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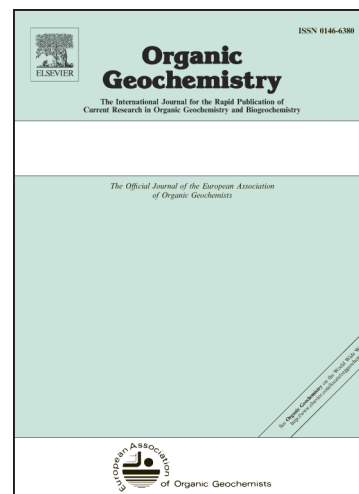
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Organic geochemistry of the Lower Toarcian Posidonia Shale in NW Europe

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Abstract

A suite of core and outcrop samples of the Lower Toarcian Posidonia Shale and time-equivalent deposits was collected from multiple locations, including southern Germany (Swabian Alb and Franconian Alb), northern Germany, the east coast of Great Britain, the Netherlands, and Luxembourg, in order to study major differences and similarities with respect to depositional environment and redox potential based on molecular geochemical data. All samples are immature or in the early oil window with the highest thermal maturity occurring in the profile from Great Britain (about 0.7% vitrinite reflectance). Molecular geochemical maturity parameters were used to quantify maturation in detail.

During shale deposition in the West Cleveland Basin, Great Britain, H₂S was immediately consumed in the water column by terrigenous input, supplying abundant reactive iron to form pyrite. These samples are characterized by low dibenzothiophene/phenanthrene ratios (<0.2) and gammacerane indexes (<0.1) and are accompanied by a high sulfur content and abundant tiny pyrites (>95% of <7 μm in diameter), generated within the water column due to the immediate reaction of Fe²⁺ and H₂S. In contrast, sulfidic (euxinic) bottom waters, possibly with enhanced

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