Machine learning models to replicate large-eddy simulations of air pollutant concentrations along boulevard-type streets - Supplementary material

This supplementary material contains visualisations for the features used for training the regression models on KU18. Table 1 presents the features. Notice that most features are undefined on points that contain buildings. Note also that these features were computed with the help of auxiliary features that are not listed here, such as is_building, is_inhabited, and is_intersection, which are available in the supplied code. The figure titles correspond to the variable names used in the code.

Table 1: List of features used in the regression models.

Feature name	Description
Building height	Height of the closest building
Canopy height	Height of the vegetation canopy
Courtyard	Binary variable indicating presence of a courtyard
Direction of closest building	Direction to the closest building relative to the wind direction
Distance to building downwind	Distance to closest building in the same direction as the wind
Distance to building upwind	Distance to closest building in the direction against the wind
Height to width ratio	Height of the closest building relative to the width of the street
Pollutant emissions	Emission level
Pollutant emissions convolution, $\sigma = \{1,\ 2,\ 4,\ 8,\ 16\}$	Gaussian convolution of the emissions with standard deviation σ
Pollutant emissions convolution upwind, $\sigma = \{8,\ 16,\ 32\}$	Convolution of the emissions upwind with standard deviation σ
Street	Binary variable indicating presence of a street
Street width	Width of the street
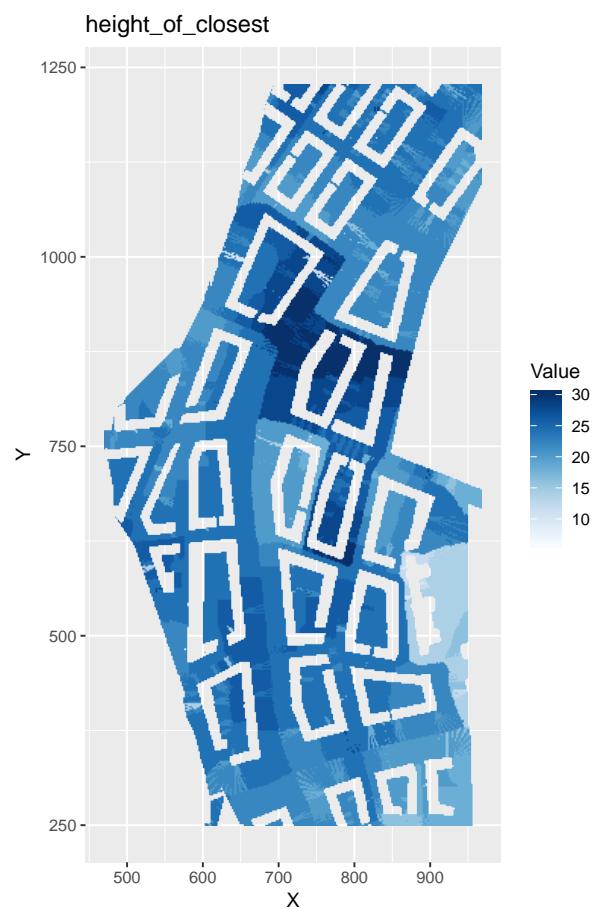
Figure 1: Building height

Figure 2: Canopy height
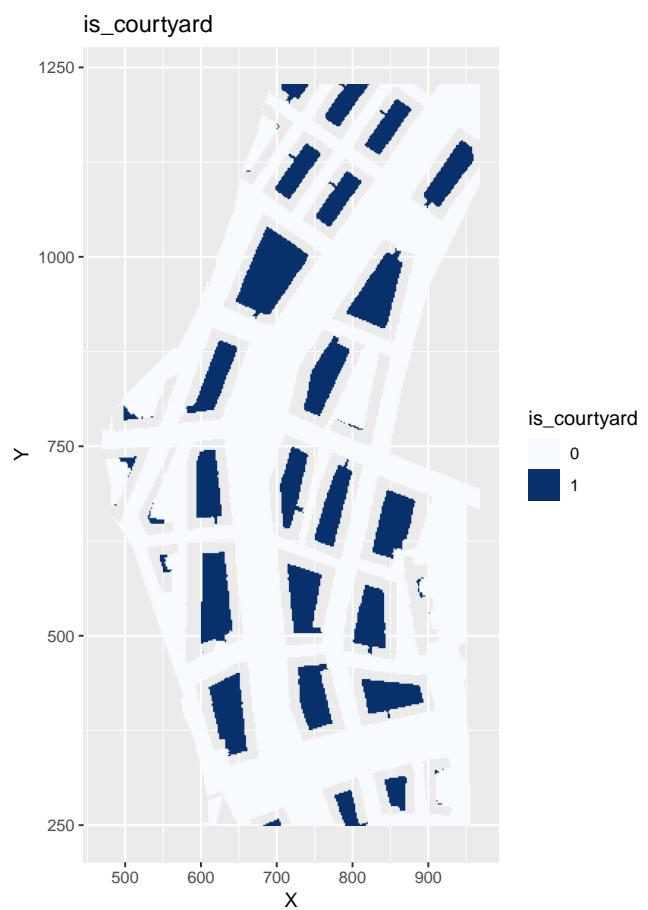
Figure 3: Courtyard
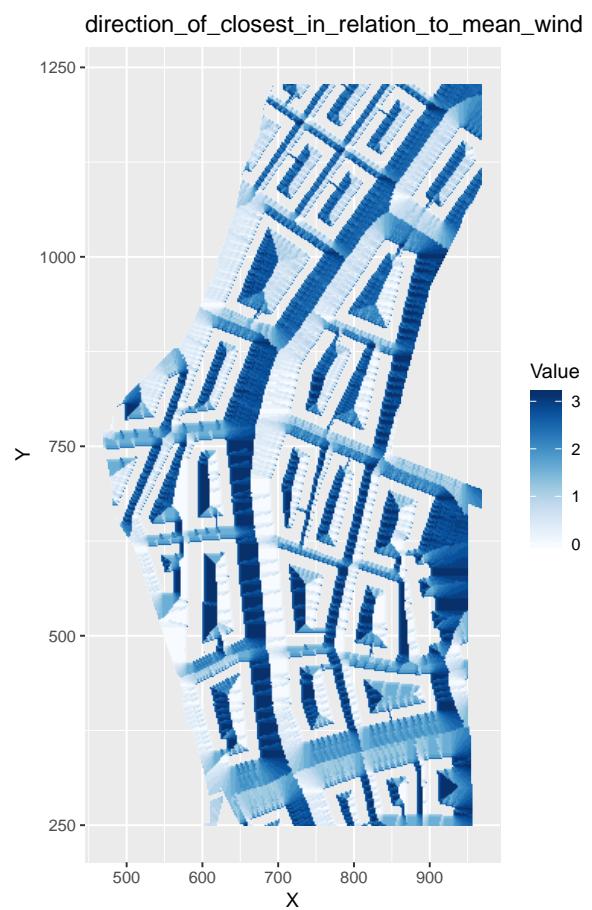
Figure 4: Direction of closest building
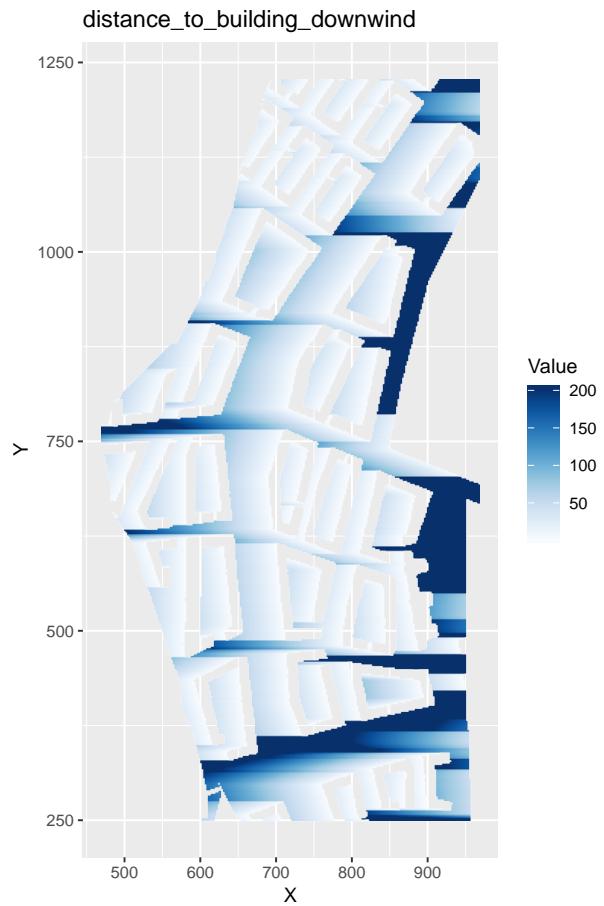
Figure 5: Distance to building downwind. Due to the particulars of the feature generating algorithm, the feature is undefined if the next building is 300m away.
