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**Reservoir Quality Problems in Carbonates Overcome by Application of Quantitative Image Analysis**

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Carbonate reservoirs are notorious for difficult-to-explain well logs, well tests and production behavior. Greater understanding and prediction of these variables is gained using an analysis system of calibrated CL and PPL thin-section image pairs. Acquired porosity and permeability characteristics are integrated quantitatively with matrix components (e.g., allochems and cement phases). All porosity information for samples is compared to a statistical database of mechanically measured samples (plug poroperm and mercury porosimetry). These cover the spectrum of poroperm characteristics, allowing prediction of permeability and assessment of variability of the reservoir type.

The system is proficient at multiple tasks. It is used for analysis of 'difficult' samples such as core fragments too small to plug, fractured or rubbly samples (i.e., broken plugs) where understanding of matrix properties may be critical. Capabilities also include mapping fracture generations, quantitative mapping of individual diagenetic phases (aiding prediction of poroperm variation through reservoirs) and aiding full characterization of SCAL samples. This system has also been scaled-up to look at porosity distributions in core and outcrop images.

The aim is not to replace core plug/whole core poroperm but to enable greater insight into controlling factors upon reservoir behavior. We also have a capability to model poroperm variation through time by backstripping cement phases, and produce archives of representative images from individual reservoirs or basins.