

Study of the relationships between auroral wave structures and the auroral acceleration region: Reimei observations

Masakazu Sugimoto^{1*}, SHIKIJI, Tatuya¹, TAKADA, Taku¹, Kazushi Asamura², Takeshi Sakanoi³, Atsushi Yamazaki²

¹Electrical Engineering and Information Science, Kochi National College of Technology, ²JAXA/ISAS, ³PPARC, Tohoku University

Auroral wave structures are very dynamic phenomena: its growth and decay processes are complicated and attractive. Auroral electrons are considered to be accelerated in the accelerated region at several thousand km altitude. That is, potential structure in the acceleration region might affect the wave growth. However, the relationships between auroral wave structures and the auroral acceleration region, is not fully understood. In this study, we examined the growth process of the auroral wave structure during a quiet period of the magnetosphere. Using the Reimei observations, the 13 aurora waves events are selected during 2007 data. The characteristic energy is derived based on the inverted-V electron structures in the energy-time diagrams. Assuming the U-shaped potential structures, we then calculated an electric field perpendicular to the magnetic field from the space variations of the electron energy gain. As a result, we found that the time variations of the auroral wave is more active when the electric field and/or potential of the auroral acceleration region is enough strong.

Keywords: REIMEI Satellite, Aurora wave structure, Characteristic Energy, Inverted-V type electronic structure, Electron acceleration region