Release Notes 2023

MIKE+

Contents:

Introduction

Welcome to MIKE+ 2023 Update 1

In this Release Note, you will find information about new features of MIKE+, and what you need to know in order to install and get started with MIKE+ 2023.

MIKE+ is our new, flexible system for modelling and designing water distribution networks and collection systems for wastewater and storm water, as well as for modelling river networks and 2D surface flooding.

MIKE+ is offered in two versions:

- **MIKE+**
- **MIKE+ ArcGIS**

With MIKE+ you get:

- GIS-based model building and data management
- Powerful hydraulic simulation engine that supports parallel processing
- Integrated water quality, fire flow, real time control, flushing, multi-source tracing and hydraulic simulation (water distribution)
- Integrated water quality, control rules, LID and Soakway, rain dependent inflow and infiltration (collection system and river network)
- Long-term statistics (collection system)
- Integrated 2D hydraulic and water quality, dynamic interactions with collection system and river networks, surface flows visualisation (2D overland)
- Full undo and redo capability in all editors
- Thematic mapping and integrated result visualisation
- Open data models - easy integration with other applications
- Instant data checking and validation

With MIKE+ ArcGIS you get:

- Sophisticated GIS capabilities and smooth integration with ArcGIS Pro. MIKE+ embeds ArcGIS/ArcGIS Pro software for GIS-based model building, data management and result presentation.

System requirements

Operating systems

Fully supported Windows operating systems *	Windows 11 Pro, version 22H2 (64 bit) Windows 10 Pro, version 22H2 (64 bit) Windows Server 2022, version 21H2 Windows Server 2019 Standard, version 1809
Non-supported but partially tested operating systems **	Windows Server 2016 Standard, version 1607

* Fully supported operating systems are systems that have been tested in accordance with MIKE's Quality Assurance procedures and where warranty and software maintenance agreement conditions apply.

** Non-supported but partially tested operating systems are systems, which are not officially supported by the MIKE software products. These operating systems have only undergone very limited testing for the purpose of MIKE software, but the software and key features are likely to work. Installation of MIKE software on a non-supported operating system is done so at the user's own risk. The MIKE software warranty and software maintenance agreement conditions do not apply for unsupported operating systems and DHI is under no obligation to provide assistance or troubleshooting for cases where the software is being used on a non-supported operating system.

Please note that when running a fully supported operating system as a 'guest operating system' on a virtualization platform, it is automatically downgraded to a non-supported operating system under the conditions provided above.

Minimum hardware/software requirements

Processor	compatible with x64 instruction set, 2.2 GHz or higher
Memory (RAM)	4 GB or higher *
Storage	64 GB or higher *
Display	resolution 1024 x 720 (High-Definition) or higher, 24-bit color (true color)
Graphics adapter	64 MB RAM (256 MB RAM or higher recommended), 32-bit true color **
Software requirements	Microsoft .NET Framework 4.7.2 or higher, for MIKE+. Microsoft .NET Desktop Runtime 6.0.5, or a later patch release, is also required for MIKE+ ArcGIS.

* The actual required amount of memory and disk space depend on the usage (application, model setup, size of data files etc.)

** MIKE+ utilizing GPU for 2D overland simulations requires a Nvidia graphics card with compute capability 6.0 or higher. Please note that some of these graphics' cards have varying performance in single compared to double precision calculations. The GPU functionality is based on version 12.0 of the Nvidia® CUDA® Toolkit.

Installation

To install MIKE+:
To install MIKE+, please go to the MIKE+ product folder and execute the setup.exe file either on the MIKE 2023 USB or from the downloaded, un-zipped installation files. Press the 'Install' button to begin installation.

The setup program will automatically install all necessary files and folders on your computer. Additionally, an entry is created in the Start Menu for MIKE+.

To install MIKE+ ArcGIS:
To install MIKE+, please go to the MIKE+ product folder and execute the setup.exe file either on the MIKE 2023 USB or from the downloaded, un-zipped installation files. Press the 'Install' button to begin installation.

The setup program will automatically install all necessary files and folders on your computer. Additionally, an entry is created in the Start Menu for MIKE+.

