

## **New Attribute for determination of lithology and brittleness**

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### **Abstract**

The discrimination of fluid content and lithology in a reservoir is an important characterization that has a bearing on reservoir development and its management. For the unconventional reservoirs, such as shale gas formations, besides other favorable considerations that are expected of them, it is vital that reservoir zones are brittle. Brittle zones frac better and fracturing of shale gas reservoirs is required for their production. Amongst the different physical parameters that characterize the rocks, Young's modulus ( $E$ ) is a measure of their brittleness. Attempts are usually made to determine this physical constant from well log data, but such measurements are localized over a small area. For studying lateral variation of brittleness in an area, 3D seismic data needs to be used. Computation of Young's modulus from seismic data requires the availability of density ( $\rho$ ). The computation of density in turn requires long offset data, which is usually not available. In this study, we propose a new attribute ( $E \rho$ ) in the form of a product of Young's modulus and density. For a brittle rock, both Young's modulus and density are expected to be high, and so the  $E \rho$  attribute would exhibit a high value and serve as a brittleness indicator. As well, we demonstrate the usefulness of this new attribute for litho-fluid detection, when it is used in conjunction with the product of bulk modulus and density.