

Lecture Abstract:

**Petrography of Speleothems: What every speleothem researcher should
know, but almost no one cares to know**

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This talk could also be entitled: the tyranny of O isotope ratios in speleothem research. For "historical" reasons, most speleothem-based palaeoclimate research has focused on stable isotope ratios, and, in particular, the O isotope ratio as indicator of temperature? rainfall? moisture provenance? amount effect?

Recently, other chemical (including isotope) proxies have become necessary complements to the palaeoclimate research because, as yet, there are uncertainties in the interpretation of the O isotope ratio data.

Rather unfortunately, thousands of quantitative data series on speleothems are, however, not tied to the essence of the material where the data are extracted, namely, the carbonate (or other phases). Little is known about crystallization pathways, replacement processes, and fabrics as a whole, given the (wrong) assumption, that calcite is the first and only phase which formed when no aragonite is present, and that the mechanisms of nucleation and growth are irrelevant. This assumption is, most probably, wrong and bears serious consequences, such as on dating issues, or on "disequilibrium" fractionation or partitioning.

Here, I will, therefore, present:

1. A brief Introduction on petrography of speleothems;
2. A brief overview of its potential as a climate proxy in itself;
3. Examples where petrography served to test the significance of other climate proxies and examples where the lack of petrographic observations led to equivocal and, in some cases, dubious results.

The conclusions will tackle the issue of where petrography should go next and provide hints for the subsequent discussion.

This talk will also include a workshop on speleothem petrography.

Students are encouraged to bring thin sections (if microscopes are available) and/or images of thin sections as power point which can be projected for discussion. Students who choose to bring up their samples for discussion should also provide available information on the cave where samples have been collected and regional context, also, data on the geologic framework for the cave and, if possible, retrieve information on host rocks.

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