Please choose ArcGIS Pro's "ArcGISPro.msi" to install ArcGIS Pro separately. This version of MIKE+ comes with ArcGIS Pro 3.1. You find the installation of ArcGIS Pro in the folder "Prerequisites\ArcGIS Pro 3.1". Other versions of ArcGIS Pro might also work with MIKE+ but are not covered by warranty and software maintenance agreement conditions.

Optional installation of PostgreSQL/PostGIS:
Both MIKE+ and MIKE+ ArcGIS are installed with SQLite/SpatiaLite. If you wish to use the alternative database option, PostgreSQL/PostGIS then please install the two products found in the "Prerequisites\PostgreSQL 15.2" and "Prerequisites\PostGIS 3.3.2" folders. Before you install the two products, we recommend that you read the note describing how to install PostgreSQL/PostGIS - this is available here.

License file and dongle

Please Note that when using the local or network license option, which require a license file and a dongle, then

- the DHI License Manager must be installed separately.
- all licensed applications included in MIKE 2023 Update 1 require a 2023 version of the DHI License Manager.
- a new license file format (file extension dhilic2) has been introduced with MIKE 2022 and these license files can only be used together with a DHI License Manager 2022 or newer.

To use MIKE software in licensed mode, please refer to the DHI License Manager Release Notes (License Manager Release Notes).

Product invocation

Launch MIKE+ from the Windows Start menu.

Support

For general support, please refer to our Customer Care Portal.

If you experience any difficulties, or if you have questions, please contact our Customer Care team at mike@dhigroup.com.

You can also contact your local Customer Care team for support in your local language. A list can be accessed from here.

New features and fixed issues

Every new release of MIKE+ consists of new modules, new features and/or corrections to problems or significant inconsistencies discovered in previous releases. Please find below short descriptions of the most significant news.

Release 2023 Update 1

New features

Module/type	New feature
General	A new 'Help' list has been added to the 'File' menu, providing links to various sources of information hosted online and related to MIKE+.
General	While importing model setups from the File \ import menu (e.g. from MIKE URBAN, MIKE HYDRO River, EPANET, etc.), all messages related to this import and reported in the log view are now also saved to a text file, for future reference. This text file is saved in the folder containing the MIKE+ database.
General	The option to add user-defined columns to the overview table in the editors, has been extended to show on the fly results from a selected result item. This allows comparing input data with results in a common table. This functionality is available for pipe network editors only (MIKE 1D Collection System, SWMM, Water Distribution).
General	The 'Field calculator', used to edit items in the overview table in the editors, now allows to built expressions using user-defined columns containing expressions or results.
General	The 'Plots and statistics' editor has been reviewed. It now contains a new set of calibration criteria, as well as options to control the time frame for which the statistics are computed. A problem making this editor slow in some cases has also been resolved.
General	A new button to zoom to specified XY coordinates on the map has been added to the 'Map' tab of the ribbon.
General	When MIKE+ is opened in results presentation mode (no model database opened), it is now possible to save the .mupp file, which allows saving and restoring the layout of the result windows.
General	The workflow for executing simulations in MIKE Cloud has been improved, so that it is no longer required to manually export the simulation files to be uploaded to the cloud. The simulation files from the active simulation are now automatically prepared for upload, when using the 'Run in MIKE Cloud' button.
General	Minor improvements have been made to the 'Versions management' tool. The main dialog to manage the list of versions has a new option to create a child using an existing model version, and shows the last modification date of each model instance. The 'Update' tool includes new functionalities to handle conflicts: a new action 'Restore reference', a new button 'Zoom to active' to view the map location for each listed conflict, and a 'Show record's attributes' button to view the differences between the various model versions.
General	The 'Results table' windows can now include columns of results from different result files for comparison.
General	The 'Results table' windows can now include user-defined columns, to perform operations between result columns and/or network properties.

