UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

OCTOBER 1982

OPEN FILE REPORT 82-0300J

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, 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..... $+64.8^{\circ}$
Geomagnetic longitude..... -256.9°
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 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 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) U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION										OBSERVATORY COLLEGE OBSERVATORY	
MAGNETIC ACTIVITY (Greenwich civil time, counted from midnight to midnight)										MONTH AND YEAR October 1982	
DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS
	00-03 0	03-06 3	06-09 6	09-12 9	12-15 12	15-18 15	18-21 18	21-24 21			20 mm/hr
1	2	3	5	6	4	6	5	4	35	42	SUDDEN COMMENCEMENTS d h m
2	3	4	5	6	5	3	4	2	32	33	
3	2	1	4	3	4	4	2	1	21	15	
4	1	3	5	4	5	5	1	2	26	25	
5	2	3	3	1	1	1	2	1	14	07	
6	2	4	4	5	5	5	4	3	32	31	
7	4	5	6	5	4	7	2	3	36	49	
8	3	5	5	5	6	5	3	2	34	39	
9	1	0	1	2	1	2	0	1	08	03	
10	2	1	1	4	4	2	2	3	19	12	
11	3	3	4	4	3	2	2	1	22	15	
12	1	2	2	5	2	3	4	3	22	16	
13	2	3	3	5	6	6	3	4	32	36	
14	4	4	7	6	5	5	5	3	39	54	
15	1	2	2	5	3	1	2	1	17	12	
16	1	1	2	3	4	5	3	3	22	17	
17	4	4	3	5	4	3	3	4	30	25	
18	3	4	4	5	5	7	3	3	34	42	
19	3	2	3	3	4	4	3	3	25	17	
20	3	4	6	5	5	2	1	1	27	29	
21	2	2	2	2	1	2	2	1	14	06	
22	0	1	1	2	1	1	0	0	06	02	
23	0	0	2	2	1	3	2	0	10	05	
24	0	0	0	2	0	1	0	0	03	01	
25	1	4	3	4	5	5	4	2	28	25	
26	6	5	5	4	4	3	1	1	29	31	
27	1	2	4	4	5	5	2	2	25	22	
28	1	1	2	5	4	1	2	2	18	13	
29	2	4	6	6	6	6	4	3	37	50	
30	3	3	5	7	6	5	5	3	37	51	
31	2	3	3	1	3	4	7	4	27	31	

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D	H	Z
683.8	321.7	
3.73	7.79	
2550	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 YEAR
OCTOBER 1982

DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS
22	14xx	pc4	
24	10xx	pc2	
26	0029	si*	
<p>IDENTIFIED BY: JBT</p> <p>VERIFIED BY: EAS</p>			

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 1982 OCTOBER

WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80501 U.S.A.

Data from Individual Observatories:

Obs. 2 letter IAO 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
CO	64.6 N	06	01XX	..	..	..	..	07	6	7	172	1390	780	08	22
		13	06XX	..	..	..	..	14	3	7	231	1350	910	14	22
		25	04XX	..	..	..	..	26	1	6	178	980	810	26	14
		29	04XX	..	..	..	..	30	4	7	274	1430	720	30	21
		31	12XX	..	..	..	..	31	7	7	294	1780	910	Nov 03	14
								Nov 01	5	7					
								02	5	7					
								03	3	7					

OCTOBER

1982

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 10-1-82	2400 U.T., 10-31-82	1.6/mm	3.78/mm	27° 47.4 E
H	0000 U.T., 10-1-82	2400 U.T., 10-31-82	7.88/mm		127658
Z	0000 U.T., 10-1-82	2400 U.T., 10-31-82	7.58/mm		551328

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 10-1-82	2400 U.T., 10-31-82	7.9/mm	29.68/mm	23° 41.3 E
H	0000 U.T., 10-1-82	2400 U.T., 10-31-82	44.08		115218
Z	0000 U.T., 10-1-82	2400 U.T., 10-31-82	48.58		540488

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 57.6 E	129528	553958

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: OCT 3, 5, 9, 10, 15, 21, 22, 23, 24, 28

[illegible]

MAGNETOGRAM HOURLY SCALINGS

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Strokeplay corrections have been applied. Negative values are in red, with minus signs shown.

te _____ universal day.

