Contribution ID: **171** Type: **Oral presentation**

Angular Extension of Io Magnetic Footprint in Corresponding to Volcanic Activity on Io

Thursday 21 May 2015 13:15 (15 minutes)

FUV images of Jupiter's auroral region have been taken since the early observational era of the Hubble Space Telescope (HST). In the vicinity of the main auroral oval, an emission spot was detected and appeared to be evidence of electromagnetic interaction between Jupiter's magnetospheric plasma and Io's atmosphere. In previous works, the brightness of this emission, which is called Io's auroral magnetic footprint, reveals strong correlation with Io's location in Jupiter's system III longitude. In 2007, with HST's Advanced Camera for Surveys (ACS), the magnetic footprints of Io were observed, while the volcanoes on Io concurrently erupted. In this study, the magnetic footprint emissions were chosen regarding the variation of Io's locations. Detailed analysis of the angular extension of Io's magnetic footprint was presented. Based on the complexity of angular extension due to the multiplicity of the footprint spots, the connection between angular extensions of Io magnetic footprints and the volcanic activity reveals some correlation. This result suggests the possible influence of the picked-up current on the extension of the interaction region between precipitating electrons and Jupiter's ionospheric particles.

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Session Classification: Astronomy, Astrophysics and Cosmology (Sponsored by NARIT)

Track Classification: Astronomy, Astrophysics, and Cosmology