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Investigating the Bowland Shale: Preliminary Insights into Understanding the Spatial and Temporal Distribution of Organic Matter

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The Bowland Shale (late Mississippian, early Carboniferous) has potential for the unconventional extraction of hydrocarbons in the UK and in equivalent successions that extend across Europe to the Lublin Basin, Poland. The Bowland Shale was deposited in a marine epicontinental seaway and in a basinal setting. This study seeks to characterise the controls (sedimentological, geochemical, biological, preservation) on the spatial and temporal distribution of organic matter in the Bowland Shale within the Craven Basin (UK) and link this to resource potential. This approach can also contribute to understanding the role that these basins had as a sink for organic carbon (hence sequestered CO₂) on the geological timescale.

The preliminary data presented delineate variation in lithology (utilising sedimentary logging, optical and scanning electron microscopy) and organic carbon content (including TOC and stable isotope analysis) through an exposed succession of the Bowland Shale, located in the Craven Basin, Lancashire. These analyses are compared with time-equivalent borehole core sample(s) also located within the Craven Basin. The study will seek to quantify the effect of modern weathering, by comparing between outcrop and borehole samples. Where modern weathering is considered to be minimal, such analyses can be utilised as an analogue used during exploration for, and classification of, prospective hydrocarbon intervals for unconventional extraction. Future analyses will target approximately time-equivalent sections across the Craven Basin in order to delineate the variation in type, abundance and spatial distribution of organic matter in more proximal and/or distal locations.