

Testing Nature Based Solutions for Air Quality Improvement: Aveiro Case Study

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Abstract : Innovative nature-based solutions (NBSs) can provide answers to the challenges that urban areas are currently facing due to urban densification and extreme weather conditions. The effects of NBSs are recognized and include improved quality of life, mental and physical health and improvement of air quality, among others. Part of the work developed in the scope of the UNaLab project, which aims to guide cities in developing and implementing their own co-creative NBSs, intends to assess the impacts of NBSs on air quality, using Eindhoven city as a case study. The state-of-the-art online air quality modelling system WRF-CHEM was applied to simulate meteorological and concentration fields over the study area with a spatial resolution of 1 km² for the year 2015. The baseline simulation (without NBSs) was validated by comparing the model results with monitored data retrieved from the Eindhoven air quality database, showing an adequate model performance. In addition, land use changes were applied in a set of simulations to assess the effects of different types of NBSs. Finally, these simulations were compared with the baseline scenario and the impacts of the NBSs were assessed. Reductions on pollutant concentrations, namely for NO_x and PM, were found after the application of the NBSs in the Eindhoven study area. The present work is particularly important to support public planners and decision makers in understanding the effects of their actions and planning more sustainable cities for the future.

Keywords : air quality, modelling approach, nature based solutions, urban area

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