



Correlations between atmospheric fossil fuel derived CO₂ traced by $\Delta^{14}\text{C}$ and air quality index pollutants in Chinese cities

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Greenhouse gases are often co-emitted with air pollutants in cities. Little research involves the relationship between air pollutants and CO₂ derived from fossil fuel emissions (CO₂ff), the main contributor to the atmospheric CO₂ increasing. Here, we studied the correlations between atmospheric CO₂ff traced by $\Delta^{14}\text{C}$ and air quality index (AQI) pollutants in Chinese cities, and then traced indirectly the diurnal CO₂ff variations by AQI pollutants during certain days at urban sites in Beijing and Xiamen, China, based on the correlations obtained from the continually observations in one year. We found CO generally showed highest correlation coefficients among these AQI pollutants. CO tracer showed low normalized root-mean-square (NRMS) errors for samples with CO₂ff concentrations above 5 ppm. High CO₂ff concentrations often correspond to severe haze episodes and there are persistent positive correlations between CO₂ff and fine particulate (PM_{2.5}) concentrations. The slope of the regression line between PM_{2.5} and CO₂ff is, in part, a function of the type of fossil fuel utilized. The correlations might offer a new measure to understand urban PM_{2.5} pollution.