

PETROPHYSICAL MODELS TO DESCRIBE THE PRESSURE DEPENDENCE OF ACOUSTIC WAVE PROPAGATION CHARACTERISTICS

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Understanding the relationship between pressure and rock physical parameters, such as acoustic velocities, elastic moduli, porosity is essential for exploring and exploiting of natural reserves. In this study we introduce petrophysical models which describe the relationship between acoustic P, S wave velocities as well as quality factors and pressure. The models are based on the idea that the pore volume of a rock is decreasing with increasing pressure. On the basis of the models the pressure dependent Lamé coefficients and loss angles were deduced. Laboratory measured acoustic P and S wave velocities and quality factors as a function of pressure were inverted to prove the applicability of the models and to obtain that of parameters. The quality checked joint inversion results showed that the calculated and measured data matched accurately and also proved that the suggested petrophysical models perform well in practice.

This research was supported by the European Union and the State of Hungary, co-financed by the European Social Fund in the framework of TÁMOP-4.2.4.A/ 2-11/1-2012-0001 'National Excellence Program'.