UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA COLLEGE OBSERVATORY FAIRBANKS, ALASKA

APRIL 1980

OPEN FILE REPORT

80-300D

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Normal Magnetograms

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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, E.A. SAUTER, 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*
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			
MAGNETIC ACTIVITY (Greenwich civil time, counted from midnight to midnight)										COLLEGE, ALASKA			
MONTH AND YEAR										APRIL 1980			
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	2	0	0	0	4	3	1	0	10	07	SUDDEN COMMENCEMENTS d h m		
2	0	0	0	0	0	0	0	1	01	00			
3	1	1	0	1	2	2	1	0	08	03			
4	0	1	2	4	3	3	2	1	16	10			
5	1	1	0	0	1	3	1	0	07	03			
6	0	2	1	2	6	6	5	4	26	32			
7	2	2	2	2	5	2	2	3	20	13			
8	3	2	2	4	6	3	1	2	23	20			
9	2	4	6	5	6	4	2	2	31	35			
10	3	5	6	6	3	1	1	2	27	31			
11	2	3	3	6	3	5	5	4	31	32			
12	4	4	4	5	5	4	3	4	33	31			
13	4	3	5	4	2	3	3	0	24	19			
14	1	1	2	1	2	3	2	3	15	08			
15	4	4	4	2	2	4	4	3	27	21			
16	2	4	4	4	3	4	1	1	23	17			
17	3	4	2	1	1	2	1	1	15	09			
18	2	1	1	2	0	0	0	0	06	03			
19	1	1	2	2	2	1	0	0	09	04			
20	2	1	0	0	3	1	1	1	09	04			
21	1	1	1	2	0	0	1	0	06	02			
22	2	2	0	0	3	2	1	1	11	05			
23	2	2	0	0	1	1	1	1	08	03			
24	2	2	1	2	2	2	1	1	13	06			
25	2	3	2	5	4	1	0	0	17	13			
26	2	2	1	0	3	2	2	1	13	06			
27	0	1	0	1	1	1	0	1	05	02			
28	1	2	0	2	2	1	0	1	09	04			
29	2	2	1	0	1	1	1	1	09	04			
30	2	2	0	1	4	2	2	1	14	08			
31													

K SCALE USED: LOWER LIMIT FOR K = 9..... CURRENT SCALE VALUE..... LOWER LIMIT FOR K = 9	D	H	Z	(mm) (γ/mm) (to nearest 10γ)
	683.8	321.7		
	3.75	7.81		
	2560	2510		

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED JOHN B. TOWNSEND, CHIEF, COLLEGE OBSERVATORY
 OBSERVER IN CHARGE

OUTSTANDING MAGNETIC EFFECTS			OBSERVATORY COLLEGE, ALASKA	
			MONTH APRIL	YEAR 1980
DATE	TIME U.T.	NATURE OF PHENOMENON ¹	REMARKS	
02	2111	si*	pc5's on H component	
06	1059	ssc*		
21	01XX	pc5		
21	16XX	pc4		
IDENTIFIED BY: JEP			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
APRIL 1980

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 min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	Z(Y)	day hr
C0	64°6 N	06	1059	s.c.*	-9	-97	-39	06	5, 6	6	172	1160	750	07 03
		09	05XX	..	..	..	..	09 10	3, 5 3, 4	6 6	281	1430	1150	10 13
		11	06XX	..	..	..	..	11	4	6	137	960	470	13 11

APRIL

1980

NORMAL MAGNETOGRAPHS					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 4-1-80	2400 U.T., 4-30-80	1.6/mm	3.78/mm	27° 47.2 E
H	0000 U.T., 4-1-80	2400 U.T., 4-30-80	7.88/mm		127558
Z	0000 U.T., 4-1-80	2400 U.T., 4-30-80	7.38/mm		551708

STORM MAGNETOGRAPHS					
COMPONENT	PERIOD		CALIBRATION		
	FROM	TO	SCALE VALUE		BASELINE
D	0000 U.T., 4-1-80	2400 U.T., 4-30-80	7.8/mm	29.78/mm	23° 49.5 E
H	0000 U.T., 4-1-80	2400 U.T., 4-30-80	44.08/mm		115078
Z	0000 U.T., 4-1-80	2400 U.T., 4-30-80	48.58/mm		540338

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

MONTHLY MEAN ABSOLUTE VALUES*		
D	H	Z
28° 08.7 E	130118	553778
* COMPUTED FROM TEN QUIETEST DAYS DURING MONTH.		
DAYS USED: APR 2, 3, 5, 18, 19, 20, 21, 23, 27, 28		

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 (1500M.T.) is hour 11 of the SDUC universal day.
Shrinkage corrections have been applied. Negative values are in red, with minus signs shown.

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

OBSY.

