

## Influence of $^{17}\text{O}$ correction parameters on calculation and calibration of $\Delta_{47}$

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The measurement of carbonate clumped isotope compositions ( $\Delta_{47}$  values) requires the application of  $^{17}\text{O}$  corrections. When these measurements were originally developed a decade ago, the recommended parameterization for  $^{17}\text{O}$  corrections was based on Santrock et al. [1] and/or Gonfiantini et al.[2] (*e.g.*, in the calculation of  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  by Isodat 3.0 on Thermo 253 mass spectrometers; in algorithms for the calculation of  $\Delta_{47}$  presented in Huntington et al., 2009 [3]). In 2010 a new set of recommendations were released (Brand et al.[4]). Using model data and re-analysis of a suite of samples and equilibrated water standards, we show that this change can significantly affect the computed  $\Delta_{47}$  values of some samples. One consequence is that samples that have the same  $\delta_{47}$  values and the same true  $\Delta_{47}$  values (*i.e.*, equilibrated at the same temperature), but different  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  values, can produce calculated  $\Delta_{47}$  values that are offset by up to 30 per meg simply by shifting from one  $^{17}\text{O}$  correction to another. The sensitivity to  $^{17}\text{O}$  correction is systematic and varies with  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  of both sample and working reference gas. We discuss how this manifests both in the analysis of individual samples as well as in the generation of equilibrated gases and heated gases, with the potential to influence absolute reference frame calibrations (Dennis et al.,[5]).

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