

NEW INDICATIONS OF THE DISTRIBUTION OF PRE-WESTPHALIAN SOURCE ROCKS IN THE NORTH GERMAN BASIN – EVIDENCE FROM MAGNETOTELLURIC AND GAS GEOCHEMISTRY DATA

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Recent magnetotelluric (MT) measurements have established the presence of good electrical conductors in the deeper, pre-Westphalian rocks of the North German basin. Petrophysical analysis of core material prove that these layers can be correlated with TOC and pyrite-rich black shale. For the first time an attempt is being made to directly correlate magnetotelluric and organic-geochemical data to develop models of the regional distribution of these marine source rocks. The MT data shows that the regional distribution of pre-Westphalian source rocks in the depocentre of the North German Rotliegend basin is unlikely, and hence exploration for deep gas does not seem promising here. On the other hand, northeast of this area up to the southern Baltic, Cambro-Ordovician Alum Shale, known from boreholes and outcrops in Scandinavia, form good conductive layers at depth (8 – 11 km). Although pyrolysis experiments indicate a gas formation potential for this source rock, no gas may be expected to be formed in nature because of the high maturity of the source rock. The good conducting layers south of the central Rotliegend basin at depths of 7 – 10 km correlate with the Dinantian and Early Namurian black shales identified in boreholes. Depending on the maturity of the organic substances these rocks produce natural gas of differing quality along the Rotliegend fairway. The presence of good conducting layers raises the question whether these layers could be potential source rocks for gas in other parts of the mid-European basin.