

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

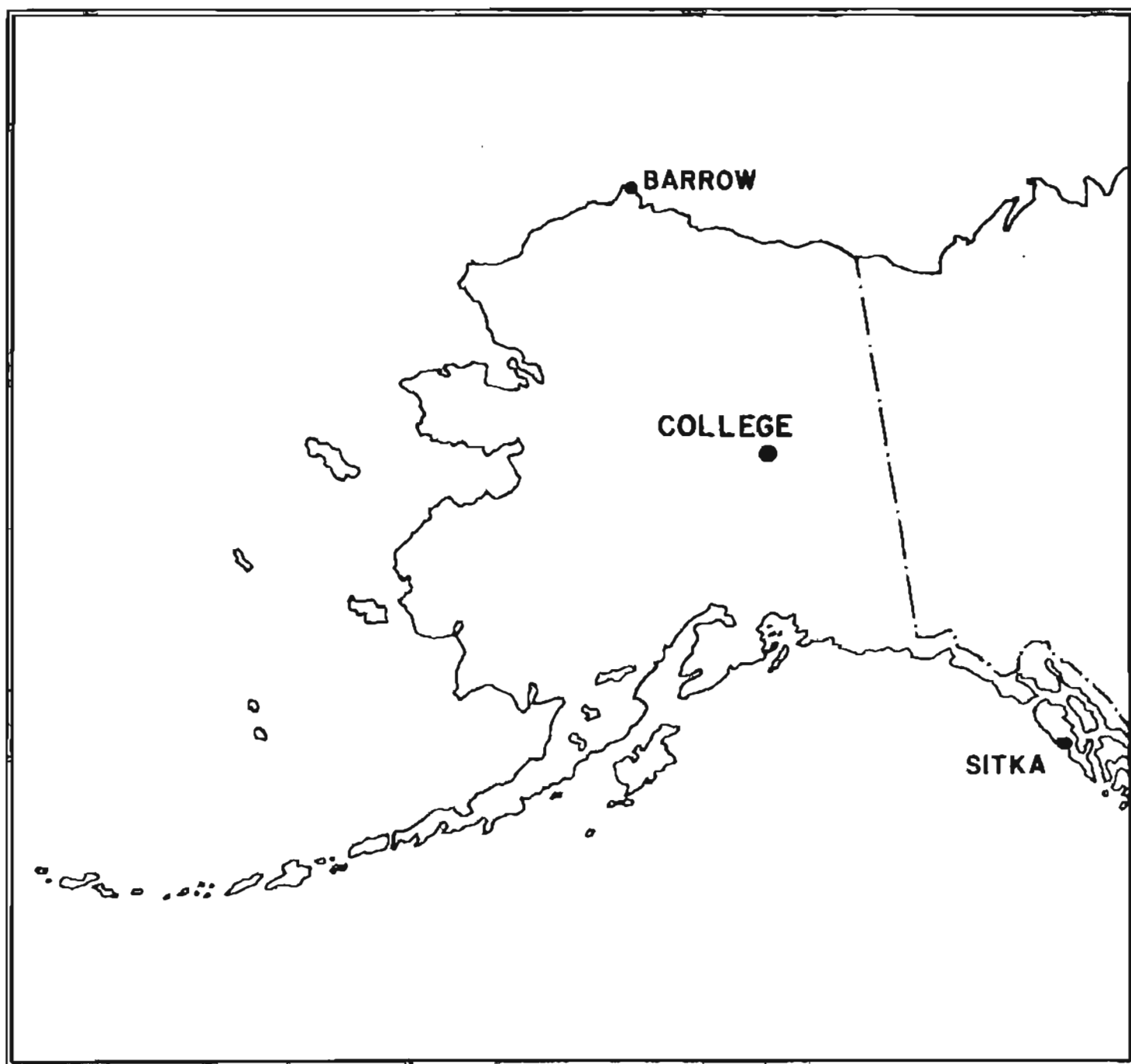
PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

JUNE 1982

OPEN FILE REPORT 82-0300F



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, T.K. CUNNINGHAM 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.

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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, 125 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 β -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 10 γ 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 (10 γ)

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 3 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
JUNE 1982

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	4	4	4	5	3	3	3	4	30	25	SUDDEN COMMENCEMENTS d h m
2	5	5	5	4	3	2	2	3	29	27	
3	3	3	3	3	3	2	1	2	20	12	
4	3	3	1	1	2	3	1	2	16	09	
5	3	2	2	3	2	2	1	2	17	09	
6	3	4	5	4	3	2	2	2	25	19	
7	2	4	5	6	3	3	2	2	27	26	
8	1	1	1	2	5	4	3	3	20	15	
9	4	4	2	3	3	2	2	2	22	14	
10	5	4	6	6	7	7	2	3	40	67	
11	4	4	6	5	4	4	4	4	35	36	
12	5	4	3	2	7	7	5	4	37	57	
13	5	5	7	6	7	4	6	4	44	74	
14	3	5	6	7	5	4	3	2	35	48	
15	4	4	7	4	5	4	3	3	34	41	
16	3	3	3	4	5	3	2	2	25	19	
17	2	3	3	3	4	1	1	1	18	11	
18	1	3	2	2	1	1	2	2	14	07	
19	2	2	4	4	5	4	3	3	27	22	
20	3	4	5	4	3	4	2	2	27	22	
21	2	3	3	3	3	2	2	2	20	11	
22	3	2	3	4	3	4	3	2	24	16	
23	4	4	5	4	4	3	2	2	28	23	
24	2	2	4	4	4	2	3	4	25	18	
25	5	5	4	3	3	3	0	2	25	22	
26	3	3	2	4	5	4	3	4	28	23	
27	4	4	5	4	5	2	4	4	32	30	
28	4	4	3	5	5	4	3	3	31	28	
29	4	3	2	4	2	4	2	3	24	17	
30	5	6	5	6	5	3	3	4	37	45	
31											

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	M	Z	(mm) (γ/mm) (to nearest 10γ)
	683.8	321.7		
	3.73	7.79		
	2550	2510		

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN B. TOWNSHEND, CHIEF, COLLEGE OBSERVATORY
OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY
COLLEGE, ALASKA

MONTH
JUNE

YEAR
1982

DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS
04	14XX	pi2	
06	0243	ssc*	
12	1443	ssc*	
14	1743	si	
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.

NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS

Data from Individual Observatories:

COLLEGE OBSERVATORY, COLLEGE, ALASKA
JUNE 19 82

WDC-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(γ)	Z(γ)	day (3 hr - period)	K	D(')	H(γ)	Z(γ)	day	hr	
CO	64°6 N	10	01XX	10	5, 6	7	365	1710	1250	16	02
		12	1443	s.c.*	-24	-1255	-71	12	5, 6	7					
								13	3, 5	7					
								14	4	7					
								15	3	7					

NORMAL MAGNETOGRAPHS					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 6-1-82	2400 U.T., 6-30-82	1.0/mm	3.78/mm	27° 46.7 E
H	0000 U.T., 6-1-82	2400 U.T., 6-30-82	7.88/mm		127648
Z	0000 U.T., 6-1-82	2400 U.T., 6-30-82	7.78/mm		551468

STORM MAGNETOGRAPHS					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 6-1-82	2400 U.T., 6-30-82	7.9/mm	29.68/mm	23° 41.4 E
H	0000 U.T., 6-1-82	2400 U.T., 6-30-82	44.08/mm		115238
Z	0000 U.T., 6-1-82	2400 U.T., 6-30-82	48.58/mm		540628

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

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
27° 57.3 E	129858	553898

* COMPUTED FROM ^{FIVE} QUIETEST DAYS DURING MONTH.

