



## ORAL PRESENTATION

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# Natural Experiments in Long Term CO<sub>2</sub> Storage: Observations from Sarawak

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Anomalous features observed in seismic data from parts of the Greater Sarawak Basin are believed to be diagenetic fronts associated with the presence of CO<sub>2</sub>. Measurements from well log data show that the elastic properties of shales and silts behind these diagenetic fronts have been altered through a loss of capillary bound micro-porosity. It is hypothesized that this is the result of the action on the clays of carbonic acid, which diffuses along a concentration gradient away from the reservoir rocks, which contain high concentrations of CO<sub>2</sub> that have accumulated in traps along with hydrocarbons. The velocity and density data can be corrected based on an empirical model that matches similar changes caused by normal mechanical compaction, although some chemical alteration must have occurred. We show that the degree and shape of the alteration is sufficient for these effects to be observed on seismic data. The amplitudes and AVO characteristics of the seismic data drastically change due to the alteration thereby making reservoir and fluid prediction significantly more challenging. On the other hand, the presence of alteration might be used as an indirect hydrocarbon indicator as there is a strong correlation within the current data between hydrocarbon presence and shale alteration. The change in elastic properties of the seal rocks through interaction with high concentrations of carbonic acid in the reservoir may have implications for long term CO<sub>2</sub> storage.

## SPEAKER BIOGRAPHY

Mark Sams is Vice President of Services for Ikon Science in Asia Pacific. Mark holds an MSc. and Ph.D. in geophysics from Imperial College, London University. Mark has been based in Kuala Lumpur since 1994 work for PETRONAS, Jason Geoscience, and Ikon Science. His main areas of interest include the practical application of rock physics, deterministic and geostatistical inversion in the Seismic Quantitative Interpretation workflow.