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## **Global and regional methane budget and its inter-annual variability**

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Methane global concentration has more than doubled since the pre-industrial times. This increase is generally caused by the anthropogenic activities like the massive use and extraction of fossil fuel, rice paddies agriculture and emissions from landfills.

Space observations are very useful to monitor and quantify methane concentration in the atmosphere, in order to improve our knowledge of its sources, sinks, transport and trends.

Since 2002 global methane total-columns mixing ratios from the SCanning Imaging Absorption spectroMeter for Atmospheric ChartographY (SCIAMACHY) on board ENVISAT was the first space-borne sensitive to methane in the boundary layer. However the communication with the instrument was lost in April 2012.

Since January 2009 methane columns retrievals have been available also from the Thermal And Near Infrared Sensor for carbon Observations-Fourier Transform Spectrometer (TANSO-FTS), on-board the GOSAT satellite.

In this study, we used measurements in the short wave infrared radiation (SWIR) from TANSO-FTS covering 5 years, from January 2010 to December 2014 to estimate global methane fluxes by inverse modeling, using the PYVAR-LMDZ model. We present here the results of global and regional methane budget, and its inter-annual variability during this period.