

Abstract

Extensive work has been done in the recent years involving use of conventional and passive seismic data for fracture characterization. This is particularly the case with unconventional reservoirs such as shale gas, shale oil and geothermal fields. The purpose of our study is to combine the benefits of conventional seismic data that provides relatively higher resolution reservoir characteristics with the relatively low resolution property estimates available from inversion of micro-earthquake data. Given the lower cost of the latter, we propose a cost effective dynamic reservoir characterization approach using a self- sustaining evaluation framework. The resulting time lapse fracture characterization technique is most suitable for those developments which involve the use of low cost passive seismic data acquisition arrays for reservoir monitoring. Our proposed method should allow for optimal use of microseismic data generated as part of passive seismic arrays common in unconventional field developments and thereby provide time lapse reservoir property predictions without having to carry out relatively expensive 4D seismic surveys.