Analogue and numerical modelling of salt supply to a diapiric structure rising above an active basement fault

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Abstract

Salt diapirs preferably rise above basement faults in extensional basins. A series of analogue and numerical models were developed in order to assess the supply of salt from the footwall and hanging wall to a diapir and to study the influence of basin inversion on the diapir development. The modelling scenario was based on the Kłodawa Salt Structure evolution (central Poland). The experiments show that the ductile material derived from the footwall constitutes the dominant portion of the diapir developed due to model extension, and this material occurs both in the footwall and hanging wall parts of the diapir. Shortening of the analogue models resulted in thinning of the diapir and shifting its stem onto the footwall. Ductile material become redistributed inside the diapir, however footwall material still prevails in the diapir structure. Results from the numerical models show that the magnitude of the basement fault governs the amount of salt supply to a diapir across the fault and that there is a differential salt supply from the hanging wall and footwall with time.