AAPG International Conference
Barcelona, Spain
September 21-24, 2003

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Visualization and Utilization of 3D Outcrop Data

Photorealistic virtual outcrop models of the Eocene Ainsall Turbidite System in the South Pyrenean foreland basin have been created. The models were created using reflectorless laser scanners which are positioned with GPS and used to generate a detailed terrain model of the outcrop. Digital photographs were then precisely positioned on the model to produce high-accuracy, globally positioned 3D digital outcrops with stunning verisimilitude.

The virtual outcrops have been integrated with georeferenced contextural data, such as DEMs, aerial photographs, geologic maps, and cored wells in an immersive 3D visualization room (CAVE). These integrated data sets are a powerful tool for teaching 3D geological concepts, and provide a framework for making accurate and quantitative interpretations of the geology in this deep water system. Surfaces can be directly digitised from the virtual outcrops in the CAVE, which eliminates parallax errors and miscommunication between interpreters.

The digitised surfaces from the virtual outcrops, a basin-wide mapped structural surface, facies data from wells and measured sections, and a conceptual geological model derived from "traditional" fieldwork have been used to build a 3D reservoir model of the depositional system. The wealth of data mandated a deterministic approach to modelling, which challenged the stochastic reservoir modelling package used. The model can be visualized synchronously with the input data, which can be used to illustrate the assumptions made during model building, particularly upscaling.