HYDROLOGICAL EXTENSION

- Potentiometric Maps and Draw Down

Hydrological Extension

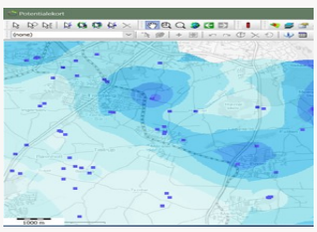
The Hydrological Extension provides a set of tools for conducting common analyses related to understanding water levels in aquifers and wells. The extension provides capabilities for conducting efficient hydrologic analyses like creation of potentiometric surface maps and conducting drawdown analyses. In addition, tools from the toolbox can be integrated with this extension to increase utility.

Potentiometric Maps

Potentiometric maps can be created with the Hydrologic Extension. The tools ensure a smooth workflow through the entire process, from extracting water levels from your database to interpolation and saving as a grid file.
The maps can be made from layered geologic models, creating aquifer-specific potentiometric maps, or based on specific depths (e.g., screen depths from boreholes), and can be visualized in any of the 3D, GIS Map and Cross Section View windows.

Extraction of water levels

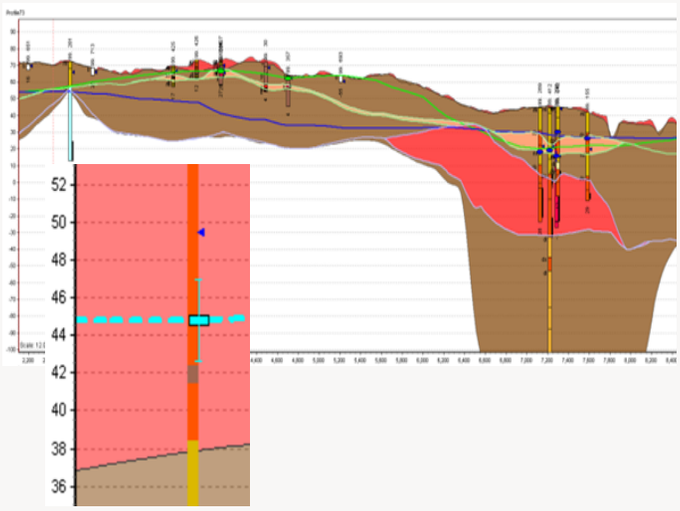
Wizards guides the user through the process of data selection.
Selections can be based on



- Boreholes with screens.
- Boreholes without screens.
- Physical limits defined as regions or layers.
- Time and/or seasonal variations.
- Output can be calculated has mean, maximum, minimum, latest, oldest measurements in the chosen period.
- Standard deviations ("uncertainty") can be calculated.
- Chosen setup is stored in xml file for future updates.
- Water levels are stored in an MS Access Database.

Interpolation

Data can be interpolated in GeoScene3D and creates a grid file for further use. User-defined and calculated standard deviations can be used in the interpolation (when using Kriging) and shows up on cross sections.

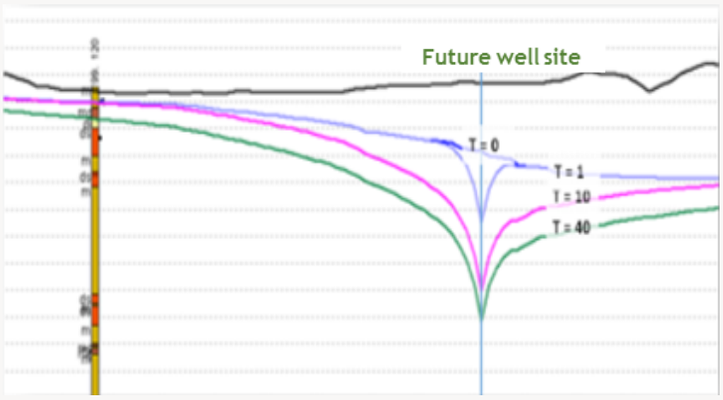


Water levels based on other observations

Points based on observations other than water level measurements from boreholes can be added to the database manually. Using a combination of terrain information and map layers that identify surface water body locations, points can be digitized and attributed directly into the database to represent the elevations of these features.

