UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

no. 77-3000
open file

MAY 1977

OPEN FILE REPORT 77-300E

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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, 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 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:

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 ⁴
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
0-11	0
11-50	1
50+	2

The assignment of C was discontinued at 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

MAY 1977

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	2	1	2	2	2	3	3	17	09	SUDDEN COMMENCEMENTS		
2	5	5	5	7	7	7	5	5	46	83	d	h	m
3	3	4	6	6	3	0	0	0	22	27			
4	1	2	2	1	1	4	3	2	16	09			
5	2	3	4	3	2	2	1	2	19	11			
6	3	2	1	5	4	5	2	1	23	20			
7	1	1	2	2	1	0	0	1	08	03			
8	0	1	0	2	2	0	0	0	05	02			
9	1	2	1	3	2	3	0	1	13	07			
10	0	1	6	3	3	3	1	1	18	17			
11	1	2	5	5	6	5	4	2	30	34			
12	3	6	6	4	3	2	1	0	25	28			
13	1	2	1	3	0	0	2	1	10	05			
14	2	3	3	3	2	2	2	2	19	10			
15	4	2	2	6	5	4	2	3	28	27			
16	4	4	4	4	4	3	4	2	29	23			
17	4	4	6	5	4	4	3	2	32	32			
18	2	3	4	5	4	2	0	1	21	17	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)		
19	2	1	1	0	2	2	0	0	08	03			
20	2	2	1	4	4	2	3	1	19	12			
21	2	0	1	2	0	1	0	1	07	03			
22	2	3	3	2	2	0	2	0	14	07			
23	2	2	0	2	2	3	1	1	13	06			
24	2	2	2	2	1	2	2	2	15	07			
25	2	1	2	1	0	3	0	0	09	04	BEGIN	END	
											d	h	m
26	0	0	0	0	0	0	1	1	02	01			
27	1	1	1	1	0	0	0	1	05	02			
28	1	2	2	5	4	0	2	1	17	13			
29	1	0	0	0	0	1	0	0	02	01			
30	0	1	1	4	3	1	1	1	12	07			
31	2	3	3	1	4	2	1	1	17	10			

SCALE USED:

LIMIT FOR K = 9.....

SCALE VALUE.....

LIMIT FOR K = 9.....

AND COMPUTATIONS HAVE BEEN CHECKED.

D

M

Z

683.8

321.7

3.76

7.82

2570

2520

(mm)

(γ/mm)

(to nearest 10γ)

APPROVED JOHN B. TOWNSHEND, CHIEF, COLLEGE OBSERVATORY

OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS

OBSERVATORY
COLLEGE, ALASKA

MONTH
MAY

YEAR
1977

DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS
04	0416	si	
04	07XX	pg	
08	03XX	pc5	
08	11XX	pi2	With small bay
18	19XX	pc3, pc4	
19	10XX	pi2	
19	12XX	pi2	
21	00XX	pc3, pc4	
22	1856	si	
28	0425	si	

VERIFIED BY: JEP

VERIFIED BY: JBT

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

1977

MAY

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

Individual Observatories:

Obs. 2 letter 1404 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	01	20XX	..	..	..	..	02	4, 5, 6	7	347	1670	1210	03 13
		11	06XX	..	..	..	..	11 12	5 2, 3	6 6	226	1340	1040	12 14

NORMAL MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 5-1-77	2400 U.T., 5-31-77	1.0/mm	3.88/mm	28° 07.0 E
B	0000 U.T., 5-1-77	2400 U.T., 5-8-77	7.88/mm		127548
	0000 U.T., 5-9-77	2400 U.T., 5-31-77	7.88/mm		127608
Z	0000 U.T., 5-1-77	2400 U.T., 5-31-77	7.78/mm		551318

STORM MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 5-1-77	2400 U.T., 5-31-77	7.9/mm	29.88/mm	24° 23.6 E
B	0000 U.T., 5-1-77	2400 U.T., 5-31-77	44.18/mm		115048
Z	0000 U.T., 5-1-77	2400 U.T., 5-31-77	48.98/mm		539998

