

MIKE+

Guide to existing MIKE URBAN Users

Migration



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1 Introduction

MIKE+ is the new and future modelling platform for modelling all urban and river water systems.

It is introduced as a full featured urban modelling package for modelling Water Distribution, Collection System, Rivers and 2D Overland. MIKE+ is the successor of MIKE URBAN.

The MIKE 2024 Release includes MIKE+. However, MIKE URBAN 2020 update 1 is the last release of MIKE URBAN and it is required to be installed on the same PC as the MIKE+ 2024 version in order to import and migrate existing MIKE URBAN models.

The current document targets existing MIKE URBAN users with the aim of informing about the current contents and features of MIKE+ as well as outlining the main steps involved in migrating from MIKE URBAN to MIKE+.

2 Release and License Information

MIKE+ is our primary urban software product for sale with the MIKE+ Release 2019 and forward.

New purchases of MIKE+ ArcGIS product will include licenses to access both MIKE+ and MIKE URBAN. MIKE+ and MIKE URBAN can coexist on the PC and run simultaneously.

MIKE+ comes in two versions:

- MIKE+
- MIKE+ ArcGIS

The difference between the two version is that MIKE+ ArcGIS includes a license for ArcGIS Pro, ArcGIS and one seat for ArcGIS Online as well as installation files for ArcGIS Pro.

In both MIKE+ and MIKE+ ArcGIS, there is an ArcGIS integration option by which export of data to ArcGIS Pro is possible. This integration requires a license for ArcGIS Pro.

Existing users of MIKE URBAN with a valid Service and Maintenance Agreement (SMA) will get access to MIKE+ ArcGIS version without additional fees.

2.1 Releases

MIKE+ releases:

- the first release in May 2019, MIKE URBAN+ 2019, includes support of water distribution and collection systems
- the second release in November 2019, MIKE URBAN+ 2020, includes:
 - 2D Overland flood modelling
 - o Culvert Structures
 - Sediment Transport



- Import of existing MIKE URBAN Scenarios
- Enhanced LTS functionality
- Improved result presentation workflow
- the third release in June 2020, MIKE URBAN+ 2020, includes:
 - Enhancements 2D Overland flood modelling
 - New river hydraulics module and option to connect to collection system and
- the fourth release in November 2020, MIKE+ 2021, includes
 - o Water Hammer
 - Support of SWMM5 hydraulics and hydrology
 - Cross section generation for river
 - Cross section viewing of 1D and 2D results
 - Non-Newtonian 2D flow
 - the fifth release in May 2021, MIKE+ 2021 Update 1, includes
 - Support of water quality for SWMM5 projects
 - Pump emergency storage estimation for collection systems
 - Support of EPANET 2.2 engine for Water Distribution
- the sixth release in November 2021, MIKE+ 2022, includes
 - Coupling of SWMM5 with 2D Overland module
 - Export of map data and profile plots to CAD file
 - New tool to analyze results differences between collection systems simulations
 - o All river structures supported
 - o Automatic import of river models from MIKE HYDRO River or MIKE 11
 - \circ $\;$ Optimization module for pumps and valves scheduling for Water $\;$
 - Distribution
 - the tenth release in November 2023, MIKE+ 2024, includes
 - A full-featured river module replacing MIKE HYDRO River and MIKE 11
 - New functionalities to compute average demand, leakage, and demand patterns per zone, for Water Distribution models
 - A new tool to convert 2D flood results to polygon classes.



3 Getting Started with MIKE+

This chapter provides a quick introduction to MIKE+.

Example files for all model types are provided with the installation in both SI and US units.

In the following illustration of a Collection System model, Sirius is used as an example.

3.1 Open MIKE+ model and explore MIKE+ GUI

1. Start MIKE+

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Q Zoom -	e selection	 Pan Pan selection Rafrash 	 O Identify 	Show compass	Selection method:	Pm Select by shape * Pk Special selections * Pk Select by operation *	 Edit selections - Selection colour Clear selection 	₽ Selection	Selection	O Selection to	CC Highlight to	P Set flags P _k Clear flags P _k Connect flags	et Trace forward		Distance 6	
		Navi	gate				Selection	nitering	manager	nignigni	severcouri	Profile a	nd tracing	Background / lavers	Snapping .	
Setup			×													
Startun tim	Layers and	59110015 Result	2													

Figure 3.1 Start screen

- 2. Open the model Sirius.mupp



Figure 3.2 File | New



b. Browse to the MIKE+ project file Sirius.mupp and click "Open"

🚠 Open						×
← → × ↑ 🖡 > Libraries	> Documents >	DHI > MIKE Software > Exampl	les → MIKEp → Sirius →	✓ 👌 Search Sirius		م
Organize 🔻 New folder						
	^	Name	Date modified	Туре	Size	
🖈 Quick access		Sirius_m1d - Result Files	24-09-2020 17:38	File folder		
len OneDrive - DHI		🚰 Sirius.mupp	23-09-2020 18:43	MIKE URBAN+		545 KB
interview (1990) (19900) (19900) (19900) (19900) (1990) (1990) (1990) (1990) (1						
🧊 3D Objects						
E Desktop						
Documents						
👃 Downloads						
👌 Music						
Pictures						
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動 OSDisk (C:)						
🍋 Libraries						
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Filo namo	Cirius annua			MIKE project	-t filo(* mun	
rite fiditie.	omusimupp			 Mike+ project 	e met inup	P) *
				Open	Ci	ancel

Figure 3.3 Browse for MIKE+ project file, *.mupp

c. Review the application window



Figure 3.4 Overview application window

Map: map view of the model with default symbology





Figure 3.5 Map and toolbar window

The map is per default 'docked', but can be 'floated' (right 'click' + 'Float', or drag the tab).

The map is brought to the front by clicking on the 'Map' tab)

Setup: One of three 'Table of contents':

- Setup: Access to model setup editors
- Layers and Symbols: Configuring map symbols
- Results: Result presentation

Context-sensitive contents – only editors associated with currently active modules are shown (controlled by 'Model type' editor)



Model: Rivers, collection system and overland flows ∨ Unit system: MU_CS_SI Edit Features Modules Modules Catchments Rainfall-Runoff (RR) Collection system network Rainfall-Runoff (RR) River network Control rules	del type Iodel type	Unit	3
Features Catchments Collection system network River network 2D Overland 2D Overland Couplings to other products Coupling to MIKE HYDRO River Coupling to MIKE 21 or MIKE 3 FM Special analyses Pump emergency storage estimation	Model: Rivers, collection system and overland flows	✓ Unit system: MU_CS_SI ✓ Edit	
2D Overland Long term statistics (LTS) Transport (AD, SWQ) Water quality (MIKE ECO Lab) Couplings to other products Sediment transport (ST) Coupling to MIKE HYDRO River Sediment transport (ST) Special analyses Pump emergency storage estimation	eatures ✓ Catchments ✓ Collection system network ☐ River network	Modules Rainfall-Runoff (RR) Hydrodynamic (HD) Control rules	
Coupling to other products	2D Overland	Long term statistics (LTS) Transport (AD, SWQ) Water quality (MIKE ECO Lab)	
Pump emergency storage estimation	Coupling to MIKE HYDRO River	Sediment transport (ST)	
	ipecial analyses		

Figure 3.6 Modules selection

Logical workflow sequence, entries organised in modules and groups

Data validation:

Green: all OK Red: Some data is incomplete or incorrect

3.2 Project Info: provides a general information on the project contents



🚡 🗠 🚈 📮 🖬 💽 🗙 🕁 🌐 File Project Map CS network	ĵ) ų ̇́γ , 𝒱 , ☑ ▼ Catchments Simulation Tools Results	MIKE+, Base [SpatiaLite, C:\Local\Sirius\Siri
Model:	S 🕄 🗛 🗹 🗊 🔓	
Rivers, collection system and overland flows	Map view Setup Symbols Results Property Simulatic view view view view view view view Manane views	on Log view Project User preferences
Setup 4 x	Project information	
→ M General settings → M Gold type □ Description ⊕ C Snetwork ⊕ C Catchments ⊕ Boundary conditions ⊕ Init conditions ⊕ L alberations ⊕ Calibrations ⊕ Calibrations ⊕ Scalabrations ⊕ Scalabrations ⊕ Result specifications ⊕ Smallow specifications	Project File name Connection info Spatialite, C:\Local\Sirius\	ber of patterns 1 of user defined pipe length 64092.73 [m]
U Siniaalon specifications	Number of weirs 2 Sum Number of orifices 9 Sum Number of valves 0 Sum Number of pumps 12 Number of carb inlets 0 Number of catchments 863	of geometrical pipe length 74959.16 [m] of pipe volume (user defined pipe length) 346447.6 [m^3] of pipe volume (geometrical pipe length) 341739.8 [m^3]
		77

Figure 3.7 Project information

3.2.1 Opening editors

General features

A click on any group entry folds/unfolds a group.

