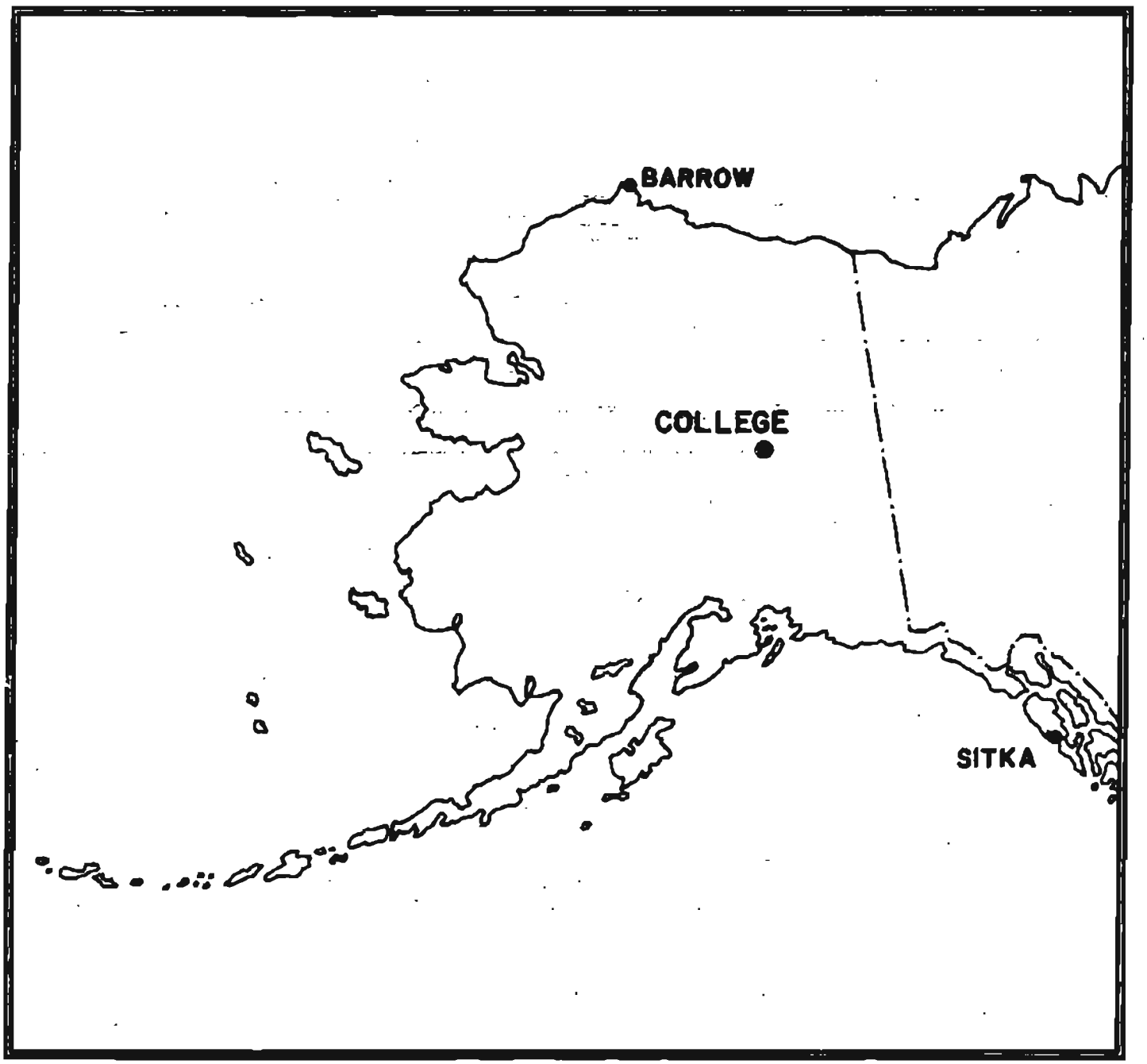
UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

APRIL 1990

OPEN FILE REPORT 90-0300D



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° 51.8'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: APRIL, 1990

DATE	K-INDICES 00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	A_K
1	1	1	0	0	3	1	1	2	9	4
2	1	1	1	5	5	5	2	1	21	20
3	2	2	2	6	6	5	3	2	28	31
4	2	1	3	4	4	4	2	1	21	15
5	1	1	6	4	5	4	2	1	24	25
6	0	1	0	3	4	4	1	2	15	10
7	0	2	1	4	2	4	1	1	15	10
8	1	1	0	0	1	1	2	1	7	3
9	1	2	7	7	5	5	3	2	32	51
10	3	4	7	9	8	7	6	3	47	132
11	4	8	7	7	5	5	5	2	43	87
12	5	7	5	5	7	5	5	4	43	68
13	4	4	7	5	6	6	6	4	42	64
14	4	4	6	6	5	5	5	4	39	48
15	4	5	4	5	5	5	3	2	33	34
16	2	2	4	6	3	3	2	2	24	21
17	2	3	4	6	6	5	4	4	34	39
18	4	4	4	5	5	2	3	2	29	26
19	3	2	2	4	2	2	1	2	18	10
20	2	3	4	3	3	4	3	4	26	19
21	4	3	3	3	1	1	1	1	17	11
22	2	2	5	4	5	5	2	3	28	26
23	4	4	5	4	6	6	5	2	36	43
24	2	4	4	6	4	5	4	3	32	32
25	4	4	7	7	4	3	2	2	33	49
26	3	6	4	2	1	1	2	2	21	19
27	3	3	6	3	5	4	3	2	29	28
28	3	3	7	6	5	3	3	3	33	43
29	5	5	5	6	4	4	3	3	35	39
30	5	4	4	4	4	3	1	3	28	24
31										

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.....	3.68	7.73		(γ/mm)
LOWER LIMIT FOR K = 9	2490	2490		(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)

Data from Individual Observatories:

PRINCIPAL MAGNETIC STORMS

COLLEGE OBSERVATORY, COLLEGE, ALASKA

APRIL 1990

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

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	9	07 xx	..				9	3,4	7	196	1610	670	9	18
		10	04 xx	..				10	4	9	512	3410	1790	15	16
		17	07 xx	..				17	4,5	6	121	1070	620	18	14
		23	01 xx	..				23	5,6	6	268	1240	840	23	19

COLLEGE OBSERVATORY, COLLEGE, ALASKA -- PRELIMINARY CALIBRATION DATA FOR: APRIL 1990

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE		CALIBRATION BASELINE
D	0001 UT, 4-1-90	2400 UT, 4-14-90	1.0'/mm	3.7γ/mm	26° 33.9' E
	0001 UT, 4-15-90	2400 UT, 4-30-90	↓	↓	26° 34.6' E
H	0001 UT, 4-1-90	2400 UT, 4-30-90	7.7γ/mm		12625γ
Z	(SAME)	(SAME)	7.7γ/mm		55206γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD FROM	PERIOD TO	CALIBRATION SCALE VALUE		CALIBRATION BASELINE
D	0001 UT, 4-1-90	2400 UT, 4-30-90	7.9'/mm	29.4γ/mm	
H	(SAME)	(SAME)	43.4γ/mm		
Z	(SAME)	(SAME)	49.1γ/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
26° 55.5' E	12763γ	55340γ

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: APR 1, 6, 7, 8, 19

U.S. Dept. of Interior
Geological Survey

Observatory: **COLLEGE, ALASKA** | Month: APRIL | Year: 1990

Jep-CO - 1/86

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

(UNIVERSAL TIME)

