IMF dependence on solar wind plasma

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It is usually believed that IMF is determined independently of solar wind plasma. However, the Bz component of IMF becomes smaller depending upon decrease of the solar wind dynamic pressure as shown in Figure A. This property has been found from the scatter plot of Dst index versus the square root of solar wind dynamic pressure (Pd<sup>0.5</sup>, Figure B). There are two boundaries in Figure B. The upper boundary which linearly increases with increasing Pd<sup>0.5</sup> shows the minimum level of the ring current. For a fixed value of Pd, Dst (ring current) decreases with decreasing negative Bz. The lower boundary which linearly decreases with increasing Pd<sup>0.5</sup> is produced by decreasing negative IMF-Bz seen in Figure A. The scatter plot of Dst index versus the square root of the solar wind density (N<sup>0.5</sup>) shows the similar pattern as Figure B. When Pd or N becomes smaller, IMF-Bz approaches to zero value while the Bx- and By-component converges to a finite value of 3-4 nT. This means that IMF shows a typical spiral pattern for rare solar wind.

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