DAYS USED: JUN 4, 5, 17, 18, 21 ** (NOTE BELOW)

** DUE TO VERY DISTURBED MAGNETIC CONDITIONS DURING THE MONTH OF JUNE 1982, ONLY FIVE DAYS ARE USED TO COMPUTE THE MONTHLY MEAN ABSOLUTE VALUES.

FORM 75-100

MAGNETOGRAM HOURLY SCALINGS

Values are in units of gauss and are averaged for successive periods of one hour beginning on midnight. Hours 01 of local day (1300 GMT) is hour 11 of the universal day.

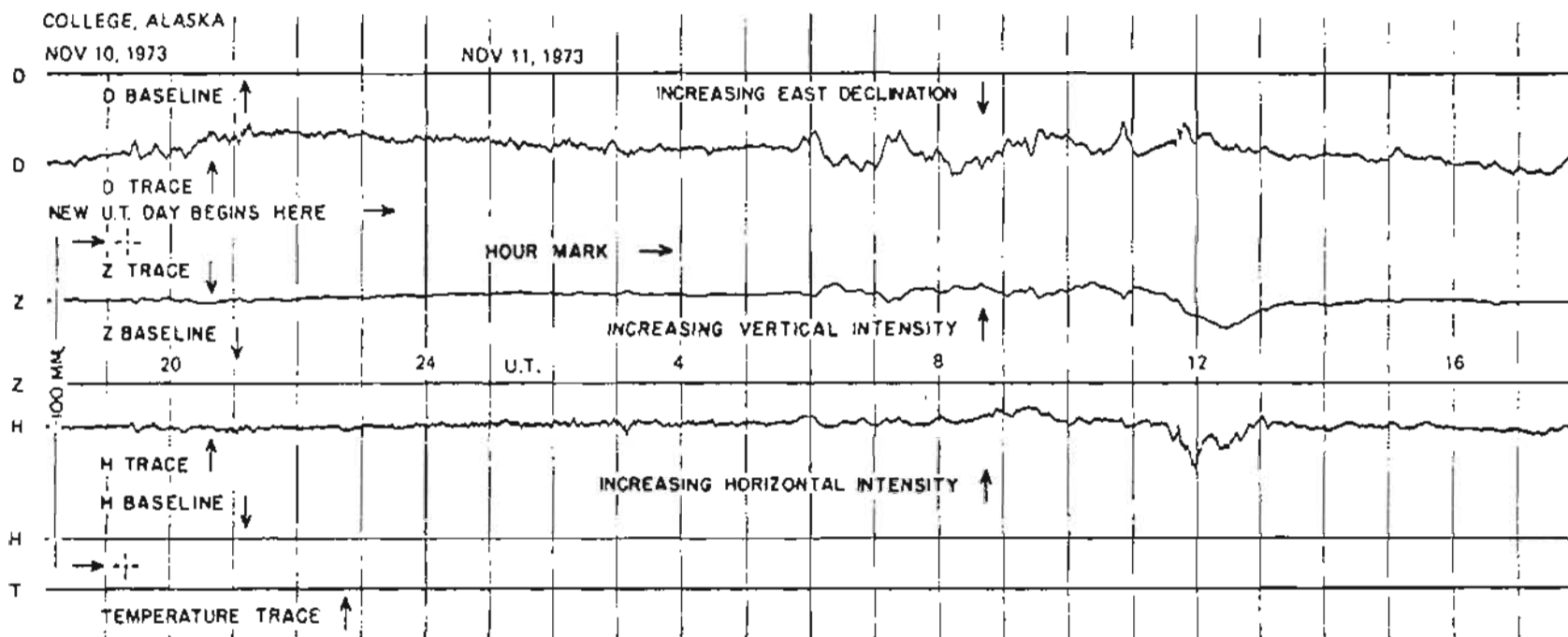
Standard conversion: Gauss = 10⁻⁴ Tesla

C	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
01	118	81	40	52	14	114	48	-25	-32	0	4	109	93	113	163	210	270	252	303	236	156	42	36	118	2555	
02	97	-3	-9	122	83	72	34	56	120	9	16	45	76	68	101	169	241	215	260	191	76	53	32	26	2210	
03	26	24	15	73	71	52	135	128	55	63	61	-4	27	73	120	198	265	251	234	195	200	106	55	11	2434	
04	-1	21	16	16	78	106	94	99	87	69	67	61	68	72	126	176	221	272	264	196	157	110	27	2682		
05	-19	-30	-8	28	64	66	71	88	63	61	59	66	63	117	149	174	204	233	228	199	142	80	44	14	2176	
06	-4	0	12	13	48	23	6	26	65	35	-52	62	34	92	136	179	270	339	311	220	165	65	19	30	2122	
07	27	33	44	37	86	8	37	-244	-174	-38	-38	61	76	66	127	191	305	318	272	203	130	75	28	-7	1583	
08	-2	12	42	66	92	79	100	92	89	86	86	49	63	102	128	220	316	316	268	152	134	62	-11	-6	2539	
09	17	6	11	70	98	49	60	31	35	33	4	14	32	58	88	166	198	254	254	210	152	82	27	6	1955	
10	16	-1	-26	58	37	37	-519	-162	-42	46	54	73	330	180	449	260	268	201	317	297	223	151	148	22	2357	
11	18	36	50	57	46	37	44	5	3	44	78	52	-11	96	111	148	187	308	376	225	122	101	131	165	3431	
12	187	66	61	40	55	106	65	139	25	73	59	56	55	50	97	180	319	291	116	232	271	103	43	34	2893	
13	124	43	-48	45	34	26	-14	-233	-201	34	25	114	-96	214	136	42	156	443	624	392	171	288	174	114	2029	
14	-23	28	39	-12	57	67	-162	-88	53	-16	53	13	-67	70	114	175	224	284	273	200	149	124	103	49	1573	
15	60	41	15	-4	25	66	-26	-106	-63	72	50	93	101	90	164	247	305	304	247	224	151	58	66	92	2292	
16	78	57	44	46	57	65	98	95	62	68	119	92	60	73	139	195	261	254	233	178	116	93	89	78	2697	
17	54	53	70	56	86	103	183	93	67	76	58	120	106	92	166	210	242	244	242	205	139	81	64	47	2665	
18	29	12	39	45	57	125	100	103	62	47	80	94	119	145	166	115	225	204	233	231	162	139	72	44	2665	
19	21	40	64	96	109	116	80	11	27	17	-5	70	1	74	241	326	443	401	352	269	109	-13	-36	-49	2764	
20	-15	23	89	78	24	26	62	-26	-170	-22	54	52	16	23	132	223	320	303	282	266	128	36	24	59	1543	
21	8	24	49	76	83	84	113	68	-17	42	41	32	62	36	136	181	245	275	272	245	200	126	62	18	2455	
22	-12	6	36	28	91	120	113	71	25	10	5	4	21	114	225	219	326	346	330	197	160	114	88	79	2632	
23	32	-15	53	128	73	112	-292	140	-11	-140	-93	-89	-3	157	176	244	259	368	342	226	166	98	55	30	1776	
24	13	35	21	-4	7	-41	34	47	-69	-101	-70	-21	90	166	233	238	248	248	222	256	319	276	157	66	1924	
25	-26	-44	-118	59	17	39	-10	-110	-56	-101	-23	-28	61	82	200	162	188	246	232	188	142	91	20	27	1238	
26	34	16	5	44	0	25	24	52	2	-10	5	40	99	107	144	390	374	458	283	214	165	76	137	149	2842	
27	86	53	-54	-34	-93	-1	26	2	49	70	31	50	-62	111	72	116	150	187	208	311	170	16	263	-7	1722	
28	-36	-45	-85	-49	-45	-41	-105	-26	-26	129	-32	14	49	8	149	230	401	370	231	250	129	197	119	77	1856	
29	50	50	59	63	54	54	82	74	56	8	150	121	35	76	123	193	234	283	233	216	200	122	115	25	2675	
30	-77	-43	-41	6	-4	-418	-181	-148	-24	-7	-109	121	42	135	113	165	234	349	263	226	160	79	75	91	1001	
31																										

