UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

MAY 1982

OPEN FILE REPORT 82-0300E

THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSEND, 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
860 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 063, 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 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.

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

MAY 1982

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	mm/hr		
1	4	3	6	6	4	6	3	2	34	41	SUDDEN COMMENCEMENTS		
2	4	4	2	4	6	6	7	3	36	50	d	h	m
3	4	5	6	6	6	6	5	3	41	57			
4	3	2	2	6	5	6	2	2	28	31			
5	2	4	5	4	4	5	2	2	28	25			
6	3	2	3	3	3	2	1	1	18	10			
7	1	2	0	2	3	1	0	0	09	04			
8	2	1	0	4	1	1	0	1	10	06			
9	2	3	3	2	2	2	2	1	17	09			
10	2	2	0	0	3	1	1	1	10	05			
11	3	2	1	3	3	3	2	1	18	10			
12	2	2	2	2	1	1	2	0	12	05			
13	1	2	1	1	0	1	1	1	08	03			
14	1	1	1	2	3	1	1	1	11	05			
15	3	2	2	5	6	4	3	1	26	25			
16	3	1	3	3	2	3	2	2	19	11			
17	3	2	2	4	5	5	2	2	25	21			
18	4	4	2	7	4	3	3	3	30	34	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
19	4	3	3	5	5	3	2	2	27	23			
20	2	2	3	3	2	2	1	1	16	08			
21	1	1	3	4	4	3	1	1	18	12			
22	1	1	2	2	0	0	0	1	07	03			
23	2	1	0	0	0	0	0	0	03	01	BEGIN	END	
24	1	1	2	1	4	1	0	0	10	06	d	h	m
25	2	1	0	1	1	1	2	2	10	04			
26	3	4	2	3	5	5	4	3	29	25			
27	4	6	6	5	6	6	6	4	43	63			
28	5	5	5	7	6	6	4	4	42	62			
29	6	5	7	6	5	6	4	4	43	66			
30	5	3	6	6	5	6	4	4	39	51			
31	4	5	7	6	5	4	4	4	39	53			

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

683.8

3.73

2550

H

321.7

7.79

2510

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 MAY	YEAR 1982
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
07	09XX	pi 2		
22	08XX	pi 2		
23	10XX	pi 2		
24	13XX	bps		
IDENTIFIED BY: JEP			VERIFIED BY: JBT	

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

PRINCIPAL MAGNETIC STORMS

Data from Individual Observatories:

COLLEGE OBSERVATORY, COLLEGE, ALASKA
MAY 19 82WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80502 U.S.A.

Obs. 2 letter IAAA 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	64.06 N	26	00XX	..	..	..	..	28	4	7	282	1650	1110	Jun 02 16			
								29	3	7							
								31	3	7							

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 5-1-82	2400 U.T., 5-31-82	1.0/mm	3.78/mm	27° 46.8 E
H	0000 U.T., 5-1-82	2400 U.T., 5-31-82	7.88/mm		127638
Z	0000 U.T., 5-1-82	2400 U.T., 5-31-82	7.78/mm		551448

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 5-1-82	2400 U.T., 5-31-82	7.9/mm	29.68/mm	23° 41.0 E
H	0000 U.T., 5-1-82	2400 U.T., 5-31-82	44.08/mm		115218
Z	0000 U.T., 5-1-82	2400 U.T., 5-31-82	48.58/mm		540568

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
27° 58.3 E	129808	553808

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED:

MAY

7

8

10

12

13

14

22

23

24

25

[illegible]

FORM 14-106

MAGNETOGRAM HOURLY SCALINGS

Values are in units of mT and are average for successive periods of one hour beginning at midnight. Hourly data are from 0000 to 2359 of the day. Values are in units of mT and are average for successive periods of one hour beginning at midnight. Hourly data are from 0000 to 2359 of the day. Values are in units of mT and are average for successive periods of one hour beginning at midnight. Hourly data are from 0000 to 2359 of the day.

FORM 74-116

MAGNETOGRAM HOURLY SCALINGS

(UNIVERSAL TIME)

C.	Q.	M.	D.	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	MONTHLY MEAN	DAILY MEAN	REMARKS	
Values are in units of 100 and are averages for successive periods of one hour by polarity at midnight. Hours 01 to 24 are in daylight, hours 25 to 24 are in night. Horizontal correction has been applied. Negative values are in red, with minus signs shown.																																
01	01	349	359	375	357	334	348	342	330	317	316	350	327	300	222	510	419	370	421	250	151	272	314	306	328	333	7596	7596				
02	02	336	347	362	373	362	332	314	347	306	254	310	319	300	336	370	270	166	17	17	199	76	135	224	313	362	6633	6633				
03	03	374	346	330	354	336	306	418	29	308	442	362	363	300	357	476	420	500	642	534	243	276	303	329	344	359	8381	8381				
04	04	347	353	338	336	341	332	350	362	333	301	345	180	300	332	466	445	339	110	264	319	326	326	328	329	7607	7607					
05	05	332	349	356	341	364	368	416	342	186	229	324	313	300	440	364	333	260	269	303	322	326	323	325	334	332	7693	7693				
06	06	333	330	340	351	350	346	358	278	271	324	319	292	300	254	248	272	265	285	300	317	316	311	307	315	318	7422	7422				
07	07	321	336	338	349	351	332	321	319	318	312	322	308	300	247	205	222	240	263	260	282	281	281	282	300	306	7126	7126				
08	08	316	326	351	366	360	361	353	350	347	329	314	303	300	300	292	299	281	279	281	281	278	277	291	294	291	7562	7562				
09	09	293	310	366	374	400	407	380	351	350	334	307	294	300	302	302	320	314	305	312	320	313	304	312	309	318	7680	7680				
10	10	322	340	334	332	341	330	331	321	316	315	312	300	300	293	253	310	324	321	304	309	310	299	300	308	312	7546	7546				
11	11	310	324	336	332	347	353	339	330	325	320	272	269	300	240	281	304	297	303	304	304	311	299	308	316	327	7408	7408				
12	12	324	331	343	342	330	345	303	352	354	341	209	284	300	276	309	317	323	309	304	300	292	291	293	301	304	7687	7687				
13	13	317	329	335	331	344	341	328	320	315	311	314	312	300	311	313	315	320	305	262	292	263	290	302	303	313	7532	7532				
14	14	316	323	329	341	335	322	319	313	318	311	316	290	300	290	302	315	322	322	310	311	309	298	296	299	312	7521	7521				
15	15	311	317	321	321	358	333	324	348	315	307	344	353	300	262	370	229	146	233	265	265	262	262	262	266	295	7178	7178				
16	16	299	308	335	332	323	317	313	328	258	261	276	307	300	253	309	312	293	296	267	261	270	279	287	296	304	7127	7127				
17	17	303	310	322	313	371	330	322	317	323	325	218	291	300	320	334	407	261	299	292	305	294	289	292	300	309	7452	7452				
18	18	320	301	308	415	405	409	386	376	353	320	496	360	300	302	385	346	330	334	326	334	310	319	309	330	359	8692	8692				
19	19	355	334	362	364	368	353	346	329	304	213	227	259	300	279	262	272	192	276	263	231	242	256	282	279	305	6339	6339				
20	20	316	335	336	330	320	326	329	326	334	210	262	300	300	291	284	265	265	290	300	299	290	282	262	266	295	7178	7178				
21	21	291	290	289	294	301	321	343	324	281	309	303	300	300	326	288	245	265	315	324	313	316	304	292	308	311	7247	7247				
22	22	317	311	312	307	312	312	320	319	315	295	307	302	300	308	308	314	311	300	301	304	302	294	291	294	293	7354	7354				
23	23	308	312	325	337	307	302	297	293	301	301	303	302	300	299	296	296	303	309	302	299	291	279	271	277	284	7207	7207				
24	24	289	290	288	292	307	302	301	310	317	328	309	292	300	290	266	175	236	298	316	308	293	296	294	292	291	6967	6967				
25	25	269	261	268	311	310	306	294	295	301	300	299	299	300	290	279	268	305	308	304	310	287	286	290	289	7099	7099					
26	26	297	330	327	347	366	346	352	367	333	298	262	267	300	328	391	309	278	131	230	270	294	193	224	227	280	6970	6970				
27	27	316	314	306	395	340	103	90	135	264	404	305	312	300	420	526	577	539	628	111	18	190	261	321	372	352	7609	7609				
28	28	333	306	277	103	4	40	27	227	121	253	492	370	300	444	577	557	215	165	94	192	292	301	300	336	360	6578	6578				
29	29	332	331	267	344	293	236	326	314	195	277	275	345	300	242	267	375	260	214	250	273	294	306	328	357	363	7120	7120				
30	30	344	346	346	351	363	371	364	219	240	291	473	474	300	302	421	306	322	273	167	208	220	279	300	335	374	7173	7173				
31	31	318	340	350	300	266	312	72	266	317	402	330	482	300	432	333	337	386	334	300	277	306	315	308	339	352	7780	7780				
( ) Interpolated ( ) Significant portion of night ( ) No record or no value available because of faulty record.																																
( ) Scaling increments because of night ( ) No record or no value available because of faulty record.																																
( ) Derived from STORE Magn., converted to Normal Magn.																																
 																																

[ ] Scaling uncertain because

of insufficient data.

C> Record all about for per

in all of about 10 values to

be available for estimated

for missing parts.

[ ] Significant portion of

data is interpolated.

[ ] No record or no value

available because of

faulty record.

[ ] Derived from STORA

Mgph., converted to Normal Mgph.

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

200 mV
100 mV
0

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

STORM MAGNETOGRAMS

100 mm
0

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS