

Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

©2011. Japan Geoscience Union. All Rights Reserved.



AAS021-P02

Room:Convention Hall

Time:May 23 16:15-18:45

Development of the precise measurement of carbon dioxide in the atmosphere with optical spectrum analyzer

Satoshi Kusakari^{1*}

¹Solar-Terrestrial Environment Laboratory

Carbon dioxide (CO₂) is a greenhouse gas which is most significant effect on the global warming, and therefore, it is necessary to reveal the distribution and variation of CO₂ precisely to understand the mechanism of the global warming. Around 20 high-resolution Fourier transform Infra-Red spectrometers (FTIRs), which are one of the instruments provided an accurate measurement of CO₂ column-averaged mixing ratio (XCO₂), have been operated all over the world. However, it is difficult to extend a measurement site with a high-resolution FTIR due to its cost and size. For more extended measurements of XCO₂, a compact and portable instrument with considerable measurement accuracy is highly desired. For this purpose, we have newly developed an instrument measuring XCO₂ by using an Optical Spectrum Analyzer (OSA). The instrument measures a CO₂ absorption spectrum of the sunlight in a 1.6 μ m band. The sunlight is guided to the OSA through an optical fiber from a solar tracker. The absorption spectrum from 1.569 to 1.576 μ m with a resolution of 0.07 nm is measured. The number of sampling points is 5001, and a scan time is 135 seconds. Continuous measurements of XCO₂ are carried out automatically by using a PC running with LabVIEW programs. In this presentation, we show the details of the instrument and measurement results, and will discuss a possible improvement of measurement accuracy.

Keywords: carbon dioxide, precise measurement, optical spectrum analyzer