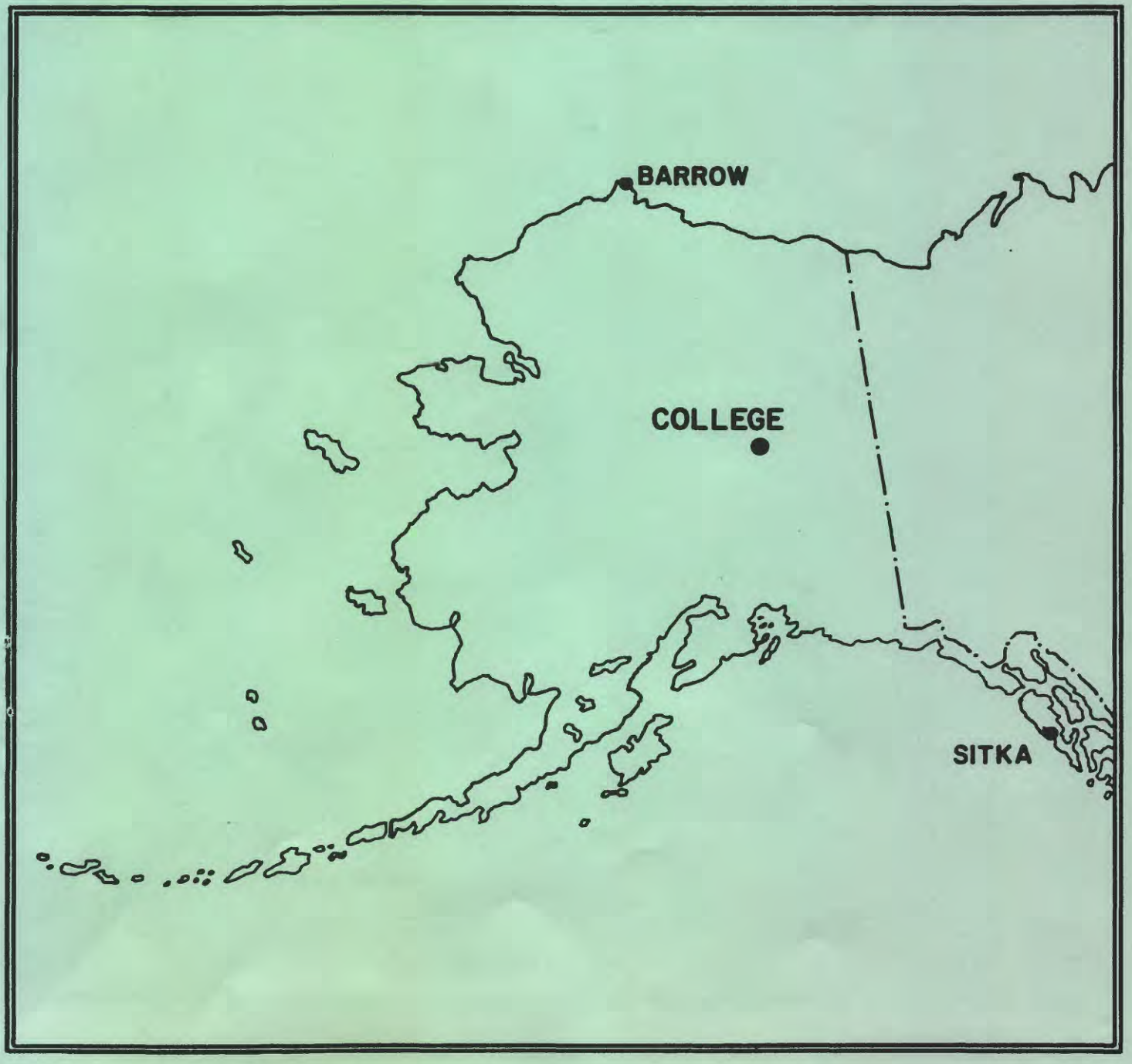
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

OCTOBER 1989

OPEN FILE REPORT 89-0300J



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 CAROL ANN VARNER AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA FAIRBANKS. THE COLLEGE OBSERVATORY IS PART OF THE BRANCH OF GLOBAL SEISMOLOGY AND GEOMAGNETISM OF THE U.S. GEOLOGICAL SURVEY.

COLLEGE OBSERVATORY PRELIMINARY GEOMAGNETIC DATA

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. 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 the 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° 51.6'N
Geographic longitude.....147° 50.2'W
Geomagnetic latitude.....+64.6°
Geomagnetic longitude....+256.5°
Elevation.....200 meters

EXPLANATION OF DATA & REPORTS

Available Data & Reports

Normal and storm magnetograms and appropriate calibration data are processed at the observatory and are available for analysis or copying. Magnetic Activity Report (K-Indices & AK values), Principal Magnetic Storms Report, and Magnetogram Hourly Scalings for the five quietest days of the month are also available.

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 commencement; 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 magnetogram.

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:

$D=B_D+d\ S_D$; $H=B_H+h\ S_H$; $Z=B_Z+z\ S_Z$
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: OCTOBER 1989

DATE	K-INDICES 00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	A_K
1	3	4	5	5	5	5	2	2	31	31
2	2	3	2	1	2	2	2	1	15	7
3	1	0	2	2	5	5	3	2	20	17
4	2	2	1	1	4	2	1	1	14	8
5	1	0	0	0	1	1	1	1	5	2
6	2	1	3	1	2	3	1	2	15	8
7	2	3	3	2	2	2	2	2	18	9
8	2	2	2	2	2	2	1	1	14	6
9	2	2	1	1	2	2	1	2	13	6
10	2	1	2	3	3	3	2	1	18	9
11	1	3	3	2	1	2	0	1	13	7
12	1	0	1	2	2	1	2	1	10	4
13	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	1	0	1	0
16	1	1	0	2	6	5	4	2	21	22
17	2	3	4	5	5	1	2	1	23	20
18	2	3	1	5	6	2	2	1	22	21
19	3	3	6	6	2	1	2	1	24	26
20	2	4	6	7	7	8	8	6	48	119
21	6	6	6	7	7	8	7	5	52	119
22	4	4	7	7	6	5	5	3	41	66
23	3	5	6	3	2	3	3	3	28	26
24	4	3	5	3	3	3	4	3	28	22
25	4	4	6	6	3	3	2	1	29	32
26	1	3	4	5	4	5	5	4	31	30
27	3	3	4	6	5	3	3	2	29	28
28	1	1	1	1	4	6	2	2	18	17
29	1	2	2	1	3	2	3	3	17	9
30	3	4	5	6	4	3	3	3	31	30
31	3	2	1	1	6	4	3	1	21	19

TIME SCALE ON MAGNETOGRAMS: 20 mm/hr

SUDDEN COMMENCEMENTS

d	h	m

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.....	3.69	7.75		(γ/mm)
LOWER LIMIT FOR K = 9	2490	2500		(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief
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

OCTOBER 1989

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	20	07XX	. .				20	6,7	8	466	2720	2275	22	22

COLLEGE OBSERVATORY, COLLEGE, ALASKA -- PRELIMINARY CALIBRATION DATA FOR: OCTOBER 1989

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE		CALIBRATION BASELINE
D	0001 UT, 10-1-89	2400 UT, 10-31-89	1.0'/mm	3.7 γ/mm	26° 51.3' E
H	0001 UT, 10-1-89	2400 UT, 10-3-89	7.8 γ/mm		12641 γ
	0001 UT, 10-4-89	2400 UT, 10-15-89			12636 γ
	0001 UT, 10-16-89	2400 UT, 10-27-89			12629 γ
	0001 UT, 10-28-89	2400 UT, 10-31-89			12623 γ
Z	0001 UT, 10-1-89	2400 UT, 10-9-89	7.7 γ/mm		55202 γ
	0001 UT, 10-10-89	2400 UT, 10-24-89			55204 γ
	0001 UT, 10-25-89	2400 UT, 10-31-89			55206 γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE		CALIBRATION BASELINE
D	0001 UT, 10-1-89	2400 UT, 10-31-89	7.9'/mm	29.4 γ/mm	
H	(SAME)	(SAME)	43.5 γ/mm		
Z	(SAME)	(SAME)	48.9 γ/mm		

The College Observatory has used several absolute instruments and different observing piers since it began operations in 1948. To avoid artificial secular shifts in the absolute values published when instruments were changed, corrections were applied to provide continuity in the data from the time the Observatory began operating. For many years the instruments used for observing absolute values have had zero correction. Effective with the May 1989 Preliminary Data Report, in accordance with a directive issued by the USGS Branch of Global Seismology and Geomagnetism analysis personnel, these longstanding corrections are discontinued and all data listed (D, H & Z) are for the position at absolute pier 1a and without any corrections applied. The net effect of these changes is as follows:

Declination (D): No Change
Horizontal Intensity (H): -5γ; i.e., H absolute and baseline values are 5γ less than previously reported.
Vertical Intensity (Z): +33γ; i.e., Z absolute and baseline values are 33γ higher than previously reported.

