![MIKE Powered by DHI]

MIKE Zero

The Common DHI User Interface for
Project Oriented Water Modelling

User Guide

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CONTENTS

1 Preface

1.1 Introduction

MIKE Zero is the common name of DHI's fully Windows integrated graphical user interface for setting up simulations, pre- and post-processing analysis, presentation and visualisation within a project oriented environment. Presently, the MIKE Zero framework gives access to the following DHI modelling systems:

- MIKE HYDRO - A physical and conceptual model system for catchments, rivers and floodplains
- MIKE 11 - a 1D modelling system for rivers and channels
- MIKE 21 - a 2D modelling system for estuaries, coastal water and seas
- MIKE 3 - a 3D modelling system for deep seas, estuaries and coastal waters
- MIKE 21/3 Integrated Models[1]
- MIKE FLOOD - a 1D-2D modelling system for inland flood and urban flood studies
- LITPACK - a modelling system for littoral processes and coastline kinetics
- MIKE SHE - a modelling system for coupled groundwater and surface water resources

1.2 About this Document

This document provides a quick guide to getting started with the MIKE Zero framework with emphasis on the basic features and functionalities of the Project View and concept of Version Control. The User Guides, Online Help and Scientific Documentation covering the above-mentioned modelling systems and tools complement the present document with a number of application examples - from simple test examples to advanced and complex problem applications. Additionally, the mentioned documents include essential information on the conceptual and algorithmic implementation of the main physical processes treated in the modelling systems as well as descriptions of applied modelling techniques.

All documents are available as PDF files (Acrobat Reader) from the MIKE Zero Documentation Index.

We recommend that you read the present document before passing on to the modelling system specific User Guides and documentation.

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1 - including the MIKE 21/3 Coupled Model FM, which allows full dynamic coupling between wave, flow and sediment transport models

2 Before You Begin

2.1 Product Support

If you have questions concerning MIKE Zero or problems with the MIKE Zero Setup Editors, please consult the present document or the Online Help System.

You may also have a look at the MIKE Powered by DHI home page at

   http://www.mikepoweredbydhi.com

At the MIKE website you can also subscribe/unsubscribe to *The Network* newsletter for our community for DHI software users. Please also visit our DHI software FAQ at

   http://faq.dhigroup.com

This site may have the answers to your questions regarding MIKE modelling.

If you cannot find the answers to your queries, please contact your local agent. In countries where no local agent is present you may contact DHI directly, by mail, phone, fax or e-mail:

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Fax:	+45 4516 9292
E-mail:	mike@dhigroup.com
Web:	www.mikepoweredbydhi.com

If you wish to upgrade or purchase additional modules for an existing installation, please contact your local agent or DHI.

The most efficient way of communicating is by e-mail, which allows us to optimise our services to our clients. Under normal circumstances, all e-mail queries received at DHI will be answered within 24 hours.

When contacting your local agent or DHI, please make sure that you have the following information at hand:

- the version number of your MIKE Zero installation and any possible service pack

- the exact wording of any message that appears on the screen (in case of software problems)

- preferably, also submit the log file (if any) produced by the task

- a description of what happened and what you were trying to do when the problem occurred

- a description of how (if at all) you tried to solve the problem

- the type of hardware you are using

2.2   DHI Training Course

DHI software is often used to solve complex and complicated problems, which require a good perception of modelling techniques and the capabilities of the software.

Therefore DHI provides training courses in the use of its products. A list of standard courses is offered to our clients, ranging from introduction courses to courses for more advanced users. The courses are advertised via DHI Software News and our website on the Internet. Upon request, tailor-made training courses to fit your specific needs can also be arranged.

If you have any questions regarding DHI training courses, please do not hesitate to contact us.

For further information please visit our website

http://www.theacademybydhi.com

2.3   Comments and Suggestions

Success in perception of the information presented in this document together with the user's general knowledge of hydraulics and experience in numerical modelling is essential for getting a maximum benefit from the MIKE Zero products. This implies that the quality of the documentation, in terms of presentation style, completeness and scientific competence, constitutes an important aspect of the software product quality.

DHI would therefore appreciate any suggestions in that respect, hoping that future editions will contribute to the improved overall quality of MIKE Zero products. Please give your contribution by e-mail, fax or letter.

3 Getting Started

The hardware requirements and installation process for MIKE Zero are described in the Release Note.

PLEASE NOTE:
Multiple versions of MIKE Zero Setup Editors or other MIKE Zero products, including components from different versions of these, installed on a single PC may not work as expected and are not supported.

3.1 How to Install MIKE Zero Examples

MIKE Zero includes a large number of examples demonstrating how to use the various modules. These are initially placed in the Program Files directory. The examples can be installed from either the MIKE Zero file menu (File -> Options -> Install Examples) or the MIKE Zero start page (see Figure 3.1).
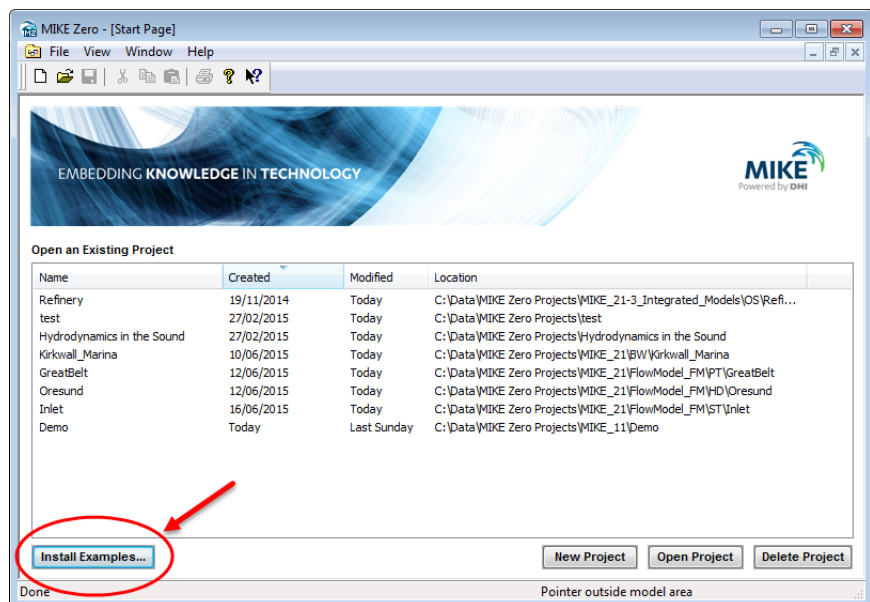
Figure 3.1   Installing examples from the Start Page

The 'Install Examples' dialog will give you the option to select which examples to install, and where to put them, see Figure 3.2. Per default the examples are installed in the folder:

'My Documents\MIKE Zero Projects'
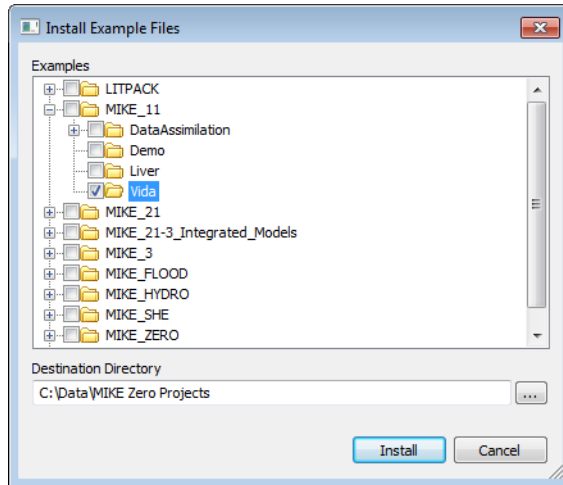
Figure 3.2   Selecting which examples to install

3.2   How to Start MIKE Zero and MIKE Zero Setup Editors

The MIKE Zero Graphical User Interface (GUI) can either be started from the start menu or by clicking 'MZShell.exe' in the basic directory of the installation.

This will open the general MIKE Zero shell, see Figure 3.3, where you can select to create a new or open an existing MIKE 21 model setup.
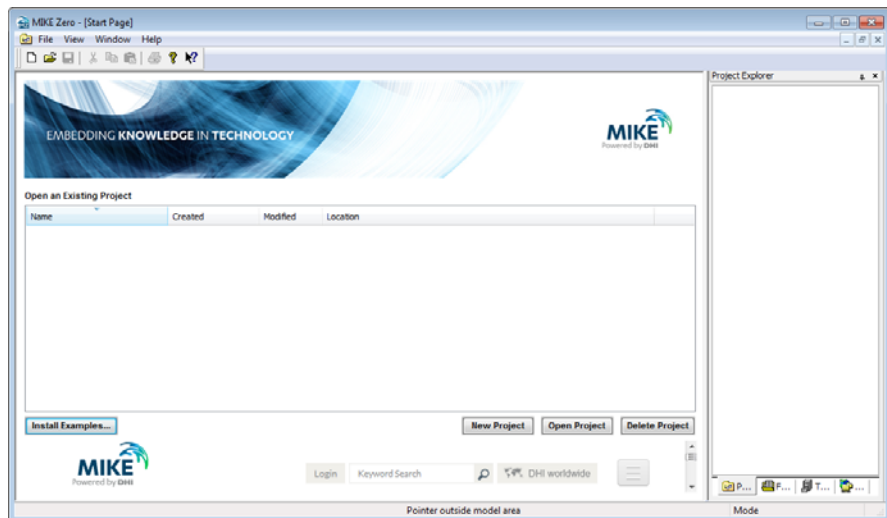
Figure 3.3   The MIKE Zero shell

MIKE Zero contains the basic utilities of the File, View, Window and Help menu in the main menu.

The MIKE Zero shell will contain the windows for the MIKE Zero GUIs such as the Project Explorer, plot files and various setup editors. MIKE Zero also contains the basic abilities of creating and opening files. An overview of the different tasks (i.e. tools, utilities, computational modules), which can be performed from the MIKE Zero installation, can be found by selecting File → New → File from the main menu, see Figure 3.4.
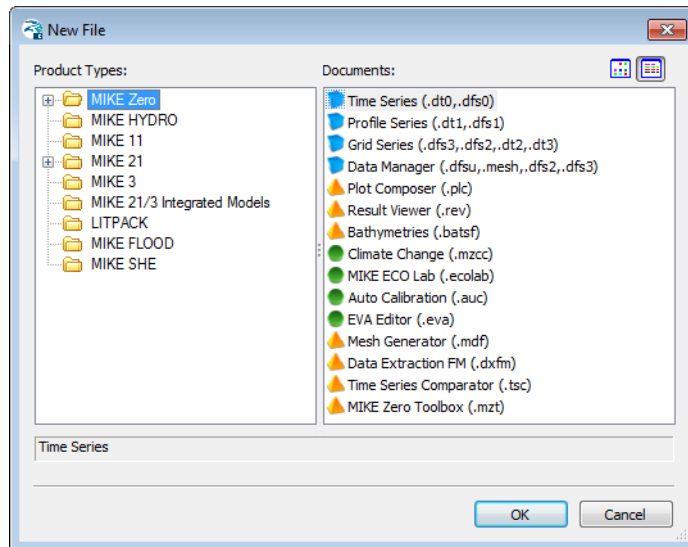
Figure 3.4   Creating new file within MIKE Zero

Creating and opening files are undertaken in the basic MIKE Zero shell, but in general all files should be related to a MIKE Zero Project in order to obtain the full benefit from the facilities connected to the MIKE Zero Project Framework,

Starting MIKE Zero without a DHI configured Software Key and a valid license file causes the program to run in Demo mode. If this happens, a message box will inform you during program initialisation. Running in Demo mode, MIKE Zero supplies full access to all editors, input files and editing facilities. However, some restrictions apply to which setups that can actually be executed as a model simulation.

4   Working with MIKE Zero

4.1   Basic Functions

Only buttons specific to the selected item in the main MIKE Zero window shell is activated on the MIKE Zero Toolbars. For example, if you select a .dfs0 file, a set of buttons is added to the toolbar. However, if you select a .log file, only the Standard toolbar is displayed. Because the active file determines the toolbar icons, the description below is a partial representation of those you might encounter while working in MIKE Zero.

Table 4.1   Example of toolbar icons

🗋	New file
📂	Open file
💾	Save file
✂	Cut
📋	Copy
📋	Paste
🖨	Print
🔍 🔍 ⬅ ➡	You can Zoom-in, Zoom-out and go to Previous-zoom and Next-zoom. You can recall all available previous and next zooms. If the buttons are greyed out, there are no previous or next zooms available. These functions are also available to you by right-clicking the pointer device.
✋	Click to pan the graphics to a new location or use the mouse wheel to zoom in or out.
▦	Switch to turn grid on and off.

4.1.1   Toolbars

From the View drop-down menu, you may select which toolbars should be displayed. Given the type of files opened in the shell, you can select from a variety of toolbars.

4.1.2   Shortcut Keys

MIKE Zero contains two types of shortcut keys.

● Generic shortcut keys

- Graphical shortcut keys

Generic shortcut keys

The Generic shortcut keys are always available and relates to the creation, opening and saving of projects and files.

Table 4.2

Shortcut key	Description
Ctrl+Shift+N	Create new project
Ctrl+N	Create new file
Ctrl+Shift+O	Open existing project
Ctrl+O	Open existing file
Ctrl+S	Save file
Ctrl+Shift+S	Save all
Ctrl+P	Print

Graphical shortcut keys

The Graphical shortcut keys can be used in any of the generic editors and tools.

Table 4.3

Shortcut key	Description
Shift+Left mouse click and drag	Panning in graphics
Shift+Mouse wheel up	Zoom in keeping the relative mouse position
Shift+Mouse wheel down	Zoom out keeping the relative mouse position

4.2 Setup Editors

The setup editors are used for making input data for simulations and analyses. A MIKE Zero setup editor consists of 4 basic elements (see Figure 4.1).

The 'Tree View' is used for navigating through the input data. It may be regarded as a table of contents for the input data. By clicking on the desired location in the tree, a corresponding dialog will appear in the 'Dialog Window'. The tree may be expanded or folded by clicking the boxes containing a '+' for expanding and a '-' for folding.

In 'Dialog Window' the actual data is given for the current subject of the 'Tree View'.

The 'Validation' tab in the 'Error/Status Window' is used for error messages and warnings for obvious errors in the given input data. Clicking on an error message opens the dialog associated with the error or warning.

The 'Simulation' tab in the 'Error/Status Window' shows the progress of the simulation along with the contents of the -log file.

The 'Run' menu is used for running the analysis. Before starting any analysis or simulation, all input data is checked and cross-checked for obvious errors and saved. The analysis will not start if errors are encountered. Warnings will not halt the analysis.
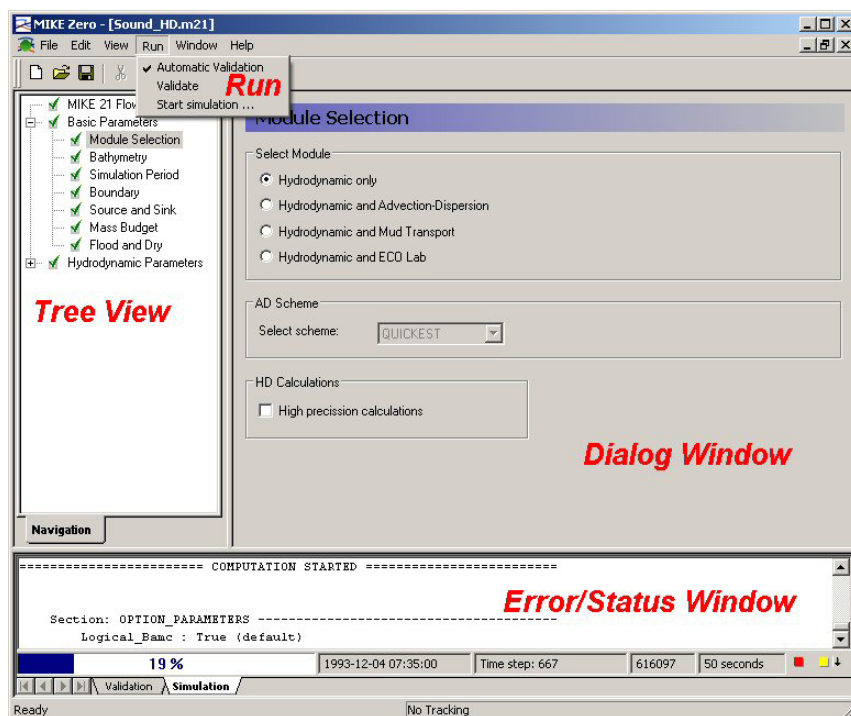
Figure 4.1   Basic elements of the Setup Editors

The error message system in MIKE Zero Setup Editors detects obvious errors in the input. It may be a value too large, too small, or a wrong sign. It may also be more complex error checks as e.g. cross-checking values between 2 dialogs. Green marks in the 'Tree View' mean no obvious errors, while red crosses indicate that the corresponding dialog contains an error (see Figure 4.2).
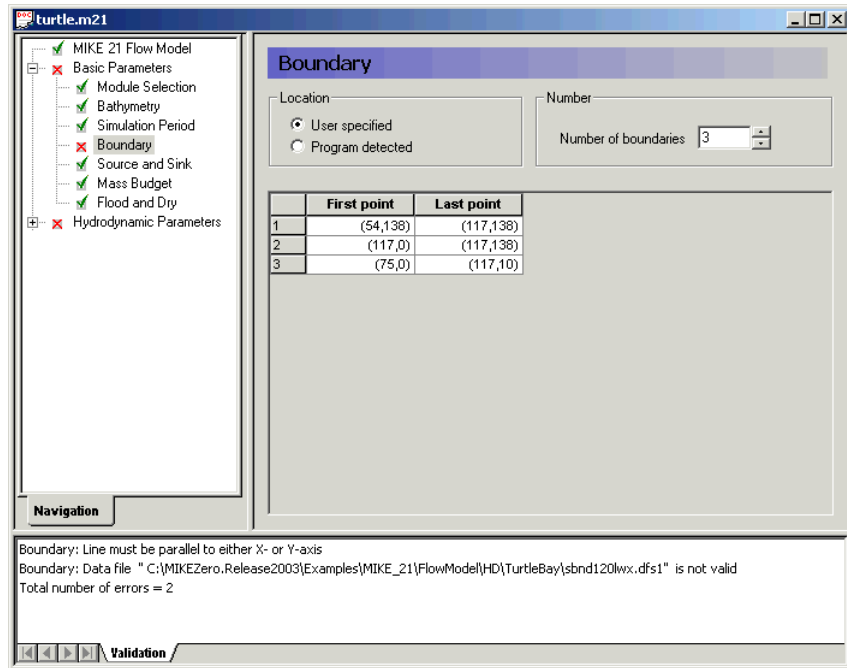
Figure 4.2   Error message in checking in the Setup Editors

More than one setup editor may be open for input and output at the same time, as shown in Figure 4.3. Also more than one version of the same program (here MIKE 21 Flow Model) may be open at the same time.
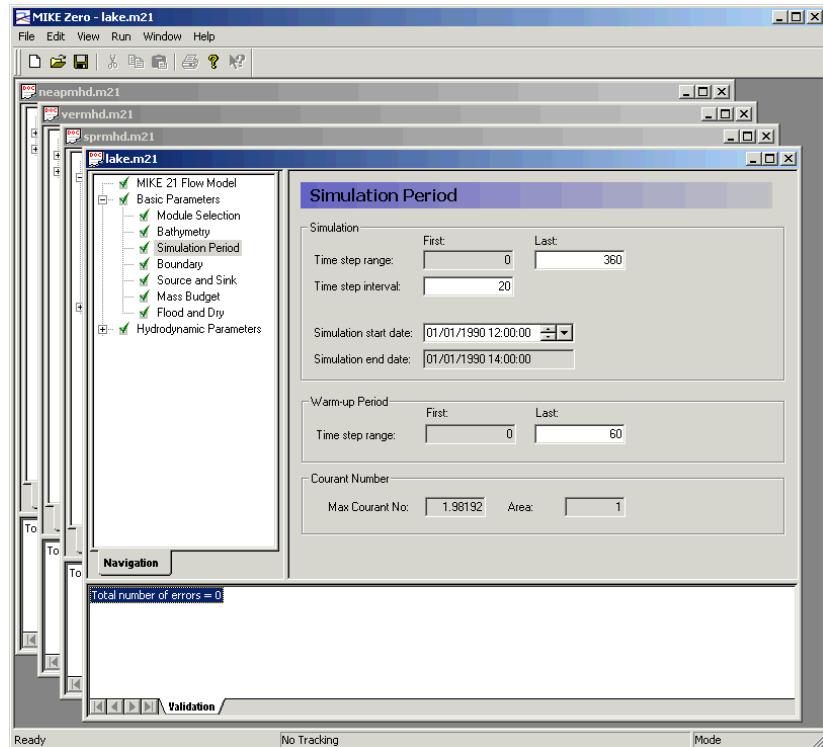
Figure 4.3   Multiple setup editors open at the same time

4.3   Tools and Toolboxes

MIKE Zero contains tools that are applied for pre- and post processing data. Dependent on the main usability some of these tools have been defined as belonging to certain Tool Areas and Tool Groups.

You can access such a tool in two ways:

- Open the GUI for the Toolbox containing tools in the given Tool Area (e.g. MIKE 21 Toolbox)
- Select the tool from the Tool Explorer
  (when using the MIKE Zero Project Framework)

The input data and result is the same disregarding which way is used to access and execute the tool. However some functionality are different:

- When using a Toolbox the input data is saved in a separate Toolbox file (e.g. *input.21t*) whereas the input data in Tool Explorer will be saved in the common *.txp* file for the project.
- The setup file from a Toolbox can be used for Batch Execution whereas a tool defined in Tool Explorer cannot.

4.4 EUM Unit Management

All data in MIKE Zero (either given as a constant or in a DFS data file) is based on an EUM Item Type (a string describing the item) and a related EUM Unit Type (a string specifying the corresponding unit).

