ATS/CIRA Special Seminar

Kimberly J. Hageman

Visiting ATS from the University of Otago, New Zealand

Predicting Pesticide Volatilization, Vapor Drift, and Impacts on Honey Bees

Hosted by Jeff Collett

Thursday, Aug. 10, 2017

ATS room 101
Discussion will begin at 10:15 a.m.
Refreshments will be served at 10 a.m. in the weather lab

Pesticide vapor drift is the transfer of pesticides as gas-phase molecules from a sprayed field to downwind locations **via the atmosphere**. Under certain circumstances, vapor drift is an important pathway of pesticide exposure to non-target crops and organisms. In this presentation, I will discuss three projects that contribute to my long-term goal to develop a comprehensive set of models for predicting the transport and impacts of semi-volatile pesticides.

I will first discuss a **chemical fate model** designed to predict the volatilization rate of pesticides from agricultural soil under various temperature, relative humidity, and soil organic carbon conditions. This work showed that models based on soil-air partition coefficient ($K_{soil\text{-}air}$) values produce the most accurate predictions. Chemical fate models, such as the one described above, rely on predictive equations for estimating chemical properties. However, we found that predictive equations for estimating $K_{soil\text{-}air}$ values of *current-use* pesticides had not been robustly developed, due to a lack of measured data. Thus, I will next discuss a major effort to ameliorate this data gap. In this project, a solid-phase fugacity meter was used to measure 943 $\boldsymbol{K_{soil\text{-}air}}$ **values of current- and historic-use pesticides**. I will discuss how the *new* predictive equation we developed from these measurements is being used in our current work and that of other research groups. Finally, I will briefly discuss an on-going collaborative research project between my research group and that of a honey bee neuroscience team. In this project, our goal is to determine if vapor drift of the semi-volatile pesticide, chlorpyrifos, results in an over-looked route of **exposure to honey bees**.

Link to colloquia page: https://www.atmos.colostate.edu/colloquia/