UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA

COLLEGE OBSERVATORY

FAIRBANKS, ALASKA

NOVEMBER 1981

OPEN FILE REPORT

81-300K

ORDER OF CONTENTS

Explanation of Data & Reports

Magnetic Activity Report

Outstanding Magnetic Effects

Principal Magnetic Storms

Preliminary Calibration Data & Monthly Mean Absolute Values

Magnetogram Hourly Scalings

Sample Format for Normal & Storm Magnetograms

Normal Magnetograms

Storm Magnetograms (When Normal is too disturbed to read)

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 AND E.A. SAUTER, 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.

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:

COLLEGE OBSERVATORY
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, 11 AA
Environmental Data Service
Boulder, Colorado 80502

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 Alaskan 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 heliophysics, it cooperates with other scientists and local citizens 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
Geographic latitude.....64.6°
Geographic longitude.....126.6°
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 readings, K-values, selected magnetic phenomena reports, and on a real-time basis are recordings from a 3-component magnetic magnetometer and Y-component proton current meter.

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 UT, 0300 UT, ..., 2100-2400 UT. It is a measure of the difference between the highest and lowest variation 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 geomagnetic 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 geomagnetic ranges to K, and K to AK is as follows:

Geom. 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	42
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
0-50	0
50-100	1
100+	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 & Rapid Run records were reviewed at the observatory for selected magnetic phenomena and the events identified were forwarded to the 1965 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

Global and local geomagnetic storms with 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; periods 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 Readings

Magnetogram hourly readings are averages for successive periods of one hour for the D, H, and Z elements. The value in the column headed "M" is the average for the hour beginning 0000 and ending 0100. Note that the values on the reading sheets are in tenths of γ with the decimal point omitted. The user of these readings should keep in mind that the tabular values are in milligauss and if he is concerned in the detailed morphology of the magnetic field, he should refer directly to the magnetograms.

Units and Scales

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 readings the following equations should be used:

$D = D_0 + S_D$; $H = H_0 + S_H$; $Z = Z_0 + S_Z$
where D, H, and Z are absolute values;
 D_0 , H_0 , and Z_0 are base-line values;
 S_D , S_H , and S_Z are scale values;
and d, h, and z are readings in millimeters.

COLLEGE, ALASKA

MAGNETIC ACTIVITY
(Greenwich civil time, counted from midnight to midnight)MONTH AND YEAR
NOVEMBER 1981

DATE	K-INDICES								WHOLE-DAY CHARACTER 0, 1, OR 2 AK	TIME SCALE ON MAGNETOGRAMS 20 mm/hr
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24		
1	0	0	0	6	3	3	1	1	14	15
2	0	0	0	1	0	1	1	0	03	01
3	2	1	1	3	1	0	1	1	10	05
4	0	0	0	0	1	3	1	1	06	03
5	0	2	5	4	6	3	1	0	21	23
6	1	1	1	3	3	2	1	1	13	07
7	2	4	5	4	5	5	2	1	28	27
8	2	4	6	5	5	4	2	1	29	31
9	2	1	1	3	3	2	1	0	13	07
10	0	1	2	6	4	3	2	1	18	18
11	1	3	3	3	8	7	6	4	35	67
12	5	6	6	5	4	3	2	1	32	39
13	0	1	0	1	0	0	2	2	06	03
14	1	2	3	6	6	6	5	5	34	45
15	4	4	4	5	4	6	4	2	33	34
16	2	3	5	4	4	3	3	3	27	21
17	3	3	3	7	6	6	5	3	36	51
18	3	2	5	6	5	4	5	3	33	36
19	3	1	3	5	5	5	4	2	28	26
20	2	2	3	6	5	4	2	2	26	25
21	2	2	3	4	4	4	4	3	26	19
22	2	2	6	5	3	3	1	1	23	22
23	2	2	5	5	5	7	5	3	34	45
24	2	3	4	4	5	3	1	1	23	18
25	5	3	4	4	3	3	2	2	26	20
26	3	1	1	3	3	3	3	1	18	11
27	0	0	3	2	0	0	0	1	05	03
28	1	0	0	0	1	2	0	0	04	02
29	1	0	0	0	0	0	0	0	01	00
30	0	0	0	0	0	0	0	0	00	00
31										

SUDDEN COMMENCEMENTS
d h mPOSSIBLE SOLAR-FLARE
EFFECTS BASED ON
INSPECTION OF GRAMS
ALONE (WITHOUT
REFERENCE TO DATA
FROM OTHER SOURCES)

BEGIN

END

d h m

d h m

SUM

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

683.8

H

321.7

Z

(mm)

(Y/mm)

(to nearest 10Y)

2560

2510

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN B. TOWNSHEND, CHIEF, COLLEGE OBSERVATORY

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY
COLLEGE, ALASKA

MONTH
NOVEMBER

YEAR
1981

DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS
08	16XX	pc5	
12	15XX	pc5	
20	16XX	pc5	
23	0607	ssc*	
25	0228	ssc*	
IDENTIFIED BY: JEP			VERIFIED BY: EAS

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

NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS

Data from Individual Observatories:

COLLEGE OBSERVATORY, COLLEGE, ALASKA
1981

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

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
CO	64.6 N	11	05XX	..	..	..	..	11	5	8	211	2020	790	12 22
		14	05XX	..	..	..	..	17	4	7	232	1440	930	19 20
		23	0607	s.o.*	-20	-118	-24	23	6	7	386	1560	660	23 20

NOVEMBER

1981

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 11-01-81	2400 U.T., 11-30-81	1.6/mm	3.78/mm	27° 46.8 E
H	0000 U.T., 11-01-81	2400 U.T., 11-30-81	7.88/mm		127548
Z	0000 U.T., 11-01-81	2400 U.T., 11-30-81	7.78/mm		551498

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 11-01-81	2400 U.T., 11-30-81	7.8/mm	29.78/mm	23° 45.9 E
H	0000 U.T., 11-01-81	2400 U.T., 11-30-81	44.08/mm		115138
Z	0000 U.T., 11-01-81	2400 U.T., 11-30-81	48.68/mm		539998

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

MONTHLY MEAN ABSOLUTE VALUES*					
D		H		Z	
28° 01.9 E		129758		553918	

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: NOV 2, 3, 4, 6, 9, 13, 27, 28, 29, 30

FORM 51-10										MAGNETOGRAM HOURLY SCALINGS										UNIVERSAL TIME										MONTHLY MEAN									
STATION NO. 1000000										STATION NO. 1000000										STATION NO. 1000000										STATION NO. 1000000									
DATE 10-10-60										DATE 10-10-60										DATE 10-10-60										DATE 10-10-60									
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FORM 11-18

MAGNETOGRAM MONTHLY SCALINGS

UNIVERSAL TIME

Station and time of day of the first magnetic field measurement at night, from the first day of the month to the last day of the month, in the month of the year.

STATION	DATE	TIME	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
01	266	277	287	288	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315
02	268	279	289	290	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317
03	261	266	271	272	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299
04	262	263	264	265	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291
05	263	264	265	266	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292
06	264	265	266	267	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293
07	265	266	267	268	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294
08	266	267	268	269	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295
09	267	268	269	270	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296
10	268	269	270	271	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297
 																									

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

1000 nm
100 nm
0

NORMAL MAGNETOGRAMS

0 100 mV 200 mV

NORMAL MAGNETOGRAMS

100 mV
100 ms

NORMAL MAGNETOGRAMS

Figure 1. Schematic diagram of the experimental setup. The subject is seated at a table, viewing a video screen. The screen displays a target (a small circle) and a starting point (a larger circle). The subject's hand is positioned at the starting point. The distance between the starting point and the target is indicated by a horizontal line. The vertical distance between the starting point and the target is indicated by a vertical line. The horizontal distance between the starting point and the target is indicated by a horizontal line. The vertical distance between the starting point and the target is indicated by a vertical line. The horizontal distance between the starting point and the target is indicated by a horizontal line. The vertical distance between the starting point and the target is indicated by a vertical line.

NORMAL MAGNETOGRAMS

0 100 nm 500 nm

NORMAL MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS

0 100 km

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS