Increasing temporal depth of urban Land-Use Regression Models by wind-data driven dynamic buffer generation

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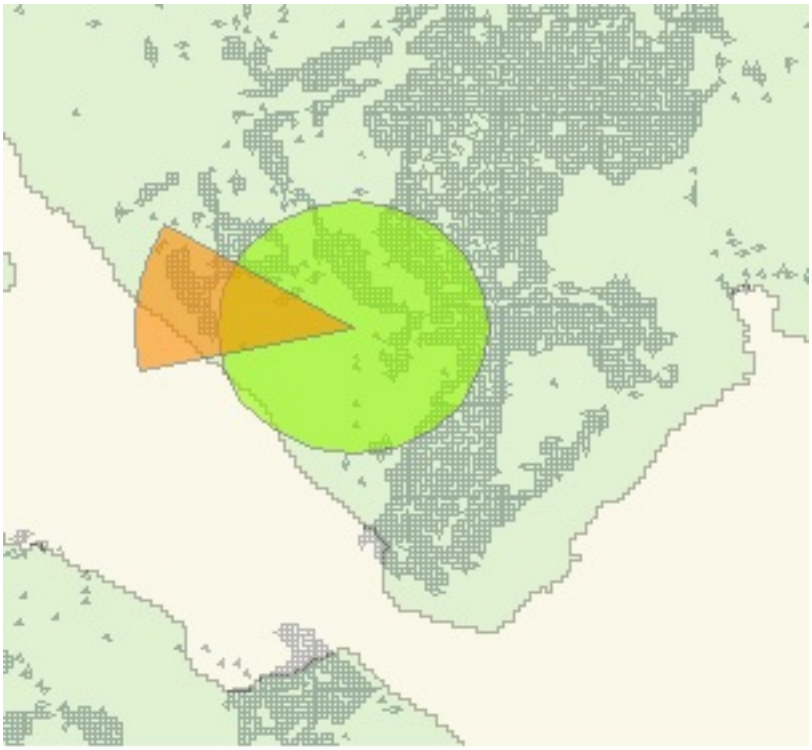
Land-use regression (LUR) models are commonly used as an inexpensive and easy to set-up way to predict spatial variability in air-pollution. They are successfully applied to regional and, more and more, urban settings, making use of spatial predictors such as land-use, vegetation, morphology and geography. New approaches include an improved use of wind-data for buffer-creation and predictor calculation.

Traditionally, LUR models are used to generate annual or seasonal concentration averages and are not able cover deeper temporal variability. We aim at increasing temporal depth by using a novel approach in generating dynamic buffers for predictor calculation using both monthly wind-speed and wind-direction averages. The traditional circular buffers are replaced by wedges, whose orientation and radius are bound to these meteorological variables.

Here, Hong Kong’ s diverse territory is taken as a study site, and our model is trained with 5 years data from 16 government air quality monitoring stations and deployed portable sensors network. We compare our novel approach to both traditional LUR models and a sophisticated urban chemical transport model (ADMS-Urban).

Results will highlight the opportunities in using LUR models for monthly air-quality pollution concentration as an alternative to chemical transport modelling.

Keywords: Wind, Land Use Regression, Spatial Data, Meteorology



Dynamic and circular LUR buffer in Hong Kong's urban environment