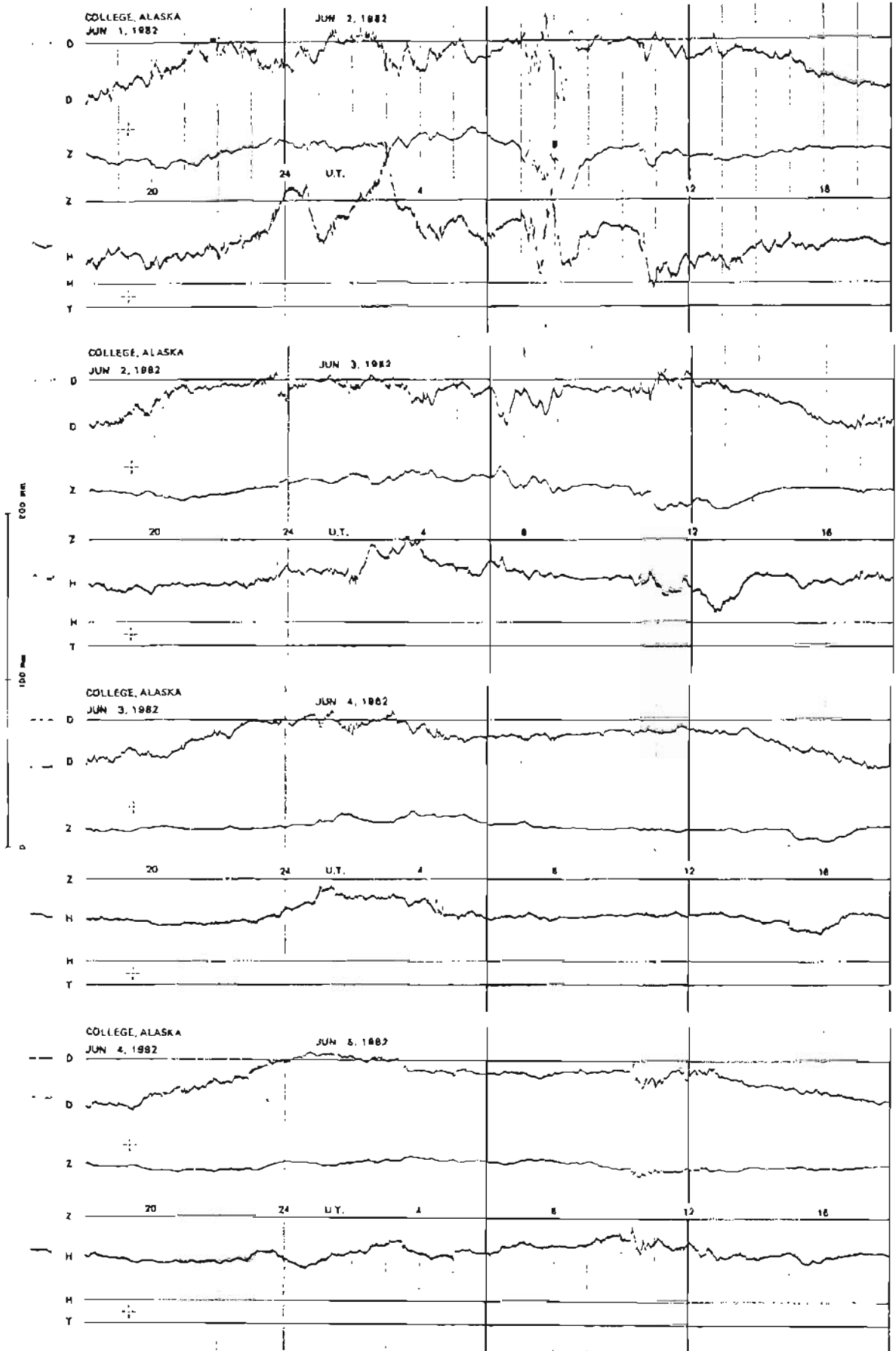
Interpolated
 Significant position of magnetic storm
 No record; or no values available because of faulty record.
 * Derived from STORM Mapp., converted to Normal Mapp.

MONTHLY SUM MONTHLY MEAN DAILY MEANS	67026 93
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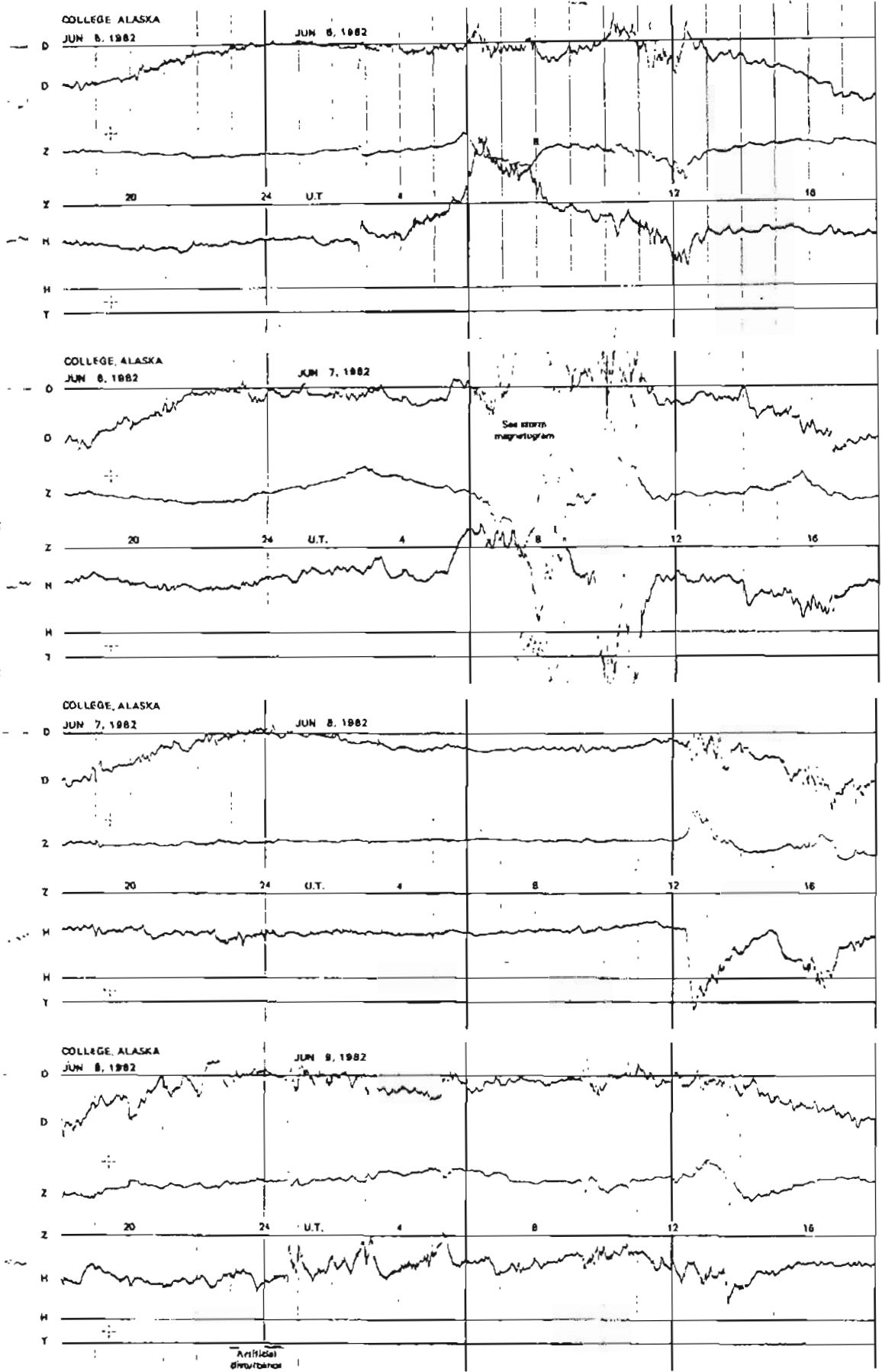
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



