

Interactive comment on “Eliciting geologists’ tacit model of the uncertainty of mapped geological boundaries” by R. M. Lark et al.

Anonymous Referee #4

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The idea of the paper is reasonable, to poll a committee of experts in an attempt to extract the tacit understanding held by geologists as to how to best draw lines on geological maps. The expert-elicitation methodology used in this paper closely follows one that has been previously described in the literature, so there is nothing new here about the methodology, except unfortunately that in this case the experts all knew each other and were not allowed to make statements about their expertise and personal interest in the subject matter. Although I am not an expert in in this area of research, I have some other major difficulties with the paper, and invite a response from the authors.

(1) The results, which are actually very thin in my opinion, represent a statistical interpretation based on very small sample sizes of the purported consensus view of a particular close-knit group of experts who work for BGS. I don’t think the results can be

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extrapolated to the geological community writ large, as promised in the title. The experts are likely to have had overlapping experience on shared projects and have been similarly indoctrinated by the same institutional mores for a long period of time. So they are not independent experts in any real sense. The familiarity of the experts with each other very likely constrained the expression of divergent opinions in the discussion periods. It would be difficult for the authors to convince readers otherwise.

(2) No attempt was made to understand whether a geologist would draw a line on a map differently based on his exposure to the actual field situation with all its complexity, versus his exposure to hypothetical simplistic scenarios as part of an experimental test, knowing that he would have to justify his decisioning to a group of long-time colleagues. It would have been nice to see some discussion about this severe limitation on the applicability of this method to real-world decision-making. I am not sure that the results of this paper bear much relevance to the purported topic of the paper for two reasons: (a) the scenarios are, by necessity, unrealistically simplistic; (b) the experts were constrained in their opinions by knowing the other members of the group.

(3) As mentioned above, the methodology is not new. The authors follow a known method, with some divergence, so that the paper cannot be published as a methodological advancement. The title promises extraction of tacit knowledge from geologists. The tacit knowledge is captured here by probability distributions. I don't see this as a particularly insightful way to reveal tacit knowledge. What the authors really should be striving for is to dig deep into the thought processes that go into decision-making of an expert geologist. The statistical summation of the final decisions of a pool of experts, notwithstanding they are not independent, does not provide the reader with a clear idea of how geologists intuitively think about difficult problems. There are many different intuitive thought processes that could yield the same probability distributions as a final result. So, what have we actually learned?

(4) It is not clear that the consensus opinion of a group of experts is better than any one of the expert opinions considered separately. For example, in a real-world application,

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one of the experts could hold key information not known to the others. The opinion of this expert would simply be watered down by the opinions of the experts who do not hold the key. The resulting whole would be less than one of its parts. In other words, consensus building simply arrives at a least common denominator. There must be some mechanism, if this expert elicitation process is going to work, of evaluating the relative strengths of the expertise held by the group. Simply assuming all experts are equally well-qualified is not justifiable, nor is it helpful in producing a result that can be trusted.

Interactive comment on Solid Earth Discuss., 7, 147, 2015.

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