General	After opening a MIKE+ project, if the path to a map layer is broken and the layer cannot be displayed, a new option in the layer's context menu allows to reselect the input file with its new path.
Collection System	The presentation of water filling in profile plots has been improved, so that the filling is limited by the actual height of the pipes and the filling also occurs in the nodes.
Collection System and Rivers	In the 'Catchments' editor, a new option for specifying loss and infiltration properties as a function of the land uses on the catchment is available. This new method can be used in combination with hydrological models 'Time area', 'Kinematic wave' or 'Linear reservoir'. This method allows to separate the specification of the routing process (controlled by the selected hydrological model) and the infiltration process which is now defined in a new 'Land uses' editor for each type of land use.
Collection System and Rivers	A new option in the 'Simulation setup' definition allows to control how rainfall time series are applied to catchments for Rainfall-Runoff modelling: either applying the closest rainfall time series to each catchment, applying weighted time series using the Thiessen polygons method, or applying weighted time series using an inverse distance weighting method.
Collection System and Rivers	When connecting catchments to the network from the map, the 'Connect catchment' button in the ribbon offers two different modes: either add to existing connections, or replace all previous connections.
Collection System and Rivers	For Rainfall-Runoff modelling with the RDI hydrological model, additional options are available in the 'Parameters RDI' editor. It especially includes additional options for the snowmelt processes (effect of solar radiation, heat transfer from rainfall, use of elevation zones), effects of irrigation on the catchment, and definition of seasonal variation for some of the RDI parameters.
Collection System and Rivers	A new option in the 'Simulation setup' editor allows to run water quality simulations based on a hydrodynamic result file, instead of running both hydrodynamic and water quality conditions simultaneously. The decoupled approach can significantly speed-up the water quality simulation.
Collection System and Rivers	Hydrodynamic results can now be saved as time series to a text file.
Collection System and Rivers	Water Quality modelling with MIKE ECO Lab now allows using several MIKE ECO Lab templates, with shared state variables. This allows the various templates to interact one with another.
Rivers	The 'Sediment transport' module can now be applied on river networks. This module now offers a 'Basic morphological analysis' mode, with limited options and primarilty designed for pipe networks, and an 'Advanced morphological analysis' mode, providing additional options designed for river applications.
Rivers	The cross sections tool 'Export to text' now offers a new option to export marker levels and coordinates to text file, for all or only the selected cross sections.
Rivers	A new button 'Insert all rivers' in the 'Boundary conditions' editor can automatically insert all missing boundary conditions on river ends.
Rivers	Profiles representing elevations from markers 4 and/or 5 in the cross sections, can now be presented on profile plots.
Rivers	A new option in the 'General' tab of the 'Cross sections' editor allows to plot elevations from a selected DEM for comparison with the active cross section.

Rivers	A new option has been added to the 'Create and update cross sections' tool, to set markers in cross sections at intersections with polylines (alignment lines) from a shape file.
Rivers	It is now allowed to define rivers with identical names, if their respective range of chainages don't overlap.
Rivers	When renaming a river, cross sections are updated accordingly with the new river name.
Rivers	Cross section labels (cross section location or ID) can now be shown on profile plots.
Rivers	Control rules now support the action 'Apply natural flow' (ignoring the structure's head loss) for weirs and culverts.
2D overland	A new button '2D cross section plot' has been added to the '2D Overland' tab of the ribbon. It allows drawing cross sections from the 2D domain, along polylines drawn on the map. This 2D domain cross section can be combined with a river cross section. It can also draw simultaneously elevations from a DEM.
2D overland	A new type of 2D overland result file (content type 'Section statistics') has been added, saving maximum inundation results along a horizontal line.
2D overland	'2D flood statistics' result files can now also save the maximum water level throughout the simulation period.
2D overland	Two new options have been added to the list of 'Special selections' in the Map tab of the ribbon, respectively to select 1D-2D couplings associated to selected network items and to select network items associated to selected 1D-2D couplings.
2D overland	A new 'Split' button in the 'Coupling tools' tab of the ribbon allows splitting 'River bank' and 'Natural channel' couplings.
2D overland	After closing MIKE+ and continuing a simulation in the 'Launch simulation engine' window, it is now possible to launch simultaneously another simulation from the same MIKE+ project (the simulations no longer use the same log file names, which previously led to conflicts).
Water Distribution	A new 'Autocalibration' special analysis has been introduced. Autocalibration uses optimization algorithms to find optimum pipe friction coefficients, locate closed isolating valves, adjust water consumptions and/or find point leakages, in order to improve the match between model results and measurements.
Water Distribution	A new 'Regulation overview' editor gives an overview of all the simple controls defined on pipes, pumps, valves or turbines.
Water Distribution	The 'Cost analysis' editor has been reviewed, especially to better control which simulation ID is associated to the analysis and to report results per pump station, if any is defined in the network.
Water Distribution	The workflow associated to the 'Demand allocations' editor has been reviewed. The 'Geocode' tab is now replaced by the 'Connection' tool and the 'Aggregation' tab replaced by a new 'Aggregation' tool. Both tools are available either from the ribbon ('WD network' tab) or from the 'Demand allocations' editor.
Water Distribution	In the 'Connection' tool, the method 'To node by pipe ID' has been enabled. It is used to connect demand allocations to the closest node on a pipe with the same name as the demand allocation.
Water Distribution	The 'Generate' button from the 'Zones' editor, which creates zones from shape files, has been improved to also create zones of type 'Network'.

