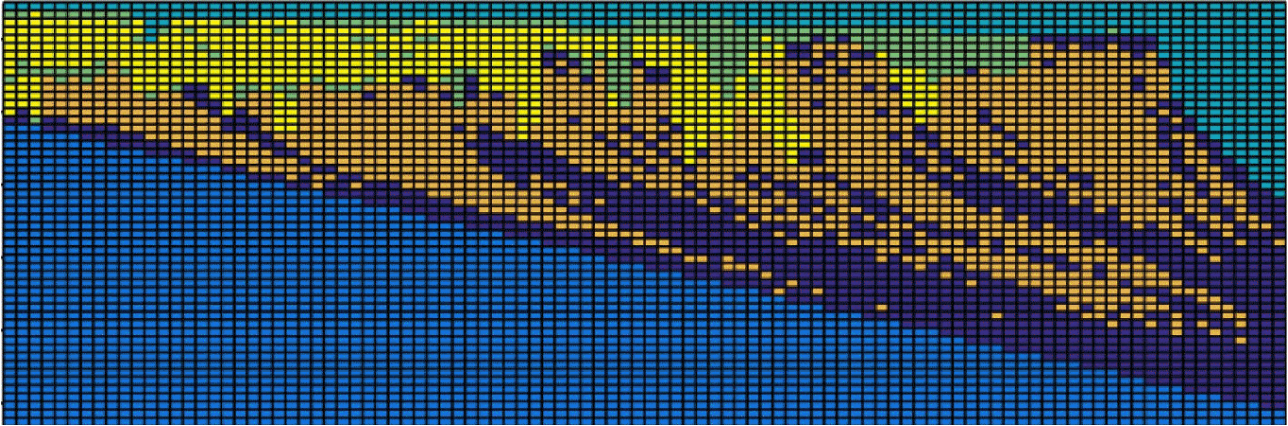


Explorative Toolbox for Teaching Geostatistical Modelling



Porous media reservoirs are essential for the energy supply – nowadays, by providing oil & natural gas for combustion processes, as well as in the future, by means of *carbon capture and storage (CCS)* and as source of geothermal energy. Finding those reservoirs and assessing their energy-delivery potential is at the core of *petroleum geology*. Assessing those porous media reservoirs is nowadays rarely conducted by environmentally-intrusive drilling. Instead, geologists use *geostatistical tools* to *model* a reservoir. Those tools integrate *sparse-sample interpolation* using statistical prior knowledge, such as porosity distribution or homogeneity of the rock composition. The different geostatistical algorithms together represent the toolbox of the geological modeller.

For geology students, learning about the various algorithms, their differences, (dis-)advantages and application scenarios is complicated. The algorithms are integrated in professional, complex and commercial tools, which themselves are not designed for *method learning* but for *production modelling*. This lack of learning tools poses a barrier in geology education.

This project aims to remove this entry barrier by providing for a simplistic, *graphical* and *interactive* tool to try out various modelling techniques on educational case studies and without the need for production data. The research question followed in this approach is *how interactive, visual tools can augment the advanced university-level training of Geostatistics with minimal mathematical priors*. Design ideas for maximizing interaction, engagement, experimentation and *fun* (including gamification concepts) are appreciated. The objectives of the envisaged toolbox are:

- Provide *graphical* access to various algorithms in 2D or 3D
- Differentiate the modelling purpose (i.e. *application context*) of the algorithms & methods, e.g. through distinct categorisation
- Highlight the impact of each method's required input data via masking & noise-modulation
- Interactively show the impact of the methods' parametrisation
- Visualise the methods' stochastic variability and model re-use potential

The project milestones aside of the software development include:

- Survey the literature for gamified- and interactive training methods in Geology
- Develop a user evaluation survey to assess engagement and *fun* during tool use
- Conduct a user study through the developed survey
- Comment on the assessed engagement & fun through the survey results