

Short-term variations of N₂O and CO mixing ratios observed at suburb of Sendai from November to December 2016

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Nitrous oxide (N₂O) is one of the most important greenhouse gas, and carbon monoxide (CO) has a significant role in atmospheric chemistry through reactions with hydroxyl radical (OH) in the atmosphere. The both gases are released from anthropogenic and natural origins and should be monitored with high accuracy to understand their dynamics. Atmospheric N₂O and CO mixing ratios over Aoba-yama, suburb of Sendai, Japan had been observed from November to December 2016 by a continuous measurement system for N₂O and CO, that was a newly developed in Tohoku University using Off-Axis Integrated Cavity Output Spectroscopy (OA-ICOS). The baseline mixing ratios of N₂O and CO mixing ratios were ~331 ppb and ~150 ppb, respectively, during the measurement period. Further, short-term and sporadic increases of N₂O and CO were also frequently observed. By means of meteorological analyses including backward trajectory calculations, those short-term variations are interpreted as being affected by local emissions near the observation site in some cases, or by regional-scale transport of air masses in other cases. The overall tendency for trajectories suggests that air masses transported from northeast China have relatively low mixing ratios of N₂O and CO, while those from near Japan have relatively high mixing ratios of them.

Keywords: N₂O CO, trajectory analysis, transport, lower troposphere, northeast Asia