Fixed issues

Module/type	Error/Inconvenience
General	Various improvements or corrections have been made to the import from MIKE URBAN, MIKE HYDRO River or MIKE11 model setups. This especially includes improvements to the scenarios imported from MIKE URBAN, and automatic creation of Storages on the river network when importing MIKE 11 models including link channels with storages.
General	An unexpected error occured in MIKE+ 2023 when trying to save a project file, if an image was added to the map.
General	Profile plots saved with the project could not be restored when reopening.
General	Some memory usage issues occuring when using large raster files, leading to MIKE+ becoming slow, have been improved. These issues especially occured when using a large .dfs2 files as 2D domain, or in tools 'Trace rivers from DEM' and 'Catchment delineation'.
General	In the 'Versions management' tool, the 'Compare' function failed to show database differences on the map, with un expected error message.
General	The 'Versions management' tool did not work with model databases saved on remote / network locations.
General	Changes made to expressions of 'user defined columns' were not saved to the database and therefore not restored after saving and reopening.
General	The path selected between flags to locate profile plots was sometimes not the expected one, in particular when structure links were involved. A new path selection logic is now used, selecting the path with the smallest number of links.
General	When loading results data from result files, the user-defined time period to load was ignored if derived results were selected, and the whole time period was therefore loaded.
General	The 'Results differences' tool prevented from selecting other result file types than MIKE 1D results, when using the Chinese version of MIKE+.
Collection System	The 'Results differences' tool showed in one case a wrong input time series and therefore reported a wrong difference.
Collection System	The Profile plot window failed to show the 'Slope' value in links, in the data table below the plot.
Collection System	The 'Project information' window didn't report the exact sum of pipes volume for pipes with egg shape.
Collection System	The Report tool failed in some cases to report differences between alternatives, with an unexpected error message.
Collection System	The profile plot window sometimes failed to show elevations from a DEM.
Collection System and Rivers	While defining actions for the control rules, the 'PID input' field was limited to 40 characters, which was too small for some expressions. This limitation has been increased.
Collection System and Rivers	The 'Boundary overview' editor sometimes took a very long time to open and show the list of boundary conditions.

Collection System and Rivers	In the 'Catchments' editor, the tabs for the linear reservoir methods C1 and C2 have been slightly redesigned, to better reflect that some parameters from the parameter sets are used also when working with local parameters defined in the catchment.
Collection System and Rivers	An unexpected error sometimes occured when trying to edit the condition expression, for a control rule.
Rivers	It is now possible to show labels on the map, for the cross sections layer.
Rivers	When exporting the cross sections layer to shape file from the 'Layers and symbols' tree, all global properties of the cross sections are now exported as attributes.
Rivers	Result items saved in structures are now presented and grouped by item type (e.g. when selecting result time series to plot).
Rivers	In the profile plot window, the water level simulated in the river was sometimes plotted with a wrong elevation.
Rivers	The extent of the active cross section (from marker 1 to marker 3) was inaccurately shown on map.
Rivers	Connection lines between catchments and rivers always connected on the map to the middle of the river, and didn't reflect the actual connection location used in the simulation. The connection lines on the map now show the chainages of the connections.
2D overland	In the 2D overland volume balance summary, the flow through culverts was wrongly reported as an error correction.
2D overland	The 2D domain's symbology palette sometimes turned to zero values for all elevation ranges when reopening the project.
2D overland	For Water Quality simulations, the component’s concentration associated to distributed source boundary conditions was incorrect, as it didn’t match the user-defined value specified in the ‘2D WQ boundaries’ editor.
2D overland	When using the Chinese version of MIKE+, it was not possible to exclude from the mesh the polygons provided in a shape file.
SWMM	Some rainfall time series files were not accepted by MIKE+ despite being in a valid .dat format.
SWMM	When splitting a conduit on the map, the new levels at the split location were copied from the upstream / downstream levels of the original pipe, instead of being interpolated. This led to a wrong profile of elevation.
Water Distribution	Storage tank volume is now reported as a result from fire flow analyses.
Water Distribution	The tool 'Time series from map' failed to select pipes on result maps.
Water Distribution	Profile plots showed wrong pipe diameters when no model database was opened.
MIKE 1D engine	Fixed error running LTS simulation with a flexible time step (TT62245).
MIKE 1D engine	Fixed error causing controlled structure simulation to fail when using a longer time step (TT62335).

