

## Working standard gas saving system for in-situ CO<sub>2</sub> and CH<sub>4</sub> measurements and calculation method for concentrations and uncertainty.

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Continuous measurements of CO<sub>2</sub> and CH<sub>4</sub> concentration have been carried out using a tower network in Siberia (JR-STATION: Japan-Russia Siberian Tall Tower Inland Observation Network) to study the spatial and temporal variations of CO<sub>2</sub> and CH<sub>4</sub> and estimate the distribution of the flux over this vast area (Sasakawa et al., 2010, 2012, 2013) where only a few atmospheric investigations had been made. Transport of working standard gases to remote sites is a significant issue. Thus, to reduce the consumption of the gases, Watai et al. (2010) developed a system that utilizes in-situ air as sub-working standard gas to track the baseline drift of an NDIR. The calibrations using the working standard gases were carried out twice a day. Watai et al. (2010) installed the system at the first tower site in West Siberia (Berezorechka). We modified the working gas saving system and further added a CH<sub>4</sub> sensor (Suto et al., 2010), then expanded the tower network. We evaluated the uncertainty of the concentrations obtained from this modified system. From the year of 2015, we installed a Cavity Ring-Down Spectroscopy (CRDS; Picarro inc.) at Karasevoe, Demyanskoe, and Noyabrsk. We thus validate the recent data with the data by the CRDSs.

### References

- Sasakawa, M. et al., *Tellus* **62B**, 403-416, 2010.  
Sasakawa, M. et al., *Tellus* **64B**, doi:10.3402/tellusb.v64i0.17514, 2012.  
Sasakawa, M. et al., *J. Geophys. Res.* **118**, 1-10, doi:10.1002/jgrd.50755, 2013.  
Suto, H. et al., *J. Atmos. Ocean. Tech.* **27**, 1175-1184, 2010.  
Watai, T. et al., *Atmos. Ocean. Tech.* **27**, 843-855, 2010.

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