

08.11: Integrated Approach to Pressure Prediction at Mad Dog, Gulf of Mexico

Landon Lockhart, The University of Texas at Austin

ABSTRACT

I apply our workflow to predict pressure that integrates geomechanical modeling, a critical state model, and wellbore data. I illustrate this workflow at the Mad Dog Field, which is associated with an allochthonous salt body. Because of the loading from the salt, the stresses are not uniaxial. To account for this, I develop a relationship between velocity and an equivalent effective stress at the control well using iso-velocity lines (Figure 1). I then apply our calibrated velocity-stress relationships to other wells to demonstrate how our workflow improves pressure prediction in areas where mean and shear stress are different than those measured from the control well (Figure 2).

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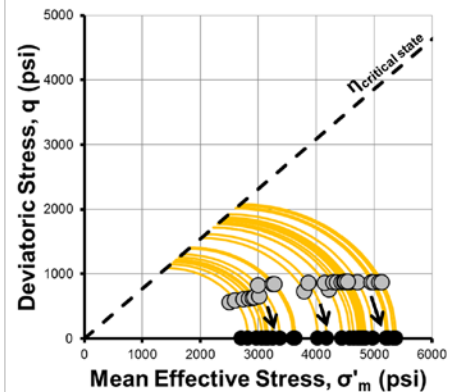


Fig 1: Figure showing the conversion of mean effective stress (gray) to equivalent effective stress (black) using iso-velocity lines (orange) from calibration measurements.

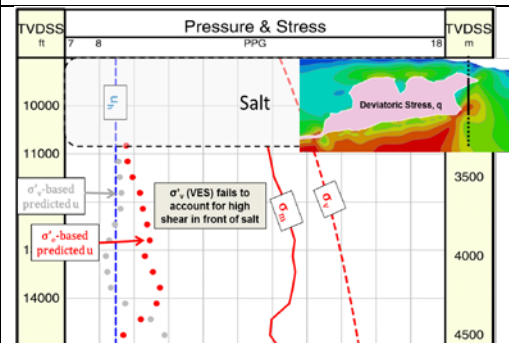


Fig 2: Figure showing mean- and shear-induced pore pressure, unaccounted for by VES workflow.

