



Paleostress Reconstruction from 3D seismic, Natural Fracture and Calcite Twin Analyses: Structural Insights into the Otway Basin, Australia

Hugo Burgin, Khalid Amrouch, and Simon Holford

The Australian School of Petroleum, The University of Adelaide, Adelaide, Australia

Abstract

The Otway Basin, Australia, is of particular interest due to its significance as an Australian hydrocarbon producing province and a major global CO₂ burial project. Structural data was collected in the form of natural fractures from wellbore image logs and outcrop in addition to calcite twin analyses, within formations from the mid cretaceous from both on and offshore. Evidence for four structural events within the study area have been identified including NE-SW and NW-SE orientated extension, in addition to a NW-SE compressive event. Natural fracture data also reveals a previously “un-detected” NE-SW compression within the Otway Basin. This study presents the first investigation of paleostress environments within the region from micro, meso and macro scale tectonic data in both onshore and offshore in addition to the first quantification of differential paleostresses. This work highlights the importance of a comprehensive understanding of four dimensional stress evolution within the sedimentary basins of Australia’s southern margin.