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 00.9' E	12777 γ	55336 γ

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: OCT. 5, 12, 13, 14, 15,

U.S. Dept. of Interior
Geological Survey

Observatory	Month	Year
College, Alaska	OCTOBER	1989

Jep-CO - 1/86

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

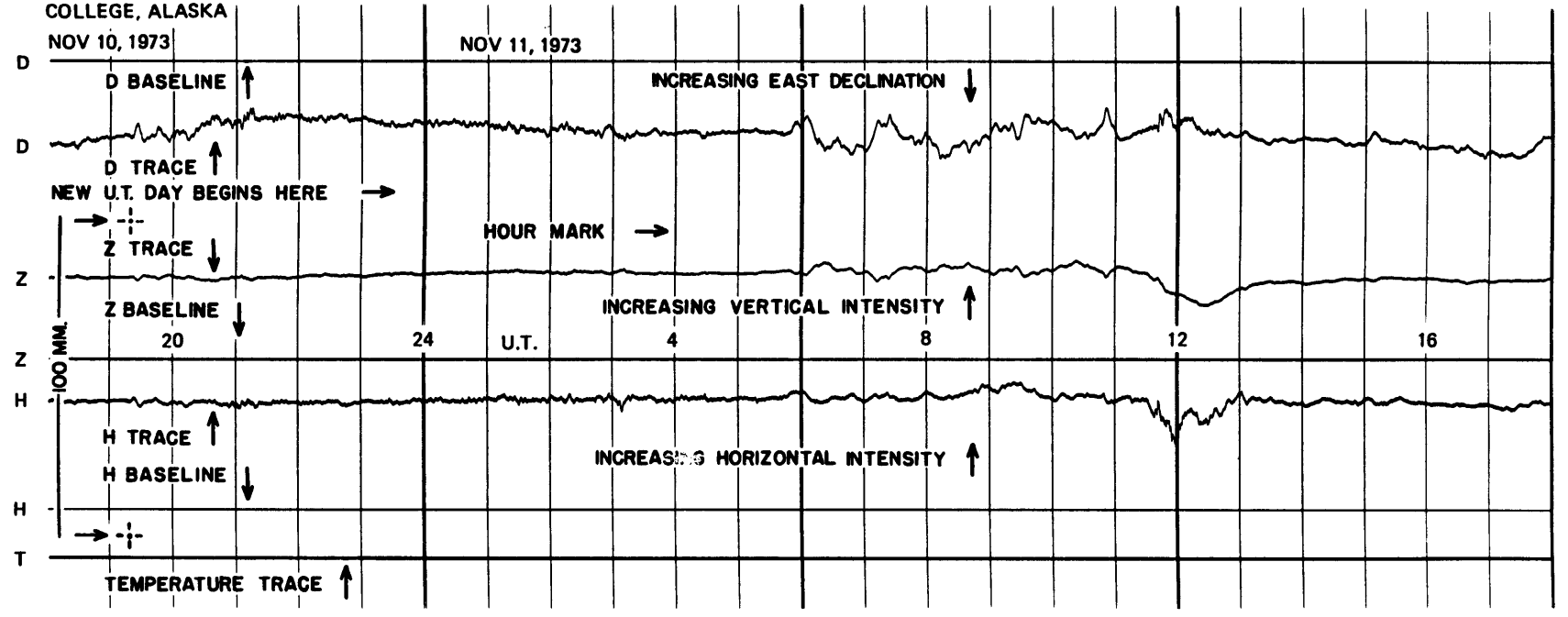
(UNIVERSAL TIME)

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		5	12	13	14	15	5	12	13	14	15	5	12	13	14	15	DAY
A_k		02	04	00	00	00	02	04	00	00	00	02	04	00	00	00	A_k
HOUR	01	28	70	69	69	57	179	170	169	170	183	191	182	169	175	164	01 HOUR
	02	31	75	69	67	52	180	170	175	172	183	203	180	170	175	165	02
	03	30	60	67	67	50	177	190	180	178	190	203	173	174	175	166	03
	04	42	38	60	61	50	177	200	185	181	201	193	174	172	173	166	04
	05	50	66	70	62	64	184	198	189	192	208	181	207	175	171	168	05
	06	60	73	72	69	73	180	200	191	199	210	180	186	174	170	169	06
	07	69	74	79	78	80	190	200	200	200	210	179	179	171	170	169	07
	08	78	70	80	80	81	191	206	201	201	212	179	172	170	168	169	08
	09	84	68	79	83	83	196	220	201	207	216	180	178	170	166	166	09
	10	86	82	79	84	83	200	211	203	209	216	180	180	170	166	166	10
	11	89	109	83	89	90	202	234	200	210	214	180	179	172	165	166	11
	12	98	115	92	94	89	201	221	200	209	212	179	177	167	170	167	12
	13	107	116	91	93	91	195	195	202	209	214	176	164	157	168	167	13
	14	106	149	93	93	97	190	173	200	208	214	173	150	163	170	165	14
	15	110	121	102	98	103	180	202	191	205	211	165	159	165	170	164	15
	16	102	121	116	109	130	195	200	189	201	203	164	169	170	171	164	16
	17	129	154	132	129	148	191	190	181	198	205	169	170	177	175	166	17
	18	141	199	158	149	178	199	170	179	190	199	176	175	179	175	172	18
	19	150	145	177	160	220	199	127	170	178	187	174	140	180	176	170	19
	20	180	150	173	154	152	180	160	166	170	160	179	126	178	174	154	20
	21	163	145	143	138	121	170	177	159	164	159	180	140	174	168	126	21
	22	150	102	112	107	96	161	176	159	164	170	180	152	172	165	134	22
	23	100	89	89	89	67	150	176	161	168	174	179	164	170	165	150	23
	24	68	79	79	70	65	141	170	165	174	180	187	172	172	165	160	24
DAILY SUM		2251	2470	2364	2292	2320	4408	4536	4416	4557	4731	4330	4048	4111	4086	3893	DAILY SUM
DAILY MEAN		94	103	98	96	97	184	189	184	190	197	180	169	171	170	162	DAILY MEAN
MEAN				97					189					171			MEAN

