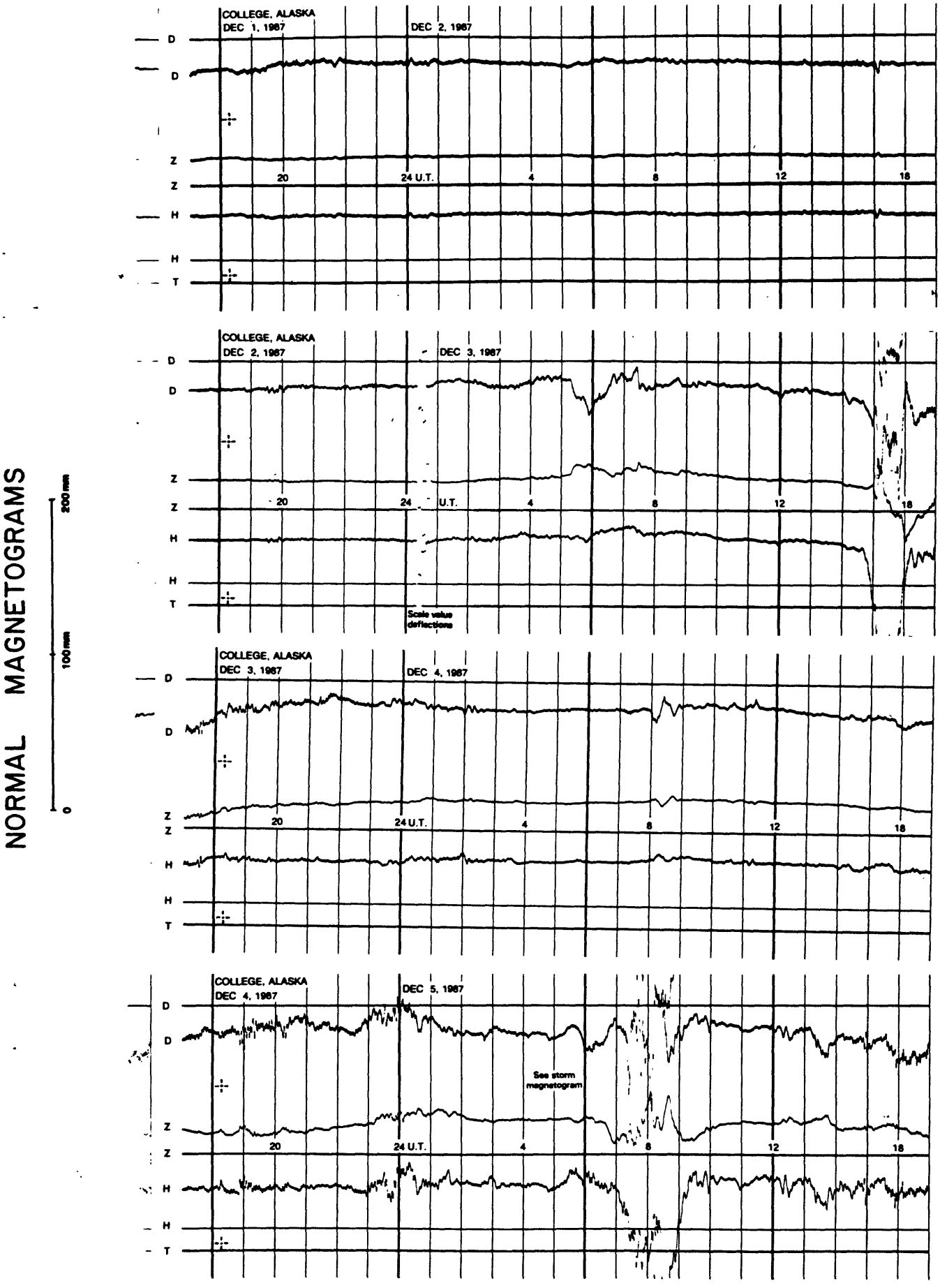
Scaled LYT | Checked RVO

FORMAT FOR NORMAL & STORM MAGNETOGRAMS
(SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS



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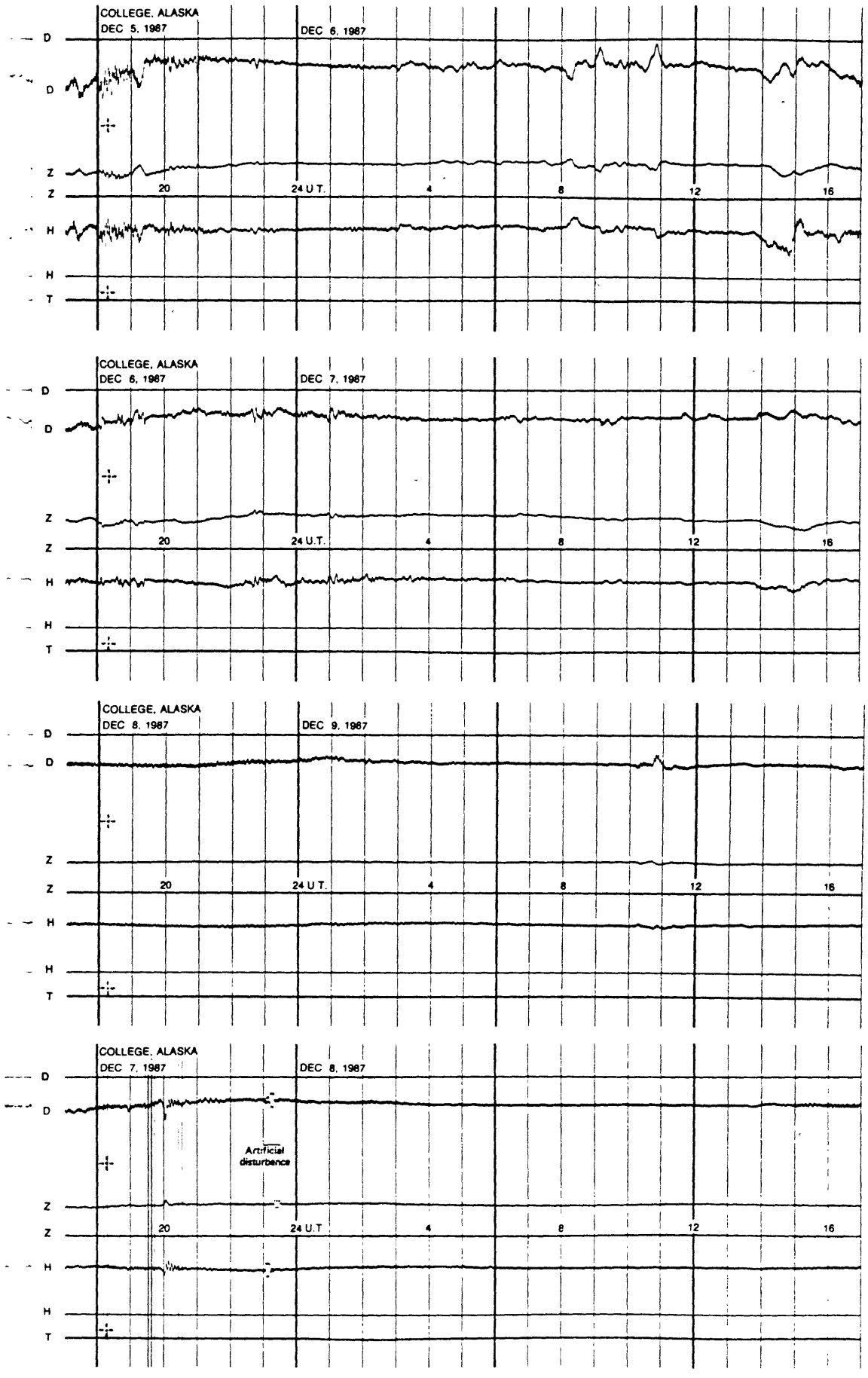

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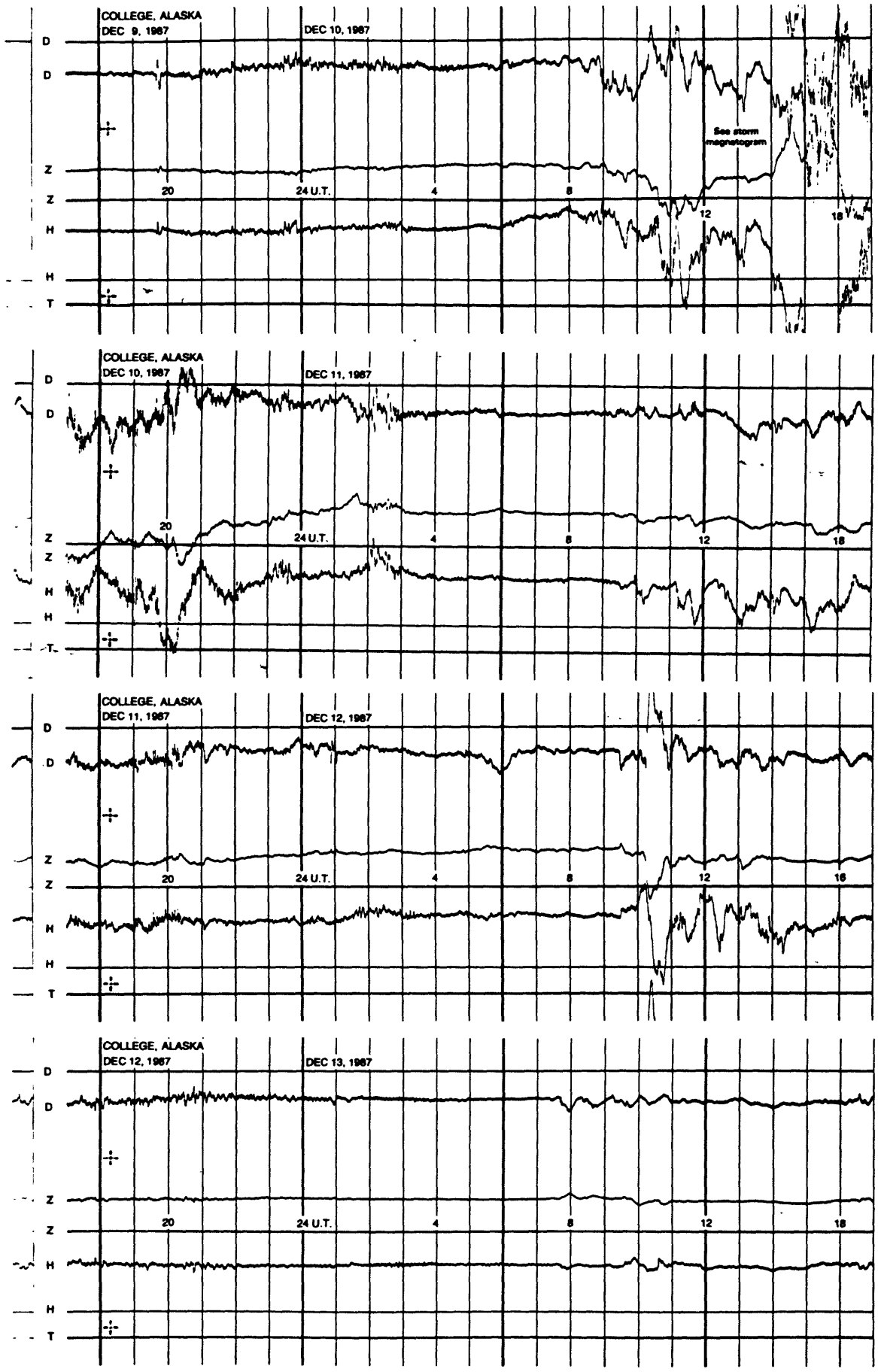
