

SPRING

Simulation of Processes
in Groundwater

SPRING-Getting Started

delta h Ingenieurgesellschaft mbH
Parkweg 67
58453 Witten
www.spring.delta-h.de
info@delta-de

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2 Introduction to SPRING 4

Welcome to SPRING 4, the latest version of the software system for groundwater modeling proven for more than 30 years.

From underground mining to water supply, groundwater remediation and geothermics: SPRING's innovative software system provides optimal support for all your planning and consulting projects.

The software system based on a development by the Ruhr University of Bochum allows you to calculate three-dimensional groundwater flow, surface water, heat and contaminant transport models.

SPRING 4 in combination with the expert knowledge and experience of our staff is the basis for making your project a success.

SPRING = Simulation of Processes in Groundwater

2.1 SPRING - Performance Features

- Finite Element method
- Any combination of 1D, 2D and 3D elements possible
- Interactive mesh generation with automatic mesh generation and mesh refining
- Outflow layers in 3D models
- Statistical calculation of fractures
- Exact representation of geological structures by means of collapsing layers
- Including tunnel structures in the calculation
- Steady-state flow / transient flow calculations
- Flow lines, calculation of path lines and travel times
- Saturated / unsaturated flow, including calculation of the unconfined surface
- Heat transport
- Density-dependent flow
- Contaminant transport, taking into account dispersion / diffusion, adsorption, production, disintegration and decay
- Transport of nuclide chains
- Reactive contaminant transport
- Simulation of flooding using box models

- Automatic calibration methods (gradient method and inverse modelling)
- Drainage flow (leakage, with limited amounts)
- Special boundary conditions for geothermal calculations
- Recharge calculation on the basis of a climatic soil water balance
- Interface with the ArcInfo software system
- Interactive control of the program sequence via SPRING'S graphic interface or via batch files
- Extensive re-editing options of the displayed results with the display of bitmap (TIFF) files and output in DXF format
- Automatic interpolation option of transient boundary conditions between the pre-defined time steps
- Output option for model data and calculation results in a freely selectable format as ASCII file.
- Automatic calibration methods
- Drainage balance, relative to the water body mesh
- Statistical calculation of the basin area

2.2 System Requirements

- Windows 7, Vista, XP
- 512 MB RAM (2 GB recommended)
- At least 300 MB available hard disk storage
- Screen resolution 1024 x 768 (1280 x 1024 recommended)

2.3 Installation

- Close all open applications.
- Insert the product CD or DVD into the appropriate drive of the computer.
- As soon as the Autoplay screen appears, follow the instructions.

Note: If the Autoplay screen is not loaded automatically, select "Computer" on the desktop, select the drive icon and finally the file "setup.exe".

The number of computers in which the software may be installed can be found in the license agreement which forms part of the software.

2.3.1 SPRING Update

Delta h makes software updates available for maintenance customers at intervals. You can download these updates conveniently via the delta h Download Centre. This requires an active Internet connection.

- In SPRING 4, click at top right on the *Help* → *Find Updates* button.
- Select Update and download it to your computer.
- Follow the enclosed installation instructions.

2.4 Program Start

To start the software, click on *Start* – *Programs* – *SPRING* or, if you have created a desktop link, double-click on the corresponding icon:



2.5 From Nature to the Model

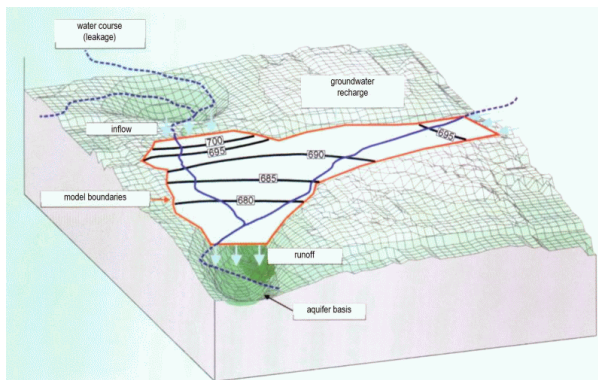


Fig. 1: From nature to the model

A groundwater model must be able to simulate real hydrogeological situations. To this end, first raw data such as groundwater measuring points and water level measurements, geological and topographic maps and other water management documentation must be collected, and the problem under investigation must be formulated.

