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Sources of atmospheric methane in Arctic: observations and model simulation

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The second most important greenhouse gas in atmosphere after carbon dioxide (CO₂) is methane, CH₄. The limited data of surface methane observations in Arctic makes it difficult to quantify the impact of methane emissions from major regional anthropogenic and biogenic sources on this region. This gap is partially filled by long-term observations at arctic and subarctic stations. According to these observations, since 2005, there has been a noticeable increase in the surface methane concentration. The reasons of this increase are still not fully understood. This work provides quantitative estimates of possible contribution into surface CH₄ observed long-term variability from the most important regional sources of methane emissions.

To analyze variations in surface methane concentration was used the data from observations at background monitoring stations, as well as numerical calculations performed by GEOS-Chem chemical-transport model, which is widely used in international community for calculating the fields of chemically active and greenhouse gases.