MIKE 1D engine	Fixed error in LTS simulations when running RR and HD LTS simulations simultaneously (TT62042).
MIKE 1D engine	Fixed error causing incorrect limiting of head losses in manholes (TT62553).
MIKE 1D engine	Fixed volume conservation error in catchment routing (TT62610).
MIKE 1D engine	Fixed error with synchronization of time steps when running an RR+HD simulation (TT62369).
MIKE 1D engine	Fixed error in reporting of dam breach statistics (TT62460).
MIKE 1D engine	Fixed error when using simplified catchments in an LTS simulation (TT62623).
MIKE 1D engine	Fixed error causing simulation launcher to hang after closing GUI (TT62590).
Couplings engine	Fixed error in volume balance summary for coupled 1D-2D models with 2D culverts (TT62321).
Couplings engine	Fixed error causing couplings engine to hang after a failed simulation initialization (TT62952).
Couplings engine	Added check to disable use of coordinates to link 1D and 2D model elements in case of complex 2D mesh structures alongside river sections (TT62944).

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New features

Module/type	New feature
General	New unit systems are available for 'Rivers, collection system and overland flows' model type. They control the unit for discharge and volume values in input editors and in results presentation windows.
General	The 'Apply' option in 'Rivers, collection system and overland flows' model type and the 'Is active' option in the 'Water Distribution' model type have been added to all relevant editors. When this option is unselected, the corresponding items will be ignored in the simulation without having to create scenarios.
General	User-defined columns are now automatically imported from MIKE URBAN setups.
General	The 'Import and export' tool allows importing data to and exporting from user-defined columns.
General	The 'Import and export' tool offers a new transfer mode to skip the import of records already existing in the target MIKE+ database.
General	MIKE+ can now open a .sqlite database even if it doesn't have a corresponding .mupp file. The .mupp file will be created automatically.
General	The 'Interpolation and assignment' tool can use feature layers in .xyz format as source for interpolation of data.
General	The 'Network simplification' tool can be executed from a command line.