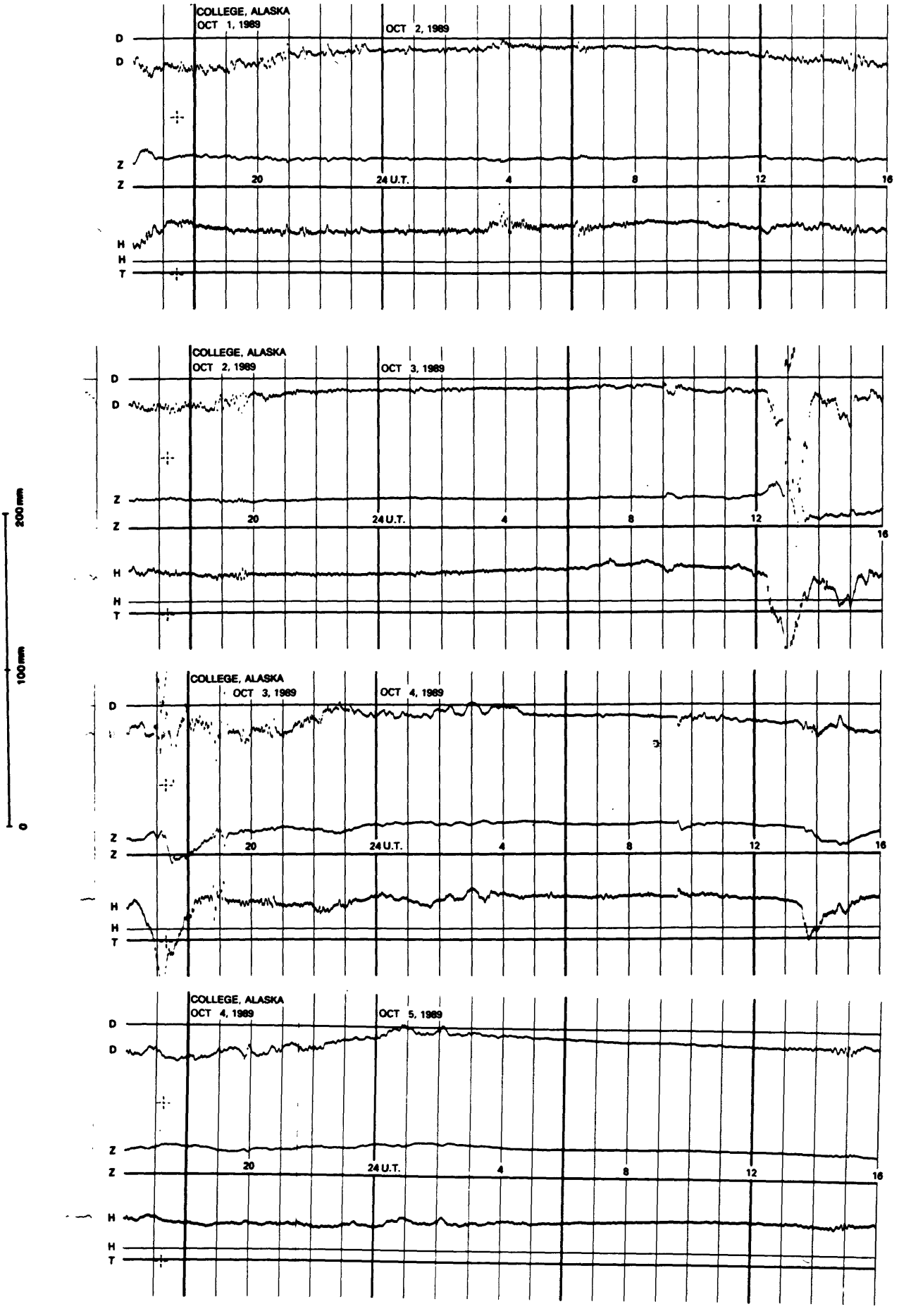
Scaled TVO	Checked

FORMAT FOR NORMAL & STORM MAGNETOGRAMS
(SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS



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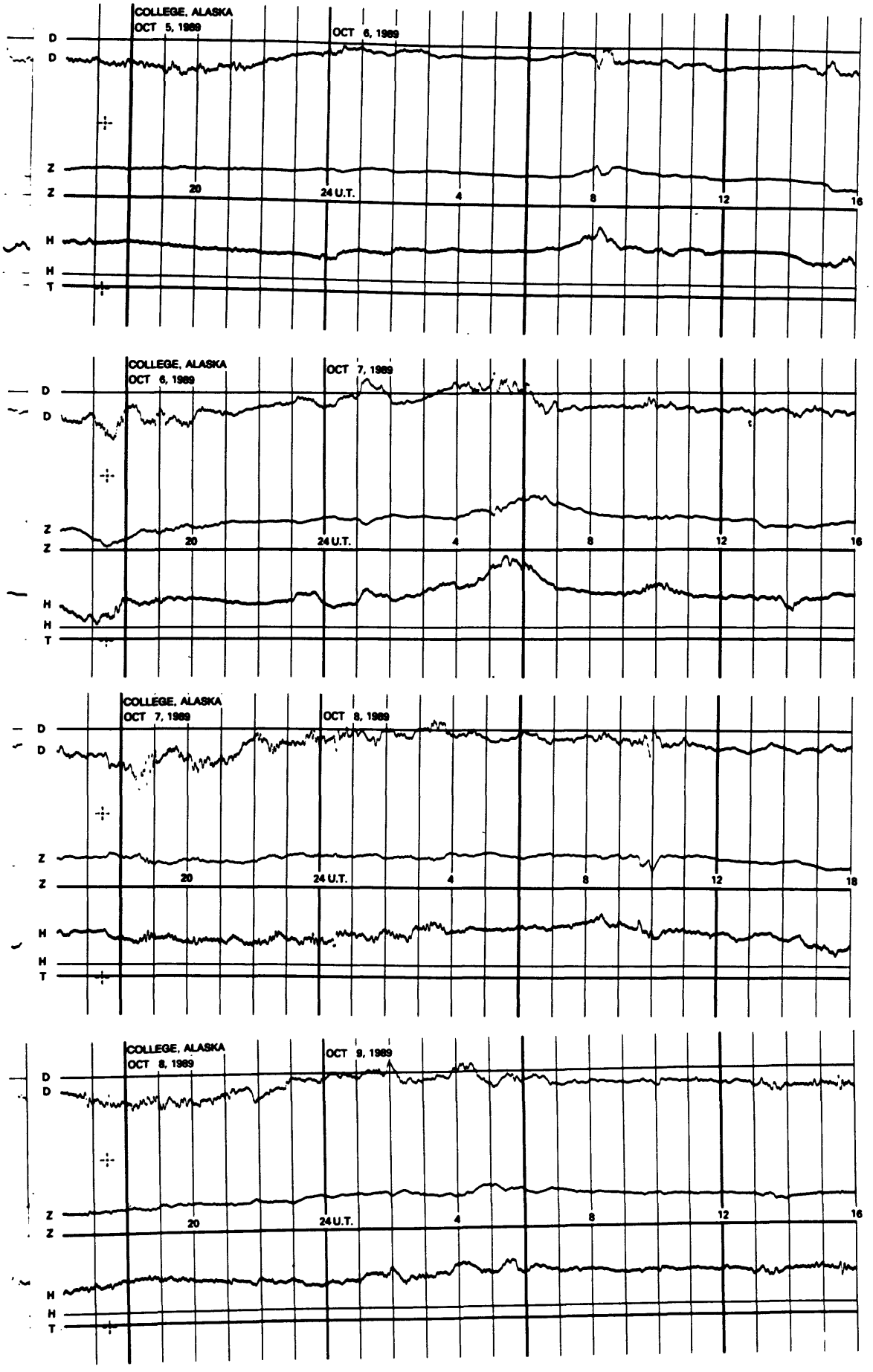

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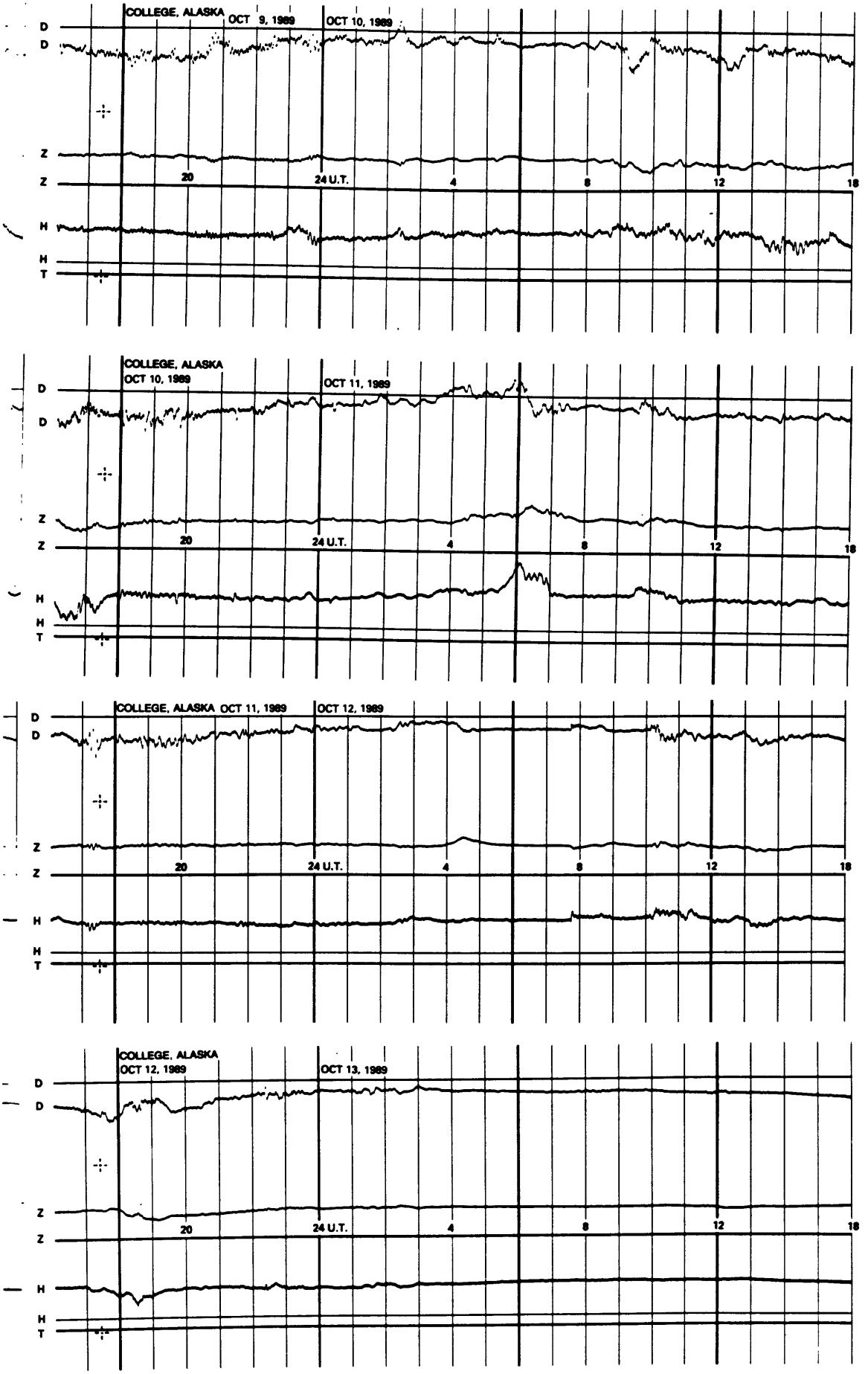