From this follow the selection of the model boundaries and the aquifers to be included.

This is where you start working with SPRING.

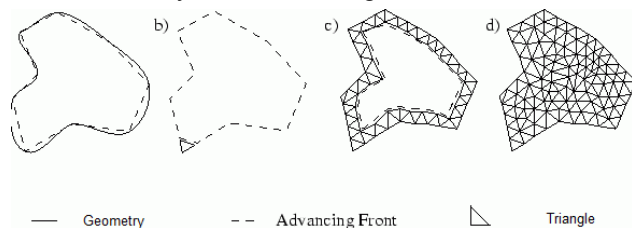


Fig. 2: From the area boundary to the model area

All raw data are read into SPRING by data export or digitisation and saved as structures. The structures are mesh-independent. The data can already be visualised at this point and subjected to a first inspection.

Systematic building of the model using SPRING can be represented by the following schematic sequence:

Data become **Structures**,
mesh-relevant **Structures** become **Contours**,
Contours become **Nodes**,
Nodes become **Elements**.

The nodes and elements of the finished FE mesh are assigned **Attributes**.

2.5.1 Structures

Structural data are points, lines and polygons, which, in addition to their geometric point information may also carry data information (attributes). A distinction is made between:

- Point structures (zero-dimensional geometry)
- Line structures (one-dimensional geometry)
- Area structures (two-dimensional geometry)

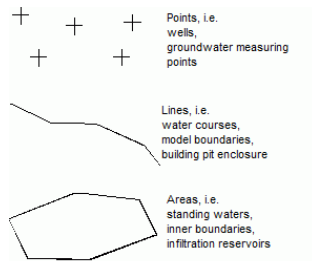




Fig. 3: Structural types

These structural types and the allocation of the corresponding information allow all data required for a groundwater model to be described, such as:

- **Point structures:**
 - Coordinates of pumping wells and disposal wells
 - Coordinates of groundwater measuring points plus groundwater levels
- **Line structures**
 - Polygon lines of the course of water course systems, including drainage levels or leakage coefficients or ex-/infiltration volumes
 - Building pit enclosure (sheet piling walls or seal walls)
 - Ditches, tunnels, navigation channels
 - Sewage and drainage systems
- **Area structures**
 - Areas of different groundwater recharge
 - Areas of different soil characteristics or hydraulic parameters
 - Standing water (lakes or ponds) with and without overflow
 - Infiltration reservoir with amount of infiltration

The structures () can be created directly on-screen (e.g. on the basis of a topographic map) or imported from existing ASCII files (e.g. *.txt, *.csv, ARC/INFO generate format or *.dxf). The structure menu also offers extensive modification options.

2.5.2 Contours

Contours () define all geometric constraint points and lines required when generating an FE mesh. They include, for example:

- the outline of the area to be modeled,

- the geometric information required in the area, such as
the course of water courses,
the location of lakes and
the exact location of wells.

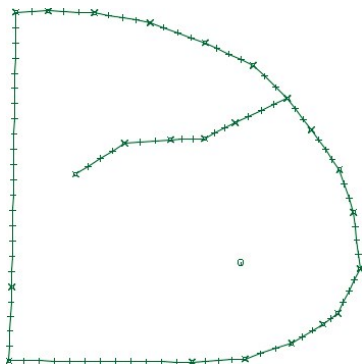


Fig. 4: Contours of a model

These constraint points and lines must be present as mesh nodes or element edges in the later FE mesh and combined in the contour.

The basis of the contour are usually the structures and the required geometric constraint points during generation of the mesh. The required components can be added by simply selecting them from the structural data (*Contour* → *New* → *From Structure*).

A basic distinction is made between

- l contours,
- k contours
- p contours

l contours are contour lines on which later on element edges will be placed.

k contours are the same lines as l contours, but are used for generating 1D fracture elements. They are generated using the program KLUFTI and contain, apart from the generation parameters provided for l contours, also the thickness and opening width of the 1D fractures. Moreover, k contours are also treated separately in boundary node generation.

p contours are contour lines on which later on mesh nodes will be placed.

The contours must be provided with parameters for further mesh generation (e.g. well parameters for exponential node generation around well nodes, maximum distances or division points for long line contours). To do this, the Contour menu offers numerous options for editing and modification.