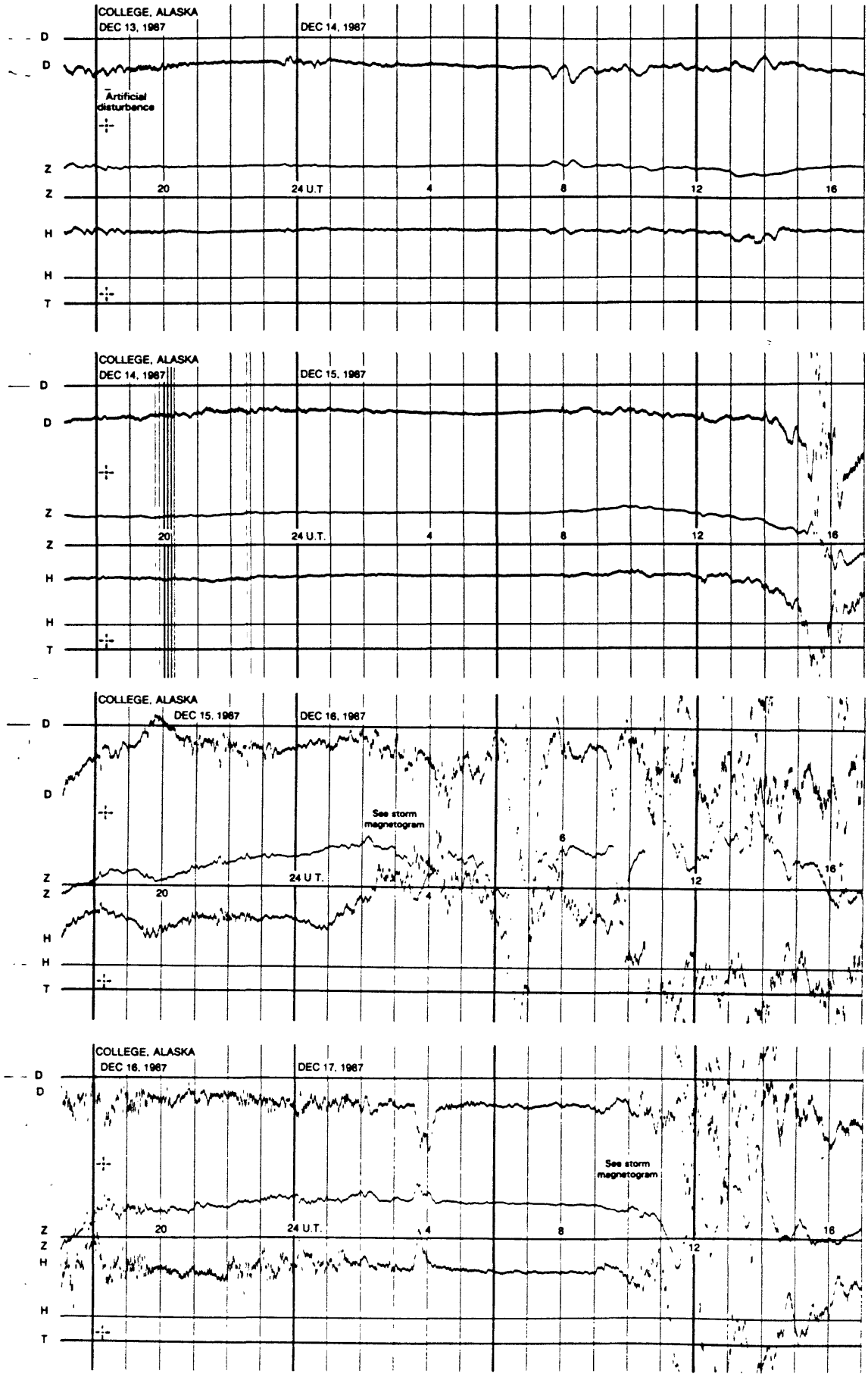


200 mm

100 mm

0

NORMAL MAGNETOGRAMS



200 mm
100 mm
