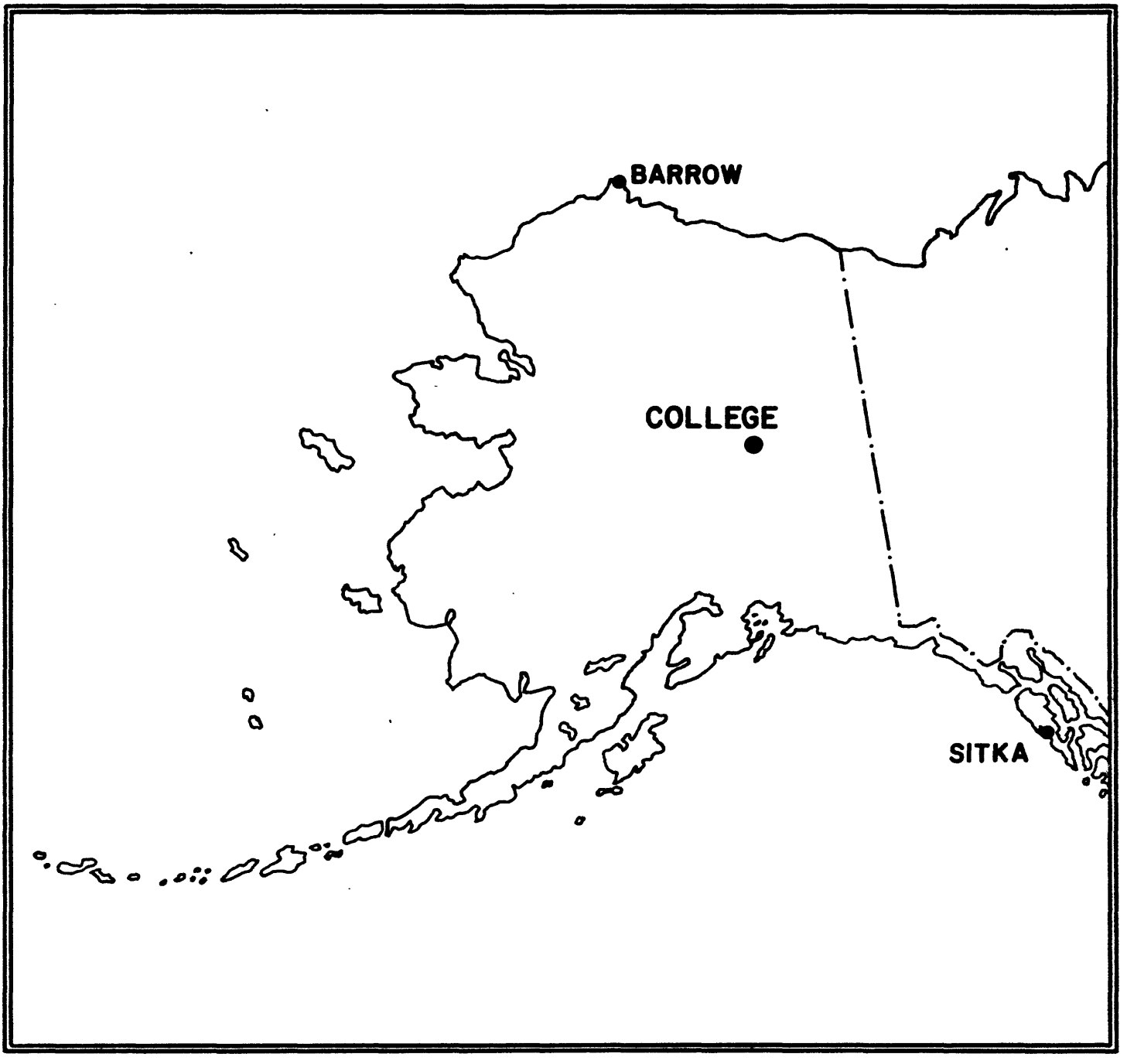
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

SEPTEMBER 1987 **OPEN FILE REPORT** 87-0300I



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.

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 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: September 1987

DATE	K-INDICES 00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	AK
1	4	5	5	6	6	5	3	3	37	45
2	3	4	6	4	5	2	2	1	27	27
3	1	1	3	0	0	0	0	0	05	03
4	1	1	0	4	4	4	2	1	17	12
5	1	2	4	5	2	0	1	0	15	12
6	0	1	2	5	2	2	1	1	14	10
7	0	1	3	4	5	3	1	2	19	15
8	2	2	2	4	4	2	1	1	18	11
9	1	2	5	4	3	0	1	1	17	13
10	1	0	0	1	7	7	4	5	25	45
11	3	4	5	6	5	6	4	3	36	43
12	3	3	5	5	4	4	3	3	30	26
13	3	3	3	3	6	6	3	3	30	31
14	5	5	4	6	5	4	4	3	36	40
15	3	3	6	6	6	4	3	4	35	42
16	3	2	3	6	5	3	2	2	26	24
17	2	4	2	5	5	4	3	3	28	24
18	3	1	2	5	3	2	1	2	19	13
19	1	0	0	3	3	0	0	0	07	04
20	0	1	0	3	3	3	3	1	14	08
21	2	2	1	2	4	2	1	0	14	08
22	2	3	4	4	2	6	4	4	29	27
23	3	4	6	4	4	2	0	0	23	23
24	4	3	2	2	1	1	2	1	16	09
25	1	4	5	7	7	7	5	4	40	72
26	3	5	5	6	4	3	2	1	29	30
27	3	2	1	2	3	3	3	2	19	11
28	3	2	3	6	6	3	2	3	28	29
29	4	4	4	6	6	6	5	3	38	48
30	5	5	5	6	5	6	3	3	38	48
31										

TIME SCALE ON MAGNETOGRAMS: 20 mm/hr

SUDDEN COMMENCEMENTS

d	h	m
10	11	35
24	01	56

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

September 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(γ)	Z(γ)	day	(3 hr - period)	K	D(')	H(γ)	Z(γ)	day	hr
CO	64°.6 N	10	1135	s.c.	+2	+19	+1	10	5, 6	7	304	760	800	11	06
		24	0156	s.c.*	-18	+211	-47	25	4, 5, 6	7	334	1750	1120	26	01

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

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE		CALIBRATION BASELINE
D	0000 U.T., 9/1/87	2400 U.T., 9/30/87	1.0'/mm	3.7 γ/mm	27° 01.3' E
H	(same)	(same)	7.8 γ/mm		12644 γ
Z	(same)	(same)	7.7 γ/mm		55158 γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE		CALIBRATION BASELINE
D	0000 U.T., 9/1/87	1315 U.T., 9/7/87	7.9'/mm	29.5 γ/mm	23° 44' E *
	0040 UT, 9/10/87	2400 U.T., 9/30/87	7.9'/mm	29.5 γ/mm	23° 29' E *
H	0000 U.T., 9/1/87	1315 U.T., 9/7/87	43.7 γ/mm		10,743 γ *
	0040 U.T., 9/10/87	2400 U.T., 9/30/87	43.7 γ/mm		10,715 γ *
Z	0000 U.T., 9/1/87	2400 U.T., 9/30/87	48.7 γ/mm		54101 γ

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE
D			
H			
Z			

* Storm magnetograph distrupted by local earthquake (M=4.2) of September 7, 1987. H-trace and D-baseline restored to desired ordinates on September 10, 1987.

