Measuring Isotope Ratios Using Tunable Diode Laser Absorption Spectroscopy. (A03-sargent094718-Oral)

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Abstract:

The TGA100 tunable diode laser trace gas analyzer was originally developed by Edwards, Kidd, and Thurtell at the University of Guelph to make low-noise trace gas concentration measurements. It has been adapted to make high accuracy measurements of carbon dioxide isotopic ratios. The TGA100 operating system software has been enhanced to measure two gases at the same time using jump-scan modulation. The analyzer has been modified to purge the space between the laser and the sample cell with nitrogen, to avoid absorption by the high ambient level of carbon dioxide. A temperature controller and additional insulation have been added to reduce measurement errors caused by diurnal temperature changes. The optical alignment and the parameter settings have been optimized for best accuracy rather than lowest noise. These adaptations, along with an automated sampling system configured for frequent two-point calibration, allow the TGA100 to make continuous, unattended measurements of carbon dioxide isotopic ratios.

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