2.5.3 Nodes

Once all contours have been adjusted, the nodes will be generated. In general, the following sequence of node generation is recommended.

- Node generation on the contours and perpendicular to the contours using 1-2 sections of the boundary node generator.

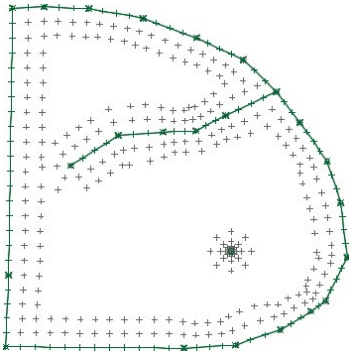


Fig. 5: Boundary node generator

- Generation of regular meshes in areas without contours

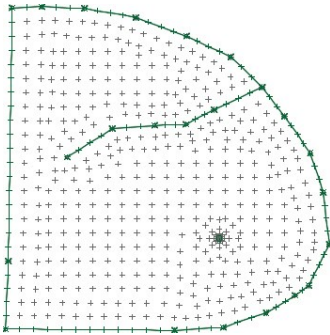


Fig. 6: Boundary node generator

- Generation of additional nodes by hand in the transition areas.
Manual movement and deletion of nodes optimize node distribution.

2.5.4 Elements

Once node generation has been completed in areas or globally, these nodes can be grouped (in areas or globally) by means of elements. The *triangulation algorithm* (advancing front) used in SPRING groups the nodes, first all triangular nodes. Then (if triangles and quadrangles are to be generated) suitable triangles are combined to quadrangles, in order to reduce the number of elements and thus the amount of calculation and memory required.

After creating the elements, there are occasionally areas in which an unfavourable mesh structure becomes only visible after grouping the nodes. These areas can be re-edited by local mesh editing (deletion of areas and regeneration of nodes and elements, combining nodes or parts of quadrangles). SPRING's Mesh menu offers various methods of editing the mesh geometry.

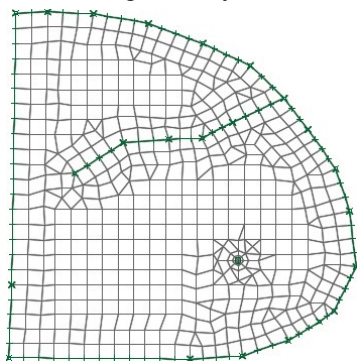


Fig. 7: Finished FE mesh

2.5.5 Attributes

Attributes contain all the data information that goes beyond the point information, such as material data, boundary conditions and auxiliary data.

Once the generation of the mesh geometry is complete and has been inspected, the nodes and elements can be assigned attributes. On the basis of the structural data, data can be assigned in one of two ways:

- Direct assignment: Node or element centres sufficiently close to the structure point containing the data information are assigned its value.
- Assignment by interpolation: On the basis of "isolated" structure data points, values will be interpolated for the nodes or element centres of the corresponding structures lying in-between.

Example:

The structure of a water course only contains water level information at the level measuring points. Any number of additional nodes containing not a water level information are located between these data points. These nodes are assigned linearly interpolated values via *Assignment by interpolation*.

Apart from assignment via structures, attributes can also be assigned to nodes or elements directly or statistically either individually or by area.

All possible attributes are listed in chapter "Description of the data types" (→ Data structure of the groundwater model).

The structure of a horizontal groundwater model is described in detail in chapter "Structure of a 2D model".

2.5.6 Calculation modules

SPRING uses for the various calculations the following program modules:

- Module for the model checking: DADIA
- Module for the calibration: EICHEN
- Module for the interpolation: INTERPOL
- Module of the steady-state flow computation: GEONEU
- Module of the transient flow computation: INSTAT
- Module for the steady-state/transient flow and/or heat- or mass transport calculation and module for the inverse calibration: SITRA
- Module for the plot generation: PLOGEO
- Module for the data export: NACHLAUF

The calculation modules of the flow calculation can be started in the SPRING user interface via the menu item *Calculation* and are described in detail in the corresponding chapter "Calculations" (p. **Fehler! Textmarke nicht definiert.**).

2.6 SPRING User Interface

The SPRING 4 user interface consists mainly of 5 areas - menu bar, toolbars, main window, status bar and project manager. The range of functions of all areas depends on the currently open project type. If commands in a menu, in a view or at a certain point in the project are not available, they are shown in grey and are inactive or are not shown.

