Global carbon cycle estimates in GOSAT/GOSAT-2 projects

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Greenhouse gases Observing SATellite (GOSAT) has been monitoring atmospheric column carbon dioxide (XCO_2) and methane (XCH_4) concentrations from space since its launch in January 2009. The primary goal of GOSAT project is to successfully estimate global carbon budget on subcontinental scales using spatiotemporal distribution of XCO_2 and XCH_4. GOSAT observations have provided the basis for assessments of the values of space-based measurements of CO_2 and CH_4 concentrations. Additionally, GOSAT-2 which is the successor of GOSAT is scheduled for launch in the end of 2018. GOSAT-2 aims to monitor spatiotemporal distribution of greenhouse gases with higher level of accuracy and to improve the number of available observation data. This work summarizes GOSAT level 4 products on global CO_2 and CH_4 flux estimates based on an inversion system and the benefit of GOSAT observations for the study of global carbon cycle. We also introduce a new inversion system which is under construction as GOSAT-2 level 4 system; atmospheric transport and inverse models, a biospheric model using variability of solar-induced chlorophyll fluorescence by GOSAT observations, and a high resolution bottom-up anthropogenic emission inventory.

Keywords: global carbon cycle, satellite observation, GOSAT