MIKE FLOOD

Urban, coastal and riverine flooding

MIKE FLOOD is the unique toolbox for professional flood modellers. It includes a wide selection of specialised 1D and 2D flood simulation engines, enabling you to model any flood problem - whether it involves rivers, floodplains, flooding in streets, drainage networks, coastal areas, dams, levee and dike breaches, or any combination of these.

APPLICATIONS

MIKE FLOOD is applicable at any scale from a parking lot to regional models with multiple options for computational performance improvements using parallelised simulation engines.

Applications range from classical flood extent and risk mapping to environmental impact assessments of severe flood events.

TYPICAL APPLICATIONS

MIKE FLOOD is the ideal software for:

- Flood forecasting
- Flood management and mitigation
- Flood risk analysis and flood hazard mapping for industrial, residential or cultural heritage areas
- Flood contingency planning like evacuation routes and rescue priorities planning
- Climate change assessments
- Dam breach and flood defence failure impact studies
- Integrated urban, river and coastal flood modelling

FEATURES

MIKE FLOOD SIMULATION ENGINES

Multiple simulation engines are available in the MIKE FLOOD modelling framework.

Channels and pipe networks (1D)

- 1D River is DHI’s classic, hydrodynamic engine for rivers and open channels. See MIKE HYDRO River on page 26.
- 1D Urban is DHI’s equally classic engine for sewer and drainage networks. See MIKE URBAN Plus on page 6.

Overland flow (2D)

- A Single Grid solver for the classical rectilinear grid model.
- A Flexible Mesh (FM) solver offering maximum flexibility for detailed and tailored meshes.
- Multi-Cell Overland Flow solver utilising high resolution DEM information on a coarse simulation grid for increased computational performance.
- Parallelisation enables 2D model performance enhancements through use of multiple cores, GPU-cards or HPC systems. See also MIKE 21 on page 14.

THREE-WAY COUPLING

MIKE FLOOD includes fully dynamic, integrated coupling of collection systems, rivers and overland flow areas, and hence provides the flexibility and complexity required for investigating complex flood problems.

WATER QUALITY

MIKE FLOOD enables powerful analysis of flood-related environmental impacts through dynamically coupled, water quality and pollutant transport options in all engine components.

HYDRAULIC STRUCTURES

Structures like weirs, dikes, culverts and operational structures are available in both 1D and 2D engines.

URBAN FLOODING

DEMAND FOR ACCURACY

Today’s demand for accuracy in urban flood modelling often requires an integrated modelling approach combining a 1D pipe flow model with a 2D overland flow model. MIKE FLOOD offers this combination through the coupling of MIKE URBAN Plus CS and MIKE 21.

MIKE FLOOD efficiently simulates any cause of urban flooding, including heavy local rainfall, insufficient flow capacity of storm water inlets or drainage network, and flooding caused by overtopping of nearby rivers or coastal flood defences.

Urban flooding is simulated through model couplings at nodes, pumps, weirs or outlets. Through these couplings, MIKE FLOOD exchanges water between the 1D pipe flow model and 1D river or 2D overland flow model in a fully dynamic process.

The 2D overland model (FM) allows for a detailed representation of buildings and roads to accurately represent the complexity of flow and rain in an urban environment.

The graphical user interface (GUI) in both MIKE FLOOD and MIKE URBAN Plus supports urban flood model coupling as well as launching simulations and visualising results. For more information about MIKE URBAN Plus, see page 6.
COASTAL FLOODING

THE IDEAL FLOOD MODELLING PACKAGE
MIKE FLOOD is ideal for efficient and accurate coastal flood risk assessments - whether they relate to flooding of coastal cities and infrastructures, or to inundation of reclaimed or low-lying areas.

The flexibility of MIKE FLOOD components enables professional modelling of complex and dynamic events due to ocean storm surges, and the impacts in estuaries, rivers and drainage canals as well as sewer systems.

MIKE FLOOD enables you to investigate the effects of coastal protection, such as dikes, polders and tidal gates, or other operational structures in delta areas.

Combined with one of our wave models (MIKE 21 Spectral Wave or MIKE 21 Boussinesq Wave), MIKE FLOOD offers a unique capability to address all aspects of coastal impacts of storm surge and wave induced inundation. For more information about MIKE 21, see page 14.

RIVERINE FLOODING

EFFICIENT AND FLEXIBLE
MIKE FLOOD is highly efficient and flexible for riverine flood modelling.

Flood mapping, risk and hazard analysis of flood incidents from extreme upstream inflows as well as local high intensity rainfall in surrounding catchments are perfectly modelled with MIKE FLOOD.

MIKE FLOOD enables flood simulations on multiple scales from river basins to local cells and flood-prone areas along the river.

Riverine flood modelling commonly consists of a coupled model of our 1D river component, MIKE HYDRO River, and the 2D overland flow component, MIKE 21.

The 2D overland model (FM) allows for specification of depth varying roughness to accurately represent the impact of different types of land covers.

The flexibility of the coupled 1D/2D models provides numerous opportunities to analyse complex flooding issues, such as:
- Conveyance problems due to improper maintenance of vegetation
- Limited upstream flood storage capacity
- Crossing infrastructures reducing flow capacity in rivers and floodplains
- Flood preventions through optimised structure operation in reservoirs
- Flood impacts from dam break or levee breach failures
- Land use changes
- Climate change flood risk impacts

BENEFITS

MIKE FLOOD builds on well-proven technology and simulation engines, which are applied successfully in numerous important engineering projects all over the world.

MIKE FLOOD offers the highest flexibility in coupling of fully dynamic 1D and 2D model engines targeting any type of flood modelling.

FAST AND VERSATILE
With the parallel 2D engines, MIKE FLOOD provides a unique framework for coupling 1D and 2D models using graphics processing units (GPU) for fast simulation execution.

MORE THAN FLOOD EXTENTS
Especially for environmental flood impact assessments, MIKE FLOOD provides unique features for dynamically coupled pollution transport and water quality processes.

MORE THAN JUST SOFTWARE
MIKE FLOOD includes access to DHI flood modelling expertise in more than 30 countries around the world.

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For more information, visit: www.mikepoweredbydhi.com