Horizontal Distributions of Sprites and the Relation to Parent Lightning Discharges Derived from JEM-GLIMS Nadir Observations

*Mitsuteru Sato[1], Toru Adachi[2], Tsuyoshi Sato[3], Tomoo Ushio[4], Takeshi Morimoto[5], Makoto Suzuki[6], Atsushi Yamazaki[6], Yukihiro Takahashi[1]

1.Faculty of Science, Hokkaido University, 2.Meteorological Research Institute, 3.Department of Cosmosciences, Hokkaido University, 4.Graduate School of Engineering, Osaka University, 5.Faculty of Science and Engineering, Kinki University, 6.ISAS/JAXA

JEM-GLIMS carried out ~3-years nadir observations of lightning discharges and lightning-producing transient luminous events (TLEs) at the ISS. In this period, JEM-GLIMS succeeded in detecting 8357 lightning events and 699 TLEs. From the detailed data analyses, 42 and 508 events in 699 TLEs are confirmed to be sprites and elves, respectively. It is found that the delay time of the sprite occurrence from the parent lightning occurrence is ~1 ms in all the sprite events (i.e., short-delayed sprites) and that the sprite emissions occurred above the parent lightning emissions. However, the exact location of the sprite emissions was slightly displaced from the peak location of the parent lightning emissions, which is regarded as the return stroke point. We statistically estimated the displacement and found that the median and average values are 13.6 km and 13.3 km, respectively. This result is consistent with the pervious report of *Lu et al.* [JGR, 2013], who suggested that the short-delayed sprites tend to occur within 30 km from the return stroke point. At the presentation, we will show the characteristics of the horizontal distributions of sprites and discuss the possible mechanism of the displacement more in detail.

Keywords: Lightning, TLEs, ISS