RAPID RUN MAGNETOGRAPH

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D	0000 U.T., 5-1-77	2400 U.T., 5-31-77	0.3/mm	1.08/mm
B	0000 U.T., 5-1-77	2400 U.T., 5-31-77	1.08/mm	
Z	0000 U.T., 5-1-77	2400 U.T., 5-31-77	2.48/mm	

MONTHLY MEAN ABSOLUTE VALUES*

D	B	Z
28° 19.0 E	130538	553668

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: MAY 7, 8, 13, 19, 21, 23, 25, 26, 27, 29

FORM 5085-44a		MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)																				U.S. DEPARTMENT OF COMMERCE ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION COAST AND GEODETIC SURVEY SCIENTIFIC DIVISION		DATE	YEAR	MONTH	ELEMENT
Values are in tenths of mm, and are averages for successive periods of one hour beginning at midnight. If at 01 of local day (1200 M T.) is hour 11 of the 6825 universal day.																						CO	77	MAY	D		
C	Q	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	18	26	41	87	97	110	116	103	103	113	116	156	01	136	161	163	173	171	211	201	199	75	-34	28	16	2580
	02	-33	-7	44	3	77	214	92	41	85	109	105	163	02	75	613	343	161	264	312	216	110	236	19	-66	13	2807
	03	43	79	66	56	49	-14	31	69	153	74	185	129	03	107	111	129	150	177	197	198	172	136	96	76	79	2548
	04	74	84	96	106	118	126	121	111	91	111	114	127	04	130	156	191	224	286	297	295	185	59	35	70	56	3243
	05	41	59	70	96	111	70	167	101	50	143	122	121	05	131	161	196	193	181	191	178	136	66	65	53	27	2729
	06	47	60	23	103	103	99	82	69	71	60	164	164	06	126	160	217	268	275	220	190	159	112	64	16	24	2892
	07	30	27	46	61	91	109	173	131	100	93	103	93	07	103	122	147	170	192	211	214	197	176	107	37	27	2760
	08	42	56	70	82	111	109	107	109	110	97	100	133	08	150	140	166	201	215	207	199	179	141	99	76	60	2959
	09	51	42	50	54	77	111	99	96	103	142	166	100	09	138	137	177	223	241	198	156	156	122	114	84	91	2928
	10	99	94	93	86	95	101	93	101	-5	117	132	113	10	162	149	157	204	224	216	186	141	149	117	76	58	2958
	11	67	59	57	47	52	56	63	26	178	67	117	109	11	121	199	400	496	456	416	293	52	18	-6	-4	17	3340
	12	43	49	50	19	-44	-76	-409	-124	27	34	-20	11	12	130	142	150	207	224	206	164	150	117	94	86	84	1354
	13	83	89	90	112	120	122	114	109	123	124	120	102	13	110	137	171	201	200	136	192	160	87	47	21	17	2847
	14	37	57	61	31	57	74	97	56	31	28	114	120	14	124	151	181	202	203	231	211	187	130	98	53	16	2550
	15	53	39	53	66	82	89	81	93	82	18	156	151	15	354	386	210	331	250	238	227	153	101	87	82	67	3419
	16	75	52	-23	-19	40	79	73	101	123	111	142	122	16	137	95	216	217	209	243	112	118	142	143	89	51	2248
	17	11	-3	23	13	72	47	54	103	127	93	89	133	17	82	142	155	239	161	156	173	110	117	121	77	69	2364
	18	38	45	32	21	51	182	82	75	98	97	97	8	18	106	117	169	191	199	202	177	148	117	100	79	67	2498
	19	59	57	82	102	111	118	119	111	109	107	117	110	19	136	139	157	189	217	224	203	176	120	93	78	64	2998
	20	54	53	27	38	23	59	96	69	98	77	23	101	20	153	131	172	182	251	239	258	190	66	31	6	11	2478
	21	12	35	53	81	102	117	110	111	106	105	122	109	21	103	113	144	171	212	222	207	181	141	111	91	68	2827
	22	61	42	56	67	37	113	156	106	116	137	127	126	22	80	88	118	173	203	220	196	173	151	130	103	82	2861
	23	71	61	67	91	91	116	106	102	92	90	97	101	23	109	137	131	194	221	214	200	181	152	130	90	59	2303
	24	48	48	53	71	121	112	92	101	124	103	93	56	24	106	114	162	183	204	213	200	132	112	71	48	37	2403
	25	42	51	67	100	109	117	100	111	138	92	106	108	25	91	84	109	152	198	202	203	186	143	102	82	76	2769
	26	80	81	88	92	98	107	114	112	111	111	110	116	26	122	131	147	161	194	200	182	159	127	113	104	79	2939
	27	77	93	104	103	110	117	110	92	97	119	103	111	27	124	151	168	197	202	199	187	160	123	95	80	77	2999
	28	70	78	81	77	61	70	80	86	81	62	105	117	28	150	146	188	190	200	209	203	150	103	104	89	90	2790
	29	93	89	77	71	86	99	101	103	110	112	118	120	29	130	149	168	189	208	206	210	192	149	109	73	71	3039
	30	63	60	68	79	90	98	109	99	91	69	78	154	30	130	141	168	209	238	238	224	192	150	109	70	57	2984
	31	66	56	55	39	-5	27	59	82	168	49	71	66	31	70	145	142	181	212	230	210	171	130	104	96	20	2444

