R009-10
B 会場 ：11/24　PM2 （15:30-18:15）
15:45〜16:00

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C^+ emission mechanisms on Mars revealed by MAVEN: Implications for response to thermospheric and ionospheric variations

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C^+ emission is generated by electron impact, dissociative ionization, photoionization, and resonant scattering with carbon-related atoms, molecules, and ions in the Martian ionosphere and thermosphere. The contribution of each mechanism to emission, however, has not been revealed due to the difficulty of observation and the fact that a part of the emission cross section is uncertain. This paper isolates the C^+ emission mechanism using remote-sensing and in-situ observations onboard MAVEN (Mars Atmosphere and Volatile EvolutioN). Observational data from the Imaging Ultraviolet Spectrograph instrument are analyzed to obtain C^+ emission from the remote-sensing method and compared to C^+ emission obtained from in-situ observations of Solar Wind Electron Analyzed and Neutral Gas and Ion Mass Spectrometer. Both electron impact and dissociative ionization/photoionization contribute to C^+ emission below 150 km altitude when the CO density is high, but only dissociative ionization/photoionization contributes to the emission for the low CO density case, while only dissociative ionization/photoionization dominates the emission at altitudes between 150 km and 165 km for both CO density cases. It is difficult to estimate the total flux of suprathermal electrons in the ionosphere from remote-sensing observations of C^+ emission because the contribution of electron impact to C^+ emission is small. In contrast, C-atom remote-sensing observations might provide a better understanding of the total flux of suprathermal electrons in the ionosphere than C^+ emission, and global ultraviolet observations could be utilized as a tool for monitoring the ionosphere. The total flux of suprathermal electrons estimated from C-atom emission may be utilized to isolate the contribution of each C^+ emission process to the brightness more accurately. This suggests that the C^+ and C-atom emissions might be tracers of spatiotemporal variations in the Martian ionosphere and thermosphere.