



## Remote Software

*This document briefly presents the hydrological and hydraulic modeling software available on the University of Nice Server with Remote Desktop Connection.*

*Note that the Server provides ArcGIS9 applications with Spatial Analyst and 3D Analyst extensions and Archydro tools.*

*For further documentation, please see:*

<http://www.hydroeurope.org/jahia/Jahia/op/edit/lang/en/pid/6302>

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<b>DHI Water Resources Software</b> .....	2
<b>Haestad Software</b> .....	7
<b>Wallingford Software</b> .....	8

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Sources:

<http://www.dhigroup.com>

<http://www.haestad.com>

<http://www.hrwallingford.co.uk>



### **MIKE SHE – Integrated Surface Water and Ground Water Modeling**

MIKE SHE is an integrated hydrological modeling system which covers the entire land phase of the hydrological cycle. Thus it is not just a three-dimensional, numerical groundwater model, but also includes numerical models for overland flow, unsaturated flow, solute transport, agricultural practice, evapotranspiration, etc. MIKE SHE is by default coupled to MIKE 11 and can also be coupled to MOUSE for urban applications.

#### Applications Areas:

- Distributed rainfall-runoff modeling
- Surface water impact from groundwater withdrawal
- Conjunctive use of groundwater and surface water
- Wetland management and restoration
- River basin management and planning
- Environmental impact assessments
- Aquifer vulnerability mapping with dynamic recharge and surface water boundaries
- Groundwater management
- Floodplain studies
- Impact studies for changes in land use and climate
- Impact studies of agricultural practices including irrigation, drainage and nutrient and pesticide management with DAISY



## MIKE 11 – River and Channel Hydraulics

MIKE 11 is a one-dimensional hydrodynamic software package including a full solution of the St. Venant equations, plus many process modules for advection-dispersion, water quality and ecology, sediment transport, rainfall-runoff, flood forecasting, real-time operations, and dam break modeling.

The software can simulate flow and water level, water quality and sediment transport in rivers, irrigation canals, reservoirs and other inland water bodies. It is an engineering tool with capabilities provided in a modular framework.

It can be applied on numerous applications - from simple design tasks to large forecasting projects including complex structure operation policies. It allows you to integrate your river and floodplain modeling with watershed processes, detailed floodplain representation, sewer systems and coastal processes. MIKE 11 offers links to groundwater codes.

### Application Areas:

- Flood risk analysis and alleviation design
- Real-time flood forecasting
- Dam break analysis
- Optimization of reservoir and canal gate / structure operations
- Ecological and water quality assessments in rivers, reservoirs and wetlands
- Real-time water quality forecasting and pollutant tracking
- Sediment transport and river morphology
- Salinity intrusion in rivers and estuaries
- Integrated surface water and groundwater and water analysis



## **MIKE FLOOD – Integrated 1D - 2D Flood Modeling**

MIKE FLOOD is a dynamically linked one-dimensional and two-dimensional flood modeling package. The tool is assembled from components taken from MIKE 11 and MIKE 21, and enhanced with new features which are targeted specifically towards modeling of floods. This combination ensures a maximum of flexibility by allowing users to model some areas in 2D detail, while other areas can be modeled in 1D. The tool provides an efficient coupling between river / floodplain or between the sea and inland waterways / bays / lagoons.

It extensively utilizes GIS for automated model development and flood mapping. It enables to present results by GIS integration for spatial and temporal analysis.

MIKE FLOOD enables to model floodplains and coastal zones in 2D, while at the same time also modeling the 1D river hydraulic system and allows to:

- Add a floodplain, coastal zone, or other 2D area to an existing MIKE 11 model
- Replace your looped and networked 1D floodplain model (pseudo-2D) in MIKE 11 with a real 2D model
- Re-use existing MIKE 11 setups and MIKE 21 setups by adding links between the two

MIKE FLOOD is especially relevant to floodplain and storm surge analysis. This is due to:

- Comprehensive hydraulic structures package
- GIS integration for spatial and temporal analysis
- Supercritical flow solutions
- Dam and embankment failure analysis tools



## **MIKE 21 – River Hydraulics and Morphology**

MIKE 21 is a 2D modeling tool for the simulation of free surface flow and sediment transport in lakes, estuaries, bays and coastal areas. It incorporates a varying size mesh design with hydrodynamic and morphological technology. The modeling system consists of a number of modules relevant to sediment and morphology studies in rivers:

- Hydrodynamic model
- Advection-dispersion model
- Sediment transport model
- Bed form/flow resistance model (small-scale morphology)
- Bank erosion model
- Large scale morphological model

The model components can run simultaneously, thus incorporating dynamic feedback from changing hydraulic resistance, bed topography and bank lines to the hydrodynamic behavior of the river.

Applications Areas:

- Flow and sediment transport pattern in river channels and on flood plains
- Bank erosion and bend scour in meandering channels
- General erosion and deposition, constriction and confluence scour
- Development of new channels (channel bifurcation) and bars
- Morphological impact of river training works

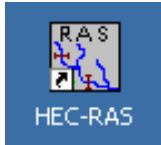


## **MIKE Animator – 3D video-generating GIS**

MIKE Animator is a video-generating tool for presentation of results from water modeling applications. It is possible to work with result data from MIKE 21. MIKE Animator enables to view model areas and simulation results in a 3D environment.

MIKE Animator is thus a tool for facilitating the communication of results from hydrodynamic and environmental model applications, that allows:

- Creating realistic 3D perspective scenes
- Viewing model areas and model simulations of flows and related processes in 3D
- Interactively controlling view points and flight paths
- Producing professional fly-through animations



## HEC-RAS – FloodPlain Modeling

HEC-RAS is an integrated system of software, designed for interactive use in a multi-tasking environment. The system is comprised of a graphical user interface, separate hydraulic analysis components, data storage and management capabilities, graphics and reporting facilities.

The HEC-RAS system will ultimately contain three one-dimensional hydraulic analysis components for:

- Steady flow water surface profile computations
- Unsteady flow simulation
- Movable boundary sediment transport computations

A key element is that all three components will use a common geometric data representation and common geometric and hydraulic computation routines. In addition to the three hydraulic analysis components, the system contains several hydraulic design features that can be invoked once the basic water surface profiles are computed.

The interface provides for the following functions:

- File management
- Data entry and editing
- Hydraulic analyses
- Tabulation and graphical displays of input and output data
- Reporting facilities
- On-line help



### InfoWorks RS – River Simulation

InfoWorks RS combines the advanced ISIS (Integrated Services for Information Systems) Flow simulation engine, GIS functionality and database storage within a single environment, bringing together source data and hydraulic modelling into a unique product.

The software includes full solution modelling of open channels, floodplains, embankments and hydraulic structures. Rainfall-runoff simulation is available using both event based and conceptual hydrological methods.

Full interactive views of data are available using geographical plan views, sectional view, long sections, spreadsheet and time varying graphical data. The underlying data can be accessed from any graphical or geographical view.

Animated presentation of results in geographical plan, long section and cross section views is standard, including fully dynamic flood mapping, as well as results reporting and analysis using tables and graphs. The software contains comprehensive diagnostic error checking and warning, and rapid access to the full on-line documentation that is integrated with the help system.