Glossary

Accommodation. Although used in different ways by different workers, it is usually treated as another term for relative sea-level. It is often described as the space in which sediments can be filled up and defined as the distance between the top of the basement (igneous and metamorphic crust) and the top of the ocean surface.

Basinward Shift in Facies. When viewed in cross-section, a lateral displacement of all facies belts towards the center of a basin (seawards). Note that this is a lateral shift in facies, such that in vertical succession, a basinward shift in facies is characterized by a shift to shallow facies, and not a vertical shift to more basinward or deeper water facies.

Bed. Layer of sedimentary rocks or sediments bounded above and below by bedding surfaces. Bedding surfaces are produced during periods of non-deposition or abrupt changes in depositional conditions, including erosion. Bedding surfaces are synchronous when traced laterally; therefore, beds are time- stratigraphic units. See Campbell, 1967 (Sedimentology 8:7–26) for more information.

Bedset. Two or more superposed beds with the same composition, texture, and sedimentary structures. Thus, a beset forms the record of deposition in an environment characterized by a certain set of depositional processes. In this way, bedsets are what define sedimentary facies. A bedset is equivalent to McKee and Weir's coset, as applied to cross-stratification. See Campbell, 1967 (Sedimentology 8:7–26) for more information.

Condensation. Slow net rates of sediment accumulation. Stratigraphic condensation can occur not only through a cessation in the supply of sediments at the site of accumulation, but also in cases where the supply of sediment to a site is balanced by the rate of removal of sediment from that site (called dynamic bypassing). Where net sediment accumulation rates are slow, a variety of unusual sedimentologic features may form, including burrowed horizons, accumulations of shells, authigenic minerals (such as phosphate, pyrite, siderite, glauconite, etc.), early cementation and hardgrounds, and enrichment in normally rare sedimentary components, such as volcanic ash and micrometeorites. Conformity. Bedding surface separating younger from older strata, along which there is no evidence of subaerial or submarine erosion or non-deposition and along which there is no evidence of a significant hiatus. Unconformities (sequence boundaries) and flooding surfaces (parasequence boundary) will pass laterally into correlative conformities, most commonly in deeper marine sediments.

Eustatic Sea Level. Global sea level, which changes in response to changes in the volume of oceanwater and the volume of ocean basins.

Falling-stage Systems Tract. Abbreviated FSST, it is the systems tract overlying the basal surface of forced regression, overlain by the subaerial unconformity, and displaying a degradational stacking pattern. The deposits now placed in the FSST were considered by Exxon to be part of the late highstand systems tract.

Flooding Surface. Shortened term for a marine flooding surface.

Highstand Systems Tract. Abbreviated HST, it is the systems tract overlying a maximum flooding surface, overlain by the basal surface of forced regression, and displaying an aggradational to progradational stacking pattern. In original Exxon usage, the highstand systems tract is bounded above, by the subaerial unconformity (sequence boundary), which means that it would include deposits now considered to be part of the falling-stage systems tract.

High-Frequency Cycle. A term applied to a cycle of fourth order or higher, that is, having a period of less than 1 million years. Parasequences and sequences can each be considered high-frequency cycles when their period is less than 1 million years.

Isostatic Subsidence. Vertical movements of the lithosphere as a result of increased weight on the lithosphere from sediments, water, or ice. Isostatic subsidence is a fraction of the thickness of accumulated material. For example, 100 meters of sediment will drive about 33 meters of subsidence, or less, depending on the flexural rigidity of the lithosphere.

Lowstand Systems Tract. Abbreviated LST, it is the systems tract overlying a (type 1) sequence boundary, overlain by a transgressive surface (surface of maximum regression), and displaying progradational to aggregational stacking.

Marine Flooding Surface. Surface separating younger from older strata, across which there is evidence of an abrupt increase in water depth. Surface may also display evidence of minor submarine erosion. Forms in response to a rapid rise in eustatic sea level, abrupt subsidence (such as an earthquake), or by autocyclic mechanisms such as delta switching.

Maximum Flooding Surface. Marine flooding surface separating the underlying transgressive systems tract from the overlying highstand systems tract. This surface marks the most landward position of the shoreline within a sequence, and typically, the deepest water facies within a sequence. This flooding surface lies at the turnaround from retrogradational to progradational parasequence stacking, although this turnaround may be gradational and characterized by aggradational stacking. In this case, a single surface defining the point of maximum flooding may not be identifiable, and a maximum flooding zone is recognized instead. The maximum flooding surface commonly, but not always, displays evidence of condensation or slow deposition, such as burrowing, hardgrounds, mineralization, and fossil accumulations. Because, other flooding surfaces can have evidence of condensation (in some cases, more than the maximum flooding surface), condensation alone should not be used to define the maximum flooding surface.