The MIKE Zero models are per default setup to work with a selection of SI units, however it is possible to customize the MIKE Zero work environment to a local unit system by selecting another EUM Unit Type for the given EUM Item Type using the MIKE Zero option 'Edit Unit Base Groups', see Figure 4.4. In addition, an entire set of units (e.g. US Imperial units) can be loaded by using the "Load unit file..." button.
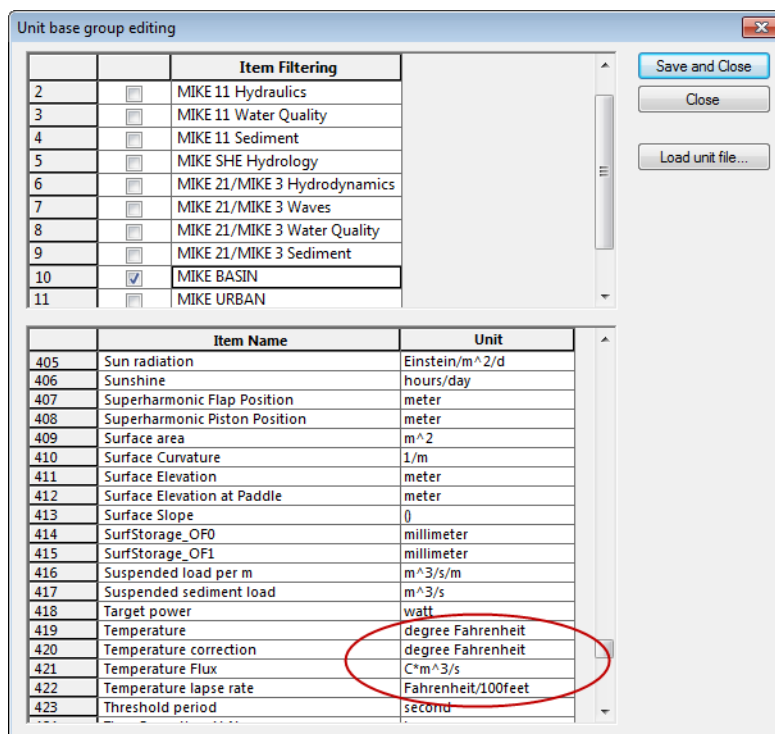
Figure 4.4   Modified temperature units displayed in the Edit Unit Base Groups dialog

PLEASE NOTE:
Some item types have a mutual dependency in the way the MIKE software applies them. To be sure that the software can perform correct and meaningful processing it is a requirement that the following item types are specified with identical user units:

• Bathymetry, Water depth, Water level, Surface elevation

• u-velocity component, v-velocity component, w-velocity component

Though a large part of modeling systems in MIKE Zero support multiple unit systems, not all models are supported. For an up-to-date list, please refer to FAQ below "Support" at http://www.mikepoweredbydhi.com - search for the entry: "Which modeling systems support EUM Unit Management"

4.4.1 Model setup editor

The unit for the values to be entered into the given model editor is typically shown next to the input box or visual when placing the cursor on top of the input box.

The Editor will work with the specified unit system as shown below. When saving the data to the input file the values will automatically be converted to the default base units and the calculations carried out accordingly.

Figure 4.5   Flooding and drying dialog in MIKE 21 HD FM using SI units

Figure 4.6   Flooding and drying dialog in MIKE 21 HD FM using US units

4.4.2 DFS data

The DFS output data from simulations will be stored in the local unit system. (This implies that model setups can readily be exchanged between users using different localized work environments).

Where data in DFS files are supplied as input data files, the input data may in most cases be supplied in a unit of the user's choice. The system will in this case enforce that a certain item type it used for the data - and as a consequence of this that only certain subset of units can be chosen.

An example of this is a MIKE 21 bathymetry file, where the item type must be "Bathymetry", see Figure 4.7. The allowed units for item type "Bathymetry" is meter, centimeter, millimeter, feet, feet US, inch and inch US, see Figure 4.8. This is to ensure that the input data can be correctly converted to the unit used internally during the simulation.
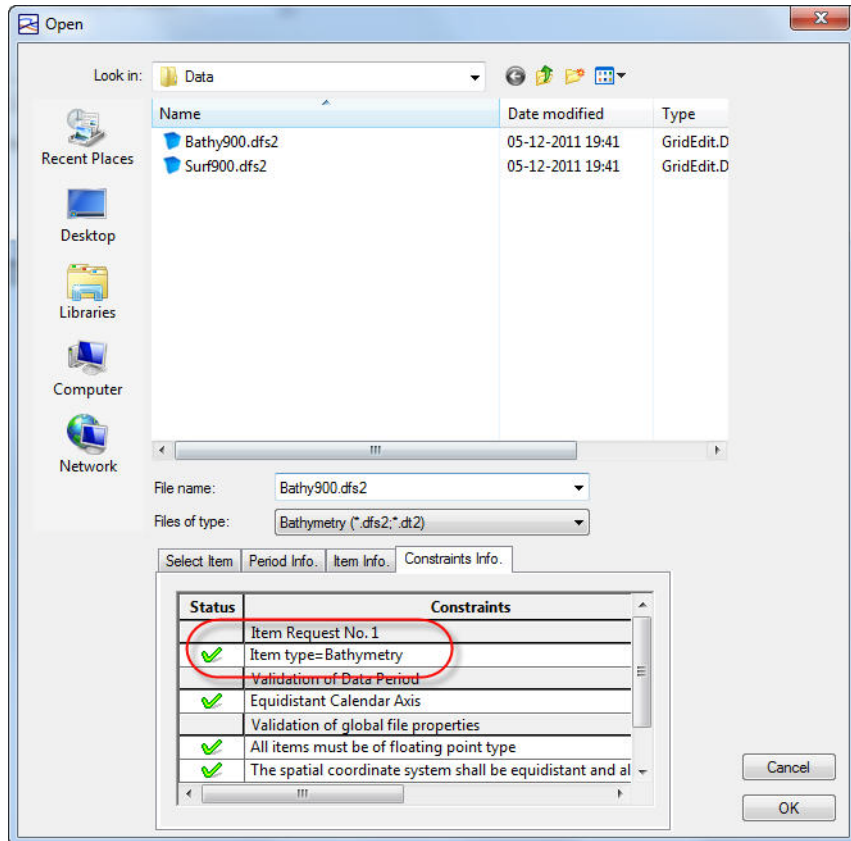
Figure 4.7   Selection of a MIKE 21 bathymetry

Figure 4.8   Allowed units of the item type "Bathymetry"

PLEASE NOTE:
If you have a model setup created with an earlier version of MIKE and input data in DFS files do not have the correct item type, the validation will typically display an error saying that the input file is not valid.

4.5 DFS Selection

The type of access to DFS files, e.g. selecting data files for input or defining data files for output, is dependent on the work environment, i.e. it depends on the presence of an active MIKE Zero Project.

4.5.1 Input DFS files

When a MIKE Zero project is active in the MIKE Zero shell the DFS File & Item Selection dialog will display a list of all files within the active MIKE Zero Project that coincides with the required extension. Check marks and crosses will indicate if the files coincides with the required Constraints information attached to the input, see Figure 4.9.

You select one of these files for the input by highlighting the file on the list and press OK.

If the required file is not displayed on the list, i.e. it is not a part of the MIKE Zero project, you click the "External File" button to browse for the file elsewhere. When selecting the file you will be given the option to include it in the project.
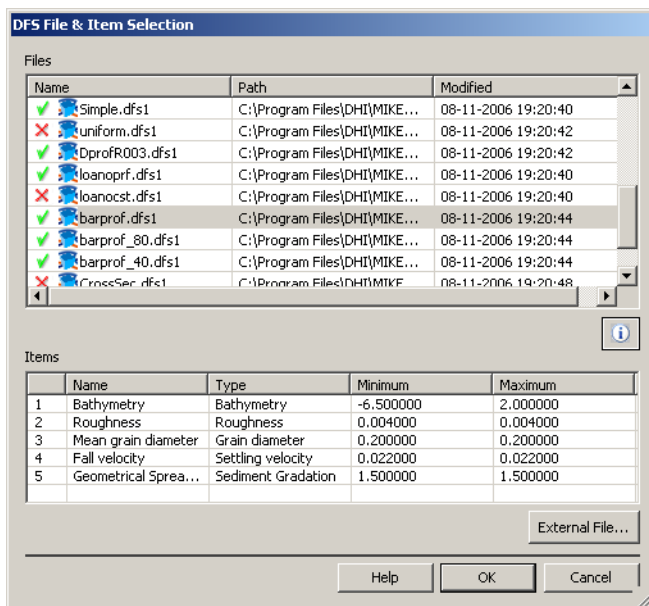
Figure 4.9   DFS file selection within MIKE Zero project from setup editor

Constraints information

To control that the selected input file works correctly with the overall model setup, the editor will check if the file fulfills a number of constraints. The constraints will depend on the individual input parameter.

Typically a constraint could be that the start and end time will cover the simulation period. Another constraint will be that the individual item in the data file are defined by a specific EUM item type.

4.5.2   Output DFS files

When specifying an output data file name in a model setup you can specify the name by a local or an absolute name:

● Local name
  If the output data file name is defined as a local name in the setup, i.e. without an absolute path, the generated files are saved in a generic Result Folder.

● Global name
  If the output data file name is defined by an absolute path, the files are save accordingly.

Per default the editors may be designed for local file names, however you can use the command Ctrl-D on the entry field to define a global output data file name with an absolute path.

When a MIKE Zero project is active in the MIKE Zero shell, a folder of Folder type Result defines the default location of the output data folders from various model setups stored in the project. The folder is per default displayed in the Project Explorer by a unique font color, see Figure 4.10.
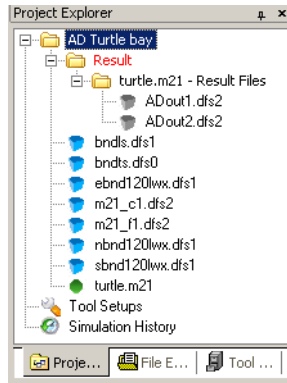
Figure 4.10   Result folder as displayed in Project Explorer

If a model setup with local defined output data file names is executed from outside a MIKE Zero Project, the output sub folder is placed by the model setup.

4.5.3   Dfs Previewer

The dfs previewer allows you to preview any dfs file in a preview pane in Windows Explorer. The preview pan will contain a summary of the header information of the dfs file including time-axis, spatial axis and item information.
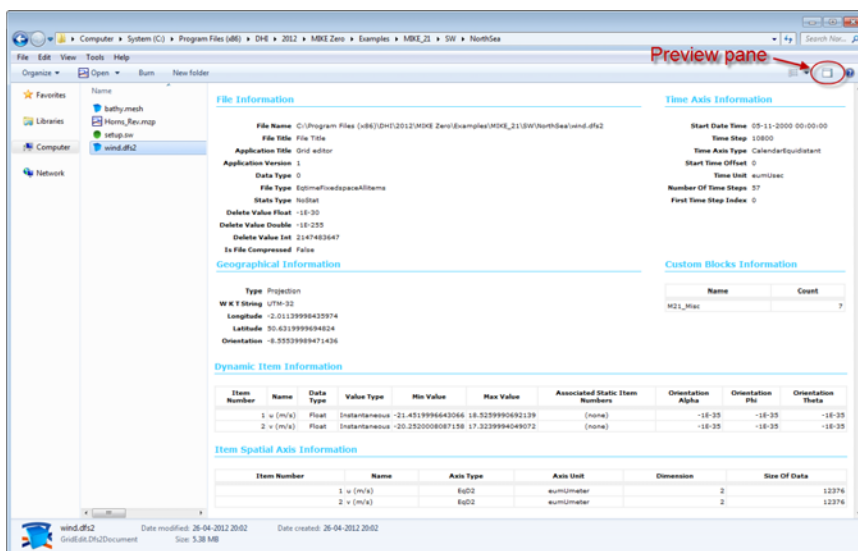
Figure 4.11   Example of file contents shown in dfs preview pane

4.6   Geographical Description

All MIKE Zero products that work with spatial data relate the data elements to geographical positions on the planet earth. This is managed through the use of a map projection and origin coordinates.

The extent of the displayed data is determined either by the extension of a work area or by the spatial settings and orientation of the DFS file.

4.6.1   Work area

Some editors define a working area for processing and viewing data and data files within the area.

A working area is defined by a Map projection, a Geographical origin and a Spatial Extent.

Figure 4.12   Specification of working area location

Spatial Extent

The extent of the working area is defined by the width and height of a rectangular coordinate system, see Figure 4.13. The properties and units of the coordinate system correspond to the given Map projection and the origin of the working area is defined by the given longitude and latitude of the Geographical origin, see Figure 4.12.
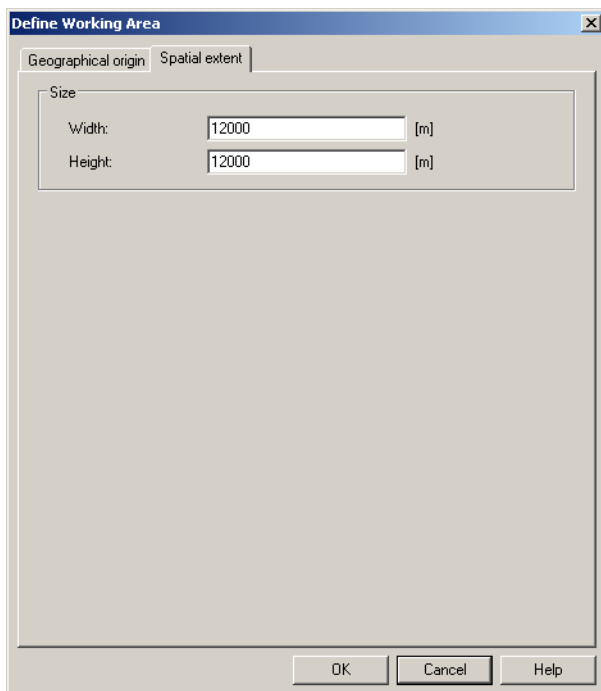
Figure 4.13   Specification of extent of working area

4.6.2   Map projection

The map projection defines the local coordinate system/rectangular area in which the data is specified. It is best to select a map projection that result in a minimum of distortion of the spatial data.

MIKE Zero provides a comprehensive list of pre-defined map projections that can be selected from the Map Projection type drop-down box. Often the map projection will be of type Transverse Mercator, but other types are available as well. The map projection type "LONG/LAT" is mainly relevant for model applications using spherical coordinates, i.e. for modules in the MIKE 21/3 FM series.

A map projection is basically a formula for converting between Cartesian (x,y)-coordinates - often in map projections referred to as easting and northing - and longitudes and latitudes. Thus whenever the map projection is changed you will get the opportunity to select how to synchronize the coordinates of the origin of the local coordinate system.

A User Guide on how to work with geographical data and how to create new map projections in MIKE Zero is available from the MIKE Zero General Documentation Index.

4.6.3 Geographical origin

The coordinates of the origin are defined in two ways:

- Geographical coordinates specified by longitude and latitude (it is possible to define the type of input)

- Map projection coordinates specified by Easting and Northing

The two specification modes are linked such that e.g. when modifying the origin using the Map projection values, the Geographical coordinates will automatically be updated accordingly.

dfs2 file

The position of the origin of a grid is defined as the centre point in the first grid cell (j,k) = (0,0).
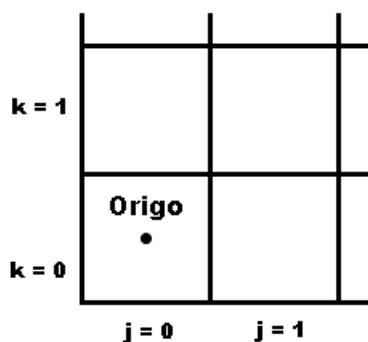
Figure 4.14   Definition of Origo for grid

NOTE: If the map projection is defined as NON-UTM, the origo is defined as the lower left corner of cell (j,k) = (0,0).

dfs1 file

The position of the origin of a line is defined by grid point 0.
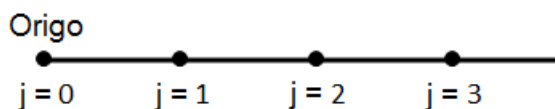
Figure 4.15   Definition of origo for line

4.6.4   Positioning of DFS file

Most data files in MIKE Zero are tagged with:

1.   The Map projection that the actual data is given in
2.   The coordinates of the Geographical origin
3.   The Orientation of DFS file at Geographical origin

This information makes it possible for MIKE Zero to calculate the exact geographical position of each grid point in a given data file.
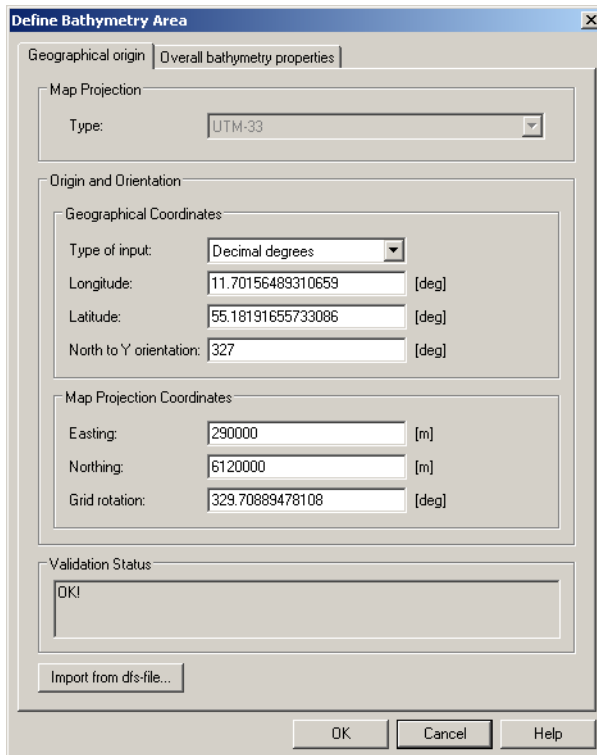
Figure 4.16   Geographical information for DFS data file

4.6.5   Orientation of DFS file

The orientation is defined as the angle between true north and the y-axis of the grid measured clockwise ("North to Y orientation"). A mnemonic way of remembering this definition is by thinking of NYC, which normally means **N**ew **Y**ork **C**ity, but which for our purpose means "from **N**orth to the **Y**-axis **C**lockwise", see Figure 4.17.
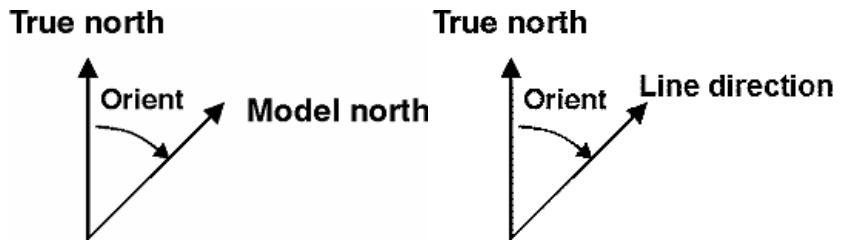
Figure 4.17   Definition of grid orientation (left) and line orientation (right)

The grid rotation defines the clockwise rotation of the grid from map projection north to model north (y-axis of the grid).
The line rotation defines the clockwise rotation of the line from map projection north to the direction of the line.

PLEASE NOTE:
The grid/line rotation in general is not equal to the North to Y orientation as the map projection north deviate increasingly from true north the longer away from the center of the map projection domain the model area is placed, see Figure 4.18.
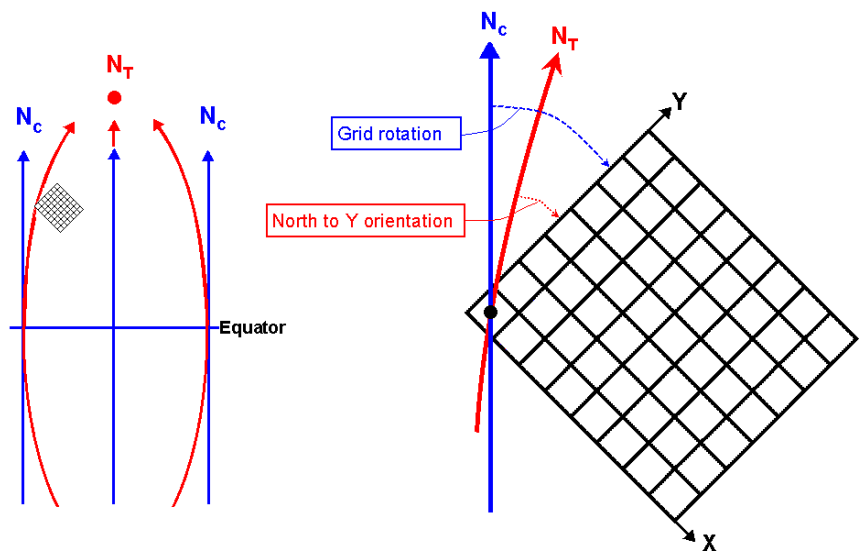
Figure 4.18   Left: Chart north (N_c) and true north (N_T) for single UTM zone.
                    Right: Difference between Grid rotation and North to Y orientation.

4.7   Visualisation Tools

There are a number of visualisation tools within the MIKE Zero environment. Some are common for all models and some are focused on visualising data

from certain models. For the following tools some examples are shown in Figure 4.19 - Figure 4.23:

- Plot Composer
  Creates various types of plots based on time series data, line series data and 2D/3D data.

- Data Viewer
  Display data from MIKE Zero flexible mesh models.

- Result Viewer
  Display model results from a various range of DHI models, including MIKE 11.

- MIKE Animator Plus (Add-on module)
  Display data and create animations using a 3D view.

