Seismic technology advances and well established reservoir workflow industry practices have led to a more accurate description of subsurface through reservoir models. Seismic driven reservoir characterization is a dynamic process in which iterative calibration and interpretation of information contributes to geologically sound and quantitatively calibrated model. Whether the main goal of the reservoir characterization is structural or stratigraphic, or even a quantitative reservoir property calculation and distribution, it is essential to focus efforts that contribute to: (1) the quality of the input data; (2) the best acquisition/processing methods and, (3) the calibration and correction of seismic-well log data that contribute in lowering uncertainties.

This presentation deals with the cons and pros in using seismic as main driver while building reservoir models. Three cases are presented

Case 1: Seismic reservoir architecture of prograding events in a falling seal level stage.

This Tortonian deltaic reservoir sands was extensively drilled and produced. Previous studies could not fully explain reservoir connectivity issues; in consequence the recognition of heterogeneities in the reservoir modelling is a precondition to understand fluid flow behaviour that supports optimal design and implementation of flooding patterns and subsequent EOR activities. The use of relative acoustic impedance and spectral decomposition attributes enhanced the expression of subtle geological features. Results demonstrate that higher accuracy in interpretation of flow units is reached using seismic attributes in addition to classical stratigraphic modelling methods.

Case 2: Seismic morphology and seismic stratigraphy in a low accommodation regressive Silurian deltaic system.

High frequency transgressive and regressive events in a long range progradational mixed deltaic system are unravelled by means of a multidisciplinary study that integrates seismic stratigraphy, log and core analysis. As progradational events are below seismic resolution specific attributes were applied to highlight high frequency changes. This frequency enhancement reveals stratigraphic patterns such as off lap breaks, onlaps and chaotic channel seismic facies previously unidentified. Two seismic units were interpreted consisting in several prograding clinothems. Shapes and apparent depths of clinoforms indicate low accommodation space and progradation in a SE-NW trend that can be now used to derive property modelling trends.


To reduce uncertainty both on correlations and reservoir continuity, an acoustic impedance inversion was performed and used to identify seismic events in a target area. The relevant acoustic impedance events where used as a frame to guide isopachs mapping for each individual reservoir sand. A good correlation between acoustic impedance, previously defined petrophysical rock types and porosity allows the use of acoustic impedance for property distribution. In order to bridge the resolution gap between seismic and individual sand bodies, the acoustic impedance volume was downscaled into the reservoir grid using Sequential Gaussian Simulation (SGS). The downscaling process doesn’t have a unique solution; multiple realisations have to be considered in the process as potential input to guide both rock types distributions and porosity distributions to identify possible scenarios.