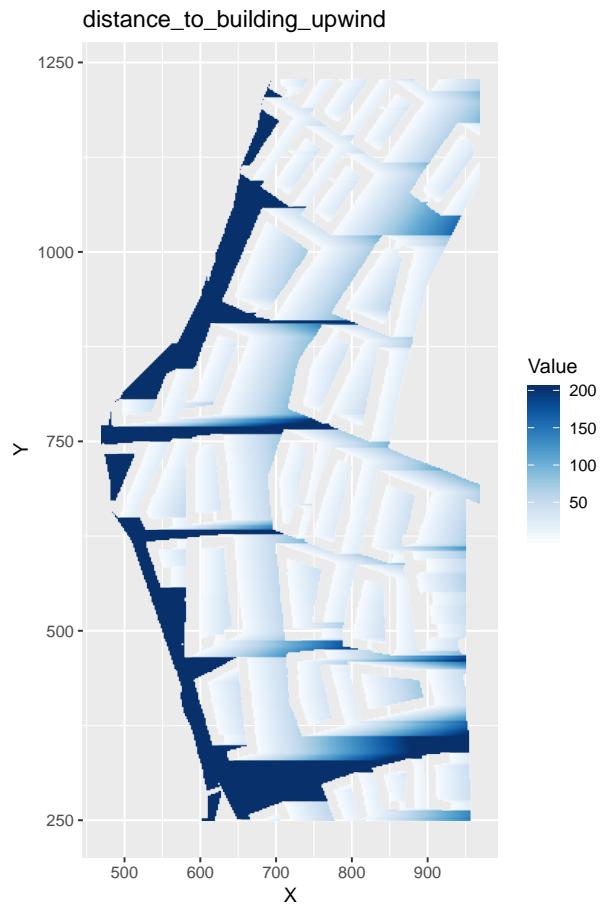
Figure 6: Distance to building upwind. Due to the particulars of the feature generating algorithm, the feature is undefined if the next building is 300m away.
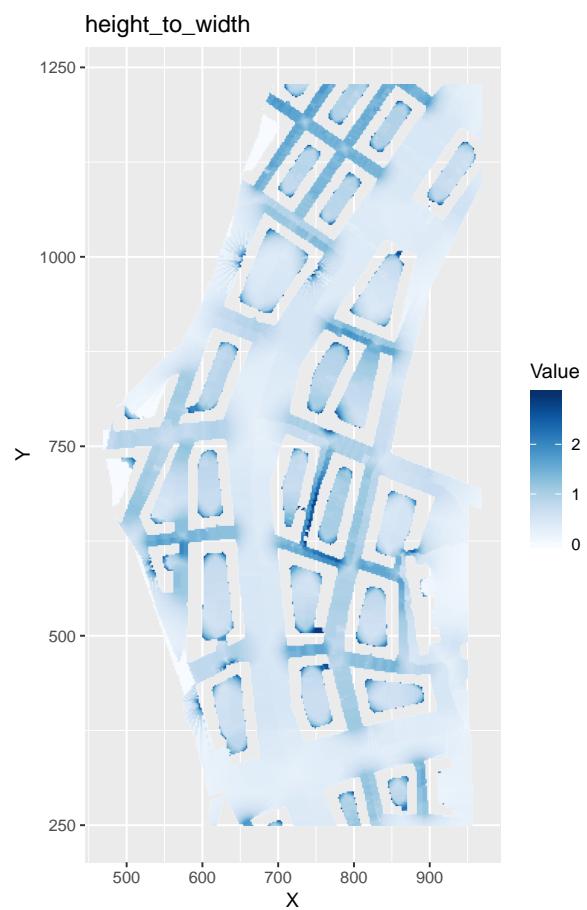
