

Inversion & Integration - in a geological framework

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Abstract

Reservoir characterization is invariably a data integration exercise; we need all the help we can get from all available data. This also makes it a multidisciplinary process that may typically involve geologists, geophysicists, petrophysicists and reservoir engineers. However as geophysicists we tend to associate reservoir characterization with inversion, carried out in a geophysical domain. But this is not a natural domain for other disciplines.

Bayesian methods provide a framework for data integration and our instinct is to translate the priors and likelihoods, with their associated uncertainties, into velocities and densities. But it would be more inclusive if we could work in a geological domain with parameter uncertainties defined directly in terms of reservoir parameters. As well as providing much greater transparency this would mean the integration step is moved towards the end of the process rather than the beginning which would allow each discipline to have a better understanding and control over their contribution and more easily adjust it as new data and new insights become available.

In this talk I'll illustrate how such an integration scheme may work. I'll demonstrate direct approaches to estimating reservoir parameters from seismic with their associated uncertainties and show how these can then be taken into a multidisciplinary integration process. I'll also demonstrate parameter estimation in a Shakespearian framework!

Biography



Patrick graduated from Birmingham University with a BSc in physics in 1977 and joined Seismograph Service Ltd as a data processor working in Oman, New Zealand, Pakistan and London. He moved to Britoil in Glasgow 1982 and worked as a seismic programmer until the company was acquired by BP in 1989.

He has remained with BP working as a seismic analyst and occasional interpreter in Aberdeen, Houston and London. He has been a member of a number of exploration and appraisal teams working in the West of Shetland, Gulf of Mexico and offshore Angola. Since 2001 he has worked in BP's E&P Technology division in Sunbury, UK.

Patrick was awarded the SEG Virgil Kauffman Gold Medal in 2001 for his development of elastic impedance technology. He was an EAGE distinguished lecturer in 2007 and an SEG distinguished lecturer in 2010.