QUANTITATIVE COMPARISON OF OBSERVED STRATIGRAPHY AND THAT PREDICTED FROM FORWARD MODELLING

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Forward modelling of stratigraphic units has developed rapidly in recent years. Many groups are now producing simulated 2D sections and 3D volumes that can be compared to observed sections derived from seismic lines, boreholes, or outcrop. The question remains however as to the degree of similarity between any given simulated section and the observed section that we are trying to match. This becomes of vital importance in the design of forward modelling routines that automatically modify input parameters to converge on the observed section. In this respect forward modelling is no different from any conditioned simulation. Simulated and observed sections may superficially look similar to each other, and yet differ 'significantly' in the very detail that we wished to predict from the modelling exercise.

Various approaches to comparing sections or volumes have been used. We can define the shape of each component 'chronosome' and compare the shapes. We can compare a series of 1D sections. We can define each bounding surface as a plane and compare planes. We can compare the 1D spectra of bed bundling or 2D FFT's of each surface. Each comparison emphasises a different aspect of the simulation and we need to choose an appropriate measure for the problem being investigated. The need for computationally effective comparison techniques is particularly important as we move towards stratigraphic inverse modelling.