

Hidden uncertainties revealed in mapping the marine subsurface

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Geological boreholes and samples are mostly isolated within scientific institutes, universities and private companies. In the marine realm, merging those fragmented datasets to produce seamless maps are largely underestimated, given that the different origins and the wide timespan of acquisition result in varying data quality. Compiling a set of necessary metadata for uncertainty purposes is often not a priority or a simple dedicated procedure is missing. This paper provides a tiered approach on how to assess data quality of marine data products with relevance to a better management of seabed resources. Quality flagging remains the most basic approach in quantifying uncertainties, procuring simple and probabilistic scores. Probabilities are provided for metadata related to positioning accuracy, vintage, sampling gear and analyzing methods per substrate type. They are interpolated and integrated into two-dimensional maps and state-of-the-art three-dimensional voxel models of the subsurface to visualize the abstract concept of uncertainty. In addition, variation in borehole density and geological complexity contribute to the confidence level of data products. Expert knowledge remains vital to understand the background of uncertainty and to optimize marine geological mapping and modeling that it is coherent for the wider community and policy makers. Implication remains how to combine the assessment into one overall uncertainty.