

# What Controls Reservoir Quality in Volcanic Reservoirs? An Example from the Taranaki Basin, New Zealand

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## ABSTRACT

The heterogeneity of volcanic reservoirs compared to clastic or carbonate sedimentary reservoirs has marked them as secondary reservoir targets for hydrocarbon exploration. However, improvements in our understanding of volcanoclastic deposits' (composition, petrography, geometry, facies, and distribution) are now rendering those more valuable targets in exploration. The ability of volcanoclastics to serve as hydrocarbon traps depends on the coincidence of porosity preservation and generation processes with the time of hydrocarbon migration. The Taranaki Basin is an onshore-offshore with up to 9 km of late Cretaceous - Cenozoic sedimentary basin located on the western margin of New Zealand. It is currently the only hydrocarbon producing basin in New Zealand. Within this basin there is the mid-Miocene aged Mohakatino Formation (~17-13 Ma), and is formed of sandstone, siltstones, and mudstones, which are primarily made up of andesitic detritus, as well as a number of volcanic and volcanoclastic lithotypes derived from the nearby Mohakatino Volcanic Centre (MVC) of early Miocene age. The Mohakatino Formation is interpreted as a submarine fan succession sourced dominantly from offshore, andesitic volcanic complexes as part of a larger andesitic arc. The volcanoclastics are a proven hydrocarbon system (Kora Field), where the Mohakatino Formation is buried along the axis of the Taranaki Basin. Several wells have targeted the volcanoclastics as a potential reservoir with reservoir porosities and permeabilities as high as 30% and 300 md, respectively.