Seismic Expression of Low Angle Clinoforms in Ancient Deltaic Systems: Implications for Stratigraphic Modelling

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Upper Miocene deltaic reservoir sands located in the strike-slip Vienna Basin contain substantial remaining potential. Although the studied production unit has been extensively drilled, previous studies could not fully explain reservoir connectivity issues. The recognition of different scale heterogeneities in reservoir modelling studies is a prerequisite to understand fluid flow behaviour that supports optimal design and implementation of flooding patterns and subsequent EOR activities.

During the ongoing study detail mapping of seismic signatures was carried out in the reservoir using relative Acoustic Impedance (AI) and Spectral Decomposition (SD). The attributes used enhance the expression of depositional elements at different scales and allows the identification of geologic patterns such as low angle clinoforms and previously unrecognized morphological progradation/aggradation events. The seismically imaged morphological characteristics suggest an intricate reservoir facies distribution. The patterns observed might be linked to a rapidly and changing interplay between accommodation space and sediment supply, different feeders and/or source-shifting that are inferred to be acting over the deposition area. This complex scenario renders largely ambiguous a definition of flow units based on a purely lateral well-to-well log correlation.

It is concluded that a more accurate interpretation of flow units could be achieved using the aforementioned seismic attributes together with a classical stratigraphic modelling approach and available reservoir information. The value added with the use of these techniques certainly impacts the geological understanding during integrated multidisciplinary reservoir model workflows. At a subsequent study stage during dynamic simulation this may lead to improved understanding of the flow behaviour.