4-23-1999

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SELF-ORGANIZING MODELS OF SHALLOW-WATER CARBONATE ACCUMULATION
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Carbonate stratigraphy has until now been analyzed largely through a combination of field observations and simple one- and two-dimensional forward models of deposition. This research demonstrates the ability of a three-dimensional cellular model of shallow-water carbonate deposition to generate both vertical and spatial stratigraphic patterns, that are mathematically and geometrically similar to those encountered in natural systems. By changing the rules of connection between cells across the model grid, using a simple linking algorithm, bi-lithologic stratigraphic simulations produce results that capture the characteristics of modern and ancient carbonate depositional systems, and display self-organizational behavior.