R006-18
A 会場 ：11/27　AM2 （10:30-12:00）
11:00〜11:15

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The source altitude distribution and heating property of electron conic estimated with the Arase satellite

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We examined the source altitude of electron conics by analyzing high-angular resolution electron data obtained by the Arase satellite. We surveyed electron conic events between 2017 and 2021 and identified electron conics with ion beams observed at an altitude of ˜30,000 km above the auroral acceleration region. Assuming that the observed electron conics have adiabatically moved upward from the source altitude and undergone a potential difference along the dipole field line, we fitted energy-dependent loss cone curves to the electron flux distribution of the conics to estimate the mirror ratio and the potential difference between the source and the satellite altitude. The electron conic source altitude approximately matched the simultaneously observed auroral kilometeric radiation (AKR) source altitude, at which a parallel electric field is formed. In particular, the coincidence of the middle of the source altitude with the bottom altitude of the AKR suggests that heating is related to the time spent in the acceleration region. This result suggests two hypotheses for the generation of electron conics: electron heating due to time-varying electric fields that accelerate auroral electrons, and diffusive heating due to waves, such as electrostatic waves seen around this altitude. We also compared the phase space densities of downward and upward electrons to determine their heating property. We found that the number fluxes of upward and downward electrons were comparable, while the upward energy fluxes increased. This implies that the magnetospheric electrons just outside the loss cone are heated at low altitude and reflected. Using the estimated heating altitude and potential difference, we reproduced the observed electron conic distribution by a Monte Carlo simulation.