



Fracking Bad Language: the importance of language in the understanding and perceptions of unconventional gas exploitation in UK experts and publics

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Modern geoscience underpins many current energy and climate change issues of social and environmental importance. But controversies and uncertainties associated with the different geological solutions (e.g. nuclear waste disposal, carbon capture and storage, shale-gas extraction, geothermal energy) impact opinion on their efficacies and exploitation. The need for public engagement in scientific debate, particularly on issues of social and environmental importance creates a new challenge for scientists, policy makers and the publics. Despite an apparently 'shared' language, scientific jargon underpins the explanation of many scientific concepts between experts. Geoscience is by no means exempt. Terms are used that for those outside the science are incomprehensible, or worse, that mean something entirely different in other contexts. Statements such as 'complex' geology, deep in the Earth, and 'low levels' of contaminants are used loosely even between scientists.

Here we use the UK's nascent shale gas industry to illustrate these issues. We focus on communication of one of the potential impacts of hydraulic fracturing, namely seismicity. We explore how these communications are perceived across and within the classical silos of geoscience experts and the publics. We consider how poor descriptors and 'loose' language could be used to influence and determine public policy. We gathered perspectives on the potential risks from shale gas development from over 300 individuals: from academia, industry, policy, and the general public at a series of events. We used the same questions as asked in the UK Government's YouGov poll which collected answers using a Likert scale. However, we asked follow-up questions asking why participants had chosen the answer they did.

Our participants recognised that the language used to describe and explain technical risks associated with shale gas exploitation is ambiguous. Terms carry implications with them that participants of all backgrounds thought were problematic. For example; different terms are used to describe seismicity (earthquakes vs tremors vs micro-seismicity) and its effects (felt and unfelt events etc.) even when the participant's intention was to communicate the same concept. For example "Induced earthquakes are rare" could equally be differently expressed as "fracturing only causes microearthquakes". Many participants observed that different descriptors could be used by pro- and anti- unconventional gas campaigners to evoke emotional responses to further their own causes. Additionally, participants had different conceptualisations of the same term. For example 'Deep' is a highly relative term and previous research has shown that non-geoscientists struggle to comprehend the depths that geoscientists refer to. Participants identified ambiguity of terms as a problem that could lead to confusion and uncertainty. Our findings are relevant to improving communication between publics, experts and policy makers and informing policy decisions. Our work shows that imprecise language produces ambiguity and confusion for non-geoscientists and geoscientists alike, particularly in the face of uncertainty and controversy.