

Urban direct CO₂ flux measurement and its footprint analysis in Korea

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To quantify anthropogenic carbon dioxide emission to the atmosphere from canopy scale, urban CO₂ and heat fluxes were measured at Gwang-ju, Korea, using eddy covariance method. The measurements were performed at the rooftop of Gwangju city hall (~80 m AGL) to secure appropriate footprint of urban activities (e.g. Commuting, manufacturing, and land use changing). To ensure the suitableness of urban representative measurements of CO₂ emission, footprints were analyzed by two methods; by using ready-made commercial software, SmartfluxTM (LI-COR) and by using a home built codes based on Kormann and Meixner footprint model. The building height and the building-to-land ratio data for calculating roughness parameter were provided by National Geographic Information Institute. For calculating stability parameter, precipitation and vertical temperature distribution provided by Gwang-ju Korea Meteorological Administration and Weather Group of Republic of Korea Air Force were used. As a result, the mean urban CO₂ and mean sensible heat fluxes range from -1028umol/m²s to 1505umol/m²s and -390.2W/m² to 1702.8W/m² respectively from 11/01/2017 to 01/07/2018 measurement period where the footprint covers the activity or urban signature (e.g. Parking lot emission, car emission, and street tree). Detailed results of diurnal flux measurements and comparison between different footprint analyses will be present.