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 20.6' E	12838 γ	55306 γ

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: SEPT. 3, 19, 20, 21, 27,

U.S. Dept. of Interior
Geological Survey

Observatory: COLLEGE, ALASKA | Month: September | Year: 1987

Jep-CO - 1/86

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

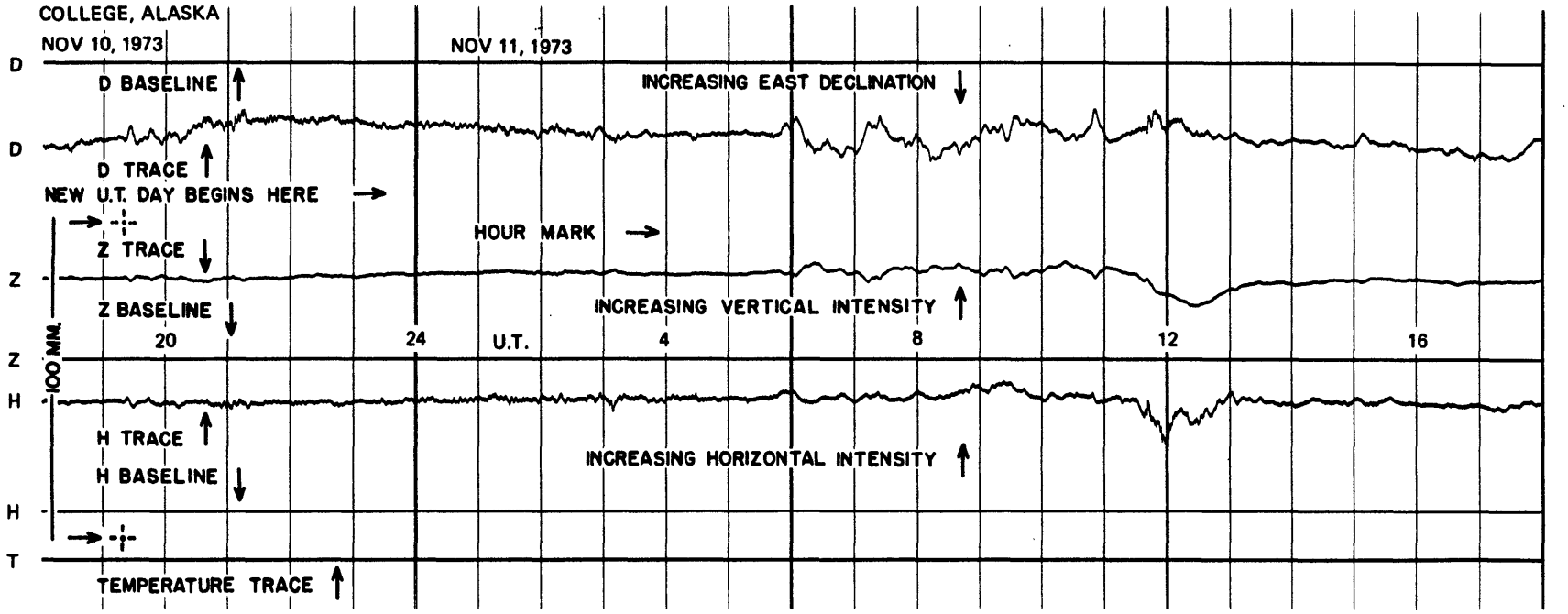
(UNIVERSAL TIME)

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		03	19	20	21	27	03	19	20	21	27	03	19	20	21	27	DAY
A_k		03	04	08	08	11	03	04	08	08	11	03	04	08	08	11	A_k
HOUR	01	147	156	167	128	159	253	260	263	276	277	209	213	200	196	212	01 HOUR
	02	165	161	170	132	164	259	257	262	268	270	213	219	202	203	207	02
	03	170	164	170	98	178	255	250	261	270	255	209	216	203	203	212	03
	04	177	173	173	97	172	260	261	263	265	261	213	216	206	224	209	04
	05	178	176	177	150	167	260	261	263	262	267	217	213	207	230	209	05
	06	173	177	178	166	156	262	260	261	279	282	211	213	207	211	210	06
	07	227	178	180	163	169	280	258	260	277	263	227	213	207	209	217	07
	08	245	178	174	163	170	274	260	263	272	278	141	209	208	210	221	08
	09	166	179	171	167	161	270	260	263	291	278	187	210	211	219	221	09
	10	168	183	177	173	163	263	265	267	271	283	203	208	212	208	225	10
	11	178	192	197	173	172	262	270	259	290	313	203	203	200	207	233	11
	12	187	175	255	196	190	263	223	150	280	290	198	170	118	214	223	12
	13	203	209	267	285	212	257	267	162	116	267	199	157	181	213	217	13
	14	203	211	243	291	227	243	263	203	121	218	199	197	181	202	197	14
	15	226	227	232	277	275	253	246	227	190	211	202	196	127	100	137	15
	16	232	243	260	248	246	249	237	229	272	250	203	173	136	152	190	16
	17	249	248	289	261	273	255	255	223	249	198	204	184	79	182	203	17
	18	257	236	263	253	293	251	249	214	247	151	206	199	91	192	133	18
	19	252	223	247	241	314	243	243	149	240	221	203	206	103	190	128	19
	20	236	213	129	220	256	231	243	229	233	240	202	203	87	180	172	20
	21	216	191	175	172	188	227	244	256	247	210	198	199	143	175	182	21
	22	193	176	147	165	124	230	250	267	251	227	197	201	162	186	177	22
	23	173	173	157	157	143	237	253	264	253	241	200	207	188	203	193	23
	24	150	169	153	151	137	240	253	270	258	260	203	207	196	208	199	24
DAILY SUM		4771	4611	4751	4527	4709	6077	6088	5728	5978	6011	4847	4832	4055	4717	4727	DAILY SUM
DAILY MEAN		199	192	198	189	196	253	254	239	249	250	202	201	169	196	197	DAILY MEAN
MEAN			195					249					193				MEAN