A click on any low-level entry opens an editor and per default docks it as a tabbed document.

'Docked' editors are displayed one at a time. Any editor can be brought to the front by clicking on its tab.

When 'Floated', editors are displayed in a stack, with the active editor on top.



Figure 3.8 Dialogs floating



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- Iden Catc	tification hment ID	S14150801			k			Insert Delete			
Loca	ation										
(Node	Node II	c			C1415080	1 📐				
() Entire	link Link ID									
() Link ch	ainage Chainag	ge start/	end			[m]	[m]			
Cat	chment loa	ad allocation									
L	oad type				Standard	``````````````````````````````````````	/				
F	raction of	f catchment runoff				10	0 [%]				
F	raction of	f catchment discha	rge			10	D [%]				
_		ID	~ ALL		~ (lear 🗌	Show selected S	now data errors 1/86	3 rows, 0 selecte	d	
	ID	Catchment ID	Туре		Node ID	Link ID	Start chainage [m]	End chainage [m]	Load type	RR fraction [%]	PE fraction [%]
▶1	3453	S14150801	1 Node	•	C14150801				Standard 👻	100	100
2	3454	S14151901	1 Node	•	C14150801				Standard +	100	100
3	3455	S14152801	1 Node	•	C14150801				Standard -	100	100
4	3456	514150802	2 Node	-	C14150802				Standard -	100	100
5	3457	515150001	Node	•	C14150802				standard •	100	100

Figure 3.9 Dialogs docked

3.2.2 Editor Functionality

Error validation

Setup 4 x	Map Nodes 🗙		•
General settings Model type Description → Map configuration → CS network → Kodes	Identification ID C14150801	X 95821.0001220703 [m] Y 103061.600097656 [m]	Insert Delete
Pipes and canals Pumps Weirs Orfices	Node type Manhole Diameter	Ground level	22.82 [ff Ground level must be given]
Curb inlets	Basin geometry River ID	Edit Location	[m]
Calcinitiats Conditions Doundary conditions Initial conditions Tables Tables			
Calibration Scenarios Scenarios Result specifications Simulation specifications	ID V AL	LL V Clear Show selected	Show data errors 1/568 rows, Occaected
L Validation	ID X [m]	Y [m] Node type Diameter [m]	Ground level [m] Bottom level [m] Bi
	1 C14150801 95821.0001220703 2 C14150802 95856.7000732422	103061.600097656 Manhole Manhole	. 22.82 . 28.02 23.35

Move the cursor above red marks with exclamation marks, to view the error description.

Figure 3.10 On-the-fly data validation

Filtering



Мар	Cat	chment connections	; x								
-Ider Cate	ntification	S14150801			k			Insert Delete			
Loc	ation										
	Node	Node ID				C1415080	1 📐				
) Entire	link Link ID									
	🔵 Link d	nainage Chainag	e start/	end			[m]	[m]			
Cat	tchment la	ad allocation									
1	Load type				Standard	`	/				
	Fraction o	f S chment runoff	2		2	10	0 [%]				
	Fraction	r catchment disch a	ae			10	0 [%]				
			-								
								-			
		ID	~ All		~ (lear 🗌	Show selected Sh	ow data errors 1/86	i3 rows, 0 select	ed	
	ID	Catchment ID	Туре		Node ID	Link ID	Start chainage [m]	End chainage [m]	Load type	RR fraction [%]	PE fraction [%]
▶ 1	3453	S14150801	Node	•	C14150801				Standard -	100	100
2	3454	S14151901	Node	•	C14150801				Standard •	100	100
3	3455	S14152801	Node	•	C14150801				Standard •	100	100
4	3456	S14150802	Node	•	C14150802				Standard •	100	100
5	3457	S15150001	Node	•	C14150802				Standard -	100	100
6	3458	S14154801	Node	•	C14154801				Standard •	100	100
7	3459	S14152901	Node	•	C15152001				Standard •	100	100

Figure 3.11 Catchment Connections

Other functions



Figure 3.12 Grid functions (1)

Clear selection	-			
Copy to clipboard	-			
Copy to clipboard with header text	-			
Paste from clipboard				
Manage selection		New selection	n list	
Add user defined column		Add to existin	g selection	
Clone selected rows		Remove from	existing selec	tion
Show columns in active tab	-			
Show grid only	L			
Reset layout	L			





3.3 Boundary conditions



Figure 3.14 Boundary Conditions

3.3.1 Boundary Conditions Editor

'Identification' box

BC 'passport': Identifier (name), Type, Activity

Serves all types of BC.



Мар	Boundary condit	ions 🗙					
Iden	tification						
I	D SiriusRiver_Node	_13 Type	Outlet water level	~	Insert		
Spatia	Apply Boundary	Outlet Levels	Rainfall Air temperature Evapo-transpiration Catchment discharg	e	Delete		
j spaue			Catchment discharg Catchment discharg Load point discharg Load point discharg	e per area e per PE e e per unit	Trelation Desc		
) List Individual	Node_13	Inflow to hode Inflow to link Inflow from result fi Outlet water level	le He			
	Source type	Start chainage	Exfiltration from link Stormwater loads(s Stormwater loads(R	urface) DII)	[m] Downstr.	. chainage	[m]
	Data source locatio	n X	Source inflow to river River water level River Q/h relation	er			
(Grid distributed wei	ights	Closed river bounda	iry			
	ID	~ ALL	∠ Clear Sho	w selected Show	v data errors	1/7 rows, 0 selected	
	ID.	Type	Group No	Apply Boundary	Load type	Connection type	List Name
▶1	SiriusRiver_Node_13	Outlet water level -	Outlet Levels			Individual -	

Figure 3.15 Boundary Conditions



'Spatial extent' tab

Linking of the actual BC with the model

- All entire model
- List (selection): reference to a sub-set of model elements, defined in a 'selection manager' (in MU Classic: '*.mus' file)
- Individual: reference to individual model element
- Geo-coded: applies for load points associated with individual model elements
- Data source location: applies for meteorological stations (e.g. rain gauges)
- Grid-distributed weights: applies for rainfall supplied as RADAR grid data

