Circulation of plasma in the Jupiter's inner magnetosphere revealed from time variation in radial profile of plasma temperature and density obtained by Hisaki/EXCEED observation

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The satellite Io, which has many volcanoes and is located at 5.9 R_J from the center of Jupiter, is a powerful plasma source in the magnetosphere. The resulting specificity of the Jupiter's magnetosphere is the magnitude of energy that circulates internally. Previous researches, using data obtained by Voyager and Cassini spacecraft and chemical models complementarily, showed that the pickup energy of heavy ions originating from volcanoes on Io and the energy of hot electrons are converted into radiation reaching ~3 TW. However, the origins of hot electrons, that is, heating and/or transport mechanisms are still unrevealed. Therefore, in this research, we focus on the response to the change in the amount of plasma supplied to the magnetosphere and explore the above problem. In this study, the radial distributions of plasma density and temperature were derived from the intensities of emission lines in the extreme ultraviolet range obtained by Hisaki satellite. In this presentation, we will show the results using data obtained from December 2014 to May 2015. The activation of volcanoes on Io in early January 2015 was confirmed by ground-based infrared observations.

