

3.144 Temporal variations of the mole fraction and carbon isotope ratio of atmospheric methane observed at Ny-Ålesund, Svalbard.

Presenting Author:

Shinji Morimoto, Graduate School of Science, Tohoku University, Sendai 980-8578 Japan, mon@tohoku.ac.jp

Co-Authors:

Ryo Fujita, Graduate School of Science, Tohoku University, Sendai 980-8578 Japan

Shuji Aoki, Graduate School of Science, Tohoku University, Sendai 980-8578 Japan

Daisuke Goto, National Institute of Polar Research, Tachikawa 190-8518 Japan

Takakiyo Nakazawa, Graduate School of Science, Tohoku University, Sendai 980-8578 Japan

Abstract:

CH₄ is one of the most important gases for the atmospheric greenhouse effect and the atmospheric chemistry. To contribute to a better prediction of future climate change, great efforts have been conducted for characterizing variations in the CH₄ sources and sinks and their response to climate variability. The stable carbon isotope of atmospheric CH₄ (d¹³C relative to V-PDB) provides us with additional constraints for understanding the CH₄ cycle, since the respective source categories, microbial, fossil fuel and biomass burning, have their own characteristic d¹³C values of ~-60, ~-40 and ~-25‰. However, systematic and long-term observation data of d¹³C are still limited. We have measured the CH₄ mole fraction and d¹³C using air samples collected weekly at Ny-Ålesund, Svalbard (78°55'N, 11°56'E) since 1991 and 1996, respectively. In this paper, we will present temporal variations of the CH₄ mole fraction and d¹³C at the site and discuss the causes of the atmospheric CH₄ variations based on the d¹³C data.