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Deciphering Spring-related from Nearshore Carbonates in Lacustrine Settings - Lessons from Searles Lake, CA

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Summary

Pleistocene lacustrine carbonates of the Searles Valley are composed of nearshore/marginal microbial buildups and spectacular carbonate mounds, known as the “Trona Pinnacles”. They developed in a hypersaline and alkaline lacustrine system during a period characterized by rapid high-frequency climate changes leading to its evaporation.

The formation of the pinnacles is closely related to the occurrence of sublacustrine springs which introduced Ca-rich fluids in alkaline lake waters. Recent studies evidenced that water was still outflowing in the buildups during dry stage as subaerial deposits have been preserved in cavities of the pinnacles. In contrast to those mounds, the nearshore microbial buildups received less attention in the literature. Those deposits were formed in shallow lacustrine settings facing important detrital supplies.

The objectives of this study are: 1) to propose a depositional model both for the pinnacles and nearshore buildups; 2) to define processes driving carbonate production in such lacustrine settings; 3) to highlight the links between the development of the carbonate factories and the geodynamic and climatic evolution of the basin.