General	Any scenario can be converted to a Base scenario, in a new database. This new option is accessible in the context menu of the scenarios tree.
General	A new 'Combine tiles' tool has been added to the 'Tools' tab of the ribbon. It merges multiple DEM tiles into a single DEM file for later use in MIKE+.
General	In the 'Versions management' tool, the 'Compare' and the 'Update' tools have a new 'Filter on model type' which allows to analyse only the tables relevant for the active features and modules in the project.
General	In the 'Versions management' tool, the 'Compare' and the 'Update' tools can compare networks with merged pipes to their original network, to avoid considering merged pipes as new pipes.
General / Results visualization	The 'Results differences' tool can compare link results on networks with merged pipes to results obtained with the original network.
General / Results visualization	The 'Results differences' tool can now also analyse results differences between Water Distribution results (.res files) or between SWMM results (.out files).
General / Results visualization	The 'Compare' button in the 'Results' tree view, used to create a result file with differences between two source files, now supports the following types of files: MIKE 1D results (.res1d), 2D Overland (.dfs2, .dfsu), Water Distribution (.res, .resx), SWMM (.out).
General / Results visualization	2D Overland results (.dfs2, .dfsu files) can be presented on result maps. It is therefore possible to visualize 2D result maps without opening a model database.
General / Results visualization	The 'Results tables' window has been redesigned. It provides a clearer presentation of tabular data, options to show statistical values for each result location, and new options to select model data based on results selection or vice versa.
Collection System	Roughness values can be specified in Manning (n) instead of Manning (M), when defining catchments or pipes and canals.
Collection System	SWMM runoff result files (.out) and SWMM outflow interface files (.txt) can be used as input file for 'Inflow from result file' boundary condition in 'Rivers, collection system and overland flows' network simulation.
Collection System	A new routing option is available in the 'Catchment connections' editor, to introduce some time delay and attenuation of the runoff hydrograph before it enters the network. This option can be enabled from the 'Network simplification' tool, for catchments which are reconnected after a trimming operation.
Collection System	A new button 'Update markers' has been added in the 'Generic shapes' editor for automatically inserting markers at default locations in shapes with type 'X-Z-R-M Open'.
Collection System and Rivers	The 'Wave approximation' numerical solution can be changed for selected pipes or rivers, in the 'Pipes and canals' and 'Rivers' editors.
Collection System and Rivers	A new 'Variable expression' type of sensor is available in the 'Control rules' module. It allows defining sensors with an advanced user-defined expression, typically as a function of other sensors. The result time series of this sensor can be saved in result files.
Collection System and Rivers	A new 'Analyse network' tool is available in the 'Simulation setup' editor for network simulations. It aims a finding and reporting locations prone to instabilities, in order to improve the model stability. Improved stability allows running simulations with longer time steps, therefore resulting in shorter simulations.

Collection System and Rivers	When importing a full MIKE FLOOD setup, the River/Urban links from MIKE FLOOD are now converted to connections between the river and the collection system network.
Collection System and Rivers	For catchments modelled with the 'RDI' rainfall-runoff method, it is possible to enable an autocalibration of the RDI parameters against a discharge measurement time series. Autocalibration is enabled in the 'RDI' tab in the 'Catchments' editor, and the calibration settings are defined in the 'Parameters RDI' editor.
Collection System and Rivers	The symbology for catchment connections can now be customised.
Collection System and Rivers	A new type of initial conditions definition, using 'State files', is available in the 'Simulation setup' editor for network simulations. State files are special result files saving detailed information for later use as initial conditions, and therefore need to be saved during a previous simulation. To save state files, a simulation must contain a result file with the new content type 'State files (initial conditions)'.
Rivers	A new 'Steady state' type of initial conditions is available in the 'Simulation setup' editor for river simulations.
Rivers	For boundary conditions of type 'River Q/h relation', a new 'Compute' button allows estimating the Q/h relation table based on cross section geometry at the boundary location.
Rivers	A new type of boundary condition 'Groundwater leakage' is available for river networks.
Rivers	A new plot has been added to the 'Culverts', 'Weirs', 'Gates' and 'Bridges' editors. It provides a graphical view of the structures geometries along with their upstream and downstream cross sections, for comparison.
Rivers	The main river boundary condition types are now visible on map using new dedicated map layers.
Rivers	Muskingum and Muskingum-Cunge routing methods are available for rivers. Routing location and method are specified in the 'Routing' tab of the 'Rivers' editor, after defining the river type as 'Simple routing'.
Rivers	Couplings between rivers and MIKE SHE can now be defined in the new 'MIKE SHE couplings' editor. It is enabled by activating the 'Coupling to MIKE SHE' option in the 'Model type' editor. After setting up a river model including such couplings, the .m1dx simulation file must be exported from the File \ Export menu, for use in MIKE SHE.
Rivers	A new tool 'Trace rivers from DEM' has been added to the ribbon, in the 'River network' tab. It is used to create new rivers, following highest slopes from a Digital Elevation Model.
Rivers	The 'Catchments delineation' tool has been extended to allow creating catchments for river networks, based on a Digital Elevation Model.
Rivers	The 'Bed roughness' editor now has a new type of roughness distribution, based on multiple zones on the vertical axis. It also includes a new 'Roughness factors' tab to define constant or time-varying factors to the bed roughness.
Rivers	A new tool 'Interpolate resistance' has been added to the ribbon, in the 'River network' tab. It is used to spatially interpolate bed roughness values and apply them to cross sections.
2D overland	In the '2D boundary conditions' editor, the 'Source' type of boundary offers a new 'Q/h relation' type of definition, designed to specify an outflow value as a function of the water level.
2D overland	'Saturation' can now be saved as a new result item in 2D result files.

