脈動オーロラにおける内部変調の起源について

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Origin of internal modulations of the pulsating aurora

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We investigate the origin of the internal modulations, so-called quasi-few Hz modulations of precipitating electrons for the pulsating aurora by comparative studies between the Reimei observation and a computer simulation for the chorus-wave particle interactions. From the Reimei observations, the main modulation of precipitation, with a few seconds, and the internal modulations, with a few Hz, that are embedded inside the main modulations are identified. A computer simulation that calculates interactions between the bouncing electrons along the magnetic field and the propagating whistler mode waves shows that the generation and collapse of the lower-band chorus bursts determines on-off switching of the pulsating aurora. A train of rising tone elements embedded in the lower-band chorus bursts drives the internal modulations. Besides the internal modulations, the Reimei satellite found a precipitation gap between intermittent precipitations above a few keV and stable precipitations around 1 keV. The gap corresponds to the half-gyro frequency gap between the lower-band chorus waves and the upper-band chorus waves.