

## Mechanism for nighttime loss and daytime production of HONO at ground surfaces: Reactive uptake and displacement

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Nitrous acid (HONO) is an important source of hydroxyl radicals in the troposphere, particularly in early morning. Formation of HONO from the precursor NO<sub>2</sub> is known to occur through heterogeneous mechanisms, with accumulation overnight, followed by photolysis in the morning. Observations have been made of HONO during the day that cannot be fully explained by current formation mechanisms. Understanding these mechanisms is critical to determining the full role of HONO as a radical source.

Recent field observations of nitrite in particles suggest that partitioning and/or reactive uptake may also play a role in the atmospheric chemistry of HONO. Models using currently understood mechanisms require additional unknown night-time sinks and day time sources to reconcile measured levels of HONO. These sinks and sources remain significant points of uncertainty in understanding HONO atmospheric chemistry. In this study we explore the reactive uptake of HONO on soil-salt surrogates and real soil extracts as a function of relative humidity at atmospheric temperature and pressure. Measurements were made using a negative-ion proton-transfer mass spectrometer and cavity ring-down spectrometer to track acids and nitrogen oxides, respectively. Uptake of HONO onto salts could be reversed by exposure to the strong acids HCl and HNO<sub>3</sub>, which may act as a realistic daytime source of HONO.