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UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

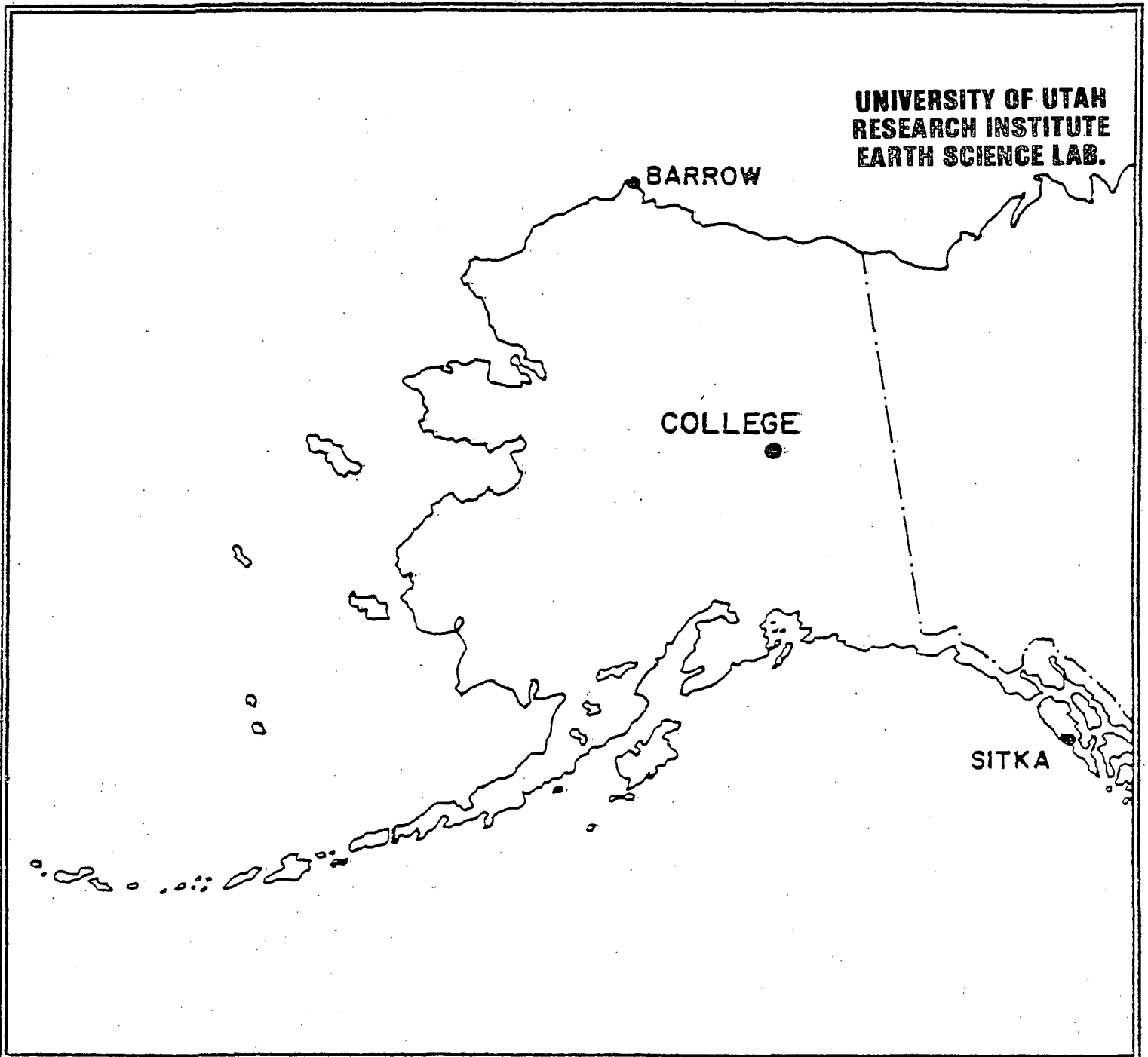
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81-300C

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

MARCH 1981

OPEN FILE REPORT

81-300C



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Normal Magnetograms

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THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY WITH THE ASSISTANCE OF OBSERVATORY STAFF MEMBERS J.E. PAPP AND E.A. SAUTER, AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA. THE COLLEGE OBSERVATORY IS A PART OF THE BRANCH OF ELECTROMAGNETISM 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. 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
Yukon Drive on West Ridge
Fairbanks, Alaska 99701

Requests for copies of the magnetograms except for the current month should be addressed to:

World Data Center A-NOAA
Environmental Data Service
Boulder, Colorado 80302

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

GEOMAGNETIC DATA

Normal, Storm, and Rapid Run magnetograms and appropriate calibration data are processed daily at the observatory and are available for analysis or copying. Also available are mean hourly scalings, K-Indices, selected magnetic phenomena reports, and on a real-time basis are recordings from a 3-component fluxgate magnetometer and F-component proton magnetometer.

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 beginning 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)

The Magnetic Daily Character Figure, C. To each Universal day a character is assigned on the basis C=0, if it is quiet; C=1 if it is moderately disturbed; C=2 if it is greatly disturbed. The method used to assign characters at the College Observatory is based on AK as follows:

AK Range	C
0 ≈ 11	0
11 ≈ 50	1
50+	2

Routine assignment of C was discontinued at College on January 1, 1976.

Selected Phenomena & Outstanding Magnetic Effects

Prior to January 1, 1976, the Normal & Rapid Run records were reviewed at the observatory for selected magnetic phenomena and the events identified were forwarded to the IUGG Commission on Magnetic Variations and Disturbances. This was discontinued on January 1, 1976, but a report on Outstanding Magnetic Effects is prepared monthly for this report.

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 averages 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 sheets 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 he is interested in the detailed morphology of the magnetic field, he should 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.

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

MARCH 1981

DATE	K-INDICES									AK	TIME SCALE ON MAGNETOGRAMS 20 mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM		
1	3	2	3	6	5	5	3	3	30	30	SUDDEN COMMENCEMENTS d h m
2	2	2	6	6	6	3	2	1	28	35	
3	1	0	0	0	1	2	1	1	06	02	
4	2	3	6	5	1	0	0	1	18	20	
5	2	5	5	7	7	7	6	3	42	77	
6	3	1	3	2	2	1	2	1	15	08	
7	2	2	3	6	5	7	6	2	33	48	
8	2	1	4	5	5	2	1	0	20	18	
9	1	0	0	3	3	0	0	1	08	05	
10	1	1	0	6	5	3	1	0	17	19	
11	1	0	1	5	3	1	1	1	13	10	
12	0	0	2	4	4	4	2	3	19	14	
13	2	2	2	4	5	6	5	4	30	31	
14	3	4	4	7	7	6	4	3	38	59	
15	3	3	2	3	5	5	4	2	27	23	
16	2	3	3	3	4	3	2	2	22	14	
17	3	2	3	3	5	4	3	2	25	19	
18	2	3	5	6	4	5	5	2	32	35	
19	2	1	2	3	1	5	4	1	19	14	
20	1	1	4	4	5	5	1	0	21	20	
21	0	0	0	1	0	0	3	2	06	03	
22	1	1	1	0	0	1	1	0	05	02	
23	0	0	0	5	3	0	0	0	08	08	
24	0	0	0	1	1	0	1	1	04	02	
25	1	4	4	3	6	6	4	3	31	34	
26	5	3	3	4	6	5	3	3	32	33	
27	2	2	3	3	5	5	2	2	24	19	
28	1	2	2	3	5	4	2	2	21	15	
29	2	3	5	6	4	5	2	1	28	29	
30	3	2	2	4	5	5	3	3	27	23	
31	4	4	3	4	5	4	4	3	31	27	

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

BEGIN			END		
d	h	m	d	h	m

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

H

Z

683.8

321.7

3.75

7.81

2560

2510

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN B. TOWNSEND, CHIEF, COLLEGE OBSERVATORY

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY
COLLEGE, ALASKA

MONTH
MARCH

YEAR
1981

DATE	TIME U. T.	NATURE OF PHENOMENON ¹	REMARKS
04	2033	ssc	
05	0535	si*	
05	19XX	pc5	
07	19XX	pc5	
12	09XX	pi2	With bps
12	1823	ssc*	

IDENTIFIED BY: JBT

VERIFIED BY: JEP

1. NATURE OF PHENOMENON: ssc, ssc*, si, si*, b, bp, bs, bps, pc1, pc2 - - - pc5, pg, pi 1, pi 2, sfe.

NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA
MARCH 1981

WDC-A FOR SOLAR-TERRRESTRIAL 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	01	0738	s.c.*	-4	+116	-18	01 02	4 3, 4, 5	6 6	170	1190	960	03	01
		04	2033	s.c.*	..	..	..	05	4, 5, 6	7	396	1830	1330	06	01
		07	07XX	..	..	..	..	07	6	7	341	1310	720	08	02
		12	1823	s.c.*	-12	+59	+23	14	4, 5	7	266	1620	1330	16	08
		25	05XX	..	..	..	..	25 26	5, 6 5	6 6	215	1320	790	26	23

