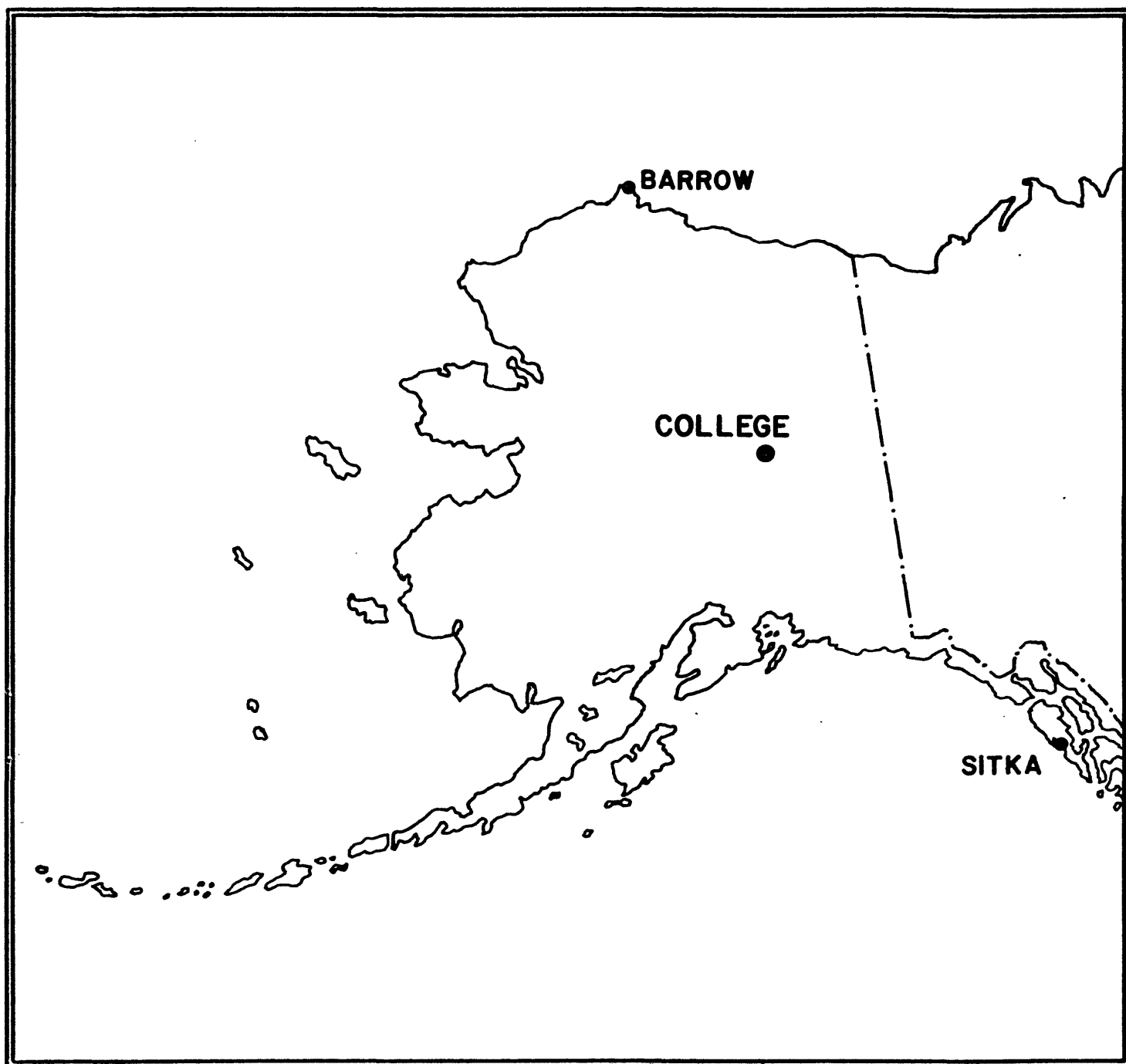


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

JANUARY 1985

OPEN FILE REPORT 85-0300A



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.

COLLEGE, ALASKA

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

JANUARY 1985

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	3	3	4	6	5	5	5	4	35	39	SUDDEN COMMENCEMENTS		
2	3	2	3	5	4	3	3	3	26	20	d	h	m
3	3	2	3	5	1	2	2	2	20	14			
4	2	1	0	1	1	0	1	1	07	03			
5	1	1	0	1	1	1	1	1	07	03			
6	2	1	1	0	0	1	1	0	06	02			
7	0	1	2	0	0	1	1	1	06	02			
8	0	0	3	1	1	5	6	4	20	22			
9	3	5	6	7	7	6	5	3	42	71			
10	2	3	3	7	3	3	4	2	27	30			
11	3	2	4	5	5	3	4	3	29	25			
12	2	3	3	6	5	4	3	4	30	29			
13	3	2	3	4	4	4	2	0	22	16			
14	1	1	2	5	5	4	1	1	20	18			
15	0	0	2	5	4	5	3	1	20	19			
16	1	1	3	5	5	1	0	0	16	15			
17	0	0	0	6	4	5	1	1	17	20			
18	1	0	3	4	3	2	1	0	14	09	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
19	0	0	2	5	4	2	2	0	15	12			
20	0	0	2	3	2	2	2	1	12	06			
21	0	3	4	5	4	2	1	0	19	16			
22	0	0	3	4	2	3	2	3	17	11			
23	3	4	7	7	5	5	2	3	36	55			
24	2	1	2	2	3	2	2	2	16	08			
25	2	2	1	1	1	0	0	0	07	03			
26	0	0	0	3	1	2	1	1	08	04			
27	1	2	1	2	2	0	3	3	14	07			
28	5	4	5	6	7	8	5	5	45	85			
29	3	3	0	4	4	3	4	4	25	19			
30	3	3	3	4	4	3	3	2	25	17			
31	2	2	4	7	6	4	2	2	29	38			

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9

D

675.7

H

322.2

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY COLLEGE, ALASKA	
			MONTH	YEAR
			JANUARY	1985
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
03	01xx	pc5		
05	17xx	pc3		
05	23xx	pc5		
07	23xx	pc1		
22	0831	ssc*		
23	22xx	pc4, pc5		
IDENTIFIED BY: JEP			VERIFIED BY: JBT	

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

PRINCIPAL MAGNETIC STORMS

WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80502 U.S.A.

Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA

JANUARY 19 85

Obs. 2 letter IAGA code	Geomag. lat.	Commencement			SC - amplitudes			Max. 3 hr - index K			Ranges			UT End day hr
		day	hr min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	Z(Y)	
C0	64.96 N	08	16xx	..	..	..	..	09 10	4,5 4	7 7	197	1750	1000	11 03
		22	0831	s.c.*	+25	..	+36	23	3,4	7	187	1280	800	23 24
		27	18xx	..	..	..	..	28	6	8	622	2150	1870	29 05

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 1-1-85	2400 U.T., 1-31-85	1.0/mm	3.78/mm	27° 16.6 E
H	0000 U.T., 1-1-85	2400 U.T., 1-31-85	7.88/mm		126708
Z	0000 U.T., 1-1-85	2400 U.T., 1-31-85	7.68/mm		551758

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 1-1-85	2400 U.T., 1-31-85	7.9/mm	29.58/mm	23° 43.1 E
H	0000 U.T., 1-1-85	2400 U.T., 1-31-85	43.88/mm		107948
Z	0000 U.T., 1-1-85	2400 U.T., 1-31-85	48.28/mm		540908

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 41.6 E	129138	553478

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

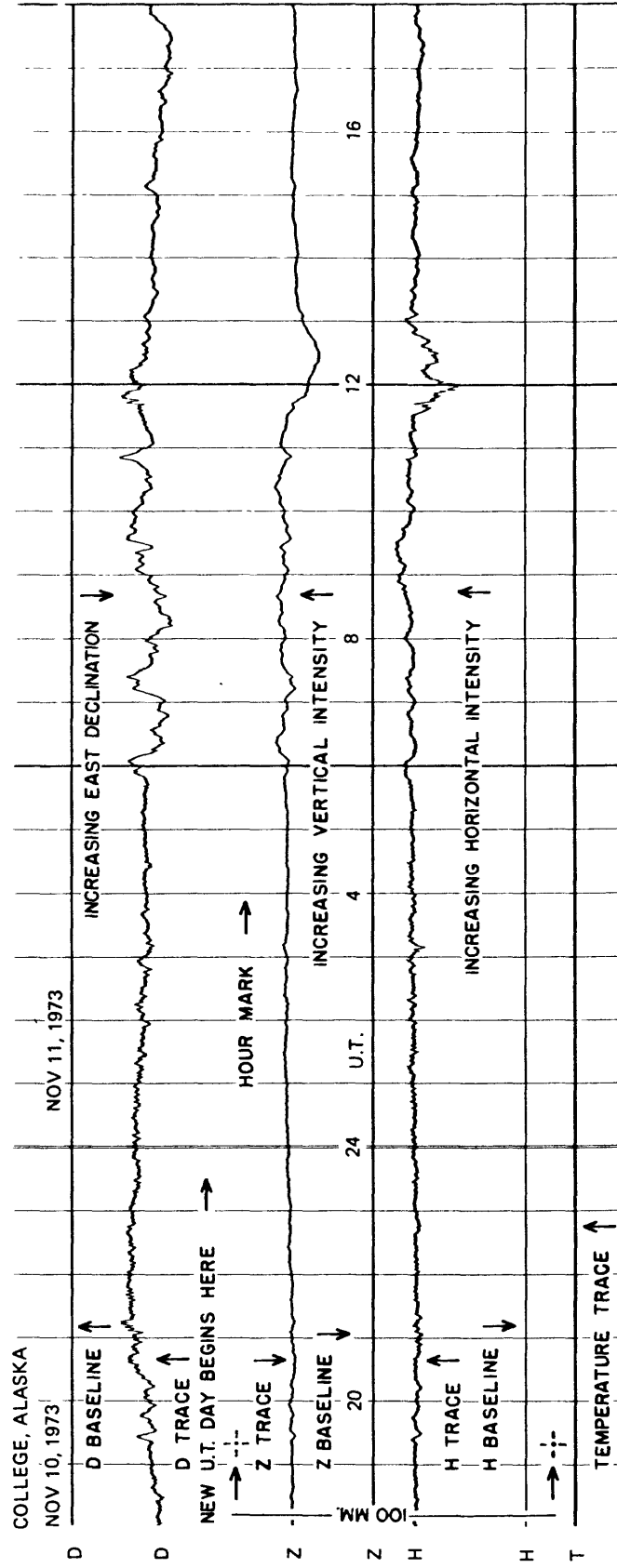
DAYS USED: JAN 4, 5, 6, 7, 18, 20, 24, 25, 26, 27

MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)												U.S. DEPARTMENT OF MINING Geological Survey Denver Federal Center Denver, CO 80215												OBSV.		YEAR		MONTH		ELL- MENT	
Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (1355W.T.) is hour 09 of the B.M.T. universal day. Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.																								CO		85		JAN		D	
C	0	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	232	236	233	318	263	246	220	229	342	186	01	292	271	334	363	191	303	303	309	160	100	127	194	6098							
02	168	250	223	253	260	277	255	304	213	223	154	233	02	303	298	252	272	323	277	253	256	247	207	130	146	5777					
03	199	207	242	247	259	272	243	227	250	183	303	268	03	277	267	273	260	257	269	293	277	221	177	207	217	5925					
04	223	225	223	233	245	264	271	260	272	263	270	272	04	273	269	257	260	270	271	259	257	247	233	227	218	6062					
05	197	218	227	233	247	254	249	252	261	248	269	267	05	273	268	273	269	283	257	273	270	253	229	216	200	5986					
06	237	233	224	229	233	211	241	250	252	256	257	259	06	268	260	263	265	266	277	273	252	238	243	233	227	5947					
07	249	244	243	246	247	233	220	235	251	253	255	260	07	257	268	273	296	322	313	287	226	213	217	227	247	6082					
08	253	247	260	260	263	260	253	263	213	239	252	257	08	268	273	281	300	326	319	162	273	157	124	96	113	5912					
09	193	233	224	163	249	317	260	591	312	130	11	122	09	416	273	511	306	420	417	204	195	183	237	215	224	6456					
10	247	275	236	302	363	293	272	453	252	217	19	201	10	173	347	283	272	280	280	240	227	220	217	235	6164						
11	256	254	253	309	277	267	500	390	248	400	200	190	11	250	290	350	293	365	343	303	159	157	219	209	228	6700					
12	241	262	263	263	303	253	243	352	313	237	151	371	12	122	402	359	208	326	309	280	179	172	181	170	198	6158					
13	239	249	252	243	273	277	262	304	301	125	211	217	13	230	307	278	287	279	239	271	245	213	208	217	227	5954					
14	232	257	267	271	287	261	270	273	230	253	223	70	14	348	342	272	348	367	220	289	254	249	240	232	225	6250					
15	233	251	256	261	261	257	252	264	307	262	271	263	15	307	310	520	400	217	363	316	169	183	203	213	216	6555					
16	211	235	239	273	237	257	267	333	293	227	164	380	16	323	220	247	280	293	277	273	263	263	257	257	248	6437					
17	246	247	258	254	260	256	257	263	253	253	1																				

