

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

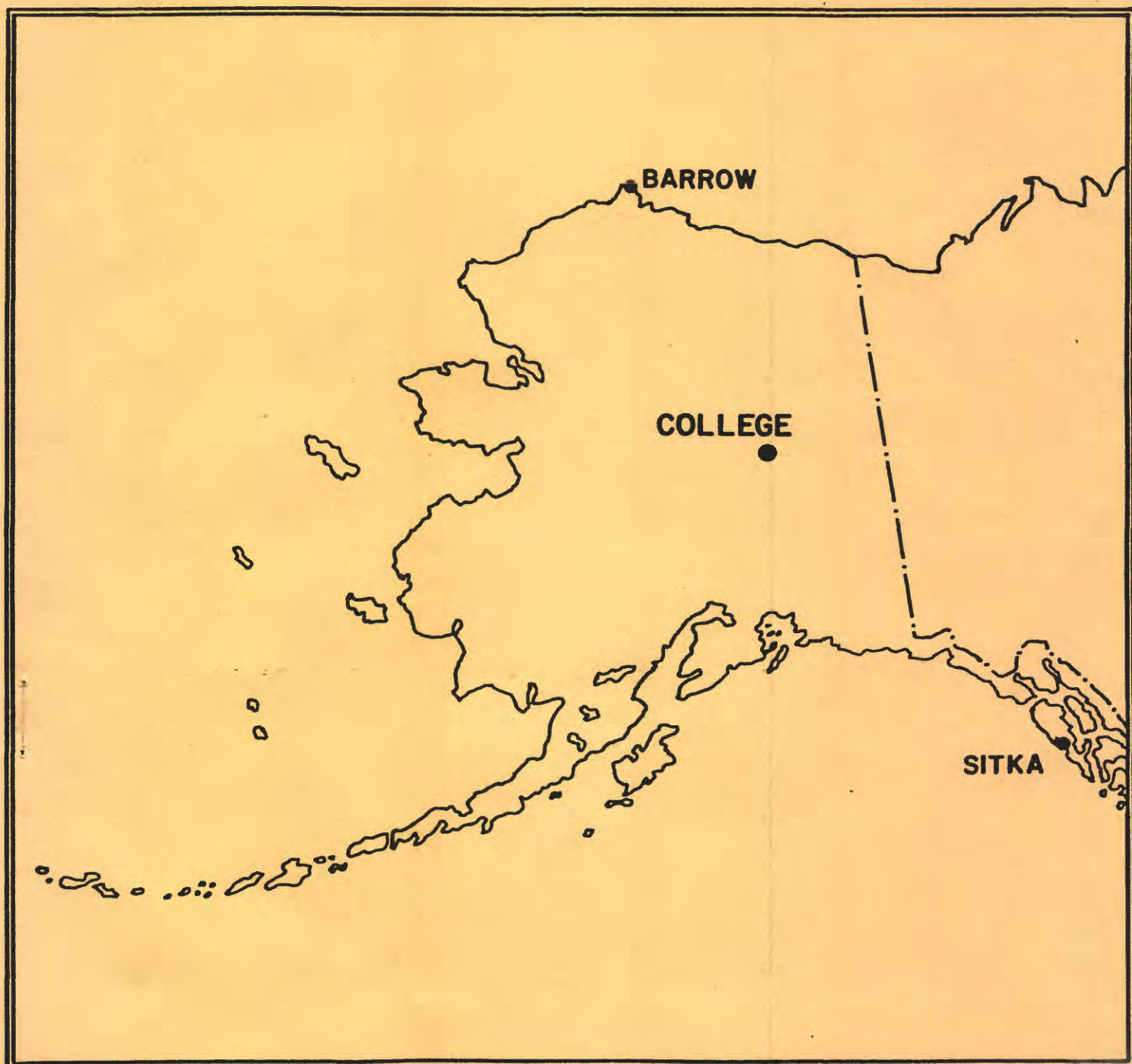
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

JANUARY 1984

OPEN FILE REPORT 84-0300A



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: J.E. PAPP, E.A. SAUTER, L.Y. TORRENCE, P.A. FRANKLIN 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

Outstanding Magnetic Effects

Principal Magnetic Storms

Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings

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 99701

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

World Data Center A
NOAA D63, 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 latitude..... $64^{\circ}51.6'N$
Geographic longitude..... $147^{\circ}50.2'W$
Geomagnetic latitude..... $+64.6^{\circ}$
Geomagnetic longitude..... $+256.5^{\circ}$
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 and 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.

NOAA FORM 76-133 (9-72) <div style="text-align: center; margin-top: 5px;"> U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION </div> <div style="text-align: center; margin-top: 10px;"> MAGNETIC ACTIVITY (Greenwich civil time, counted from midnight to midnight) </div>	OBSERVATORY <div style="text-align: center; margin-top: 5px;"> COLLEGE, ALASKA </div> <div style="margin-top: 5px;"> MONTH AND YEAR <div style="text-align: center;">JANUARY 1984</div> </div>
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DATE	K-INDICES								AK	TIME SCALE ON MAGNETOGRAMS
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24		
								SUM		20 mm/hr
1	4	3	6	4	6	5	5	3	36	43
2	3	4	4	6	6	4	1	1	29	33
3	2	2	5	4	7	6	3	2	31	41
4	3	4	6	6	4	4	4	3	34	37
5	4	4	5	4	6	3	3	2	31	31
6	3	2	3	6	5	5	1	1	26	27
7	1	0	1	3	1	2	0	0	08	04
8	0	0	2	1	0	1	0	0	04	02
9	0	0	0	3	1	0	0	0	04	02
10	1	1	0	1	3	3	5	3	17	13
11	2	2	2	3	2	2	3	2	18	09
12	2	2	2	2	1	3	0	0	12	06
13	0	1	0	1	6	6	2	2	18	23
14	1	0	0	1	4	1	1	1	09	05
15	1	0	3	0	3	3	0	0	10	06
16	0	1	1	0	3	4	2	0	11	07
17	2	2	2	2	2	0	0	0	10	04
18	0	0	0	3	2	0	2	2	09	05
19	4	4	4	6	4	4	1	2	29	28
20	3	1	1	5	1	1	0	0	12	09
21	1	1	4	5	1	0	1	1	14	11
22	2	2	2	3	4	3	1	1	18	11
23	1	1	0	0	2	3	1	1	09	04
24	1	1	1	0	0	0	0	0	03	01
25	0	0	3	4	3	3	3	1	17	11
26	3	4	5	4	5	5	3	2	31	29
27	1	1	1	2	4	3	1	1	14	08
28	2	3	3	6	6	6	3	3	32	38
29	3	3	4	6	5	2	2	2	27	26
30	3	4	3	6	5	6	4	4	35	40
31	3	2	2	6	6	6	4	3	32	39

K SCALE USED: LOWER LIMIT FOR K = 9..... CURRENT SCALE VALUE..... LOWER LIMIT FOR K = 9	D 675.7 3.72 2510	H 322.2 7.76 2500	Z	(mm) (γ/mm) (to nearest 10γ)
SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.				
APPROVED <u>JOHN B. TOWNSHEND, CHIEF, COLLEGE OBSERVATORY</u> OBSERVER IN CHARGE				

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY COLLEGE, ALASKA	
			MONTH JANUARY	YEAR 1984
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
13	20xx	pc5		
15	07xx	bp		
22	2340	si*		
IDENTIFIED BY: JEP			VERIFIED BY: EAS	

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

PRINCIPAL MAGNETIC STORMS
Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA
JANUARY 19 84WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80502 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(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	Z(Y)	day	hr
C0	64.6 N	03	07xx	..	..	..	..	03	5	7	174	1520	800	06	18
		28	09xx	..	..	..	..	28	4,5,6	6	148	1390	620	FEB 01	21
								29	4	6					
								30	4,6	6					
								31	4,5,6	6					
								FEB 01	4	6					

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 1-1-84	2400 U.T., 1-31-84	1.0/mm	3.78/mm	27° 16.8 E
H	0000 U.T., 1-1-84	2400 U.T., 1-10-84	7.88/mm		126588
	0000 U.T., 1-11-84	2400 U.T., 1-18-84	"		126668
	0000 U.T., 1-19-84	2400 U.T., 1-31-84	"		126578
Z	0000 U.T., 1-1-84	2400 U.T., 1-10-84	7.68/mm		551848
	0000 U.T., 1-11-84	2400 U.T., 1-18-84	"		551788
	0000 U.T., 1-19-84	2400 U.T., 1-31-84	"		551858

