

Review of MIKE SHE

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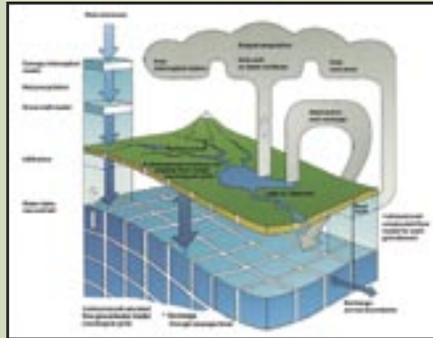
MIKE SHE is a powerful, physically based, distributed-parameter, fully integrated code for three-dimensional simulation of hydrologic systems. It has been successfully applied at multiple scales, using spatially distributed, continuous climate data to simulate a broad range of integrated hydrologic, hydraulic, and transport problems in humid as well as semi-arid and arid areas. In the United States it has been used extensively in South Florida on Everglades restoration projects, at a former DOE nuclear manufacturing facility in Rocky Flats, Colorado, and in the Black Mesa basin of northeastern Arizona, among other locations.

MIKE SHE 2003 was developed by DHI Water and Environment. An earlier version, SHE, was developed in cooperation with the British Institute of Hydrology and SOGREAH Consultants. In the 2003 version, all major hydrologic flow processes are dynamically coupled, including 2-D overland flow, 1-D channel flow, 3-D saturated zone flow, 1-D (Richard's-based) unsaturated zone flow, snowmelt, and evapotranspiration. Overland flow simulation uses digital elevation models, while channel flow is simulated through the MIKE 11 code, which has extensive capabilities, including user-defined regulating structures, water quality and sediment transport, and a morphological module. It is also capable of simulating integrated advective-dispersive transport, sorption, biodegradation, geochemistry (including PHREEQC), and macropore flow, and is generally applicable for most hydrologic, water resources, and contaminant transport applications. In contrast to similar codes, MIKE SHE uses rigorous physical flow equations for all major flow processes, but also permits less complex descriptions.

MIKE SHE has undergone limited verification (www.integratedhydro.com/reviews.html) to test its ability to simulate single component processes and some process interactions. Though sophisticated and flexible, its ability to simulate evapotranspiration and stream-aquifer interactions could be improved. Verification emphasized that a systematic approach and careful consideration of scale-dependent

MIKE SHE Software Review

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Rating System for graphics:

- ★★★★ Excellent
- ★★★★ Very Good
- ★★★ Good
- ★★ Satisfactory
- ★ Poor

Ease of Use: ★★★★★

GUI: ★★★★★

Application: ★★★★★

Output/Plotting: ★★★★★

Documentation: ★★★★★

Speed: ★★★★★

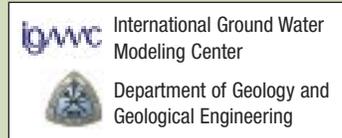
Best Feature:

The capabilities for solving both simple and highly complex, integrated problems.

Worst Feature:

Cost and limited access to source code.

OVERALL RATING: ★★★★★



integrated processes are needed during development and calibration. Developing more complex, larger-scale integrated models requires specialized skills and a substantial investment in time.

The graphical interface has been significantly improved in the 2003 version, offering a dynamic navigation tree, dynamic dialogs, limited online documentation, and notably improved output animation capabilities. The software seamlessly links

with ArcView shape files and has well-organized spreadsheet-graphical functionality for ease in editing spatial and temporal input.

DHI offers the full version of MIKE SHE for about \$10,000, but simpler and less expensive versions may also be purchased. Specialized add-on modules are available for additional charges.

Visit DHI Water and Environment at www.dhi.dk. Contact Robert Prucha at prucha@integratedhydro.com.

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