Figure 7: Height to width ratio
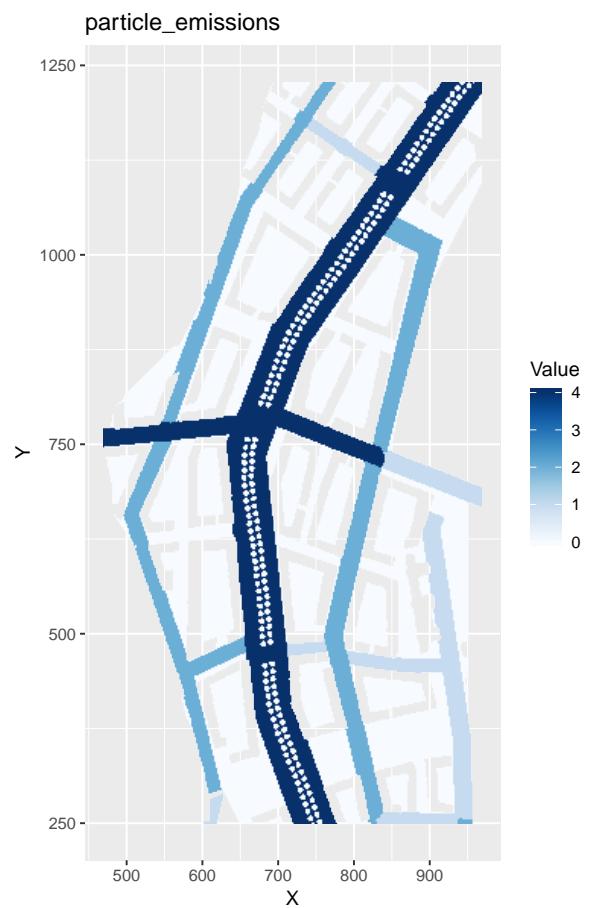
Figure 8: Pollutant emissions
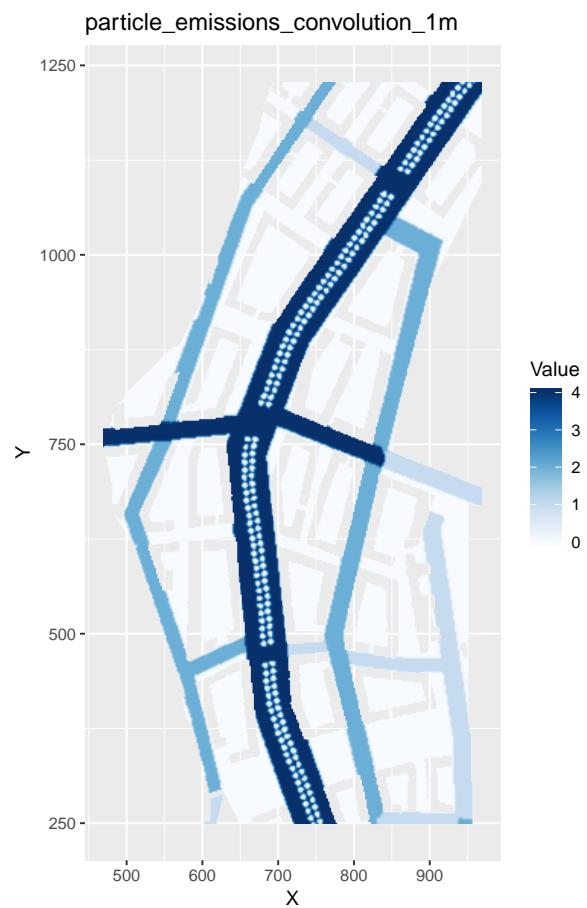
Figure 9: Pollutant emissions convolution, $\sigma = 1$
