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International air quality, health, and climate impacts of cookstoves, diesel NO_x, and other anthropogenic sectors via $PM_{2.5}$ and O_3

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Abstract

Diesel cars, trucks, and buses produce ~70% of global land transportation emissions of nitrogen oxides (NO_x), a key $PM_{2.5}$ and ozone precursor. Globally, over 3 billion people presently use solid fuel for meal preparation. What are the impacts of these activities on the environmental through atmospheric chemistry and transport? Which species dominates the local and long-range health impacts of air pollution? I will first discuss the use of models and remote sensing measurements to evaluate the domestic and international contributions to $PM_{2.5}$ and O_3, and their impacts on human health and climate, at global scales. This talk will then delve into impacts of diesel NO_x emissions standards and solid fuel use in major markets and source regions worldwide. We find that the per-cookstove impacts on ambient air quality and global temperature changes are pronounced in several countries not typically targeted in cookstove mitigation efforts (e.g., Ukraine and Romania). We also show that real-world diesel NO_x emissions in 11 markets representing ~80% of global diesel vehicle sales are significantly higher than certification limits indicate. This excess NO_x contributed an estimated ~39,000 additional ozone- and $PM_{2.5}$-related premature deaths globally in 2015, with a larger portion of this owing to excessive emissions from heavy-duty vehicles than from defeat devices on light duty vehicles. Lastly, we present recent evaluation of the global premature deaths and pre-term births associated with air pollution exposure, showing that role of O_3 towards the former is possibly several times larger than previously expected, rivaling the health impacts of $PM_{2.5}$ in severity.

Date: **Monday, October 2, 2017**
Time: **Refreshments 3:15pm, Seminar 3:30pm**
NCAR Foothills Laboratory
3450 Mitchell Lane, Boulder, CO 80301
FL2-1022, Large Auditorium
Live webcast: http://ucarconnect.ucar.edu/live

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