UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

MARCH 1982

OPEN FILE REPORT 82-0300C

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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, E.A. SAUTER AND L.Y. TORRENCE 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
800 Yukon Drive
Fairbanks, Alaska 99701

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

World Data Center A
NOAA D63, 325 Broadway
Boulder, Colorado 80303

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.....+256.0°
Elevation.....200 meters

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 7-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, a_k : The K-Index is converted into an equivalent range, a_k , 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 a_k . 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 a_k is as follows:

Gamma Range	K - Index	a_k
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 a_k as follows:

a_k Range	C
0-11	0
11-50	1
50+	2

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

Selected Phenomena & Outstanding Magnetic Effects

Prior to January 1, 1976, the Normal and 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

MARCH 1982

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		
1	1	2	4	4	5	7	4	6	33	45	SUDDEN COMMENCEMENTS d h m
2	5	6	6	7	7	6	4	4	45	78	
3	3	2	3	6	5	5	2	1	27	28	
4	1	0	2	6	4	4	1	1	19	19	
5	2	4	4	5	2	1	0	0	18	15	
6	0	0	0	1	1	1	0	0	03	01	
7	0	0	0	0	0	0	0	1	01	00	
8	1	0	2	2	2	3	2	3	15	08	
9	2	2	2	5	4	5	3	3	26	22	
10	4	3	4	5	5	3	1	0	23	19	
11	0	5	4	0	4	2	1	1	17	14	POSSIBLE SOLAR-FLARE EFFECTS BASED ON INSPECTION OF GRAMS ALONE (WITHOUT REFERENCE TO DATA FROM OTHER SOURCES)
12	1	0	1	1	1	4	2	2	12	07	
13	3	3	3	3	3	2	1	1	19	11	
14	2	1	0	4	3	4	3	1	18	12	
15	1	2	2	2	1	1	0	0	09	04	
16	0	0	2	2	1	0	0	0	05	02	
17	0	0	0	3	4	3	2	2	14	09	
18	2	2	4	5	3	3	2	2	23	17	
19	3	3	2	4	3	0	1	1	17	11	
20	0	1	3	5	5	5	3	2	24	23	
21	1	3	6	4	5	5	3	3	30	31	BEGIN
22	5	6	5	4	4	5	4	2	35	39	
23	2	3	1	4	5	2	0	0	17	13	END
24	0	2	0	2	2	4	4	2	16	10	
25	3	3	3	6	6	3	2	2	28	29	
26	3	2	0	4	3	3	2	2	19	12	d h m
27	2	2	1	5	5	0	1	0	16	15	
28	1	2	2	0	0	0	0	1	06	03	d h m
29	1	3	6	4	1	1	1	2	19	18	
30	2	3	2	5	5	3	2	2	24	19	
31	3	4	4	5	5	6	6	2	35	42	

K SCALE USED:

LOWER LIMIT FOR K = 9.....

CURRENT SCALE VALUE.....

LOWER LIMIT FOR K = 9.....

D

683.8

3.73

2550

H

321.7

7.79

2510

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
MARCH

YEAR
1982

DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS
06	09XX	pi2	
23	02XX	pc5	
IDENTIFIED BY: JEP VERIFIED BY: EAS			

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
MARCH 1982

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

Obs. 2 letter 1400 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	06XX	..	..	..	..	01 02	6 4, 5	7 7	410	1780	1380	03 19
		21	06XX	..	..	..	..	21 22	3 2	6 6	153	1100	840	22 22

NORMAL MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 3-1-82	2400 U.T., 3-31-82	1.6/mm	378/mm	27° 46.8 E
H	0000 U.T., 3-1-82	2400 U.T., 3-31-82	7.88/mm		127528
Z	0000 U.T., 3-1-82	2400 U.T., 3-31-82	7.78/mm		551518

STORM MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 3-1-82	2400 U.T., 3-31-82	7.9/mm	29.68/mm	23° 42.7 E
H	0000 U.T., 3-1-82	2400 U.T., 3-31-82	44.08/mm		115048
Z	0000 U.T., 3-1-82	2400 U.T., 3-31-82	48.58/mm		540298

RAPID RUN MAGNETOGRAPH					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		
D					
H					
Z					

MONTHLY MEAN ABSOLUTE VALUES*					
D		H		Z	
28° 00.7 E		129718		553868	

* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.

