

Global Occurrence Rates of Lightning, Elves, and Sprites and Their LT/Monthly/Seasonal Dependences Derived from JEM-GLIMS Observations

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In order to clarify the occurrence rates of TLEs and to estimate their local time (LT), monthly, and seasonal variations quantitatively, JEM-GLIMS carried out the three-year nadir observations from the ISS. In this observation period, JEM-GLIMS succeeded in detecting 6404 lightning events, 42 sprite events, and 504 elves events. The global occurrence rates of lightning, sprites and elves are estimated to be 90 ± 1 , 0.59 ± 0.09 , and 7.1 ± 0.3 events/min. The estimated LT variation of sprites shows gradual increase from 20LT to 05LT, while that of elves shows slight decrease from 20LT to 23LT and the following gradual increase after 00LT. These results imply that both sprites and elves tend to frequently occur in the early morning sector. The similarities and discrepancies between the JEM-GLIMS results and previous results derived from the satellite measurements, such as OTD, LIS, ISUAL, and ground-based observations are discussed at the presentation more in detail.

Keywords: lightning, transient luminous events, International Space Station