



Eddy Covariance Flux Measurements of Carbon Dioxide in Urban Environments

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Increasingly the eddy covariance (EC) method is applied in urban environments to estimate the carbon exchange between cities and the atmosphere. The technique has many advantages over other methods to quantify CO₂ fluxes. It is a direct measure of the flux that includes all major and minor natural and anthropogenic sources and sinks, it is in situ, it is non-intrusive, it is quasi-continuous and with proper selection of the footprint can represent a large upwind extent similar to the size of a complete urban neighborhood. Hence, the EC method can be used to evaluate directly CO₂ emissions inventories in a way that is not possible with other indirect approaches such as inverse modeling. To date more than 30 EC systems have been deployed in urban environments, the majority in mid-latitude locations in the Northern hemisphere. Only 3 systems have been installed in (sub)tropical cities. Measurements from these sites show that the urban surface is a net source of CO₂, with vehicle exhaust and domestic heating as the major contributors while urban vegetation is not capable to offset the anthropogenic emissions. This presentation provides a review of urban measurements and discusses directions for future research.