# Zechstein-like Petroleum Systems: A Preliminary Evaluation

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We examine the distribution of organic carbon enrichment within two carbonate-evaporite units in the Permian basins of Europe and discuss their potential as analogues for possible age equivalent sources in the Norwegian North Sea using public source rock data. We also provide an overview of the chemistry of carbonate-evaporite sourced oils using a database of previously unpublished oils from the southern Gulf of Mexico (GoM) combined with published oils from the Zechstein Group onshore Poland.

Shelf-to-basin changes in sedimentary environment exert a strong control on the accumulation of organic matter within the two Permian sources: the Ravnefjeld Fm. in eastern Greenland (roughly equivalent to the Kupferschiefer Fm. of the Zechstein-1 cycle) and the Main Dolomite/Stassfurt Carbonate of the Zechstein-2 cycle in Poland-Germany. With the distribution of organic carbon and the net thickness represented by the carbon-rich intervals, we map the source potential (ultimate expellable potential = UEP) of each unit, after restoration of initial potentials as necessary.

We attempt to transfer the understanding of source rock distribution within the Zechstein Group to the Norwegian North Sea using the gross stratigraphic framework in Marin et al., (2023). We recognize that Permian source rocks exist within the Zechstein Group offshore Norway, but an effort is needed to better understand lateral changes in sedimentary environment before being able to understand the significance of these source rocks.

Finally, we review the compositional attributes of the GoM and Polish oils to establish their organofacies – dominated in these settings by clay-poor organofacies AC. These liquids, however, show considerable variation in their biomarker and isotopic signatures, even when the gross organofacies remains broadly similar. We perform actual oil-source correlations and explain these compositional variations as generation from various parts of the platform-slope-basin facies belt. Observed reservoir fluid properties are generally low GOR and viscous, with dense (low API), high sulfur stock tank liquids.