- MIKE to Google Earth (tool)
  Display and animate dfs2 and dfsu data files in Google Earth

Common for all visualisation tools are the graphical display settings described in sections 4.7.1 to 4.7.6.
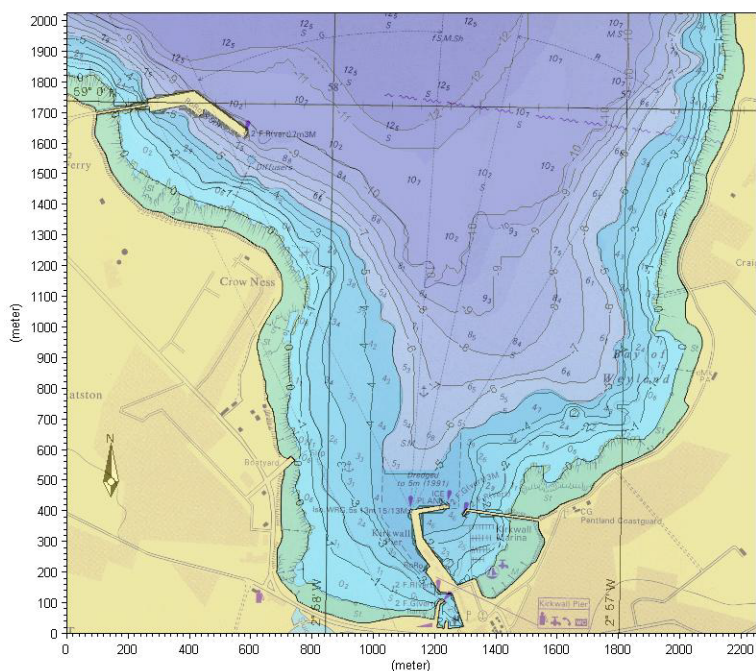
Figure 4.19   Plot Composer: using grid plot to display isolines, color contours and background layer (Kirkwall Marina)
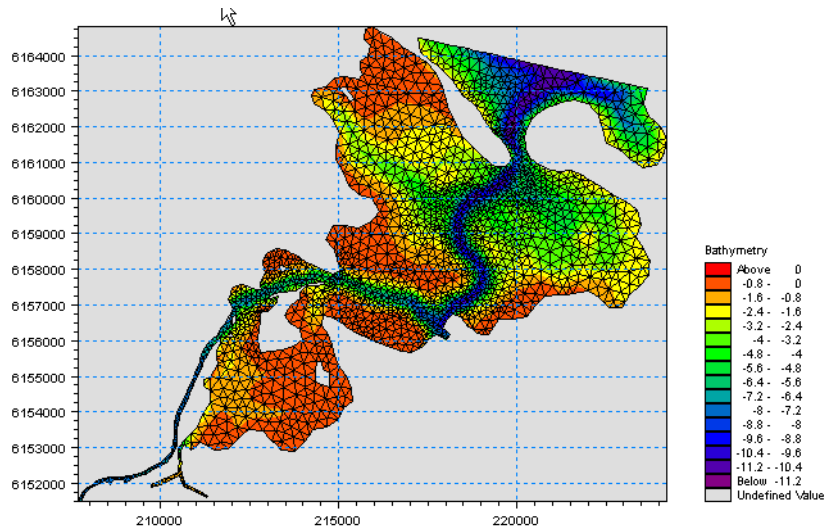
Figure 4.20   Data Viewer: showing mesh grid, bathymetry values and color legend (Odense Fjord)
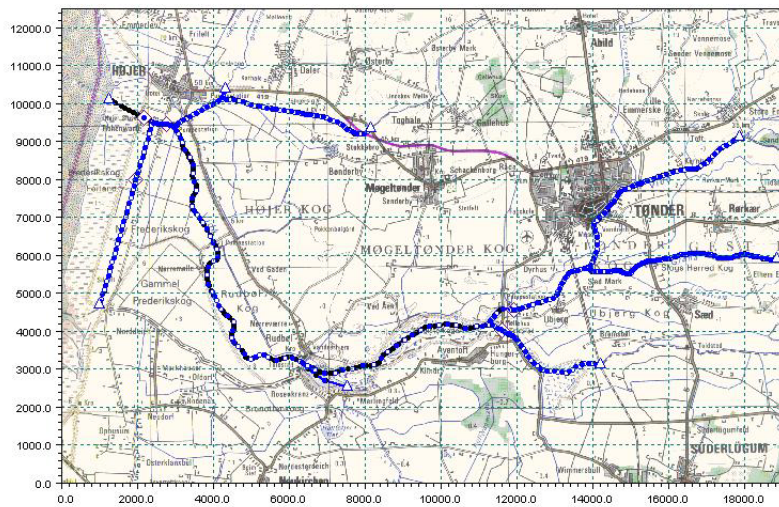
Figure 4.21   Result Viewer: showing MIKE 11 setup and background layer (Vida)
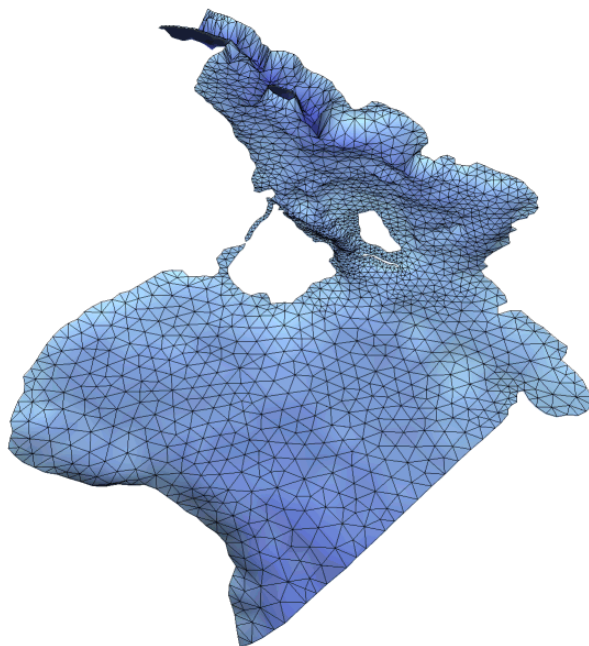
Figure 4.22   MIKE Animator Plus: 3D display of bathymetry data (Oresund region)
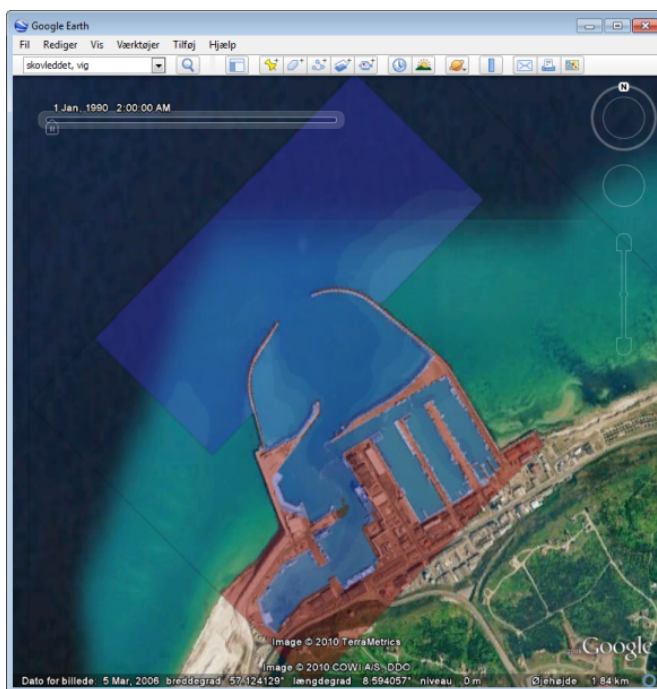
Figure 4.23   MIKE to Google Earth: showing dfs data in Google Earth (Hanstholm harbour)

4.7.1 Palette

The color palette is used to specify the colors used for displaying data according to contour levels. You may create a palette and save it for later use.

A new palette is created using the Palette Wizard as described below.

Palette Wizard, step 1 of 3
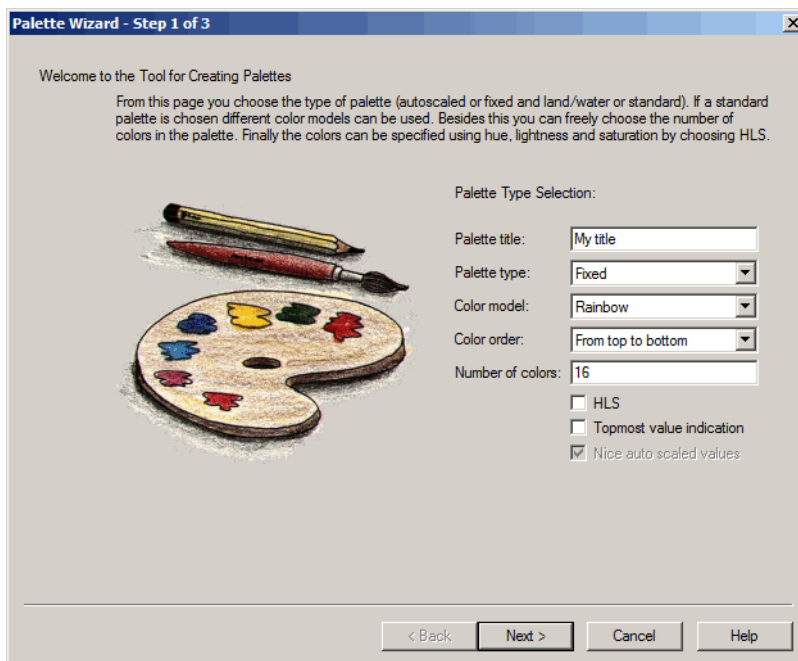
Figure 4.24   Palette Wizard, step 1 of 3

Palette title
Give the palette a title.

Palette type
Choose the type of palette from among the following options.

The two general palette types:

- Linear auto scaled - a linear scale between the minimum and the maximum value in the view, automatically scaled

- Fixed - a scale where you can choose the intervals freely and where the scale does not change according to the data shown in the view

The two palette types suitable for plotting bathymetries:

- Land/water auto scaled - as the linear auto scaled with the extension that a special color is specified for land areas

- Land/water fixed - as the fixed type with the extension that a special color is specified for land areas

Color model

A number of different color models are provided for convenience. These colors may be modified during the second step. However, when using the land/water palette types, the color model is fixed and cannot be changed.

Color order

You may choose to revert the color order in the chosen color model

Number of colors

Choose the number of colors, i.e. the number of intervals in the palette.

HLS

You can choose the color value to be defined by the Hue, Luminance and Saturation (HLS) instead of the default RGB color definition.

Topmost value indication

You can define the way the uppermost value in the color palette is displayed. Per default, the value will be displayed as 'Above *xxx*', however you may choose to display the topmost value by the interval '*xxx* - *yyy*'.

Nice auto scaled values

Per default the values in an auto scaled palette is set to limit the number of decimals in the displayed color values.

Palette Wizard, step 2 of 3
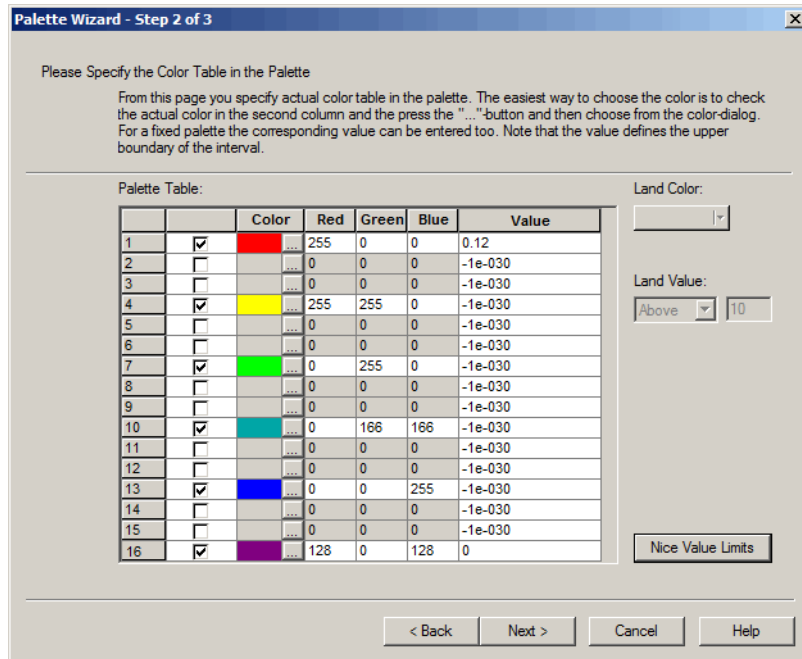
Figure 4.25   Palette Wizard for fixed palette, step 2 of 3

Palette Table

In the example above we have chosen 16 colors and used *Rainbow* as the color model in step 1. We can now select any number of these levels and modify the color and enter the value we want for this level. Note that the value defines the upper boundary of the interval. The color can be specified either by the RGB-value or by opening a color dialog by pressing the '…' button.

Land color

If you are working with a land/water palette, you may select the color for land.

Land Value

If you are working with a land/water palette, choose the value such that cells with a value larger or equal to this value will be shown as land.

Nice value limits

Initially, the values in a fixed palette are defined by the minimum and maximum data value. Selecting Nice value limits will modify the intervals and reduce the number of decimals in the displayed color values.

Palette Wizard, step 3 of 3
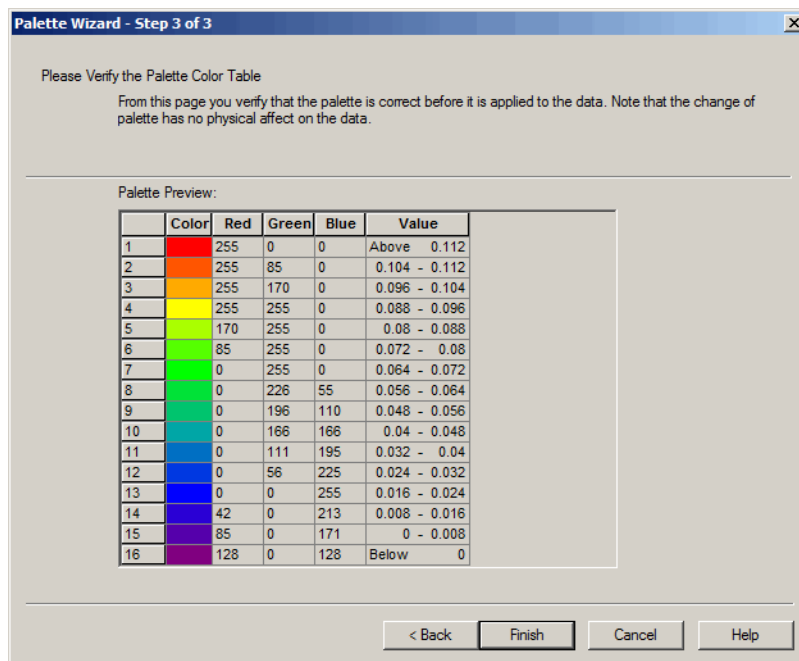
Figure 4.26   Palette Wizard for fixed palette, step 3 of 3

In the third step you can verify that the palette you have chosen corresponds to the result you were aiming at. If it does press *Finish*, if not press *<Back>*.

Open

A palette that has been saved to disk can be loaded and will immediately take effect. The palette files have the extension *.pal.

Save

Save the present palette to disk for later use. The palette file should have the extension *.pal.

4.7.2   Grid settings

Here you can define the way contours and isolines are displayed. An example is shown in Figure 4.19.

The colors can be set and edited using a Palette.
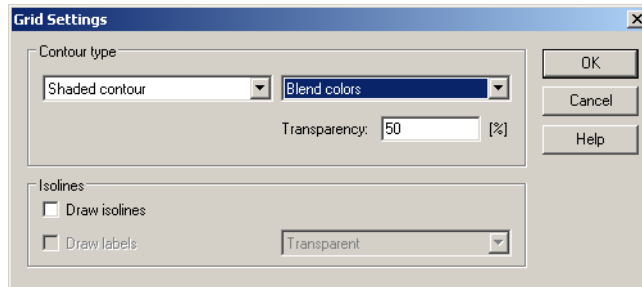
Figure 4.27   Grid settings for visualisation of contours and isolines in Grid Editor

Contour Type

You can define the way contours are displayed. The contour is defined by a Primary option that defines the contour type and Secondary options that depends on the primary option.

Primary options

Box Contour
Each grid cell is given a color according to the value in the cell.
Secondary Options: No. 1

Box Contour with transparency
Each grid cell is given a color according to the value in the cell.
Secondary Options: No. 1 + Transparency

Shaded Contour
The grid is covered with colors indicating the values in the cells, a smooth surface is used. The land values will always be displayed in green.
Secondary options: No. 2 or No. 3 or No. 4 + Transparency

Shaded Contour with land
The grid is covered with colors indicating the values in the cells, a smooth surface is used. The land values will be displayed with a color indicative of land.
Secondary options: No. 2 or No. 3 or No. 4 + Transparency

No Contour
Used in connection with background overlays. The contour will not be shown.

Secondary options

1. Box contour divider
   This option can be switched on and off having selected box contour for display. A system of lines will be placed on the grid displaying the transition between the colors.

2. Copy colors
   The colors indicate the values in the cell.

3. Copy colors with Transparency
The colors indicate the values in the cell, one color is fully transparent (usually white).

4. Blend colors
All colors are transparent with a user-defined Transparency (secondary option 2) and one color is fully transparent (usually white).

Transparency

For some contour types it is possible to define the degree of transparency of the layer. This means that you e.g. will be able to see a background map display behind a contour plot (an example is shown in Figure 4.19).

PLEASE NOTE: The Transparency functionality requires the color quality display settings to be set to 32 bit colors (highest) in order to work.

Isolines

Here you can define the way isolines are displayed.

Draw Isolines
This option can be switched on and off. A system of isolines will be placed on the grid.

Draw labels
Apply labels to the isolines either as transparent, opaque or framed opaque.

4.7.3 Image Manager
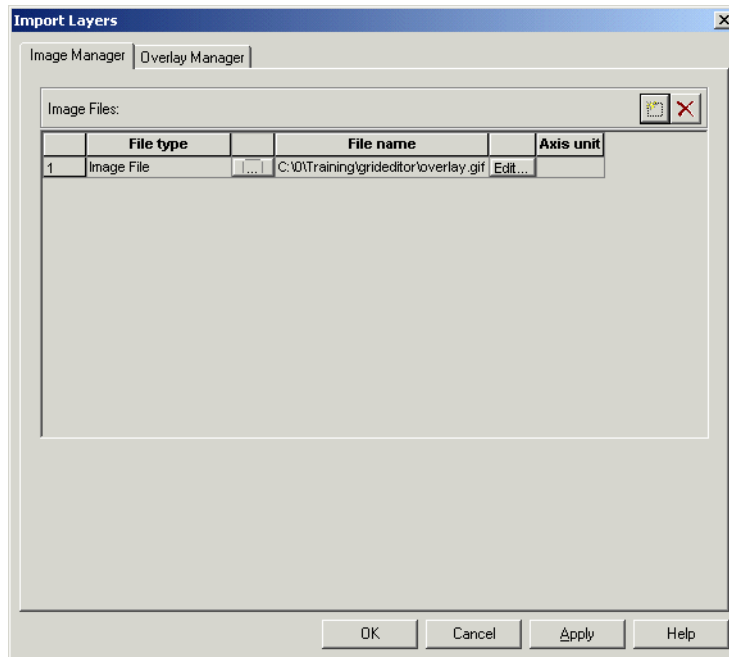
Figure 4.28   Image Manager dialog

In the Image Manager you can import files and display the contents as additional image layers in the workspace area.

Enable a new image on the list by pressing 🗎 .

To change the File Type press the File type field.
To select a file press the button next to the File type field.

You specify the display style of the particular File Type by clicking the **Edit...** button.

File Type

You can choose between the following file types:

1. Image File
    You can select a *.bmp, *.jpg, *.gif, *.png or *.tif image.
    If the image has been georeferenced you have the option to display data from various different coordinate systems.
2. Shape File
    You may select a *.shp file that is often used in GIS environments.

3. XYZ File
You may select a *.xyz file that displays the positions and z-values for given (x,y) coordinate positions. You have the option to import the data from various different coordinate systems.

4. River File
You may select a MIKE 11 River network file (*.nwk11) that contains a river network. You have the option to import the data from various different coordinate systems.

5. Enhanced MetaFile
You can select a *.emf image.

6. Particle File
You can select a Particle Tracking file (*.xml) that contains information about the particle tracks and the instantaneous location of each particle.

PLEASE NOTE: Not all file types are available for all applications that use the functionality of the Image Manager.

Image style

Here you specify how the image is displayed in the plot. If the image has been georeferenced the image origin and image size values are derived from the image world file. See also Background maps *(p. 47)*.

Display style
The display style decides how the colors of the images are shown.

Copy colors
Shows the colors of the top picture only

Copy colors with Transparency
Shows the colors of the topmost picture's colors, but you can choose one transparent color. Areas of your picture that has this color will be transparent, so you can see the image below.

Blend colors
The colors of the different layers will be mixed and you can define the Transparency value of the layer.

Stretch mode
When a pixel image is drawn in a window such that the image is smaller in at least one direction, at least some pixels in the original image will map to a single displaced pixel. The stretch mode determines the color of those pixels.

Halftone
Maps pixels from the source rectangle into blocks of pixels in the destination rectangle. The average color over the destination block of pixels approximates the color of the source pixels.

color-on-color
Deletes all eliminated lines of pixels without trying to preserve their information.

Black-on-white
Performs an operation using the color values for the eliminated and existing pixels. If the bitmap is a monochrome bitmap, this mode preserves black pixels at the expense of white pixels.

Image origin
The default values for the origin of the image are taken from the default display area.

Image size
The image size is defined by the pixel width and height multiplied by the number of pixels in the image for the two directions.

Shape style

Here you specify the style of the points and lines/polygons that may be a part of the shape file.

XYZ style

Here you specify the layout of the square markers that indicate each XYZ point. The color of the markers indicate the Z-values in the XYZ file.

You may omit the XYZ data entirely, show the squares with or without black frames and include a text string showing the value of the individual point.

Finally you can set the size of the marker (in mm).

Meta file style

Her you specify the location and size of the picture on the plot.

The default values for the **Image origin** are taken from the default display area.

The **Meta File Size** is given in number of grid points.

Particle style

You may display the particles in one of two ways (or both):

- Particle track
  Displays Lines which shows tracks of the particle movements

- Particle instantaneous
  Displays Markers which shows the position of the individual particles. Optionally Annotations for selected particles can be shown.

Lines

You can define the width, style and color of the lines.

The track length may be displayed as the total track, the track from start to current time step or the recent track only (current with Tail).

Markers

You can choose between predefined vector symbols or your own meta file. When using a predefined vector symbol you can define the color and style of the marker. When using a metafile you can define the orientation of the marker in different ways.

You may choose to have a fixed size for all the markers or have the size vary according to the value of a selected variable. In the latter case the marker scale factor can be used to resize the marker.

You have the option to show the particles for one particular time step, all time steps or only the recent time steps (current with Tail).

Tail

The tail length defines the number of recent time steps to display.

Annotations

You can show annotations for selected particles.
You may choose to show all variables, or a selected few.

Filters

You can define and apply varying filters to control the display of particles and annotations.

4.7.4 Overlay Manager
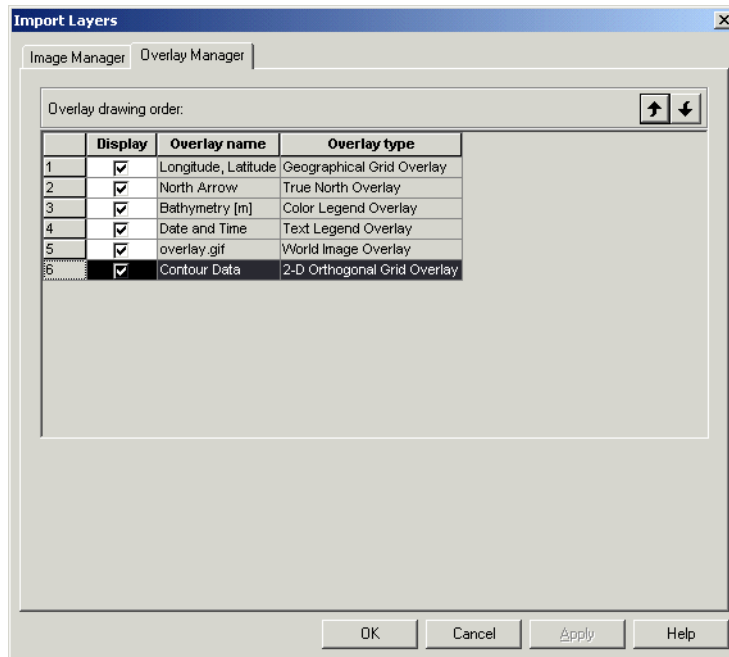
Figure 4.29   Overlay Manager dialog

In the Overlay Manager you can specify what should be displayed on the plot, like palettes, file name, date, time, etc.

Specify which layer to display and the display order. If e.g. an item is very low on the list (high number), it will be plotted on top of an item higher on the list, thus creating a different picture than if the two were switched around.

You specify which item goes on top, by using the arrow buttons to put the items higher or lower in the plotting sequence.

Remember to adjust the Transparency level in Grid settings *(p. 40)*.

4.7.5 Background maps

Often editing can be easier and presentation of data more transparent with the inclusion of a background map (image) in the graphical display.

The background map usually needs to be fully georeferenced in order for the data and map to be aligned correctly. If this is not the case the Display functionality may lead to unexpected results.

A georeferenced image consist of two files:

1. The image file itself (e.g. map.gif in Figure 4.30)

2. The DHI world file for the image (e.g. map.gifw in Figure 4.31)

A full DHI world file contains information about the geographical extension of the image area corresponding to the lower left corner and upper right corner and the map projection for which the corner coordinates are valid.

You may create a DHI world file by the use of the Image Rectifier and/or the MIKE Zero tool Geo Referencing Image File.

PLEASE NOTE:
A DHI world file is different from a world file used in standardized GIS applications.

Figure 4.30   Example of georeferenced image file (map.gif)

```
[MIKE_0_Graphical_Images]
    [World_Coordinates]
        x0 = 305430
        y0 = 6121100
        x1 = 403900
        y1 = 6240150
        MapProjection = 'PROJCS["UTM-33",GEOGCS["Unused",DATUM["UTM
Projections",SPHEROID["WGS 1984",6378137,298.257223563]],PRIMEM
["Greenwich",0],UNIT["Degree",0.0174532925199433]],PROJECTION
["Transverse_Mercator"],PARAMETER["False_Easting",500000],PARAMETER
["False_Northing",0],PARAMETER["Central_Meridian",15],PARAMETER
["Scale_Factor",0.9996],PARAMETER["Latitude_Of_Origin",0],UNIT["Meter",1]]'
    EndSect  // World_Coordinates

EndSect  // MIKE_0_Graphical_Images
```

Figure 4.31   Example of DHI world file (map.gifw) for georeferenced image

Display functionality

The display of a background map in a given projected workspace area/domain will depend on the presence and contents of the related DHI world file:

- If the image file is fully georeferenced the image will be displayed as defined in the image file. If the domain holds a different map projection than the image, the image will automatically be converted and displayed according to the new map projection (however without considering any datum shift).

- If the DHI world file exists but without any information regarding the map projection, the coordinates for the extension of the image will be assumed to be related to the map projection for the domain.

- If the image file is not georeferenced or no related DHI world file can be found, the image file will be stretched and scaled to cover the same area as defined by the workspace.

Image Rectifier

The Image Rectifier is a utility to rectify images. The resulting image will be aligned towards north and a world file will be written, however without any information regarding the map projection. To include this information you can use the MIKE Zero tool Geo Referencing Image File.

Pls. read more about the Image Rectifier in the related online help.

Geo Referencing Image File

The georeferencing tool will not modify the image itself but create a related world file based on user input. If the image has previously been rectified using the Image Rectifier you can add the map projection information using this tool.

Pls. read more about the georeferencing tool in the related online help.

4.7.6 Animation

For files with time-varying data it is possible to animate the values and save the animation in a video file by use of an animation toolbar as shown below.

Figure 4.32   Example of toolbar from Data Viewer

The icons in the toolbar may differ dependent on the active module.

Generally the toolbar contain icons to move forwards and backwards in time to display results from a simulation. If preferred the animation may be stored in a video file.

Other icons enables you to control the Animation Setup with respect to the time steps that are to be used in the video.

4.8   Online Help

Use of the Online Help requires access to the internet.

MIKE Zero utilises an integrated Online Help supplying descriptive information on each of the editors, dialogs and property pages within the system. The Online Help supplies explanations on how to operate a specific dialog as well as descriptions of the parameters present on the specific page.

The Online Help can be activated in several ways depending on the user's requirements:

- **Open the Online Help system for browsing manually after a specific help page**:

  Open the Online Help system by selecting 'Help → Help Topics' from the main menu bar, see Figure 4.33.

- **F1-key seeking help on a specific activated editor page**:

  To access the help associated with a specific editor property page, press the F1-key on the keyboard after opening the editor and activating the specific property page.
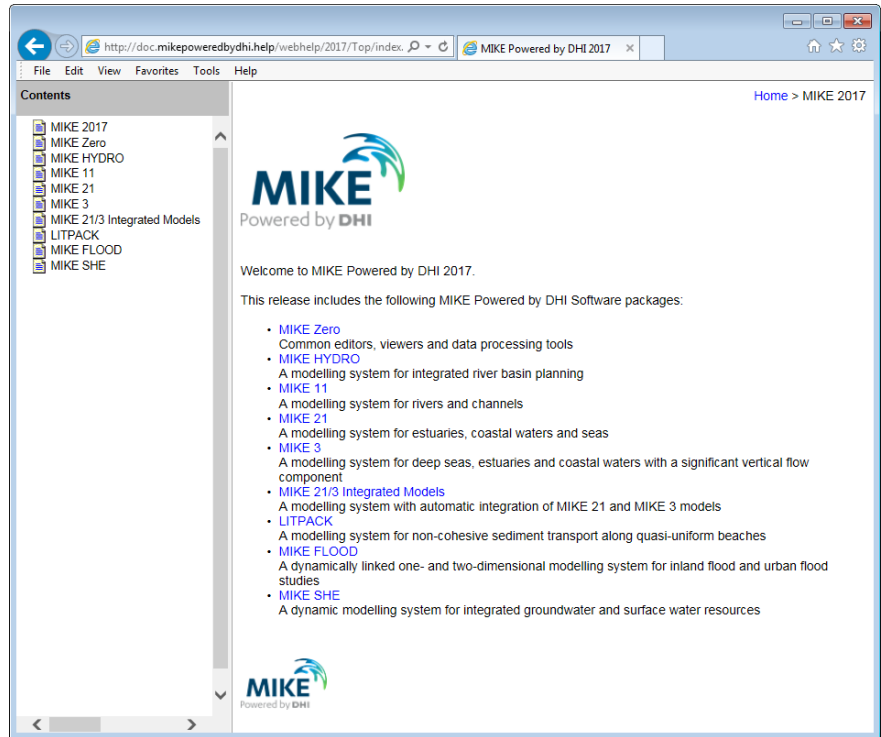
Figure 4.33   Online Help system

5 Launch Simulation

5.1 Introduction

When working with numerical modelling you often utilize the model editor to setup the model and hereafter execute the simulation using the Run command. However there are times were it is more convenient to start up a simulation without going through the related editor or to arrange for a suite of simulations to automatically be executed in certain sequence.

The process for each of the three different ways to execute models is given in the following.

5.2 Simulation from Model Setup Editor

When you start a simulation from within MIKE Zero by an open model setup editor, you are presented with the Launch Settings Dialog where settings for the launch, the purpose and the result folder for the simulation are specified. Dependent on the model you may also specify some parallelization parameters.

5.2.1 Launch
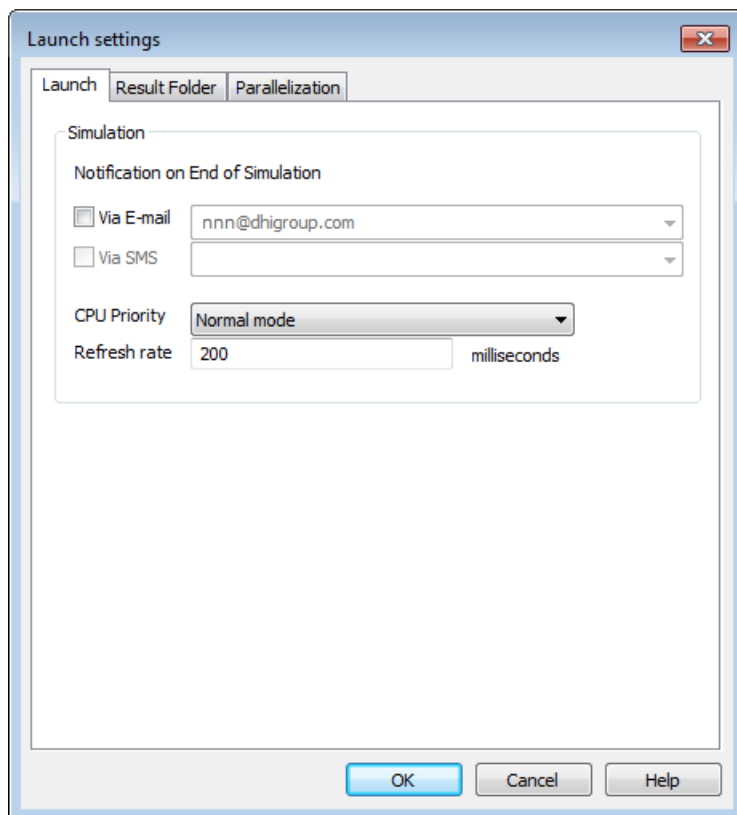
Figure 5.1   Launch Settings dialog

In the Launch Settings dialog you enable simulation end notification via e-mail and/or SMS. The setup of these services is described in Simulation settings *(p. 67)*.

You may also change the CPU priority of the model simulation (default is 'Normal') and the refresh interval (default is 200 milliseconds).

NOTE: The file `MzMail.log' is stored in the same folder as the setup and will contain log information for notification emails. During errors the program will try to re-send 10 times before giving up and the log-file is only updated after this re-send period, i.e. the log file is not updated immediately.

5.2.2 Purpose

If the model setup file is part of a project, you may specify a name and descriptive text in the Purpose dialog. The information is written to the Simu-

lation History window which can be accessed through the top toolbar in the MIKE Zero shell.

5.2.3 Result Folder

In this dialog you can set the location of the Result folder in where Output DFS files is placed in case the result file is specified by a local file name in the setup.

- Default location
  The output files are placed in a sub-folder named after the setup file, e.g. 'lake.m21 - Result Files'.

- Custom location
  The output files are placed in the specified folder.

PLEASE NOTE:
If the setup file is not a part of a MIKE Zero Project, the Default location is defined as the path for the setup file.

5.2.4 Parallelization

The parallelization options available are dependent of which model is chosen. Model setups that utilize engines that are part of the flexible mesh modelling systems have more options than other types of model setups.

See also Parallelization Description *(p. 62)*.

MIKE_FM

The flexible mesh based engines utilize the following parallelization techniques in a hybrid manner:

- OpenMP computing approach
- MPI computing approach
- GPU computing approach

When launching a flexible mesh based engine the user has the possibility to specify the number of subdomains and the number of threads per subdomain for which the simulation should be run. By dividing the model domain in a number of smaller subdomains the computational work is divided among a number of processors as described in the MPI computing approach. The number of threads per subdomain specifies the number of OpenMP threads to utilize for each subdomain. Hence, this is a hybrid OpenMP + MPI parallelization technique.

Furthermore, if the computer has a supported graphics card, it is possible to utilize the GPU computing approach. When selecting the "Use GPU" checkbox, the user is presented with a list of supported graphics cards on the com-

puter. If more than one graphics card is available and ticked off, then the simulation will run using multiple GPUs. Hence, a hybrid OpenMP + MPI + GPU parallelization technique is used.

Currently, only the computational intensive hydrodynamic calculations and the k-ε based turbulence calculations are performed on the GPU. The additional calculations are for each sub-domain performed on the CPU and these calculations are parallelized based on the OpenMP computing approach.

All flexible mesh models, with MIKE 21 Spectral Waves FM being the only exception, are capable of utilizing the GPU computing approach. However, only one inundation map covering the whole domain is supported, and only first-order calculations in time and space for the k-ε based turbulence formulation are supported.

Generally, neither the specified number of subdomains nor the number of threads per subdomain (nor the product of these) should exceed the number of cores available on the PC, since this will decrease performance.

The output is independent of the number of subdomains and the number of threads per subdomain used for the simulation. If more than one subdomain is used, then intermediate output data is generated for each subdomain during the simulation. At the end of the simulation these output files are automatically merged to one file covering the entire domain. If only one subdomain is used, no merging is necessary. For each subdomain a temporary log file containing the processed information for the given subdomain will be created. These log files are named by the specified setup name combined with the number of the given subdomain, e.g. SimA_p2.log. These will per default be deleted after the simulation finishes. The log file for the first sub domain will have no additional subdomain number, e.g. SimA.log, and will include statistics for the overall simulation as well. This log file will remain after the simulation ends.

PLEASE NOTE:
For the GPU computing approach it is recommended that the number of subdomains does not exceed the number of GPUs used for running the simulation. Only if the AD modules are the time consuming part of the simulation it might be beneficial to specify more subdomains than available GPUs.

PLEASE NOTE:
Some computers have Hyper-Threading. The engines which are part of the flexible mesh modelling system does not benefit from having this enabled. If a Hyper-Threaded computer has 4 cores and thus 8 threads then the engines should be launched with 4 threads.

Other models

The only parallelization approach used with this model is

- OpenMP computing approach

The OpenMP computing approach will run the simulation in a number of threads. The user can specify this number of threads, which should not exceed the number of cores available on the machine.

PLEASE NOTE: Some computers have Hyper-Threading. The parallelized engines do not benefit from having this enabled. If a Hyper-Threaded computer has 4 cores and thus 8 threads, then the engines should be started with 4 threads.

5.3 Launch Simulation Engine

The Launch Simulation Engine tool enables you to initiate a model simulation without opening a model setup editor through the MIKE Zero shell. It requires that you have prepared a simulation input file, either from a model setup editor or a text editor.

To open the Launch Simulation Engine start it from the Start menu.

The Application Progress Visualizer and continued log-file view are both active as if you were running the simulation from a model setup editor.

NOTE: The Launch Simulation Engine utilize the MzLaunch command to select the default engine, see Batch Execution, page 61.
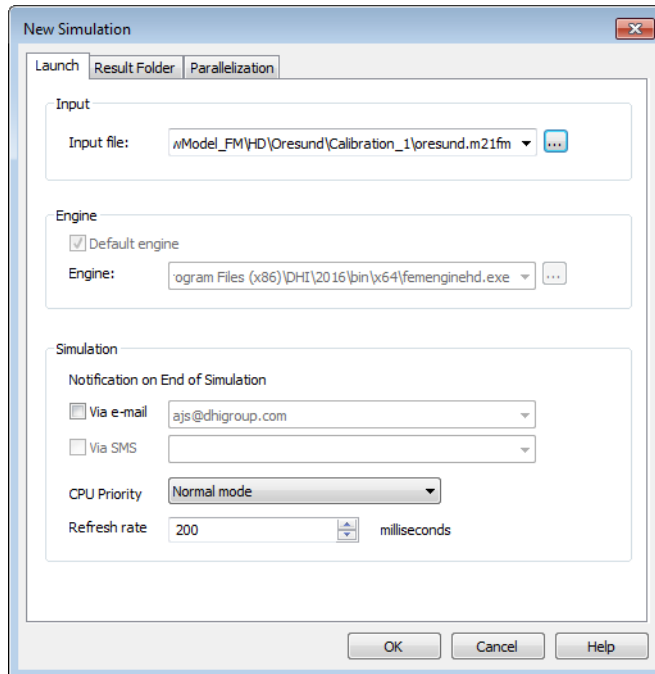
5.3.1 Launch

Figure 5.2   Launch Simulation Engine dialog, Launch information

Input file

The input file is a model simulation input file (PFS type), which is either pre-pared from a model setup editor or a text editor.

Engine

Based on the specified input file, the default engine executable is identified automatically. You may select another appropriate engine executable after leaving the 'Default Engine' check box blank, see Figure 5.2.

PLEASE NOTE:
The default engine executables are defined in the configuration file MzEngines.cfg included in the folder ...\DHI\[Year]\bin\(x64), where [Year] is the release year, e.g. 2017.

Simulation

Notification on End of Simulation
If you want to be notified by e-mail or SMS when the simulation has ended, please mark the check box for 'E-mail' and/or 'SMS'. The e-mail address and/or the SMS dial string is per default set as specified in MIKE Zero User

Settings (File → Options → User Settings), see section 6.2.2 Simulation settings *(p. 67)*.

Trouble shooting
In case the e-mail notification does not work properly, please check and validate the SMTP (Simple Mail Transfer Protocol) settings again. Open MIKE Zero → File → Options → User Settings and select 'Notification'.

If the SMTP settings are correct and the e-mail notification still fails, the problem may be related to the configuration of your anti-virus system. The log of your anti-virus system may help you to identify the problem.

CPU Priority
You can change the base CPU priority of the model simulation (default is 'Normal') and the refresh interval (default is 200 milliseconds).

5.3.2 Result folder

The Result Folder defines where output files are placed in case the result file is specified by a local file name in the setup.
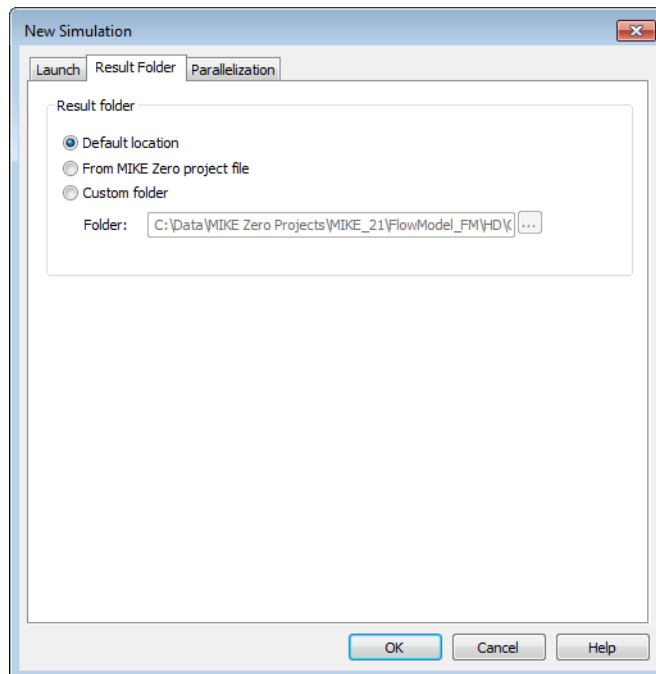

Figure 5.3   Launch Simulation Engine dialog, Result folder

5.3.3 Parallelization

The parallelization options available are dependent of which model is chosen. Model setups that utilize engines that are part of the flexible mesh modelling systems have more options than other types of model setups.
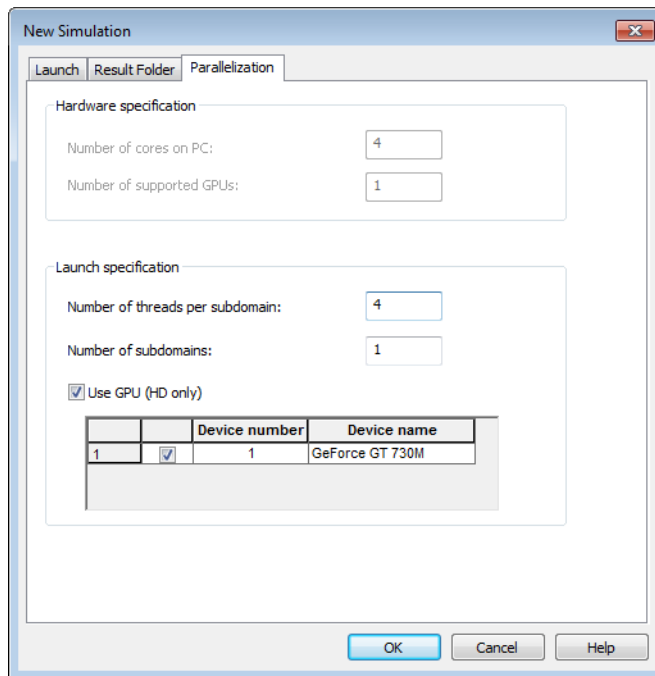
See also Parallelization Description *(p. 62)*.

Figure 5.4   Launch Simulation Engine dialog, Parallelization options

5.3.4 Progress View

The progress view includes an Application Progress Visualizer bar showing the progress of the simulation, current simulation time (or time step), computational speed and expected remaining computational time. You may also halt the simulation, change the base priority settings, suspend or set the simulation on idle.

The model simulation log file is shown at all times. By right-clicking on the log file in the progress windows you may use the 'Find…' feature to search in the log file. The 'Properties…' page provides you with information about the settings for the actual simulation.

PLEASE NOTE:
When enabling the 'Find…' feature, the simulation is suspended until you cancel the search.

5.4 Batch Execution

Figure 5.5   File for batch execution of MIKE 21 Flow Model.

From a command prompt the usual syntax for a launching model engine is:

MzLaunch [model input file] [options]

where 'Model Input File' is the full path to the model input file. If this is omitted, the tool will start prompting you for a name of model setup file. The MzLaunch utility will utilize the default model engine related to the extension of the setup file. If you want to use an alternative engine you may write the name explicitly. The default CPU priority of the simulation is 'Normal', however using e.g. the option '-y 2' you can specify the priority to be 'Below normal'. The option '-run' will cause the model to run in silent mode.

A full list of the all options is available when executing 'MzLaunch -h' from a command prompt.

If you have prepared a number of model input files, and want to carry out several simulations in a row you can create an ASCII batch file containing the prompts for each simulation, as shown in Figure 5.5 and Figure 5.6.

It is also possible to launch toolbox engines by using the syntax:

toolboxshell -run [toolbox input file]

and generate graphics files using plot objects by using the syntax:

MzPlotCompApp [plot composer input file] -printtofile [-options]

For more information regarding plotting graphic files in batch pls. see the documentation for Plot Composer.

5.4.1 Example

The example shown in Figure 5.6 will carry out two flow model calculations (one by call to MzLaunch, another with call directly to engine), process some of the data using the MIKE Zero toolbox tools and create two graphic files showing results from the simulation in one go using a batch script.