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 1-1-84	2400 U.T., 1-31-84	7.9/mm	29.68/mm	24° 23.7 E
H	0000 U.T., 1-1-84	2400 U.T., 1-10-84	43.98/mm		107748
	0000 U.T., 1-11-84	2400 U.T., 1-18-84	"		107888
	0000 U.T., 1-19-84	2400 U.T., 1-31-84	"		107668
Z	0000 U.T., 1-1-84	2400 U.T., 1-10-84	48.08/mm		540768
	0000 U.T., 1-11-84	2400 U.T., 1-18-84	"		540828
	0000 U.T., 1-19-84	2400 U.T., 1-31-84	"		540748

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 46.8 E	129358	553658

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: JAN 7, 8, 9, 12, 14, 15, 17, 18, 23, 24

MAGNETOGRAM HOURLY SCALINGS

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (150 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		O		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	257	282	254	266	217	281	338	410	188	188	255	262	242	01	441	537	497	371	356	254	336	209	165	257	280	274	274	7229	02	286	294	334	385	341	326	380	412	340	329	304	119	02	240	642	443	355	332	349	326	320	326	323	308	8154	03	307	320	317	347	343	322	330	411	380	320	320	320	03	378	426	531	587	576	447	338	335	288	290	284	268	8746	04	288	302	258	280	324	300	315	126	40	142	255	287	04	245	340	360	365	402	343	302	232	62	148	260	249	6145	05	265	292	286	417	312	330	369	374	371	306	291	314	05	420	873	410	299	325	346	362	334	313	294	303	305	8684	06	294	312	298	316	338	328	324	342	322	245	166	282	06	341	366	457	299	346	345	346	324	319	313	298	7667	07	292	313	322	317	314	325	333	334	349	412	328	345	07	329	322	346	316	324	339	341	342	338	339	320	309	7949	08	311	321	321	321	327	316	347	325	335	335	334	338	338	08	335	334	338	338	341	348	353	359	349	342	335	322	7997	09	320	323	323	322	309	320	317	317	323	334	335	344	09	320	349	340	339	332	333	344	348	353	359	349	342	335	322	7997	10	303	310	297	292	278	317	328	329	331	333	330	335	10	386	435	432	384	362	401	375	359	369	343	272	275	8176	11	261	308	290	274	277	287	314	317	285	321	286	300	11	360	329	326	340	347	359	353	349	272	263	295	287	7400	12	258	285	303	194	278	285	304	306	354	290	288	314	12	319	347	336	346	343	340	359	352	336	326	315	288	7566	13	300	315	302	303	308	303	314	321	320	316	317	332	13	374	407	566	853	409	353	372	340	324	304	313	298	8664	14	279	290	291	297	293	307	328	332	333	329	324	325	14	330	323	334	335	326	331	344	355	315	282	290	273	7566	15	301	298	290	312	318	320	295	376	293	312	318	322	15	330	332	334	360	334	350	370	351	333	321	316	284	7770	16	280	298	299	293	257	260	309	308	338	333	320	320	16	329	346	349	415	408	376	415	367	332	313	299	288	7882	17	266	278	255	252	293	302	313	288	342	287	318	323	17	349	353	346	359	366	365	360	339	320	307	300	300	7581	18	302	303	305	315	325	322	327	327	322	334	308	356	18	328	317	330	309	343	358	370	344	344	308	302	317	7816	19	224	195	230	222	239	290	322	361	321	290	413	410	19	422	432	413	328	324	346	359	357	330	294	275	253	7650	20	269	307	314	313	336	328	331	327	323	323	304	312	20	328	333	321	315	347	343	340	337	335	337	327	308	7877	21	300	299	301	293	300	339	286	336	329	625	465	303	21	290	313	317	317	327	335	353	357	349	313	292	299	8108	22	198	275	275	277	311	327	317	370	312	377	397	300	22	353	335	353	337	353	367	340	353	308	298	290	287	7800	23	277	298	297	309	313	319	327	326	324	317	320	328	23	323	337	353	353	338	340	362	345	318	279	273	275	7651	24	283	271	270	315	323	321	323	326	321	323	323	323	24	322	325	325	323	327	333	340	348	341	336	329	315	7690	25	305	307	299	304	300	298	249	242	252	293	324	317	25	342	410	390	339	360	374	335	386	343	320	284	254	7627	26	233	252	270	274	200	278	186	300	302	270	267	307	26	340	430	469	545	533	346	350	349	344	312	274	278	7709	27	290	293	285	280	297	299	309	315	304	317	327	323	27	345	348	387	383	407	323	393	378	337	323	262	237	7762	28	253	237	263	283	248	219	288	303	319	344	318	440	28	350	363	535	548	424	359	313	321	281	235	262	301	7797	29	277	302	299	285	257	293	319	384	408	308	496	447	29	450	374	362	323	313	338	347	359	330	344	310	265	8190	30	278	196	195	289	327	381	307	318	372	33	289	372	30	369	377	456	543	472	385	260	297	286	224	271	265	7942	31	300	313	310	306	318	366	315	318	442	411	316	297	31	575	528	702	599	766	447	173	249	300	286	296	320	9253

SCALED BY: LYT

CHECKED BY: JEP

MON. RE. VIEWED BY: JEP

PUNCHED BY:

MONTHLY SUM: 243952

MONTHLY MEAN: 328

DATES WITH GAPS:

() Interpolated

() Significant portion of line interpolated.

() No record, or no value available because of faulty record.

() 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.

* Derived from STORM Mph., converted to Normal Mph.

FORM 74-106

MAGNETOGRAM HOURLY SCALINGS
 (UNIVERSAL TIME)

U.S. DEPARTMENT OF INTERIOR
 Geological Survey, Geologic Division
 Washington, D.C. 20508

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight, Hour 01 of local day (120 M.T.) is hour 11 of the same universal day.
 Shrinkage corrections have been applied. Negative values are in red, with minus sign above.

OBSV. _____
 CO _____
 YEAR 84
 MONTH JAN
 DAY 24

C	Q	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	SUM
01	404	426	468	576	568	465	582	293	362	306	111	216	01	-78	-209	106	365	321	180	76	166	232	349	384	377	7246
02	353	334	374	489	435	360	446	548	447	369	306	75	02	176	-91	-193	320	385	363	362	360	354	361	362	354	7649
03	349	334	353	371	368	369	379	400	169	303	215	194	03	273	218	448	367	79	186	345	341	378	362	366	362	5959
04	358	362	389	446	419	488	579	582	497	548	390	271	04	355	364	318	276	298	347	325	270	213	307	349	379	8774
05	357	419	446	472	381	382	411	424	372	347	256	256	05	329	-63	278	357	365	359	364	336	356	352	329	326	7590
06	370	356	378	372	366	379	392	389	396	-63	121	354	06	349	275	108	142	341	389	368	357	341	327	351	348	7506
07	358	360	364	357	345	351	370	360	358	351	298	327	07	334	350	329	331	358	362	353	348	350	344	339	333	8330
08	346	350	355	359	360	356	359	350	351	349	349	351	08	349	339	344	357	356	367	361	360	355	353	350	349	8475
09	349	352	353	359	359	355	357	359	353	353	329	257	09	353	361	362	363	362	367	369	368	366	359	353	349	8473
10	353	360	370	365	369	369	369	369	368	367	360	357	10	319	267	230	332	371	341	38	277	296	339	357	345	8554
11	386	353	358	374	375	398	382	373	396	404	382	354	11	326	351	343	336	349	322	318	347	351	347	339	343	8604
12	346	357	371	366	385	396	390	393	416	384	361	355	12	344	327	342	337	318	318	361	357	351	347	339	343	7309
13	361	353	358	353	351	369	370	367	371	367	363	355	13	302	256	-43	-308	307	383	373	359	357	347	329	319	8205
14	348	358	358	359	351	355	363	360	360	349	343	332	14	214	360	351	333	347	333	343	329	349	339	342	339	8442
15	345	357	357	349	347	359	371	445	422	349	343	344	15	340	334	287	331	322	364	349	352	350	346	338	341	8015
16	347	356	360	364	375	368	357	365	356	350	348	347	16	347	330	245	176	282	245	327	360	359	352	348	347	8674
17	348	353	350	425	397	374	360	391	400	424	363	361	17	330	340	354	341	340	340	340	343	310	359	351	350	8577
18	352	359	360	359	360	360	359	358	355	379	404	424	18	382	368	353	352	350	344	303	313	362	358	337	326	7704
19	318	410	444	441	498	590	480	416	440	293	250	-104	19	32	60	91	256	354	373	353	350	357	340	330	332	8043
20	354	347	353	358	343	361	359	350	340	303	90	288	20	371	352	350	338	343	359	351	353	352	343	345	340	8244
21	345	343	350	355	360	348	377	507	420	136	134	368	21	380	367	355	356	352	360	329	339	341	340	341	341	8255
22	329	367	350	391	374	359	373	385	381	306	302	374	22	323	238	216	289	369	350	376	370	361	365	354	353	8409
23	342	350	364	363	363	360	365	369	357	357	352	353	23	360	343	338	263	294	356	379	370	350	359	353	347	8775
24	352	369	387	384	370	370	361	370	363	361	359	358	24	361	367	368	369	368	369	369	368	362	360	357	353	8608
25	360	370	376	380	380	384	397	430	567	482	380	215	25	270	260	330	337	322	243	343	389	363	339	348	343	8703
26	333	369	438	411	500	568	607	590	529	423	435	405	26	339	142	97	82	47	158	377	398	371	370	345	369	8738
27	350	353	361	356	352	362	372	367	370	363	347	334	27	302	276	132	222	278	334	346	357	354	351	347	352	7938
28	347	368	373	391	428	479	505	439	410	327	-140	163	28	359	349	177	304	-4	383	402	380	358	348	351	381	7270
29	363	362	380	370	422	397	387	485	384	260	-35	335	29	32	222	350	371	356	367	372	363	355	359	329	330	7806
30	352	462	399	358	504	428	389	438	410	165	-12	-41	30	-84	32	1	1	236	419	300	302	300	357	376	362	5462
31	369	362	359	359	374	375	381	378	400	378	322	18	31	326	369	-179	69	-157	-281	347	331	384	371	363	342	5070
SCALED BY	L Y T																								MONTHLY SUM	244645
CHECKED BY	JEP																								MONTHLY MEAN	329
SIGNED BY	JEP																								DATES WITH GAPS:	
PUNCHED BY																										

