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Calculation of the roughness length parameters with a new method in medium sized cities

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In urban environments the surface geometry is altered and the drag of the surface is enhanced. Owing to this the average wind speed is lower in the cities than in the surrounding rural areas. For describing the geometry of the surface and as a consequence its roughness several parameters are known. The connection between the wind and the drag force of the obstacles (buildings, tree crowns) can be characterized by the aerodynamical roughness length (z_0) and the zero-plane displacement height (z_d). These are the key parameters in studying the urban atmosphere as they can be utilized for example in pollutant dispersion modelling, microclimate modelling, wind energy calculations and they can be useful input for large-scale flow models as well. Despite the fact of their usefulness there is lack of appropriate method or software for the automatic calculation of these roughness parameters. In this study we present a new surface roughness calculation and mapping method. This new calculation procedure based on a morphometric approach, and it uses building and tree crown databases. In this study we also present the first results of the calculation of the surface roughness parameters in medium sized Central European cities, to present the advantage of this new method.