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0000 U.T., 3-1-81	2400 U.T., 3-31-81	1.6/mm	3.78/mm	27° 46.8 E
H	0000 U.T., 3-1-81	2400 U.T., 3-12-81	7.88/mm		127538
	0000 U.T., 3-13-81	2400 U.T., 3-20-81	"		127628
	0000 U.T., 3-21-81	2400 U.T., 3-31-81	"		127548
Z	0000 U.T., 3-1-81	2400 U.T., 3-12-81	7.78/mm		551368
	0000 U.T., 3-13-81	2400 U.T., 3-20-81	"		551318
	0000 U.T., 3-21-81	2400 U.T., 3-31-81	"		551438

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D	0000 U.T., 3-1-81	2400 U.T., 3-31-81	7.8/mm	29.78/mm	23° 47.6 E
H	0000 U.T., 3-1-81	2400 U.T., 3-31-81	44.08/mm		115178
Z	0000 U.T., 3-1-81	2400 U.T., 3-31-81	48.68/mm		540438

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE	BASELINE	
D					
H					
Z					

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
28° 05.6 E	129838	553908

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: MAR 3, 6, 9, 11, 12, 16, 21, 22, 23, 24

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)

U.S. DEPARTMENT OF INTERIOR
Geological Survey, Geologic Division
Denver Federal Center
DENVER, CO 80225

OBSY.	YEAR	MONTH	ELE- MENT
CO	81	XXII	D

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (12 M.M.T.) is hour 11 of the same universal day.
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

C	Q	S	Ten	Min	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	SUM	
					142	108	104	86	157	146	155	145	70	149*	-34	63*	01	218	236*	262	299	321	384	359	218	231	274	156	66	4315
					138	116	108	117	135	140	138	232*	-10*	121*	363*	333	02	252*	196*	238	202	222	260	269	198	185	187	177	170	3773
					147	152	140	153	165	171	165	164	162	160	173	180	03	195	208	203	215	209	233	215	224	191	181	180	173	4359
					127	108	113	81	74	131	21*	29*	330	69*	139	175	04	178	180	191	183	195	211	227	235	228	212	182	190	3809
					170	167	146	130	149	110	161	-90*	-129*	-185*	46	418*	05	371*	544*	806*	600*	624*	101*	600*	231	228	250	175	154	5780
					148	146	166	166	172	160	155	163	171	177	182	189	06	182	192	197	208	218	234	249	260	231	233	216	202	4620
					189	170	133	143	162	167	165	180	180	158	172	573*	07	536*	320	311	371*	711*	386*	281	183	194	233	211	182	6251
					175	134	159	148	147	160	141	111	127	-154*	141	218	08	265	324	179	194	212	208	238	247	240	215	191	176	4199
					159	155	152	153	160	164	166	171	169	180	189	217	09	227	188	186	204	205	213	220	246	230	230	189	166	4539
					178	151	131	134	150	160	153	167	166	134	196	322	10	181	297	269	205	223	180	212	227	224	207	171	164	4602
					152	155	152	146	149	151	199	157	169	172	130	183	11	275	231	193	202	205	234	218	251	239	215	188	171	4537
					161	151	150	145	152	156	159	148	133	53*	242	191	12	221	260	170	228	215	245	262	267	222	270	118	109	4428
					131	143	136	150	159	160	147	129	160	165	131	199	13	200	198	213	573*	180*	466*	354	292	208	268	181	144	5027
					142	176	157	146	119	120	190	127	71	50	15	314*	14	600*	458*	307*	378*	225	244	233	254	251	222	185	188	5172
					167	153	154	129	141	167	143	224	167	170	161	195	15	194	231	317	271	240	381	168	186	197	232	209	190	4787
					162	176	174	140	147	134	201	215	162	183	175	201	16	210	256	192	202	225	240	253	176	193	212	229	201	4659
					131	91	92	123	135	140	151	155	152	184	217	191	17	269	232	301	153	214	211	211	233	208	119	157	161	4231
					141	113	109	118	157	102	93	299	184	165	225	349	18	248	247	217	345	281*	178	204	188	181	132	139	151	4566
					164	149	155	160	167	170	161	177	151	164	186	221	19	193	187	178	163	295	248	259	205	205	190	167	163	4418
					165	158	155	148	150	149	150	156	147	102	187	189	20	283	285	363	273	199	241	251	241	210	179	160	157	4638
					159	156	153	157	152	159	160	164	159	187	177	208	21	180	171	186	212	233	268	295	245	177	200	186	173	4517
					154	147	152	131	153	164	177	167	168	177	189	200	22	191	180	182	189	210	229	256	271	278	239	209	192	4605
					165	142	140	139	150	158	160	161	152	151	187	233	23	243	205	201	221	232	257	273	272	269	243	211	180	4745
					154	138	130	137	142	151	159	158	152	165	179	198	24	237	191	182	195	208	247	262	258	286	241	229	173	4572
					135	107	101	90	39	52	315*	162	138	169	173	204	25	202	669*	581*	478*	336	227	282	344	150	248	62	75	4709
					102	120	117	102	115	79	82	96	134	156	153	163	26	204	581*	803*	256	361	252	207	222	240	212	161	192	5110
					130	126	61	92	108	104	89	185	121	126	159	201	27	178	187	154	238	193	250	249	284	189	130	165	188	3907
					126	99	92	108	66	119	125	140	153	129	213	190	28	202	200	238	325	289	305	280	305	249	200	164	153	4470
					143	78	97	68	38	55	93	-26*	167	124	163	280	29	306	315	314	246	268	413	266	142	157	191	159	148	4205
					115	74	79	130	131	109	109	102	83	143	147	192	30	207	437	247	270	302	226	384	201	326	232	226	174	4646
					60	68	73	7	121	180	159	147	126	187	92	172	31	177	248	217	244	341	330	292	199	236	231	204	166	4277

SCALED BY	EAS, LLE, JEP	Preliminary base-line and scale values: Interval Beginning Base-line Value Scale Value	<input type="checkbox"/> Interpolated <input type="checkbox"/> Significant portion of hour interpolated. <input type="checkbox"/> No record; or no values available because of faulty record. * Derived from STORM Mghp., converted to Normal Mghp.	<input type="checkbox"/> Scaling uncertain because of magnetic storm. <> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.	MONTHLY SUM	142473
CHECKED BY	JEP, EAS				MONTHLY MEAN	191
SIGNS REVIEWED BY	JEP				DATES WITH GAPS:	
PUNCHED BY						

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)

U.S. DEPARTMENT OF INTERIOR
Geological Survey, Geophysics Division
Denver Federal Center
DENVER, CO. 80225

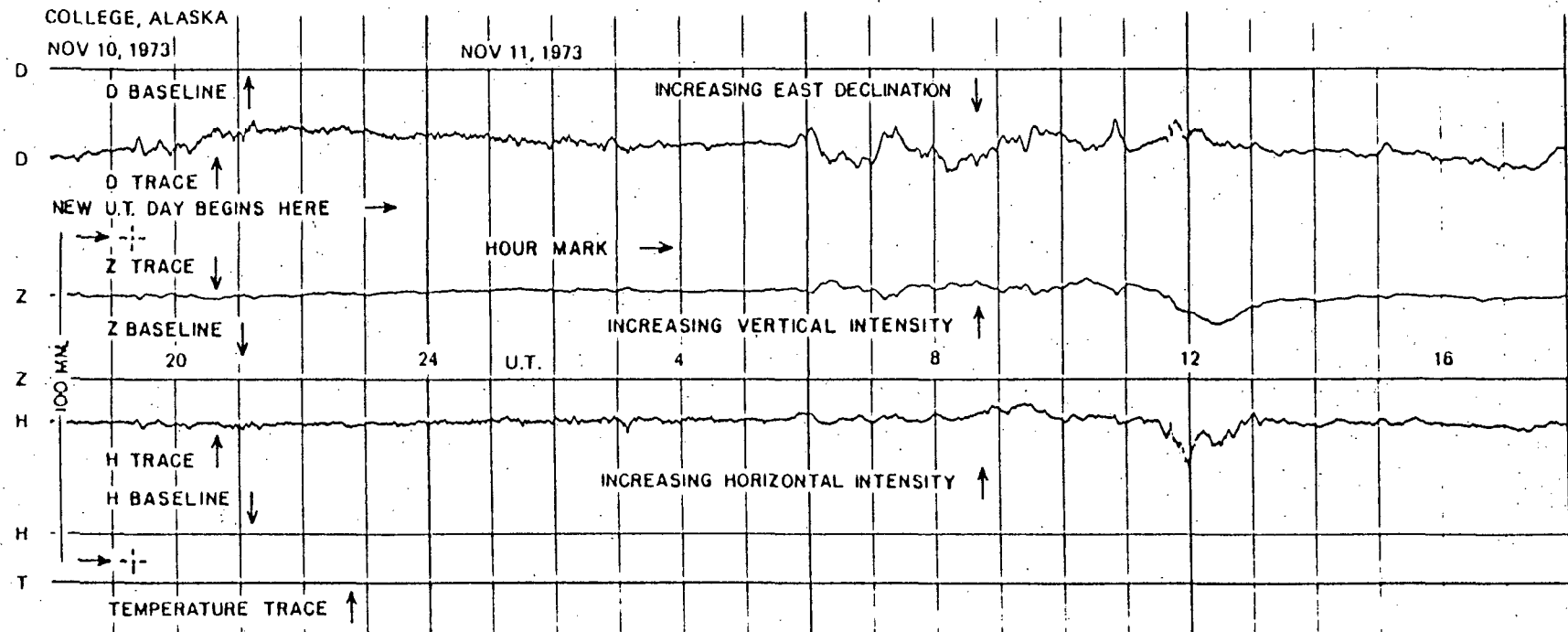
OBSE. YEAR MONTH ELEMENT
GO 81 MAR 2

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (SLOW M.T.) is hour 11 of the 511103 universal day.
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