Figure 5.6   Sequence of command prompts for a typical MIKE 21 investigation

5.5 Parallelization Description

5.5.1 OpenMP computing approach

Parallelization for shared-memory multiprocessor/multicore computers is performed using OpenMP. OpenMP is an implementation of multithreading and it consists of a set of compiler directives, library routines, and environment variables.

Using the shared memory approach the computational tasks are divided on a number of threads.

5.5.2 MPI computing approach

To enable utilisation of distributed-memory systems, parallelization has been performed based on the message passing paradigm. The distribution of work and data is based on the domain decomposition concept, and Message Passing Interface (MPI) is used for communication between processors. The computational mesh is partitioned into a number of physical subdomains, and the work associated with each subdomain is processed by an individual processor. The data exchange between processors is based on the halo-layer approach with overlapping elements.

5.5.3 GPU computing approach

The GPU computing approach uses the computers graphics card to perform of the computational intensive calculations. This approach is based on CUDA™ by NVIDIA and can be executed on NVIDIA graphic cards with Compute Capability 2.0 or higher.

Some GPUs have a significantly higher processing power when performing single-precision floating-point calculations rather than double-precision floating-point calculations. The default setting for the flexible mesh based engines is to use double-precision floating-point calculations, because these are more accurate than single-precision floating-point calculations. However, it is possible to force the flexible mesh based engines to use single precision floating-point calculations. This is done by ticking off the "Use single precision GPU

calculations" checkbox in the Simulation Settings tab found in File → Options → User Settings.

6 MIKE Zero Project Framework

A MIKE Zero project is defined by three files sharing the same main name but with the extensions .mzp, .his and .txp, respectively.

- The project setup will be stored in an ascii-file with the extension .mzp. If this file is clicked in a standard File Explorer, the MIKE Zero shell will open and the project will be active in the Project View.

- The Simulation History data for the project (e.g. previous input files, engine executables, notes and observations) will be stored in an ascii file with the extension .his.

- Input data for tools accessed by the Tool Explorer will be stored in an ascii file with the extension .txp.

More details regarding tools and settings for MIKE Zero Projects are given below and in section 7 Working with a MIKE Zero Project *(p. 79)*.

6.1 MIKE Zero Project Definition

A MIKE Zero Project file (.mzp file) is a list of files and folders associated with a certain MIKE Zero project. All files and folders related to the project must be located in one or several folders recursively under the folder where the project file is positioned. Typically the files are MIKE Zero parameter files, i.e. files that correspond to specific types of MIKE Zero Editors, or MIKE Zero data files, i.e. binary files that contain input and results. It is, however, possible and very convenient to include other project documents such as Word documents, spreadsheets, images etc.

The project file contains information about the physical position on the hard disk of each file in the project. Each file also has a text string attached to it where notes regarding the particular file can be saved and a section with settings parameters, describing how to display the file in Project Map.

It is possible to include links to files in folders that are not a part of a MIKE Zero project. In that case a shortcut file is created, which links to the file in question.

Thus, the MIKE Zero Project file concept enables

- One Project file (.mzp) to include one or many Files
- One File to be attached to one or many Project files (.mzp)

The individual user of MIKE Zero can form their own project concept - naming of files, folder structure for files, etc. However, pre-defined Project Templates are a part of the installation.

> **PLEASE NOTE:**
> A Project must always contain one folder with the Folder type Result. If an old project file without a result folder is opened, a new folder named Result will automatically be added to the project.

6.2 User Settings

The User Settings dialog enables you to specify a number of base settings used in the MIKE Zero framework.

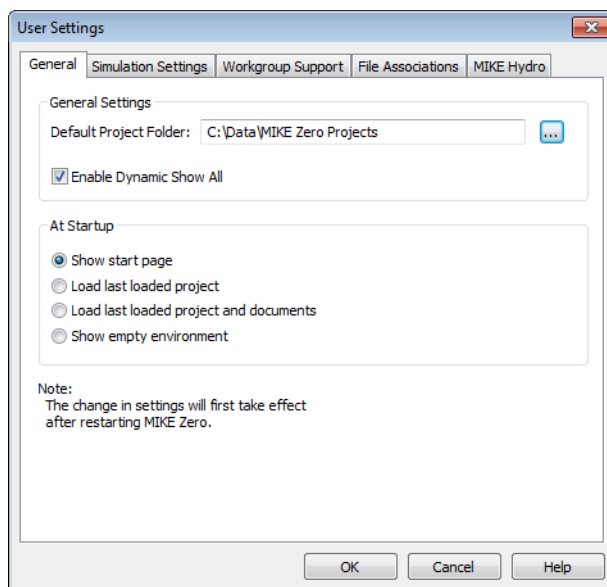### 6.2.1 General Settings

Figure 6.1   User Settings dialog: General settings

In this dialog you specify the default project folder used when setting up a new project in MIKE Zero and how the MIKE Zero shell is displayed when opened.

The 'Enable Dynamic Show All' feature manages whether folders in the Project Explorer with Show All enabled automatically will refresh the folder list if files are added to or removed from the folder. Files added to or removed from a folder from within MIKE Zero will always be reflected in the Project Explorer, however files added to or removed from a folder from another program will only automatically be listed in the Project Explorer if 'Enable Dynamic Show All' is enabled.

A special case is the Result type folder where the files always will be displayed.

PLEASE NOTE:
The change in settings will first take effect after restarting MIKE Zero.

6.2.2 Simulation settings

Figure 6.2   User Settings dialog: Simulation settings

In the simulation settings dialog you may specify the default simulation control and ways of notification once the simulation is finished.

E-mail notification

The e-mail notification in MIKE Zero is based on SMTP (Simple Mail Transfer Protocol). If you want to be notified by e-mail when the simulation has ended, you must specify the SMTP settings for your e-mail account in this dialog.

You can get the SMTP server name from e.g. the setup of your e-mail account. The SMTP port controls the port for which incoming mail connections will be accepted. Please note that it is strongly recommend that you do not change this value. The SMTP standard specifies that all SMTP servers must use port 25 and changing this value may prevent you from receiving incoming mail off the Internet. However, if you are using ICS, a router or a

firewall then you must ensure that the port forwarding listens on port 25 and forwards to the port value specified here. Finally, please enter your e-mail address in the user field.

PLEASE NOTE:
A log file (MzMail.log) including email initialization settings is available in the folder %TEMP%\\MzMail.log which will typically be C:\Users\[user name]\AppData\Local\Temp.

SMS notification

The SMS notification in MIKE Zero is based on Clickatell's SMS Gateway API (see http://www.clickatell.com). If you want to be notified by SMS when the simulation has ended, you must enable the SMS notification in this dialog.

Initial setup
Before you can use the SMS notification service in MIKE Zero you will need to purchase a number of SMS credits through Clickatell online service. The typical cost is EUR 0.044 per SMS credit.

Before using the SMS notification in MIKE Zero for the first time, you have to install a so-called key file. From a command prompt please execute 'MzClk-atl.exe - install' (the program MzClkatl.exe is included in the \bin folder of the MIKE Zero installation) and enter:

1. the Clickatell user name
2. the Clickatell password
3. the Clickatell API id

This information is provided by Clickatell upon purchasing the SMS credits.

Next step is to enable the SMS notification in the Simulation settings dialog (see Figure 6.2).

Notification
When executing a simulation please enter you phone number. The format is 'Country Code, Network prefix without the leading "0", Number, no spaces, only numerals'. At Clickatell's web site you may test your phone number.

Default simulation control

You may change the default base priority of the model simulation and the refresh interval.

Parallel computing

You may change the default parallelization approach for executing the flexible mesh models.

See also 5.3.3 Parallelization *(p. 60)*.
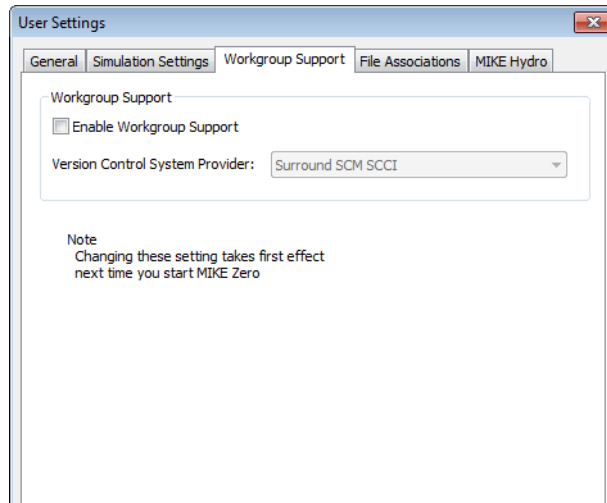
6.2.3 Workgroup Support

Figure 6.3   User Settings dialog: Workgroup Support

If you and a number of your colleagues are working on the same project as a team or workgroup, your project may benefit from using a Version Control System (VSC). In this dialog you enable workgroup support and specify the VSC provider. This requires an installation of a VSC system, see section 7.4 Version Control Interface *(p. 99)*.

PLEASE NOTE:
In order for the Version Control System in MIKE Zero to work the version control client and the MIKE Zero installation needs to be both either 32 bit or 64 bit.
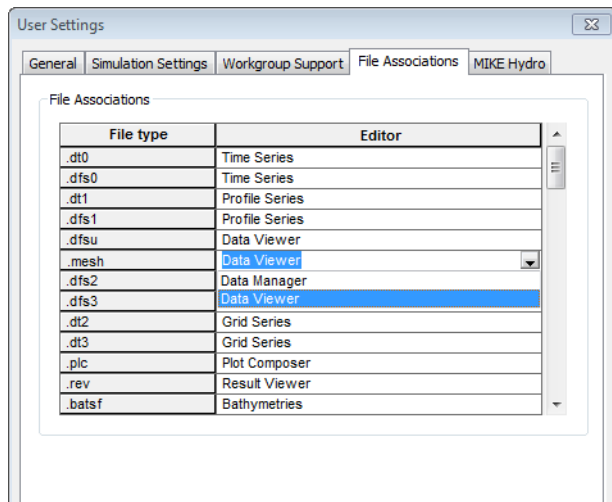
6.2.4   File Associations

Figure 6.4   User Settings dialog: File Associations

In the File Associations dialog you define the default editor to use when opening a specific file type. For some file types more than one editor may be selected, e.g. .mesh and .dfsu files.

When you double-click the file the default editor will be used, but you may open file with another editor by right-clicking the file in the Project Explorer or in a standard Windows Explorer and select 'Open With' instead of 'Open'. This will present you with a list of available editors and an option to set the selected editor as the new default editor for the specific file type.

6.2.5   MIKE HYDRO

You may change the general settings and language used when working with MIKE HYDRO.

6.3   Project Properties
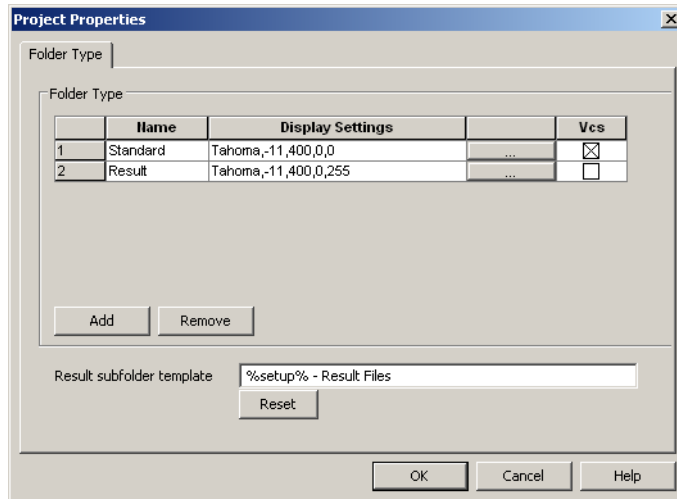
6.3.1   Folder type

Figure 6.5   Project Properties dialog: Folder Type

You can define the folders in your project to be different types dependent on the expected use and contents of the folder. The type of the folder will determine how the folder and folder contents is displayed in the Project Explorer and the access to Workgroup Support.

Per default two folder types are defined:

● Standard
  This is the default setting for all new folders.

● Result
  A project must have one, and only one, folder of type Result. All output data files, defined by local names, that are generated from models executed from within the project will be stored in sub-folders below this result folder and the data files will be displayed automatically in the Project Explorer.
  Pls. see additional description in Output DFS files *(p. 26)* and Result Folder *(p. 55)*.

By default the name of the sub-folder where the simulation result files are written are named *name-of-setup-file – Result Files*. You can change this name by altering the *Result subfolder template* parameter. Here you specify the name of the sub-folder. You can use the following macros:

● %setup%
  - will be replaced with the name of the setup file

- %setup2%
  - will be replaced with the name of the setup file excluding the extension
- %folder%
  - will be replaced with the name of the folder where the setup file is placed
- %date%
  - will be replaced with the current date in the format ddmm, e.g. 12Oct
- %user%
  - will be replaced with the name of the user

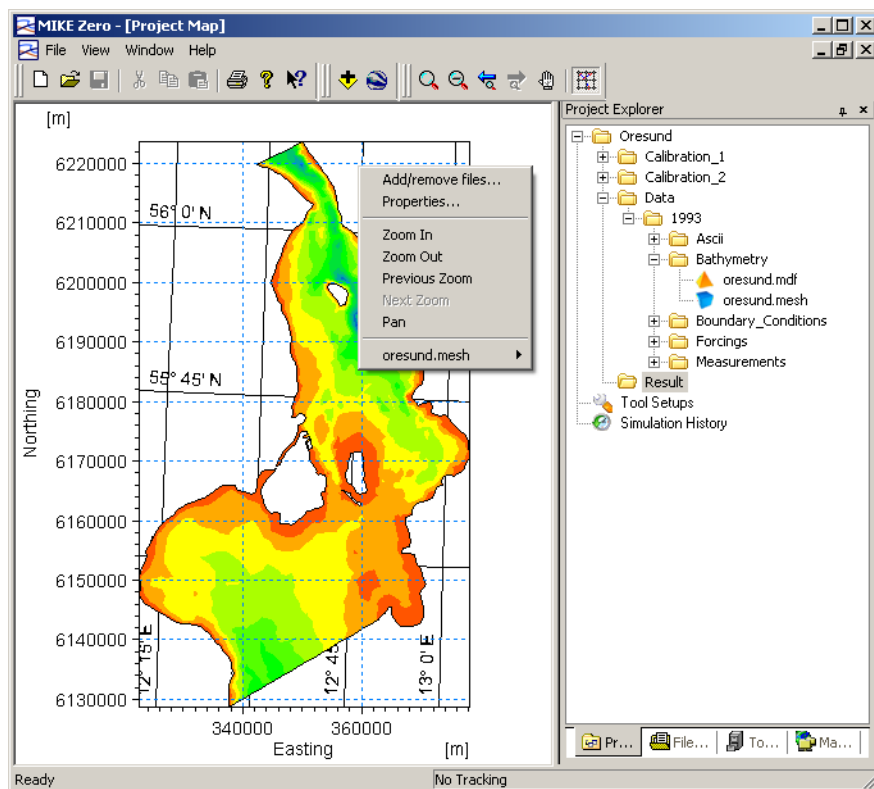The macros can be combined.

6.4   Project Map

Figure 6.6   Project Map Example: mesh file and time series file active in display

You may use the Project Map to show the location of files, that are part of the project, in a geographic environment.

The Project Map mode can be enabled selecting Project Map from the toolbar in the View drop-down menu or by going to the Map Explorer tab where you

have to right-click within the window and select Enable Project Map. After this you will see that the project goes into Project Map mode and that a geographic environment (map) appear.

In Project Map mode you can manage the files you would like to display geographically either by right-clicking the map (from where you can add and remove files and edit the overall properties of the Project Map) or by marking the relevant files directly from the Project Explorer tree, right-click and select Added To Project Map.

If you click in the vicinity of points or outlines,you will also be given the option to open the files.

6.4.1 Layer Manager

You can use the Layer Manager to add and edit images to the display. This consist of the Image Manager *(p. 43)* and the Overlay Manager *(p. 47)*.
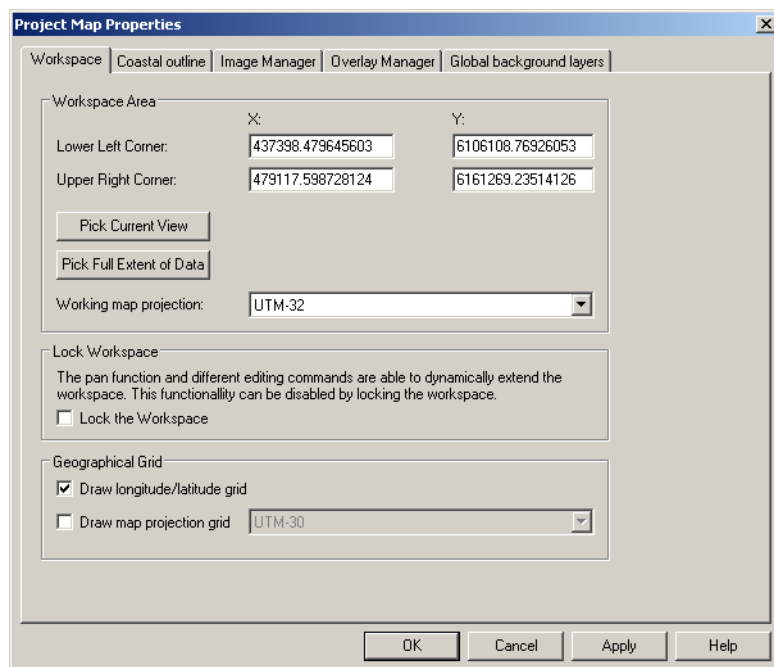
6.4.2 Workspace

Figure 6.7   Project Map: Workspace settings

The workspace dialog allows you to define the workspace area by setting the lower left and upper right corner coordinates. You can choose to select the current view as workspace area by pressing "Pick Current View" or you can scale the workspace area to the data by pressing "Pick Full Extent of Data".

The workspace area is specified in either map projection coordinates or geographical coordinates:

- The workspace area is defined in easting/northing if the working map projection combobox is set to e.g. WGS_1984_UTM_Zone_32N or OSGB (projected coordinate system)

- The workspace area is defined in degrees only if the map projection combobox is set to LONG/LAT.

The working map projection can be changed by using the combobox. If the map projection is changed all geo-referenced objects are mapped to the new working map projection.

You furthermore have the options to select and display geographical grids and to lock the workspace.

6.4.3 Global background layers

The Global background layers dialog allows you to specify whether or not the individual files displayed in Project Map should be used as global background layers in other presentation tools.

6.5 Simulation History

After each simulation in a MIKE Zero Project, the program writes simulation data in the Simulation History window, which is accessed through the top toolbar, see Figure 6.8.
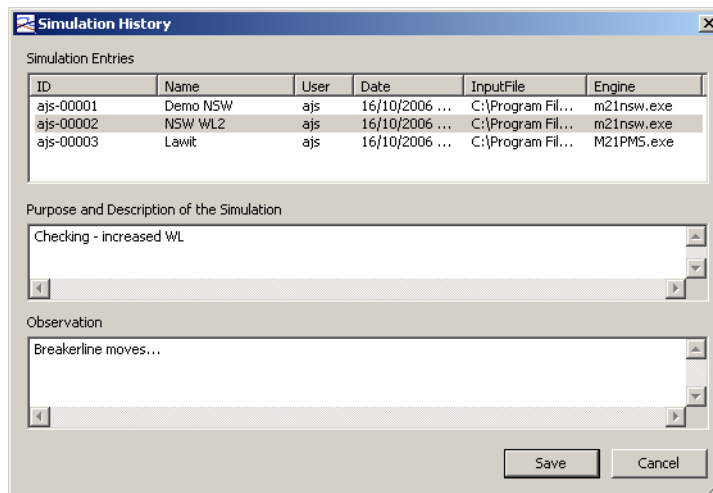

Figure 6.8   Simulation History window

The Simulation History window consists of the following three areas:

1. Simulation Entries
2. Purpose and Description of the Simulation
3. Observation

You can use this facility to follow your simulations and record your observations, e.g. during calibration of a model.

PLEASE NOTE:
The history of previous input files, engine executables, notes and observations is stored in the project file (with the extension .his).

If you have used the Launch Simulation to execute a simulation, the history of previous input files, engine executables, e-mail addresses and SMS dial strings is stored in the file MzLaunch.his available in the folder C:\Users\[User]\AppData\Local\DHI\2017\MIKE Zero, where [User] is the user identification name, e.g. initials.

6.5.1 Simulation Entries

The Simulation Entries area show a list of the simulations carried out.

For each simulation different information is recorded at the start time of the simulation:

- Simulation ID
- Name (of simulation)
  (defined in the Launch settings dialog)
- User
- Date
- Input file
- Engine

6.5.2 Purpose and Description of the Simulation

By selecting a simulation in the Simulation Entries area, the corresponding text concerning the purpose of the simulation is displayed. This text is created by the user in the Launch settings dialog at the start of the simulation and copied to the Simulation History.

You may edit the text later.

6.5.3 Observation

In the Observation area you have the option to record your own observations of the results from the simulation. This could be comments about accuracy,

good/bad results, model features, etc. This is especially useful when carrying out calibration runs, as the progress of the calibration can be recorded along with the model data, generating an overview of the calibration process.

6.6   Project Templates

A project template provides its own collection of folders for indicating the nature of the items in the project and to provide a better overview for the various files included. For example, a DHI project will typically hold separate folders for measured data, model input, model results and documentation.
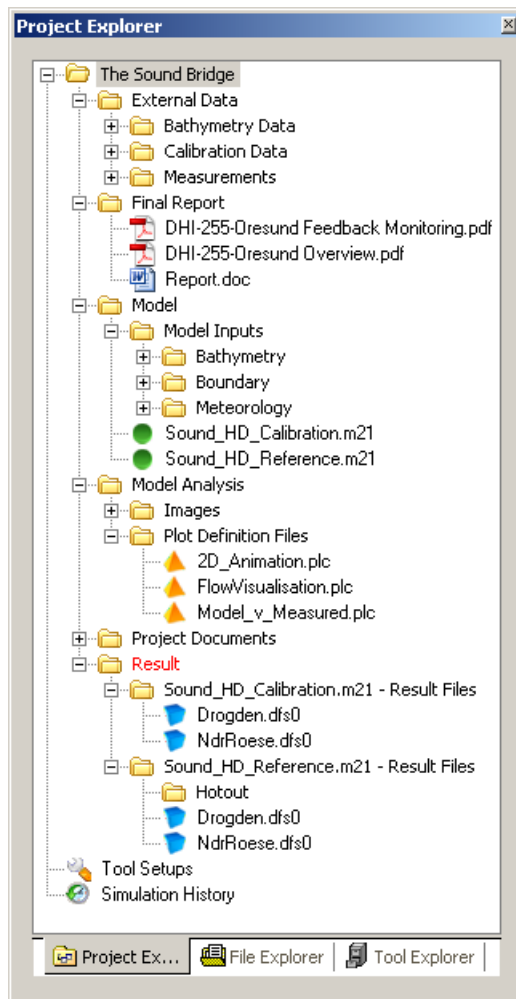
Figure 6.9   Example of Project using template

MIKE Zero comes with two pre-defined project templates:

- **Blank**
  This template is blank with no pre-defined folder structure.

