

Kedzierski, P., Mallet, J-L, Clark, S., & Caumon, G. 2007.
High-resolution sequence stratigraphy as a controller for facies simulation.
27th Gocad Meeting, Nancy, France. June 18-21.

ABSTRACT

The genetic stratigraphy concepts state that the distribution of sedimentary bodies is controlled both by the accommodation rate and by the sediment supply. The main rule introduced by this stratigraphic approach is known as the A/S ration concept, describing the different stratigraphic system tracts. For instance, transgressions are identified by an A/S ratio greater than 1 while regressions corresponds to a ratio lower than 1. Based on this concept, we propose a methodology for the modeling of the paleotopography, by accounting for stratigraphic records, well data and sedimentological rules. From the paleotopography, facies probabilities are then deduced using facies occurrence rules. As a corollary of the A/S ratio concept, the sediment volumetric partitioning rule states that the sediments are better preserved in the distal pole during regressions and in the proximal pole during transgressions. If transgressions and regressions are well identified on the chronostratigraphic correlations, the lateral gradient of the sediment thickness provides an indicator of the distality vector. Using DSI interpolation of membership functions constrained by trend vectors, we propose to compute a second probability field accounting for the distality. The advantage of this additional probability field is to better capture information about the facies distribution in case of confinement, like for instance in lagoon systems. By combining these facies probabilities, the suggested solution provides a more complete description of the sedimentary system and gives more realistic facies simulations. This methodology implemented in the Thalassa plug-in is illustrated on clastic and carbonate reservoirs.