When There Isn't a Right Answer - Dealing with the Uncertainty of Seismic Interpretation to Maximise Success

Bond, Clare E.[1]; Shipton, Zoe K.[2]; Macrae, Euan [2]; Philo, Chris [2] (1) Midland Valley Exploration, Glasgow, United Kingdom. (2) Department of Geographical and Earth Sciences, University of Glasgow, Glasgow, United Kingdom.

Seismic images have an inherent uncertainty due to the nature of the data collection and its resolution. Generally, humans do not like such uncertainty, especially when they are unsure of how to deal with a problem. In this paper we present an observational study of geoscientists at different stages in their career interpreting seismic data sets. We use the observations of under-graduate students through to professional geoscientists to track the evolution of skills and approaches to seismic interpretation with expertise. We have considered the effects of the observed evolution of workflows with expertise on interpretational outcome. The observations allowed key skills and technical workflows to be identified, that individuals have developed through their professional experience and training . Observing how individuals deal with the uncertainty of seismic interpretation allows new training strategies to be developed to aid other geoscientists undertaking similar tasks. The ultimate goal is to help geoscientists at any career stage to optimise their interpretational ability.

In the initial experiment the geoscientists were asked to interpret the seismic sections 'blind', without context such as: geological setting, stratigraphy etc. We compare the results of this initial study with one in which geoscientists were given a seismic section overlain with five plausible interpretations and asked to choose their preferred interpretation, or make their own. In this example, the direct uncertainty of physically interpreting the data has been removed. Instead the uncertainty lies in choosing the correct model. Do the geoscientists use the same techniques to determine the most plausible interpretation? Or do they rely on 'gut-feeling' and prior knowledge?

The combined study tells us about how geoscientists evolve skills and mechanisms to deal with the uncertainty of interpreting seismic data. It also shows how technique use changes when similar problems are framed differently. Understanding the human inter-play with uncertain data is important for risk assessment of the models geoscientists create from their interpretations. Our observations allow recommendations to be made for training geoscientists to tackle interpretation problems at all stages of their professional career.