Impact of urban morphology and high-resolution land use land cover for city scale modelling

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Urban areas are facing increasing environmental challenges, especially due to rapid urbanization in developing countries. The incidence of extreme weather events like poor air quality, heatwaves, and intense precipitation emphasizes the necessity for accurate modelling of urban processes and their interactions across different scales. In this study, urban processes in two Indian cities, Delhi and Bhubaneswar, are examined using a two tile urban parameterization scheme known as the Met Office-Reading Urban Surface Exchange Scheme (MORUSES). New empirical relationships for urban morphology parameters, specifically Planar Area Index, Frontal Area Index, and Building Height, have been established based on local data from Bhubaneswar and Delhi. It was observed that both cities exhibit a significant correlation between urban fraction and Planar Area Index. However, Building Height shows a strong correlation in Delhi and a moderate correlation in Bhubaneswar. Furthermore, the impact of high-resolution land use and land cover (LULC) data from AWiFS LULC, compatible with the Joint UK Land Environment Simulator (JULES), is being evaluated against the default Climate Change Initiative (CCI) LULC data. Different case studies are carried out to study the impact of local morphology and high resolution LULC under different weather conditions. A detailed evaluation is ongoing and the main outcome will be presented.