Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Modeling and measuring neighborhood scale flow, turbulence, and temperature within Chicago heat island[1] PATRICK CONRY, ASHISH SHARMA, LAURA LEO, H.J.S. FERNANDO, University of Notre Dame, MARK POTOSNAK, DePaul University, JESSICA HELLMANN, University of Notre Dame — The modeling of urban heat island (UHI) requires a multi-scale approach as it involves numerous physical phenomena spanning a range of scales. We have performed a comprehensive study of Chicago's UHI via coupling of mesoscale Weather Research and Forecasting (WRF) and micro-scale ENVI-met models. The application of the latter model to a Lincoln Park neighborhood and a parallel observational campaign will be the primary focus of this presentation. ENVI-met employs a computational fluid dynamics model to represent heterogeneity of urban areas, providing fine resolution output of UHI dynamics. In the field campaign, two stations located on rooftops of DePaul University buildings were each equipped with a sonic anemometer and vertical array of thermocouples, allowing investigations of spatial variability of flow, turbulent fluxes, and temperature profiles in an urban roughness sublayer. One of these was located above a rooftop garden and the other above a conventional rooftop. Downscaled output from the WRF model or a set of observational data served as initial and boundary conditions for the ENVI-met model. The model's predicative capabilities were assessed through comparison with another set of observational data, and dynamical causes for the model's poor behavior were identified.

[1]Funded by NSF Grant No. 0934592 and ND-ECI

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Date submitted: 01 Aug 2013 Electronic form version 1.4