() Interpolated

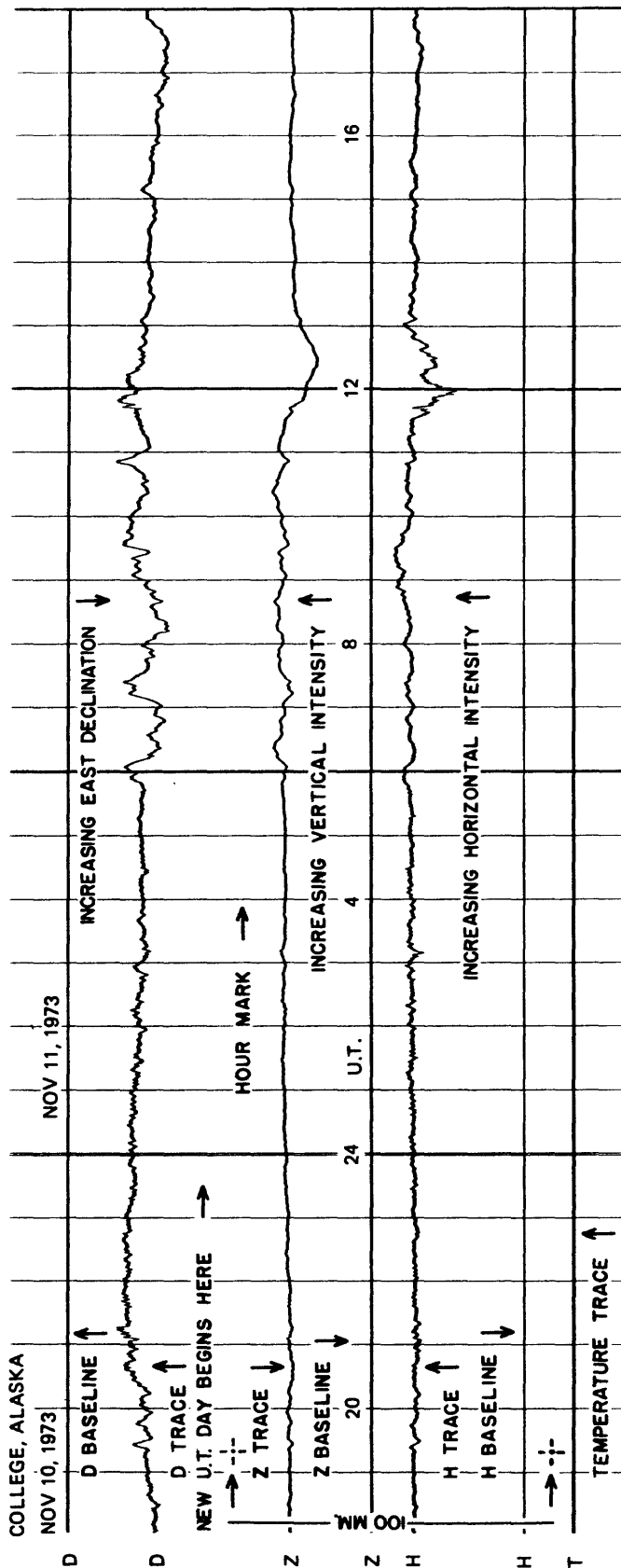
() Significant portion of hour interpolated.

<> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.

☐ No record or no value available because of faulty record.

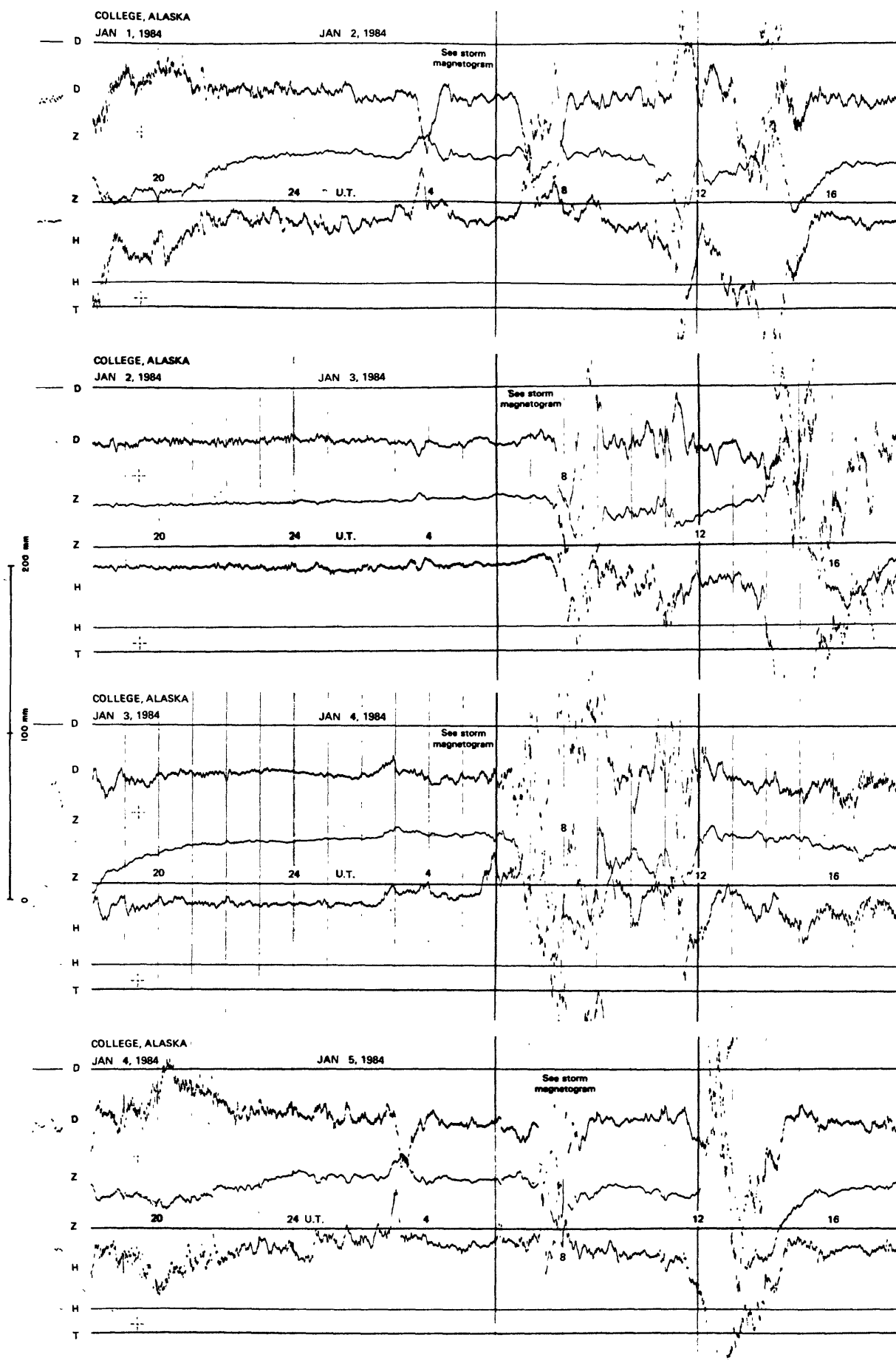
* Derived from STORM Meph., converted to Normal Meph.

