

## **WS11 C02**

# Constraining the history match using 4D seismic data: how far can we go?

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## Summary

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A key direction for history matching (HM) or close-the-loop exercises is the incorporation of time-lapse (4D) seismic data into our workflows.

## Constraining the history match using 4D seismic data: how far can we go?

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A key direction for history matching (HM) or close-the-loop exercises is the incorporation of time-lapse (4D) seismic data into our workflows. The attraction from the history matching perspective is that 4D seismic data provide areal coverage of the changes occurring between wells and during the period between the baseline and monitor surveys - which can be anything from several months to several years depending upon the selected acquisition. In HM it is compelling to consider 4D seismic data as yet another source of dynamic data (Johnson 2015). However successes of a precise quantitative match between observed and predicted 4D seismic responses are recognised to be limited to date, and do not necessarily maximise value from the integration. The reason for this relates to many obvious shortcomings in both the simulation and seismic domain, which consort to a lack of inter-disciplinary communication. This talk will highlight the uncertainties involved with performing a 4D seismic-HM (manual or assisted), and discuss to what extent these may be ameliorated. Field data examples are provided to illustrate the range of data quality typically encountered, and the requisite choices. A hierarchical approach to assimilating 4D seismic data into the simulation model is proposed that starts by robust calibration, and then follows a successively quantitative route through direct update to a final possible assisted or automated 4D seismic-HM. The scheme is proposed as a practical workflow that provides a carefully controlled sequential evolution along the ‘qualitative’ to ‘quantitative’ trajectory.

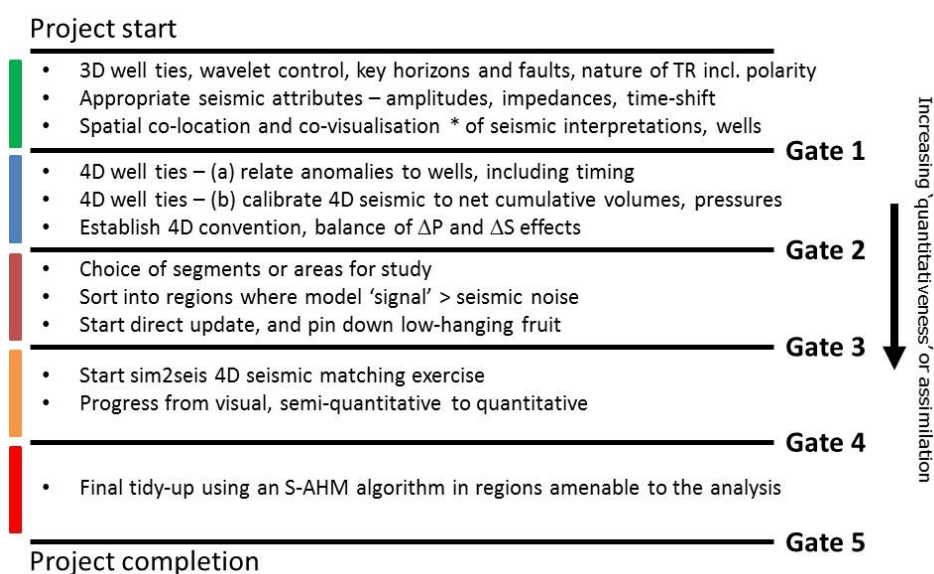


Figure 1 A hierarchical scheme for assimilating 4D seismic data into the simulation model.