

Sequence Stratigraphy Past, Present and Future; and the Challenge of Integrating 3D Seismic Data

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In the twenty-five years since the landmark publication of AAPG Memoir 26, the concepts of sequence stratigraphy have evolved rapidly. This discipline, an outgrowth of seismic stratigraphy, has spread far beyond applications to 2D seismic data alone, embracing data sets ranging from biostratigraphic to geochemical to physical oceanographic and from borehole to outcrop, and finally, coming full cycle, to 3D seismic data. Initially the domain of industry geoscientists, sequence stratigraphy has gained widespread acceptance among geoscientists in all professions, having been recognized as an approach that facilitates integration of a broad range of disciplines.

The evolution of sequence stratigraphic concepts is far from complete. In particular, recent increased availability of high-quality 3D seismic coverage promises to provide insights that will lead to further modification of sequence concepts. The obvious advantage of 3D seismic coverage, in addition to enhanced 2D profiles, is that they afford exceptional plan views of the subsurface that in the past could only be inferred. These plan view images now comprise a fundamental starting point from which geologic analyses and interpretation can begin. Such images depict paleo-landscapes, which can be analyzed using time-honored principles of geomorphology, leading to the development of the discipline of seismic geomorphology. Systematic seismic geomorphologic analysis of 3D seismic volumes can bring to light spatial and temporal relationships of successive depositional systems, criteria critical to sequence stratigraphic analyses. Consequently, when used in conjunction with seismic stratigraphy, seismic geomorphology can significantly enhance sequence stratigraphic interpretations.