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Reconstruction of Salt Tectonics: Insights from the Mid North Sea High

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Abstract

The North Sea is a complex rift system that has undergone a polyphase evolutionary history from the Palaeozoic to Recent, including the deposition, and subsequent mobilisation of Upper Permian Zechstein salt. This halokinesis has played an integral role in the geologic evolution of the North Sea, controlling the present-day structural style. The driving mechanisms and kinematics of salt deformation have gained widespread interest partly due to the potential role of salt in hydrocarbon systems, and also due to its potential uses for nuclear waste disposal. However, the primary driving mechanism for salt-related deformation in the North Sea is debated. Here, we focus on the Mid-North Sea High (MNSH), an area of the North Sea in which salt-related deformation is widespread. We interpret open access data made available by United Kingdom Oil and Gas Authority (OGA) including 2D seismic reflection, gravity, magnetic and well data in Petrel, followed by forward modeling and restoration in the MOVE software. The results show that, the style of salt-related deformation in the MNSH region is highly variable, with the influence of local stratigraphy, as well as basement structures, also contributing to the deformation style.

Keywords: Salt tectonics, Halokinesis, North Sea, Mid North Sea High