

Statistical analysis of radial IMF events with long duration

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Interplanetary magnetic field (IMF) in the solar equatorial plane becomes direction along the Archimedes spiral because of solar rotation. The direction of IMF is in proportion to distance from the Sun and in inverse proportion to solar wind speed

The calculated direction of IMF is approximately 45 degrees for typical solar wind speed 400km/s near the Earth. According to in-situ satellite observations near the Earth, the direction of IMF is 45 degrees on average. However, radial IMF (almost direction of the Sun) with a long duration was observed sometimes. Such a phenomenon is often observed in the trailing region of a high-speed solar wind from the coronal holes and ICMEs (Interplanetary counterpart of Coronal Mass Ejections). Such a phenomenon is also observed by the Ulysses spacecraft at 5AU.

In this report, a statistical analysis of the radial IMF events with long duration was done by using the solar wind data of approximately 40 years. As a result, it was found that the events were often observed in the regions where the speed of the solar wind decreases slowly. The events occurred in not only trailing region of ICMEs and high-speed solar wind but also slow solar wind. The events were frequently occurred during solar minimum periods rather than solar maximum periods.