Newfoundland – Ireland Conjugate Margin Oil Families: Siblings and Cousins Plus the Occasional Outsider

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ABSTRACT

The North Atlantic Mesozoic basins are tectonically linked and share a common evolution related to the opening of the North Atlantic Ocean. The offshore basins of Ireland and Newfoundland/Labrador have numerous oil and gas discoveries and to further enhance present understanding and help define future exploration strategy, an integrated geochemical study has recently been completed. This study addresses each basin of Ireland and Newfoundland/Labrador where drilling has taken place and as such, was able to access datasets from 600 offshore wells and additionally, from numerous scientific publications. One of the key aspects of this study has been the collation and integration of both existing and newly acquired analytical data pertaining to oil samples. In the South Atlantic, the oils of the seaboard basins of both continents can often be closely correlated. This study provided the opportunity to make the same assessment of the conjugate basins of Ireland and Newfoundland/Labrador. The database resulting from the study comprises over 100 individual analysed oil samples from Newfoundland and Labrador plus more than 40 similar samples from Ireland. These are supplemented by numerous extracted samples from reservoir and source rock intervals. Integration of these data has confirmed similarities, for example between a number of oils in the Jeanne d'Arc/Flemish Pass and Porcupine basins, through the occurrence of key biomarkers such as Gammacerane. However, within these basins there are differing oil groupings indicating potential variation in source facies. Gammacerane appears to be absent from oils within the Rockall and Slyne basins. Furthermore, the occurrence of Bisnorhopane in Rockall Basin samples points to a closer association with Kimmeridge Clay Formation (KCF) sourced oils found to the north, in both the west and east Shetland basins. In addition to gas chromatography and GC-MS biomarkers, Carbon Isotope signatures from oils point to a range of environments of source deposition and to genetic associations. Locally, the situation can be more complex through potential mixing or alteration of oils. Nevertheless, this new database constructed from both existing and newly acquired datasets allows a greater understanding of origins, distribution and relationships of oils in the study area.