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 μm 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 μm 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