

**AAPG International Conference
Barcelona, Spain
September 21-24, 2003**

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Accommodation Measurement at Different Time-Scales: toward a Quantification of Eustatic versus Tectonic and Sedimentary Flux Controls

The accommodation space is defined as the space created by tectonism and eustasy (or climate in lake) in a marine or lacustrine setting. Accommodation space is the first order control of the degree of sediments preservation in both space and time. Numerous modifications or extensions of the definition have been done the last few years, with applications of the concept to the fluvial and deep-marine environments. The 3D quantification of the accommodation at the basin-scale is the base of the discrimination between eustasy and tectonics. This is also, at higher time-frequency, the way to do correlations (in fluvial and turbidite system, for example). Different techniques have been developed to quantify (or to semi-quantify) accommodation space at different time-scales. At time-scale higher than 0.5 My, the accommodation space variation for a given time-interval is quantified as the decompacted accumulated sediments corrected for the paleodepth / paleoaltitude,. At time-scale lower than 0.5 My, accommodation space is estimated by the degree of preservation of the sedimentary facies. Multiple biases can occur (non-filled accommodation, differential rates of sediment production through time, facies partitionning in time and space,...). At this time-frequency, the major limit for the quantification is the uncertainties on the paleodepth / paleoaltitude. We discussed (1) the different techniques of accommodation space measurements, their uncertainties and limits, (2) the quantification of eustatism and the different tectonic wave-length at basin-scale and (3) the stratigraphic consequences of accommodation variations in space.