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## HO<sub>2</sub> enhancements due to sprite discharges - observations and model simulations

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We present first observational evidences of an HO<sub>2</sub> production in the mesosphere above sprite-producing thunderstorms derived from low-noise SMILES (Submillimeter-Wave Limb-Emission Sounder) observation spectra in relation with sprite detections by the ISUAL (Imager of Sprites and Upper Atmospheric Lightning) instrument. Three events were identified with enhanced HO<sub>2</sub> levels of approximately 10<sup>25</sup> molecules at altitudes of 75-80 km a few hours after sprite occurrence. These first direct observations of chemical sprite effects are compared to results of plasma chemistry model simulations of electrical discharges in the mesosphere, and processes which can lead to an increase of mesospheric HO<sub>2</sub> on timescale of a few hours after a sprite event are analysed.