- **General**
  This template has a pre-defined folder structure, which will apply to most models.

An example of a MIKE Zero project is shown in Figure 6.9, where the General template has been used to generate a new project with pre-defined folders and then modified to include additional subfolders.

User defined template

You can create your own templates to meet the needs of your individual project. Once a project has been created you have the possibility to edit or add new or existing folders and files to the project. When you are satisfied with the collection of folders in the project you may save the setup as a template.

PLEASE NOTE:
The pre-defined project templates will be installed together with the program, e.g. under '.\MIKEZero\Templates\Projects'.
The templates that you define yourself will be stored on the hard disk under 'Documents and Folders', e.g. in the folder 'C:\Documents and Settings\[User]\Local Settings\Application Data\DHI\[Year]\MIKE Zero\My Template'.

7 Working with a MIKE Zero Project

A MIKE Zero Project File is a collection of files, positioned in one or several folders recursively under the folder where the project file is positioned. Typically the files are MIKE Zero parameter files, i.e. files that correspond to specific types of MIKE Zero Editors, or MIKE Zero data files, i.e. binary files that contain input and results. It is, however, possible to include other file types as well, e.g. Word documents, files with raw data (e.g. measurement) and image files.

By creating a project including files and folders it is possible to quickly access the specific files relevant for a particular work task - everything included in one common shell, MIKE Zero.

7.1 Start Page

MIKE Zero will keep track of the projects previously used in MIKE Zero. When opening MIKE Zero, a start page appears from which you can open old projects or create new projects, see Figure 7.1. Furthermore you have the option to install one or more of the examples applied with the installation in a directory of your choice.
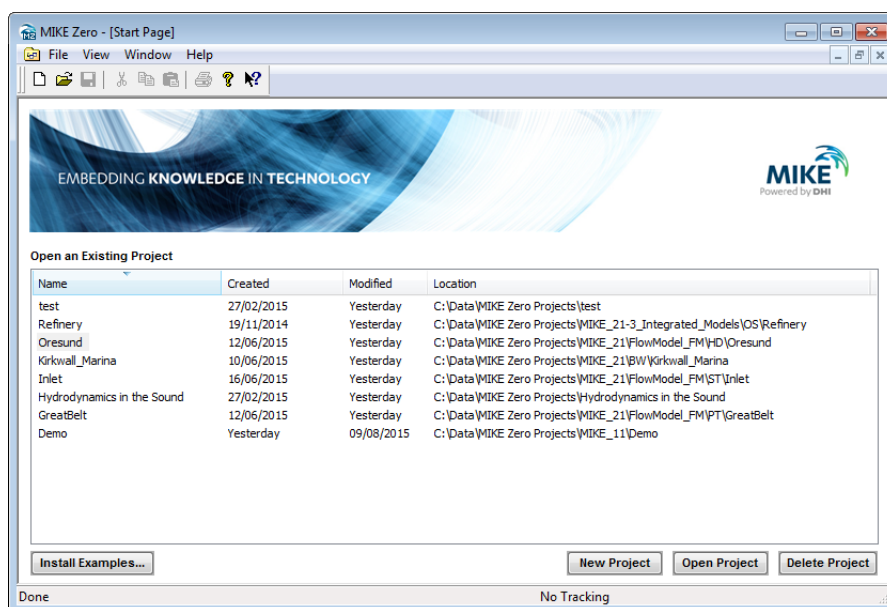

Figure 7.1   Start Page window in MIKE Zero

7.2 MIKE Zero Project

7.2.1 New Project

You have three options to create a new MIKE Zero project file (.mzp):

- Create a new project using templates
- Create a new project from folder
- Create a new project from setup file

A folder named Result will automatically be added to the project to contain local output data files.

After creating the project you have the possibility to edit or add new or existing folders and files to the project by right-clicking the project or a project folder in the Project Explorer pane.

The project will have the same tools and capabilities independent of the way of creation.

PLEASE NOTE:
If you want to create a MIKE Zero project file (.mzp) to contain existing data from e.g. an old investigation, it is convenient to use the "Create a new project from folder" option.

Create a new project using templates

1. On the File menu, select New, Project...
2. In the New Project dialog box, select a Category in the left pane.
3. Select a template in the right pane.
4. Enter Name for the new project.
5. Enter Client name (optional).
6. Enter location for the new project. You have the option to create a new folder with the project name or to place the new project in an existing folder.

Dependent on the selected template, the Project View will be updated showing the new Project and associated folders in the Project Explorer pane.

You will get the option to add the project to a Version Control System using the MIKE Zero Version Control Interface.

Press 'F1' or click on 'Help' in the New Project dialog box for more information about specific project templates.
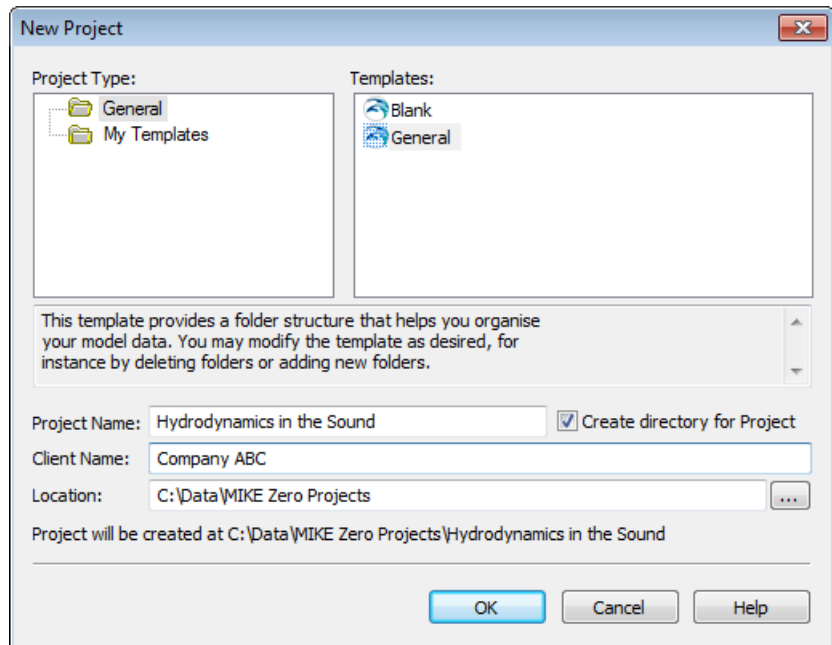
Figure 7.2   New Project dialog using templates

Create a new project from folder

This option creates a project where all existing files within the folder and sub-folders may be included in the project by default, maintaining the folder structure. The project file will be positioned in the same directory folder as the selected.

1.   On the File menu, select New, Project from Folder...

2.   Select the folder.

3.   In the next dialog select the folders and files you want to include in the project.

Dependent on the selections, the Project View will be updated showing the new project and selected files and folders in the Project Explorer and File Explorer panes.

Create a new project from setup file

This option creates a project where all existing files defined in the setup file are included in the project by default. The project file will be positioned in the same directory folder as the setup file.

1. On the File menu, select New, Project from Setup File...

2. Select the setup file.

Dependent on the selected setup file, the Project View will be updated showing the new project and associated files in the Project Explorer and File Explorer panes.

PLEASE NOTE:

In case an associated file is not located in the same directory as the setup file, a shortcut will be created that points to the original files. Initially no folders other than the main project will be generated.

7.2.2 Open Project

1. On the File menu, select Open, Project...

2. Select the project file

Dependent on the selected project file, the Project View will be updated showing the Project and associated folders and files in the Project Explorer and File Explorer panes. The layout of the display will be the same as the last time the project was closed.

7.2.3 Delete Project

You may delete a MIKE Zero project in two ways:

- Delete all referenced files
  This sends the project file (.mzp) and all files that are included in the project to the recycle bin.

- Remove .mzp file only
  This sends the project file (.mzp) to the recycle bin. The files that were included in the project, including the project history file (.his) and toolbox file (.txp) remains.

7.2.4 Project Properties

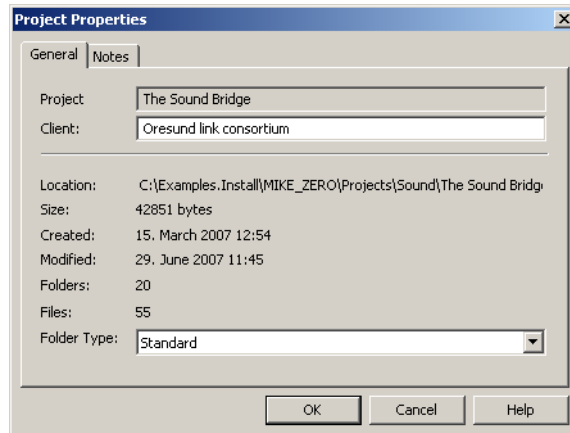The project properties consist of General information and Notes, see Figure 7.3.

Figure 7.3   Project Properties

When a project is open in the Project Explorer you can view the project properties by right-clicking.

To view the project properties for a project:

1.   In Project Explorer, select the project
2.   Right-click in the Project Explorer and select Properties...

General

The general information consists of the location and name of the project and the name of the client. These data were inserted at the time of creation.

Furthermore, the time of creation and modification is included as well as the Folder type.

Notes

You may add notes to the project file. These notes can be used to describe the aim of the project or the contents herein, and will aid in a quick identification of the project.

7.2.5   Adding Folders to Project

You have two options to manually add folders to a project

● Add new folder
● Add existing folder

Folders containing output files from a project setup must not necessarily be a part of the project, but it is advisable.

PLEASE NOTE:
Per default the Folder type is set to Standard. You may right-click the folder in the Project Explorer to change the folder type in the Properties... dialog.

Add new folder

To add a new folder to a project

1. In the Project Explorer, select the project or a project folder.
2. Right-click in the Project Explorer and select Add Folder...
3. Enter Name for the new folder.
4. Enter notes (optional).
5. Press 'OK' to accept input.

This will create a new folder on the hard disk and in the project.

Add existing folder

To add an existing folder to a project

1. In the Project Explorer, select the project or a project folder.
2. Right-click in the Project Explorer and select Add Folder...
3. Click the drop-down list in the name field showing the available folders.
4. Select the folder name
5. Enter notes (optional).
6. Press 'OK' to accept input.

This will include the existing folder in the project. Note, that the files within the folder is **not** included in the project at the same time.

7.2.6 Adding Files to Project

You have two options to manually add files to a project

- Add new file
- Add existing file

Files created during numerical simulation of a setup included in a project will not automatically be added to the project.
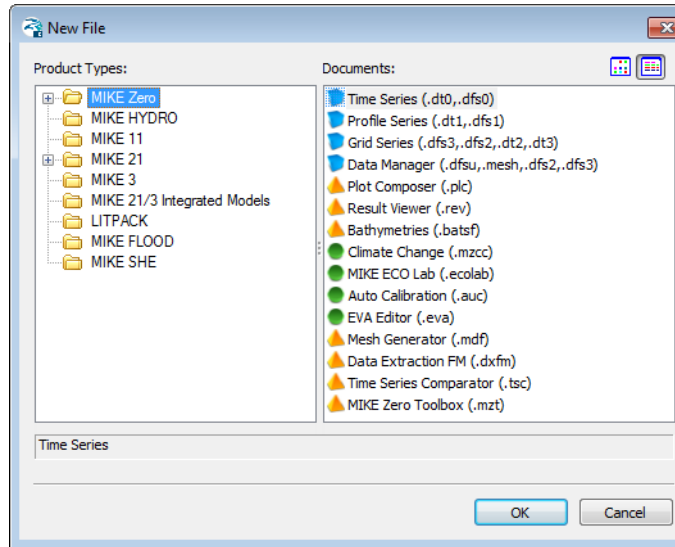
Figure 7.4   Adding New File

Add new file

To add a new file to a project

1. In the Project Explorer, select the project or a project folder.
2. On the File menu, select New, File... or
    right-click in the Project Explorer and select Add New File...
3. In the New File dialog box, select a Category in the left pane.
4. Select a file type in the right pane.

This will open the tool required to create the new file.
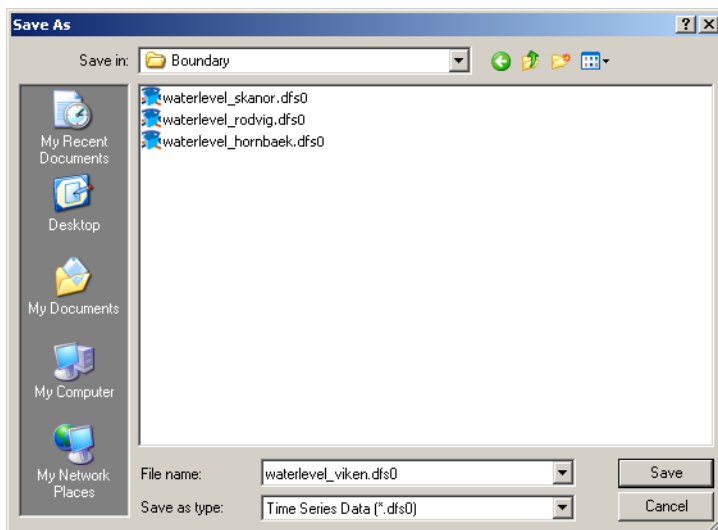
5. Edit the contents of the file (optional).
6. Press 'Save' to save the file.

Figure 7.5   Saving new file

7. In the Save dialog box, enter Name and location for the new file.

8. Press 'OK' to accept input and save the file.

Once the file is saved on the hard disk the project will be updated and the Project View will show the new file in the chosen folder.

Add existing file

To add an existing file to a project

1. In the Project Explorer, select the project or a project folder.

2. Right-click the folder and select Add Existing File...

3. Browse and select an existing file.

4. Enter notes describing the file (optional).

5. Select either to copy the file to the active folder or to create a shortcut.

6. Press 'OK' to accept input.

Once added the Project View will be updated with the selected file in the chosen folder.

PLEASE NOTE:
Files that are added to the project by a shortcut cannot be displayed in Project Map.
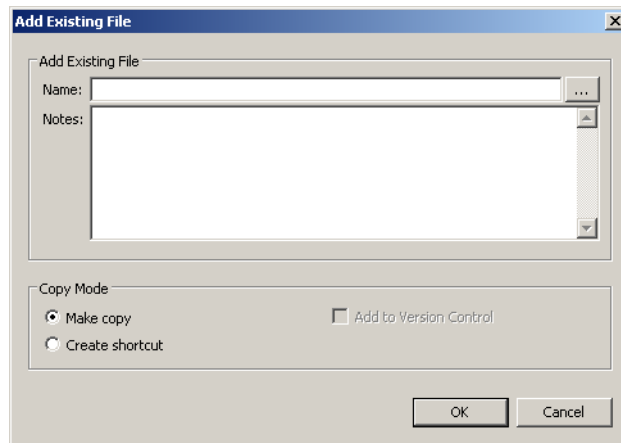
Figure 7.6   Add Existing File

7.2.7   Folder/File Properties

Each folder and file within the project can be described by properties. The common properties include general information and notes. Apart from this the folder contains information about the Folder type and the file properties contains information about the file display settings defined for Project Map *(p. 72)*.

The general information consists of the location and name of the folder or file, the size of the folder/file and the time of creation and modification.

The notes may be added at the time of creation, but may also be added or edited at a later stage.

To view the folder or file properties:

1. In the Project Explorer, select the folder or file

2. Right-click in the Project Explorer and select Properties...

Folder type
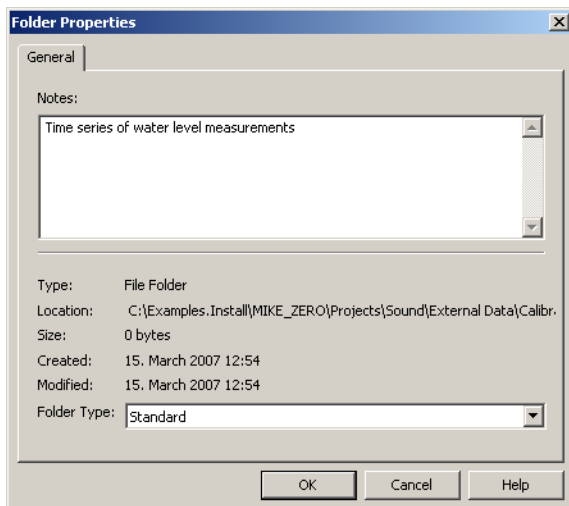
Figure 7.7   Folder properties

You can change the Folder type by selecting among the available types. Note that a warning will be issued when you try to select Result because a folder will already be defined by this type.

Geo Position
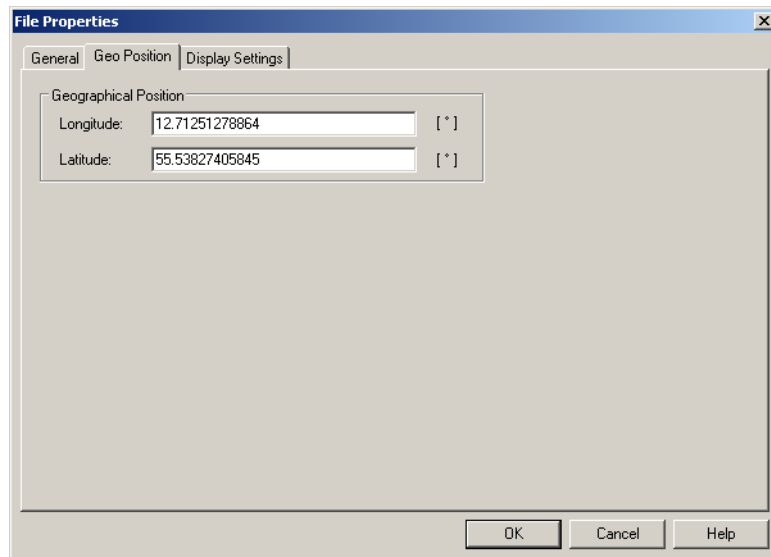
Figure 7.8   File properties: Geo Position

Files in the project that contains no geographical information can be related to a position in the Project Map by entering a geographical position.

If the file already contains geographical information, e.g. 2D and 3D data files, the Geo Position tab will not be shown.

Display Settings
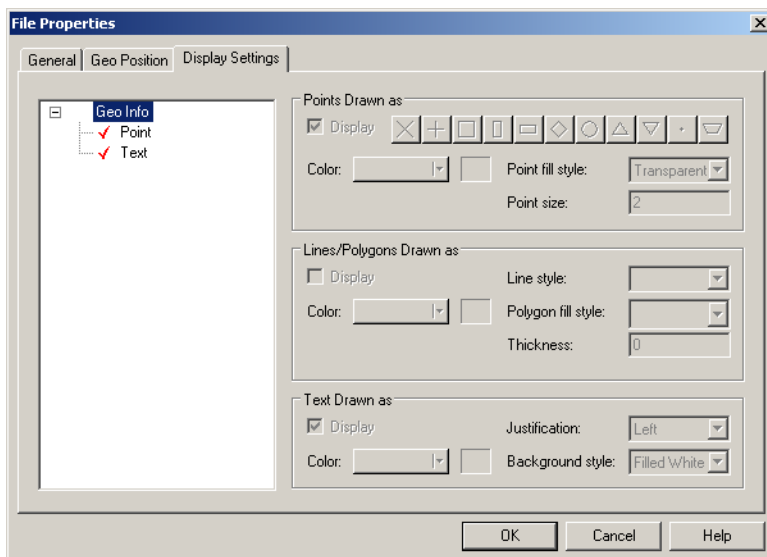
Figure 7.9   File properties: Display settings

The display settings panel allows you to control the attributes for the referenced position or outline of data in Project Map.

7.3 Project View

The Project View provides you with an organized view of the set of files comprising the project as well as ready access to the commands that pertain to them. To display Project View, select Project Explorer on the View menu.

The Project View contains four main panes:

- Project Explorer lists the files in the project according to the physical placement in folders.
- File Explorer lists the files in the project according to the file type.
- Tool Explorer list the available plot- and toolbox tools and attached setup files according to the application.
- Map Explorer list the files that are included for display in Project Map

Double-clicking a file in the Project Explorer pane will start the application corresponding to the file type.

7.3.1 File Status

The display of icons and file names provides updated information about the status of the files.

A file name shown in bold font in the Project Explorer pane reflects that the file is opened in the main MIKE Zero window Shell.

If an asterisk '*' is succeeding the file name, the file has been modified without being saved.

An icon is placed in front of the file name or folder to reflect the file type and status of the file or folder.

Icons

Most MIKE Zero files are attached by one of the three icons below:

MIKE Zero data
(e.g. .dfs0, .dfs1, .dfs2, .dfs3, .mesh, .dfsu, .nwk11)

MIKE Zero model setup
(e.g. .bw, .m21fm, .sim11, .hd11, .she, .m3)

MIKE Zero tool setup
(e.g. .plc, .batsf,.mdf, .mzt, .21t, .mza)

The file icons can indicate a variety of information about an item. For example, depending on the project, you might see an icon indicating that an item is a MIKE Zero file or that a file is a shortcut.

Signal icons indicate information about the status of your files relating to the Version Control Interface. Please see Signal icons *(p. 103)* for further information.

Because icons can be modified and attached to various file types, the following list is a partial representation of those you might encounter while working with the Project View..

