UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

ALASKAN GEOLOGY BRANCH
TECHNICAL DATA FILE

PRELIMINARY GEOMAGNETIC DATA COLLEGE OBSERVATORY FAIRBANKS, ALASKA

MARCH 1976

OPEN FILE REPORT 76-300C

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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 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:

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 (10 γ)

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 $\approx$ 11	0
11 $\approx$ 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 COLLEGE, ALASKA							
MAGNETIC ACTIVITY (Greenwich civil time, counted from midnight to midnight)						MONTH AND YEAR MARCH, 1976							
DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS		
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			20 mm/hr		
1	4	4	3	6	5	4	2	2	30	30	SUDDEN COMMENCEMENTS d h m		
2	2	3	4	5	7	6	4	4	35	46			
3	4	5	5	6	6	4	3	4	37	44			
4	3	2	2	5	3	2	2	1	20	14			
5	2	2	3	5	3	3	2	3	23	16			
6	2	3	3	5	5	6	5	4	33	36			
7	4	3	5	6	6	6	3	3	36	45			
8	4	5	6	6	6	5	3	3	38	49			
9	2	3	4	6	6	5	5	4	35	42			
10	4	5	3	5	6	5	3	4	35	39			
11	3	3	3	6	6	3	5	3	32	35	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
12	4	3	5	7	4	4	3	3	33	39			
13	2	2	3	5	4	3	2	2	23	17			
14	4	4	3	5	4	2	1	2	25	20			
15	2	3	5	4	6	5	2	3	30	31			
16	2	2	4	3	4	4	3	2	24	17			
17	3	2	5	6	5	3	2	3	29	29			
18	3	2	3	6	4	1	3	2	24	21			
19	2	2	5	6	4	2	2	1	24	23			
20	1	1	4	5	5	2	1	0	19	17			
21	1	1	1	3	4	1	0	0	11	07	BEGIN END d h m d h m		
22	0	0	0	2	1	1	0	0	04	02			
23	0	0	0	1	2	1	2	2	08	03			
24	2	1	1	0	0	0	0	0	04	02			
25	0	0	1	0	0	0	1	1	03	01			
26	2	6	6	8	9	8	6	3	48	143			
27	5	4	4	5	7	4	4	3	36	45			
28	3	4	3	3	4	3	2	1	23	16			
29	3	5	5	4	2	1	1	1	22	19			
30	1	1	3	5	5	3	3	3	24	20			
31	2	2	4	4	3	2	2	1	20	13			
SUM													
K SCALE USED:					D	H	Z						
LOWER LIMIT FOR K = 9.....					683.8	321.7		(mm)					
CURRENT SCALE VALUE.....					3.76	7.82		(γ/mm)					
LOWER LIMIT FOR K = 9.....					2570	2520		(to nearest 10γ)					
SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.													
/s/ John B. Townshend APPROVED John B. Townshend, Chief, College Observatory													
OBSERVER IN CHARGE													

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY COLLEGE, ALASKA	
			MONTH	YEAR
			MARCH	1976
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
04	03XX	pc5	with pc3 & pc4	
14	16XX	pc4		
15	01XX	pc4		
19	04XX	pc5		
26	0231	ssc*		
30	01XX	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.

NOAA FORM 86-500
(11/73)

PRINCIPAL MAGNETIC STORMS
Data from Individual Observatories: COLLEGE OBSERVATORY, COLLEGE, ALASKA
MARCH 1976

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
		day	hr min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	Z(Y)	
C0	64.6 N	02	04XX	..	..	..	..	02	5	7	124	1480	610	04 03
		05	06XX	..	..	..	..	12	4	7	188	1710	1050	12 19
		26	0231	ssc*	-7	+32	-8	26	5	9	769	2630	1940	27 15

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0000 UT, 3-1-76	2400 UT, 3-31-76	1.0/mm	3.88/mm	28° 07.3 E
H	0000 UT, 3-1-76	2400 UT, 3-31-76	7.88/mm		127488
Z	0000 UT, 3-1-76	2400 UT, 3-31-76	7.68/mm		551318

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASLINE
D	0000 UT, 3-1-76	2400 UT, 3-31-76	7.9/mm	29.88/mm	24° 24.3 E
H	0000 UT, 3-1-76	2400 UT, 3-31-76	44.18/mm		114938
Z	0000 UT, 3-1-76	2400 UT, 3-31-76	48.68/mm		540148

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D	0000 UT, 3-1-76	2400 UT, 3-31-76	0.3/mm		1.08/mm
H	0000 UT, 3-1-76	2400 UT, 3-31-76	1.08/mm		
Z	0000 UT, 3-1-76	2400 UT, 3-31-76	2.48/mm		

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
28° 24.7 E	130448	55355
* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.		
DAYS USED: MAR 4, 5, 20, 21, 22, 23, 24, 25, 28, 31		

