ACINN Graduate Seminar, Innsbruck University
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A Lagrangian particle dispersion model for urban applications

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Increasing population density in urban areas and numerous sources of air pollution in close proximity can lead to health issues. Therefore it is important to understand urban pollutant dispersion. In this contribution we will investigate whether a specific type of dispersion model (Lagrangian particle dispersion model) can resolve the urban canopy layer, which is - roughly - the layer between the houses. The existing dispersion model already takes the urban roughness sublayer into account and is valid for the urban neighborhood scale.

We use profile data from literature to extend the necessary turbulence profiles into the canopy between the buildings. Since it is virtually impossible to get spatially averaged flux measurements between buildings, most of the profiles stem from wind tunnel and numerical modeling studies. We apply a first order approach to test to what degree the urban canopy changes the model results, i.e concentration distributions.

The impact of the parameterized turbulence profiles in the canopy layer is tested via sensitivity studies and comparisons of model results with tracer dispersion experiments in different urban areas.

Ultimately, we will implement the knowledge gained from urban dispersion simulation in an existing footprint model (LPDM-B), thus extending the footprint model to application over very rough (i.e. urban) surfaces and therefore creating on of the first footprint models for urban areas without have to resolve each individual building.