Drawdown Analysis

Using the Hydrologic Extension, drawdown analyses can be easily conducted from well data based on the Theis Equation. This provides an estimate of drawdown over time and under specific conditions.



Drawdown calculations at different times after pumping start

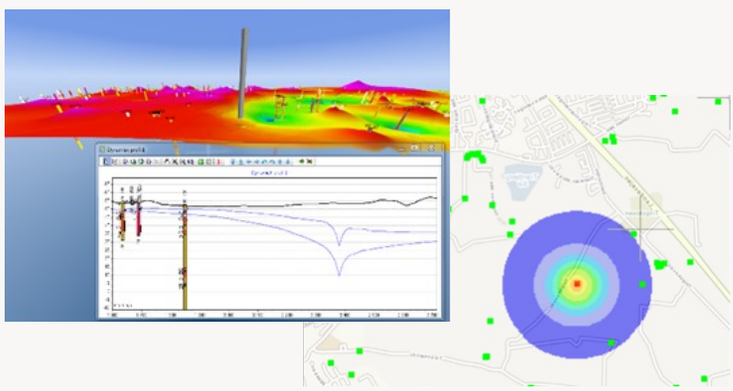
Visualization and output

Calculated water levels are automatically added as grid files into GeoScene3D's Map Window and 3D environment.

Drawdown maps (difference between before and after situation) are added to the Map Window and show the actual calculated drawdown.

Color scales can be defined individually.

Settings (used hydrological parameters) and file names are written as remarks to the individual grid-files.



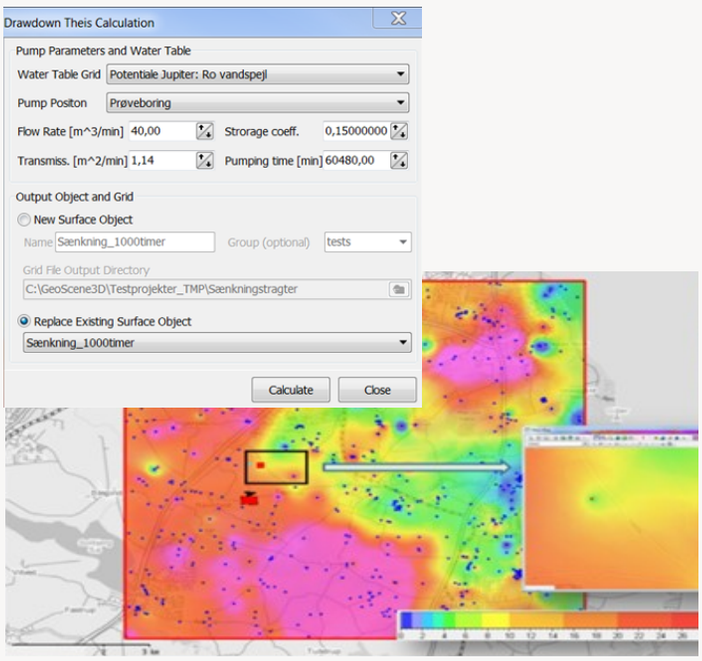
Drawdown Calculation Parameter Options

- Homogenous, isotopic, nonleaky confined aquifer
- Uniform thickness and infinite areal extent of aquifer
- Flow to pumping well is horizontal when pumping well is fully penetrating
- Water table is horizontal
- Control well is fully or partially penetrating
- Water is released instantaneously from storage with decline of hydraulic head

User Interface and Workflow

The user interface and workflow in GeoScene3D is simple (see figure below).

1. Add a water table
2. Define pump/well position (simplified by just on the desired position in a Map Window
3. Insert desired hydraulic– and pump parameters



Data export

The calculated grids can be exported in several file formats (*.asc, *.grd, *.csv, *.txt etc.), for import in other programs. An Export Wizard assists the user in the process.

WANT TO KNOW MORE?

We are here to help you! Find our useful online tutorials and information about GeoScene3D on our homepage or on YouTube channel: www.youtube.com/user/GeoScene3D