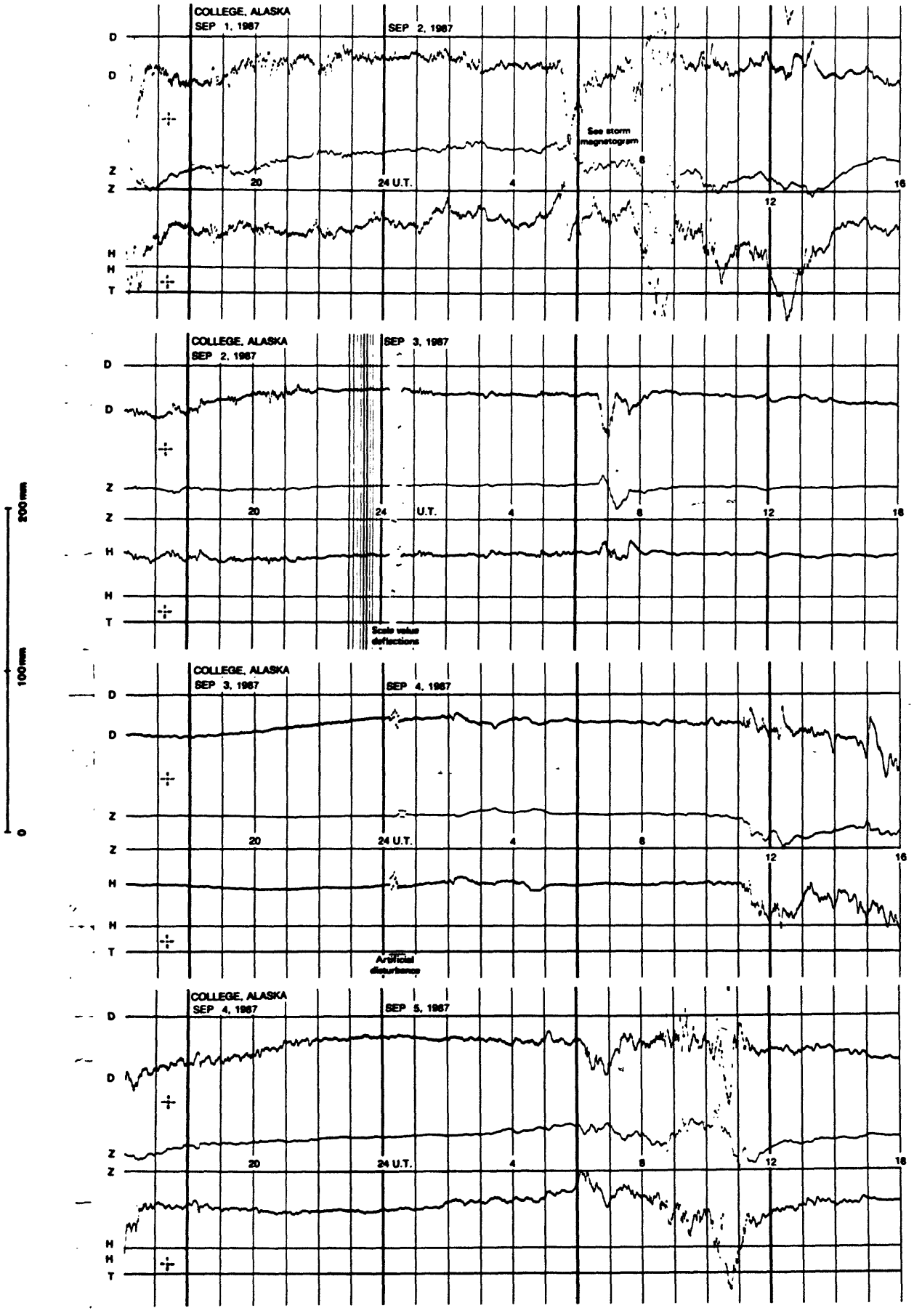
Scaled LYT | Checked RVO

FORMAT FOR NORMAL & STORM MAGNETOGRAMS
(SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS



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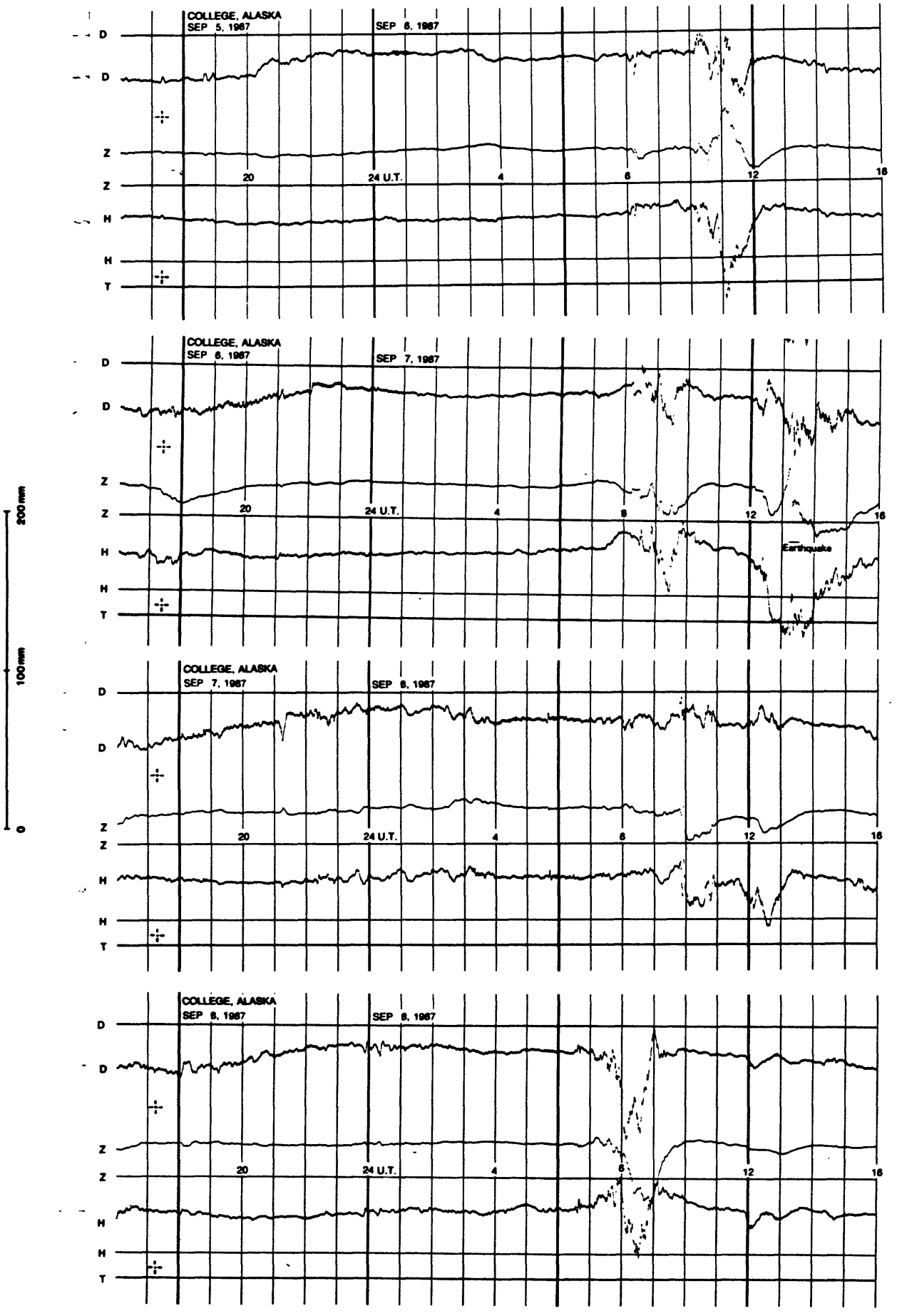

