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Spatially variant uncertainty in the geological interpretation of reflection seismic data

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Quantifying uncertainty in seismic interpretation is typically achieved through stochastic modelling. Propagating expected variability in structural geometry through the seismic processing and interpretation workflows considers inherent errors however fails to constrain uncertainty in the interpretation.

Misinterpretation may occur when practitioners make a categorical decision adjusting the assumptions applied during interpretation. Applying different a priori knowledge this may lead the interpreter to apply inappropriate base values during stochastic modelling.

Modelling the seismic reflection response of alternate interpretation cases provides new insight into interpretation uncertainty. Furthermore it provides the initial steps of quantifying interpretation uncertainty.

Understanding the illumination, resolution and detectability of data constrains the variation of interpretation uncertainty in space. Combining knowledge of this spatial variation with basic logic of interpretation provides a means to greatly improve our potential to conceive and consider alternate models.