

Missing Puzzles in Tight Reservoirs Sweet Spots Jigsaw: Geomechanics Challenges

Abdelwahab Noufal¹

¹ADNOC

ABSTRACT

Created reservoir, drilling and completion engineers simulation models to understand wellbore stability, sand production, fracturing or casing failure issues, require knowledge of geomechanics rocks properties. Reviewing shortcomings of conventional and unconventional geomechanics modeling based on cores and well's data integration, will reduce the cost and impact the drilling, completion and stimulation. Many studies employed incorrect geomechanical workflows fail to address important challenges. A review of several case studies revealed the importance of the quality checking of standard rock geomechanical modeling results. These enhanced data acquisition and integration workflows enable the generation of more realistic geomechanical models and in turn better well and reservoir management decisions. This talk gives an overview of the geomechanics challenges and presents some case studies and field applications of these challenges.

Operators are escaping from facing the challenges that affect the cost, as for example the wellbore stability cost the Gulf countries millions of USD yearly. Data Auditing and Quality checking is the corner stone for a valid analytical protocol including the samples preparation according to stringent specifications in terms of shape, size, and homogeneity. Testing conditions rely on these specifications to allow results be used for calibration. Integration of RMT (Rock Mechanics Testing) and well logs for mechanical properties represent a main challenge due to discrete measurements of strength tests run on plugs that lacks core volume representation; size of data sets, resolution scales and upscaling. Data compatibility in terms of differences between in-situ (i.e. borehole and reservoir conditions) and laboratory conditions.

High-resolution continuous profiles of these rock properties used to estimate mechanical properties and their correlation with the mineralogical composition, and mapping geomechanical facies for further calibration with reservoir models. Repeatability is an importance factor, in comparing the model results at one location with offset wells are not luxury and not a better to have, but should be moved to must column.