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Halokinetic Induced Topographic Controls on Sediment Routing in Salt-Bearing Basins: A Combined Physical and Numerical Modeling Approach

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Abstract

Allogenic controls are frequently cited as key factors influencing basin evolution; however, fewer studies perform paleo-topographic reconstructions to examine the impact of topography in the development of stratigraphic sequences. Disentangling how allogenic versus autogenic controls affect the stratigraphic succession within a basin affected by salt tectonics is particularly challenging because decoupling the stratigraphic signature of lithospheric induced uplift and subsidence from salt tectonics is not a trivial exercise. We tackle this problem by integrating physical modeling results with a landscape numerical model and compare results with a case scenario from the subsurface. The physical model provides surface displacement data that are then used as inputs into the landscape numerical model to simulate the surface and stratigraphic evolution of a salt tectonic basin during a 25-m.y. timespan and within the context of a continental-scale source-to-sink (S2S) system. Results show that the evolution of salt structures impact the development and diversion of sedimentary routing systems within salt basins, thus

influencing the character of the stratigraphic record independently of allogenic factors such as lithospheric induced uplift. Modeling results highlight the importance of reconstructing the paleo-topography of ancient depositional systems affected by salt tectonics to truly understand the nature of the final stratigraphic record.

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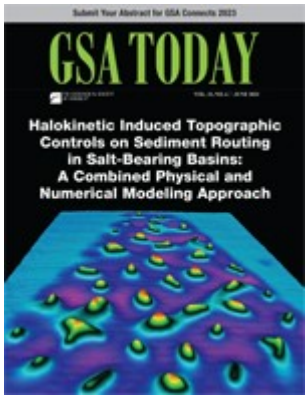

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