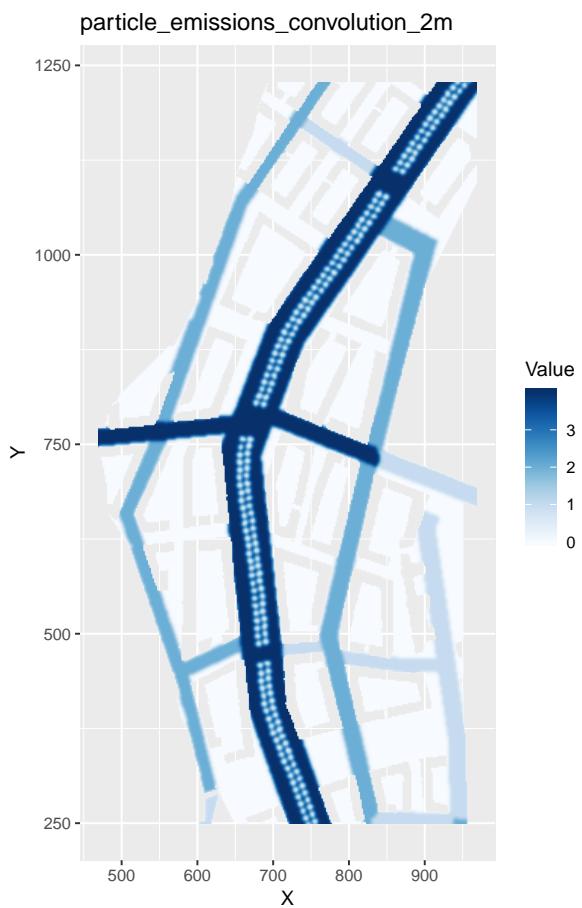
Figure 10: Pollutant emissions convolution, $\sigma = 2$
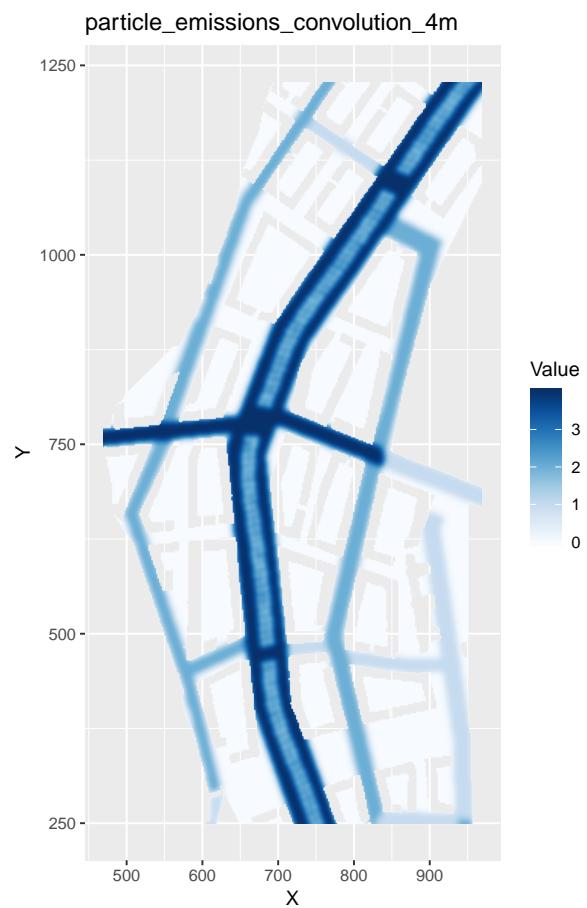
Figure 11: Pollutant emissions convolution, $\sigma = 4$
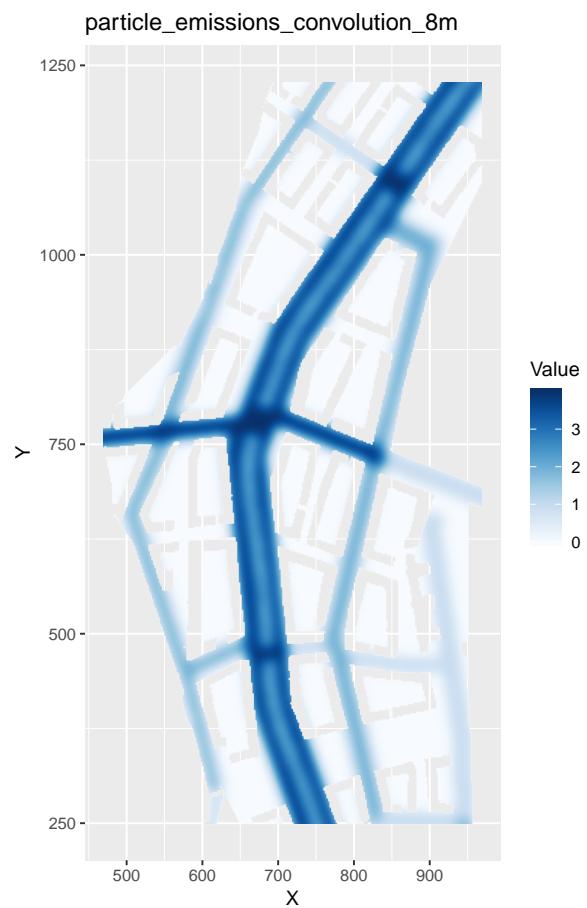
Figure 12: Pollutant emissions convolution, $\sigma = 8$
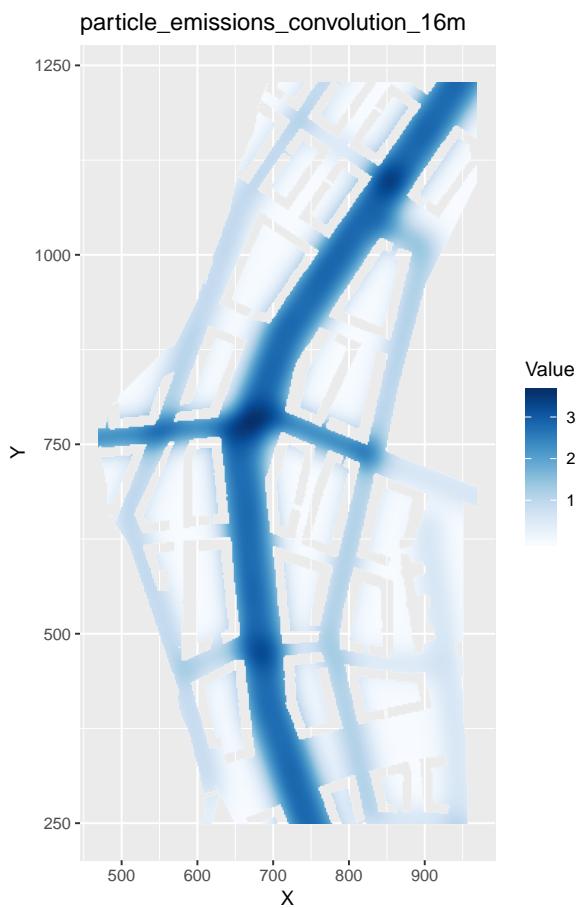
Figure 13: Pollutant emissions convolution, $\sigma = 16$
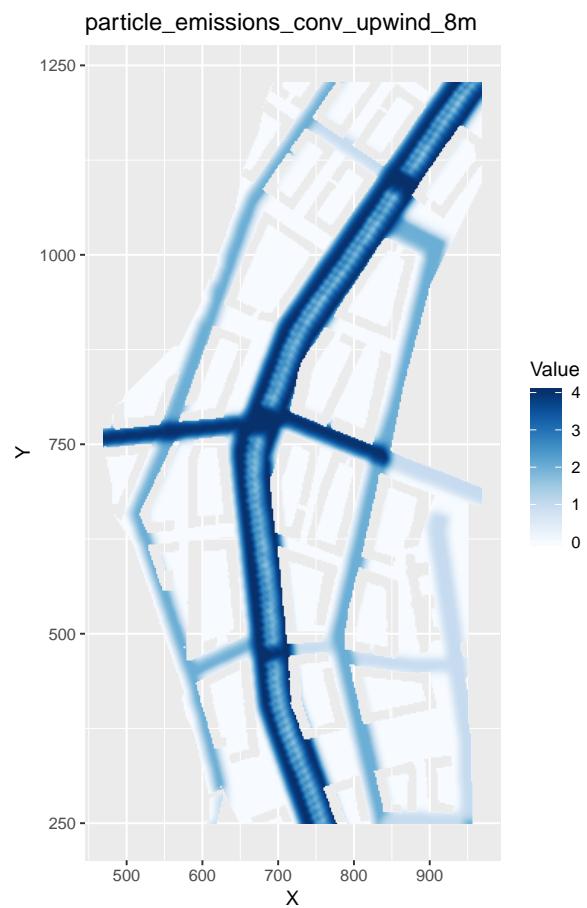
Figure 14: Pollutant emissions convolution upwind, $\sigma = 8$
