UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

JULY 1983

OPEN FILE REPORT 83-03006

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 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
500 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°
Geomagnetic longitude..... $+236.9^{\circ}$
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 J-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, ΔK : The K-Index is converted into an equivalent range, ΔK , 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 ΔK . 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 ΔK is as follows:

Gamma Range	K - Index	ΔK
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 ΔK as follows:

ΔK 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:

$$D = B_0 + d \cdot S_d; H = B_0 + h \cdot S_H; Z = B_0 + z \cdot S_Z$$

where D, H and Z are absolute values;

B_0 , 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 OBSERVATORY

MONTH AND YEAR
JULY 1983

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

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														
1	2	2	2	3	1	1	2	1	14	07	SUDDEN COMMENCEMENTS d h m												
2	2	2	2	2	4	2	2	2	18	10													
3	3	1	4	3	2	1	2	2	18	11													
4	2	2	2	1	1	3	2	2	15	07													
5	2	1	3	3	0	1	1	0	11	06													
6	1	2	4	5	5	3	2	2	24	20													
7	2	3	3	5	5	4	2	2	26	22													
8	3	2	3	4	4	2	2	2	22	14													
9	3	4	3	6	2	2	2	2	24	21													
10	2	2	2	1	0	1	1	1	10	04													
11	0	1	1	3	2	1	1	0	09	04	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)												
12	1	1	1	4	4	5	3	3	22	18													
13	4	4	5	6	6	2	1	2	30	35													
14	2	3	3	3	4	2	2	1	20	12													
15	2	2	2	2	1	1	1	2	13	06													
16	2	4	3	3	5	3	3	3	26	20													
17	5	4	5	6	4	3	3	3	33	34													
18	4	4	4	4	3	4	2	2	27	21													
19	3	3	4	4	4	4	2	1	25	19													
20	3	3	4	2	1	1	2	2	18	11													
21	2	2	3	4	3	3	1	1	19	12	<table><tr><th colspan="3">BEGIN</th><th colspan="3">END</th></tr><tr><th>d</th><th>h</th><th>m</th><th>d</th><th>h</th><th>m</th></tr></table>	BEGIN			END			d	h	m	d	h	m
BEGIN			END																				
d	h	m	d	h	m																		
22	2	2	2	4	2	1	2	3	18	10													
23	3	4	3	4	2	3	3	4	26	19													
24	5	4	6	6	7	5	4	2	39	57													
25	4	3	5	4	3	4	2	1	26	21													
26	3	2	2	4	4	3	2	2	22	14													
27	2	2	2	4	2	1	2	2	17	09													
28	2	3	3	4	3	4	3	2	24	16													
29	3	4	3	5	5	3	2	2	27	23													
30	4	4	3	7	5	2	3	2	30	36													
31	3	2	1	2	5	2	2	1	18	12													

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

683.8

H

321.7

Z

(mm)

(γ/mm)

(to nearest 10γ)

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN E. TOWNSHEND, CHIEF, COLLEGE OBSERVATORY

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY
COLLEGE, ALASKA

MONTH
JULY

YEAR
1983

DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS
02	10xx	pi 2	
10	06xx	pi 2	
22	09xx	pi 2	With Bay
<div> <div>IDENTIFIED BY: JEP</div> <div>VERIFIED BY: EAS</div> </div>			

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
JULY 1983

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

Data from Individual Observatories:

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	12	11XX	..	..	..	..	13	4, 5	6	105	1080	480	13	16
		16	00XX	..	..	..	..	17	4	6	127	1150	470	18	17
		22	20XX	..	..	..	..	24	5	7	131	1520	720	25	23
		28	05XX	..	..	..	..	30	4	7	163	1530	520	30	15

JULY

1983

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T. 7-1-83	2400 U.T. 7-31-83	1.0/mm	3.78/mm	27° 16.9 E
B	0000 U.T. 7-1-83	2400 U.T. 7-31-83	7.88/mm		126878
Z	0000 U.T. 7-1-83	2400 U.T. 7-10-83	7.78/mm		551468
	0000 U.T. 7-11-83	2400 U.T. 7-24-83	"		551508
	0000 U.T. 7-25-83	2400 U.T. 7-31-83	"		551418

