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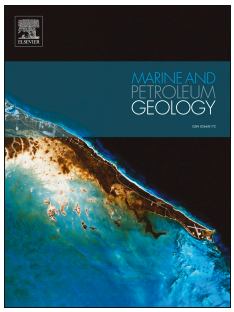

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Stress magnitudes across UK regions: new analysis and legacy data across potentially prospective unconventional resource areas

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Abstract

Stress magnitude data across the UK is limited spatially and stratigraphically with information available for only 21 sites in the latest release of the World Stress Map. This information is largely derived from geothermal resource exploration and radioactive waste storage site assessment. Active exploration of unconventional resources in the UK has highlighted a lack of information to adequately characterise the stress field, in particular in regions underlain by potentially prospective shale formations. Understanding the in-situ stress conditions is critical to the planning of sub surface operations and the potential extraction of unconventional resources.

Legacy stress magnitude data from 75 sites is combined with new analysis of wireline data to re-characterise the stress field across two regions which are underlain by the Bowland Shale Formation which has resource potential for unconventional hydrocarbons. These regions are: East Yorkshire and North Nottinghamshire, and Cheshire and Lancashire.

Vertical stress gradients vary between 23 and 26 $MPakm^{-1}$ for the regions studied. Pore pressure is similar for both regions and is hydrostatic with a gradient of 10.19 $MPakm^{-1}$. Lower bounds for the