UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

JANUARY 1992

OPEN FILE REPORT 92-0300A

THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: R.V. O'CONNELL AND CAROL ANN VARNER AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA FAIRBANKS. THE COLLEGE OBSERVATORY IS PART OF THE BRANCH OF GLOBAL SEISMOLOGY AND GEOMAGNETISM OF THE U.S. GEOLOGICAL SURVEY.

Explanation of Data and Reports

Magnetic Activity Report

Principal Magnetic Storms

Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings - Five Quietest Days

Sample Format for Normal and Storm Magnetograms

Normal Magnetograms

Storm Magnetograms (When Normal is too disturbed to read)

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. 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 99775-5160

Requests for copies of the magnetograms except for the current month should be addressed to:

World Data Center A
NOAA D63m 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 the 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° 51.6'N
Geographic longitude.....147° 50.2'W
Geomagnetic latitude.....+64.6°
Geomagnetic longitude....+256.5°
Elevation.....200 meters

EXPLANATION OF DATA & REPORTS

Available Data & Reports

Normal and storm magnetograms and appropriate calibration data are processed at the observatory and are available for analysis or copying. Magnetic Activity Report (K-Indices & AK values), Principal Magnetic Storms Report, and Magnetogram Hourly Scalings for the five quietest days of the month are also available.

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 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:

<u>Gamma Range</u>	<u>K-Index</u>	<u>ak</u>
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)

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 commencement; 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 averaged 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 sheet 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 one is interested in the detailed morphology of the magnetic field, refer directly to the magnetogram.

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:

$D = B_D + d S_D$; $H = B_H + h S_H$; $Z = B_Z + z S_Z$
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)

College, Alaska

MONTH AND YEAR

January, 1992

DATE	K-INDICES									A _K	TIME SCALE ON MAGNETOGRAMS		
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM		20 mm/hr		
1	2	1	3	5	4	4	2	2	23	18	SUDDEN COMMENCEMENTS		
2	2	4	4	6	3	3	2	1	25	23	d	h	m
3	2	2	3	4	5	3	2	3	24	18			
4	3	4	4	3	3	3	3	3	26	18			
5	3	3	2	5	3	5	4	1	26	22			
6	1	3	2	2	4	4	2	2	20	13			
7	1	2	2	4	2	3	3	1	18	11			
8	2	3	4	6	4	4	5	2	30	30			
9	2	2	0	0	1	0	0	2	7	3			
10	2	2	4	6	4	4	3	2	27	25			
11	2	3	3	5	7	6	5	3	34	46			
12	3	2	3	6	5	3	3	1	26	25			
13	2	5	5	6	5	5	4	2	34	39			
14	3	3	4	4	5	6	4	4	33	33			
15	2	2	4	5	6	3	3	2	27	26			
16	1	2	5	4	5	4	4	5	30	29			
17	2	1	3	3	3	3	2	2	19	11			
18	1	1	3	4	4	0	1	0	14	10	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
19	0	0	2	4	3	2	0	0	11	7			
20	0	3	3	5	5	5	3	2	26	25			
21	1	0	0	0	4	4	1	2	12	8			
22	3	1	2	4	5	2	1	0	18	14			
23	0	0	2	1	2	2	1	0	8	3			
24	0	0	2	1	0	1	0	0	4	2			
25	2	1	0	2	3	0	0	0	8	4			
26	0	0	0	0	2	2	2	2	8	4			
27	4	5	3	2	2	2	2	2	22	16			
28	3	2	2	4	4	3	3	1	22	15			
29	3	1	3	3	5	4	3	2	24	18			
30	3	3	3	3	3	5	3	3	26	19			
31	4	3	3	5	5	3	3	2	28	24			

COLLEGE OBSERVATORY, COLLEGE, ALASKA

Obs	Geomag lat.	Commencement (UT)			SC -amplitudes			Max. 3 hr -index K			Ranges			UT End day hr
		day	hr min	type	D(')	H nT	Z nT	day	(3 hr - period)	K	D(')	HnT	ZnT	
CO	64.6 N													
NO MAJOR MAGNETIC STORMS RECORDED THIS MONTH.														

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 1-1-92	2400 UT, 1-20-92	1.0' / mm	3.7 γ / mm	25° 59.4' E
	0001 UT, 1-21-92	2400 UT, 1-31-92	↓	↓	58.5' E
H	(SAME)	(SAME)	7.7 γ / mm		12626 γ
			↓		616 γ
Z	(SAME)	(SAME)	7.8 γ / mm		55224 γ
					219 γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0001 UT, 1-1-92	2400 UT, 1-31-92	7.9' / mm	29.3 γ / mm	
H	(SAME)	(SAME)	43.4 γ / mm		
Z	(SAME)	(SAME)	49.0 γ / mm		

The College Observatory has used several absolute instruments and different observing piers since it began operations in 1948. To avoid artificial secular shifts in the absolute values published when instruments were changed, corrections were applied to provide continuity in the data from the time the Observatory began operating. For many years the instruments used for observing absolute values have had zero correction. Effective with the May 1989 Preliminary Data Report, in accordance with a directive issued by the USGS Branch of Global Seismology and Geomagnetism analysis personnel, these longstanding corrections are discontinued and all data listed (D, H & Z) are for the position at absolute pier 1a and without any corrections applied. The net effect of these changes is as follows:

Declination (D): No Change

Horizontal Intensity (H): -5 γ ; i.e., H absolute and baseline values are 5 γ less than previously reported.

