UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

SEPTEMBER 1976

OPEN FILE REPORT 76-300 I

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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

SEPTEMBER 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	2	1	1	0	5	5	2	1	17	15	SUDDEN COMMENCEMENTS		
2	2	4	6	6	5	4	2	2	31	35	d	h	m
3	2	2	4	5	4	2	1	2	22	17			
4	2	3	4	4	4	3	1	2	23	16			
5	2	3	2	5	4	2	1	1	20	15			
6	2	2	2	3	3	2	1	1	16	08			
7	1	2	3	3	3	3	1	0	16	09			
8	1	2	0	4	4	0	2	0	13	09			
9	2	1	2	4	4	2	0	0	15	10			
10	2	0	1	1	2	3	2	1	12	06			
11	0	1	1	0	3	3	0	0	08	05			
12	1	1	2	4	3	3	2	1	17	10			
13	1	1	3	3	0	0	1	1	10	05			
14	1	1	3	4	5	3	1	1	19	15			
15	0	4	4	5	5	0	1	1	20	20			
16	1	2	1	1	1	1	1	1	09	04			
17	1	2	1	2	1	1	2	3	13	06			
18	2	6	7	5	6	3	1	1	31	47	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
19	1	1	2	6	5	6	2	3	26	30			
20	3	6	6	7	7	5	4	3	41	68			
21	3	2	3	6	5	6	2	2	29	32			
22	3	3	4	6	6	4	2	2	30	32			
23	0	1	5	6	5	2	1	1	21	24			
24	1	0	1	4	3	1	1	2	13	08			
25	2	2	6	6	5	5	3	3	32	38			
26	3	2	1	4	5	2	3	2	22	16			
27	2	2	3	5	3	3	2	1	21	15			
28	2	2	1	0	0	1	1	1	08	03			
29	1	1	2	3	1	1	1	1	11	05			
30	0	1	0	3	3	2	2	3	14	08			
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 SEPTEMBER	YEAR 1976
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
06	07XX	pi2		
08	1132	bps		
12	1311	si		
13	0843	bps		
17	17XX	pc5		
24	08XX	pi2		
24	1049	bps		
24	2345	ssc*		
29	13XX	pc4		
IDENTIFIED BY: MJM			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
Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA
SEPTEMBER 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
		day	hr min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	Z(Y)	
CO	64°6 N	17	21XX	..	..	..	..	18	3	7	159	1710	940	18 16
		19	09XX	..	..	..	..	20	4,5	7	262	1480	980	21 20
		24	2345	SC*	+7	-26	+9	25	3,4	6	175	940	620	25 21

SEPTEMBER

1976

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 9-1-76	2400 UT, 9-30-76	1.0/mm	3.8γ/mm	28°07.0E
H	0000 UT, 9-1-76	2400 UT, 9-30-76	7.8γ/mm		12774γ
Z	0000 UT, 9-1-76	2400 UT, 9-30-76	7.6γ/mm		55124γ

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 UT, 9-1-76	2400 UT, 9-30-76	7.9/mm	29.8γ/mm	24°21.2E
H	0000 UT, 9-1-76	2400 UT, 9-30-76	44.1γ/mm		11520γ
Z	0000 UT, 9-1-76	2400 UT, 9-30-76	48.6γ/mm		54011γ

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D	0000 UT, 9-1-76	2400 UT, 9-30-76	0.3/mm	1.0γ/mm
H	0000 UT, 9-1-76	2400 UT, 9-30-76	1.0γ/mm	
Z	0000 UT, 9-1-76	2400 UT, 9-30-76	2.4γ/mm	

MONTHLY MEAN ABSOLUTE VALUES*

D	H	Z
28°21.8E	13050γ	55355γ
* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.		
DAYS USED: SEPT. 6, 10, 11, 13, 16, 17, 24, 28, 29, 30		

MAGNETOGRAM HOURLY SCALINGS

Values are in tenths of min. and σ average $\pm$ for successive periods of one hour beginning at midnight. Hour 0 of local day (1500h T.) is hour 11 of the same universal day. Strikethrough corrections have been applied. Negative values are in red, with minus signs shown.