FORM CACS-404c												MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)												U.S. DEPARTMENT OF INTERIOR Geological Survey, Geological Division Denver Federal Center Denver, CO 80225												OBSV.		YEAR		MONTH		ELE- MENT	
Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (2350 M.T.) is hour 09 of the scaling universal day. Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.																																											
C	Q	T	0	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	265	284	287	367	284	316	295	302	275	256	352	182	01	189	214	222	173	107	163	124	93	133	146	197	253	5419																	
02	246	285	191	316	303	279	290	306	304	302	183	255	02	200	236	240	236	223	217	227	223	219	229	243	226	6079																	
03	265	280	283	273	266	257	256	293	277	109	208	256	03	240	235	236	227	207	218	223	226	193	151	193	240	5702																	
04	263	273	263	263	265	253	253	254	250	254	246	228	04	207	199	213	230	230	227	231	228	230	224	229	237	5740																	
05	251	262	247	252	248	253	246	245	246	254	260	248	05	246	233	229	229	210	193	197	202	203	207	220	244	5619																	
06	263	256	251	263	267	267	267	267	267	267	267	248	06	233	219	225	226	215	206	208	220	218	227	235	234	5758																	
07	236	236	237	244	242	246	265	260	250	246	263	249	07	242	236	229	207	171	164	163	174	193	206	220	240	5399																	
08	243	243	246	248	245	243	250	277	273	288	267	248	08	237	227	223	215	174	30	-92	0	159	214	224	277	4959																	
09	310	276	293	317	214	199	158	120	-51	183	307	207	09	596	792	133	70	144	149	116	179	205	236	242	251	5646																	
10	272	285	281	354	336	292	265	232	107	199	387	-20	10	63	219	251	228	218	167	185	207	217	223	233	250	5451																	
11	265	263	257	286	261	243	263	236	238	162	-51	101	11	147	162	126	196	164	146	100	120	166	235	244	243	4593																	
12	253	260	256	256	297	249	247	277	234	140	-71	150	12	125	103	251	185	143	156	156	144	183	202	221	253	4740																	
13	267	267	267	280	284	274	251	247	197	50	167	223	13	186	205	177	142	165	219	187	195	215	227	236	248	5176																	
14	247	254	247	247	249	260	268	249	205	224	156	-26	14	135	170	68	167	162	157	184	194	213	227	232	239	4728																	
15	247	246	246	247	249	245	243	257	264	237	201	50	15	92	117	134	147	-10	137	135	116	151	183	216	224	4374																	
16	234	246	254	273	260	268	272	261	171	170	113	68	16	178	74	108	202	214	219	224	226	233	236	236	233	4973																	
17	235	234	235	236	236	236	234	234	233	179	8	80	17	-10	166	150	106	193	154	223	236	215	223	223	225	4393																	
18	230	238	236	240	239	239	237	237	243	174	247	223	18	178	177	168	200	225	231	230	225	227	228	226	229	5322																	
19	230	229	232	233	237	240	243	250	259	254	172	232	19	235	25	150	179	191	189	182	210	216	227	227	228	5070																	
20	232	230	233	229	233	232	233	233	233	243	212	192	20	175	204	210	196	187	163	139	157	194	207	217	222	5006																	
21	224	225	229	231	231	300	313	290	154	141	269	285	21	221	163	170	197	189	186	187	196	204	209	218	224	5256																	
22	227	233	233	231	230	230	229	227	221	135	191	163	22	166	167	246	232	185	151	167	193	193	207	223	173	4879																	
23	207	226	240	279	307	262	199	87	39	204	161	-68	23	192	464	287	383	179	135	147	127	152	197	226	237	4695																	
24	237	242	247	246	243	246	256	242	260	245	240	240	24	235	171	156	181	211	207	224	215	217	213	222	233	5409																	
25	243	245	266	268	273	260	251	242	245	243	241	246	25	232	233	227	227	228	228	229	224	223	223	223	223	5743																	
26	227	226	226	226	226	229	233	231	232	249	270	244	26	230	225	206	188	182	140	206	206	207	204	207	207	5277																	
27	223	233	249	253	263	267	237	246	244	246	240	202	27	199	230	234	217	219	210	157	75	93	90	100	166	4883																	
28	216	246	249	282	262	267	217	109	141	167	230	237	28	592	579	642	157	205	237	170	134	55	136	217	280	6024																	
29	279	270	301	274	293	269	249	247	253	256	247	209	29	234	191	218	231	153	170	160	171	127	89	193	253	5337																	
30	273	238	250	263	264	270	297	257	248	100	196	249	30	234	135	125	169	155	196	166	216	217	206	213	217	234	5208																
31	243	249	256	265	253	247	247	257	60	153	165	268	31	0	32	73	107	143	174	209	213	213	224	238	239	4528																	
SCALED BY												LYT												Preliminary base-line and scale values:												MONTHLY SUM		MONTHLY MEAN		DATES WITH GAPS:			
CHECKED BY												JEP, PAF												Interval Beginning Base-line Value Scale Value																			
SIGNS RE- VIEWED BY												JEP																															
PUNCHED BY																																											
</																																											

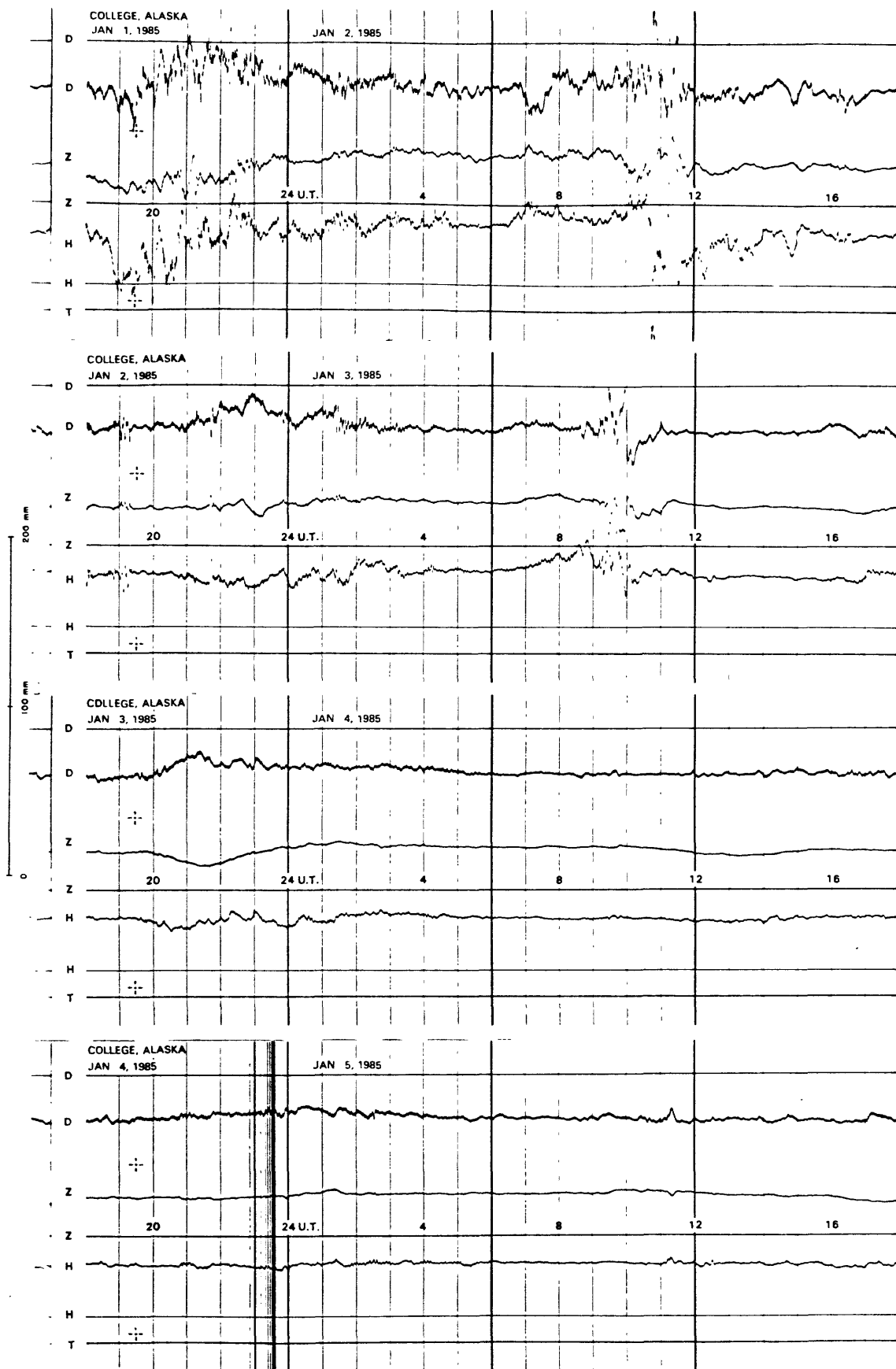
C		Q		S		O		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22		23		24		SUM																																																																																																																																																																																																																																																																																																																																																																																																									
01		02		03		04		05		06		07		08		09		10		11		12		13		14		15		16		17		18		19		20		21		22		23		24		SUM																																																																																																																																																																																																																																																																																																																																																																																																																	
342		340		359		343		405		372		384		449		332		310		50		119		01		299		331		224		139		227		287		234		63		191		307		375		308		6412																																																																																																																																																																																																																																																																																																																																																																																																															
303		373		339		372		373		353		283		448		401		396		385		130		02		210		213		283		330		283		302		302		302		311		303		283		257		294		7527																																																																																																																																																																																																																																																																																																																																																																																																													
293		300		370		320		337		330		341		385		440		394		311		320		03		288		302		294		283		280		327		309		307		260		281		317		290		7679																																																																																																																																																																																																																																																																																																																																																																																																															
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313		312		320		320		317		309		315		313		310		315		306		318		05		306		309		307		307		287		300		310		320		296		309		320		7449																																																																																																																																																																																																																																																																																																																																																																																																																	
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FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

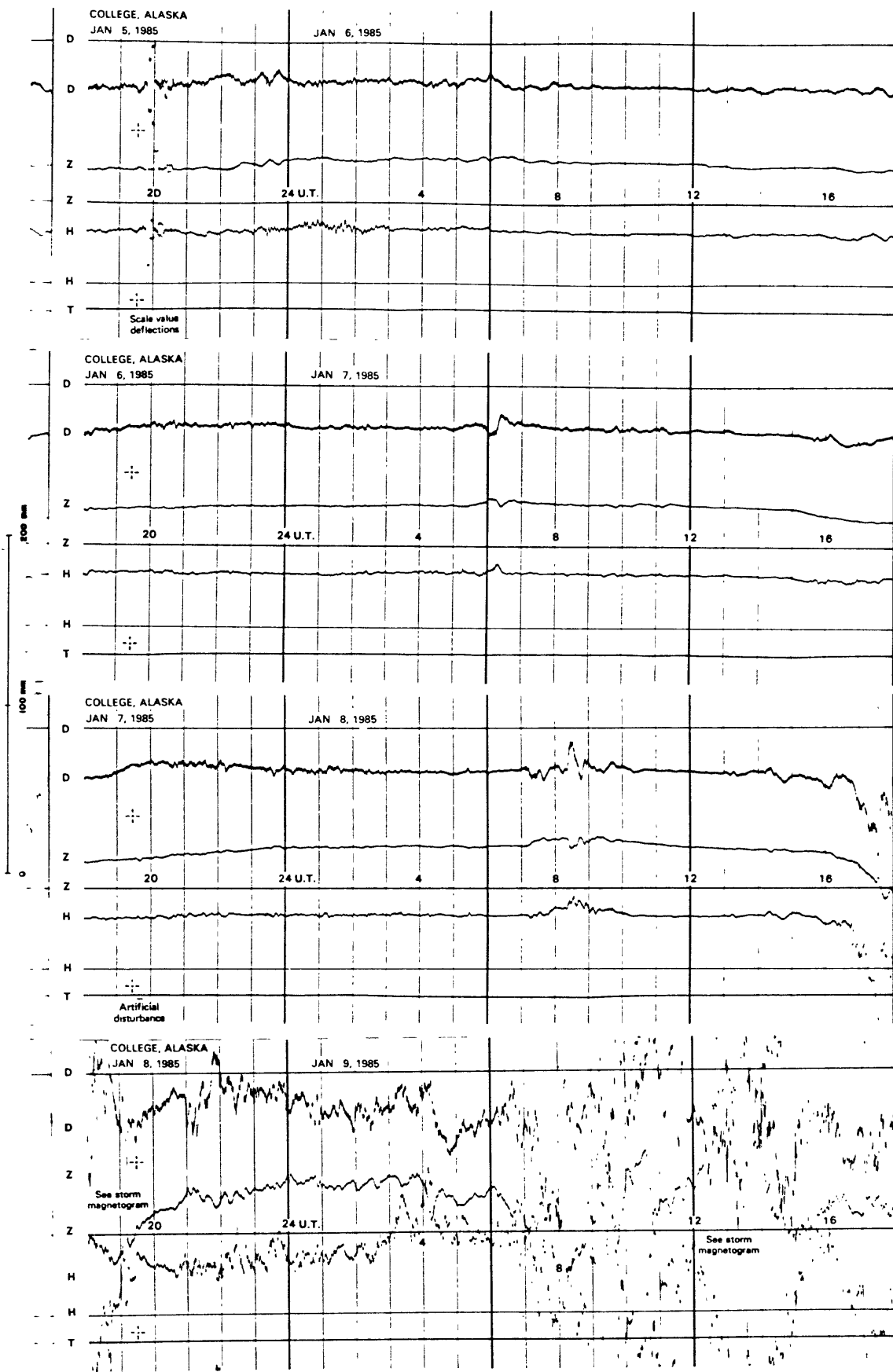


SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

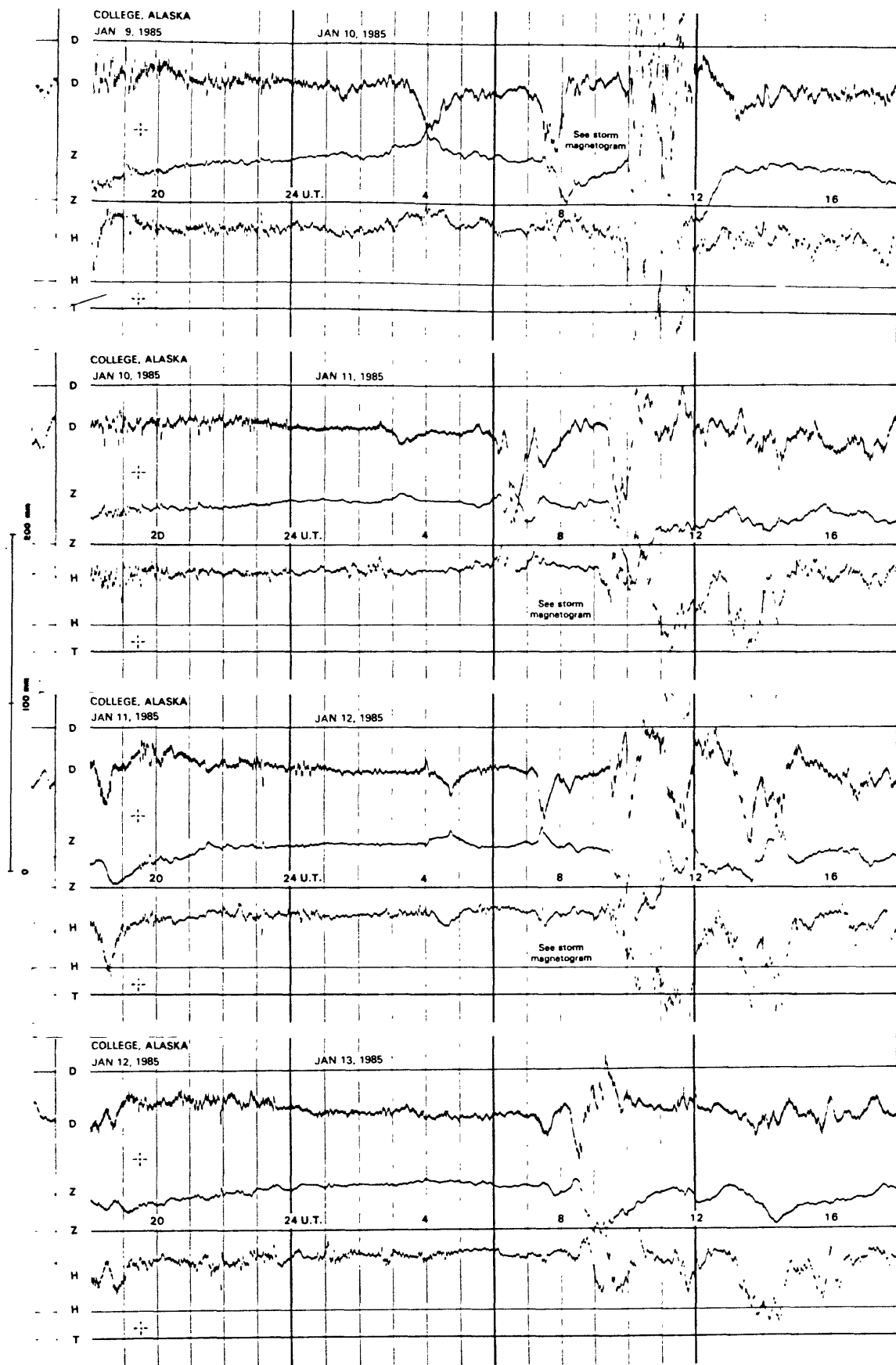
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