2D overland	The numerical scheme for the hydrodynamic calculations using the higher-order scheme has been improved (improvements to the well-balanced scheme; including velocity-based reconstruction of face values), to improve the simulation's stability. This may result in differences of results after updating to this new version.
2D overland	The performance of simulations using GPU acceleration has been improved, to reduce simulation times.
2D overland	The initialisation phase is now faster for simulations with infrastructures defined with shape files including many thousands of polygons (for example, house footprints to be included in the calculation).
2D overland	Stability has been improved for free outflow boundary conditions.
2D overland	The log file from 2D overland simulations better reports locations of errors related to 1D-2D couplings, with clear indication of river ID and chainage or node ID.
Water Distribution	It is possible to export the network and results data shown on the Profile plot window to a text file. This new option is accessible from the context menu of the Profile plot windows.
Water Distribution	In the 'Network simplification' tool, filters are now available in a new 'Select to exclude' tab, to exclude some network element types from the simplification.
Water Distribution	In the 'Optimization' special analysis, new target types have been introduced: 'Water quality', 'Pump power', 'Pump energy cost' and 'Pump speed'.
Water Distribution	A 'Level control' option has been added to TCV valves to model float valves.
Water Distribution	The 'Connection tool' is now available in the 'WD network' tab in the ribbon, to connect demand allocations and measurement stations to the network.
Water Distribution	A new special selection 'Pipes connected to selected nodes' has been added.
Water Distribution	The 'Zone mapping' tool offers a new option to separate zones based on pipes with user-selected criteria.
SWMM	Catchment connection lines are now visible on the map.
MIKE 1D engine	Changed behavior of pump sump to use pump stop level for setting initial water level of pump (TT61508).

Fixed issues

Module/type	Error/Inconvenience
General	Various unexpected errors, popping up in different situations, have been fixed.
General	The pipe direction was unexpectedly taken into consideration when performing a network simplification. As a consequence, pipes could not be merged when they were defined in opposite direction. This pipe direction criterion has been removed.
General	Results values shown in X-axes data under a profile plot, were not refreshed when animating results.

General	The 'ArcGIS integration' sometimes failed to export geometry data for 1D result layers.
General	The 'ArcGIS integration' sometimes failed to export results from 2D result files in .dfsu format.
General	An unexpected error could show up when loading some .TIF files as an image layer on the map.
General	When joining model data and results in a report table, the table contained some attributes which were not selected in the report settings.
General	Levee elevation shown on the Profile plot for pipes defined with a generic shape was wrong, if the last two points defining the shape have the same X-value.
General	While running a simulation, the remaining simulation time was always shown in accumulated seconds. It is now shown in hours, minutes and/or seconds.
General	Exporting 1D-2D couplings to shape file using the option 'Export selected layers to shape file' from the layer's context menu failed.
General	Using the context-menu option 'Show validation items on map', more error locations than expected were shown on the map.
General	Working with the 'Use single editor style', clicking the 'Simulation setup' button in the ribbon opened the last opened editor instead of the 'Simulation setup' editor.
General	There was an error in the license usage, preventing from importing a MIKE URBAN model into MIKE+ when having only one seat available in the license.
General	The same file format for saving symbology configuration can now be used on the main Map and on result maps.
General	The 'Preprocessing Temporal Data' tool from the 'MIKE Zero toolbox' always failed during execution.
Collection System	Profile plots failed to show results in locations with parallel pipes.
Collection System	Catchment connections to 'River junction' nodes triggered an unexpected error when starting the simulation.
Collection System	The resistance distribution type was undefined for X-Z cross sections imported from MIKE URBAN setups, instead of being set to 'Uniform'.
Collection System	The special selections 'Load points connected to selected nodes/pipes' sometimes selected load points not connected to selected nodes.
Collection System	Many unexpected control rules were sometimes imported from MIKE URBAN setups with RTC rules.
Collection System	The unit description for values in boundary conditions with type 'Exfiltration from node' was incorrectly showing a discharge unit instead of an infiltration rate unit.
Collection System	Points in X-Z cross-sections imported from MIKE URBAN were not sorted by increasing S-coordinate.
Collection System	The use of 'Water age' components in the Transport module did not work: the water age remained constant.

