

**Recent advances in carbonate
clumped isotope thermometry:
towards high-resolution paleoclimate
reconstructions from marine
sediments**

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Carbonate clumped isotope thermometry is a very promising tool for many applications in geosciences. Its application in paleoclimatology and paleoceanography, however, has been limited by the large samples sizes required by traditional measurement methods (3-10 mg for one analysis), the complex methodology, and contrasting temperature calibrations which add considerable uncertainty in climate reconstructions. A first step towards the application of clumped isotopes in paleoclimatology has been the demonstration that high precision measurements are also possible with repeated measurement of aliquots of only 100 µg [1]. We present the latest improvements in small sample analysis, using the LIDI protocol [2] and demonstrate that it is possible to obtain measurements with errors better than $\pm 3^\circ\text{C}$ (at the 95% CI) with only 1.4 mg of carbonate and that discrepancies in calibrations can be solved if proper error propagation is applied to published calibrations. Finally, we show that with these improvements in analytical protocols and a novel statistical data analysis it is possible to produce robust high resolution reconstructions of glacial interglacial temperature changes from marine sediments.

[1] Meckler et al. (2014) *Rapid Comm. Mass. Spec.* 28, 1705-1715 [2] Müller et al. (in press) *Rapid Comm. Mass. Spec.*