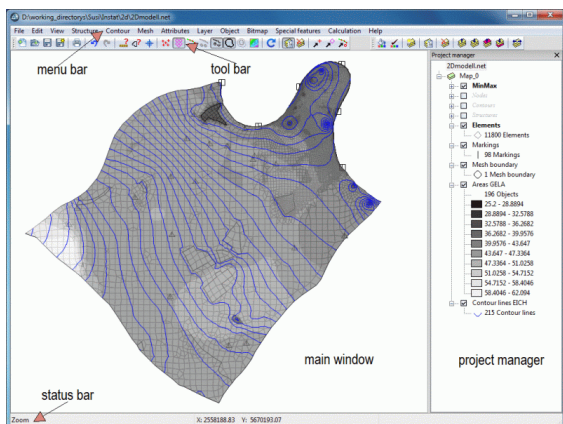
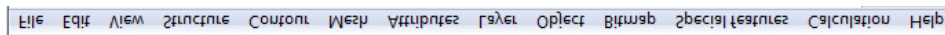


Fig. 8: SPRING User Interface

2.6.1 Menu bar

The menu bar gives access to most SPRING features:



Upon selection of some menu commands, a submenu is displayed containing a list of additional options. Such menu commands have an arrow on the right of the command name pointing to the right.

With some menu commands, a dialog box is displayed in which you have to enter more information for the command to be executed. These commands are marked with three suspension marks (...) following the name of the command.

Some menu commands can be displayed directly by pressing a special key abbreviation or key combination (Ctrl+KEY). For commands that have been assigned a key abbreviation, the key abbreviation or key combination is shown on the right of the command. Thus, for example, the last action can be undone by pressing the key combination Ctrl+Z, and the last menu command can be repeated by pressing F12.

Menu bar:

- **File** The File menu is used to Open/Save/Finish projects, for data import/export, for adding/superimposing plots, for creating plots or for printing.
- **Edit** The Edit menu is used to Restore/Undo editing steps, for project editing and for loading program options.

- **View** The View menu is used to Display/Hide layers/toolbars/3D displays and for creating vertical cuts.
- **Structure** The Structure menu is used for creating and editing the structural data, for example reading in digital data on a line structure.
- **Contour** The Contour menu is used for editing the contour elements.
- **Mesh** The Mesh menu is used for creating and editing meshes, for example mesh generator.
- **Attributes** The Attributes menu is used for editing data attributes, for example copying or calculating data types.
- **Layer** The Layer menu is used for managing the graphic layers.
- **Object** The Object menu is used for editing graphic objects, for example duplicating or moving individual objects.
- **Bitmap** The Bitmap menu is used for editing or saving graphic files, for example tiff files.
- **Special features** The Special features menu gives access to special program functions for water meshes, transient program parameters, fractures or tunnels.
- **Calculation** The Calculation menu is used to start SPRING's calculation tools.
- **Help** The Help menu gives access to the program help and is used to start updates.

2.6.2 Toolbars

The toolbars (see figure below) contain buttons for quick access to the most important menu commands. The name of the command is displayed when the mouse pointer is placed over the button.

The buttons of the toolbars are arranged in groups. In the *View* → *Toolbars* dialog box, you can set which toolbar groups you want to have displayed. These settings apply to the current view and will be saved when the program is finished. The toolbar groups can also be dragged to a different position of the graphic user interface by clicking on the drag point on the left-hand side of the toolbar and moving it to the desired position while holding down the left mouse button. When the toolbar is dropped in the central area of the application window, it is undocked and shown freely floating; when the toolbar is dropped at the edge of the application window, the toolbar will be docked to this position. The following figure shows the toolbar "standard":



The other toolbars are shown in chapter "SPRING-menus - View - Toolbars" (p. **Fehler! Textmarke nicht definiert.**).

2.6.3 Status bar


The three-part status bar is located at the bottom edge of the application window (see figure). It shows the following information: (left) current input mode, (centre) world coordinates of the mouse pointer, (right) information on menu commands and command buttons in the toolbars when placing the cursor over them.



2.6.4 Main window

The main window is used for creating, editing and visualizing element meshes and plots and is SPRING's centrepiece.


2.6.5 Project manager

The project manager is started by clicking on *View* → *Additional windows* → *Project manager* or by selecting the symbol . It visualizes the arrangement of open Maps/Layers of the active project and their legends and allows easy manipulation of the Maps/Layers via drag&drop.

A project is a collection of maps, layers, objects and other resources related to one another via a tree structure. At their specific level, they can be added in any number. An exception is the mesh editing mode, in which only one map is allowed.

For example, the figure below contains a project named Witten.net with Map_0, which in turn is subdivided into various layers, for example mesh boundary, marks or elements. The GELA (ground level surface) layer is folded up and shows the legend of the isoareas shown in the main window.

Only a single project can be open in the project manager. Upon creating a new project or opening an existing one, the project currently open in the project window will be replaced with the new one.

After modifying a project, the project must be saved (by selecting the command *File* → *Save* or the symbol ).

The commands for Maps/Layers are available in the menu bar under the same names. The project manager makes some functions available in context menus (to open them, click on the appropriate entry) (see figure).

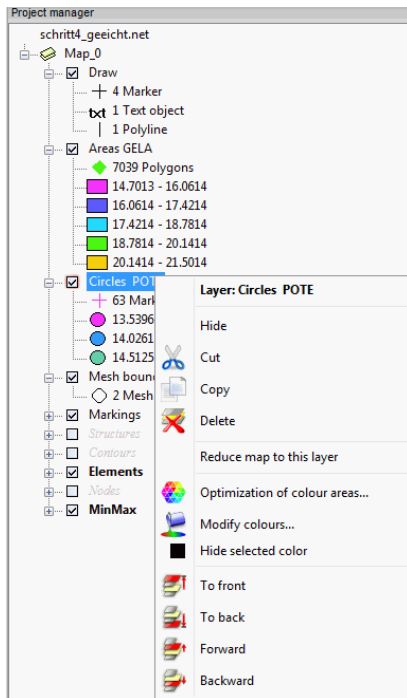


Fig. 9: Project manager in the mode model file

In the project manager, Maps/Layers can be dragged to a different position (drag&drop). A layer can be dragged to a different map, but cannot be moved to a different layer. To delete a selected layer, press the "Del" key.

Maps and layers are "semantic folders" which do not constitute a logical file grouping and do not have to coincide with hierarchical organisation of files on your hard disk.

Layers can correspond to physical files (e.g. tiff maps) located in your file system and are directly related to them. Layers of this type are displayed in the project window with their path specification.

In the mode plot file, it is possible to edit the object of the individual layers (right mouse button). For example, it is possible to remove all polylines of a layer simultaneously, or the values of the object properties (defined before in the menu options) are assigned to all of the polylines.

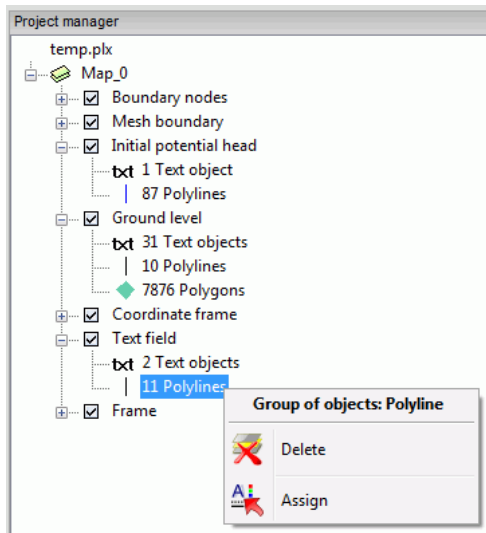


Fig. 10: Project manager in the mode plot file

2.6.6 Project information

The project information window provides an overview of the most important project properties.