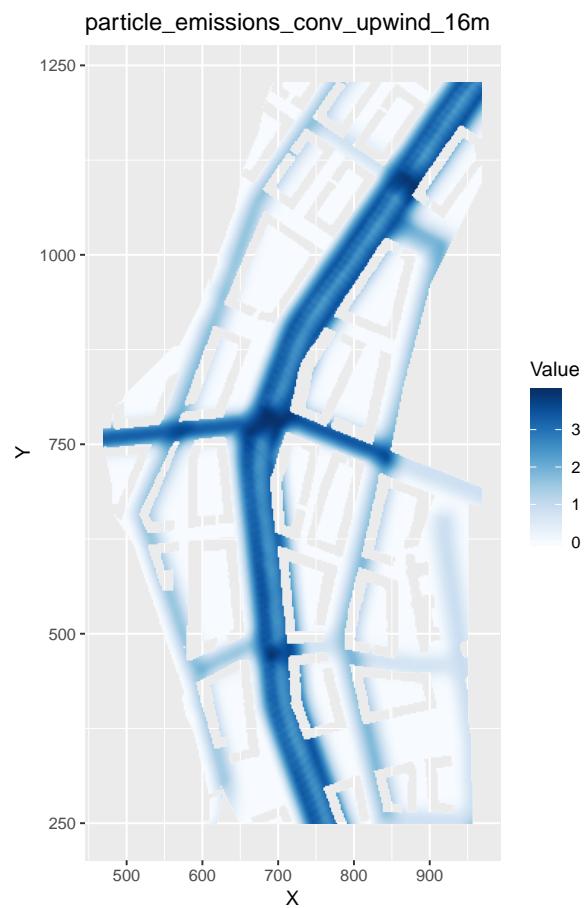
Figure 15: Pollutant emissions convolution upwind, $\sigma = 16$
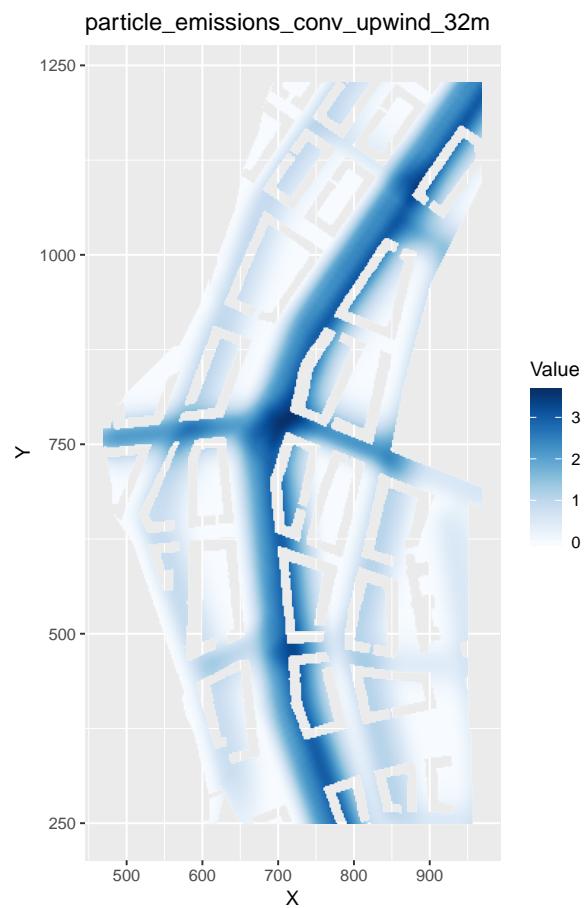
Figure 16: Pollutant emissions convolution upwind, $\sigma = 32$