'Temporal variation' tab

Мар	Boundary condit	ions ×												-
Ide	ntification													
	ID Rainfall 1 year	т	vne	Rainfall	~	Insert								
			/			Delete								
	Apply Catchme	nt Loads				Delete								
Spat	ial extent Temporal	Variation Limited in	nterval	Scaling factor Dis	tributed Weights De	scription								
0	Constant	0.0	Cyclic		Time s	eries								
					Ele ann	Cisius	IDE minfal							
V.	alue	[mm/h] Va	aue		[mm/n] File fidin	sinus,	JUF Jainai							
	Gradual start up	Pa	attern		Time seri	es ID	F=1							
E	mor	[mm/h]			Data tvo	e Rainf	al Intensity							
LIп	me (0 [sec]												
	ID	 ✓ ALL 		V Clear Sh	ow selected 🔲 Show	v data errors	6/7 rows, 0 selecter							
	ID	V ALL Boundary type	``	✓ Clear Sh	ow selected Show	v data errors Load type	6/7 rows, 0 selecter Connection type	List Name	Load category	X coordinate [m]	Y coordinate [m]	Catchment ID	Node ID	Link ID
1	ID ID SiriusRiver_Node_13	V ALL Boundary type Outlet water level		Clear Sh Group No Outlet Levels	ow selected Show	v data errors Load type	6/7 rows, 0 selecter Connection type • Individual	List Name	Load category 1: Domestic WW	X coordinate [m]	Y coordinate [m]	Catchment ID	Node ID Node_13	Link ID
1 2	ID SiriusRiver_Node_13 SiriusRiver_Node_14	V ALL Boundary type Outlet water level Outlet water level	•	Clear Sh Group No Outlet Levels Outlet Levels	ow selected Show	v data errors Load type	6/7 rows, 0 selecter Connection type Individual Individual	List Name	Load category 1: Domestic WW 1: Domestic WW	X coordinate [m]	Y coordinate [m]	Catchment ID	Node ID Node_13 Node_14	Link ID
1 2 3	ID SiriusRiver_Node_13 SiriusRiver_Node_14 SiriusRiver_Node_15	 ALL Boundary type Outlet water level Outlet water level Outlet water level 	•	Clear Sh Group No Outlet Levels Outlet Levels Outlet Levels	ow selected Show Apply Boundary IV IV IV	v data errors Load type	6/7 rows, 0 selecter Connection type Individual Individual Individual	List Name	Load category 1: Domestic WW 1: Domestic WW 1: Domestic WW	X coordinate [m]	Y coordinate [m]	Catchment ID	Node ID Node_13 Node_14 Node_15	Link ID
1 2 3 4	ID SiriusRiver_Node_13 SiriusRiver_Node_14 SiriusRiver_Node_15 SiriusRiver_Node_16	V ALL Boundary type Outlet water level Outlet water level Outlet water level Outlet water level	•	Clear Group No Outlet Levels	ow selected Show Apply Boundary IV IV IV IV IV	v data errors Load type	6/7 rows, 0 selecter Connection type Individual Individual Individual Individual	List Name List Name	Load category 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW	X coordinate [m]	Y coordinate [m]	Catchment ID	Node ID Node_13 Node_14 Node_15 Node_16	Link ID
1 2 3 4 5	ID SiriusRiver_Node_13 SiriusRiver_Node_14 SiriusRiver_Node_15 SiriusRiver_Node_16 Wastewater	V ALL Boundary type Outlet water level Outlet water level Outlet water level Load point discharg	• • • •	Clear Sh Group No Outlet Levels Outlet Levels Outlet Levels Outlet Levels Network Loads	Apply Boundary	v data errors Load type DWF	6/7 rows, 0 selecter Connection type Individual Individual Individual Geo-coded	List Name	Load category 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW	X coordinate [m]	Y coordinate [m]	Catchment ID	Node ID Node_13 Node_14 Node_15 Node_16	Link ID
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1 2 3 4 5 5 • 6 7	D SriusRiver_Node_13 SriusRiver_Node_14 SriusRiver_Node_16 SriusRiver_Node_16 Wastewater Rainfal_1_veer Runoff_input	ALL Boundary type Outlet water level Outlet water level Outlet water level Load point discharg Rainfall Inflow from result fi	v v v v v e v ile v	Clear Sh Group No Outlet Levels Outlet Levels Outlet Levels Network Loads Catchment Loads Network Loads	Apply Boundary	v data errors Load type DWF	6/7 rows; 0 selecte Connection type Individual Individual Individual Ceo-coded Al Al	List Name List N	Load category 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW	X coordinate [m]	Y coordinate [m]	Catchment ID	Node ID Node_13 Node_14 Node_15 Node_16	Link ID
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1 2 3 4 5 ▶ 6 7	D SrikaRiver_Node_13 SrikaRiver_Node_14 SrikaRiver_Node_15 SrikaRiver_Node_15 Wastewater Rainfal_1_veer Runoff_input	V ALL Boundary type Outlet water level Outlet water level Outlet water level Outlet water level Outlet water level Lode point discharg Rainfall Inflow from result fi	• • • • •	Clear Sh Group No Outlet Levels Outlet Levels Outlet Levels Outlet Levels Network Loads Network Loads	ow selected Show	Load type	6/7 rows, 0 selectes Connection type • Individual • Individual • Individual • Individual • Geo-coded • All • All	List Name List Name List Name	Load category 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW	X coordinate [m]	Y coordinate [m]	Catchment ID	Node ID Node_13 Node_14 Node_15 Node_16	Link ID
1 2 3 4 5 6 7	D SriusRiver_Node_13 SriusRiver_Node_14 SriusRiver_Node_15 SriusRiver_Node_15 Wastewater Rainfal_1_yeer Runoff_input	V ALL Boundary type Outlet water level Outlet water level Outlet water level Outlet water level Outlet water level Lodd point discharg Rainfall Inflow from result fi	• • • • •	Clear Sh Group No Outlet Levels Outlet Levels Outlet Levels Outlet Levels Network Loads Network Loads	Apply Boundary F F F F F F F F F F F F F	Load type	6/7 rows, 0 selectes Cornection type Individual Individual Individual Ces-coded All All	List Name List Name V V V V V V V V V V V V V V V V V V	Load category 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW 1: Domestic WW	X coordinate [m]	Y coordinate [m]	Catchment ID	Node ID Node_13 Node_14 Node_15 Node_16	Link ID

Figure 3.16 Temporal Variations

Provides information about quantities and temporal variation

- Constant
- Cyclic
- Time series

'Limited interval' tab

Per default, a BC applies during entire simulation period. Activating 'Limited interval' restricts the BCs activity for the specified time interval only



Map Boundary conditions 🗙	
Identification	Insert
ID Rainfall_1_year Type	Rainfall
Apply Catchment Loads	Delete
Spatial extent Temporal Variation Limited interval	Scaling factor Distributed Weights Description
Use limited validity interval	
Start: 01-01-1900	End: 01-01-2100 🔍 🗸 00:00:00
1	
Figure 3.17 Limited interval	

'Scaling factor' tab

'Scaling factor' other than '1' scales the specified BC quantity up or down.

Мар	Boundary conditions 🛛 🗶				
Identific	ation				Trank
ID	Rainfall_1_year	Туре	Rainfall	~	Insert
	Apply Catchment Loads				Delete
				~	
Spatial ex	tent Temporal Variation	Limited interval	Scaling factor	Distributed Weights	Description
Scal	e factor	1 [0]			
I					

Figure 3.18 Scaling factor

'Distributed weights' tab

Contains user-specified or automatically computed 'weighting factors', i.e. contributions of RADAR grid cells to each catchment in the model. Note that the sum of weights for each catchment must be one. Data validation automatically controls that the data are correct.



Мар	Boundary conditions	×				
- Identi ID	fication Rainfall_1_year Apply Catchment Loa	ads	Туре	Rainfall	~	Insert Delete
Spatial	extent Temporal Varia	tion Limite	ed interval	Scaling factor	Distributed Weights	Description
			Sirius	s_IDF_rainfall.dfs	0	F=1
	Catchment ID	I	J	Weight		
*						
				All		 ✓ Compute

Figure 3.19 Distributed Weights

'Description' tab

Contains user-specified description of the actual BC. Good as a reminder!