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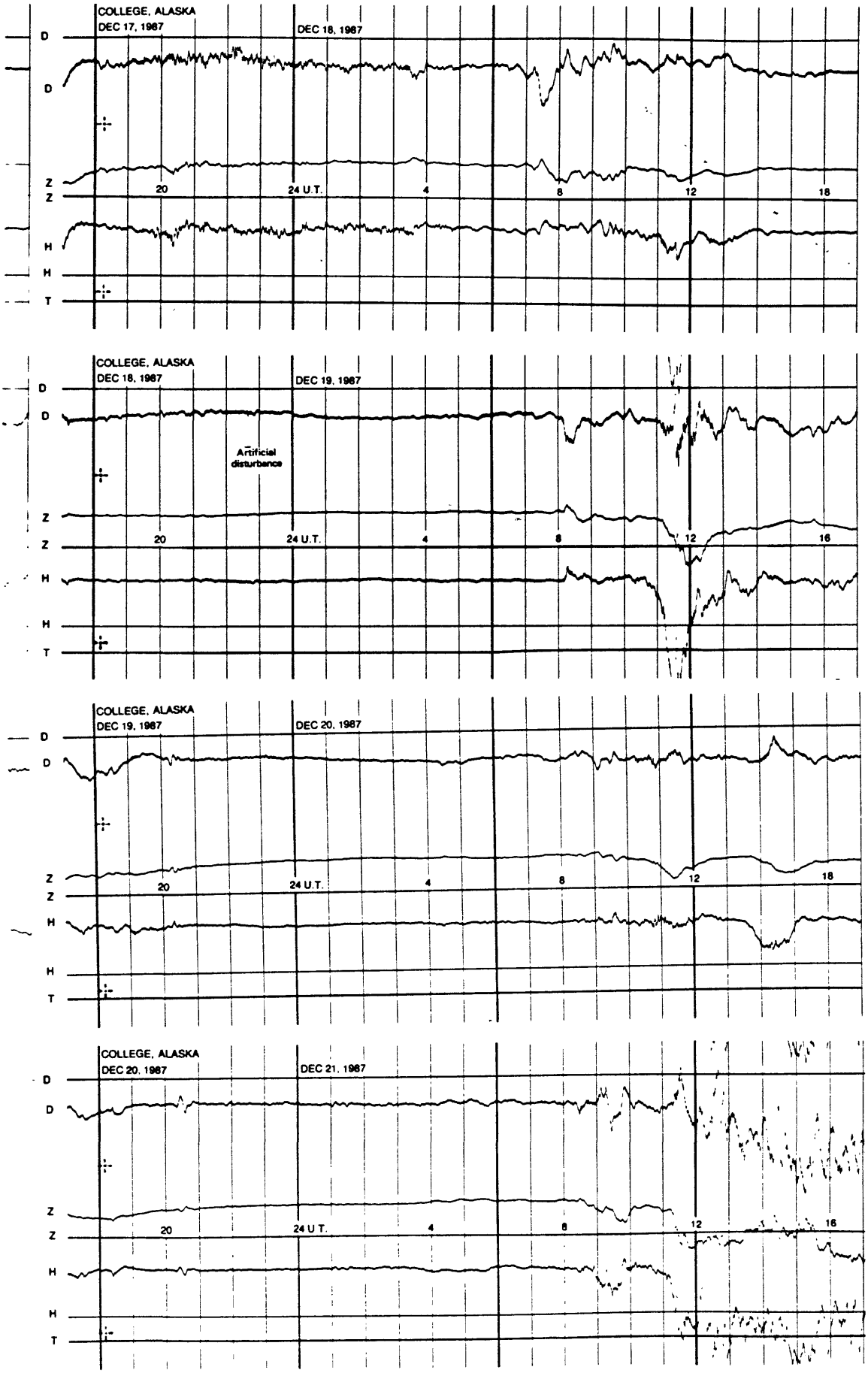
NORMAL MAGNETOGRAMS



200 mm