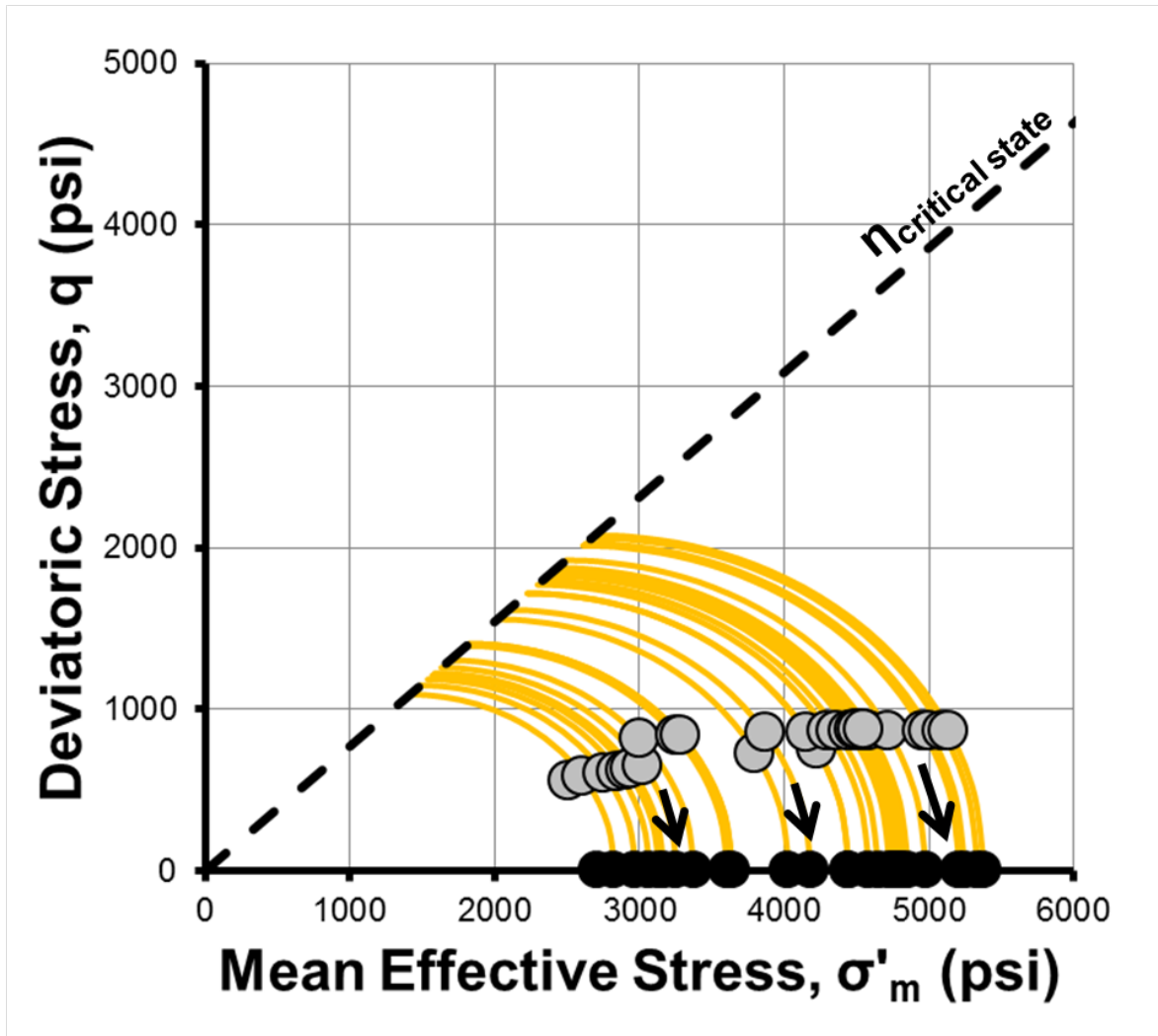


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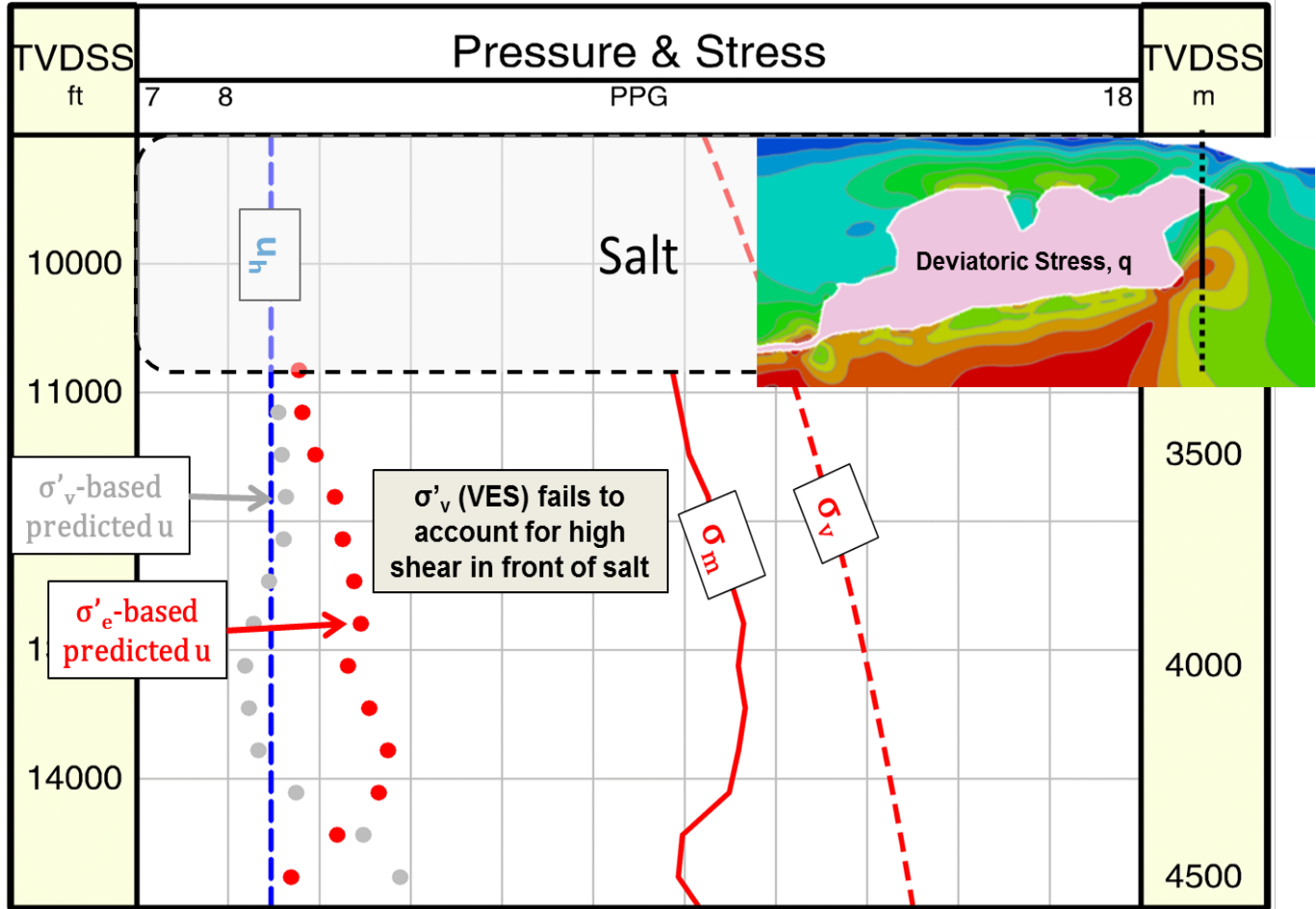


Fig. 2: Figure showing mean- and shear-induced pore pressure, unaccounted for by VES workflow.

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