C	Q ¹ to Q ⁴	Q ¹	Q ²	Q ³	Q ⁴	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	SUM
01	84	84	63	62	128	143	125	128	122	130	148	143	01	142	143	361	284*	261	227	198	139	143	119	114	87	3602
02	67	70	100	132	90	12	218	95*	67	62	191*	135*	01	170	142	195	189	219	220	205	164	152	93	57	84	3229
03	122	134	129	127	162	288	176	205	145	148	122	151	01	182	153	177	183	214	208	193	184	164	100	102	108	3877
04	112	119	129	150	133	264	129	333	99	92	119	104	01	125	165	255	183	202	205	191	161	134	94	122	92	3612
05	113	108	104	107	132	128	131	129	116	175	188	170	01	139	224	188	192	212	221	200	157	128	108	102	104	3576
06	110	98	93	129	148	139	132	151	216	150	169	180	01	175	178	248	219	233	205	179	144	123	107	104	110	3740
07	117	103	115	102	104	112	108	169	247	144	133	138	01	147	169	181	208	234	210	188	173	149	114	109	85	3568
08	92	89	110	107	134	142	144	147	148	153	168	157	01	159	151	152	175	181	192	149	153	150	138	135	129	3451
09	112	107	123	132	152	138	139	123	138	134	208	221	01	175	193	178	179	188	197	182	161	146	130	127	139	3722
10	143	128	150	148	153	150	154	125	122	113	133	147	11	154	140	138	199	263	260	212	149	135	122	112	110	3660
11	123	137	142	145	144	119	108	130	129	142	148	150	11	170	174	199	225	238	222	208	188	157	136	120	101	3765
12	89	99	119	109	120	113	143	137	189	152	167	193	12	162	192	199	264	289	254	239	195	148	107	80	85	3836
13	109	132	142	143	147	144	143	132	193	128	119	147	13	151	160	179	195	211	213	209	202	171	138	113	97	3708
14	108	133	133	125	122	173	117	148	147	141	144	250	14	283	340	355	243	219	255	247	202	168	142	95	95	4465
15	96	107	123	119	89	88	33	130	113	63	93	162	15	53	128	183	198	188	193	192	191	135	89	85	102	2953
16	113	123	124	128	130	207	122	148	149	121	124	137	16	160	172	204	197	219	235	223	192	154	133	112	118	3745
17	124	118	95	109	112	119	120	123	123	144	142	156	17	160	172	180	191	189	193	164	146	138	48	17	82	3165
18	130	104	67	43	79	107	203*	115*	28*	123*	107*	192	18	186*	322	347	180	213	203	180	151	129	118	127	128	2450
19	138	142	141	143	148	131	109	112	107	85	218*	290*	19	410	236	277	293	305*	268	158	173	125	20	97	66	4192
20	90	129	104	47	233	171*	323	113	75	4*	370*	123*	20	210*	91*	444	215*	198	242	191	44	27	73	107	138	3040
21	124	111	138	191	159	165	114	128	212	416	128	344	21	43*	268	212	335	577*	103	126	102	99	112	114	117	4238
22	124	127	134	162	195	270	300	132	114	175	139	262*	22	332	199	248	269	268	212	168	148	122	92	104	118	4414
23	134	133	140	141	147	142	137	144	356	121	189	512*	23	148	374	373	273	215	179	158	134	95	73	93	130	4541
24	192	122	133	123	136	140	137	137	138	158	120	132	24	135	162	168	189	198	192	189	174	148	139	125	119	3546
25	107	67	54	67	82	107	137	138	285	186*	202	189	25	437	269	734*	525	379	255	154	94	17	53	81	93	4712
26	61	109	121	114	119	140	133	133	143	144	146	182	26	205	174	208	236	230	248	204	171	141	123	118	117	3720
27	113	116	115	117	119	127	172	173	178	125	163	167	27	195	218	239	218	220	205	188	163	149	137	115	114	3784
28	118	113	124	134	134	130	188	164	142	144	152	153	28	160	164	170	174	189	199	207	188	167	131	123	122	3690
29	134	128	122	117	115	148	122	121	123	158	208	180	29	200	174	209	172	185	200	199	167	164	150	128	120	3740
30	109	102	104	110	114	112	122	122	133	130	188	160	30	192	220	213	212	209	204	190	176	67	-6	41	86	3342
31													31													

SCALED BY	SPT	Preliminary base-line and scale values:	Scale Value	() Interpolated	☐ Scaling uncertain because of magnetic storm.	MONTHLY RUN	///065
CHECKED BY	CED, M.J.M., JEP	Interval Beginning	Base-line Value	☐ Significant portion of record off sheet for part or all of hour; if value is given, curve was estimated for missing part.	<> Record off sheet for part or all of hour; if value is given, curve was estimated for missing part.	MONTHLY MEAN	154
SIGNS RE-VIEWED BY	CED			☐ No record; or no values available because of faulty record.		DATES WITH GAPS:	
PUNCHED BY				☐ Derived from <u>Storm</u> Magph., converted to Normal Magph.			

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)

Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (150M4.T.) is hour 11 of the same universal day.
 Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)																											
Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (1500W.T.): is hour 11 of the same universal day. Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.																											
C	Q ^u Trs S O 30	01	02	03	04	05	06	07	08	09	10	11	12	NIC 100%	13	14	15	16	17	18	19	20	21	22	23	24	SUM
	01	336	351	377	378	382	370	367	366	371	374	366	370	01	328	294	111	66	291	368	346	331	345	346	340	345	7927
	02	332	375	376	376	411	534	581	294	491	381	31	115	02	201	13	-84	237	382	365	340	352	326	323	325	322	7419
	03	356	358	315	366	364	363	385	366	328	366	301	-170	03	278	346	364	335	332	358	328	324	325	326	340	359	7786
	04	364	357	363	394	395	399	408	376	404	377	376	242	04	282	331	216	262	367	352	337	335	336	338	347	345	8323
	05	355	322	363	380	368	359	351	356	403	386	282	234	05	80	238	232	343	322	318	328	340	338	345	346	356	7745
	06	366	382	371	371	372	358	355	362	367	376	265	217	06	308	208	258	334	353	346	322	340	353	351	360	359	8091
	07	368	355	359	349	345	362	371	381	390	388	338	275	07	299	359	323	274	335	357	350	348	342	351	349	345	8353
	08	335	357	349	381	346	343	348	353	353	352	362	276	08	351	372	359	361	341	329	306	333	338	343	351	363	8295
	09	362	343	349	361	367	354	368	385	372	361	372	248	09	87	224	280	325	302	341	331	332	346	358	362	366	7826
	10	371	378	346	355	351	355	359	363	358	361	363	355	10	363	362	346	267	322	361	352	355	349	343	346	353	8434
	11	356	358	363	371	372	365	369	371	374	365	362	366	11	346	267	255	298	371	376	373	360	353	342	341	342	8416
	12	341	355	372	363	371	392	419	422	371	373	316	173	12	305	193	241	343	348	310	313	344	342	328	339	353	8027
	13	362	363	366	365	368	373	371	376	392	349	347	373	13	368	369	365	364	351	340	339	339	337	332	333	339	8581
	14	353	359	366	365	364	370	431	426	368	366	382	265	14	87	75	191	351	363	386	365	353	347	351	348	350	7982
	15	355	361	359	379	403	530	596	511	440	351	184	181	15	26	351	378	362	359	353	339	324	319	333	346	359	8508
	16	356	349	360	367	366	366	372	362	370	368	371	380	16	380	369	353	367	375	355	355	350	341	343	346	351	8678
	17	351	358	357	356	367	369	369	368	373	384	366	365	17	363	363	365	363	361	346	336	327	281	278	293	368	8435
	18	359	345	385	401	429	640*	510	266	-67*	114*	108	206	18	-226*	-107	93	385	399	368	366	369	372	362	358	373	6808
	19	360	357	353	352	352	360	358	368	393	414	-10*	-163*	19	38	264	250	74	-140*	278	279	271	300	305	331	353	6097
	20	440	402	410	385	549	441*	165*	507	315	41*	-360*	-123*	20	-388*	-163*	-9	306	276	266	70	243	319	396	373	407	5474
	21	399	372	386	384	405	407	382	380	431	325	152	-181*	21	-90*	40	241	-44*	-247*	245	335	352	349	353	371	363	6105
	22	365	371	375	368	368	367	369	379	315	403	157	-247*	22	-146*	-38	180	319	275	293	345	335	341	322	351	368	6535
	23	360	362	360	361	365	363	363	383	328	376	97*	-24*	23	268	-73	149	322	359	353	352	345	326	326	346	357	6917
	24	363	364	353	361	359	363	360	366	368	366	360	269	24	335	362	352	348	342	333	341	351	352	353	358	366	8444
	25	368	323	365	392	389	416	413	401	182*	-151*	336	64	25	-56	-88	-214*	-46	99	244	247	346	298	335	366	359	5388
	26	345	363	385	386	368	380	369	366	362	363	362	134	26	61	328	363	333	324	271	278	329	342	341	365	365	7871
	27	378	359	375	389	368	398	396	438	392	343	42	337	27	379	241	208	273	356	352	357	352	341	340	357	341	8028
	28	356	353	356	372	375	362	340	374	361	367	305	358	28	307	358	355	352	345	348	342	339	335	332	343	351	8498
	29	354	355	362	367	369	364	383	382	399	403	357	351	29	305	362	360	348	365	368	359	339	338	341	343	339	8653
	30	349	355	357	355	371	366	361	362	369	378	381	366	30	315	354	375	384	371	359	355	357	374	311	359	338	8502
	31												31														
SCALED BY	SPT	Preliminary base-line and scale values:										Scale Value		MONTHLY SUM												MONTHLY MEAN	
CHECKED BY	CED, MIM, JEP	Base-line Value										Value		23244												322	
SIGNS RE- VIEWED BY	CED													MONTHLY MEAN												DATES WITH GAPS:	
PUNCHED BY																											

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

STORM MAGNETOGRAMS

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