The Role of Sediment Supply and Local Versus Regional Accommodation on Growth Strata Analysis: Discussion and Examples

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Syntectonic unconformities within growth strata are traditionally interpreted to represent periods of time when the rate of uplift exceeded the rate of deposition adjacent or across a growing structure. However, to distinguish phases and styles of uplift many growth-strata studies assume that: (1) the space available for sediment above the growing structure is only controlled by that particular structure and (2) sediment supply is constant. Such assumptions can underestimate the affect of other processes that create accommodation above the structure, and changes in sediment supply on the resultant growth-strata package. Although deposition and preservation of sediment across a given structure are largely controlled by that structure, numerous other factors control the resultant growth-strata geometry and internal architecture, including syntectonic unconformity development. Climate, sediment source composition, basin slope and the type of depositional system carrying sediment control the amount of sediment produced and carried toward a given structure. Uplift of a local structure, regional subsidence (including long-, and short-wavelength subsidence processes), sediment loading, and sea-level fluctuation control the amount of space available for sediment to accumulate and be preserved over the crest of the structure. This study (1) examines the non-tectonic controls on growth strata development, (2) describes two end-member syntectonic unconformities (i.e., Traditional- and Subtle-type sensu Aschoff and Schmitt (2008)) identified in the Cordilleran Foreland basin that can improve growth-strata analysis in successions where sediment supply may have fluctuated significantly, and (3) proposes practical ways to address sediment supply and regional accommodation in growth-strata analysis.