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

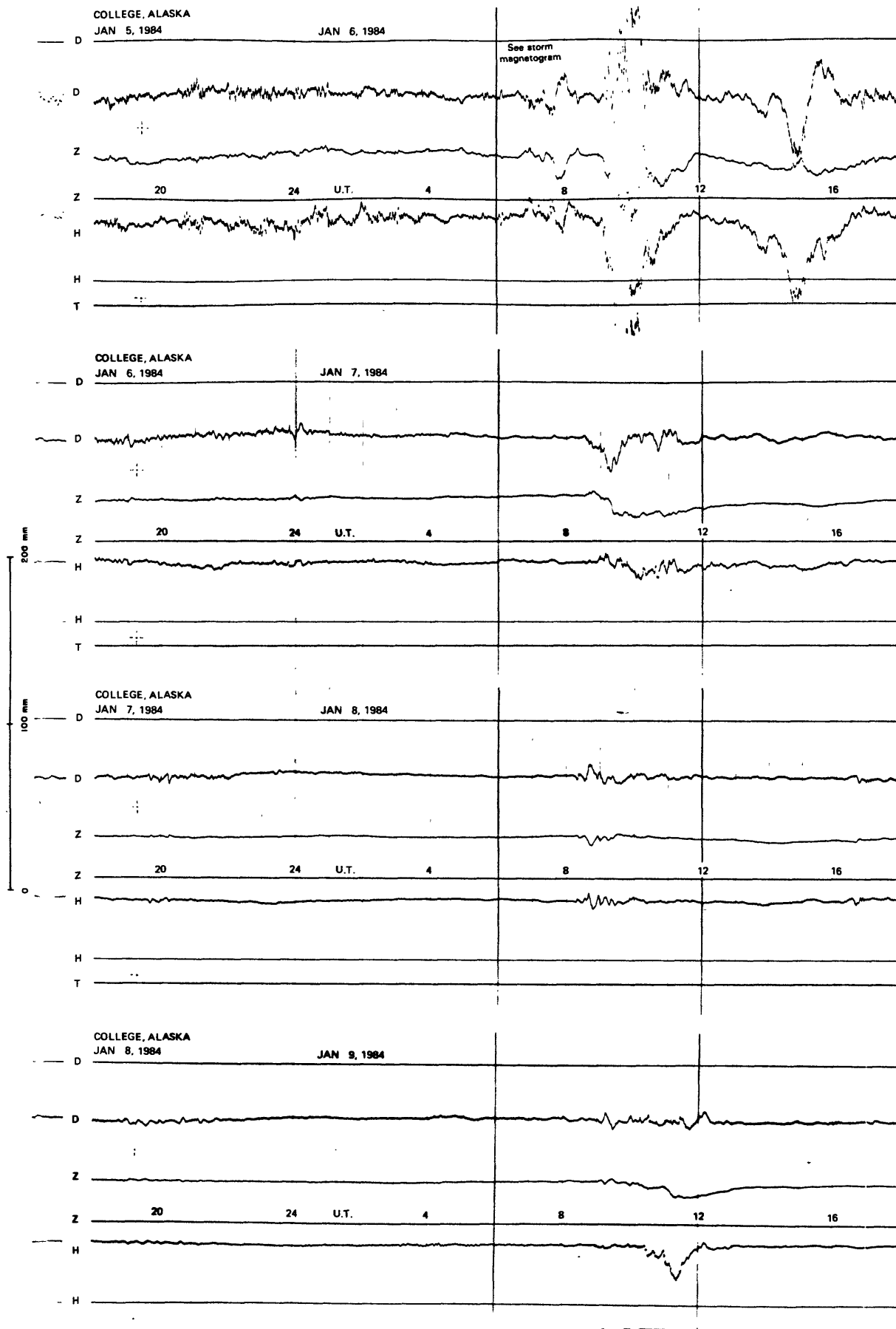


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

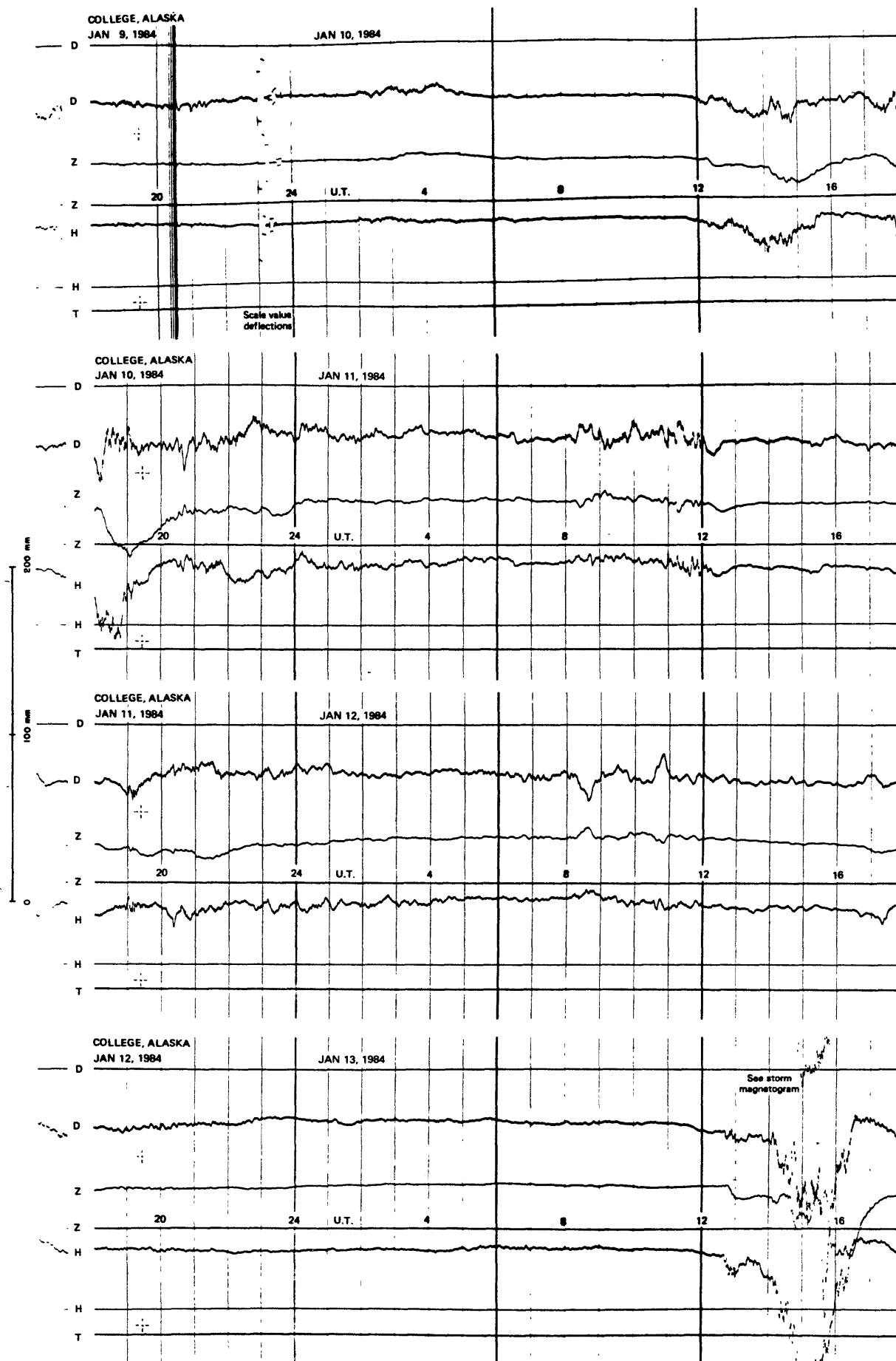
