

Analysis of Siberian CH₄ flux during 1994-2010 Analysis of Siberian CH₄ flux during 1994-2010

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A vast Siberian forest area and the largest West Siberian wetland area in the world play a significant role in the global carbon cycle as a large carbon sink and a major natural source of atmospheric CH₄. Moreover the high Siberian Arctic land areas containing thick permafrost layers with carbon rich soils could release high CO₂ and CH₄ emissions thawing under a warmer climate. In this study, we estimate monthly CH₄ fluxes for 43 regions including 4 regions over Siberia during 1994-2010 using a fixed-lag Kalman smoother and investigate the year-to-year variation of Siberian CH₄ flux to understand climate-induced changes in Siberian CH₄ flux and the significance of Siberia on year-to-year variation of global CH₄ budget. Continuous and event measurement data of atmospheric CH₄ taken from WDCGG are inverted to optimize CH₄ fluxes in this study. Airborne observations of CH₄ at three sites over Siberia are used to adjust the magnitude of Siberian CH₄ flux with inverse modeling: at Surgut over wetlands and at Novosibirsk and Yakutsk over forests. We use interannually varying CH₄ emissions and interannually repeating OH, Cl and O₁D radicals provided by TransCom-CH₄ project (Patra et al., 2011) in forward simulation by NIES transport model (Belikov et al., 2011).

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