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High-resolution WRF-urban simulations of metropolitan Tel-Aviv.

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We have conducted high-resolution (down to 500m grid-cell size) mesoscale simulations for the largest coastal urban region in Israel using WRF-Urban modules. A three-category urban classification and urban morphological parametrization were created based on 50m-resolution GIS databases. This classification was then ingested into WRF and used within the urban modules. We have chosen a typical summer-time weather event as a test case scenario, characterized by sea-land breeze circulation. We have applied both the single-layer urban canopy model and the multi-layer model, and performed sensitivity tests with varying anthropogenic heat and urban fraction. The impact of the urban modules has been primarily assessed by comparing model 10m winds and 2m temperatures to local observations. The results indicate that the single-layer urban canopy model reconstructs wind direction most accurately, while the multi-layer model shows advantage in simulating wind speeds. Using the urban modules, the urban heat island is indicative during night-time. Further sensitivity tests and the use of more accurate initial and lateral boundary conditions are underway.