

INCORPORATING DATA UNCERTAINTY IN 3D VOXEL MODELLING AND THE IMPORTANCE IN DECISION MAKING

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Geological databases resulting from the merging of various data sources and time periods jeopardize harmonization of data products. Data standardization is already common practice and a first step in avoiding semantic overlap. European marine data-management infrastructures provide such standards, e.g., Geo-Seas (<http://www.geo-seas.eu/>) for geological data and SeaDataNet (<https://www.seadatanet.org/>) for marine metadata in general. In addition, metadata quality control is important, though data uncertainty is seldom quantified and yet to be used in modeling.

Preliminary uncertainty analyses were worked out to provide an extra dimension to the cross-border 3D voxel models of the geological subsurface of the Belgian and southern Netherlands part of the North Sea (<http://odnature.naturalsciences.be/tiles/>). Starting from simple quality flagging in geological databases and model-uncertainty calculations (probability and entropy) in the 3D modelling, data uncertainty (e.g., related to qualities in positioning, sampling and vintage) is now quantified. Combining all uncertainties remains a challenge, as is communicating their importance in decision making.

A demonstration will be given on the status of the uncertainty analyses and on the way these are incorporated into a newly developed decision support tool allowing interactive querying of the 3D voxel model, now comprising geological parameters as well as entropy, probability and data-uncertainty attributes (Figure 1).

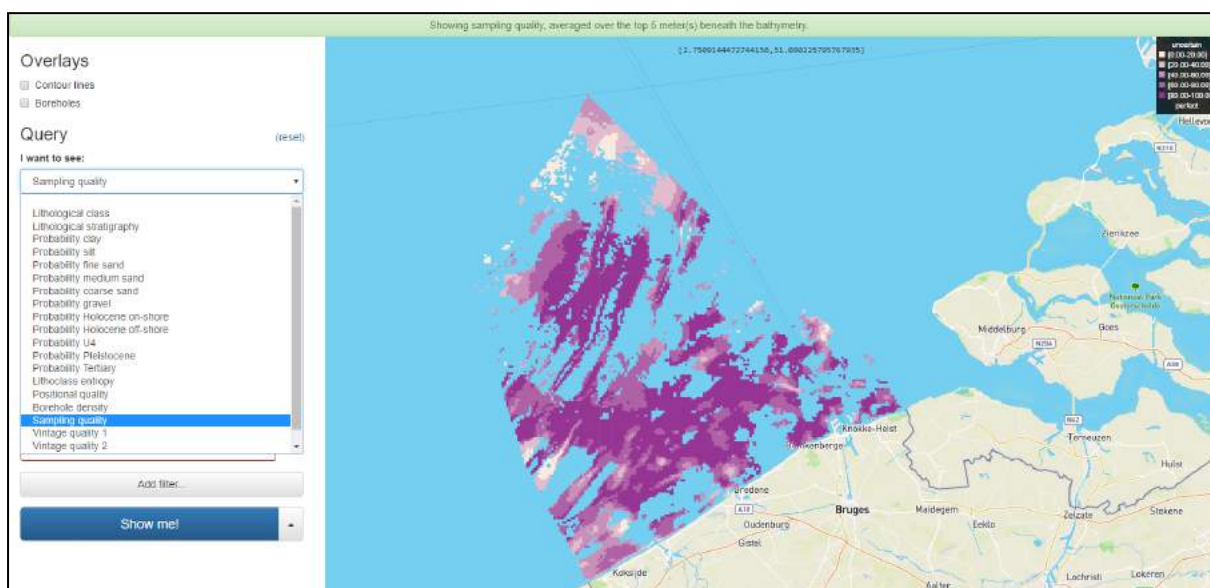


Figure 1. Interactive querying of the 3D geological voxel model in the newly developed 2D Decision Support System (DSS).