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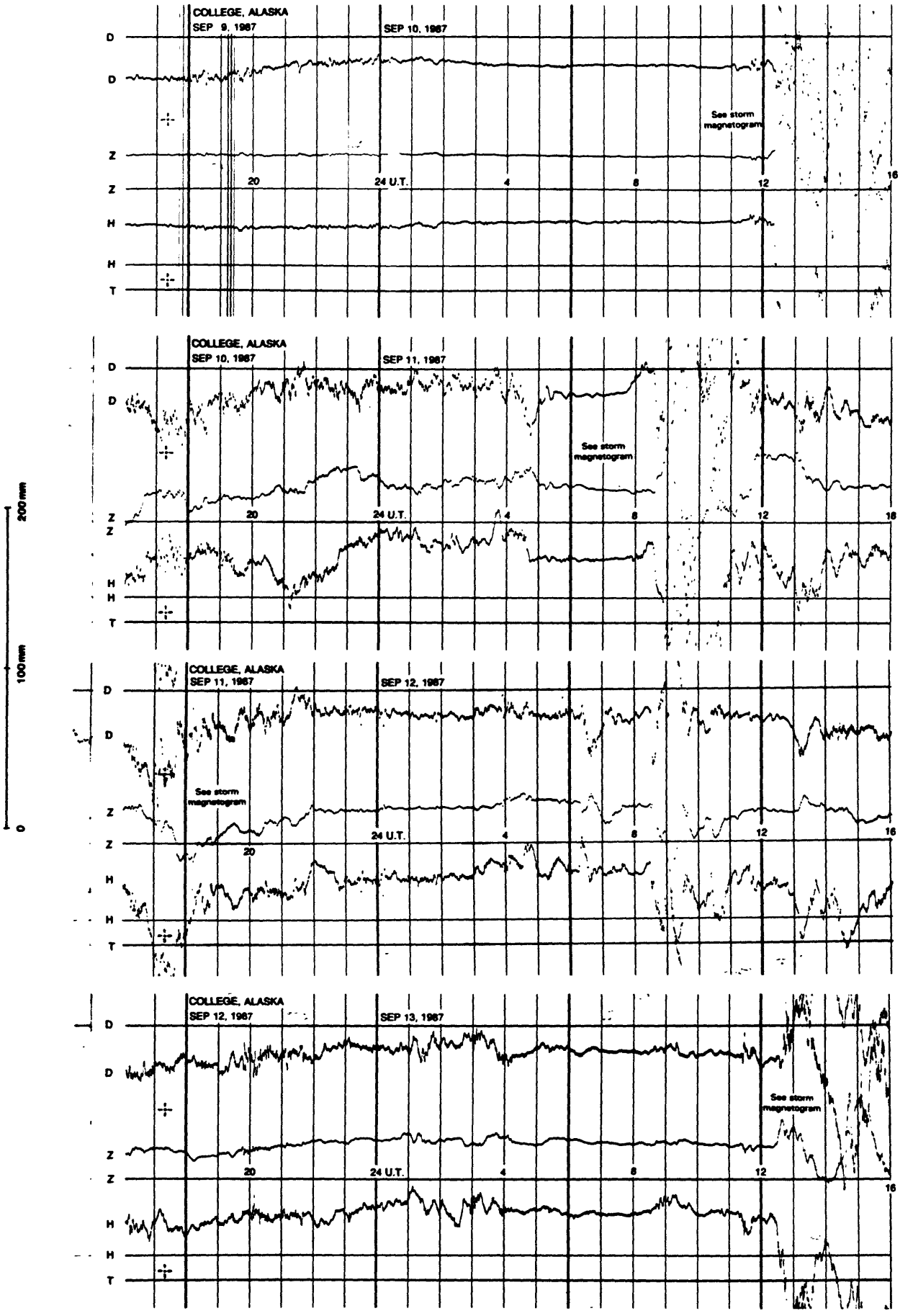

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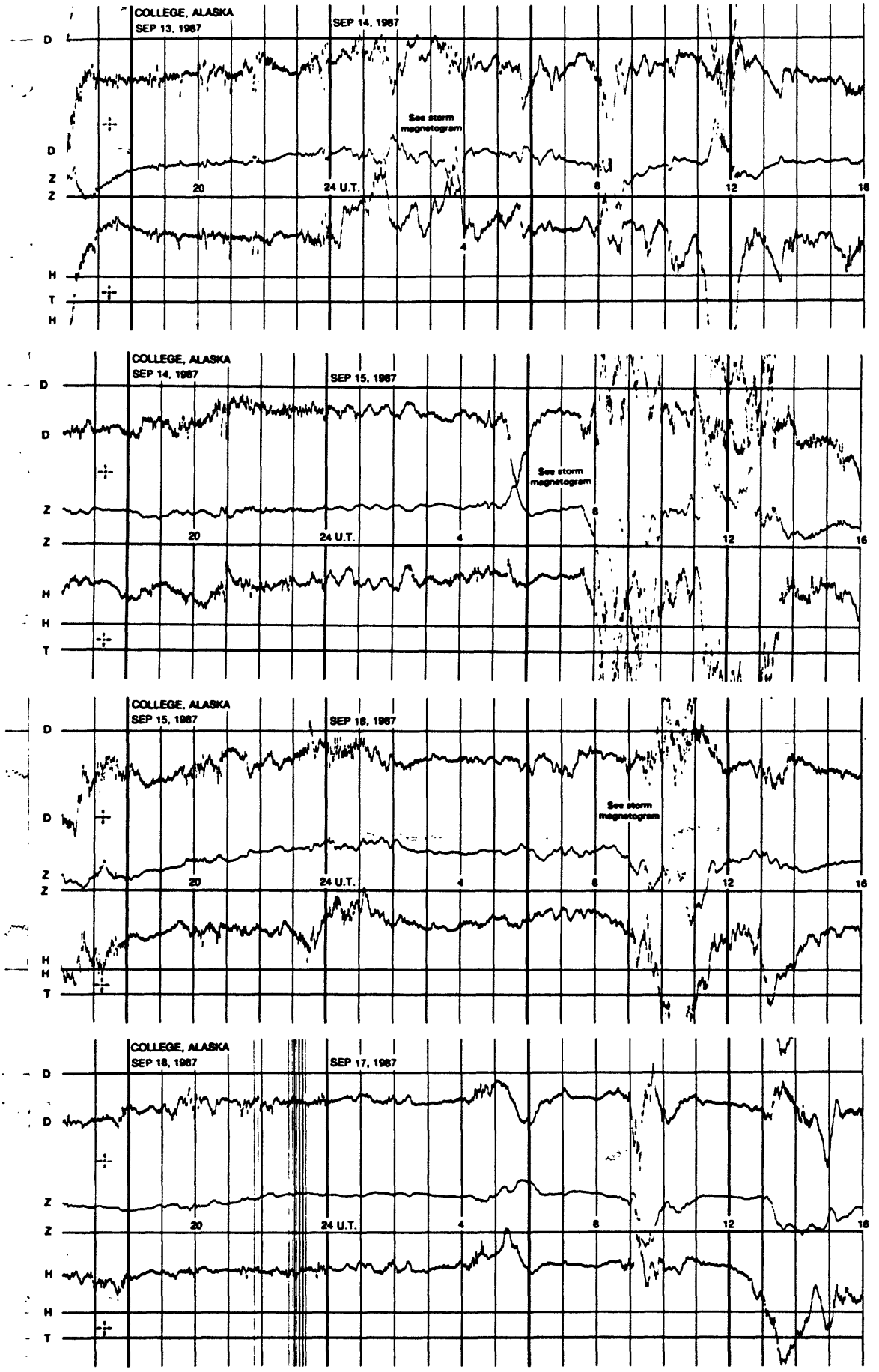

