Jupiter’s auroral energy input and its modulations by Io’s volcanic activity observed by Hisaki/EXCEED

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Aurora is an important indicator representing the momentum transfer from the fast-rotating outer planet to the magnetosphere and the energy input into the atmosphere through the magnetosphere-ionosphere coupling. Long-term monitoring of Jupiter’s northern aurora is achieved by the Extreme Ultraviolet (EUV) spectrometer called EXCEED (Extreme Ultraviolet Spectroscope for Exospheric Dynamics) onboard JAXA’s Earth-orbiting planetary space telescope Hisaki until today after its launch in September 2013. We have proceeded the statistical survey of the Jupiter’s auroral energy input into the upper atmosphere. The auroral electron energy is estimated using a hydrocarbon color ratio (CR) adopted for the wavelength range of EXCEED. The emission power in the long wavelength range 138.5-144.8 nm is used to derive the total emitted power before hydrocarbon absorption which is a good indicator for the total energy input into the atmosphere. Long-term observation provides us a "typical" occurrence ratio profile of the input energy following a log-normal distribution with the highest occurrence at 1.12 TW. In addition, temporal dynamic variation of the auroral intensity was detected when Io’s volcanic activity and thus EUV emission from the Io plasma torus are enhanced in the early 2015. Average of the total input power over 80 days increases by ˜10% with sometimes sporadically more than a factor of 3 upto 7, while the CR indicates the auroral electron energy decreases by ˜20% during the volcanic event compared to the other period. This indicates much more increase in the current system and Joule heating which contributes heating of the upper atmosphere. We will discuss the impact of this event on the upper atmosphere and ionosphere.