FORM CRO-404a (4-87)		MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)										ENVIRONMENTAL SCIENCE DIVISION U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION COAST AND GEODETIC SURVEY SEISMOLOGICAL DIVISION										YEAR	MONTH	ELE- MENT			
		Values are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day 1250W M.T. is hour 11 of the same universal day.																				76	76	Z			
C	U.S. Tm S	Hour 01 of local day 1250W M.T. is hour 11 of the same universal day.																						Z			
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	SUM	
	01	347	336	333	367	385	342	366	328	264	317	286	212	01	65	200	239	184	222	241	285	284	281	298	310	314	6801
	02	314	313	309	352	340	368	401	416	344	317	175	213	02	346	498	318	185	-78	60	191	236	262	313	293	345	6831
	03	347	352	335	352	344	292	341	230	301	319	206	207	03	166	151	244	275	303	226	217	264	276	308	314	321	6731
	04	357	334	372	318	310	311	323	331	337	309	142	174	04	140	244	260	269	289	300	285	290	292	292	302	304	6885
	05	307	308	310	315	318	331	378	319	348	230	213	194	05	243	256	293	233	242	284	277	287	296	287	260	278	6775
	06	317	324	325	354	357	405	365	353	322	197	200	274	06	284	297	395	184	-46	113	168	218	272	305	319	309	6608
	07	342	343	348	347	347	350	353	371	334	286	89	263	07	268	211	269	395	57	22	216	275	275	260	319	307	6527
	08	341	323	241	127	267	315	197	171	-71	228	407	309	08	398	292	131	121	207	257	278	251	260	284	314	335	5983
	09	320	323	324	327	345	331	372	265	321	311	421	346	09	584	114	12	-63	186	259	199	243	205	225	355	345	6945
	10	331	333	353	349	291	293	341	343	288	164	56	178	10	344	311	149	82	221	206	274	271	205	312	334	333	6562
	11	364	342	358	375	353	345	261	353	325	326	209	-85	11	207	458	126	225	278	253	226	267	286	295	330	321	6874
	12	328	387	353	331	400	342	352	348	251	204	247	149	12	259	281	301	244	260	264	290	294	302	320	322	320	7149
	13	331	352	371	323	319	321	360	352	341	287	329	322	13	302	271	207	206	281	241	293	283	281	289	285	292	7289
	14	313	318	370	358	348	388	333	335	331	312	282	332	14	268	189	191	263	302	302	303	303	292	298	305	309	7345
	15	309	310	311	323	322	382	396	358	152	270	272	289	15	280	365	246	167	218	282	294	279	274	278	291	301	6969
	16	306	313	325	369	366	327	368	340	296	301	295	244	16	246	374	254	207	284	279	283	292	302	303	301	303	7258
	17	316	321	338	337	331	339	334	44	132	309	344	176	17	275	245	122	125	218	265	291	295	299	302	312	334	6403
	18	341	353	331	311	310	311	330	346	336	114	-71	202	18	214	215	264	298	297	301	301	293	298	305	302	6717	
	19	311	319	310	311	318	335	364	341	236	210	245	234	19	131	115	201	265	291	302	270	245	262	281	287	274	6533
	20	306	304	311	315	312	314	324	341	241	306	301	210	20	150	83	161	222	285	303	303	300	300	302	301	300	6535
	21	301	301	304	304	304	305	308	317	314	254	287	251	21	213	98	150	243	285	297	301	298	301	303	307	301	6653
	22	309	308	307	306	305	306	307	305	304	304	317	267	22	270	281	292	296	302	305	307	303	300	302	300	278	7203
	23	277	298	302	302	302	302	302	301	300	302	296	294	23	254	253	283	300	301	295	262	243	264	272	290	299	6914
	24	313	312	313	313	315	312	311	314	319	303	300	245	24	285	284	284	284	286	299	300	294	288	286	290	270	7207
	25	292	295	297	298	297	298	302	317	297	297	295	285	25	282	295	296	300	302	303	296	292	285	285	283	285	7096
	26	294	301	299	383	75	-183	34	64	401	732	552	712	26	599	694	910	872	1354	564	224	337	283	311	319	332	10465
	27	343	289	280	356	400	387	371	333	283	338	340	310	27	466	592	161	291	337	310	328	265	290	325	341	361	8147
	28	362	353	339	342	354	393	375	392	394	363	338	340	28	309	260	271	272	292	292	289	305	304	313	315	323	7878
	29	329	335	337	353	368	361	363	245	183	341	247	271	29	326	321	323	324	324	331	328	319	319	322	321	328	7639
	30	327	328	323	324	325	324	354	353	326	335	245	273	30	356	403	216	244	328	327	316	302	277	256	291	321	7514
	31	342	362	332	331	334	322	354	239	261	333	334	244	31	254	265	214	254	270	286	308	313	313	313	313	313	7209
SCALED BY	SPT, CED																										
CHECKED BY	CED, MJM, JEP																										
SIGNATURE	MJM																										
DATE																											
MONTH																											
YEAR																											
 																											

