

R006-59

Zoom meeting B : 11/4 AM2 (10:45-12:30)  
12:00-12:15

## 磁気静穏時のサブストーム中に観測された Stable Auroral Red (SAR) arc の地上全天カメラ と内部磁気圏衛星による同時観測の複数例解析

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## Multi-event analysis of Stable Auroral Red (SAR) arcs by all-sky imagers and inner magnetospheric satellites

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Stable auroral red (SAR) arcs with 630.0-nm emission are caused by low-energy electron heat flux or precipitation into the topside ionosphere from the inner magnetosphere. SAR arcs are observed at subauroral latitudes equatorward of the auroral oval and often occurs during the recovery phase of magnetic storms and substorms [e.g., Rees and Roble, Rev. Geophys., 1975; Takagi et al., GRL, 2018]. Kozyra et al. [JGR, 1997] has noted that there were three possible mechanisms to generate these low-energy electrons. The first hypothesis is the Coulomb collision between plasmaspheric electrons and ring current ions [e.g., Cole, JGR, 1965; Kozyra et al., JGR, 1987]. The second hypothesis is that the Landau damping of electromagnetic ion cyclotron (EMIC) waves causes heated electrons, resulting in their pitch angle scattering and precipitation into the ionosphere [Cornwall et al., JGR, 1971]. The third is that the kinetic Alfvén waves (KAWs) with the electric field parallel to the magnetic field accelerate plasmaspheric electrons into the ionosphere [Hasegawa and Mima, JGR, 1978]. Inaba et al. [submitted to JGR, 2020] has identified that EMIC waves or KAWs associated with the SAR arc were not observed in the magnetospheric source region of a SAR arc and has concluded that the Coulomb collision was likely to be the main cause of the SAR arc. However, the previous study showed only a single event without low-energy ion data, so the Coulomb collision evaluation was not adequate. In this presentation, we show three conjunction events of SAR arcs observed by all-sky imagers and inner magnetospheric satellites (Arase and Van Allen Probes) during non-storm time substorms on 4 November 2019, 17 January 2015, and 19 December 2012. KAWs and EMIC waves were not observed in the source magnetosphere on these three events. We are also evaluating the electron heating rate through the Coulomb collision using full-energy range ion data observed by the satellites. In the presentation, we will discuss the production mechanisms of these SAR arcs based on these detailed analyses.