Map Bound	ary conditions 🛛 🗙					
Identification ID Rainfall	_1_year Catchment Loads	Туре	Rainfall	~	Insert Delete	
Spatial extent	Temporal Variation	Limited interval	Scaling factor	Distributed Weights	Description	
Description						

Figure 3.20 Boundary Conditions - Description



3.4 Results specification

3.4.1 Result Files

Map Result files ×	v
Identification	
ID Default_Surface_runoff Model type Catchments	
Content type Surface runoff V Format .res1d V	
Delete	
Save all BP Items SWO AD Itams SWO ST Itams IID Itams OD Itams OD AD Itams	
Basic items Additional items	
	A
Total runoff	
Net rainfall	
I I I I I I I I I I I I I I I I I I I	
RDI: Overland how	
DD1 Interflow and base flow	
RDI: Groundwater depth	~
ID V ALL V Clear Show selected Show data errors 1/6 rows, 0 select	Insert Delete Copy 1/1 rows, 0 selected
Result files	Result selections
ID Model type Content type Format	ID Location type Subset type Individual type Selection ID Individual ID Grid poi
▶ 1 Default_Surface_runoff Catchments ▼ Surface runoff ▼ .res1d ▼	▶ 1 CATCHMENT_RR Save all Selection Node All grid p
2 Default_RDII Catchments • RDII • .res1d •	
3 Default_LIDs Catchments • LIDs • .resid •	
4 Default_Catchment_discharge Catchments Catchment discharge • .res1d •	
5 Default_Catchment_discharge_quality Catchments Catchment discharge quality res1d	
Default_Network_HD_Network Hydrodynamic Fissid	

Figure 3.21 Result files

'Identification' box

Identification						Incert
ID	Default Surface runoff		Model type	Catchments	\sim	Insert
		_				Сору
Content type	Surface runoff	\sim	Format	.res1d	\sim	Delete
						Delete

Figure 3.22 Identification box

Contains basic information about the result file:

- ID: ResultFileID is a part of the unique result file name, which is created as: SimulationID+ScenarioID+ResultFileID+format extension
- Model Type: Makes a distinction between 'Catchments' model and 'Network' model. This
 distinction controls possible contents types and formats.
- Content type: Each of the above model types can generate various contents. Result file
 may contain just one type of contents (keeps various types of results in separate files), or
 the contents may be mixed (puts various types or results in one result files)
- Format: various types or results may be saved in various formats: res1d and dfs0

Default result files

For each model type, MIKE+ database contains several definitions for default result file contents for each type of simulation.

Simulation results are distinguished as 'basic items' and 'additional items'

Default content may be user-modified to include or exclude specific result items.



Default result files contain results for the entire model.

List of accessible default result file definitions adjusts dynamically, depending on the activated modules.

Map Result files 🗶	Ψ
Identification	
ID Default_Surface_runoff Model type Catchments V	rt
Content type Surface runoff V Format .resid V	te
Save all RR Items SWQ AD Items SWQ ST Items LID Items CD Items CD AD Items	
Basic items Additional items	
☑ Total runoff	^
Net rainfall Actual evaporation	
Total infiltration	A delthioned
Total Loss	Additional
RDI: Interflow routed from second reservoir	Ttome
RDI: Base flow	Items
RDI: Interflow and base flow	
RDI: Rootzone storage	
RDI: Surrace storage	
RDI: Groundwater depen	•
ID V ALL V Clear Show selected Show data errors 1	/6 rows, 0 selected Insert Delete Copy 1/1 rows, 0 selected
Result files	Result selections
ID Model type Content type Format	ID Location type Subset type Individual type Selection ID Individual ID Grid po
▶ 1 Default_Surface_runoff Catchments - Surface runoffres1d -	▶ 1 CATCHMENT_RR Save all - Selection - Node - All grid
2 Default_RDII Catchments • RDII • .res1d •	
3 Default_LIDs Catchments • LIDs • .res1d •	
4 Default_Catchment_discharge Catchments • Catchment discharge • .res1d •	Spatial aytant for
5 Default_Catchment_discharge_quality Catchments • Catchment discharge quality • .res1d •	Spatial Extent 10
6 Default_Network_HD Network Very Hydrodynamic Very Ires1d Very Ire	
List of datault results to	Saving results
List of default results fi	les saving results

Figure 3.23 Result files

User-specified result files: Content types

The default list of result files can be extended to include any number of result file definitions, distinguished by the format, contents type and geographical extensions.

User-specified result files may include mixed-contents from the same model type. E.g., a mixedcontent result file may include both runoff and surface pollutant results in one file. Of course, user-specified result file may be limited to include only one type of content.

Map Nodes Result files X											
Identification	Insert										
ID Default_Surface_runoff M	ID Default_Surface_runoff Model type Catchments										
Content type Surface runoff	Instant type System and Copy										
	Delete										
Save all RR Items SWQ AD Items SWQ ST Items	LID Items CD Items CD AD Items										
Basic items	Additional items										
☑ Total runoff	Actual rainfall	RDI: Groundwater depth	RDI: Snow ZoneWaterRetention								
☑ Net rainfall	Accumulated actual rainfall	RDI: Infiltration to groundwater	RDI: Snow ZoneMeltingCoefficient								
	Actual evaporation	Accumulated RDI: Infiltration to groundwater	RDI: Snow ZoneAreaCoverage								
	Accumulated actual evaporation	RDI: Overland first reservoir flow from first to second reservoir	RDI: Snow ZoneMeltingWater								
	Total infiltration	Accumulated RDI: Overland first reservoir flow from first to second reservoir	TimeArea: InitialLossStorage								
	Accumulated total infiltration	RDI: Interflow first reservoir flow from first to second reservoir	UHM: Excess Rainfall								
1	RDI: Overland flow	Accumulated RDI: Interflow first reservoir flow from first to second reservoir Accumulated UHM: Excess rainfall									
	Accumulated RDI: Overland flow	RDI: Capilary flux	KW Runoff [ImperviousSteep]								
	RDI: Interflow routed from second reservoir	RDI: Overland first reservoir storage	Accumulated KW Runoff [ImperviousSteep]								
	Accumulated RDI: Interflow routed from second reservoir	RDI: Overland second reservoir storage	KW Runoff [ImperviousFlat]								
	RDI: Base flow	RDI: Lower base flow	Accumulated KW Runoff [ImperviousFlat]								
	Accumulated RDI: Base flow	Accumulated RDI: Lower base flow	KW Runoff [PerviousSmall]								
	RDI: Interflow and base flow	SnowStorage	Accumulated KW Runoff [PerviousSmall]								
	Accumulated RDI: Interflow and base flow	RDI: Snow ZoneTemperature	KW Runoff [PerviousMedium]								
	RDI: Rootzone storage	RDI: Snow ZoneRainfall	Accumulated KW Runoff [PerviousMedium]								
	RDI: Surface storage	Accumulated RDI: Snow ZoneRainfall	KW Runoff [PerviousLarge]								
	<										

Figure 3.24 Additional Results

Various result items are accessible through currently active tabs. The tabs activity depends on the selected model type, content type and active modules.