FORM CEGS-104 (10-75)		MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)																								OBSY.		YEAR		MONTH		ELEMENT		
		U.S. DEPARTMENT OF COMMERCE NATIONAL SYSTEM OF TIME SERVICE GEOMAGNETISM DIVISION																								CO		76		1976		H		
		Values are in tenths of min. and are averages for successive periods of one hour beginning at midnight, hour 01 of local day (1500M, L.T.) is hour 11 of the same universal day.																																
C	Q	S	T	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	SUM						
01	407	365	399	538	464	420	409	449	411	405	293	-131	149	285	122	233	375	392	411	389	391	371	371	363	360	395	363	360	395	6639				
02	388	402	410	386	439	482	562	450	394	439	266	446	02	153	-208	-503	-287	17	133	339	392	321	363	355	359	370	440	8615						
03	455	395	471	533	547	613	583	479	342	262	83	53	03	-174	327	394	417	389	321	388	321	388	321	388	321	388	321	388	321	388	8896			
04	424	497	427	391	393	393	401	419	464	433	103	81	04	325	378	340	351	405	385	390	380	374	380	384	378	384	378	384	378	9052				
05	383	390	398	384	404	410	414	415	451	412	318	436	05	396	355	203	312	359	335	375	376	355	332	284	395	332	284	395	332	284	9052			
06	384	400	391	402	499	459	413	451	412	283	242	384	06	394	379	62	-203	-10	114	209	384	390	318	280	411	7352								
07	413	412	468	464	424	425	556	459	397	262	-53	97	07	29	315	266	-332	-173	246	419	396	351	332	407	402	6974								
08	380	558	641	764	632	513	421	391	159	481	-62	238	08	159	-527	77	128	367	338	311	313	358	354	352	401	7947								
09	433	401	440	441	411	525	566	528	522	323	-123	573	09	290	-231	-231	-27	401	252	247	397	380	394	320	427	6381								
10	404	402	446	461	468	409	410	439	449	406	358	272	10	272	-417	-163	-31	264	266	375	388	422	392	347	339	7638								
11	446	412	501	401	385	458	423	420	444	395	207	-33	11	167	-257	223	392	385	215	256	393	378	353	359	374	7845								
12	404	489	395	441	470	409	412	482	310	340	-310	206	12	308	250	124	320	333	403	332	365	389	350	365	394	7999								
13	407	410	410	392	397	414	428	449	471	458	364	252	13	327	217	162	321	392	392	368	371	353	359	361	391	8908								
14	391	408	542	454	422	527	412	394	421	400	452	337	14	170	253	302	412	396	378	388	382	376	379	372	365	9353								
15	381	385	393	398	422	485	538	510	340	244	290	225	15	277	-106	-327	-28	297	451	418	412	401	365	380	372	7543								
16	373	310	402	424	406	376	401	423	399	373	381	335	16	48	94	135	339	262	375	361	362	399	382	374	373	8227								
17	370	387	416	430	431	421	460	459	400	395	-78	218	17	307	83	-8	351	292	412	384	383	384	378	343	344	8062								
18	402	392	399	382	409	404	428	446	426	119	164	246	18	271	335	408	398	391	392	374	360	375	371	349	335	8594								
19	366	381	382	400	403	405	407	484	345	362	316	61	19	87	199	323	382	406	392	330	355	360	381	367	368	8287								
20	377	379	384	393	399	393	402	436	435	415	380	171	20	152	109	134	383	413	413	400	390	384	367	367	370	8446								
21	374	381	384	390	393	395	394	385	391	377	376	365	21	301	217	358	400	405	395	395	386	376	364	360	362	8942								
22	370	378	386	393	399	400	394	392	395	389	384	371	22	392	394	395	389	393	399	391	385	379	372	373	374	9287								
23	377	382	385	393	396	399	398	399	401	410	396	402	23	364	395	406	402	391	369	348	361	370	371	363	378	9276								
24	371	379	370	383	381	395	392	393	392	395	392	394	24	390	386	383	385	388	389	389	385	384	378	370	376	9252								
25	379	385	389	390	398	397	395	391	401	402	406	405	25	405	406	402	402	404	402	394	386	383	375	376	379	9450								
26	378	375	407	626	613	223	87	-162	59	-501	245	195	26	223	-704	-1038	-26	959	914	291	71	335	407	363	335	347								
27	371	583	439	497	508	459	469	397	417	387	263	217	27	123	-392	211	413	351	309	157	282	334	359	378	382	7888								
28	404	579	391	494	694	582	562	472	432	406	371	328	28	74	147	248	243	343	338	380	364	360	361	353	354	9102								
29	364	384	437	582	535	408	526	414	385	413	367	440	29	392	364	371	362	365	374	360	351	353	352	354	364	9607								
30	365	370	374	382	379	382	399	397	467	442	384	302	30	69	52	210	389	411	385	373	340	297	309	383	395	8258								
31	404	392	393	380	366	398	431	444	447	430	405	247	31	335	242	283	360	370	384	371	388	377	367	364	365	8343								
SPT, CED		Preliminary base-line and scale values:		Scale Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		
CED, M3M, JEP		Preliminary base-line and scale values:		Scale Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value		
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M3M		Preliminary base-line and scale values:		Scale Value		Base-line Value		Base-line Value		Base-line Value		Base-line Value																						

FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)

SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

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NORMAL MAGNETOGRAMS

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NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS

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