NORMAL MAGNETOGRAMS



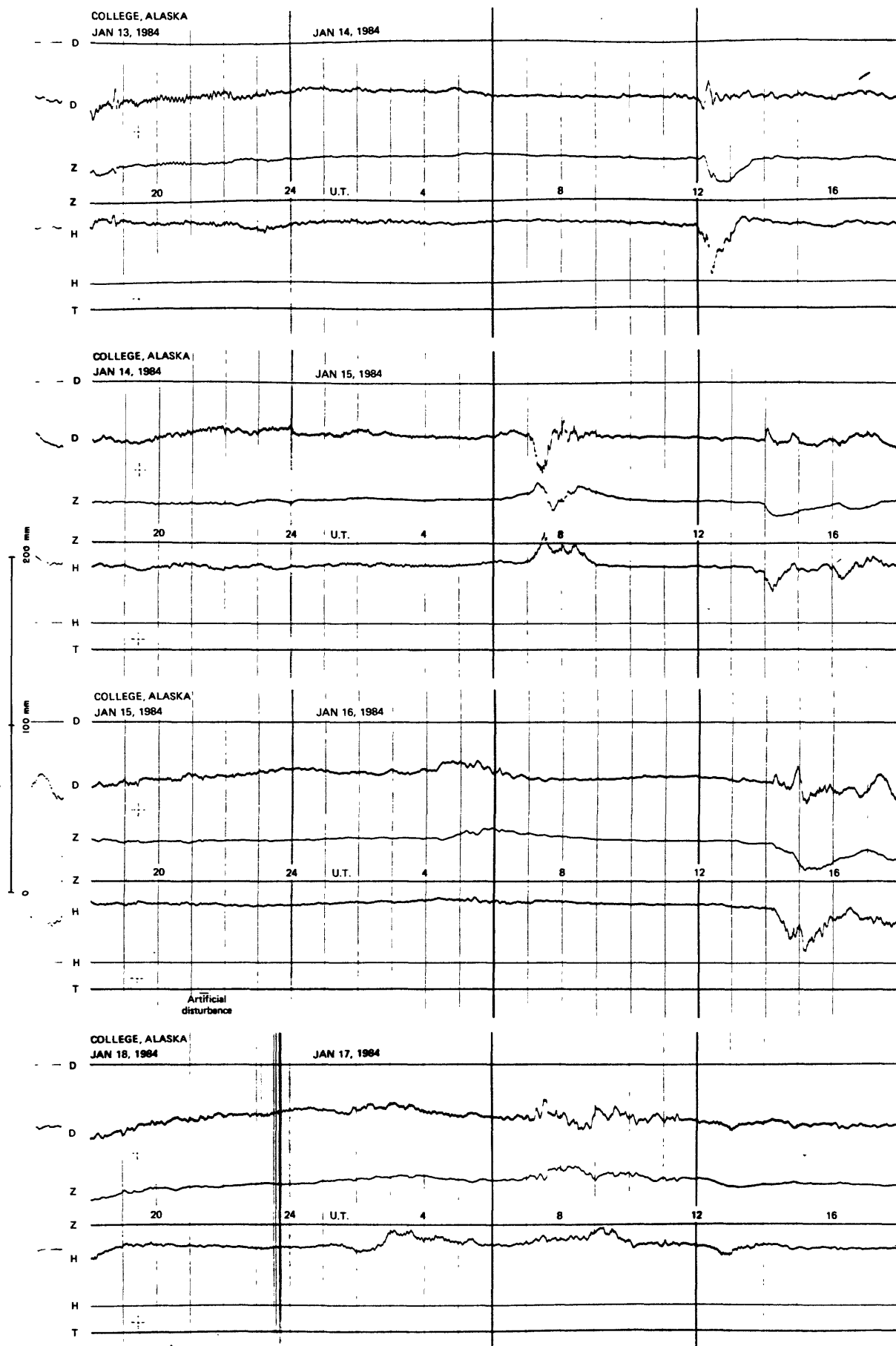
NORMAL MAGNETOGRAMS



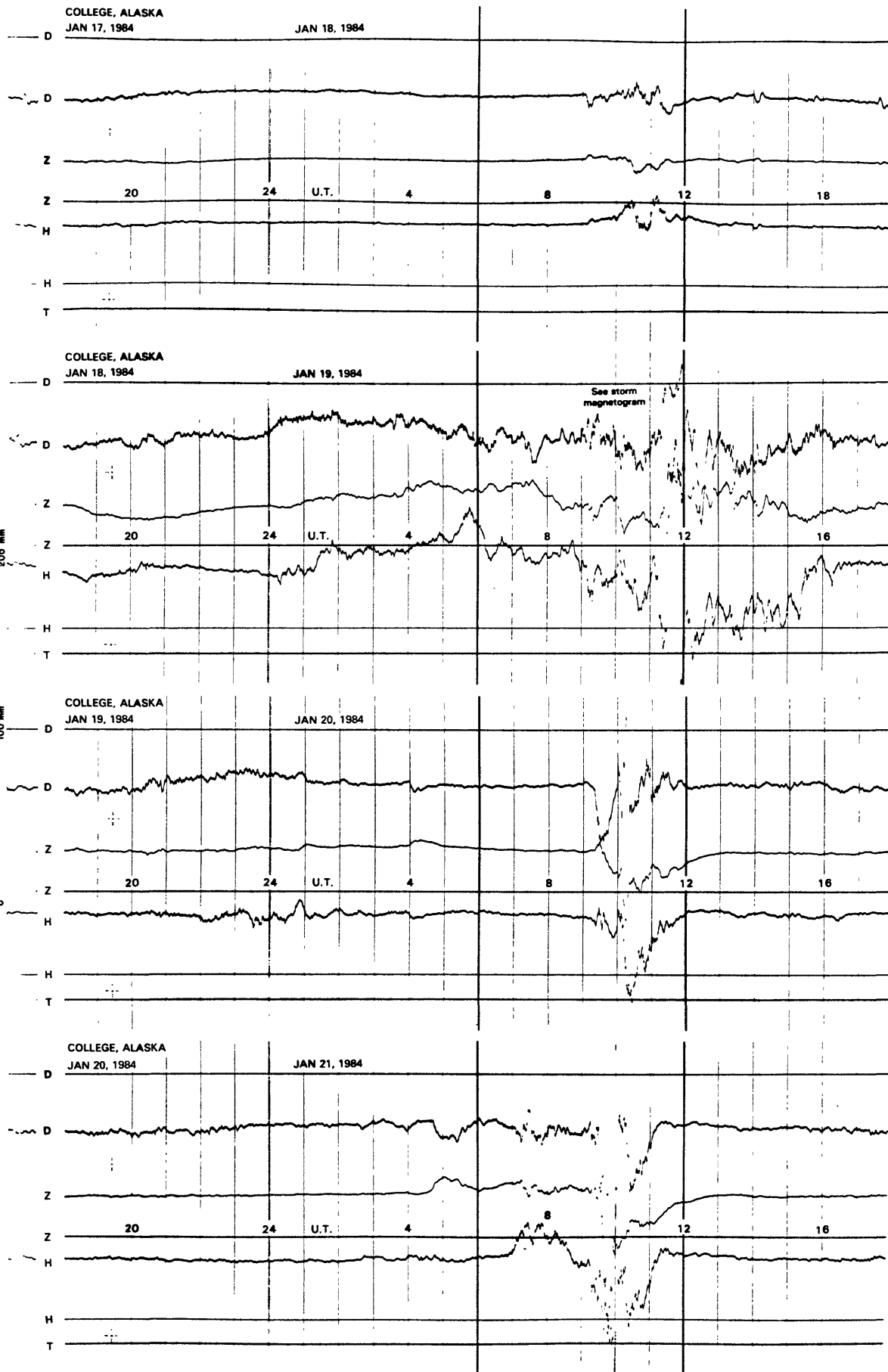
NORMAL MAGNETOGRAMS



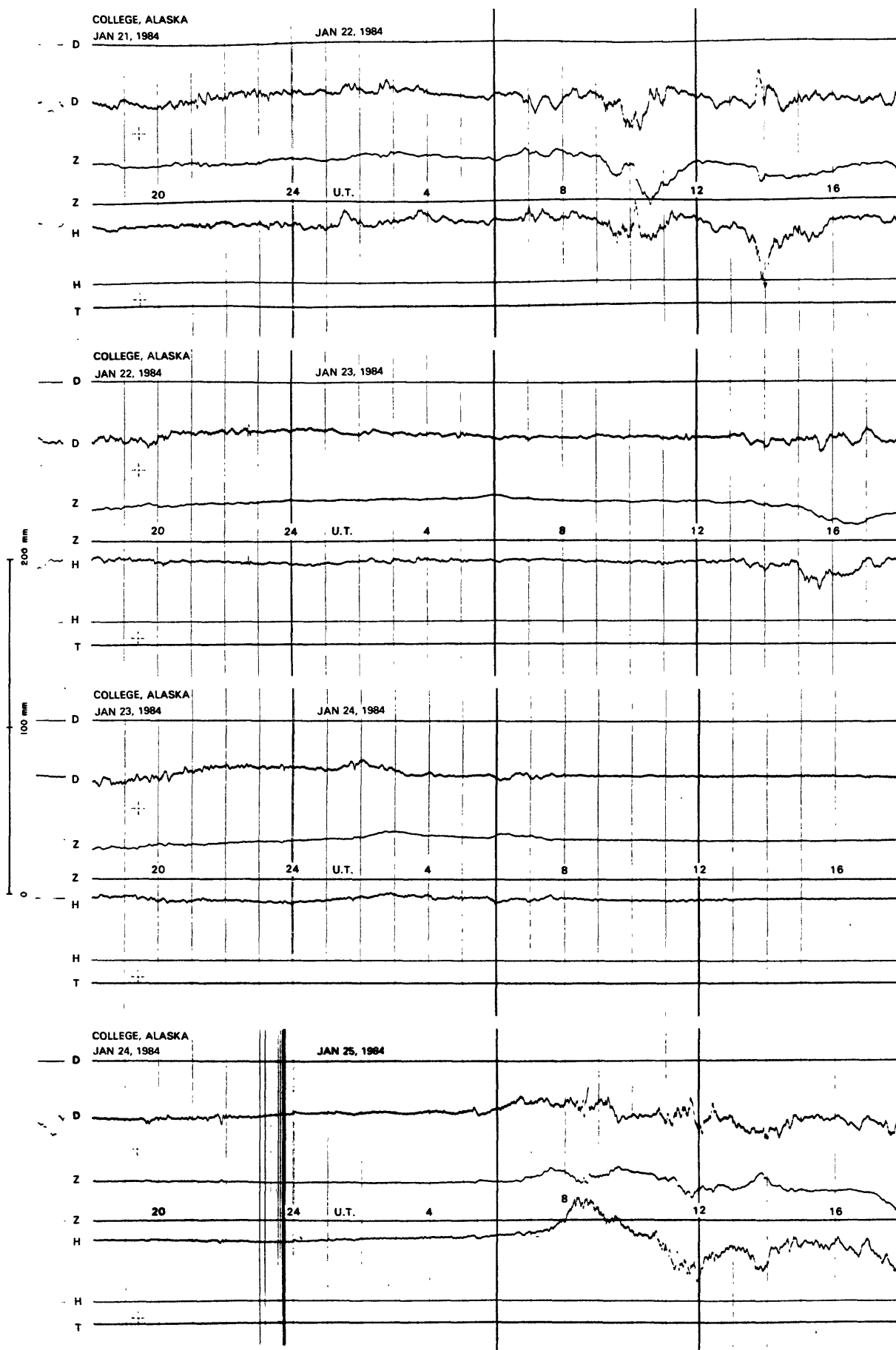
