

MicroFEM

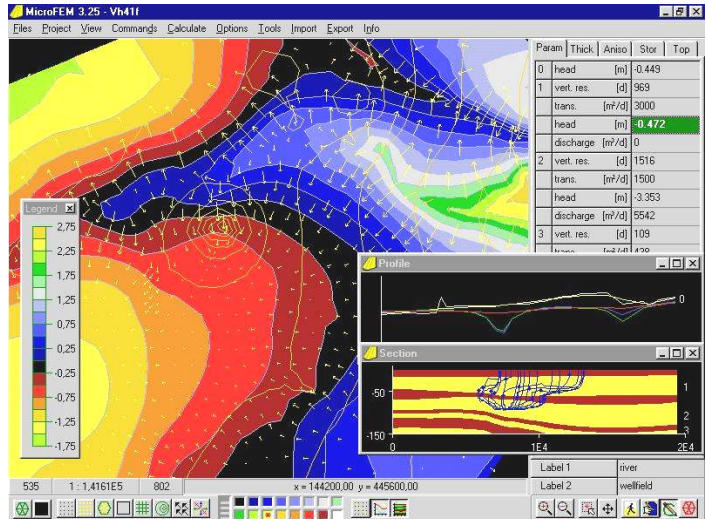
Finite-Element Program for Multiple-Aquifer Steady-State & Transient Groundwater Flow Modeling

MicroFEM for Windows takes you through the whole process of groundwater modeling, from the generation of a finite-element grid through the stages of pre processing, calculation, post processing, graphical interpretation and optimization. Confined, semi-confined, phreatic, stratified and leaky multi-aquifer systems can be simulated with a maximum of 20 aquifers.

Irregular grids, as typically used by finite element programs, have several advantages compared to the more or less regular grids used by finite-difference codes. A model with a well designed irregular grid will show more accurate results with fewer nodes so less computer memory is required while calculations are faster. MicroFEM offers extensive possibilities as to the ease of creating such irregular grids. Two grid generators are available: one is suitable for irregular geometries as often encountered in regional studies, while the other is useful for engineering applications that often require high contrasts in node spacing e.g., sheet piling and excavations. Adding and erasing nodes, connection swapping and further modifications to the grid can be done interactively.

Other MicroFEM features include the ease of data preparation and the presentation and analysis of modeling results. A flexible way of zone-selection and formula-assignment is used for all parameters: transmissivities, aquitard resistances, discharges and boundary conditions for each layer. Depending on the type of model, this can be extended with layer thicknesses, storativities, anisotropy and top system parameters. To inspect and interpret model results, maps and profiles can be used to visualize contours, heads, flow lines, flow vectors, etc. A 3D model viewer is included. Time –drawdown curves and water balances can be selected with just a few keystrokes or clicks of the mouse.

A built-in optimization tool is available to calibrate steady-state models.



Modeling Features

- Saturated single-density flow
- Multiple aquifer systems and stratified aquifers
- Confined, leaky and unconfined conditions
- Heterogeneous aquifers and aquitards
- Steady-state and transient flow
- Spatially varying anisotropic aquifers
- Spatially and temporally varying wells and boundary conditions
- Precipitation, evaporation, drain, river and wadi top systems.

MicroFEM capacities

- Mesh generators for regional flow models and for civil engineering models
- Interactive mesh design and adjustment
- Graphical user interface and data base
- Interactive assignment of spatially varying properties
- Up to 20 aquifers or sublayers
- More than 50,000 nodes per layer
- User-assigned names for all nodes
- Flow vectors and flow lines, 3-D particle tracking
- Water balances for each aquifer and subarea
- Transient flow modeling in batch mode

Input & Output

- Model files in ASCII format
- DXF maps and flowlines files import
- Screen resolution output to printer
- Plots of grids, contours, flow lines and time series
- SURFER and ArcView compatible data files
- HPGL and DXF files export

MicroFEM for Windows

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| • MicroFEM Lite | free |
| • professional version | |
| • updates and support | |
| • single-user license | € 900 |
| • office license | € 1500 |