Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

An Improved Simulation of the Diurnally Varying Street Canyon Flow NEDA YAGHOOBIAN, JAN KLEISSL, University of California San Diego, KYAW THA PAW U, University of California Davis — The impact of diurnal variation of temperature distribution over building and ground surfaces on the wind flow and scalar transport in street canyons is numerically investigated using the PArallelized LES Model (PALM). The Temperature of Urban Facets Indoor-Outdoor Building Energy Simulator (TUF-IOBES) is used for predicting urban surface heat fluxes as boundary conditions for a modified version of PALM. TUF-IOBES dynamically simulates indoor and outdoor building surface temperatures and heat fluxes in an urban area taking into account weather conditions, indoor heat sources, building and urban material properties, composition of the building envelope (e.g. windows, insulation), and HVAC equipment. Temperature (and heat flux) distribution over urban surfaces of the 3-D raster-type geometry of TUF-IOBES makes it possible to provide realistic, high resolution boundary conditions for the numerical simulation of flow and scalar transport in an urban canopy. Compared to some previous analyses using uniformly distributed thermal forcing associated with urban surfaces, the present analysis shows that resolving non-uniform thermal forcings can provide more detailed and realistic patterns of the local air flow and pollutant dispersion in urban canyons.

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Date submitted: 03 Aug 2012 Electronic form version 1.4