

EGU2020-3218

<https://doi.org/10.5194/egusphere-egu2020-3218>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Studying the spatial and seasonal variability of greenhouse gases across West Siberia: large-scale mobile measurement campaigns of 2018-2019

Mikhail Arshinov, Boris Belan, Denis Davydov, Artem Kozlov, Alexander Fofonov, and Victoria Arshinova

V.E. Zuev Institute of Atmospheric Optics, SB RAS, Tomsk, Russian Federation (michael@iao.ru)

The continuous ground-based measurements of greenhouse gases carried out in Siberia in the past two decades allowed the long-term trends, as well as the diurnal and seasonal cycles of CO₂ and CH₄ to be derived for this poorly studied region (Belikov et al., 2019). To date, these in-situ observations are made at the joint Japan-Russia Siberian Tall Tower Inland Observation Network (JR-STATION) consisted of 6 automated stations that should be maintained several times per year. In late October to early November 2018, we have undertaken the first mobile campaign to derive a distribution of CO₂ and CH₄ concentrations at high spatial resolution while traveling to the sites of the above network. For that, we used a commercially available GHG CRDS analyzer (G4301, Picarro Inc., Santa Clara, CA, USA) installed in an off-road vehicle (Arshinov et al., 2019). Over one trip, the instrument were driven over 7000 km throughout the study area.

In March, June, August, and October 2019 we have performed four more campaigns along the same route. This enabled the seasonal pattern of CO₂ and CH₄ concentrations to be obtained over a huge area of West Siberia between 54.5° and 63.2° north latitude and between 62.3° and 85.0° east longitude, as well as to reveal a large- and small-scale spatial heterogeneity in CH₄ mixing ratios particularly over wetland regions. We plan to continue mobile campaigns to cover interannual variations.

This work was supported by the Ministry of Science and Higher Education of the Russian Federation under State Contract No. 14.616.21.0104 (ID No RFMEFI61618X0104).

Belikov, D.; Arshinov, M.; Belan, B.; Davydov, D.; Fofonov, A.; Sasakawa, M.; Machida, T. Analysis of the Diurnal, Weekly, and Seasonal Cycles and Annual Trends in Atmospheric CO₂ and CH₄ at Tower Network in Siberia from 2005 to 2016. *Atmosphere* 2019, 10, 689.

Arshinov, M.Yu.; Belan B.D.; Davydov D.K.; Kozlov A.V., Fofonov A.V., and Arshinova V. Heterogeneity of the spatial distribution of CO₂ and CH₄ concentrations in the atmospheric surface layer over West Siberia: October-November 2018, Proc. SPIE 11208, 25th International Symposium on Atmospheric and Ocean Optics: Atmospheric Physics, 1120831 (18

December 2019);<https://doi.org/10.1117/12.2539205>