MARCH 1986 GEOMAGNETIC INDICES BULLETIN

NATIONAL GEOPHYSICAL DATA CENTER
Telephone 303-497-6134
Solar-Terrestrial Physics Division (E/GC2)
325 Broadway, Boulder, Colorado 80303 USA

MONTHLY SUMMARY OF GEOMAGNETIC ACTIVITY

PLAIN TALK ON A COMPLEX TOPIC

PROMPT AND COMPREHENSIVE

GEOMAGNETIC FIELD. The Earth's permanent magnetism generates the geomagnetic field. It has two poles like the field of a bar magnet and permeates the Earth's interior and the surrounding space. About 95% of the terrestrial magnetism orginates inside the earth. The remaining 5% arises from electric currents flowing in the planet's upper atmosphere.

Solar activity influences the Earths's magnetic field through the solar wind--that hot, supersonic, tenuous, magnetized stream of positively and negatively charged particles emitted radially by the sun. The geomagnetic field carves out a teardrop-shaped cavity within the solar wind, because the field deflects charged particles. Sunward, the solar wind compresses the Earth's field; away from the sun, it draws the field out into a long comet-like tail. The magnetic activity indices below indirectly measure the solar wind's changing speed, density and temperature, because each 3-hour value and each 24-hour value classifies the disturbance level of the terrestrial field. Geomagnetic indices measure regular and irregular short-term variations in the field's strength and direction; they continuously summarize many direct observations.

MARCH 1986 INDICES OF GEOMAGNETIC ACTIVITY

Day	Jul	Bart	Rank Q/D	Kp Three-Hour Indices 1	2	3	4	5	6	7	8	Kp Sum	Ap	Cp	sc (UT)	AFR	An	As	Am	aa Provisional N	S	M1	M2	
1	60	2		3+	2+	4-	3+	3-	4+	4-	2+	26-	18	1.0		14	30	23	26	38	21	28	31	
2	61	3		3-	3-	3+	3+	3	2	2-	2	21-	12	0.7		11	21	18	20	21	20	26	15	
3	62	4		2+	2-	1+	1+	2-	2+	3	5-	18+	12	0.7		11	21	17	18	25	12	8	30	
4	63	5		3-	2	2	2-	2+	2	3-	2	17+	8	0.5		6	16	15	15	18	13	14	17	
5	64	6		2-	2-	1+	1+	2	3	2+	3	16+	8	0.5		7	13	13	13	18	12	9	22	
6	65	7	D1	4+	3+	1	4-	5	5-	4	6-	32-	32	1.3	1044	29	48	49	49	50	36	29	57	
7	66	8	D2	5	4	4-	4	3+	4+	5-	5	34	33	1.3		23	50	41	45	54	37	36	55	
8	67	9	D4	5	4-	3	3	3	4+	4	3-	29-	23	1.1		19	38	31	34	41	23	27	38	
9	68	10	Q4	2	2+	2+	1+	0+	1-	0+	0+	10-	5	0.2		4	9	9	9	10	9	15	4	C
10	69	11	Q1	0	0	1-	0+	0+	1+	1-	0+	4-	2	0.0		2	4	3	4	4	4	2	5	CC
11	70	12	Q2	0	0+	0	0+	0+	1-	1	1+	4	2	0.0		2	5	3	4	6	6	3	9	CC
12	71	13	Q9A	1-	0+	2+	2+	3	2-	1-	2+	13+	7	0.4		8	13	11	12	14	8	8	15	C
13	72	14		4	3+	4-	4-	4-	4	2+	3+	28	21	1.1		18	36	34	35	36	35	30	42	
14	73	15		4	2	2-	1	1+	1+	2-	2-	15-	8	0.4		7	16	12	14	19	10	19	11	
15	74	16		2-	2+	2	1+	1+	1	3	3	16-	8	0.4		7	15	13	14	21	10	11	20	
16	75	17	Q7	2+	2	2+	2+	2-	1-	1	1	13+	6	0.3		6	14	13	14	11	14	15	11	C
17	76	18	Q6	2-	2-	3-	1+	1	2-	2-	1	13-	6	0.3		7	12	11	11	12	8	11	9	CC
18	77	19		3-	2	2-	3-	2+	2+	1	2-	16+	8	0.4		9	17	16	17	16	15	15	17	
19	78	20		2+	3	2+	2	1+	3-	2+	1+	17+	9	0.5		9	17	15	16	19	11	16	14	C
20	79	21	Q3	0	0	1	0+	1	1+	1+	1-	6-	3	0.1		2	6	4	5	7	4	4	8	CK
21	80	22		1-	2+	3-	3+	5-	3	3	4	24-	17	0.9		14	29	32	30	29	34	17	46	
22	81	23		5	5-	3	2	3	3+	3-	3+	27	22	1.1		18	32	30	31	38	30	36	32	
23	82	24		2+	2	2+	2+	3-	2+	4-	3-	20+	11	0.6		10	20	16	18	25	10	13	22	
24	83	25	D5	3	3	3-	4-	5-	4+	4	2+	28-	21	1.1		15	35	27	31	40	24	24	40	
25	84	26	D3	4	3+	4	3-	4-	3+	5+	5-	31	27	1.2		24	38	33	36	48	28	28	49	
26	85	27		3+	2	2	1+	3-	4-	3-	3	21-	12	0.7		12	23	21	22	30	20	22	29	
27	86	1		4+	4-	4+	3	3	3-	2+	1	24+	18	1.0		19	33	33	33	30	29	34	25	
28	87	2		3	3-	4-	2+	3-	3	4-	2+	23+	14	0.8		14	25	20	22	29	21	24	27	
29	88	3	Q10A	3-	2+	2-	1-	2-	3	2+	1	15+	8	0.4		7	15	14	14	18	15	11	22	
30	89	4	Q5	0+	0	1	2-	2-	2-	2+	2	11-	8	0.2		4	10	8	9	15	7	5	18	CK
31	90	5	Q8A	1	0+	1	2	2+	3-	3-	2-	14-	7	0.4		6	13	12	13	15	14	9	21	
MEAN													13	0.63			22	19	21	25	18	21		