User-specified result file: Location

All specified results will be saved only as the specified locations

Mode Readt field ID Nodd type Content type Second type Save all Image: Second type Internet Node type Node Image: Second type Save all Image: Second type Save all type Image: Second type Internet Node type Save all type Image: Second type Internet Image: Second type Internet <th></th> <th>- 11 ft</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>		- 11 ft									
Identifiation Insert Core D Readling Model type Cathments Content type Need cathment contents Format Core Content type Save all Save all Save all Save all © Save all Save a	Мар	Result files ×									
D Retail_fe_1 Model type Catchments Content type Model type Contents Conv D Retirem SWQ AD times SWQ ST times LD times CD AD times O Save all Swe subset Selection O Save subset Selection O Save subset Save subset Selection O Save subset Selection Save subset Selection Save subset Selection O Save subset Selection Save subset Selection Save subset Selection O Save subset Selection Selection Selection Save subset Selection O Save subset Selection Selection Selection Save subset Selection Selection Selection Selection Neet Selection D Model type Content type Format ID ID ID Nodel type Selection Nod	Ider	tification				Insert					
Content type Next ackthment contents Format restd O Save addet Selection Outres SW 251 them 100 thems OD 1000000000000000000000000000000000000	ID	Result_file_1	Model	type Catchments	\sim						
Location BR Items SWQ 25T Items UD Items O DAD Items O Save all Swe subset Selection Couldest	Con	tent type Mixed catchment contents	 Forma 	.res1d	\sim	Сору					
Interes SVQ AD thess SVQ ST terms UD thess OD thess OD AD thess Save all Save all Control						Delete					
O Save all ● Save alloct ● Save alloct ● Save individual ● Save individual ● Save within polycon ● Realt Belict © (00 rows, 0 selected) ● Default, Burloce, 100 ● Default, Burloment, discharge © assist ← 100 ● Default, Burloment, discharge © assist ← 100 ● Default, Burlowent, Hydrodymanice ← 100 ● Default, Default, 100 ● Default, 100 ● Default, 100 ● Default, 100	Locat	ion RR Items SWQ AD Items S	WQ ST Items LI	ID Items CD Items CD AD Item	IS						
Save adoet Save adoet Save adoet Save individual Save indit Save indit Save indit Save indit Save individu	Os	ave all									
○ Save individual Image: Optimume, 0 selected ○ Save within polygon Result polection geometry Draw on map X [m] Y [m] X [m] Y [m] Non-state selection D ALL Clear B Model type Clear Show selected Show data errors 10 Model type Clear Show selected 10 Model type Clear Show selected 10 Model type Clear Show selected 10 Model type 11 Selection 12 Default, Suffore, unoff 2 Default, Suffore, unoff 3 Default, Suffore, unoff 3 Default, Suffore, unoff 4 Default, Suffore, unoff 5 Default, Suffore, unoff 6 Default, Suffore, unoff 6 Default, Suffore, unoff 7 Default, Model type 7 Default, Model type) 🖲 S	ave subset Selection	~	outlets							
O Save within polygon Insert Delete 00 rows, 0 selected Draw on map Real/Lelector geometry X [m] Y [m] X [m] Y [m] B ALL Clear B Model type Clear Show selected B Model type Clear Show selected B Model type Clear Show selected Solution Insert D Model type Control type Format I Reautifies D Model type Control type Format I Default_Suffice_runoff Clear Suffice runoff I Super suffice J Default_Suffice_runoff Clear Nodel type Solection Hold Solection Hold Default_Cathment declarge resid Solection Format Default_Suffice_runoff Cathment declarge Continent declarge resid Solection For	() s	ave individual	\sim								
Drew on map Result selection geometry x [m] Y [m] x [m] Y [m] x [m] Y [m] x [0 s	ave within polygon Insert De	elete 0/0 r	rows, 0 selected							
Image: Default Suffice Fund X [m] Y [m] Image: Default Suffice Fund ALL Clear Show selected Show selected Show selected Image: Default Suffice Fund Default Suffice Fund Suffice Fu			Result se	ection geometry							
ID AL Clear Show selected Show data errors 1/7 rows, 0 selected ID Realt files Copy 1/1 rows, 0 selected ID Model type Content type Format I Realt_files Content type Format 2 Default_Suffice_ruroff Catchments Sufface runoff resid 3 Default_Sufface_ruroff Catchments Sufface runoff resid 4 Default_Cathments Cathments Cathment decharge resid 5 Default_Cathments Cathment decharge resid Cathment decharge 6 Default_Cathment, decharge Cathment Cathment decharge resid 7 Default_Ident decharge Cathment Hordowyne resid	Dra	w on map X [m]	Y [m]								
ID ALL Olear Show selected Show data errors 1/7 rows, 0 selected Insert Defet Copy 1/1 rows, 0 selected Insert Insert Insert Defet Insert Insert Defat Cathements Node resid Insert Defat Cathement Cathement debrage quality resid Insert Defat Cathement Cathement debrage quality resid Insert Defat Cathement debrage quality resid resid Insert Defat Cathement debrage quality resid resid Insert Defat Cathement debrage quality <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>											
ID ALL Clear Show selected Show data errors 1/7 rows, 0 selected ID Result files Comport Result files Comport Result selector ID Result files Content type Format Pormat ID Location type Subset type Individual type Selection 1 Result files Content type Order or type Subset type Individual type Selection 2 Default_Surface_uronff Catchments Surface numff - resid - 3 Default_Surface_uronff Catchment dacharge - resid - 5 Default_Cathment, dacharge - cathment dacharge - resid - 6 Default_Cathment, dacharge quality - cathment dacharge quality - resid - 7 Default_type Net dathment - cathment dacharge - resid -											
ID ALL Clear Show selected Show data errors 1/7 rows, 0 selected ID Result field Copy 1/1 rows, 0 selected ID Result field Copy 1/1 rows, 0 selected ID Result field Format ID Location type Subset type Individual type 2 Default_Sufface_uruoff Cathments Nation - resid - 3 Default_ROII Cathments - Result effect 5 Default_Cathment_discharge - Cathment datarge - resid 6 Default_Cathment_discharge Cathment - Cathment datarge - resid 7 Default_Louting_Login to Nexted - resid -											
ID ALL Olear Show selected Show data errors 1/7 rows, 0 selected Insert Delete Copy 1/1 rows, 0 selected ID Result files Result file <											
ID Made Clear Show selected Show data errors 1/7 rows, 0 selected ID Result fies Result fies Result fies Result fies ID Model type Content type Pornat I Result fies Content type Pornat I Result fies Content type Pornat ID Location type Subset type Individual type Section Individual type Selection ID Default_Suffice_runoff Catchments Sufface runoff ID Default_Us Catchments Sufface runoff resid S Default_Cathment Robit Cathment desharge resid S Default_Cathment Cathment desharge resid S Default_Leity (b Nork Hydrodynamic res											
ID AL Clear Show selected Show data errors 1/7 rows, 0 selected Inset Defet Copy 1/1 rows, 0 selected ID Result, file; Content type Format Inset Defet Copy 1/1 rows, 0 selected 1 Result, file; Cathements + Nade athemet contents + :restd + 2 Defetuit, Lysufface_runoff Cathements + Nade athemet contents + :restd + 3 Defetuit, Lysufface_runoff Cathements + ROII - :restd + 5 Defetuit, Cathements + Cathement discharge quality - :restd + 6 Defetuit, Cathements + Cathement discharge quality - :restd + 7 Defetuit, Cathements + Cathement discharge quality - :restd +											
ID ALL Clear Show selected Show data errors 1/7 rows, 0 selected Interview of the selection Result files Result files 1 Result files ID Noded type Operating Colspan=16 2 Default,Surface_runoff 2 Default,Surface_runoff 3 Default,Surface_runoff 2 Default,Surface_runoff 2 Default,Surface_runoff Cathments Surface runoff 5 Default,Surface_runoff Cathment dasharge - resid 5 Default,Surfment dasharge - resid 5 Default,Cathment, dasharge quality - resid Cathment, dasharge quality - resid - - resid - - Default,Cathment, dasharge quality - - - - -											
ID ALL Clear Show data errors 1/7 rows, 0 selected Insert Debte Copy 1/1 rows, 0 selected ID ID Result, Be1 Odd type Content type Femat ID ID Location type Subset type Tobulat selector ID Defail_UserSecured Catchments IMade tablement contents - resid - ID Defail_UserSecured Catchments IMade tablement contents - resid - ID Defail_UserSecured Catchments - Suffice rund - resid - ID Defail_UserSecured Catchments - resid - - resid - ID Defail_UserSecured Catchment dasharge - <th></th>											
Result fies Result fies Result fies Result fies Content type Sector Subset type Result fies 1 Result fies Cathments * Result * <		ID 🗸 ALL	~ CI	lear 🔄 Show selected 📃 S	how data en	ors 1/7 rows, 0 selected	Insert	Delete Copy	1/1 rows, 0 s	selected	
ID Noted type Content type Format 1 Rest_id_g Catchments + risid + 2 Defaul_Surface_runniff Catchments + risid + 3 Defaul_Surface_runniff - risid + 4 Defaul_Surface_runniff + risid + 5 Defaul_Cathment_discharge_asity Cathment - risid + 6 Defaul_Ebronk_th0 Nethore + risid + -		1		Result files							Result selectio
I Result_Re_1 Cathments Node		ID	Model type	Content type	Format			ID Location type	Subset type	Individual type	Selection
2 Defail_gurface_runoff Cathments + Surface runoff + restal 3 Defail_gurface_runoff Cathments + Roll - restal 4 Defail_clating Cathments + IIDs - restal 5 Defail_clating Cathments - Cathment discharge quality + restal 6 Defail_Clathment_discharge.quality Cathments - Cathment discharge quality - restal 7 Defail_Clathment/H Mehnork + Hydrodynamic - restal -	▶ 1	Result_file_1	Catchments •	Mixed catchment contents	.res1d •		▶1	Sel_1 Save subset	Selection ·	Node	• 0
3 Default_DOII Cathments + ROII + .res1d 4 Default_DIIS Cathments + IDis res1d 5 Default_Cathment_discharge res1d - 6 Default_Cathment_discharge_quality res1d - 7 Default_Dietorky_t0 Network + ./Hydrodynamic res1d	2	Default_Surface_runoff	Catchments -	Surface runoff	.res1d •						
4 Obefault_Los Catadoments • Lios • restid 5 Default_Catadoment_discharge Catadoment discharge • restid • 6 Default_Catadoment_discharge Catadoment discharge • restid • 7 Default_Jetwork_HD Network • Hydrodynamic • restid •	3	Default_RDII	Catchments •	RDII •	.res1d •						
5 Default_Cathment_dedrage Cathment dedrage • / restd • 6 Default_Cathment_dedrage_quality Cathment dedrage quality • / restd • 7 Default_Dethonk_H0 Network_H0 • Network • Hydrodynamic • / restd •	4	Default_LIDs	Catchments •	LIDs	.res1d •						
6 Default_Catchment_discharge_quality Catchment discharge quality restd • 7 Default_Network_HD Network • Hydrodynamic • restd •	5	Default_Catchment_discharge	Catchments •	Catchment discharge	.res1d •						
7 Default_Network_HD Network + Hydrodynamic + .res1d +	6	Default_Catchment_discharge_quality	Catchments -	Catchment discharge quality •	.res1d •						
	7	Default_Network_HD	Network •	 Hydrodynamic 	.res1d •						