200 mm

100 mm

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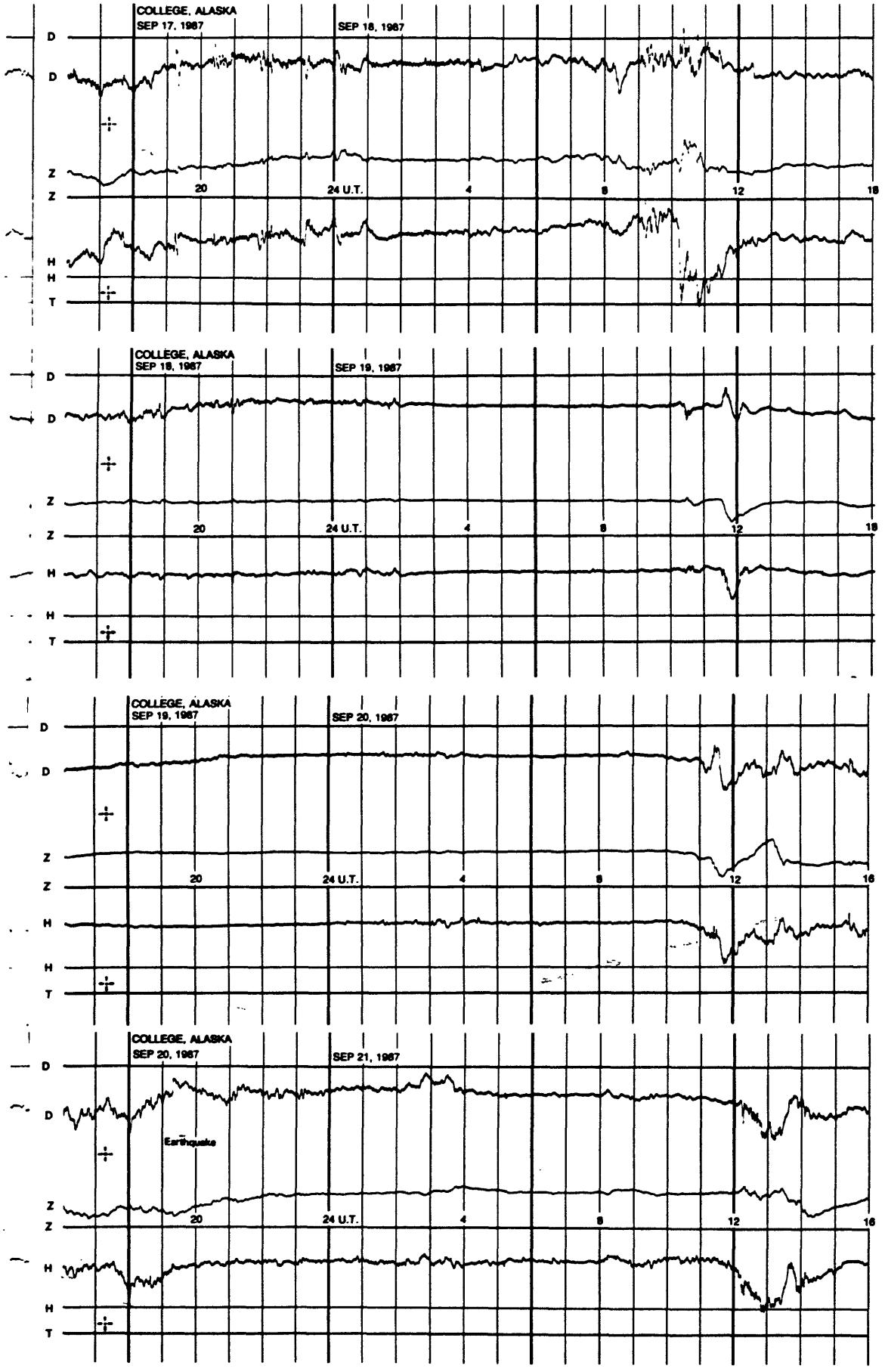
NORMAL MAGNETOGRAMS



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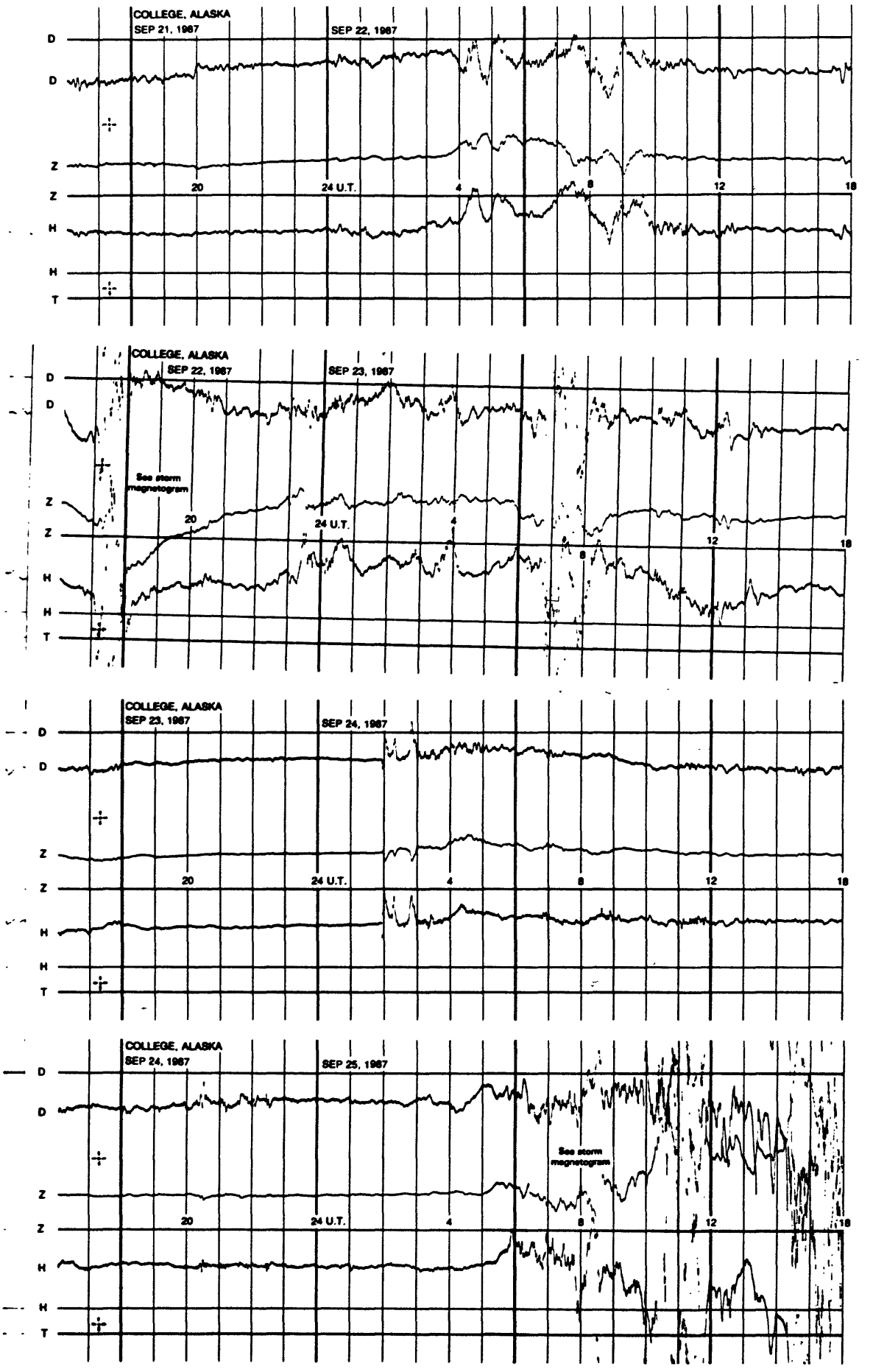