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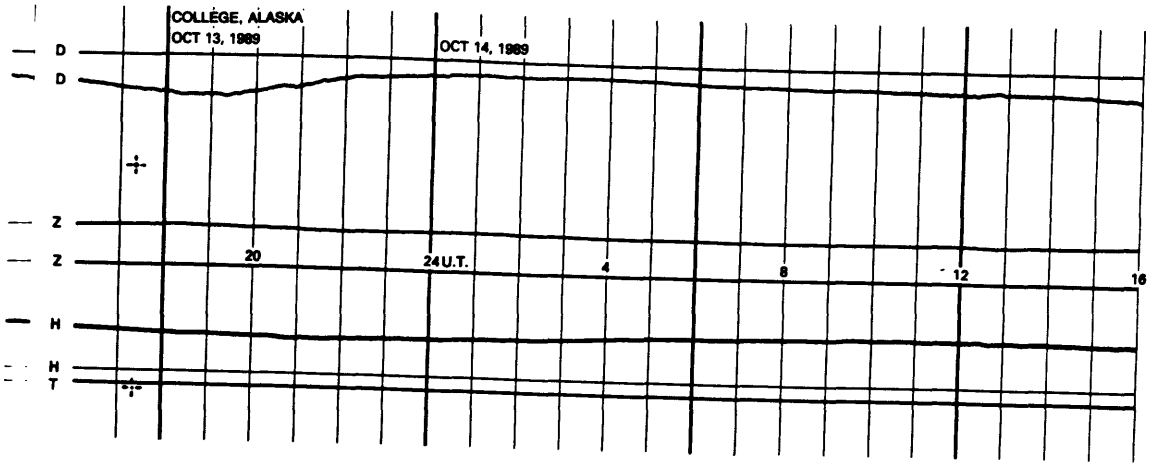