100 mm
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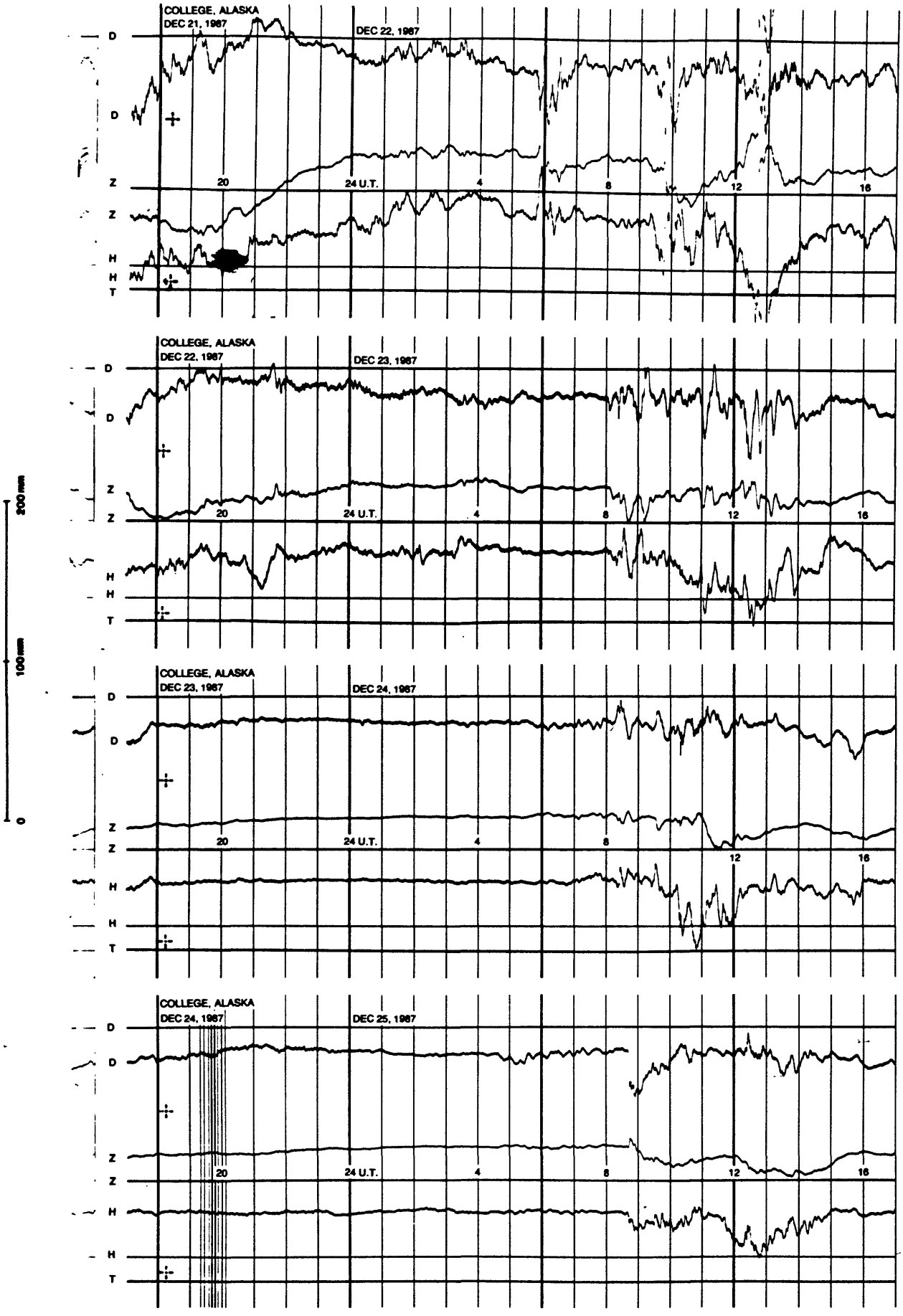
NORMAL MAGNETOGRAMS



