

Improving geomagnetic forecasts by means of ACE EPAM data

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Popular precursors of geomagnetic disturbances used by space weather warning centers are coronal mass ejection (CME) and coronal hole (CH), as well as solar wind speed (S) and vertical component of the interplanetary magnetic field (Bz). Since the former (CME and CH) give a 2 to 3 days advance warning and the latter (S and Bz) provide warning of about an hour ahead, it would seem desirable to have a supplementary warning between these two warnings so as to either reinforce or rebut the early warning as well as to give weight to the later warning. Real-time data from Electron, Proton, and Alpha Monitor (EPAM) on the Advanced Compositional Explorer spacecraft (ACE) can provide such an intermediate warning as EPAM data often shows enhancement in particle counts 24-36 hours preceding increased geomagnetic activity. The interplanetary particle conditions revealed in EPAM data can thus be considered as additional precursors for geomagnetic disturbances. A detailed study of EPAM and Canadian geomagnetic data will be presented to show quantitative empirical relationship between the two, and to highlight the relationship as an useful qualifier to ascertain the eventual geomagnetic impact of CME or CH. The results of this study are used to improve geomagnetic forecast in Canada.