DAYS USED: MAR 6, 7, 8, 12, 13, 15, 16, 17, 24, 28

MAGNETOGRAM HOURLY SCALINGS
(UNIVERSAL TIME)U.S. DEPARTMENT OF INTERIOR
Geological Survey, Geologic Division
Denver Federal Center
DENVER, CO 80215OBSY. YEAR MONTH ELEMENT
CO 82 MAR DValues are in tenths of mm. and are averages for successive periods of one hour beginning at midnight. Hour 01 of local day (150 M.T.) is hour 11 of the 8888 universal day.
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

Millage collections have been reduced. Negative values are in red. Minimums have been shown.																											
C.	0	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	103	103	97	113	100	117	38	138	132	102	130	144	01	253	232	445	573	620	326	201	119	109	198	511	265	5169
	02	202	98	74	-124	-212	-394	-108	-61	-299	336	-204	185	02	98	637	407	-116	66	104	119	146	123	82	59	122	1340
	03	120	108	109	120	158	137	91	108	206	82	209	210	03	185	249	186	235	270	228	232	192	179	170	147	130	4061
	04	147	139	138	135	126	123	114	112	107	129	-13	384	04	183	141	136	143	196	244	224	220	181	166	133	128	3736
	05	82	96	102	92	71	58	118	110	118	143	72	179	05	148	162	152	146	147	178	189	171	142	139	126	109	3050
	06	112	111	110	112	111	114	118	122	125	162	149	129	06	136	136	142	167	208	226	232	229	204	169	146	124	3594
	07	106	94	89	87	97	109	120	121	124	125	130	138	07	146	163	170	169	185	176	207	218	209	190	166	132	3471
	08	84	60	30	28	64	94	103	129	82	100	115	146	08	152	165	182	211	268	356	330	346	319	181	129	35	3709
	09	114	31	10	59	73	79	120	122	94	44	6	110	09	153	216	214	255	340	323	241	184	226	97	45	72	3228
	10	80	69	31	53	67	89	65	2	140	41	109	111	10	126	148	144	178	160	136	177	190	209	165	142	98	2730
	11	66	57	45	42	41	170	13	133	135	129	125	124	11	151	194	113	160	196	251	188	171	163	156	122	123	3068
	12	93	78	71	79	80	99	107	127	147	107	128	136	12	145	150	170	186	260	290	297	284	230	152	94	93	3603
	13	67	57	4	70	57	6	80	20	78	70	98	215	13	175	196	204	196	191	207	202	213	179	157	106	83	2931
	14	62	26	54	74	86	106	125	123	122	118	106	261	14	253	190	178	283	171	304	268	218	136	161	123	71	3619
	15	43	32	30	36	78	84	111	104	115	121	132	144	15	187	175	164	176	190	228	248	241	255	215	158	92	3359
	16	50	37	36	53	88	95	94	75	106	124	132	149	16	176	156	162	178	196	133	235	222	211	179	145	104	3136
	17	90	69	61	78	82	83	94	101	99	78	164	190	17	188	320	288	229	253	270	246	133	145	149	99	41	3550
	18	38	44	54	81	84	103	126	104	106	115	190	196	18	138	144	134	150	172	174	196	200	154	163	111	92	3069
	19	56	44	24	15	101	109	112	135	104	111	140	164	19	150	117	132	133	151	176	192	186	184	130	115	132	2913
	20	113	103	101	97	105	110	115	39	98	110	238	132	20	140	177	100	176	207	146	161	149	130	160	122	82	3111
	21	82	91	88	52	66	100	193	-71	32	72	129	80	21	64	263	469	382	253	170	178	152	69	59	110	165	3248
	22	66	-4	-47	40	28	175	8	-87	68	221	230	143	22	230	283	277	331	226	200	151	190	176	144	126	112	3287
	23	116	116	114	122	114	115	119	129	130	153	232	150	23	128	240	133	132	176	208	213	193	169	148	122	109	3581
	24	108	104	110	104	104	102	110	105	113	122	155	166	24	142	155	141	143	168	200	192	128	124	151	129	126	3202
	25	106	54	95	71	94	114	142	203	141	63	162	210	25	254	214	72	166	177	176	174	198	142	171	164	117	3480
	26	103	81	83	76	99	112	115	130	133	144	154	183	26	153	132	134	129	184	165	213	236	225	186	126	107	3403
	27	98	76	49	85	84	100	116	164	135	123	130	168	27	104	135	130	142	176	199	220	219	199	149	137	106	3244
	28	85	74	82	36	75	85	108	110	156	117	118	126	28	125	120	112	147	173	187	207	198	177	154	126	116	3014
	29	109	90	102	70	12	72	44	39	76	94	126	130	29	130	137	153	159	193	239	254	241	243	232	183	114	3242
	30	71	68	29	10	41	68	100	91	84	87	60	176	30	202	332	233	232	259	220	218	258	212	168	136	134	3489
	31	46	52	28	-13	90	-53	27	-168	140	130	130	94	31	165	319	222	193	250	332	174	107	148	180	158	117	2868

SCALED BY TKC, LYT, JEP
CHECKED BY EAS, JEP
IONS REVIEWED BY JET
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 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 STORM Mph., converted to Normal Mph.

