

## **An understanding of effectiveness of a multidisciplinary approach on sandstone reservoir studies, Example from Grand bank offshore Newfoundland**

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**Wells St. George J-55 which is located relatively central within the Carson Basin, is characterised by the presence of a thick Late Jurassic (Tithonian) to Early Cretaceous sedimentary succession, capped by a very thin and unconformity bound veneer of Late Cretaceous sediments. Geochemically, these two sections are comprised different lithology and chemical signatures. The sediment provenance of key sandstones is assessed using automated Raman heavy mineral analyses and detrital zircon U-Pb geochronology. A major sediment provenance change is recorded in the detrital zircon age distributions in from Late Jurassic to Late Cretaceous Sandstones. A new approach on analytical procedures on younger and older sediments within the well has identified two different heavy mineral assemblages in which changing of the sources are likely considered. Most of these sandstones from Late Jurassic have detrital zircon distributions that show a dominant late Neoproterozoic component. Coupled with generally high proportions of zircon, tourmaline and rutile, this component suggests that the Palaeozoic sedimentary rocks of the Avalon Zone and rocks of the Gander Zone were probably significant sediment contributors to the Carson Basin. Late Cretaceous sandstones are dominated by mid-Palaeozoic detrital zircons and are also characterised by a general increase in older detrital zircons (Palaeo- and Mesoproterozoic).**

## **Theory / Method / Workflow**

A collection of techniques and disciplines including stratigraphy, geochemistry, mineralogy and provenance study have been undertaken on selected well within the Carson Basin, offshore Newfoundland, Eastern coast of Canada. To do this, applying a full set of analysis including ICP, biostratigraphy (nannopalaentology and micropalaentology), Stable isotope, MLA, QEMSCAN, and Raman on selected samples from well St George J-55 have demonstrate the progress on understanding the most effective workflow approach.

## **Results, Observations, Conclusions**

Various stratigraphic schemes have been applied within the Carson Basin. Many released or open file biostratigraphy reports are available; however, interpretations differ widely. The stratigraphic framework is based on full integration of multidisciplinary Biostratigraphy (Micropalaeontology, Nannopalaeeontology plus Palynology) with elemental-based Chemostratigraphy and Isotope Stratigraphy and quantitative mineralogy including bulk mineralogy and specified heavy mineral provenance. The combined use of these stratigraphic techniques has enabled production of a more robust stratigraphic framework which, in turn, facilitates assessment of changes in sediment provenance, depositional facies, and source rock potential.

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### **References**

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