

Start of greenhouse gases and related tracer measurements at Tokyo Megacity

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Anthropogenic emissions of carbon dioxide (CO₂) are treated as a true value for estimations of natural source and sink. Thus uncertainties in these inventories are concerned for quantification of global carbon budget. To reduce the uncertainties in the inventories, high-precision measurements of atmospheric concentrations of CO₂ and tracers for detecting fossil fuel burnings such as carbon isotopes and oxygen are required in urban area as well as in background sites.

We built atmospheric observation facilities at Tokyo Skytree (TST), broadcasting tower located in the center of Tokyo, to monitor the greenhouse gases (GHGs) emissions from the most populous metropolitan in the world. At first, we started continuous in-situ measurement of CO₂ concentrations using Licor Li-840A in March 2016. The Li-840A was replaced by PICARRO G2401 for continuous in-situ measurements of CO₂, CH₄, and CO concentrations in January 2017. We also started continuous in-situ measurements of oxygen concentrations using Oxizilla in February 2017. Air samplings using 2.5L glass flasks have been performed since July 2016. The air samples were analyzed in NIES for concentrations of CO₂ (using NDIR), CH₄ and CO (GC-FID), N₂O and SF₆ (GC-ECD), ¹³CO₂ (MAT-252 and 253), and ¹⁴CO₂ (NIES-CAMS). Furthermore, we have a plan to install a radon analyzer at TST.

In this presentation we show the initial results obtained from the TST observations, including time series of CO₂, CH₄, CO, and O₂ concentrations and analysis of carbon isotopes and oxygen for partitioning of CO₂ emitted from biosphere and fossil fuel burnings.

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