



Urban fine-scale weather forecasting reveals Amsterdam weather conditions with unprecedented detail

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Going beyond traditional Numerical Weather Prediction that forecast weather on regional scales, we developed a weather forecasting system for the neighborhood and street scale, the scale on which people eat, sleep, work and relax. During the summer of 2015, this system was used to produce daily a 48 hour weather forecast for the Amsterdam metropolitan area (Netherlands). Therefore, detailed information on land use and built-up morphological characteristics was collected and made available for use in the Weather Research and Forecasting (WRF) model, while WRF itself was customized to enable weather forecasts for domains with grid cells with a dimension of 100 m. Verifying the resulting weather forecasts against 24 urban weather stations and the Schiphol airport rural reference stations revealed that the Urban Forecasting System is able to determine the impact of urban morphological characteristics and urban spatial structure on local climate. Comparing the forecasts on domains with grid sizes of 100 m and 500 m significantly improves weather forecasts on computational domains with more conventional grid spacings of 2.5 km and 12.5 km. Most notably, fine-scale weather forecasting improves forecasts for neighborhoods that are characterized by the proximity of water surfaces and urban sites that are characterized by presence of green spaces such as city parks.