21. 3D static analysis of pore pressure and stresses around a salt dome in Green Canyon 955

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ABSTRACT

We integrate 3D seismic interpretation and velocities with 3D geomechanical modeling to estimate pore pressure and stresses around a salt dome in Green Canyon 955, Gulf of Mexico (Fig. 1). Following the Full-Effective-Stress method, we use the geomechanical model to estimate total stresses and the interval seismic velocity to estimate effective stresses, and calculate pore pressure as the difference between total and effective stresses. We compare pore pressure and minimum stresses predicted by the 3D model along a transect of the dome to those predicted by 2D-axisymmetric and 1D (standard) models and show that the 3D model predicts significantly different appropriate mud weights for drilling wellbores subsalt (Fig. 2).

CLICK ON IMAGE FOR LARGER VIEW

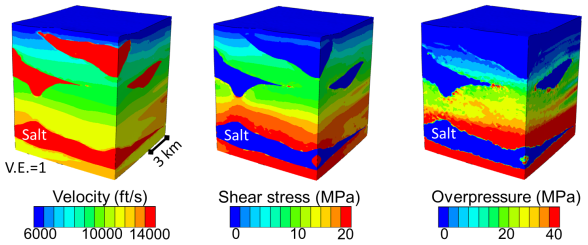


Fig. 1: Pore pressure prediction over a seismic cube around a salt dome. Seismic velocity is used in conjunction with total stresses from a 3D geomechanical model to predict pore pressure.

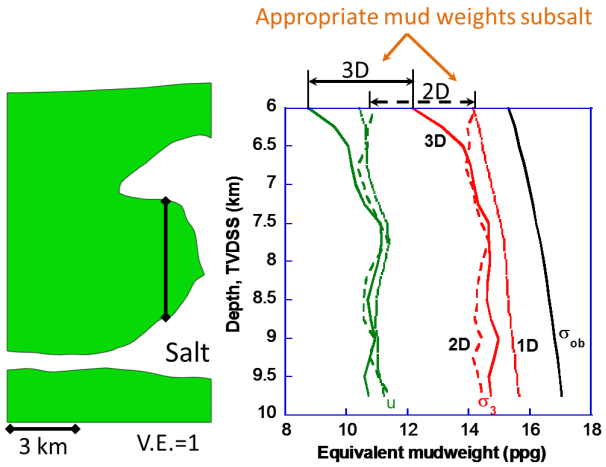
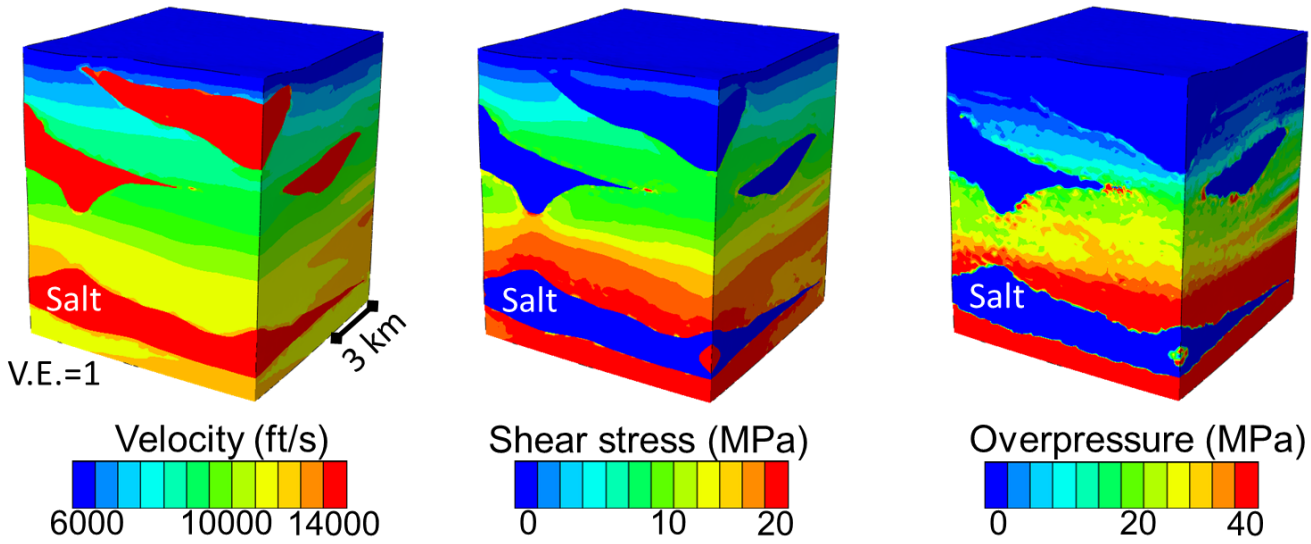


Fig. 2: Pore pressure and minimum stress along a vertical profile near salt as predicted by the standard (1D) method and the Full-Effective-Stress method using 2D-axisymmetric and 3D geomechanical models. The 3D model predicts significantly different appropriate mud weights for drilling wellbores subsalt.



