Geophysical Research Abstracts
Vol. 20, EGU2018-16919, 2018
EGU General Assembly 2018

Fault related frequency anomalies: geometric controls from seismic forward modelling

Simon Oldfield, Douglas Paton, Emma Bramham, and Taija Torvela

University of Leeds, Institute of Applied Geoscience, School of Earth and Environment, Leeds, United Kingdom (s.j.oldfield@leeds.ac.uk)

Faulting affects the seismic response in a variety of manners. Geometric attributes such as curvature and coherency greatly assist interpretation of fault networks. Trace attributes such as amplitude and frequency commonly exhibit anomalous responses associated with faults however are less diagnostic.

Using seismic forward modelling we demonstrate that frequency anomalies comparable to those observed in real data may be generated using a simple normal fault geometry. No variation in fluid or solid phase composition or fault-related deformation is required.

Spatial variation of these anomalies across the fault plane indicate that fault response may vary without inferring associated compositional or structural change. This implies that methods seeking to identify uniform fault characteristics to assist interpretation are flawed even in the case of simple faults if juxtaposition is present.

Basic modelling methods demonstrate that the spatial variance is predictable. As such, the response should be considered in attempt to isolate fault-deformation or fault-composition responses. This may form the basis of a tool to advance such observations and refine the fault interpretation process.