SCALED BY: SPT, MIM, JEP

CHECKED BY: MIM, JEP

SIGNATURE REVIEWED BY: MIM

PUNCHED BY:

Preliminary baseline and scale values:

Interval	Baseline Value	Scale Value
Beginning		

() Interpolated

(*) Significant portion of hour interpolated.

(X) No records or no values available because of faulty record.

(.) Deleted from Storm

[] Scaling uncertain because of magnetic storm.

<> Record all sheets for part or all of hour if value is given, curve was estimated for missing part.

• Derived from Storm

MONTHLY SUM: 86078

MONTHLY MEAN: 116

DATES WITH GAPS:

Form C-603-6000		MAGNETOGRAM HOURLY SCALINGS																				U.S. DEPARTMENT OF COMMERCE ENVIRONMENTAL SCIENCE SERVICE ADMINISTRATION COAST AND GEODETIC SURVEY BOSTON FIELD OFFICE		DATE	YEAR	MONTH	DAY	
		UNIVERSAL TIME																						CO	77	MAY	2	
		Values are in tenths of gauss and are averages for successive periods of one hour beginning at midnight, from 01 of local day (1500Z) to hour 11 of the same universal day. Source: Corrections have been applied. Negative values are in italics, with minus sign shown.																										
C	G	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	379	351	394	437	420	379	390	401	400	406	393	369	01	333	350	369	307	350	380	369	330	287	299	341	324	8758
		02	477	659	471	540	592	480	556	559	364	373	133	254	02	180	496	226	683	406	571	259	7	104	169	349	418	3534
		03	454	460	487	510	552	591	480	315	18	215	97	-5	03	383	401	419	416	417	410	402	390	388	379	369	372	8920
		04	376	380	386	380	387	380	389	396	416	411	410	402	04	433	434	420	417	401	366	284	296	366	351	339	347	9167
		05	379	400	427	379	381	436	487	406	329	396	409	331	05	350	323	359	359	356	356	329	319	340	340	366	364	8987
		06	408	369	454	424	360	366	393	420	400	413	125	194	06	210	103	83	76	254	379	377	359	341	330	344	361	7543
		07	380	384	419	407	399	386	394	400	387	392	393	386	07	379	384	385	370	363	363	350	331	311	310	350	371	8994
		08	376	379	381	380	380	392	390	387	390	396	399	361	08	356	371	376	384	390	382	370	356	344	344	347	361	8997
		09	361	376	377	383	397	380	391	400	409	410	363	349	09	374	376	396	343	224	316	371	374	372	370	362	364	8838
		10	364	370	370	382	386	391	410	463	252	309	304	329	10	277	333	323	267	317	390	380	386	370	369	351	371	8474
		11	391	386	371	380	399	431	500	544	164	216	416	439	11	316	186	54*	183*	69	5	152	214	329	364	386	388	6671
		12	384	384	416	466	649	911	824	504	472	451	389	343	12	298	205	340	374	364	358	366	367	359	361	361	363	10409
		13	358	373	378	394	390	395	370	376	392	369	332	396	13	384	381	380	371	379	366	344	309	300	353	352	356	8806
		14	359	367	389	417	389	400	391	430	517	508	433	307	14	379	333	307	349	376	366	369	356	350	338	329	341	9193
		15	426	449	497	406	349	351	370	387	403	167*	64*	-101	15	-77	150*	86	201	374	396	356	339	344	359	361	391	6620