YEAR

MONTH

FILE-

MENT

D

CO

RO

APR

D

Q of Ten	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	132	142	168	187	203	210	210	209	207	207	211	221	218	211	261	275	259	301	294	268	256	231	221	210	5312
02	182	168	180	189	199	198	201	203	208	208	210	207	214	199	188	205	242	271	293	297	279	269	232	207	5249
03	177	168	169	183	192	189	192	197	196	202	217	220	206	227	221	237	269	281	276	284	287	258	229	209	5286
04	187	170	167	170	178	198	199	190	238	228	210	326	229	210	188	238	251	279	269	228	210	228	231	208	5230
05	298	183	187	181	177	173	183	191	199	207	217	207	216	225	242	221	281	291	301	285	248	230	219	207	5369
06	197	177	160	156	170	177	180	189	188	189	205	197	263	369	348	537	522	261	228	240	236	201	198	201	5829
07	167	180	176	171	160	220	190	211	212	181	212	217	206	213	261	250	270	270	269	187	188	272	221	151	5055
08	148	123	81	197	181	173	178	193	177	167	217	198	434	277	241	258	292	288	299	318	282	274	233	212	5441
09	173	118	96	81	104	67	171	111	149	213	442	119	364	194	211	197	271	271	282	253	222	207	203	195	4714
10	170	140	96	84	83	-9	149	160	104	164	347	194	211	236	254	302	312	331	325	289	273	230	204	219	4340
11	186	168	182	208	223	242	216	190	173	99	213	185	248	279	329	351	354	435	388	348	309	144	207	196	5873
12	159	200	194	100	125	147	119	182	218	56	151	241	215	238	258	270	306	303	257	220	202	200	181	153	5363
13	157	116	138	139	137	138	19	148	114	153	246	217	210	235	271	281	270	260	250	212	189	240	244	188	4525
14	149	136	128	137	164	159	184	184	200	170	183	183	210	235	271	281	270	260	250	212	189	240	244	188	4827
15	159	111	91	148	109	141	116	182	151	159	189	189	220	239	248	281	351	339	308	281	224	253	209	144	4842
16	158	141	139	99	132	119	147	136	191	181	182	181	198	201	289	349	389	348	307	250	248	256	182	191	5014
17	154	108	68	91	132	151	186	169	179	179	190	201	203	221	242	278	321	311	313	336	292	240	213	269	5047
18	159	147	130	158	170	179	181	181	183	261	211	211	234	231	260	289	309	298	307	307	288	252	211	190	5347
19	161	149	151	151	169	179	179	201	221	221	218	229	219	221	259	303	319	318	341	333	309	251	204	179	5485
20	149	139	131	173	178	181	190	180	181	187	178	189	221	231	262	280	289	308	309	278	242	221	188	171	5056
21	121	109	111	141	161	171	198	201	189	200	199	222	221	228	258	289	300	290	293	283	252	221	189	151	4998
22	149	112	120	136	161	171	181	186	191	197	200	189	199	217	229	281	347	351	329	299	266	239	199	154	5103
23	121	108	138	140	171	178	177	189	198	202	211	209	191	218	248	277	300	309	278	284	274	237	230	200	5088
24	151	123	193	90	80	160	168	176	175	174	182	200	211	226	275	318	378	303	278	257	242	239	210	189	4992
25	168	121	101	121	71	139	158	175	195	172	168	406	277	224	240	266	268	266	250	293	228	232	211	174	4864
26	160	147	135	143	168	194	194	182	190	192	209	205	201	178	235	255	276	283	284	274	248	251	176	173	4953
27	165	158	152	158	187	190	198	187	198	195	223	223	216	205	191	269	278	271	269	261	241	276	200	173	5084
28	131	123	133	138	191	190	190	198	195	191	209	189	218	231	269	298	299	313	289	254	246	229	220	203	5147
29	169	151	131	151	172	179	199	203	189	191	181	171	181	198	224	301	327	316	289	271	231	212	187	152	4976
30	142	150	132	167	191	179	183	182	189	189	207	206	199	300	263	310	327	337	318	277	201	196	152	168	5165
31																									

SCALED BY	SPT, PEF	MONTHLY SUM	153574
CHECKED BY	JEP, SPT, EAS	MONTHLY MEAN	213
SIGNS RE- VIEWED BY	JEP	DATES WITH GAPS:	
PUNCHED BY			

() Interpolated
() Significant portion of hour interpolated.
() No record; or no values available because of faulty record.
* Derived from Storm Megph., converted to Normal Megph.

() 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.

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

200 mm
100 mm
0

NORMAL MAGNETOGRAMS

NORMAL MAGNETOGRAMS

STORM MAGNETOGRAMS

200 mm
100 mm
0

STORM MAGNETOGRAMS

STORM MAGNETOGRAMS