

Tall tower eddy covariance for monitoring CO₂ emissions from the city of Vienna

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Cities are estimated to contribute over 70% of global energy-related carbon dioxide (CO₂) emissions and are therefore key to mitigating climate change. In Vienna, as in other cities, the efficacy of urban mitigation measures is gauged by examining interannual trends in official greenhouse gas (GHG) emissions inventories; however, these quantification methods are not without limitation. The CarboWien project, a collaboration between University of Natural Resources and Life Sciences, Vienna, the Environment Agency Austria and the telecommunications company A1 Telekom Austria AG, is currently investigating the potential of a tall tower eddy covariance station to support CO₂ emissions monitoring in Austria's capital city. In December 2017, an eddy covariance system was installed on a specially built mast on the top platform of the Arsenal radio tower in Vienna's third district. Unlike typical urban eddy covariance applications that provide neighbourhood scale net emissions estimates, the turbulent CO₂ fluxes measured here at 144 m above the ground are representative of net CO₂ emissions from much of the city area. Upscaled, annual net CO₂ emissions from the measurements for 2018 appear to be in good agreement with the latest official inventory estimates for the city. Furthermore, temporal variation in measured fluxes indicate expected dynamics in road traffic and space heating, both of which are significant contributors to Vienna's total production-based CO₂ emissions. Presentation of the first full year's measurement campaign will discuss potential of this monitoring station to support and improve official city emissions inventories and contribute to routine emissions monitoring in Vienna.