



## **Effects of detrital material on stable oxygen and carbon isotopes of carbonates from the varved interglacial sequence of the Piànico palaeolake**

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Stable isotope analysis of endogenic calcite from lake sediments is a valuable tool for reconstructing climatic and environmental changes. Commonly, bulk carbonates are analysed but such samples might be contaminated with detrital carbonate from the catchment, which carries a completely different environmental signal. This is demonstrated in a case study of the long, varved interglacial lake deposit of Piànico (400 ka BP). Microscopic information on the mineralogy and depositional processes of the sediments has been used to select samples for isotope analysis. Following this procedure three different types of samples are distinguished: (a) purely endogenic calcite varves (five varves per sample), (b) exclusively detrital layers containing mainly dolomite originating from the catchment and (c) 'mixed' samples of five calcite varves including 1 - 4 sub-millimetric detrital layers.

Detrital material can be easily discriminated from endogenic calcite by its distinctly more positive  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  values. Consequently, mixed samples also show positive isotope shifts depending on the portion of detrital matter included. Already when the amount of detrital carbonate exceeds  $\sim 20\%$ , the shift in oxygen isotope is  $>1$  per mil which might lead to over-estimate palaeotemperatures. We compare the complete high-resolution stable isotope data set from a 16,000 varve year interval of the Piànico Interglacial (southern Alps) with the same but reduced data set from which all samples that contain detrital layers were excluded. The results are discussed with respect to palaeoclimatic interpretation. The comparison of the two data sets further shows that

detrital material also affects covariance between  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$ . Covariance is high when the correlation coefficient is calculated on the base of all samples but low when only samples of pure endogenic calcite are considered.