

**CONTROL ID:** 2850338

**TITLE:** 4D Accommodation Space Analysis: Refining Petroleum Systems from Basin to Play to Prospect

**AUTHORS (FIRST NAME, LAST NAME):** Steven Tobias<sup>1</sup>, Jie Huang<sup>1</sup>

**INSTITUTIONS (ALL):**

1. Exploration, NearFX, LLC, Houston, TX, United States.

**PRESENTER:** Steven Tobias

**Poster Consideration:** No

**ABSTRACT BODY:**

**Abstract Body:** The integration of machine-assisted technologies into seismic interpretation creates a significant competitive advantage for play-based E&P explorers, especially those focused on near field exploration in proven petroleum systems. Though modern seismic processing methods often yield data cubes that exhibit very high resolution, mainstream seismic interpretation workflows focus on the mapping of only several key reflectors. This introduces a great loss of granularity, especially when considering the detailed geometries that exist in areas of complex structure and stratigraphy. New machine-based workflows exploit this information by fully and rapidly interpreting/ describing all reflection geometries, down to the smallest clinoform and fault block.

This offers at least two potential breakthroughs. The first relates to information contained in the detailed geometries of geomodels that honor the fine details found in high resolution seismic. Using a simple mathematical transform of the data-driven geomodel, it becomes possible to analyze 4D variations in relative accommodation space with a high degree of precision. A quantitative understanding of accommodation space through time offers new insight into the facies and corresponding rock properties that filled these spaces.

The second breakthrough results from being able to age-date tectonic pulses and/or salt movements with greater precision, either in relative or absolute terms depending on the availability of well and paleontological control. Their implications to timing relationships, hydrocarbon migration and trap-charge scenarios facilitate the incorporation of basin modeling in both play and prospect evaluation, which is often a great aid to risk and resource assessment. Structural-sediment interaction relationships established by this workflow can also lead to new insights in reservoir depositional systems and seal facies capacity, providing critical constraints in the delineation of play fairway and sweet spots.

Examples of this approach are shown from the North Sea and offshore New Zealand.