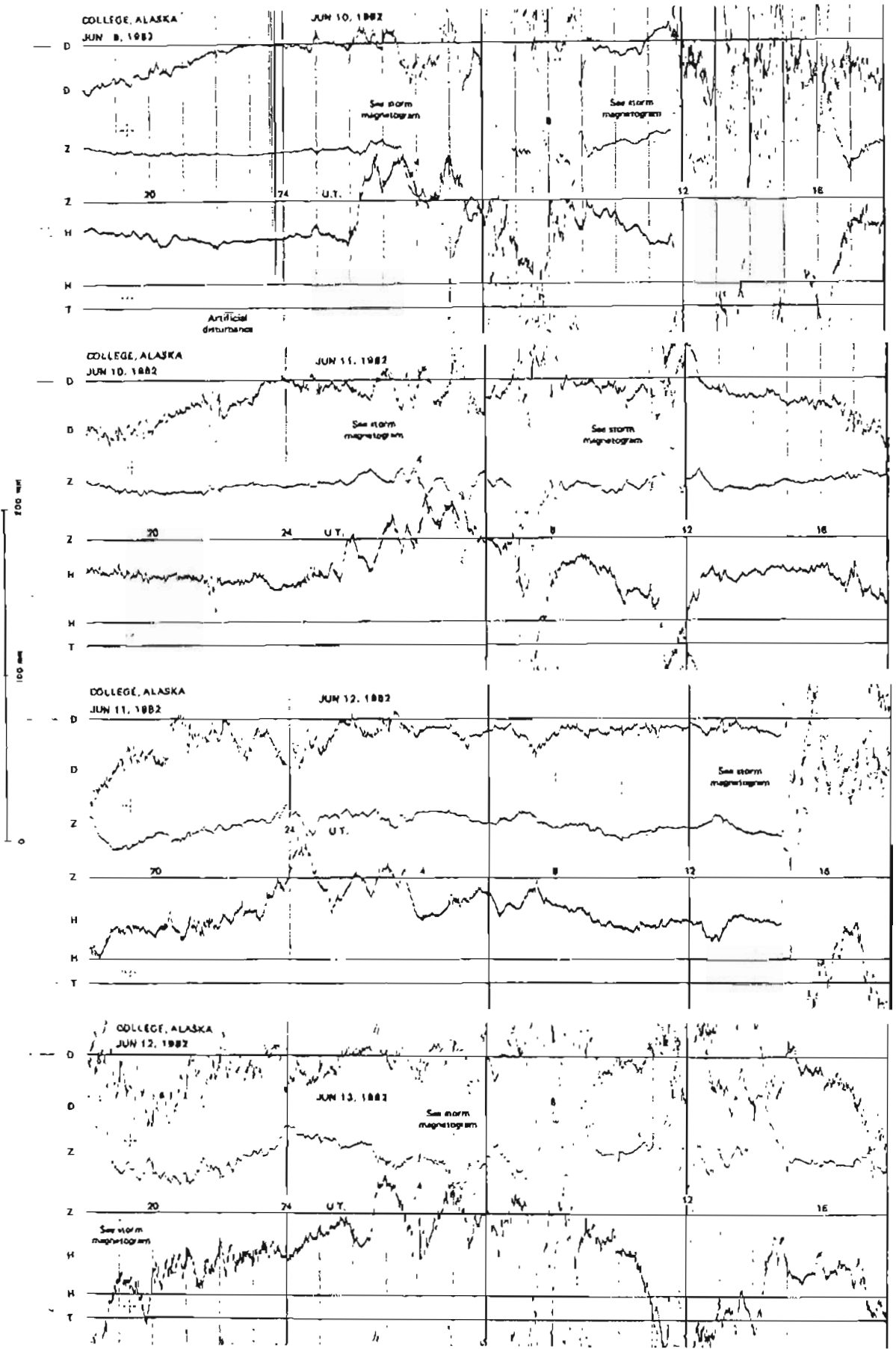
NORMAL MAGNETOGRAMS



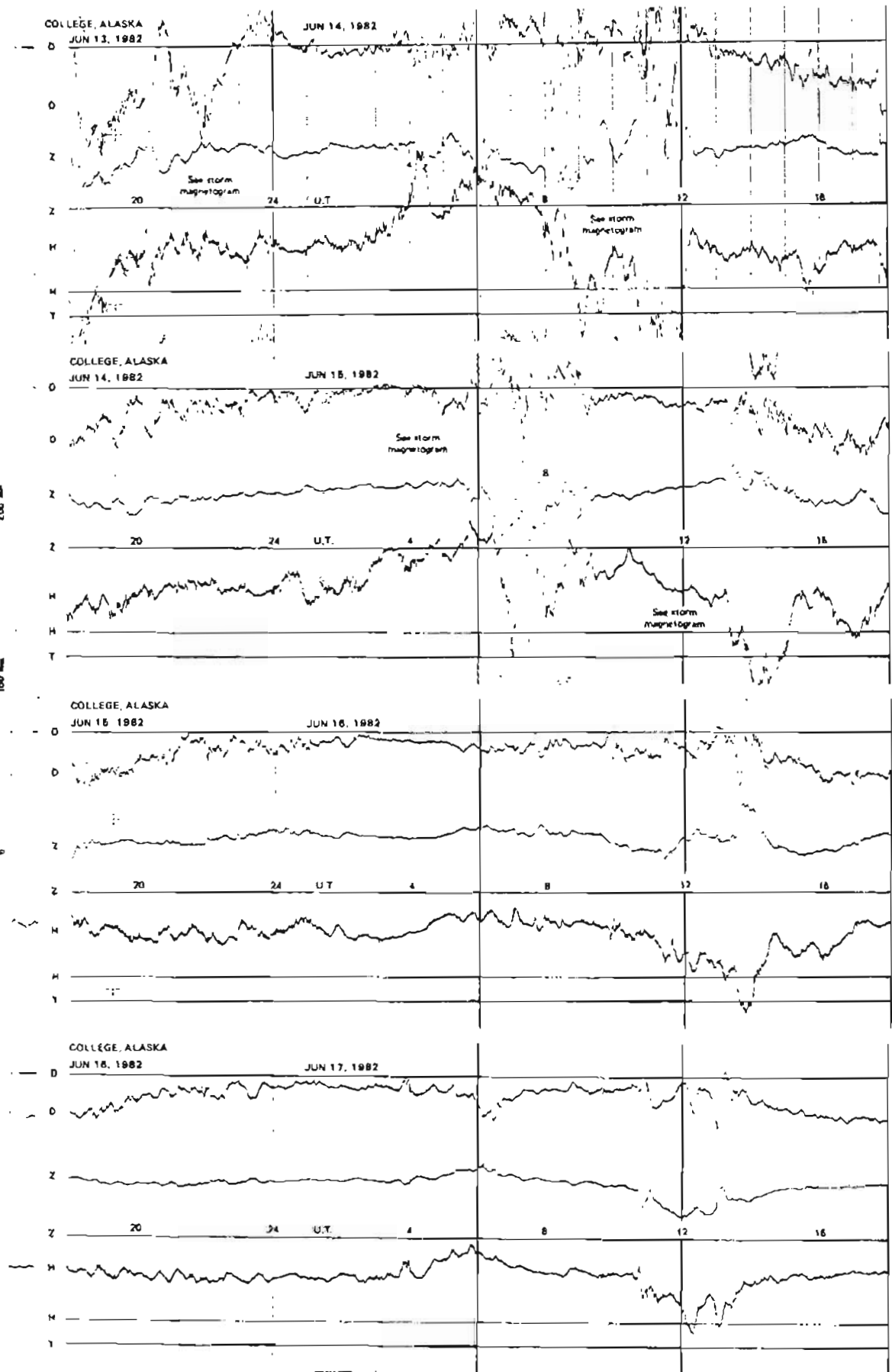
NORMAL MAGNETOGRAMS



