Satellite remote sensing of methane from GOSAT to TROPOMI measurements

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Methane is the second most important greenhouse gas after carbon dioxide and it is one of the essential climate variables, which are needed to measure and to understand current and future climate change. For this purpose, satellite-based multi-decadal climate information products are needed at regional and global scales. To meet this need, ESA will launch in 2016 the Sentinel-5 Precursor mission with the TROPOMI spectrometer as its single payload to monitor the atmospheric composition for air quality and climate monitoring. Followed by ESA's Senitinel-5 mission, we envisage a 25 year continuous data set of methane till the year 2045. One of the mission's key products is the global distribution of methane total column density, which will be freely available for the scientific community. For TROPOMI, huge amounts of data need to be processed with unprecedented speed and precision. For this end, we have developed the retrieval algorithm, RemoTeC, which has heritage from methane and carbon dioxide retrievals from the GOSAT satellite. In this presentation we will present the algorithm, the data product and its potential use, supported by examples of 10 years of experience with the interpretation of GOSAT measurements. Additionally, we will touch on validation strategies and new experimental data products like methane column retrievals over cloudy ocean pixels.