See back side for definitions of column headings

DST FOR **DECEMBER 1985** has not been received, so we are printing without it. We will send it out as soon as receive it. Thank you for your patience.

Kp PLANETARY 3-HOUR RANGE INDEX. K-indices isolate solar particle effects on the Earth's magnetism by classifying into disturbance levels the range of variation of the most unsettled horizontal field component during a 3-hour period. Each activity level relates almost logarithmically to its corresponding amplitude. Three-hour indices discriminate conservatively between true magnetic field perturbations and the regular quiet-day variations produced by ionospheric currents.

Ap PLANETARY A-INDEX. The A-index ranges from 0 to 400. A indices are daily averages of 'a' indices which convert K-values to a linear scale in field units--a scale that measures equivalent disturbance amplitude of a station at which K=9 has a lower limit of 500 nanotesla (nt). Ap is the daily average of A indices from a global array of observatories.

Dst DISTURBANCE AMPLITUDE-STORM TIME. Dst tracks variations in the solar-induced electric currents flowing about 5.6 Earth radii above the planet's surface. Each hourly value is the average symmetric disturbance amplitude of the horizontal component recorded at four stations, reduced to equatorial changes. Values are given in nt, and they can be either positive or negative; during a storm they become strongly negative.

Cp PLANETARY DAILY CHARACTER FIGURE. The Cp-figure is a standardized version of the Ci-figure formerly published and is derived from the indices Kp by converting the daily sum of ap into the range 0.0 (quiet) to 2.5 (highly disturbed).

Jul JULIAN DAY or day of the year. This number resets to 1 after the end of the year, January 1=1.

Bart DAY NUMBER OF BARTELS 27-DAY CYCLE. The recurrence of geomagnetic activity every 27 days reflects their solar source. J. Bartels defined a series of 27-day periods to track more easily times of unsettled magnetic conditions. He arbitrarily defined his sequence of 27-day intervals to begin in January 1833.

Q/D MAGNETICALLY QUIET AND DISTURBED DAYS. The following criteria are used to rank selected days of the month from most (Q1) to the least quiet (Q10) and from most (D1) to least disturbed (D5). The following criteria are used in the ranking: the sum of the 8 Kps, the sum of the squares of the of the 8 Kps, and the greatest Kp.

aa The aa indices are three-hourly indices computed from K indices of two antipodal observatories (invariant magnetic latitude 50) and provide a quantitative characterization of the magnetic activity. Half-daily and daily values give an estimation of the activity level very close to that obtained with "am" indices. Values are in nanotesla and correspond to the activity level at an invariant magnetic latitude of 50. The aa indices are computed for:

N = daily values for the northern Hemisphere,
S = daily values for the Southern Hemisphere,
M1, M2 = half-daily values of aa indices for Greenwich day.

What is an index and why are there so many for terrestrial magnetism? An index continuously summarizes a complex measurement; its discrete values simplify and clarify the variations. Ideally each geomagnetic index should follow a single class of magnetic disturbance; in reality few do. The bewildering array of magnetic indices reflects many past attempts to define measurements that isolate a single source of variation.

The subscript "p" means planetary and designates a global magnetic activity index. The following 13 observatories, which lie between 46 and 63 north and south geomagnetic latitude, now contribute to the planetary indices: Lerwick (UK), Eskdalemuir (UK), Hartland (UK), Ottawa (Canada), Fredericksburg (USA), Meanook (Canada), Sitka (USA), Eyrewell (New Zealand), Canberra (Australia), Lovo (Sweden), Rude Skov (Denmark), Wingst (Germany), and Witteveen (the Netherlands).

NEW ADDITIONS TO THE GEOMAGNETIC ARCHIVES

The Data Center has received 1.0 minute data for 1984 and 1985 from Fredericksburg, a United States Geological Survey observatory.

The charge for a 1-year subscription to this monthly bulletin, January through December, is $20.00 for USA, all other countries is $22.00. To become a subscriber you may either call (303) 497-6134 or (303) 497-6135 or write to the NATIONAL GEOPHYSICAL DATA CENTER, Solar-Terrestrial Physics Division (E/GC2), 325 Broadway, Boulder, Colorado 80303 USA. Please include with your written order a check or money order payable in U.S. currency to Department of Commerce, NOAA/NGDC. Payment may be made, also, through one of three credit cards: VISA, American Express, or MasterCard. To ensure prompt service provide your card number and expiration date and the name to which the card is issued.