

MIKE SHE

Integrated catchment modelling

MIKE SHE delivers **truly integrated modelling** of groundwater, surface water, recharge and evapotranspiration. MIKE SHE includes **all important aspects of hydrology** when your project requires a fully integrated model. **No other tool or combination of tools can match MIKE SHE** in terms of seamless integration of all the important processes of the hydrological cycle.

APPLICATIONS

The following is a subset of the almost endless MIKE SHE applications.

TYPICAL APPLICATIONS

MIKE SHE is the ideal software for:

- Integrated catchment hydrology
- Conjunctive use and management of surface water and groundwater
- Irrigation and drought management
- Wetland management and restoration
- Environmental river flows
- Floodplain management
- Groundwater-induced flooding
- Land use and climate change impacts on groundwater and surface water
- Nutrient fate and management
- Integrated mine water management

FEATURES

MIKE SHE is a flexible modelling framework that includes a range of numerical methods for each hydrological process. It has an advanced, conceptual, model-independent user interface with full water balance accounting for all hydrological processes.

It is possible to combine the hydrological processes and numerical methods depending on the requirements of your application and the availability of data.

All numerical engines in MIKE SHE are parallelised to make efficient use of available multicore resources.

OVERLAND FLOW

MIKE SHE includes both a simple, semi-distributed overland flow method for rainfall-runoff modelling and a 2D, diffusive wave, finite difference method for detailed runoff and flood modelling.

It can simulate detailed flooding based on fine scale topography in a coarser numerical grid as well as detailed two-way exchange with rivers.

FEATURES

RIVER FLOW

You can simulate channel flow using full, 1D hydrodynamics, including operation of hydraulic structures such as gates, pumps and weirs. For larger networks, a faster and less data intensive flow routing method is also available.

UNSATURATED ZONE

For detailed, vertical unsaturated flow, you can use the 1D, finite difference multilayer method based on either Richards' equation or gravity flow (Enterprise version only).

Alternatively, you can use a two-layer root zone model for simple water balance calculations in the unsaturated zone.

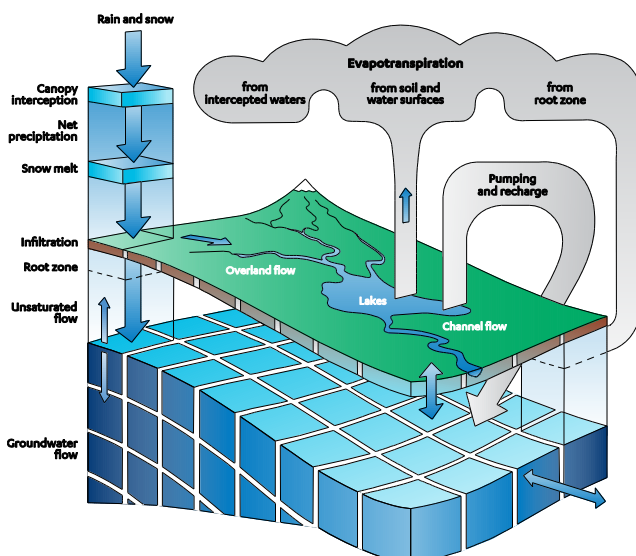
The Green and Ampt infiltration model for dry soil is available, as is bypass flow for soil macropores and subgrid variability of infiltration.

EVAPOTRANSPIRATION

Rainfall and evapotranspiration are the largest parts of the water balance. In MIKE SHE, vegetation-based actual evapotranspiration is calculated from interception, soil, ponded water, the root zone and groundwater.

SNOW

In cold climates, MIKE SHE converts elevation corrected precipitation to wet and dry snow storage. Snow is converted to surface water using an extended degree-day method, including elevation corrected temperature, radiation and rain-on-snow.





FEATURES

GROUNDWATER

For detailed groundwater-surface water interaction, MIKE SHE includes 3D, finite difference groundwater flow, which discharges groundwater drainage directly to surface water (Enterprise version only).

A linear reservoir groundwater method is also available for basin-wide water balance and management as well as fully distributed rainfall-runoff modelling.

WATER QUALITY

With MIKE SHE, you can simulate fully integrated solute transport between surface water and the subsurface, including decay, sorption, precipitation and selective uptake.

You can also include more complex, multispecies, kinetic reactions, comprising all aspects of eco-hydrology, with ECO Lab. See more on page 18.

For source water protection and groundwater age analysis, fully dynamic random walk particle tracking is available in the saturated zone. Water quality and particle tracking is available in the Enterprise version only.

WATER BALANCE

MIKE SHE includes a comprehensive and flexible water balance utility for complete local and model wide water balances - for any time period.

ADDITIONAL FEATURES

Deficit-driven irrigation from multiple sources, such as rivers and groundwater subject to control and license limits

AUTOCAL, which is a general tool for parameter estimation and sensitivity analysis that automatically utilises available multicore resources

Particle tracking for abstraction well capture zones, groundwater age and solute transport time presentation

PACKAGES

MIKE SHE SOFTWARE PACKAGES

MIKE SHE is available in three software packages:

MIKE SHE Studio

MIKE SHE Studio is the ideal package for distributed rainfall-runoff modelling or basin wide water balance and water management studies.

It is a powerful 1D-2D coupled surface water tool for flood modelling when spatially distributed evapotranspiration, infiltration and groundwater are important.

MIKE SHE studio also includes the MIKE HYDRO River Studio package.

MIKE SHE Enterprise

MIKE SHE Enterprise is the ideal package for advanced fully integrated groundwater and surface water modelling, including water quality. MIKE SHE Enterprise includes the MIKE SHE Studio package as well as all other features described on these pages.

MIKE SHE Enterprise also includes the full MIKE HYDRO River Studio package.

MIKE HYDRO River - MIKE SHE Enterprise

The combination of MIKE SHE Enterprise and MIKE HYDRO River Enterprise packages ensures a dynamic, unlimited and fully integrated modelling package for efficient groundwater and surface water interaction. For more information about MIKE HYDRO River, see page 26.

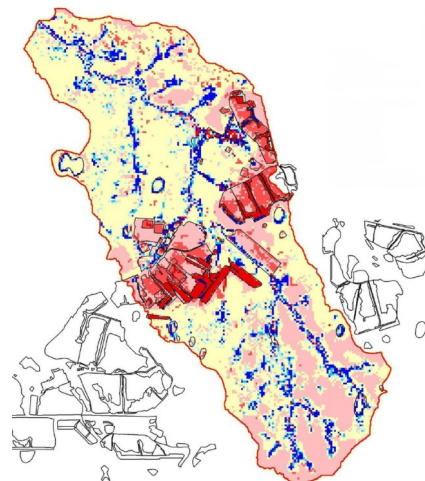
BENEFITS

DHI has more than 30 years of experience in integrated hydrological modelling, which is more than any other organisation in the world.

It is this experience that is embedded in MIKE SHE and is available to you in our unparalleled technical support and training.

If you need to accurately partition rainfall into runoff, evapotranspiration and groundwater recharge, MIKE SHE is the fastest, most dependable way to produce accurate integrated models.

With MIKE SHE, you can tailor the complexity of your model and truly explore the impact of any changes to the hydrological regime within your project area.



Fully distributed map of groundwater recharge (in red) and discharge (in blue).

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For more information, visit:
www.mikepoweredbydhi.com

