



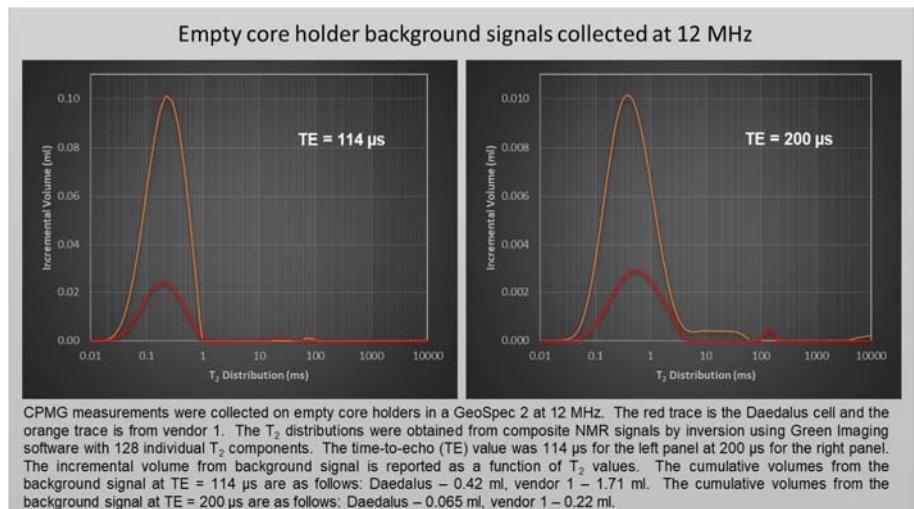
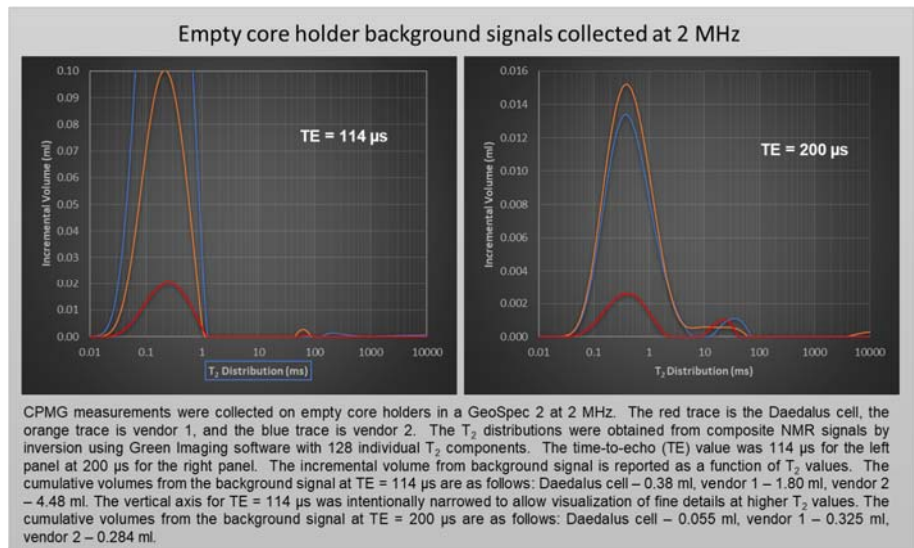
OVERBURDEN CELL PERFORMANCE COMPARISON

The Daedalus overburden cell was compared by an independent laboratory to units offered by two major vendors of overburden cells. The data was collected on an Oxford GeoSpec2 at 2 MHz or 12 MHz employing CPMG experiments used for porosity measurements. The Daedalus unit tested was a standard 49 mm OD cell for 1" diameter cores rated to 10,000 psi.

At 2 MHz: It is clear the Daedalus cell trace (red) has a much lower background signal than either vendor 1 (orange) or vendor 2 (blue). Only the Daedalus cell would permit measurements of shale at short TE values; the other cell signals would swamp the sample signal leading to large errors in measurements.

At 12 MHz: Again, it is readily apparent that the background signal from the Daedalus cell (red) is much lower than the vendor 1 cell (orange).

The cell from vendor 2 could not be tested because it was not designed to work at that field with the instruments available for this testing.



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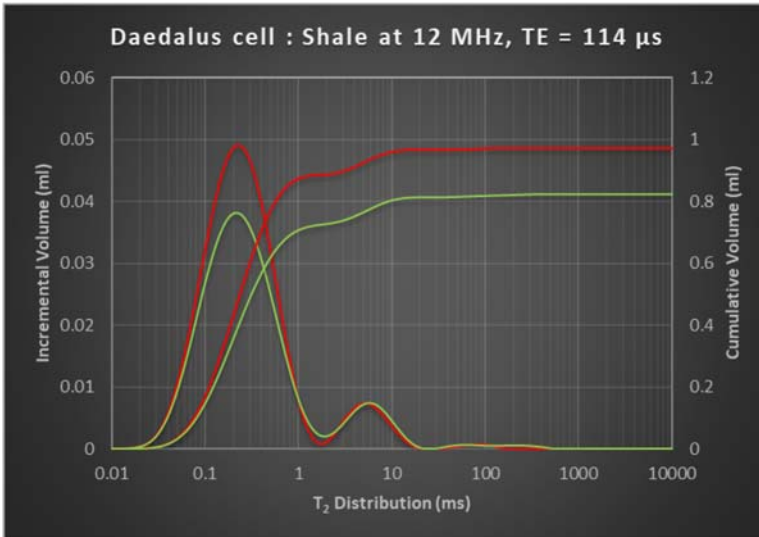
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The Daedalus cell delivers:

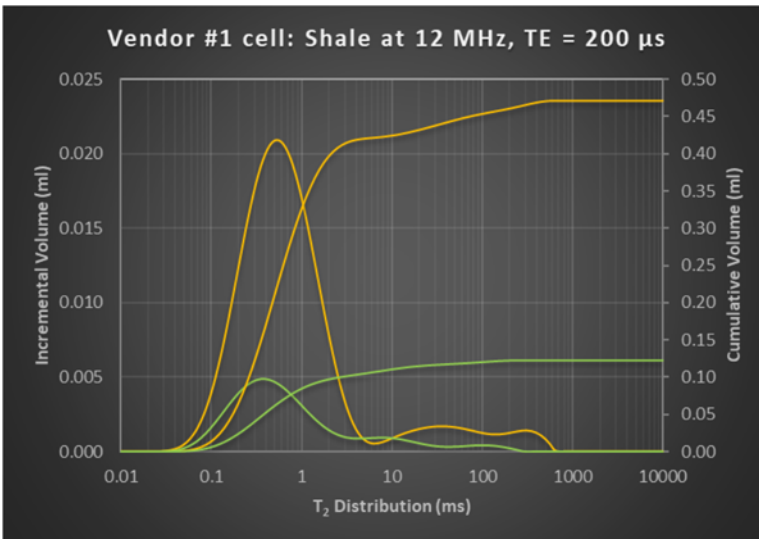
- The lowest background signal
- Short time-to-echo spacings are now possible
- Accurate measurements of tight rock samples
- Higher pressures and temperatures

DAEDALUS INNOVATIONS

Shale measurements: Porosity data was collected on shale samples in both the Daedalus cell and the cell from vendor 1 at 12 MHz. For comparison purposes the sample was also measured in a glass vial to assess the accuracy of the data collected. The method of data collection was the same as that used for measurement of the background signal from the empty cells.



The low background signal from the Daedalus cell allows data to be collected with TE = 114 μ s. The green traces are the data of the sample in a glass vial with the red traces the data from the Daedalus cell. Though the Daedalus cell data does show an overestimate of the pore volume the overall agreement is remarkably good. No effort was made to subtract the empty cell spectrum from the sample spectrum in this analysis.



The data from the vendor 1 cell could not be collected with TE = 114 μ s due to the background signal overwhelming the sample data signal. The data collected at TE = 200 μ s (orange) shows considerable overestimation of the total pore volume. Further, due to the high background signal at low T₂ values the overall fitted trajectory of the trace is influenced such that the overall profile only marginally resembles the glass vial data (green).



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The background signal from a core holders was either too large to permit measurements of shale samples, or risked throwing away valuable data at low T₂ values. With the Daedalus cell such measurements can be performed with a high accuracy at short TE values. The background signal is sufficiently low that it does not overwhelm the sample signal such that it makes sense to attempt to subtract the background spectrum from the sample spectrum for improved results. Such methods are currently being explored.