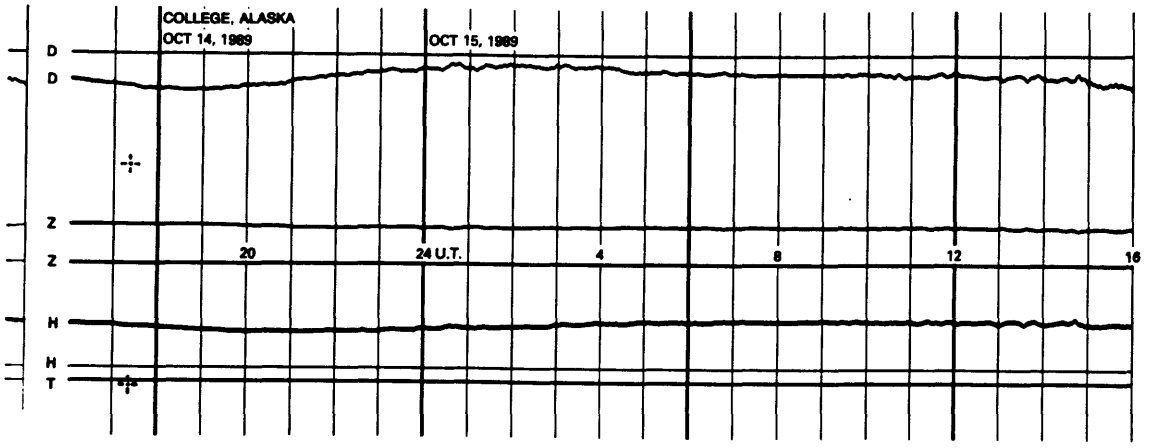

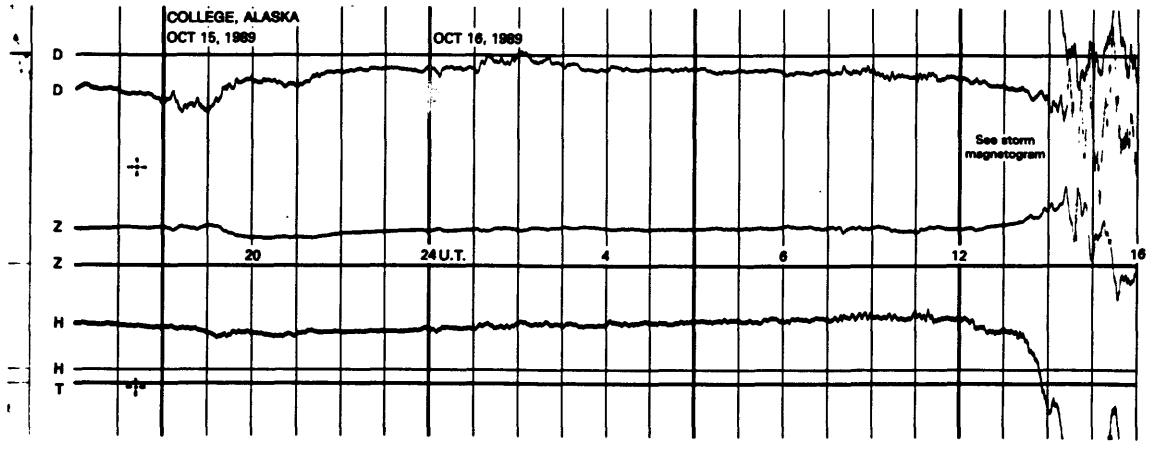

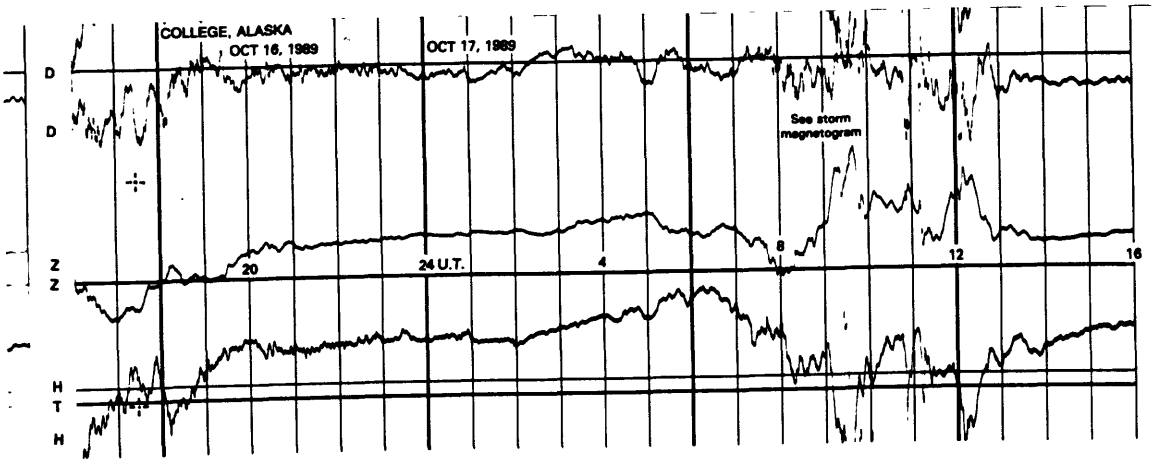

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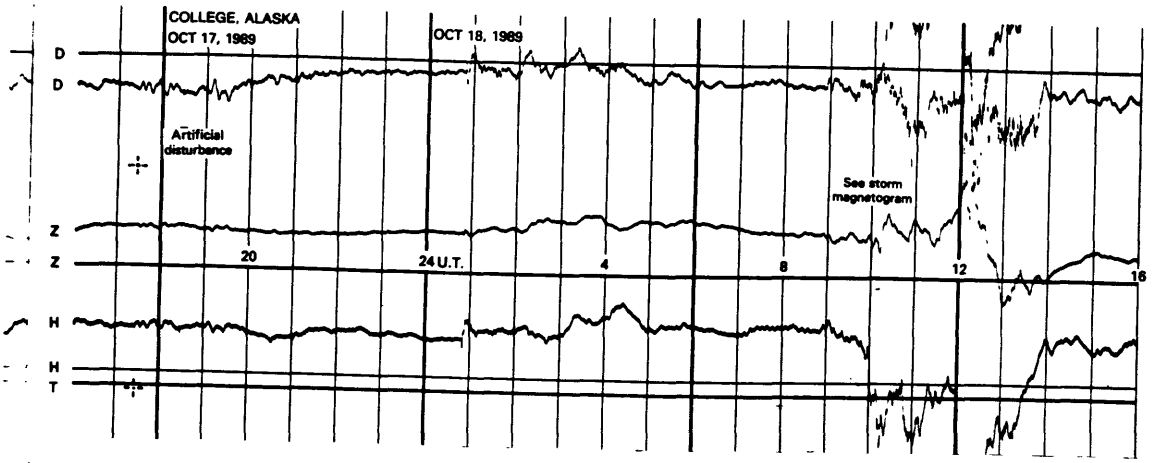
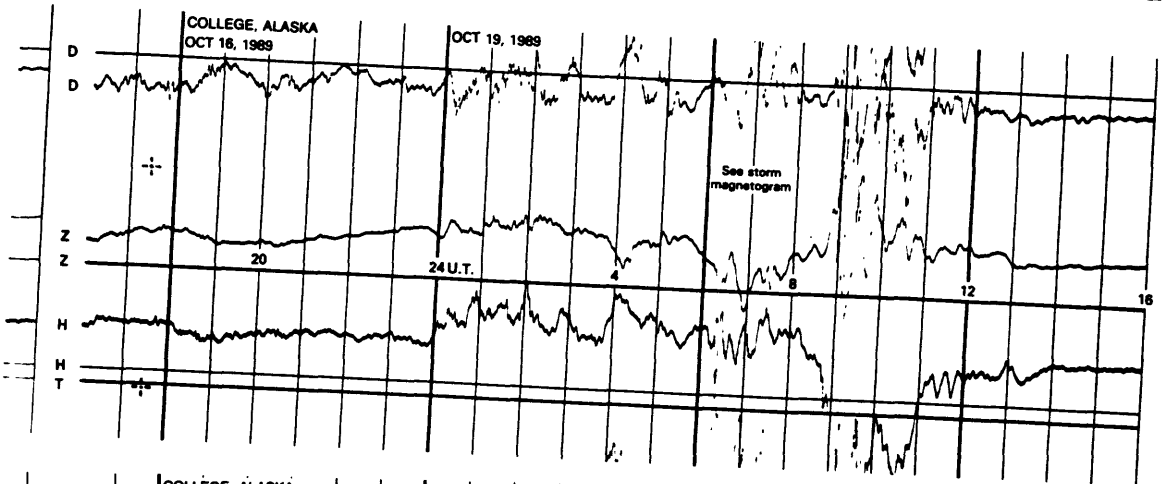
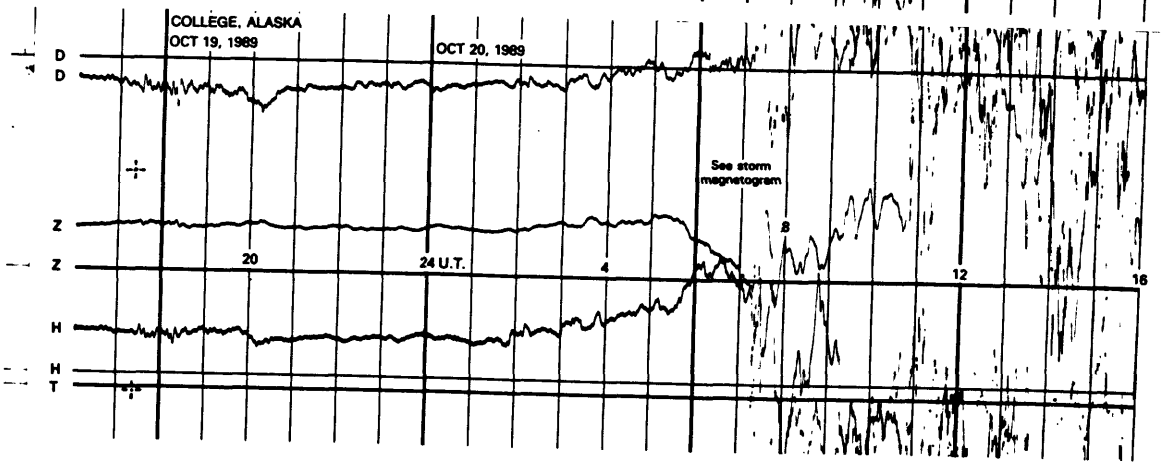
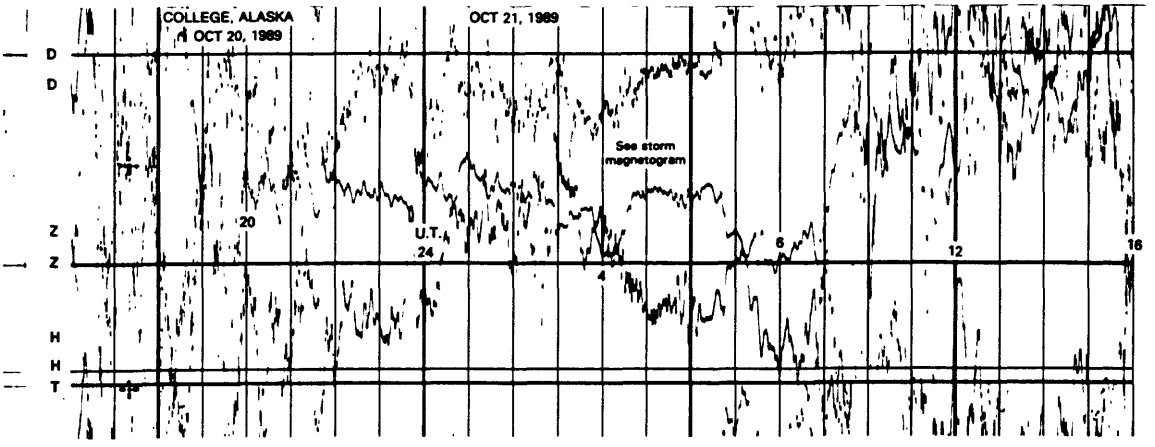
NORMAL MAGNETOGRAMS









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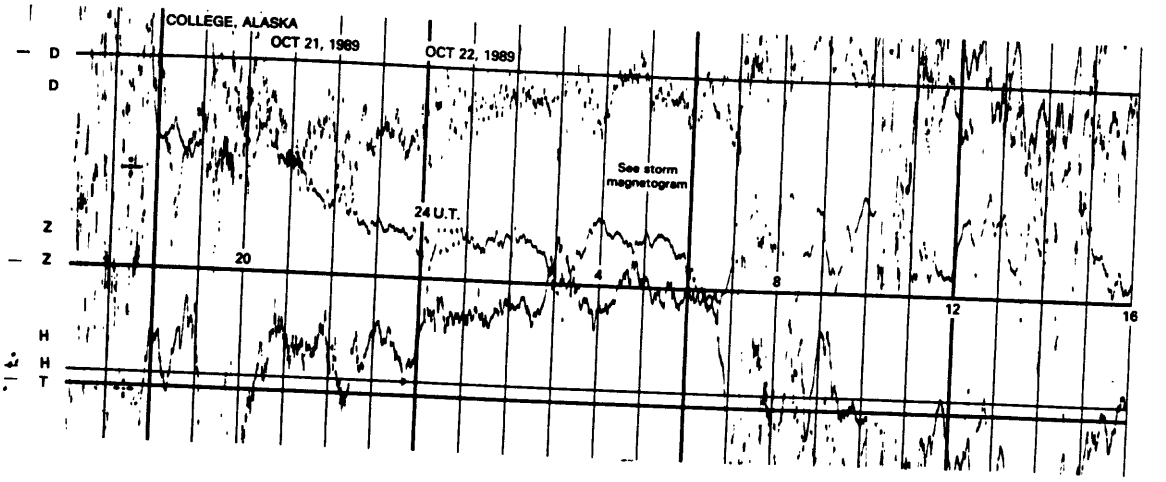

