# BUILDING ON 50 YEARS OF GEOMODELLING: WALKING A TIGHTROPE BETWEEN TRADITION AND CLEAN SLATE

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Geological surveys are facing the transition from systematic 2D mapping of national territories to more versatile – possibly cross-border – 3D models. BRGM has produced geological models for several decades in a project driven approach implying specific goals, hypotheses, scales, modeling tools... In such an approach, a few experts' choices may constrain the final deliverable and hamper interdisciplinary contributions. BRGM is currently redesigning its set of existing tools into an open modeling platform based on modular software components. This is an opportunity to take stock of our vision of 3D geological modeling, the way we produce and make use of geological models, and to rethink the way we want to work tomorrow. In this talk, we will share some of the challenges that we are currently facing in this redesign. A first observation is that the era of monolithic software is over. As a geological survey, we need to find our position – both individually and collectively as European surveys – between two major trends: the replacement of proprietary commercial suites by web-service based cloud platforms and the rise of many open-source initiatives. Though promising, the latter does not benefit from a mature structured global community support yet, as it can exist in other communities (e.g., for GIS), which would make us take the next step. Another observation is that there is still a considerable gap between the geologist's dream tool and the modeling experience that geological software have been offering for the last twenty years – mainly consisting in popularizing the "implicit" modeling approach. Ideally, new tools will combine both proven legacy and newer methodologies to overcome existing tools limitations and promote true interdisciplinary experience. Though some fields of research are promising, as are many technological devices, the feeling is that we still need a breakthrough that would change the daily life of geological model producers and represent a clear alternative to old monolithic software. Finally, the major challenges that the geomodelling community is facing are probably the ever-increasing complexity and diversity of uses of geological models. We want tomorrow's models to be detailed and accurate, upgradable and scalable, to allow for uncertainty quantification and risk analysis, etc. Finally yet importantly, we also want to share these models across domains and applications. Meeting all these needs requires us to rethink our definition of a geological model. Observing that several tools share common core concepts (e.g., geological pile/architecture to express relations between geological interfaces), a first step is to clearly identify and harmonize these underlying concepts. This will pave the way to their generalization and to the emergence of a common definition of a geological model as a framework for interdisciplinary contributions.