

## Methane emission trends of China in 2009-2018 induced by atmospheric observations

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The reduction of methane emissions of China causes great interest as its significant increase in the last decade. Accuracy quantification of methane budgets of China plays a critical role in implementing national mitigation strategies. In this study, we present top-down estimates of methane emissions of China from 2009-2018 deduced from atmospheric inversions using the high-resolution ( $0.1^\circ \times 0.1^\circ$ ) global inverse model NIES-TM-FLEXPART-VAR. Surface observations, GOSAT retrieval, and a combination of surface observations and GOSAT are used to constrain inversions and the results are compared. Prior fluxes contained the latest Emission Database for Global Atmospheric Research (EDGAR v5) emissions, augmented by biomass burning emissions from the Global Fire Assimilation System (GFASv1.2) and wetland emissions from the Vegetation Integrative Simulator for Trace Gases (VISIT) model. The estimated results are further analyzed for a ten-year period and two five-year periods, which can serve as an independent evaluation of the coming global stock under the Paris Agreement.

Keywords: GOSAT, methane emissions, China, high-resolution inverse model