Meter-Scale Cycle. A term applied to a cycle with a thickness of a couple of meters or less. Parasequences and sequences can each be considered meter-scale cycles when they are thinner than a couple of meters.

Parasequence. Relatively conformable (that is, containing no major unconformities), genetically related succession of beds or bedsets bounded by marine-flooding surfaces or their correlative surfaces. Parasequences are commonly shallowing-upward cycles, although many have deepening-upward intervals at their base.

Parasequence Boundary. A marine flooding surfaces.

Parasequence Set. Succession of genetically related parasequences that form a distinctive stacking pattern, and typically bounded by major marine flooding surfaces and their correlative surfaces. Parasequence set boundaries may coincide with sequence boundaries in some cases.

Peritidal. All depositional environments associated with tidal flats, including those ranging from the highest spring tides to somewhat below the lowest tides.

Relative Sea Level. The local sum of global sea level and tectonic subsidence. Locally, a rise in eustatic sea level and an increase in subsidence rates will have the same effect on accommodation. Likewise, a fall in eustatic sea level and tectonic uplift will have the same effect on accommodation. Because of the extreme difficulty in teasing apart the effects of tectonic subsidence and eustatic sea level in regional or local studies, sequence stratigraphy emphasizes relative changes in sea level, as opposed to its earlier emphasis on eustatic sea level.
Sequence. Relatively conformable (that is, containing no major unconformities), genetically related succession of strata bounded by unconformities or their correlative conformities.

Sequence Boundary. A surface represented by a subaerial unconformity, correlative marine erosion surfaces (such as a surface of forced regression), and correlative surfaces, which are collectively used to define the limits of a depositional sequence. Sequence boundaries form in response to relative falls in sea level.

Sequence Stratigraphy. The study of genetically related facies within a framework of chronostratigraphically significant surfaces.

Shelf Margin Systems Tract. Systems tract overlying a type 2 sequence boundary, overlain by a transgressive surface (maximum regressive surface), and characterized by a progradational to aggradational parasequence set.

Systems Tract. Linkage of contemporaneous depositional systems, which are three-dimensional assemblages of lithofacies. For example, a systems tract might consist of fluvial, deltaic, and hemipelagic depositional systems. Systems tracts are defined by their position within sequences and by the stacking pattern of successive parasequences. Each sequence consists of systems tracts in a particular order. For a type 1 sequence, these are the lowstand, transgressive, highstand, and falling- stage systems tracts. For a type 2 sequence, these are the shelf margin, transgressive, and highstand systems tracts.

Tectonic Subsidence. Vertical movements of the lithosphere, in the absence of any effects from changes in the weight of overlying sediments or water. Also called driving subsidence. Tectonic subsidence is generated primarily by cooling, stretching, loading (by thrust sheets, for example), lateral compression of the lithosphere, and asthenosphere upwelling and downwelling.

Transgressive Surface. Marine flooding surface separating the underlying lowstand systems tract from the overlying transgressive systems tract. Because this surface marks the most seaward extent of the shoreline within a sequence, it is called the maximum regressive surface by some. The transgressive surface is the first major flooding surface following the lowstand systems tract. In depositional updip areas, the transgressive surface is commonly merged with the sequence boundary, with all of the time represented by the missing lowstand systems tract contained within the unconformity. The transgressive surface, like all of the major flooding surfaces within the transgressive systems tract, may display evidence of stratigraphic condensation orslow net deposition, such as burrowed surfaces, hardgrounds, mineralization, and fossil accumulations.

Transgressive Systems Tract. Abbreviated TST, it is the systems tract overlying a transgressive surface, overlain by a maximum flooding surface, and characterized by retrogradational stacking.

Type 1 Sequence Boundary. Characterized by subaerial exposure and associated erosion from downcutting streams, a basinward shift in facies, a downward shift in coastal onlap, and onlap of overlying strata. Forms when the rate of sea-level fall exceeds the rate of subsidence at the depositional shoreline break (usually at base level or at sea level). Note that this means that if such changes can be observed in outcrop and the underlying strata are marine, then the boundary is a type 1 sequence boundary.

