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EXTREME SPACE WEATHER EVENTS AS SEEN IN THE HISTORICAL GEOMAGNETIC RECORDS OF COLABA, INDIA AND THEIR ESTIMATION OF INTERPLANETARY CONDITIONS

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Geomagnetic variations recorded at ground can well project the role of electromagnetic fields and currents in the ionosphere. Active regions in the sun give rise to flares, coronal mass ejections and several major solar energetic particle events of varying amplitudes and characteristics resulting in geomagnetic disturbances. Solar flares and Coronal Mass Ejections (CMEs) are the most prominent and violent manifestation of the solar activity. When the ejecta from solar flares and CMEs hit the Earth's magnetosphere, they often lead to intense magnetic storms. The geomagnetic data from Colaba Magnetic Observatory consisted of systematic hourly eye observations using Grubb's magnetometer from 1847 to 1872 in continuation of the earlier series of observations at Colaba since 1841. The regular daily photographic records of the geomagnetic components are available since 1872 to 1905 from Colaba. The geomagnetic records from Colaba-Alibag observatories in India, contain historically the longest and continuous observations recorded on photographic paper since 1872 to the present day digital data using modern magnetometers. Data reduction and analysis techniques evolved at various stages of data processing. Some of the super intense space weather events are investigated using old preserved historical records of Colaba, India. The study of super intense storms after 1900 as recorded at Alibag Observatory will provide important insights into plausible interplanetary conditions for intense geomagnetic storms and probable frequency of their occurrence. Following the *Burton et al.* [1975], an empirical relationship is derived for estimation of interplanetary electric field (IEFy) from the variations of Dst index and ΔH at Colaba-Alibag observatories. The estimated IEFy values using Dst and ΔH_{ABG} variations agree well with the observed IEFy, calculated using ACE (Advanced Composition Explorer) satellite observations for intense geomagnetic storms in solar cycle 23. This study will provide the uniqueness of each event and provide important insights into possible interplanetary conditions for intense geomagnetic storms and probable frequency of their occurrence. The WDC Mumbai activities and data preserving, digitization process will be presented as a member of WDS.

REFERENCES

Burton R. K., R. L. McPherron, and C. T. Russell (1975), Empirical relationship between interplanetary conditions and Dst, *J. Geophys. Res*., 80, 4204.