C	Year	Day	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	SUM	
			01	344	375	374	371	378	347	337	327	262	173	200	381	01	536	558	357	398	267	256	247	257	328	347	333	331	8084
			02	360	346	357	346	362	355	367	81	196	252	431*	494	02	539*	425	268	243	315	329	330	315	323	343	350	362	8089
			03	358	358	345	350	348	340	338	338	338	338	340	346	03	343	330	324	320	300	300	293	293	305	325	355	374	7999
			04	375	396	405	401	378	374	206	239	286	205	387	297	04	327	348	340	335	326	321	318	331	340	347	348	347	7977
			05	350	355	349	362	444	414	315	81	59	239	442	723*	05	605*	423	962*	723*	710*	823*	573*	173	251	318	335	332	10501
			06	345	364	368	369	367	364	367	374	370	371	367	365	06	365	361	356	360	364	367	369	368	362	364	365	361	8753
			07	370	363	352	357	356	360	363	385	338	321	437	583*	07	355*	378	595	621*	362*	413*	384	192	285	329	344	346	9189
			08	361	369	365	353	347	352	358	334	260	330	371	366	08	481	336	235	335	331	338	349	354	353	350	354	354	8336
			09	351	355	349	346	345	345	344	345	342	349	343	307	09	264	324	334	340	339	346	345	348	346	347	340	340	8154
			10	338	345	339	340	335	348	355	346	346	334	300	385	10	158	317	364	237	249	298	320	335	347	342	346	347	7771
			11	345	353	350	348	345	342	359	341	343	340	303	259	11	212	249	254	309	332	329	320	330	331	335	332	337	7698
			12	344	346	346	336	332	330	331	340	339	353	304	313	12	311	270	235	212	308	331	344	325	319	334	334	348	7685
			13	375	362	341	340	340	335	341	352	359	335	343	366	13	379	433	80	30*	258*	333*	166	232	277	310	336	400	7423
			14	374	350	338	344	338	304	330	347	251	317	295	618*	14	1061*	725*	574*	415*	320	352	343	359	353	338	353	361	9760
			15	360	359	363	362	380	387	373	396	370	369	330	292	15	352	378	338	245	298	288	268	319	341	362	363	363	8256
			16	359	370	374	361	375	382	407	403	377	365	357	326	16	336	310	279	315	326	341	345	324	331	343	350	357	8413
			17	371	375	378	371	361	351	351	360	346	338	309	322	17	379	351	400	209	295	301	328	334	329	318	339	344	8160
			18	360	371	381	380	391	393	330	238	223	319	372	317	18	373	322	342	414	503*	373	298	264	305	335	365	380	8409
			19	375	370	372	363	357	350	346	369	367	355	332	320	19	322	339	336	320	262	157	169	239	329	330	359	359	7797
			20	360	364	359	356	360	350	350	359	323	325	330	314	20	325	262	159	268	274	314	331	339	341	343	349	348	7803
			21	348	348	346	341	338	339	337	341	336	337	336	312	21	320	326	331	339	342	342	348	283	249	282	329	333	7883
			22	336	330	328	329	340	342	340	320	319	319	318	315	22	306	309	311	318	321	322	319	320	320	320	321	323	7746
			23	328	327	322	319	319	319	319	318	322	329	330	314	23	229	255	299	319	321	322	320	321	319	320	317	311	7519
			24	312	311	312	311	310	313	312	318	321	324	320	308	24	291	283	296	310	315	318	322	314	320	302	308	310	7461
			25	309	311	324	317	324	262	-10	349	340	344	339	327	25	379	508*	349*	324*	224	292	342	289	280	327	310	312	7472
			26	318	308	344	363	350	381	397	318	270	232	319	366	26	483	590*	342*	265	278	267	290	329	342	340	338	365	8235
			27	334	350	342	383	366	371	379	314	305	336	340	319	27	316	337	360	194	191	294	323	346	308	284	323	344	7759
			28	340	351	342	341	336	368	361	357	360	317	335	339	28	333	311	259	253	242	233	275	316	311	324	335	338	7677
			29	333	332	354	365	362	362	295	189	292	348	305	352	29	341	437	541	540	410	287	200	218	262	320	346	351	8142
			30	350	361	379	373	350	328	360	351	322	305	339	337	30	373	381	388	352	285	189	295	216	292	336	405	389	8056
			31	350	362	327	368	374	390	350	338	323	251	187	265	31	321	413	263	235	273	268	188	100	229	284	308	325	7092

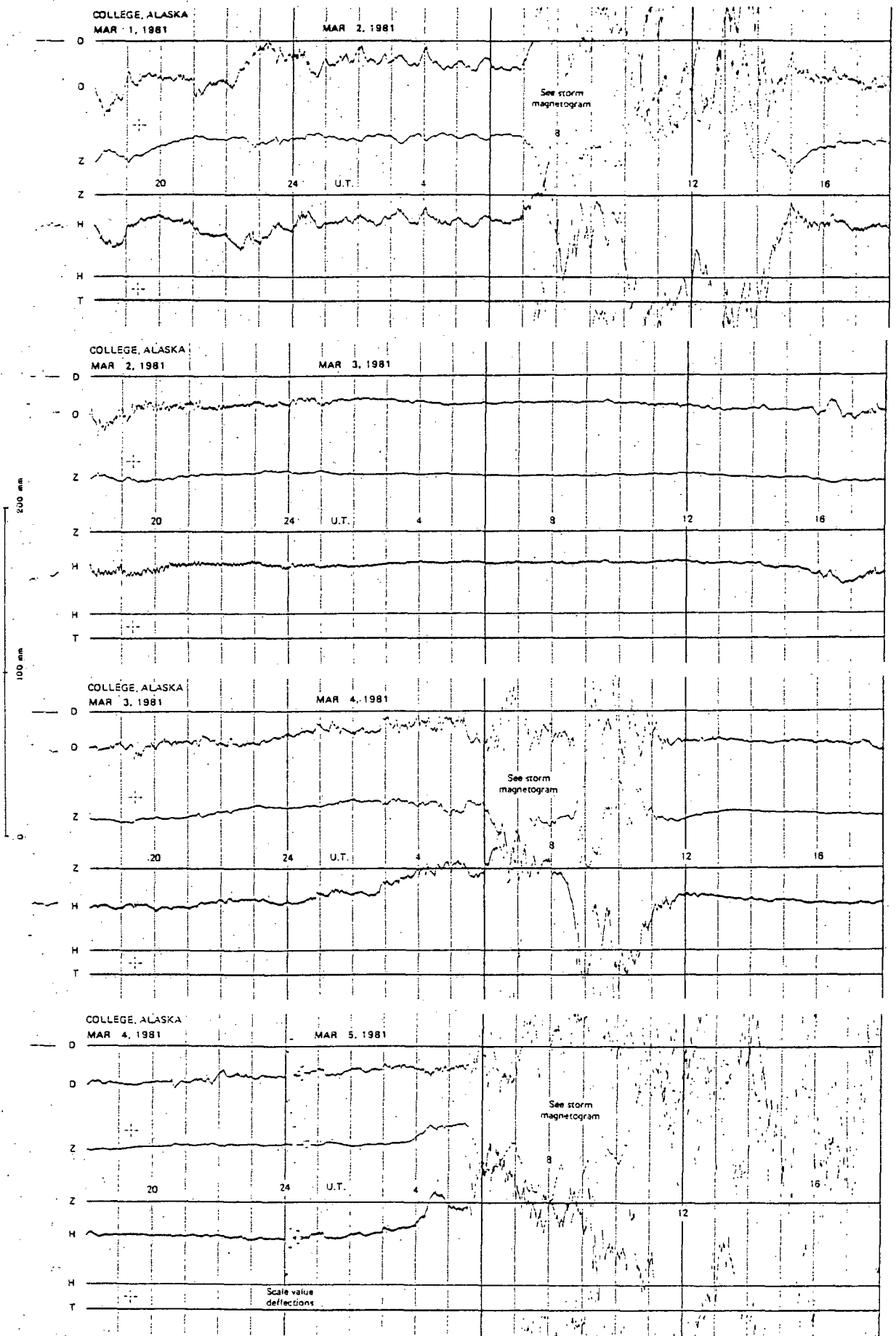
SCALED BY	EA5, LLF, JEP	Preliminary base-line and scale values:	() Interpolated	() Scaling uncertain because of magnetic storm.	MONTHLY SUM	251299
CHECKED BY	JEP, EA5	Interval Beginning	() Significant portion of hour interpolated.	() Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.	MONTHLY MEAN	338
SIGNS RE-VIEWED BY	JEP	Base-line Value	() No record; or no values available because of faulty record.	* Derived from STORM Mgh., converted to Normal Mgh.	DATES WITH GAPS:	
PUNCHED BY		Scale Value				

