Goldschmidt 2026 Abstract
https://doi.org/10.46427/gold2026.37143

From authigenesis to diagenesis: insights from carbonate *in-situ* U-Pb-Th

PERACH NURIEL

Dept. of Earth Sciences, University of Geneva

Carbonates are important archives for many geological processes. Their occurrences as primary or secondary phases in the rock, through diagenetic process, or as autogenic product, are crucial for our interpretation of these geological archives. To date, much of our understanding of diagenesis and authigenesis is based on petrography and textural examinations and on geochemical and isotope analyses of various proxies for alteration. In this talk I will provide some insights from *in-situ* U-Pb and U-Th analyses (LA-(MC)-ICPMS) of various carbonate precipitates, including Microcodium, Melanopsis shells, oncoids, stromatolites, lake deposit, travertine, and speleothems. The *in-situ* analyses of carbonates of both biogenic and inorganic origins suggest that obtained ages, in most systems, reflect the timing of phase formation by either a complete replacement (dissolution and reprecipitation), authigenic precipitation (*e.g.,* cementation), or overgrowth. While partial replacement, post-formation alteration, and detrital contribution are evident in many systems, the *in-situ* dating approach, combined with cathodoluminescence petrography, can resolve these complexities and potentially provide an important tool for evaluating open vs. closed system behavior. Such observations may change the interpretation of these carbonate archives.