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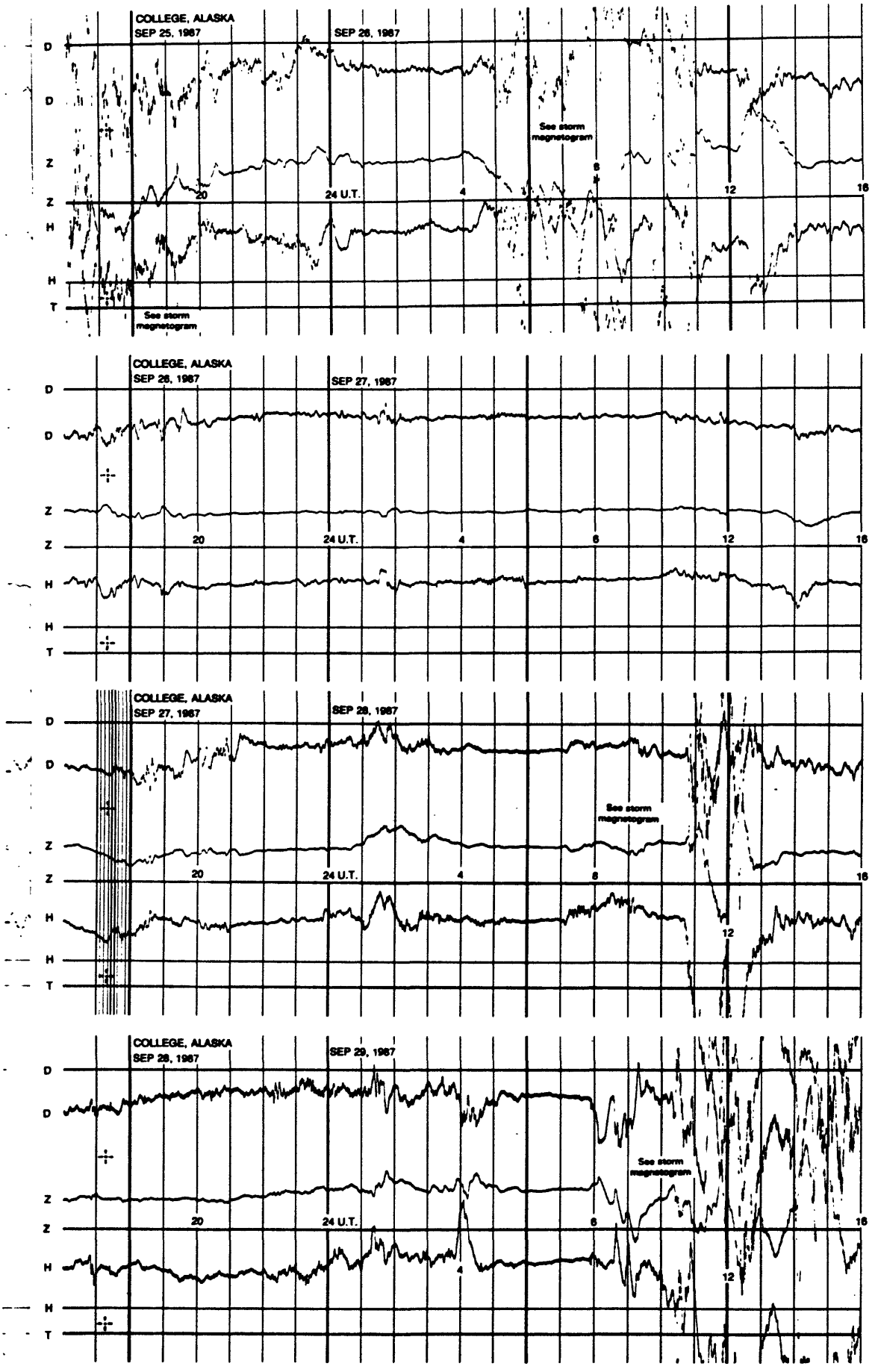

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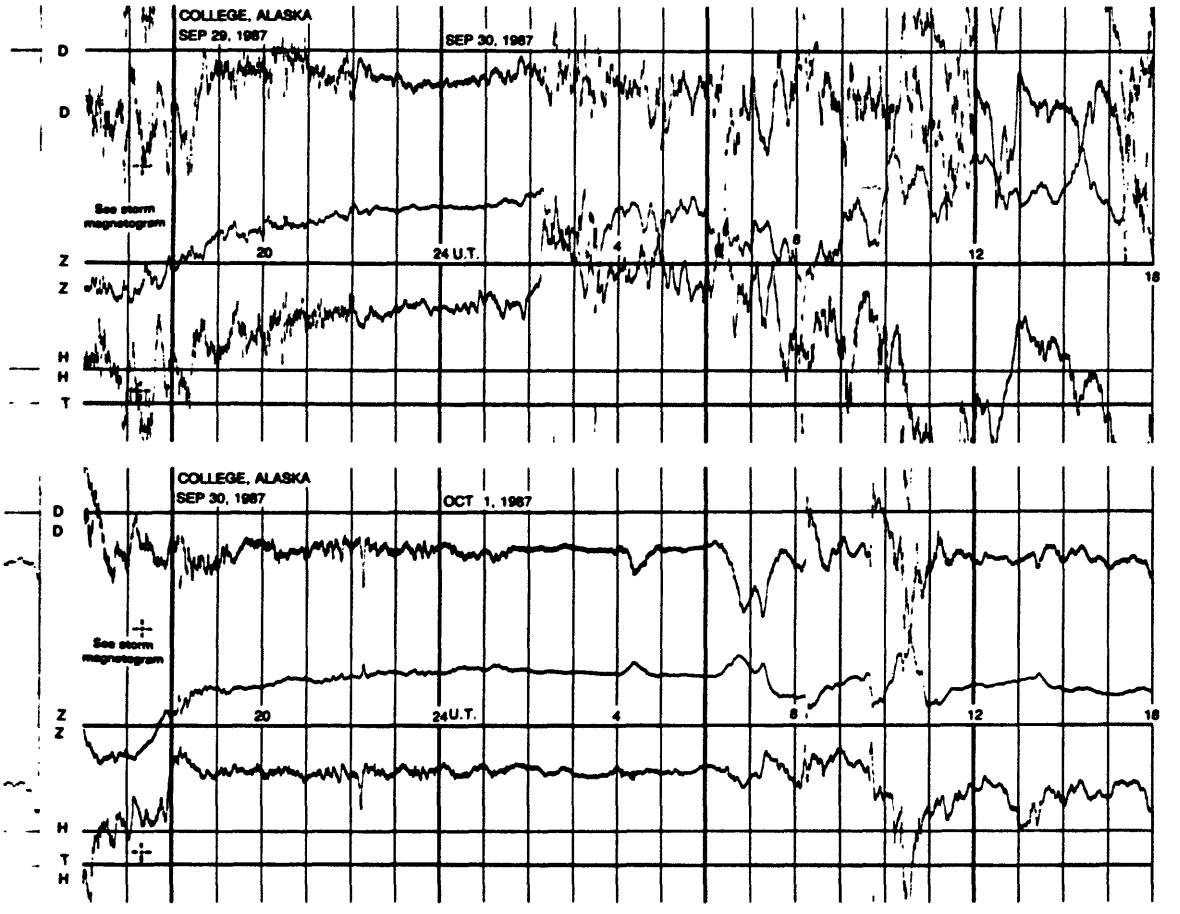

