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Impacts on Ozone of a New Interactive Soil NO_x Scheme

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Ozone chemistry in remote regions of the troposphere is often NO_x-limited, and soil NO_x emissions therefore make an important contribution to ozone production in these areas. Atmospheric chemistry models generally use prescribed monthly mean soil NO_x emissions. Since real-world soil NO_x emissions are highly sensitive to temperature and rainfall, a soil NO_x scheme that includes these factors will result in improved temporal resolution for not only NO_x emissions but also for ozone concentrations and the oxidative capacity of the atmosphere. Soil NO_x is produced through nitrification, denitrification, and chemodenitrification. These processes depend on soil temperature, pH, moisture, and nitrogen content. Comprehensive schemes for soil NO_x production should therefore include these factors, as well as vegetation type, as a substantial proportion of emitted soil NO_x is taken up by the canopy. We have developed a model that predicts soil NO_x emissions interactively based on soil moisture, soil temperature, nitrogen availability, pH, and vegetation type. We will present results from this model and explore the impact of our new representation of soil NO_x emissions on tropospheric ozone.