Reducing Uncertainty in Core Analysis Programs Using Magnetic Resonance Imaging

Leslie Randall*, Ken Green, Douglas Fisher
Alberta Research Council, Calgary, AB
randall@arc.ab.ca

ABSTRACT

Uncertainty in our laboratory measurements can cause scatter in the data making trends more difficult to recognize. The industry often makes use of "sister" core plugs which have "identical" pore space properties to help speed up the process of analysis, but in truth very little is done to ensure that this is the case. Even thin sections can be a possible source of problems in that the slide is taken from the end of the plug and may not be representative of the entire sample. This is especially true in carbonate reservoir samples. The problem is even more serious when we realize that the results from the plug are often scaled to represent a layer in the reservoir.

What our industry needs is a fast, inexpensive, non-destructive technique that can examine the core plugs at the same scale as other physical measurements (i.e. over the same representative volume). Magnetic resonance imaging (MRI) is such a technique. Detailed pictures of the pore space are possible providing a fast assessment of the spatial variations that can result in data scatter.

In this poster presentation, numerous examples of how MRI can be quickly, easily and inexpensively incorporated into a core analysis program and can be used for the (i) characterization of fractured samples, (ii) estimation of dissolution porosity, (iii) fingerprinting of sister samples, (iv) detection of hidden heterogeneity. Finally it will be clear how an MRI scan can ensure that the thin section taken of a core plug is relevant to the entire sample.