

# PRINCIPAL MAGNETIC STORMS

## SITKA MAGNETIC OBSERVATORY

JULY TO SEPTEMBER, 1941

(Latitude  $57^{\circ} 03'.0$  N., longitude  $135^{\circ} 20'.1$  or  $9^{\text{h}} 01^{\text{m}}.3$  W. of Gr.)

*July 4-5*—A major magnetic storm began suddenly at  $03^{\text{h}} 52^{\text{m}}$  GMT, July 4, with a sharp motion of all traces. Conditions remained comparatively calm with gradually increasing storminess until  $06^{\text{h}}$ , July 5. Until  $16^{\text{h}}$ , July 5, the trace was very disturbed and could be identified in only a few places. The  $K$ -values during the storm were 9 for three three-hour intervals. After  $17^{\text{h}}$ , July 5, there was a gradual return to normal.

*July 6-7*—The second phase of the previous storm began gradually at about  $11^{\text{h}}$  GMT, July 6, with increasing activity. From  $00^{\text{h}}$  to  $09^{\text{h}}$ , July 7, the values of horizontal intensity were abnormally high with numerous bays. After  $12^{\text{h}}$  the trace returned to normal, though it was slightly disturbed for several days.

*July 21*—A period of disturbed conditions began gradually at  $04^{\text{h}}$  GMT, July 21, with deep bays and a superimposed short-period motion. After  $13^{\text{h}}$  the conditions returned to about normal.

*August 4-5*—A major magnetic storm began abruptly at  $01^{\text{h}} 28^{\text{m}}$  GMT, August 4, with a sudden commencement of all traces. The horizontal intensity decreased 24 gammas and then abruptly increased 137 gammas during the first two minutes of the storm. The storminess increased slowly until  $10^{\text{h}}$ , August 4. For a period of about six hours the traces moved so rapidly that positive identifications of the traces were difficult. After  $16^{\text{h}}$  the conditions gradually returned to normal values at  $04^{\text{h}}$  August 5. The maximum  $K$ -index of 9 was recorded during the height of the storm.

*August 8-9*—A peculiar short-period vibration was recorded from  $20^{\text{h}} 30^{\text{m}}$  GMT, August 8 until  $05^{\text{h}} 30^{\text{m}}$ , August 9. The period of the disturbance was about two minutes with amplitudes of about 2' in declination and 6 to 12 gammas in horizontal intensity.

*August 26-28*—A moderate magnetic storm began gradually about  $09^{\text{h}}$  GMT, August 26. The storminess increased gradually to maximum values at  $09^{\text{h}}$ , August 27. After  $15^{\text{h}}$  the storm gradually subsided. The trace remained moderately disturbed for several days.  $K$ -indices of 7 and 8 were recorded for three successive three-hour intervals.

*September 7*—A sudden commencement at  $04^{\text{h}} 41^{\text{m}}$  GMT, September 7, was followed by a period of only slight disturbance with a  $K$ -index of 6. The disturbed period ended at  $24^{\text{h}}$ .

*September 13-15*—A slight commencement at  $07^{\text{h}} 59^{\text{m}}$  GMT, September 13, was followed after about five hours by a deep bay whose  $K$ -index was 6. The trace continued moderately disturbed until the close of September 15.

*September 18-21*—A major magnetic storm began gradually at about  $04^{\text{h}}.2$  GMT, September 18, with increases in the values of all elements. The intensity of the storm gradually increased to a maximum at  $08^{\text{h}}$ . Until  $19^{\text{h}}$  the record was hopelessly tangled. As near as can be determined the  $K$ -indices for the five three-hour intervals were 9. The storm gradually decreased in intensity during the next few days. Mag-

netic conditions were not normal until 17<sup>h</sup>, September 21. Very brilliant auroras were observed during the storm.

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### CHELTENHAM MAGNETIC OBSERVATORY

JULY TO SEPTEMBER, 1941

(Latitude 38° 44'.0 N., longitude 76° 50'.5 or 5<sup>h</sup> 07<sup>m</sup>.4 W. of Gr.)

*July 4-7*—At 03<sup>h</sup> 43<sup>m</sup> GMT, July 4, a sudden commencement of a storm occurred. The abrupt change in  $H$  was an increase of 61 $\gamma$ ; the abrupt  $D$  and  $Z$  changes were small. This was followed by several bays in  $D$  and irregular fluctuations in  $H$  and  $Z$ . After about five hours of activity all the elements became quiet until 17<sup>h</sup>, July 4, when mild activity was renewed. Then at 05<sup>h</sup> 40<sup>m</sup>, July 5, the storm broke into violent activity with four consecutive three-hour periods with  $K$ -number 9. There followed moderate activity until 12<sup>h</sup>, July 7, after which the storm gradually ended. Ranges:  $D$ , 252';  $H$ , 1466 gammas;  $Z$ , greater than 1000 gammas.

*July 20-25*—A disturbance began at 17<sup>h</sup> GMT, July 20, and by 02<sup>h</sup>, July 21, gradually worked up to a storm of moderate intensity which lasted several days. It ended at 10<sup>h</sup>, July 25. Ranges:  $D$ , 32';  $H$ , 138 gammas;  $Z$ , 150 gammas. The highest  $K$ -number was 6.

*August 4-5*—A storm began abruptly at 01<sup>h</sup> 28<sup>m</sup> GMT, August 4, when  $H$  increased 76 gammas. The storm ended at 08<sup>h</sup>, August 5. The highest  $K$ -number was 6. Ranges:  $D$ , 51';  $H$ , 308 gammas;  $Z$ , 275 gammas.

*August 6-7*—A mild disturbance began at 14<sup>h</sup> 53<sup>m</sup> GMT, August 6, and continued until 12<sup>h</sup>, August 7. The highest  $K$ -number was 5.

*August 25-30*—A storm of moderate intensity began at 17<sup>h</sup> GMT, August 25. At first the activity was slight, but the elements became more active at 18<sup>h</sup>, August 26, and continued so until 10<sup>h</sup>, August 30.  $D$  and  $Z$  were particularly active between 00<sup>h</sup> and 03<sup>h</sup>, August 27. Ranges:  $D$ , 56';  $H$ , 132 gammas;  $Z$ , 228 gammas. The highest  $K$ -number was 6 and it occurred in three 3-hour periods.

*September 13-16*—A disturbance began at 08<sup>h</sup> 01<sup>m</sup> GMT, September 13, and continued until 23<sup>h</sup>, September 16. The highest  $K$ -number was 6. Ranges:  $D$ , 35';  $H$ , 144 gammas;  $Z$ , 101 gammas.

*September 18-21*—A great storm began at 04<sup>h</sup> GMT, September 18. During the first hour the storm gradually became active without any distinct beginning. From 05<sup>h</sup>, September 18, to 08<sup>h</sup>, September 19, the storm was very active and the record on the sensitive magnetograph was not readable. However the entire storm was recorded on the insensitive magnetograph. In this period of greatest activity the ranges were:  $D$ , 264';  $H$ , 2540 gammas;  $Z$ , 1390 gammas. The  $K$ -numbers for three-hour periods beginning at 00<sup>h</sup>, September 18, were 2689, 8799, 9997. A brilliant display of the Aurora Borealis visible in the vicinity of Cheltenham, Maryland, accompanied this storm. There were observed ray-bundles, and draperies in pink, green, and lavender, and the corona with its center south of the zenith. After 08<sup>h</sup>, September 19, the violence of the storm subsided but the field was disturbed until 19<sup>h</sup>, September 21.

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