

Elemental, mineralogical and isotopic analysis: A commercial tool for the petroleum industry.

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Chemostrat have been at the forefront of taking techniques, previously seen as being used solely in the realms of academia, and making them fit for purpose for industry. For example chemostratigraphy has, over the last 20 years, turned from a niche academic technique into a mainstream tool for petroleum companies. Over the last few years Chemostrat has expanded our range of analysis from elemental, into isotopic (both stable and radioactive), mineralogical (for provenance and high resolution sand stratigraphy), and linking chemistry to geo and petrophysics. This paper demonstrates, through the use of carbonate, and clastic case studies, how a wide variety of geochemical data has been successfully used, in the commercial environment, to aid the exploration and development of these petroleum systems.

Case study 1 will demonstrate how isotopic data, was able to provide a correlation of hitherto unseen detail to a mature U.K. Central North Sea chalk play. There is no core available for this play, therefore, it is extremely difficult to gather information about the reservoir/rock properties of this play in traditional ways. Therefore it will also be shown how elemental analysis of the cutting samples was able to produce invaluable information on the rock qualities of the play.

Case study 2 will demonstrate how chemostratigraphic data was combined with provenance analysis in a study of a clastic petroleum system in a within a frontier area. In this case study all elemental analysis was undertaken using analytical equipment that can be deployed to well site to provide real time analysis of material as drilling is occurring. Furthermore, it will be shown how this elemental data can be used to produce a suite of petrophysical logs and so intergrate geochemistry with geophysics. All of this data produced a chemostratigraphic framework which was then used to enable samples to be selected for detrital zircon analysis, not as a provenance tool, but as a way to carry out high resolution stratigraphy within reservoir units.

It is hoped that this paper will stimulate discussion between academic and commercial geochemists in order to develop new commercial geochemical tools for the petroleum industry.