Transnational seabed mapping and subsurface modeling

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Transnational mapping and subsurface modelling are by no means simple endeavours. Often, they start through groups or individuals willing to cooperate and add value to national datasets. More and more, producing transnational data products is becoming a goal on its own. This evolution is stimulated and facilitated by datasets that are increasingly free of charge and available in formats that are easily accessible and mergeable, as well as by technical advancement. Shifting mindsets, common regional to global socio-economic and environmental challenges, but of course also funding opportunities (e.g., EMODnet) have paved the way.

However, significant optimisation is still needed on the data level. Nowadays, new data are mostly acquired using 'sound' protocols and calibration procedures, and data descriptions and interpretations benefit from common vocabularies. However, legacy datasets compiled from national, regional and local archives cannot be used immediately; they require many standardisation and harmonisation steps. Quality assessments, although a must, are only seldomly quantified and taken along in the mapping or modelling process. As of yet, few standardised procedures are in place to obtain products with estimated model ánd data accuracy at various spatial scales.

To a typical end user, products from 3D (sub)surface modelling look more convincing than traditional paper maps, but they too are only as good as the underlying data. As with mapping, many complex techniques exist increasing the predictive power. Statistics now drive the delineation of seabed classes or facies, though geological expert knowledge and common sense are needed more than ever to guide the process. Speed and flexibility in visualisation are key, with mismatches emerging rapidly, different parameter settings demonstrating their advantages and disadvantages, but also unveiling knowledge gaps. Improving methodologies for querying data and data products enable the effective control of tailor-made model output. Data portals, and ideally decision support systems, are becoming increasingly powerful and therefore more relevant for applications. With web services, users can easily incorporate new products into their own geographic information systems, facilitating exploration and quantification of relationships between a wide range of multidisciplinary datasets.

In this keynote, examples will be given of broad- to small-scale applications related to the mapping and modelling of seabed sediments, geomorphology, and subsurface geology. For all, tiered approaches are needed, including the necessary quality control. Mapping goals should be defined upfront, since 'one size fits all' seldomly delivers the best product. Importantly, underlying databases should be designed to have as much flexibility as possible. They should include the full spectrum of available data, original and standardised, and with quality parametrised, enabling fully customized products serving the purpose. Collaborative actions, shared data acquisition platforms, adequate technology, and aligned visions are more than ever desired.