

Experimental Tests of Compressional Wave Reflectivity

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ABSTRACT

Amplitude Versus Offset (AVO) methods are being increasingly used to provide measures of the elastic physical properties of the subsurface layers, the information obtained can be used to infer the existence of fluids. However, this technique assumes that the fluid saturated sedimentary formations may be characterized as completely elastic whereupon the Zoeppritz Equations, or their many different approximations, may be correctly applied. However, these formulae may not be adequate in certain fluid saturated porous formations in which wave propagation is complicated by the existence of the two phases of fluid and solid; this modifies the reflectivity curves. To further understand this problem we have carried out a series of laboratory experiments on elastic and saturated porous materials. This required the development of a new technique of acoustic goniometry that accounts properly for wave propagation effects. Curves of reflectivity versus angle of incidence for a variety of cases will highlight the influence of porous media effects on AVO analyses.