

Quasi-periodic ELF/VLF wave emissions in the Earth's magnetosphere: comparison of satellite observations and modeling

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We analyze quasi-periodic (QP) ELF/VLF hiss emissions observed onboard Freja, and Magion 5 satellites. Their properties are compared with parameters of energetic electrons and cold plasma, detected simultaneously, and other available data. Possible scenarios of formation of these emissions are discussed on the basis of self-consistent simulations employing the information obtained experimentally. It is shown that the scenario of self-sustained pulsations can explain consistently our data set. Comparison of the observations and simulations makes it possible to restrict possible ranges of the parameters that are missing in the observations. The numerical model is capable to explain such features of the dynamic spectrum of QP emissions as an increase of the frequency drift rate in QP element, the alteration of QP elements with different frequency drift rates, and some other. We also discuss the relationship between QP hiss emissions and discrete VLF emissions observed simultaneously in space.