Figure 3.25 Result files location

Saving result may be specified at:

- Save all: saves the wanted results at all model elements
- Save subset: saves the wanted results for model elements included in the chosen selection
- Save individual: saves the wanted results for the specified individual model element
- Save within polygon: saves the wanted results for the model elements located within a polygon drawn on the map

'Location' for one result file may be defined by any number of location definitions. Overlapping location definitions are ignored (the results are saved only once).

3.4.2 Network summary

Any number of summary contents can be specified and associated with network model simulations



Мар	Netv	vork summar	y ×							
- Identi ID	fication Summ	_1				Inser	t			
Table	s with m	in, max and a	accumulated values fo	or						
	Nodes		Grid points,	water levels						
	Weirs a	and orifices	Grid points,	discharge						
	Pumps		🗹 Links, veloci	ity						
] Links a	nd structures	5							
Summ	nary of ir] Links a	nput data nd structures	5							
Use s	election	to reduce su	mmary tables							
] Node s	election								
] Link se	lection								
		ID	~ ALL	~ C	ear 🗌	Show selected 🗌 Show d	ata errors	1/1 rows, 0 sele	cted	
	ID	Nodes	Weirs & orifices	Pumps	Links	Grid points, water levels	Grid points	s, discharges	Links, velocity	Link
▶1 S	Summ_1	N	V	N		V		V	V	

Figure 3.26 Network summary



3.5 Simulation setup

3.5.1 'Identification' box and function buttons

Simulation setup				• •	c
Identification					
ID Sirius_RR_and_HD	Ins	sert Cop	у		
Scenario Base	∨ De	lete RUI	N		
General Catchments HD Results					
- Simulation Type	Simulation Period				
 ✓ Catchments ✓ Rainfall-Runoff (RR) Stormwater runoff WQ (SWQ) Catchment Discharge (CD) CD Water quality ✓ CS network (HD) Long-Term Simulation(LTS) Water quality(AD) MIKE ECO Lab (WQ) Sediment Transport (ST) Rivers (HD) 2D overland (HD) Water quality (AD) Water quality (AD) MIKE HYDRO River 	Start 01/0 Duration 1 End 02/0 Description	1/2019 00:00:00		Boundary Info. Set max. time	
				diama Andrea	i
ID V ALL	✓ Clear	Show sele	cted Show data error	s 1/4 rows, 0 selected	
ID Scepario	Active simulation	Catchments	Rainfall-Runoff (RR)	Stormwater runoff WO (SWO)	6
▶ 1 Sirius RR and HD Base					_
2 Sirius CDS 1 yearHD Base		Г			
3 Sirius_CDS_1_yearRR Base	Г	V	~		
4 DWF_Network Base		Г		Γ	
<				-	>

Figure 3.27 Simulation setup

- ID: Unique simulation ID, used in the result file name
- Scenario: Scenario to be used for the current simulation. In some cases, model setup based on selections (e.g. requested result outputs, boundary conditions, etc.) may conflict with the contents of the selected scenario
- Insert button: Inserts a new simulation setup
- Copy button: copies a specified simulation setup (increased productivity)
- Delete button: deletes current simulation setup record
- RUN button: Executes the current simulation setup record

Access to various functionalities related to executing simulations, under 'Simulations'



File	Project	Map CS ne	twork Catch	ments	Simulation	Tools	Res	ults			
÷	Ē	l.	1	Set active	e simulation:	(Ð	C _A	Ŀ	Ê	串
Simulation setup	Batch simulation	CS engine configuration	Parallelization configuration	Siriu	us_RR •	Rur	active ulation	View log	View summary	Model and result report	Boundary overview
Setu	p "	Configu	ration 🔺			Exe	tution		A	Reporting 🔒	Boundaries

Figure 3.28 Simulation ribbon tools

3.5.2 'General' tab

Simulati	on setup							• •
Ider	tification							
ID	1	Sirius_RR	_and_HD		Insert	Сор	У	
So	enario	Base		~	Delete	RU	N	
Gener	al Catchn	nents HD) Results					
Simula	ation Type —			-Simulation Peri	od			
Catchments			Start	01/01/201	9 00:00:00		Boundary Info.	
	Stormwater runoff WQ (SWQ) Catchment Discharge (CD) CD Water quality CS network (HD)			Duration	1 0	0	(dddd][hh][mm][ss]	Set max. time
				End 02/01/2019 00:00:00				
	Long-Term Simulation(LTS) Water quality(AD)			Description				
		CO Lab (W	2)					
	Sediment	Transport (ST)					
	2D overland	(HD)						
	Water gu	ality (AD)						
) River						
	MIKE THERE							
		ID	~ All	~ (lear [Show sele	cted 🗌 Show data erro	rs 1/4 rows, 0 selected
					Simulati	on setup		
	ID		Scenario	Active simulation	n Cato	hments	Rainfall-Runoff (RR)	Stormwater runoff WQ (SWQ)
▶ 1	Sirius_R	R_and_HD	Base	V		V	v	
2	Sirius_CDS_	1_yearHD	Base					
4	SIRIUS_CDS_	_1_yearRR = Network	Base					
	511		buse				1	
<								

Figure 3.29 Simulation setup

- Simulation Type: Choice of modules to be included in the simulation. Accessible modules depend on module activation, model setup data and module dependency
- Simulation Period: start and end time for the simulation, limited by the active boundary conditions (note some exceptions!)
- Description: user-specified reminder information about the actual simulation
- Boundary Info: provides overview of the extent of the active boundary conditions
- Set max. time: sets the maximum extent of the simulation (the earliest possible start time and the latest possible end time), based on active boundary conditions



