



Valuing urban green spaces in mitigating climate change: a city-wide estimate of aboveground carbon stored in urban green spaces of China's Capital

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Urban green spaces provide manifold environmental benefits and promote human well-being. Unfortunately, these services are largely undervalued, and the potential of urban areas themselves to mitigate future climate change has received little attention. In this study, we quantified and mapped city-wide aboveground carbon storage of urban green spaces in China's capital, Beijing, using field survey data of diameter at breast height (DBH) and tree height from 326 field survey plots, combined with satellite-derived vegetation index at a fine resolution of 6 m. As expected, carbon density tended to decrease with urban development intensity (UDI). Likely affected by vegetation cover proportion and configuration of green space patches, large differences presented between the 95th and 5th quantile carbon density for each UDI bin, showing great potential for carbon sequestration. However, the interquartile range of carbon density narrowed drastically when UDI reached 60%, signifying a threshold for greatly reduced carbon sequestration potentials for higher UDI. These findings suggested that urban green spaces have great potential to make contribution to mitigating against future climate change if we plan and design urban green spaces following the trajectory of high carbon density, but we should be aware that such potential will be very limited when the urban development reaches certain intensity threshold.