



Deformation of competent lithologies interbedded with salt in rifted margins: Insights from analogue models and comparison with case studies

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Abstract

The Layered Evaporite Sequences (LES) are common in saline units (i.e., Airi Fm. and Zechstein Gp.) and usually can be found in extensional basins (i.e., Santos Basin and Southern Permian Basin). The rising interest in the energy transition has increased the study of salt bodies, because they are promising storage sites for different energy carriers, such as H₂ or CO₂. To ensure the quality of these repositories, it is important to understand and determine the internal deformation of the LES, because the stringers present critical affections on the stability and impermeability of the salt geological storage. To characterise the LES, the quality of the seismic data is often not good enough, and therefore, other techniques, such as analogue and numerical modelling are used. In this MSc, a systematic analogue modelling program of half-graben basement extensional faulting (thick-skinned), with a pre-kinematic LES is presented. We investigate how the different layering configurations of the LES control the kinematic evolution and the structures that are formed, as well as how the intra-salt layer acts. The results show, that when an intra-salt layer is implemented, its vertical location influences the velocity of the salt flow, the way these layers deform and the structures that are formed. Finally, a comparison of analogue models with natural case studies provides insights into how structures reported by several authors relate to the kinematic evolution of the intra-salt layers within salt-bearing half-graben basins.

Keywords: layered evaporite sequence (LES), stringers, salt flow and half-graben basin.

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