Example Calibration Questions and Introduction from the Elicitation Workshop

Using the methodology of Cooke, we will be trialing the use of expert calibration, which provides a weight to the input of each expert. Based on responses to 15 calibration questions, a weight is calculated for each expert that measures the calibration (how well, statistically, the expert's values match the true values) and the information (a statistical measure of the width of the expert's confidence bounds). The scoring is designed so that an expert receives his or her optimal score by giving the best estimate of the mean and confidence bounds. An additional benefit of calibration questions is in helping the experts to understand the elicitation process they will be undertaking. Any expert weighting calculated will be kept confidential to the facilitator and analyst. Presentation of analysis of calibration question results to the workshop will be kept anonymous, and no individual weights will be shown.

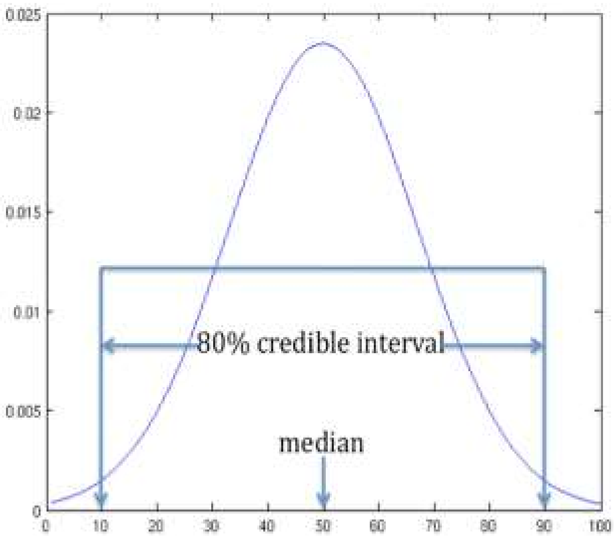
The following questions are broadly relevant to the question of interest. We (or the Cooke method) do not expect you to know all the answers. We ask you to provide your best estimate (50^{th} percentile) as well as a credible range, i.e., an 80% chance that your answer is right.

The 10^{th} percentile estimate says that there is a 10% chance that the 'correct' answer is lower than your estimate.

The 90^{th} percentile estimate says there is a 10% chance that the 'correct' answer is higher than your estimate.

The 50^{th} percentile gives your best estimate and should represent the median (50% percentile) value of your uncertainty distribution. The distribution shape need not be symmetric about the median.

The information, that is, how well the uncertainty is estimated, is heavily weighted in the calibration method. Framing the questions like this, we expect the 'correct' answer to be outside your "credible interval" 20% of the time (see figure below).



Q7: The Omori law is the oldest empirical relationship in seismology and originally described how the number of felt aftershocks per day decayed with time t as 1/t for the 1891 Nobi, Japan earthquake (Omori, 1894). The relationship was found to still be ongoing 100 years after the Nobi earthquake (Utsu et al., 1995). For an average aftershock sequence (e.g., with Omori decay with a p-value of 1.0 and a c value of 0.1 days), please provide your estimated range (10th, 50th and 90th percentile) for the percentage of total aftershocks within 50 years that occur within the first year.

10%_________50%_________90%__________

Q13: In a typical PSHA model, the background smoothed seismicity model is based on a catalogue where clusters have been removed (declustered). In New Zealand, the Reasenberg declustering algorithm is employed to decluster the earthquake catalogue used for creating the background smoothed seismicity model (of the seismic hazard model). Reasenberg is a standard methodology that uses small earthquakes to link clusters of earthquakes together. Wellington is a moderate-to-high seismicity region in NZ but has experienced no large and extended aftershock sequences during the historical times used to create the background seismicity model. Please provide your estimated range (10th, 50th and 90th percentile) for the percent change in the predicted 10% in 50 year PGA for Wellington when using a catalogue that contains all events and has not been declustered vs. one that has been declustered (the mean value and bounds may be either + or -).

10%_________50%_________9