Type 2 Sequence Boundary. Characterized by subaerial exposure and a downward shift in onlap landward of the depositional shoreline break (usually at base level or at sea level). Overlying strata onlap this surface. Type 2 sequence boundaries lack subaerial erosion associated with the downcutting of streams and lack a basinward shift in facies. Forms when the rate of sea-level fall is less than the rate of subsidence at the depositional shoreline break. Note that the lack of a basinward shift in facies and the lack of a relative fall in sea level at the depositional shoreline break means that there are essentially no criteria by which to recognize a type 2 sequence boundary in outcrop.

Unconformity. Surface separating younger from older strata, along which there is evidence of subaerial erosional truncation or subaerial exposure or correlative submarine erosion in some areas, indicating asignificant hiatus. Forms in response to a relative fall in sea level. Note that this is a much more restrictive definition of unconformity than is commonly used or used in earlier works on sequence stratigraphy (e.g., Mitchum, 1977). Walther's Law states that "…only those facies and facies areas can be superimposed, withouta break, that can be observed beside each other at the present time" (G. Middleton translation from German). Ata Waltherian contact, one facies usually pass gradationally into overlying facies, and those two facies represent sedimentary environments that were originally adjacent to one another.

Water Depth. The distance between the sediment surface and the ocean surface. Water depth is reflected in sedimentary facies. Many studies purport to describe sea-level changes (both eustatic and relative), but are actually describing changes in water depth. The effects of isostatic subsidence and compaction must be removed from water depth to calculate relative sea level. This is typically done through back stripping. To calculate eustatic sea level, the rate of tectonic subsidence must then be subtracted from the relative sea-level term.

Base level. In reality, base level is usually below sea-level due to the erosional action of waves and marine currents. The global reference surface to which continental denudation and marine aggradation end to proceed is often known as the base level (of deposition or erosion).

Base level change. The concept of 'base-level change' becomes equivalent to the concept of 'relative sea-level change' when base level is approximated as sea level (Posamentier et al., 1988; Catuneanu et al., 2009). Base level fluctuations are by a variety of exogenous (eustatic, tectonic, climatic), diagenetic (sediment compaction), and environmental (wave and current energy) controls.

Eustasy. Eustasy is a global phenomenon involving changes in the volume of water in the world's oceans. It is solely a function of sea-surface movement, as measured between the sea surface and a fixed point usually the center of the earth.

Relative sea-level. Relative sea level change refers to how the height of the ocean rises or falls relative to the land at a particular location. It is a function of both sea surface and sea-floor movement (Posamentier et al., 1988). The latter parameter may be controlled by tectonics, thermal cooling, sediment/water load, or compaction. Therefore, relative sea-level may vary from location to location corresponding to changes in accommodations space Absolute Sea level change. This change refers to the height of the ocean surface above the center of the earth, without regard to whether nearby land is rising or falling.

Seismic Stratigraphy. Seismic Stratigraphy is the science of interpreting or modelling stratigraphy, sedimentary facies, and geologic history from seismic reflection data. Seismic stratigraphy is an integral part of sequence stratigraphy and the data is used in sequence stratigraphy. Seismic reflections are produced by contrasts in sonic velocity at chronostratigraphically significant stratal surfaces and unconformities; therefore, they are considered to approximate time-lines in the sedimentary record. The basic assumption behind seismic stratigraphy is that individual reflector can be considered as timelines i.e., it is representing a time interval of similar sedimentation conditions. This assumption signifies that seismic reflector can have the different depositional environment and therefore, it has information of various lithofacies units. However, for seismic stratigraphic analysis, only sedimentary reflections are generally used.

Seismic reflections. Seismic reflections occur due to acoustic impedance (the ratio of the pressure over an imaginary surface in a sound wave to the rate of particle flow across the surface) variations in stratal packages at interface boundaries. Each unit has an acoustic impedance equal to the rock density multiplied by the seismic velocity. The intensity of the reflection is dependent on how much energy is reflected back at the interface boundary.

Reflector. In seismic stratigraphy, a reflector might represent a change in lithology, a fault or an unconformity. A reflector is expressed as a reflection in seismic data. Reflection configuration patterns can be divided into three groups: 1. Parallel—including subparallel and divergent, 2. Discontinuous- hummocky, lenticular, chaotic, disrupted and contorted, 3. Prograding - caused by lateral accretion of strata

Seismic reflection terminations. Seismic reflection terminations also termed "lapout", are stratal discontinuities recognized on seismic sections that separate apparently conformable sedimentary units from non-conformable units, forming the basis of seismic sequence stratigraphy.
Reference: UGA Stratigraphy Lab The data is in the strata, https://strata.uga.edu/sequence/glossary.html