UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

OCTOBER 1976

OPEN FILE REPORT 76-300J

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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, M. J. MOORMAN, C. E. DEADMON, AND S. P. TILTON, 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.

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

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.

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

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.

COLLEGE, ALASKA

MAGNETIC ACTIVITY
(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

OCTOBER, 1976

DATE	K-INDICES									AK	TIME SCALE ON MAGNETOGRAMS 20mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM		
1	2	1	5	7	5	2	1	1	24	32	SUDDEN COMMENCEMENTS d h m
2	2	5	5	7	5	4	1	0	29	40	
3	1	1	2	5	3	3	0	0	15	11	
4	0	1	1	3	1	1	1	0	08	04	
5	2	2	2	5	0	1	0	1	13	09	
6	0	2	5	5	3	1	2	1	19	16	
7	1	1	0	1	2	2	1	0	08	03	
8	0	0	2	3	2	2	1	2	12	06	
9	1	1	1	3	4	0	1	0	11	07	
10	0	1	2	4	3	3	1	1	15	09	
11	2	1	0	1	3	3	1	1	12	06	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)
12	1	1	0	0	1	1	3	3	10	05	
13	2	3	4	4	3	2	2	1	21	14	
14	0	0	1	3	1	0	1	2	08	04	
15	2	3	4	6	6	5	3	4	33	37	
16	5	5	5	6	5	2	3	3	34	39	
17	3	3	6	7	7	3	3	2	34	53	
18	5	3	4	6	5	3	2	2	30	31	
19	0	0	1	3	4	5	1	1	15	12	
20	1	1	2	4	2	1	1	0	12	07	
21	1	1	1	4	2	1	1	1	12	07	BEGIN d h m
22	0	1	3	5	4	1	0	0	14	12	
23	0	0	2	4	2	2	0	0	10	06	
24	0	0	0	2	0	2	1	1	06	03	
25	1	1	0	0	1	0	0	0	03	01	
26	0	0	0	1	0	0	0	0	01	00	END d h m
27	0	0	2	3	2	2	2	1	12	06	
28	2	0	0	2	3	2	0	0	09	05	
29	0	0	0	1	0	0	0	0	01	00	
30	0	0	2	4	5	3	3	3	20	16	
31	3	4	6	6	6	6	3	3	37	49	

SUM

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9

D

H

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 OCTOBER	YEAR 1976
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
08	21XX	pc4		
12	23XX	pc5		
14	22XX	pc5		
19	08XX	pi2		
21	12XX	pg		
21	17XX	pg		
25	12XX	pi2		
IDENTIFIED BY: MJM, 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
COLLEGE OBSERVATORY, COLLEGE, ALASKA

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

Data from Individual Observatories:

OCTOBER 1976

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	64.6 N	02	00XX	..	..	..	..	02	4	7	160	1250	630	02 20
		15	05XX	..	..	..	..	17	4,5	7	229	1920	1070	18 21
		30	08XX	..	..	..	..	31	3,4,5,6	6	303	1200	760	NOV 01 12

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 10-1-76	2400 UT, 10-31-76	1'0/mm	3.8 γ/mm	28°07.2 E
H	0000 UT, 10-1-76	2400 UT, 10-10-76	7.8 γ/mm		12769 γ
	0000 UT, 10-11-76	2400 UT, 10-31-76	7.8 γ/mm		12758 γ
Z	0000 UT, 10-1-76	2400 UT, 10-31-76	7.6 γ/mm		55130 γ

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 10-1-76	2400 UT, 10-31-76	7.9' /mm	29.8 γ/mm	24° 21.7 E
H	0000 UT, 10-1-76	2400 UT, 10-31-76	44.1 γ/mm		11505 γ
Z	0000 UT, 10-1-76	2400 UT, 10-31-76	48.6 γ/mm		54001 γ

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D	0000 UT, 10-1-76	2400 UT, 10-31-76	0.3' /mm		1.0 γ/mm
H	0000 UT, 10-1-76	2400 UT, 10-31-76	1.0 γ/mm		
Z	0000 UT, 10-1-76	2400 UT, 10-31-76	2.4 γ/mm		

MONTHLY MEAN ABSOLUTE VALUES*					
D		H		Z	
28° 22.0 E		13048 γ		55356 γ	

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: OCT. 4, 7, 8, 12, 14, 24, 25, 26, 28, 29