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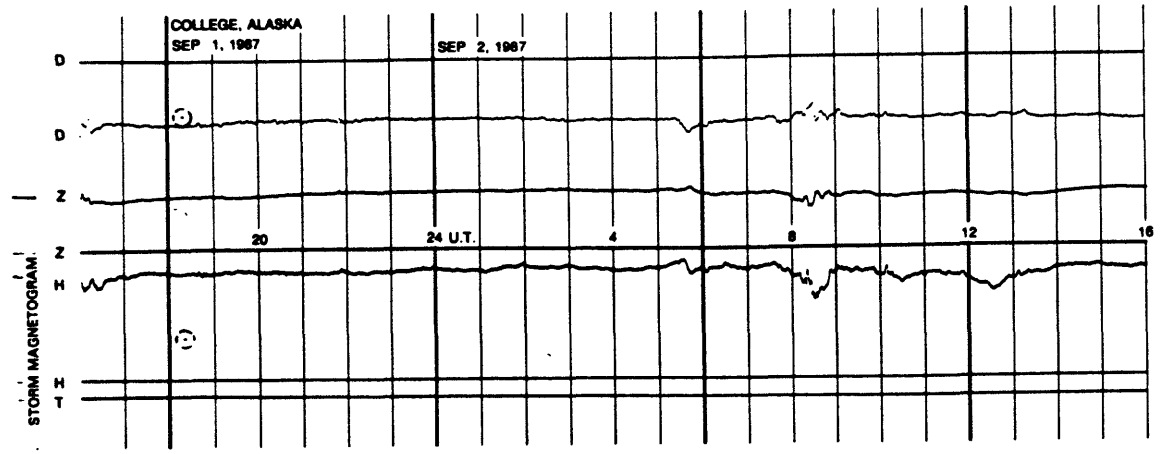
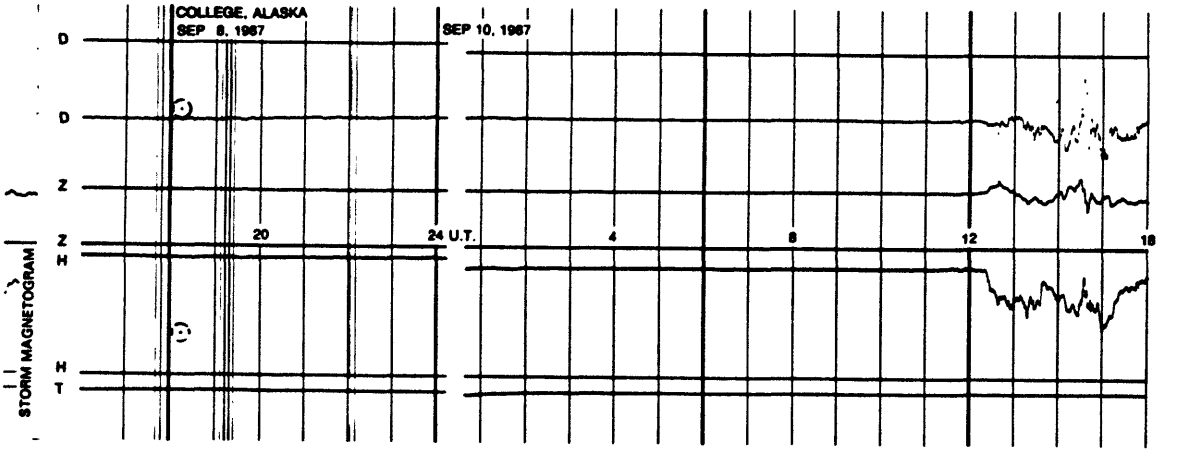
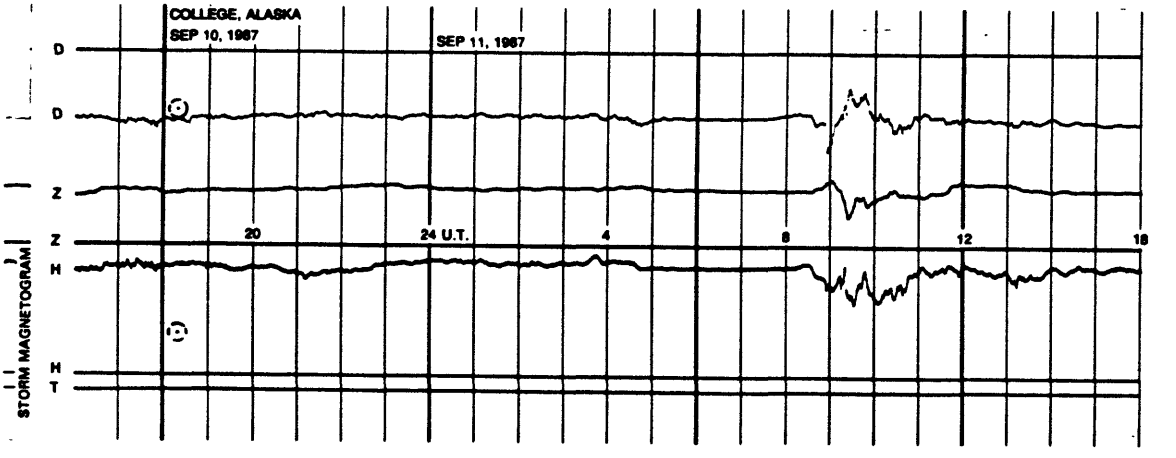
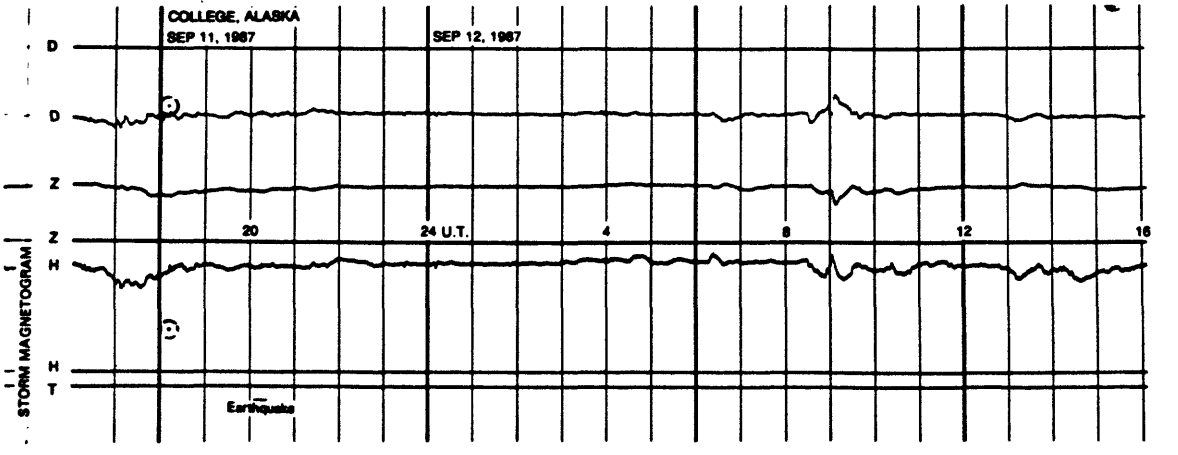