		16	392	402	514	570	632	549	597	413	400	321	297	213	16	149	204	300	360	397	256	181	361	353	339	357	371	8998
		17	409	516	599	561	644	577	588	324	191	420	303	-31	17	287	398	343	206	257	284	291	358	384	369	361	378	9017
		18	381	379	416	437	444	464	464	396	431	416	362	-11	18	302	384	361	389	401	376	386	379	359	341	344	366	8967
		19	370	393	356	316	390	381	381	383	387	386	385	319	19	358	384	386	381	356	363	346	344	343	343	350	359	8890
		20	363	364	417	420	451	430	408	411	416	400	391	312	20	195	315	340	383	340	339	365	343	320	327	323	343	8716
		21	360	369	381	349	371	373	390	386	389	391	353	440	21	396	391	387	386	389	390	383	383	371	356	350	351	9065
		22	359	374	380	386	469	416	494	409	399	381	366	366	22	369	400	400	403	406	400	393	383	363	354	353	356	9379
		23	376	350	389	387	409	381	391	398	397	391	412	309	23	396	386	370	292	380	390	384	381	376	360	361	360	9086
		24	363	389	401	410	420	391	400	401	406	394	396	403	24	382	385	394	400	393	343	363	350	346	339	341	350	9160
		25	356	377	380	397	380	366	394	398	376	390	384	390	25	406	402	406	334	380	387	384	379	369	367	366	360	9128
		26	361	362	370	377	376	380	380	385	389	389	389	386	26	383	386	389	383	391	397	384	373	373	367	367	350	9087
		27	360	361	369	371	367	385	389	399	394	400	396	399	27	393	387	390	389	388	380	371	368	359	359	358	359	9091
		28	369	364	364	369	388	381	388	399	427	489	463	178	28	343	389	410	416	416	398	370	374	369	372	380	389	9195
		29	389	388	388	382	383	379	380	382	389	392	397	397	29	399	402	406	406	398	384	377	365	360	369	369	368	9249
		30	375	379	380	388	396	408	409	416	407	411	381	234	30	286	379	409	415	414	398	379	364	359	358	368	381	9096
		31	377	399	399	382	459	481	523	460	433	416	396	406	31	385	188	386	398	403	415	412	409	380	363	363	347	9570

SCALED BY: SPT, MJM, JEP

CHECKED BY: MJM, JEP

REVIEWED BY: MJM

PUNCHED BY:

Preliminary baseline and scale values:

Intercept: Beginning

Baseline Value

Scale Value

() Interpolated

(*) Significant portion of hour interpolated.

□ No record; or no values available because of faulty record.

* Derived from STOPB Mag., converted to Normal Mag.

() Scaling uncertain because of magnetic storm.

<> Record off sheet for part or all of hour; if value is given, it was interpolated for missing part.

MONTHLY SUM: 269602

MONTHLY MEAN: 362

DATES WITH DATA:

COLLEGE, ALASKA

NOV 10, 1973 NOV 11, 1973

D BASELINE ↑
D TRACE ↑
NEW UT DAY BEGINS HERE →
Z TRACE ↓
Z BASELINE ↓
H TRACE ↑
H BASELINE ↓
TEMPERATURE TRACE ↑

INCREASING EAST DECLINATION ↓
HOUR MARK →
INCREASING VERTICAL INTENSITY ↑
INCREASING HORIZONTAL INTENSITY ↑

24 U.T.
20
18
16
14
12
10
8
6
4
2
0

100 MA

SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

100 m
0

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

100 Am
0

NORMAL MAGNETOGRAMS

1000 nT
100 nT

NORMAL MAGNETOGRAMS

100 mm
0

STORM MAGNETOGRAMS

100 A
100 A

STORM MAGNETOGRAMS

100 mm
100 mm