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

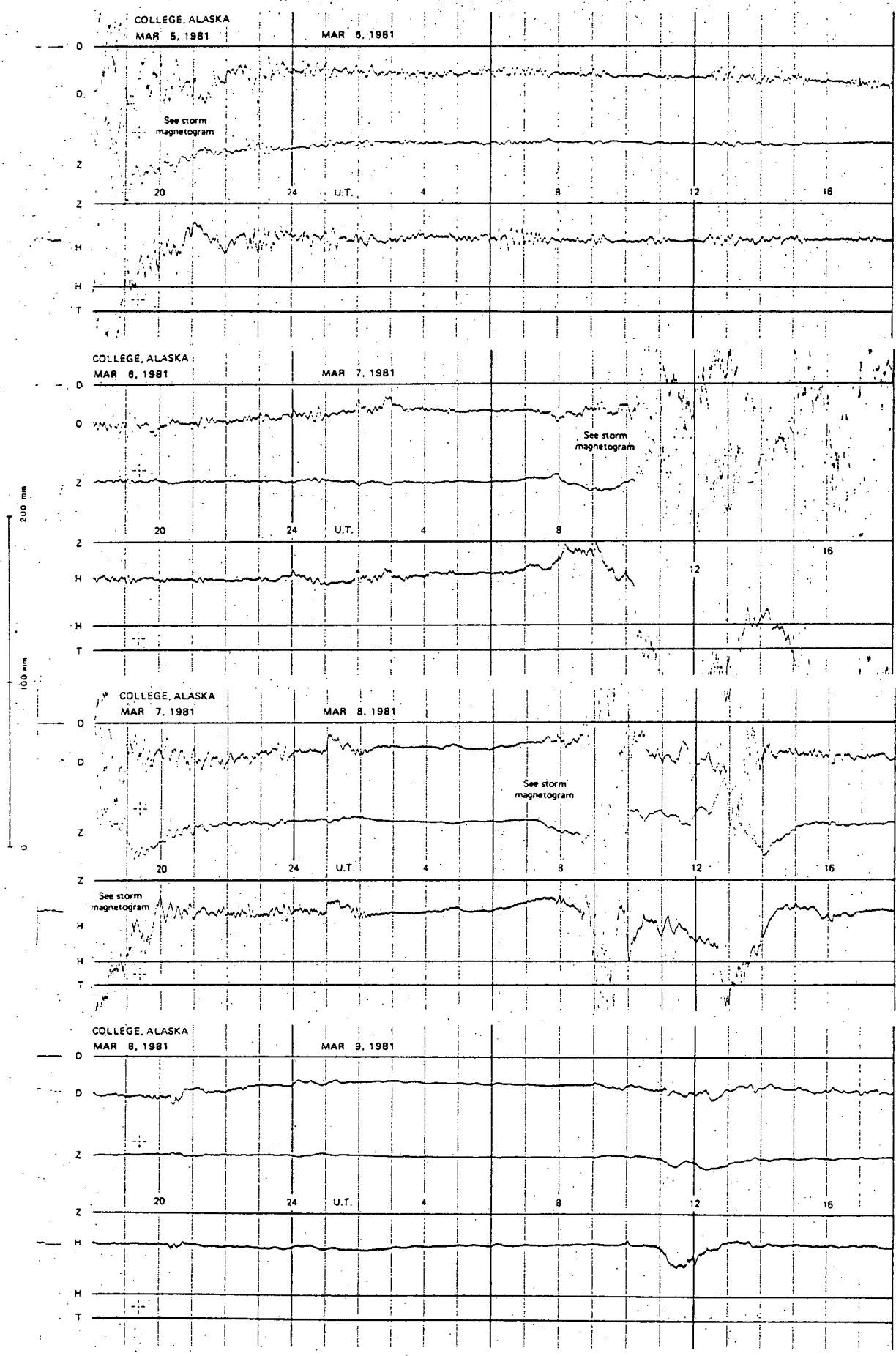


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

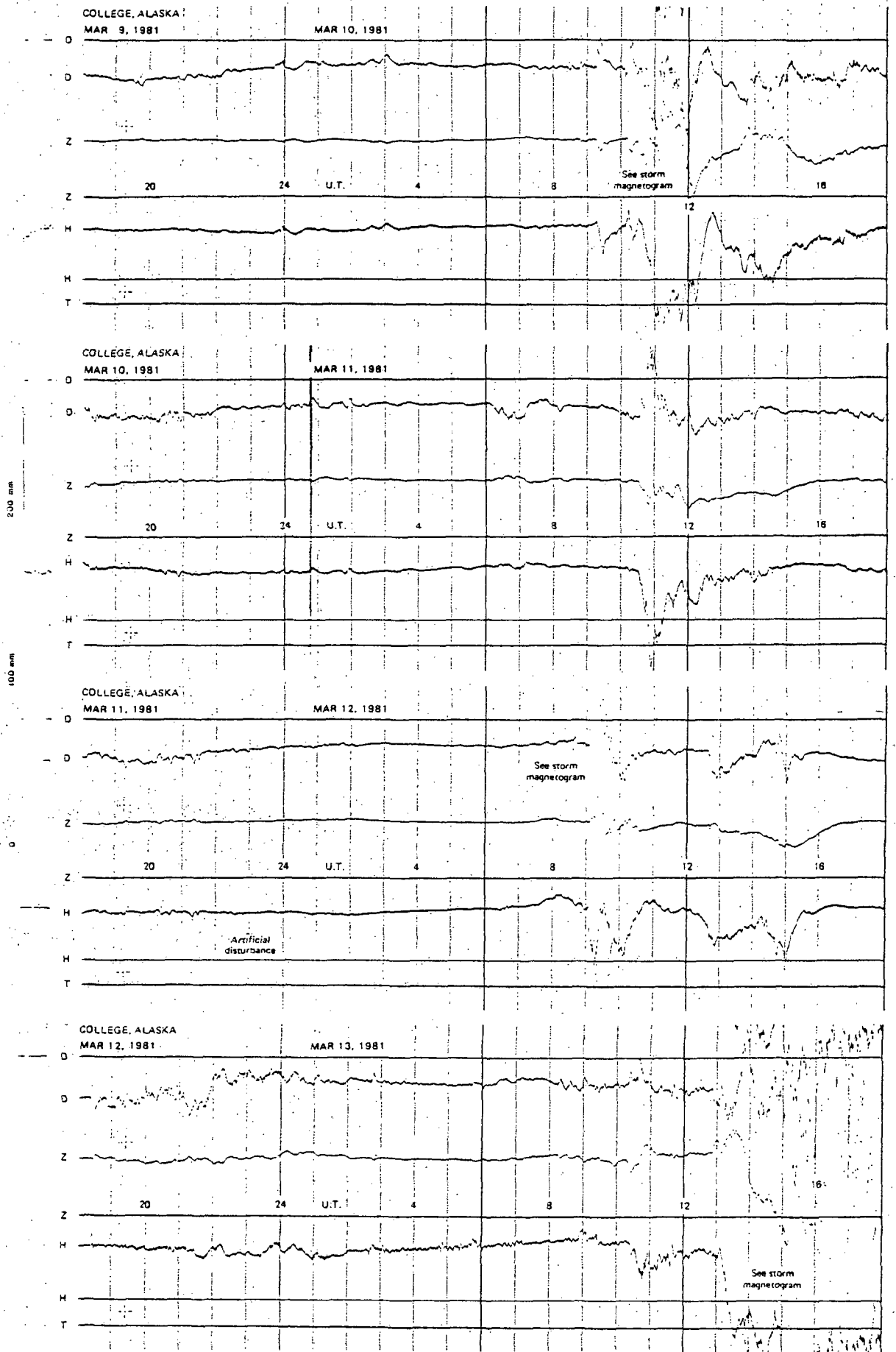
NORMAL MAGNETOGRAMS