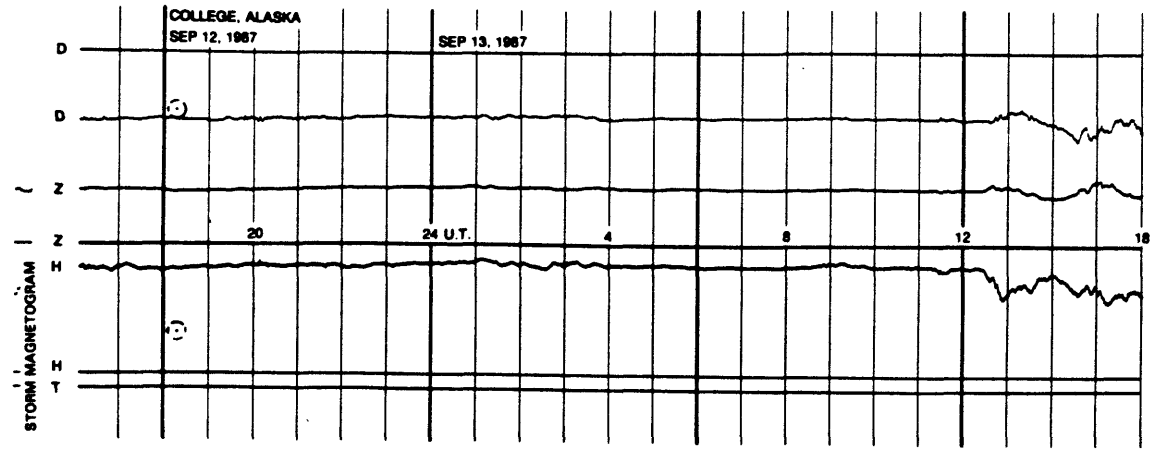
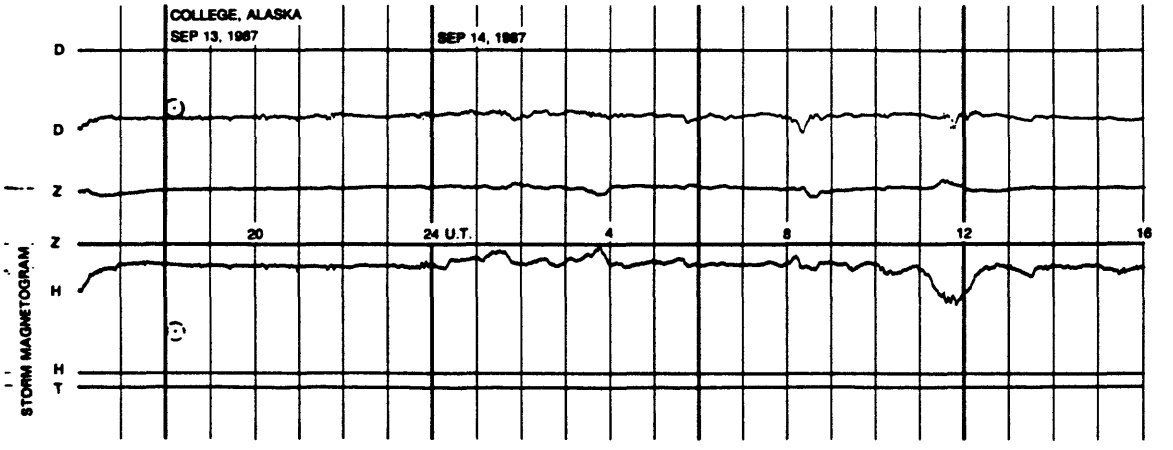
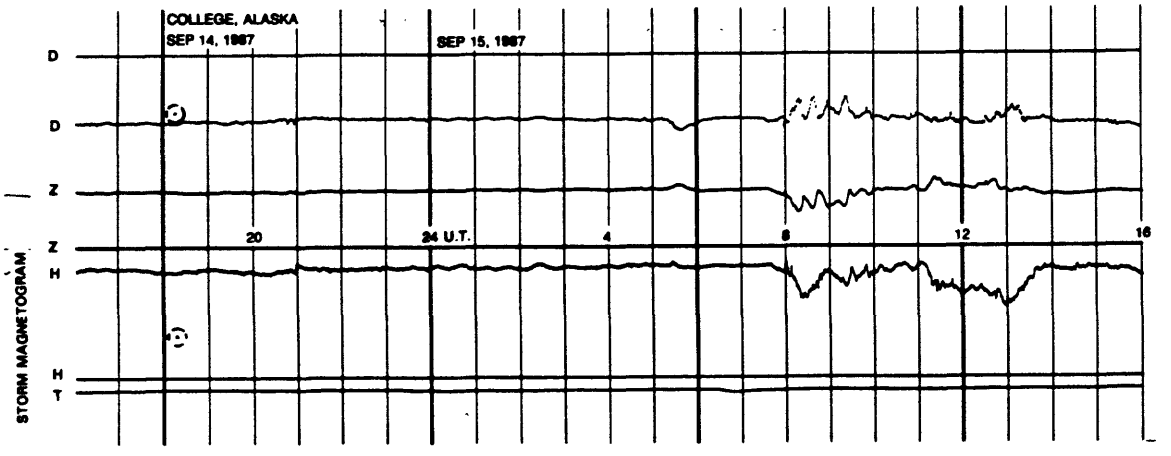
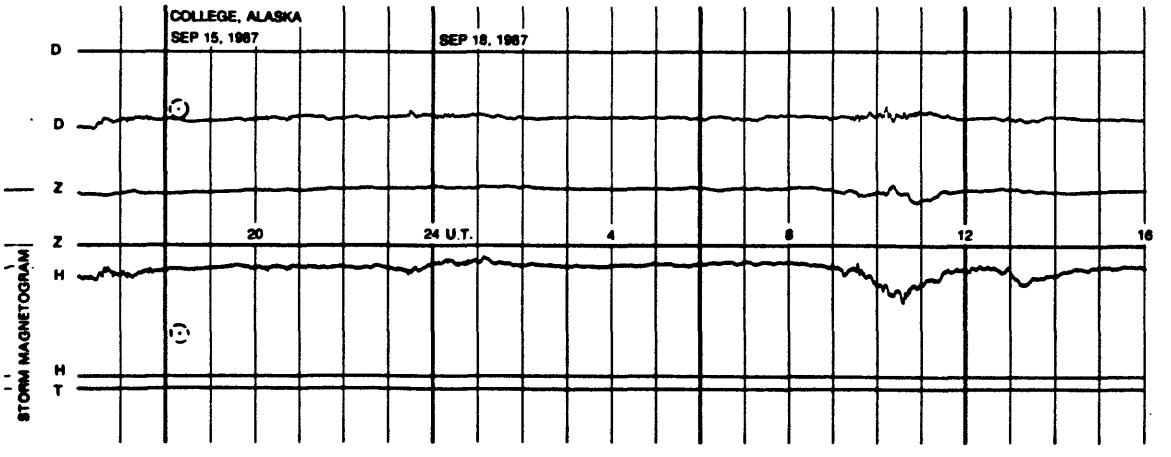
STORM MAGNETOGRAMS









STORM MAGNETOGRAMS