

Initial Results Derived From JEM-GLIMS Optical Observations

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JEM-GLIMS is a space mission to carry out the nadir observations of lightning and TLEs from International Space Station (ISS). The final goal of this mission is to identify the spatial and temporal evolutions of lightning and TLEs and to clarify the occurrence conditions of TLEs. JEM-GLIMS consists of four science instruments; (1) Lightning and Sprite Imager (LSI), (2) six-color spectrophotometer (PH), (3) VLF receiver (VLFR), and (4) VHF interferometer (VITF). LSI will acquire lightning and sprite images with a frame rate of 29 fps, and PH will measure absolute intensities of lightning and sprite emissions with a sampling frequency of 20 kHz at the different wavelength of 150-280, 316, 337, 392, 762, and 600-900 nm, respectively. VLFR will measure electromagnetic waves in the frequency range of 1-40 kHz, while VITF will measure VHF pulses in the frequency range of 70-100 MHz. From these science instruments, it is possible to identify the optical occurrence characteristics of lightning and TLEs and the electric characteristics of the TLE-inducing lightning discharges. JEM-GIMS was successfully launched and transported to the ISS, and it was successfully installed at the Exposed Facility of the Japanese Experiment Module (JEM) on August 9. Finally, a continuous observation of lightning and TLEs by JEM-GLIMS was started from December 20, 2012. Up to the end of January 2013, JEM-GLIMS has triggered and recorded 350 transient optical events in total, where strong lightning signatures are confirmed in LSI and PH channels. For some of these events, transient signatures of N2 LBH are confirmed in the PH1 photometer, which strongly implies the occurrence of TLEs. At the presentation we will report more detailed initial results derived from JEM-GLIMS data.

Keywords: Lightning, Sprite, GLIMS mission, International Space Station