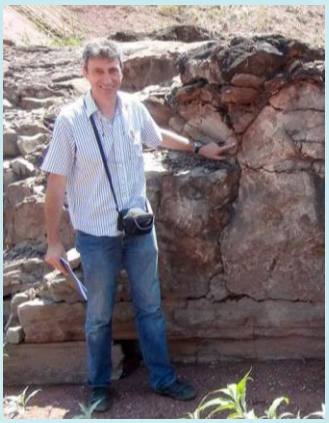
Academic Lecture

Title: The KALKOWSKY Project: How Petrographic Observations Change Our View of Ooids



Speaker: Prof. Bruno Granier

Affiliation: University of Western Brittany, France

Time: April 17 (Fri), 14:30

Venue: Lecture Hall, 2nd Floor, Library

Speaker Bio:

Bruno Granier is a professor at the University of Western Brittany (France) and an internationally recognized expert in carbonate sedimentology and micropaleontology. His research spans from the Paleozoic to the Cenozoic, focusing on carbonate platform evolution, diagenesis, and biomineralization processes.

Abstract:

Ooids were traditionally described in textbooks as simple concentrically coated grains formed by physico-chemical precipitation under agitated conditions. However, a growing body of observations challenges this oversimplified view. Based on several recent studies, this contribution demonstrates that ooids are complex structures whose growth, internal fabrics, and diagenetic evolution are frequently misinterpreted.

Revisiting the early insights of Kalkowsky, who first recognized the relationship between ooids and stromatolites, we show that these structures represent end-members of a continuum of microbial carbonates sharing a dual organic – mineral nature. The role of organic matter, particularly extracellular polymeric substances (EPS), is central in controlling mineral precipitation and fabric development, as illustrated by asymmetric ooids displaying uneven cortical growth.

Several commonly reported ooid types are re-evaluated. "Wobbly" ooids are introduced as a distinct category of eccentric coated grains, clearly differentiated from previously described forms. In contrast, so-called "distorted ooids" are shown not to result from grain deformation, but from the collapse of oomolds or biomolds during mechanical compaction of early cemented frameworks. Similarly, broken ooids cannot be explained by mechanical impacts, hypersalinity, or desiccation; instead, their development is closely linked to radial cortical fabrics and involves centripetal fracture propagation.

Finally, the validity of "bimineralic" ooids is questioned. Evidence suggests that many such features result from differential diagenetic alteration of originally high-Mg calcite cortices, likely controlled by variations in organic content and oxidation.

Altogether, these results indicate that ooids are not simple abiotic grains but components of dynamic bio-mineral systems. This calls for a reassessment of traditional models and highlights that key aspects of ooid formation and evolution remain absent from standard textbook descriptions.