UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

ALASKAN GEOLOGY BRANCH
TECHNICAL DATA FILE

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

FEBRUARY 1976

OPEN FILE REPORT 76-300B

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

NOAA FORM 76-133 (9-72) U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION										OBSERVATORY		
MAGNETIC ACTIVITY (Greenwich civil time, counted from midnight to midnight)										COLLEGE, ALASKA		
MONTH AND YEAR										FEBRUARY, 1976		
DATE	K-INDICES								WHOLE-DAY CHARACTER 0, 1, OR 2		TIME SCALE ON MAGNETOGRAMS 20 mm/hr	
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24	SUM	C		AK
1	3	2	3	5	6	4	5	3	31	1	32	SUDDEN COMMENCEMENTS d h m
2	3	2	3	4	6	5	4	2	29	1	28	
3	3	2	5	6	4	2	2	2	26	1	25	
4	3	2	2	3	4	5	2	2	23	1	17	
5	2	1	1	3	4	4	1	2	18	1	12	
6	3	2	1	2	2	1	1	1	13	0	06	
7	0	1	1	7	6	5	5	3	28	1	42	
8	3	2	4	6	7	7	3	4	36	2	56	
9	3	3	3	6	6	4	3	4	32	1	34	
10	3	3	4	6	6	3	4	3	32	1	34	
11	2	1	3	6	4	3	2	3	24	1	21	
12	2	2	3	3	4	4	2	3	23	1	15	
13	3	3	2	3	6	4	3	3	27	1	24	
14	2	4	2	5	5	5	2	1	26	1	24	
15	1	0	2	3	4	4	2	0	16	1	11	
16	0	1	2	2	2	2	1	1	11	0	05	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)
17	0	0	2	5	2	3	4	2	18	1	14	
18	2	3	4	6	5	3	2	3	28	1	27	
19	2	2	6	6	6	5	4	3	34	1	43	
20	3	2	4	6	6	4	3	2	30	1	32	
21	2	2	2	5	4	3	3	2	23	1	17	
22	3	2	3	5	5	3	2	2	25	1	20	
23	1	0	1	3	3	1	0	0	09	0	05	
24	0	0	1	1	1	1	0	0	04	0	02	
25	0	0	1	2	1	0	1	0	05	0	02	
26	0	0	3	5	3	2	1	1	15	1	11	BEGIN END d h m d h m
27	2	2	3	5	7	7	5	4	35	2	54	
28	4	2	4	5	4	3	3	2	27	1	22	
29	4	5	4	4	3	3	3	3	29	1	24	
30												
31												
31												
SUM										26		
K SCALE USED:				D	H	Z	(mm) (γ/mm) (to nearest 10γ)					
LOWER LIMIT FOR K = 9.....				683.8	321.7							
CURRENT SCALE VALUE.....				3.76	7.82							
LOWER LIMIT FOR K = 9.....				2570	2520							
SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.												
<i>/s/ John B. Townshend</i> APPROVED JOHN B. TOWNSHEND, CHIEF, COLLEGE OBSERVATORY												
OBSERVER IN CHARGE												

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY COLLEGE, ALASKA	
			MONTH FEBRUARY	YEAR 1976
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
04	113X	pi2		
04	23XX	pc4		
22	18XX	pc4		
24	083X	pi2	With small bays	
IDENTIFIED BY: MJM/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.

NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA

Data from Individual Observatories:

FEBRUARY 1976

WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80302 U.S.A.

Obs. station name	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	64.6 N	07	09XX	..	..	..	..	07 08	4 5,6	7 7	265	1830	1310	10 21
		19	05XX	..	..	..	..	19 20	3,4,5 4,5	6 6	95	1320	510	20 20
		27	05XX	..	..	..	..	27	5,6	7	173	1490	1030	Mar. 01 19

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 2-1-76	2400 UT, 2-29-76	1.0/mm	3.8 γ /mm	28° 07' 2E
H	0000 UT, 2-1-76	2400 UT, 2-15-76	7.8 γ /mm		12744 γ
	0000 UT, 2-16-76	2400 UT, 2-29-76	7.8 γ /mm		12741 γ
Z	0000 UT, 2-1-76	2400 UT, 2-15-76	7.6 γ /mm		55132 γ
	0000 UT, 2-16-76	2400 UT, 2-29-76	7.6 γ /mm		55137 γ

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 2-1-76	2400 UT, 2-29-76	7.9/mm	29.8 γ /mm	24° 25' 1E
H	0000 UT, 2-1-76	2400 UT, 2-29-76	44.1 γ /mm		11470 γ
Z	0000 UT, 2-1-76	2400 UT, 2-15-76	48.6 γ /mm		54013 γ
	0000 UT, 2-16-76	2400 UT, 2-29-76	48.6 γ /mm		54004 γ

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D	0000 UT, 2-1-76	2400 UT, 2-29-76	0.3/mm		1.0 γ /mm
H	0000 UT, 2-1-76	2400 UT, 2-29-76	1.0 γ /mm		
Z	0000 UT, 2-1-76	2400 UT, 2-29-76	2.4 γ /mm		

MONTHLY MEAN ABSOLUTE VALUES*					
D		H		Z	
28° 24' 5E		13045 γ		55352 γ	

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: FEB 5, 6, 12, 15, 16, 17, 23, 24, 25, 26

MAGNETOGRAM HOURLY SCALINGS

Values are in units of mT and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (1500M.T.) is hour 11 of the same universal day. Summer correction has been applied. Negative values are in red, with minus signs shown.

U.S. DEPARTMENT OF COMMERCE ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION COAST AND GEODETIC DIVISION		OBSV.	YEAR	MONTH	ELE- MENT																								
of the same universal day.		00	76	FEB	D																								
C	10	01	129	157	124	130	131	152	161	162	266	8	48	134	01	121	345	74	108	212	237	251	124	133	149	145	172	3753	
		02	161	171	205	168	173	156	158	169	320	156	165	173	02	211	197	155	195	249	191	21	153	156	153	153	135	137	4128
		03	140	126	163	152	142	137	187	242	182	129	116	89	03	168	187	174	182	197	228	232	179	119	135	172	149	3917	
		04	149	159	168	157	171	176	178	219	223	204	199	188	04	200	234	390	224	235	241	224	179	185	152	128	130	4722	
		05	139	142	169	170	170	174	180	172	172	169	168	132	05	181	198	280	250	202	213	188	164	158	123	125	137	4164	
		06	139	143	158	138	159	163	149	183	205	217	169	172	06	203	180	190	172	196	218	187	189	179	163	121	107	4079	
		07	119	143	149	153	145	149	165	175	176	198	448	842	07	139	337	254	544	445	664	362	302	153	128	119	119	7452	
		08	88	120	121	146	146	170	165	116	131	131	318	306	08	401	275	364	378	226	187	154	239	195	170	155	142	4844	
		09	136	146	129	165	154	219	221	158	176	171	179	68	09	226	315	265	315	185	221	203	207	186	132	151	147	4465	
		10	155	128	170	150	162	220	169	193	156	177	138	528	10	211	242	202	170	200	233	249	17	97	158	154	132	4028	
		11	133	144	165	164	165	178	174	154	251	194	176	91	11	164	153	167	156	201	212	213	190	190	178	85	122	3948	
		12	119	147	148	147	152	162	178	164	213	174	169	148	12	169	162	223	247	177	194	222	202	171	122	-80	35	4160	
		13	96	118	137	157	187	128	178	164	173	303	142	140	13	123	226	293	167	240	239	229	186	168	152	98	116	4160	
		14	119	135	138	145	235	163	170	175	218	232	170	165	14	139	267	377	252	158	195	218	203	163	154	145	142	4478	
		15	150	161	170	173	175	162	174	180	160	170	187	144	15	191	204	188	227	209	219	194	185	165	162	159	153	4262	
		16	153	151	150	142	143	142	146	134	156	165	164	156	16	188	178	193	194	191	236	217	175	189	168	145	138	4214	
		17	131	147	160	161	166	159	175	181	161	105	122	188	17	198	175	198	183	173	170	38	104	143	193	150	115	3696	
		18	72	108	143	159	164	168	170	154	191	-20	162	154	18	227	236	170	163	172	178	173	168	153	120	122	135	3642	
		19	154	156	143	168	159	198	288	151	122	104	148	155	19	284	241	305	203	323	216	129	178	159	128	119	108	4345	
		20	138	120	153	163	178	156	178	407	306	211	201	194	20	345	234	171	180	186	188	130	151	135	84	55	103	4389	
		21	152	136	156	141	159	169	195	183	170	308	249	196	21	205	161	198	204	211	217	119	98	120	133	113	143	4136	
		22	130	169	170	169	167	168	169	168	201	281	119	165	22	204	183	195	197	198	170	190	180	163	155	154	162	4227	
		23	163	163	169	170	169	169	179	185	163	188	112	159	23	126	220	210	190	204	203	192	186	173	172	169	169	4203	
		24	170	175	170	173	172	173	170	168	181	179	157	158	24	179	174	178	182	197	182	209	204	183	163	153	153	4205	
		25	161	163	164	160	173	168	164	168	185	183	195	219	25	182	182	180	184	195	196	196	190	176	163	161	158	4266	
		26	151	146	162	163	172	169	179	160	232	190	181	341	26	183	208	205	224	261	255	269	194	196	162	123	121	4647	
		27	121	111	112	161	150	96	134	162	136	181	165	144	27	349	270	540	567	313	294	293	207	147	149	154	108	5038	
		28	138	120	140	183	165	163	233	229	138	153	119	175	28	226	193	118	198	259	80	208	169	100	145	104	124	3880	
		29	93	86	143	63	185	35	213	191	67	198	171	194	29	195	193	212	245	340	274	286	192	183	129	168	102	4158	
		30												30															
		31													31														

SCALED BY: SPT, CED, HIM

CHECKED BY: CED, HIM, JEP

SIGNS RE-
VIEWED BY: JEP

PUNCHED BY:

Preliminary base-line and scale values:

Interval Beginning

Base-line Value

Scale Value

() Interpolated

() Significant portion of hour interpolated.

() No record; or no values available because of faulty recording.

* Derived from SPTM

Mph., converted to Normal Mph.

() 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.

MONTHLY SUM

MONTHLY MEAN

DATES WITH GAPS:

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

200 mm
100 mm
0

NORMAL MAGNETOGRAMS

200 mm
100 mm
0

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

200 mm
100 mm
0

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS