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Interaction between Urban Heat Island and Sea-Breeze: a focus on Shanghai

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In the context of ongoing global warming and the intensification of urbanization processes, urban climate research is particularly important. The urban heat island (UHI) stands out as the most typical characteristic of urban climates. Shanghai is recognized as one of the largest cities in China, with over 24 million inhabitants. Located on the east coast, Shanghai's climate is significantly affected by the UHI and sea breeze, particularly during the summer.

UHI and sea breezes have been extensively explored in various coastal cities on a global scale. This study aims to run for the first time the ALARO model over the Shanghai region and analyze interplay between sea breezes and UHI during heat waves (HW). The ALARO-SURFEX regional climate model set-up will be used for dynamical downscaling from ERA5 up to kilometeric resolution. Urban effects will be taken into account by running the Town Energy Balance (TEB) module. The model runs will be evaluated based on observations in different Local Climate Zones (LCZs). The ECOCLIMAP database used to characterize the land characteristics has been updated based on detailed urban datasets of Shanghai. Additionally, this study will explore the effects of LCZs on this interaction.