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The Preliminary Attempt in Prediction the Geomagnetic Storm with Ground Cosmic Ray Data

Abstract content

Abstract In this paper an algorithm was introduced to use the ground cosmic ray data in prediction significant geomagnetic storm. The muon measurement data from Nagoya station, Japan, was employed and the characters of cosmic ray evolution before geomagnetic storm were revealed by analyzing the difference between the data advancing the geomagnetic storm and the quiet days. It was found that fluctuation advancing geomagnetic storm increased due to the approaching of CME because the shock front and strong IMF induced by CME. An index to measure the fluctuation of data, $D8(t)$, was used in the cosmic ray data processing. The result showed that $D8(t)$ always increased monotonously several hours ahead the geomagnetic storm, which hopefully could become useful factor for geomagnetic storm prediction. As it had been admitted that most of the large geomagnetic storms were caused by CMEs accompanying the solar proton events (SPEs), the SPEs were also chosen together with $D8(t)$ in the prediction process. The mentioned algorithm was tested with the relative data of whole year 2001. The result turned out to be encouraging with the accurate rate reach 80% (8 out of 10) and false rate less than 18% (2 out of 11).

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

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