

## Study on analytical methods for hydrogen and oxygen isotopes in water samples

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The stable isotopes of hydrogen and oxygen ( $\delta^2\text{H}$  and  $\delta^{18}\text{O}$ ) are excellent tracers for studies on the natural water cycle. New analytical techniques for stable isotope ratio measurements have become popular over the past decade. These techniques include mass spectrometry with online or continuous flow apparatus for sample introduction, and non-mass spectrometry using laser spectroscopy. Analyze the composition of hydrogen in water sample adopting four analytical methods, including the chromium-reduction method,  $\text{H}_2$ - $\text{H}_2\text{O}$  equilibration using platinum as a catalyst, laser-based stable isotope measurement, and high-temperature conversion /elemental analysis-isotope ratio mass spectrometry (HTC). The  $\delta^{18}\text{O}$  value was determined primarily by the classic the  $\text{CO}_2$ - $\text{H}_2\text{O}$  equilibration method, Laser Spectroscopy, and high-temperature conversion /elemental analysis (HTC). Upon comparing with those methods, it revealed a larger deviation using the HTC method for determining the  $\delta^{18}\text{O}$  isotope value, this method was not sufficiently accurate to determine  $\delta^{18}\text{O}$  values. The obtained  $\delta$ -values also had no significant dependence on the analyser type. The results of the laser water isotope analysers and mass spectrometers were within the acceptable range of uncertainties.

[1] Stephen T. 2000. *Rapid commun. Mass spectrum*, **14**:1044-1046