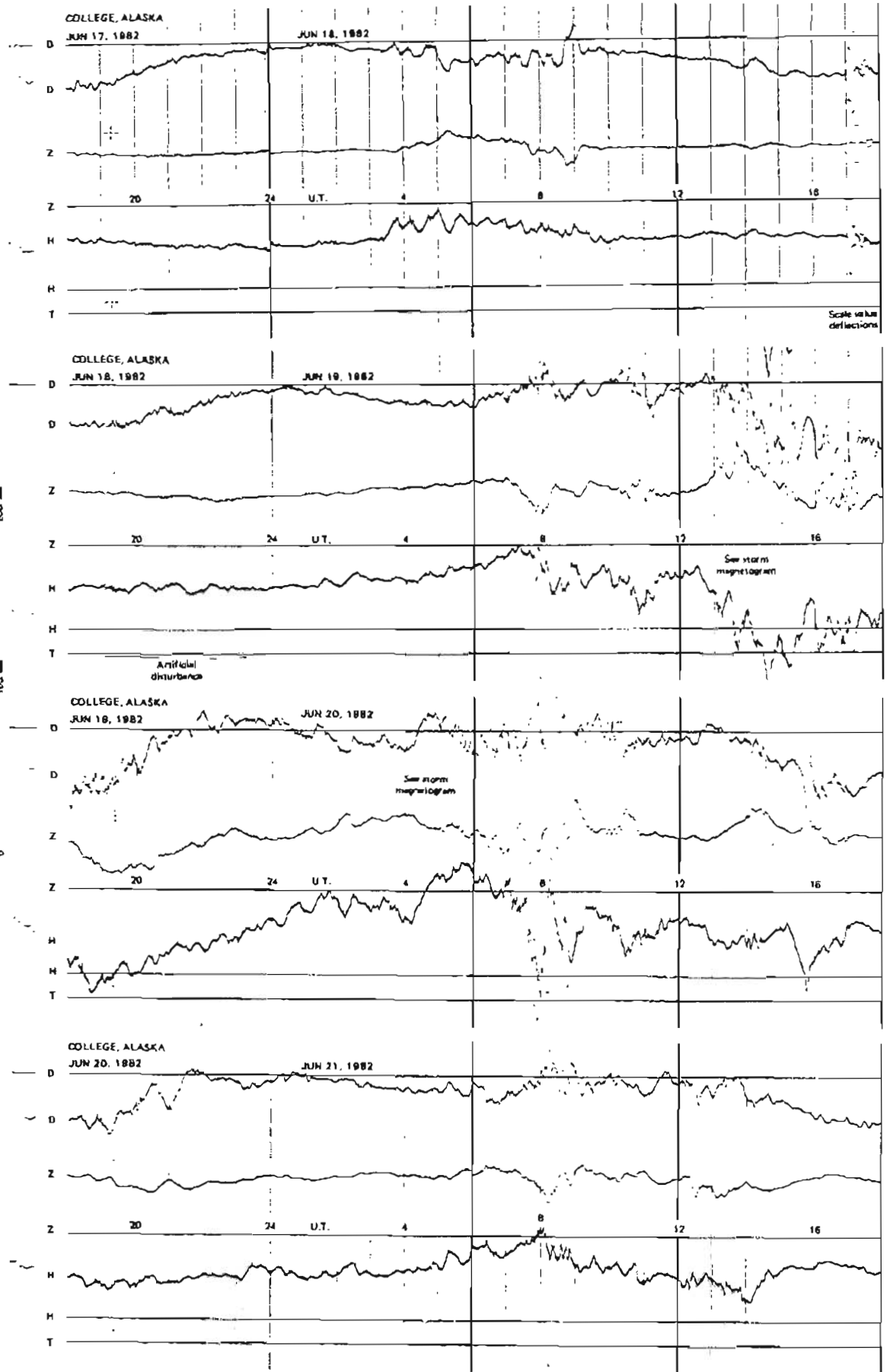
NORMAL MAGNETOGRAMS



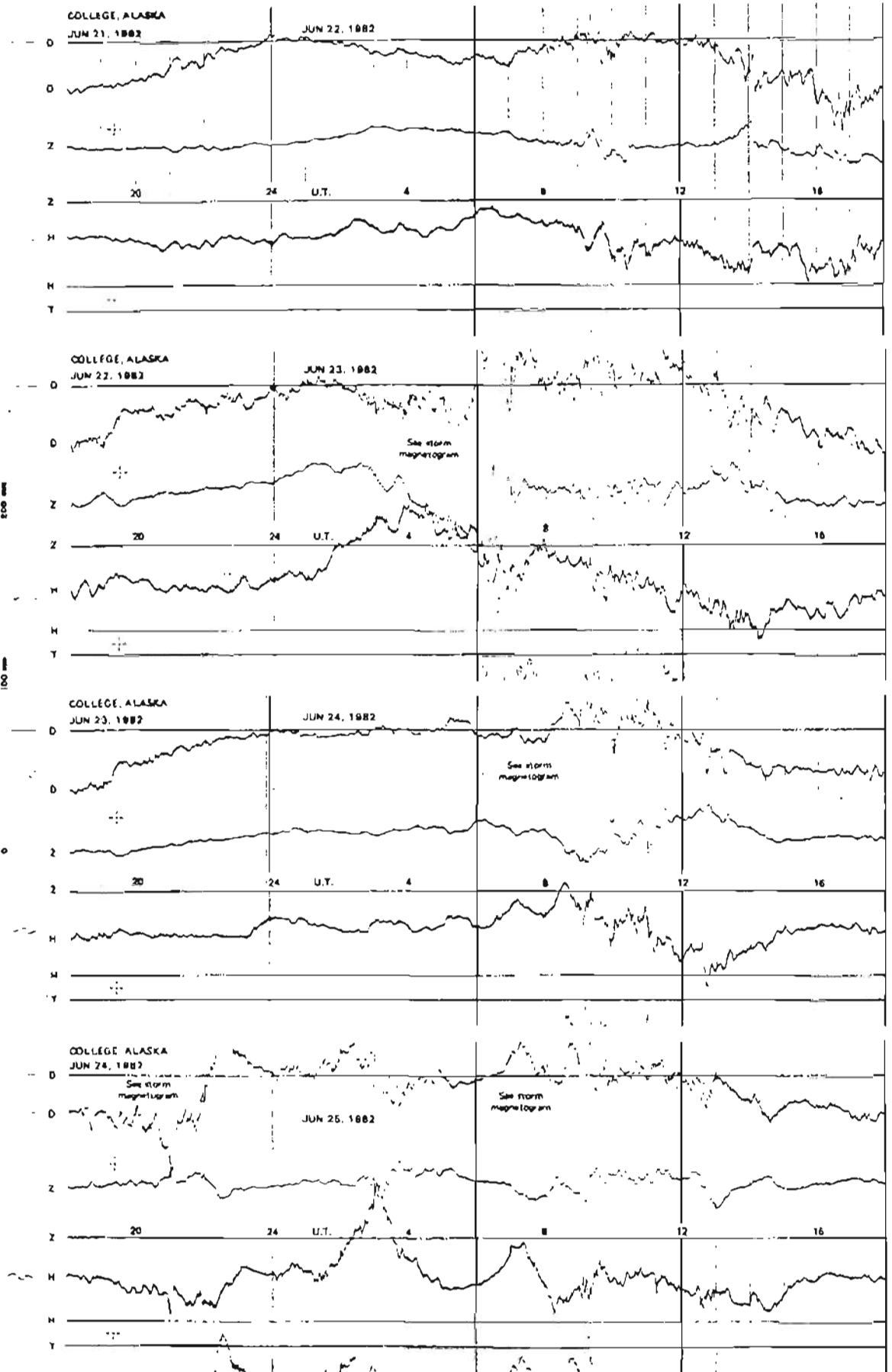
