Review of the Early Carboniferous source facies of the North Atlantic

Lea Francastel¹ and James Armstrong²

1: University of Derby, UK (email: francastell.eva@gmail.com) 2: Petroleum Systems Limited, Prestatyn, UK (email: jpa@petroleumsystems.co.uk)

New Brunswick Basins

Marine Basins

Analogue Basins

Conclusions

There are at least two phases of major tectonic movement in the Early Carboniferous resulting in pull-apart basins in which lacustrine extensive marine source rocks are developed.

First phase is in the Early to Middle Visean (8270 to 8850 feet or 2530 to 2700 m) giving rise to the Late Visean source rocks in offshore basins that have only been lightly explored. The geometry of these source rocks are constrained to the Middle Visean transgressive systems as reported by Ross and Degens (1974). These source rocks have been characterized using a combination of organic richness, a constant feature of both settings, basin margins are marked by large carbonate platforms or slope to basin units that form a significant part of these source rocks. The Sumatra basin complex (Figure 17B) is made up of several separate synrift grabens with superimposed post-rift sequences (Choub and Nobs, 2006). Of these basins, the Central Sumatra Basin is the most prolific yielding 210,200 MMBOIL of oil to date. The oil is of algal origin (Type I kerogen) with sources developing in the early syn-rift phase of the basin, in fresh to brackish water lakes. The setting of the Sumatra basins in terms of both magniture and source type is similar to those of the study area. The principal difference is in thermal maturity. Most of the study area basins are of low maturity despite being significantly older than those of Sumatra. Thermal history and the development of a significant post-source overburden has aided hydrocarbon generation in Sumatra.

Marine basins (modified from Heidrick and Aulia, 1993) show similar tectonic setting and basin margins are marked by large carbonate platforms or slope to basin units that form a significant part of these source rocks. The Sumatra basin complex (Figure 17B) is made up of several separate synrift grabens with superimposed post-rift sequences (Choub and Nobs, 2006). Of these basins, the Central Sumatra Basin is the most prolific yielding 210,200 MMBOIL of oil to date. The oil is of algal origin (Type I kerogen) with sources developing in the early syn-rift phase of the basin, in fresh to brackish water lakes. The setting of the Sumatra basins in terms of both magniture and source type is similar to those of the study area. The principal difference is in thermal maturity. Most of the study area basins are of low maturity despite being significantly older than those of Sumatra. Thermal history and the development of a significant post-source overburden has aided hydrocarbon generation in Sumatra.

Acknowledgments

I would like to thank all her lecturers for passing on their knowledge during this course, particularly Dorothy Satterfield and Ian Billing.

References


Study from a Prospective Mississippian Source Rock Reservoir (Bowland Shale, UK). Natural Resources Research. https://doi.org/10.1007/s11053-019-09543-z

Additional references from Forrester and Guerin (2012)'s GeoSciences Ireland paper on the influence of thermal maturation on source rocks in Ireland.

If you understand this study as part fulfillment of a Masters degree in Petroleum Geoscience at the University of Derby in doing so, we would welcome feedback and suggestions for further research.

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