

Four Systems Tracts: Useful Methodology or Model-Driven, Wishful Thinking?

Ashton Embry*

Geological Survey of Canada, Calgary, Alberta, Canada
aembry@nrcan.gc.ca

Abstract

It has been advocated that a sequence be subdivided into four systems tracts on the basis of a model that employs sinusoidal base level change and constant sediment supply. The four systems tracts in ascending order are: 1) Lowstand systems tract (LST) - strata deposited during initial base level rise before transgression has begun, 2) Transgressive systems tracts (TST) - strata deposited during transgression, 3) Highstand systems tract (HST) - strata deposited during the last stage of rise but during regression and 4) Forced regressive systems tract (FRST) - strata deposited during base level fall.

Field-testing of this high resolution, deductive, four systems tract model has revealed it is not applicable to the real world. Firstly, an objective, scientifically sound contact cannot be drawn between the HST and the overlying FRST, making such a subdivision invalid. Furthermore, it has been found that in almost all instances the start of base level rise coincides with the start of transgression and that a sinusoidal base level curve, which includes a lag time between start rise and start transgression, is not actualistic. The coincidence of start rise and transgression negates the continuation of regression during early base level rise and consequently eliminates the development of an LST.

On both theoretical and observational grounds, it is apparent that the best resolution achievable for subdividing a sequence in a scientifically acceptable manner is two systems tracts: the already established TST and a regressive systems tract (RST) that includes the hypothetical but unrecognizable HST and FRST.