

Characteristics of electron distributions observed during large amplitude whistler wave events in the magnetosphere

Abstract:

We present a statistical study of the characteristics of electron distributions associated with large amplitude whistler waves inside the terrestrial magnetosphere using waveform capture data as an addition of the study by Kellogg et al., [2010b]. We identified three types of electron distributions observed simultaneously with the whistler waves including beam-like, beam/flattop, and anisotropic distributions. The whistlers exhibited different characteristics dependent upon the observed electron distributions. The majority of the waveforms observed in our study have $f/f_{ce} \leq 0.5$ and are observed primarily in the radiation belts outside the plasmapause simultaneously with anisotropic electron distributions. We also present an example waveform capture of the largest magnetic field amplitude (≥ 8 nT pk-pk) whistler wave measured in the radiation belts. The majority of the largest amplitude whistlers occur during magnetically active periods (AE > 200 nT).