Table 7.1

	Folder
	Active Folder
	Folder not included in project
	Folder in project not found
	DHI dfs data file
	DHI Model input file
	DHI Tool input file
	Shortcut to DHI dfs data file
	Shortcut to DHI Model input file
	Shortcut to DHI Tool input file
	Spatial data (.xyz file extension)
	File opened by Notepad
	Unknown file type
	Word file
	File in result folder, not included in project
	File not included in project
	File in project not found
	Tool Area, collection of Tool Groups

Table 7.1

⬚🔨	Tool Group, collection of Tools
↗🔨	Tools associated with Favorites

7.3.2 Project Explorer

The Project Explorer is the first of the four panes in the Project View.
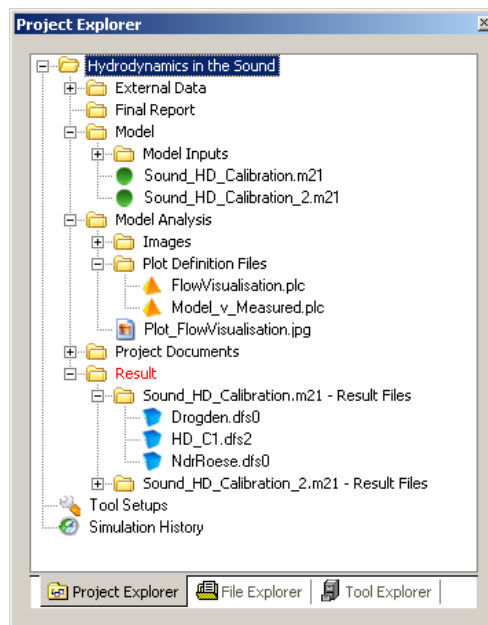
Figure 7.10   Project Explorer pane in the Project View

The standard Project Explorer view presents a logical container for a project and the files associated with it. You can open files for editing and perform other management tasks directly from this view.

Hierarchical display

The folder structure in the Project Explorer reflects the actual physical storage of the files listed. However, some of the files may be shortcuts to files stored elsewhere.

The project and its files appear in a hierarchical display, which provides updated information about the status of your project and files. Icons for each file indicate the type of the file and its status in connection to the Version Control Interface.

Commands

You can open files, add and remove files, and perform other management tasks. Each project template provides its own folders and icons for indicating the nature of the files in the project. You can add and remove folders and files to meet the needs of your individual project. However, the access to the folder with Folder type Result has certain restrictions.

PLEASE NOTE:
To display all miscellaneous files in a folder or project, right-click in the tree view and select the option 'Show All'. The command is recursive. If files have been added to the folder outside the project after you have activated the 'Show All', you must deactivate and activate the option again to view the recently added files unless you have enabled the 'Enable Dynamic Show All' option in User Settings.

Selection

You can double-click a file to display it in the designer, tool or editor associated with the file type.

Right-clicking a folder will provide you with a context menu from where e.g. new folders or files can be added.

Right-clicking a file will provide you with a context menu from where e.g. the file can be removed from or added to the project. You can also choose to enable the file for display in Project Map or edit the properties (see Folder/File Properties *(p. 87)*).

Zip

You can zip any file or folder within the project by right-clicking the file and folder and select the zip utility.

This brings up a window where you specify the name and location of the zip-file. If applicable, you may furthermore specify whether to include referenced files or not. This is the case with setup-files, where you refer to e.g. the bathymetry data file and the boundary data files.

If you zip a folder, the underlying folder structure and files are included in the zip-file. To zip files you need the tool winzip. Please visit the winzip web site http://www.winzip.com for a copy.

PLEASE NOTE:
If you want to give another user the necessary files to be able to simulate a setup of your own, you can use this facility to zip the setup file and all related files in one process. The 'Include referenced files' option ensures that all files necessary to simulate the setup are included.

Result Files

If the output files is specified by a local file name, i.e. without a global path, the generated files are placed in a special Result Folder. The files are not included in the project, and as such are not displayed in the File Explorer. However, due to the special behaviour of folders with Folder type Result, the files are always displayed in the Project Explorer, even without the Show All option enabled.

See also Output DFS files *(p. 26)*.

7.3.3 File Explorer

The File Explorer is the second of the four panes in the Project View. Unlike the Project Explorer, the File Explorer only lists the files, which are actually contained in the project, and groups the files according to file type.
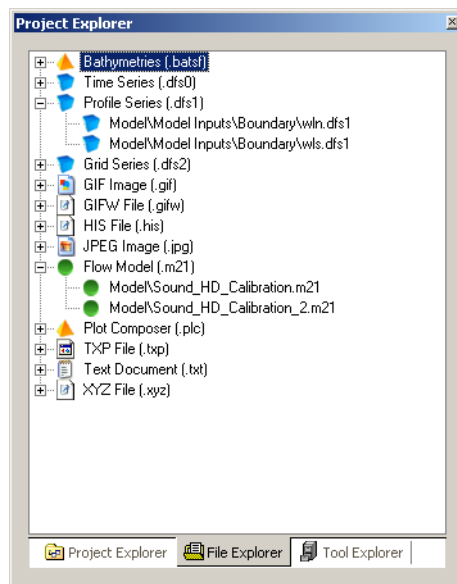

Figure 7.11   File Explorer pane in the Project View

Hierarchical display

The files are divided into groups according to file type. Within each group the list of files may be sorted in one of four ways

- Alphabetical order
- Creation date
- Modification date

- Size

Right-clicking the group will provide you with a context menu where the way of sorting is selected.

Selection

You can double-click a file to display it in the designer, tool or editor associated with the file type.

Right-clicking a file will provide you with a context menu where you may view the properties of the file.

7.3.4 Tool Explorer

The Tool Explorer is the third of the four panes in Project View. The Tool Explorer enables you to access all tools and plot objects available for different Product types (Tool Areas) and graphics types without having to generate a separate toolbox file for each Tool Area or a Plot Composer file for each plot.
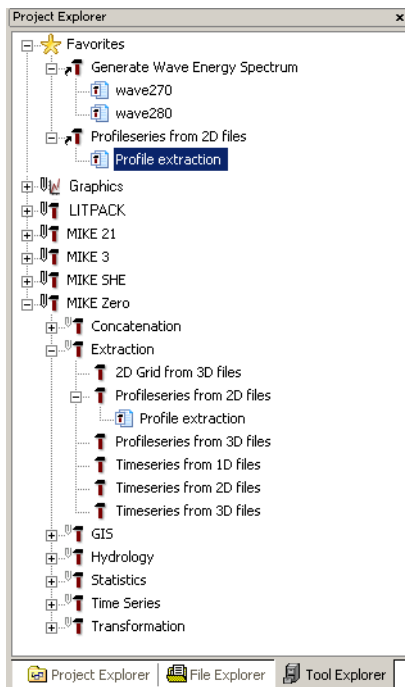

Figure 7.12   Tool Explorer pane in Project View

Hierarchical display

The tools and files are divided into Tool Areas, Tool Groups and Tools dependent on the overall application. The Tool Areas reflect the different Product Types in MIKE Zero, whereas the Tool Groups reflect the type of tool.

For each tool the existing setup entries are listed in alphabetical order.

Commands

You may run, edit, copy, rename and remove setups for the various tools in the Tool Explorer by right-clicking the setup file.

You may add a tool to the Favorites folder by right-clicking the tool and selecting 'Pin to Favorites'.

Selection

You can double-click a setup file to display the file in the corresponding editor.

If you double-click a Tool, the corresponding editor will open and you may create a new setup.

Favorites

In the Favorites folder you can save links to frequently used tools.

Tool Areas

The Tool Areas listed in the Tool Explorer correspond to tools and plot objects related to the major modelling systems of DHI Software within MIKE Zero:

- GRAPHICS
- LITPACK
- MIKE 21
- MIKE 3
- MIKE FLOOD
- MIKE SHE
- MIKE Zero
- Oil Spill

7.3.5 Map Explorer

The Map Explorer is the fourth of the four panes in Project View. The Map Explorer only lists the files which is actually displayed in Project Map.
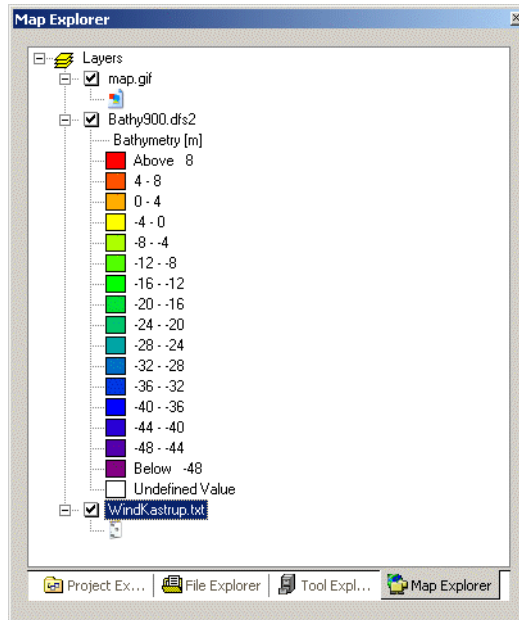
Figure 7.13   Map Explorer in Project View

Hierarchical display

The files are sorted according to the updated overlay drawing order.

Right-clicking a file will provide you with a context menu from where e.g. the file can be removed from Project Map. You can also choose to edit the display properties of the file.

PLEASE NOTE:
If the file is displayed in Project Map using a color scale you have the option to include the color legend to the map from the properties page.
See also Grid settings *(p. 40)*.

Layers

Right-clicking the top Layers group will provide you with a context menu from where you may add or remove files from Project Map. You also have the option to display all the files in Google Earth (provided this program is installed on your computer). Finally you can choose to edit the overall properties for Project Map.

PLEASE NOTE:
It is only possible to export images from Project Map to show in Google Earth if the color quality display settings are set to 32 bit colors (highest). In case this is not possible the tool MIKE to Google Earth can be used as an alternative.

7.4 Version Control Interface

MIKE Zero provides an integrated Version Control Interface, which linked to a Version Control System (VCS) supports workgroup-oriented projects.

As MIKE Zero is a very file-oriented system, the workflow the system imposes is based on creating, using and sharing files. A simple solution for supporting workgroups has been to interface the MIKE Zero Project Explorer with a standard version control system. This makes it possible for workgroups to share files in a simple and well-known manner.

An example of use is a scenario where three persons are working together on the same project, see Figure 7.14. The project artifacts (data, input files, documents, etc.) are stored in a central repository. In order to work with the artifacts, the users should retrieve copies of the artifacts from the central repository to their own work station. The artifacts can be retrieved in either read-only or write mode.
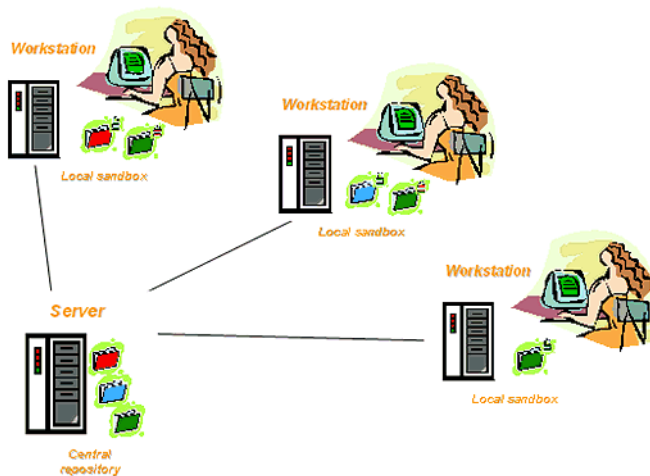

Figure 7.14   Example of users sharing the same repository

7.4.1 Concept of Version Control

The term Version Control describes a system in which a central piece of server software stores and tracks file versions and controls access to version-controlled files.

A typical version control system includes a version control provider and two or more version control clients.

A version control provider provides archiving, versioning, and control facilities for a dynamically defined set of files. For each file version it uses reverse

delta technology to store the difference between the present and the preceding file version. The version control provider also stores crucial information about the version: when it was created, when it was modified, and by whom.

To avoid conflicting file versions, a version control provider controls file access, enforcing a protocol by which users who want to modify a file must check out the file. If a file is checked out exclusively, only the user who checked it out can modify it. When a file is checked in again it becomes the latest available version.

File check-outs, check-ins, and other version control operations are accomplished through a version control client. The client is designed to interact with the provider to make the provider's capabilities available to a distributed group of users. Using a version control client, users can browse the files stored by the provider; add and delete files; check files in and out, and retrieve copies of local files.

Version control benefits

Placing your assets under version control makes it possible to:

- Manage the process by which the control of items passes from one person to another. Version control providers support both shared and exclusive file access. If access to project files is exclusive, the version control provider allows only one user at a time to check them out and modify them. If access is shared, more than one use can check out the file, and the version control provider provides a mechanism for merging the versions as they are checked in. Typically binary files will have an exclusive access whereas ascii files will be shared.

- Archive successive versions of version-controlled items. A version control provider stores the data that distinguishes one version of a version-controlled item from another. Consequently, you can retrieve any version of a version-controlled item. You can also designate any version to be the latest version of that item.

- Maintain detailed historical and version information on version-controlled items. Version control stores detailed information about each version of an item: the date and time on which it was created, when it was checked out or checked in, and the user who performed the action.

- Collaborate across projects. File sharing makes it possible for multiple projects to share version-controlled items. Changes to a shared item are reflected in all the projects that share the item.

- Automate frequently repeated version control operations. A version control provider may define a command-line interface that supports the key features of version control. You can use this interface in batch files to automate the version control tasks that you perform regularly.

- Recover from accidental deletions. You can restore the latest file version checked into version control.

- Conserve disk space on both the version control client and server. Some version control providers support disk space conservation on the server by using the reverse delta technique to keep track of file and project changes; this technique tracks versions by storing the latest version of a file and the differences between each version and the version that precedes or follows it. You can cloak folders and files so that they are not downloaded to your local disk.

7.4.2   MIKE Zero VCS User Interface

The Version Control System in MIKE Zero consists of the following:

- A version control provider (3rd party software such as PVCS or Seapine) that controls a Version Control Archive.

- A version control client, i.e. User Interface, designed specifically for interfacing MIKE Zero.

The VCS User Interface provides the user with all basic functionalities of a VCS system, such as adding or getting files from VCS, check-in and check-out of files, unlocking files and changing VCS bindings.

The features can either be accessed through the VCS User Interface Toolbar or through the Context menu in the Project Explorer activated by right-clicking a file or folder.

Signal icons indicate the status of the files in VCS, e.g. if the files are checked out, checked in or unavailable for editing.

NOTE: In order for the Version Control System in MIKE Zero to work the version control client and the MIKE Zero installation needs to be both 64 bit.

Toolbar

The VCS User Control toolbar is only visible if the project that is open has been attached to a Version Control archive. The different buttons on the toolbar are shown below.

Table 7.2

1		Changing the VCS binding for the project. Activating this button displays a dialog where the you can - Disconnect the project from the VCS (if attached) - Attach the project to an existing project in the VCS - Attach the project to a new project in the VCS
2		'Get' Getting a read-only copy of the latest version of the file from the archive
3		'Check-out' Getting a read-write copy of the latest version of the file from the archive
4		'Check-in' Updating the archive with a previous checked-out version. You will get the option to give a check-in comment
5		'Unlock' Unlocking a previous checked-out file
6		Launch the VCS native client
7		Refresh the tree from VCS client

The buttons 2, 3, 4 and 5 are only enabled if you have selected a node in the Project Explorer. If the selected node is a file, the actions are limited to the specific file. If the node is a folder, you will be asked if the actions shall be performed recursively down the hierarchy or just to the files in the specified folder.

Context menu

By right-clicking the Project node in the Project Explorer you can open the Project Properties property sheet from the context menu. From this you can change the VCS bindings for the project, similar to the first toolbar button.

The VCS menu items in the Project Explorer context menu for files and folders are only visible if the project that is open has been attached to a version control archive. The following menu items are presented:

1. Show pending check-ins
2. Get - getting a read-only copy of the latest version of the file from the archive
3. Check-out - getting a read-write copy of the latest version of the file from the archive
4. Check-in - updating the archive with a previous checked-out version. You will get the option to give a check-in comment
5. Unlock - unlocking a previous checked-out file
6. History - showing a dialog listing the check-in/check-out history of the file
7. Add to VCS - adding the corresponding file to the VCS. This menu item is only enabled if the file is not already part of the VCS

The first four menu items behave as the corresponding Toolbar buttons. Only the relevant items will be displayed, e.g. if the file has not been checked out there will be no item displayed for Check-in.

Signal icons

Signal icons indicate information about the status of your files relating to the Version Control Interface. The icons are only shown if the project is binded to VCS.

Table 7.3

🔴	Item has been moved, renamed, or deleted in the project directory and cannot be found
🔒	Item is checked into the source control database
✔	Item is checked out from the source control database
✔!	Item is checked out exclusively from the source control database
⊘	Item is locked exclusively by another user in the source control database
◆	Item is not included in the source control database

The Version Control System controls the type of check-out. Typically binary files will be checked out exclusively, while ascii files will be checked out in common mode.

7.4.3 Adding VCS to MIKE Zero

You can configure the VCS independently of the project via the general settings dialog in the VCS dialog. These settings will be used as default input when trying to add a project to the VCS.

If you have added VCS to MIKE Zero, all projects in MIKE Zero will try to link to the corresponding repository in the VCS.

To enable VCS in MIKE Zero, see section 6.2.3 Workgroup Support *(p. 69)*.

7.4.4 Adding to VCS

You can add items either by use of the toolbar menu icons or through the context menu.

The option to include folders and files to VCS will only be available if the project and path to the new folder/file already are entirely within VCS.

Adding project to VCS

When loading existing projects MIKE Zero will try to link to the corresponding repository in the VCS. A warning will be issued if the VCS folder cannot be found.

If you want to add a project to VCS, right-click the project in the Project Explorer and select Add to Source Control.

Adding folder to VCS

When creating and naming a new folder within the Project Explorer you will be given the option to add the folder to VCS.

If the folder exists, you can add the folder by right-clicking the folder in the Project Explorer and select Add to Source Control. Existing files within the folder will be added recursively.

If you have retrieved the folder (and files) from VCS for editing, you have two options for adding the folder and contents to VCS:

- Check In the folder (and files within) with editions
- Undo Check Out of the folder (and files)

Adding file to VCS

When creating and naming a new file within the Project Explorer you will be given the option to add the file to VCS.

If you have retrieved the file from VCS for editing, you will have two options for saving the file:

- Check In the file with editions
- Undo Check Out of the file

If the file already exists in VCS, you can add a comment to describe the new editions in the file.

7.4.5 Retrieving from VCS

Once a project and its contents are added to VCS you can always retrieve the latest version of the project folders and files. Dependent on other users of VCS you should be able to check out files for editing.

You can retrieve items either by use of the toolbar menu icons or through the context menu.

Retrieving project from VCS

You may open a project from VCS by using File → VCS Control → Open from VCS control. Having selected a folder, all files within the folder will be retrieved recursively and placed on your hard disk. Following the selection of a .mzp file the project will be opened in the Project View.

It is not necessary to retrieve all files within a project. The icons will show if files are in the project but not retrieved from VCS.

Retrieving folder from VCS

You have two options for retrieving a folder from VCS:

- Get latest version
- Check Out the file for editing

When you retrieve a folder from VCS all files within the folder are retrieved with the same option (if possible).

If you retrieve a folder from VCS, which is not placed on the hard disk already, the folder in which the folder is situated will be retrieved as well.

Retrieving file from VCS

You have two options for retrieving a file from VCS:

- Get latest version

- Check Out the file for editing

If you retrieve a file from VCS, which is not placed on the hard disk already, the folder in which the file is situated will be retrieved as well.

7.4.6 Pending Check-ins

MIKE Zero keeps track of all files in the project that are checked out of the archive. You may add all or part of the files to the archive in one session by selecting the file names in the dialog. Furthermore, you may add a comment, common for all files, to be saved in VCS along with the files.

If you loose connection to the VCS provider during your session and try to add files to the archive during that period, MIKE Zero will keep track of the files. Once the connection is restored, the files can be checked into VCS.

8 Examples Included in the Installation

8.1 How to Use the Model Example Setups

Setting up a model - especially for new users of MIKE Zero - typically introduces some initial problems on how to schematise the physical/mathematical model, which input data are required, how to combine the hydraulic data and topographical surveys, etc. To reduce the amount of initial difficulties in the process of setting up a model for the first time, it is often beneficial to obtain experience from already existing setups.

In the MIKE Zero installation you will find examples of model setups including all required data input files to perform a simulation with any of the licensed MIKE Zero computational modules. The examples are typically described in the User Guides or Step-by-Step Training Guides for the separate computational modules. This documentation can be accessed via the MIKE Zero Documentation Index.

The input files for the demonstration setups are located in the .\MIKE Zero\Examples-folder. You have the option to copy the examples to another position, see p.13. Each example is defined by a project file and the input data consist of comprised data files and model bathymetries, boundary definitions, time series data and other parameters, etc.

For the purpose of giving an overview, the model setups are also included in a number of project files, each representing a major modelling system within MIKE Zero.

The enclosed setups (if more than one) differ from each other in several ways: Different modules are treated and different aspects, facilities, complexities, etc. for the respective modules are covered.

MIKE Zero can be run both as a Demo version (without a software key and valid license files) and as a Licensed version (with software key and valid license files for one or more of the modules). If MIKE Zero is being run as a as Demo version, several limitations will apply compared to a licensed version. All editors will be accessible and operate as in a licensed version, but restrictions will apply to the kind of model simulations that can be executed.

In the following examples the focus has been put on the use and application of Project Oriented Water Modelling using the new Working with a MIKE Zero Project concept.

A directory is provided for each example. The directory names are as follows (these may have been changed during your installation; please ask your system administrator if you cannot find the directories):

- Open Existing Project and View File:
  Examples\MIKE_Zero\Projects\Sound

- Use Project Template to Structure MIKE 11:
  Examples\MIKE_Zero\Projects\Vida

- Display data from Project Map in Google Earth:
  Examples\MIKE_Zero\Projects\GoogleEarthDisplay

- Project Oriented Water Modelling, From scratch to final report:
  Examples\MIKE_Zero\Projects\Sound

8.2 Example: Open Existing Project and View Files

The MIKE Zero installation includes various examples for the different modules. For each example a Project File can be attached or many examples may be attached to the same Project File.

The existing project file 'The Sound Bridge.mzp'[1] is positioned inside the folder Examples\MIKE Zero\Projects\Sound. You can open this file in MIKE Zero in one of two ways

- Double-click the file from File Explorer (this will open a MIKE Zero shell with the project activated)
- Open the project file from within an already open MIKE Zero shell.

The Project Explorer now displays the folders and files contained in the project. The files are positioned in project folders, branched from the folder containing the 'Sound.mzp' file.

The File Explorer displays the files that are actually contained in the project and groups the files dependent on file type, but independent of location. The relative path of the files are included in the list.

The Project File remembers how the settings for the display of files in the Project Explorer were the last time the project was closed. For the project 'Sound', the Project Explorer view had originally expanded all branches in the project. Now try to close the folder 'Production' in the Project Explorer, so the files therein are not displayed. Thereafter, close the project. The next time you open the project you will find that the Project Explorer settings will be as you left the last time you closed the project.

