Geophysical Research Abstracts
Vol. 15, EGU2013-12454, 2013
EGU General Assembly 2013

Structural interpretation of seismic data and inherent uncertainties

Clare Bond
School of Geosicences, University of Aberdeen, Aberdeen, United Kingdom (clare.bond@abdn.ac.uk)

Geoscience is perhaps unique in its reliance on incomplete datasets and building knowledge from their interpretation. This interpretation basis for the science is fundamental at all levels; from creation of a geological map to interpretation of remotely sensed data. To teach and understand better the uncertainties in dealing with incomplete data we need to understand the strategies individual practitioners deploy that make them effective interpreters. The nature of interpretation is such that the interpreter needs to use their cognitive ability in the analysis of the data to propose a sensible solution in their final output that is both consistent not only with the original data but also with other knowledge and understanding.

In a series of experiments Bond et al. (2007, 2008, 2011, 2012) investigated the strategies and pitfalls of expert and non-expert interpretation of seismic images. These studies focused on large numbers of participants to provide a statistically sound basis for analysis of the results. The outcome of these experiments showed that a wide variety of conceptual models were applied to single seismic datasets. Highlighting not only spatial variations in fault placements, but whether interpreters thought they existed at all, or had the same sense of movement. Further, statistical analysis suggests that the strategies an interpreter employs are more important than expert knowledge per se in developing successful interpretations. Experts are successful because of their application of these techniques.

In a new set of experiments a small number of experts are focused on to determine how they use their cognitive and reasoning skills, in the interpretation of 2D seismic profiles. Live video and practitioner commentary were used to track the evolving interpretation and to gain insight on their decision processes. The outputs of the study allow us to create an educational resource of expert interpretation through online video footage and commentary with associated further interpretation and analysis of the techniques and strategies employed. This resource will be of use to undergraduate, post-graduate, industry and academic professionals seeking to improve their seismic interpretation skills, develop reasoning strategies for dealing with incomplete datasets, and for assessing the uncertainty in these interpretations.

Bond, C.E. et al. (2012). 'What makes an expert effective at interpreting seismic images?' Geology, 40, 75-78.

Bond, C. E. et al. (2011). 'When there isn't a right answer: interpretation and reasoning, key skills for 21st century geoscience'. International Journal of Science Education, 33, 629-652.

Bond, C. E. et al. (2008). 'Structural models: Optimizing risk analysis by understanding conceptual uncertainty'. First Break, 26, 65-71.

Bond, C. E. et al., (2007). 'What do you think this is?: "Conceptual uncertainty" In geoscience interpretation'. GSA Today, 17, 4-10.