NEWS IN FEFLOW 7.1

Unprecedented geometrical flexibility for fully integrated modelling of subsurface and surface phenomena

Advanced technologies. Sustainable solutions. Fuelled by knowledge.

All over the world, water professionals know MIKE Powered by DHI technologies are the gold standard. Whether you need software solutions or access to online services, our flexible technologies work seamlessly together for the best user experience.

We develop unique solutions for your specific challenges and make them directly accessible to you. With unparalleled client care from offices in over 30 countries, our users never stand alone.

The foundation of MIKE Powered by DHI encapsulates years of knowledge and experience. With our advanced and customisable technologies, YOU become the expert in water environments.

The expert in **WATER ENVIRONMENTS**

MIKE
Powered by **DHI**

The unprecedented level of geometrical flexibility achieved with the FEFLOW 7.0 release is consolidated and further enriched by an advanced representation of Discrete Feature Elements allowing more adequate treatment of discontinuities.

This upcoming release of FEFLOW enables you to model groundwater processes more efficiently in unconsolidated materials, fractured rocks and fault systems, or karstic aquifers.

Try out our new integrated powerful surface-subsurface coupling engine!

COUPLING THE POWER OF MIKE21FM & FEFLOW

This new coupling integrates the state-of-the-art FEFLOW 7.1 and MIKE 21 Flow Model FM (MIKE21FM) models into a single, dynamically coupled modelling system. The coupling engine handles a 4-way coupling through optimal, hybrid parallelization models (OpenMP, MPI, Multi-GPU):

- 3-way coupling between MIKE21FM, the river models MIKE11/MIKE1D, and the Urban model (MIKE FLOOD)
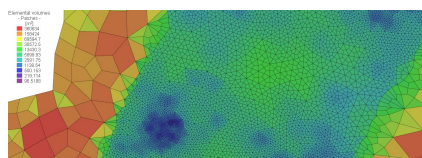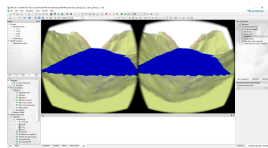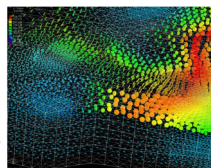- **MIKE21FM - FEFLOW coupling [flow, heat and salinity]**
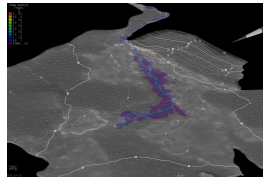
Exploit the FEFLOW GUI to pre– and post–process subsurface and surface quantities (surface water depths and levels, exchange rates). Model surface runoff, infiltration of ponded waters, surface and groundwater flooding events, river-aquifer interactions in coastal settings and at fine resolution using non-conforming meshes.

GENERAL FEFLOW USABILITY
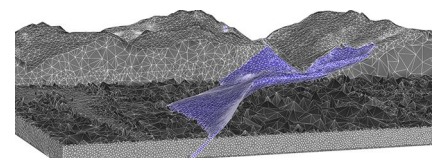
FEFLOW general usability has been improved and extended:

- **New 2D/3D selection tools like the "Select by Value" or "Select Discrete Feature"**
- **Additional property visualisation styles (e.g., *surface water bodies, tensorial properties*)**
- More "Drag & Drop" actions (e.g., properties onto element/node/edge/face selections, map files onto the GUI)
- **Charting and recording of property content**
- Personalize the FEFLOW UI layout from a choice of styles
- Improved TetGen meshing with additional controls on add-ins
- Improved parameter interpolation for 3D remeshing
- More 3D polygons format support (off, obj, stl, vtk, vtu)
- Improved support for screenshot and movie exports
- **Discover our Oculus Virtual Reality support and dive into your meshes!**

HANDLING OF DISCRETE FEATURE ELEMENTS (DFE) REVISITED

FEFLOW 7.1 comes with a full revision of DFEs both at the pre/post-process and calculation levels:

- New entity panel for DFEs
- **Dual-node approach for all processes:** it is now possible to control the exchanges between matrix elements and DFEs by means of a 1st-order type conductance type relationship
- Beyond the enhanced control on flow solutions, the dual-node approach also brings more robustness and provides more physical mass transport solutions through dispersion/diffusion control
- DFEs parameter regionalization is also more flexible today!

REGIONALIZATION, CALCULATIONS, MODEL CALIBRATION AND UNCERTAINTY QUANTIFICATION

FEFLOW

- **Highly optimized inverse-distance and kriging methods**
- New preconditioned iterative solvers (Jacobi-CG, iLU0/iLUt –fGMRes)
- **Minimum allowed stepsize new control**

FePEST

- **Unsaturated zone parameters support**
- **Explore predictive uncertainty with the Pareto mode**
- Objective function components visualisation
- Access FEFLOW Point Sets to create 3D Pilot Points
- New BeoPEST configuration options and advanced run options
- Parallelised sensitivity and stability analyses
- Access to improved FEFLOW kriging functionality

In addition to unstructured meshing in the 3rd dimension, FEFLOW handles *mixed triangular/quadrangular meshes*, a useful combination that can improve model stability and cut down on run times.
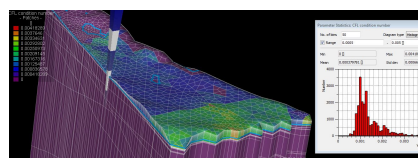
New auxiliary parameters allow to directly show fluid *density* and *viscosity*, as well as *relative permeability* , *pseudo-saturation* and *Courant-Friedrich-Levy condition number* (CFL) .
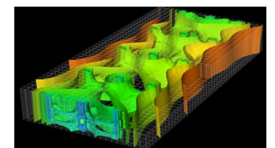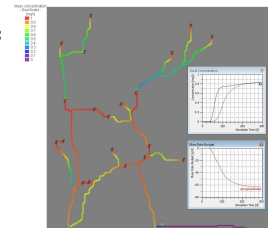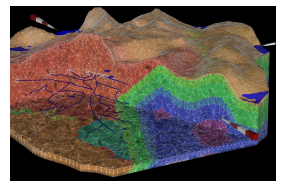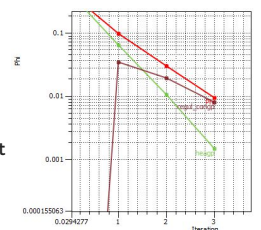
Aside from these major new features, there are *numerous smaller improvements* that make it worthwhile to have a closer look at FEFLOW 7.1! Let us know if you would like to get an evaluation

Contact us: MIKE Powered by DHI Client Care - mike@dhigroup.com
For more information, visit: www.mikepoweredbydhi.com

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