

## Observations of atmospheric CH<sub>4</sub> enhancements due to anthropogenic emissions by the GOSAT-2 satellite.

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We present early results of applying the observational data by the Greenhouse gases Observing SATellite-2 (GOSAT-2) to the detection of the local anthropogenic methane emissions signatures in the total column-averaged concentrations of atmospheric methane around the globe. We use the column-averaged methane observations data retrieved with NIES Level 2 algorithms v01.03 (with proxy algorithm) and v01.04 (with full physics algorithm). To relate the observations to the EDGAR anthropogenic methane emission inventory in various regions, we extract localized emission anomalies from column-averaged methane observations (XCH<sub>4</sub>) by GOSAT-2 satellite using high-resolution atmospheric transport model simulations made with FLEXPART model, that match the size of the satellite observation footprint. XCH<sub>4</sub> enhancement due to anthropogenic emissions is estimated as the difference between polluted observations from surrounding cleaner observations after categorizing the observations with model simulations. To reduce the impact of the observation error we apply binning the observations over large region according to model-simulated enhancements. We found that the local enhancements observed by GOSAT-2 and retrieved with both algorithms scale linearly with inventory-based simulations of XCH<sub>4</sub> for the globe, confirming good potential for using GOSAT-2 observations for quantification of the methane emissions.

Keywords: methane emission inventory, anthropogenic emission, GOSAT-2