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Modeling of mesoscale phenomena using WRF-BEP-BEM-CIM in a complex region

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Because of the global warming, urban planning strategies must be investigated to reduce the building energy consumption and increase the thermal comfort in cities. In the framework of Energy Strategy 2050 of Switzerland, it is important to highlight the impact of future climate change on urban planning and proposes strategies to help urban planners and policymakers face this new challenge particularly in a future where heat waves are going to become common at mid-latitudes. However, to do so in the best possible way, the models currently used have to be robust enough in complex regions (with lakes, mountains and urban areas) to evaluate future planning scenarios. Simulations are performed over Switzerland at high resolution using a meso-scale numerical weather prediction system. The results from the simulations are compared with multiple meteorological stations located in the domain and is also used to evaluate the urban heat island. We demonstrate that the models performs well in plateaued regions but some important deviations are noted in particularly complex region with complex topography. The importance of Lake Geneva in the meso-scale dynamics in the region is also highlighted.