

Simulation of Microseismic Deformation During Hydraulic Fracturing

S.C. Maxwell¹ and X. Weng¹

¹*Schlumberger*

Abstract

Modeled geomechanical deformation associated with hydraulic fracture stimulation of a complex hydraulic fracture provides context for interpretation of microseismic deformation. Partitioning of modeled strains into shear and dilatational components allows relative comparison of the appropriate displacement mode with observed cumulative microseismic moments. A workflow is described where the input parameters of the simulation are varied to match both the footprint and deformation of the microseismicity, which then results in an estimate of the complete fracture network volume and proppant placement. In this way the effective stimulated volume can be assessed and used as input to a reservoir simulation to investigate well performance and reservoir drainage.