MONTHLY SUM 102505
MONTHLY MEAN 138
DATES WITH GAPS:

MAGNETOGRAM HOURLY SCALINGS (UNIVERSAL TIME)

U.S. DEPARTMENT OF COMMERCE
BIOLOGICAL SERVICE, GEORGETOWN STATION
SUMMER FEDERAL CENTER
GEORGETOWN, GE 36525

DATE
YEAR
MONTH
DAY

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

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	281	282	287	291	319	334	454	470	390	400	312	294	188	183	-148	-251	-188	242	254	314	282	221	215	568	5996
02	482	579	262	30	63	233	155	-140	193	-350	-457	-117	-163	-746	-237	-282	-79	121	208	254	168	206	256	334	973
03	326	319	295	285	274	288	281	270	215	-100	42	127	39	-55	-89	82	184	281	317	309	283	280	281	284	4818
04	178	282	282	284	289	289	298	322	330	340	24	248	229	319	298	264	208	233	284	278	263	259	247	259	5911
05	288	294	284	286	333	422	471	380	329	213	180	188	282	280	230	285	284	277	260	261	266	270	261	260	6944
06	259	266	270	276	281	288	292	291	289	288	297	292	290	283	254	264	287	281	273	263	264	262	262	262	6634
07	259	262	271	277	287	294	297	303	304	300	300	302	299	299	301	297	292	304	295	284	272	264	266	262	6891
08	266	270	297	303	311	316	315	330	347	340	312	296	295	282	266	228	224	228	242	263	255	202	218	303	6709
09	336	297	277	273	296	333	363	319	337	367	422	321	264	146	199	98	-236	46	131	277	245	162	220	259	5722
10	284	415	491	430	439	412	464	413	357	234	410	341	291	242	253	181	138	279	290	274	245	240	240	244	7629
11	268	280	287	308	354	408	441	381	293	290	282	279	218	67	185	247	182	218	210	231	240	250	250	239	6408
12	259	260	272	272	290	298	312	331	325	320	306	297	290	298	275	198	-41	138	267	279	249	270	268	259	6292
13	251	275	344	294	337	412	430	474	458	384	310	268	200	148	190	251	285	300	294	279	262	254	259	252	7211
14	251	284	273	299	283	301	295	297	299	320	282	166	163	194	217	116	-9	138	160	231	270	256	247	250	5583
15	253	271	296	321	311	330	365	363	329	321	329	285	287	288	281	273	258	256	281	277	268	254	245	250	6992
16	260	267	291	299	310	317	329	354	357	335	332	321	302	305	290	288	284	284	292	285	272	259	249	250	7132
17	252	267	280	287	299	311	313	319	320	305	218	257	158	21	192	316	328	338	311	304	307	279	256	254	6492
18	262	298	291	310	321	312	330	379	345	243	107	66	242	247	277	258	221	273	301	283	246	237	248	262	6359
19	264	306	294	373	280	277	292	321	324	306	297	132	263	296	282	294	296	292	291	279	265	271	258	250	6803
20	249	252	258	270	282	294	369	398	362	409	109	254	279	107	-224	46	185	258	232	252	272	276	263	248	5700
21	255	265	270	307	298	336	273	336	234	130	202	223	-111	-90	-353	-185	87	342	252	178	279	274	302	252	4354
22	276	394	552	469	636	251	353	442	324	154	43	152	-168	-63	-36	1	180	80	223	299	302	284	278	267	5693
23	266	267	259	273	269	276	280	269	284	254	109	274	239	-2	189	265	294	296	289	285	277	269	263	258	6002
24	260	260	259	280	276	288	287	295	301	301	307	268	290	295	307	264	226	107	226	258	292	281	257	242	6427
25	249	284	268	298	281	297	337	311	343	275	-147	59	-203	-288	107	215	265	296	301	281	252	231	237	234	4783
26	236	267	268	281	282	285	292	295	293	282	144	141	216	257	282	241	179	260	281	283	258	244	221	247	6035
27	256	277	285	296	296	298	307	309	311	315	279	31	112	274	286	293	298	299	287	264	256	254	248	249	6380
28	253	271	270	324	301	303	291	311	298	295	292	291	294	300	281	285	288	280	275	261	255	256	247	245	6773
29	250	270	266	296	355	436	486	68	300	232	132	301	302	291	281	288	288	295	280	278	265	254	259	226	6699
30	268	255	288	334	458	351	326	339	366	382	339	48	-158	-238	120	233	254	250	308	282	268	260	242	264	5836
31	351	372	312	390	432	498	554	584	435	347	257	120	-57	-69	65	296	176	-153	-118	176	220	264	282	266	6005

SCALED BY
TKE, LYT, JEP
CHECKED BY
EMS, JEP
REVIEWED 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 record.

* Derived from STORM Map, converted to Normal Map.

[ ] Setting uncertain because of magnetic storm.

<> Record all about the part or all of hour; if value is given, error was estimated for missing part.

MONTHLY SUM 188186

MONTHLY MEAN 253

DATES WITH DATA

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

100 mm
0

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS