# Geomechanical modeling of mudrock stress-level dependency

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## ABSTRACT

We implement stress-level dependency into our evolutionary models through the constitutive model SR3KH. SR3KH is based on experimental measurements on R-GoM EI material and can account for material anisotropy (yield-surface rotation) and degradation of frictional resistance. We show that when we incorporate this fundamentally different material behavior into mudrock description, we predict different stress distribution and weaker sediments. In drained uniaxial deposition, stress dependency predicts a stress ratio that increases with depth and leads to a higher least principal stress than the original model (SR3). We also model the rise of a salt wall (Figs 1, 2). Friction angle in basin sediments decreases with depth as well as near the source-layer weld, where mean stress increases (*Talk 6.21*) (Fig. 1). Stress-level dependency predicts higher porosity and a more uniform stress state near salt. However, sediments are weaker and closer to failure, because of the decrease in frictional strength (Fig. 2). Overall, incorporating this experimentally observed material behavior improves stress prediction and leads to more accurate geomechanical models.

**CLICK ON IMAGE FOR LARGER VIEW**

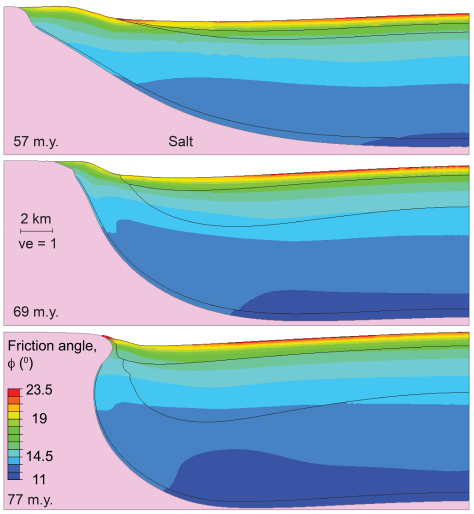



**Figure 1**: Accounting for stress-level dependency predicts a friction angle in basin sediments that decreases with depth as well as near the source-layer weld, where mean stress increases.

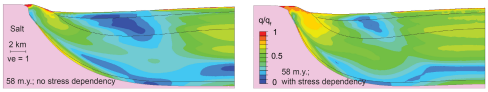
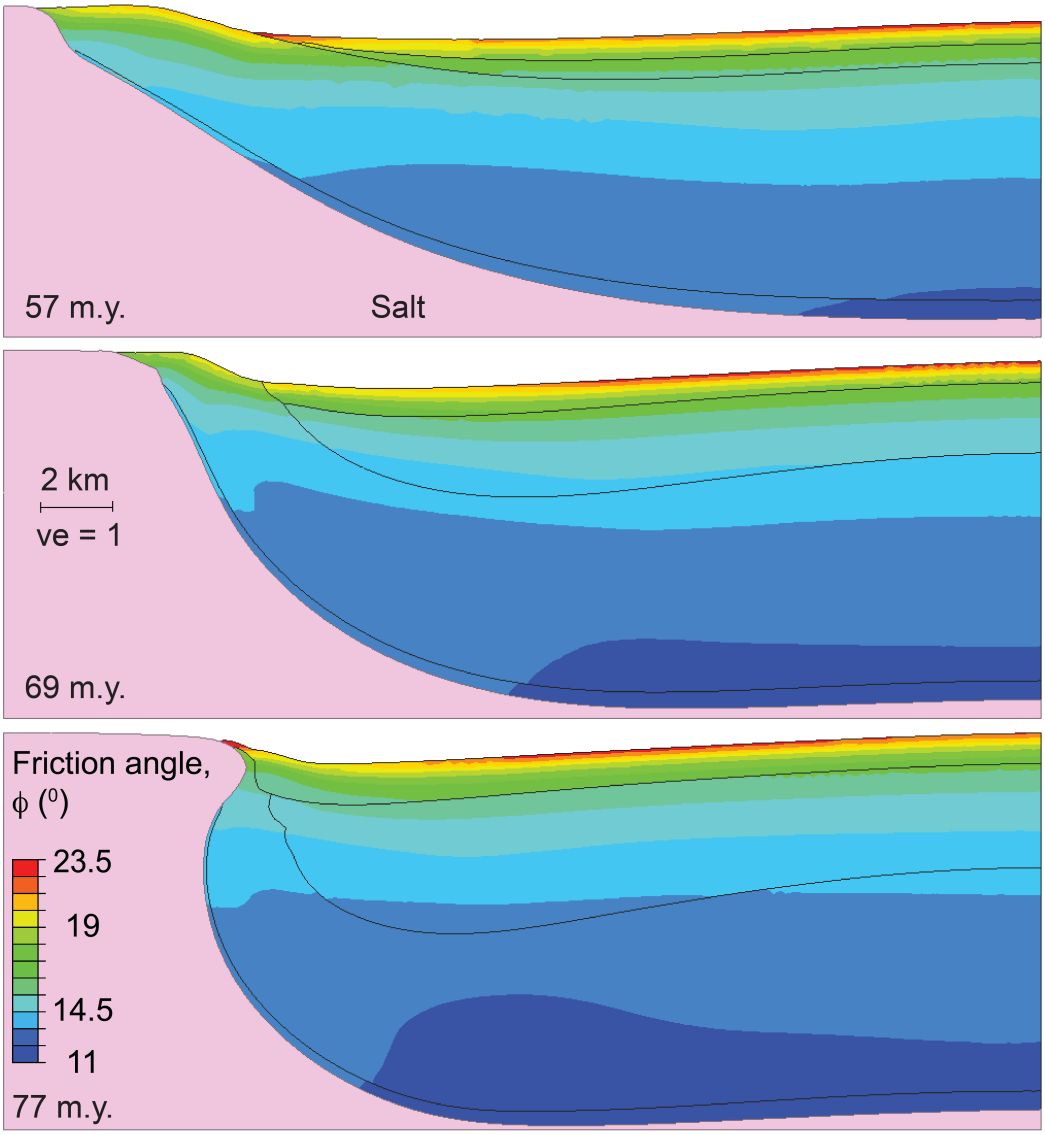



**Figure 2**: Stress-level dependency (right) predicts that sediments near salt are weaker than in the original model (left), and closer to failure. This is because of the decrease in frictional strength (Fig. 1).

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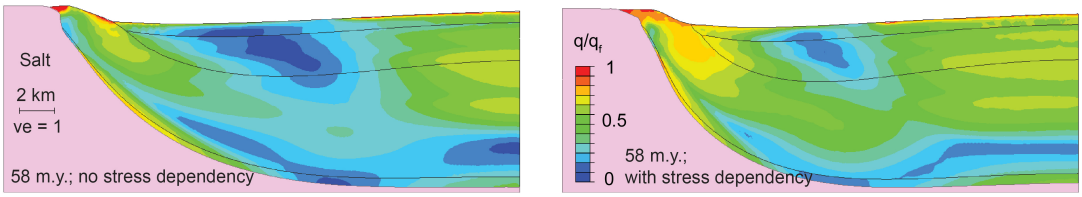


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