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MEETING PAPER

Acoustic Logging in Slim Boreholes

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1. ABSTRACT

Slimhole logging has become important method in mining, engineering geology and environmental geophysics. Geophysical measurements in slim, shallow boreholes are also useful in prospecting geology.

Methods of comprehensive interpretation of slim borehole logging i.e. resistivity logs, nuclear logs and acoustic logs are advanced in formation evaluation and deliver unquestionable information about lithology and rock parameters.

Acoustic full waveform logging play special role in determination of dynamic, elastic moduli of rocks. Some formation exhibit shear waves and it rises the possibility of shear logging and rock mechanic evaluation *in situ*. Waveforms processed to provide compressional slowness and shear slowness can be also useful to identification of lithology and to gas bearing zones detection using Vp/Vs ratio. Stoneley slowness is sensitive to permeability. Therefore the fronts of compressional, shear and Stoneley waves, distinctly visible on variable density logs, show low velocity zones and acoustic waveforms may be used as excellent natural and artifical fracture indicators.

Two examples of acoustic full waveform interpretation in slim boreholes are presented. Both of the results of log interpretation were derived from Istebna sandstones in the region of Świnna Poręba dam. Determination of velocities of compressional and shear waves and dynamic moduli i.e. Young modulus and Poisson coefficient and recognition of inhomogenity of investigated formation were the aim of investigation.

Domestic slim borehole prototype equipment with acoustic probe SAM-60 was used to record field data.