To open a file in the MIKE Zero shell you just double-click the file.

8.2.1 Project Folder Description

The project file has been created based on the template 'General' and later modified by adding the 'Model Analysis' folder. The main folders in this particular template are

---

1 The file 'Hydrodynamics in the Sound.mzp' is an example of how the resulting .mzp file will look after having completed the tasks within the last example, described in the MIKE Zero Step-by-step guide .

- External Data
- Final Report
- Model
- Project Documents
- Result

The Project Documents folder has been designed to store data concerning the administration of the project, e.g. Client communication, minutes of meetings, photographs, presentations and status reports. This folder structure (with added files) will normally be active throughout the entire timeframe of the investigation.

The External Data folder has been designed to contain data such as bathymetry, measurements and other external data that provide the basis of the input parameters, and data for calibration purposes focusing on hydrodynamic modelling. This folder structure will normally just be active in the beginning of the investigation.

The Model, Result and Model Analysis folders are designed to co-exist, such that the model setups and model inputs are saved in the Model folder, the simulation results are saved in the Result folder and the analysis of the results are created and processed using the Model Analysis folder. These folders will be used during and after the numerical model simulations, thus covering both the calibration phase and the production phase.

The subfolders are named to support a hydrodynamic simulation, i.e. folder names such as Bathymetry and Boundary indicate that these data are needed to perform a simulation.

In the end the final report can be written and saved in the Final Report folder.

8.3 Example: Use Project Template to Structure MIKE 11 Data

Within the MIKE Zero Project concept lies a recommendation to sort and structure data. The method of using pre-defined Project Templates to structure model data can be applied for all sorts of projects, but in this example we want to carry out a river investigation by setting up a river model using the MIKE 11 numerical model.

The steps to create a project and import data are described in the following.

8.3.1 Introduction

The data origins from a stream (small river) in Denmark, called 'Vid-Å'. The used MIKE 11 network is outlined in Figure 8.1.
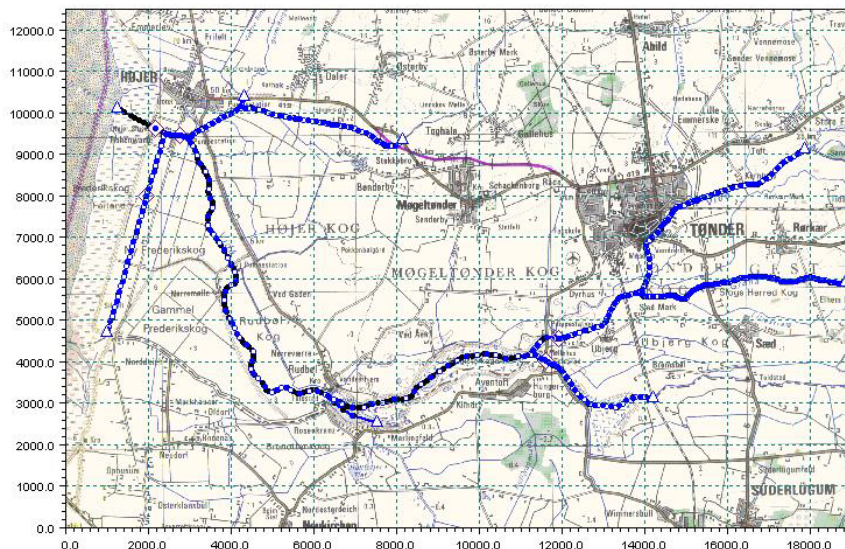
Figure 8.1   Vida, plan plot of MIKE 11 setup including background map

The Vida setup comprises a main river branch with several smaller tributaries feeding into the main river. Boundary conditions are defined as inflow hydrographs on all upstream boundaries and a downstream tidal boundary at the sea. The downstream boundary is defined by applying measured water levels covering a large number of tidal periods.

The files used are a part of the installation and located in the directory .\Examples\MIKE_ZERO\Projects\Vida

All input files required to perform the hydrodynamic computation are present. Additionally, two graphical files (.gif) are enclosed each containing a scanned map of the study area. The scanned images are provided as high and low resolution (200 dpi or 400 dpi).

8.3.2   Create MIKE Zero Project

Open the MIKE Zero shell and click File → New → Project... to open the New Project dialog.

In the New Project dialog select the Type of Project as 'General' and the template as 'General', see Figure 8.2.
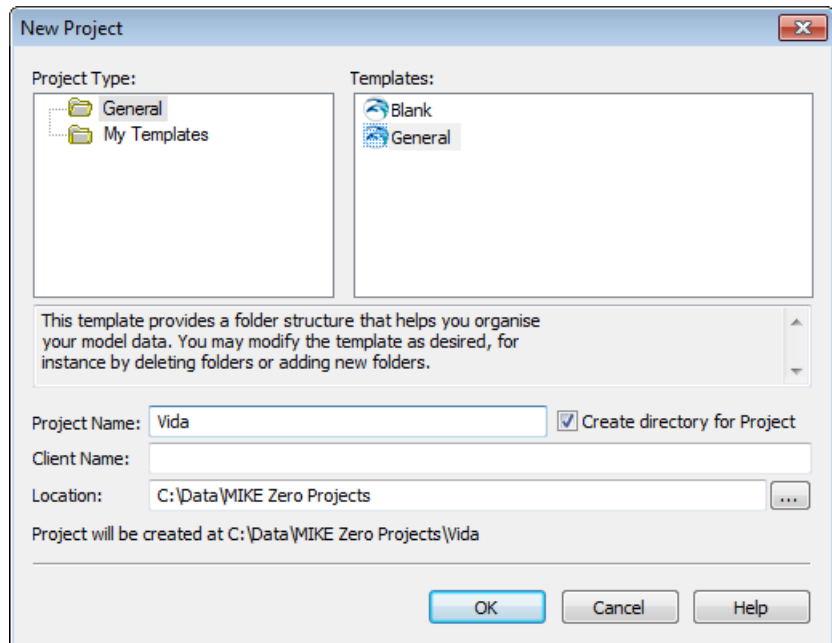
Figure 8.2   Creating New Project by selecting template for River Modelling

Specify the project name as 'Vida', enable the 'Create directory for project' and define the location on the hard disk of the project, for example 'C:\Data\MIKE Zero Projects'. This will create a folder called Vida that contains the project file.

Now you are ready to include files to the project.

8.3.3   Add Model Data

The MIKE 11 model setup consists of a number of files describing the river network, cross-sections, boundary conditions and hydrodynamic setup. These files should be located in the 'Model Inputs' folder in the Project Explorer. Some of the files are time series files, which can be saved in a subfolder named 'Time Series Data'.

First create a new folder called 'Time Series Data':

1. Right-click the folder 'Model Inputs' in the Project Explorer

2. Select 'Add Folder...' and specify the name 'Time Series Data'

3. Press OK to create the folder.

To add time series data, select 'Time Series Data' in the Project Explorer, right-click the mouse and choose 'Add Existing File' from the drop-down menu.

Select the file 'M4220h.dfs0' from the Examples directory. Write 'Water level data' in the Notes (optional) and enable the 'Make Copy' in the dialog, see Figure 8.3. After clicking OK, a copy of the file will be located in the directory 'Time series data', and the name included in the Project Explorer.
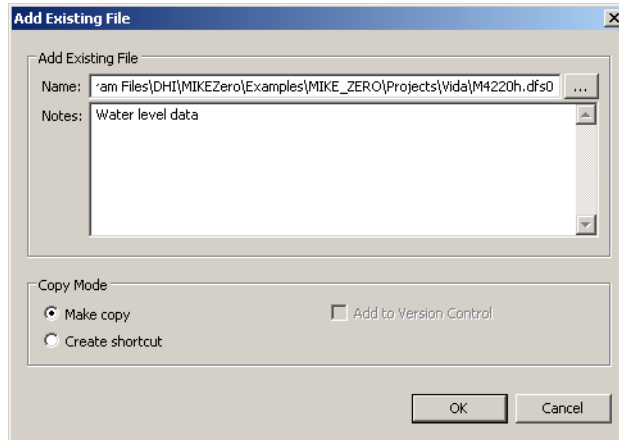
Figure 8.3   Selecting existing time series file

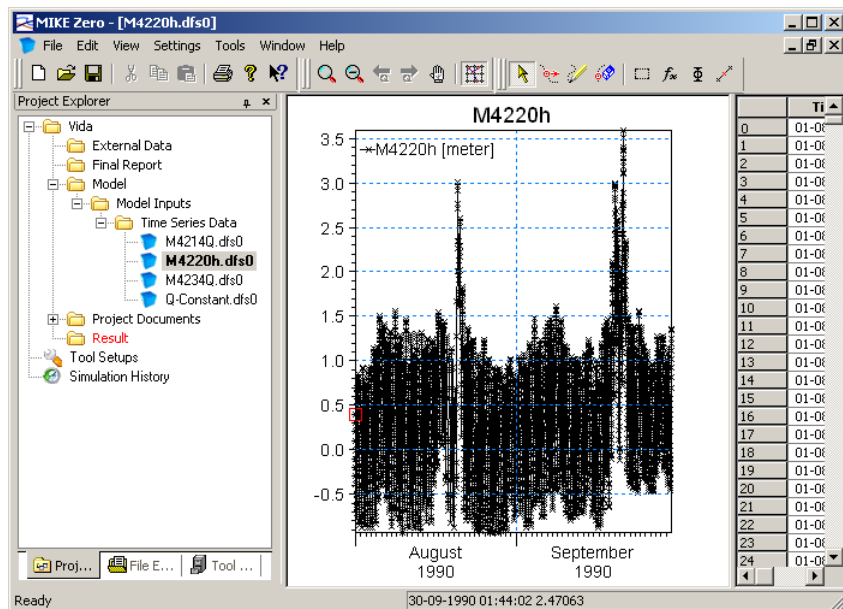After repeating the process with the remaining three time series in the example, the project in MIKE Zero will look as shown in Figure 8.4.

Figure 8.4   Project Explorer View after adding time series files.
Time series for water levels is opened by the Time Series Editor.

The model setup files should be located in the 'Model' folder. In this example the model setup files consist of 5 files with the extension .sim11, .nwk11, .xns11, .bnd11 and .hd11, respectively. To add the data, right-click the 'Model' folder and choose 'Add Existing File'. Select the files in a similar way as for the time series data.

Now the data for the MIKE 11 model simulation are included in the project. Please note that the path to the time series data files in Vida96-3.bnd11 reflects the location on the hard disk.

8.3.4   Add External Data

When creating a numerical model and presenting the numerical model results it helps the process if you can relate the numerical model to the reality. For this georeferenced background image files are frequently used.

The image files are not a part of the model simulation and they are often being used in more than one project. Furthermore, images could be relatively large in size. As such the images should be stored in a separate folder, accessible from various projects but located physically within the project directory. This can be done by the project linking to the image files instead of copying the files into the project.

When displaying a MIKE 11 network file (.nwk11) it is possible to add a background map. In this example two image files are included. The applied images is shown in Figure 8.1.

To add the image files to the project right-click 'External Data' in the Project Explorer and select 'Add Existing File'.

Select the file 'Vida200.gif' from the Examples directory. Write 'Background image' in the Notes (optional) and enable the 'Create shortcut' in the dialog, see Figure 8.5.

After clicking OK, a shortcut link to the file will be located in the directory 'Photos & Images' and the name included in the Project Explorer. The icon in the Project Explorer by the file indicate that the file is a shortcut link, see Figure 8.6. The actual target file for the shortcut link is shown in the Properties dialog for the shortcut file (right-click and select Properties).

PLEASE NOTE:
If you want to store the image file itself together with the project data you should use the option 'Make copy' instead of 'Create shortcut'.
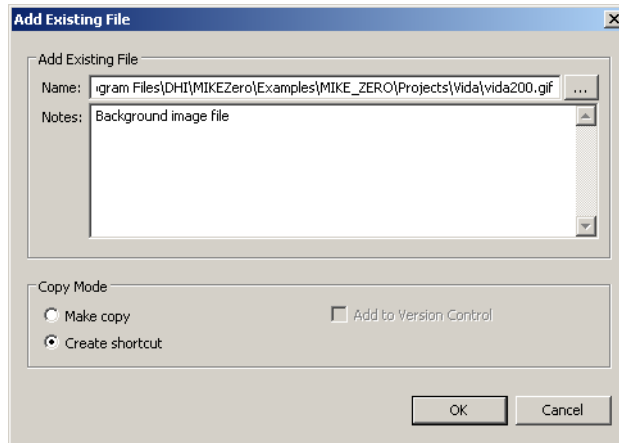
Figure 8.5   Selecting existing background image file
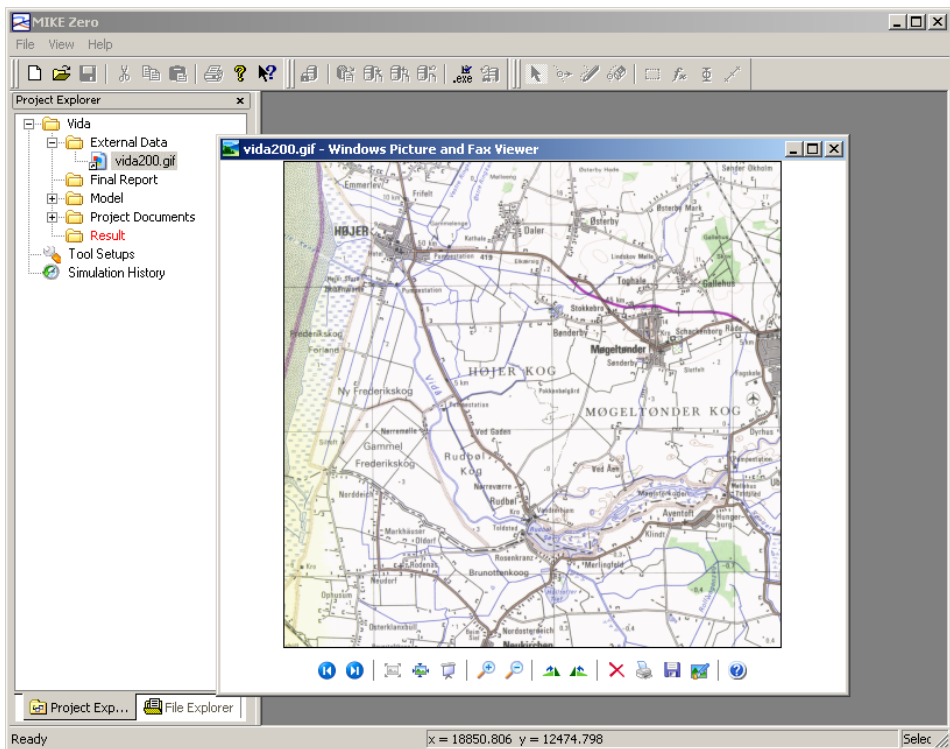

Figure 8.6   Project Explorer View after adding background image.
              The background image is opened by the computer's standard image
              viewer.

Repeat the process for all the image files (i.e. all files *.gif*).

8.3.5   Running Simulation

Now you have a MIKE Zero project file containing all the data necessary to perform a MIKE 11 simulation.

During the simulation the output data is automatically positioned in the Model Results directory and added to the project in the Project Explorer. Thus, after the project investigation has ended you know that all data relating to the project will be located in sub-directories within the 'Vida' directory, which makes it easy to save and backup.

8.4   Example: Display data from Project Map in Google Earth

In case you have Google Earth installed on your computer you have the option to export the graphics from Project Map in MIKE Zero and display the files in Google Earth.

An example is given in the following.

8.4.1   Introduction

The data origins from investigations at a number of locations around the world. The project file *Map Explorer to Google Earth.mzp* is a part of the installation as well as the files within. All the files used are located in the directory .\Examples\MIKE_ZERO\Projects\GoogleEarthDisplay.

All the files in the project have been added to Project Map for display. Thus, when opening the file in the MIKE Zero shell the files will be displayed in Project Map as shown in Figure 8.7.
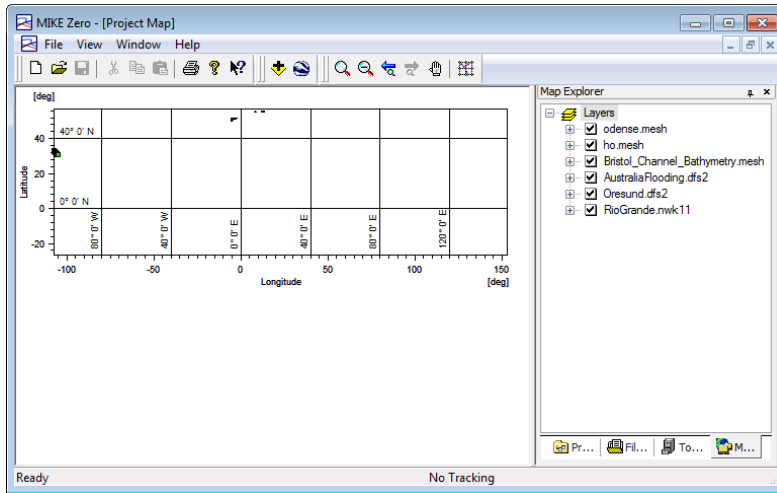
Figure 8.7   Project Map display after opening project. Map Explorer lists files.
(Note: The spatial distance between the location of the various data
files makes the individual file outlines very small)

8.4.2   Display in Google Earth

When pressing the Google Earth icon in the toolbar the program generates
an image file (.png) for each file in Map Explorer and saves the file in the
Results folder of the project, see Figure 8.8. Furthermore a .KML file is gener-
ated that contains spatial information about the generated images.
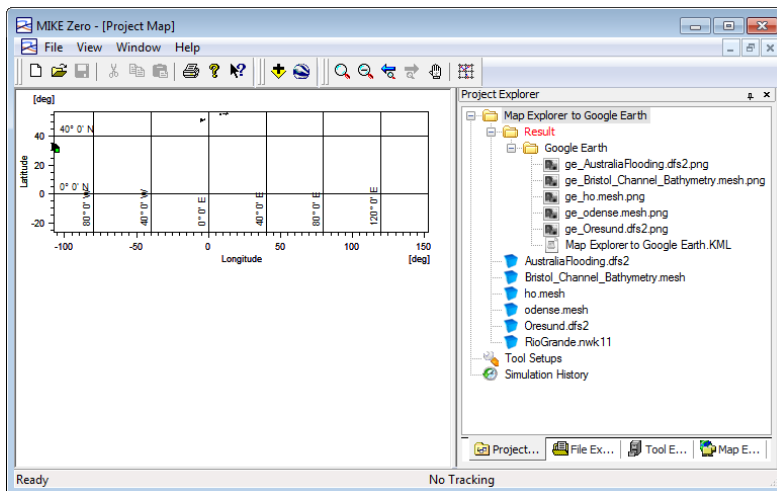
Figure 8.8   Contents of Result folder after exporting data to Google Earth.

Following this Google Earth is automatically launched in a new window with the generated images imported as Temporary places and displayed in the map, see Figure 8.9.
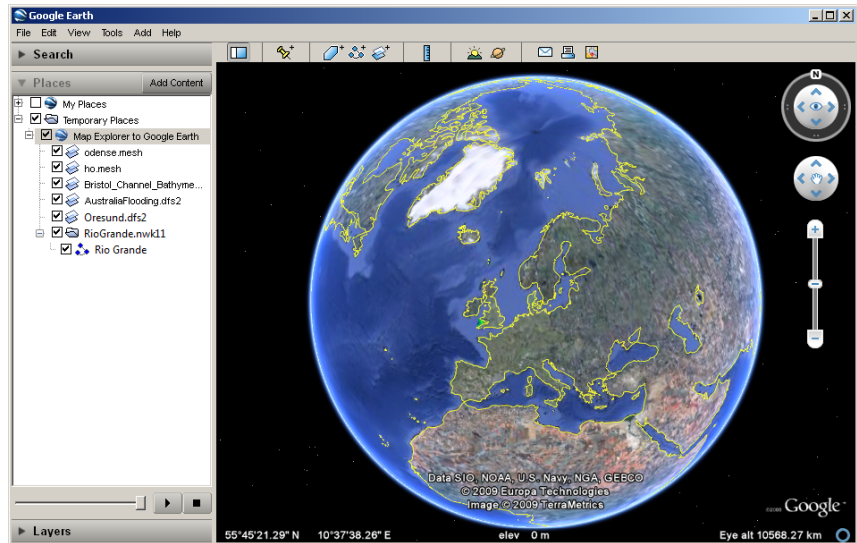
Figure 8.9   Files from Map Explorer in Google Earth

By enabling the Play Tour facility in Google Earth you will be taken on a tour around the world when Google Earth zooms into the sites where the files exported from Project Map are located, see Figure 8.10.
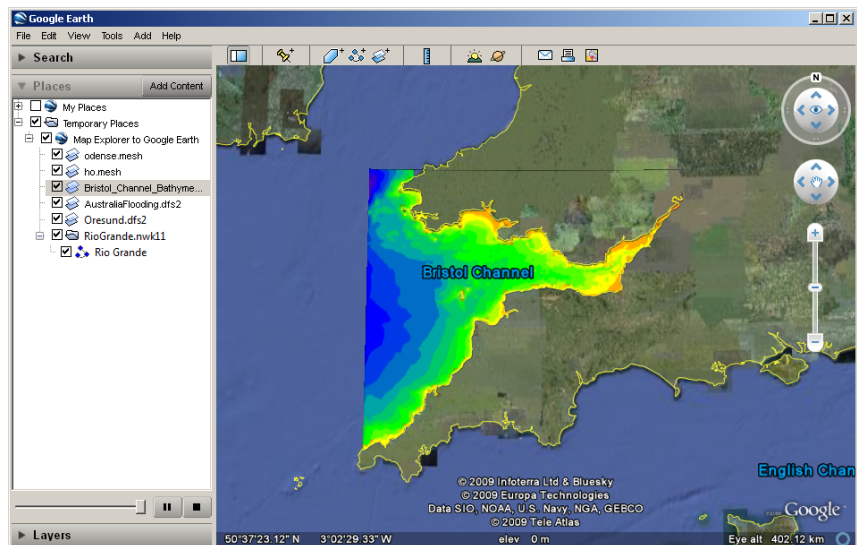
Figure 8.10   Snapshot from "Play Tour" animation in Google Earth.

8.5 Example: Project from Scratch to Final Report

The objective of this example is to create and use a MIKE Zero Project in aid of the process of creating a numerical model investigation from scratch and to the final report is presented.

An easy to follow Step-by-step Training guide is provided in a separate pdf-file which can be found in the MIKE Zero General Documentation Index via the MIKE Zero Documentation Index.

INDEX