



Detection of the HO₂ enhancement with sprite event

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Sprites are lightning-induced secondary discharges appearing in the middle atmosphere. Both lateral and vertical scales are a few tens of kilometers, and 720 or more events occur in a day in the global [Sato et al., 2003]. It has been pointed out that sprite discharge may modulate atmospheric compositions in the middle atmosphere [Enell et al., 2008; Sentman et al., 2008; Hiraki et al., 2008]. Hiraki et al., [2008] suggested HO₂ abundance is enhanced by sprite about 1000-10,000 times more than the background value at 40km.

We used two satellite observations to survey the air-mass, which has both HO₂ abundance and sprite lightning simultaneously. A highly sensitive 'Superconducting Submillimeter-Wave Limb Emission Sounder' (SMILES) provides vertical profiles of HO₂ abundance in upper atmosphere from International Space Station (ISS). Number of the HO₂ observation is 180,000 points between 65S and 65N in the period from 12 October 2009 to 21 April 2010. Sprite lightning has been observed by UV/VIS (633 – 751 nm) part of 'Imager of Sprites and Upper Atmospheric Lightning' (ISUAL) mounted in the FORMOSAT-2 satellite [J.L. Chern 2003], and 120 most clear sprite events were detected during SMILES observation period/coverage. We found 2 cases that HO₂ spectrum was certainly enhanced where sprite happened in the same air-mass. We will discuss the enhancement of HO₂ abundance and its mechanism in the presentation.