

Lecture Abstract:

## SIMS and other high resolution techniques in speleothem research

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Analyses of  $\delta^{18}\text{O}$  of speleothems at the 10 micron scale by ion microprobe combined with confocal laser fluorescence microscopy (CLFM) imaging, allows for the study of sub-domains of speleothem individual annual growth bands. The large data set obtained by these methods provides new constraints for interpreting climate change at the sub-annual scale. The high-resolution analytical methods are ideal for examining the nature and mechanism of seasonal rainfall and drip water variability during rapid climate change events (e.g., deglaciation) as well as seasonal climate differences between broad time slices (e.g., Younger Dryas vs. Holocene). Combined with LA ICP MS analyses, the mechanism of incorporation and seasonal input of trace elements can be determined, which enables modeling and characterization of the specific hydrological conditions above the cave. Studies of the seasonal characteristics on time slices such as: the present-day, the early and late Holocene, the Younger Dryas and the last glacial in the Soreq cave in the Eastern Mediterranean region are of major importance for understanding the response of humans to abrupt climate changes (Ayalon et al., 1998; Bar-Matthews and Ayalon, 2011; Kolodny et al., 2003; Orland et al., 2009; 2012).

### References:

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