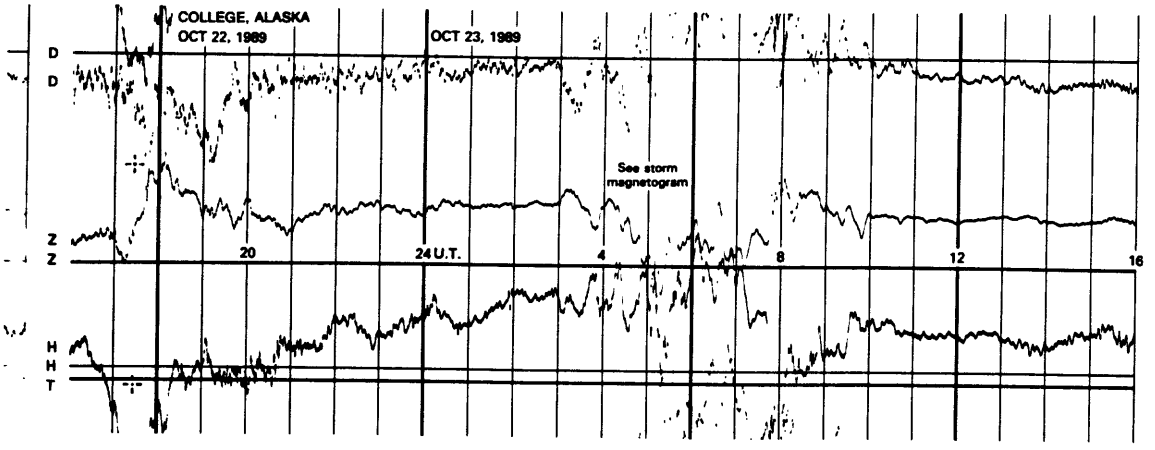

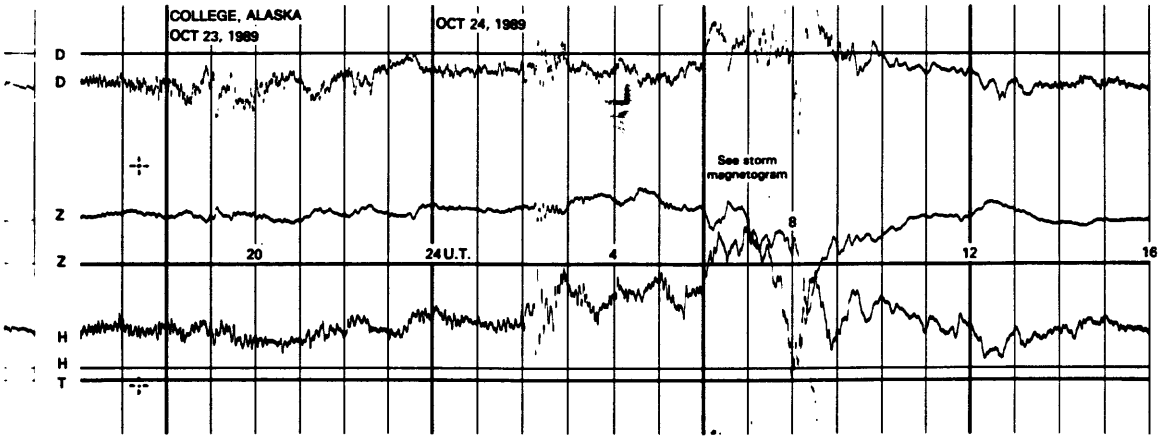

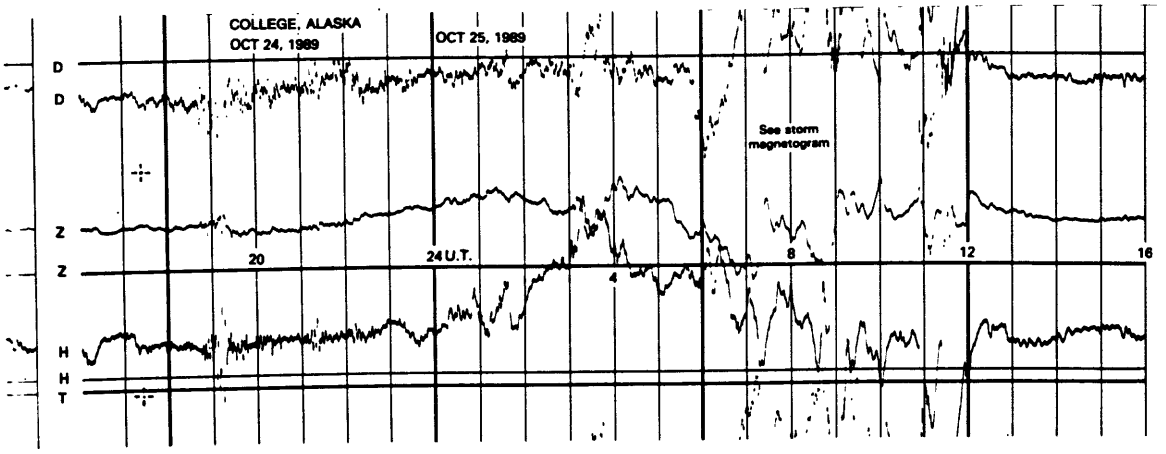

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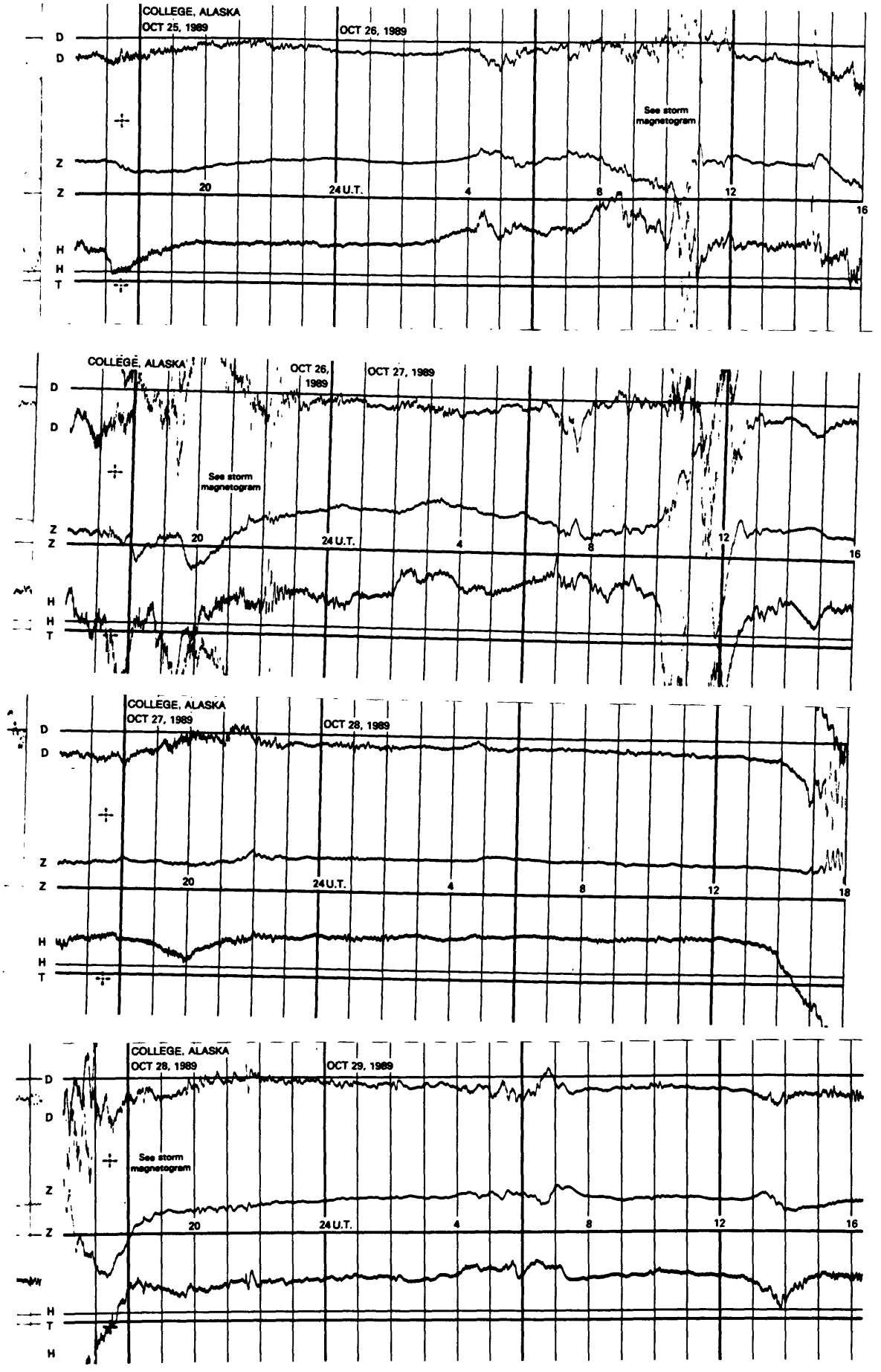

