Geophysical Research Abstracts
Vol. 17, EGU2015-660, 2015
EGU General Assembly 2015
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A Confidence Index for expressing geological model uncertainty

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A Confidence Index has been developed that expresses the confidence of experts in the quality of a 3-D model as a representation of the subsurface at particular locations. The Confidence Index is based on the notion that the variation of the height of a particular geological surface represents general geological variability and local variability. The general variability comprises simple trends which allow the modeller to project surface structure at locations remote from direct observations. The local variability limits the extent to which hard data constrain inferences which the modeller can make concerning local fluctuations around the broad trends. The general and local geological variability of particular contacts are modelled in terms of simple trend surfaces and variogram models. These are then used to extend measures of confidence that reflect expert opinion so as to assign a confidence value to any location where a particular contact is represented in a model. The index is illustrated for individual model surfaces and ther thickness of units with examples from the East Midlands region of England.