



Environmental baselines: preparing for shale gas in the UK

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Groundwater is a vital source of freshwater in the UK. It provides almost 30% of public water supply on average, but locally, for example in south-east England, it constitutes nearly 90% of public supply. In addition to public supply, groundwater has a number of other uses including agriculture, industry, and food and drink production. It is also vital for maintaining river flows especially during dry periods and so is essential for maintaining ecosystem health. Recently, there have been concerns expressed about the potential impacts of shale gas development on groundwater. The UK has abundant shales and clays which are currently the focus of considerable interest and there is active research into their characterisation, resource evaluation and exploitation risks. The British Geological Survey (BGS) is undertaking research to provide information to address some of the environmental concerns related to the potential impacts of shale gas development on groundwater resources and quality. The aim of much of this initial work is to establish environmental baselines, such as a baseline survey of methane occurrence in groundwater (National methane baseline study) and the spatial relationships between potential sources and groundwater receptors (iHydrogeology project), prior to any shale gas exploration and development. The poster describes these two baseline studies and presents preliminary findings.

BGS are currently undertaking a national survey of baseline methane concentrations in groundwater across the UK. This work will enable any potential future changes in methane in groundwater associated with shale gas development to be assessed. Measurements of methane in potable water from the Cretaceous, Jurassic and Triassic carbonate and sandstone aquifers are variable and reveal methane concentrations of up to 500 micrograms per litre, but the mean value is relatively low at < 10 micrograms per litre. These values compare with much higher levels of methane in aquicludes and thermal waters, for example from the Carboniferous and Triassic which have concentrations in excess of 1500 micrograms per litre.

It is important to understand the spatial relationships between potential shale gas source rocks and overlying aquifers if shale gas is to be developed in a safe and sustainable manner. The BGS and the Environment Agency have undertaken a national-scale study of the UK to assess the vertical separation between potential shale gas source rocks and major aquifers (iHydrogeology project). Aquifer – shale separations have been documented in the range <200m to >2km. The geological modelling process will be presented and discussed along with maps combining the results of the methane baseline study, the distribution of Principal Aquifers and shale/clay units, and aquifer – shale separation maps for the UK.