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## Key Role of Equilibrium HONO Concentration over the Soil

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Nitrous acid (HONO) is an important component of the nitrogen cycle. HONO can also be rapidly photolyzed by actinic radiation to form hydroxyl radicals (OH) and exerts a primary influence on the oxidative capacity of the atmosphere. The sources and sinks of HONO, however, are not fully understood. Soil nitrite, produced via nitrification or denitrification, is an important source for the atmospheric HONO production.  $[\text{HONO}]^*$ , the equilibrium gas phase HONO concentration over the soil, has been suggested as key to understanding the environmental effects of soil fluxes of HONO (Su et al., 2011). But if and how  $[\text{HONO}]^*$  may exist and vary remains an open question. In this project, a measurement method using a dynamic chamber has been developed to derive  $[\text{HONO}]^*$  and the atmospheric soil fluxes of HONO can accordingly be quantified. We demonstrate the existence of  $[\text{HONO}]^*$  and determine its variation in the course of soil drying processes. We show that when  $[\text{HONO}]^*$  is higher than the atmospheric HONO concentration, HONO will be released from soil; otherwise, HONO will be deposited on soil. This work advances the understanding of soil HONO emissions, and the evaluation of its impact on the atmospheric oxidizing capacity and the nitrogen cycling.