Whistler and electron cyclotron harmonic waves at the near-Earth dayside plasma sheet: statistics of modulation by ultra-low frequency waves

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Magnetopause perturbations by solar wind transients drive a wide variety of ultra-low-frequency (ULF) waves in the Earth’s magnetosphere. Compressional ULF waves modulate thermal and energetic electron fluxes, changing their flux anisotropy. Such modulation may move electron distributions beyond the threshold of instabilities and drive the generation of electron cyclotron harmonic (ECH) and whistler-mode waves. Given the importance of ECH and whistler-mode waves for electron scattering into the atmosphere, we statistically investigate the main characteristics of ULF-modulated ECH and whistler-mode waves. We find two main types of events: with the correlation of whistler-mode and ECH waves and with their anti-correlation. We present the spatial distribution of these two types of events and examine correlations of background plasma/magnetic field characteristics with properties of whistler and ECH waves modulated by ULF waves.