Zhao, X. P., J.M. Reyes-Montes, and R.P. Young. (2012) The role of pre-existing fracturing in enhanced reservoir treatments. ***The 46th US Rock Mechanics/Geomechanics Symposium*****, Chicago, USA.**

The role of pre-existing fracturing in enhanced reservoir treatments

Abstract

Hydraulic fracturing methods for reservoir treatment are applied to increasingly complex environments including naturally or previously fractured reservoirs. The potential interaction with the in-situ fracture network or with fracturing induced in previous treatments plays a crucial role in the outcome of the stimulation, controlling the extent and geometry of the paths of enhanced fluid migration. Passive microseismic (MS) monitoring can provide an imaging of the effect of hydraulic treatments and an indication of the relative role of pre-existing fractures in the development of the fracture network. Further insights into the mechanisms of the induced fracturing is provided by the use of Synthetic Rock Mass (SRM) numerical models that reproduce the nature of the rock and the stress conditions imposed by the engineering. The rock mass is reproduced by an assembly of bonded particles with an embedded Discrete Fracture Network (DFN) to represent joints, faults or other pre-existing fractures. This study presents the analysis of the microseismicity induced during the treatment of a pre-fractured reservoir. The observations are compared with the results from tests on SRM samples that are subjected to the same fluid disturbance applied in the field, with a suite of DFN to reproduce potential in-situ fracturing scenarios. The combination of microseismic observations with the suite of SRM models will allow an interpretation of the fracture mechanism and its relation with the reservoir pre-existing fracturing. This combined approach provides field engineers with a unique tool for the design, monitoring and optimization of reservoir treatments

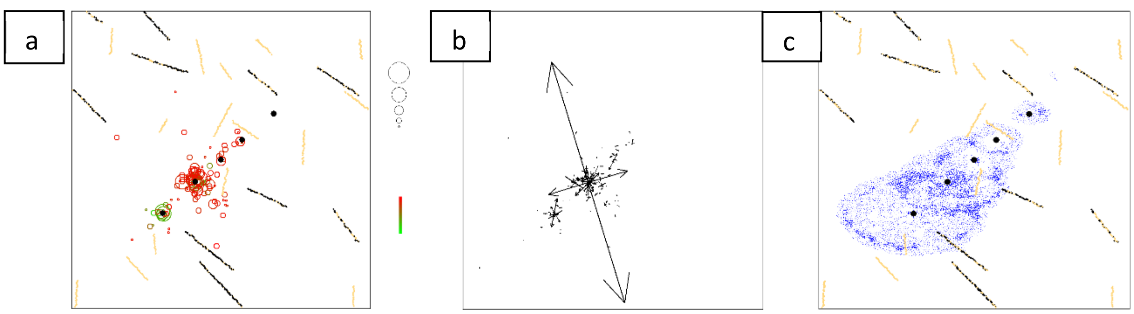

Figure: *Modeling results of fluid injection in SRM-1. The dimension of each subfigure is 2 km × 2 km. The superposed black/orange lines represent healed/open fractures, respectively. (a) Synthetic MS events (color scaled to time, with green corresponding to earlier and red to later events). (b) Moment tensors corresponding to (a). (c) Fluid pressure.*

Website: https://www.onepetro.org/conference-paper/ARMA-2012-647

Please contact us (info@microseismic.net) for the details of the paper.