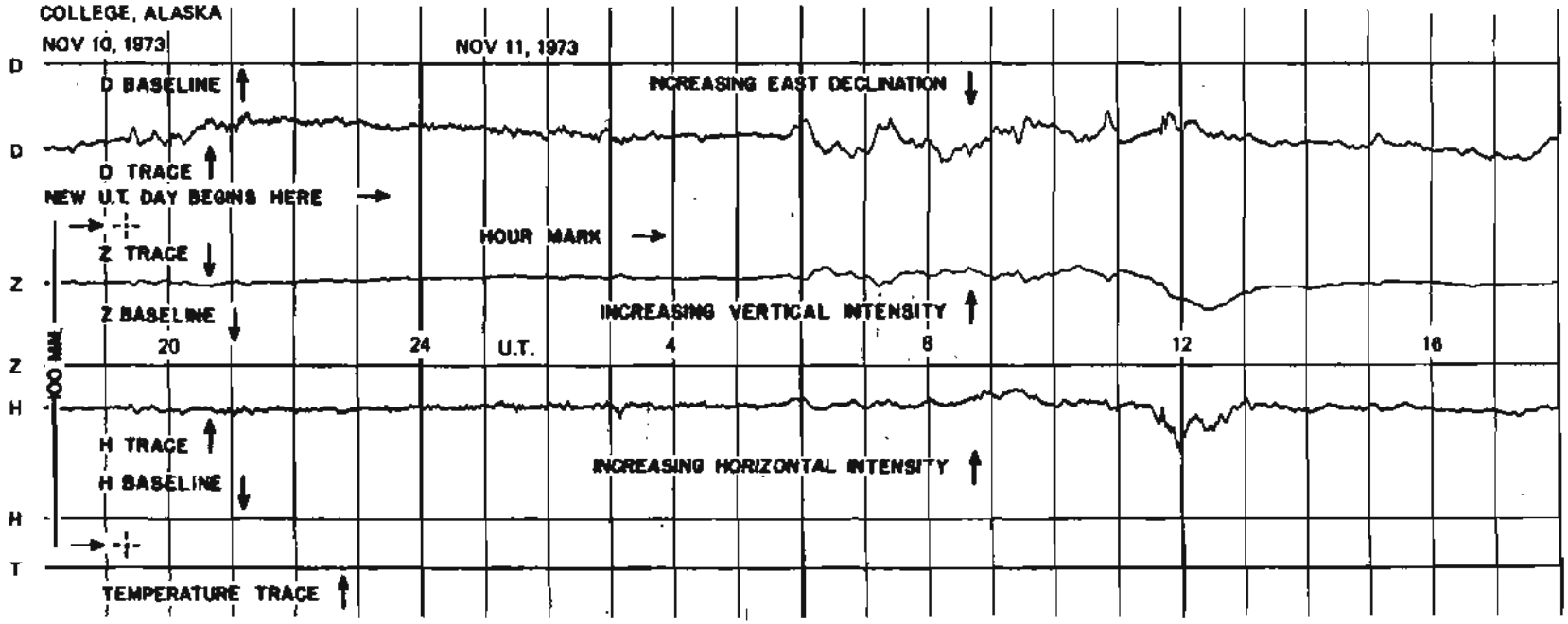
Values are in Tenths of mm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT		D					H					Z					COMPONENT
DAY		1	6	7	8	19	1	6	7	8	19	1	6	7	8	19	DAY
A_k		4	10	10	3	10	4	10	10	3	10	4	10	10	3	10	A_k
HOUR	01	148	178	152	173	119	180	180	173	190	150	190	191	182	200	209	01 HOUR
	02	152	179	160	156	97	170	180	185	166	189	201	181	176	205	219	02
	03	143	179	157	149	97	170	190	189	172	223	204	180	176	196	238	03
	04	160	180	157	142	137	186	194	200	202	210	200	179	187	193	240	04
	05	174	190	168	171	150	190	199	212	195	206	202	183	189	195	232	05
	06	187	198	190	176	169	191	212	209	193	204	195	187	203	180	230	06
	07	188	200	172	180	180	197	210	229	199	206	190	200	203	176	226	07
	08	181	180	180	181	179	203	210	215	208	211	192	186	207	173	227	08
	09	182	191	167	188	155	201	215	228	210	256	196	185	193	174	219	09
	10	193	224	190	186	171	205	219	233	209	259	207	165	185	172	220	10
	11	190	249	77	190	120	200	155	1	210	158	204	145	134	173	184	11
	12	202	239	230	202	192	199	190	143	199	100	197	144	131	166	150	12
	13	232	208	232	216	218	140	201	200	197	158	162	160	126	156	167	13
	14	232	209	211	230	234	69	184	197	190	120	84	161	154	150	156	14
	15	234	210	219	250	293	158	58	131	204	85	100	166	146	144	190	15
	16	240	251	288	250	355	202	81	-	208	90	160	97	117	150	166	16
	17	247	284	294	248	331	200	193		208	151	182	117	57	163	153	17
	18	259	296	296	280	359	190	211	101	210	157	196	164	23	165	173	18
	19	319	281	270	270	325	155	200	189	217	161	195	172	100	167	164	19
	20	289	270	277	279	297	166	198	200	201	160	178	171	159	171	171	20
	21	240	259	240	261	250	167	192	199	196	155	168	173	172	166	179	21
	22	245	214	206	260	191	172	198	200	179	150	173	169	173	169	175	22
	23	239	217	210	210	180	170	201	200	180	150	173	179	186	170	189	23
	24	198	179	185	203	180	176	188	200	164	161	175	190	172	173	202	24
DAILY SUM		5064	5265	4928	5051	4979	4256	4459	3993	4707	4070	4324	4045	3771	4147	4679	DAILY SUM
DAILY MEAN		211	219	205	210	207	177	186	166	196	170	180	169	157	173	195	DAILY MEAN
MEAN				211					179					175			MEAN

Scaled RVO | Checked

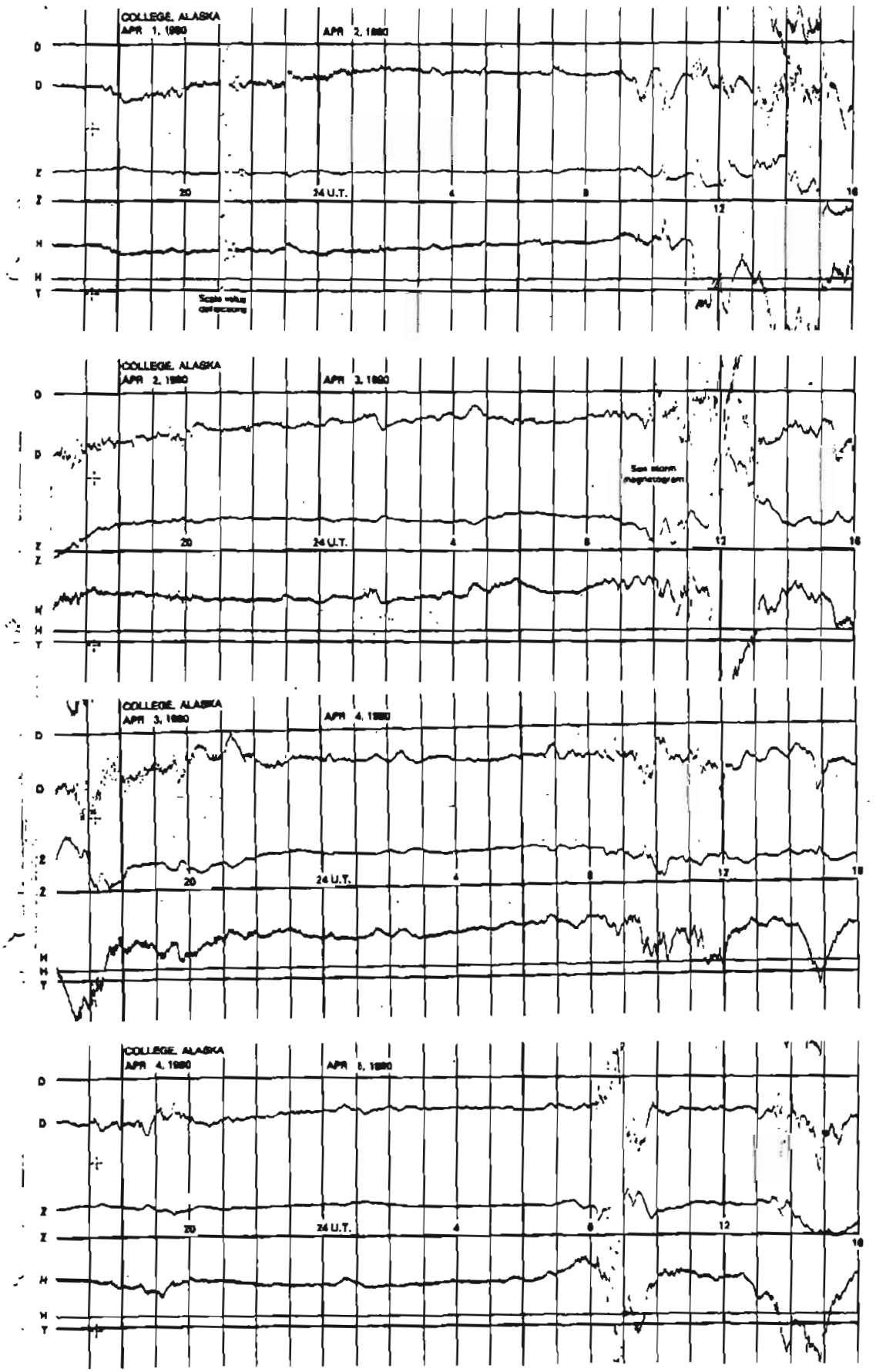
FORMAT FOR NORMAL & STORM MAGNETOGRAMS

(SAMPLE ONLY)



SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS



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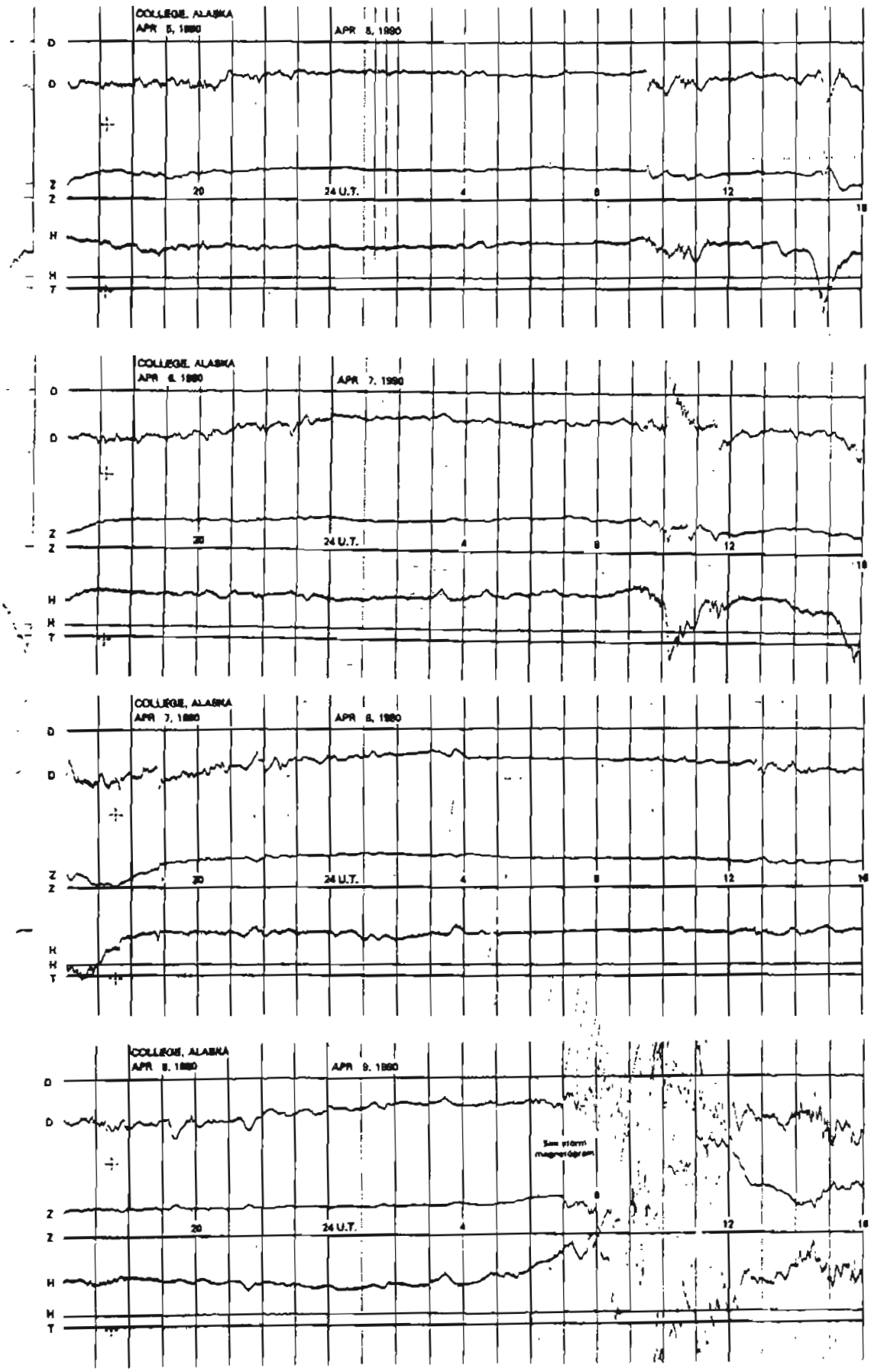

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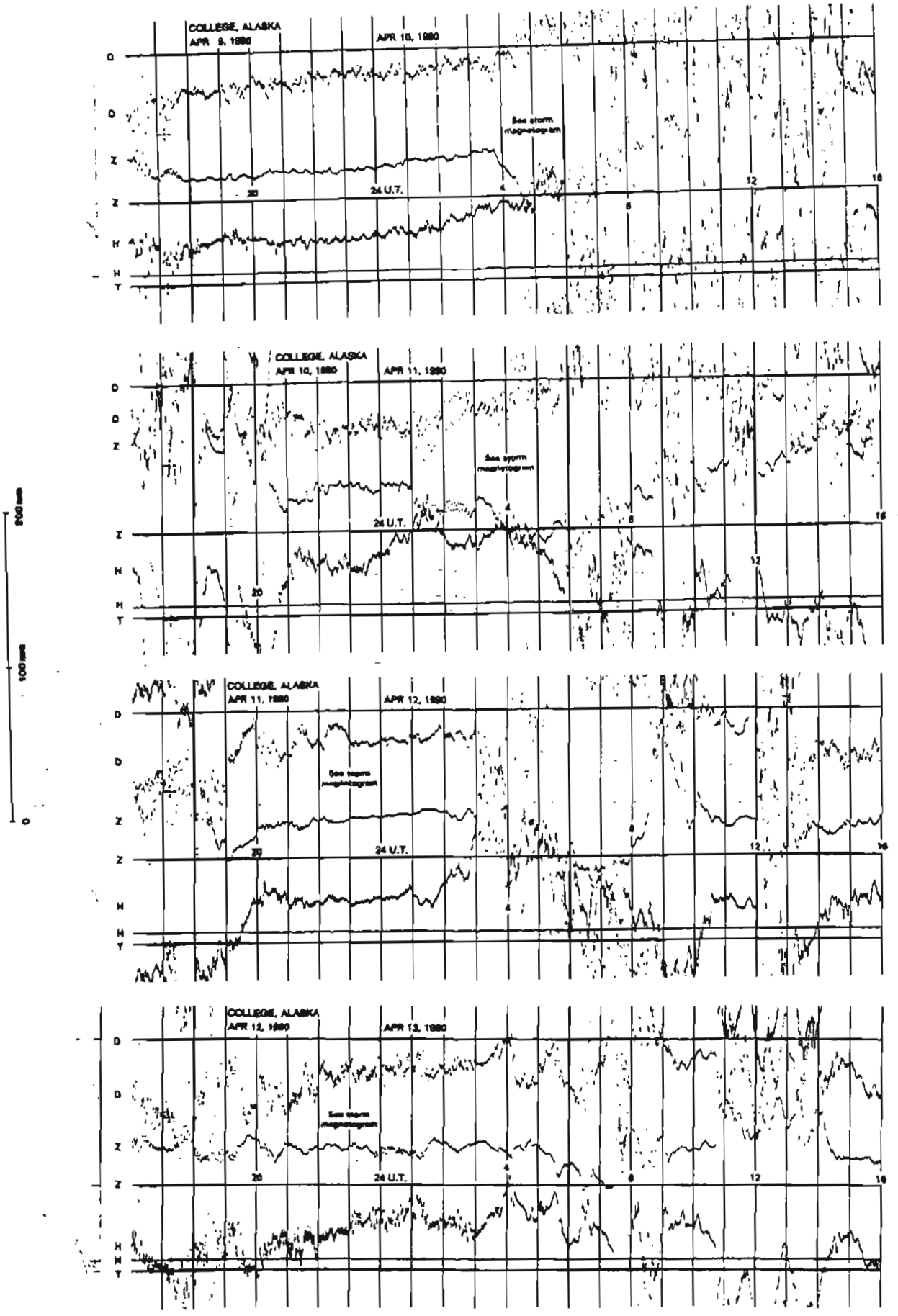

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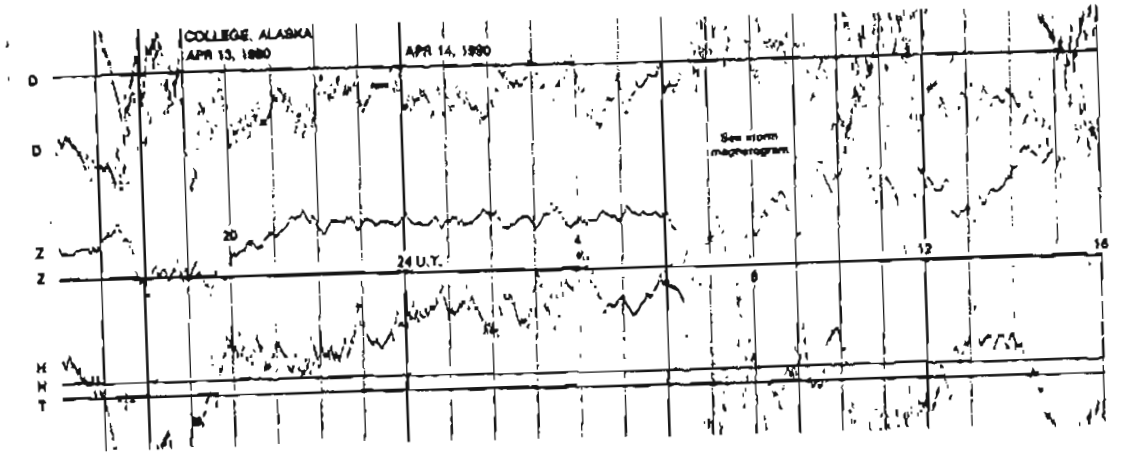

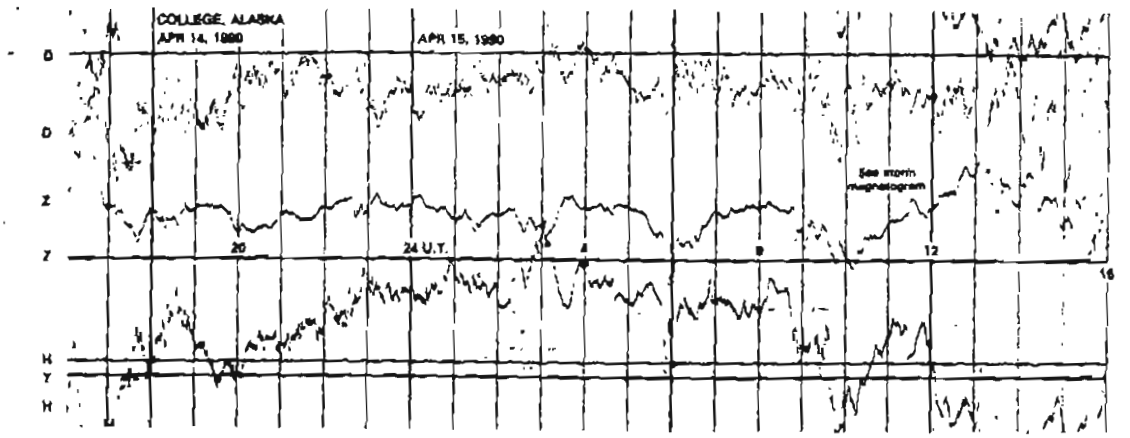

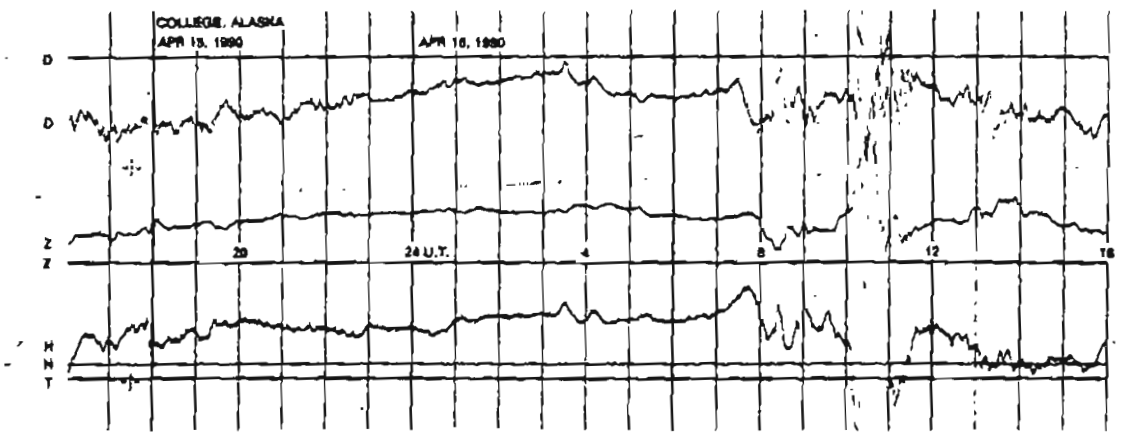

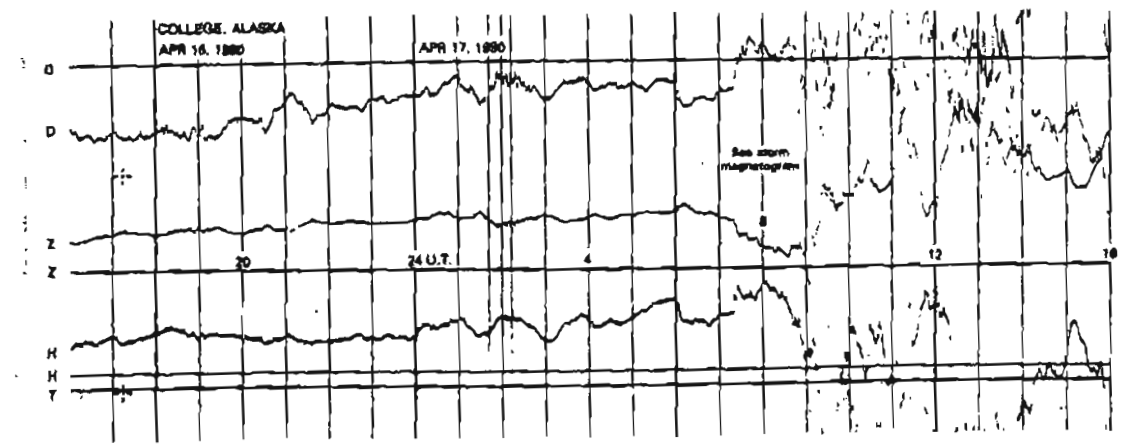

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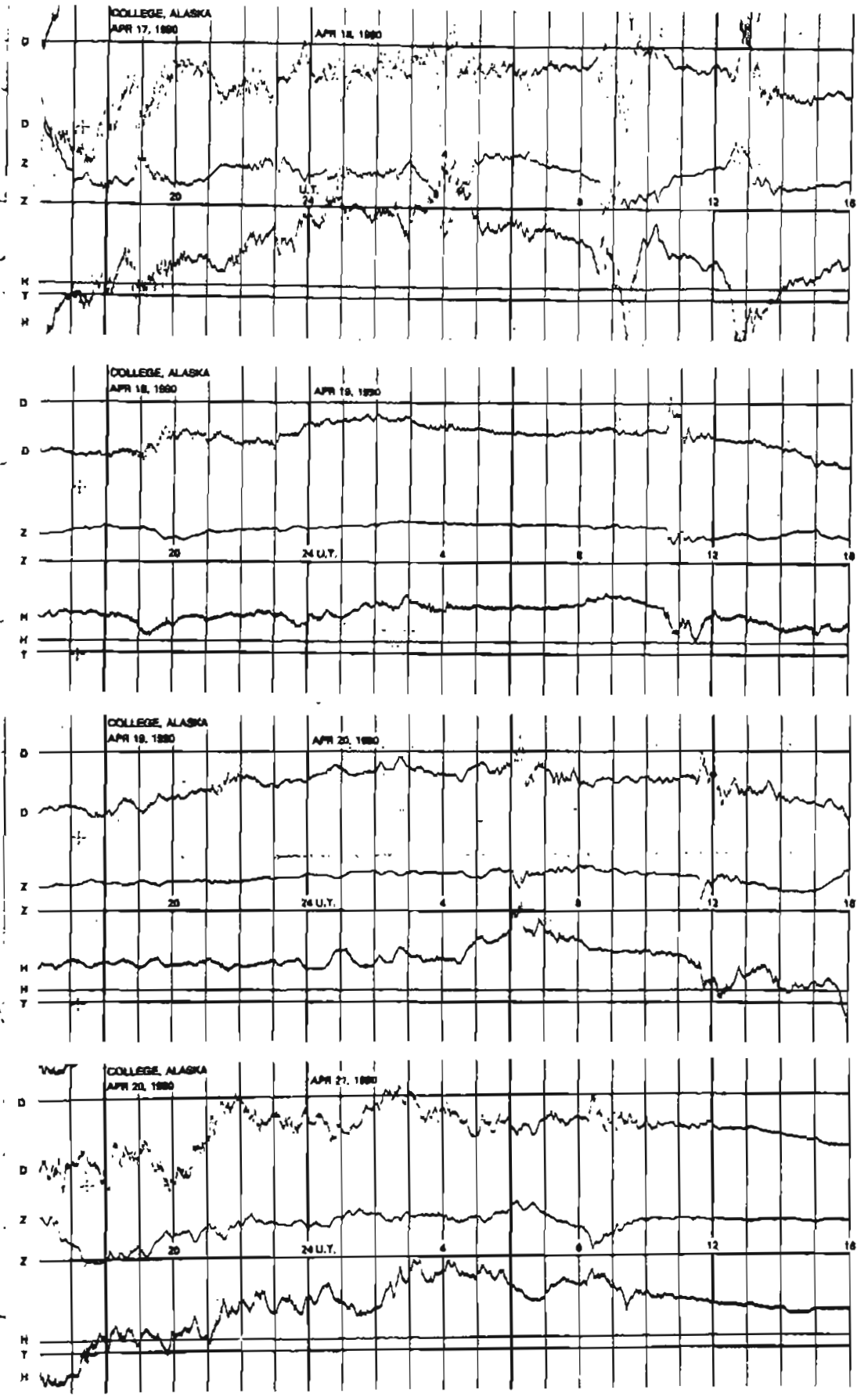

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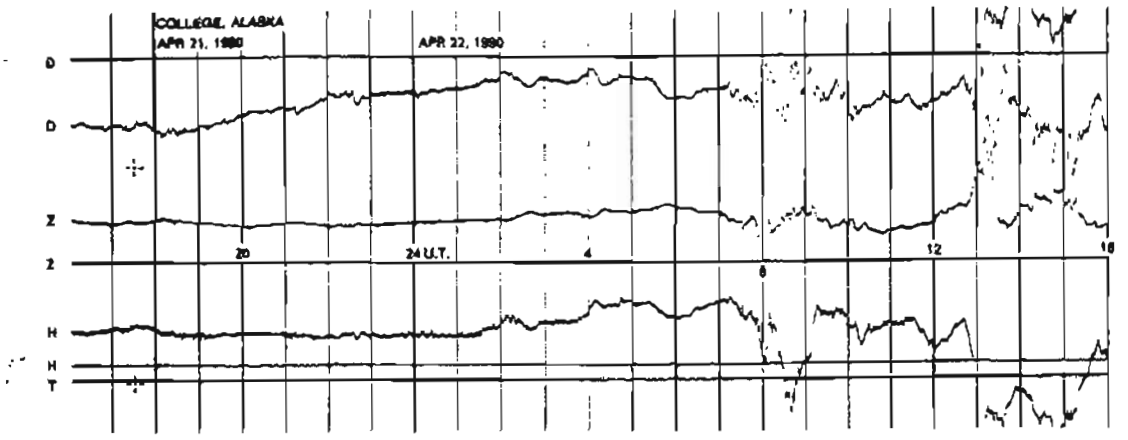

