

# THE PROPAGATION, GROWTH, AND TERMINATION OF POLYGONAL FAULT SYSTEMS

**James King**

*University of Oxford, Earth Sciences, Oxford, United Kingdom*  
james.king2@univ.ox.ac.uk

## ABSTRACT

Polygonal faults systems are a fascinating geological phenomena found exclusively in fine-grained sediments. Polygonal faults are layer bound normal faults that form complex three-dimensional networks, which when observed in plan view display spectacular interconnected polygonal patterns. Understanding the nucleation, propagation, and termination of polygonal faults systems has vast implications and applications to any field where faults can influence the integrity of fine-grained sealing/cap rocks such as petroleum geoscience, carbon capture storage and nuclear waste storage site planning. It is currently unknown to what extent polygonal faults act as conduits for sub-surface fluid flow. The genetic mechanism(s) to explain polygonal fault nucleation, propagation, and subsequent termination have remained elusive despite over two decades of research, however, recent research suggest that diagenesis can induce shear failure in fine-grained sediments. Novel analysis of polygonal faults in 3D seismic data from several locations with contrasting physical parameters, with particular emphasis on upper polygonal fault tips, are anticipated to provide new insights into potential nucleation, propagation, and termination mechanisms. Detailed fieldwork of analogous faults in silts and mudstones of the Taranaki Basin, New Zealand will be undertaken in conjunction with seismic interpretation where fault outcrop characteristics beneath the seismic resolution will be analysed. This research aims to bridge the gap between present ambiguity and future understanding.

AAPG Search and Discovery Article #90298 © 2017 AAPG Foundation 2016 Grants-in-Aid Projects