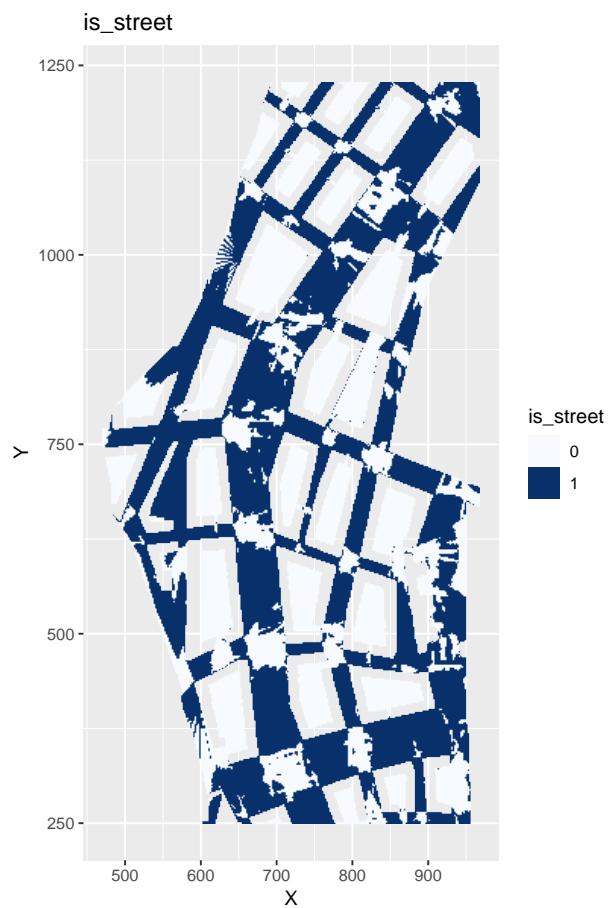
Figure 17: Street
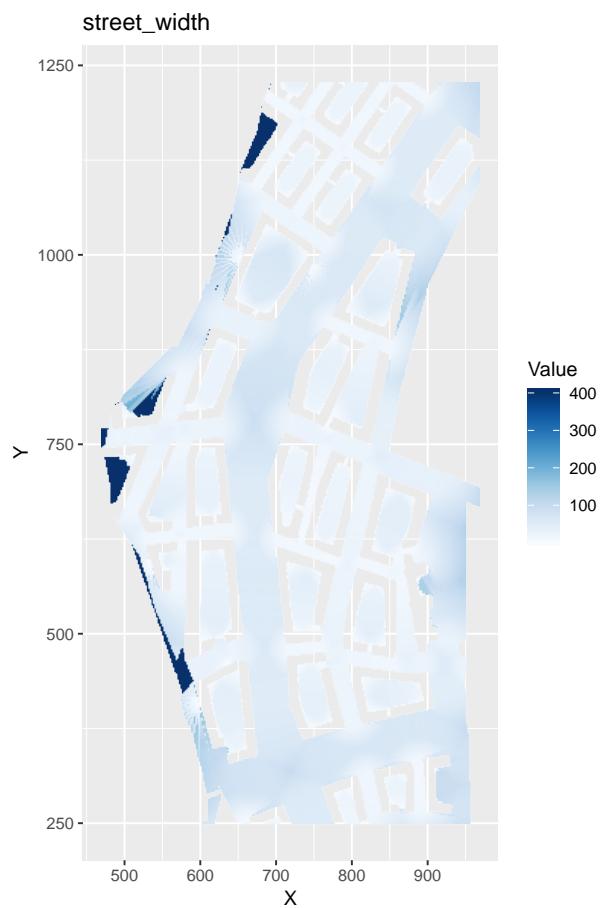
Figure 18: Street width
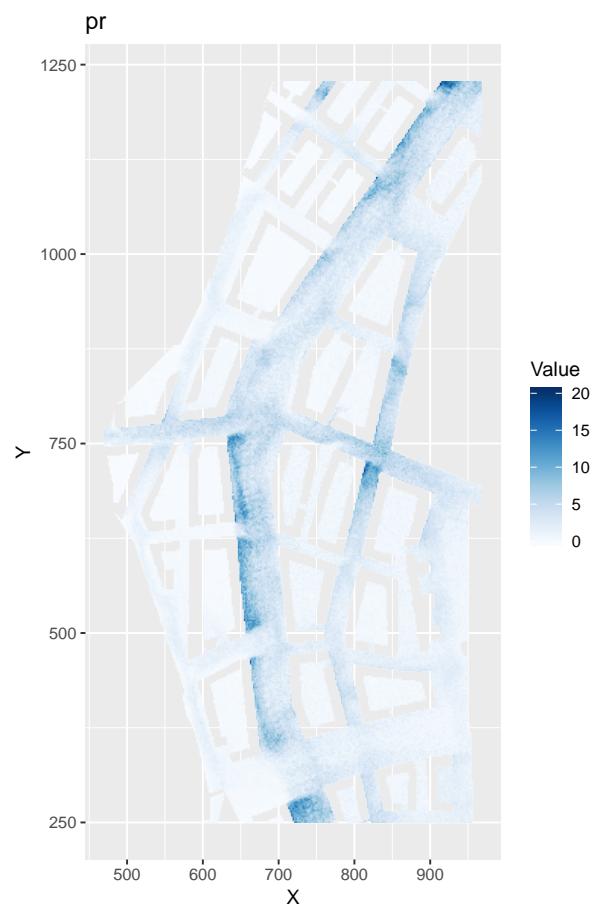
Figure 19: Pollutant concentrations (target variable)