Vertical Intensity (Z): +33 γ ; i.e., Z absolute and baseline values are 33 γ higher than previously reported.

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
26° 35.3' E	12747 γ	55326 γ

*COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: JAN 9, 23, 24, 25, 26.

MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS

(UNIVERSAL TIME)

Values are in Tenths of mm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.

COMPONENT	D						H						Z						COMPONENT					
	DAY						DAY						DAY						DAY					
	A _k						A _k						A _k						A _k					
HOUR	01						02						03						04					
	05						06						07						08					
01	310	310	361	350	329	344	142	154	145	148	142	135	148	145	131	140	140	140	147	145	151	160	147	139
02	325	325	358	349	300	339	139	152	148	159	150	145	147	146	133	139	139	139	145	145	151	160	147	139
03	308	308	352	351	309	335	175	157	160	179	160	151	140	144	147	139	139	139	145	145	151	160	147	139
04	330	330	359	360	281	340	196	159	165	184	168	160	141	144	157	139	139	139	145	145	151	160	147	139
05	350	350	357	361	320	350	180	160	169	186	169	147	139	140	181	140	140	140	145	145	151	160	147	139
06	327	327	358	362	350	350	182	160	170	186	170	139	145	140	178	139	139	139	145	145	151	160	147	139
07	375	375	370	361	348	353	151	161	171	186	170	152	136	139	156	140	140	140	145	145	151	160	147	139
08	365	365	338	350	355	359	150	170	170	171	169	147	156	139	151	140	140	140	145	145	151	160	147	139
09	362	362	344	392	363	357	148	181	170	168	170	143	156	157	143	140	140	140	145	145	151	160	147	139
10	364	364	341	360	357	357	145	176	179	167	170	146	159	133	143	144	144	144	145	145	151	160	147	139
11	365	365	359	353	361	365	145	161	171	159	170	144	146	144	143	140	140	140	145	145	151	160	147	139
12	367	367	367	367	384	368	148	156	163	123	166	141	135	137	120	136	136	136	145	145	151	160	147	139
13	368	368	371	363	392	373	149	158	165	44	169	140	130	130	76	132	132	132	145	145	151	160	147	139
14	370	370	369	370	397	373	152	160	168	131	169	134	126	132	66	125	125	125	145	145	151	160	147	139
15	380	380	369	380	388	379	153	98	171	160	172	132	95	128	96	127	127	127	145	145	151	160	147	139
16	382	382	380	382	388	419	155	130	173	160	190	134	69	130	110	123	123	123	145	145	151	160	147	139
17	392	392	396	387	386	406	153	175	171	166	197	134	112	130	130	119	119	119	145	145	151	160	147	139
18	398	398	413	393	409	410	151	171	177	163	201	135	126	126	135	120	120	120	145	145	151	160	147	139
19	395	395	400	411	403	412	150	163	177	161	190	135	127	130	129	123	123	123	145	145	151	160	147	139
20	388	388	409	408	395	409	145	156	170	156	180	135	129	132	134	123	123	123	145	145	151	160	147	139
21	378	378	369	400	388	399	142	154	161	150	168	133	126	136	133	122	122	122	145	145	151	160	147	139
22	370	370	370	380	379	402	142	154	152	148	159	136	128	134	136	129	129	129	145	145	151	160	147	139
23	370	370	361	371	374	387	150	151	150	140	150	131	137	136	143	130	130	130	145	145	151	160	147	139
24	348	348	351	351	353	361	147	147	151	140	152	132	145	130	142	126	126	126	145	145	151	160	147	139
DAILY SUM	8687	8687	8822	8912	8709	8947	3690	3764	3967	3735	4071	3361	3218	3282	3213	3175	3175	3175	3361	3361	3361	3361	3361	3361
DAILY MEAN	362	362	368	371	363	373	154	157	165	156	170	140	134	137	134	132	132	132	140	140	140	140	140	140
MEAN	367						160						135						135					

Scaled

RND

Checked

Tkd

COLLEGE, ALASKA

NOV 10, 1973

NOV 11, 1973

00 04 08 12 16 20 24 U.T.

100 mG

D BASELINE ↑

D TRACE ↑

NEW U.T. DAY BEGINS HERE →

Z TRACE ↓

Z BASELINE ↓

H TRACE ↑

H BASELINE ↓

TEMPERATURE TRACE ↑

INCREASING EAST DECLINATION ↓

HOUR MARK →

INCREASING VERTICAL INTENSITY ↑

INCREASING HORIZONTAL INTENSITY ↑

SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

200 mm
100 mm
0

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

200 mm
100 mm
0

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

200 mm
100 mm
0

NORMAL MAGNETOGRAMS

200 mm
100 mm
0

NORMAL MAGNETOGRAMS

200 mm
100 mm
0

NORMAL MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS