Temporal and Spatial Variations of Atmospheric CO$_2$ in Nanjing, China

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**Introduction**

- Urban areas are important sources of GHGs. Observational study on urban CO$_2$ concentration is an important step for quantifying its sources and sinks in urban landscapes.
- Urban areas occupy less than 3% of global total land area, but contribute more than 80% of global anthropogenic CO$_2$ emissions.
- In this study, we measured CO$_2$ in the city of Nanjing, China, using mobile and stationary sensors. Nanjing is the second largest city in East China, with a population of 5.11 million.

**Spatial transects**

We measured CO$_2$ concentrations along four major streets in the city. In the summer, CO$_2$ concentration on weekends was higher than on weekdays. The pattern was reversed in the winter.

**Instruments**

Five non-dispersive infrared CO$_2$/H$_2$O gas analyzers (model LI-840A, LI-COR, Inc., Lincoln, NE, USA) were used to measure atmospheric CO$_2$ concentration. They were put in home-made temperature-controlled enclosures with constant temperature of 43°C (± 0.3°C) to ensure measurement stability. In addition, a portable CO$_2$/CH$_4$/H$_2$O analyzer based on off-axis integrated cavity output spectroscopy (model 915-0011, Los Gatos Research, Mountain View, CA, USA) was used to make comparison.

**Stationary measurement at street-level**

We conducted street-level CO$_2$ measurements (June 2013 and January 2014) at six locations representative of six land use types: commercial, park, old residential, new residential, university campus and pedestrian plaza.

**Stationary measurement on tall buildings**

We are making measurements on the roof of 5 tall buildings (100-120 m tall) located in the north, east, south, west and middle of the Nanjing City. The data will be used with a box model to determine the spatial and temporal variations of the urban surface CO$_2$ source strength.