

Generation of a web-interface for hydrogeological applications

Computer programs for hydraulic groundwater calculations are essential for the management of groundwater resources and the mitigation of environmental risks. Over the last decade, the Federal Institute for Geosciences and Natural Resources (BGR) has developed a suite of computer programs and applications for hydraulic groundwater calculations. These software products are normally hosted on open-source code-sharing platforms (i.e. GitHub, GitLab, Bitbucket), which require user accounts for individual scientists. For the near future, the BGR aims at offering the suite as web-based groundwater tools on a centralized host system, allowing the user to use the tools in real time and without the necessity of a local installation, avoiding therefore potential problems with operating systems compatibility.

The proposed master thesis aims at designing and developing a pilot web-based groundwater tools infrastructure. The candidate will be provided with existing python-codes for graphical user interfaces (GUI) of the groundwater tools and embed those into a web-based framework. The candidate will further design a website interface for the application of the web-based programs. The website will also include a GUI download option. In the present Master thesis, the candidate will develop the interface for the two BGR tools WellDesigner (<https://bitbucket.org/cguevaramorel/well-designer/src/master/>) and HYPAGS (<https://github.com/APeche/HYPAGS>) (Peche & Houben 2022; Peche et al., 2023).

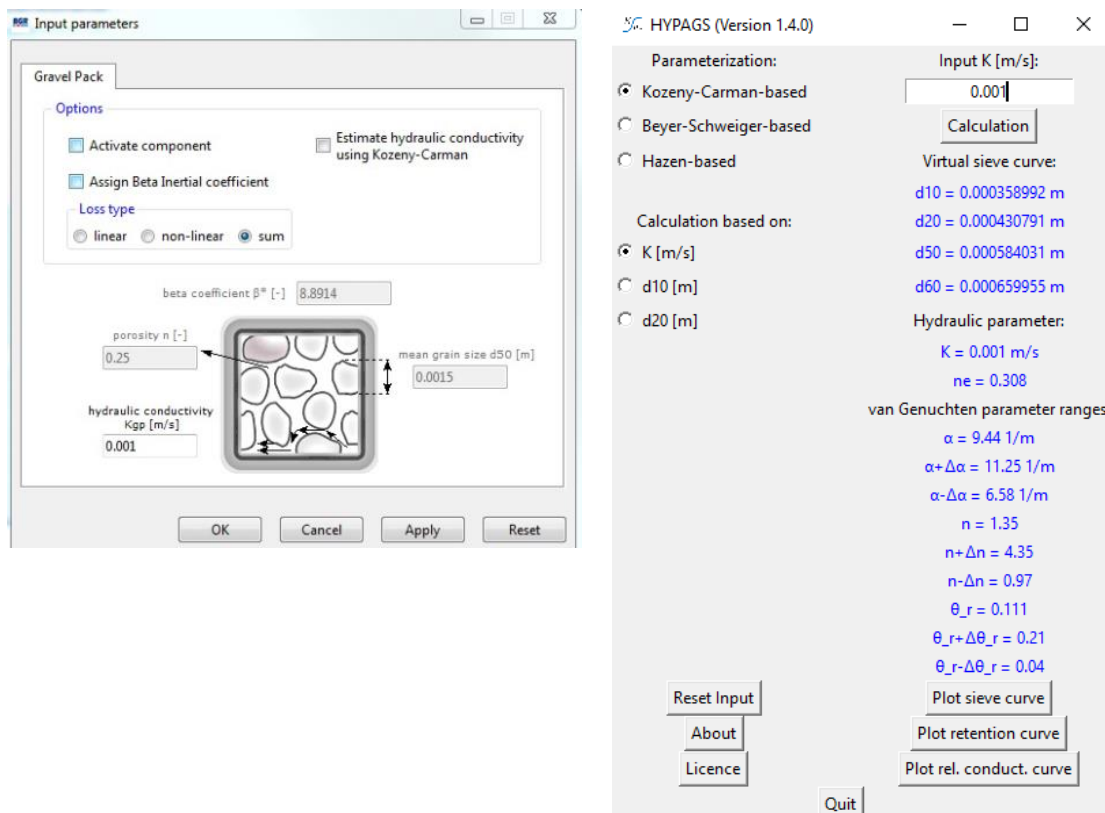


Fig. Left: Example view of WellDesigner component window. Right: Body of the HYPAGS GUI

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Literature:

[1] Houben, G. J., Wachenhausen, J. & Guevara Morel, C. (2018). Effects of ageing on the hydraulics of water wells and the influence of non-Darcy flow. *Hydrogeology Journal*, 26, 1285-1294.

[2] Peche, A., & Houben, G. J. (2022). Estimating characteristic grain sizes and effective porosity from hydraulic conductivity data. *Groundwater*, 61(4), 574-585.

[3] Peche, A., Houben, G., & Altfelder, S. (2023). Approximation of van Genuchten parameter ranges from hydraulic conductivity data. *Groundwater*.