

The vertical profiles and its variations of methane at Poker flat observed by ground-based FTIR spectrometer

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Abundance of methane has increased in long term, but no growth in 2000-2006. In this paper, we report variations of the vertical profiles of methane observed from 2004 to 2010 at Poker Flat, Alaska.

In the terrestrial atmosphere, methane is thought as the second important greenhouse gas, because its global warming potential is 21 times of CO₂. Methane is primarily produced by the anthropogenic activity, i.e., ruminants of cattle, paddy fields, natural gases, and biomass burning. They cause 70 percent of total methane emissions. Natural emissions occur from wetlands, termites and so on.

According to IPCC AR4, methane abundance is reported to increase from the Industrial Revolution, from 800ppb to 1900ppb. However, it show little change in 2000- 2006. Its origin is still not established.

We are analyzing the vertical profiles of methane and its seasonal and annual variations based on the FTIR (Fourier Transform Infrared Spectrometer) observation from 2004 to 2010 at Poker Flat, Alaska. The observed spectra are fitted by the program SFIT2 using Rodgers Optimal Estimation Method (OEM). Five microwindows between 2600 and 3000 cm⁻¹ are used for this retrieval. In this paper, we will present the seasonal and annual variations at several altitudes. It will be validated by the methane data obtained by ACE-FTS (2003-) or MIPAS (ENVISAT, 2002-) spacecraft measurements in same term.

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