



Thursday 7 May 2026

4 pm (Rome time) - Aula Fratianni, *Dip. Scienze della Terra, Torino*  
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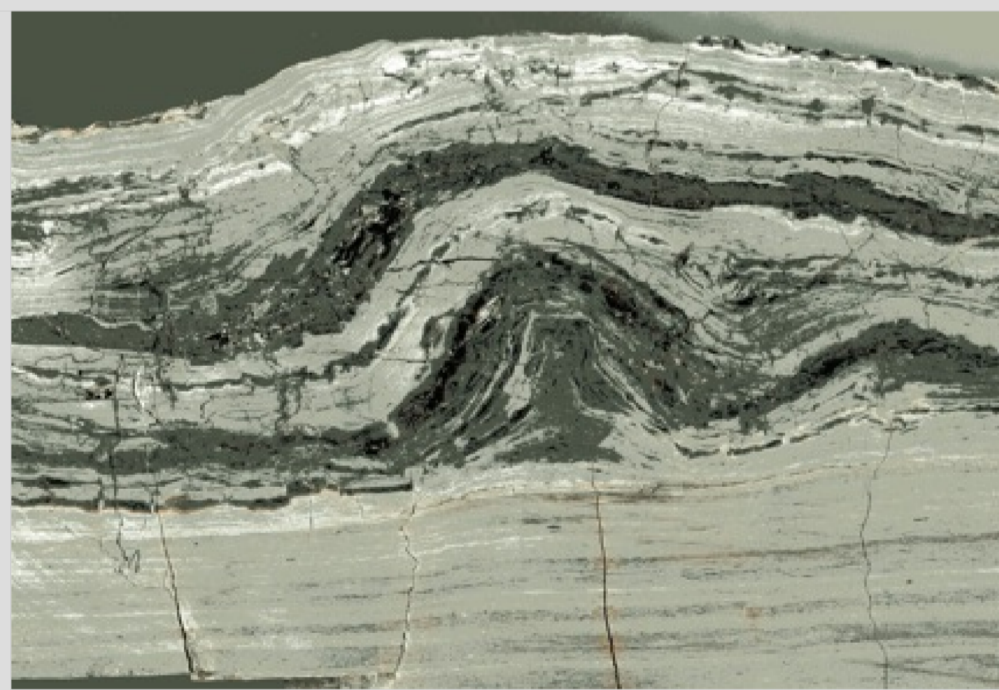
# The Monterey Formation of California: a natural laboratory of sedimentology, paleoceanography, diagenesis and structural deformation

***Prof. Richard J. Behl***

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The Miocene Monterey Formation is the primary source rock and an important reservoir of petroleum in California. It is also an unmatched archive of paleoenvironmental data as its deposition spans the Miocene Climatic Optimum and the Miocene Climatic transition. It is an important reservoir of organic carbon, potentially large enough to have influenced the global transition from greenhouse to icehouse conditions. Because of its excellent and widespread exposures and abundant sub-surface penetrations, the Monterey serves as a laboratory for understanding the sedimentology, stratigraphy, diagenesis and deformational styles of siliceous/ diatomaceous sediments around the globe.

Biogenic silica from diatoms and radiolarians undergoes dramatic and surprising diagenetic transformations after deposition that influence rock properties, reservoir potential and styles of structural deformation. The porosity of siliceous sediments decreases in abrupt steps with the transformation of opal-A to opal-CT to quartz, but the pore sizes and structures undergo an unexpected progression starting with large inter- and intraparticle pores in diatomaceous sediment, followed by much smaller, partially isolated nanopores in opal-CT phase rocks, then larger, more connected equidimensional micropores in quartz phase rocks. Hardness also increases with each diagenetic step and the overall decrease in porosity, but within any one diagenetic stage or burial depth, hardness increases with diagenetic silica content and increased porosity. Contrasting lithologic composition from the bed-scale to member-scale results in distinct styles and mechanisms of deformation. Within a contractive regime, diatomaceous sediment horizontally compacts and develops widely spaced, penetrative fault or fracture sets that cross primary stratification. Diagenetic enhancement of bedding in the opal-CT and quartz phases produces a highly contrasting mechanical stratigraphy prone to bed-confined fractures, detachment faulting and fault- and breccia-related folding.



## The Speaker

Richard Behl is a marine sedimentologist, Professor Emeritus at CSULB (USA). Most of his work focuses on the wonderfully complex Miocene Monterey Formation of California and the spectacular Quaternary record of Santa Barbara Basin. Overall, his research is tied together by trying to unravel the tectonic, climatic, and oceanographic evolution of the California Margin and the Pacific Ocean. In particular, his research focuses on the sedimentology and paleoceanography of continental margins and deep-sea upwelling zones, and the diagenesis of siliceous sediments and other authigenic minerals associated with organic-rich sediments.

