Geophysical Research Abstracts
Vol. 19, EGU2017-3270, 2017
EGU General Assembly 2017

Intensities and periodic structures of magnetospheric line radiation and quasiperiodic emissions: Dependence on solar wind parameters

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Electromagnetic waves observed in the inner magnetosphere at frequencies of a few kHz sometimes exhibit nearly harmonic frequency modulation or almost periodic time modulation of the wave intensity. Such emissions are usually called magnetospheric line radiation and quasiperiodic emissions, respectively. Although their existence is known for already a few decades, and they are rather routinely observed both by ground-based and satellite instruments, their generation mechanism still remains unclear. We investigate a relation of the event occurrence and properties to solar wind parameters. Specifically, we analyze how the event intensities and periodic structure (frequency spacing or the modulation period) depend on the solar wind dynamic pressure, solar wind speed, plasma number density, and interplanetary magnetic field. It is found that the behavior of quasiperiodic events with modulation periods larger than about 20 s is rather different from the behavior of quasiperiodic events with lower modulation periods. This suggests that quasiperiodic events with lower and larger modulation periods may have a different generation mechanism. We also investigate a possible relation between magnetospheric line radiation and quasiperiodic emissions, as well as their link to hiss emissions observed in the same frequency range.