

MIS023-14

Room:303

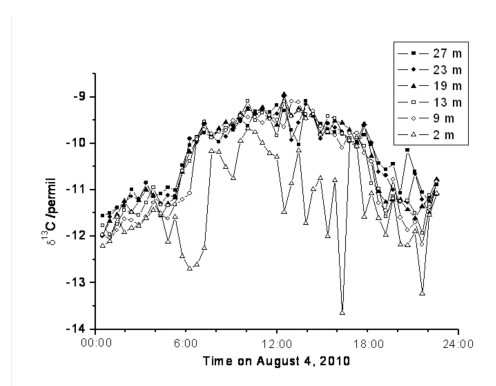
Time:May 22 15:00-15:15

Real time, continuous measurements of CO₂ and H₂O isotopes in the forest using laser absorption spectrometers

Ryuichi Wada^{1*}, Masahiro Takemura¹, Mai Ouchi¹, Tomoki Nakayama¹, Yutaka Matsumi¹, Satoru Takanashi², Yuichiro Nakai², Kenzo Kitamura², Naoyuki Kurita³, Yasushi Fujiyoshi⁴, Kenichiro Muramoto⁵, Tetsuya Hiyama⁶, Gen Inoue⁶, Naomi Kodama⁷, Takashi Nakano⁸

¹STE laboratory, Nagoya Univ., ²FFPRI, ³JAMSTEC, ⁴Inst. Low Temp. Sci., Hokkaido Univ., ⁵College of Sci. and Eng., Kanazawa Univ., ⁶Research Inst. For Humanity and Nature, ⁷National Inst. for Agro-Environ. Sci., ⁸Yamanashi Inst. of Environ. Sci.

Measurements of CO₂ and H₂O isotope compositions are very powerful methods for investigating the carbon and water cycles. We had been deployed in the red-pine forest at the foot of Mt. Fuji for 10 days from the end of July, 2010 and had successfully measured CO₂ and H₂O isotopologues (¹⁶O¹²C¹⁶O, ¹⁶O¹³C¹⁶O and ¹⁸O¹²C¹⁶O for CO₂, D₂O and H₂¹⁸O for H₂O) using infrared absorption laser spectrometers (Aerodyne Inc. for CO₂ and Los Gatos Research Inc. for H₂O). The CO₂ isotope laser spectrometer can measure the isotope ratios (delta¹³C, delta¹⁸O) of ambient air CO₂ in 10-second integration time with a precision of 0.1 permil in real-time. The height of the observation tower is 30 m. Air was sampled every 260 seconds from six vertical height locations from above the forest canopy to 2 m above the ground. The total interval time was 30 minutes including measurements of standard gases for the calibration. The 30-minutes interval measurements of the CO₂ and H₂O isotope ratios were repeated continuously during the 10 days. The figure shows observed data for carbon isotopic composition of CO₂, delta¹³C, determined by the laser absorption spectrometer in one cycle (30 minutes) from 00:00 August 4, 2010. We will discuss the details of the observation result at the meeting.



Keywords: CO₂ isotopes, H₂O isotopes, forest, laser spectroscopy, ecosystem, atmospheric CO₂