

### **Accommodation Succession Method and the Meaning of Sequence Stratigraphic Surfaces**

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The Accommodation Succession Method was proposed to emphasize that sequence stratigraphy is a method to interpret geologic data based on direct observational criteria. The definition of systems tracts (ST's) and surfaces is not dependent of time duration, driving mechanisms and magnitude of events. In fact, just 2 elements control stratigraphic architecture and surfaces: the rates of accommodation creation and sediment accumulation. In siliciclastic systems, these 2 elements are controlled by tectonics, eustasy and climate, and their signals are difficult to distinguish in the geologic record.

Relative movement of sea level is not used and very misleading to define ST's and surfaces. For example, all ST's are at least in part deposited during a relative rise of sea level. The key for the identification of ST's and surfaces is the horizontal movement of the shoreline. Shoreline trajectory translates in 4 stacking patterns: retrogradational, aggradational, progradational and degradational. Rather than being discrete entities, these stacking patterns often morph from one to another due to the changes in accommodation through time. A resulting motif in a depositional succession starting with negative accommodation on the shelf, to maximum accommodation and to negative again is of: progradational to aggradation (PA or lowstand ST), followed by retrogradation (R or transgressive ST), followed by aggradation to progradation to degradation (APD or highstand ST).

ST's bounding surfaces are defined at the changes in direction of a shoreline trajectory during a depositional succession. The extreme positions of shoreline (basinward and landward) are often inferred due to data constrains. For example, offlap break observed in seismic profiles is interpreted as the position of the shoreline and vertical stacking of lithofacies in cores, well-logs and outcrops indicate changes from proximal to distal shelfal environments. The Transgressive Surface (or Maximum Regressive Surface) and the Maximum Flooding Surface (or Maximum Transgressive Surface) are defined at the basinwardmost and landwardmost positions of the shoreline during a depositional succession, respectively. The Sequence Boundary is defined by the basinward shift in coastal onlap.

High-resolution, Quaternary inner-shelf to slope data sets and tank experiments clarified these processes and are of unique importance to further advance the understanding of sequence stratigraphic architecture prediction.