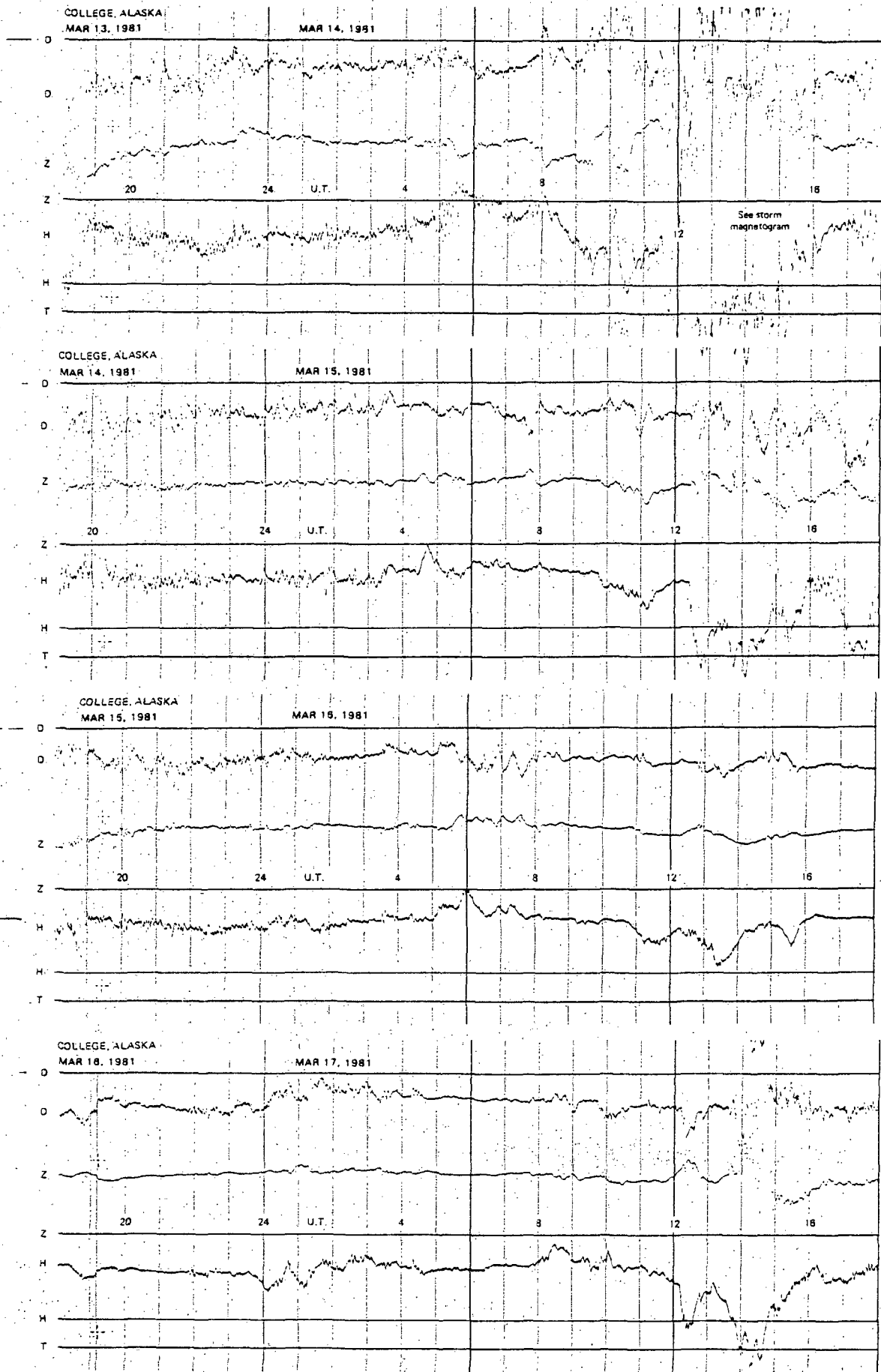
NORMAL MAGNETOGRAMS



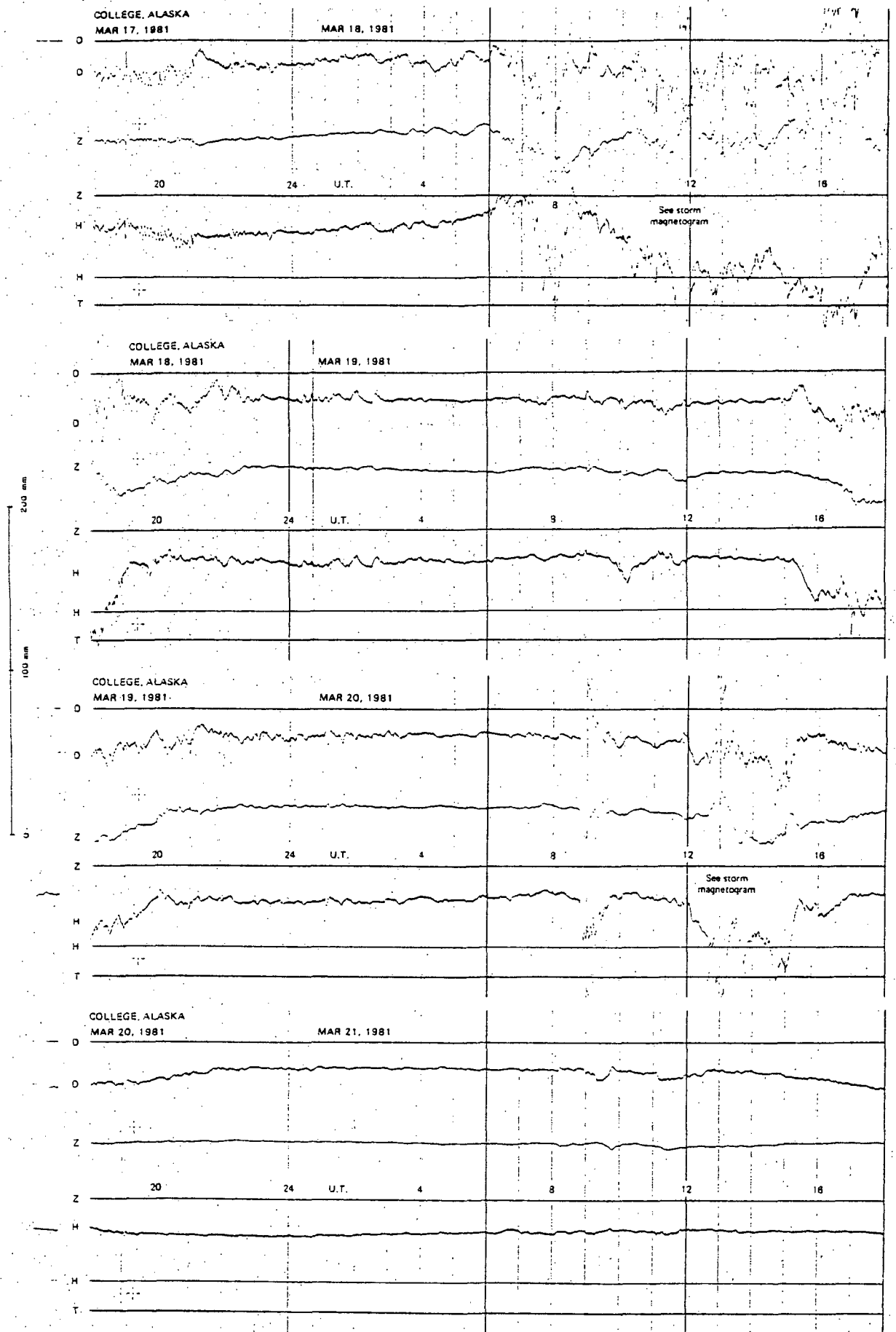
NORMAL MAGNETOGRAMS



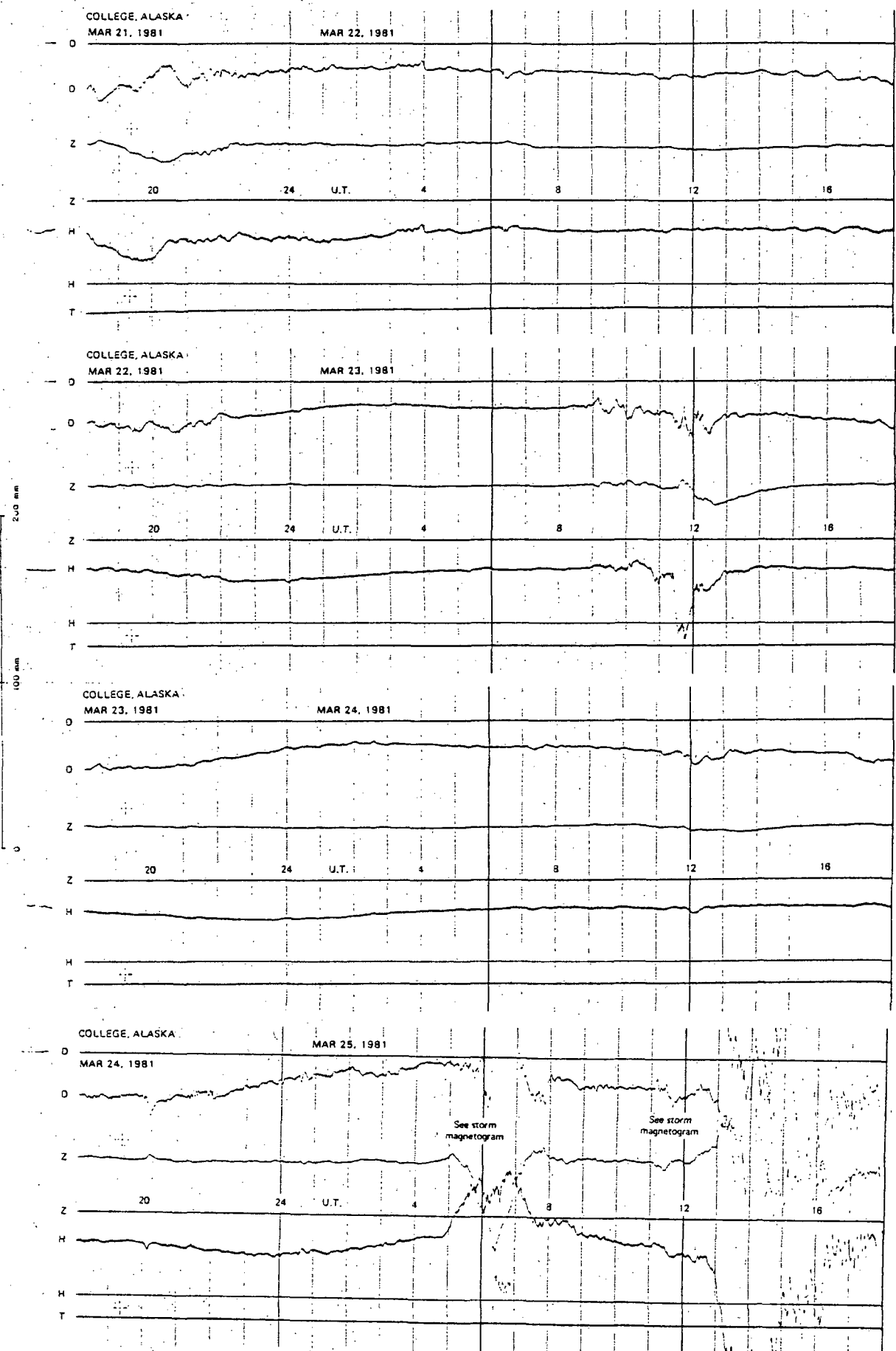
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS



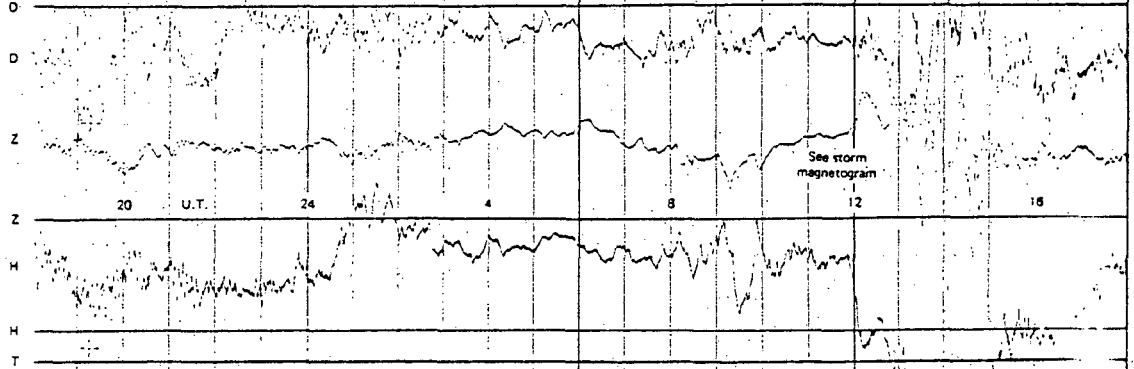
NORMAL MAGNETOGRAMS



NORMAL MAGNETOGRAMS

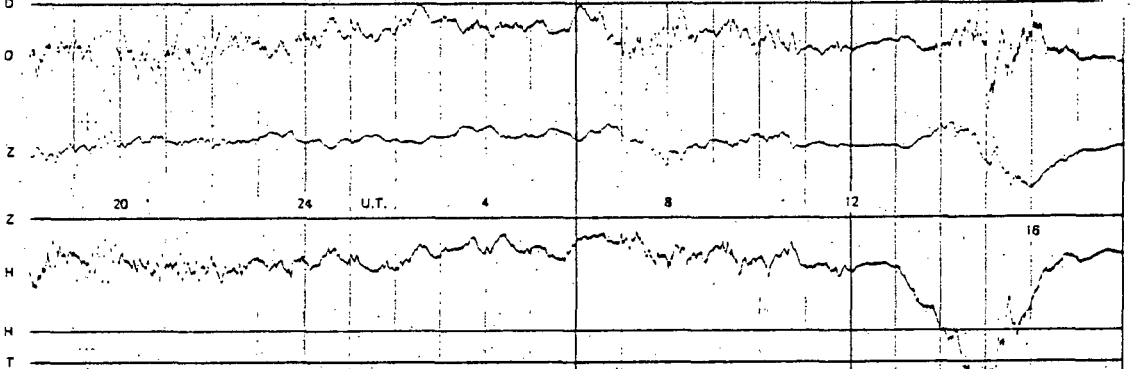
COLLEGE, ALASKA
MAR 25, 1981

MAR 26, 1981



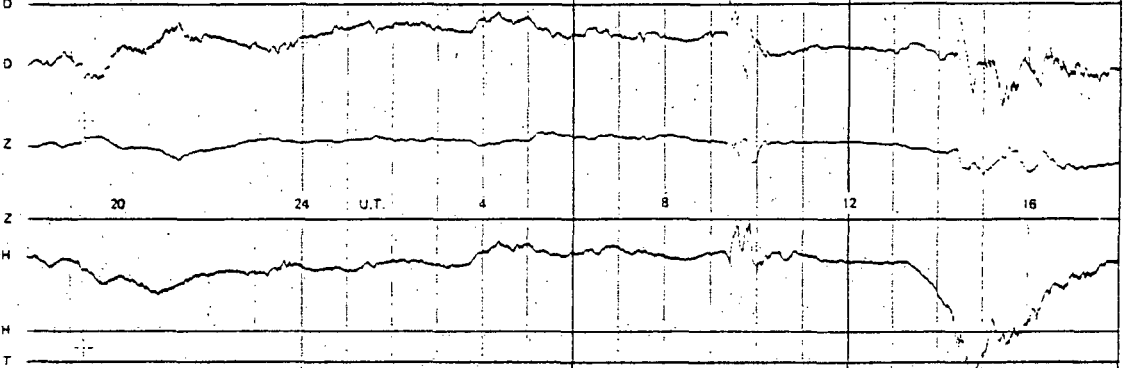
COLLEGE, ALASKA
MAR 26, 1981

MAR 27, 1981



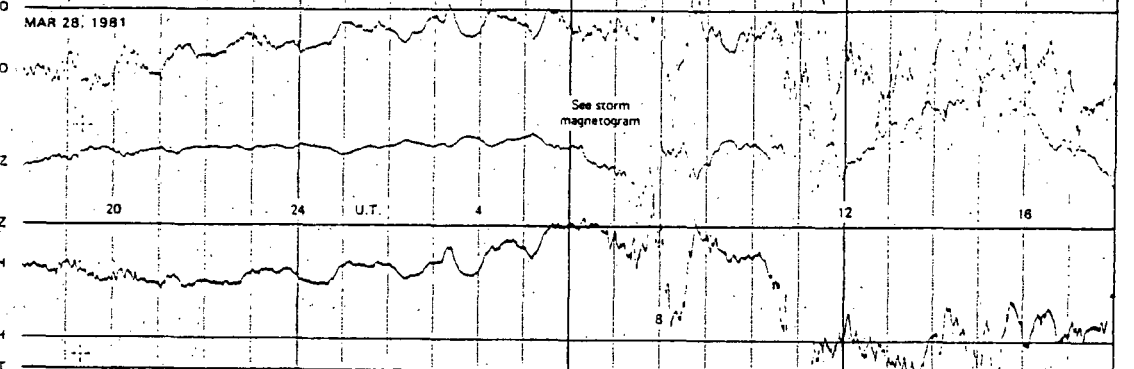
