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Characterising the Architecture of New Zealand's Geothermal Structural Fluid Flow Networks Using Borehole Images

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Borehole imaging has been used worldwide since the 1950's to capture vital geological information on the lithology, structure, and stress conditions of the Earth's subsurface. In New Zealand both acoustic and resistivity based borehole image logs are utilised to explore the geological nature of the basement and volcanic rocks that contain the country's unique geothermal reservoirs.

Borehole image logs in wells from three geothermal fields in the Taupo Volcanic Zone (TVZ) provide the first, direct, subsurface, structural orientation measurements in New Zealand geothermal reservoir lithologies. While showing an overall structural pattern aligned to the regional tectonic trend, heterogeneities are observed that provide insight into the complexity of the structurally controlled, geothermal, fluid flow pathways. Analysis of imaged stress induced features informs us that the stress field orientation in the TVZ is also not homogenous, but is variable at a local scale.