



## **Impacts of land use/land cover change on regional carbon dynamics: an investigation along an urban-to-rural gradient in Massachusetts, USA**

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More than half the world's population lives in cities, a fraction which is projected to increase over the next century. Land use and land cover changes associated with the urbanization process have important implications for vegetation and soil carbon cycling. The impact of urbanization on carbon dynamics is poorly understood, representing a major uncertainty in constraining regional carbon budgets. We initiated a suite of field measurements, remote sensing analyses, and modeling activities in order to investigate how urbanization alters carbon dynamics. We found that conversion of forest to urban land uses resulted in a decrease in overall biomass but a marked increase in productivity of the remaining vegetation. We also found that land use patterns had a profound impact on atmospheric carbon dioxide concentrations on daily, seasonal, and annual timescales. Our results suggest that urbanization has a profound impact on regional carbon dynamics that extends from the time of land use change out well into the future, and the trajectory of urban carbon exchange in the future strongly depends on development patterns.