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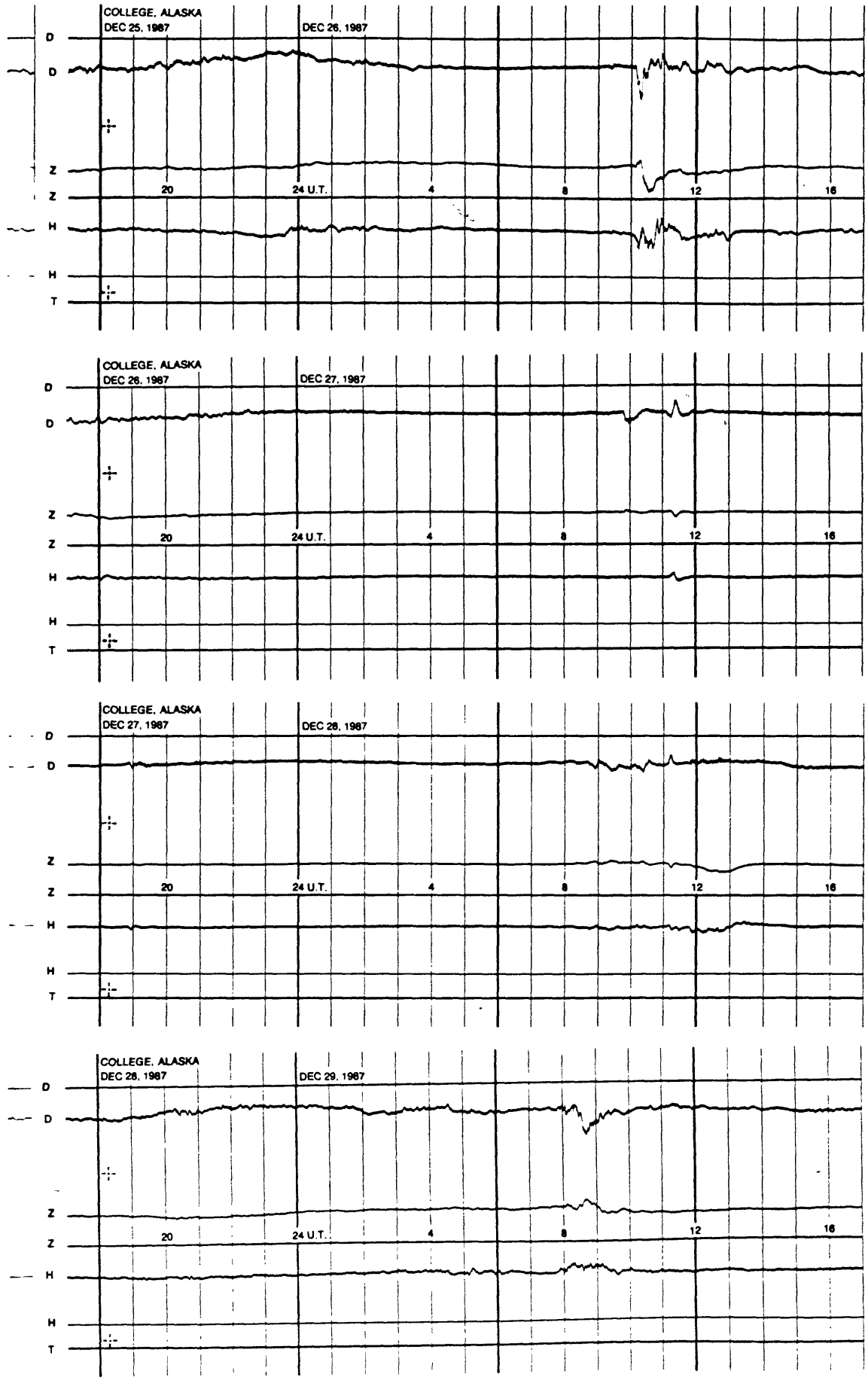

