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The relationship between the Russell-McPherron effect and solar wind entry under northward IMF condition

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The strong magnetic storms tend to occur in March and September. This phenomenon can be explained by the Russell-McPherron (R-M) effect, since the Bz magnitude is enhanced in March and September under southward IMF condition. Same mechanism should be valid under northward IMF condition, and the semiannual variation of geomagnetic activity under northward IMF condition could be expected.
In this paper, the R-M effect under northward IMF condition is verified by utilizing 42 years of Interplanetary Magnetic Field (IMF) data. Cold-dense plasma sheet occurrence is chosen to investigate the monthly variation of solar wind entry under northward IMF condition. CDPS events are identified using multiple satellites' data between 1996 and 2014. We found that the seasonal variation of northward IMF and the occurrence rate of CDPS have semiannual period, these phenomena are related to the R-M effect.The R-M effect will affect the solar wind entry under northward IMF condition.

Keywords: Semiannual variation, Russell-McPherron effect, Cold-dense plasma sheet