hydrosconsult
Hydrology and Geomatics for Water Resources Management

GHC
Tools and interfaces for data management

DEM
Digital Elevation Model for Smallworld GIS

The digital elevation model (DEM), together with other surface models, is an important component for the direct assessment and representation of a particular terrain situation in project design and for customer information.

The Product

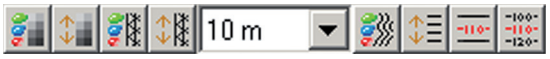
The module offers a straightforward and inter-divisional integration of DEMs into the Smallworld GIS. It is based on the Smallworld's core modules TIN (Triangular Irregular Network) and Raster, which have been considerably enhanced. The data model allows for the flexible administration, management and visualization of all relevant elevation information in the Smallworld database. It has been specifically designed for the performance-optimized handling of large date volumes. Visualizations of several hundreds of square miles can be carried out with a resolution of a few square feet. Despite the administration of the datasets as tiles/area segments, smooth visibility control is warranted with seamless transitions on tile boundaries.
Further to the flexible data model for TINs, raster and contour line objects, the product is well equipped with tools for the efficient processing of elevation data. Professional visualization tools with target-oriented, user-defined customizations of the relief representations are integrated. In addition, a central task manager for optimized data import and convenient data administration is at your command. With these powerful visualization and analysis tools, the package represents a valuable instrument for planning and development.

GHC DEM Tools

The DEM implements modern cartographic methods to visualize the relief with area, line and point representations. As result hypsometric layers, hill shading, contour line systems and fields of elevation points can be visualized independently or in combination. In addition to the rich customization options for the graphical design, color scales, interval aggregation and contour line labels support of the NRM-legend and the layout tool is part of the overall concept.

The following tools are integrated:

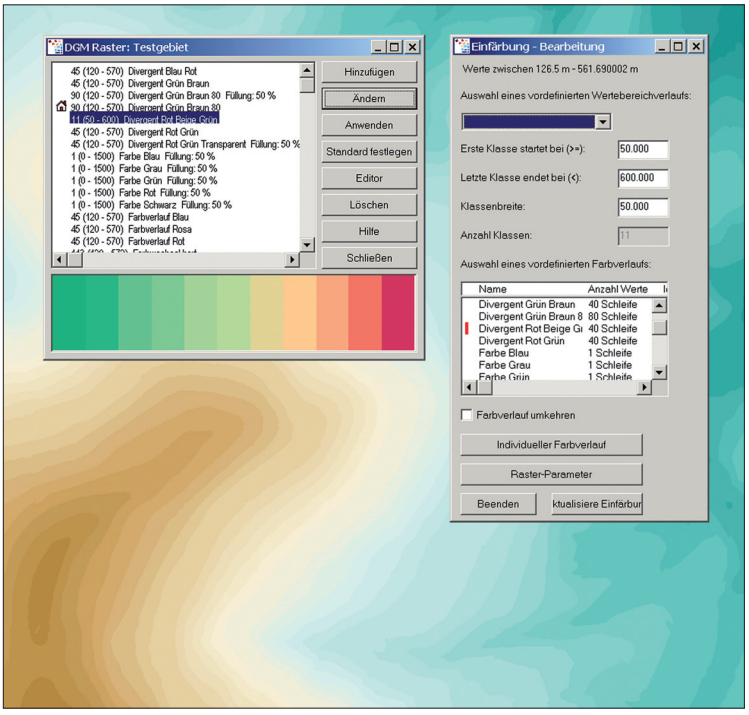
(1) (2) (3) (4) (5) (6) (7) (8)



- Coloring and interval aggregation for raster contour layers (1)
- Optimization and dynamic adjustment of intervals for raster contour layers dependent on the DEM segment in the graphics window (2)
- Coloring and interval aggregation for TIN contour layers (3)
- Optimization of intervals for TIN contour layers (4)
- Coloring and shape variation of contour lines with optional interval aggregation (5)
- Interval optimization for contour lines (6)
- Insertion of contour line elevation labels, replacement (7) and supplementation (8) of existing labels

Elevation Raster (Colored Contour Layers)

The map visualization of altitude information is integrated using the object classes Raster and TIN. Raster objects are intended for the representation of the relief on the smaller map scales. Various levels of display generalization allow for the accelerated user-friendly screen refreshment. The TIN representation of large-scale map sections (1 : 1000 and beyond) yields smooth and seamless transitions of the elevation levels.



Contour layer plot from raster objects with colouring and interval aggregation tool.

