

Acceleration of outer belt electrons associated with high speed streams

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Flux enhancements of relativistic electrons in the outer belt tend to occur associated with high-speed streams, and a large flux enhancement is observed during the predominantly southward IMF. Our statistical studies revealed that 90%(50%) of the fast coronal hole streams display a large flux enhancement at GEO when the southward (northward) IMF is dominant. From the standpoint of the internal acceleration by whistler mode chorus waves, this IMF dependence can be understood as follows. The internal acceleration by wave-particle interactions is especially effective when a continuous source of hot electrons can be maintained to produce chorus waves for the several day periods. Continuous hot electron injections are enhanced during a prolonged period of intense convection/substorms, which are driven by the southward IMF in high-speed streams. The statistical studies show clear differences of hot electrons, whistler mode chorus waves and substorm/convection between the southward and northward dominant IMF in high-speed streams, which are consistent with the internal acceleration process.

Keywords: radiation belts, particle acceleration, high speed streams