SEAL SEQUENCE STRATIGRAPHY AND SEAL GEOMETRY

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Determining seal geometry for various depositional environments has advanced with the development of high-resolution sequence stratigraphy. The recognition of systems tracts, separated by a variety of key surfaces (i.e. sequence boundaries, transgressive surfaces and flooding surfaces) *within* reservoirs previously considered to be connected lithosomes, has led to a better understanding of reservoir heterogeneity. The sequence stratigraphic paradigm is now applied to the seals that encase reservoirs, which are also more complex and heterogenous than previously appreciated. Based on an extensive literature review drawing on modern and ancient analogues, the geometry, lateral extent and orientation of sealing facies from a number of depositional environments are constrained. These data are useful for mapping seal risk.

Seal geometry is strongly influenced by the stratigraphic position of the seal facies. Specifically, the preservation of seal facies is linked to the ratio of accommodation to sediment supply during deposition and, by implication, is linked to the systems tract in which the seal facies occurs. In *low accommodation* intervals, seal preservation is low on the shelf, but influenced by the type of sediment supplied (i.e. in margins supplied dominantly by fine-grained sediments early transgressive systems tracts can be important seals especially within incised valleys). In *high accommodation* basins, conditions for seal preservation can be optimal, especially if there is high sediment supply where high tectonic subsidence is combined with rapidly rising base level (lake or sea level). Again the type of sediment supply is important, and therefore, basin physiography, sediment provenance, and climate can play an important role in seal lithology. These concepts are illustrated using wireline, core, outcrop, and seismic data sets from variety of non-marine, coastal, deltaic, shelf and deep-marine depositional environments represented in various systems tracts.