Extraction of Urban Morphology Parameters from Generic European Datasets: A Case Study for Antwerp, Berlin and Almada

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Climate change is driven by global processes such as the global ocean circulation and its variability over time leading to changing weather patterns on regional scales as well as changes in the severity and occurrence of extreme events such as heat waves. The response of urban societies to the evolving climate depends not only on their regional climate characteristics but also on other local factors such as the urban heat island effect. Simulation of this phenomenon with local urban climate models requires comprehensive information about the urban morphology. This study focusses on the extraction of the planar and frontal area indices from detailed 3D city models and their relationship with the European Soil Sealing Level database from the European Environment Agency. These parameters have been calculated on a 1km2 grid and compared with soil sealing values aggregated at the same spatial resolution. The optimal size of the grid is a trade-off between the level of detail and the robustness of the established relationships by reducing the scatter at small scales. Moreover, the transferability of the results to other geographical areas has been investigated. The analyses have been conducted in the framework of the NACLIM FP7 project funded by the European Commission and include the cities of Antwerp (BE), Berlin (DE) and Almada (PT) represented by different climate and urban characteristics. First results show a correlation of 70% between the planar area index and the averaged soil sealing using a linear regression model at a 1km scale. Moreover, a good correspondence has been found between the relationships for Antwerp and Berlin which is promising for urban climate modellers to reduce model complexity and analyse various climate scenarios in an effective way.