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Climatic impacts of urbanization on the Beijing

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WRF coupled UCM is used to simulate the climatic impacts from 2008 to 2012 of urbanization on the Beijing. The results show that simulation is generally well compared to the observation. The urbanization caused a strongest UHI in the night in urban areas. The precipitation is reduced slightly. The relative humidity has a more direct response to the urbanization process than precipitation. The effect of urbanization can heat the temperature up to 1.2 kilometers inside the urban boundary layer in the daytime. While for the nighttime, the UHI development height is less than 400 meters. The relative humidity is reduced below 800 meters in daytime in Beijing but is hardly changed in nighttime. Three different urban land use datasets include year 1990, 2000 and 2010 are used to set up three sensitive tests to find out that the real urbanization process has changed the surface energy balance with the sensible heat flux increase, latent heat flux decrease and ground heat flux increase, causing the increase of temperature which forms the UHI. Both the changes of sensible heat flux and latent heat flux is more pronounced in the time period of 2000 to 2010 than that of 1990 to 2000. Twenty years from1990 to 2010 urbanization can enhance the UHI about 3.5˚C, among which the 2000-2010 period urbanization has attributed over 68%. The latest ten years urbanization process has a much pronounced impact on the UHI.