

DEVELOPING A ROCK PHYSICS TEMPLATE FOR IMPROVED SEISMIC MAPPING OF NEW ZEALAND COALY SOURCE ROCKS

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ABSTRACT

Coal and coaly mudstones are considered the main source rocks of the petroleum systems in New Zealand. Our ability to predict their nature in the subsurface from seismic mapping is constrained by a lack of calibration of geophysical attributes (e.g. acoustic impedance and seismic amplitudes) to the physical properties of these rocks. Few studies have evaluated the relationships between geophysical properties (e.g., P- and S- wave velocities) and coaly source rock properties (e.g., TOC, rank, and organic constituents). New Zealand presents a unique opportunity to refine this link and apply the results towards future exploration. The New Zealand Coal Band spans both the North and South Islands and hosts a continuum of coal ranks from low-grade lignites to higher ranking anthracites (Figure 1). We plan to analyse a suite of coaly rock samples from boreholes and outcrops throughout the country and prepare a rock physics template. The trends established with the template will aid future interpretations of both the presence and quality of coaly source rocks both on and offshore New Zealand. This will be accomplished by extending the laboratory study and coal source rock characterization to predict geophysical signatures (forward seismic modeling) by combining experimental data and well logs.

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