

POSSIBLE GLEISSBERG PERIODICITY IN LARGE FLUENCE SOLAR PROTON EVENTS

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Large fluence solar proton events identified from the nitrate deposition in ice core from Greenland for the period 1561-1950 and proton events identified from ionospheric and satellite data for the period 1950-1994 have been examined in an exploratory study of geophysical information. We find there is a well-defined Gleissberg (approximately 80-year) periodicity in large fluence solar proton events, with six well-defined minima, two in close association with the Maunder and Dalton minima in solar sunspot number. The present "satellite" era is a recurrence of this series of minima. Comparison of the total solar proton production for the five Gleissberg cycles since 1580 shows that the Gleissberg cycle 1820-1910 was the most active followed by the Gleissberg cycle 1580-1660. The present Gleissberg cycle is one of the least effective in the production of large fluence solar proton events at Earth.