UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

NOVEMBER 1976

OPEN FILE REPORT 76-300K

ALASKAN GEOLOGY BRANCH
TECHNICAL DATA FILE

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 Magnetogram

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, M. J. MOORMAN, C. E. DEADMON, AND S. P. TILTON, 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.

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:

Chief, College Observatory
U.S. Geological Survey
Yukon Drive on West Ridge
Fairbanks, Alaska 99701

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

World Data Center A-NOAA
Environmental Data Service
Boulder, Colorado 80302

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 10γ 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 (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
0-11	0
11-50	1
50+	2

Routine assignment of C was discontinued at College on January 1, 1976.

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°51.6'N
Geographic longitude.....147°50.2'W
Geomagnetic latitude.....+64.6°
Geomagnetic longitude.....+256.5°
Elevation.....200 meters

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 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.

COLLEGE, ALASKA

MAGNETIC ACTIVITY

(Greenwich civil time, counted from midnight to midnight)

MONTH AND YEAR

NOVEMBER, 1976

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		20 mm/hr		
1	3	2	3	4	2	0	1	2	17	10	SUDDEN COMMENCEMENTS		
2	1	1	3	3	4	2	1	0	15	09	d	h	m
3	1	1	3	2	2	3	0	1	13	07			
4	1	0	1	3	2	1	0	0	08	04			
5	0	0	1	1	1	0	0	0	03	01			
6	0	0	2	1	0	0	0	0	03	01			
7	0	1	1	2	0	0	0	0	04	02			
8	0	0	0	0	1	2	1	2	06	03			
9	1	1	2	4	3	1	2	0	14	08			
10	0	3	2	6	5	3	2	3	24	23			
11	2	3	4	6	6	6	5	3	35	44			
12	4	2	2	5	5	4	3	4	29	26			
13	3	3	6	7	7	4	4	2	36	56			
14	2	1	2	5	6	4	3	2	25	24			
15	2	2	2	3	5	2	1	0	17	12			
16	0	0	2	3	4	3	2	1	15	09			
17	0	1	1	4	4	1	1	1	13	09			
18	1	1	0	2	0	0	0	0	04	02	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
19	1	1	2	3	3	3	2	1	16	09			
20	1	1	2	5	3	0	1	1	14	10			
21	0	1	0	2	1	0	1	0	05	02			
22	0	1	0	3	2	0	1	1	08	04			
23	1	0	0	2	1	1	0	0	05	02			
24	0	1	0	1	2	0	0	0	04	02			
25	0	3	6	6	5	3	2	1	26	31			
26	1	1	0	5	3	3	3	2	18	13			
27	2	2	3	2	0	1	0	0	10	05			
28	0	0	0	1	2	1	1	0	05	02			
29	0	0	3	2	1	2	1	1	10	05			
30	2	2	1	3	4	3	1	0	16	10			
31													

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

683.8

3.76

2570

H

321.7

7.82

2520

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	YEAR
			NOVEMBER	1976
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
03	06XX	pi2		
03	23XX	pc5	With pc3's & pc4's	
04	09XX	pi2	With bays	
06	07XX	pi2		
08	00XX	pc1		
17	14XX	pg		
21	18XX	pc4	With pc3's	
22	11XX	pi2	With bay	
28	20XX	si		
IDENTIFIED BY: MJM/JEP			VERIFIED BY: JBT	

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

Data from Individual Observatories:

NOVEMBER 19 76

WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80302 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
C0	64°6 N	10	03XX	..	..	..	..	10	4	6	182	1100	770	12	03
		12	1025	sc	?	?	?	11	4,5,6	6					
								13	4,5	7	210	1650	830	13	21

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 11-1-76	2400 UT, 11-30-76	1.0/mm	3.8 γ /mm	28°07.1E
H	0000 UT, 11-1-76	2400 UT, 11-30-76	7.8 γ /mm		12754 γ
Z	0000 UT, 11-1-76	2400 UT, 11-30-76	7.6 γ /mm		55134 γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 11-1-76	2400 UT, 11-30-76	7.9/mm	29.8 γ /mm	24°22.9 E
H	0000 UT, 11-1-76	2400 UT, 11-30-76	44.1 γ /mm		11504 γ
Z	0000 UT, 11-1-76	2400 UT, 11-30-76	48.9 γ /mm		53999 γ

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D	0000 UT, 11-1-76	2400 UT, 11-30-76	0.3/mm	1.0 γ /mm
H	0000 UT, 11-1-76	2400 UT, 11-30-76	1.0 γ /mm	
Z	0000 UT, 11-1-76	2400 UT, 11-30-76	2.4 γ /mm	

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
28°21.5 E	13054 γ	55360 γ

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: NOV. 5, 6, 7, 8, 18, 21, 22, 23, 24, 28

三三三

NOV	D
-----	---

24	SUM
97	3243
119	3722
121	3460
120	3504
133	3628
131	3488
121	3445
3/	3472
113	3732
81	3420
96	3975
91	2993
132	4190
112	3818
122	3594
113	3765
114	3581
115	3250
98	3451
102	3159
122	3829
93	3414
113	3517
119	3458
101	3243
62	3302
128	3529
132	3517
108	3434
110	3183

SUM	104476
MEAN	145

TH GAPS:

FORM CAGS-046 (Rev. 11)		MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)																				OBSY.		YEAR		MONTH		ELE- MENT			
U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANOGRAPHIC ADMINISTRATION COAST AND GEODETIC SURVEY GEOMAGNETISM DIVISION		ENVIRONMENTAL SCIENCE CENTER UNIVERSITY OF CALIFORNIA, SAN DIEGO																				CO		76		NOV		H			
Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour: 01 of local day (1500M.T.) is hour 11 of the GMT.		Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.																				CO		76		NOV		H			
Q on Top S	Q on Bottom N	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MONTHLY SUM		MONTHLY MEAN		DATES WITH GAPS:	
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	257690		358			
		01	02	03	04																										

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC DIVISION

YEAR 76

MONTH NOV

DAY 2

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight, 1 hour 01 of local day (1500M.T.) is hour 11 of the same universal day.

C	Q	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	SUM
01	329	331	342	325	323	336	302	301	265	128	254	287	01	274	275	281	292	294	294	291	292	292	294	287	293	303	6993
02	310	314	319	342	319	314	322	304	310	294	273	271	02	192	221	269	270	238	191	196	229	251	269	283	299	6600	
03	311	316	316	315	311	306	322	302	249	324	316	301	03	299	293	263	189	211	263	275	276	272	288	299	295	6916	
04	302	305	306	300	299	298	301	303	305	294	265	193	04	244	283	296	292	290	285	291	291	289	291	293	299	6915	
05	307	303	301	299	303	305	311	305	303	308	299	291	05	291	295	294	295	298	298	295	294	291	292	292	293	7163	
06	293	294	294	295	298	300	305	315	318	296	299	293	06	298	295	288	288	291	293	291	289	288	289	291	292	7093	
07	293	294	293	294	303	325	335	315	307	301	294	293	07	293	293	294	293	295	298	299	299	296	294	293	291	7185	
08	293	293	297	294	294	294	295	298	299	299	297	297	08	296	295	263	225	196	251	278	281	276	274	236	257	6688	
09	305	313	326	334	333	321	319	323	290	246	160	178	09	182	220	258	254	254	270	282	283	291	287	273	298	6622	
10	305	309	308	315	355	399	410	360	330	312	300	149	10	39	190	331	255	264	230	194	207	240	272	313	315	6702	
11	332	328	325	352	365	346	363	331	254	126	61	174	11	575	524	352	288	66	32	209	262	272	288	290	307	6690	
12	323	370	381	341	340	334	321	315	304	319	172	139	12	274	281	193	162	262	280	272	264	261	263	318	318	6607	
13	355	384	351	325	399	369	261	157	293	269	213	302	13	179	314	270	280	171	193	209	181	254	283	314	315	6639	
14	333	341	349	334	321	314	315	327	325	321	298	221	14	255	117	151	275	278	290	285	287	294	303	313	328	6977	
15	341	350	351	341	335	332	319	316	318	291	255	246	15	224	181	217	240	232	261	262	280	282	293	303	305	6555	
16	306	306	308	311	310	309	319	320	288	252	291	219	16	242	91	76	137	240	271	275	283	299	303	305	307	6448	
17	311	309	312	309	307	308	319	322	328	281	227	210	17	211	224	256	301	301	289	281	271	273	283	298	303	6834	
18	308	308	318	328	334	320	313	313	314	314	263	282	18	297	298	293	292	292	293	298	290	282	277	283	292	7202	
19	301	304	308	313	318	318	325	312	322	274	305	315	19	311	302	282	282	242	281	281	280	268	258	272	288	7032	
20	299	309	308	313	313	313	320	320	321	314	301	173	20	170	255	305	308	302	297	291	283	294	293	292	301	6881	
21	305	308	308	308	305	301	301	299	299	304	309	283	21	299	305	305	304	295	289	284	291	292	296	299	300	7189	
22	303	303	305	304	300	299	302	304	315	308	301	264	22	260	272	281	282	288	289	288	284	281	278	283	292	6986	
23	299	303	304	303	299	298	303	309	319	311	299	296	23	295	301	289	284	286	286	285	285	283	291	293	301	7122	
24	303	301	299	302	308	305	309	311	309	304	301	273	24	268	276	291	292	289	289	288	289	287	289	288	292	7065	
25	293	291	292	291	308	351	320	293	243	343	366	345	25	319	289	238	239	261	241	217	232	239	260	282	299	6672	
26	309	312	323	330	326	317	303	305	308	293	251	97	26	200	184	117	150	178	214	232	242	241	243	284	289	6068	
27	317	312	322	351	323	311	292	347	319	318	315	312	27	309	301	297	293	287	288	293	274	294	293	290	302	7380	
28	307	308	303	303	302	303	303	302	297	302	311	299	28	273	261	281	292	273	286	287	289	291	293	296	301	7063	
29	301	301	300	302	305	304	302	309	295	284	278	288	29	301	291	278	259	235	249	280	282	284	293	302	308	6931	
30	304	308	323	335	390	383	354	328	333	304	299	245	30	137	248	251	262	257	259	281	282	283	285	292	296	7041	
31													31														

☐ Interpolated
☐ Significant portion of hour interpolated.
☐ No record; or no value available because of faulty record.
☐ Scaling uncertain because of magnetic storm.
☐ Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.

* Derived from SIOTM Mgph., converted to Normal Mgph.

SPT
 CED, MJA, JEP
 CED
 PUNCHED BY

MONTHLY SUM 206979
 MONTHLY MEAN 287
 DATES WITH GAPS:

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

200 mm
100 mm
0

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

STORM MAGNETOGRAMS

200 mm
100 mm
0

COLLEGE
NOV 12, 1976

NOV 13, 1976

SEE NORMAL
MAGNETOGRAPH
FOR THIS PERIOD

COLLEGE
NOV 13, 1976

SEE NORMAL
MAGNETOGRAPH
FOR THIS PERIOD

STORM MAGNETOGRAMS