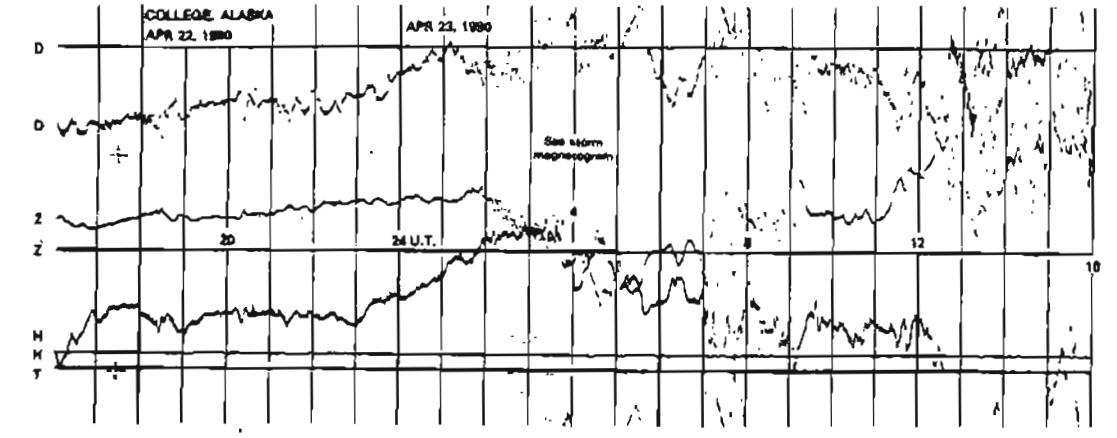

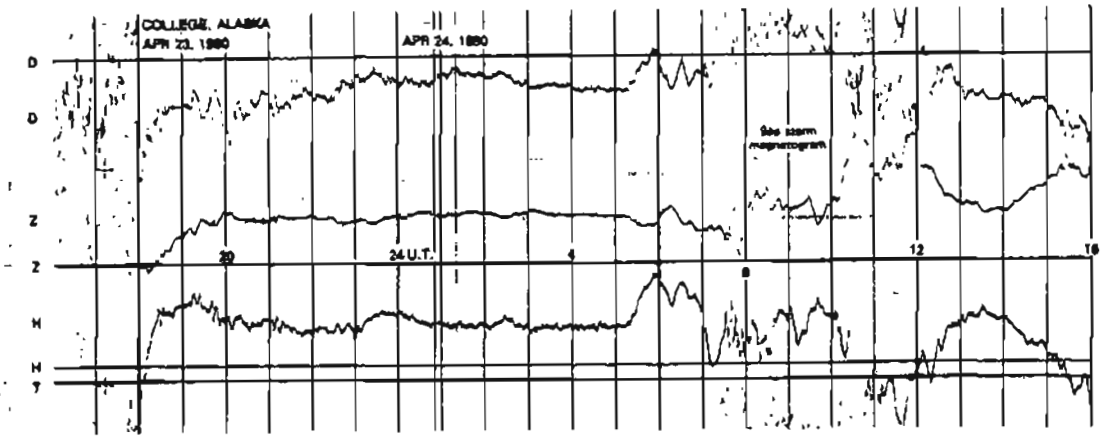

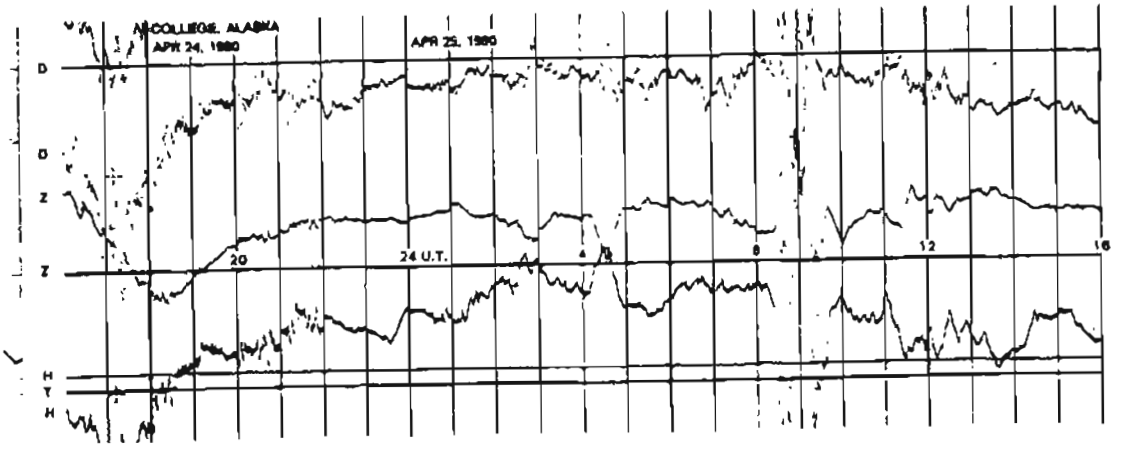

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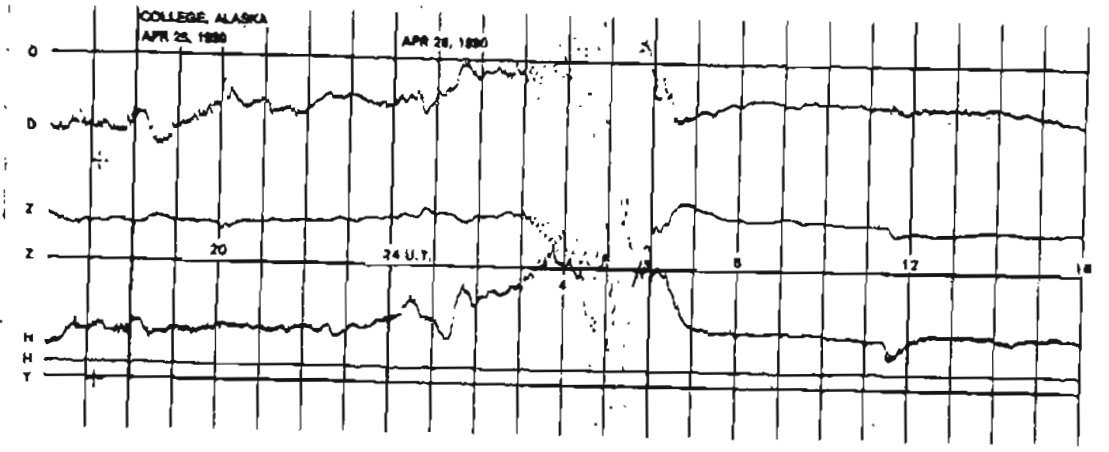

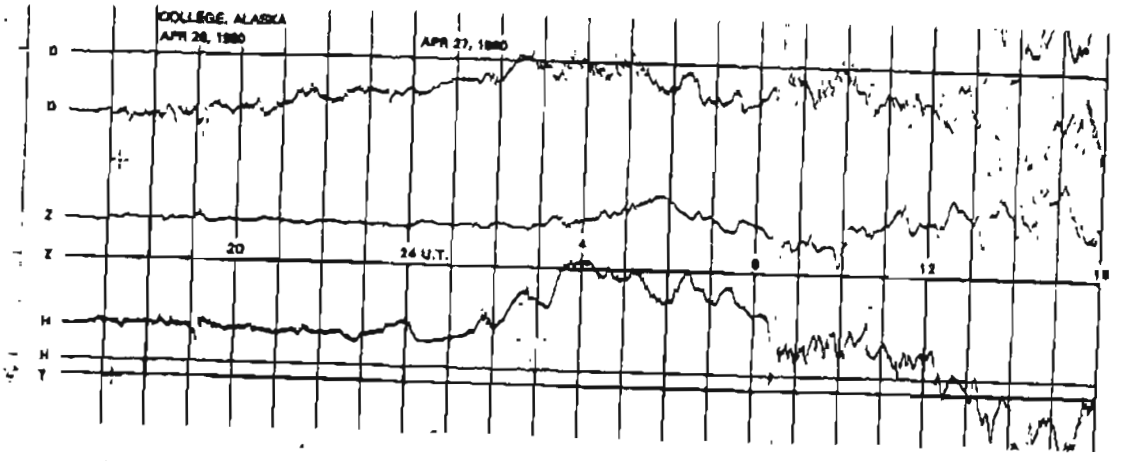

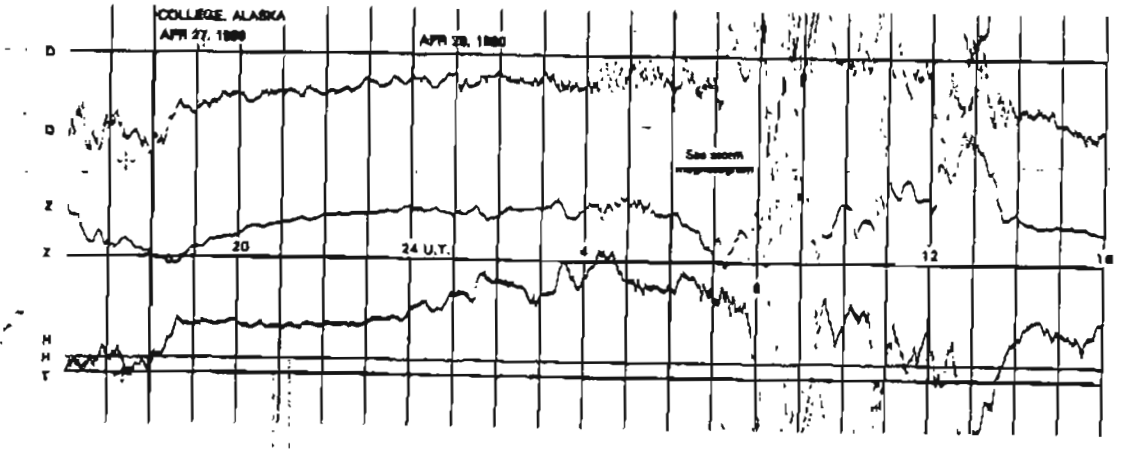

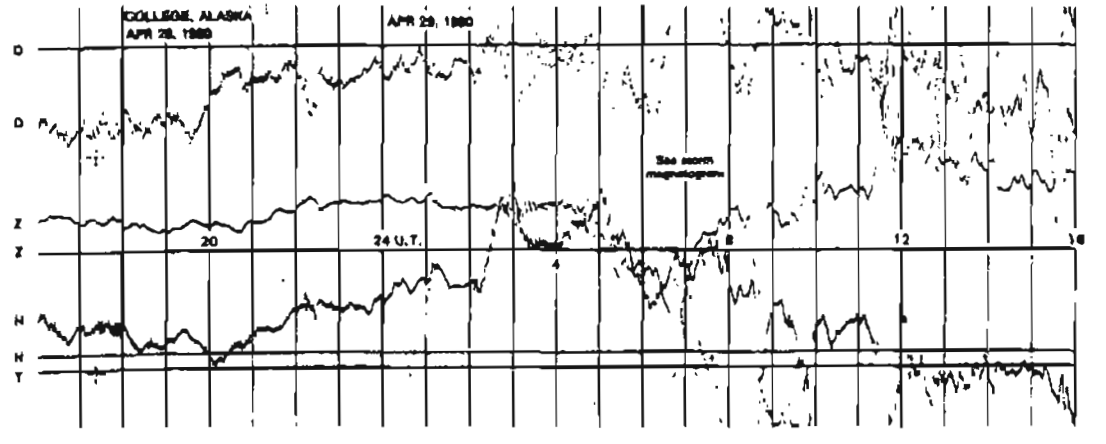

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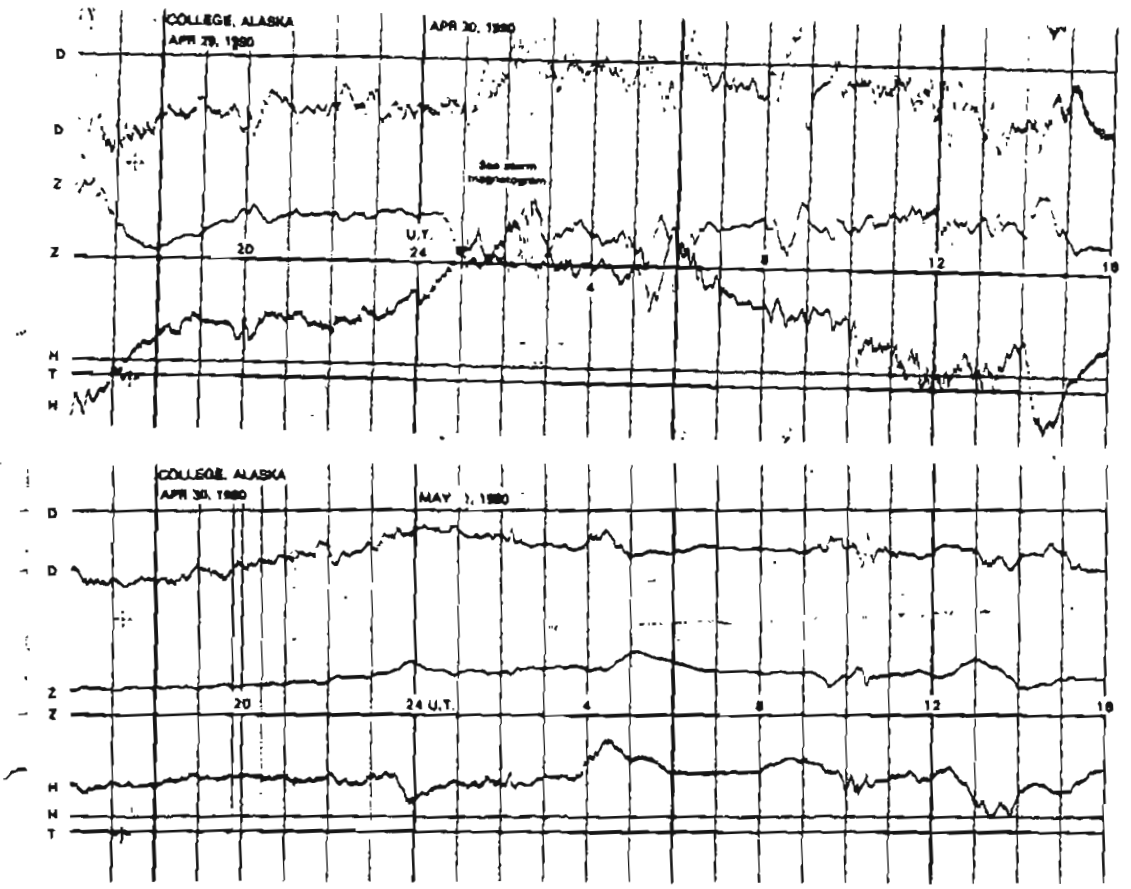
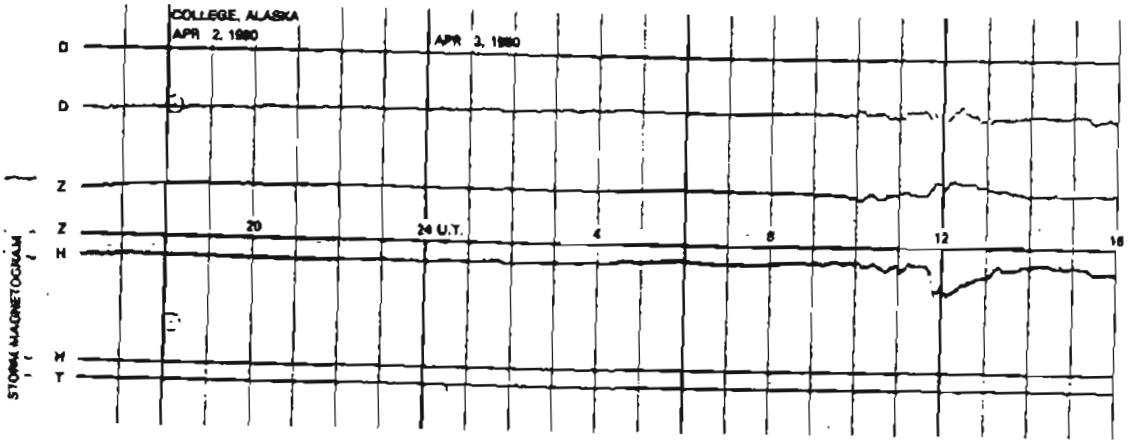
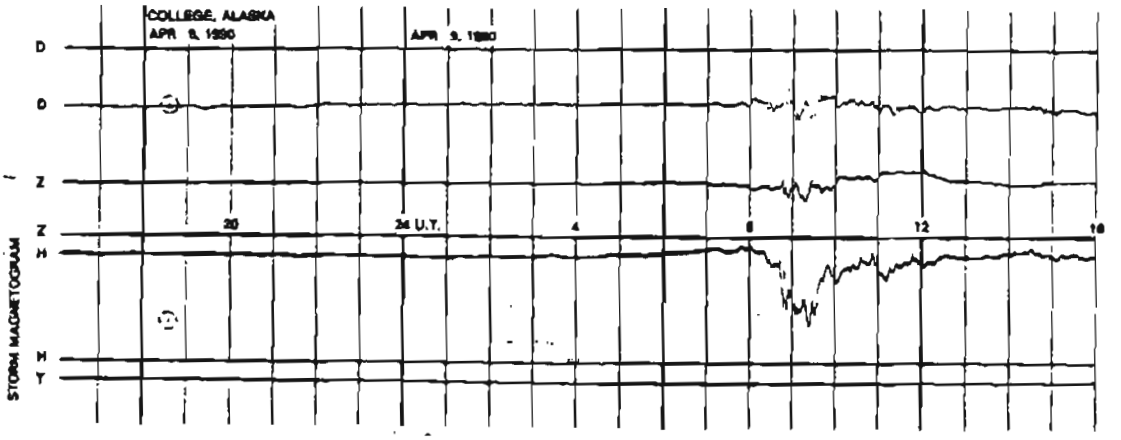
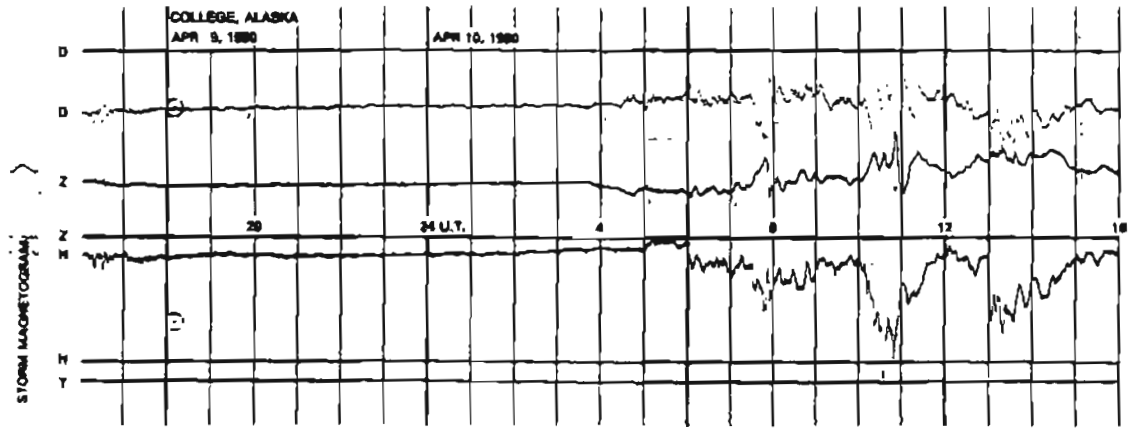
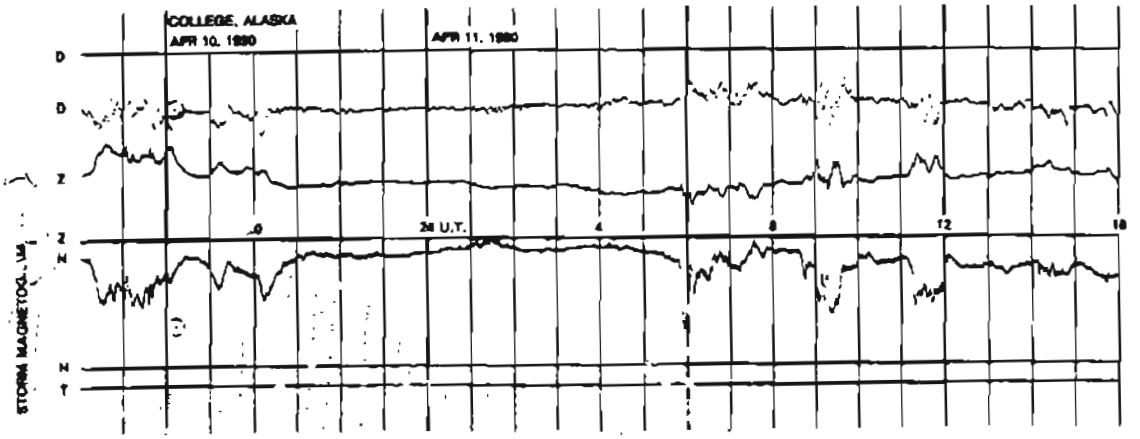


STORM MAGNETOGRAMS

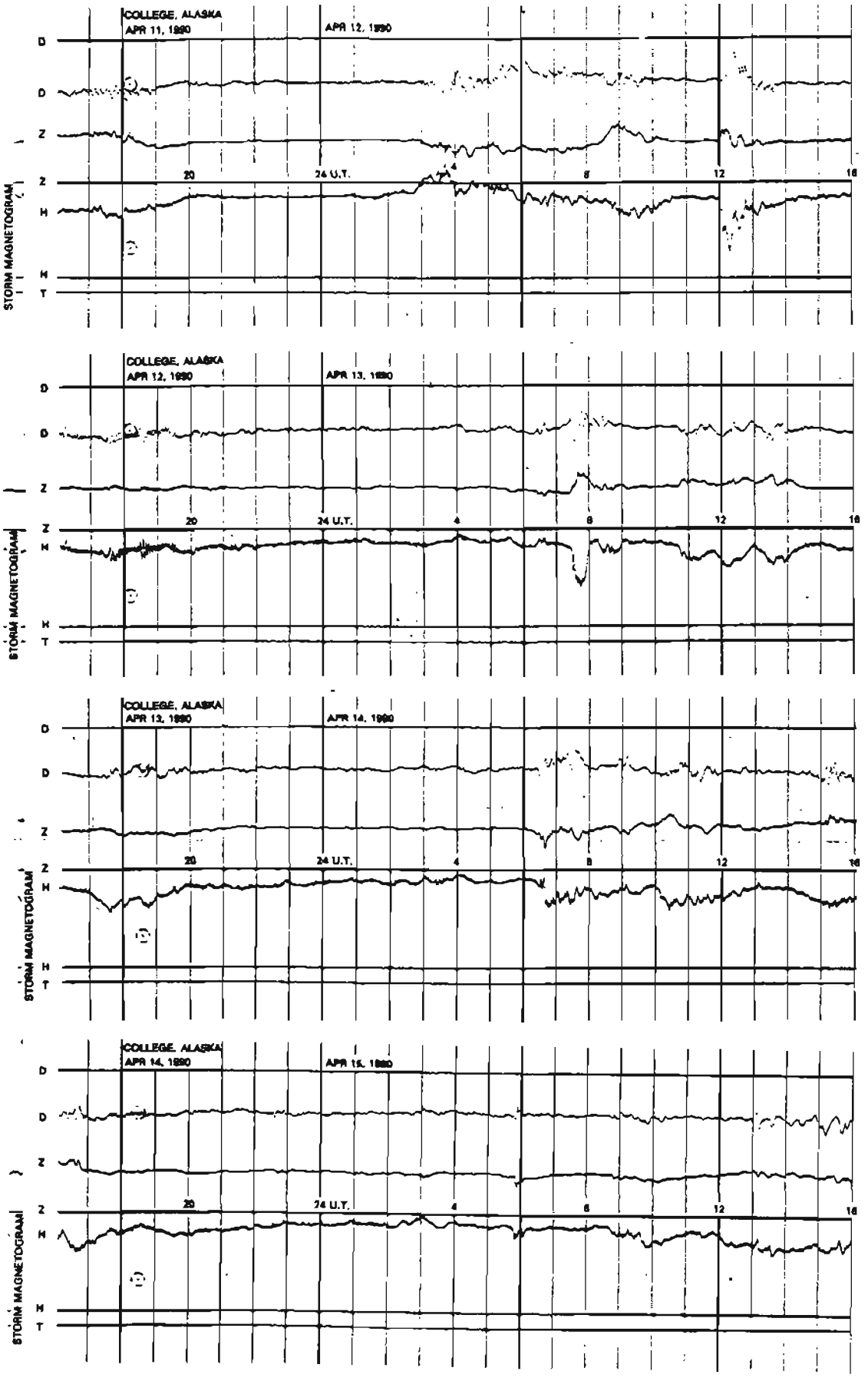








STORM MAGNETOGRAMS



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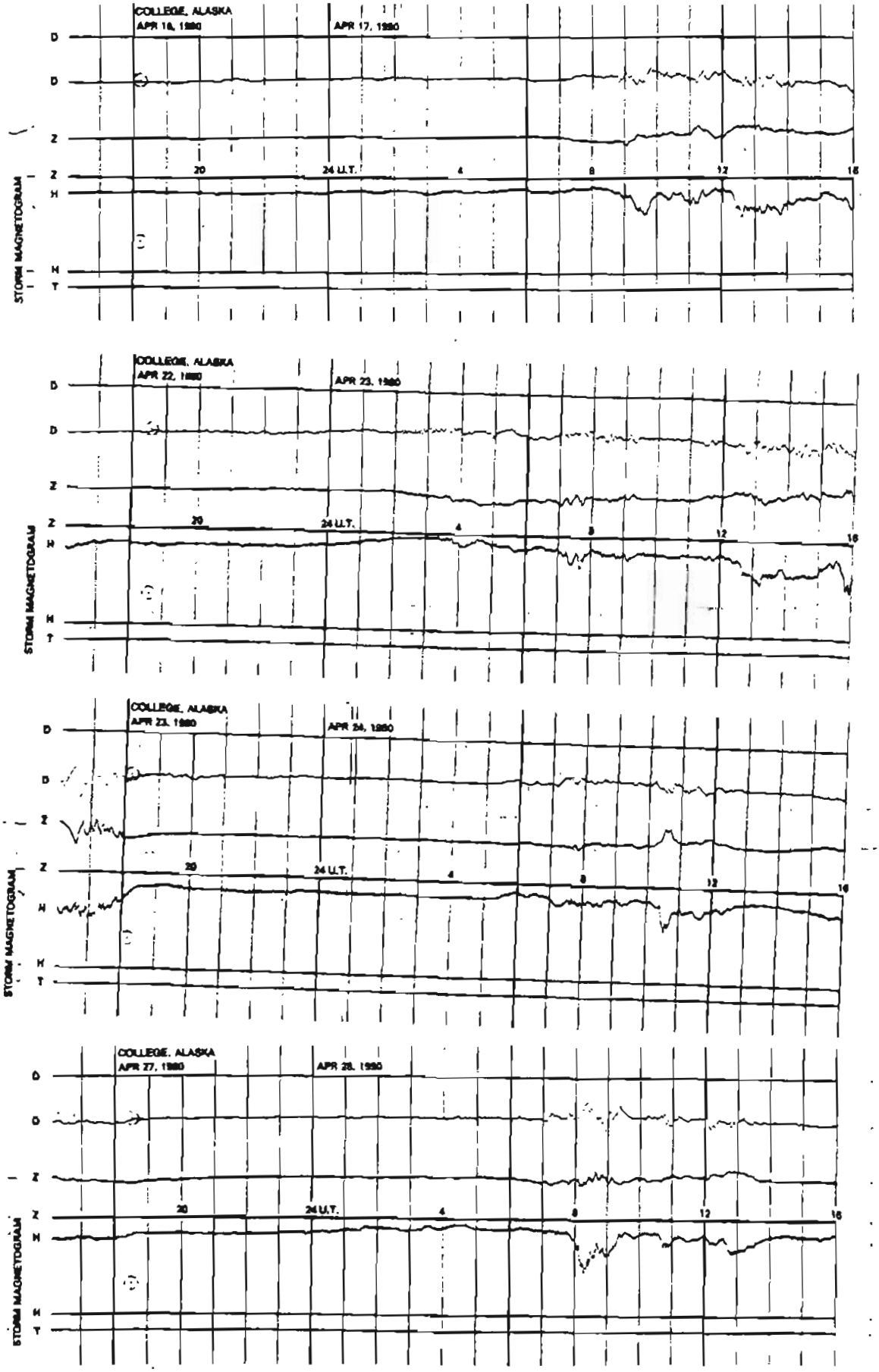

STORM MAGNETOGRAMS