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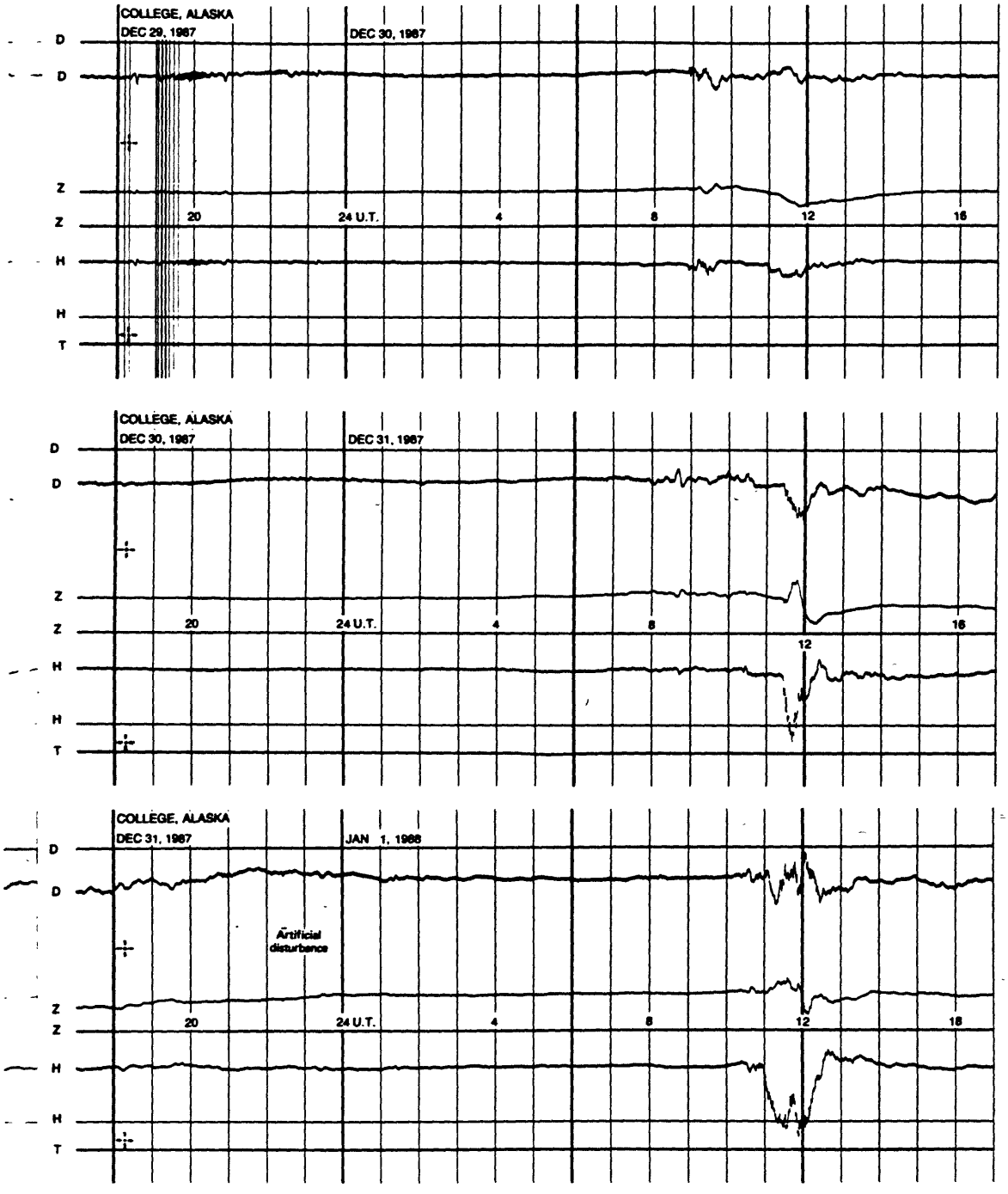

200 mm
100 mm
0

STORM MAGNETOGRAMS