Rivers	Cross sections were shown on the map even when their chainage was out of the range of the river chainages.
Rivers	While selecting result items to be shown in result windows, items from river structures were not correctly categorized, and each structure was presented in a separate category.
Rivers	Paths to dambreak time series files were saved as absolute paths in the database, breaking the file paths when moving the database to a new folder location.
Rivers	QOF and QIF initial conditions for NAM catchments were imported from MIKE HYDRO River files with a wrong unit conversion.
Rivers	While importing full MIKE FLOOD model setups, rivers are sometimes renamed to fulfill MIKE+ requirements, but the river IDs were not renamed accordingly in the imported '1D-2D couplings'.
Rivers	Catchment connections to storages on the river network were sometimes ignored in the simulation.
2D overland	The option to show a time series file in the time series editor failed in the '2D boundary conditions' editor.
2D overland	The size of the MIKE+ database increased when starting a 2D overland simulation even if input data had not been edited.
2D overland	An unexpected error occurred during the simulation when applying spatially-varying crest level changes on 2D dikes.
2D overland	While inserting 2D dikes using the 'Insert from file' button, dikes' coordinates where not reprojected when the shape file was in a different map projection than the MIKE+ project.
2D overland	Attempting to run a 2D Overland simulation using multiple GPUs actually used only the first GPU for all subdomains, hence slowing down the simulation.
2D overland	The time for validating the database data was very long, after opening a 2D Overland project involving a mesh with millions of elements and with buildings excluded from the mesh.
2D overland	The import of couplings locations has been improved when importing a full MIKE FLOOD setup which was coupled to MIKE 21 classic. XY coordinates of the couplings are now recomputed during the import based on the cell indices defining the coupling location in the MIKE FLOOD file. This new method provides an improved consistency with the MIKE FLOOD model, in case the actual cell indices had been adjusted after the automatic creation of the couplings.
SWMM	The conduits' offset values were not correctly computed when the user-defined conduit's elevation was deleted or set strictly equal to node's invert elevation. This was a problem only if changing the network elevations definition to 'Relative depths' afterwards.
SWMM	The special selection 'Catchments connected to selected nodes/pipes' did not work in SWMM5 collection system model types.
Water Distribution	The 'Cost analysis' special analysis has been reviewed, to provide a better workflow to access results and reports, and also to fix errors leading to different result time series being shown in the editor and in the result file.
Water Distribution	When a pump or valve was renamed, its ID was not automatically updated in the 'Real time control' editor.

Water Distribution	The 'Refresh connection lines' tool did not refresh connections to demand allocations.
Water Distribution	Statistics reported in the 'Statistics and redistribution' table were sometimes erroneous, e.g. in case some network items are included in several zones.
Water Distribution	Duration values from the 'Demand predictions' editor, specified in minutes, were wrongly interpreted as hours.
Water Distribution	An unexpected error occurred when loading a result layer from a fire flow analysis (.csv file).
Water Distribution	Shape files exported from a Network Vulnerability result layer sometimes had missing coordinates for nodes.
Water Distribution	Results of an Optimization special analysis could be wrong when the target was defined on a link or with an average value.
MIKE 1D engine	Changed variable unit to undefined (TT61943).
MIKE 1D engine	Fixed error in LTS simulations when running RR and HD/LTS simultaneously (TT61760).
MIKE 1D engine	Fixed errors in application of local initial conditions in collection system modelling (TT61736/61736).
MIKE 1D engine	Fixed error in the application of relative resistance to natural channels in collection system modelling (TT61758).
MIKE 1D engine	Fixed error in the formulation of energy loss structures (TT61843).
MIKE 1D engine	Fixed unhandled exception occurring during coupled 2D Overland - 1D Rivers and Pipes simulation (TT60831).
MIKE 1D engine	Added support for creating a timeseries subset that retains the original start date, with a time offset (TT61149).
MIKE 1D engine	Fixed errors in calculation of Q-h relations for culverts (TT22399, 53709, 54967, 24403, 20255, 19925)