

JEM-GLIMS による3年間の雷放電・高高度放電発光現象の観測成果

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Results derived from 3-year JEM-GLIMS observations of lightning and TLEs

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JEM-GLIMS nadir observations of lightning and TLEs at the ISS started from November 2012 and successfully ended on August 2015. For three-year observation period, JEM-GLIMS succeeded in detecting over 8,000 lightning events and 670 TLEs. From the JEM-GLIMS observations, we succeeded in detecting (1) sprites and elves over continental and oceanic regions, (2) many lightning whistler (0+ whistler) events, (3) VHF pulses related to lightning discharges, and (4) meteor events. For the detailed data analysis of JEM-GLIMS data, we have developed new data processing technique to distinguish the weak sprite optical emissions from the intense lightning optical emissions and to estimate the possible source locations of VHF pulses excited by lightning discharges using both an interferometric technique and a group delay technique. Based on the synthetic data analysis using the JEM-GLIMS optical and radio wave data and ground-based electromagnetic wave data, following new findings are derived: (1) temporal and spatial characteristics of lightning and TLE optical emissions, (2) detailed spatial distributions of sprites and the parent lightning discharges, (3) spectral characteristics of lightning and TLEs optical emissions and their differences, (4) dispersion characteristics of lightning whistler and the relation to the parent lightning discharges, (5) source locations of VHF pulses the their relation to the parent lightning discharges, (6) global occurrence distributions and rates of lightning and TLEs, and (7) detailed spectral characteristics of meteors. At the presentation, we briefly summarize the results derived from the 3-year JEM-GLIMS observations and will discuss the importance of the results and future works.