Fracture Evaluation from Image Logs, A New development: Image Petrophysics

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Bore hole imaging is the only tool to characterize from very small features like fractures or cross bedding up to major structural features.
Since the late 80's, bore hole imaging based on resistivity measurements has been the only tool with the vertical and horizontal resolution, capable to detect very small bioturbation effects, cross bedding, vugs and or fractures as well as other structural features such as faults, unconformities or folds. The main question about this technology has been, how deep into the formation these small features really are and how they impact the hydrocarbon production?

There are only a few methods to evaluate the fracture extension or the cross bedding effect within the reservoirs, one is a dynamic interference test among two or more wells, another is the use of seismic attributes and neural networks to correlate with image logs and/or core data. From the images the fracture orientation, spacing, aperture are obtained, which could be used to calculate fracture porosity and permeability as well as vugular porosity and perm distribution around the well bore using image petrophysics, were each resistivity curve is transformed into a porosity curve generating an azimuthal property distribution map, defining the vertical and the horizontal anisotropy of each interval of the reservoir. Using this extremely powerful method and integrating with seismic attributes several is the most advanced method to generate a 3D reservoir model, in any reservoirs.