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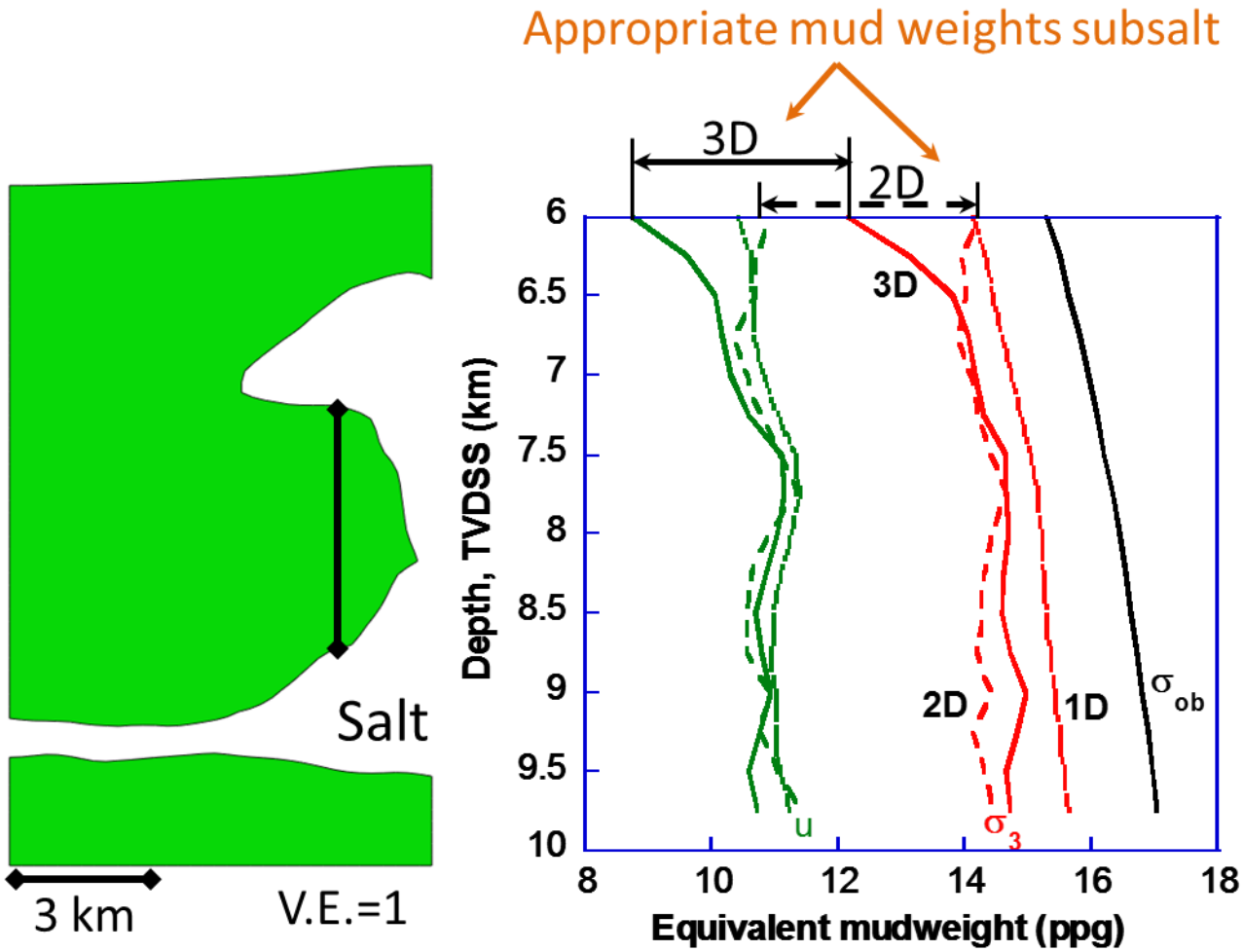

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