NORMAL MAGNETOGRAMS



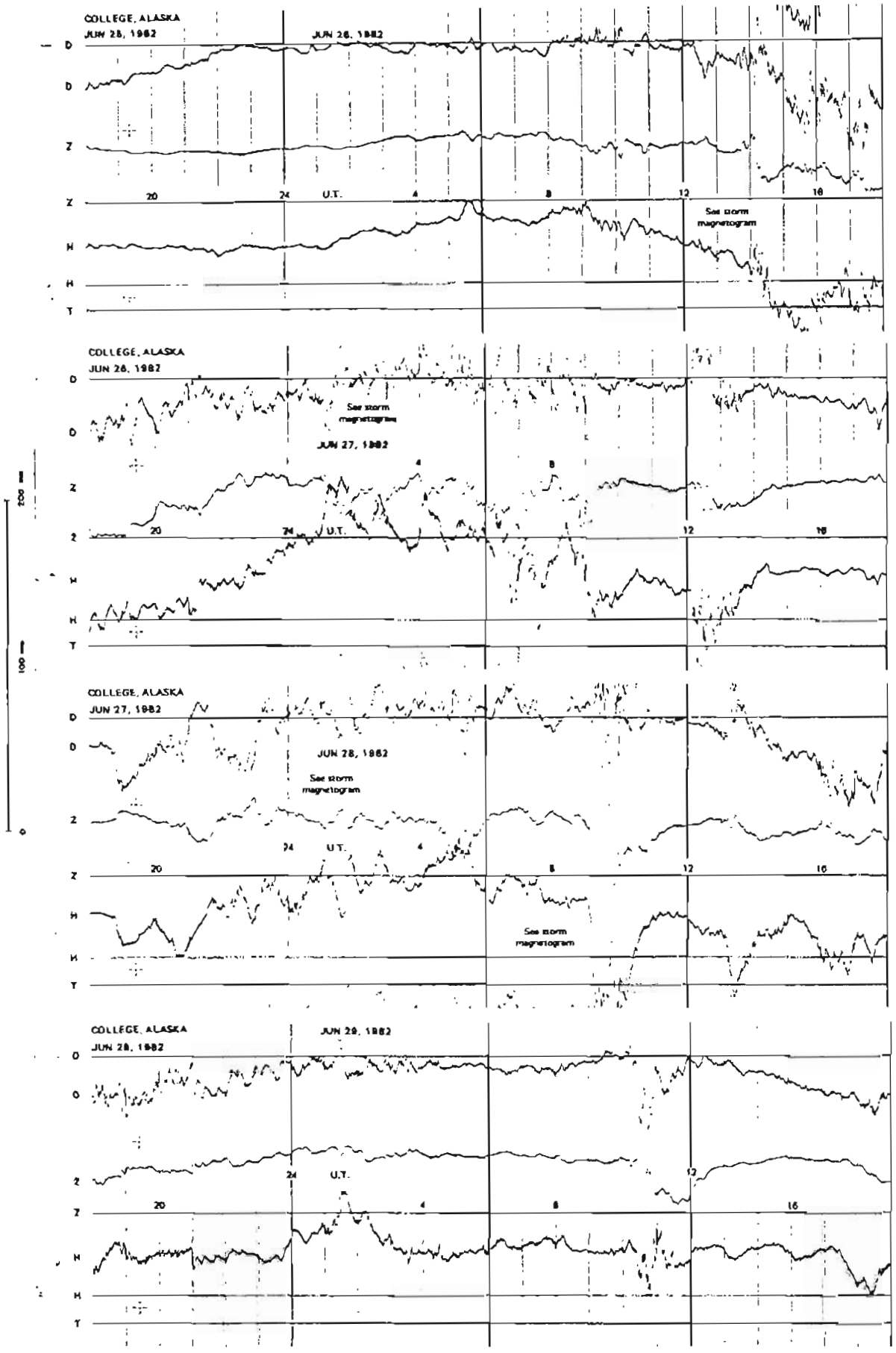
NORMAL MAGNETOGRAMS



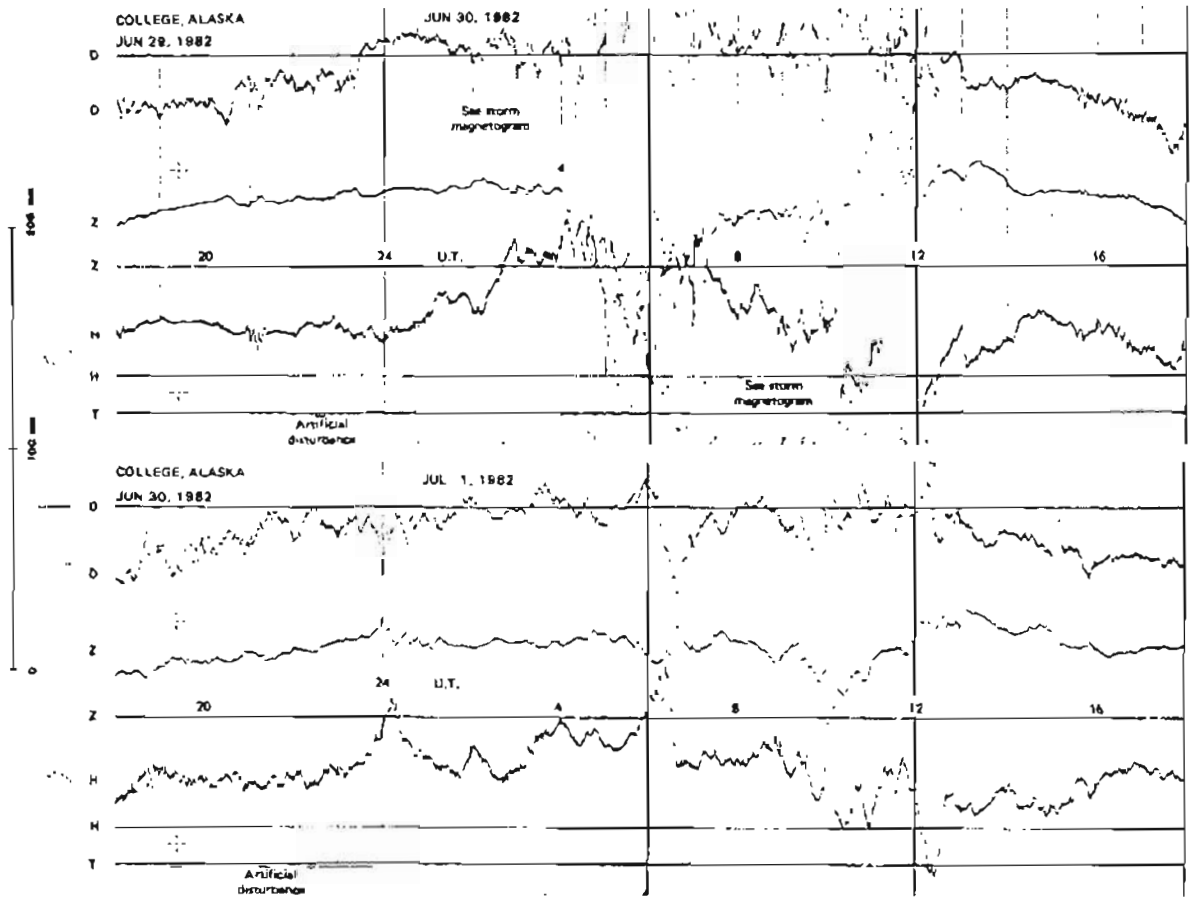
