

# Interplay of 3D base-salt relief on the suprasalt deformation in salt bearing passive margin: An analogue modelling approach

Author: Manel Ramos Grau<sup>1,2,3</sup> | Tutors: Oriol Ferrer<sup>1,2</sup> Leonardo M. Pichel<sup>4</sup>

<sup>1</sup>Institut de Recerca UB-Geomodels, Universitat de Barcelona (UB), Barcelona, Spain

<sup>2</sup>Departament de Ciències de la Terra i de l'Oceà, Facultat de Ciències de la Terra, Universitat de Barcelona (UB), Barcelona, Spain

<sup>3</sup>Departament de Geologia, Facultat de Ciències, Universitat Autònoma de Barcelona (UAB), Bellaterra, Spain

<sup>4</sup>Department of Earth Science, University of Bergen (UiB), Bergen, Norway

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- 3D base-salt relief
- Analogue modelling
- Suprasalt deformation
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- West Africa passive margin

## ABSTRACT

Understanding the complex interplay of 3D base-salt relief on the suprasalt deformation in salt bearing passive margin is crucial for comprehending the dynamics of rifted margins. In this study, we present a comprehensive analysis of a model representing a salt-bearing rifted margin to investigate the influence variability and deformation characteristics of a base-salt relief.

The model analysis reveals significant along-strike variability in initial salt thickness, salt basin geometry, and rifted margin architecture. Proximal deformation is primarily focused on the necking crustal domain and is characterized by gravity-driven extension with normal faults and rollovers. Mid-margin deformation is associated with substantial seaward salt flow and overburden translation over variable base-salt relief, resulting in multiphase, hybrid diapirs, closed anticlines, and minibasins. Distal deformation is characterized by downdip shortening, diapirs, associated minibasins, salt inflation and salt extrusion across the hyperextended crust domain.

These findings enhance our understanding of the complex dynamics of base-salt relief and salt tectonics in salt-bearing rifted margins. The comprehensive DIC and 3D voxel model provides valuable insights into the deformation characteristics and lateral variability of structures, shedding light on the intricate relationship between rifted margin architecture, salt deposition, and subsequent post-rift salt tectonics. Such knowledge is crucial for accurately interpreting and predicting the behaviour of salt-bearing rifted margins worldwide, ultimately aiding in geological and hydrocarbon exploration efforts or gas storage.