Does having access to uncertainty information improve geologic interpretation? You tell us!

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We are a collaborative group of geoscientists and psychologists seeking to understand the influence of uncertainty information on geologic interpretation. We have developed a five-fold ranking system for characterizing uncertainty in the internal features of an outcrop. From least well constrained to best constrained, these are, Permissive, Suggestive, Presumptive, Compelling, and Certain. In some sense, Permissive and Certain are end members, because there is no variability within these categories. In contrast, the middle three categories - Suggestive, Presumptive, Compelling – have a range of possible values.

Permissive is the least certain form of evidence. Permissive suggests that a particular idea or interpretation cannot be ruled out, but it is also not the only available solution. Suggestive indicates that there is positive evidence for a particular interpretation, but that the evidence also allows the possibility for other interpretations. Presumptive – defined as “presumed in the absence of further information” – indicates that an interpretation is “more likely right than wrong”. Compelling indicates that the evidence is strongly supportive of the interpretation. That is, compelling evidence for an interpretation is based on a preponderance of positive evidence. Finally, Certain indicates that there is a direct and resolvable link between the evidence and a particular interpretation.

Attaching uncertainty rankings to observational data has the potential to improve the sharing and combining of datasets within geoscience, and offers experts the opportunity to weight data (based on uncertainty) during geologic interpretation. At this poster, we are investigating how the availability of uncertainty rankings for strike and dip bedding measurements impacts the structural interpretation of folding rocks in Mecca Hills in Southern California. The geology of the Mecca Hills is often described as three distinct structural blocks (the platform, central, and basin blocks), all of which are highly exposed. The Central block is characterized by highly deformed stratigraphy of Palm Spring and underlying Miocene Mecca formations that define a series of en-echelon anticline/syncline pairs of varying frequency.

We invite expert geoscientists (who have completed at least a Master’s degree) to make structural interpretations of folds (e.g., hinge orientations). You will be provided drone imagery of anticline/syncline pairs, with strike and dip bedding measurements marked at different locations. Each measurement has a corresponding ranking of uncertainty in measurement quality. We will
not collect any identifying information, but we will ask you to complete a brief demographic survey.