

Overall I really enjoyed this paper and it utilised a slightly different approach to its analysis than a traditional mental models paper, many of which use interview data alongside textual/pictorial analyses. The sketches were really interesting with fascinating analysis and they incorporated an affective component of geoscientists, something that is not usually done for m.m approach but provides a worthy discussion point. There are a few clarifications and changes that I feel would improve this paper.

24 Not clear what 'beliefs' are just that they are composed of cognitive and affective components. A sentence defining how the authors want to contextualise 'beliefs' would be useful somewhere in the introduction

59 – 61 A couple of lines acknowledging that non-geoscientists may actually be very knowledgeable from a different perspective (as the paper does end up doing later on) should be included. There are clearly those without a degree who will be at an 'expert' level for example. How one defines a non-expert and expert can be quite tricky!

108 Is there any work that has explored affective responses of experts more generally even? This is something that seems to be lacking in the literature more generally. And is there a reason that research focuses on simply the knowledge aspect of how this group understand a risk issue? (I mean generally, not this specific paper as it is a departure from the norm for m.m)

158 Switch non-geoscientists and scientists (number of) for consistency as you report recruitment of geoscientists and then non-geoscientists over the page (139-140), just to ease reading

167 Table 1 does not add up, numbers reported in all sociodemographic categories (age and educational level) for both groups do not come to the total recruited. Please fix.

176 I was curious why you chose to recruit from an area where you anticipated knowledge levels about the topic to be higher, was this a conscious decision? The aim of the research and purpose for creating the mental models could be clearer. You do mention in your final paragraph of the introduction (124 – 133) that you use a rural community but give the impression that the sample is typical, not one with potentially strong links to this topic. Make this a little clearer ie. that you used this sample specifically because they lived in this area and therefore would be more aware of possible issues or raise things geoscientists may not have considered for example and therefore future dialogue with such a community should consider x, y, z (if this was your intention)

178 Please include a sentence on what information respondents were given in their recruitment letter, was it topic blind or not? (To make it clear if this would bias response)

237 The authors state that they pre-defined six indicators, on what basis was this done? Was this prior to the thematic analysis or from the TA? Not clear, particularly as late on (263) they mention there being four themes. Were the initial six themes deductive and latter inductive utilising grounded theory? (e.g. see Glaser and Strauss (1967) or Pidgeon and Henwood (1997))

342 Check Nature reference, e.g. title?

485, 503, 517 I would argue that the definition of mental models are conceptual or knowledge based but as you correctly say, of course this is not the way humans think and there is research that supports that particularly in non-experts/publics conceptualisation of risk even where it is unfamiliar to them. This is where your paper is more unique as experts are not traditionally asked about their affective response in this methodology but you have done just that. My main thought throughout this paper has been blurring of this line of whether mental models are used as a tool for experts to

only provide rational information or if they should be incorporating emotion (as you discuss later, you want them to include emotion). I think this discussion point is one that will be divisive. Clearly it has an impact on how an expert conceptualises a risk issue and is an important consideration. You state that perhaps they should provide motivations and affect in their dialogues in communication strategies, this might get tricky when it comes to impartiality or a reliance on expertise. I think this is a worthwhile discussion point and one that is quite difficult. I am thinking of deliberative work where people defer to the experts and the influence of affect and how this would interact. In summary, acknowledge the complexities that this may bring.

533 Related to the previous point about communications, are geoscientists the group that should be doing this as they may be seen as having an agenda? So what is the purpose of the communications, make this a little clearer. Perhaps a more interdisciplinary approach including social scientists and comms specialists would be appropriate to eradicate the 'expert' on said topic and influence they have.