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T. 7-1-83	2400 U.T. 7-31-83	7.9/mm	29.68/mm	24° 20.8 E
B	0000 U.T. 7-1-83	2400 U.T. 7-31-83	43.98/mm		108238
Z	0000 U.T. 7-1-83	2400 U.T. 7-31-83	48.48/mm		540748

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D					
B					
Z					

MONTHLY MEAN ABSOLUTE VALUES*					
D	B	Z			
27° 51.2 E	129558	553718			

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: JUL 1, 2, 3, 4, 5, 10, 11, 15, 22, 27

FORM 76-106		MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)																				U.S. DEPARTMENT OF INTERIOR Geological Survey, Columbia Station Denver Federal Office Denver, CO 80221		DATE	YEAR	MONTH	FILE- MARK
Values are in tenths of gauss, 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 2200 universal day. Knowledge corrections have been applied. Negative values are in red, with minus signs shown.																						CO	83	JUL	D		
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			
	268	262	253	286	321	331	340	327	330	358	304	306	316	331	356	401	418	444	441	417	500	348	316	262	8198		
	248	269	301	323	327	322	298	321	307	301	310	330	358	363	360	431	501	514	450	458	400	318	329	276	8467		
	256	257	278	296	316	325	319	308	312	288	311	296	338	378	358	419	484	494	509	511	368	348	300	262	8366		
	248	256	270	291	288	346	328	313	308	340	316	306	307	346	348	406	472	453	468	428	326	314	298	276	8056		
	274	266	271	298	310	328	326	318	319	291	343	346	342	333	378	425	479	514	468	445	366	353	309	294	8418		
	283	262	238	251	270	243	266	282	308	296	178	242	400	376	424	479	516	540	482	440	360	284	216	251	7977		
	253	270	282	286	329	328	341	314	287	329	240	303	436	421	461	540	556	535	491	414	427	310	274	256	8668		
	244	228	258	254	295	282	282	476	351	268	299	274	334	316	356	424	481	552	528	451	396	340	297	237	8227		
	227	221	203	293	286	311	296	322	279	295	301	263	298	320	371	435	461	504	490	457	348	353	244	258	7900		
	228	242	248	284	316	319	326	378	337	340	310	307	314	344	391	425	438	460	456	453	381	317	276	266	8156		
	256	256	280	299	314	317	320	320	324	327	366	374	380	358	380	408	470	501	486	456	405	360	313	298	8568		
	264	263	266	299	319	336	352	344	346	332	346	346	250	458	416	516	472	442	521	484	341	353	265	178	8520		
	243	218	305	250	259	200	255	157	315	539	394	461	230	316	375	382	447	415	430	408	355	335	288	286	7902		
	275	295	293	299	322	303	347	352	339	289	280	291	292	313	391	439	488	485	441	426	356	316	314	319	8265		
	299	285	285	280	309	330	305	318	302	301	335	314	297	331	345	403	441	487	457	429	391	351	332	301	8198		
	256	223	200	177	225	200	301	311	255	233	222	245	300	358	427	452	494	545	426	445	438	254	226	249	7708		
	245	198	250	164	194	256	349	254	286	357	328	262	402	422	448	441	575	431	409	415	494	303	251	262	7296		
	226	215	216	228	176	194	251	296	310	274	477	304	325	403	393	443	412	446	484	415	437	390	292	237	7984		
	223	252	265	249	263	278	307	291	296	290	271	293	326	360	315	422	514	505	472	454	389	289	221	240	7814		
	235	230	233	294	300	290	328	368	353	295	290	300	318	340	376	426	464	470	448	409	371	342	281	261	8037		
	266	244	258	210	259	270	291	286	314	336	272	385	316	347	386	422	452	482	486	427	415	329	308	287	8048		
	275	264	266	254	242	246	299	314	328	288	308	342	355	350	400	458	507	500	468	490	448	424	268	139	8233		
	211	225	227	262	292	302	313	354	296	111	266	346	341	405	446	518	576	600	593	467	349	353	345	356	8554		
	354	310	348	228	136	264	103	262	190	357	226	258	245	214	323	409	571	498	493	385	351	324	302	324	7495		
	279	251	228	289	342	342	324	316	172	397	290	340	375	311	390	508	466	488	474	457	401	351	293	257	8341		
	255	232	274	310	284	344	309	341	303	313	312	311	346	311	382	398	458	468	462	455	428	374	316	286	8332		
	239	243	270	274	311	334	336	373	317	282	481	337	330	328	352	414	466	478	464	458	384	393	364	257	8477		
	246	241	261	278	286	300	342	312	318	299	294	346	365	309	286	409	464	452	508	471	398	349	318	267	8121		
	235	244	202	202	326	292	350	332	306	355	307	363	446	294	337	356	429	504	468	430	406	350	264	299	8097		
	264	246	267	257	219	328	356	314	271	257	348	270	260	372	327	392	432	460	460	450	442	307	282	276	7879		
	255	251	260	292	308	376	331	321	322	358	290	304	248	372	360	382	426	468	474	436	400	365	292	269	8182		

