

Overview of the GLIMS Mission

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The Global Lightning and sprIte MeasurementS (GLIMS) on the International Space Station (ISS) is a mission to detect and locate optical transient luminous events (TLEs) and its associated lightning simultaneously from the non-sun synchronous orbit, and was launched successfully in July, 2012 as part of the multi-mission consolidated equipment on Japanese Exposure Module (JEM). Our mission goals are to identify temporal and spatial evolutions of lightning and TLEs and to clarify the occurrence conditions of TLEs and global occurrence locations and rates of TLEs from the nadir observation. To achieve these goals, two CMOS cameras, six Photometers, VLF receiver, and VHF interferometer with two antennas, are installed at the bottom of the module to observe the TLEs as well as parent lightning discharges at nadir direction. Though the luminous events so-called sprite, elves and jets have been investigated by numerous researchers all over the world based mainly on the ground observations, some important problems have not been fully understood yet such as generation mechanisms of columniform fine structure and horizontal offset of some sprites from the parent lightning discharges. So far, more than one thousand events were recorded, and this mission is continuously observing TLEs and lightning events. In this paper, in order to discuss on the TLE and lightning effect to atmosphere, mission overview, and some examples of the observation results are introduced. This is the first time to present on the results of the GLIMS mission from the meteorological aspects.

Keywords: Lightning, Sprite, TLE, ISS