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Mesospheric HO2 and O3 Distribution in Tropical Region Measured by SMILES and Their Relation to Transient Luminous Event

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Based on the chemical simulation of the lightning-associated Transient Luminous Events (TLEs) such as sprites and elves, it is reported that the number density of NOx, HOx and O3 in the stratosphere and mesosphere can be drastically changed after the occurrence of TLEs. Though it is reported that the occurrence of TLEs mainly centers on the tropical region and that these TLEs may affect chemistry in the tropical stratosphere and mesosphere, no qualitative analysis has been performed so far. In order to identify the chemical impact of TLEs, we analyzed the O3 and HO2 data obtained by ISS/SMILES. Based on the initial analysis, we identified that the number density of HO2 increased over the tropical continents and that the number density is about 2 times bigger than that estimated by the three-dimensional photochemical model (SD-WACCM). At the presentation, we will show more detailed HO2, O3 distributions and time variations.

Keywords: lightning, sprite, HO2, O3, SMILES