COLLEGE, ALASKA
MAR 27, 1981

MAR 28, 1981

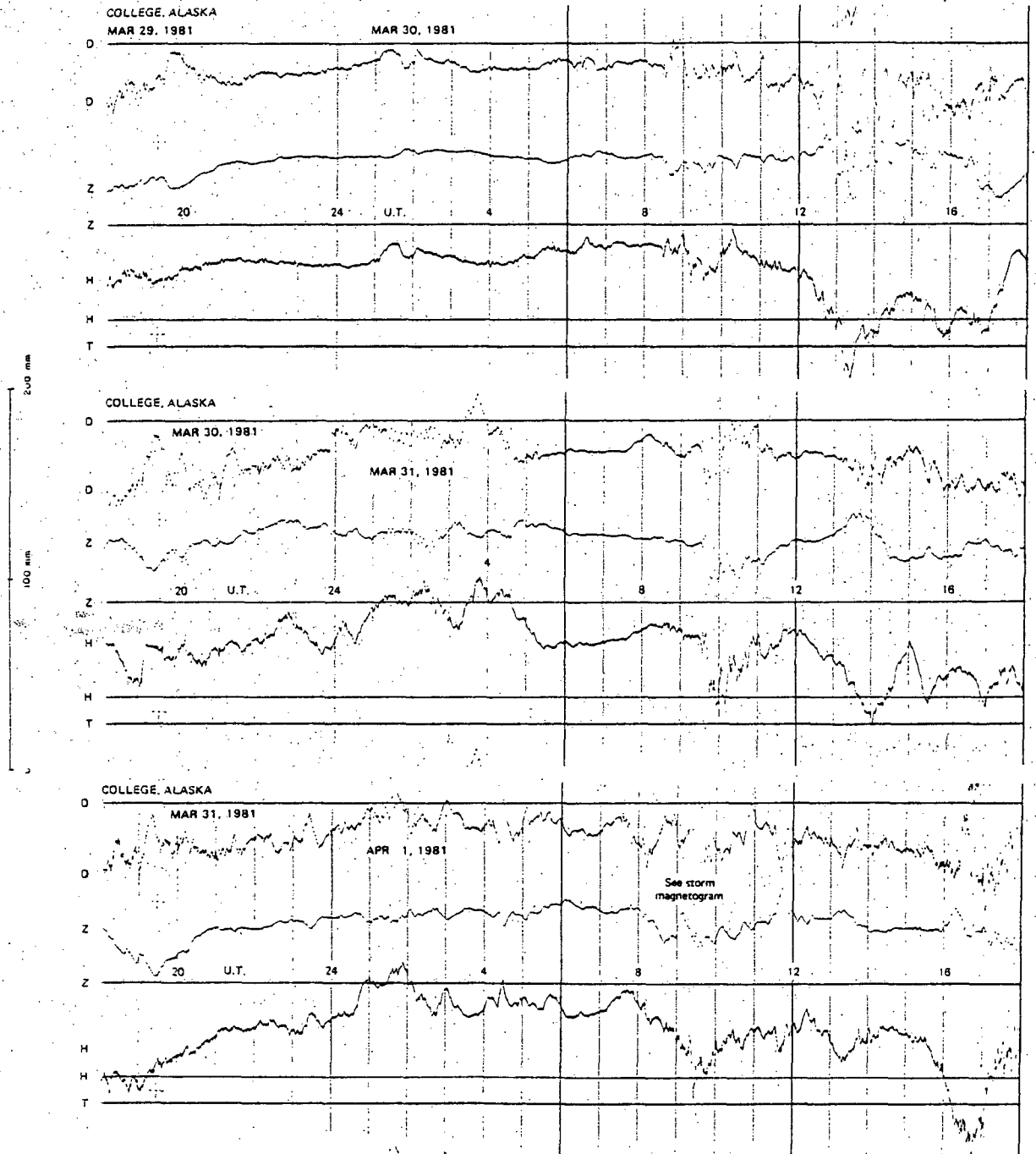


COLLEGE, ALASKA
MAR 28, 1981

MAR 29, 1981

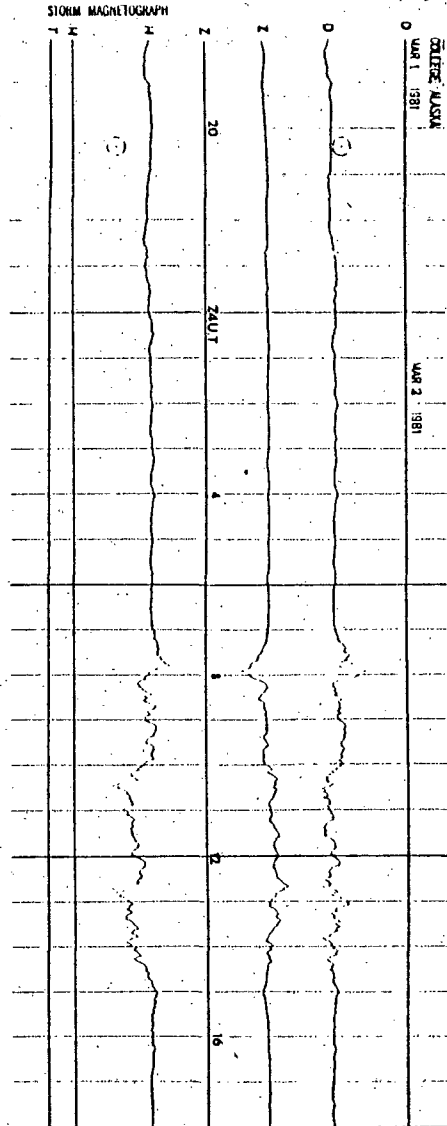
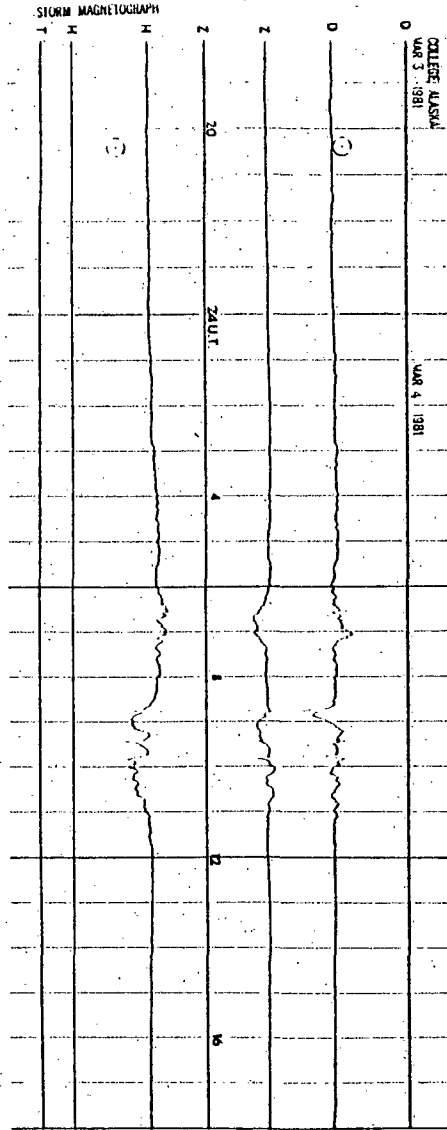
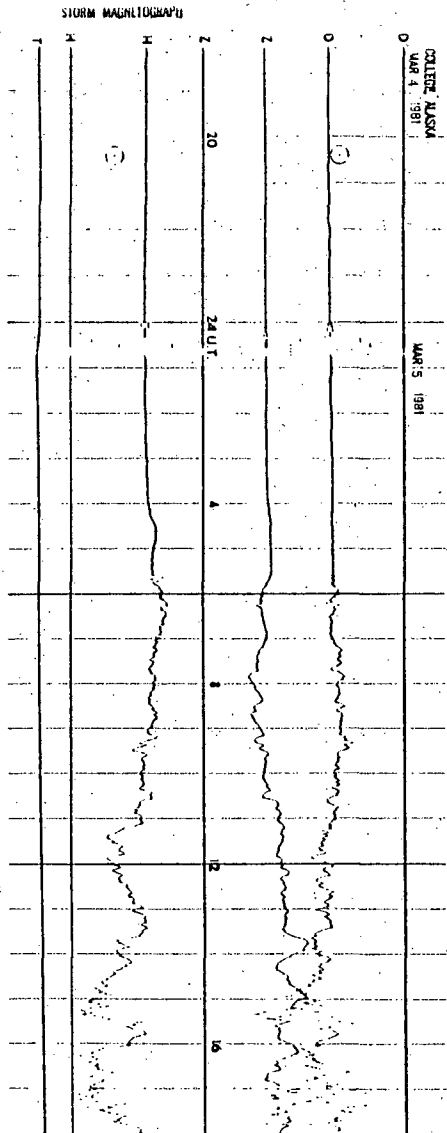
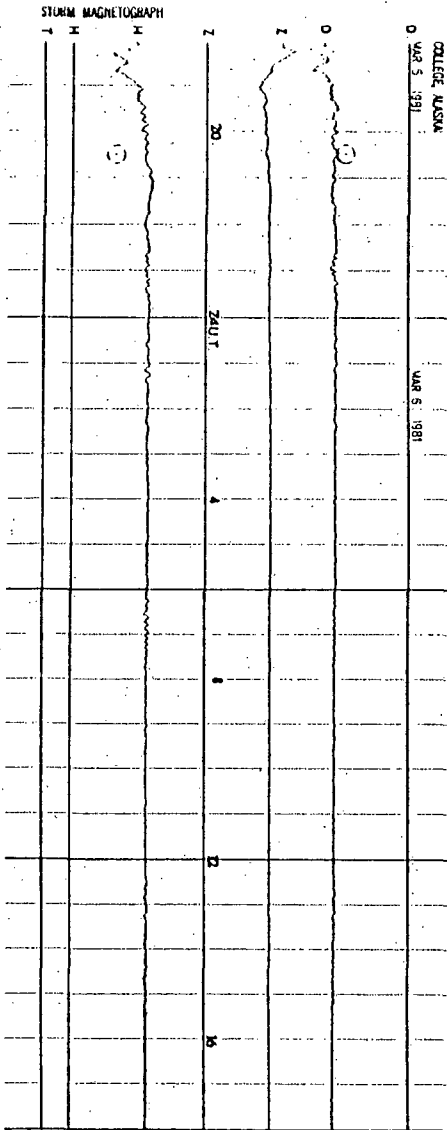


