

In-situ Measurements of $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ of Dissolved CO_2 using an Underwater Mass Spectrometer

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We present here novel high-resolution measurements of stable isotopic ratios of dissolved CO_2 ($\delta^{13}\text{C}$ and $\delta^{18}\text{O}$) calculated from an underwater mass spectrometer. The isotopic composition of dissolved CO_2 can be diagnostic of the gas source and may enable identification of leaks around oil and gas sites. We show that current underwater mass spectrometers are able to measure masses 44, 45, and 46 in sufficiently high resolution to enable precise *in-situ* measurements of CO_2 isotopes in deionized water. There are also possible interferences at masses 45 and 46 in seawater, and their effects on our stable isotope calculations. We present data from both laboratory studies of CO_2 dissolved in seawater and measurements taken in the Gulf of Mexico with very high depth resolution. A high-resolution record of dissolved CO_2 isotopes would further our understanding of the oceanic carbon cycle and pave the way for *in-situ* isotopic measurements of other species of interest such as methane and ethane.