

Earth & Environmental Sciences presents

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Atmospheric Chemistry After Dark

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Science II Room 109

One of the most important issues affecting air quality, both globally and within the United States, is the formation of ozone, O₃, a compound that is hazardous to human health. It is formed in the presence of sunlight from reactions of nitrogen oxides (NO_x = NO + NO₂) and volatile organic compounds (VOC), both of which are commonly occurring pollutants from fossil fuel combustion. The daytime photochemical reactions that generate O₃ pollution have been the subject of intense study over the last several decades. Less well studied are a set of reactions that occur in the nighttime atmosphere through the formation of the nitrate radical, NO₃, and dinitrogen pentoxide, N₂O₅. During the course of a night, reactions of these compounds consume some 50-90% of the NO_x present at sunset as well as an appreciable fraction of the available ozone. Furthermore, NO₃ is a strong oxidant that can lead to the removal of the most reactive VOC that participate in ozone formation during the day. Thus, nighttime chemical transformation strongly influences the concentrations of the ingredients for O₃ photochemistry, NO_x and VOC, as well as the concentration of O₃ itself. This talk will discuss the nocturnal chemistry of NO₃ and N₂O₅ and its implications for air quality on regional scales.