

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

Jeroen A. Kenter¹, Guy G. Drijkoningen², A. Filippidou², H. Braaksma¹ (1) Vrije Universiteit, Amsterdam, Netherlands
(2) Delft Technical University, Delft, Netherlands

Geology and Geophysics: Groundtruthing Through Natural Seismic Laboratories

Acoustic wave propagation, and therefore the generation of reflection events, in sedimentary rocks is intimately linked to the spatial distribution and interrelationships of geological, geophysical and petrophysical properties. Though lacking behind the ever-increasing sophistication of the tool, verification of seismic data has advanced as well. Rules that quantify the relationship between geometry and shape of stratal surfaces and sediment composition in marine slopes have been one important step to improve geologic prediction from seismic data. Constructing seismic models of outcrops proved to be another important step that identified crucial pitfalls in the current interpretation methods. Natural seismic laboratories where the sediment column can be studied simultaneously in outcrops, shallow boreholes and seismic images will advance the understanding to a next higher level. A recent study on parallel-bedded alternations of Jurassic shale, sandstone and limestone in fresh sea cliffs and equivalent water saturated interval below the adjacent beach in northern France resulted in fundamental relationships between mineralogy and texture and acoustic properties and improved the quantification of the effects of scale and frequency on the origin and position of reflections. To take the approach to more complex geological geometries with lateral facies changes, the "textbook" prograding Miocene coralgal reef sequence on Mallorca was selected as the second natural laboratory. It will be examined by terrestrial high-resolution 2D and 3D S-wave seismic data in the spring of 2003 and followed by boreholes, a DGPS outcrop survey of the cliff face, and offshore sparker lines when the results of the seismic survey are evaluated.