

Comparison analysis of CH₄ estimations from biophysical modeling, satellite measurement and inventory data in Siberian natural wetland

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Abstract: Being one of the most important ecosystems, wetlands are presumed to be a source of natural methane emission besides anthropogenic activities. Methane emission always influenced by many reasons or environment conditions and it has complicate variation. For methane estimation, there are three kinds of approaches used in scientific research that are bottom-up approach, top-down approach and inventory approach. Bottom-up approach is kind of measurement rely on monitoring instrument and ground surface indicators such as temperature, soil moisture, wind speed and so on. Top-down approach is detecting the atmosphere trace gases by satellite from the space. In this study, the bottom-up approaches include biophysical modeling of CH₄ derived from Moderate Resolution Imaging Spectroradiometer (MODIS); the top-down approaches include atmospheric concentration measurements from Scanning Imaging Absorption spectroMeter for Atmospheric CHartography (SCIAMACHY) and Greenhouse gases Observing SATellite (GOSAT); the inventory data is from World Data Centre for Greenhouse Gases (WDCGG), which is one of the WDCs under the World Meteorological Organization (WMO) Global Atmosphere Watch (GAW) programme.

The objective of this study is to compare the modeling methane estimations with other several estimations. Firstly, using biophysical model estimate methane emissions of wetland in object area by MODIS. Secondly, doing comparison analysis with SCIAMACHY, GOSAT and WDCGG dataset.

Since global warming, the arctic ice melting provides more water coverage thus more anaerobic environment created and leads more methane flux. More NDVI represent more methane emission in growing season also. By gradually increasing trend of wetland, the expecting result of methane emission should increase.

Keyword : methane emission, SCIAMACHY, GOSAT, WDCGG