NORMAL MAGNETOGRAMS



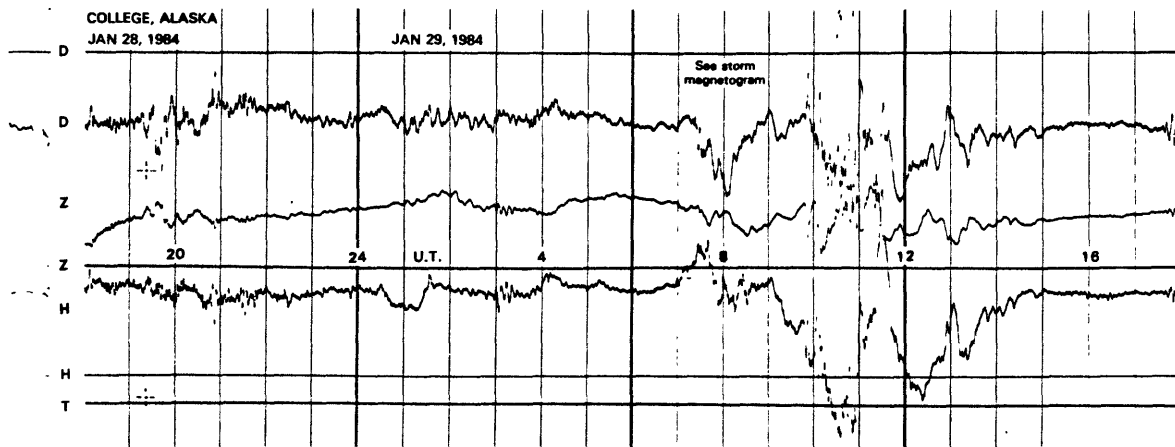
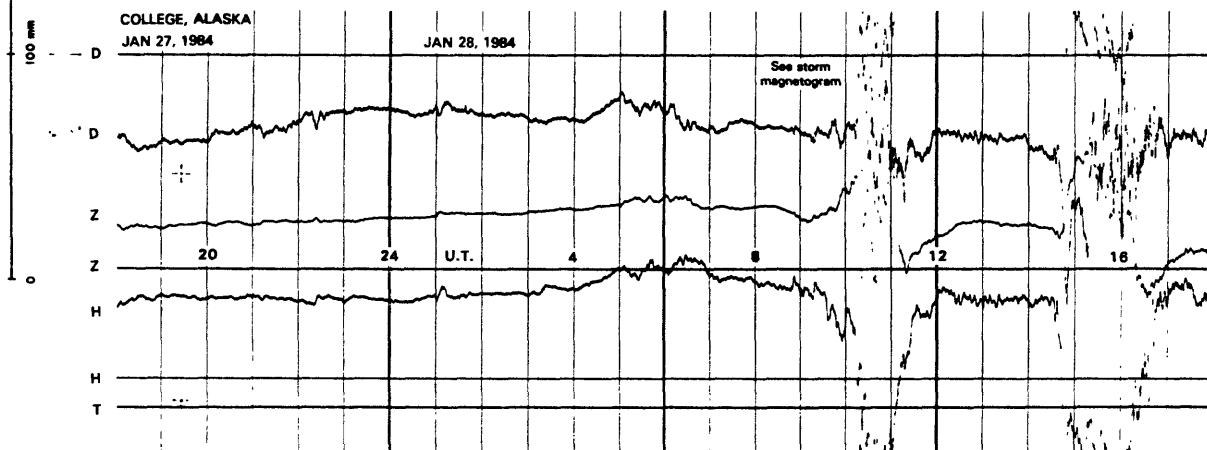
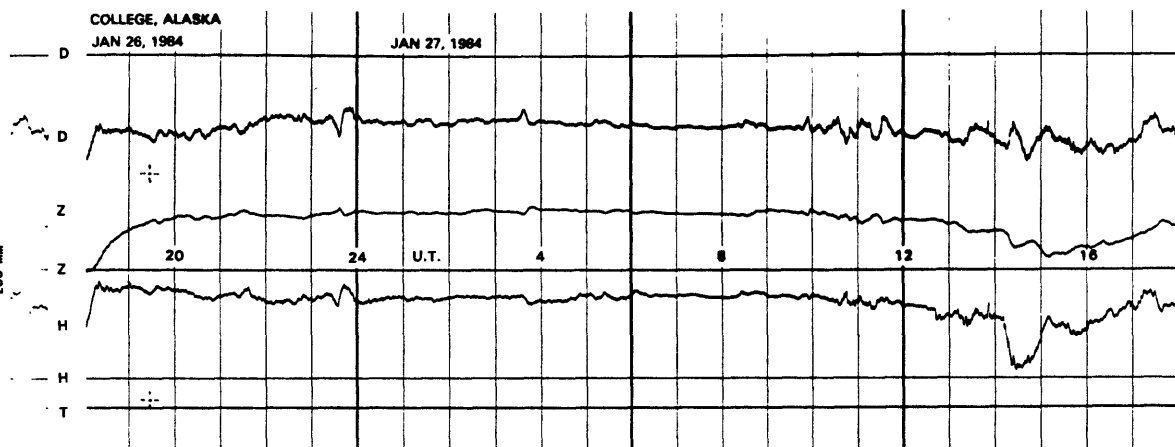
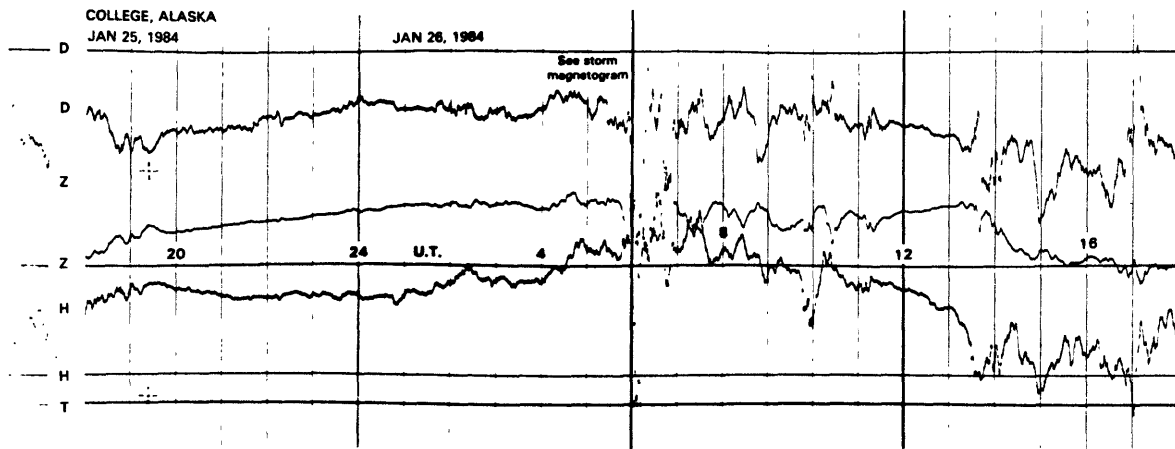
NORMAL MAGNETOGRAMS