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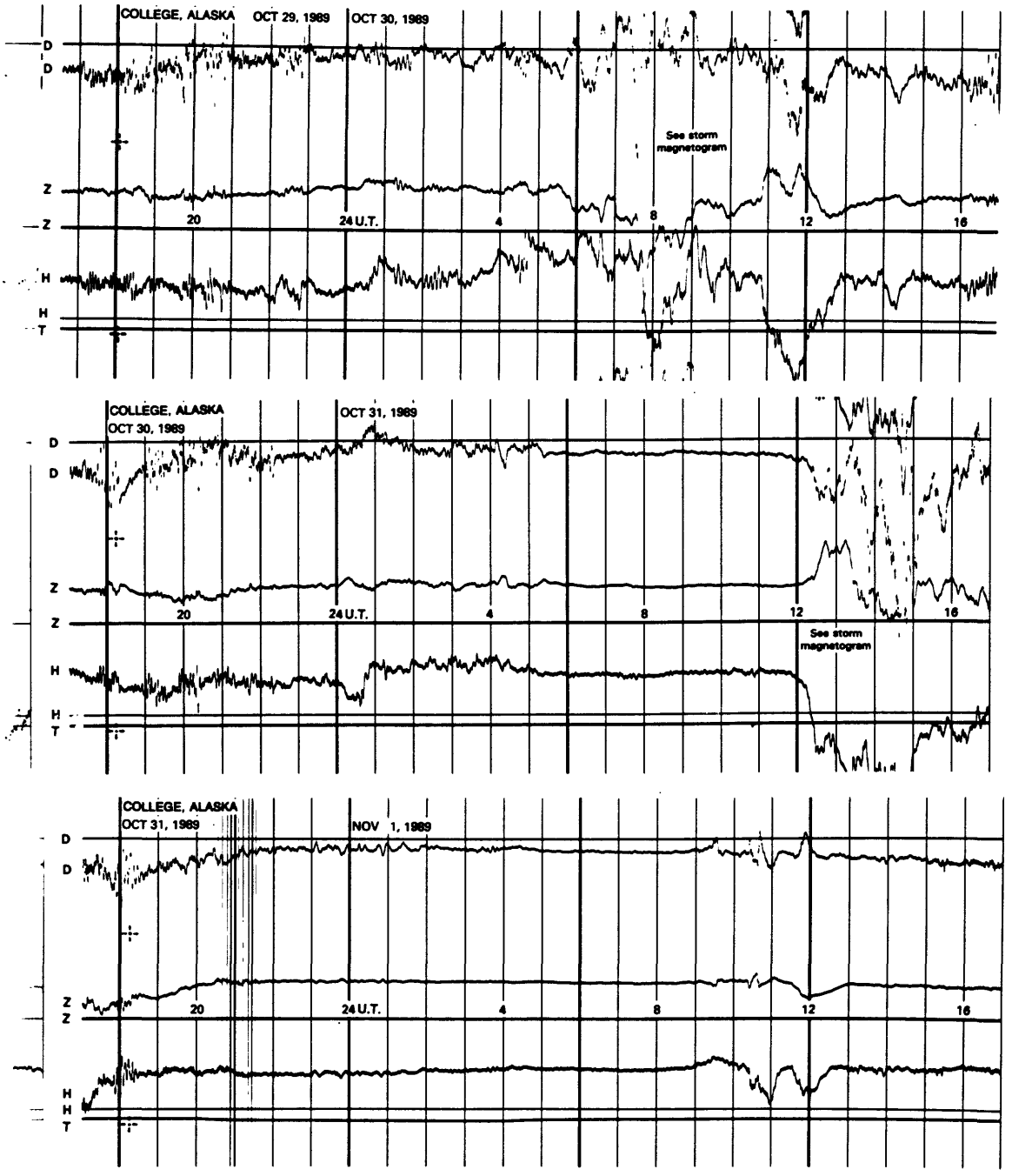

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100 mm
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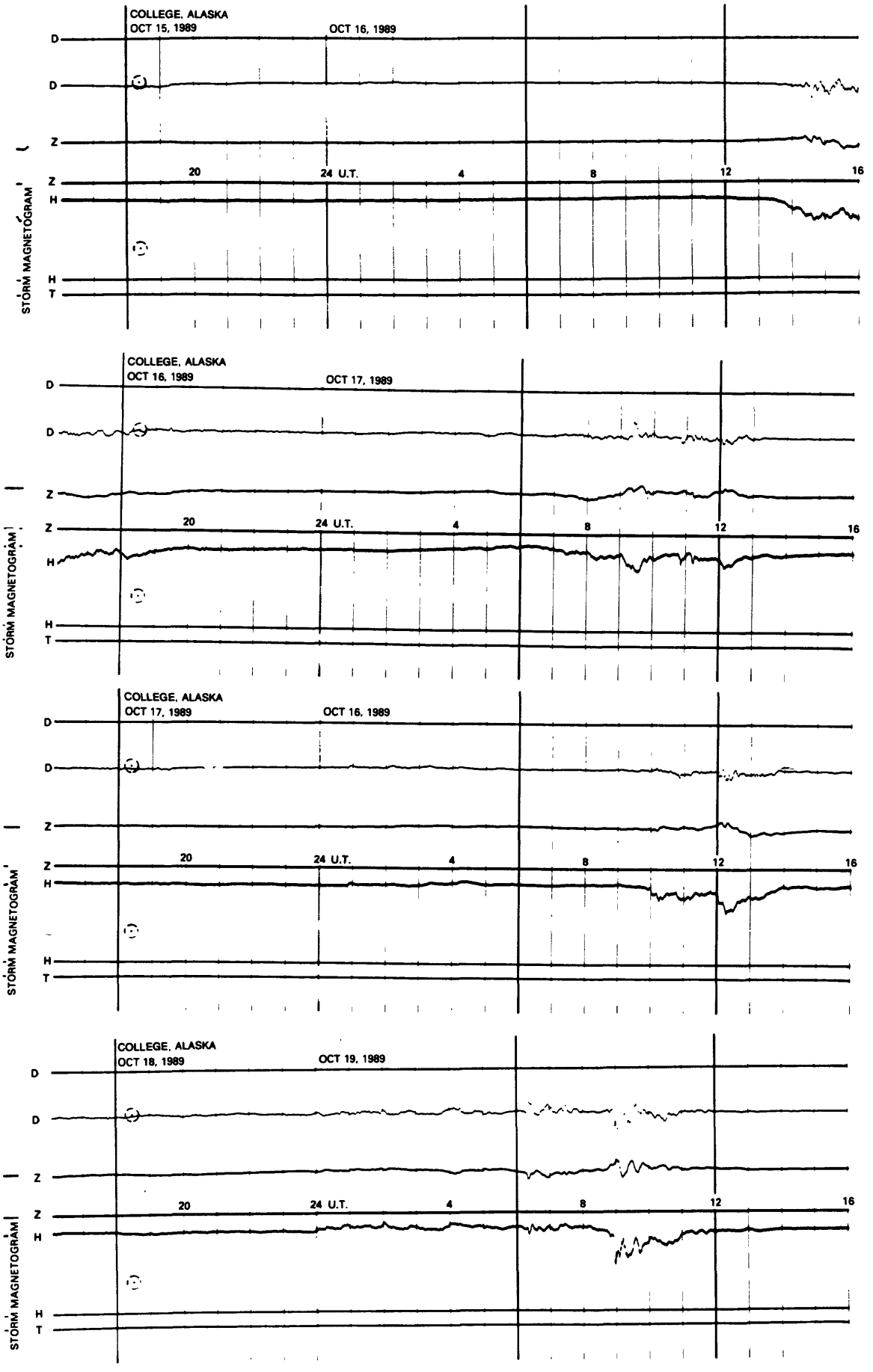
STORM MAGNETOGRAMS



