Ambient magnetic field weakness during chorus event and their implication on the outer radiation belt dynamic

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The Earth's magnetosphere is continuously disturbed by the solar wind plasma incident upon it, and such a disturbance in association with internal (to the magnetosphere) physical processes may engender both the generation and amplification of Very Low Frequency (VLF) range whistler-mode chorus waves in the inner magnetosphere. Chorus waves are known to interact with particles in the outer Van Allen radiation belt resulting in both acceleration and pitch angle scattering into the loss cone, which in turn leads to flux dropouts. The first two years of operational Van Allen Probes magnetometer data were analyzed regarding the local magnetic field variation during periods of relativistic electron flux dropouts. It was observed that the ambient magnetic field at the spacecraft's apogee can vary from 180 nT to as low as 30 nT. Also, the high time resolution magnetic field data show that the whistler-mode chorus waves can often occur throughout the periods in which the ambient magnetic field is weakened, i.e. less than about 70 nT. We investigate the likelihood of the weakness of the ambient magnetic field to be an additional parameter related to outer radiation belt electron flux dropouts during periods when only chorus waves are present.

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