76 OCT H

C	Q	W	T	F	S	S	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	342	342	335	358	367	360	362	391	267	-29	-447	225	01	341	112	237	357	358	355				358	364	353	359	319	352	6771	
	02	381	371	381	470	571	562	443	485	339	111	-114	-109	02	-42	-43	221	217	341	368				366	363	362	361	360	356	7061	
	03	354	357	374	375	365	372	376	364	396	297	243	369	03	383	364	278	276	340	346				347	352	362	356	353	352	8255	
	04	360	364	363	366	353	351	369	353	367	359	302	393	04	370	359	372	363	376	363				362	358	352	353	352	349	8629	
	05	362	361	376	398	413	368	395	368	401	244	266	395	05	375	366	361	341	332	341				349	350	357	363	356	359	8597	
	06	356	353	361	366	352	383	476	534	307	46	328	276	06	346	332	313	353	369	355				351	346	354	343	365	363	8358	
	07	356	357	353	367	359	358	358	361	362	362	348	363	07	346	323	302	345	313	321				356	358	355	356	359	361	8399	
	08	362	362	359	363	362	366	361	361	366	363	375	386	08	365	361	302	335	346	362				363	358	353	353	363	362	8615	
	09	369	372	363	351	362	376	374	369	373	376	366	348	09	252	239	231	280	378	363				342	345	359	351	354	362	8455	
	10	362	352	359	361	353	370	366	380	389	313	233	345	10	353	376	291	350	379	382				367	363	363	361	352	346	8416	
	11	354	364	385	373	368	365	363	364	365	369	370	362	11	278	233	224	265	371	374				375	356	343	335	342	352	8246	
	12	362	366	372	384	393	384	381	376	373	373	374	375	12	376	375	385	383	383	374				352	334	292	333	350	381	8831	
	13	350	362	373	372	383	449	460	426	408	360	319	384	13	363	313	302	353	372	384				369	365	357	354	360	362	8900	
	14	364	366	369	372	372	370	377	383	393	389	347	298	14	384	382	383	378	376	376				374	367	356	378	328	328	8749	
	15	341	376	376	375	397	463	473	487	470	162	-149	-41	15	-276	-256	-149	98	346	311				343	383	318	390	326	386	5930	
	16	509	473	507	633	409	416	347	404	239	60	264	29	16	81	51	190	373	368	343				328	318	341	366	354	401	7804	
	17	388	385	411	405	383	401	400	236	326	185	-144	206	17	-114	-228	288	374	358	302				331	342	386	394	355	361	6101	
	18	412	404	566	449	392	422	389	400	404	406	371	-41	18	283	371	372	369	293	365				347	339	330	347	372	367	8649	
	19	363	362	363	366	369	369	370	370	366	372	367	303	19	117	255	257	33	283	366				366	359	360	362	372	373	7843	
	20	362	349	373	392	390	373	386	383	382	328	189	332	20	308	335	346	359	383	358				362	366	365	361	355	358	8445	
	21	363	376	379	366	363	380	413	402	403	435	352	273	21	396	401	378	372	368	365				367	366	375	376	379	382	9047	
	22	372	366	371	378	380	380	379	398	402	381	306	29	22	191	338	375	385	380	379				371	366	365	368	372	372	8404	
	23	373	373	371	368	368	369	402	395	401	359	335	420	23	309	382	342	311	321	344				366	365	369	371	372	375	8841	
	24	382	383	379	378	377	373	381	379	391	393	386	380	24	383	368	357	359	350	364				366	363	363	365	371	375	8941	
	25	371	363	355	366	383	378	372	374	373	372	371	370	25	359	373	375	323	372	363				361	357	363	368	371	371	8858	
	26	365	366	372	382	381	385	383	383	388	390	398	384	26	383	378	382	379	379	379				372	370	366	366	367	370	9068	
	27	379	383	384	383	380	382	382	409	416	391	342	293	27	386	354	368	387	399	382				386	382	359	342	353	368	8946	
	28	376	388	384	382	381	382	382	381	381	219	376	952	28	272	262	271	320	356	392				384	371	264	366	368	373	8643	
	29	378	381	383	385	385	380	386	384	387	384	383	377	29	383	379	284	386	381	382				382	380	372	372	376	379	9145	
	30	380	383	384	386	388	372	394	389	411	467	472	362	30	-110	-94	145	349	348	271				333	393	391	358	319	335	7846	
	31	373	409	378	582	443	542	214	430	357	-231	-8	302	31	279	-203	-406	-302	103	419				408	383	378	382	403	386	5757	

SCALED BY	SP7, AMN	Preliminary base-line and scale values:	Interpolated	Scaling uncertain because	MONTHLY SUM
CHECKED BY	HJM, CED	Interval Beginning	Scale Value	☐ Significant portion of hour interpolated. ☐ No record or no values given, curve was estimated from base-line or faulty record.	MONTHLY MEAN
SIGNS RE- VIEWED BY	AMN			☐ Scaling uncertain because <> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.	DATES WITH GAPS
PUNCHED BY				• Derived from <u>Storm</u> Mph., converted to Normal Mph.	342
					254548

FORM 605-4846
1-5-57

MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (1500 M.T.) is hour 11 of the 8000 universal day.
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

U.S. DEPARTMENT OF COMMERCE NATIONAL BUREAU OF STANDARDS COAST AND GEODETIC DIVISION SEISMOGRAPHIC DIVISION		OBSV.																										YEAR		MONTH		CLIP		HEAT																																																																																																																																																														
ENVIRONMENTAL SERVICE DIVISION		COAST AND GEODETIC DIVISION																										76		OCT		Z																																																																																																																																																																
10-437		00																										00																																																																																																																																																																				
C		Q		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																																																																																																																																										

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

200 mm
100 mm
0

STORM MAGNETOGRAMS