SCALED BY	LYT, TKC	Preliminary base-line and scale values:	
CHECKED BY	JIT, TKC	Interpol	Base-line Value
INITIALS	JEP	Beginning	Scale Value
PUNCHED BY			

() Interpolated	() Scaling variation because of magnetic storm.
() Significant portion of hour interpolated.	() Record all sheets for part or all of hour, if value is given, curve was estimated for missing part.
() No record, or no values available because of faulty record.	
* Derived from STORM Apph., converted to Normal Apph.	

MONTHLY SUM	253206
MONTHLY MEAN	340
DATES WITH GAPS:	

OSBY	YEAR	WPAID	CLE- MENT
CO	83	JUL	2

Values are in months of age, and age weights for successive periods of our data beginning at midnight, hour 01 of local day (150 G.T.) are hour 11 of the same universal day. Smaller corrections have been applied. Negative values are in red, with minus signs shown.

C		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	298	312	340	354	364	362	340	348	326	309	216	232	01	264	300	306	316	302	298	290	288	284	285	286	281	7365																																																																											
02	265	265	299	226	316	311	307	351	321	319	305	276	02	225	218	276	271	253	262	260	291	292	274	285	291	6919																																																																											
03	307	311	324	329	307	295	298	302	307	259	306	284	03	291	302	312	313	292	277	272	276	248	270	270	272	7015																																																																											
04	273	286	304	314	330	346	339	322	312	313	291	287	04	282	286	300	274	232	230	270	270	229	232	254	266	6862																																																																											
05	267	306	202	316	299	297	291	294	303	211	286	303	05	282	296	302	294	290	270	266	266	265	264	266	274	6832																																																																											
06	281	290	298	315	315	319	345	329	274	225	166	238	06	294	134	231	235	203	218	248	265	275	276	276	300	6344																																																																											
07	302	316	319	338	344	320	313	299	302	231	176	318	07	425	223	220	196	168	164	246	274	298	272	269	310	6759																																																																											
08	307	309	324	344	340	322	325	325	218	286	300	342	08	318	264	262	307	310	297	256	222	227	238	248	260	6951																																																																											
09	262	263	310	401	372	335	318	336	296	277	107	167	09	243	264	281	294	286	246	264	266	254	267	266	311	6790																																																																											
10	304	320	329	350	323	314	330	314	290	292	290	269	10	286	295	297	292	286	289	289	289	281	273	269	278	7169																																																																											
11	286	266	291	291	291	293	303	304	309	306	296	218	11	204	232	274	294	300	287	289	288	280	277	282	286	6769																																																																											
12	291	295	296	297	296	296	296	298	294	295	298	256	12	202	184	202	264	227	268	270	200	165	226	229	226	6175																																																																											
13	273	341	366	346	339	244	196	175	317	339	261	405	13	339	240	256	290	297	295	268	290	289	294	292	305	7159																																																																											
14	300	309	335	366	363	338	343	314	313	303	278	316	14	353	279	214	250	272	269	270	276	273	266	280	293	7179																																																																											
15	305	300	331	330	342	346	338	363	334	302	268	268	15	273	274	267	279	264	227	232	269	278	276	273	270	7015																																																																											
16	276	264	320	351	348	361	407	341	290	285	253	271	16	365	362	354	292	286	302	266	249	272	231	255	276	7337																																																																											