82-031

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C	U	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
01	416	413	423	451	442	424	390	341	313	206	202	299	342	409	469	289	297	290	104	248	367	415	473	434	8470	
02	426	380	412	432	460	246	246	331	450	651	431	438	605	696	406	316	306	353	337	321	350	379	318	385	9755	
03	409	410	390	391	385	407	400	414	418	327	372	380	389	451	325	245	314	344	368	360	367	372	381	379	9018	
04	385	390	394	390	381	411	416	415	347	247	341	451	534	495	521	318	356	397	385	376	368	382	387	392	9529	
05	405	388	401	396	453	471	448	439	416	389	382	369	360	358	366	372	376	366	340	365	364	362	373	375	9324	
06	400	430	410	429	468	463	425	398	403	399	401	493	270	298	342	301	270	334	310	232	267	246	362	395	8835	
07	384	393	314	292	24	123	153	265	418	461	519	485	632	592	496	1612	425	164	302	339	373	379	385	395	8669	
08	419	318	381	346	380	421	431	395	202	140	265	363	365	362	444	297	95	158	193	296	321	370	368	378	7811	
09	385	396	384	376	376	374	376	373	382	367	369	365	343	348	362	333	337	351	359	366	374	349	346	352	5699	
10	355	375	369	361	362	359	369	376	312	364	338	377	357	304	340	340	340	345	340	339	346	320	331	345	8428	
11	368	364	363	355	372	370	316	430	422	386	367	367	336	346	302	325	338	316	328	348	345	349	360	360	8541	
12	355	361	364	372	360	374	388	365	370	346	528	297	312	351	338	367	309	339	331	338	388	282	307	332	8364	
13	340	354	380	441	388	418	357	408	393	322	222	298	450	509	103	482	347	206	235	164	242	345	396	419	8849	
14	403	400	242	247	330	78	73	165	335	657	558	478	683	560	448	269	89	94	44	24	160	290	339	352	7348	
15	372	378	377	368	367	375	370	379	382	310	172	308	371	373	341	351	357	358	355	320	324	334	344	350	8336	
16	352	352	358	351	351	355	376	376	330	290	315	305	361	350	348	373	294	189	256	314	310	325	313	349	7895	
17	360	368	348	365	427	375	364	364	338	350	358	352	443	365	369	340	343	343	337	329	296	315	303	394	8586	
18	364	380	395	381	378	396	378	369	326	349	346	484	472	580	387	11	37	270	324	332	346	362	363	385	8343	
19	377	376	362	382	372	363	402	353	369	365	368	336	256	271	281	306	330	304	290	260	323	347	331	334	8158	
20	222	382	402	416	404	382	342	299	79	386	372	445	20	553	382	311	330	368	368	366	362	360	363	366	8620	
21	367	374	381	383	371	378	396	400	374	390	394	368	21	362	342	343	343	312	299	314	324	325	326	341	8543	
22	356	351	354	372	366	358	360	367	360	345	342	324	22	319	332	332	327	336	343	343	341	342	340	343	8302	
23	349	347	343	345	346	347	366	377	376	372	342	352	23	346	324	320	286	202	188	240	300	322	331	336	7193	
24	341	342	340	343	349	350	355	359	360	361	356	326	24	313	330	333	311	247	229	250	258	278	292	311	332	7666
25	338	342	351	361	390	277	357	368	255	312	350	449	25	474	619	376	213	118	25	122	246	342	382	376	364	7807
26	358	425	434	422	252	-15	15	280	330	342	344	404	26	445	316	343	337	347	345	323	348	350	354	352	355	7806
27	365	366	368	360	352	380	366	353	361	262	258	337	27	346	392	489	254	248	261	270	289	304	339	363	359	8032
28	364	363	365	360	366	374	383	368	419	364	308	234	28	366	312	244	309	345	356	358	351	332	332	330	332	8035
29	342	351	348	348	314	134	112	250	314	440	444	417	29	512	652	437	405	280	266	304	359	370	386	385	386	2566
30	390	376	390	406	401	382	297	362	326	516	516	573	30	516	509	471	311	321	289	61	158	302	363	381	389	9006
31	390	376	381	372	348	343	370	381	372	362	362	354	37	332	333	326	313	278	314	393	224	214	321	358	350	8142

- 3) Interpolated
 - ☐ Specified portion of how imputed
 - ☐ No repaid; no values available because of faulty record
 - ☐ Scaling uncertain because of magnetic bloom
 - ☐ Record off sheet for past or all of how; if value is present, error was estimate for missing part.

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...the ...

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$$\xi_{\text{c}} = 16$$

$$\eta = 1.5$$

Parameter	Value
Parameter	Value

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	Population	Interval	Beginning
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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

200 nm
100 nm
0

NORMAL MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS