7 Surface water

ROYAL HASKONING

Chapter 7: Surface water

7.1 Supported models

The following surface water models are supported by the triwaco modelling environment:

Modelcode	Developed by	Description	Chapter
SOEBK-CF	WL Delft/Deltares	Hydraulic model for stationary and transient surface water flow	6

7.2 The SOBEK-CF Tutorial: defining a Triwaco project

7.2.1 Introduction

There are several possibilities to get to know **Triwaco**. The most extensive information on the software package can be found in the next chapters of the manual, that includes not only an explanation of how to run the software, but also contains extensive background information of the different modules and supported model codes. This information can also be accessed by the Help function.

This tutorial gives an introduction on how to set up and run a SOBEK-CF surface model in **Triwaco**. It is meant for those who are familiar with SOBEK-CF modelling and wish to get a quick view of the normal method to set up and to run a SOBEK-CF model, and the standard possibilities of **Triwaco**. A complete view is obtained by using the manual.

It is strongly recommended that prior to starting this exercise one first reads through the previous chapters which explain the general philosophy and handling of the Triwaco modelling environment. Especially chapters 3, 4 and 5 is recommended to read first.

The model set up in this tutorial will be located in the directory C:\My Model\TutorialProject1\ All data referred to in the text is available in the directory C:\My Models\TutorialData\. A resulting version of the model is located in the directory C:\My Model\Tutorial\. So when things go wrong or you don't know what to do one can always refer to this working model. Below an overview of the successive steps of building a model in Triwaco is given.

6.2.1 Setting up a triwaco project
6.2.2 Setting up a surface water model
6.2.3 Setting up a discretisation dataset
6.2.4 Setting up a design dataset
6.2.5 Setting up a simulation dataset
6.2.6 Setting up a scenario dataset

Model building starts with the choice of boundaries and collection of data. This is done without the use of the software, and will not be discussed here.

Triwaco works with a clear hierarchical data storage structure. The entry always is a project that can contain several models. Every model consists of different connected datasets that contain different parameters.

7.2.2 The SOBEK-CF Tutorial

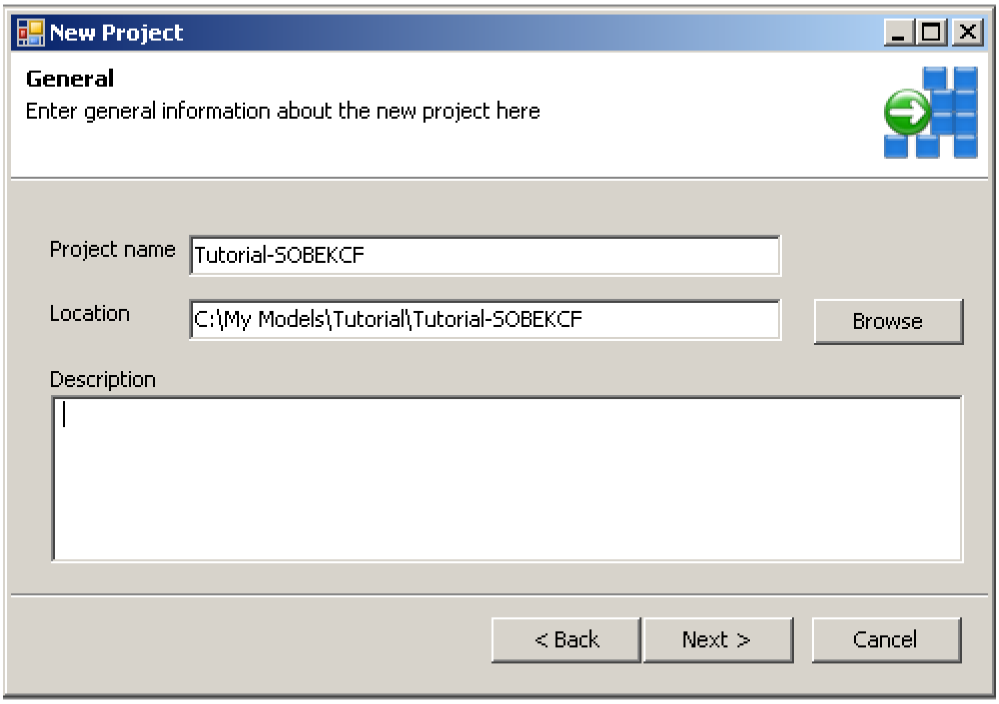
Regional – Local database construction

Data of the watersystem is often available in a regional database. The research area is a small part of the regional database. We will show you how to use the regional database to set up a local SOBEK-CF model using Triwaco.

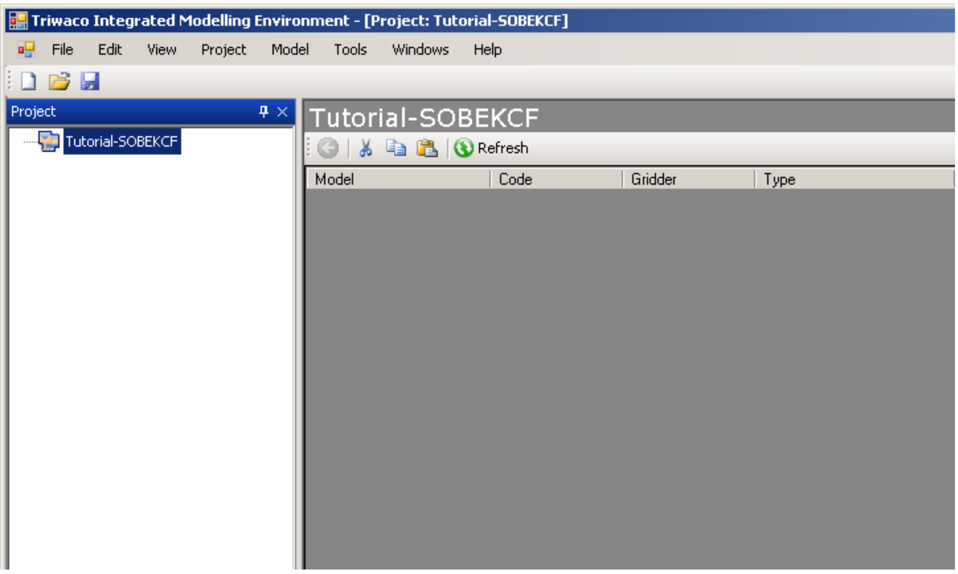
7.2.3 Definition of a Triwaco Project

Now we show you the steps to take for making a SOBEK-CF model using **Triwaco**. We keep to the 'main route'; extra options are mentioned with the letter **E** and shown in *italic*. Important notices are indicated with **NB**.

Modelling with **Triwaco** always starts by defining a project. Choose 'File - New' if you want to set up a new modelling project (otherwise choose 'File - Open' - and look for the location and name of your project). A wizard will pop up which will guide you through setting up de project.



After finishing the wizard, you will see the start window of the modelling environment with the new project added in the project list (see figure below). It gives all information of de modelling project, models, datasets and parameters. For more information on the modelling environment see chapter 5. To add or remove windows go to the menu 'View' in the top of the application-window. The modelling environment is fully customizable and each window can be put at any location by simply drag and drop.

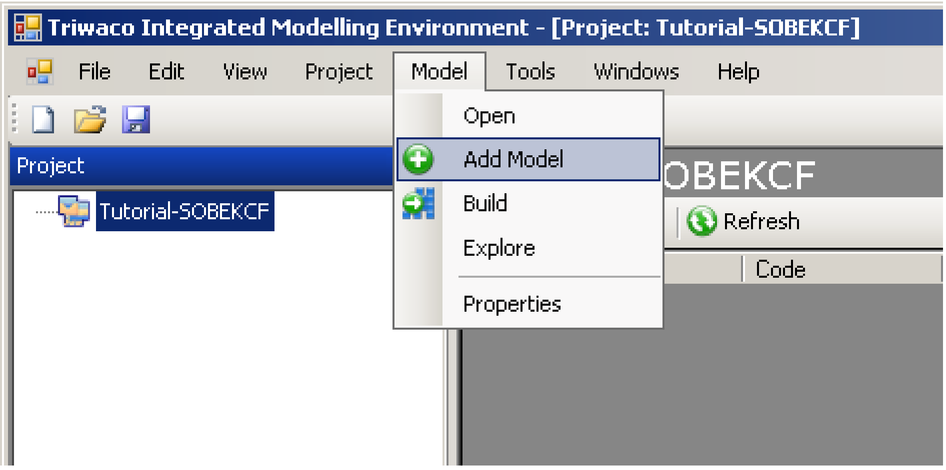


- *It is possible to use your favourite text editor, instead of the standard OpenSource editor that comes with Triwaco, Notepad++. To do this go to 'Tools' in the task bar at the top. Select 'Edit Database'. This will open the database in Access or other database editor. Go to Applications and change the path and location of your favourite text-editor.*

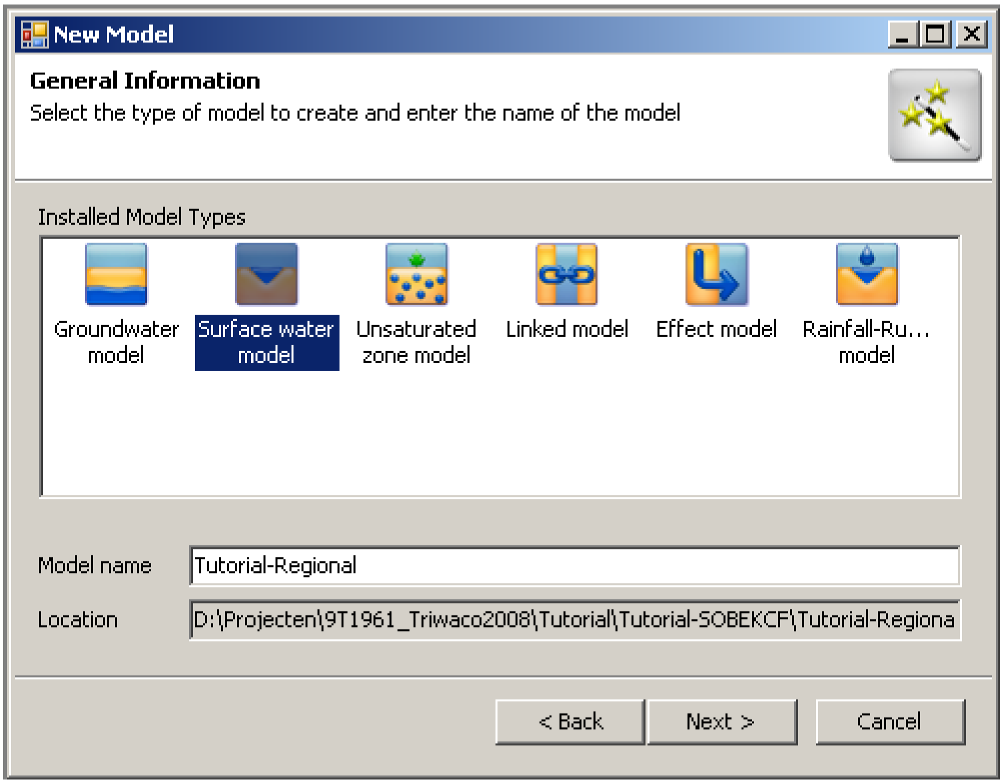
7.2.4 Setting up a SOBEK-CF model

If you want to add a new surface water model like SOBEK-CF to the project this is done by: 'Model - Add

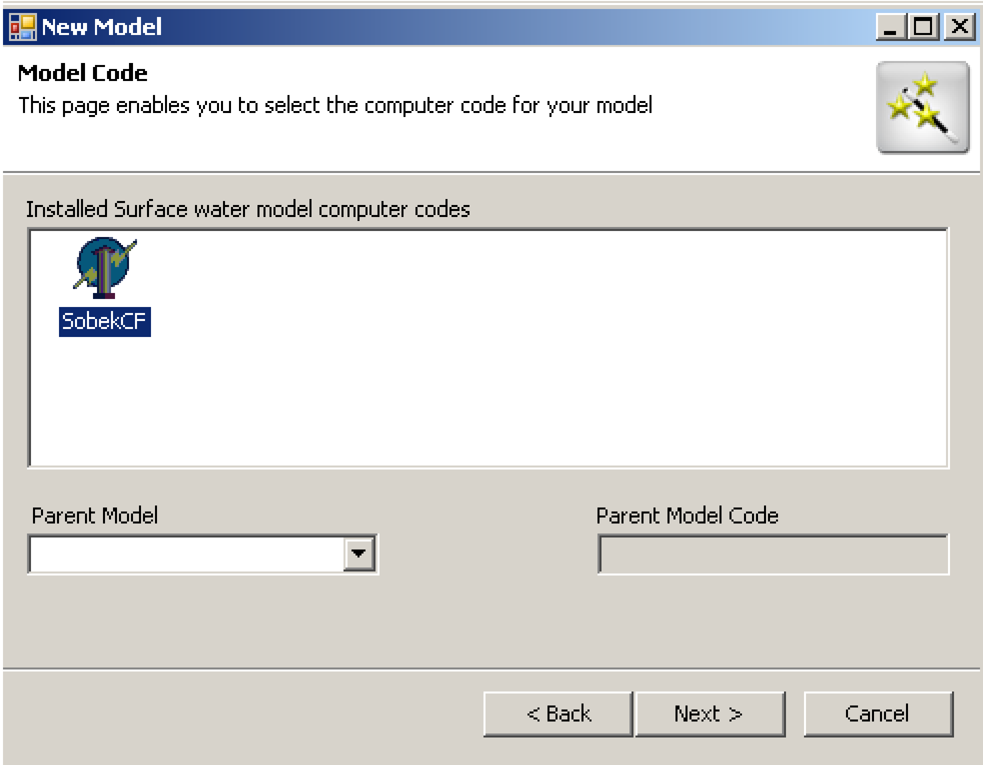
Model'. An existing model will already be listed in the project-window.



A wizard will pop up. In the first window select 'Next' to continue. In the second window one can choose the type of model (see figure below). In our case we want to set up a surface water model. So select 'Surface water model' and give it the name **Tutorial-Regional** (since we will start by setting up the regional model first).



In the next window one can select the model code to be used for the simulation. Currently **Triwaco** supports only one surface water model, SOBEK-CF (a package for hydraulic modelling developed by Deltares / WLDelft Hydraulics). In this tutorial we will set up a surface water model with the model code SOBEK-CF.



In the window there is also an option for selecting a parent model. This is used when setting up a sub-model or scenario based on a previously created model. For now this option is not used. Select next and finish to create the model.

The SOBEK-CF model with the name **Tutorial-Regional** is now added to the project. The SOBEK-CF model can be opened in several ways. One can open it by double-clicking at its location in the project tree of the project-window or one can select 'Model - Open' in the main menu. The model is currently empty and contains no datasets. In the next paragraphs we will show how to add the necessary datasets to define the Tutorial model. We will start by setting up a discretisation dataset where the calculation grid is defined.

7.3 Setting up a discretisation dataset (regional)

The SOBEK-CF calculation grid is set up in the following steps :

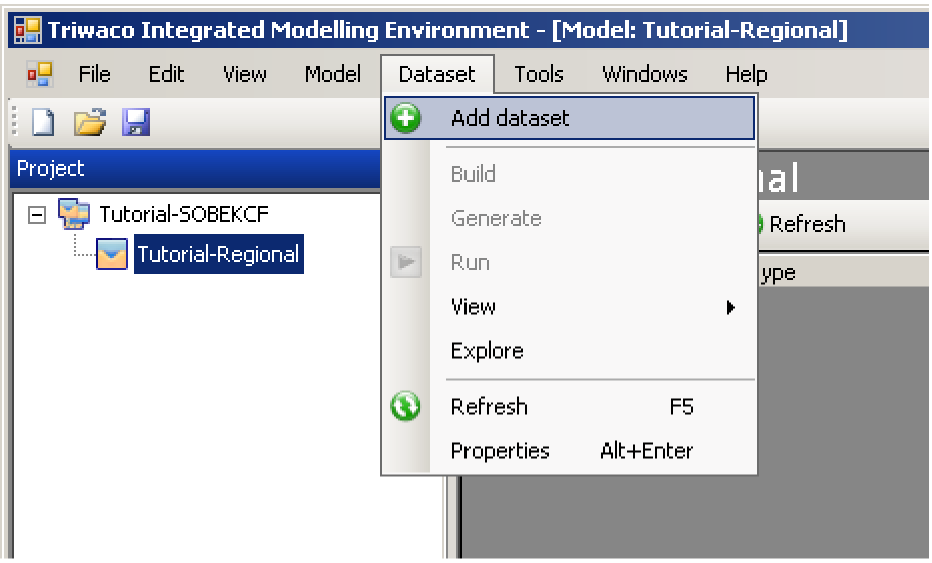
1. definition of the discretisation dataset
2. definition of the model boundary
3. definition of the model attributes (grid parameters)

When the discretisation dataset, model boundary and model attributes have been defined the grid can be generated (final step).

7.3.1 Step 1: Creating a discretisation dataset

The data for the generation of the network (calculation grid) is defined in the discretisation dataset. For the discretisation of the Tutorial model we will use shape files for boundary, rivers and other model attributes (weirs, laterals). All data used in this tutorial is available in the directory My Models\TutorialData\

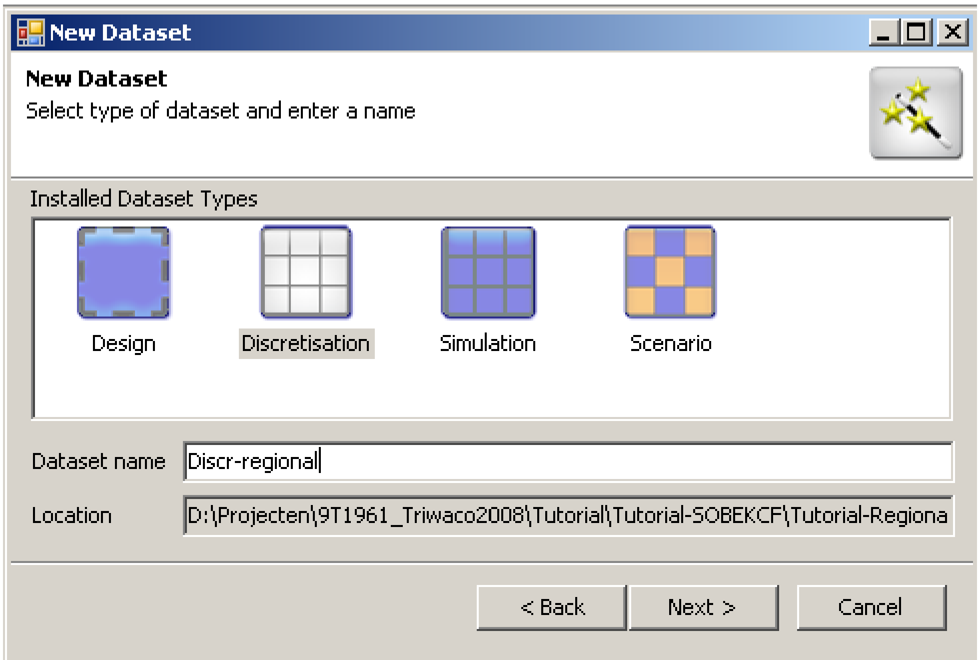
First we add the discretisation dataset to the model by selecting 'Dataset - Add Dataset' from the main menu. A pop up window will appear similar to that of adding a model. Again in the first window select 'Next' to continue.



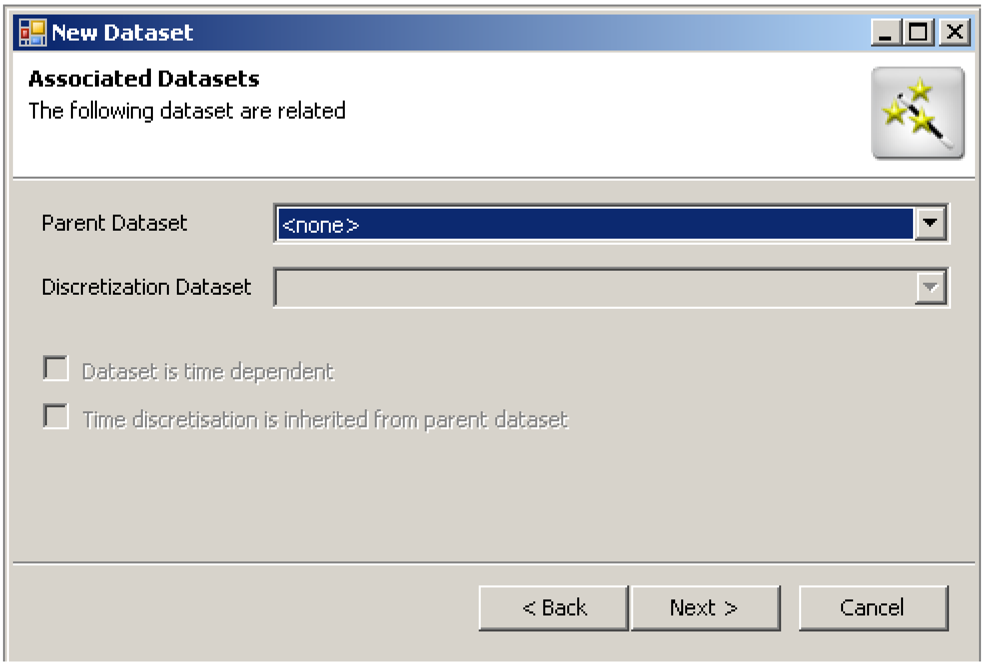
In the second window one can choose the type of dataset. There are four types of datasets each with its own characteristics and purpose:

- **Discretisation**: Defines the network or calculation grid (boundaries and model attributes)
- **Design**: Defines the conceptual model using GIS maps and tables.
- **Simulation**: Here is where the data from the conceptual model is linked to the calculation grid. The model is now prepared to run with the modelcode.
- **Scenario**: Is similar to the simulation dataset. It is base upon the simulation dataset or another scenario dataset. The dataset is created with parameters linked to the parent dataset. Only parameters that need to be altered for that scenario have to be specified.

Each of these will be created in this tutorial with exception of the scenario dataset. In surface water modelling the discretiosaint of a scenario is often different in comparsion to the discretisation of the reference model. When defining a new discretisation one have to set up a new simulaiton dataset. So in surface water modelling the simulation dataset is preferred in fovour of the scenario dataset. This will become clear in the rest of the Tutorial. For now select 'Discretisation' and use the name **Discr-regional** for the dataset. Then select 'Next'.

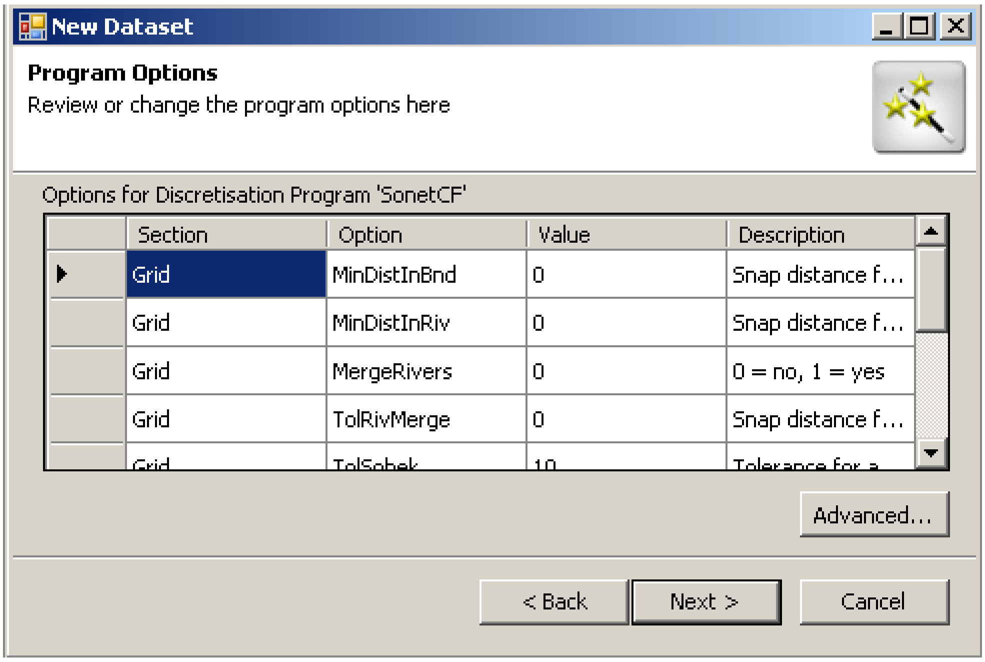


In the next window one may want to select a parent dataset. This is only of importance when a new grid is created based on an existing discretisation dataset (like a sub-model or scenario). The nice thing about this option is that a new model can be creating based on an existing conceptual model. We will show how this works for a local study area in the XXX-part of this Tutortial. For now we are defining a regional discretisation dataset and will not use a parent dataset; select 'Next'.

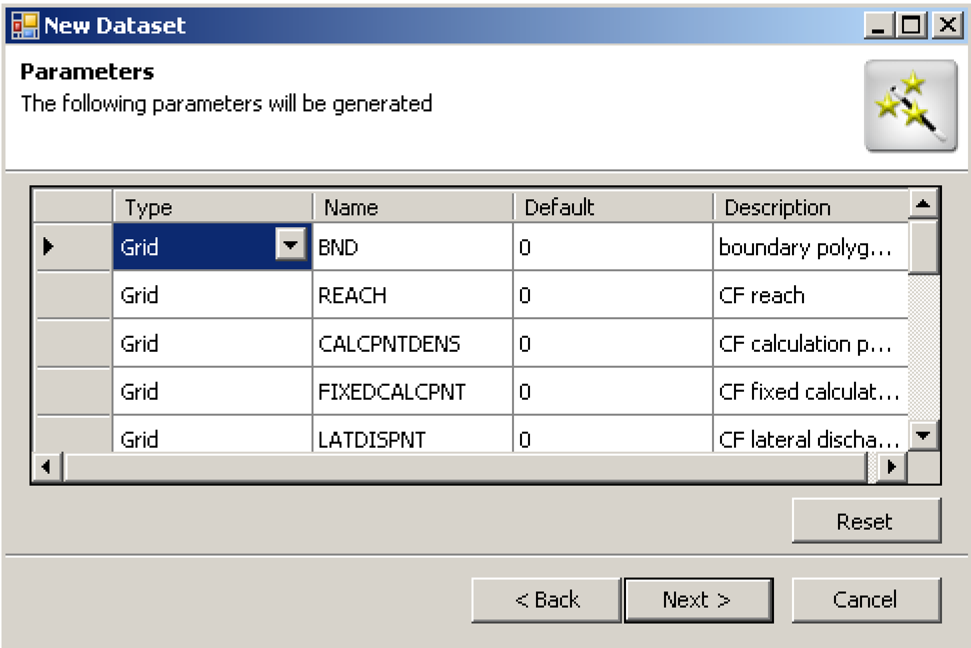


In the following window it is possible to change the appearing program options. These options describe for example snapping distances for merging rivers and model attributes. In this Tutorial we will only use the default options so select 'Next' to continue without changing the program options.

These program options can be changed at any time by selecting 'Dataset – Properties' and tab 'Options' for the selected dataset.



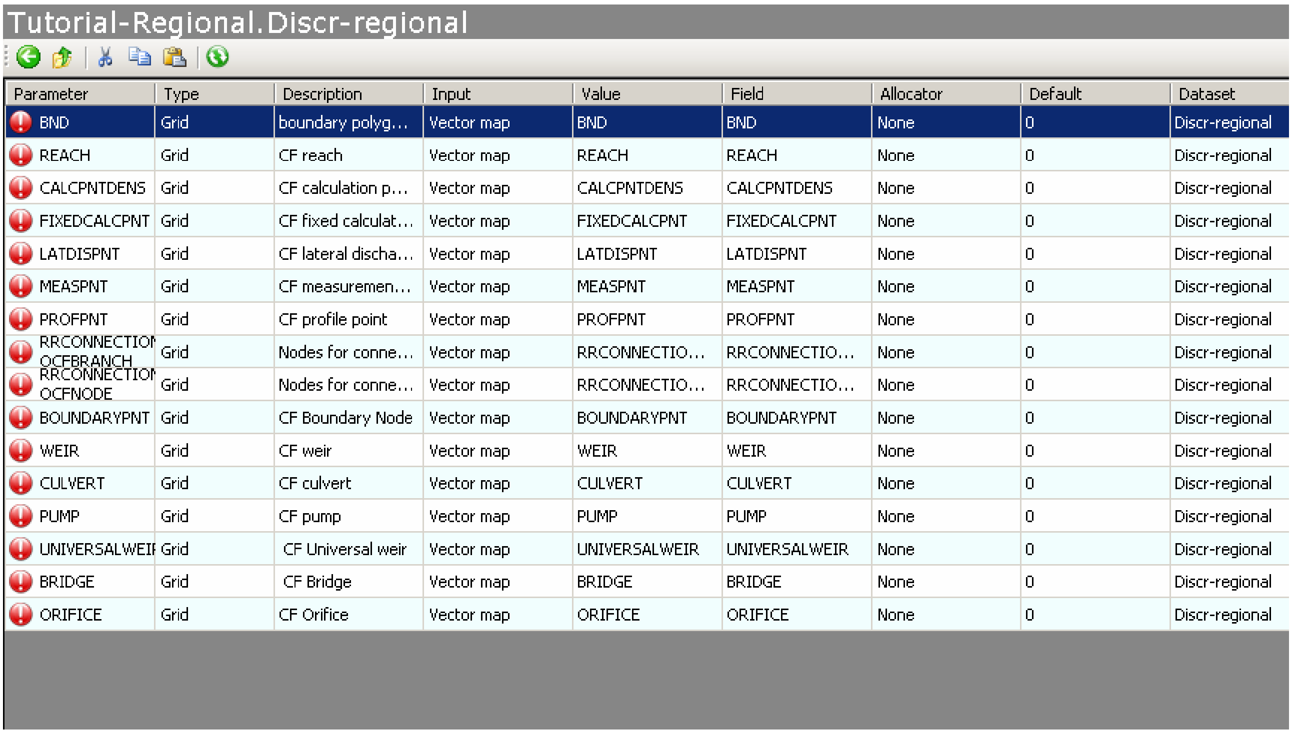
The next window is used to define parameters for the specified dataset. In the figure below the parameters for model boundary, rivers, calculation grid density, fixed calculation points and lateral discharge points are shown:
BND = model boundary
REACH = rivers
CALCPNTDENS = density of the calculation grid
FIXEDCALCPNT = fixed calculation points
LATDISPNT = lateral discharge points



Usually there is no need to make changes to the specified parameters, so select 'Next' and after that 'Finish'. Now the dataset is created and appears as part of the model. We will show you in the next paragraphs how to remove, use and add parameters to the dataset.

The screen shot below shows all parameters for defining a discretisation dataset that can be used to set up a

SOBEK-CF surface water model. Currently all parameters have a bad status (red colour), in our case meaning the parameter maps still have to be defined as we show in the next paragraph.


Tutorial-Regional.Discr-regional

Parameter	Type	Description	Input	Value	Field	Allocator	Default	Dataset
BND	Grid	boundary polyg…	Vector map	BND	BND	None	0	Discr-regional
REACH	Grid	CF reach	Vector map	REACH	REACH	None	0	Discr-regional
CALCPNTDENS	Grid	CF calculation p…	Vector map	CALCPNTDENS	CALCPNTDENS	None	0	Discr-regional
FIXEDCALCPNT	Grid	CF fixed calculat…	Vector map	FIXEDCALCPNT	FIXEDCALCPNT	None	0	Discr-regional
LATDISPNT	Grid	CF lateral discha…	Vector map	LATDISPNT	LATDISPNT	None	0	Discr-regional
MEASPNT	Grid	CF measuremen…	Vector map	MEASPNT	MEASPNT	None	0	Discr-regional
PROFPNT	Grid	CF profile point	Vector map	PROFPNT	PROFPNT	None	0	Discr-regional
RRCONNECTIOI OCFBRANCH	Grid	Nodes for conne…	Vector map	RRCONNECTIO…	RRCONNECTIO…	None	0	Discr-regional
RRCONNECTIOI OCFNODE	Grid	Nodes for conne…	Vector map	RRCONNECTIO…	RRCONNECTIO…	None	0	Discr-regional
BOUNDARYPNT	Grid	CF Boundary Node	Vector map	BOUNDARYPNT	BOUNDARYPNT	None	0	Discr-regional
WEIR	Grid	CF weir	Vector map	WEIR	WEIR	None	0	Discr-regional
CULVERT	Grid	CF culvert	Vector map	CULVERT	CULVERT	None	0	Discr-regional
PUMP	Grid	CF pump	Vector map	PUMP	PUMP	None	0	Discr-regional
UNIVERSALWEII	Grid	CF Universal weir	Vector map	UNIVERSALWEIR	UNIVERSALWEIR	None	0	Discr-regional
BRIDGE	Grid	CF Bridge	Vector map	BRIDGE	BRIDGE	None	0	Discr-regional
ORIFICE	Grid	CF Orifice	Vector map	ORIFICE	ORIFICE	None	0	Discr-regional

7.3.2 Step 2: Defining the model boundary (define a vector map)

A boundary or any map (rivers, weirs, etc.) can directly be defined in Triwaco from several file formats (see text box), like a shape file set up in ArcView or ArcGIS, MapInfo or any other GIS software. For the model boundary we use a shape file generated in ArcView. How to define parameters directly from the different file formats will be explained in other steps of creating the calculation grid and design dataset for the model.

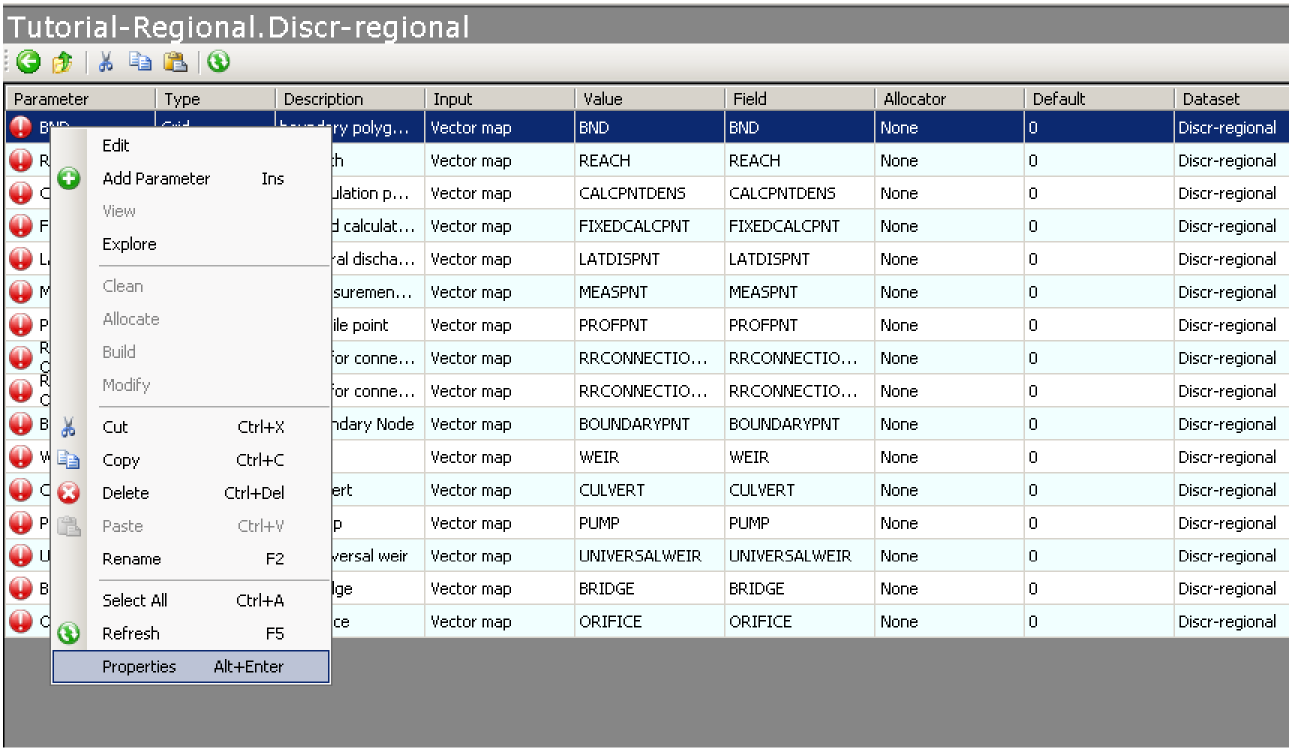
OpenGIS in Triwaco
For definition of parameter the modelling environment follows the specifications provided by the Open GIS Consortium (OpenGIS or Open GeoSpatial) using the Open Source Geospatioal Data Abstraction Library (GDAL).

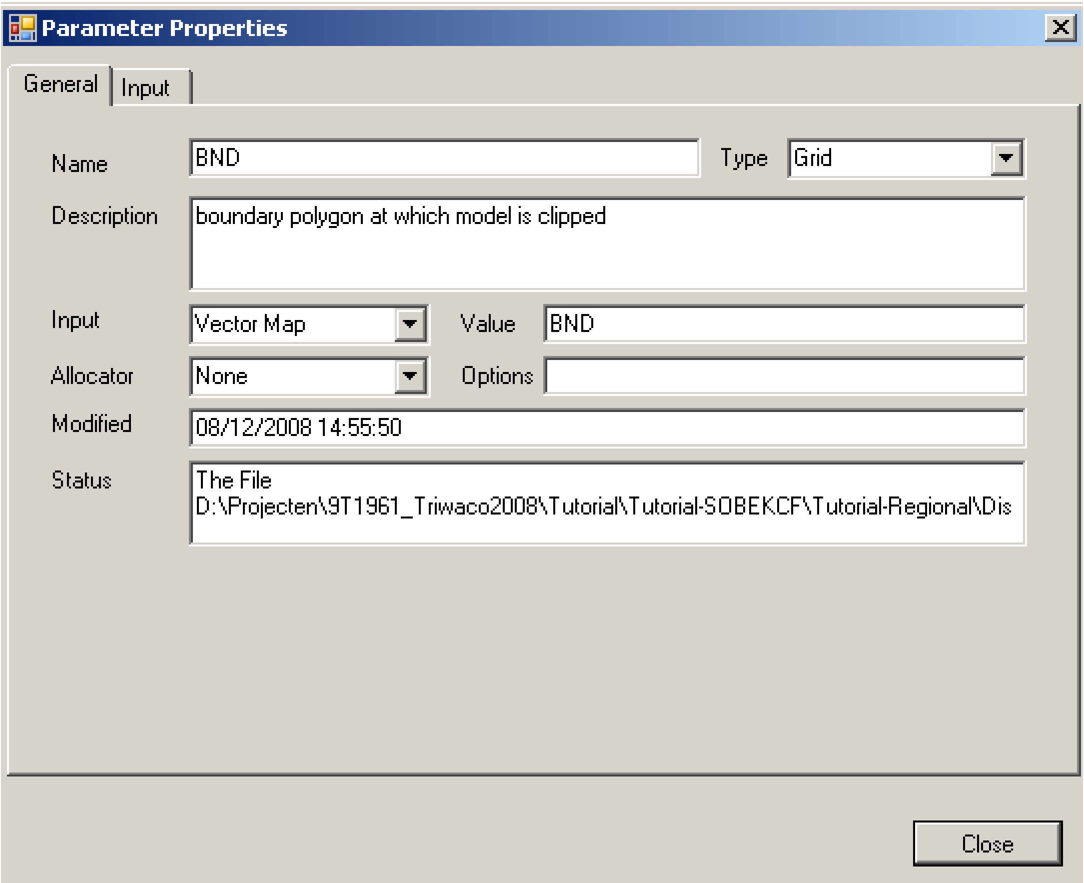
The implementation of GDAL into our software opens the world of all sorts of data file formats that can directly can be read by the modelling environment. It can handle almost all known GIS formats (and the Dutch standards like Aquo, INTWIS and IRIS). The list of supported formats is ever growing, a selection:

* Raster maps (over 64 formats ; Idrisi, ESRI grids, Erdas, …)
* Vector maps (over 16 format ; ESRI-shape, MapInfo, AutoCAD, …)
* Data bases such as Oracle, MySQL en Access;
* Other well known formats such as Excel, txt en csv.
* Data processing in the modelling environment using expressions and Spatial Queries

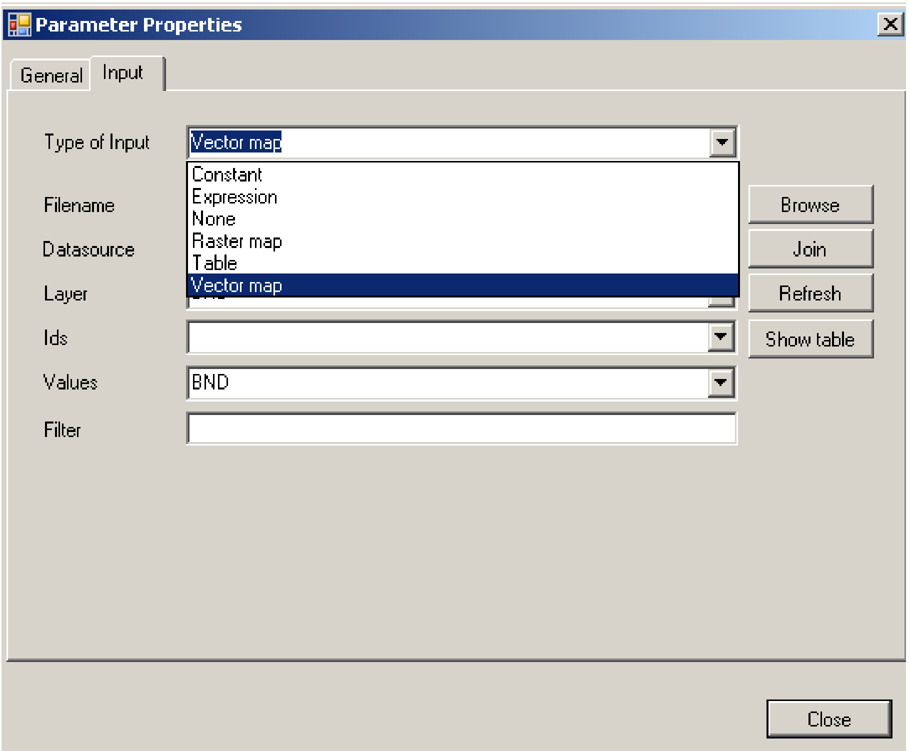
Data files in one of these formats can be used as model input without any conversion prior to use in the modelling environment. The modelling environment also supports the conversion of model results to several data file formats

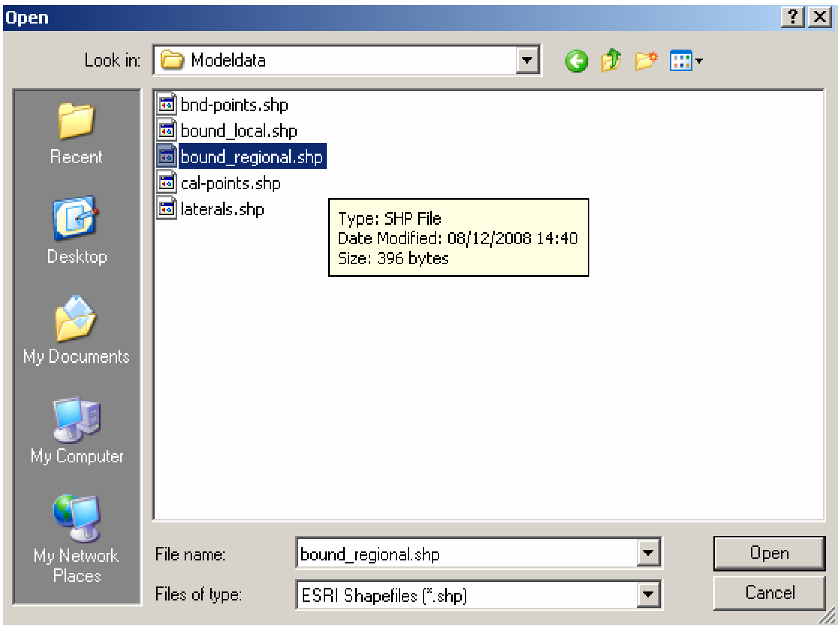
Select the parameter BND (model boundary) and open a context menu (right-click mouse) and select 'Properties'. The parameter properties window has two tabs, General and Input. The General tab gives general information which is also shown in the dataset. For now you can leave this tab as it is. Note that the Status of the parameters says the parameter does not exist.

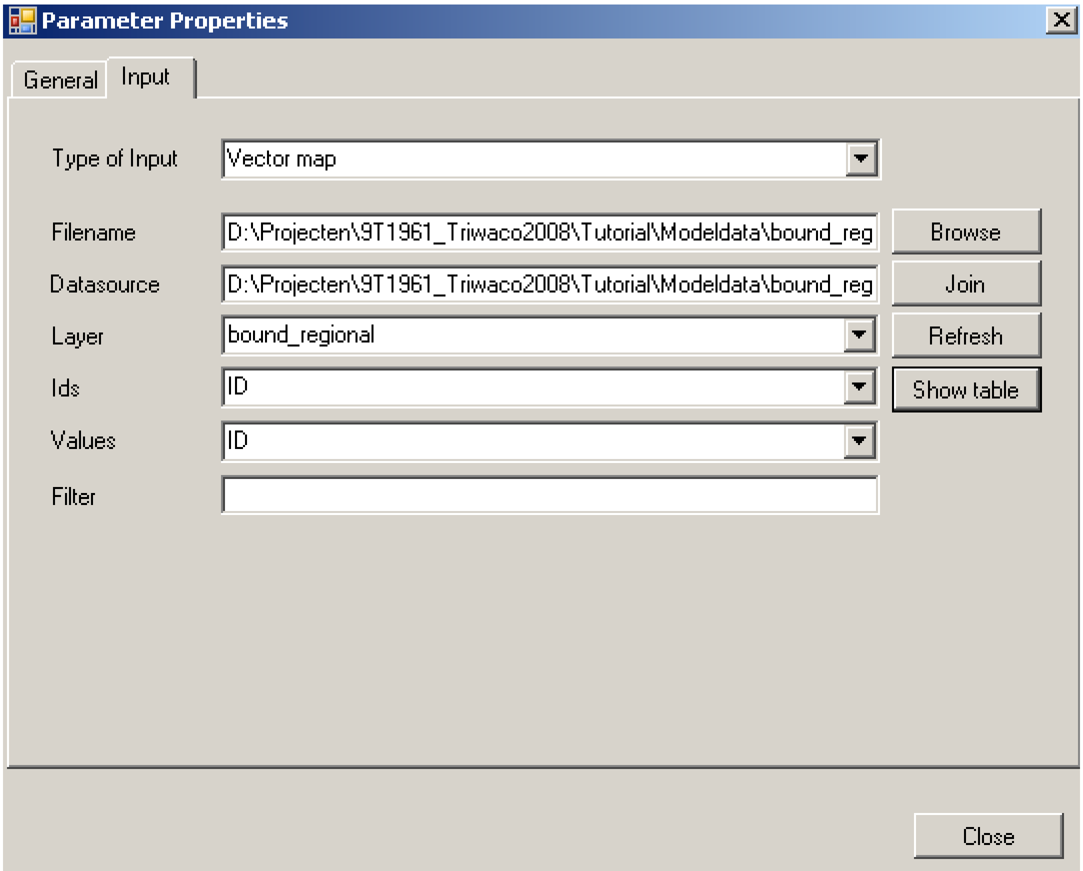

Tutorial-Regional.Discr-regional
Parameter
Type
Description
Input
Value
Field
Allocator
Default
Dataset
Edit
Add Parameter Ins
View
Explore
Clean
Allocate
Build
Modify
Cut Ctrl+X
Copy Ctrl+C
Delete Ctrl+Del
Paste Ctrl+V
Rename F2
Select All Ctrl+A
Refresh F5
Properties Alt+Enter
Vector map
BND
REACH
CALCPNTDENS
FIXEDCALCPNT
LATDISPNT
MEASPNT
PROFPNT
RRCONNECTIO...
BOUNDARYPNT
WEIR
CULVERT
PUMP
UNIVERSALWEIR
BRIDGE
ORIFICE
None
0
Discr-regional


Parameter Properties
General
Input
Name
BND
Type
Grid
Description
boundary polygon at which model is clipped
Input
Vector Map
Value
BND
Allocator
None
Options
Modified
08/12/2008 14:55:50
Status
The File
D:\Projecten\9T1961_Triwaco2008\Tutorial\Tutorial-SOBEKCF\Tutorial-Regional\Dis
Close

Select the tab 'Input' and in the 'Type of Input' pull down menu choose 'Vector Map' for defining a shape-file. Then use the 'Browse' button to select the boundary of the regional model (bound-regional.shp) in the directory /My models/TutorialData/Modeldata/. After selecting the right shape-file it is obvious that the fields 'Filename' 'Datasource' and 'Layer' are automatically filled. The fields Filename and Datasource will now be the same as shown in the figure. Select from the pull down menus of the fields 'Ids' and 'Values' the attribute ID. Notice that this attribute is a field from the selected shape file bound-regional.shp. Leave the field 'Filter' empty en click 'Close'.







Note that the status bullet in the dataset for the boundary parameter is now green. You can check to see if the files are stored in the right directory (the name of which must be the same as the name of the grid dataset). Select and open the context menu for the parameter BND (Right hand mouse button) select 'Explore'. The windows explorer is opened in the directory where the file should be located.

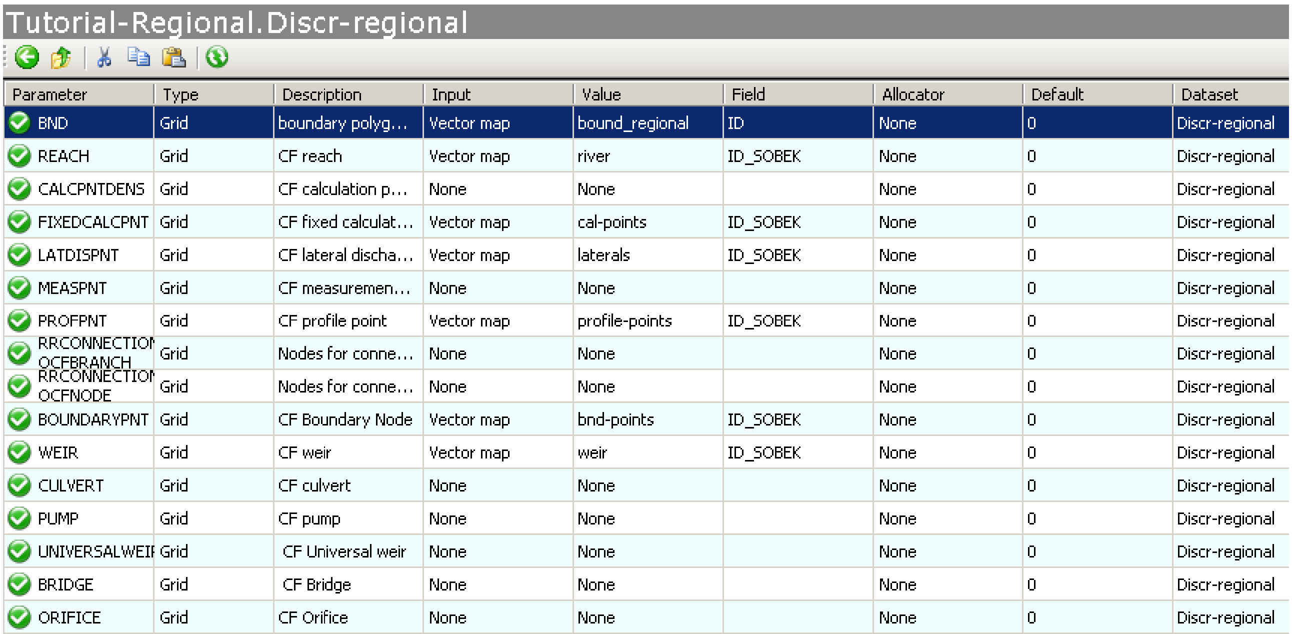
7.3.3 Step 3: definition of the model attributes (grid parameters)

As mentioned before we can define parameters directly from several file formats (see text box), like a shape file set up in ArcView or ArcGIS, MapInfo or any other GIS software. In this Tutorial we will define all grid parameters directly using a shape file which is provided in the directory My Models\TutorialData\Modeldata\. There is no need for copying the files in this directory to the project. You could even leave it there for use in a GIS project in the same time.

In the same manner as the definition of the model boundary we will define the location and source data of all parameters. Use the figure and information below to define all parameters.

REACH: rivers (My Models\TutorialData\Geodata\rivers.shp)
WEIR: weirs (My Models\TutorialData\Geodata\weirs.shp)
PROFPNT: profile points (My Models\TutorialData\Geodata\profile-points.shp)
LATDISPNT: lateral discharge points (My Models\TutorialData\Modeldata\laterals.shp)
FIXEDCALCPNT: fixed calculation points (My Models\TutorialData\Modeldata\cal-points.shp)
BOUNDARYPNT: boundary points (My Models\TutorialData\Modeldata\bnd-points.shp)

The remaining parameters will not be used in this Tutorial model and should therefore be set on 'None' in the input information. After defining all parameters the discretisation dataset is finished and should look like the dataset in the figure below.

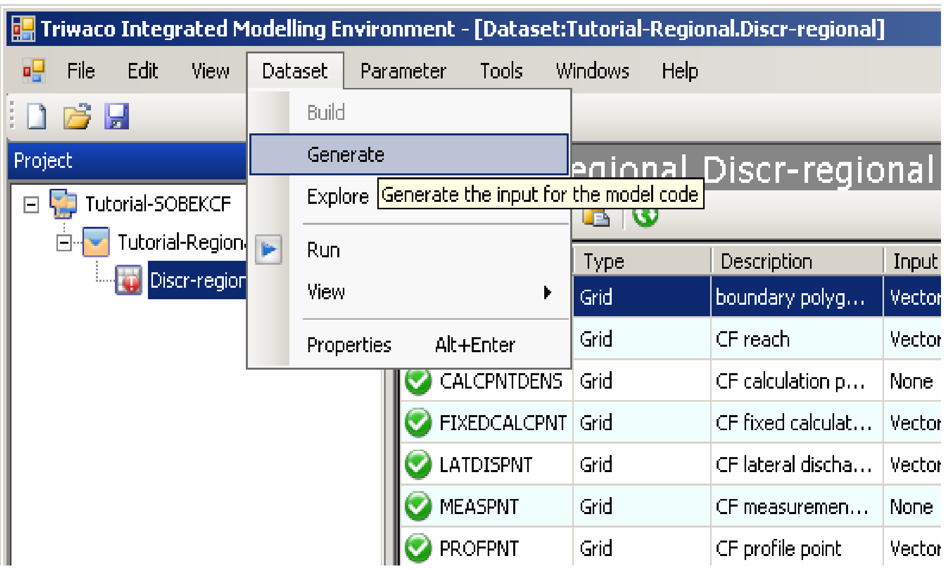


Tutorial-Regional.Discr-regional

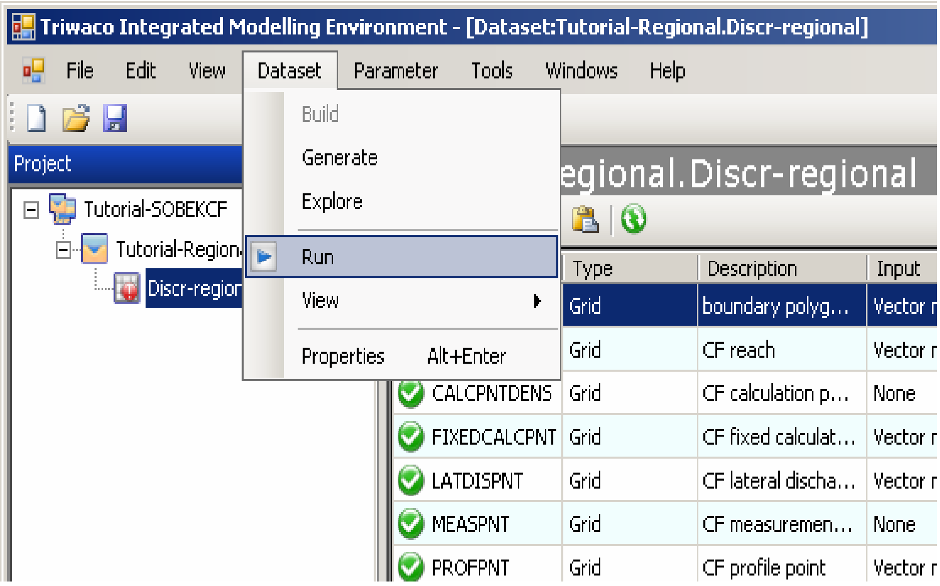
Parameter	Type	Description	Input	Value	Field	Allocator	Default	Dataset
BND	Grid	boundary polyg…	Vector map	bound_regional	ID	None	0	Discr-regional
REACH	Grid	CF reach	Vector map	river	ID_SOBEK	None	0	Discr-regional
CALCPNTDENS	Grid	CF calculation p…	None	None		None	0	Discr-regional
FIXEDCALCPNT	Grid	CF fixed calculat…	Vector map	cal-points	ID_SOBEK	None	0	Discr-regional
LATDISPNT	Grid	CF lateral discha…	Vector map	laterals	ID_SOBEK	None	0	Discr-regional
MEASPNT	Grid	CF measuremen…	None	None		None	0	Discr-regional
PROFPNT	Grid	CF profile point	Vector map	profile-points	ID_SOBEK	None	0	Discr-regional
RRCONNECTIOI OCFBRANCH	Grid	Nodes for conne…	None	None		None	0	Discr-regional
RRCONNECTIOI OCFNODE	Grid	Nodes for conne…	None	None		None	0	Discr-regional
BOUNDARYPNT	Grid	CF Boundary Node	Vector map	bnd-points	ID_SOBEK	None	0	Discr-regional
WEIR	Grid	CF weir	Vector map	weir	ID_SOBEK	None	0	Discr-regional
CULVERT	Grid	CF culvert	None	None		None	0	Discr-regional
PUMP	Grid	CF pump	None	None		None	0	Discr-regional
UNIVERSALWEII	Grid	CF Universal weir	None	None		None	0	Discr-regional
BRIDGE	Grid	CF Bridge	None	None		None	0	Discr-regional
ORIFICE	Grid	CF Orifice	None	None		None	0	Discr-regional

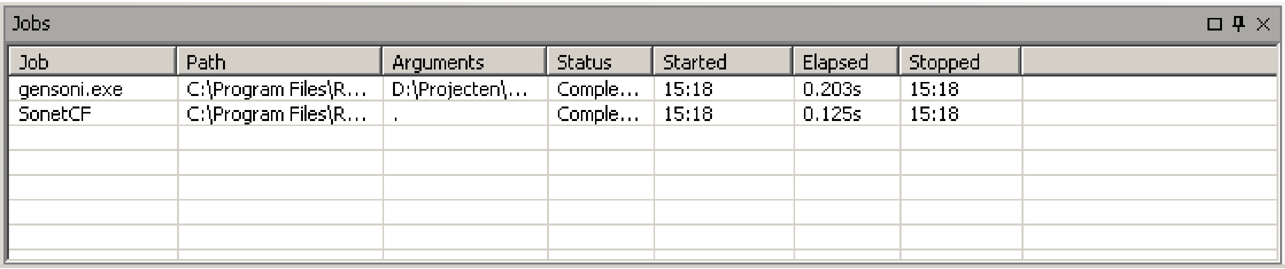
7.3.4 Generating the calculation grid (river network)

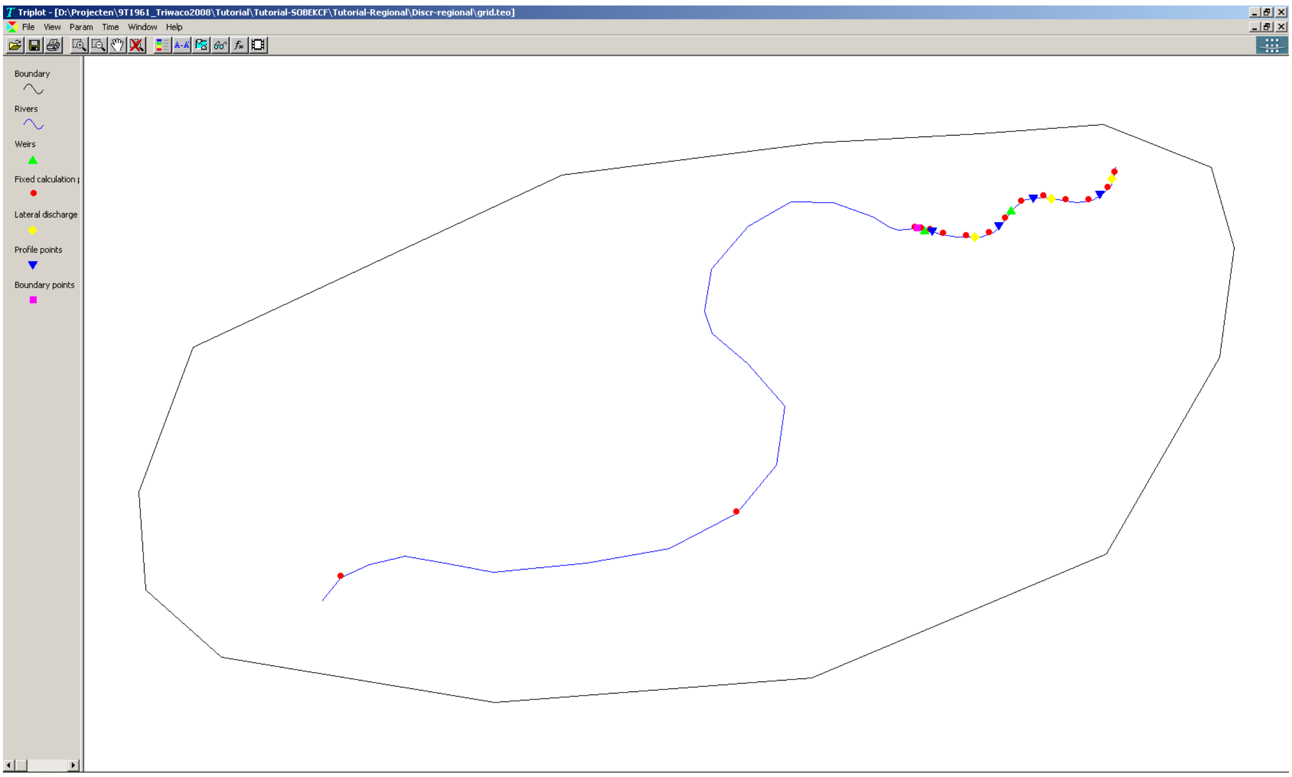
Now all data is entered (all status bullets are green), the grid can be generated. This is done in two steps. First the grid input file is generated after which the grid is created. To generate the grid input file: 'Dataset - Generate'. This will create the input file for the grid generator. Triwaco will show in the Jobs pane (if not available do so by 'View - Jobs' the progress of generating the grid input file. In the Output pane the log of the grind generator is shown.



To create the grid: 'Dataset - Run' Again information is provided in the Jobs and Output pane. When an error occurs this is mentioned in the job pane or an error message may appear due to incorrect input. To find out where it went wrong look into the log file. To view the log file: 'Dataset - View – Print'. To view the resulting grid: 'Dataset – View - Output'.


Triwaco Integrated Modelling Environment - [Dataset:Tutorial-Regional.Discr-regional]
File Edit View Dataset Parameter Tools Windows Help
Project
Tutorial-SOBEKCF
Tutorial-Region
Discr-regior
Build
Generate
Explore
Run
View
Properties Alt+Enter
egional.Discr-regional
Type Description Input
Grid boundary polyg... Vector r
Grid CF reach Vector r
CALCPNTDENS Grid CF calculation p... None
FIXEDCALCPNT Grid CF fixed calculat... Vector r
LATDISPNT Grid CF lateral discha... Vector r
MEASPNT Grid CF measuremen... None
PROFPNT Grid CF profile point Vector r


Jobs
Job Path Arguments Status Started Elapsed Stopped
gensoni.exe C:\Program Files\R... D:\Projecten\... Comple... 15:18 0.203s 15:18
SonetCF C:\Program Files\R... . Comple... 15:18 0.125s 15:18

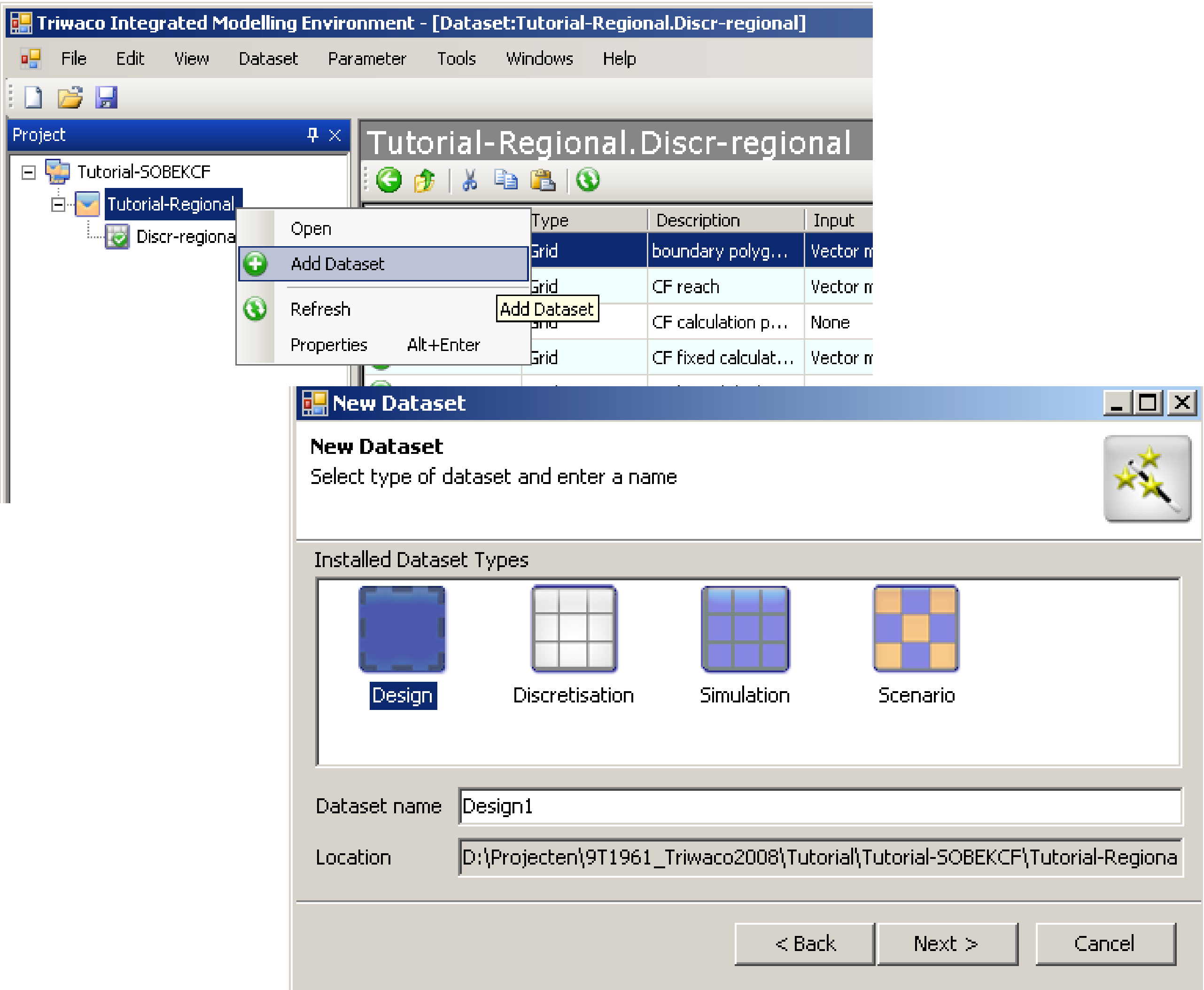

File View Param Time Window Help
Boundary
Rivers
Weirs
Fixed calculation
Lateral discharge
Profile points
Boundary points

7.4 Setting up design dataset, the conceptual model set up

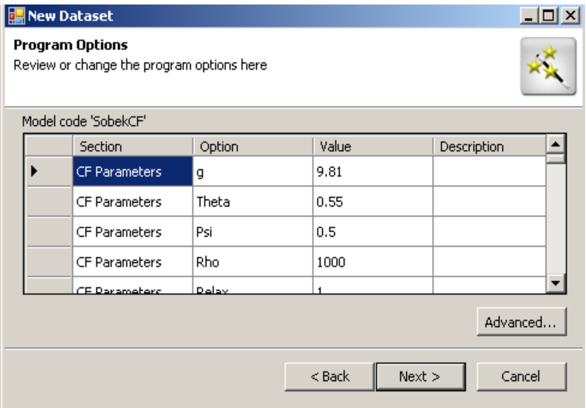
The conceptual model is defined in the Design data set. This data set contains the input parameters needed to run the model. The data in this data set is independent from the grid and consists of data like vector maps (ArcGIS, mapinfo), raster files, excel sheets, etc. The characteristics of each parameter are entered using maps which may contain point values, polygons, lines or constants or a combination. The parameters may also depend on each other using expressions. The default length and time units are meters and days.

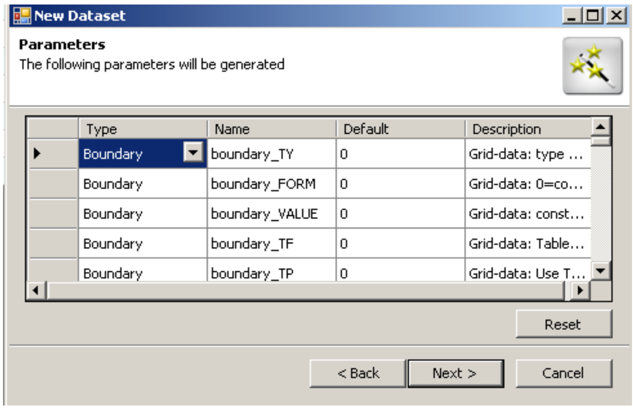
7.4.1 Creating a Design data set

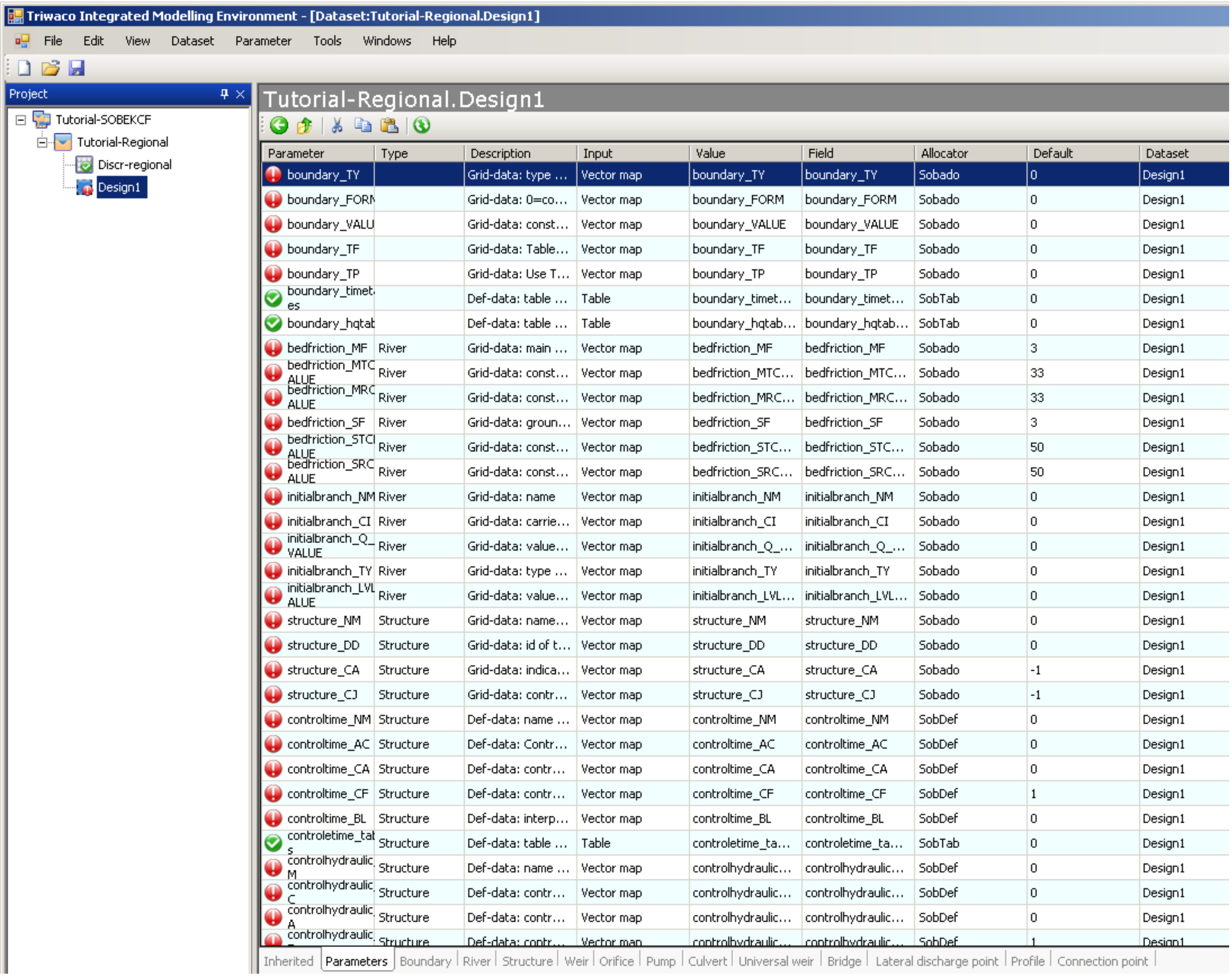
Go back a higher level to the level of the model Tutorial-Regional. This can be achieved by double clicking on it in the project tree or by opening the context menu of the model Tutorial-Regional and selecting 'Open'. The Design data set is created by: 'Dataset - Add Dataset' or selecting 'Add Dataset' from the context menu (right click in the project-tree). A pop up window will appear the same as when we created the discretisation data set. Again in the first window select next to continue. In the second window one can choose the type of dataset. This time we select 'Design', name it **Design1** (default name) and select 'Next'.



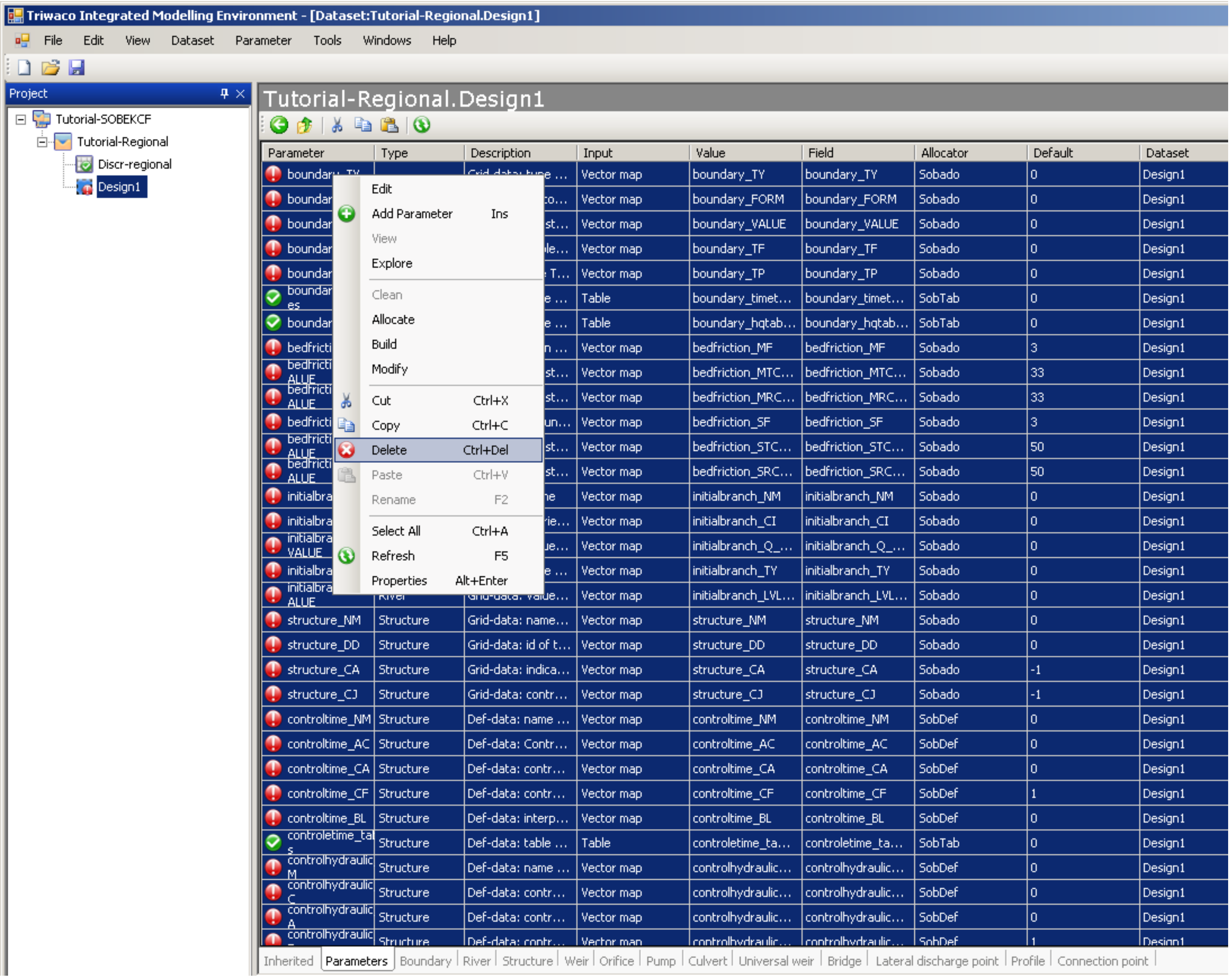
The following window that appears is for the definition of program options. In this window one can change parameters which describe the properties of water and the environment (gravitational constant and density of water). There is no reason to change these parameters so we will keep the default settings, click 'Next'.
In the following window all parameters that are added to the design dataset are shown. More experienced users can add and remove parameters to specify the model. For now we want to add the default parameters so there is no need to make changes, click 'Next' and 'Finish'.







The design data set Design1 is now created and filled with the parameters (see figure above). Each SOBEK-CF model is different and uses different kinds of river, boundary and structure definitions. Therefore different TRIWACO parameters are needed to define the model. For this Tutorial model it is already know which parameters should be used and which can be deleted. We will define them step-by-step in the following paragrapahs but for now we need to delete all parameters. Select all, open the context menu (right click) and select 'Delete' and in the pop up window 'Remove'.



Within this design data set all parameter information is stored. In other words this data set is your meta database for maps which are independent from the modelling grid. For definition of parameter the modelling environment follows the specifications provided by the Open GIS Consortium (OpenGIS or Open GeoSpatial) using the Open Source Geospatioal Data Abstraction Library (GDAL). The implementation of GDAL into our software opens the world of all sorts of data file formats that can directly can be read by the modelling environment. It can handle almost all known GIS formats (and the Dutch standards like Aquo, INTWIS and IRIS). The list of supported formats is ever growing, a selection:

* Raster maps (over 64 formats ; Idrisi, ESRI grids, Erdas, …)
* Vector maps (over 16 format ; ESRI-shape, MapInfo, AutoCAD, …)
* Data bases such as Oracle, MySQL en Access;
* Other well known formats such as Excel, txt en csv.
* Data processing in the modelling environment using expressions and Spatial Queries

Data files in one of these formats can be used as model input without any conversion prior to use in the modelling environment.

The design dataset is now empty and will be filled with parameters that define the Tutorial model. Parameters in Triwaco can be divided in different types, accordingly to the type of structure, network-point or attribute in SOBEK-CF.

The parameters for this Tutorial model can be divided in 5 types:

- **River**: parameters defining river properties (e.g. friction)
- **Profile**: parameters defining the dimensions of the river
- **Boundary points**: parameters defining the model boundary conditions

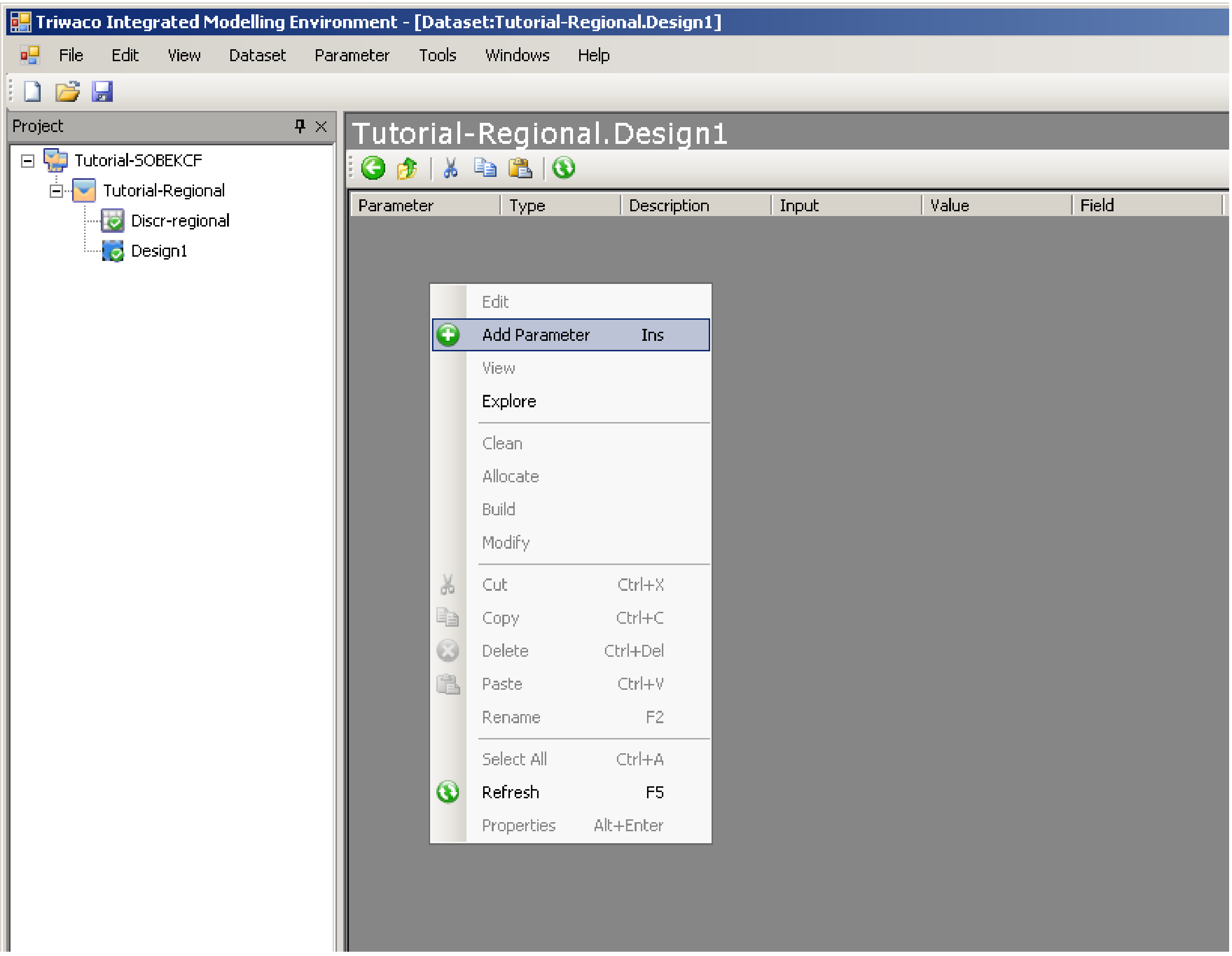
- **Lateral discharge points**: parameters defining lateral discharge properties
- **Weirs**: parameters defining weir properties

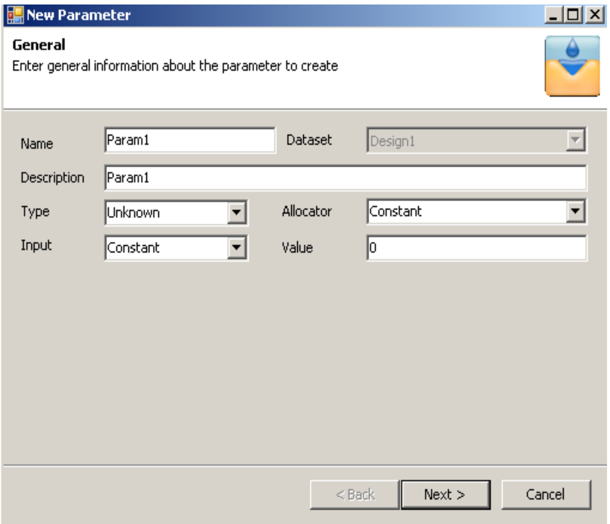
It is important to notice that these 5 types are specifically for this Tutorial model. In a different model also other structures can be used in the model for example culverts, controllers, orifices, etc. Successively other parameters and parameter-types should be defined. All parameters that are selected in the parameter.xls spreadsheet (program file). This spreadsheet should be used to understand the link between Triwaco and SOBEK but may not be changed.

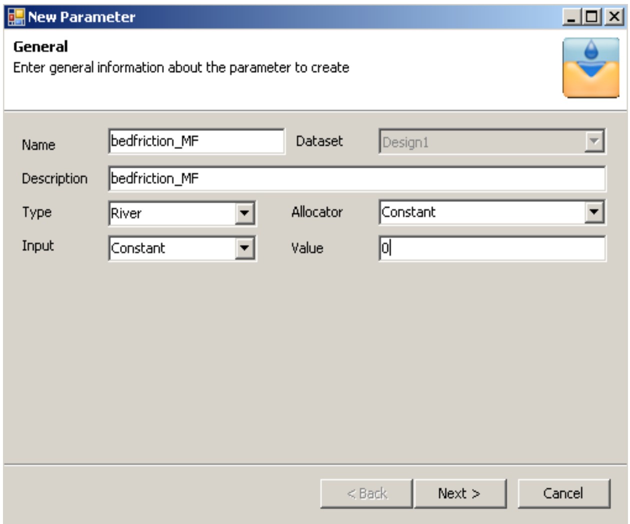
For the Tutorial model we will now show how and which parameters must be added to the design dataset. After that we give a step-by-step description of the parameters definition.

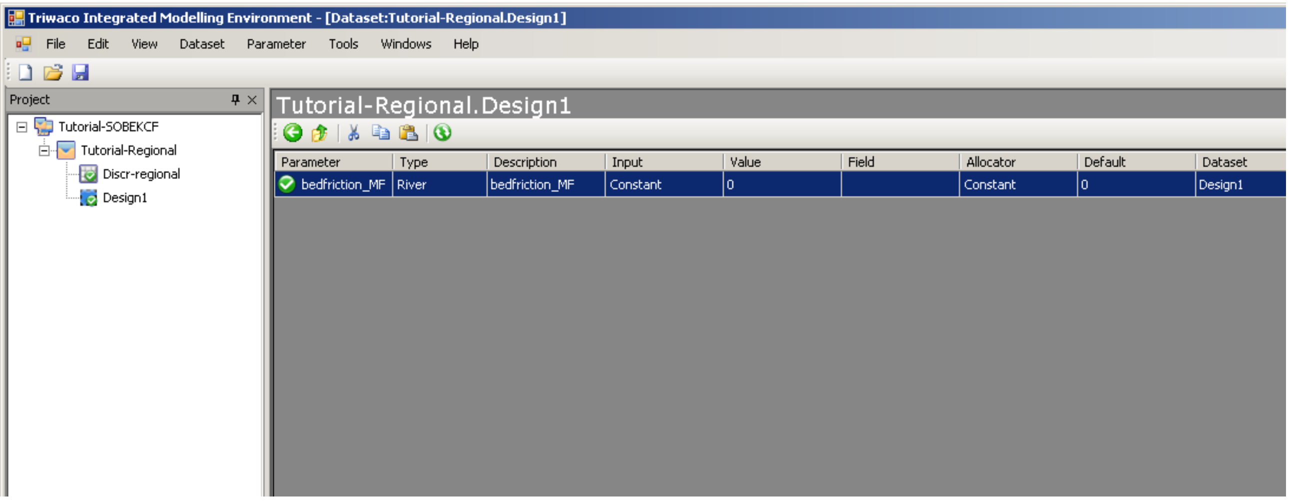
7.4.2 Adding the parameters of the Tutorial model to the design dataset

The design dataset is empty so we will add the necessary parameters to the dataset. Make sure the Design1 dataset is activated and open the context window (right click) in the list window. Select the option 'Add parameter' and a new window will appear. For now we will only fill in the name and type of all parameters and define it later.





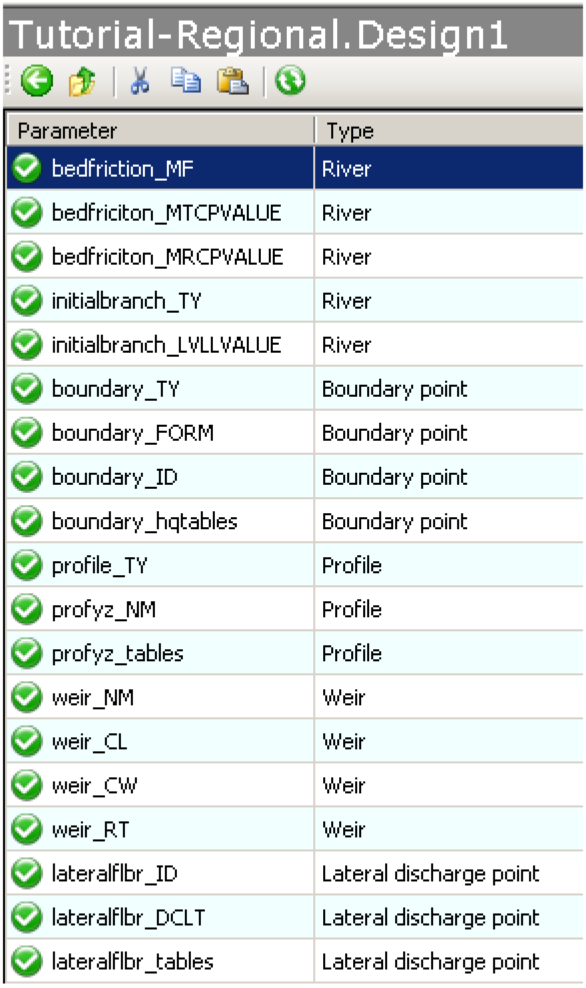




For the Tutorial model we will use a total of 19 parameters (see below):

bedfriction_MF	type: river
bedfriction_MTCPVALUE	type: river
bedfriction_MRCPVALUE	type: river
initialbranch_TY	type: river
initialbranch_LVLLVALUE	type: river
boundary_TY	type: boundary point
boundary_FORM	type: boundary point
boundary_ID	type: boundary point
boundary_hqtables	type: boundary point
profile_TY	type: profile
profyz_NM	type: profile
profyz_tables	type: profile
weir_NM	type: weir
weir_CL	type: weir
weir_CW	type: weir
weir_RT	type: weir
lateralflbr_ID	type: lateral
lateralflbr_DCLT	type: lateral
lateralflbr_tables	type: lateral

Add these parameters to the design dataset and make sure that he name and type of the parameter is defined.



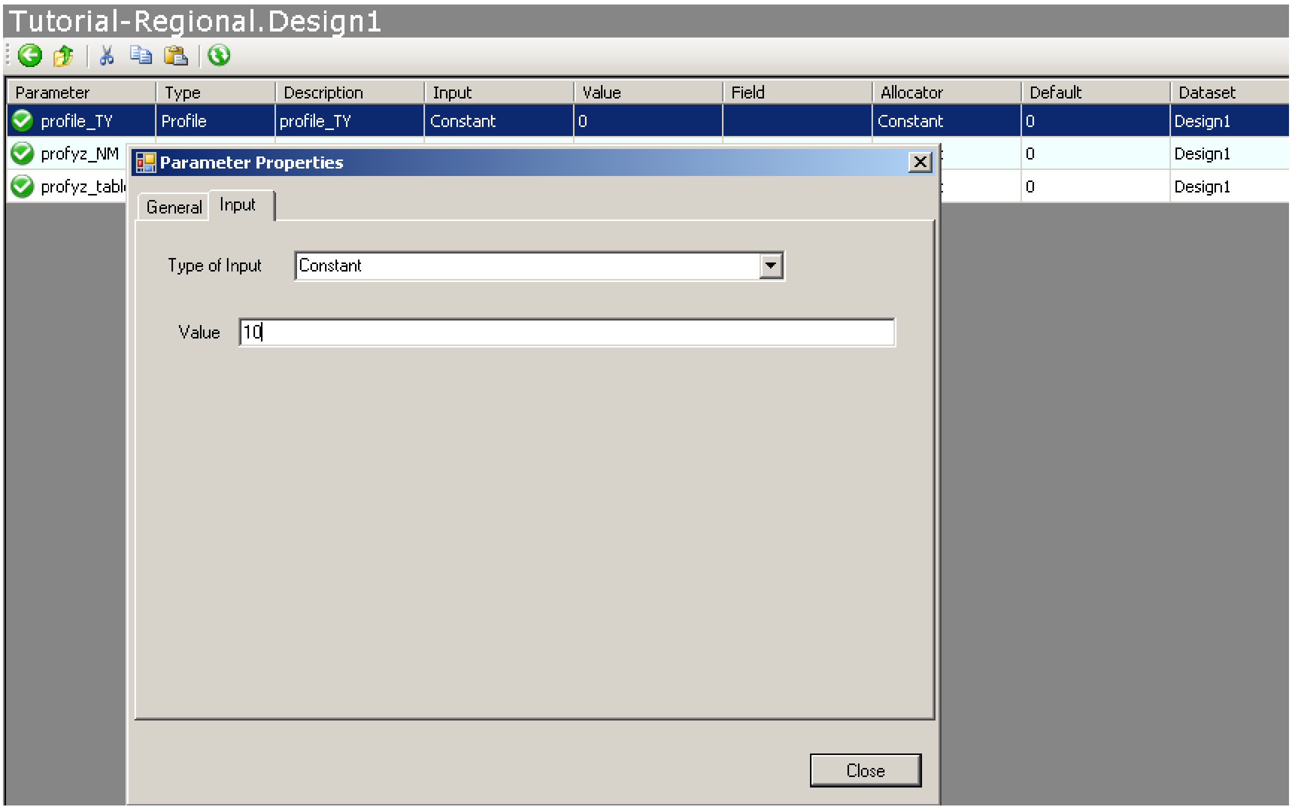
Parameter	Type
bedfriction_MF	River
bedfriciton_MTCPVALUE	River
bedfriciton_MRCPVALUE	River
initialbranch_TY	River
initialbranch_LVLLVALUE	River
boundary_TY	Boundary point
boundary_FORM	Boundary point
boundary_ID	Boundary point
boundary_hqtables	Boundary point
profile_TY	Profile
profyz_NM	Profile
profyz_tables	Profile
weir_NM	Weir
weir_CL	Weir
weir_CW	Weir
weir_RT	Weir
lateralflbr_ID	Lateral discharge point
lateralflbr_DCLT	Lateral discharge point
lateralflbr_tables	Lateral discharge point

The parameters are automatically sorted per type (see figure below). It is possible to select only the parameters defining a special type by clicking on the tab of for example 'River'. In the tab 'Parameters' all parameters of the dataset are listed (like figure above). The tab 'Inherited' shows all listed parameters that are inherited from a parent dataset. This dataset has been set up without a parent dataset so the list of inherited parameters is empty.

7.4.3 Input of parameters Profile type

In this paragraph we define the parameters for the profile points. Three parameters have been added to the dataset: profile_TY, profyz_NM and profyz_tables. These parameters describe the SOBEK-CF profile point with a y-z cross section definition.

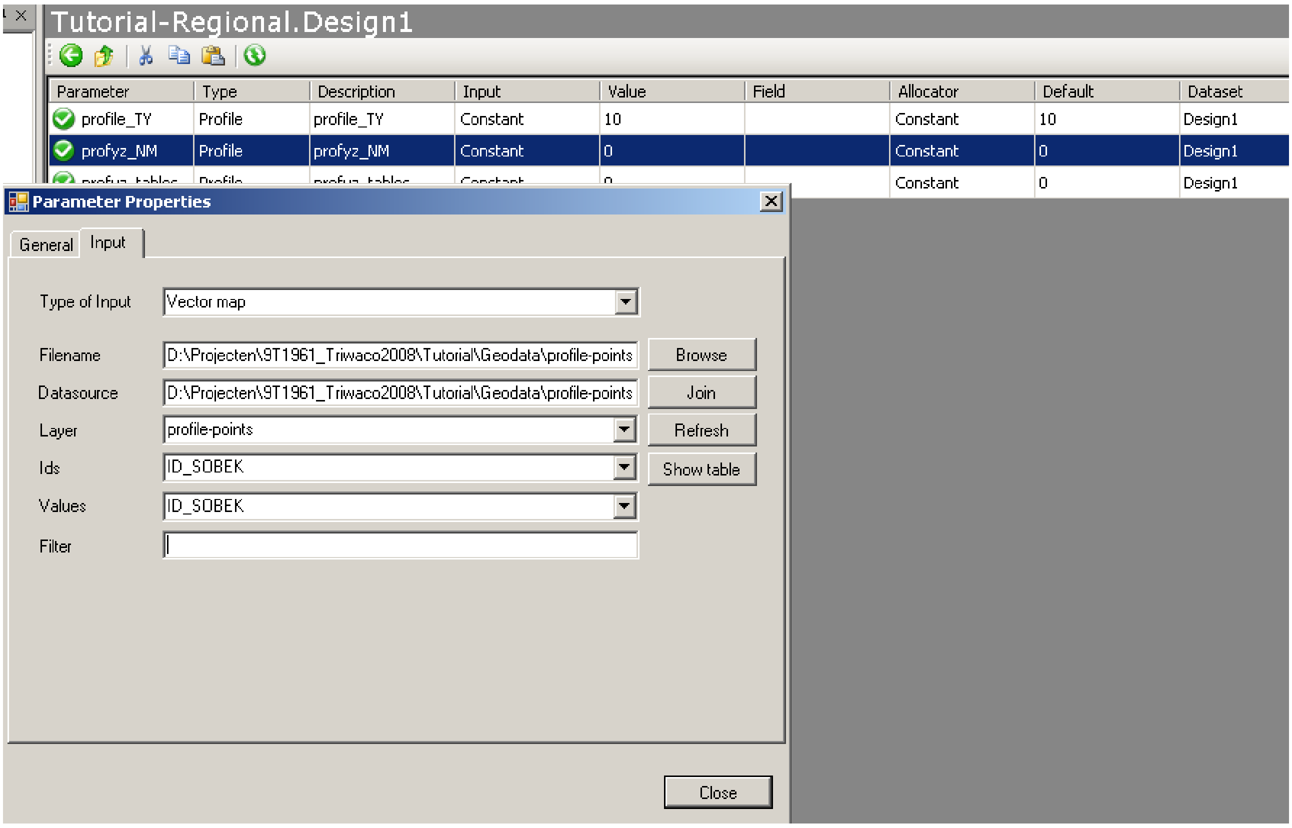
With the parameter prof_TY one can define the type of the cross section definition. This parameter can have several value which represent different types of cross section definitions. In this case we use the value 10 for a y-z cross section definition. So open the context menu (right click on the parameter profile_TY) and select the tab 'Input' of the pop up window. Choose 'Constant' from the pull down menu of the field 'Type of Input' and fill in 10 in the 'Value' field.

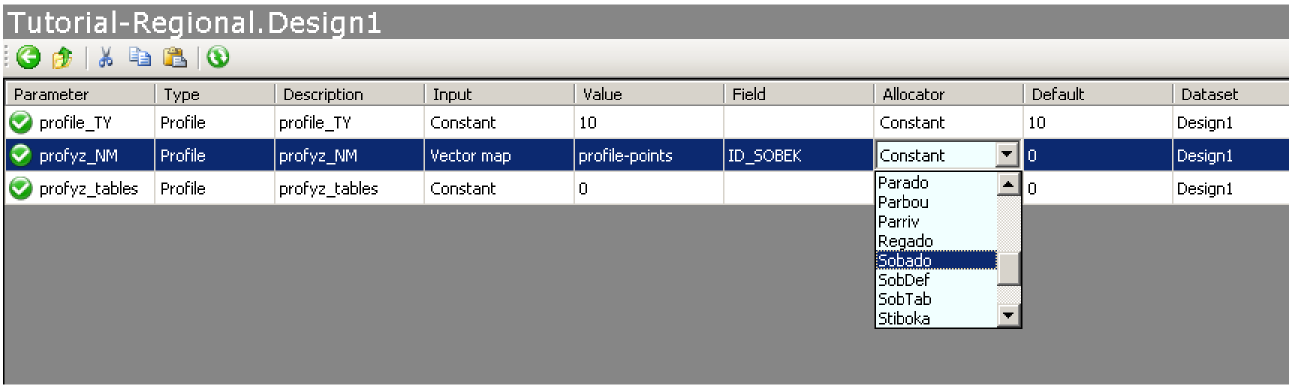


The parameter profyz_NM links a ID (name) to a y-z cross section definition. We have used a shape-file with profile points in the discretisation dataset. Per profile point a ID has been defined and we will use the same ID's for the cross section definition.

Open the context menu of the parameter profyz_NM (right click) and select the function 'Properties'. In the pop up window choose the tab 'Input' and select the input type 'Vector map'. Next browse for the shape-file prof-points.shp in the directory XXX. The field for Filename, Datasource and Layer are automatically filled in. The fields Ids and Values must link to the attribue ID_SOBEK in the shape-file. Now there is a link between the ID of the profile point at the network (discritsation dataset) and the name (ID) of the cross section definition. Click on 'Close' to exit the input screen.

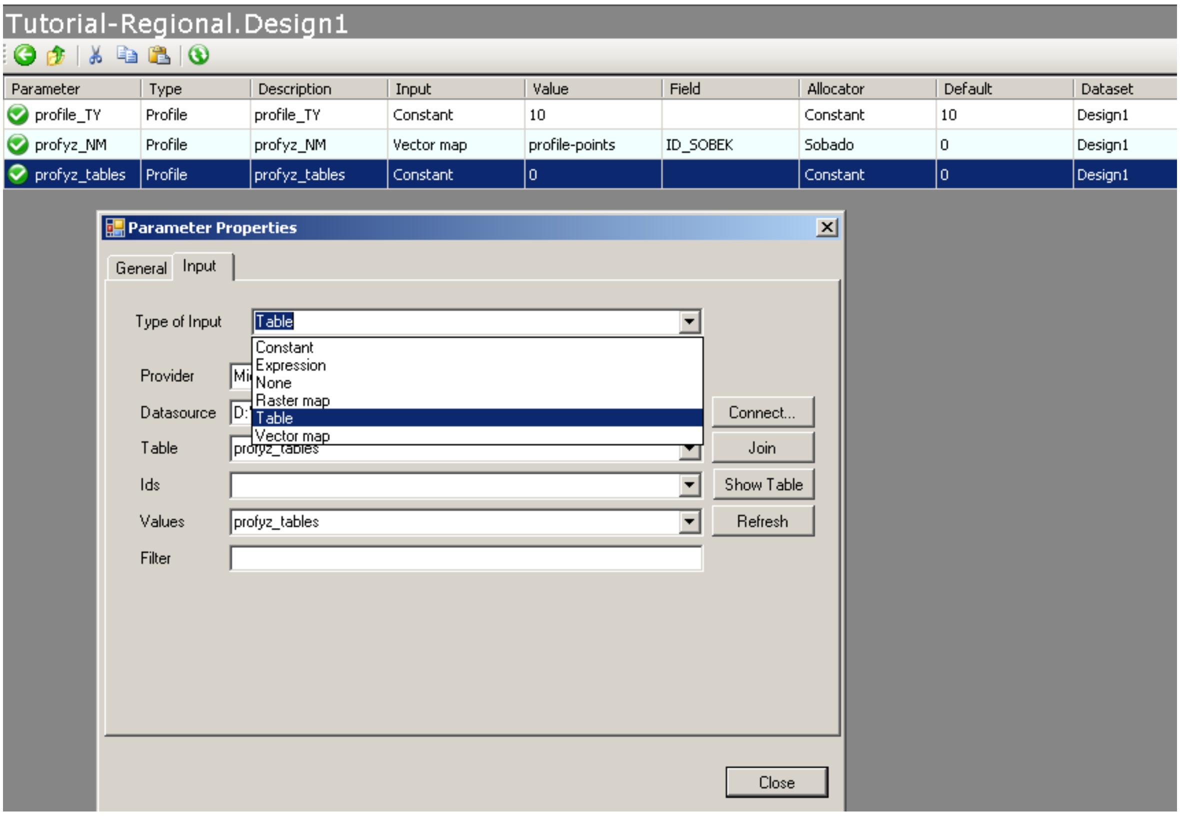
The final step in defining this parameter is to change its allocator. This should be done in the column 'Allocator' of the parameter in the list window. Use the allocator 'Sobado' which is being used for shape-files and vector maps.

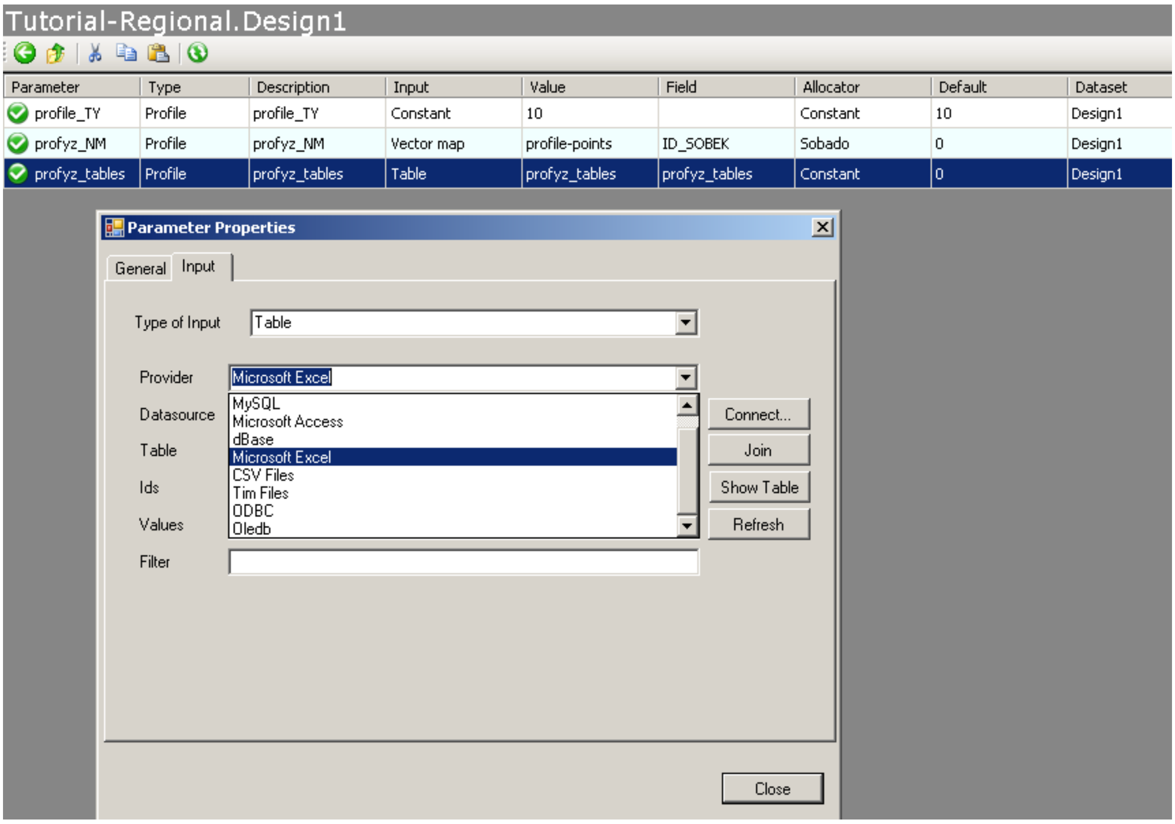


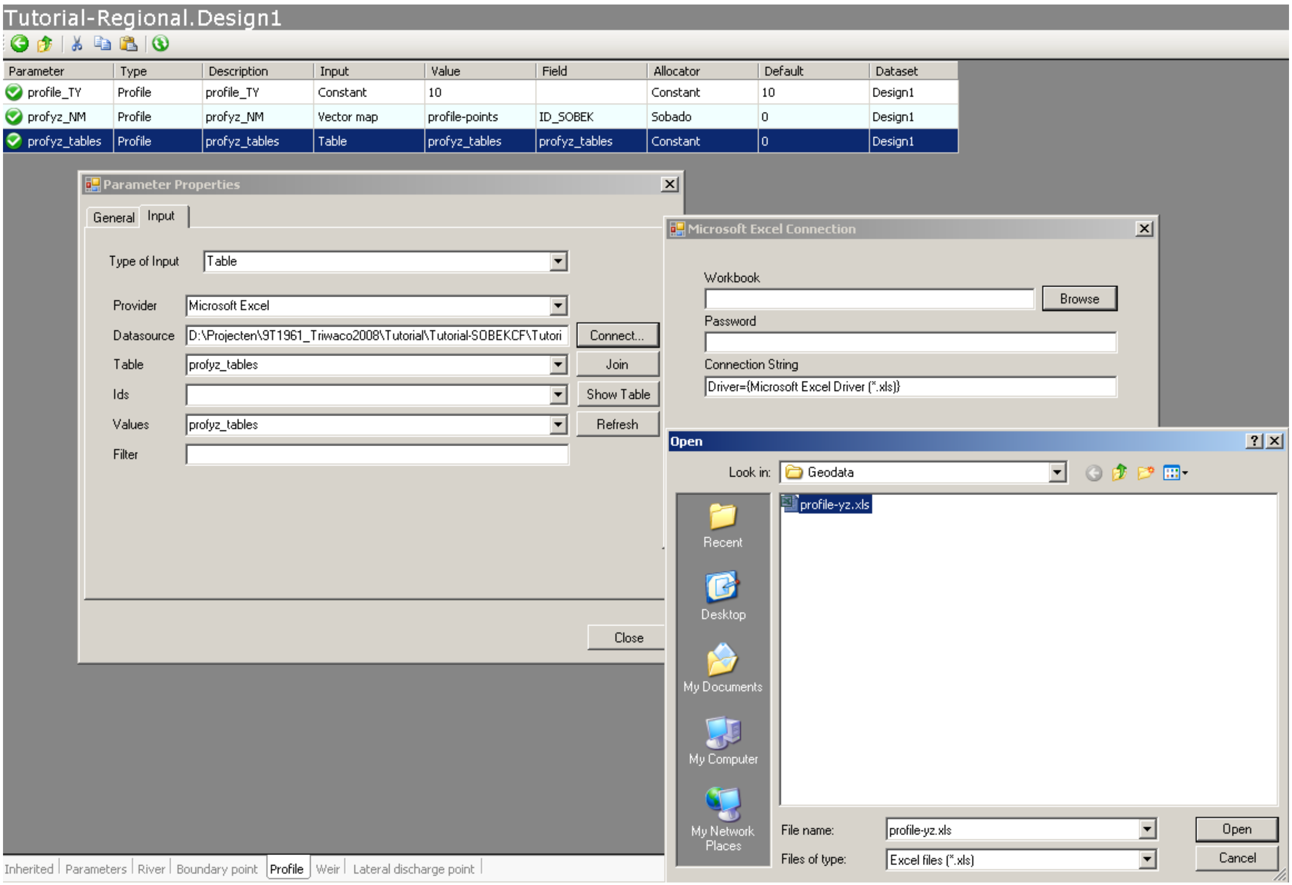


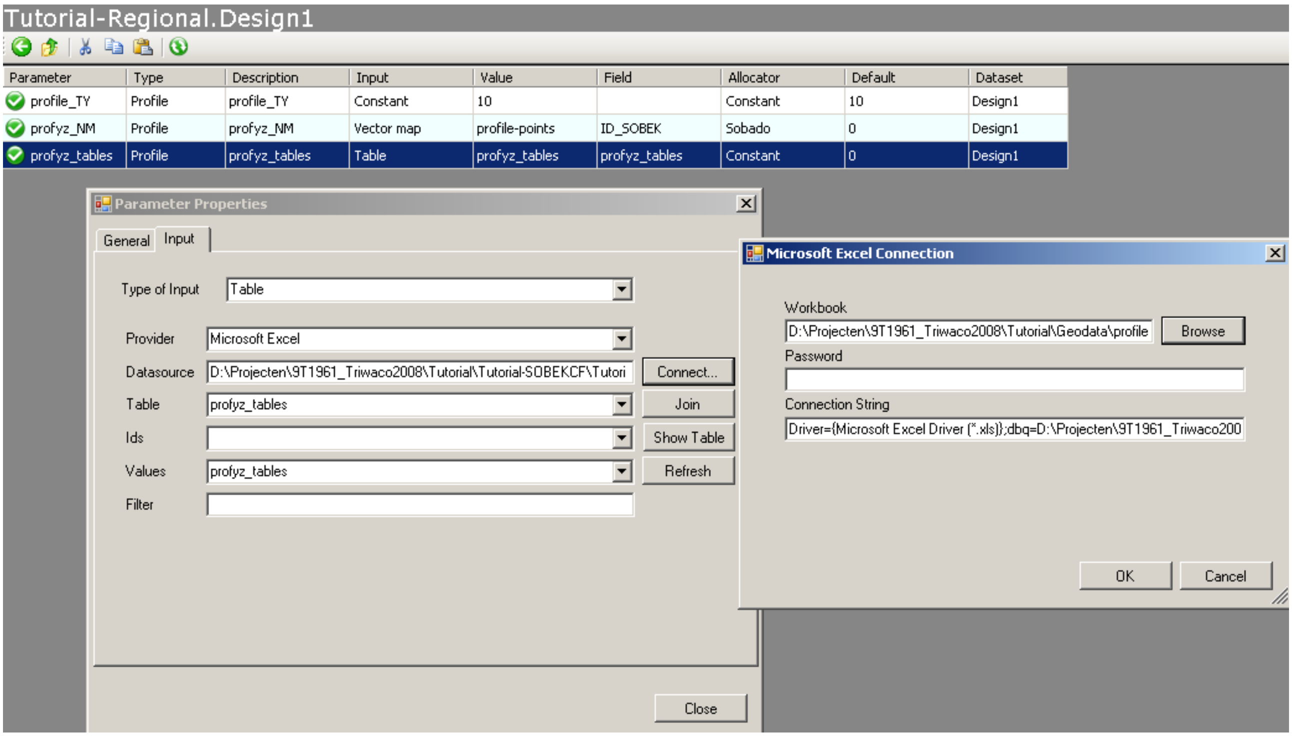
Now we have define the y-z cross section profile definition (see figures below). This is executed by the parameter profyz_tables. We have the profile definitions of the four profiles of the Tutorial model listed in a excel workbook (profile.xls) in directory XXX. Open the context menu (right click) of the parameter profyz_tables and select 'Properties'. In the pop up window select the tab 'Input' and use the input type 'Table'. In the appeared field 'Provider' select 'Microsoft Excel' because we have the profile definitions in an excel spreadsheet. 'Connect' the right data source by browsing for the location (XXX)of the file profile.xls.
In the field 'Table' one can select the right worksheet. Use the pull down menu to choose the 'Tutorial' worksheet. Now it is possible to look at the connected table by 'Show table' function. The table has three columns ID_SOBEK, Y and Z. The first column is necessary for identifying the profile definition and link it to the discretisation. Therefore select 'ID_SOBEK' from the pull down menu next to the Ids field. The Value field cannot be defined using the pull down menu because we have to declare two columns, namely Y and Z. Therefore fill in 'Y,Z' manually.
The final step for this parameter definition is to define its allocator. Allocation is translating parameter values defined by maps or tables to a calculation grid and is carried out by allocators. Allocation is the spatial or temporal interpolation or up/down scaling. Transformation to model parameter input is, usually, in the triwaco file format (.ado or .adx). The reason for using this standard file format is that data can easily be exchanged between models, all tools and processors can access it, automatic calibration tools will always work with any model, etc. Also very important is that all transformed input data can be visualised with the built in viewers.

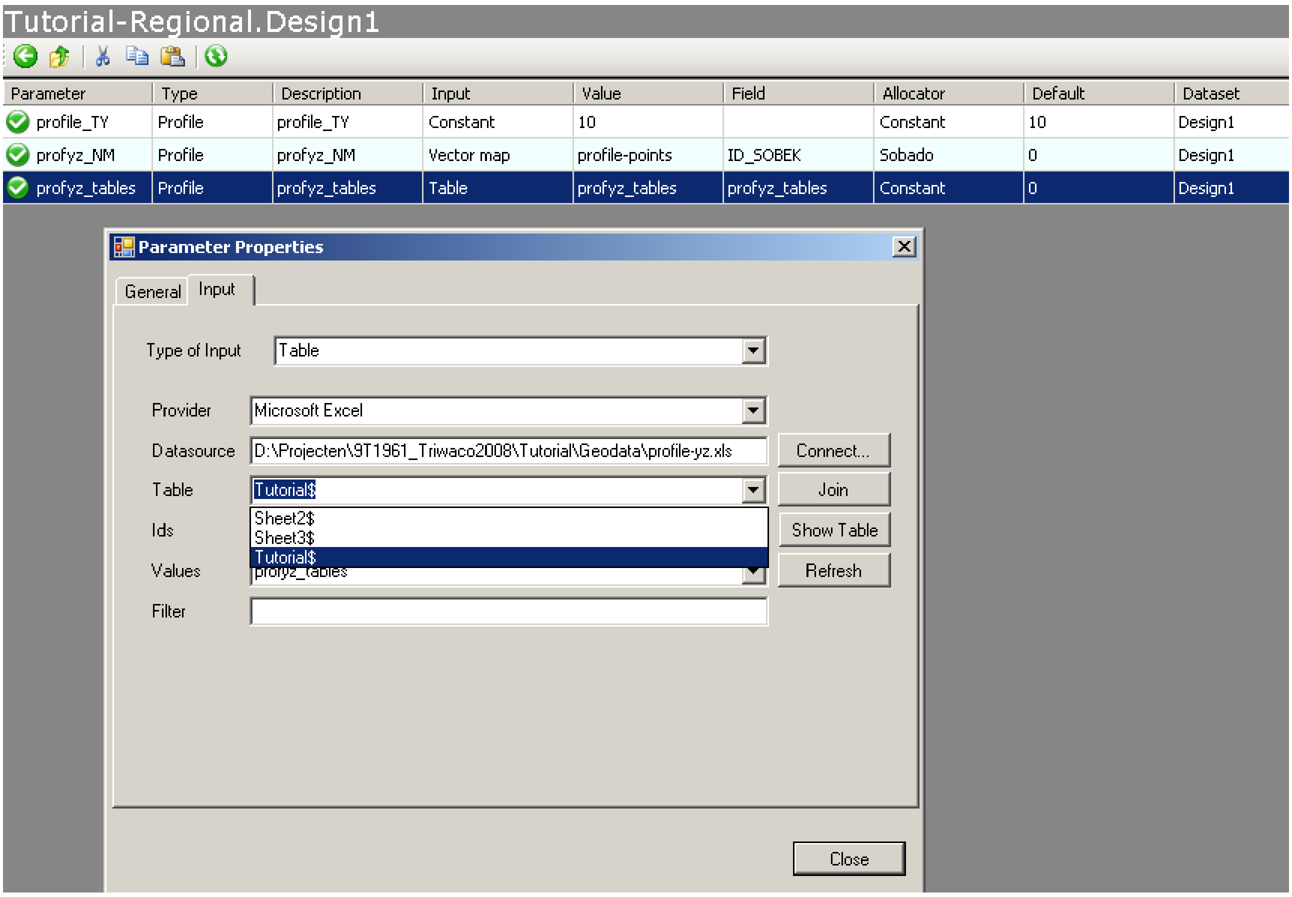
Close the input window en use the Allocator column in the List window. Make sure you set the allocator of the parameter profyz_tables to 'SobTab'.

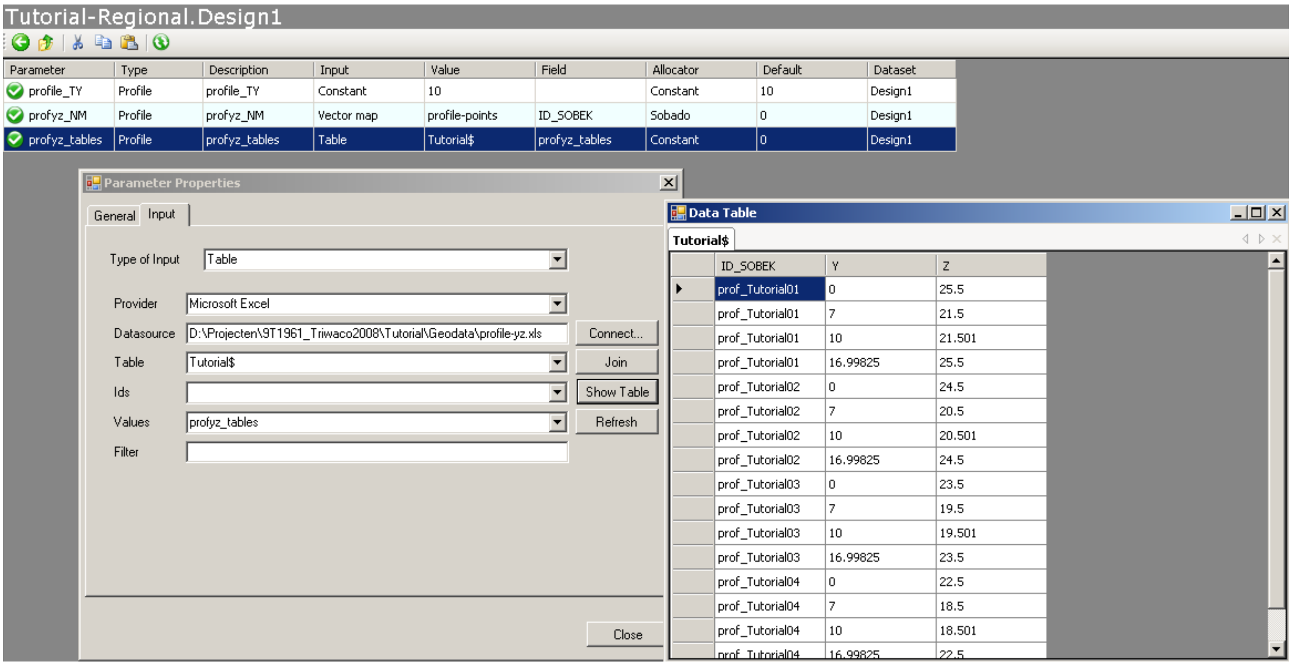


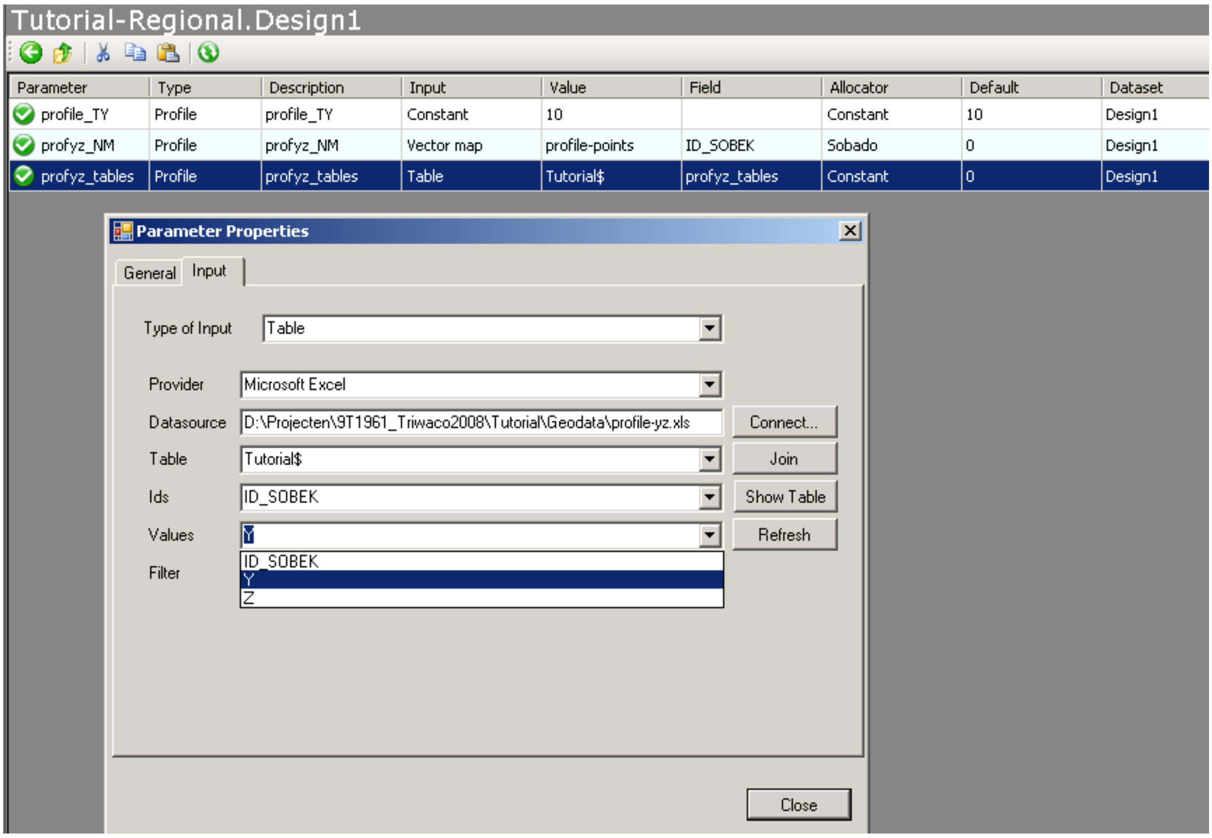

Tutorial-Regional.Design1
Parameter Type Description Input Value Field Allocator Default Dataset
profile_TY Profile profile_TY Constant 10 Constant 10 Design1
profyz_NM Profile profyz_NM Vector map profile-points ID_SOBEK Sobado 0 Design1
profyz_tables Profile profyz_tables Table profyz_tables profyz_tables Constant 0 Design1
Parameter Properties
General
Input
Type of Input
Table
Provider
Microsoft Excel
Datasource
Table
Ids
Values
Filter
MySQL
Microsoft Access
dBase
Microsoft Excel
CSV Files
Tim Files
ODBC
Oledb
Connect...
Join
Show Table
Refresh
Close

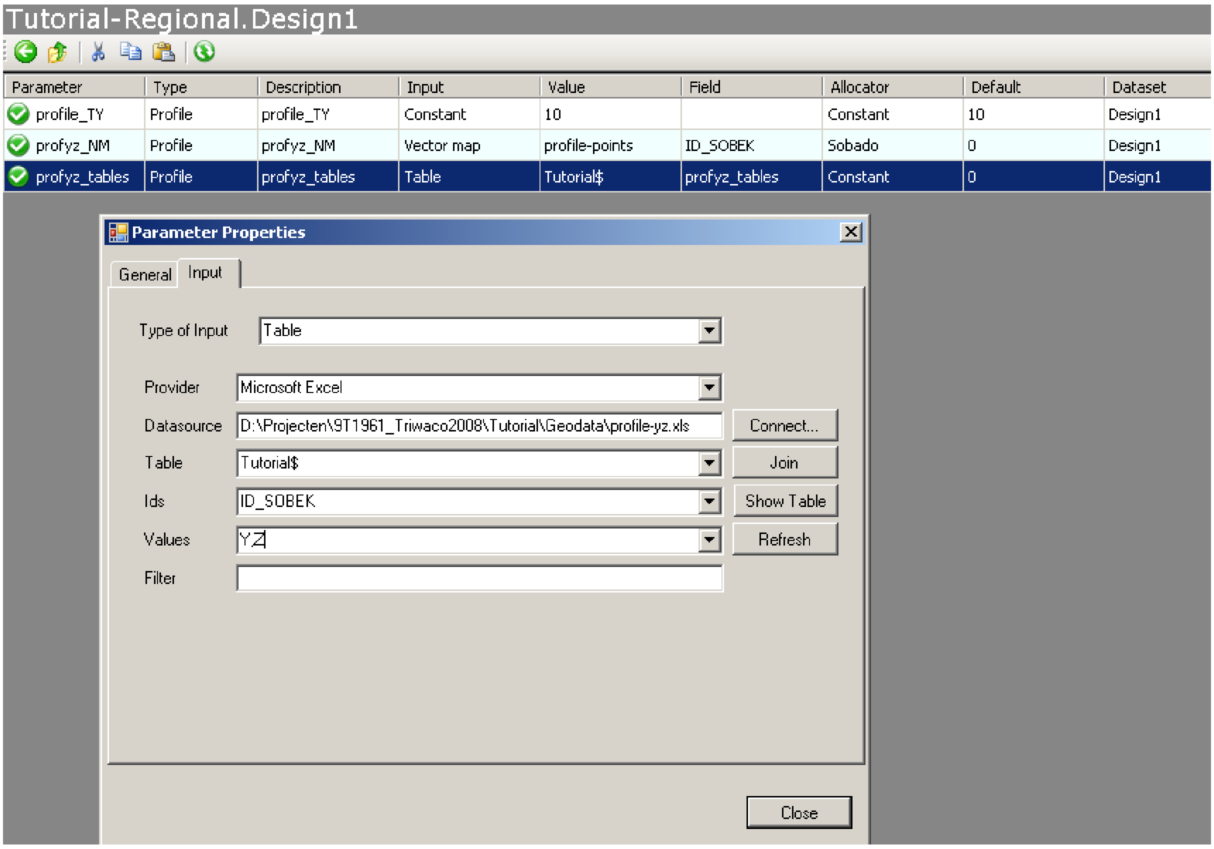

Tutorial-Regional.Design1
Parameter Type Description Input Value Field Allocator Default Dataset
profile_TY Profile profile_TY Constant 10 Constant 10 Design1
profyz_NM Profile profyz_NM Vector map profile-points ID_SOBEK Sobado 0 Design1
profyz_tables Profile profyz_tables Table profyz_tables profyz_tables Constant 0 Design1
Parameter Properties
General
Input
Type of Input
Table
Provider
Microsoft Excel
Datasource
D:\Projecten\9T1961_Triwaco2008\Tutorial\Tutorial-SOBEKCF\Tutori
Table
profyz_tables
Ids
Values
profyz_tables
Filter
Connect...
Join
Show Table
Refresh
Close
Microsoft Excel Connection
Workbook
Browse
Password
Connection String
Driver={Microsoft Excel Driver (*.xls)}
Open
Look in:
Geodata
profile-yz.xls
Recent
Desktop
My Documents
My Computer
My Network Places
File name:
profile-yz.xls
Files of type:
Excel files (*.xls)
Open
Cancel
Inherited
Parameters
River
Boundary point
Profile
Weir
Lateral discharge point

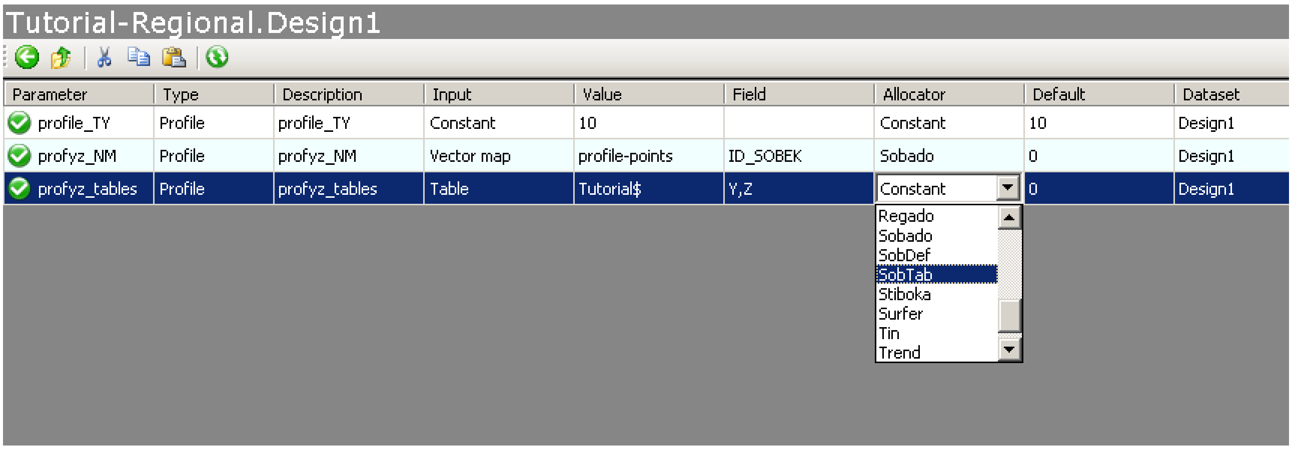

Tutorial-Regional.Design1
Parameter Type Description Input Value Field Allocator Default Dataset
profile_TY Profile profile_TY Constant 10 Constant 10 Design1
profyz_NM Profile profyz_NM Vector map profile-points ID_SOBEK Sobado 0 Design1
profyz_tables Profile profyz_tables Table profyz_tables profyz_tables Constant 0 Design1
Parameter Properties
General
Input
Type of Input
Table
Provider
Microsoft Excel
Datasource
D:\Projecten\9T1961_Triwaco2008\Tutorial\Tutorial-SOBEKCF\Tutori
Table
profyz_tables
Ids
Values
profyz_tables
Filter
Connect...
Join
Show Table
Refresh
Close
Microsoft Excel Connection
Workbook
D:\Projecten\9T1961_Triwaco2008\Tutorial\Geodata\profile
Browse
Password
Connection String
Driver={Microsoft Excel Driver (*.xls)};dbq=D:\Projecten\9T1961_Triwaco200
OK
Cancel


Tutorial-Regional.Design1
Parameter Type Description Input Value Field Allocator Default Dataset
profile_TY Profile profile_TY Constant 10 Constant 10 Design1
profyz_NM Profile profyz_NM Vector map profile-points ID_SOBEK Sobado 0 Design1
profyz_tables Profile profyz_tables Table profyz_tables profyz_tables Constant 0 Design1
Parameter Properties
General
Input
Type of Input
Table
Provider
Microsoft Excel
Datasource
D:\Projecten\9T1961_Triwaco2008\Tutorial\Geodata\profile-yz.xls
Table
Tutorial$
Sheet2$
Sheet3$
Tutorial$
Ids
Values
Filter
Connect...
Join
Show Table
Refresh
Close


Tutorial-Regional.Design1
Parameter | Type | Description | Input | Value | Field | Allocator | Default | Dataset
profile_TY | Profile | profile_TY | Constant | 10 | | Constant | 10 | Design1
profyz_NM | Profile | profyz_NM | Vector map | profile-points | ID_SOBEK | Sobado | 0 | Design1
profyz_tables | Profile | profyz_tables | Table | Tutorial$ | profyz_tables | Constant | 0 | Design1
Parameter Properties
General
Input
Type of Input
Table
Provider
Microsoft Excel
Datasource
D:\Projecten\9T1961_Triwaco2008\Tutorial\Geodata\profile-yz.xls
Connect...
Table
Tutorial$
Join
Ids
Show Table
Values
profyz_tables
Refresh
Filter
Close
Data Table
Tutorial$
ID_SOBEK | Y | Z
prof_Tutorial01 | 0 | 25.5
prof_Tutorial01 | 7 | 21.5
prof_Tutorial01 | 10 | 21.501
prof_Tutorial01 | 16.99825 | 25.5
prof_Tutorial02 | 0 | 24.5
prof_Tutorial02 | 7 | 20.5
prof_Tutorial02 | 10 | 20.501
prof_Tutorial02 | 16.99825 | 24.5
prof_Tutorial03 | 0 | 23.5
prof_Tutorial03 | 7 | 19.5
prof_Tutorial03 | 10 | 19.501
prof_Tutorial03 | 16.99825 | 23.5
prof_Tutorial04 | 0 | 22.5
prof_Tutorial04 | 7 | 18.5
prof_Tutorial04 | 10 | 18.501


Tutorial-Regional.Design1
Parameter | Type | Description | Input | Value | Field | Allocator | Default | Dataset
profile_TY | Profile | profile_TY | Constant | 10 | | Constant | 10 | Design1
profyz_NM | Profile | profyz_NM | Vector map | profile-points | ID_SOBEK | Sobado | 0 | Design1
profyz_tables | Profile | profyz_tables | Table | Tutorial$ | profyz_tables | Constant | 0 | Design1
Parameter Properties
General
Input
Type of Input
Table
Provider
Microsoft Excel
Datasource
D:\Projecten\9T1961_Triwaco2008\Tutorial\Geodata\profile-yz.xls
Connect...
Table
Tutorial$
Join
Ids
ID_SOBEK
Show Table
Values
Y
Refresh
Filter
ID_SOBEK
Y
Z
Close





The parameters for the profile points are finished and your List window screen (tab profile points) should be look like the figure below.

Tutorial-Regional.Design1

Parameter	Type	Description	Input	Value	Field	Allocator	Default	Dataset
profile_TY	Profile	profile_TY	Constant	10		Constant	10	Design1
profyz_NM	Profile	profyz_NM	Vector map	profile-points	ID_SOBEK	Sobado	0	Design1
profyz_tables	Profile	profyz_tables	Table	Tutorial$	Y,Z	SobTab	0	Design1

7.4.4 Input of remaining parameters

We show you how to change the input settings of parameters. From now on we expect you are able to change the input of the parameters yourself.

Weirs in the Tutorial model will be defined by four parameters: weir_NM, weir_CL, weir_CW and weir_RT. The first three parameters should be linked to the shapefile XXX weirs.shp. The parameter weir_NM should be linked to ID_SOBEK (ID of weir), weir_CL must link tot the attribue CRESTLEVEL and weir_CW to CRESTWIDTH. The parameter weir_RT defines the flow direction and the value of 0 represents flow possible in both directions. Make sure all parameters are define as shown in the figure below.

Tutorial-Regional.Design1

Parameter	Type	Description	Input	Value	Field	Allocator	Default	Dataset
weir_NM	Weir	weir_NM	Vector map	weir	ID_SOBEK	Sobado	0	Design1
weir_CL	Weir	weir_CL	Vector map	weir	CRESTLEVEL	Sobado	0	Design1
weir_CW	Weir	weir_CW	Vector map	weir	CRESTWIDTH	Sobado	0	Design1
weir_RT	Weir	weir_RT	Constant	0		Constant	0	Design1

The parameters that define river properties represent friction of the riverbed and initial water depths. Dimensions of the river have already been defined by the profile point parameters. Information about the different parameters can be found in the parameter.xls spreadsheet. For now we only show you the input values of the river parameters (see figure below).

Tutorial-Regional.Design1

Parameter	Type	Description	Input	Value	Field	Allocator	Default	Dataset
bedfriction_MF	River	bedfriction_MF	Constant	7		Constant	7	Design1
bedfriciton_MTCPVALUE	River	bedfriciton_MTC...	Vector map	river	FRIC_BB	Sobado	0	Design1
bedfriciton_MRCPVALUE	River	bedfriciton_MRC...	Vector map	river	FRIC_BB	Sobado	0	Design1
initialbranch_TY	River	initialbranch_TY	Constant	0		Constant	0	Design1
initialbranch_LVLVALUE	River	initialbranch_LVL...	Vector map	river	INI_WDEPTH	Sobado	0	Design1

The figure below shows the parameters for the boundary points. The Tutorial model has one boundary point with a Q-h relation. Make sure all parameters in the boundary point tab are defined as shown in the figure.

Tutorial-Regional.Design1

Parameter	Type	Description	Input	Value	Field	Allocator	Default	Dataset
boundary_TY	Boundary p...	boundary_TY	Constant	1		Constant	1	Design1
boundary_FORM	Boundary p...	boundary_FORM	Constant	4		Constant	4	Design1
boundary_ID	Boundary p...	boundary_ID	Vector map	bnd-points	ID_SOBEK	Sobado	0	Design1
boundary_hqtab	Boundary p...	boundary_hqtab...	Table	Tutorial$	h,Q	SobTab	0	Design1

The lateral discharge points need three parameters in this Tutorial model. The discharge (time depended) is in an excel spreadsheet.

Tutorial-Regional.Design1

Parameter	Type	Description	Input	Value	Field	Allocator	Default	Dataset
lateralflbr_ID	Lateral disc...	lateralflbr_ID	Vector map	laterals	ID_SOBEK	Sobado	0	Design1
lateralflbr_DCLT	Lateral disc...	lateralflbr_DCLT	Constant	1		Constant	1	Design1
lateralflbr_table	Lateral disc...	lateralflbr_tables	Table	Tutorial$	D,T,Q	SobTab	0	Design1

7.4.5 Overview of all parameters Tutorial model

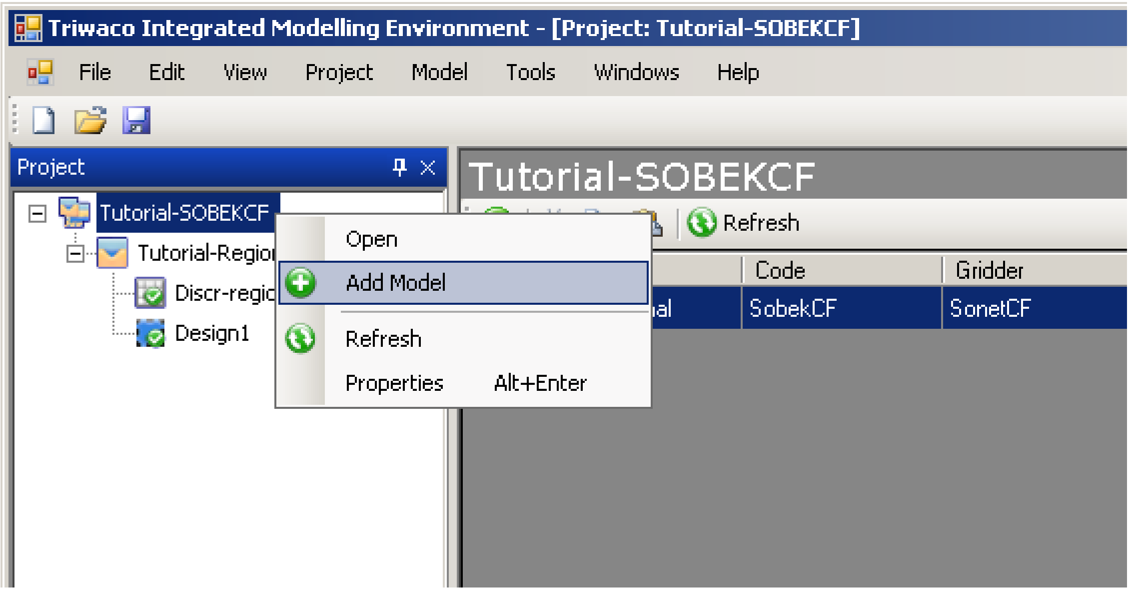
All parameters of the Tutorial model have been defined. The list window (tab Parameters) should be look like the figure below. Check all settings of the parameters to make sure the design dataset is without errors.

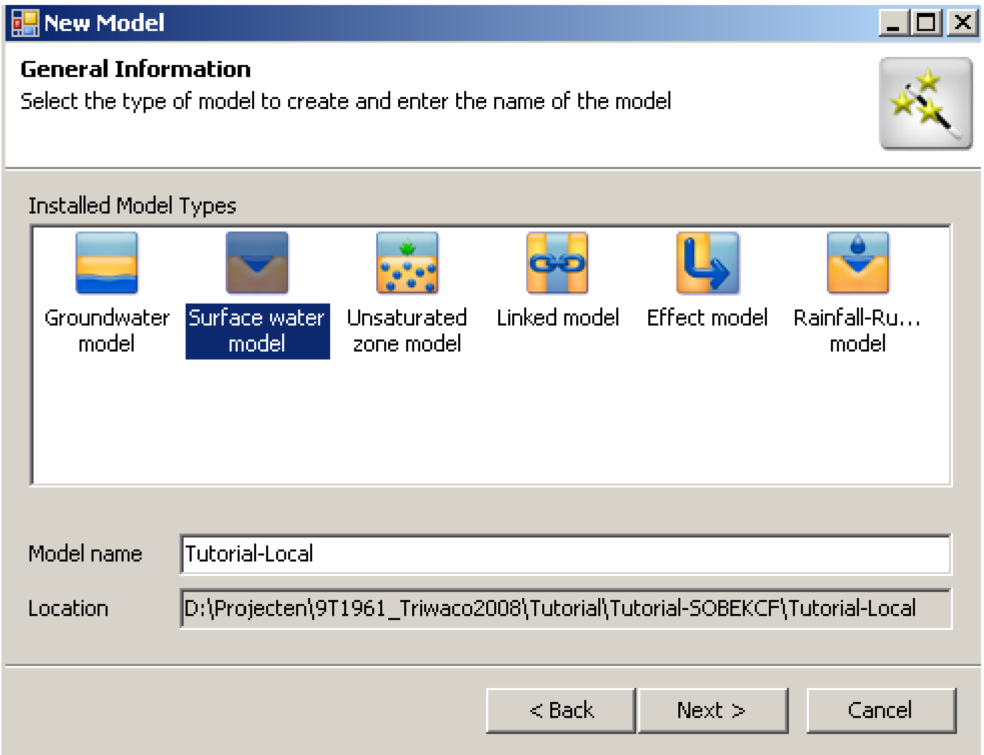
Tutorial-Regional.Design1

Parameter	Type	Description	Input	Value	Field	Allocator	Default	Dataset
bedfriction_MF	River	bedfriction_MF	Constant	7		Constant	7	Design1
bedfriciton_MTCPVALUE	River	bedfriciton_MTC...	Vector map	river	FRIC_BB	Sobado	0	Design1
bedfriciton_MRCPVALUE	River	bedfriciton_MRC...	Vector map	river	FRIC_BB	Sobado	0	Design1
initialbranch_TY	River	initialbranch_TY	Constant	0		Constant	0	Design1
initialbranch_LVLLVALUE	River	initialbranch_LVL...	Vector map	river	INI_WDEPTH	Sobado	0	Design1
boundary_TY	Boundary point	boundary_TY	Constant	1		Constant	1	Design1
boundary_FORM	Boundary point	boundary_FORM	Constant	4		Constant	4	Design1
boundary_ID	Boundary point	boundary_ID	Vector map	bnd-points	ID_SOBEK	Sobado	0	Design1
boundary_hqtables	Boundary point	boundary_hqtab...	Table	Tutorial$	h,Q	SobTab	0	Design1
profile_TY	Profile	profile_TY	Constant	10		Constant	10	Design1
profyz_NM	Profile	profyz_NM	Vector map	profile-points	ID_SOBEK	Sobado	0	Design1
profyz_tables	Profile	profyz_tables	Table	Tutorial$	Y,Z	SobTab	0	Design1
weir_NM	Weir	weir_NM	Vector map	weir	ID_SOBEK	Sobado	0	Design1
weir_CL	Weir	weir_CL	Vector map	weir	CRESTLEVEL	Sobado	0	Design1
weir_CW	Weir	weir_CW	Vector map	weir	CRESTWIDTH	Sobado	0	Design1
weir_RT	Weir	weir_RT	Constant	0		Constant	0	Design1
lateralflbr_ID	Lateral discharge point	lateralflbr_ID	Vector map	laterals	ID_SOBEK	Sobado	0	Design1
lateralflbr_DCLT	Lateral discharge point	lateralflbr_DCLT	Constant	1		Constant	1	Design1
lateralflbr_tables	Lateral discharge point	lateralflbr_tables	Table	Tutorial$	D,T,Q	SobTab	0	Design1

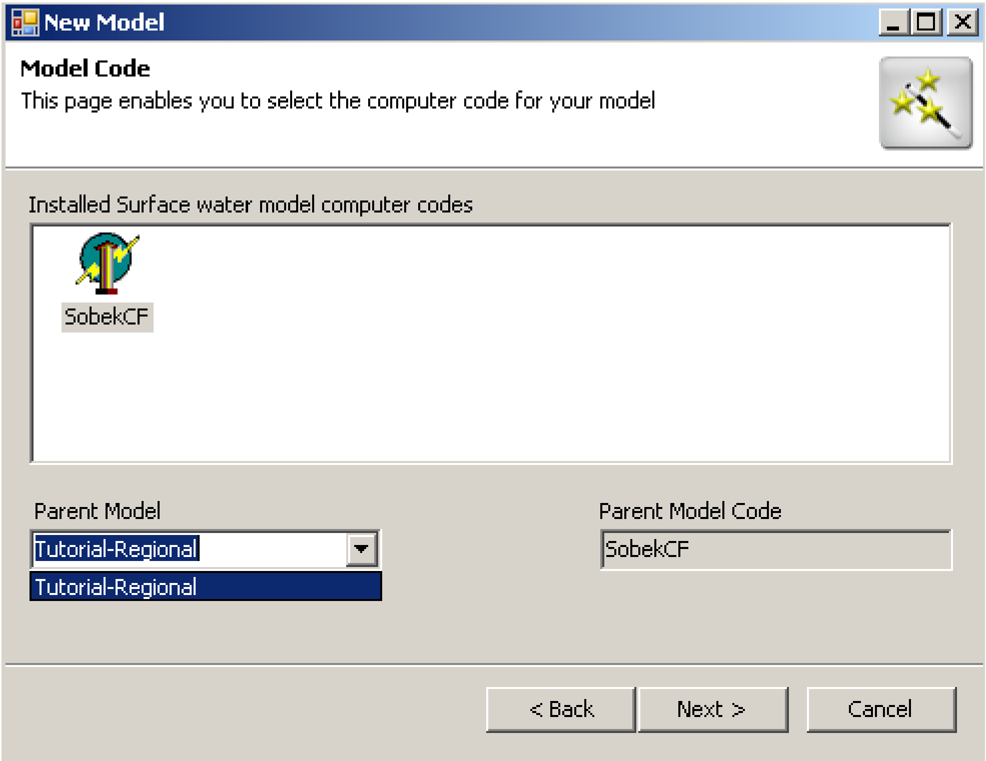
7.5 Setting up a local model for the simulation

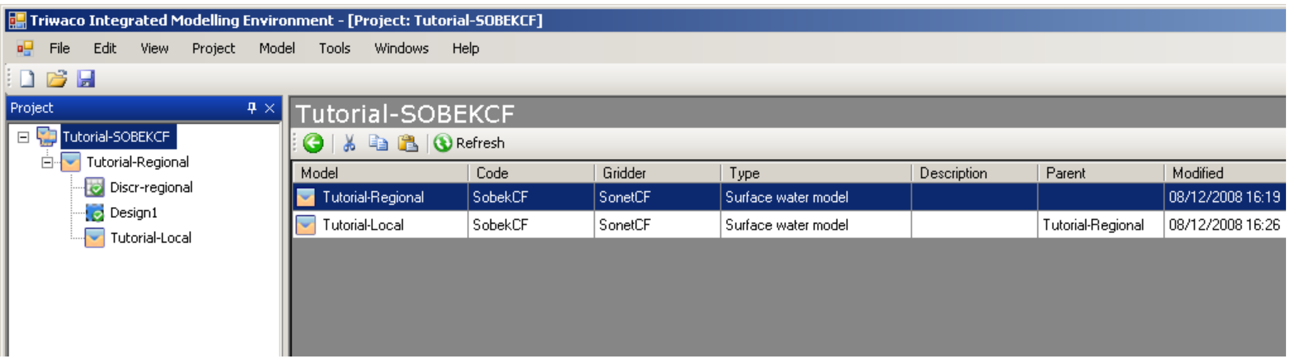
We have defined a regional discretisation set because database are often containing all information of a catchment area. However we do not want to model a large catchment but just a small piece of the upstream area. Therefore we have to define a second modelling level on which the local Tutorial model is based. First we add a new Surface water model to the Tutorial-SOBEKCF project which we call Tutorial-Local.





In de model code window we now select a parent model, namely Tutorial-Regional. The local model will become a sub-model of the regional model.

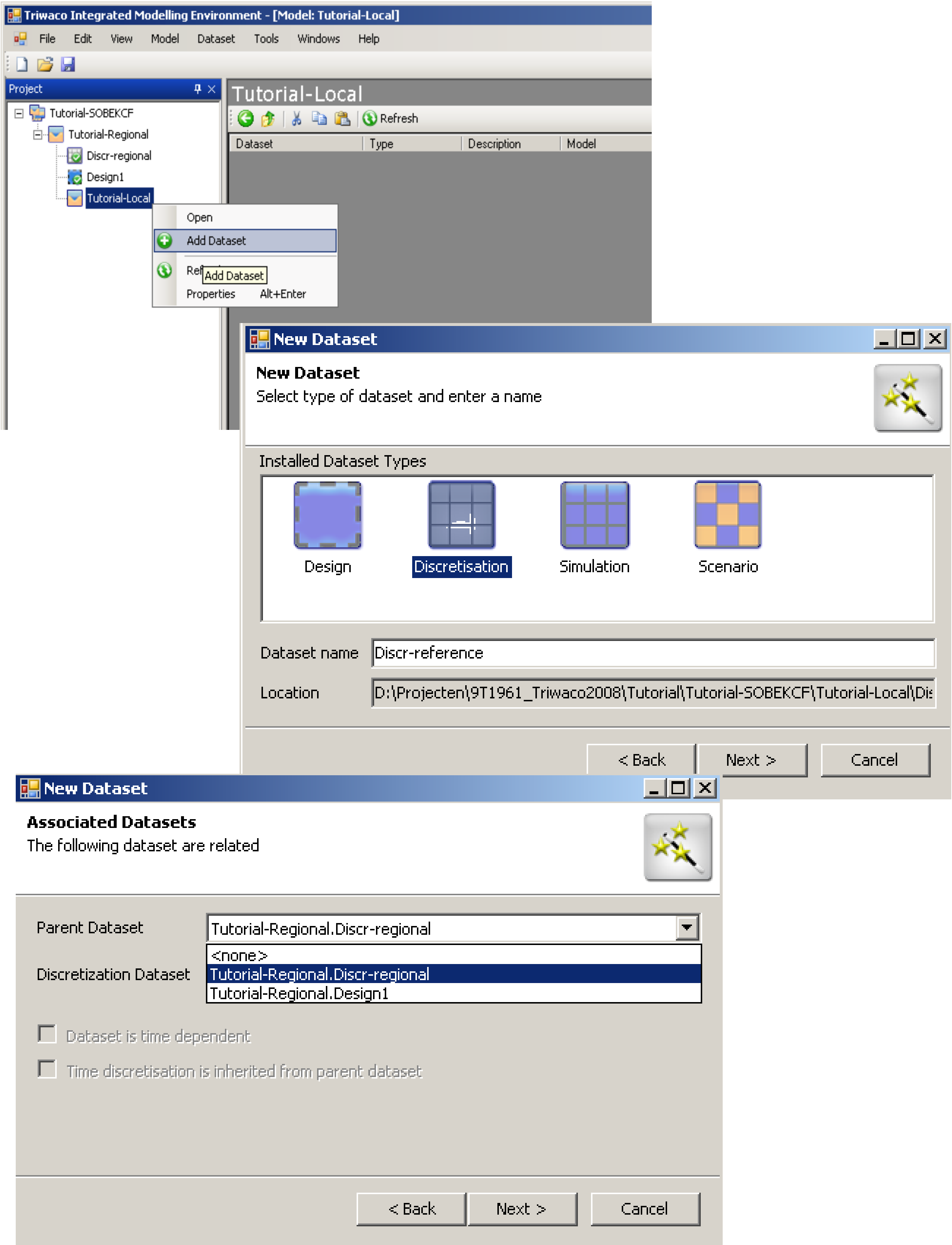


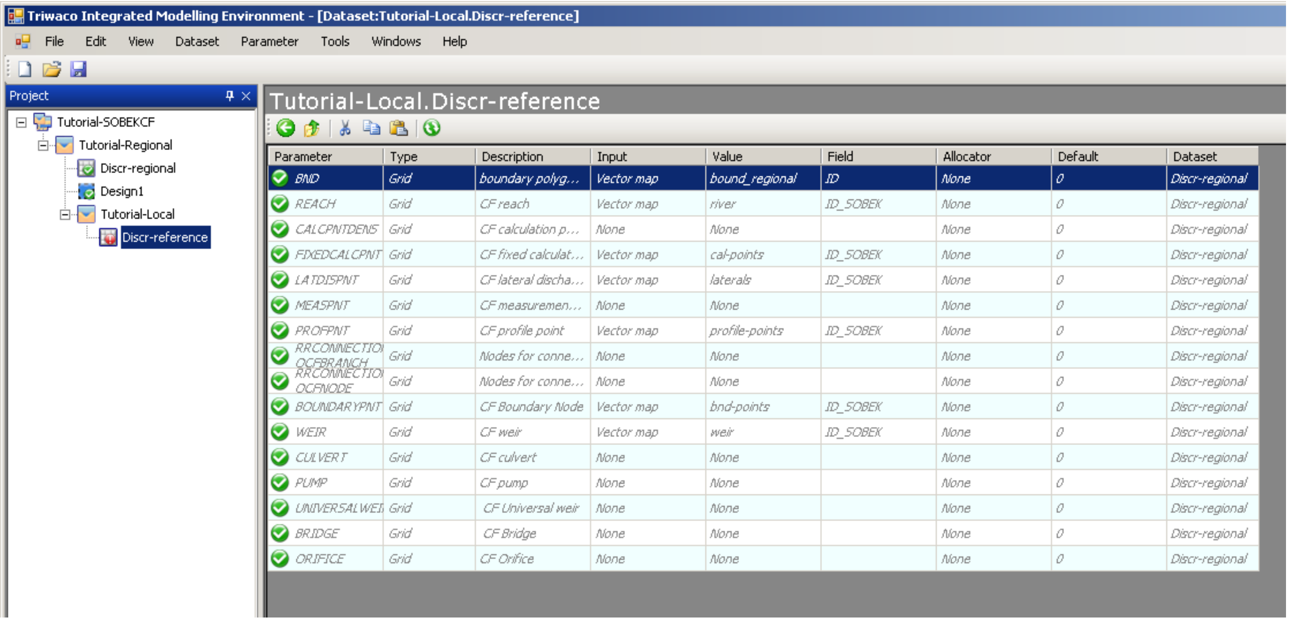


After adding the model Tutorial-Local to the project tree a new discretisation dataset should be added to the model (name it **Discr-reference**). Click 'Next' and in the Associated datasets window select 'Tutorial-Regional.Discr-Regional' as parent dataset. All parameters and its definitions will be inherited in the local discretisation. All other properties and settings remain the same as the default, so click 'Next' until the dataset is added to the model Tutorial-Local.

Now check the tabs 'Parameters' and 'Inherited' and one will notice that the inherited parameters are the same as defined in the Reigonal discretisation dataset. In the 'Parameter' tab some new parameters are listed but we do not need these, so remove them.

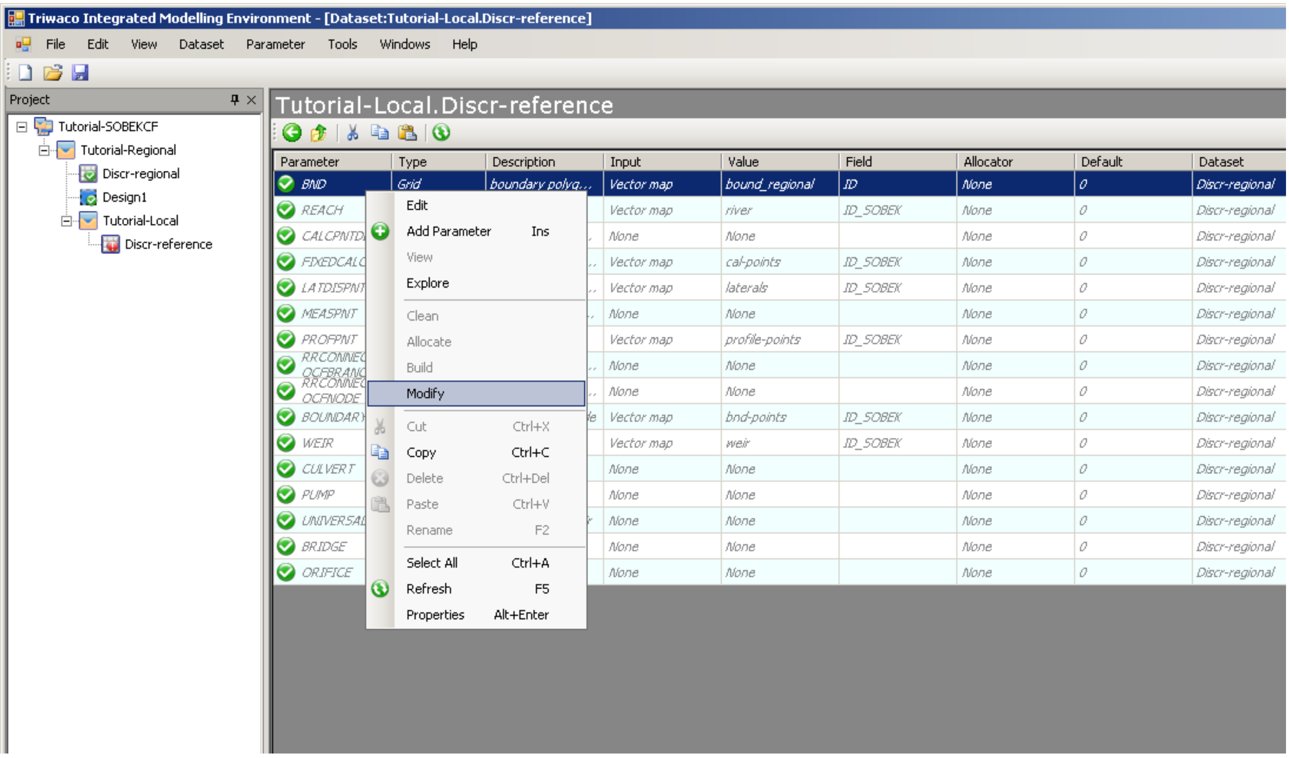
We want to make two changes in the local schematization in comparison to the Regional dataset, namely a different boundary and a difference in weir discretisation. Both these parameters are listed in the inherited tab so select them and open the context menu (right click). Select 'Modify' and check the parameter tab. These two parameters are now listed in the parameter tab and should be defined for the local discretisation.

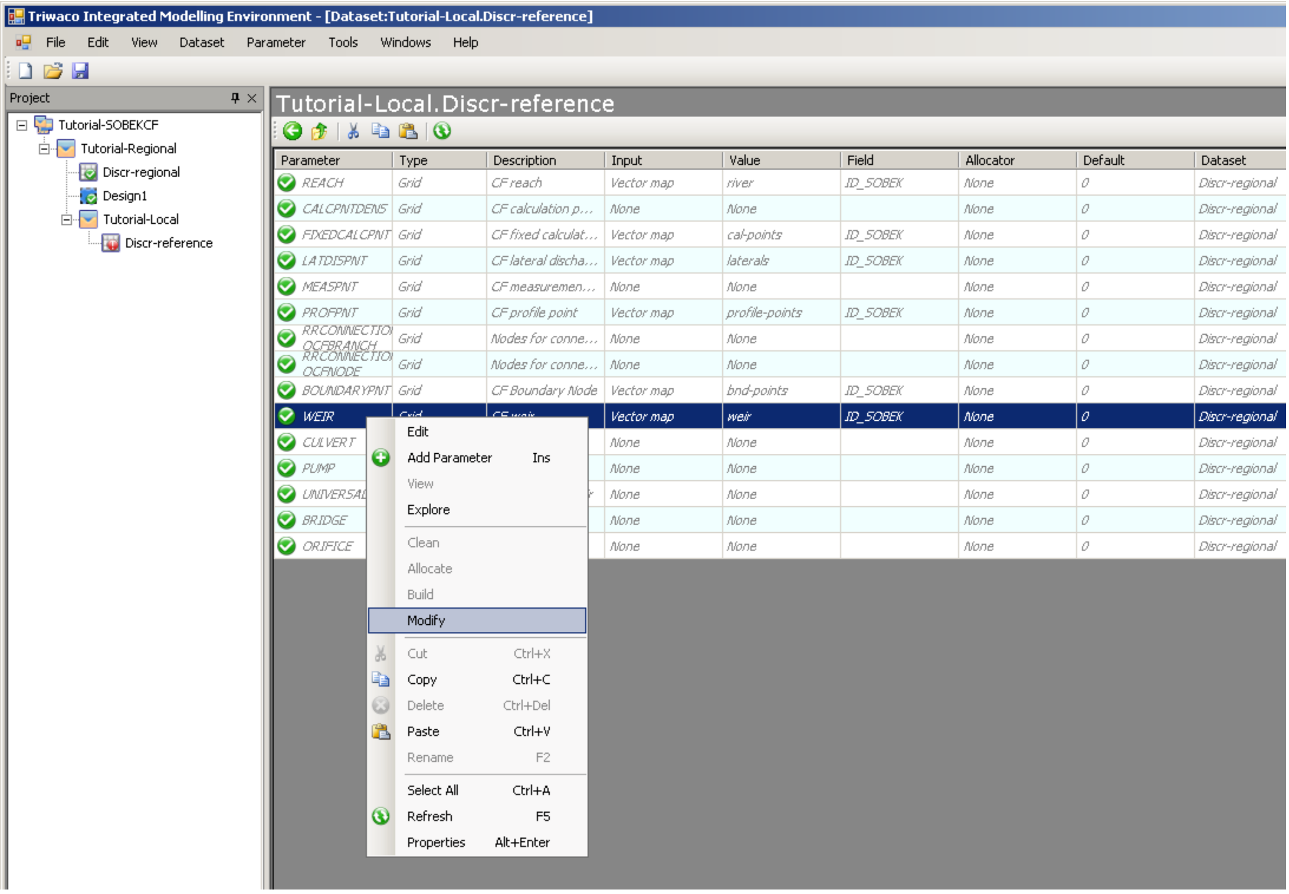

Triwaco Integrated Modelling Environment - [Model: Tutorial-Local]
File Edit View Model Dataset Tools Windows Help
Project
Tutorial-SOBEKCF
Tutorial-Regional
Discr-regional
Design1
Tutorial-Local
Tutorial-Local
Refresh
Dataset Type Description Model
Open
Add Dataset
Add Dataset
Properties Alt+Enter
New Dataset
New Dataset
Select type of dataset and enter a name
Installed Dataset Types
Design
Discretisation
Simulation
Scenario
Dataset name
Discr-reference
Location
D:\Projecten\9T1961_Triwaco2008\Tutorial\Tutorial-SOBEKCF\Tutorial-Local\Di:
< Back
Next >
Cancel
New Dataset
Associated Datasets
The following dataset are related
Parent Dataset
Tutorial-Regional.Discr-regional
Discretization Dataset
<none>
Tutorial-Regional.Discr-regional
Tutorial-Regional.Design1
Dataset is time dependent
Time discretisation is inherited from parent dataset
< Back
Next >
Cancel


Triwaco Integrated Modelling Environment - [Dataset:Tutorial-Local.Discr-reference]
File Edit View Dataset Parameter Tools Windows Help
Project
Tutorial-SOBEKCF
Tutorial-Regional
Discr-regional
Design1
Tutorial-Local
Discr-reference
Tutorial-Local.Discr-reference
Parameter Type Description Input Value Field Allocator Default Dataset
BND Grid boundary polyg... Vector map bound_regional ID None 0 Discr-regional
REACH Grid CF reach Vector map river ID_SOBEK None 0 Discr-regional
CALCPNTDENS Grid CF calculation p... None None None 0 Discr-regional
FIXEDCALCPNT Grid CF fixed calculat... Vector map cal-points ID_SOBEK None 0 Discr-regional
LATDISPNT Grid CF lateral discha... Vector map laterals ID_SOBEK None 0 Discr-regional
MEASPNT Grid CF measuremen... None None None 0 Discr-regional
PROFPNT Grid CF profile point Vector map profile-points ID_SOBEK None 0 Discr-regional
RRCONNECTIONOCFBRANCH Grid Nodes for conne... None None None 0 Discr-regional
RRCONNECTIONOCFNODE Grid Nodes for conne... None None None 0 Discr-regional
BOUNDARYPNT Grid CF Boundary Node Vector map bnd-points ID_SOBEK None 0 Discr-regional
WEIR Grid CF weir Vector map weir ID_SOBEK None 0 Discr-regional
CULVERT Grid CF culvert None None None 0 Discr-regional
PUMP Grid CF pump None None None 0 Discr-regional
UNIVERSALWEIR Grid CF Universal weir None None None 0 Discr-regional
BRIDGE Grid CF Bridge None None None 0 Discr-regional
ORIFICE Grid CF Orifice None None None 0 Discr-regional

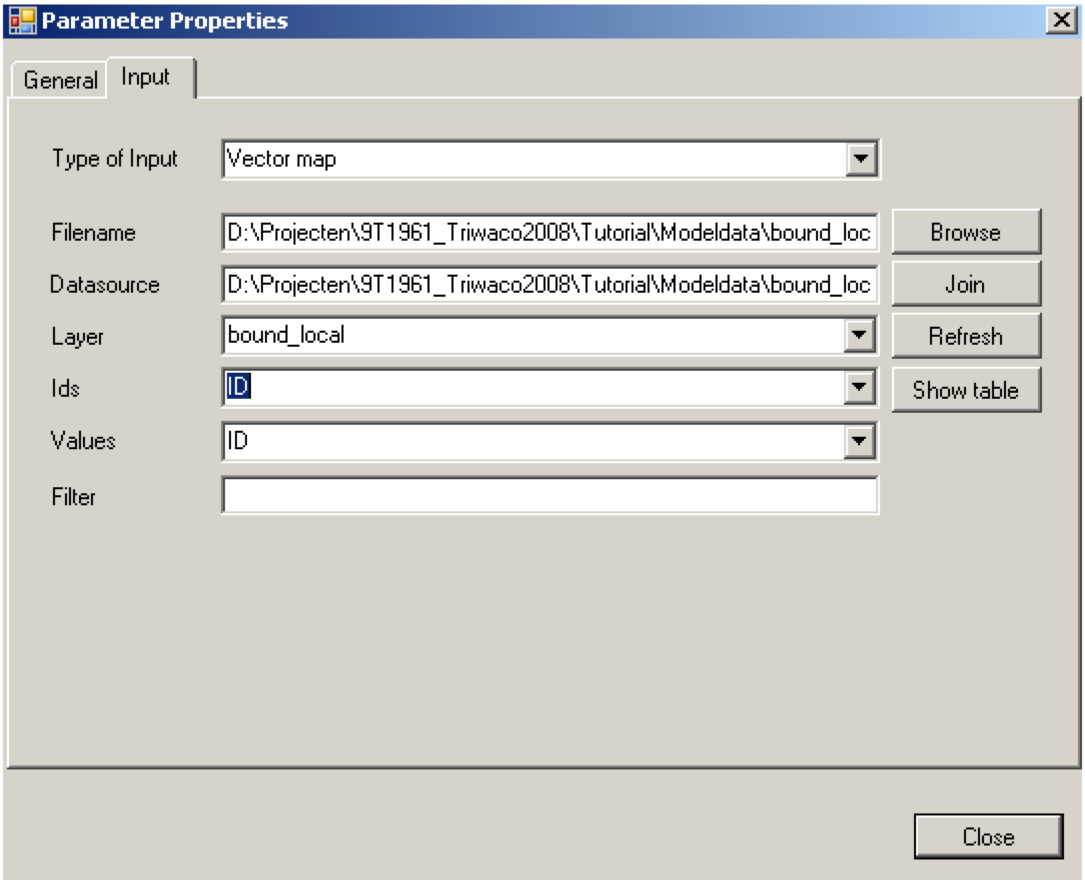

Inherited Parameters Grid


Inherited Parameters Grid

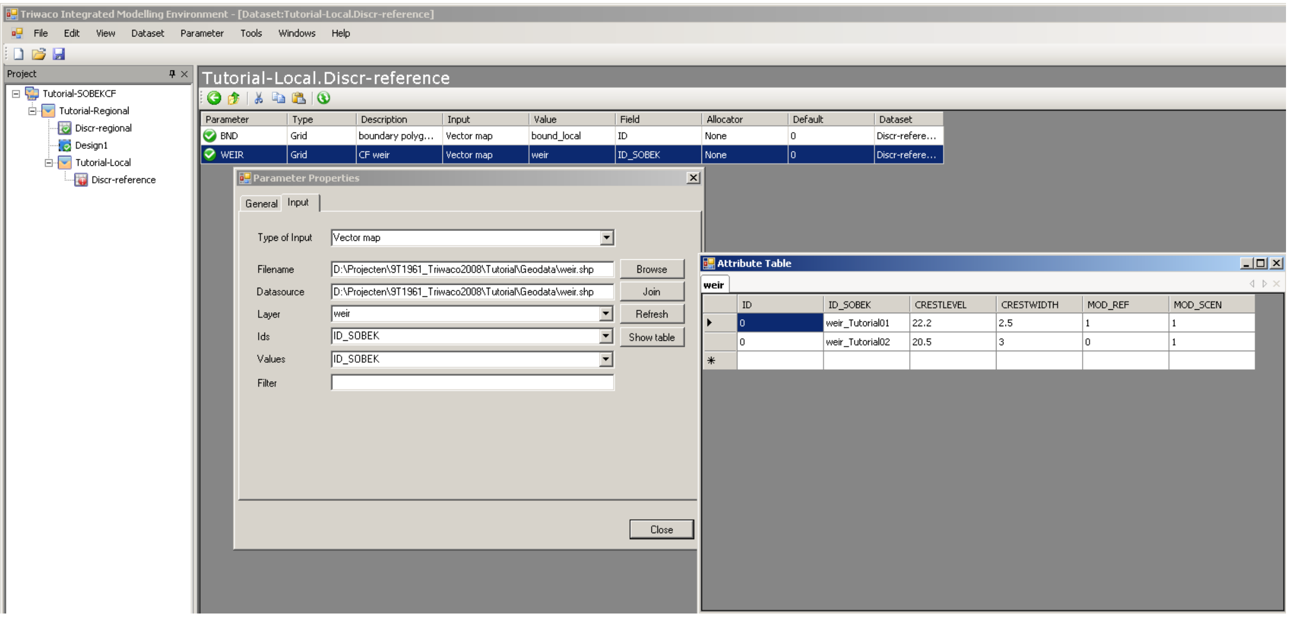

Triwaco Integrated Modelling Environment - [Dataset:Tutorial-Local.Discr-reference]
File Edit View Dataset Parameter Tools Windows Help
Project
Tutorial-SOBEKCF
Tutorial-Regional
Discr-regional
Design1
Tutorial-Local
Discr-reference
Tutorial-Local.Discr-reference
Parameter Type Description Input Value Field Allocator Default Dataset
Edit
Add Parameter Ins
View
Explore
Clean
Allocate
Build
Modify
Cut Ctrl+X
Copy Ctrl+C
Delete Ctrl+Del
Paste Ctrl+V
Rename F2
Select All Ctrl+A
Refresh F5
Properties Alt+Enter

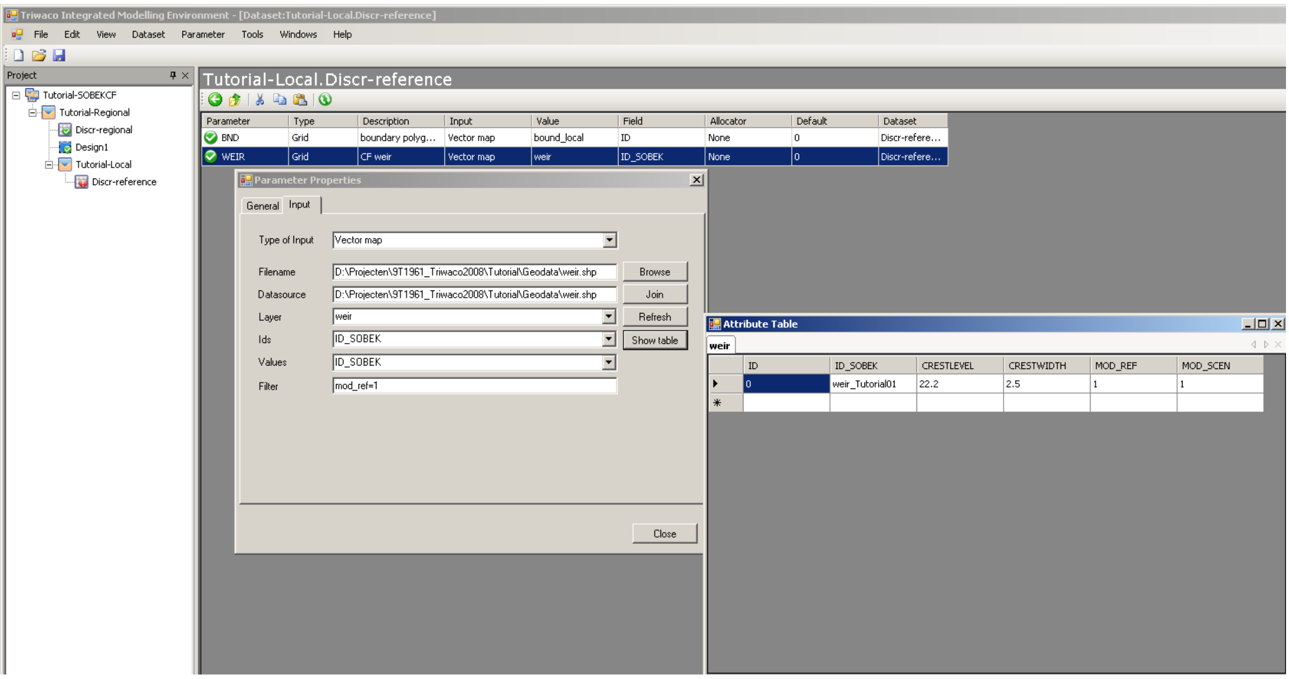


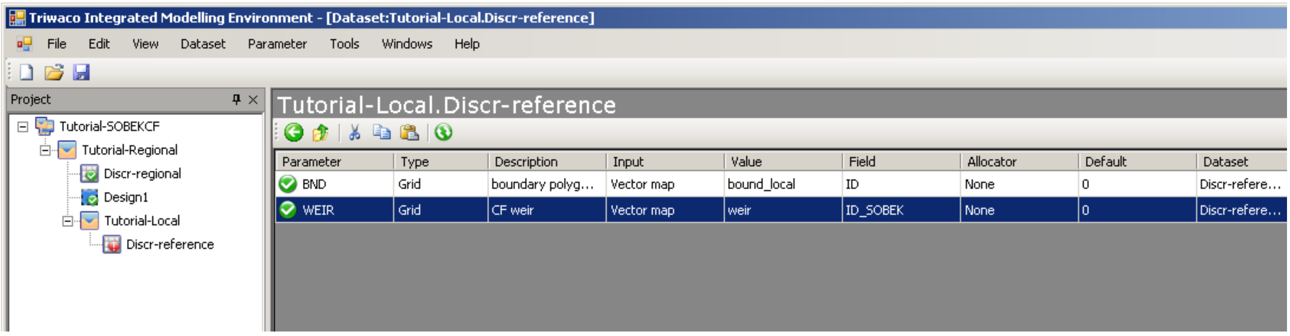
The boundary will be defined by a shape file bound_local.shp. This shape file is located in the directory XXX. Make sure the input screen is like the figure below.

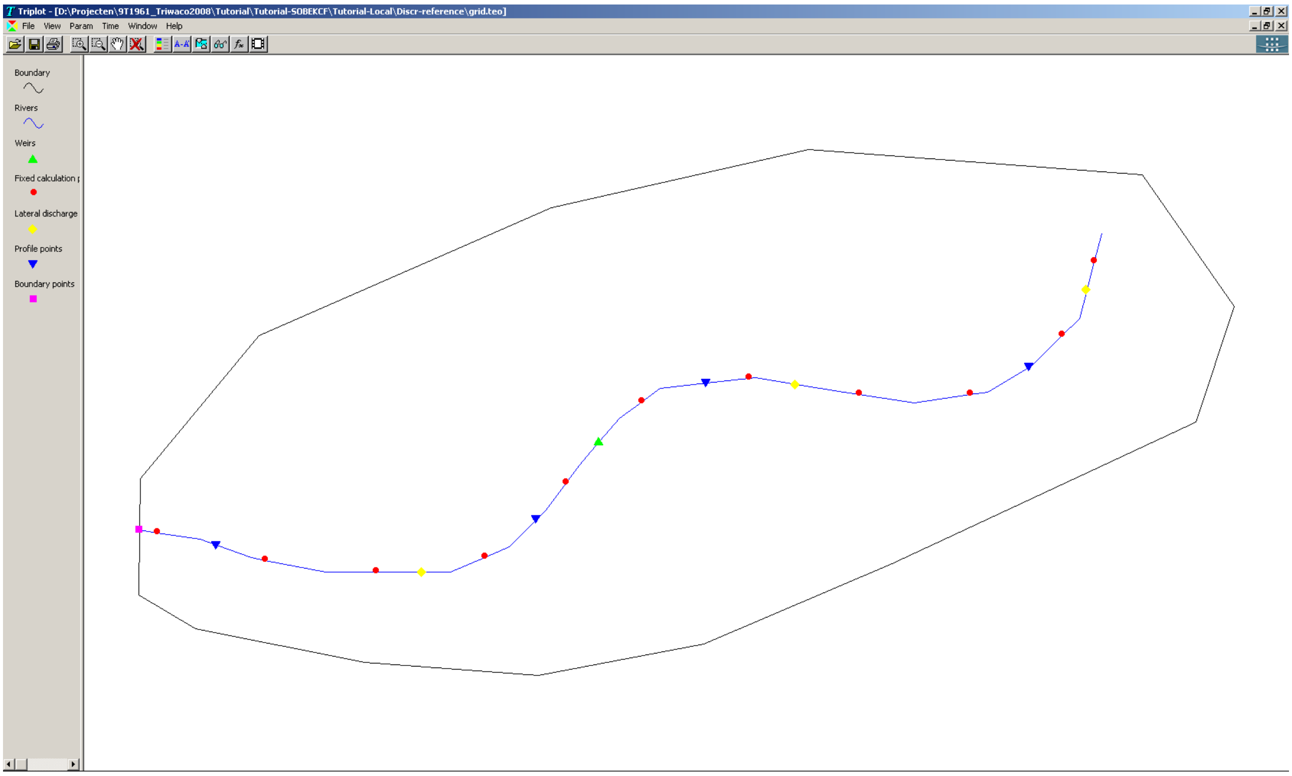


For the weirs we use the same shape-file (weir.shp) but use a filter to select which weir is to be added in the discretisation and which not. The filter is defined by two attributes in the shapefile, mod_ref and mod_scen. The filter is binair, a zero (0) means not added to the discretisation and a one (1) means it should be added to the discretisation. The filter are being used in the input screen of the weir discretisation parameter (see figure). In the field filter one must fill in an logical expression like mod_ref=1 or mod_scen=1. It depends on the expression used which weir is added to the model. The shape of the Tutorial has already a filter to seperate the refernec3e fromn the scenario situation. Normally the user have to add filters to the shape files. In fact, modelling is done in a GIS environment and not in the SOBEK interface. See the figures below how the use the filter of the weir in the Tutorial model.






Triwaco Integrated Modelling Environment - [Dataset:Tutorial-Local.Discr-reference]
File Edit View Dataset Parameter Tools Windows Help
Project
Tutorial-SOBEKCF
Tutorial-Regional
Discr-regional
Design1
Tutorial-Local
Discr-reference
Tutorial-Local.Discr-reference
Parameter Type Description Input Value Field Allocator Default Dataset
BND Grid boundary polyg... Vector map bound_local ID None 0 Discr-refere...
WEIR Grid CF weir Vector map weir ID_SOBEK None 0 Discr-refere...

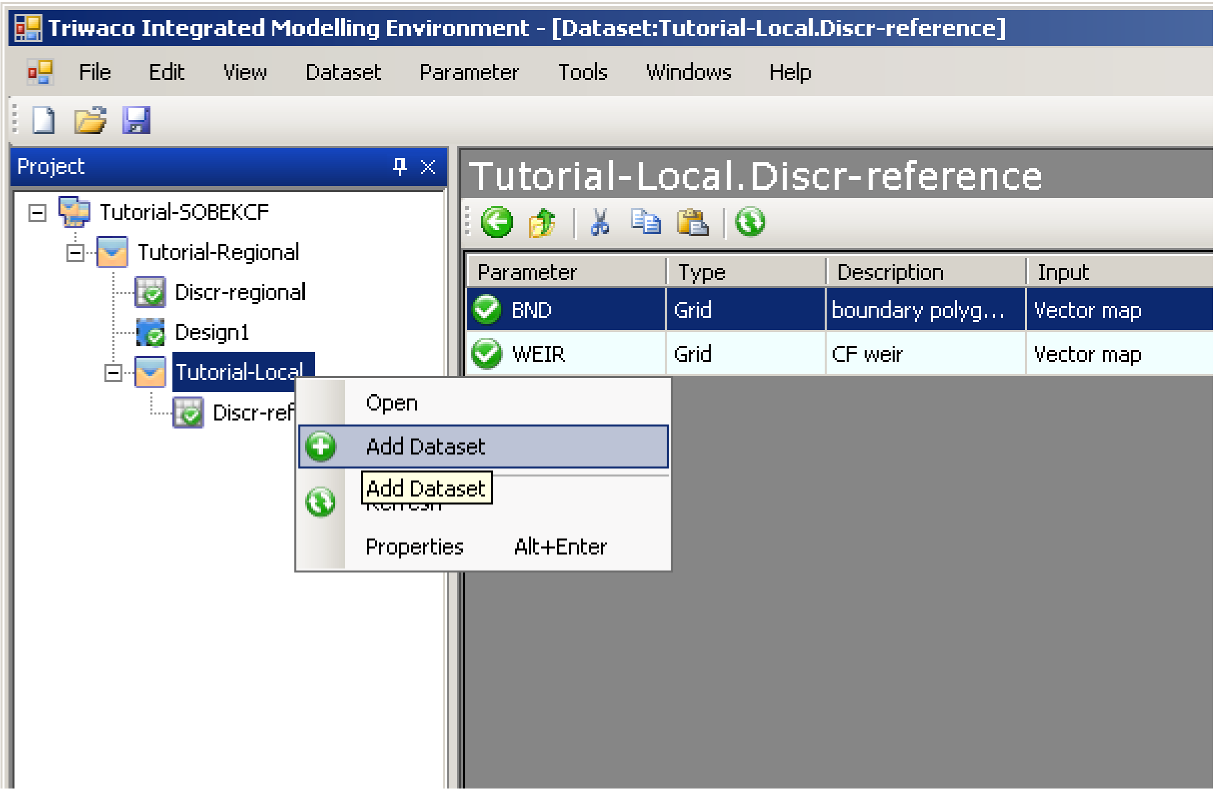

Triplot - [D:\Projecten\9T1961_Triwaco2008\Tutorial\Tutorial-SOBEKCF\Tutorial-Local\Discr-reference\grid.teo]
File View Param Time Window Help
Boundary
Rivers
Weirs
Fixed calculation p
Lateral discharge
Profile points
Boundary points

7.6 Setting up a simulation data set (reference situation)

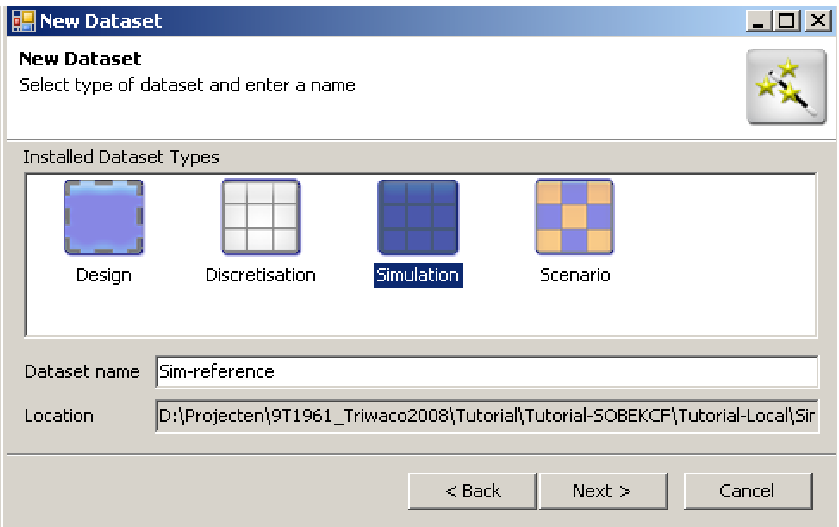
Up to now the parameter values are stored independently of the calculation grid in tables and maps. The advantage is that the grid can be changed without a change of the original input. The original input is linked (allocated) to the grid in a separate data set, the simulation dataset. This is done only for the conceptual model (design dataset).

7.6.1 Creating a simulation data set for the reference situation

Open the context menu for the sub model Tutorial-Local by right clicking on it in the project-tree and select 'Add Dataset'.



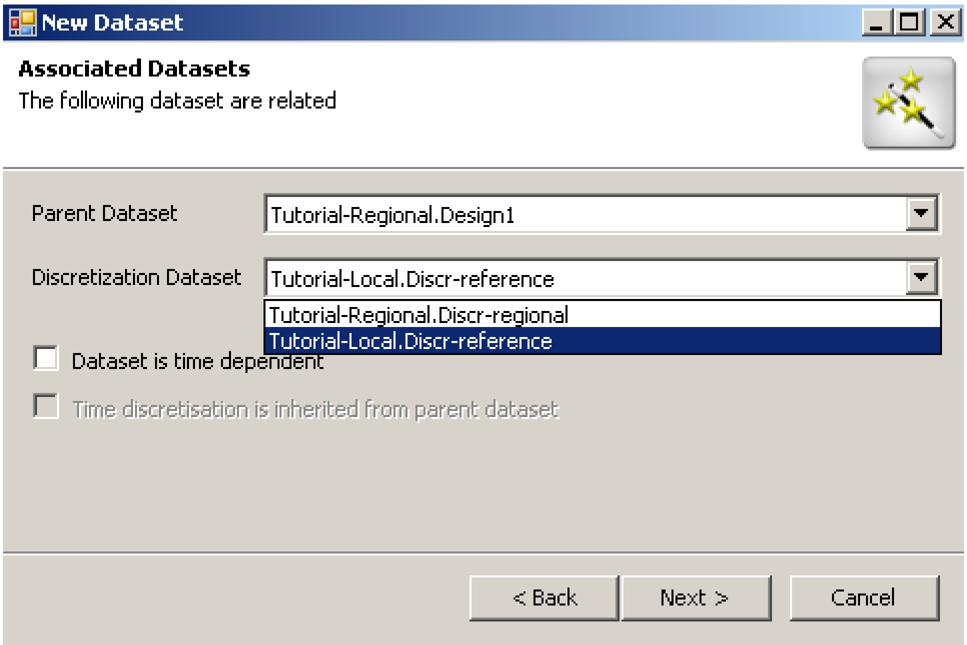
A pop up window will appear the same as when we created the discretisation data set. Again in the first window select next to continue. In the second window one can choose the type of dataset. Select 'Simulation' and change the name to 'Sim-reference' and select 'Next'.



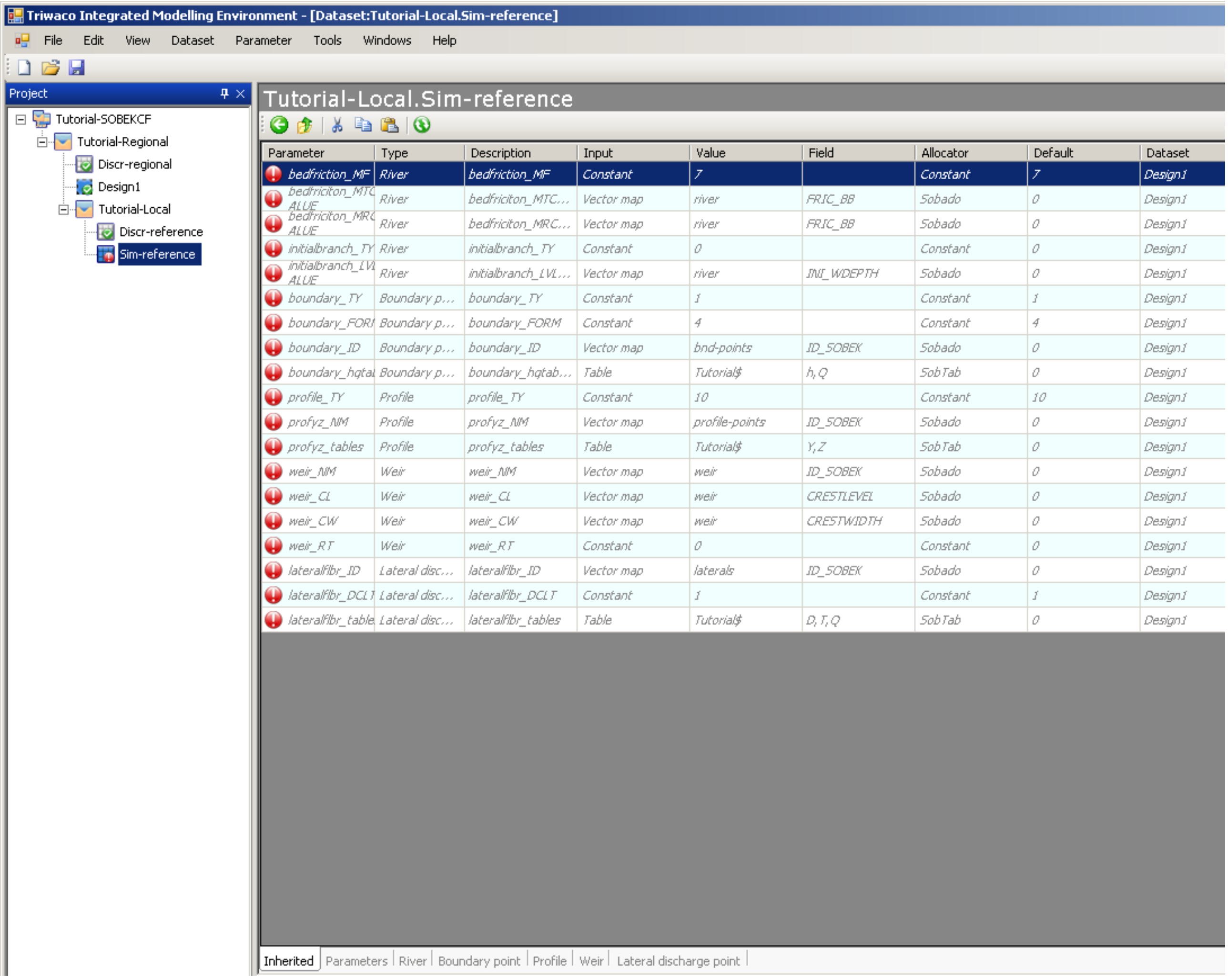
The Simulation set combines the conceptual model (Design dataset) with a calculation grid of the local schematization (Discretisation Local dataset) to create a local model (Simulation Local dataset) to run with the specified model code. In the following window that appears the conceptual model (Design dataset) is selected as the Parent dataset as well as the calculation grid of the reference discretisaton (Discr-reference dataset) as the Discretisation dataset. Note that this means you can easily create an alternative grid and create a new simulation dataset (thus a model) based upon the same conceptual model and visa versa.

- *Note that the datasets are defined as [Model name].[Dataset name], so here for the Parent Dataset Tutorial-Regional.Design1.*

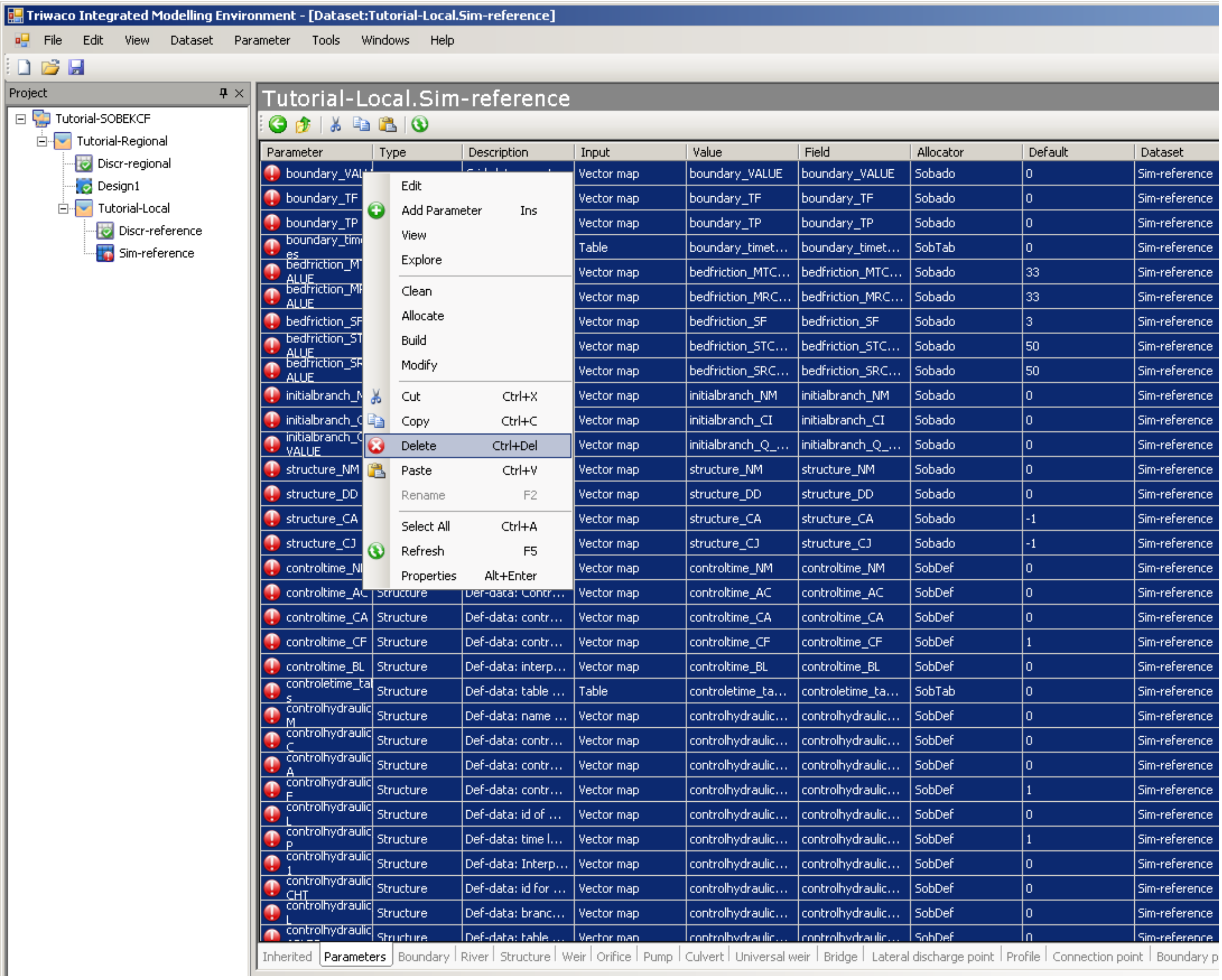
Select next and find yourself in the same properties window when defining the design dataset. Leave everything as it is. All information was inherited from the Design dataset. Select the 'Next' button and 'Finish' the dataset wizard.



You are now back in the list of datasets in the model Tutorial-Local. Note that the dataset Simulation has a red status indicator. Open the dataset **Sim-reference**. You will automatically will be directed in the Inherited tab. Since the parameters are shown in a a different font (italic) than what you have seen before. The reason for this is that it is immediately clear that you are dealing with inherited parameters. Also notice that all status indicators are red which means they either need to be updated or allocation is not carried out yet.



In the parameter tab new parameters have been added to the dataset. For the Tutorial model we do not need these new parameters, so select all and 'Delete' them.

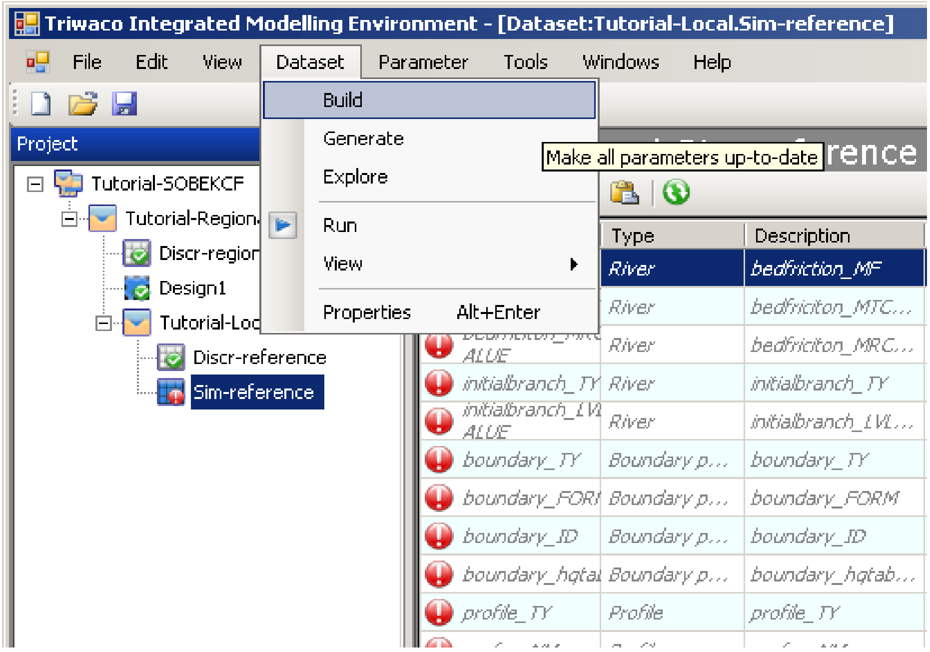


7.6.2 Allocating the entire dataset and making all parameters up-to-date (Build)

Since modelling is a process of entering data, calibration adapting and changing maps and parameters keeping track of all changes made is difficult. Triwaco already provides a lot of useful information via the status indicator and dependencies. However with a lot of data you want as quickly as possible allocate all necessary parameters to do another simulation. For this there is the option 'Build'. This option checks the status of all parameters in the dataset and allocates them if necessary. It will also check the dependencies of parameters and will in order of dependencies allocate them. So with one push of the button the entire dataset is up to date.

You may test this option even though all parameters at the moment are up to date. From the pull down menu 'Dataset' select 'Build'. The building process starts. In the Jobs pane you will see the progress. In the Output pane information is provided for each parameter. If one of the parameters fails the reason for this is given,so the appropriate action can be taken.

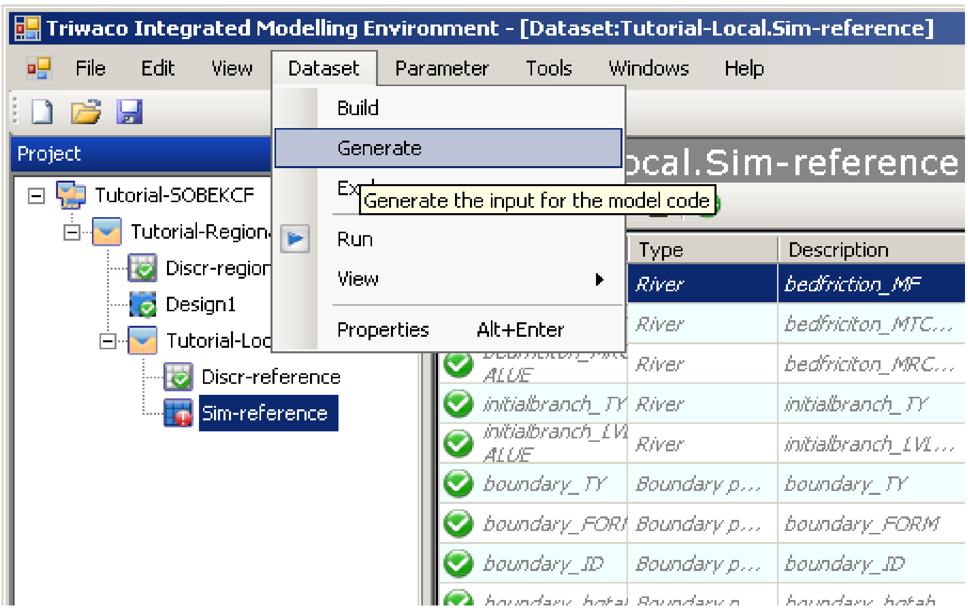
There is always a change of error in the model input files (.ado) even though the status indicator may be green. It is therefore recommended to check all the allocated data (adore files) before running a simulation. One can easily check the outcome of the allocation by looking at the summary of the parameter in Triwaco. Select the parameter and open the 'Properties Window'. You will now see that next to General and Input tab an additional tab is present, Output. Go to this tab to look at the allocated data.



Additionally it is important to check the model within the SOBEK interface with the tools 'Validate network' and 'Check Flow model'. This is possible when the SOBEK-files have been copied in the designated case (after executed 'Run' ; see paragraph XXX).

7.6.3 Generating the SOBEK-CF model-files (Generate)

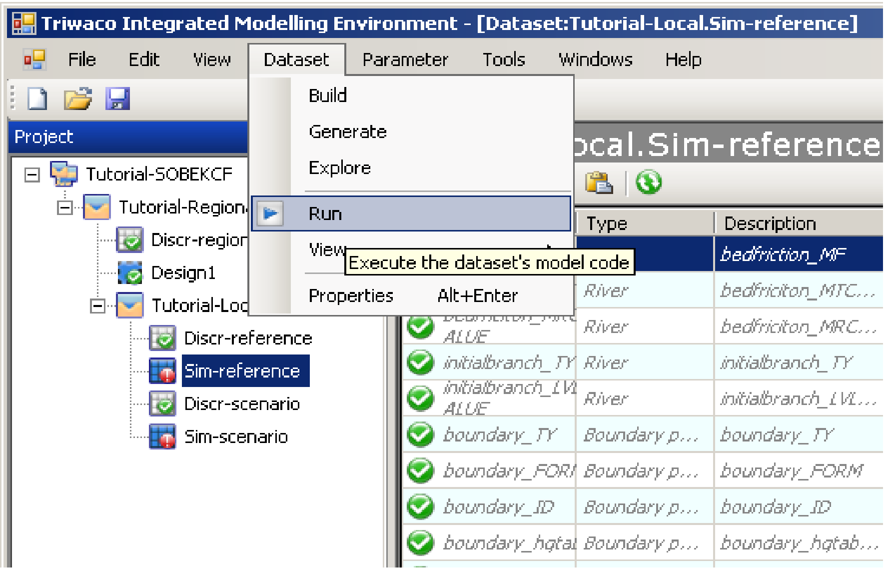
When all parameters are allocated to the calculation grid and checked, the model is ready for the first simulation run. The first thing that has to be done is to convert all parameters now in the standard Triwaco file format into modelinput files for the model code as well as creating other input files to run the simulation with the specified modelcode, in this case SOBEK-CF.

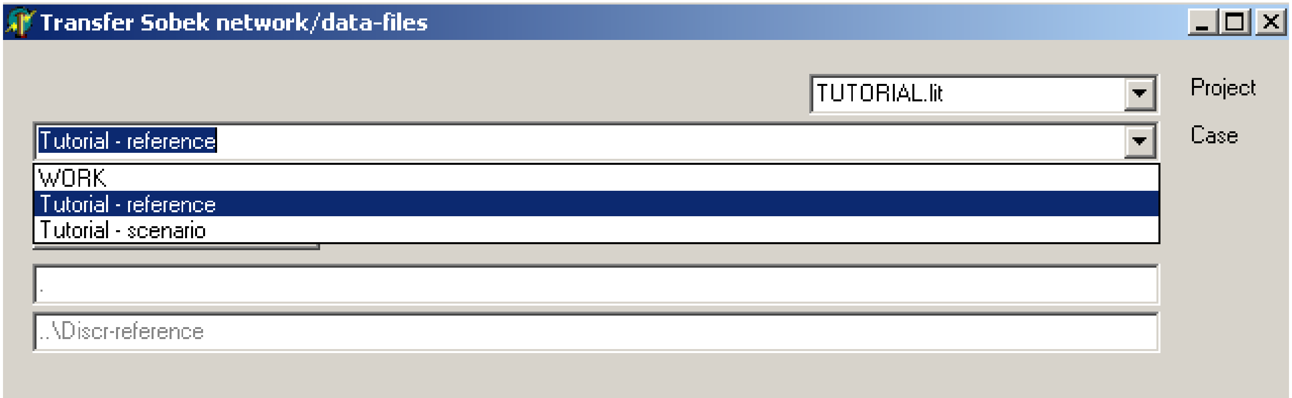


In the Simulation dataset select 'Dataset - Generate', which creates the input files for the SOBEK-CF model code, based on the parameters defined in the dataset.

7.6.4 Copy SOBEK-files for simulation (Run)

To start the simulation first the created SOBEK-files must be copied to the designated SOBEK project and case. This is done by selecting 'Dataset - Run'.





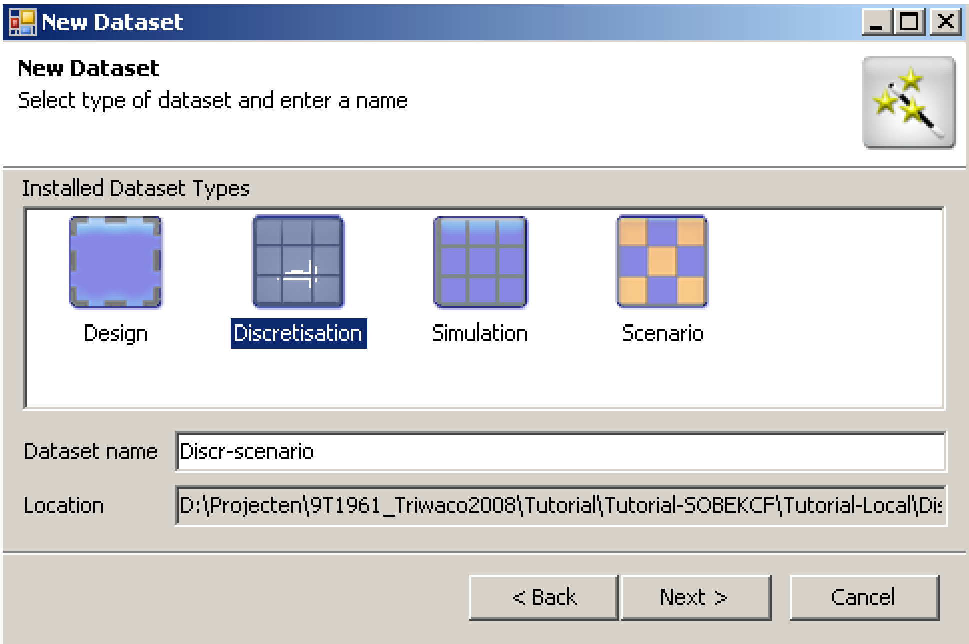
A pop up window is opened where one can choose the right SOBEK-project and SOBEK-case. Select the SOBEK-project TUTORIAL.lit and case Tutorial – reference. Notice that this SOBEK project should exist (as dummy-project, with dummy cases) on the C:\SOBEK directory. For this tutorial the SOBEK-project and cases have already been made, so you only have to copy it to the right SOBEK directory.

7.7 Setting up a Scenario (scenario situation)

In most cases a surface water model or any other model is used to predict consequences of changes made to the water system. These changes usually concern only a few model parameters. Scenario's in surface water model result often in a change in network and therefore a new discretisation must be set up. Consequently, when a new discretisation is set up, a new simulation dataset has to be defined. In TRIWACO it is not possible to define a scenario dataset without defining a simulation dataset first. Therefore in surface water modellering we choose to use a new discretisation dataset combined with a simulation dataset to define a scenario model. In this paragraph we show how to add a new weir to the schematisation.

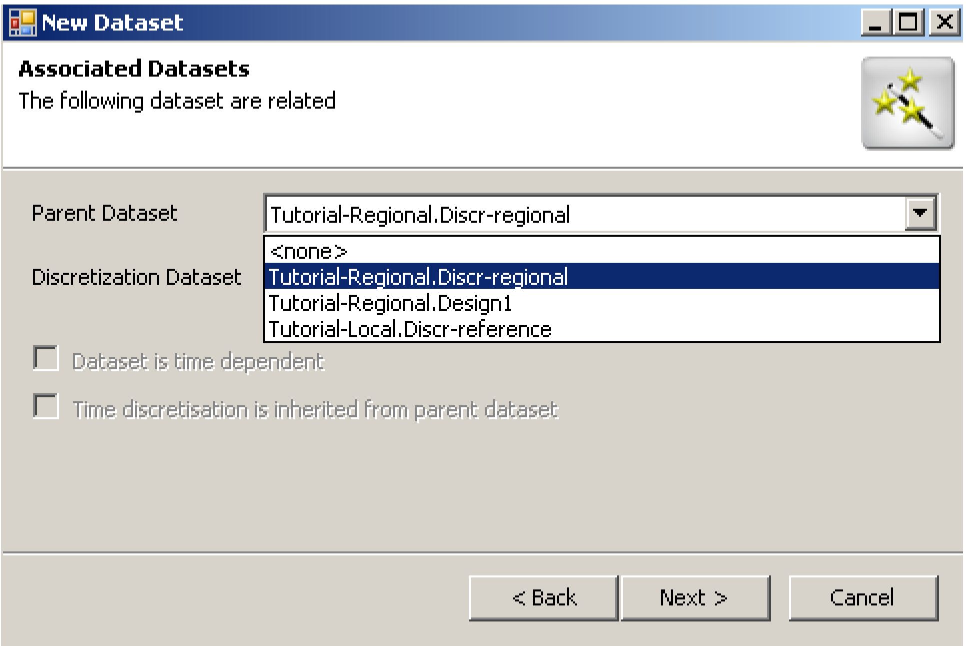
7.7.1 Creating a scenario dataset

Go back a higher level to the level of the model Tutorial-Local. This can be achieved by double clicking on it in the project tree or by opening the context menu of the model Tutorial-Local and selecting 'Open'.

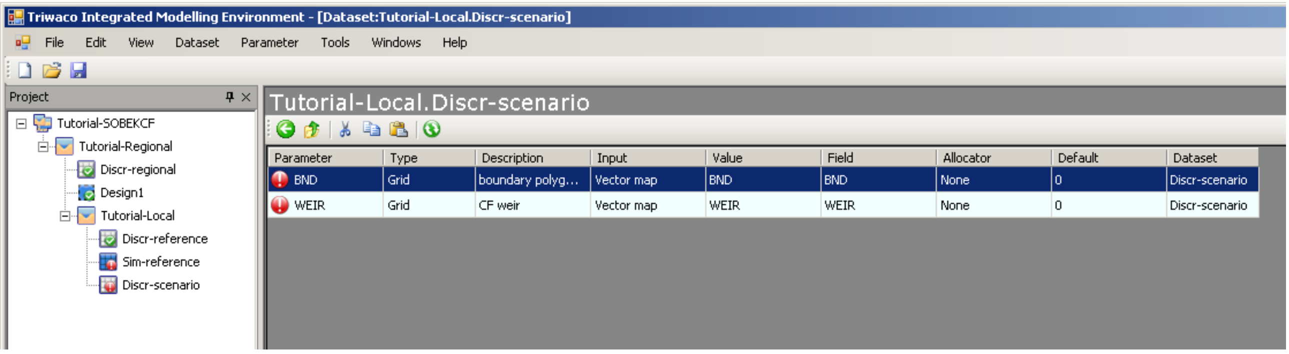


The new discretisation data set is created by: 'Dataset','Add Dataset'. A pop up window will appear the same as when we created the other datasets. Again in the first window select next to continue. In the second window one can choose the type of dataset. Select Discretisation and name it 'Discr-scenario' and select 'Next'.

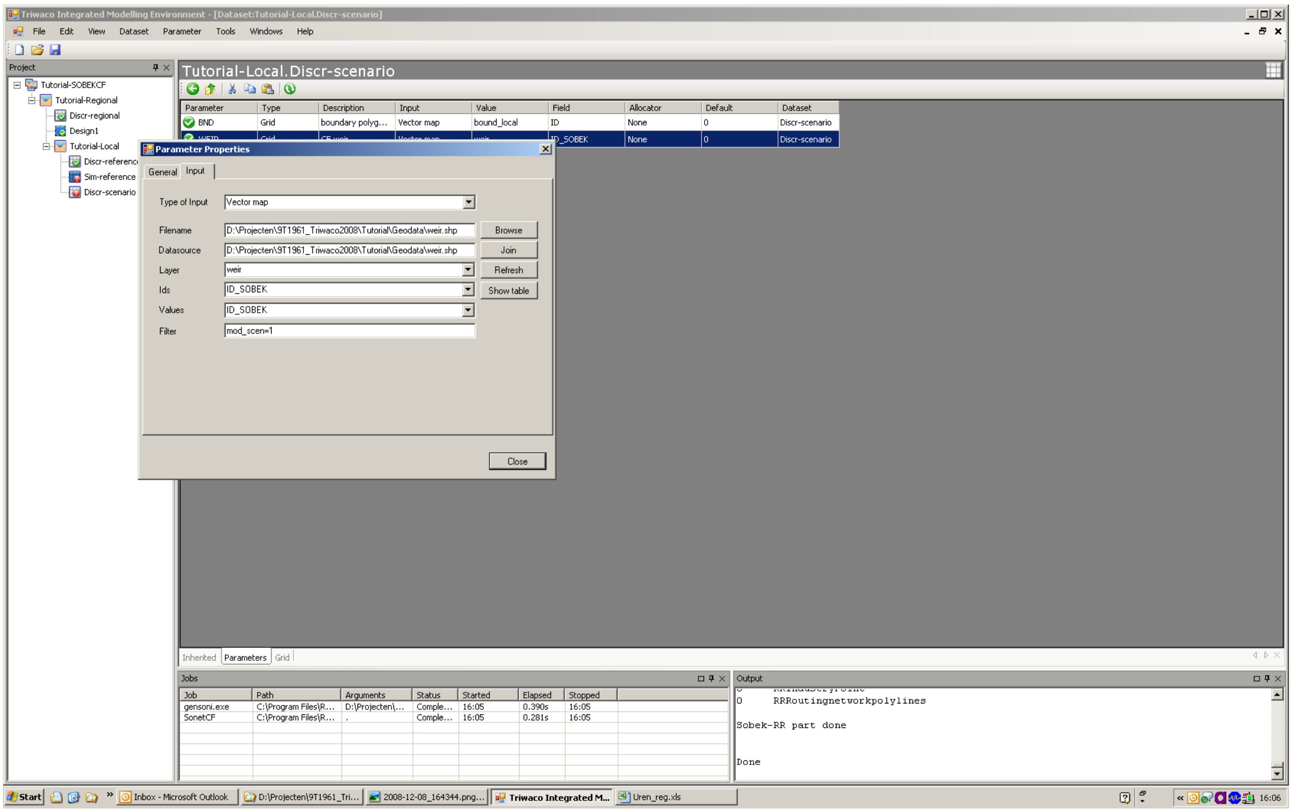
In the following window that appears select Tutorial-Regional.Discr-regional as the Parent dataset.



Select next and find yourself in the same properties window when defining the other discretisation datasets. Leave everything as it is. All information was inherited from the Simulation dataset. Select next and finish.



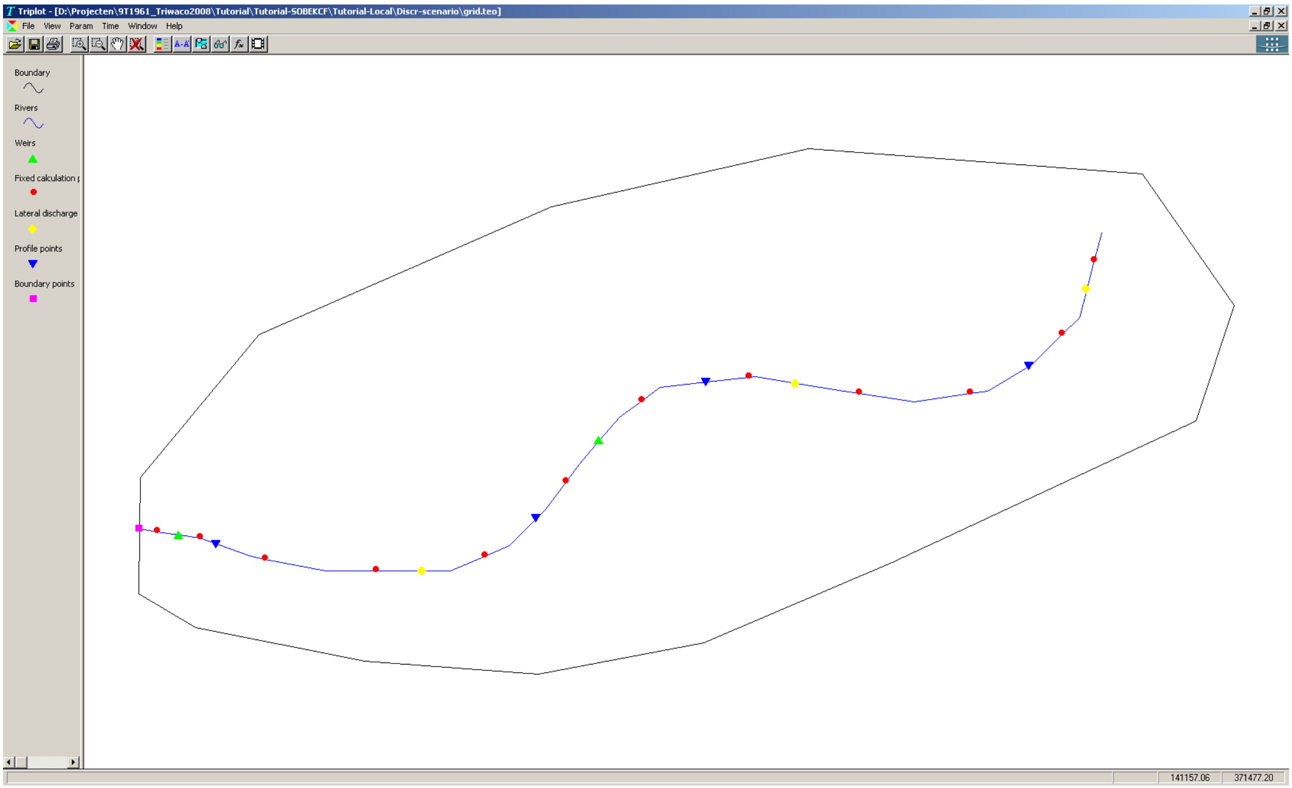
Two parameters in the discretisation dataset have to be modified. The boundary has to be defined on a local scale and the weirs need to be filtered for the scenario discretisation as we have seen in chapter XXX.

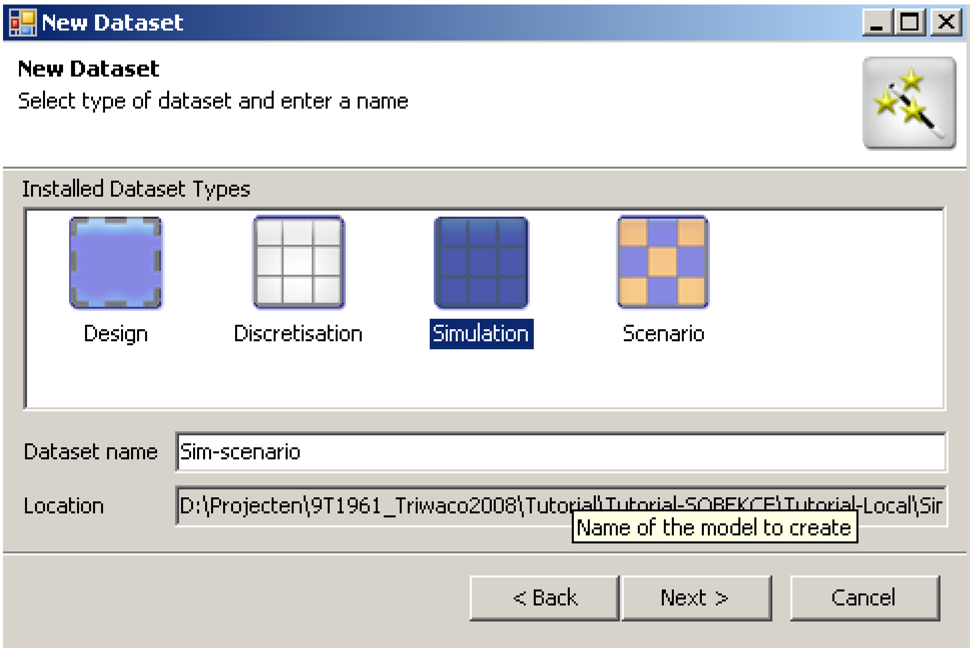


7.7.2 The discretisation of the scenario model

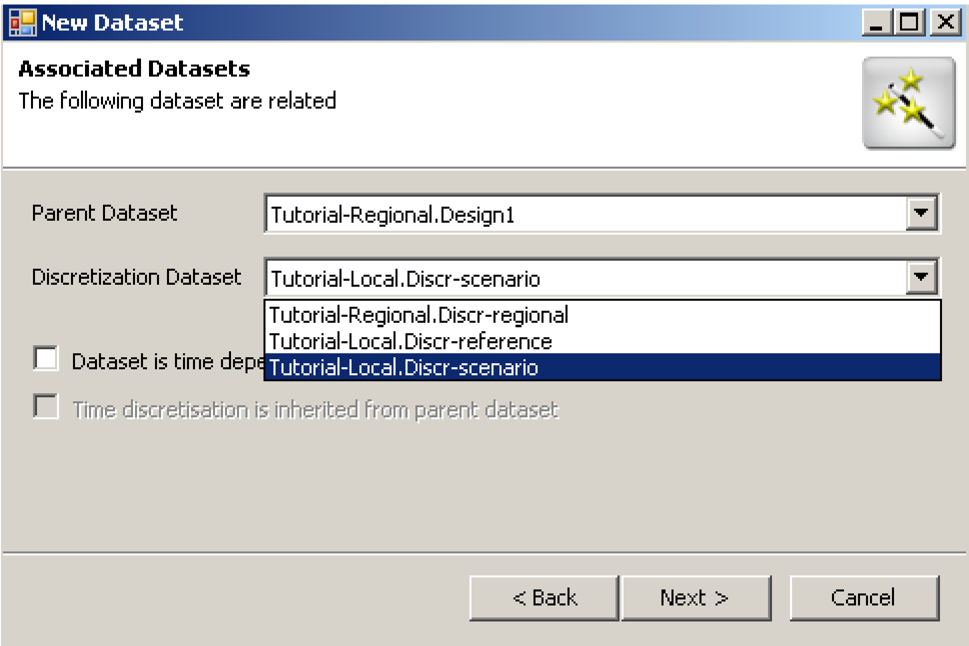
Build' and 'Generate' the network and look at the the result ('Dataset' – View-output). Notice that a new weir has been added to the network. Now we will create a new simulation dataset. It is not neccesary to create a design dataset, because we can inherit all parameter definitions from the Regional design dataset. So, add a new dataset to the project-tree. Choose a simulation dataset and name it 'Sim-scenario'.

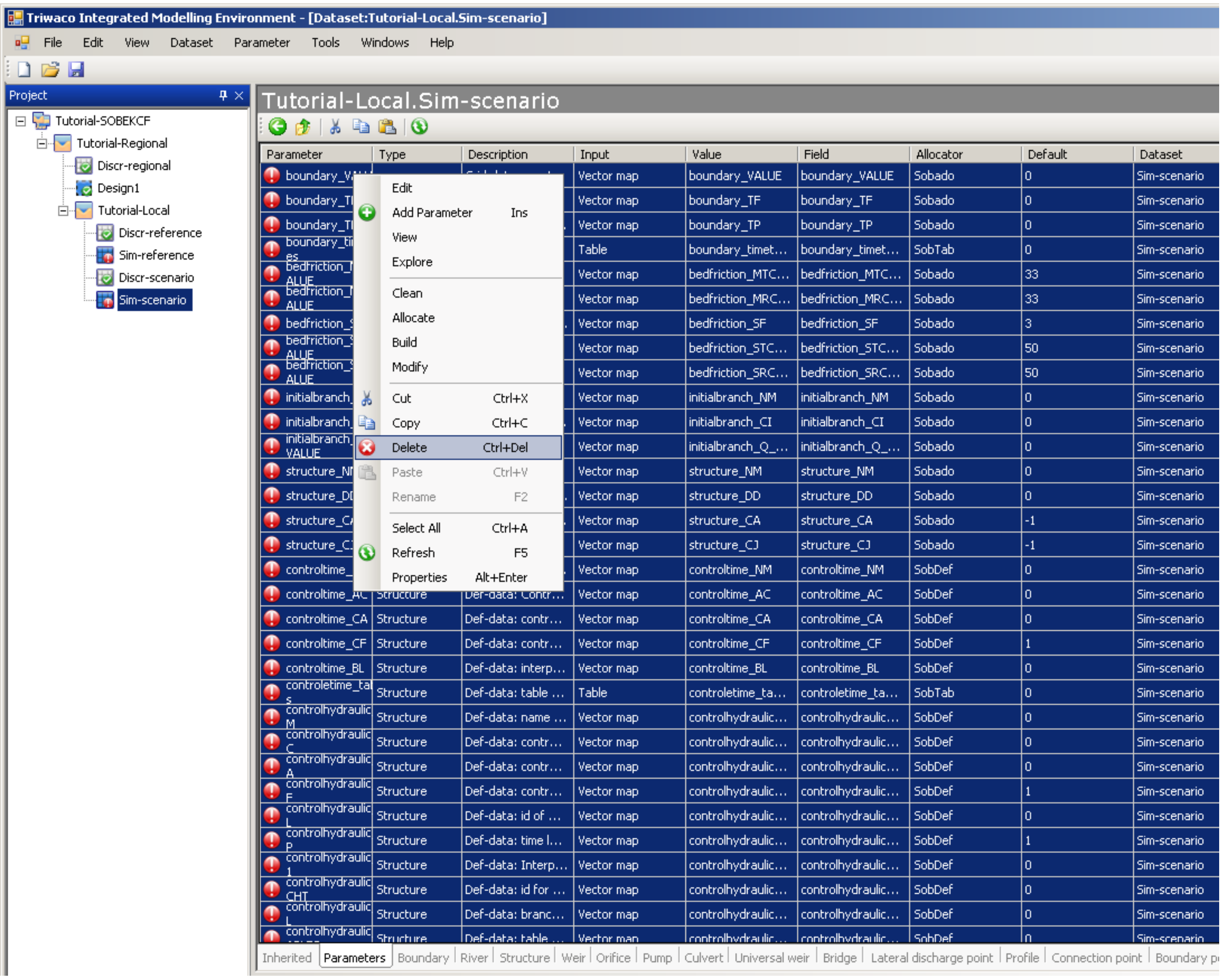
'

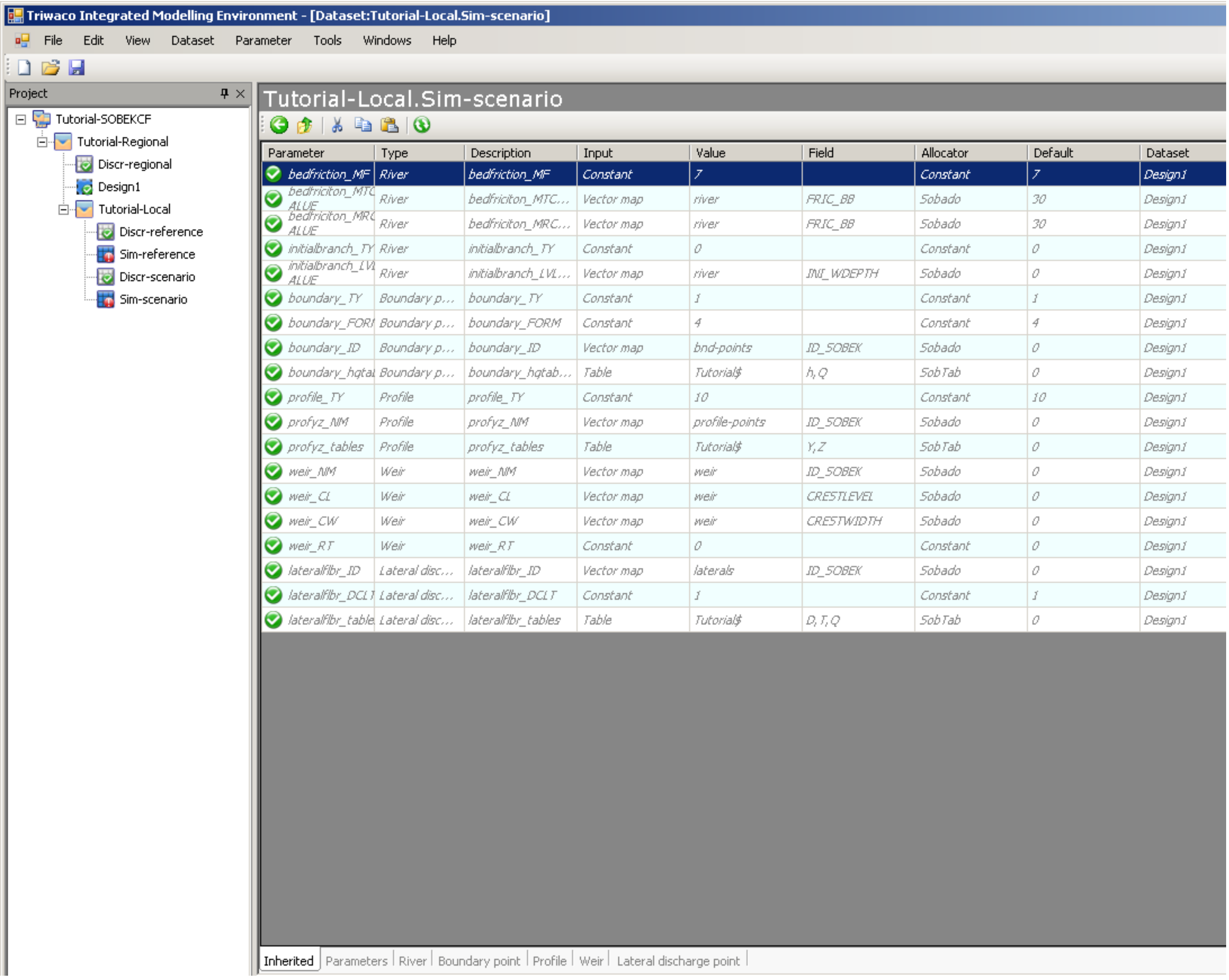




Select the 'Tutorial-Regional.Design1' as the Parent dataset and the 'Tutoral-Local.Discr-scenario' for the desired scenario network. Select 'Next' a couple of times and the scenario simulation dataset will be added to the project-tree. Open the parameter window by double clicking it in the project tree. The necessary parameters have been inherited from the design dataset (tab inherited) and again a large number of additional parameters have been added to the dataset (tab parameter). These additional parameters should be deleted.


New Dataset
Associated Datasets
The following dataset are related
Parent Dataset
Tutorial-Regional.Design1
Discretization Dataset
Tutorial-Local.Discr-scenario
Tutorial-Regional.Discr-regional
Tutorial-Local.Discr-reference
Tutorial-Local.Discr-scenario
Dataset is time depe
Time discretisation is inherited from parent dataset
< Back
Next >
Cancel


Triwaco Integrated Modelling Environment - [Dataset:Tutorial-Local.Sim-scenario]
File Edit View Dataset Parameter Tools Windows Help
Project
Tutorial-SOBEKCF
Tutorial-Regional
Discr-regional
Design1
Tutorial-Local
Discr-reference
Sim-reference
Discr-scenario
Sim-scenario
Tutorial-Local.Sim-scenario
Parameter Type Description Input Value Field Allocator Default Dataset
Edit
Add Parameter Ins
View
Explore
Clean
Allocate
Build
Modify
Cut Ctrl+X
Copy Ctrl+C
Delete Ctrl+Del
Paste Ctrl+V
Rename F2
Select All Ctrl+A
Refresh F5
Properties Alt+Enter
Inherited Parameters Boundary River Structure Weir Orifice Pump Culvert Universal weir Bridge Lateral discharge point Profile Connection point



All parameters are ready because they have already been defined in the design dataset. Build and generate the simulation dataset and the model is ready to run. To run the simulation choose 'Dataset','Run'. A simulation window is opened showing the link to the SOBEK-model. Make sure that the SOBEK-model is already on your hard disk. The SOBEK-model need to be ready up until 'schematisaion' (its colour should be yellow). Select the right case 'Tutorial – scenario' and choose 'Run'. All files are being copied to the SOBEK case and now you can open the model with the SOBEK interface and run the simulation.