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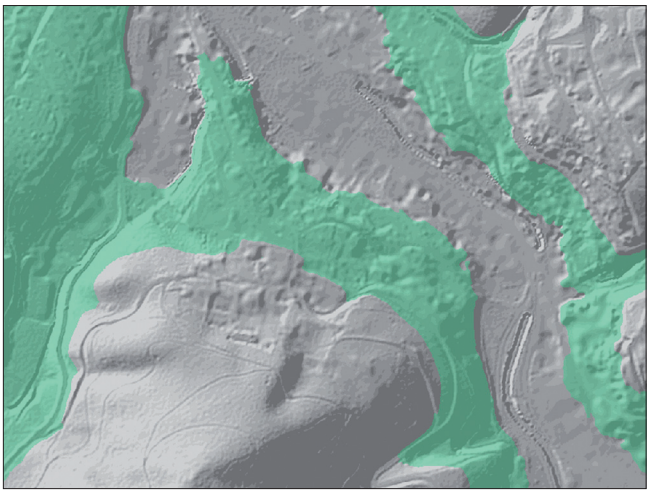


Hill shading overlaying a selected transparent altitude range.

Contour Lines

The data model holds contour lines as independent line geometries. Contour lines are administrated via object classes in groups, which are defined by their equidistance. Contour line elevation labels can be displayed together with their respective elevation system. Their positioning on the map can be controlled individually. Through direct access to line objects, main and secondary contour lines can be distinguished using customizable line widths and styles.

Elevation Point Fields

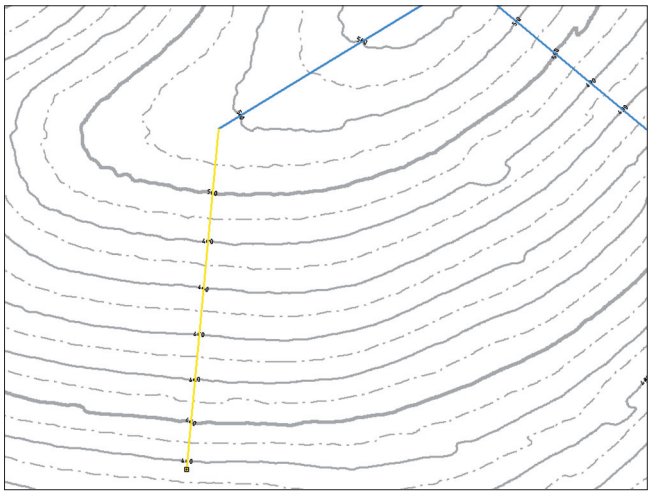
With spatially distributed elevation points, the DGM module implements another option for qualitative assessments. Two variations exist: The distribution of elevation points can be area-wide or constrained to certain map sections, which are user-defined by areas or line segments. The density of the point network can be adapted. In addition, the points can be labels with their elevation.

Terrain Cross-Section

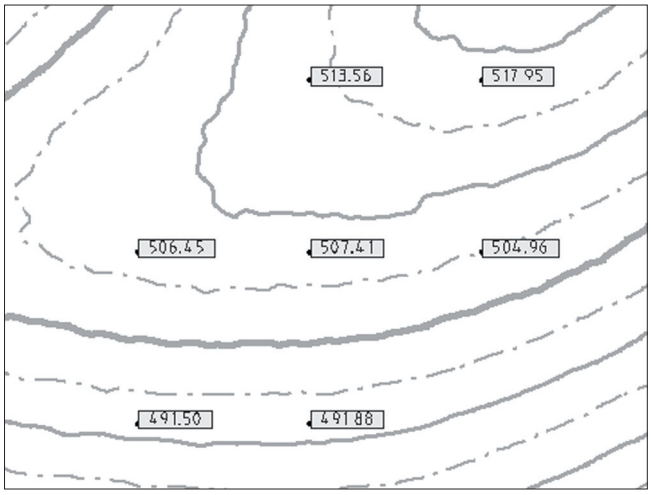
Another valuable analysis method is the capability to create terrain cross-sections along user defined line segments. Both raster and TIN maps support this function. After the definition of the reference line in the main window, the function “reference line points” displays a list of point coordinates. This list can be exported to MSExcel® where the cross-section with the Earth’s surface can be plotted as a point xy diagram.

Hill Shading

Based on elevation rasters and TINs, relief shading for a true-to-life three-dimensional impression can be integrated in the map, which yields a detailed and descriptive view of the terrain. This is beneficial for digitalization tasks and as content for topographic base maps that are used for planning and development.



Contour line system with reference line for the construction of elevation line labels.



Elevation point field with the selective method.

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