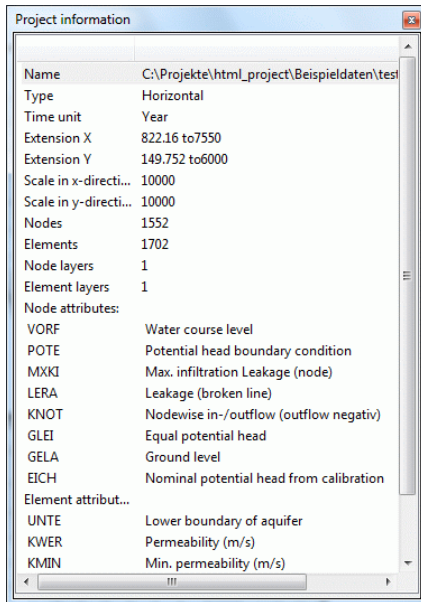


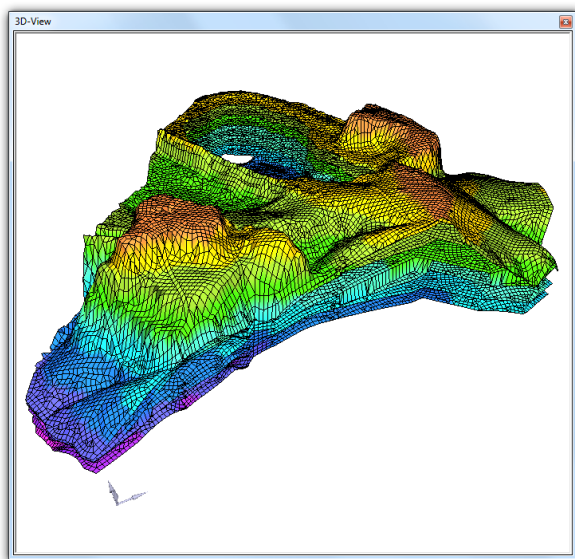
Fig. 11: Project information

2.6.7 3D View

The 3D view displays the element mesh opened in the mesh editing mode three-dimensionally.

Navigation:

- **Zoom** Mouse wheel
- **Rotation** Left mouse button + Movement of the mouse in the x or y direction
- **Shift** Middle mouse button + Movement of the mouse in the x or y direction
- **z scaling** Ctrl + mouse wheel
- **Reset** Middle mouse button



The presentation can be changed with the help of the buttons of the toolbar in the main window (below).



The element mesh, the element areas, the 1D-fractures, the mesh of 2D-fractures or the areas of the 2D-fractures can be displayed. The current 3D view can be exported as a bitmap.

2.6.8 Vertical section

In the mesh editing mode, the vertical section window shows a vertical section through the model with a straight line between two selected points.

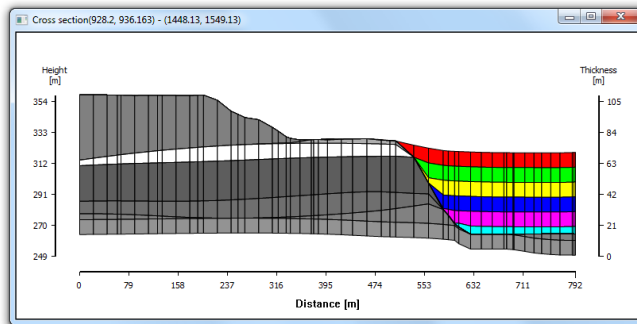


Fig. 12: Vertical section

2.6.9 Settings

SPRING 4 can be configured by means of various settings and options. The settings are described in detail in chapter *SPRING menus* → *Edit* → *Options*.

2.7 New functions

In addition to the newly developed graphic user interface, changes have been made to individual menu items and various additional functions have been incorporated, which make working with SPRING very convenient. The most important changes are described in the following chapters.

2.7.1 Newly developed graphic user interface

The newly developed graphic user interface has the following advantages:

- Full support of Microsoft Windows 7
- Native support of 64-bit processors (Windows 64/Linux x64)
- OpenGL support for 3D visualisation
- Multi-language support
- Internet update
- Independently of Display Managers

Apart from the general advantages of program changes, SPRING's new user interface offers the following:

- Merging of mesh and plot editing in a common interface
The new SPRING software presents itself with a completely newly developed interface. Merging mesh and plot editing allows short training periods and intuitive work sequences.
- "Intelligent menus"
The available menu items adapt themselves to the current processing status by means of context-sensitive activation/deactivation.
Dialogs are predefined with "valid" max./min. values. Erroneous entries are automatically corrected, if possible.
- Transparent program windows
If desired, program windows can be displayed transparently, thus allowing the project to be viewed even when dialogs are open. The user can adjust the degree of transparency him-/herself
- Dockable dialog windows and toolbars
Individual docking of dialog windows and toolbars allows the user interface to be adjusted to the task at hand. For a clear view of the working area, toolbars that are not required can be hidden. The arrangement is maintained, even after finishing SPRING, and is restored the next time the program is started.
- Convenient mouse functions
Zooming with the mouse wheel and moving the project with the middle mouse button.
- Buffered display
By buffering the frame buffer of the graphic card memory, the display is accelerated and a flickering screen avoided.
- True WYSIWYG
The open document is now displayed during editing in exactly the same way as it looks when it is printed out or visualised in a graphics file.
- Coordinate display in status bar
Permanent display of the world coordinates of the mouse pointer in the status bar.
- A scale bar can be activated
The adaptive scale bar allows simple size comparisons during editing over all zoom levels.
- Bookmarks for zoom sizes
Zoom sizes can be saved during a session for quick restore.
- By drag&drop into the program window