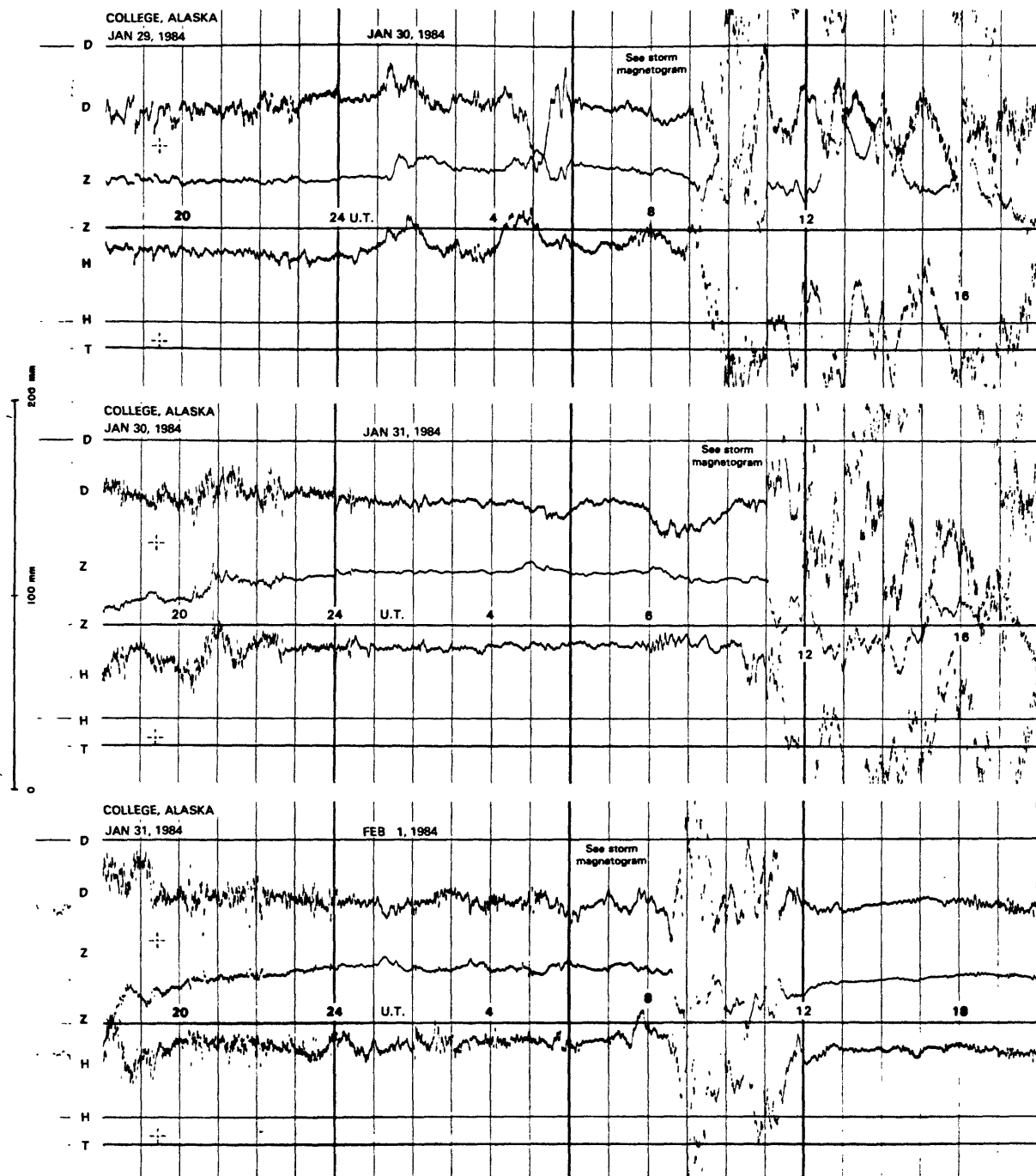
NORMAL MAGNETOGRAMS



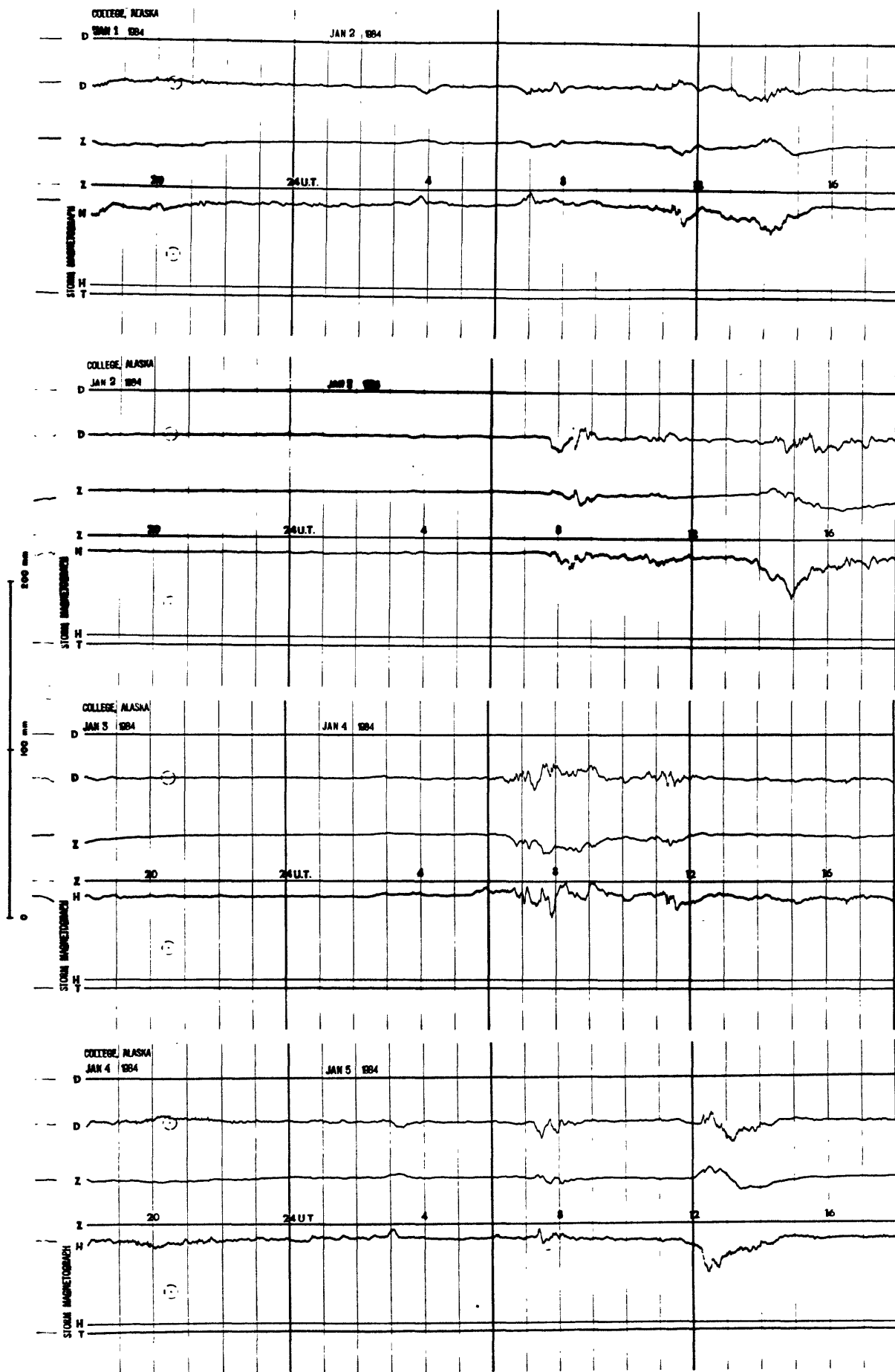
NORMAL MAGNETOGRAMS



