[포SS-21] Asymmetric cosmic ray modulation of Forbush decreases related to the propagation direction of ICMEs

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A Forbush decrease(FD) is a depression of cosmic ray intensity observed by ground-based neutron monitors(NMs). The cosmic ray intensity is thought to be modulated by the heliospheric magnetic structures including the interplanetary coronal mass ejection(ICME) surrounding the Earth. The different magnitude of the decreasing in intensity at each NM was explained only by the geomagnetic cutoff rigidity of NM station. However, sometimes NMs of the almost same rigidity in northern and southern hemispheres observe the asymmetric intensity depression magnitudes of FD events. Thus, in this study we intend to see the effects on cosmic ray intensity depression rate of FD event recorded at different NMs due to different ICME propagation direction as an additional parameter in the model explaining the cosmic ray modulation. Fortunately, since 2006 the coronagraphs of twin spacecraft of the STEREO mission allow us to infer the propagation direction of ICME associated with the FD event in 3-dimension with respect to the Earth. We confirm that the asymmetric cosmic ray decreasing modulations of FD events are determined by the propagation directions of the associated ICMEs.

[포SS-22] Cosmic Ray Flux Variation Estimated from the Raw Solar Images

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The solar images are taken by the CCD detectors of the Sun monitoring satellites. The solar images are constructed after removing the traces of cosmic rays on the raw CCD data files. Thus, while applying the method of removing the cosmic rays traces, we can estimate the cosmic rays flux by counting the number of traces. The cosmic ray flux in the steady state might be the sum of the solar and galactic cosmic rays. However, the abrupt change in the flux could be assumed to be originated from the Sun. Therefore, we can identify the solar origins of the sudden solar cosmic ray flux changes from the phenomena shown in the processed solar images taken by SOHO/EIT. As the results, the estimated cosmic ray flux in the steady state is the anti-correlated with sunspot numbers, which shows the minima in cosmic ray flux at the solar cycle maxima defined by the sunspot numbers. The profiles of estimated solar cosmic ray associated with the ground level enhancements have the significant increase in the cosmic ray flux with good correlation. Thus, the solar images are valuable data useful in estimating the solar cosmic ray long term and transient flux variations.