

EGU21-632

<https://doi.org/10.5194/egusphere-egu21-632>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Current and future limits to automated 3D geological model construction

Mark Jessell

Mineral Exploration Cooperative Research Centre, The University of Western Australia, School of Earth Sciences, Crawley, Australia (mark.jessell@uwa.edu.au)

In geological settings characterised by folded and faulted strata, and where good field data exist, we have been able to automate a large part of the 3D modelling process directly from the raw geological database (maps, bedding orientations and drillhole data). The automation is based upon the deconstruction of the geological maps and databases into positional, gradient and spatial and temporal topology information, and the combination of deconstructed data into augmented inputs for 3D geological modelling systems, notably LoopStructural and GemPy.

When we try to apply this approach to more complex terranes, such as greenstone belts, we come across two types of problem:

- 1) Insufficient structural data, since the more complexly deformed the geology, the more we need to rely on secondary structural information, such as fold axial traces and vergence to 'solve' the structures. Unfortunately these types of data are not always stored in national geological databases. One approach to overcoming this is to analyse the simpler (i.e. bedding) data to try and estimate the secondary information automatically.
- 2) The available information is unsuited to the logic of the modelling system. Most modern modelling platforms assume the knowledge of a chronostratigraphic hierarchy, however, especially in more complexly deformed regions, a lithostratigraphy may be all that is available. Again a pre-processing of the map and stratigraphic information may be possible to overcome this problem.

This presentation will highlight the progress that has been made, as well as the road-blocks to universal automated 3D geological model construction.

We acknowledge the support of the MinEx CRC and the Loop: Enabling Stochastic 3D Geological Modelling (LP170100985) consortia. The work has been supported by the Mineral Exploration Cooperative Research Centre whose activities are funded by the Australian Government's

Cooperative Research Centre Programme. This is MinEx CRC Document 2020/xxx.