3.5.3 Module tabs

- Catchments tab: Contains data for any catchment simulation (runoff, SQW, catchment discharge)
- HD tab: Contains data for network hydraulics simulation setup
- AD and WQ: Contains pollution transport and WQ specific data for network simulation setup
- LTS: Contains LTS-specific simulation setup data

Simulati	on setup					□ X					
Iden	tification										
ID	Sirius_RR	_and_HD	Ins	sert Cop	У						
So	enario Base		∼ De	lete RUI	N						
	L Catchmente U	Devilte									
Gener		Results									
- time :	step										
Tim Kin.	e-Area (50 [sec]	Linear reservoir Wet weather	60 [sec]	RDII Catchment discharg	4 [h]					
UHI	4	50 [sec]	Dry weather	300 [sec]		600 [sec]					
RDII hot start											
	Apply										
Additi	ional Parameters										
	Apply										
	ID	~ All	✓ Clear	Show sele	cted 📃 Show data error	s 1/4 rows, 0 selected					
			S	imulation setup							
	ID	Scenario	Active simulation	Catchments	Rainfall-Runoff (RR)	Stormwater runoff WQ (SWQ)					
	Sirius_RR_and_HD	Base			N N						
2	Sirius_CDS_1_yearHD	Base									
4	DWE Network	Base		I¥ □							
	Divi _icciiolik	bdse			1	1					
<						>					

Figure 3.30 Simulation setup



3.5.4 'Results' tab

Мар	Simulation setup	×								
Ider	ntification									
ID	Sirius_RR_a	nd_HD		Active project	Inse	ert Copy				
S	cenario Base	~	1		Dele	te RUN				
	buse]							
Gene	ral Catchments HD	Results								
Outp	ut folder									
0 5	Save results in default fold	er								
05	Save results in this folder									
Collec	ction System Summary									
						✓ Edir	t summary			
	Project outputs Result files									
	ID	Туре	Format	Save every		Default save period	Start saving	End saving	Indu	ıde
▶ 1	Default_Surface_runoff	Surface runoff	.res1d	60	seconds	- 1	01-01-2019 00:00:0	00 02-01-2019 12:00:00		
2	Default_Network_HD	Hydrodynamic	.res1d	60	seconds	• 🔽	01-01-2019 00:00:0	00 02-01-2019 12:00:00	Induc	de all
									Ed	lit
									Rem	ove
									- Cent	ove
									Use de	efault
									pen	ou
	ID		Class	show o		Show data errors 1/4	rows 0 colocted			
	ID V ALL V Clear Show selected Show data errors 1/4 rows, 0 selected									
								Canada don a		
	ID	Scenario Activ	ve Project	Catchments	Runoff(RR)	Stormwater runoff \	NO (SWO) Catch	ment Discharge (CD)	CD Water guality	Network(HD)
▶ 1	ID Sirius_RR_and_HD	Scenario Activ Base	ve Project	Catchments	Runoff(RR)	Stormwater runoff	WQ (SWQ) Catch	ment Discharge (CD)	CD Water quality	Network(HD)

Figure 3.31 Results specifications

- Output folder: Default (= Project folder) or user-specified location
- Summary: reference to a network summary definition
- Result files: List of selected result files. Initially, the output list include default result files for all modules included in the simulation. This list can be modified by deleting the unwanted result files and including user-specified result files.

3.6 Results

Result presentation supports 'ordinary' time series result presentation, as well as LTS statistics.

3.6.1 Loading result files

Per default, results from current simulations are automatically loaded for the presentation. This feature can be toggled ON/OFF in 'User preferences':



He Project Map CS network Catchme	™ _× ☑ ▼ nts Simulation Tools Results	MIKE+, Base [Spat
Model: Rivers, collection system and overland flows Model type	ap view Setup Symbols Results Property Simulation Log	view Project User preferences
Image: Second	Image English ✓ User preferences ✓ Language English ✓ Prefered unit system SI ✓ Use single editor style Show warning on undo buffer dear ✓ Auto-bad result files after simulation finished ✓ Auto-add result files of the simulation finished Auto-add result layers after simulation Retain exported 2D setup files for simulation Report max row count per table preview 200 ÷ OK Cancel	New selection

Figure 3.32 User preferences

Results are accessible through 'Results' view.



Results		џx
Add file	Add Folder	Remove
Refresh	Properties	Compare
Sinus_F Cat Cat	R_and_HDBasel chment Total Run chment Net Rainfi RR_and_HDBasel de Water Level de Flood de Depth de Water minus Cri (Water Level c Discharge c Flow velocity c Flood c Depth c Absolute Discharge ir Water level ir Discharge ir Water level ir Discharge ir Absolute Discharge ir Absolute Discharge in Water minus Cri ir Absolute Discharge in Depth np Discharge np Bod np Depth np Discharge ice Depth ice Water minus Cri ice Absolute Disch ice Water minus Cri ice Discharge ice Discharge ice Flood ice Depth ice Water minus Cri ice Absolute Disch ice Absolute Disch	Default_Surface_ off all Default_Network itical Level ical Level tical Level arge ntical Level arge
<	and and a	>
Setup Lay	ers and symbols	Results

Figure 3.33 Results selection

3.6.2 Results in the map

- Animation
- Minimum
- Maximum
- Average
- Single time step
- LTS results



Result Items								
	Мар	TS Plot	Table	Profile Plot	Bar chart	LTS report	t	
☐ ✓ C: \Users \mjk \Document:								
Node Visit Provided the second se		Animatic Minimum Maximum Average Single ti Recurre Recurre	on m e me step nce inte nce inte	item	01-01-2019 01-01-2019 01-01-2019 01-01-2019 01-01-2019 01-01-2019 discharge e: water level water level)) 00:01) 00:02) 00:03) 00:04) 00:05 xceedance exceedance	of Manning discharg e of ground level e of critical level	je
<	Cre Edit	eate new t existing as	map R	Lesult Map(18	:21:57) Icel			~

Figure 3.34 Results presentation

3.6.3 Results TS Plot & table



Figure 3.35 Time series plot



lax. node levels						•
General						
Result file	DWF_NetworkBa	seDefault_Network_H	D.res1d	Num	er of decimals 3	
Time step	01/01/2019 00:0	00:00		• DI	se cache	
Filter						
Apply filter	r					
Filter				 ✓ Edit 	Save Load	
Calumna		-		intine C	lastias	
Maximum	Time of a	sp		isucs 5	Transfer to map	
Mainum		-iaimum		The surger of the first large		
Minimum		ninimum		SHOW STRUCTOR	Update from map	
Average	Time step	p value			Load	
	All	 ✓ Cle 	ar	Show selected Show s	ngle point in links Showin	g 569 of 569 records
ID	Туре	Node Water Level,	max.	Node Water Level, time of max.		
1 C1415080	1 Node		22.864	01/01/2019 19:32:00		
C1415080	2 Node		23.375	01/01/2019 19:31:00		
C1415480	1 Node		23.522	01/01/2019 19:30:00		
C1515200	1 Node		21.741	01/01/2019 19:32:00		
C1515240	1 Node		22.398	01/01/2019 19:31:00		
C1515310	1 Node		20.865	01/01/2019 19:34:00		
C1515430	1 Node		19.932	01/01/2019 19:39:00		
C1515500	1 Node		22.903	01/01/2019 19:32:00		
C1515510	1 Node		22.623	01/01/2019 19:38:00		
.0 C1515540	1 Node		19.394	01/01/2019 19:41:00		
1 C1515570	1 Node		22.710	01/01/2019 19:30:00		
.2 C1515610	1 Node		22.655	01/01/2019 19:38:00		
.3 C1515650	1 Node		18.874	01/01/2019 19:43:00		
L4 C1515660	2 Node		18.412	01/01/2019 19:41:00		
.5 C1515670	1 Node		21.072	01/01/2019 19:32:00		
6 C1515740	1 Node		22.813	01/01/2019 19:34:00		

Figure 3.36 Tabular results



3.6.4 Results in Long profile



Figure 3.37 Longitudinal profile and results

3.6.5 Results in Bar-chart

Used for LTS chronological results (annual and monthly statistics)

3.6.6 Results: LTS reports

Used for reporting LTS statistics results in tabular form.