NORMAL MAGNETOGRAMS



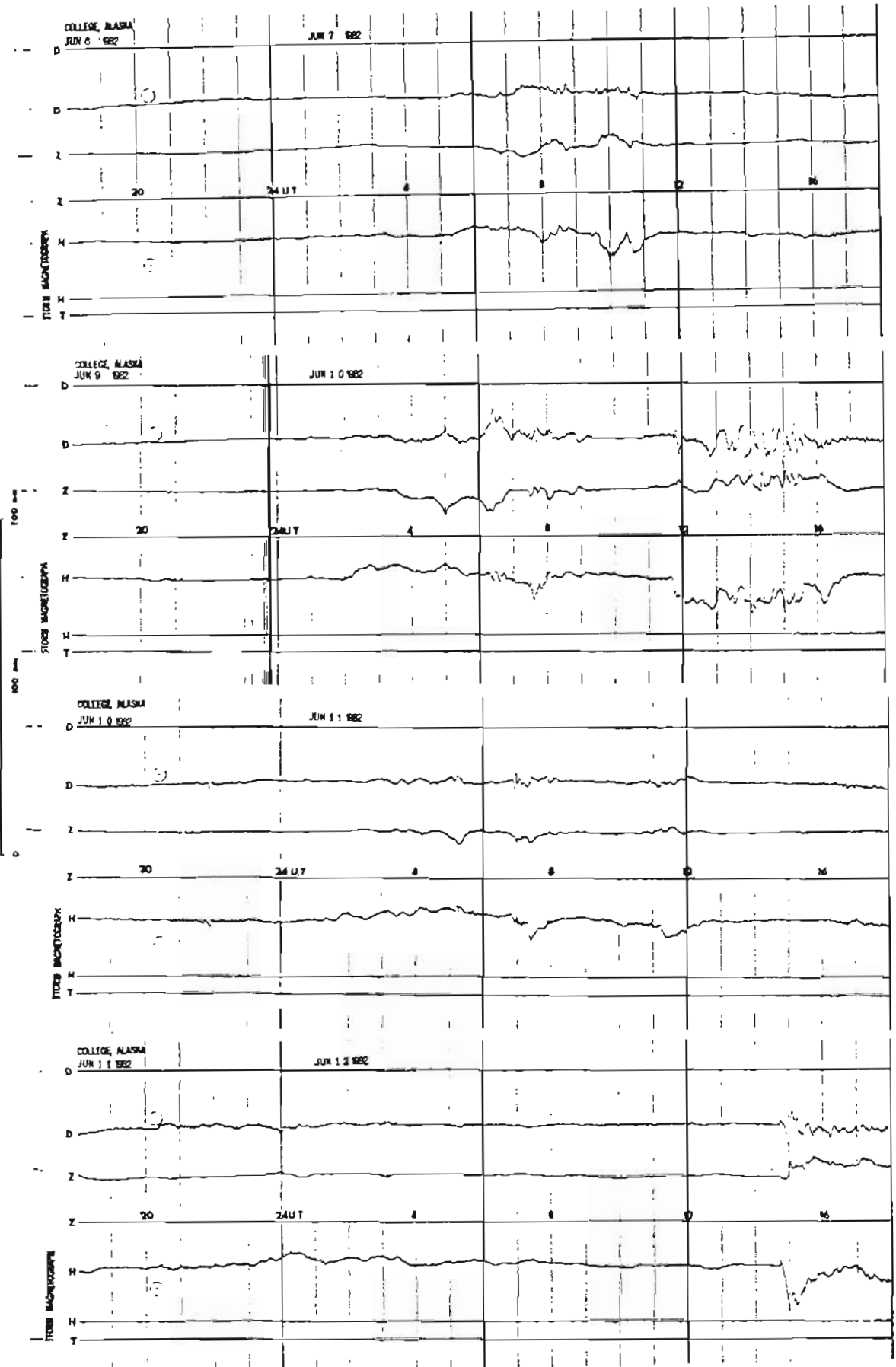
NORMAL MAGNETOGRAMS



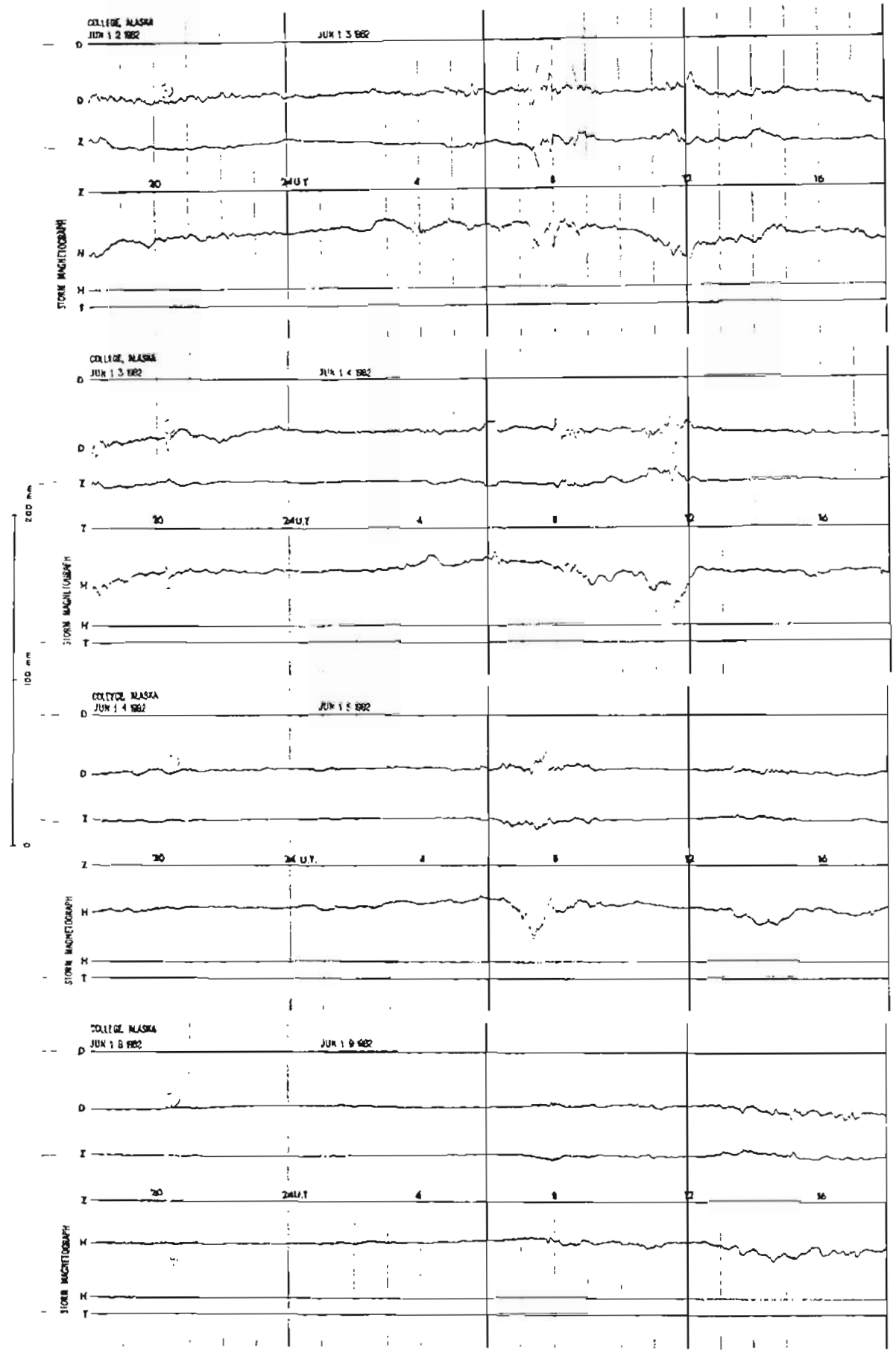
