

Pore pressure within dipping aquifers in overpressured basins

Gao, B.¹, Flemings, P.¹

baiyuan@utexas.edu

1. Jackson School of Geosciences, The University of Texas at Austin, Austin, TX

We first use forward modeling to study how mudstone permeability controls the pore pressure in sand bodies. We show that when dipping aquifers are surrounded by constant permeability mudstone, the pore pressure of the sandstone equals the pore pressure of the mudstone at the midpoint. In contrast, when the permeability is a function of stress, the pore pressure in the sandstone equals the pore pressure in the mudstone at a higher depth. The reason for this is that mudstone is more compressed and has lower permeability at the down-dip end of the structure. As a result, less of the higher pressures present at deep depth contribute to the sandstone pressure. We then present an approach to predict the reservoir pore pressure if the mudstone properties are known. This static model successfully predicts in-situ pressure in reservoirs and results in a centroid depth approximately 1/3 the depth of the structure. This study also further the understanding of regional fluid field within sedimentary basins and the control of large scale of stratigraphy and material properties on subsurface pressures.

Keywords: overpressure prediction, permeability, basin modeling