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Poster
It has been shown that atmospheric inverse models benefit from satellite retrievals for constraining global and regional greenhouse gas (GHG) budgets. Due to their spatial coverage, they have advantage over surface in-situ observations for the estimation of GHG fluxes in regions with a limited in-situ observation network, such as Tropics. However, assimilation of the satellite data has been challenging as both transport model and retrieval errors need to be taken into account. For methane (CH4), several studies showed large discrepancies between modelled and retrieved values, even after the flux estimates are optimised based on surface observations. Possible explanations lay in the upper atmosphere. Model may not be able to estimate stratospheric profiles well due to e.g. limited number of model layers, incorrect distribution of the stratospheric sinks, and insufficient parametrization of troposphere-stratosphere exchange. For the satellite data, it is challenging to accurately retrieve the shape of the prior profiles over the stratosphere, especially at high latitudes.

In this study, we use the JAXA/EORC's GOSAT partial column retrievals of CH4 (v2.0) in CTE-CH4 atmospheric inverse model for estimation of global and regional CH4 budgets. The preliminary comparison to the inversion constrained by the surface in situ data showed good agreement on global total CH4 budgets when lower tropospheric data are assimilated. However, the latitudinal budgets showed that the GOSAT inversion estimated higher emissions in the southern hemispheric extratropical regions with much larger month-to-month fluctuations and seasonal cycle amplitudes compared to the surface inversion. Although further evaluation of the results are needed, the results show potentials that the partial column data have advantage over total column data in constraining CH4 fluxes using the atmospheric inverse models.
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