How Geological Architecture Helps 3D Modelling
Philippe Calcagno, Gabriel Courrioux, Simon Lopez, Bernard Bourgine

To cite this version:
Philippe Calcagno, Gabriel Courrioux, Simon Lopez, Bernard Bourgine. How Geological Architecture Helps 3D Modelling. 4th meeting of the European 3D GeoModelling Community, Feb 2018, Orleans, France. hal-01710045

HAL Id: hal-01710045
https://brgm.hal.science/hal-01710045
Submitted on 15 Feb 2018

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
How Geological Architecture Helps 3D Modelling

Philippe Calcagno, Gabriel Courrioux, Simon Lopez, Bernard Bourgine

BRGM

3D Geological modelling aims at representing the geology of the subsurface in 3 dimensions. Building a 3D geological model is not only pushing data through a code to obtain a representation of the geology. Two kinds of knowledge are mainly used to complete a geological model. The first one is explicit and consists in the data that constrain the model. The other one is generally implicit and consists in the geological knowledge that is used—sometimes unconsciously—by the person(s) in charge of completing the model. This knowledge is essential to drive the interpretation supporting the model.

The geological knowledge can be seen as an architecture underlying the 3D model. This geological architecture is derived from data, observations, interpretations, and experience. It needs to be compatible with the data but the same geological architecture may apply to various sets of data. Then, a 3D model is a geometrical realization of the topology represented by the geological architecture.

Formalizing such relations between geological structures and bodies is a way to conceptualize, to store, and to retrieve the geological knowledge. It is also a tool for the automation of the 3D model computation (Calcagno et al., 2008; Perrin and Rainaud, 2013). In that case, the geometry of the modelled structures can be generated using the data and the rules of the geological architecture. The presentation will demonstrate how the geological architecture can be set up to represent various geological contexts. Finally, the pertinence of storing 3D model, data, and geological architecture will be debated.