

WHAT IS INOWAS?

INOWAS is a web-based platform to create, run and visualize groundwater flow and transport models directly from the browser.

- **What is the scientific scope?**
We focus on the characterisation of water flow and solute transport processes in the saturated soil zone.
- **What is the content of the platform?**
The platform includes a collection of MODFLOW-based numerical tools, analytical equations and empirical correlations based on data mining.
- **How to use the platform?**
All tools can be used directly from the web browser, without the need to install any additional software, To protect your data, user registration is required.
- **What is different with INOWAS?**
The web-based implementation facilitates sharing data and models via internet, enabling a facile collaboration between users.
- **How much it costs?**
Nothing. We aim to make groundwater tools easily accessible via internet to everyone so the platform can be used for free.
- **What type of license is used?**
All tools are developed from existing open source frameworks and groundwater flow equations under the CC BY-SA 4.0 license.
- **Who developed the platform?**
The platform is developed and maintained by the Research Group on Managed Aquifer Recharge at the Department of Hydrosociences of the Faculty of Environmental Sciences of TU Dresden, Germany.
- **Where can I learn more?**
On our project website www.inowas.com you can find the complete documentation of all our tools, tutorials, examples of models, an FAQ section, video recordings and much more.

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Visit our website:
➤ <https://www.inowas.com>

READ MORE

Glass, J., Junghanns, R., Schlick, R., Stefan, C. (2022) The INOWAS platform: A web-based numerical groundwater modelling approach for groundwater management applications. *Environmental Modelling & Software*, 155, 105452. <http://dx.doi.org/10.1016/j.envsoft.2022.105452>

Glass, J., Jain, R., Junghanns, R., Sallwey, J., Fichtner, T., Stefan, C. (2018) Web-based tool compilation of analytical equations for groundwater management applications. *Environmental Modelling & Software*, 108, 1–7. <https://doi.org/10.1016/j.envsoft.2018.07.008>



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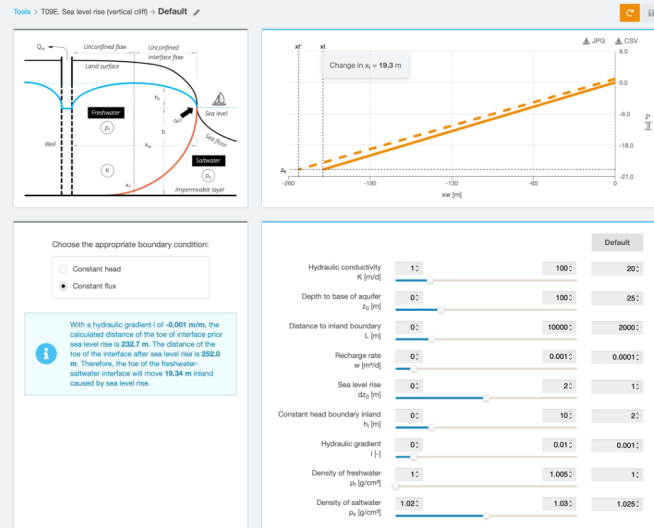


Web-based groundwater modeling platform for managed aquifer recharge (MAR) applications

ANALYTICAL AND EMPIRICAL TOOLS

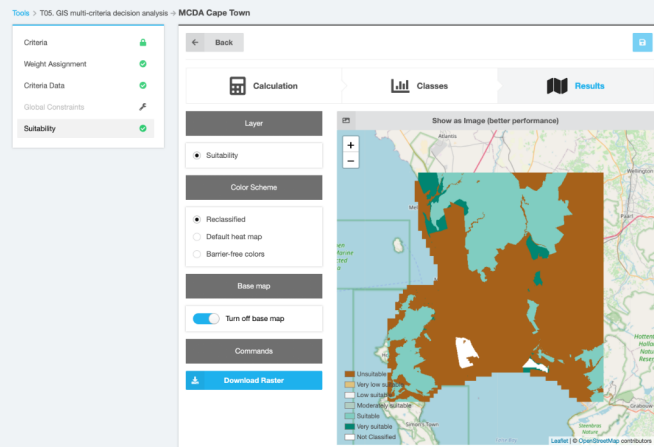
Implementation of analytical equations

Assessing the saltwater intrusion induced by pumping or sea level rise, calculation of groundwater residence time, pumping-induced river drawdown, groundwater mounding below infiltration basins, contaminant transport, multi-criteria decision analysis for MAR suitability mapping, quantitative microbial risk assessment, real-time monitoring.



Data mining and empirical correlations

Decision support system for selection of MAR infiltration methods and modelling tools, design of infiltration basins, query tool and database for suitability mapping, global portal of MAR applications.



NUMERICAL MODFLOW TOOLS

The INOWAS platform uses **MODFLOW-2005**, a three-dimensional finite-difference groundwater model developed by USGS to simulate steady and transient water flow through an aquifer system. Supported by a simple yet powerful web-based graphic interface, the user can create groundwater flow models equipped with additional packages for solute transport (**MT3DMS**), variable-density flow and transport (**SEAWAT**), as well as a scenarios analyser and semi-automatic groundwater flow modelling using (near) real-time sensor data.

FEATURES

Grid-independent data input

Creation of georeferenced features directly on map, geospatial data import from files in raster (TIFF) and GeoJSON format, interpolation from data points, multi-option time series import from local CSV files, online sensors or external sources.

User friendly model creation

Structured grid with customized spatial discretization, manual angle rotation and local refinement, model layers creation from GIS files, most-relevant packages for flow boundary conditions.

Server-based model calculation

Control of model parametrisation, overview calculation progress, calculation logs, view and download individual MODFLOW files, manual calibration using head observations.

Visualisation of model results in browser

Steady-state and transient representation (2D) of groundwater heads, drawdowns and solute concentrations, cross-sections and time series data at selected locations, cumulative budgets.

Scenarios management and analysis

Direct comparison of groundwater heads and drawdowns from unlimited number of model scenarios (cross sections, scenarios difference, time series).

Semi-automatic, real-time model update

Connect MODFLOW models with sensors and update model boundaries in real-time with data from external sources.