All files superimposable in SPRING (e.g. mesh files/plots/bitmap graphics/csv files) can be dragged into the program window by drag&drop and are superimposed on the map located below the cursor.

- File history
Allows quick access to the documents opened last.
- Undo/Redo for many actions
A large number of entries can be undone or restored in SPRING. Depending on the complexity of the action, no undo is possible or only a single-step undo up to the undoing of all working steps is possible.
- Shortcuts
Shortcuts for selected program functions.
- Project information window
Visualizes the most important project parameters at a glance.
- Project manager
Shows a clear arrangement of the map/layer structure of the open document in a tree structure and allows simple editing. Intuitive drag&drop allows adjustment of the sequence. Context menus (right click) allow quick access to the most important editing actions (e.g. copy/delete). By folding it open, further information can be displayed (e.g. legends), if required.
- 3D view/vertical section in the mesh editing mode
During mesh editing, the user has access to the 3D view and any positionable vertical sections, allowing possible mesh errors to be quickly detected.
- 2D/3D fracture visualisation
Fractures can be visualised both in 2D top view and in a 3D view.
- 2nd graphics system supports antialiasing and transparency effects

2.7.2 New features in the individual menu items

File

- Import of partial meshes
The integration of partial meshes into a global mesh allows very large meshes to be edited, thus saving computer resources and allowing simple variant studies.
- Direct bitmap graphic export
The current display in the program window can be saved at any time as a bitmap graphic (TIFF/JPEG).
- Printing
Printing is possible at any time, not only in plot mode.

- Interface with Tecplot
Selected or all model and result data can be exported to the Tecplot format for visualisation.
- Project modification
Closing the mesh no longer required.
- Superimposing file
DXF/SHP files can now also be superimposed in the mesh editing mode.
- File attachment
Files can now also be attached in plot mode on the left or at the bottom.

Structures

- Extensively parameterizable import of dxf/shp files
Structures can now be extensively parameterised and, if required, excluded prior to import from the dxf or shp format.
- Intuitive structure list
The new structure list has been optimised for very large numbers of structures (e.g. following dxf import) and offers the user extensive sorting options.
- Optimised selection tools
The selection tools have been improved and allow, apart from deselection by reselection, inversion of the selected area.
- Quick generation of special structural geometries
Parallels to existing structures can be generated specifying distance and selecting the reference direction, as required, for example, for integrating seal walls.
Circular structures can be generated by simple parameterisation.
Automatic generation of a structure from the mesh boundary and the terrain surface (attribute GELA).
- Structure coarsening in the area
- Export of structures
- Structure for water course system
- When selecting the structure view, it can be selected according to the type of structure (line, point or area), without having to use a list.
- New function: "Display structure texts"
- New function: "Direction arrows" and their display size (zoon in direction arrow/zoom out direction arrow) are new

Contours

- Fracture contours

Fracture contours (k contours) can now be generated and parameterised directly in SPRING.

Mesh

- Support for "Triangle" mesh generator
SPRING allows generation of element meshes using the external mesh generator Triangle (by Jonathan Richard Shewchuk). For licensing reasons, it will be delivered as external binary and with source text.
- Mesh refinement in the area of structures
Element meshes can be refined in SPRING also in the area of structures.
- Additional function: 3D layer division
The "Layer division" function can now also be applied to several layers or to all layers simultaneously.
In addition, layers can now also be divided at a predefined height value.