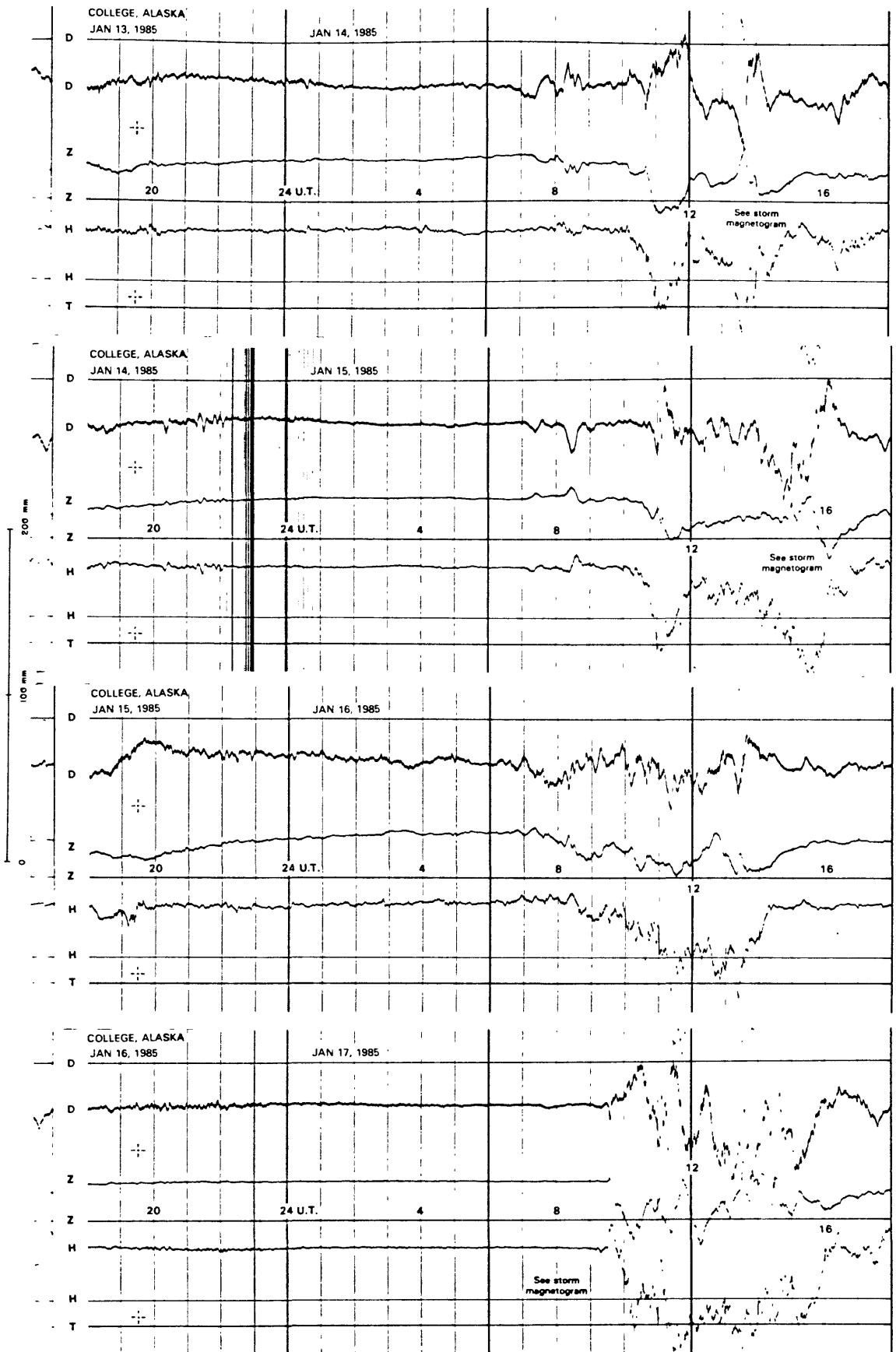
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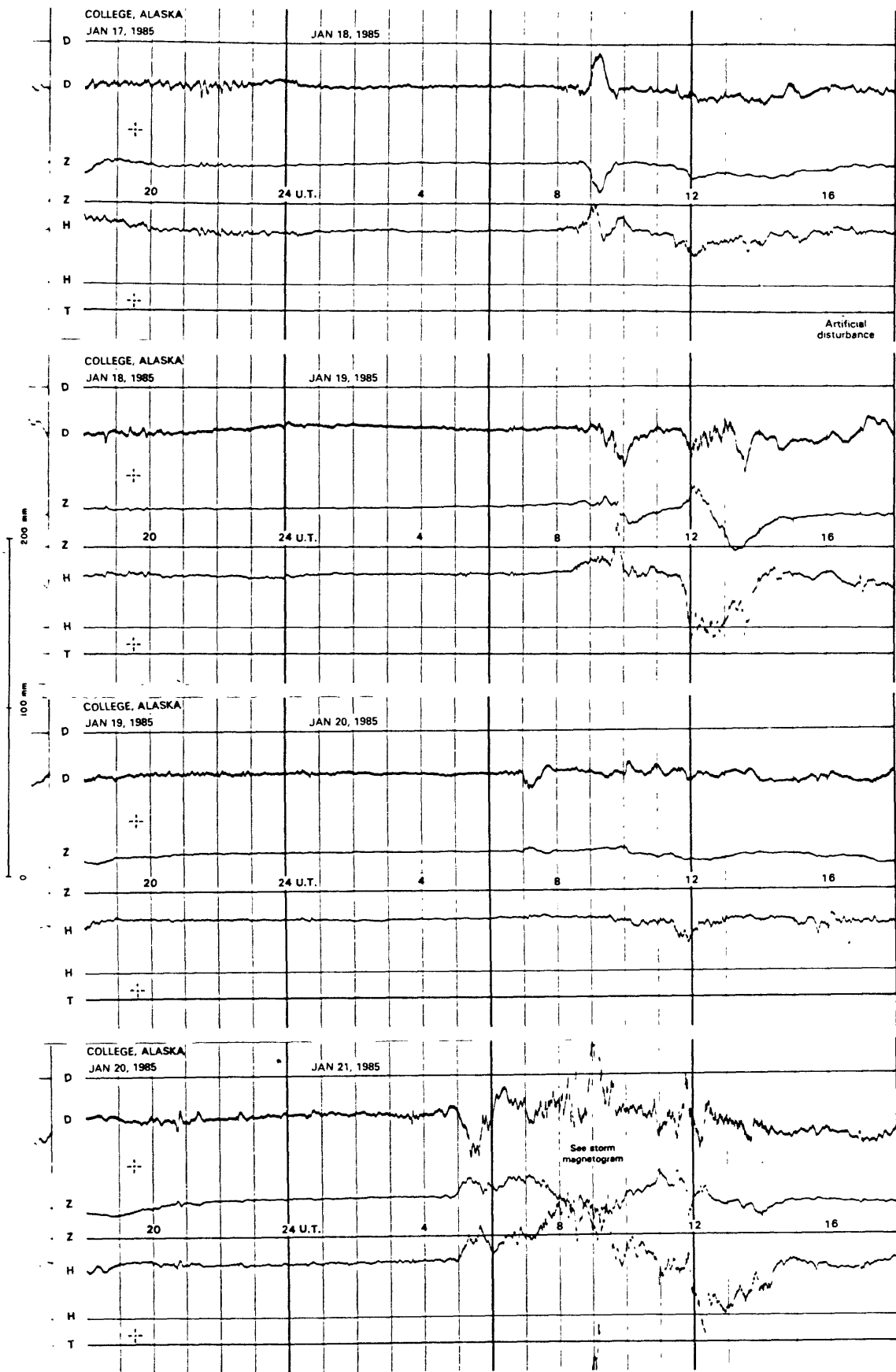
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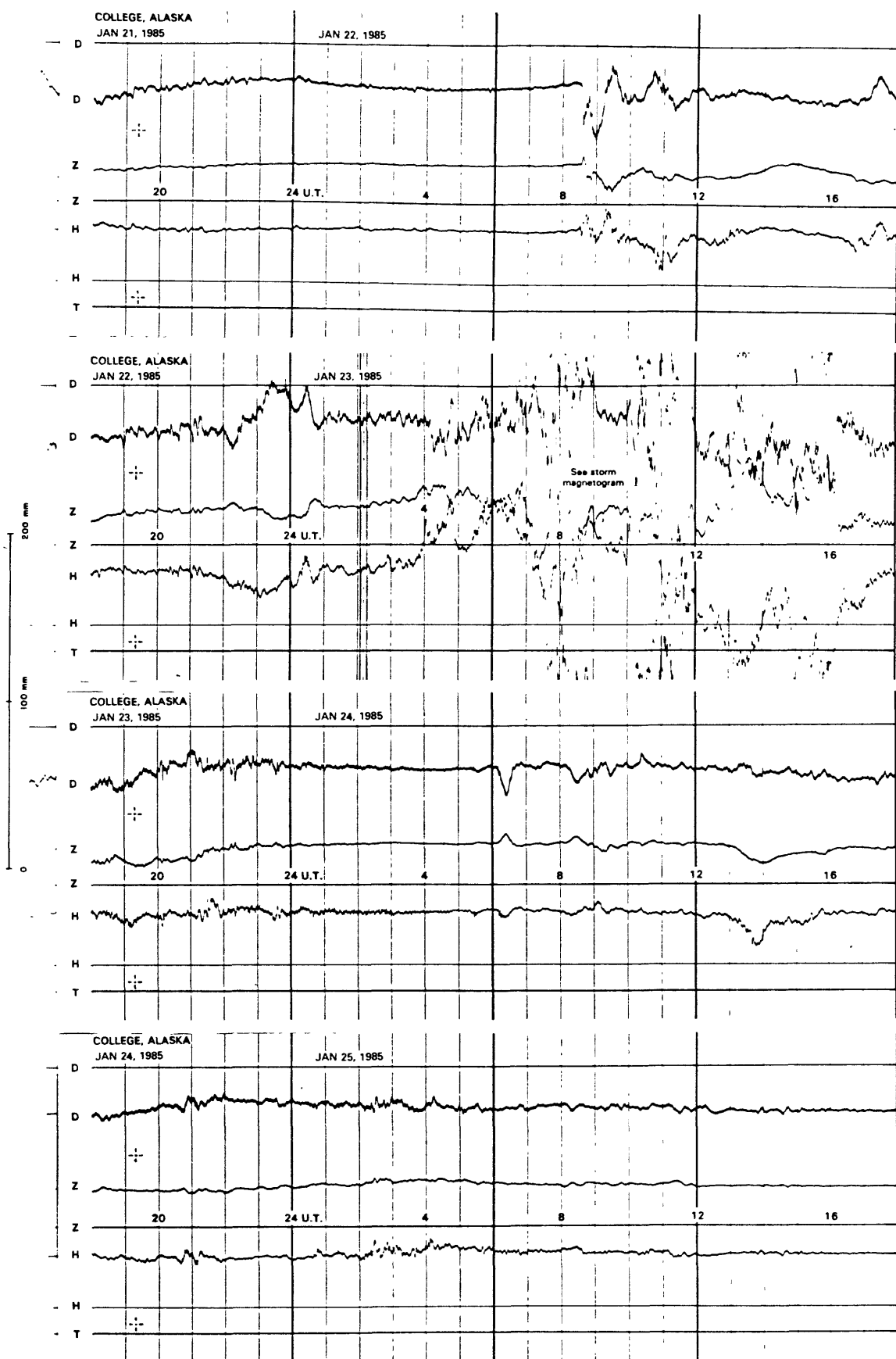
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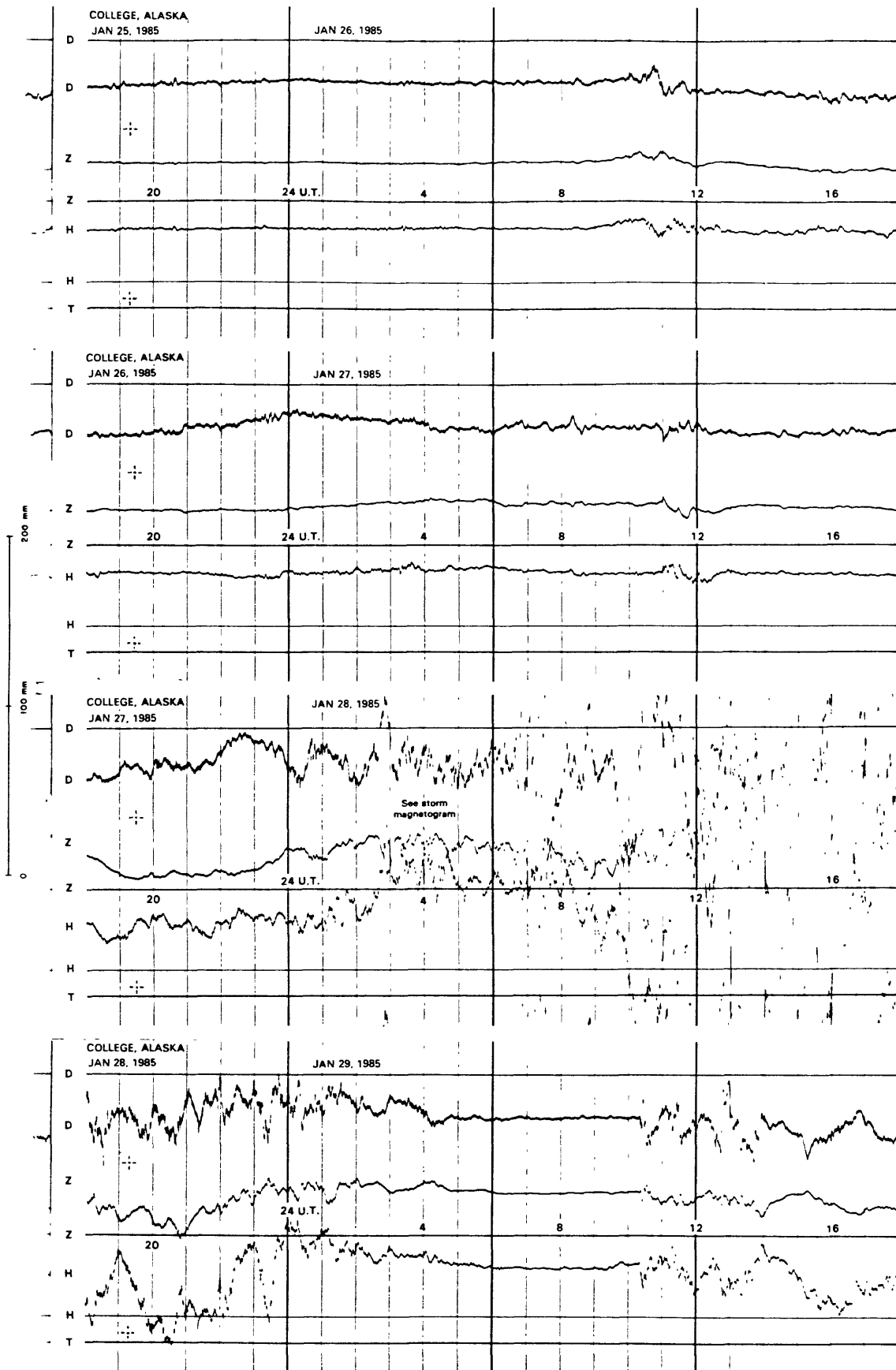
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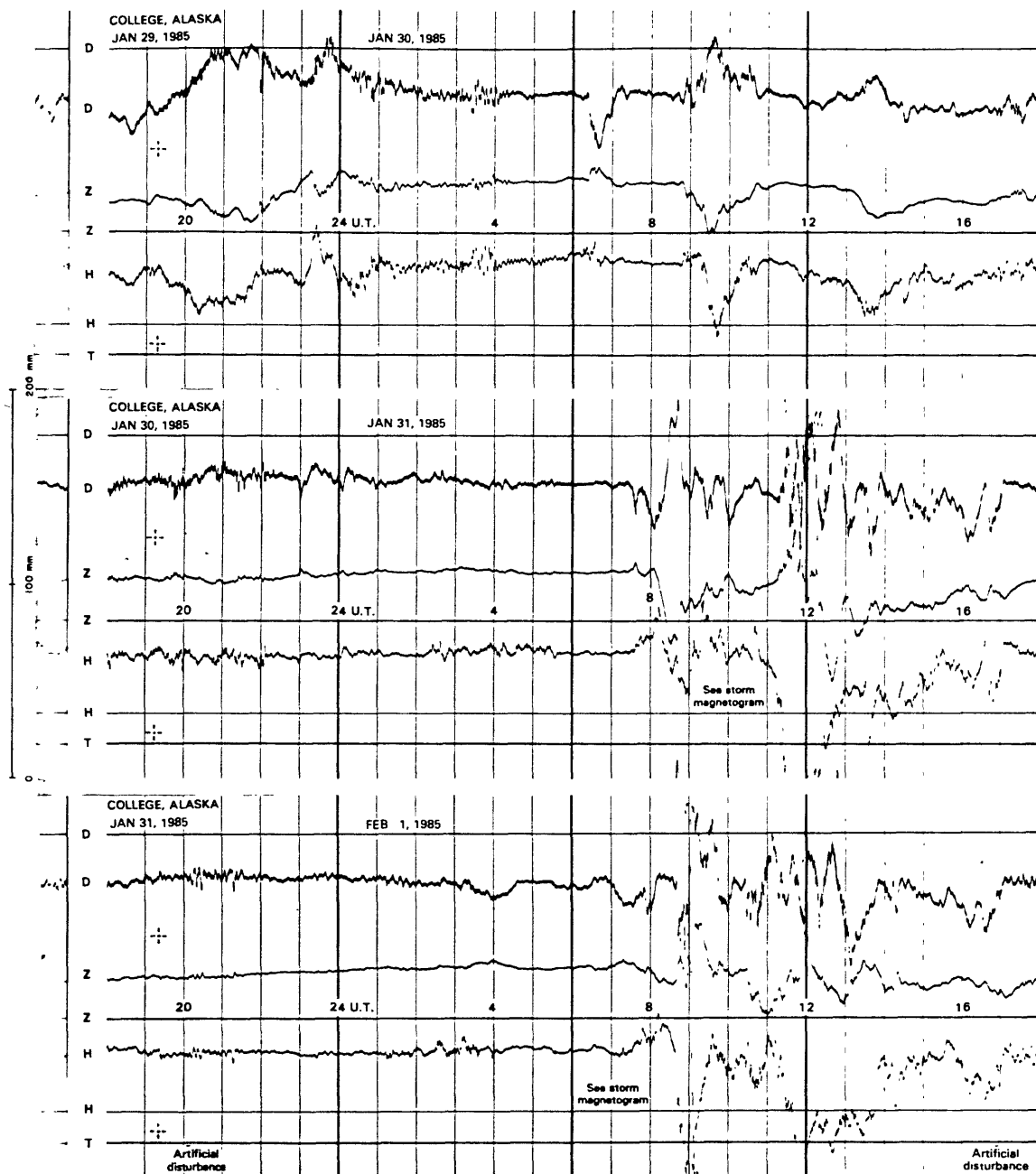
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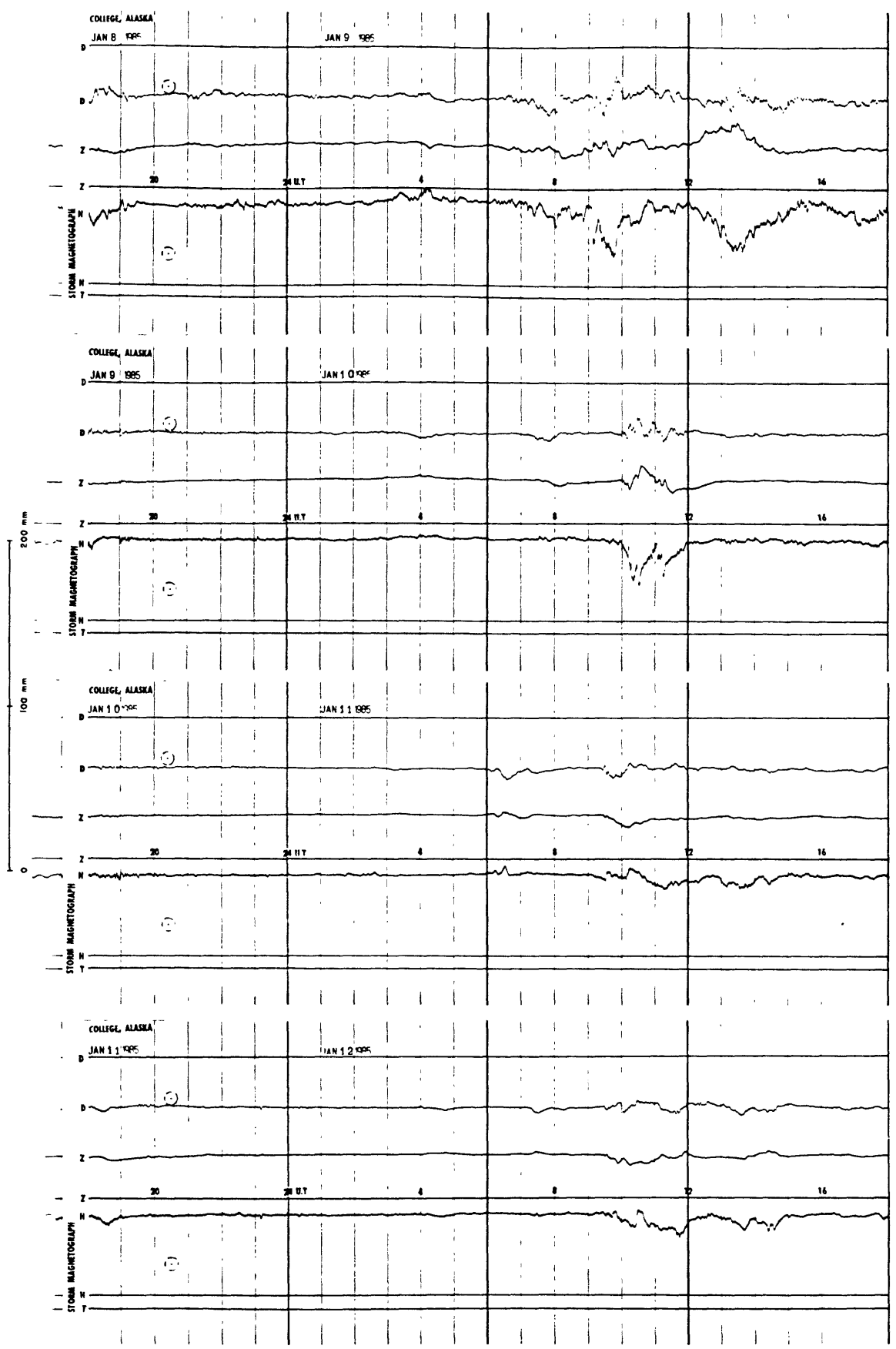
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