NORMAL MAGNETOGRAMS



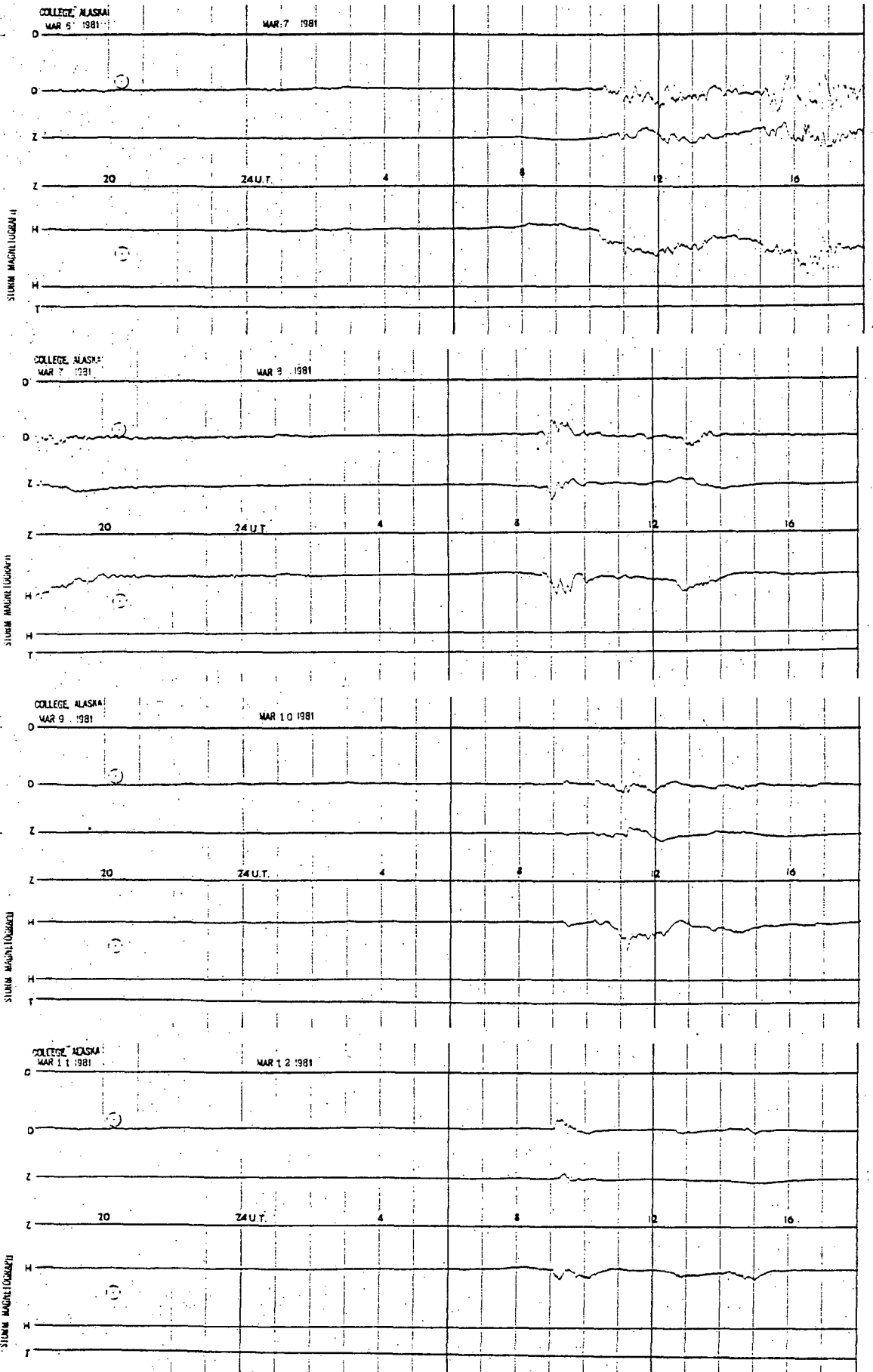
STORM MAGNETOGRAMS

0 100 mm 200 mm

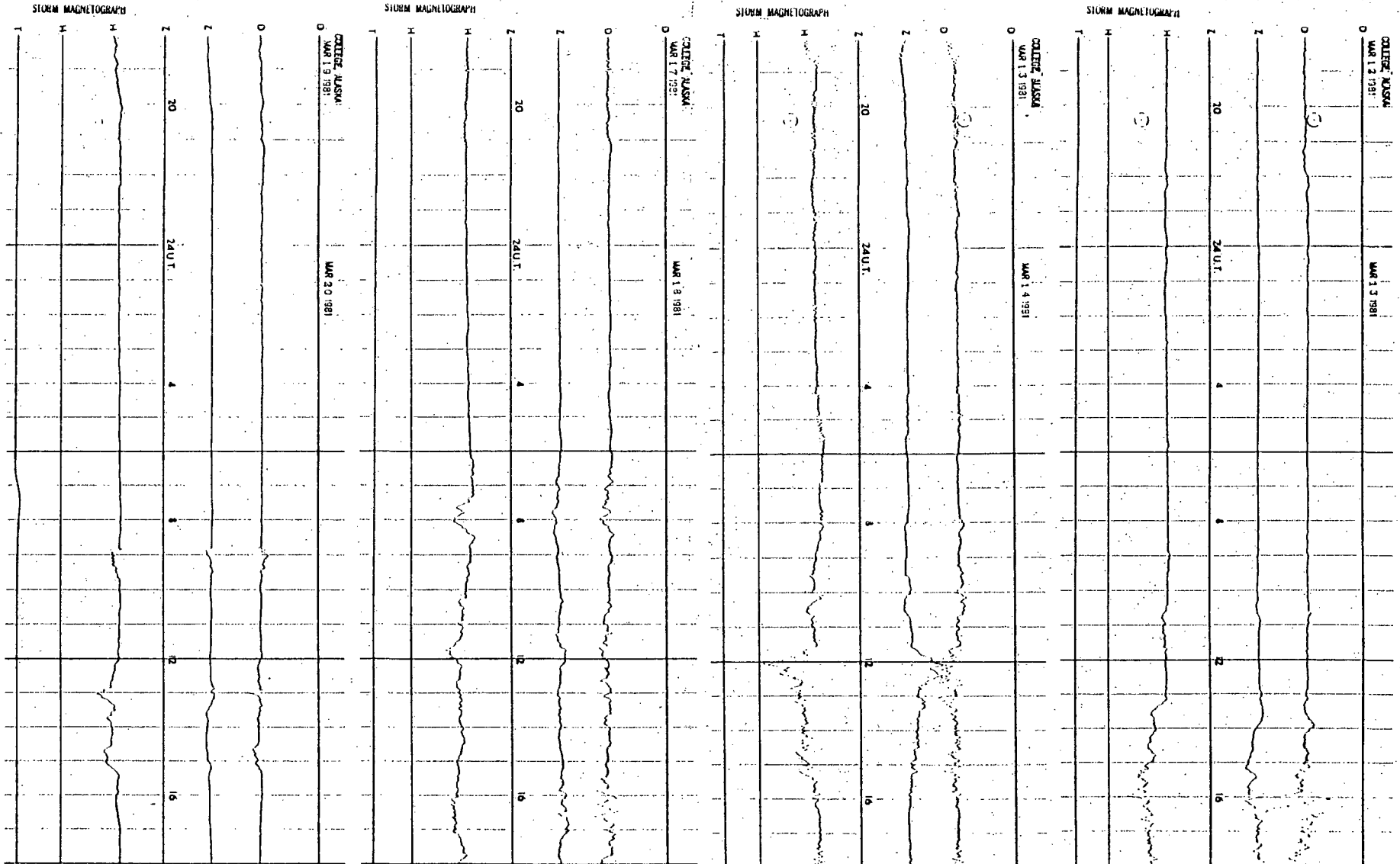
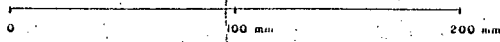


STORM MAGNETOGRAMS

200 mm
100 mm
0



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

200 mm
100 mm
0

