Natural gamma response to indicate REE

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# ABSTRACT

Natural gamma is extensively used as a down-hole wire-line logging method for detecting naturally occurring gamma radiation from rock or sediment. Different rock types emit varying amounts of gamma radiation, making the data valuable for distinguishing ‘fingerprints’ that can assist formation evaluation and sedimentary resource models.

Seeking rare earth elements (REE) in the coal measures, typically delivered through volcanic mechanisms during coal measure formation, we explored the full suite of available downhole data. REE are commonly adsorbed by clays, hence we focussed on high gamma traces that would indicate clay-rich or tuffaceous sediments. We have used natural gamma logs for ~20 boreholes in the Bowen Basin, Queensland, and found that high gamma responses, mainly associated with tuffs, correlate with high REE concentrations. Further, we have considered the collocation of heavy radioactive (gamma producing) elements with REE and discussed the results here.

Given the encouraging results of our preliminary study, we plan to further explore the use of pre-existing gamma logs and identify REE opportunities in non-coal sedimentary situations.