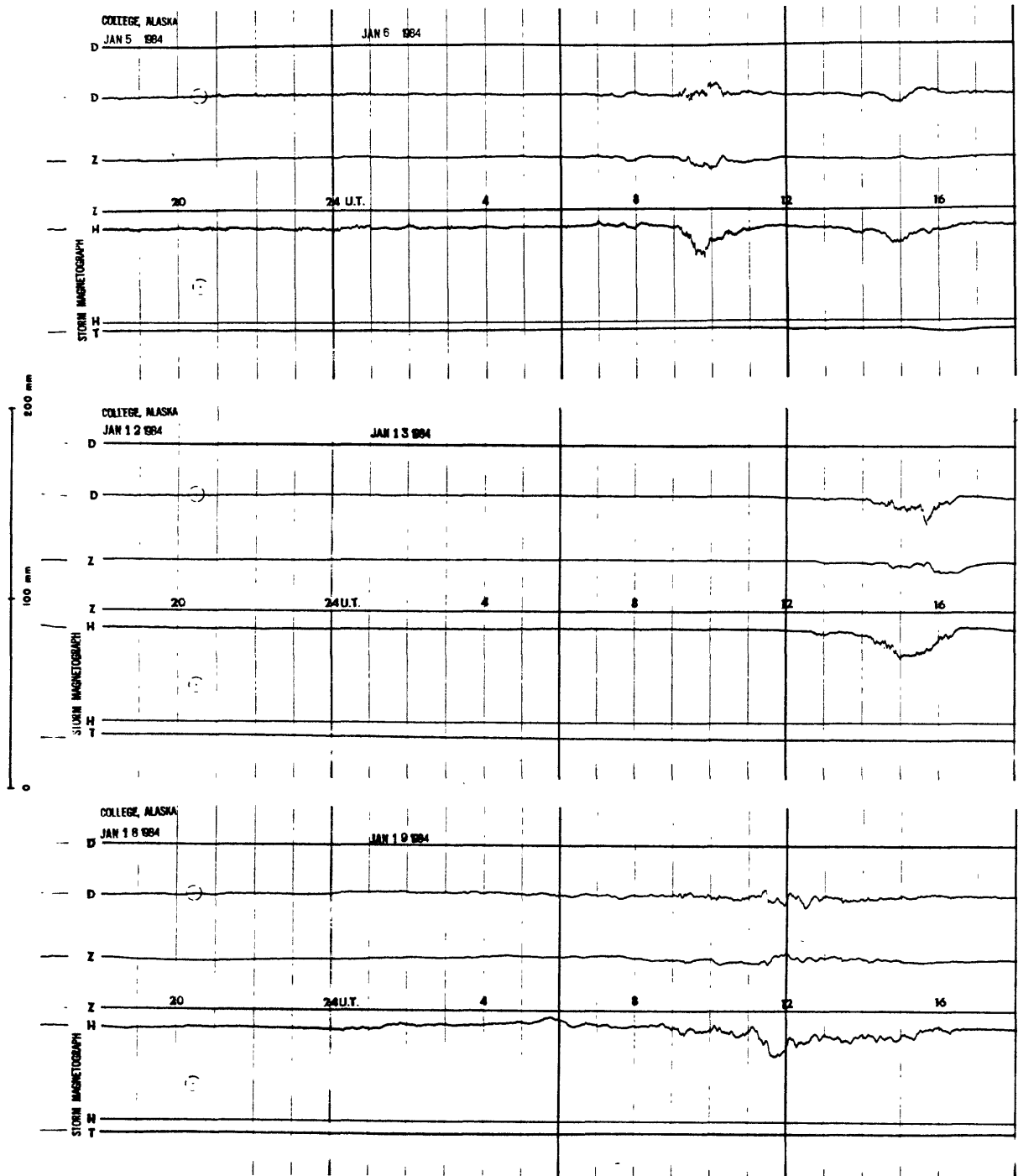
NORMAL MAGNETOGRAMS



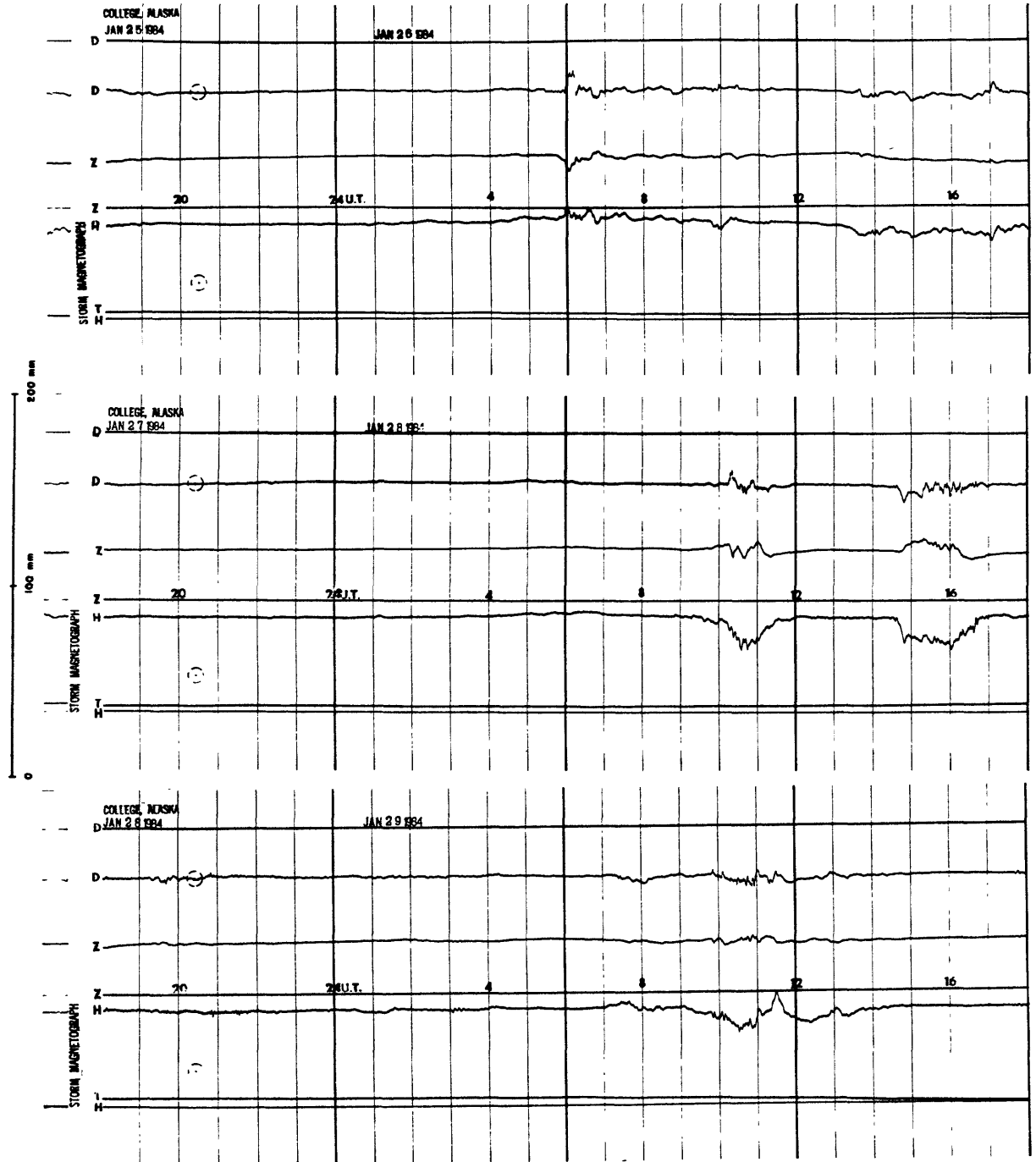
STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