4 Import MIKE URBAN model to MIKE+

A step-by-step description is provided on how to import existing models into MIKE+.

The first step is to open MIKE+ and then follow the steps described in the following.

4.1 Prerequisites

As the first step, before importing existing MIKE URBAN models to MIKE+, the MIKE URBAN model needs to be updated to MIKE URBAN 2020 Update 1 version.

4.2 File | New

Under File menu you have various options available:

- New (project)
- Open (an existing project)
- Recent projects,
- User preferences
- Install Examples
- About
- Exit (application)

Chose File | New to create a new project.

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Fi	le	
₿.	New	New (Ctrl+N)
ſţ.	Open	Ctrl+0
8	Database	•
E	Recent projects	•
鐐	User preferences	Ctrl+F, Ctrl+G
₫	Install examples	Ctrl+F, Ctrl+E
	About	
€	Exit	Alt+F4

Figure 4.1 File | New

4.2.1 Module Selection

In the 'Model Selection' tab, you have the following options:

- Model type:
 - Water Distribution
 - Rivers, collection system and overland flows
 - SWMM5 collection system and overland flows
- Unit system:



- Selection of unit system for the model, SI or US.
- Database type: Two options available
 - SQLite (installed with MIKE+)
 - PostGIS (installed separately please follow the installation guide)
- Database setting: File path for model database
- Project setting: Project file (*.mupp)

New model setup			x
Model selection Coordinate system	MODE Model type Unit system	Rivers, collection system and overland flows \checkmark MU_CS_SI \checkmark	
Description	Database type Database type	SQLite (single file)	
	Database setting File path	C:\Users\Documents\Sirius.sqlite	
	Project setting Project file	C: \Users\Documents\Sirius.mupp	
		ОК С	ancel

Figure 4.2 Selection of module, unit and database

4.2.2 Coordinate System

At the Coordinate System tab, the local coordinate projection can be set. This projection will be overwritten with the map projection used in the MIKE URBAN model during the import.



New model setup				x
Model selection	Coordinate system			
Coordinate	Projection Local Coordinates	l de la companya de l	~	
system	Use projection	from MIKE URBAN classic model		
Description	(requires that	MIKE URBAN classic is installed)		
_				OK Cancel
iaure 4.3 Sele	tion of projection or use	from existing model (to	be imported or a	nother model)

4.2.3 General settings | Model type

In the General settings | Model type, the different features and modules available for Collection System or Water Distribution can be activated for the model to get the complete overview of the data groups available.

odel type			Unit		
Model:	Rivers, collection system and overland flows	~	Unit system:	SI units, CMS	- Edit
atures		Modules			
🔽 Cat	chments	🗹 Rainfall-	Runoff (RR)		
🔽 Coll	lection system network	🗹 Hydrody	mamic (HD)		
🗹 Rive	er network	00 💟	ontrol rules		
2D	Overland		ring term statistics (LTS		
		U Transpo	ater quality (MIKE ECC) Lab)	
uplings to c	other products	Sedimen	t transport (ST)	. 660)	
		Data ass	similation (DA)		
	upling to MIKE 21 or MIKE 3 FM				
	upling to MIKE SHE or FEFLOW				
ecial analys	ses				
Pun	np emergency storage estimation				

Figure 4.4 Model type selection for the project. Can be toggled on/off any time



4.3 File | Import

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Fi	ile						Simul	ation	Tools	Result	S		
Ľ,	New				Ctrl+	N	1	~			0	Ê	ൻ
(†	Open				Ctrl+	0	Sv	mbols	Results	Property		Project	Global
•	Save				Ctrl+	-S	v	view	view	view	Log view	info	settings
•	Save as						M	lanage	views			Glob	al 🔺
×	Close						Ma	ap ×					
8	Database					•		0	શ્વ	< > (🖲 🗟 🖻	ÿx (D 🗖 🤂
5	Import					•	5	Impo	ort MU cla	assic mode	el (mdb)	Ctrl+l, C	Ctrl+M
G	Export					•	ত	Impo	ort MU cla	assic mode	el (gdb)	Ctrl+l, (Ctrl+G
E	Recent pro	ojects				•	ি	Impo	ort full MI	KE FLOOD	model setu	p (couple))
鐐	Global set	tings	C	trl+F,	Ctrl+	G	ি	Impo	ort MIKE 2	1 model s	etup (m21, i	m21fst, m	21fm)
₽	Install exa	mples	C	trl+F	, Ctrl+	-E	ি	Impo	ort MIKE F	LOOD cou	iplings (cou	ple)	
Figu	re 4.5 Fa	ist imp	ort o	ptior	ns of	exist	ing n	node	ls				

The File | Import provides a quick access to import existing models:

To import a MIKE URBAN model, either select:

- Import MU Classic model (mdb) requires that MIKE URBAN is installed.
- Import MU Classic model (gdb) does not require that MIKE URBAN is installed.

These imports have been developed to make it easy for users to import existing MIKE URBAN models. If customised imports are required, then the general 'Import and export' tool found under Tools tab can be used.

When clicking on e.g. 'Import MU Classic model (mdb)', the dialog below appears for selecting the MIKE URBAN file.

🚠 Import MDB				×
\leftarrow \rightarrow \checkmark \uparrow \square « CollectionSystemMOUSE \rightarrow Demo		~ Ū	Search Demo	Q
Organize 🔻 New folder				• 🔳 💡
😻 Dropbox	^ Name	^		Date modified
	TS_DB			14-11-2018 16:17
	🖲 Demo.mdb			21-09-2018 12:04
🝊 OneDrive - DHI				
💻 This PC				
🧊 3D Objects				
🔜 Desktop				
🔮 Documents				
🕂 Downloads				
Music				
	× <			^
File name: Demo.mdb		~	mdb files (*.mdb)	\sim
			Open	Cancel

Figure 4.6 Browser for selecting MIKE+ model

The import process starts after clicking Open.





After import of the MIKE URBAN model, then it could look like this.

Figure 4.7 Imported MIKE URBAN model to MIKE+

At the right side in the setup tree, data has been grouped and instant data validation is performed. If there are any errors in the data, a red cross will appear. If there are no errors in the data, a green check mark or no mark will be displayed.

4.4 Status after import

All features in Water Distribution including Water Hammer is supported in MIKE+, so all models that run in MIKE URBAN 2020 or EPANET 2.0 can be imported into MIKE+ without data errors and ready to run. The same applies to SWMM models.

For Collection System and 2D Urban Flood models, it is expected that most running MIKE URBAN 2020 models based on MIKE 1D will be running in MIKE+ with the exception of models including features listed in 4.5.



4.5 MIKE+ unsupported features

In Table 4.1, the features which are not supported in MIKE+ are listed.

Feature Status MOUSE UWC (User Written If MOUSE UWC has been applied, this cannot be transferred to MIKE 1D. Those UWC Control) controls needs to be recoded into MIKE SDK. The MIKE 1D is in general much more open for user control than MOUSE. **MOUSE Storage Nodes** Not supported in MIKE 1D. Special feature: MOUSE PCS Not supported in MIKE 1D. Expected to be developed later. MIKE 1D – RTC Imports existing models using RTC. However, if some Actions have been reused, then they have to be added manually as individual Actions. This is an improvement of how Actions are handled in the model with unique ids, but it is impossible to update the model automatically. Replaced by a new version of Submodel Sub Model Manager Manager.

Table 4.1 Overview of features with limited support in MIKE+