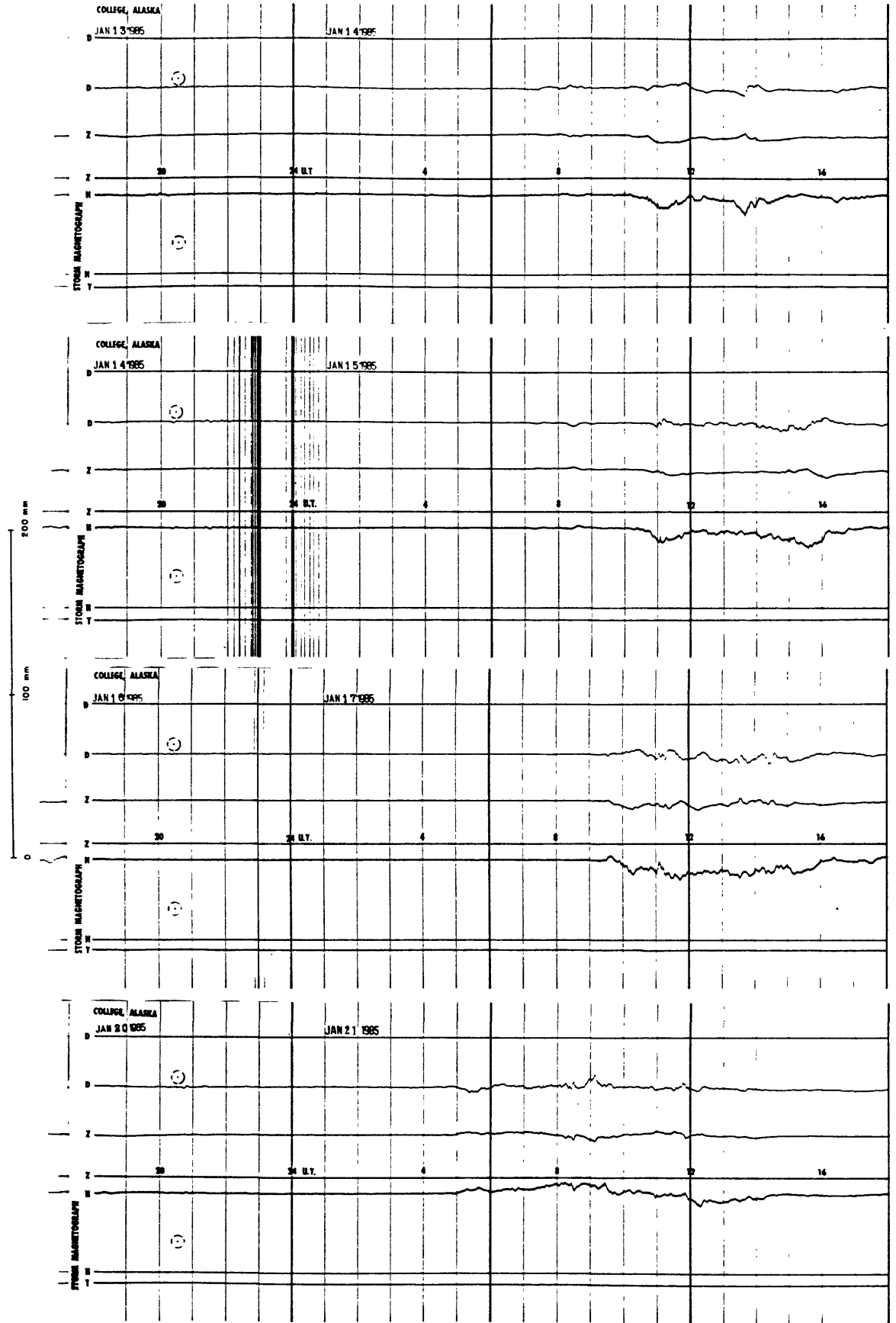
NORMAL MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

200 mm
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