

Sedimentary Cycles in Siliciclastic Sequences

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Sedimentary cycles in siliciclastic sequences can be detected and analyzed through the use of gamma-ray profiles to provide series of measures associated to bed thickness. The variation in bed thickness gives a perfect identification of parasequences and their internal geometry on thickening or thinning upwards allowing the accurate identification of the sedimentary environment, facies and system tracts. The pile up pattern can then be analyzed by time series methods and the ratios among the various periods of the sedimentary cycles can be compared and associated with astronomical cycles in the Band of Milankovitch. Besides, the results give an excellent insight on the sedimentary processes of in filling of the sedimentary basin, sea level variation and sedimentary flux. Using this method of analysis, it is possible to identify forth an fifth order sequences (in the Exxon sense) that are locally correctable. This application of quantitative stratigraphy allows even the correlation of third order sequences an it may provide a way to compare locally identified sea level variation with the proposed curves of global sea level variation. This methodology was developed by the Laboratory of Basin Analysis an Geological Correlation of the Faculty of Geology of the University of the State of Rio the Janeiro. Examples of application are provide for the Permian section of the Parana Basin, the Barremian section of the Reconcavo Basin and the Devonian section of the Parnaiba basin.