NORMAL MAGNETOGRAMS



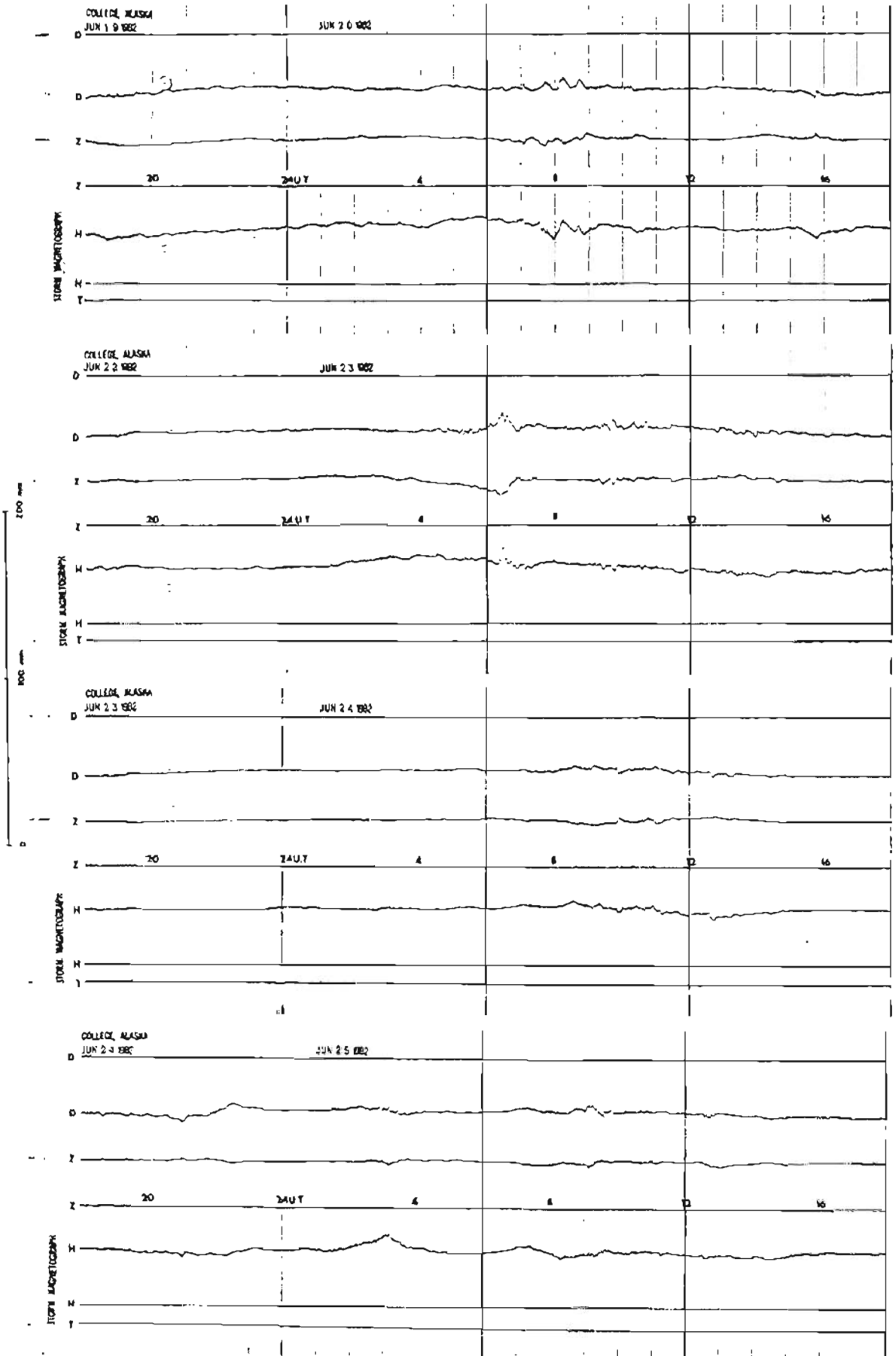
STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