Attributes

- Automatic correction of overlapping layers:
Node layers can now be checked for overlapping and the nodes merged automatically if needed (from top to bottom or opposite).
- "Nearest Neighbour" interpolation method
SPRING has been extended by the "Nearest Neighbour" interpolation method. This method assigns each node or each element the value of its nearest neighbour. This method results in a "layered" appearance of the final result. Owing to its simplicity, the algorithm is extremely quick and plays out its strengths especially when digital ground models of very high resolution are assigned.
- Advanced import options
SPRING offers the option to import calculation results from ongoing/aborted calculation runs. This allows errors to be detected and minimised already at the calculation stage. In addition to that, model data records can now also be imported from background files.
- Export of attributes in the structure format
For simple further processing in the structure format, attributes can also be exported coordinate-related.
- Visualisation of assigned hydrographs
Imported hydrographs can be conveniently displayed as a diagram during editing.

Object

- With immediate effect, objects can also be edited in the mesh editing mode.

Special features

Although some of the tools available to the user are functional, at the present time some of them are still at the "experimental stage".

- Water course system grouping related to the direction of flow
 - Automatic detection and grouping (incidence) of grouped water course systems.
 - Wizard functions for testing and adjusting the raw data with respect to the direction of flow.
 - Balancing of the exchange volumes between water course system and groundwater, taking into account the water resources.
 - Definition of the added (water treatment plant) and removed amounts (water works) at water course system nodes.
 - Determination of the water levels by simple parameterisation of the water course properties.
- Improved handling of transient boundary conditions
- Simple integration of fractures/tunnels in element meshes
 - SPRING offers tools for simple integration of constraint geometries such as tunnel constructions into three-dimensional element meshes, taking into account changes in topography and geological layers. This allows errors to be minimised when integrating fractures or tunnel constructions.

Calculation

- Completely newly designed interface of the calculation modules
- Combination of the calculation modules
 - The calculation modules are combined, requiring the user first to decide which type of calculation (contaminant transport, density-dependent, heat...) is to be carried out. The abstract names (SITRA, GEONEU,...) have been integrated into the individual dialogs.
- Interpolation using Kriging methods
 - Improvement in graphic processing during interactive generation of a variogram.

Plot generation

- Separation of the plot options
- "Points" additional visualisation mode
- Hydrograph plot using further dialog-based settings
- Measured data can be displayed dialog-based as bar since SPRING 4
- No limit to the measured/calculated data records to be plotted

Data Export

- Separation of the individual data export options
- Dialog-based data export in TECPLOT format

Other

- New help system
The new program help was compiled in the Microsoft CHM (Compiled HTML) format and allows convenient use, including a table of contents, keyword index and full text search function.
- Central options dialog
The new options dialog allows configuration of all SPRING settings, including dialog-based composition of colour charts.
- Colour chart import in the Golden Software Surfer format
Colour charts can be imported in the Golden Software Surfer Colour Scale format. "Missing" colour values will be automatically interpolated.

2.7.3 New features in the calculation modules

Flow

- Output of relative permeabilities
The calculated relative permeabilities can be read as result data.
- Variable memory term calculation
Option to calculate the memory term via the van Genuchten parameters or porosity with variably saturated calculation
- Accuracies (residual and iteration difference) can now also be predefined in GEONEU when using the iterative equation solver.

Decay and production

- Half-lives
Calculation of radioactive decay or biodegradation via the half-life.
- Triangle function
When the material parameters are zoned, a triangle function for the decay or production rate can be entered as additional 4th order function, which, after reaching a maximum, drops again until reaching the upper limit. This is followed by setting the decay or production to 0.

2.8 Help

The complete documentation of the current SPRING version is available under Help. It is a browser-based system which can be accessed via *Help* → *Manual*. The help topics are updated with the update of the software, so that the latest information is always available.

Important: The Online Help contains all information from the printed user manuals and additional information not available in printed form. A complete PDF version of the printed manual is contained on the product CD or DVD. The latest version is always available to download on our website spring.delta-h.de under Download&Support: Manual SPRING 4.1 (EN).

2.9 Support

If you have concluded a maintenance agreement, you can contact your personal telephone support if you have questions on the installation or detect any product errors. Further information and contact addresses can be found in the Support area of the delta h website.

www.delta-h.de Telephone: 0049-2302-91406-0

email: dh@delta-h.de

The Support area of the delta h website also contains information on troubleshooting and allows you to access the Support database, list of frequently asked questions (FAQ) and many more sources of information. Information on training courses/conferences for delta h products is also found on the website.

3 Notices