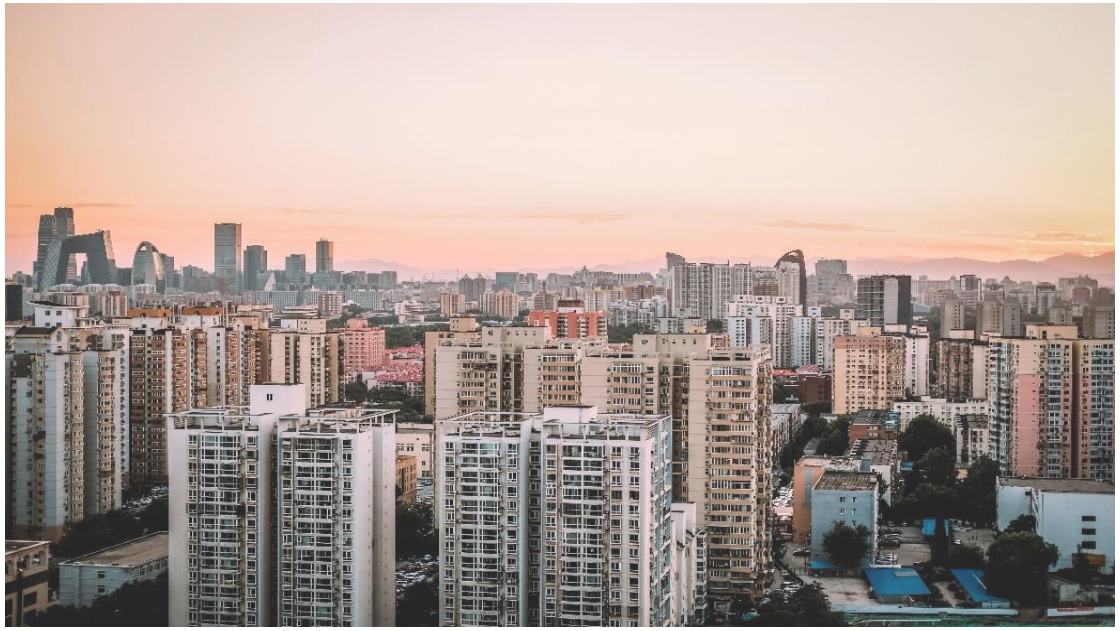
Modeling land-atmosphere interactions and urban climate in Eastern China

You are kindly invited to the public defense of the PhD dissertation of

Fengqi Cui

Wednesday, 28 June 2023 at 10:00 am (Brussels time)
UGent, Campus De Sterre – Krijgslaan 281, 9000 Ghent
Lecture room 2.4 at S8 building
Follow the livestream of the defense through the link: https://ap.lc/SCZbn

After the defense, you are welcome to attend the reception. Please confirm your in-person attendance before 20 June by e-mail: fengqi.cui@ugent.be



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SUMMARY

This thesis comprehensively explored the urban green space mitigation on urban heat islands (UHIs), the interactions between irrigation and urbanization, the interplay between heat waves (HWs) and UHIs, and the future urban climate under Paris Agreement using remote sensing data and regional climate model in Eastern China, especially in Beijing. The results demonstrated that the cooling effects of urban green space in daytime surface UHIs were highly dependent on the background climate. The temperate zone had the highest daytime surface UHIs, while the arid zone had the lowest daytime surface UHIs. The combined effect of urbanization and irrigation decreased T2max, T2avg, and T2min by -0.84, -0.77, and -0.71 ºC in Huang-Huai-Hai plain. Urbanization reduced rainfall by decreasing convective precipitation, while irrigation enhanced convective and large-scale precipitation. The compound HWs and daytime HWs enhanced both daytime and nighttime UHIs, while the nighttime HWs suppressed daytime UHI. The enhancement of daytime HWs on UHI is triggered by increased urban-rural differences in sensible heat and a decline in latent heat. But nighttime HWs altered the daytime UHI by less urban-rural differences in net radiation. An average summer warming reaches up to 3.5 ºC and 4 ºC at GWL1.5 and GWL2 in Beijing, and UHIs will increase more under GWL15 than that under GWL2 compared to historical UHIs.

ABOUT THE AUTHOR

Fengqi Cui was born in Heze (Shandong Province) on October 8, 1993. In 2016, she obtained her bachelor's diploma in Land Resource Management from the Shandong Agricultural University (China). In 2019, she obtained her Master's diploma in Geography (Natural Resources) from Beijing Normal University (China). In September 2019, Fengqi started her doctoral training in Geography at both CARTOGRAPHY & GIS of Ghent University and the Royal Meteorological Institute. Her research focuses on the influence of land use/land cover change (LUCC) on climate change (i.e. temperature, precipitation, etc.) using the regional climate model. Her study also aims at finding useful policies for mitigating urban heat islands and projecting urban heat islands under different global warming levels. On this topic, she has finished four papers as the first author and published three in Web-of-Science journals.