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Challenges and Pitfalls in Multi-Physics Integration for Reservoir Characterisation

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SUMMARY

Combining multiple geophysical data types using integrated interpretation or joint inversion approaches can provide information on earth properties that is either unreliable or simply unavailable when only a single data type is considered. In particular the combination of seismic, CSEM and well log data has the potential to improve the certainty with which reservoir lithology and fluid properties are constrained.

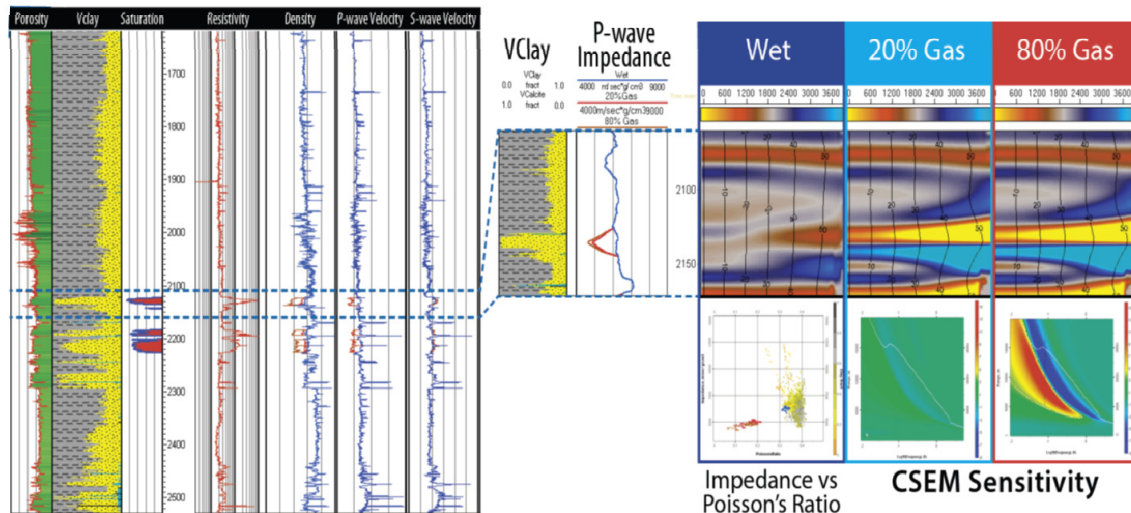


Figure 2 An example of rock physics modelling to understand the effect of varying fluid type and saturation on the elastic and electric responses. On the left a consistent petrophysical interpretation is computed for each well, including mineral and fluid volumetrics.

Conclusions

The solutions to these challenges are case dependent and must be considered with care. For any given geophysical question, the most robust answer will be obtained by using the tool, or combination of tools best suited to the task, and determining this combination is the first step in any analysis. The resulting choice of data must then be integrated within a rock physics framework, to provide a model that is geologically reasonable, and consistent with each of the geophysical data types available.

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