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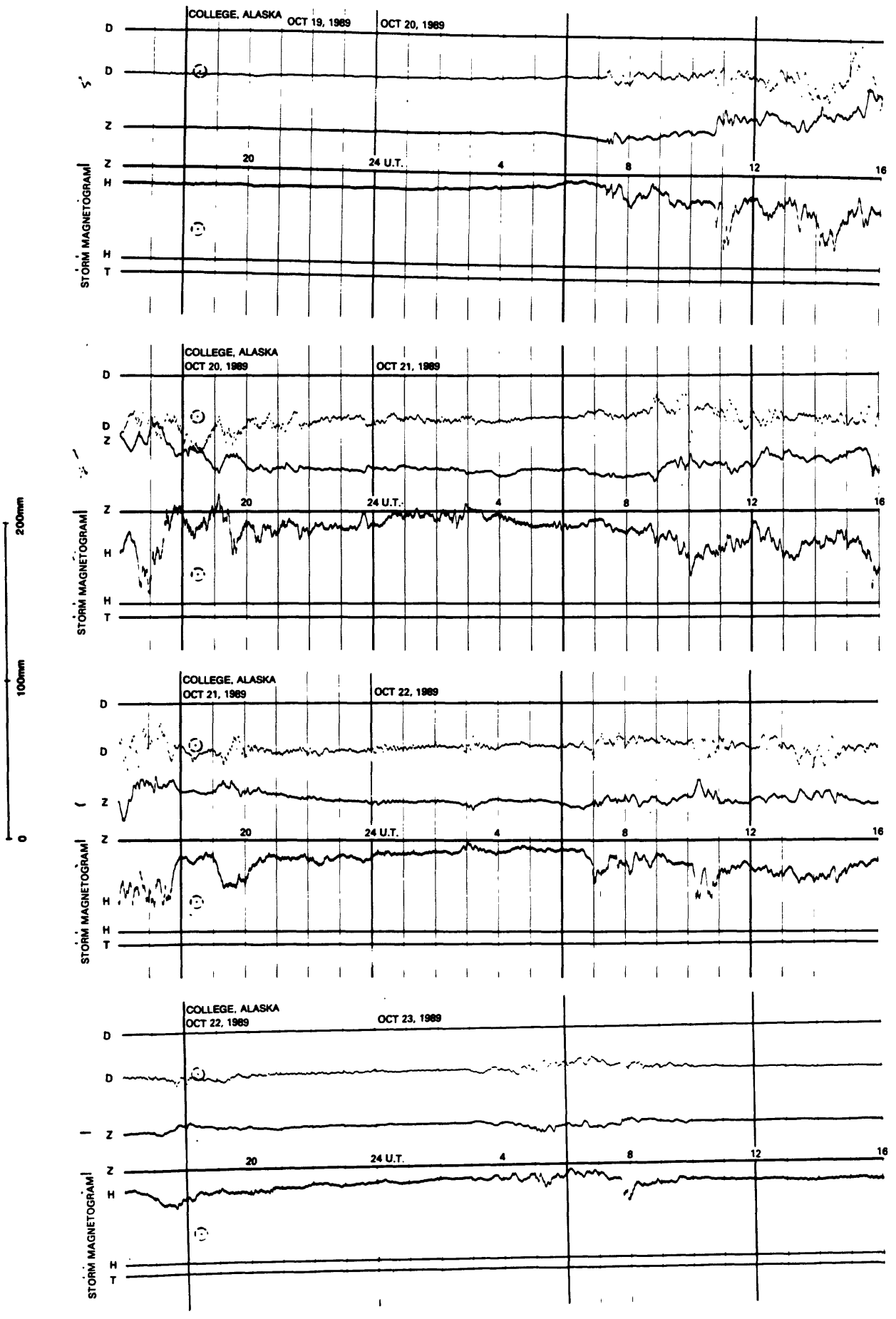
STORM MAGNETOGRAMS



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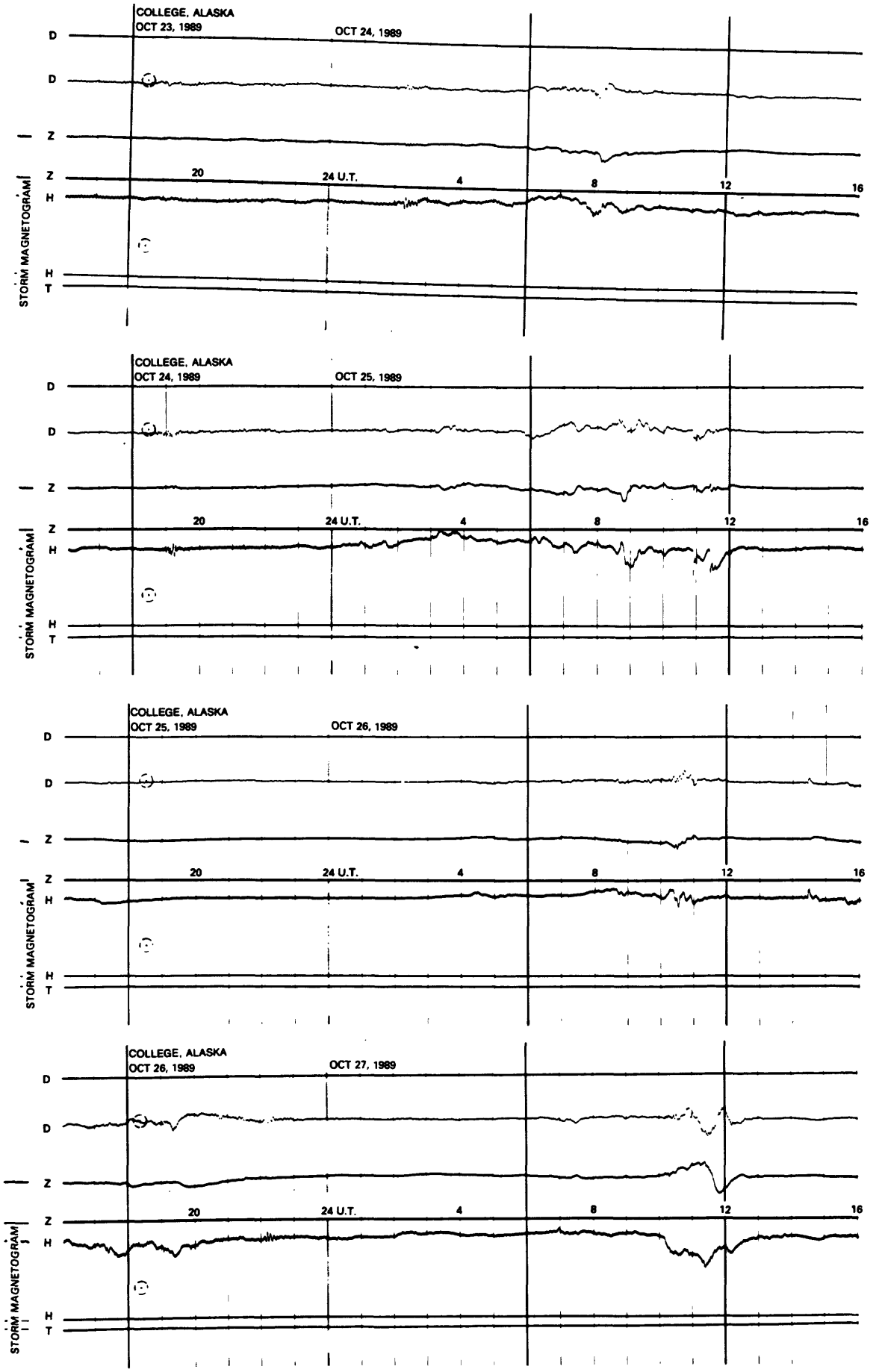

STORM MAGNETOGRAMS