

International Subcommittee on Stratigraphic Classification: Guidelines for Sequence Stratigraphy

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Abstract

Sequence stratigraphy provides the means of correlation of sedimentary successions on the basis of stratal stacking patterns and key bounding surfaces. Stratal stacking patterns form in response to the interplay of accommodation (space available for sediments to fill) and sediment supply, and reflect combinations of depositional trends that include forestepping, backstepping, upstepping and downstepping. Changes in stratal stacking patterns through time result in the formation of key bounding surfaces in the rock record, referred to as sequence stratigraphic surfaces. The recurrence of the same types of sequence stratigraphic surface through geologic time defines cycles of change in accommodation or sediment supply, which correspond to sequences in the rock record.

Sequences can be subdivided into systems tracts, which are units bounded by sequence stratigraphic surfaces and defined by specific stratal stacking patterns. Stratal stacking patterns may be linked to shoreline trajectories, in which case they define lowstand, transgressive, highstand and falling-stage systems tracts, or may be independent of shoreline trajectories, such as in the case of low- and high-accommodation systems tracts in fully continental settings. Depending on the scale of observation, sequences, systems tracts, and their bounding surfaces may be ascribed to different hierarchical orders. The nomenclature of sequence stratigraphic units and surfaces remains independent of scale.

The observation of stratal stacking patterns (i.e., systems tracts) and changes thereof (i.e., sequence stratigraphic surfaces) is key to the sequence stratigraphic methodology. The construction of a framework of systems tracts and bounding surfaces ensures the success of the method, and constitutes the model-independent platform of sequence stratigraphy. Beyond this standard workflow, the interpreter may make model-dependent choices with respect to which sequences stratigraphic surfaces should be elevated in importance and be selected as sequence boundaries. In practice, the data often dictate which surfaces are best expressed and hold the greatest utility at defining sequence boundaries, and implicitly at defining different types of sequence, in each particular succession.