17	312	258	325	315	318	335	369	286	242	33	209	246	17	37	153	239	153	141	169	215	249	292	256	231	261	5674																																																																											
18	280	276	319	293	324	282	324	281	295	258	176	150	18	241	267	264	251	199	271	287	263	281	287	271	274	6418																																																																											
19	292	315	316	317	320	335	340	331	248	222	253	242	19	196	150	193	245	197	188	218	227	243	246	259	294	6193																																																																											
20	301	304	319	347	328	302	319	310	235	284	304	292	20	287	303	304	296	286	285	295	280	270	274	272	279	7096																																																																											
21	297	301	305	292	341	349	377	374	332	278	242	274	21	247	291	259	184	208	231	235	225	239	236	260	274	6651																																																																											
22	286	311	344	328	341	365	368	352	327	291	246	221	22	204	216	254	266	262	268	278	290	265	280	257	243	6883																																																																											
23	251	267	271	292	296	297	324	332	268	194	418	421	23	329	286	258	233	186	207	198	184	214	257	275	337	6595																																																																											
24	319	152	34	106	30	34	34	229	326	310	334	378	24	645	467	304	332	436	297	279	228	265	279	292	326	6370																																																																											
25	348	360	330	344	335	378	377	294	203	227	243	258	25	253	202	248	252	268	293	275	269	278	287	301	305	6928																																																																											
26	316	321	346	367	339	366	356	344	330	327	325	293	26	326	241	158	178	209	240	292	294	289	291	295	301	7144																																																																											
27	297	309	324	321	333	335	325	346	323	297	252	231	27	280	299	310	312	314	294	306	298	261	291	296	297	7271																																																																											
28	305	314	318	327	324	364	372	365	354	325	322	338	28	260	268	331	305	309	307	297	309	296	288	293	306	7639																																																																											
29	303	326	337	364	402	386	406	314	283	346	352	507	29	478	420	297	324	328	314	279	276	282	291	288	296	6199																																																																											
30	329	400	404	410	415	425	376	374	344	300	368	470	30	459	443	232	311	344	332	308	303	312	296	331	350	8659																																																																											
31	370	363	354	357	367	368	346	340	336	303	307	312	31	287	240	245	299	319	318	310	291	290	296	296	299	7605																																																																											
SCALED BY		LYT, TAC				Preliminary base-line and scale values:																		1) Interpolated										2) Scaling uncertain because of magnetic storm.										MONTHLY SUM		215965																																																							
CHECKED BY		TAC, JEP				Interval Beginning																		Base-line Value																		Scale Value																		3) Significant portion of hour interpolated.										4) Record all short for part or all of hour; if value is given, curve was estimated for missing part.										MONTHLY MEAN		290																			
SHORTS REVIEWED BY		JEP																																																										5) No record; or no values available because of faulty record.																				DATES WITH GAPS:																					
PUNCHED BY																																																																														* Derived from STORM										Mph., converted to Normal Mph.													

STATION		DATE		TIME		YEAR	
NAME		MONTH		DAY		YEAR	
LAT. LONG.		UT		UT		UT	
MAGNETOGRAM HOURLY SCALINGS		UT		UT		UT	
UNIVERSAL TIME		UT		UT		UT	
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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

200 nm
100 nm
0

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS

200 mm
100 mm
0